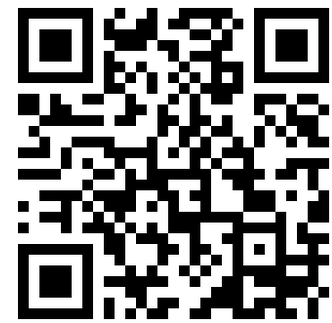

H. O. PUB. NO. 214

VOL. III

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

LATITUDES 20° — 29°, INCLUSIVE

U. S. NAVY HYDROGRAPHIC OFFICE

SPEED-TIME-DISTANCE TABLE

SPEED IN KNOTS

TIME

Min.	Hr.	28	29	30	31	32	33	34	35	36	37	38	39	40	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1	.017	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	.033	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	.050	1.4	1.4	1.5	1.6	1.6	1.6	1.7	1.8	1.8	1.8	1.9	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	.067	1.9	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
5	.083	2.3	2.4	2.5	2.6	2.7	2.8	2.8	2.9	3.0	3.1	3.2	3.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
6	.100	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
7	.117	3.3	3.4	3.5	3.6	3.7	3.8	4.0	4.1	4.2	4.3	4.4	4.6	4.7	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
8	.133	3.7	3.9	4.0	4.1	4.3	4.4	4.5	4.7	4.8	4.9	5.1	5.2	5.3	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9	.150	4.2	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.4	5.6	5.7	5.8	6.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
10	.167	4.7	4.8	5.0	5.2	5.3	5.5	5.7	5.8	6.0	6.2	6.3	6.5	6.7	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
11	.183	5.1	5.3	5.5	5.7	5.9	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
12	.200	5.6	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
13	.217	6.1	6.3	6.5	6.7	6.9	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.7	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
14	.233	6.5	6.8	7.0	7.2	7.5	7.7	7.9	8.2	8.4	8.6	8.9	9.1	9.3	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
15	.250	7.0	7.2	7.5	7.8	8.0	8.2	8.5	8.8	9.0	9.2	9.5	9.8	10.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
16	.267	7.5	7.7	8.0	8.3	8.5	8.8	9.1	9.3	9.6	9.9	10.1	10.4	10.7	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
17	.283	7.9	8.2	8.5	8.8	9.1	9.4	9.6	9.9	10.2	10.5	10.8	11.0	11.3	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
18	.300	8.4	8.7	9.0	9.3	9.6	9.9	10.2	10.5	10.8	11.1	11.4	11.7	12.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
19	.317	8.9	9.2	9.5	9.8	10.1	10.4	10.8	11.1	11.4	11.7	12.0	12.4	12.7	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
20	.333	9.3	9.7	10.0	10.3	10.7	11.0	11.3	11.7	12.0	12.3	12.7	13.0	13.3	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
21	.350	9.8	10.2	10.5	10.8	11.2	11.6	11.9	12.2	12.6	13.0	13.3	13.6	14.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
22	.367	10.3	10.6	11.0	11.4	11.7	12.1	12.5	12.8	13.2	13.6	13.9	14.3	14.7	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
23	.383	10.7	11.1	11.5	11.9	12.3	12.6	13.0	13.4	13.8	14.2	14.6	15.0	15.3	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
24	.400	11.2	11.6	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
25	.417	11.7	12.1	12.5	12.9	13.3	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.7	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
26	.433	12.1	12.6	13.0	13.4	13.9	14.3	14.7	15.2	15.6	16.0	16.5	16.9	17.3	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4
27	.450	12.6	13.0	13.5	14.0	14.4	14.8	15.3	15.8	16.2	16.6	17.1	17.6	18.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
28	.467	13.1	13.5	14.0	14.5	14.9	15.4	15.9	16.3	16.8	17.3	17.7	18.2	18.7	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
29	.483	13.5	14.0	14.5	15.0	15.5	16.0	16.4	16.9	17.4	17.9	18.4	18.8	19.3	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
30	.500	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5
31	.517	14.5	15.0	15.5	16.0	16.5	17.0	17.6	18.1	18.6	19.1	19.6	20.2	20.7	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
32	.533	14.9	15.5	16.0	16.5	17.1	17.6	18.1	18.7	19.2	19.7	20.3	20.8	21.3	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
33	.550	15.4	16.0	16.5	17.0	17.6	18.2	18.7	19.2	19.8	20.4	20.9	21.4	22.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
34	.567	15.9	16.4	17.0	17.6	18.1	18.7	19.3	19.8	20.4	21.0	21.5	22.1	22.7	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
35	.583	16.3	16.9	17.5	18.1	18.7	19.2	19.8	20.4	21.0	21.6	22.2	22.8	23.3	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
36	.600	16.8	17.4	18.0	18.6	19.2	19.8	20.4	21.0	21.6	22.2	22.8	23.4	24.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
37	.617	17.3	17.9	18.5	19.1	19.7	20.4	21.0	21.6	22.2	22.8	23.4	24.0	24.7	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6
38	.633	17.7	18.4	19.0	19.6	20.3	20.9	21.5	22.2	22.8	23.4	24.1	24.7	25.3	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
39	.650	18.2	18.8	19.5	20.2	20.8	21.4	22.1	22.8	23.4	24.0	24.7	25.4	26.0	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6
40	.667	18.7	19.3	20.0	20.7	21.3	22.0	22.7	23.3	24.0	24.7	25.3	26.0	26.7	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
41	.683	19.1	19.8	20.5	21.2	21.9	22.6	23.2	23.9	24.6	25.3	26.0	26.6	27.3	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
42	.700	19.6	20.3	21.0	21.7	22.4	23.1	23.8	24.5	25.2	25.9	26.6	27.3	28.0	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7
43	.717	20.1	20.8	21.5	22.2	22.9	23.6	24.4	25.1	25.8	26.5	27.2	28.0	28.7	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7
44	.733	20.5	21.3	22.0	22.7	23.5	24.2	24.9	25.7	26.4	27.1	27.9	28.6	29.3	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7
45	.750	21.0	21.8	22.5	23.2	24.0	24.8	25.5	26.2	27.0	27.8	28.5	29.2	30.0	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8
46	.767	21.5	22.2	23.0	23.8	24.5	25.3	26.1	26.8	27.6	28.4	29.1	29.9	30.7	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
47	.783	21.9	22.7	23.5	24.3	25.1	25.8	26.6	27.4	28.2	29.0	29.8	30.6	31.3	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
48	.800	22.4	23.2	24.0	24.8	25.6	26.4	27.2	28.0	28.8	29.6	30.4	31.2	32.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8
49	.817	22.9	23.7	24.5	25.3	26.1	27.0	27.8	28.6	29.4	30.2	31.0	31.8	32.7	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8
50	.833	23.3	24.2	25.0	25.8	26.7	27.5	28.3	29.2	30.0	30.8	31.7	32.5	33.3	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8
51	.850	23.8	24.6	25.5	26.4	27.2	28.0	28.9	29.8	30.6	31.4	32.3	33.2	34.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.8
52	.867	24.3	25.1	26.0	26.9	27.7	28.6	29.5	30.3	31.2	32.1	32.9	33.8	34.7	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9
53	.883	24.7	25.6	26.5	27.4	28.3	29.2	30.0	30.9	31.8	32.7	33.6	34.4	35.3	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9
54	.900	25.2	26.1	27.0	27.9	28.8	29.7	30.6	31.5	32.4	33.3	34.2	35.1	36.0	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9
55	.917	25.7	26.6	27.5	28.4	29.3	30.2	31.2	32.1	33.0	33.9	34.8	35.8	36.7	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.9
56	.933	26.1	27.1	28.0	28.9	29.9	30.8	31.7	32.7	33.6	34.5	35.5	36.4	37.3	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.9
57	.950	26.6	27.6	28.5	29.4	30.4	31.4	32.3	33.2	34.2	35.2	36.1	37.0	38.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
58	.967	27.1	28.0	29.0	30.0	30.9	31.9	32.9	33.8	34.8	35.8	36.7	37.7	38.7	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
59	.983	27.5	28.5	29.5	30.5	31.5	32.4	33.4	34.4	35.4	36.4	37.4	38.4	39.3	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	1	28	29	30	31	32	33	34	35	36	37	38	39	40	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
	2	56	58	60	62	64	66	68	70	72	74	76	78	80	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
	3	84	87	90	93	96	99	102	105	108	111	114	117	120	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
	4	112	116	120	124	128	132	136	140	144	148	152	156	160	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0
	5	140	145	150	155	160	165	170	175	180	185	190	195	200	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
	6	168	174	180	186	192	198	204	210	216	222	228	234	240	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0
	7	196	203	210	217	224	231	238	245	252	259	266	273	280	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0
	8	224	232	240	248	256	264	272	280	288	296	304	312	320	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0
	9	252	261	270	279	288	297	306	315	324	333	342	351	360	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0
	10	280	290	300	310	320	330	340	350	360	370	380	390	400	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
	11	308	319	330	341	352	363	374	385	396	407	418	429	440	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	11.0
	12	336	348	360	372	384	396	408	420	432	444	456	468	480	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0
	13	364	377	390	403	416	429	442	455	468	481	494	507	520	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13.0
	14	392	406	420	434	448	462	476	490	504	518	532	546	560	1.4	2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14.0
	15	420	435	450	465	480	495	510	525	540	555	570	585	600	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
	16	448	464	480	496	512	528	544	560	576	592	608	624	640	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	14.4	16.0
	17	476	493	510	527	544	561	578	595	612	629	646	663	680	1.7	3.4	5.1	6.8	8.5	10.2	11.9	13.6	15.3	17.0
	18	504	522	540	558	576	594	612	630	648	666	684	702	720	1.8	3.6	5.4	7.2	9.0	10.8	12.6	14.4	16.2	18.0
	19	532	551	570	589	608	627	646	665	684	703	722	741	760	1.9	3.8	5.7	7.6	9.5	11.4	13.3	15.2	17.1	19.0
	20	560	580	600	620	640	660	680	700	720	740	760	780	800	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
	21	588	609	630	651	672	693	714	735	756	777	798	819	840	2.1	4.2	6.3	8.4	10.5	12.6	14.7	16.8	18.9	21.0
	22	616	638	660	682	704	726	748	770	792	814	836	858	880	2.2	4.4	6.6	8.8	11.0	13.2	15.4	17.6	19.8	22.0
	23	644	667	690	713	736	759	782	805	828	851	874	897	920	2.3	4.6	6.9	9.2	11.5	13.8	16.1	18.4	20.7	23.0
	24	672	696	720	744	768	792	816	840	864	888	912	936	960	2.4	4.8	7.2	9.6	12.0	14.4	16.8	19.2	21.6	24.0
	25	700	725	750	775	800	825	850	875	900	925	950	975	1000	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0

SPEED [illegible]LE

Min.	Hr.	6	7	8	9	10	11	12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	20	21	22	23	24	25	26	27
1	.017	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4
2	.033	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.5	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9
3	.050	0.3	0.4	0.4	0.4	0.5	0.6	0.6	0.6	0.7	0.8	0.8	0.8	0.9	1.0	1.0	1.0	1.1	1.2	1.2	1.2	1.3	1.4
4	.067	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.9	0.9	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.8
5	.083	0.5	0.6	0.7	0.8	0.8	0.9	1.0	1.1	1.2	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.2
6	.100	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7
7	.117	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.5	1.6	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.2
8	.133	0.8	0.9	1.1	1.2	1.3	1.5	1.6	1.7	1.9	2.0	2.1	2.3	2.4	2.5	2.7	2.8	2.9	3.1	3.2	3.3	3.5	3.6
9	.150	0.9	1.0	1.2	1.4	1.5	1.6	1.8	2.0	2.1	2.2	2.4	2.6	2.7	2.8	3.0	3.2	3.3	3.4	3.6	3.8	3.9	4.0
10	.167	1.0	1.2	1.3	1.5	1.7	1.8	2.0	2.2	2.3	2.5	2.7	2.8	3.0	3.2	3.3	3.5	3.7	3.8	4.0	4.2	4.3	4.5
11	.183	1.1	1.3	1.5	1.6	1.8	2.0	2.2	2.4	2.6	2.8	2.9	3.1	3.3	3.5	3.7	3.8	4.0	4.2	4.4	4.6	4.8	5.0
12	.200	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4
13	.217	1.3	1.5	1.7	2.0	2.2	2.4	2.6	2.8	3.0	3.2	3.5	3.7	3.9	4.1	4.3	4.6	4.8	5.0	5.2	5.4	5.6	5.8
14	.233	1.4	1.6	1.9	2.1	2.3	2.6	2.8	3.0	3.3	3.5	3.7	4.0	4.2	4.4	4.7	4.9	5.1	5.4	5.6	5.8	6.1	6.3
15	.250	1.5	1.8	2.0	2.2	2.5	2.8	3.0	3.2	3.5	3.8	4.0	4.2	4.5	4.8	5.0	5.2	5.5	5.8	6.0	6.2	6.5	6.8
16	.267	1.6	1.9	2.1	2.4	2.7	2.9	3.2	3.5	3.7	4.0	4.3	4.5	4.8	5.1	5.3	5.6	5.9	6.1	6.4	6.7	6.9	7.2
17	.283	1.7	2.0	2.3	2.6	2.8	3.1	3.4	3.7	4.0	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.2	6.5	6.8	7.1	7.4	7.6
18	.300	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1
19	.317	1.9	2.2	2.5	2.8	3.2	3.5	3.8	4.1	4.4	4.8	5.1	5.4	5.7	6.0	6.3	6.6	7.0	7.3	7.6	7.9	8.2	8.6
20	.333	2.0	2.3	2.7	3.0	3.3	3.7	4.0	4.3	4.7	5.0	5.3	5.7	6.0	6.3	6.7	7.0	7.3	7.7	8.0	8.3	8.7	9.0
21	.350	2.1	2.4	2.8	3.2	3.5	3.8	4.2	4.6	4.9	5.2	5.6	6.0	6.3	6.6	7.0	7.4	7.7	8.0	8.4	8.8	9.1	9.4
22	.367	2.2	2.6	2.9	3.3	3.7	4.0	4.4	4.8	5.1	5.5	5.9	6.2	6.6	7.0	7.3	7.7	8.1	8.4	8.8	9.2	9.5	9.9
23	.383	2.3	2.7	3.1	3.4	3.8	4.2	4.6	5.0	5.4	5.8	6.1	6.5	6.9	7.3	7.7	8.0	8.4	8.8	9.2	9.6	10.0	10.4
24	.400	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8
25	.417	2.5	2.9	3.3	3.8	4.2	4.6	5.0	5.4	5.8	6.2	6.7	7.1	7.5	7.9	8.3	8.8	9.2	9.6	10.0	10.4	10.8	11.2
26	.433	2.6	3.0	3.5	3.9	4.3	4.8	5.2	5.6	6.1	6.5	6.9	7.4	7.8	8.2	8.7	9.1	9.5	10.0	10.4	10.8	11.3	11.7
27	.450	2.7	3.2	3.6	4.0	4.5	5.0	5.4	5.8	6.3	6.8	7.2	7.6	8.1	8.6	9.0	9.4	9.9	10.4	10.8	11.2	11.7	12.2
28	.467	2.8	3.3	3.7	4.2	4.7	5.1	5.6	6.1	6.5	7.0	7.5	7.9	8.4	8.9	9.3	9.8	10.3	10.7	11.2	11.7	12.1	12.6
29	.483	2.9	3.4	3.9	4.4	4.8	5.3	5.8	6.3	6.8	7.2	7.7	8.2	8.7	9.2	9.7	10.2	10.6	11.1	11.6	12.1	12.6	13.0
30	.500	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5
31	.517	3.1	3.6	4.1	4.6	5.2	5.7	6.2	6.7	7.2	7.8	8.3	8.8	9.3	9.8	10.3	10.8	11.4	11.9	12.4	12.9	13.4	14.0
32	.533	3.2	3.7	4.3	4.8	5.3	5.9	6.4	6.9	7.5	8.0	8.5	9.1	9.6	10.1	10.7	11.2	11.7	12.3	12.8	13.3	13.9	14.4
33	.550	3.3	3.8	4.4	5.0	5.5	6.0	6.6	7.2	7.7	8.2	8.8	9.4	9.9	10.4	11.0	11.6	12.1	12.6	13.2	13.8	14.3	14.8
34	.567	3.4	4.0	4.5	5.1	5.7	6.2	6.8	7.4	7.9	8.5	9.1	9.6	10.2	10.8	11.3	11.9	12.5	13.0	13.6	14.2	14.7	15.3
35	.583	3.5	4.1	4.7	5.2	5.8	6.4	7.0	7.6	8.2	8.8	9.3	9.9	10.5	11.1	11.7	12.2	12.8	13.4	14.0	14.6	15.2	15.8
36	.600	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2
37	.617	3.7	4.3	4.9	5.6	6.2	6.8	7.4	8.0	8.6	9.2	9.9	10.5	11.1	11.7	12.3	13.0	13.6	14.2	14.8	15.4	16.0	16.6
38	.633	3.8	4.4	5.1	5.7	6.3	7.0	7.6	8.2	8.9	9.5	10.1	10.8	11.4	12.0	12.7	13.3	13.9	14.6	15.2	15.8	16.5	17.1
39	.650	3.9	4.6	5.2	5.8	6.5	7.2	7.8	8.4	9.1	9.8	10.4	11.0	11.7	12.4	13.0	13.6	14.3	15.0	15.6	16.2	16.9	17.6
40	.667	4.0	4.7	5.3	6.0	6.7	7.3	8.0	8.7	9.3	10.0	10.7	11.3	12.0	12.7	13.3	14.0	14.7	15.3	16.0	16.7	17.3	18.0
41	.683	4.1	4.8	5.5	6.2	6.8	7.5	8.2	8.9	9.6	10.2	10.9	11.6	12.3	13.0	13.7	14.4	15.0	15.7	16.4	17.1	17.8	18.4
42	.700	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	11.2	11.9	12.6	13.3	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9
43	.717	4.3	5.0	5.7	6.4	7.2	7.9	8.6	9.3	10.0	10.8	11.5	12.2	12.9	13.6	14.3	15.0	15.8	16.5	17.2	17.9	18.6	19.4
44	.733	4.4	5.1	5.9	6.6	7.3	8.1	8.8	9.5	10.3	11.0	11.7	12.5	13.2	13.9	14.7	15.4	16.1	16.9	17.6	18.3	19.1	19.8
45	.750	4.5	5.2	6.0	6.8	7.5	8.2	9.0	9.8	10.5	11.2	12.0	12.8	13.5	14.2	15.0	15.8	16.5	17.2	18.0	18.8	19.5	20.2
46	.767	4.6	5.4	6.1	6.9	7.7	8.4	9.2	10.0	10.7	11.5	12.3	13.0	13.8	14.6	15.3	16.1	16.9	17.6	18.4	19.2	19.9	20.7
47	.783	4.7	5.5	6.3	7.0	7.8	8.6	9.4	10.2	11.0	11.8	12.5	13.3	14.1	14.9	15.7	16.4	17.2	18.0	18.8	19.6	20.4	21.2
48	.800	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6
49	.817	4.9	5.7	6.5	7.4	8.2	9.0	9.8	10.6	11.4	12.2	13.1	13.9	14.7	15.5	16.3	17.2	18.0	18.8	19.6	20.4	21.2	22.0
50	.833	5.0	5.8	6.7	7.5	8.3	9.2	10.0	10.8	11.7	12.5	13.3	14.2	15.0	15.8	16.7	17.5	18.3	19.2	20.0	20.8	21.7	22.5
51	.850	5.1	6.0	6.8	7.6	8.5	9.4	10.2	11.0	11.9	12.8	13.6	14.4	15.3	16.2	17.0	17.8	18.7	19.6	20.4	21.2	22.1	23.0
52	.867	5.2	6.1	6.9	7.8	8.7	9.5	10.4	11.3	12.1	13.0	13.9	14.7	15.6	16.5	17.3	18.2	19.1	19.9	20.8	21.7	22.5	23.4
53	.883	5.3	6.2	7.1	8.0	8.8	9.7	10.6	11.5	12.4	13.2	14.1	15.0	15.9	16.8	17.7	18.6	19.4	20.3	21.2	22.1	23.0	23.8
54	.900	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3
55	.917	5.5	6.4	7.3	8.2	9.2	10.1	11.0	11.9	12.8	13.8	14.7	15.6	16.5	17.4	18.3	19.2	20.2	21.1	22.0	22.9	23.8	24.8
56	.933	5.6	6.5	7.5	8.4	9.3	10.3	11.2	12.1	13.1	14.0	14.9	15.9	16.8	17.7	18.7	19.6	20.5	21.5	22.4	23.3	24.3	25.2
57	.950	5.7	6.6	7.6	8.6	9.5	10.4	11.4	12.4	13.3	14.2	15.2	16.2	17.1	18.0	19.0	20.0	20.9	21.8	22.8	23.8	24.7	25.6
58	.967	5.8	6.8	7.7	8.7	9.7	10.6	11.6	12.6	13.5	14.5	15.5	16.4	17.4	18.4	19.3	20.3	21.3	22.2	23.2	24.2	25.1	26.1
59	.983	5.9	6.9	7.9	8.8	9.8	10.8	11.8	12.8	13.8	14.8	15.7	16.7	17.7	18.7	19.7	20.6	21.6	22.6	23.6	24.6	25.6	26.6
	1	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	2	12	14	16	18	20	22	24	26	28	30	32	34	36	38	40	42	44	46	48	50	52	54
	3	18	21	24	27	30	33	36	39	42	45	48	51	54	57	60	63	66	69	72	75	78	81
	4	24	28	32	36	40	44	48	52	56	60	64	68	72	76	80	84	88	92	96	100	104	108
	5	30	35	40	45	50	55	60	65	70	75	80	85	90	95	100	105	110	115	120	125	130	135
	6	36	42	48	54	60	66	72	78	84	90	96	102	108	114	120	126	132	138	144	150	156	162
	7	42	49	56	63	70	77	84	91	98	105	112	119	126	133	140	147	154	161	168	175	182	189
	8	48	56	64	72	80	88	96	104	112	120	128	136	144	152	160	168	176	184	192	200	208	216
	9	54	63	72	81	90	99	108	117	126	135	144	153	162	171	180	189	198	207	216	225	234	243
	10	60	70	80	90	100	110	120	130	140	150	160	170	180	190	200	210	220	230	240	250	260	270
	11	66	77	88	99	110	121	132	143	154	165	176	187	198	209	220	231	242	253	264	275	286	297
	12	72	84	96	108	120	132	144	156	168	180	192	204	216	228	240	252	264	276	288	300	312	324
	13	78	91	104	117	130	143	156	169	182	195	208	221	234	247	260	273	286	299	312	325	338	351
	14	84	98	112	126	140	154	168	182	196	210	224	238	252	266	280	294	308	322	336	350	364	378
	15	90	105	120	135	150	165	180	195	210	225	240	255	270	285	300	315	330	345	360	375	390	405
	16	96	112	128	144	160	176	192	208	224	240	256	272	288	304	320	336	352	368	384	400	416	432
	17	102	119	136	153	170	187	204	221	238	255	272	289	306	323	340	357	374	391	408	425	442	459
	18	108	126	144	162	180	198	216	234	252	270	288	306	324	342	360	378	396	414	432	450	468	486
	19	114	133	152	171	190	209	228	247	266	285	304	323	342	361	380	399	418	437	456	475	494	513
	20	120	140	160	180	200	220	240	260	280	300	320	340	360	380	400	420	440	460	480	500	520	540
	21	126	147	168	189	210	231	252	273	294	315	336	357	378	399	420	441	462	483	504	525	546	567
	22	132	154	176	198	220	242	264	286	308	330	352	374	396	418	440	462	484	506	528	550	572	594
	23	138	161	184	207	230	253	276	299	322	345	368	391	414	437	460	483	506	529	552	575	598	621
	24	144	168	192	216	240	264	288	312	336	360	384	408	432	456	480	504	528	552	576	600	624	648
	25	150	175	200	225	250	275	300	325	350	375	400	425	450	475	500	525	550	575	600	625	650	675

FOR CONVERSION OF ARC TO TIME

°	h m	°	h m	°	h m	°	h m	°	h m	°	h m
0	0 0	60	4 0	120	8 0	180	12 0	240	16 0	300	20 0
1	0 4	61	4 4	121	8 4	181	12 4	241	16 4	301	20 4
2	0 8	62	4 8	122	8 8	182	12 8	242	16 8	302	20 8
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56
15	1 0	75	5 0	135	9 0	195	13 0	255	17 0	315	21 0
16	1 4	76	5 4	136	9 4	196	13 4	256	17 4	316	21 4
17	1 8	77	5 8	137	9 8	197	13 8	257	17 8	317	21 8
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56
30	2 0	90	6 0	150	10 0	210	14 0	270	18 0	330	22 0
31	2 4	91	6 4	151	10 4	211	14 4	271	18 4	331	22 4
32	2 8	92	6 8	152	10 8	212	14 8	272	18 8	332	22 8
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56
45	3 0	105	7 0	165	11 0	225	15 0	285	19 0	345	23 0
46	3 4	106	7 4	166	11 4	226	15 4	286	19 4	346	23 4
47	3 8	107	7 8	167	11 8	227	15 8	287	19 8	347	23 8
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56
60	4 0	120	8 0	180	12 0	240	16 0	300	20 0	360	24 0

′	m s
0	0 0
1	0 4
2	0 8
3	0 12
4	0 16
5	0 20
6	0 24
7	0 28
8	0 32
9	0 36
10	0 40
11	0 44
12	0 48
13	0 52
14	0 56
15	1 0
16	1 4
17	1 8
18	1 12
19	1 16
20	1 20
21	1 24
22	1 28
23	1 32
24	1 36
25	1 40
26	1 44
27	1 48
28	1 52
29	1 56
30	2 0
31	2 4
32	2 8
33	2 12
34	2 16
35	2 20
36	2 24
37	2 28
38	2 32
39	2 36
40	2 40
41	2 44
42	2 48
43	2 52
44	2 56
45	3 0
46	3 4
47	3 8
48	3 12
49	3 16
50	3 20
51	3 24
52	3 28
53	3 32
54	3 36
55	3 40
56	3 44
57	3 48
58	3 52
59	3 56
60	4 0

″	s
0	0.00
1	0.07
2	0.13
3	0.20
4	0.27
5	0.33
6	0.40
7	0.47
8	0.53
9	0.60
10	0.67
11	0.73
12	0.80
13	0.87
14	0.93
15	1.00
16	1.07
17	1.13
18	1.20
19	1.27
20	1.33
21	1.40
22	1.47
23	1.53
24	1.60
25	1.67
26	1.73
27	1.80
28	1.87
29	1.93
30	2.00
31	2.07
32	2.13
33	2.20
34	2.27
35	2.33
36	2.40
37	2.47
38	2.53
39	2.60
40	2.67
41	2.73
42	2.80
43	2.87
44	2.93
45	3.00
46	3.07
47	3.13
48	3.20
49	3.27
50	3.33
51	3.40
52	3.47
53	3.53
54	3.60
55	3.67
56	3.73
57	3.80
58	3.87
59	3.93
60	4.00

H. O. PUB. NO. 214

VOL. III

U.S. Hydrographic Office

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

LATITUDES 20° — 29°, INCLUSIVE

ed by the U. S. Navy Hydrographic Office
thority of the SECRETARY OF THE NAVY

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PREFACE

These tables consist of tabulated solutions of the navigational triangle, so arranged as to yield computed altitude and azimuth angle by inspection. The scheme of precomputing such values for ready use is a long-established one. It is in the scope, arrangement, and convenience of interpolation, developed by the Hydrographic Office, that these tables are unique.

The tables are applicable equally to observations of the sun, moon, planets, and navigational stars, whether observed in north or south latitude. For convenience, the values for only 10 degrees of latitude are included in each volume. This series of tables, commonly known as H. O. Pub. No. 214, is intended primarily for marine navigation. For air navigation the H. O. Pub. No. 249 series of tables consisting of 3 volumes and entitled "Sight Reduction Tables for Air Navigation" is recommended.

In the 1952 reprint the basic information remains unchanged. Some modification has been made in the descriptive text, and the illustrative examples have been changed to reflect recent modifications of the *Nautical Almanac*. A speed-time-distance table replaces the sextant altitude correction tables formerly shown on the inside front cover but now omitted because recent almanac changes render them unnecessary.

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Hydrographer.

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Description of the Tables

The tables are equally applicable to sights of the sun, moon, planets, and navigational stars.

The arrangement is on the basis of whole degrees of latitude, the data for each degree comprising a section of 24 pages, with 2 additional pages for star identification.

Declination arguments in degrees and half degrees head the main columns of each page, while meridian angle arguments in whole degrees appear at the sides. Within the limits of each declination column are four groups of figures representing, from left to right—the altitude (Alt.); the multiplier (Δd) for declination difference; the multiplier (Δt) for meridian angle difference; and the azimuth angle (Az.). The declination arguments for celestial bodies not commonly used in practical navigation are omitted.

The altitudes have been computed to an accuracy of one-tenth of a minute of arc by seven place logarithms.

The azimuth angle has been computed to an accuracy of one-tenth of a degree.

Δd represents the change in altitude due to a change of 1′ of arc of declination, computed for the tabulated entering arguments.

Δt represents the change in altitude due to a change of 1′ of arc of meridian angle, and is one-sixtieth of the difference between the tabulated altitude and that for the next larger meridian angle.

ΔL represents the change in altitude due to a change of 1′ of arc of latitude. A special table on pages 262–263 gives the corrections for minutes of latitude.

The following procedures are available for finding a line of position:

(1) Assuming both latitude and longitude, using only the Δd correction.

(2) Assuming latitude with the DR longitude, using the Δd and Δt corrections.

(3) Working from the DR position, using the Δd, Δt, and ΔL corrections.

When either Δd or Δt is changing rapidly, or when Δd changes sign (at the maximum altitude for any given meridian angle), interpolation may be somewhat less accurate than in other parts of the tables, but should not introduce a significant error unless the body is near the zenith.

(1) SOLUTION FOR LINE OF POSITION USING Δd CORRECTION ONLY

This is the primary method for which the tables were designed. The solution is short and simple. The tables are entered with arguments of nearest whole degree of latitude, nearest whole or half degree of declination, and nearest whole degree of meridian angle. Alt., Δd, and Az. are taken from the body of the tables.

The azimuth angle obtained from the tables is correct for the values with which the tables are entered and, for plotting lines of position, generally needs no correction. If extreme accuracy is desired, the azimuth angle may be interpolated by inspection. The tabulated azimuth angle (Az.) is reckoned from the elevated pole of the observer, to the east when the body is rising or east of the meridian; and to the west when the body is setting or west of the meridian. Azimuth angle is customarily converted to azimuth (Zn) before plotting.

The altitude (Alt.) obtained from the tables is correct for the values with which the tables are entered; but since the exact declination of the body usually differs from the tabulated declination, a correction to the tabulated altitude must be made for this difference. For example, if the exact declination of a star is 57° 28′.7 and the table is entered with a declination of 57° 30′.0, the declination difference is 1′.3. Since Δd represents the change in altitude due to a change of 1′ of arc of declination, if Δd is multiplied by the declination difference, the correction to the altitude for declination difference is obtained. When this correction is applied to the tabulated altitude (Alt.), the altitude thus obtained is the correct computed altitude for arguments of whole degree of latitude, whole degree of meridian angle, and the exact declination of the body. The correction can be obtained by inspection from a multiplication table on the back cover pages. The multiplication table is entered with arguments, Δd at the side, and the declination difference at the top. The correction to the altitude for declination difference is taken from the body of the table. The multiplication table is so arranged that it may be entered at the top with both whole numbers and tenths. For example, using Δd 65, and declination difference 6′.4, the multiplication table is entered with 65 at the side and 6′ at the top, the correction is 3′.9; with 65 at the side and 0′.4 at the top, the correction is 0′.3; the total correction to the altitude for declination difference being 3′.9+0′.3=4′.2.

By comparing the tabulated altitude for the entering declination with the values of altitude for adjoining tabulated declinations, one can determine whether the altitude is increasing or decreasing as the tabulated declination approaches the exact declination. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing. *Watch the plus or minus signs for Δd, and apply correctly, remembering that Δd may change sign between entries at the maximum altitude.* The multiplier Δd should not be interpolated.

When the Δd correction only is made to the tabulated altitude, the sight must be plotted from an assumed position as follows:

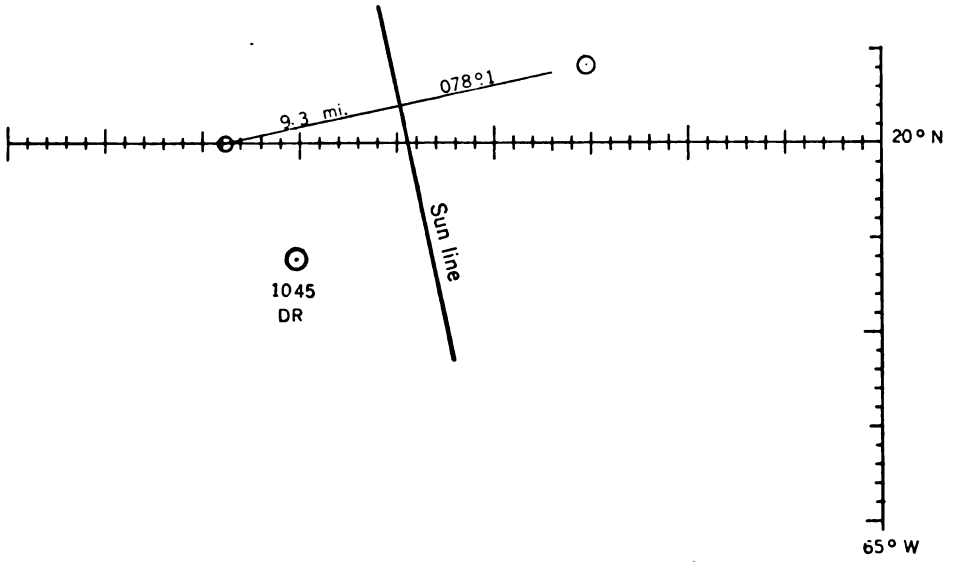
Latitude.—The whole degree with which the tables were entered.

Longitude.—The longitude which was assumed in finding the meridian angle in whole degrees.

Example 1.—On July 1, 1951, the 1045 dead reckoning position of a ship is lat. 19° 54′.0 N, long. 65° 30′.2 W. About this time the navigator observes the lower limb of the sun, as follows: watch time (W) $10^h\ 46^m\ 04^s$ AM; watch error (WE) on zone time 13^s fast, height of eye 45 feet, index correction (IC) (+) 1′.0, sextant altitude (hs) 66° 33′.4. Solve the observation for altitude difference (a) and azimuth (Zn), using Δd only.

	July 1, 1951
W	$10^h\ 46^m\ 04^s$ AM
WE	(F) 13^s
ZT	$10^h\ 45^m\ 51^s$
ZD (+)	4^h
GMT*	$14^h\ 45^m\ 51^s$ July 1
GHA for 14^h GMT	29° 06′.1
Correction for $45^m\ 51^s$	11° 27′.8
GHA	40° 33′.9
aλ	65° 33′.9 W (assumed longitude)
LHA	335° 00′.0
t (H.A.)	25° 00′.0 E
d	23° 08′.7 N d diff. 8′.7
aL	20° 00′.0 N (assumed latitude)
ht	66° 34′.5 Δd (−) 0.05
Correction	(−) 0′.4
Hc	66° 34′.1
Ho	66° 43′.4
a	9.3 miles toward
Zn	078°.1

	+ ☉ —
IC	1′.0
Additional	0′.1
Correction	15′.3
Dip ht. of eye	6′.4
Sum	16′.4 6′.4
Correction	(+) 10′.0
hs	66° 33′.4
Ho	66° 43′.4
d for 14^h GMT	(+) 23° 08′.9 code
Correction	(−) 0′.2 (−)2
d	23° 08′.7 N
Z (Az.)	N 78°.1 E



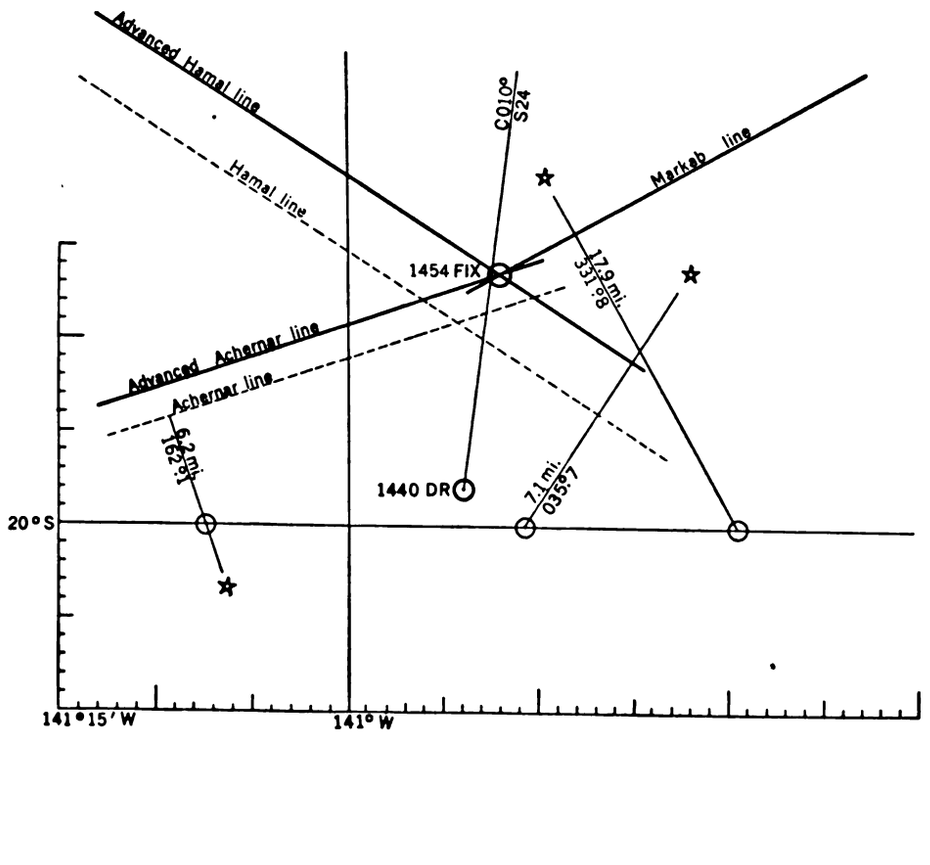
NOTE.—Minus 0.05 is obtained from the Δd column abreast Alt. in the tables. The value (−) 0′.4 (correction for 8′.7 of declination difference) is obtained by multiplying 8′.7 by 0.05 or by referring to the multiplication table on the inside back cover, entering with 8′ and then with 0′.7 at the top and with 05 at the side. The two values (0′.4 and 0′.0) thus obtained are then added to obtain the correction. The correction 0′.4 is subtracted because as the tabulated declination (23°) approaches the exact declination of the body (23° 08′.7), the altitude decreases, as determined by inspection of the table. The tabulated azimuth angle, taken from the table without correction, is reckoned from the observer's elevated pole toward the east when the body is rising, or east of the meridian. The sight is plotted from the nearest whole degree of latitude (20° 00′.0 N) and the assumed longitude (65° 33′.9 W).

*Greenwich mean time; called *Greenwich civil time* (*GCT*) in the United States before January 1, 1953.

Example 2.—On July 3, 1951, the GMT 1440 dead reckoning position of a ship is lat. 19° 58′.0 S, long. 140° 54′.0 W. The ship is on course 010°, speed 24 knots. Observations are made as indicated below. Solve for a and Zn, using Δd only.

Stars	*GMT*	*Declination*	*Obs. Alt. (Ho)*
Hamal	14h 44m 32s	23° 14′.0 N	37° 55′.1
Achernar	14h 49m 08s	57° 28′.6 S	49° 04′.8
Markab	14h 53m 41s	14° 56′.6 N	51° 07′.8

	HAMAL		ACHERNAR		MARKAB	
GMT	14h 44m 32s		14h 49m 08s		14h 53m 41s	
GHA ♈ for 14h GMT	130° 47′.2		130° 47′.2		130° 47′.2	
Correction for 44m 32s / 49m 08s / 53m 41s	11° 09′.8		12° 19′.0		13° 27′.5	
SHA	328° 53′.6		336° 01′.2		14° 24′.7	
GHA☆	110° 50′.6		119° 07′.4		158° 39′.4	
aλ	140° 50′.6 W		141° 07′.4 W		140° 39′.4 W	
LHA	330° 00′.0		338° 00′.0		18° 00′.0	
t (H.A.)	30° 00′.0 E		22° 00′.0 E		18° 00′.0 W	
d	23° 14′.0 N	d diff. 14′.0	57° 28′.6 S	d diff. 1′.4	14° 56′.6 N	d diff. 3′.4
aL	20° 00′.0 S		20° 00′.0 S		20° 00′.0 S	
Δd and correction	(−) 0.80 (−) 11′.2	(+) 0.84	(+) 1′.1	(+) 0.89	(+) 3′.1	
ht (Alt.)	37° 59′.2		49° 09′.9		50° 46′.8	
Hc	37° 48′.0		49° 11′.0		50° 49′.9	
Ho	37° 55′.1		49° 04′.8		51° 07′.8	
a	7.1 miles toward		6.2 miles away		17.9 miles toward	
Z (Az.) and Zn	S 144°.3 E	035°.7	S 17°.9 E	162°.1	S 151°.8 W	331°.8



NOTE.—The Hamal sight is plotted from lat. 20° 00′.0 S, long. 140° 50′.6 W; the Achernar sight from lat. 20° 00′.0 S, long. 141° 07′.4 W; and the Markab sight from Lat. 20° 00′.0 S, Long. 140° 39′.4 W. In the illustration the Hamal line of position is advanced 3.7 miles for a 9.2-minute run and the Achernar line is advanced 1.8 miles for a 4.6-minute run, both in the direction of the course, 010°, to obtain a fix at the time of Markab sight.

(2) SOLUTION FOR LINE OF POSITION USING BOTH Δd AND Δt CORRECTIONS

If the navigator desires to plot the sight from his dead reckoning longitude (and the nearest whole degree of latitude to his dead reckoning position), he may do so by applying an additional correction to the altitude for hour angle difference. For example, if the exact hour angle of a star is 20° 10′.2 and the tables are entered with an hour angle of 20°, the hour angle difference is 10′.2. The correction is determined as follows:

Since Δt represents the change in altitude due to a change of 1′ of arc of hour angle, if Δt is multiplied by the hour angle difference, the correction for hour angle difference is obtained. When this correction, together with the Δd correction, is applied to the tabulated altitude, the value thus obtained is the correct computed altitude for arguments of whole degree of latitude, the exact hour angle, and the exact declination of the body.

When successive Δt values have large differences in numerical value, always make the altitude interpolation forward from the smaller entering hour angle, never interpolating backward from the nearest entering hour angle. Even with this precaution, the computed altitude will not be of the usual accuracy. In general, it is preferable to not use Δt in this situation.

The Δt correction is obtained from the multiplication table in exactly the same manner as the Δd correction, i. e., by entering the multiplication table with Δt at the side and the hour angle difference at the top of the page, the Δt correction is taken from the body of the table by inspection.

By comparing the values of altitude for the tabulated hour angles between which the exact hour angle lies, one can determine whether the altitude is increasing or decreasing as the tabulated hour angle approaches the exact hour angle. The correction is applied to the tabulated altitude, plus if the altitude is increasing, and minus if the altitude is decreasing.

When both the Δd and the Δt corrections have been made to the tabulated altitude, the sight is plotted from the following position:

Latitude.—The whole degree with which the tables were entered.

Longitude.—The dead reckoning longitude.

Example 3.—On July 2, 1951, the 1900 dead reckoning position of a ship is lat. 20° 05′.3 N, long. 53° 50′.2 W. About this time the navigator observes the star Spica, as follows: watch time (W) 7^h 00^m 32^s PM, watch error (WE) on zone time 12^s slow, height of eye 45 feet, index correction (IC) (−) 1′.0, sextant altitude (hs) 57° 15′.0. Solve the observation for a and Zn, using Δd and Δt.

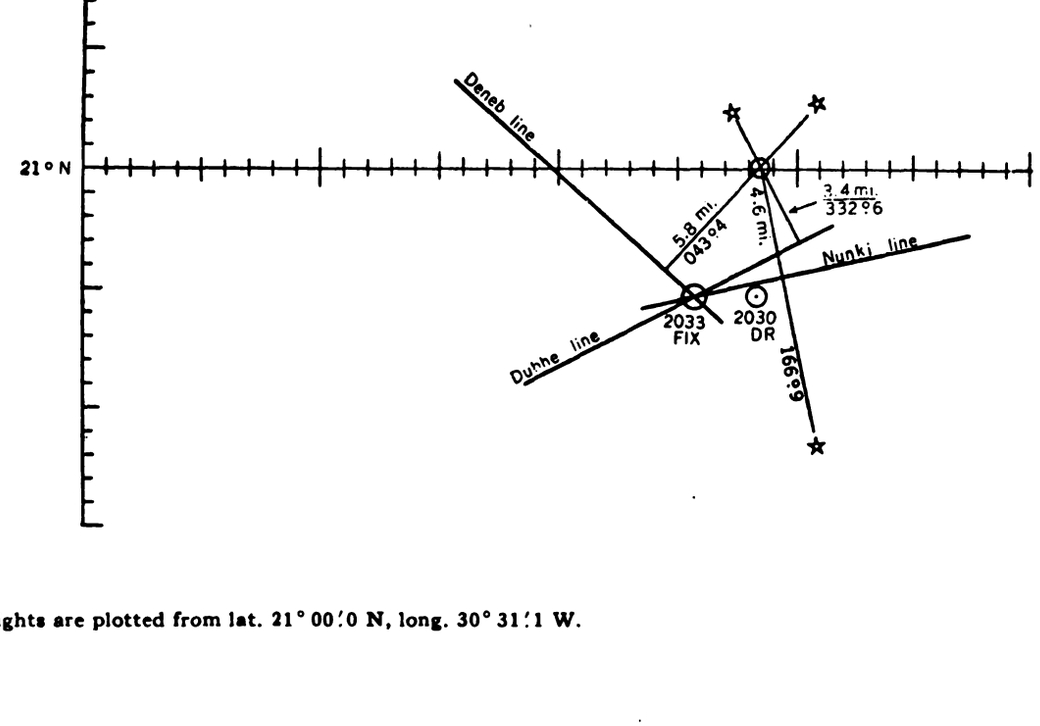
	July 2, 1951		
W	7^h 00^m 32^s PM		
WE	(S) 12^s		
ZT	19^h 00^m 44^s		
ZD	(+) 4^h		
GMT	23^h 00^m 44^s July 2		
GHA ♈ for 23^h GMT	265° 10′.2		
Correction for 0^m 44^s	11′.0		
SHA	159° 20′.4		
GHA ☆	64° 41′.6		
aλ	53° 50′.2 W		
LHA	10° 51′.4		
t (H.A.)	10° 51′.4 W	t diff. 8′.6	
d	10° 54′.6 S	d diff. 5′.4	
aL	20° 00′.0 N		
ht (Alt.)	57° 09′.8	Δd (+) 0.94; Δt (+) 0.34	
Correction	(+) 8′.0		
Hc	57° 17′.8		
Ho	57° 07′.0		
a	10.8 miles away		
Zn	200°.2		

	+ ☆ −	
IC		1′.0
Additional		-----
Correction		0′.6
Dip		6′.4
Sum	0′.0	8′.0
Correction		(−) 8′.0
hs		57° 15′.0
Ho		57° 07′.0
t correction	(+) 2′.9	
d correction	(+) 5′.1	
Correction	(+) 8′.0	
Z (Az.)	N 159°.8 W	

Example 4.—On September 15, 1951, the GMT 2030 dead reckoning position of a ship is lat. 20° 55′.0 N, long. 30° 31′.1 W. Nearly simultaneous observations are made as follows:

Stars	*GMT*	*Declination*	*Obs. Alt. (Ho)*
Dubhe	20h 32m 15s	62° 00′.8 N	11° 04′.7
Deneb	20h 32m 55s	45° 06′.6 N	50° 22′.7
Nunki	20h 33m 35s	26° 21′.7 S	41° 29′.2

	DUBHE		DENEB		NUNKI
GMT	20h 32m 15s		20h 32m 55s		20h 33m 35s
GHA ♈ for 20h GMT	293° 58′.3		293° 58′.3		293° 58′.3
Correction for 32m 15s	8° 05′.1	(32m 55s)	8° 15′.1	(33m 35s)	8° 25′.1
SHA	194° 48′.8		50° 02′.9		76° 55′.7
GHA ☆	136° 52′.2		352° 16′.3		19° 19′.1
$a\lambda$	30° 31′.1 W		30° 31′.1 W		30° 31′.1 W
LHA	106° 21′.1		321° 45′.2		348° 48′.0
t (H.A.)	106° 21′.1 W	t diff. 21′.1	38° 14′.8 E	t diff. 14′.8	11° 12′.0 E	t diff. 12′.0
d	62° 00′.8 N	d diff. 0′.8	45° 06′.6 N	d diff. 6′.6	26° 21′.7 S	d diff. 8′.3
aL	21° 00′.0 N		21° 00′.0 N		21° 00′.0 N
Δd and correction (+) 0.40	(+) 0′.3	(−) 0.42	(−) 2′.8	(+) 0.97	(+) 8′.1
Δt and correction (−) 0.43	(−) 9′.0	(−) 0.64	(−) 9′.4	(−) 0.22	(−) 2′.6
ht (Alt.)	11° 16′.8		50° 40′.7		41° 19′.1
Hc	11° 08′.1		50° 28′.5		41° 24′.6
Ho	11° 04′.7		50° 22′.7		41° 29′.2
a	3.4 miles away		5.8 miles away		4.6 miles toward
Z (Az.) and Zn N 27°.4 W	332°.6	N 43°.4 E	043°.4	N 166°.9 E	166°.9



NOTE.—All sights are plotted from lat. 21° 00′.0 N, long. 30° 31′.1 W.

(3) SOLUTION FOR LINE OF POSITION FROM THE DEAD RECKONING POSITION USING Δd, Δt, AND ΔL

If the navigator desires to plot the sight from the dead reckoning position, in addition to the Δd and Δt corrections, a correction to the altitude for latitude (called the ΔL correction) must be applied. If the nearest whole degree of latitude is used for entering the table, it will be necessary to correct for as much as 30′ difference in latitude between the integral degree with which the table is entered and the dead reckoning latitude. On pages 262 and 263 of this book is given a ΔL multiplication table from which corrections for minutes of latitude can be taken directly by inspection. The values in this table are the product of the ΔL value times the minutes of latitude. The value ΔL is the natural cosine of the azimuth angle, so that it is necessary to know only the azimuth angle of observation and the difference of latitude between the dead reckoning position and the nearest whole degree, as arguments for entry. In working from the dead reckoning position, corrections are made for Δd and Δt exactly as shown in the previous examples, in addition to the ΔL correction.

The LHA for the dead reckoning longitude is found by applying the dead reckoning longitude to the GHA.

With the nearest whole degree of latitude, the t (H.A.), and declination as arguments, take from the main table Alt., Δd, Δt, and Az. With the arguments azimuth angle and the difference of latitude between the dead reckoning position and the nearest whole degree, take the correction for latitude directly by inspection from the ΔL multiplication table on page 262 or 263. The sign of the ΔL correction is determined as follows:

Azimuth angle greater than 90°:

If DR latitude is greater than selected tabulated latitude, ΔL correction is minus; but for DR latitude less than selected tabulated latitude, the correction is plus.

Azimuth angle less than 90°:

If DR latitude is greater than selected tabulated latitude, ΔL correction is plus; but for DR latitude less than selected tabulated latitude, the correction is minus.

Example 5.—On August 17, 1951, the 2100 dead reckoning position of a ship is lat. 20° 29′.0 N, long. 53° 50′.2 W. About this time the navigator observes the upper limb of the moon, as follows: watch time (W) 9h 00m 35s PM, watch error (WE) on zone time 5s slow, height of eye 28 feet, index correction (IC) (+) 1′.5, sextant altitude (hs) 30° 44′.5. Solve the observation for altitude difference (a) and azimuth (Zn), using Δd, Δt and ΔL.

	August 17, 1951		
W	9h 00m 35s PM		
WE	(S) 5s		
ZT	21h 00m 40s		
ZD	(+) 4h		
GMT	1h 00m 40s Aug. 18		
GHA for 1h GMT	2°04′.1		
Correction for 0m 40s	9′.5 code		
Code correction	0′.1 (+) 110		
GHA	2° 13′.7	d for 1h GMT (−) 9° 20′.2 code	
aλ	53° 50′.2 W	Correction (+) 0′.1 (+) 164	
LHA	308° 23′.5	d 9° 20′.1 S	
t (H.A.)	51° 36′.5 E	t diff. 23′.5	
d	9° 20′.1 S	d diff. 9′.9	
aL	20° 29′.0 N	L diff. 29′.0	
ht (Alt.)	30° 56′.4	Δd (+) 0.50; Δt (+) 0.85	
Correction	(+) 12′.7		
Hc	31° 09′.1		
Ho	31° 14′.6		
a	5.5 miles toward		
Zn	115°.0		

	+	−
IC	1′.5	
Additional Correction	47′.4	13′.8
Dip		5′.0
Sum	48′.9	18′.8
Correction		(+) 30′.1
hs		30°44′.1
Ho		31°14′.6

	+	−
t correction	20′.0	
d correction	5′.0	
L correction		12′.3
Sum	25′.0	12′.3
Correction		(+) 12′.7

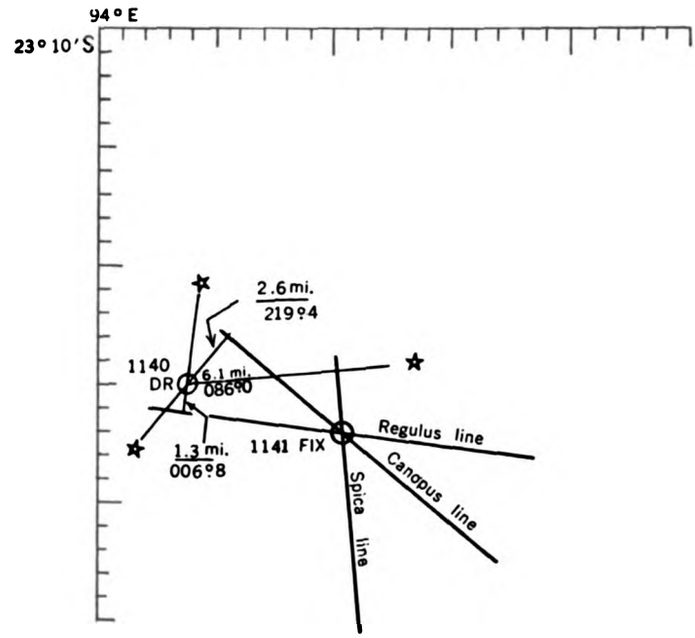
Z (Az.) N 115°.0 E

NOTE—The moon line is plotted from the dead reckoning position.

Example 6.—On May 21, 1951, the GMT 1140 dead reckoning position of a ship is lat. 23° 25′.0 S, long. 94° 03′.7 E. Nearly simultaneous observations are made, as follows:

Stars	*GMT*	*Declination*	*Obs. Alt. (Ho)*
Regulus	11h 40m 10s	12° 12′.4 N	54° 08′.3
Spica	11h 40m 51s	10° 54′.7 S	38° 09′.8
Canopus	11h 41m 29s	52° 40′.2 S	41° 07′.9

	REGULUS		SPICA		CANOPUS	
GMT	11h 40m 10s		11h 40m 51s		11h 41m 29s	
GHA ♈ for 11h GMT	43° 16′.8		43° 16′.8		43° 16′.8	
Correction for 40m 10s	10° 04′.1	(40m 51s)	10° 14′.4	(41m 29s)	10° 24′.0	
SHA	208° 33′.2		159° 20′.3		264° 17′.4	
GHA ☆	261° 54′.1		212° 51′.5		317° 58′.2	
aλ	94° 03′.7 E		94° 03′.7 E		94° 03′.7 E	
LHA	355° 57′.8		306° 55′.2		52° 01′.9	
t (H.A.)	4° 02′.2 E	t diff. 2′.2	53° 04′.8 E	t diff. 4′.8	52° 01′.9 W	t diff. 1′.9
d	12° 12′.4 N	d diff. 12′.4	10° 54′.7 S	d diff. 5′.3	52° 40′.2 S	d diff. 10′.2
aL	23° 25′.0 S	L diff. 25′.0	23° 25′.0 S	L diff. 25′.0	23° 25′.0 S	L diff. 25′.0
Δd and correction (−) 0.99	(−) 12′.3	(−) 0.35	(−) 1′.9	(−) 0.28	(−) 2′.9	
Δt and correction (−) 0.12	(−) 0′.2	(−) 0.92	(−) 4′.4	(−) 0.58	(−) 1′.1	
ΔL correction	(−) 24′.8		(−) 1′.7		(+) 19′.4	
ht (Alt.)	54° 46′.9		38° 11′.7		40° 55′.1	
Hc	54° 09′.6		38° 03′.7		41° 10′.5	
Ho	54° 08′.3		38° 09′.8		41° 07′.9	
a	1.3 miles away		6.1 miles toward		2.6 miles away	
Z (Az.) and Zn. S 173°.2 E	006°.8	S 94°.0 E	086°.0	S 39°.4 W	219°.4	



NOTE.—All three sights are plotted from the dead reckoning position.

STAR IDENTIFICATION

With the sextant altitude and azimuth angle of the unknown star, enter the double-page Star Identification Table immediately following the applicable latitude section and extract the tabulated values of declination and hour angle. Eye interpolation will suffice for accuracy.

Combine the LHA with the longitude to determine the GHA of the star, and from this substract the GHA ♈ to obtain the SHA. Enter the *Nautical Almanac* with the declination and SHA, and identify the star.

Example 7.—On October 16, 1951, the GMT 0340 (Oct. 17) dead reckoning position of a ship is lat. 22° 17′.3 N, long. 145° 13′.6 W. About this time the navigator observes a star through a break in the clouds, as follows: sextant altitude (hs) 40° 04′.3, azimuth (Zn) 195°. Identify the star.

SOLUTION

Enter the star identification table for latitude 22° with the approximate arguments Alt. 40° and Az. 165° (Zn 195°=Az. N 165° W in north latitude) and find approximate

Dec. 26° S, t (H.A.) 13° W

t (H.A.)	13° W	GMT	3h 40m
LHA ☆	13°	GHA ♈ for 3h	69° 48′.8
Longitude	145° W	Correction for 40m 00s	10° 01′.6
GHA ☆	158°	GHA ♈	79° 50′.4
GHA ♈	80°		
SHA	78°		

Enter the *Nautical Almanac* star list with the approximate sidereal hour angle (SHA) 78° and declination 26° S and identify the star as Nunki.

GREAT-CIRCLE SAILING

These tables can be used to solve for initial course and distance in great-circle sailing problems. Substitute latitude of departure for assumed latitude, latitude of destination for declination, and difference of longitude between the point of departure and the destination for hour angle. Great-circle distance in nautical miles is found by subtracting computed altitude (Hc) from 90° and converting the answer to minutes of arc. The azimuth becomes the initial great-circle course.

Example 8.—Find the great-circle distance and the initial course between Mazatlan, Mexico, and Attu Island, Alaska.

Departure		*Destination*	
Latitude (L_1)	23° 10′.2 N	Latitude (L_2)	52° 55′.0 N
Longitude (λ_1)	106° 26′.5 W	Longitude (λ_2)	173° 00′.0 E

SOLUTION

Enter the tables with the nearest tabulated value to L_1 as latitude, L_2 as declination, and DLo ($\lambda_2-\lambda_1=360°-(173° 00′.0+106° 26′.5)=360°-279° 26′.5=80° 33′.5$) as meridian angle (H.A.).

		Alt.	*Δd*	*Δt*	*Az.*
		23° 25′.9	(+) 0.13	(+) 0.60	N 40°.9 W
Δd correction for 25′.0	(+) 3′.3				
Δt correction for 26′.5	(+) 15′.9				
ΔL correction for 10′.2	(+) 7′.7				
	(+) 26′.9	(+) 26′.9			
	Hc	23° 52′.8			
	Subtract from	90°			
Zenith distance (great-circle distance)		66° 07′.2=3,967.2 nautical miles			
Great-circle course (N 40°.9 W)		319°.1			

If the combination of latitude of departure, latitude of destination, and difference of longitude cannot be found in the table, the name of the latitude of destination is reversed and the supplement of the difference of longitude is used for entering the table. The distance is found by *adding* the altitude to 90°; the great-circle course angle is the supplement of the azimuth angle. In the example, if the latitude of the destination is 52°55′.0 S, the name is changed to N and the supplement of the difference of longitude is found ($180°-80° 33′.5=99° 26′.5$). Enter the table with lat. 23°, dec. 52° 30′ N (same name as latitude) and H.A. 99°.

		Alt.	*Δd*	*Δt*	*Az.*
		12° 50′.7	(+) 0.36	(−) 0.56	38°.1
Δd correction for 25′.0	(+) 9′.0				
Δt correction for 26′.5	(−) 14′.9				
ΔL correction for 10′.2	(+) 8′.1				
	(+) 2′.2	(+) 2′.2			
	Hc	12° 52′.9			
	Add to	90°			
Zenith distance (great-circle distance)		102° 52′.9=6,172.9 nautical miles			
Great-circle course (180°−38°.1=N 141°.9 E)		218°.1			

In those cases where neither combination of entering arguments can be found in the tables, this method of solution cannot be used.

Lat. 20°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	
00	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 03	180.0	72 00.0	1.0 03	180.0	72 30.0	1.0 03	180.0	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	00
1	69 58.6	1.0 07	177.1	70 28.5	1.0 07	177.0	70 58.5	1.0 08	176.9	71 28.4	1.0 08	176.9	71 58.4	1.0 08	176.8	72 28.4	1.0 08	176.7	72 58.3	1.0 08	176.6	73 28.3	1.0 09	176.5	1
2	69 54.3	1.0 12	174.2	70 24.1	1.0 12	174.0	70 54.0	99 12	173.9	71 23.8	99 13	173.7	71 53.7	99 13	173.6	72 23.5	99 14	173.4	72 53.3	99 14	173.2	73 23.1	99 14	173.0	2
3	69 47.1	99 16	171.3	70 16.8	99 17	171.1	70 46.5	99 17	170.9	71 16.1	99 18	170.6	71 45.8	99 18	170.4	72 15.4	99 19	170.1	72 45.0	99 19	169.8	73 14.6	99 20	169.6	3
4	69 37.2	98 21	168.4	70 06.6	98 22	168.2	70 36.1	98 22	167.9	71 05.5	98 23	167.6	71 34.8	98 23	167.3	72 04.2	98 24	166.9	72 33.5	98 24	166.6	73 02.7	97 25	166.2	4
05	69 24.6	97 26	165.7	69 53.7	97 26	165.3	70 22.8	97 27	165.0	70 51.9	97 27	164.6	71 20.9	97 28	164.2	71 49.9	97 29	163.8	72 18.8	96 29	163.4	72 47.7	96 30	162.9	05
6	69 09.3	96 30	162.9	69 38.1	96 30	162.5	70 06.8	96 31	162.1	70 35.5	96 32	161.7	71 04.2	95 32	161.2	71 32.7	95 33	160.7	72 01.2	95 34	160.2	72 29.6	95 35	159.7	6
7	68 51.5	95 34	160.3	69 19.9	95 34	159.8	69 48.2	94 35	159.3	70 16.5	94 36	158.8	70 44.7	94 37	158.3	71 12.7	93 38	157.8	71 40.7	93 38	157.2	72 08.6	93 40	156.6	7
8	68 31.2	93 38	157.7	68 59.2	93 38	157.2	69 27.1	93 39	156.6	69 54.9	92 40	156.1	70 22.6	92 41	155.5	70 50.1	92 42	154.9	71 17.6	91 43	154.3	71 44.9	91 44	153.7	8
9	68 08.6	92 41	155.2	68 36.2	92 42	154.6	69 03.6	91 43	154.0	69 30.8	91 44	153.5	69 58.9	90 45	152.8	70 25.0	90 46	152.2	70 51.9	89 47	151.5	71 18.7	89 48	150.8	9
10	67 43.9	90 45	152.7	68 10.9	90 46	152.1	68 37.8	89 46	151.5	69 04.5	89 47	150.9	69 31.1	88 48	150.3	69 57.6	88 49	149.6	70 23.9	87 50	148.9	70 50.0	87 51	148.1	10
1	67 17.0	89 48	150.4	67 43.5	88 49	149.8	68 09.9	88 50	149.1	68 36.1	87 51	148.5	69 02.1	87 52	147.8	69 28.0	86 53	147.1	69 53.7	85 54	146.3	70 19.2	85 55	145.6	1
2	66 48.2	87 51	148.1	67 14.2	86 52	147.5	67 40.0	86 53	146.8	68 05.6	85 54	146.1	68 31.1	85 55	145.4	68 56.4	84 56	144.7	69 21.5	83 57	143.9	69 46.3	82 58	143.1	2
3	66 17.5	85 54	146.0	66 43.0	84 55	145.3	67 08.2	84 56	144.6	67 33.3	83 57	143.9	67 58.2	83 58	143.2	68 22.9	82 59	142.4	68 47.3	81 60	141.6	69 11.6	80 61	140.8	3
4	65 45.1	83 57	143.9	66 10.0	83 58	143.2	66 34.7	82 58	142.5	66 59.3	81 60	141.8	67 23.6	81 60	141.0	67 47.6	80 61	140.2	68 11.5	79 62	139.4	68 35.1	78 64	138.6	4
15	65 11.1	81 59	141.9	65 35.5	81 60	141.2	65 59.7	80 61	140.5	66 23.6	80 62	139.8	66 47.3	79 63	139.0	67 10.8	78 64	138.2	67 34.0	77 65	137.4	67 57.0	76 66	136.5	15
6	64 35.6	80 61	140.0	64 59.5	79 62	139.3	65 23.1	78 63	138.6	65 46.4	78 64	137.8	66 09.6	77 65	137.0	66 32.5	76 66	136.2	66 55.1	75 67	135.4	67 17.5	74 68	134.5	6
7	63 58.7	78 64	138.2	64 22.0	77 64	137.5	64 45.1	76 66	136.7	65 07.9	76 66	136.0	65 30.5	75 67	135.2	65 52.8	74 68	134.4	66 14.9	73 69	133.5	66 36.7	72 70	132.7	7
8	63 20.5	76 66	136.5	63 43.3	75 67	135.7	64 05.8	75 67	135.0	64 28.1	74 68	134.2	64 50.1	73 69	133.4	65 11.9	72 70	132.6	65 33.4	71 71	131.8	65 54.7	70 72	130.9	8
9	62 41.1	75 68	134.8	63 03.3	74 68	134.1	63 25.4	73 69	133.3	63 47.1	72 70	132.5	64 08.6	71 71	131.8	64 29.9	70 72	130.9	64 50.8	69 73	130.1	65 11.5	68 74	129.2	9
20	62 00.5	73 69	133.2	62 22.3	72 70	132.5	62 43.8	71 71	131.7	63 05.1	70 72	130.9	63 26.0	70 72	130.2	63 46.8	69 74	129.3	64 07.2	68 74	128.5	64 27.4	67 75	127.7	20
1	61 18.9	71 71	131.7	61 40.2	71 72	131.0	62 01.2	70 72	130.2	62 22.0	69 73	129.4	62 42.5	68 74	128.6	63 02.7	67 75	127.8	63 22.6	66 76	127.0	63 42.3	65 77	126.1	1
2	60 36.4	70 72	130.2	60 57.2	69 73	129.5	61 17.7	68 74	128.8	61 38.0	67 75	128.0	61 58.0	66 76	127.2	62 17.7	65 76	126.4	62 37.2	64 77	125.6	62 56.3	63 78	124.7	2
3	59 52.9	68 74	128.9	60 13.2	67 75	128.1	60 33.3	66 75	127.4	60 53.1	66 76	126.6	61 12.7	65 77	125.8	61 31.9	64 78	125.0	61 50.9	63 78	124.2	62 09.6	62 79	123.4	3
4	59 08.6	67 75	127.5	59 28.5	66 76	126.8	59 48.1	65 76	126.0	60 07.5	64 77	125.3	60 26.6	63 78	124.5	60 45.4	62 79	123.7	61 03.9	61 79	122.9	61 22.2	60 80	122.1	4
25	58 23.5	65 76	126.3	58 43.0	64 77	125.5	59 02.2	64 78	124.8	59 21.1	63 78	124.0	59 39.8	62 79	123.3	59 58.2	61 80	122.5	60 16.3	60 80	121.7	60 34.1	59 81	120.9	25
6	57 37.7	64 77	125.0	57 56.7	63 78	124.3	58 15.5	62 79	123.6	58 34.0	61 79	122.8	58 52.3	60 80	122.1	59 10.3	60 81	121.3	59 28.0	59 82	120.5	59 45.4	58 82	119.7	6
7	56 51.2	63 78	123.9	57 09.8	62 79	123.2	57 28.2	61 80	122.4	57 46.4	60 80	121.7	58 04.2	59 81	120.9	58 21.8	58 82	120.2	58 39.1	57 82	119.4	58 56.2	56 83	118.6	7
8	56 04.1	61 79	122.8	56 22.3	60 80	122.0	56 40.3	60 81	121.3	56 58.1	59 81	120.6	57 15.6	58 82	119.8	57 32.8	57 82	119.1	57 49.7	56 83	118.3	58 06.4	55 84	117.5	8
9	55 16.4	60 80	121.7	55 34.3	59 81	121.0	55 51.9	58 82	120.2	56 09.3	58 82	119.5	56 26.4	57 83	118.8	56 43.3	56 83	118.0	56 59.9	55 84	117.3	57 16.2	54 84	116.5	9
30	54 28.1	59 81	120.6	54 45.7	58 82	119.9	55 02.9	57 82	119.2	55 20.0	56 83	118.5	55 36.8	55 84	117.8	55 53.3	55 84	117.0	56 09.5	54 84	116.3	56 25.5	53 85	115.5	30
1	53 39.4	58 82	119.6	53 56.6	57 83	119.0	54 13.5	56 83	118.3	54 30.2	55 84	117.5	54 46.7	54 84	116.8	55 02.8	54 85	116.1	55 18.8	53 85	115.3	55 34.4	52 86	114.6	1
2	52 50.1	57 83	118.7	53 07.0	56 83	118.0	53 23.6	55 84	117.3	53 40.0	54 84	116.6	53 56.1	53 85	115.9	54 12.0	53 85	115.2	54 27.6	52 86	114.4	54 43.0	51 86	113.7	2
3	52 00.5	56 84	117.8	52 17.0	55 84	117.1	52 33.3	54 84	116.4	52 49.4	53 85	115.7	53 05.2	52 86	115.0	53 20.8	51 86	114.3	53 36.1	51 86	113.6	53 51.2	50 87	112.8	3
4	51 10.4	55 84	116.9	51 26.6	54 85	116.2	51 42.6	53 85	115.5	51 58.4	52 86	114.8	52 13.9	51 86	114.2	52 29.2	50 86	113.4	52 44.3	50 87	112.7	52 59.0	49 87	112.0	4
35	50 19.9	54 85	116.0	50 35.9	53 85	115.4	50 51.6	52 86	114.7	51 07.1	51 86	114.0	51 22.3	50 86	113.3	51 37.3	50 87	112.6	51 52.1	49 87	111.9	52 06.6	48 88	111.2	35
6	49 29.1	53 85	115.2	49 44.7	52 86	114.6	50 00.2	51 86	113.9	50 15.4	50 86	113.2	50 30.4	50 87	112.5	50 45.2	49 88	111.8	51 00.0	48 88	111.2	51 13.9	47 88	110.5	6
7	48 37.9	52 86	114.4	48 53.3	51 86	113.8	49 08.5	50 87	113.1	49 23.5	49 87	112.4	49 38.2	49 88	111.8	49 52.7	48 88	111.1	50 07.0	47 88	110.4	50 21.0	46 89	109.7	7
8	47 46.4	51 86	113.6	48 01.5	50 87	113.0	48 16.5	49 87	112.4	48 31.2	49 88	111.7	48 45.7	48 88	111.0	49 00.0	47 88	110.4	49 14.0	46 89	109.7	49 27.8	46 89	109.0	8
9	46 54.6	50 87	112.9	47 09.5	49 87	112.3	47 24.2	49 88	111.6	47 38.7	48 88	111.0	47 52.9	47 88	110.3	48 07.0	46 89	109.7	48 20.8	46 89	109.0	48 34.4	45 90	108.3	9
40	46 02.5	49 87	112.2	46 17.2	49 88	111.5	46 31.7	48 88	110.9	46 45.9	47 88	110.3	47 00.0	46 89	109.6	47 13.8	46 89	109.0	47 27.4	45 90	108.3	47 40.7	44 90	107.6	40
1	45 10.2	49 88	111.5	45 24.6	48 88	110.9	45 38.9	47 88	110.2	45 52.9	46 89	109.6	46 06.7	46 89	109.0	46 20.3	45 89	108.3	46 33.7	44 90	107.7	46 46.9	44 90	107.0	1
2	44 17.6	48 88	110.8	44 31.8	47 88	110.2	44 45.9	46 89	109.6	44 59.7	46 89	108.9	45 13.3	45 89	108.3	45 26.7	44 90	107.7	45 39.9	44 90	107.0	45 52.9	43 90	106.4	2
3	43 24.8	47 88	110.1	43 38.8	46 89	109.5	43 52.6	46 89	108.9	44 06.3	45 90	108.3	44 19.7	44 90	107.7	44 32.9	44 90	107.0	44 45.9	43 90	106.4	44 58.7	42 90	105.8	3
4	42 31.7	46 89	109.5	42 45.5	46 89	108.9	42 59.2	45 89	108.3	43 12.6	45 90	107.7	43 25.9	44 90	107.1	43 38.9	43 90	106.4	43 51.8	42 91	105.8	44 04.4	42 91	105.2	4
45	41 38.5	46 89	108.9	41 52.1	45 89	108.3	42 05.6	45 90	107.7	42 18.8	44 90	107.1	42 31.9	43 90	106.5	42 44.8	43 91	105.9	42 57.4	42 91	105.2	43 09.9	41 91	104.6	45
6	40 45.0	45 89	108.3	40 58.5	45 90	107.7	41 11.8	44 90	107.1	41 24.8	43 90	106.5	41 37.7	43 90	105.9	41 50.4	42 91	105.3	42 03.0	41 91	104.7	42 15.3	41 91	104.1	6
7	39 51.4	45 90	107.7	40 04.7	44 90	107.1	40 17.8	43 90	106.5	40 30.7	43 90	105.9	40 43.4	42 91	105.3	40 56.0	42 91	104.7	41 08.4	41 91	104.1	41 20.5	40 91	103.5	7
8	38 57.6	44 90	107.1	39 10.7	43 90	106.5	39 23.6	43 90	106.0	39 36.4	42 91	105.4	39 49.0	42 91	104.8	40 01.4	41 91	104.2	40 13.6	40 92	103.6	40 25.6	40 92	103.0	8
9	38 03.6	43 90	106.6	38 16.6	43 90	106.0	38 29.4	42 91	105.4	38 42.0	42 91	104.8	38 54.4	41 91	104.2	39 06.7	41 92	103.7	39 18.7	40 92	103.1	39 30.6	39 92	102.5	9
50	37 09.5	43 90	106.0	37 22.3	42 91	105.4	37 35.0	42 91	104.9	37 47.4	41 91	104.3	37 59.7	41 91	103.7	38 11.8	40 92	103.1	38 23.8	40 92	102.6	38 35.5	39 92	102.0	50
1	36 15.2	42 91	105.5	36 27.9	42 91	104.9	36 40.4	41 91	104.3	36 52.7	41 91	103.8	37 04.9	40 92	103.2	37 16.9	40 92	102.6	37 28.7	39 92	102.1	37 40.3	39 92	101.5	1
2	35 20.8	42 91	105.0	35 33.3	41 91	104.4	35 45.7	41 91	103.8	35 57.9	40 92	103.3	36 09.9	40 92	102.7	36 21.8	39 92	102.1	36 33.5	39 92	101.6	36 45.0	38 92	101.0	2
3	34 26.3	41 91	104.5	34 38.7	41 91	103.9	34 50.9	40 92	103.3	35 03.0	40 92	102.8	35 14.9	39 92	102.2	35 26.6	39 92	101.7	35 38.2	38 92	101.1	35 49.6	38 92	100.5	3
4	33 31.7	41 91	104.0	33 43.9	41 92	103.4	33 56.0	40 92	102.9	34 07.9	40 92	102.3	34 19.7	39 92	101.7	34 31.4	39 92	101.2	34 42.8	38 92	100.6	34 54.2	38 93	100.1	4
55	32 36.9	41 92	103.5	32 49.0	40 92	102.9	33 01.0	40 92	102.4	33 12.8	39 92	101.8	33 24.5	39 92	101.3	33 36.0	38 92	100.7	33 47.4	38 92	100.2	33 58.6	37 93	99.6	55
6	31 42.0	40 92	103.0	31 54.0	40 92	102.4	32 05.8	39 92	101.9	32 17.6	39 92	101.4	32 29.1	38 92	100.8	32 40.6	38 93	100.3	32 51.9	37 93	99.7	33 03.0	37 93	99.2	6
7	30 47.0	40 92	102.5	30 58.9	39 92	102.0	31 10.6	39 92	101.5	31 22.2	38 92	100.9	31 33.7	38 92	100.4	31 45.0	38 93	99.8	31 56.2	37 93	99.3	32 07.3	37 93	98.7	7
8	29 51.9	39 92	102.1	30 03.7	39 92	101.5	30 15.3	39 92	101.0	30 26.8	38 92	100.5	30 38.2	38 93	99.9	30 49.5	37 93	99.4	31 00.6	37 93	98.8	31 11.5	36 93	98.3	8
9	28 56.7	39 92	101.6	29 08.4	39 92	101.1	29 19.9	38 92	100.6	29 31.3	38 93	100.0	29 42.6	37 93	99.5	29 53.8	37 93	99.0	30 04.8	37 93	98.4	30 15.7	36 93	97.9	9
60	28 01.5	39 92	101.2	28 13.0	38 92	100.7	28 24.5	38 93	100.1	28 35.8	38 93	99.6	28 47.0	37 93	99.1	28 58.1	37 93	98.5	29 09.0	36 93	98.0	29 19.8	36 93	97.5	60
1	27 06.1	38 92	100.7	27 17.6	38 93	100.2	27 28.9	38 93	99.7	27 40.2	37 93	99.2	27 51.3	37 93	98.6	28 02.3	36 93	98.1	28 13.2	36 93	97.6	28 23.9	36 93	97.1	1
2	26 10.7	38 92	100.3	26 22.0	38 93	99.8	26 33.3	37 93	99.3	26 44.5	37 93	98.8	26 55.5	37 93	98.2	27 06.4	36 93	97.7	27 17.2	36 93	97.2	27 27.9	35 93	96.7	2
3	25 15.2	38 93	99.9	25 26.5	37 93	99.4	25 37.6	37 93	98.9	25 48.7	37 93	98.3	25 59.7	36 93	97.8	26 10.5	36 93	97.3	26 21.3	36 93	96.8	26 31.9	35 93	96.3	3
4	24 19.6	38 93	99.5	24 30.8	37 93	99.0	24 41.9	37 93	98.4	24 52.9	37 93	97.9	25 03.8	36 93	97.4	25 14.6	36 93	96.9	25 25.3	35 94	96.4	25 35.8	35 94	95.9	4
65	23 23.9	37 93	99.1	23 35.1	37 93	98.6	23 46.1	37 93	98.0	23 57.0	36 93	97.5	24 07.9	36 93	97.0	24 18.6	36 93	96.5	24 29.2	35 94	96.0	24 39.7	35 94	95.5	65
6	22 28.2	37 93	98.7	22 39.3	37 93	98.2	22 50.2	36 93	97.6	23 01.1	36 93	97.1	23 11.9	36 93	96.6	23 22.6	35 94	96.1	23 33.1	35 94	95.6	23 43.6	35 94	95.1	6
7	21 32.5	37 93	98.3	21 43.4	37 93	97.8	21 54.3	36 93	97.3	22 05.1	36 93	96.8	22 15.9	36 93	96.3	22 26.5	35 94	95.7	22 37.0	35 94	95.2	22 47.4	35 94	94.7	7
8	20 36.6	37 93	97.9	20 47.6	36 93	97.4	20 58.4	36 93	96.9	21 09.1	36 93	96.4	21 19.8	35 94	95.9	21 30.4	35 94	95.4	21 40.8	35 94	94.9	21 51.2	34 94	94.4	8
9	19 40.8	36 93	97.5	19 51.6	36 93	97.0	20 02.4	36 93	96.5	20 13.1	35 94	96.0	20 23.7	35 94	95.5	20 34.2	35 94	95.0	20 44.6	35 94	94.5	20 55.0	34 94	94.0	9
70	18 44.8	36 93	97.1	18 55.6	36 93	96.6	19 06.3	36 93	96.1	19 17.0	35 94	95.6	19 27.5	35 94	95.1	19 38.0	35 94	94.6	19 48.4	34 94	94.1	19 58.7	34 94	93.6	70
1	17 48.9	36 93	96.7	17 59.6	36 93	96.2	18 10.3	35 94	95.7	18 20.9	35 94	95.2	18 31.4	35 94	94.7	18 41.8	35 94	94.3	18 52.2	34 94	93.8	19 02.5	34 94	93.3	1
2	16 52.8	36 93	96.3	17 03.5	35 93	95.8	17 14.2	35 94	95.4	17 24.7	35 94	94.9	17 35.2	35 94	94.4	17 45.6	35 94	93.9	17 55.9	34 94	93.4	18 06.2	34 94	92.9	2
3	15 56.8	36 94	96.0	16 07.4	35 94	95.5	16 18.0	35 94	95.0	16 28.5	35 94	94.5	16 38.9	35 94	94.0	16 49.3	34 94	93.5	16 59.6	34 94	93.0	17 09.8	34 94	92.5	3
4	15 00.7	35 94	95.6	15 11.3	35 94	95.1	15 21.8	35 94	94.6	15 32.3	35 94	94.1	15 42.7	35 94	93.7	15 53.0	34 94	93.2	16 03.3	34 94	92.7	16 13.5	34 94	92.2	4
75	14 04.6	35 94	95.2	14 15.1	35 94	94.8	14 25.6	35 94	94.3	14 36.0	35 94	93.8	14 46.4	34 94	93.3	14 56.7	34 94	92.8	15 07.0	34 94	92.3	15 17.2	34 94	91.8	75
6	13 08.4	35 94	94.9	13 18.9	35 94	94.4	13 29.4	35 94	93.9	13 39.8	35 94	93.4	13 50.1	34 94	92.9	14 00.4	34 94	92.5	14 10.6	34 94	92.0	14 20.8	34 94	91.5	6
7	12 12.2	35 94	94.5	12 22.7	35 94	94.0	12 33.1	35 94	93.6	12 43.5	35 94	93.1	12 53.8	34 94	92.6	13 04.1	34 94	92.1	13 14.3	34 94	91.6	13 24.4	34 94	91.1	7
8	11 16.0	35 94	94.2	11 26.4	35 94	93.7	11 36.8	35 94	93.2	11 47.2	34 94	92.7	11 57.5	34 94	92.2	12 07.7	34 94	91.8	12 17.9	34 94	91.3	12 28.1	34 94	90.8	8
9	10 19.7	35 94	93.8	10 30.2	35 94	93.3	10 40.5	35 94	92.8	10 50.8	34 94	92.4	11 01.1	34 94	91.9	11 11.4	34 94	91.4	11 21.5	34 94	90.9	11 31.7	34 94	90.5	9
80	9 23.5	35 94	93.5	9 33.9	35 94	93.0	9 44.2	34 94	92.5	9 54.5	34 94	92.0	10 04.8	34 94	91.5	10 15.0	34 94	91.1	10 25.2	34 94	90.6	10 35.3	34 94	90.1	80
1	8 27.1	35 94	93.1	8 37.5	34 94	92.6	8 47.9	34 94	92.2	8 58.1	34 94	91.7	9 08.4	34 94	91.2	9 18.6	34 94	90.7	9 28.8	34 94	90.2	9 38.9	34 94	89.8	1
2	7 30.9	34 94	92.8	7 41.2	34 94	92.3	7 51.5	34 94	91.8	8 01.8	34 94	91.3	8 12.0	34 94	90.9	8 22.2	34 94	90.4	8 32.4	34 94	89.9	8 42.5	34 94	89.4	2
3	6 34.6	34 94	92.4	6 44.9	34 94	91.9	6 55.2	34 94	91.5	7 05.4	34 94	91.0	7 15.7	34 94	90.5	7 25.9	34 94	90.0	7 36.0	34 94	89.6	7 46.2	34 94	89.1	3
4	5 38.2	34 94	92.1	5 48.5	34 94	91.6	5 58.8	34 94	91.1	6 09.0	34 94	90.6	6 19.3	34 94	90.2	6 29.5	34 94	89.7	6 39.6	34 94	89.2	6 49.8	34 94	88.7	4
85							5 02.4	34 94	90.8	5 12.7	34 94	90.3	5 22.9	34 94	89.8	5 33.1	34 94	89.4	5 43.3	34 94	88.9	5 53.4	34 94	88.4	85

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	70 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	69 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	68 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0	67 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	00
1	69 58.6	1.0 07	177.1	69 28.6	1.0 07	177.1	68 58.6	1.0 07	177.2	68 28.7	1.0 07	177.3	67 58.7	1.0 07	177.3	67 28.7	1.0 06	177.4	66 58.7	1.0 06	177.4	66 28.8	1.0 06	177.5	1
2	69 54.3	1.0 12	174.2	69 24.4	1.0 12	174.3	68 54.5	1.0 11	174.4	68 24.6	1.0 11	174.6	67 54.8	1.0 11	174.7	67 24.9	1.0 11	174.8	66 55.0	1.0 10	174.9	66 25.1	1.0 10	175.0	2
3	69 47.1	99 16	171.3	69 17.4	99 16	171.5	68 47.7	99 16	171.7	68 18.0	99 16	171.9	67 48.2	99 15	172.0	67 18.5	99 15	172.2	66 48.7	99 14	172.4	66 19.0	99 14	172.5	3
4	69 37.2	98 21	168.4	69 07.7	98 21	168.7	68 38.2	98 20	169.0	68 08.7	98 20	169.2	67 39.2	98 19	169.4	67 09.6	99 19	169.7	66 40.0	99 18	169.9	66 10.4	99 18	170.1	4
05	69 24.6	97 26	165.7	68 55.4	97 25	166.0	68 26.1	97 24	166.3	67 56.9	98 24	166.6	67 27.6	98 23	166.9	66 58.3	98 23	167.1	66 28.9	98 22	167.4	65 59.5	98 22	167.7	05
6	69 09.3	96 30	162.9	68 40.4	96 29	163.3	68 11.5	96 28	163.7	67 42.6	97 28	164.0	67 13.6	97 27	164.3	66 44.5	97 27	164.7	66 15.4	97 26	165.0	65 46.3	97 26	165.3	6
7	68 51.5	95 34	160.3	68 23.0	95 33	160.7	67 54.4	95 32	161.1	67 25.8	95 32	161.5	66 57.2	96 31	161.9	66 28.5	96 30	162.2	65 59.7	96 30	162.6	65 30.9	96 29	162.9	7
8	68 31.2	93 38	157.7	68 03.2	94 37	158.1	67 35.0	94 36	158.6	67 06.8	94 35	159.0	66 38.5	94 35	159.5	66 10.2	95 34	159.9	65 41.7	95 33	160.3	65 13.3	95 33	160.6	8
9	68 08.6	92 41	155.2	67 41.0	92 41	155.7	67 13.3	93 40	156.2	66 45.5	93 39	156.7	66 17.7	93 38	157.1	65 49.7	93 38	157.6	65 21.7	94 37	158.0	64 53.5	94 36	158.4	9
10	67 43.9	90 45	152.7	67 16.7	91 44	153.3	66 49.5	91 43	153.8	66 22.1	91 42	154.3	65 54.7	92 42	154.8	65 27.2	92 41	155.3	64 59.5	92 40	155.8	64 31.8	93 39	156.2	10
1	67 17.0	89 48	150.4	66 50.4	89 47	151.0	66 23.6	89 46	151.6	65 56.7	90 46	152.1	65 29.7	90 45	152.6	65 02.6	91 44	153.1	64 35.4	91 43	153.6	64 08.1	91 42	154.1	1
2	66 48.2	87 51	148.1	66 22.1	87 50	148.8	65 55.8	88 49	149.4	65 29.4	88 49	149.9	65 02.9	89 48	150.5	64 36.2	89 47	151.0	64 09.5	89 46	151.6	63 42.6	90 45	152.1	2
3	66 17.5	85 54	146.0	65 51.9	86 53	146.6	65 26.2	86 52	147.2	65 00.3	87 52	147.8	64 34.2	87 51	148.4	64 08.1	87 50	149.0	63 41.7	88 49	149.5	63 15.3	88 48	150.1	3
4	65 45.1	83 57	143.9	65 20.1	84 56	144.6	64 54.8	84 55	145.2	64 29.4	85 54	145.8	64 03.9	85 53	146.4	63 38.2	86 53	147.0	63 12.3	86 52	147.6	62 46.4	87 51	148.1	4
15	65 11.1	81 59	141.9	64 46.6	82 58	142.6	64 21.9	83 57	143.3	63 57.0	83 57	143.9	63 31.9	84 56	144.5	63 06.7	84 55	145.1	62 41.3	85 54	145.7	62 15.8	85 53	146.3	15
6	64 35.6	80 61	140.0	64 11.6	80 61	140.7	63 47.4	81 60	141.4	63 23.0	82 59	142.0	62 58.5	82 58	142.7	62 33.7	83 57	143.3	62 08.8	83 57	143.9	61 43.8	84 56	144.5	6
7	63 58.7	78 64	138.2	63 35.2	79 63	138.9	63 11.5	79 62	139.6	62 47.7	80 61	140.3	62 23.6	81 60	140.9	61 59.3	81 60	141.5	61 34.9	82 59	142.2	61 10.4	82 58	142.8	7
8	63 20.5	76 66	136.5	62 57.5	77 65	137.2	62 34.4	78 64	137.9	62 11.0	78 63	138.5	61 47.4	79 62	139.2	61 23.6	80 62	139.9	60 59.7	80 61	140.5	60 35.6	81 60	141.1	8
9	62 41.1	75 68	134.8	62 18.6	75 67	135.5	61 55.9	76 66	136.2	61 33.0	77 65	136.9	61 10.0	77 64	137.6	60 46.7	78 64	138.2	60 23.2	79 63	138.9	59 59.5	79 62	139.5	9
20	62 00.5	73 69	133.2	61 38.6	74 69	133.9	61 16.4	74 68	134.6	60 54.0	75 67	135.3	60 31.3	76 66	136.0	60 08.5	76 65	136.7	59 45.5	77 65	137.3	59 22.3	78 64	137.9	20
1	61 18.9	71 71	131.7	60 57.5	72 70	132.4	60 35.7	73 69	133.1	60 13.8	73 69	133.8	59 51.6	74 68	134.5	59 29.3	75 67	135.2	59 06.7	75 66	135.8	58 44.0	76 66	136.4	1
2	60 36.4	70 72	130.2	60 15.4	71 72	131.0	59 54.1	71 71	131.7	59 32.6	72 70	132.4	59 10.9	73 69	133.0	58 49.0	73 69	133.7	58 26.9	74 68	134.4	58 04.6	75 67	135.0	2
3	59 52.9	68 74	128.9	59 32.3	69 73	129.6	59 11.5	70 72	130.3	58 50.5	70 72	131.0	58 29.3	71 71	131.7	58 07.8	72 70	132.3	57 46.1	73 69	133.0	57 24.3	73 69	133.6	3
4	59 08.6	67 75	127.5	58 48.5	68 75	128.3	58 28.1	68 74	129.0	58 07.5	69 73	129.6	57 46.7	70 72	130.3	57 25.7	70 72	131.0	57 04.5	71 71	131.6	56 43.0	72 70	132.3	4
25	58 23.5	65 76	126.3	58 03.8	66 76	127.0	57 43.9	67 75	127.7	57 23.7	68 74	128.4	57 03.3	68 74	129.0	56 42.7	69 73	129.7	56 21.9	70 72	130.4	56 00.9	70 72	131.0	25
6	57 37.7	64 77	125.0	57 18.4	65 77	125.7	56 58.9	65 76	126.5	56 39.1	66 75	127.1	56 19.1	67 75	127.8	55 59.0	68 74	128.5	55 38.6	68 74	129.1	55 17.9	69 73	129.8	6
7	56 51.2	63 78	123.9	56 32.3	63 78	124.6	56 13.2	64 77	125.3	55 53.8	65 76	126.0	55 34.3	66 76	126.6	55 14.5	66 75	127.3	54 54.4	67 75	127.9	54 34.2	68 74	128.6	7
8	56 04.1	61 79	122.8	55 45.6	62 79	123.5	55 26.8	63 78	124.1	55 07.9	64 78	124.8	54 48.7	64 77	125.5	54 29.3	65 76	126.2	54 09.6	66 76	126.8	53 49.8	66 75	127.4	8
9	55 16.4	60 80	121.7	54 58.2	61 80	122.4	54 39.9	62 79	123.1	54 21.3	62 79	123.7	54 02.5	63 78	124.4	53 43.4	64 77	125.1	53 24.2	65 77	125.7	53 04.7	65 76	126.3	9
30	54 28.1	59 81	120.6	54 10.3	60 81	121.3	53 52.3	60 80	122.0	53 34.1	61 80	122.7	53 15.6	62 79	123.3	52 57.0	63 78	124.0	52 38.1	63 78	124.6	52 19.0	64 77	125.3	30
1	53 39.4	58 82	119.6	53 21.9	58 82	120.3	53 04.3	59 81	121.0	52 46.4	60 80	121.7	52 28.3	61 80	122.3	52 09.9	61 79	123.0	51 51.4	62 79	123.6	51 32.7	63 78	124.2	1
2	52 50.1	57 83	118.7	52 33.0	57 82	119.4	52 15.7	58 82	120.0	51 58.1	59 81	120.7	51 40.4	60 81	121.4	51 22.4	60 80	122.0	51 04.2	61 79	122.6	50 45.8	62 79	123.3	2
3	52 00.5	56 84	117.8	51 43.6	56 83	118.4	51 26.7	57 82	119.1	51 09.4	58 82	119.8	50 52.0	59 81	120.4	50 34.3	59 81	121.1	50 16.5	60 80	121.7	49 58.4	61 80	122.3	3
4	51 10.4	55 84	116.9	50 53.9	55 84	117.6	50 37.2	56 83	118.2	50 20.3	57 83	118.9	50 03.1	57 82	119.5	49 45.8	58 82	120.1	49 28.2	59 81	120.8	49 10.5	60 81	121.4	4
35	50 19.9	54 85	116.0	50 03.7	54 84	116.7	49 47.3	55 84	117.3	49 30.7	56 83	118.0	49 13.8	56 83	118.6	48 56.8	57 82	119.2	48 39.6	58 82	119.9	48 22.1	58 81	120.5	35
6	49 29.1	53 85	115.2	49 13.1	53 85	115.9	48 57.0	54 84	116.5	48 40.7	55 84	117.1	48 24.2	55 84	117.8	48 07.4	56 83	118.4	47 50.5	57 82	119.0	47 33.3	57 82	119.6	6
7	48 37.9	52 86	114.4	48 22.3	53 85	115.1	48 06.4	53 85	115.7	47 50.3	54 85	116.3	47 34.1	55 84	116.9	47 17.6	55 83	117.6	47 01.0	56 83	118.2	46 44.1	57 83	118.8	7
8	47 46.4	51 86	113.6	47 31.0	52 86	114.3	47 15.4	52 86	114.9	46 59.6	53 85	115.5	46 43.6	54 84	116.2	46 27.5	54 84	116.8	46 11.1	55 84	117.4	45 54.5	56 83	118.0	8
9	46 54.6	50 87	112.9	46 39.5	51 87	113.5	46 24.1	51 86	114.2	46 08.6	52 85	114.8	45 52.9	53 85	115.4	45 36.9	53 85	116.0	45 20.8	54 84	116.6	45 04.5	55 84	117.2	9
40	46 02.5	49 87	112.2	45 47.6	50 87	112.8	45 32.5	51 86	113.4	45 17.3	51 86	114.0	45 01.8	52 86	114.6	44 46.1	53 85	115.2	44 30.2	53 85	115.8	44 14.2	54 84	116.4	40
1	45 10.2	49 88	111.5	44 55.5	49 87	112.1	44 40.7	50 87	112.7	44 25.6	50 86	113.3	44 10.4	51 86	113.9	43 55.0	52 86	114.5	43 39.3	52 85	115.1	43 23.6	53 85	115.7	1
2	44 17.6	48 88	110.8	44 03.1	48 88	111.4	43 48.5	49 87	112.0	43 33.7	50 87	112.6	43 18.7	50 87	113.2	43 03.5	51 86	113.8	42 48.1	52 86	114.4	42 32.6	52 85	115.0	2
3	43 24.8	47 88	110.1	43 10.5	48 88	110.7	42 56.1	48 88	111.3	42 41.5	49 87	111.9	42 26.7	50 87	112.5	42 11.8	50 87	113.1	41 56.6	51 86	113.7	41 41.3	51 86	114.3	3
4	42 31.7	46 89	109.5	42 17.7	47 88	110.1	42 03.5	48 88	110.7	41 49.1	48 88	111.3	41 34.5	49 87	111.9	41 19.8	49 87	112.5	41 04.9	50 87	113.0	40 49.8	51 86	113.6	4
45	41 38.5	46 89	108.9	41 24.6	46 89	109.5	41 10.6	47 88	110.1	40 56.5	48 88	110.6	40 42.1	48 88	111.2	40 27.6	49 87	111.8	40 12.9	49 87	112.4	39 58.0	50 87	112.9	45
6	40 45.0	45 89	108.3	40 31.4	46 89	108.9	40 17.6	46 89	109.5	40 03.6	47 88	110.0	39 49.4	47 88	110.6	39 35.1	48 88	111.2	39 20.6	49 87	111.7	39 06.0	49 87	112.3	6
7	39 51.4	45 90	107.7	39 37.9	45 89	108.3	39 24.3	46 89	108.8	39 10.5	46 89	109.4	38 56.6	47 88	110.0	38 42.4	47 88	110.6	38 28.1	48 88	111.1	38 13.7	48 87	111.7	7
8	38 57.6	44 90	107.1	38 44.3	45 90	107.7	38 30.9	45 89	108.3	38 17.3	46 89	108.8	38 03.5	46 89	109.4	37 49.5	47 88	110.0	37 35.4	47 88	110.5	37 21.2	48 88	111.1	8
9	38 03.6	43 90	106.6	37 50.5	44 90	107.1	37 37.2	45 90	107.7	37 23.8	45 89	108.3	37 10.2	46 89	108.8	36 56.4	46 89	109.4	36 42.5	47 88	109.9	36 28.5	47 88	110.5	9
50	37 09 5	43 90	106.0	36 56.6	44 90	106.6	36 43.4	44 90	107.1	36 30.2	45 90	107.7	36 16.7	45 89	108.3	36 03.2	46 89	108.8	35 49.4	46 89	109.4	35 35.5	47 88	109.9	50
1	36 15.2	42 91	105.5	36 02.5	43 90	106.0	35 49.5	43 90	106.6	35 36.4	44 90	107.2	35 23.1	44 90	107.7	35 09.7	45 89	108.2	34 56.1	45 89	108.8	34 42.4	46 89	109.3	1
2	35 20.8	42 91	105.0	35 08.2	42 91	105.5	34 55.4	43 90	106.1	34 42.4	43 90	106.6	34 29.3	44 90	107.2	34 16.1	44 90	107.7	34 02.7	45 89	108.2	33 49.1	45 89	108.8	2
3	34 26.3	41 91	104.5	34 13.8	42 91	105.0	34 01.1	42 91	105.6	33 48.3	43 90	106.1	33 35.4	43 90	106.6	33 22.3	44 90	107.2	33 09.1	44 90	107.7	32 55.7	45 89	108.2	3
4	33 31.7	41 91	104.0	33 19.3	42 91	104.5	33 06.7	42 91	105.0	32 54.1	42 91	105.6	32 41.3	43 90	106.1	32 28.3	43 90	106.7	32 15.3	44 90	107.2	32 02.1	44 90	107.7	4
55	32 36.9	41 92	103.5	32 24.6	41 91	104.0	32 12.2	42 91	104.6	31 59.7	42 91	105.1	31 47.0	42 91	105.6	31 34.3	43 90	106.1	31 21.3	43 90	106.7	31 08.3	44 90	107.2	55
6	31 42.0	40 92	103.0	31 29.8	41 91	103.5	31 17.6	41 91	104.1	31 05.2	42 91	104.6	30 52 7	42 91	105.1	30 40.0	42 90	105.7	30 27.3	43 90	106.2	30 14.4	44 90	106.7	6
7	30 47.0	40 92	102.5	30 35.0	40 92	103.1	30 22.9	41 91	103.6	30 10.6	41 91	104.1	29 58.2	42 91	104.6	29 45.7	42 91	105.2	29 33.0	42 90	105.7	29 20.3	43 90	106.2	7
8	29 51.9	39 92	102.1	29 40.0	40 92	102.6	29 28.0	40 92	103.1	29 15.9	41 91	103.6	29 03.6	41 91	104.2	28 51.2	42 91	104.7	28 38.7	42 91	105.2	28 26.1	42 91	105.7	8
9	28 56.7	39 92	101.6	28 44.9	40 92	102.1	28 33.0	40 92	102.7	28 21.0	40 91	103.2	28 08.9	41 91	103.7	27 56.6	41 91	104.2	27 44.2	41 91	104.7	27 31.7	42 91	105.2	9
60	28 01.5	39 92	101.2	27 49.8	39 92	101.7	27 38.0	40 92	102.2	27 26.1	40 92	102.7	27 14.0	40 91	103.2	27 01.9	41 91	103.8	26 49.6	41 91	104.3	26 37.3	41 91	104.8	60
1	27 06.1	38 92	100.7	26 54.5	39 92	101.3	26 42.8	39 92	101.8	26 31.0	40 92	102.3	26 19.1	40 92	102.8	26 07.1	40 91	103.3	25 54.9	41 91	103.8	25 42.7	41 91	104.3	1
2	26 10.7	38 92	100.3	25 59.2	38 92	100.8	25 47.6	39 92	101.3	25 35.9	39 92	101.8	25 24.1	40 92	102.4	25 12.2	40 92	102.9	25 00.1	40 92	103.4	24 48.0	41 91	103.9	2
3	25 15.2	38 93	99.9	25 03.8	38 92	100.4	24 52.3	39 92	100.9	24 40.7	39 92	101.4	24 29.0	39 92	101.9	24 17.1	40 92	102.4	24 05.2	40 92	102.9	23 53.2	40 91	103.4	3
4	24 19.6	38 93	99.5	24 08.3	38 93	100.0	23 56.9	38 93	100.5	23 45.4	39 92	101.0	23 33.7	39 92	101.5	23 22.0	39 92	102.0	23 10.2	40 92	102.5	22 58.3	40 91	103.0	4
65	23 23.9	37 93	99.1	23 12.7	38 93	99.6	23 01.4	38 93	100.1	22 50.0	39 92	100.6	22 38.4	39 92	101.1	22 26.9	39 92	101.6	22 15.1	39 92	102.1	22 03.4	39 92	102.6	65
6	22 28.2	37 93	98.7	22 17.1	37 93	99.2	22 05.8	38 93	99.7	21 54.5	38 92	100.2	21 43.1	38 92	100.7	21 31.6	39 92	101.2	21 20.0	39 92	101.7	21 08.3	39 92	102.1	6
7	21 32.5	37 93	98.3	21 21.4	37 93	98.8	21 10.2	37 93	99.3	20 59.0	38 93	99.8	20 47.6	38 92	100.3	20 36.2	38 92	100.7	20 24.7	39 92	101.2	20 13.1	39 92	101.7	7
8	20 36.6	37 93	97.9	20 25.6	37 93	98.4	20 14.5	37 93	98.9	20 03.4	37 93	99.4	19 52.1	38 93	99.8	19 40.8	38 92	100.3	19 29.4	38 92	100.8	19 17.9	38 92	101.3	8
9	19 40.8	36 93	97.5	19 29.8	37 93	98.0	19 18.8	37 93	98.5	19 07.7	37 93	99.0	18 56.5	37 93	99.4	18 45.3	38 93	99.9	18 34.0	38 92	100.4	18 22.5	38 92	100.9	9
70	18 44.8	36 93	97.1	18 34.0	36 93	97.6	18 23.0	37 93	98.1	18 12.0	37 93	98.6	18 00.9	37 93	99.1	17 49.7	37 93	99.5	17 38.5	38 93	100.0	17 27.1	38 92	100.5	70
1	17 48.9	36 93	96.7	17 38.1	36 93	97.2	17 27.2	36 93	97.7	17 16.2	37 93	98.2	17 05.2	37 93	98.7	16 54.1	37 93	99.2	16 42.9	37 93	99.6	16 31.7	38 93	100.1	1
2	16 52.8	36 93	96.3	16 42.1	36 93	96.8	16 31.3	36 93	97.3	16 20.4	37 93	97.8	16 09.4	37 93	98.3	15 58.4	37 93	98.8	15 47.3	37 93	99.3	15 36.1	37 93	99.7	2
3	15 56.8	36 94	96.0	15 46.1	36 93	96.5	15 35.3	36 93	96.9	15 24.5	36 93	97.4	15 13.6	36 93	97.9	15 02.6	37 93	98.4	14 51.6	37 93	98.9	14 40.5	37 93	99.4	3
4	15 00.7	35 94	95.6	14 50.1	36 93	96.1	14 39.3	36 93	96.6	14 28.6	36 93	97.0	14 17.7	36 93	97.5	14 06.8	36 93	98.0	13 55.9	37 93	98.5	13 44.9	37 93	99.0	4
75	14 04.6	35 94	95.2	13 54.0	35 93	95.7	13 43.3	36 93	96.2	13 32.6	36 93	96.7	13 21.8	36 93	97.2	13 11.0	36 93	97.6	13 00.1	36 93	98.1	12 49.2	37 93	98.6	75
6	13 08.4	35 94	94.9	12 57.9	35 94	95.4	12 47.2	35 93	95.8	12 36.6	36 93	96.3	12 25.8	36 93	96.8	12 15.1	36 93	97.3	12 04.2	36 93	97.7	11 53.4	36 93	98.2	6
7	12 12.2	35 94	94.5	12 01.7	35 94	95.0	11 51.1	35 94	95.5	11 40.5	35 93	96.0	11 29.8	36 93	96.4	11 19.1	36 93	96.9	11 08.4	36 93	97.4	10 57.6	36 93	97.9	7
8	11 16.0	35 94	94.2	11 05.5	35 94	94.6	10 55.0	35 94	95.1	10 44.4	35 93	95.6	10 33.8	35 93	96.1	10 23.1	36 93	96.5	10 12.4	36 93	97.0	10 01.7	36 93	97.5	8
9	10 19.7	35 94	93.8	10 09.3	35 94	94.3	9 58.8	35 94	94.8	9 48.3	35 94	95.2	9 37.7	35 93	95.7	9 27.1	35 93	96.2	9 16.4	36 93	96.7	9 05.8	36 93	97.1	9
80	9 23.5	35 94	93.5	9 13.1	35 94	93.9	9 02.6	35 94	94.4	8 52.1	35 94	94.9	8 41.6	35 94	95.3	8 31.0	35 93	95.8	8 20.4	35 93	96.3	8 09.8	36 93	96.8	80
1	8 27.1	35 94	93.1	8 16.8	35 94	93.6	8 06.4	35 94	94.0	7 55.9	35 94	94.5	7 45.4	35 94	95.0	7 34.9	35 93	95.5	7 24.4	35 93	95.9	7 13.8	35 93	96.4	1
2	7 30.9	34 94	92.8	7 20.5	35 94	93.2	7 10.1	35 94	93.7	6 59.7	35 94	94.2	6 49.2	35 94	94.6	6 38.8	35 94	95.1	6 28.3	35 94	95.6	6 17.7	35 93	96.1	2
3	6 34.6	34 94	92.4	6 24.2	35 94	92.9	6 13.8	35 94	93.4	6 03.5	35 94	93.8	5 53.0	35 94	94.3	5 42.6	35 94	94.8	5 32.1	35 94	95.2	5 21.6	35 93	95.7	3
4	5 38.2	34 94	92.1	5 27.9	34 94	92.5	5 17.6	35 94	93.0	5 07.2	35 94	93.5													4

Lat. 20°

H.A.	4° 00′ Alt. ° ′	Δd Δt	Az. °	4° 30′ Alt. ° ′	Δd Δt	Az. °	5° 00′ Alt. ° ′	Δd Δt	Az. °	5° 30′ Alt. ° ′	Δd Δt	Az. °
00	74 00.0	1.0 08	180.0	74 30.0	1.0 08	180.0	75 00.0	1.0 08	180.0	75 30.0	1.0 08	180.0
1	73 58.2	1.0 09	176.4	74 28.2	1.0 09	176.3	74 58.1	1.0 09	176.2	75 28.0	1.0 10	176.0
2	73 52.9	99 15	172.8	74 22.7	99 15	172.6	74 52.5	99 16	172.3	75 22.2	99 16	172.1
3	73 44.1	98 20	169.3	74 13.6	98 21	168.9	74 43.1	98 22	168.6	75 12.6	98 22	168.2
4	73 31.9	97 26	165.8	74 01.1	97 26	165.4	74 30.2	97 27	164.9	74 59.2	97 28	164.5
05	73 16.5	96 31	162.4	73 45.2	96 32	161.9	74 13.8	96 33	161.4	74 42.4	96 34	160.8
6	72 57.9	94 36	159.2	73 26.1	94 37	158.6	73 54.2	93 38	157.9	74 22.2	93 39	157.3
7	72 36.4	92 40	156.0	73 04.0	92 42	155.3	73 31.6	91 43	154.7	73 58.9	91 44	153.9
8	72 12.1	90 45	153.0	72 39.1	90 46	152.3	73 06.0	89 47	151.5	73 32.7	89 48	150.7
9	71 45.2	88 49	150.1	72 11.6	88 50	149.3	72 37.8	87 51	148.5	73 03.9	86 52	147.7
10	71 16.0	86 52	147.4	71 41.7	85 54	146.6	72 07.2	85 55	145.7	72 32.5	84 56	144.8
1	70 44.5	84 56	144.8	71 09.5	83 57	143.9	71 34.4	82 58	143.0	71 59.0	81 59	142.1
2	70 10.9	82 59	142.3	70 35.3	81 60	141.4	70 59.5	80 61	140.5	71 23.3	79 62	139.6
3	69 35.5	80 62	139.9	69 59.3	79 63	139.1	70 22.7	78 64	138.1	70 45.9	77 65	137.2
4	68 58.4	77 64	137.7	69 21.5	76 66	136.8	69 44.3	75 67	135.9	70 06.8	75 68	134.9
15	68 19.7	76 67	135.6	68 42.2	74 68	134.7	69 04.3	73 69	133.8	69 26.1	72 70	132.8
6	67 39.6	73 69	133.7	68 01.4	72 70	132.8	68 22.9	71 71	131.8	68 44.1	70 72	130.8
7	66 58.2	71 71	131.8	67 19.4	70 72	130.9	67 40.3	69 73	129.9	68 00.9	68 74	129.0
8	66 15.6	69 73	130.0	66 36.2	68 74	129 1	66 56.5	67 75	128.2	67 16.5	66 76	127.2
9	65 31.9	67 74	128.4	65 52.0	66 75	127.5	66 11.7	65 76	126.5	66 31.1	64 77	125.6
20	64 47.2	66 76	126.8	65 06.7	65 77	125.9	65 25.9	63 78	125.0	65 44.8	62 78	124.0
1	64 01.6	64 77	125.3	64 20.6	63 78	124.4	64 39.3	62 79	123.5	64 57.7	60 80	122.6
2	63 15.2	62 79	123.9	63 33.7	61 79	123.0	63 51.9	60 80	122.1	64 09.8	59 81	121.2
3	62 28.0	61 80	122.5	62 46.1	60 81	121.7	63 03.8	59 81	120.8	63 21.2	57 82	119.9
4	61 40.1	59 81	121.2	61 57.7	58 82	120.4	62 15.0	57 82	119.5	62 32.0	56 83	118.6
25	60 51.6	58 82	120.0	61 08.8	57 82	119.2	61 25.7	56 83	118.3	61 42.2	55 84	117.4
6	60 02.5	57 83	118.9	60 19.3	55 83	118.0	60 35.8	54 84	117.2	60 52.0	53 85	116.3
7	59 12.9	55 84	117.8	59 29.3	54 84	116.9	59 45.4	53 85	116.1	60 01.2	52 85	115.3
8	58 22.7	54 84	116.7	58 38.8	53 85	115.9	58 54.6	52 86	115.1	59 10.0	51 86	114.2
9	57 32.2	53 85	115.7	57 47.9	52 86	114.9	58 03.3	51 86	114.1	58 18.4	50 87	113.3
30	56 41.2	52 86	114.7	56 56.6	51 86	114.0	57 11.6	50 87	113.2	57 26.4	49 87	112.4
1	55 49.8	51 86	113.8	56 04.8	50 87	113.1	56 19.6	49 87	112.3	56 34.1	48 88	111.5
2	54 58.0	50 87	112.9	55 12.8	49 87	112.2	55 27.3	48 88	111.4	55 41.5	47 88	110.6
3	54 05.9	49 87	112.1	54 20.4	48 88	111.3	54 34.7	47 88	110.6	54 48.6	46 89	109.8
4	53 13.5	48 88	111.3	53 27.8	47 88	110.5	53 41.7	46 88	109.8	53 55.4	45 89	109.0
35	52 20.9	47 88	110.5	52 34.9	46 89	109.8	52 48.6	45 89	109.0	53 02.0	44 89	108.3
6	51 27.9	46 89	109.8	51 41.7	45 89	109.0	51 55.2	44 90	108.3	52 08.4	44 90	107.6
7	59 34.7	45 89	109.0	50 48.3	45 90	108.3	51 01.5	44 90	107.6	51 14.5	43 90	106.9
8	49 41.3	45 89	108.3	49 54.6	44 90	107.6	50 07.7	43 90	106.9	50 20.5	42 90	106.2
9	48 47.7	44 90	107.6	49 00.8	43 90	107.0	49 13.6	42 90	106.3	49 26.3	42 91	105.6
40	47 53.9	43 90	107.0	48 06.8	43 90	106.3	48 19.4	42 90	105.6	48 31.9	41 91	104.9
1	46 59.9	43 90	106.3	47 12.6	42 91	105.7	47 25.1	41 91	105.0	47 37.3	40 91	104.3
2	46 05.7	42 91	105.7	46 18.2	41 91	105.1	46 30.5	41 91	104.4	46 42.6	40 91	103.7
3	45 11.3	42 91	105.1	45 23.7	41 91	104.5	45 35.8	40 91	103.8	45 47.8	39 92	103.2
4	44 16.8	41 91	104.6	44 29.0	40 91	103.9	44 41.0	40 92	103.3	44 52.8	39 92	102.6
45	43 22.2	41 91	104.0	43 34.2	40 92	103.4	43 46.1	39 92	102.7	43 57.7	38 92	102.1
6	42 27.4	40 92	103.4	42 39.3	39 92	102.8	42 51.0	39 92	102.2	43 02.6	38 92	101.6
7	41 32.5	40 92	102.9	41 44.3	39 92	102.3	41 55.9	38 92	101.7	42 07.3	38 92	101.0
8	49 37.5	39 92	102.4	40 49.1	39 92	101.8	41 00.6	38 92	101.2	41 11.9	37 92	100.5
9	39 42.4	39 92	101.9	39 53.9	38 92	101.3	40 05.2	38 92	100.7	40 16.4	37 92	100.1
50	38 47.1	38 92	101.4	38 58.6	38 92	100.8	39 09.8	37 92	100.2	39 20.9	37 93	99.6
1	37 51.8	38 92	100.9	38 03.1	37 92	100.3	38 14.3	37 93	99.7	38 25.2	36 93	99.1
2	36 56.4	38 92	100.4	37 07.6	37 93	99.8	37 18.7	37 93	99.3	37 29.5	36 93	98.7
3	36 00.9	37 93	100.0	36 12.0	37 93	99.4	36 23.0	36 93	98.8	36 33.7	36 93	98.2
4	35 05.3	37 93	99.5	35 16.4	36 93	98.9	35 27.2	36 93	98.4	35 37.9	35 93	97.8
55	34 09.7	37 93	99.0	34 20.6	36 93	98.5	34 31.4	36 93	97.9	34 42.0	35 93	97.4
6	33 14.0	36 93	98.6	33 24.8	36 93	98.1	33 35.5	35 93	97.5	33 46.1	35 93	96.9
7	32 18.2	36 93	98.2	32 29.0	36 93	97.6	32 39.6	35 93	97.1	32 50.1	35 93	96.5
8	31 22.4	36 93	97.8	31 33.1	35 93	97.2	31 43.6	35 93	96.7	31 54.0	34 93	96.1
9	30 26.5	36 93	97.3	39 37.1	35 93	96.8	30 47.6	35 94	96.3	30 58.0	34 94	95.7
60	29 30.5	35 93	96.9	29 41.1	35 93	96.4	29 51.5	35 94	95.9	30 01.8	34 94	95.3
1	28 34.5	35 93	96.5	28 45.1	35 94	96.0	28 55.4	34 94	95.5	29 05.7	34 94	94.9
2	27 38.5	35 94	96.1	27 49.0	35 94	95.6	27 59.3	34 94	95.1	28 09.5	34 94	94.5
3	26 42.4	35 94	95.7	26 52.8	34 94	95.2	27 03.1	34 94	94.7	27 13.3	34 94	94.2
4	25 46.3	35 94	95.4	25 56.7	34 94	94.8	26 06.9	34 94	94.3	26 17.0	34 94	93.8
65	24 50.1	35 94	95.0	25 00.5	34 94	94.5	25 10.7	34 94	93.9	25 20.8	33 94	93.4
6	23 54.0	34 94	94.6	24 04.2	34 94	94.1	24 14.4	34 94	93.6	24 24.5	33 94	93.0
7	22 57.8	34 94	94.2	23 08.0	34 94	93.7	23 18.1	34 94	93.2	23 28.2	33 94	92.7
8	22 01.5	34 94	93.9	22 11.7	34 94	93.3	22 21.8	34 94	92.8	22 31.8	33 94	92.3
9	21 05.3	34 94	93.5	21 15.4	34 94	93.0	21 25.5	33 94	92.5	21 35.5	33 94	92.0
70	20 00.0	34 94	93.1	20 19.1	34 94	92.6	20 29.2	33 94	92.1	20 39.1	33 94	91.6
1	19 12.7	34 94	92.8	19 22.8	34 94	92.3	19 32.8	33 94	91.8	19 42.8	33 94	91.3
2	18 16.3	34 94	92.4	18 26.4	34 94	91.9	18 36.5	33 94	91.4	18 46.4	33 94	90.9
3	17 20.0	34 94	92.1	17 30.1	34 94	91.6	17 40.1	33 94	91.1	17 50.0	33 94	90.6
4	16 23.6	34 94	91.7	16 33.7	33 94	91.2	16 43.7	33 94	90.7	16 53.6	33 94	90.2
75	15 27.3	34 94	91.4	15 37.3	33 94	90.9	15 47.3	33 94	90.4	15 57.3	33 94	89.9
6	14 30.9	34 94	91.0	14 41.0	33 94	90.5	14 51.0	33 94	90.0	15 00.9	33 94	89.5
7	13 34.5	34 94	90.7	13 44.6	33 94	90.2	13 54.6	33 94	89.7	14 04.5	33 94	89.2
8	12 38.2	34 94	90.3	12 48.2	33 94	89.8	12 58.2	33 94	89.3	13 08.1	33 94	88.9
9	11 41.8	34 94	90.0	11 51.8	33 94	89.5	12 01.8	33 94	89.0	12 11.8	33 94	88.5
80	10 45.4	34 94	89.6	10 55.4	33 94	89.2	11 05.4	33 94	88.7	11 15.4	33 94	88.2
1	9 49.0	34 94	89.3	9 59.1	33 94	88.8	10 00.1	33 94	88.3	10 19.1	33 94	87.9
2	8 52.6	34 94	89.0	9 02.7	34 94	88.5	9 12.7	33 94	88.0	9 22.7	33 94	87.5
3	7 56.3	34 94	88.6	8 06.3	34 94	88.1	8 16.4	33 94	87.7	8 26.4	33 94	87.2
4	6 59.9	34 94	88.3	7 10.0	34 94	87.8	7 20.1	33 94	87.3	7 30.1	33 94	86.8
85	6 03.6	34 94	87.9	6 13.7	34 94	87.5	6 23.8	34 94	87.0	6 33.8	33 94	86.5
6	5 07.2	34 94	87.6	5 17.4	34 94	87.1	5 27.5	34 94	86.7	5 37.5	34 94	86.2
7												

H.A.	6° 00′ Alt. ° ′	Δd Δt	Az. °	6° 30′ Alt. ° ′	Δd Δt	Az. °	7° 00′ Alt. ° ′	Δd Δt	Az. °	7° 30′ Alt. ° ′	Δd Δt	Az. °
00	76 00.0	1.0 08	180.0	76 30.0	1.0 04	180.0	77 00.0	1.0 04	180.0	77 30.0	1.0 04	180.0
1	75 58.0	1.0 10	175.9	76 27.9	1.0 10	175.8	76 57.8	1.0 11	175.6	77 27.7	1.0 11	175.4
2	75 51.9	99 16	171.8	76 21.7	99 17	171.5	76 51.4	99 18	171.2	77 21.0	99 18	170.9
3	75 42.0	98 23	167.8	76 11.4	98 24	167.4	76 40.7	98 24	167.0	77 10.0	98 25	166.5
4	75 28.2	97 29	163.9	75 57.2	96 30	163.4	76 26.0	96 31	162.8	76 54.8	96 32	162.2
05	75 10.9	95 35	160.2	75 39.2	94 36	159.5	76 07.5	94 37	158.9	76 35.6	94 38	158.1
6	74 50.1	93 40	156.6	75 17.8	92 41	155.8	75 45.4	92 42	155.1	76 12.8	91 44	154.2
7	74 26.1	90 45	153.1	74 53.2	90 46	152.3	75 20.0	89 47	151.5	75 46.7	88 49	150.5
8	73 59.2	88 49	149.9	74 25.6	87 51	149.0	74 51.6	87 52	148.1	75 17.5	86 53	147.1
9	73 29.6	86 53	146.8	73 55.2	85 55	145.9	74 20.5	84 56	144.9	74 45.5	83 57	143.8
10	72 57.6	83 57	143.9	73 22.4	82 58	142.9	73 46.9	81 60	141.9	74 11.0	80 61	140.8
1	72 23.3	81 61	141.2	72 47.3	80 62	140.2	73 11.0	78 63	139.1	73 34.4	77 64	138.0
2	71 46.9	78 64	138.6	72 10.2	77 65	137.6	72 33.1	76 66	136.5	72 55.7	75 67	135.4
3	71 08.7	76 66	136.2	71 31.3	75 68	135.2	71 53.4	73 69	134.1	72 15.2	72 70	133.0
4	70 28.9	73 69	133.9	70 50.7	72 70	132.9	71 12.2	71 71	131.8	71 33.2	70 72	130.7
15	69 47.6	71 71	131.8	70 08.7	70 72	130.8	70 29.5	69 73	129.7	70 49.8	67 74	128.6
6	69 04.9	69 73	129.8	69 25.4	68 74	128.8	69 45.5	66 75	127.7	70 05.2	65 76	126.6
7	68 21.1	67 75	128.0	68 40.9	66 76	127.0	69 00.3	64 77	125.9	69 19.4	63 78	124.8
8	67 36.1	65 77	126.2	67 55.3	63 78	125.2	68 14.2	62 78	124.2	68 32.6	61 79	123.1
9	66 50.1	63 78	124.6	67 08.8	62 79	123.6	67 27.1	60 80	122.6	67 45.0	59 81	121.5
20	66 03.3	61 79	123.1	66 21.4	60 80	122.1	66 39.2	58 81	121.1	66 56.5	57 82	120.0
1	65 15.7	59 81	121.6	65 33.3	58 81	120.6	65 50.5	57 82	119.6	66 07.4	55 83	118.6
2	64 27.3	58 82	120.2	64 44.4	57 82	119.3	65 01.2	55 83	118.3	65 17.6	54 84	117.3
3	63 38.3	56 83	118.9	63 55.0	55 83	118.0	64 11.3	54 84	117.0	64 27.2	52 85	116.1
4	62 48.6	55 84	117.7	63 04.9	54 84	116.8	63 20.8	52 85	115.9	63 36.3	51 86	114.9
25	61 58.5	53 84	116.6	62 14.3	52 85	115.6	62 29.8	51 86	114.7	62 44.9	50 86	113.8
6	61 07.8	52 85	115.5	61 23.3	51 86	114.6	61 38.4	50 86	113.7	61 53.1	49 87	112.7
7	60 16.6	51 86	114.4	60 31.8	50 86	113.5	60 46.5	49 87	112.6	61 00.9	47 88	111.7
8	59 25.1	50 86	113.4	59 39.9	49 87	112.5	59 54.3	48 88	111.7	60 08.4	46 88	110.8
9	58 33.2	49 87	112.5	58 47.6	48 88	111.6	59 01.8	47 88	110.8	59 15.5	45 88	109.9
30	57 40.9	48 88	111.5	57 55.1	47 88	110.7	58 08.9	46 89	109.9	58 22.4	44 89	109.0
1	56 48.3	47 88	110.7	57 02.2	46 89	109.9	57 15.7	45 89	109.0	57 28.9	43 89	108.2
2	55 55.4	46 89	109.8	56 09.0	45 89	109.0	56 22.3	44 90	108.2	56 35.3	43 90	107.4
3	55 02.2	45 89	109.1	55 15.6	44 90	108.3	55 28.6	43 90	107.5	55 41.4	42 90	106.7
4	54 08.8	44 89	108.3	54 21.9	43 90	107.5	54 34.7	42 90	106.7	54 47.2	41 90	106.0
35	53 15.2	43 90	107.5	53 28.1	42 90	106.8	53 40.6	41 90	106.0	53 52.9	41 91	105.3
6	52 21.3	43 90	106.8	52 34.0	42 90	106.1	52 46.4	41 91	105.3	52 58.5	40 91	104.6
7	51 27.3	42 90	106.2	51 39.7	41 91	105.4	51 51.9	40 91	104.7	52 03.8	39 91	103.9
8	50 33.0	41 91	105.5	50 45.3	40 91	104.8	50 57.3	40 91	104.1	51 09.0	39 92	103.3
9	49 38.6	41 91	104.9	49 50.7	40 91	104.2	50 02.5	39 92	103.4	50 14.1	38 92	102.7
40	48 44.0	40 91	104.2	48 56.0	39 92	103.6	49 07.6	38 92	102.8	49 19.0	38 92	102.1
1	47 49.3	40 91	103.7	48 01.1	39 92	103.0	48 12.6	38 92	102.3	48 23.9	37 92	101.6
2	46 54.5	39 92	103.1	47 06.1	38 92	102.4	47 17.4	38 92	101.7	47 28.6	37 92	101.0
3	45 59.5	39 92	102.5	46 10.9	38 92	101.9	46 22.2	37 92	101.2	46 33.2	36 92	100.5
4	45 04.4	38 92	102.0	45 15.7	37 92	101.3	45 26.8	37 92	100.7	45 37.7	36 93	100.0
45	44 09.2	38 92	101.4	44 20.4	37 92	100.8	44 31.4	36 93	100.1	44 42.1	35 93	99.5
6	43 13.9	37 92	100.9	43 24.9	37 93	100.3	43 35.8	36 93	99.6	43 46.5	35 93	99.0
7	42 18.4	37 92	100.4	42 29.4	36 93	99.8	42 40.2	36 93	99.2	42 50.8	35 93	98.5
8	41 23.0	37 93	99.9	41 33.8	36 93	99.3	41 44.5	35 93	98.7	41 55.0	35 93	98.1
9	40 27.4	36 93	99.4	40 38.1	36 93	98.8	40 48.7	35 93	98.2	40 59.1	34 93	97.6
50	39 31.7	36 93	99.0	39 42.4	35 93	98.4	39 52.9	35 93	97.8	40 03.2	34 93	97.2
1	38 36.0	36 93	98.5	38 46.6	35 93	97.9	38 57.0	34 93	97.3	39 07.2	34 93	96.7
2	37 40.2	35 93	98.1	37 59.7	35 93	97.5	38 01.0	34 93	96.9	38 11.2	34 94	96.3
3	36 44.4	35 93	97.6	36 54.8	34 93	97.0	37 05.1	34 94	96.5	37 15.1	33 94	95.9
4	35 48.5	35 93	97.2	35 58.8	34 93	96.6	36 09.0	34 94	96.0	36 19.0	33 94	95.5
55	34 52.5	35 93	96.8	35 02.8	34 94	96.2	35 12.9	34 94	95.6	35 22.9	33 94	95.1
6	33 56.5	34 94	96.4	34 06.7	34 94	95.8	34 16.8	33 94	95.2	34 26.7	33 94	94.7
7	33 00.4	34 94	96.0	33 10.6	34 94	95.4	33 20.6	33 94	94.8	33 30.5	33 94	94.3
8	32 04.3	34 94	95.6	32 14.4	34 94	95.0	32 24.4	33 94	94.4	32 34.3	33 94	93.9
9	31 08.2	34 94	95.2	31 18.3	33 94	94.6	31 28.2	33 94	94.1	31 38.0	32 94	93.5
60	30 12.0	34 94	94.8	30 22.0	33 94	94.2	30 31.9	33 94	93.7	30 41.7	32 94	93.1
1	29 15.8	34 94	94.4	29 25.8	33 94	93.8	29 35.7	33 94	93.3	29 45.4	32 94	92.8
2	28 19.6	33 94	94.0	28 29.5	33 94	93.5	28 39.4	33 94	92.9	28 49.1	32 94	92.4
3	27 23.3	33 94	93.6	27 33.3	33 94	93.1	27 43.1	32 94	92.6	27 52.7	32 94	92.0
4	26 27.0	33 94	93.3	26 36.9	33 94	92.7	26 46.7	32 94	92.2	26 56.4	32 94	91.7
65	25 30.7	33 94	92.9	25 40.6	33 94	92.4	25 50.4	32 94	91.8	26 00.0	32 94	91.3
6	24 34.4	33 94	92.5	24 44.3	33 94	92.0	24 54.0	32 94	91.5	25 03.7	32 94	91.0
7	23 38.1	33 94	92.2	23 47.9	33 94	91.7	23 57.7	32 94	91.1	24 07.3	32 94	90.6
8	22 41.7	33 94	91.8	22 51.6	33 94	91.3	23 01.3	32 94	90.8	23 10.9	32 94	90.3
9	21 45.4	33 94	91.5	21 55.2	33 94	91.0	22 04.9	32 94	90.4	22 14.5	32 94	89.9
70	20 49.0	33 94	91.1	20 58.8	33 94	90.6	21 08.5	32 94	90.1	21 18.1	32 94	89.6
1	19 52.6	33 94	90.8	20 02.4	32 94	90.3	20 12.1	32 94	89.8	20 21.8	32 94	89.3
2	18 56.3	33 94	90.4	19 06.1	32 94	89.9	19 15.8	32 94	89.4	19 25.4	32 94	88.9
3	17 59.9	33 94	90.1	18 09.7	33 94	89.6	18 19.4	32 94	89.1	18 29.0	32 94	88.6
4	17 03.5	33 94	89.7	17 13.3	33 94	89.2	17 23.0	32 94	88.7	17 32.7	32 94	88.2
75	16 07.1	33 94	89.4	16 16.9	33 94	88.9	16 26.6	32 94	88.4	16 36.3	32 94	87.9
6	15 10.7	33 94	89.1	15 20.6	33 94	88.6	15 30.3	32 94	88.1	15 40.0	32 94	87.6
7	14 14.4	33 94	88.7	14 24.2	33 94	88.2	14 33.9	32 94	87.7	14 43.6	32 94	87.3
8	13 18.0	33 94	88.4	13 27.8	33 94	87.9	13 37.6	32 94	87.4	13 47.3	32 94	86.9
9	12 21.7	33 94	88.0	12 31.5	33 94	87.6	12 41.3	33 94	87.1	12 51.0	32 94	86.6
80	11 25.3	33 94	87.7	11 35.2	33 94	87.2	11 45.0	33 94	86.7	11 54.8	32 94	86.3
1	10 29.0	33 94	87.4	10 38.9	33 94	86.9	10 48.7	33 94	86.4	10 58.5	33 94	85.9
2	9 32.7	33 94	87.0	9 42.6	33 94	86.6	9 52.5	33 94	86.1	10 02.3	33 94	85.6
3	8 36.4	33 94	86.7	8 46.3	33 94	86.2	8 56.2	33 94	85.8	9 06.1	33 94	85.3
4	7 40.1	33 94	86.4	7 50.1	33 94	85.9	8 00.0	33 94	85.4	8 09.9	33 94	84.9
85	6 43.8	33 94	86.0	6 53.8	33 94	85.6	7 03.8	33 94	85.1	7 13.8	33 94	84.6
6	5 47.6	34 94	85.7	5 57.6	34 94	85.2	6 07.7	33 94	84.8	6 17.6	33 93	84.3
7				5 01.5	34 94	84.9	5 11.5	33 94	84.4	5 21.6	33 93	84.0

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
00	66 00.0	1.0 02	180.0	65 30.0	1.0 02	180.0	65 00.0	1.0 02	180.0	64 30.0	1.0 02	180.0	64 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0	63 00.0	1.0 02	180.0	62 30.0	1.0 02	180.0	00
1	65 58.8	1.0 06	177.5	65 28.8	1.0 06	177.6	64 58.8	1.0 06	177.6	64 28.9	1.0 06	177.7	63 58.9	1.0 06	177.7	63 28.9	1.0 05	177.8	62 58.9	1.0 05	177.8	62 28.9	1.0 05	177.9	1
2	65 55.2	1.0 10	175.1	65 25.3	1.0 10	175.2	64 55.4	1.0 10	175.3	64 25.5	1.0 10	175.4	63 55.5	1.0 09	175.5	63 25.6	1.0 09	175.6	62 55.7	1.0 09	175.6	62 25.8	1.0 09	175.7	2
3	65 49.2	99 14	172.7	65 19.4	99 14	172.8	64 49.6	99 13	173.0	64 19.8	99 13	173.1	63 50.0	99 13	173.2	63 20.2	99 13	173.3	62 50.3	99 12	173.5	62 20.5	99 12	173.6	3
4	65 40.8	99 18	170.3	65 11.2	99 17	170.5	64 41.6	99 17	170.6	64 11.9	99 17	170.8	63 42.2	99 16	171.0	63 12.6	99 16	171.2	62 42.9	99 16	171.3	62 13.2	99 16	171.5	4
05	65 30.1	98 22	167.9	65 00.7	98 21	168.1	64 31.3	98 21	168.4	64 01.8	98 20	168.6	63 32.3	98 20	168.8	63 02.8	98 20	169.0	62 33.3	98 19	169.2	62 03.8	98 19	169.4	05
6	65 17.2	97 25	165.6	64 48.0	97 25	165.8	64 18.8	97 24	166.1	63 49.6	98 24	166.4	63 20.3	98 24	166.6	62 51.0	98 23	166.8	62 21.7	98 23	167.1	61 52.4	98 22	167.3	6
7	65 02.0	96 29	163.3	64 33.1	96 28	163.6	64 04.2	96 28	163.9	63 35.2	97 27	164.2	63 06.2	97 27	164.5	62 37.2	97 26	164.7	62 08.1	97 26	165.0	61 39.0	97 26	165.3	7
8	64 44.7	95 32	161.0	64 16.2	95 32	161.4	63 47.5	95 31	161.7	63 18.8	96 31	162.0	62 50.1	96 30	162.4	62 21.4	96 30	162.7	61 52.6	96 29	163.0	61 23.7	96 28	163.3	8
9	64 25.4	94 36	158.8	63 57.1	94 35	159.2	63 28.8	94 34	159.6	63 00.5	95 34	159.9	62 32.1	95 33	160.3	62 03.6	95 33	160.6	61 35.1	95 32	161.0	61 06.5	95 32	161.3	9
10	64 04.0	93 39	156.7	63 36.1	93 38	157.1	63 08.2	93 37	157.5	62 40.2	93 37	157.9	62 12.1	94 36	158.3	61 44.0	94 36	158.6	61 15.8	94 35	159.0	60 47.5	94 35	159.3	10
1	63 40.7	91 42	154.6	63 13.2	92 41	155.0	62 45.7	92 40	155.5	62 18.0	92 40	155.9	61 50.3	92 39	156.3	61 22.5	93 39	156.7	60 54.7	93 38	157.1	60 26.8	93 37	157.4	1
2	63 15.6	90 45	152.5	62 48.6	90 44	153.0	62 21.4	91 43	153.5	61 54.1	91 43	153.9	61 26.8	91 42	154.4	60 59.4	92 41	154.8	60 31.9	92 41	155.2	60 04.3	92 40	155.6	2
3	62 48.8	89 47	150.6	62 22.1	89 47	151.1	61 55.4	89 46	151.6	61 28.5	90 45	152.0	61 01.6	90 45	152.5	60 34.5	90 44	152.9	60 07.4	91 43	153.4	59 40.2	91 43	153.8	3
4	62 20.3	87 50	148.7	61 54.1	88 50	149.2	61 27.7	88 49	149.7	61 01.3	88 48	150.2	60 34.7	89 47	150.7	60 08.1	89 47	151.1	59 41.4	89 46	151.6	59 14.5	90 45	152.0	4
15	61 50.2	86 53	146.8	61 24.4	86 52	147.4	60 58.5	87 51	147.9	60 32.5	87 50	148.4	60 06.4	87 50	148.9	59 40.1	88 49	149.4	59 13.8	88 48	149.9	58 47.3	88 48	150.3	15
6	61 18.6	84 55	145.1	60 53.3	85 54	145.6	60 27.8	85 53	146.2	60 02.2	86 53	146.7	59 36.5	86 52	147.2	59 10.7	86 51	147.7	58 44.8	87 51	148.2	58 18.7	87 50	148.7	6
7	60 45.6	83 57	143.3	60 20.8	83 56	143.9	59 55.7	84 56	144.5	59 30.6	84 55	145.0	59 05.3	84 54	145.5	58 39.9	85 54	146.0	58 14.3	85 53	146.5	57 48.7	86 52	147.0	7
8	60 11.3	81 59	141.7	59 46.9	82 58	142.3	59 22.3	82 58	142.8	58 57.6	83 57	143.4	58 32.7	83 56	143.9	58 07.7	83 56	144.4	57 42.6	84 55	145.0	57 17.4	84 54	145.5	8
9	59 35.7	80 61	140.1	59 11.8	80 61	140.7	58 47.6	81 60	141.2	58 23.3	81 59	141.8	57 58.9	82 58	142.4	57 34.3	82 58	142.9	57 09.6	83 57	143.4	56 44.8	83 56	143.9	9
20	58 59.0	78 63	138.5	58 35.4	79 62	139.1	58 11.7	79 62	139.7	57 47.9	80 61	140.3	57 23.9	80 60	140.9	56 59.7	81 59	141.4	56 35.4	81 59	141.9	56 11.0	82 58	142.5	20
1	58 21.1	77 65	137.1	57 58.0	77 64	137.7	57 34.7	78 63	138.2	57 11.3	78 63	138.8	56 47.7	79 62	139.4	56 24.0	79 61	140.0	56 00.1	80 61	140.5	55 36.1	80 60	141.0	1
2	57 42.2	75 67	135.6	57 19.5	76 66	136.2	56 56.7	76 65	136.8	56 33.7	77 65	137.4	56 10.5	77 64	138.0	55 47.2	78 63	138.5	55 23.7	78 62	139.1	55 00.1	79 62	139.6	2
3	57 02.2	74 68	134.2	56 40.0	74 67	134.9	56 17.6	75 67	135.5	55 55.0	76 66	136.1	55 32.3	76 65	136.6	55 09.4	77 65	137.2	54 46.3	77 64	137.8	54 23.1	78 63	138.3	3
4	56 21.4	72 70	132.9	55 59.6	73 69	133.5	55 37.6	74 68	134.1	55 15.4	74 68	134.7	54 53.1	75 67	135.3	54 30.6	75 66	135.9	54 07.9	76 66	136.4	53 45.1	76 65	137.0	4
25	55 39.7	71 71	131.6	55 18.3	72 70	132.3	54 56.7	72 69	132.9	54 34.9	73 69	133.5	54 13.0	73 68	134.0	53 50.9	74 68	134.6	53 28.6	74 67	135.2	53 06.2	75 66	135.7	25
6	54 57.1	70 72	130.4	54 36.1	70 72	131.0	54 15.0	71 71	131.6	53 53.6	71 70	132.2	53 32.1	72 70	132.8	53 10.3	73 69	133.4	52 48.5	73 68	134.0	52 26.4	74 68	134.5	6
7	54 13.8	68 73	129.2	53 53.2	69 73	129.8	53 32.4	70 72	130.4	53 11.5	70 72	131.0	52 50.3	71 71	131.6	52 29.0	71 70	132.2	52 07.5	72 70	132.8	51 45.8	72 69	133.3	7
8	53 29.8	67 75	128.1	53 09.6	68 74	128.7	52 49.2	68 73	129.3	52 28.6	69 73	129.9	52 07.8	70 72	130.5	51 46.8	70 71	131.1	51 25.7	71 71	131.6	51 04.4	71 70	132.2	8
9	52 45.1	66 76	127.0	52 25.2	67 75	127.6	52 05.2	67 74	128.2	51 45.0	68 74	128.8	51 24.6	68 73	129.4	51 04.0	69 73	130.0	50 43.2	69 72	130.5	50 22.3	70 71	131.1	9
30	51 59.7	65 77	125.9	51 40.2	66 76	126.5	51 20.5	66 75	127.1	51 00.7	67 75	127.7	50 40.6	67 74	128.3	50 20.4	68 74	128.9	50 00.0	68 73	129.5	49 39.5	69 72	130.0	30
1	51 13.7	63 78	124.9	50 54.6	64 77	125.5	50 35.3	65 76	126.1	50 15.8	65 76	126.7	49 56.1	66 75	127.3	49 36.2	66 75	127.8	49 16.2	67 74	128.4	48 56.0	68 74	129.0	1
2	50 27.2	62 79	123.9	50 08.4	63 78	124.5	49 49.4	64 77	125.1	49 30.3	64 77	125.7	49 10.9	65 76	126.3	48 51.4	65 76	126.8	48 31.7	66 75	127.4	48 11.8	67 75	128.0	2
3	49 40.1	61 79	122.9	49 21.7	62 79	123.5	49 03.0	62 78	124.1	48 44.2	63 78	124.7	48 25.2	64 77	125.3	48 06.0	64 77	125.9	47 46.6	65 76	126.4	47 27.1	65 75	127.0	3
4	48 52.5	60 80	122.0	48 34.4	61 79	122.6	48 16.1	61 79	123.2	47 57.6	62 79	123.8	47 38.9	63 78	124.4	47 20.0	63 77	124.9	47 01.0	64 77	125.5	46 41.8	64 76	126.1	4
35	48 04.5	59 81	121.1	47 46.7	60 80	121.7	47 28.7	60 80	122.3	47 10.5	61 79	122.9	46 52.1	62 79	123.5	46 33.6	62 78	124.0	46 14.8	63 78	124.6	45 56.0	63 77	125.2	35
6	47 16.0	58 81	120.2	46 58.5	59 81	120.8	46 40.8	59 81	121.4	46 22.9	60 80	122.0	46 04.8	61 80	122.6	45 46.6	61 79	123.1	45 28.2	62 79	123.7	45 09.6	62 78	124.3	6
7	46 27.1	57 82	119.4	46 09.8	58 82	120.0	45 52.4	58 81	120.6	45 34.8	59 81	121.1	45 17.1	60 80	121.7	44 59.1	60 80	122.3	44 41.0	61 79	122.8	44 22.8	61 79	123.4	7
8	45 37.7	56 83	118.6	45 20.8	57 82	119.2	45 03.7	57 82	119.7	44 46.4	58 81	120.3	44 28.9	59 81	120.9	44 11.3	59 80	121.5	43 53.5	60 80	122.0	43 35.5	60 80	122.6	8
9	44 48.0	55 83	117.8	44 31.4	56 83	118.4	44 14.5	56 82	118.9	43 57.5	57 82	119.5	43 40.3	58 82	120.1	43 23.0	58 81	120.6	43 05.4	59 81	121.2	42 47.8	59 80	121.8	9
40	43 58.0	54 84	117.0	43 41.6	55 84	117.6	43 25.0	56 83	118.2	43 08.2	56 83	118.7	42 51.3	57 82	119.3	42 34.3	57 82	119.9	42 17.0	58 81	120.4	41 59.6	58 81	121.0	40
1	43 07.6	54 84	116.3	42 51.4	54 84	116.8	42 35.1	55 84	117.4	42 18.6	55 83	118.0	42 02.0	56 83	118.5	41 45.2	56 82	119.1	41 28.2	57 82	119.7	41 11.1	57 81	120.2	1
2	42 16.9	53 85	115.6	42 01.0	53 85	116.1	41 44.9	54 84	116.7	41 28.7	54 84	117.3	41 12.3	55 83	117.8	40 55.7	55 83	118.4	40 39.0	56 82	118.9	40 22.2	57 82	119.5	2
3	41 25.8	52 85	114.8	41 10.2	52 85	115.4	40 54.4	53 85	116.0	40 38.4	54 84	116.5	40 22.2	54 84	117.1	40 05.9	55 83	117.6	39 49.5	55 83	118.2	39 32.9	56 83	118.7	3
4	40 34.5	51 86	114.2	40 19.1	52 85	114.7	40 03.5	52 85	115.3	39 47.8	53 85	115.8	39 31.9	53 84	116.4	39 15.8	54 84	116.9	38 59.6	54 84	117.5	38 43.3	55 83	118.0	4
45	39 43.0	50 86	113.5	39 27.8	51 86	114.1	39 12.4	51 86	114.6	38 56.9	52 85	115.2	38 41.2	52 85	115.7	38 25.4	53 84	116.3	38 09.5	53 84	116.8	37 53.4	54 84	117.3	45
6	38 51.1	50 87	112.9	38 36.2	50 86	113.4	38 21.0	51 86	114.0	38 05.8	51 86	114.5	37 50.3	52 85	115.1	37 34.7	52 85	115.6	37 19.0	53 85	116.1	37 03.1	53 84	116.7	6
7	37 59.1	49 87	112.2	37 44.3	50 87	112.8	37 29.4	50 86	113.3	37 14.3	51 86	113.9	36 59.1	51 86	114.4	36 43.7	52 85	115.0	36 28.2	52 85	115.5	36 12.6	52 85	116.0	7
8	37 06.8	48 88	111.6	36 52.2	49 87	112.2	36 37.5	49 87	112.7	36 22.6	50 86	113.3	36 07.6	50 86	113.8	35 52.5	51 86	114.3	35 37.2	51 85	114.9	35 21.8	52 85	115.4	8
9	36 14.2	48 88	111.0	35 59.9	48 88	111.6	35 45.4	49 87	112.1	35 30.7	49 87	112.6	35 15.9	50 86	113.2	35 01.0	50 86	113.7	34 45.9	50 86	114.2	34 30.7	51 85	114.7	9
50	35 21.5	47 88	110.4	35 07.3	47 88	111.0	34 53.0	48 88	111.5	34 38.6	48 87	112.1	34 24.0	49 87	112.6	34 09.3	49 87	113.1	33 54.4	50 86	113.6	33 39.4	50 86	114.2	50
1	34 28.6	46 88	109.9	34 14.6	47 88	110.4	34 00.5	47 88	110.9	33 46.2	48 88	111.5	33 31.8	48 87	112.0	33 17.3	49 87	112.5	33 02.6	49 87	113.0	32 47.8	50 86	113.6	1
2	33 35.5	46 89	109.3	33 21.7	46 89	109.9	33 07.7	47 88	110.4	32 53.6	47 88	110.9	32 39.4	48 88	111.4	32 25.1	48 87	112.0	32 10.6	48 87	112.5	31 56.0	49 87	113.0	2
3	32 42.2	45 89	108.8	32 28.5	46 89	109.3	32 14.8	46 88	109.8	32 00.9	47 88	110.4	31 46.9	47 88	110.9	31 32.7	47 88	111.4	31 18.4	48 87	111.9	31 04.0	48 87	112.4	3
4	31 48.7	45 89	108.2	31 35.3	45 89	108.8	31 21.7	46 89	109.3	31 07.9	46 88	109.8	30 54.1	46 88	110.3	30 40.1	47 88	110.8	30 26.0	47 88	111.4	30 11.8	48 87	111.9	4
55	30 55.1	44 90	107.7	30 41.8	45 89	108.3	30 28.4	45 89	108.8	30 14.8	45 89	109.3	30 01.1	46 88	109.8	29 47.3	46 88	110.3	29 33.4	47 88	110.8	29 19.4	47 88	111.3	55
6	30 01.3	44 90	107.2	29 48.2	44 90	107.7	29 34.9	44 89	108.3	29 21.5	45 89	108.8	29 08.0	45 89	109.3	28 54.4	46 89	109.8	28 40.6	46 88	110.3	28 26.8	46 88	110.8	6
7	29 07.4	43 90	106.7	28 54.4	44 90	107.2	28 41.3	44 90	107.8	28 28.0	44 89	108.3	28 14.7	45 89	108.8	28 01.2	45 89	109.3	27 47.7	45 89	109.8	27 34.0	46 88	110.3	7
8	28 13.3	43 90	106.2	28 00.5	43 90	106.7	27 47.5	43 90	107.3	27 34.4	44 90	107.8	27 21.2	44 89	108.3	27 07.9	45 89	108.8	26 54.5	45 89	109.3	26 41.0	45 88	109.8	8
9	27 19.1	42 91	105.8	27 06.4	43 90	106.3	26 53.6	43 90	106.8	26 40.7	43 90	107.3	26 27.6	44 90	107.8	26 14.5	44 89	108.3	26 01.2	44 89	108.8	25 47.9	45 89	109.3	9
60	26 24.8	42 91	105.3	26 12.2	42 91	105.8	25 59.5	42 90	106.3	25 46.7	43 90	106.8	25 33.8	43 90	107.3	25 20.9	44 90	107.8	25 07.8	44 89	108.3	24 54.6	44 89	108.8	60
1	25 30.4	41 91	104.8	25 17.9	42 91	105.3	25 05.4	42 91	105.8	24 52.7	42 90	106.3	24 40.0	43 90	106.8	24 27.1	43 90	107.3	24 14.2	43 90	107.8	24 01.1	44 89	108.3	1
2	24 35.8	41 91	104.4	24 23.5	41 91	104.9	24 11.1	42 91	105.4	23 58.5	42 90	105.9	23 45.9	42 90	106.4	23 33.2	43 90	106.9	23 20.4	43 90	107.4	23 07.5	43 90	107.9	2
3	23 41.1	41 91	103.9	23 28.9	41 91	104.4	23 16.6	41 91	104.9	23 04.2	41 91	105.4	22 51.8	42 90	105.9	22 39.2	42 90	196.4	22 26.5	42 90	106.9	22 13.8	43 90	107.4	3
4	22 46.3	40 91	103.5	22 34.3	40 91	104.0	22 22.1	41 91	104.5	22 09.8	41 91	105.0	21 57.5	41 91	105.5	21 45.0	42 90	106.0	21 32.5	42 90	106.4	21 19.9	42 90	106.9	4
65	21 51.5	40 92	103.1	21 39.5	40 91	103.6	21 27.4	40 91	104.0	21 15.3	41 91	104.5	21 03.1	41 91	105.0	20 50.8	41 91	105.5	20 38.4	41 90	106.0	20 25.9	42 90	106.5	65
6	20 56.5	39 92	102.6	20 44.6	40 92	103.1	20 32.7	40 91	103.6	20 20.7	40 91	104.1	20 08.6	40 91	104.6	19 56.4	41 91	105.1	19 44.1	41 91	105.6	19 31.8	41 90	106.1	6
7	20 01.4	39 92	102.2	19 49.7	39 92	102.7	19 37.9	40 92	103.2	19 25.9	40 91	103.7	19 14.0	40 91	104.2	19 01.9	40 91	104.7	18 49.8	41 91	105.1	18 37.5	41 91	105.6	7
8	19 06.3	39 92	101.8	18 54.6	39 92	102.3	18 42.9	39 92	102.8	18 31.1	39 91	103.3	18 19.2	40 91	103.8	18 07.3	40 91	104.3	17 55.3	40 91	104.7	17 43.2	40 91	105.2	8
9	18 11.1	38 92	101.4	17 59.5	39 92	101.9	17 47.9	39 92	102.4	17 36.2	39 92	102.9	17 24.4	39 91	103.3	17 12.6	40 91	103.8	17 00.7	40 91	104.3	16 48.7	40 91	104.8	9
70	17 15.8	38 92	101.0	17 04.3	38 92	101.5	16 52.8	39 92	102.0	16 41.2	39 92	102.5	16 29.5	39 92	102.9	16 17.8	39 91	103.4	16 06.0	39 91	103.9	15 54.2	40 91	104.4	70
1	16 20.4	38 92	100.6	16 09.0	38 92	101.1	15 57.6	38 92	101.6	15 46.1	38 92	102.0	15 34.5	39 92	102.5	15 22.9	39 92	103.0	15 11.2	39 91	103.5	14 59.5	39 91	104.0	1
2	15 24.9	37 93	100.2	15 13.6	38 92	100.7	15 02.3	38 92	101.2	14 50.9	38 92	101.7	14 39.4	38 92	102.1	14 27.9	39 92	102.6	14 16.4	39 92	103.1	14 04.7	39 91	103.6	2
3	14 29.4	37 93	99.8	14 18.2	37 93	100.3	14 07.0	38 92	100.8	13 55.6	38 92	101.3	13 44.3	38 92	101.7	13 32.9	38 92	102.2	13 21.4	38 92	102.7	13 09.9	39 92	103.2	3
4	13 33.8	37 93	99.4	13 22.7	37 93	99.9	13 11.5	37 92	100.4	13 00.3	38 92	100.9	12 49.0	38 92	101.4	12 37.7	38 92	101.8	12 26.3	38 92	102.3	12 14.9	38 92	102.8	4
75	12 38.2	37 93	99.1	12 27.1	37 93	99.5	12 16.0	37 93	100.0	12 04.9	37 92	100.5	11 53.7	37 92	101.0	11 42.5	38 92	101.4	11 31.2	38 92	101.9	11 19.9	38 92	102.4	75
6	11 42.5	36 93	98.7	11 31.5	37 93	99.2	11 20.5	37 93	99.6	11 09.4	37 93	100.1	10 58.3	37 92	100.6	10 47.2	37 92	101.1	10 36.0	37 92	101.5	10 24.8	38 92	102.0	6
7	10 46.7	36 93	98.3	10 35.8	36 93	98.8	10 24.9	37 93	99.3	10 13.9	37 93	99.8	10 02.9	37 92	100.2	9 51.8	37 92	100.7	9 40.7	37 92	101.2	9 29.6	37 92	101.6	7
8	9 50.9	36 93	98.0	9 40.1	36 93	98.4	9 29.2	36 93	98.9	9 18.3	36 93	99.4	9 07.4	37 93	99.9	8 56.4	37 92	100.3	8 45.4	37 92	100.8	8 34.3	37 92	101.3	8
9	8 55.0	36 93	97.6	8 44.3	36 93	98.1	8 33.5	36 93	98.5	8 22.7	36 93	99.0	8 11.8	36 93	99.5	8 00.9	36 98	100.0	7 50.0	36 92	100.4	7 39.0	37 92	100.9	9
80	7 59.1	36 93	97.2	7 48.4	36 93	97.7	7 37.7	36 93	98.2	7 26.9	36 93	98.7	7 16.2	36 93	99.1	7 05.3	36 98	99.6	6 54.5	36 93	100.1	6 43.6	36 92	100.5	80
1	7 03.2	35 93	96.9	6 52.5	36 93	97.4	6 41.9	36 93	97.8	6 31.2	36 93	98.3	6 20.5	36 93	98.8	6 09.7	36 98	99.2	5 58.9	36 93	99.7	5 48.2	36 92	100.2	1
2	6 07.2	35 93	96 5	5 56.6	35 93	97.0	5 46.0	35 93	97.5	5 35.4	35 93	97.9	5 24.7	36 93	98.4	5 14.0	36 93	98.9	5 03.3	36 98	99.3				2
3	5 11.1	35 93	96.2	5 00.6	35 93	96.6																			3

Lat. 20°

H.A.	8° 00′				8° 30′				9° 00′				9° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	78 00.0	1.0	04	180.0	78 30.0	1.0	04	180.0	79 00.0	1.0	04	180.0	79 30.0	1.0	04	180.0
1	77 57.7	1.0	12	175.2	78 27.6	1.0	12	175.1	78 57.5	1.0	13	174.8	79 27.3	1.0	13	174.6
2	77 50.7	99	19	170.6	78 20.3	99	20	170.2	78 49.9	99	21	169.7	79 19.4	98	22	169.3
3	77 39.2	97	26	166.0	78 08.4	97	27	165.4	78 37.5	97	28	164.8	79 06.5	97	30	164.1
4	77 23.4	95	33	161.6	77 52.0	95	34	160.8	78 20.4	95	36	160.1	78 48.7	94	37	159.2
05	77 03.6	93	39	157.3	77 31.5	93	41	156.5	77 59.1	92	42	155.6	78 26.6	91	43	154.6
6	76 40.1	90	45	153.3	77 07.1	90	46	152.4	77 33.9	89	48	151.3	78 00.5	88	49	150.3
7	76 13.1	88	50	149.6	76 39.3	87	52	148.5	77 05.2	86	53	147.4	77 30.8	85	55	146.2
8	75 43.1	85	55	146.0	76 08.3	84	56	144.9	76 33.3	83	58	143.8	76 57.9	81	59	142.5
9	75 10.2	82	59	142.8	75 34.6	81	60	141.6	75 58.6	79	62	140.4	76 22.3	78	63	139.1
10	74 34.9	79	62	139.7	74 58.4	78	64	138.5	75 21.5	76	66	137.3	75 44.2	75	67	136.0
1	73 57.4	76	66	136.9	74 20.0	75	67	135.7	74 42.2	73	69	134.4	75 04.0	72	70	133.1
2	73 17.9	73	69	134.2	73 39.7	72	70	133.0	74 01.0	70	71	131.8	74 22.0	69	73	130.5
3	72 36.7	71	71	131.8	72 57.7	69	73	130.6	73 18.2	68	74	129.3	73 38.3	66	75	128.0
4	71 53.9	68	74	129.6	72 14.1	67	75	128.3	72 33.9	65	76	127.1	72 53.2	63	77	125.8
15	71 09.8	66	76	127.5	71 29.3	64	77	126.3	71 48.3	63	78	125.0	72 06.9	61	79	123.8
6	70 24.4	63	77	125.5	70 43.3	62	78	124.3	71 01.6	60	80	123.1	71 19.5	59	80	121.9
7	69 38.0	61	79	123.7	69 56.2	60	80	122.5	70 13.9	58	81	121.4	70 31.2	57	82	120.2
8	68 50.7	59	80	122.0	69 08.3	58	81	120.9	69 25.4	56	82	119.7	69 42.1	55	83	118.5
9	68 02.4	58	82	120.4	68 19.5	56	82	119.3	68 36.1	54	83	118.2	68 52.2	53	84	117.1
20	67 13.5	56	83	119.0	67 30.0	54	84	117.9	67 46.0	53	84	116.8	68 01.6	51	85	115.6
1	66 23.8	54	84	117.6	66 39.8	53	84	116.5	66 55.4	51	85	115.4	67 10.5	50	86	114.3
2	65 33.5	53	85	116.3	65 49.1	51	85	115.2	66 04.2	50	86	114.2	66 18.9	48	87	113.1
3	64 42.7	51	86	115.1	64 57.9	50	86	114.0	65 12.6	48	87	113.0	65 26.8	47	88	112.0
4	63 51.4	50	86	113.9	64 06.1	48	87	112.9	64 20.5	47	88	111.9	64 34.3	46	88	110.9
25	62 59.7	48	87	112.8	63 14.0	47	88	111.9	63 28.0	46	88	110.9	63 41.5	44	89	109.9
6	62 07.5	47	88	111.8	62 21.5	46	88	110.8	62 35.1	45	89	109.9	62 48.3	43	89	108.9
7	61 15.0	46	88	110.8	61 28.7	45	89	109.9	61 41.9	44	89	109.0	61 54.8	42	90	108.0
8	60 22.1	45	88	109.9	60 35.5	44	89	109.0	60 48.5	43	90	108.1	61 01.1	41	90	107.1
9	59 29.0	44	89	109.0	59 42.0	43	90	108.1	59 54.7	42	90	107.2	60 07.1	40	90	106.3
30	58 35.5	43	90	108.2	58 48.3	42	90	107.3	59 00.8	41	90	106.4	59 12.9	40	91	105.5
1	57 41.8	42	90	107.4	57 54.4	41	90	106.5	58 06.6	40	91	105.7	58 18.4	39	91	104.8
2	56 47.9	42	90	106.6	57 00.2	41	90	105.8	57 12.2	39	91	104.9	57 23.8	38	91	104.1
3	55 53.8	41	91	105.9	56 05.9	40	91	105.0	56 17.6	39	91	104.2	56 29.1	38	92	103.4
4	54 59.4	40	91	105.2	55 11.3	39	91	104.4	55 22.9	38	92	103.5	55 34.1	37	92	102.7
35	54 04.9	40	91	104.5	54 16.6	38	91	103.7	54 28.0	37	92	102.9	54 39.1	36	92	102.1
6	53 10.3	39	92	103.8	53 21.8	38	92	103.1	53 33.0	37	92	102.3	53 43.9	36	92	101.5
7	52 15.4	38	92	103.2	52 26.8	37	92	102.4	52 37.8	36	92	101.7	52 48.6	35	92	100.9
8	51 20.5	38	92	102.6	51 31.7	37	92	101.8	51 42.5	36	92	101.1	51 53.1	35	93	100.3
9	50 25.4	37	92	102.0	50 36.4	36	92	101.3	50 47.2	35	92	100.5	50 57.6	34	93	99.8
40	49 30.2	37	92	101.4	49 41.1	36	92	100.7	49 51.7	35	93	100.0	50 02.0	34	93	99.3
1	48 34.9	36	92	100.9	48 45.6	35	92	100.2	48 56.1	35	93	99.5	49 06.3	34	93	98.7
2	47 39.4	36	92	100.3	47 50.1	35	93	99.6	48 00.5	34	93	98.9	48 10.6	33	93	98.2
3	46 43.9	35	93	99.8	46 54.5	35	93	99.1	47 04.7	34	93	98.4	47 14.7	33	93	97.8
4	45 48.3	35	93	99.3	45 58.8	34	93	98.6	46 08.9	34	93	98.0	46 18.8	33	93	97.3
45	44 52.7	35	93	98.8	45 03.0	34	93	98.2	45 13.1	33	93	97.5	45 22.9	32	93	96.8
6	43 56.9	34	93	98.3	44 07.1	34	93	97.7	44 17.1	33	93	97.0	44 26.9	32	94	96.4
7	43 01.1	34	93	97.9	43 11.2	33	93	97.3	43 21.1	33	93	96.6	43 30.8	32	94	95.9
8	42 05.2	34	93	97.4	42 15.3	33	93	96.8	42 25.1	32	94	96.1	42 34.7	32	94	95.5
9	41 09.3	34	93	97.0	41 19.3	33	93	96.3	41 29.0	32	94	95.7	41 38.6	32	94	95.1
50	40 13.3	33	93	96.5	40 23.2	33	94	95.9	40 32.9	32	94	95.3	40 42.4	31	94	94.7
1	39 17.3	33	94	96.1	39 27.1	32	94	95.5	39 36.7	32	94	94.9	39 46.2	31	94	94.3
2	38 21.2	33	94	95.7	38 31.0	32	94	95.1	38 40.6	32	94	94.5	38 50.0	31	94	93.9
3	37 25.0	33	94	95.3	37 34.8	32	94	94.7	37 44.3	32	94	94.1	37 53.7	31	94	93.5
4	36 28.9	33	94	94.9	36 38.6	32	94	94.3	36 48.1	31	94	93.7	36 57.4	31	94	93.1
55	35 32.7	32	94	94.5	35 42.3	32	94	93.9	35 51.8	31	94	93.3	36 01.1	31	94	92.7
6	34 36.5	32	94	94.1	34 46.1	32	94	93.5	34 55.5	31	94	92.9	35 04.8	31	94	92.4
7	33 40.2	32	94	93.7	33 49.8	32	94	93.1	33 59.2	31	94	92.6	34 08.4	31	94	92.0
8	32 43.9	32	94	93.3	32 53.5	32	94	92.8	33 02.9	31	94	92.2	33 12.1	31	94	91.6
9	31 47.6	32	94	92.9	31 57.1	31	94	92.4	32 06.5	31	94	91.8	32 15.7	30	94	91.3
60	30 51.3	32	94	92.6	31 00.8	31	94	92.0	31 10.1	31	94	91.5	31 19.3	30	94	90.9
1	29 55.0	32	94	92.2	30 04.5	31	94	91.7	30 13.8	31	94	91.1	30 23.0	30	94	90.6
2	28 58.6	32	94	91.9	29 08.1	31	94	91.3	29 17.4	31	94	90.8	29 26.6	30	94	90.2
3	28 02.3	32	94	91.5	28 11.7	31	94	90.9	28 21.0	31	94	90.4	28 30.2	30	94	89.9
4	27 05.9	32	94	91.1	27 15.3	31	94	90.6	27 24.6	31	94	90.1	27 33.8	30	94	89.5
65	26 09.6	32	94	90.8	26 19.0	31	94	90.3	26 28.3	31	94	89.7	26 37.4	30	94	89.2
6	25 13.2	32	94	90.4	25 22.6	31	94	89.9	25 31.9	31	94	89.4	25 41.1	30	94	88.9
7	24 16.8	32	94	90.1	24 26.2	31	94	89.6	24 35.5	31	94	89.1	24 44.7	31	94	88.5
8	23 20.4	32	94	89.8	23 29.8	31	94	89.2	23 39.1	31	94	88.7	23 48.3	31	94	88.2
9	22 24.0	32	94	89.4	22 33.5	31	94	88.9	22 42.8	31	94	88.4	22 52.0	31	94	87.9
70	21 27.7	32	94	89.1	21 37.1	31	94	88.6	21 46.4	31	94	88.1	21 55.7	31	94	87.5
1	20 31.3	32	94	88.7	20 40.7	31	94	88.2	20 50.1	31	94	87.7	20 59.3	31	94	87.2
2	19 34.9	32	94	88.4	19 44.4	31	94	87.9	19 53.7	31	94	87.4	20 03.0	31	94	86.9
3	18 38.6	32	94	88.1	18 48.0	31	94	87.6	18 57.4	31	94	87.1	19 06.7	31	94	86.6
4	17 42.2	32	94	87.7	17 51.7	32	94	87.2	18 01.1	31	94	86.8	18 10.5	31	94	86.3
75	16 45.9	32	94	87.4	16 55.4	32	94	86.9	17 04.8	31	94	86.4	17 14.2	31	94	85.9
6	15 49.6	32	94	87.1	15 59.1	32	94	86.6	16 08.6	31	94	86.1	16 18.0	31	94	85.6
7	14 53.3	32	94	86.8	15 02.8	32	94	86.3	15 12.3	32	94	85.8	15 21.8	31	94	85.3
8	13 57.0	32	94	86.4	14 06.6	32	94	85.9	14 16.1	32	94	85.5	14 25.6	32	94	85.0
9	13 00.7	32	94	86.1	13 10.4	32	94	85.6	13 19.9	32	94	85.1	13 29.5	32	94	84.6
80	12 04.5	32	94	85.8	12 14.2	32	94	85.3	12 23.8	32	94	84.8	12 33.3	32	93	84.3
1	11 08.3	32	94	85.5	11 18.0	32	94	85.0	11 27.6	32	94	84.5	11 37.3	32	93	84.0
2	10 12.1	33	94	85.1	10 21.8	32	94	84.6	10 31.5	32	93	84.2	10 41.2	32	93	83.7
3	9 15.9	33	94	84.8	9 25.7	33	94	84.3	9 35.5	32	93	83.8	9 45.2	32	93	83.4
4	8 19.8	33	94	84.5	8 29.6	33	93	84.0	8 39.4	32	93	83.5	8 49.2	32	93	83.0
85	7 23.7	33	94	84.1	7 33.6	33	93	83.7	7 43.4	33	93	83.2	7 53.2	33	93	82.7
6	6 27.6	33	93	83.8	6 37.5	33	93	83.3	6 47.5	33	93	82.9	6 57.3	33	93	82.4
7	5 31.6	33	93	83.5	5 41.6	33	93	83.0	5 51.5	33	93	82.5	6 01.5	33	93	82.1
8													5 05.7	33	93	81.7

10° 00′				10° 30′				11° 00′				11° 30′				H.A.
Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.	
° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	°
80 00.0	1.0	05	180.0	80 30.0	1.0	05	180.0	81 00.0	1.0	06	180.0	81 30.0	1.0	06	180.0	00
79 57.2	1.0	14	174.3	80 27.1	1.0	15	174.1	80 56.9	99	15	173.7	81 26.7	99	16	173.4	1
79 48.9	98	23	168.8	80 18.4	98	24	168.2	80 47.8	98	25	167.6	81 17.1	98	26	167.0	2
79 35.4	96	31	163.4	80 04.2	96	32	162.6	80 32.9	95	34	161.8	81 01.4	95	35	160.8	3
79 16.9	94	38	158.3	79 44.9	93	40	157.3	80 12.7	92	42	156.2	80 40.2	91	43	155.1	4
78 53.9	91	45	153.5	79 20.9	90	47	152.4	79 47.7	89	49	151.1	80 14.1	88	51	149.8	05
78 26.8	87	51	149.1	78 52.8	86	53	147.8	79 18.4	85	55	146.4	79 43.7	83	57	144.9	6
77 56.1	84	56	145.0	78 21.0	82	58	143.6	78 45.5	81	60	142.1	79 09.5	79	62	140.6	7
77 22.2	80	61	141.2	77 46.0	79	63	139.8	78 09.4	77	65	138.3	78 32.2	75	66	136.7	8
76 45.5	77	65	137.7	77 08.3	75	67	136.3	77 30.6	73	69	134.8	77 52.3	71	70	133.1	9
76 06.5	73	69	134.6	76 28.2	72	70	133.1	76 49.4	70	72	131.6	77 10.1	68	73	130.0	10
75 25.3	70	72	131.7	75 46.1	68	73	130.3	76 06.3	67	74	128.7	76 26.0	64	76	127.1	1
74 42.4	67	74	129.1	75 02.3	65	76	127.7	75 21.6	63	77	126.1	75 40.3	61	78	124.6	2
73 57.9	64	76	126.7	74 16.9	63	78	125.3	74 35.4	61	79	123.8	74 53.2	59	80	122.3	3
73 12.0	62	78	124.5	73 30.2	60	80	123.1	73 47.9	58	81	121.7	74 05.0	56	82	120.2	4
72 25.0	59	80	122.5	72 42.5	58	81	121.1	72 59.4	56	82	119.7	73 15.8	54	83	118.3	15
71 36.9	57	82	120.6	71 53.8	55	83	119.3	72 10.0	53	84	117.9	72 25.8	51	85	116.5	6
70 47.9	55	83	118.9	71 04.2	53	84	117.6	71 19.9	51	85	116.3	71 35.0	49	86	114.9	7
69 58.2	53	84	117.3	70 13.9	51	85	116.1	70 29.0	49	86	114.8	70 43.5	48	87	113.5	8
69 07.8	51	85	115.8	69 22.9	50	86	114.6	69 37.5	48	87	113.4	69 51.5	46	87	112.1	9
68 16.8	50	86	114.5	68 31.4	48	87	113.3	68 45.5	46	88	112.1	68 59.1	44	88	110.8	20
67 25.2	48	87	113.2	67 39.4	46	88	112.1	67 53.0	45	88	110.9	68 06.2	43	89	109.7	1
66 33.1	47	88	112.0	66 46.9	45	88	110.9	67 00.1	43	89	109.7	67 12.9	42	89	108.6	2
65 40.6	45	88	110.9	65 54.0	44	89	109.8	66 06.9	42	89	108.7	66 19.3	41	90	107.6	3
64 47.8	44	89	109.8	65 00.8	43	89	108.8	65 13.3	41	90	107.7	65 25.4	39	90	106.6	4
63 54.6	43	89	108.9	64 07.3	42	90	107.8	64 19.5	40	90	106.8	64 31.2	38	90	105.7	25
63 01.1	42	90	107.9	63 13.4	41	90	106.9	63 25.4	39	91	105.9	63 36.9	37	91	104.8	6
62 07.3	41	90	107.0	62 19.4	40	90	106.0	62 31.0	38	91	105.1	62 42.3	37	91	104.0	7
61 13.3	40	90	106.2	61 25.1	39	91	105.2	61 36.5	37	91	104.3	61 47.5	36	92	103.3	8
60 19.0	39	91	105.4	60 30.6	38	91	104.5	60 41.8	37	92	103.5	60 52.5	35	92	102.6	9
59 24.6	38	91	104.6	59 35.9	37	92	103.7	59 46.9	36	92	102.8	59 57.4	35	92	101.9	30
58 29.9	38	91	103.9	58 41.0	36	92	103.0	58 51.8	35	92	102.1	59 02.2	34	92	101.2	1
57 35.1	37	92	103.2	57 46.0	36	92	102.3	57 56.6	35	92	101.5	58 06.8	33	92	100.6	2
56 40.1	36	92	102.5	56 50.9	35	92	101.7	57 01.3	34	92	100.8	57 11.3	33	93	100.0	3
55 45.0	36	92	101.9	55 55.6	35	92	101.1	56 05.9	34	93	100.2	56 15.7	32	93	99.4	4
54 49.8	35	92	101.3	55 00.2	34	92	100.5	55 10.3	33	93	99.6	55 20.1	32	93	98.8	35
53 54.5	35	92	100.7	54 04.7	34	93	99.9	54 14.7	33	93	99.1	54 24.3	32	93	98.3	6
52 59.0	34	92	100.1	53 09.1	33	93	99.3	53 19.0	32	93	98.6	53 28.5	31	93	97.8	7
52 03.5	34	93	99.6	52 13.5	33	93	98.8	52 23.2	32	93	98.0	52 32.6	31	93	97.3	8
51 07.8	33	93	99.0	51 17.7	33	93	98.3	51 27.3	32	93	97.5	51 36.6	31	93	96.8	9
50 12.1	33	93	98.5	50 21.9	32	93	97.8	50 31.4	31	93	97.0	50 40.6	30	94	96.3	40
49 16.3	33	93	98.0	49 26.0	32	93	97.3	49 35.4	31	93	96.6	49 44.5	30	94	95.8	1
48 20.4	32	93	97.5	48 30.0	32	93	96.8	48 39.4	31	94	96.1	48 48.4	30	94	95.4	2
47 24.5	32	93	97.1	47 34.0	31	93	96.4	47 43.3	30	94	95.7	47 52.3	30	94	94.9	3
46 28.5	32	93	96.6	46 38.0	31	94	95.9	46 47.2	30	94	95.2	46 56.1	29	94	94.5	4
45 32.5	32	93	96.1	45 41.9	31	94	95.5	45 51.0	30	94	94.8	45 59.9	29	94	94.1	45
44 36.4	31	94	95.7	44 45.7	31	94	95.0	44 54.8	30	94	94.4	45 03.6	29	94	93.7	6
43 40.3	31	94	95.3	43 49.5	30	94	94.6	43 58.5	30	94	94.0	44 07.3	29	94	93.3	7
42 44.1	31	94	94.9	42 53.3	30	94	94.2	43 02.3	30	94	93.6	43 11.0	29	94	92.9	8
41 47.9	31	94	94.4	41 57.1	30	94	93.8	42 06.0	29	94	93.2	42 14.7	29	94	92.5	9
40 51.7	31	94	94.0	41 00.8	30	94	93.4	41 09.7	29	94	92.8	41 18.4	29	94	92.1	50
39 55.5	31	94	93.6	40 04.5	30	94	93.0	40 13.4	29	94	92.4	40 22.0	29	94	91.8	1
38 59.2	30	94	93.3	39 08.2	30	94	92.6	39 17.0	29	94	92.0	39 25.7	28	94	91.4	2
38 02.9	30	94	92.9	38 11.9	30	94	92.3	38 20.7	29	94	91.7	38 29.3	28	94	91.1	3
37 06.6	30	94	92.5	37 15.5	30	94	91.9	37 24.3	29	94	91.3	37 32.9	28	94	90.7	4
36 10.2	30	94	92.1	36 19.2	30	94	91.5	36 28.0	29	94	90.9	36 36.5	28	94	90.3	55
35 13.9	30	94	91.8	35 22.8	30	94	91.2	35 31.6	29	94	90.6	35 40.2	28	94	90.0	6
34 17.5	30	94	91.4	34 26.4	29	94	90.8	34 35.2	29	94	90.2	34 43.8	28	94	89.7	7
33 21.1	30	94	91.0	33 30.1	29	94	90.5	33 38.8	29	94	89.9	33 47.4	28	94	89.3	8
32 24.8	30	94	90.7	32 33.7	29	94	90.1	32 42.4	29	94	89.6	32 51.0	28	94	89.0	9
31 28.4	30	94	90.4	31 37.3	29	94	89.8	31 46.1	29	94	89.2	31 54.7	28	94	88.7	60
30 32.0	30	94	90.0	30 40.9	29	94	89.5	30 49.7	29	94	88.9	30 58.3	29	94	88.3	1
29 35.6	30	94	89.7	29 44.5	29	94	89.1	29 53.3	29	94	88.6	30 01.9	29	94	88.0	2
28 39.2	30	94	89.3	28 48.2	30	94	88.8	28 57.0	29	94	88.2	29 05.6	29	94	87.7	3
27 42.9	30	94	89.0	27 51.8	30	94	88.5	28 00.6	29	94	87.9	28 09.3	29	94	87.4	4
26 46.5	30	94	88.7	26 55.4	30	94	88.1	27 04.3	29	94	87.6	27 13.0	29	94	87.0	65
25 50.1	30	94	88.3	25 59.1	30	94	87.8	26 07.9	29	94	87.3	26 16.7	29	94	86.7	6
24 53.8	30	94	88.0	25 02.8	30	94	87.5	25 11.6	29	94	87.0	25 20.4	29	94	86.4	7
23 57.4	30	94	87.7	24 06.4	30	94	87.2	24 15.3	29	94	86.6	24 24.1	29	94	86.1	8
23 01.1	30	94	87.4	23 10.1	30	94	86.8	23 19.1	30	94	86.3	23 27.9	29	94	85.8	9
22 04.8	30	94	87.0	22 13.9	30	94	86.5	22 22.8	30	94	86.0	22 31.7	29	94	85.5	70
21 08.5	30	94	86.7	21 17.6	30	94	86.2	21 26.6	30	94	85.7	21 35.5	29	94	85.2	1
20 12.2	31	94	86.4	20 21.3	30	94	85.9	20 30.4	30	94	85.4	20 39.3	30	94	84.9	2
19 16.0	31	94	86.1	19 25.1	30	94	85.6	19 34.2	30	94	85.1	19 43.2	30	94	84.5	3
18 19.7	31	94	85.8	18 28.9	31	94	85.3	18 38.0	30	94	84.7	18 47.0	30	93	84.2	4
17 23.5	31	94	85.4	17 32.7	31	94	84.9	17 41.9	30	94	84.4	17 51.0	30	93	83.9	75
16 27.3	31	94	85.1	16 36.6	31	94	84.6	16 45.8	31	94	84.1	16 54.9	30	93	83.6	6
15 31.2	31	94	84.8	15 40.5	31	94	84.3	15 49.7	31	93	83.8	15 58.9	31	93	83.3	7
14 35.0	31	94	84.5	14 44.4	31	94	84.0	14 53.7	31	93	83.5	15 02.9	31	93	83.0	8
13 38.9	31	93	84.2	13 48.3	31	93	83.7	13 57.7	31	93	83.2	14 07.0	31	93	82.7	9
12 42.9	32	93	83.8	12 52.3	31	93	83.4	13 01.7	31	93	82.9	13 11.1	31	93	82.4	80
11 46.8	32	93	83.5	11 56.3	32	93	83.0	12 05.8	31	93	82.5	12 15.2	31	93	82.1	1
10 50.8	32	93	83.2	11 00.4	32	93	82.7	11 09.9	32	93	82.2	11 19.4	32	93	81.7	2
9 54.8	32	93	82.9	10 04.5	32	93	82.4	10 14.1	32	93	81.9	10 23.6	32	93	81.4	3
8 58.9	32	93	82.6	9 08.6	32	93	82.1	9 18.3	32	93	81.6	9 27.9	32	93	81.1	4
8 03.0	33	93	82.2	8 12.8	32	93	81.8	8 22.5	32	93	81.3	8 32.2	32	93	80.8	85
7 07.2	33	93	81.9	7 17.0	33	93	81.4	7 26.8	33	93	81.0	7 36.6	33	93	80.5	6
6 11.4	33	93	81.6	6 21.3	33	93	81.1	6 31.2	33	93	80.6	6 41.0	33	92	80.1	7
5 15.6	33	93	81.3	5 25.6	33	93	80.7	5 35.6	33	93	80.3	5 45.5	33	92	79.8	8

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	62 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	59 00.0	1.0 02	180.0	58 30.0	1.0 02	180.0	00
1	61 59.0	1.0 05	177.9	61 29.0	1.0 05	177.9	60 59.0	1.0 05	178.0	60 29.0	1.0 05	178.0	59 59.0	1.0 05	178.0	59 29.0	1.0 05	178.1	58 59.1	1.0 06	178.1	58 29.1	1.0 05	178.1	1
2	61 55.9	1.0 09	175.8	61 25.9	1.0 08	175.9	60 56.0	1.0 08	175.9	60 26.1	1.0 08	176.0	59 56.1	1.0 08	176.1	59 26.2	1.0 08	176.1	58 56.3	1.0 08	176.2	58 26.3	1.0 08	176.3	2
3	61 50.7	99 12	173.7	61 20.8	99 12	173.8	60 51.0	99 12	173.9	60 21.2	1.0 11	174.0	59 51.3	1.0 11	174.1	59 21.4	1.0 11	174.2	58 51.6	1.0 11	174.3	58 21.7	1.0 11	174.4	3
4	61 43.5	99 15	171.6	61 13.8	99 15	171.8	60 44.0	99 15	171.9	60 14.3	99 15	172.0	59 44.6	99 14	172.2	59 14.8	99 14	172.3	58 45.1	99 14	172.4	58 15.3	99 14	172.5	4
05	61 34.3	99 19	169.6	61 04.7	99 18	169.7	60 35.1	99 18	169.9	60 05.5	99 18	170.1	59 35.9	99 17	170.2	59 06.3	99 17	170.4	58 36.7	99 17	170.5	58 07.1	99 17	170.7	05
6	61 23.0	98 22	167.5	60 53.7	98 22	167.7	60 24.3	98 21	167.9	59 54.9	98 21	168.1	59 25.4	98 20	168.3	58 56.0	98 20	168.5	58 26.5	98 20	168.7	57 57.1	98 20	168.9	6
7	61 09.9	97 25	165.5	60 40.7	97 25	165.8	60 11.6	97 24	166.0	59 42.4	97 24	166.2	59 13.1	97 23	166.4	58 43.9	98 23	166.6	58 14.6	98 23	166.9	57 45.3	98 22	167.1	7
8	60 54.8	96 28	163.5	60 25.9	96 28	163.8	59 57.0	97 27	164.1	59 28.0	97 27	164.3	58 59.0	97 26	164.6	58 30.0	97 26	164.8	58 00.9	97 26	165.1	57 31.8	97 25	165.3	8
9	60 37.9	95 31	161.6	60 09.3	96 31	161.9	59 40.6	96 30	162.2	59 11.9	96 30	162.5	58 43.1	96 29	162.7	58 14.4	96 29	163.0	57 45.5	96 28	163.3	57 16.7	96 28	163.5	9
10	60 19.2	94 34	159.7	59 50.9	95 33	160.0	59 22.5	95 33	160.3	58 54.1	95 33	160.6	58 25.6	95 32	160.9	57 57.0	95 31	161.2	57 28.5	95 31	161.5	56 59.9	95 31	161.8	10
1	59 58.8	93 37	157.8	59 30.8	94 36	158.2	59 02.7	94 36	158.5	58 34.5	94 35	158.8	58 06.3	94 35	159.2	57 38.1	94 34	159.5	57 09.8	94 34	159.8	56 41.5	95 33	160.1	1
2	59 36.7	92 40	156.0	59 09.0	92 39	156.4	58 41.2	93 38	156.7	58 13.4	93 38	157.1	57 45.5	93 37	157.4	57 17.5	93 37	157.8	56 49.5	93 36	158.1	56 21.5	94 36	158.4	2
3	59 12.9	91 42	154.2	58 45.6	91 42	154.6	58 18.1	92 41	155.0	57 50.6	92 40	155.4	57 23.1	92 40	155.7	56 55.4	92 39	156.1	56 27.8	92 39	156.4	56 00.0	93 38	156.8	3
4	58 47.6	90 45	152.5	58 20.6	90 44	152.9	57 53.5	90 43	153.3	57 26.4	91 43	153.7	56 59.2	91 42	154.1	56 31.9	91 42	154.4	56 04.5	91 41	154.8	55 37.1	92 41	155.2	4
15	58 20.8	89 47	150.8	57 54.2	89 46	151.2	57 27.5	89 46	151.6	57 00.7	89 45	152.0	56 33.8	90 45	152.4	56 06.8	90 44	152.8	55 39.8	90 43	153.2	55 12.7	90 43	153.6	15
6	57 52.6	87 50	149.1	57 26.3	87 49	149.6	57 00.0	88 48	150.0	56 33.5	88 47	150.4	56 07.0	89 47	150.9	55 40.4	89 46	151.3	55 13.7	89 46	151.7	54 47.0	89 45	152.1	6
7	57 22.9	86 52	147.5	56 57.1	86 51	148.0	56 31.1	87 50	148.4	56 05.1	87 50	148.9	55 38.9	87 49	149.3	55 12.6	88 48	149.7	54 46.3	88 48	150.2	54 19.9	88 47	150.6	7
8	56 52.0	85 54	146.0	56 26.5	85 53	146.4	56 01.0	85 52	146.9	55 35.3	86 52	147.4	55 09.5	86 51	147.8	54 43.6	86 50	148.3	54 17.6	87 50	148.7	53 51.6	87 49	149.1	8
9	56 19.8	83 56	144.4	55 54.8	84 55	144.9	55 29.6	84 54	145.4	55 04.3	85 54	145.9	54 38.8	85 53	146.3	54 13.3	85 52	146.8	53 47.7	86 52	147.2	53 22.0	86 51	147.7	9
20	55 46.5	82 57	143.0	55 21.8	83 57	143.5	54 57.0	83 56	144.0	54 32.1	83 56	144.5	54 07.0	84 55	144.9	53 41.9	84 54	145.4	53 16.6	84 54	145.8	52 51.3	85 53	146.3	20
1	55 12.0	81 59	141.6	54 47.7	81 59	142.1	54 23.3	82 58	142.6	53 58.7	82 57	143.1	53 34.1	82 57	143.5	53 09.3	83 56	144.0	52 44.4	83 56	144.5	52 19.4	83 55	144.9	1
2	54 36.4	79 61	140.2	54 12.5	80 60	140.7	53 48.4	80 60	141.2	53 24.3	81 59	141.7	53 00.0	81 58	142.2	52 35.6	82 58	142.7	52 11.1	82 57	143.1	51 46.5	82 56	143.6	2
3	53 59.7	78 63	138.8	53 36.2	79 62	139.4	53 12.6	79 61	139.9	52 48.8	79 61	140.4	52 25.0	80 60	140.9	52 00.9	80 59	141.4	51 36.8	81 59	141.9	51 12.6	81 58	142.3	3
4	53 22.2	77 64	137.5	52 59.0	77 64	138.1	52 35.8	78 63	138.6	52 12.4	78 62	139.1	51 48.9	79 62	139.6	51 25.3	79 61	140.1	51 01.5	79 60	140.6	50 37.6	80 60	141.1	4
25	52 43.6	75 66	136.3	52 20.9	76 65	136.8	51 58.1	76 64	137.4	51 35.0	77 64	137.9	51 11.9	77 63	138.4	50 48.6	78 62	138.9	50 25.2	78 62	139.4	50 01.7	79 61	139.9	25
6	52 04.2	74 67	135.1	51 41.9	75 66	135.6	51 19.4	75 66	136.1	50 56.8	76 65	136.7	50 34.0	76 64	137.2	50 11.1	77 64	137.7	49 48.1	77 63	138.2	49 24.9	77 63	138.7	6
7	51 24.0	73 68	133.9	51 02.1	73 68	134.4	50 39.9	74 67	135.0	50 17.7	74 66	135.5	49 55.3	75 66	136.0	49 32.7	75 65	136.5	49 10.1	76 65	137.0	48 47.3	76 64	137.5	7
8	50 43.0	72 70	132.8	50 21.4	72 69	133.3	49 59.7	73 68	133.8	49 37.8	73 68	134.4	49 15.7	74 67	134.9	48 53.6	74 67	135.4	48 31.2	75 66	135.9	48 08.8	75 65	136.4	8
9	50 01.2	71 71	131.6	49 40.0	71 70	132.2	49 18.6	72 70	132.7	48 57.1	72 69	133.3	48 35.4	72 68	133.8	48 13.6	73 68	134.3	47 51.6	73 67	134.8	47 29.5	74 67	135.3	9
30	49 18.8	69 72	130.6	48 57.9	70 71	131.1	48 36.9	70 71	131.7	48 15.7	71 70	132.2	47 54.3	71 69	132.7	47 32.9	72 69	133.3	47 11.3	72 69	133.8	46 49.5	73 68	134.3	30
1	48 35.6	68 73	129.5	48 15.1	69 72	130.1	47 54.4	69 72	130.6	47 33.6	70 71	131.2	47 12.6	70 71	131.7	46 51.5	71 70	132.2	46 30.2	71 70	132.7	46 08.8	72 69	133.2	1
2	47 51.8	67 74	128.5	47 31.6	68 73	129.1	47 11.3	68 73	129.6	46 50.8	69 72	130.2	46 30.2	69 72	130.7	46 09.4	70 71	131.2	45 48.5	70 71	131.7	45 27.4	71 70	132.2	2
3	47 07.4	66 75	127.6	46 47.6	66 74	128.1	46 27.6	67 74	128.7	46 07.4	67 73	129.2	45 47.1	68 73	129.7	45 26.7	68 72	130.2	45 06.1	69 72	130.8	44 45.3	69 71	131.3	3
4	46 22.4	65 76	126.6	46 02.9	65 75	127.2	45 43.2	66 75	127.7	45 23.4	66 74	128.2	45 03.4	67 74	128.8	44 43.3	67 73	129.3	44 23.1	68 73	129.8	44 02.7	68 72	130.3	4
35	45 36.9	64 77	125.7	45 17.7	64 76	126.3	44 58.4	65 76	126.8	44 38.9	65 75	127.3	44 19.2	66 75	127.9	43 59.4	66 74	128.4	43 39.5	67 74	128.9	43 19.4	67 73	129.4	35
6	44 50.9	63 78	124.8	44 32.0	63 77	125.4	44 13.0	64 77	125.9	43 53.8	64 76	126.4	43 34.4	65 75	127.0	43 14.9	65 75	127.5	42 55.3	66 74	128.0	42 35.5	66 74	128.5	6
7	44 04.4	62 78	124.0	43 45.8	62 78	124.5	43 27.0	63 77	125.0	43 08.1	63 77	125.6	42 49.1	64 76	126.1	42 29.9	64 76	126.6	42 10.6	65 76	127.1	41 51.2	65 75	127.7	7
8	43 17.4	61 79	123.1	42 59.1	61 79	123.7	42 40.6	62 78	124.2	42 22.0	62 78	124.7	42 03.3	63 77	125.3	41 44.4	63 77	125.8	41 25.4	64 76	126.3	41 06.3	64 76	126.8	8
9	42 29.9	60 80	122.3	42 11.9	60 79	122.8	41 53.8	61 79	123.4	41 35.5	61 78	123.9	41 17.0	62 78	124.4	40 58.5	62 78	125.0	40 39.7	63 77	125.5	40 20.9	63 77	126.0	9
40	41 42.0	59 80	121.5	41 24.3	59 80	122.1	41 06.5	60 80	122.6	40 48.5	60 79	123.1	40 30.3	61 79	123.6	40 12.0	61 78	124.2	39 53.6	62 78	124.7	39 35.0	62 77	125.2	40
1	40 53.8	58 81	120.7	40 36.4	58 81	121.3	40 18.8	59 80	121.8	40 01.0	59 80	122.3	39 43.2	60 79	122.9	39 25.2	60 79	123.4	39 07.0	61 78	123.9	38 48.7	61 78	124.4	1
2	40 05.1	57 82	120.0	39 48.0	57 81	120.5	39 30.7	58 81	121.1	39 13.2	58 80	121.6	38 55.6	59 80	122.1	38 37.9	59 80	122.6	38 20.0	60 79	123.1	38 02.0	60 78	123.6	2
3	39 16.1	56 82	119.3	38 59.2	57 82	119.8	38 42.2	57 81	120.3	38 25.0	58 81	120.9	38 07.7	58 81	121.4	37 50.2	58 80	121.9	37 32.6	59 80	122.4	37 14.9	59 79	122.9	3
4	38 26.8	55 83	118.6	38 10.1	56 82	119.1	37 53.3	56 82	119.6	37 36.4	57 81	120.1	37 19.3	57 81	120.7	37 02.1	58 81	121.2	36 44.8	58 80	121.7	36 27.3	58 80	122.2	4
45	37 37.1	54 83	117.9	37 20.7	55 83	118.4	37 04.2	55 83	118.9	36 47.5	56 82	119.4	36 30.7	56 82	120.0	36 13.7	57 81	120.5	35 56.6	57 81	121.0	35 39.4	58 80	121.5	45
6	36 47.1	54 84	117.2	36 30.9	54 83	117.7	36 14.6	55 83	118.2	35 58.2	55 83	118.8	35 41.6	55 82	119.3	35 25.0	56 82	119.8	35 08.1	56 81	120.3	34 51.2	57 81	120.8	6
7	35 56.8	53 84	116.5	35 40.9	53 84	117.1	35 24.8	54 83	117.6	35 08.6	54 83	118.1	34 52.3	55 83	118.6	34 35.9	55 82	119.1	34 19.3	55 82	119.6	34 02.6	56 81	120.1	7
8	35 06.2	52 85	115.9	34 50.5	53 84	116.4	34 34.7	53 84	116.9	34 18.7	53 83	117.5	34 02.7	54 83	118.0	33 46.4	54 83	118.5	33 30.1	55 83	119.0	33 13.7	55 82	119.5	8
9	34 15.4	51 85	115.3	33 59.9	52 85	115.8	33 44.3	52 84	116.3	33 28.6	53 84	116.8	33 12.7	53 84	117.3	32 56.7	53 83	117.8	32 40.6	54 83	118.3	32 24.4	54 82	118.8	9
50	33 24.3	51 86	114.7	33 09.0	51 85	115.2	32 53.6	51 85	115.7	32 38.1	52 84	116.2	32 22.5	52 84	116.7	32 06.7	53 84	117.2	31 50.9	53 83	117.7	31 34.9	53 83	118.2	50
1	32 32.9	50 86	114.1	32 17.9	50 86	114.6	32 02.7	51 85	115.1	31 47.4	51 85	115.6	31 32.0	52 85	116.1	31 16.5	52 84	116.6	31 00.8	52 84	117.1	30 45.1	53 83	117.6	1
2	31 41.3	49 86	113.5	31 26.5	50 86	114.0	31 11.5	50 86	114.5	30 56.4	50 85	115.0	30 41.2	51 85	115.5	30 25.9	51 85	116.0	30 10.5	52 84	116.5	29 55.0	52 84	117.0	2
3	30 49.5	49 87	112.9	30 34.9	49 86	113.4	30 20.1	49 86	113.9	30 05.2	50 86	114.4	29 50.2	50 85	114.9	29 35.1	50 85	115.4	29 19.9	51 85	115.9	29 04.6	51 84	116.4	3
4	29 57.5	48 87	112.4	29 43.0	48 87	112.9	29 28.5	49 86	113.4	29 13.8	49 86	113.9	28 59.0	49 86	114.4	28 44.1	50 85	114.9	28 29.1	50 85	115.4	28 14.0	51 85	115.9	4
55	29 05.2	47 87	111.8	28 51.0	48 87	112.3	28 36.6	48 87	112.8	28 22.1	48 86	113.3	28 07.5	49 86	113.8	27 52.8	49 86	114.3	27 38.0	49 85	114.8	27 23.1	50 85	115.3	55
6	28 12.8	47 88	111.3	27 58.7	47 87	111.8	27 44.5	47 87	112.3	27 30.3	48 87	112.8	27 15.9	48 86	113.3	27 01.4	49 86	113.8	26 46.8	49 86	114.3	26 32.1	49 86	114.8	6
7	27 20.2	46 88	110.8	27 06.3	47 88	111.3	26 52.3	47 87	111.8	26 38.2	47 87	112.3	26 24.0	48 87	112.8	26 09.7	48 86	113.3	25 55.3	48 86	113.7	25 40.7	48 86	114.2	7
8	26 27.4	46 88	110.3	26 13.7	46 88	110.8	25 59.8	46 88	111.3	25 45.9	47 87	111.8	25 31.9	47 87	112.2	25 17.8	47 87	112.7	25 03.5	48 86	113.2	24 49.2	48 86	113.7	8
9	25 34.4	45 88	109.8	25 20.9	45 88	110.3	25 07.2	46 88	110.8	24 53.4	46 88	111.3	24 39.6	46 87	111.7	24 25.7	47 87	112.2	24 11.6	47 87	112.7	23 57.5	47 86	113.2	9
60	24 41.3	44 89	109.3	24 27.9	45 89	109.8	24 14.4	45 88	110.3	24 00.8	45 88	110.8	23 47.1	46 88	111.2	23 33.4	46 87	111.7	23 19.5	46 87	112.2	23 05.6	47 87	112.7	60
1	23 48.0	44 89	108.8	23 34.7	44 89	109.3	23 21.4	45 88	109.8	23 08.0	45 88	110.3	22 54.5	45 88	110.8	22 40.9	45 88	111.2	22 27.2	46 87	111.7	22 13.5	46 87	112.2	1
2	22 54.5	43 89	108.3	22 41.5	44 89	108.8	22 28.3	44 89	109.3	22 15.0	44 88	109.8	22 01.7	45 88	110.3	21 48.3	45 88	110.8	21 34.8	45 88	111.2	21 21.2	45 87	111.7	2
3	22 00.9	43 89	107.9	21 48.0	43 89	108.4	21 35.0	43 89	108.8	21 21.9	44 89	109.3	21 08.7	44 88	109.8	20 55.5	44 88	110.3	20 42.1	45 88	110.8	20 28.7	45 88	111.2	3
4	21 07.2	42 90	107.4	20 54.4	43 89	107.9	20 41.6	43 89	108.4	20 28.6	43 89	108.9	20 15.6	44 89	109.3	20 02.5	44 88	109.8	19 49.3	44 88	110.3	19 36.1	44 88	110.8	4
65	20 13.3	42 90	107.0	20 00.7	42 90	107.4	19 48.0	42 89	107.9	19 35.2	43 89	108.4	19 22.3	43 89	108.9	19 09.4	43 89	109.4	18 56.4	43 88	109.9	18 43.3	44 88	110.3	65
6	19 19.4	42 90	106.5	19 06.9	42 90	107.0	18 54.3	42 90	107.5	18 41.6	42 89	108.0	18 28.9	43 89	108.5	18 16.1	43 89	108.9	18 03.3	43 89	109.4	17 50.4	43 88	109.9	6
7	18 25.2	41 90	106.1	18 12.9	41 90	106.6	18 00.5	42 90	107.1	17 48.0	42 90	107.5	17 35.4	42 89	108.0	17 22.7	42 89	108.5	17 10.0	42 89	109.0	16 57.3	43 89	109.4	7
8	17 31.0	40 90	105.7	17 18.8	41 90	106.2	17 06.5	41 90	106.6	16 54.1	41 90	107.1	16 41.7	42 90	107.6	16 29.2	42 89	108.1	16 16.6	42 89	108.5	16 04.0	42 89	109.0	8
9	16 36.7	40 91	105.3	16 24.6	40 90	105.7	16 12.4	41 90	106.2	16 00.2	41 90	106.7	15 47.9	41 90	107.2	15 35.5	41 90	107.6	15 23.1	41 89	108.1	15 10.6	42 89	108.6	9
70	15 42.2	40 91	104.8	15 30.3	40 91	105.3	15 18.2	40 90	105.8	15 06.1	40 90	106.3	14 54.0	41 90	106.7	14 41.7	41 90	107.2	14 29.5	41 90	107.7	14 17.1	41 89	108.2	70
1	14 47.7	39 91	104.4	14 35.8	40 91	104.9	14 23.9	40 91	105.4	14 11.9	40 90	105.9	13 59.9	40 90	106.3	13 47.8	40 90	106.8	13 35.7	41 90	107.3	13 23.5	41 90	107.7	1
2	13 53.0	39 91	104.0	13 41.3	39 91	104.5	13 29.5	39 91	105.0	13 17.6	40 91	105.5	13 05.7	40 90	105.9	12 53.8	40 90	106.4	12 41.8	40 90	106.9	12 29.7	40 90	107.3	2
3	12 58.3	39 91	103.6	12 46.7	39 91	104.1	12 35.0	39 91	104.6	12 23.2	39 91	105.1	12 11.5	39 91	105.5	11 59.6	40 90	106.0	11 47.8	40 90	106.5	11 35.9	40 90	106.9	3
4	12 03.5	38 92	103.2	11 51.9	38 91	103.7	11 40.4	39 91	104.2	11 28.8	39 91	104.7	11 17.1	39 91	105.1	11 05.4	39 91	105.6	10 53.6	39 90	106.1	10 41.9	39 90	106.5	4
75	11 08.5	38 92	102.9	10 57.1	38 91	103.3	10 45.7	38 91	103.8	10 34.2	38 91	104.3	10 22.6	39 91	104.7	10 11.0	39 91	105.2	9 59.4	39 90	105.7	9 47.8	39 90	106.1	75
6	10 13.5	38 92	102.5	10 02.2	38 92	103.0	9 50.9	38 92	103.4	9 39.5	38 91	103.9	9 28.0	38 91	104.4	9 16.6	38 91	104.8	9 05.1	38 91	105.3	8 53.5	39 90	105.8	6
7	9 18.4	37 92	102.1	9 07.2	37 92	102.6	8 56.0	38 92	103.0	8 44.7	38 91	103.5	8 33.4	38 91	104.0	8 22.0	38 91	104.5	8 10.7	38 91	104.9	7 59.2	38 91	105.4	7
8	8 23.3	37 92	101.7	8 12.2	37 92	102.2	8 01.0	37 92	102.7	7 49.8	37 91	103.1	7 38.6	37 91	103.6	7 27.4	38 91	104.1	7 16.1	38 91	104.5	7 04.8	38 91	105.0	8
9	7 28.0	37 92	101.4	7 17.0	37 92	101.8	7 06.0	37 92	102.3	6 54.9	37 92	102.8	6 43.8	37 91	103.2	6 32.7	37 91	103.7	6 21.5	37 91	104.2	6 10.3	37 91	104.6	9
80	6 32.7	36 92	101.0	6 21.8	37 92	101.5	6 10.8	37 92	101.9	5 59.9	37 92	102.4	5 48.9	37 91	102.9	5 37.8	37 91	103.3	5 26.8	37 91	103.8	5 15.7	37 91	104.3	80
1	5 37.3	36 92	100.6	5 26.5	36 92	101.1	5 15.6	36 92	101.6	5 04.8	36 92	102.0													1

Lat. 20°

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	82 00.0	1.0 06	180.0	82 30.0	1.0 06	180.0	83 00.0	1.0 06	180.0	83 30.0	1.0 07	180.0
1	81 56.6	99 17	173.0	82 26.3	99 18	172.6	82 56.1	99 19	172.1	83 25.8	99 21	171.5
2	81 46.4	97 28	166.2	82 15.5	97 29	165.3	82 44.5	97 31	164.4	83 13.4	96 33	163.8
3	81 29.8	94 37	159.7	81 58.0	94 39	158.6	82 26.0	93 41	157.2	82 53.7	92 44	155.7
4	81 07.5	91 46	153.7	81 34.5	89 48	152.3	82 01.2	88 50	150.7	82 27.4	87 53	148.9
05	80 40.2	86 53	148.3	81 05.9	85 55	146.6	81 31.1	83 58	144.8	81 55.7	81 60	142.9
6	80 08.5	82 59	143.3	80 32.8	80 61	141.6	80 56.5	78 64	139.7	81 19.6	76 66	137.6
7	79 33.1	78 64	138.9	79 56.0	76 66	137.1	80 18.4	73 69	135.1	80 40.0	71 71	133.1
8	78 54.5	73 68	134.9	79 16.2	71 70	133.1	79 37.2	69 72	131.2	79 57.5	66 75	129.1
9	78 13.4	69 72	131.4	78 33.9	67 74	129.6	78 53.7	65 76	127.7	79 12.6	62 78	125.6
10	77 30.1	66 75	128.3	77 49.5	63 77	126.5	78 08.1	61 78	124.6	78 26.0	58 80	122.6
1	76 45.0	62 78	125.5	77 03.4	60 79	123.7	77 21.0	57 81	121.9	77 37.8	55 82	120.0
2	75 58.4	59 80	123.0	76 15.8	57 81	121.3	76 32.5	54 83	119.5	76 48.4	52 84	117.7
3	75 10.5	56 82	120.7	75 27.0	54 83	119.0	75 42.9	52 84	117.3	75 58.0	49 86	115.6
4	74 21.5	54 83	118.6	74 37.3	52 84	117.1	74 52.4	49 86	115.4	75 06.7	47 87	113.7
15	73 31.6	51 85	116.8	73 46.7	49 86	115.2	74 01.1	47 87	113.7	74 14.8	44 88	112.0
6	72 40.8	49 86	115.1	72 55.3	47 86	113.6	73 09.1	45 88	112.1	73 22.2	43 88	110.5
7	71 49.5	47 87	113.5	72 03.4	45 87	112.1	72 16.6	43 88	110.6	72 29.2	41 89	109.1
8	70 57.5	46 88	112.1	71 10.9	44 88	110.7	71 23.6	41 89	109.3	71 35.7	39 90	107.9
9	70 05.0	44 88	110.8	70 17.9	42 89	109.5	70 30.2	40 90	108.1	70 41.9	38 90	106.7
20	69 12.1	42 89	109.6	69 24.6	41 90	108.3	69 36.5	39 90	107.0	69 47.7	37 91	105.6
1	68 18.8	41 90	108.4	68 30.9	39 90	107.2	68 42.4	37 91	105.9	68 53.3	35 91	104.7
2	67 25.1	40 90	107.4	67 36.9	38 90	106.2	67 48.0	36 91	105.0	67 58.7	34 92	103.7
3	66 31.2	39 90	106.4	66 42.6	37 91	105.2	66 53.5	35 91	104.1	67 03.8	34 92	102.9
4	65 37.0	38 91	105.5	65 48.1	36 91	104.4	65 58.7	34 92	103.2	66 08.7	33 92	102.1
25	64 42.5	37 91	104.6	64 53.4	35 92	103.5	65 03.7	34 92	102.4	65 13.5	32 92	101.3
6	63 47.9	36 92	103.8	63 58.5	34 92	102.7	64 08.5	33 92	101.7	64 18.2	31 92	100.6
7	62 53.0	35 92	103.0	63 03.4	34 92	102.0	63 13.3	32 92	100.9	63 22.7	31 93	99.9
8	61 58.0	34 92	102.3	62 08.2	33 92	101.3	62 17.8	32 92	100.3	62 27.1	30 93	99.2
9	61 02.9	34 92	101.6	61 12.8	32 92	100.6	61 22.3	31 93	99.6	61 31.4	30 93	98.6
30	60 07.6	33 92	100.9	60 17.3	32 93	100.0	60 26.7	30 93	99.0	60 35.6	29 93	98.0
1	59 12.1	33 92	100.3	59 21.7	31 93	99.4	59 30.9	30 93	98.4	59 39.7	29 93	97.5
2	58 16.6	32 93	99.7	58 26.1	31 93	98.8	58 35.1	30 93	97.8	58 43.8	28 93	96.9
3	57 21.0	32 93	99.1	57 30.3	30 93	98.2	57 39.2	29 93	97.3	57 47.8	28 94	96.4
4	56 25.3	31 93	98.5	56 34.5	30 93	97.7	56 43.3	29 93	96.8	56 51.7	28 94	95.9
35	55 29.5	31 93	98.0	55 38.5	30 93	97.1	55 47.3	28 94	96.3	55 55.6	27 94	95.4
6	54 33.6	30 93	97.5	54 42.6	29 93	96.6	54 51.2	28 94	95.8	54 59.5	27 94	95.0
7	53 37.7	30 93	97.0	53 46.5	29 93	96.1	53 55.1	28 94	95.3	54 03.3	27 94	94.5
8	52 41.7	30 94	96.5	52 50.5	29 94	95.7	52 58.9	28 94	94.9	53 07.1	27 94	94.1
9	51 45.6	30 94	96.0	51 54.3	29 94	95.2	52 02.7	28 94	94.4	52 10.8	26 94	93.7
40	50 49.5	29 94	95.5	50 58.2	28 94	94.8	51 06.5	27 94	94.0	51 14.5	26 94	93.2
1	49 53.4	29 94	95.1	50 02.0	28 94	94.3	50 10.2	27 94	93.6	50 18.2	26 94	92.8
2	48 57.2	29 94	94.6	49 05.7	28 94	93.9	49 14.0	27 94	93.2	49 21.9	26 94	92.4
3	48 01.0	29 94	94.2	48 09.5	28 94	93.5	48 17.7	27 94	92.8	48 25.6	26 94	92.1
4	47 04.8	29 94	93.8	47 13.2	28 94	93.1	47 21.3	27 94	92.4	47 29.2	26 94	91.7
45	46 08.5	28 94	93.4	46 16.9	28 94	92.7	46 25.0	27 94	92.0	46 32.9	26 94	91.3
6	45 12.2	28 94	93.0	45 20.5	27 94	92.3	45 28.6	27 94	91.6	45 36.5	26 94	91.0
7	44 15.9	28 94	92.6	44 24.2	27 94	92.0	44 32.3	27 94	91.3	44 40.1	26 94	90.6
8	43 19.6	28 94	92.2	43 27.8	27 94	91.6	43 35.9	27 94	90.9	43 43.7	26 94	90.3
9	42 23.2	28 94	91.9	42 31.5	27 94	91.2	42 39.5	26 94	90.6	42 47.4	26 94	89.9
50	41 26.8	28 94	91.5	41 35.1	27 94	90.9	41 43.1	26 94	90.2	41 51.0	26 94	89.6
1	40 30.5	28 94	91.1	40 38.7	27 94	90.5	40 46.8	26 94	89.9	40 54.6	26 94	89.2
2	39 34.1	28 94	90.8	39 42.3	27 94	90.2	39 50.4	26 94	89.5	39 58.2	26 94	88.9
3	38 37.7	28 94	90.4	38 46.0	27 94	89.8	38 54.0	26 94	89.2	39 01.9	26 94	88.6
4	37 41.4	28 94	90.1	37 49.6	27 94	89.5	37 57.6	27 94	88.9	38 05.5	26 94	88.3
55	36 45.0	28 94	89.8	36 53.2	27 94	89.2	37 01.3	27 94	88.5	37 09.1	26 94	87.9
6	35 48.6	28 94	89.4	35 56.8	27 94	88.8	36 04.9	27 94	88.2	36 12.8	26 94	87.6
7	34 52.2	28 94	89.1	35 00.5	27 94	88.5	35 08.6	27 94	87.9	35 16.5	26 94	87.3
8	33 55.8	28 94	88.7	34 04.1	27 94	88.2	34 12.2	27 94	87.6	34 20.2	26 94	87.0
9	32 59.5	28 94	88.4	33 07.8	27 94	87.8	33 15.9	27 94	87.3	33 23.9	26 94	86.7
60	32 03.1	28 94	88.1	32 11.4	27 94	87.5	32 19.6	27 94	87.0	32 27.6	26 94	86.4
1	31 06.8	28 94	87.8	31 15.1	28 94	87.2	31 23.3	27 94	86.7	31 31.3	27 94	86.1
2	30 10.4	28 94	87.5	30 18.8	28 94	86.9	30 27.0	27 94	86.3	30 35.1	27 94	85.8
3	29 14.1	28 94	87.1	29 22.5	28 94	86.6	29 39.8	27 94	86.0	29 38.9	27 94	85.5
4	28 17.8	28 94	86.8	28 26.2	28 94	86.3	28 34.5	27 94	85.7	28 42.7	27 94	85.2
65	27 21.5	28 94	86.5	27 30.0	28 94	86.0	27 38.3	28 94	85.4	27 46.5	27 94	84.9
6	26 25.3	28 94	86.2	26 33.8	28 94	85.7	26 42.1	28 94	85.1	26 50.4	27 94	84.6
7	25 29.0	29 94	85.9	25 37.5	28 94	85.4	25 46.0	28 94	84.8	25 54.2	27 94	84.3
8	24 32.8	29 94	85.6	24 41.4	28 94	85.1	24 49.8	28 94	84.5	24 58.2	28 94	84.0
9	23 36.6	29 94	85.3	23 45.2	29 94	84.8	23 53.7	28 94	84.2	24 02.1	28 93	83.7
70	22 40.4	29 94	85.0	22 49.1	29 94	84.4	22 57.6	28 93	83.9	23 06.1	28 93	83.4
1	21 44.3	29 94	84.7	21 53.0	29 94	84.1	22 01.6	29 93	83.6	22 10.1	28 93	83.1
2	20 48.1	29 94	84.3	20 56.9	29 93	83.8	21 05.6	29 93	83.3	21 14.1	28 93	82.8
3	19 52.0	30 93	84.0	20 00.9	29 93	83.5	20 09.6	29 93	83.0	20 18.2	29 93	82.5
4	18 56.0	30 93	83.7	19 04.8	29 93	83.2	19 13.6	29 93	82.7	19 22.3	29 93	82.2
75	18 00.0	30 93	83.4	18 08.9	30 93	82.9	18 17.7	29 93	82.4	18 26.5	29 93	81.9
6	17 04.0	30 93	83.1	17 12.9	30 93	82.6	17 21.8	30 93	82.1	17 30.7	29 93	81.6
7	16 08.0	30 93	82.8	16 17.0	30 93	82.3	16 26.0	30 93	81.8	16 34.9	30 93	81.3
8	15 12.1	30 93	82.5	15 21.2	30 93	82.0	15 30.2	30 93	81.5	15 39.2	30 93	81.0
9	14 16.2	31 93	82.2	14 25.4	31 93	81.7	14 34.5	30 93	81.2	14 43.5	30 93	80.7
80	13 20.4	31 93	81.9	13 29.6	31 93	81.4	13 38.8	31 93	80.9	13 47.9	30 93	80.4
1	12 24.6	31 93	81.6	12 33.9	31 93	81.1	12 43.1	31 93	80.6	12 52.3	31 92	80.1
2	11 28.8	31 93	81.3	11 38.2	31 93	80.8	11 47.5	31 92	80.3	11 56.8	31 92	79.8
3	10 33.1	32 93	81.0	10 42.6	31 93	80.5	10 52.0	31 92	80.0	11 01.4	31 92	79.5
4	9 37.5	32 93	80.6	9 47.0	32 92	80.2	9 56.5	32 92	79.7	10 06.0	31 92	79.2
85	8 41.9	32 93	80.3	8 51.5	32 92	79.8	9 01.1	32 92	79.4	9 10.6	32 92	78.9
6	7 46.3	32 92	80.0	7 56.0	32 92	79.5	8 05.7	32 92	79.0	8 15.3	32 92	78.6
7	6 50.8	33 92	79.7	7 00.6	33 92	79.2	7 10.3	32 92	78.7	7 20.1	32 92	78.3
8	5 55.4	33 92	79.4	6 05.2	33 92	78.9	6 15.1	33 92	78.4	6 24.9	33 92	77.9
9	5 00.0	33 92	79.0	5 00.9	33 92	78.6	5 19.9	33 92	78.1	5 29.8	33 92	77.6
90												

H.A.	14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	84 00.0	1.0 08	180.0	84 30.0	1.0 08	180.0	85 00.0	1.0 09	180.0	85 30.0	1.0 10	180.0
1	83 55.5	99 22	170.8	84 25.1	99 24	170.0	84 54.6	98 26	169.0	85 24.0	98 29	167.9
2	83 42.2	96 35	162.0	84 10.7	96 38	160.5	84 38.9	94 41	158.8	85 06.8	92 44	156.7
3	83 21.0	91 46	154.0	83 48.0	89 50	152.0	84 14.4	87 53	149.8	84 40.2	85 56	147.1
4	82 53.1	85 56	146.9	83 18.3	83 59	144.6	83 42.7	80 62	142.0	84 06.3	77 66	139.1
05	82 19.8	79 63	140.7	82 43.1	76 66	138.3	83 05.5	73 69	135.6	83 27.0	70 72	132.6
6	81 42.0	73 69	135.4	82 03.6	70 71	132.9	82 24.2	67 74	130.2	82 43.7	63 77	127.3
7	81 00.8	68 73	130.8	81 20.8	65 76	128.4	81 39.7	61 78	125.7	81 57.5	57 80	122.9
8	80 16.9	63 77	126.9	80 35.4	60 79	124.5	80 52.9	56 81	122.0	81 09.2	53 83	119.3
9	79 30.8	59 80	123.5	79 48.0	56 82	121.2	80 04.2	52 83	118.8	80 19.3	49 85	116.3
10	78 43.0	55 82	120.6	78 59.1	52 84	118.4	79 14.2	49 85	116.1	79 28.2	45 87	113.7
1	77 53.8	52 84	118.0	78 08.9	49 85	115.9	78 23.0	46 87	113.8	78 36.2	42 88	111.5
2	77 03.5	49 85	115.7	77 17.7	46 87	113.8	77 31.0	43 88	111.7	77 43.4	40 89	109.6
3	76 12.3	46 87	113.8	76 25.7	43 88	111.9	76 38.3	40 89	109.9	76 50.0	37 90	107.9
4	75 20.3	44 88	112.0	75 33.1	41 89	110.2	75 45.0	38 90	108.3	75 56.1	35 90	106.4
15	74 27.7	42 88	110.4	74 39.9	39 89	108.7	74 51.3	37 90	106.9	75 01.8	34 91	105.1
6	73 34.6	40 89	108.9	73 46.3	38 90	107.3	73 57.1	35 91	105.6	74 07.2	32 91	103.9
7	72 41.1	38 90	107.6	72 52.3	36 91	106.0	73 02.7	34 91	104.4	73 12.4	31 92	102.8
8	71 47.2	37 90	106.4	71 57.9	35 91	104.9	72 08.0	32 92	103.4	72 17.3	30 92	101.8
9	70 52.9	36 91	105.3	71 03.3	34 91	103.9	71 13.0	31 92	102.4	71 22.0	29 92	100.9
20	69 58.4	35 91	104.3	70 08.5	32 92	102.9	70 17.8	30 92	101.5	70 26.6	28 93	100.1
1	69 03.7	33 92	103.3	69 13.4	31 92	102.0	69 22.5	29 92	100.7	69 31.0	27 93	99.3
2	68 08.7	32 92	102.5	68 18.2	31 92	101.2	68 27.0	29 93	99.9	68 35.3	27 93	98.6
3	67 13.6	32 92	101.6	67 22.8	30 92	100.4	67 31.4	28 93	99.2	67 39.5	26 93	97.9
4	66 18.3	31 92	100.9	66 27.3	29 93	99.7	66 35.7	27 93	98.5	66 43.6	25 93	97.3
25	65 22.8	30 92	100.2	65 31.6	28 93	99.0	65 39.9	27 93	97.8	65 47.6	25 93	96.7
6	64 27.3	30 93	99.5	64 35.9	28 93	98.4	64 44.0	26 93	97.2	64 51.6	24 94	96.1
7	63 31.6	29 93	98.8	63 40.1	27 93	97.7	63 48.0	26 93	96.7	63 55.5	24 94	95.6
8	62 35.9	29 93	98.2	62 44.2	27 93	97.2	62 52.0	25 94	96.1	62 59.4	24 94	95.0
9	61 40.0	28 93	97.6	61 48.2	27 93	96.6	61 55.9	25 94	95.6	62 03.2	24 94	94.5
30	60 44.1	28 93	97.1	60 52.2	26 94	96.1	60 59.8	25 94	95.1	61 07.0	23 94	94.1
1	59 48.1	27 93	96.5	59 56.1	26 94	95.6	60 03.6	24 94	94.6	60 10.7	23 94	93.6
2	58 52.1	27 94	96.0	58 59.9	26 94	95.1	59 07.4	24 94	94.1	59 14.4	23 94	93.2
3	57 56.0	27 94	95.5	58 03.7	25 94	94.6	58 11.1	24 94	93.7	58 18.1	23 94	92.8
4	56 59.8	26 94	95.0	57 07.5	25 94	94.1	57 14.9	24 94	93.3	57 21.8	23 94	92.4
35	56 03.6	26 94	94.6	56 11.3	25 94	93.7	56 18.6	24 94	92.8	56 25.5	22 94	92.0
6	55 07.4	26 94	94.1	55 15.0	25 94	93.3	55 22.2	24 94	92.4	55 29.1	22 94	91.6
7	54 11.2	26 94	93.7	54 18.7	25 94	92.9	54 25.9	23 94	92.0	54 32.7	22 94	91.2
8	53 14.9	26 94	93.3	53 22.4	24 94	92.5	53 29.5	23 94	91.7	53 36.4	22 94	90.8
9	52 18.6	25 94	92.9	52 26.0	24 94	92.1	52 33.2	23 94	91.3	52 40.0	22 94	90.5
40	51 22.3	25 94	92.5	51 29.7	24 94	91.7	51 36.8	23 94	90.9	51 43.6	22 94	90.1
1	50 25.9	25 94	92.1	50 33.3	24 94	91.3	50 40.4	23 94	90.6	50 47.2	22 94	89.8
2	49 29.6	25 94	91.7	49 37.0	24 94	91.0	49 44.1	23 94	90.2	49 50.8	22 94	89.5
3	48 33.2	25 94	91.3	48 40.6	24 94	90.6	48 47.7	23 94	89.9	48 54.5	22 94	89.1
4	47 36.8	25 94	91.0	47 44.2	24 94	90.2	47 51.3	23 94	89.5	47 58.1	22 94	88.8
45	46 40.5	25 94	90.6	46 47.8	24 94	89.9	46 54.9	23 94	89.2	47 01.7	22 94	88.5
6	45 44.1	25 94	90.3	45 51.4	24 94	89.6	45 58.5	23 94	88.9	46 05.4	22 94	88.2
7	44 47.7	25 94	89.9	44 55.1	24 94	89.2	45 02.2	23 94	88.5	45 09.0	22 94	87.9
8	43 51.3	25 94	89.6	43 58.7	24 94	88.9	44 05.8	23 94	88.2	44 12.7	23 94	87.6
9	42 54.9	25 94	89.2	43 02.3	24 94	88.6	43 09.4	23 94	87.9	43 16.4	23 94	87.3
50	41 58.6	25 94	88.9	42 06.0	24 94	88.3	42 13.1	24 94	87.6	42 20.1	23 94	87.0
1	41 02.2	25 94	88.6	41 09.6	24 94	88.0	41 16.8	24 94	87.3	41 23.8	23 94	86.7
2	40 05.8	25 94	88.3	40 13.3	24 94	87.6	40 20.5	24 94	87.0	40 27.5	23 94	86.4
3	39 09.5	25 94	88.0	39 16.9	25 94	87.3	39 24.2	24 94	86.7	39 31.2	23 94	86.1
4	38 13.2	25 94	87.6	38 20.6	25 94	87.0	38 27.9	24 94	86.4	38 35.0	23 94	85.8
55	37 16.8	25 94	87.3	37 24.3	25 94	86.7	37 31.6	24 94	86.1	37 38.8	24 94	85.5
6	36 20.5	25 94	87.0	36 28.1	25 94	86.4	36 35.4	24 94	85.8	36 42.6	24 94	85.2
7	35 24.2	26 94	86.7	35 31.8	25 94	86.1	35 39.2	24 94	85.5	35 46.4	24 94	84.9
8	34 27.9	26 94	86.4	34 35.5	25 94	85.8	34 43.0	25 94	85.2	34 50.3	24 94	84.7
9	33 31.7	26 94	86.1	33 39.3	25 94	85.5	33 46.8	25 94	85.0	33 54.1	24 94	84.4
60	32 35.4	26 94	85.8	32 43.1	26 94	85.2	32 50.7	25 94	84.7	32 58.0	24 93	84.1
1	31 39.2	26 94	85.5	31 46.9	26 94	85.0	31 54.5	25 94	84.4	32 02.0	25 93	83.8
2	30 43.0	26 94	85.2	30 50.8	26 94	84.7	30 58.4	25 93	84.1	31 05.9	25 93	83.5
3	29 46.8	26 94	84.9	29 54.7	26 94	84.4	30 02.4	25 93	83.8	30 09.9	25 93	83.3
4	28 50.7	26 94	84.6	28 58.6	26 94	84.1	29 06.3	26 93	83.5	29 13.9	25 93	83.0
65	27 54.6	27 94	84.3	28 02.5	26 93	83.8	28 10.3	26 93	83.3	28 18.0	25 93	82.7
6	26 58.5	27 94	84.1	27 06.5	27 93	83.5	27 14.3	26 93	83.0	27 22.1	26 93	82.4
7	26 02.4	27 93	83.8	26 10.5	27 93	83.2	26 18.4	26 93	82.7	26 26.2	26 93	82.1
8	25 06.4	27 93	83.5	25 14.5	27 93	82.9	25 22.5	26 93	82.4	25 30.4	26 93	81.9
9	24 10.4	27 93	83.2	24 18.6	27 93	82.6	24 26.6	27 93	82.1	24 34.6	26 93	81.6
70	23 14.4	28 93	82.9	23 22.7	27 93	82.4	23 30.8	27 93	81.8	23 38.8	27 93	81.3
1	22 18.5	28 93	82.6	22 26.8	28 93	82.1	22 35.0	27 93	81.6	22 43.1	27 93	81.0
2	21 22.6	28 93	82.3	21 31.0	28 93	81.8	21 39.3	27 93	81.3	21 47.5	27 93	80.7
3	20 26.7	28 93	82.0	20 35.2	28 93	81.5	20 43.6	28 93	81.0	20 51.8	27 93	80.5
4	19 30.9	29 93	81.7	19 39.5	28 93	81.2	19 47.9	28 93	80.7	19 56.3	28 93	80.2
75	18 35.2	29 93	81.4	18 43.8	29 93	80.9	18 52.3	28 93	80.4	19 00.7	28 93	79.9
6	17 39.4	29 93	81.1	17 48.1	29 93	80.6	17 56.7	29 92	80.1	18 05.2	28 92	79.6
7	16 43.7	29 93	80.8	16 52.5	29 93	80.3	17 01.2	29 92	79.8	17 09.8	29 92	79.3
8	15 48.1	30 93	80.5	15 57.0	29 93	80.0	16 05.7	29 92	79.5	16 14.4	29 92	79.0
9	14 52.5	30 92	80.2	15 01.4	30 92	79.7	15 10.3	29 92	79.2	15 19.1	29 92	78.7
80	13 57.0	30 92	79.9	14 06.0	30 92	79.4	14 14.9	30 92	78.9	14 23.8	29 92	78.5
1	13 01.5	30 92	79.6	13 10.6	30 92	79.1	13 19.6	30 92	78.6	13 28.6	30 92	78.2
2	12 06.1	31 92	79.3	12 15.3	31 92	78.8	12 24.4	30 92	78.3	12 33.5	30 92	77.9
3	11 10.7	31 92	79.0	11 20.0	31 92	78.5	11 29.2	31 92	78.0	11 38.4	30 92	77.6
4	10 15.4	31 92	78.7	10 24.7	31 92	78.2	10 34.1	31 92	77.7	10 43.4	31 92	77.3
85	9 20.1	32 92	78.4	9 29.6	32 92	77.9	9 39.0	31 92	77.4	9 48.4	31 92	77.0
6	8 24.9	32 92	78.1	8 34.5	32 92	77.6	8 44.0	32 92	77.1	8 53.5	32 91	76.6
7	7 29.8	32 92	77.8	7 39.4	32 92	77.3	7 49.1	32 92	76.8	7 58.7	32 91	76.3
8	6 34.7	33 92	77.5	6 44.5	33 91	77.0	6 54.2	32 91	76.5	7 03.9	32 91	76.0
9	5 39.7	33 92	77.1	5 49.6	33 91	76.7	5 59.4	33 91	76.2	6 09.3	33 91	75.7
90							5 04.7	33 91	75.9	5 14.7	33 91	75.4

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	58 00.0	1.0 02	180.0	57 30.0	1.0 02	180.0	57 00.0	1.0 02	180.0	56 30.0	1.0 02	180.0	56 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	00
1	57 59.1	1.0 05	178.2	57 29.1	1.0 05	178.2	56 59.1	1.0 04	178.2	56 29.1	1.0 04	178.2	55 59.1	1.0 04	178.3	55 29.2	1.0 04	178.3	54 59.2	1.0 04	178.3	54 29.2	1.0 04	178.3	1
2	57 56.4	1.0 08	176.3	57 26.4	1.0 07	176.4	56 56.5	1.0 07	176.4	56 26.5	1.0 07	176.5	55 56.6	1.0 07	176.5	55 26.6	1.0 07	176.6	54 56.7	1.0 07	176.6	54 26.7	1.0 07	176.7	2
3	57 51.8	1.0 11	174.5	57 22.0	1.0 10	174.6	56 52.1	1.0 10	174.6	56 22.2	1.0 10	174.7	55 52.3	1.0 10	174.8	55 22.4	1.0 10	174.9	54 52.6	1.0 10	175.0	54 22.7	1.0 10	175.0	3
4	57 45.5	99 14	172.7	57 15.7	99 13	172.8	56 46.0	99 13	172.9	56 16.2	99 13	173.0	55 46.4	99 13	173.1	55 16.6	99 13	173.2	54 46.8	99 12	173.3	54 17.0	99 12	173.4	4
05	57 37.4	99 16	170.8	57 07.8	99 16	171.0	56 38.1	99 16	171.1	56 08.4	99 16	171.3	55 38.8	99 16	171.4	55 09.1	99 15	171.5	54 39.4	99 15	171.6	54 09.7	99 15	171.8	05
6	57 27.6	98 19	169.0	56 58.1	98 19	169.2	56 28.6	98 19	169.4	55 59.0	98 18	169.5	55 29.5	98 18	169.7	54 59.9	99 18	169.8	54 30.4	99 18	170.0	54 00.8	99 17	170.1	6
7	57 16.0	98 22	167.3	56 46.7	98 22	167.5	56 17.3	98 21	167.6	55 48.0	98 21	167.8	55 18.6	98 21	168.0	54 49.2	98 20	168.2	54 19.8	98 20	168.4	53 50.4	98 20	168.5	7
8	57 02.7	97 25	165.5	56 33.6	97 25	165.7	56 04.4	97 24	165.9	55 35.3	97 24	166.1	55 06.1	97 23	166.3	54 36.9	97 23	166.5	54 07.6	97 23	166.7	53 38.4	98 22	166.9	8
9	56 47.8	96 28	163.8	56 18.9	96 27	164.0	55 49.9	97 27	164.3	55 21.0	97 26	164.5	54 52.0	97 26	164.7	54 23.0	97 26	164.9	53 53.9	97 25	165.1	53 24.9	97 25	165.3	9
10	56 31.2	96 30	162.1	56 02.6	96 30	162.3	55 33.9	96 29	162.6	55 05.1	96 29	162.8	54 36.3	96 28	163.1	54 07.5	96 28	163.3	53 38.7	96 28	163.6	53 09.9	96 27	163.8	10
1	56 13.1	95 33	160.4	55 44.7	95 32	160.7	55 16.2	95 32	161.0	54 47.7	95 31	161.2	54 19.2	95 31	161.5	53 50.6	95 31	161.8	53 22.0	95 30	162.0	52 53.4	96 30	162.3	1
2	55 53.4	94 35	158.7	55 25.3	94 35	159.0	54 57.1	94 34	159.3	54 28.8	94 34	159.6	54 00.6	94 33	159.9	53 32.2	94 33	160.2	53 03.9	95 33	160.5	52 35.5	95 32	160.7	2
3	55 32.2	93 38	157.1	55 04.4	93 37	157.4	54 36.5	93 37	157.8	54 08.5	93 36	158.1	53 40.5	93 36	158.4	53 12.4	94 35	158.7	52 44.4	94 35	159.0	52 16.2	94 34	159.3	3
4	55 09.6	92 40	155.5	54 42.0	92 40	155.9	54 14.4	92 39	156.2	53 46.7	92 39	156.5	53 19.0	92 38	156.9	52 51.3	93 38	157.2	52 23.4	93 37	157.5	51 55.6	93 37	157.8	4
15	54 45.5	91 42	154.0	54 18.3	91 42	154.3	53 51.0	91 41	154.7	53 23.6	91 41	155.0	52 56.2	91 40	155.4	52 28.7	92 40	155.7	52 01.2	92 39	156.0	51 33.6	92 39	156.3	15
6	54 20.1	90 45	152.5	53 53.2	90 44	152.8	53 26.2	90 43	153.2	52 59.2	90 43	153.6	52 32.1	90 42	153.9	52 04.9	91 42	154.3	51 37.6	91 41	154.6	51 10.4	91 41	154.9	6
7	53 53.4	88 47	151.0	53 26.8	89 46	151.4	53 00.2	89 46	151.7	52 33.4	89 45	152.1	52 06.6	89 44	152.5	51 39.8	90 44	152.8	51 12.8	90 43	153.2	50 45.8	90 43	153.5	7
8	53 25.4	87 49	149.5	52 59.2	88 48	149.9	52 32.8	88 48	150.3	52 06.5	88 47	150.7	51 40.0	88 46	151.1	51 13.4	89 46	151.5	50 46.8	89 45	151.8	50 20.1	89 45	152.2	8
9	52 56.2	86 51	148.1	52 30.3	86 50	148.5	52 04.3	87 49	148.9	51 38.3	87 49	149.3	51 12.1	87 48	149.7	50 45.9	88 48	150.1	50 19.6	88 47	150.5	49 53.3	88 47	150.9	9
20	52 25.8	85 53	146.7	52 00.3	85 52	147.2	51 34.7	86 51	147.6	51 08.9	86 51	148.0	50 43.1	86 50	148.4	50 17.3	86 50	148.8	49 51.3	87 49	149.2	49 25.2	87 48	149.6	20
1	51 54.3	84 54	145.4	51 29.2	84 54	145.8	51 03.9	84 53	146.2	50 38.5	85 52	146.7	50 13.0	85 52	147.1	49 47.5	85 51	147.5	49 21.9	86 51	147.9	48 56.1	86 50	148.3	1
2	51 21.8	83 56	144.1	50 57.0	83 55	144.5	50 32.0	83 55	145.0	50 07.0	84 54	145.4	49 41.9	84 54	145.8	49 16.7	84 53	146.2	48 51.4	84 52	146.6	48 26.0	85 52	147.0	2
3	50 48.2	81 58	142.8	50 23.7	82 57	143.2	49 59.1	82 56	143.7	49 34.5	82 56	144.1	49 09.7	83 55	144.6	48 44.8	83 55	145.0	48 19.9	83 54	145.4	47 54.8	84 54	145.8	3
4	50 13.6	80 59	141.5	49 49.5	81 59	142.0	49 25.3	81 58	142.5	49 00.9	81 57	142.9	48 36.5	82 57	143.4	48 12.0	82 56	143.8	47 47.4	82 56	144.2	47 22.6	83 55	144.6	4
25	49 38.1	79 61	140.3	49 14.3	79 60	140.8	48 50.5	80 60	141.3	48 26.5	80 59	141.7	48 02.4	80 58	142.2	47 38.2	81 58	142.6	47 13.9	81 57	143.0	46 49.5	81 57	143.5	25
6	49 01.6	78 62	139.2	48 38.2	78 61	139.6	48 14.7	79 61	140.1	47 51.1	79 60	140.6	47 27.4	79 60	141.0	47 03.5	80 59	141.5	46 39.6	80 59	141.9	46 15.5	80 58	142.3	6
7	48 24.4	77 64	138.0	48 01.3	77 63	138.5	47 38.1	77 62	139.0	47 14.9	78 62	139.4	46 51.5	78 61	139.9	46 28.0	78 61	140.3	46 04.4	79 60	140.8	45 40.7	79 60	141.2	7
8	47 46.2	75 65	136.9	47 23.5	76 64	137.4	47 00.7	76 64	137.9	46 37.8	77 63	138.3	46 14.7	77 62	138.8	45 51.6	77 62	139.3	45 28.3	78 61	139.7	45 04.9	78 61	140.2	8
9	47 07.3	74 66	135.8	46 45.0	75 65	136.3	46 22.5	75 65	136.8	45 59.9	76 64	137.3	45 37.2	76 64	137.7	45 14.4	76 63	138.2	44 51.5	77 63	138.7	44 28.4	77 62	139.1	9
30	46 27.7	73 67	134.8	46 05.7	74 67	135.3	45 43.5	74 66	135.7	45 21.3	74 66	136.2	44 58.9	75 65	136.7	44 36.4	75 64	137.2	44 13.8	75 64	137.6	43 51.1	76 63	138.1	30
1	45 47.3	72 68	133.7	45 25.6	72 68	134.2	45 03.8	73 67	134.7	44 41.9	73 67	135.2	44 19.9	74 66	135.7	43 57.7	74 66	136.2	43 35.5	74 65	136.6	43 13.1	75 65	137.1	1
2	45 06.2	71 70	132.7	44 44.9	71 69	133.2	44 23.4	72 68	133.7	44 01.8	72 68	134.2	43 40.1	73 67	134.7	43 18.3	73 67	135.2	42 56.4	73 66	135.6	42 34.3	74 66	136.1	2
3	44 24.5	70 71	131.8	44 03.5	70 70	132.3	43 42.3	71 69	132.8	43 21.1	71 69	133.3	42 59.7	71 68	133.7	42 38.2	72 68	134.2	42 16.6	72 67	134.7	41 54.9	73 67	135.1	3
4	43 42.1	69 72	130.8	43 21.4	69 71	131.3	43 00.6	70 70	131.8	42 39.7	70 70	132.3	42 18.7	70 69	132.8	41 57.5	71 69	133.3	41 36.2	71 68	133.8	41 14.8	72 68	134.2	4
35	42 59.2	68 73	129.9	42 38.8	68 72	130.4	42 18.3	68 71	130.9	41 57.7	69 71	131.4	41 37.0	69 70	131.9	41 16.2	70 70	132.4	40 55.2	70 69	132.8	40 34.1	70 69	133.3	35
6	42 15.6	67 73	129.0	41 55.6	67 73	129.5	41 35.4	67 72	130.0	41 15.2	68 72	130.5	40 54.7	68 71	131.0	40 34.2	69 71	131.5	40 13.5	69 70	132.0	39 52.8	69 70	132.4	6
7	41 31.6	66 74	128.2	41 11.8	66 74	128.7	40 52.0	66 73	129.2	40 32.0	67 73	129.7	40 11.9	67 72	130.1	39 51.7	68 72	130.6	39 31.3	68 71	131.1	39 10.9	68 71	131.6	7
8	40 47.0	65 75	127.3	40 27.6	65 75	127.8	40 08.0	65 74	128.3	39 48.3	66 74	128.8	39 28.5	66 73	129.3	39 08.6	67 73	129.8	38 48.6	67 72	130.3	38 28.4	67 72	130.7	8
9	40 01.9	64 76	126.5	39 42.8	64 76	127.0	39 23.5	64 75	127.5	39 04.1	65 74	128.0	38 44.6	65 74	128.5	38 25.0	66 73	129.0	38 05.3	66 73	129.4	37 45.4	66 72	129.9	9
40	39 16.3	63 77	125.7	38 57.5	63 76	126.2	38 38.5	63 76	126.7	38 19.5	64 75	127.2	38 00.3	64 75	127.7	37 40.9	65 74	128.2	37 21.5	65 74	128.6	37 01.9	65 73	129.1	40
1	38 30.3	62 77	124.9	38 11.8	62 77	125.4	37 53.1	62 77	125.9	37 34.3	63 76	126.4	37 15.4	63 75	126.9	36 56.4	64 75	127.4	36 37.2	64 74	127.9	36 17.9	64 74	128.3	1
2	37 43.9	61 78	124.2	37 25.6	61 78	124.7	37 07.2	62 77	125.2	36 48.7	62 77	125.6	36 30.1	62 76	126.1	36 11.3	63 76	126.6	35 52.5	63 75	127.1	35 33.5	63 75	127.6	2
3	36 57.0	60 79	123.4	36 39.0	60 78	123.9	36 20.9	61 78	124.4	36 02.7	61 77	124.9	35 44.3	61 77	125.4	35 25.9	62 76	125.9	35 07.3	62 76	126.4	34 48.6	62 76	126.8	3
4	36 09.7	59 79	122.7	35 52.0	59 79	123.2	35 34.2	60 78	123.7	35 16.2	60 78	124.2	34 58.2	60 78	124.7	34 40.0	61 77	125.1	34 21.7	61 77	125.6	34 03.2	62 76	126.1	4
45	35 22.1	58 80	122.0	35 04.7	58 80	122.5	34 47.1	59 79	123.0	34 29.4	59 79	123.5	34 11.6	60 78	124.0	33 53.7	60 78	124.4	33 35.6	60 77	124.9	33 17.5	61 77	125.4	45
6	34 34.1	57 81	121.3	34 16.9	58 80	121.8	33 59.6	58 80	122.3	33 42.2	58 79	122.8	33 24.6	59 79	123.3	33 07.0	59 78	123.7	32 49.2	59 78	124.2	32 31.3	60 77	124.7	6
7	33 45.8	56 81	120.6	33 28.8	57 81	121.1	33 11.8	57 80	121.6	32 54.6	57 80	122.1	32 37.3	58 79	122.6	32 19.9	58 79	123.1	32 02.4	59 79	123.6	31 44.8	59 78	124.0	7
8	32 57.1	55 82	120.0	32 40.4	56 81	120.5	32 23.6	56 81	121.0	32 06.7	57 80	121.4	31 49.6	57 80	121.9	31 32.5	57 80	122.4	31 15.2	58 79	122.9	30 57.9	58 79	123.4	8
9	32 08.1	55 82	119.3	31 51.6	55 82	119.8	31 35.1	55 81	120.3	31 18.4	56 81	120.8	31 01.6	56 80	121.3	30 44.7	57 80	121.8	30 27.7	57 80	122.2	30 10.6	57 79	122.7	9
50	31 18.8	54 83	118.7	31 02.6	54 82	119.2	30 46.2	55 82	119.7	30 29.8	55 81	120.2	30 13.3	55 81	120.7	29 56.6	56 81	121.1	29 39.9	56 80	121.6	29 23.0	56 80	122.1	50
1	30 29.2	53 83	118.1	30 13.2	53 83	118.6	29 57.1	54 82	119.1	29 40.9	54 82	119.6	29 24.6	55 82	120.0	29 08.2	55 81	120.5	28 51.7	55 81	121.0	28 35.1	56 80	121.5	1
2	29 39.3	52 83	117.5	29 23.6	53 83	118.0	29 07.7	53 83	118.5	28 51.7	53 82	119.0	28 35.7	54 82	119.4	28 19.5	54 82	119.9	28 03.2	54 81	120.4	27 46.9	55 81	120.9	2
3	28 49.2	52 84	116.9	28 33.6	52 83	117.4	28 18.0	52 83	117.9	28 02.3	53 83	118.4	27 46.4	53 82	118.9	27 30.5	53 82	119.3	27 14.4	54 82	119.8	26 58.3	54 81	120.3	3
4	27 58.8	51 84	116.4	27 43.5	51 84	116.8	27 28.0	52 84	117.3	27 12.5	52 83	117.8	26 56.9	52 83	118.3	26 41.2	53 83	118.8	26 25.4	53 82	119.2	26 09.5	53 82	119.7	4
55	27 08.1	50 85	115.8	26 53.0	51 84	116.3	26 37.8	51 84	116.8	26 22.5	51 84	117.2	26 07.1	51 83	117.7	25 51.6	52 83	118.2	25 36.0	52 82	118.7	25 20.4	52 82	119.1	55
6	26 17.3	50 85	115.3	26 02.4	50 85	115.7	25 47.4	50 84	116.2	25 32.3	50 84	116.7	25 17.1	51 84	117.2	25 01.8	51 83	117.6	24 46.5	51 83	118.1	24 31.0	52 83	118.6	6
7	25 26.1	49 85	114.7	25 11.5	49 85	115.2	24 56.7	49 85	115.7	24 41.8	50 84	116.2	24 26.8	50 84	116.6	24 11.7	50 84	117.1	23 56.6	51 83	117.6	23 41.4	51 83	118.1	7
8	24 34.8	48 86	114.2	24 20.3	49 85	114.7	24 05.7	49 85	115.2	23 51.1	49 85	115.6	23 36.3	49 84	116.1	23 21.4	50 84	116.6	23 06.5	50 84	117.0	22 51.5	50 83	117.5	8
9	23 43.3	48 86	113.7	23 29.0	48 86	114.2	23 14.6	48 86	114.6	23 00.1	48 85	115.1	22 45.6	49 85	115.6	22 30.9	49 85	116.1	22 16.2	49 84	116.5	22 01.4	50 84	117.0	9
60	22 51.6	47 87	113.2	22 37.4	47 86	113.7	22 23.2	47 86	114.1	22 09.0	48 86	114.6	21 54.6	48 85	115.1	21 40.1	48 85	115.6	21 25.6	49 85	116.0	21 11.0	49 84	116.5	60
1	21 59.6	46 87	112.7	21 45.7	47 86	113.2	21 31.7	47 86	113.6	21 17.6	47 86	114.1	21 03.4	47 85	114.6	20 49.2	48 85	115.1	20 34.8	48 85	115.5	20 20.4	48 84	116.0	1
2	21 07.5	46 87	112.2	20 53.8	46 87	112.7	20 39.9	46 86	113.2	20 26.0	46 86	113.6	20 12.1	47 86	114.1	19 58.0	47 86	114.6	19 43.9	47 85	115.0	19 29.7	47 85	115.5	2
3	20 15.2	45 87	111.7	20 01.7	45 87	112.2	19 48.0	46 87	112.7	19 34.3	46 86	113.1	19 20.5	46 86	113.6	19 06.6	46 86	114.1	18 52.7	47 86	114.6	18 38.7	47 85	115.0	3
4	19 22.8	45 88	111.3	19 09.4	45 87	111.7	18 55.9	45 87	112.2	18 42.4	45 87	112.7	18 28.7	46 87	113.1	18 15.1	46 86	113.6	18 01.3	46 86	114.1	17 47.5	46 86	114.5	4
65	18 30.1	44 88	110.8	18 16.9	44 88	111.3	18 03.6	44 87	111.7	17 50.2	45 87	112.2	17 36.8	45 87	112.7	17 23.3	45 86	113.2	17 09.7	45 86	113.6	16 56.1	46 86	114.1	65
6	17 37.4	43 88	110.4	17 24.3	44 88	110.8	17 11.2	44 88	111.3	16 58.0	44 87	111.8	16 44.7	44 87	112.2	16 31.4	45 87	112.7	16 18.0	45 86	113.2	16 04.5	45 86	113.6	6
7	16 44.4	43 88	109.9	16 31.5	43 88	110.4	16 18.5	43 88	110.8	16 05.5	44 88	111.3	15 52.4	44 87	111.8	15 39.3	44 87	112.3	15 26.1	44 87	112.7	15 12.8	44 86	113.2	7
8	15 51.3	42 89	109.5	15 38.6	43 88	109.9	15 25.8	43 88	110.4	15 12.9	43 88	110.9	15 00.0	43 88	111.3	14 47.0	43 87	111.8	14 34.0	44 87	112.3	14 20.9	44 87	112.7	8
9	14 58.1	42 89	109.0	14 45.5	42 89	109.5	14 32.9	42 88	110.0	14 20.2	43 88	110.5	14 07.4	43 88	110.9	13 54.6	43 88	111.4	13 41.7	43 87	111.8	13 28.8	43 87	112.3	9
70	14 04.7	41 89	108.6	13 52.3	42 89	109.1	13 39.8	42 89	109.6	13 27.3	42 88	110.0	13 14.7	42 88	110.5	13 02.0	42 88	111.0	12 49.3	42 88	111.4	12 36.6	43 87	111.9	70
1	13 11.3	41 89	108.2	12 59.0	41 89	108.7	12 46.6	41 89	109.1	12 34.2	41 89	109.6	12 21.8	42 88	110.1	12 09.2	42 88	110.5	11 56.8	42 88	111.0	11 44.2	42 88	111.5	1
2	12 17.6	40 89	107.8	12 05.5	41 89	108.3	11 53.3	41 89	108.7	11 41.0	41 89	109.2	11 28.8	41 89	109.7	11 16.4	41 88	110.1	11 04.0	41 88	110.6	10 51.6	42 88	111.1	2
3	11 23.9	40 90	107.4	11 11.9	40 89	107.9	10 59.8	40 89	108.3	10 47.7	40 89	108.8	10 35.6	41 89	109.3	10 23.4	41 88	109.7	10 11.2	41 88	110.2	9 58.9	41 88	110.7	3
4	10 30.0	40 90	107.0	10 18.2	40 90	107.5	10 06.2	40 89	107.9	9 54.3	40 89	108.4	9 42.3	40 89	108.9	9 30.3	40 89	109.3	9 18.2	40 88	109.8	9 06.1	40 88	110.3	4
75	9 36.1	39 90	106.6	9 24.3	39 90	107.1	9 12.5	39 90	107.5	9 00.7	39 89	108.0	8 48.9	40 89	108.5	8 37.0	40 89	108.9	8 25.1	40 89	109.4	8 13.2	40 88	109.9	75
6	8 42.0	39 90	106.2	8 30.4	39 90	106.7	8 18.7	39 90	107.2	8 07.1	39 90	107.6	7 55.4	39 89	108.1	7 43.6	39 89	108.6	7 31.9	39 89	109.0	7 20.1	39 89	109.5	6
7	7 47.8	38 90	105.9	7 36.3	38 90	106.3	7 24.8	38 90	106.8	7 13.3	39 90	107.3	7 01.7	39 90	107.7	6 50.1	39 89	108.2	6 38.5	39 89	108.6	6 26.9	39 89	109.1	7
8	6 53.5	38 91	105.5	6 42.2	38 90	105.9	6 30.8	38 90	106.4	6 19.4	38 90	106.9	6 07.9	38 90	107.3	5 56.5	38 89	107.8	5 45.0	38 89	108.3	5 33.5	38 89	108.7	8
9	5 59.1	37 91	105.1	5 47.9	38 90	105.6	5 36.6	38 90	106.0	5 25.4	38 90	106.5	5 14.1	38 90	107.0	5 02.8	38 89	107.4							9
80	5 04.6	37 91	104.7																						80

Lat. 20°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	86 00.0	1.0 11	180.0	86 30.0	1.0 13	180.0	87 00.0	1.0 15	180.0	87 30.0	1.0 17	180.0	88 00.0	1.0 21	180.0	88 30.0	1.0 27	180.0	89 00.0	1.0 38	180.0	89 30.0	1.0 56	180.0	00
1	85 53.3	97 32	166.5	86 22.4	97 36	164.7	86 51.2	95 40	162.3	87 19.6	94 46	159.1	87 47.3	91 54	154.5	88 13.7	85 64	147.6	88 37.5	73 76	136.5	88 56.0	47 88	117.8	1
2	85 34.3	91 48	154.3	86 01.1	88 53	151.2	86 27.1	85 58	147.4	86 51.8	80 65	142.5	87 14.9	73 72	136.3	87 35.3	63 79	128.1	87 51.9	47 86	117.6	88 03.1	26 92	104.5	2
3	85 05.2	82 61	144.0	85 29.2	78 65	140.4	85 52.0	73 70	136.0	86 13.0	67 76	130.9	86 31.8	58 81	124.7	86 47.7	48 86	117.4	87 00.0	34 90	109.0	87 08.0	18 93	99.5	3
4	84 28.8	73 69	135.8	84 50.1	69 73	132.0	85 09.9	63 78	127.7	85 27.7	56 82	122.8	85 43.3	48 85	117.2	85 56.2	38 89	111.0	86 05.9	27 92	104.2	86 12.1	14 93	96.9	4
05	83 47.2	65 75	129.3	84 06.1	60 79	125.6	84 23.4	55 82	121.5	84 38.8	48 85	117.0	84 52.0	40 88	112.1	85 02.8	32 91	106.8	85 10.9	22 92	101.1	85 16.1	12 94	95.2	05
6	83 02.0	59 80	124.1	83 18.8	54 82	120.6	83 34.1	48 85	116.8	83 47.6	42 88	112.8	83 59.1	35 90	108.4	84 08.4	27 92	103.8	84 15.4	19 93	99.0	84 19.9	11 94	94.0	6
7	82 14.1	53 83	119.9	82 29.3	48 85	116.6	82 43.0	43 87	113.2	82 55.0	37 89	109.5	83 05.2	31 91	105.7	83 13.4	24 92	101.6	83 19.6	17 93	97.4	83 23.6	10 94	93.2	7
8	81 24.4	48 85	116.5	81 38.2	44 87	113.4	81 50.6	39 89	110.3	82 01.4	33 90	106.9	82 10.6	28 92	103.5	82 18.0	22 93	99.9	82 23.6	15 94	96.2	82 27.3	09 94	92.4	8
9	80 33.3	44 87	113.6	80 46.0	40 88	110.8	80 57.3	35 90	107.9	81 07.2	31 91	104.9	81 15.6	25 92	101.7	81 22.4	20 93	98.5	81 27.5	14 94	95.2	81 30.9	09 94	91.8	9
10	79 41.2	41 88	111.2	79 52.9	37 89	108.6	80 03.4	33 91	105.9	80 12.5	28 92	103.1	80 20.3	23 93	100.3	80 26.5	19 93	97.4	80 31.3	13 94	94.4	80 34.6	08 94	91.3	10
1	78 48.2	38 89	109.2	78 59.2	34 90	106.7	79 08.9	30 91	104.3	79 17.4	26 92	101.7	79 24.7	22 93	99.1	79 30.6	17 94	96.4	79 35.1	13 94	93.7	79 38.2	08 94	90.9	1
2	77 54.7	36 90	107.4	78 04.9	32 91	105.1	78 14.1	29 92	102.8	78 22.1	25 92	100.4	78 28.9	21 93	98.0	78 34.5	17 94	95.5	78 38.8	12 94	93.0	78 41.8	08 94	90.5	2
3	77 00.7	34 91	105.8	77 10.3	31 92	103.7	77 19.0	27 92	101.5	77 26.6	23 93	99.3	77 33.0	20 93	97.1	77 38.3	16 94	94.8	77 42.5	12 94	92.5	77 45.5	08 94	90.1	3
4	76 06.2	32 91	104.5	76 15.4	29 92	102.5	76 23.6	26 92	100.4	76 30.8	22 93	98.4	76 37.0	19 94	96.3	76 42.1	15 94	94.1	76 46.1	12 94	92.0	76 49.1	08 94	89.8	4
15	75 11.5	31 92	103.2	75 20.3	28 92	101.4	75 28.1	25 93	99.5	75 35.0	21 93	97.5	75 40.9	18 94	95.5	75 45.9	15 94	93.5	75 49.8	11 94	91.5	75 52.7	08 94	89.5	15
6	74 16.5	29 92	102.2	74 24.9	27 93	100.4	74 32.4	24 93	98.6	74 39.1	21 94	96.7	74 44.8	18 94	94.9	74 49.6	15 94	93.0	74 53.4	11 94	91.1	74 56.3	08 94	89.2	6
7	73 21.3	28 92	101.2	73 29.3	26 93	99.5	73 36.6	23 93	97.7	73 43.0	20 94	96.0	73 48.6	17 94	94.3	73 53.3	14 94	92.5	73 57.0	11 94	90.7	73 59.9	08 94	88.9	7
8	72 25.9	27 93	100.2	72 33.7	25 93	98.6	72 40.7	22 93	97.0	72 46.9	20 94	95.4	72 52.3	17 94	93.7	72 56.9	14 94	92.0	73 00.7	11 94	90.3	73 03.6	08 94	88.6	8
9	71 30.3	26 93	99.4	71 37.9	24 93	97.9	71 44.7	22 94	96.3	71 50.8	19 94	94.8	71 56.0	16 94	93.2	72 00.6	14 94	91.6	72 04.3	11 94	90.0	72 07.2	08 94	88.4	9
20	70 34.6	26 93	98.6	70 42.0	23 93	97.2	70 48.6	21 94	95.7	70 54.5	19 94	94.2	70 59.7	16 94	92.7	71 04.2	14 94	91.2	71 07.9	11 94	89.6	71 10.9	09 94	88.1	20
1	69 38.8	25 93	97.9	69 46.0	23 94	96.5	69 52.5	21 94	95.1	69 58.3	18 94	93.7	70 03.4	16 94	92.2	70 07.8	14 94	90.8	70 11.5	11 94	89.3	70 14.5	09 94	87.8	1
2	68 42.9	24 93	97.3	68 49.9	22 94	95.9	68 56.3	20 94	94.6	69 02.0	18 94	93.2	69 07.1	16 94	91.8	69 11.4	13 94	90.4	69 15.1	11 94	89.0	69 18.2	09 94	87.6	2
3	67 47.0	24 94	96.6	67 53.8	22 94	95.3	68 00.1	20 94	94.0	68 05.7	18 94	92.7	68 10.7	16 94	91.4	68 15.1	13 94	90.1	68 18.8	11 94	88.7	68 21.8	09 94	87.4	3
4	66 50.9	23 94	96.0	66 57.7	22 94	94.8	67 03.8	20 94	93.5	67 09.4	18 94	92.3	67 14.3	16 94	91.0	67 18.7	13 94	89.7	67 22.4	11 94	88.4	67 25.5	09 94	87.1	4
25	65 54.8	23 94	95.5	66 01.5	21 94	94.3	66 07.5	19 94	93.1	66 13.0	17 94	91.9	66 18.0	15 94	90.6	66 22.3	14 94	89.4	66 26.1	12 94	88.2	66 29.2	10 94	86.9	25
6	64 58.7	23 94	94.9	65 05.2	21 94	93.8	65 11.2	19 94	92.6	65 16.7	17 94	91.5	65 21.6	15 94	90.3	65 25.9	14 94	89.1	65 29.7	12 94	87.9	65 32.9	10 94	86.7	6
7	64 02.5	22 94	94.5	64 09.0	21 94	93.3	64 14.9	19 94	92.2	64 20.3	17 94	91.1	64 25.2	15 94	89.9	64 29.6	14 94	88.8	64 33.4	12 94	87.6	64 36.6	10 94	86.5	7
8	63 06.3	22 94	94.0	63 12.7	21 94	92.9	63 18.5	19 94	91.8	63 23.9	17 94	90.7	63 28.8	15 94	89.6	63 33.2	14 94	88.5	63 37.0	12 94	87.4	63 40.4	10 94	86.2	8
9	62 10.0	22 94	93.5	62 16.3	20 94	92.5	62 22.2	19 94	91.4	62 27.6	17 94	90.3	62 32.4	15 94	89.3	62 36.8	14 94	88.2	62 40.7	12 94	87.1	62 44.1	11 94	86.0	9
30	61 13.7	22 94	93.1	61 20.0	20 94	92.0	61 25.8	19 94	91.0	61 31.2	17 94	90.0	61 36.1	16 94	89.0	61 40.5	14 94	87.9	61 44.4	12 94	86.9	61 47.9	11 94	85.8	30
1	60 17.4	22 94	92.6	60 23.6	20 94	91.6	60 29.4	19 94	90.7	60 34.8	17 94	89.7	60 39.7	16 94	88.6	60 44.1	14 94	87.6	60 48.1	13 94	86.6	60 51.7	11 94	85.6	1
2	59 21.1	21 94	92.2	59 27.3	20 94	91.3	59 33.1	19 94	90.3	59 38.4	17 94	89.3	59 43.3	16 94	88.3	59 47.8	14 94	87.4	59 51.9	13 94	86.4	59 55.5	11 94	85.4	2
3	58 24.7	21 94	91.8	58 30.9	20 94	90.9	58 36.7	19 94	90.0	58 42.0	17 94	89.0	58 47.0	16 94	88.1	58 51.5	14 94	87.1	58 55.6	13 94	86.1	58 59.3	11 94	85.2	3
4	57 28.4	21 94	91.4	57 34.5	20 94	90.5	57 40.3	19 94	89.7	57 45.7	17 94	88.7	57 50.6	16 94	87.8	57 55.2	15 94	86.8	57 59.4	13 94	85.9	58 03.1	12 94	85.0	4
35	56 32.0	21 94	91.1	56 38.1	20 94	90.2	56 43.9	19 94	89.3	56 49.3	17 94	88.4	56 54.3	16 94	87.5	56 58.9	15 94	86.6	57 03.1	13 94	85.7	57 06.9	12 94	84.8	35
6	55 35.6	21 94	90.7	55 41.8	20 94	89.8	55 47.5	19 94	89.0	55 53.0	17 94	88.1	55 58.0	16 94	87.2	56 02.6	15 94	86.3	56 06.9	14 94	85.4	56 10.8	12 93	84.6	6
7	54 39.2	21 94	90.4	54 45.4	20 94	89.5	54 51.2	19 94	88.6	54 56.6	18 94	87.8	55 01.7	16 94	86.9	55 06.4	15 94	86.1	55 10.7	14 94	85.2	55 14.7	13 93	84.3	7
8	53 42.9	21 94	90.0	53 49.0	20 94	89.2	53 54.8	19 94	88.3	54 00.3	18 94	87.5	54 05.4	16 94	86.7	54 10.1	15 94	85.8	54 14.5	14 94	85.0	54 18.6	13 93	84.1	8
9	52 46.5	21 94	89.7	52 52.6	20 94	88.9	52 58.5	19 94	88.0	53 03.9	18 94	87.2	53 09.1	17 94	86.4	53 13.9	15 94	85.6	53 18.4	14 94	84.8	53 22.5	13 93	83.9	9
40	51 50.1	21 94	89.3	51 56.3	20 94	88.5	52 02.1	19 94	87.7	52 07.6	18 94	86.9	52 12.8	17 94	86.1	52 17.7	16 94	85.3	52 22.2	15 94	84.5	52 26.5	14 93	83.7	40
1	50 53.7	21 94	89.0	50 59.9	20 94	88.2	51 05.8	19 94	87.5	51 11.3	18 94	86.7	51 16.6	17 94	85.9	51 21.5	16 94	85.1	51 26.1	15 94	84.3	51 30.4	14 93	83.5	1
2	49 57.4	21 94	88.7	50 03.6	20 94	87.9	50 09.5	19 94	87.2	50 15.1	18 94	86.4	50 20.4	17 94	85.6	50 25.4	16 94	84.9	50 30.0	15 93	84.1	50 34.4	14 93	83.3	2
3	49 01.0	21 94	88.4	49 07.2	20 94	87.6	49 13.2	19 94	86.9	49 18.8	18 94	86.1	49 24.2	17 94	85.4	49 29.2	16 94	84.6	49 34.0	15 93	83.9	49 38.4	14 93	83.1	3
4	48 04.6	21 94	88.1	48 10.9	20 94	87.3	48 16.9	19 94	86.6	48 22.6	18 94	85.9	48 28.0	17 94	85.1	48 33.1	17 94	84.4	48 37.9	16 93	83.6	48 42.5	15 93	82.9	4
45	47 08.3	21 94	87.8	47 14.6	21 94	87.0	47 20.6	20 94	86.3	47 26.3	19 94	85.6	47 31.8	17 94	84.9	47 37.0	17 94	84.1	47 41.9	16 93	83.4	47 46.5	15 93	82.7	45
6	46 12.0	22 94	87.5	46 18.3	21 94	86.8	46 24.3	20 94	86.0	46 30.1	19 94	85.3	46 35.7	18 94	84.6	46 40.9	17 93	83.9	46 45.9	16 93	83.2	46 50.6	15 93	82.5	6
7	45 15.6	22 94	87.2	45 22.0	21 94	86.5	45 28.1	20 94	85.8	45 33.9	19 94	85.1	45 39.5	18 94	84.4	45 44.9	17 93	83.7	45 49.9	16 93	83.0	45 54.8	16 93	82.3	7
8	44 19.3	22 94	86.9	44 25.7	21 94	86.2	44 31.9	20 94	85.5	44 37.8	19 94	84.8	44 43.4	18 93	84.1	44 48.8	18 93	83.4	44 54.0	17 93	82.7	44 58.9	16 93	82.0	8
9	43 23.0	22 94	86.6	43 29.5	21 94	85.9	43 35.7	20 94	85.2	43 41.6	20 94	84.6	43 47.4	19 93	83.9	43 52.8	18 93	83.2	43 58.1	17 93	82.5	44 03.1	16 93	81.8	9
50	42 26.8	22 94	86.3	42 33.3	21 94	85.6	42 39.5	20 94	85.0	42 45.5	20 94	84.3	42 51.3	19 93	83.6	42 56.9	18 93	83.0	43 02.2	17 93	82.3	43 07.3	17 93	81.6	50
1	41 30.5	22 94	86.0	41 37.0	21 94	85.4	41 43.4	21 94	84.7	41 49.4	20 93	84.0	41 55.3	19 93	83.4	42 00.9	18 93	82.7	42 06.3	18 93	82.1	42 11.5	17 93	81.4	1
2	40 34.3	22 94	85.7	40 40.9	22 94	85.1	40 47.2	21 94	84.4	40 53.4	20 93	83.8	40 59.3	19 93	83.1	41 05.0	19 93	82.5	41 10.5	18 93	81.8	41 15.8	17 93	81.2	2
3	39 38.1	22 94	85.4	39 44.7	22 94	84.8	39 51.1	21 94	84.2	39 57.3	20 93	83.5	40 03.3	20 93	82.9	40 09.1	19 93	82.3	40 14.7	18 93	81.6	40 20.1	18 93	81.0	3
4	38 41.9	23 94	85.2	38 48.6	22 94	84.5	38 55.0	21 93	83.9	39 01.3	21 93	83.3	39 07.4	20 93	82.7	39 13.3	19 93	82.0	39 19.0	19 93	81.4	39 24.4	18 93	80.8	4
55	37 45.7	23 94	84.9	37 52.4	22 93	84.3	37 59.0	21 93	83.7	38 05.4	21 93	83.0	38 11.5	20 93	82.4	38 17.5	19 93	81.8	38 23.2	19 93	81.2	38 28.8	18 93	80.5	55
6	36 49.6	23 94	84.6	36 56.4	22 93	84.0	37 03.0	22 93	83.4	37 09.4	21 93	82.8	37 15.6	20 93	82.2	37 21.7	20 93	81.5	37 27.5	19 93	80.9	37 33.2	18 93	80.3	6
7	35 53.4	23 94	84.3	36 00.3	23 93	83.7	36 07.0	22 93	83.1	36 13.5	21 93	82.5	36 19.8	21 93	81.9	36 25.9	20 93	81.3	36 31.9	20 93	80.7	36 37.6	19 93	80.1	7
8	34 57.3	23 93	84.1	35 04.3	23 93	83.5	35 11.0	22 93	82.9	35 17.6	22 93	82.3	35 24.0	21 93	81.7	35 30.2	20 93	81.1	35 36.3	20 93	80.5	35 42.1	19 92	79.9	8
9	34 01.3	24 93	83.8	34 08.3	23 93	83.2	34 15.1	22 93	82.6	34 21.7	22 93	82.0	34 28.2	21 93	81.4	34 34.5	21 93	80.8	34 40.7	20 93	80.2	34 46.6	20 92	79.6	9
60	33 05.2	24 93	83.5	33 12.3	23 93	82.9	33 19.2	23 93	82.4	33 25.9	22 93	81.8	33 32.5	22 93	81.2	33 38.9	21 93	80.6	33 45.1	21 92	80.0	33 51.2	20 92	79.4	60
1	32 09.2	24 93	83.2	32 16.4	23 93	82.7	32 23.3	23 93	82.1	32 30.1	22 93	81.5	32 36.8	22 93	80.9	32 43.3	21 93	80.4	32 49.6	21 92	79.8	32 55.8	20 92	79.2	1
2	31 13.3	24 93	83.0	31 20.5	24 93	82.4	31 27.5	23 93	81.8	31 34.4	23 93	81.3	31 41.1	22 93	80.7	31 47.7	22 92	80.1	31 54.1	21 92	79.5	32 00.4	21 92	79.0	2
3	30 17.3	24 93	82.7	30 24.6	24 93	82.1	30 31.7	24 93	81.6	30 38.7	23 93	81.0	30 45.5	23 93	80.4	30 52.2	22 92	79.9	30 58.7	22 92	79.3	31 05.1	21 92	78.7	3
4	29 21.4	25 93	82.4	29 28.8	24 93	81.9	29 36.0	24 93	81.3	29 43.0	23 93	80.8	29 49.9	23 92	80.2	29 56.7	22 92	79.6	30 03.3	22 92	79.1	30 09.8	21 92	78.5	4
65	28 25.5	25 93	82.2	28 33.0	24 93	81.6	28 40.2	24 93	81.0	28 47.4	24 93	80.5	28 54.4	23 92	79.9	29 01.3	23 92	79.4	29 08.0	22 92	78.8	29 14.6	22 92	78.3	65
6	27 29.7	25 93	81.9	27 37.2	25 93	81.3	27 44.6	24 93	80.8	27 51.8	24 92	80.2	27 58.9	23 92	79.7	28 05.9	23 92	79.1	28 12.7	23 92	78.6	28 19.4	22 92	78.0	6
7	26 33.9	25 93	81.6	26 41.5	25 93	81.1	26 48.9	25 93	80.5	26 56.3	24 92	80.0	27 03.5	24 92	79.4	27 10.5	23 92	78.9	27 17.5	23 92	78.3	27 24.3	23 92	77.8	7
8	25 38.2	26 93	81.3	25 45.8	25 93	80.8	25 53.3	25 92	80.3	26 00.8	25 92	79.7	26 08.1	24 92	79.2	26 15.2	24 92	78.6	26 22.3	23 92	78.1	26 29.2	23 92	77.6	8
9	24 42.4	26 93	81.1	24 50.2	26 93	80.5	24 57.8	25 92	80.0	25 05.3	25 92	79.5	25 12.7	24 92	78.9	25 20.0	24 92	78.4	25 27.1	24 92	77.9	25 34.2	23 92	77.3	9
70	23 46.8	26 93	80.8	23 54.6	26 93	80.3	24 02.3	26 92	79.7	24 09.9	25 92	79.2	24 17.4	25 92	78.7	24 24.8	24 92	78.1	24 32.0	24 92	77.6	24 39.2	24 92	77.1	70
1	22 51.1	27 93	80.5	22 59.0	26 92	80.0	23 06.8	26 92	79.5	23 14.5	26 92	78.9	23 22.1	25 92	78.4	23 29.6	25 92	77.9	23 37.0	24 92	77.3	23 44.3	24 92	76.8	1
2	21 55.5	27 92	80.2	22 03.5	26 92	79.7	22 11.4	26 92	79.2	22 19.2	26 92	78.7	22 26.9	25 92	78.1	22 34.5	25 92	77.6	22 42.0	25 92	77.1	22 49.4	24 91	76.6	2
3	21 00.0	27 92	80.0	21 08.1	27 92	79.4	21 16.1	27 92	78.9	21 24.0	26 92	78.4	21 31.8	26 92	77.9	21 39.5	26 92	77.4	21 47.1	25 92	76.8	21 54.6	25 91	76.3	3
4	20 04.5	27 92	79.7	20 12.7	27 92	79.2	20 20.8	27 92	78.6	20 28.8	27 92	78.1	20 36.7	26 92	77.6	20 44.5	26 92	77.1	20 52.2	26 91	76.6	20 59.8	25 91	76.1	4
75	19 09.1	28 92	79.4	19 17.3	27 92	78.9	19 25.5	27 92	78.4	19 33.6	27 92	77.9	19 41.6	27 92	77.3	19 49.6	26 92	76.8	19 57.4	26 91	76.3	20 05.2	26 91	75.8	75
6	18 13.7	28 92	79.1	18 22.0	28 92	78.6	18 30.3	27 92	78.1	18 38.5	27 92	77.6	18 46.7	27 92	77.1	18 54.7	27 91	76.6	19 02.7	26 91	76.1	19 10.5	26 91	75.6	6
7	17 18.3	28 92	78.8	17 26.8	28 92	78.3	17 35.2	28 92	77.8	17 43.5	28 92	77.3	17 51.7	27 91	76.8	17 59.9	27 91	76.3	18 08.0	27 91	75.8	18 16.0	27 91	75.3	7
8	16 23.1	29 92	78.5	16 31.6	28 92	78.0	16 40.1	28 92	77.5	16 48.5	28 92	77.0	16 56.9	28 91	76.5	17 05.1	27 91	76.0	17 13.3	27 91	75.5	17 21.5	27 91	75.0	8
9	15 27.8	29 92	78.2	15 36.5	29 92	77.8	15 45.1	29 92	77.3	15 53.6	28 91	76.8	16 02.1	28 91	76.3	16 10.5	28 91	75.8	16 18.8	28 91	75.3	16 27.0	27 90	74.8	9
80	14 32.7	29 92	78.0	14 41.4	29 92	77.5	14 50.1	29 92	77.0	14 58.8	29 91	76.5	15 07.3	28 91	76.0	15 15.8	28 91	75.5	15 24.3	28 91	75.0	15 32.7	28 90	74.5	80
1	13 37.5	30 92	77.7	13 46.4	29 92	77.2	13 55.2	29 91	76.7	14 04.0	29 91	76.2	14 12.7	29 91	75.7	14 21.3	29 91	75.2	14 29.9	28 91	74.7	14 38.4	28 90	74.2	1
2	12 42.5	30 92	77.4	12 51.5	30 92	76.9	13 00.4	30 91	76.4	13 09.3	29 91	75.9	13 18.1	29 91	75.4	13 26.8	29 91	74.9	13 35.5	29 90	74.4	13 44.2	29 90	73.9	2
3	11 47.5	30 92	77.1	11 56.6	30 91	76.6	12 05.6	30 91	76.1	12 14.6	30 91	75.6	12 23.5	30 91	75.1	12 32.4	30 90	74.6	12 41.2	29 90	74.1	12 50.0	29 90	73.7	3
4	10 52.6	31 92	76.8	11 01.8	31 91	76.3	11 10.9	30 91	75.8	11 20.0	30 91	75.3	11 29.1	30 91	74.8	11 38.1	30 90	74.3	11 47.0	30 90	73.9	11 56.0	30 90	73.4	4
85	9 57.7	31 91	76.5	10 07.0	31 91	76.0	10 16.3	31 91	75.5	10 25.5	31 91	75.0	10 34.7	31 90	74.5	10 43.8	30 90	74.1	10 52.9	30 90	73.6	11 02.0	30 90	73.1	85
6	9 03.0	31 91	76.2	9 12.4	31 91	75.7	9 21.8	31 91	75.2	9 31.1	31 90	74.7	9 40.4	31 90	74.2	9 49.7	31 90	73.8	9 58.9	31 90	73.3	10 08.1	31 90	72.8	6
7	8 08.2	32 91	75.9	8 17.8	32 91	75.4	8 27.3	32 91	74.9	8 36.8	32 90	74.4	8 46.2	31 90	73.9	8 55.6	31 90	73.5	9 04.9	31 90	73.0	9 14.3	31 90	72.5	7
8	7 13.6	32 91	75.6	7 23.3	32 91	75.1	7 32.9	32 90	74.6	7 42.5	32 90	74.1	7 52.0	32 90	73.6	8 01.6	32 90	73.2	8 11.1	32 90	72.7	8 20.5	32 89	72.2	8
9	6 19.1	33 91	75.2	6 28.8	33 90	74.8	6 38.6	32 90	74.3	6 48.3	32 90	73.8	6 58.0	32 90	73.3	7 07.6	32 90	72.9	7 17.3	32 90	72.4	7 26.9	32 89	71.9	9
90	5 24.6	33 91	74.9	5 34.5	33 90	74.4	5 44.3	33 90	74.0	5 54.2	33 90	73.5	6 04.0	33 90	73.0	6 13.8	33 90	72.5	6 23.6	33 89	72.1	6 33.3	32 89	71.6	90

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	54 00.0	1.0	01	180.0	53 30.0	1.0	01	180.0	53 00.0	1.0	01	180.0	52 30.0	1.0	01	180.0	52 00.0	1.0	01	180.0	51 30.0	1.0	01	180.0	51 00.0	1.0	01	180.0	50 30.0	1.0	01	180.0	00
1	53 59.2	1.0	04	178.4	53 29.2	1.0	04	178.4	52 59.2	1.0	04	178.4	52 29.2	1.0	04	178.4	51 59.2	1.0	04	178.5	51 29.3	1.0	04	178.5	50 59.3	1.0	04	178.5	50 29.3	1.0	04	178.5	1
2	53 56.8	1.0	07	176.7	53 26.8	1.0	06	176.8	52 56.9	1.0	06	176.8	52 26.9	1.0	06	176.9	51 57.0	1.0	06	176.9	51 27.0	1.0	06	177.0	50 57.0	1.0	06	177.0	50 27.1	1.0	06	177.0	2
3	53 52.8	1.0	09	175.1	53 22.9	1.0	09	175.2	52 53.0	1.0	09	175.2	52 23.1	1.0	09	175.3	51 53.2	1.0	09	175.4	51 23.3	1.0	09	175.4	50 53.4	1.0	09	175.5	50 23.4	1.0	08	175.6	3
4	53 47.2	99	12	173.5	53 17.3	99	12	173.6	52 47.5	99	12	173.7	52 17.7	99	11	173.8	51 47.9	99	11	173.8	51 18.0	99	11	173.9	50 48.2	99	11	174.0	50 18.4	99	11	174.1	4
05	53 40.0	99	15	171.9	53 10.3	99	14	172.0	52 40.5	99	14	172.1	52 10.8	99	14	172.2	51 41.1	99	14	172.3	51 11.3	99	13	172.4	50 41.6	99	13	172.5	50 11.9	99	13	172.6	05
6	53 31.2	99	17	170.3	53 01.6	99	17	170.4	52 32.0	99	17	170.5	52 02.4	99	16	170.7	51 32.8	99	16	170.8	51 03.2	99	16	170.9	50 33.5	99	16	171.0	50 03.9	99	16	171.2	6
7	53 20.9	98	20	168.7	52 51.5	98	19	168.8	52 22.0	98	19	169.0	51 52.5	98	19	169.1	51 23.1	98	19	169.3	50 53.6	98	18	169.4	50 24.1	98	18	169.6	49 54.5	98	18	169.7	7
8	53 09.1	98	22	167.1	52 39.8	98	22	167.3	52 10.5	98	22	167.5	51 41.2	98	21	167.6	51 11.9	98	21	167.8	50 42.5	98	21	168.0	50 13.2	98	20	168.1	49 43.6	98	20	168.3	8
9	52 55.8	97	25	165.6	52 26.7	97	24	165.8	51 57.6	97	24	165.9	51 28.4	97	24	166.1	50 59.2	97	23	166.3	50 30.1	97	23	166.5	50 00.9	97	23	166.7	49 31.7	97	22	166.9	9
10	52 41.0	96	27	164.0	52 12.1	96	27	164.2	51 43.1	96	26	164.5	51 14.2	97	26	164.7	50 45.2	97	26	164.9	50 16.2	97	25	165.1	49 47.2	97	25	165.3	49 18.2	97	25	165.5	10
1	52 24.7	96	29	162.5	51 56.1	96	29	162.7	51 27.3	96	29	163.0	50 58.6	96	28	163.2	50 29.8	96	28	163.4	50 01.0	96	27	163.6	49 32.2	96	27	163.9	49 03.4	96	27	164.1	1
2	52 07.1	95	32	161.0	51 38.6	95	31	161.3	51 10.1	95	31	161.5	50 41.6	95	30	161.8	50 13.1	95	30	162.0	49 44.5	95	30	162.3	49 15.9	95	29	162.5	48 47.2	96	29	162.7	2
3	51 48.0	94	34	159.5	51 19.8	94	33	159.8	50 51.6	94	33	160.1	50 23.3	94	33	160.3	49 55.0	94	32	160.6	49 26.6	95	32	160.8	48 58.2	95	32	161.1	48 29.8	95	31	161.3	3
4	51 27.7	93	36	158.1	50 59.7	93	36	158.4	50 31.7	93	35	158.7	50 03.7	93	35	158.9	49 35.6	94	34	159.2	49 07.5	94	34	159.5	48 39.3	94	33	159.7	48 11.2	94	33	160.0	4
15	51 06.0	92	38	156.7	50 38.3	92	38	157.0	50 10.6	93	37	157.3	49 42.8	93	37	157.6	49 15.0	93	36	157.8	48 47.1	93	36	158.1	48 19.2	93	35	158.4	47 51.3	93	35	158.7	15
6	50 43.0	91	40	155.3	50 15.6	91	40	155.6	49 48.1	92	39	155.9	49 20.6	92	39	156.2	48 53.1	92	38	156.5	48 25.5	92	38	156.8	47 57.9	92	38	157.1	47 30.2	92	37	157.4	6
7	50 18.8	90	42	153.9	49 51.7	90	42	154.2	49 24.5	91	41	154.6	48 57.3	91	41	154.9	48 30.0	91	40	155.2	48 02.7	91	40	155.5	47 35.3	91	40	155.8	47 07.9	91	39	156.1	7
8	49 53.4	89	44	152.5	49 26.6	89	44	152.9	48 59.7	90	43	153.2	48 32.8	90	43	153.6	48 05.8	90	42	153.9	47 38.7	90	42	154.2	47 11.6	90	41	154.5	46 44.5	91	41	154.8	8
9	49 26.8	88	46	151.2	49 00.3	88	46	151.6	48 33.7	89	45	151.9	48 07.1	89	45	152.3	47 40.4	89	44	152.6	47 13.7	89	44	153.0	46 46.8	89	43	153.3	46 20.0	90	43	153.6	9
20	48 59.1	87	48	149.9	48 32.9	87	47	150.3	48 06.7	88	47	150.7	47 40.3	88	46	151.0	47 13.9	88	46	151.4	46 47.5	88	45	151.7	46 21.0	88	45	152.1	45 54.4	89	44	152.4	20
1	48 30.3	86	50	148.7	48 04.5	86	49	149.1	47 38.5	87	49	149.4	47 12.5	87	48	149.8	46 46.4	87	48	150.2	46 20.3	87	47	150.5	45 54.0	88	46	150.9	45 27.7	88	46	151.2	1
2	48 00.5	85	51	147.4	47 35.0	85	51	147.8	47 09.3	86	50	148.2	46 43.6	86	50	148.6	46 17.8	86	49	149.0	45 52.0	86	49	149.3	45 26.0	87	48	149.7	45 00.1	87	48	150.0	2
3	47 29.7	84	53	146.2	47 04.4	84	52	146.6	46 39.1	84	52	147.0	46 13.7	85	51	147.4	45 48.3	85	51	147.8	45 22.7	85	50	148.2	44 57.1	85	50	148.5	44 31.4	86	49	148.9	3
4	46 57.8	83	55	145.0	46 32.9	83	54	145.5	46 08.0	83	54	145.9	45 42.9	84	53	146.3	45 17.7	84	52	146.6	44 52.5	84	52	147.0	44 27.2	84	51	147.4	44 01.8	85	51	147.8	4
25	46 25.1	82	56	143.9	46 00.5	82	56	144.3	45 35.8	82	55	144.7	45 11.1	83	54	145.1	44 46.3	83	54	145.5	44 21.4	83	53	145.9	43 56.4	83	53	146.3	43 31.3	84	52	146.7	25
6	45 51.4	81	58	142.8	45 27.2	81	57	143.2	45 02.8	81	56	143.6	44 38.4	82	56	144.0	44 13.9	82	55	144.4	43 49.3	82	55	144.8	43 24.6	82	54	145.2	42 59.9	83	54	145.6	6
7	45 16.9	80	59	141.7	44 52.9	80	58	142.1	44 28.9	80	58	142.5	44 04.9	80	57	142.9	43 40.7	81	57	143.3	43 16.4	81	56	143.8	42 52.1	81	56	144.1	42 27.6	82	55	144.5	7
8	44 41.5	78	60	140.6	44 17.9	79	60	141.0	43 54.2	79	59	141.5	43 30.5	79	59	141.9	43 06.6	80	58	142.3	42 42.7	80	58	142.7	42 18.6	80	57	143.1	41 54.5	81	56	143.5	8
9	44 05.3	77	62	139.5	43 42.0	78	61	140.0	43 18.7	78	60	140.4	42 55.3	78	60	140.8	42 31.7	79	59	141.3	42 08.1	79	59	141.7	41 44.4	79	58	142.1	41 20.6	79	58	142.5	9
30	43 28.3	76	63	138.5	43 05.4	77	62	139.0	42 42.4	77	62	139.4	42 19.3	77	61	139.8	41 56.1	78	61	140.3	41 32.8	78	60	140.7	41 09.4	78	60	141.1	40 45.9	78	59	141.5	30
1	42 50.6	75	64	137.5	42 28.0	75	63	138.0	42 05.3	76	63	138.4	41 42.5	76	62	138.9	41 19.6	76	62	139.3	40 56.7	77	61	139.7	40 33.6	77	61	140.1	40 10.4	77	60	140.5	1
2	42 12.2	74	65	136.6	41 49.9	74	65	137.0	41 27.6	75	64	137.5	41 05.1	75	64	137.9	40 42.5	75	63	138.3	40 19.8	76	62	138.8	39 57.1	76	62	139.2	39 34.2	76	61	139.6	2
3	41 33.1	73	66	135.6	41 11.1	73	66	136.1	40 49.1	74	65	136.5	40 26.9	74	65	137.0	40 04.7	74	64	137.4	39 42.3	75	64	137.8	39 19.9	75	63	138.3	38 57.3	75	63	138.7	3
4	40 53.3	72	67	134.7	40 31.7	72	67	135.1	40 10.0	73	66	135.6	39 48.1	73	66	136.0	39 26.2	73	65	136.5	39 04.1	74	65	136.9	38 42.0	74	64	137.4	38 19.8	74	64	137.8	4
35	40 12.9	71	68	133.8	39 51.6	71	68	134.2	39 30.2	72	67	134.7	39 08.7	72	67	135.1	38 47.0	72	66	135.6	38 25.3	73	66	136.0	38 03.5	73	65	136.5	37 41.6	73	65	136.9	35
6	39 31.9	70	69	132.9	39 10.9	70	69	133.4	38 49.8	71	68	133.8	38 28.6	71	68	134.3	38 07.3	71	67	134.7	37 45.9	72	67	135.2	37 24.4	72	66	135.6	37 02.7	72	66	136.0	6
7	38 50.3	69	70	132.0	38 29.6	69	70	132.5	38 08.8	70	69	133.0	37 47.9	70	69	133.4	37 26.9	70	68	133.9	37 05.8	71	68	134.3	36 44.6	71	67	134.8	36 23.3	71	67	135.2	7
8	38 08.2	68	71	131.2	37 47.8	68	71	131.7	37 27.3	68	70	132.1	37 06.7	69	70	132.6	36 46.0	69	69	133.0	36 25.2	70	69	133.5	36 04.3	70	68	133.9	35 43.3	70	68	134.4	8
9	37 25.5	67	72	130.4	37 05.4	67	71	130.8	36 45.2	67	71	131.3	36 24.9	68	70	131.8	36 04.5	69	70	132.2	35 44.0	69	69	132.7	35 23.4	69	69	133.1	35 02.7	69	68	133.6	9
40	36 42.3	66	73	129.6	36 22.5	66	72	130.1	36 02.6	66	72	130.5	35 42.6	67	71	131.0	35 22.5	67	71	131.4	35 02.3	68	70	131.9	34 42.0	68	70	132.3	34 21.6	68	69	132.8	40
1	35 58.6	65	74	128.8	35 39.1	65	73	129.3	35 19.5	66	73	129.7	34 59.8	66	72	130.2	34 40.0	66	72	130.7	34 20.1	67	71	131.1	34 00.1	67	71	131.6	33 39.9	67	70	132.0	1
2	35 14.4	64	74	128.0	34 55.2	64	74	128.5	34 35.9	65	73	129.0	34 16.5	65	73	129.4	33 57.0	65	72	129.9	33 37.3	66	72	130.4	33 17.6	66	72	130.8	32 57.8	66	71	131.3	2
3	34 29.8	63	75	127.3	34 10.9	63	75	127.8	33 51.8	64	74	128.2	33 32.7	64	74	128.7	33 13.5	64	73	129.2	32 54.1	65	73	129.6	32 34.7	65	72	130.1	32 15.2	65	72	130.5	3
4	33 44.7	62	76	126.6	33 26.1	62	75	127.0	33 07.3	63	75	127.5	32 48.5	63	74	128.0	32 29.5	63	74	128.4	32 10.5	64	73	128.9	31 51.3	64	73	129.4	31 32.1	64	72	129.8	4
45	32 59.2	61	76	125.9	32 40.9	61	76	126.3	32 22.4	62	76	126.8	32 03.8	62	75	127.3	31 45.2	62	75	127.7	31 26.4	63	74	128.2	31 07.5	63	74	128.6	30 48.6	63	73	129.1	45
6	32 13.3	60	77	125.2	31 55.2	60	77	125.6	31 37.0	61	76	126.1	31 18.8	61	76	126.6	31 00.4	61	75	127.0	30 41.9	62	75	127.5	30 23.3	62	74	128.0	30 04.6	62	74	128.4	6
7	31 27.1	59	78	124.5	31 09.2	60	77	125.0	30 51.3	60	77	125.4	30 33.3	60	76	125.9	30 15.2	61	76	126.4	29 56.9	61	75	126.8	29 38.6	61	75	127.3	29 20.2	61	75	127.7	7
8	30 40.4	58	78	123.8	30 22.8	59	78	124.3	30 05.2	59	77	124.8	29 47.4	59	77	125.2	29 29.6	60	77	125.7	29 11.6	60	76	126.2	28 53.6	60	76	126.6	28 35.4	61	75	127.1	8
9	29 53.4	58	79	123.2	29 36.1	58	78	123.7	29 18.7	58	78	124.1	29 01.2	59	78	124.6	28 43.6	59	77	125.1	28 25.9	59	77	125.5	28 08.1	59	76	126.0	27 50.2	60	76	126.4	9
50	29 06.1	57	79	122.6	28 49.0	57	79	123.0	28 31.9	57	79	123.5	28 14.6	58	78	124.0	27 57.3	58	78	124.4	27 39.8	58	77	124.9	27 22.3	59	77	125.4	27 04.7	59	76	125.8	50
1	28 18.4	56	80	122.0	28 01.6	56	80	122.4	27 44.7	57	79	122.9	27 27.7	57	79	123.4	27 10.6	57	78	123.8	26 53.4	57	78	124.3	26 36.2	58	78	124.7	26 18.8	58	77	125.2	1
2	27 30.4	55	80	121.3	27 13.8	55	80	121.8	26 57.2	56	80	122.3	26 40.4	56	79	122.7	26 23.6	56	79	123.2	26 06.7	57	78	123.7	25 49.6	57	78	124.1	25 32.5	57	77	124.6	2
3	26 42.1	54	81	120.8	26 25.8	55	81	121.2	26 09.3	55	80	121.7	25 52.8	55	80	122.2	25 36.3	55	79	122.6	25 19.6	56	79	123.1	25 02.8	56	79	123.5	24 46.0	56	78	124.0	3
4	25 53.5	53	81	120.2	25 37.4	54	81	120.6	25 21.2	54	81	121.1	25 05.0	54	80	121.6	24 48.6	55	80	122.0	24 32.2	55	79	122.5	24 15.7	55	79	123.0	23 59.1	55	79	123.4	4
55	25 04.6	53	82	119.6	24 48.8	53	82	120.1	24 32.8	53	81	120.5	24 16.8	54	81	121.0	24 00.7	54	80	121.5	23 44.5	54	80	121.9	23 28.2	54	80	122.4	23 11.8	55	79	122.8	55
6	24 15.5	52	82	119.1	23 59.8	52	82	119.5	23 44.1	53	82	120.0	23 28.3	53	81	120.5	23 12.4	53	81	120.9	22 56.5	53	80	121.4	22 40.5	54	80	121.8	22 24.3	54	80	122.3	6
7	23 26.0	51	83	118.5	23 10.6	52	82	119.0	22 55.2	52	82	119.5	22 39.6	52	82	119.9	22 23.9	52	81	120.4	22 08.2	53	81	120.8	21 52.4	53	80	121.3	21 36.5	53	80	121.8	7
8	22 36.4	50	83	118.0	22 21.2	51	83	118.5	22 05.9	51	82	118.9	21 50.6	51	82	119.4	21 35.2	52	82	119.8	21 19.7	52	81	120.3	21 04.1	52	81	120.8	20 48.5	52	81	121.2	8
9	21 46.5	50	84	117.5	21 31.5	50	83	117.9	21 16.5	50	83	118.4	21 01.3	51	82	118.9	20 46.1	51	82	119.3	20 30.9	51	82	119.8	20 15.5	51	81	120.2	20 00.1	52	81	120.7	9
60	20 56.3	49	84	117.0	20 41.6	49	84	117.4	20 26.7	50	83	117.9	20 11.8	50	83	118.4	19 56.9	50	83	118.8	19 41.8	50	82	119.3	19 26.7	51	82	119.7	19 11.5	51	81	120.2	60
1	20 06.0	48	84	116.5	19 51.4	49	84	116.9	19 36.8	49	84	117.4	19 22.1	49	83	117.8	19 07.3	49	83	118.3	18 52.5	50	82	118.8	18 37.6	50	82	119.2	18 22.6	50	82	119.7	1
2	19 15.4	48	85	116.0	19 01.0	48	84	116.4	18 46.6	48	84	116.9	18 32.1	48	84	117.4	18 17.6	49	83	117.8	18 03.0	49	83	118.3	17 48.3	49	83	118.7	17 33.5	49	82	119.2	2
3	18 24.6	47	85	115.5	18 10.4	47	85	116.0	17 56.2	48	84	116.4	17 41.9	48	84	116.9	17 27.6	48	84	117.3	17 13.2	48	83	117.8	16 58.7	48	83	118.3	16 44.2	49	83	118.7	3
4	17 33.6	46	85	115.0	17 19.6	47	85	115.5	17 05.6	47	85	115.9	16 51.6	47	84	116.4	16 37.4	47	84	116.9	16 23.2	47	84	117.3	16 09.0	48	83	117.8	15 54.6	48	83	118.2	4
65	16 42.4	46	86	114.6	16 28.6	46	85	115.0	16 14.8	46	85	115.5	16 01.0	46	85	115.9	15 47.0	47	84	116.4	15 33.0	47	84	116.9	15 19.0	47	84	117.3	15 04.9	47	83	117.8	65
6	15 51.0	45	86	114.1	15 37.5	45	86	114.6	15 23.8	46	85	115.0	15 10.2	46	85	115.5	14 56.4	46	85	115.9	14 42.6	46	84	116.4	14 28.8	46	84	116.9	14 14.9	46	84	117.3	6
7	14 59.5	45	86	113.6	14 46.1	45	86	114.1	14 32.7	45	86	114.6	14 19.2	45	85	115.0	14 05.6	45	85	115.5	13 52.0	45	85	116.0	13 38.4	46	84	116.4	13 24.7	46	84	116.9	7
8	14 07.7	44	86	113.2	13 54.5	44	86	113.7	13 41.3	44	86	114.1	13 28.0	44	86	114.6	13 14.6	45	85	115.1	13 01.2	45	85	115.5	12 47.8	45	85	116.0	12 34.3	45	84	116.4	8
9	13 15.8	43	87	112.8	13 02.8	43	86	113.2	12 49.7	44	86	113.7	12 36.6	44	86	114.2	12 23.5	44	86	114.6	12 10.3	44	85	115.1	11 57.0	44	85	115.5	11 43.7	44	85	116.0	9
70	12 23.8	43	87	112.4	12 10.9	43	87	112.8	11 58.0	43	86	113.3	11 45.1	43	86	113.7	11 32.1	43	86	114.2	11 19.1	44	85	114.7	11 06.0	44	85	115.1	10 52.9	44	85	115.6	70
1	11 31.5	42	87	111.9	11 18.9	42	87	112.4	11 06.2	42	87	112.9	10 53.4	43	86	113.3	10 40.6	43	86	113.8	10 27.8	43	86	114.2	10 14.9	43	85	114.7	10 02.0	43	85	115.2	1
2	10 39.2	42	87	111.5	10 26.7	42	87	112.0	10 14.1	42	87	112.5	10 01.6	42	87	112.9	9 48.9	42	86	113.4	9 36.3	42	86	113.8	9 23.6	42	86	114.3	9 10.9	43	85	114.8	2
3	9 46.7	41	88	111.1	9 34.3	41	87	111.6	9 22.0	41	87	112.0	9 09.5	41	87	112.5	8 57.1	42	87	113.0	8 44.6	42	86	113.4	8 32.1	42	86	113.9	8 19.6	42	86	114.3	3
4	8 54.0	41	88	110.7	8 41.8	41	88	111.2	8 29.6	41	87	111.7	8 17.4	41	87	112.1	8 05.1	41	87	112.6	7 52.8	41	86	113.0	7 40.5	41	86	113.5	7 28.1	41	86	114.0	4
75	8 01.2	40	88	110.3	7 49.2	40	88	110.8	7 37.1	40	88	111.3	7 25.1	40	87	111.7	7 13.0	40	87	112.2	7 00.9	40	87	112.6	6 48.7	41	86	113.1	6 36.5	41	86	113.6	75
6	7 08.3	39	88	110.0	6 56.4	40	88	110.4	6 44.5	40	88	110.9	6 32.6	40	88	111.3	6 20.7	40	87	111.8	6 08.8	40	87	112.3	5 56.8	40	87	112.7	5 44.8	40	86	113.2	6
7	6 15.2	39	89	109.6	6 03.5	39	88	110.0	5 51.8	39	88	110.5	5 40.0	39	88	111.0	5 28.3	39	87	111.4	5 16.5	39	87	111.9	5 04.7	39	87	112.3					7
8	5 22.0	38	89	109.2	5 10.5	39	88	109.7																									8

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30 Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91													5 00.2	33	90	73.2	5 10.1	33	90	72.7	5 20.1	33	90	72.2	5 30.0	33	89	71.8	5 39.9	33	89	71.3	91

Lat. 20°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	90 00.0	. . 94	. . . .	89 30.0	1.0 56	00.0	89 00.0	1.0 37	00.0	88 30.0	1.0 27	00.0
1	89 03.6	00 94	89.8	88 56.2	47 88	61.8	88 37.8	73 75	43.0	88 14.0	85 63	31.8
2	88 07.2	01 94	89.7	88 03.5	25 92	74.7	87 52.6	47 86	61.6	87 36.2	62 78	50.9
3	87 10.9	01 94	89.5	87 08.5	17 93	79.4	87 01.0	33 90	69.9	86 49.1	46 85	61.3
4	86 14.5	01 94	89.3	86 12.8	12 93	81.7	86 07.3	25 91	74.4	85 58.2	36 88	67.4
05	85 18.1	01 94	89.1	85 17.0	09 93	83.1	85 12.7	19 92	77.1	85 05.4	29 90	71.3
6	84 21.7	02 94	89.0	84 20.9	07 93	83.9	84 17.5	16 92	78.9	84 11.6	24 91	74.0
7	83 25.4	02 94	88.8	83 24.9	06 94	84.4	83 22.1	13 93	80.1	83 17.1	20 91	75.9
8	82 29.0	02 94	88.6	82 28.7	04 94	84.8	82 26.5	11 93	81.0	82 22.3	17 92	77.3
9	81 32.6	03 94	88.5	81 32.6	03 94	85.1	81 30.7	09 93	81.7	81 27.2	15 92	78.3
10	80 36.3	03 94	88.3	80 36.4	02 94	85.2	80 34.9	08 93	82.2	80 31.9	13 92	79.1
1	79 39.9	03 94	88.1	79 40.2	01 94	85.3	79 39.0	06 93	82.5	79 36.4	11 92	79.8
2	78 43.6	04 94	87.9	78 44.0	00 94	85.4	78 43.1	05 93	82.8	78 40.9	09 93	80.3
3	77 47.2	04 94	87.8	77 47.8	00 94	85.4	77 47.1	04 93	83.0	77 45.3	08 93	80.7
4	76 50.9	04 94	87.6	76 51.6	01 94	85.4	76 51.2	03 93	83.2	76 49.6	07 93	81.0
15	75 54.6	05 94	87.4	75 55.4	01 94	85.4	75 55.2	02 93	83.3	75 53.9	06 93	81.3
6	74 58.2	05 94	87.2	74 59.2	01 94	85.3	74 59.2	02 93	83.4	74 58.2	05 93	81.5
7	74 01.9	05 94	87.1	74 03.0	02 94	85.3	74 03.2	01 93	83.4	74 02.4	04 93	81.6
8	73 05.6	05 94	86.9	73 06.8	03 94	85.2	73 07.2	00 93	83.5	73 06.6	03 93	81.7
9	72 09.3	06 94	86.7	72 10.6	03 94	85.1	72 11.1	00 93	83.5	72 10.8	02 93	81.8
20	71 13.0	06 94	86.5	71 14.5	03 94	85.0	71 15.1	01 93	83.4	71 15.0	01 93	81.9
1	70 16.8	06 94	86.4	70 18.3	04 94	84.9	70 19.1	01 93	83.4	70 19.2	01 93	81.9
2	69 20.5	07 94	86.2	69 22.2	04 94	84.8	69 23.1	02 93	83.4	69 23.4	00 93	81.9
3	68 24.3	07 94	86.0	68 26.0	05 94	84.7	68 27.1	03 93	83.3	68 27.5	00 93	81.9
4	67 28.0	07 94	85.8	67 29.9	05 94	84.5	67 31.1	03 93	83.2	67 31.7	01 93	81.9
25	66 31.8	08 94	85.7	66 33.8	06 94	84.4	66 35.1	04 93	83.2	66 35.9	02 93	81.9
6	65 35.6	08 94	85.5	65 37.7	06 94	84.3	65 39.1	04 93	83.1	65 40.1	02 93	81.9
7	64 39.4	08 94	85.3	64 41.6	06 94	84.1	64 43.2	05 93	83.0	64 44.3	03 93	81.8
8	63 43.2	08 94	85.1	63 45.5	07 94	84.0	63 47.2	05 93	82.9	63 48.5	03 93	81.7
9	62 47.0	09 94	84.9	62 49.4	07 93	83.9	62 51.3	05 93	82.8	62 52.7	04 93	81.7
30	61 50.9	09 94	84.8	61 53.4	07 93	83.7	61 55.4	06 93	82.7	61 56.9	04 93	81.6
1	60 54.7	09 94	84.6	60 57.3	08 93	83.6	60 59.5	06 93	82.5	61 01.1	05 93	81.5
2	59 58.6	10 94	84.4	60 01.3	08 93	83.4	60 03.6	07 93	82.4	60 05.4	05 93	81.4
3	59 02.5	10 94	84.2	59 05.3	09 93	83.2	59 07.7	07 93	82.3	59 09.6	06 93	81.3
4	58 06.4	10 93	84.0	58 09.3	09 93	83.1	58 11.8	08 93	82.1	58 13.9	06 93	81.2
35	57 10.4	11 93	83.8	57 13.4	09 93	82.9	57 16.0	08 93	82.0	57 18.2	07 93	81.1
6	56 14.3	11 93	83.7	56 17.4	10 93	82.8	56 20.2	08 93	81.9	56 22.5	07 93	81.0
7	55 18.3	11 93	83.5	55 21.5	10 93	82.6	55 24.4	09 93	81.7	55 26.8	08 93	80.8
8	54 22.3	12 93	83.3	54 25.6	10 93	82.4	54 28.6	09 93	81.6	54 31.2	08 93	80.7
9	53 26.3	12 93	83.1	53 29.7	11 93	82.3	53 32.8	10 93	81.4	53 35.5	08 93	80.6
40	52 30.3	12 93	82.9	52 33.9	11 93	82.1	52 37.1	10 93	81.3	52 39.9	09 93	80.4
1	51 34.4	13 93	82.7	51 38.0	12 93	81.9	51 41.4	11 93	81.1	51 44.3	10 93	80.3
2	50 38.5	13 93	82.5	50 42.2	12 93	81.7	50 45.7	11 93	81.0	50 48.8	10 93	80.2
3	49 42.6	13 93	82.3	49 46.4	12 93	81.6	49 50.0	11 93	80.8	49 53.2	10 92	80.0
4	48 46.7	14 93	82.1	48 50.7	13 93	81.4	48 54.3	12 93	80.6	48 57.7	11 92	79.9
45	47 50.9	14 93	81.9	47 55.0	13 93	81.2	47 58.7	12 93	80.5	48 02.2	11 92	79.7
6	46 55.1	14 93	81.7	46 59.3	13 93	81.0	47 03.1	13 92	80.3	47 06.8	12 92	79.6
7	45 59.3	15 93	81.5	46 03.6	14 93	80.8	46 07.6	13 92	80.1	46 11.3	12 92	79.4
8	45 03.5	15 93	81.3	45 07.9	14 93	80.6	45 12.1	13 92	79.9	45 15.9	13 92	79.2
9	44 07.8	15 93	81.1	44 12.3	14 93	80.5	44 16.6	14 92	79.8	44 20.6	13 92	79.1
50	43 12.1	16 93	80.9	43 16.7	15 92	80.3	43 21.1	14 92	79.6	43 25.2	13 92	78.9
1	42 16.5	16 93	80.7	42 21.2	15 92	80.1	42 25.7	15 92	79.4	42 29.9	14 92	78.7
2	41 20.8	16 93	80.5	41 25.7	16 92	79.9	41 30.3	15 92	79.2	41 34.6	14 92	78.6
3	40 25.2	17 93	80.3	40 30.2	16 92	79.7	40 34.9	15 92	79.0	40 39.4	15 92	78.4
4	39 29.7	17 93	80.1	39 34.7	17 92	79.5	39 39.6	16 92	78.8	39 44.2	15 92	78.2
55	38 34.1	18 92	79.9	38 39.3	17 92	79.3	38 44.3	16 92	78.6	38 49.0	16 92	78.0
6	37 38.7	18 92	79.7	37 43.9	17 92	79.1	37 49.0	17 92	78.4	37 53.9	16 92	77.8
7	36 43.2	18 92	79.5	36 48.6	18 92	78.9	36 53.8	17 92	78.2	36 58.8	16 92	77.6
8	35 47.8	19 92	79.3	35 53.3	18 92	78.7	35 58.6	17 92	78.0	36 03.7	17 92	77.4
9	34 52.4	19 92	79.0	34 58.0	18 92	78.4	35 03.5	18 92	77.8	35 08.7	17 92	77.2
60	33 57.1	19 92	78.8	34 02.8	19 92	78.2	34 08.4	18 92	77.6	34 13.8	18 92	77.0
1	33 01.8	20 92	78.6	33 07.6	19 92	78.0	33 13.3	19 92	77.4	33 18.8	18 92	76.8
2	32 06.5	20 92	78.4	32 12.5	20 92	77.8	32 18.3	19 92	77.2	32 23.9	19 91	76.6
3	31 11.3	21 92	78.2	31 17.4	20 92	77.6	31 23.3	19 92	77.0	31 29.1	19 91	76.4
4	30 16.2	21 92	77.9	30 22.4	20 92	77.4	30 28.4	20 91	76.8	30 34.3	19 91	76.2
65	29 21.1	21 92	77.7	29 27.4	21 92	77.1	29 33.6	20 91	76.6	29 39.6	20 91	76.0
6	28 26.0	22 92	77.5	28 32.4	21 92	76.9	28 38.7	21 91	76.4	28 44.9	20 91	75.8
7	27 31.0	22 92	77.2	27 37.5	22 91	76.7	27 44.0	21 91	76.1	27 50.3	21 91	75.6
8	26 36.0	22 92	77.0	26 42.7	22 91	76.5	26 49.3	22 91	75.9	26 55.7	21 91	75.4
9	25 41.1	23 92	76.8	25 47.9	23 91	76.2	25 54.6	22 91	75.7	26 01.2	22 91	75.1
70	24 46.2	23 91	76.5	24 53.2	23 91	76.0	25 00.0	23 91	75.5	25 06.7	22 91	74.9
1	23 51.4	24 91	76.3	23 58.5	23 91	75.8	24 05.4	23 91	75.2	24 12.3	23 91	74.7
2	22 56.7	24 91	76.0	23 03.9	24 91	75.5	23 11.0	24 91	75.0	23 17.9	23 90	74.5
3	22 02.0	25 91	75.8	22 09.3	24 91	75.3	22 16.5	24 90	74.8	22 23.6	24 90	74.2
4	21 07.4	25 91	75.5	21 14.8	25 91	75.0	21 22.2	24 90	74.5	21 29.4	24 90	74.0
75	20 12.8	25 91	75.3	20 20.4	25 91	74.8	20 27.9	25 90	74.3	20 35.3	24 90	73.7
6	19 18.3	26 91	75.0	19 26.0	26 90	74.5	19 33.6	25 90	74.0	19 41.2	25 90	73.5
7	18 23.9	26 91	74.8	18 31.7	26 90	74.3	18 39.5	26 90	73.8	18 47.1	26 90	73.3
8	17 29.5	27 90	74.5	17 37.5	26 90	74.0	17 45.4	26 90	73.5	17 53.2	26 90	73.0
9	16 35.2	27 90	74.3	16 43.3	27 90	73.8	16 51.3	27 90	73.2	16 59.3	26 90	72.7
80	15 41.0	28 90	74.0	15 49.2	27 90	73.5	15 57.4	27 90	73.0	16 05.5	27 90	72.5
1	14 46.8	28 90	73.7	14 55.2	28 90	73.2	15 03.5	28 90	72.7	15 11.8	27 90	72.2
2	13 52.7	29 90	73.4	14 01.3	28 90	72.9	14 09.7	28 90	72.5	14 18.1	28 89	72.0
3	12 58.7	29 90	73.2	13 07.4	29 90	72.7	13 16.0	29 89	72.2	13 24.5	28 89	71.7
4	12 04.8	29 90	72.9	12 13.6	29 90	72.4	12 22.4	29 89	71.9	12 31.1	29 89	71.4
85	11 11.0	30 90	72.6	11 19.9	30 89	72.1	11 28.8	30 89	71.6	11 37.7	29 89	71.1
6	10 17.2	30 90	72.3	10 26.3	30 89	71.8	10 35.3	30 89	71.3	10 44.4	30 89	70.9
7	9 23.5	31 90	72.0	9 32.8	31 89	71.5	9 42.0	31 89	71.1	9 51.1	31 88	70.6
8	8 29.9	31 90	71.7	8 39.3	31 89	71.2	8 48.7	31 89	70.8	8 58.0	31 88	70.3
9	7 36.5	32 90	71.4	7 46.0	32 89	70.9	7 55.5	32 88	70.5	8 05.0	32 88	70.0
90	6 43.1	32 89	71.1	6 52.8	32 89	70.6	7 02.4	32 88	70.2	7 12.1	32 88	69.7

22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
88 00.0	1.0 21	00.0	87 30.0	1.0 17	00.0	87 00.0	1.0 14	00.0	86 30.0	1.0 12	00.0	00
87 47.6	90 53	24.8	87 19.9	94 45	20.3	86 51.6	95 39	17.0	86 22.7	97 34	14.7	1
87 15.8	73 70	42.7	86 52.9	80 63	36.4	86 28.2	85 57	31.4	86 02.3	88 51	27.6	2
86 33.5	57 80	53.9	86 15.0	66 74	47.7	85 54.2	73 68	42.4	85 31.6	78 63	38.0	3
85 45.8	46 84	61.1	85 30.7	55 80	55.4	85 13.2	62 76	50.4	84 53.8	68 71	46.0	4
84 55.3	38 87	65.9	84 42.7	46 84	60.9	84 27.9	53 80	56.3	84 11.1	59 77	52.1	05
84 03.2	32 89	69.3	83 52.5	39 86	64.8	83 39.8	46 83	60.7	83 25.2	52 80	56.8	6
83 10.0	27 90	71.7	83 00.9	34 88	67.8	82 49.9	40 85	64.0	82 37.1	45 83	60.4	7
82 16.2	23 90	73.6	82 08.3	29 89	70.0	81 58.6	35 87	66.6	81 47.3	40 85	63.3	8
81 21.9	20 91	75.0	81 15.0	26 90	71.8	81 06.4	31 88	68.7	80 56.4	36 86	65.7	9
80 27.3	18 91	76.1	80 21.2	23 90	73.2	80 13.6	28 89	70.3	80 04.7	32 87	67.5	10
79 32.4	16 92	77.0	79 27.0	20 91	74.3	79 20.3	25 90	71.7	79 12.3	29 88	69.1	1
78 37.4	14 92	77.8	78 32.6	18 91	75.3	78 26.8	22 90	72.8	78 19.4	26 89	70.4	2
77 42.2	12 92	78.3	77 38.0	16 91	76.0	77 32.6	20 90	73.7	77 26.1	24 89	71.5	3
76 47.0	11 92	78.8	76 43.2	14 92	76.7	76 38.4	18 91	74.5	76 32.5	21 90	72.4	4
75 51.6	09 92	79.2	75 48.3	13 92	77.2	75 44.0	16 91	75.2	75 38.6	19 90	73.2	15
74 56.2	08 92	79.5	74 53.3	11 92	77.6	74 49.4	15 91	75.7	74 44.5	18 90	73.9	6
74 00.7	07 92	79.8	73 58.2	10 92	78.0	73 54.7	13 91	76.2	73 50.3	16 91	74.4	7
73 05.2	06 93	80.0	73 03.0	09 92	78.3	72 59.9	12 92	76.6	72 55.9	15 91	74.9	8
72 09.7	05 93	80.2	72 07.7	08 92	78.6	72 05.0	11 92	76.9	72 01.4	13 91	75.3	9
71 14.1	04 93	80.3	71 12.5	07 92	78.8	71 10.0	09 92	77.2	71 06.8	12 91	75.7	20
70 18.5	03 93	80.4	70 17.1	06 92	79.0	70 15.0	08 92	77.5	70 12.2	11 91	76.0	1
69 22.9	03 93	80.5	69 21.8	05 92	79.1	69 20.0	07 92	77.7	69 17.4	10 91	76.3	2
68 27.3	02 93	80.6	68 26.4	04 92	79.2	68 24.8	06 92	77.9	68 22.6	08 91	76.5	3
67 31.7	01 93	80.6	67 31.0	03 92	79.3	67 29.7	05 92	78.0	67 27.8	07 92	76.7	4
66 36.0	00 93	80.6	66 35.6	02 92	79.4	66 34.5	05 92	78.1	66 32.9	07 92	76.9	25
65 40.4	00 93	80.6	65 40.2	02 92	79.4	65 39.4	04 92	78.2	65 38.0	06 92	77.0	6
64 44.8	01 93	80.6	64 44.8	01 92	79.5	64 44.2	03 92	78.3	64 43.0	05 92	77.1	7
63 49.2	01 93	80.6	63 49.3	00 92	79.5	63 48.9	02 92	78.3	63 48.0	04 92	77.2	8
62 53.5	02 93	80.6	62 53.9	00 92	79.5	62 53.7	01 92	78.4	62 53.1	03 92	77.3	9
61 57.9	03 93	80.5	61 58.5	01 92	79.5	61 58.5	01 92	78.4	61 58.1	03 92	77.3	30
61 02.3	03 93	80.5	61 03.0	02 92	79.4	61 03.3	00 92	78.4	61 03.0	02 92	77.4	1
60 06.7	04 93	80.4	60 07.6	02 92	79.4	60 08.0	01 92	78.4	60 08.0	01 92	77.4	2
59 11.1	04 93	80.3	59 12.2	03 92	79.4	59 12.8	01 92	78.4	59 13.0	00 92	77.4	3
58 15.6	05 93	80.2	58 16.8	03 92	79.3	58 17.6	02 92	78.3	58 18.0	00 92	77.4	4
57 20.0	05 93	80.2	57 21.4	04 92	79.2	57 22.4	03 92	78.3	57 23.0	01 92	77.4	35
56 24.4	06 93	80.1	56 26.0	04 92	79.2	56 27.2	03 92	78.3	56 27.9	01 92	77.4	6
55 28.9	06 92	80.0	55 30.6	06 92	79.1	55 32.0	04 92	78.2	55 32.9	02 92	77.3	7
54 33.4	07 92	79.9	54 35.3	06 92	79.0	54 36.8	04 92	78.1	54 37.9	03 92	77.3	8
53 37.9	07 92	79.7	53 39.9	06 92	78.9	53 41.6	05 92	78.1	53 42.9	04 92	77.2	9
52 42.5	08 92	79.6	52 44.6	07 92	78.8	52 46.5	06 92	78.0	52 48.0	05 92	77.2	40
51 47.0	08 92	79.5	51 49.3	07 92	78.7	51 51.3	06 92	77.9	51 53.0	05 92	77.1	1
50 51.6	09 92	79.4	50 54.1	08 92	78.6	50 56.2	07 92	77.8	50 58.0	06 92	77.0	2
49 56.2	09 92	79.2	49 58.8	08 92	78.5	50 01.1	07 92	77.7	50 03.1	06 92	76.9	3
49 00.8	10 92	79.1	49 03.6	09 92	78.4	49 06.0	08 92	77.6	49 08.2	07 92	76.8	4
48 05.4	10 92	79.0	48 08.4	09 92	78.2	48 11.0	08 92	77.5	48 13.3	08 91	76.7	45
47 10.1	11 92	78.8	47 13.2	10 92	78.1	47 16.0	09 92	77.4	47 18.5	08 91	76.6	6
46 14.8	11 92	78.7	46 18.0	10 92	78.0	46 21.0	09 92	77.2	46 23.6	08 91	76.5	7
45 19.5	12 92	78.5	45 22.9	11 92	77.8	45 26.0	10 92	77.1	45 28.8	09 91	76.4	8
44 24.3	12 92	78.4	44 27.8	11 92	77.7	44 31.0	10 92	77.0	44 34.0	10 91	76.3	9
43 29.1	13 92	78.2	43 32.7	12 92	77.5	43 36.1	11 92	76.8	43 39.3	10 91	76.2	50
42 33.9	13 92	78.1	42 37.7	12 92	77.4	42 41.2	11 91	76.7	42 44.5	11 91	76.0	1
41 38.8	13 92	77.9	41 42.7	13 92	77.2	41 46.4	12 91	76.6	41 49.8	11 91	75.9	2
40 43.7	14 92	77.7	40 47.7	13 92	77.1	40 51.6	12 91	76.4	40 55.2	12 91	75.8	3
39 48.6	14 92	77.5	39 52.8	14 92	76.9	39 56.8	13 91	76.3	40 00.5	12 91	75.6	4
38 53.6	15 92	77.4	38 57.9	14 91	76.7	39 02.0	13 91	76.1	39 05.9	13 91	75.5	55
37 58.6	15 92	77.2	38 03.0	15 91	76.6	38 07.3	14 91	75.9	38 11.4	13 91	75.3	6
37 03.6	16 92	77.0	37 08.2	15 91	76.4	37 12.6	14 91	75.8	37 16.9	14 91	75.2	7
36 08.7	16 91	76.8	36 13.4	16 91	76.2	36 18.0	15 91	75.6	36 22.4	14 91	75.0	8
35 13.8	17 91	76.6	35 18.7	16 91	76.0	35 23.4	15 91	75.4	35 27.9	15 91	74.8	9
34 19.0	17 91	76.5	34 24.0	17 91	75.9	34 28.9	16 91	75.3	34 33.6	15 91	74.7	60
33 24.2	18 91	76.3	33 29.4	17 91	75.7	33 34.4	16 91	75.1	33 39.2	16 90	74.5	1
32 29.4	18 91	76.1	32 34.7	18 91	75.5	32 39.9	17 91	74.9	32 44.9	16 90	74.3	2
31 34.7	18 91	75.9	31 40.2	18 91	75.3	31 45.5	17 91	74.7	31 50.6	17 90	74.1	3
30 40.1	19 91	75.7	30 45.7	18 91	75.1	30 51.1	18 90	74.5	30 56.4	17 90	73.9	4
29 45.5	19 91	75.5	29 51.2	19 91	74.9	29 56.8	18 90	74.3	30 02.3	18 90	73.8	65
28 50.9	20 91	75.2	28 56.8	19 90	74.7	29 02.6	19 90	74.1	29 08.2	18 90	73.6	6
27 56.4	20 91	75.0	28 02.5	20 90	74.5	28 08.4	19 90	73.9	28 14.1	19 90	73.4	7
27 02.0	21 91	74.8	27 08.2	20 90	74.3	27 14.2	20 90	73.7	27 20.1	20 90	73.2	8
26 07.6	21 91	74.6	26 13.9	21 90	74.1	26 20.1	20 90	73.5	26 26.2	20 90	73.0	9
25 13.3	22 90	74.4	25 19.7	21 90	73.8	25 26.1	21 90	73.3	25 32.3	21 90	72.8	70
24 19.0	22 90	74.2	24 25.6	22 90	73.6	24 32.1	21 90	73.1	24 38.5	21 90	72.5	1
23 24.8	23 90	73.9	23 31.6	22 90	73.4	23 38.2	22 90	72.9	23 44.7	22 90	72.3	2
22 30.6	23 90	73.7	22 37.6	23 90	73.2	22 44.4	22 90	72.6	22 51.0	22 89	72.1	3
21 36.6	24 90	73.5	21 43.6	23 90	72.9	21 50.6	23 90	72.4	21 57.4	23 89	71.9	4
20 42.5	24 90	73.2	20 49.7	24 90	72.7	20 56.9	24 89	72.2	21 03.9	23 89	71.7	75
19 48.6	25 90	73.0	19 56.0	24 90	72.5	20 03.2	24 89	72.0	20 10.4	24 89	71.4	6
18 54.7	25 90	72.7	19 02.2	25 89	72.2	19 09.6	25 89	71.7	19 17.0	24 89	71.2	7
18 00.9	26 90	72.5	18 08.6	25 89	72.0	18 16.1	25 89	71.5	18 23.6	25 89	71.0	8
17 07.2	26 89	72.2	17 15.0	26 89	71.7	17 22.7	26 89	71.2	17 30.4	25 89	70.7	9
16 13.5	27 89	72.0	16 21.5	27 89	71.5	16 29.4	26 89	71.0	16 37.2	26 88	70.5	80
15 19.9	27 89	71.7	15 28.1	27 89	71.2	15 36.1	27 89	70.7	15 44.1	27 88	70.2	1
14 26.4	28 89	71.5	14 34.7	27 89	71.0	14 42.9	27 88	70.5	14 51.1	27 88	70.0	2
13 33.0	28 89	71.2	13 41.5	28 89	70.7	13 49.8	28 88	70.2	13 58.2	28 88	69.7	3
12 39.7	29 89	70.9	12 48.3	29 88	70.4	12 56.8	28 88	69.9	13 05.3	28 88	69.5	4
11 46.5	29 89	70.6	11 55.2	29 88	70.2	12 03.9	29 88	69.7	12 12.6	29 88	69.2	85
10 53.3	30 88	70.4	11 02.2	30 88	69.9	11 11.1	29 88	69.4	11 19.9	29 88	68.9	6
10 00.3	30 88	70.1	10 09.3	30 88	69.6	10 18.4	30 88	69.1	10 27.4	30 88	68.6	7
9 07.3	31 88	69.8	9 16.5	31 88	69.3	9 25.7	31 88	68.8	9 34.9	31 87	68.4	8
8 14.4	31 88	69.5	8 23.8	31 88	69.0	8 33.2	31 87	68.5	8 42.6	31 87	68.1	9
7 21.7	32 88	69.2	7 31.2	32 87	68.7	7 40.8	32 87	68.3	7 50.3	32 87	67.8	90

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	50 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	49 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	48 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	47 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	00
1	49 59.3	1.0 04	178.5	49 29.3	1.0 04	178.6	48 59.3	1.0 04	178.6	48 29.3	1.0 03	178.6	47 59.3	1.0 03	178.6	47 29.3	1.0 03	178.6	46 59.3	1.0 03	178.7	46 29.3	1.0 03	178.7	1
2	49 57.1	1.0 06	177.1	49 27.2	1.0 06	177.1	48 57.2	1.0 06	177.2	48 27.2	1.0 06	177.2	47 57.3	1.0 06	177.2	47 27.3	1.0 06	177.3	46 57.3	1.0 06	177.3	46 27.4	1.0 06	177.3	2
3	49 53.5	1.0 08	175.6	49 23.6	1.0 08	175.7	48 53.7	1.0 08	175.7	48 23.8	1.0 08	175.8	47 53.9	1.0 08	175.8	47 24.0	1.0 08	175.9	46 54.0	1.0 08	176.0	46 24.1	1.0 08	176.0	3
4	49 48.5	99 11	174.2	49 18.7	99 11	174.2	48 48.8	99 10	174.3	48 19.0	1.0 10	174.4	47 49.1	1.0 10	174.5	47 19.3	1.0 10	174.5	46 49.4	1.0 10	174.6	46 19.5	1.0 10	174.7	4
05	49 42.1	99 13	172.7	49 12.3	99 13	172.8	48 42.6	99 13	172.9	48 12.8	99 12	173.0	47 43.0	99 12	173.1	47 13.2	99 12	173.2	46 43.5	99 12	173.3	46 13.7	99 12	173.4	05
6	49 34.2	99 15	171.3	49 04.6	99 15	171.4	48 34.9	99 15	171.5	48 05.3	99 15	171.6	47 35.6	99 15	171.7	47 05.9	99 14	171.8	46 36.2	99 14	171.9	46 06.5	99 14	172.1	6
7	49 25.0	98 18	169.9	48 55.5	98 17	170.0	48 25.9	98 17	170.1	47 56.4	99 17	170.3	47 26.8	99 17	170.4	46 57.2	99 16	170.5	46 27.7	99 16	170.6	45 58.1	99 16	170.7	7
8	49 14.4	98 20	168.4	48 45.0	98 20	168.6	48 15.6	98 20	168.7	47 46.2	98 19	168.9	47 16.7	98 19	169.0	46 47.3	98 19	169.2	46 17.8	98 18	169.3	45 48.4	98 18	169.5	8
9	49 02.4	97 22	167.0	48 33.2	97 22	167.2	48 03.9	98 22	167.4	47 34.7	98 21	167.5	47 05.4	98 21	167.7	46 36.1	98 21	167.9	46 06.8	98 21	168.0	45 37.4	98 20	168.2	9
10	48 49.1	97 24	165.7	48 20.0	97 24	165.8	47 51.0	97 24	166.0	47 21.8	97 23	166.2	46 52.7	97 23	166.4	46 23.6	97 23	166.5	45 54.4	97 23	166.7	45 25.3	97 22	166.9	10
1	48 34.5	96 26	164.3	48 05.6	96 26	164.5	47 36.7	96 26	164.7	47 07.8	96 26	164.9	46 38.8	97 25	165.1	46 09.8	97 25	165.3	45 40.9	97 25	165.4	45 11.9	97 24	165.6	1
2	48 18.6	96 29	162.9	47 49.9	96 28	163.1	47 21.2	96 28	163.4	46 52.4	96 28	163.6	46 23.7	96 27	163.8	45 54.9	96 27	164.0	45 26.1	96 27	164.2	44 57.3	96 26	164.4	2
3	48 01.4	95 31	161.6	47 32.9	95 30	161.8	47 04.4	95 30	162.0	46 35.9	95 30	162.3	46 07.3	95 29	162.5	45 38.7	95 29	162.7	45 10.1	95 29	162.9	44 41.5	95 28	163.1	3
4	47 42.9	94 33	160.3	47 14.7	94 32	160.5	46 46.4	94 32	160.7	46 18.1	94 32	161.0	45 49.7	95 31	161.2	45 21.4	95 31	161.5	44 53.0	95 30	161.7	44 24.5	95 30	161.9	4
15	47 23.3	93 35	158.9	46 55.3	93 34	159.2	46 27.2	94 34	159.5	45 59.1	94 33	159.7	45 31.0	94 33	160.0	45 02.9	94 33	160.2	44 34.7	94 32	160.5	44 06.5	94 32	160.7	15
6	47 02.4	92 37	157.7	46 34.7	93 36	157.9	46 06.9	93 36	158.2	45 39.0	93 35	158.5	45 11.1	93 35	158.7	44 43.2	93 34	159.0	44 15.3	93 34	159.3	43 47.3	93 34	159.5	6
7	46 40.4	92 39	156.4	46 12.9	92 38	156.7	45 45.4	92 38	157.0	45 17.8	92 37	157.3	44 50.1	92 37	157.5	44 22.5	92 36	157.8	43 54.7	92 36	158.1	43 27.0	93 36	158.3	7
8	46 17.3	91 40	155.2	45 50.1	91 40	155.5	45 22.8	91 40	155.8	44 55.4	91 39	156.0	44 28.0	91 39	156.3	44 00.6	91 38	156.6	43 33.1	92 38	156.9	43 05.6	92 37	157.2	8
9	45 53.1	90 42	153.9	45 26.1	90 42	154.2	44 59.1	90 41	154.6	44 32.0	90 41	154.9	44 04.9	90 40	155.2	43 37.7	91 40	155.4	43 10.5	91 39	155.7	42 43.2	91 39	156.0	9
20	45 27.7	89 44	152.7	45 01.1	89 43	153.1	44 34.3	89 43	153.4	44 07.5	89 42	153.7	43 40.7	90 42	154.0	43 13.8	90 42	154.3	42 46.8	90 41	154.6	42 19.8	90 41	154.9	20
1	45 01.4	88 46	151.5	44 35.0	88 45	151.9	44 08.5	88 45	152.2	43 42.0	88 44	152.5	43 15.4	89 44	152.9	42 48.8	89 43	153.2	42 22.1	89 43	153.5	41 55.4	89 42	153.8	1
2	44 34.0	87 47	150.4	44 07.9	87 47	150.7	43 41.7	87 46	151.1	43 15.5	88 46	151.4	42 49.2	88 45	151.7	42 22.9	88 45	152.1	41 56.5	88 44	152.4	41 30.0	88 44	152.7	2
3	44 05.7	86 49	149.3	43 39.9	86 48	149.6	43 14.0	86 48	150.0	42 48.1	87 47	150.3	42 22.0	87 47	150.6	41 56.0	87 46	151.0	41 29.9	87 46	151.3	41 03.7	87 45	151.6	3
4	43 36.4	85 50	148.1	43 10.9	85 50	148.5	42 45.3	85 49	148.9	42 19.7	86 49	149.2	41 53.9	86 48	149.6	41 28.2	86 48	149.9	41 02.3	86 47	150.2	40 36.4	86 47	150.6	4
25	43 06.2	84 52	147.1	42 41.0	84 51	147.4	42 15.7	84 51	147.8	41 50.3	85 50	148.1	41 24.9	85 50	148.5	40 59.4	85 49	148.9	40 33.9	85 49	149.2	40 08.3	85 48	149.5	25
6	42 35.1	83 53	146.0	42 10.2	83 53	146.4	41 45.2	83 52	146.7	41 20.1	84 52	147.1	40 55.0	84 51	147.5	40 29.8	84 51	147.8	40 04.6	84 50	148.2	39 39.3	84 50	148.5	6
7	42 03.1	82 55	144.9	41 38.5	82 54	145.3	41 13.8	82 54	145.7	40 49.1	83 53	146.1	40 24.3	83 53	146.4	39 59.4	83 52	146.8	39 34.4	83 52	147.2	39 09.4	83 51	147.5	7
8	41 30.3	81 56	143.9	41 06.0	81 55	144.3	40 41.7	81 55	144.7	40 17.2	82 54	145.1	39 52.7	82 54	145.4	39 28.1	82 53	145.8	39 03.5	82 53	146.2	38 38.7	83 52	146.5	8
9	40 56.7	80 57	142.9	40 32.7	80 57	143.3	40 08.7	80 56	143.7	39 44.5	81 56	144.1	39 20.3	81 55	144.5	38 56.1	81 55	144.8	38 31.7	81 54	145.2	38 07.3	82 54	145.6	9
30	40 22.3	79 59	141.9	39 58.6	79 58	142.3	39 34.9	79 58	142.7	39 11.1	80 57	143.1	38 47.2	80 56	143.5	38 23.2	80 56	143.9	37 59.2	80 56	144.3	37 35.0	81 55	144.6	30
1	39 47.2	78 60	141.0	39 23.8	78 59	141.4	39 00.4	78 59	141.8	38 36.9	79 58	142.2	38 13.3	79 58	142.6	37 49.6	79 57	143.0	37 25.9	79 57	143.3	37 02.0	80 56	143.7	1
2	39 11.3	77 61	140.0	38 48.2	77 60	140.4	38 25.1	77 60	140.8	38 01.9	77 59	141.2	37 38.6	78 59	141.6	37 15.3	78 58	142.0	36 51.8	78 58	142.4	36 28.3	79 57	142.8	2
3	38 34.7	76 62	139.1	38 12.0	76 62	139.5	37 49.2	76 61	139.9	37 26.3	76 60	140.3	37 03.3	77 60	140.7	36 40.3	77 60	141.1	36 17.1	77 59	141.5	35 53.9	78 58	141.9	3
4	37 57.5	75 63	138.2	37 35.1	75 63	138.6	37 12.6	75 62	139.0	36 50.0	75 62	139.5	36 27.3	76 61	139.9	36 04.5	76 61	140.3	35 41.7	76 60	140.7	35 18.8	77 60	141.1	4
35	37 19.6	74 64	137.3	36 57.5	74 64	137.8	36 35.3	74 63	138.2	36 13.0	74 63	138.6	35 50.6	75 62	139.0	35 28.2	75 62	139.4	35 05.6	75 61	139.8	34 43.0	76 61	140.2	35
6	36 41.0	73 65	136.5	36 19.2	73 65	136.9	35 57.4	73 64	137.3	35 35.4	73 64	137.7	35 13.3	74 63	138.2	34 51.2	74 63	138.6	34 29.0	74 62	139.0	34 06.6	75 62	139.4	6
7	36 01.9	71 66	135.6	35 40.4	72 66	136.1	35 18.8	72 65	136.5	34 57.2	72 65	136.9	34 35.4	73 64	137.3	34 13.6	73 64	137.7	33 51.6	73 63	138.2	33 29.6	74 63	138.6	7
8	35 22.2	70 67	134.8	35 01.0	71 67	135.2	34 39.7	71 66	135.7	34 18.4	71 66	136.1	33 56.9	72 65	136.5	33 35.4	72 65	136.9	33 13.7	72 64	137.4	32 52.0	73 64	137.8	8
9	34 41.9	69 68	134.0	34 21.0	70 67	134.4	34 00.0	70 67	134.9	33 39.0	70 67	135.3	33 17.8	71 66	135.7	32 56.6	71 66	136.1	32 35.3	71 65	136.6	32 13.8	72 65	137.0	9
40	34 01.1	68 69	133.2	33 40.5	69 68	133.7	33 19.8	69 68	134.1	32 59.0	69 67	134.5	32 38.2	70 67	134.9	32 17.2	70 66	135.4	31 56.2	70 66	135.8	31 35.1	71 65	136.2	40
1	33 19.7	68 70	132.5	32 59.5	68 69	132.9	32 39.1	68 69	133.3	32 18.6	68 68	133.8	31 58.0	69 68	134.2	31 37.4	69 67	134.6	31 16.6	69 67	135.0	30 55.8	70 66	135.5	1
2	32 37.9	67 71	131.7	32 17.9	67 70	132.1	31 57.8	67 70	132.6	31 37.6	67 69	133.0	31 17.3	68 69	133.4	30 57.0	68 68	133.9	30 36.5	68 68	134.3	30 16.0	69 67	134.7	2
3	31 55.6	66 71	131.0	31 35.8	66 71	131.4	31 16.0	66 70	131.9	30 56.1	66 70	132.3	30 36.2	67 69	132.7	30 16.1	67 69	133.2	29 55.9	67 68	133.6	29 35.7	68 68	134.0	3
4	31 12.8	65 72	130.2	30 53.3	65 72	130.7	30 33.8	65 71	131.1	30 14.2	66 71	131.6	29 54.5	66 70	132.0	29 34.7	66 70	132.4	29 14.9	66 69	132.9	28 54.9	67 69	133.3	4
45	30 29.5	64 73	129.5	30 10.4	64 72	130.0	29 51.1	64 72	130.4	29 31.8	65 72	130.9	29 12.4	65 71	131.3	28 52.9	65 71	131.7	28 33.3	65 70	132.2	28 13.6	66 69	132.6	45
6	29 45.8	63 74	128.9	29 26.9	63 73	129.3	29 08.0	63 73	129.8	28 48.9	64 72	130.2	28 29.8	64 72	130.6	28 10.6	64 71	131.1	27 51.3	64 71	131.5	27 31.9	65 70	131.9	6
7	29 01.7	62 74	128.2	28 43.1	62 74	128.6	28 24.4	62 73	129.1	28 05.7	63 73	129.5	27 46.8	63 72	130.0	27 27.9	63 72	130.4	27 08.9	64 71	130.8	26 49.8	64 71	131.3	7
8	28 17.2	61 75	127.5	27 58.9	61 74	128.0	27 40.5	62 74	128.4	27 22.0	62 73	128.9	27 03.4	62 73	129.3	26 44.7	62 72	129.8	26 26.0	63 72	130.2	26 07.2	63 72	130.6	8
9	27 32.3	60 75	126.9	27 14.2	60 75	127.3	26 56.1	61 75	127.8	26 37.9	61 74	128.2	26 19.6	61 74	128.7	26 01.2	61 73	129.1	25 42.7	62 73	129.6	25 24.2	62 72	130.0	9
50	26 47.0	59 76	126.3	26 29.2	59 76	126.7	26 11.3	60 75	127.2	25 53.4	60 75	127.6	25 35.4	60 74	128.0	25 17.2	61 74	128.5	24 59.1	61 73	128.9	24 40.8	61 73	129.4	50
1	26 01.4	58 77	125.6	25 43.8	59 76	126.1	25 26.2	59 76	126.5	25 08.5	59 75	127.0	24 50.8	59 75	127.4	24 32.9	60 74	127.9	24 15.0	60 74	128.3	23 57.0	60 73	128.8	1
2	25 15.4	57 77	125.0	24 58.1	58 77	125.5	24 40.8	58 76	125.9	24 23.3	58 76	126.4	24 05.8	58 76	126.8	23 48.2	59 75	127.3	23 30.6	59 75	127.7	23 12.9	59 74	128.2	2
3	24 29.0	57 78	124.4	24 12.0	57 77	124.9	23 54.9	57 77	125.4	23 37.8	57 76	125.8	23 20.5	58 76	126.2	23 03.2	58 76	126.7	22 45.8	58 75	127.1	22 28.3	58 75	127.6	3
4	23 42.4	56 78	123.9	23 25.6	56 78	124.3	23 08.8	56 77	124.8	22 51.9	56 77	125.2	22 34.9	57 77	125.7	22 17.8	57 76	126.1	22 00.7	57 76	126.6	21 43.5	57 75	127.0	4
55	22 55.4	55 79	123.3	22 38.9	55 78	123.8	22 22.3	55 78	124.2	22 05.7	56 78	124.7	21 48.9	56 77	125.1	21 32.1	56 77	125.6	21 15.2	56 76	126.0	20 58.3	57 76	126.4	55
6	22 08.1	54 79	122.8	21 51.9	54 79	123.2	21 35.5	55 78	123.7	21 19.1	55 78	124.1	21 02.6	55 78	124.6	20 46.1	55 77	125.0	20 29.5	56 77	125.4	20 12.8	56 76	125.9	6
7	21 20.6	53 80	122.2	21 04.6	54 79	122.7	20 48.5	54 79	123.1	20 32.3	54 78	123.6	20 16.0	54 78	124.0	19 59.7	55 78	124.5	19 43.4	55 77	124.9	19 26.9	55 77	125.3	7
8	20 32.7	53 80	121.7	20 16.9	53 80	122.1	20 01.1	53 79	122.6	19 45.2	53 79	123.0	19 29.2	53 79	123.5	19 13.1	54 78	123.9	18 57.0	54 78	124.4	18 40.8	54 77	124.8	8
9	19 44.6	52 81	121.2	19 29.1	52 80	121.6	19 13.4	52 80	122.1	18 57.8	52 79	122.5	18 42.0	53 79	123.0	18 26.2	53 79	123.4	18 10.3	53 78	123.9	17 54.4	53 78	124.3	9
60	18 56.2	51 81	120.6	18 40.9	51 81	121.1	18 25.5	51 80	121.6	18 10.1	52 80	122.0	17 54.6	52 80	122.5	17 39.0	52 79	122.9	17 23.3	52 79	123.3	17 07.6	52 78	123.8	60
1	18 07.6	50 82	120.1	17 52.5	50 81	120.6	17 37.3	51 81	121.0	17 22.1	51 80	121.5	17 06.8	51 80	122.0	16 51.5	51 79	122.4	16 36.1	51 79	122.8	16 20.7	52 79	123.3	1
2	17 18.7	49 82	119.7	17 03.9	50 81	120.1	16 48.9	50 81	120.6	16 33.9	50 81	121.0	16 18.9	50 80	121.5	16 03.8	50 80	121.9	15 48.6	51 80	122.4	15 33.4	51 79	122.8	2
3	16 29.6	49 82	119.2	16 15.0	49 82	119.6	16 00.2	49 82	120.1	15 45.5	49 81	120.5	15 30.7	49 81	121.0	15 15.8	50 80	121.4	15 00.9	50 80	121.9	14 45.9	50 80	122.3	3
4	15 40.3	48 83	118.7	15 25.8	48 82	119.1	15 11.3	48 82	119.6	14 56.8	49 81	120.1	14 42.2	49 81	120.5	14 27.6	49 81	121.0	14 12.9	49 80	121.4	13 58.1	49 80	121.9	4
65	14 50.7	47 83	118.2	14 36.5	47 83	118.7	14 22.2	48 82	119.1	14 07.9	48 82	119.6	13 53.5	48 82	120.0	13 39.1	48 81	120.5	13 24.6	48 81	120.9	13 10.1	49 80	121.4	65
6	14 00.9	47 83	117.8	13 46.9	47 83	118.2	13 32.9	47 83	118.7	13 18.7	47 82	119.1	13 04.6	47 82	119.6	12 50.4	47 81	120.0	12 36.2	48 81	120.5	12 21.9	48 81	120.9	6
7	13 10.9	46 84	117.3	12 57.1	46 83	117.8	12 43.3	46 83	118.2	12 29.4	46 83	118.7	12 15.5	47 82	119.1	12 01.5	47 82	119.6	11 47.5	47 82	120.1	11 33.4	47 81	120.5	7
8	12 20.7	45 84	116.9	12 07.1	45 83	117.3	11 53.5	46 83	117.8	11 39.8	46 83	118.3	11 26.1	46 83	118.7	11 12.3	46 82	119.2	10 58.5	46 82	119.6	10 44.7	46 81	120.1	8
9	11 30.4	45 84	116.5	11 17.0	45 84	116.9	11 03.5	45 84	117.4	10 50.1	45 83	117.8	10 36.6	45 83	118.3	10 23.0	45 82	118.7	10 09.4	45 82	119.2	9 55.8	45 82	119.6	9
70	10 39.8	44 85	116.0	10 26.6	44 84	116.5	10 13.4	44 84	116.9	10 00.1	44 83	117.4	9 46.8	44 83	117.9	9 33.5	45 83	118.3	9 20.1	45 82	118.8	9 06.7	45 82	119.2	70
1	9 49.0	43 85	115.6	9 36.0	43 85	116.1	9 23.0	43 84	116.5	9 10.0	44 84	117.0	8 56.9	44 84	117.4	8 43.7	44 83	117.9	8 30.6	44 83	118.4	8 17.4	44 82	118.8	1
2	8 58.1	43 85	115.2	8 45.3	43 85	115.7	8 32.5	43 84	116.1	8 19.6	43 84	116.6	8 06.7	43 84	117.0	7 53.8	43 83	117.5	7 40.9	43 83	117.9	7 27.9	43 83	118.4	2
3	8 07.0	42 85	114.8	7 54.4	43 85	115.3	7 41.8	42 85	115.7	7 29.1	42 84	116.2	7 16.4	42 84	116.6	7 03.7	42 84	117.1	6 51.0	43 83	117.5	6 38.2	43 83	118.0	3
4	7 15.8	41 86	114.4	7 03.3	41 85	114.9	6 50.9	41 85	115.3	6 38.4	42 85	115.8	6 25.9	42 84	116.2	6 13.4	42 84	116.7	6 00.9	42 84	117.2	5 48.3	42 83	117.6	4
75	6 24.3	41 86	114.0	6 12.1	41 86	114.5	5 59.9	41 85	114.9	5 47.6	41 85	115.4	5 35.3	41 85	115.9	5 23.0	41 84	116.3	5 10.6	41 84	116.8				75
6	5 32.8	40 86	113.6	5 20.7	40 86	114.1	5 08.7	40 86	114.6																6

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	5 49.8	33 88	70.8	5 59.6	33 88	70.3	6 09.4	33 88	69.9	6 19.2	33 88	69.4	6 29.0	33 88	68.9	6 38.8	32 87	68.4	6 48.5	32 87	68.0	6 58.2	32 87	67.5	91
2				5 06.6	33 88	70.0	5 16.6	33 88	69.6	5 26.5	33 88	69.1	5 36.5	33 88	68.6	5 46.4	33 87	68.1	5 56.3	33 87	67.7	6 06.1	33 87	67.2	2
3																			5 04.2	34 87	67.3	5 14.2	34 87	66.9	3

Lat. 20°

H.A.	24° 00′ Alt.	Δd Δt	Az.	24° 30′ Alt.	Δd Δt	Az.	25° 00′ Alt.	Δd Δt	Az.	25° 30′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	86 00.0	1.0 11	00.0	85 30.0	1.0 09	00.0	85 00.0	1.0 08	00.0	84 30.0	1.0 08	00.0
1	85 53.6	97 30	12.9	85 24.4	98 27	11.4	84 54.9	98 24	10.3	84 25.4	99 22	09.3
2	85 35.5	90 46	24.5	85 08.1	92 42	22.0	84 40.2	94 30	19.9	84 12.0	95 36	18.2
3	85 07.7	82 58	34.3	84 42.8	85 54	31.1	84 17.0	87 50	28.4	83 50.6	89 47	26.1
4	84 32.8	73 67	42.1	84 10.4	76 63	38.7	83 47.0	80 59	35.7	83 22.7	82 55	33.1
05	83 52.7	64 73	48.3	83 32.8	68 69	44.9	83 11.7	72 66	41.8	82 49.5	75 62	39.0
6	83 09.0	57 77	53.2	82 51.3	61 74	49.9	82 32.2	65 71	46.8	82 12.1	69 68	44.0
7	82 22.7	50 80	57.1	82 06.9	55 78	53.9	81 49.7	59 75	51.0	81 31.4	63 72	48.3
8	81 34.5	45 83	60.2	81 20.3	50 80	57.2	81 04.8	54 78	54.4	80 48.1	58 75	51.8
9	80 45.0	40 84	62.8	80 32.2	45 82	60.0	80 18.1	49 80	57.3	80 02.9	53 78	54.8
10	79 54.4	36 86	64.8	79 42.8	41 84	62.2	79 30.0	45 82	59.7	79 16.1	48 80	57.3
1	79 03.0	33 87	66.6	78 52.5	37 85	64.1	78 40.8	41 83	61.8	78 28.1	44 82	59.5
2	78 11.0	30 88	68.0	78 01.4	34 86	65.7	77 50.7	37 85	63.5	77 39.0	41 83	61.3
3	77 18.4	27 88	69.3	77 09.7	31 87	67.1	77 00.0	34 86	65.0	76 49.2	38 84	62.9
4	76 25.5	25 89	70.3	76 17.5	28 88	68.3	76 08.6	31 86	66.3	75 58.7	35 85	64.3
15	75 32.3	23 89	71.2	75 25.0	26 88	69.3	75 16.7	29 87	67.4	75 07.6	32 86	65.5
6	74 38.8	21 90	72.0	74 32.1	24 89	70.2	74 24.5	27 88	68.3	74 16.1	30 86	66.6
7	73 45.0	19 90	72.7	73 38.9	22 89	70.9	73 32.0	25 88	69.2	73 24.2	27 87	67.5
8	72 51.1	17 90	73.2	72 45.5	20 89	71.6	72 39.1	23 88	69.9	72 31.9	25 88	68.3
9	71 57.1	16 90	73.7	71 52.0	18 90	72.1	71 46.1	21 89	70.6	71 39.4	23 88	69.0
20	71 02.9	14 90	74.2	70 58.2	17 90	72.7	70 52.8	19 89	71.1	70 46.6	22 88	69.7
1	70 08.6	13 91	74.5	70 04.3	15 90	73.1	69 59.4	18 89	71.6	69 53.7	20 89	70.2
2	69 14.2	12 91	74.9	69 10.3	14 90	73.5	69 05.8	16 90	72.1	69 00.5	19 89	70.7
3	68 19.8	11 91	75.2	68 16.2	13 90	73.8	68 12.1	15 90	72.5	68 07.3	17 89	71.2
4	67 25.2	10 91	75.4	67 22.0	12 90	74.1	67 18.2	14 90	•72.8	67 13.8	16 89	71.5
25	66 30.6	09 91	75.6	66 27.8	10 90	74.4	66 24.3	12 90	73.1	66 20.3	14 89	71.9
6	65 36.0	08 91	75.8	65 33.5	09 91	74.6	65 30.3	11 90	73.4	65 26.7	13 90	72.2
7	64 41.3	07 91	76.0	64 39.1	08 91	74.8	64 36.3	10 90	73.6	64 32.9	12 90	72.5
8	63 46.6	06 91	76.1	63 44.7	07 91	74.9	63 42.2	09 90	73.8	63 39.1	11 90	72.7
9	62 51.9	05 91	76.2	62 50.2	06 91	75.1	62 48.0	08 90	74.0	62 45.3	10 90	72.9
30	61 57.1	04 91	76.3	61 55.7	06 91	75.2	61 53.8	07 90	74.1	61 51.4	09 90	73.1
1	61 02.3	03 91	76.3	61 01.2	05 91	75.3	60 59.5	06 90	74.3	60 57.4	08 90	73.2
2	60 07.5	02 91	76.4	60 06.6	04 91	75.4	60 05.2	05 90	74.4	60 03.4	07 90	73.4
3	59 12.7	02 91	76.4	59 12.1	03 91	75.4	59 10.9	05 90	74.5	59 09.3	06 90	73.5
4	58 17.9	01 91	76.4	58 17.5	02 91	75.5	58 16.6	04 91	74.5	58 15.3	05 90	73.6
35	57 23.1	00 91	76.5	57 22.9	01 91	75.5	57 22.2	03 91	74.6	57 21.2	04 90	73.7
6	56 28.3	01 91	76.4	56 28.3	00 91	75.5	56 27.9	02 91	74.6	56 27.1	03 90	73.7
7	55 33.5	01 91	76.4	55 33.7	00 91	75.6	55 33.5	01 91	74.7	55 32.9	03 90	73.8
8	54 38.7	02 91	76.4	54 39.1	01 91	75.5	54 39.1	01 91	74.7	54 38.8	02 90	73.8
9	53 43.9	03 91	76.4	53 44.5	01 91	75.5	53 44.7	00 91	74.7	53 44.6	01 90	73.8
40	52 49.1	03 91	76.3	52 49.9	02 91	75.5	52 50.4	01 91	74.7	52 50.5	00 90	73.8
1	51 54.3	04 91	76.3	51 55.3	02 91	75.5	51 56.0	02 91	74.7	51 56.3	00 90	73.8
2	50 59.6	05 91	76.2	51 00.8	03 91	75.4	51 01.6	02 91	74.6	51 02.2	01 90	73.8
3	50 04.8	05 91	76.1	50 06.2	03 91	75.4	50 07.3	03 91	74.6	50 08.0	02 90	73.8
4	49 10.1	06 91	76.1	49 11.7	04 91	75.3	49 12.9	04 90	74.5	49 13.9	02 90	73.8
45	48 15.4	06 91	76.0	48 17.1	05 91	75.2	48 18.6	04 90	74.5	48 19.8	03 90	73.7
6	47 20.7	07 91	75.9	47 22.6	05 91	75.2	47 24.3	05 90	74.4	47 25.6	04 90	73.7
7	46 26.0	08 91	75.8	46 28.1	06 91	75.1	46 30.0	06 90	74.3	46 31.5	05 90	73.6
8	45 31.4	08 91	75.7	45 33.7	07 91	75.0	45 35.7	06 90	74.3	45 37.5	05 90	73.6
9	44 36.7	09 91	75.6	44 39.2	08 91	74.9	44 41.4	07 90	74.2	44 43.4	06 90	73.5
50	43 42.2	09 91	75.5	43 44.8	08 91	74.8	43 47.2	08 90	74.1	43 49.3	07 90	73.4
1	42 47.6	10 91	75.4	42 50.4	09 91	74.7	42 53.0	08 90	74.0	42 55.3	07 90	73.3
2	41 53.1	10 91	75.2	41 56.0	10 90	74.6	41 58.8	09 90	73.9	42 01.3	08 90	73.2
3	40 58.6	11 91	75.1	41 01.7	10 90	74.4	41 04.7	09 90	73.8	41 07.4	09 90	73.1
4	40 04.1	11 91	75.0	40 07.4	11 90	74.3	40 10.5	10 90	73.7	40 13.4	09 90	73.0
55	39 09.7	12 91	74.8	39 13.2	11 90	74.2	39 16.4	11 90	73.5	39 19.5	10 90	72.9
6	38 15.3	13 91	74.7	38 18.9	12 90	74.0	38 22.4	11 90	73.4	38 25.7	10 90	72.8
7	37 20.9	13 90	74.5	37 24.7	12 90	73.9	37 28.4	12 90	73.3	37 31.8	11 90	72.7
8	36 26.6	14 90	74.4	36 30.6	13 90	73.8	36 34.4	12 90	73.1	36 38.0	12 90	72.5
9	35 32.3	14 90	74.2	35 36.5	14 90	73.6	35 40.5	13 90	73.0	35 44.3	12 90	72.4
60	34 38.1	15 90	74.1	34 42.4	14 90	73.5	34 46.6	14 90	72.9	34 50.5	13 89	72.3
1	33 43.9	15 90	73.9	33 48.4	15 90	73.3	33 52.7	14 90	72.7	33 56.9	14 89	72.1
2	32 49.7	16 90	73.7	32 54.4	15 90	73.1	32 58.9	15 90	72.5	33 03.2	14 89	72.0
3	31 55.6	16 90	73.5	32 00.5	16 90	73.0	32 05.1	15 90	72.4	32 09.6	15 89	71.8
4	31 01.6	17 90	73.4	31 06.6	16 90	72.8	31 11.4	16 89	72.2	31 16.1	15 89	71.6
65	30 07.6	17 90	73.2	30 12.7	17 90	72.6	30 17.8	16 89	72.0	30 22.6	16 89	71.5
6	29 13.6	18 90	73.0	29 19.0	18 90	72.4	29 24.1	17 89	71.9	29 29.2	17 89	71.3
7	28 19.7	19 90	72.8	28 25.2	18 89	72.3	28 30.6	18 89	71.7	28 35.8	17 89	71.1
8	27 25.9	19 90	72.6	27 31.6	19 89	72.1	27 37.1	18 89	71.5	27 42.5	18 89	71.0
9	26 32.1	20 90	72.4	26 38.0	19 89	71.9	26 43.7	19 89	71.3	26 49.2	18 89	70.8
70	25 38.4	20 89	72.2	25 44.4	20 89	71.7	25 50.3	19 89	71.1	25 56.0	19 88	70.6
1	24 44.8	21 89	72.0	24 50.9	20 89	71.5	24 57.0	20 89	70.9	25 02.9	20 88	70.4
2	23 51.2	21 89	71.8	23 57.5	21 89	71.3	24 03.7	21 89	70.7	24 09.8	20 88	70.2
3	22 57.6	22 89	71.6	23 04.1	21 89	71.1	23 10.5	21 88	70.5	23 16.8	21 88	70.0
4	22 04.2	22 89	71.4	22 10.8	22 89	70.8	22 17.4	22 88	70.3	22 23.8	21 88	69.8
75	21 10.8	23 89	71.1	21 17.6	23 88	70.6	21 24.3	22 88	70.1	21 31.0	22 88	69.6
6	20 17.5	23 89	70.9	20 24.5	23 88	70.4	20 31.4	23 88	69.9	20 38.2	23 88	69.4
7	19 24.2	24 89	70.7	19 31.4	24 88	70.2	19 38.5	23 88	69.7	19 45.4	23 88	69.1
8	18 31.0	25 88	70.5	18 38.4	24 88	69.9	18 45.6	24 88	69.4	18 52.8	24 88	68.9
9	17 38.0	25 88	70.2	17 45.5	25 88	69.7	17 52.9	25 88	69.2	18 00.2	24 88	68.7
80	16 44.9	26 88	70.0	16 52.6	25 88	69.5	17 00.2	25 88	69.0	17 07.7	25 87	68.5
1	15 52.0	26 88	69.7	15 59.9	26 88	69.2	16 07.6	26 88	68.7	16 15.3	26 87	68.2
2	14 59.2	27 88	69.5	15 07.2	27 88	69.0	15 15.1	26 87	68.5	15 23.0	26 87	68.0
3	14 06.4	27 88	69.2	14 14.6	27 88	68.7	14 22.7	27 87	68.2	14 30.8	27 87	67.7
4	13 13.7	28 88	69.0	13 22.1	28 87	68.5	13 30.4	28 87	68.0	13 38.7	27 87	67.5
85	12 21.2	29 88	68.7	12 29.7	28 87	68.2	12 38.2	28 87	67.7	12 46.6	28 86	67.2
6	11 28.7	29 87	68.4	11 37.4	29 87	67.9	11 46.1	29 87	67.4	11 54.7	29 86	67.0
7	10 36.3	30 87	68.1	10 45.2	30 87	67.7	10 54.1	29 86	67.2	11 02.9	29 86	66.7
8	9 44.0	30 87	67.9	9 53.1	30 87	67.4	10 02.2	30 86	66.9	10 11.2	30 86	66.4
9	8 51.9	31 87	67.6	9 01.1	31 86	67.1	9 10.4	31 86	66.6	9 19.5	31 86	66.1
90	7 59.8	32 87	67.3	8 09.2	31 86	66.8	8 18.7	31 86	66.3	8 28.0	31 86	65.9

26° 00′ Alt.	Δd Δt	Az.	26° 30′ Alt.	Δd Δt	Az.	27° 00′ Alt.	Δd Δt	Az.	27° 30′ Alt.	Δd Δt	Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
84 00.0	1.0 07	00.0	83 30.0	1.0 06	00.0	83 00.0	1.0 06	00.0	82 30.0	1.0 06	00.0	00
83 55.8	99 20	08.5	83 26.1	99 19	07.9	82 56.4	99 18	07.3	82 26.7	99 16	06.8	1
83 43.5	95 33	16.7	83 14.7	96 30	15.4	82 45.8	97 28	14.3	82 16.8	97 26	13.3	2
83 23.8	90 44	24.1	82 56.4	92 40	22.4	82 28.8	93 38	20.9	82 00.9	94 36	19.5	3
82 57.7	84 52	30.8	82 32.1	86 49	28.7	82 05.9	88 46	26.9	81 39.4	89 44	25.2	4
82 26.4	78 59	36.5	82 02.6	81 56	34.3	81 38.1	83 54	32.3	81 13.0	84 51	30.4	05
81 50.9	72 65	41.5	81 28.8	75 62	39.2	81 06.0	77 59	37.0	80 42.5	79 57	35.0	6
81 12.0	66 69	45.7	80 51.6	69 67	43.4	80 30.4	72 64	41.2	80 08.5	74 62	39.1	7
80 30.4	61 73	49.3	80 11.6	64 70	47.0	79 51.9	67 68	44.8	79 31.5	69 66	42.8	8
79 46.6	56 76	52.4	79 29.3	59 74	50.1	79 11.1	62 71	48.0	78 52.0	65 69	45.9	9
79 01.1	52 78	55.0	78 45.2	55 76	52.8	78 28.3	58 74	50.7	78 10.6	60 72	48.7	10
78 14.3	48 80	57.3	77 59.6	51 78	55.2	77 43.9	54 76	53.1	77 27.4	56 74	51.2	1
77 26.4	44 81	59.2	77 12.7	47 80	57.2	76 58.2	50 78	55.2	76 42.8	53 76	53.4	2
76 37.5	41 83	60.9	76 24.8	44 81	59.0	76 11.3	46 80	57.1	75 57.0	49 78	55.3	3
75 47.8	38 84	62.4	75 36.1	41 82	60.5	75 23.5	43 81	58.7	75 10.2	46 80	57.0	4
74 57.6	35 85	63.7	74 46.7	38 83	61.9	74 35.0	40 82	60.2	74 22.5	43 81	58.5	15
74 06.8	32 86	64.8	73 56.7	35 84	63.1	73 45.8	38 83	61.4	73 34.1	40 82	59.8	6
73 15.5	30 86	65.8	73 06.1	33 85	64.2	72 56.0	35 84	62.6	72 45.0	38 83	61.0	7
72 23.9	28 86	66.7	72 15.2	30 86	65.1	72 05.7	33 84	63.6	71 55.5	35 83	62.1	8
71 32.0	26 87	67.5	71 23.9	28 86	66.0	71 15.0	31 85	64.5	71 05.5	33 84	63.0	9
70 39.8	24 88	68.2	70 32.2	26 86	66.7	70 24.0	29 86	65.3	70 15.0	31 85	63.9	20
69 47.3	22 88	68.8	69 40.3	25 87	67.4	69 32.6	27 86	66.0	69 24.2	29 85	64.6	1
68 54.7	21 88	69.3	68 48.1	23 87	68.0	68 40.9	25 86	66.7	68 33.1	27 86	65.3	2
68 01.8	19 88	69.8	67 55.7	21 88	68.5	67 49.1	23 87	67.2	67 41.8	25 86	66.0	3
67 08.8	18 88	70.3	67 03.2	20 88	69.0	66 57.0	22 87	67.8	66 50.2	24 86	66.5	4
66 15.7	16 89	70.7	66 10.5	18 88	69.4	66 04.7	20 87	68.2	65 58.4	22 87	67.0	25
65 22.4	15 89	71.0	65 17.6	17 88	69.8	65 12.3	19 88	68.6	65 06.4	21 87	67.5	6
64 29.1	14 89	71.3	64 24.6	16 88	70.2	64 19.7	17 88	69.0	64 14.2	19 87	67.9	7
63 35.6	13 89	71.6	63 31.5	14 88	70.5	63 27.0	16 88	69.4	63 21.9	18 87	68.3	8
62 42.1	12 89	71.8	62 38.4	13 89	70.7	62 34.2	15 88	69.7	62 29.5	17 88	68.6	9
61 48.5	10 89	72.0	61 45.1	12 89	71.0	61 41.2	14 88	69.9	61 36.9	15 88	68.9	30
60 54.8	09 90	72.2	60 51.8	11 89	71.2	60 48.2	13 88	70.2	60 44.3	14 88	69.2	1
60 01.1	08 90	72.4	59 58.4	10 89	71.4	59 55.2	11 89	70.4	59 51.5	13 88	69.4	2
59 07.3	07 90	72.5	59 04.9	09 89	71.6	59 02.0	10 89	70.6	58 58.7	12 88	69.6	3
58 13.5	06 90	72.6	58 11.4	08 89	71.7	58 08.8	09 89	70.8	58 05.8	11 88	69.8	4
57 19.7	06 90	72.7	57 17.8	07 89	71.8	57 15.6	08 89	70.9	57 12.9	10 88	70.0	35
56 25.9	05 90	72.8	56 24.3	06 89	71.9	56 22.3	07 89	71.0	56 19.9	09 88	70.1	6
55 32.0	04 90	72.9	55 30.6	05 89	72.0	55 28.9	06 89	71.1	55 26.8	08 88	70.3	7
54 38.1	03 90	73.0	54 37.0	04 89	72.1	54 35.6	05 89	71.2	54 33.7	07 88	70.4	8
53 44.2	02 90	73.0	53 43.3	03 89	72.1	53 42.2	05 89	71.3	53 40.6	06 88	70.5	9
52 50.3	01 90	73.0	52 49.7	02 89	72.2	52 48.8	04 89	71.4	52 47.5	05 89	70.5	40
51 56.3	01 90	73.0	51 56.0	02 89	72.2	51 55.3	03 89	71.4	51 54.3	04 89	70.6	1
51 02.4	00 90	73.0	51 02.3	01 89	72.2	51 01.9	02 89	71.4	51 01.1	03 89	70.6	2
50 08.5	01 90	73.0	50 08.6	00 89	72.2	50 08.4	01 89	71.5	50 07.9	02 89	70.7	3
49 14.5	02 90	73.0	49 14.9	00 89	72.2	49 15.0	00 89	71.5	49 14.7	02 89	70.7	4
48 20.6	02 90	73.0	48 21.2	01 89	72.2	48 21.5	00 89	71.5	48 21.5	01 89	70.7	45
47 26.7	03 90	72.9	47 27.5	02 89	72.2	47 28.0	01 89	71.5	47 28.3	00 89	70.7	6
46 32.8	04 90	72.9	46 33.8	03 89	72.2	46 34.6	02 89	71.4	46 35.1	01 89	70.7	7
45 39.0	05 90	72.8	45 40.2	04 89	72.1	45 41.1	03 89	71.4	45 41.8	02 89	70.7	8
44 45.1	05 90	72.8	44 46.5	04 89	72.1	44 47.7	03 89	71.4	44 48.6	03 89	70.7	9
43 51.2	06 90	72.7	43 52.9	05 89	72.0	43 54.3	04 89	71.3	43 55.4	03 89	70.6	50
42 57.4	07 90	72.6	42 59.3	06 89	71.9	43 00.9	06 89	71.3	43 02.2	04 89	70.6	1
42 03.6	07 90	72.5	42 05.7	06 89	71.9	42 07.5	06 89	71.2	42 09.1	05 89	70.5	2
41 09.9	08 90	72.5	41 12.1	07 89	71.8	41 14.1	06 89	71.1	41 15.9	06 88	70.5	3
40 16.1	09 90	72.4	40 18.6	08 89	71.7	40 20.8	07 89	71.1	40 22.8	06 88	70.4	4
39 22.4	09 90	72.3	39 25.0	08 89	71.6	39 27.5	06 89	71.0	39 29.7	07 88	70.3	55
38 28.7	10 89	72.1	38 31.6	09 89	71.5	38 34.2	08 89	70.9	38 36.6	08 88	70.2	6
37 35.1	10 89	72.0	37 38.1	10 89	71.4	37 40.9	09 89	70.8	37 43.6	09 88	70.1	7
36 41.4	11 89	71.9	36 44.7	10 89	71.3	36 47.7	10 89	70.7	36 50.6	09 88	70.0	8
35 47.9	12 89	71.8	35 51.3	11 89	71.2	35 54.5	11 88	70.6	35 57.6	10 88	69.9	9
34 54.3	12 89	71.6	34 58.0	12 89	71.0	35 01.4	11 88	70.4	35 04.7	11 88	69.8	60
34 00.8	13 89	71.5	34 04.7	13 89	70.9	34 08.3	12 88	70.3	34 11.8	11 88	69.7	1
33 07.4	14 89	71.4	33 11.4	13 89	70.8	33 15.2	12 88	70.2	33 18.9	12 88	69.6	2
32 14.0	14 89	71.2	32 18.2	14 89	70.6	32 22.2	13 88	70.0	32 26.1	13 88	69.5	3
31 20.6	15 89	71.1	31 25.0	14 88	70.5	31 29.2	14 88	69.9	31 33.3	13 88	69.3	4
30 27.3	15 89	70.9	30 31.9	15 88	70.3	30 36.3	14 88	69.8	30 40.6	14 88	69.2	65
29 34.1	16 89	70.7	29 38.8	16 88	70.2	29 43.4	15 88	69.6	29 47.9	15 88	69.0	6
28 40.9	17 89	70.6	28 45.8	16 88	70.0	28 50.6	16 88	69.4	28 55.3	15 88	68.9	7
27 47.7	17 88	70.4	27 52.9	17 88	69.8	27 57.9	16 88	69.3	28 02.7	16 88	68.7	8
26 54.7	18 88	70.2	27 00.0	18 88	69.7	27 05.2	17 88	69.1	27 10.2	17 87	68.6	9
26 01.6	19 88	70.0	26 07.1	18 88	69.5	26 12.5	18 88	68.9	26 17.8	17 87	68.4	70
25 08.7	19 88	69.8	25 14.4	19 88	69.3	25 19.9	18 88	68.8	25 25.4	18 87	68.2	1
24 15.8	20 88	69.7	24 21.6	19 88	69.1	24 27.4	19 88	68.6	24 33.0	19 87	68.0	2
23 22.9	20 88	69.5	23 29.0	20 88	68.9	23 34.9	20 87	68.4	23 40.8	19 87	67.9	3
22 30.2	21 88	69.3	22 36.4	21 88	68.7	22 42.6	20 87	68.2	22 48.6	20 87	67.7	4
21 37.5	22 88	69.1	21 43.9	21 87	68.5	21 50.3	21 87	68.0	21 56.5	21 87	67.5	75
20 44.9	22 88	68.8	20 51.5	22 87	68.3	20 58.0	22 87	67.8	21 04.4	21 86	67.3	6
19 52.3	23 87	68.6	19 59.1	23 87	68.1	20 05.9	22 87	67.6	20 12.5	22 86	67.1	7
18 59.9	23 87	68.4	19 06.9	23 87	67.9	19 13.8	23 87	67.4	19 20.6	23 86	66.9	8
18 07.5	24 87	68.2	18 14.7	24 87	67.7	18 21.8	24 86	67.2	18 28.8	23 86	66.6	9
17 15.2	25 87	67.9	17 22.6	24 87	67.4	17 29.9	24 86	66.9	17 37.1	24 86	66.4	80
16 23.0	25 87	67.7	16 30.5	25 86	67.2	16 38.0	25 86	66.7	16 45.4	25 86	66.2	1
15 30.8	26 87	67.5	15 38.6	26 86	67.0	15 46.3	25 86	66.5	15 53.9	25 86	66.0	2
14 38.8	27 86	67.2	14 46.8	26 86	66.7	14 54.6	26 86	66.2	15 02.5	26 86	65.7	3
13 46.9	27 86	67.0	13 55.0	27 86	66.5	14 03.1	27 86	66.0	14 11.1	27 85	65.5	4
12 55.0	28 86	66.7	13 03.4	28 86	66.2	13 11.6	27 86	65.7	13 19.8	27 85	65.2	85
12 03.3	29 86	66.5	12 11.8	28 86	66.0	12 20.3	28 85	65.5	12 28.7	28 85	65.0	6
11 11.6	29 86	66.2	11 20.4	29 86	65.7	11 29.0	29 85	65.2	11 37.7	29 85	64.7	7
10 20.1	30 86	65.9	10 29.0	30 85	65.4	10 37.9	29 85	65.0	10 46.7	29 85	64.5	8
9 28.7	30 86	65.7	9 37.8	30 85	65.2	9 46.9	30 85	64.7	9 55.9	30 84	64.2	9
8 37.4	31 85	65.4	8 46.7	31 85	64.9	8 56.0	31 85	64.4	9 05.2	31 84	63.9	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	46 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	00
1	45 59.4	1.0 03	178.7	45 29.4	1.0 03	178.7	44 59.4	1.0 03	178.7	44 29.4	1.0 03	178.7	43 59.4	1.0 03	178.8	43 29.4	1.0 03	178.8	42 59.4	1.0 03	178.8	42 29.4	1.0 03	178.8	1
2	45 57.4	1.0 05	177.4	45 27.4	1.0 05	177.4	44 57.5	1.0 05	177.4	44 27.5	1.0 05	177.5	43 57.5	1.0 05	177.5	43 27.6	1.0 05	177.5	42 57.6	1.0 05	177.6	42 27.6	1.0 05	177.6	2
3	45 54.2	1.0 08	176.1	45 24.3	1.0 07	176.1	44 54.3	1.0 07	176.2	44 24.4	1.0 07	176.2	43 54.5	1.0 07	176.3	43 24.5	1.0 07	176.3	42 54.6	1.0 07	176.3	42 24.7	1.0 07	176.4	3
4	45 49.7	1.0 10	174.8	45 19.8	1.0 10	174.8	44 49.9	1.0 09	174.9	44 20.1	1.0 09	175.0	43 50.2	1.0 09	175.0	43 20.3	1.0 09	175.1	42 50.4	1.0 09	175.1	42 20.5	1.0 09	175.2	4
05	45 43.9	99 12	173.5	45 14.1	99 12	173.5	44 44.3	99 11	173.6	44 14.5	99 11	173.7	43 44.7	99 11	173.8	43 14.9	99 11	173.9	42 45.1	99 11	173.9	42 15.2	99 11	174.0	05
6	45 36.8	99 14	172.2	45 07.1	99 14	172.3	44 37.4	99 14	172.4	44 07.7	99 13	172.4	43 38.0	99 13	172.5	43 08.2	99 13	172.6	42 38.5	99 13	172.7	42 08.8	99 13	172.8	6
7	45 28.5	99 16	170.9	44 58.9	99 16	171.0	44 29.3	99 16	171.1	43 59.7	99 15	171.2	43 30.0	99 15	171.3	43 00.4	99 15	171.4	42 30.8	99 15	171.5	42 01.1	99 15	171.6	7
8	45 18.9	98 18	169.6	44 49.4	98 18	169.7	44 19.9	98 18	169.8	43 50.4	98 17	170.0	43 20.9	98 17	170.1	42 51.4	98 17	170.2	42 21.9	98 17	170.3	41 52.4	98 16	170.5	8
9	45 08.1	98 20	168.3	44 38.8	98 20	168.5	44 09.4	98 20	168.6	43 40.0	98 19	168.7	43 10.6	98 19	168.9	42 41.3	98 19	169.0	42 11.9	98 19	169.2	41 42.5	98 18	169.3	9
10	44 56.1	97 22	167.1	44 26.9	97 22	167.2	43 57.7	97 22	167.4	43 28.4	97 21	167.5	42 59.2	97 21	167.7	42 29.9	98 21	167.8	42 00.7	98 20	168.0	41 31.4	98 20	168.1	10
1	44 42.8	97 24	165.8	44 13.8	97 24	166.0	43 44.7	97 23	166.2	43 15.7	97 23	166.3	42 46.6	97 23	166.5	42 17.5	97 23	166.7	41 48.4	97 22	166.8	41 19.3	97 22	167.0	1
2	44 28.4	96 26	164.6	43 59.6	96 26	164.8	43 30.7	96 26	164.9	43 01.8	96 25	165.1	42 32.9	96 25	165.3	42 03.9	96 26	165.5	41 35.0	97 24	165.7	41 06.0	97 24	165.8	2
3	44 12.8	96 28	163.3	43 44.2	96 28	163.5	43 15.5	96 27	163.7	42 46.7	96 27	163.9	42 18.0	96 27	164.1	41 49.2	96 26	164.3	41 20.5	96 26	164.5	40 51.7	96 26	164.7	3
4	43 56.1	96 30	162.1	43 27.6	96 29	162.3	42 59.1	96 29	162.6	42 30.6	96 29	162.8	42 02.0	96 28	163.0	41 33.5	96 28	163.2	41 04.9	96 28	163.4	40 36.3	96 27	163.6	4
15	43 38.2	94 32	160.9	43 10.0	94 31	161.2	42 41.7	94 31	161.4	42 13.3	94 30	161.6	41 45.0	95 30	161.8	41 16.6	95 30	162.0	40 48.2	95 30	162.3	40 19.8	95 29	162.5	15
6	43 19.3	93 34	159.8	42 51.2	94 33	160.0	42 23.1	94 33	160.2	41 55.0	94 32	160.5	41 26.9	94 32	160.7	40 58.7	94 31	160.9	40 30.5	94 31	161.2	40 02.3	94 31	161.4	6
7	42 59.2	93 35	158.6	42 31.4	93 35	158.8	42 03.5	93 34	159.1	41 35.6	93 34	159.3	41 07.7	93 34	159.6	40 39.8	93 33	159.8	40 11.8	93 33	160.1	39 43.8	93 32	160.3	7
8	42 38.1	92 37	157.4	42 10.5	92 36	157.7	41 42.9	92 36	158.0	41 15.2	92 36	158.2	40 47.5	92 35	158.5	40 19.8	92 35	158.7	39 52.1	93 34	159.0	39 24.3	93 34	159.2	8
9	42 15.9	91 39	156.3	41 48.6	91 38	156.6	41 21.2	91 38	156.9	40 53.8	91 37	157.1	40 26.4	92 37	157.4	39 58.9	92 36	157.7	39 31.4	92 36	157.9	39 03.8	92 36	158.2	9
20	41 52.8	90 40	155.2	41 25.7	90 40	155.5	40 58.6	90 39	155.8	40 31.4	91 39	156.0	40 04.2	91 38	156.3	39 37.0	91 38	156.6	39 09.7	91 38	156.9	38 42.4	91 37	157.1	20
1	41 28.6	89 42	154.1	41 01.8	89 41	154.4	40 34.9	90 41	154.7	40 08.0	90 40	155.0	39 41.1	90 40	155.3	39 14.1	90 40	155.5	38 47.0	90 39	155.8	38 20.0	90 39	156.1	1
2	41 03.5	88 43	153.0	40 37.0	89 43	153.3	40 10.4	89 43	153.6	39 43.7	89 42	153.9	39 17.0	89 42	154.2	38 50.3	89 41	154.5	38 23.5	89 41	154.8	37 56.7	89 40	155.1	2
3	40 37.5	88 45	151.9	40 11.2	88 44	152.3	39 44.8	88 44	152.6	39 18.5	88 44	152.9	38 52.0	88 43	153.2	38 25.6	88 43	153.5	37 59.0	88 42	153.8	37 32.5	89 42	154.1	3
4	40 10.5	87 46	150.9	39 44.5	87 46	151.2	39 18.4	87 46	151.5	38 52.3	87 45	151.9	38 26.2	87 45	152.2	37 59.9	87 44	152.5	37 33.7	88 44	152.8	37 07.4	88 43	153.1	4
25	39 42.6	86 48	149.9	39 16.9	86 47	150.2	38 51.1	86 47	150.5	38 25.3	86 46	150.9	37 59.4	86 46	151.2	37 33.5	87 45	151.5	37 07.5	87 45	151.8	36 41.4	87 44	152.1	25
6	39 13.9	85 49	148.9	38 48.5	85 49	149.2	38 23.0	85 48	149.5	37 57.4	85 48	149.9	37 31.8	85 47	150.2	37 06.2	86 47	150.5	36 40.4	86 46	150.9	36 14.7	86 46	151.2	6
7	38 44.3	84 51	147.9	38 19.2	84 50	148.2	37 54.0	84 50	148.6	37 28.7	84 49	148.9	37 03.4	85 49	149.2	36 38.0	85 48	149.6	36 12.6	85 48	149.9	35 47.1	85 47	150.2	7
8	38 14.0	83 52	146.9	37 49.1	83 51	147.3	37 24.2	83 51	147.6	36 59.2	83 50	148.0	36 34.2	84 50	148.3	36 09.1	84 50	148.6	35 43.9	84 49	149.0	35 18.7	84 49	149.3	8
9	37 42.8	82 53	146.0	37 18.2	82 53	146.3	36 53.6	82 52	146.7	36 28.9	82 52	147.0	36 04.2	83 51	147.4	35 39.3	83 51	147.7	35 14.5	83 50	148.1	34 49.5	83 50	148.4	9
30	37 10.8	81 54	145.0	36 46.6	81 54	145.4	36 22.2	81 54	145.8	35 57.8	81 53	146.1	35 33.4	82 52	146.5	35 08.9	82 52	146.8	34 44.3	82 52	147.2	34 19.6	82 51	147.5	30
1	36 38.1	80 56	144.1	36 14.2	80 55	144.5	35 50.1	80 55	144.8	35 26.0	80 54	145.2	35 01.9	81 54	145.6	34 37.6	81 53	145.9	34 13.4	81 53	146.3	33 49.0	81 52	146.6	1
2	36 04.7	79 57	143.2	35 41.1	79 56	143.6	35 17.3	79 56	144.0	34 53.5	79 55	144.3	34 29.6	80 55	144.7	34 05.7	80 54	145.1	33 41.7	80 54	145.4	33 17.6	80 53	145.8	2
3	35 30.6	78 58	142.3	35 07.2	78 57	142.7	34 43.8	78 57	143.1	34 20.3	78 56	143.5	33 56.7	79 56	143.8	33 33.1	79 55	144.2	33 09.4	79 55	144.6	32 45.6	79 54	144.9	3
4	34 55.8	77 59	141.5	34 32.7	77 59	141.8	34 09.6	77 58	142.2	33 46.4	77 58	142.6	33 23.1	78 57	143.0	32 59.8	78 57	143.4	32 36.3	78 56	143.7	32 12.9	78 56	144.1	4
35	34 20.3	76 60	140.6	33 57.6	76 60	141.0	33 34.7	76 59	141.4	33 11.8	77 59	141.8	32 48.8	77 58	142.2	32 25.8	77 58	142.5	32 02.7	77 57	142.9	31 39.5	77 57	143.3	35
6	33 44.3	75 61	139.8	33 21.8	75 61	140.2	32 59.2	75 60	140.6	32 36.6	76 60	141.0	32 13.9	76 59	141.4	31 51.2	76 59	141.7	31 28.4	76 58	142.1	31 05.5	76 58	142.5	6
7	33 07.5	74 62	139.0	32 45.4	74 62	139.4	32 23.1	74 61	139.8	32 00.8	75 61	140.2	31 38.4	75 60	140.6	31 16.0	75 60	140.9	30 53.4	75 59	141.3	30 30.8	75 59	141.7	7
8	32 30.2	73 63	138.2	32 08.4	73 63	138.6	31 46.4	73 62	139.0	31 24.4	74 62	139.4	31 02.3	74 61	139.8	30 40.1	74 61	140.2	30 17.9	74 60	140.6	29 55.6	74 60	140.9	8
9	31 52.3	72 64	137.4	31 30.8	72 64	137.8	31 09.1	72 63	138.2	30 47.4	73 63	138.6	30 25.6	73 62	139.0	30 03.7	73 62	139.4	29 41.8	73 61	139.8	29 19.8	73 61	140.2	9
40	31 13.9	71 65	136.6	30 52.6	71 64	137.0	30 31.3	71 64	137.4	30 09.8	72 63	137.9	29 48.3	72 63	138.3	29 26.8	72 62	138.7	29 05.1	72 62	139.1	28 43.4	72 61	139.4	40
1	30 34.9	70 66	135.9	30 13.9	70 65	136.3	29 52.9	70 65	136.7	29 31.7	71 64	137.1	29 10.5	71 64	137.5	28 49.3	71 63	137.9	28 27.9	71 63	138.3	28 06.5	71 62	138.7	1
2	29 55.4	69 67	135.1	29 34.7	69 66	135.6	29 14.0	69 66	136.0	28 53.1	70 65	136.4	28 32.2	70 65	136.8	28 11.2	70 64	137.2	27 50.2	70 64	137.6	27 29.0	71 63	138.0	2
3	29 15.4	68 68	134.4	28 55.0	68 67	134.8	28 34.5	68 67	135.3	28 14.0	69 66	135.7	27 53.3	69 66	136.1	27 32.7	69 65	136.5	27 11.9	69 65	136.9	26 51.0	70 64	137.3	3
4	28 34.9	67 68	133.7	28 14.8	67 68	134.1	27 54.6	67 67	134.6	27 34.3	68 67	135.0	27 14.0	68 66	135.4	26 53.6	68 66	135.8	26 33.1	68 65	136.2	26 12.6	69 65	136.6	4
45	27 53.9	66 69	133.0	27 34.1	66 69	133.5	27 14.2	66 68	133.9	26 54.2	67 68	134.3	26 34.2	67 67	134.7	26 14.1	67 67	135.1	25 53.9	67 66	135.5	25 33.6	68 66	136.0	45
6	27 12.5	65 70	132.4	26 52.9	65 69	132.8	26 33.3	66 69	133.2	26 13.6	66 68	133.6	25 53.9	66 68	134.1	25 34.0	66 67	134.5	25 14.1	66 67	134.9	24 54.2	67 66	135.3	6
7	26 30.6	64 70	131.7	26 11.3	64 70	132.1	25 52.0	65 70	132.6	25 32.6	65 69	133.0	25 13.1	65 69	133.4	24 53.6	65 68	133.8	24 34.0	66 68	134.2	24 14.3	66 67	134.6	7
8	25 48.3	63 71	131.1	25 29.3	63 71	131.5	25 10.3	64 70	131.9	24 51.1	64 70	132.3	24 31.9	64 69	132.8	24 12.7	64 69	133.2	23 53.4	65 68	133.6	23 34.0	65 68	134.0	8
9	25 05.6	62 72	130.4	24 46.9	63 71	130.9	24 28.1	63 71	131.3	24 09.3	63 70	131.7	23 50.3	63 70	132.1	23 31.4	63 70	132.6	23 12.3	64 69	133.0	22 53.2	64 69	133.4	9
50	24 22.4	61 72	129.8	24 04.0	62 72	130.2	23 45.5	62 72	130.7	23 27.0	62 71	131.1	23 08.3	62 71	131.5	22 49.6	62 70	131.9	22 30.9	63 70	132.4	22 12.0	63 69	132.8	50
1	23 38.9	60 73	129.2	23 20.8	61 73	129.6	23 02.6	61 72	130.1	22 44.3	61 72	130.5	22 25.9	61 71	130.9	22 07.5	61 71	131.3	21 49.0	62 70	131.8	21 30.4	62 70	132.2	1
2	22 55.8	59 74	128.6	22 37.2	60 73	129.0	22 19.2	60 73	129.5	22 01.2	60 72	129.9	21 43.1	60 72	130.3	21 25.0	61 71	130.8	21 06.8	61 71	131.2	20 48.5	61 71	131.6	2
3	22 10.8	59 74	128.0	21 53.2	59 74	128.4	21 35.5	59 73	128.9	21 17.8	59 73	129.3	21 00.0	59 73	129.7	20 42.1	60 72	130.2	20 24.1	60 72	130.6	20 06.1	60 71	131.0	3
4	21 26.2	58 75	127.4	21 08.9	58 74	127.9	20 51.4	58 74	128.3	20 34.0	58 74	128.7	20 16.4	59 73	129.2	19 58.8	59 73	129.6	19 41.2	59 72	130.0	19 23.4	59 72	130.5	4
55	20 41.3	57 76	126.9	20 24.2	57 75	127.3	20 07.0	57 74	127.8	19 49.8	58 74	128.2	19 32.5	58 74	128.6	19 15.2	58 73	129.1	18 57.8	58 73	129.5	18 40.4	58 72	129.9	55
6	19 56.0	56 76	126.3	19 39.2	56 75	126.8	19 22.3	56 75	127.2	19 05.3	57 75	127.6	18 48.3	57 74	128.1	18 31.3	57 74	128.5	18 14.1	57 73	128.9	17 56.9	57 73	129.4	6
7	19 10.4	55 76	125.8	18 53.9	55 76	126.2	18 37.2	56 76	126.7	18 20.5	56 75	127.1	18 03.8	56 75	127.5	17 47.0	56 74	128.0	17 30.1	56 74	128.4	17 13.2	56 73	128.8	7
8	18 24.5	54 77	125.3	18 08.2	54 76	125.7	17 51.9	55 76	126.1	17 35.4	55 76	126.6	17 18.9	55 75	127.0	17 02.4	55 75	127.5	16 45.8	55 74	127.9	16 29.1	56 74	128.3	8
9	17 38.4	53 78	124.7	17 22.3	54 77	125.2	17 06.2	54 77	125.6	16 50.0	54 76	126.1	16 33.8	54 76	126.5	16 17.5	54 75	126.9	16 01.1	55 75	127.4	15 44.7	55 75	127.8	9
60	16 51.9	53 78	124.2	16 36.1	53 77	124.7	16 20.2	53 77	125.1	16 04.3	53 77	125.6	15 48.3	53 76	126.0	15 32.3	53 76	126.4	15 16.2	54 75	126.9	15 00.0	54 75	127.3	60
1	16 05.1	52 78	123.7	15 49.6	52 78	124.2	15 33.9	52 78	124.6	15 18.3	52 77	125.1	15 02.5	53 77	125.5	14 46.8	53 76	126.0	14 30.9	53 76	126.4	14 15.1	53 75	126.9	1
2	15 18.1	51 79	123.3	15 02.8	51 78	123.7	14 47.4	51 78	124.1	14 32.0	52 78	124.6	14 16.5	52 77	125.0	14 01.0	52 77	125.5	13 45.4	52 76	125.9	13 29.8	52 76	126.4	2
3	14 30.8	50 79	122.8	14 15.8	50 79	123.2	14 00.6	51 78	123.7	13 45.4	51 78	124.1	13 30.2	51 78	124.6	13 14.9	51 77	125.0	12 59.6	51 77	125.4	12 44.2	51 76	125.9	3
4	13 43.3	49 80	122.3	13 28.5	50 79	122.8	13 13.6	50 79	123.2	12 58.6	50 78	123.6	12 43.6	50 78	124.1	12 28.6	50 78	124.5	12 13.5	50 77	125.0	11 58.4	50 77	125.4	4
65	12 55.5	49 80	121.8	12 40.9	49 80	122.3	12 26.3	49 79	122.7	12 11.6	49 79	123.2	11 56.8	49 78	123.6	11 42.0	49 78	124.1	11 27.2	49 78	124.5	11 12.3	50 77	125.0	65
6	12 07.5	48 80	121.4	11 53.1	48 80	121.8	11 38.7	48 80	122.3	11 24.3	48 79	122.7	11 09.8	48 79	123.2	10 55.2	48 78	123.6	10 40.6	49 78	124.1	10 26.0	49 78	124.5	6
7	11 19.3	47 81	121.0	11 05.1	47 80	121.4	10 50.9	47 80	121.8	10 36.7	47 80	122.3	10 22.5	48 79	122.7	10 08.1	48 79	123.2	9 53.8	48 78	123.6	9 39.4	48 78	124.1	7
8	10 30.8	46 81	120.5	10 16.9	47 81	121.0	10 02.9	47 80	121.4	9 48.9	47 80	121.9	9 34.9	47 80	122.3	9 20.8	47 79	122.8	9 06.8	47 79	123.2	8 52.6	47 78	123.7	8
9	9 42.1	46 82	120.1	9 28.4	46 81	120.5	9 14.7	46 81	121.0	9 00.9	46 80	121.4	8 47.2	46 80	121.9	8 33.3	46 79	122.3	8 19.5	46 79	122.8	8 05.6	46 79	123.2	9
70	8 53.3	45 82	119.7	8 39.8	45 81	120.1	8 26.3	45 81	120.6	8 12.7	45 81	121.0	7 59.2	45 80	121.5	7 45.6	45 80	121.9	7 32.0	45 80	122.4	7 18.3	45 79	122.8	70
1	8 04.2	44 82	119.3	7 50.9	44 82	119.7	7 37.6	44 81	120.2	7 24.3	44 81	120.6	7 11.0	45 81	121.1	6 57.6	45 80	121.5	6 44.2	45 80	122.0	6 30.8	45 80	122.4	1
2	7 14.9	43 82	118.9	7 01.8	44 82	119.3	6 48.8	44 82	119.8	6 35.7	44 81	120.2	6 22.6	44 81	120.7	6 09.5	44 81	121.1	5 56.3	44 80	121.6	5 43.1	44 80	122.0	2
3	6 25.4	43 83	118.5	6 12.6	43 82	118.9	5 59.7	43 82	119.4	5 46.9	43 81	119.8	5 34.0	43 81	120.3	5 21.1	43 81	120.8	5 08.2	43 80	121.2				3
4	5 35.7	42 83	118.1	5 23.1	42 83	118.5	5 10.5	42 82	119.0																4

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	7 07.8	32 86	67.0	7 17.5	32 86	66.5	7 27.1	32 86	66.0	7 36.6	32 85	65.6	7 46.2	32 85	65.1	7 55.7	32 85	64.6	8 05.2	32 84	64.1	8 14.6	31 84	63.7	91
2	6 16.0	33 86	66.7	6 25.8	33 86	66.2	6 35.6	33 86	65.8	6 45.4	33 85	65.3	6 55.1	32 85	64.8	7 04.8	32 85	64.3	7 14.5	32 84	63.8	7 24.1	32 84	63.4	2
3	5 24.3	33 86	66.4	5 34.3	33 86	65.9	5 44.3	33 85	65.5	5 54.2	33 85	65.0	6 04.2	33 85	64.5	6 14.1	33 85	64.0	6 23.9	33 84	63.6	6 33.8	33 84	63.1	3
4										5 03.2	34 85	64.7	5 13.3	34 85	64.2	5 23.4	34 85	63.7	5 33.5	34 84	63.3	5 43.6	34 84	62.8	4

Lat. 20°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	86 00.0	1.0 11	00.0	85 30.0	1.0 09	00.0	85 00.0	1.0 08	00.0	84 30.0	1.0 08	00.0	84 00.0	1.0 07	00.0	83 30.0	1.0 06	00.0	83 00.0	1.0 06	00.0	82 30.0	1.0 06	00.0	00
1	85 53.6	97 30	12.9	85 24.4	98 27	11.4	84 54.9	98 24	10.3	84 25.4	99 22	09.3	83 55.8	99 20	08.5	83 26.1	99 19	07.9	82 56.4	99 18	07.3	82 26.7	99 16	06.8	1
2	85 35.5	90 46	24.5	85 08.1	92 42	22.0	84 40.2	94 39	19.9	84 12.0	95 36	18.2	83 43.5	95 33	16.7	83 14.7	96 30	15.4	82 45.8	97 28	14.3	82 16.8	97 26	13.3	2
3	85 07.7	82 58	34.3	84 42.8	85 54	31.1	84 17.0	87 50	28.4	83 50.6	89 47	26.1	83 23.8	90 44	24.1	82 56.4	92 40	22.4	82 28.8	93 38	20.9	82 00.9	94 36	19.5	3
4	84 32.8	73 67	42.1	84 10.4	76 63	38.7	83 47.0	80 59	35.7	83 22.7	82 55	33.1	82 57.7	84 52	30.8	82 32.1	86 49	28.7	82 05.9	88 46	26.9	81 39.4	89 44	25.2	4
05	83 52.7	64 73	48.3	83 32.8	68 69	44.9	83 11.7	72 66	41.8	82 49.5	75 62	39.0	82 26.4	78 59	36.5	82 02.6	81 56	34.3	81 38.1	83 54	32.3	81 13.0	84 51	30.4	05
6	83 09.0	57 77	53.2	82 51.3	61 74	49.9	82 32.2	65 71	46.8	82 12.1	69 68	44.0	81 50.9	72 65	41.5	81 28.8	75 62	39.2	81 06.0	77 59	37.0	80 42.5	79 57	35.0	6
7	82 22.7	50 80	57.1	82 06.9	55 78	53.9	81 49.7	59 75	51.0	81 31.4	63 72	48.3	81 12.0	66 69	45.7	80 51.6	69 67	43.4	80 30.4	72 64	41.2	80 08.5	74 62	39.1	7
8	81 34.5	45 83	60.2	81 20.3	50 80	57.2	81 04.8	54 78	54.4	80 48.1	58 75	51.8	80 30.4	61 73	49.3	80 11.6	64 70	47.0	79 51.9	67 68	44.8	79 31.5	69 66	42.8	8
9	80 45.0	40 84	62.8	80 32.2	45 82	60.0	80 18.1	49 80	57.3	80 02.9	53 78	54.8	79 46.6	56 76	52.4	79 29.3	59 74	50.1	79 11.1	62 71	48.0	78 52.0	65 69	45.9	9
10	79 54.4	36 86	64.8	79 42.8	41 84	62.2	79 30.0	45 82	59.7	79 16.1	48 80	57.3	79 01.1	52 78	55.0	78 45.2	55 76	52.8	78 28.3	58 74	50.7	78 10.6	60 72	48.7	10
1	79 03.0	33 87	66.6	78 52.5	37 85	64.1	78 40.8	41 83	61.8	78 28.1	44 82	59.5	78 14.3	48 80	57.3	77 59.6	51 78	55.2	77 43.9	54 76	53.1	77 27.4	56 74	51.2	1
2	78 11.0	30 88	68.0	78 01.4	34 86	65.7	77 50.7	37 85	63.5	77 39.0	41 83	61.3	77 26.4	44 81	59.2	77 12.7	47 80	57.2	76 58.2	50 78	55.2	76 42.8	53 76	53.4	2
3	77 18.4	27 88	69.3	77 09.7	31 87	67.1	77 00.0	34 86	65.0	76 49.2	38 84	62.9	76 37.5	41 83	60.9	76 24.8	44 81	59.0	76 11.3	46 80	57.1	75 57.0	49 78	55.3	3
4	76 25.5	25 89	70.3	76 17.5	28 88	68.3	76 08.6	31 86	66.3	75 58.7	35 85	64.3	75 47.8	38 84	62.4	75 36.1	41 82	60.5	75 23.5	43 81	58.7	75 10.2	46 80	57.0	4
15	75 32.3	23 89	71.2	75 25.0	26 88	69.3	75 16.7	29 87	67.4	75 07.6	32 86	65.5	74 57.6	35 85	63.7	74 46.7	38 83	61.9	74 35.0	40 82	60.2	74 22.5	43 81	58.5	15
6	74 38.8	21 90	72.0	74 32.1	24 89	70.2	74 24.5	27 88	68.3	74 16.1	30 86	66.6	74 06.8	32 86	64.8	73 56.7	35 84	63.1	73 45.8	38 83	61.4	73 34.1	40 82	59.8	6
7	73 45.0	19 90	72.7	73 38.9	22 89	70.9	73 32.0	25 88	69.2	73 24.2	27 87	67.5	73 15.5	30 86	65.8	73 06.1	33 85	64.2	72 56.0	35 84	62.6	72 45.0	38 83	61.0	7
8	72 51.1	17 90	73.2	72 45.5	20 89	71.6	72 39.1	23 88	69.9	72 31.9	25 88	68.3	72 23.9	28 86	66.7	72 15.2	30 86	65.1	72 05.7	33 84	63.6	71 55.5	35 83	62.1	8
9	71 57.1	16 90	73.7	71 52.0	18 90	72.1	71 46.1	21 89	70.6	71 39.4	23 88	69.0	71 32.0	26 87	67.5	71 23.9	28 86	66.0	71 15.0	31 85	64.5	71 05.5	33 84	63.0	9
20	71 02.9	14 90	74.2	70 58.2	17 90	72.7	70 52.8	19 89	71.1	70 46.6	22 88	69.7	70 39.8	24 88	68.2	70 32.2	26 86	66.7	70 24.0	29 86	65.3	70 15.0	31 85	63.9	20
1	70 08.6	13 91	74.5	70 04.3	15 90	73.1	69 59.4	18 89	71.6	69 53.7	20 89	70.2	69 47.3	22 88	68.8	69 40.3	25 87	67.4	69 32.6	27 86	66.0	69 24.2	29 85	64.6	1
2	69 14.2	12 91	74.9	69 10.3	14 90	73.5	69 05.8	16 90	72.1	69 00.5	19 89	70.7	68 54.7	21 88	69.3	68 48.1	23 87	68.0	68 40.9	25 86	66.7	68 33.1	27 86	65.3	2
3	68 19.8	11 91	75.2	68 16.2	13 90	73.8	68 12.1	15 90	72.5	68 07.3	17 89	71.2	68 01.8	19 88	69.8	67 55.7	21 88	68.5	67 49.1	23 87	67.2	67 41.8	25 86	66.0	3
4	67 25.2	10 91	75.4	67 22.0	12 90	74.1	67 18.2	14 90	•72.8	67 13.8	16 89	71.5	67 08.8	18 88	70.3	67 03.2	20 88	69.0	66 57.0	22 87	67.8	66 50.2	24 86	66.5	4
25	66 30.6	09 91	75.6	66 27.8	10 90	74.4	66 24.3	12 90	73.1	66 20.3	14 89	71.9	66 15.7	16 89	70.7	66 10.5	18 88	69.4	66 04.7	20 87	68.2	65 58.4	22 87	67.0	25
6	65 36.0	08 91	75.8	65 33.5	09 91	74.6	65 30.3	11 90	73.4	65 26.7	13 90	72.2	65 22.4	15 89	71.0	65 17.6	17 88	69.8	65 12.3	19 88	68.6	65 06.4	21 87	67.5	6
7	64 41.3	07 91	76.0	64 39.1	08 91	74.8	64 36.3	10 90	73.6	64 32.9	12 90	72.5	64 29.1	14 89	71.3	64 24.6	16 88	70.2	64 19.7	17 88	69.0	64 14.2	19 87	67.9	7
8	63 46.6	06 91	76.1	63 44.7	07 91	74.9	63 42.2	09 90	73.8	63 39.1	11 90	72.7	63 35.6	13 89	71.6	63 31.5	14 88	70.5	63 27.0	16 88	69.4	63 21.9	18 87	68.3	8
9	62 51.9	05 91	76.2	62 50.2	06 91	75.1	62 48.0	08 90	74.0	62 45.3	10 90	72.9	62 42.1	12 89	71.8	62 38.4	13 89	70.7	62 34.2	15 88	69.7	62 29.5	17 88	68.6	9
30	61 57.1	04 91	76.3	61 55.7	06 91	75.2	61 53.8	07 90	74.1	61 51.4	09 90	73.1	61 48.5	10 89	72.0	61 45.1	12 89	71.0	61 41.2	14 88	69.9	61 36.9	15 88	68.9	30
1	61 02.3	03 91	76.3	61 01.2	05 91	75.3	60 59.5	06 90	74.3	60 57.4	08 90	73.2	60 54.8	09 90	72.2	60 51.8	11 89	71.2	60 48.2	13 88	70.2	60 44.3	14 88	69.2	1
2	60 07.5	02 91	76.4	60 06.6	04 91	75.4	60 05.2	05 90	74.4	60 03.4	07 90	73.4	60 01.1	08 90	72.4	59 58.4	10 89	71.4	59 55.2	11 89	70.4	59 51.5	13 88	69.4	2
3	59 12.7	02 91	76.4	59 12.1	03 91	75.4	59 10.9	05 90	74.5	59 09.3	06 90	73.5	59 07.3	07 90	72.5	59 04.9	09 89	71.6	59 02.0	10 89	70.6	58 58.7	12 88	69.6	3
4	58 17.9	01 91	76.4	58 17.5	02 91	75.5	58 16.6	04 91	74.5	58 15.3	05 90	73.6	58 13.5	06 90	72.6	58 11.4	08 89	71.7	58 08.8	09 89	70.8	58 05.8	11 88	69.8	4
35	57 23.1	00 91	76.5	57 22.9	01 91	75.5	57 22.2	03 91	74.6	57 21.2	04 90	73.7	57 19.7	06 90	72.7	57 17.8	07 89	71.8	57 15.6	08 89	70.9	57 12.9	10 88	70.0	35
6	56 28.3	01 91	76.4	56 28.3	00 91	75.5	56 27.9	02 91	74.6	56 27.1	03 90	73.7	56 25.9	05 90	72.8	56 24.3	06 89	71.9	56 22.3	07 89	71.0	56 19.9	09 88	70.1	6
7	55 33.5	01 91	76.4	55 33.7	00 91	75.6	55 33.5	01 91	74.7	55 32.9	03 90	73.8	55 32.0	04 90	72.9	55 30.6	05 89	72.0	55 28.9	06 89	71.1	55 26.8	08 88	70.3	7
8	54 38.7	02 91	76.4	54 39.1	01 91	75.5	54 39.1	01 91	74.7	54 38.8	02 90	73.8	54 38.1	03 90	73.0	54 37.0	04 89	72.1	54 35.6	05 89	71.2	54 33.7	07 88	70.4	8
9	53 43.9	03 91	76.4	53 44.5	01 91	75.5	53 44.7	00 91	74.7	53 44.6	01 90	73.8	53 44.2	02 90	73.0	53 43.3	03 89	72.1	53 42.2	05 89	71.3	53 40.6	06 88	70.5	9
40	52 49.1	03 91	76.3	52 49.9	02 91	75.5	52 50.4	01 91	74.7	52 50.5	00 90	73.8	52 50.3	01 90	73.0	52 49.7	02 89	72.2	52 48.8	04 89	71.4	52 47.5	05 89	70.5	40
1	51 54.3	04 91	76.3	51 55.3	02 91	75.5	51 56.0	02 91	74.7	51 56.3	00 90	73.8	51 56.3	01 90	73.0	51 56.0	02 89	72.2	51 55.3	03 89	71.4	51 54.3	04 89	70.6	1
2	50 59.6	05 91	76.2	51 00.8	03 91	75.4	51 01.6	02 91	74.6	51 02.2	01 90	73.8	51 02.4	00 90	73.0	51 02.3	01 89	72.2	51 01.9	02 89	71.4	51 01.1	03 89	70.6	2
3	50 04.8	05 91	76.1	50 06.2	03 91	75.4	50 07.3	03 91	74.6	50 08.0	02 90	73.8	50 08.5	01 90	73.0	50 08.6	00 89	72.2	50 08.4	01 89	71.5	50 07.9	02 89	70.7	3
4	49 10.1	06 91	76.1	49 11.7	04 91	75.3	49 12.9	04 90	74.5	49 13.9	02 90	73.8	49 14.5	02 90	73.0	49 14.9	00 89	72.2	49 15.0	00 89	71.5	49 14.7	02 89	70.7	4
45	48 15.4	06 91	76.0	48 17.1	06 91	75.2	48 18.6	04 90	74.5	48 19.8	03 90	73.7	48 20.6	02 90	73.0	48 21.2	01 89	72.2	48 21.5	00 89	71.5	48 21.5	01 89	70.7	45
6	47 20.7	07 91	75.9	47 22.6	05 91	75.2	47 24.3	05 90	74.4	47 25.6	04 90	73.7	47 26.7	03 90	72.9	47 27.5	02 89	72.2	47 28.0	01 89	71.5	47 28.3	00 89	70.7	6
7	46 26.0	08 91	75.8	46 28.1	06 91	75.1	46 30.0	06 90	74.3	46 31.5	05 90	73.6	46 32.8	04 90	72.9	46 33.8	03 89	72.2	46 34.6	02 89	71.4	46 35.1	01 89	70.7	7
8	45 31.4	08 91	75.7	45 33.7	07 91	75.0	45 35.7	06 90	74.3	45 37.5	05 90	73.6	45 39.0	05 90	72.8	45 40.2	04 89	72.1	45 41.1	03 89	71.4	45 41.8	02 89	70.7	8
9	44 36.7	09 91	75.6	44 39.2	08 91	74.9	44 41.4	07 90	74.2	44 43.4	06 90	73.5	44 45.1	05 90	72.8	44 46.5	04 89	72.1	44 47.7	03 89	71.4	44 48.6	03 89	70.7	9
50	43 42.2	09 91	75.5	43 44.8	08 91	74.8	43 47.2	08 90	74.1	43 49.3	07 90	73.4	43 51.2	06 90	72.7	43 52.9	05 89	72.0	43 54.3	04 89	71.3	43 55.4	03 89	70.6	50
1	42 47.6	10 91	75.4	42 50.4	09 91	74.7	42 53.0	08 90	74.0	42 55.3	07 90	73.3	42 57.4	07 90	72.6	42 59.3	06 89	71.9	43 00.9	05 89	71.3	43 02.2	04 89	70.6	1
2	41 53.1	10 91	75.2	41 56.0	10 90	74.6	41 58.8	09 90	73.9	42 01.3	08 90	73.2	42 03.6	07 90	72.5	42 05.7	06 89	71.9	42 07.5	06 89	71.2	42 09.1	05 89	70.5	2
3	40 58.6	11 91	75.1	41 01.7	10 90	74.4	41 04.7	09 90	73.8	41 07.4	09 90	73.1	41 09.9	08 90	72.5	41 12.1	07 89	71.8	41 14.1	06 89	71.1	41 15.9	06 88	70.5	3
4	40 04.1	11 91	75.0	40 07.4	11 90	74.3	40 10.5	10 90	73.7	40 13.4	09 90	73.0	40 16.1	09 90	72.4	40 18.6	08 89	71.7	40 20.8	07 89	71.1	40 22.8	06 88	70.4	4
55	39 09.7	12 91	74.8	39 13.2	11 90	74.2	39 16.4	11 90	73.5	39 19.5	10 90	72.9	39 22.4	09 90	72.3	39 25.0	08 89	71.6	39 27.5	08 89	71.0	39 29.7	07 88	70.3	55
6	38 15.3	13 91	74.7	38 18.9	12 90	74.0	38 22.4	11 90	73.4	38 25.7	10 90	72.8	38 28.7	10 89	72.1	38 31.6	09 89	71.5	38 34.2	08 89	70.9	38 36.6	08 88	70.2	6
7	37 20.9	13 90	74.5	37 24.7	12 90	73.9	37 28.4	12 90	73.3	37 31.8	11 90	72.7	37 35.1	10 89	72.0	37 38.1	10 89	71.4	37 40.9	09 89	70.8	37 43.6	09 88	70.1	7
8	36 26.6	14 90	74.4	36 30.6	13 90	73.8	36 34.4	12 90	73.1	36 38.0	12 90	72.5	36 41.4	11 89	71.9	36 44.7	10 89	71.3	36 47.7	10 89	70.7	36 50.6	09 88	70.0	8
9	35 32.3	14 90	74.2	35 36.5	14 90	73.6	35 40.5	13 90	73.0	35 44.3	12 90	72.4	35 47.9	12 89	71.8	35 51.3	11 89	71.2	35 54.5	11 88	70.6	35 57.6	10 88	69.9	9
60	34 38.1	15 90	74.1	34 42.4	14 90	73.5	34 46.6	14 90	72.9	34 50.5	13 89	72.3	34 54.3	12 89	71.6	34 58.0	12 89	71.0	35 01.4	11 88	70.4	35 04.7	11 88	69.8	60
1	33 43.9	15 90	73.9	33 48.4	15 90	73.3	33 52.7	14 90	72.7	33 56.9	14 89	72.1	34 00.8	13 89	71.5	34 04.7	13 89	70.9	34 08.3	12 88	70.3	34 11.8	11 88	69.7	1
2	32 49.7	16 90	73.7	32 54.4	15 90	73.1	32 58.9	15 90	72.5	33 03.2	14 89	72.0	33 07.4	14 89	71.4	33 11.4	13 89	70.8	33 15.2	12 88	70.2	33 18.9	12 88	69.6	2
3	31 55.6	16 90	73.5	32 00.5	16 90	73.0	32 05.1	15 90	72.4	32 09.6	15 89	71.8	32 14.0	14 89	71.2	32 18.2	14 89	70.6	32 22.2	13 88	70.0	32 26.1	13 88	69.5	3
4	31 01.6	17 90	73.4	31 06.6	16 90	72.8	31 11.4	16 89	72.2	31 16.1	15 89	71.6	31 20.6	15 89	71.1	31 25.0	14 88	70.5	31 29.2	14 88	69.9	31 33.3	13 88	69.3	4
65	30 07.6	17 90	73.2	30 12.7	17 90	72.6	30 17.8	16 89	72.0	30 22.6	16 89	71.5	30 27.3	15 89	70.9	30 31.9	15 88	70.3	30 36.3	14 88	69.8	30 40.6	14 88	69.2	65
6	29 13.6	18 90	73.0	29 19.0	18 90	72.4	29 24.1	17 89	71.9	29 29.2	17 89	71.3	29 34.1	16 89	70.7	29 38.8	16 88	70.2	29 43.4	15 88	69.6	29 47.9	15 88	69.0	6
7	28 19.7	19 90	72.8	28 25.2	18 89	72.3	28 30.6	18 89	71.7	28 35.8	17 89	71.1	28 40.9	17 89	70.6	28 45.8	16 88	70.0	28 50.6	16 88	69.4	28 55.3	15 88	68.9	7
8	27 25.9	19 90	72.6	27 31.6	19 89	72.1	27 37.1	18 89	71.5	27 42.5	18 89	71.0	27 47.7	17 88	70.4	27 52.9	17 88	69.8	27 57.9	16 88	69.3	28 02.7	16 88	68.7	8
9	26 32.1	20 90	72.4	26 38.0	19 89	71.9	26 43.7	19 89	71.3	26 49.2	18 89	70.8	26 54.7	18 88	70.2	27 00.0	18 88	69.7	27 05.2	17 88	69.1	27 10.2	17 87	68.6	9
70	25 38.4	20 89	72.2	25 44.4	20 89	71.7	25 50.3	19 89	71.1	25 56.0	19 88	70.6	26 01.6	19 88	70.0	26 07.1	18 88	69.5	26 12.5	18 88	68.9	26 17.8	17 87	68.4	70
1	24 44.8	21 89	72.0	24 50.9	20 89	71.5	24 57.0	20 89	70.9	25 02.9	20 88	70.4	25 08.7	19 88	69.8	25 14.4	19 88	69.3	25 19.9	18 88	68.8	25 25.4	18 87	68.2	1
2	23 51.2	21 89	71.8	23 57.5	21 89	71.3	24 03.7	21 89	70.7	24 09.8	20 88	70.2	24 15.8	20 88	69.7	24 21.6	19 88	69.1	24 27.4	19 88	68.6	24 33.0	19 87	68.0	2
3	22 57.6	22 89	71.6	23 04.1	21 89	71.1	23 10.5	21 88	70.5	23 16.8	21 88	70.0	23 22.9	20 88	69.5	23 29.0	20 88	68.9	23 34.9	20 87	68.4	23 40.8	19 87	67.9	3
4	22 04.2	22 89	71.4	22 10.8	22 89	70.8	22 17.4	22 88	70.3	22 23.8	21 88	69.8	22 30.2	21 88	69.3	22 36.4	21 88	68.7	22 42.6	20 87	68.2	22 48.6	20 87	67.7	4
75	21 10.8	23 89	71.1	21 17.6	23 88	70.6	21 24.3	22 88	70.1	21 31.0	22 88	69.6	21 37.5	22 88	69.1	21 43.9	21 87	68.5	21 50.3	21 87	68.0	21 56.5	21 87	67.5	75
6	20 17.5	23 89	70.9	20 24.5	23 88	70.4	20 31.4	23 88	69.9	20 38.2	23 88	69.4	20 44.9	22 88	68.8	20 51.5	22 87	68.3	20 58.0	22 87	67.8	21 04.4	21 86	67.3	6
7	19 24.2	24 89	70.7	19 31.4	24 88	70.2	19 38.5	23 88	69.7	19 45.4	23 88	69.1	19 52.3	23 87	68.6	19 59.1	23 87	68.1	20 05.9	22 87	67.6	20 12.5	22 86	67.1	7
8	18 31.0	25 88	70.5	18 38.4	24 88	69.9	18 45.6	24 88	69.4	18 52.8	24 88	68.9	18 59.9	23 87	68.4	19 06.9	23 87	67.9	19 13.8	23 87	67.4	19 20.6	23 86	66.9	8
9	17 38.0	25 88	70.2	17 45.5	25 88	69.7	17 52.9	25 88	69.2	18 00.2	24 88	68.7	18 07.5	24 87	68.2	18 14.7	24 87	67.7	18 21.8	24 86	67.2	18 28.8	23 86	66.6	9
80	16 44.9	26 88	70.0	16 52.6	25 88	69.5	17 00.2	25 88	69.0	17 07.7	25 87	68.5	17 15.2	25 87	67.9	17 22.6	24 87	67.4	17 29.9	24 86	66.9	17 37.1	24 86	66.4	80
1	15 52.0	26 88	69.7	15 59.9	26 88	69.2	16 07.6	26 88	68.7	16 15.3	26 87	68.2	16 23.0	26 87	67.7	16 30.5	25 86	67.2	16 38.0	25 86	66.7	16 45.4	25 86	66.2	1
2	14 59.2	27 88	69.5	15 07.2	27 88	69.0	15 15.1	26 87	68.5	15 23.0	26 87	68.0	15 30.8	26 87	67.5	15 38.6	26 86	67.0	15 46.3	25 86	66.5	15 53.9	25 86	66.0	2
3	14 06.4	27 88	69.2	14 14.6	27 88	68.7	14 22.7	27 87	68.2	14 30.8	27 87	67.7	14 38.8	27 86	67.2	14 46.8	26 86	66.7	14 54.6	26 86	66.2	15 02.5	26 86	65.7	3
4	13 13.7	28 88	69.0	13 22.1	28 87	68.5	13 30.4	28 87	68.0	13 38.7	27 87	67.5	13 46.9	27 86	67.0	13 55.0	27 86	66.5	14 03.1	27 86	66.0	14 11.1	27 85	65.5	4
85	12 21.2	29 88	68.7	12 29.7	28 87	68.2	12 38.2	28 87	67.7	12 46.6	28 86	67.2	12 55.0	28 86	66.7	13 03.4	28 86	66.2	13 11.6	27 86	65.7	13 19.8	27 85	65.2	85
6	11 28.7	29 87	68.4	11 37.4	29 87	67.9	11 46.1	29 87	67.4	11 54.7	29 86	67.0	12 03.3	29 86	66.5	12 11.8	28 86	66.0	12 20.3	28 85	65.5	12 28.7	28 85	65.0	6
7	10 36.3	30 87	68.1	10 45.2	30 87	67.7	10 54.1	29 86	67.2	11 02.9	29 86	66.7	11 11.6	29 86	66.2	11 20.4	29 86	65.7	11 29.0	29 85	65.2	11 37.7	29 85	64.7	7
8	9 44.0	30 87	67.9	9 53.1	30 87	67.4	10 02.2	30 86	66.9	10 11.2	30 86	66.4	10 20.1	30 86	65.9	10 29.0	30 85	65.4	10 37.9	29 85	65.0	10 46.7	29 85	64.5	8
9	8 51.9	31 87	67.6	9 01.1	31 86	67.1	9 10.4	31 86	66.6	9 19.5	31 86	66.1	9 28.7	30 86	65.7	9 37.8	30 85	65.2	9 46.9	30 85	64.7	9 55.9	30 84	64.2	9
90	7 59.8	32 87	67.3	8 09.2	31 86	66.8	8 18.7	31 86	66.3	8 28.0	31 86	65.9	8 37.4	31 85	65.4	8 46.7	31 85	64.9	8 56.0	31 85	64.4	9 05.2	31 84	63.9	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	46 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	00
1	45 59.4	1.0 03	178.7	45 29.4	1.0 03	178.7	44 59.4	1.0 03	178.7	44 29.4	1.0 03	178.7	43 59.4	1.0 03	178.8	43 29.4	1.0 03	178.8	42 59.4	1.0 03	178.8	42 29.4	1.0 03	178.8	1
2	45 57.4	1.0 05	177.4	45 27.4	1.0 05	177.4	44 57.5	1.0 05	177.4	44 27.5	1.0 05	177.5	43 57.5	1.0 05	177.5	43 27.6	1.0 05	177.5	42 57.6	1.0 05	177.6	42 27.6	1.0 05	177.6	2
3	45 54.2	1.0 08	176.1	45 24.3	1.0 07	176.1	44 54.3	1.0 07	176.2	44 24.4	1.0 07	176.2	43 54.5	1.0 07	176.3	43 24.5	1.0 07	176.3	42 54.6	1.0 07	176.3	42 24.7	1.0 07	176.4	3
4	45 49.7	1.0 10	174.8	45 19.8	1.0 10	174.8	44 49.9	1.0 09	174.9	44 20.1	1.0 09	175.0	43 50.2	1.0 09	175.0	43 20.3	1.0 09	175.1	42 50.4	1.0 09	175.1	42 20.5	1.0 09	175.2	4
05	45 43.9	99 12	173.5	45 14.1	99 12	173.5	44 44.3	99 11	173.6	44 14.5	99 11	173.7	43 44.7	99 11	173.8	43 14.9	99 11	173.9	42 45.1	99 11	173.9	42 15.2	99 11	174.0	05
6	45 36.8	99 14	172.2	45 07.1	99 14	172.3	44 37.4	99 14	172.4	44 07.7	99 13	172.4	43 38.0	99 13	172.5	43 08.2	99 13	172.6	42 38.5	99 13	172.7	42 08.8	99 13	172.8	6
7	45 28.5	99 16	170.9	44 58.9	99 16	171.0	44 29.3	99 16	171.1	43 59.7	99 15	171.2	43 30.0	99 15	171.3	43 00.4	99 15	171.4	42 30.8	99 15	171.5	42 01.1	99 15	171.6	7
8	45 18.9	98 18	169.6	44 49.4	98 18	169.7	44 19.9	98 18	169.8	43 50.4	98 17	170.0	43 20.9	98 17	170.1	42 51.4	98 17	170.2	42 21.9	98 17	170.3	41 52.4	98 16	170.5	8
9	45 08.1	98 20	168.3	44 38.8	98 20	168.5	44 09.4	98 20	168.6	43 40.0	98 19	168.7	43 10.6	98 19	168.9	42 41.3	98 19	169.0	42 11.9	98 19	169.2	41 42.5	98 18	169.3	9
10	44 56.1	97 22	167.1	44 26.9	97 22	167.2	43 57.7	97 22	167.4	43 28.4	97 21	167.5	42 59.2	97 21	167.7	42 29.9	98 21	167.8	42 00.7	98 20	168.0	41 31.4	98 20	168.1	10
1	44 42.8	97 24	165.8	44 13.8	97 24	166.0	43 44.7	97 23	166.2	43 15.7	97 23	166.3	42 46.6	97 23	166.5	42 17.5	97 23	166.7	41 48.4	97 22	166.8	41 19.3	97 22	167.0	1
2	44 28.4	96 26	164.6	43 59.6	96 26	164.8	43 30.7	96 25	164.9	43 01.8	96 25	165.1	42 32.9	96 25	165.3	42 03.9	96 25	165.5	41 35.0	97 24	165.7	41 06.0	97 24	165.8	2
3	44 12.8	96 28	163.3	43 44.2	96 28	163.5	43 15.5	96 27	163.7	42 46.7	96 27	163.9	42 18.0	96 27	164.1	41 49.2	96 26	164.3	41 20.5	96 26	164.5	40 51.7	96 26	164.7	3
4	43 56.1	96 30	162.1	43 27.6	96 29	162.3	42 59.1	96 29	162.6	42 30.6	96 29	162.8	42 02.0	96 28	163.0	41 33.5	96 28	163.2	41 04.9	96 28	163.4	40 36.3	96 27	163.6	4
15	43 38.2	94 32	160.9	43 10.0	94 31	161.2	42 41.7	94 31	161.4	42 13.3	94 30	161.6	41 45.0	95 30	161.8	41 16.6	95 30	162.0	40 48.2	95 30	162.3	40 19.8	95 29	162.5	15
6	43 19.3	93 34	159.8	42 51.2	94 33	160.0	42 23.1	94 33	160.2	41 55.0	94 32	160.5	41 26.9	94 32	160.7	40 58.7	94 31	160.9	40 30.5	94 31	161.2	40 02.3	94 31	161.4	6
7	42 59.2	93 35	158.6	42 31.4	93 35	158.8	42 03.5	93 34	159.1	41 35.6	93 34	159.3	41 07.7	93 34	159.6	40 39.8	93 33	159.8	40 11.8	93 33	160.1	39 43.8	93 32	160.3	7
8	42 38.1	92 37	157.4	42 10.5	92 36	157.7	41 42.9	92 36	158.0	41 15.2	92 36	158.2	40 47.5	92 35	158.5	40 19.8	92 35	158.7	39 52.1	93 34	159.0	39 24.3	93 34	159.2	8
9	42 15.9	91 39	156.3	41 48.6	91 38	156.6	41 21.2	91 38	156.9	40 53.8	91 37	157.1	40 26.4	92 37	157.4	39 58.9	92 36	157.7	39 31.4	92 36	157.9	39 03.8	92 36	158.2	9
20	41 52.8	90 40	155.2	41 25.7	90 40	155.5	40 58.6	90 39	155.8	40 31.4	91 39	156.0	40 04.2	91 38	156.3	39 37.0	91 38	156.6	39 09.7	91 38	156.9	38 42.4	91 37	157.1	20
1	41 28.6	89 42	154.1	41 01.8	89 41	154.4	40 34.9	90 41	154.7	40 08.0	90 40	155.0	39 41.1	90 40	155.3	39 14.1	90 40	155.5	38 47.0	90 39	155.8	38 20.0	90 39	156.1	1
2	41 03.5	88 43	153.0	40 37.0	89 43	153.3	40 10.4	89 43	153.6	39 43.7	89 42	153.9	39 17.0	89 42	154.2	38 50.3	89 41	154.5	38 23.5	89 41	154.8	37 56.7	89 40	155.1	2
3	40 37.5	88 45	151.9	40 11.2	88 44	152.3	39 44.8	88 44	152.6	39 18.5	88 44	152.9	38 52.0	88 43	153.2	38 25.6	88 43	153.5	37 59.0	88 42	153.8	37 32.5	89 42	154.1	3
4	40 10.5	87 46	150.9	39 44.5	87 46	151.2	39 18.4	87 46	151.5	38 52.3	87 45	151.9	38 26.2	87 45	152.2	37 59.9	87 44	152.5	37 33.7	88 44	152.8	37 07.4	88 43	153.1	4
25	39 42.6	86 48	149.9	39 16.9	86 47	150.2	38 51.1	86 47	150.5	38 25.3	86 46	150.9	37 59.4	86 46	151.2	37 33.5	87 45	151.5	37 07.5	87 45	151.8	36 41.4	87 44	152.1	25
6	39 13.9	85 49	148.9	38 48.5	85 49	149.2	38 23.0	85 48	149.5	37 57.4	85 48	149.9	37 31.8	85 47	150.2	37 06.2	86 47	150.5	36 40.4	86 46	150.9	36 14.7	86 46	151.2	6
7	38 44.3	84 51	147.9	38 19.2	84 50	148.2	37 54.0	84 50	148.6	37 28.7	84 49	148.9	37 03.4	85 49	149.2	36 38.0	85 48	149.6	36 12.6	85 48	149.9	35 47.1	85 47	150.2	7
8	38 14.0	83 52	146.9	37 49.1	83 51	147.3	37 24.2	83 51	147.6	36 59.2	83 50	148.0	36 34.2	84 50	148.3	36 09.1	84 50	148.6	35 43.9	84 49	149.0	35 18.7	84 49	149.3	8
9	37 42.8	82 53	146.0	37 18.2	82 53	146.3	36 53.6	82 52	146.7	36 28.9	82 52	147.0	36 04.2	83 51	147.4	35 39.3	83 51	147.7	35 14.5	83 50	148.1	34 49.5	83 50	148.4	9
30	37 10.8	81 54	145.0	36 46.6	81 54	145.4	36 22.2	81 54	145.8	35 57.8	81 53	146.1	35 33.4	82 52	146.5	35 08.9	82 52	146.8	34 44.3	82 52	147.2	34 19.6	82 51	147.5	30
1	36 38.1	80 56	144.1	36 14.2	80 55	144.5	35 50.1	80 55	144.8	35 26.0	80 54	145.2	35 01.9	81 54	145.6	34 37.6	81 53	145.9	34 13.4	81 53	146.3	33 49.0	81 52	146.6	1
2	36 04.7	79 57	143.2	35 41.1	79 56	143.6	35 17.3	79 56	144.0	34 53.5	79 55	144.3	34 29.6	80 55	144.7	34 05.7	80 54	145.1	33 41.7	80 54	145.4	33 17.6	80 53	145.8	2
3	35 30.6	78 58	142.3	35 07.2	78 57	142.7	34 43.8	78 57	143.1	34 20.3	78 56	143.5	33 56.7	79 56	143.8	33 33.1	79 55	144.2	33 09.4	79 55	144.6	32 45.6	79 54	144.9	3
4	34 55.8	77 59	141.5	34 32.7	77 59	141.8	34 09.6	77 58	142.2	33 46.4	77 58	142.6	33 23.1	78 57	143.0	32 59.8	78 57	143.4	32 36.3	78 56	143.7	32 12.9	78 56	144.1	4
35	34 20.3	76 60	140.6	33 57.6	76 60	141.0	33 34.7	76 59	141.4	33 11.8	77 59	141.8	32 48.8	77 58	142.2	32 25.8	77 58	142.5	32 02.7	77 57	142.9	31 39.5	77 57	143.3	35
6	33 44.3	75 61	139.8	33 21.8	75 61	140.2	32 59.2	75 60	140.6	32 36.6	76 60	141.0	32 13.9	76 59	141.4	31 51.2	76 59	141.7	31 28.4	76 58	142.1	31 05.5	76 58	142.5	6
7	33 07.5	74 62	139.0	32 45.4	74 62	139.4	32 23.1	74 61	139.8	32 00.8	75 61	140.2	31 38.4	75 60	140.6	31 16.0	75 60	140.9	30 53.4	75 59	141.3	30 30.8	75 59	141.7	7
8	32 30.2	73 63	138.2	32 08.4	73 63	138.6	31 46.4	73 62	139.0	31 24.4	74 62	139.4	31 02.3	74 61	139.8	30 40.1	74 61	140.2	30 17.9	74 60	140.6	29 55.6	74 60	140.9	8
9	31 52.3	72 64	137.4	31 30.8	72 64	137.8	31 09.1	72 63	138.2	30 47.4	73 63	138.6	30 25.6	73 62	139.0	30 03.7	73 62	139.4	29 41.8	73 61	139.8	29 19.8	73 61	140.2	9
40	31 13.9	71 65	136.6	30 52.6	71 64	137.0	30 31.3	71 64	137.4	30 09.8	72 63	137.9	29 48.3	72 63	138.3	29 26.8	72 62	138.7	29 05.1	72 62	139.1	28 43.4	72 61	139.4	40
1	30 34.9	70 66	135.9	30 13.9	70 65	136.3	29 52.9	70 65	136.7	29 31.7	71 64	137.1	29 10.5	71 64	137.5	28 49.3	71 63	137.9	28 27.9	71 63	138.3	28 06.5	71 62	138.7	1
2	29 55.4	69 67	135.1	29 34.7	69 66	135.6	29 14.0	69 66	136.0	28 53.1	70 65	136.4	28 32.2	70 65	136.8	28 11.2	70 64	137.2	27 50.2	70 64	137.6	27 29.0	71 63	138.0	2
3	29 15.4	68 68	134.4	28 55.0	68 67	134.8	28 34.5	68 67	135.3	28 14.0	69 66	135.7	27 53.3	69 66	136.1	27 32.7	69 65	136.5	27 11.9	69 65	136.9	26 51.0	70 64	137.3	3
4	28 34.9	67 68	133.7	28 14.8	67 68	134.1	27 54.6	67 67	134.6	27 34.3	68 67	135.0	27 14.0	68 66	135.4	26 53.6	68 66	135.8	26 33.1	68 65	136.2	26 12.6	69 65	136.6	4
45	27 53.9	66 69	133.0	27 34.1	66 69	133.5	27 14.2	66 68	133.9	26 54.2	67 68	134.3	26 34.2	67 67	134.7	26 14.1	67 67	135.1	25 53.9	67 66	135.5	25 33.6	68 66	136.0	45
6	27 12.5	65 70	132.4	26 52.9	65 69	132.8	26 33.3	66 69	133.2	26 13.6	66 68	133.6	25 53.9	66 68	134.1	25 34.0	66 67	134.5	25 14.1	66 67	134.9	24 54.2	67 66	135.3	6
7	26 30.6	64 70	131.7	26 11.3	64 70	132.1	25 52.0	65 70	132.6	25 32.6	65 69	133.0	25 13.1	65 69	133.4	24 53.6	65 68	133.8	24 34.0	66 68	134.2	24 14.3	66 67	134.6	7
8	25 48.3	63 71	131.1	25 29.3	63 71	131.5	25 10.3	64 70	131.9	24 51.1	64 70	132.3	24 31.9	64 69	132.8	24 12.7	64 69	133.2	23 53.4	65 68	133.6	23 34.0	65 68	134.0	8
9	25 05.6	62 72	130.4	24 46.9	63 71	130.9	24 28.1	63 71	131.3	24 09.3	63 70	131.7	23 50.3	63 70	132.1	23 31.4	63 70	132.6	23 12.3	64 69	133.0	22 53.2	64 69	133.4	9
50	24 22.4	61 72	129.8	24 04.0	62 72	130.2	23 45.5	62 72	130.7	23 27.0	62 71	131.1	23 08.3	62 71	131.5	22 49.6	62 70	131.9	22 30.9	63 70	132.4	22 12.0	63 69	132.8	50
1	23 38.9	60 73	129.2	23 20.8	61 73	129.6	23 02.6	61 72	130.1	22 44.3	61 72	130.5	22 25.9	61 71	130.9	22 07.5	61 71	131.3	21 49.0	62 70	131.8	21 30.4	62 70	132.2	1
2	22 55.0	59 74	128.6	22 37.2	60 73	129.0	22 19.2	60 73	129.5	22 01.2	60 72	129.9	21 43.1	60 72	130.3	21 25.0	61 71	130.8	21 06.8	61 71	131.2	20 48.5	61 71	131.6	2
3	22 10.8	59 74	128.0	21 53.2	59 74	128.4	21 35.5	59 73	128.9	21 17.8	59 73	129.3	21 00.0	59 73	129.7	20 42.1	60 72	130.2	20 24.1	60 72	130.6	20 06.1	60 71	131.0	3
4	21 26.2	58 75	127.4	21 08.9	58 74	127.9	20 51.4	58 74	128.3	20 34.0	58 74	128.7	20 16.4	59 73	129.2	19 58.8	59 73	129.6	19 41.2	59 72	130.0	19 23.4	59 72	130.5	4
55	20 41.3	57 76	126.9	20 24.2	57 75	127.3	20 07.0	57 74	127.8	19 49.8	58 74	128.2	19 32.5	58 74	128.6	19 15.2	58 73	129.1	18 57.8	58 73	129.5	18 40.4	58 72	129.9	55
6	19 56.0	56 76	126.3	19 39.2	56 75	126.8	19 22.3	56 75	127.2	19 05.3	57 75	127.6	18 48.3	57 74	128.1	18 31.3	57 74	128.5	18 14.1	57 73	128.9	17 56.9	57 73	129.4	6
7	19 10.4	55 76	125.8	18 53.9	55 76	126.2	18 37.2	56 76	126.7	18 20.5	56 75	127.1	18 03.8	56 75	127.5	17 47.0	56 74	128.0	17 30.1	56 74	128.4	17 13.2	56 73	128.8	7
8	18 24.5	54 77	125.3	18 08.2	54 76	125.7	17 51.9	55 76	126.1	17 35.4	55 76	126.6	17 18.9	55 75	127.0	17 02.4	55 75	127.5	16 45.8	55 74	127.9	16 29.1	56 74	128.3	8
9	17 38.4	53 78	124.7	17 22.3	54 77	125.2	17 06.2	54 77	125.6	16 50.0	54 76	126.1	16 33.8	54 76	126.5	16 17.5	54 75	126.9	16 01.1	55 75	127.4	15 44.7	55 75	127.8	9
60	16 51.9	53 78	124.2	16 36.1	53 77	124.7	16 20.2	53 77	125.1	16 04.3	53 77	125.6	15 48.3	53 76	126.0	15 32.3	53 76	126.4	15 16.2	54 75	126.9	15 00.0	54 75	127.3	60
1	16 05.1	52 78	123.7	15 49.6	52 78	124.2	15 33.9	52 78	124.6	15 18.3	52 77	125.1	15 02.5	53 77	125.5	14 46.8	53 76	126.0	14 30.9	53 76	126.4	14 15.1	53 75	126.9	1
2	15 18.1	51 79	123.3	15 02.8	51 78	123.7	14 47.4	51 78	124.1	14 32.0	52 78	124.6	14 16.5	52 77	125.0	14 01.0	52 77	125.5	13 45.4	52 76	125.9	13 29.8	52 76	126.4	2
3	14 30.8	50 79	122.8	14 15.8	50 79	123.2	14 00.6	51 78	123.7	13 45.4	51 78	124.1	13 30.2	51 78	124.6	13 14.9	51 77	125.0	12 59.6	51 77	125.4	12 44.2	51 76	125.9	3
4	13 43.3	49 80	122.3	13 28.5	50 79	122.8	13 13.6	50 79	123.2	12 58.6	50 78	123.6	12 43.6	50 78	124.1	12 28.6	50 78	124.5	12 13.5	50 77	125.0	11 58.4	50 77	125.4	4
65	12 55.5	49 80	121.8	12 40.9	49 80	122.3	12 26.3	49 79	122.7	12 11.6	49 79	123.2	11 56.8	49 78	123.6	11 42.0	49 78	124.1	11 27.2	49 78	124.5	11 12.3	50 77	125.0	65
6	12 07.5	48 80	121.4	11 53.1	48 80	121.8	11 38.7	48 80	122.3	11 24.3	48 79	122.7	11 09.8	48 79	123.2	10 55.2	48 78	123.6	10 40.6	49 78	124.1	10 26.0	49 78	124.5	6
7	11 19.3	47 81	121.0	11 05.1	47 80	121.4	10 50.9	47 80	121.8	10 36.7	47 80	122.3	10 22.5	48 79	122.7	10 08.1	48 79	123.2	9 53.8	48 78	123.6	9 39.4	48 78	124.1	7
8	10 30.8	46 81	120.5	10 16.9	47 81	121.0	10 02.9	47 80	121.4	9 48.9	47 80	121.9	9 34.9	47 80	122.3	9 20.8	47 79	122.8	9 06.8	47 79	123.2	8 52.6	47 78	123.7	8
9	9 42.1	46 82	120.1	9 28.4	46 81	120.5	9 14.7	46 81	121.0	9 00.9	46 80	121.4	8 47.2	46 80	121.9	8 33.3	46 79	122.3	8 19.5	46 79	122.8	8 05.6	46 79	123.2	9
70	8 53.3	45 82	119.7	8 39.8	45 81	120.1	8 26.3	45 81	120.6	8 12.7	45 81	121.0	7 59.2	45 80	121.5	7 45.6	45 80	121.9	7 32.0	45 80	122.4	7 18.3	45 79	122.8	70
1	8 04.2	44 82	119.3	7 50.9	44 82	119.7	7 37.6	44 81	120.2	7 24.3	44 81	120.6	7 11.0	45 81	121.1	6 57.6	45 80	121.5	6 44.2	45 80	122.0	6 30.8	45 80	122.4	1
2	7 14.9	43 82	118.9	7 01.8	44 82	119.3	6 48.8	44 82	119.8	6 35.7	44 81	120.2	6 22.6	44 81	120.7	6 09.5	44 81	121.1	5 56.3	44 80	121.6	5 43.1	44 80	122.0	2
3	6 25.4	43 83	118.5	6 12.6	43 82	118.9	5 59.7	43 82	119.4	5 46.9	43 81	119.8	5 34.0	43 81	120.3	5 21.1	43 81	120.8	5 08.2	43 80	121.2				3
4	5 35.7	42 83	118.1	5 23.1	42 83	118.5	5 10.5	42 82	119.0																4

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
91	7 07.8	32 86	67.0	7 17.5	32 86	66.5	7 27.1	32 86	66.0	7 36.6	32 85	65.6	7 46.2	32 85	65.1	7 55.7	32 85	64.6	8 05.2	32 84	64.1	8 14.6	31 84	63.7	91
2	6 16.0	33 86	66.7	6 25.8	33 86	66.2	6 35.6	33 86	65.8	6 45.4	33 85	65.3	6 55.1	32 85	64.8	7 04.8	32 85	64.3	7 14.5	32 84	63.8	7 24.1	32 84	63.4	2
3	5 24.3	33 86	66.4	5 34.3	33 86	65.9	5 44.3	33 85	65.5	5 54.2	33 85	65.0	6 04.2	33 85	64.5	6 14.1	33 85	64.0	6 23.9	33 84	63.6	6 33.8	33 84	63.1	3
4										5 03.2	34 85	64.7	5 13.3	34 85	64.2	5 23.4	34 85	63.7	5 33.5	34 84	63.3	5 43.6	34 84	62.8	4

Lat. 20°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	82 00.0	1.0 05	00.0	81 30.0	1.0 05	00.0	81 00.0	1.0 04	00.0	80 00.0	1.0 04	00.0	78 00.0	1.0 03	00.0	76 00.0	1.0 03	00.0	75 30.0	1.0 03	00.0	74 30.0	1.0 03	00.0	00
1	81 56.9	99 15	06.3	81 27.1	99 15	05.9	80 57.3	99 14	05.6	79 57.6	1.0 12	05.0	77 58.0	1.0 10	04.1	75 58.3	1.0 08	03.4	75 28.4	1.0 08	03.3	74 28.5	1.0 08	03.0	1
2	81 47.7	97 25	12.5	81 18.4	98 24	11.7	80 49.1	98 22	11.0	79 50.3	98 20	09.9	77 52.0	99 16	08.1	75 53.3	99 14	06.8	75 23.5	99 13	06.5	74 24.0	99 12	06.1	2
3	81 32.7	94 34	18.3	81 04.3	95 32	17.2	80 35.8	95 30	16.3	79 38.3	96 27	14.6	77 42.2	97 23	12.0	75 45.0	98 19	10.2	75 15.5	98 18	09.8	74 16.6	98 17	09.0	3
4	81 12.4	90 42	23.8	80 45.2	91 40	22.4	80 17.6	92 38	21.2	79 21.9	93 34	19.1	77 28.6	95 28	15.8	75 33.4	96 24	13.4	75 04.5	97 24	12.9	74 06.3	97 22	12.0	4
05	80 47.4	86 48	28.7	80 21.5	87 46	27.2	79 55.1	88 44	25.8	79 01.5	90 40	23.4	77 11.5	93 34	19.5	75 18.9	95 29	16.6	74 50.4	95 28	15.9	73 53.3	96 26	14.8	05
6	80 18.4	81 54	33.2	79 53.8	83 52	31.6	79 28.7	84 50	30.0	78 37.4	87 46	27.3	76 51.1	90 39	22.9	75 01.4	92 34	19.6	74 33.5	93 33	18.9	73 37.5	94 30	17.6	6
7	79 45.8	76 59	37.3	79 22.6	78 57	35.5	78 58.8	80 55	33.9	78 09.9	83 51	31.0	76 27.6	87 44	26.2	74 41.1	90 38	22.5	74 14.0	91 37	21.7	73 19.3	92 35	20.2	7
8	79 10.3	72 64	40.8	78 48.4	74 61	39.1	78 26.0	76 59	37.4	77 39.5	79 55	34.3	76 01.4	84 48	29.2	74 18.3	88 42	25.2	73 51.9	88 41	24.4	72 58.6	89 38	22.8	8
9	78 32.2	67 67	44.0	78 11.7	70 65	42.2	77 50.5	72 63	40.5	77 06.4	75 59	37.4	75 32.6	81 52	32.1	73 53.1	85 46	27.9	73 27.5	86 44	26.9	72 35.7	87 42	25.2	9
10	77 52.0	63 70	46.8	77 32.8	65 68	45.0	77 12.8	68 66	43.3	76 31.1	71 62	40.2	75 01.5	78 55	34.7	73 25.7	82 49	30.3	73 00.9	83 48	29.3	72 10.6	85 45	27.5	10
1	77 10.1	59 72	49.3	76 52.0	61 71	47.6	76 33.2	64 69	45.9	75 53.8	68 65	42.7	74 28.4	74 58	37.2	72 56.2	79 52	32.6	72 32.3	80 51	31.6	71 43.6	82 48	29.7	1
2	76 26.6	55 75	51.5	76 09.6	58 73	49.8	75 52.0	60 71	48.1	75 14.7	64 68	45.0	73 53.4	71 61	39.5	72 24.9	76 55	34.8	72 01.9	77 54	33.7	71 14.8	79 51	31.8	2
3	75 41.8	52 76	53.5	75 25.9	54 75	51.8	75 09.3	56 73	50.2	74 34.1	61 70	47.1	73 16.8	68 64	41.5	71 51.9	73 58	36.8	71 29.7	75 56	35.7	70 44.3	77 53	33.7	3
4	74 56.0	49 78	55.3	74 41.1	51 77	53.6	74 25.4	53 75	52.0	73 52.2	57 72	48.9	72 38.7	65 66	43.5	71 17.4	71 60	38.7	70 56.1	72 59	37.6	70 12.3	74 56	35.6	4
15	74 09.2	45 79	56.8	73 55.2	48 78	55.2	73 40.5	50 76	53.6	73 09.1	54 74	50.7	71 59.3	62 68	45.2	70 41.5	68 62	40.5	70 21.0	69 61	39.4	69 38.8	71 58	37.3	15
6	73 21.6	43 80	58.2	73 08.5	45 79	56.6	72 54.7	47 78	55.1	72 25.0	51 75	52.2	71 18.7	59 69	46.8	70 04.3	65 64	42.1	69 44.6	66 63	41.0	69 04.0	69 60	38.9	6
7	72 33.4	40 81	59.4	72 21.1	42 80	57.9	72 08.0	45 79	56.5	71 40.1	49 76	53.6	70 37.1	56 71	48.3	69 25.9	62 66	43.6	69 07.0	64 64	42.5	68 28.0	66 62	40.4	7
8	71 44.6	38 82	60.6	71 33.0	40 81	59.1	71 20.7	42 80	57.7	70 54.3	46 78	54.9	69 54.5	53 72	49.7	68 46.5	60 67	45.0	68 28.4	61 66	43.9	67 50.9	64 64	41.9	8
9	70 55.2	35 83	61.6	70 44.3	37 82	60.1	70 32.8	40 81	58.8	70 07.8	44 78	56.0	69 11.1	51 74	51.0	68 06.2	57 69	46.4	67 48.8	59 68	45.3	67 12.8	61 65	43.2	9
20	70 05.4	33 84	62.5	69 55.2	35 83	61.1	69 44.3	37 82	59.7	69 20.8	41 79	57.1	68 26.9	48 75	52.1	67 24.9	55 70	47.6	67 08.3	56 69	46.5	66 33.7	59 66	44.4	20
1	69 15.2	31 84	63.3	69 05.6	33 83	62.0	68 55.4	35 82	60.6	68 33.2	39 80	58.1	67 42.1	46 76	53.2	66 42.9	52 71	48.7	66 27.0	54 70	47.7	65 53.9	57 68	45.6	1
2	68 24.7	29 85	64.0	68 15.7	31 84	62.7	68 06.1	33 83	61.5	67 45.1	37 81	59.0	66 56.6	44 77	54.2	66 00.2	50 72	49.8	65 45.0	52 71	48.7	65 13.2	54 69	46.7	2
3	67 33.9	27 85	64.7	67 25.4	29 84	63.4	67 16.4	31 83	62.2	66 56.6	35 81	59.8	66 10.6	42 78	55.1	65 16.8	48 73	50.8	65 02.3	49 72	49.7	64 31.8	52 70	47.7	3
4	66 42.8	26 86	65.3	66 34.8	27 85	64.1	66 26.3	29 84	62.9	66 07.7	33 82	60.5	65 24.1	40 78	56.0	64 32.9	46 74	51.7	64 18.9	47 73	50.7	63 49.8	50 71	48.7	4
25	65 51.5	24 86	65.8	65 44.0	26 85	64.6	65 36.0	28 84	63.5	65 18.4	31 82	61.2	64 37.2	38 79	56.7	63 48.4	44 75	52.5	63 35.1	45 74	51.5	63 07.2	48 72	49.6	25
6	64 59.9	22 86	66.3	64 52.9	24 85	65.2	64 45.4	26 85	64.0	64 28.9	29 83	61.8	63 49.9	36 80	57.5	63 03.4	42 76	53.3	62 50.7	43 75	52.3	62 24.0	46 73	50.4	6
7	64 08.2	21 86	66.8	64 01.7	23 86	65.6	63 54.6	24 85	64.5	63 39.1	28 84	62.4	63 02.1	34 80	58.1	62 17.9	40 76	54.1	62 05.8	41 76	53.1	61 40.3	44 74	51.2	7
8	63 16.3	19 87	67.2	63 10.2	21 86	66.1	63 03.6	23 85	65.0	62 49.0	26 84	62.9	62 14.1	32 80	58.7	61 32.1	38 77	54.7	61 20.5	39 76	53.8	60 56.2	42 74	51.9	8
9	62 24.3	18 87	67.5	62 18.6	20 86	66.5	62 12.4	21 86	65.4	61 58.7	24 84	63.3	61 25.8	30 81	59.3	60 45.9	36 78	55.4	60 34.9	37 77	54.4	60 11.6	40 75	52.6	9
30	61 32.1	17 87	67.9	61 26.8	18 87	66.8	61 21.1	20 86	65.8	61 08.2	23 84	63.8	60 37.2	29 81	59.8	59 59.3	34 78	56.0	59 48.8	36 77	55.0	59 26.7	38 75	53.2	30
1	60 39.8	16 87	68.2	60 34.9	17 87	67.1	60 29.6	19 86	66.1	60 17.6	21 85	64.2	59 48.3	27 82	60.3	59 12.4	33 79	56.5	59 02.5	34 78	55.6	58 41.4	36 76	53.8	1
2	59 47.4	14 87	68.4	59 42.9	16 87	67.4	59 38.0	17 86	66.5	59 26.8	20 85	64.5	58 58.3	26 82	60.7	58 25.3	31 79	57.0	58 15.8	32 78	56.1	57 55.7	35 77	54.3	2
3	58 55.0	13 88	68.7	58 50.8	15 87	67.7	58 46.2	16 86	66.7	58 35.8	19 85	64.9	58 10.0	24 83	61.1	57 37.8	29 79	57.5	57 28.8	31 79	56.6	57 09.7	33 77	54.9	3
4	58 02.4	12 88	68.9	57 58.6	13 87	67.9	57 54.4	15 87	67.0	57 44.7	18 85	65.1	57 20.5	23 83	61.5	56 50.2	28 80	57.9	56 41.6	29 79	57.1	56 23.5	31 77	55.3	4
35	57 09.8	11 88	69.1	57 06.3	12 87	68.1	57 02.4	14 87	67.2	56 53.5	16 86	65.4	56 30.9	21 83	61.8	56 02.3	26 80	58.3	55 54.2	27 79	57.5	55 37.0	30 78	55.8	35
6	56 17.1	10 88	69.2	56 13.9	11 87	68.3	56 10.4	12 87	67.4	56 02.1	15 86	65.7	55 41.1	20 83	62.2	55 14.2	25 80	58.7	55 06.6	26 80	57.9	54 50.3	28 78	56.2	6
7	55 24.4	09 88	69.4	55 21.5	10 88	68.5	55 18.3	11 87	67.6	55 10.7	14 86	65.9	54 51.2	19 84	62.4	54 25.9	23 81	59.1	54 18.7	25 80	58.2	54 03.3	27 78	56.6	7
8	54 31.6	08 88	69.5	54 29.0	09 88	68.6	54 26.1	10 87	67.8	54 19.2	13 86	66.1	54 01.1	17 84	62.7	53 37.5	22 81	59.4	53 30.7	23 80	58.6	53 16.2	25 79	56.9	8
9	53 38.7	07 88	69.6	53 36.5	08 88	68.8	53 33.9	09 87	67.9	53 27.6	12 86	66.3	53 11.0	16 84	62.9	52 48.9	21 81	59.7	52 42.5	22 81	58.9	52 28.8	24 79	57.3	9
40	52 45.9	06 88	69.7	52 43.9	07 88	68.9	52 41.6	08 87	68.1	52 36.0	10 86	66.4	52 20.7	15 84	63.2	52 00.1	19 81	60.0	51 54.2	20 81	59.2	51 41.3	22 80	57.6	40
1	51 53.0	05 88	69.8	51 51.3	06 88	69.0	51 49.3	07 87	68.2	51 44.3	09 86	66.6	51 30.4	14 84	63.4	51 11.3	18 82	60.2	51 05.7	19 81	59.4	50 53.6	21 80	57.9	1
2	51 00.1	04 88	69.9	50 58.7	05 88	69.1	50 56.9	06 87	68.3	50 52.5	08 86	66.7	50 39.9	13 84	63.5	50 22.3	17 82	60.4	50 17.1	18 81	59.7	50 05.8	20 80	58.1	2
3	50 07.1	03 88	69.9	50 06.0	04 88	69.1	50 04.6	05 87	68.3	50 00.7	07 86	66.8	49 49.4	11 84	63.7	49 33.2	16 82	60.6	49 28.4	17 81	59.9	49 17.9	19 80	58.4	3
4	49 14.2	02 88	69.9	49 13.3	03 88	69.2	49 12.1	04 87	68.4	49 08.9	06 86	66.9	48 58.8	10 84	63.8	48 44.0	14 82	60.8	48 39.6	15 82	60.1	48 29.8	17 80	58.6	4
45	48 21.2	02 88	70.0	48 20.6	02 88	69.2	48 19.7	03 87	68.5	48 17.0	05 86	67.0	48 08.2	09 84	64.0	47 54.7	13 82	61.0	47 50.7	14 82	60.3	47 41.6	16 80	58.8	45
6	47 28.2	01 88	70.0	47 27.9	02 88	69.2	47 27.2	03 87	68.5	47 25.1	04 87	67.0	47 17.5	08 85	64.1	47 05.4	12 82	61.2	47 01.7	13 82	60.4	46 53.4	15 81	59.0	6
7	46 35.2	00 88	70.0	46 35.1	01 88	69.3	46 34.8	02 87	68.5	46 33.2	04 87	67.1	46 26.8	07 85	64.2	46 16.0	11 83	61.3	46 12.6	12 82	60.6	46 05.0	14 81	59.1	7
8	45 42.3	01 88	70.0	45 42.4	00 88	69.3	45 42.3	01 87	68.5	45 41.3	03 87	67.1	45 36.0	06 85	64.3	45 26.5	10 83	61.4	45 23.5	11 82	60.7	45 16.6	12 81	59.3	8
9	44 49.3	02 88	70.0	44 49.7	01 88	69.3	44 49.8	00 87	68.6	44 49.3	02 87	67.1	44 45.2	05 85	64.3	44 37.0	09 83	61.5	44 34.3	09 82	60.8	44 28.1	11 81	59.4	9
50	43 56.3	03 88	69.9	43 57.0	02 88	69.2	43 57.4	01 87	68.5	43 57.4	01 87	67.2	43 54.4	04 85	64.4	43 47.4	07 83	61.6	43 45.0	08 82	60.9	43 39.5	10 81	59.5	50
1	43 03.4	03 88	69.9	43 04.3	02 88	69.2	43 04.9	02 87	68.5	43 05.4	00 87	67.2	43 03.5	03 85	64.4	42 57.8	06 83	61.7	42 55.7	07 82	61.0	42 50.9	09 81	59.6	1
2	42 10.4	04 88	69.9	42 11.5	03 88	69.2	42 12.4	03 87	68.5	42 13.5	01 87	67.2	42 12.7	02 85	64.5	42 08.1	05 83	61.8	42 06.4	06 82	61.1	42 02.2	08 81	59.7	2
3	41 17.5	05 88	69.8	41 18.9	04 88	69.1	41 20.0	03 87	68.5	41 21.5	02 87	67.1	41 21.8	01 85	64.5	41 18.4	04 83	61.8	41 17.0	05 82	61.1	41 13.5	07 81	59.8	3
4	40 24.6	06 88	69.7	40 26.2	05 88	69.1	40 27.5	04 87	68.4	40 29.6	03 87	67.1	40 30.9	00 85	64.5	40 28.7	03 83	61.9	40 27.6	04 82	61.2	40 24.7	05 81	59.9	4
55	39 31.7	06 88	69.7	39 33.5	06 88	69.0	39 35.1	05 87	68.4	39 37.6	03 87	67.1	39 40.0	01 85	64.5	39 39.0	02 83	61.9	39 38.2	03 82	61.2	39 35.9	04 81	59.9	55
6	38 38.9	07 88	69.6	38 40.9	06 88	69.0	38 42.7	06 87	68.3	38 45.7	04 87	67.0	38 49.2	01 85	64.5	38 49.3	01 83	61.9	38 48.8	02 82	61.3	38 47.1	03 81	60.0	6
7	37 46.0	08 88	69.5	37 48.3	07 88	68.9	37 50.3	06 87	68.2	37 53.8	05 87	67.0	37 58.3	02 85	64.4	37 59.5	00 83	61.9	37 59.3	01 82	61.3	37 58.3	02 81	60.0	7
8	36 53.2	09 88	69.4	36 55.7	08 88	68.8	36 58.0	07 87	68.2	37 01.9	06 87	66.9	37 07.4	03 85	64.4	37 09.8	01 83	61.9	37 09.9	00 82	61.3	37 09.5	01 81	60.0	8
9	36 00.5	09 88	69.3	36 03.1	09 88	68.7	36 05.6	08 87	68.1	36 10.0	07 86	66.9	36 16.6	04 85	64.4	36 20.0	02 83	61.9	36 20.4	01 82	61.3	36 20.6	00 81	60.0	9
60	35 07.7	10 88	69.2	35 10.6	09 87	68.6	35 13.3	09 87	68.0	35 18.2	08 86	66.8	35 25.7	05 85	64.3	35 30.3	03 83	61.9	35 31.0	02 82	61.3	35 31.8	01 81	60.0	60
1	34 15.0	11 88	69.1	34 18.2	10 87	68.5	34 21.1	10 87	67.9	34 26.4	08 86	66.7	34 34.9	06 85	64.3	34 40.6	03 83	61.8	34 41.5	03 82	61.2	34 42.9	02 81	60.0	1
2	33 22.4	11 88	69.0	33 25.7	11 87	68.4	33 28.9	10 87	67.8	33 34.7	09 86	66.6	33 44.2	07 85	64.2	33 50.9	04 83	61.8	33 52.1	04 82	61.2	33 54.1	03 81	60.0	2
3	32 29.8	12 88	68.9	32 33.3	11 87	68.3	32 36.7	11 87	67.7	32 42.9	10 86	66.5	32 53.4	08 85	64.1	33 01.2	05 83	61.8	33 02.7	05 82	61.2	33 05.3	04 81	60.0	3
4	31 37.2	13 88	68.7	31 41.0	12 87	68.2	31 44.5	12 87	67.6	31 51.2	11 86	66.4	32 02.7	08 85	64.1	32 11.5	06 83	61.7	32 13.3	06 82	61.1	32 16.5	05 81	59.9	4
65	30 44.7	14 88	68.6	30 48.6	13 87	68.0	30 52.4	12 87	67.4	30 59.6	11 86	66.3	31 12.0	09 84	64.0	31 21.9	07 83	61.6	31 24.0	07 82	61.1	31 27.7	06 81	59.9	65
6	29 52.2	14 87	68.5	29 56.4	14 87	67.9	30 00.4	13 87	67.3	30 08.0	12 86	66.2	30 21.4	10 84	63.9	30 32.3	08 83	61.6	30 34.7	08 82	61.0	30 38.9	07 81	59.8	6
7	28 59.8	15 87	68.3	29 04.2	14 87	67.8	29 08.4	14 87	67.2	29 16.4	13 86	66.0	29 30.8	11 84	63.8	29 42.8	09 83	61.5	29 45.4	08 82	60.9	29 50.2	07 81	59.8	7
8	28 07.4	15 87	68.2	28 12.0	15 87	67.6	28 16.5	15 86	67.0	28 24.9	14 86	65.9	28 40.2	12 84	63.7	28 53.2	10 82	61.4	28 56.1	09 82	60.8	29 01.5	08 81	59.7	8
9	27 15.1	16 87	68.0	27 19.9	16 87	67.5	27 24.6	15 86	66.9	27 33.5	14 86	65.8	27 49.7	13 84	63.5	28 03.8	11 82	61.3	28 06.9	10 82	60.7	28 12.9	09 81	59.6	9
70	26 22.9	17 87	67.8	26 27.9	16 87	67.3	26 32.7	16 86	66.7	26 42.1	15 86	65.6	26 59.3	13 84	63.4	27 14.3	12 82	61.2	27 17.8	11 82	60.6	27 24.2	10 81	59.5	70
1	25 30.7	18 87	67.7	25 35.9	17 87	67.1	25 41.0	17 86	66.6	25 50.8	16 86	65.5	26 08.9	14 84	63.3	26 25.0	13 82	61.1	26 28.7	12 82	60.5	26 35.7	11 81	59.4	1
2	24 38.6	18 87	67.5	24 44.0	18 87	67.0	24 49.3	17 86	66.4	24 59.5	17 85	65.3	25 18.5	15 84	63.1	25 35.6	13 82	61.0	25 39.6	13 82	60.4	25 47.2	12 81	59.3	2
3	23 46.5	19 87	67.3	23 52.1	19 86	66.8	23 57.6	18 86	66.2	24 08.3	17 85	65.2	24 28.3	16 84	63.0	24 46.4	14 82	60.8	24 50.6	14 82	60.3	24 58.7	13 81	59.2	3
4	22 54.5	20 86	67.1	23 00.3	19 86	66.6	23 06.1	19 86	66.1	23 17.2	18 85	65.0	23 38.1	17 84	62.9	23 57.2	15 82	60.7	24 01.7	15 82	60.2	24 10.3	14 81	59.1	4
75	22 02.6	20 86	66.9	22 08.6	20 86	66.4	22 14.6	20 86	65.9	22 26.1	19 85	64.8	22 47.9	18 83	62.7	23 08.1	16 82	60.6	23 12.8	16 81	60.0	23 22.0	15 81	58.9	75
6	21 10.8	21 86	66.7	21 17.0	21 86	66.2	21 23.1	20 86	65.7	21 35.1	20 85	64.6	21 57.9	18 83	62.5	22 19.0	17 82	60.4	22 24.0	17 81	59.9	22 33.7	16 80	58.8	6
7	20 19.0	22 86	66.5	20 25.4	21 86	66.0	20 31.8	21 85	65.5	20 44.2	20 85	64.5	21 07.9	19 83	62.4	21 30.0	18 82	60.3	21 35.3	17 81	59.7	21 45.5	17 80	58.7	7
8	19 27.3	22 86	66.3	19 34.0	22 86	65.8	19 40.5	22 85	65.3	19 53.4	21 85	64.3	20 18.0	20 83	62.2	20 41.1	19 81	60.1	20 46.6	18 81	59.6	20 57.4	18 80	58.5	8
9	18 35.7	23 86	66.1	18 42.6	23 86	65.6	18 49.3	22 85	65.1	19 02.6	22 84	64.1	19 28.1	21 83	62.0	19 52.3	19 81	59.9	19 58.1	19 81	59.4	20 09.4	19 80	58.4	9
80	17 44.2	24 86	65.9	17 51.3	23 85	65.4	17 58.2	23 85	64.9	18 12.0	23 84	63.9	18 38.4	21 83	61.8	19 03.5	20 81	59.7	19 09.6	20 81	59.2	19 21.4	19 80	58.2	80
1	16 52.8	24 86	65.7	17 00.0	24 85	65.2	17 07.2	24 85	64.7	17 21.4	23 84	63.7	17 48.8	22 83	61.6	18 14.9	21 81	59.6	18 21.2	21 81	59.0	18 33.6	20 80	58.0	1
2	16 01.4	25 85	65.5	16 08.9	25 85	65.0	16 16.3	25 85	64.5	16 30.9	24 84	63.4	16 59.2	23 83	61.4	17 26.3	22 81	59.4	17 32.9	22 80	58.9	17 45.8	21 80	57.8	2
3	15 10.2	26 85	65.2	15 17.9	26 85	64.7	15 25.5	25 85	64.2	15 40.5	25 84	63.2	16 09.7	24 82	61.2	16 37.8	23 81	59.2	16 44.7	23 80	58.7	16 58.1	22 79	57.7	3
4	14 19.1	26 85	65.0	14 26.9	26 85	64.5	14 34.8	26 84	64.0	14 50.2	26 84	63.0	15 20.4	25 82	61.0	15 49.5	24 81	59.0	15 56.5	24 80	58.5	16 10.5	23 79	57.5	4
85	13 28.0	27 85	64.8	13 36.1	27 85	64.3	13 44.1	27 84	63.8	14 00.1	26 83	62.8	14 31.1	25 82	60.8	15 01.2	25 80	58.8	15 08.5	24 80	58.3	15 23.0	24 79	57.3	85
6	12 37.1	28 85	64.5	12 45.4	28 84	64.0	12 53.6	27 84	63.5	13 10.0	27 83	62.5	13 42.0	26 82	60.5	14 13.0	25 80	58.6	14 20.6	25 80	58.1	14 35.7	25 79	57.1	6
7	11 46.2	28 84	64.2	11 54.8	28 84	63.8	12 03.2	28 84	63.3	12 20.0	28 83	62.3	12 52.9	27 82	60.3	13 25.0	26 80	58.3	13 32.9	26 80	57.8	13 48.4	26 79	56.8	7
8	10 55.5	29 84	64.0	11 04.2	29 84	63.5	11 12.9	29 84	63.0	11 30.2	29 83	62.0	12 04.0	28 81	60.1	12 37.1	27 80	58.1	12 45.2	27 79	57.6	13 01.3	27 79	56.6	8
9	10 04.9	30 84	63.7	10 13.8	30 84	63.2	10 22.7	30 83	62.8	10 40.4	29 83	61.8	11 15.2	29 81	59.8	11 49.2	28 79	57.9	11 57.6	28 79	57.4	12 14.2	28 78	56.4	9
90	9 14.4	31 84	63.5	9 23.6	30 84	63.0	9 32.7	30 83	62.5	9 50.8	30 83	61.5	10 26.5	29 81	59.6	11 01.6	29 79	57.6	11 10.2	29 79	57.1	11 27.3	28 78	56.2	90

Lat. 20°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	42 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	40 00.0	1.0 01	180.0	38 00.0	1.0 01	180.0	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	34 30.0	1.0 01	180.0	00
1	41 59.4	1.0 03	178.8	41 29.4	1.0 03	178.8	40 59.4	1.0 03	178.9	39 59.4	1.0 03	178.9	37 59.4	1.0 03	178.9	35 59.5	1.0 02	179.0	35 29.5	1.0 02	179.0	34 29.5	1.0 02	179.0	1
2	41 57.7	1.0 05	177.6	41 27.7	1.0 05	177.7	40 57.7	1.0 05	177.7	39 57.8	1.0 05	177.7	37 57.9	1.0 05	177.8	35 58.0	1.0 04	178.0	35 28.0	1.0 04	178.0	34 28.1	1.0 04	178.0	2
3	41 54.7	1.0 07	176.4	41 24.8	1.0 07	176.5	40 54.9	1.0 07	176.5	39 55.0	1.0 06	176.6	37 55.2	1.0 06	176.8	35 55.5	1.0 06	176.9	35 25.5	1.0 06	177.0	34 25.6	1.0 06	177.0	3
4	41 50.7	1.0 09	175.3	41 20.8	1.0 09	175.3	40 50.9	1.0 08	175.4	39 51.1	1.0 08	175.5	37 51.5	1.0 08	175.7	35 51.9	1.0 07	175.9	35 22.0	1.0 07	176.0	34 22.2	1.0 07	176.1	4
05	41 45.4	99 11	174.1	41 15.6	99 10	174.2	40 45.8	99 10	174.2	39 46.1	99 10	174.4	37 46.8	99 10	174.6	35 47.4	99 09	174.9	35 17.6	1.0 09	175.0	34 17.9	1.0 09	175.1	05
6	41 39.0	99 13	172.9	41 09.3	99 12	173.0	40 39.5	99 12	173.1	39 40.0	99 12	173.2	37 41.0	99 11	173.6	35 41.9	99 11	173.9	35 12.1	99 11	173.9	34 12.5	99 10	174.1	6
7	41 31.5	99 14	171.7	41 01.8	99 14	171.8	40 32.2	99 14	171.9	39 32.9	99 14	172.1	37 34.2	99 13	172.5	35 35.4	99 12	172.9	35 05.7	99 12	172.9	34 06.3	99 12	173.1	7
8	41 22.8	98 16	170.6	40 53.3	98 16	170.7	40 23.7	99 16	170.8	39 24.6	99 16	171.0	37 26 3	99 15	171.5	35 27.9	99 14	171.9	34 58.3	99 14	172.0	33 59.0	99 13	172.1	8
9	41 13.0	98 18	169.4	40 43.6	98 18	169.5	40 14.2	98 18	169.7	39 15.3	98 17	169.9	37 17.4	98 16	170.4	35 19.4	98 16	170.9	34 49.9	98 15	171.0	33 50.9	98 15	171.2	9
10	41 02.1	98 20	168.3	40 32.8	98 20	168.4	40 03.5	98 20	168.6	39 04.9	98 19	168.8	37 07.5	98 18	169.4	35 10.0	98 17	169.9	34 40.6	98 17	170.0	33 41.7	98 17	170.2	10
1	40 50.1	97 22	167.1	40 21.0	97 22	167.3	39 51.8	97 21	167.4	38 53.4	97 21	167.7	36 56.6	97 20	168.3	34 59.6	98 19	168.9	34 30.3	98 19	169.0	33 31.7	98 18	169.3	1
2	40 37.0	97 24	166.0	40 08.0	97 23	166.2	39 39.0	97 23	166.3	38 40.9	97 22	166.7	36 44.7	97 21	167.3	34 48.2	97 20	167.9	34 19.1	97 20	168.0	33 20.7	97 20	168.3	2
3	40 22.9	96 25	164.9	39 54.0	96 25	165.1	39 25.2	96 25	165.2	38 27.4	96 24	165.6	36 31.8	96 23	166.3	34 35.9	97 22	166.9	34 06.9	97 22	167.1	33 08.9	97 21	167.4	3
4	40 07.6	95 27	163.8	39 39.0	96 27	164.0	39 10.3	96 26	164.2	38 12.9	96 26	164.5	36 17.9	96 25	165.3	34 22.7	96 24	165.9	33 53.8	96 23	166.1	32 56.1	96 23	166.4	4
15	39 51.4	95 29	162.7	39 22.9	95 28	162.9	38 54.4	95 28	163.1	37 57.4	95 27	163.5	36 03.1	95 26	164.2	34 08.5	96 25	165.0	33 39.8	96 25	165.2	32 42.4	96 24	165.5	15
6	39 34.1	94 30	161.6	39 05.8	94 30	161.8	38 37.5	94 30	162.0	37 40.9	94 29	162.4	35 47.3	95 28	163.3	33 53.4	95 27	164.0	33 24.9	95 26	164.2	32 27.8	95 26	164.6	6
7	39 15.8	93 32	160.5	38 47.7	94 32	160.8	38 19.6	94 31	161.0	37 23.4	94 31	161.4	35 30.6	94 29	162.3	33 37.5	94 28	163.1	33 09.1	94 28	163.3	32 12.4	95 27	163.7	7
8	38 56.5	93 34	159.5	38 28.6	93 33	159.7	38 00.8	93 33	159.9	37 04.9	93 32	160.4	35 13.0	93 31	161.3	33 20.6	92 29	162.1	32 52.5	94 29	162.3	31 56.1	94 28	162.8	8
9	38 36.2	92 35	158.4	38 08.6	92 35	158.7	37 40.9	92 35	158.9	36 45.5	92 34	159.4	34 54.4	93 32	160.3	33 02.9	93 31	161.2	32 34.9	93 30	161.4	31 39.0	93 30	161.9	9
20	38 15.0	91 37	157.4	37 47.6	91 36	157.6	37 20.2	91 36	157.9	36 25.2	92 35	158.4	34 35.0	92 34	159.4	32 44.3	92 32	160.3	32 16.6	92 32	160.5	31 21.0	93 31	161.0	20
1	37 52.9	90 38	156.4	37 25.7	91 38	156.6	36 58.5	91 38	156.9	36 04.0	91 37	157.4	34 14.7	91 35	158.4	32 24.9	92 34	159.4	31 57.4	92 33	159.6	31 02.2	92 33	160.1	1
2	37 29.8	90 40	155.4	37 02.9	90 39	155.6	36 36.0	90 39	155.9	35 42.0	90 38	156.5	33 53.5	91 37	157.5	32 04.6	91 35	158.5	31 37.3	91 35	158.7	30 42.6	91 34	159.2	2
3	37 05.9	89 41	154.4	36 39.2	89 41	154.7	36 12.5	89 40	154.9	35 19.0	89 40	155.5	33 31.5	90 38	156.6	31 43.6	90 36	157.6	31 16.5	90 36	157.9	30 22.2	91 35	158.4	3
4	36 41.0	88 43	153.4	36 14.6	88 42	153.7	35 48.2	88 42	154.0	34 55.2	88 41	154.6	33 08.7	89 39	155.7	31 21.7	89 38	156.7	30 54.8	90 37	157.0	30 01.1	90 37	157.5	4
25	36 15.4	87 44	152.4	35 49.2	87 44	152.7	35 23.0	87 43	153.0	34 30.6	88 42	153.6	32 45.1	88 41	154.8	30 59.0	89 39	155.9	30 32.4	89 39	156.1	29 39.1	89 38	156.7	25
6	35 48.9	86 46	151.5	35 23.0	86 45	151.8	34 57.1	86 45	152.1	34 05.1	87 44	152.7	32 20.7	87 42	153.9	30 35.6	88 40	155.0	30 09.2	88 40	155.3	29 16.4	88 39	155.8	6
7	35 21.5	85 47	150.6	34 56.0	85 46	150.9	34 30.3	86 46	151.2	33 38.9	86 45	151.8	31 55.5	86 43	153.0	30 11.4	87 41	154.2	29 45.3	87 41	154.5	28 53.0	87 40	155.0	7
8	34 53.4	84 48	149.6	34 28.1	85 48	150.0	34 02.8	85 47	150.3	33 11.9	85 46	150.9	31 29.5	86 45	152.2	29 46.5	86 43	153.4	29 20.7	86 42	153.7	28 28.8	86 41	154.2	8
9	34 24.6	83 49	148.7	33 59.5	84 49	149.1	33 34.4	84 48	149.4	32 44.1	84 48	150.1	31 02.8	85 46	151.3	29 20.9	85 44	152.5	28 55.3	85 43	152.8	28 04.0	86 43	153.4	9
30	33 54.9	82 51	147.9	33 30.2	83 50	148.2	33 05.4	83 50	148.5	32 15.6	83 49	149.2	30 35.4	84 47	150.5	28 54.5	84 45	151.7	28 29.2	84 45	152.0	27 38.4	85 44	152.6	30
1	33 24.6	81 52	147.0	33 00.1	82 51	147.3	32 35.6	82 51	147.7	31 46.4	82 50	148.4	30 07.3	83 48	149.7	28 27.5	83 46	150.9	28 02.4	84 46	151.3	27 12.1	84 45	151.9	1
2	32 53.5	81 53	146.1	32 29.3	81 52	146.5	32 05.1	81 52	146.8	31 16.4	81 51	147.5	29 38.5	82 49	148.9	27 59.8	83 47	150.2	27 35.0	83 47	150.5	26 45.2	83 46	151.1	2
3	32 21.8	80 54	145.3	31 57.9	80 54	145.7	31 33.9	80 53	146.0	30 45.8	80 52	146.7	29 09.0	81 50	148.1	27 31.4	82 48	149.4	27 06.9	82 48	149.7	26 17.7	82 47	150.4	3
4	31 49.3	79 55	144.5	31 25.7	79 55	144.8	31 02.1	79 54	145.2	30 14.5	79 53	145.9	28 38.9	80 51	147.3	27 02.3	81 49	148.6	26 38.1	81 49	149.0	25 49.5	81 48	149.6	4
35	31 16.2	78 56	143.7	30 52.9	78 56	144.0	30 29.5	78 55	144.4	29 42.6	78 54	145.1	28 08.1	79 52	146.5	26 32.7	80 50	147.9	26 08.7	80 50	148.2	25 20.6	80 49	148.9	35
6	30 42.5	77 57	142.9	30 19.5	77 57	143.2	29 56.4	77 56	143.6	29 10.1	77 55	144.3	27 36.7	78 53	145.8	26 02.4	79 51	147.2	25 38.7	79 51	147.5	24 51.2	79 50	148.2	6
7	30 08.2	76 58	142.1	29 45.4	76 58	142.5	29 22.7	76 57	142.8	28 36.9	76 56	143.6	27 04.6	77 54	145.0	25 31.5	78 52	146.4	25 08.1	78 52	146.8	24 21.2	78 51	147.5	7
8	29 33.2	75 59	141.3	29 10.8	75 59	141.7	28 48.3	75 58	142.1	28 03.1	76 57	142.8	26 32.0	76 55	144.3	25 00.1	77 53	145.7	24 37.0	77 53	146.1	23 50.6	77 52	146.8	8
9	28 57.7	74 60	140.6	28 35.6	74 60	141.0	28 13.4	74 59	141.3	27 28.8	75 58	142.1	25 58.8	75 56	143.6	24 28.0	76 54	145.0	24 05.2	76 54	145.4	23 19.4	77 53	146.1	9
40	28 21.6	73 61	139.8	27 59.8	73 61	140.2	27 37.9	73 60	140.6	26 53.8	74 59	141.4	25 25.0	74 57	142.9	23 55.4	75 55	144.3	23 32.9	75 55	144.7	22 47.7	76 54	145.4	40
1	27 45.0	72 62	139.1	27 23.4	72 61	139.5	27 01.8	72 61	139.9	26 18.4	73 60	140.7	24 50.8	73 58	142.2	23 22.3	74 56	143.7	23 00.0	74 56	144.0	22 15.4	75 55	144.8	1
2	27 07.8	71 63	138.4	26 46.6	71 62	138.8	26 25.2	71 62	139.2	25 42.4	72 61	140.0	24 16.0	72 60	141.5	22 48.6	73 57	143.0	22 26.7	73 56	143.4	21 42.6	74 55	144.1	2
3	26 30.1	70 64	137.7	26 09.2	70 63	138.1	25 48.1	70 63	138.5	25 05.9	71 62	139.3	23 40.6	71 60	140.8	22 14.4	72 58	142.3	21 52.8	72 57	142.7	21 09.3	73 56	143.5	3
4	25 52.0	69 64	137.0	25 31.3	69 64	137.4	25 10.5	69 64	137.8	24 28.8	70 63	138.6	23 04.7	70 60	140.2	21 39.8	71 59	141.7	21 18.4	71 58	142.1	20 35.5	72 57	142.8	4
45	25 13.3	68 65	136.4	24 52.9	68 65	136.8	24 32.4	68 64	137.2	23 51.3	69 63	138.0	22 28.4	69 61	139.5	21 04.6	70 60	141.1	20 43.5	70 59	141.5	20 01.2	71 58	142.2	45
6	24 34.1	67 66	135.7	24 14.0	67 65	136.1	23 53.9	67 65	136.5	23 13.3	68 64	137.3	21 51.6	69 62	138.9	20 28.9	69 60	140.5	20 08.1	69 60	140.8	19 26.4	70 59	141.6	6
7	23 54.5	66 67	135.1	23 34.7	66 66	135.5	23 14.8	66 66	135.9	22 34.9	67 65	136.7	21 14.3	68 63	138.3	19 52.8	68 61	139.9	19 32.3	68 60	140.2	18 51.1	69 59	141.0	7
8	23 14.5	65 67	134.4	22 55.0	65 67	134.8	22 35.4	65 66	135.3	21 56.0	66 65	136.1	20 36.5	67 64	137.7	19 16.2	67 62	139.3	18 56.0	67 61	139.6	18 15.4	68 60	140.4	8
9	22 34.0	64 68	133.8	22 14.8	64 68	134.2	21 55.5	64 67	134.6	21 16.7	65 66	135.5	19 58.4	66 64	137.1	18 39.2	66 62	138.7	18 19.3	67 62	139.1	17 39.3	67 61	139.8	9
50	21 53.1	63 69	133.2	21 34.2	63 69	133.6	21 15.1	64 68	134.0	20 36.9	64 67	134.9	19 19.8	65 65	136.5	18 01.8	65 63	138.1	17 42.1	66 62	138.5	17 02.7	66 62	139.3	50
1	21 11.8	62 70	132.6	20 53.1	62 69	133.0	20 34.4	63 69	133.4	19 56.7	63 67	134.3	18 40.7	64 66	135.9	17 23.9	64 64	137.5	17 04.6	65 63	137.9	16 25.7	65 62	138.7	1
2	20 30.1	61 70	132.0	20 11.7	61 70	132.4	19 53.3	62 69	132.9	19 16.2	62 68	133.7	18 01.3	63 66	135.4	16 45.6	63 64	137.0	16 26.6	64 64	137.4	15 48.4	64 63	138.2	2
3	19 48.1	60 71	131.5	19 29.9	61 70	131.9	19 11.8	61 70	132.3	18 35.2	61 69	133.1	17 21.5	62 67	134.8	16 07.0	62 65	136.4	15 48.2	63 64	136.8	15 10.6	63 64	137.6	3
4	19 05.6	59 71	130.9	18 47.8	60 71	131.3	18 29.9	60 70	131.7	17 53.9	60 69	132.6	16 41.3	61 68	134.3	15 27.9	61 66	135.9	15 09.5	62 65	136.3	14 32.4	62 64	137.1	4
55	18 22.8	58 72	130.3	18 05.3	59 71	130.8	17 47.6	59 71	131.2	17 12.2	59 70	132.0	16 00.7	60 68	133.7	14 48.5	61 66	135.4	14 30.3	61 66	135.8	13 53.8	61 65	136.6	55
6	17 39.7	58 72	129.8	17 22.4	58 72	130.2	17 05.0	58 72	130.7	16 30.2	58 71	131.5	15 19.8	59 69	133.2	14 08.7	60 67	134.9	13 50.8	60 66	135.3	13 14.9	60 65	136.1	6
7	16 56.2	57 73	129.3	16 39.2	57 73	129.7	16 22.1	57 72	130.1	15 47.8	57 71	131.0	14 38.5	58 69	132.7	13 28.6	59 67	134.4	13 11.0	59 67	134.8	12 35.7	59 66	135.6	7
8	16 12.4	56 74	128.8	15 55.6	56 73	129.2	15 38.8	56 73	129.6	15 05.0	56 72	130.5	13 56.9	57 70	132.2	12 48.1	58 68	133.9	12 30.8	58 68	134.3	11 56.0	58 66	135.1	8
9	15 28.3	55 74	128.3	15 11.8	55 74	128.7	14 55.2	55 73	129.1	14 22.0	56 72	130.0	13 15.0	56 70	131.7	12 07.3	57 69	133.4	11 50.2	57 68	133.8	11 16.1	57 67	134.6	9
60	14 43.9	54 74	127.8	14 27.6	54 74	128.2	14 11.3	54 74	128.6	13 38.6	55 73	129.5	12 32.7	55 71	131.2	11 26.1	56 69	132.9	11 09.4	56 69	133.3	10 35.8	56 68	134.2	60
1	13 59.1	53 75	127.3	13 43.2	53 75	127.7	13 27.1	53 74	128.1	12 55.0	54 73	129.0	11 50.1	54 71	130.7	10 44.7	55 70	132.4	10 28.2	55 69	132.9	9 55.2	55 68	133.7	1
2	13 14.1	52 75	126.8	12 58.4	52 75	127.2	12 42.7	53 75	127.7	12 11.0	53 74	128.5	11 07.3	53 72	130.3	10 02.9	54 70	132.0	9 46.7	54 69	132.4	9 14.3	54 69	133.3	2
3	12 28.8	51 76	126.3	12 13.4	52 75	126.8	11 57.9	52 75	127.2	11 26.8	52 74	128.1	10 24.1	52 72	129.8	9 20.8	53 71	131.5	9 05.0	53 70	132.0	8 33.1	53 69	132.8	3
4	11 43.3	51 76	125.9	11 28.1	51 76	126.3	11 12.8	51 76	126.7	10 42.2	51 75	127.6	9 40.6	52 73	129.4	8 38.5	52 71	131.1	8 22.9	52 71	131.5	7 51.6	52 70	132.4	4
65	10 57.4	50 77	125.4	10 42.5	50 76	125.8	10 27.5	50 76	126.3	9 57.4	50 75	127.2	8 56.9	51 73	128.9	7 55.9	51 71	130.7	7 40.5	51 71	131.1	7 09.8	51 70	132.0	65
6	10 11.4	49 77	125.0	9 56.7	49 77	125.4	9 41.9	49 76	125.8	9 12.4	49 75	126.7	8 12.9	50 74	128.5	7 13.0	50 72	130.2	6 57.9	50 71	130.7	6 27.7	50 70	131.5	6
7	9 25.0	48 78	124.5	9 10.6	48 77	125.0	8 56.1	48 77	125.4	8 27.1	49 76	126.3	7 28.6	49 74	128.1	6 29.8	49 72	129.8	6 15.0	49 72	130.3	5 45.4	49 71	131.1	7
8	8 38.5	47 78	124.1	8 24.3	47 78	124.5	8 10.0	47 77	125.0	7 41.5	48 76	125.9	6 44.1	48 75	127.7	5 46.3	48 73	129.4	5 31.9	48 72	129.9	5 02.8	48 71	130.7	8
9	7 51.7	46 78	123.7	7 37.7	46 78	124.1	7 23.7	47 78	124.6	6 55.7	47 77	125.5	5 59.4	47 75	127.2	5 02.7	47 73	129.0							9
70	7 04.6	46 79	123.3	6 50.9	46 78	123.7	6 37.2	46 78	124.2	6 09.7	46 77	125.1	5 14.4	46 75	126.8										70
1	6 17.4	45 79	122.9	6 03.9	45 79	123.3	5 50.4	45 78	123.8	5 23.4	45 77	124.7													1
2	5 29.9	44 80	122.5	5 16.7	44 79	122.9	5 03.5	44 79	123.4																2

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	8 24.0	31 84	63.2	8 33.4	31 83	62.7	8 42.7	31 83	62.2	9 01.3	31 82	61.2	9 38.0	30 81	59.3	10 14.0	30 79	57.4	10 22.9	29 79	56.9	10 40.6	29 78	55.9	91
2	7 33.8	32 84	62.9	7 43.4	32 83	62.4	7 52.9	32 83	61.9	8 11.9	32 82	61.0	8 49.6	31 81	59.1	9 26.6	31 79	57.1	9 35.7	31 78	56.6	9 53.9	30 78	55.7	2
3	6 43.6	33 83	62.6	6 53.4	33 83	62.1	7 03.2	33 83	61.7	7 22.7	32 82	60.7	8 01.3	32 80	58.8	8 39.3	31 79	56.9	8 48.7	31 78	56.4	9 07.4	31 77	55.4	3
4	5 53.7	33 83	62.3	6 03.7	33 83	61.8	6 13.7	33 82	61.4	6 33.6	33 82	60.4	7 13.1	33 80	58.5	7 52.2	32 78	56.6	8 01.8	32 78	56.1	8 21.1	32 77	55.2	4
95	5 03.8	34 83	62.0	5 14.0	34 83	61.5	5 24.3	34 82	61.1	5 44.6	34 82	60.1	6 25.1	34 80	58.2	7 05.2	33 78	56.3	7 15.1	33 78	55.9	7 34.9	33 77	54.9	95
6													5 37.2	34 80	57.9	6 18.3	34 78	56.0	6 28.5	34 77	55.6	6 48.8	34 76	54.6	6
7																5 31.6	35 78	55.8	5 42.1	35 77	55.3	6 02.9	35 76	54.3	7
8																						5 17.2	36 76	54.1	8

Lat. 20°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	74 00.0	1.0 02	00.0	73 00.0	1.0 02	00.0	71 30.0	1.0 02	00.0	70 00.0	1.0 02	00.0	68 00.0	1.0 02	00.0	67 30.0	1.0 02	00.0	67 00.0	1.0 02	00.0	65 00.0	1.0 01	00.0	00
1	73 58.6	1.0 07	02.9	72 58.7	1.0 07	02.7	71 28.8	1.0 06	02.5	69 58.9	1.0 06	02.2	67 59.0	1.0 05	02.0	67 29.1	1.0 05	01.9	66 59.1	1.0 05	01.9	64 59.2	1.0 04	01.7	1
2	73 54.2	99 12	05.8	72 54.6	99 11	05.4	71 25.2	99 10	04.9	69 55.6	1.0 09	04.5	67 56.1	1.0 08	04.0	67 26.2	1.0 08	03.8	66 56.3	1.0 08	03.7	64 56.7	1.0 07	03.3	2
3	73 47.1	98 17	08.7	72 48.0	99 15	08.1	71 19.1	99 14	07.3	69 50.1	99 13	06.7	67 51.2	99 11	05.9	67 21.5	99 11	05.8	66 51.7	99 11	05.6	64 52.6	99 09	05.0	3
4	73 37.2	97 21	11.5	72 38.7	98 20	10.8	71 10.8	98 18	09.7	69 42.5	98 16	08.9	67 44.5	98 15	07.9	67 14.9	99 14	07.6	66 45.3	99 14	07.4	64 46.9	99 12	06.6	4
05	73 24.6	96 25	14.3	72 26.9	96 24	13.3	71 00.1	97 22	12.1	69 32.8	97 20	11.0	67 35.8	98 18	09.8	67 06.5	98 17	09.5	66 37.2	98 17	09.2	64 39.6	98 15	08.3	05
6	73 09.4	94 30	17.0	72 12.7	96 28	15.9	70 47.1	96 25	14.4	69 21.0	96 23	13.1	67 25.3	97 21	11.7	66 56.3	97 20	11.3	66 27.2	97 19	11.0	64 30.7	97 18	09.9	6
7	72 51.7	92 33	19.5	71 56.2	93 31	18.3	70 32.1	94 29	16.6	69 07.2	96 26	15.2	67 13.0	96 23	13.5	66 44.3	96 23	13.2	66 15.6	96 22	12.8	64 28.2	96 20	11.5	7
8	72 31.7	90 37	22.0	71 37.4	91 35	20.6	70 14.9	92 32	18.8	68 51.5	93 29	17.2	66 59.0	94 26	15.3	66 30.7	94 26	14.9	66 02.3	95 25	14.5	64 08.2	95 22	13.0	8
9	72 09.4	88 41	24.4	71 16.4	89 38	22.9	69 55.8	90 35	20.9	68 33.9	92 32	19.1	66 43.2	93 29	17.1	66 15.3	93 28	16.6	65 47.4	93 27	16.2	63 54.8	94 25	14.6	9
10	71 45.1	85 44	26.7	70 53.5	87 41	25.1	69 34.7	88 38	22.9	68 14.5	90 35	21.0	66 25.8	91 32	18.8	65 58.4	92 31	18.3	65 30.9	92 30	17.8	63 39.9	93 27	16.1	10
1	71 18.9	83 47	28.8	70 28.7	84 44	27.1	69 11.9	86 41	24.9	67 53.4	88 38	22.9	66 06.8	90 34	20.5	65 39.9	90 33	20.0	65 12.8	90 32	19.4	63 23.6	92 30	17.5	1
2	70 50.9	80 50	30.8	70 02.1	82 47	29.1	68 47.3	84 44	26.7	67 30.7	86 40	24.6	65 46.4	88 37	22.1	65 19.9	88 36	21.5	64 53.3	89 35	21.0	63 05.9	90 32	19.0	2
3	70 21.1	78 52	32.8	69 33.9	80 50	31.0	68 21.2	82 46	28.5	67 06.5	84 43	26.3	65 24.4	86 39	23.7	64 58.5	87 38	23.1	64 32.4	87 37	22.5	62 47.0	89 34	20.4	3
4	69 49.9	75 55	34.6	69 04.2	77 52	32.7	67 53.5	80 48	30.2	66 40.8	82 45	27.9	65 01.1	84 41	25.2	64 35.7	85 40	24.6	64 10.2	85 39	24.0	62 26.7	87 36	21.7	4
15	69 17.2	73 57	36.3	68 33.0	75 54	34.4	67 24.5	77 51	31.8	66 13.7	80 47	29.5	64 36.4	82 43	26.6	64 11.6	83 42	26.0	63 46.7	83 41	25.4	62 05.3	85 38	23.0	15
6	68 43.1	70 59	37.9	68 00.4	72 56	36.0	66 54.1	75 53	33.4	65 45.4	78 49	30.9	64 10.5	80 45	28.0	63 46.3	81 44	27.4	63 21.9	82 43	26.7	61 42.7	84 40	24.3	6
7	68 07.9	68 61	39.4	67 26.7	70 58	37.5	66 22.5	73 55	34.8	65 15.8	75 51	32.4	63 43.4	78 47	29.4	63 19.8	79 46	28.7	62 56.0	80 45	28.0	61 18.9	82 41	25.5	7
8	67 31.6	65 62	40.8	66 51.8	67 60	38.9	65 49.8	71 57	36.2	64 45.0	73 53	33.7	63 15.2	76 49	30.7	62 52.2	77 48	30.0	62 28.9	78 47	29.3	60 54.1	80 43	26.7	8
9	66 54.2	63 64	42.2	66 15.9	65 62	40.2	65 15.9	68 58	37.5	64 13.2	71 55	35.0	62 45.9	74 51	31.9	62 23.5	75 50	31.2	62 00.8	76 49	30.5	60 28.3	78 45	27.8	9
20	66 15.9	60 65	43.4	65 39.0	63 63	41.5	64 41.1	66 60	38.8	63 40.4	69 56	36.2	62 15.6	72 52	33.1	61 53.8	73 51	32.4	61 31.7	74 50	31.6	60 01.4	77 46	28.9	20
1	65 36.7	58 67	44.6	65 01.2	60 64	42.7	64 05.4	64 61	39.9	63 06.6	67 58	37.4	61 44.3	70 54	34.2	61 23.1	71 53	33.5	61 01.7	72 52	32.8	59 33.7	75 48	30.0	1
2	64 56.7	56 68	45.7	64 22.6	58 66	43.8	63 28.8	62 62	41.0	62 32.0	65 59	38.5	61 12.2	68 55	35.3	60 51.6	69 54	34.6	60 30.7	70 53	33.8	59 05.1	73 49	31.0	2
3	64 16.0	53 69	46.7	63 43.2	56 67	44.8	62 51.4	59 64	42.1	61 56.5	62 61	39.5	60 39.2	66 56	36.3	60 19.2	67 55	35.6	59 58.9	68 54	34.8	58 35.6	71 50	32.0	3
4	63 34.6	51 70	47.7	63 03.2	54 68	45.8	62 13.2	57 65	43.1	61 20.2	60 62	40.5	60 05.4	64 58	37.3	59 46.0	65 57	36.6	59 26.3	66 56	35.8	58 05.3	69 52	33.0	4
25	62 52.7	49 71	48.6	62 22.4	52 69	46.7	61 34.4	55 66	44.0	60 43.3	58 63	41.5	59 30.9	62 59	38.2	59 12.1	63 58	37.5	58 53.0	64 57	36.7	57 34.2	67 53	33.9	25
6	62 10.1	47 72	49.4	61 41.1	50 70	47.6	60 54.9	53 67	44.9	60 05.6	56 64	42.3	58 55.6	60 60	39.1	58 37.4	61 59	38.4	58 18.9	62 58	37.6	57 02.5	65 54	34.7	6
7	61 27.0	45 73	50.2	60 59.2	48 71	48.4	60 14.8	51 68	45.7	59 27.3	54 65	43.2	58 19.7	58 61	40.0	58 02.1	59 60	39.2	57 44.2	60 59	38.5	56 30.0	63 55	35.6	7
8	60 43.4	43 73	51.0	60 16.8	46 72	49.1	59 34.2	49 69	46.5	58 48.5	52 66	44.0	57 43.2	56 62	40.8	57 26.1	57 61	40.0	57 08.8	58 60	39.3	55 56.9	62 56	36.4	8
9	59 59.4	41 74	51.6	59 33.9	44 72	49.8	58 53.0	47 69	47.2	58 09.0	50 66	44.7	57 06.0	54 63	41.6	56 49.6	55 62	40.8	56 32.8	56 61	40.0	55 23.2	60 57	37.1	9
30	59 15.0	39 75	52.3	58 50.6	42 73	50.5	58 11.4	45 70	47.9	57 29.1	49 67	45.4	56 28.4	53 64	42.3	56 12.5	54 63	41.5	55 56.3	54 62	40.8	54 48.8	58 58	37.8	30
1	58 30.2	38 75	52.9	58 06.9	40 74	51.1	57 29.3	44 71	48.6	56 48.7	47 68	46.1	55 50.2	51 64	43.0	55 34.8	52 64	42.2	55 19.2	53 63	41.5	54 14.0	56 59	38.5	1
2	57 45.1	36 76	53.5	57 22.8	38 74	51.7	56 46.8	42 71	49.2	56 07.8	45 69	46.8	55 11.5	49 65	43.6	54 56.7	50 64	42.9	54 41.6	51 63	42.1	53 38.6	54 60	39.2	2
3	56 59.6	34 76	54.0	56 38.4	37 75	52.3	56 04.0	40 72	49.8	55 26.6	43 70	47.4	54 32.4	47 66	44.2	54 18.1	48 65	43.5	54 03.6	49 64	42.7	53 02.7	52 61	39.8	3
4	56 13.9	33 77	54.5	55 53.6	35 75	52.8	55 20.7	38 73	50.3	54 44.9	41 70	47.9	53 52.9	45 67	44.8	53 39.1	46 66	44.1	53 25.1	47 65	43.3	52 26.4	51 61	40.4	4
35	55 27.9	31 77	54.9	55 08.6	33 76	53.3	54 37.2	37 73	50.8	54 02.9	40 71	48.5	53 12.9	44 67	45.4	52 59.7	45 66	44.6	52 46.2	45 65	43.9	51 49.6	49 62	41.0	35
6	54 41.6	29 77	55.4	54 23.3	32 76	53.7	53 53.3	35 74	51.3	53 20.5	38 71	49.0	52 32.6	42 68	45.9	52 19.9	43 67	45.2	52 06.9	44 66	44.4	51 12.4	47 63	41.6	6
7	53 55.1	28 78	55.8	53 37.7	30 76	54.1	53 09.2	33 74	51.8	52 37.9	36 72	49.4	51 51.9	40 68	46.4	51 39.8	41 68	45.7	51 27.3	42 67	44.9	50 34.8	45 63	42.1	7
8	53 08.4	26 78	56.1	52 51.9	29 77	54.5	52 24.8	32 75	52.2	51 54.9	35 72	49.9	51 10.9	38 69	46.9	50 59.3	39 68	46.1	50 47.3	40 67	45.4	49 56.8	44 64	42.6	8
9	52 21.5	25 79	56.5	52 05.9	27 77	54.9	51 40.1	30 75	52.6	51 11.6	33 73	50.3	50 29.6	37 69	47.3	50 18.4	38 69	46.6	50 07.0	39 68	45.9	49 18.5	42 64	43.0	9
40	51 34.4	24 79	56.8	51 19.6	26 77	55.2	50 55.2	29 75	52.9	50 28.1	32 73	50.7	49 48.1	35 70	47.7	49 37.3	36 69	47.0	49 26.4	37 68	46.3	48 39.9	40 65	43.5	40
1	50 47.1	22 79	57.1	50 33.2	24 78	55.6	50 10.1	27 75	53.3	49 44.4	30 73	51.0	49 06.2	34 70	48.1	48 56.0	35 70	47.4	48 45.5	35 69	46.7	48 00.9	39 65	43.9	1
2	49 59.7	21 79	57.4	49 46.6	23 78	55.8	49 24.8	26 76	53.6	49 00.5	28 74	51.4	48 24.1	32 71	48.5	48 14.3	33 70	47.8	48 04.3	34 69	47.1	47 21.7	37 66	44.3	2
3	49 12.2	19 79	57.6	48 59.9	21 78	56.1	48 39.4	24 76	53.9	48 16.3	27 74	51.7	47 41.7	31 71	48.9	47 32.4	31 70	48.1	47 22.9	32 70	47.4	46 42.1	36 66	44.7	3
4	48 24.5	18 80	57.8	48 13.0	20 78	56.4	47 53.7	23 76	54.2	47 32.0	26 74	52.0	46 59.2	29 71	49.2	46 50.3	30 70	48.5	46 41.2	31 70	47.8	46 02.4	34 67	45.0	4
45	47 36.7	17 80	58.1	47 26.0	19 79	56.6	47 07.9	21 76	54.4	46 47.4	24 74	52.3	46 16.4	28 71	49.5	46 08.0	28 71	48.8	45 59.4	29 70	48.1	45 22.4	32 67	45.4	45
6	46 48.8	16 80	58.3	46 38.9	17 79	56.8	46 22.0	20 77	54.7	46 02.7	23 75	52.6	45 33.5	26 72	49.8	45 25.5	27 71	49.1	45 17.3	28 70	48.4	44 42.1	31 67	45.7	6
7	46 00.8	14 80	58.4	45 51.7	16 79	57.0	45 35.9	19 77	54.9	45 17.9	21 75	52.8	44 50.3	25 72	50.0	44 42.8	26 71	49.4	44 35.1	26 71	48.7	44 01.7	29 68	46.0	7
8	45 12.8	13 80	58.6	45 04.3	15 79	57.2	44 49.8	17 77	55.1	44 32.9	20 75	53.0	44 07.0	23 72	50.3	44 00.0	24 72	49.6	43 52.6	25 71	48.9	43 21.0	28 68	46.3	8
9	44 24.6	12 80	58.7	44 16.9	14 79	57.3	44 03.5	16 77	55.3	43 47.8	19 75	53.2	43 23.6	22 73	50.5	43 16.9	23 72	49.8	43 10.0	23 71	49.2	42 40.2	26 68	46.5	9
50	43 36.4	11 81	58.9	43 29.4	12 79	57.5	43 17.1	15 77	55.4	43 02.6	17 75	53.4	42 40.0	20 73	50.7	42 33.8	21 72	50.1	42 27.3	22 71	49.4	41 59.2	25 69	46.8	50
1	42 48.1	10 81	59.0	42 41.8	11 79	57.6	42 30.6	14 77	55.6	42 17.3	16 76	53.6	41 56.3	19 73	50.9	41 50.5	20 72	50.3	41 44.4	21 72	49.6	41 18.0	24 69	47.0	1
2	41 59.8	08 81	59.1	41 54.2	10 79	57.7	41 44.1	12 78	55.7	41 31.9	15 76	53.7	41 12.5	18 73	51.1	41 07.0	18 72	50.5	41 01.4	19 72	49.8	40 36.7	22 69	47.2	2
3	41 11.4	07 81	59.2	41 06.5	09 80	57.8	40 57.4	11 78	55.9	40 46.4	13 76	53.9	40 28.5	16 73	51.3	40 23.5	17 73	50.6	40 18.3	18 72	50.0	39 55.3	21 69	47.4	3
4	40 22.9	06 81	59.2	40 18.7	08 80	57.9	40 10.7	10 78	56.0	40 00.8	12 76	54.0	39 44.5	15 73	51.4	39 39.9	16 73	50.8	39 35.1	16 72	50.1	39 13.7	19 69	47.6	4
55	39 34.5	05 81	59.3	39 30.9	07 80	58.0	39 24.0	09 78	56.1	39 15.1	11 76	54.1	39 00.4	14 74	51.6	38 56.1	14 73	50.9	38 51.7	15 72	50.3	38 32.0	18 70	47.8	55
6	38 46.0	04 81	59.3	38 43.1	06 80	58.1	38 37.2	08 78	56.1	38 29.4	10 76	54.2	38 16.1	12 74	51.7	38 12.3	13 73	51.1	38 08.3	14 72	50.4	37 50.2	16 70	47.9	6
7	37 57.5	03 81	59.4	37 55.2	04 80	58.1	37 50.3	06 78	56.2	37 43.6	08 76	54.3	37 31.9	11 74	51.8	37 28.4	12 73	51.2	37 24.8	12 73	50.6	37 08.3	15 70	48.1	7
8	37 09.0	02 81	59.4	37 07.4	03 80	58.1	37 03.5	05 78	56.3	36 57.8	07 76	54.4	36 47.5	10 74	51.9	36 44.5	11 73	51.3	36 41.2	11 73	50.7	36 26.3	14 70	48.2	8
9	36 20.4	01 81	59.4	36 19.5	02 80	58.2	36 16.6	04 78	56.3	36 12.0	06 76	54.5	36 03.1	09 74	52.0	36 00.5	09 73	51.4	35 57.6	10 73	50.8	35 44.2	12 70	48.3	9
60	35 31.9	00 81	59.4	35 31.5	01 80	58.2	35 29.6	03 78	56.4	35 26.1	05 76	54.5	35 18.7	07 74	52.1	35 16.4	08 73	51.5	35 13.9	09 73	50.8	35 02.1	11 70	48.4	60
1	34 43.3	01 81	59.4	34 43.6	00 80	58.2	34 42.7	02 78	56.4	34 40.1	04 77	54.6	34 34.2	06 74	52.1	34 32.3	07 74	51.5	34 30.1	07 73	50.9	34 19.9	10 70	48.5	1
2	33 54.8	02 81	59.4	33 55.7	01 80	58.2	33 55.7	01 78	56.4	33 54.2	03 77	54.6	33 49.7	05 74	52.2	33 48.1	06 74	51.6	33 46.4	06 73	51.0	33 37.7	08 70	48.6	2
3	33 06.3	03 81	59.4	33 07.8	02 80	58.2	33 08.8	00 78	56.4	33 08.2	01 77	54.6	33 05.1	04 74	52.2	33 03.9	04 74	51.6	33 02.5	05 73	51.0	32 55.4	07 71	48.6	3
4	32 17.8	04 81	59.3	32 19.9	03 80	58.2	32 21.8	01 78	56.4	32 22.3	00 77	54.6	32 20.6	03 74	52.2	32 19.7	03 74	51.6	32 18.7	04 73	51.1	32 13.0	06 71	48.7	4
65	31 29.3	05 81	59.3	31 32.0	04 80	58.1	31 34.9	02 78	56.4	31 36.3	01 77	54.6	31 36.0	01 74	52.3	31 35.5	02 74	51.7	31 34.8	02 73	51.1	31 30.6	05 71	48.7	65
6	30 40.8	06 81	59.2	30 44.1	05 80	58.1	30 48.0	03 78	56.3	30 50.4	02 77	54.6	30 51.4	00 74	52.3	30 51.3	01 74	51.7	30 51.0	01 73	51.1	30 48.3	03 71	48.8	6
7	29 52.4	07 81	59.2	29 56.3	06 80	58.0	30 01.0	05 78	56.3	30 04.4	03 77	54.6	30 06.8	01 74	52.3	30 07.0	00 74	51.7	30 07.1	00 73	51.1	30 05.8	02 71	48.8	7
8	29 04.0	08 81	59.1	29 08.5	07 80	58.0	29 14.1	06 78	56.3	29 18.5	04 77	54.5	29 22.2	02 74	52.2	29 22.8	01 74	51.7	29 23.2	01 73	51.1	29 23.4	01 71	48.8	8
9	28 15.6	09 81	59.0	28 20.7	08 80	57.9	28 27.3	07 78	56.2	28 32.6	06 77	54.5	28 37.7	03 74	52.2	28 38.6	02 74	51.7	28 39.3	02 73	51.1	28 41.0	00 71	48.8	9
70	27 27.3	10 81	58.9	27 32.9	09 80	57.8	27 40.4	08 78	56.1	27 46.7	06 76	54.5	27 53.1	04 74	52.2	27 54.4	04 74	51.6	27 55.5	04 73	51.1	27 58.6	02 71	48.8	70
1	26 39.0	11 80	58.9	26 45.2	10 79	57.7	26 53.6	09 78	56.1	27 00.8	07 76	54.4	27 08.6	05 74	52.2	27 10.2	05 74	51.6	27 11.6	05 73	51.0	27 16.2	03 71	48.8	1
2	25 50.8	12 80	58.8	25 57.6	11 79	57.6	26 06.9	10 78	56.0	26 15.0	08 76	54.3	26 24.1	07 74	52.1	26 26.0	06 74	51.5	26 27.8	06 73	51.0	26 33.8	04 71	48.8	2
3	25 02.6	13 80	58.6	25 10.0	12 79	57.5	25 20.2	11 78	55.9	25 29.2	09 76	54.2	25 39.6	08 74	52.0	25 41.9	07 74	51.5	25 44.0	07 73	50.9	25 51.4	05 71	48.7	3
4	24 14.5	14 80	58.5	24 22.4	13 79	57.4	24 33.5	12 78	55.8	24 43.5	11 76	54.2	24 55.2	09 74	52.0	24 57.8	08 74	51.4	25 00.2	08 73	50.9	25 09.0	06 71	48.7	4
75	23 26.4	15 80	58.4	23 35.0	14 79	57.3	23 46.9	13 78	55.7	23 57.8	12 76	54.1	24 10.8	10 74	51.9	24 13.7	10 73	51.3	24 16.5	09 73	50.8	24 26.7	08 71	48.6	75
6	22 38.4	16 80	58.3	22 47.5	15 79	57.2	23 00.3	14 77	55.6	23 12.2	13 76	54.0	23 26.4	11 74	51.8	23 29.7	11 73	51.3	23 32.9	10 73	50.7	23 44.4	09 70	48.5	6
7	21 59.5	16 80	58.1	22 00.2	16 79	57.1	22 13.9	15 77	55.5	22 26.6	14 76	53.9	22 42.1	12 74	51.7	22 45.8	12 73	51.2	22 49.3	11 73	50.6	23 02.2	10 70	48.5	7
8	21 02.7	17 80	58.0	21 12.9	17 79	56.9	21 27.5	16 77	55.3	21 41.1	15 76	53.7	21 57.9	13 74	51.6	22 01.9	13 73	51.1	22 05.7	13 73	50.5	22 20.0	11 70	48.4	8
9	20 14.9	18 80	57.8	20 25.7	18 79	56.8	20 41.1	17 77	55.2	20 55.7	16 76	53.6	21 13.8	14 74	51.5	21 18.0	14 73	51.0	21 22.2	14 72	50.4	21 37.9	12 70	48.3	9
80	19 27.2	19 79	57.7	19 38.6	19 79	56.6	19 54.9	18 77	55.1	20 10.3	17 75	53.5	20 29.7	15 73	51.4	20 34.3	15 73	50.9	20 38.8	15 72	50.3	20 55.8	14 70	48.2	80
1	18 39.6	20 79	57.5	18 51.5	20 78	56.5	19 08.7	19 77	54.9	19 25.1	18 75	53.3	19 45.7	17 73	51.3	19 50.6	16 73	50.7	19 55.4	16 72	50.2	20 13.8	15 70	48.1	1
2	17 52.1	21 79	57.3	18 04.6	20 78	56.3	18 22.6	20 77	54.7	18 39.9	19 75	53.2	19 01.7	18 73	51.1	19 07.0	17 72	50.6	19 12.1	17 72	50.1	19 31.9	16 70	48.0	2
3	17 04.7	22 79	57.1	17 17.7	21 78	56.1	17 36.6	21 77	54.6	17 54.8	20 75	53.0	18 17.9	19 73	51.0	18 23.5	18 72	50.5	18 28.9	18 72	49.9	18 50.0	17 70	47.9	3
4	16 17.4	23 79	57.0	16 30.9	22 78	55.9	16 50.7	22 76	54.4	17 09.8	21 75	52.9	17 34.1	20 73	50.8	17 40.0	20 72	50.3	17 45.8	19 72	49.8	18 08.3	18 69	47.7	4
85	15 30.2	24 78	56.8	15 44.3	23 78	55.7	16 04.9	23 76	54.2	16 24.9	22 75	52.7	16 50.5	21 73	50.7	16 56.7	21 72	50.2	17 02.8	20 72	49.6	17 26.6	19 69	47.6	85
6	14 43.1	25 78	56.6	14 57.7	24 77	55.6	15 19.2	24 76	54.0	15 40.1	23 75	52.5	16 06.9	22 72	50.5	16 13.4	22 72	50.0	16 19.9	21 71	49.5	16 45.0	20 69	47.4	6
7	13 56.1	26 78	56.3	14 11.3	25 77	55.3	14 33.6	25 76	53.8	14 55.4	24 74	52.3	15 23.5	23 72	50.3	15 30.3	23 72	49.8	15 37.1	23 71	49.3	16 03.5	22 69	47.3	7
8	13 09.2	26 78	56.1	13 25.0	26 77	55.1	13 48.2	26 76	53.6	14 10.8	25 74	52.2	14 40.1	24 72	50.1	14 47.3	24 72	49.6	14 54.4	24 71	49.1	15 22.1	23 69	47.1	8
9	12 22.5	27 78	55.9	12 38.8	27 77	54.9	13 02.8	26 75	53.4	13 26.3	26 74	52.0	13 56.9	25 72	50.0	14 04.4	25 71	49.5	14 11.8	25 71	49.0	14 40.9	24 69	47.0	9
90	11 35.8	28 78	55.7	11 52.7	28 77	54.7	12 17.6	27 75	53.2	12 42.0	27 74	51.7	13 13.8	26 72	49.8	13 21.6	26 71	49.3	13 29.3	26 71	48.8	13 59.7	25 68	46.8	90

Lat. 20°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	34 00.0	1.0 01	180.0	33 00.0	1.0 01	180.0	31 30.0	1.0 01	180.0	30 00.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	27 00.0	1.0 01	180.0	25 00.0	1.0 01	180.0	00
1	33 59.5	1.0 02	179.0	32 59.5	1.0 02	179.0	31 29.5	1.0 02	179.1	29 59.6	1.0 02	179.1	27 59.6	1.0 02	179.2	27 29.6	1.0 02	179.2	26 59.6	1.0 02	179.2	24 59.6	1.0 02	179.2	1
2	33 58.1	1.0 04	178.0	32 58.1	1.0 04	178.1	31 28.2	1.0 04	178.2	29 58.3	1.0 04	178.2	27 58.3	1.0 03	178.3	27 28.4	1.0 03	178.3	26 58.4	1.0 03	178.4	24 58.5	1.0 03	178.4	2
3	33 55.7	1.0 06	177.1	32 55.8	1.0 05	177.1	31 25.9	1.0 05	177.2	29 56.1	1.0 06	177.3	27 56.3	1.0 05	177.5	27 26.3	1.0 05	177.5	26 56.4	1.0 05	177.5	24 56.5	1.0 04	177.7	3
4	33 52.3	1.0 07	176.1	32 52.5	1.0 07	176.2	31 22.8	1.0 07	176.3	29 53.0	1.0 07	176.5	27 53.4	1.0 06	176.6	27 23.5	1.0 06	176.7	26 53.5	1.0 06	176.7	24 53.9	1.0 06	176.9	4
05	33 48.0	1.0 09	175.1	32 48.3	1.0 09	175.2	31 18.7	1.0 08	175.4	29 49.1	1.0 08	175.6	27 49.7	1.0 08	175.8	27 19.8	1.0 07	175.9	26 49.9	1.0 07	175.9	24 50.4	1.0 07	176.1	05
6	33 42.8	99 10	174.2	32 43.2	99 10	174.3	31 13.8	99 10	174.5	29 44.4	99 10	174.7	27 45.1	99 09	175.0	27 15.3	99 09	175.0	26 45.5	99 09	175.1	24 46.2	99 08	175.3	6
7	33 36.6	99 12	173.2	32 37.1	99 12	173.4	31 07.9	99 11	173.6	29 38.7	99 11	173.8	27 39.8	99 10	174.1	27 10.0	99 10	174.2	26 40.3	99 10	174.3	24 41.2	99 10	174.6	7
8	33 29.4	99 13	172.2	32 30.1	99 13	172.4	31 01.2	99 13	172.7	29 32.3	99 12	173.0	27 33.6	99 12	173.3	27 03.9	99 11	173.4	26 34.2	99 11	173.5	24 35.5	99 11	173.8	8
9	33 21.3	98 15	171.3	32 22.3	98 15	171.5	30 53.6	99 14	171.8	29 24.9	99 14	172.1	27 26.6	99 13	172.5	26 57.0	99 13	172.6	26 27.4	99 13	172.7	24 29.0	99 12	173.0	9
10	33 12.3	98 16	170.3	32 13.5	98 16	170.6	30 45.1	98 15	170.9	29 16.7	98 15	171.2	27 18.8	98 14	171.6	26 49.3	98 14	171.8	26 19.8	98 14	171.9	24 21.8	98 13	172.3	10
1	33 02.4	98 18	169.4	32 03.8	98 18	169.6	30 35.8	98 17	170.0	29 07.7	98 16	170.4	27 10.2	98 16	170.8	26 40.8	98 15	170.9	26 11.5	98 15	171.1	24 13.8	98 14	171.5	1
2	32 51.6	97 20	168.4	31 53.2	97 19	168.7	30 25.6	97 18	169.1	28 57.9	97 18	169.5	27 00.9	98 17	170.0	26 31.6	98 17	170.1	26 02.3	98 16	170.3	24 05.1	98 16	170.7	2
3	32 39.8	97 21	167.5	31 41.7	97 20	167.8	30 14.5	97 20	168.2	28 47.2	97 19	168.7	26 50.7	97 18	169.2	26 21.5	97 18	169.3	25 52.4	97 18	169.5	23 55.7	97 17	170.0	3
4	32 27.2	96 23	166.6	31 29.4	96 22	166.9	30 02.6	97 21	167.4	28 35.7	97 20	167.8	26 39.7	97 19	168.4	26 10.7	97 19	168.5	25 41.7	97 19	168.7	23 45.5	97 18	169.2	4
15	32 13.7	96 24	165.7	31 16.2	96 23	166.0	29 49.8	96 23	166.5	28 23.4	96 22	167.0	26 28.0	96 21	167.6	25 59.1	96 20	167.7	25 30.2	96 20	167.9	23 34.6	96 19	168.5	15
6	31 59.3	96 25	164.8	31 02.1	96 25	165.1	29 36.3	96 24	165.6	28 10.3	96 23	166.1	26 15.5	96 22	166.8	25 46.8	96 22	167.0	25 18.0	96 21	167.1	23 23.0	96 20	167.7	6
7	31 44.0	95 27	163.9	30 47.2	95 26	164.2	29 21.9	95 25	164.8	27 56.4	95 24	165.3	26 02.2	95 23	166.0	25 33.7	95 23	166.2	25 05.1	95 23	166.3	23 10.7	95 22	167.0	7
8	31 27.9	94 28	163.0	30 31.5	94 28	163.4	29 06.7	94 27	163.9	27 41.7	94 26	164.5	25 48.2	95 25	165.2	25 19.8	95 24	165.4	24 51.4	95 24	165.6	22 57.6	95 23	166.3	8
9	31 11.0	93 30	162.1	30 14.9	94 29	162.5	28 50.7	94 28	163.1	27 26.3	94 27	163.7	25 33.5	94 26	164.4	25 05.3	94 26	164.6	24 37.0	94 25	164.8	22 43.9	94 24	165.5	9
20	30 53.2	93 31	161.2	29 57.5	93 30	161.6	28 33.9	93 29	162.3	27 10.0	93 28	162.9	25 18.0	93 27	163.7	24 49.9	94 27	163.9	24 21.9	94 26	164.1	22 29.5	94 25	164.8	20
1	30 34.6	92 32	160.3	29 39.4	92 32	160.8	28 16.3	92 30	161.4	26 53.0	93 30	162.1	25 01.8	93 28	162.9	24 33.9	93 28	163.1	24 06.0	93 28	163.3	22 14.4	93 26	164.1	1
2	30 15.2	91 34	159.5	29 20.4	91 33	159.9	27 58.0	92 32	160.6	26 35.3	92 31	161.3	24 44.9	92 29	162.1	24 17.2	92 29	162.4	23 49.5	92 29	162.6	21 58.6	93 27	163.4	2
3	29 55.1	91 35	158.6	29 00.7	91 34	159.1	27 38.9	91 33	159.8	26 16.9	91 32	160.5	24 27.2	92 31	161.4	23 59.8	92 30	161.6	23 32.3	92 30	161.8	21 42.2	92 28	162.7	3
4	29 34.1	90 36	157.8	28 40.2	90 35	158.3	27 19.0	90 34	159.0	25 57.7	91 33	159.7	24 08.9	91 32	160.7	23 41.6	91 31	160.9	23 14.4	91 31	161.1	21 25.1	91 29	162.0	4
25	29 12.4	89 37	156.9	28 18.9	89 37	157.5	26 58.5	90 36	158.2	25 37.8	90 34	159.0	23 49.9	90 33	159.9	23 22.8	90 32	160.2	22 55.8	90 32	160.4	21 07.4	90 31	161.3	25
6	28 50.0	88 39	156.1	27 56.9	88 38	156.7	26 37.2	89 37	157.4	25 17.2	89 35	158.2	23 30.2	89 34	159.2	23 03.4	89 34	159.4	22 36.5	89 33	159.7	20 49.0	90 32	160.6	6
7	28 26.8	87 40	155.3	27 34.2	88 39	155.9	26 15.2	88 38	156.7	24 55.9	88 36	157.4	23 09.8	89 35	158.5	22 43.2	89 35	158.7	22 16.6	89 34	159.0	20 30.0	89 33	160.0	7
8	28 02.9	87 41	154.5	27 10.8	87 40	155.1	25 52.5	87 39	155.9	24 34.0	87 38	156.7	22 48.8	88 36	157.8	22 22.4	88 36	158.0	21 56.1	88 35	158.3	20 10.3	88 34	159.3	8
9	27 38.2	86 42	153.7	26 46.7	86 41	154.3	25 29.2	86 40	155.1	24 11.3	87 39	156.0	22 27.1	87 37	157.1	22 01.0	87 37	157.3	21 34.9	87 36	157.6	19 50.1	87 35	158.6	9
30	27 12.9	85 43	152.9	26 21.9	85 42	153.5	25 05.1	85 41	154.4	23 48.1	86 40	155.3	22 04.8	86 38	156.4	21 39.0	86 38	156.6	21 13.1	86 37	156.9	19 29.2	87 36	158.0	30
1	26 47.0	84 44	152.2	25 56.5	84 43	152.8	24 40.5	85 42	153.7	23 24.1	85 41	154.5	21 41.9	85 39	155.7	21 16.3	86 39	156.0	20 50.7	86 38	156.2	19 07.8	86 37	157.3	1
2	26 20.3	83 45	151.4	25 30.4	83 45	152.0	24 15.1	84 43	152.9	22 59.6	84 42	153.8	21 18.4	85 40	155.0	20 53.0	85 40	155.3	20 27.6	85 39	155.6	18 45.8	85 38	156.7	2
3	25 53.0	82 46	150.7	25 03.6	83 46	151.3	23 49.2	83 44	152.2	22 34.4	83 43	153.1	20 54.3	84 41	154.3	20 29.2	84 41	154.6	20 04.0	84 40	154.9	18 23.2	84 39	156.1	3
4	25 25.1	81 48	149.9	24 36.2	82 47	150.6	23 22.6	82 45	151.5	22 08.6	82 44	152.5	20 29.5	83 42	153.7	20 04.7	83 42	154.0	19 39.8	83 41	154.3	18 00.0	83 40	155.4	4
35	24 56.5	80 49	149.2	24 08.2	81 48	149.9	22 55.4	81 46	150.8	21 42.3	81 45	151.8	20 04.2	82 43	153.0	19 39.7	82 43	153.3	19 15.0	82 42	153.6	17 36.3	82 40	154.8	35
6	24 27.4	79 50	148.5	23 39.6	80 49	149.2	22 27.6	80 47	150.1	21 15.3	81 46	151.1	19 38.4	81 44	152.4	19 14.1	81 44	152.7	18 49.7	81 43	153.0	17 12.0	82 41	154.2	6
7	23 57.6	79 50	147.8	23 10.4	79 50	148.5	21 59.3	79 48	149.5	20 47.8	80 47	150.5	19 12.0	80 45	151.7	18 47.9	80 44	152.0	18 23.8	80 44	152.4	16 47.2	81 42	153.6	7
8	23 27.3	78 51	147.1	22 40.7	78 51	147.8	21 30.4	78 49	148.8	20 19.7	79 48	149.8	18 45.0	79 46	151.1	18 21.2	79 45	151.4	17 57.4	79 45	151.8	16 21.9	80 43	153.0	8
9	22 56.4	77 52	146.4	22 10.3	77 51	147.1	21 00.9	77 50	148.2	19 51.1	78 49	149.2	18 17.5	78 47	150.5	17 54.0	78 46	150.8	17 30.5	78 46	151.1	15 56.1	79 44	152.4	9
40	22 25.0	76 53	145.8	21 39.5	76 52	146.5	20 30.9	76 51	147.5	19 21.9	77 49	148.5	17 49.4	77 48	149.9	17 26.2	77 47	150.2	17 03.0	78 47	150.5	15 29.7	78 45	151.9	40
1	21 53.0	75 54	145.1	21 08.1	75 53	145.8	20 00.3	75 52	146.9	18 52.2	76 50	147.9	17 20.9	76 49	149.3	16 58.0	76 48	149.6	16 35.0	77 47	150.0	15 02.9	77 46	151.3	1
2	21 20.5	74 55	144.5	20 36.1	74 54	145.2	19 29.3	75 53	146.3	18 22.0	75 51	147.3	16 51.8	75 49	148.7	16 29.2	75 49	149.0	16 06.5	76 48	149.4	14 35.6	76 46	150.7	2
3	20 47.5	73 56	143.8	20 03.7	73 55	144.6	18 57.7	74 54	145.6	17 51.3	74 52	146.7	16 22.3	74 50	148.1	16 00.0	75 50	148.5	15 37.6	75 49	148.8	14 07.8	75 47	150.2	3
4	20 13.9	72 57	143.2	19 30.7	72 56	143.9	18 25.6	73 54	145.0	17 20.1	73 53	146.1	15 52.3	73 51	147.5	15 30.2	74 50	147.9	15 08.1	74 50	148.2	13 39.5	74 48	149.6	4
45	19 39.9	71 58	142.6	18 57.3	71 57	143.3	17 53.1	72 55	144.4	16 48.5	72 54	145.5	15 21.8	72 52	147.0	15 00.0	73 51	147.3	14 38.2	73 51	147.7	13 10.8	73 49	149.1	45
6	19 05.4	70 58	142.0	18 23.4	70 57	142.7	17 20.1	71 56	143.9	16 16.3	71 54	145.0	14 50.8	71 52	146.4	14 29.4	72 52	146.8	14 07.9	72 51	147.1	12 41.6	72 49	148.6	6
7	18 30.5	69 59	141.4	17 49.1	69 58	142.2	16 46.6	70 56	143.3	15 43.7	70 55	144.4	14 19.4	70 53	145.9	13 58.3	71 53	146.2	13 37.1	71 52	146.6	12 12.0	71 50	148.1	7
8	17 55.1	68 60	140.8	17 14.2	68 59	141.6	16 12.7	69 57	142.7	15 10.7	69 56	143.9	13 47.6	69 54	145.3	13 26.7	70 53	145.7	13 05.8	70 53	146.1	11 41.9	70 51	147.5	8
9	17 19.2	67 60	140.2	16 39.0	67 59	141.0	15 38.3	68 58	142.2	14 37.2	68 56	143.3	13 15.3	68 54	144.8	12 54.7	69 54	145.2	12 34.1	69 53	145.6	11 11.5	69 51	147.0	9
50	16 43.0	66 61	139.7	16 03.3	66 60	140.5	15 03.5	67 59	141.6	14 03.3	67 57	142.8	12 42.6	67 55	144.3	12 22.4	68 55	144.7	12 02.1	68 54	145.1	10 40.6	68 52	146.5	50
1	16 06.3	65 62	139.1	15 27.2	65 61	139.9	14 28.3	66 59	141.1	13 29.0	66 58	142.3	12 09.5	66 56	143.8	11 49.5	67 55	144.2	11 29.6	67 55	144.6	10 09.3	67 53	146.1	1
2	15 29.2	64 62	138.6	14 50.7	64 61	139.4	13 52.7	65 60	140.6	12 54.3	65 58	141.7	11 36.0	65 57	143.3	11 16.3	66 56	143.7	10 56.7	66 56	144.1	9 37.6	66 53	145.6	2
3	14 51.7	63 63	138.0	14 13.8	63 62	138.9	13 16.7	64 61	140.0	12 19.2	64 59	141.2	11 02.0	64 57	142.8	10 42.7	65 56	143.2	10 23.4	65 56	143.6	9 05.6	65 54	145.1	3
4	14 13.8	62 64	137.5	13 36.5	62 63	138.3	12 40.3	63 61	139.5	11 43.7	63 60	140.7	10 27.8	63 58	142.3	10 08.8	64 57	142.7	9 49.7	64 57	143.1	8 33.2	64 55	144.7	4
55	13 35.5	61 64	137.0	12 58.8	61 63	137.8	12 03.5	62 62	139.0	11 07.8	62 60	140.2	9 53.2	62 58	141.8	9 34.4	63 58	142.2	9 15.7	63 57	142.6	8 00.4	63 55	144.2	55
6	12 56.9	60 65	136.5	12 20.8	60 64	137.3	11 26.3	61 62	138.6	10 31.6	61 61	139.8	9 18.1	61 59	141.4	8 59.7	62 58	141.8	8 41.3	62 58	142.2	7 27.2	62 56	143.8	6
7	12 17.9	59 65	136.0	11 42.4	59 64	136.8	10 48.8	60 63	138.1	9 55.0	60 62	139.3	8 42.8	60 60	140.9	8 24.6	60 59	141.3	8 06.5	61 58	141.7	6 53.7	61 56	143.3	7
8	11 38.6	58 66	135.5	11 03.7	58 65	136.4	10 11.0	59 64	137.6	9 18.0	59 62	138.8	8 07.0	59 60	140.5	7 49.2	59 59	140.9	7 31.4	59 59	141.3	6 19.8	60 57	142.9	8
9	10 59.0	57 67	135.1	10 24.6	57 66	135.9	9 32.8	58 64	137.1	8 40.8	58 63	138.4	7 31.0	58 61	140.0	7 13.5	58 60	140.4	6 56.0	58 60	140.8	5 45.7	59 57	142.5	9
60	10 19.0	56 67	134.6	9 45.2	56 66	135.4	8 54.3	57 65	136.7	8 03.1	57 63	137.9	6 54.6	57 61	139.6	6 37.4	57 61	140.0	6 20.2	57 60	140.4	5 11.2	58 58	142.1	60
1	9 38.7	55 68	134.1	9 05.5	55 67	135.0	8 15.4	56 65	136.2	7 25.2	56 64	137.5	6 17.9	56 62	139.2	6 01.0	56 61	139.6	5 44.1	56 61	140.0				1
2	8 58.0	54 68	133.7	8 25.4	54 67	134.5	7 36.3	55 66	135.8	6 47.0	55 64	137.1	5 40.9	55 62	138.7	5 24.3	55 61	139.2	5 07.7	55 61	139.6				2
3	8 17.1	53 69	133.2	7 45.1	53 68	134.1	6 56.8	54 66	135.4	6 08.4	54 65	136.6	5 03.5	54 63	138.3										3
4	7 35.9	52 69	132.8	7 04.4	53 68	133.7	6 17.1	53 67	135.0	5 29.5	53 65	136.2													4
65	6 54.4	51 70	132.4	6 23.5	52 69	133.3	5 37.0	52 67	134.5																65
6	6 12.6	50 70	132.0	5 42.3	51 69	132.8																			6
7	5 30.6	49 70	131.6	5 00.8	50 69	132.4																			7

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	10 49.3	29 77	55.4	11 06.7	29 76	54.5	11 32.5	28 75	53.0	11 57.8	28 74	51.5	12 30.8	27 71	49.6	12 38.9	27 71	49.1	12 47.0	27 70	48.6	13 18.7	26 68	46.6	91
2	10 03.0	30 77	55.2	10 29.9	30 76	54.2	10 47.5	29 75	52.8	11 13.7	29 73	51.3	11 48.0	28 71	49.4	11 56.4	28 71	48.9	12 04.8	28 70	48.4	12 37.8	27 68	46.4	2
3	9 16.8	31 77	54.9	9 35.3	31 76	54.0	10 02.7	30 75	52.5	10 29.8	30 73	51.1	11 05.3	29 71	49.1	11 14.0	29 70	48.6	11 22.7	29 70	48.2	11 57.0	28 68	46.2	3
4	8 30.7	32 77	54.7	8 49.7	32 76	53.7	9 18.0	31 74	52.3	9 46.0	31 73	50.8	10 22.7	30 71	48.9	10 31.8	30 70	48.4	10 40.8	30 70	47.9	11 16.4	29 68	46.0	4
95	7 44.7	33 76	54.4	8 04.3	33 75	53.5	8 33.5	32 74	52.0	9 02.3	32 72	50.6	9 40.3	31 71	48.7	9 49.7	31 70	48.2	9 59.0	31 69	47.7	10 35.9	30 67	45.8	95
6	6 59.0	34 76	54.2	7 19.1	33 75	53.2	7 49.1	33 74	51.8	8 18.9	33 72	50.3	8 58.0	32 70	48.4	9 07.7	32 70	48.0	9 17.4	32 69	47.5	9 55.6	32 67	45.6	6
7	6 13.3	35 76	53.9	6 34.0	34 75	52.9	7 04.9	34 73	51.5	7 35.5	34 72	50.1	8 15.9	33 70	48.2	8 25.9	33 69	47.7	8 35.9	33 69	47.2	9 15.4	33 67	45.3	7
8	5 27.9	36 76	53.6	5 49.1	35 75	52.7	6 20.9	35 73	51.2	6 52.4	35 72	49.8	7 34.0	34 70	47.9	7 44.3	34 69	47.5	7 54.6	34 69	47.0	8 35.4	34 66	45.1	8
9				5 04.4	36 74	52.4	5 37.0	36 73	51.0	6 09.4	36 71	49.6	6 52.2	36 69	47.7	7 02.8	35 69	47.2	7 13.4	35 68	46.7	7 55.6	35 66	44.8	9
100										5 26.5	37 71	49.3	6 10.6	37 69	47.4	6 21.5	36 69	46.9	6 32.5	36 68	46.5	7 15.9	36 66	44.6	100
1													5 29.2	38 69	47.1	5 40.4	38 69	46.7	5 51.7	37 68	46.2	6 36.4	37 66	44.3	1
2																			5 11.1	38 67	45.9	5 57.1	38 65	44.1	2
3																						5 18.0	39 65	43.8	3

Lat. 20°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	64 00.0	1.0 01	00.0	63 00.0	1.0 01	00.0	61 30.0	1.0 01	00.0	60 30.0	1.0 01	00.0	59 30.0	1.0 01	00.0	58 30.0	1.0 01	00.0	57 30.0	1.0 01	00.0	56 00.0	1.0 01	00.0	00
1	63 59.2	1.0 04	01.6	62 59.3	1.0 04	01.5	61 29.3	1.0 03	01.4	60 29.4	1.0 03	01.3	59 29.4	1.0 03	01.3	58 29.4	1.0 03	01.2	57 29.4	1.0 03	01.1	55 59.5	1.0 03	01.1	1
2	63 56.9	1.0 07	03.2	62 57.0	1.0 06	03.0	61 27.3	1.0 06	02.8	60 27.4	1.0 05	02.6	59 27.5	1.0 05	02.5	58 27.7	1.0 05	02.4	57 27.8	1.0 05	02.3	55 57.9	1.0 04	02.1	2
3	63 53.0	99 09	04.7	62 53.4	99 08	04.5	61 23.9	99 08	04.2	60 24.2	1.0 08	03.9	59 24.5	1.0 07	03.8	58 24.7	1.0 07	03.6	57 25.0	1.0 07	03.4	55 55.4	1.0 06	03.1	3
4	63 47.0	99 12	06.3	62 48.2	99 11	06.0	61 19.1	99 10	05.5	60 19.6	99 10	05.3	59 20.2	99 09	05.0	58 20.6	99 09	04.7	57 21.1	99 08	04.5	55 51.7	99 08	04.2	4
05	63 40.6	98 14	07.8	62 41.6	98 13	07.4	61 13.0	99 12	06.9	60 13.9	99 12	06.5	59 14.7	99 11	06.2	58 15.4	99 11	05.9	57 16.1	99 10	05.6	55 47.1	99 09	05.2	05
6	63 32.2	98 16	09.4	62 33.6	98 16	08.9	61 05.6	98 15	08.2	60 06.8	98 14	07.8	59 07.9	98 13	07.4	58 09.0	98 13	07.1	57 10.0	98 12	06.7	55 41.5	98 11	06.3	6
7	63 22.3	97 19	10.9	62 24.2	97 18	10.3	60 56.9	97 17	09.6	59 58.5	97 16	09.1	59 00.0	97 15	08.7	58 01.5	98 14	08.2	57 02.9	98 14	07.8	55 34.8	98 13	07.3	7
8	63 10.9	96 21	12.4	62 13.4	96 20	11.8	60 46.8	96 19	10.9	59 49.0	97 18	10.4	58 51.0	97 17	09.8	57 52.9	97 16	09.4	56 54.7	97 15	08.9	55 27.2	97 14	08.3	8
9	62 58.1	95 24	13.8	62 01.2	95 22	13.1	60 35.6	96 21	12.2	59 38.2	96 20	11.6	58 40.8	96 19	11.0	57 43.1	96 18	10.5	56 45.4	96 17	10.0	55 18.6	97 16	09.3	9
10	62 43.9	93 28	15.3	61 47.8	94 25	14.5	60 23.0	94 23	13.5	59 26.3	95 22	12.8	58 29.4	95 21	12.2	57 32.3	95 20	11.6	56 35.1	96 19	11.1	55 09.0	96 18	10.3	10
1	62 28.4	92 28	16.7	61 33.0	93 27	15.9	60 09.3	93 25	14.7	59 13.2	94 24	14.0	58 16.9	94 23	13.3	57 20.4	94 22	12.7	56 23.8	95 21	12.1	54 58.4	96 19	11.3	1
2	62 11.6	91 30	18.0	61 17.0	91 29	17.2	59 54.4	92 27	15.9	58 59.0	93 26	15.2	58 03.4	93 24	14.5	57 07.5	93 23	13.8	56 11.4	94 22	13.1	54 46.9	94 21	12.2	2
3	61 53.5	89 32	19.4	60 59.7	90 31	18.4	59 38.3	91 29	17.2	58 43.7	91 27	16.3	57 48.8	92 26	15.6	56 53.6	92 25	14.9	55 58.1	93 24	14.2	54 34.5	93 22	13.2	3
4	61 34.2	88 34	20.7	60 41.3	89 33	19.7	59 21.2	89 31	18.3	58 27.3	90 29	17.5	57 33.1	91 28	16.7	56 38.6	91 26	15.9	55 43.8	91 25	15.2	54 21.2	92 24	14.1	4
15	61 13.7	86 36	21.9	60 21.7	87 34	20.9	59 02.9	88 32	19.5	58 09.8	89 31	18.6	57 16.4	89 29	17.7	56 22.7	90 28	16.9	55 28.6	90 27	16.1	54 07.0	91 25	15.0	15
6	60 52.1	85 38	23.2	60 01.1	86 36	22.1	58 43.6	87 34	20.6	57 51.4	87 33	19.7	56 58.8	88 31	18.8	56 05.8	89 30	17.9	55 12.5	89 28	17.1	53 52.0	90 26	15.9	6
7	60 29.4	83 40	24.4	59 39.3	84 38	23.2	58 23.2	85 35	21.7	57 31.9	86 34	20.7	56 40.2	87 33	19.8	55 48.0	87 31	18.9	54 55.5	88 30	18.0	53 36.1	89 28	16.8	7
8	60 05.6	81 41	25.5	59 16.6	82 40	24.4	58 01.9	84 37	22.8	57 11.5	84 36	21.7	56 20.6	85 34	20.8	55 29.3	86 33	19.8	54 37.6	87 31	19.0	53 19.3	87 29	17.7	8
9	59 40.9	80 43	26.6	58 52.8	81 41	25.4	57 39.6	82 39	23.8	56 50.2	83 37	22.7	56 00.2	84 36	21.7	55 09.7	84 34	20.8	54 18.8	85 33	19.9	53 01.8	86 31	18.6	9
20	59 15.1	78 44	27.7	58 28.1	79 43	26.5	57 16.4	80 40	24.8	56 27.9	81 39	23.7	55 38.9	82 37	22.7	54 49.3	83 35	21.7	53 59.3	84 34	20.7	52 43.4	85 32	19.4	20
1	58 48.5	76 46	28.7	58 02.5	77 44	27.5	56 52.4	79 41	25.8	56 04.8	80 40	24.7	55 16.7	81 38	23.6	54 28.1	82 37	22.6	53 38.9	82 35	21.6	52 24.3	83 33	20.2	1
2	58 21.0	74 47	29.7	57 36.1	75 46	28.5	56 27.5	77 43	26.7	55 40.9	78 41	25.6	54 53.7	79 40	24.5	54 06.0	80 38	23.4	53 17.8	81 37	22.4	52 04.5	82 34	21.0	2
3	57 52.6	72 49	30.7	57 08.8	74 47	29.4	56 01.7	75 44	27.6	55 16.2	76 42	26.5	54 30.0	77 41	25.3	53 43.2	78 39	24.3	52 55.9	79 38	23.2	51 44.0	81 35	21.8	3
4	57 23.4	70 50	31.6	56 40.7	72 48	30.3	55 35.2	74 45	28.5	54 50.7	75 44	27.3	54 05.5	76 42	26.2	53 19.7	77 40	25.1	52 33.3	78 39	24.0	51 22.7	79 36	22.5	4
25	56 53.5	69 51	32.5	56 11.9	70 49	31.2	55 08.0	72 47	29.3	54 24.5	73 45	28.1	53 40.3	74 43	27.0	52 55.4	75 41	25.9	52 10.0	76 40	24.8	51 00.8	78 38	23.3	25
6	56 22.8	67 52	33.4	55 42.3	68 50	32.0	54 40.0	70 48	30.1	53 57.5	71 46	28.9	53 14.3	73 44	27.8	52 30.5	74 43	26.6	51 46.0	75 41	25.5	50 38.2	76 39	24.0	6
7	55 51.5	65 53	34.2	55 12.0	66 51	32.9	54 11.3	68 49	30.9	53 29.9	70 47	29.7	52 47.7	71 45	28.5	52 04.9	72 44	27.4	51 21.4	73 42	26.3	50 15.0	74 40	24.7	7
8	55 19.5	63 54	35.0	54 41.1	65 53	33.6	53 42.0	67 50	31.7	53 01.6	68 48	30.5	52 20.5	69 46	29.3	51 38.6	70 45	28.1	50 56.1	71 43	27.0	49 51.1	73 41	25.3	8
9	54 46.8	61 55	35.7	54 09.6	63 54	34.4	53 12.1	65 51	32.4	52 32.7	66 49	31.2	51 52.6	68 47	30.0	51 11.8	69 46	28.8	50 30.2	70 44	27.6	49 26.7	71 42	26.0	9
30	54 13.6	59 56	36.5	53 37.5	61 54	35.1	52 41.6	63 52	33.1	52 03.3	65 50	31.9	51 24.2	66 48	30.7	50 44.3	67 47	29.5	50 03.8	68 45	28.3	49 01.7	70 43	26.6	30
1	53 39.8	58 57	37.1	53 04.8	59 55	35.8	52 10.5	61 53	33.8	51 33.2	63 51	32.5	50 55.1	64 49	31.3	50 16.3	65 48	30.1	49 36.8	66 46	28.9	48 36.2	68 44	27.2	1
2	53 05.5	56 58	37.8	52 31.5	57 56	36.4	51 38.8	60 54	34.5	51 02.6	61 52	33.2	50 25.6	62 50	31.9	49 47.8	64 49	30.7	49 09.2	65 47	29.6	48 10.1	67 44	27.8	2
3	52 30.7	54 59	38.4	51 57.8	56 57	37.1	51 06.7	58 55	35.1	50 31.5	59 53	33.8	49 55.5	61 51	32.6	49 18.7	62 49	31.3	48 41.2	63 48	30.1	47 43.5	65 45	28.4	3
4	51 55.5	52 60	39.0	51 23.6	54 58	37.7	50 34.0	56 55	35.7	49 59.9	58 54	34.4	49 24.9	59 52	33.1	48 49.1	60 50	31.9	48 12.6	62 48	30.7	47 16.5	63 46	29.0	4
35	51 19.7	51 60	39.6	50 48.9	52 59	38.3	50 00.9	54 56	36.3	49 27.8	56 54	35.0	48 53.8	57 52	33.7	48 19.1	59 51	32.5	47 43.6	60 49	31.3	46 48.9	62 47	29.5	35
6	50 43.0	49 61	40.2	50 13.8	50 59	38.8	49 27.3	53 57	36.8	48 55.3	54 55	35..	48 22.3	56 53	34.3	47 48.6	57 52	33.0	47 14.1	58 50	31.8	46 20.9	60 47	30.0	6
7	50 07.0	47 62	40.7	49 38.2	49 60	39.3	48 53.3	51 57	37.3	48 22.3	52 56	36.0	47 50.4	54 54	34.8	47 17.7	55 52	33.5	46 44.1	57 50	32.3	45 52.5	58 48	30.5	7
8	49 30.0	45 62	41.2	49 02.3	47 60	39.8	48 18.9	49 58	37.8	47 48.9	51 56	36.5	47 18.0	52 55	35.3	46 46.4	54 53	34.0	46 13.8	55 51	32.8	45 23.6	57 49	31.0	8
9	48 52.7	44 63	41.7	48 26.0	45 61	40.3	47 44.2	48 59	38.3	47 15.1	49 57	37.0	46 45.3	50 55	35.8	46 14.6	52 54	34.5	45 43.1	53 52	33.3	44 54.4	55 50	31.5	9
40	48 15.1	42 63	42.1	47 49.4	44 62	40.8	47 09.0	46 59	38.8	46 41.0	47 58	37.5	46 12.1	49 56	36.2	45 42.4	50 54	35.0	45 11.9	52 53	33.7	44 24.7	53 50	31.9	40
1	47 37.1	40 64	42.5	47 12.4	42 62	41.2	46 33.5	44 60	39.2	46 06.5	46 58	37.9	45 38.7	47 57	36.6	45 10.9	49 55	35.4	44 40.4	50 53	34.2	43 54.7	52 51	32.4	1
2	46 58.9	39 64	42.9	46 35.1	40 63	41.6	45 57.7	43 60	39.6	45 31.7	44 59	38.3	45 04.8	46 57	37.1	44 37.1	47 55	35.8	44 08.6	48 54	34.6	43 24.4	50 51	32.8	2
3	46 20.3	37 65	43.3	45 57.5	39 63	42.0	45 21.6	41 61	40.0	44 56.6	42 59	38.7	44 30.7	44 57	37.5	44 04.0	45 56	36.2	43 36.4	47 54	35.0	42 53.7	48 52	33.2	3
4	45 41.5	36 65	43.7	45 19.7	37 64	42.4	44 45.2	39 61	40.4	44 21.2	41 60	39.1	43 56.3	42 58	37.9	43 30.5	44 56	36.6	43 04.0	45 55	35.4	42 22.7	47 52	33.6	4
45	45 02.4	34 66	44.0	44 41.5	36 64	42.7	44 08.5	38 61	40.8	43 45.5	39 60	39.5	43 21.5	41 58	38.2	42 56.7	42 57	37.0	42 31.2	43 55	35.7	41 51.4	45 53	33.9	45
6	44 23.1	32 66	44.4	44 03.2	34 64	43.0	43 31.6	36 62	41.1	43 09.5	38 61	39.8	42 46.5	39 59	38.6	42 22.7	40 57	37.3	41 58.1	42 55	36.1	41 19.8	44 53	34.3	6
7	43 43.6	31 66	44.7	43 24.6	32 65	43.4	42 54.4	35 62	41.4	42 33.2	36 61	40.1	42 11.2	37 59	38.9	41 48.4	39 58	37.6	41 24.8	40 56	36.4	40 47.9	42 54	34.6	7
8	43 03.8	29 67	45.0	42 45.8	31 65	43.7	42 17.0	33 63	41.7	41 56.8	34 61	40.5	41 35.7	36 59	39.2	41 13.8	37 58	38.0	40 51 2	38 56	36.7	40 15.7	40 54	34.9	8
9	42 23.9	28 67	45.2	42 06.7	29 65	43.9	41 39.4	31 63	42.0	41 20.1	33 61	40.8	41 00.0	34 60	39.5	40 39.0	36 58	38.3	40 17 3	37 57	37.0	39 43.3	39 54	35.2	9
50	41 43.8	26 67	45.5	41 27.5	28 66	44.2	41 01.5	30 63	42.3	40 43.2	31 62	41.0	40 24.0	33 60	39.8	40 04.9	34 59	38.5	39 43.3	35 57	37.3	39 10.7	37 55	35.5	50
1	41 03.5	25 67	45.7	40 48.1	26 66	44.4	40 23.5	28 64	42.5	40 06.1	30 62	41.3	39 47.8	31 61	40.0	39 28.8	32 59	38.8	39 09.0	34 57	37.6	38 37.8	35 55	35.8	1
2	40 23.1	23 68	45.9	40 08.6	25 66	44.7	39 45.3	27 64	42.8	39 28.8	28 62	41.5	39 11.4	30 61	40.3	38 53.3	31 59	39.1	38 34.5	32 58	37.8	38 04.8	34 55	36.0	2
3	39 42.5	22 68	46.1	39 28.9	23 66	44.9	39 06.9	25 64	43.0	38 51.3	27 63	41.8	38 34.9	28 61	40.5	38 17.7	30 60	39.3	37 59.8	31 58	38.1	37 31.5	32 56	36.3	3
4	39 01.7	21 68	46.3	38 49.0	22 67	45.1	38 28.4	24 64	43.2	38 13.7	25 63	42.0	37 58.2	26 61	40.8	37 41.9	28 60	39.5	37 24.9	29 58	38.3	36 58.0	31 56	36.5	4
55	38 20.9	19 68	46.5	38 09.0	20 67	45.3	37 49.7	22 65	43.4	37 35.9	24 63	42.2	37 21.3	25 62	41.0	37 05.9	26 60	39.7	36 49.9	27 59	38.5	36 24.4	29 56	36.7	55
6	37 39.9	18 68	46.7	37 28.9	19 67	45.4	37 10.9	21 65	43.6	36 58.0	22 63	42.4	36 44.3	23 62	41.1	36 29.8	25 60	39.9	36 14.7	26 59	38.7	35 50.6	28 57	37.0	6
7	36 58.9	16 69	46.8	36 48.7	18 67	45.6	36 32.0	20 65	43.8	36 19.9	21 64	42.5	36 07.1	22 62	41.3	35 53.6	23 61	40.1	35 39.3	24 59	38.9	35 16.6	26 57	37.1	7
8	36 17.7	15 69	47.0	36 08.3	16 67	45.7	35 52.9	18 65	43.9	35 41.7	19 64	42.7	35 29.8	21 62	41.5	35 17.1	22 61	40.3	35 03.8	23 59	39.1	34 42.5	25 57	37.3	8
9	35 36.4	14 69	47.1	35 27.9	15 67	45.9	35 13.8	17 65	44.1	35 03.4	18 64	42.8	34 52.4	19 62	41.6	34 40.6	20 61	40.5	34 28.2	21 60	39.3	34 08.2	23 57	37.5	9
60	34 55.1	12 69	47.2	34 47.4	13 68	46.0	34 34.5	15 65	44.2	34 25.0	16 64	43.0	34 14.9	18 63	41.8	34 04.0	19 61	40.6	33 52.4	20 60	39.4	33 33.8	21 58	37.6	60
1	34 13.7	11 69	47.3	34 06.8	12 68	46.1	33 55.2	14 66	44.3	33 46.5	15 64	43.1	33 37.2	16 63	41.9	33 27.2	17 61	40.7	33 16.6	18 60	39.6	32 59.3	20 58	37.8	1
2	33 32.3	10 69	47.4	33 26.2	11 68	46.2	33 15.8	12 66	44.4	33 08.0	14 64	43.2	32 59.5	15 63	42.0	32 50.4	16 61	40.9	32 40.6	17 60	39.7	32 24.7	18 58	37.9	2
3	32 50.7	08 69	47.5	32 45.5	09 68	46.3	32 36.3	11 66	44.5	32 29.3	12 64	43.3	32 21.7	13 63	42.1	32 13.5	14 62	41.0	32 04.6	15 60	39.8	31 50.0	17 58	38.1	3
4	32 09.2	07 69	47.5	32 04.7	08 68	46.3	31 56.7	10 66	44.6	31 50.6	11 65	43.4	31 43.9	12 63	42.2	31 36.5	13 62	41.1	31 28.4	14 60	39.9	31 15.2	15 58	38.2	4
65	31 27.6	06 69	47.6	31 23.9	07 68	46.4	31 17.1	08 66	44.6	31 11.9	09 65	43.5	31 05.9	10 63	42.3	30 59.4	11 62	41.2	30 52.2	13 60	40.0	30 40.3	14 58	38.3	65
6	30 46.0	04 69	47.6	30 43.0	05 68	46.4	30 37.5	07 66	44.7	30 33.0	08 65	43.5	30 28.0	09 63	42.4	30 22.3	10 62	41.2	30 16.0	11 61	40.1	30 05.4	13 58	38.4	6
7	30 04.3	03 69	47.6	30 02.2	04 68	46.5	29 57.8	06 66	44.8	29 54.2	07 65	43.6	29 49.9	08 63	42.4	29 45.1	09 62	41.3	29 39.6	09 61	40.2	29 30.4	11 58	38.4	7
8	29 22.6	02 69	47.7	29 21.3	03 68	46.5	29 18.1	04 66	44.8	29 15.3	06 65	43.6	29 11.8	06 63	42.5	29 07.8	07 62	41.4	29 03.2	08 61	40.2	28 55.3	10 58	38.5	8
9	28 41.0	01 70	47.7	28 40.4	01 68	46.5	28 38.4	03 66	44.8	28 36.3	04 65	43.7	28 33.7	05 63	42.5	28 30.6	05 62	41.4	28 26.8	07 61	40.3	28 20.2	08 59	38.6	9
70	27 59.3	01 70	47.7	27 59.4	00 68	46.5	27 58.6	01 66	44.8	27 57.4	03 65	43.7	27 55.6	03 63	42.6	27 53.3	04 62	41.4	27 50.4	05 61	40.3	27 45.0	07 59	38.6	70
1	27 17.6	02 70	47.7	27 18.5	01 68	46.5	27 18.9	00 66	44.8	27 18.4	01 65	43.7	27 17.5	02 64	42.6	27 15.9	03 62	41.5	27 13.9	04 61	40.3	27 09.8	06 59	38.7	1
2	26 35.9	03 69	47.6	26 37.6	02 68	46.5	26 39.1	01 66	44.8	26 39.5	00 65	43.7	26 39.3	01 64	42.6	26 38.6	02 62	41.5	26 37.4	03 61	40.4	26 34.6	04 59	38.7	2
3	25 54.3	04 69	47.6	25 56.7	04 68	46.5	25 59.4	02 66	44.8	26 00.5	01 65	43.7	26 01.1	01 64	42.6	26 01.2	01 62	41.5	26 00.9	01 61	40.4	25 59.3	02 59	38.7	3
4	25 12.7	06 69	47.6	25 15.8	05 68	46.5	25 19.6	04 66	44.8	25 21.5	03 65	43.7	25 23.0	02 64	42.6	25 23.9	01 62	41.5	25 24.3	00 61	40.4	25 24.0	01 59	38.7	4
75	24 31.1	07 69	47.5	24 35.0	06 68	46.4	24 39.9	05 66	44.8	24 42.6	04 65	43.7	24 44.8	03 64	42.6	24 46.6	03 62	41.5	24 47.8	02 61	40.4	24 48.8	00 59	38.7	75
6	23 49.5	08 69	47.5	23 54.1	07 68	46.4	24 00.2	06 66	44.7	24 03.7	05 65	43.6	24 06.7	05 63	42.5	24 09.2	04 62	41.5	24 11.3	03 61	40.4	24 13.5	02 59	38.7	6
7	23 08.0	09 69	47.4	23 13.3	09 68	46.3	23 20.5	07 66	44.7	23 24.8	07 65	43.6	23 28.6	06 63	42.5	23 31.9	06 62	41.4	23 34.8	04 61	40.3	23 38.3	03 59	38.7	7
8	22 26.5	11 69	47.3	22 32.6	10 68	46.2	22 40.9	09 66	44.6	22 45.9	08 65	43.5	22 50.5	07 63	42.5	22 54.6	06 62	41.4	22 58.3	06 61	40.3	23 03.0	05 59	38.7	8
9	21 45.1	12 69	47.2	21 51.9	11 68	46.2	22 01.3	10 66	44.6	22 07.1	09 65	43.5	22 12.4	09 63	42.4	22 17.4	08 62	41.3	22 21.9	07 61	40.3	22 27.8	06 59	38.6	9
80	21 03.7	13 69	47.1	21 11.3	12 68	46.1	21 21.8	11 66	44.5	21 28.3	11 65	43.4	21 34.4	10 63	42.3	21 40.2	09 62	41.3	21 45.4	08 61	40.2	21 52.6	07 59	38.6	80
1	20 22.4	14 69	47.0	20 30.7	13 67	46.0	20 42.3	13 66	44.4	20 49.6	12 65	43.3	20 56.5	11 63	42.3	21 03.0	11 62	41.2	21 09.1	10 61	40.1	21 17.5	09 59	38.5	1
2	19 41.2	15 69	46.9	19 50.2	15 67	45.9	20 02.9	14 66	44.3	20 10.9	13 64	43.3	20 18.6	13 63	42.2	20 25.9	12 62	41.1	20 32.7	11 60	40.1	20 42.4	10 59	38.5	2
3	19 00.0	16 68	46.8	19 09.7	16 67	45.8	19 23.6	15 65	44.2	19 32.3	14 64	43.2	19 40.8	14 63	42.1	19 48.8	13 62	41.1	19 56.5	13 60	40.0	20 07.3	12 58	38.4	3
4	18 19.0	18 68	46.7	18 29.4	17 67	45.7	18 44.3	16 65	44.1	18 53.8	16 64	43.1	19 03.0	15 63	42.0	19 11.8	14 62	41.0	19 20.3	14 60	39.9	19 32.3	13 58	38.3	4
85	17 38.0	19 68	46.6	17 49.1	18 67	45.5	18 05.1	17 65	44.0	18 15.4	17 64	42.9	18 25.3	16 63	41.9	18 34.9	16 62	40.9	18 44.1	15 60	39.8	18 57.4	14 58	38.3	85
6	16 57.1	20 68	46.4	17 08.9	19 67	45.4	17 26.0	19 65	43.9	17 37.0	18 64	42.8	17 47.7	18 63	41.8	17 58.0	17 61	40.8	18 08.1	16 60	39.7	18 22.5	16 58	38.2	6
7	16 16.3	21 68	46.3	16 28.8	21 67	45.3	16 47.0	20 65	43.7	16 58.7	19 64	42.7	17 10.1	19 62	41.7	17 21.3	18 61	40.6	17 32.1	18 60	39.6	17 47.7	17 58	38.1	7
8	15 35.6	22 68	46.1	15 48.8	22 66	45.1	16 08.1	22 65	43.6	16 20.5	21 63	42.6	16 32.7	20 62	41.5	16 44.6	20 61	40.5	16 56.2	19 60	39.5	17 13.0	18 58	37.9	8
9	14 55.0	23 67	46.0	15 08.9	23 66	44.9	15 29.2	22 65	43.4	15 42.4	22 63	42.4	15 55.4	21 62	41.4	16 08.0	21 61	40.4	16 20.4	20 60	39.4	16 38.3	20 58	37.8	9
90	14 14.6	24 67	45.8	14 29.1	24 66	44.8	14 50.5	23 64	43.3	15 04.5	23 63	42.3	15 18.1	23 62	41.3	15 31.5	22 61	40.2	15 44.7	22 60	39.2	16 03.8	21 57	37.7	90

Lat. 20°

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	24 00.0	1.0	01	180.0	23 00.0	1.0	01	180.0	21 30.0	1.0	01	180.0	20 30.0	1.0	01	180.0	19 30.0	1.0	01	180.0	18 30.0	1.0	01	180.0	17 30.0	1.0	01	180.0	16 00.0	1.0	01	180.0	00
1	23 59.6	1.0	02	179.2	22 59.6	1.0	02	179.3	21 29.7	1.0	02	179.3	20 29.7	1.0	02	179.3	19 29.7	1.0	02	179.3	18 29.7	1.0	02	179.3	17 29.7	1.0	02	179.4	15 59.7	1.0	02	179.4	1
2	23 58.5	1.0	03	178.5	22 58.5	1.0	03	178.5	21 28.6	1.0	03	178.6	20 28.6	1.0	03	178.6	19 28.7	1.0	03	178.7	18 28.7	1.0	03	178.7	17 28.7	1.0	03	178.7	15 58.8	1.0	03	178.8	2
3	23 56.6	1.0	04	177.7	22 56.7	1.0	04	177.8	21 26.8	1.0	04	177.9	20 26.9	1.0	04	177.9	19 27.0	1.0	04	178.0	18 27.1	1.0	04	178.0	17 27.2	1.0	04	178.1	15 57.3	1.0	04	178.2	3
4	23 54.0	1.0	06	177.0	22 54.2	1.0	06	177.0	21 24.4	1.0	05	177.2	20 24.5	1.0	05	177.2	19 24.7	1.0	05	177.3	18 24.8	1.0	05	177.4	17 25.0	1.0	05	177.4	15 55.2	1.0	05	177.6	4
05	23 50.7	1.0	07	176.2	22 50.9	1.0	07	176.3	21 21.3	1.0	06	176.4	20 21.5	1.0	06	176.5	19 21.7	1.0	06	176.6	18 21.9	1.0	06	176.7	17 22.2	1.0	06	176.8	15 52.5	1.0	06	176.9	05
6	23 46.6	99	08	175.4	22 46.9	99	08	175.6	21 17.4	99	07	175.7	20 17.7	99	07	175.8	19 18.1	99	07	176.0	18 18.4	99	07	176.1	17 18.7	99	07	176.2	15 49.2	99	06	176.3	6
7	23 41.7	99	09	174.7	22 42.2	99	09	174.8	21 12.9	99	09	175.0	20 13.3	99	08	175.2	19 13.8	99	08	175.3	18 14.2	99	08	175.4	17 14.6	99	08	175.5	15 45.3	99	07	175.7	7
8	23 36.1	99	10	173.9	22 36.7	99	10	174.1	21 07.6	99	10	174.3	20 08.2	99	10	174.5	19 08.8	99	09	174.6	18 09.4	99	09	174.8	17 10.0	99	09	174.9	15 40.8	99	08	175.1	8
9	23 29.8	99	12	173.2	22 30.6	99	12	173.4	21 01.7	99	11	173.6	20 02.5	99	11	173.8	19 03.2	99	10	174.0	18 03.9	99	10	174.1	17 04.6	99	10	174.3	15 35.7	99	09	174.5	9
10	23 22.8	98	13	172.4	22 23.7	98	13	172.6	20 55.1	98	12	172.9	19 56.0	98	12	173.1	18 56.9	99	11	173.3	17 57.8	99	11	173.5	16 58.7	99	11	173.7	15 30.0	99	10	173.9	10
1	23 15.0	98	14	171.7	22 16.1	98	14	171.9	20 47.8	98	13	172.2	19 48.9	98	13	172.4	18 50.0	98	12	172.6	17 51.1	98	12	172.8	16 52.2	98	12	173.0	15 23.8	98	11	173.3	1
2	23 06.5	98	15	171.0	22 07.9	98	15	171.2	20 39.9	98	14	171.5	19 41.2	98	14	171.8	18 42.5	98	14	172.0	17 43.8	98	13	172.2	16 45.0	98	13	172.4	15 16.9	98	12	172.7	2
3	22 57.3	97	16	170.2	21 58.9	97	16	170.5	20 31.2	97	15	170.8	19 32.8	97	15	171.1	18 34.3	97	15	171.3	17 35.8	98	14	171.6	16 37.3	98	14	171.8	15 09.5	98	13	172.1	3
4	22 47.4	97	18	169.5	21 49.2	97	17	169.8	20 21.9	97	17	170.2	19 23.7	97	16	170.4	18 25.5	97	16	170.7	17 27.2	97	15	170.9	16 28.9	97	15	171.2	15 01.5	97	14	171.5	4
15	22 36.7	96	19	168.8	21 38.8	97	18	169.1	20 11.9	97	18	169.5	19 14.0	97	17	169.7	18 16.0	97	17	170.0	17 18.0	97	16	170.3	16 20.0	97	16	170.6	14 52.9	97	15	170.9	15
6	22 25.4	96	20	168.0	21 27.8	96	20	168.3	20 01.3	96	19	168.8	19 03.6	96	18	169.1	18 05.9	96	18	169.4	17 08 2	96	17	169.7	16 10.4	96	17	169.9	14 43.7	96	16	170.4	6
7	22 13.4	96	21	167.3	21 16.1	96	21	167.6	19 50.0	96	20	168.1	18 52.6	96	19	168.4	17 55.2	96	19	168.7	16 57.7	96	18	169.0	16 00.3	96	18	169.3	14 34.0	96	17	169.8	7
8	22 00.7	95	22	166.6	21 03.7	95	22	166.9	19 38.1	95	21	167.4	18 41.0	95	20	167.8	17 43.9	95	20	168.1	16 46.7	95	19	168.4	15 49.5	96	19	168.7	14 23.7	95	18	169.2	8
9	21 47.3	94	23	165.9	20 50.6	94	23	166.3	19 25.5	95	22	166.8	18 28.7	95	21	167.1	17 31.9	95	21	167.5	16 35.1	95	20	167.8	15 38.2	96	20	168.1	14 12.8	95	19	168.6	9
20	21 33.2	94	24	165.2	20 36.9	94	24	165.6	19 12.3	94	23	166.1	18 15.9	94	22	166.5	17 19.4	94	22	166.8	16 22.9	94	21	167.2	15 26.3	94	21	167.5	14 01.4	94	20	168.0	20
1	21 18.5	93	26	164.5	20 22.5	93	25	164.9	18 58.5	93	24	165.5	18 02.4	93	23	165.8	17 06.2	94	23	166.2	16 10.1	94	22	166.6	15 13.9	94	22	166.9	13 49.5	94	21	167.5	1
2	21 03.1	93	27	163.8	20 07.5	93	26	164.2	18 44.0	93	25	164.8	17 48.3	93	24	165.2	16 52.5	93	24	165.6	15 56.7	93	23	166.0	15 00.8	93	23	166.3	13 37.0	93	22	166.9	2
3	20 47.0	92	28	163.1	19 51.8	92	27	163.5	18 28.9	92	26	164.2	17 33.6	92	25	164.6	16 38.2	92	25	165.0	15 42.7	92	24	165.4	14 47.2	93	23	165.8	13 23.9	93	23	166.3	3
4	20 30.3	91	29	162.4	19 35.5	91	28	162.9	18 13.2	92	27	163.5	17 18.3	92	26	163.9	16 23.2	92	26	164.4	15 28.2	92	25	164.8	14 33.1	92	24	165.2	13 10.4	92	24	165.8	4
25	20 13.0	91	30	161.8	19 18.6	91	29	162.2	17 56.9	91	28	162.9	17 02.4	91	27	163.3	16 07.8	91	27	163.7	15 13.1	91	26	164.2	14 18.4	91	25	164.6	12 56.2	91	24	165.2	25
6	19 55.1	90	31	161.1	19 01.1	90	30	161.6	17 40.0	90	29	162.3	16 45.9	90	28	162.7	15 51.7	90	28	163.1	14 57.4	90	27	163.6	14 03.2	91	26	164.0	12 41.6	91	25	164.7	6
7	19 36.5	89	32	160.4	18 43.0	89	31	160.9	17 22.5	89	30	161.6	16 28.8	90	29	162.1	15 35.1	90	29	162.6	14 41.2	90	28	163.0	13 47.4	90	27	163.5	12 26.5	90	26	164.1	7
8	19 17.3	88	33	159.8	18 24.2	89	32	160.3	17 04.5	89	31	161.0	16 11.2	89	30	161.5	15 17.9	89	30	162.0	14 24.5	89	29	162.4	13 31.1	89	28	162.9	12 10.8	89	27	163.6	8
9	18 57.5	88	34	159.1	18 04.9	88	33	159.6	16 45.8	88	32	160.4	15 53.0	88	31	160.9	15 00.2	88	30	161.4	14 07.2	88	30	161.9	13 14.2	88	29	162.4	11 54.6	88	28	163.1	9
30	18 37.2	87	35	158.5	17 45.0	87	34	159.0	16 26.6	87	33	159.8	15 34.3	87	32	160.3	14 41.9	87	31	160.8	13 49.4	88	31	161.3	12 56.9	88	30	161.8	11 38.0	88	29	162.5	30
1	18 16.2	86	36	157.9	17 24.6	86	35	158.4	16 06.9	86	34	159.2	15 15.0	86	33	159.7	14 23.1	87	32	160.2	13 31.1	87	32	160.7	12 39.0	87	31	161.3	11 20.8	87	29	162.0	1
2	17 54.7	85	37	157.2	17 03.5	85	36	157.8	15 46.6	86	35	158.6	14 55.2	86	34	159.1	14 03.8	86	33	159.7	13 12.2	86	32	160.2	12 20.6	86	31	160.7	11 03.2	86	30	161.5	2
3	17 32.6	84	38	156.6	16 41.9	85	37	157.2	15 25.8	85	36	158.0	14 34.9	85	35	158.6	13 43.9	85	34	159.1	12 52.9	85	33	159.6	12 01.8	85	32	130.2	10 45.0	85	31	161.0	3
4	17 09.9	84	39	156.0	16 19.8	84	38	156.6	15 04.4	84	37	157.4	14 14.0	84	36	158.0	13 23.5	84	35	158.6	12 33.0	84	34	159.1	11 42.4	84	33	159.7	10 26.4	85	32	160.5	4
35	16 46.8	83	40	155.4	15 57.1	83	39	156.0	14 42.5	83	37	156.9	13 52.6	83	37	157.4	13 02.7	83	36	158.0	12 12.7	83	35	158.6	11 22.6	83	34	159.1	10 07.3	84	33	160.0	35
6	16 23.0	82	40	154.8	15 33.9	82	40	155.4	14 20.1	82	38	156.3	13 30.7	82	37	156.9	12 41.3	82	36	157.5	11 51.8	82	36	158.0	11 02.3	83	35	158.6	9 47.8	83	33	159.5	6
7	15 58.8	81	41	154.2	15 10.2	81	40	154.8	13 57.2	81	39	155.7	13 08.4	81	38	156.3	12 19.5	81	37	156.9	11 30.5	82	36	157.5	10 41.5	82	36	158.1	9 27.8	82	34	159.0	7
8	15 34.0	80	42	153.6	14 46.0	80	41	154.3	13 33.7	80	40	155.2	12 45.5	81	39	155.8	11 57.1	81	38	156.4	11 08.7	81	37	157.0	10 20.2	81	36	157.6	9 07.4	81	35	158.5	8
9	15 08.7	79	43	153.1	14 21.2	79	42	153.7	13 09.8	79	41	154.6	12 22.1	80	40	155.3	11 34.3	80	39	155.9	10 46.5	80	38	156.5	9 58.5	80	37	157.1	8 46.5	80	35	158.0	9
40	14 42.9	78	44	152.5	13 56.0	78	43	153.1	12 45.5	79	41	154.1	11 58.3	79	41	154.7	11 11.1	79	40	155.4	10 23.7	79	38	156.0	9 36.4	79	38	156.6	8 25.2	79	36	157.5	40
1	14 16.7	77	45	151.9	13 30.3	77	44	152.6	12 20.6	78	43	153.6	11 34.0	78	41	154.2	10 47.3	78	40	154.9	10 00.6	78	39	155.5	9 13.8	78	38	156.1	8 03.4	78	37	157.1	1
2	13 49.9	76	45	151.4	13 04.1	76	44	152.1	11 55.3	77	43	153.1	11 09.3	77	42	153.7	10 23.2	77	41	154.4	9 37.0	77	40	155.0	8 50.7	77	39	155.7	7 41.2	77	37	156.6	2
3	13 22.7	75	46	150.9	12 37.5	75	45	151.5	11 29.5	76	44	152.5	10 44.1	76	43	153.2	9 58.5	76	42	153.9	9 12.9	76	41	154.5	8 27.3	76	40	155.2	7 18.7	76	38	156.2	3
4	12 55.0	74	47	150.3	12 10.4	74	46	151.0	11 03.3	75	45	152.0	10 18.4	75	43	152.7	9 33.5	75	42	153.4	8 48.5	75	41	154.0	8 03.4	75	40	154.7	6 55.7	75	39	155.7	4
45	12 26.9	73	48	149.8	11 42.8	73	47	150.5	10 36.6	74	45	151.5	9 52.4	74	44	152.2	9 08.0	74	43	152.9	8 23.6	74	42	153.6	7 39.1	74	41	154.3	6 32.3	74	40	155.3	45
6	11 58.3	72	48	149.3	11 14.8	72	47	150.0	10 09.5	73	46	151.0	9 25.9	73	45	151.7	8 42.1	73	44	152.4	7 58.3	73	43	153.1	7 14.4	73	42	153.8	6 08.5	73	40	154.8	6
7	11 29.3	71	49	148.8	10 46.4	71	48	149.5	9 42.0	72	46	150.6	8 59.0	72	45	151.3	8 15.8	72	44	152.0	7 32.6	72	43	152.7	6 49.3	72	42	153.4	5 44.3	72	41	154.4	7
8	10 59.8	70	50	148.3	10 17.6	70	49	149.0	9 14.1	71	47	150.1	8 31.7	71	46	150.8	7 49.1	71	45	151.5	7 06.5	71	44	152.2	6 23.9	71	43	152.9	5 19.8	71	41	154.0	8
9	10 30.0	69	50	147.8	9 48.4	69	50	148.5	8 45.8	70	48	149.6	8 03.9	70	47	150.3	7 22.0	70	46	151.0	6 40.1	70	45	151.8	5 58.0	70	44	152.5					9
50	9 59.7	68	51	147.3	9 18.7	68	50	148.0	8 17.0	69	48	149.1	7 35.8	69	47	149.9	6 54.5	69	46	150.6	6 13.2	69	45	151.3	5 31.8	69	44	152.1					50
1	9 29.0	67	52	146.8	8 48.7	67	51	147.6	7 47.9	68	49	148.7	7 07.3	68	48	149.4	6 26.7	68	47	150.2	5 46.0	68	46	150.9	5 05.2	68	45	151.6					1
2	8 58.0	66	52	146.3	8 18.2	66	51	147.1	7 18.4	67	50	148.2	6 38.5	67	49	149.0	5 58.5	67	48	149.7	5 18.4	67	46	150.5									2
3	8 26.5	65	53	145.9	7 47.4	65	52	146.7	6 48.6	65	50	147.8	6 09.2	66	49	148.6	5 29.9	66	48	149.3													3
4	7 54.7	64	54	145.4	7 16.2	64	52	146.2	6 18.3	64	51	147.4	5 39.7	65	50	148.1	5 00.9	65	49	148.9													4
55	7 22.6	63	54	145.0	6 44.7	63	53	145.8	5 47.8	63	52	146.9	5 09.7	63	50	147.7																	55
6	6 50.0	62	55	144.5	6 12.8	62	54	145.3	5 16.8	62	52	146.5																					6
7	6 17.2	61	55	144.1	5 40.6	61	54	144.9																									7
8	5 43.9	60	56	143.7	5 08.0	60	55	144.5																									8
9	5 10.4	59	56	143.3																													9

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	13 34.2	26	67	45.6	13 49.5	25	66	44.6	14 11.9	25	64	43.1	14 26.6	24	63	42.1	14 41.0	24	62	41.1	14 55.2	23	61	40.1	15 09.0	23	59	39.1	15 29.4	22	57	37.6	91
2	12 54.0	27	67	45.4	13 10.0	26	66	44.4	13 33.5	26	64	42.9	13 48.9	25	63	41.9	14 04.0	25	61	40.9	14 18.9	25	60	39.9	14 33.5	24	59	38.9	14 55.0	24	57	37.4	2
3	12 13.9	28	67	45.2	12 30.6	28	65	44.2	12 55.1	27	64	42.8	13 11.2	26	63	41.8	13 27.1	26	61	40.8	13 42.8	26	60	39.8	13 58.2	26	59	38.8	14 20.8	25	57	37.3	3
4	11 34.0	29	66	45.0	11 51.3	29	65	44.0	12 16.9	28	63	42.6	12 33.7	28	62	41.6	12 50.4	28	61	40.6	13 06.7	27	60	39.6	13 22.9	27	58	38.6	13 46.7	26	57	37.1	4
95	10 54.1	30	66	44.8	11 12.2	30	65	43.8	11 38.8	30	63	42.4	11 56.4	29	62	41.4	12 13.7	29	61	40.4	12 30.9	28	60	39.4	12 47.8	28	58	38.5	13 12.7	27	56	37.0	95
6	10 14.5	31	66	44.6	10 33.2	31	65	43.6	11 00.9	31	63	42.2	11 19.2	30	62	41.2	11 37.2	30	61	40.2	11 55.1	30	59	39.3	12 12.8	29	58	38.3	12 38.9	29	56	36.8	6
7	9 35.0	32	66	44.4	9 54.4	32	64	43.4	10 23.1	32	63	42.0	10 42.1	31	61	41.0	11 00.9	31	60	40.0	11 19.5	31	59	39.1	11 37.9	31	58	38.1	12 05.2	30	56	36.6	7
8	8 55.6	34	65	44.1	9 15.7	33	64	43.2	9 45.5	33	62	41.7	10 05.2	33	61	40.8	10 24.7	32	60	39.8	10 44.1	32	59	38.9	11 03.2	32	57	37.9	11 31.6	31	56	36.4	8
9	8 16.5	35	65	43.9	8 37.2	34	64	42.9	9 08.1	34	62	41.5	9 28.5	34	61	40.6	9 48.7	34	60	39.6	10 08.8	33	59	38.7	10 28.7	33	57	37.7	10 58.2	33	55	36.3	9
100	7 37.5	36	65	43.6	7 58.9	36	64	42.7	8 30.8	35	62	41.3	8 51.9	35	61	40.3	9 12.8	35	60	39.4	9 33.6	35	58	38.4	9 54.3	34	57	37.5	10 24.9	34	55	36.1	100
1	6 58.6	37	64	43.4	7 20.7	37	63	42.5	7 53.7	36	62	41.0	8 15.5	36	61	40.1	8 37.1	36	59	39.2	8 58.7	36	58	38.2	9 20.0	36	57	37.3	9 51.8	35	55	35.8	1
2	6 20.0	38	64	43.1	6 42.8	38	63	42.2	7 16.7	38	61	40.8	7 39.2	37	60	39.9	8 01.6	37	59	38.9	8 23.9	37	58	38.0	8 46.0	37	56	37.0	9 18.9	36	55	35.6	2
3	5 41.5	39	64	42.9	6 05.0	39	63	41.9	6 40.0	39	61	40.5	7 03.2	39	60	39.6	7 26.3	38	59	38.7	7 49.3	38	57	37.8	8 12.1	38	56	36.8	8 46.2	38	54	35.4	3
4	5 03.3	40	63	42.6	5 27.4	40	62	41.7	6 03.4	40	61	40.3	6 27.3	40	59	39.4	6 51.1	40	58	38.4	7 14.8	39	57	37.5	7 38.4	39	56	36.6	8 13.6	39	54	35.2	4
105									5 27.1	41	60	40.0	5 51.7	41	59	39.1	6 16.2	41	58	38.2	6 40.6	41	57	37.3	7 04.9	40	55	36.3	7 41.2	40	54	35.0	105
6													5 16.2	42	59	38.8	5 41.4	42	58	37.9	6 06.6	42	56	37.0	6 31.6	42	55	36.1	7 09.0	41	53	34.7	6
7																	5 06.9	43	57	37.6	5 32.7	43	56	36.7	5 58.5	43	55	35.8	6 37.0	43	53	34.5	7
8																									5 25.6	44	54	35.6	6 05.2	44	53	34.2	8
9																													5 33.6	45	52	33.9	9
110																													5 02.2	46	52	33.7	110

Lat. 20°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	55 30.0	1.0 01	00.0	55 00.0	1.0 01	00.0	54 00.0	1.0 01	00.0	53 30.0	1.0 01	00.0	53 00.0	1.0 01	00.0	52 30.0	1.0 01	00.0	51 00.0	1.0 01	00.0	50 30.0	1.0 01	00.0	00
1	55 29.5	1.0 02	01.0	54 59.5	1.0 02	01.0	53 59.5	1.0 02	01.0	53 29.5	1.0 02	00.9	52 59.5	1.0 02	00.9	52 29.6	1.0 02	00.9	50 59.6	1.0 02	00.8	50 29.6	1.0 02	00.8	1
2	55 28.0	1.0 04	02.0	54 58.0	1.0 04	02.0	53 58.1	1.0 04	01.9	53 28.2	1.0 04	01.9	52 58.2	1.0 04	01.8	52 28.3	1.0 04	01.8	50 58.4	1.0 03	01.6	50 28.4	1.0 03	01.6	2
3	55 25.5	1.0 06	03.1	54 55.6	1.0 05	03.0	53 55.8	1.0 05	02.8	53 25.9	1.0 05	02.8	52 56.0	1.0 05	02.7	52 26.1	1.0 05	02.6	50 56.4	1.0 05	02.5	50 26.5	1.0 05	02.4	3
4	55 21.9	99 07	04.1	54 52.1	99 07	04.0	53 52.5	99 07	03.8	53 22.7	99 07	03.7	52 52.9	99 07	03.6	52 23.1	99 07	03.5	50 53.6	99 06	03.3	50 23.7	99 06	03.2	4
05	55 17.4	99 09	05.1	54 47.7	99 09	05.0	53 48.3	99 09	04.7	53 18.6	99 08	04.6	52 48.9	99 08	04.5	52 19.2	99 08	04.4	50 50.0	99 07	04.1	50 20.2	99 07	04.0	05
6	55 11.9	99 11	06.1	54 42.4	99 11	06.0	53 43.2	99 10	05.7	53 13.6	99 10	05.5	52 44.0	99 10	05.4	52 14.4	99 09	05.3	50 45.6	99 09	04.9	50 15.9	99 08	04.8	6
7	55 05.4	98 12	07.1	54 36.9	98 12	06.9	53 37.2	98 12	06.6	53 07.8	98 11	06.4	52 38.3	98 11	06.3	52 08.8	98 11	06.1	50 40.4	98 10	05.7	50 10.9	98 10	05.5	7
8	54 58.0	97 14	08.1	54 28.8	97 14	07.9	53 30.3	98 13	07.5	53 01.0	98 13	07.3	52 31.7	98 12	07.2	52 02.4	98 12	07.0	50 34.4	98 11	06.5	50 05.0	98 11	06.3	8
9	54 49.6	97 16	09.1	54 20.6	97 15	08.9	53 22.4	97 15	08.4	52 53.4	97 14	08.2	52 24.3	97 14	08.0	51 55.1	97 13	07.8	50 27.6	97 12	07.3	49 58.4	97 12	07.1	9
10	54 40.2	96 17	10.0	54 11.4	96 17	09.8	53 13.7	96 16	09.3	52 44.9	96 16	09.1	52 16.0	96 15	08.9	51 47.0	96 15	08.7	50 20.1	97 14	08.1	49 51.1	97 13	07.9	10
1	54 29.9	96 19	11.0	54 01.4	96 18	10.7	53 04.2	96 18	10.2	52 35.5	96 17	10.0	52 06.8	96 17	09.7	51 38.1	96 16	09.5	50 11.8	96 15	08.8	49 43.0	96 15	08.6	1
2	54 18.7	94 20	11.9	53 50.4	94 20	11.7	52 53.7	95 19	11.1	52 25.3	95 18	10.8	51 56.9	95 18	10.6	51 28.4	95 17	10.3	50 02.8	95 16	09.6	49 34.2	95 16	09.4	2
3	54 06.6	93 22	12.9	53 38.6	93 21	12.6	52 42.4	94 20	12.0	52 14.3	94 20	11.7	51 46.1	94 19	11.4	51 17.9	94 19	11.1	49 53.0	94 17	10.4	49 24.7	95 17	10.1	3
4	53 53.6	92 23	13.8	53 25.9	92 23	13.5	52 30.3	93 22	12.8	52 02.5	93 21	12.5	51 34.6	93 21	12.2	51 06.6	93 20	11.9	49 42.5	94 19	11.1	49 14.4	94 18	10.8	4
15	53 39.7	91 25	14.7	53 12.3	91 24	14.4	52 17.4	92 23	13.7	51 49.8	92 22	13.4	51 22.2	92 22	13.0	50 54.6	92 21	12.7	49 31.3	93 20	11.8	49 03.5	93 19	11.6	15
6	53 25.0	90 26	15.6	52 57.9	90 25	15.2	52 03.6	91 24	14.5	51 36.4	91 24	14.2	51 09.1	91 23	13.8	50 41.8	91 23	13.5	49 19.4	92 21	12.6	48 51.8	92 20	12.3	6
7	53 09.4	89 27	16.4	52 42.7	89 27	16.1	51 49.1	90 26	15.3	51 22.2	90 25	15.0	50 55.2	90 24	14.6	50 28.2	90 24	14.3	49 06.8	91 22	13.3	48 39.5	91 22	13.0	7
8	52 53.1	88 29	17.3	52 26.7	88 28	16.9	51 33.8	88 27	16.1	51 07.3	89 26	15.8	50 40.6	89 26	15.4	50 13.9	89 25	15.0	48 53.5	90 23	14.0	48 26.5	90 23	13.7	8
9	52 35.9	86 30	18.1	52 09.9	87 29	17.7	51 17.8	87 28	16.9	50 51.6	87 27	16.5	50 25.3	88 27	16.2	49 58.9	88 26	15.8	48 39.5	89 24	14.7	48 12.9	89 24	14.4	9
20	52 18.0	85 31	19.0	51 52.4	85 31	18.5	51 01.0	86 29	17.7	50 35.2	86 29	17.3	50 09.3	87 28	16.9	49 43.3	87 27	16.5	48 24.8	87 25	15.4	47 58.5	88 25	15.0	20
1	51 59.3	84 32	19.8	51 34.1	84 32	19.3	50 43.5	85 30	18.5	50 18.0	85 30	18.0	49 52.5	85 29	17.6	49 26.9	86 28	17.2	48 09.5	86 27	16.1	47 43.6	87 26	15.7	1
2	51 39.9	82 34	20.5	51 15.1	83 33	20.1	50 25.3	83 31	19.2	50 00.2	84 31	18.8	49 35.1	84 30	18.3	49 09.9	84 29	17.9	47 53.6	85 28	16.7	47 28.1	85 27	16.3	2
3	51 19.7	81 35	21.3	50 55.4	81 34	20.8	50 06.4	82 32	19.9	49 41.8	82 32	19.5	49 17.0	83 31	19.0	48 52.2	83 30	18.6	47 37.1	84 29	17.4	47 11.9	84 28	17.0	3
4	50 58.9	79 36	22.0	50 35.0	80 35	21.6	49 46.9	81 34	20.6	49 22.7	81 33	20.2	48 58.3	81 32	19.7	48 33.9	82 31	19.3	47 20.0	83 30	18.0	46 55.2	83 29	17.6	4
25	50 37.4	78 37	22.8	50 14.0	78 36	22.3	49 26.7	79 35	21.3	49 02.9	80 34	20.8	48 39.0	80 33	20.4	48 15.0	80 33	19.9	47 02.3	81 30	18.6	46 37.8	82 30	18.2	25
6	50 15.3	76 38	23.5	49 52.3	77 37	23.0	49 05.9	78 36	22.0	48 42.5	78 35	21.5	48 19.0	79 34	21.0	47 55.4	79 34	20.6	46 44.0	80 31	19.2	46 19.9	80 31	18.8	6
7	49 52.6	75 39	24.1	49 30.0	75 38	23.6	48 44.5	76 37	22.6	48 21.6	77 36	22.2	47 58.5	77 35	21.7	47 35.3	77 34	21.2	46 25.1	79 32	19.8	46 01.5	79 32	19.4	7
8	49 29.2	73 40	24.8	49 07.1	74 39	24.3	48 22.5	75 38	23.3	48 00.0	75 37	22.8	47 37.4	76 36	22.3	47 14.7	76 35	21.8	46 05.7	77 33	20.4	45 42.5	77 32	19.9	8
9	49 05.2	72 41	25.5	48 43.6	72 40	24.9	47 59.9	73 39	23.9	47 37.9	74 38	23.4	47 15.7	74 37	22.9	46 53.4	75 36	22.4	45 45.8	76 34	21.0	45 23.0	76 33	20.5	9
30	48 40.7	70 42	26.1	48 19.6	71 41	25.6	47 36.8	72 39	24.5	47 15.2	72 39	24.0	46 53.5	73 38	23.5	46 31.7	73 37	23.0	45 25.4	74 35	21.5	45 03.0	75 34	21.1	30
1	48 15.7	69 43	26.7	47 55.0	69 42	26.2	47 13.2	70 40	25.1	46 52.1	71 39	24.6	46 30.8	71 39	24.1	46 09.4	72 38	23.5	45 04.4	73 36	22.1	44 42.5	73 35	21.6	1
2	47 50.1	67 44	27.3	47 29.9	68 43	26.7	46 49.0	69 41	25.7	46 28.4	69 40	25.1	46 07.6	70 39	24.6	45 46.6	70 39	24.1	44 43.0	71 36	22.6	44 21.6	72 36	22.1	2
3	47 24.0	65 44	27.9	47 04.3	66 44	27.3	46 24.4	67 42	26.2	46 04.2	68 41	25.7	45 43.9	68 40	25.1	45 23.4	68 40	24.6	44 21.1	70 37	23.1	44 00.1	70 37	22.6	3
4	46 57.4	64 45	28.4	46 38.2	64 44	27.8	45 59.2	65 43	26.7	45 39.5	66 42	26.2	45 19.7	66 41	25.7	44 59.7	67 40	25.1	43 58.8	68 38	23.6	43 38.2	69 37	23.1	4
35	46 30.3	62 46	28.9	46 11.6	63 45	28.4	45 33.6	64 43	27.3	45 14.4	64 43	26.7	44 55.0	65 42	26.2	44 35.5	65 41	25.6	43 36.0	67 39	24.1	43 15.9	67 38	23.6	35
6	46 02.8	61 47	29.5	45 44.6	61 46	28.9	45 07.6	62 44	27.8	44 48.8	63 43	27.2	44 29.9	63 43	26.7	44 10.9	64 42	26.1	43 12.8	65 39	24.5	42 53.1	66 38	24.0	6
7	45 34.9	59 47	30.0	45 17.1	59 46	29.4	44 41.1	61 45	28.3	44 22.8	61 44	27.7	44 04.4	62 43	27.1	43 45.8	62 42	26.6	42 49.2	64 40	25.0	42 30.0	64 39	24.5	7
8	45 06.5	57 48	30.4	44 49.3	58 47	29.9	44 14.2	59 45	28.7	43 56.4	60 45	28.2	43 38.5	60 44	27.6	43 20.4	61 43	27.1	42 25.1	62 41	25.4	42 06.4	63 40	24.9	8
9	44 37.8	56 49	30.9	44 21.0	56 48	30.3	43 46.9	57 46	29.2	43 29.6	58 45	28.6	43 12.2	58 44	28.0	42 54.5	59 44	27.5	42 00.7	61 41	25.9	41 42.5	61 40	25.3	9
40	44 08.6	54 49	31.3	43 52.3	55 48	30.8	43 19.2	56 47	29.6	43 02.4	56 46	29.0	42 45.5	57 45	28.5	42 28.3	57 44	27.9	41 36.0	59 42	26.3	41 18.2	59 41	25.7	40
1	43 39.1	52 50	31.8	43 23.3	53 49	31.2	42 51.2	54 47	30.0	42 34.9	55 46	29.5	42 18.4	55 46	28.9	42 01.7	56 45	28.3	41 10.8	57 42	26.7	40 53.5	58 42	26.1	1
2	43 09.3	51 50	32.2	42 54.0	51 50	31.6	42 22.8	52 48	30.4	42 07.0	53 47	29.9	41 51.0	54 46	29.3	41 34.8	54 45	28.7	40 45.3	56 43	27.1	40 28.5	56 42	26.5	2
3	42 39.1	49 51	32.6	42 24.2	50 50	32.0	41 54.1	51 48	30.8	41 38.7	51 47	30.2	41 23.2	52 47	29.7	41 07.5	53 46	29.1	40 19.5	54 43	27.4	40 03.2	55 43	26.9	3
4	42 08.5	47 51	33.0	41 54.2	48 51	32.4	41 25.0	49 49	31.2	41 10.2	50 48	30.6	40 55.2	50 47	30.0	40 40.0	51 46	29.5	39 53.4	53 44	27.8	39 37.5	53 43	27.2	4
45	41 37.7	46 52	33.3	41 23.9	46 51	32.7	40 55.7	48 49	31.6	40 41.3	48 49	31.0	40 26.8	49 48	30.4	40 12.1	49 47	29.8	39 26.9	51 44	28.1	39 11.6	51 44	27.6	45
6	41 06.6	44 52	33.7	40 53.3	45 52	33.1	40 26.0	46 50	31.9	40 12.2	47 49	31.3	39 58.1	47 48	30.7	39 43.9	48 47	30.2	39 00.2	49 45	28.5	38 45.3	50 44	27.9	6
7	40 35.2	43 53	34.0	40 22.3	43 52	33.4	39 56.1	44 50	32.2	39 42.7	45 49	31.7	39 29.1	46 49	31.1	39 15.4	46 48	30.5	38 33.2	48 45	28.8	38 18.8	48 45	28.2	7
8	40 03.5	41 53	34.3	39 51.2	42 52	33.7	39 25.9	43 51	32.5	39 13.0	43 50	32.0	38 59.9	44 49	31.4	38 46.7	44 48	30.8	38 05.9	46 46	29.1	37 52.0	47 45	28.5	8
9	39 31.6	39 53	34.6	39 19.7	40 53	34.0	38 55.4	41 51	32.9	38 43.0	42 50	32.3	38 30.4	42 49	31.7	38 17.6	43 49	31.1	37 38.3	44 46	29.4	37 24.9	45 45	28.8	9
50	38 59.5	38 54	34.9	38 48.1	38 53	34.3	38 24.7	40 52	33.1	38 12.8	40 51	32.6	38 00.7	41 50	32.0	37 48.4	41 49	31.4	37 10.5	43 47	29.7	36 57.6	43 46	29.1	50
1	38 27.1	36 54	35.2	38 16.2	37 53	34.6	37 53.8	38 52	33.4	37 42.3	38 51	32.8	37 30.7	39 50	32.2	37 18.9	40 49	31.7	36 42.5	41 47	30.0	36 30.1	42 46	29.4	1
2	37 54.5	35 55	35.4	37 44.1	35 54	34.9	37 22.6	36 52	33.7	37 11.7	37 51	33.1	37 00.5	37 51	32.5	36 49.2	38 50	31.9	36 14.3	40 47	30.2	36 02.3	40 47	29.6	2
3	37 21.7	33 55	35.7	37 11.7	34 54	35.1	36 51.3	35 53	33.9	36 40.8	35 52	33.3	36 30.1	36 51	32.8	36 19.3	36 50	32.2	35 45.8	38 48	30.5	35 34.3	39 47	29.9	3
4	36 48.7	31 55	35.9	36 39.2	32 54	35.3	36 19.7	33 53	34.2	36 09.7	34 52	33.6	35 59.5	34 51	33.0	35 49.1	35 50	32.4	35 17.1	36 48	30.7	35 06.1	37 47	30.1	4
55	36 15.5	30 55	36.2	36 06.5	30 55	35.6	35 47.9	32 53	34.4	35 38.4	32 52	33.8	35 28.7	33 52	33.2	35 18.8	33 51	32.6	34 48.2	35 48	30.9	34 37.7	35 48	30.3	55
6	35 42.2	28 56	36.4	35 33.6	29 55	35.8	35 16.0	30 53	34.6	35 07.0	31 53	34.0	34 57.7	31 52	33.4	34 48.3	32 51	32.9	34 19.2	33 49	31.1	34 09.1	34 48	30.6	6
7	35 08.7	27 56	36.6	35 00.6	27 55	36.0	34 43.9	28 54	34.8	34 35.3	29 53	34.2	34 26.6	29 52	33.6	34 17.7	30 51	33.1	33 49.9	32 49	31.3	33 40.4	32 48	30.8	7
8	34 35.0	25 56	36.7	34 27.4	26 56	36.2	34 11.7	27 54	35.0	34 03.6	27 53	34.4	33 55.3	28 52	33.8	33 46.8	28 52	33.2	33 20.5	30 49	31.5	33 11.4	31 48	31.0	8
9	34 01.2	24 56	36.9	33 54.1	24 56	36.3	33 39.3	25 54	35.2	33 31.6	26 53	34.6	33 23.8	26 53	34.0	33 15.8	27 52	33.4	32 51.0	28 50	31.7	32 42.4	29 49	31.1	9
60	33 27.3	22 57	37.1	33 20.6	23 56	36.5	33 06.7	24 54	35.3	32 59.6	24 54	34.7	32 52.2	25 53	34.2	32 44.7	25 52	33.6	32 21.3	27 50	31.9	32 13.2	27 49	31.3	60
1	32 53.3	21 57	37.2	32 47.0	21 56	36.6	32 34.1	22 55	35.5	32 27.4	23 54	34.9	32 20.5	23 53	34.3	32 13.5	24 52	33.7	31 51.4	25 50	32.0	31 43.8	26 49	31.5	1
2	32 19.1	19 57	37.4	32 13.3	20 56	36.8	32 01.3	21 55	35.6	31 55.1	21 54	35.0	31 48.6	22 53	34.5	31 42.1	22 52	33.9	31 21.5	24 50	32.2	31 14.3	24 49	31.6	2
3	31 44.9	18 57	37.5	31 39.5	18 56	36.9	31 28.4	19 55	35.7	31 22.6	20 54	35.2	31 16.7	20 53	34.6	31 10.6	21 53	34.0	30 51.4	22 50	32.3	30 44.7	23 49	31.7	3
4	31 10.5	16 57	37.6	31 05.6	16 57	37.0	30 55.4	18 55	35.9	30 50.1	18 54	35.3	30 44.6	19 54	34.7	30 39.0	19 53	34.1	30 21.2	21 50	32.4	30 15.0	21 50	31.9	4
65	30 36.1	14 57	37.7	30 31.6	15 57	37.1	30 22.4	16 55	36.0	30 17.5	17 54	35.4	30 12.5	17 54	34.8	30 07.3	18 53	34.3	29 50.9	19 51	32.6	29 45.1	19 50	32.0	65
6	30 01.6	13 58	37.8	29 57.6	13 57	37.2	29 49.2	14 55	36.1	29 44.8	15 55	35.5	29 40.2	15 54	34.9	29 35.5	16 53	34.4	29 20.5	17 51	32.7	29 15.2	18 50	32.1	6
7	29 27.0	12 58	37.9	29 23.5	12 57	37.3	29 16.0	13 55	36.2	29 12.0	13 55	35.6	29 07.9	14 54	35.0	29 03.6	14 53	34.5	28 50.0	16 51	32.8	28 45.2	16 50	32.2	7
8	28 52.3	10 58	37.9	28 49.3	11 57	37.4	28 42.7	11 56	36.3	28 39.1	12 55	35.7	28 35.5	12 54	35.1	28 31.7	13 53	34.5	28 19.5	14 51	32.9	28 15.1	15 50	32.3	8
9	28 17.7	09 58	38.0	28 15.0	09 57	37.4	28 09.3	10 56	36.3	28 06.2	10 55	35.7	28 03.0	11 54	35.2	27 59.7	11 53	34.6	27 48.9	13 51	32.9	27 45.0	13 50	32.4	9
70	27 42.9	07 58	38.1	27 40.7	08 57	37.5	27 35.9	08 56	36.4	27 33.3	09 55	35.8	27 30.5	09 54	35.2	27 27.6	10 53	34.7	27 18.2	11 51	33.0	27 14.8	12 50	32.4	70
1	27 08.1	06 58	38.1	27 06.4	06 57	37.5	27 02.4	07 56	36.4	27 00.3	07 55	35.9	26 58.0	08 54	35.3	26 55.5	08 53	34.7	26 47.5	10 51	33.1	26 44.5	10 50	32.5	1
2	26 33.3	04 58	38.1	26 32.0	05 57	37.6	26 29.0	06 56	36.5	26 27.2	06 55	35.9	26 25.4	06 54	35.3	26 23.4	07 54	34.8	26 16.7	08 51	33.1	26 14.2	09 51	32.6	2
3	25 58.5	03 58	38.2	25 57.6	03 57	37.6	25 55.4	04 56	36.5	25 54.2	04 55	35.9	25 52.8	05 54	35.4	25 51.2	05 54	34.8	25 45.9	07 51	33.2	25 43.8	07 51	32.6	3
4	25 23.7	01 58	38.2	25 23.2	02 57	37.6	25 21.9	03 56	36.5	25 21.1	03 55	36.0	25 20.1	03 54	35.4	25 19.0	04 54	34.8	25 15.0	05 51	33.2	25 13.4	05 51	32.6	4
75	24 48.9	00 58	38.2	24 48.8	00 57	37.6	24 48.4	01 56	36.5	24 48.0	02 55	36.0	24 47.4	02 54	35.4	24 46.8	02 54	34.9	24 44.1	04 51	33.2	24 43.0	04 51	32.7	75
6	24 14.0	01 58	38.2	24 14.4	01 57	37.6	24 14.8	00 56	36.5	24 14.8	00 55	36.0	24 14.8	00 54	35.4	24 14.6	00 54	34.9	24 13.2	02 51	33.2	24 12.6	02 51	32.7	6
7	23 39.2	03 58	38.2	23 40.0	03 57	37.6	23 41.3	02 56	36.5	23 41.7	01 55	36.0	23 42.1	01 54	35.4	23 42.3	01 54	34.9	23 42.3	01 51	33.2	23 42.1	01 51	32.7	7
8	23 04.4	04 58	38.1	23 05.6	04 57	37.6	23 07.7	03 56	36.5	23 08.6	03 55	36.0	23 09.4	02 54	35.4	23 10.1	02 54	34.9	23 11.4	01 51	33.2	23 11.7	01 51	32.7	8
9	22 29.6	06 58	38.1	22 31.2	06 57	37.6	22 34.2	05 56	36.5	22 35.5	04 55	35.9	22 36.8	04 54	35.4	22 37.9	04 54	34.8	22 40.5	02 51	33.2	22 41.2	02 51	32.7	9
80	21 54.8	07 58	38.1	21 56.9	07 57	37.5	22 00.7	06 56	36.4	22 02.5	06 55	35.9	22 04.1	05 54	35.4	22 05.7	05 54	34.8	22 09.7	04 51	33.2	22 10.8	04 51	32.7	80
1	21 20.1	09 58	38.0	21 22.5	08 57	37.5	21 27.2	07 56	36.4	21 29.4	07 55	35.9	21 31.5	07 54	35.3	21 33.5	06 54	34.8	21 38.8	05 51	33.2	21 40.4	05 51	32.6	1
2	20 45.4	10 58	37.9	20 48.3	10 57	37.4	20 53.8	09 56	36.4	20 56.4	09 55	35.8	20 58.9	08 54	35.3	21 01.3	08 53	34.8	21 07.9	07 51	33.1	21 10.0	06 51	32.6	2
3	20 10.7	11 58	37.9	20 14.0	11 57	37.3	20 20.4	10 56	36.3	20 23.4	10 55	35.8	20 26.4	10 54	35.2	20 29.2	10 53	34.7	20 37.1	08 51	33.1	20 39.6	08 51	32.6	3
4	19 36.1	13 58	37.8	19 39.8	12 57	37.3	19 47.0	12 55	36.2	19 50.5	11 55	35.7	19 53.9	11 54	35.2	19 57.1	11 53	34.6	20 06.4	10 51	33.1	20 09.2	09 50	32.5	4
85	19 01.6	14 58	37.7	19 05.7	14 57	37.2	19 13.7	13 55	36.2	19 17.6	13 55	35.6	19 21.4	12 54	35.1	19 25.1	12 53	34.6	19 35.6	11 51	33.0	19 39.0	11 50	32.5	85
6	18 27.1	15 57	37.6	18 31.7	15 57	37.1	18 40.5	14 55	36.1	18 44.8	14 55	35.6	18 49.0	14 54	35.0	18 53.1	14 53	34.5	19 04.9	13 51	32.9	19 08.7	12 50	32.4	6
7	17 52.7	17 57	37.5	17 57.7	16 57	37.0	18 07.3	16 55	36.0	18 12.1	16 55	35.5	18 16.7	15 54	34.9	18 21.2	15 53	34.4	18 34.3	14 51	32.9	18 38.5	14 50	32.3	7
8	17 18.4	18 57	37.4	17 23.8	18 56	36.9	17 34.3	17 55	35.9	17 39.4	17 54	35.4	17 44.4	17 54	34.9	17 49.4	16 53	34.3	18 03.8	16 51	32.8	18 08.4	15 50	32.3	8
9	16 44.2	19 57	37.3	16 49.9	19 56	36.8	17 01.2	19 55	35.8	17 06.8	18 54	35.3	17 12.2	18 53	34.8	17 17.6	18 53	34.2	17 33.3	17 51	32.7	17 38.3	17 50	32.2	9
90	16 10.0	21 57	37.2	16 16.2	20 56	36.7	16 28.3	20 55	35.7	16 34.3	20 54	35.2	16 40.1	20 53	34.6	16 45.9	19 53	34.1	17 02.9	18 51	32.6	17 08.4	18 50	32.1	90

Lat. 20°

H.A.	54° 30′ Alt.	Az.	55° 00′ Alt.	Az.	56° 00′ Alt.	Az.	56° 30′ Alt.	Az.	57° 00′ Alt.	Az.	57° 30′ Alt.	Az.	59° 00′ Alt.	Az.	59° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	15 30.0 1.0 01	180.0	15 00.0 1.0 01	180.0	14 00.0 1.0 01	180.0	13 30.0 1.0 01	180.0	13 00.0 1.0 01	180.0	12 30.0 1.0 01	180.0	11 00.0 1.0 01	180.0	10 30.0 1.0 01	180.0	00
1	15 29.7 1.0 02	179.4	14 59.7 1.0 02	179.4	13 59.7 1.0 01	179.4	13 29.7 1.0 01	179.4	12 59.7 1.0 01	179.4	12 29.7 1.0 01	179.4	10 59.7 1.0 01	179.5	10 29.7 1.0 01	179.5	1
2	15 28.8 1.0 03	178.8	14 58.8 1.0 02	178.8	13 58.9 1.0 02	178.8	13 28.9 1.0 02	178.9	12 58.9 1.0 02	178.9	12 28.9 1.0 02	178.9	10 59.0 1.0 02	179.0	10 29.0 1.0 02	179.0	2
3	15 27.3 1.0 03	178.2	14 57.4 1.0 03	178.2	13 57.4 1.0 03	178.3	13 27.5 1.0 03	178.3	12 57.5 1.0 03	178.3	12 27.6 1.0 03	178.3	10 57.7 1.0 03	178.4	10 27.7 1.0 03	178.5	3
4	15 25.3 1.0 04	177.6	14 55.3 1.0 04	177.6	13 55.5 1.0 04	177.7	13 25.5 1.0 04	177.7	12 55.6 1.0 04	177.8	12 25.7 1.0 04	177.8	10 55.9 1.0 04	177.9	10 25.9 1.0 04	177.9	4
05	15 22.6 1.0 05	177.0	14 52.7 1.0 05	177.0	13 52.9 1.0 05	177.1	13 23.0 1.0 05	177.2	12 53.1 1.0 05	177.2	12 23.2 1.0 05	177.3	10 53.6 1.0 05	177.4	10 23.7 1.0 05	177.4	05
6	15 19.3 99 06	176.4	14 49.5 99 06	176.4	13 49.8 99 06	176.5	13 20.0 99 06	176.6	12 50.1 99 06	176.7	12 20.3 99 06	176.7	10 50.7 1.0 06	176.9	10 20.9 1.0 05	176.9	6
7	15 15.5 99 07	175.8	14 45.7 99 07	175.9	13 46.1 99 07	176.0	13 16.3 99 07	176.0	12 46.5 99 07	176.1	12 16.8 99 07	176.2	10 47.3 99 06	176.3	10 17.6 99 06	176.4	7
8	15 11.1 99 08	175.2	14 41.3 99 08	175.3	13 41.9 99 08	175.4	13 12.2 99 08	175.5	12 42.4 99 08	175.5	12 12.7 99 08	175.6	10 43.5 99 07	175.8	10 13.8 99 07	175.9	8
9	15 06.1 99 09	174.6	14 36.4 99 09	174.7	13 37.1 99 09	174.8	13 07.4 99 09	174.9	12 37.8 99 09	175.0	12 08.1 99 09	175.1	10 39.1 99 08	175.3	10 09.5 99 08	175.4	9
10	15 00.5 98 10	174.0	14 30.9 99 10	174.1	13 31.7 99 10	174.3	13 02.2 99 10	174.4	12 32.6 99 10	174.4	12 03.0 98 09	174.5	10 34.3 99 09	174.8	10 04.7 99 09	174 9.	10
1	14 54.3 98 11	173.4	14 24.8 98 11	173.5	13 25.8 98 11	173.7	12 56.4 98 11	173.8	12 26.9 98 10	173.9	11 57.4 98 10	174.0	10 28.9 98 10	174.3	9 59.4 98 10	174.4	1
2	14 47.5 98 12	172.8	14 18.2 98 12	172.9	13 19.4 98 12	173.1	12 50.0 98 12	173.2	12 20.6 98 11	173.3	11 51.2 98 11	173.4	10 23.0 98 11	173.8	9 53.6 98 11	173.9	2
3	14 40.2 98 13	172.2	14 10.9 98 13	172.4	13 12.4 98 13	172.6	12 43.1 98 13	172.7	12 13.8 98 12	172.8	11 44.5 98 12	172.9	10 16.6 98 11	173.2	9 47.3 98 11	173.3	3
4	14 32.3 97 14	171.7	14 03.1 97 14	171.8	13 04.8 97 13	172.0	12 35.6 97 13	172.1	12 06.5 97 13	172.3	11 37.3 97 13	172.4	10 09.7 97 12	172.7	9 40.5 97 12	172.8	4
15	14 23.8 97 15	171.1	13 54.8 97 15	171.2	12 56.7 97 14	171.5	12 27.7 97 14	171.6	11 58.6 97 14	171.7	11 29.5 97 14	171.8	10 02.3 97 13	172.2	9 33.3 97 13	172.3	15
6	14 14.8 96 16	170.5	13 45.9 96 16	170.6	12 48.1 96 15	170.9	12 19.1 96 15	171.0	11 50.2 96 15	171.2	11 21.3 96 15	171.3	9 54.5 96 14	171.7	9 25.5 96 14	171.8	6
7	14 05.2 96 17	169.9	13 36.4 96 17	170.1	12 38.9 96 16	170.4	12 10.1 96 16	170.5	11 41.3 96 16	170.6	11 12.5 96 15	170.8	9 46.1 96 15	171.2	9 17.3 96 14	171.4	7
8	13 55.1 95 18	169.3	13 26.4 95 18	169.5	12 29.2 95 17	169.8	12 00.5 96 17	170.0	11 31.9 96 17	170.1	11 03.2 96 16	170.3	9 37.2 96 16	170.7	9 08.6 96 15	170.9	8
9	13 44.4 95 19	168.8	13 15.9 95 18	168.9	12 18.9 95 18	169.3	11 50.4 95 18	169.4	11 21.9 95 17	169.6	10 53.4 95 17	169.7	9 27.9 95 16	170.2	8 59.4 95 16	170.4	9
20	13 33.1 94 20	168.2	13 04.8 94 19	168.4	12 08.2 94 19	168.7	11 39.8 94 18	168.9	11 11.5 94 18	169.1	10 43.1 94 18	169.2	9 18.1 95 17	169.7	8 49.7 95 17	169.9	20
1	13 21.3 94 20	167.6	12 53.2 94 20	167.8	11 56.9 94 20	168.2	11 28.7 94 19	168.4	11 00.5 94 19	168.5	10 32.3 94 19	168.7	9 07.8 94 18	169.2	8 39.6 94 18	169.4	1
2	13 09.0 93 21	167.1	12 41.0 93 21	167.3	11 45.1 93 21	167.6	11 17.1 93 20	167.8	10 49.1 93 20	168.0	10 21.0 93 20	168.2	8 57.0 93 19	168.7	8 29.0 93 19	168.9	2
3	12 56.1 93 22	166.5	12 28.4 93 22	166.7	11 32.7 93 21	167.1	11 04.9 93 21	167.3	10 37.1 93 21	167.5	10 09.3 93 21	167.7	8 45.7 93 20	168.3	8 17.9 93 19	168.4	3
4	12 42.8 92 23	166.0	12 15.2 92 23	166.2	11 19.9 92 22	166.6	10 52.3 92 22	166.8	10 24.6 92 22	167.0	9 57.0 92 21	167.2	8 34.0 92 20	167.8	8 06.4 92 20	168.0	4
25	12 28.8 91 24	165.4	12 01.4 91 24	165.7	11 06.6 91 23	166.1	10 39.1 92 23	166.3	10 11.7 92 22	166.5	9 44.3 92 22	166.7	8 21.8 92 21	167.3	7 54.4 92 21	167.5	25
6	12 14.4 91 25	164.9	11 47.2 91 24	165.1	10 52.8 91 24	165.5	10 25.5 91 23	165.8	9 58.3 91 23	166.0	9 31.0 91 23	166.2	8 09.2 91 22	166.8	7 41.9 91 21	167.0	6
7	11 59.5 90 26	164.4	11 32.5 90 25	164.6	10 38.4 90 25	165.0	10 11.4 90 24	165.3	9 44.4 90 24	165.5	9 17.3 90 23	165.7	7 56.1 90 23	166.3	7 29.1 90 22	166.6	7
8	11 44.0 89 26	163.8	11 17.2 89 26	164.1	10 23.6 89 25	164.5	9 56.8 89 25	164.7	9 30.0 89 25	165.0	9 03.2 89 24	165.2	7 42.6 90 23	165.9	7 15.7 90 23	166.1	8
9	11 28.1 89 27	163.3	11 01.5 89 27	163.5	10 08.3 89 26	164.0	9 41.7 89 26	164.2	9 15.1 89 26	164.5	8 48.5 89 25	164.7	7 28.6 89 24	165.4	7 02.0 89 24	165.6	9
30	11 11.6 88 28	162.8	10 45.3 88 28	163.0	9 52.6 88 27	163.5	9 26.2 88 27	163.8	8 59.8 88 26	164.0	8 33.4 88 26	164.2	7 14.2 88 25	165.0	6 47.8 88 24	165.2	30
1	10 54.7 87 29	162.3	10 28.6 87 28	162.5	9 36.3 87 28	163.0	9 10.2 87 27	163.3	8 44.1 87 27	163.5	8 17.9 87 27	163.8	6 59.3 87 25	164.5	6 33.2 87 25	164.7	1
2	10 37.3 86 30	161.8	10 11.4 86 29	162.0	9 19.6 86 29	162.5	8 53.7 86 28	162.8	8 27.8 86 28	163.0	8 01.9 86 27	163.3	6 44.1 87 26	164.0	6 18.1 87 26	164.3	2
3	10 19.4 85 31	161.2	9 53.8 85 30	161.5	9 02.5 86 29	162.0	8 36.8 86 29	162.3	8 11.1 86 29	162.6	7 45.5 86 28	162.8	6 28.4 86 27	163.6	6 02.6 86 26	163.9	3
4	10 01.0 85 31	160.7	9 35.7 85 31	161.0	8 44.9 85 30	161.6	8 19.5 85 30	161.8	7 54.0 85 29	162.1	7 28.6 85 29	162.4	6 12.2 85 28	163.2	5 46.8 85 27	163.4	4
35	9 42.2 84 32	160.2	9 17.1 84 32	160.5	8 26.8 84 31	161.1	8 01.7 84 30	161.4	7 36.5 84 30	161.6	7 11.3 84 30	161.9	5 55.7 84 28	162.7	5 30.5 84 28	163.0	35
6	9 22.9 83 33	159.8	8 58.1 83 32	160.0	8 08.3 83 31	160.6	7 43.4 83 31	160.9	7 18.5 83 31	161.2	6 53.6 83 30	161.5	5 38.7 83 29	162.3	5 13.8 83 29	162.6	6
7	9 03.2 82 34	159.3	8 38.6 82 33	159.6	7 49.4 82 32	160.1	7 24.7 82 32	160.4	7 00.1 82 31	160.7	6 35.4 82 31	161.0	5 21.4 82 30	161.9			7
8	8 43.0 81 34	158.8	8 18.7 81 34	159.1	7 30.0 81 33	159.7	7 05.6 81 32	160.0	6 41.3 81 32	160.3	6 16.9 81 32	160.6	5 03.6 81 30	161.4			8
9	8 22.4 80 35	158.3	7 58.4 80 35	158.6	7 10.2 80 34	159.2	6 46.1 80 33	159.5	6 22.0 80 33	159.8	5 57.9 80 32	160.1					9
40	8 01.4 79 36	157.9	7 37.6 79 35	158.2	6 50.0 79 34	158.8	6 26.2 79 34	159.1	6 02.4 79 33	159.4	5 38.5 79 33	159.7					40
1	7 39.9 78 36	157.4	7 16.4 78 36	157.7	6 29.4 78 35	158.3	6 05.9 78 35	158.6	5 42.3 79 34	159.0	5 18.8 79 34	159.3					1
2	7 18.0 77 37	156.9	6 54.8 77 37	157.3	6 08.4 77 36	157.9	5 45.1 77 35	158.2	5 21.9 78 35	158.5							2
3	6 55.8 76 38	156.5	6 32.8 76 37	156.8	5 47.0 76 36	157.5	5 24.0 77 36	157.8	5 01.0 77 35	158.1							3
4	6 33.1 75 38	156.0	6 10.4 75 38	156.4	5 25.2 75 37	157.0	5 02.5 76 36	157.4									4
45	6 10.0 74 39	155.6	5 47.6 74 38	155.9	5 03.0 74 38	156.6											45
6	5 46.5 73 40	155.2	5 24.5 73 39	155.5													6
7	5 22.6 72 40	154.7	5 00.9 72 40	155.1													7

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30′ Alt.	Az.	55° 00′ Alt.	Az.	56° 00′ Alt.	Az.	56° 30′ Alt.	Az.	57° 00′ Alt.	Az.	57° 30′ Alt.	Az.	59° 00′ Alt.	Az.	59° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
91	15 36.0 22 56	37.1	15 42.6 22 56	36.6	15 55.5 21 55	35.5	16 01.8 21 54	35.0	16 08.1 21 53	34.5	16 14.3 21 52	34.0	16 32.5 20 50	32.5	16 38.4 20 50	32.0	91
2	15 02.1 23 56	36.9	15 09.0 23 56	36.4	15 22.8 23 54	35.4	15 29.5 22 54	34.9	15 36.2 22 53	34.4	15 42.8 22 52	33.9	16 02.3 21 50	32.4	16 08.6 21 50	31.9	2
3	14 28.2 25 56	36.8	14 35.6 24 56	36.3	14 50.1 24 54	35.3	14 57.3 24 53	34.8	15 04.4 24 53	34.3	15 11.4 23 52	33.8	15 32.1 23 50	32.3	15 38.9 22 49	31.8	3
4	13 54.5 26 56	36.6	14 02.3 26 55	36.1	14 17.6 25 54	35.1	14 25.2 25 53	34.6	14 32.7 25 53	34.1	14 40.1 25 52	33.6	15 02.1 24 50	32.1	15 09.3 24 49	31.6	4
95	13 20.9 27 56	36.5	13 29.1 27 55	36.0	13 45.2 27 54	35.0	13 53.2 27 53	34.5	14 01.1 26 52	34.0	14 09.0 26 52	33.5	14 32.2 25 50	32.0	14 39.8 25 49	31.5	95
6	12 47.5 29 56	36.3	12 56.0 28 55	35.8	13 13.0 28 54	34.8	13 21.3 28 53	34.3	13 29.6 28 52	33.8	13 37.9 27 52	33.4	14 02.3 27 50	31.9	14 10.3 27 49	31.4	6
7	12 14.2 30 55	36.1	12 23.1 30 55	35.7	12 40.8 29 53	34.7	12 49.6 29 53	34.2	12 58.3 29 52	33.7	13 07.0 29 51	33.2	13 32.6 28 49	31.7	13 41.1 28 49	31.2	7
8	11 41.0 31 55	36.0	11 50.3 31 54	35.5	12 08.8 31 53	34.5	12 18.0 31 52	34.0	12 27.1 30 52	33.5	12 36.2 30 51	33.0	13 03.0 30 49	31.6	13 11.9 29 49	31.1	8
9	11 08.0 32 55	35.8	11 17.7 32 54	35.3	11 36.9 32 53	34.3	11 46.5 32 52	33.8	11 56.1 32 52	33.4	12 05.5 31 51	32.9	12 33.6 31 49	31.4	12 42.8 31 48	30.9	9
100	10 35.1 34 55	35.6	10 45.2 34 54	35.1	11 05.2 33 53	34.1	11 15.2 33 52	33.7	11 25.1 33 51	33.2	11 35.0 33 51	32.7	12 04.3 32 49	31.2	12 13.9 32 48	30.8	100
1	10 02.4 35 54	35.4	10 12.8 35 54	34.9	10 33.7 35 52	33.9	10 44.0 34 52	33.5	10 54.3 34 51	33.0	11 04.6 34 50	32.5	11 35.1 34 48	31.1	11 45.2 34 48	30.6	1
2	9 29.8 36 54	35.2	9 40.7 36 53	34.7	10 02.3 36 52	33.7	10 13.0 36 51	33.3	10 23.7 36 51	32.8	10 34.4 35 50	32.3	11 06.1 35 48	30.9	11 16.6 35 48	30.4	2
3	8 57.4 38 54	34.9	9 08.7 37 53	34.5	9 31.0 37 52	33.5	9 42.2 37 51	33.1	9 53.2 37 50	32.6	10 04.3 37 50	32.1	10 37.2 36 48	30.7	10 48.1 36 47	30.2	3
4	8 25.2 39 53	34.7	8 36.8 39 53	34.3	9 00.0 39 52	33.3	9 11.5 38 51	32.9	9 23.0 38 50	32.4	9 34.4 38 50	31.9	10 08.5 38 48	30.5	10 19.8 38 47	30.0	4
105	7 53.2 40 53	34.5	8 05.2 40 52	34.0	8 29.1 40 51	33.1	8 41.0 40 51	32.6	8 52.9 40 50	32.2	9 04.7 39 49	31.7	9 40.0 39 47	30.3	9 51.7 39 47	29.8	105
6	7 21.4 41 53	34.3	7 33.7 41 52	33.8	7 58.4 41 51	32.9	8 10.7 41 50	32.4	8 22.9 41 50	31.9	8 35.1 41 49	31.5	9 11.6 40 47	30.1	9 23.7 40 46	29.6	6
7	6 49.7 43 52	34.0	7 02.5 42 52	33.6	7 27.9 42 50	32.6	7 40.5 42 50	32.2	7 53.2 42 49	31.7	8 05.8 42 49	31.3	8 43.4 42 47	29.9	8 55.9 42 46	29.4	7
8	6 18.3 44 52	33.8	6 31.4 44 51	33.3	6 57.6 44 50	32.4	7 10.6 43 50	31.9	7 23.6 43 49	31.5	7 36.6 43 48	31.0	8 15.4 43 46	29.7	8 28.3 43 46	29.2	8
9	5 47.1 45 52	33.5	6 00.6 45 51	33.0	6 27.5 45 50	32.1	6 40.9 45 49	31.7	6 54.3 45 49	31.2	7 07.7 45 48	30.8	7 47.6 44 46	29.4	8 00.9 44 46	29.0	9
110	5 16.1 46 52	33.2	5 29.9 46 51	32.8	5 57.6 46 50	31.9	6 11.4 46 49	31.4	6 25.1 46 48	31.0	6 38.9 46 48	30.6	7 20.0 46 46	29.2	7 33.6 45 45	28.8	110
1					5 27.9 47 50	31.6	5 42.1 47 49	31.2	5 56.2 47 48	30.7	6 10.3 47 47	30.3	6 52.6 47 45	29.0	7 06.6 47 45	28.5	1
2							5 13.0 48 48	30.9	5 27.5 48 48	30.5	5 42.0 48 47	30.0	6 25.4 48 45	28.7	6 39.8 48 44	28.3	2
3											5 13.9 50 47	29.8	5 58.4 49 45	28.5	6 13.2 49 44	28.0	3
4													5 31.6 51 44	28.2	5 46.8 51 44	27.8	4
115													5 05.1 52 44	27.9	5 20.6 52 44	27.5	115

Lat. 20°

H.A.	60° 00′		60° 30′		62° 00′		62° 30′		63° 00′		69° 00′		69° 30′		74° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	50 00.0 1.0 01	00.0	49 30.0 1.0 01	00.0	48 00.0 1.0 01	00.0	47 30.0 1.0 01	00.0	47 00.0 1.0 01	00.0	41 00.0 1.0 00	00.0	40 30.0 1.0 00	00.0	35 30.0 1.0 00	00.0	00
1	49 59.6 1.0 02	00.8	49 29.6 1.0 02	00.8	47 59.7 1.0 02	00.7	47 29.7 1.0 02	00.7	46 59.7 1.0 02	00.7	40 59.8 1.0 01	00.5	40 29.8 1.0 01	00.5	35 29.8 1.0 01	00.3	1
2	49 58.5 1.0 03	01.6	49 28.5 1.0 03	01.5	47 58.6 1.0 03	01.4	47 28.7 1.0 03	01.4	46 58.7 1.0 03	01.3	40 59.1 1.0 02	00.9	40 29.1 1.0 02	00.9	35 29.4 1.0 01	00.7	2
3	49 56.6 1.0 04	02.3	49 26.6 1.0 04	02.3	47 56.9 1.0 04	02.1	47 27.0 1.0 04	02.0	46 57.1 1.0 04	02.0	40 57.9 1.0 03	01.4	40 28.0 1.0 03	01.4	35 28.5 1.0 02	01.0	3
4	49 53.9 99 06	03.1	49 24.0 99 05	03.0	47 54.5 1.0 05	02.8	47 24.6 1.0 05	02.7	46 54.8 1.0 05	02.7	40 56.3 1.0 04	01.9	40 26.4 1.0 04	01.8	35 27.4 1.0 02	01.3	4
05	49 50.5 99 07	03.9	49 20.7 99 07	03.8	47 51.4 99 06	03.5	47 21.6 99 06	03.4	46 51.8 99 06	03.3	40 54.2 99 04	02.4	40 24.3 99 04	02.3	35 26.0 99 03	01.6	05
6	49 46.3 99 08	04.6	49 16.6 99 08	04.5	47 47.6 99 07	04.2	47 17.9 99 07	04.1	46 48.2 99 07	04.0	40 51.6 99 05	02.8	40 21.9 99 05	02.8	35 24.2 99 03	02.0	6
7	49 41.3 98 09	05.4	49 11.8 98 09	05.3	47 43.2 99 09	04.9	47 13.6 99 08	04.8	46 44.0 99 08	04.6	40 48.6 99 06	03.3	40 18.9 99 06	03.2	35 22.1 99 04	02.3	7
8	49 35.6 98 11	06.2	49 06.3 98 10	06.0	47 38.0 98 10	05.6	47 08.6 98 10	05.4	46 39.1 98 09	05.3	40 45.1 98 06	03.8	40 15.5 99 06	03.7	35 19.7 99 04	02.6	8
9	49 29.2 97 12	06.9	49 00.0 97 12	06.7	47 32.2 98 11	06.2	47 02.9 98 11	06.1	46 33.6 98 10	05.9	40 41.2 98 07	04.2	40 11.7 98 07	04.1	35 17.0 98 05	02.9	9
10	49 22.1 97 13	07.7	48 53.0 97 13	07.5	47 25.8 97 12	06.9	46 56.6 97 12	06.7	46 27.5 97 11	06.6	40 36.8 98 08	04.7	40 07.5 98 08	04.6	35 13.9 98 05	03.3	10
1	49 14.2 96 14	08.4	48 45.3 96 14	08.2	47 18.6 96 13	07.6	46 49.7 97 13	07.4	46 20.7 97 12	07.2	40 31.9 97 09	05.2	40 02.8 97 09	05.0	35 10.6 98 06	03.6	1
2	49 05.6 96 16	09.1	48 37.0 96 15	08.9	47 10.9 96 14	08.3	46 42.1 96 14	08.0	46 13.3 96 13	07.8	40 26.6 97 10	05.6	39 57.6 97 09	05.5	35 06.9 97 07	03.9	2
3	48 56.3 96 17	09.9	48 27.9 96 16	09.6	47 02.4 96 15	08.9	46 33.9 96 15	08.7	46 05.3 96 14	08.5	40 20.9 96 10	06.1	39 52.0 96 10	05.9	35 02.9 97 07	04.2	3
4	48 46.3 94 18	10.6	48 18.1 94 17	10.3	46 53.4 94 16	09.6	46 25.1 94 16	09.3	45 56.7 94 15	09.1	40 14.7 95 11	06.5	39 46.0 96 11	06.3	34 58.6 96 08	04.5	4
15	48 35.6 93 19	11.3	48 07.7 93 18	11.0	46 43.7 93 17	10.2	46 15.6 94 17	10.0	45 47.5 94 16	09.7	40 08.1 95 12	07.0	39 39.6 95 11	06.8	34 54.0 96 08	04.8	15
6	48 24.2 92 20	12.0	47 56.6 92 20	11.7	46 33.4 93 18	10.8	46 05.6 93 18	10.6	45 37.7 93 17	10.3	40 01.0 94 13	07.4	39 32.8 94 12	07.2	34 49.1 95 09	05.1	6
7	48 12.2 91 21	12.7	47 44.8 91 20	12.4	46 22.5 92 19	11.5	45 54.9 92 19	11.2	45 27.4 92 18	10.9	39 53.5 93 13	07.8	39 25.5 93 13	07.6	34 43.9 94 09	05.5	7
8	47 59.5 90 22	13.3	47 32.4 90 22	13.0	46 11.0 91 20	12.1	45 43.7 91 20	11.8	45 16.4 91 19	11.5	39 45.6 93 14	08.3	39 17.8 93 13	08.0	34 38.4 93 10	05.8	8
9	47 46.2 89 23	14.0	47 19.4 89 23	13.7	45 58.9 90 21	12.7	45 31.9 90 21	12.4	45 04.9 90 20	12.1	39 37.3 92 15	08.7	39 09.7 92 14	08.5	34 32.6 93 10	06.1	9
20	47 32.2 88 24	14.7	47 05.8 88 24	14.3	45 46.2 89 22	13.3	45 19.5 89 22	13.0	44 52.8 89 21	12.7	39 28.5 91 15	09.1	39 01.2 91 15	08.9	34 26.5 92 11	06.4	20
1	47 17.6 87 25	15.3	46 51.5 87 25	15.0	45 32.9 88 23	13.9	45 06.6 88 23	13.6	44 40.2 88 22	13.2	39 19.4 90 16	09.6	38 52.4 90 15	09.3	34 20.1 91 11	06.7	1
2	47 02.4 86 26	16.0	46 36.7 86 26	15.6	45 19.1 87 24	14.5	44 53.1 87 24	14.1	44 27.0 87 23	13.8	39 09.8 89 17	10.0	38 43.1 89 16	09.7	34 13.4 90 12	07.0	2
3	46 46.6 84 27	16.6	46 21.3 85 27	16.2	45 04.7 85 25	15.1	44 39.0 86 24	14.7	44 13.3 86 24	14.3	38 59.9 88 17	10.4	38 33.4 88 17	10.1	34 06.4 90 12	07.2	3
4	46 30.2 83 28	17.2	46 05.3 83 28	16.8	44 49.8 84 26	15.6	44 24.5 84 25	15.2	43 59.1 85 25	14.9	38 49.5 87 18	10.8	38 23.3 87 17	10.5	33 59.2 89 13	07.5	4
25	46 13.3 82 29	17.8	45 48.7 82 29	17.3	44 34.4 83 27	16.2	44 09.4 83 26	15.8	43 44.4 84 25	15.4	38 38.8 86 19	11.2	38 12.9 86 18	10.9	33 51.6 88 13	07.8	25
6	45 55.8 81 30	18.4	45 31.6 81 29	17.9	44 18.4 82 28	16.7	43 53.8 82 27	16.3	43 29.2 82 26	15.9	38 27.6 85 19	11.6	38 02.1 85 19	11.2	33 43.8 87 13	08.1	6
7	45 37.8 79 31	18.9	45 14.0 80 30	18.5	44 01.9 81 28	17.2	43 37.7 81 28	16.8	43 13.5 81 27	16.4	38 16.1 84 20	12.0	37 50.9 84 19	11.6	33 35.8 86 14	08.4	7
8	45 19.2 78 32	19.5	44 55.8 78 31	19.1	43 45.0 79 29	17.8	43 21.2 80 29	17.3	42 57.3 80 28	16.9	38 04.3 83 20	12.3	37 39.4 83 20	12.0	33 27.4 85 14	08.6	8
9	45 00.1 77 33	20.0	44 37.1 77 32	19.6	43 27.5 78 30	18.3	43 04.1 78 29	17.8	42 40.6 79 29	17.4	37 52.0 82 21	12.7	37 27.5 82 20	12.4	33 18.8 84 15	08.9	9
30	44 40.6 75 33	20.6	44 18.0 75 33	20.1	43 09.6 76 31	18.8	42 46.6 77 30	18.3	42 23.5 77 29	17.9	37 39.5 80 22	13.1	37 15.3 81 21	12.7	33 09.9 83 15	09.2	30
1	44 20.5 74 34	21.1	43 58.4 74 33	20.6	42 51.2 75 31	19.3	42 28.7 75 31	18.8	42 06.0 76 30	18.4	37 26.5 79 22	13.4	37 02.7 80 21	13.1	33 00.8 82 16	09.4	1
2	44 00.0 72 35	21.6	43 38.3 73 34	21.1	42 32.4 74 32	19.7	42 10.3 74 32	19.3	41 48.0 74 31	18.8	37 13.2 78 23	13.8	36 49.8 78 22	13.4	32 51.4 81 16	09.7	2
3	43 39.0 71 36	22.1	43 17.7 71 35	21.6	42 13.2 72 33	20.2	41 51.4 73 32	19.7	41 29.6 73 31	19.3	36 59.6 77 23	14.1	36 36.6 77 23	13.7	32 41.8 79 16	10.0	3
4	43 17.5 69 36	22.6	42 56.7 70 36	22.1	41 53.5 71 33	20.7	41 32.2 71 33	20.2	41 10.8 72 32	19.7	36 45.7 75 24	14.5	36 23.0 76 23	14.1	32 31.9 78 17	10.2	4
35	42 55.7 68 37	23.1	42 35.3 68 36	22.6	41 33.4 69 34	21.1	41 12.5 70 33	20.6	40 51.5 70 33	20.1	36 31.4 74 24	14.8	36 09.1 74 24	14.4	32 21.8 77 17	10.5	35
6	42 33.4 66 38	23.5	42 13.4 67 37	23.0	41 12.9 68 35	21.5	40 52.5 69 34	21.0	40 31.9 68 33	20.6	36 16.9 73 25	15.1	35 55.0 73 24	14.7	32 11.5 76 18	10.7	6
7	42 10.7 65 38	24.0	41 51.2 65 38	23.4	40 52.0 66 35	21.9	40 32.1 67 35	21.4	40 12.0 67 34	21.0	36 02.0 71 25	15.5	35 40.5 72 25	15.0	32 00.9 75 18	10.9	7
8	41 47.6 63 39	24.4	41 28.6 64 38	23.9	40 30.8 65 36	22.3	40 11.3 65 35	21.8	39 51.6 66 35	21.4	35 46.8 70 26	15.8	35 25.7 70 25	15.3	31 50.1 73 18	11.2	8
9	41 24.1 62 40	24.8	41 05.6 62 39	24.3	40 09.2 63 37	22.7	39 50.1 64 36	22.2	39 30.9 64 35	21.7	35 31.3 69 26	16.1	35 10.6 69 25	15.6	31 39.0 72 19	11.4	9
40	41 00.3 60 40	25.2	40 42.2 60 40	24.7	39 47.2 62 37	23.1	39 28.6 62 36	22.6	39 09.9 63 36	22.1	35 15.5 67 27	16.4	34 55.3 68 26	15.9	31 27.8 71 19	11.6	40
1	40 36.1 58 41	25.6	40 18.5 59 40	25.1	39 24.9 60 38	23.5	39 06.8 61 37	23.0	38 48.5 61 36	22.5	34 59.5 66 27	16.7	34 39.7 66 26	16.2	31 16.3 69 19	11.8	1
2	40 11.6 57 41	26.0	39 54.5 57 41	25.4	39 02.3 59 38	23.9	38 44.6 59 37	23.3	38 26.8 60 37	22.8	34 43.2 64 28	17.0	34 23.8 65 27	16.5	31 04.7 68 20	12.1	2
3	39 46.7 55 42	26.3	39 30.1 56 41	25.8	38 39.3 57 39	24.2	38 22.1 58 38	23.7	38 04.7 58 37	23.2	34 26.6 63 28	17.2	34 07.7 63 27	16.8	30 52.8 67 20	12.3	3
4	39 21.5 54 42	26.7	39 05.4 54 42	26.1	38 16.0 56 39	24.5	37 59.3 56 38	24.0	37 42.4 57 38	23.5	34 09.8 61 28	17.5	33 51.3 61 28	17.0	30 40.7 65 20	12.5	4
45	38 56.1 52 43	27.0	38 40.4 53 42	26.5	37 52.5 54 40	24.9	37 36.2 54 39	24.3	37 19.8 55 38	23.8	33 52.7 60 29	17.8	33 34.6 60 28	17.3	30 28.5 64 21	12.7	45
6	38 30.3 50 43	27.4	38 15.1 51 43	26.8	37 28.6 52 40	25.2	37 12.8 53 39	24.6	36 56.9 53 39	24.1	33 35.3 58 29	18.0	33 17.8 59 28	17.5	30 16.0 62 21	12.9	6
7	38 04.2 49 44	27.7	37 49.5 49 43	27.1	37 04.5 51 41	25.5	36 49.2 51 40	25.0	36 33.7 52 39	24.4	33 17.8 57 30	18.3	33 00.7 57 29	17.8	30 03.4 61 21	13.1	7
8	37 37.9 47 44	28.0	37 23.7 48 43	27.4	36 40.1 49 41	25.8	36 25.3 50 40	25.2	36 10.3 50 39	24.7	33 00.0 55 30	18.5	32 43.3 56 29	18.0	29 50.5 59 22	13.2	8
9	37 11.3 46 45	28.3	36 57.6 46 44	27.7	36 15.4 48 42	26.1	36 01.1 48 41	25.5	35 46.6 49 40	25.0	32 42.0 54 30	18.7	32 25.8 54 30	18.2	29 37.5 58 22	13.4	9
50	36 44.5 44 45	28.6	36 31.2 44 44	28.0	35 50.5 46 42	26.3	35 36.7 46 41	25.8	35 22.7 47 40	25.2	32 23.8 52 31	19.0	32 08.0 53 30	18.5	29 24.4 56 22	13.6	50
1	36 17.4 42 45	28.8	36 04.7 43 45	28.3	35 25.4 44 42	26.6	35 12.0 45 41	26.0	34 58.5 45 41	25.5	32 05.3 51 31	19.2	31 50.8 51 30	18.7	29 11.0 55 22	13.8	1
2	35 50.1 41 46	29.1	35 37.9 41 45	28.5	35 00.1 43 43	26.8	34 47.2 43 42	26.3	34 34.1 44 41	25.8	31 46.7 49 31	19.4	31 31.9 50 31	18.9	28 57.6 53 23	13.9	2
3	35 22.6 39 46	29.3	35 10.8 40 45	28.8	34 34.5 41 43	27.1	34 22.1 42 42	26.5	34 09.5 42 41	26.0	31 27.9 48 32	19.6	31 13.5 48 31	19.1	28 43.9 52 23	14.1	3
4	34 54.9 38 47	29.6	34 43.6 38 46	29.0	34 08.7 40 43	27.3	33 56.8 40 42	26.8	33 44.7 41 42	26.2	31 08.9 46 32	19.8	30 55.0 46 31	19.3	28 30.1 50 23	14.2	4
55	34 27.0 36 47	29.8	34 16.2 36 46	29.2	33 42.7 38 43	27.5	33 31.3 38 43	27.0	33 19.7 39 42	26.4	30 49.7 44 32	20.0	30 36.3 45 31	19.5	28 16.2 49 23	14.4	55
6	33 58.9 34 47	30.0	33 48.6 35 46	29.4	33 16.6 36 44	27.7	33 05.6 37 43	27.2	32 54.5 37 42	26.6	30 30.3 43 32	20.2	30 17.4 43 32	19.6	28 02.1 47 24	14.5	6
7	33 30.7 33 47	30.2	33 20.8 33 47	29.6	32 50.2 35 44	27.9	32 39.8 35 43	27.4	32 29.2 36 43	26.8	30 10.8 41 33	20.3	29 58.4 42 32	19.8	27 47.9 45 24	14.7	7
8	33 02.2 31 48	30.4	32 52.8 32 47	29.8	32 23.7 33 44	28.1	32 13.8 34 44	27.6	32 03.6 34 43	27.0	29 51.1 39 33	20.5	29 39.2 40 32	20.0	27 33.5 44 24	14.8	8
9	32 33.6 29 48	30.6	32 24.7 30 47	30.0	31 57.1 31 45	28.3	31 47.6 32 44	27.7	31 37.9 32 43	27.2	29 31.3 38 33	20.7	29 19.9 38 32	20.1	27 19.0 42 24	14.9	9
60	32 04.9 28 48	30.7	31 56.4 28 47	30.2	31 30.3 30 45	28.5	31 21.3 30 44	27.9	31 12.1 31 43	27.4	29 11.3 36 33	20.8	29 00.4 37 33	20.3	27 04.4 41 24	15.1	60
1	31 36.0 26 48	30.9	31 28.0 27 48	30.3	31 03.3 28 45	28.6	30 54.8 29 44	28.1	30 46.1 29 43	27.5	28 51.2 35 34	21.0	28 40.8 35 33	20.4	26 49.7 39 25	15.2	1
2	31 07.0 25 49	31.0	30 59.5 25 48	30.5	30 36.2 27 45	28.8	30 28.2 27 45	28.2	30 20.0 28 44	27.7	28 30.9 33 34	21.1	28 21.0 33 33	20.6	26 34.9 37 25	15.3	2
3	30 37.8 23 49	31.2	30 30.9 24 48	30.6	30 09.0 25 45	28.9	30 01.4 26 45	28.4	29 53.7 26 44	27.8	28 10.5 31 34	21.2	28 01.1 32 33	20.7	26 20.0 36 25	15.4	3
4	30 08.6 21 49	31.3	30 02.1 22 48	30.7	29 41.7 23 46	29.1	29 34.6 24 45	28.5	29 27.4 24 44	27.9	27 50.1 30 34	21.4	27 41.2 30 33	20.8	26 05.0 34 25	15.5	4
65	29 39.3 20 49	31.4	29 33.2 20 48	30.9	29 14.2 22 46	29.2	29 07.6 22 45	28.6	29 00.9 23 44	28.1	27 29.5 28 34	21.5	27 21.1 28 34	20.9	25 49.8 32 25	15.6	65
6	29 09.8 18 49	31.5	29 04.2 19 48	31.0	28 46.7 20 46	29.3	28 40.6 21 45	28.7	28 34.3 21 44	28.2	27 08.8 26 35	21.6	27 00.9 27 34	21.0	25 34.6 31 25	15.7	6
7	28 40.3 17 49	31.6	28 35.2 17 49	31.1	28 19.1 19 46	29.4	28 13.4 19 45	28.8	28 07.6 19 44	28.3	26 48.0 25 35	21.7	26 40.6 25 34	21.1	25 19.3 29 26	15.8	7
8	28 10.7 15 50	31.7	28 06.0 16 49	31.2	27 51.3 17 46	29.5	27 46.2 17 45	28.9	27 40.9 18 45	28.4	26 27.1 23 35	21.8	26 20.2 23 34	21.2	25 03.9 27 26	15.9	8
9	27 41.0 14 50	31.8	27 36.8 14 49	31.3	27 23.5 16 46	29.6	27 18.9 16 46	29.0	27 14.0 16 45	28.5	26 06.2 21 35	21.9	25 59.7 22 34	21.3	24 48.5 26 26	16.0	9
70	27 11.2 12 50	31.9	27 07.5 13 49	31.3	26 55.7 14 46	29.7	26 51.5 14 46	29.1	26 47.1 15 45	28.5	25 45.1 20 35	22.0	25 39.2 20 34	21.4	24 32.9 24 26	16.0	70
1	26 41.4 11 50	31.9	26 38.2 11 49	31.4	26 27.8 12 47	29.7	26 24.0 13 46	29.2	26 20.2 13 45	28.6	25 24.0 18 35	22.0	25 18.5 18 34	21.5	24 17.3 22 26	16.1	1
2	26 11.6 09 50	32.0	26 08.8 09 49	31.4	25 59.8 11 47	29.8	25 56.5 11 46	29.2	25 53.1 12 45	28.7	25 02.8 16 35	22.1	24 57.9 17 35	21.6	24 01.7 21 26	16.2	2
3	25 41.7 07 50	32.0	25 39.4 08 49	31.5	25 31.7 09 47	29.8	25 29.0 09 46	29.3	25 26.0 10 45	28.7	24 41.6 15 35	22.2	24 37.1 15 35	21.6	23 46.0 19 26	16.2	3
4	25 11.7 06 50	32.1	25 09.9 06 49	31.5	25 03.7 08 47	29.9	25 01.4 08 46	29.3	24 58.9 08 45	28.8	24 20.3 13 35	22.2	24 16.3 13 35	21.7	23 30.2 17 26	16.3	4
75	24 41.8 04 50	32.1	24 40.4 05 49	31.6	24 35.6 06 47	29.9	24 33.7 06 46	29.4	24 31.8 07 45	28.8	23 59.0 11 36	22.3	23 55.5 12 35	21.7	23 14.4 16 26	16.3	75
6	24 11.8 03 50	32.1	24 10.9 03 49	31.6	24 07.4 04 47	29.9	24 06.1 05 46	29.4	24 04.6 05 45	28.8	23 37.6 10 36	22.3	23 34.6 10 35	21.8	22 58.5 14 26	16.4	6
7	23 41.8 01 50	32.1	23 41.3 02 49	31.6	23 39.3 03 47	30.0	23 38.4 03 46	29.4	23 37.4 04 45	28.9	23 16.2 08 36	22.3	23 13.7 09 35	21.8	22 42.6 12 26	16.4	7
8	23 11.8 00 50	32.1	23 11.8 00 49	31.6	23 11.1 01 47	30.0	23 10.7 02 46	29.4	23 10.1 02 45	28.9	22 54.7 07 36	22.4	22 52.7 07 35	21.8	22 26.7 10 27	16.4	8
9	22 41.8 02 50	32.1	22 42.2 01 49	31.6	22 43.0 00 47	30.0	22 43.0 00 46	29.4	22 42.9 00 45	28.9	22 33.3 05 36	22.4	22 31.7 05 35	21.8	22 10.7 09 27	16.5	9
80	22 11.8 03 50	32.1	22 12.7 03 49	31.6	22 14.8 02 47	30.0	22 15.3 01 46	29.4	22 15.6 01 45	28.9	22 11.8 03 36	22.4	22 10.8 04 35	21.9	21 54.7 07 27	16.5	80
1	21 41.8 05 50	32.1	21 43.2 04 49	31.6	21 46.6 03 47	30.0	21 47.6 03 46	29.4	21 48.4 03 45	28.9	21 50.3 02 36	22.4	21 49.8 02 35	21.9	21 38.7 05 27	16.5	1
2	21 11.9 06 50	32.1	21 13.7 06 49	31.5	21 18.5 05 47	29.9	21 19.9 04 46	29.4	21 21.2 04 45	28.9	21 28.8 00 36	22.4	21 28.7 00 35	21.9	21 22.7 04 27	16.5	2
3	20 41.9 08 50	32.0	20 44.2 07 49	31.5	20 50.4 06 47	29.9	20 52.2 06 46	29.4	20 54.0 06 45	28.8	21 07.3 01 36	22.4	21 07.7 01 35	21.9	21 06.7 02 27	16.5	3
4	20 12.0 09 50	32.0	20 14.7 09 49	31.5	20 22.3 08 47	29.9	20 24.6 08 46	29.3	20 26.8 07 45	28.8	20 45.8 03 36	22.4	20 46.7 03 35	21.9	20 50.7 00 27	16.5	4
85	19 42.2 11 50	31.9	19 45.3 10 49	31.4	19 54.2 09 47	29.8	19 57.0 09 46	29.3	19 59.6 09 45	28.8	20 24.3 05 36	22.4	20 25.7 05 35	21.9	20 34.6 01 27	16.5	85
6	19 12.4 12 50	31.9	19 16.0 12 49	31.4	19 26.2 11 47	29.8	19 29.4 10 46	29.2	19 32.5 10 45	28.7	20 02.8 06 36	22.4	20 04.7 06 35	21.8	20 18.6 03 27	16.5	6
7	18 42.6 14 50	31.8	18 46.7 13 49	31.3	18 58.2 12 46	29.7	19 01.9 12 46	29.2	19 05.5 12 45	28.7	19 41.4 08 36	22.3	19 43.8 08 35	21.8	20 02.6 06 27	16.5	7
8	18 12.9 15 49	31.7	18 17.4 15 49	31.2	18 30.3 14 46	29.7	18 34.4 14 46	29.1	18 38.4 13 45	28.6	19 20.0 10 36	22.3	19 22.9 09 35	21.8	19 46.6 08 27	16.5	8
9	17 43.3 16 49	31.7	17 48.2 16 49	31.1	18 02.4 15 46	29.6	18 07.0 15 46	29.1	18 11.5 15 45	28.5	18 58.6 11 36	22.3	19 01.9 11 35	21.7	19 30.6 08 27	16.5	9
90	17 13.8 18 49	31.6	17 19.1 18 48	31.1	17 34.6 17 46	29.5	17 39.6 17 46	29.0	17 44.6 16 45	28.5	18 37.2 13 35	22.2	18 41.1 13 35	21.7	19 14.6 10 27	16.4	90

H.A.	60° 00′ Alt.	Az.	60° 30′ Alt.	Az.	62° 00′ Alt.	Az.	62° 30′ Alt.	Az.	63° 00′ Alt.	Az.	69° 00′ Alt.	Az.	69° 30′ Alt.	Az.	74° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	16 44.3 19 49	31.5	16 50.1 19 48	31.0	17 06.9 18 46	29.4	17 12.3 18 45	28.9	17 17.7 18 45	28.4	18 16.0 15 35	22.2	18 20.3 14 35	21.6	18 58.7 11 27	16.4	91
2	16 14.9 21 49	31.4	16 21.1 21 48	30.9	16 39.2 20 46	29.3	16 45.1 20 45	28.8	16 51.0 19 45	28.3	17 54.7 16 35	22.1	17 59.5 16 35	21.6	18 42.7 13 26	16.4	2
3	15 45.6 22 49	31.3	15 52.2 22 48	30.7	16 11.7 21 46	29.2	16 18.0 21 45	28.7	16 24.3 21 44	28.2	17 33.5 18 35	22.0	17 38.8 17 35	21.5	18 26.9 15 26	16.3	3
4	15 16.4 24 49	31.1	15 23.4 23 48	30.6	15 44.2 23 46	29.1	15 51.0 23 45	28.6	15 57.7 22 44	28.1	17 12.4 19 35	22.0	17 18.1 19 34	21.5	18 11.0 16 26	16.3	4
95	14 47.3 25 48	31.0	14 54.8 25 48	30.5	15 16.8 24 46	29.0	15 24.0 24 45	28.5	15 31.2 24 44	28.0	16 51.3 21 35	21.9	16 57.5 21 34	21.4	17 55.2 18 26	16.2	95
6	14 18.3 26 48	30.9	14 26.2 26 47	30.4	14 49.5 26 45	28.9	14 57.2 25 45	28.4	15 04.7 25 44	27.9	16 30.3 22 35	21.8	16 37.0 22 34	21.3	17 39.5 20 26	16.2	6
7	13 49.4 28 48	30.7	13 57.8 28 47	30.2	14 22.3 27 45	28.8	14 30.4 27 44	28.3	14 38.4 27 44	27.8	16 09.4 24 35	21.7	16 16.5 24 34	21.2	17 23.8 21 26	16.1	7
8	13 20.7 29 48	30.6	13 29.4 29 47	30.1	13 55.3 28 45	28.6	14 03.8 28 44	28.1	14 12.2 28 43	27.6	15 48.6 25 35	21.6	15 56.1 25 34	21.1	17 08.1 23 26	16.1	8
9	12 52.1 31 48	30.4	13 01.2 30 47	29.9	13 28.3 30 45	28.5	13 37.3 30 44	28.0	13 46.1 29 43	27.5	15 27.8 27 35	21.5	15 35.9 27 34	21.0	16 52.5 24 26	16.0	9
100	12 23.6 32 47	30.3	12 33.1 32 47	29.8	13 01.5 31 45	28.3	13 10.9 31 44	27.8	13 20.2 31 43	27.4	15 07.1 28 34	21.4	15 15.7 28 34	20.9	16 37.0 26 26	15.9	100
1	11 55.2 33 47	30.1	12 05.2 33 46	29.6	12 34.8 33 44	28.2	12 44.6 33 44	27.7	12 54.3 32 43	27.2	14 46.6 30 34	21.3	14 55.5 30 33	20.8	16 21.6 28 26	15.9	1
2	11 27.0 35 47	29.9	11 37.4 35 46	29.5	12 08.3 34 44	28.0	12 18.5 34 43	27.5	12 28.6 34 43	27.1	14 26.1 32 34	21.2	14 35.5 31 33	20.7	16 06.2 29 26	15.8	2
3	10 58.9 36 47	29.8	11 09.7 36 46	29.3	11 41.9 35 44	27.8	11 52.5 35 43	27.4	12 03.0 35 42	26.9	14 05.8 33 34	21.1	14 15.6 33 33	20.6	15 50.9 31 25	15.7	3
4	10 31.0 37 46	29.6	10 42.2 37 46	29.1	11 15.6 37 43	27.7	11 26.6 37 43	27.2	11 37.6 37 42	26.7	13 45.5 34 34	21.0	13 55.8 34 33	20.5	15 35.7 32 25	15.6	4
105	10 03.3 39 46	29.4	10 14.9 39 45	28.9	10 49.5 38 43	27.5	11 00.9 38 43	27.0	11 12.3 38 42	26.6	13 25.4 36 33	20.8	13 36.2 36 33	20.4	15 20.5 34 25	15.5	105
6	9 35.7 40 46	29.2	9 47.7 40 45	28.7	10 23.5 40 43	27.3	10 35.4 39 42	26.8	10 47.2 39 42	26.4	13 05.4 37 33	20.7	13 16.6 37 32	20.2	15 05.5 35 25	15.4	6
7	9 08.3 41 45	29.0	9 20.7 41 45	28.5	9 57.7 41 43	27.1	10 10.0 41 42	26.7	10 22.2 41 41	26.2	12 45.5 39 33	20.6	12 57.2 39 32	20.1	14 50.5 37 25	15.3	7
8	8 41.1 43 45	28.8	8 53.9 43 44	28.3	9 32.1 42 42	26.9	9 44.8 42 42	26.5	9 57.4 42 41	26.0	12 25.8 40 33	20.4	12 37.8 40 32	20.0	14 35.7 38 25	15.2	8
9	8 14.1 44 45	28.5	8 27.3 44 44	28.1	9 06.7 44 42	26.7	9 19.8 44 42	26.3	9 32.8 43 41	25.8	12 06.2 42 32	20.3	12 18.7 42 32	19.8	14 20.9 40 24	15.1	9
110	7 47.3 45 44	28.3	8 00.8 45 44	27.9	8 41.4 45 42	26.5	8 54.9 45 41	26.1	9 08.3 45 40	25.6	11 46.7 43 32	20.1	11 59.6 43 32	19.7	14 06.3 41 24	15.0	110
1	7 20.6 47 44	28.1	7 34.6 47 43	27.6	8 16.4 46 42	26.3	8 30.2 46 41	25.8	8 44.1 46 40	25.4	11 27.4 45 32	20.0	11 40.7 44 31	19.5	13 51.7 43 24	14.9	1
2	6 54.2 48 44	27.8	7 08.6 48 43	27.4	7 51.5 48 41	26.1	8 05.8 47 41	25.6	8 20.0 47 40	25.2	11 08.2 46 32	19.8	11 22.0 46 31	19.3	13 37.3 44 24	14.8	2
3	6 28.0 49 43	27.6	6 42.7 49 43	27.2	7 26.8 49 41	25.8	7 41.5 49 40	25.4	7 56.1 49 40	25.0	10 49.2 47 31	19.6	11 03.4 47 31	19.2	13 23.0 46 24	14.6	3
4	6 02.0 50 43	27.3	6 17.1 50 42	26.9	7 02.4 50 41	25.6	7 17.4 50 40	25.2	7 32.4 50 39	24.7	10 30.3 49 31	19.4	10 44.9 49 30	19.0	13 08.8 47 24	14.5	4
115	5 36.2 52 43	27.1	5 51.7 52 42	26.7	6 38.1 51 40	25.4	6 53.5 51 39	24.9	7 08.9 51 39	24.5	10 11.6 50 31	19.3	10 26.7 50 30	18.8	12 54.7 49 23	14.4	115
6	5 10.6 53 43	26.8	5 26.5 53 42	26.4	6 14.1 53 40	25.1	6 29.9 53 39	24.7	6 45.7 53 39	24.3	9 53.1 51 30	19.1	10 08.6 51 30	18.6	12 40.8 50 23	14.3	6
7			5 01.6 54 41	26.1	5 50.2 54 39	24.9	6 06.4 54 39	24.4	6 22.6 54 38	24.0	9 34.8 53 30	18.9	9 50.6 53 30	18.5	12 27.0 51 23	14.1	7
8					5 26.6 55 39	24.6	5 43.2 55 38	24.2	5 59.8 55 38	23.8	9 16.6 54 30	18.7	9 32.8 54 29	18.3	12 13.3 53 23	14.0	8
9					5 03.3 57 38	24.3	5 20.2 56 38	23.9	5 37.2 56 37	23.5	8 58.6 55 30	18.5	9 15.3 55 29	18.1	11 59.7 54 22	13.8	9
120									5 14.8 58 37	23.3	8 40.8 57 29	18.3	8 57.9 57 29	17.9	11 46.3 56 22	13.7	120
1											8 23.2 58 29	18.1	8 40.6 58 28	17.7	11 33.1 57 22	13.5	1
2											8 05.8 59 29	17.9	8 23.6 59 28	17.5	11 20.0 58 22	13.4	2
3											7 48.6 61 28	17.7	8 06.8 61 28	17.3	11 07.0 60 21	13.2	3
4											7 31.6 62 28	17.4	7 50.2 62 28	17.0	10 54.2 61 21	13.0	4
125											7 14.8 63 28	17.2	7 33.7 63 27	16.8	10 41.6 62 21	12.9	125
6											6 58.2 64 27	17.0	7 17.5 64 27	16.6	10 29.1 63 21	12.7	6
7											6 41.9 66 27	16.7	7 01.5 65 26	16.4	10 16.8 65 20	12.5	7
8											6 25.8 67 27	16.5	6 45.8 67 26	16.1	10 04.6 66 20	12.4	8
9											6 09.8 68 26	16.3	6 30.2 68 26	15.9	9 52.7 67 20	12.2	9
130											5 54.2 69 26	16.0	6 14.9 69 25	15.7	9 40.9 68 20	12.0	130
1											5 38.7 70 25	15.8	5 59.8 70 25	15.4	9 29.2 69 19	11.8	1
2											5 23.5 71 25	15.5	5 44.9 71 24	15.2	9 17.8 71 19	11.6	2
3											5 08.6 72 25	15.3	5 30.3 72 24	14.9	9 06.6 72 18	11.4	3
4													5 15.9 73 24	14.7	8 55.5 73 18	11.2	4

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	60° 00′ Alt.	Az.	60° 30′ Alt.	Az.	62° 00′ Alt.	Az.	62° 30′ Alt.	Az.	63° 00′ Alt.	Az.	69° 30′ Alt.	Az.	74° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	10 00.0 1.0 00	180.0	9 30.0 1.0 00	180.0	8 00.0 1.0 00	180.0	7 30.0 1.0 00	180.0	7 00.0 1.0 00	180.0			8 44.6 74 18	11.0	135
1	9 59.8 1.0 01	179.5	9 29.8 1.0 01	179.5	7 59.8 1.0 01	179.5	7 29.8 1.0 01	179.5	6 59.8 1.0 01	179.5			8 33.9 75 18	10.8	6
2	9 59.0 1.0 02	179.0	9 29.0 1.0 02	179.0	7 59.1 1.0 02	179.1	7 29.1 1.0 02	179.1	6 59.1 1.0 02	179.1			8 23.4 76 17	10.6	7
3	9 57.8 1.0 03	178.5	9 27.8 1.0 03	178.5	7 57.9 1.0 03	178.6	7 27.9 1.0 03	178.6	6 58.0 1.0 03	178.6			8 13.2 77 17	10.4	8
4	9 56.0 1.0 04	178.0	9 26.1 1.0 04	178.0	7 56.3 1.0 04	178.1	7 26.3 1.0 03	178.1	6 56.4 1.0 03	178.2			8 03.1 78 16	10.2	9
05	9 53.8 1.0 05	177.5	9 23.9 1.0 05	177.5	7 54.2 1.0 04	177.6	7 24.3 1.0 04	177.7	6 54.4 1.0 04	177.7			7 53.2 79 16	10.0	140
6	9 51.0 1.0 05	177.0	9 21.2 1.0 05	177.0	7 51.6 1.0 05	177.2	7 21.8 1.0 05	177.2	6 51.9 1.0 05	177.3			7 43.5 80 16	09.8	1
7	9 47.8 99 06	176.5	9 18.0 99 06	176.5	7 48.6 99 06	176.7	7 18.8 99 06	176.7	6 49.0 99 06	176.8			7 34.1 81 15	09.6	2
8	9 44.0 99 07	176.0	9 14.3 99 07	176.0	7 45.1 99 06	176.2	7 15.4 99 06	176.3	6 45.6 99 06	176.4			7 24.8 82 15	09.3	3
9	9 39.8 99 08	175.4	9 10.2 99 08	175.5	7 41.2 99 07	175.8	7 11.5 99 07	175.8	6 41.8 99 07	175.9			7 15.8 83 15	09.1	4
10	9 35.1 99 09	174.9	9 05.5 99 08	175.0	7 36.7 99 08	175.3	7 07.2 99 08	175.4	6 37.6 99 08	175.4			7 06.9 84 14	08.9	145
1	9 29.9 98 10	174.4	9 00.4 98 09	174.5	7 31.9 98 09	174.8	7 02.4 98 09	174.9	6 32.9 98 09	175.0			6 58.3 85 14	08.7	6
2	9 24.2 98 10	174.0	8 54.8 98 10	174.1	7 26.6 98 10	174.4	6 57.1 98 09	174.5	6 27.7 98 09	174.5			6 50.0 86 14	08.4	7
3	9 18.0 98 11	173.5	8 48.7 98 11	173.6	7 20.8 98 10	173.9	6 51.5 98 10	174.0	6 22.2 98 10	174.1			6 41.8 87 13	08.2	8
4	9 11.3 97 12	173.0	8 42.1 97 12	173.1	7 14.6 97 11	173.4	6 45.3 97 11	173.5	6 16.1 97 11	173.7			6 33.9 87 13	08.0	9
15	9 04.2 97 13	172.5	8 35.1 97 13	172.6	7 07.9 97 12	173.0	6 38.8 97 12	173.1	6 09.7 97 11	173.2			6 26.2 88 12	07.7	150
6	8 56.6 97 14	172.0	8 27.6 97 13	172.1	7 00.7 97 13	172.5	6 31.8 97 12	172.6	6 02.8 97 12	172.8			6 18.7 89 12	07.5	1
7	8 48.5 96 14	171.5	8 19.6 96 14	171.6	6 53.2 96 13	172.1	6 24.3 96 13	172.2	5 55.5 96 13	172.3			6 11.5 90 12	07.2	2
8	8 39.9 96 15	171.0	8 11.2 96 15	171.2	6 45.2 96 14	171.6	6 16.5 96 14	171.7	5 47.8 96 14	171.9			6 04.5 90 11	07.0	3
9	8 30.8 95 16	170.5	8 02.3 95 16	170.7	6 36.7 95 15	171.1	6 08.2 95 15	171.3	5 39.6 95 14	171.5			5 57.7 91 11	06.8	4
20	8 21.3 95 17	170.0	7 52.9 95 16	170.2	6 27.8 95 16	170.7	5 59.4 95 15	170.9	5 31.0 95 15	171.0			5 51.2 92 10	06.5	155
1	8 11.3 94 17	169.6	7 43.1 94 17	169.7	6 18.5 94 16	170.3	5 50.2 94 16	170.4	5 22.0 94 16	170.6			5 44.9 92 10	06.3	6
2	8 00.9 93 18	169.1	7 32.9 94 18	169.3	6 08.7 94 17	169.8	5 40.7 94 17	170.0	5 12.6 94 16	170.2			5 38.9 93 10	06.0	7
3	7 50.0 93 19	168.6	7 22.2 93 19	168.8	5 58.5 93 18	169.4	5 30.7 93 17	169.6	5 02.8 93 17	169.7			5 33.1 94 09	05.8	8
4	7 38.7 92 20	168.2	7 11.0 92 19	168.4	5 47.9 92 18	168.9	5 20.2 92 18	169.1					5 27.6 94 09	05.5	9
25	7 26.9 92 20	167.7	6 59.4 92 20	167.9	5 36.9 92 19	168.5	5 09.4 92 18	168.7					5 22.3 95 08	05.3	160
6	7 14.6 91 21	167.2	6 47.4 91 21	167.4	5 25.4 91 20	168.1							5 17.2 95 08	05.0	1
7	7 02.0 90 22	166.8	6 34.9 90 21	167.0	5 13.6 90 20	167.6							5 12.4 96 08	04.8	2
8	6 48.9 90 23	166.3	6 22.0 90 22	166.5	5 01.3 90 21	167.2							5 07.9 96 07	04.5	3
9	6 35.3 89 23	165.9	6 08.7 89 23	166.1									5 03.6 97 07	04.2	4
30	6 21.3 88 24	165.4	5 54.9 88 24	165.7											
1	6 06.9 87 25	165.0	5 40.7 87 24	165.2											
2	5 52.1 87 25	164.6	5 26.2 87 25	164.8											
3	5 36.9 86 26	164.1	5 11.2 86 25	164.4											
4	5 21.3 85 27	163.7													
35	5 05.3 84 28	163.3													

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 20°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	74	180	78	180	82	180	86	180	90	...	86	00	82	00	78	00	74	00	70	00	66	00	00
4	74	166	77	162	81	154	84	136	86	89	85	42	81	24	77	16	74	12	70	09	66	07	4
8	72	153	76	146	79	135	81	116	82	89	82	60	79	41	76	29	73	22	69	17	65	14	8
12	70	142	73	134	76	123	78	107	79	88	78	68	76	52	74	39	71	31	68	25	64	20	12
16	68	134	70	126	73	115	74	102	75	87	75	72	73	58	71	47	69	38	66	31	63	25	16
20	65	127	67	119	69	110	71	99	71	87	71	74	70	62	68	52	66	43	64	36	61	30	20
24	62	121	64	114	66	105	67	96	67	86	67	75	67	65	65	56	64	48	61	41	59	34	24
28	58	117	60	110	62	102	63	94	64	85	64	76	63	67	62	59	61	51	59	44	57	38	28
32	55	113	57	107	58	100	59	92	60	84	60	76	60	68	59	61	58	53	56	47	54	41	32
36	51	110	53	104	55	97	56	91	56	84	56	76	56	69	56	62	55	55	53	49	52	43	36
40	48	107	50	101	51	96	52	89	53	83	53	76	53	70	52	63	52	57	50	51	49	45	40
44	44	105	46	99	47	94	48	88	49	82	49	76	49	70	49	64	48	58	48	52	46	46	44
48	41	102	42	97	43	92	44	87	45	81	46	76	46	70	46	64	45	59	45	53	44	48	48
52	37	100	38	96	40	91	41	86	41	81	42	75	42	70	42	64	42	59	42	54	41	49	52
56	33	99	35	94	36	89	37	85	38	80	38	75	39	70	39	64	39	59	39	54	38	49	56
60	30	97	31	93	32	88	33	84	34	79	35	74	35	69	35	64	36	59	35	55	35	50	60
64	26	95	27	91	28	87	29	82	30	78	31	73	32	69	32	64	32	59	32	55	32	50	64
68	22	94	23	90	25	86	26	81	27	77	27	73	28	68	29	64	29	59	29	55	29	50	68
72	18	92	20	88	21	84	22	80	23	76	24	72	25	67	25	63	26	59	26	54	27	50	72
76	15	91	16	87	17	83	18	79	19	75	20	71	21	67	22	63	23	58	23	54	24	50	76
80	11	90	12	86	13	82	15	78	16	74	17	70	18	66	19	62	19	58	20	53	21	49	80
84	07	88	08	84	10	81	11	77	12	73	13	69	14	65	15	61	16	57	17	53	18	49	84
88	03	87	05	83	06	79	07	76	08	72	10	68	11	64	12	60	13	56	14	52	15	48	88
92	01	86	01	82	02	78	04	74	05	70	06	67	08	63	09	59	10	55	11	51	12	47	92
96	04	84	03	80	01	77	00	73	01	69	03	65	04	62	06	58	07	54	08	50	10	47	96
100	08	83	07	79	05	75	04	72	02	68	01	64	01	60	02	57	04	53	05	49	07	46	100
104	12	81	10	78	09	74	07	70	06	66	04	63	02	59	01	55	01	52	03	48	04	44	104
108	15	80	14	76	12	72	11	68	09	65	07	61	05	57	04	54	02	50	00	47	02	43	108
112	19	78	18	74	16	71	14	67	12	63	11	59	09	56	07	52	05	49	03	45	01	42	112
116	23	76	21	73	19	69	18	65	16	61	14	58	12	54	10	51	08	47	05	44	03	40	116
120	26	75	25	71	23	67	21	63	19	59	17	56	15	52	13	49	10	45	08	42	06	39	120
124	30	73	28	69	26	65	24	61	22	57	20	54	18	50	15	47	13	43	11	40	08	37	124
128	34	71	32	66	30	62	28	59	25	55	23	51	21	48	18	45	15	41	13	38	10	35	128
132	37	68	35	64	33	60	31	56	28	53	26	49	23	46	21	42	18	39	15	36	12	33	132
136	41	66	38	61	36	57	34	53	31	50	29	46	26	43	23	40	20	37	17	34	14	31	136
140	44	63	42	58	39	54	37	50	34	47	31	43	28	40	25	37	22	34	19	31	16	29	140
144	47	60	45	55	42	51	40	47	37	44	34	40	31	37	28	34	24	31	21	29	18	26	144
148	50	56	48	51	45	47	42	43	39	40	36	37	33	34	30	31	26	29	23	26	20	24	148
152	53	52	51	47	48	43	45	39	42	36	38	33	35	30	31	28	28	25	25	23	21	21	152
156	56	47	53	42	50	38	47	35	44	32	40	29	37	27	33	24	30	22	26	20	22	18	156
160	59	41	56	37	52	33	49	30	45	27	42	25	38	23	35	21	31	19	27	17	23	16	160
164	61	35	58	31	54	28	51	25	47	22	43	20	40	18	36	17	32	15	28	14	24	13	164
168	63	27	60	24	56	21	52	19	48	17	44	15	41	14	37	13	33	12	29	10	25	10	168
172	65	19	61	16	57	14	53	13	49	12	45	10	41	09	37	09	33	08	30	07	26	06	172
176	66	10	62	08	58	07	54	07	50	06	46	05	42	05	38	04	34	04	30	04	26	03	176
180	66	00	62	00	58	00	54	00	50	00	46	00	42	00	38	00	34	00	30	00	26	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	62	00	58	00	54	00	50	00	46	00	42	00	38	00	34	00	30	00	26	00	22	00	00
4	62	06	58	05	54	04	50	03	46	03	42	02	38	02	34	01	30	01	26	00	22	00	4
8	61	11	57	09	54	08	50	06	46	05	42	04	38	03	34	02	30	02	26	01	22	00	8
12	60	16	57	13	53	11	49	09	45	07	41	06	38	05	34	03	30	02	26	01	22	00	12
16	59	21	56	18	52	15	48	12	45	10	41	08	37	06	33	05	30	03	26	02	22	01	16
20	58	25	54	21	51	18	48	15	44	12	40	10	37	08	33	06	29	04	26	02	22	01	20
24	56	29	53	25	50	21	47	17	43	14	40	11	36	09	33	07	29	05	25	03	22	01	24
28	54	32	51	28	48	23	45	20	42	16	39	13	36	10	32	08	29	05	25	03	22	01	28
32	52	35	49	30	47	26	44	22	41	18	38	15	35	12	32	09	28	06	25	04	22	01	32
36	50	37	48	32	45	28	43	24	40	20	37	16	34	13	31	10	28	07	25	04	22	01	36
40	47	39	45	34	43	30	41	25	39	21	36	17	33	14	30	10	28	07	25	04	22	01	40
44	45	41	43	36	41	31	39	27	37	22	35	18	32	15	30	11	27	08	24	05	21	01	44
48	42	42	41	37	39	33	38	28	36	24	34	20	31	16	29	12	26	08	24	05	21	02	48
52	40	43	39	38	37	34	36	29	34	25	32	20	30	16	28	12	26	09	24	05	21	02	52
56	37	44	36	39	35	35	34	30	33	26	31	21	29	17	27	13	25	09	23	05	21	02	56
60	35	45	34	40	33	35	32	31	31	26	30	22	28	18	26	14	25	10	23	06	21	02	60
64	32	45	32	40	31	36	30	31	29	27	28	22	27	18	26	14	24	10	23	06	21	02	64
68	29	45	29	41	29	36	28	32	27	27	27	23	26	19	25	14	23	10	22	06	21	02	68
72	27	45	27	41	26	36	26	32	26	28	25	23	25	19	24	15	23	10	22	06	21	02	72
76	24	45	24	41	24	37	24	32	24	28	24	23	23	19	23	15	22	10	21	06	20	02	76
80	21	45	22	41	22	36	22	32	22	28	22	23	22	19	22	15	21	11	21	06	20	02	80
84	19	45	19	40	20	36	20	32	21	28	21	23	21	19	21	15	21	11	21	06	20	02	84
88	16	44	17	40	18	36	18	32	19	28	19	23	20	19	20	15	20	11	20	06	20	02	88
92	13	43	14	39	15	35	16	31	17	27	18	23	18	19	19	15	19	11	20	06	20	02	92
96	11	43	12	39	13	35	14	31	15	27	16	23	17	19	18	15	19	11	19	06	20	02	96
100	08	42	10	38	11	34	12	30	14	26	15	22	16	18	17	14	18	10	19	06	20	02	100
104	06	41	07	37	09	33	11	30	12	26	13	22	15	18	16	14	17	10	18	06	20	02	104
108	03	40	05	36	07	32	09	29	10	25	12	21	14	18	15	14	17	10	18	06	19	02	108
112	01	38	03	35	05	31	07	28	09	24	11	21	13	17	14	13	16	10	18	06	19	02	112
116	*01*	37	01	34	03	30	05	27	07	23	09	20	11	16	13	13	15	09	17	06	19	02	116
120	*03*	35	*01*	32	01	29	04	26	06	22	08	19	10	16	13	12	15	09	17	05	19	02	120
124	*06*	34	*03*	31	*01*	28	02	25	04	21	07	18	09	15	12	12	14	09	17	05	19	02	124
128	*08*	32	*05*	29	*02*	26	00	23	03	20	06	17	08	14	11	11	14	08	16	05	19	02	128
132	*10*	30	*07*	27	*04*	25	*01*	22	02	19	05	16	08	13	10	11	13	08	16	05	19	02	132
136	*11*	28	*08*	26	*05*	23	*02*	20	01	18	04	15	07	12	10	10	13	07	16	04	19	01	136
140	*13*	26	*10*	24	*07*	21	*04*	19	*00*	16	03	14	06	12	09	09	12	07	15	04	18	01	140
144	*15*	24	*11*	22	*08*	19	*05*	17	*01*	15	02	13	05	11	09	08	12	06	15	04	18	01	144
148	*16*	22	*13*	20	*09*	17	*06*	15	*02*	13	01	11	05	09	08	07	11	05	15	03	18	01	148
152	*18*	19	*14*	17	*10*	15	*07*	14	*03*	12	00	10	04	08	08	07	11	05	15	03	18	01	152
156	*19*	17	*15*	15	*11*	13	*08*	12	*04*	10	*00*	09	03	07	07	06	11	04	15	03	18	01	156
160	*20*	14	*16*	13	*12*	11	*08*	10	*05*	09	*01*	07	03	06	07	05	11	03	14	02	18	01	160
164	*21*	11	*17*	10	*13*	09	*09*	08	*05*	07	*01*	06	03	05	07	04	10	03	14	02	18	01	164
168	*21*	09	*17*	08	*13*	07	*09*	06	*05*	05	*02*	04	02	04	06	03	10	02	14	01	18	00	168
172	*22*	06	*18*	05	*14*	05	*10*	04	*06*	04	*02*	03	02	02	06	02	10	01	14	01	18	00	172
176	*22*	03	*18*	03	*14*	02	*10*	02	*06*	02	*02*	01	02	01	06	01	10	01	14	00	18	00	176
180	*22*	00	*18*	00	*14*	00	*10*	00	*06*	00	*02*	00	02	00	06	00	10	00	14	00	18	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 21°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 03	180.0	72 00.0	1.0 03	180.0	72 30.0	1.0 03	180.0	00
1	68 58.6	1.0 07	177.2	69 28.6	1.0 07	177.1	69 58.6	1.0 07	177.1	70 28.5	1.0 07	177.0	70 58.5	1.0 08	176.9	71 28.5	1.0 08	176.9	71 58.4	1.0 08	176.8	72 28.4	1.0 08	176.7	1
2	68 54.6	1.0 11	174.4	69 24.4	1.0 12	174.3	69 54.3	1.0 12	174.2	70 24.2	1.0 12	174.0	70 54.0	1.0 12	173.9	71 23.9	99 13	173.7	71 53.7	99 13	173.6	72 23.5	99 13	173.4	2
3	68 47.8	99 16	171.7	69 17.5	99 16	171.5	69 47.2	99 16	171.3	70 16.9	99 17	171.1	70 46.6	99 17	170.9	71 16.2	99 18	170.6	71 45.9	99 18	170.4	72 15.5	99 18	170.1	3
4	68 38.4	98 20	169.0	69 07.9	98 20	168.7	69 37.3	98 21	168.4	70 06.8	98 21	168.2	70 36.2	98 22	167.9	71 05.6	98 22	167.6	71 35.0	98 23	167.3	72 04.4	98 24	166.9	4
05	68 26.4	98 24	166.3	68 55.6	97 25	166.0	69 24.8	97 25	165.7	69 54.0	97 26	165.3	70 23.1	97 26	165.0	70 52.2	97 27	164.6	71 21.2	97 28	164.2	71 50.2	97 28	163.8	05
6	68 11.8	96 28	163.7	68 40.7	96 29	163.3	69 09.6	96 30	162.9	69 38.4	96 30	162.5	70 07.2	96 31	162.1	70 35.9	96 32	161.7	71 04.6	95 32	161.2	71 33.1	95 33	160.7	6
7	67 54.8	95 32	161.1	68 23.4	95 33	160.7	68 51.9	95 34	160.2	69 20.3	95 34	159.8	69 48.7	94 35	159.3	70 17.0	94 36	158.8	70 45.2	94 37	158.3	71 13.3	94 38	157.8	7
8	67 35.5	94 36	158.6	68 03.7	94 37	158.1	68 31.8	93 37	157.7	68 59.8	93 38	157.2	69 27.7	93 39	156.6	69 55.5	93 40	156.1	70 23.2	92 40	155.5	70 50.8	92 42	155.0	8
9	67 14.0	93 40	156.2	67 41.7	92 40	155.7	68 09.4	92 41	155.1	68 36.9	92 42	154.6	69 04.3	91 43	154.0	69 31.7	91 44	153.5	69 58.9	90 44	152.9	70 25.9	90 45	152.2	9
10	66 50.3	91 43	153.8	67 17.6	91 44	153.3	67 44.7	90 44	152.7	68 11.8	90 45	152.1	68 38.7	90 46	151.5	69 05.5	89 47	150.9	69 32.2	89 48	150.3	69 58.7	88 49	149.6	10
1	66 24.6	90 46	151.5	66 51.4	89 47	151.0	67 18.0	89 48	150.4	67 44.6	88 49	149.8	68 11.0	88 50	149.1	68 37.2	87 50	148.5	69 03.3	87 51	147.8	69 29.3	86 52	147.1	1
2	65 56.9	88 49	149.3	66 22.2	87 50	148.7	66 49.4	87 51	148.1	67 15.4	86 52	147.5	67 41.3	86 53	146.8	68 07.0	85 54	146.1	68 32.5	85 54	145.4	68 57.8	84 56	144.7	2
3	65 27.4	86 52	147.2	65 53.3	86 53	146.6	66 18.9	85 54	146.0	66 44.4	85 54	145.3	67 09.7	84 56	144.6	67 34.9	83 56	143.9	67 59.8	83 57	143.2	68 24.5	82 58	142.4	3
4	64 56.3	85 55	145.2	65 21.6	84 56	144.5	65 46.7	83 56	143.9	66 11.7	83 57	143.2	66 36.4	82 58	142.5	67 01.0	82 59	141.8	67 25.4	81 60	141.0	67 49.5	80 61	140.2	4
15	64 23.5	83 57	143.2	64 48.3	82 58	142.5	65 12.9	82 59	141.9	65 37.3	81 60	141.2	66 01.5	80 61	140.5	66 25.5	80 62	139.7	66 49.3	79 62	139.0	67 12.9	78 64	138.2	15
6	63 49.2	81 60	141.3	64 13.5	81 60	140.7	64 37.6	80 61	140.0	65 01.5	79 62	139.3	65 25.1	79 63	138.5	65 48.6	78 64	137.8	66 11.8	77 65	137.0	66 34.8	76 66	136.2	6
7	63 13.5	80 62	139.5	63 37.3	79 62	138.8	64 00.9	78 63	138.1	64 24.2	78 64	137.4	64 47.4	77 65	136.7	65 10.3	76 66	135.9	65 33.0	75 67	135.1	65 55.4	74 68	134.3	7
8	62 36.5	78 64	137.8	62 59.8	77 64	137.1	63 22.9	77 65	136.4	63 45.7	76 66	135.7	64 08.3	75 67	134.9	64 30.7	74 68	134.2	64 52.8	73 69	133.4	65 14.7	72 70	132.6	8
9	61 58.3	76 66	136.1	62 21.1	76 66	135.4	62 43.7	75 67	134.7	63 06.0	74 68	134.0	63 28.1	73 69	133.2	63 50.0	72 70	132.5	64 11.6	72 71	131.7	64 32.9	71 72	130.9	9
20	61 18.9	75 67	134.6	61 41.2	74 68	133.9	62 03.3	73 69	133.1	62 25.2	72 70	132.4	62 46.8	72 71	131.6	63 08.1	71 71	130.9	63 29.2	70 72	130.1	63 50.0	69 73	129.3	20
1	60 38.5	73 69	133.0	61 00.3	72 70	132.3	61 21.9	72 70	131.6	61 43.3	71 71	130.9	62 04.4	70 72	130.1	62 25.3	69 73	129.3	62 45.9	68 74	128.6	63 06.2	67 74	127.7	1
2	59 57.1	72 71	131.6	60 18.4	71 71	130.9	60 39.6	70 72	130.1	61 00.5	69 73	129.4	61 21.1	68 74	128.7	61 41.5	68 74	127.9	62 01.6	67 75	127.1	62 21.5	66 76	126.3	2
3	59 14.7	70 72	130.2	59 35.6	69 73	129.5	59 56.3	69 74	128.7	60 16.8	68 74	128.0	60 36.9	67 75	127.3	60 56.9	66 76	126.5	61 16.5	65 76	125.7	61 35.9	64 77	124.9	3
4	58 31.5	69 73	128.8	58 52.0	68 74	128.1	59 12.2	67 75	127.4	59 32.2	66 76	126.7	59 52.0	65 76	125.9	60 11.5	65 77	125.2	60 30.7	64 78	124.4	60 49.6	63 78	123.6	4
25	57 47.5	67 75	127.5	58 07.5	66 75	126.8	58 27.3	66 76	126.1	58 46.9	65 77	125.4	59 06.3	64 78	124.7	59 25.3	63 78	123.9	59 44.1	62 79	123.1	60 02.7	61 80	122.4	25
6	57 02.7	66 76	126.3	57 22.3	65 76	125.6	57 41.7	64 77	124.9	58 00.9	63 78	124.2	58 19.8	63 78	123.4	58 38.5	62 79	122.7	58 56.9	61 80	121.9	59 15.0	60 80	121.2	6
7	56 17.2	65 77	125.1	56 36.5	64 77	124.4	56 55.5	63 78	123.7	57 14.3	62 79	123.0	57 32.8	61 80	122.3	57 51.1	60 80	121.5	58 09.1	60 81	120.8	58 26.8	59 81	120.0	7
8	55 31.1	63 78	124.0	55 49.9	63 78	123.3	56 08.6	62 79	122.6	56 27.0	61 80	121.9	56 45.1	60 80	121.2	57 03.0	59 81	120.4	57 20.7	58 82	119.7	57 38.0	57 82	118.9	8
9	54 44.3	62 79	122.9	55 02.8	61 79	122.2	55 21.1	61 80	121.5	55 39.1	60 81	120.8	55 56.9	59 81	120.1	56 14.5	58 82	119.4	56 31.7	57 82	118.6	56 48.7	56 83	117.9	9
30	53 57.0	61 80	121.8	54 15.2	60 80	121.1	54 33.1	59 81	120.5	54 50.8	59 82	119.8	55 08.2	58 82	119.1	55 25.4	57 82	118.3	55 42.3	56 83	117.6	55 59.0	55 84	116.9	30
1	53 09.2	60 81	120.8	53 27.0	59 81	120.1	53 44.5	58 82	119.5	54 01.9	57 82	118.8	54 19.0	57 83	118.1	54 35.9	56 83	117.4	54 52.5	55 84	116.6	55 08.8	54 84	115.9	1
2	52 20.8	59 81	119.8	52 38.3	58 82	119.2	52 55.5	57 82	118.5	53 12.6	56 83	117.8	53 29.4	56 84	117.1	53 45.9	55 84	116.4	54 02.2	54 84	115.7	54 18.2	53 85	115.0	2
3	51 32.0	58 82	118.9	51 49.2	57 83	118.2	52 06.1	56 83	117.6	52 22.8	55 84	116.9	52 39.3	55 84	116.2	52 55.5	54 84	115.5	53 11.5	53 85	114.8	53 27.3	52 86	114.1	3
4	50 42.7	57 83	118.0	50 59.6	56 83	117.3	51 16.2	55 84	116.7	51 32.7	54 84	116.0	51 48.8	54 85	115.3	52 04.8	53 85	114.6	52 20.5	52 86	113.9	52 36.0	51 86	113.2	4
35	49 53.1	56 84	117.1	50 09.6	55 84	116.5	50 26.0	54 84	115.8	50 42.1	53 85	115.1	50 58.0	53 85	114.5	51 13.7	52 86	113.8	51 29.1	51 86	113.1	51 44.3	50 86	112.4	35
6	49 03.0	55 84	116.3	49 19.3	54 84	115.6	49 35.4	53 85	115.0	49 51.2	52 85	114.3	50 06.9	52 86	113.6	50 22.3	51 86	113.0	50 37.5	50 87	112.3	50 52.4	49 87	111.6	6
7	48 12.6	54 84	115.4	48 28.6	53 85	114.8	48 44.4	52 85	114.2	49 00.0	52 86	113.5	49 15.4	51 86	112.9	49 30.6	50 87	112.2	49 45.5	49 87	111.5	50 00.2	49 88	110.8	7
8	47 21.9	53 85	114.6	47 37.6	52 86	114.0	47 53.2	52 86	113.4	48 08.5	51 86	112.7	48 23.6	50 87	112.1	48 38.6	49 87	111.4	48 53.2	49 88	110.8	49 07.7	48 88	110.1	8
9	46 30.8	52 86	113.9	46 46.3	51 86	113.3	47 01.6	51 86	112.6	47 16.7	50 87	112.0	47 31.6	49 87	111.3	47 46.3	49 88	110.7	48 00.7	48 88	110.0	48 15.0	47 88	109.4	9
40	45 39.4	51 86	113.1	45 54.7	51 86	112.5	46 09.8	50 87	111.9	46 24.6	49 87	111.3	46 39.3	49 88	110.6	46 53.8	48 88	110.0	47 08.0	47 88	109.3	47 22.0	46 89	108.7	40
1	44 47.7	51 86	112.4	45 02.8	50 87	111.8	45 17.7	49 87	111.2	45 32.3	49 88	110.6	45 46.8	48 88	109.9	46 01.0	47 88	109.3	46 15.0	46 88	108.7	46 28.9	46 89	108.0	1
2	43 55.8	50 87	111.7	44 10.7	49 87	111.1	44 25.3	48 88	110.5	44 39.7	48 88	109.9	44 54.0	47 88	109.3	45 08.0	46 88	108.6	45 21.9	46 89	108.0	45 35.5	45 89	107.4	2
3	43 03.7	49 87	111.0	43 18.3	48 88	110.4	43 32.7	48 88	109.8	43 47.0	47 88	109.2	44 01.0	46 89	108.6	44 14.9	46 89	108.0	44 28.5	45 89	107.4	44 41.9	44 90	106.7	3
4	42 11.3	48 88	110.4	42 25.7	48 88	109.8	42 39.9	47 88	109.2	42 54.0	46 89	108.6	43 07.8	46 89	108.0	43 21.5	45 89	107.4	43 34.9	45 90	106.7	43 48.2	44 90	106.1	4
45	41 18.6	48 88	109.7	41 32.9	47 88	109.1	41 46.9	47 89	108.5	42 00.8	46 89	107.9	42 14.4	45 89	107.3	42 27.9	45 90	106.7	42 41.2	44 90	106.1	42 54.3	43 90	105.5	45
6	40 25.8	47 88	109.1	40 39.8	46 89	108.5	40 53.7	46 89	107.9	41 07.4	45 89	107.3	41 20.9	45 90	106.7	41 34.2	44 90	106.1	41 47.3	43 90	105.5	42 00.3	43 90	104.9	6
7	39 32.8	46 89	108.5	39 46.6	46 89	107.9	40 00.3	45 89	107.3	40 13.8	45 90	106.7	40 27.2	44 90	106.2	40 40.3	44 90	105.6	40 53.3	43 90	105.0	41 06.1	42 91	104.4	7
8	38 39.6	46 89	107.9	38 53.2	45 89	107.3	39 06.8	45 90	106.7	39 20.1	44 90	106.2	39 33.3	44 90	105.6	39 46.3	43 90	105.0	39 59.1	42 90	104.4	40 11.7	42 91	103.8	8
9	37 46.2	45 89	107.3	37 59.7	45 90	106.7	38 13.0	44 90	106.2	38 26.2	44 90	105.6	38 39.2	43 90	105.0	38 52.1	43 90	104.4	39 04.8	42 91	103.9	39 17.3	41 91	103.3	9
50	36 52.6	45 90	106.7	37 06.0	44 90	106.2	37 19.2	44 90	105.6	37 32.2	43 90	105.0	37 45.1	43 90	104.5	37 57.8	42 91	103.9	38 10.3	42 91	103.3	38 22.7	41 91	102.7	50
1	35 58.9	44 90	106.2	36 12.1	44 90	105.6	36 25.1	43 90	105.1	36 38.0	43 90	104.5	36 50.8	42 91	103.9	37 03.4	42 91	103.4	37 15.8	41 91	102.8	37 28.0	41 91	102.2	1
2	35 05.0	44 90	105.6	35 18.1	43 90	105.1	35 31.0	43 90	104.5	35 43.7	42 91	104.0	35 56.4	42 91	103.4	36 08.8	41 91	102.9	36 21.1	41 91	102.3	36 33.2	40 92	101.7	2
3	34 11.0	43 90	105.1	34 23.9	43 90	104.6	34 36.7	42 91	104.0	34 49.3	42 91	103.5	35 01.8	41 91	102.9	35 14.1	41 91	102.4	35 26.3	40 92	101.8	35 38.3	40 92	101.2	3
4	33 16.9	43 90	104.6	33 29.6	42 91	104.1	33 42.3	42 91	103.5	33 54.8	41 91	103.0	34 07.2	41 91	102.4	34 19.4	40 92	101.9	34 31.4	40 92	101.3	34 43.3	39 92	100.7	4
55	32 22.6	42 91	104.1	32 35.2	42 91	103.5	32 47.8	42 91	103.0	33 00.2	41 91	102.5	33 12.4	41 92	101.9	33 24.5	40 92	101.4	33 36.5	40 92	100.8	33 48.3	39 92	100.3	55
6	31 28.2	42 91	103.6	31 40.7	42 91	103.1	31 53.1	41 91	102.5	32 05.4	41 91	102.0	32 17.5	40 92	101.4	32 29.5	40 92	100.9	32 41.4	39 92	100.4	32 53.1	39 92	99.8	6
7	30 33.7	42 91	103.1	30 46.1	41 91	102.6	30 58.4	41 91	102.0	31 10.6	40 92	101.5	31 22.6	40 92	101.0	31 34.5	39 92	100.4	31 46.2	39 92	99.9	31 57.9	39 92	99.3	7
8	29 39.1	41 91	102.6	29 51.4	41 91	102.1	30 03.6	40 92	101.6	30 15.6	40 92	101.0	30 27.6	40 92	100.5	30 39.4	39 92	100.0	30 51.0	39 92	99.4	31 02.6	38 92	98.9	8
9	28 44.4	41 91	102.2	28 56.6	40 92	101.6	29 08.7	40 92	101.1	29 20.6	40 92	100.6	29 32.4	39 92	100.1	29 44.2	39 92	99.5	29 55.7	38 92	99.0	30 07.2	38 92	98.5	9
60	27 49.6	41 92	101.7	28 01.7	40 92	101.2	28 13.6	40 92	100.7	28 25.5	39 92	100.1	28 37.3	39 92	99.6	28 48.9	39 92	99.1	29 00.4	38 92	98.6	29 11.8	38 92	98.0	60
1	26 54.7	40 92	101.2	27 06.7	40 92	100.7	27 18.6	39 92	100.2	27 30.3	39 92	99.7	27 42.0	39 92	99.2	27 53.5	38 92	98.6	28 05.0	38 92	98.1	28 16.3	37 93	97.6	1
2	25 59.7	40 92	100.8	26 11.6	40 92	100.3	26 23.4	39 92	99.8	26 35.1	39 92	99.3	26 46.7	38 92	98.7	26 58.1	38 92	98.2	27 09.5	38 93	97.7	27 20.7	37 93	97.2	2
3	25 04.6	40 92	100.3	25 16.4	39 92	99.8	25 28.2	39 92	99.3	25 39.8	39 92	98.8	25 51.3	38 92	98.3	26 02.7	38 93	97.8	26 13.9	37 93	97.3	26 25.1	37 93	96.8	3
4	24 09.5	39 92	99.9	24 21.2	39 92	99.4	24 32.8	39 92	98.9	24 44.4	38 92	98.4	24 55.8	38 92	97.9	25 07.1	38 93	97.4	25 18.3	37 93	96.9	25 29.5	37 93	96.3	4
65	23 14.3	39 92	99.5	23 25.9	39 92	99.0	23 37.5	38 92	98.5	23 48.9	38 92	98.0	24 00.3	38 93	97.5	24 11.6	37 93	97.0	24 22.7	37 93	96.5	24 33.8	37 93	95.9	65
6	22 19.0	39 92	99.1	22 30.6	38 92	98.6	22 42.0	38 92	98.1	22 53.4	38 92	97.6	23 04.7	38 93	97.1	23 15.9	37 93	96.6	23 27.0	37 93	96.1	23 38.0	37 93	95.5	6
7	21 23.6	39 92	98.6	21 35.1	38 92	98.2	21 46.6	38 93	97.7	21 57.9	38 93	97.2	22 09.1	37 93	96.7	22 20.3	37 93	96.2	22 31.3	37 93	95.7	22 42.3	36 93	95.1	7
8	20 28.2	38 92	98.2	20 39.7	38 93	97.7	20 51.0	38 93	97.2	21 02.3	37 93	96.8	21 13.5	37 93	96.3	21 24.5	37 93	95.8	21 35.5	37 93	95.3	21 46.5	36 93	94.8	8
9	19 32.8	38 92	97.8	19 44.1	38 93	97.3	19 55.4	37 93	96.8	20 06.6	37 93	96.4	20 17.8	37 93	95.9	20 28.8	37 93	95.4	20 39.8	36 93	94.9	20 50.6	36 93	94.4	9
70	18 37.2	38 92	97.4	18 48.6	38 93	96.9	18 59.8	37 93	96.5	19 10.9	37 93	96.0	19 22.0	37 93	95.5	19 33.0	37 93	95.0	19 43.9	36 93	94.5	19 54.8	36 93	94.0	70
1	17 41.7	38 93	97.0	17 52.9	37 93	96.5	18 04.1	37 93	96.1	18 15.2	37 93	95.6	18 26.2	37 93	95.1	18 37.2	36 93	94.6	18 48.1	36 93	94.1	18 58.9	36 93	93.6	1
2	16 46.1	37 93	96.6	16 57.3	37 93	96.2	17 08.4	37 93	95.7	17 19.4	37 93	95.2	17 30.4	37 93	94.7	17 41.3	36 93	94.2	17 52.2	36 93	93.7	18 02.9	36 93	93.2	2
3	15 50.4	37 93	96.3	16 01.5	37 93	95.8	16 12.6	37 93	95.3	16 23.6	37 93	94.8	16 34.6	36 93	94.3	16 45.5	36 93	93.8	16 56.3	36 93	93.3	17 07.0	36 93	92.9	3
4	14 54.7	37 93	95.9	15 05.8	37 93	95.4	15 16.8	37 93	94.9	15 27.8	36 93	94.4	15 38.7	36 93	93.9	15 49.6	36 93	93.5	16 00.3	36 93	93.0	16 11.1	36 93	92.5	4
75	13 59.0	37 93	95.5	14 10.0	37 93	95.0	14 21.0	37 93	94.5	14 31.9	36 93	94.0	14 42.8	36 93	93.6	14 53.6	36 93	93.1	15 04.4	36 93	92.6	15 15.1	36 93	92.1	75
6	13 03.2	37 93	95.1	13 14.2	37 93	94.6	13 25.2	36 93	94.1	13 36.1	36 93	93.7	13 46.9	36 93	93.2	13 57.7	36 93	92.7	14 08.4	36 93	92.2	14 19.1	35 93	91.7	6
7	12 07.4	37 93	94.7	12 18.3	36 93	94.3	12 29.3	36 93	93.8	12 40.1	36 93	93.3	12 51.0	36 93	92.8	13 01.7	36 93	92.3	13 12.4	36 93	91.9	13 23.1	35 93	91.4	7
8	11 11.5	37 93	94.4	11 22.5	36 93	93.9	11 33.4	36 93	93.4	11 44.2	36 93	92.9	11 55.0	36 93	92.5	12 05.8	36 93	92.0	12 16.5	36 93	91.5	12 27.1	35 93	91.0	8
9	10 15.7	36 93	94.0	10 26.6	36 93	93.5	10 37.4	36 93	93.0	10 48.3	36 93	92.6	10 59.0	36 93	92.1	11 09.8	36 93	91.6	11 20.5	36 93	91.1	11 31.1	35 93	90.7	9
80	9 19.8	36 93	93.6	9 30.7	36 93	93.1	9 41.5	36 93	92.7	9 52.3	36 93	92.2	10 03.1	36 93	91.7	10 13.8	36 93	91.2	10 24.5	36 93	90.8	10 35.1	35 93	90.3	80
1	8 23.9	36 93	93.2	8 34.7	36 93	92.8	8 45.5	36 93	92.3	8 56.3	36 93	91.8	9 07.1	36 93	91.4	9 17.8	36 93	90.9	9 28.4	36 93	90.4	9 39.1	35 93	89.9	1
2	7 27.9	36 93	92.9	7 38.8	36 93	92.4	7 49.6	36 93	91.9	8 00.3	36 93	91.5	8 11.1	36 93	91.0	8 21.8	36 93	90.5	8 32.4	36 93	90.1	8 43.1	35 93	89.6	2
3	6 32.0	36 93	92.5	6 42.8	36 93	92.0	6 53.6	36 93	91.6	7 04.3	36 93	91.1	7 15.0	36 93	90.6	7 25.7	36 93	90.2	7 36.4	36 93	89.7	7 47.0	35 93	89.2	3
4	5 36.0	36 93	92.2	5 46.8	36 93	91.7	5 57.6	36 93	91.2	6 08.3	36 93	90.7	6 19.0	36 93	90.3	6 29.7	36 93	89.8	6 40.4	36 93	89.3	6 51.0	35 93	88.9	4
85							5 01.6	36 93	90.9	5 12.3	36 93	90.4	5 23.0	36 93	89.9	5 33.7	36 93	89.5	5 44.4	36 93	89.0	5 55.0	35 93	88.5	85

Lat. 21°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	° ′	Δd Δt °	°
00	69 00.0	1.0 02 180.0	68 30.0	1.0 02 180.0	68 00.0	1.0 02 180.0	67 30.0	1.0 02 180.0	67 00.0	1.0 02 180.0	66 30.0	1.0 02 180.0	66 00.0	1.0 02 180.0	65 30.0	1.0 02 180.0	00
1	68 58.6	1.0 07 177.2	68 28.7	1.0 07 177.3	67 58.7	1.0 06 177.3	67 28.7	1.0 06 177.4	66 58.7	1.0 06 177.4	66 28.8	1.0 06 177.5	65 58.8	1.0 06 177.5	65 28.8	1.0 06 177.6	1
2	68 54.6	1.0 11 174.4	68 24.7	1.0 11 174.6	67 54.8	1.0 11 174.7	67 24.9	1.0 10 174.8	66 55.0	1.0 10 174.9	66 25.1	1.0 10 175.0	65 55.2	1.0 10 175.1	65 25.3	1.0 10 175.2	2
3	68 47.8	99 16 171.7	68 18.1	99 16 171.9	67 48.3	99 15 172.0	67 18.6	99 15 172.2	66 48.8	99 14 172.4	66 19.0	99 14 172.5	65 49.2	99 14 172.7	65 19.4	99 14 172.8	3
4	68 38.4	98 20 169.0	68 08.8	98 20 169.2	67 39.3	99 19 169.4	67 09.7	99 19 169.7	66 40.1	99 18 169.9	66 10.5	99 18 170.1	65 40.9	99 18 170.3	65 11.3	99 17 170.4	4
05	68 26.4	98 24 166.3	67 57.1	98 24 166.6	67 27.8	98 23 166.9	66 58.4	98 23 167.1	66 29.1	98 22 167.4	65 59.7	98 22 167.6	65 30.3	98 22 167.9	65 00.9	98 21 168.1	05
6	68 11.8	96 28 163.7	67 42.9	97 28 164.0	67 13.8	97 27 164.3	66 44.8	97 27 164.7	66 15.7	97 26 165.0	65 46.6	97 26 165.3	65 17.4	97 25 165.5	64 48.2	97 25 165.8	6
7	67 54.8	95 32 161.1	67 26.2	96 32 161.5	66 57.5	96 31 161.9	66 28.8	96 30 162.2	66 00.0	96 30 162.6	65 31.2	96 29 162.9	65 02.3	96 29 163.2	64 33.4	96 28 163.6	7
8	67 35.5	94 36 158.6	67 07.3	94 35 159.0	66 39.0	94 35 159.4	66 10.6	95 34 159.9	65 42.2	95 33 160.2	65 13.7	95 33 160.6	64 45.1	95 32 161.0	64 16.5	95 32 161.3	8
9	67 14.0	93 40 156.2	66 46.2	93 39 156.6	66 18.3	93 38 157.1	65 50.3	93 38 157.5	65 22.2	94 37 158.0	64 54.1	94 36 158.4	64 25.9	94 36 158.8	63 57.6	94 35 159.2	9
10	66 50.3	91 43 153.8	66 22.9	91 42 154.3	65 55.4	92 41 154.8	65 27.8	92 40 155.3	65 00.2	92 40 155.8	64 32.4	93 39 156.2	64 04.6	93 38 156.6	63 36.7	93 38 157.0	10
1	66 24.6	90 46 151.5	65 57.6	90 45 152.1	65 30.6	90 44 152.6	65 03.5	91 44 153.1	64 36.2	91 43 153.6	64 08.9	91 42 154.1	63 41.5	92 42 154.5	63 13.9	92 41 155.0	1
2	65 56.9	88 49 149.3	65 30.5	88 48 149.9	65 03.9	89 48 150.5	64 37.2	89 47 151.0	64 10.4	90 46 151.5	63 43.5	90 45 152.0	63 16.5	90 44 152.5	62 49.4	91 44 153.0	2
3	65 27.4	86 52 147.2	65 01.5	87 51 147.8	64 35.4	87 50 148.4	64 09.2	88 50 149.0	63 42.8	88 49 149.5	63 16.3	88 48 150.0	62 49.8	89 47 150 5	62 23.1	89 47 151.0	3
4	64 56.3	85 55 145.2	64 30.8	85 54 145.8	64 05.2	86 53 146.4	63 39.5	86 52 147.0	63 13.6	87 52 147.5	62 47.5	87 50 148.1	62 21.4	87 50 148.6	61 55.1	88 49 149.1	4
15	64 23.5	83 57 143.2	63 58.5	83 56 143.9	63 33.4	84 56 144.5	63 08.1	85 55 145.1	62 42.7	85 54 145.7	62 17.2	85 53 146.2	61 51.5	86 52 146.8	61 25.6	86 52 147.3	15
6	63 49.2	81 60 141.3	63 24.8	82 59 142.0	63 00.1	82 58 142.6	62 35.3	83 57 143.2	62 10.4	83 56 143.8	61 45.3	84 56 144.4	61 20.0	84 55 145.0	60 54.6	85 54 145.5	6
7	63 13.5	80 62 139.5	62 49.6	80 61 140.2	62 25.4	81 60 140.8	62 01.1	81 59 141.5	61 36.6	82 58 142.1	61 12.0	82 58 142.7	60 47.2	83 57 143.3	60 22.3	83 56 143.8	7
8	62 36.5	78 64 137.8	62 13.1	79 63 138.5	61 49.4	79 62 139.1	61 25.6	80 61 139.8	61 01.6	80 61 140.4	60 37.4	81 60 141.0	60 13.0	81 59 141.6	59 48.5	82 58 142.2	8
9	61 58.3	76 66 136.1	61 35.3	77 65 136.8	61 12.2	78 64 137.5	60 48.8	78 63 138.1	60 25.2	79 62 138.8	60 01.5	79 62 139.4	59 37.6	80 61 140.0	59 13.6	80 60 140.6	9
20	61 18.9	75 67 134.6	60 56.4	75 66 135.2	60 33.7	76 66 135.9	60 10.8	77 65 136.6	59 47.7	77 64 137.2	59 24.5	78 64 137.8	59 01.0	78 63 138.4	58 37.4	79 62 139.0	20
1	60 38.5	73 69 133.0	60 16.5	74 68 133.7	59 54.2	74 68 134.4	59 31.8	75 67 135.1	59 09.1	76 66 135.7	58 46.3	76 65 136.3	58 23.3	77 64 136.9	58 00.1	78 64 137.5	1
2	59 57.1	72 71 131.6	59 35.5	72 70 132.3	59 13.7	73 69 132.9	58 51.7	74 68 133.6	58 29.5	74 68 134.2	58 07.1	75 67 134.9	57 44.6	76 66 135.5	57 21.8	76 66 136.1	2
3	59 14.7	70 72 130.2	58 53.6	71 71 130.9	58 32.2	72 70 131.5	58 10.7	72 70 132.2	57 48.9	73 69 132.9	57 27.0	74 68 133.5	57 04.8	74 68 134.1	56 42.5	75 67 134.7	3
4	58 31.5	69 73 128.8	58 10.8	69 73 129.5	57 49.9	70 72 130.2	57 28.7	71 71 130.9	57 07.4	71 71 131.5	56 45.9	72 70 132.1	56 24.1	73 69 132.8	56 02.2	73 68 133.4	4
25	57 47.5	67 75 127.5	57 27.2	68 74 128.2	57 06.7	69 73 128.9	56 46.0	69 73 129.6	56 25.0	70 72 130.2	56 03.9	71 71 130.9	55 42.6	71 71 131.5	55 21.1	72 70 132.1	25
6	57 02.7	66 76 126.3	56 42.8	67 75 127.0	56 22.7	67 74 127.7	56 02.4	68 74 128.3	55 41.9	69 73 129.0	55 21.2	69 73 129.6	55 00.2	70 72 130.2	54 39.1	71 71 130.9	6
7	56 17.2	65 77 125.1	55 57.7	65 76 125.8	55 38.0	66 76 126.5	55 18.1	67 75 127.1	54 58.0	67 74 127.8	54 37.6	68 74 128.4	54 17.1	69 73 129.0	53 56.4	69 72 129.7	7
8	55 31.1	63 78 124.0	55 12.0	64 77 124.7	54 52.6	65 77 125.3	54 33.1	65 76 126.0	54 13.4	66 76 126.6	53 53.4	67 75 127.3	53 33.2	67 74 127.9	53 12.9	68 74 128.5	8
9	54 44.3	62 79 122.9	54 25.6	63 78 123.6	54 06.6	64 78 124.2	53 47.5	64 77 124.9	53 28.1	65 76 125.5	53 08.5	66 76 126.2	52 48.7	66 75 126.8	52 28.7	67 75 127.4	9
30	53 57.0	61 80 121.8	53 38.6	62 79 122.5	53 20.0	62 78 123.2	53 01.2	63 78 123.8	52 42.2	64 78 124.4	52 22.9	64 77 125.1	52 03.5	65 76 125.7	51 43.9	66 76 126.3	30
1	53 09.2	60 81 120.8	52 51.1	61 80 121.5	52 32.9	61 80 122.1	52 14.4	62 79 122.8	51 55.7	63 78 123.4	51 36.8	63 78 124.0	51 17.7	64 77 124.7	50 58.5	65 77 125.3	1
2	52 20.8	59 81 119.8	52 03.1	59 81 120.5	51 45.2	60 80 121.1	51 27.0	61 80 121.8	51 08.7	61 79 122.4	50 50.1	62 79 123.0	50 31.4	63 78 123.7	50 12.5	63 78 124.3	2
3	51 32.0	58 82 118.9	51 14.6	58 82 119.5	50 57.0	59 81 120.2	50 39.2	60 81 120.8	50 21.1	60 80 121.5	50 02.9	61 80 122.1	49 44.5	62 79 122.7	49 25.9	62 78 123.3	3
4	50 42.7	57 83 118.0	50 25.6	57 82 118.6	50 08.3	58 82 119.3	49 50.8	59 81 119.9	49 33.1	59 81 120.5	49 15.2	60 80 121.1	48 57.1	61 80 121.7	48 38.8	61 79 122.4	4
35	49 53.1	56 84 117.1	49 36.3	56 83 117.7	49 19.3	57 82 118.4	49 02.1	58 82 119.0	48 44.6	58 82 119.6	48 27.0	59 81 120.2	48 09.2	60 80 120.8	47 51.3	60 80 121.4	35
6	49 03.0	55 84 116.3	48 46.5	55 84 116.9	48 29.8	56 83 117.5	48 12.9	57 83 118.1	47 55.7	57 82 118.8	47 38.4	58 82 119.4	47 20.9	59 81 120.0	47 03.2	59 81 120.6	6
7	48 12.6	54 84 115.4	47 56.4	54 84 116.1	47 39.9	55 84 116.7	47 23.3	56 83 117.3	47 06.4	56 83 117.9	46 49.4	57 82 118.5	46 32.2	58 82 119.1	46 14.8	58 82 119.7	7
8	47 21.9	53 85 114.6	47 05.9	54 85 115.3	46 49.7	54 84 115.9	46 33.3	55 84 116.5	46 16.8	56 84 117.1	46 00.0	56 83 117.7	45 43.1	57 83 118.3	45 25.9	57 82 118.9	8
9	46 30.8	52 86 113.9	46 15.0	53 85 114.5	45 59.1	53 85 115.1	45 43.0	54 84 115.7	45 26.7	55 84 116.3	45 10.2	55 84 116.9	44 53.5	56 83 117.5	44 36.7	56 83 118.1	9
40	45 39.4	51 86 113.1	45 23.9	52 86 113.7	45 08.2	53 85 114.3	44 52.4	53 85 114.9	44 36.3	54 84 115.5	44 20.1	54 84 116.1	44 03.7	55 84 116.7	43 47.1	56 83 117.3	40
1	44 47.7	51 86 112.4	44 32.5	51 86 113.0	44 17.1	52 86 113.6	44 01.4	52 85 114.2	43 45.6	53 85 114.8	43 29.6	54 84 115.4	43 13.5	54 84 116.0	42 57.1	55 84 116.5	1
2	43 55.8	50 87 111.7	43 40.8	50 86 112.3	43 25.6	51 86 112.9	43 10.2	52 86 113.5	42 54.6	52 85 114.1	42 38.9	53 85 114.7	42 23.0	53 85 115.2	42 06.9	54 84 115.8	2
3	43 03.7	49 87 111.0	42 48.9	50 87 111.6	42 33.9	50 87 112.2	42 18.7	51 86 112.8	42 03.4	51 86 113.4	41 47.8	52 86 113.9	41 32.1	53 85 114.5	41 16.3	53 85 115.1	3
4	42 11.3	48 88 110.4	41 56.7	49 88 110.9	41 41.9	50 87 111.5	41 26.9	50 87 112.1	41 11.8	51 86 112.7	40 56.5	51 86 113.3	40 41.0	52 86 113.8	40 25.4	52 85 114.4	4
45	41 18.6	48 88 109.7	41 04.2	48 88 110.3	40 49.7	49 88 110.9	40 34.9	49 87 111.5	40 20.0	50 87 112.0	40 04.9	51 86 112.6	39 49.7	51 86 113.1	39 34.2	52 86 113.7	45
6	40 25.8	47 88 109.1	40 11.6	48 88 109.7	39 57.2	48 88 110.2	39 42.7	49 88 110.8	39 27.9	49 87 111.4	39 13.1	50 87 111.9	38 58.0	50 86 112.5	38 42.8	51 86 113.0	6
7	39 32.8	46 89 108.5	39 18.7	47 88 109.1	39 04.6	48 88 109.6	38 50.2	48 88 110.2	38 35.7	49 88 110.7	38 21.0	49 87 111.3	38 06.2	50 87 111.9	37 51.2	50 86 112.4	7
8	38 39.6	46 89 107.9	38 25.7	46 89 108.5	38 11.7	47 88 109.0	37 57.5	48 88 109.6	37 43.2	48 88 110.1	37 28.7	49 88 110.7	37 14.1	49 87 111.2	36 59.3	50 87 111.8	8
9	37 46.2	45 89 107.3	37 32.5	46 89 107.9	37 18.6	46 89 108.4	37 04.6	47 88 109.0	36 50.5	47 88 109.5	36 36.2	48 88 110.1	36 21.7	48 88 110.6	36 07.1	49 87 111.2	9
50	36 52.6	45 90 106.7	36 39.1	45 89 107.3	36 25.4	46 89 107.8	36 11.6	46 89 108.4	35 57.6	47 88 108.9	35 43.5	47 88 109.5	35 29.2	48 88 110.0	35 14.8	48 88 110.6	50
1	35 58.9	44 90 106.2	35 45.5	45 90 106.7	35 32.0	45 89 107.3	35 18.3	46 89 107.8	35 04.5	46 89 108.4	34 50.6	47 88 108.9	34 36.5	47 88 109.5	34 22.3	48 88 110.0	1
2	35 05.0	44 90 105.6	34 51.8	44 90 106.2	34 38.4	45 90 106.7	34 24.9	45 89 107.3	34 11.3	46 89 107.8	33 57.5	46 89 108.4	33 43.6	47 88 108.9	33 29.5	47 88 109.4	2
3	34 11.0	43 90 105.1	33 57.9	44 90 105.7	33 44.7	44 90 106.2	33 31.4	45 90 106.7	33 17.9	45 89 107.3	33 04.3	46 89 107.8	32 50.5	46 89 108.3	32 36.6	47 88 108.9	3
4	33 16.9	43 90 104.6	33 03.9	43 90 105.1	32 50.9	44 90 105.7	32 37.7	44 90 106.2	32 24.3	45 90 106.7	32 10.8	45 89 107.3	31 57.2	46 89 107.8	31 43.5	46 89 108.3	4
55	32 22.6	42 91 104.1	32 09.8	43 90 104.6	31 56.9	43 90 105.2	31 43.8	44 90 105.7	31 30.6	44 90 106.2	31 17.3	45 90 106.7	31 03.8	45 89 107.3	30 50.2	45 89 107.8	55
6	31 28.2	42 91 103.6	31 15.5	42 91 104.1	31 02.7	43 90 104.6	30 49.8	43 90 105.2	30 36.7	44 90 105.7	30 23.6	44 90 106.2	30 10.3	45 90 106.7	29 56.8	45 89 107.3	6
7	30 33.7	42 91 103.1	30 21.1	42 91 103.6	30 08.5	42 91 104.2	29 55.7	43 90 104.7	29 42.7	43 90 105.2	29 29.7	44 90 105.7	29 16.5	44 90 106.2	29 03.3	44 90 106.7	7
8	29 39.1	41 91 102.6	29 26.7	42 91 103.1	29 14.1	42 91 103.7	29 01.4	42 90 104.2	28 48.6	43 90 104.7	28 35.7	43 90 105.2	28 22.7	44 90 105.7	28 09.5	44 90 106.2	8
9	28 44.4	41 91 102.2	28 32.1	41 91 102.7	28 19.6	42 91 103.2	28 07.1	42 91 103.7	27 54.4	42 91 104.2	27 41.6	43 90 104.7	27 28.7	43 90 105.2	27 15.7	44 90 105.7	9
60	27 49.6	41 92 101.7	27 37.4	41 91 102.2	27 25.0	41 91 102.7	27 12.6	42 91 103.2	27 00.0	42 91 103.7	26 47.4	42 91 104.2	26 34.6	43 90 104.8	26 21.7	43 90 105.3	60
1	26 54.7	40 92 101.2	26 42.6	41 92 101.7	26 30.3	41 91 102.3	26 18.0	41 91 102.8	26 05.6	42 91 103.3	25 53.0	42 91 103.8	25 40.4	42 91 104.3	25 27.6	43 90 104.8	1
2	25 59.7	40 92 100.8	25 47.7	40 92 101.3	25 35.6	41 92 101.8	25 23.3	41 91 102.3	25 11.0	41 91 102.8	24 58.6	42 91 103.3	24 46.0	42 91 103.8	24 33.4	42 90 104.3	2
3	25 04.6	40 92 100.3	24 52.7	40 92 100.9	24 40.7	40 92 101.4	24 28.6	41 92 101.9	24 16.3	41 91 102.4	24 04.0	41 91 102.9	23 51.6	42 91 103.4	23 39.1	42 91 103.9	3
4	24 09.5	39 92 99.9	23 57.6	40 92 100.4	23 45.7	40 92 100.9	23 33.7	40 92 101.4	23 21.6	41 92 101.9	23 09.4	41 91 102.4	22 57.0	41 91 102.9	22 44.6	41 91 103.4	4
65	23 14.3	39 92 99.5	23 02.5	39 92 100.0	22 50.7	40 92 100.5	22 38.7	40 92 101.0	22 26.7	40 92 101.5	22 14.6	41 91 102.0	22 02.4	41 91 102.5	21 50.1	41 91 103.0	65
6	22 19.0	39 92 99.1	22 07.3	39 92 99.6	21 55.6	39 92 100.1	21 43.7	40 92 100.6	21 31.8	40 92 101.0	21 19.8	40 92 101.5	21 07.7	40 92 102.0	20 55.5	41 91 102.5	6
7	21 23.6	39 92 98.6	21 12.0	39 92 99.1	21 00.4	39 92 99.6	20 48.6	39 92 100.1	20 36.8	40 92 100.6	20 24.8	40 92 101.1	20 12.8	40 92 101.6	20 00.7	40 91 102.1	7
8	20 28.2	38 92 98.2	20 16.7	39 92 98.7	20 05.1	39 92 99.2	19 53.4	39 92 99.7	19 41.7	39 92 100.2	19 29.8	40 92 100.7	19 17.9	40 92 101.2	19 05.9	40 92 101.7	8
9	19 32.8	38 92 97.8	19 21.3	38 92 98.3	19 09.8	39 92 98.8	18 58.2	39 92 99.3	18 46.5	39 92 99.8	18 34.8	39 92 100.3	18 22.9	40 92 100.8	18 11.0	40 92 101.2	9
70	18 37.2	38 92 97.4	18 25.9	38 92 97.9	18 14.4	38 92 98.4	18 02.9	39 92 98.9	17 51.3	39 92 99.4	17 39.6	39 92 99.9	17 27.9	39 92 100.3	17 16.0	40 92 100.8	70
1	17 41.7	38 93 97.0	17 30.4	38 93 97.5	17 19.0	38 92 98.0	17 07.5	38 92 98.5	16 56.0	39 92 99.0	16 44.4	39 92 99.5	16 32.7	39 92 99.9	16 21.0	39 92 100.4	1
2	16 46.1	37 93 96.6	16 34.8	38 93 97.1	16 23.5	38 93 97.6	16 12.1	38 92 98.1	16 00.6	38 92 98.6	15 49.1	39 92 99.1	15 37.5	39 92 99.5	15 25.9	39 92 100.0	2
3	15 50.4	37 93 96.3	15 39.2	37 93 96.7	15 27.9	38 93 97.2	15 16.6	38 92 97.7	15 05.2	38 92 98.2	14 53.7	38 92 98.7	14 42.2	38 92 99.1	14 30.7	39 92 99.6	3
4	14 54.7	37 93 95.9	14 43.5	37 93 96.3	14 32.3	37 93 96.8	14 21.1	38 93 97.3	14 09.7	38 92 97.8	13 58.3	38 92 98.3	13 46.9	38 92 98.7	13 35.4	38 92 99.2	4
75	13 59.0	37 93 95.5	13 47.9	37 93 96.0	13 36.7	37 93 96.4	13 25.5	37 93 96.9	13 14.2	38 93 97.4	13 02.9	38 92 97.9	12 51.5	38 92 98.3	12 40.1	38 92 98.8	75
6	13 03.2	37 93 95.1	12 52.1	37 93 95.6	12 41.0	37 93 96.1	12 29.8	37 93 96.5	12 18.6	37 93 97.0	12 07.4	38 93 97.5	11 56.1	38 92 98.0	11 44.7	38 92 98.4	6
7	12 07.4	37 93 94.7	11 56.4	37 93 95.2	11 45.3	37 93 95.7	11 34.2	37 93 96.2	11 23.0	37 93 96.6	11 11.8	37 93 97.1	11 00.6	38 93 97.6	10 49.3	38 92 98.0	7
8	11 11.5	37 93 94.4	11 00.6	37 93 94.8	10 49.5	37 93 95.3	10 38.5	37 93 95.8	10 27.3	37 93 96.2	10 16.2	37 93 96.7	10 05.0	37 93 97.2	9 53.8	38 93 97.7	8
9	10 15.7	36 93 94.0	10 04.7	37 93 94.5	9 53.7	37 93 94.9	9 42.7	37 93 95.4	9 31.6	37 93 95.9	9 20.5	37 93 96.3	9 09.4	37 93 96.8	8 58.2	37 93 97.3	9
80	9 19.8	36 93 93.6	9 08.9	36 93 94.1	8 57.9	37 93 94.6	8 46.9	37 93 95.0	8 35.9	37 93 95.5	8 24.9	37 93 96.0	8 13.8	37 93 96.4	8 02.6	37 93 96.9	80
1	8 23.9	36 93 93.2	8 13.0	36 93 93.7	8 02.1	36 93 94.2	7 51.1	37 93 94.7	7 40.1	37 93 95.1	7 29.1	37 93 95.6	7 18.1	37 93 96.1	7 07.0	37 93 96.5	1
2	7 27.9	36 93 92.9	7 17.1	36 93 93.4	7 06.2	36 93 93.8	6 55.3	36 93 94.3	6 44.3	37 93 94.8	6 33.4	37 93 95.2	6 22.4	37 93 95.7	6 11.3	37 93 96.2	2
3	6 32.0	36 93 92.5	6 21.1	36 93 93.0	6 10.3	36 93 93.5	5 59.4	36 93 93.9	5 48.5	36 93 94.4	5 37.6	36 93 94.9	5 26.6	37 93 95.3	5 15.6	37 93 95.8	3
4	5 36.0	36 93 92.2	5 25.2	36 93 92.6	5 14.4	36 93 93.1	5 03.5	36 93 93.6									4

Lat. 21°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0
1	72 58.3	1.0 08	176.6	73 28.3	1.0 08	176.5	73 58.2	1.0 09	176.4	74 28.2	1.0 09	176.3
2	72 53.3	99 14	173.2	73 23.2	99 14	173.0	73 53.0	99 15	172.8	74 22.7	99 15	172.6
3	72 45.1	99 19	169.9	73 14.7	99 20	169.6	73 44.2	98 20	169.3	74 13.8	98 21	168.9
4	72 33.7	98 24	166.6	73 02.9	97 25	166.2	73 32.1	97 26	165.8	74 01.3	97 26	165.4
05	72 19.1	96 29	163.4	72 48.0	96 30	162.9	73 16.8	96 31	162.4	73 45.5	96 32	161.9
6	72 01.6	95 34	160.2	72 30.0	95 35	159.7	72 58.4	94 36	159.2	73 26.6	94 36	158.6
7	71 41.3	93 38	157.2	72 09.2	93 39	156.6	72 37.0	92 40	156.0	73 04.7	92 41	155.4
8	71 18.3	91 42	154.3	71 45.7	91 44	153.7	72 12.9	91 44	153.0	72 40.0	90 46	152.3
9	70 52.8	90 46	151.5	71 19.6	89 47	150.9	71 46.2	88 48	150.1	72 12.7	88 50	149.4
10	70 25.0	88 50	148.9	70 51.2	87 51	148.1	71 17.2	86 52	147.4	71 43.0	86 53	146.6
1	69 55.0	85 53	146.3	70 20.5	85 54	145.6	70 45.9	84 56	144.8	71 11.0	83 57	143.9
2	69 23.0	83 56	143.9	69 47.9	83 58	143.1	70 12.6	82 59	142.3	70 37.0	81 60	141.4
3	68 49.1	81 60	141.6	69 13.4	81 60	140.8	69 37.4	80 62	139.9	70 01.2	79 62	139.1
4	68 13.4	79 62	139.4	68 37.1	78 63	138.6	69 00.5	78 64	137.7	69 23.7	77 65	136.8
15	67 36.2	77 64	137.3	67 59.3	76 66	136.5	68 22.1	76 66	135.6	68 44.6	75 68	134.7
6	66 57.6	75 67	135.4	67 20.0	74 68	134.5	67 42.2	73 69	133.6	68 04.1	72 70	132.7
7	66 17.6	73 69	133.5	66 39.4	72 70	132.6	67 01.0	72 70	131.8	67 22.3	70 72	130.8
8	65 36.3	72 70	131.7	65 57.7	71 72	130.9	66 18.7	70 72	130.0	66 39.4	69 73	129.1
9	64 54.0	70 72	130.0	65 14.8	69 73	129.2	65 35.2	68 74	128.3	65 55.4	67 75	127.4
20	64 10.6	68 74	128.4	64 30.9	67 75	127.6	64 50.8	66 76	126.7	65 10.4	65 76	125.8
1	63 26.3	66 75	126.9	63 46.0	65 76	126.1	64 05.5	64 77	125.2	64 24.6	63 78	124.3
2	62 41.1	65 77	125.5	63 00.3	64 77	124.6	63 19.3	63 78	123.8	63 37.9	62 79	122.9
3	61 55.0	63 78	124.1	62 13.9	62 79	123.3	62 32.4	61 79	122.4	62 50.6	60 80	121.6
4	61 08.3	62 79	122.8	61 26.7	61 80	122.0	61 44.8	60 80	121.1	62 02.5	59 81	120.3
25	60 20.9	60 80	121.6	60 38.8	59 81	120.7	60 56.5	58 81	119.9	61 13.8	57 82	119.1
6	59 32.9	59 81	120.4	59 50.4	58 82	119.6	60 07.7	57 82	118.7	60 24.6	56 83	117.9
7	58 44.3	58 82	119.2	59 01.4	57 82	118.4	59 18.3	56 83	117.6	59 34.9	55 84	116.8
8	57 55.1	56 83	118.1	58 11.9	56 83	117.4	58 28.4	55 84	116.6	58 44.6	54 84	115.8
9	57 05.5	55 84	117.1	57 21.9	54 84	116.3	57 38.1	53 84	115.5	57 54.0	52 85	114.8
30	56 15.4	54 84	116.1	56 31.5	53 85	115.3	56 47.4	52 85	114.6	57 02.9	51 86	113.8
1	55 24.9	53 85	115.2	55 40.7	52 85	114.4	55 56.2	51 86	113.6	56 11.5	50 86	112.9
2	54 34.0	52 85	114.2	54 49.5	51 86	113.5	55 04.7	50 86	112.8	55 19.7	49 87	112.0
3	53 42.8	51 86	113.4	53 58.0	50 86	112.6	54 12.9	49 87	111.9	54 27.6	48 87	111.1
4	52 51.2	50 86	112.5	53 06.1	49 87	111.8	53 20.8	49 87	111.1	53 35.2	48 88	110.3
35	51 59.3	49 87	111.7	52 14.0	49 88	111.0	52 28.4	48 88	110.3	52 42.6	47 88	109.5
6	51 07.1	49 88	110.9	51 21.5	48 88	110.2	51 35.7	47 88	109.5	51 49.6	46 88	108.8
7	50 14.6	48 88	110.2	50 28.8	47 88	109.5	50 42.8	46 89	108.8	50 56.5	45 89	108.1
8	49 21.9	47 88	109.4	49 35.9	46 88	108.7	49 49.6	45 89	108.1	50 03.1	45 89	107.4
9	48 29.0	46 89	108.7	48 42.8	46 89	108.0	48 56.3	45 89	107.4	49 09.6	44 90	106.7
40	47 35.8	46 89	108.0	47 49.4	45 89	107.4	48 02.7	44 90	106.7	48 15.8	43 90	106.0
1	46 42.5	45 89	107.4	46 55.8	44 90	106.7	47 09.0	43 90	106.1	47 21.9	43 90	105.4
2	45 48.9	44 90	106.7	46 02.1	44 90	106.1	46 15.1	43 90	105.4	46 27.8	42 90	104.8
3	44 55.2	44 90	106.1	45 08.2	43 90	105.5	45 21.0	42 90	104.8	45 33.6	42 91	104.2
4	44 01.3	43 90	105.5	44 14.1	42 90	104.9	44 26.8	42 91	104.2	44 39.2	41 91	103.6
45	43 07.2	43 90	104.9	43 19.9	42 90	104.3	43 32.4	41 91	103.7	43 44.7	41 91	103.0
6	42 13.0	42 90	104.3	42 25.6	41 91	103.7	42 37.9	41 91	103.1	42 50.1	40 91	102.5
7	41 18.7	42 91	103.8	41 31.1	41 91	103.2	41 43.3	40 91	102.5	41 55.3	40 91	101.9
8	40 24.2	41 91	103.2	40 36.5	41 91	102.6	40 48.6	40 92	102.0	41 00.5	39 92	101.4
9	39 29.6	41 91	102.7	39 41.8	40 92	102.1	39 53.7	40 92	101.5	40 05.5	39 92	100.9
50	38 34.9	40 91	102.2	38 46.9	40 92	101.6	38 58.8	39 92	101.0	39 10.4	39 92	100.4
1	37 40.1	40 92	101.7	37 52.0	39 92	101.1	38 03.7	39 92	100.5	38 15.3	38 92	99.9
2	36 45.2	40 92	101.2	36 57.0	39 92	100.6	37 08.6	38 92	100.0	37 20.1	38 92	99.4
3	35 50.2	39 92	100.7	36 01.9	39 92	100.1	36 13.4	38 92	99.5	36 24.8	38 92	98.9
4	34 55.1	39 92	100.2	35 06.7	38 92	99.6	35 18.1	38 92	99.1	35 29.4	37 92	98.5
55	33 59.9	39 92	99.7	34 11.4	38 92	99.2	34 22.8	38 92	98.6	34 34.0	37 92	98.0
6	33 04.7	38 92	99.3	33 16.1	38 92	98.7	33 27.4	37 92	98.1	33 38.5	37 93	97.6
7	32 09.4	38 92	98.8	32 20.7	38 92	98.3	32 31.9	37 92	97.7	32 42.9	37 93	97.2
8	31 14.0	38 92	98.4	31 25.2	37 92	97.8	31 36.4	37 93	97.3	31 47.3	36 93	96.7
9	30 18.5	38 92	97.9	30 29.7	37 93	97.4	30 40.8	37 93	96.8	30 51.7	36 93	96.3
60	29 23.0	37 93	97.5	29 34.1	37 93	97.0	29 45.1	36 93	96.4	29 56.0	36 93	95.9
1	28 27.4	37 93	97.1	28 38.5	37 93	96.5	28 49.4	36 93	96.0	29 00.2	36 93	95.5
2	27 31.8	37 93	96.7	27 42.8	36 93	96.1	27 53.7	36 93	95.6	28 04.5	36 93	95.1
3	26 36.2	37 93	96.2	26 47.1	36 93	95.7	26 57.9	36 93	95.2	27 08.7	36 93	94.7
4	25 40.5	36 93	95.8	25 51.4	36 93	95.3	26 02.1	36 93	94.8	26 12.8	35 93	94.3
65	24 44.7	36 93	95.4	24 55.6	36 93	94.9	25 06.3	36 93	94.4	25 16.9	35 93	93.9
6	23 48.9	36 93	95.0	23 59.7	36 93	94.5	24 10.4	36 93	94.0	24 21.0	35 93	93.5
7	22 53.1	36 93	94.6	23 03.9	36 93	94.1	23 14.6	35 93	93.6	23 25.1	35 93	93.1
8	21 57.3	36 93	94.3	22 08.0	36 93	93.7	22 18.6	35 93	93.2	22 29.2	35 93	92.7
9	21 01.4	36 93	93.9	21 12.1	36 93	93.4	21 22.7	35 93	92.9	21 33.2	35 93	92.4
70	20 05.5	36 93	93.5	20 16.2	35 93	93.0	20 26.8	35 93	92.5	20 37.2	35 93	92.0
1	19 09.6	36 93	93.1	19 20.2	35 93	92.6	19 30.8	35 93	92.1	19 41.3	35 93	91.6
2	18 13.6	36 93	92.7	18 24.3	35 93	92.2	18 34.8	35 93	91.8	18 45.3	35 93	91.3
3	17 17.7	35 93	92.4	17 28.3	35 93	91.9	17 38.8	35 93	91.4	17 49.3	35 93	90.9
4	16 21.7	35 93	92.0	16 32.3	35 93	91.5	16 42.8	35 93	91.0	16 53.2	35 93	90.5
75	15 25.7	35 93	91.6	15 36.3	35 93	91.1	15 46.8	35 93	90.7	15 57.2	35 93	90.2
6	14 29.7	35 93	91.3	14 40.3	35 93	90.8	14 50.8	35 93	90.3	15 01.2	35 93	89.8
7	13 33.7	35 93	90.9	13 44.3	35 93	90.4	13 54.8	35 93	89.9	14 05.2	35 93	89.5
8	12 37.7	35 93	90.5	12 48.3	35 93	90.1	12 58.8	35 93	89.6	13 09.2	35 93	89.1
9	11 41.7	35 93	90.2	11 52.2	35 93	89.7	12 02.7	35 93	89.2	12 13.2	35 93	88.7
80	10 45.7	35 93	89.8	10 56.2	35 93	89.3	11 06.7	35 93	88.9	11 17.2	35 93	88.4
1	9 49.7	35 93	89.5	10 00.2	35 93	89.0	10 10.7	35 93	88.5	10 21.2	35 93	88.0
2	8 53.7	35 93	89.1	9 04.2	35 93	88.6	9 14.7	35 93	88.2	9 25.2	35 93	87.7
3	7 57.7	35 93	88.8	8 08.2	35 93	88.3	8 18.8	35 93	87.8	8 29.3	35 93	87.3
4	7 01.7	35 93	88.4	7 12.2	35 93	87.9	7 22.8	35 93	87.5	7 33.3	35 93	87.0
85	6 05.7	35 93	88.0	6 16.3	35 93	87.6	6 26.8	35 93	87.1	6 37.4	35 93	86.6
6	5 09.7	35 93	87.7	5 20.3	35 93	87.2	5 30.9	35 93	86.7	5 41.5	35 93	86.3
7												

H.A.	6° 00′			6° 30′			7° 00′			7° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 04	180.0
1	74 58.1	1.0 09	176.2	75 28.1	1.0 10	176.0	75 58.0	1.0 10	175.9	76 27.9	1.0 10	175.8
2	74 52.5	99 15	172.4	75 22.3	99 16	172.1	75 52.0	99 16	171.8	76 21.7	99 17	171.6
3	74 43.3	98 22	168.6	75 12.7	98 22	168.2	75 42.1	98 23	167.9	76 11.5	98 24	167.4
4	74 30.4	97 27	164.9	74 59.5	97 28	164.5	75 28.5	97 29	164.0	75 57.4	96 30	163.4
05	74 14.2	95 32	161.4	74 42.8	95 33	160.8	75 11.3	95 34	160.2	75 39.7	94 36	159.6
6	73 54.8	94 38	158.0	74 22.8	93 39	157.3	74 50.7	93 40	156.6	75 18.4	92 41	155.9
7	73 32.3	92 42	154.7	73 59.6	91 43	154.0	74 26.9	91 44	153.2	74 54.0	90 46	152.4
8	73 06.9	89 47	151.5	73 33.6	89 48	150.8	74 00.2	88 49	149.9	74 26.6	87 50	149.0
9	72 38.9	87 51	148.6	73 05.0	87 52	147.7	73 30.8	86 53	146.8	73 56.4	85 54	145.9
10	72 08.5	85 54	145.7	72 33.9	84 56	144.8	72 59.0	83 57	143.9	73 23.8	82 58	143.0
1	71 35.9	83 58	143.0	72 00.5	82 59	142.1	72 24.9	81 60	141.2	72 49.0	80 61	140.2
2	71 01.2	80 61	140.5	71 25.2	79 62	139.6	71 48.8	78 63	138.6	72 12.2	77 64	137.6
3	70 24.7	78 64	138.1	70 48.0	77 65	137.2	71 10.9	76 66	136.2	71 33.5	75 67	135.2
4	69 46.5	76 66	135.9	70 09.1	75 67	134.9	70 31.3	74 68	133.9	70 53.2	72 70	132.9
15	69 06.8	74 68	133.8	69 28.7	72 69	132.8	69 50.3	71 71	131.8	70 11.5	70 72	130.8
6	68 25.7	71 71	131.8	68 47.0	70 72	130.8	69 07.9	69 73	129.8	69 28.4	68 74	128.8
7	67 43.3	69 72	129.9	68 04.0	68 74	129.0	68 24.3	67 74	128.0	68 44.2	66 76	126.9
8	66 59.8	67 74	128.1	67 19.9	66 75	127.2	67 39.6	65 76	126.2	67 58.9	64 77	125.2
9	66 15.3	66 76	126.5	66 34.8	64 77	125.5	66 53.9	63 78	124.6	67 12.7	62 78	123.6
20	65 29.8	64 77	124.9	65 48.7	63 78	124.0	66 07.4	61 79	123.0	66 25.6	60 80	122.0
1	64 43.4	62 78	123.4	65 01.9	61 79	122.5	65 20.0	60 80	121.5	65 37.7	59 81	120.6
2	63 56.3	61 80	122.0	64 14.3	59 80	121.1	64 31.9	58 81	120.2	64 49.2	57 82	119.2
3	63 08.4	59 81	120.7	63 26.0	58 82	119.8	63 43.1	57 82	118.9	64 00.0	55 83	117.9
4	62 19.9	58 82	119.4	62 37.0	56 82	118.5	62 53.8	55 83	117.6	63 10.2	54 84	116.7
25	61 30.9	56 83	118.2	61 47.5	55 83	117.3	62 03.9	54 84	116.4	62 19.9	53 85	115.5
6	60 41.2	55 84	117.1	60 57.5	54 84	116.2	61 13.5	53 85	115.3	61 29.1	51 85	114.4
7	59 51.1	54 84	116.0	60 07.0	53 85	115.1	60 22.6	51 85	114.3	60 37.9	50 86	113.4
8	59 00.5	52 85	114.9	59 16.1	51 86	114.1	59 31.4	50 86	113.3	59 46.3	49 87	112.4
9	58 09.5	51 86	113.9	58 24.8	50 86	113.1	58 39.7	49 87	112.3	58 54.3	48 87	111.5
30	57 18.2	50 86	113.0	57 33.1	49 87	112.2	57 47.7	48 87	111.4	58 02.1	47 88	110.6
1	56 26.4	49 87	112.1	56 41.1	48 87	111.3	56 55.4	47 88	110.5	57 09.5	46 88	109.7
2	55 34.4	48 87	111.2	55 48.7	47 88	110.4	56 02.8	46 88	109.7	56 16.6	45 89	108.9
3	54 42.0	48 88	110.4	54 56.1	47 88	109.6	55 09.9	46 88	108.8	55 23.4	45 89	108.1
4	53 49.4	47 88	109.6	54 03.2	46 88	108.8	54 16.8	45 89	108.1	54 30.1	44 89	107.3
35	52 56.5	46 89	108.8	53 10.1	45 89	108.1	53 23.5	44 89	107.3	53 36.5	43 90	106.6
6	52 03.3	45 89	108.1	52 16.7	44 89	107.3	52 29.9	43 90	106.6	52 42.7	42 90	105.9
7	51 10.0	44 89	107.4	51 23.1	44 90	106.6	51 36.1	43 90	105.9	51 48.7	42 90	105.2
8	50 16.4	44 90	106.7	50 29.4	43 90	106.0	50 42.1	42 90	105.2	50 54.6	41 90	104.5
9	49 22.6	43 90	106.0	49 35.4	42 90	105.3	49 48.0	41 90	104.6	50 00.3	41 91	103.9
40	48 28.7	42 90	105.3	48 41.3	42 90	104.7	48 53.7	41 91	104.0	49 05.8	40 91	103.3
1	47 34 6	42 90	104.7	47 47.1	41 91	104.1	47 59.3	40 91	103.4	48 11.3	40 91	102.7
2	46 40.4	41 91	104.1	46 52.7	41 91	103.4	47 04.7	40 91	102.8	47 16.5	39 91	102.1
3	45 46.0	41 91	103.5	45 58.1	40 91	102.9	46 10.0	39 91	102.2	46 21.7	39 92	101.5
4	44 51.4	40 91	102.9	45 03.4	40 91	102.3	45 15.2	39 92	101.6	45 26.8	38 92	101.0
45	43 56.8	40 91	102.4	44 08.6	39 92	101.7	44 20.3	38 92	101.1	44 31.7	38 92	100.5
6	43 02.0	39 92	101.8	43 13.8	39 92	101.2	43 25.3	38 92	100.6	43 36.6	37 92	99.9
7	42 07.1	39 92	101.3	42 18.8	38 92	100.7	42 30.2	38 92	100.1	42 41.4	37 92	99.4
8	41 12.2	39 92	100.8	41 23.7	38 92	100.2	41 35.0	37 92	99.6	41 46.1	37 92	98.9
9	40 17.1	38 92	100.3	40 28.5	38 92	99.7	40 39.7	37 92	99.1	40 50.7	36 92	98.5
50	39 21.9	38 92	99.8	39 33.2	37 92	99.2	39 44.4	37 92	98.6	39 55.3	36 92	98.0
1	38 26.7	38 92	99.3	38 37.9	37 92	98.7	38 48.9	36 92	98.1	38 59.8	36 93	97.5
2	37 31.4	37 92	98.8	37 42.5	37 92	98.3	37 53.5	36 93	97.7	38 04.2	36 93	97.1
3	36 36.0	37 92	98.4	36 47.0	37 92	97.8	36 57.9	36 93	97.2	37 08.6	35 93	96.6
4	35 40.6	37 93	97.9	35 51.5	36 93	97.3	36 02.3	36 93	96.8	36 12.9	35 93	96.2
55	34 45.0	37 93	97.5	34 55.9	36 93	96.9	35 06.7	36 93	96.3	35 17.2	35 93	95.8
6	33 49.5	36 93	97.0	34 00.3	36 93	96.5	34 11.0	35 93	95.9	34 21.5	35 93	95.3
7	32 53.9	36 93	96.6	33 04.6	36 93	96.0	33 15.2	35 93	95.5	33 25.7	35 93	94.9
8	31 58.2	36 93	96.2	32 08.9	35 93	95.6	32 19.4	35 93	95.1	32 29.9	34 93	94.5
9	31 02.5	36 93	95.8	31 13.1	35 93	95.2	31 23.6	35 93	94.7	31 34.0	34 93	94.1
60	30 06.7	36 93	95.3	30 17.3	35 93	94.8	30 27.8	35 93	94.3	30 38.1	34 93	93.7
1	29 10.9	35 93	94.9	29 21.5	35 93	94.4	29 31.9	35 93	93.9	29 42.2	34 93	93.3
2	28 15.1	35 93	94.5	28 25.6	35 93	94.0	28 36.0	34 93	93.5	28 46.3	34 93	92.9
3	27 19.3	35 93	94.1	27 29.7	35 93	93.6	27 40.1	34 93	93.1	27 50.3	34 93	92.6
4	26 23.4	35 93	93.8	26 33.8	35 93	93.2	26 44.2	34 93	92.7	26 54.4	34 93	92.2
65	25 27.5	35 93	93.4	25 37.9	35 93	92.8	25 48.2	34 93	92.3	25 58.4	34 93	91.8
6	24 31.5	35 93	93.0	24 41.9	34 93	92.5	24 52.2	34 93	92.0	25 02.4	34 93	91.4
7	23 35.6	35 93	92.6	23 46.0	34 93	92.1	23 56.2	34 93	91.6	24 06.4	34 93	91.1
8	22 39.6	35 93	92.2	22 50.0	34 93	91.7	23 00.2	34 93	91.2	23 10.4	34 93	90.7
9	21 43.6	35 93	91.9	21 54.0	34 93	91.4	22 04.2	34 93	90.8	22 14.4	34 93	90.3
70	20 47.7	35 93	91.5	20 58.0	34 93	91.0	21 08.2	34 93	90.5	21 18.4	34 93	90.0
1	19 51.7	35 93	91.1	20 02.0	34 93	90.6	20 12.2	34 93	90.1	20 22.3	34 93	89.6
2	18 55.7	35 93	90.8	19 06.0	34 93	90.3	19 16.2	34 93	89.8	19 26.3	34 93	89.3
3	17 59.6	34 93	90.4	18 09.9	34 93	89.9	18 20.2	34 93	89.4	18 30.3	34 93	88.9
4	17 03.6	34 93	90.0	17 13.9	34 93	89.5	17 24.2	34 93	89.1	17 34.3	34 93	88.6
75	16 07.6	34 93	89.7	16 17.9	34 93	89.2	16 28.2	34 93	88.7	16 38.3	34 93	88.2
6	15 11.6	34 93	89.3	15 21.9	34 93	88.8	15 32.2	34 93	88.4	15 42.3	34 93	87.9
7	14 15.6	35 93	89.0	14 25.9	34 93	88.5	14 36.2	34 93	88.0	14 46.4	34 93	87.5
8	13 19.6	35 93	88.6	13 29.9	34 93	88.1	13 40.2	34 93	87.7	13 50.4	34 93	87.2
9	12 23.6	35 93	88.3	12 33.9	34 93	87.8	12 44.2	34 93	87.3	12 54.5	34 93	86.8
80	11 27.6	35 93	87.9	11 38.0	34 93	87.4	11 48.3	34 93	87.0	11 58.6	34 93	86.5
1	10 31.6	35 93	87.6	10 42.0	35 93	87.1	10 52.4	34 93	86.6	11 02.7	34 93	86.1
2	9 35.7	35 93	87.2	9 46.1	35 93	86.7	9 56.5	35 93	86.3	10 06.8	34 93	85.8
3	8 39.7	35 93	86.9	8 50.2	35 93	86.4	9 00.6	35 93	85.9	9 10.9	34 93	85.4
4	7 43.8	35 93	86.5	7 54.3	35 93	86.0	8 04.7	35 93	85.6	8 15.1	35 93	85.1
85	6 47.9	35 93	86.2	6 58.4	35 93	85.7	7 08.9	35 93	85.2	7 19.3	35 93	84.7
6	5 52.0	35 93	85.8	6 02.6	35 93	85.3	6 13.1	35 93	84.9	6 23.6	35 93	84.4
7				5 06.8	35 93	85.0	5 17.3	35 93	84.5	5 27.8	35 93	84.0

Lat. 21°

H.A.	4° 00′ Alt.	Az.	4° 30′ Alt.	Az.	5° 00′ Alt.	Az.	5° 30′ Alt.	Az.	6° 00′ Alt.	Az.	6° 30′ Alt.	Az.	7° 00′ Alt.	Az.	7° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	65 00.0 1.0 02	180.0	64 30.0 1.0 02	180.0	64 00.0 1.0 02	180.0	63 30.0 1.0 02	180.0	63 00.0 1.0 02	180.0	62 30.0 1.0 02	180.0	62 00.0 1.0 02	180.0	61 30.0 1.0 02	180.0	00
1	64 58.8 1.0 06	177.6	64 28.9 1.0 06	177.7	63 58.9 1.0 06	177.7	63 28.9 1.0 06	177.8	62 58.9 1.0 05	177.8	62 28.9 1.0 05	177.8	61 59.0 1.0 05	177.9	61 29.0 1.0 05	177.9	1
2	64 55.4 1.0 10	175.3	64 25.5 1.0 10	175.4	63 55.6 1.0 09	175.5	63 25.6 1.0 09	175.5	62 55.7 1.0 09	175.6	62 25.8 1.0 09	175.7	61 55.9 1.0 09	175.8	61 25.9 1.0 08	175.9	2
3	64 49.7 99 13	172.9	64 19.8 99 13	173.1	63 50.0 99 13	173.2	63 20.2 99 13	173.3	62 50.4 99 12	173.5	62 20.6 99 12	173.6	61 50.7 99 12	173.7	61 20.9 99 12	173.8	3
4	64 41.7 99 17	170.6	64 12.0 99 17	170.8	63 42.3 99 16	171.0	63 12.6 99 16	171.1	62 43.0 99 16	171.3	62 13.3 99 16	171.4	61 43.5 99 15	171.6	61 13.8 99 15	171.7	4
05	64 31.4 98 21	168.3	64 02.0 98 20	168.6	63 32.5 98 20	168.8	63 03.0 98 20	169.0	62 33.4 98 19	169.2	62 03.9 98 19	169.3	61 34.4 99 19	169.5	61 04.8 99 18	169.7	05
6	64 19.0 97 24	166.1	63 49.8 98 24	166.3	63 20.5 98 23	166.6	62 51.2 98 23	166.8	62 21.9 98 22	167.0	61 52.6 98 22	167.3	61 23.2 98 22	167.5	60 53.8 98 22	167.7	6
7	64 04.5 97 28	163.9	63 35.5 97 27	164.1	63 06.5 97 27	164.4	62 37.4 97 26	164.7	62 08.4 97 26	165.0	61 39.2 97 25	165.2	61 10.1 97 25	165.5	60 40.9 97 24	165.7	7
8	63 47.9 96 31	161.7	63 19.2 96 30	162.0	62 50.5 96 30	162.3	62 21.7 96 30	162.6	61 52.9 96 29	162.9	61 24.0 96 28	163.2	60 55.1 96 28	163.5	60 26.2 96 28	163.8	8
9	63 29.3 94 34	159.5	63 00.9 95 34	159.9	62 32.5 95 33	160.2	62 04.0 95 32	160.6	61 35.5 95 32	160.9	61 06.9 95 32	161.2	60 38.3 95 31	161.5	60 09.6 96 30	161.8	9
10	63 08.8 93 37	157.5	62 40.7 94 37	157.8	62 12.6 94 36	158.2	61 44.5 94 36	158.6	61 16.2 94 35	158.9	60 48.0 94 34	159.3	60 19.7 94 34	159.6	59 51.3 95 34	160.0	10
1	62 46.4 92 40	155.4	62 18.7 92 40	155.8	61 50.9 93 39	156.2	61 23.1 93 38	156.6	60 55.2 93 38	157.0	60 27.3 93 37	157.4	59 59.3 93 37	157.8	59 31.2 94 36	158.1	1
2	62 22.2 91 43	153.4	61 54.9 91 42	153.9	61 27.5 91 42	154.3	61 00.1 92 41	154.7	60 32.5 92 40	155.1	60 04.9 92 40	155.5	59 37.3 92 40	155.9	59 09.5 93 39	156.3	2
3	61 56.3 89 46	151.5	61 29.4 90 45	152.0	61 02.4 90 44	152.4	60 35.3 90 44	152.9	60 08.2 91 43	153.3	59 40.9 91 43	153.7	59 13.6 91 42	154.1	58 46.2 91 41	154.5	3
4	61 28.8 88 48	149.6	61 02.3 88 48	150.1	60 35.7 89 47	150.6	60 09.0 89 46	151.1	59 42.2 89 46	151.5	59 15.3 90 45	152.0	58 48.4 90 44	152.4	58 21.4 90 44	152.8	4
15	60 59.7 87 51	147.8	60 33.6 87 50	148.3	60 07.4 87 50	148.8	59 41.1 88 49	149.3	59 14.8 88 48	149.8	58 48.3 88 48	150.2	58 21.7 89 47	150.7	57 55.0 89 46	151.1	15
6	60 29.1 85 53	146.1	60 03.5 86 52	146.6	59 37.7 86 52	147.1	59 11.8 86 51	147.6	58 45.8 87 50	148.1	58 19.7 87 50	148.6	57 53.5 88 49	149.0	57 27.2 88 48	149.5	6
7	59 57.2 84 56	144.4	59 32.0 84 55	144.9	59 06.6 85 54	145.4	58 41.1 85 53	145.9	58 15.6 85 53	146.4	57 49.8 86 52	146.9	57 24.0 86 51	147.4	56 58.1 87 51	147.9	7
8	59 23.9 82 58	142.7	58 59.1 83 57	143.3	58 34.2 83 56	143.8	58 09.1 84 55	144.3	57 43.9 84 55	144.9	57 18.6 85 54	145.4	56 53.2 85 53	145.8	56 27.7 85 53	146.3	8
9	58 49.4 81 60	141.1	58 25.0 81 59	141.7	58 00.5 82 58	142.3	57 35.9 82 58	142.8	57 11.1 83 57	143.3	56 46.2 83 56	143.8	56 21.2 84 56	144.3	55 56.0 84 55	144.8	9
20	58 13.6 80 61	139.6	57 49.7 80 61	140.2	57 25.6 81 60	140.7	57 01.4 81 59	141.3	56 37.0 81 59	141.8	56 12.5 82 58	142.3	55 47.9 82 57	142.8	55 23.2 83 57	143.3	20
1	57 36.8 78 63	138.1	57 13.3 79 62	138.7	56 49.6 79 62	139.3	56 25.8 80 61	139.8	56 01.8 80 60	140.4	55 37.8 81 60	140.9	55 13.5 81 59	141.4	54 49.2 81 58	141.9	1
2	56 58.9 77 65	136.7	56 35.8 77 64	137.3	56 12.5 78 63	137.9	55 49.1 78 63	138.4	55 25.6 79 62	139.0	55 01.9 79 62	139.5	54 38.1 80 61	140.0	54 14.1 80 60	140.5	2
3	56 20.0 75 66	135.3	55 57.3 76 66	135.9	55 34.5 76 65	136.5	55 11.5 77 64	137.1	54 48.3 77 64	137.6	54 25.0 78 63	138.2	54 01.6 78 62	138.7	53 38.0 79 62	139.2	3
4	55 40.1 74 68	134.0	55 17.9 75 67	134.6	54 55.4 75 66	135.2	54 32.8 76 66	135.7	54 10.1 76 65	136.3	53 47.2 77 65	136.8	53 24.1 77 64	137.4	53 00.9 78 63	137.9	4
25	54 59.4 73 69	132.7	54 37.5 73 68	133.3	54 15.5 74 68	133.9	53 53.3 74 67	134.5	53 30.9 75 67	135.0	53 08.4 75 66	135.6	52 45.7 76 65	136.1	52 22.9 76 65	136.7	25
6	54 17.8 71 70	131.5	53 56.4 72 70	132.1	53 34.7 72 69	132.6	53 12.9 73 69	133.2	52 50.9 74 68	133.8	52 28.8 74 68	134.3	52 06.5 75 67	134.9	51 44.0 75 66	135.4	6
7	53 35.5 70 72	130.3	53 14.4 71 71	130.9	52 53.1 71 71	131.5	52 31.7 72 70	132.0	52 10.1 72 69	132.6	51 48.3 73 69	133.2	51 26.4 73 68	133.7	51 04.3 74 68	134.2	7
8	52 52.4 69 73	129.1	52 31.6 69 72	129.7	52 10.7 70 72	130.3	51 49.7 71 71	130.9	51 28.5 71 71	131.4	51 07.1 72 70	132.0	50 45.5 72 69	132.6	50 23.8 73 69	133.1	8
9	52 08.6 68 74	128.0	51 48.2 68 74	128.6	51 27.7 69 73	129.2	51 07.0 69 72	129.8	50 46.1 70 72	130.3	50 25.1 70 71	130.9	50 03.9 71 71	131.4	49 42.5 71 70	132.0	9
30	51 24.1 66 75	126.9	51 04.1 67 74	127.5	50 43.9 68 74	128.1	50 23.6 68 74	128.7	50 03.1 69 73	129.2	49 42.4 69 72	129.8	49 21.5 70 72	130.4	49 00.5 70 71	130.9	30
1	50 39.0 65 76	125.9	50 19.4 66 76	126.5	49 59.5 66 75	127.1	49 39.5 67 74	127.6	49 19.4 68 74	128.2	48 59.0 68 73	128.8	48 38.5 69 73	129.3	48 17.9 69 72	129.9	1
2	49 53.3 64 77	124.9	49 34.0 65 76	125.5	49 14.5 65 76	126.0	48 54.9 66 76	126.6	48 35.0 66 75	127.2	48 15.0 67 74	127.7	47 54.9 67 74	128.3	47 34.6 68 73	128.8	2
3	49 07.1 63 78	123.9	48 48.1 64 77	124.5	48 28.9 64 77	125.1	48 09.6 65 76	125.6	47 50.1 65 76	126.2	47 30.4 66 75	126.8	47 10.6 66 75	127.3	46 50.6 67 74	127.9	3
4	48 20.3 62 79	122.9	48 01.7 63 78	123.5	47 42.8 63 78	124.1	47 23.8 64 77	124.7	47 04.6 64 77	125.3	46 45.3 65 76	125.8	46 25.8 65 76	126.4	46 06.1 66 75	126.9	4
35	47 33.1 61 80	122.0	47 14.7 61 79	122.6	46 56.2 62 78	123.2	46 37.5 63 78	123.8	46 18.6 63 78	124.3	45 59.6 64 77	124.9	45 40.4 64 76	125.4	45 21.1 65 76	126.0	35
6	46 45.4 60 80	121.1	46 27.3 60 80	121.7	46 09.1 61 79	122.3	45 50.7 62 79	122.9	45 32.1 62 78	123.4	45 13.4 63 78	124.0	44 54.5 63 77	124.5	44 35.5 64 77	125.1	6
7	45 57.2 59 81	120.3	45 39.5 59 80	120.9	45 21.5 60 80	121.4	45 03.4 61 80	122.0	44 45.2 61 79	122.6	44 26.7 62 78	123.1	44 08.1 62 78	123.7	43 49.4 63 78	124.2	7
8	45 08.6 58 82	119.5	44 51.2 59 81	120.0	44 33.5 59 81	120.6	44 15.7 60 80	121.2	43 57.7 60 80	121.7	43 39.6 61 79	122.3	43 21.3 61 79	122.8	43 02.8 62 78	123.4	8
9	44 19.7 57 82	118.6	44 02.5 58 82	119.2	43 45.1 58 81	119.8	43 27.6 59 81	120.3	43 09.9 59 80	120.9	42 52.0 60 80	121.4	42 34.0 60 80	122.0	42 15.8 61 79	122.5	9
40	43 30.3 56 83	117.9	43 13.4 57 82	118.4	42 56.3 57 82	119.0	42 39.0 58 82	119.6	42 21.6 58 81	120.1	42 04.0 59 81	120.6	41 46.3 59 80	121.2	41 28.4 60 80	121.7	40
1	42 40.6 55 83	117.1	42 24.0 56 83	117.7	42 07.1 56 82	118.2	41 50.1 57 82	118.8	41 33.0 57 82	119.3	41 15.6 58 81	119.9	40 58.2 58 81	120.4	40 40.5 59 80	120.9	1
2	41 50.6 54 84	116.4	41 34.2 55 84	116.9	41 17.6 56 83	117.5	41 00.8 56 83	118.0	40 43.9 57 82	118.6	40 26.9 57 82	119.1	40 09.7 58 82	119.7	39 52.3 58 81	120.2	2
3	41 00.3 54 84	115.6	40 44.1 54 84	116.2	40 27.7 55 84	116.8	40 11.2 55 83	117.3	39 54.6 56 83	117.8	39 37.8 56 82	118.4	39 20.8 57 82	118.9	39 03.7 57 82	119.4	3
4	40 09.6 53 85	114.9	39 53.7 53 84	115.5	39 37.6 54 84	116.0	39 21.3 54 84	116.6	39 04.9 55 83	117.1	38 48.3 55 83	117.7	38 31.6 56 82	118.2	38 14.8 56 82	118.7	4
45	39 18.7 52 85	114.3	39 03.0 53 85	114.8	38 47.1 53 85	115.4	38 31.1 54 84	115.9	38 14.9 54 84	116.4	37 58.6 55 84	117.0	37 42.1 55 83	117.5	37 25.5 56 83	118.0	45
6	38 27.5 51 86	113.6	38 12.0 52 86	114.1	37 56.3 52 85	114.7	37 40.5 53 85	115.2	37 24.6 53 84	115.8	37 08.5 54 84	116.3	36 52.2 54 84	116.8	36 35.9 55 83	117.3	6
7	37 36.0 51 86	113.0	37 20.7 51 86	113.5	37 05.3 52 86	114.0	36 49.7 52 85	114.6	36 34.0 53 85	115.1	36 18.1 53 84	115.6	36 02.1 54 84	116.1	35 46.0 54 84	116.7	7
8	36 44.3 50 86	112.3	36 29.2 51 86	112.9	36 14.0 51 86	113.4	35 58.6 51 86	113.9	35 43.1 52 85	114.5	35 27.5 52 85	115.0	35 11.7 53 84	115.5	34 55.8 53 84	116.0	8
9	35 52.4 49 87	111.7	35 37.5 50 87	112.2	35 22.5 50 86	112.8	35 07.3 51 86	113.3	34 52.0 51 86	113.8	34 36.6 52 85	114.3	34 21.0 52 85	114.9	34 05.3 53 84	115.4	9
50	35 00.2 49 87	111.1	34 45.5 49 87	111.6	34 30.7 50 87	112.2	34 15.7 50 86	112.7	34 00.6 51 86	113.2	33 45.4 51 86	113.7	33 30.0 51 85	114.2	33 14.6 52 85	114.8	50
1	34 07.9 48 88	110.5	33 53.4 49 87	111.0	33 38.7 49 87	111.6	33 23.9 49 87	112.1	33 09.0 50 86	112.6	32 54.0 50 86	113.1	32 38.8 51 86	113.6	32 23.6 51 86	114.1	1
2	33 15.3 48 88	109.9	33 01.0 48 88	110.5	32 46.5 48 87	111.0	32 31.9 49 87	111.5	32 17.2 49 87	112.0	32 02.4 50 86	112.5	31 47.4 50 86	113.0	31 32.3 50 86	113.6	2
3	32 22.6 47 88	109.4	32 08.4 47 88	109.9	31 54.1 48 88	110.4	31 39.7 48 87	110.9	31 25.2 49 87	111.5	31 10.5 49 87	112.0	30 55.8 49 86	112.5	30 40.9 50 86	113.0	3
4	31 29.6 46 88	108.8	31 15.7 47 88	109.4	31 01.5 47 88	109.9	30 47.3 48 88	110.4	30 33.0 48 88	110.9	30 18.5 48 87	111.4	30 03.9 49 87	111.9	29 49.2 49 86	112.4	4
55	30 36.5 46 89	108.3	30 22.7 46 88	108.8	30 08.8 47 88	109.3	29 54.7 47 88	109.8	29 40.5 47 88	110.3	29 26.2 48 87	110.8	29 11.8 48 87	111.3	28 57.3 49 87	111.8	55
6	29 43.3 45 89	107.8	29 29.6 46 89	108.3	29 15.8 46 88	108.8	29 01.9 47 88	109.3	28 47.9 47 88	109.8	28 33.8 47 88	110.3	28 19.6 48 88	110.8	28 05.2 48 87	111.3	6
7	28 49.9 45 89	107.3	28 36.3 45 89	107.8	28 22.7 46 89	108.3	28 09.0 46 88	108.8	27 55.1 46 88	109.3	27 41.2 47 88	109.8	27 27.1 47 88	110.3	27 12.9 47 87	110.8	7
8	27 56.3 44 90	106.7	27 42.9 45 89	107.3	27 29.4 45 89	107.8	27 15.9 45 89	108.3	27 02.2 46 88	108.8	26 48.4 46 88	109.3	26 34.5 47 88	109.8	26 20.5 47 88	110.2	8
9	27 02.6 44 90	106.3	26 49.4 44 90	106.8	26 36.0 45 89	107.3	26 22.6 45 89	107.8	26 09.1 45 89	108.3	25 55.4 46 88	108.7	25 41.7 46 88	109.2	25 27.8 46 88	109.7	9
60	26 08.7 43 90	105.8	25 55.7 44 90	106.3	25 42.5 44 90	106.8	25 29.2 44 89	107.3	25 15.8 45 89	107.8	25 02.3 45 89	108.2	24 48.7 45 88	108.7	24 35.0 46 88	109.2	60
1	25 14.8 43 90	105.3	25 01.8 43 90	105.8	24 48.8 44 90	106.3	24 35.6 44 90	106.8	24 22.4 44 89	107.3	24 09.0 45 89	107.8	23 55.6 45 89	108.2	23 42.0 45 88	108.7	1
2	24 20.7 43 90	104.8	24 07.8 43 90	105.3	23 54.9 43 90	105.8	23 41.9 44 90	106.3	23 28.8 44 90	106.8	23 15.6 44 89	107.3	23 02.3 44 89	107.8	22 48.9 45 89	108.3	2
3	23 26.5 42 91	104.4	23 13.8 42 90	104.8	23 01.0 43 90	105.3	22 48.1 43 90	105.8	22 35.1 43 90	106.3	22 22.0 44 89	106.8	22 08.9 44 89	107.3	21 55.7 44 89	107.8	3
4	22 32.1 42 91	103.9	22 19.6 42 91	104.4	22 06.9 42 90	104.9	21 54.1 43 90	105.4	21 41.3 43 90	105.9	21 28.4 43 90	106.3	21 15.3 44 89	106.8	21 02.2 44 89	107.3	4
65	21 37.7 41 91	103.4	21 25.2 42 91	103.9	21 12.7 42 90	104.4	21 00.1 42 90	104.9	20 47.3 43 90	105.4	20 34.5 43 90	105.9	20 21.7 43 90	106.4	20 08.7 43 90	106.8	65
6	20 43.2 41 91	103.0	20 30.8 41 91	103.5	20 18.4 42 91	104.0	20 05.9 42 90	104.5	19 53.3 42 90	104.9	19 40.6 42 90	105.4	19 27.8 43 90	105.9	19 15.0 43 90	106.4	6
7	19 48.6 41 91	102.6	19 36.3 41 91	103.1	19 24.0 41 91	103.5	19 11.6 41 91	104.0	18 59.1 42 90	104.5	18 46.5 42 90	105.0	18 33.9 42 90	105.5	18 21.2 42 90	105.9	7
8	18 53.8 40 91	102.1	18 41.7 41 91	102.6	18 29.5 41 91	103.1	18 17.2 41 91	103.6	18 04.8 41 91	104.1	17 52.4 42 90	104.5	17 39.9 42 90	105.0	17 27.3 42 90	105.5	8
9	17 59.0 40 91	101.7	17 47.0 40 91	102.2	17 34.9 41 91	102.7	17 22.7 41 91	103.2	17 10.4 41 91	103.6	16 58.1 41 91	104.1	16 45.7 41 90	104.6	16 33.3 42 90	105.1	9
70	17 04.2 40 92	101.3	16 52.2 40 92	101.8	16 40.2 40 91	102.3	16 28.1 40 91	102.7	16 16.0 41 91	103.2	16 03.7 41 91	103.7	15 51.5 41 91	104.2	15 39.1 41 90	104.6	70
1	16 09.2 39 92	100.9	15 57.3 40 92	101.4	15 45.4 40 92	101.8	15 33.4 40 91	102.3	15 21.4 40 91	102.8	15 09.3 40 91	103.3	14 57.1 41 91	103.7	14 44.9 41 91	104.2	1
2	15 14.1 39 92	100.5	15 02.4 39 92	101.0	14 50.5 40 92	101.4	14 38.7 40 92	101.9	14 26.7 40 91	102.4	14 14.7 40 91	102.9	14 02.6 40 91	103.3	13 50.5 40 91	103.8	2
3	14 19.0 39 92	100.1	14 07.3 39 92	100.6	13 55.6 39 92	101.0	13 43.8 39 92	101.5	13 32.0 40 92	102.0	13 20.0 40 91	102.5	13 08.1 40 91	102.9	12 56.1 40 91	103.4	3
4	13 23.8 39 92	99.7	13 12.2 39 92	100.2	13 00.6 39 92	100.6	12 48.9 39 92	101.1	12 37.1 39 92	101.6	12 25.3 39 91	102.0	12 13.5 40 91	102.5	12 01.5 40 91	103.0	4
75	12 28.6 38 92	99.3	12 17.1 39 92	99.8	12 05.5 39 92	100.2	11 53.9 39 92	100.7	11 42.2 39 92	101.2	11 30.5 39 92	101.6	11 18.7 39 91	102.1	11 06.9 39 91	102.6	75
6	11 33.3 38 92	98.9	11 21.8 38 92	99.4	11 10.3 38 92	99.8	10 58.8 39 92	100.3	10 47.2 39 92	100.8	10 35.6 39 92	101.3	10 23.9 39 92	101.7	10 12.2 39 91	102.2	6
7	10 37.9 38 92	98.5	10 26.5 38 92	99.0	10 15.1 38 92	99.5	10 03.7 38 92	99.9	9 52.2 38 92	100.4	9 40.6 39 92	100.9	9 29.0 39 92	101.3	9 17.4 39 92	101.8	7
8	9 42.5 38 92	98.1	9 31.2 38 92	98.6	9 19.8 38 92	99.1	9 08.4 38 92	99.5	8 57.0 38 92	100.0	8 45.6 38 92	100.5	8 34.1 38 92	100.9	8 22.5 38 92	101.4	8
9	8 47.0 37 92	97.8	8 35.8 38 92	98.2	8 24.5 38 92	98.7	8 13.2 38 92	99.2	8 01.8 38 92	99.6	7 50.5 38 92	100.1	7 39.0 38 92	100.6	7 27.6 38 92	101.0	9
80	7 51.5 37 93	97.4	7 40.3 37 92	97.8	7 29.1 37 92	98.3	7 17.9 38 92	98.8	7 06.6 38 92	99.2	6 55.3 38 92	99.7	6 43.9 38 92	100.2	6 32.6 38 92	100.6	80
1	6 55.9 37 93	97.0	6 44.8 37 93	97.5	6 33.6 37 92	97.9	6 22.5 37 92	98.4	6 11.3 37 92	98.9	6 00.0 37 92	99.3	5 48.8 38 92	99.8	5 37.5 38 92	100.3	1
2	6 00.3 37 93	96.6	5 49.2 37 93	97.1	5 38.1 37 92	97.6	5 27.0 37 92	98.0	5 15.9 37 92	98.5	5 04.7 37 92	99.0					2
3	5 04.6 37 93	96.3															3

Lat. 21°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	77 00.0	1.0 04	180.0	77 30.0	1.0 04	180.0	78 00.0	1.0 04	180.0	78 30.0	1.0 04	180.0	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	80 00.0	1.0 05	180.0	80 30.0	1.0 05	180.0	00
1	76 57.8	1.0 11	175.6	77 27.8	1.0 11	175.4	77 57.7	1.0 12	175.3	78 27.6	1.0 12	175.1	78 57.5	1.0 12	174.9	79 27.4	1.0 13	174.6	79 57.2	1.0 14	174.4	80 27.1	1.0 14	174.1	1
2	76 51.4	99 18	171.3	77 21.1	99 18	170.9	77 50.8	99 19	170.6	78 20.4	99 20	170.2	78 50.0	99 20	169.8	79 19.5	98 21	169.3	79 49.0	98 22	168.8	80 18.5	98 23	168.3	2
3	76 40.9	98 24	167.0	77 10.2	98 25	166.5	77 39.4	97 26	166.0	78 08.6	97 27	165.5	78 37.7	97 28	164.8	79 06.7	97 29	164.2	79 35.6	96 30	163.5	80 04.4	96 32	162.7	3
4	76 26.3	96 31	162.9	76 55.1	96 32	162.3	77 23.8	95 33	161.6	77 52.3	95 34	160.9	78 20.8	95 35	160.1	78 49.1	94 36	159.3	79 17.3	94 38	158.4	79 45.3	93 40	157.4	4
05	76 07.9	94 36	158.9	76 36.1	94 38	158.2	77 04.1	93 39	157.4	77 32.0	93 40	156.5	77 59.7	92 42	155.6	78 27.2	91 43	154.7	78 54.5	91 45	153.6	79 21.6	90 46	152.4	05
6	75 46.0	92 42	155.1	76 13.5	91 43	154.3	76 40.8	91 45	153.4	77 07.8	90 46	152.4	77 34.7	89 48	151.4	78 01.3	88 49	150.3	78 27.6	87 51	149.1	78 53.7	86 53	147.9	6
7	75 20.9	89 47	151.5	75 47.6	89 48	150.6	76 14.0	88 50	149.6	76 40.2	87 51	148.6	77 06.2	86 53	147.5	77 31.9	85 54	146.3	77 57.2	84 56	145.0	78 22.1	83 58	143.7	7
8	74 52.7	87 52	148.1	75 18.6	86 53	147.1	75 44.2	85 54	146.1	76 09.6	84 56	145.0	76 34.6	83 57	143.8	76 59.3	82 59	142.6	77 23.6	80 61	141.3	77 47.5	79 62	139.8	8
9	74 21.8	84 56	144.9	74 46.8	83 57	143.9	75 11.6	82 58	142.8	75 36.1	81 60	141.6	76 00.2	80 62	140.4	76 23.9	78 63	139.2	76 47.2	77 65	137.8	77 10.0	75 66	136.4	9
10	73 48.4	81 59	141.9	74 12.6	80 61	140.9	74 36.6	79 62	139.7	75 00.1	78 64	138.6	75 23.3	77 65	137.3	75 46.1	75 66	136.0	76 08.4	74 68	134.6	76 30.3	72 70	133.2	10
1	73 12.8	79 63	139.1	73 36.2	78 64	138.0	73 59.3	76 65	136.9	74 22.0	75 67	135.7	74 44.3	74 68	134.4	75 06.2	72 70	133.1	75 27.6	70 71	131.8	75 48.5	69 73	130.3	1
2	72 35.2	76 66	136.5	72 57.8	75 67	135.4	73 20.1	74 68	134.3	73 42.0	72 70	133.1	74 03.4	71 71	131.8	74 24.4	69 72	130.5	74 44.9	67 74	129.1	75 04.9	66 75	127.7	2
3	71 55.8	74 68	134.1	72 17.7	72 70	133.0	72 39.2	71 71	131.8	73 00.2	70 72	130.6	73 20.9	68 73	129.4	73 41.1	66 75	128.1	74 00.7	65 76	126.7	74 19.9	63 77	125.3	3
4	71 14.8	71 71	131.8	71 35.9	70 72	130.7	71 56.7	68 73	129.6	72 17.0	67 74	128.4	72 36.9	65 76	127.1	72 56.3	64 77	125.8	73 15.2	62 78	124.5	73 33.5	60 79	123.1	4
15	70 32.3	69 73	129.7	70 52.8	68 74	128.6	71 12.8	66 75	127.5	71 32.5	65 76	126.3	71 51.6	63 77	125.0	72 10.3	61 78	123.8	72 28.5	60 80	122.5	72 46.1	58 81	121.1	15
6	69 48.6	67 75	127.7	70 06.4	65 76	126.6	70 27.8	64 77	125.5	70 46.7	62 78	124.3	71 05.2	61 79	123.1	71 23.2	59 80	121.9	71 40.7	57 81	120.6	71 57.7	56 82	119.3	6
7	69 03.8	65 76	125.9	69 22.9	63 77	124.8	69 41.7	62 78	123.7	70 00.0	60 80	122.5	70 17.8	59 80	121.3	70 35.2	57 81	120.1	70 52.1	55 82	118.9	71 08.4	54 83	117.6	7
8	68 17.9	63 78	124.1	68 36.5	61 79	123.1	68 54.6	60 80	122.0	69 12.3	58 81	120.9	69 29.6	57 82	119.7	69 46.4	55 83	118.5	70 02.6	53 84	117.3	70 18.4	52 84	116.0	8
9	67 31.1	61 79	122.5	67 49.1	59 80	121.5	68 06.7	58 81	120.4	68 23.8	56 82	119.3	68 40.5	55 83	118.2	68 56.8	53 84	117.0	69 12.5	52 84	115.8	69 27.8	50 85	114.6	9
20	66 43.5	59 81	121.0	67 01.0	58 82	120.0	67 18.0	56 82	118.9	67 34.6	55 83	117.8	67 50.8	53 84	116.7	68 06.6	52 85	115.6	68 21.8	50 86	114.4	68 36.6	48 86	113.2	20
1	65 55.1	57 82	119.6	66 12.1	56 83	118.6	66 28.6	55 83	117.5	66 44.8	53 84	116.5	67 00.5	52 85	115.4	67 15.8	50 86	114.3	67 30.5	48 86	113.1	67 44.8	47 87	112.0	1
2	65 06.1	56 83	118.2	65 22.6	54 84	117.2	65 38.7	53 84	116.2	65 54.4	52 85	115.2	66 09.6	50 86	114.1	66 24.4	49 86	113.0	66 38.8	47 87	111.9	66 52.7	46 88	110.8	2
3	64 16.4	54 84	116.9	64 32.5	53 84	116.0	64 48.2	52 85	115.0	65 03.4	50 86	114.0	65 18.3	49 86	112.9	65 32.7	47 87	111.9	65 46.6	46 88	110.8	66 00.1	44 88	109.7	3
4	63 26.2	53 84	115.7	63 41.9	52 85	114.8	63 57.1	50 86	113.8	64 12.0	49 86	112.8	64 26.5	47 87	111.8	64 40.5	46 88	110.8	64 54.1	45 88	109.7	65 07.2	43 89	108.7	4
25	62 35.5	52 85	114.6	62 50.8	50 86	113.7	63 05.7	49 86	112.7	63 20.2	48 87	111.7	63 34.3	46 88	110.8	63 47.9	45 88	109.8	64 01.2	43 89	108.7	64 14.0	42 89	107.7	25
6	61 44.4	50 86	113.5	61 59.3	49 86	112.6	62 13.8	48 87	111.7	62 28.0	47 88	110.7	62 41.7	45 88	109.8	62 55.1	44 89	108.8	63 08.0	42 89	107.8	63 20.5	41 90	106.8	6
7	60 52.8	49 86	112.5	61 07.4	48 87	111.6	61 21.6	47 88	110.7	61 35.4	45 88	109.8	61 48.8	44 88	108.8	62 01.9	43 89	107.9	62 14.5	41 90	106.9	62 26.8	40 90	105.9	7
8	60 00.9	48 87	111.5	60 15.1	47 88	110.6	60 29.0	46 88	109.8	60 42.5	44 88	108.8	60 55.7	43 89	107.9	61 08.4	42 89	107.0	61 20.8	41 90	106.0	61 32.8	39 90	105.1	8
9	59 08.6	47 88	110.6	59 22.6	46 88	109.7	59 36.2	45 89	108.9	59 49.4	43 89	108.0	60 02.3	42 90	107.1	60 14.8	41 90	106.2	60 26.9	40 90	105.2	60 38.6	38 91	104.3	9
30	58 16.0	46 88	109.7	58 29.7	45 88	108.9	58 43.0	44 89	108.0	58 56.0	43 90	107.1	59 08.6	41 90	106.3	59 20.8	40 90	105.4	59 32.7	39 90	104.5	59 44.2	38 91	103.5	30
1	57 23.2	45 89	108.9	57 36.6	44 89	108.0	57 49.6	43 89	107.2	58 02.3	42 90	106.3	58 14.7	41 90	105.5	58 26.7	39 90	104.6	58 38.4	38 91	103.7	58 49.7	37 91	102.8	1
2	56 30.0	44 89	108.1	56 43.2	43 89	107.2	56 56.0	42 90	106.4	57 08.5	41 90	105.6	57 20.6	40 90	104.7	57 32.4	39 91	103.9	57 43.9	38 91	103.0	57 55.0	36 91	102.1	2
3	55 36.7	44 89	107.3	55 49.6	42 90	106.5	56 02.2	41 90	105.7	56 14.4	40 90	104.8	56 26.4	39 91	104.0	56 38.0	38 91	103.2	56 49.2	37 91	102.3	57 00.2	36 92	101.5	3
4	54 43.1	43 90	106.5	54 55.7	42 90	105.7	55 08.1	41 90	104.9	55 20.2	40 91	104.1	55 31.9	39 91	103.3	55 43.4	38 91	102.5	55 54.4	36 92	101.7	56 05.2	35 92	100.8	4
35	53 49.3	42 90	105.8	54 01.7	41 90	105.0	54 13.9	40 91	104.3	54 25.8	39 91	103.5	54 37.4	38 91	102.7	54 48.6	37 92	101.9	54 59.5	36 92	101.1	55 10.1	35 92	100.2	35
6	52 55.3	41 90	105.1	53 07.6	40 91	104.4	53 19.5	39 91	103.6	53 31.2	38 91	102.8	53 42.6	37 91	102.0	53 53.7	36 92	101.2	54 04.5	35 92	100.5	54 15.0	34 92	99.7	6
7	52 01.1	41 90	104.4	52 13.2	40 91	103.7	52 25.0	39 91	102.9	52 36.6	38 92	102.2	52 47.8	37 92	101.4	52 58.7	36 92	100.7	53 09.4	35 92	99.9	53 19.7	34 92	99.1	7
8	51 06.8	40 91	103.8	51 18.7	39 91	103.1	51 30.4	38 91	102.3	51 41.7	37 92	101.6	51 52.8	36 92	100.8	52 03.6	36 92	100.1	52 14.1	35 92	99.3	52 24.3	34 92	98.5	8
9	50 12.3	40 91	103.2	50 24.1	39 91	102.5	50 35.6	38 92	101.7	50 46.8	37 92	101.0	50 57.8	36 92	100.3	51 08.4	35 92	99.5	51 18.8	34 92	98.8	51 28.9	33 92	98.0	9
40	49 17.7	39 91	102.6	49 29.3	38 91	101.9	49 40.7	37 92	101.1	49 51.8	37 92	100.4	50 02.6	36 92	99.7	50 13.1	35 92	99.0	50 23.4	34 92	98.2	50 33.4	33 93	97.5	40
1	48 23.0	39 92	102.0	48 34.5	38 92	101.3	48 45.7	37 92	100.6	48 56.6	36 92	99.9	49 07.3	35 92	99.2	49 17.8	34 92	98.4	49 27.9	33 92	97.7	49 37.8	33 93	97.0	1
2	47 28.1	38 92	101.4	47 39.5	37 92	100.7	47 50.6	37 92	100.0	48 01.4	36 92	99.3	48 12.0	35 92	98.6	48 22.3	34 92	97.9	48 32.4	33 93	97.2	48 42.2	32 93	96.5	2
3	46 33.2	38 92	100.9	46 44.4	37 92	100.2	46 55.4	36 92	99.5	47 06.1	35 92	98.8	47 16.6	35 92	98.1	47 26.8	34 93	97.4	47 36.8	33 93	96.7	47 46.5	32 93	96.0	3
4	45 38.1	37 92	100.3	45 49.2	37 92	99.7	46 00.1	36 92	99.0	46 10.7	35 92	98.3	46 21.1	34 93	97.6	46 31.2	33 93	97.0	46 41.1	33 93	96.3	46 50.8	32 93	95.6	4
45	44 43.0	37 92	99.8	44 53.9	36 92	99.2	45 04.7	36 92	98.5	45 15.2	35 92	97.8	45 25.5	34 93	97.2	45 35.6	33 93	96.5	45 45.4	32 93	95.8	45 55.0	32 93	95.1	45
6	43 47.7	37 92	99.3	43 58.6	36 92	98.6	44 09.3	35 92	98.0	44 19.7	34 93	97.3	44 29.9	34 93	96.7	44 39.9	33 93	96.0	44 49.7	32 93	95.4	44 59.2	31 93	94.7	6
7	42 52.4	36 92	98.8	43 03.2	36 92	98.2	43 13.8	35 93	97.5	43 24.1	34 93	96.9	43 34.3	33 93	96.2	43 44.2	33 93	95.6	43 53.9	32 93	94.9	44 03.4	31 93	94.3	7
8	41 57.0	36 92	98.3	42 07.7	35 92	97.7	42 18.2	35 93	97.1	42 28.5	34 93	96.4	42 38.6	33 93	95.8	42 48.4	33 93	95.1	42 58.1	32 93	94.5	43 07.5	31 93	93.8	8
9	41 01.5	36 92	97.8	41 12.2	35 93	97.2	41 22.6	34 93	96.6	41 32.8	34 93	96.0	41 42.8	33 93	95.3	41 52.6	32 93	94.7	42 02.2	32 93	94.1	42 11.6	31 93	93.4	9
50	40 06.0	35 93	97.4	40 16.6	35 93	96.8	40 26.9	34 93	96.1	40 37.1	34 93	95.5	40 47.0	33 93	94.9	40 56.8	32 93	94.3	41 06.3	31 93	93.7	41 15.7	31 93	93.0	50
1	39 10.4	35 93	96.9	39 20.9	35 93	96.3	39 31.2	34 93	95.7	39 41.3	33 93	95.1	39 51.2	33 93	94.5	40 00.9	32 93	93.9	40 10.4	31 93	93.2	40 19.7	31 93	92.6	1
2	38 14.8	35 93	96.5	38 25.2	34 93	95.9	38 35.5	34 93	95.3	38 45.5	33 93	94.7	38 55.3	33 93	94.1	39 05.0	32 93	93.5	39 14.5	31 93	92.8	39 23.8	31 93	92.2	2
3	37 19.1	35 93	96.0	37 29.5	34 93	95.4	37 39.7	34 93	94.9	37 49.6	33 93	94.3	37 59.5	32 93	93.7	38 09.1	32 93	93.1	38 18.5	31 93	92.5	38 27.8	31 93	91.8	3
4	36 23.4	35 93	95.6	36 33.7	34 93	95.0	36 43.8	33 93	94.4	36 53.8	33 93	93.8	37 03.5	32 93	93.3	37 13.1	32 93	92.7	37 22.6	31 93	92.1	37 31.8	30 93	91.5	4
55	35 27.6	34 93	95.2	35 37.9	34 93	94.6	35 48.0	33 93	94.0	35 57.9	33 93	93.4	36 07.6	32 93	92.9	36 17.2	32 93	92.3	36 26.6	31 93	91.7	36 35.8	30 93	91.1	55
6	34 31.8	34 93	94.8	34 42.0	34 93	94.2	34 52.1	33 93	93.6	35 01.9	33 93	93.1	35 11.7	32 93	92.5	35 21.2	32 93	91.9	35 30.6	31 93	91.3	35 39.8	30 93	90.7	6
7	33 36.0	34 93	94.4	33 46.2	34 93	93.8	33 56.2	33 93	93.2	34 06.0	33 93	92.7	34 15.7	32 93	92.1	34 25.2	31 93	91.5	34 34.6	31 93	90.9	34 43.8	30 93	90.4	7
8	32 40.1	34 93	94.0	32 50.3	33 93	93.4	33 00.2	33 93	92.8	33 10.0	32 93	92.3	33 19.7	32 93	91.7	33 29.2	31 93	91.1	33 38.6	31 93	90.6	33 47.8	30 93	90.0	8
9	31 44.2	34 93	93.6	31 54.3	33 93	93.0	32 04.3	33 93	92.5	32 14.1	32 93	91.9	32 23.7	32 93	91.3	32 33.2	31 93	90.8	32 42.6	31 94	90.2	32 51.7	30 93	89.6	9
60	30 48.3	34 93	93.2	30 58.4	33 93	92.6	31 08.3	33 93	92.1	31 18.1	32 93	91.5	31 27.7	32 93	91.0	31 37.2	31 93	90.4	31 46.5	31 93	89.8	31 55.7	30 93	89.3	60
1	29 52.4	34 93	92.8	30 02.4	33 93	92.2	30 12.3	33 93	91.7	30 22.1	32 93	91.1	30 31.7	32 93	90.6	30 41.2	31 93	90.0	30 50.5	31 93	89.5	30 59.7	30 93	88.9	1
2	28 56.4	34 93	92.4	29 06.4	33 93	91.9	29 16.3	33 93	91.3	29 26.1	32 93	90.8	29 35.7	32 93	90.2	29 45.2	31 93	89.7	29 54.5	31 93	89.1	30 03.7	30 93	88.6	2
3	28 00.4	34 93	92.0	28 10.4	33 93	91.5	28 20.3	33 93	91.0	28 30.1	32 94	90.4	28 39.7	32 93	89.9	28 49.2	31 94	89.3	28 58.5	31 93	88.8	29 07.7	31 93	88.2	3
4	27 04.5	33 93	91.6	27 14.4	33 93	91.1	27 24.3	33 93	90.6	27 34.0	32 93	90.1	27 43.7	32 94	89.5	27 53.1	31 93	89.0	28 02.5	31 93	88.4	28 11.7	31 93	87.9	4
65	26 08.5	33 93	91.3	26 18.4	33 93	90.8	26 28.3	33 93	90.2	26 38.0	32 93	89.7	26 47.6	32 93	89.2	26 57.1	31 93	88.6	27 06.5	31 93	88.1	27 15.8	31 93	87.6	65
6	25 12.5	33 93	90.9	25 22.4	33 93	90.4	25 32.3	33 93	89.9	25 42.0	32 93	89.3	25 51.6	32 93	88.8	26 01.1	32 93	88.3	26 10.5	31 93	87.8	26 19.8	31 93	87.2	6
7	24 16.5	33 93	90.5	24 26.4	33 93	90.0	24 36.3	33 93	89.5	24 46.0	32 93	89.0	24 55.6	32 93	88.5	25 05.2	32 93	87.9	25 14.6	31 93	87.4	25 23.9	31 93	86.9	7
8	23 20.4	33 93	90.2	23 30.4	33 93	89.7	23 40.2	33 93	89.2	23 50.0	32 93	88.6	23 59.6	32 93	88.1	24 09.2	32 93	87.6	24 18.6	31 93	87.1	24 28.0	31 93	86.6	8
9	22 24.4	33 93	89.8	22 34.4	33 93	89.3	22 44.2	33 93	88.8	22 54.0	32 93	88.3	23 03.7	32 93	87.8	23 13.2	32 93	87.3	23 22.7	31 93	86.7	23 32.1	31 93	86.2	9
70	21 28.4	33 93	89.5	21 38.4	33 93	89.0	21 48.2	33 93	88.5	21 58.0	32 93	87.9	22 07.7	32 93	87.4	22 17.3	32 93	86.9	22 26.8	31 93	86.4	22 36.2	31 93	85.9	70
1	20 32.4	33 93	89.1	20 42.4	33 93	88.6	20 52.3	33 93	88.1	21 02.0	33 93	87.6	21 11.7	32 93	87.1	21 21.4	32 93	86.6	21 30.9	32 93	86.1	21 40.3	31 93	85.6	1
2	19 36.4	33 93	88.8	19 46.4	33 93	88.3	19 56.3	33 93	87.8	20 06.1	33 93	87.3	20 15.8	32 93	86.7	20 25.5	32 93	86.3	20 35.0	32 93	85.7	20 44.5	31 93	85.2	2
3	18 40.4	33 93	88.4	18 50.4	33 93	87.9	19 00.3	33 93	87.4	19 10.1	33 93	86.9	19 19.9	32 93	86.4	19 29.6	32 93	85.9	19 39.2	32 93	85.4	19 48.7	32 93	84.9	3
4	17 44.4	33 93	88.1	17 54.4	33 93	87.6	18 04.4	33 93	87.1	18 14.2	33 93	86.6	18 24.0	32 93	86.1	18 33.7	32 93	85.6	18 43.3	32 93	85.1	18 52.9	32 93	84.6	4
75	16 48.4	34 93	87.7	16 58.5	33 93	87.2	17 08.4	33 93	86.7	17 18.3	33 93	86.2	17 28.1	33 93	85.7	17 37.9	32 93	85.2	17 47.5	32 93	84.8	17 57.1	32 93	84.3	75
6	15 52.5	34 93	87.4	16 02.5	33 93	86.9	16 12.5	33 93	86.4	16 22.4	33 93	85.9	16 32.3	33 93	85.4	16 42.1	32 93	84.9	16 51.8	32 93	84.4	17 01.4	32 93	83.9	6
7	14 56.5	34 93	87.0	15 06.6	33 93	86.5	15 16.6	33 93	86.1	15 26.6	33 93	85.6	15 36.5	33 93	85.1	15 46.3	33 93	84.6	15 56.0	32 93	84.1	16 05.7	32 93	83.6	7
8	14 00.6	34 93	86.7	14 10.7	34 93	86.2	14 20.7	33 93	85.7	14 30.7	33 93	85.2	14 40.7	33 93	84.7	14 50.5	33 93	84.2	15 00.3	33 93	83.8	15 10.1	32 93	83.3	8
9	13 04.7	34 93	86.3	13 14.8	34 93	85.9	13 24.9	34 93	85.4	13 34.9	33 93	84.9	13 44.9	33 93	84.4	13 54.8	33 93	83.9	14 04.7	33 93	83.4	14 14.5	33 93	82.9	9
80	12 08.8	34 93	86.0	12 19.0	34 93	85.5	12 29.1	34 93	85.0	12 39.2	33 93	84.5	12 49.2	33 93	84.1	12 59.1	33 93	83.6	13 09.1	33 93	83.1	13 18.9	33 92	82.6	80
1	11 12.9	34 93	85.6	11 23.1	34 93	85.2	11 33.3	34 93	84.7	11 43.4	34 93	84.2	11 53.5	33 93	83.7	12 03.5	33 93	83.2	12 13.5	33 93	82.8	12 23.4	33 92	82.3	1
2	10 17.1	34 93	85.3	10 27.3	34 93	84.8	10 37.5	34 93	84.3	10 47.7	34 93	83.9	10 57.8	34 93	83.4	11 07.9	33 93	82.9	11 17.9	33 92	82.4	11 27.9	33 92	82.0	2
3	9 21.3	34 93	85.0	9 31.6	34 93	84.5	9 41.8	34 93	84.0	9 52.0	34 93	83.5	10 02.2	34 93	83.1	10 12.3	34 92	82.6	10 22.4	34 92	82.1	10 32.5	33 92	81.6	3
4	8 25.5	35 93	84.6	8 35.8	34 93	84.1	8 46.1	34 93	83.7	8 56.4	34 93	83.2	9 06.6	34 92	82.7	9 16.8	34 92	82.2	9 27.0	34 92	81.8	9 37.1	34 92	81.3	4
85	7 29.7	35 93	84.3	7 40.1	35 93	83.8	7 50.5	34 93	83.3	8 00.8	34 93	82.8	8 11.1	34 92	82.4	8 21.3	34 92	81.9	8 31.6	34 92	81.4	8 41.7	34 92	80.9	85
6	6 34.0	35 93	83.9	6 44.4	35 93	83.5	6 54.9	35 93	83.0	7 05.2	35 92	82.5	7 15.6	34 92	82.0	7 25.9	34 92	81.6	7 36.2	34 92	81.1	7 46.4	34 92	80.6	6
7	5 38.3	35 93	83.6	5 48.8	35 93	83.1	5 59.3	35 93	82.6	6 09.7	35 92	82.2	6 20.1	35 92	81.7	6 30.5	35 92	81.2	6 40.9	34 92	80.7	6 51.2	34 92	80.3	7
8							5 03.7	35 93	82.3	5 14.2	35 92	81.8	5 24.7	35 92	81.3	5 35.2	35 92	80.9	5 45.6	35 92	80.4	5 56.0	35 92	79.9	8
9																						5 06.9	35 92	79.6	9

Lat. 21°

H.A.	8° 00′ Alt.	Δd	Δt	Az.	8° 30′ Alt.	Δd	Δt	Az.	9° 00′ Alt.	Δd	Δt	Az.	9° 30′ Alt.	Δd	Δt	Az.	10° 00′ Alt.	Δd	Δt	Az.	10° 30′ Alt.	Δd	Δt	Az.	11° 00′ Alt.	Δd	Δt	Az.	11° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	61 00.0	1.0	02	180.0	60 30.0	1.0	02	180.0	60 00.0	1.0	02	180.0	59 30.0	1.0	02	180.0	59 00.0	1.0	02	180.0	58 30.0	1.0	02	180.0	58 00.0	1.0	02	180.0	57 30.0	1.0	02	180.0	00
1	60 59.0	1.0	05	178.0	60 29.0	1.0	05	178.0	59 59.0	1.0	05	178.0	59 29.1	1.0	05	178.1	58 59.1	1.0	05	178.1	58 29.1	1.0	05	178.1	57 59.1	1.0	04	178.1	57 29.1	1.0	04	178.2	1
2	60 56.0	1.0	08	175.9	60 26.1	1.0	08	176.0	59 56.1	1.0	08	176.1	59 26.2	1.0	08	176.1	58 56.3	1.0	08	176.2	58 26.3	1.0	08	176.2	57 56.4	1.0	08	176.3	57 26.4	1.0	07	176.4	2
3	60 51.0	99	12	173.9	60 21.2	1.0	11	174.0	59 51.3	1.0	11	174.1	59 21.5	1.0	11	174.2	58 51.6	1.0	11	174.3	58 21.7	1.0	11	174.4	57 51.9	1.0	10	174.5	57 22.0	1.0	10	174.5	3
4	60 44.1	99	15	171.9	60 14.4	99	15	172.0	59 44.6	99	14	172.1	59 14.9	99	14	172.3	58 45.1	99	14	172.4	58 15.3	99	14	172.5	57 45.6	99	14	172.6	57 15.8	99	13	172.7	4
05	60 35.2	99	18	169.9	60 05.6	99	18	170.0	59 36.0	99	17	170.2	59 06.4	99	17	170.4	58 36.8	99	17	170.5	58 07.1	99	17	170.7	57 37.5	99	16	170.8	57 07.8	99	16	170.9	05
6	60 24.4	98	21	167.9	59 55.0	98	21	168.1	59 25.6	98	20	168.3	58 56.1	98	20	168.5	58 26.6	98	20	168.7	57 57.2	98	20	168.8	57 27.7	98	19	169.0	56 58.2	98	19	169.2	6
7	60 11.7	97	24	165.9	59 42.5	97	24	166.2	59 13.3	97	24	166.4	58 44.0	98	23	166.6	58 14.8	98	23	166.8	57 45.5	98	22	167.0	57 16.1	98	22	167.2	56 46.8	98	22	167.4	7
8	59 57.2	97	27	164.0	59 28.2	97	27	164.3	58 59.2	97	26	164.5	58 30.2	97	26	164.8	58 01.1	97	26	165.0	57 32.0	97	25	165.2	57 02.9	97	25	165.5	56 33.8	97	24	165.7	8
9	59 40.9	96	30	162.1	59 12.2	96	30	162.4	58 43.4	96	29	162.7	58 14.6	96	29	163.0	57 45.8	96	28	163.2	57 16.9	96	28	163.5	56 48.0	96	28	163.7	56 19.1	96	27	164.0	9
10	59 22.9	95	33	160.3	58 54.4	95	32	160.6	58 25.9	95	32	160.9	57 57.4	95	32	161.2	57 28.8	95	31	161.5	57 00.2	95	31	161.7	56 31.5	96	30	162.0	56 02.8	96	30	162.3	10
1	59 03.1	94	36	158.4	58 35.0	94	35	158.8	58 06.7	94	34	159.1	57 38.5	94	34	159.4	57 10.2	94	34	159.7	56 41.8	95	33	160.0	56 13.4	95	33	160.3	55 45.0	95	32	160.6	1
2	58 41.7	93	38	156.7	58 13.9	93	38	157.0	57 46.0	93	37	157.4	57 18.0	93	37	157.7	56 50.0	93	36	158.0	56 21.9	94	36	158.3	55 53.8	94	35	158.7	55 25.6	94	35	159.0	2
3	58 18.7	92	41	154.9	57 51.2	92	40	155.3	57 23.6	92	40	155.6	56 56.0	92	39	156.0	56 28.2	92	39	156.4	56 00.5	93	38	156.7	55 32.6	93	38	157.0	55 04.8	93	37	157.4	3
4	57 54.2	91	43	153.2	57 27.0	91	43	153.6	56 59.8	91	42	154.0	56 32.4	91	42	154.4	56 05.0	91	41	154.7	55 37.6	92	40	155.1	55 10.1	92	40	155.4	54 42.5	92	40	155.8	4
15	57 28.3	89	46	151.5	57 01.4	90	45	151.9	56 34.5	90	44	152.4	56 07.5	90	44	152.7	55 40.4	90	43	153.1	55 13.3	91	43	153.5	54 46.1	91	42	153.9	54 18.8	91	42	154.2	15
6	57 00.9	88	48	149.9	56 34.4	88	47	150.3	56 07.8	89	47	150.8	55 41.2	89	46	151.2	55 14.4	89	46	151.6	54 47.6	89	45	152.0	54 20.7	90	44	152.3	53 53.8	90	44	152.7	6
7	56 32.1	87	50	148.3	56 06.0	87	50	148.8	55 39.8	88	49	149.2	55 13.5	88	48	149.6	54 47.1	88	48	150.0	54 20.6	88	47	150.5	53 54.1	89	46	150.8	53 27.5	89	46	151.2	7
8	56 02.1	86	52	146.8	55 36.3	86	52	147.2	55 10.5	86	51	147.7	54 44.5	87	50	148.1	54 18.5	87	50	148.6	53 52.4	87	49	149.0	53 26.2	87	48	149.4	52 59.9	88	48	149.8	8
9	55 30.8	84	54	145.3	55 05.4	85	54	145.8	54 39.9	85	53	146.2	54 14.4	85	52	146.7	53 48.7	86	52	147.1	53 22.9	86	51	147.5	52 57.1	86	50	148.0	52 31.1	87	50	148.4	9
20	54 58.3	83	56	143.8	54 33.3	83	55	144.3	54 08.2	84	55	144.8	53 43.0	84	54	145.2	53 17.7	85	54	145.7	52 52.3	85	53	146.1	52 26.8	85	52	146.6	52 01.2	85	52	147.0	20
1	54 24.7	82	58	142.4	54 00.1	82	57	142.9	53 35.3	83	56	143.4	53 10.5	83	56	143.9	52 45.6	83	55	144.3	52 20.5	84	55	144.8	51 55.4	84	54	145.2	51 30.1	84	54	145.7	1
2	53 50.0	81	60	141.1	53 25.8	81	59	141.6	53 01.4	81	58	142.0	52 36.9	82	58	142.5	52 12.4	82	57	143.0	51 47.7	83	56	143.4	51 22.9	83	56	143.9	50 58.0	83	55	144.3	2
3	53 14.3	79	61	139.7	52 50.4	80	60	140.2	52 26.4	80	60	140.7	52 02.4	81	59	141.2	51 38.1	81	59	141.7	51 13.8	81	58	142.2	50 49.4	82	58	142.6	50 24.8	82	57	143.1	3
4	52 37.6	78	63	138.4	52 14.1	78	62	138.9	51 50.5	79	62	139.4	51 26.8	79	61	139.9	51 02.9	80	60	140.4	50 39.0	80	60	140.9	50 14.9	80	59	141.4	49 50.7	81	58	141.8	4
25	51 59.9	77	64	137.2	51 36.9	77	64	137.7	51 13.6	78	63	138.2	50 50.3	78	62	138.7	50 26.8	78	62	139.2	50 03.2	79	61	139.7	49 39.4	79	60	140.1	49 15.6	80	60	140.6	25
6	51 21.4	76	66	136.0	50 58.7	76	65	136.5	50 35.8	76	64	137.0	50 12.8	77	64	137.5	49 49.7	77	63	138.0	49 26.5	78	63	138.5	49 03.1	78	62	139.0	48 39.6	78	61	139.4	6
7	50 42.1	74	67	134.8	50 19.7	75	66	135.3	49 57.2	75	66	135.8	49 34.6	76	65	136.3	49 11.8	76	64	136.8	48 48.9	77	64	137.3	48 25.9	77	63	137.8	48 02.8	77	63	138.3	7
8	50 01.9	73	68	133.6	49 39.9	74	68	134.2	49 17.8	74	67	134.7	48 55.5	75	66	135.2	48 33.1	75	66	135.7	48 10.5	75	65	136.2	47 47.9	76	65	136.7	47 25.1	76	64	137.2	8
9	49 21.0	72	69	132.5	48 59.4	72	69	133.1	48 37.6	73	68	133.6	48 15.6	73	68	134.1	47 53.6	74	67	134.6	47 31.4	74	66	135.1	47 09.0	75	66	135.6	46 46.6	75	65	136.1	9
30	48 39.4	71	70	131.4	48 18.1	71	70	132.0	47 56.6	72	69	132.5	47 35.0	72	69	133.0	47 13.3	73	68	133.5	46 51.5	73	68	134.0	46 29.5	74	67	134.5	46 07.4	74	67	135.0	30
1	47 57.1	70	72	130.4	47 36.1	70	71	130.9	47 15.0	71	70	131.5	46 53.7	71	70	132.0	46 32.4	72	70	132.5	46 10.8	72	69	133.0	45 49.2	72	68	133.5	45 27.4	73	68	134.0	1
2	47 14.1	68	73	129.4	46 53.5	69	72	129.9	46 32.7	69	72	130.4	46 11.8	70	71	131.0	45 50.7	70	70	131.5	45 29.5	71	70	132.0	45 08.2	71	69	132.5	44 46.8	72	69	133.0	2
3	46 30.5	67	74	128.4	46 10.2	68	73	128.9	45 49.8	68	73	129.5	45 29.2	69	72	130.0	45 08.4	69	71	130.5	44 47.6	70	71	131.0	44 26.6	70	70	131.5	44 05.5	71	70	132.0	3
4	45 46.3	66	74	127.4	45 26.3	67	74	128.0	45 06.2	67	74	128.5	44 45.9	68	73	129.0	44 25.6	68	72	129.5	44 05.0	69	72	130.1	43 44.3	69	71	130.6	43 23.5	70	71	131.1	4
35	45 01.6	65	76	126.5	44 41.9	66	75	127.1	44 22.1	66	74	127.6	44 02.2	67	74	128.1	43 42.1	67	74	128.6	43 21.8	68	73	129.1	43 01.5	68	72	129.6	42 41.0	69	72	130.1	35
6	44 16.3	64	76	125.6	43 56.9	65	76	126.1	43 37.4	65	75	126.7	43 17.8	66	75	127.2	42 58.0	66	74	127.7	42 38.1	67	74	128.2	42 18.1	67	73	128.7	41 57.9	67	73	129.2	6
7	43 30.5	63	77	124.7	43 11.4	64	77	125.3	42 52.3	64	76	125.8	42 32.9	65	76	126.3	42 13.5	65	75	126.8	41 53.8	66	74	127.3	41 34.1	66	74	127.9	41 14.2	66	74	128.4	7
8	42 44.2	62	78	123.9	42 25.5	63	78	124.4	42 06.6	63	77	124.9	41 47.5	64	76	125.5	41 28.4	64	76	126.0	41 09.1	65	76	126.5	40 49.6	65	75	127.0	40 30.0	65	74	127.5	8
9	41 57.5	61	78	123.1	41 39.0	62	78	123.6	41 20.4	62	78	124.1	41 01.7	63	77	124.6	40 42.8	63	77	125.2	40 23.8	64	76	125.7	40 04.6	64	76	126.2	39 45.3	65	75	126.7	9
40	41 10.4	60	79	122.3	40 52.2	61	79	122.8	40 33.8	61	78	123.3	40 15.4	62	78	123.8	39 56.8	62	78	124.3	39 38.0	63	77	124.8	39 19.2	63	76	125.4	39 00.2	64	76	125.9	40
1	40 22.8	59	80	121.5	40 04.9	60	80	122.0	39 46.8	60	79	122.5	39 28.6	61	78	123.0	39 10.3	61	78	123.6	38 51.9	62	78	124.1	38 33.3	62	77	124.6	38 14.6	63	77	125.1	1
2	39 34.8	59	80	120.7	39 17.2	59	80	121.2	38 59.4	60	80	121.8	38 41.5	60	79	122.3	38 23.4	60	79	122.8	38 05.2	61	78	123.3	37 46.9	61	78	123.8	37 28.5	62	78	124.3	2
3	38 46.5	58	81	120.0	38 29.1	58	81	120.5	38 11.6	59	80	121.0	37 53.9	59	80	121.5	37 36.1	60	79	122.0	37 18.2	60	79	122.5	37 00.2	60	79	123.0	36 42.0	61	78	123.5	3
4	37 57.8	57	82	119.2	37 40.6	57	81	119.8	37 23.4	58	81	120.3	37 06.0	58	80	120.8	36 48.5	59	80	121.3	36 30.8	59	80	121.8	36 13.0	59	79	122.3	35 55.1	60	79	122.8	4
45	37 08.7	56	82	118.5	36 51.8	56	82	119.1	36 34.8	57	81	119.6	36 17.7	57	81	120.1	36 00.4	58	81	120.6	35 43.0	58	80	121.1	35 25.5	59	80	121.6	35 07.8	59	79	122.1	45
6	36 19.4	55	83	117.9	36 02.7	56	82	118.4	35 46.0	56	82	118.9	35 29.0	57	82	119.4	35 12.0	57	81	119.9	34 54.9	57	81	120.4	34 37.6	58	80	120.9	34 20.2	58	80	121.4	6
7	35 29.7	54	83	117.2	35 13.3	55	83	117.7	34 56.7	55	82	118.2	34 40.1	56	82	118.7	34 23.3	56	82	119.2	34 06.4	57	81	119.7	33 49.4	57	81	120.2	33 32.2	57	80	120.7	7
8	34 39.7	54	84	116.5	34 23.5	54	83	117.0	34 07.2	55	83	117.5	33 50.8	55	83	118.1	33 34.2	55	82	118.6	33 17.6	56	82	119.1	33 00.8	56	82	119.5	32 43.9	57	81	120.0	8
9	33 49.5	53	84	115.9	33 33.5	53	84	116.4	33 17.4	54	84	116.9	33 01.2	54	83	117.4	32 44.9	55	83	117.9	32 28.5	55	82	118.4	32 11.9	55	82	118.9	31 55.2	56	82	119.4	9
50	32 58.9	52	85	115.3	32 43.2	53	84	115.8	32 27.3	53	84	116.3	32 11.3	53	84	116.8	31 55.3	54	83	117.3	31 39.0	54	83	117.8	31 22.7	55	82	118.3	31 06.3	55	82	118.8	50
1	32 08.1	52	85	114.7	31 52.6	52	85	115.2	31 37.0	52	84	115.7	31 21.2	53	84	116.2	31 05.3	53	84	116.7	30 49.3	54	83	117.2	30 33.2	54	83	117.6	30 17.0	54	82	118.1	1
2	31 17.1	51	85	114.1	31 01.8	51	85	114.6	30 46.4	52	85	115.1	30 30.8	52	84	115.6	30 15.1	52	84	116.1	29 59.4	53	84	116.5	29 43.5	53	84	117.0	29 27.5	54	83	117.5	2
3	30 25.9	50	86	113.5	30 10.7	51	86	114.0	29 55.5	51	85	114.5	29 40.1	51	85	115.0	29 24.7	52	84	115.5	29 09.1	52	84	116.0	28 53.4	52	84	116.4	28 37.7	53	84	116.9	3
4	29 34.4	50	86	112.9	29 19.4	50	86	113.4	29 04.4	50	86	113.9	28 49.2	51	85	114.4	28 34.0	51	85	114.9	28 18.6	51	84	115.4	28 03.2	52	84	115.9	27 47.6	52	84	116.3	4
55	28 42.7	49	86	112.3	28 27.9	49	86	112.8	28 13.1	50	86	113.3	27 58.1	50	86	113.8	27 43.1	50	85	114.3	27 27.9	51	85	114.8	27 12.6	51	84	115.3	26 57.3	51	84	115.8	55
6	27 50.8	48	87	111.8	27 36.2	49	86	112.3	27 21.5	49	86	112.8	27 06.8	49	86	113.3	26 51.9	50	86	113.8	26 36.9	50	85	114.2	26 21.9	50	85	114.7	26 06.7	51	85	115.2	6
7	26 58.7	48	87	111.3	26 44.3	48	87	111.8	26 29.8	48	87	112.2	26 15.2	49	86	112.7	26 00.5	49	86	113.2	25 45.8	49	86	113.7	25 30.9	50	85	114.2	25 15.9	50	85	114.7	7
8	26 06.4	47	88	110.7	25 52.2	48	87	111.2	25 37.8	48	87	111.7	25 23.4	48	86	112.2	25 09.0	48	86	112.7	24 54.4	49	86	113.2	24 39.7	49	86	113.7	24 24.9	49	85	114.1	8
9	25 13.9	47	88	110.2	24 59.8	47	87	110.7	24 45.7	47	87	111.2	24 31.5	48	87	111.7	24 17.2	48	87	112.2	24 02.8	48	86	112.6	23 48.3	48	86	113.1	23 33.7	49	86	113.6	9
60	24 21.2	46	88	109.7	24 07.4	46	88	110.2	23 53.4	47	88	110.7	23 39.3	47	87	111.2	23 25.2	47	87	111.7	23 11.0	48	87	112.1	22 56.7	48	86	112.6	22 42.2	48	86	113.1	60
1	23 28.4	46	88	109.2	23 14.7	46	88	109.7	23 00.9	46	88	110.2	22 47.0	46	88	110.7	22 33.0	47	87	111.1	22 19.0	47	87	111.6	22 04.8	47	86	112.1	21 50.6	48	86	112.6	1
2	22 35.5	45	89	108.7	22 21.9	45	88	109.2	22 08.3	46	88	109.7	21 54.5	46	88	110.2	21 40.7	46	88	110.7	21 26.8	46	87	111.1	21 12.9	47	87	111.6	20 58.8	47	87	112.1	2
3	21 42.3	45	89	108.3	21 28.9	45	88	108.7	21 15.4	45	88	109.2	21 01.9	45	88	109.7	20 48.2	46	88	110.2	20 34.5	46	88	110.6	20 20.7	46	87	111.1	20 06.8	46	87	111.6	3
4	20 49.1	44	89	107.8	20 35.8	44	89	108.3	20 22.5	45	88	108.7	20 09.1	45	88	109.2	19 55.6	45	88	109.7	19 42.0	45	88	110.2	19 28.4	46	88	110.6	19 14.6	46	87	111.1	4
65	19 55.7	44	89	107.3	19 42.5	44	89	107.8	19 29.4	44	89	108.3	19 16.1	44	88	108.8	19 02.8	45	88	109.2	18 49.3	45	88	109.7	18 35.9	45	88	110.2	18 22.3	45	88	110.6	65
6	19 02.1	43	89	106.9	18 49.1	43	89	107.3	18 36.1	44	89	107.8	18 23.0	44	89	108.3	18 09.8	44	88	108.8	17 56.5	44	88	109.2	17 43.2	45	88	109.7	17 29.8	45	88	110.2	6
7	18 08.5	43	90	106.4	17 55.6	43	89	106.9	17 42.7	43	89	107.4	17 29.7	43	89	107.8	17 16.7	44	89	108.3	17 03.6	44	88	108.8	16 50.4	44	88	109.3	16 37.2	44	88	109.7	7
8	17 14.7	42	90	106.0	17 02.0	42	90	106.4	16 49.2	43	90	106.9	16 36.3	43	89	107.4	16 23.4	43	89	107.9	16 10.5	43	89	108.3	15 57.4	44	88	108.8	15 44.3	44	88	109.3	8
9	16 20.8	42	90	105.5	16 08.2	42	90	106.0	15 55.5	42	90	106.5	15 42.8	42	89	107.0	15 30.1	43	89	107.4	15 17.2	43	89	107.9	15 04.3	43	89	108.4	14 51.4	43	88	108.8	9
70	15 26.7	41	90	105.1	15 14.3	42	90	105.6	15 01.8	42	90	106.1	14 49.2	42	90	106.5	14 36.5	42	89	107.0	14 23.9	42	89	107.5	14 11.1	43	89	107.9	13 58.3	43	89	108.4	70
1	14 32.6	41	90	104.7	14 20.3	41	90	105.2	14 07.9	41	90	105.6	13 55.4	42	90	106.1	13 42.9	42	90	106.6	13 30.4	42	90	107.0	13 17.8	42	89	107.5	13 05.1	42	89	108.0	1
2	13 38.4	41	91	104.3	13 26.1	41	90	104.7	13 13.9	41	90	105.2	13 01.5	41	90	105.7	12 49.2	41	90	106.1	12 36.7	41	90	106.6	12 24.3	42	89	107.1	12 11.7	42	89	107.5	2
3	12 44.0	40	91	103.9	12 31.9	40	90	104.3	12 19.8	41	90	104.8	12 07.6	41	90	105.3	11 55.3	41	90	105.7	11 43.0	41	90	106.2	11 30.7	41	90	106.7	11 18.3	41	89	107.1	3
4	11 49.6	40	91	103.5	11 37.6	40	91	103.9	11 25.6	40	91	104.4	11 13.5	40	90	104.9	11 01.3	41	90	105.3	10 49.2	41	90	105.8	10 36.9	41	90	106.3	10 24.7	41	90	106.7	4
75	10 55.1	40	91	103.1	10 43.2	40	91	103.5	10 31.2	40	91	104.0	10 19.3	40	90	104.5	10 07.3	40	90	104.9	9 55.2	40	90	105.4	9 43.1	40	90	105.8	9 31.0	40	90	106.3	75
6	10 00.5	39	91	102.7	9 48.7	39	91	103.1	9 36.8	39	91	103.6	9 25.0	40	91	104.1	9 13.1	40	90	104.5	9 01.2	40	90	105.0	8 49.2	40	90	105.4	8 37.2	40	90	105.9	6
7	9 05.8	39	91	102.3	8 54.1	39	91	102.7	8 42.4	39	91	103.2	8 30.6	39	91	103.7	8 18.8	39	91	104.1	8 07.0	39	90	104.6	7 55.1	40	90	105.1	7 43.3	40	90	105.5	7
8	8 11.0	39	92	101.9	7 59.4	39	91	102.3	7 47.8	39	91	102.8	7 36.1	39	91	103.3	7 24.4	39	91	103.7	7 12.7	39	90	104.2	7 01.0	39	90	104.7	6 49.2	39	90	105.1	8
9	7 16.1	38	92	101.5	7 04.6	38	91	102.0	6 53.1	38	91	102.4	6 41.6	39	91	102.9	6 30.0	39	91	103.4	6 18.4	39	91	103.8	6 06.8	39	91	104.3	5 55.1	39	90	104.7	9
80	6 21.2	38	92	101.1	6 09.8	38	92	101.6	5 58.4	38	91	102.0	5 46.9	38	91	102.5	5 35.4	38	91	103.0	5 23.9	38	91	103.4	5 12.4	38	91	103.9	5 00.9	38	90	104.4	80
1	5 26.2	38	92	100.7	5 14.9	38	92	101.2	5 03.6	38	91	101.7																					1

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 21°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
00	81 00.0	1.0 06	180.0	81 30.0	1.0 05	180.0	82 00.0	1.0 06	180.0	82 30.0	1.0 06	180.0	83 00.0	1.0 06	180.0	83 30.0	1.0 07	180.0	84 00.0	1.0 08	180.0	84 30.0	1.0 08	180.0	00
1	80 57.0	99 15	173.8	81 26.8	99 16	173.4	81 56.6	99 17	173.0	82 26.4	99 18	172.6	82 56.1	99 19	172.1	83 25.8	99 20	171.5	83 55.5	99 22	170.8	84 25.1	99 24	170.0	1
2	80 47.9	98 24	167.7	81 17.2	98 26	167.0	81 46.5	97 27	166.2	82 15.7	97 29	165.4	82 44.7	97 31	164.4	83 13.6	96 33	163.4	83 42.4	95 35	162.1	84 10.9	95 38	160.6	2
3	80 33.2	95 34	161.8	81 01.7	95 35	160.9	81 30.1	94 37	159.8	81 58.3	94 39	158.6	82 26.3	93 41	157.3	82 54.0	92 43	155.8	83 21.4	91 46	154.1	83 48.4	89 49	152.1	3
4	80 13.1	92 41	156.3	80 40.7	92 43	155.1	81 08.1	91 45	153.8	81 35.1	90 47	152.4	82 01.8	88 50	150.8	82 28.0	87 52	149.0	82 53.8	85 55	147.0	83 19.0	83 58	144.7	4
05	79 48.3	89 48	151.2	80 14.8	88 50	149.8	80 41.0	86 52	148.4	81 06.7	85 55	146.7	81 31.9	83 57	144.9	81 56.7	81 60	143.0	82 20.8	79 62	140.8	82 44.1	77 65	138.4	05
6	79 19.4	85 54	146.5	79 44.7	84 56	145.0	80 09.5	82 58	143.4	80 33.9	80 61	141.7	80 57.7	78 63	139.8	81 20.9	76 66	137.7	81 43.3	74 68	135.5	82 05.0	71 71	133.0	6
7	78 46.7	81 60	142.2	79 10.8	80 62	140.7	79 34.4	78 64	139.0	79 57.5	76 66	137.2	80 19.9	74 68	135.2	80 41.6	71 70	133.2	81 02.5	68 73	130.9	81 22.5	65 75	128.5	7
8	78 10.9	77 64	138.3	78 33.8	76 66	136.7	78 56.2	74 68	135.0	79 18.0	71 70	133.2	79 39.0	69 72	131.3	79 59.4	66 74	129.2	80 18.9	64 76	127.0	80 37.5	60 78	124.6	8
9	77 32.4	74 68	134.8	77 54.2	72 70	133.2	78 15.4	70 72	131.5	78 36.0	67 74	129.7	78 55.8	65 75	127.8	79 14.9	62 77	125.7	79 33.1	59 79	123.6	79 50.4	56 81	121.3	9
10	76 51.6	70 71	131.7	77 12.3	68 73	130.0	77 32.4	66 75	128.4	77 51.9	64 76	126.6	78 10.6	61 78	124.7	78 28.6	58 80	122.7	78 45.6	56 81	120.6	79 01.8	52 83	118.4	10
1	76 08.8	67 74	128.8	76 28.5	65 76	127.2	76 47.6	63 77	125.5	77 06.1	60 79	123.8	77 23.8	58 80	122.0	77 40.7	55 82	120.0	77 56.8	52 83	118.0	78 12.0	49 85	116.0	1
2	75 24.3	64 76	126.2	75 43.2	62 78	124.6	76 01.3	60 79	123.0	76 18.8	57 81	121.3	76 35.6	55 82	119.5	76 51.7	52 84	117.7	77 06.8	49 85	115.8	77 21.2	46 86	113.8	2
3	74 38.4	61 78	123.8	74 56.4	59 80	122.3	75 13.8	57 81	120.7	75 30.4	54 82	119.1	75 46.4	52 84	117.4	76 01.6	49 85	115.6	76 16.0	47 86	113.8	76 29.5	44 87	111.9	3
4	73 51.3	58 80	121.7	74 08.5	56 82	120.2	74 25.1	54 83	118.7	74 41.0	52 84	117.1	74 56.2	49 85	115.4	75 10.7	47 86	113.7	75 24.4	44 87	112.0	75 37.3	42 88	110.2	4
15	73 03.2	56 82	119.7	73 19.6	54 83	118.3	73 35.5	52 84	116.8	73 50.7	50 85	115.2	74 05.2	47 86	113.7	74 19.1	45 87	112.0	74 32.1	42 88	110.4	74 44.4	40 89	108.6	15
6	72 14.1	54 83	117.9	72 29.9	52 84	116.5	72 45.1	50 85	115.1	72 59.7	48 86	113.6	73 13.6	45 87	112.1	73 26.8	43 88	110.5	73 39.3	40 89	108.9	73 51.1	38 90	107.2	6
7	71 24.2	52 84	116.3	71 39.4	50 85	114.9	71 54.1	48 86	113.5	72 08.1	46 87	112.1	72 21.4	43 88	110.6	72 34.1	41 88	109.1	72 46.1	39 89	107.6	72 57.4	36 90	106.0	7
8	70 33.6	50 85	114.7	70 48.3	48 86	113.4	71 02.4	46 87	112.1	71 15.9	44 88	110.7	71 28.8	42 88	109.3	71 41.0	40 89	107.8	71 52.6	37 90	106.4	72 03.4	35 90	104.8	8
9	69 42.5	48 86	113.3	69 56.7	46 87	112.1	70 10.3	44 88	110.7	70 23.3	42 88	109.4	70 35.7	40 89	108.0	70 47.5	38 90	106.6	70 58.7	36 90	105.2	71 09.2	34 91	103.8	9
20	68 50.8	47 87	112.0	69 04.5	45 88	110.8	69 17.7	43 88	109.5	69 30.3	41 89	108.2	69 42.3	39 90	106.9	69 53.7	37 90	105.6	70 04.5	35 91	104.2	70 14.7	33 91	102.8	20
1	67 58.6	45 88	110.8	68 11.9	43 88	109.6	68 24.7	42 89	108.4	68 36.9	40 90	107.1	68 48.5	38 90	105.9	68 59.6	36 90	104.6	69 10.1	34 91	103.3	69 19.9	32 92	101.9	1
2	67 06.1	44 88	109.7	67 19.0	42 89	108.5	67 31.4	40 90	107.3	67 43.2	39 90	106.1	67 54.5	37 90	104.9	68 05.3	35 91	103.6	68 15.5	33 91	102.4	68 25.0	31 92	101.1	2
3	66 13.2	43 89	108.6	66 25.7	41 89	107.5	66 37.7	39 90	106.3	66 49.3	38 90	105.1	67 00.3	36 91	104.0	67 10.7	34 91	102.8	67 20.7	32 92	101.5	67 30.0	30 92	100.3	3
4	65 19.9	41 89	107.6	65 32.1	40 90	106.5	65 43.8	38 90	105.4	65 55.1	37 91	104.2	66 05.8	35 91	103.1	66 16.0	33 92	101.9	66 25.7	31 92	100.8	66 34.8	30 92	99.6	4
25	64 26.4	40 90	106.6	64 38.3	39 90	105.6	64 49.7	37 90	104.5	65 00.7	36 91	103.4	65 11.2	34 91	102.3	65 21.1	32 92	101.2	65 30.6	31 92	100.0	65 39.5	29 92	98.9	25
6	63 32.6	40 90	105.8	63 44.2	38 90	104.7	63 55.4	37 91	103.7	64 06.1	35 91	102.6	64 16.4	33 92	101.5	64 26.1	32 92	100.4	64 35.4	30 92	99.3	64 44.1	28 92	98.2	6
7	62 38.6	39 90	104.9	62 49.9	37 91	103.9	63 00.9	36 91	102.9	63 11.4	34 92	101.8	63 21.4	33 92	100.8	63 31.0	31 92	99.7	63 40.1	30 92	98.7	63 48.7	28 93	97.6	7
8	61 44.3	38 91	104.1	61 55.5	36 91	103.1	62 06.2	35 91	102.1	62 16.5	34 92	101.1	62 26.3	32 92	100.1	62 35.7	31 92	99.1	62 44.6	29 92	98.0	62 53.1	27 93	97.0	8
9	60 49.9	37 91	103.3	61 00.8	36 91	102.4	61 11.4	34 92	101.4	61 21.4	33 92	100.4	61 31.1	31 92	99.4	61 40.3	30 92	98.4	61 49.1	29 93	97.4	61 57.5	27 93	96.4	9
30	59 55.3	36 91	102.6	60 06.1	35 92	101.7	60 16.4	34 92	100.7	60 26.3	32 92	99.8	60 35.8	31 92	98.8	60 44.9	30 92	97.8	60 53.5	28 93	96.9	61 01.8	27 93	95.9	30
1	59 00.6	36 92	101.9	59 11.1	35 92	101.0	59 21.3	33 92	100.1	59 31.0	32 92	99.2	59 40.4	31 92	98.2	59 49.4	29 93	97.3	59 57.9	28 93	96.3	60 06.0	26 93	95.4	1
2	58 05.7	35 92	101.3	58 16.1	34 92	100.4	58 26.1	33 92	99.5	58 35.7	31 92	98.6	58 44.9	30 92	97.6	58 53.8	29 93	96.7	59 02.2	27 93	95.8	59 10.2	26 93	94.9	2
3	57 10.7	35 92	100.6	57 20.9	33 92	99.8	57 30.8	32 92	98.9	57 40.3	31 92	98.0	57 49.4	30 93	97.1	57 58.1	28 93	96.2	58 06.4	27 93	95.3	58 14.4	26 93	94.4	3
4	56 15.6	34 92	100.0	56 25.7	33 92	99.2	56 35.4	32 92	98.3	56 44.8	31 93	97.4	56 53.8	29 93	96.6	57 02.4	28 93	95.7	57 10.6	27 93	94.8	57 18.5	26 93	93.9	4
35	55 20.4	34 92	99.4	55 30.3	33 92	98.6	55 39.9	31 92	97.7	55 49.2	30 93	96.9	55 58.1	29 93	96.1	56 06.6	28 93	95.2	56 14.8	27 93	94.3	56 22.6	25 93	93.5	35
6	54 25.1	33 92	98.8	54 34.9	32 92	98.0	54 44.4	31 93	97.2	54 53.5	30 93	96.4	55 02.4	29 93	95.6	55 10.8	28 93	94.7	55 18.9	26 93	93.9	55 26.7	25 93	93.0	6
7	53 29.7	33 92	98.3	53 39.4	32 93	97.5	53 48.8	31 93	96.7	53 57.8	30 93	95.9	54 06.6	29 93	95.1	54 15.0	27 93	94.3	54 23.0	26 93	93.4	54 30.8	25 93	92.6	7
8	52 34.2	33 92	97.8	52 43.8	31 93	97.0	52 53.1	30 93	96.2	53 02.1	29 93	95.4	53 10.8	28 93	94.6	53 19.1	27 93	93.8	53 27.1	26 93	93.0	53 34.8	25 93	92.2	8
9	51 38.7	32 93	97.3	51 48.2	31 93	96.5	51 57.4	30 93	95.7	52 06.3	29 93	94.9	52 14.9	28 93	94.2	52 23.2	27 93	93.4	52 31.2	26 93	92.6	52 38.8	25 93	91.8	9
40	50 43.1	32 93	96.7	50 52.5	31 93	96.0	51 01.7	30 93	95.2	51 10.5	29 93	94.5	51 19.0	28 93	93.7	51 27.3	27 93	92.9	51 35.2	26 93	92.2	51 42.8	25 93	91.4	40
1	49 47.5	32 93	96.3	49 56.8	31 93	95.5	50 05.9	30 93	94.8	50 14.6	29 93	94.0	50 23.1	28 93	93.3	50 31.3	27 93	92.5	50 39.2	26 93	91.8	50 46.8	25 93	91.0	1
2	48 51.8	31 93	95.8	49 01.0	30 93	95.1	49 10.0	30 93	94.3	49 18.7	29 93	93.6	49 27.2	28 93	92.9	49 35.4	27 93	92.1	49 43.2	26 93	91.4	49 50.8	25 93	90.6	2
3	47 56.0	31 93	95.3	48 05.2	30 93	94.6	48 14.2	29 93	93.9	48 22.8	28 93	93.2	48 31.2	28 93	92.5	48 39.4	27 93	91.7	48 47.2	26 93	91.0	48 54.8	25 93	90.3	3
4	47 00.2	31 93	94.9	47 09.4	30 93	94.2	47 18.3	29 93	93.5	47 26.9	28 93	92.8	47 35.3	27 93	92.1	47 43.4	27 93	91.3	47 51.2	26 93	90.6	47 58.8	25 93	89.9	4
45	46 04.4	31 93	94.4	46 13.5	30 93	93.8	46 22.3	29 93	93.1	46 30.9	28 93	92.4	46 39.3	27 93	91.7	46 47.4	27 93	91.0	46 55.2	26 93	90.3	47 02.8	25 93	89.6	45
6	45 08.5	31 93	94.0	45 17.6	30 93	93.3	45 26.4	29 93	92.7	45 35.0	28 93	92.0	45 43.3	27 93	91.3	45 51.4	26 93	90.6	45 59.2	26 93	89.9	46 06.8	25 93	89.2	6
7	44 12.6	30 93	93.6	44 21.6	30 93	92.9	44 30.4	29 93	92.3	44 39.0	28 93	91.6	44 47.3	27 93	90.9	44 55.3	26 93	90.2	45 03.2	26 93	89.6	45 10.7	25 93	88.9	7
8	43 16.7	30 93	93.2	43 25.7	30 93	92.5	43 34.4	29 93	91.9	43 43.0	28 93	91.2	43 51.3	27 93	90.5	43 59.3	26 93	89.9	44 07.2	26 93	89.2	44 14.7	25 93	88.5	8
9	42 20.8	30 93	92.8	42 29.7	29 93	92.1	42 38.5	29 93	91.5	42 47.0	28 93	90.8	42 55.3	27 93	90.2	43 03.3	26 93	89.5	43 11.1	26 93	88.9	43 18.8	25 93	88.2	9
50	41 24.8	30 93	92.4	41 33.7	29 93	91.7	41 42.5	29 93	91.1	41 51.0	28 93	90.5	41 59.2	27 93	89.8	42 07.3	27 93	89.2	42 15.1	26 93	88.5	42 22.8	25 93	87.9	50
1	40 28.8	30 93	92.0	40 37.7	29 93	91.4	40 46.4	29 93	90.7	40 54.9	28 93	90.1	41 03.2	27 93	89.5	41 11.3	27 93	88.8	41 19.2	26 93	88.2	41 26.8	25 93	87.5	1
2	39 32.9	30 93	91.6	39 41.7	29 93	91.0	39 50.4	29 93	90.4	39 58.9	28 93	89.7	40 07.2	27 93	89.1	40 15.3	27 93	88.5	40 23.2	26 93	87.9	40 30.8	25 93	87.2	2
3	38 36.9	30 93	91.2	38 45.7	29 93	90.6	38 54.4	29 93	90.0	39 02.9	28 93	89.4	39 11.2	27 93	88.8	39 19.3	27 93	88.2	39 27.2	26 93	87.5	39 34.9	25 93	86.9	3
4	37 40.9	30 93	90.9	37 49.7	29 93	90.3	37 58.4	29 93	89.7	38 06.9	28 93	89.0	38 15.2	27 93	88.4	38 23.3	27 93	87.8	38 31.3	26 93	87.2	38 39.0	25 93	86.6	4
55	36 44.8	30 93	90.5	36 53.7	29 93	89.9	37 02.4	29 93	89.3	37 10.9	28 93	88.7	37 19.2	27 93	88.1	37 27.4	27 93	87.5	37 35.3	26 93	86.9	37 43.1	26 93	86.3	55
6	35 48.8	30 93	90.1	35 57.7	29 93	89.5	36 06.4	29 93	89.0	36 14.9	28 93	88.4	36 23.2	28 93	87.8	36 31.4	27 93	87.2	36 39.4	26 93	86.6	36 47.2	26 93	86.0	6
7	34 52.8	30 93	89.8	35 01.7	29 93	89.2	35 10.4	29 93	88.6	35 18.9	28 93	88.0	35 27.3	28 93	87.4	35 35.5	27 93	86.8	35 43.5	26 93	86.2	35 51.3	26 93	85.7	7
8	33 56.8	30 93	89.4	34 05.7	29 93	88.8	34 14.4	29 93	88.3	34 22.9	28 93	87.7	34 31.3	28 93	87.1	34 39.5	27 93	86.5	34 47.6	27 93	85.9	34 55.5	26 93	85.3	8
9	33 00.8	30 93	89.1	33 09.7	29 93	88.5	33 18.4	29 93	87.9	33 27.0	28 93	87.4	33 35.4	28 93	86.8	33 43.6	27 93	86.2	33 51.7	27 93	85.6	33 59.7	26 93	85.0	9
60	32 04.8	30 93	88.7	32 13.7	29 93	88.2	32 22.4	29 93	87.6	32 31.0	28 93	87.0	32 39.5	28 93	86.5	32 47.8	27 93	85.9	32 55.9	27 93	85.3	33 03.9	26 93	84.7	60
1	31 08.8	30 93	88.4	31 17.7	29 93	87.8	31 26.5	29 93	87.3	31 35.1	29 93	86.7	31 43.6	28 93	86.1	31 51.9	28 93	85.6	32 00.1	27 93	85.0	32 08.1	26 93	84.4	1
2	30 12.8	30 93	88.0	30 21.7	30 93	87.5	30 30.5	29 93	86.9	30 39.2	29 93	86.4	30 47.7	28 93	85.8	30 56.1	28 93	85.3	31 04.3	27 93	84.7	31 12.4	27 93	84.1	2
3	29 16.8	30 93	87.7	29 25.8	30 93	87.2	29 34.6	29 93	86.6	29 43.3	29 93	86.1	29 51.8	28 93	85.5	30 00.3	28 93	84.9	30 08.5	27 93	84.4	30 16.7	27 93	83.8	3
4	28 20.9	30 93	87.4	28 29.8	30 93	86.8	28 38.7	29 93	86.3	28 47.4	29 93	85.7	28 56.0	28 93	85.2	29 04.5	28 93	84.6	29 12.8	28 93	84.1	29 21.0	27 93	83.5	4
65	27 24.9	30 93	87.0	27 33.9	30 93	86.5	27 42.8	29 93	86.0	27 51.6	29 93	85.4	28 00.2	29 93	84.9	28 08.7	28 93	84.3	28 17.1	28 93	83.8	28 25.3	27 93	83.2	65
6	26 29.0	30 93	86.7	26 38.0	30 93	86.2	26 46.9	30 93	85.6	26 55.8	29 93	85.1	27 04.4	29 93	84.6	27 13.0	28 93	84.0	27 21.4	28 93	83.5	27 29.7	27 93	82.9	6
7	25 33.1	30 93	86.4	25 42.1	30 93	85.8	25 51.1	30 93	85.3	26 00.0	29 93	84.8	26 08.7	29 93	84.2	26 17.3	29 93	83.7	26 25.8	28 93	83.2	26 34.2	28 93	82.6	7
8	24 37.2	31 93	86.0	24 46.3	30 93	85.5	24 55.3	30 93	85.0	25 04.2	29 93	84.5	25 13.0	29 93	83.9	25 21.6	29 93	83.4	25 30.2	28 93	82.9	25 38.6	28 92	82.3	8
9	23 41.3	31 93	85.7	23 50.5	30 93	85.2	23 59.5	30 93	84.7	24 08.4	30 93	84.1	24 17.3	29 93	83.6	24 26.0	29 93	83.1	24 34.6	29 92	82.6	24 43.1	28 92	82.0	9
70	22 45.5	31 93	85.4	22 54.7	30 93	84.9	23 03.7	30 93	84.3	23 12.7	30 93	83.8	23 21.6	29 93	83.3	23 30.4	29 92	82.8	23 39.1	29 92	82.3	23 47.7	28 92	81.7	70
1	21 49.6	31 93	85.1	21 58.9	31 93	84.5	22 08.0	30 93	84.0	22 17.1	30 93	83.5	22 26.0	30 93	83.0	22 34.9	29 92	82.5	22 43.6	29 92	82.0	22 52.3	29 92	81.4	1
2	20 53.8	31 93	84.7	21 03.1	31 93	84.2	21 12.3	30 93	83.7	21 21.4	30 93	83.2	21 30.4	30 92	82.7	21 39.4	30 92	82.2	21 48.2	29 92	81.7	21 56.9	29 92	81.1	2
3	19 58.1	31 93	84.4	20 07.4	31 93	83.9	20 16.7	31 93	83.4	20 25.8	30 93	82.9	20 34.9	30 92	82.4	20 43.9	30 92	81.9	20 52.8	29 92	81.4	21 01.6	29 92	80.8	3
4	19 02.4	31 93	84.1	19 11.7	31 93	83.6	19 21.0	31 93	83.1	19 30.3	31 93	82.6	19 39.4	30 92	82.1	19 48.5	30 92	81.6	19 57.4	30 92	81.1	20 06.3	29 92	80.5	4
75	18 06.7	32 93	83.8	18 16.1	31 93	83.3	18 25.5	31 93	82.8	18 34.7	31 92	82.3	18 43.9	31 92	81.8	18 53.1	30 92	81.2	19 02.1	30 92	80.7	19 11.1	30 92	80.2	75
6	17 11.0	32 93	83.4	17 20.5	32 93	82.9	17 29.9	31 92	82.4	17 39.3	31 92	81.9	17 48.5	31 92	81.4	17 57.7	31 92	80.9	18 06.8	30 92	80.4	18 15.9	30 92	79.9	6
7	16 15.4	32 93	83.1	16 24.9	32 92	82.6	16 34.4	32 92	82.1	16 43.8	31 92	81.6	16 53.2	31 92	81.1	17 02.4	31 92	80.6	17 11.6	31 92	80.1	17 20.8	30 92	79.6	7
8	15 19.8	32 93	82.8	15 29.4	32 92	82.3	15 38.9	32 92	81.8	15 48.4	32 92	81.3	15 57.8	31 92	80.8	16 07.2	31 92	80.3	16 16.5	31 92	79.8	16 25.7	31 92	79.3	8
9	14 24.2	32 92	82.5	14 33.9	32 92	82.0	14 43.5	32 92	81.5	14 53.1	32 92	81.0	15 02.6	32 92	80.5	15 12.0	31 92	80.0	15 21.4	31 92	79.5	15 30.7	31 92	79.0	9
80	13 28.7	33 92	82.1	13 38.5	32 92	81.6	13 48.1	32 92	81.2	13 57.8	32 92	80.7	14 07.4	32 92	80.2	14 16.9	32 92	79.7	14 26.3	31 92	79.2	14 35.7	31 92	78.7	80
1	12 33.2	33 92	81.8	12 43.1	33 92	81.3	12 52.8	32 92	80.8	13 02.5	32 92	80.3	13 12.2	32 92	79.9	13 21.8	32 92	79.4	13 31.3	32 92	78.9	13 40.8	32 91	78.4	1
2	11 37.8	33 92	81.5	11 47.7	33 92	81.0	11 57.6	33 92	80.5	12 07.3	33 92	80.0	12 17.1	32 92	79.5	12 26.8	32 92	79.1	12 36.4	32 92	78.6	12 46.0	32 91	78.1	2
3	10 42.5	33 92	81.1	10 52.4	33 92	80.7	11 02.3	33 92	80.2	11 12.2	33 92	79.7	11 22.0	33 92	79.2	11 31.8	33 92	78.7	11 41.5	32 91	78.2	11 51.2	32 91	77.8	3
4	9 47.1	34 92	80.8	9 57.2	33 92	80.3	10 07.2	33 92	79.8	10 17.1	33 92	79.4	10 27.0	33 92	78.9	10 36.9	33 92	78.4	10 46.7	33 91	77.9	10 56.5	33 91	77.4	4
85	8 51.9	34 92	80.5	9 02.0	34 92	80.0	9 12.1	34 92	79.5	9 22.1	33 92	79.0	9 32.1	33 92	78.6	9 42.0	33 91	78.1	9 52.0	33 91	77.6	10 01.8	33 91	77.1	85
6	7 56.7	34 92	80.1	8 06.8	34 92	79.7	8 17.0	34 92	79.2	8 27.1	34 92	78.7	8 37.2	34 91	78.2	8 47.3	33 91	77.8	8 57.3	33 91	77.3	9 07.3	33 91	76.8	6
7	7 01.5	34 92	79.8	7 11.8	34 92	79.3	7 22.0	34 92	78.9	7 32.2	34 91	78.4	7 42.4	34 91	77.9	7 52.6	34 91	77.4	8 02.7	34 91	77.0	8 12.8	34 91	76.5	7
8	6 06.4	35 92	79.5	6 16.8	35 92	79.0	6 27.1	34 92	78.5	6 37.4	34 91	78.0	6 47.7	34 91	77.6	6 57.9	34 91	77.1	7 08.2	34 91	76.6	7 18.4	34 91	76.2	8
9	5 11.4	35 92	79.1	5 21.8	35 92	78.6	5 32.2	35 92	78.2	5 42.6	35 91	77.7	5 53.0	35 91	77.2	6 03.4	34 91	76.8	6 13.7	34 91	76.3	6 24.0	34 90	75.8	9
90																5 08.9	35 91	76.4	5 19.3	35 91	76.0	5 29.7	35 90	75.5	90

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	57 00.0	1.0 02	180.0	56 30.0	1.0 02	180.0	56 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	00
1	56 59.1	1.0 04	178.2	56 29.1	1.0 04	178.2	55 59.1	1.0 04	178.2	55 29.2	1.0 04	178.3	54 59.2	1.0 04	178.3	54 29.2	1.0 04	178.3	53 59.2	1.0 04	178.4	53 29.2	1.0 04	178.4	1
2	56 56.5	1.0 07	176.4	56 26.5	1.0 07	176.5	55 56.6	1.0 07	176.5	55 26.6	1.0 07	176.6	54 56.7	1.0 07	176.6	54 26.7	1.0 07	176.7	53 56.8	1.0 07	176.7	53 26.8	1.0 06	176.8	2
3	56 52.1	1.0 10	174.6	56 22.2	1.0 10	174.7	55 52.3	1.0 10	174.8	55 22.5	1.0 10	174.9	54 52.6	1.0 10	174.9	54 22.7	1.0 10	175.0	53 52.8	1.0 09	175.1	53 22.9	1.0 09	175.1	3
4	56 46.0	99 13	172.8	56 16.2	99 13	173.0	55 46.4	99 13	173.1	55 16.6	99 12	173.2	54 46.8	99 12	173.3	54 17.0	99 12	173.4	53 47.2	99 12	173.5	53 17.4	99 12	173.5	4
05	56 38.2	99 16	171.1	56 08.5	99 16	171.2	55 38.8	99 15	171.3	55 09.1	99 15	171.5	54 39.4	99 15	171.6	54 09.7	99 15	171.7	53 40.0	99 14	171.8	53 10.3	99 14	171.9	05
6	56 28.6	98 19	169.3	55 59.1	98 18	169.5	55 29.6	99 18	169.6	55 00.0	99 18	169.8	54 30.4	99 18	169.9	54 00.9	99 18	170.1	53 31.3	99 17	170.2	53 01.7	99 17	170.4	6
7	56 17.4	98 21	167.6	55 48.1	98 21	167.8	55 18.7	98 21	168.0	54 49.3	98 20	168.1	54 19.9	98 20	168.3	53 50.4	98 20	168.5	53 21.0	98 20	168.6	52 51.5	98 19	168.8	7
8	56 04.6	97 24	165.9	55 35.4	97 24	166.1	55 06.2	97 24	166.3	54 37.0	97 23	166.5	54 07.7	98 23	166.7	53 38.5	98 22	166.9	53 09.2	98 22	167.0	52 39.9	98 22	167.2	8
9	55 50.1	97 27	164.2	55 21.1	97 26	164.4	54 52.1	97 26	164.6	54 23.1	97 26	164.9	53 54.1	97 25	165.1	53 25.0	97 25	165.3	52 55.9	97 25	165.5	52 26.8	97 24	165.7	9
10	55 34.1	96 29	162.5	55 05.3	96 29	162.8	54 36.5	96 28	163.0	54 07.7	96 28	163.3	53 38.9	96 28	163.5	53 10.0	96 27	163.7	52 41.1	96 27	163.9	52 12.2	96 27	164.2	10
1	55 16.5	95 32	160.9	54 48.0	95 32	161.1	54 19.4	95 31	161.4	53 50.8	95 30	161.7	53 22.2	95 30	161.9	52 53.6	96 30	162.2	52 24.9	96 29	162.4	51 56.2	96 29	162.6	1
2	54 57.4	94 34	159.3	54 29.1	94 34	159.5	54 00.8	94 33	159.8	53 32.5	95 33	160.1	53 04.1	95 32	160.4	52 35.7	95 32	160.6	52 07.3	95 32	160.9	51 38.8	95 31	161.2	2
3	54 36.8	93 37	157.7	54 08.8	93 36	158.0	53 40.8	94 36	158.3	53 12.7	94 35	158.6	52 44.6	94 35	158.9	52 16.5	94 34	159.1	51 48.3	94 34	159.4	51 20.0	94 34	159.7	3
4	54 14.8	92 39	156.1	53 47.1	92 38	156.4	53 19.4	93 38	156.8	52 51.6	93 38	157.1	52 23.7	93 37	157.4	51 55.9	93 37	157.7	51 27.9	93 36	158.0	50 59.9	93 36	158.3	4
15	53 51.5	91 41	154.6	53 24.1	91 41	154.9	52 56.6	92 40	155.3	52 29.1	92 40	155.6	52 01.5	92 39	155.9	51 33.9	92 39	156.2	51 06.3	92 38	156.5	50 38.5	92 38	156.8	15
6	53 26.8	90 43	153.1	52 59.7	90 43	153.4	52 32.5	91 42	153.8	52 05.3	91 42	154.1	51 38.0	91 41	154.5	51 10.7	91 41	154.8	50 43.3	91 40	155.1	50 15.9	92 40	155.4	6
7	53 00.8	89 46	151.6	52 34.0	89 45	152.0	52 07.2	90 44	152.4	51 40.2	90 44	152.7	51 13.3	90 43	153.1	50 46.2	90 43	153.4	50 19.2	90 42	153.7	49 52.0	91 42	154.1	7
8	52 33.5	88 47	150.2	52 07.1	88 47	150.6	51 40.6	89 46	151.0	51 14.0	89 46	151.3	50 47.3	89 45	151.7	50 20.6	89 45	152.0	49 53.8	89 44	152.4	49 26.9	90 44	152.7	8
9	52 05.1	87 49	148.8	51 39.0	87 49	149.2	51 12.8	87 48	149.6	50 46.5	88 48	150.0	50 20.2	88 47	150.3	49 53.7	88 46	150.7	49 27.3	88 46	151.1	49 00.7	89 46	151.4	9
20	51 35.5	86 51	147.4	51 09.7	86 51	147.8	50 43.8	86 50	148.2	50 17.9	87 50	148.6	49 51.9	87 49	149.0	49 25.8	87 48	149.4	48 59.6	87 48	149.8	48 33.4	88 48	150.1	20
1	51 04.8	85 53	146.1	50 39.3	85 52	146.5	50 13.8	85 52	146.9	49 48.2	86 51	147.3	49 22.5	86 51	147.7	48 56.7	86 50	148.1	48 30.9	86 50	148.5	48 04.9	87 49	148.9	1
2	50 33.0	84 55	144.8	50 07.9	84 54	145.2	49 42.7	84 54	145.6	49 17.4	84 53	146.0	48 52.1	85 52	146.5	48 26.6	85 52	146.9	48 01.1	85 51	147.3	47 35.5	86 51	147.6	2
3	50 00.2	82 56	143.5	49 35.4	83 56	144.0	49 10.6	83 55	144.4	48 45.6	83 54	144.8	48 20.6	84 54	145.2	47 55.5	84 54	145.6	47 30.3	84 53	146.0	47 05.0	84 52	146.4	3
4	49 26.4	81 58	142.3	49 02.0	82 57	142.7	48 37.5	82 57	143.2	48 12.9	82 56	143.6	47 48.2	82 56	144.0	47 23.4	83 55	144.4	46 58.5	83 54	144.8	46 33.5	83 54	145.2	4
25	48 51.6	80 59	141.1	48 27.6	80 59	141.5	48 03.4	81 58	142.0	47 39.2	81 58	142.4	47 14.8	81 57	142.8	46 50.3	82 56	143.3	46 25.8	82 56	143.7	46 01.1	82 56	144.1	25
6	48 16.0	79 61	139.9	47 52.3	79 60	140.4	47 28.5	80 60	140.8	47 04.5	80 59	141.3	46 40.5	80 58	141.7	46 16.4	81 58	142.1	45 52.2	81 58	142.5	45 27.8	81 57	143.0	6
7	47 39.5	78 62	138.8	47 16.1	78 62	139.2	46 52.6	78 61	139.7	46 29.0	79 60	140.1	46 05.4	79 60	140.6	45 41.6	79 60	141.0	45 17.7	80 59	141.4	44 53.7	80 58	141.9	7
8	47 02.2	77 64	137.6	46 39.1	77 63	138.1	46 16.0	77 62	138.6	45 52.7	78 62	139.0	45 29.4	78 61	139.5	45 05.9	78 61	139.9	44 42.3	79 60	140.4	44 18.7	79 60	140.8	8
9	46 24.0	75 65	136.6	46 01.3	76 64	137.0	45 38.5	76 64	137.5	45 15.6	77 63	138.0	44 52.6	77 63	138.4	44 29.4	77 62	138.9	44 06.2	78 62	139.3	43 42.9	78 61	139.7	9
30	45 45.1	74 66	135.5	45 22.8	75 66	136.0	45 00.3	75 65	136.4	44 37.7	75 64	136.9	44 15.0	76 64	137.4	43 52.2	76 63	137.8	43 29.3	77 63	138.3	43 06.3	77 62	138.7	30
1	45 05.5	73 67	134.5	44 43.5	74 67	135.0	44 21.3	74 66	135.4	43 59.1	74 66	135.9	43 36.7	75 65	136.4	43 14.2	75 64	136.8	42 51.6	75 64	137.3	42 28.9	76 63	137.7	1
2	44 25.2	72 68	133.5	44 03.5	73 68	134.0	43 41.7	73 67	134.4	43 19.7	73 67	134.9	42 57.7	74 66	135.4	42 35.5	74 66	135.8	42 13.3	74 65	136.3	41 50.9	75 65	136.7	2
3	43 44.2	71 69	132.5	43 22.8	71 69	133.0	43 01.3	72 68	133.5	42 39.7	72 68	133.9	42 18.0	73 67	134.4	41 56.2	73 67	134.9	41 34.2	73 66	135.3	41 12.1	74 66	135.8	3
4	43 02.6	70 70	131.5	42 41.5	70 70	132.0	42 20.4	71 69	132.5	41 59.1	71 69	133.0	41 37.7	72 68	133.5	41 16.1	72 68	133.9	40 54.5	72 67	134.4	40 32.7	73 67	134.8	4
35	42 20.4	69 71	130.6	41 59.6	69 71	131.1	41 38.8	70 70	131.6	41 17.8	70 70	132.1	40 56.7	71 69	132.5	40 35.5	71 69	133.0	40 14.1	71 68	133.5	39 52.7	72 68	133.9	35
6	41 37.6	68 72	129.7	41 17.1	68 72	130.2	40 56.6	69 71	130.7	40 35.9	69 71	131.2	40 15.1	70 70	131.6	39 54.2	70 70	132.1	39 33.2	70 69	132.6	39 12.1	71 69	133.0	6
7	40 54.2	67 73	128.8	40 34.1	67 73	129.3	40 13.8	68 72	129.8	39 53.5	68 72	130.3	39 33.0	68 71	130.8	39 12.4	69 71	131.2	38 51.7	69 70	131.7	38 30.8	70 70	132.2	7
8	40 10.3	66 74	128.0	39 50.5	66 74	128.5	39 30.5	67 73	129.0	39 10.5	67 72	129.4	38 50.3	67 72	129.9	38 30.0	68 72	130.4	38 09.6	68 71	130.9	37 49.0	69 70	131.3	8
9	39 25.9	65 75	127.2	39 06.4	65 74	127.6	38 46.7	66 74	128.1	38 27.0	66 73	128.6	38 07.1	67 73	129.1	37 47.1	67 72	129.6	37 26.9	67 72	130.0	37 06.7	68 71	130.5	9
40	38 41.1	64 76	126.3	38 21.8	64 75	126.8	38 02.4	65 74	127.3	37 43.0	65 74	127.8	37 23.3	66 74	128.3	37 03.6	66 73	128.8	36 43.8	66 73	129.2	36 23.9	67 72	129.7	40
1	37 55.7	63 76	125.6	37 36.7	63 76	126.0	37 17.7	64 76	126.5	36 58.5	64 75	127.0	36 39.1	65 74	127.5	36 19.7	65 74	128.0	36 00.2	65 74	128.4	35 40.5	66 73	128.9	1
2	37 09.9	62 77	124.8	36 51.2	63 76	125.3	36 32.4	63 76	125.8	36 13.5	63 76	126.2	35 54.5	64 75	126.7	35 35.3	64 75	127.2	35 16.0	64 74	127.7	34 56.7	65 74	128.1	2
3	36 23.7	61 78	124.0	36 05.3	62 77	124.5	35 46.7	62 77	125.0	35 28.1	62 76	125.5	35 09.3	63 76	126.0	34 50.5	63 76	126.4	34 31.5	63 75	126.9	34 12.4	64 74	127.4	3
4	35 37.1	60 78	123.3	35 18.9	61 78	123.8	35 00.7	61 78	124.3	34 42.3	61 77	124.8	34 23.8	62 77	125.2	34 05.2	62 76	125.7	33 46.5	63 76	126.2	33 27.7	63 75	126.6	4
45	34 50.1	59 79	122.6	34 32.2	60 79	123.1	34 14.2	60 78	123.6	33 56.1	61 78	124.0	33 37.8	61 77	124.5	33 19.5	61 77	125.0	33 01.0	62 76	125.5	32 42.5	62 76	125.9	45
6	34 02.7	59 80	121.9	33 45.0	59 79	122.4	33 27.3	59 79	122.9	33 09.4	60 78	123.3	32 51.5	60 78	123.8	32 33.4	60 78	124.3	32 15.2	61 77	124.8	31 56.9	61 76	125.2	6
7	33 14.9	58 80	121.2	32 57.6	58 80	121.7	32 40.1	58 79	122.2	32 22.5	59 79	122.6	32 04.8	59 78	123.1	31 46.9	60 78	123.6	31 29.0	60 78	124.1	31 11.0	60 77	124.5	7
8	32 26.9	57 81	120.5	32 09.7	57 80	121.0	31 52.5	58 80	121.5	31 35.1	58 80	122.0	31 17.7	58 79	122.5	31 00.1	59 79	122.9	30 42.4	59 78	123.4	30 24.7	59 78	123.9	8
9	31 38.4	56 81	119.9	31 21.5	56 81	120.4	31 04.5	57 80	120.8	30 47.4	57 80	121.3	30 30.2	58 80	121.8	30 12.9	58 79	122.3	29 55.5	58 79	122.7	29 38.0	59 78	123.2	9
50	30 49.7	55 82	119.2	30 33.1	56 81	119.7	30 16.3	56 81	120.2	29 59.4	56 80	120.7	29 42.4	57 80	121.2	29 25.4	57 80	121.6	29 08.2	57 79	122.1	28 50.9	58 79	122.6	50
1	30 00.7	55 82	118.6	29 44.3	55 82	119.1	29 27.7	55 81	119.6	29 11.1	56 81	120.1	28 54.4	56 81	120.5	28 37.5	56 80	121.0	28 20.6	57 80	121.5	28 03.6	57 80	121.9	1
2	29 11.4	54 83	118.0	28 55.2	54 82	118.5	28 38.9	55 82	119.0	28 22.5	55 82	119.4	28 06.0	55 81	119.9	27 49.4	56 81	120.4	27 32.7	56 80	120.9	27 15.9	56 80	121.3	2
3	28 21.8	53 83	117.4	28 05.8	53 83	117.9	27 49.7	54 82	118.4	27 33.5	54 82	118.8	27 17.3	54 82	119.3	27 00.9	55 81	119.8	26 44.4	55 81	120.3	26 27.9	55 80	120.7	3
4	27 31.9	52 84	116.8	27 16.2	53 83	117.3	27 00.3	53 83	117.8	26 44.3	53 82	118.3	26 28.3	54 82	118.7	26 12.1	54 82	119.2	25 55.9	54 81	119.7	25 39.6	55 81	120.1	4
55	26 41.8	52 84	116.3	26 26.3	52 84	116.7	26 10.6	52 83	117.2	25 54.9	53 83	117.7	25 39.0	53 82	118.2	25 23.1	53 82	118.6	25 07.1	54 82	119.1	24 51.0	54 82	119.6	55
6	25 51.5	51 84	115.7	25 36.1	51 84	116.2	25 20.7	52 84	116.6	25 05.1	52 83	117.1	24 49.5	52 83	117.6	24 33.8	53 83	118.1	24 18.0	53 82	118.5	24 02.1	53 82	119.0	6
7	25 00.9	50 85	115.1	24 45.7	51 84	115.6	24 30.5	51 84	116.1	24 15.1	51 84	116.6	23 59.7	52 83	117.0	23 44.2	52 83	117.5	23 28.6	52 83	118.0	23 13.0	52 82	118.4	7
8	24 10.0	50 85	114.6	23 55.1	50 85	115.1	23 40.1	50 84	115.6	23 24.9	51 84	116.0	23 09.7	51 84	116.5	22 54.4	51 83	117.0	22 39.0	51 83	117.4	22 23.6	52 83	117.9	8
9	23 19.0	49 85	114.1	23 04.2	49 85	114.6	22 49.4	50 85	115.0	22 34.5	50 84	115.5	22 19.5	50 84	116.0	22 04.4	50 84	116.4	21 49.2	51 84	116.9	21 34.0	51 83	117.4	9
60	22 27.8	48 86	113.6	22 13.2	49 86	114.0	21 58.5	49 85	114.5	21 43.8	49 85	115.0	21 29.0	49 84	115.4	21 14.1	50 84	115.9	20 59.1	50 84	116.4	20 44.1	50 84	116.8	60
1	21 36.3	48 86	113.1	21 21.9	48 86	113.5	21 07.5	48 86	114.0	20 52.9	49 85	114.5	20 38.3	49 85	114.9	20 23.6	49 84	115.4	20 08.8	49 84	115.9	19 54.0	50 84	116.3	1
2	20 44.7	47 86	112.6	20 30.5	47 86	113.0	20 16.2	48 86	113.5	20 01.8	48 86	114.0	19 47.4	48 85	114.4	19 32.9	48 85	114.9	19 18.3	49 84	115.4	19 03.7	49 84	115.8	2
3	19 52.9	47 87	112.1	19 38.8	47 86	112.5	19 24.7	47 86	113.0	19 10.5	47 86	113.5	18 56.3	48 86	113.9	18 42.0	48 85	114.4	18 27.6	48 85	114.9	18 13.1	48 84	115.3	3
4	19 00.9	46 87	111.6	18 47.0	46 87	112.1	18 33.1	47 86	112.5	18 19.1	47 86	113.0	18 05.0	47 86	113.4	17 50.9	47 86	113.9	17 36.7	47 85	114.4	17 22.4	48 85	114.8	4
65	18 08.7	46 87	111.1	17 55.0	46 87	111.6	17 41.2	46 87	112.0	17 27.4	46 86	112.5	17 13.5	46 86	113.0	16 59.6	47 86	113.4	16 45.6	47 86	113.9	16 31.5	47 85	114.4	65
6	17 16.3	45 88	110.6	17 02.8	45 87	111.1	16 49.2	45 87	111.6	16 35.6	46 87	112.0	16 21.9	46 86	112.5	16 08.1	46 86	113.0	15 54.3	46 86	113.4	15 40.4	46 86	113.9	6
7	16 23.8	44 88	110.2	16 10.5	45 88	110.7	15 57.1	45 87	111.1	15 43.6	45 87	111.6	15 30.0	45 87	112.0	15 16.4	45 86	112.5	15 02.8	46 86	113.0	14 49.1	46 86	113.4	7
8	15 31.2	44 88	109.7	15 18.0	44 88	110.2	15 04.7	44 88	110.7	14 51.4	45 87	111.1	14 38.0	45 87	111.6	14 24.6	45 87	112.1	14 11.1	45 86	112.5	13 57.6	45 86	113.0	8
9	14 38.4	43 88	109.3	14 25.3	44 88	109.8	14 12.2	44 88	110.2	13 59.1	44 88	110.7	13 45.9	44 87	111.2	13 32.6	44 87	111.6	13 19.3	44 87	112.1	13 05.9	45 86	112.5	9
70	13 45.5	43 88	108.9	13 32.6	43 88	109.3	13 19.6	43 88	109.8	13 06.6	43 88	110.3	12 53.5	44 87	110.7	12 40.4	44 87	111.2	12 27.3	44 87	111.6	12 14.1	44 87	112.1	70
1	12 52.4	42 89	108.4	12 39.6	43 88	108.9	12 26.8	43 88	109.4	12 14.0	43 88	109.8	12 01.1	43 88	110.3	11 48.1	43 87	110.7	11 35.1	43 87	111.2	11 22.1	43 87	111.7	1
2	11 59.2	42 89	108.0	11 46.6	42 89	108.5	11 33.9	42 88	108.9	11 21.2	42 88	109.4	11 08.5	43 88	109.9	10 55.7	43 88	110.3	10 42.9	43 88	110.8	10 30.0	43 87	111.2	2
3	11 05.8	41 89	107.6	10 53.4	42 89	108.1	10 40.9	42 89	108.5	10 28.3	42 88	109.0	10 15.7	42 88	109.4	10 03.1	42 88	109.9	9 50.4	42 88	110.4	9 37.7	42 87	110.8	3
4	10 12.4	41 89	107.2	10 00.1	41 89	107.6	9 47.7	41 89	108.1	9 35.3	41 89	108.6	9 22.8	42 88	109.0	9 10.3	42 88	109.5	8 57.8	42 88	110.0	8 45.3	42 88	110.4	4
75	9 18.8	41 90	106.8	9 06.6	41 89	107.2	8 54.4	41 89	107.7	8 42.1	41 89	108.2	8 29.8	41 88	108.6	8 17.5	41 88	109.1	8 05.1	41 88	109.5	7 52.7	41 88	110.0	75
6	8 25.1	40 90	106.4	8 13.1	40 90	106.8	8 01.0	40 89	107.3	7 48.8	41 89	107.8	7 36.7	41 89	108.2	7 24.5	41 89	108.7	7 12.2	41 88	109.1	7 00.0	41 88	109.6	6
7	7 31.3	40 90	106.0	7 19.4	40 90	106.4	7 07.4	40 89	106.9	6 55.4	40 89	107.4	6 43.4	40 89	107.8	6 31.3	40 89	108.3	6 19.3	40 88	108.8	6 07.2	40 88	109.2	7
8	6 37.4	39 90	105.6	6 25.6	39 90	106.1	6 13.8	40 90	106.5	6 01.9	40 89	107.0	5 50.0	40 89	107.4	5 38.1	40 89	107.9	5 26.2	40 88	108.4	5 14.2	40 88	108.8	8
9	5 43.4	39 90	105.2	5 31.7	39 90	105.7	5 20.0	39 90	106.1	5 08.3	39 89	106.6													9

Lat. 21°

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 21°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	85 00.0	1.0 09	180.0	85 30.0	1.0 10	180.0	86 00.0	1.0 11	180.0	86 30.0	1.0 12	180.0	87 00.0	1.0 14	180.0	87 30.0	1.0 17	180.0	88 00.0	1.0 21	180.0	88 30.0	1.0 27	180.0	00
1	84 54.7	98 26	169.1	85 24.1	98 28	168.0	85 53.4	97 31	166.5	86 22.5	97 35	164.7	86 51.3	95 40	162.4	87 19.7	94 46	159.2	87 47.4	91 54	154.7	88 13.8	85 63	147.8	1
2	84 39.2	94 40	158.9	85 07.1	92 44	156.8	85 34.5	91 48	154.4	86 01.4	88 52	151.3	86 27.4	85 58	147.5	86 52.2	80 64	142.7	87 15.3	73 71	136.4	87 35.9	63 79	128.3	2
3	84 14.9	87 52	149.9	84 40.7	85 56	147.2	85 05.8	82 60	144.2	85 29.9	78 65	140.5	85 52.7	73 70	136.2	86 13.7	67 75	131.0	86 32.6	59 80	124.8	86 48.7	48 85	117.5	3
4	83 43.5	80 62	142.2	84 07.1	77 65	139.3	84 29.8	73 69	135.9	84 51.1	69 73	132.1	85 10.9	63 77	127.8	85 28.9	56 81	122.9	85 44.6	48 85	117.3	85 57.5	38 88	111.1	4
05	83 06.6	73 68	135.7	83 28.2	70 72	132.7	83 48.5	66 75	129.4	84 07.5	61 78	125.7	84 24.8	55 82	121.6	84 40.3	48 85	117.1	84 53.6	41 88	112.2	85 04.5	32 90	106.9	05
6	82 25.6	67 74	130.3	82 45.2	63 76	127.4	83 03.6	59 79	124.2	83 20.6	54 82	120.7	83 35.9	48 84	116.9	83 49.5	42 87	112.8	84 01.1	35 89	108.5	84 10.5	27 91	103.9	6
7	81 41.5	62 78	125.8	81 59.4	58 80	123.0	82 16.1	53 82	120.0	82 31.4	49 84	116.7	82 45.2	43 87	113.2	82 57.3	37 89	109.6	83 07.5	31 90	105.7	83 15.9	24 92	101.6	7
8	80 55.0	57 80	122.1	81 11.5	53 82	119.4	81 26.7	49 84	116.5	81 40.7	44 86	113.5	81 53.1	39 88	110.3	82 04.1	34 90	107.0	82 13.3	28 91	103.5	82 20.8	22 92	99.9	8
9	80 06.7	53 83	118.9	80 22.0	49 85	116.3	80 36.0	45 86	113.7	80 48.8	40 88	110.9	81 00.2	36 89	107.9	81 10.2	31 90	104.9	81 18.7	26 92	101.7	81 25.5	20 92	98.5	9
10	79 17.0	49 85	116.1	79 31.2	45 86	113.7	79 44.2	41 88	111.2	79 56.1	37 89	108.6	80 06.6	33 90	105.9	80 15.9	28 91	103.1	80 23.7	24 92	100.3	80 30.0	19 93	97.3	10
1	78 26.2	46 86	113.8	78 39.5	42 88	111.5	78 51.7	39 89	109.2	79 02.7	35 90	106.7	79 12.5	31 91	104.2	79 21.1	27 92	101.7	79 28.5	22 92	99.0	79 34.4	18 93	96.3	1
2	77 34.6	43 87	111.7	77 47.0	40 88	109.6	77 58.5	36 90	107.4	78 08.8	33 90	105.1	78 18.1	29 91	102.8	78 26.2	25 92	100.4	78 33.1	21 93	98.0	78 38.7	17 93	95.5	2
3	76 42.2	41 88	109.9	76 54.0	38 89	107.9	77 04.8	34 90	105.8	77 14.6	31 91	103.7	77 23.3	27 92	101.5	77 31.0	24 92	99.3	77 37.5	20 93	97.0	77 42.9	16 93	94.7	3
4	75 49.3	39 89	108.3	76 00.5	36 90	106.4	76 10.7	33 91	104.4	76 20.0	29 91	102.4	76 28.3	26 92	100.4	76 35.6	23 92	98.3	76 41.9	19 93	96.2	76 47.1	16 93	94.0	4
15	74 55.9	37 90	106.9	75 06.5	34 90	105.1	75 16.3	31 91	103.2	75 25.2	28 92	101.3	75 33.1	25 92	99.4	75 40.1	22 93	97.4	75 46.2	18 93	95.5	75 51.2	15 93	93.4	15
6	74 02.1	35 90	105.6	74 12.3	33 91	103.8	74 21.7	30 92	102.1	74 30.2	27 92	100.3	74 37.8	24 92	98.5	74 44.5	21 93	96.6	74 50.4	18 93	94.8	74 55.2	15 93	92.9	6
7	73 08.0	34 91	104.4	73 17.8	31 91	102.8	73 26.8	29 92	101.1	73 35.0	26 92	99.4	73 42.3	23 92	97.7	73 48.9	20 93	95.9	73 54.5	17 93	94.2	73 59.3	14 93	92.4	7
8	72 13.6	33 91	103.3	72 23.0	30 92	101.8	72 31.7	28 92	100.2	72 39.6	25 92	98.6	72 46.8	22 93	96.9	72 53.1	20 93	95.3	72 58.6	17 93	93.6	73 03.3	14 93	91.9	8
9	71 19.0	32 91	102.3	71 28.1	29 92	100.8	71 36.5	27 92	99.3	71 44.2	24 92	97.8	71 51.1	22 93	96.2	71 57.3	19 93	94.6	72 02.7	17 93	93.1	72 07.3	14 93	91.5	9
20	70 24.2	31 92	101.4	70 33.0	28 92	100.0	70 41.2	26 92	98.5	70 48.7	24 93	97.1	70 55.4	21 93	95.6	71 01.5	19 93	94.1	71 06.8	16 93	92.6	71 11.3	14 93	91.0	20
1	69 29.2	30 92	100.6	69 37.8	28 92	99.2	69 45.7	25 92	97.8	69 53.0	23 93	96.4	69 59.6	21 93	95.0	70 05.6	19 93	93.5	70 10.8	16 93	92.1	70 15.3	14 93	90.6	1
2	68 34.0	29 92	99.8	68 42.4	27 92	98.5	68 50.2	25 93	97.1	68 57.3	23 93	95.8	69 03.8	21 93	94.4	69 09.6	18 93	93.0	69 14.8	16 93	91.7	69 19.3	14 93	90.3	2
3	67 38.8	28 92	99.0	67 47.0	26 93	97.8	67 54.6	24 93	96.5	68 01.6	22 93	95.2	68 07.9	20 93	93.9	68 13.7	18 93	92.6	68 18.8	16 93	91.2	68 23.3	14 93	89.9	3
4	66 43.4	28 92	98.3	66 51.4	26 93	97.1	66 58.9	24 93	95.9	67 05.8	22 93	94.6	67 12.0	20 93	93.4	67 17.7	18 93	92.1	67 22.8	16 93	90.8	67 27.3	14 93	89.5	4
25	65 47.9	27 92	97.7	65 55.8	25 93	96.5	66 03.1	23 93	95.3	66 09.9	22 93	94.1	66 16.1	20 93	92.9	66 21.7	18 93	91.7	66 26.8	16 93	90.5	66 31.3	14 04	89.2	25
6	64 52.4	27 93	97.1	65 00.1	25 93	95.9	65 07.3	23 93	94.8	65 14.0	21 93	93.6	65 20.2	20 93	92.4	65 25.7	18 93	91.3	65 30.8	16 93	90.1	65 35.2	14 93	88.9	6
7	63 56.8	26 93	96.5	64 04.4	25 93	95.4	64 11.5	23 93	94.3	64 18.1	21 93	93.1	64 24.2	19 93	92.0	64 29.7	18 93	90.9	64 34.8	16 94	89.7	64 39.2	14 93	88.6	7
8	63 01.1	26 93	95.9	63 08.6	24 93	94.9	63 15.6	23 93	93.8	63 22.2	21 93	92.7	63 28.2	19 93	91.6	63 33.7	18 93	90.5	63 38.7	16 93	89.4	63 43.3	14 93	88.3	8
9	62 05.3	26 93	95.4	62 12.8	24 93	94.4	62 19.7	22 93	93.3	62 26.2	21 93	92.3	62 32.2	19 93	91.2	62 37.7	18 93	90.1	62 42.7	16 93	89.1	62 47.3	14 93	88.0	9
30	61 09.6	25 93	94.9	61 16.9	24 93	93.9	61 23.8	22 93	92.9	61 30.2	21 93	91.8	61 36.2	19 93	90.8	61 41.7	18 93	89.8	61 46.7	16 93	88.7	61 51.3	14 93	87.7	30
1	60 13.7	25 93	94.4	60 21.0	24 93	93.4	60 27.8	22 93	92.4	60 34.2	21 93	91.4	60 40.2	19 93	90.4	60 45.7	18 93	89.4	60 50.7	16 93	88.4	60 55.3	15 93	87.4	1
2	59 17.9	25 93	93.9	59 25.1	23 93	93.0	59 31.9	22 93	92.0	59 38 2	21 93	91.0	59 44.2	19 93	90.1	59 49.7	18 93	89.1	59 54.7	16 93	88.1	59 59.4	15 93	87.1	2
3	58 22.0	25 93	93.5	58 29.1	23 93	92.5	58 35.9	22 93	91.6	58 42.2	20 93	90.7	58 48.2	19 93	89.7	58 53.7	18 93	88.8	58 58.8	16 93	87.8	59 03.4	15 93	86.8	3
4	57 26.0	24 93	93.0	57 33.1	23 93	92.1	57 39.9	22 93	91.2	57 46.2	20 93	90.3	57 52.1	19 93	89.4	57 57.7	18 93	88.4	58 02.8	16 03	87.5	58 07.5	15 93	86.6	4
35	56 30.1	24 93	92.6	56 37.2	23 93	91.7	56 43.9	22 93	90.8	56 50.2	20 93	89.9	56 56.1	19 93	89.0	57 01.7	18 93	88.1	57 06.8	17 93	87.2	57 11.6	15 93	86.3	35
6	55 34.1	24 93	92.2	55 41.2	23 93	91.3	55 47.9	22 93	90.4	55 54.2	20 93	89.6	56 00.1	19 93	88.7	56 05.7	18 93	87.8	56 10.9	17 93	86.9	56 15.7	15 93	86.0	6
7	54 38.1	24 93	91.8	54 45.2	23 93	90.9	54 51.8	22 93	90.1	54 58.2	20 93	89.2	55 04.1	19 93	88.4	55 09.7	18 93	87.5	55 15.0	17 93	86.6	55 19.8	16 93	85.8	7
8	53 42.1	24 93	91.4	53 49.2	23 94	90.5	53 55.8	22 93	89.7	54 02.2	21 93	88.9	54 08.1	19 93	88.1	54 13.8	18 93	87.2	54 19.1	17 93	86.4	54 24.0	16 93	85.5	8
9	52 46.1	24 93	91.0	52 53.1	23 93	90.2	52 59.8	22 93	89.4	53 06.2	21 93	88.6	53 12.2	19 93	87.7	53 17.8	18 93	86.9	53 23.2	17 93	86.1	53 28.2	16 93	85.3	9
40	51 50.1	24 93	90.6	51 57.1	23 93	89.8	52 03.8	22 93	89.0	52 10.2	21 93	88.2	52 16.2	20 93	87.4	52 21.9	19 93	86.6	52 27.3	17 93	85.8	52 32.3	16 93	85.0	40
1	50 54.1	24 93	90.2	51 01.1	23 93	89.5	51 07.8	22 93	88.7	51 14.2	21 93	87.9	51 20.2	20 93	87.1	51 26.0	19 93	86.3	51 31.4	18 93	85.6	51 36.6	17 93	84.8	1
2	49 58.1	24 93	89.9	50 05.1	23 93	89.1	50 11.8	22 93	88.4	50 18.2	21 93	87.6	50 24.3	20 93	86.8	50 30.1	19 93	86.1	50 35.6	18 93	85.3	50 40.8	17 93	84.5	2
3	49 02.1	24 93	89.5	49 09.1	23 93	88.8	49 15.8	22 93	88.0	49 22.3	21 93	87.3	49 28.4	20 93	86.5	49 34.2	19 93	85.8	49 39.8	18 93	85.0	49 45.0	17 93	84.3	3
4	48 06.1	24 93	89.2	48 13.1	23 93	88.5	48 19.8	22 93	87.7	48 26.3	21 93	87.0	48 32.5	20 93	86.2	48 38.4	19 93	85.5	48 44.0	18 93	84.8	48 49.3	17 93	84.0	4
45	47 10.1	24 93	88.8	47 17.1	23 93	88.1	47 23.9	22 93	87.4	47 30.4	21 93	86.7	47 36.6	20 93	86.0	47 42.6	19 93	85.2	47 48.2	18 93	84.5	47 53.6	18 93	83.8	45
6	46 14.1	24 93	88.5	46 21.1	23 93	87.8	46 27.9	22 93	87.1	46 34.5	21 93	86.4	46 40.7	20 93	85.7	46 46.7	20 93	85.0	46 52.5	19 93	84.2	46 58.0	18 93	83.5	6
7	45 18.1	24 93	88.2	45 25.2	23 93	87.5	45 32.0	22 93	86.8	45 38.6	22 93	86.1	45 44.9	21 93	85.4	45 51.0	20 93	84.7	45 56.8	19 93	84.0	46 02.3	18 93	83.3	7
8	44 22.1	24 93	87.8	44 29.2	23 93	87.2	44 36.1	22 93	86.5	44 42.7	22 93	85.8	44 49.1	21 93	85.1	44 55.2	20 93	84.4	45 01.1	19 93	83.7	45 06.7	18 93	83.0	8
9	43 26.1	24 93	87.5	43 33.3	23 93	86.9	43 40.2	23 93	86.2	43 46.8	22 93	85.5	43 53.3	21 93	84.8	43 59.5	20 93	84.2	44 05.4	19 93	83.5	44 11.1	19 93	82.8	9
50	42 30.2	24 93	87.2	42 37.3	24 93	86.6	42 44.3	23 93	85.9	42 51.0	22 93	85.2	42 57.5	21 93	84.6	43 03.7	20 93	83.9	43 09.8	20 93	83.2	43 15.5	19 92	82.5	50
1	41 34.2	24 93	86.9	41 41.4	24 93	86.2	41 48.4	23 93	85.6	41 55.2	22 93	84.9	42 01.7	21 93	84.3	42 08.1	21 93	83.6	42 14.2	20 93	83.0	42 20.0	19 92	82.3	1
2	40 38.3	26 93	86.6	40 45.6	24 93	85.9	40 52.6	23 93	85.3	40 59.4	22 93	84.7	41 06.0	22 93	84.0	41 12.4	21 93	83.4	41 18.6	20 93	82.7	41 24.5	19 92	82.1	2
3	39 42.4	25 93	86.3	39 49.7	24 93	85.6	39 56.8	23 93	85.0	40 03.7	23 93	84.4	40 10.3	22 93	83.7	40 16.8	21 93	83.1	40 23.0	20 92	82.5	40 29.1	20 92	81.8	3
4	38 46.5	25 93	86.0	38 53.9	24 93	85.3	39 01.0	23 93	84.7	39 07.9	23 93	84.1	39 14.7	22 93	83.5	39 21.2	21 93	82.8	39 27.5	21 92	82.2	39 33.6	20 92	81.6	4
55	37 50.6	25 93	85.7	37 58.0	24 93	85.0	38 05.2	24 93	84.4	38 12.2	23 93	83.8	38 19.0	22 93	83.2	38 25.6	22 92	82.6	38 32.0	21 92	81.9	38 38.3	20 92	81.3	55
6	36 54.8	25 93	85.4	37 02.2	24 93	84.8	37 09.5	24 93	84.1	37 16.6	23 93	83.5	37 23.4	23 93	82.9	37 30.1	22 92	82.3	37 36.6	21 92	81.7	37 42.9	21 92	81.1	6
7	35 59.0	25 93	85.1	36 06.5	25 93	84.5	36 13.8	24 93	83.9	36 20.9	23 93	83.3	36 27.9	23 93	82.7	36 34.6	22 92	82.0	36 41.2	22 92	81.4	36 47.6	21 92	80.8	7
8	35 03.2	25 93	84.8	35 10.7	25 93	84.2	35 18.1	24 93	83.6	35 25.3	24 93	83.0	35 32.3	23 92	82.4	35 39.2	23 92	81.8	35 45.8	22 92	81.2	35 52.3	21 92	80.6	8
9	34 07.4	26 93	84.5	34 15.0	25 93	83.9	34 22.5	25 93	83.3	34 29.7	24 92	82.7	34 36.8	23 92	82.1	34 43.7	23 92	81.5	34 50.5	22 92	80.9	34 57.1	22 92	80.3	9
60	33 11.7	26 93	84.2	33 19.3	25 93	83.6	33 26.8	25 93	83.0	33 34.2	24 92	82.4	33 41.3	24 92	81.8	33 48.3	23 92	81.3	33 55.2	23 92	80.7	34 01.9	22 92	80.1	60
1	32 16.0	26 93	83.9	32 23.7	25 93	83.3	32 31.3	25 93	82.7	32 38.7	24 92	82.1	32 45.9	24 92	81.6	32 53.0	23 92	81.0	32 59.9	23 92	80.4	33 06.7	22 92	79.8	1
2	31 20.3	26 93	83.6	31 28.1	26 93	83.0	31 35.7	25 92	82.4	31 43.2	25 92	81.9	31 50.5	24 92	81.3	31 57.7	24 92	80.7	32 04.7	23 92	80.2	32 11.6	23 92	79.6	2
3	30 24.7	26 93	83.3	30 32.5	26 93	82.7	30 40.2	25 92	82.2	30 47.8	25 92	81.6	30 55.2	24 92	81.0	31 02.4	24 92	80.5	31 09.6	23 92	79.9	31 16.5	23 92	79.3	3
4	29 29.0	27 93	83.0	29 37.0	26 93	82.4	29 44.7	26 92	81.9	29 52.4	25 92	81.3	29 59.9	25 92	80.8	30 07.2	24 92	80.2	30 14.4	24 92	79.6	30 21.5	23 92	79.1	4
65	28 33.5	27 93	82.7	28 41.4	26 92	82.1	28 49.3	26 92	81.6	28 57.0	25 92	81.0	29 04.6	25 92	80.5	29 12.0	25 92	79.9	29 19.4	24 92	79.4	29 26.5	24 92	78.8	65
6	27 37.9	27 92	82.4	27 46.0	27 92	81.9	27 53.9	26 92	81.3	28 01.7	26 92	80.8	28 09.4	25 92	80.2	28 16.9	25 92	79.7	28 24.3	24 92	79.1	28 31.6	24 92	78.6	6
7	26 42.4	27 92	82.1	26 50.5	27 92	81.6	26 58.6	26 92	81.0	27 06.4	26 92	80.5	27 14.2	26 92	79.9	27 21.8	25 92	79.4	27 29.3	25 92	78.8	27 36.7	24 91	78.3	7
8	25 47.0	28 92	81.8	25 55.2	27 92	81.3	26 03.3	27 92	80.7	26 11.2	26 92	80.2	26 19.1	26 92	79.7	26 26.8	26 92	79.1	26 34.4	25 92	78.6	26 41.9	25 91	78.0	8
9	24 51.5	28 92	81.5	24 59.8	27 92	81.0	25 08.0	27 92	80.5	25 16.0	27 92	79.9	25 24.0	26 92	79.4	25 31.8	26 92	78.9	25 39.5	26 91	78.3	25 47.1	25 91	77.8	9
70	23 56.2	28 92	81.2	24 04.5	28 92	80.7	24 12.8	27 92	80.2	24 20.9	27 92	79.6	24 29.0	27 92	79.1	24 36.9	26 92	78.6	24 44.7	26 91	78.0	24 52.4	25 91	77.5	70
1	23 00.8	28 92	80.9	23 09.3	28 92	80.4	23 17.6	28 92	79.9	23 25.8	27 92	79.4	23 34.0	27 92	78.8	23 42.0	27 91	78.3	23 49.9	26 91	77.8	23 57.7	26 91	77.3	1
2	22 05.5	29 92	80.6	22 14.1	28 92	80.1	22 22.5	28 92	79.6	22 30.8	28 92	79.1	22 39.1	27 92	78.6	22 47.2	27 91	78.0	22 55.2	27 91	77.5	23 03.1	26 91	77.0	2
3	21 10.3	29 92	80.3	21 18.9	29 92	79.8	21 27.4	28 92	79.3	21 35.8	28 92	78.8	21 44.2	28 91	78.3	21 52.4	27 91	77.8	22 00.6	27 91	77.2	22 08.6	27 91	76.7	3
4	20 15.1	29 92	80.0	20 23.8	29 92	79.5	20 32.4	29 92	79.0	20 40.9	28 91	78.5	20 49.4	28 91	78.0	20 57.7	28 91	77.5	21 05.9	27 91	77.0	21 14.1	27 91	76.4	4
75	19 19.9	29 92	79.7	19 28.7	29 92	79.2	19 37.4	29 92	78.7	19 46.1	29 91	78.2	19 54.6	28 91	77.7	20 03.1	28 91	77.2	20 11.4	28 91	76.7	20 19.7	27 91	76.2	75
6	18 24.9	30 92	79.4	18 33.7	29 92	78.9	18 42.5	29 91	78.4	18 51.3	29 91	77.9	18 59.9	29 91	77.4	19 08.5	28 91	76.9	19 16.9	28 91	76.4	19 25.3	28 90	75.9	6
7	17 29.8	30 92	79.1	17 38.8	30 92	78.6	17 47.7	30 91	78.1	17 56.5	29 91	77.6	18 05.3	29 91	77.1	18 13.9	29 91	76.6	18 22.5	28 90	76.1	18 31.0	28 90	75.6	7
8	16 34.8	30 92	78.8	16 43.9	30 91	78.3	16 52.9	30 91	77.8	17 01.8	30 91	77.3	17 10.7	29 91	76.8	17 19.5	29 91	76.3	17 28.2	29 90	75.8	17 36.8	29 90	75.3	8
9	15 39.9	31 92	78.5	15 49.1	30 91	78.0	15 58.2	30 91	77.5	16 07.2	30 91	77.0	16 16.2	30 91	76.5	16 25.1	30 90	76.0	16 33.9	29 90	75.5	16 42.7	29 90	75.0	9
80	14 45.0	31 91	78.2	14 54.3	31 91	77.7	15 03.5	31 91	77.2	15 12.7	30 91	76.7	15 21.7	30 90	76.2	15 30.8	30 90	75.7	15 39.7	30 90	75.3	15 48.6	29 90	74.8	80
1	13 50.2	31 91	77.9	13 59.6	31 91	77.4	14 08.9	31 91	76.9	14 18.2	31 91	76.4	14 27.4	31 90	75.9	14 36.5	30 90	75.5	14 45.6	30 90	75.0	14 54.6	30 90	74.5	1
2	12 55.5	32 91	77.6	13 05.0	31 91	77.1	13 14.4	31 91	76.6	13 23.8	31 91	76.1	13 33.1	31 90	75.6	13 42.3	31 90	75.2	13 51.5	31 90	74.7	14 00.6	30 90	74.2	2
3	12 00.8	32 91	77.3	12 10.4	32 91	76.8	12 19.9	32 91	76.3	12 29.4	32 90	75.8	12 38.8	31 90	75.3	12 48.2	31 90	74.9	12 57.5	31 90	74.4	13 06.8	31 90	73.9	3
4	11 06.2	32 91	77.0	11 15.9	32 91	76.5	11 25.5	32 90	76.0	11 35.1	32 90	75.5	11 44.7	32 90	75.0	11 54.2	32 90	74.5	12 03.6	31 90	74.1	12 13.0	31 90	73.6	4
85	10 11.7	33 91	76.6	10 21.5	33 91	76.2	10 31.2	32 90	75.7	10 40.9	32 90	75.2	10 50.6	32 90	74.7	11 00.2	32 90	74.2	11 09.8	32 90	73.8	11 19.3	32 89	73.3	85
6	9 17.2	33 91	76.3	9 27.1	33 90	75.8	9 37.0	33 90	75.4	9 46.8	33 90	74.9	9 56.6	33 90	74.4	10 06.4	32 90	73.9	10 16.1	32 90	73.4	10 25.7	32 89	73.0	6
7	8 22.8	33 90	76.0	8 32.9	33 90	75.5	8 42.8	33 90	75.0	8 52.8	33 90	74.6	9 02.7	33 90	74.1	9 12.6	33 90	73.6	9 22.4	33 89	73.1	9 32.2	33 89	72.7	7
8	7 28.5	34 90	75.7	7 38.7	34 90	75.2	7 48.8	34 90	74.7	7 58.8	34 90	74.3	8 08.9	33 90	73.8	8 18.9	33 89	73.3	8 28.9	33 89	72.8	8 38.8	33 89	72.3	8
9	6 34.3	34 90	75.3	6 44.5	34 90	74.9	6 54.8	34 90	74.4	7 05.0	34 90	73.9	7 15.1	34 89	73.5	7 25.3	34 89	73.0	7 35.4	34 89	72.5	7 45.5	34 89	72.0	9
90	5 40.1	35 90	75.0	5 50.5	35 90	74.5	6 00.9	34 90	74.1	6 11.2	34 90	73.6	6 21.5	34 89	73.1	6 31.8	34 89	72.7	6 42.0	34 89	72.2	6 52.2	34 88	71.7	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	53 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	00
1	52 59.2	1.0 04	178.4	52 29.2	1.0 04	178.4	51 59.2	1.0 04	178.4	51 29.3	1.0 04	178.5	50 59.3	1.0 04	178.5	50 29.3	1.0 04	178.5	49 59.3	1.0 04	178.5	49 29.3	1.0 04	178.5	1
2	52 56.9	1.0 07	176.8	52 26.9	1.0 06	176.9	51 57.0	1.0 06	176.9	51 27.0	1.0 06	176.9	50 57.0	1.0 06	177.0	50 27.1	1.0 06	177.0	49 57.1	1.0 06	177.1	49 27.2	1.0 06	177.1	2
3	52 53.8	1.0 09	175.2	52 23.1	1.0 09	175.3	51 53.2	1.0 09	175.4	51 23.3	1.0 09	175.4	50 53.4	1.0 09	175.5	50 23.5	1.0 08	175.5	49 53.5	1.0 08	175.6	49 23.6	1.0 08	175.7	3
4	52 47.5	99 12	173.6	52 17.7	99 12	173.7	51 47.9	99 11	173.8	51 18.0	99 11	173.9	50 48.2	99 11	174.0	50 18.4	99 11	174.1	49 48.5	99 11	174.1	49 18.7	1.0 11	174.2	4
05	52 40.6	99 14	172.1	52 10.8	99 14	172.2	51 41.1	99 14	172.3	51 11.4	99 14	172.4	50 41.6	99 13	172.5	50 11.8	99 13	172.6	49 42.1	99 13	172.7	49 12.3	99 13	172.8	05
6	52 32.1	99 17	170.5	52 02.5	99 16	170.6	51 32.8	99 16	170.8	51 03.2	99 16	170.9	50 33.6	99 16	171.0	50 03.9	99 16	171.1	49 34.3	99 16	171.2	49 04.6	99 15	171.3	6
7	52 22.1	98 19	168.9	51 52.6	98 19	169.1	51 23.1	98 19	169.2	50 53.6	98 18	169.4	50 24.1	98 18	169.5	49 54.6	98 18	169.7	49 25.0	98 18	169.8	48 55.5	98 18	169.9	7
8	52 10.6	98 22	167.4	51 41.3	98 21	167.6	51 11.9	98 21	167.7	50 42.6	98 21	167.9	50 13.2	98 20	168.1	49 43.8	98 20	168.2	49 14.4	98 20	168.4	48 45.0	98 20	168.5	8
9	51 57.6	97 24	165.9	51 28.5	97 24	166.1	50 59.3	97 23	166.3	50 30.1	97 23	166.4	50 00.9	97 23	166.6	49 31.7	97 22	166.8	49 02.5	97 22	167.0	48 33.2	98 22	167.1	9
10	51 43.3	97 26	164.4	51 14.3	97 26	164.6	50 45.3	97 26	164.8	50 16.3	97 25	165.0	49 47.3	97 25	165.2	49 18.2	97 25	165.4	48 49.1	97 24	165.6	48 20.1	97 24	165.7	10
1	51 27.5	96 29	162.9	50 58.7	96 28	163.1	50 29.9	96 28	163.3	50 01.1	96 28	163.5	49 32.3	96 27	163.8	49 03.4	96 27	164.0	48 34.5	96 26	164.2	48 05.6	96 26	164.4	1
2	51 10.3	96 31	161.4	50 41.7	96 30	161.7	50 13.2	96 30	161.9	49 44.6	96 30	162.1	49 15.9	96 29	162.4	48 47.3	96 29	162.6	48 18.6	96 29	162.8	47 49.9	96 28	163.0	2
3	50 51.8	94 33	160.0	50 23.4	94 32	160.2	49 55.1	96 32	160.5	49 26.7	96 32	160.7	48 58.3	96 32	161.0	48 29.9	96 31	161.2	48 01.4	96 31	161.5	47 32.9	96 30	161.7	3
4	50 31.9	93 35	158.5	50 03.9	94 35	158.8	49 35.8	94 34	159.1	49 07.6	94 34	159.4	48 39.4	94 34	159.6	48 11.2	94 33	159.9	47 43.0	94 33	160.1	47 14.7	94 32	160.4	4
15	50 10.8	93 37	157.1	49 43.0	93 37	157.4	49 15.1	93 36	157.7	48 47.2	93 36	158.0	48 19.3	93 36	158.3	47 51.3	93 35	158.5	47 23.3	93 35	158.8	46 55.3	94 34	159.1	15
6	49 48.4	92 39	155.8	49 20.9	92 39	156.1	48 53.3	92 38	156.4	48 25.7	92 38	156.7	47 58.0	92 38	157.0	47 30.3	92 37	157.2	47 02.5	93 37	157.5	46 34.7	93 36	157.8	6
7	49 24.8	91 41	154.4	48 57.5	91 41	154.7	48 30.2	91 40	155.0	48 02.9	91 40	155.3	47 35.5	91 40	155.7	47 08.0	92 39	155.9	46 40.5	92 38	156.2	46 13.0	92 38	156.5	7
8	49 00.0	90 43	153.1	48 33.0	90 43	153.4	48 06.0	90 42	153.7	47 38.9	90 42	154.1	47 11.8	91 41	154.4	46 44.6	91 41	154.7	46 17.4	91 40	155.0	45 50.1	91 40	155.3	8
9	48 34.1	89 45	151.8	48 07.4	89 44	152.1	47 40.7	89 44	152.5	47 13.9	89 44	152.8	46 47.0	90 43	153.1	46 20.1	90 43	153.4	45 53.1	90 42	153.8	45 26.1	90 42	154.1	9
20	48 07.0	88 47	150.5	47 40.7	88 46	150.9	47 14.2	88 46	151.2	46 47.7	88 45	151.5	46 21.1	89 45	151.9	45 54.5	89 44	152.2	45 27.8	89 44	152.5	45 01.1	89 44	152.9	20
1	47 38.9	87 48	149.2	47 12.9	87 48	149.6	46 46.7	87 48	150.0	46 20.5	87 47	150.3	45 54.2	88 46	150.7	45 27.9	88 46	151.0	45 01.5	88 46	151.4	44 35.0	88 45	151.7	1
2	47 09.8	86 50	148.0	46 44.0	86 50	148.4	46 18.2	86 49	148.8	45 52.3	86 49	149.1	45 26.3	87 48	149.5	45 00.2	87 48	149.8	44 34.1	87 47	150.2	44 08.0	87 47	150.5	2
3	46 39.6	85 52	146.8	46 14.2	85 52	147.2	45 48.6	85 51	147.6	45 23.0	85 50	148.0	44 57.4	86 50	148.3	44 31.6	86 49	148.7	44 05.8	86 49	149.0	43 39.9	86 48	149.4	3
4	46 08.5	84 54	145.6	45 43.3	84 53	146.0	45 18.1	84 52	146.4	44 52.8	84 52	146.8	44 27.5	85 51	147.2	44 02.0	85 51	147.6	43 36.5	85 50	147.9	43 10.9	85 50	148.3	4
25	45 36.4	83 55	144.5	45 11.6	83 54	144.9	44 46.7	83 54	145.3	44 21.7	83 53	145.7	43 56.7	84 53	146.1	43 31.5	84 52	146.4	43 06.3	84 52	146.8	42 41.0	84 51	147.2	25
6	45 03.4	82 56	143.4	44 38.9	82 56	143.8	44 14.4	82 56	144.2	43 49.7	82 55	144.6	43 24.9	83 54	145.0	43 00.1	83 54	145.4	42 35.2	83 53	145.7	42 10.2	83 53	146.1	6
7	44 29.6	80 58	142.3	44 05.4	81 57	142.7	43 41.1	81 57	143.1	43 16.8	81 56	143.5	42 52.4	82 56	143.9	42 27.9	82 55	144.3	42 03.3	82 55	144.7	41 38.6	82 54	145.1	7
8	43 54.9	79 59	141.2	43 31.0	80 58	141.6	43 07.1	80 58	142.0	42 43.1	80 58	142.5	42 18.9	81 57	142.9	41 54.7	81 56	143.3	41 30.5	81 56	143.6	41 06.1	81 56	144.0	8
9	43 19.4	78 60	140.2	42 55.9	79 60	140.6	42 32.3	79 60	141.0	42 08.5	79 59	141.4	41 44.7	80 58	141.8	41 20.8	80 58	142.2	40 56.9	80 57	142.6	40 32.8	80 57	143.0	9
30	42 43.1	77 62	139.1	42 19.9	78 61	139.6	41 56.6	78 61	140.0	41 33.2	78 60	140.4	41 09.7	78 60	140.8	40 46.1	79 59	141.2	40 22.5	79 59	141.6	39 58.7	79 58	142.0	30
1	42 06.1	76 63	138.1	41 43.2	76 62	138.6	41 20.2	77 62	139.0	40 57.2	77 61	139.4	40 34.0	77 61	139.8	40 10.7	78 60	140.3	39 47.3	78 60	140.7	39 23.9	78 59	141.1	1
2	41 28.4	75 64	137.2	41 05.8	75 64	137.6	40 43.1	76 63	138.0	40 20.4	76 62	138.5	39 57.5	76 62	138.9	39 34.5	77 61	139.3	39 11.5	77 61	139.7	38 48.4	77 60	140.1	2
3	40 50.9	74 65	136.2	40 27.7	74 65	136.7	40 05.3	75 64	137.1	39 42.9	75 64	137.5	39 20.3	75 63	138.0	38 57.7	76 63	138.4	38 34.9	76 62	138.8	38 12.1	76 62	139.2	3
4	40 10.9	73 66	135.3	39 48.9	73 66	135.7	39 26.9	74 65	136.2	39 04.7	74 65	136.6	38 42.5	74 64	137.0	38 20.1	75 64	137.5	37 57.7	75 63	137.9	37 35.2	75 63	138.3	4
35	39 31.2	72 67	134.4	39 09.5	72 67	134.8	38 47.8	73 66	135.3	38 25.9	73 66	135.7	38 04.0	73 65	136.1	37 41.9	74 65	136.6	37 19.8	74 64	137.0	36 57.6	74 64	137.4	35
6	38 50.8	71 68	133.5	38 29.5	71 68	133.9	38 08.0	72 67	134.4	37 46.5	72 67	134.8	37 24.9	72 66	135.3	37 03.1	73 66	135.7	36 41.3	73 65	136.1	36 19.4	73 65	136.6	6
7	38 09.9	70 69	132.6	37 48.9	70 69	133.1	37 27.7	71 68	133.5	37 06.5	71 68	134.0	36 45.1	71 67	134.4	36 23.7	72 67	134.8	36 02.2	72 66	135.3	35 40.6	72 66	135.7	7
8	37 28.4	69 70	131.8	37 07.7	69 70	132.2	36 46.8	70 69	132.7	36 25.9	70 69	133.1	36 04.8	70 68	133.6	35 43.7	71 68	134.0	35 22.5	71 67	134.4	35 01.1	71 67	134.9	8
9	36 46.4	68 71	131.0	36 25.9	68 70	131.4	36 05.4	69 70	131.9	35 44.7	69 70	132.3	35 24.0	69 69	132.8	35 03.1	70 68	133.2	34 42.2	70 68	133.6	34 21.2	70 68	134.1	9
40	36 03.8	67 72	130.1	35 43.7	67 71	130.6	35 23.4	68 71	131.1	35 03.0	68 70	131.5	34 42.6	68 70	132.0	34 22.0	69 69	132.4	34 01.4	69 69	132.8	33 40.7	69 68	133.3	40
1	35 20.7	66 72	129.4	35 00.9	66 72	129.8	34 40.9	67 72	130.3	34 20.8	67 71	130.7	34 00.7	67 71	131.2	33 40.4	68 70	131.6	33 20.1	68 70	132.1	32 59.6	68 69	132.5	1
2	34 37.2	65 73	128.6	34 17.6	65 73	129.1	33 57.9	66 72	129.5	33 38.1	66 72	130.0	33 18.3	66 72	130.4	32 58.3	67 71	130.9	32 38.2	67 70	131.3	32 18.1	67 70	131.7	2
3	33 53.2	64 74	127,8	33 33.9	65 74	128.3	33 14.5	65 73	128.8	32 55.0	65 73	129.2	32 35.4	65 72	129.7	32 15.7	66 72	130.1	31 55.9	66 71	130.6	31 36.0	66 71	131.0	3
4	33 08.7	63 75	127.1	32 49.7	64 74	127.6	32 30.6	64 74	128.0	32 11.3	64 73	128.5	31 52.0	65 73	128.9	31 32.6	65 72	129.4	31 13.1	65 72	129.8	30 53.5	65 72	130.3	4
45	32 23.8	62 76	126.4	32 05.1	63 75	126.8	31 46.2	63 74	127.3	31 27.3	63 74	127.8	31 08.2	64 74	128.2	30 49.1	64 73	128.7	30 29.9	64 73	129.1	30 10.5	65 72	129.6	45
6	31 38.5	61 76	125.7	31 20.1	62 76	126.1	31 01.5	62 75	126.6	30 42.8	62 75	127.1	30 24.0	63 74	127.5	30 05.1	63 74	128.0	29 46.2	63 74	128.4	29 27.1	64 73	128.9	6
7	30 52.9	61 77	125.0	30 34.6	61 76	125.5	30 16.3	61 76	125.9	29 57.9	62 76	126.4	29 39.4	62 75	126.8	29 20.8	62 75	127.3	29 02.1	62 74	127.7	28 43.3	63 74	128.2	7
8	30 06.8	60 77	124.3	29 48.8	60 77	124.8	29 30.8	60 77	125.3	29 12.6	61 76	125.7	28 54.3	61 76	126.2	28 36.0	61 75	126.6	28 17.6	62 75	127.1	27 59.1	62 74	127.5	8
9	29 20.4	59 78	123.7	29 02.6	59 78	124.1	28 44.8	60 77	124.6	28 26.9	60 77	125.1	28 08.9	60 76	125.5	27 50.9	60 76	126.0	27 32.7	61 76	126.4	27 14.4	61 75	126.9	9
50	28 33.6	58 79	123.0	28 16.1	58 78	123.5	27 58.5	59 78	124.0	27 40.9	59 77	124.4	27 23.2	59 77	124.9	27 05.3	60 76	125.3	26 47.4	60 76	125.8	26 29.4	60 76	126.2	50
1	27 46.4	57 79	122.4	27 29.2	58 79	122.9	27 11.9	58 78	123.3	26 54.5	58 78	123.8	26 37.0	58 78	124.2	26 19.4	59 77	124.7	26 01.8	59 77	125.1	25 44.0	59 76	125.6	1
2	26 59.0	56 80	121.8	26 42.0	57 79	122.2	26 24.9	57 79	122.7	26 07.8	57 78	123.2	25 50.5	58 78	123.6	25 33.2	58 78	124.1	25 15.8	58 77	124.5	24 58.3	58 77	125.0	2
3	26 11.2	56 80	121.2	25 54.5	56 80	121.6	25 37.6	56 79	122.1	25 20.7	57 79	122.6	25 03.7	57 78	123.0	24 46.7	57 78	123.5	24 29.5	57 78	123.9	24 12.3	58 77	124.4	3
4	25 23.1	55 80	120.6	25 06.6	55 80	121.1	24 50.0	55 80	121.5	24 33.4	56 80	122.0	24 16.6	56 79	122.4	23 59.8	56 79	122.9	23 42.9	57 78	123.3	23 25.9	57 78	123.8	4
55	24 34.8	54 81	120.0	24 18.5	54 81	120.5	24 02.1	55 80	120.9	23 45.7	55 80	121.4	23 29.2	55 80	121.9	23 12.6	55 79	122.3	22 55.9	56 79	122.8	22 39.1	56 78	123.2	55
6	23 46.1	53 82	119.5	23 30.1	54 81	119.9	23 14.0	54 81	120.4	22 57.7	54 80	120.8	22 41.5	54 80	121.3	22 25.1	55 80	121.7	22 08.6	55 79	122.2	21 52.1	55 79	122.6	6
7	22 57.2	53 82	118.9	22 41.4	53 82	119.4	22 25.5	53 81	119.8	22 09.5	53 81	120.3	21 53.4	54 80	120.7	21 37.3	54 80	121.2	21 21.1	54 80	121.6	21 04.8	54 79	122.1	7
8	22 08.1	52 82	118.4	21 52.4	52 82	118.8	21 36.8	52 82	119.3	21 21.0	53 81	119.7	21 05.2	53 81	120.2	20 49.2	53 80	120.6	20 33.3	53 80	121.1	20 17.2	54 80	121.5	8
9	21 18.6	51 83	117.8	21 03.2	51 82	118.3	20 47.8	52 82	118.7	20 32.2	52 82	119.2	20 16.6	52 81	119.7	20 00.9	52 81	120.1	19 45.2	53 81	120.6	19 29.3	53 80	121.0	9
60	20 29.0	51 83	117.3	20 13.8	51 83	117.8	19 58.5	51 82	118.2	19 43.2	51 82	118.7	19 27.8	51 82	119.1	19 12.3	52 81	119.6	18 56.8	52 81	120.0	18 41.2	52 81	120.5	60
1	19 39.1	50 84	116.8	19 24.1	50 83	117.2	19 09.0	50 83	117.7	18 53.9	51 82	118.2	18 38.7	51 82	118.6	18 23.5	51 82	119.1	18 08.2	51 82	119.5	17 52.8	51 81	120.0	1
2	18 49.0	49 84	116.3	18 34.2	49 84	116.7	18 19.3	50 83	117.2	18 04.4	50 83	117.7	17 49.4	50 82	118.1	17 34.4	50 82	118.6	17 19.3	50 82	119.0	17 04.1	51 81	119.5	2
3	17 58.6	49 84	115.8	17 44.1	49 84	116.2	17 29.4	49 84	116.7	17 14.7	49 83	117.2	16 59.9	49 83	117.6	16 45.1	50 82	118.1	16 30.2	50 82	118.5	16 15.3	50 82	119.0	3
4	17 08.1	48 85	115.3	16 53.7	48 84	115.8	16 39.3	48 84	116.2	16 24.7	48 84	116.7	16 10.2	49 83	117.1	15 55.6	49 83	117.6	15 40.9	49 83	118.0	15 26.1	49 82	118.5	4
65	16 17.3	47 85	114.8	16 03.2	47 85	115.3	15 48.9	48 84	115.7	15 34.6	48 84	116.2	15 20.2	48 84	116.6	15 05.8	48 83	117.1	14 51.3	48 83	117.6	14 36.8	49 83	118.0	65
6	15 26.4	47 85	114.4	15 12.4	47 85	114.8	14 58.3	47 84	115.3	14 44.2	47 84	115.7	14 30.1	47 84	116.2	14 15.8	48 84	116.6	14 01.6	48 83	117.1	13 47.2	48 83	117.5	6
7	14 35.3	46 86	113.9	14 21.5	46 85	114.3	14 07.6	46 85	114.8	13 53.7	47 85	115.3	13 39.7	47 84	115.7	13 25.7	47 84	116.2	13 11.6	47 84	116.6	12 57.5	47 83	117.1	7
8	13 44.0	45 86	113.4	13 30.3	46 86	113.9	13 16.7	46 85	114.4	13 02.9	46 85	114.8	12 49.1	46 84	115.3	12 35.3	46 84	115.7	12 21.4	46 84	116.2	12 07.5	46 84	116.6	8
9	12 52.5	45 86	113.0	12 39.0	45 86	113.4	12 25.5	45 86	113.9	12 12.0	45 85	114.4	11 58.4	45 85	114.8	11 44.7	46 84	115.3	11 31.0	46 84	115.7	11 17.3	46 84	116.2	9
70	12 00.9	44 86	112.6	11 47.6	44 86	113.0	11 34.2	45 86	113.5	11 20.9	45 86	113.9	11 07.4	45 85	114.4	10 54.0	45 85	114.8	10 40.5	45 84	115.3	10 26.9	45 84	115.7	70
1	11 09.0	44 86	112.1	10 55.9	44 86	112.6	10 42.8	44 86	113.0	10 29.6	44 86	113.5	10 16.3	44 85	114.0	10 03.1	44 85	114.4	9 49.8	44 85	114.9	9 36.4	45 84	115.3	1
2	10 17.1	43 87	111.7	10 04.1	43 86	112.2	9 51.1	43 86	112.6	9 38.1	43 86	113.1	9 25.1	44 86	113.5	9 12.0	44 86	114.0	8 58.8	44 85	114.4	8 45.7	44 85	114.9	2
3	9 25.0	43 87	111.3	9 12.2	43 87	111.7	8 59.4	43 87	112.2	8 46.5	43 86	112.7	8 33.6	43 86	113.1	8 20.7	43 86	113.6	8 07.8	43 86	114.0	7 54.8	43 85	114.5	3
4	8 32.7	42 87	110.9	8 20.1	42 87	111.3	8 07.4	42 87	111.8	7 54.7	42 86	112.2	7 42.0	42 86	112.7	7 29.3	43 86	113.2	7 16.5	43 86	113.6	7 03.7	43 85	114.1	4
75	7 40.3	41 88	110.5	7 27.8	42 87	110.9	7 15.3	42 87	111.4	7 02.8	42 87	111.8	6 50.3	42 86	112.3	6 37.7	42 86	112.8	6 25.1	42 86	113.2	6 12.5	42 86	113.7	75
6	6 47.7	41 88	110.1	6 35.4	41 88	110.5	6 23.1	41 87	111.0	6 10.7	41 87	111.4	5 58.4	41 87	111.9	5 46.0	41 86	112.4	5 33.6	41 86	112.8	5 21.1	41 86	113.3	6
7	5 55.0	40 88	109.7	5 42.9	41 88	110.1	5 30.7	41 87	110.6	5 18.5	41 87	111.0	5 06.3	41 87	111.5										7
8	5 02.2	40 88	109.3																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91							5 07.0	35 90	73.7	5 17.5	35 90	73.2	5 27.9	35 89	72.8	5 38.3	35 89	72.3	5 48.7	35 89	71.9	5 59.1	35 88	71.4	91
2																						5 06.1	35 88	71.1	2

Lat. 21°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	89 00.0	1.0 37	180.0	89 30.0	1.0 56	180.0	90 00.0	..93	....	89 30.0	1.0 56	00.0	89 00.0	1.0 37	00.0	88 30.0	1.0 26	00.0	88 00.0	1.0 20	00.0	87 30.0	1.0 16	00.0	00
1	88 37.8	73 75	136.7	88 56.4	47 88	118.0	89 04.0	00 93	89.8	88 56.5	47 87	61.6	88 38.0	73 75	42.8	88 14.2	85 62	31.6	87 47.7	91 52	24.7	87 20.1	94 44	20.1	1
2	87 52.6	48 86	117.7	88 03.8	26 91	104.6	88 08.0	01 93	89.6	88 04.2	25 91	74.6	87 53.2	47 85	61.4	87 36.7	62 78	50.7	87 16.4	73 70	42.5	86 53.4	80 63	36.1	2
3	87 01.1	34 90	109.1	87 09.0	18 92	99.6	87 12.0	01 93	89.5	87 09.6	17 92	79.3	87 02.1	33 89	69.7	86 50.1	47 84	61.2	86 34.5	58 79	53.7	86 15.8	66 73	47.4	3
4	86 07.3	27 91	104.2	86 13.6	14 93	96.9	86 16.0	01 94	89.3	86 14.3	12 92	81.6	86 08.8	25 90	74.2	85 59.6	36 87	67.3	85 47.2	46 84	60.9	85 32.0	55 79	55.2	4
05	85 12.7	22 92	101.2	85 17.9	12 93	95.2	85 19.9	02 93	89.1	85 18.8	09 93	83.0	85 14.5	19 91	77.0	85 07.2	20 89	71.2	84 57.1	38 86	65.7	84 44.5	46 83	60.7	05
6	84 17.5	19 92	99.0	84 22.0	11 93	94.0	84 23.9	02 93	88.9	84 23.2	07 93	83.8	84 19.7	16 92	78.8	84 13.8	24 90	73.8	84 05.3	32 88	69.1	83 54.7	39 86	64.6	6
7	83 22.1	17 93	97.4	83 26.1	10 93	93.1	83 27.9	02 93	88.7	83 27.4	05 93	84.4	83 24.7	13 92	80.0	83 19.7	20 91	75.7	83 12.6	27 89	71.6	83 03.4	34 87	67.6	7
8	82 26.5	16 93	96.2	82 30.2	09 93	92.4	82 31.9	03 93	88.6	82 31.7	04 93	84.7	82 29.4	11 92	80.9	82 25.2	17 91	77.1	82 19.1	23 90	73.4	82 11.2	29 88	69.9	8
9	81 30.7	14 93	95.2	81 34.2	09 93	91.8	81 35.9	03 93	88.4	81 35.9	03 93	85.0	81 34.1	09 92	81.6	81 30.5	15 92	78.2	81 25.2	20 90	74.9	81 18.3	26 89	71.6	9
10	80 34.9	14 93	94.3	80 38.2	08 93	91.3	80 39.9	03 93	88.2	80 40.1	02 93	85.1	80 38.6	07 92	82.0	80 35.6	13 92	79.0	80 31.0	18 91	76.0	80 24.9	23 90	73.0	10
1	79 39.0	13 93	93.6	79 42.2	08 93	90.8	79 44.0	03 93	88.0	79 44.3	01 93	85.2	79 43.1	06 93	82.4	79 40.6	11 92	79.6	79 36.6	16 91	76.9	79 31.2	20 90	74.2	1
2	78 43.1	12 93	93.0	78 46.2	08 93	90.4	78 48.0	04 93	87.8	78 48.4	01 93	85.3	78 47.6	05 93	82.7	78 45.4	09 92	80.1	78 41.9	14 91	77.6	78 37.2	18 90	75.1	2
3	77 47.1	12 93	92.4	77 50.2	08 93	90.0	77 52.0	04 93	87.7	77 52.6	00 93	85.3	77 52.0	04 93	82.9	77 50.2	08 92	80.5	77 47.2	12 92	78.2	77 43.0	16 91	75.8	3
4	76 51.2	12 93	91.9	76 54.2	08 93	89.7	76 56.0	01 93	87.5	76 56.8	01 93	85.3	76 56.4	03 93	83.1	76 54.9	07 92	80.8	76 52.3	11 92	78.7	76 48.6	14 91	76.5	4
15	75 55.2	12 93	91.4	75 58.2	08 94	89.4	76 00.1	05 93	87.3	76 01.0	01 93	85.2	76 00.8	02 93	83.2	75 59.6	06 92	81.1	75 57.3	09 92	79.0	75 54.1	13 91	77.0	15
6	74 59.2	12 93	91.0	75 02.1	08 93	89.1	75 04.1	05 93	87.1	75 05.2	02 93	85.2	75 05.2	02 93	83.2	75 04.2	05 92	81.3	75 02.3	08 92	79.4	74 59.4	11 91	77.4	6
7	74 03.2	11 93	90.6	74 06.1	08 93	88.8	74 08.2	05 93	86.9	74 09.3	02 93	85.1	74 09.6	01 93	83.3	74 08.9	04 92	81.4	74 07.3	07 92	79.6	74 04.7	10 91	77.8	7
8	73 07.2	11 93	90.2	73 10.1	09 93	88.5	73 12.3	06 93	86.8	73 13.5	03 93	85.0	73 13.9	00 93	83.3	73 13.5	03 92	81.6	73 12.1	06 92	79.8	73 09.9	09 91	78.1	8
9	72 11.1	11 93	89.8	72 14.1	09 93	88.2	72 16.4	06 93	86.6	72 17.7	03 93	84.9	72 18.3	01 93	83.3	72 18.1	02 92	81.6	72 17.0	05 92	80.0	72 15.1	08 92	78.4	9
20	71 15.1	11 93	89.5	71 18.2	09 93	87.9	71 20.4	06 93	86.4	71 21.9	04 93	84.8	71 22.7	01 93	83.3	71 22.6	01 92	81.7	71 21.8	04 92	80.1	71 20.2	07 92	78.6	20
1	70 19.1	11 93	89.2	70 22.2	09 93	87.7	70 24.5	07 93	86.2	70 26.2	04 93	84.7	70 27.1	02 93	83.2	70 27.2	01 92	81.7	70 26.6	03 92	80.2	70 25.3	06 92	78.7	1
2	69 23.1	12 93	88.8	69 26.2	09 93	87.4	69 28.7	07 93	86.0	69 30.4	05 93	84.6	69 31.4	02 93	83.2	69 31.8	00 92	81.7	69 31.4	02 92	80.3	69 30.3	05 92	78.9	2
3	68 27.1	12 93	88.5	68 30.3	09 93	87.2	68 32.8	07 93	85.8	68 34.6	05 93	84.5	68 35.8	03 93	83.1	68 36.3	01 92	81.7	68 36.2	02 92	80.4	68 35.4	04 92	79.0	3
4	67 31.1	12 93	88.3	67 34.3	10 93	87.0	67 36.9	08 93	85.6	67 38.9	05 93	84.3	67 40.2	03 93	83.0	67 40.9	01 92	81.7	67 41.0	01 92	80.4	67 40.4	03 92	79.1	4
25	66 35.1	12 93	88.0	66 38.4	10 93	86.7	66 41.1	08 93	85.5	66 43.2	06 93	84.2	66 44.6	04 93	82.9	66 45.5	02 92	81.7	66 45.7	00 92	80.4	66 45.4	02 92	79.1	25
6	65 39.1	12 93	87.7	65 42.5	10 93	86.5	65 45.2	08 93	85.3	65 47.4	06 93	84.1	65 49.0	04 93	82.8	65 50.1	02 92	81.6	65 50.5	00 92	80.4	65 50.4	01 92	79.2	6
7	64 43.2	12 93	87.4	64 46.6	10 93	86.2	64 49.4	09 93	85.1	64 51.7	07 93	83.9	64 53.5	05 93	82.7	64 54.6	03 92	81.6	64 55.3	01 92	80.4	64 55.3	01 92	79.2	7
8	63 47.2	12 93	87.2	63 50.7	11 93	86.0	63 53.6	09 93	84.9	63 56.0	07 93	83.8	63 57.9	05 93	82.6	63 59.2	04 92	81.5	64 00.0	02 92	80.3	64 00.3	00 92	79.2	8
9	62 51.3	13 93	86.9	62 54.8	11 93	85.8	62 57.8	09 93	84.7	63 00.4	08 93	83.6	63 02.4	06 93	82.5	63 03.9	04 92	81.4	63 04.8	02 92	80.3	63 05.3	01 92	79.2	9
30	61 55.4	13 93	86.6	61 59.0	11 93	85.6	62 02.1	10 93	84.5	62 04.7	08 93	83.5	62 06.8	06 92	82.4	62 08.5	05 92	81.3	62 09.6	03 92	80.2	62 10.3	01 92	79.2	30
1	60 59.5	13 93	86.4	61 03.1	11 93	85.4	61 06.3	10 93	84.3	61 09.1	08 93	83.3	61 11.3	07 92	82.3	61 13.1	05 92	81.2	61 14.4	04 92	80.2	61 15.3	02 92	79.1	1
2	60 03.6	13 93	86.1	60 07.3	12 93	85.1	60 10.6	10 93	84.1	60 13.4	09 93	83.1	60 15.8	07 92	82.1	60 17.8	06 92	81.1	60 19.2	04 92	80.1	60 20.2	03 92	79.1	2
3	59 07.7	13 93	85.9	59 11.5	12 93	84.9	59 14.9	11 93	83.9	59 17.8	09 92	83.0	59 20.3	08 92	82.0	59 22.4	06 92	81.0	59 24.1	05 92	80.0	59 25.2	03 92	79.0	3
4	58 11.8	14 93	85.6	58 15.7	12 93	84.7	58 19.2	11 93	83.7	58 22.3	09 93	82.8	58 24.9	08 92	81.8	58 27.1	07 92	80.9	58 28.9	05 92	79.9	58 30.3	04 92	79.0	4
35	57 16.0	14 93	85.4	57 20.0	13 93	84.5	57 23.5	11 93	83.6	57 26.7	10 93	82.6	57 29.5	09 92	81.7	57 31.8	07 92	80.8	57 33.7	06 92	79.8	57 35.3	04 92	78.9	35
6	56 20.2	14 93	85.2	56 24.2	13 93	84.3	56 27.9	12 93	83.4	56 31.1	10 92	82.5	56 34.0	09 92	81.6	56 36.5	08 92	80.7	56 38.6	06 92	79.7	56 40.3	05 92	78.8	6
7	55 24.4	14 93	84.9	55 28.5	13 93	84.0	55 32.2	12 93	83.2	55 35.6	11 92	82.3	55 38.6	09 92	81.4	55 41.3	08 92	80.5	55 43.5	07 92	79.6	55 45.4	06 92	78.7	7
8	54 28.6	15 93	84.7	54 32.8	13 93	83.8	54 36.6	12 92	83.0	54 40.1	11 92	82.1	54 43.3	10 92	81.2	54 46.0	09 92	80.4	54 48.4	07 92	79.5	54 50.4	06 92	78.7	8
9	53 32.8	15 93	84.4	53 37.1	14 93	83.6	53 41.1	13 92	82.8	53 44.7	11 92	81.9	53 47.9	10 92	81.1	53 50.8	09 92	80.2	53 53.3	08 92	79.4	53 55.5	07 92	78.6	9
40	52 37.1	15 93	84.2	52 41.5	14 93	83.4	52 45.5	13 92	82.6	52 49.2	12 92	81.8	52 52.6	11 92	80.9	52 55.6	10 92	80.1	52 58.3	08 92	79.3	53 00.6	07 91	78.4	40
1	51 41.4	15 93	84.0	51 45.8	14 93	83.2	51 50.0	13 92	82.4	51 53.8	12 92	81.6	51 57.3	11 92	80.8	52 00.4	10 92	80.0	52 03.3	09 92	79.1	52 05.8	08 91	78.3	1
2	50 45.7	16 93	83.7	50 50.2	15 93	82.9	50 54.5	14 92	82.2	50 58.4	13 92	81.4	51 02.0	12 92	80.6	51 05.3	10 92	79.8	51 08.3	09 92	79.0	51 10.9	08 91	78.2	2
3	49 50.0	16 93	83.5	49 54.6	15 92	82.7	49 59.0	14 92	82.0	50 03.0	13 92	81.2	50 06.8	12 92	80.4	50 10.2	11 92	79.6	50 13.3	10 92	78.9	50 16.1	09 91	78.1	3
4	48 54.3	16 93	83.3	48 59.1	15 92	82.5	49 03.5	14 92	81.8	49 07.7	13 92	81.0	49 11.5	12 92	80.2	49 15.1	11 92	79.5	49 18.4	10 92	78.7	49 21.3	09 91	78.0	4
45	47 58.7	17 93	83.0	48 03.6	16 92	82.3	48 08.1	15 92	81.6	48 12.4	14 92	80.8	48 16.4	13 92	80.1	48 20.0	12 92	79.3	48 23.4	11 92	78.6	48 26.5	10 91	77.8	45
6	47 03.1	17 92	82.8	47 08.1	16 92	82.1	47 12.7	15 92	81.4	47 17.1	14 92	80.6	47 21.2	13 92	79.9	47 25.0	12 92	79.1	47 28.5	11 91	78.4	47 31.8	10 91	77.7	6
7	46 07.6	17 92	82.6	46 12.6	16 92	81.9	46 17.4	15 92	81.1	46 21.8	14 92	80.4	46 26.1	14 92	79.7	46 30.0	13 92	79.0	46 33.7	12 91	78.3	46 37.1	11 91	77.5	7
8	45 12.1	17 92	82.3	45 17.2	17 92	81.6	45 22.0	16 92	80.9	45 26.6	15 92	80.2	45 31.0	14 92	79.5	45 35.0	13 92	78.8	45 38.9	12 91	78.1	45 42.4	11 91	77.4	8
9	44 16.6	18 92	82.1	44 21.8	17 92	81.4	44 26.7	16 92	80.7	44 31.4	15 92	80.0	44 35.9	14 92	79.3	44 40.1	14 92	78.6	44 44.1	13 91	78.0	44 47.8	12 91	77.2	9
50	43 21.1	18 92	81.9	43 26.4	17 92	81.2	43 31.5	16 92	80.5	43 36.3	16 92	79.8	43 40.9	15 92	79.1	43 45.2	14 92	78.5	43 49.3	13 91	77.8	43 53.1	12 91	77.1	50
1	42 25.7	18 92	81.6	42 31.1	18 92	81.0	42 36.2	17 92	80.3	42 41.2	16 92	79.6	42 45.9	15 92	79.0	42 50.3	14 91	78.3	42 54.6	14 91	77.6	42 58.6	13 91	76.9	1
2	41 30.3	19 92	81.4	41 35.8	18 92	80.7	41 41.0	17 92	80.1	41 46.1	16 92	79.4	41 50.9	16 92	78.8	41 55.5	15 91	78.1	41 59.9	14 91	77.4	42 04.0	13 91	76.8	2
3	40 34.9	19 92	81.2	40 40.5	18 92	80.5	40 45.9	18 92	79.9	40 51.0	17 92	79.2	40 56.0	16 92	78.6	41 00.7	15 91	77.9	41 05.2	15 91	77.3	41 09.5	14 91	76.6	3
4	39 39.6	19 92	80.9	39 45.3	19 92	80.3	39 50.8	18 92	79.7	39 56.0	17 92	79.0	40 01.1	17 91	78.4	40 06.0	16 91	77.7	40 10.6	15 91	77.1	40 15.0	14 91	76.4	4
55	38 44.3	20 92	80.7	38 50.1	19 92	80.1	38 55.7	18 92	79.4	39 01.1	18 92	78.8	39 06.3	17 91	78.2	39 11.3	16 91	77.5	39 16.0	16 91	76.9	39 20.6	15 91	76.3	55
6	37 49.0	20 92	80.5	37 54.9	19 92	79.8	38 00.6	19 92	79.2	38 06.1	18 91	78.6	38 11.5	17 91	78.0	38 16.6	17 91	77.3	38 21.5	16 91	76.7	38 26.2	15 90	76.1	6
7	36 53.8	20 92	80.2	36 59.8	20 92	79.6	37 05.6	19 92	79.0	37 11.3	18 91	78.4	37 16.7	18 91	77.8	37 21.9	17 91	77.1	37 27.0	17 91	76.5	37 31.9	16 90	75.9	7
8	35 58.6	21 92	80.0	36 04.7	20 92	79.4	36 10.7	19 92	78.8	36 16.4	19 91	78.2	36 22.0	18 91	77.5	36 27.4	18 91	76.9	36 32.6	17 91	76.3	36 37.6	16 90	75.7	8
9	35 03.5	21 92	79.7	35 09.7	20 92	79.1	35 15.7	20 91	78.5	35 21.6	19 91	77.9	35 27.3	19 91	77.3	35 32.8	18 91	76.7	35 38.2	17 91	76.1	35 43.3	17 90	75.5	9
60	34 08.4	21 92	79.5	34 14.7	21 92	78.9	34 20.9	20 91	78.3	34 26.9	20 91	77.7	34 32.7	19 91	77.1	34 38.3	19 91	76.5	34 43.8	18 90	75.9	34 49.1	17 90	75.3	60
1	33 13.3	22 92	79.2	33 19.8	21 92	78.7	33 26.0	21 91	78.1	33 32.1	20 91	77.5	33 38.1	20 91	76.9	33 43.9	19 91	76.3	33 49.5	18 90	75.7	33 54.9	18 90	75.1	1
2	32 18.3	22 92	79.0	32 24.9	22 92	78.4	32 31.3	21 91	77.8	32 37.5	21 91	77.3	32 43.6	20 91	76.7	32 49.5	19 91	76.1	32 55.2	19 90	75.5	33 00.8	18 90	74.9	2
3	31 23.3	22 92	78.8	31 30.0	22 91	78.2	31 36.5	21 91	77.6	31 42.9	21 91	77.0	31 49.1	20 91	76.5	31 55.1	20 90	75.9	32 01.0	19 90	75.3	32 06.7	19 90	74.7	3
4	30 28.4	23 91	78.5	30 35.2	22 91	77.9	30 41.8	22 91	77.4	30 48.3	21 91	76.8	30 54.6	21 91	76.2	31 00.8	20 90	75.7	31 06.9	20 90	75.1	31 12.7	19 90	74.5	4
65	29 33.6	23 91	78.3	29 40.4	23 91	77.7	29 47.2	22 91	77.1	29 53.8	22 91	76.6	30 00.3	21 91	76.0	30 06.6	21 90	75.4	30 12.8	20 90	74.9	30 18.8	20 90	74.3	65
6	28 38.7	24 91	78.0	28 45.7	23 91	77.5	28 52.6	23 91	76.9	28 59.3	22 91	76.3	29 05.9	22 90	75.8	29 12.4	21 90	75.2	29 18.7	21 90	74.7	29 24.9	20 90	74.1	6
7	27 44.0	24 91	77.8	27 51.1	24 91	77.2	27 58.1	23 91	76.7	28 04.9	23 90	76.1	28 11.7	22 90	75.6	28 18.3	22 90	75.0	28 24.7	21 90	74.4	28 31.0	21 90	73.9	7
8	26 49.3	24 91	77.5	26 56.5	24 91	77.0	27 03.6	23 91	76.4	27 10.6	23 90	75.9	27 17.4	23 90	75.3	27 24.2	22 90	74.8	27 30.8	22 90	74.2	27 37.3	21 90	73.7	8
9	25 54.6	25 91	77.2	26 02.0	24 91	76.7	26 09.2	24 91	76.2	26 16.3	23 90	75.6	26 23.3	23 90	75.1	26 30.2	23 90	74.5	26 36.9	22 90	74.0	26 43.5	22 89	73.4	9
70	25 00.0	25 91	77.0	25 07.5	25 91	76.4	25 14.8	24 90	75.9	25 22.1	24 90	75.4	25 29.2	24 90	74.8	25 36.2	23 90	74.3	25 43.1	23 90	73.8	25 49.9	22 89	73.2	70
1	24 05.4	26 91	76.7	24 13.0	25 90	76.2	24 20.5	25 90	75.7	24 27.9	24 90	75.1	24 35.2	24 90	74.6	24 42.3	24 90	74.1	24 49.3	23 90	73.5	24 56.3	23 89	73.0	1
2	23 11.0	26 91	76.5	23 18.7	26 90	75.9	23 26.3	25 90	75.4	23 33.8	25 90	74.9	23 41.2	25 90	74.3	23 48.5	24 90	73.8	23 55.7	24 89	73.3	24 02.7	23 89	72.8	2
3	22 16.5	26 90	76.2	22 24.4	26 90	75.7	22 32.1	26 90	75.1	22 39.7	25 90	74.6	22 47.3	25 90	74.1	22 54.7	25 90	73.6	23 02.0	24 89	73.0	23 09.3	24 89	72.5	3
4	21 22.2	27 90	75.9	21 30.1	26 90	75.4	21 38.0	26 90	74.9	21 45.8	26 90	74.4	21 53.4	25 90	73.8	22 01.0	25 89	73.3	22 08.5	25 89	72.8	22 15.9	24 89	72.3	4
75	20 27.9	27 90	75.7	20 36.0	27 90	75.1	20 44.0	27 90	74.6	20 51.9	26 90	74.1	20 59.7	26 90	73.6	21 07.4	26 89	73.1	21 15.0	25 89	72.6	21 22.6	25 89	72.0	75
6	19 33.6	28 90	75.4	19 41.8	27 90	74.9	19 50.0	27 90	74.4	19 58.0	27 90	73.8	20 06.0	26 89	73.3	20 13.8	26 89	72.8	20 21.6	26 89	72.3	20 29.3	25 89	71.8	6
7	18 39.5	28 90	75.1	18 47.8	28 90	74.6	18 56.1	27 90	74.1	19 04.3	27 90	73.6	19 12.4	27 89	73.1	19 20.4	27 89	72.6	19 28.3	26 89	72.0	19 36.1	26 88	71.5	7
8	17 45.4	28 90	74.8	17 53.8	28 90	74.3	18 02.2	28 90	73.8	18 10.6	28 90	73.3	18 18.8	27 89	72.8	18 27.0	27 89	72.3	18 35.1	27 89	71.8	18 43.1	27 88	71.3	8
9	16 51.3	29 90	74.5	16 59.9	29 90	74.0	17 08.5	28 90	73.5	17 16.9	28 89	73.0	17 25.3	28 89	72.5	17 33.6	28 89	72.0	17 41.9	27 88	71.5	17 50.0	27 88	71.0	9
80	15 57.4	29 90	74.3	16 06.1	29 90	73.8	16 14.8	29 89	73.3	16 23.4	29 89	72.8	16 31.9	28 89	72.3	16 40.4	28 89	71.8	16 48.8	28 88	71.3	16 57.1	28 88	70.8	80
1	15 03.5	30 90	74.0	15 12.4	29 90	73.5	15 21.2	29 89	73.0	15 30.0	29 89	72.5	15 38.6	29 89	72.0	15 47.2	29 88	71.5	15 55.8	28 88	71.0	16 04.3	28 88	70.5	1
2	14 09.7	30 90	73.7	14 18.7	30 89	73.2	14 27.7	30 89	72.7	14 36.6	30 89	72.2	14 45.4	29 88	71.7	14 54.2	29 88	71.2	15 02.9	29 88	70.7	15 11.5	29 88	70.2	2
3	13 16.0	31 89	73.4	13 25.1	30 89	72.9	13 34.2	30 89	72.4	13 43.3	30 89	71.9	13 52.3	30 88	71.4	14 01.2	30 88	70.9	14 10.0	29 88	70.4	14 18.8	29 88	69.9	3
4	12 22.4	31 89	73.1	12 31.7	31 89	72.6	12 40.9	31 89	72.1	12 50.1	31 88	71.6	12 59.2	30 88	71.1	13 08.3	30 88	70.7	13 17.3	30 88	70.2	13 26.3	30 88	69.7	4
85	11 28.8	32 89	72.8	11 38.2	31 89	72.3	11 47.6	31 88	71.8	11 57.0	31 88	71.3	12 06.2	31 88	70.8	12 15.5	31 88	70.4	12 24.7	31 88	69.9	12 33.8	30 87	69.4	85
6	10 35.3	32 89	72.5	10 44.9	32 89	72.0	10 54.5	32 88	71.5	11 03.9	32 88	71.0	11 13.4	31 88	70.6	11 22.8	31 88	70.1	11 32.1	31 87	69.6	11 41.4	31 87	69.1	6
7	9 42.0	32 89	72.2	9 51.7	32 88	71.7	10 01.4	32 88	71.2	10 11.0	32 88	70.7	10 20.6	32 88	70.3	10 30.2	32 88	69.8	10 39.7	32 87	69.3	10 49.1	31 87	68.8	7
8	8 48.7	33 89	71.9	8 58.6	33 88	71.4	9 08.4	33 88	70.9	9 18.2	33 88	70.4	9 27.9	32 88	70.0	9 37.7	32 88	69.5	9 47.3	32 87	69.0	9 57.0	32 87	68.5	8
9	7 55.5	33 88	71.6	8 05.5	33 88	71.1	8 15.5	33 88	70.6	8 25.5	33 88	70.1	8 35.4	33 88	69.6	8 45.2	33 87	69.2	8 55.1	33 87	68.7	9 04.9	33 87	68.2	9
90	7 02.4	34 88	71.2	7 12.6	34 88	70.8	7 22.7	34 88	70.3	7 32.8	34 88	69.8	7 42.9	34 87	69.3	7 52.9	33 87	68.9	8 03.0	33 87	68.4	8 12.9	33 86	67.9	90

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	49 00.0	1.0	01	180.0	48 30.0	1.0	01	180.0	48 00.0	1.0	01	180.0	47 30.0	1.0	01	180.0	47 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	46 00.0	1.0	01	180.0	45 30.0	1.0	01	180.0	00
1	48 59.3	1.0	04	178.6	48 29.3	1.0	04	178.6	47 59.3	1.0	03	178.6	47 29.3	1.0	03	178.6	46 59.3	1.0	03	178.6	46 29.3	1.0	03	178.7	45 59.4	1.0	03	178.7	45 29.4	1.0	03	178.7	1
2	48 57.2	1.0	06	177.1	48 27.2	1.0	06	177.2	47 57.3	1.0	06	177.2	47 27.3	1.0	06	177.2	46 57.3	1.0	06	177.3	46 27.4	1.0	06	177.3	45 57.4	1.0	05	177.4	45 27.4	1.0	05	177.4	2
3	48 53.7	1.0	08	175.7	48 23.8	1.0	08	175.8	47 53.9	1.0	08	175.8	47 23.9	1.0	08	175.9	46 54.0	1.0	08	175.9	46 24.1	1.0	08	176.0	45 54.2	1.0	08	176.0	45 24.3	1.0	08	176.1	3
4	48 48.8	1.0	10	174.3	48 19.0	1.0	10	174.4	47 49.1	1.0	10	174.4	47 19.3	1.0	10	174.5	46 49.4	1.0	10	174.6	46 19.5	1.0	10	174.6	45 49.7	1.0	10	174.7	45 19.8	1.0	10	174.8	4
05	48 42.6	99	13	172.9	48 12.8	99	13	173.0	47 43.0	99	12	173.1	47 13.2	99	12	173.1	46 43.4	99	12	173.2	46 13.6	99	12	173.3	45 43.9	99	12	173.4	45 14.1	99	12	173.5	05
6	48 34.9	99	15	171.5	48 05.2	99	15	171.6	47 35.6	99	15	171.7	47 05.9	99	14	171.8	46 36.2	99	14	171.9	46 06.5	99	14	172.0	45 36.8	99	14	172.1	45 07.1	99	14	172.2	6
7	48 25.9	99	17	170.1	47 56.4	99	17	170.2	47 26.8	99	17	170.3	46 57.2	99	16	170.4	46 27.6	99	16	170.6	45 58.0	99	16	170.7	45 28.5	99	16	170.8	44 58.8	99	16	170.9	7
8	48 15.6	98	20	168.7	47 46.2	98	19	168.8	47 16.7	98	19	169.0	46 47.3	98	19	169.1	46 17.8	98	18	169.2	45 48.3	98	18	169.4	45 18.9	98	18	169.5	44 49.4	98	18	169.6	8
9	48 03.9	98	22	167.3	47 34.6	98	21	167.5	47 05.4	98	21	167.6	46 36.0	98	21	167.8	46 06.7	98	20	167.9	45 37.4	98	20	168.1	45 08.0	98	20	168.2	44 38.7	98	20	168.4	9
10	47 51.0	97	24	165.9	47 21.8	97	23	166.1	46 52.7	97	23	166.3	46 23.5	97	23	166.5	45 54.4	97	23	166.6	45 25.2	97	22	166.8	44 56.0	97	22	167.0	44 26.8	97	22	167.1	10
1	47 36.7	96	26	164.6	47 07.8	97	26	164.8	46 38.8	97	25	165.0	46 09.8	97	25	165.1	45 40.8	97	25	165.3	45 11.8	97	24	165.5	44 42.8	97	24	165.7	44 13.7	97	24	165.9	1
2	47 21.2	96	28	163.2	46 52.4	96	28	163.4	46 23.6	96	27	163.7	45 54.8	96	27	163.9	45 26.0	96	27	164.1	44 57.2	96	26	164.3	44 28.3	96	26	164.4	43 59.4	96	26	164.6	2
3	47 04.4	95	30	161.9	46 35.8	95	30	162.1	46 07.3	95	29	162.4	45 38.7	95	29	162.6	45 10.0	95	28	162.8	44 41.4	96	28	163.0	44 12.7	96	28	163.2	43 44.0	96	28	163.4	3
4	46 46.4	94	32	160.6	46 18.1	95	32	160.9	45 49.7	95	31	161.1	45 21.3	95	31	161.3	44 52.9	95	30	161.5	44 24.4	95	30	161.8	43 56.0	95	30	162.0	43 27.5	95	30	162.2	4
15	46 27.2	94	34	159.3	45 59.1	94	34	159.6	45 31.0	94	33	159.8	45 02.8	94	33	160.1	44 34.6	94	32	160.3	44 06.3	94	32	160.5	43 38.1	94	32	160.8	43 09.8	94	31	161.0	15
6	46 06.9	93	36	158.1	45 39.0	93	36	158.3	45 11.1	93	35	158.6	44 43.1	93	34	158.8	44 15.2	93	34	159.1	43 47.1	93	34	159.3	43 19.1	94	34	159.6	42 51.0	94	33	159.8	6
7	45 45.4	92	38	156.8	45 17.7	92	37	157.1	44 50.1	92	37	157.4	44 22.4	92	36	157.6	43 54.6	93	36	157.9	43 26.8	93	36	158.2	42 59.0	93	35	158.4	42 31.2	93	35	158.7	7
8	45 22.8	91	40	155.6	44 55.4	91	39	155.9	44 28.0	91	39	156.2	44 00.5	92	38	156.4	43 33.0	92	38	156.7	43 05.5	92	38	157.0	42 37.9	92	37	157.3	42 10.3	92	37	157.5	8
9	44 59.1	90	41	154.4	44 32.0	90	41	154.7	44 04.8	91	40	155.0	43 37.6	91	40	155.3	43 10.3	91	40	155.6	42 43.0	91	39	155.8	42 15.7	91	39	156.1	41 48.3	91	38	156.4	9
20	44 34.3	89	43	153.2	44 07.5	90	42	153.5	43 40.6	90	42	153.8	43 13.6	90	42	154.1	42 46.6	90	41	154.4	42 19.6	90	41	154.7	41 52.5	90	40	155.0	41 25.4	90	40	155.3	20
1	44 08.5	88	45	152.0	43 42.0	89	44	152.3	43 15.3	89	44	152.7	42 48.7	89	43	153.0	42 21.9	89	43	153.3	41 55.2	89	42	153.6	41 28.4	89	42	153.9	41 01.5	90	42	154.2	1
2	43 41.7	88	46	150.9	43 15.5	88	46	151.2	42 49.1	88	45	151.5	42 22.7	88	45	151.8	41 56.3	88	44	152.2	41 29.8	88	44	152.5	41 03.2	89	43	152.8	40 36.6	89	43	153.1	2
3	43 14.0	87	48	149.7	42 48.0	87	47	150.1	42 21.9	87	47	150.4	41 55.8	87	46	150.7	41 29.6	87	46	151.1	41 03.4	88	46	151.4	40 37.1	88	45	151.7	40 10.8	88	44	152.0	3
4	42 45.3	86	49	148.6	42 19.6	86	49	149.0	41 53.8	86	48	149.3	41 28.0	86	48	149.7	41 02.1	86	48	150.0	40 36.1	87	47	150.3	40 10.1	87	46	150.7	39 44.1	87	46	151.0	4
25	42 15.7	85	51	147.5	41 50.3	85	50	147.9	41 24.8	85	50	148.3	40 59.3	85	50	148.6	40 33.6	85	49	149.0	40 08.0	86	48	149.3	39 42.3	86	48	149.6	39 16.5	86	48	150.0	25
6	41 45.2	84	52	146.5	41 20.1	84	52	146.8	40 54.9	84	51	147.2	40 29.6	84	51	147.6	40 04.3	84	50	147.9	39 38.9	85	50	148.3	39 13.5	85	49	148.6	38 48.0	85	49	148.9	6
7	41 13.8	83	54	145.4	40 49.0	83	53	145.8	40 24.1	83	53	146.2	39 59.2	83	52	146.5	39 34.1	84	52	146.9	39 09.1	84	51	147.3	38 43.9	84	51	147.6	38 18.7	84	50	148.0	7
8	40 41.7	82	55	144.4	40 17.1	82	54	144.8	39 52.5	82	54	145.2	39 27.9	82	54	145.5	39 03.2	83	53	145.9	38 38.4	83	52	146.3	38 13.5	83	52	146.6	37 48.6	83	52	147.0	8
9	40 08.7	81	56	143.4	39 44.4	81	56	143.8	39 20.2	81	55	144.2	38 55.8	81	55	144.6	38 31.4	82	54	144.9	38 06.9	82	54	145.3	37 42.3	82	53	145.7	37 17.6	82	53	146.0	9
30	39 34.9	80	58	142.4	39 11.0	80	57	142.8	38 47.0	80	56	143.2	38 22.9	80	56	143.6	37 58.8	81	56	144.0	37 34.6	81	55	144.3	37 10.3	81	54	144.7	36 46.0	81	54	145.1	30
1	39 00.4	79	59	141.5	38 36.8	79	58	141.9	38 13.1	79	58	142.3	37 49.3	79	57	142.7	37 25.5	80	57	143.0	37 01.6	80	56	143.4	36 37.6	80	56	143.8	36 13.5	80	55	144.2	1
2	38 25.1	78	60	140.5	38 01.8	78	59	140.9	37 38.4	78	59	141.3	37 15.0	78	58	141.7	36 51.4	79	58	142.1	36 27.8	79	57	142.5	36 04.1	79	57	142.9	35 40.4	79	56	143.3	2
3	37 49.2	77	61	139.6	37 26.2	77	60	140.0	37 03.1	77	60	140.4	36 39.9	77	60	140.8	36 16.7	78	59	141.2	35 53.4	78	59	141.6	35 30.0	78	58	142.0	35 06.5	78	58	142.4	3
4	37 12.6	76	62	138.7	36 49.9	76	62	139.1	36 27.1	76	61	139.5	36 04.2	76	61	139.9	35 41.3	77	60	140.3	35 18.2	77	60	140.7	34 55.2	77	59	141.1	34 32.0	77	59	141.5	4
35	36 35.3	75	63	137.8	36 12.9	75	63	138.2	35 50.4	75	62	138.7	35 27.8	75	62	139.1	35 05.2	76	61	139.5	34 42.5	76	61	139.9	34 19.7	76	60	140.3	33 56.8	76	60	140.6	35
6	35 57.4	74	64	137.0	35 35.3	74	64	137.4	35 13.1	74	63	137.8	34 50.8	74	63	138.2	34 28.5	75	62	138.6	34 06.0	75	62	139.0	33 43.5	75	61	139.4	33 21.0	75	61	139.8	6
7	35 18.8	73	65	136.1	34 57.0	73	65	136.5	34 35.2	73	64	137.0	34 13.2	73	64	137.4	33 51.1	74	63	137.8	33 29.0	74	63	138.2	33 06.8	74	62	138.6	32 44.5	74	62	139.0	7
8	34 39.7	72	66	135.3	34 18.2	72	66	135.7	33 56.6	72	65	136.1	33 35.0	72	65	136.6	33 13.2	73	64	137.0	32 51.4	73	64	137.4	32 29.4	73	63	137.8	32 07.5	73	63	138.2	8
9	34 00.0	71	67	134.5	33 38.8	71	66	134.9	33 17.5	71	66	135.3	32 56.2	71	66	135.8	32 34.7	72	65	136.2	32 13.1	72	64	136.6	31 51.5	72	64	137.0	31 29.8	72	64	137.4	9
40	33 19.8	70	68	133.7	32 58.9	70	68	134.1	32 37.9	70	67	134.6	32 16.8	70	66	135.0	31 55.6	71	66	135.4	31 34.4	71	66	135.8	31 13.0	71	65	136.2	30 51.6	72	65	136.6	40
1	32 39.1	69	69	132.9	32 18.4	69	68	133.4	31 57.7	69	68	133.8	31 36.9	69	67	134.2	31 16.0	70	67	134.6	30 55.1	70	66	135.0	30 34.0	70	66	135.5	30 12.9	71	66	135.9	1
2	31 57.8	68	70	132.2	31 37.5	68	69	132.6	31 17.0	68	69	133.0	30 56.5	69	68	133.5	30 35.9	69	68	133.9	30 15.2	69	67	134.3	29 54.5	69	67	134.7	29 33.6	70	66	135.1	2
3	31 16.0	67	70	131.4	30 56.0	67	70	131.9	30 35.8	67	69	132.3	30 15.6	68	69	132.7	29 55.3	68	68	133.1	29 34.9	68	68	133.6	29 14.4	68	68	134.0	28 53.9	69	67	134.4	3
4	30 33.8	66	71	130.7	30 14.0	66	71	131.1	29 54.2	66	70	131.6	29 34.2	67	70	132.0	29 14.2	67	69	132.4	28 54.1	67	69	132.9	28 33.9	67	68	133.3	28 13.6	68	68	133.7	4
45	29 51.1	65	72	130.0	29 31.6	65	71	130.4	29 12.0	65	71	130.9	28 52.4	66	70	131.3	28 32.6	66	70	131.7	28 12.8	66	70	132.2	27 52.9	67	69	132.6	27 32.9	67	69	133.0	45
6	29 08.0	64	73	129.3	28 48.8	64	72	129.7	28 29.4	65	72	130.2	28 10.1	65	71	130.6	27 50.6	65	71	131.0	27 31.0	65	70	131.5	27 11.4	66	70	131.9	26 51.7	66	70	132.3	6
7	28 24.4	63	73	128.6	28 05.5	63	73	129.1	27 46.4	64	72	129.5	27 27.3	64	72	129.9	27 08.1	64	72	130.4	26 48.8	64	71	130.8	26 29.5	65	71	131.2	26 10.0	65	70	131.6	7
8	27 40.5	62	74	128.0	27 21.8	62	74	128.4	27 03.0	63	73	128.8	26 44.1	63	72	129.3	26 25.2	63	72	129.7	26 06.2	63	72	130.1	25 47.1	64	71	130.6	25 28.0	64	71	131.0	8
9	26 56.1	61	75	127.3	26 37.7	62	74	127.7	26 19.2	62	74	128.2	26 00.6	62	73	128.6	25 41.9	62	73	129.1	25 23.2	63	72	129.5	25 04.4	63	72	129.9	24 45.5	63	72	130.3	9
50	26 11.3	60	75	126.7	25 53.2	61	75	127.1	25 34.9	61	74	127.5	25 16.6	61	74	128.0	24 58.2	61	74	128.4	24 39.8	62	73	128.9	24 21.2	62	72	129.3	24 02.6	62	72	129.7	50
1	25 26.2	60	76	126.0	25 08.3	60	75	126.5	24 50.3	60	75	126.9	24 32.3	60	74	127.4	24 14.1	61	74	127.8	23 55.9	61	74	128.2	23 37.7	61	73	128.7	23 19.3	61	73	129.1	1
2	24 40.8	59	76	125.4	24 23.1	59	76	125.9	24 05.4	59	76	126.3	23 47.6	59	75	126.7	23 29.7	60	75	127.2	23 11.8	60	74	127.6	22 53.7	60	74	128.1	22 35.6	60	73	128.5	2
3	23 54.9	58	77	124.8	23 37.5	58	76	125.3	23 20.1	58	76	125.7	23 02.5	59	76	126.1	22 44.9	59	75	126.6	22 27.2	59	75	127.0	22 09.4	59	74	127.5	21 51.6	60	74	127.9	3
4	23 08.8	57	77	124.2	22 51.6	57	77	124.7	22 34.4	58	77	125.1	22 17.1	58	76	125.6	21 59.8	58	76	126.0	21 42.3	58	75	126.4	21 24.8	58	75	126.9	21 07.2	59	74	127.3	4
55	22 22.3	56	78	123.7	22 05.4	56	78	124.1	21 48.4	57	77	124.5	21 31.4	57	77	125.0	21 14.3	57	76	125.4	20 57.1	57	76	125.9	20 39.8	58	76	126.3	20 22.5	58	75	126.7	55
6	21 35.5	55	78	123.1	21 18.9	56	78	123.5	21 02.1	56	78	124.0	20 45.3	56	77	124.4	20 28.5	56	77	124.9	20 11.5	57	76	125.3	19 54.5	57	76	125.7	19 37.5	57	76	126.2	6
7	20 48.5	55	79	122.5	20 32.0	55	78	123.0	20 15.5	55	78	123.4	19 59.0	55	78	123.9	19 42.4	56	78	124.3	19 25.7	56	77	124.8	19 08.9	56	76	125.2	18 52.1	56	76	125.6	7
8	20 01.1	54	79	122.0	19 44.9	54	79	122.4	19 28.6	54	78	122.9	19 12.3	55	78	123.3	18 55.9	55	78	123.8	18 39.5	55	78	124.2	18 23.0	55	77	124.7	18 06.4	55	77	125.1	8
9	19 13.4	53	80	121.5	18 57.5	53	80	121.9	18 41.5	54	79	122.4	18 25.4	54	79	122.8	18 09.2	54	78	123.2	17 53.0	54	78	123.7	17 36.8	54	78	124.1	17 20.4	55	77	124.6	9
60	18 25.5	52	80	120.9	18 09.8	53	80	121.4	17 54.0	53	80	121.8	17 38.2	53	79	122.3	17 22.2	53	79	122.7	17 06.3	53	78	123.2	16 50.2	54	78	123.6	16 34.2	54	78	124.0	60
1	17 37.3	52	81	120.4	17 21.8	52	80	120.9	17 06.3	52	80	121.3	16 50.7	52	80	121.8	16 35.0	52	79	122.2	16 19.2	53	79	122.7	16 03.5	53	78	123.1	15 47.6	53	78	123.5	1
2	16 48.9	51	81	119.9	16 33.6	51	81	120.4	16 18.3	51	80	120.8	16 02.9	51	80	121.3	15 47.5	52	80	121.7	15 32.0	52	79	122.2	15 16.4	52	79	122.6	15 00.8	52	78	123.0	2
3	16 00.2	50	82	119.4	15 45.2	50	81	119.9	15 30.1	50	81	120.3	15 14.9	51	80	120.8	14 59.7	51	80	121.2	14 44.4	51	80	121.7	14 29.1	51	79	122.1	14 13.7	51	79	122.5	3
4	15 11.3	49	82	118.9	14 56.5	50	82	119.4	14 41.6	50	81	119.8	14 26.6	50	81	120.3	14 11.6	50	80	120.7	13 56.6	50	80	121.2	13 41.5	50	80	121.6	13 26.3	51	79	122.1	4
65	14 22.2	49	82	118.5	14 07.6	49	82	118.9	13 52.9	49	82	119.4	13 38.2	49	81	119.8	13 23.4	49	81	120.3	13 08.5	49	80	120.7	12 53.7	50	80	121.1	12 38.8	50	80	121.6	65
6	13 32.9	48	83	118.0	13 18.4	48	82	118.4	13 04.0	48	82	118.9	12 49.4	48	82	119.3	12 34.9	49	81	119.8	12 20.3	49	81	120.2	12 05.6	49	80	120.7	11 50.9	49	80	121.1	6
7	12 43.3	47	83	117.5	12 29.1	47	83	118.0	12 14.8	48	82	118.4	12 00.5	48	82	118.9	11 46.2	48	82	119.3	11 31.8	48	81	119.8	11 17.3	48	81	120.2	11 02.9	48	80	120.7	7
8	11 53.5	47	83	117.1	11 39.5	47	83	117.5	11 25.4	47	82	118.0	11 11.3	47	82	118.4	10 57.2	47	82	118.9	10 43.0	47	82	119.3	10 28.8	47	81	119.8	10 14.6	48	81	120.2	8
9	11 03.5	46	84	116.6	10 49.7	46	83	117.1	10 35.9	46	83	117.5	10 22.0	46	83	118.0	10 08.1	46	82	118.4	9 54.1	47	82	118.9	9 40.1	47	82	119.3	9 26.1	47	81	119.8	9
70	10 13.4	45	84	116.2	9 59.8	45	84	116.7	9 46.1	46	83	117.1	9 32.4	46	83	117.6	9 18.7	46	82	118.0	9 04.9	46	82	118.5	8 51.2	46	82	118.9	8 37.3	46	82	119.4	70
1	9 23.0	45	84	115.8	9 09.6	45	84	116.2	8 56.2	45	84	116.7	8 42.7	45	83	117.1	8 29.2	45	83	117.6	8 15.6	45	82	118.0	8 02.0	45	82	118.5	7 48.4	45	82	118.9	1
2	8 32.5	44	84	115.3	8 19.3	44	84	115.8	8 06.0	44	84	116.3	7 52.7	44	84	116.7	7 39.4	44	83	117.2	7 26.1	45	83	117.6	7 12.7	45	82	118.1	6 59.3	45	82	118.5	2
3	7 41.8	43	85	114.9	7 28.7	43	84	115.4	7 15.7	44	84	115.8	7 02.6	44	84	116.3	6 49.5	44	84	116.7	6 36.3	44	83	117.2	6 23.2	44	83	117.7	6 10.0	44	82	118.1	3
4	6 50.9	43	85	114.5	6 38.1	43	85	115.0	6 25.2	43	84	115.4	6 12.3	43	84	115.9	5 59.4	43	84	116.3	5 46.4	43	83	116.8	5 33.5	43	83	117.3	5 20.5	43	82	117.7	4
75	5 59.9	42	85	114.1	5 47.2	42	85	114.6	5 34.5	42	84	115.0	5 21.8	42	84	115.5	5 09.1	42	84	115.9													75
6	5 08.7	42	86	113.7																													6

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	6 09.4	34	88	70.9	6 19.8	34	88	70.4	6 30.0	34	88	70.0	6 40.3	34	87	69.5	6 50.6	34	87	69.0	7 00.8	34	87	68.5	7 10.9	34	86	68.1	7 21.1	34	86	67.6	91
2	5 16.6	35	88	70.6	5 27.0	35	88	70.1	5 37.5	35	88	69.6	5 47.9	35	87	69.2	5 58.3	35	87	68.7	6 08.7	35	87	68.2	6 19.0	34	86	67.8	6 29.4	34	86	67.3	2
3																	5 06.2	35	87	68.4	5 16.7	35	87	67.9	5 27.3	35	86	67.4	5 37.8	35	86	67.0	3

Lat. 21°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	87 09.0	1.0 14	00.0	86 30.0	1.0 12	00.0	85 00.0	1.0 10	00.0	85 30.0	1.0 09	00.0	85 00.0	1.0 08	00.0	84 30.0	1.0 08	00.0	84 00.0	1.0 07	00.0	83 30.0	1.0 06	00.0	00
1	86 51.7	95 38	16.9	86 22.8	97 34	14.6	85 53.7	97 30	12.8	85 24.4	98 27	11.3	84 55.0	98 24	10.2	84 25.5	99 22	09.2	83 55.9	99 20	08.5	83 26.2	99 19	07.8	1
2	86 28.6	88 56	31.3	86 02.6	88 50	27.4	85 35.8	91 46	24.3	85 08.4	92 42	21.8	84 40.5	94 38	19.8	84 12.2	96 35	18.0	83 43.7	96 32	16.5	83 15.0	96 30	15.3	2
3	85 55.0	78 68	42.2	85 32.4	78 62	37.8	85 08.4	82 58	34.0	84 43.4	85 53	30.9	84 17.6	87 49	28.2	83 51.2	89 46	25.9	83 24.3	90 43	24.0	82 56.9	92 40	22.2	3
4	85 14.4	62 75	50.2	84 55.0	68 70	45.8	84 33.9	73 66	41.9	84 11.5	77 62	38.5	83 48.0	80 58	35.5	83 23.7	82 55	32.9	82 58.6	85 52	30.5	82 32.9	86 48	28.5	4
05	84 29.6	53 80	56.1	84 12.7	59 76	51.9	83 54.2	64 72	48.0	83 34.2	69 68	44.6	83 13.0	72 65	41.6	82 50.8	76 62	38.8	82 27.7	78 58	36.3	82 03.8	81 56	34.0	05
6	83 41.9	46 82	60.5	83 27.3	52 80	56.6	83 10.9	57 76	52.9	82 53.2	62 73	49.6	82 34.1	66 70	46.6	82 13.8	69 67	43.8	81 52.6	72 64	41.2	81 30.5	75 61	38.9	6
7	82 52.3	40 85	63.8	82 39.5	46 82	60.2	82 25.1	51 80	56.8	82 09.2	55 77	53.7	81 52.9	59 74	50.7	81 33.6	63 71	48.0	81 14.1	67 69	45.4	80 53.7	70 66	43.1	7
8	82 01.5	35 86	66.4	81 50.2	40 84	63.1	81 37.4	45 82	60.0	81 23.1	50 80	57.0	81 07.5	54 77	54.2	80 50.8	58 75	51.5	80 32.9	61 72	49.0	80 14.1	64 70	46.7	8
9	81 09.8	31 87	68.5	80 59.7	36 86	65.4	80 48.2	41 84	62.5	80 35.4	45 82	59.7	80 21.3	49 80	57.1	80 06.0	53 77	54.5	79 49.6	56 75	52.1	79 32.3	59 73	49.8	9
10	80 17.4	28 88	70.1	80 08.4	32 87	67.3	79 58.1	37 85	64.6	79 46.5	41 83	62.0	79 33.6	45 81	59.5	79 19.7	48 79	57.0	79 04.6	52 77	54.7	78 48.6	55 75	52.5	10
1	79 24.5	25 89	71.5	79 16.4	29 88	68.9	79 07.1	33 86	66.4	78 56.6	37 84	63.9	78 44.9	41 83	61.5	78 32.1	44 81	59.2	78 18.3	48 79	57.0	78 03.5	51 77	54.9	1
2	78 31.2	22 89	72.6	78 23.9	26 88	70.2	78 15.5	30 87	67.8	78 05.9	34 85	65.5	77 55.2	37 84	63.3	77 43.5	41 82	61.1	77 30.8	44 81	59.0	77 17.1	47 79	56.9	2
3	77 37.6	20 90	73.5	77 31.0	24 89	71.3	77 23.4	27 88	69.0	77 14.7	31 86	66.9	77 04.9	34 85	64.7	76 54.1	38 84	62.7	76 42.4	41 82	60.6	76 29.7	44 80	58.7	3
4	76 43.7	18 90	74.3	76 37.9	21 89	72.2	76 30.9	25 88	70.1	76 22.9	28 87	68.0	76 14.0	32 86	66.0	76 04.0	35 84	64.0	75 53.2	38 83	62.1	75 41.4	41 82	60.2	4
15	75 49.7	16 90	75.0	75 44.4	19 90	73.0	75 38.1	23 88	71.0	75 30.8	26 88	69.0	75 22.6	29 86	67.1	75 13.4	32 85	65.3	75 03.4	35 84	63.4	74 52.5	38 83	61.6	15
6	74 55.6	14 90	75.5	74 50.7	18 90	73.6	74 45.0	21 89	71.8	74 38.3	24 88	69.9	74 30.8	27 87	68.1	74 22.3	30 86	66.3	74 13.0	32 85	64.5	74 02.9	35 84	62.8	6
7	74 01.3	13 91	76.0	73 56.9	16 90	74.2	73 51.7	19 89	72.4	73 45.6	22 88	70.7	73 38.6	25 87	68.9	73 30.8	27 86	67.2	73 22.2	30 85	65.5	73 12.8	33 84	63.9	7
8	73 06.9	12 91	76.4	73 03.0	14 90	74.7	72 58.2	17 89	73.0	72 52.6	20 88	71.3	72 46.2	23 88	69.7	72 39.0	25 87	68.0	72 31.1	28 86	66.4	72 22.3	30 86	64.8	8
9	72 12.4	10 91	76.7	72 08.9	13 90	75.1	72 04.6	16 90	73.5	71 59.5	18 89	71.9	71 53.6	21 88	70.3	71 47.0	23 87	68.7	71 39.6	26 86	67.2	71 31.4	28 85	65.7	9
20	71 17.8	09 91	77.0	71 14.7	12 90	75.5	71 10.8	14 90	73.9	71 06.2	17 89	72.4	71 00.8	19 88	70.9	70 54.6	22 88	69.4	70 47.8	24 87	67.9	70 40.2	26 86	66.4	20
1	70 23.2	08 91	77.2	70 20.4	11 90	75.8	70 16.9	13 90	74.3	70 12.7	15 89	72.8	70 07.8	18 89	71.4	70 02.1	20 88	70.0	69 55.8	22 87	68.5	69 48.8	25 86	67.1	1
2	69 28.6	07 91	77.4	69 26.1	09 91	76.0	69 23.0	12 90	74.6	69 19.1	14 89	73.2	69 14.6	16 89	71.8	69 09.4	18 88	70.4	69 03.6	21 87	69.1	68 57.1	23 87	67.7	2
3	68 33.9	06 91	77.6	68 31.7	08 91	76.2	68 28.9	10 90	74.9	68 25.5	13 90	73.5	68 21.3	15 89	72.2	68 16.6	17 88	70.8	68 11.2	19 88	69.5	68 05.1	21 87	68.2	3
4	67 39.2	05 91	77.8	67 37.3	07 91	76.4	67 34.8	09 90	75.1	67 31.7	11 90	73.8	67 27.9	14 89	72.5	67 23.6	16 88	71.2	67 18.6	18 88	70.0	67 13.0	20 87	68.7	4
25	66 44.4	04 91	77.9	66 42.8	06 91	76.6	66 40.6	08 90	75.3	66 37.9	10 90	74.1	66 34.5	12 89	72.8	66 30.5	14 89	71.6	66 25.9	16 88	70.4	66 20.8	18 87	69.1	25
6	65 49.6	03 91	78.0	65 48.3	05 91	76.7	65 46.4	07 90	75.5	65 44.0	09 90	74.3	65 40.9	11 89	73.1	65 37.3	13 89	71.9	65 33.1	15 88	70.7	65 28.4	17 88	69.5	6
7	64 54.8	03 91	78.0	64 53.8	04 91	76.8	64 52.2	06 90	75.7	64 50.0	08 90	74.5	64 47.3	10 90	73.3	64 44.0	12 89	72.2	64 40.2	14 88	71.0	64 35.8	15 88	69.8	7
8	64 00.0	02 91	78.1	63 59.2	04 91	76.9	63 57.9	05 90	75.8	63 56.0	07 90	74.6	63 53.6	09 90	73.5	63 50.7	11 89	72.4	63 47.2	12 88	71.3	63 43.2	14 88	70.2	8
9	63 05.2	01 91	78.1	63 04.7	03 91	77.0	63 03.6	05 91	75.9	63 02.0	06 90	74.8	62 59.9	08 90	73.7	62 57.2	10 89	72.6	62 54.1	11 89	71.5	62 50.5	13 88	70.4	9
30	62 10.4	00 91	78.1	62 10.1	02 91	77.0	62 09.2	04 91	76.0	62 07.9	05 90	74.9	62 06.1	07 90	73.8	62 03.8	09 89	72.8	62 01.0	10 89	71.7	61 57.7	12 88	70.6	30
1	61 15.6	00 91	78.1	61 15.5	01 91	77.1	61 14.9	03 91	76.0	61 13.8	04 90	75.0	61 12.3	06 90	74.0	61 10.2	08 89	72.9	61 07.7	09 89	71.9	61 04.8	11 88	70.8	1
2	60 20.8	01 91	78.1	60 20.9	00 91	77.1	60 20.5	02 91	76.1	60 19.7	03 90	75.1	60 18.4	05 90	74.1	60 16.7	07 89	73.0	60 14.5	08 89	72.0	60 11.8	10 88	71.0	2
3	59 26.0	02 91	78.1	59 26 3	00 91	77.1	59 26.2	01 91	76.1	59 25.6	03 90	75.1	59 24.6	04 90	74.1	59 23.1	06 89	73.2	59 21.2	07 89	72.2	59 18.8	09 88	71.2	3
4	58 31.2	02 91	78.0	58 31.7	01 91	77.1	58 31.8	00 91	76.1	58 31.4	02 90	75.2	58 30.7	03 90	74.2	58 29.5	05 89	73.2	58 27.8	06 89	72.3	58 25.8	08 88	71.3	4
35	57 36.4	03 91	78.0	57 37.1	02 91	77.0	57 37.4	00 91	76.1	57 37.3	01 90	75.2	57 36.8	02 90	74.2	57 35.8	04 89	73.3	57 34.5	05 89	72.4	57 32.7	07 88	71.4	35
6	56 41.6	04 91	77.9	56 42.5	02 91	77.0	56 43.0	01 91	76.1	56 43.1	00 90	75.2	56 42.8	02 90	74.3	56 42.2	03 90	73.4	56 41.1	04 89	72.5	56 39.6	06 89	71.6	6
7	55 46.8	04 91	77.9	55 47.9	03 91	77.0	55 48.7	02 91	76.1	55 49.0	00 90	75.2	55 48.9	01 90	74.3	55 48.5	02 90	73.4	55 47.6	03 89	72.5	55 46.4	05 89	71.6	7
8	54 52.1	05 91	77.8	54 53.4	04 91	76.9	54 54.3	02 91	76.0	54 54.8	01 90	75.2	54 55.0	00 90	74.3	54 54.8	01 90	73.4	54 54.2	03 89	72.6	54 53.3	04 89	71.7	8
9	53 57.4	05 91	77.7	53 58.8	04 91	76.8	53 59.9	03 91	76.0	54 00.7	02 90	75.2	54 01.1	01 90	74.3	54 01.1	00 90	73.4	54 00.8	02 89	72.6	54 00.1	03 89	71.8	9
40	53 02.6	06 91	77.6	53 04.3	05 91	76.8	53 05.6	04 91	76.0	53 06.5	03 90	75.1	53 07.1	01 90	74.3	53 07.4	00 90	73.4	53 07.3	01 89	72.6	53 06.9	02 89	71.8	40
1	52 07.9	07 91	77.5	52 09.8	06 91	76.7	52 11.2	04 91	75.9	52 12.4	03 90	75.1	52 13.2	02 90	74.3	52 13.7	01 90	73.4	52 13.8	00 89	72.6	52 13.6	01 89	71.8	1
2	51 13.3	07 91	77.4	51 15.3	06 91	76.6	51 16.9	05 90	75.8	51 18.3	04 90	75.0	51 19.3	03 90	74.2	51 20.0	02 90	73.4	51 20.4	01 89	72.6	51 20.4	00 89	71.8	2
3	50 18.6	08 91	77.3	50 20.8	07 91	76.5	50 22.6	06 90	75.7	50 24.2	05 90	75.0	50 25.4	04 90	74.2	50 26.3	03 89	73.4	50 26.9	01 89	72.6	50 27.2	00 89	71.8	3
4	49 24.0	08 91	77.2	49 26.3	07 91	76.4	49 28.4	06 90	75.7	49 30.1	05 90	74.9	49 31.5	04 90	74.1	49 32.7	03 89	73.4	49 33.5	02 89	72.6	49 34.0	01 89	71.8	4
45	48 29.3	09 91	77.1	48 31.9	08 91	76.3	48 34.1	07 90	75.6	48 36.0	06 90	74.8	48 37.7	05 90	74.1	48 39.0	04 89	73.3	48 40.0	03 89	72.6	48 40.8	02 89	71.8	45
6	47 34.8	09 91	77.0	47 37.5	08 91	76.2	47 39.9	08 90	75.5	47 42.0	07 90	74.7	47 43.8	06 90	74.0	47 45.3	05 89	73.2	47 46.6	04 89	72.5	47 47.6	03 89	71.8	6
7	46 40.2	10 91	76.8	46 43.1	09 91	76.1	46 45.6	08 90	75.4	46 47.9	07 90	74.6	46 50.0	06 90	73.9	46 51.7	05 89	73.2	46 53.2	04 89	72.5	46 54.4	03 89	71.7	7
8	45 45.7	10 91	76.7	45 48.7	10 90	76.0	45 51.5	09 90	75.3	45 53.9	08 90	74.5	45 56.2	07 90	73.8	45 58.1	06 89	73.1	45 59.8	05 89	72.4	46 01.2	04 89	71.7	8
9	44 51.2	11 91	76.5	44 54.4	10 90	75.8	44 57.3	09 90	75.1	45 00.0	08 90	74.4	45 02.4	08 90	73.7	45 04.5	07 89	73.0	45 06.4	06 89	72.3	45 08.0	05 88	71.6	9
50	43 56.7	12 91	76.4	44 00.1	11 90	75.7	44 03.2	10 90	75.0	44 06.0	09 90	74.3	44 08.6	08 90	73.6	44 11.0	07 89	72.9	44 13.0	07 89	72.2	44 14.9	06 88	71.5	50
1	43 02.3	12 91	76.3	43 05.8	11 90	75.6	43 09.1	10 90	74.9	43 12.1	10 90	74.2	43 14.9	09 90	73.5	43 17.4	08 89	72.8	43 19.7	07 89	72.2	43 21.8	06 88	71.5	1
2	42 07.9	13 91	76.1	42 11.6	12 90	75.4	42 15.0	11 90	74.8	42 18.2	10 90	74.1	42 21.2	09 90	73.4	42 23.9	09 89	72.7	42 26.4	08 89	72.1	42 28.7	07 88	71.4	2
3	41 13.6	13 91	76.0	41 17.4	12 90	75.3	41 21.0	12 90	74.6	41 24.4	11 90	74.0	41 27.5	10 89	73.3	41 30.4	09 89	72.6	41 33.1	09 89	72.0	41 35.6	08 88	71.3	3
4	40 19.2	14 90	75.8	40 23.2	13 90	75.1	40 27.0	12 90	74.5	40 30.6	11 90	73.8	40 33.9	11 89	73.2	40 37.0	10 89	72.5	40 39.9	09 89	71.9	40 42.5	09 88	71.2	4
55	39 25.0	14 90	75.6	39 29.1	13 90	75.0	39 33.0	13 90	74.3	39 36.8	12 90	73.7	39 40.3	11 89	73.0	39 43.6	11 89	72.4	39 46.7	10 89	71.7	39 49.5	09 88	71.1	55
6	38 30.7	15 90	75.4	38 35.0	14 90	74.8	38 39.1	13 90	74.2	38 43.0	13 90	73.5	38 46.7	12 89	72.9	38 50.2	11 89	72.3	38 53.5	11 89	71.6	38 56.6	10 88	71.0	6
7	37 36.5	15 90	75.3	37 41.0	15 90	74.6	37 45.3	14 90	74.0	37 49.3	13 89	73.4	37 53.2	13 89	72.8	37 56.9	12 89	72.1	38 00.3	11 88	71.5	38 03.6	11 88	70.9	7
8	36 42.4	16 90	75.1	36 47.0	15 90	74.5	36 51.4	14 90	73.9	36 55.7	14 89	73.2	36 59.7	13 89	72.6	37 03.6	13 89	72.0	37 07.2	12 88	71.4	37 10.7	11 88	70.8	8
9	35 48.3	16 90	74.9	35 53.1	16 90	74.3	35 57.7	15 90	73.7	36 02.1	14 89	73.1	36 06.3	14 89	72.5	36 10.3	13 89	71.8	36 14.2	13 88	71.2	36 17.8	12 88	70.6	9
60	34 54.2	17 90	74.7	34 59.1	16 90	74.1	35 03.9	16 90	73.5	35 08.5	15 89	72.9	35 12.9	14 89	72.3	35 17.1	14 89	71.7	35 21.2	13 88	71.1	35 25.0	13 88	70.5	60
1	34 00.2	17 90	74.5	34 05.3	17 90	73.9	34 10.2	16 89	73.3	34 15.0	16 89	72.8	34 19.6	15 89	72.2	34 24.0	14 88	71.6	34 28.2	14 88	71.0	34 32.2	13 88	70.4	1
2	33 06.2	18 90	74.4	33 11.5	17 90	73.8	33 16.6	17 89	73.2	33 21.5	16 89	72.6	33 26.3	16 89	72.0	33 30.9	15 88	71.4	33 35.3	14 88	70.8	33 39.5	14 88	70.2	2
3	32 12.3	18 90	74.2	32 17.7	18 90	73.6	32 23.0	17 89	73.0	32 28.1	17 89	72.4	32 33.0	16 89	71.8	32 37.8	16 88	71.2	32 42.4	15 88	70.6	32 46.8	15 88	70.0	3
4	31 18.5	19 90	74.0	31 24.0	18 89	73.4	31 29.5	18 89	72.8	31 34.7	17 89	72.2	31 39.8	17 88	71.6	31 44.8	16 88	71.1	31 49.6	16 88	70.5	31 54.2	15 88	69.9	4
65	30 24.7	19 90	73.7	30 30.4	19 89	73.2	30 36.0	18 89	72.6	30 41.4	18 89	72.0	30 46.7	17 88	71.5	30 51.8	17 88	70.9	30 56.8	16 88	70.3	31 01.6	16 88	69.8	65
6	29 30.9	20 90	73.5	29 36.8	19 89	73.0	29 42.5	19 89	72.4	29 48.2	18 89	71.8	29 53.6	18 88	71.3	29 58.9	17 88	70.7	30 04.1	17 88	70.1	30 09.1	16 88	69.6	6
7	28 37.2	20 89	73.3	28 43.3	20 89	72.8	28 49.2	19 89	72.2	28 55.0	19 89	71.6	29 00.6	19 88	71.1	29 06.1	18 88	70.5	29 11.4	18 88	70.0	29 16.6	17 87	69.4	7
8	27 43.6	21 89	73.1	27 49.8	20 89	72.6	27 55.9	20 89	72.0	28 01.8	20 88	71.5	28 07.6	19 88	70.9	28 13.3	19 88	70.3	28 18.8	18 88	69.8	28 24.2	18 87	69.2	8
9	26 50.0	21 89	72.9	26 56.4	21 89	72.4	27 02.6	21 89	71.8	27 08.7	20 88	71.2	27 14.7	20 88	70.7	27 20.6	19 88	70.2	27 26.3	19 88	69.6	27 31.9	18 87	69.0	9
70	25 56.5	22 89	72.7	26 03.0	22 89	72.2	26 09.4	21 88	71.6	26 15.7	21 88	71.0	26 21.9	20 88	70.5	26 27.9	20 88	70.0	26 33.8	19 87	69.4	26 39.6	19 87	68.9	70
1	25 03.1	22 89	72.5	25 09.8	22 89	71.9	25 16.3	22 88	71.4	25 22.8	21 88	70.8	25 29.1	21 88	70.3	25 35.3	21 88	69.8	25 41.4	20 87	69.2	25 47.4	20 87	68.7	1
2	24 09.7	23 89	72.2	24 16.5	23 89	71.7	24 23.3	22 88	71.2	24 29.9	22 88	70.6	24 36.4	22 88	70.1	24 42.8	21 87	69.5	24 49.1	21 87	69.0	24 55.3	20 87	68.5	2
3	23 16.4	24 89	72.0	23 23.4	23 88	71.5	23 30.3	23 88	70.9	23 37.1	22 88	70.4	23 43.8	22 88	69.9	23 50.4	22 87	69.3	23 56.8	21 87	68.8	24 03.2	21 87	68.3	3
4	22 23.2	24 89	71.8	22 30.3	24 88	71.2	22 37.4	23 88	70.7	22 44.4	23 88	70.2	22 51.2	23 87	69.6	22 58.0	22 87	69.1	23 04.7	22 87	68.6	23 11.2	22 86	68.1	4
75	21 30.0	25 88	71.5	21 37.3	24 88	71.0	21 44.6	24 88	70.5	21 51.7	24 88	70.0	21 58.8	23 87	69.4	22 05.7	23 87	68.9	22 12.5	23 87	68.4	22 19.3	22 86	67.8	75
6	20 36.9	25 88	71.3	20 44.4	25 88	70.8	20 51.8	25 88	70.2	20 59.1	24 88	69.7	21 06.4	24 87	69.2	21 13.5	24 87	68.7	21 20.5	23 87	68.2	21 27.4	23 86	67.6	6
7	19 43.9	26 88	71.0	19 51.6	25 88	70.5	19 59.1	25 88	70.0	20 06.6	25 87	69.5	20 14.0	25 87	69.0	20 21.3	24 87	68.4	20 28.6	24 86	67.9	20 35.7	24 86	67.4	7
8	18 51.0	26 88	70.8	18 58.8	26 88	70.3	19 06.6	26 88	69.8	19 14.2	25 87	69.2	19 21.8	25 87	68.7	19 29.3	25 87	68.2	19 36.7	25 86	67.7	19 44.0	24 86	67.2	8
9	17 58.1	27 88	70.5	18 06.1	27 88	70.0	18 14.0	26 87	69.5	18 21.9	26 87	69.0	18 29.6	26 87	68.5	18 37.3	25 86	68.0	18 44.9	25 86	67.5	18 52.4	25 86	67.0	9
80	17 05.4	27 88	70.3	17 13.5	27 88	69.8	17 21.6	27 87	69.3	17 29.6	27 87	68.8	17 37.6	26 87	68.2	17 45.4	26 86	67.7	17 53.2	26 86	67.2	18 00.9	26 86	66.7	80
1	16 12.7	28 88	70.0	16 21.0	28 87	69.5	16 29.3	27 87	69.0	16 37.5	27 87	68.5	16 45.6	27 86	68.0	16 53.6	27 86	67.5	17 01.6	26 86	67.0	17 09.5	26 86	66.5	1
2	15 20.1	28 88	69.7	15 28.6	28 87	69.2	15 37.0	28 87	68.7	15 45.4	28 87	68.2	15 53.7	28 86	67.7	16 01.9	27 86	67.2	16 10.1	27 86	66.7	16 18.2	27 85	66.2	2
3	14 27.6	29 87	69.4	14 36.3	29 87	69.0	14 44.9	29 87	68.5	14 53.4	28 86	68.0	15 01.9	28 86	67.5	15 10.3	28 86	67.0	15 18.7	28 86	66.5	15 27.0	28 85	66.0	3
4	13 35.2	30 87	69.2	13 44.0	29 87	68.7	13 52.8	29 87	68.2	14 01.6	29 86	67.7	14 10.2	29 86	67.2	14 18.8	29 86	66.7	14 27.4	28 85	66.2	14 35.9	28 85	65.7	4
85	12 42.9	30 87	68.9	12 51.9	30 87	68.4	13 00.9	30 86	67.9	13 09.8	30 86	67.4	13 18.6	29 86	66.9	13 27.4	29 86	66.4	13 36.2	29 85	66.0	13 44.9	29 85	65.5	85
6	11 50.7	31 87	68.6	11 59.9	31 87	68.1	12 09.0	30 86	67.6	12 18.1	30 86	67.2	12 27.2	30 86	66.7	12 36.1	30 85	66.2	12 45.1	30 85	65.7	12 54.0	30 85	65.2	6
7	10 58.6	31 87	68.3	11 07.9	31 86	67.8	11 17.3	31 86	67.4	11 26.5	31 86	66.9	11 35.8	31 86	66.4	11 45.0	31 85	65.9	11 54.1	30 85	65.4	12 03.2	30 84	64.9	7
8	10 06.6	32 86	68.0	10 16.1	32 86	67.5	10 25.6	32 86	67.1	10 35.1	31 86	66.6	10 44.5	31 85	66.1	10 53.9	31 85	65.6	11 03.2	31 85	65.1	11 12.5	31 84	64.6	8
9	9 14.7	33 86	67.7	9 24.4	32 86	67.2	9 34.1	32 86	66.8	9 43.7	32 85	66.3	9 53.3	32 85	65.8	10 02.9	32 85	65.3	10 12.4	32 84	64.8	10 21.9	32 84	64.4	9
90	8 22.9	33 86	67.4	8 32.8	33 86	67.0	8 42.7	33 86	66.5	8 52.5	33 85	66.0	9 02.3	33 85	65.5	9 12.1	33 84	65.0	9 21.8	32 84	64.6	9 31.5	32 84	64.1	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	45 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	00
1	44 59.4	1.0 03	178.7	44 29.4	1.0 03	178.7	43 59.4	1.0 03	178.7	43 29.4	1.0 03	178.8	42 59.4	1.0 03	178.8	42 29.4	1.0 03	178.8	41 59.4	1.0 03	178.8	41 29.4	1.0 03	178.8	1
2	44 57.5	1.0 05	177.4	44 27.5	1.0 05	177.4	43 57.5	1.0 05	177.5	43 27.6	1.0 05	177.5	42 57.6	1.0 05	177.5	42 27.6	1.0 05	177.6	41 57.7	1.0 05	177.6	41 27.7	1.0 05	177.6	2
3	44 54.3	1.0 07	176.1	44 24.4	1.0 07	176.2	43 54.5	1.0 07	176.2	43 24.5	1.0 07	176.3	42 54.6	1.0 07	176.3	42 24.7	1.0 07	176.4	41 54.7	1.0 07	176.4	41 24.8	1.0 07	176.5	3
4	44 49.9	1.0 09	174.8	44 20.0	1.0 09	174.9	43 50.2	1.0 09	175.0	43 20.3	1.0 09	175.0	42 50.4	1.0 09	175.1	42 20.5	1.0 09	175.2	41 50.6	1.0 09	175.2	41 20.8	1.0 09	175.3	4
05	44 44.3	99 12	173.6	44 14.5	99 12	173.6	43 44.6	99 11	173.7	43 14.8	99 11	173.8	42 45.0	99 11	173.9	42 15.2	99 11	174.0	41 45.4	99 11	174.0	41 15.6	99 11	174.1	05
6	44 37.4	99 14	172.3	44 07.6	99 13	172.4	43 37.9	99 13	172.5	43 08.2	99 12	172.6	42 38.5	99 13	172.7	42 08.7	99 13	172.8	41 39.0	99 13	172.8	41 09.2	99 12	172.9	6
7	44 29.2	99 16	171.0	43 59.6	99 15	171.1	43 30.0	99 15	171.2	43 00.4	99 15	171.3	42 30.7	99 15	171.5	42 01.1	99 15	171.6	41 31.4	99 14	171.7	41 01.8	99 14	171.8	7
8	44 19.9	98 18	169.8	43 50.4	98 18	169.9	43 20.9	98 17	170.0	42 51.3	98 17	170.1	42 21.8	98 17	170.3	41 52.3	98 17	170.4	41 22.7	98 16	170.5	40 53.2	99 16	170.6	8
9	44 09.3	98 20	168.5	43 39.9	98 19	168.7	43 10.6	98 19	168.8	42 41.2	98 19	168.9	42 11.8	98 19	169.1	41 42.3	98 18	169.2	41 12.9	98 18	169.3	40 43.5	98 18	169.4	9
10	43 57.6	97 22	167.3	43 28.3	97 21	167.4	42 59.1	98 21	167.6	42 29.8	98 21	167.7	42 00.6	98 21	167.9	41 31.3	98 20	168.0	41 02.0	98 20	168.2	40 32.7	98 20	168.3	10
1	43 44.6	97 24	166.0	43 15.6	97 23	166.2	42 46.5	97 23	166.4	42 17.4	97 23	166.5	41 48.2	97 22	166.7	41 19.1	97 22	166.9	40 49.9	97 22	167.0	40 20.8	97 22	167.2	1
2	43 30.5	96 25	164.8	43 01.6	96 25	165.0	42 32.7	96 25	165.2	42 03.7	97 25	165.4	41 34.8	97 24	165.5	41 05.8	97 24	165.7	40 36.8	97 24	165.9	40 07.8	97 23	166.0	2
3	43 15.3	96 27	163.6	42 46.6	96 27	163.8	42 17.8	96 27	164.0	41 49.0	96 26	164.2	41 20.2	96 26	164.4	40 51.4	96 26	164.6	40 22.6	96 26	164.7	39 53.8	96 25	164.9	3
4	42 58.9	96 29	162.4	42 30.4	96 29	162.6	42 01.8	96 28	162.8	41 33.2	96 28	163.0	41 04.6	96 28	163.2	40 36.0	96 28	163.4	40 07.3	96 27	163.6	39 38.7	96 27	163.8	4
15	42 41.5	94 31	161.2	42 13.1	95 30	161.5	41 44.8	95 30	161.7	41 16.4	95 30	161.9	40 47.9	95 30	162.1	40 19.5	95 29	162.3	39 51.0	95 29	162.5	39 22.5	95 28	162.7	15
6	42 22.9	94 33	160.1	41 54.8	94 32	160.3	41 26.6	94 32	160.5	40 58.4	94 32	160.8	40 30.2	94 31	161.0	40 02.0	94 31	161.2	39 33.7	94 31	161.4	39 05.4	94 30	161.6	6
7	42 03.3	93 34	158.9	41 35.4	93 34	159.2	41 07.4	93 34	159.4	40 39.4	93 33	159.6	40 11.4	93 33	159.9	39 43.4	93 32	160.1	39 15.3	94 32	160.3	38 47.3	94 32	160.6	7
8	41 42.6	92 36	157.8	41 14.9	92 36	158.0	40 47.2	92 35	158.3	40 19.5	93 35	158.5	39 51.7	93 35	158.8	39 23.9	93 34	159.0	38 56.0	93 34	159.3	38 28.1	93 34	159.5	8
9	41 20.9	91 38	156.7	40 53.5	92 38	156.9	40 26.0	92 37	157.2	39 58.5	92 37	157.5	39 30.9	92 36	157.7	39 03.3	92 36	158.0	38 35.7	92 36	158.2	38 08.0	92 35	158.5	9
20	40 58.2	91 39	155.6	40 31.0	91 39	155.8	40 03.8	91 39	156.1	39 36.5	91 38	156.4	39 09.2	91 38	156.6	38 41.8	91 37	156.9	38 14.4	91 37	157.2	37 47.0	91 37	157.4	20
1	40 34.6	90 41	154.5	40 07.6	90 40	154.8	39 40.6	90 40	155.0	39 13.6	90 40	155.3	38 46.5	90 39	155.6	38 19.4	90 39	155.9	37 52.2	91 38	156.1	37 25.0	91 38	156.4	1
2	40 10.0	89 43	153.4	39 43.3	89 42	153.7	39 16.5	89 42	154.0	38 49.7	89 41	154.3	38 22.9	89 41	154.6	37 56.0	90 40	154.8	37 29.1	90 40	155.1	37 02.2	90 40	155.4	2
3	39 44.4	88 44	152.3	39 18.0	88 44	152.6	38 51.5	88 43	153.0	38 25.0	88 43	153.2	37 58.4	89 42	153.5	37 31.8	89 42	153.8	37 05.1	89 42	154.1	36 38.4	89 41	154.4	3
4	39 18.0	87 46	151.3	38 51.8	87 45	151.6	38 25.6	87 45	151.9	37 59.3	88 44	152.2	37 33.0	88 44	152.5	37 06.6	88 43	152.8	36 40.2	88 43	153.1	36 13.8	88 42	153.4	4
25	38 50.6	86 47	150.3	38 24.7	86 46	150.6	37 58.8	87 46	150.9	37 32.8	87 46	151.2	37 06.7	87 45	151.6	36 40.7	87 45	151.9	36 14.5	87 44	152.2	35 48.3	87 44	152.5	25
6	38 22.4	85 48	149.3	37 56.8	85 48	149.6	37 31.2	86 48	149.9	37 05.4	86 47	150.3	36 39.6	86 46	150.6	36 13.8	86 46	150.9	35 47.9	86 46	151.2	35 22.0	87 45	151.5	6
7	37 53.4	84 50	148.3	37 28.1	85 49	148.6	37 02.7	85 49	149.0	36 37.2	85 48	149.3	36 11.7	85 48	149.6	35 46.2	85 48	150.0	35 20.6	85 47	150.3	34 54.9	86 46	150.6	7
8	37 23.6	83 51	147.3	36 58.5	84 50	147.7	36 33.4	84 50	148.0	36 08.2	84 50	148.4	35 43.0	84 49	148.7	35 17.7	84 49	149.0	34 52.4	85 48	149.3	34 27.0	85 48	149.7	8
9	36 52.9	82 52	146.4	36 28.2	83 52	146.7	36 03.3	83 51	147.1	35 38.5	83 51	147.4	35 13.5	83 50	147.8	34 48.5	83 50	148.1	34 23.5	84 50	148.4	33 58.3	84 49	148.8	9
30	36 21.5	81 54	145.4	35 57.1	82 53	145.8	35 32.5	82 53	146.2	35 07.9	82 52	146.5	34 43.3	82 52	146.9	34 18.5	82 51	147.2	33 53.8	83 51	147.5	33 28.9	83 50	147.9	30
1	35 49.4	81 55	144.5	35 25.2	81 54	144.9	35 01.0	81 54	145.3	34 36.6	81 53	145.6	34 12.3	81 53	146.0	33 47.8	81 52	146.3	33 23.3	82 52	146.7	32 58.8	82 52	147.0	1
2	35 16.5	80 56	143.6	34 52.6	80 55	144.0	34 28.7	80 55	144.4	34 04.7	80 54	144.7	33 40.6	80 54	145.1	33 16.4	81 54	145.4	32 52.2	81 53	145.8	32 27.9	81 52	146.1	2
3	34 43.0	79 57	142.7	34 19.4	79 57	143.1	33 55.7	79 56	143.5	33 32.0	79 56	143.9	33 08.2	79 55	144.2	32 44.3	80 55	144.6	32 20.4	80 54	144.9	31 56.4	80 54	145.3	3
4	34 08.7	78 58	141.9	33 45.4	78 58	142.3	33 22.0	78 57	142.6	32 58.6	78 57	143.0	32 35.1	78 56	143.4	32 11.5	79 56	143.7	31 47.9	79 55	144.1	31 24.1	79 55	144.5	4
35	33 33.8	77 59	141.0	33 10.8	77 59	141.4	32 47.7	77 58	141.8	32 24.6	77 58	142.2	32 01.3	78 57	142.6	31 38.0	78 57	142.9	31 14.7	78 56	143.3	30 51.3	78 56	143.7	35
6	32 58.3	76 60	140.2	32 35.6	76 60	140.6	32 12.8	76 59	141.0	31 49.9	76 59	141.4	31 27.0	77 58	141.7	31 04.0	77 58	142.1	30 40.9	77 57	142.5	30 17.8	77 57	142.9	6
7	32 22.1	75 61	139.4	31 59.7	75 61	139.8	31 37.2	75 60	140.2	31 14.6	75 60	140.6	30 52.0	76 59	140.9	30 29.3	76 59	141.3	30 06.5	76 58	141.7	29 43.6	76 58	142.1	7
8	31 45.4	74 62	138.6	31 23.2	74 62	139.0	31 01.0	74 61	139.4	30 38.7	74 61	139.8	30 16.4	75 60	140.2	29 53.9	75 60	140.5	29 31.5	75 59	140.9	29 08.9	75 59	141.3	8
9	31 08 0	73 63	137.8	30 46.2	73 63	138.2	30 24.3	73 62	138.6	30 02.3	73 62	139.0	29 40.2	74 61	139.4	29 18.1	74 61	139.8	28 55.9	74 60	140.2	28 33.6	74 60	140.5	9
40	30 30.1	72 64	137.0	30 08.6	72 64	137.4	29 46.9	72 63	137.8	29 25.2	72 63	138.2	29 03.5	73 62	138.6	28 41.6	73 62	139.0	28 19.7	73 61	139.4	27 57.7	73 61	139.8	40
1	29 51.7	71 65	136.3	29 30.4	71 64	136.7	29 09.1	71 64	137.1	28 47.6	72 64	137.5	28 26.2	72 63	137.9	28 04.6	72 62	138.3	27 43.0	72 62	138.7	27 21.3	72 62	139.1	1
2	29 12.7	70 66	135.5	28 51.7	70 65	136.0	28 30.7	70 65	136.4	28 09.5	71 64	136.8	27 48.3	71 64	137.2	27 27.1	71 64	137.6	27 05.7	71 63	138.0	26 44.3	71 62	138.3	2
3	28 33.2	69 67	134.8	28 12.5	69 66	135.2	27 51.8	69 66	135.6	27 30 9	70 65	136.0	27 10.0	70 65	136.5	26 49.0	70 64	136.9	26 27.9	70 64	137.3	26 06.8	71 63	137.6	3
4	27 53.3	68 68	134.1	27 32.8	68 67	134.5	27 12.4	68 66	134.9	26 51.8	69 66	135.3	26 31.2	69 66	135.8	26 10.4	69 65	136.2	25 49.7	69 65	136.6	25 28.8	70 64	137.0	4
45	27 12.8	67 68	133.4	26 52.7	67 68	133.8	26 32.5	67 67	134.2	26 12.2	68 67	134.6	25 51.8	68 66	135.1	25 31.4	68 66	135.5	25 10.9	68 65	135.9	24 50.4	69 65	136.3	45
6	26 31.9	66 69	132.7	26 12.0	66 68	133.2	25 52.1	67 68	133.6	25 32.1	67 68	134.0	25 12.0	67 67	134.4	24 51.9	67 67	134.8	24 31.7	67 66	135.2	24 11.4	68 66	135.6	6
7	25 50.5	65 70	132.1	25 30.9	65 69	132.5	25 11.3	66 69	132.9	24 51.6	66 68	133.3	24 31.8	66 68	133.7	24 11.9	66 67	134.1	23 52.0	67 67	134.6	23 32.0	67 66	135.0	7
8	25 08.7	64 70	131.4	24 49.4	64 70	131.8	24 30.0	65 69	132.3	24 10.6	65 69	132.7	23 51.1	65 68	133.1	23 31.5	65 68	133.5	23 11.9	66 68	133.9	22 52.1	66 67	134.3	8
9	24 26.5	63 71	130.8	24 07.5	64 71	131.2	23 48.4	64 70	131.6	23 29.2	64 70	132.0	23 10.0	64 69	132.5	22 50.7	64 69	132.9	22 31.3	65 68	133.3	22 11.9	65 68	133.7	9
50	23 43.9	62 72	130.1	23 25.1	63 71	130.6	23 06.3	63 71	131.0	22 47.4	63 70	131.4	22 28.4	63 70	131.8	22 09.4	64 70	132.2	21 50.3	64 69	132.7	21 31.2	64 69	133.1	50
1	23 00.9	62 72	129.5	22 42.4	62 72	130.0	22 23.8	62 71	130.4	22 05.2	62 71	130.8	21 46.5	62 70	131.2	21 27.7	63 70	131.6	21 08.9	63 70	132.1	20 50.0	63 69	132.5	1
2	22 17.5	61 73	128.9	21 59.3	61 72	129.3	21 41.0	61 72	129.8	21 22.6	61 72	130.2	21 04.2	62 71	130.6	20 45.7	62 71	131.0	20 27.1	62 70	131.5	20 08.5	62 70	131.9	2
3	21 33.7	60 74	128.3	21 15.8	60 73	128.8	20 57.7	60 73	129.2	20 39.6	60 72	129.6	20 21.5	61 72	130.0	20 03.3	61 71	130.5	19 45.0	61 71	130.9	19 26.6	61 70	131.3	3
4	20 49.6	59 74	127.7	20 31.9	59 74	128.2	20 14.1	59 73	128.6	19 56.3	60 73	129.0	19 38.4	60 72	129.5	19 20.5	60 72	129.9	19 02.4	60 72	130.3	18 44.4	60 71	130.7	4
55	20 05.1	58 75	127.2	19 47.7	58 74	127.6	19 30.2	58 74	128.0	19 12.6	59 73	128.5	18 55.0	59 73	128.9	18 37.3	59 72	129.3	18 19.5	59 72	129.7	18 01.7	59 72	130.2	55
6	19 20.3	57 75	126.6	19 03.1	57 75	127.1	18 45.9	58 74	127.5	18 28.6	58 74	127.9	18 11.2	58 74	128.3	17 53.8	58 73	128.8	17 36.3	58 73	129.2	17 18.8	59 72	129.6	6
7	18 35.2	56 76	126.1	18 18.3	57 75	126.5	18 01.3	57 75	126.9	17 44.2	57 74	127.4	17 27.1	57 74	127.8	17 10.0	57 74	128.2	16 52.7	58 73	128.7	16 35.5	58 73	129.1	7
8	17 49.8	55 76	125.5	17 33.1	56 76	126.0	17 16.4	56 75	126.4	16 59.6	56 75	126.8	16 42.7	56 74	127.3	16 25.8	56 74	127.7	16 08.8	57 74	128.1	15 51.8	57 73	128.6	8
9	17 04.1	55 77	125.0	16 47.6	55 76	125.4	16 31.1	55 76	125.9	16 14.6	55 76	126.3	15 58.0	55 75	126.7	15 41.3	56 75	127.2	15 24.6	56 74	127.6	15 07.9	56 74	128.0	9
60	16 18.0	54 77	124.5	16 01.8	54 77	124.9	15 45.6	54 76	125.4	15 29.3	54 76	125.8	15 12.9	55 76	126.2	14 56.5	55 75	126.7	14 40.1	55 75	127.1	14 23.6	55 74	127.5	60
1	15 31.7	53 78	124.0	15 15.8	53 77	124.4	14 59.8	53 77	124.9	14 43.7	54 76	125.3	14 27.6	54 76	125.7	14 11.4	54 76	126.2	13 55.3	54 75	126.6	13 39.0	54 75	127.0	1
2	14 45.1	52 78	123.5	14 29.4	52 78	123.9	14 13.6	53 77	124.4	13 57.8	53 77	124.8	13 42.0	53 76	125.2	13 26.1	53 76	125.7	13 10.1	53 76	126.1	12 54.1	53 75	126.5	2
3	13 58.3	52 78	123.0	13 42.8	52 78	123.4	13 27.3	52 78	123.9	13 11.7	52 77	124.3	12 56.1	52 77	124.7	12 40.4	52 76	125.2	12 24.7	52 76	125.6	12 09.0	53 76	126.0	3
4	13 11.2	51 79	122.5	12 55.9	51 78	123.0	12 40.6	51 78	123.4	12 25.3	51 78	123.8	12 09.9	51 77	124.3	11 54.5	51 77	124.7	11 39.1	52 77	125.1	11 23.6	52 76	125.6	4
65	12 23.8	50 79	122.0	12 08.8	50 79	122.5	11 53.7	50 78	122.9	11 38.6	50 78	123.4	11 23.5	51 78	123.8	11 08.3	51 77	124.2	10 53.1	51 77	124.7	10 37.9	51 77	125.1	65
6	11 36.2	49 80	121.6	11 21.4	49 79	122.0	11 06.6	49 79	122.5	10 51.7	50 78	122.9	10 36.8	50 78	123.3	10 21.9	50 78	123.8	10 06.9	50 77	124.2	9 51.9	50 77	124.7	6
7	10 48.3	48 80	121.1	10 33.8	49 80	121.6	10 19.2	49 79	122.0	10 04.6	49 79	122.4	9 49.9	49 78	122.9	9 35.2	49 78	123.3	9 20.5	49 78	123.8	9 05.8	49 78	124.2	7
8	10 00.3	48 80	120.7	9 46.0	48 80	121.1	9 31.6	48 80	121.6	9 17.2	48 79	122.0	9 02.8	48 79	122.5	8 48.3	48 78	122.9	8 33.8	48 78	123.3	8 19.3	48 78	123.8	8
9	9 12.0	47 81	120.2	8 57.0	47 80	120.7	8 43.8	47 80	121.1	8 29.6	47 80	121.6	8 15.4	47 79	122.0	8 01.2	47 79	122.5	7 46.9	48 78	122.9	7 32.6	48 78	123.3	9
70	8 23.5	46 81	119.8	8 09.6	46 81	120.3	7 55.7	46 80	120.7	7 41.8	47 80	121.1	7 27.8	47 80	121.6	7 13.8	47 79	122.0	6 59.8	47 79	122.5	6 45.7	47 78	122.9	70
1	7 34.8	46 82	119.4	7 21.1	46 81	119.8	7 07.4	46 81	120.3	6 53.7	46 80	120.7	6 40.0	46 80	121.2	6 26.2	46 80	121.6	6 12.4	46 79	122.1	5 58.6	46 79	122.5	1
2	6 45.9	45 82	119.0	6 32.4	45 82	119.4	6 19.0	45 81	119.9	6 05.5	45 81	120.3	5 51.9	45 80	120.8	5 38.4	45 80	121.2	5 24.8	45 80	121.7	5 11.3	45 79	122.1	2
3	5 56.8	44 82	118.6	5 43.5	44 82	119.0	5 30.3	44 81	119.4	5 17.0	44 81	119.9	5 03.7	44 81	120.4										3
4	5 07.5	43 82	118.2																						4

Lat. 21°

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	7 31.2	34 86	67.1	7 41.3	34 86	66.6	7 51.4	33 85	66.2	8 01.4	33 85	65.7	8 11.4	33 85	65.2	8 21.4	33 84	64.7	8 31.3	33 84	64.3	8 41.2	33 84	63.8	91
2	6 39.7	34 86	66.8	6 49.9	34 85	66.3	7 00.2	34 85	65.9	7 10.4	34 85	65.4	7 20.6	34 84	64.9	7 30.8	34 84	64.4	7 40.9	34 84	64.0	7 51.0	34 84	63.5	2
3	5 48.2	35 86	66.5	5 58.7	35 85	66.0	6 09.1	35 85	65.5	6 19.5	35 84	65.1	6 29.9	35 84	64.6	6 40.3	34 84	64.1	6 50.6	34 84	63.7	7 00.9	34 83	63.2	3
4				5 07.6	35 85	65.7	5 18.2	35 85	65.2	5 28.8	35 84	64.8	5 39.4	35 84	64.3	5 50.0	35 84	63.8	6 00.5	35 83	63.3	6 11.0	35 83	62.9	4
95																			5 10.5	36 83	63.0	5 21.2	36 83	62.6	95

Lat. 21°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	83 00.0	1.0 05	00.0	82 30.0	1.0 06	00.0	82 00.0	1.0 05	00.0	81 00.0	1.0 04	00.0	79 00.0	1.0 04	00.0	77 00.0	1.0 03	00.0	76 30.0	1.0 03	00.0	75 30.0	1.0 03	00.0	00
1	82 56.5	99 17	07.2	82 26.7	99 16	06.7	81 56.9	99 15	06.3	80 57.3	99 13	05.5	78 57.8	1.0 11	04.4	76 58.2	1.0 09	03.7	76 28.3	1.0 09	03.5	75 28.4	1.0 08	03.2	1
2	82 46.1	97 28	14.2	82 17.0	97 26	13.2	81 47.9	97 25	12.4	80 49.3	98 22	10.9	78 51.4	99 18	08.8	76 52.8	99 15	07.3	76 23.1	99 14	07.0	75 23.7	99 13	06.5	2
3	82 29.3	93 38	20.7	82 01.3	94 35	19.3	81 33.1	94 33	18.2	80 36.2	95 30	16.1	78 40.7	97 24	13.1	76 44.0	98 20	10.9	75 14.6	98 20	10.4	75 15.8	98 18	09.6	3
4	82 06.7	88 46	26.7	81 40.1	89 43	25.0	81 13.1	90 41	23.6	80 18.3	92 37	21.0	78 26.1	95 30	17.2	76 31.7	96 26	14.4	76 02.9	96 25	13.8	75 04.9	97 23	12.7	4
05	81 39.2	83 53	32.0	81 14.1	85 50	30.2	80 48.5	86 48	28.5	79 56.1	88 43	25.6	78 07.8	92 36	21.1	76 16.2	94 31	17.7	75 48.0	94 30	17.0	74 51.1	95 28	15.8	05
6	81 07.6	77 59	36.8	80 44.0	80 56	34.8	80 19.9	81 54	33.0	79 30.1	84 49	29.8	77 46.0	89 42	24.7	75 57.7	92 36	20.9	75 30.1	92 34	20.1	74 34.6	93 32	18.7	6
7	80 32.4	72 63	40.9	80 10.4	75 61	38.9	79 47.7	77 58	37.0	79 00.6	80 54	33.6	77 21.0	85 46	28.2	75 36.3	89 40	24.0	75 09.5	90 39	23.1	74 15.3	91 36	21.4	7
8	79 54.4	67 67	44.5	79 33.9	70 65	42.5	79 12.6	72 63	40.6	78 28.2	76 58	37.1	76 53.2	82 51	31.3	75 12.2	86 44	26.9	74 46.2	87 43	25.9	73 53.7	88 40	24.1	8
9	79 14.0	62 70	47.7	78 54.9	65 68	45.6	78 35.0	67 66	43.7	77 53.2	72 62	40.2	76 22.8	78 54	34.3	74 45.7	83 48	29.6	74 20.6	84 46	28.5	73 29.6	86 44	26.6	9
10	78 31.7	58 73	50.4	78 13.9	61 71	48.4	77 55.3	63 69	46.5	77 16.0	68 65	43.0	75 50.2	75 58	37.0	74 17.0	80 51	32.1	73 52.8	81 50	31.0	73 03.5	83 47	29.0	10
1	77 47.8	54 76	52.8	77 31.2	57 74	50.9	77 13.8	59 72	49.0	76 36.9	64 68	45.5	75 15.5	71 61	39.5	73 46.2	77 54	34.5	73 22.9	78 53	33.4	72 35.3	80 50	31.3	1
2	77 02.5	50 77	55.0	76 47.1	53 76	53.1	76 30.8	55 74	51.2	75 56.1	60 70	47.8	74 39.0	68 64	41.8	73 13.6	74 57	36.7	72 51.2	75 56	35.5	72 05.4	78 53	33.4	2
3	76 16.1	47 79	56.8	76 01.7	49 77	55.0	75 46.5	52 76	53.2	75 13.9	57 72	49.8	74 00.9	65 66	43.8	72 39.4	71 60	38.7	72 17.9	72 58	37.6	71 33.7	75 55	35.4	3
4	75 28.8	43 80	58.4	75 15.4	46 79	56.6	75 01.2	49 77	54.9	74 30.5	53 74	51.7	73 21.4	61 68	45.8	72 03.6	68 62	40.6	71 43.0	69 60	39.5	71 00.6	72 58	37.2	4
15	74 40.7	40 81	59.9	74 28.2	43 80	58.2	74 14.9	46 78	56.5	73 46.1	50 76	53.3	72 40.7	58 70	47.5	71 26.5	65 64	42.4	71 06.7	67 62	41.2	70 26.0	69 60	39.0	15
6	73 52.0	38 82	61.1	73 40.3	40 81	59.5	73 27.8	43 80	57.9	73 00.7	47 77	54.8	71 58.9	55 71	49.1	70 48.1	62 66	44.0	70 29.2	64 64	42.8	69 50.1	67 62	40.6	6
7	73 02.6	35 83	62.3	72 51.7	38 82	60.7	72 40.0	40 81	59.1	72 14.6	45 78	56.1	71 16.1	53 73	50.5	70 08.7	60 68	45.5	69 50.6	61 66	44.4	69 13.1	64 64	42.1	7
8	72 12.8	33 84	63.3	72 02.6	35 83	61.8	71 51.7	38 82	60.2	71 27.8	42 79	57.3	70 32.4	50 74	51.9	69 28.2	57 69	46.9	69 10.9	58 68	45.8	68 35.0	61 65	43.5	8
9	71 22.6	31 84	64.2	71 13.0	33 83	62.7	71 02.8	35 82	61.2	70 40.3	40 80	58.4	69 48.0	47 75	53.1	68 46.8	54 70	48.2	68 30.3	56 69	47.1	67 55.9	59 66	44.9	9
20	70 32.0	29 85	65.0	70 23.1	31 84	63.6	70 13.5	33 83	62.1	69 52.4	37 81	59.4	69 02.9	45 76	54.2	68 04.7	52 72	49.4	67 48.9	53 70	48.3	67 16.0	56 68	46.1	20
1	69 41.1	27 85	65.7	69 32.7	29 84	64.3	69 23.8	31 84	63.0	69 03.9	35 81	60.3	68 17.2	43 77	55.2	67 21.8	49 73	50.5	67 06.7	51 71	49.4	66 35.2	54 69	47.2	1
2	68 49.9	25 86	66.3	68 42.1	27 85	65.0	68 33.7	29 84	63.7	68 15.1	33 82	61.1	67 30.9	40 78	56.2	66 38.2	47 74	51.6	66 23.9	49 72	50.4	65 53.7	52 70	48.3	2
3	67 58.5	23 86	66.9	67 51.2	25 85	65.6	67 43.3	27 84	64.4	67 25.8	31 82	61.8	66 44.1	38 79	57.0	65 54.1	45 74	52.5	65 40.4	46 74	51.4	65 11.6	49 71	49.3	3
4	67 06.8	22 86	67.4	67 00.1	24 86	66.2	66 52.7	25 85	64.9	66 36.3	29 83	62.5	65 56.9	36 79	57.8	65 09.4	43 75	53.4	64 56.3	44 74	52.3	64 28.8	47 72	50.2	4
25	66 15.0	20 87	67.9	66 08.7	22 86	66.7	66 01.9	24 85	65.5	65 46.5	27 84	63.1	65 09.3	34 80	58.5	64 24.2	41 76	54.2	64 11.7	42 75	53.1	63 45.5	45 73	51.1	25
6	65 23.1	19 87	68.3	65 17.2	20 86	67.1	65 10.8	22 86	66.0	64 56.4	26 84	63.7	64 21.4	33 80	59.2	63 38.5	39 77	54.9	63 26.7	40 76	53.9	63 01.7	43 74	51.9	6
7	64 30.9	17 87	68.7	64 25.5	19 86	67.6	64 19.5	21 86	66.4	64 06.1	24 84	64.2	63 33.1	31 81	59.8	62 52.5	37 77	55.6	62 41.2	38 76	54.6	62 17.4	41 75	52.6	7
8	63 38.7	16 87	69.0	63 33.7	18 87	67.9	63 28.1	19 86	66.8	63 15.6	23 84	64.6	62 44.5	29 81	60.4	62 06.1	35 78	56.3	61 55.3	36 77	55.3	61 32.6	39 75	53.3	8
9	62 46.3	15 87	69.3	62 41.7	16 87	68.2	62 36.6	18 86	67.2	62 24.9	21 85	65.0	61 55.7	27 82	60.9	61 19.3	33 78	56.9	61 09.1	35 78	55.9	60 47.5	37 76	54.0	9
30	61 53.9	13 88	69.6	61 49.6	15 87	68.5	61 44.9	17 86	67.5	61 34.0	20 85	65.4	61 06.7	26 82	61.4	60 32.2	32 79	57.4	60 22.6	33 78	56.5	60 02.0	36 76	54.6	30
1	61 01.3	12 88	69.8	60 57.4	14 87	68.8	60 53.1	15 86	67.8	60 43.0	18 85	65.8	60 17.4	24 82	61.8	59 44.9	30 79	57.9	59 35.7	31 78	57.0	59 16.2	34 77	55.1	1
2	60 08.7	11 88	70.0	60 05.2	13 87	69.0	60 01.2	14 87	68.0	59 51.8	17 85	66.1	59 27.9	23 83	62.2	58 57.3	28 80	58.4	58 48.6	30 79	57.5	58 30.1	32 77	55.7	2
3	59 16.0	10 88	70.2	59 12.8	11 87	69.2	59 09.2	13 87	68.3	59 00.6	16 86	66.4	58 38.3	21 83	62.6	58 09.5	27 80	58.9	58 01.3	28 79	57.9	57 43.7	30 78	56.1	3
4	58 23.3	09 88	70.4	58 20.4	10 88	69.4	58 17.1	12 87	68.5	58 09.2	15 86	66.6	57 48.5	20 83	62.9	57 21.4	25 80	59.3	57 13.7	26 80	58.4	56 57.1	29 78	56.6	4
35	57 30.5	08 88	70.5	57 27.9	09 88	69.6	57 24.9	11 87	68.7	57 17.8	13 86	66.8	56 58.6	19 84	63.2	56 33.2	24 81	59.6	56 25.9	25 80	58.7	56 10.2	27 78	57.0	35
6	56 37.7	07 88	70.6	56 35.4	08 88	69.7	56 32.7	10 87	68.8	56 26.2	12 86	67.0	55 08.5	17 84	63.5	55 44.8	22 81	60.0	55 37.9	23 80	59.1	55 23.1	26 79	57.4	6
7	55 44.8	06 88	70.7	55 42.8	07 88	69.9	55 40.5	09 87	69.0	55 34.6	11 86	67.2	55 18.4	16 84	63.7	54 56.2	21 81	60.3	54 49.8	22 80	59.4	54 35.8	24 79	57.8	7
8	54 51.9	05 88	70.8	54 50.2	06 88	70.0	54 48.2	07 87	69.1	54 42.9	10 86	67.4	54 28.1	15 84	63.9	54 07.5	19 82	60.6	54 01.5	21 81	59.7	53 48.4	23 79	58.1	8
9	53 59.0	04 88	70.9	53 57.6	05 88	70.0	53 55.8	07 87	69.2	53 51.2	09 86	67.5	53 37.7	14 84	64.2	53 18.6	18 82	60.8	53 13.0	19 81	60.0	53 00.8	22 80	58.4	9
40	53 06.1	03 88	71.0	53 04.9	04 88	70.1	53 03.4	06 87	69.3	52 59.4	08 86	67.6	52 47.3	12 84	64.3	52 29.7	17 82	61.1	52 24.4	18 81	60.3	52 13.0	20 80	58.7	40
1	52 13.1	02 88	71.0	52 12.2	03 88	70.2	52 11.0	05 87	69.4	52 07.6	07 86	67.7	51 56.7	11 84	64.5	51 40.6	16 82	61.3	51 35.7	17 81	60.5	51 25.1	19 80	58.9	1
2	51 20.1	01 88	71.0	51 19.5	03 88	70.2	51 18.6	04 87	69.4	51 15.7	06 86	67.8	51 06.1	10 84	64.6	50 51.4	14 82	61.5	50 46.9	15 82	60.7	50 37.0	18 80	59.2	2
3	50 27.2	01 88	71.0	50 26.8	02 88	70.2	50 26.1	03 87	69.5	50 23.9	05 87	67.9	50 15.5	09 84	64.8	50 02.1	13 82	61.7	49 58.0	14 82	60.9	49 48.9	16 80	59.4	3
4	49 34.2	00 88	71.0	49 34.1	01 88	70.2	49 33.7	02 88	69.5	49 31.9	04 87	68.0	49 24.8	08 84	64.9	49 12.8	12 82	61.8	49 09.0	13 82	61.1	49 00.7	15 81	59.6	4
45	48 41.2	01 88	71.0	48 41.4	00 88	70.3	48 41.2	01 88	69.5	48 40.0	03 87	68.0	48 34.1	07 85	65.0	48 23.4	11 82	62.0	48 20.0	12 82	61.2	48 12.3	14 81	59.7	45
6	47 48.2	02 88	71.0	47 48.6	01 88	70.3	47 48.7	00 87	69.5	47 48.1	02 87	68.0	47 43.3	06 85	65.1	47 33.9	10 82	62.1	47 30.8	11 82	61.4	47 23.9	13 81	59.9	6
7	46 55.3	03 88	71.0	46 55.9	02 88	70.3	46 56.3	01 87	69.5	46 56.1	01 87	68.1	46 52.5	05 85	65.1	46 44.4	09 83	62.2	46 41.7	10 82	61.5	46 35.4	11 81	60.0	7
8	46 02.3	03 88	71.0	46 03.2	02 88	70.2	46 03.8	02 87	69.5	46 04.2	00 87	68.1	46 01.6	04 85	65.2	45 54.8	07 83	62.3	45 52.4	08 82	61.6	45 46.8	10 81	60.2	8
9	45 09.4	04 88	70.9	45 10.5	03 88	70.2	45 11.3	02 87	69.5	45 12.2	01 87	68.1	45 10.8	03 85	65.2	45 05.2	06 83	62.4	45 03.1	07 82	61.7	44 58.2	09 81	60.3	9
50	44 16.5	05 88	70.8	44 17.8	04 88	70.2	44 18.9	03 87	69.5	44 20.2	01 87	68.1	44 19.9	02 85	65.3	44 15.5	05 83	62.5	44 13.8	06 82	61.8	44 09.5	08 81	60.4	50
1	43 23.6	06 88	70.8	43 25.1	05 88	70.1	43 26.4	04 87	69.4	43 28.3	02 87	68.0	43 29.0	01 85	65.3	43 25.8	04 83	62.5	43 24.4	05 82	61.8	43 20.8	07 81	60.5	1
2	42 30.7	06 88	70.7	42 32.5	06 88	70.0	42 34.0	05 87	69.4	42 36.3	03 86	68.0	42 38.2	00 85	65.3	42 36.1	03 83	62.6	42 35.0	04 82	61.9	42 32.1	06 81	60.5	2
3	41 37.8	07 88	70.6	41 39.8	06 88	70.0	41 41.6	05 87	69.3	41 44.4	04 86	68.0	41 47.3	01 85	65.3	41 46.4	02 83	62.6	41 45.6	03 82	61.9	41 43.3	05 81	60.6	3
4	40 45.0	08 88	70.5	40 47.2	07 88	69.9	40 49.2	06 87	69.2	40 52.5	05 86	67.9	40 56.4	02 85	65.3	40 56.7	01 83	62.6	40 56.2	02 82	62.0	40 54.5	04 81	60.6	4
55	39 52.2	08 88	70.5	39 54.6	08 88	69.8	39 56.8	07 87	69.2	40 00.6	06 86	67.8	40 05.5	03 85	65.2	40 06.9	00 83	62.6	40 06.7	01 82	62.0	40 05.7	03 81	60.7	55
6	38 59.4	09 88	70.4	39 02.1	08 88	69.7	39 04.5	08 87	69.1	39 08.7	06 86	67.8	39 14.7	04 85	65.2	39 17.2	01 83	62.6	39 17.3	00 82	62.0	39 16.8	01 81	60.7	6
7	38 06.7	10 88	70.2	38 09.5	09 87	69.6	38 12.2	09 87	69.0	38 16.9	07 86	67.7	38 23.8	04 85	65.2	38 27.4	02 83	62.6	38 27.8	01 82	62.0	38 28.0	00 81	60.7	7
8	37 14.0	11 88	70.1	37 17.1	10 87	69.5	37 19.9	09 87	68.9	37 25.1	08 86	67.6	37 33.0	05 85	65.1	37 37.7	03 83	62.6	37 38.4	02 82	62.0	37 39.1	01 81	60.7	8
9	36 21.3	11 88	70.0	36 24.6	11 87	69.4	36 27.7	10 87	68.8	36 33.3	09 86	67.5	36 42.2	06 85	65.0	36 48.0	04 83	62.6	36 49.0	03 82	61.9	36 50.3	02 81	60.7	9
60	35 28.7	12 88	69.9	35 32.2	11 87	69.3	35 35.5	11 87	68.7	35 41.6	09 86	67.4	35 51.4	07 84	65.0	35 58.3	04 83	62.5	35 59.5	04 82	61.9	36 01.5	03 81	60.7	60
1	34 36.1	13 88	69.8	34 39.8	12 87	69.2	34 43.3	11 87	68.5	34 49.8	10 86	67.3	35 00.7	08 84	64.9	35 08.6	05 83	62.5	35 10.1	05 82	61.9	35 12.6	04 81	60.6	1
2	33 43.6	13 88	69.6	33 47.5	13 87	69.0	33 51.2	12 87	68.4	33 58.2	11 86	67.2	34 10.0	09 84	64.8	34 19.0	06 83	62.4	34 20.8	06 82	61.8	34 23.8	05 81	60.6	2
3	32 51.1	14 87	69.5	32 55.2	13 87	68.9	32 59.2	13 87	68.3	33 06.6	12 86	67.1	33 19.3	09 84	64.7	33 29.3	07 83	62.3	33 31.4	07 82	61.7	33 35.0	05 81	60.5	3
4	31 58.7	15 87	69.3	32 03.0	14 87	68.8	32 07.2	14 87	68.2	32 15.0	13 86	67.0	32 28.7	10 84	64.6	32 39.7	08 82	62.3	32 42.1	08 82	61.7	32 46.3	06 81	60.5	4
65	31 06.3	15 87	69.2	31 10.8	15 87	68.6	31 15.2	14 86	68.0	31 23.4	13 86	66.8	31 38.1	11 84	64.5	31 50.2	09 82	62.2	31 52.8	08 82	61.6	31 57.5	07 81	60.4	65
6	30 14.0	16 87	69.0	30 18.7	16 87	68.4	30 23.3	15 86	67.9	30 32.0	14 86	66.7	30 47.5	12 84	64.4	31 00.7	10 82	62.1	31 03.5	09 82	61.5	31 08.8	08 81	60.3	6
7	29 21.7	17 87	68.8	29 26.6	16 87	68.3	29 31.4	16 86	67.7	29 40.6	15 86	66.6	29 57.0	13 84	64.3	30 11.2	11 82	62.0	30 14.3	10 82	61.4	30 20.2	09 81	60.3	7
8	28 29.5	17 87	68.7	28 34.6	17 86	68.1	28 39.6	16 86	67.5	28 49.2	15 86	66.4	29 06.6	14 84	64.2	29 21.7	12 82	61.9	29 25.2	11 82	61.3	29 31.6	10 81	60.2	8
9	27 37.4	18 87	68.5	27 42.7	18 86	67.9	27 47.9	17 86	67.4	27 57.9	16 86	66.3	28 16.2	14 84	64.0	28 32.4	13 82	61.8	28 36.1	12 82	61.2	28 43.0	11 81	60.1	9
70	26 45.3	19 87	68.3	26 50.8	18 86	67.8	26 56.2	18 86	67.2	27 06.6	17 85	66.1	27 25.9	15 84	63.9	27 43.0	13 82	61.6	27 47.0	13 82	61.1	27 54.5	12 81	60.0	70
1	25 53.3	19 87	68.1	25 59.0	19 86	67.6	26 04.6	18 86	67.0	26 15.5	18 85	65.9	26 35.6	16 84	63.7	26 53.8	14 82	61.5	26 58.0	14 82	61.0	27 06.0	13 81	59.8	1
2	25 01.3	20 86	67.9	25 07.3	20 86	67.4	25 13.1	19 86	66.8	25 24.3	18 86	65.8	25 45.4	17 84	63.6	26 04.6	15 82	61.4	26 09.1	15 82	60.8	26 17.6	14 80	59.7	2
3	24 09.4	21 86	67.7	24 15.6	20 86	67.2	24 21.6	20 86	66.7	24 33.3	19 85	65.6	24 55.3	18 83	63.4	25 15.4	16 82	61.2	25 20.2	16 81	60.7	25 29.3	15 80	59.6	3
4	23 17.7	21 86	67.5	23 24.0	21 86	67.0	23 30.2	21 86	66.5	23 42.3	20 85	65.4	24 05.3	18 83	63.2	24 26.4	17 82	61.1	24 31.4	16 81	60.5	24 41.0	16 80	59.5	4
75	22 25.9	22 86	67.3	22 32.5	22 86	66.8	22 38.9	21 85	66.3	22 51.4	21 85	65.2	23 15.3	19 83	63.1	23 37.4	18 82	60.9	23 42.6	17 81	60.4	23 52.8	17 80	59.3	75
6	21 34.3	23 86	67.1	21 41.0	22 86	66.6	21 47.7	22 85	66.1	22 00.6	21 84	65.0	22 25.4	20 83	62.9	22 48.5	19 82	60.8	22 54.0	18 81	60.2	23 04.7	17 80	59.2	6
7	20 42.7	23 86	66.9	20 49.7	23 86	66.4	20 56.5	23 85	65.8	21 09.9	22 84	64.8	21 35.6	21 83	62.7	21 59.6	19 81	60.6	22 05.4	19 81	60.1	22 16.6	18 80	59.0	7
8	19 51.2	24 86	66.7	19 58.4	24 85	66.2	20 05.4	23 85	65.6	20 19.3	23 84	64.6	20 45.8	22 83	62.5	21 10.9	20 81	60.4	21 16.9	20 81	59.9	21 28.6	19 80	58.8	8
9	18 59.9	25 86	66.4	19 07.2	24 85	65.9	19 14.5	24 85	65.4	19 28.7	23 84	64.4	19 56.2	22 83	62.3	20 22.2	21 81	60.2	20 28.5	21 81	59.7	20 40.7	20 80	58.7	9
80	18 08.6	25 85	66.2	18 16.1	25 85	65.7	18 23.6	25 85	65.2	18 38.2	24 84	64.2	19 06.6	23 82	62.1	19 33.6	22 81	60.0	19 40.1	22 80	59.5	19 52.9	21 80	58.5	80
1	17 17.3	26 85	66.0	17 25.1	26 85	65.5	17 32.8	25 84	65.0	17 47.9	25 84	63.9	18 17.2	24 82	61.9	18 45.1	23 81	59.9	18 51.9	22 80	59.3	19 05.2	22 79	58.3	1
2	16 26.2	27 85	65.7	16 34.2	26 85	65.2	16 42.1	26 84	64.7	16 57.6	26 84	63.7	17 27.8	25 82	61.7	17 56.7	24 80	59.6	18 03.8	23 80	59.1	18 17.6	23 79	58.1	2
3	15 35.2	27 85	65.5	15 43.4	27 84	65.0	15 51.5	27 84	64.5	16 07.4	26 83	63.5	16 38.5	25 82	61.5	17 08.4	24 80	59.4	17 15.7	24 80	58.9	17 30.1	24 79	57.9	3
4	14 44.3	28 85	65.2	14 52.7	28 84	64.7	15 01.0	28 84	64.2	15 17.4	27 83	63.2	15 49.4	26 82	61.2	16 20.3	25 80	59.2	16 27.8	25 80	58.7	16 42.7	25 79	57.7	4
85	13 53.5	29 84	65.0	14 02.1	28 84	64.5	14 10.6	28 84	64.0	14 27.4	28 83	63.0	15 00.3	27 82	61.0	15 32.2	26 80	59.0	15 40.0	26 80	58.5	15 55.4	25 79	57.5	85
6	13 02.8	29 84	64.7	13 11.6	29 84	64.2	13 20.3	29 84	63.7	13 37.6	29 83	62.7	14 11.4	28 81	60.8	14 44.2	27 80	58.8	14 52.3	27 79	58.3	15 08.2	26 78	57.3	6
7	12 12.2	30 84	64.4	12 21.2	30 84	64.0	12 30.1	30 83	63.5	12 47.8	29 83	62.5	13 22.6	29 81	60.5	13 56.4	28 80	58.5	14 04.7	28 79	58.0	14 21.1	27 78	57.1	7
8	11 21.7	31 84	64.2	11 30.9	31 84	63.7	11 40.1	30 83	63.2	11 58.2	30 82	62.2	12 33.9	29 81	60.3	13 08.7	29 79	58.3	13 17.2	28 79	57.8	13 34.2	28 78	56.8	8
9	10 31.4	31 84	63.9	10 40.8	31 83	63.4	10 50.1	31 83	62.9	11 08.7	31 82	61.9	11 45.3	30 81	60.0	12 21.1	29 79	58.1	12 29.9	29 79	57.6	12 47.4	29 78	56.6	9
90	9 41.1	32 84	63.6	9 50.8	32 83	63.1	10 00.3	32 83	62.6	10 19.3	32 82	61.7	10 56.8	31 80	59.7	11 33.6	30 79	57.8	11 42.7	30 79	57.3	12 00.7	30 78	56.3	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	41 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	40 00.0	1.0 01	180.0	39 00.0	1.0 01	180.0	37 00.0	1.0 01	180.0	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	33 30.0	1.0 01	180.0	00
1	40 59.4	1.0 03	178.8	40 29.4	1.0 03	178.8	39 59.4	1.0 03	178.9	38 59.5	1.0 03	178.9	36 59.5	1.0 03	178.9	34 59.5	1.0 02	179.0	34 29.5	1.0 02	179.0	33 29.5	1.0 02	179.0	1
2	40 57.7	1.0 05	177 7	40 27.7	1.0 05	177.7	39 57.8	1.0 05	177.7	38 57.8	1.0 04	177.8	36 57.9	1.0 04	177.9	34 58.0	1.0 04	178.0	34 28.0	1.0 04	178.0	33 28.1	1.0 04	178.0	2
3	40 54.9	1.0 07	176.5	40 24.9	1.0 06	176.5	39 55.0	1.0 06	176.6	38 55.1	1.0 06	176.7	36 55.3	1.0 06	176.8	34 55.6	1.0 06	177.0	34 25.6	1.0 06	177.0	33 25.7	1.0 06	177.1	3
4	40 50.9	1.0 09	175.3	40 21.0	1.0 08	175.4	39 51.1	1.0 08	175.4	38 51.3	1.0 08	175.6	36 51.7	1.0 08	175.8	34 52.1	1.0 07	176.0	34 22.2	1.0 07	176.0	33 22.4	1.0 07	176.1	4
05	40 45.7	99 10	174.2	40 15.9	99 10	174.2	39 46.1	99 10	174.3	38 46.4	99 10	174.4	36 47.1	99 10	174.7	34 47.7	1.0 09	175.0	34 17.8	1.0 09	175.0	33 18.1	1.0 09	175.1	05
6	40 39.5	99 12	173.0	40 09.7	99 12	173.1	39 40.0	99 12	173.2	38 40.5	99 12	173.3	36 41.4	99 11	173.7	34 42.2	99 11	173.9	34 12.4	99 10	174.0	33 12.9	99 10	174.2	6
7	40 32.1	99 14	171.9	40 02.4	99 14	172.0	39 32.8	99 14	172.1	38 33.4	99 14	172.2	36 34.7	99 13	172.6	34 35.8	99 12	172.9	34 06.1	99 12	173.0	33 06.7	99 12	173.2	7
8	40 23.6	99 16	170.7	39 54.1	99 16	170.8	39 24.5	99 16	170.9	38 25.3	99 15	171.1	36 27.0	99 15	171.6	34 28.5	99 14	172.0	33 58.9	99 14	172.0	32 59.6	99 13	172.2	8
9	40 14.0	98 18	169.6	39 44.6	98 18	169.7	39 15.1	98 17	169.8	38 16.2	98 17	170.1	36 18.2	98 16	170.5	34 20.2	98 16	171.0	33 50.6	98 15	171.1	32 51.6	98 15	171.3	9
10	40 03.4	98 20	168.4	39 34.0	98 19	168.6	39 04.7	98 19	168.7	38 06.0	98 19	169.0	36 08.5	98 18	169.5	34 10.9	98 17	170.0	33 41.5	98 17	170.1	32 42.6	98 16	170.3	10
1	39 51.6	97 21	167.3	39 22.4	97 21	167.5	38 53.2	97 21	167.6	37 54.8	97 20	167.9	35 57.8	98 20	168.5	34 00.7	98 19	169.0	33 31.4	98 18	169.1	32 32.7	98 18	169.4	1
2	39 38.8	97 23	166.2	39 09.7	97 23	166.4	38 40.7	97 23	166.5	37 42.5	97 22	166.8	35 46.1	97 21	167.4	33 49.5	97 20	168.0	33 20.3	97 20	168.2	32 22.0	97 19	168.4	2
3	39 24.9	96 25	165.1	38 56.0	96 24	165.3	38 27.1	96 24	165.4	37 29.3	96 24	165.8	35 33.5	97 23	166.4	33 37.4	97 22	167.1	33 08.4	97 21	167.2	32 10.3	97 21	167.5	3
4	39 10.0	96 27	164.0	38 41.3	96 26	164.2	38 12.5	96 26	164.4	37 15.0	96 25	164.7	35 19.9	96 24	165.4	33 24.4	96 23	166.1	32 55.5	96 23	166.3	31 57.7	96 22	166.6	4
15	38 54.0	95 28	162.9	38 25.5	95 28	163.1	37 57.0	95 28	163.3	36 59.8	95 27	163.7	35 05.3	96 26	164.4	33 10.5	96 25	165.1	32 41.8	96 24	165.3	31 44.3	96 24	165.7	15
6	38 37.1	94 30	161.9	38 08.8	94 30	162.1	37 40.4	95 29	162.3	36 43.6	95 28	162.7	34 49.8	95 27	163.5	32 55.7	95 26	164.2	32 27.2	95 26	164.4	31 30.0	95 25	164.7	6
7	38 19.1	94 32	160.8	37 51.0	94 31	161.0	37 22.8	94 31	161.2	36 26.5	94 30	161.7	34 33.4	94 29	162.5	32 40.0	95 28	163.3	32 11.6	95 27	163.5	31 14.8	95 27	163.8	7
8	38 00.2	93 33	159.7	37 32.3	93 33	160.0	37 04.3	93 32	160.2	36 08.4	93 32	160.6	34 16.1	94 30	161.5	32 23.5	94 29	162.3	31 55.3	94 29	162.5	30 58.8	94 28	162.9	8
9	37 40.4	92 35	158.7	37 12.6	92 34	158.9	36 44.9	93 34	159.2	35 49.3	93 33	159.7	33 57.9	93 32	160.6	32 06.0	93 30	161.4	31 38.0	93 30	161.6	30 41.9	94 29	162.0	9
20	37 19.6	92 36	157.7	36 52.1	92 36	157.9	36 24.5	92 36	158.2	35 29.4	92 35	158.7	33 38.8	92 33	159.6	31 47.8	93 32	160.5	31 20.0	93 32	160.7	30 24.3	93 31	161.2	20
1	36 57.8	91 38	156.7	36 30.6	91 37	156.9	36 03.3	91 37	157.2	35 08.6	91 36	157.7	33 18.8	92 34	158.7	31 28.7	92 33	159.6	31 01.1	92 33	159.8	30 05.8	92 32	160.3	1
2	36 35.2	90 39	155.7	36 08.2	90 39	155.9	35 41.1	90 38	156.2	34 46.9	90 38	156.7	32 58.1	91 36	157.7	31 08.8	91 35	158.7	30 41.4	91 34	159.0	29 46.5	92 34	159.4	2
3	36 11.7	89 41	154.7	35 44.9	89 40	155.0	35 18.1	89 40	155.2	34 24.3	90 39	155.8	32 36.4	90 37	156.8	30 48.0	91 36	157.8	30 20.9	91 35	158.1	29 26.4	91 35	158.6	3
4	35 47.3	88 42	153.7	35 20.8	88 42	154.0	34 54.2	89 41	154.3	34 00.9	89 40	154.9	32 14.0	89 39	155.9	30 26.5	90 37	157.0	29 59.6	90 37	157.2	29 05.6	90 36	157.7	4
25	35 22.1	88 43	152.8	34 55.8	88 43	153.1	34 29.5	88 42	153.4	33 36.7	88 42	153.9	31 50.8	89 40	155.0	30 04.2	89 38	156.1	29 37.5	89 38	156.4	28 44.0	89 37	156.9	25
6	34 56.0	87 45	151.8	34 30.0	87 44	152.1	34 04.0	87 44	152.4	33 11.7	87 43	153.0	31 26.7	88 41	154.2	29 41.2	89 40	155.3	29 14.7	88 39	155.5	28 21.6	89 38	156.1	6
7	34 29.2	86 46	150.9	34 03.5	86 46	151.2	33 37.8	86 45	151.5	32 45.9	86 44	152.1	31 01.9	87 42	153.3	29 17.4	87 41	154.4	28 51.1	88 40	154.7	27 58.5	88 40	155.3	7
8	34 01.6	85 47	150.0	33 36.1	85 47	150.3	33 10.6	85 46	150.6	32 19.3	85 46	151.2	30 36.4	86 44	152.4	28 52.8	87 42	153.6	28 26.8	87 42	153.9	27 34.7	87 41	154.5	8
9	33 33.2	84 49	149.1	33 08.0	84 48	149.4	32 42.7	84 48	149.7	31 52.0	85 47	150.4	30 10.1	85 45	151.6	28 27.6	86 43	152.8	28 01.8	86 43	153.1	27 10.2	86 42	153.7	9
30	33 04.0	83 50	148.2	32 39.1	83 49	148.5	32 14.1	83 49	148.9	31 24.0	84 48	149.5	29 43.1	84 46	150.8	28 01.6	85 44	152.0	27 36.1	85 44	152.3	26 45.0	85 43	152.9	30
1	32 34.2	82 51	147.3	32 09.5	82 50	147.7	31 44.8	82 50	148.0	30 55.2	83 49	148.7	29 15.4	83 47	150.0	27 35.0	84 46	151.2	27 09.7	84 45	151.5	26 19.2	84 44	152.1	1
2	32 03.6	81 52	146.5	31 39.2	81 52	146.8	31 14.8	82 51	147.2	30 25.7	82 50	147.8	28 47.0	83 48	149.2	27 07.6	83 46	150.4	26 42.7	83 46	150.7	25 52.6	84 45	151.3	2
3	31 32.3	80 53	145.7	31 08.2	80 53	146.0	30 44.1	81 52	146.3	29 55.6	81 51	147.0	28 18.0	82 50	148.4	26 39.7	82 48	149.7	26 15.0	82 47	150.0	25 25.5	83 46	150.6	3
4	31 00.4	79 54	144.8	30 36.6	79 54	145.2	30 12.7	80 53	145.5	29 24.8	80 52	146.2	27 48.3	81 51	147.6	26 11.0	81 49	148.9	25 46.6	81 48	149.2	24 57.6	82 47	149.9	4
35	30 27.8	78 55	144.0	30 04.3	79 55	144.4	29 40.7	79 54	144.7	28 53.3	79 54	145.4	27 17.9	80 52	146.8	25 41.8	80 50	148.1	25 17.6	81 49	148.5	24 29.2	81 48	149.1	35
6	29 54.6	77 56	143.2	29 31.3	78 56	143.6	29 08.0	78 56	143.9	28 21.2	78 54	144.7	26 47.0	79 53	146.1	25 11.9	80 51	147.4	24 48.1	80 50	147.8	24 00.2	80 49	148.4	6
7	29 20.7	76 57	142.4	28 57.8	77 57	142.8	28 34.7	77 56	143.2	27 48.5	77 56	143.9	26 15.4	78 54	145.3	24 41.5	79 52	146.7	24 17.9	79 51	147.0	23 30.5	79 50	147.7	7
8	28 46.3	76 58	141.7	28 23.6	76 58	142.0	28 00.9	76 58	142.4	27 15.2	76 56	143.1	25 43.2	77 54	144.6	24 10.4	78 53	146.0	23 47.1	78 53	146.3	23 00.3	78 51	147.0	8
9	28 11.3	75 59	140.9	27 48.9	75 59	141.3	27 26.4	75 58	141.7	26 41.3	75 57	142.4	25 10.5	76 56	143.9	23 38.8	77 54	145.3	23 15.8	77 53	145.6	22 29.5	77 52	146.3	9
40	27 35.7	74 60	140.2	27 13.6	74 60	140.6	26 51.4	74 59	140.9	26 06.9	74 58	141.7	24 37.2	75 56	143.2	23 06.6	76 54	144.6	22 43.9	76 54	144.9	21 58.2	76 53	145.6	40
1	26 59.5	73 61	139.5	26 37.7	73 61	139.8	26 15.8	73 60	140.2	25 31.9	73 59	141.0	24 03.3	74 57	142.5	22 33.9	75 56	143.9	22 11.4	75 55	144.3	21 26.3	75 54	145.0	1
2	26 22.8	72 62	138.7	26 01.3	72 62	139.1	25 39.7	72 61	139.5	24 56.3	72 60	140.3	23 28.9	73 58	141.8	22 00.6	74 56	143.2	21 38.4	74 56	143.6	20 53.9	74 55	144.3	2
3	25 45.6	71 63	138.0	25 24.4	71 62	138.4	25 03.1	71 62	138.8	24 20.3	72 61	139.6	22 54.0	72 59	141.1	21 26.9	73 57	142.6	21 05.0	73 57	143.0	20 21.0	73 56	143.7	3
4	25 07.9	70 64	137.4	24 47.0	70 63	137.7	24 25.9	70 63	138.1	23 43.7	71 62	138.9	22 18.6	71 60	140.4	20 52.6	72 58	141.9	20 31.0	72 58	142.3	19 47.6	72 56	143.1	4
45	24 29.7	69 64	136.7	24 09.1	69 64	137.1	23 48.3	69 64	137.5	23 06.7	70 63	138.3	21 42.7	70 61	139.8	20 17.8	71 59	141.3	19 56.5	71 58	141.7	19 13.7	71 57	142.4	45
6	23 51.1	68 65	136.0	23 30.7	68 65	136.4	23 10.2	68 64	136.8	22 29.1	69 63	137.6	21 06.3	69 62	139.2	19 42.6	70 60	140.7	19 21.5	70 59	141.1	18 39.3	71 58	141.8	6
7	23 12.0	67 66	135.4	22 51.8	67 66	135.8	22 31.7	67 65	136.2	21 51.1	68 64	137.0	20 29.4	68 62	138.5	19 06.9	69 60	140.1	18 46.1	69 60	140.5	18 04.4	70 59	141.2	7
8	22 32.4	66 67	134.7	22 12.5	66 66	135.1	21 52.7	66 66	135.5	21 12.7	67 65	136.3	19 52.1	68 63	137.9	18 30.7	68 61	139.5	18 10.2	68 60	139.9	17 29.1	69 60	140.6	8
9	21 52.4	65 67	134.1	21 32.8	65 67	134.5	21 13.2	65 66	134.9	20 33.8	66 66	135.7	19 14.3	67 64	137.3	17 54.1	67 62	138.9	17 33.9	67 61	139.3	16 53.4	68 60	140.1	9
50	21 11.9	64 68	133.5	20 52.7	64 68	133.9	20 33.3	65 67	134.3	19 54.5	65 66	135.1	18 36.2	66 64	136.7	17 17.0	66 62	138.3	16 57.1	66 62	138.7	16 17.2	67 61	139.5	50
1	20 31.1	63 69	132.9	20 12.1	63 68	133.3	19 53.0	64 68	133.7	19 14 8	64 67	134.5	17 57.6	65 65	136.1	16 39.6	65 63	137.7	16 19.9	65 62	138.1	15 40.6	66 62	138.9	1
2	19 49.9	62 69	132.3	19 31.1	63 69	132.7	19 12.4	63 68	133.1	18 34.6	63 68	133.9	17 18.5	64 66	135.6	16 01.7	64 64	137.2	15 42.4	65 63	137.6	15 03.6	65 62	138.4	2
3	19 08.2	61 70	131.7	18 49.8	62 70	132.1	18 31.3	62 69	132.6	17 54.1	62 68	133.4	16 39.1	63 66	135.0	15 23.4	63 64	136.6	15 04.4	64 64	137.0	14 26.2	64 63	137.8	3
4	18 26.2	61 71	131.2	18 08.1	61 70	131.6	17 49.8	61 70	132.0	17 13.2	61 69	132.8	15 59.4	62 67	134.5	14 44.8	62 65	136.1	14 26.0	63 65	136.5	13 48.4	63 64	137.3	4
55	17 43.9	60 71	130.6	17 26.0	60 71	131.0	17 08.0	60 70	131.4	16 31.9	60 69	132.3	15 19.2	61 68	133.9	14 05.7	61 66	135.6	13 47.2	62 65	136.0	13 10.2	62 64	136.8	55
6	17 01.2	59 72	130.0	16 43.5	59 71	130.5	16 25.8	59 71	130.9	15 50.3	59 70	131.7	14 38.7	60 68	133.4	13 26.3	61 66	135.0	13 08.1	61 66	135.4	12 31.6	61 65	136.3	6
7	16 18.1	58 72	129.5	16 00.8	58 72	129.9	15 43.3	58 71	130.4	15 08.3	58 70	131.2	13 57.8	59 69	132.9	12 46.6	60 67	134.5	12 28.7	60 66	134.9	11 52.7	60 65	135.8	7
8	15 34.8	57 73	129.0	15 17.6	57 72	129.4	15 00.5	57 72	129.8	14 26.0	58 71	130.7	13 16.6	58 69	132.4	12 06.5	59 68	134.0	11 48.8	59 67	134.4	11 13.5	59 66	135.3	8
9	14 51.1	56 73	128.5	14 34.2	56 73	128.9	14 17.3	56 72	129.3	13 43.4	57 72	130.2	12 35.0	57 70	131.9	11 26.0	58 68	133.5	11 08.7	58 68	133.9	10 33.9	58 66	134.8	9
60	14 07.0	55 74	128.0	13 50.4	55 73	128.4	13 33.8	56 73	128.8	13 00.4	56 72	129.7	11 53.1	56 70	131.4	10 45.2	57 68	133.0	10 28.2	57 68	133.5	9 54.0	57 67	134.3	60
1	13 22.7	54 74	127.5	13 06.4	55 74	127.9	12 50.0	55 74	128.3	12 17.1	55 72	129.2	11 10.9	55 71	130.9	10 04.1	56 69	132.6	9 47.4	56 69	133.0	9 13.7	56 68	133.8	1
2	12 38.1	54 75	127.0	12 22.0	54 74	127.4	12 05.9	54 74	127.8	11 33.6	54 73	128.7	10 28.4	55 71	130.4	9 22.7	55 70	132.1	9 06.2	55 69	132.5	8 33.1	55 68	133.4	2
3	11 53.2	53 75	126.5	11 37.4	53 75	126.9	11 21.5	53 74	127.4	10 49.7	53 74	128.2	9 45.6	54 72	129.9	8 41.0	54 70	131.6	8 24.8	54 70	132.1	7 52.3	54 69	132.9	3
4	11 08.0	52 76	126.0	10 52.5	52 75	126.5	10 36.9	52 75	126.9	10 05.6	52 74	127.8	9 02.5	53 72	129.5	7 59.0	53 70	131.2	7 43.1	53 70	131.6	7 11.1	53 69	132.5	4
65	10 22.6	51 76	125.6	10 07.3	51 76	126.0	9 51.9	51 75	126.4	9 21.1	51 74	127.3	8 19.2	52 73	129.0	7 16.7	52 71	130.8	7 01.1	52 70	131.2	6 29.7	52 70	132.0	65
6	9 36.9	50 76	125.1	9 21.8	50 76	125.5	9 06.7	50 76	126.0	8 36.4	51 75	126.9	7 35.5	51 73	128.6	6 34.2	51 72	130.3	6 18.8	51 71	130.8	5 47.9	51 70	131.6	6
7	8 51.0	49 77	124.7	8 36.1	49 76	125.1	8 21.3	50 76	125.5	7 51.5	50 75	126.4	6 51.6	50 74	128.2	5 51.3	50 72	129.9	5 36.2	50 71	130.3	5 05.9	51 70	131.2	7
8	8 04.8	49 77	124.2	7 50.2	49 77	124.7	7 35.6	49 77	125.1	7 06.3	49 76	126.0	6 07.4	49 74	127.7	5 08.2	49 72	129.5							8
9	7 18.3	48 78	123.8	7 04.0	48 77	124.2	6 49.6	48 77	124.7	6 20.9	48 76	125.6	5 23.0	48 74	127.3										9
70	6 31.7	47 78	123.4	6 17.6	47 78	123.8	6 03.5	47 77	124.3	5 35.2	47 77	125.1													70
1	5 44.8	46 78	123.0	5 30.9	46 78	123.4	5 17.0	46 78	123.9																1

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	8 51.0	33 83	63.3	9 00.9	33 83	62.8	9 10.6	33 82	62.4	9 30.1	32 82	61.4	10 08.5	32 80	59.5	10 46.3	31 79	57.5	10 55.6	31 78	57.1	11 14.1	31 77	56.1	91
2	8 01.1	34 83	63.0	8 11.1	33 83	62.5	8 21.1	33 82	62.1	8 41.0	33 82	61.1	9 20.3	33 80	59.2	9 59.1	32 78	57.3	10 08.7	32 78	56.8	10 27.7	32 77	55.8	2
3	7 11.2	34 83	62.7	7 21.4	34 82	62.2	7 31.7	34 82	61.8	7 52.0	34 81	60.8	8 32.3	33 80	58.9	9 12.0	33 78	57.0	9 21.9	33 78	56.5	9 41.4	32 77	55.6	3
4	6 21.5	35 83	62.4	6 32.0	35 82	61.9	6 42.4	35 82	61.5	7 03.2	35 81	60.5	7 44.4	34 80	58.6	8 25.1	34 78	56.7	8 35.2	34 78	56.2	8 55.3	33 77	55.3	4
95	5 31.9	36 83	62.1	5 42.6	36 82	61.6	5 53.2	35 82	61.2	6 14.5	35 81	60.2	6 56.7	35 79	58.3	7 38.4	35 78	56.4	7 48.7	34 77	56.0	8 09.3	34 76	55.0	95
6							5 04.3	36 81	60.8	5 25.9	36 81	59.9	6 09.1	36 79	58.0	6 51.8	35 78	56.1	7 02.4	35 77	55.7	7 23.5	35 76	54.7	6
7													5 21.6	37 79	57.7	6 05.3	36 77	55.8	6 16.2	36 77	55.4	6 37.9	36 76	54.4	7
8																5 19.1	37 77	55.5	5 30.2	37 77	55.1	5 52.4	37 76	54.1	8
9																						5 07.1	38 76	53.8	9

Lat. 21°
Lat. 22°
Lat. 23°
Lat. 24°
Lat. 25°
Lat. 26°
Lat. 27°
Lat. 28°

Lat. 21°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	75 00.0	1.0 02	00.0	74 00.0	1.0 02	00.0	72 30.0	1.0 02	00.0	71 00.0	1.0 02	00.0	69 00.0	1.0 02	00.0	68 30.0	1.0 02	00.0	68 00.0	1.0 02	00.0	66 00.0	1.0 01	00.0	00
1	74 56.5	1.0 08	03.1	73 58.6	1.0 07	02.9	72 28.7	1.0 06	02.6	70 58.9	1.0 06	02.4	68 59.0	1.0 05	02.1	68 29.0	1.0 05	02.0	67 59.0	1.0 05	02.0	65 59.2	1.0 04	01.7	1
2	74 53.9	99 12	06.2	73 54.4	99 12	05.8	72 24.9	99 10	05.2	70 55.4	1.0 10	04.7	68 56.0	1.0 08	04.1	68 26.1	1.0 08	04.0	67 56.2	1.0 08	03.9	65 56.6	1.0 07	03.5	2
3	74 46.4	98 18	09.3	73 47.3	98 16	08.6	72 18.6	99 15	07.7	70 49.7	99 13	07.0	68 50.9	99 12	06.2	68 21.2	99 11	06.0	67 51.4	99 11	05.8	65 52.4	99 10	05.2	3
4	74 35.9	97 22	12.3	73 37.6	97 21	11.4	72 09.8	98 18	10.3	70 41.7	98 17	09.3	68 43.9	98 15	08.2	68 14.4	98 15	08.0	67 44.8	99 14	07.7	65 46.5	99 13	06.9	4
05	74 22.6	96 27	15.2	73 25.2	96 25	14.1	71 58.7	96 22	12.7	70 31.6	97 20	11.6	68 34.9	97 18	10.2	68 05.6	98 18	09.9	67 36.4	98 17	09.6	65 38.9	98 15	08.6	05
6	74 06.6	93 31	18.0	73 10.3	94 29	16.8	71 45.2	96 26	15.1	70 19.3	96 24	13.8	68 24.0	96 21	12.2	67 55.1	97 21	11.8	67 26.1	97 20	11.5	65 29.7	97 18	10.3	6
7	73 48.0	91 35	20.7	72 53.0	92 33	19.3	71 29.4	93 30	17.5	70 05.0	94 27	15.9	68 11.3	95 24	14.1	67 42.7	95 24	13.7	67 14.1	96 23	13.3	65 19.0	96 21	11.9	7
8	73 27.0	89 39	23.3	72 33.3	90 36	21.8	71 11.5	92 33	19.7	69 48.7	93 30	18.0	67 56.7	94 27	16.0	67 28.6	94 26	15.5	67 00.3	94 26	15.1	65 06.6	95 23	13.5	8
9	73 03.8	87 42	25.8	72 11.5	88 40	24.1	70 51.6	90 36	21.9	69 30.4	91 34	20.0	67 40.5	92 30	17.8	67 12.7	93 29	17.3	66 44.9	93 28	16.8	64 52.8	94 26	15.1	9
10	72 38.4	84 46	28.1	71 47.6	85 43	26.3	70 29.8	87 39	24.0	69 10.3	89 36	22.0	67 22.5	91 33	19.6	66 55.2	91 32	19.1	66 27.9	91 31	18.5	64 37.5	93 28	16.6	10
1	72 11.1	81 48	30.3	71 21.8	83 46	28.5	70 06.1	85 42	26.0	68 48.5	87 39	23.9	67 02.9	89 35	21.3	66 36.1	89 34	20.7	66 09.3	90 34	20.2	64 20.7	91 30	18.2	1
2	71 42.0	79 52	32.4	70 54.2	81 49	30.5	69 40.6	83 45	27.9	68 25.1	85 42	25.7	66 41.8	87 38	23.0	66 15.6	88 37	22.4	65 49.2	88 36	21.8	64 02.6	90 32	19.6	2
3	71 11.1	76 54	34.4	70 25.0	78 51	32.4	69 13.6	81 48	29.8	68 00.0	83 44	27.4	66 19.2	85 40	24.6	65 53.5	86 39	24.0	65 27.7	86 38	23.3	63 43.1	88 35	21.1	3
4	70 38.8	73 56	36.2	69 54.2	75 54	34.2	68 45.1	78 50	31.5	67 33.6	81 46	29.0	65 55.2	83 42	26.1	65 30.1	84 41	25.5	65 04.8	84 40	24.8	63 22.3	86 37	22.4	4
15	70 05.0	70 58	37.9	69 22.0	73 56	35.9	68 15.1	76 52	33.1	67 05.7	78 49	30.6	65 29.8	81 44	27.6	65 05.3	82 43	26.9	64 40.7	83 42	26.3	63 00.3	85 38	23.8	15
6	69 30.0	68 60	39.5	68 48.5	70 58	37.5	67 43.8	73 54	34.7	66 36.5	76 51	32.1	65 03.2	79 46	29.1	64 39.4	80 45	28.4	64 15.3	81 44	27.7	62 37.2	83 40	25.1	6
7	68 53.7	65 62	41.1	68 13.8	68 60	39.0	67 11.4	71 56	36.2	66 06.1	74 52	33.6	64 35.4	77 48	30.4	64 12.2	78 47	29.7	63 48.7	79 46	29.0	62 12.2	81 42	26.3	7
8	68 16.4	63 64	42.5	67 38.0	65 61	40.4	66 37.8	69 58	37.6	65 34.6	72 54	34.9	64 06.5	75 50	31.7	63 43.9	76 49	31.0	63 21.0	77 48	30.3	61 47.5	79 44	27.5	8
9	67 38.1	60 65	43.8	67 01.2	63 63	41.8	66 03.1	66 59	38.9	65 02.0	69 56	36.2	63 36.5	73 52	33.0	63 14.5	74 50	32.2	62 52.3	75 50	31.5	61 21.1	77 46	28.7	9
20	66 58.9	58 67	45.0	66 23.4	60 64	43.0	65 27.5	64 61	40.1	64 28.4	67 58	37.4	63 05.6	71 53	34.2	62 44.2	72 52	33.4	62 22.5	73 51	32.6	60 53.7	75 47	29.8	20
1	66 18.8	55 68	46.2	65 44.8	58 66	44.2	64 50.9	62 62	41.3	63 53.9	65 59	38.6	62 33.6	69 55	35.3	62 12.9	70 54	34.5	61 51.9	70 53	33.8	60 25.4	74 49	30.9	1
2	65 38.0	53 69	47.3	65 05.4	56 67	45.3	64 13.6	59 64	42.4	63 18.5	63 60	39.7	62 00.8	67 56	36.4	61 40.7	68 55	35.6	61 20.3	68 54	34.8	59 56.2	72 50	31.9	2
3	64 56.6	51 70	48.3	64 25.3	53 68	46.3	63 35.4	57 65	43.4	62 42.4	61 62	40.7	61 27.2	65 57	37.4	61 07.7	66 56	36.6	60 47.9	66 55	35.9	59 26.2	70 51	32.9	3
4	64 14.4	49 71	49.2	63 44.4	51 69	47.2	62 56.6	55 66	44.4	62 05.4	58 63	41.7	60 52.8	63 59	38.4	60 33.9	63 58	37.6	60 14.7	64 56	36.8	58 55.4	68 53	33.9	4
25	63 31.8	47 72	50.1	63 03.0	49 70	48.1	62 17.0	53 67	45.3	61 27.8	56 64	42.7	60 17.6	61 60	39.3	59 59.3	61 59	38.5	59 40.8	62 58	37.8	58 23.8	66 54	34.8	25
6	62 48.5	44 73	50.9	62 21.0	47 71	49.0	61 36.9	51 68	46.2	60 49.5	54 65	43.5	59 41.8	58 61	40.2	59 24.1	59 60	39.4	59 06.1	60 59	38.6	57 51.5	64 55	35.6	6
7	62 04.8	42 74	51.7	61 38.5	45 72	49.8	60 56.2	49 69	47.0	60 10.7	52 66	44.4	59 05.3	56 62	41.1	58 48.2	57 61	40.3	58 30.8	58 60	39.5	57 18.5	62 56	36.5	7
8	61 20.7	41 74	52.4	60 55.5	43 72	50.5	60 15.0	47 70	47.8	59 31.2	50 67	45.2	58 28.2	55 63	41.8	58 11.7	56 62	41.1	57 54.9	56 61	40.3	56 44.9	60 57	37.3	8
9	60 36.1	39 75	53.0	60 12.1	41 73	51.2	59 33.3	45 70	48.5	58 51.2	48 67	45.9	57 50.6	53 64	42.6	57 34.7	54 63	41.8	57 18.4	55 62	41.0	56 10.7	58 58	38.0	9
30	59 51.2	37 76	53.7	59 28.3	39 74	51.8	58 51.1	43 71	49.2	58 10.8	47 68	46.6	57 12.4	51 64	43.3	56 57.0	52 64	42.5	56 41.4	53 63	41.7	55 35.9	56 59	38.7	30
1	59 05.9	35 76	54.2	58 44.0	38 74	52.4	58 08.5	41 72	49.8	57 29.9	45 69	47.2	56 33.7	49 65	44.0	56 18.9	50 64	43.2	56 03.8	51 63	42.4	55 00.6	54 60	39.4	1
2	58 20.3	33 76	54.8	57 59.5	36 75	53.0	57 25.6	39 72	50.4	56 48.5	43 70	47.9	55 54.6	47 66	44.6	55 40.4	48 65	43.8	55 25.8	49 64	43.1	54 24.8	53 60	40.1	2
3	57 34.4	32 77	55.3	57 14.6	34 75	53.5	56 42.2	38 73	50.9	56 06.8	41 70	48.4	55 15.0	45 66	45.2	55 01.3	46 66	44.5	54 47.3	47 65	43.7	53 48.5	51 61	40.7	3
4	56 48.2	30 77	55.7	56 29.4	33 76	54.0	55 58.6	36 73	51.5	55 24.7	39 71	49.0	54 35.1	43 67	45.8	54 21.9	44 66	45.0	54 08.4	45 66	44.3	53 11.7	49 62	41.3	4
35	56 01.8	29 78	56.1	55 44.0	31 76	54.4	55 14.6	34 74	51.9	54 42.3	38 71	49.5	53 54.7	42 68	46.4	53 42.1	43 67	45.6	53 29.1	44 66	44.8	52 34.6	47 63	41.9	35
6	55 15.2	27 78	56.5	54 58.3	29 76	54.9	54 30.4	33 74	52.4	53 59.5	36 72	50.0	53 14.0	40 68	46.9	53 01.9	41 68	46.1	52 49.5	42 67	45.4	51 57.0	46 63	42.4	6
7	54 28.4	26 78	56.9	54 12.4	28 77	55.3	53 45.9	31 75	52.8	53 16.5	34 72	50.4	52 33.0	38 69	47.3	52 21.3	39 68	46.6	52 09.4	40 67	45.8	51 19.0	44 64	42.9	7
8	53 41.3	24 79	57.3	53 26.2	26 77	55.6	53 01.1	30 75	53.2	52 33.2	33 73	50.9	51 51.6	37 69	47.8	51 40.5	38 69	47.1	51 29.1	38 68	46.3	50 40.7	42 64	43.4	8
9	52 54.1	23 79	57.6	52 39.9	25 78	56.0	52 16.1	28 75	53.6	51 49.6	31 73	51.3	51 10.0	35 70	48.2	50 59.3	36 69	47.5	50 48.4	37 68	46.7	50 02.1	40 65	43.9	9
40	52 06.8	21 79	57.9	51 53.4	23 78	56.3	51 31.0	26 76	53.9	51 05.8	29 73	51.6	50 28.1	33 70	48.6	50 17.9	34 70	47.9	50 07.5	35 69	47.2	49 23.1	39 66	44.3	40
1	51 19.3	20 80	58.1	51 06.7	22 78	56.6	50 45.6	25 76	54.3	50 21.8	28 74	52.0	49 45.9	32 71	49.0	49 36.2	33 70	48.3	49 26.3	34 69	47.6	48 43.8	37 66	44.7	1
2	50 31.6	19 80	58.4	50 19.9	21 78	56.8	50 00.0	24 76	54.6	49 37.5	26 74	52.3	49 03.5	30 71	49.4	48 54.3	31 70	48.6	48 44.8	32 69	47.9	48 04.3	35 66	45.1	2
3	49 43.9	17 80	58.6	49 32.9	19 78	57.1	49 14.3	22 76	54.8	48 53.1	25 74	52.6	48 20.9	29 71	49.7	48 12.2	30 71	49.0	48 03.2	30 70	48.3	47 24.5	34 67	45.4	3
4	48 56.0	16 80	58.8	48 45.9	18 79	57.3	48 28.5	21 77	55.1	48 08.5	24 74	52.9	47 38.1	27 72	50.0	47 29.8	28 71	49.3	47 21.3	29 70	48.6	46 44.5	32 67	45.8	4
45	48 08.0	15 80	59.0	47 58.7	17 79	57.5	47 42.5	19 77	55.3	47 23.8	22 75	53.1	46 55.1	26 72	50.3	46 47.2	27 71	49.6	46 39.1	27 70	48.9	46 04.2	31 67	46.1	45
6	47 20.0	13 80	59.2	47 11.4	15 79	57.7	46 56.3	18 77	55.5	46 38.9	21 75	53.4	46 11.9	24 72	50.6	46 04.5	25 72	49.9	45 56.9	26 71	49.2	45 23.8	29 68	46.4	6
7	46 31.9	12 80	59.3	46 24.0	14 79	57.9	46 10.1	17 77	55.7	45 53.8	19 75	53.6	45 28.6	23 72	50.8	45 21.6	24 72	50.1	45 14.4	24 71	49.4	44 43.1	28 68	46.7	7
8	45 43.6	11 80	59.5	45 36.5	13 79	58.0	45 23.7	15 77	55.9	45 08.7	18 76	53.8	44 45.1	21 73	51.0	44 38.5	22 72	50.4	44 31.8	23 71	49.7	44 02.2	26 68	47.0	8
9	44 55.4	10 81	59.6	44 48.9	12 79	58.2	44 37.3	14 78	56.1	44 23.4	17 76	54.0	44 01.4	20 73	51.3	43 55.3	21 72	50.6	43 49.0	22 72	49.9	43 21.2	25 69	47.2	9
50	44 07.0	09 81	59.7	44 01.3	10 80	58.3	43 50.8	13 78	56.2	43 38.1	15 76	54.2	43 17.7	19 73	51.5	43 12.0	19 72	50.8	43 06.1	20 72	50.1	42 40.0	23 69	47.4	50
1	43 18.7	08 81	59.8	43 13.6	09 80	58.4	43 04.2	12 78	56.4	42 52.6	14 76	54.3	42 33.8	17 73	51.6	42 28.5	18 72	51.0	42 23.0	19 72	50.3	41 58.7	22 69	47.7	1
2	42 30.2	07 81	59.9	42 25.9	08 80	58.5	42 17.5	10 78	56.5	42 07.1	13 76	54.5	41 49.8	16 73	51.8	41 45.0	17 73	51.2	41 39.9	17 72	50.5	41 17.2	20 69	47.9	2
3	41 41.8	05 81	59.9	41 38.1	07 80	58.6	41 30.8	09 78	56.6	41 21.4	12 76	54.6	41 05.8	15 74	52.0	41 01.3	15 73	51.3	40 56.6	16 72	50.6	40 35.6	19 70	48.0	3
4	40 53.3	04 81	60.0	40 50.3	06 80	58.7	40 44.0	08 78	56.7	40 35.7	10 76	54.7	40 21.6	13 74	52.1	40 17.5	14 73	51.4	40 13.2	15 72	50.8	39 53.9	18 70	48.2	4
55	40 04.8	03 81	60.0	40 02.4	05 80	58.7	39 57.2	07 78	56.8	39 50.0	09 76	54.8	39 37.4	12 74	52.2	39 33.7	13 73	51.6	39 29.8	13 72	50.9	39 12.1	16 70	48.4	55
6	39 16.3	02 81	60.0	39 14.5	04 80	58.7	39 10.3	06 78	56.8	39 04.2	08 76	54.9	38 53.1	11 74	52.3	38 49.8	11 73	51.7	38 46.3	12 73	51.0	38 30.2	15 70	48.5	6
7	38 27.7	01 81	60.1	38 26.6	03 80	58.8	38 23.4	05 78	56.9	38 18.4	07 76	55.0	38 08.7	09 74	52.4	38 05.8	10 73	51.8	38 02.7	11 73	51.2	37 48.2	13 70	48.6	7
8	37 39.2	00 81	60.1	37 38.7	01 80	58.8	37 36.5	03 78	56.9	37 32.5	05 76	55.0	37 24.3	08 74	52.5	37 21.8	02 74	51.9	37 19.0	09 73	51.2	37 06.1	12 70	48.8	8
9	36 50.7	01 81	60.1	36 50.8	00 80	58.8	36 49.6	02 78	56.9	36 46.6	04 77	55.1	36 39.8	07 74	52.6	36 37.7	08 74	52.0	36 35.3	08 73	51.3	36 23.9	11 70	48.9	9
60	36 02.1	02 81	60.0	36 02.9	01 80	58.8	36 02.6	01 78	57.0	36 00.6	03 77	55.1	35 55.3	06 74	52.6	35 53.5	06 74	52.0	35 51.6	07 73	51.4	35 41.7	09 70	48.9	60
1	35 13.6	03 81	60.0	35 15.0	02 80	58.8	35 15.7	00 78	57.0	35 14.7	02 77	55.1	35 10.8	05 74	52.7	35 09.4	05 74	52.1	35 07.8	06 73	51.5	34 59.5	08 70	49.0	1
2	34 25.1	04 81	60.0	34 27.1	03 80	58.8	34 28.7	01 78	57.0	34 28.7	01 77	55.1	34 26.3	03 74	52.7	34 25.2	04 74	52.1	34 23.9	04 73	51.5	34 17.2	07 71	49.1	2
3	33 36.6	06 81	59.9	33 39.2	04 80	58.7	33 41.8	02 78	56.9	33 42.8	00 77	55.1	33 41.7	02 74	52.7	33 41.0	03 74	52.1	33 40.1	03 73	51.5	33 34.8	06 71	49.1	3
4	32 48.1	06 81	59.9	32 51.3	05 80	58.7	32 54.8	03 78	56.9	32 56.8	01 77	55.1	32 57.1	01 74	52.7	32 56.7	01 74	52.2	32 56.2	02 73	51.6	32 52.4	04 71	49.2	4
65	31 59.7	07 81	59.8	32 03.5	00 80	58.7	32 07.9	04 78	56.9	32 10.9	02 77	55.1	32 12.5	00 74	52.7	32 12.5	00 74	52.2	32 12.3	01 73	51.6	32 10.0	03 71	49.2	65
6	31 11.3	08 81	59.8	31 15.6	07 80	58.6	31 21.0	06 78	56.8	31 24.9	04 76	55.1	31 27.9	01 74	52.7	31 28.3	01 74	52.2	31 28.5	00 73	51.6	31 27.6	02 71	49.2	6
7	30 22.9	09 80	59.7	30 27.8	08 80	58.5	30 34.1	06 78	56.8	30 39.0	05 76	55.0	30 43.3	03 74	52.7	30 44.0	02 74	52.1	30 44.6	02 73	51.6	30 45.2	01 71	49.2	7
8	29 34.6	10 80	59.6	29 40.1	09 80	58.5	29 47.3	07 78	56.7	29 53.1	06 76	55.0	29 58.8	04 74	52.7	29 59.8	03 74	52.1	30 00.7	03 73	51.5	30 02.8	01 71	49.2	8
9	28 46.3	11 80	59.5	28 52.4	10 80	58.4	29 00.4	08 78	56.7	29 07.2	07 76	54.9	29 14.2	05 74	52.7	29 15.6	04 74	52.1	29 16.9	04 73	51.5	29 20.3	02 71	49.2	9
70	27 58.0	12 80	59.4	28 04.7	11 79	58.3	28 13.7	09 78	56.6	28 21.4	08 76	54.9	28 29.7	06 74	52.6	28 31.4	06 74	52.0	28 33.0	05 73	51.5	28 37.9	03 71	49.2	70
1	27 09.8	13 80	59.3	27 17.1	12 79	58.2	27 26.9	10 78	56.5	27 35.6	09 76	54.8	27 45.2	07 74	52.6	27 47.3	07 74	52.0	27 49.2	06 73	51.4	27 55.5	04 71	49.2	1
2	26 21.7	13 80	59.2	26 29.5	13 79	58.1	26 40.3	11 78	56.4	26 49.8	10 76	54.7	27 00.8	08 74	52.5	27 03.2	08 74	51.9	27 05.4	07 73	51.4	27 13.2	06 71	49.1	2
3	25 33.6	14 80	59.0	25 42.0	14 79	57.9	25 53.6	12 78	56.3	26 04.1	11 76	54.6	26 16.3	09 74	52.4	26 19.1	09 74	51.9	26 21.7	08 73	51.3	26 30.8	07 70	49.1	3
4	24 45.6	15 80	58.9	24 54.6	14 79	57.8	25 07.1	13 78	56.2	25 18.5	12 76	54.5	25 32.0	10 74	52.3	25 35.0	10 73	51.8	25 38.0	10 73	51.2	25 48.5	08 70	49.0	4
75	23 57.7	16 80	58.8	24 07.2	15 79	57.7	24 20.5	14 77	56.1	24 32.9	13 76	54.4	24 47.7	12 74	52.3	24 51.0	11 73	51.7	24 54.3	11 73	51.2	25 06.2	09 70	49.0	75
6	23 09.8	17 80	58.6	23 19.9	16 79	57.6	23 34.1	15 77	55.9	23 47.3	14 76	54.3	24 03.4	13 74	52.2	24 07.1	12 73	51.6	24 10.7	12 72	51.1	24 24.0	10 70	48.9	6
7	22 22.0	18 80	58.5	22 32.6	17 78	57.4	22 47.7	16 77	55.8	23 01.9	15 76	54.2	23 19.2	14 74	52.0	23 23.2	13 73	51.5	23 27.2	13 72	51.0	23 41.8	11 70	48.8	7
8	21 34.3	19 79	58.3	21 45.5	18 78	57.3	22 01.4	17 77	55.7	22 16.5	16 76	54.1	22 35.1	15 74	51.9	22 39.4	14 73	51.4	22 43.7	14 72	50.9	22 59.7	13 70	48.7	8
9	20 46.7	20 79	58.1	20 58.4	19 78	57.1	21 15.2	18 77	55.5	21 31.2	17 76	53.9	21 51.0	16 73	51.8	21 55.7	16 73	51.3	22 00.3	15 72	50.7	22 17.7	14 70	48.6	9
80	19 59.2	21 79	58.0	20 11.4	20 78	56.9	20 29.1	19 77	55.4	20 45.9	18 75	53.8	21 07.0	17 73	51.7	21 12.0	17 73	51.2	21 17.0	16 72	50.6	21 35.7	15 70	48.5	80
1	19 11.7	22 79	57.8	19 24.5	21 78	56.8	19 43.1	20 77	55.2	20 00.8	19 75	53.6	20 23.1	18 73	51.5	20 28.4	18 72	51.0	20 33.7	17 72	50.5	20 53.8	16 70	48.4	1
2	18 24.4	22 79	57.6	18 37.7	22 78	56.6	18 57.1	21 76	55.0	19 15.7	20 75	53.5	19 39.3	19 73	51.4	19 45.0	19 72	50.9	19 50.5	18 72	50.3	20 11.9	17 70	48.3	2
3	17 37.2	23 79	57.4	17 51.0	23 78	56.4	18 11.3	22 76	54.8	18 30.7	21 75	53.3	18 55.6	20 73	51.2	19 01.5	20 72	50.7	19 07.4	20 72	50.2	19 30.2	18 70	48.1	3
4	16 50.0	24 78	57.2	17 04.4	24 77	56.2	17 25.5	23 76	54.7	17 45.9	22 75	53.1	18 11.9	21 72	51.1	18 18.2	21 72	50.6	18 24.5	21 72	50.0	18 48.5	19 69	48.0	4
85	16 03.0	25 78	57.0	16 18.0	25 77	56.0	16 39.9	24 76	54.5	17 01.1	23 74	52.9	17 28.4	22 72	50.9	17 35.0	22 72	50.4	17 41.6	22 71	49.9	18 07.0	21 69	47.8	85
6	15 16.1	26 78	56.8	15 31.6	26 77	55.8	15 54.3	25 76	54.3	16 16.5	24 74	52.8	16 45.0	23 72	50.7	16 51.9	23 72	50.2	16 58.8	23 71	49.7	17 25.5	22 69	47.7	6
7	14 29.3	27 78	56.6	14 45.3	27 77	55.6	15 08.9	26 76	54.1	15 31.9	25 74	52.6	16 01.7	24 72	50.5	16 08.9	24 71	50.0	16 16.1	24 71	49.5	16 44.1	23 69	47.5	7
8	13 42.6	28 78	56.3	13 59.2	27 77	55.3	14 23.6	27 75	53.9	14 47.5	26 74	52.4	15 18.5	25 72	50.4	15 26.1	25 71	49.9	15 33.6	25 71	49.4	16 02.9	24 68	47.3	8
9	12 56.0	29 77	56.1	13 13.2	28 76	55.1	13 38.5	28 75	53.6	14 03.2	27 74	52.1	14 35.4	26 72	50.2	14 43.3	26 71	49.7	14 51.1	26 70	49.2	15 21.8	25 68	47.2	9
90	12 09.6	30 77	55.9	12 27.3	29 76	54.9	12 53.4	29 75	53.4	13 19.1	28 73	51.9	13 52.5	27 71	50.0	14 00.7	27 71	49.5	14 08.8	27 70	49.0	14 40.7	26 68	47.0	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	33 00.0	1.0 01	180.0	32 00.0	1.0 01	180.0	30 30.0	1.0 01	180.0	29 00.0	1.0 01	180.0	27 00.0	1.0 01	180.0	26 30.0	1.0 01	180.0	26 00.0	1.0 01	180.0	24 00.0	1.0 01	180.0	00
1	32 59.5	1.0 02	179.0	31 59.5	1.0 02	179.1	30 29.6	1.0 02	179.1	28 59.6	1.0 02	179.1	26 59.6	1.0 02	179.2	26 29.6	1.0 02	179.2	25 59.6	1.0 02	179.2	23 59.6	1.0 02	179.2	1
2	32 58.1	1.0 04	178.1	31 58.2	1.0 04	178.1	30 28.2	1.0 04	178.2	28 58.3	1.0 04	178.2	26 58.4	1.0 04	178.3	26 28.4	1.0 03	178.4	25 58.4	1.0 03	178.4	23 58.5	1.0 03	178.5	2
3	32 55.8	1.0 06	177.1	31 55.9	1.0 06	177.2	30 26.0	1.0 05	177.3	28 56.1	1.0 05	177.4	26 56.3	1.0 05	177.5	26 26.4	1.0 05	177.5	25 56.4	1.0 05	177.6	23 56.6	1.0 04	177.7	3
4	32 52.5	1.0 07	176.1	31 52.6	1.0 07	176.3	30 22.9	1.0 07	176.4	28 53.2	1.0 06	176.5	26 53.5	1.0 06	176.7	26 23.6	1.0 06	176.7	25 53.6	1.0 06	176.7	23 54.0	1.0 06	176.9	4
05	32 48.2	1.0 08	175.2	31 48.5	1.0 08	175.3	30 18.9	1.0 08	175.5	28 49.3	1.0 08	175.6	26 49.8	1.0 07	175.8	26 19.9	1.0 07	175.9	25 50.1	1.0 07	176.0	23 50.6	1.0 07	176.1	05
6	32 43.1	99 10	174.2	31 43.5	99 10	174.4	30 14 1	99 10	174.6	28 44.6	99 09	174.8	26 45.4	99 09	175.0	26 15.5	99 09	175.1	25 45.7	99 08	175.1	23 46.4	99 08	175.4	6
7	32 37.8	99 12	173.3	31 37.5	99 11	173.4	30 08.3	99 11	173.7	28 39.1	99 11	173.9	26 40.1	99 10	174.2	26 10.3	99 10	174.3	25 40.6	99 10	174.3	23 41.5	99 09	174.6	7
8	32 30.9	99 13	172.3	31 30.7	99 13	172.5	30 01.7	99 12	172.8	28 32.7	99 12	173.0	26 34.0	99 12	173.4	26 04.3	99 11	173.4	25 34.6	99 11	173.5	23 35.9	99 11	173.8	8
9	32 22.9	98 15	171.4	31 22.9	99 14	171.6	29 54.2	99 14	171.9	28 25.5	99 14	172.2	26 27.1	99 13	172.5	25 57.5	99 13	172.6	25 27.9	99 12	172.7	23 29.5	99 12	173.1	9
10	32 13.2	98 16	170.4	31 14.3	98 16	170.7	29 45.9	98 15	171.0	28 17.4	98 15	171.3	26 19.5	98 14	171.7	25 49.9	98 14	171.8	25 20.4	98 14	171.9	23 22.4	98 13	172.3	10
1	32 03.4	98 18	169.5	31 04.7	98 17	169.8	29 36.7	98 17	170.1	28 08.6	98 16	170.5	26 11.0	98 15	170.9	25 41.6	98 15	171.0	25 12.2	98 15	171.1	23 14.5	98 14	171.6	1
2	31 52.8	97 19	168.6	30 54.3	97 19	168.8	29 26.6	97 18	169.2	27 58.9	98 18	169.6	26 01.8	98 17	170.1	25 32.5	98 16	170.2	25 03.2	98 16	170.3	23 05.9	98 16	170.8	2
3	31 41.2	97 21	167.7	30 43.1	97 20	167.9	29 15.8	97 20	168.4	27 48.4	97 19	168.8	25 51.7	97 18	169.3	25 22.6	97 18	169.4	24 53.4	97 18	169.6	22 56.6	97 17	170.1	3
4	31 28 8	96 22	166 7	30 30.9	97 22	167.0	29 04.0	97 21	167.5	27 37.0	97 20	167.9	25 40.9	97 19	168.5	25 11.9	97 19	168.6	24 42.8	97 19	168.8	22 46.6	97 18	169.3	4
15	31 15.5	96 24	165.8	30 17.9	96 23	166.1	28 51.5	96 22	166.6	27 24.9	96 22	167.1	25 29.4	96 20	167.7	25 00.5	96 20	167 8	24 31.6	96 20	168.0	22 35.8	97 19	168.6	15
6	31 01.4	95 25	164.9	30 04.1	96 24	165.3	28 38.1	96 24	165.8	27 12.0	96 23	166.3	25 17.1	96 22	166.9	24 48.3	96 22	167 1	24 19.5	96 21	167.2	22 24.3	96 20	167.8	6
7	30 46.4	95 26	164.0	29 49.5	96 26	164.4	28 24.0	95 25	164.9	26 58.3	96 24	165.4	25 04.0	96 23	166.1	24 35.4	96 23	166.3	24 06.8	96 22	166.5	22 12.2	96 22	167.1	7
8	30 30.5	94 28	163.1	29 34.0	94 27	163.5	28 09.0	94 26	164.1	26 43.9	96 25	164.6	24 50.2	96 24	165.3	24 21.8	96 24	165.5	23 53.3	96 24	165.7	21 59.3	96 22	166.4	8
9	30 13.9	94 29	162.3	29 17.7	94 28	162.7	27 53.2	94 28	163.2	26 28.7	94 27	163.8	24 35.7	94 26	164.6	24 07.4	94 25	164.7	23 39.1	94 25	164.9	21 45.8	94 24	165.6	9
20	29 56.4	93 30	161.4	29 00.6	93 30	161.8	27 36.7	93 29	162.4	26 12.7	93 28	163.0	24 20.4	94 27	163.8	23 52.3	94 26	164.0	23 24.2	94 26	164.2	21 31.6	94 25	164.9	20
1	29 38.1	92 32	160.5	28 42.7	92 31	161.0	27 19.4	93 30	161.6	25 55.9	93 29	162.2	24 04.4	93 28	163.0	23 36.5	93 28	163.2	23 08.6	93 27	163.4	21 16.7	93 26	164.2	1
2	29 19.0	92 33	159 7	28 24.0	92 32	160.1	27 01.3	92 31	160.8	25 38.5	92 30	161.4	23 47.7	92 29	162.3	23 20.0	92 29	162.5	22 52.2	93 28	162.7	21 01.1	93 27	163.5	2
3	28 59.2	91 34	158.8	28 04.6	91 34	159.3	26 42.5	91 32	160.0	25 20.3	91 32	160.7	23 30.3	92 30	161 5	23 02.8	92 30	161.8	22 35.2	92 29	162.0	20 44.9	92 28	162.8	3
4	28 38.5	90 36	158.0	27 44.4	90 35	158.5	26 23.0	91 34	159.2	25 01.4	91 33	159.9	23 12.3	91 31	160.8	22 44.9	91 31	161.0	22 17.6	91 31	161.3	20 28.0	91 20	162.1	4
25	28 17.2	89 37	157.2	27 23.5	90 36	157.7	26 02.7	90 35	158.4	24 41.8	90 34	159.1	22 53.5	90 32	160.1	22 26.4	90 32	160.3	21 59.2	90 32	160.5	20 10.5	91 30	161.4	25
6	27 55.1	89 38	156.3	27 01.8	89 37	156.9	25 41.8	89 36	157.6	24 21.5	89 35	158.4	22 34.1	90 34	159.3	22 07.2	90 33	159.6	21 40.2	90 33	159.8	19 52.3	90 31	160.8	6
7	27 32.2	88 39	155.5	26 39.4	88 38	156.1	25 20.1	88 37	156.9	24 00.5	89 36	157.6	22 14.0	89 35	158.6	21 47.3	89 34	158.9	21 20.6	89 34	159.1	19 33.6	89 32	160.1	7
8	27 08.7	87 40	154.7	26 16.4	87 40	155.3	24 57.7	88 38	156.1	23 38.8	88 37	156.9	21 53.2	88 36	157.9	21 26.8	88 35	158.2	21 00.3	88 35	158.4	19 14.2	89 33	159.4	8
9	26 44.4	86 42	153.9	25 52.6	86 41	154.5	24 34.7	87 40	155.3	23 16.5	87 38	156.2	21 31.9	87 37	157.2	21 05.6	87 36	157.5	20 39.4	88 36	157.7	18 54.2	88 34	158.8	9
30	26 19.5	85 43	153.2	25 28.2	86 42	153.7	24 11.0	86 41	154.6	22 53.5	86 39	155.4	21 09.8	87 38	156.5	20 43.9	87 37	156.8	20 17.9	87 37	157.1	18 33.6	87 35	158.1	30
1	25 53.8	85 44	152 4	25 03.1	85 43	153.0	23 46.6	85 42	153.9	22 29.9	85 40	154.7	20 47.2	86 39	155.8	20 21.5	86 38	156.1	19 55.7	86 38	156.4	18 12.4	86 36	157.5	1
2	25 27.6	84 45	151.7	24 37.3	84 44	152.3	23 21.6	84 43	153.1	22 05.7	85 42	154.0	20 24.0	85 40	155.2	19 58.5	85 39	155.4	19 33.0	85 39	155.7	17 50.6	85 37	156.8	2
3	25 00.7	83 46	150.9	24 10.9	83 45	151.5	22 56.0	83 44	152.4	21 40.8	84 42	153.3	20 00.2	84 41	154.5	19 34.9	84 40	154.8	19 09.6	84 40	155.1	17 28.3	85 38	156.2	3
4	24 33.1	82 47	150 2	23 43.9	82 46	150 8	22 29.8	83 45	151.7	21 15.4	83 44	152.6	19 35.7	83 42	153.8	19 10.7	83 41	154.1	18 45.7	83 41	154.4	17 05.4	84 39	155.6	4
35	24 04.9	81 48	149.5	23 16.3	81 47	150.1	22 03.0	82 46	151.0	20 49.3	82 44	152.0	19 10.7	82 42	153.2	18 46.0	82 42	153.5	18 21.3	83 42	153.8	16 42.0	83 40	154.9	35
6	23 36.2	80 49	148.7	22 48.0	80 48	149.4	21 35.5	81 47	150.3	20 22.7	81 45	151.3	18 45.2	81 44	152 5	18 20.7	82 43	152.8	17 56.2	82 43	153.1	16 18.0	82 41	154.3	6
7	23 06.8	79 50	148.0	22 19.2	79 49	148.7	21 07.5	80 48	149.7	19 55.5	80 46	150.6	18 19.1	81 44	151 9	17 54.9	81 44	152.2	17 30.6	81 44	152.5	15 53.5	81 42	153.7	7
8	22 36.9	78 51	147.3	21 49.8	79 50	148.0	20 39.0	79 49	149.0	19 27.8	79 47	150.0	17 52.4	80 45	151.3	17 28.5	80 45	151.6	17 04.5	80 44	151.9	15 28.4	80 42	153.1	8
9	22 06.4	77 52	146.7	21 19.9	78 51	147.3	20 09.9	78 50	148.4	18 59.5	78 48	149.3	17 25.2	79 46	150.6	17 01.6	79 46	151.0	16 37.9	79 45	151.3	15 02.9	79 44	152.6	9
40	21 35.3	76 53	146.0	20 49.4	77 52	146.7	19 40.2	77 50	147.7	18 30.7	77 49	148.7	16 57.5	78 47	150.0	16 34.1	78 47	150.4	16 10.7	78 46	150.7	14 36.8	78 44	152.0	40
1	21 03.7	75 54	145.3	20 18.4	76 53	146.0	19 10.0	76 51	147.1	18 01.3	76 50	148.1	16 29.3	77 48	149.4	16 06.2	77 48	149.8	15 43.0	77 47	150.1	14 10.2	78 45	151.4	1
2	20 31.6	75 54	144.7	19 46.8	75 54	145.4	18 39.3	75 52	146.4	17 31.5	76 51	147.5	16 00.5	76 49	148.8	15 37.7	76 48	149.2	15 14.9	76 48	149.5	13 43.2	77 46	150.9	2
3	19 59.0	74 55	144.0	19 14.7	74 54	144.8	18 08.1	74 53	145.8	17 01.1	75 51	146.9	15 31.3	75 50	148.3	15 08.8	75 49	148.6	14 46.2	75 48	148.9	13 15.7	76 47	150.3	3
4	19 25.8	73 56	143.4	18 42.2	73 55	144.1	17 36.4	73 54	145.2	16 30.3	74 52	146.3	15 01.6	74 50	147.7	14 39.4	74 50	148.0	14 17.1	74 49	148.4	12 47.7	75 47	149.8	4
45	18 52.2	72 57	142.8	18 09.1	72 56	143.5	17 04.2	72 54	144.6	15 58.9	73 53	145.7	14 31.4	73 51	147.1	14 09.5	73 51	147.5	13 47.5	73 50	147.8	12 19.3	74 48	149.2	45
6	18 18.1	71 58	142.2	17 35.6	71 57	142.9	16 31.5	71 55	144.0	15 27.2	72 54	145.1	14 00.8	72 52	146.6	13 39.1	72 51	146.9	13 17.4	72 51	147.3	11 59.4	73 49	148.7	6
7	17 43.5	70 58	141.6	17 01.6	70 57	142.3	15 58.4	70 56	143.5	14 54.9	71 54	144.6	13 29.7	71 52	146.0	13 08.3	71 52	146.4	12 46.9	71 52	146.7	11 21.0	72 50	148.2	7
8	17 08.5	69 59	141.0	16 27.2	69 58	141.8	15 24.9	69 57	142.9	14 22.2	70 55	144.0	12 58.2	70 53	145.5	12 37.1	70 53	145.8	12 16.0	70 52	146.2	10 51.3	71 50	147.7	8
9	16 33.1	68 60	140.4	15 52.3	68 59	141.2	14 50.8	68 57	142.3	13 49.1	69 56	143.5	12 26.2	69 54	144.9	12 05.4	69 53	145.3	11 44.6	69 53	145.7	10 21.1	70 51	147.1	9
50	15 57.2	67 61	139.9	15 17.0	67 60	140.6	14 16.4	67 58	141.8	13 15.5	68 57	142.9	11 53.9	68 55	144.4	11 33.4	68 54	144.8	11 12.8	68 54	145.2	9 50.5	69 52	146.6	50
1	15 20.8	66 61	139.3	14 41.2	66 60	140.1	13 41.5	67 59	141.2	12 41.5	67 57	142.4	11 21.1	67 55	143.9	11 00.9	67 55	144.3	10 40.6	67 54	144.7	9 19.5	68 52	146.2	1
2	14 44.1	65 62	138.8	14 05.1	65 61	139.5	13 06.3	66 60	140.7	12 07.1	66 58	141.9	10 47.9	66 56	143.4	10 28.0	66 56	143.8	10 08.0	66 55	144.2	8 48.1	67 53	145.7	2
3	14 07.0	64 62	138.2	13 28.6	64 62	139.0	12 30.6	65 60	140.2	11 32.4	65 59	141.4	10 14.3	65 57	142.9	9 54.7	65 56	143.3	9 35.1	65 56	143.7	8 16.3	66 54	145.2	3
4	13 29.5	63 63	137.7	12 51.6	63 62	138.5	11 54.6	64 61	139.7	10 57.2	64 59	140 9	9 40 3	64 57	142.4	9 21.0	64 57	142.8	9 01.7	64 56	143.2	7 44.2	65 54	144.7	4
55	12 51.6	62 64	137.2	12 14.3	62 63	138.0	11 18.1	63 61	139.2	10 21.7	63 60	140.4	9 06.0	63 58	141.9	8 47.0	63 58	142.3	8 27.9	63 57	142.7	7 11.7	64 55	144.3	55
6	12 13.3	61 64	136.7	11 36.6	61 63	137.5	10 41.3	62 62	138.7	9 45.7	62 60	139.9	8 31.2	62 58	141.5	8 12.5	62 58	141.9	7 53.8	62 57	142.3	6 38.8	63 55	143.8	6
7	11 34.7	60 65	136.2	10 58.6	60 64	137.0	10 04.2	61 63	138.2	9 09.5	61 61	139.4	7 56.2	61 59	141.0	7 37.8	61 58	141.4	7 19.4	61 58	141.8	6 05.6	62 56	143.4	7
8	10 55 7	59 66	135.7	10 20.2	59 64	136.5	9 26.6	60 63	137.7	8 32.8	60 62	138.9	7 20.7	60 60	140.5	7 02.7	60 59	140.9	6 44.6	60 59	141.4	5 32.0	61 56	143.0	8
9	10 16.4	58 66	135.2	9 41.5	58 65	136.0	8 48.8	59 64	137.2	7 55.9	59 62	138.5	6 45.0	59 60	140.1	6 27.2	59 60	140.5	6 09.4	59 59	140.9				9
60	9 36.8	57 67	134.7	9 02.4	57 66	135.5	8 10.6	58 64	136.8	7 18.6	58 63	138.0	6 08.9	58 61	139.7	5 51.4	58 60	140.1	5 33.9	58 60	140.5				60
1	8 56.8	56 67	134.2	8 23.0	56 66	135.1	7 32.1	57 65	136.3	6 40.9	57 63	137.6	5 32.5	57 61	139.2	5 15.3	57 61	139.6							1
2	8 16.6	55 68	133.8	7 43.3	56 67	134.6	6 53.2	56 65	135.9	6 03.0	56 64	137.1													2
3	7 36.8	54 68	133.3	7 03.3	55 67	134.2	6 14.1	55 66	135.5	5 24.7	55 64	136.7													3
4	6 55.1	53 69	132.9	6 23.0	54 68	133.8	5 34.7	54 66	135.0																4
65	6 13.9	52 69	132.5	5 42.4	53 68	133 3																			65
6	5 32.5	52 69	132.1	5 01.5	52 69	132.9																			6

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 23.3	31 77	55.6	11 41.5	30 76	54.6	12 08.5	30 74	53.2	12 35.1	29 73	51.7	13 09.7	28 71	49.7	13 18.2	28 71	49.2	13 26.6	28 70	48.8	13 59.9	27 68	46.8	91
2	10 37.2	31 77	55.3	10 55.9	31 76	54.4	11 23.8	31 74	52.9	11 51.2	30 73	51.5	12 27.9	29 71	49.5	12 35.8	29 70	49.0	12 44.6	29 70	48.5	13 19.1	28 68	46.6	2
3	9 51.2	32 76	55.1	10 10.5	32 76	54.1	10 39.1	32 74	52.7	11 07.4	31 73	51.2	11 44.4	31 71	49.3	11 53.6	30 70	48.8	12 02.7	30 70	48.3	12 38.5	30 68	46.4	3
4	9 05.3	33 76	54.8	9 25.2	33 75	53.9	9 54.7	33 74	52.4	10 23.8	32 72	51.0	11 02.1	32 70	49.1	11 11.5	31 70	48.6	11 20.9	31 69	48.1	11 58.0	31 67	46.1	4
95	8 19.6	34 76	54.5	8 40.0	34 75	53.6	9 10.4	34 74	52.2	9 40.4	33 72	50.7	10 19.8	33 70	48.8	10 29.6	32 70	48.3	10 39.3	32 69	47.8	11 17.7	32 67	45.9	95
6	7 34.1	35 76	54.3	7 55.0	35 75	53.3	8 26.2	35 73	51.9	8 57.1	34 72	50.5	9 37.8	34 70	48.6	9 47.8	33 69	48.1	9 57.9	33 69	47.6	10 37.6	33 67	45.7	6
7	6 48.7	36 75	54.0	7 10.2	36 74	53.0	7 42.2	35 73	51.6	8 14.0	35 72	50.2	8 55.9	35 70	48.3	9 06.2	35 69	47.8	9 16.6	34 68	47.3	9 57.6	34 66	45.4	7
8	6 03.5	37 75	53.7	6 25.5	37 74	52.7	6 58.4	36 73	51.3	7 31.0	36 71	49.9	8 14.1	36 69	48.0	8 24.8	36 69	47.6	8 35.5	35 68	47.1	9 17.7	35 66	45.2	8
9	5 18.4	38 75	53.4	5 41.0	38 74	52.4	6 14.7	37 72	51.0	6 48.3	37 71	49.6	7 32.6	37 69	47.8	7 43.6	37 68	47.3	7 54.5	37 68	46.8	8 38.1	36 66	44.9	9
100							5 31.3	38 72	50.7	6 05.7	38 71	49.3	6 51.2	38 69	47.5	7 02.5	38 68	47.0	7 13.8	38 68	46.6	7 58.6	37 66	44.7	100
1										5 23.3	39 71	49.1	6 10.0	39 68	47.2	6 21.6	39 68	46.7	6 33.2	39 67	46.3	7 19.3	38 65	44.4	1
2													5 29.0	40 68	46.9	5 40.9	40 68	46.4	5 52.8	40 67	46.0	6 40.2	39 65	44.1	2
3																5 00.4	41 68	46.1	5 12.6	41 67	45.7	6 01.3	40 64	43.9	3
4																						5 22.6	41 64	43.6	4

Lat. 21°
Lat. 22°
Lat. 23°
Lat. 24°
Lat. 25°
Lat. 26°
Lat. 27°
Lat. 28°

Lat. 21°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	65 00.0	1.0 01	00.0	64 00.0	1.0 01	00.0	62 30.0	1.0 01	00.0	61 30.0	1.0 01	00.0	60 30.0	1.0 01	00.0	59 30.0	1.0 01	00.0	58 30.0	1.0 01	00.0	57 00.0	1.0 01	00.0	00
1	64 59.2	1.0 04	01.6	63 59.2	1.0 04	01.6	62 29.3	1.0 04	01.4	61 29.3	1.0 03	01.4	60 29.4	1.0 03	01.3	59 29.4	1.0 03	01.2	58 29.4	1.0 03	01.2	56 59.5	1.0 03	01.1	1
2	64 56.8	1.0 07	03.3	63 57.0	1.0 06	03.1	62 27.2	1.0 06	02.9	61 27.3	1.0 06	02.7	60 27.5	1.0 05	02.6	59 27.6	1.0 05	02.5	58 27.7	1.0 05	02.3	56 57.9	1.0 04	02.2	2
3	64 52.8	99 09	04.9	63 53.2	99 09	04.7	62 23.7	99 08	04.3	61 24.0	99 08	04.1	60 24.3	1.0 07	03.9	59 24.6	1.0 07	03.7	58 24.9	1.0 07	03.5	56 55.3	1.0 06	03.2	3
4	64 47.2	99 12	06.5	63 47.9	99 11	06.2	62 18.8	99 10	05.7	61 19.4	99 10	05.4	60 19.9	99 09	05.1	59 20.4	99 09	04.9	58 20.9	99 08	04.6	56 51.6	99 08	04.3	4
05	64 40.1	98 14	08.1	63 41.1	98 14	07.7	62 12.6	98 13	07.1	61 13.5	99 12	06.8	60 14.3	99 12	06.4	59 15.1	99 11	06.1	58 15.8	99 10	05.8	56 46.9	99 10	05.4	05
6	64 31.4	97 17	09.7	63 32.9	98 16	09.2	62 04.9	98 15	08.5	61 06.2	98 14	08.1	60 07.4	98 14	07.7	59 08.6	98 13	07.3	58 09.6	98 12	06.9	56 41.1	98 11	06.4	6
7	64 21.1	96 19	11.3	63 23.2	97 18	10.7	61 56.0	97 17	09.9	60 57.7	97 16	09.4	59 59.3	97 15	08.9	59 00.9	98 15	08.5	58 02.3	98 14	08.1	56 34.3	98 13	07.5	7
8	64 09.5	95 22	12.8	63 12.1	96 21	12.2	61 45.7	96 19	11.2	60 48.0	96 18	10.7	59 50.1	97 18	10.1	58 52.0	97 16	09.6	57 53.9	97 16	09.2	56 26.5	97 14	08.5	8
9	63 56.3	94 24	14.3	62 59.6	95 23	13.6	61 34.2	95 22	12.6	60 37.0	95 20	12.0	59 39.6	96 19	11.4	58 42.1	96 18	10.8	57 44.5	96 18	10.3	56 17.8	96 16	09.5	9
10	63 41.8	93 27	15.8	62 45.8	94 25	15.0	61 21.3	94 23	13.9	60 24.8	94 22	13.2	59 28.0	95 21	12.6	58 31.1	95 20	11.9	57 33.9	95 19	11.4	56 08.0	96 18	10.6	10
1	63 25.8	92 29	17.2	62 30.6	92 27	16.4	61 07.3	93 26	15.2	60 11.4	93 24	14.4	59 15.3	94 23	13.7	58 18.9	94 22	13.1	57 22.4	94 21	12.5	55 57.2	95 20	11.6	1
2	63 08.6	90 31	18.6	62 14.2	91 30	17.7	60 52.0	92 27	16.4	59 56.9	92 26	15.6	59 01.4	93 25	14.9	58 05.7	93 24	14.2	57 09.8	93 23	13.5	55 45.5	94 21	12.5	2
3	62 50.0	89 33	20.0	61 56.5	89 31	19.0	60 35.6	90 29	17.7	59 41.2	91 28	16.8	58 46.5	91 27	16.0	57 51.5	92 26	15.3	56 56.2	92 24	14.5	55 32.9	93 22	13.5	3
4	62 30.2	87 35	21.3	61 37.7	88 33	20.3	60 18.0	89 31	18.9	59 24.4	90 30	18.0	58 30.5	90 28	17.1	57 36.2	91 27	16.3	56 41.7	91 26	15.6	55 19.4	92 24	14.5	4
15	62 09.3	86 37	22.6	61 17.7	86 35	21.6	59 59.4	88 33	20.1	59 06.6	88 31	19.1	58 13.5	89 30	18.2	57 20.0	89 29	17.4	56 26.2	90 27	16.6	55 04.9	91 26	15.4	15
6	61 47.1	84 39	23.9	60 56.5	85 37	22.8	59 39.6	86 34	21.2	58 47.8	87 33	20.2	57 55.5	87 32	19.3	57 02.8	88 30	18.4	56 09.8	89 29	17.5	54 49.6	89 27	16.3	6
7	61 23.9	82 40	25.1	60 34.3	83 39	23.9	59 18.9	84 36	22.3	58 27.9	85 35	21.3	57 36.5	86 33	20.3	56 44.7	87 32	19.4	55 52.4	87 30	18.5	54 33.4	88 28	17.2	7
8	60 59.6	80 42	26.3	60 11.1	81 40	25.1	58 57.1	83 38	23.4	58 07.1	84 36	22.3	57 16.6	85 35	21.3	56 25.6	85 33	20.4	55 34.2	86 32	19.4	54 16.4	87 30	18.1	8
9	60 34.3	79 44	27.4	59 46.8	80 42	26.2	58 34.4	81 39	24.4	57 45.4	82 38	23.3	56 55.8	83 36	22.3	56 05.7	84 35	21.3	55 15.2	85 33	20.3	53 58.6	86 31	19.0	9
20	60 08.1	77 45	28.5	59 21.7	78 44	27.2	58 10.8	80 41	25.5	57 22.7	81 39	24.3	56 34.1	81 38	23.3	55 44.9	82 36	22.2	54 55.3	83 34	21.2	53 40.0	84 32	19.8	20
1	59 40.9	75 47	29.6	58 55.6	76 45	28.3	57 46.3	78 42	26.4	56 59.2	79 40	25.3	56 11.6	80 39	24.2	55 23.3	81 37	23.1	54 34.6	82 36	22.1	53 20.6	83 34	20.7	1
2	59 12.8	73 48	30.6	58 28.6	74 46	29.3	57 20.9	76 44	27.4	56 34.9	77 42	26.2	55 48.2	78 40	25.1	55 01.0	79 39	24.0	54 13.1	80 37	23.0	53 00.4	81 35	21.5	2
3	58 44.0	71 50	31.5	58 00.9	73 48	30.2	56 54.7	74 45	28.3	56 09.7	76 43	27.1	55 24.1	77 42	26.0	54 37.8	78 40	24.8	53 50.9	79 38	23.8	52 39.6	80 36	22.3	3
4	58 14.3	69 51	32.5	57 32.3	71 49	31.1	56 27.8	73 46	29.2	55 43.8	74 44	28.0	54 59.2	75 43	26.8	54 13.9	76 41	25.7	53 28.0	77 40	24.6	52 18.0	78 37	23.1	4
25	57 43.8	67 52	33.4	57 03.0	69 50	32.0	56 00.1	71 47	30.1	55 17.2	72 46	28.8	54 33.6	73 44	27.6	53 49.3	74 42	26.5	53 04.3	75 40	25.4	51 55.8	77 38	23.8	25
6	57 12.7	65 53	34.2	56 32.9	67 51	32.8	55 31.7	69 48	30.9	54 49.9	70 47	29.6	54 07.3	72 45	28.4	53 24.0	73 43	27.2	52 40.0	74 42	26.1	51 32.9	75 39	24.5	6
7	56 40.8	64 54	35.0	56 02.2	65 52	33.7	55 02.6	67 50	31.7	54 21.8	69 48	30.4	53 40.3	70 46	29.2	52 58.0	71 44	28.0	52 15.0	72 43	26.8	51 09.4	74 40	25.2	7
8	56 08.4	62 55	35.8	55 30.9	63 53	34.4	54 32.9	65 51	32.4	53 53.2	67 49	31.2	53 12.7	68 47	29.9	52 31.4	69 45	28.7	51 49.4	71 44	27.5	50 45.3	72 41	25.9	8
9	55 35.3	60 56	36.6	54 58.9	61 54	35.2	54 02.5	64 52	33.2	53 23.9	65 50	31.9	52 44.4	66 48	30.6	52 04.2	68 46	29.4	51 23.2	69 44	28.2	50 20.5	71 42	26.5	9
30	55 01.6	58 57	37.3	54 26.3	60 55	35.9	53 31.6	62 52	33.9	52 54.0	63 51	32.6	52 15.6	65 49	31.3	51 36.4	66 47	30.1	50 56.5	67 46	28.9	49 55.2	69 43	27.2	30
1	54 27.4	56 58	38.0	53 53.2	58 56	36.6	53 00.1	60 53	34.5	52 23.6	62 52	33.2	51 46.2	63 50	32.0	51 08.1	64 48	30.7	50 29.1	65 46	29.5	49 29.4	67 44	27.8	1
2	53 52.7	54 59	38.6	53 19.6	56 57	37.2	52 28.1	58 54	35.2	51 52.6	60 52	33.9	51 16.3	61 51	32.6	50 39.2	63 49	31.4	50 01.3	64 47	30.1	49 03.0	66 45	28.4	2
3	53 17.5	53 60	39.3	52 45.4	54 58	37.9	51 55.5	57 55	35.8	51 21.1	58 53	34.5	50 45.9	59 52	33.2	50 09.8	61 50	32.0	49 32.9	62 48	30.7	48 36.2	64 46	29.0	3
4	52 41.8	51 60	39.9	52 10.8	52 58	38.5	51 22.5	55 56	36.4	50 49.2	56 54	35.1	50 15.0	58 52	33.8	49 39.9	59 51	32.5	49 04.0	60 49	31.3	48 08.8	62 46	29.5	4
35	52 05.7	49 61	40.4	51 35.7	51 59	39.0	50 49.0	53 56	37.0	50 16.7	55 55	35.7	49 43.6	56 53	34.4	49 09.5	57 51	33.1	48 34.7	59 50	31.9	47 41.0	61 47	30.1	35
6	51 29.1	47 62	41.0	51 00.3	49 60	39.6	50 15.1	51 57	37.5	49 43.9	53 56	36.2	49 11.7	54 54	34.9	48 38.7	56 52	33.6	48 04.9	57 50	32.4	47 12.7	59 48	30.6	6
7	50 52.2	46 62	41.5	50 24.4	47 60	40.1	49 40.8	50 58	38.0	49 10.6	51 56	36.7	48 39.5	53 54	35.4	48 07.5	54 53	34.1	47 34.7	55 51	32.9	46 44.0	57 48	31.1	7
8	50 14.9	44 63	42.0	49 48.1	46 61	40.6	49 06.1	48 58	38.5	48 36.9	49 57	37.2	48 06.8	51 55	35.9	47 35.9	52 54	34.6	47 04.1	54 52	33.4	46 14.9	56 49	31.6	8
9	49 37.3	42 63	42.4	49 11.5	44 62	41.1	48 31.0	46 59	39.0	48 02.8	48 57	37.7	47 33.8	49 56	36.4	47 03.8	51 54	35.1	46 33.1	52 52	33.9	45 45.4	54 50	32.0	9
40	48 59.3	40 64	42.9	48 34.6	42 62	41.5	47 55.6	44 60	39.5	47 28.4	46 58	38.1	47 00.4	47 56	36.8	46 31.4	49 54	35.6	46 01.7	50 53	34.3	45 15.5	52 50	32.5	40
1	48 21.1	39 64	43.3	47 57.3	40 63	41.9	47 19.8	43 60	39.9	46 53.7	44 58	38.6	46 26.6	40 57	37.3	45 58.7	47 55	36.0	45 29.9	49 54	34.7	44 45.3	51 51	32.9	1
2	47 42.5	37 65	43.7	47 19.7	39 63	42.3	46 43.7	41 60	40.3	46 18.6	43 59	39.0	45 52.5	44 57	37.7	45 25.6	46 56	36.4	44 57.8	47 54	35.1	44 14.7	49 52	33.3	2
3	47 03.7	36 65	44.1	46 41.9	37 64	42.7	46 07.4	40 61	40.7	45 43.2	41 60	39.4	45 18.1	42 58	38.1	44 52.2	44 56	36.8	44 25.4	45 54	35.5	43 43.8	47 52	33.7	3
4	46 24.6	34 66	44.4	46 03.8	36 64	43.1	45 30.7	38 62	41.1	45 07.5	39 60	39.7	44 43.4	41 58	38.5	44 18.5	42 57	37.2	43 52.7	44 55	35.9	43 12.5	46 52	34.1	4
45	45 45.3	32 66	44.7	45 25.4	34 64	43.4	44 53.8	36 62	41.4	44 31.6	38 60	40.1	44 08.5	39 59	38.8	43 44.5	41 57	37.5	43 19.7	42 56	36.3	42 41.0	44 53	34.4	45
6	45 05.7	31 66	45.1	44 46.8	32 65	43.7	44 16.6	35 62	41.7	43 55.4	36 61	40.4	43 33.2	38 59	39.2	43 10.2	39 58	37.9	42 46.4	40 56	36.6	42 09.2	42 54	34.8	6
7	44 26.0	29 67	45.4	44 08.0	31 65	44.0	43 39.2	33 63	42.1	43 18.9	35 61	40.8	42 57.7	36 60	39.5	42 35.7	37 58	38.2	42 12.9	39 56	37.0	41 37.1	41 54	35.1	7
8	43 46.0	28 67	45.6	43 28.9	29 65	44.3	43 01.6	32 63	42.3	42 42.2	33 62	41.1	42 22.0	34 60	39.8	42 01.0	36 58	38.5	41 39.1	37 57	37.3	41 04.8	39 54	35.4	8
9	43 05.9	26 67	45.9	42 49.7	28 66	44.6	42 23.7	30 63	42.6	42 05.3	31 62	41.3	41 46.1	33 60	40.1	41 26.0	34 59	38.8	41 05.1	36 57	37.6	40 32.2	37 55	35.7	9
50	42 25.6	25 67	46.1	42 10.3	26 66	44.8	41 45.7	28 64	42.9	41 28.2	30 62	41.6	41 09.9	31 60	40.3	40 50.8	33 59	39.1	40 30.8	31 58	37.8	39 59.4	36 55	36.0	50
1	41 45.2	23 68	46.4	41 30.7	25 66	45.1	41 07.5	27 64	43.1	40 50.9	28 62	41.9	40 33.6	30 61	40.6	40 15.4	31 59	39.3	39 56.3	32 58	38.1	39 26.4	34 56	36.3	1
2	41 04.5	22 68	46.6	40 51.0	23 66	45.3	40 29.1	25 64	43.4	40 13.5	27 63	42.1	39 57.0	28 61	40.8	39 39.8	29 60	39.6	39 21.7	31 58	38.3	38 53.1	33 56	36.5	2
3	40 23.8	20 68	46.8	40 11.2	22 67	45.5	39 50.6	24 64	43.6	39 35.9	25 63	42.3	39 20.3	27 62	41.1	39 04.0	28 60	39.8	38 46.8	29 58	38.6	38 19.7	31 56	36.8	3
4	39 42.9	19 68	46.9	39 31.2	20 67	45.7	39 11.9	22 65	43.8	38 58.1	24 63	42.5	38 43.4	25 62	41.3	38 28.0	26 60	40.0	38 11.8	28 59	38.8	37 46.1	30 56	37.0	4
55	39 02.0	18 68	47.1	38 51.0	19 67	45.8	38 33.1	21 65	44.0	38 20.2	22 64	42.7	38 06.4	24 62	41.5	37 51.9	25 60	40 2	37 36.6	26 59	39.0	37 12.3	28 56	37.2	55
6	38 20.9	16 69	47.2	38 10.8	18 67	46.0	37 54.2	19 65	44.1	37 42.1	21 64	42.9	37 29.3	22 62	41.6	37 15.7	23 61	40:4	37 01.3	25 59	39.2	36 38.4	26 57	37.4	6
7	37 39.7	15 69	47.4	37 30.5	16 68	46.1	37 15.1	18 65	44.3	37 03.9	19 64	43.0	36 52.0	21 62	41.8	36 39.3	22 61	40.6	36 25.8	23 59	39.4	36 04.3	25 57	37.6	7
8	36 58.4	13 69	47.5	36 50.0	15 68	46.3	36 36.0	17 65	44.4	36 25.6	18 64	43.2	36 14.6	19 63	42.0	36 02.8	20 61	40.8	35 50.2	22 60	39.6	35 30.1	23 57	37.8	8
9	36 17.1	12 69	47.6	36 09.5	13 68	46.4	35 56.7	15 66	44.6	35 47.2	16 64	43.3	35 37.0	18 63	42.1	35 26.1	19 61	40.9	35 14.5	20 60	39.7	34 55.7	22 58	37.9	9
60	35 35.7	11 69	47.7	35 28.9	12 68	46.5	35 17.4	14 66	44.7	35 08.8	15 64	43.5	34 59.4	16 63	42.3	34 49.4	17 61	41.1	34 38.6	19 60	39.9	34 21.2	20 58	38.1	60
1	34 54.2	09 69	47.8	34 48.2	11 68	46.6	34 37.9	12 66	44.8	34 30.2	14 64	43.6	34 21.7	15 63	42.4	34 12.6	16 62	41.2	34 02.7	17 60	40.0	33 46.6	19 58	38.2	1
2	34 12.7	08 69	47.9	34 07.5	09 68	46.7	33 58.5	11 66	44.9	33 51.5	12 64	43.7	33 43.9	13 63	42.5	33 35.6	14 62	41.3	33 26.7	16 60	40.1	33 11.9	17 58	38.3	2
3	33 31.1	07 69	47.9	33 26.8	08 68	46.7	33 18.9	10 66	45.0	33 12.8	11 64	43.8	33 06.1	12 63	42.6	32 58.6	13 62	41.4	32 50.5	14 60	40.2	32 37.1	16 58	38.4	3
4	32 49.5	05 69	48.0	32 45.9	07 68	46.8	32 39.3	08 66	45.0	32 34.1	09 65	43.8	32 28.1	10 63	42.7	32 21.6	12 62	41.5	32 14.3	13 60	40.3	32 02.3	14 58	38.5	4
65	32 07.9	04 69	48.0	32 05.1	05 68	46.8	31 59.7	07 66	45.1	31 55.2	08 65	43.9	31 50.2	09 63	42.7	31 44.4	10 62	41.6	31 38.1	11 61	40.4	31 27.3	13 58	38.6	65
6	31 26.2	03 69	48.1	31 24.2	04 68	46.9	31 20.0	05 66	45.1	31 16.4	07 65	44.0	31 12.1	08 63	42.8	31 07.2	09 62	41.6	31 01.7	10 61	40.5	30 52.3	11 58	38.7	6
7	30 44.6	02 70	48.1	30 43.3	03 68	46.9	30 40.3	04 66	45.2	30 37.5	05 65	44.0	30 34.1	06 64	42.8	30 30.0	07 62	41.7	30 25.4	08 61	40.5	30 17.2	10 58	38.8	7
8	30 02.9	00 70	48.1	30 02.4	01 68	46.9	30 00.5	03 66	45.2	29 58.5	04 65	44.0	29 55.9	05 64	42.9	29 52.7	06 62	41.7	29 48.9	07 61	40.6	29 42.1	08 58	38.9	8
9	29 21.2	01 70	48.1	29 21.5	00 68	46.9	29 20.8	02 66	45.2	29 19.6	02 65	44.1	29 17.8	03 64	42.9	29 15.4	04 62	41.8	29 12.5	05 61	40.6	29 07.0	07 59	38.9	9
70	28 39.5	02 69	48.1	28 40.6	01 68	46.9	28 41.0	00 66	45.2	28 40.6	01 65	44.1	28 39.7	02 64	42.9	28 38.1	03 62	41.8	28 36.0	04 61	40.7	28 31.8	05 59	39.0	70
1	27 57.9	03 69	48.0	27 59.7	03 68	46.9	28 01.3	01 66	45.2	28 01.7	00 65	44.1	28 01.5	01 64	42.9	28 00.8	02 62	41.8	27 59.5	03 61	40.7	27 56.5	04 59	39.0	1
2	27 16.2	05 69	48.0	27 18.8	04 68	46.9	27 21.5	02 66	45.2	27 22.7	02 65	44.1	27 23.3	01 64	42.9	27 23.4	00 62	41.8	27 23.0	01 61	40.7	27 21.3	03 59	39.0	2
3	26 34.6	06 69	48.0	26 37.9	05 68	46.9	26 41.8	04 66	45.2	26 43.7	03 65	44.1	26 45.2	02 64	42.9	26 46.1	01 62	41.8	26 46.5	00 61	40.7	26 46.0	01 59	39.0	3
4	25 53.0	07 69	47.9	25 57.0	06 68	46.8	26 02.1	05 66	45.1	26 04.8	04 65	44.0	26 07.0	03 64	42.9	26 08.7	02 62	41.8	26 09.9	02 61	40.7	26 10.8	00 59	39.0	4
75	25 11.5	08 69	47.9	25 16.2	07 68	46.8	25 22.4	06 66	45.1	25 25.9	05 65	44.0	25 28.9	05 64	42.9	25 31.4	04 62	41.8	25 33.4	03 61	40.7	25 35.5	02 59	39.0	75
6	24 29.9	09 69	47.8	24 35.4	09 68	46.7	24 42.7	08 66	45.1	24 47.0	07 65	44.0	24 50.8	06 64	42.9	24 54.1	05 62	41.8	24 56.9	04 61	40.7	25 00.2	03 59	39.0	6
7	23 48.5	11 69	47.7	23 54.7	10 68	46.6	24 03.1	09 66	45.0	24 08.1	08 65	43.9	24 12.7	07 63	42.8	24 16.8	06 62	41.7	24 20.4	06 61	40.6	24 25.0	04 59	39.0	7
8	23 07.1	12 69	47.6	23 14.0	11 68	46.5	23 23.5	10 66	44.9	23 29.3	09 65	43.8	23 34.7	09 63	42.8	23 39.5	08 62	41.7	23 44.0	07 61	40.6	23 49.8	06 59	38.9	8
9	22 25.7	13 69	47.6	22 33.3	12 68	46.5	22 44.0	11 66	44.8	22 50.5	11 64	43.8	22 56.6	10 63	42.7	23 02.3	09 62	41.6	23 07.6	08 61	40.5	23 14.6	07 59	38.9	9
80	21 44.4	14 69	47.4	21 52.8	14 68	46.4	22 04.5	13 66	44.8	22 11.8	12 64	43.7	22 18.7	11 63	42.6	22 25.2	10 62	41.5	22 31.2	10 60	40.5	22 39.4	09 58	38.8	80
1	21 03.2	15 68	47.3	21 12.3	15 68	46.3	21 25.1	14 66	44.7	21 33.2	13 64	43.6	21 40.8	12 63	42.5	21 48.0	12 62	41.5	21 54.9	11 60	40.4	22 04.3	10 58	38.8	1
2	20 22.1	17 68	47.2	20 31.8	16 67	46.2	20 45.8	15 66	44.6	20 54.5	14 64	43.5	21 03.0	14 63	42.5	21 11.0	13 62	41.4	21 18.6	12 60	40.3	21 29.2	11 58	38.7	2
3	19 41.0	18 68	47.1	19 51.5	17 67	46.0	20 06.5	16 65	44.5	20 16.0	16 64	43.4	20 25.2	15 63	42.4	20 34.0	14 63	41.3	20 42.4	14 60	40.2	20 54.2	13 58	38.6	3
4	19 00.0	19 68	46.9	19 11.2	18 67	45.9	19 27.3	17 65	44.3	19 37.6	17 64	43.3	19 47.5	16 63	42.2	19 57.0	16 61	41.2	20 06.2	15 60	40.1	20 19.3	14 58	38.6	4
85	18 19.2	20 68	46.8	18 31.0	19 67	45.8	18 48.2	19 65	44.2	18 59.2	18 64	43.2	19 09.9	17 63	42.1	19 20.2	17 61	41.1	19 30.1	16 60	40.0	19 44.4	15 58	38.5	85
6	17 38.4	21 68	46.6	17 50.9	21 67	45.6	18 09.2	20 65	44.1	18 20.9	19 64	43.0	18 32.3	19 62	42.0	18 43.4	18 61	41.0	18 54.1	18 60	39.9	19 09.6	17 58	38.4	6
7	16 57.7	22 68	46.5	17 10.9	22 66	45.5	17 30.3	21 65	43.9	17 42.7	21 64	42.9	17 54.9	20 62	41.9	18 06.7	19 61	40.9	18 18.2	19 60	39.8	18 34.9	18 58	38.3	7
8	16 17.1	23 67	46.3	16 31.1	23 66	45.3	16 51.4	22 64	43.8	17 04.7	22 63	42.8	17 17.5	21 62	41.7	17 30.1	21 61	40.7	17 42.4	20 60	39.7	18 00.2	19 58	38.1	8
9	15 36.7	25 67	46.1	15 51.3	24 66	45.1	16 12.7	23 64	43.6	16 26.7	23 63	42.6	16 40.3	22 62	41.6	16 53.6	22 60	40.6	17 06.7	21 59	39.6	17 25.7	21 58	38.0	9
90	14 56.3	26 67	46.0	15 11.7	25 66	45.0	15 34.2	25 64	43.5	15 48.8	24 63	42.5	16 03.2	24 62	41.4	16 17.3	23 60	40.4	16 31.1	23 59	39.4	16 51.2	22 57	37.9	90

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 21°

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	23 00.0	1.0	01	180.0	22 00.0	1.0	01	180.0	20 30.0	1.0	00	180.0	19 30.0	1.0	00	180.0	18 30.0	1.0	00	180.0	17 30.0	1.0	00	180.0	16 30.0	1.0	00	180.0	15 00.0	1.0	00	180.0	00
1	22 59.6	1.0	02	179.2	21 59.6	1.0	02	179.3	20 29.7	1.0	02	179.3	19 29.7	1.0	02	179.3	18 29.7	1.0	02	179.3	17 29.7	1.0	02	179.3	16 29.7	1.0	02	179.4	14 59.7	1.0	02	179.4	1
2	22 58.5	1.0	03	178.5	21 58.6	1.0	03	178.5	20 28.6	1.0	03	178.6	19 28.7	1.0	03	178.6	18 28.7	1.0	03	178.7	17 28.7	1.0	03	178.7	16 28.8	1.0	03	178.7	14 58.8	1.0	02	178.8	2
3	22 56.7	1.0	04	177.7	21 56.8	1.0	04	177.8	20 26.9	1.0	04	177.9	19 27.0	1.0	04	177.9	18 27.1	1.0	04	178.0	17 27.1	1.0	04	178.0	16 27.2	1.0	04	178.1	14 57.3	1.0	04	178.2	3
4	22 54.1	1.0	06	177.0	21 54.3	1.0	06	177.1	20 24.5	1.0	05	177.2	19 24.6	1.0	05	177.2	18 24.8	1.0	05	177.3	17 24.9	1.0	05	177.4	16 25.0	1.0	05	177.5	14 55.2	1.0	04	177.6	4
05	22 50.8	1.0	07	176.2	21 51.0	1.0	06	176.3	20 21.4	1.0	06	176.5	19 21.6	1.0	06	176.6	18 21.8	1.0	06	176.7	17 22.0	1.0	06	176.7	16 22.2	1.0	06	176.8	14 52.6	1.0	06	177.0	05
6	22 46.7	99	08	175.5	21 47.1	99	08	175.6	20 17.6	99	08	175.8	19 17.9	99	07	175.9	18 18.2	99	07	176.0	17 18.5	99	07	176.1	16 18.8	99	07	176.2	14 49.3	99	06	176.4	6
7	22 42.0	99	09	174.7	21 42.4	99	09	174.9	20 13.1	99	09	175.1	19 13.5	99	08	175.2	18 14.0	99	08	175.3	17 14.4	99	08	175.4	16 14.8	99	08	175.6	14 45.5	99	08	175.8	7
8	22 36.5	99	10	174.0	21 37.1	99	10	174.1	20 07.9	99	10	174.4	19 08.5	99	10	174.5	18 09.1	99	09	174.7	17 09.6	99	09	174.8	16 10.2	99	09	174.9	14 41.0	99	08	175.1	8
9	22 30.2	99	12	173.2	21 31.0	99	11	173.4	20 02.1	99	11	173.7	19 02.8	99	10	173.8	18 03.5	99	10	174.0	17 04.2	99	10	174.2	16 04.9	99	10	174.3	14 36.0	99	09	174.5	9
10	22 23.3	98	13	172.5	21 24.2	98	12	172.7	19 55.6	99	12	173.0	18 56.5	99	12	173.2	17 57.3	99	11	173.3	16 58.2	99	11	173.5	15 59.1	99	11	173.7	14 30.4	99	10	173.9	10
1	22 15.6	98	14	171.8	21 16.7	98	14	172.0	19 48.4	98	13	172.3	18 49.5	98	13	172.5	17 50.5	98	12	172.7	16 51.6	98	12	172.9	15 52.6	98	12	173.1	14 24.2	98	11	173.4	1
2	22 07.2	98	15	171.0	21 08.6	98	15	171.3	19 40.5	98	14	171.6	18 41.8	98	14	171.8	17 43.1	98	14	172.0	16 44.3	98	13	172.2	15 45.6	98	13	172.4	14 17.4	98	12	172.8	2
3	21 58.2	97	16	170.3	20 59.7	97	16	170.5	19 32.0	97	15	170.9	18 33.5	98	15	171.1	17 35.0	98	15	171.4	16 36.4	98	14	171.6	15 37.9	98	14	171.8	14 10.0	98	13	172.2	3
4	21 48.4	97	18	169.6	20 50.2	97	17	169.8	19 22.8	97	16	170.2	18 24.5	97	16	170.5	17 26.3	97	16	170.7	16 27.9	97	15	171.0	15 29.6	97	15	171.2	14 02.1	97	14	171.6	4
15	21 37.9	97	19	168.8	20 39.9	97	18	169.1	19 13.0	97	17	169.5	18 14.9	97	17	169.8	17 16.9	97	17	170.1	16 18.8	97	16	170.3	15 20.8	97	16	170.6	13 53.6	97	15	171.0	15
6	21 26.7	96	20	168.1	20 29.0	96	19	168.4	19 02.5	96	19	168.9	18 04.7	96	18	169.1	17 06.9	96	18	169.4	16 09.1	96	17	169.7	15 11.3	96	17	170.0	13 44.6	96	16	170.4	6
7	21 14.8	96	21	167.4	20 17.5	96	20	167.7	18 51.3	96	20	168.2	17 53.8	96	19	168.5	16 56.4	96	19	168.8	15 58.8	96	18	169.1	15 01.3	96	18	169.4	13 34.9	96	17	169.8	7
8	21 02.3	95	22	166.7	20 05.2	95	22	167.0	18 39.5	95	21	167.5	17 42.4	95	20	167.8	16 45.2	95	20	168.2	15 47.9	95	19	168.5	14 50.7	95	19	168.8	13 24.8	96	18	169.2	8
9	20 49.1	95	23	166.0	19 52.3	95	22	166.3	18 27.1	95	22	166.9	17 30.2	95	21	167.2	16 33.4	95	21	167.5	15 36.4	95	20	167.9	14 39.5	95	20	168.2	13 14.0	95	19	168.7	9
20	20 35.2	94	24	165.3	19 38.8	94	24	165.7	18 14.0	94	23	166.2	17 17.5	94	22	166.5	16 21.0	94	22	166.9	15 24.4	94	21	167.2	14 27.7	94	20	167.6	13 02.7	94	20	168.1	20
1	20 20.6	93	25	164.6	19 24.6	93	25	165.0	18 00.4	94	24	165.5	17 04.2	94	23	165.9	16 08.0	94	23	166.3	15 11.7	94	22	166.6	14 15.4	94	22	167.0	12 50.9	94	21	167.5	1
2	20 05.4	93	26	163.9	19 09.7	93	26	164.3	17 46.1	93	25	164.9	16 50.2	93	24	165.3	15 54.4	93	24	165.7	14 58.5	93	23	166.0	14 02.5	93	22	166.4	12 38.5	93	22	167.0	2
3	19 49.6	92	28	163.2	18 54.3	92	27	163.6	17 31.2	92	26	164.2	16 35.7	92	25	164.6	15 40.2	93	24	165.0	14 44.7	93	24	165.4	13 49.1	93	23	165.8	12 25.6	93	22	166.4	3
4	19 33.1	92	28	162.6	18 38.2	92	28	163.0	17 15.7	92	27	163.6	16 20.6	92	26	164.0	15 25.5	92	26	164.4	14 30.3	92	25	164.8	13 35.1	92	24	165.2	12 12.2	92	23	165.8	4
25	19 16.0	91	30	161.9	18 21.5	91	29	162.3	16 59.6	91	28	163.0	16 04.9	91	27	163.4	15 10.1	91	26	163.8	14 15.4	91	26	164.2	13 20.5	91	25	164.7	11 58.2	92	24	165.3	25
6	18 58.3	90	31	161.2	18 04.2	90	30	161.7	16 42.9	90	29	162.3	15 48.6	91	28	162.8	14 54.3	91	28	163.2	13 59.9	91	27	163.7	13 05.5	91	26	164.1	11 43.7	91	25	164.7	6
7	18 39.9	89	32	160.6	17 46.3	90	31	161.0	16 25.6	90	30	161.7	15 31.7	90	29	162.2	14 37.8	90	28	162.6	13 43.9	90	28	163.1	12 49.8	90	27	163.5	11 28.7	90	26	164.2	7
8	18 21.0	89	32	159.9	17 27.7	89	32	160.4	16 07.7	89	31	161.1	15 14.3	89	30	161.6	14 20.8	89	29	162.0	13 27.3	89	28	162.5	12 33.7	89	28	163.0	11 13.2	89	27	163.7	8
9	18 01.5	88	34	159.3	17 08.7	88	33	159.8	15 49.3	88	32	160.5	14 56.3	88	31	161.0	14 03.3	88	30	161.5	13 10.2	89	29	161.9	12 17.0	89	28	162.4	10 57.2	89	28	163.1	9
30	17 41.3	87	34	158.6	16 49.0	87	34	159.1	15 30.3	87	32	159.9	14 37.8	88	32	160.4	13 45.2	88	31	160.9	12 52.6	88	30	161.4	11 59.9	88	30	161.9	10 40.7	88	28	162.6	30
1	17 20.6	86	36	158.0	16 28.7	87	35	158.5	15 10.8	87	34	159.3	14 18.7	87	33	159.8	13 26.6	87	32	160.3	12 34.4	87	31	160.8	11 42.2	87	30	161.3	10 23.7	87	29	162.1	1
2	16 59.3	86	36	157.4	16 07.9	86	36	157.9	14 50.7	86	34	158.7	13 59.1	86	34	159.2	13 07.5	86	33	159.7	12 15.8	86	32	160.3	11 24.0	86	31	160.8	10 06.2	86	30	161.6	2
3	16 37.5	85	37	156.7	15 46.6	85	36	157.3	14 30.1	85	35	158.1	13 39.0	85	34	158.7	12 47.8	85	34	159.2	11 56.6	85	33	159.7	11 05.3	86	32	160.3	9 48.3	86	31	161.0	3
4	16 15.1	84	38	156.1	15 24.7	84	37	156.7	14 09.0	84	36	157.5	13 18.4	84	35	158.1	12 27.7	85	34	158.6	11 36.9	85	34	159.2	10 46.2	85	33	159.7	9 29.8	85	32	160.5	4
35	15 52.2	83	39	155.5	15 02.3	83	38	156.1	13 47.3	83	37	157.0	12 57.2	84	36	157.5	12 07.0	84	35	158.1	11 16.8	84	34	158.6	10 26.5	84	34	159.2	9 10.9	84	32	160.0	35
6	15 28.7	82	40	154.9	14 39.3	82	39	155.5	13 25.1	83	38	156.4	12 35.5	83	37	157.0	11 45.9	83	36	157.5	10 56.2	83	35	158.1	10 06.4	83	34	158.7	8 51.6	83	33	159.5	6
7	15 04.7	81	41	154.3	14 15.9	81	40	154.9	13 02.4	82	38	155.8	12 13.4	82	38	156.4	11 24.2	82	37	157.0	10 35.0	82	36	157.6	9 45.8	82	35	158.2	8 31.8	82	34	159.0	7
8	14 40.2	80	42	153.8	13 51.9	81	41	154.4	12 39.3	81	40	155.3	11 50.7	81	38	155.9	11 02.1	81	38	156.5	10 13.5	81	37	157.1	9 24.7	81	36	157.7	8 11.5	81	34	158.6	8
9	14 15.2	80	42	153.2	13 27.4	80	42	153.8	12 15.6	80	40	154.7	11 27.6	80	39	155.4	10 39.6	80	38	156.0	9 51.4	80	38	156.6	9 03.2	80	36	157.2	7 50.8	81	35	158.1	9
40	13 49.7	79	43	152.6	13 02.5	79	42	153.3	11 51.5	79	41	154.2	11 04.0	79	40	154.8	10 16.5	79	39	155.4	9 28.9	79	38	156.1	8 41.3	79	37	156.7	7 29.7	80	36	157.6	40
1	13 23.7	78	44	152.1	12 37.0	78	43	152.7	11 26.8	78	42	153.7	10 40.0	78	41	154.3	9 53.0	78	40	154.9	9 06.0	78	39	155.6	8 18.9	79	38	156.2	7 08.1	79	36	157.1	1
2	12 57.2	77	45	151.5	12 11.1	77	44	152.2	11 01.8	77	43	153.1	10 15.5	77	42	153.8	9 29.1	77	41	154.4	8 42.6	77	40	155.1	7 56.1	78	39	155.7	6 46.2	78	37	156.7	2
3	12 30.2	76	46	151.0	11 44.7	76	45	151.6	10 36.2	76	43	152.6	9 50.5	76	42	153.3	9 04.7	76	42	153.9	8 18.8	77	40	154.6	7 32.8	77	40	155.2	6 23.8	77	38	156.2	3
4	12 02.8	75	46	150.4	11 17.9	75	46	151.1	10 10.3	75	44	152.1	9 25.1	75	43	152.8	8 39.8	75	42	153.4	7 54.5	76	41	154.1	7 09.1	76	40	154.8	6 01.0	76	39	155.8	4
45	11 35.0	74	47	149.9	10 50.6	74	46	150.6	9 43.9	74	45	151.6	8 59.3	75	44	152.3	8 14.6	75	43	153.0	7 29.9	75	42	153.6	6 45.1	75	41	154.3	5 37.8	75	39	155.3	45
6	11 06.7	73	48	149.4	10 22.9	73	47	150.1	9 17.0	73	45	151.1	8 33.0	73	44	151.8	7 48.9	74	43	152.5	7 04.8	74	42	153.2	6 20.6	74	42	153.9	5 14.2	74	40	154.9	6
7	10 37.9	72	48	148.9	9 54.7	72	48	149.6	8 49.7	72	46	150.6	8 06.3	72	45	151.3	7 22.9	73	44	152.0	6 39.3	73	43	152.7	5 55.7	73	42	153.4					7
8	10 08.8	71	49	148.4	9 26.1	71	48	149.1	8 22.1	71	47	150.1	7 39.3	71	46	150.9	6 56.4	72	45	151.6	6 13.4	72	44	152.3	5 30.4	72	43	153.0					8
9	9 39.2	70	50	147.9	8 57.2	70	49	148.6	7 54.0	70	48	149.7	7 11.8	70	46	150.4	6 29.5	71	45	151.1	5 47.2	71	44	151.8	5 04.8	71	43	152.5					9
50	9 09.2	69	51	147.4	8 27.8	69	50	148.1	7 25.5	69	48	149.2	6 43.9	69	47	149.9	6 02.3	69	46	150.7	5 20.5	70	45	151.4									50
1	8 38.8	68	51	146.9	7 58.0	68	50	147.6	6 56.6	68	49	148.8	6 15.7	68	48	149.5	5 34.6	68	47	150.2													1
2	8 08.0	67	52	146.4	7 27.8	67	51	147.2	6 27.4	67	49	148.3	5 47.0	67	48	149.0	5 06.6	67	47	149.8													2
3	7 36.8	66	52	146.0	6 57.3	66	52	146.7	5 57.8	66	50	147.9	5 18.0	66	49	148.6																	3
4	7 05.3	65	53	145.5	6 26.4	65	52	146.3	5 27.8	65	51	147.4																					4
55	6 33.4	64	54	145.1	5 55.1	64	53	145.8																									55
6	6 01.1	63	54	144.6	5 23.4	63	53	145.4																									6
7	5 28.5	62	55	144.2																													7

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	14 16.1	27	67	45.8	14 32.1	26	66	44.8	14 55.7	26	64	43.3	15 11.1	25	63	42.3	15 26.2	25	62	41.3	15 41.0	25	60	40.3	15 55.6	24	59	39.3	16 16.9	23	57	37.8	91
2	13 36.0	28	66	45.6	13 52.7	28	65	44.6	14 17.3	27	64	43.1	14 33.4	27	62	42.1	14 49.3	26	61	41.1	15 04.8	26	60	40.1	15 20.2	25	59	39.1	15 42.6	25	57	37.6	2
3	12 56.1	29	66	45.4	13 13.5	29	65	44.4	13 39.1	28	63	42.9	13 55.9	28	62	41.9	14 12.5	27	61	40.9	14 28.8	27	60	39.9	14 44.9	27	59	39.0	15 08.5	26	57	37.5	3
4	12 16.3	30	66	45.2	12 34.4	30	65	44.2	13 01.1	29	63	42.7	13 18.6	29	62	41.7	13 35.9	29	61	40.8	13 52.9	28	60	39.8	14 09.7	28	58	38.8	14 34.5	27	56	37.3	4
95	11 36.7	31	66	44.9	11 55.4	31	65	44.0	12 23.1	31	63	42.5	12 41.3	30	62	41.5	12 59.4	30	61	40.6	13 17.2	29	59	39.6	13 34.7	29	58	38.6	14 00.6	28	56	37.1	95
6	10 57.2	33	66	44.7	11 16.6	32	64	43.8	11 45.3	32	63	42.3	12 04.3	31	62	41.3	12 23.0	31	60	40.4	12 41.5	31	59	39.4	12 59.8	30	58	38.4	13 26.9	30	56	36.9	6
7	10 17.8	34	65	44.5	10 37.9	33	64	43.5	11 07.7	33	62	42.1	11 27.4	33	61	41.1	11 46.8	32	60	40.2	12 06.1	32	59	39.2	12 25.1	32	58	38.2	12 53.3	31	56	36.8	7
8	9 38.7	35	65	44.3	9 59.4	34	64	43.3	10 30.3	34	62	41.9	10 50.6	34	61	40.9	11 10.8	33	60	39.9	11 30.7	33	58	39.0	11 50.5	33	57	38.0	12 19.8	32	55	36.6	8
9	8 59.7	36	65	44.0	9 21.1	36	64	43.1	9 53.0	35	62	41.6	10 14.0	35	61	40.7	10 34.9	35	60	39.7	10 55.6	34	58	38.8	11 16.1	34	57	37.8	11 46.6	34	55	36.4	9
100	8 20.8	37	64	43.7	8 42.9	37	63	42.8	9 15.8	36	62	41.4	9 37.6	36	60	40.4	9 59.2	36	59	39.5	10 20.6	36	58	38.5	10 41.8	35	57	37.6	11 13.4	35	55	36.2	100
1	7 42.2	38	64	43.5	8 05.0	38	63	42.5	8 38.9	38	61	41.1	9 01.3	37	60	40.2	9 23.6	37	59	39.3	9 45.8	37	58	38.3	10 07.8	37	57	37.4	10 40.4	36	55	36.0	1
2	7 03.8	39	64	43.2	7 27.2	39	63	42.3	8 02.1	39	61	40.9	8 25.3	38	60	40.0	8 48.3	38	59	39.0	9 11.1	38	57	38.1	9 33.8	38	56	37.2	10 07.6	37	54	35.7	2
3	6 25.5	40	63	42.9	6 49.6	40	62	42.0	7 25.6	40	61	40.6	7 49.4	40	60	39.7	8 13.1	39	58	38.8	8 36.7	39	57	37.8	9 00.1	39	56	36.9	9 35.0	39	54	35.5	3
4	5 47.5	41	63	42.6	6 12.2	41	62	41.7	6 49.2	41	60	40.4	7 13.7	41	59	39.4	7 38.1	41	58	38.5	8 02.4	40	57	37.6	8 26.6	40	56	36.7	9 02.6	40	54	35.3	4
105	5 09.6	42	63	42.4	5 35.0	42	62	41.4	6 13.0	42	60	40.1	6 38.2	42	59	39.2	7 03.3	42	58	38.3	7 28.3	42	56	37.3	7 53.2	41	55	36.4	8 30.3	41	53	35.0	105
6									5 37.1	43	60	39.8	6 03.0	43	58	38.9	6 28.8	43	57	38.0	6 54.5	43	56	37.1	7 20.1	43	55	36.2	7 58.3	42	53	34.8	6
7									5 01.3	44	60	39.5	5 27.9	44	58	38.6	5 54.4	44	57	37.7	6 20.8	44	56	36.8	6 47.1	44	54	35.9	7 26.4	43	53	34.5	7
8																	5 20.2	45	57	37.4	5 47.4	45	56	36.5	6 14.4	45	54	35.6	6 54.8	45	52	34.3	8
9																					5 14.1	46	55	36.2	5 41.9	46	54	35.3	6 23.3	46	52	34.0	9
110																									5 09.6	47	54	35.1	5 52.1	47	52	33.7	110
1																													5 21.1	48	52	33.4	1

Lat. 21°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	
00	56 30.0	1.0 01	00.0	56 00.0	1.0 01	00.0	55 00.0	1.0 01	00.0	54 30.0	1.0 01	00.0	54 00.0	1.0 01	00.0	53 30.0	1.0 01	00.0	52 00.0	1.0 01	00.0	51 30.0	1.0 01	00.0	00
1	56 29.5	1.0 03	01.1	55 59.5	1.0 02	01.0	54 59.5	1.0 02	01.0	54 29.5	1.0 02	01.0	53 59.5	1.0 02	00.9	53 29.6	1.0 02	00.9	51 59.6	1.0 02	00.8	51 29.6	1.0 02	00.8	1
2	56 27.9	1.0 04	02.1	55 58.0	1.0 04	02.0	54 58.1	1.0 04	01.9	54 28.1	1.0 04	01.9	53 58.2	1.0 04	01.9	53 28.2	1.0 04	01.8	51 58.4	1.0 04	01.7	51 28.4	1.0 03	01.6	2
3	56 25.4	1.0 06	03.2	55 55.5	1.0 06	03.1	54 55.7	1.0 05	02.9	54 25.8	1.0 05	02.8	53 55.9	1.0 05	02.8	53 26.0	1.0 05	02.7	51 56.3	1.0 05	02.5	51 26.4	1.0 05	02.4	3
4	56 21.8	99 08	04.2	55 52.0	99 08	04.1	54 52.4	99 07	03.9	54 22.6	99 07	03.8	53 52.8	99 07	03.7	53 22.9	99 06	03.6	51 53.5	99 06	03.3	51 23.6	99 06	03.3	4
05	56 17.2	99 09	05.2	55 47.5	99 09	05.1	54 48.1	99 09	04.9	54 18.4	99 08	04.7	53 48.7	99 08	04.6	53 19.0	99 08	04.5	51 49.8	99 08	04.2	51 20.1	99 07	04.1	05
6	56 11.6	98 11	06.3	55 42.0	98 11	06.1	54 42.9	99 10	05.8	54 13.3	99 10	05.7	53 43.8	99 10	05.5	53 14.2	99 10	05.4	51 45.3	99 09	05.0	51 15.7	99 08	04.9	6
7	56 06.0	98 13	07.3	55 35.6	98 12	07.1	54 36.8	98 12	06.8	54 07.4	98 12	06.6	53 37.9	98 11	06.4	53 08.5	98 11	06.3	51 40.1	98 10	05.8	51 10.6	98 10	05.7	7
8	55 57.4	97 14	08.3	55 28.2	97 14	08.1	54 29.7	97 13	07.7	54 00.5	98 13	07.5	53 31.2	98 12	07.3	53 01.9	98 12	07.1	51 34.0	98 12	06.6	51 04.7	98 11	06.5	8
9	55 48.8	97 16	09.3	55 19.8	97 16	09.1	54 21.8	97 15	08.6	53 52.7	97 14	08.4	53 23.7	97 14	08.2	52 54.6	97 14	08.0	51 27.1	97 13	07.4	50 58.0	97 12	07.2	9
10	55 39.3	96 18	10.3	55 10.5	96 17	10.0	54 12.9	96 16	09.6	53 44.1	96 16	09.3	53 15.2	96 16	09.1	52 46.3	96 15	08.9	51 19.5	97 14	08.2	50 50.5	97 14	08.0	10
1	55 28.8	96 19	11.3	55 00.3	96 19	11.0	54 03.2	96 18	10.5	53 34.6	96 17	10.2	53 05.9	96 17	10.0	52 37.3	96 16	09.7	51 11.1	96 15	09.0	50 42.3	96 15	08.0	1
2	55 17.4	94 21	12.2	54 49.1	94 20	11.9	53 52.6	94 19	11.4	53 24.2	96 19	11.1	52 55.8	96 18	10.8	52 27.4	96 18	10.6	51 02.0	96 17	09.8	50 33.4	96 16	09.6	2
3	55 05.0	93 22	13.2	54 37.1	93 22	12.9	53 41.1	94 20	12.3	53 13.0	94 20	12.0	52 44.9	94 20	11.7	52 16.7	94 19	11.4	50 52.0	94 18	10.6	50 23.7	94 17	10.3	3
4	54 51.8	92 24	14.1	54 24.2	92 23	13.8	53 28.8	93 22	13.1	53 01.0	93 21	12.8	52 33.2	93 21	12.5	52 05.3	93 20	12.2	50 41.4	93 19	11.3	50 13.3	94 18	11.1	4
15	54 37.7	91 25	15.0	54 10.4	91 24	14.7	53 15.6	91 23	14.0	52 48.2	92 23	13.7	52 20.6	92 22	13.3	51 53.1	92 22	13.0	50 30.0	92 20	12.1	50 02.2	93 20	11.8	15
6	54 22.7	90 26	15.9	53 55.8	90 26	15.6	53 01.7	90 25	14.8	52 34.5	91 24	14.5	52 07.3	91 24	14.2	51 40.1	91 23	13.8	50 17.9	92 21	12.8	49 50.4	92 21	12.5	6
7	54 06.9	88 28	16.8	53 40.3	89 27	16.4	52 46.9	89 26	15.7	52 20.1	89 26	15.3	51 53.2	90 25	15.0	51 26.3	90 24	14.6	50 06.1	90 22	13.6	49 37.9	91 22	13.2	7
8	53 50.3	87 29	17.7	53 24.1	88 28	17.3	52 31.4	88 27	16.5	52 04.9	88 26	16.1	51 38.4	89 26	15.7	51 11.8	89 25	15.4	49 51.6	89 24	14.3	49 24.8	90 23	13.9	8
9	53 32.8	86 30	18.6	53 07.0	86 30	18.1	52 15.1	87 28	17.3	51 49.0	87 28	16.9	51 22.9	87 27	16.5	50 56.6	88 26	16.1	49 37.5	88 25	15.0	49 10.9	89 24	14.6	9
20	53 14.6	85 32	19.4	52 49.2	85 31	18.9	51 58.1	86 30	18.1	51 32.4	86 29	17.7	51 06.6	86 28	17.3	50 40.7	86 28	16.9	49 22.6	87 26	15.7	48 56.5	87 25	15.3	20
1	52 55.7	83 33	20.2	52 30.7	84 32	19.7	51 40.3	84 31	18.9	51 15.0	85 30	18.4	50 49.6	85 29	18.0	50 24.1	85 29	17.6	49 07.2	86 27	16.4	48 41.3	86 26	16.0	1
2	52 36.9	82 34	21.0	52 11.4	82 33	20.5	51 21.9	83 32	19.6	50 57.0	83 31	19.2	50 32.0	84 30	18.7	50 06.9	84 30	18.3	48 51.0	85 28	17.0	48 25.6	85 27	16.7	2
3	52 15.6	80 35	21.8	51 51.4	81 34	21.3	51 02.8	81 33	20.3	50 38.3	82 32	19.9	50 13.7	82 32	19.4	49 49.0	82 31	19.0	48 34.3	83 29	17.7	48 09.2	84 28	17.3	3
4	51 54.5	79 36	22.5	51 30.7	79 36	22.0	50 43.0	80 34	21.1	50 18.9	80 33	20.6	49 54.7	81 33	20.1	49 30.4	81 32	19.7	48 17.0	82 30	18.3	47 52.3	82 29	17.9	4
25	51 32.7	77 37	23.2	51 09.4	78 36	22.7	50 22.5	79 35	21.8	49 58.9	79 34	21.3	49 35.1	79 34	20.8	49 11.3	80 33	20.3	47 59.1	81 31	19.0	47 34.8	81 30	18.5	25
6	51 10.3	76 38	24.0	50 47.5	76 38	23.4	50 01.5	77 36	22.4	49 38.3	77 36	21.9	49 15.0	78 35	21.5	48 51.5	78 34	21.0	47 40.6	79 32	19.6	47 16.7	80 31	19.1	6
7	50 47.2	74 40	24.6	50 24.9	75 39	24.1	49 39.8	76 37	23.1	49 17.0	76 36	22.6	48 54.2	76 36	22.1	48 31.2	77 35	21.6	47 21.5	78 33	20.2	46 58.0	78 32	19.7	7
8	50 23.5	73 40	25.3	50 01.7	73 40	24.8	49 17.5	74 38	23.7	48 55.2	75 37	23.2	48 32.8	75 36	22.7	48 10.3	75 36	22.2	47 01.9	77 34	20.8	46 38.9	77 33	20.3	8
9	49 59.3	71 41	26.0	49 37.9	72 40	25.4	48 54.7	73 39	24.4	48 32.9	73 38	23.8	48 10.9	73 37	23.3	47 48.8	74 37	22.8	46 41.8	75 34	21.3	46 19.2	76 34	20.9	9
30	49 34.5	69 42	26.6	49 13.6	70 42	26.1	48 31.3	71 40	25.0	48 10.0	71 39	24.4	47 48.5	72 38	23.9	47 26.8	72 38	23.4	46 21.1	74 35	21.9	45 58.9	74 34	21.4	30
1	49 09.1	68 43	27.2	48 48.7	68 42	26.7	48 07.4	69 41	25.6	47 46.5	70 40	25.0	47 25.5	70 39	24.5	47 04.3	71 38	24.0	46 00.0	72 36	22.4	45 38.2	73 35	22.0	1
2	48 43.3	66 44	27.8	48 23.3	67 43	27.2	47 43.0	68 42	26.1	47 22.6	68 41	25.6	47 02.0	69 40	25.1	46 41.3	69 39	24.5	45 38.3	71 37	23.0	45 17.1	71 36	22.5	2
3	48 16.9	65 45	28.4	47 57.5	65 44	27.8	47 18.1	66 42	26.7	46 58.1	67 42	26.1	46 38.1	67 41	25.6	46 17.8	68 40	25.1	45 16.2	69 38	23.5	44 55.4	70 37	23.0	3
4	47 50.0	63 46	28.9	47 31.1	63 45	28.4	46 52.7	65 43	27.2	46 33.2	65 42	26.7	46 13.6	66 42	26.1	45 53.9	66 41	25.6	44 53.7	68 38	24.0	44 33.3	68 38	23.5	4
35	47 22.7	61 46	29.5	47 04.3	62 46	28.9	46 26.8	63 44	27.7	46 07.9	63 43	27.2	45 48.7	64 42	26.6	45 29.5	65 42	26.1	44 30.7	66 39	24.5	44 10.8	67 38	23.9	35
6	46 54.9	60 47	30.0	46 37.0	60 46	29.4	46 00.5	61 44	28.2	45 42.1	62 44	27.7	45 23.4	62 43	27.1	45 04.6	63 42	26.6	44 07.3	64 40	24.9	43 47.9	65 39	24.4	6
7	46 26.7	58 48	30.5	46 09.3	58 47	29.9	45 33.8	60 45	28.7	45 15.8	60 44	28.2	44 57.7	61 44	27.6	44 39.3	61 43	27.0	43 43.5	63 40	25.4	43 24.5	63 40	24.9	7
8	45 58.1	56 48	31.0	45 41.2	57 48	30.4	45 06.7	58 46	29.2	44 49.2	59 45	28.6	44 31.5	59 44	28.1	44 13.7	60 43	27.5	43 19.2	61 41	25.8	43 00.8	62 40	25.3	8
9	45 29.1	55 49	31.4	45 12.7	55 48	30.8	44 39.2	56 46	29.6	44 22.2	57 46	29.1	44 05.0	58 45	28.5	43 47.7	58 44	27.9	42 54.6	60 42	26.3	42 36.6	60 41	25.7	9
40	44 59.7	53 50	31.9	44 43.8	54 49	31.3	44 11.3	55 47	30.1	43 54.8	55 46	29.5	43 38.1	56 46	28.9	43 21.2	56 45	28.4	42 29.7	58 42	26.7	42 12.2	59 42	26.1	40
1	44 39.0	51 50	32.3	44 14.5	52 49	31.7	43 43.0	53 48	30.5	43 27.0	54 47	29.9	43 10.8	54 46	29.3	42 54.4	55 45	28.8	42 04.3	56 43	27.1	41 47.3	57 42	26.5	1
2	43 59.9	50 51	32.7	43 44.9	50 50	32.1	43 14.4	51 48	30.9	42 58.9	52 47	30.3	42 43.2	53 47	29.7	42 27.3	53 46	29.2	41 38.7	55 43	27.5	41 22.1	55 42	26.9	2
3	43 29.5	48 51	33.1	43 15.0	49 50	32.5	42 45.5	50 49	31.3	42 30.5	50 48	30.7	42 15.2	51 47	30.1	41 59.9	52 46	29.5	41 12.7	53 44	27.8	40 56.6	54 43	27.3	3
4	42 58.7	46 52	33.5	42 44.8	47 51	32.9	42 16.2	48 49	31.7	42 01.7	49 48	31.1	41 47.0	49 48	30.5	41 32.1	50 47	29.9	40 46.4	52 44	28.2	40 30.8	52 44	27.6	4
45	42 27.7	45 52	33.8	42 14.2	45 51	33.2	41 46.7	47 50	32.0	41 32.6	47 49	31.4	41 18.4	48 48	30.8	41 04.0	48 47	30.3	40 19.8	50 45	28.5	40 04.7	51 44	28.0	45
6	41 56.4	43 53	34.2	41 43.4	44 52	33.6	41 16.8	45 50	32.4	41 03.3	45 49	31.8	40 49.5	46 48	31.2	40 35.6	47 48	30.6	39 52.9	48 45	28.9	39 38.3	49 44	28.3	6
7	41 24.8	41 53	34.5	41 12.3	43 52	33.9	40 46.7	43 51	32.7	40 33.7	44 50	32.1	40 20.4	44 49	31.5	40 07.0	45 48	30.9	39 25.7	47 46	29.2	39 11.6	47 45	28.6	7
8	40 53.0	40 54	34.8	40 40.9	40 53	34.2	40 16.3	42 51	33.0	40 03.8	42 50	32.4	39 51.0	43 49	31.8	39 38.1	43 49	31.2	38 58.2	45 46	29.5	38 44.6	46 45	28.9	8
9	40 29.9	38 54	35.1	40 09.3	39 53	34.5	39 45.7	40 52	33.3	39 33.6	41 51	32.7	39 21.4	41 50	32.1	39 08.9	42 49	31.5	38 30.5	43 46	29.8	38 17.4	44 46	29.2	9
50	39 48.5	37 54	35.4	39 37.5	37 54	34.8	39 14.8	38 52	33.6	39 03.2	39 51	33.0	38 51.5	40 50	32.4	38 39.5	40 49	31.8	38 02.6	42 47	30.1	37 49.9	42 46	29.5	50
1	39 16.9	35 55	35.7	39 06.4	36 54	35.1	38 43.7	37 52	33.9	38 32.6	37 51	33.3	38 21.3	38 50	32.7	38 09.9	39 50	32.1	37 34.4	40 47	30.3	37 22.2	41 46	29.8	1
2	38 43.2	33 55	35.9	38 33.2	34 54	35.3	38 12.4	35 52	34.1	38 01.8	36 52	33.5	37 51.0	36 51	32.9	37 40.0	37 50	32.3	37 06.0	39 48	30.6	36 54.3	39 47	30.0	2
3	38 10.3	32 55	36.2	38 00.7	32 54	35.6	37 40.9	34 53	34.4	37 30.8	34 52	33.8	37 20.4	35 51	33.2	37 09.9	35 50	32.6	36 37.4	37 48	30.8	36 26.2	38 47	30.3	3
4	37 37.2	30 56	36.4	37 28.0	31 55	35.8	37 09.2	32 53	34.6	36 59.6	33 52	34.0	36 49.7	33 52	33.4	36 39.7	34 51	32.8	36 08.6	35 48	31.1	35 57.9	36 48	30.5	4
55	37 03.8	29 56	36.6	36 55.2	29 55	36.0	36 37.3	30 53	34.8	36 28.1	31 52	34.2	36 18.8	32 52	33.6	36 09.2	32 51	33.0	35 39.6	34 49	31.3	35 29.4	34 48	30.7	55
6	36 30.4	27 56	36.8	36 22.2	28 55	36.2	36 05.3	29 54	35.0	35 56.6	29 53	34.4	35 47.7	30 52	33.8	35 38.6	30 51	33.2	35 10.4	32 49	31.5	35 00.7	33 48	30.9	6
7	35 56.7	26 56	37.0	35 49.0	26 56	36.4	35 33.1	27 54	35.2	35 24.8	28 53	34.6	35 16.4	28 52	34.0	35 07.8	29 52	33.4	34 41.1	31 49	31.7	34 31.8	31 48	31.1	7
8	35 23.0	24 56	37.2	35 15.7	24 56	36.6	35 00.7	26 54	35.4	34 52.9	26 53	34.8	34 45.0	27 53	34.2	34 36.9	27 52	33.6	34 11.6	29 50	31.9	34 02.8	29 49	31.3	8
9	34 49.1	22 57	37.3	34 42.3	23 56	36.7	34 28.2	24 54	35.6	34 20.9	25 54	35.0	34 13.4	25 53	34.4	34 05.8	26 52	33.8	33 41.9	27 50	32.0	33 33.6	28 49	31.5	9
60	34 15.1	21 57	37.5	34 08.7	21 56	36.9	33 55.6	22 55	35.7	33 48.7	23 54	35.1	33 41.8	24 53	34.5	33 34.6	24 52	34.0	33 12.1	26 50	32.2	33 04.3	26 49	31.6	60
1	33 40.9	19 57	37.6	33 35.1	20 56	37.0	33 22.8	21 55	35.9	33 16.5	21 54	35.3	33 09.9	22 53	34.7	33 03.2	23 52	34.1	32 42.2	24 50	32.4	32 34.9	25 49	31.8	1
2	33 06.7	18 57	37.7	33 01.3	18 56	37.2	32 50.0	19 55	36.0	32 44.1	20 54	35.4	32 38.0	20 53	34.8	32 31.8	21 53	34.2	32 12.2	23 50	32.5	32 05.3	23 50	31.9	2
3	32 32.4	16 58	37.9	32 27.4	17 57	37.3	32 17.0	18 55	36.1	32 11.6	18 54	35.5	32 06.9	19 54	34.9	32 00.2	19 53	34.4	31 42.0	21 50	32.6	31 35.6	22 50	32.1	3
4	31 57.9	15 58	38.0	31 53.4	15 57	37.4	31 43.9	16 55	36.2	31 39.0	17 54	35.6	31 33.8	17 54	35.1	31 28.5	18 53	34.5	31 11.7	19 50	32.8	31 05.8	20 50	32.2	4
65	31 23.4	13 58	38.1	31 19.4	14 57	37.5	31 10.8	15 55	36.3	31 06.3	15 55	35.7	31 01.6	16 54	35.2	30 56.8	16 53	34.6	30 41.4	18 51	32.9	30 35.9	18 50	32.3	65
6	30 48.9	12 58	38.2	30 45.3	12 57	37.6	30 37.6	13 55	36.4	30 33.5	14 55	35.8	30 29.3	14 54	35.3	30 24.9	15 53	34.7	30 10.9	16 51	33.0	30 06.0	17 50	32.4	6
7	30 14.2	10 58	38.2	30 11.1	11 57	37.6	30 04.3	12 56	36.5	30 00.7	12 55	35.9	29 56.9	13 54	35.4	29 53.0	13 53	34.8	29 40.4	15 51	33.1	29 35.9	15 50	32.5	7
8	29 39.6	09 58	38.3	29 36.8	09 57	37.7	29 31.0	10 56	36.6	29 27.8	11 55	36.0	29 24.5	11 54	35.4	29 21.0	12 53	34.9	29 09.8	13 51	33.2	29 05.8	14 50	32.6	8
9	29 04.8	07 58	38.3	29 02.5	08 57	37.8	28 57.6	09 56	36.6	28 54.8	09 55	36.1	28 52.0	10 54	35.5	28 49.0	10 54	34.9	28 39.1	12 51	33.2	28 35.6	12 50	32.7	9
70	28 30.1	06 58	38.4	28 28.2	06 57	37.8	28 24.1	07 56	36.7	28 21.8	08 55	36.1	28 19.4	08 54	35.5	28 16.9	09 54	35.0	28 08.4	10 51	33.3	28 05.3	11 50	32.7	70
1	27 55.3	04 58	38.4	27 53.9	05 57	37.9	27 50.6	06 56	36.7	27 48.8	06 55	36.2	27 46.9	07 54	35.6	27 44.8	07 54	35.0	27 37.7	09 51	33.3	27 35.0	09 50	32.8	1
2	27 20.4	03 58	38.4	27 19.5	03 57	37.9	27 17.1	04 56	36.8	27 15.7	05 55	36.2	27 14.2	05 54	35.6	27 12.6	06 54	35.1	27 06.9	07 51	33.4	27 04.7	07 51	32.8	2
3	26 45.6	02 58	38.5	26 45.1	02 57	37.9	26 43.6	03 56	36.8	26 42.7	03 55	36.2	26 41.6	04 54	35.7	26 40.4	04 54	35.1	26 36.0	06 51	33.4	26 34.3	06 51	32.9	3
4	26 10.8	00 58	38.5	26 10.7	01 57	37.9	26 10.1	01 56	36.8	26 09.6	02 55	36.2	26 08.9	02 54	35.7	26 08.2	03 54	35.1	26 05.1	04 51	33.5	26 03.9	04 51	32.9	4
75	25 35.9	01 58	38.5	25 36.2	01 57	37.9	25 36.5	00 56	36.8	25 36.4	00 55	36.2	25 36.3	01 54	35.7	25 35.9	01 54	35.1	25 34.3	03 52	33.5	25 33.4	03 51	32.9	75
6	25 01.1	03 58	38.4	25 01.8	02 57	37.9	25 03.0	01 56	36.8	25 03.3	01 55	36.2	25 03.6	01 54	35.7	25 03.7	00 54	35.1	25 03.4	01 52	33.5	25 03.0	01 51	32.9	6
7	24 26.3	04 58	38.4	24 27.4	04 57	37.9	24 29.4	03 56	36.8	24 30.2	03 55	36.2	24 30.9	02 54	35.7	24 31.5	02 54	35.1	24 32.5	00 52	33.5	24 32.6	00 51	32.9	7
8	23 51.5	05 58	38.4	23 53.1	06 57	37.9	23 55.9	04 56	36.8	23 57.1	04 55	36.2	23 58.2	04 54	35.7	23 59.2	03 54	35.1	24 01.6	02 52	33.5	24 02.1	02 51	32.9	8
9	23 16.7	07 58	38.4	23 18.7	06 57	37.8	23 22.4	06 56	36.7	23 24.0	05 55	36.2	23 25.6	05 54	35.6	23 27.0	05 54	35.1	23 30.7	03 52	33.5	23 31.7	03 51	32.9	9
80	22 42.0	08 58	38.3	22 44.4	08 57	37.8	22 48.9	07 56	36.7	22 51.0	07 55	36.1	22 53.0	06 54	35.6	22 54.8	06 54	35.1	22 59.8	05 53	33.4	23 01.2	04 51	32.9	80
1	22 07.3	10 58	38.3	22 10.1	09 57	37.7	22 15.4	09 56	36.6	22 18.0	08 55	36.1	22 20.4	08 54	35.6	22 22.7	07 54	35.0	22 28.9	06 51	33.4	22 30.8	06 51	32.9	1
2	21 32.6	11 58	38.2	21 35.8	11 57	37.7	21 42.0	10 56	36.6	21 45.0	10 55	36.0	21 47.8	09 54	35.5	21 50.5	09 53	35.0	21 58.1	08 51	33.4	22 00.4	08 50	32.8	2
3	20 58.0	12 58	38.1	21 01.7	12 57	37.6	21 08.7	11 56	36.5	21 12.0	11 55	36.0	21 15.3	11 54	35.5	21 18.5	10 53	34.9	21 27.3	09 51	33.3	21 30.1	09 50	32.8	3
4	20 23.4	14 57	38.0	20 27.5	13 57	37.5	20 35.4	13 56	36.4	20 39.1	12 55	35.9	20 42.8	12 54	35.4	20 46.4	12 53	34.9	20 56.6	11 51	33.3	20 59.3	10 50	32.7	4
85	19 49.0	15 57	37.9	19 53.4	15 57	37.4	20 02.1	14 55	36.4	20 06.3	14 55	35.8	20 10.4	14 54	35.3	20 14.4	13 53	34.8	20 25.9	12 51	33.2	20 29.5	12 50	32.7	85
6	19 14.6	16 57	37.8	19 19.4	16 56	37.3	19 28.9	16 55	36.3	19 33.6	15 54	35.8	19 38.1	15 54	35.2	19 42.5	15 53	34.7	19 55.3	14 51	33.1	19 59.3	13 50	32.6	6
7	18 40.2	18 57	37.7	18 45.5	17 56	37.2	18 55.8	17 55	36.2	19 00.9	17 54	35.7	19 05.8	16 54	35.1	19 10.7	16 53	34.6	19 24.7	15 51	33.0	19 29.2	15 50	32.5	7
8	18 06.0	19 57	37.6	18 11.7	19 56	37.1	18 22.8	18 55	36.1	18 28.2	18 54	35.6	18 33.6	18 54	35.0	18 38.9	17 53	34.5	18 54.2	17 51	33.0	18 59.1	16 50	32.4	8
9	17 31.8	20 57	37.5	17 37.9	20 56	37.0	17 49.9	20 56	36.0	17 55.7	19 54	35.5	18 01.5	19 54	34.9	18 07.2	19 53	34.4	18 23.7	18 50	32.9	18 29.1	18 50	32.3	9
90	16 57.8	22 57	37.4	17 04.3	22 56	36.9	17 17.0	21 54	35.8	17 23.3	21 54	35.3	17 29.4	20 53	34.8	17 35.5	20 52	34.3	17 53.4	19 50	32.8	17 59.1	19 50	32.2	90

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
00	14 30.0	1.0	180.0	14 00.0	1.0	180.0	13 00.0	1.0	180.0	12 30.0	1.0	180.0	12 00.0	1.0	180.0	11 30.0	1.0	180.0	10 00.0	1.0	180.0	9 30.0	1.0	180.0	00
1	14 29.7	1.0	179.4	13 59.7	1.0	179.4	12 59.7	1.0	179.4	12 29.7	1.0	179.4	11 59.7	1.0	179.4	11 29.7	1.0	179.5	9 59.7	1.0	179.5	9 29.7	1.0	179.5	1
2	14 28.8	1.0	178.8	13 58.8	1.0	178.8	12 58.9	1.0	178.9	12 28.9	1.0	178.9	11 58.9	1.0	178.9	11 28.9	1.0	178.9	9 59.0	1.0	179.0	9 29.0	1.0	179.0	2
3	14 27.4	1.0	178.2	13 57.4	1.0	178.2	12 57.5	1.0	178.3	12 27.5	1.0	178.3	11 57.6	1.0	178.3	11 27.6	1.0	178.4	9 57.7	1.0	178.4	9 27.7	1.0	178.5	3
4	14 25.3	1.0	177.6	13 55.4	1.0	177.6	12 55.5	1.0	177.7	12 25.6	1.0	177.7	11 55.6	1.0	177.8	11 25.7	1.0	177.8	9 55.9	1.0	177.9	9 26.0	1.0	177.9	4
05	14 22.7	1.0	177.0	13 52.8	1.0	177.0	12 53.0	1.0	177.1	12 23.1	1.0	177.2	11 53.2	1.0	177.2	11 23.3	1.0	177.3	9 53.6	1.0	177.4	9 23.7	1.0	177.4	05
6	14 19.5	99	176.4	13 49.6	99	176.5	12 49.9	99	176.6	12 20.1	1.0	176.6	11 50.2	1.0	176.7	11 20.4	1.0	176.7	9 50.8	1.0	176.9	9 21.0	1.0	176.9	6
7	14 15.7	99	175.8	13 45.9	99	175.9	12 46.3	99	176.0	12 16.5	99	176.1	11 46.7	99	176.1	11 16.9	99	176.2	9 47.5	99	176.3	9 17.7	99	176.4	7
8	14 11.3	99	175.2	13 41.6	99	175.3	12 42.1	99	175.4	12 12.4	99	175.5	11 42.6	99	175.6	11 12.9	99	175.6	9 43.7	99	175.8	9 13.9	99	175.9	8
9	14 06.3	99	174.6	13 36.7	99	174.7	12 37.3	99	174.9	12 07.7	99	174.9	11 38.0	99	175.0	11 08.3	99	175.1	9 39.3	99	175.3	9 09.7	99	175.4	9
10	14 00.8	99	174.0	13 31.2	99	174.1	12 32.0	99	174.3	12 02.5	99	174.4	11 32.9	99	174.5	11 03.3	99	174.5	9 34.5	99	174.8	9 04.9	99	174.9	10
1	13 54.7	98	173.4	13 25.2	98	173.5	12 26.2	98	173.7	11 56.7	98	173.8	11 27.2	98	173.9	10 57.7	98	174.0	9 29.2	98	174.3	8 59.7	98	174.4	1
2	13 48.0	98	172.9	13 18.6	98	173.0	12 19.8	98	173.2	11 50.4	98	173.3	11 21.0	98	173.4	10 51.6	98	173.5	9 23.4	98	173.8	8 53.9	98	173.9	2
3	13 40.8	98	172.3	13 11.5	98	172.4	12 12.9	98	172.6	11 43.6	98	172.7	11 14.3	98	172.8	10 45.0	98	172.9	9 17.0	98	173.3	8 47.7	98	173.4	3
4	13 32.9	97	171.7	13 03.8	97	171.8	12 05.4	97	172.0	11 36.2	97	172.2	11 07.0	97	172.3	10 37.8	97	172.4	9 10.2	97	172.8	8 41.0	97	172.9	4
15	13 24.6	97	171.1	12 55.5	97	171.2	11 57.4	97	171.5	11 28.3	97	171.6	10 59.2	97	171.7	10 30.1	97	171.9	9 02.9	97	172.2	8 33.8	97	172.4	15
6	13 15.6	96	170.5	12 46.7	96	170.7	11 48.8	96	170.9	11 19.9	96	171.1	10 50.9	97	171.2	10 22.0	97	171.3	8 55.1	97	171.7	8 26.1	97	171.9	6
7	13 06.1	96	170.0	12 37.3	96	170.1	11 39.7	96	170.4	11 10.9	96	170.5	10 42.1	96	170.7	10 13.3	96	170.8	8 46.8	96	171.2	8 18.0	96	171.4	7
8	12 56.1	96	169.4	12 27.4	96	169.5	11 30.1	96	169.8	11 01.4	96	170.0	10 32.8	96	170.1	10 04.1	96	170.3	8 38.0	96	170.7	8 09.3	96	170.9	8
9	12 45.5	95	168.8	12 17.0	95	169.0	11 20.0	95	169.3	10 51.4	95	169.5	10 22.9	95	169.6	9 54.4	95	169.8	8 28.8	95	170.2	8 00.2	95	170.4	9
20	12 34.4	94	168.3	12 06.0	95	168.4	11 09.3	95	168.8	10 40.9	95	168.9	10 12.6	95	169.1	9 44.2	95	169.3	8 19.0	95	169.7	7 50.6	95	169.9	20
1	12 22.7	94	167.7	11 54.5	94	167.9	10 58.1	94	168.2	10 29.9	94	168.4	10 01.7	94	168.6	9 33.5	94	168.7	8 08.8	94	169.3	7 40.6	94	169.4	1
2	12 10.5	93	167.1	11 42.5	93	167.3	10 46.4	93	167.7	10 18.4	93	167.9	9 50.4	93	168.0	9 22.3	94	168.2	7 58.1	94	168.8	7 30.1	94	168.9	2
3	11 57.8	93	166.6	11 30.0	93	166.8	10 34.2	93	167.2	10 06.4	93	167.3	9 38.5	93	167.5	9 10.6	93	167.7	7 47.0	93	168.3	7 19.1	93	168.5	3
4	11 44.5	92	166.0	11 16.9	92	166.2	10 21.5	92	166.6	9 53.9	92	166.8	9 26.2	92	167.0	8 58.5	92	167.2	7 35.4	92	167.8	7 07.7	92	168.0	4
25	11 30.8	92	165.5	11 03.3	92	165.7	10 08.3	92	166.1	9 40.9	92	166.3	9 13.4	92	166.5	8 45.9	92	166.7	7 23.3	92	167.3	6 55.8	92	167.5	25
6	11 16.5	91	165.0	10 49.2	91	165.2	9 54.7	91	165.6	9 27.4	91	165.8	9 00.1	91	166.0	8 32.8	91	166.2	7 10.8	91	166.8	6 43.5	91	167.1	6
7	11 01.7	90	164.4	10 34.6	90	164.6	9 40.5	90	165.1	9 13.4	90	165.3	8 46.3	90	165.5	8 19.2	90	165.7	6 57.8	90	166.4	6 30.7	90	166.6	7
8	10 46.4	89	163.9	10 19.5	90	164.1	9 25.8	90	164.6	8 58.9	90	164.8	8 32.0	90	165.0	8 05.1	90	165.2	6 44.4	90	165.9	6 17.5	90	166.1	8
9	10 30.6	89	163.4	10 04.0	89	163.6	9 10.7	89	164.1	8 44.0	89	164.3	8 17.3	89	164.5	7 50.6	89	164.8	6 30.5	89	165.4	6 03.8	89	165.7	9
30	10 14.3	88	162.8	9 47.9	88	163.1	8 55.0	88	163.6	8 28.6	88	163.8	8 02.1	88	164.0	7 35.7	88	164.3	6 16.3	88	165.0	5 49.8	88	165.2	30
1	9 57.5	87	162.3	9 31.4	87	162.6	8 39.0	87	163.1	8 12.7	87	163.3	7 46.5	87	163.6	7 20.3	87	163.8	6 01.5	88	164.5	5 35.3	88	164.8	1
2	9 40.3	87	161.8	9 14.3	87	162.1	8 22.4	87	162.6	7 56.4	87	162.8	7 30.4	87	163.1	7 04.4	87	163.3	5 46.4	87	164.1	5 20.3	87	164.3	2
3	9 22.6	86	161.3	8 56.9	86	161.6	8 05.4	86	162.1	7 39.7	86	162.3	7 13.9	86	162.6	6 48.1	86	162.9	5 30.8	86	163.6	5 05.0	86	163.9	3
4	9 04.4	85	160.8	8 38.9	85	161.1	7 47.9	85	161.6	7 22.4	85	161.9	6 56.9	85	162.1	6 31.4	85	162.4	5 14.8	85	163.2				4
35	8 45.7	84	160.3	8 20.5	84	160.6	7 30.0	84	161.1	7 04.8	84	161.4	6 39.5	84	161.7	6 14.3	84	161.9							35
6	8 26.6	83	159.8	8 01.7	83	160.1	7 11.7	83	160.7	6 46.7	83	160.9	6 21.7	83	161.2	5 56.7	83	161.5							6
7	8 07.1	82	159.3	7 42.4	82	159.6	6 52.9	82	160.2	6 28.2	82	160.5	6 03.4	83	160.8	5 38.7	83	161.0							7
8	7 47.1	81	158.8	7 22.6	81	159.1	6 33.7	82	159.7	6 09.3	82	160.0	5 44.8	82	160.3	5 20.3	82	160.6							8
9	7 26.7	81	158.4	7 02.5	81	158.7	6 14.1	81	159.3	5 49.9	81	159.6	5 25.7	81	159.9	5 01.5	81	160.2							9
40	7 05.8	80	157.9	6 41.9	80	158.2	5 54.1	80	158.8	5 30.1	80	159.1	5 06.2	80	159.4										40
1	6 44.5	79	157.4	6 20.9	79	157.8	5 33.6	79	158.4	5 10.0	79	158.7													1
2	6 22.8	78	157.0	5 59.5	78	157.3	5 12.8	78	157.9																2
3	6 00.7	77	156.5	5 37.7	77	156.9																			3
4	5 38.2	76	156.1	5 15.5	76	156.4																			4
45	5 15.3	75	155.6																						45

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
91	16 23.8	23	37.2	16 38.7	23	36.7	16 44.3	22	35.7	16 50.9	22	35.2	16 57.5	22	34.7	17 04.0	22	34.2	17 23.1	21	32.7	17 29.3	21	32.1	91
2	15 50.0	24	37.1	15 57.3	24	36.6	16 11.6	24	35.6	16 18.7	23	35.1	16 25.7	23	34.6	16 32.6	23	34.1	16 52.9	22	32.5	16 59.5	22	32.0	2
3	15 16.2	26	37.0	15 23.9	25	36.5	15 39.1	25	35.4	15 46.5	25	34.9	15 53.9	25	34.4	16 01.3	24	33.9	16 22.8	24	32.4	16 29.9	23	31.9	3
4	14 42.6	27	36.8	14 50.7	27	36.3	15 06.6	26	35.3	15 14.5	26	34.8	15 22.3	26	34.3	15 30.1	26	33.8	15 52.9	25	32.3	16 00.3	25	31.8	4
95	14 09.1	28	36.6	14 17.6	28	36.1	14 34.3	28	35.1	14 42.6	27	34.6	14 50.8	27	34.1	14 59.0	27	33.6	15 23.0	26	32.2	15 30.9	26	31.7	95
6	13 35.8	30	36.5	13 44.6	29	36.0	14 02.2	29	35.0	14 10.8	29	34.5	14 19.4	29	34.0	14 28.0	28	33.5	14 53.2	28	32.0	15 01.5	28	31.5	6
7	13 02.6	31	36.3	13 11.8	31	35.8	13 30.1	30	34.8	13 39.2	30	34.3	13 48.2	30	33.8	13 57.1	30	33.3	14 23.6	29	31.9	14 32.3	29	31.4	7
8	12 29.5	32	36.1	12 39.1	32	35.6	12 58.2	32	34.6	13 07.7	31	34.1	13 17.1	31	33.7	13 26.4	31	33.2	13 54.1	30	31.7	14 03.2	30	31.2	8
9	11 56.6	33	35.9	12 06.6	33	35.4	12 26.5	33	34.4	12 36.3	33	34.0	12 46.1	33	33.5	12 55.9	32	33.0	13 24.8	32	31.5	13 34.3	32	31.0	9
100	11 23.8	35	35.7	11 34.2	35	35.2	11 54.9	34	34.3	12 05.1	34	33.8	12 15.3	34	33.3	12 25.4	34	32.8	12 55.5	33	31.4	13 05.5	33	30.9	100
1	10 51.2	36	35.5	11 02.0	36	35.0	11 23.4	36	34.1	11 34.0	35	33.6	11 44.6	35	33.1	11 55.2	35	32.6	12 26.5	35	31.2	12 36.8	34	30.7	1
2	10 18.8	37	35.3	10 30.0	37	34.8	10 52.1	37	33.8	11 03.1	37	33.4	11 14.1	36	32.9	11 25.0	36	32.4	11 57.5	36	31.0	12 08.3	36	30.5	2
3	9 46.6	38	35.0	9 58.1	38	34.6	10 21.0	38	33.6	10 32.4	38	33.2	10 43.8	38	32.7	10 55.1	38	32.2	11 28.8	37	30.8	11 39.9	37	30.3	3
4	9 14.5	40	34.8	9 26.4	40	34.3	9 50.1	39	33.4	10 01.9	39	32.9	10 13.6	39	32.5	10 25.3	39	32.0	11 00.2	39	30.6	11 11.7	38	30.1	4
105	8 42.6	41	34.6	8 54.9	41	34.1	9 19.3	41	33.2	9 31.5	40	32.7	9 43.6	40	32.3	9 55.7	40	31.8	10 31.7	40	30.4	10 43.7	40	29.9	105
6	8 10.9	42	34.3	8 23.6	42	33.9	8 48.8	42	33.0	9 01.3	42	32.5	9 13.8	42	32.0	9 26.3	42	31.6	10 03.5	41	30.2	10 15.8	41	29.7	6
7	7 39.4	43	34.1	7 52.5	43	33.6	8 18.4	43	32.7	8 31.3	43	32.3	8 44.2	43	31.8	8 57.1	43	31.3	9 35.4	42	30.0	9 48.1	42	29.5	7
8	7 08.2	45	33.8	7 21.5	45	33.4	7 48.2	44	32.5	8 01.5	44	32.0	8 14.8	44	31.6	8 28.0	44	31.1	9 07.5	44	29.7	9 20.6	44	29.3	8
9	6 37.1	46	33.6	6 50.8	46	33.1	7 18.3	46	32.2	7 31.9	46	31.8	7 45.6	45	31.3	7 59.2	45	30.9	8 39.8	45	29.5	8 53.3	45	29.1	9
110	6 06.2	47	33.3	6 20.3	47	32.8	6 48.5	47	32.0	7 02.5	47	31.5	7 16.6	47	31.1	7 30.5	47	30.6	8 12.3	46	29.3	8 26.2	46	28.8	110
1	5 35.6	48	33.0	5 50.1	48	32.6	6 19.0	48	31.7	6 33.4	48	31.2	6 47.8	48	30.8	7 02.1	48	30.4	7 45.1	48	29.0	7 59.3	47	28.6	1
2	5 05.2	49	32.7	5 20.8	49	32.3	5 49.7	49	31.4	6 04.4	49	31.0	6 19.2	49	30.5	6 33.9	49	30.1	7 18.0	49	28.8	7 32.6	49	28.3	2
3							5 20.6	51	31.1	5 35.7	50	30.7	5 50.8	50	30.3	6 05.9	50	29.8	6 51.1	50	28.5	7 06.1	50	28.1	3
4										5 07.2	52	30.4	5 22.7	52	30.0	5 38.2	52	29.6	6 24.5	51	28.3	6 39.9	51	27.8	4
115																5 10.7	53	29.3	5 58.1	53	28.0	6 13.8	52	27.6	115
6																			5 31.9	54	27.7	5 48.0	54	27.3	6
7																			5 06.0	55	27.4	5 22.5	55	27.0	7

Lat. 21°
Lat. 22°
Lat. 23°
Lat. 24°
Lat. 25°
Lat. 26°
Lat. 27°
Lat. 28°

Lat. 21°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	51 00.0	1.0 01	00.0	50 30.0	1.0 01	00.0	49 00.0	1.0 01	00.0	48 30.0	1.0 00	00.0	48 00.0	1.0 00	00.0	42 00.0	1.0 00	00.0	41 30.0	1.0 00	00.0	36 30.0	1.0 00	00.0	00
1	50 59.6	1.0 02	00.8	50 29.6	1.0 02	00.8	48 59.6	1.0 02	00.7	48 29.7	1.0 02	00.7	47 59.7	1.0 02	00.7	41 59.8	1.0 01	00.5	41 29.8	1.0 01	00.5	36 29.8	1.0 01	00.3	1
2	50 58.4	1.0 03	01.6	50 28.5	1.0 03	01.5	48 58.6	1.0 03	01.4	48 28.6	1.0 03	01.4	47 58.7	1.0 03	01.4	41 59.1	1.0 02	01.0	41 29.1	1.0 02	00.9	36 29.3	1.0 01	00.7	2
3	50 56.5	1.0 04	02.4	50 26.6	1.0 04	02.3	48 56.9	1.0 04	02.1	48 26.9	1.0 04	02.1	47 57.0	1.0 04	02.0	41 57.9	1.0 03	01.4	41 27.9	1.0 03	01.4	36 28.5	1.0 02	01.0	3
4	50 53.8	99 06	03.2	50 24.0	99 06	03.1	48 54.4	1.0 05	02.9	48 24.6	1.0 05	02.8	47 54.7	1.0 05	02.7	41 56.2	1.0 04	01.9	41 26.3	1.0 03	01.9	36 27.4	1.0 02	01.3	4
05	50 50.3	99 07	04.0	50 20.6	99 07	03.9	48 51.3	99 06	03.6	48 21.5	99 06	03.5	47 51.7	99 06	03.4	41 54.1	99 04	02.4	41 24.3	99 04	02.3	36 25.9	99 03	01.7	05
6	50 46.1	99 08	04.7	50 16.4	99 08	04.6	48 47.4	99 08	04.3	48 17.8	99 07	04.2	47 48.1	99 07	04.1	41 51.5	99 05	02.9	41 21.8	99 05	02.8	36 24.2	99 04	02.0	6
7	50 41.1	98 10	05.5	50 11.5	98 09	05.4	48 42.9	99 09	05.0	48 13.4	99 08	04.8	47 43.8	99 08	04.7	41 48.5	99 06	03.4	41 18.8	99 06	03.3	36 22.1	99 04	02.3	7
8	50 35.3	98 11	06.3	50 05.9	98 10	06.1	48 37.7	98 10	05.7	48 08.3	98 10	05.5	47 38.9	98 09	05.4	41 45.0	98 07	03.8	41 15.4	98 06	03.7	36 19.6	99 05	02.6	8
9	50 28.8	97 12	07.1	49 59.6	97 12	06.9	48 31.9	98 11	06.4	48 02.6	98 11	06.2	47 33.3	98 10	06.0	41 41.0	98 07	04.3	41 11.6	98 07	04.2	36 16.9	98 05	03.0	9
10	50 21.5	97 13	07.8	49 52.5	97 13	07.6	48 25.3	97 12	07.1	47 56.2	97 12	06.9	47 27.1	97 12	06.7	41 36.6	98 08	04.8	41 07.3	98 08	04.6	36 13.8	98 06	03.3	10
1	50 13.5	96 14	08.6	49 44.7	96 14	08.4	48 18.1	96 13	07.7	47 49.2	96 13	07.5	47 20.2	96 12	07.3	41 31.7	97 09	05.2	41 02.5	97 09	05.1	36 10.4	98 06	03.6	1
2	50 04.8	95 16	09.3	49 36.2	95 15	09.1	48 10.2	96 14	08.4	47 41.5	96 14	08.2	47 12.8	96 14	08.0	41 26.3	97 10	05.7	40 57.3	97 09	05.5	36 06.7	97 07	03.9	2
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6	49 22.9	92 20	12.2	48 55.3	92 20	11.9	47 32.3	92 18	11.1	47 04.6	93 18	10.8	46 36.8	93 18	10.5	41 00.5	94 12	07.5	40 32.3	94 12	07.3	35 48.8	95 09	05.2	6
7	49 10.7	91 21	12.9	48 43.4	91 21	12.6	47 21.3	92 19	11.7	46 53.8	92 19	11.4	46 26.3	92 18	11.1	40 53.0	93 13	08.0	40 25.0	93 13	07.7	35 43.6	94 09	05.5	7
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6	46 52.7	80 30	18.7	46 28.6	80 30	18.3	45 15.8	81 28	17.0	44 51.4	82 27	16.6	44 26.8	82 26	16.2	39 26.4	85 19	11.7	39 00.9	85 19	11.4	34 43.2	87 14	08.2	6
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6	30 00.9	17 49	31.8	29 55.6	18 48	31.3	29 39.0	19 46	29.6	29 33.1	20 45	29.0	29 27.1	20 44	28.4	28 04.6	26 35	21.8	27 56.8	26 34	21.2	26 32.4	30 26	15.8	6
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1	27 32.2	09 50	32.2	27 29.3	10 49	31.7	27 19.8	11 47	30.0	27 16.3	12 46	29.4	27 12.8	12 45	28.9	26 19.6	17 35	22.2	26 14.3	18 34	21.7	25 15.9	22 26	16.2	1
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9	18 34.3	17 49	31.8	18 39.5	17 48	31.3	18 54.6	16 46	29.7	18 59.4	16 46	29.2	19 04.1	16 45	28.7	19 54.1	12 36	22.4	19 57.7	12 35	21.9	20 28.1	09 27	16.6	9
90	18 04.8	19 49	31.7	18 10.5	19 48	31.2	18 26.8	18 46	29.7	18 32.1	17 46	29.1	18 37.3	17 45	28.6	19 32.8	14 36	22.4	19 36.8	13 35	21.8	20 12.1	10 26	16.5	90

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.	63° 00′ Alt.	Δd	Δt	Az.	69° 00′ Alt.	Δd	Δt	Az.	69° 30′ Alt.	Δd	Δt	Az.	74° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	17 35.4	20	49	31.6	17 41.5	20	48	31.1	17 59.1	19	46	29.6	18 04.8	19	45	29.1	18 10.5	19	45	28.5	19 11.5	15	35	22.3	19 16.0	15	34	21.8	19 56.2	12	26	16.5	91
2	17 06.1	22	49	31.5	17 12.6	21	48	31.0	17 31.5	21	46	29.5	17 37.7	20	45	29.0	17 43.7	20	44	28.4	18 50.3	17	35	22.2	18 55.3	17	34	21.7	19 40.3	14	26	16.5	2
3	16 36.9	23	49	31.4	16 43.7	23	48	30.9	17 04.0	22	46	29.4	17 10.6	22	45	28.9	17 17.1	22	44	28.3	18 29.1	18	35	22.2	18 34.6	18	34	21.7	19 24.4	15	26	16.4	3
4	16 07.7	25	48	31.3	16 15.0	24	48	30.8	16 36.6	24	46	29.3	16 43.6	23	45	28.8	16 50.6	23	44	28.2	18 08.0	20	35	22.1	18 13.9	20	34	21.6	19 08.6	17	26	16.4	4
95	15 38.7	26	48	31.1	15 46.4	26	48	30.6	16 09.2	25	45	29.1	16 16.7	25	45	28.6	16 24.1	25	44	28.1	17 47.0	21	35	22.0	17 53.4	21	34	21.5	18 52.8	18	26	16.3	95
6	15 09.8	27	48	31.0	15 17.9	27	47	30.5	15 42.0	26	45	29.0	15 49.9	26	44	28.5	15 57.7	26	44	28.0	17 26.0	23	35	21.9	17 32.9	23	34	21.4	18 37.1	20	26	16.3	6
7	14 41.0	29	48	30.9	14 49.6	28	47	30.4	15 14.9	28	45	28.9	15 23.2	28	44	28.4	15 31.5	27	44	27.9	17 05.1	25	35	21.8	17 12.4	24	34	21.3	18 21.4	22	26	16.2	7
8	14 12.3	30	48	30.7	14 21.3	30	47	30.2	14 47.9	29	45	28.7	14 56.7	29	44	28.2	15 05.3	29	43	27.8	16 44.3	26	34	21.8	16 52.1	26	34	21.2	18 05.8	23	26	16.2	8
9	13 43.8	31	48	30.6	13 53.2	31	47	30.1	14 21.0	31	44	28.6	14 30.2	30	44	28.1	14 39.3	30	43	27.6	16 23.6	28	34	21.7	16 31.8	27	34	21.1	17 50.2	25	26	16.1	9
100	13 15.3	33	47	30.4	13 25.2	33	46	29.9	13 54.3	32	44	28.4	14 03.9	32	44	28.0	14 13.4	32	43	27.5	16 03.0	29	34	21.5	16 11.7	29	34	21.0	17 34.7	26	26	16.0	100
1	12 47.1	34	47	30.2	12 57.3	34	46	29.7	13 27.7	33	44	28.3	13 37.7	33	44	27.8	13 47.7	33	43	27.3	15 42.5	31	34	21.4	15 51.6	30	33	20.9	17 19.3	28	26	15.9	1
2	12 19.0	36	47	30.0	12 29.6	35	46	29.6	13 01.2	35	44	28.1	13 11.6	35	43	27.6	13 22.0	35	42	27.2	15 22.0	32	34	21.3	15 31.6	32	33	20.8	17 03.9	30	26	15.9	2
3	11 51.0	37	46	29.9	12 02.0	37	46	29.4	12 34.9	36	44	28.0	12 45.7	36	43	27.5	12 56.5	36	42	27.0	15 01.7	34	34	21.2	15 11.8	33	33	20.7	16 48.6	31	25	15.8	3
4	11 23.2	38	46	29.7	11 34.6	38	45	29.2	12 08.7	38	43	27.8	12 20.0	37	43	27.3	12 31.2	37	42	26.8	14 41.5	35	33	21.1	14 52.0	35	33	20.6	16 33.5	33	25	15.7	4
105	10 55.6	40	46	29.5	11 07.4	39	45	29.0	11 42.7	39	43	27.6	11 54.4	39	42	27.1	12 06.0	39	42	26.6	14 21.5	37	33	20.9	14 32.4	36	32	20.5	16 18.3	34	25	15.6	105
6	10 28.1	41	46	29.3	10 40.3	41	45	28.8	11 16.8	40	43	27.4	11 28.9	40	42	26.9	11 40.9	40	41	26.5	14 01.5	38	33	20.8	14 12.9	38	32	20.3	16 03.3	36	25	15.5	6
7	10 00.8	42	45	29.0	10 13.4	42	44	28.6	10 51.1	42	42	27.2	11 03.6	42	42	26.7	11 16.1	41	41	26.3	13 41.7	39	33	20.7	13 53.5	39	32	20.2	15 48.4	37	25	15.4	7
8	9 33.7	43	45	28.8	9 46.7	43	44	28.4	10 25.6	43	42	27.0	10 38.5	43	42	26.5	10 51.3	43	41	26.1	13 22.0	41	33	20.5	13 34.2	41	32	20.0	15 33.6	39	25	15.3	8
9	9 06.8	45	44	28.6	9 20.2	45	44	28.2	10 00.3	44	42	26.8	10 13.6	44	41	26.3	10 26.8	44	41	25.9	13 02.4	42	32	20.4	13 15.1	42	32	19.9	15 18.8	40	24	15.2	9
110	8 40.1	46	44	28.4	8 53.9	46	44	27.9	9 35.1	46	42	26.6	9 48.8	46	41	26.1	10 02.4	45	40	25.7	12 43.0	44	32	20.2	12 56.1	44	31	19.7	15 04.2	42	24	15.1	110
1	8 13.5	47	44	28.1	8 27.7	47	43	27.7	9 10.2	47	41	26.4	9 24.2	47	41	25.9	9 38.3	47	40	25.5	12 23.8	45	32	20.0	12 37.3	45	31	19.6	14 49.7	43	24	15.0	1
2	7 47.2	49	44	27.9	8 01.8	49	43	27.5	8 45.4	48	41	26.1	8 59.8	48	40	25.7	9 14.3	48	40	25.2	12 04.7	47	32	19.9	12 18.6	46	31	19.4	14 35.3	45	24	14.8	2
3	7 21.1	50	43	27.7	7 36.1	50	42	27.2	8 20.8	50	40	25.9	8 35.7	49	40	25.5	8 50.5	49	39	25.0	11 45.7	48	31	19.7	12 00.0	48	30	19.2	14 21.0	46	24	14.7	3
4	6 55.2	51	43	27.4	7 10.6	51	42	27.0	7 56.5	51	40	25.7	8 11.7	51	40	25.2	8 26.9	51	39	24.8	11 26.9	49	31	19.5	11 41.7	49	30	19.1	14 06.9	48	24	14.6	4
115	6 29.6	52	42	27.1	6 45.3	52	42	26.7	7 32.3	52	40	25.4	7 47.9	52	39	25.0	8 03.5	52	39	24.6	11 08.3	51	31	19.3	11 23.4	51	30	18.9	13 52.8	49	23	14.4	115
6	6 04.1	54	42	26.9	6 20.2	54	41	26.4	7 08.4	53	40	25.2	7 24.4	53	39	24.7	7 40.3	53	38	24.3	10 49.8	52	30	19.1	11 05.4	52	30	18.7	13 38.9	50	23	14.3	6
7	5 39.0	55	42	26.6	5 55.4	55	41	26.2	6 44.7	55	39	24.9	7 01.0	55	38	24.5	7 17.4	54	38	24.1	10 31.5	53	30	19.0	10 47.5	53	30	18.5	13 25.1	52	23	14.2	7
8	5 14.0	56	42	26.3	5 30.8	56	40	25.9	6 21.2	56	39	24.7	6 37.9	56	38	24.2	6 54.7	56	38	23.8	10 13.4	55	30	18.8	10 29.8	55	29	18.3	13 11.5	53	22	14.0	8
9					5 06.5	57	40	25.6	5 57.9	57	38	24.4	6 15.1	57	38	24.0	6 32.2	57	37	23.6	9 55.5	56	30	18.6	10 12.3	56	29	18.1	12 58.0	55	22	13.9	9
120									5 34.9	58	38	24.1	5 52.4	58	37	23.7	6 09.9	58	37	23.3	9 37.8	57	29	18.3	9 54.9	57	28	17.9	12 44.6	56	22	13.7	120
1									5 12.2	60	38	23.8	5 30.0	59	37	23.4	5 47.9	59	36	23.0	9 20.3	59	29	18.1	9 37.8	58	28	17.7	12 31.4	57	22	13.6	1
2													5 07.9	61	36	23.2	5 26.1	61	36	22.8	9 02.9	60	28	17.9	9 20.8	60	28	17.5	12 18.3	59	22	13.4	2
3																	5 04.5	62	36	22.5	8 45.8	61	28	17.7	9 04.1	61	28	17.3	12 05.4	60	21	13.3	3
																					8 28.9	62	28	17.5	8 47.5	62	27	17.1	11 52.7	61	21	13.1	4
																					8 12.1	63	28	17.3	8 31.2	63	27	16.9	11 40.1	62	21	12.9	125
																					7 55.6	65	27	17.0	8 15.0	65	26	16.6	11 27.6	64	20	12.7	6
																					7 39.3	66	27	16.8	7 59.1	66	26	16.4	11 15.3	65	20	12.6	7
																					7 23.3	67	26	16.5	7 43.4	67	26	16.2	11 03.2	66	20	12.4	8
																					7 07.4	68	26	16.3	7 27.9	68	26	15.9	10 51.3	67	20	12.2	9
																					6 51.8	69	26	16.1	7 12.6	69	25	15.7	10 39.5	69	19	12.0	130
																					6 36.5	70	26	15.8	6 57.6	70	25	15.4	10 28.0	70	19	11.8	1
																					6 21.3	72	25	15.5	6 42.8	72	24	15.2	10 16.6	71	19	11.6	2
																					6 06.4	73	24	15.3	6 28.2	73	24	14.9	10 05.4	72	18	11.4	3
																					5 51.8	74	24	15.0	6 13.9	74	23	14.7	9 54.3	73	18	11.3	4
																					5 37.4	75	24	14.8	5 59.9	75	23	14.4	9 43.5	74	18	11.1	135
																					5 23.3	76	23	14.5	5 46.0	76	22	14.2	9 32.9	75	18	10.9	6
																					5 09.4	77	23	14.2	5 32.5	77	22	13.9	9 22.4	76	17	10.6	7
																									5 19.2	78	22	13.6	9 12.2	77	17	10.4	8
																									5 06.1	79	22	13.3	9 02.1	78	16	10.2	9
																													8 52.3	79	16	10.0	140
																													8 42.6	80	16	09.8	1
																													8 33.2	81	15	09.6	2
																													8 24.0	82	15	09.4	3
																													8 15.0	83	15	09.1	4
																													8 06.2	84	14	08.9	145
																													7 57.7	85	14	08.7	6
																													7 49.3	86	14	08.4	7
																													7 41.2	87	13	08.2	8
																													7 33.3	87	13	08.0	9
																													7 25.6	88	12	07.7	150
																													7 18.2	89	12	07.5	1
																													7 11.0	90	12	07.3	2
																													7 04.0	90	11	07.0	3
																													6 57.3	91	11	06.8	4
																													6 50.8	92	10	06.5	155
																													6 44.6	92	10	06.3	6
																													6 38.6	93	10	06.0	7
																													6 32.8	94	09	05.8	8
																													6 27.3	94	09	05.5	9
																													6 22.0	95	08	05.3	160
																													6 17.0	95	08	05.0	1
																													6 12.2	96	08	04.8	2
																													6 07.7	96	07	04.5	3
																													6 03.4	97	07	04.2	4
																													5 59.4	97	06	04.0	165
																													5 55.6	97	06	03.7	6
																													5 52.1	98	06	03.5	7
																													5 48.8	98	05	03.2	8
																													5 45.8	98	04	02.9	9
																													5 43.1	99	04	02.7	170
																													5 40.6	99	04	02.4	1
																													5 38.4	99	03	02.1	2
																													5 36.4	99	03	01.9	3
																													5 34.7	1.0	02	01.6	4
																													5 33.3	1.0	02	01.3	175
																													5 32.1	1.0	02	01.1	6
																													5 31.2	1.0	01	00.8	7
																													5 30.5	1.0	01	00.5	8
																													5 30.1	1.0	00	00.3	9
																													5 30.0	1.0	00	00.0	180

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.	63° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	9 00.0	1.0	00	180.0	8 30.0	1.0	00	180.0	7 00.0	1.0	00	180.0	6 30.0	1.0	00	180.0	6 00.0	1.0	00	180.0	00
1	8 59.8	1.0	01	179.5	8 29.8	1.0	01	179.5	6 59.8	1.0	01	179.5	6 29.8	1.0	01	179.5	5 59.8	1.0	01	179.5	1
2	8 59.0	1.0	02	179.0	8 29.0	1.0	02	179.0	6 59.1	1.0	02	179.1	6 29.1	1.0	02	179.1	5 59.1	1.0	02	179.1	2
3	8 57.8	1.0	03	178.5	8 27.8	1.0	03	178.5	6 57.9	1.0	03	178.6	6 28.0	1.0	03	178.6	5 58.0	1.0	03	178.6	3
4	8 56.0	1.0	04	178.0	8 26.1	1.0	04	178.0	6 56.3	1.0	04	178.1	6 26.4	1.0	04	178.1	5 56.4	1.0	03	178.2	4
05	8 53.8	1.0	04	177.5	8 23.9	1.0	04	177.5	6 54.2	1.0	04	177.6	6 24.3	1.0	04	177.7	5 54.4	1.0	04	177.7	05
6	8 51.1	1.0	05	177.0	8 21.2	1.0	05	177.0	6 51.7	1.0	05	177.2	6 21.8	1.0	05	177.2	5 52.0	1.0	05	177.3	6
7	8 47.9	99	06	176.5	8 18.1	99	06	176.5	6 48.7	99	06	176.7	6 18.9	99	06	176.8	5 49.1	99	06	176.8	7
8	8 44.2	99	07	176.0	8 14.5	99	07	176.0	6 45.2	99	06	176.2	6 15.5	99	06	176.3	5 45.7	99	06	176.4	8
9	8 40.0	99	08	175.5	8 10.3	99	08	175.5	6 41.3	99	07	175.8	6 11.6	99	07	175.8	5 42.0	99	07	175.9	9
10	8 35.3	99	08	175.0	8 05.7	99	08	175.0	6 36.9	99	08	175.3	6 07.3	99	08	175.4	5 37.7	99	08	175.5	10
1	8 30.2	98	10	174.5	8 00.7	98	09	174.6	6 32.1	98	09	174.8	6 02.6	98	09	174.9	5 33.1	98	08	175.0	1
2	8 24.5	98	10	174.0	7 55.1	98	10	174.1	6 26.8	98	10	174.4	5 57.4	98	09	174.5	5 28.0	98	09	174.6	2
3	8 18.4	98	11	173.5	7 49.1	98	11	173.6	6 21.1	98	10	173.9	5 51.8	98	10	174.0	5 22.5	98	10	174.1	3
4	8 11.8	97	12	173.0	7 42.6	97	12	173.1	6 14.9	97	11	173.4	5 45.7	97	11	173.6	5 16.5	97	11	173.7	4
15	8 04.7	97	13	172.5	7 35.6	97	12	172.6	6 08.3	97	12	173.0	5 39.2	97	12	173.1	5 10.1	97	11	173.2	15
6	7 57.1	97	13	172.0	7 28.2	97	13	172.1	6 01.3	97	13	172.5	5 32.3	97	12	172.7	5 03.3	97	12	172.8	6
7	7 49.1	98	14	171.5	7 20.3	98	14	171.7	5 53.7	98	13	172.1	5 24.9	98	13	172.2					7
8	7 40.6	98	15	171.0	7 11.9	98	15	171.2	5 45.8	98	14	171.6	5 17.1	98	14	171.8					8
9	7 31.7	98	16	170.5	7 03.1	98	16	170.7	5 37.4	98	15	171.2	5 08.8	98	14	171.3					9
20	7 22.2	98	16	170.1	6 53.8	98	16	170.2	5 28.6	98	16	170.7	5 00.2	98	15	170.9					20
1	7 12.3	99	17	169.6	6 44.1	99	17	169.8	5 19.3	99	16	170.3									1
2	7 02.0	99	18	169.1	6 33.9	99	18	169.3	5 09.7	99	17	169.8									2
3	6 51.2	99	19	168.7	6 23.3	99	18	168.8													3
4	6 40.0	99	20	168.2	6 12.2	99	19	168.4													4
25	6 28.3	99	20	167.7	6 00.7	99	20	167.9													25
6	6 16.1	99	21	167.3	5 48.8	99	21	167.5													6
7	6 03.6	99	22	166.8	5 36.4	99	21	167.0													7
8	5 50.6	99	22	166.4	5 23.6	99	22	166.6													8
9	5 37.1	89	23	165.9	5 10.4	89	23	166.1													9
30	5 23.3	88	24	165.5																	30
1	5 09.0	88	24	165.0																	1

Lat. 21°

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 21°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	75	00	71	00	67	00	00
4	73	167	76	163	80	156	84	142	86	104	85	50	82	27	78	17	75	12	71	09	67	07	4
8	71	154	75	148	78	138	81	122	82	96	82	66	80	45	77	31	73	23	70	18	66	14	8
12	69	144	73	137	75	126	78	112	79	93	79	73	77	55	75	42	72	32	68	26	65	21	12
16	67	135	70	128	72	118	74	106	75	91	75	76	74	61	72	49	69	40	67	32	63	26	16
20	64	128	67	121	69	112	70	101	71	89	71	77	71	65	69	54	67	45	64	37	62	31	20
24	61	123	63	116	65	108	67	98	68	88	68	78	67	67	66	58	64	49	62	42	60	35	24
28	58	118	60	112	62	104	63	96	64	87	64	78	64	69	63	60	61	52	60	45	57	39	28
32	55	114	57	108	58	101	59	94	60	86	60	78	60	70	59	62	58	55	57	48	55	42	32
36	51	111	53	105	54	99	56	92	56	85	57	78	57	71	56	63	55	57	54	50	52	44	36
40	48	108	49	103	51	97	52	91	53	84	53	78	53	71	53	64	52	58	51	52	50	46	40
44	44	106	46	100	47	95	48	89	49	83	49	77	50	71	49	65	49	59	48	53	47	47	44
48	40	103	42	98	43	93	44	88	45	82	46	77	46	71	46	65	46	59	45	54	44	48	48
52	37	101	38	96	40	92	41	87	42	81	42	76	43	71	43	65	43	60	42	54	41	49	52
56	33	99	35	95	36	90	37	85	38	80	39	75	39	70	39	65	39	60	39	55	39	50	56
60	29	98	31	93	32	89	33	84	34	79	35	75	35	70	36	65	36	60	36	55	36	50	60
64	26	96	27	92	28	87	29	83	30	79	31	74	32	69	32	65	33	60	33	55	33	50	64
68	22	94	23	90	25	86	26	82	27	78	28	73	28	69	29	64	30	60	30	55	30	50	68
72	18	93	20	89	21	85	22	81	23	76	24	72	25	68	26	64	26	59	27	55	27	50	72
76	14	91	16	87	17	83	18	79	20	75	21	71	22	67	22	63	23	59	24	54	24	50	76
80	11	90	12	86	13	82	15	78	16	74	17	70	18	66	19	62	20	58	21	54	21	50	80
84	07	88	08	85	10	81	11	77	12	73	14	69	15	65	16	61	17	57	18	53	19	49	84
88	03	87	05	83	06	79	07	76	09	72	10	68	11	64	13	60	14	56	15	52	16	48	88
92	*00*	86	01	82	02	78	04	74	05	71	07	67	08	63	09	59	11	55	12	51	13	48	92
96	*04*	84	*03*	80	*01*	77	00	73	02	69	03	66	05	62	06	58	08	54	09	50	10	47	96
100	*08*	83	*06*	79	*05*	75	*03*	71	*02*	68	00	64	01	60	03	57	05	53	06	49	08	46	100
104	*12*	81	*10*	77	*08*	74	*07*	70	*05*	66	*03*	63	*02*	59	*00*	55	02	52	03	48	05	44	104
108	*15*	80	*14*	76	*12*	72	*10*	68	*09*	65	*07*	61	*05*	57	*03*	54	*01*	50	01	47	02	43	108
112	*19*	78	*17*	74	*16*	70	*14*	67	*12*	63	*10*	59	*08*	56	*06*	52	*04*	49	*02*	45	*00*	42	112
116	*23*	76	*21*	72	*19*	68	*17*	65	*15*	61	*13*	57	*11*	54	*09*	51	*07*	47	*05*	44	*03*	40	116
120	*26*	74	*24*	70	*22*	66	*20*	63	*18*	59	*16*	56	*14*	52	*12*	49	*10*	45	*07*	42	*05*	39	120
124	*30*	72	*28*	68	*26*	64	*24*	61	*22*	57	*19*	53	*17*	50	*15*	47	*12*	43	*10*	40	*07*	37	124
128	*33*	70	*31*	66	*29*	62	*27*	58	*25*	55	*22*	51	*20*	48	*17*	44	*15*	41	*12*	38	*09*	35	128
132	*37*	68	*35*	63	*32*	59	*30*	56	*28*	52	*25*	49	*23*	45	*20*	42	*17*	39	*14*	36	*12*	33	132
136	*40*	65	*38*	61	*36*	57	*33*	53	*31*	49	*28*	46	*25*	43	*22*	40	*19*	37	*17*	34	*14*	31	136
140	*44*	62	*41*	58	*39*	54	*36*	50	*33*	46	*31*	43	*28*	40	*25*	37	*22*	34	*19*	31	*15*	29	140
144	*47*	59	*44*	54	*42*	50	*39*	47	*36*	43	*33*	40	*30*	37	*27*	34	*24*	31	*20*	29	*17*	26	144
148	*50*	55	*47*	51	*44*	47	*41*	43	*38*	39	*35*	36	*32*	34	*29*	31	*25*	28	*22*	26	*19*	24	148
152	*53*	51	*50*	46	*47*	42	*44*	39	*41*	36	*37*	33	*34*	30	*31*	28	*27*	25	*24*	23	*20*	21	152
156	*56*	46	*53*	42	*49*	38	*46*	34	*43*	31	*39*	29	*36*	26	*32*	24	*29*	22	*25*	20	*21*	18	156
160	*58*	40	*55*	36	*52*	33	*48*	30	*45*	27	*41*	24	*37*	22	*34*	20	*30*	19	*26*	17	*22*	15	160
164	*60*	34	*57*	30	*53*	27	*50*	24	*46*	22	*42*	20	*39*	18	*35*	17	*31*	15	*27*	14	*23*	12	164
168	*62*	27	*59*	23	*55*	21	*51*	19	*47*	17	*44*	15	*40*	14	*36*	13	*32*	11	*28*	10	*24*	09	168
172	*64*	18	*60*	16	*56*	14	*52*	13	*48*	11	*44*	10	*40*	09	*36*	08	*33*	08	*29*	07	*25*	06	172
176	*65*	09	*61*	08	*57*	07	*53*	06	*49*	06	*45*	05	*41*	05	*37*	04	*33*	04	*29*	03	*25*	03	176
180	*65*	00	*61*	00	*57*	00	*53*	00	*49*	00	*45*	00	*41*	00	*37*	00	*33*	00	*29*	00	*25*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	63	00	59	00	55	00	51	00	47	00	43	00	39	00	35	00	31	00	27	00	23	00	00
4	63	06	59	05	55	04	51	03	47	03	43	02	39	02	35	01	31	01	27	00	23	00	4
8	62	12	58	09	54	08	51	06	47	05	43	04	39	03	35	02	31	02	27	01	23	00	8
12	61	17	58	14	54	11	50	09	46	08	42	06	39	05	35	04	31	02	27	01	23	00	12
16	60	22	57	18	53	15	49	12	46	10	42	08	38	06	34	05	31	03	27	02	23	01	16
20	59	26	55	22	52	18	49	15	45	12	41	10	38	08	34	06	30	04	27	02	23	01	20
24	57	30	54	25	51	21	47	18	44	14	41	12	37	09	34	07	30	05	26	03	23	01	24
28	55	33	52	28	49	24	46	20	43	16	40	13	37	10	33	08	30	05	26	03	23	01	28
32	53	36	50	31	48	26	45	22	42	18	39	15	36	12	33	09	29	06	26	04	23	01	32
36	51	38	48	33	46	28	43	24	41	20	38	16	35	13	32	10	29	07	26	04	23	01	36
40	48	40	46	35	44	30	42	26	39	21	37	18	34	14	31	10	28	07	26	04	23	01	40
44	46	42	44	37	42	32	40	27	38	23	36	19	33	15	31	11	28	08	25	05	22	02	44
48	43	43	42	38	40	33	39	28	37	24	34	20	32	16	30	12	27	08	25	05	22	02	48
52	41	44	40	39	38	34	37	29	35	25	33	21	31	17	29	13	27	09	25	05	22	02	52
56	38	45	37	40	36	35	35	30	33	26	32	21	30	17	28	13	26	09	24	05	22	02	56
60	35	45	35	40	34	36	33	31	32	27	30	22	29	18	27	14	26	10	24	06	22	02	60
64	33	46	32	41	32	36	31	32	30	27	29	23	28	18	27	14	25	10	24	06	22	02	64
68	30	46	30	41	30	37	29	32	28	28	28	23	27	19	26	14	24	10	23	06	22	02	68
72	27	46	27	41	27	37	27	32	27	28	26	23	25	19	25	15	24	10	23	06	22	02	72
76	25	46	25	41	25	37	25	32	25	28	25	24	24	19	24	15	23	11	22	06	21	02	76
80	22	45	22	41	23	37	23	32	23	28	23	24	23	19	23	15	22	11	22	06	21	02	80
84	19	45	20	41	21	36	21	32	21	28	22	24	22	19	22	15	22	11	22	06	21	02	84
88	17	44	18	40	18	36	19	32	20	28	20	24	21	19	21	15	21	11	21	06	21	02	88
92	14	44	15	40	16	36	17	32	18	27	19	23	19	19	20	15	20	11	21	06	21	02	92
96	12	43	13	39	14	35	15	31	16	27	17	23	18	19	19	15	20	11	20	06	21	02	96
100	09	42	11	38	12	34	13	30	15	26	16	23	17	19	18	15	19	10	20	06	21	02	100
104	07	41	08	37	10	33	11	30	13	26	14	22	16	18	17	14	18	10	19	06	21	02	104
108	04	40	06	36	08	32	10	29	11	25	13	21	15	18	16	14	18	10	19	06	20	02	108
112	02	38	04	35	06	31	08	28	10	24	12	21	13	17	15	13	17	10	19	06	20	02	112
116	*00*	37	02	34	04	30	06	27	08	23	10	20	12	17	14	13	16	09	18	06	20	02	116
120	*03*	35	*00*	32	02	29	04	26	07	22	09	19	11	16	14	12	16	09	18	05	20	02	120
124	*05*	34	*02*	31	00	28	03	25	05	21	08	18	10	15	13	12	15	09	18	05	20	02	124
128	*07*	32	*04*	29	*01*	26	01	23	04	20	07	17	09	14	12	11	15	08	17	05	20	02	128
132	*09*	30	*06*	27	*03*	25	*00*	22	03	19	06	16	08	13	11	11	14	08	17	05	20	02	132
136	*11*	28	*08*	26	*05*	23	*01*	20	02	18	05	15	08	13	11	10	14	07	17	04	20	01	136
140	*12*	26	*09*	24	*06*	21	*03*	19	00	16	04	14	07	12	10	09	13	07	16	04	19	01	140
144	*14*	24	*11*	22	*07*	19	*04*	17	*01*	15	03	13	06	11	09	08	13	06	16	04	19	01	144
148	*15*	22	*12*	19	*08*	17	*05*	15	*01*	13	02	11	06	09	09	07	12	05	16	03	19	01	148
152	*17*	19	*13*	17	*09*	15	*06*	14	*02*	12	01	10	05	08	09	07	12	05	16	03	19	01	152
156	*18*	17	*14*	15	*10*	13	*07*	12	*03*	10	01	09	04	07	08	06	12	04	16	03	19	01	156
160	*19*	14	*15*	13	*11*	11	*07*	10	*04*	09	00	07	04	06	08	05	12	03	15	02	19	01	160
164	*20*	11	*16*	10	*12*	09	*08*	08	*04*	07	*00*	06	04	05	08	04	11	03	15	02	19	01	164
168	*20*	09	*16*	08	*12*	07	*08*	06	*04*	05	*01*	04	03	04	07	03	11	02	15	01	19	00	168
172	*21*	06	*17*	05	*13*	05	*09*	04	*05*	04	*01*	03	03	02	07	02	11	01	15	01	19	00	172
176	*21*	03	*17*	03	*13*	02	*09*	02	*05*	02	*01*	01	03	01	07	01	11	01	15	00	19	00	176
180	*21*	00	*17*	00	*13*	00	*09*	00	*05*	00	*01*	00	03	00	07	00	11	00	15	00	19	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 21°

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	68 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	00
1	67 58.7	1.0 06	177.3	68 28.7	1.0 07	177.3	68 58.6	1.0 07	177.2	69 28.6	1.0 07	177.1	69 58.6	1.0 07	177.1	70 28.6	1.0 07	177.0	70 58.5	1.0 07	176.9	71 28.5	1.0 08	176.9	1
2	67 54.8	1.0 11	174.7	68 24.7	1.0 11	174.6	68 54.6	1.0 11	174.4	69 24.5	1.0 12	174.3	69 54.3	1.0 12	174.2	70 24.2	1.0 12	174.0	70 54.1	1.0 12	173.9	71 23.9	99 13	173.7	2
3	67 48.4	99 15	172.0	68 18.1	99 15	171.9	68 47.9	99 16	171.7	69 17.6	99 16	171.5	69 47.3	99 16	171.3	70 17.0	99 17	171.1	70 46.7	99 17	170.9	71 16.3	99 18	170.6	3
4	67 39.4	99 19	169.4	68 09.0	98 20	169.2	68 38.5	98 20	169.0	69 08.0	98 20	168.7	69 37.5	98 21	168.4	70 07.0	98 21	168.2	70 36.4	98 22	167.9	71 05.8	98 22	167.6	4
05	67 28.0	98 23	166.9	67 57.3	98 24	166.6	68 26.6	98 24	166.3	68 55.8	97 24	166.0	69 25.0	97 25	165.7	69 54.2	97 26	165.3	70 23.4	97 26	165.0	70 52.5	97 27	164.6	05
6	67 14.1	97 27	164.3	67 43.2	97 28	164.0	68 12.2	97 28	163.7	68 41.1	96 29	163.3	69 10.0	96 29	162.9	69 38.8	96 30	162.5	70 07.6	96 31	162.1	70 36.3	96 31	161.7	6
7	66 58.0	96 31	161.9	67 26.7	96 32	161.5	67 55.3	95 32	161.1	68 23.9	95 33	160.7	68 52.4	95 33	160.3	69 20.9	95 34	159.8	69 49.2	94 35	159.3	70 17.5	94 36	158.9	7
8	66 39.5	95 34	159.4	67 07.8	94 35	159.0	67 36.1	94 36	158.6	68 04.3	94 36	158.1	68 32.4	94 37	157.7	69 00.4	93 38	157.2	69 28.4	93 39	156.6	69 56.2	93 40	156.1	8
9	66 18.9	93 38	157.1	66 46.8	93 38	156.6	67 14.7	93 39	156.1	67 42.5	92 40	155.7	68 10.1	92 41	155.1	68 37.7	92 42	154.6	69 05.2	91 42	154.0	69 32.5	91 43	153.5	9
10	65 56.2	92 41	154.8	66 23.7	92 42	154.3	66 51.2	91 43	153.8	67 18.5	91 43	153.3	67 45.7	90 44	152.7	68 12.8	90 45	152.1	68 39.7	90 46	151.5	69 06.6	89 47	150.9	10
1	65 31.6	90 44	152.6	65 58.6	90 45	152.1	66 25.6	90 46	151.5	66 52.4	89 46	150.9	67 19.2	89 48	150.4	67 45.7	88 48	149.8	68 12.2	88 49	149.1	68 38.5	87 50	148.5	1
2	65 05.0	89 47	150.4	65 31.6	89 48	149.9	65 58.1	88 49	149.3	66 24.5	88 50	148.7	66 50.7	87 50	148.1	67 16.8	87 51	147.5	67 42.7	86 52	146.8	68 08.4	86 53	146.1	2
3	64 36.7	87 50	148.4	65 02.8	87 51	147.8	65 28.8	86 52	147.2	65 54.7	86 52	146.6	66 20.4	85 53	145.9	66 46.0	85 54	145.3	67 11.3	84 55	144.6	67 36.5	84 56	143.9	3
4	64 06.7	86 53	146.4	64 32.3	85 54	145.8	64 57.8	85 54	145.1	65 23.2	84 55	144.5	65 48.4	84 56	143.8	66 13.4	83 57	143.2	66 38.3	82 58	142.5	67 02.9	82 59	141.7	4
15	63 35.1	84 55	144.4	64 00.2	84 56	143.8	64 25.3	83 57	143.2	64 50.1	83 58	142.5	65 14.8	82 58	141.8	65 39.3	81 59	141.2	66 03.6	81 60	140.4	66 27.7	80 61	139.7	15
6	63 02.0	83 58	142.6	63 26.7	82 58	141.9	63 51.2	81 59	141.3	64 15.5	81 60	140.6	64 39.7	80 61	139.9	65 03.7	80 62	139.2	65 27.4	79 62	138.5	65 51.0	78 64	137.7	6
7	62 27.5	81 60	140.8	62 51.7	80 60	140.1	63 15.7	80 61	139.5	63 39.6	79 62	138.8	64 03.2	78 63	138.1	64 26.7	78 64	137.4	64 49.9	77 65	136.6	65 12.9	76 66	135.9	7
8	61 51.6	79 62	139.1	62 15.4	79 62	138.4	62 38.9	78 63	137.7	63 02.3	77 64	137.1	63 25.4	77 65	136.3	63 48.4	76 66	135.6	64 11.1	75 67	134.9	64 33.5	75 68	134.1	8
9	61 14.6	78 64	137.4	61 37.9	77 64	136.8	62 00.9	77 65	136.1	62 23.8	76 66	135.4	62 46.4	75 67	134.7	63 08.9	74 68	133.9	63 31.1	74 68	133.2	63 53.0	73 69	132.4	9
20	60 36.4	76 66	135.8	60 59.2	76 66	135.2	61 21.8	75 67	134.5	61 44.2	74 68	133.8	62 06.3	74 68	133.1	62 28.3	73 70	132.3	62 50.0	72 70	131.6	63 11.4	71 71	130.8	20
1	59 57.1	75 67	134.3	60 19.4	74 68	133.6	60 41.6	73 69	132.9	61 03.5	73 70	132.2	61 25.2	72 70	131.5	61 46.6	71 71	130.8	62 07.9	70 72	130.0	62 28.8	69 72	129.3	1
2	59 16.8	73 69	132.8	59 38.7	73 70	132.2	60 00.4	72 70	131.5	60 21.8	71 71	130.8	60 43.1	70 72	130.1	61 04.1	70 72	129.3	61 24.8	69 73	128.6	61 45.3	68 74	127.8	2
3	58 35.5	72 70	131.4	58 57.0	71 71	130.8	59 18.2	70 72	130.1	59 39.2	70 72	129.4	60 00.0	69 73	128.6	60 20.6	68 74	127.9	60 40.9	67 74	127.2	61 01.0	66 75	126.4	3
4	57 53.4	70 72	130.1	58 14.4	70 72	129.4	58 35.2	69 73	128.7	58 55.8	68 74	128.0	59 16.2	67 74	127.3	59 36.3	67 75	126.6	59 56.2	66 76	125.8	60 15.8	65 76	125.1	4
25	57 10.4	69 73	128.8	57 31.0	68 74	128.1	57 51.4	68 74	127.4	58 11.6	67 75	126.7	58 31.6	66 76	126.0	58 51.3	65 76	125.3	59 10.7	64 77	124.5	59 29.9	64 78	123.8	25
6	56 26.6	68 74	127.5	56 46.9	67 75	126.9	57 06.9	66 75	126.2	57 26.7	66 76	125.5	57 46.2	65 77	124.8	58 05.5	64 77	124.0	58 24.6	63 78	123.3	58 43.3	62 78	122.6	6
7	55 42.2	67 75	126.3	56 02.0	66 76	125.7	56 21.6	65 76	125.0	56 41.0	64 77	124.3	57 00.2	63 78	123.6	57 19.1	63 78	122.9	57 37.7	62 79	122.1	57 56.2	61 80	121.4	7
8	54 57.0	65 76	125.2	55 16.5	65 77	124.5	55 35.7	64 77	123.8	55 54.7	63 78	123.1	56 13.5	62 79	122.4	56 32.1	61 79	121.7	56 50.3	61 80	121.0	57 08.4	60 80	120.3	8
9	54 11.2	64 77	124.1	54 30.3	63 78	123.4	54 49.2	63 78	122.7	55 07.9	62 79	122.0	55 26.3	61 80	121.3	55 44.5	60 80	120.6	56 02.4	59 81	119.9	56 20.1	59 81	119.2	9
30	53 24.8	63 78	123.0	53 43.6	62 79	122.3	54 02.1	61 79	121.7	54 20.4	61 80	121.0	54 38.5	60 80	120.3	54 56.3	59 81	119.6	55 13.9	58 82	118.9	55 31.3	57 82	118.2	30
1	52 37.9	62 79	121.9	52 56.3	61 80	121.3	53 14.5	60 80	120.6	53 32.5	60 81	120.0	53 50 2	59 81	119.3	54 07.7	58 82	118.6	54 25.0	57 82	117.9	54 42.0	56 83	117.2	1
2	51 50.4	61 80	120.9	52 08.5	60 80	120.3	52 26.4	59 81	119.6	52 44.0	58 81	119.0	53 01.5	58 82	118.3	53 18.6	57 82	117.6	53 35.6	56 83	116.9	53 52.3	55 84	116.2	2
3	51 02.5	60 81	120.0	51 20.3	59 81	119.3	51 37.8	58 82	118.7	51 55.2	57 82	118.0	52 12.3	57 83	117.4	52 29.1	56 83	116.7	52 45.8	55 84	116.0	53 02.2	54 84	115.3	3
4	50 14.1	59 82	119.0	50 31.5	58 82	118.4	50 48.8	57 82	117.8	51 05.8	56 83	117.1	51 22.6	56 83	116.4	51 39.2	55 84	115.8	51 55.6	54 84	115.1	52 11.7	53 85	114.4	4
35	49 25.2	58 82	118.1	49 42.4	57 82	117.5	49 59.4	56 83	116.9	50 16.1	55 84	116.2	50 32.7	55 84	115.6	50 49.0	54 84	114.9	51 05.0	53 85	114.2	51 20.9	52 85	113.6	35
6	48 36.0	57 83	117.3	48 52.9	56 83	116.6	49 09.6	55 84	116.0	49 26.0	55 84	115.4	49 42.3	54 84	114.7	49 58.3	53 85	114.1	50 14.2	52 85	113.4	50 29.7	52 86	112.7	6
7	47 46.3	56 83	116.4	48 03.0	55 84	115.8	48 19.4	54 84	115.2	48 35.6	54 85	114.6	48 51.6	53 85	113.9	49 07.4	52 86	113.3	49 23.0	52 86	112.6	49 38.3	51 86	111.9	7
8	46 56.4	55 84	115.6	47 12.7	54 84	115.0	47 28.9	54 85	114.4	47 44.8	53 85	113.8	48 00.6	52 86	113.1	48 16.1	51 86	112.5	48 31.4	51 86	111.8	48 46.6	50 87	111.2	8
9	46 06.0	54 84	114.8	46 22.1	53 85	114.2	46 38.1	53 85	113.6	46 53.8	52 86	113.0	47 09.3	51 86	112.4	47 24.6	51 86	111.7	47 39.7	50 87	111.1	47 54.6	49 87	110.4	9
40	45 15.4	53 85	114.1	45 31.3	53 85	113.5	45 46.9	52 86	112.8	46 02.4	51 86	112.2	46 17.7	51 86	111.6	46 32.8	50 87	111.0	46 47.6	49 87	110.3	47 02.3	49 88	109.7	40
1	44 24.4	52 85	113.3	44 40.1	52 86	112.7	44 55.5	51 86	112.1	45 10.8	51 86	111.5	45 25.8	50 87	110.9	45 40.7	49 87	110.3	45 55.4	49 87	109.6	46 09.8	48 88	109.0	1
2	43 33.2	52 86	112.6	43 48.6	51 86	112.0	44 03.8	50 86	111.4	44 18.9	50 87	110.8	44 33.7	49 87	110.2	44 48.4	49 88	109.6	45 02.9	48 88	109.0	45 17.1	47 88	108.3	2
3	42 41.7	51 86	111.9	42 56.9	50 86	111.3	43 11.9	50 87	110.7	43 26.8	49 87	110.1	43 41.4	49 88	109.5	43 55.9	48 88	108.9	44 10.1	47 88	108.3	44 24.2	47 88	107.7	3
4	41 50.0	50 87	111.2	42 05.0	50 87	110.6	42 19.8	49 87	110.0	42 34.4	48 88	109.4	42 48.9	48 88	108.8	43 03.1	47 88	108.2	43 17.2	47 88	107.6	43 31.1	46 89	107.0	4
45	40 58.0	50 87	110.5	41 12.8	49 87	110.0	41 27.4	48 88	109.4	41 41.9	48 88	108.8	41 56.1	47 88	108.2	42 10.2	47 88	107.6	42 24.1	46 89	107.0	42 37.8	45 89	106.4	45
6	40 05.8	49 87	109.9	40 20.4	48 88	109.3	40 34.8	48 88	108.7	40 49.1	47 88	108.2	41 03.2	47 89	107.6	41 17.1	46 89	107.0	41 30.8	45 89	106.4	41 44.4	45 89	105.8	6
7	39 13.4	48 88	109.3	39 27.8	48 88	108.7	39 42.1	47 88	108.1	39 56.1	47 88	107.5	40 10.1	46 89	107.0	40 23.8	46 89	106.4	40 37.4	45 89	105.8	40 50.8	44 90	105.2	7
8	38 20.8	48 88	108.6	38 35.0	47 88	108.1	38 49.1	47 89	107.5	39 03.0	46 89	106.9	39 16.8	46 89	106.4	39 30.3	45 89	105.8	39 43.8	44 90	105.2	39 57.0	44 90	104.6	8
9	37 27.9	47 88	108.0	37 42.0	47 88	107.5	37 55.9	46 89	106.9	38 09.7	46 89	106.4	38 23.3	45 89	105.8	38 36.7	44 90	105.2	38 50.0	44 90	104.6	39 03.1	43 90	104.1	9
50	36 35.0	47 89	107.4	36 48.9	46 89	106.9	37 02.6	46 89	106.3	37 16.3	45 90	105.8	37 29.7	45 90	105.2	37 43.0	44 90	104.7	37 56.1	43 90	104.1	38 09.1	43 90	103.5	50
1	35 41.8	46 89	106.9	35 55.6	46 89	106.3	36 09.2	45 89	105.8	36 22.6	45 90	105.2	36 36.0	44 90	104.7	36 49.1	44 90	104.1	37 02.1	43 90	103.5	37 14.9	42 90	103.0	1
2	34 48.5	46 89	106.3	35 02.1	45 89	105.8	35 15.6	45 90	105.2	35 28.9	44 90	104.7	35 42.1	44 90	104.1	35 55.1	43 90	103.6	36 08.0	43 90	103.0	36 20.7	42 91	102.4	2
3	33 55.0	45 89	105.8	34 08.5	45 90	105.2	34 21.8	44 90	104.7	34 35.0	44 90	104.1	34 48.1	43 90	103.6	35 00.9	43 90	103.0	35 13.7	42 91	102.5	35 26.3	42 91	101.9	3
4	33 01.4	45 90	105.2	33 14.8	44 90	104.7	33 28.0	44 90	104.2	33 41.0	43 90	103.6	33 53.9	43 90	103.1	34 06.7	42 91	102.5	34 19.3	42 91	102.0	34 31.8	41 91	101.4	4
55	32 07.7	44 90	104.7	32 20.9	44 90	104.2	32 33.9	43 90	103.6	32 46.9	43 90	103.1	32 59.7	42 91	102.6	33 12.3	42 91	102.0	33 24.9	41 91	101.5	33 37.2	41 91	100.9	55
6	31 13.8	44 90	104.2	31 26.9	43 90	103.7	31 39.8	43 90	103.1	31 52.6	42 90	102.6	32 05.3	42 91	102.1	32 17.9	42 91	101.5	32 30.3	41 91	101.0	32 42.6	41 91	100.4	6
7	30 19.8	43 90	103.7	30 32.8	43 90	103.2	30 45.6	43 90	102.6	30 58.3	42 91	102.1	31 10.9	42 91	101.6	31 23.3	41 91	101.0	31 35.6	41 91	100.5	31 47.8	40 91	100.0	7
8	29 25.7	43 90	103.2	29 38.5	43 90	102.7	29 51.3	42 91	102.1	30 03.9	42 91	101.6	30 16.3	41 91	101.1	30 28.7	41 91	100.6	30 40.9	41 91	100.0	30 53.0	40 92	99.5	8
9	28 31.5	43 91	102.7	28 44.2	42 91	102.2	28 56.8	42 91	101.7	29 09.3	41 91	101.1	29 21.7	41 91	100.6	29 33.9	41 91	100.1	29 46.1	40 92	99.6	29 58.1	40 92	99.0	9
60	27 37.1	42 91	102.2	27 49.8	42 91	101.7	28 02.3	42 91	101.2	28 14.7	41 91	100.7	28 27.0	41 91	100.1	28 39.1	40 92	99.6	28 51.2	40 92	99.1	29 03.1	40 92	98.6	60
1	26 42.7	42 91	101.7	26 55.3	42 91	101.2	27 07.7	41 91	100.7	27 20.0	41 91	100.2	27 32.2	40 92	99.7	27 44.2	40 92	99.2	27 56.2	40 92	98.6	28 08.1	39 92	98.1	1
2	25 48.2	42 91	101.3	26 00.6	41 91	100.8	26 13.0	41 91	100.3	26 25.2	41 92	99.7	26 37.3	40 92	99.2	26 49.3	40 92	98.7	27 01.2	39 92	98.2	27 13.0	39 92	97.7	2
3	24 53.6	41 91	100.8	25 05.9	41 91	100.3	25 18.2	41 91	99.8	25 30.3	40 92	99.3	25 42.3	40 92	98.8	25 54.3	40 92	98.3	26 06.1	39 92	97.8	26 17.8	39 92	97.2	3
4	23 58.9	41 91	100.4	24 11.2	41 92	99.9	24 23.3	40 92	99.4	24 35.4	40 92	98.8	24 47.3	40 92	98.3	24 59.2	39 92	97.8	25 10.9	39 92	97.3	25 22.6	39 92	96.8	4
65	23 04.2	41 92	99.9	23 16.3	40 92	99.4	23 28.4	40 92	98.9	23 40.4	40 92	98.4	23 52.3	39 92	97.9	24 04.0	39 92	97.4	24 15.7	39 92	96.9	24 27.3	38 92	96.4	65
6	22 09.3	40 92	99.5	22 21.4	40 92	99.0	22 33.4	40 92	98.5	22 45.3	40 92	98.0	22 57.1	39 92	97.5	23 08.8	39 92	97.0	23 20.5	39 92	96.5	23 32.0	38 92	96.0	6
7	21 14.4	40 92	99.0	21 26.4	40 92	98.5	21 38.4	40 92	98.0	21 50.2	39 92	97.6	22 02.0	39 92	97.1	22 13.6	39 92	96.6	22 25.2	38 92	96.1	22 36.7	38 92	95.6	7
8	20 19.4	40 92	98.6	20 31.4	40 92	98.1	20 43.2	39 92	97.6	20 55.0	39 92	97.1	21 06.7	39 92	96.6	21 18.3	39 92	96.1	21 29.8	38 92	95.7	21 41.3	38 92	95.2	8
9	19 24.4	40 92	98.2	19 36.3	39 92	97.7	19 48.1	39 92	97.2	19 59.8	39 92	96.7	20 11.4	39 92	96.2	20 23.0	38 92	95.7	20 34.5	38 92	95.2	20 45.9	38 92	94.7	9
70	18 29.3	40 92	97.8	18 41.1	39 92	97.3	18 52.9	39 92	96.8	19 04.5	39 92	96.3	19 16.1	39 92	95.8	19 27.6	38 92	95.3	19 39.0	38 92	94.8	19 50.4	38 92	94.3	70
1	17 34.2	39 92	97.3	17 45.9	39 92	96.9	17 57.6	39 92	96.4	18 09.2	39 92	95.9	18 20.7	38 92	95.4	18 32.2	38 92	94.9	18 43.6	38 92	94.4	18 54.9	38 92	93.9	1
2	16 39.0	39 92	96.9	16 50.7	39 92	96.5	17 02.3	39 92	96.0	17 13.9	38 92	95.5	17 25.3	38 92	95.0	17 36.8	38 92	94.5	17 48.1	38 92	94.0	17 59.4	37 92	93.6	2
3	15 43.7	39 92	96.5	15 55.4	39 92	96.1	16 06.9	38 92	95.6	16 18.5	38 92	95.1	16 29.9	38 92	94.6	16 41.3	38 92	94.1	16 52.6	38 92	93.6	17 03.9	37 93	93.2	3
4	14 48.4	39 92	96.1	15 00.0	39 92	95.7	15 11.6	38 92	95.2	15 23.0	38 92	94.7	15 34.4	38 92	94.2	15 45.8	38 92	93.7	15 57.1	38 93	93.3	16 08.3	37 93	92.8	4
75	13 53.1	39 92	95.7	14 04.6	38 92	95.3	14 16.1	38 92	94.8	14 27.6	38 92	94.3	14 39.0	38 92	93.8	14 50.3	38 93	93.3	15 01.5	37 93	92.9	15 12.7	37 93	92.4	75
6	12 57.7	38 92	95.3	13 09.2	38 92	94.9	13 20.7	38 92	94.4	13 32.1	38 92	93.9	13 43.4	38 92	93.4	13 54.7	38 93	93.0	14 06.0	37 93	92.5	14 17.1	37 93	92.0	6
7	12 02.3	38 92	94.9	12 13.8	38 92	94.5	12 25.2	38 92	94.0	12 36.6	38 93	93.5	12 47.9	38 93	93.0	12 59.2	37 93	92.6	13 10.4	37 93	92.1	13 21.5	37 93	91.6	7
8	11 06.9	38 92	94.6	11 18.3	38 92	94.1	11 29.7	38 92	93.6	11 41.0	38 93	93.1	11 52.3	38 93	92.7	12 03.6	37 93	92.2	12 14.8	37 93	91.7	12 25.9	37 93	91.2	8
9	10 11.4	38 92	94.2	10 22.8	38 92	93.7	10 34.2	38 93	93.2	10 45.5	38 93	92.8	10 56.7	38 93	92.3	11 08.0	37 93	91.8	11 19.2	37 93	91.3	11 30.3	37 93	90.9	9
80	9 15.9	38 92	93.8	9 27.3	38 93	93.3	9 38.6	38 93	92.8	9 49.9	38 93	92.4	10 01.2	37 93	91.9	10 12.4	37 93	91.4	10 23.5	37 93	91.0	10 34.7	37 93	90.5	80
1	8 20.4	38 93	93.4	8 31.7	38 93	92.9	8 43.0	38 93	92.5	8 54.3	38 93	92.0	9 05.5	37 93	91.5	9 16.8	37 93	91.1	9 27.9	37 93	90.6	9 39.0	37 93	90.1	1
2	7 24.8	38 93	93.0	7 36.2	38 93	92.5	7 47.5	38 93	92.1	7 58.7	37 93	91.6	8 09.9	37 93	91.1	8 21.1	37 93	90.7	8 32.3	37 93	90.2	8 43.4	37 93	89.7	2
3	6 29.3	38 93	92.6	6 40.6	38 93	92.2	6 51.8	38 93	91.7	7 03.1	37 93	91.2	7 14.3	37 93	90.8	7 25.5	37 93	90.3	7 36.7	37 93	89.8	7 47.8	37 93	89.4	3
4	5 33.7	38 93	92.3	5 45.0	38 93	91.8	5 56.2	37 93	91.3	6 07.5	37 93	90.9	6 18.7	37 93	90.4	6 29.9	37 93	89.9	6 41.0	37 93	89.5	6 52.2	37 93	89.0	4
85							5 00.6	37 93	90.9	5 11.8	37 93	90.5	5 23.1	37 93	90.0	5 34.2	37 93	89.5	5 45.4	37 93	89.1	5 56.5	37 93	88.6	85
6																						5 00.9	37 93	88.2	6

Lat. 22°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	68 09.0	1.0 02	180.0	67 39.0	1.0 02	180.0	67 09.0	1.0 02	180.0	66 39.0	1.0 02	180.0	66 09.0	1.0 02	180.0	65 39.0	1.0 02	180.0	65 09.0	1.0 02	180.0	64 39.0	1.0 02	180.0	00
1	67 58.7	1.0 06	177.3	67 28.7	1.0 06	177.4	66 58.8	1.0 06	177.4	66 28.8	1.0 06	177.5	65 58.8	1.0 06	177.5	65 28.8	1.0 06	177.6	64 58.9	1.0 06	177.6	64 28.9	1.0 06	177.7	1
2	67 54.8	1.0 11	174.7	67 24.9	1.0 10	174.8	66 55.0	1.0 10	174.9	66 25.1	1.0 10	175.0	65 55.2	1.0 10	175.1	65 25.3	1.0 10	175.2	64 55.4	1.0 10	175.3	64 25.5	1.0 09	175.4	2
3	67 48.4	99 15	172.0	67 18.6	99 14	172.2	66 48.9	99 14	172.4	66 19.1	99 14	172.5	65 49.3	99 14	172.7	65 19.5	99 14	172.8	64 49.7	99 13	172.9	64 19.9	99 13	173.1	3
4	67 39.4	99 19	169.4	67 09.9	99 19	169.6	66 40.3	99 18	169.9	66 10.7	99 18	170.1	65 41.0	99 18	170.3	65 11.4	99 17	170.4	64 41.8	99 17	170.6	64 12.1	99 17	170.8	4
05	67 28.0	98 23	166.9	56 58.6	98 23	167.1	66 29.3	98 22	167.4	65 59.9	98 22	167.6	65 30.5	98 21	167.9	65 01.0	98 21	168.1	64 31.6	98 20	168.3	64 02.1	98 20	168.5	05
6	67 14.1	97 27	164.3	66 45.1	97 26	164.6	66 16.0	97 26	164.9	65 46.8	97 25	165.2	65 17.7	97 25	165.5	64 48.5	97 24	165.8	64 19.3	97 24	166.1	63 50.0	98 24	166.3	6
7	66 58.0	96 31	161.9	66 29.2	96 30	162.2	66 00.4	96 30	162.6	65 31.6	96 29	162.9	65 02.7	96 28	163.2	64 33.8	96 28	163.5	64 04.8	97 28	163.8	63 35.8	97 27	164.1	7
8	66 39.5	95 34	159.4	66 11.1	95 34	159.8	65 42.7	95 33	160.2	65 14.2	95 33	160.6	64 45.6	95 32	161.0	64 17.0	95 32	161.3	63 48.3	96 31	161.6	63 19.6	96 30	162.0	8
9	66 18.9	93 38	157.1	65 50.9	94 37	157.5	65 22.8	94 36	157.9	64 54.6	94 36	158.4	64 26.4	94 35	158.8	63 58.1	94 34	159.1	63 29.8	95 34	159.5	63 01.4	95 34	159.9	9
10	65 56.2	92 41	154.8	65 28.6	92 40	155.3	65 00.9	92 40	155.7	64 33.1	93 39	156.2	64 05.3	93 38	156.6	63 37.4	93 38	157.0	63 09.4	93 37	157.4	62 41.3	94 36	157.8	10
1	65 31.6	90 44	152.6	65 04.4	91 44	153.1	64 37.1	91 43	153.6	64 09.7	91 42	154.0	63 42.3	92 41	154.5	63 14.7	92 41	154.9	62 47.1	92 40	155.4	62 19.4	92 40	155.8	1
2	65 05.9	89 47	150.4	64 38.3	89 46	151.0	64 11.4	90 46	151.5	63 44.5	90 45	152.0	63 17.4	90 44	152.5	62 50.3	91 44	152.9	62 23.0	91 43	153.4	61 55.7	91 42	153.8	2
3	64 36.7	87 50	148.4	64 10.4	88 49	148.9	63 44.0	88 48	149.5	63 17.5	89 48	150.0	62 50.9	89 47	150.5	62 24.1	89 46	151.0	61 57.3	90 46	151.5	61 30.4	90 45	151.9	3
4	64 06.7	86 53	146.4	63 40.9	86 52	146.9	63 14.9	87 51	147.5	62 48.8	87 50	148.0	62 22.6	88 50	148.6	61 56.3	88 49	149.1	61 29.9	88 48	149.6	61 03.4	89 48	150.1	4
15	63 35.1	84 55	144.4	63 09.7	85 54	145.0	62 44.2	85 54	145.6	62 18.6	86 53	146.2	61 52.9	86 52	146.7	61 27.0	86 51	147.2	61 01.0	87 51	147.8	60 34.9	87 50	148.3	15
6	63 02.0	83 58	142.6	62 37.1	83 57	143.2	62 12.1	84 56	143.8	61 46.9	84 55	144.4	61 21.6	85 54	144.9	60 56.2	85 54	145.5	60 30.6	85 53	146.0	60 04.9	86 52	146.5	6
7	62 27.5	81 60	140.8	62 03.1	82 59	141.4	61 38.5	82 58	142.0	61 13.8	83 57	142.6	60 48.9	83 57	143.2	60 23.9	84 56	143.7	59 58.8	84 55	144.3	59 33.5	84 54	144.8	7
8	61 51.6	79 62	139.1	61 27.7	80 61	139.7	61 03.6	81 60	140.3	60 39.4	81 60	140.9	60 15.0	82 59	141.5	59 50.4	82 58	142.1	59 25.7	83 57	142.6	59 00.8	83 56	143.2	8
9	61 14.6	78 64	137.4	60 51.1	78 63	138.1	60 27.5	79 62	138.7	60 03.7	80 62	139.3	59 39.7	80 61	139.9	59 15.6	81 60	140.5	58 51.3	81 59	141.1	58 26.9	82 59	141.6	9
20	60 36.4	76 66	135.8	60 13.4	77 65	136.5	59 50.2	78 64	137.1	59 26.8	78 63	137.7	59 03.3	79 62	138.3	58 39.6	79 62	138.9	58 15.8	80 61	139.5	57 51.7	80 60	140.1	20
1	59 57.1	75 67	134.3	59 34.5	75 66	135.0	59 11.8	76 66	135.6	58 48.9	77 65	136.2	58 25.8	77 64	136.8	58 02.5	78 64	137.4	57 39.1	78 63	138.0	57 15.5	79 62	138.6	1
2	59 16.8	73 69	132.8	58 54.7	74 68	133.5	58 32.4	75 67	134.1	58 09.9	75 67	134.8	57 47.2	76 66	135.4	57 24.4	76 65	136.0	57 01.4	77 65	136.6	56 38.2	78 64	137.2	2
3	58 35.5	72 70	131.4	58 13.8	73 70	132.1	57 52.0	73 69	132.7	57 29.9	74 68	133.4	57 07.7	74 68	134.0	56 45.2	75 67	134.6	56 22.6	76 66	135.2	55 59.9	76 66	135.8	3
4	57 53.4	70 72	130.1	57 32.1	71 71	130.7	57 10.7	72 70	131.4	56 49.0	72 70	132.0	56 27.2	73 69	132.6	56 05.2	74 68	133.3	55 43.0	74 68	133.9	55 20.6	75 67	134.4	4
25	57 10.4	69 73	128.8	56 49.6	70 72	129.4	56 28.5	70 72	130.1	56 07.3	71 71	130.7	55 45.8	72 70	131.3	55 24.2	72 70	132.0	55 02.4	73 69	132.6	54 40.5	74 68	133.2	25
6	56 26.6	68 74	127.5	56 06.2	68 74	128.2	55 45.6	69 73	128.8	55 24.7	70 72	129.5	55 03.7	70 72	130.1	54 42.5	71 71	130.7	54 21.0	72 70	131.3	53 59.5	72 70	131.9	6
7	55 42.2	67 75	126.3	55 22.1	67 75	127.0	55 01.9	68 74	127.6	54 41.4	69 73	128.3	54 20.8	69 73	128.9	53 59.9	70 72	129.5	53 38.9	70 72	130.1	53 17.7	71 71	130.7	7
8	54 57.0	65 76	125.2	54 37.3	66 76	125.8	54 17.5	67 75	126.5	53 57.4	67 74	127.1	53 37.1	68 74	127.7	53 16.6	69 73	128.3	52 56.0	69 73	128.9	52 35.1	70 72	129.5	8
9	54 11.2	64 77	124.1	53 51.9	65 77	124.7	53 32.4	65 76	125.3	53 12.7	66 76	126.0	52 52.8	67 75	126.6	52 32.6	67 74	127.2	52 12.3	68 74	127.8	51 51.9	69 73	128.4	9
30	53 24.8	63 78	123.0	53 05.9	64 78	123.6	52 46.7	64 77	124.3	52 27.3	65 76	124.9	52 07.8	66 76	125.5	51 48.0	66 75	126.1	51 28.1	67 75	126.7	51 07.9	67 74	127.3	30
1	52 37.9	62 79	121.9	52 19.3	62 78	122.6	52 00.5	63 78	123.2	51 41.4	64 77	123.8	51 22.2	64 77	124.5	51 02.8	65 76	125.1	50 43.2	66 76	125.7	50 23.4	66 75	126.3	1
2	51 50.4	61 80	120.9	51 32.2	61 79	121.6	51 13.7	62 79	122.2	50 55.0	63 78	122.8	50 36.1	63 78	123.4	50 17.0	64 77	124.1	49 57.7	65 77	124.7	49 38.2	65 76	125.2	2
3	51 02.5	60 81	120.0	50 44.5	60 80	120.6	50 26.3	61 80	121.2	50 08.0	62 79	121.9	49 49.4	62 79	122.5	49 30.6	63 78	123.1	49 11.7	63 78	123.7	48 52.5	64 77	124.3	3
4	50 14.1	59 82	119.0	49 56.4	59 81	119.7	49 38.5	60 80	120.3	49 20.5	61 80	120.9	49 02.2	61 80	121.5	48 43.7	62 79	122.1	48 25.1	62 78	122.7	48 06.3	63 78	123.3	4
35	49 25.2	58 82	118.1	49 07.9	58 82	118.8	48 50.3	59 81	119.4	48 32.5	60 81	120.0	48 14.5	60 80	120.6	47 56.4	61 80	121.2	47 38.1	61 79	121.8	47 19.5	62 79	122.4	35
6	48 36.0	57 83	117.3	48 18.9	57 82	117.9	48 01.6	58 82	118.5	47 44.1	59 81	119.1	47 26.4	59 81	119.7	47 08.6	60 80	120.3	46 50.5	60 80	120.9	46 32.3	61 79	121.5	6
7	47 46.3	56 83	116.4	47 29.5	56 83	117.0	47 12.5	57 82	117.7	46 55.3	58 82	118.3	46 37.9	58 82	118.9	46 20.3	59 81	119.4	46 02.6	59 81	120.0	45 44.7	60 80	120.6	7
8	46 56.4	55 84	115.6	46 39.8	56 84	116.2	46 23.1	56 83	116.8	46 06.1	57 82	117.4	45 49.0	57 82	118.0	45 31.7	58 82	118.6	45 14.2	59 81	119.2	44 56.6	59 81	119.8	8
9	46 06.0	54 84	114.8	45 49.7	55 84	115.4	45 33.2	55 84	116.0	45 16.6	56 83	116.6	44 59.7	56 83	117.2	44 42.7	57 82	117.8	44 25.4	58 82	118.4	44 08.1	58 82	118.9	9
40	45 15.4	53 85	114.1	44 59.3	54 84	114.7	44 43.1	54 84	115.2	44 26.7	55 84	115.8	44 10.0	56 83	116.4	43 53.3	56 83	117.0	43 36.3	57 82	117.6	43 19.2	57 82	118.1	40
1	44 24.4	52 85	113.3	44 08.6	53 85	113.9	43 52.6	54 85	114.5	43 36.4	54 84	115.1	43 20.1	55 84	115.7	43 03.5	55 83	116.2	42 46.8	56 83	116.8	42 30.0	56 83	117.4	1
2	43 33.2	52 86	112.6	43 17.6	52 86	113.2	43 01.8	53 85	113.8	42 45.9	53 85	114.3	42 29.8	54 84	114.9	42 13.5	55 84	115.5	41 57.0	55 83	116.0	41 40.4	56 83	116.6	2
3	42 41.7	51 86	111.9	42 26.3	52 86	112.5	42 10.8	52 86	113.0	41 55.1	53 85	113.6	41 39.2	53 85	114.2	41 23.1	54 84	114.8	41 06.9	54 84	115.3	40 50.5	55 84	115.9	3
4	41 50.0	50 87	111.2	41 34.8	51 86	111.8	41 19.5	51 86	112.4	41 03.9	52 86	112.9	40 48.3	53 85	113.5	40 32.4	53 85	114.0	40 16.4	54 84	114.6	40 00.3	54 84	115.2	4
45	40 58.0	50 87	110.5	40 43.0	50 87	111.1	40 27.9	51 86	111.7	40 12.6	51 86	112.2	39 57.1	52 86	112.8	39 41.5	52 85	113.4	39 25.7	53 85	113.9	39 09.8	53 85	114.5	45
6	40 05.8	49 87	109.9	39 51.0	50 87	110.5	39 36.1	50 87	111.0	39 21.0	51 86	111.6	39 05.7	51 86	112.1	38 50.3	52 86	112.7	38 34.7	52 85	113.2	38 19.0	53 85	113.8	6
7	39 13.4	48 88	109.3	38 58.8	49 88	109.8	38 44.0	49 87	110.4	38 29.1	50 87	110.9	38 14.1	50 86	111.5	37 58.8	51 86	112.0	37 43.5	51 86	112.6	37 28.0	52 86	113.1	7
8	38 20.8	48 88	108.6	38 06.3	48 88	109.2	37 51.8	49 88	109.8	37 37.1	49 87	110.3	37 22.2	50 87	110.9	37 07.2	50 87	111.4	36 52.0	51 86	111.9	36 36.7	51 86	112.5	8
9	37 27.9	47 88	108.0	37 13.7	48 88	108.6	36 59.3	48 88	109.1	36 44.8	49 88	109.7	36 30.1	49 87	110.2	36 15.2	50 87	110.8	36 00.3	50 87	111.3	35 45.1	51 86	111.8	9
50	36 35.0	47 89	107.4	36 20.9	47 88	108.0	36 06.7	48 88	108.5	35 52.3	48 88	109.1	35 37.8	49 88	109.6	35 23.1	49 87	110.2	35 08.3	50 87	110.7	34 53.4	50 87	111.2	50
1	35 41.8	46 89	106.9	35 27.9	47 89	107.4	35 13.8	47 88	108.0	34 59.6	48 88	108.5	34 45.3	48 88	109.0	34 30.8	49 88	109.6	34 16.2	49 87	110.1	34 01.4	49 87	110.6	1
2	34 48.5	46 89	106.3	34 34.7	46 89	106.9	34 20.8	47 89	107.4	34 06.8	47 88	107.9	33 52.6	47 88	108.5	33 38.3	48 88	109.0	33 23.8	48 88	109.5	33 09.3	49 87	110.0	2
3	33 55.0	45 89	105.8	33 41.4	46 89	106.3	33 27.7	46 89	106.8	33 13.8	47 89	107.4	32 59.8	47 88	107.9	32 45.6	47 88	108.4	32 31.3	48 88	108.9	32 16.9	48 88	109.5	3
4	33 01.4	45 90	105.2	32 47.9	45 89	105.8	32 34.3	46 89	106.3	32 20.6	46 89	106.8	32 06.7	46 89	107.3	31 52.7	47 88	107.9	31 38.6	47 88	108.4	31 24.4	48 88	108.9	4
55	32 07.7	44 90	104.7	31 54.3	45 90	105.2	31 40.9	45 89	105.8	31 27.3	46 89	106.3	31 13.6	46 89	106.8	30 59.7	46 89	107.3	30 45.7	47 88	107.8	30 31.6	47 88	108.3	55
6	31 13.8	44 90	104.2	31 00.6	44 90	104.7	30 47.3	45 90	105.2	30 33.8	45 89	105.7	30 20.2	45 89	106.3	30 06.5	46 89	106.8	29 52.7	46 89	107.3	29 38.8	47 88	107.8	6
7	30 19.8	43 90	103.7	30 06.7	44 90	104.2	29 53.5	44 90	104.7	29 40.2	45 90	105.2	29 26.7	45 89	105.7	29 13.2	45 89	106.3	28 59.5	46 89	106.8	28 45.7	46 89	107.3	7
8	29 25.7	43 90	103.2	29 12.7	43 90	103.7	28 59.7	44 90	104.2	28 46.4	44 90	104.7	28 33.1	45 90	105.2	28 19.7	45 89	105.7	28 06.2	45 89	106.2	27 52.5	46 89	106.8	8
9	28 31.5	43 91	102.7	28 18.6	43 90	103.2	28 05.7	43 90	103.7	27 52.6	44 90	104.2	27 39.4	44 90	104.7	27 26.1	45 90	105.2	27 12.7	45 89	105.7	26 59.2	45 89	106.2	9
60	27 37.1	42 91	102.2	27 24.4	43 90	102.7	27 11.6	43 90	103.2	26 58.6	43 90	103.7	26 45.5	44 90	104.2	26 32.4	44 90	104.7	26 19.1	44 90	105.2	26 05.7	45 89	105.7	60
1	26 42.7	42 91	101.7	26 30.1	42 91	102.2	26 17.3	43 90	102.7	26 04.5	43 90	103.2	25 51.5	43 90	103.7	25 38.5	44 90	104.2	25 25.3	44 90	104.7	25 12.1	44 90	105.2	1
2	25 48.2	42 91	101.3	25 35.7	42 91	101.8	25 23.0	42 91	102.3	25 10.3	43 90	102.8	24 57.5	43 90	103.3	24 44.5	43 90	103.8	24 31.5	44 90	104.3	24 18.3	44 90	104.8	2
3	24 53.6	41 91	100.8	24 41.2	42 91	101.3	24 28.6	42 91	101.8	24 16.0	42 91	102.3	24 03.3	43 90	102.8	23 50.4	43 90	103.3	23 37.5	43 90	103.8	23 24.5	44 90	104.3	3
4	23 58.9	41 91	100.4	23 46.6	41 91	100.9	23 34.1	42 91	101.3	23 21.6	42 91	101.8	23 09.0	42 91	102.3	22 56.2	43 90	102.8	22 43.4	43 90	103.3	22 30.5	43 90	103.8	4
65	23 04.2	41 92	99.9	22 51.9	41 91	100.4	22 39.5	41 91	100.9	22 27.1	42 91	101.4	22 14.6	42 91	101.9	22 01.9	42 90	102.4	21 49.2	42 90	102.9	21 36.4	43 90	103.3	65
6	22 09.3	40 92	99.5	21 57.1	41 91	100.0	21 44.9	41 91	100.5	21 32.5	41 91	100.9	21 20.1	42 91	101.4	21 07.6	42 91	101.9	20 55.0	42 91	102.4	20 42.3	42 90	102.9	6
7	21 14.4	40 92	99.0	21 02.3	40 92	99.5	20 50.1	41 91	100.0	20 37.9	41 91	100.5	20 25.5	41 91	101.0	20 13.1	42 91	101.5	20 00.6	42 91	102.0	19 48.0	42 91	102.4	7
8	20 19.4	40 92	98.6	20 07.4	40 92	99.1	19 55.3	40 92	99.6	19 43.1	41 91	100.1	19 30.9	41 91	100.6	19 18.5	41 91	101.0	19 06.1	42 91	101.5	18 53.6	42 91	102.0	8
9	19 24.4	40 92	98.2	19 12.5	40 92	98.7	19 00.4	40 92	99.2	18 48.3	40 92	99.6	18 36.1	41 91	100.1	18 23.9	41 91	100.6	18 11.6	41 91	101.1	17 59.2	41 91	101.6	9
70	18 29.3	40 92	97.8	18 17.4	40 92	98.2	18 05.5	40 92	98.7	17 53.4	40 92	99.2	17 41.3	40 91	99.7	17 29.2	41 91	100.2	17 16.9	41 91	100.7	17 04.6	41 91	101.1	70
1	17 34.2	39 92	97.3	17 22.3	40 92	97.8	17 10.5	40 92	98.3	16 58.5	40 92	98.8	16 46.5	40 92	99.3	16 34.4	40 92	99.7	16 22.2	41 91	100.2	16 10.0	41 91	100.7	1
2	16 39.0	39 92	96.9	16 27.2	39 92	97.4	16 15.4	40 92	97.9	16 03.5	40 92	98.4	15 51.5	40 92	98.9	15 39.5	40 92	99.3	15 27.4	40 91	99.8	15 15.3	41 91	100.3	2
3	15 43.7	39 92	96.5	15 32.0	39 92	97.0	15 20.2	39 92	97.5	15 08.4	40 92	98.0	14 56.5	40 92	98.4	14 44.6	40 92	98.9	14 32.6	40 92	99.4	14 20.5	40 91	99.9	3
4	14 48.4	39 92	96.1	14 36.8	39 92	96.6	14 25.1	39 92	97.1	14 13.3	39 92	97.6	14 01.5	40 92	98.0	13 49.6	40 92	98.5	13 37.7	40 92	99.0	13 25.7	40 92	99.4	4
75	13 53.1	39 92	95.7	13 41.5	39 92	96.2	13 29.8	39 92	96.7	13 18.1	39 92	97.2	13 06.4	39 92	97.6	12 54.5	39 92	98.1	12 42.7	40 92	98.6	12 30.8	40 92	99.0	75
6	12 57.7	38 92	95.3	12 46.2	39 92	95.8	12 34.6	39 92	96.3	12 22.9	39 92	96.8	12 11.2	39 92	97.2	11 59.4	39 92	97.7	11 47.6	39 92	98.2	11 35.8	40 92	98.6	6
7	12 02.3	38 92	94.9	11 50.8	38 92	95.4	11 39.2	39 92	95.9	11 27.6	39 92	96.4	11 16.0	39 92	96.8	11 04.3	39 92	97.3	10 52.5	39 92	97.8	10 40.8	39 92	98.2	7
8	11 06.9	38 92	94.6	10 55.4	38 92	95.0	10 43.9	38 92	95.5	10 32.3	39 92	96.0	10 20.7	39 92	96.4	10 09.1	39 92	96.9	9 57.4	39 92	97.4	9 45.7	39 92	97.8	8
9	10 11.4	38 92	94.2	10 00.0	38 92	94.6	9 48.5	38 92	95.1	9 37.0	38 92	95.6	9 25.4	39 92	96.0	9 13.8	39 92	96.5	9 02.2	39 92	97.0	8 50.5	39 92	97.4	9
80	9 15.9	38 92	93.8	9 04.5	38 92	94.2	8 53.1	38 92	94.7	8 41.6	38 92	95.2	8 30.1	38 92	95.7	8 18.5	39 92	96.1	8 07.0	39 92	96.6	7 55.4	39 92	97.0	80
1	8 20.4	38 93	93.4	8 09.0	38 92	93.9	7 57.6	38 92	94.3	7 46.2	38 92	94.8	7 34.7	38 92	95.3	7 23.2	38 92	95.7	7 11.7	38 92	96.2	7 00.1	39 92	96.7	1
2	7 24.8	38 93	93.0	7 13.5	38 92	93.5	7 02.1	38 92	93.9	6 50.7	38 92	94.4	6 39.3	38 92	94.9	6 27.8	38 92	95.3	6 16.3	38 92	95.8	6 04.8	38 92	96.3	2
3	6 29.3	38 93	92.6	6 18.0	38 93	93.1	6 06.6	38 92	93.6	5 55.2	38 92	94.0	5 43.8	38 92	94.5	5 32.4	38 92	95.0	5 21.0	38 92	95.4	5 09.5	38 92	95.9	3
4	5 33.7	38 93	92.3	5 22.4	38 93	92.7	5 11.1	38 92	93.2																4

Lat 22°

Lat. 23°

Lat. 24°

Lat 25

Lat 26°

Lat 27°

Lat 28°

Lat. 22°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	72 00.0	1.0	03	180.0	72 30.0	1.0	03	180.0	73 00.0	1.0	03	180.0	73 30.0	1.0	03	180.0
1	71 58.4	1.0	08	176.8	72 28.4	1.0	08	176.7	72 58.4	1.0	08	176.6	73 28.3	1.0	08	176.5
2	71 53.7	99	13	173.6	72 23.6	99	13	173.4	72 53.4	99	14	173.2	73 23.2	99	14	173.0
3	71 46.0	99	18	170.4	72 15.6	99	18	170.1	72 45.2	99	19	169.9	73 14.8	99	20	169.6
4	71 35.2	98	23	167.3	72 04.6	98	24	166.9	72 33.9	98	24	166.6	73 03.1	98	25	166.2
05	71 21.5	97	28	164.2	71 50.5	97	28	163.8	72 19.5	96	29	163.4	72 48.3	96	30	162.9
6	71 05.0	95	32	161.2	71 33.6	95	33	160.8	72 02.1	95	34	160.3	72 30.5	95	34	159.7
7	70 45.8	94	36	158.3	71 13.9	94	37	157.8	71 41.9	93	38	157.3	72 09.9	93	39	156.7
8	70 24.0	92	40	155.6	70 51.6	92	41	155.0	71 19.1	92	42	154.4	71 46.5	91	43	153.7
9	69 59.8	91	44	152.9	70 26.9	90	45	152.2	70 53.8	90	46	151.6	71 20.7	89	47	150.9
10	69 33.3	80	48	150.3	69 59.8	88	49	149.6	70 26.2	88	50	148.9	70 52.4	87	51	148.2
1	69 04.6	87	51	147.8	69 30.6	86	52	147.1	69 56.4	86	53	146.3	70 22.0	85	54	145.6
2	68 34.0	85	54	145.4	68 59.4	84	55	144.7	69 24.6	84	56	143.9	69 49.6	83	57	143.1
3	68 01.5	83	57	143.2	68 26.3	82	58	142.4	68 50.9	82	59	141.6	69 15.3	81	60	140.8
4	67 27.3	81	60	141.0	67 51.6	80	61	140.2	68 15.5	80	62	139.4	68 39.3	79	63	138.6
15	66 51.5	79	62	138.9	67 15.2	78	63	138.1	67 38.6	78	64	137.3	68 01.7	77	65	136.5
6	66 14.3	77	64	137.0	66 37.3	76	65	136.2	67 00.2	76	66	135.3	67 22.7	75	67	134.5
7	65 35.6	75	66	135.1	65 58.2	75	68	134.3	66 20.4	74	68	133.5	66 42.4	73	69	132.6
8	64 55.8	74	68	133.3	65 17.7	73	69	132.5	65 39.4	72	70	131.7	66 00.9	71	71	130.8
9	64 14.7	72	70	131.6	64 36.2	71	71	130.8	64 57.4	70	72	130.0	65 18.2	69	73	129.1
20	63 32.6	70	72	130.0	63 53.6	69	73	129.2	64 14.2	68	73	128.4	64 34.6	67	74	127.5
1	62 49.6	69	73	128.5	63 10.0	68	74	127.7	63 30.2	67	75	126.9	63 50.0	66	76	126.0
2	62 05.6	67	75	127.0	62 25.5	66	75	126.2	62 45.2	65	76	125.4	63 04.6	64	77	124.6
3	61 20.7	66	76	125.6	61 40.3	65	77	124.8	61 59.5	64	78	124.0	62 18.4	63	78	123.2
4	60 35.2	64	77	124.3	60 54.2	63	78	123.5	61 13.0	62	79	122.7	61 31.5	61	79	121.9
25	59 48.8	63	78	123.0	60 07.5	62	79	122.2	60 25.9	61	80	121.4	60 44.0	60	80	120.6
6	59 01.9	61	79	121.8	59 20.1	60	80	121.0	59 38.1	59	80	120.2	59 55.8	58	81	119.4
7	58 14.3	60	80	120.6	58 32.2	59	81	119.9	58 49.8	58	81	119.1	59 07.1	57	82	118.3
8	57 26.2	59	81	119.5	57 43.7	58	82	118.8	58 00.9	57	82	118.0	58 17.9	56	83	117.2
9	56 37.5	58	82	118.5	56 54.7	57	82	117.7	57 11.6	56	83	117.0	57 28.2	55	84	116.2
30	55 48.4	57	83	117.4	56 05.2	56	83	116.7	56 21.7	55	84	115.9	56 38.0	54	84	115.2
1	54 58.8	55	83	116.5	55 15.3	55	84	115.7	55 31.5	54	84	115.0	55 47.5	53	85	114.2
2	54 08.8	54	84	115.5	54 25.0	54	84	114.8	54 40.9	53	85	114.1	54 56.6	52	86	113.3
3	53 18.4	53	85	114.6	53 34.3	53	85	113.9	53 49.9	52	86	113.2	54 05.3	51	86	112.4
4	52 27.6	53	85	113.7	52 43.2	52	86	113.0	52 58.6	51	86	112.3	53 13.8	50	86	111.6
35	51 36.5	52	86	112.9	51 51.9	51	86	112.2	52 07.0	50	86	111.5	52 21.9	49	87	110.8
6	50 45.1	51	86	112.1	51 00.2	50	86	111.4	51 15.1	49	87	110.7	51 29.7	48	87	110.0
7	49 53.4	50	87	111.3	50 08.3	49	87	110.6	50 22.9	48	87	109.9	50 37.3	48	88	109.2
8	49 01.4	49	87	110.5	49 16.1	48	88	109.8	49 30.5	48	88	109.2	49 44.7	47	88	108.5
9	48 09.2	48	87	109.8	48 23.6	48	88	109.1	48 37.8	47	88	108.5	48 51.8	46	88	107.8
40	47 16.7	48	88	109.1	47 31.0	47	88	108.4	47 45.0	46	88	107.8	47 58.7	46	89	107.1
1	46 24.0	47	88	108.4	46 38.1	46	88	107.7	46 51.9	46	89	107.1	47 05.5	45	89	106.4
2	45 31.1	46	88	107.7	45 45.0	46	89	107.1	45 58.6	45	89	106.4	46 12.0	44	89	105.8
3	44 38.1	46	89	107.0	44 51.7	45	89	106.4	45 05.2	44	89	105.8	45 18.4	44	90	105.2
4	43 44.8	45	89	106.4	43 58.3	45	89	105.8	44 11.5	44	90	105.2	44 24.6	43	90	104.5
45	42 51.3	45	89	105.8	43 04.7	44	90	105.2	43 17.8	43	90	104.6	43 30.7	43	90	103.9
6	41 57.7	44	90	105.2	42 10.9	44	90	104.6	42 23.9	43	90	104.0	42 36.7	42	90	103.4
7	41 04.0	44	90	104.6	41 17.0	43	90	104.0	41 29.8	42	90	103.4	41 42.5	42	90	102.8
8	40 10.1	43	90	104.0	40 22.9	43	90	103.4	40 35.6	42	90	102.9	40 48.2	41	91	102.3
9	39 16.0	43	90	103.5	39 28.8	42	90	102.9	39 41.3	42	91	102.3	39 53.7	41	91	101.7
50	38 21.9	42	90	102.9	38 34.5	42	91	102.4	38 46.9	41	91	101.8	38 59.2	41	91	101.2
1	37 27.6	42	91	102.4	37 40.1	41	91	101.8	37 52.4	41	91	101.3	38 04.6	40	91	100.7
2	36 33.2	42	91	101.9	36 45.6	41	91	101.3	36 57.8	40	91	100.7	37 09.9	40	91	100.2
3	35 38.7	41	91	101.4	35 51.0	41	91	100.8	36 03.1	40	91	100.2	36 15.1	40	92	99.7
4	34 44.1	41	91	100.9	34 56.3	40	91	100.3	35 08.3	40	91	99.8	35 20.2	39	92	99.2
55	33 49.5	41	91	100.4	34 01.5	40	91	99.8	34 13.5	40	92	99.3	34 25.2	39	92	98.7
6	32 54.7	40	91	99.9	33 06.7	40	92	99.4	33 18.5	39	92	98.8	33 30.2	39	92	98.3
7	31 59.8	40	92	99.4	32 11.8	39	92	98.9	32 23.5	39	92	98.3	32 35.1	39	92	97.8
8	31 04.9	40	92	99.0	31 16.8	39	92	98.4	31 28.4	39	92	97.9	31 40.0	38	92	97.3
9	30 09.9	39	92	98.5	30 21.7	39	92	98.0	30 33.3	39	92	97.4	30 44.8	38	92	96.9
60	29 14.9	39	92	98.0	29 26.6	39	92	97.5	29 38.1	38	92	97.0	29 49.5	38	92	96.5
1	28 19.8	39	92	97.6	28 31.4	38	92	97.1	28 42.9	38	92	96.6	28 54.2	38	92	96.0
2	27 24.6	39	92	97.2	27 36.2	38	92	96.6	27 47.6	38	92	96.1	27 58.9	38	92	95.6
3	26 29.4	38	92	96.7	26 40.9	38	92	96.2	26 52.2	38	92	95.7	27 03.5	37	92	95.2
4	25 34.1	38	92	96.3	25 45.5	38	92	95.8	25 56.9	38	92	95.3	26 08.1	37	92	94.8
65	24 38.8	38	92	95.9	24 50.2	38	92	95.4	25 01.5	37	92	94.9	25 12.6	37	92	94.4
6	23 43.4	38	92	95.5	23 54.8	38	92	95.0	24 06.0	37	92	94.5	24 17.1	37	92	94.0
7	22 48.0	38	92	95.1	22 59.3	37	92	94.6	23 10.5	37	92	94.1	23 21.6	37	92	93.5
8	21 52.6	38	92	94.7	22 03.9	37	92	94.2	22 15.0	37	92	93.7	22 26.1	37	93	93.2
9	20 57.2	38	92	94.3	21 08.4	37	93	93.8	21 19.5	37	93	93.3	21 30.5	37	93	92.8
70	20 01.7	37	92	93.9	20 12.8	37	93	93.4	20 23.9	37	93	92.9	20 35.0	37	93	92.4
1	19 06.1	37	93	93.5	19 17.3	37	93	93.0	19 28.4	37	93	92.5	19 39.4	37	93	92.0
2	18 10.6	37	93	93.1	18 21 7	37	93	92.6	18 32.8	37	93	92.1	18 43.8	36	93	91.6
3	17 15.0	37	93	92.7	17 26.2	37	93	92.2	17 37.2	37	93	91.7	17 48.2	36	93	91.2
4	16 19.5	37	93	92.3	16 30.6	37	93	91.8	16 41.6	37	93	91.3	16 52.5	36	93	90.8
75	15 23.9	37	93	91.9	15 34.9	37	93	91.4	15 46.0	37	93	90.9	15 56.9	36	93	90.5
6	14 28.3	37	93	91.5	14 39.3	37	93	91.0	14 50.3	37	93	90.6	15 01.3	36	93	90.1
7	13 32.6	37	93	91.1	13 43.7	37	93	90.7	13 54.7	37	93	90.2	14 05.6	36	93	89.7
8	12 37.0	37	93	90.8	12 48.1	37	93	90.3	12 59.1	37	93	89.8	13 10.0	36	93	89.3
9	11 41.4	37	93	90.4	11 52.4	37	93	89.9	12 03.4	37	93	89.4	12 14.4	36	93	89.0
80	10 45.8	37	93	90.0	10 56.8	37	93	89.5	11 07.8	37	93	89.1	11 18.8	36	93	88.6
1	9 50.1	37	93	89.6	10 01.2	37	93	89.2	10 12.2	37	93	88.7	10 23.2	36	93	88.2
2	8 54.5	37	93	89.3	9 05.6	37	93	88.8	9 16.6	37	93	88.3	9 27.6	37	93	87.9
3	7 58.9	37	93	88.9	8 09.9	37	93	88.4	8 21.0	37	93	88.0	8 32.0	37	93	87.5
4	7 03.3	37	93	88.5	7 14.3	37	93	88.0	7 25.4	37	93	87.6	7 36.4	37	93	87.1
85	6 07.7	37	93	88.1	6 18.8	37	93	87.7	6 29.8	37	93	87.2	6 40.9	37	93	86.7
6	5 12.1	37	93	87.8	5 23.2	37	93	87.3	5 34.3	37	93	86.8	5 45.3	37	93	86.4
7																

H.A.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	74 00.0	1.0	03	180.0	74 30.0	1.0	03	180.0	75 00.0	1.0	03	180.0	75 30.0	1.0	03	180.0
1	73 58.3	1.0	09	176.4	74 28.2	1.0	09	176.3	74 58.1	1.0	09	176.2	75 28.1	1.0	10	176.0
2	73 53.0	99	14	172.8	74 22.8	99	15	172.6	74 52.6	99	15	172.4	75 22.3	99	16	172.1
3	73 44.4	98	20	169.3	74 13.9	98	20	169.0	74 43.4	98	21	168.6	75 12.9	98	22	168.3
4	73 32.4	97	25	165.8	74 01.6	97	26	165.4	74 30.7	97	27	165.0	74 59.8	97	28	164.5
05	73 17.2	96	30	162.5	73 45.9	96	31	162.0	74 14.6	95	32	161.4	74 43.2	95	33	160.9
6	72 58.9	94	35	159.2	73 27.1	94	36	158.6	73 55.3	94	37	158.0	74 23.4	93	38	157.3
7	72 37.7	93	40	156.0	73 05.4	92	41	155.4	73 33.0	92	42	154.7	74 00.4	91	43	154.0
8	72 13.8	91	44	153.0	72 40.9	90	45	152.3	73 07.8	90	46	151.6	73 34.6	89	47	150.8
9	71 47.3	89	48	150.1	72 13.8	88	49	149.4	72 40.1	87	50	148.6	73 06.2	87	52	147.8
10	71 18.5	86	52	147.4	71 44.3	86	53	146.6	72 09.9	85	54	145.8	72 35.3	84	55	144.9
1	70 47.4	84	55	144.8	71 12.6	84	56	143.9	71 37.5	83	57	143.1	72 02.2	82	58	142.2
2	70 14.3	82	58	142.3	70 38.9	81	59	141.4	71 03.1	80	60	140.5	71 27.1	80	62	139.6
3	69 39.4	80	61	139.9	70 03.3	79	62	139.1	70 26.9	78	63	138.2	70 50.2	77	64	137.2
4	69 02.8	78	64	137.7	69 26.0	77	65	136.8	69 49.0	76	66	135.9	70 11.6	75	67	134.9
15	68 24.6	76	66	135.6	68 47.2	75	67	134.7	69 09.5	74	68	133.8	69 31.5	73	69	132.8
6	67 45.0	74	68	133.6	68 07.0	73	69	132.7	68 28.7	72	70	131.8	68 50.0	71	71	130.8
7	67 04.1	72	70	131.7	67 25.5	71	71	130.8	67 46.6	70	72	129.9	68 07.3	69	73	128.9
8	66 22.0	70	72	129.9	66 42.8	69	73	129.0	67 03.4	68	74	128.1	67 23.5	67	75	127.2
9	65 38.8	68	74	128.3	65 59.1	67	74	127.4	66 19.1	66	75	126.4	66 38.7	65	76	125.5
20	64 54.7	66	75	126.7	65 14.4	65	76	125.8	65 33.9	64	77	124.9	65 53.0	63	78	123.9
1	64 09.6	65	76	125.1	64 28.9	64	77	124.3	64 47.8	63	78	123.4	65 06.4	61	79	122.4
2	63 23.7	63	78	123.7	63 42.5	62	78	122.8	64 00.9	61	79	121.9	64 19.1	60	80	121.0
3	62 37.1	62	79	122.3	62 55.4	61	80	121.5	63 13.4	59	80	120.6	63 31.1	58	81	119.7
4	61 49.7	60	80	121.0	62 07.6	59	81	120.2	62 25.2	58	81	119.3	62 42.4	57	82	118.4
25	61 01.8	59	81	119.8	61 19.2	58	82	119.0	61 36.4	57	82	118.1	61 53.2	56	83	117.2
6	60 13.2	57	82	118.6	60 30.3	56	82	117.8	60 47.1	55	83	116.9	61 03.5	54	84	116.1
7	59 24.1	56	83	117.5	59 40.8	55	83	116.7	59 57.2	54	84	115.8	60 13.3	53	84	115.0
8	58 34.5	55	83	116.4	58 50.9	54	84	115.6	59 06.9	53	84	114.8	59 22.7	52	85	114.0
9	57 44.5	54	84	115.4	58 00.5	53	85	114.6	58 16.2	52	85	113.8	58 31.7	51	86	113.0
30	56 54.0	53	85	114.4	57 09.7	52	85	113.6	57 25.2	51	86	112.8	57 40.3	50	86	112.0
1	56 03.2	52	85	113.5	56 18.6	51	86	112.7	56 33.7	50	86	111.9	56 48.5	49	87	111.1
2	55 12.0	51	86	112.6	55 27.1	50	86	111.8	55 41.9	49	87	111.0	55 56.5	48	87	110.3
3	54 20.4	50	86	111.7	54 35.3	49	87	111.0	54 49.9	48	87	110.2	55 04.2	47	88	109.4
4	53 28.6	49	87	110.9	53 43.2	48	87	110.1	53 57.5	47	88	109.4	54 11.6	46	88	108.6
35	52 36.5	48	87	110.1	52 50.8	47	88	109.3	53 04.9	46	88	108.6	53 18.7	46	88	107.9
6	51 44.1	47	88	109.3	51 58.2	47	88	108.6	52 12.1	46	88	107.8	52 25.7	45	89	107.1
7	50 51.5	47	88	108.5	51 05.4	46	88	107.8	51 19.0	45	89	107.1	51 32.4	44	89	106.4
8	49 58.6	46	88	107.8	50 12.3	45	89	107.1	50 25.8	44	80	106.4	50 38.9	44	89	105.7
9	49 05.5	45	89	107.1	49 19.0	45	89	106.4	49 32.3	44	89	105.7	49 45.3	43	90	105.0
40	48 12.3	45	89	106.4	48 25.6	44	89	105.8	48 38.7	43	90	105.1	48 51.5	42	90	104.4
1	47 18.8	44	89	105.8	47 32.0	43	90	105.1	47 44.9	43	90	104.4	47 57.5	42	90	103.8
2	46 25.2	44	90	105.1	46 38.2	43	90	104.5	46 50.9	42	90	103.8	47 03.4	41	90	103.1
3	45 31.4	43	90	104.5	45 44.2	42	90	103.9	45 56.8	42	90	103.2	46 09.2	41	91	102.6
4	44 37.5	43	90	103.9	44 50.2	42	90	103.3	45 02.6	41	91	102.6	45 14.8	40	91	102.0
45	43 43.4	42	90	103.3	43 55.9	41	90	102.7	44 08.3	41	91	102.1	44 20.4	40	91	101.4
6	42 49.2	42	90	102.7	43 01.6	41	91	102.1	43 13.8	40	91	101.5	43 25.8	40	91	100.9
7	41 54.9	41	91	102.2	42 07.2	41	91	101.6	42 19.2	40	91	101.0	42 31.1	39	91	100.3
8	41 00.5	41	91	101.7	41 12.6	40	91	101.0	41 24.6	40	91	100.4	41 36.3	39	91	99.8
9	40 05.9	40	91	101.1	40 18.0	40	91	100.5	40 29.8	39	92	99.9	40 41.5	39	92	99.3
50	39 11.3	40	91	100.6	39 23.2	39	91	100.0	39 35.0	39	92	99.4	39 46.5	38	92	98.8
1	38 16.6	40	91	100.1	38 28.4	39	92	99.5	38 40.0	39	92	98.9	38 51.5	38	92	98.3
2	37 21.8	39	92	99.6	37 33.5	39	92	99.0	37 45.1	38	92	98.4	37 56.4	38	92	97.8
3	36 26.9	39	92	99.1	36 38.5	39	92	98.5	36 50.0	38	92	98.0	37 01.3	37	92	97.4
4	35 31.9	39	92	98.6	35 43.5	38	92	98.1	35 54.9	38	92	97.5	36 06.1	37	92	96.9
55	34 36.9	39	92	98.2	34 48.4	38	92	97.6	34 59.7	37	92	97.0	35 10.8	37	92	96.5
6	33 41.8	38	92	97.7	33 53.2	38	92	97.1	34 04.4	37	92	96.6	34 15.5	37	92	96.0
7	32 46.6	38	92	97.2	32 58.0	38	92	96.7	33 09.2	37	92	96.1	33 20.2	37	92	95.6
8	31 51.4	38	92	96.8	32 02.7	37	92	96.2	32 13.8	37	92	95.7	32 24.8	36	92	95.2
9	30 56.1	38	92	96.4	31 07.4	37	92	95.8	31 18.4	37	92	95.3	31 29.4	36	92	94.7
60	30 00.8	37	92	95.9	30 12.0	37	92	95.4	30 23.0	37	92	94.8	30 33.9	36	92	94.3
1	29 05.5	37	92	95.5	29 16.6	37	92	95.0	29 27.6	36	92	94.4	29 38.4	36	92	93.9
2	28 10.1	37	92	95.1	28 21.2	37	92	94.5	28 32.1	36	92	94.0	28 42.9	36	92	93.5
3	27 14.7	37	92	94.7	27 25.7	37	92	94.1	27 36.6	36	92	93.6	27 47.4	36	93	93.1
4	26 19.2	37	92	94.2	26 30.2	36	92	93.7	26 41.1	36	93	93.2	26 51.8	36	93	92.7
65	25 23.7	37	92	93.8	25 34.7	36	93	93.3	25 45.5	36	93	92.8	25 56.2	36	93	92.3
6	24 28.2	37	93	93.4	24 39.1	36	93	92.9	24 49.9	36	93	92.4	25 00.6	36	93	91.9
7	23 32.6	37	93	93.0	23 43.5	36	93	92.5	23 54.3	36	93	92.0	24 05.0	36	93	91.5
8	22 37.1	36	93	92.6	22 48.0	36	93	92.1	22 58.7	36	93	91.6	23 09.4	35	93	91.1
9	21 41.5	36	93	92.3	21 52.4	36	93	91.8	22 03.1	36	93	91.3	22 13.8	35	93	90.7
70	20 45.9	36	93	91.9	20 56.7	36	93	91.4	21 07.5	36	93	90.9	21 18.2	35	93	90.4
1	19 50.3	36	93	91.5	20 01.1	36	93	91.0	20 11.9	36	93	90.5	20 22.5	35	93	90.0
2	18 54.7	36	93	91.1	19 05.5	36	93	90.6	19 16.2	36	93	90.1	19 26.9	35	93	89.6
3	17 59.1	36	93	90.7	18 09.9	36	93	90.2	18 20.6	36	93	89.7	18 31.3	35	93	89.2
4	17 03.4	36	93	90.3	17 14.2	36	93	89.9	17 25.0	36	93	89.4	17 35.7	35	93	88.9
75	16 07.8	36	93	90.0	16 18 6	36	93	89.5	16 29.4	36	93	89.0	16 40.0	36	93	88.5
6	15 12.2	36	93	89.6	15 23.0	36	93	89.1	15 33.7	36	93	88.6	15 44.4	36	93	88.1
7	14 16.5	36	93	89.2	14 27.4	36	93	88.7	14 38.1	36	93	88.3	14 48.8	36	93	87.8
8	13 20.9	36	93	88.9	13 31.7	36	93	88.4	13 42.5	36	93	87.9	13 53.3	36	93	87.4
9	12 25.3	36	93	88.5	12 36.1	36	93	88.0	12 46.9	36	93	87.5	12 57.7	36	93	87.0
80	11 29.7	36	93	88.1	11 40.6	36	93	87.6	11 51.4	36	93	87.2	12 02.1	36	92	86.7
1	10 34.1	36	93	87.7	10 45.0	36	93	87.3	10 55.8	36	92	86.8	11 06.6	36	92	86.3
2	9 38.5	36	93	87.4	9 49.4	36	92	86.9	10 00.3	36	92	86.4	10 11.1	36	92	86.0
3	8 42.9	36	93	87.0	8 53.9	36	92	86.5	9 04.8	36	92	86.1	9 15.6	36	92	85.6
4	7 47.4	37	92	86.6	7 58.4	36	92	86.2	8 09.3	36	92	85.7	8 20.2	36	92	85.2
85	6 51.9	37	92	86.3	7 02.9	37	92	85.8	7 13.8	36	92	85.3	7 24.8	36	92	84.9
6	5 56.4	37	92	85.9	6 07.4	37	92	85.4	6 18.4	37	92	85.0	6 29.4	37	92	84.5
7	5 00.9	37	92	85.5	5 12.0	37	92	85.1	5 23.0	37	92	84.6	5 34.0	37	92	84.1

Lat. 22°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	64 00.0	1.0	02	180.0	63 30.0	1.0	02	180.0	63 00.0	1.0	02	180.0	62 30.0	1.0	02	180.0	62 00.0	1.0	02	180.0	61 30.0	1.0	02	180.0	61 00.0	1.0	02	180.0	60 30.0	1.0	02	180.0	00
1	63 58.9	1.0	06	177.7	63 28.9	1.0	05	177.8	62 58.9	1.0	05	177.8	62 29.0	1.0	05	177.8	61 59.0	1.0	05	177.9	61 29.0	1.0	05	177.9	60 59.0	1.0	05	178.0	60 29.0	1.0	05	178.0	1
2	63 55.6	1.0	09	175.5	63 25.7	1.0	09	175.5	62 55.7	1.0	09	175.6	62 25.8	1.0	09	175.7	61 55.9	1.0	08	175.8	61 26.0	1.0	08	175.8	60 56.0	1.0	08	175.9	60 26.1	1.0	08	176.0	2
3	63 50.1	99	13	173.2	63 20.3	99	13	173.3	62 50.4	99	12	173.4	62 20.6	99	12	173.6	61 50.8	99	12	173.7	61 20.9	99	12	173.8	60 51.1	1.0	12	173.9	60 21.2	1.0	11	174.0	3
4	63 42.4	99	16	171.0	63 12.7	99	16	171.1	62 43.0	99	16	171.3	62 13.3	99	16	171.4	61 43.6	99	15	171.6	61 13.9	99	15	171.7	60 44.2	99	15	171.9	60 14.4	99	14	172.0	4
05	63 32.6	98	20	168.7	63 03.1	98	20	168.9	62 33.6	98	19	169.1	62 04.0	99	19	169.3	61 34.5	99	18	169.5	61 04.9	99	18	169.7	60 35.3	99	18	169.9	60 05.7	99	18	170.0	05
6	63 20.7	98	23	166.6	62 51.4	98	23	166.8	62 22.1	98	22	167.0	61 52.7	98	22	167.2	61 23.4	98	22	167.5	60 54.0	98	21	167.7	60 24.6	98	21	167.9	59 55.2	98	21	168.1	6
7	63 06.8	97	27	164.4	62 37.7	97	26	164.7	62 08.6	97	26	164.9	61 39.5	97	25	165.2	61 10.3	97	25	165.4	60 41.2	97	24	165.7	60 12.0	97	24	165.9	59 42.7	97	24	166.1	7
8	62 50.8	96	30	162.3	62 22.0	96	29	162.6	61 53.2	96	29	162.9	61 24.3	96	28	163.2	60 55.4	96	28	163.5	60 26.5	97	28	163.7	59 57.5	97	27	164.0	59 28.5	97	27	164.2	8
9	62 33.0	95	33	160.2	62 04.4	95	32	160.5	61 35.9	95	32	160.9	61 07.3	95	31	161.2	60 38.7	96	31	161.5	60 10.0	96	30	161.8	59 41.3	96	30	162.1	59 12.5	96	30	162.4	9
10	62 13.2	94	36	158.2	61 45.0	94	35	158.5	61 16.8	94	35	158.9	60 48.5	94	34	159.2	60 20.1	95	34	159.6	59 51.7	95	33	159.9	59 23.3	95	33	160.2	58 54.8	95	32	160.5	10
1	61 51.6	93	39	156.2	61 23.8	93	38	156.6	60 55.9	93	38	157.0	60 27.9	93	37	157.3	59 59.9	94	37	157.7	59 31.8	94	36	158.0	59 03.6	94	36	158.4	58 35.4	94	35	158.7	1
2	61 28.3	91	42	154.3	61 00.8	92	41	154.7	60 33.3	92	40	155.1	60 05.6	92	40	155.5	59 37.9	92	39	155.9	59 10.2	93	39	156.2	58 42.3	93	38	156.6	58 14.4	93	38	156.9	2
3	61 03.3	90	44	152.4	60 36.2	91	44	152.8	60 09.0	91	43	153.2	59 41.7	91	42	153.7	59 14.4	91	42	154.1	58 47.0	92	41	154.5	58 19.5	92	41	154.8	57 51.9	92	40	155.2	3
4	60 36.7	89	47	150.5	60 10.0	89	46	151.0	59 43.2	90	46	151.4	59 16.3	90	45	151.9	58 49.3	90	44	152.3	58 22.2	90	44	152.7	57 55.0	91	43	153.1	57 27.8	91	42	153.5	4
15	60 08.6	88	49	148.8	59 42.3	88	49	149.2	59 15.9	88	48	149.7	58 49.3	89	47	150.2	58 22.7	89	47	150.6	57 56.0	89	46	151.0	57 29.2	89	46	151.4	57 02.3	90	45	151.9	15
6	59 39.1	86	52	147.0	59 13.1	87	51	147.5	58 47.1	87	50	148.0	58 20.9	87	50	148.5	57 54.7	88	49	148.9	57 28.3	88	48	149.4	57 01.9	88	48	149.8	56 35.4	89	47	150.2	6
7	59 08.1	85	54	145.4	58 42.6	85	53	145.9	58 16.9	86	52	146.4	57 51.2	86	52	146.8	57 25.3	86	51	147.3	56 59.3	87	50	147.8	56 33.3	87	50	148.2	56 07.1	87	49	148.7	7
8	58 35.8	84	56	143.7	58 10.7	84	55	144.2	57 45.5	84	54	144.8	57 20.1	85	54	145.3	56 54.6	85	53	145.7	56 29.0	85	52	146.2	56 03.3	86	52	146.7	55 37.5	86	51	147.1	8
9	58 02.3	82	58	142.2	57 37.6	83	57	142.7	57 12.8	83	57	143.2	56 47.8	83	56	143.7	56 22.7	84	55	144.2	55 57.5	84	54	144.7	55 32.2	85	54	145.2	55 06.7	85	53	145.6	9
20	57 27.6	81	60	140.6	57 03.3	81	59	141.2	56 38.8	82	58	141.7	56 14.3	82	58	142.2	55 49.6	83	57	142.7	55 24.8	83	56	143.2	54 59.8	83	56	143.7	54 34.8	84	55	144.2	20
1	56 51.7	79	62	139.2	56 27.9	80	61	139.7	56 03.8	80	60	140.2	55 39.6	81	60	140.8	55 15.3	81	59	141.3	54 50.9	82	58	141.8	54 26.3	82	58	142.3	54 01.7	82	57	142.8	1
2	56 14.8	78	63	137.7	55 51.4	79	63	138.3	55 27.7	79	62	138.8	55 03.9	80	61	139.4	54 40.0	80	60	139.9	54 16.0	80	60	140.4	53 51.8	81	59	140.9	53 27.5	81	59	141.4	2
3	55 36.9	77	65	136.4	55 13.8	77	64	136.9	54 50.6	78	64	137.5	54 27.2	78	63	138.0	54 03.7	79	62	138.5	53 40.0	79	62	139.1	53 16.2	80	61	139.6	52 52.3	80	60	140.1	3
4	54 58.1	75	66	135.0	54 35.4	76	66	135.6	54 12.5	76	65	136.1	53 49.5	77	64	136.7	53 26.4	77	64	137.2	53 03.1	78	63	137.8	52 39.6	78	62	138.3	52 16.1	79	62	138.8	4
25	54 18.3	74	68	133.7	53 56.0	75	67	134.3	53 33.5	75	66	134.9	53 10.9	76	66	135.4	52 48.1	76	65	136.0	52 25.2	77	64	136.5	52 02.2	77	64	137.0	51 39.0	78	63	137.5	25
6	53 37.7	73	69	132.5	53 15.8	73	68	133.1	52 53.7	74	68	133.6	52 31.4	74	67	134.2	52 09.0	75	66	134.7	51 46.5	75	66	135.3	51 23.8	76	65	135.8	51 01.0	76	65	136.3	6
7	52 56.3	72	70	131.3	52 34.7	72	70	131.9	52 13.0	73	69	132.4	51 51.1	73	68	133.0	51 29.1	74	68	133.5	51 06.9	74	67	134.1	50 44.6	75	67	134.6	50 22.1	75	66	135.1	7
8	52 14.1	70	72	130.1	51 52.9	71	71	130.7	51 31.6	71	70	131.3	51 10.0	72	70	131.8	50 48.4	72	69	132.4	50 26.5	73	68	132.9	50 04.6	73	68	133.4	49 42.5	74	68	134.0	8
9	51 31.2	69	73	129.0	51 10.4	70	72	129.6	50 49.4	70	71	130.1	50 28.2	71	71	130.7	50 06.9	71	70	131.2	49 45.4	72	70	131.8	49 23.8	72	69	132.3	49 02.0	73	68	132.8	9
30	50 47.6	68	74	127.9	50 27.2	69	73	128.5	50 06.5	69	72	129.0	49 45.7	70	72	129.6	49 24.7	70	71	130.2	49 03.6	71	71	130.7	48 42.3	71	70	131.2	48 20.9	72	70	131.8	30
1	50 03.4	67	75	126.8	49 43.3	67	74	127.4	49 23.0	68	74	128.0	49 02.5	69	73	128.5	48 41.9	69	72	129.1	48 21.1	70	72	129.6	48 00.2	70	71	130.2	47 39.1	71	71	130.7	1
2	49 18.6	66	76	125.8	48 58.8	66	75	126.4	48 38.8	67	75	127.0	48 18.7	67	74	127.5	47 58.4	68	73	128.1	47 37.9	68	73	128.6	47 17.3	69	72	129.2	46 56.6	69	72	129.7	2
3	48 33.2	65	76	124.8	48 13.7	65	76	125.4	47 54.1	66	76	126.0	47 34.3	66	75	126.5	47 14.3	67	74	127.1	46 54.2	67	74	127.6	46 33.9	68	73	128.2	46 13.5	68	73	128.7	3
4	47 47.3	64	77	123.9	47 28.1	64	77	124.4	47 08.8	65	76	125.0	46 49.3	65	76	125.6	46 29.6	66	75	126.1	46 09.8	66	75	126.7	45 49.9	67	74	127.2	45 29.7	67	74	127.7	4
35	47 00.9	63	78	122.9	46 42.0	63	78	123.5	46 23.0	64	77	124.1	46 03.8	64	77	124.6	45 44.4	65	76	125.2	45 24.9	65	76	125.7	45 05.3	66	75	126.3	44 45.5	66	75	126.8	35
6	46 13.9	62	79	122.0	45 55.4	62	78	122.6	45 36.6	63	78	123.2	45 17.8	63	78	123.7	44 58.7	64	77	124.3	44 39.5	64	76	124.8	44 20.2	65	76	125.3	44 00.6	65	76	125.9	6
7	45 26.6	61	80	121.2	45 08.3	61	79	121.7	44 49.8	62	79	122.3	44 31.3	62	78	122.8	44 12.5	63	78	123.4	43 53.6	63	77	123.9	43 34.5	64	77	124.5	43 15.3	64	76	125.0	7
8	44 38.7	60	80	120.3	44 20.8	60	80	120.9	44 02.6	61	80	121.4	43 44.3	61	79	122.0	43 25.8	62	78	122.5	43 07.2	62	78	123.1	42 48.4	63	78	123.6	42 29.5	63	77	124.1	8
9	43 50.5	59	81	119.5	43 32.8	59	80	120.1	43 14.9	60	80	120.6	42 56.9	60	80	121.2	42 38.7	61	79	121.7	42 20.4	61	79	122.2	42 01.9	62	78	122.8	41 43.2	62	78	123.3	9
40	43 01.9	58	82	118.7	42 44.5	58	81	119.2	42 26.8	59	81	119.8	42 09.1	59	80	120.3	41 51.2	60	80	120.9	41 33.1	60	80	121.4	41 14.9	61	79	121.9	40 56.5	61	78	122.5	40
1	42 12.9	57	82	117.9	41 55.7	58	82	118.5	41 38.4	58	81	119.0	41 20.9	59	81	119.6	41 03.2	59	80	120.1	40 45.4	60	80	120.6	40 27.5	60	80	121.2	40 09.4	61	79	121.7	1
2	41 23.6	53	83	117.2	41 06.6	57	82	117.7	40 49.5	57	82	118.2	40 32.3	58	82	118.8	40 14.9	58	81	119.3	39 57.3	59	81	119.9	39 39.7	59	80	120.4	39 21.8	60	80	120.9	2
3	40 33.9	55	83	116.4	40 17.2	56	83	117.0	40 00.4	56	82	117.5	39 43.4	57	82	118.0	39 26.2	57	82	118.6	39 08.9	58	81	119.1	38 51.5	58	81	119.6	38 33.9	59	80	120.1	3
4	39 44.0	55	84	115.7	39 27.5	55	84	116.2	39 10.9	56	83	116.8	38 54.1	56	83	117.3	38 37.2	57	82	117.8	38 20.1	57	82	118.4	38 02.9	58	82	118.9	37 45.6	58	81	119.4	4
45	38 53.7	54	84	115.0	38 37.4	54	84	115.5	38 21.0	55	83	116.1	38 04.5	55	83	116.6	37 47.8	56	83	117.1	37 31.0	56	82	117.7	37 14.1	57	82	118.2	36 57.0	57	82	118.7	45
6	38 03.1	53	85	114.3	37 47.1	54	84	114.9	37 30.9	54	84	115.4	37 14.6	55	84	115.9	36 58.2	55	83	116.4	36 41.6	56	83	117.0	36 24.9	56	83	117.5	36 08.0	56	82	118.0	6
7	37 12.3	52	85	113.7	36 56.5	53	85	114.2	36 40.5	53	84	114.7	36 24.4	54	84	115.2	36 08.2	54	84	115.8	35 51.9	55	84	116.3	35 35.4	55	83	116.8	35 18.7	56	82	117.3	7
8	36 21.2	52	86	113.0	36 05.6	52	85	113.5	35 49.9	53	85	114.1	35 34.0	53	84	114.6	35 18.0	54	84	115.1	35 01.8	54	84	115.6	34 45.6	54	84	116.1	34 29.2	55	83	116.6	8
9	35 29.9	51	86	112.4	35 14.5	52	86	112.9	34 58.9	52	85	113.4	34 43.3	52	85	113.9	34 27.5	53	85	114.5	34 11.5	53	84	115.0	33 55.5	54	84	115.5	33 39.3	54	84	116.0	9
50	34 38.3	50	86	111.8	34 23.1	51	86	112.3	34 07.8	51	86	112.8	33 52.3	52	85	113.3	33 36.7	52	85	113.8	33 21.0	53	85	114.3	33 05.1	53	84	114.8	32 49.1	53	84	115.3	50
1	33 46.5	50	87	111.1	33 31.5	50	86	111.7	33 16.4	51	86	112.2	33 01.1	51	86	112.7	32 45.7	52	85	113.2	32 30.2	52	85	113.7	32 14.5	52	85	114.2	31 58.7	53	84	114.7	1
2	32 54.5	49	87	110.6	32 39.7	50	87	111.1	32 24.7	50	86	111.6	32 09.7	51	86	112.1	31 54.4	51	86	112.6	31 39.1	51	86	113.1	31 23.7	52	85	113.6	31 08.1	52	85	114.1	2
3	32 02.4	49	87	110.0	31 47.7	49	87	110.5	31 32.9	49	87	111.0	31 18.0	50	86	111.5	31 03.0	50	86	112.0	30 47.8	51	86	112.5	30 32.6	51	86	113.0	30 17.2	51	85	113.5	3
4	31 10.0	48	88	109.4	30 55.5	49	87	109.9	30 40.9	49	87	110.4	30 26.2	49	87	110.9	30 11.3	50	86	111.4	29 56.3	50	86	111.9	29 41.3	50	86	112.4	29 26.1	51	86	112.9	4
55	30 17.4	48	88	108.9	30 03.1	48	88	109.4	29 48.6	48	87	109.9	29 34.1	49	87	110.4	29 19.4	49	87	110.9	29 04.6	49	86	111.4	28 49.7	50	86	111.9	28 34.7	50	86	112.4	55
6	29 24.7	47	88	108.3	29 10.5	47	88	108.8	28 56.2	48	88	109.3	28 41.8	48	87	109.8	28 27.3	49	87	110.3	28 12.7	49	87	110.8	27 58.0	49	86	111.3	27 43.2	50	86	111.8	6
7	28 31.8	47	88	107.8	28 17.8	47	88	108.3	28 03.7	47	88	108.8	27 49.4	48	88	109.3	27 35.1	48	87	109.8	27 20.6	48	87	110.3	27 06.1	49	87	110.8	26 51.4	49	86	111.2	7
8	27 38.7	46	89	107.3	27 24.9	46	88	107.8	27 10.9	47	88	108.3	26 56.8	47	88	108.7	26 42.6	47	88	109.2	26 28.3	48	87	109.7	26 14.0	48	87	110.2	25 59.5	48	87	110.7	8
9	26 45.5	46	89	106.7	26 31.8	46	89	107.2	26 18.0	46	88	107.7	26 04.1	47	88	108.2	25 50.0	47	88	108.7	25 35.9	47	88	109.2	25 21.7	48	87	109.7	25 07.3	48	87	110.2	9
60	25 52.2	45	89	106.2	25 38.6	45	89	106.7	25 24.9	46	89	107.2	25 11.1	46	88	107.7	24 57.3	46	88	108.2	24 43.3	47	88	108.7	24 29.2	47	88	109.2	24 15.0	47	87	109.7	60
1	24 58.7	45	89	105.7	24 45.3	45	89	106.2	24 31.7	45	89	106.7	24 18.1	46	89	107.2	24 04.3	46	88	107.7	23 50.5	46	88	108.2	23 36.6	47	88	108.7	23 22.6	47	88	109.1	1
2	24 05.1	44	90	105.2	23 51.8	45	89	105.7	23 38.4	45	89	106.2	23 24.9	45	89	106.7	23 11.3	45	89	107.2	22 57.6	46	88	107.7	22 43.8	46	88	108.2	22 29.9	46	88	108.6	2
3	23 11.4	44	90	104.8	22 58.2	44	90	105.3	22 44.9	44	89	105.7	22 31.5	45	89	106.2	22 18.0	45	89	106.7	22 04.5	45	89	107.2	21 50.9	46	88	107.7	21 37.1	46	88	108.2	3
4	22 17.5	43	90	104.3	22 04.5	44	90	104.8	21 51.3	44	90	105.3	21 38.0	44	89	105.8	21 24.7	45	89	106.2	21 11.3	45	89	106.7	20 57.8	45	89	107.2	20 44.2	45	88	107.7	4
65	21 23.6	43	90	103.8	21 10.6	43	90	104.3	20 57.6	44	90	104.8	20 44.4	44	90	105.3	20 31.2	44	89	105.8	20 17.9	44	89	106.2	20 04.6	45	89	106.7	19 51.1	45	89	107.2	65
6	20 29.5	43	90	103.4	20 16.6	43	90	103.9	20 03.7	43	90	104.3	19 50.7	43	90	104.8	19 37.6	44	90	105.3	19 24.5	44	89	105.8	19 11.2	44	89	106.2	18 57.9	44	89	106.7	6
7	19 35.3	42	90	102.9	19 22.6	43	90	103.4	19 09.8	43	90	103.9	18 56.9	43	90	104.4	18 43.9	43	90	104.8	18 30.9	44	90	105.3	18 17.8	44	89	105.8	18 04.6	44	89	106.3	7
8	18 41.1	42	91	102.5	18 28.4	42	90	103.0	18 15.7	42	90	103.4	18 02.9	43	90	103.9	17 50.1	43	90	104.4	17 37.2	43	90	104.9	17 24.2	43	90	105.3	17 11.1	44	89	105.8	8
9	17 46.7	42	91	102.0	17 34.2	42	91	102.5	17 21.5	42	90	103.0	17 08.9	42	90	103.5	16 56.1	43	90	103.9	16 43.3	43	90	104.4	16 30.5	43	90	104.9	16 17.5	43	90	105.4	9
70	16 52.2	41	91	101.6	16 39.8	42	91	102.1	16 27.3	42	91	102.6	16 14.7	42	90	103.0	16 02.1	42	90	103.5	15 49.4	42	90	104.0	15 36.6	43	90	104.4	15 23.8	43	90	104.9	70
1	15 57.7	41	91	101.2	15 45.4	41	91	101.6	15 32.9	41	91	102.1	15 20.5	42	91	102.6	15 07.9	42	90	103.1	14 55.4	42	90	103.5	14 42.7	42	90	104.0	14 30.0	42	90	104.5	1
2	15 03.1	41	91	100.8	14 50.8	41	91	101.2	14 38.5	41	91	101.7	14 26.1	41	91	102.2	14 13.7	42	90	102.6	14 01.2	41	90	103.1	13 48.7	42	90	103.6	13 36.1	42	90	104.0	2
3	14 08.4	40	91	100.3	13 56.2	41	91	100.8	13 44.0	41	91	101.3	13 31.7	41	91	101.7	13 19.4	41	91	102.2	13 07.0	41	90	102.7	12 54.6	42	90	103.1	12 42.1	42	90	103.6	3
4	13 13.6	40	91	99.9	13 01.5	40	91	100.4	12 49.4	41	91	100.9	12 37.2	41	91	101.3	12 25.0	41	91	101.8	12 12.7	41	91	102.3	12 00.3	41	90	102.7	11 48.0	41	90	103.2	4
75	12 18.8	40	92	99.5	12 06.8	40	91	100.0	11 54.7	40	91	100.4	11 42.6	40	91	100.9	11 30.5	41	91	101.4	11 18.3	41	91	101.8	11 06.0	41	91	102.3	10 53.7	41	90	102.8	75
6	11 23.9	40	92	99.1	11 12.0	40	92	99.6	11 00.0	40	91	100.0	10 48.0	40	91	100.5	10 35.9	40	91	101.0	10 23.8	40	91	101.4	10 11.6	41	91	101.9	9 59.5	41	91	102.4	6
7	10 28.9	39	92	98.7	10 17.1	40	92	99.2	10 05.2	40	92	99.6	9 53.2	40	91	100.1	9 41.2	40	91	100.6	9 29.2	40	91	101.0	9 17.2	40	91	101.5	9 05.1	40	91	102.0	7
8	9 33.9	39	92	98.3	9 22.1	39	92	98.8	9 10.3	39	92	99.2	8 58.4	40	91	99.7	8 46.5	40	91	100.2	8 34.6	40	91	100.6	8 22.6	40	91	101.1	8 10.6	40	91	101.6	8
9	8 38.8	39	92	97.9	8 27.1	39	92	98.4	8 15.3	39	92	98.8	8 03.6	39	92	99.3	7 51.7	39	91	99.8	7 39.9	40	91	100.2	7 28.0	40	91	100.7	7 16.1	40	91	101.2	9
80	7 43.7	39	92	97.5	7 32.0	39	92	98.0	7 20.3	39	92	98.4	7 08.6	39	92	98.9	6 56.9	39	92	99.4	6 45.1	39	92	99.8	6 33.3	39	91	100.3	6 21.4	39	91	100.8	80
1	6 48.5	39	92	97.1	6 36.9	39	92	97.6	6 25.3	39	92	98.1	6 13.6	39	92	98.5	6 01.9	39	92	99.0	5 50.2	39	92	99.4	5 38.5	39	92	99.9	5 26.8	39	91	100.4	1
2	5 53.3	38	92	96.7	5 41.8	39	92	97.2	5 30.2	39	92	97.7	5 18.6	39	92	98.1	5 07.0	39	92	98.6													2

Lat. 23°

Lat. 24°

Lat. 25

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	76 00.0	1.0 03	180.0	76 30.0	1.0 04	180.0	77 00.0	1.0 04	180.0	77 30.0	1.0 04	180.0	78 00.0	1.0 04	180.0	78 30.0	1.0 04	180.0	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	00
1	75 58.0	1.0 10	175.9	76 27.9	1.0 10	175.8	76 57.9	1.0 11	175.6	77 27.8	1.0 11	175.5	77 57.7	1.0 11	175.3	78 27.6	1.0 12	175.1	78 57.5	1.0 12	174.9	79 27.4	1.0 13	174.6	1
2	75 52.1	99 16	171.9	76 21.8	99 17	171.6	76 51.5	99 18	171.3	77 21.2	99 18	171.0	77 50.9	99 19	170.6	78 20.5	99 20	170.2	78 50.1	99 20	169.8	79 19.6	98 21	169.4	2
3	75 42.3	98 22	167.9	76 11.7	98 23	167.5	76 41.0	98 24	167.0	77 10.3	98 25	166.6	77 39.6	97 26	166.0	78 08.8	97 27	165.5	78 37.9	97 28	164.9	79 06.9	97 29	164.2	3
4	75 28.8	97 28	164.0	75 57.7	96 29	163.5	76 26.6	96 30	162.9	76 55.4	96 31	162.3	77 24.1	96 32	161.6	77 52.7	95 34	160.9	78 21.2	95 35	160.2	78 49.5	94 36	159.3	4
05	75 11.7	96 34	160.3	75 40.1	95 35	159.6	76 08.4	94 36	158.9	76 36.6	94 37	158.2	77 04.6	93 38	157.4	77 32.5	93 40	156.6	78 00.3	92 41	155.7	78 27.8	91 43	154.7	05
6	74 51.3	93 39	156.7	75 19.1	92 40	155.9	75 46.7	92 42	155.1	76 14.2	91 43	154.3	76 41.5	91 44	153.4	77 08.6	90 46	152.5	77 35.5	89 47	151.5	78 02.2	88 49	150.4	6
7	74 27.7	91 44	153.2	74 54.8	90 45	152.4	75 21.8	89 47	151.6	75 48.5	89 48	150.6	76 15.0	88 49	149.7	76 41.3	87 51	148.6	77 07.3	86 52	147.5	77 33.0	85 54	146.4	7
8	74 01.2	88 48	150.0	74 27.6	88 50	149.1	74 53.8	87 51	148.2	75 19.8	86 52	147.2	75 45.4	85 54	146.1	76 10.8	84 55	145.0	76 35.9	83 57	143.9	77 00.7	82 58	142.6	8
9	73 32.1	86 53	146.9	73 57.7	85 54	145.9	74 23.1	84 55	145.0	74 48.3	83 57	143.9	75 13.1	82 58	142.9	75 37.6	81 59	141.7	76 01.8	80 61	140.5	76 25.6	79 62	139.2	9
10	73 00.5	83 56	144.0	73 25.4	83 58	143.0	73 50.0	82 59	142.0	74 14.3	81 60	140.9	74 38.3	79 62	139.8	75 02.0	78 63	138.6	75 25.2	77 64	137.4	75 48.1	75 66	136.1	10
1	72 26.7	81 60	141.2	72 50.8	80 61	140.2	73 14.7	79 62	139.2	73 38.2	78 64	138.1	74 01.4	77 65	136.9	74 24.2	75 66	135.8	74 46.5	74 68	134.5	75 08.5	72 69	133.2	1
2	71 50.9	79 63	138.6	72 14.3	78 64	137.6	72 37.4	76 65	136.6	73 00.1	75 66	135.5	73 22.5	74 68	134.3	73 44.4	73 69	133.1	74 06.0	71 70	131.8	74 27.0	69 72	130.5	2
3	71 13.2	76 66	136.2	71 35.9	75 67	135.2	71 58.3	74 68	134.1	72 20.2	73 69	133.0	72 41.8	71 70	131.9	73 03.0	70 72	130.7	73 23.7	68 73	129.4	73 44.0	67 74	128.1	3
4	70 33.9	74 68	133.9	70 55.9	73 69	132.9	71 17.5	71 70	131.8	71 38.8	70 71	130.7	71 59.6	69 72	129.6	72 20.1	67 74	128.4	72 40.0	66 75	127.1	72 59.6	64 76	125.9	4
15	69 53.2	72 70	131.8	70 14.5	70 71	130.8	70 35.4	69 72	129.7	70 56.0	68 74	128.6	71 16.1	66 74	127.5	71 35.8	65 76	126.3	71 55.1	63 77	125.1	72 13.9	62 78	123.8	15
6	69 11.1	69 72	129.8	69 31.7	68 73	128.8	69 52.0	67 74	127.7	70 11.9	66 75	126.6	70 31.4	64 76	125.5	70 50.4	63 77	124.3	71 09.0	61 78	123.1	71 27.1	60 80	121.9	6
7	68 27.7	67 74	127.9	68 47.8	66 75	126.9	69 07.5	65 76	125.9	69 26.7	64 77	124.8	69 45.6	62 78	123.7	70 04.0	61 79	122.5	70 22.0	59 80	121.3	70 39.4	57 81	120.1	7
8	67 43.3	65 76	126.2	68 02.8	64 76	125.2	68 21.9	63 78	124.1	68 40.5	62 78	123.1	68 58.8	60 79	122.0	69 16.7	59 80	120.8	69 34.0	57 81	119.7	69 50.9	56 82	118.5	8
9	66 58.0	64 77	124.5	67 16.9	62 78	123.5	67 35.4	61 79	122.5	67 53.5	60 80	121.4	68 11.2	58 81	120.4	68 28.5	57 82	119.3	68 45.3	55 82	118.1	69 01.7	54 83	117.0	9
20	66 11.7	62 78	123.0	66 30.1	61 79	122.0	66 48.1	59 80	121.0	67 05.7	58 81	119.9	67 22.8	57 82	118.9	67 39.6	55 82	117.8	67 55.9	54 83	116.7	68 11.8	52 84	115.5	20
1	65 24.6	60 80	121.5	65 42.5	59 80	120.5	66 00.0	58 81	119.5	66 17.1	56 82	118.5	66 33.8	55 83	117.5	66 50.1	54 84	116.4	67 05.9	52 84	115.3	67 21.3	51 85	114.2	1
2	64 36.8	59 81	120.1	64 54.2	57 82	119.1	65 11.3	56 82	118.2	65 27.9	55 83	117.2	65 44.1	53 84	116.1	66 00.0	52 84	115.1	66 15.4	51 85	114.0	66 30.3	49 86	113.0	2
3	63 48.4	57 82	118.8	64 05.3	56 82	117.8	64 21.9	55 83	116.9	64 38.1	53 84	115.9	64 53.9	52 84	114.9	65 09.3	51 85	113.9	65 24.3	49 86	112.8	65 38.9	48 86	111.8	3
4	62 59.3	56 83	117.5	63 15.9	55 83	116.6	63 32.0	53 84	115.7	63 47.8	52 84	114.7	64 03.2	51 85	113.7	64 18.2	49 86	112.7	64 32.8	48 86	111.7	64 47.0	47 87	110.7	4
25	62 09.7	54 84	116.3	62 25.9	53 84	115.4	62 41.6	52 85	114.5	62 57.1	51 85	113.6	63 12.1	49 86	112.6	63 26.7	48 86	111.6	63 41.0	47 87	110.7	63 54.8	45 88	109.6	25
6	61 19.6	53 84	115.2	61 35.4	52 85	114.3	61 50.8	51 85	113.4	62 05.9	50 86	112.5	62 20.5	48 86	111.6	62 34.8	47 87	110.6	62 48.7	46 88	109.6	63 02.2	44 88	108.7	6
7	60 29.1	52 85	114.1	60 44.5	51 86	113.3	60 59.6	50 86	112.4	61 14.3	48 87	111.5	61 28.6	47 87	110.6	61 42.6	46 88	109.6	61 56.2	45 88	108.7	62 09.4	43 88	107.7	7
8	59 38.1	51 86	113.1	59 53.2	50 86	112.3	60 07.9	49 87	111.4	60 22.3	47 87	110.5	60 36.4	46 88	109.6	60 50.1	45 88	108.7	61 03.4	44 89	107.8	61 16.3	42 89	106.8	8
9	58 46.8	50 86	112.1	59 01.5	49 87	111.3	59 16.0	48 87	110.5	59 30.1	46 88	109.6	59 43.8	45 88	108.7	59 57.2	44 88	107.8	60 10.2	43 89	106.9	60 22.9	42 89	106.0	9
30	57 55.1	49 87	111.2	58 09.5	48 87	110.4	58 23.7	47 88	109.6	58 37.5	46 88	108.7	58 51.0	44 88	107.8	59 04.1	43 89	107.0	59 16.9	42 89	106.1	59 29.3	41 90	105.2	30
1	57 03.0	48 87	110.3	57 17.2	47 88	109.5	57 31.1	46 88	108.7	57 44.7	45 88	107.9	57 57.9	44 89	107.0	58 10.8	42 89	106.2	58 23.4	41 90	105.3	58 35.5	40 90	104.4	1
2	56 10.7	47 88	109.5	56 24.7	46 88	108.7	56 38.3	45 88	107.9	56 51.6	44 89	107.1	57 04.6	43 89	106.2	57 17.3	42 90	105.4	57 29.6	41 90	104.5	57 41.6	39 90	103.7	2
3	55 18.2	46 88	108.7	55 31.8	45 88	107.9	55 45.2	44 89	107.1	55 58.3	43 89	106.3	56 11.1	42 90	105.5	56 23.5	41 90	104.6	56 35.7	40 90	103.8	56 47.4	39 90	103.0	3
4	54 25.3	45 88	107.9	54 38.8	44 89	107.1	54 52.0	43 89	106.3	55 04.8	42 90	105.5	55 17.4	41 90	104.7	55 29.6	40 90	103.9	55 41.6	39 90	103.1	55 53.2	38 91	102.3	4
35	53 32.3	45 89	107.1	53 45.5	44 89	106.4	53 58.5	43 90	105.6	54 11.1	42 90	104.8	54 23.5	41 90	104.0	54 35.6	40 90	103.2	54 47.3	39 91	102.5	54 58.7	38 91	101.6	35
6	52 39.0	44 89	106.4	52 52.0	43 89	105.6	53 04.8	42 90	104.9	53 17.3	41 90	104.1	53 29.4	40 90	103.4	53 41.3	39 90	102.6	53 52.9	38 91	101.8	54 04.2	37 91	101.0	6
7	51 45.5	43 89	105.7	51 58.4	42 90	104.9	52 10.9	41 90	104.2	52 23.2	41 90	103.5	52 35.2	40 90	102.7	52 47.0	39 91	101.9	52 58.4	38 91	101.2	53 09.5	37 91	100.4	7
8	50 51.9	43 90	105.0	51 04.5	42 90	104.3	51 16.9	41 90	103.5	51 29.1	40 90	102.8	51 40.9	39 91	102.1	51 52.5	38 91	101.3	52 03.8	37 91	100.6	52 14.8	36 92	99.8	8
9	49 58.1	42 90	104.3	50 10.5	41 90	103.6	50 22.8	40 90	102.9	50 34.8	39 91	102.2	50 46.5	39 91	101.5	50 57.9	38 91	100.7	51 09.0	37 91	100.0	51 19.9	36 92	99.2	9
40	49 04.1	42 90	103.7	49 16.4	41 90	103.0	49 28.5	40 91	102.3	49 40.3	39 91	101.6	49 51.9	38 91	100.9	50 03.2	37 91	100.2	50 14.2	36 92	99.4	50 25.0	35 92	98.7	40
1	48 10.0	41 90	103.1	48 22.1	40 91	102.4	48 34.1	39 91	101.7	48 45.8	39 91	101.0	48 57.2	38 91	100.3	49 08.4	37 92	99.6	49 19.3	36 92	98.9	49 29.9	35 92	98.2	1
2	47 15.7	41 91	102.5	47 27.7	40 91	101.8	47 39.5	39 91	101.1	47 51.1	38 91	100.4	48 02.4	37 92	99.7	48 13.5	36 92	99.0	48 24.3	36 92	98.3	48 34.8	35 92	97.6	2
3	46 21.3	40 91	101.9	46 33.2	39 91	101.2	46 44.9	39 91	100.6	46 56.3	38 91	99.9	47 07.5	37 92	99.2	47 18.5	36 92	98.5	47 29.2	35 92	97.8	47 39.6	34 92	97.1	3
4	45 26.8	40 91	101.3	45 38.6	39 91	100.7	45 50.2	38 91	100.0	46 01.5	37 92	99.3	46 12.6	37 92	98.7	46 23.4	36 92	98.0	46 34.0	35 92	97.3	46 44.4	34 92	96.6	4
45	44 32.2	39 91	100.8	44 43.9	39 91	100.1	44 55.3	38 92	99.5	45 06.6	37 92	98.8	45 17.6	36 92	98.2	45 28.3	35 92	97.5	45 38.8	35 92	96.8	45 49.1	34 92	96.2	45
6	43 37.5	39 91	100.2	43 49.1	38 92	99.6	44 00.4	37 92	99.0	44 11.5	37 92	98.3	44 22.4	36 92	97.7	44 33.1	35 92	97.0	44 43.6	34 92	96.3	44 53.8	34 92	95.7	6
7	42 42.7	39 91	99.7	42 54.2	38 92	99.1	43 05.4	37 92	98.4	43 16.5	36 92	97.8	43 27.3	36 92	97.2	43 37.9	35 92	96.5	43 48.3	34 92	95.9	43 58.4	33 92	95.2	7
8	41 47.9	38 92	99.2	41 59.2	38 92	98.6	42 10.4	37 92	98.0	42 21.3	36 92	97.3	42 32.1	35 92	96.7	42 42.6	35 92	96.1	42 52.9	34 92	95.4	43 03.0	33 92	94.8	8
9	40 52.9	38 92	98.7	41 04.2	37 92	98.1	41 15.2	37 92	97.5	41 26.1	36 92	96.8	41 36.8	35 92	96.2	41 47.2	35 92	95.6	41 57.5	34 92	95.0	42 07.5	33 92	94.3	9
50	39 57.9	38 92	98.2	40 09.1	37 92	97.6	40 20.1	36 92	97.0	40 30.9	36 92	96.4	40 41.5	35 92	95.8	40 51.9	34 92	95.1	41 02.1	34 92	94.5	41 12.1	33 92	93.9	50
1	39 02.8	37 92	97.7	39 13.9	37 92	97.1	39 24.8	36 92	96.5	39 35.5	35 92	95.9	39 46.1	35 92	95.3	39 56.4	34 92	94.7	40 06.6	34 92	94.1	40 16.5	33 92	93.5	1
2	38 07.6	37 92	97.3	38 18.7	36 92	96.7	38 29.5	36 92	96.1	38 40.2	35 92	95.5	38 50.7	35 92	94.9	39 01.0	34 92	94.3	39 11.1	33 93	93.7	39 21.0	33 93	93.1	2
3	37 12.4	37 92	96.8	37 23.4	36 92	96.2	37 34.2	36 92	95.6	37 44.8	35 92	95.0	37 55.2	34 92	94.4	38 05.5	34 92	93.8	38 15.6	33 93	93.2	38 25.4	33 93	92.6	3
4	36 17.2	37 92	96.3	36 28.1	36 92	95.8	36 38.8	35 92	95.2	36 49.4	35 92	94.6	36 59.7	34 92	94.0	37 10.0	34 93	93.4	37 20.0	33 93	92.8	37 29.9	33 93	92.2	4
55	35 21.8	36 92	95.9	35 32.7	36 92	95.3	35 43.4	35 92	94.7	35 53.9	35 92	94.2	36 04.2	34 92	93.6	36 14.4	34 93	93.0	36 24.4	33 93	92.4	36 34.3	33 93	91.8	55
6	34 26.5	36 92	95.5	34 37.3	36 92	94.9	34 47.9	35 92	94.3	34 58.4	35 92	93.8	35 08.7	34 93	93.2	35 18.9	34 93	92.6	35 28.8	33 93	92.0	35 38.7	32 93	91.4	6
7	33 31.1	36 92	95.0	33 41.8	36 92	94.5	33 52.4	35 92	93.9	34 02.9	35 93	93.3	34 13.1	34 93	92.8	34 23.3	33 93	92.2	34 33.2	33 93	91.6	34 43.0	32 93	91.1	7
8	32 35.7	36 92	94.6	32 46.4	35 93	94.0	32 56.9	35 92	93.5	33 07.3	34 93	92.9	33 17.6	34 93	92.4	33 27.7	33 93	91.8	33 37.6	33 93	91.2	33 47.4	32 93	90.7	8
9	31 40.2	36 92	94.2	31 50.8	35 93	93.6	32 01.4	35 93	93.1	32 11.7	34 93	92.5	32 22.0	34 93	92.0	32 32.1	33 93	91.4	32 42.0	33 93	90.9	32 51.8	32 93	90.3	9
60	30 44.7	36 92	93.8	30 55.3	35 93	93.2	31 05.8	35 93	92.7	31 16.2	34 93	92.1	31 26.4	34 93	91.6	31 36.4	33 93	91.0	31 46.4	33 93	90.5	31 56.2	32 93	89.9	60
1	29 49.2	36 93	93.4	29 59.8	35 93	92.8	30 10.2	35 93	92.3	30 20.6	34 93	91.7	30 30.8	34 93	91.2	30 40.8	33 93	90.6	30 50.7	33 93	90.1	31 00.5	32 93	89.5	1
2	28 53.6	35 93	93.0	29 04.2	35 93	92.4	29 14.6	35 93	91.9	29 25.0	34 93	91.3	29 35.1	34 93	90.8	29 45.2	33 93	90.3	29 55.1	33 93	89.7	30 04.9	32 93	89.2	2
3	27 58.1	35 93	92.6	28 08.6	35 93	92.0	28 19.0	35 93	91.5	28 29.3	34 93	91.0	28 39.5	34 93	90.4	28 49.6	33 93	89.9	28 59.5	33 93	89.3	29 09.3	32 93	88.8	3
4	27 02.5	35 93	92.2	27 13.0	35 93	91.6	27 23.4	35 93	91.1	27 33.7	34 93	90.6	27 43.9	34 93	90.0	27 53.9	33 93	89.5	28 03.9	33 93	89.0	28 13.7	32 93	88.4	4
65	26 06.9	35 93	91.8	26 17.4	35 93	91.2	26 27.8	34 93	90.7	26 38.1	34 93	90.2	26 48.2	34 93	89.7	26 58.3	33 93	89.1	27 08.2	33 93	88.6	27 18.1	33 93	88.1	65
6	25 11.3	35 93	91.4	25 21.8	35 93	90.9	25 32.2	34 93	90.3	25 42.4	34 93	89.8	25 52.6	34 93	89.3	26 02.7	33 93	88.8	26 12.6	33 93	88.3	26 22.5	33 93	87.7	6
7	24 15.6	35 93	91.0	24 26.1	35 93	90.5	24 36.5	34 93	90.0	24 46.8	34 93	89.5	24 57.0	34 93	88.9	25 07.1	33 93	88.4	25 17.0	33 93	87.9	25 26.9	33 93	87.4	7
8	23 20.0	35 93	90.6	23 30.5	35 93	90.1	23 40.9	34 93	89.6	23 51.2	34 93	89.1	24 01.4	34 93	88.6	24 11.5	33 93	88.1	24 21.4	33 93	87.5	24 31.3	33 93	87.0	8
9	22 24.4	35 93	90.2	22 34.9	35 93	89.7	22 45.3	34 93	89.2	22 55.6	34 93	88.7	23 05.8	34 93	88.2	23 15.9	33 93	87.7	23 25.9	33 93	87.2	23 35.8	33 93	86.7	9
70	21 28.8	35 93	89.9	21 39.2	35 93	89.4	21 49.6	35 93	88.9	22 00.0	34 93	88.4	22 10.2	34 93	87.8	22 20.3	34 93	87.3	22 30.3	33 92	86.8	22 40.2	33 92	86.3	70
1	20 33.1	35 93	89.5	20 43.6	35 93	89.0	20 54.0	35 93	88.5	21 04.4	34 93	88.0	21 14.6	34 93	87.5	21 24.7	34 92	87.0	21 34.8	33 92	86.5	21 44.7	33 92	86.0	1
2	19 37.5	35 93	89.1	19 48.0	35 93	88.6	19 58.4	35 93	88.1	20 08.8	34 93	87.6	20 19.0	34 93	87.1	20 29.2	34 92	86.6	20 39.3	33 92	86.1	20 49.3	33 92	85.6	2
3	18 41.9	35 93	88.8	18 52.4	35 93	88.3	19 02.8	35 93	87.8	19 13.2	34 93	87.3	19 23.5	34 92	86.8	19 33.7	34 92	86.3	19 43.8	34 92	85.8	19 53.8	33 92	85.3	3
4	17 46.3	35 93	88.4	17 56.8	35 93	87.9	18 07.2	35 93	87.4	18 17.6	34 92	86.9	18 27.9	34 92	86.4	18 38.2	34 92	85.9	18 48.3	34 92	85.4	18 58.4	33 92	84.9	4
75	16 50.7	35 93	88.0	17 01.2	35 93	87.5	17 11.7	35 93	87.0	17 22.1	35 92	86.6	17 32.4	34 92	86.1	17 42.7	34 92	85.6	17 52.9	34 92	85.1	18 03.0	34 92	84.6	75
6	15 55.1	35 93	87.7	16 05.6	35 93	87.2	16 16.1	35 92	86.7	16 26.6	35 92	86.2	16 36.9	34 92	85.7	16 47.2	34 92	85.2	16 57.5	34 92	84.7	17 07.6	34 92	84.2	6
7	14 59.5	35 93	87.3	15 10.1	35 93	86.8	15 20.6	35 92	86.3	15 31.1	35 92	85.8	15 41.5	35 92	85.4	15 51.8	34 92	84.9	16 02.1	34 92	84.4	16 12.3	34 92	83.9	7
8	14 03.9	35 93	86.9	14 14.5	35 92	86.5	14 25.1	35 92	86.0	14 35.6	35 92	85.5	14 46.0	35 92	85.0	14 56.4	34 92	84.5	15 06.7	34 92	84.0	15 17.0	34 92	83.5	8
9	13 08.4	36 92	86.6	13 19.0	35 92	86.1	13 29.6	35 92	85.6	13 40.2	35 92	85.1	13 50.6	35 92	84.6	14 01.1	35 92	84.2	14 11.4	34 92	83.7	14 21.7	34 92	83.2	9
80	12 12.9	36 92	86.2	12 23.5	36 92	85.7	12 34.2	35 92	85.3	12 44.7	35 92	84.8	12 55.3	35 92	84.3	13 05.7	35 92	83.8	13 16.1	35 92	83.3	13 26.5	34 92	82.8	80
1	11 17.4	36 92	85.8	11 28.1	36 92	85.4	11 38.7	35 92	84.9	11 49.4	35 92	84.4	11 59.9	35 92	83.9	12 10.4	35 92	83.5	12 20.9	35 92	83.0	12 31.3	35 92	82.5	1
2	10 21.9	36 92	85.5	10 32.6	36 92	85.0	10 43.3	36 92	84.5	10 54.0	35 92	84.1	11 04.6	35 92	83.6	11 15.2	35 92	83.1	11 25.7	35 92	82.6	11 36.2	35 92	82.2	2
3	9 26.5	36 92	85.1	9 37.2	36 92	84.7	9 48.0	36 92	84.2	9 58.7	36 92	83.7	10 09.4	35 92	83.2	10 20.0	35 92	82.8	10 30.6	35 92	82.3	10 41.1	35 92	81.8	3
4	8 31.0	36 92	84.8	8 41.9	36 92	84.3	8 52.7	36 92	83.8	9 03.4	36 92	83.3	9 14.1	36 92	82.9	9 24.8	36 92	82.4	9 35.5	35 92	81.9	9 46.1	35 92	81.5	4
85	7 35.7	36 92	84.4	7 46.5	36 92	83.9	7 57.4	36 92	83.5	8 08.2	36 92	83.0	8 19.0	36 92	82.5	8 29.7	36 92	82.0	8 40.4	36 92	81.6	8 51.1	36 92	81.1	85
6	6 40.3	36 92	84.0	6 51.2	36 92	83.6	7 02.1	36 92	83.1	7 13.0	36 92	82.6	7 23.8	36 92	82.2	7 34.6	36 92	81.7	7 45.4	36 92	81.2	7 56.1	36 92	80.7	6
7	5 45.0	37 92	83.7	5 56.0	37 92	83.2	6 06.9	36 92	82.7	6 17.8	36 92	82.3	6 28.7	36 92	81.8	6 39.6	36 92	81.3	6 50.5	36 91	80.9	7 01.3	36 92	80.4	7
8				5 00.8	37 92	82.8	5 11.8	37 92	82.4	5 22.7	37 92	81.9	5 33.7	37 92	81.4	5 44.6	36 92	81.0	5 55.6	36 91	80.5	6 06.4	36 91	80.0	8
9																			5 00.7	37 91	80.1	5 11.7	37 91	79.7	9

Lat. 22°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	59 00.0	1.0 02	180.0	58 30.0	1.0 02	180.0	58 00.0	1.0 02	180.0	57 30.0	1.0 02	180.0	57 00.0	1.0 02	180.0	56 30.0	1.0 02	180.0	00
1	59 59.0	1.0 05	178.0	59 29.1	1.0 05	178.1	58 59.1	1.0 05	178.1	58 29.1	1.0 05	178.1	57 59.1	1.0 04	178.1	57 29.1	1.0 04	178.2	56 59.1	1.0 04	178.2	56 29.1	1.0 04	178.2	1
2	59 56.2	1.0 08	176.0	59 26.2	1.0 08	176.1	58 56.3	1.0 08	176.2	58 26.3	1.0 08	176.2	57 56.4	1.0 07	176.3	57 26.4	1.0 07	176.3	56 56.5	1.0 07	176.4	56 26.6	1.0 07	176.5	2
3	59 51.4	1.0 11	174.1	59 21.5	1.0 11	174.2	58 51.6	1.0 11	174.3	58 21.8	1.0 11	174.4	57 51.9	1.0 10	174.4	57 22.0	1.0 10	174.5	56 52.1	1.0 10	174.6	56 22.3	1.0 10	174.7	3
4	59 44.7	99 14	172.1	59 14.9	99 14	172.2	58 45.2	99 14	172.4	58 15.4	99 14	172.5	57 45.6	99 13	172.6	57 15.8	99 13	172.7	56 46.0	99 13	172.8	56 16.3	99 13	172.9	4
05	59 36.1	99 17	170.2	59 06.5	99 17	170.3	58 36.9	99 17	170.5	58 07.2	99 16	170.6	57 37.6	99 16	170.8	57 07.9	99 16	170.9	56 38.2	99 16	171.1	56 08.6	99 16	171.2	05
6	59 25.7	98 20	168.3	58 56.3	98 20	168.4	58 26.8	98 20	168.6	57 57.3	98 20	168.8	57 27.8	98 19	169.0	56 58.3	98 19	169.1	56 28.7	98 19	169.3	55 59.2	98 18	169.4	6
7	59 13.5	98 23	166.4	58 44.2	98 23	166.6	58 14.9	98 23	166.8	57 45.6	98 22	167.0	57 16.3	98 22	167.2	56 46.9	98 22	167.4	56 17.6	98 21	167.6	55 48.2	98 21	167.7	7
8	58 59.5	97 26	164.5	58 30.4	97 26	164.7	58 01.3	97 25	165.0	57 32.2	97 25	165.2	57 03.1	97 25	165.4	56 33.9	97 24	165.6	56 04.8	97 24	165.8	55 35.6	97 24	166.0	8
9	58 43.7	96 29	162.6	58 14.9	96 29	162.9	57 46.1	96 28	163.2	57 17.2	96 28	163.4	56 48.3	96 28	163.7	56 19.3	97 27	163.9	55 50.4	97 27	164.1	55 21.4	97 26	164.4	9
10	58 26.3	95 32	160.8	57 57.7	95 31	161.1	57 29.1	95 31	161.4	57 00.5	96 30	161.7	56 31.8	96 30	161.9	56 03.1	96 30	162.2	55 34.4	96 29	162.5	55 05.6	96 29	162.7	10
1	58 07.2	94 34	159.0	57 38.9	94 34	159.3	57 10.6	95 34	159.7	56 42.2	95 33	160.0	56 13.8	95 33	160.2	55 45.3	95 32	160.5	55 16.8	95 32	160.8	54 48.3	95 31	161.1	1
2	57 46.5	93 37	157.3	57 18.5	93 36	157.6	56 50.5	94 36	157.9	56 22.4	94 36	158.3	55 54.2	94 35	158.6	55 26.0	94 35	158.9	54 57.8	94 34	159.2	54 29.5	94 34	159.5	2
3	57 24.3	92 40	155.6	56 56.6	92 39	155.9	56 28.8	93 38	156.3	56 01.0	93 38	156.6	55 33.2	93 38	156.9	55 05.2	93 37	157.3	54 37.3	93 36	157.6	54 09.3	93 36	157.9	3
4	57 00.5	91 42	153.9	56 33.1	91 41	154.3	56 05.7	92 41	154.6	55 38.2	92 40	155.0	55 10.6	92 40	155.3	54 43.0	92 39	155.7	54 15.4	92 39	156.0	53 47.6	93 38	156.3	4
15	56 35.3	90 44	152.3	56 08.3	90 44	152.7	55 41.2	90 43	153.0	55 14.0	91 43	153.4	54 46.7	91 42	153.8	54 19.4	91 42	154.1	53 52.1	91 41	154.5	53 24.6	92 40	154.8	15
6	56 08.7	89 46	150.7	55 42.0	89 46	151.1	55 15.3	89 45	151.5	54 48.4	90 45	151.9	54 21.5	90 44	152.2	53 54.5	90 44	152.6	53 27.4	90 43	153.0	53 00.3	91 43	153.3	6
7	55 40.8	88 49	149.1	55 14.5	88 48	149.5	54 48.0	88 48	149.9	54 21.5	89 47	150.3	53 54.9	89 46	150.7	53 28.3	89 46	151.1	53 01.5	89 45	151.5	52 34.7	89 45	151.9	7
8	55 11.6	87 51	147.6	54 45.6	87 50	148.0	54 19.5	87 50	148.4	53 53.4	87 49	148.9	53 27.1	88 48	149.3	53 00.8	88 48	149.7	52 34.4	88 47	150.1	52 07.9	88 47	150.4	8
9	54 41.2	85 53	146.1	54 15.6	86 52	146.5	53 49.8	86 52	147.0	53 24.0	86 51	147.4	52 58.1	87 50	147.8	52 32.1	87 50	148.2	52 06.0	87 49	148.7	51 39.8	87 48	149.0	9
20	54 09.6	84 54	144.7	53 44.3	84 54	145.1	53 18.9	85 53	145.6	52 53.5	85 53	146.0	52 27.9	85 52	146.4	52 02.2	86 52	146.9	51 36.5	86 51	147.3	51 10.7	86 50	147.7	20
1	53 36.9	83 56	143.3	53 11.9	83 56	143.7	52 46.9	84 55	144.2	52 21.8	84 54	144.6	51 56.6	84 54	145.1	51 31.3	85 54	145.5	51 05.9	85 53	145.9	50 40.4	85 52	146.3	1
2	53 03.0	82 58	141.9	52 38.5	82 58	142.4	52 13.8	82 57	142.8	51 49.1	83 56	143.3	51 24.2	83 56	143.7	50 59.2	83 55	144.2	50 34.2	84 54	144.6	50 09.0	84 54	145.0	2
3	52 28.2	80 60	140.6	52 04.0	81 59	141.1	51 39.7	81 58	141.5	51 15.3	82 58	142.0	50 50.8	82 57	142.5	50 26.2	82 57	142.9	50 01.5	83 56	143.3	49 36.6	83 56	143.8	3
4	51 52.4	79 61	139.3	51 28.6	80 61	139.8	51 04.6	80 60	140.3	50 40.6	80 60	140.7	50 16.4	81 59	141.2	49 52.2	81 58	141.6	49 27.8	81 58	142.1	49 03.3	82 57	142.5	4
25	51 15.6	78 63	138.0	50 52.2	78 62	138.5	50 28.6	79 62	139.0	50 04.9	79 61	139.5	49 41.1	80 60	140.0	49 17.2	80 60	140.4	48 53.1	80 59	140.9	48 29.0	81 59	141.3	25
6	50 38.0	77 64	136.8	50 14.9	77 64	137.3	49 51.7	78 63	137.8	49 28.3	78 62	138.3	49 04.9	78 62	138.8	48 41.3	79 61	139.2	48 17.6	79 61	139.7	47 53.8	80 60	140.2	6
7	49 59.5	76 66	135.6	49 36.8	76 65	136.1	49 13.9	76 64	136.6	48 50.9	77 64	137.1	48 27.8	77 63	137.6	48 04.5	78 62	138.1	47 41.2	78 62	138.5	47 17.7	78 62	139.0	7
8	49 20.2	74 67	134.5	48 57.8	75 66	135.0	48 35.3	75 66	135.5	48 12.6	76 65	136.0	47 49.9	76 64	136.5	47 27.0	77 64	137.0	47 03.9	77 63	137.4	46 40.8	77 63	137.9	8
9	48 40.1	73 68	133.4	48 18.1	74 68	133.9	47 55.9	74 67	134.4	47 33.6	75 66	134.9	47 11.2	75 66	135.4	46 48.6	75 65	135.9	46 25.9	76 65	136.3	46 03.1	76 64	136.8	9
30	47 59.3	72 69	132.3	47 37.6	73 68	132.8	47 15.8	73 68	133.3	46 53.8	73 68	133.8	46 31.7	74 67	134.3	46 09.5	74 66	134.8	45 47.1	75 66	135.3	45 24.7	75 65	135.7	30
1	47 17.8	71 70	131.2	46 56.5	71 70	131.7	46 35.0	72 69	132.3	46 13.3	72 69	132.8	45 51.5	73 68	133.3	45 29.6	73 68	133.7	45 07.6	74 67	134.2	44 45.5	74 66	134.7	1
2	46 35.7	70 71	130.2	46 14.6	70 71	130.7	45 53.4	71 70	131.2	45 32.1	71 70	131.7	45 10.7	72 69	132.2	44 49.1	72 69	132.7	44 27.4	73 68	133.2	44 05.6	73 68	133.7	2
3	45 52.9	69 72	129.2	45 32.2	69 72	129.7	45 11.3	70 71	130.2	44 50.3	70 71	130.8	44 29.2	71 70	131.3	44 07.9	71 70	131.7	43 46.5	71 69	132.2	43 25.0	72 69	132.7	3
4	45 09.5	68 73	128.3	44 49.1	68 73	128.8	44 28.5	69 72	129.3	44 07.9	69 72	129.8	43 47.0	70 71	130.3	43 26.1	70 71	130.8	43 05.0	70 70	131.3	42 43.8	71 70	131.8	4
35	44 25.5	67 74	127.3	44 05.4	67 74	127.8	43 45.2	68 73	128.3	43 24.8	68 73	128.9	43 04.3	69 72	129.4	42 43.7	69 72	129.8	42 22.9	69 71	130.3	42 02.0	70 70	130.8	35
6	43 41.0	66 75	126.4	43 21.2	66 74	126.9	43 01.3	67 74	127.4	42 41.2	67 74	127.9	42 21.0	68 73	128.4	42 00.7	68 72	128.9	41 40.2	68 72	129.4	41 19.7	69 72	129.9	6
7	42 56.0	65 76	125.5	42 36.5	65 76	126.0	42 16.8	66 75	126.5	41 57.1	66 74	127.1	41 37.2	67 74	127.6	41 17.2	67 74	128.0	40 57.0	67 73	128.5	40 36.7	68 72	129.0	7
8	42 10.4	64 77	124.6	41 51.2	64 76	125.2	41 31.9	65 76	125.7	41 12.4	65 75	126.2	40 52.8	66 75	126.7	40 33.1	66 74	127.2	40 13.2	66 74	127.7	39 53.2	67 73	128.2	8
9	41 24.4	63 77	123.8	41 05.5	63 77	124.3	40 46.5	64 76	124.8	40 27.3	64 76	125.3	40 08.0	65 76	125.8	39 48.5	65 75	126.3	39 28.9	65 75	126.8	39 09.2	66 74	127.3	9
40	40 38.0	62 78	123.0	40 19.4	62 78	123.5	40 00.6	63 77	124.0	39 41.7	63 77	124.5	39 22.6	64 76	125.0	39 03.5	64 76	125.5	38 44.2	65 76	126.0	38 24.8	65 75	126.5	40
1	39 51.1	61 79	122.2	39 32.8	61 78	122.7	39 14.3	62 78	123.2	38 55.6	62 78	123.7	38 36.9	63 77	124.2	38 18.0	63 77	124.7	37 58.9	64 76	125.2	37 39.8	64 76	125.7	1
2	39 03.9	60 80	121.4	38 45.7	61 79	121.9	38 27.5	61 78	122.4	38 09.1	61 78	122.9	37 50.6	62 78	123.4	37 32.0	62 77	123.9	37 13.3	63 77	124.4	36 54.4	63 76	124.9	2
3	38 16.2	59 80	120.7	37 58.3	60 80	121.2	37 40.4	60 79	121.7	37 22.3	61 79	122.2	37 04.0	61 78	122.7	36 45.7	61 78	123.2	36 27.2	62 78	123.7	36 08.6	62 77	124.2	3
4	37 28.1	58 81	119.9	37 10.5	59 80	120.4	36 52.8	59 80	120.9	36 35.0	60 80	121.4	36 17.0	60 79	121.9	35 58.9	61 78	122.4	35 40.7	61 78	122.9	35 22.3	61 78	123.4	4
45	36 39.8	58 81	119.2	36 22.4	58 81	119.7	36 04.9	58 80	120.2	35 47.3	59 80	120.7	35 29.6	59 80	121.2	35 11.8	60 79	121.7	34 53.8	60 79	122.2	34 35.7	60 78	122.7	45
6	35 51.0	57 82	118.5	35 33.9	57 81	119.0	35 16.7	58 81	119.5	34 59.3	58 80	120.0	34 41.8	58 80	120.5	34 24.2	59 80	121.0	34 06.5	59 79	121.5	33 48.7	60 79	122.0	6
7	35 02.0	56 82	117.8	34 45.1	56 82	118.3	34 28.1	57 81	118.8	34 11.0	57 81	119.3	33 53.7	58 81	119.8	33 36.4	58 80	120.3	33 18.9	58 80	120.8	33 01.3	59 80	121.3	7
8	34 12.6	55 83	117.1	33 56.0	56 82	117.6	33 39.2	56 82	118.1	33 22.3	56 82	118.6	33 05.3	57 81	119.1	32 48.2	57 81	119.6	32 30.9	58 80	120.1	32 13.6	58 80	120.6	8
9	33 23.0	55 83	116.5	33 06.5	55 83	117.0	32 50.0	55 82	117.5	32 33.3	56 82	118.0	32 16.6	56 82	118.5	31 59.7	56 82	119.0	31 42.7	57 81	119.4	31 25.5	57 80	119.9	9
50	32 33.0	54 84	115.8	32 16.8	54 83	116.3	32 00.5	55 83	116.8	31 44.1	55 83	117.3	31 27.5	55 82	117.8	31 10.8	56 82	118.3	30 54.1	56 82	118.8	30 37.2	56 81	119.3	50
1	31 42.8	53 84	115.2	31 26.8	54 84	115.7	31 10.7	54 83	116.2	30 54.5	54 83	116.7	30 38.2	55 83	117.2	30 21.7	55 82	117.7	30 05.1	55 82	118.2	29 48.5	56 82	118.6	1
2	30 52.4	52 84	114.6	30 36.6	53 84	115.1	30 20.7	53 84	115.6	30 04.7	54 84	116.1	29 48.5	54 83	116.6	29 32.3	54 82	117.1	29 16.0	55 82	117.5	28 59.5	55 82	118.0	2
3	30 01.7	52 85	114.0	29 46.1	52 84	114.5	29 30.4	53 84	115.0	29 14.6	53 84	115.5	28 58.7	53 84	116.0	28 42.6	54 83	116.4	28 26.5	54 83	116.9	28 10.3	54 83	117.4	3
4	29 10.8	51 85	113.4	28 55.4	52 85	113.9	28 39.8	52 85	114.4	28 24.2	52 84	114.9	28 08.5	53 84	115.4	27 52.7	53 84	115.9	27 36.8	53 83	116.3	27 20.7	54 83	116.8	4
55	28 19.6	51 86	112.8	28 04.4	51 85	113.3	27 49.1	51 85	113.8	27 33.6	52 85	114.3	27 18.1	52 84	114.8	27 02.5	52 84	115.3	26 46.8	53 84	115.7	26 31.0	53 84	116.2	55
6	27 28.2	50 86	112.3	27 13.2	50 86	112.8	26 58.1	51 85	113.3	26 42.8	51 85	113.7	26 27.5	51 85	114.2	26 12.1	52 84	114.7	25 56.6	52 84	115.2	25 40.9	52 84	115.7	6
7	26 36.7	49 86	111.7	26 21.8	50 86	112.2	26 06.9	50 86	112.7	25 51.8	50 85	113.2	25 36.7	51 85	113.7	25 21.4	51 85	114.1	25 06.1	51 85	114.6	24 50.7	52 84	115.1	7
8	25 44.9	49 87	111.2	25 30.2	49 86	111.7	25 15.4	49 86	112.2	25 00.6	50 86	112.6	24 45.6	50 85	113.1	24 30.5	50 85	113.6	24 15.4	51 85	114.1	24 00.2	51 84	114.5	8
9	24 52.9	48 87	110.7	24 38.4	49 87	111.1	24 23.8	49 86	111.6	24 09.1	49 86	112.1	23 54.3	49 86	112.6	23 39.5	50 86	113.1	23 24.5	50 85	113.5	23 09.5	50 85	114.0	9
60	24 00.8	48 87	110.1	23 46.4	48 87	110.6	23 32.0	48 87	111.1	23 17.5	49 86	111.6	23 02.9	49 86	112.1	22 48.2	49 86	112.5	22 33.4	49 86	113.0	22 18.5	50 85	113.5	60
1	23 08.5	47 88	109.6	22 54.3	47 87	110.1	22 40.0	48 87	110.6	22 25.7	48 87	111.1	22 11.2	48 86	111.5	21 56.7	49 86	112.0	21 42.1	49 86	112.5	21 27.4	49 86	112.9	1
2	22 16.0	47 88	109.1	22 02.0	47 88	109.6	21 47.8	47 87	110.1	21 33.7	47 87	110.6	21 19.4	48 87	111.0	21 05.0	48 86	111.5	20 50.6	48 86	112.0	20 36.1	48 86	112.4	2
3	21 23.4	46 88	108.6	21 09.5	46 88	109.1	20 55.5	47 88	109.6	20 41.5	47 87	110.1	20 27.4	47 87	110.5	20 13.2	47 87	111.0	19 58.9	48 86	111.5	19 44.6	48 86	111.9	3
4	20 30.6	46 88	108.1	20 16.8	46 88	108.6	20 03.0	46 88	109.1	19 49.1	46 88	109.6	19 35.2	47 87	110.0	19 21.1	47 87	110.5	19 07.0	47 87	111.0	18 52.9	47 86	111.4	4
65	19 37.6	45 88	107.7	19 24.0	45 88	108.1	19 10.4	46 88	108.6	18 56.6	46 88	109.1	18 42.8	46 87	109.5	18 29.0	46 87	110.0	18 15.0	47 87	110.5	18 01.0	47 87	110.9	65
6	18 44.5	45 89	107.2	18 31.1	45 88	107.7	18 17.6	45 88	108.1	18 04.0	45 88	108.6	17 50.3	46 88	109.1	17 36.6	46 88	109.5	17 22.8	46 87	110.0	17 09.0	46 87	110.5	6
7	17 51.3	44 89	106.7	17 38.0	45 89	107.2	17 24.6	45 88	107.7	17 11.2	45 88	108.1	16 57.7	45 88	108.6	16 44.1	45 88	109.1	16 30.5	46 87	109.5	16 16.8	46 87	110.0	7
8	16 58.0	44 89	106.3	16 44.8	44 89	106.7	16 31.6	44 89	107.2	16 18.3	44 88	107.7	16 04.9	45 88	108.1	15 51.5	45 88	108.6	15 38.0	45 88	109.1	15 24.4	45 88	109.5	8
9	16 04.5	43 89	105.8	15 51.5	44 89	106.3	15 38.4	44 89	106.8	15 25.2	44 89	107.2	15 12.0	44 88	107.7	14 58.7	44 88	108.2	14 45.3	45 88	108.6	14 31.9	45 88	109.1	9
70	15 10.9	43 89	105.4	14 58.0	43 89	105.8	14 45.0	43 89	106.3	14 32.0	44 89	106.8	14 18.9	44 89	107.2	14 05.7	44 88	107.7	13 52.5	44 88	108.2	13 39.3	44 88	108.6	70
1	14 17.3	43 90	104.9	14 04.4	43 89	105.4	13 51.6	43 89	105.9	13 38.7	43 89	106.3	13 25.7	43 89	106.8	13 12.7	43 89	107.3	12 59.6	44 88	107.7	12 46.5	44 88	108.2	1
2	13 23.4	42 90	104.5	13 10.8	42 90	105.0	12 58.0	43 90	105.4	12 45.2	43 89	105.9	12 32.4	43 89	106.4	12 19.5	43 89	106.8	12 06.5	43 88	107.3	11 53.6	43 88	107.7	2
3	12 29.5	42 90	104.1	12 17.0	42 90	104.5	12 04.3	42 90	105.0	11 51.7	42 90	105.5	11 38.9	42 89	105.9	11 26.2	43 89	106.4	11 13.4	43 89	106.9	11 00.5	43 89	107.3	3
4	11 35.5	41 90	103.7	11 23.1	42 90	104.1	11 10.5	42 90	104.6	10 58.0	42 90	105.0	10 45.4	42 89	105.5	10 32.7	42 89	106.0	10 20.1	42 89	106.4	10 07.3	42 89	106.9	4
75	10 41.4	41 90	103.2	10 29.1	41 90	103.7	10 16.7	41 90	104.2	10 04.2	42 90	104.6	9 51.7	42 90	105.1	9 39.2	42 89	105.6	9 26.6	42 89	106.0	9 14.1	42 89	106.5	75
6	9 47.2	41 90	102.8	9 35.0	41 90	103.3	9 22.7	41 90	103.8	9 10.3	41 90	104.2	8 58.0	41 90	104.7	8 45.6	41 90	105.1	8 33.1	42 89	105.6	8 20.6	42 89	106.1	6
7	8 52.9	40 91	102.4	8 40.8	41 90	102.9	8 28.6	41 90	103.3	8 16.4	41 90	103.8	8 04.1	41 90	104.3	7 51.8	41 90	104.7	7 39.5	41 90	105.2	7 27.1	41 89	105.6	7
8	7 58.6	40 91	102.0	7 46.5	40 91	102.5	7 34.4	40 90	102.9	7 22.3	40 90	103.4	7 10.1	41 90	103.9	6 58.0	41 90	104.3	6 45.7	41 90	104.8	6 33.5	41 90	105.2	8
9	7 04.1	40 91	101.6	6 52.1	40 91	102.1	6 40.1	40 91	102.5	6 28.1	40 90	103.0	6 16.1	40 90	103.5	6 04.0	40 90	103.9	5 51.9	40 90	104.4	5 39.8	40 90	104.8	9
80	6 09.6	40 91	101.2	5 57.7	40 91	101.7	5 45.8	40 91	102.1	5 33.9	40 90	102.6	5 21.9	40 90	103.1	5 10.0	40 90	103.5							80
1	5 15.0	39 91	100.8	5 03.2	39 91	101.3																			1

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	80 00.0	1.0	04	180.0	80 30.0	1.0	05	180.0	81 00.0	1.0	05	180.0	81 30.0	1.0	05	180.0
1	79 57.3	1.0	14	174.4	80 27.1	1.0	14	174.1	80 57.0	99	15	173.8	81 26.8	99	16	173.4
2	79 49.2	98	22	168.9	80 18.6	98	23	168.3	80 48.0	98	24	167.7	81 17.4	98	26	167.0
3	79 35.9	96	30	163.5	80 04.7	96	32	162.7	80 33.4	96	33	161.9	81 02.0	95	35	160.9
4	79 17.7	94	38	158.4	79 45.8	93	39	157.5	80 13.6	92	41	156.4	80 41.2	92	43	155.2
05	78 55.1	91	44	153.7	79 22.2	90	46	152.5	79 49.1	89	48	151.3	80 15.6	88	50	149.9
6	78 28.5	87	50	149.2	78 54.6	86	52	148.0	79 20.3	85	54	146.6	79 45.7	84	56	145.1
7	77 58.4	84	56	145.1	78 23.4	83	57	143.8	78 48.0	81	59	142.3	79 12.2	80	61	140.8
8	77 25.0	81	60	141.3	77 49.0	79	62	139.9	78 12.5	78	64	138.4	78 35.5	76	66	136.8
9	76 49.0	77	64	137.9	77 11.9	76	66	136.4	77 34.3	74	68	134.9	77 56.2	72	69	133.3
10	76 10.5	74	68	134.7	76 32.4	73	69	133.3	76 53.8	70	71	131.7	77 14.6	68	72	130.1
1	75 30.0	71	71	131.8	75 50.9	69	72	130.4	76 11.4	67	74	128.8	76 31.2	65	75	127.3
2	74 47.6	68	73	129.2	75 07.7	66	74	127.7	75 27.2	64	76	126.2	75 46.2	62	77	124.7
3	74 03.8	65	75	126.7	74 23.0	63	77	125.3	74 41.7	61	78	123.9	74 59.8	59	79	122.3
4	73 18.5	62	77	124.5	73 37.0	61	78	123.1	73 54.9	59	80	121.7	74 12.2	57	81	120.2
15	72 32.2	60	79	122.5	72 49.9	57	80	121.1	73 07.1	56	81	119.7	73 23.7	54	82	118.3
6	71 44.7	58	80	120.6	72 01.8	56	82	119.3	72 18.3	54	82	117.9	72 34.3	52	84	116.5
7	70 56.4	56	82	118.9	71 12.9	54	83	117.6	71 28.8	52	84	116.2	71 44.2	50	85	114.9
8	70 07.3	54	83	117.3	70 23.2	52	84	116.0	70 38.6	50	85	114.7	70 53.4	48	86	113.4
9	69 17.5	52	84	115.8	69 32.9	50	85	114.5	69 47.8	49	86	113.3	70 02.1	47	86	112.0
20	68 27.2	50	85	114.4	68 42.0	49	86	113.2	68 56.4	47	86	112.0	69 10.3	45	87	110.7
1	67 36.2	49	86	113.1	67 50.7	47	86	111.9	68 04.6	46	87	110.7	68 18.0	44	88	109.5
2	66 44.8	48	86	111.9	66 58.8	46	87	110.7	67 12.4	44	88	109.6	67 25.4	43	88	108.4
3	65 53.0	46	87	110.7	66 06.6	45	88	109.6	66 19.8	43	88	108.5	66 32.5	41	89	107.4
4	65 00.8	45	88	109.6	65 14.0	44	88	108.6	65 26.9	42	89	107.5	65 39.2	40	89	106.4
25	64 08.2	44	88	108.6	64 21.2	42	89	107.6	64 33.7	41	89	106.5	64 45.7	39	90	105.5
6	63 15.3	43	89	107.7	63 28.0	41	89	106.7	63 40.2	40	90	105.6	63 52.0	39	90	104.6
7	62 22.2	42	89	106.8	62 34.6	41	90	105.8	62 46.5	39	90	104.8	62 58.1	38	90	103.8
8	61 28.8	41	89	105.9	61 40.9	40	90	104.9	61 52.6	38	90	104.0	62 03.9	37	90	103.0
9	60 35.2	40	90	105.1	60 47.1	39	90	104.1	60 58.6	38	90	103.2	61 09.7	36	91	102.2
30	59 41.4	40	90	104.3	59 53.0	38	90	103.4	60 04.3	37	91	102.4	60 15.2	36	91	101.5
1	58 47.4	39	90	103.5	58 58.8	38	90	102.6	59 09.9	36	91	101.7	59 20.6	35	91	100.8
2	57 53.2	38	90	102.8	58 04.5	37	91	101.9	58 15.4	36	91	101.1	58 25.9	35	91	100.2
3	56 58.9	38	91	102.1	57 10.0	36	91	101.3	57 20.7	35	91	100.4	57 31.1	34	92	99.5
4	56 04.4	37	91	101.5	56 15.4	36	91	100.6	56 26.0	35	92	99.8	56 36.2	34	92	98.9
35	55 09.9	37	91	100.8	55 20.6	35	91	100.0	55 31.1	34	92	99.2	55 41.2	33	92	98.4
6	54 15.2	36	91	100.2	54 25.8	35	92	99.4	54 36.1	34	92	98.6	54 46.1	33	92	97.8
7	53 20.4	36	92	99.6	53 30.9	35	92	98.8	53 41.1	34	92	98.0	53 51.0	32	92	97.3
8	52 25.5	35	92	99.1	52 35.9	34	92	98.3	52 46.0	33	92	97.5	52 55.8	32	92	96.7
9	51 30.5	35	92	98.5	51 40.8	34	92	97.7	51 50.8	33	92	97.0	52 00.5	32	92	96.2
40	50 35.4	34	92	98.0	50 45.6	34	92	97.2	50 55.5	33	92	96.5	51 05.2	32	92	95.7
1	49 40.3	34	92	97.4	49 50.4	33	92	96.7	50 00.2	32	92	96.0	50 09.8	31	92	95.2
2	48 45.1	34	92	96.9	48 55.1	33	92	96.2	49 04.9	32	92	95.5	49 14.4	31	92	94.8
3	47 49.9	34	92	96.4	47 59.8	33	92	95.7	48 09.5	32	92	95.0	48 18.9	31	92	94.3
4	46 54.5	33	92	95.9	47 04.4	33	92	95.3	47 14.0	32	92	94.6	47 23.4	31	92	93.9
45	45 59.2	33	92	95.5	46 09.0	32	92	94.8	46 18.6	31	92	94.1	46 27.9	31	92	93.4
6	45 03.8	33	92	95.0	45 13.6	32	92	94.3	45 23.1	31	92	93.7	45 32.4	31	93	93.0
7	44 08.4	33	92	94.6	44 18.1	32	93	93.9	44 27.5	31	93	93.2	44 36.8	30	93	92.6
8	43 12.9	33	92	94.1	43 22.5	32	93	93.5	43 32.0	31	93	92.8	43 41.2	30	93	92.2
9	42 17.4	32	93	93.7	42 27.0	32	93	93.0	42 36.4	31	93	92.4	42 45.6	30	93	91.8
50	41 21.9	32	93	93.3	41 31.4	32	93	92.6	41 40.8	31	93	92.0	41 50.0	30	93	91.4
1	40 26.3	32	93	92.8	40 35.9	32	93	92.2	40 45.2	31	93	91.6	40 54.4	30	93	91.0
2	39 30.7	32	93	92.4	39 40.3	31	93	91.8	39 49.6	31	93	91.2	39 58.8	30	93	90.6
3	38 35.1	32	93	92.0	38 44.7	31	93	91.4	38 54.0	31	93	90.8	39 03.1	30	93	90.2
4	37 39.5	32	93	91.6	37 49.0	31	93	91.0	37 58.4	31	93	90.4	38 07.5	30	93	89.8
55	36 43.9	32	93	91.2	36 53.4	31	93	90.7	37 02.7	31	93	90.1	37 11.9	30	93	89.5
6	35 48.3	32	93	90.9	35 57.8	31	93	90.3	36 07.1	31	93	89.7	36 16.2	30	93	89.1
7	34 52.7	32	93	90.5	35 02.2	31	93	89.9	35 11.5	31	93	89.3	35 20.6	30	93	88.7
8	33 57.0	32	93	90.1	34 06.5	31	93	89.5	34 15.8	31	93	88.9	34 25.0	30	93	88.4
9	33 01.4	32	93	89.7	33 10.9	31	93	89.2	33 20.2	31	93	88.6	33 29.4	30	93	88.0
60	32 05.8	32	93	89.4	32 15.3	31	93	88.8	32 24.6	31	93	88.2	32 33.8	30	93	87.7
1	31 10.2	32	93	89.0	31 19.7	31	93	88.4	31 29.0	31	93	87.9	31 38.2	30	92	87.3
2	30 14.5	32	93	88.6	30 24.1	31	93	88.1	30 33.4	31	93	87.5	30 42.7	31	92	87.0
3	29 18.9	32	93	88.3	29 28.5	32	93	87.7	29 37.9	31	93	87.2	29 47.1	31	92	86.6
4	28 23.3	32	93	87.9	28 32.9	32	93	87.4	28 42.3	31	93	86.8	28 51.6	31	92	86.3
65	27 27.7	32	93	87.6	27 37.3	32	92	87.0	27 46.8	31	92	86.5	27 56.1	31	92	85.9
6	26 32.2	32	93	87.2	26 41.8	32	92	86.7	26 51.3	31	92	86.1	27 00.6	31	92	85.6
7	25 36.6	32	93	86.8	25 46.2	32	92	86.3	25 55.8	32	92	85.8	26 05.2	31	92	85.3
8	24 41.1	32	92	86.5	24 50.7	32	92	86.0	25 00.3	32	92	85.5	25 09.7	31	92	84.9
9	23 45.6	32	92	86.1	23 55.3	32	92	85.6	24 04.8	32	92	85.1	24 14.3	31	92	84.6
70	22 50.1	33	92	85.8	22 59.8	32	92	85.3	23 09.4	32	92	84.8	23 19.0	32	92	84.3
1	21 54.6	33	92	85.5	22 04.4	32	92	84.9	22 14.1	32	92	84.4	22 23.6	32	92	83.9
2	20 59.2	33	92	85.1	21 09.0	33	92	84.6	21 18.7	32	92	84.1	21 28.3	32	92	83.6
3	20 03.7	33	92	84.8	20 13.6	33	92	84.3	20 23.4	32	92	83.8	20 33.1	32	92	83.3
4	19 08.4	33	92	84.4	19 18.3	33	92	83.9	19 28.1	33	92	83.4	19 37.8	32	92	82.9
75	18 13.0	33	92	84.1	18 23.0	33	92	83.6	18 32.8	33	92	83.1	18 42.7	33	92	82.6
6	17 17.7	33	92	83.7	17 27.7	33	92	83.2	17 37.6	33	92	82.8	17 47.5	33	92	82.3
7	16 22.4	34	92	83.4	16 32.5	33	92	82.9	16 42.5	33	92	82.4	16 52.4	33	92	81.9
8	15 27.2	34	92	83.1	15 37.3	34	92	82.6	15 47.4	33	92	82.1	15 57.3	33	92	81.6
9	14 32.0	34	92	82.7	14 42.2	34	92	82.2	14 52.3	34	92	81.7	15 02.3	33	92	81.2
80	13 36.8	34	92	82.4	13 47.1	34	92	81.9	13 57.2	34	92	81.4	14 07.4	34	92	80.9
1	12 41.7	34	92	82.0	12 52.0	34	92	81.5	13 02.3	34	92	81.1	13 12.5	34	92	80.6
2	11 46.6	35	92	81.7	11 57.0	35	92	81.2	12 07.3	34	92	80.7	12 17.6	34	91	80.2
3	10 51.6	35	92	81.3	11 02.1	35	92	80.8	11 12.5	35	91	80.4	11 22.8	34	91	79.9
4	9 56.6	35	91	81.0	10 07.2	35	92	80.5	10 17.6	35	91	80.0	10 28.1	35	91	79.5
85	9 01.7	35	91	80.6	9 12.3	35	91	80.2	9 22.9	35	91	79.7	9 33.4	35	91	79.2
6	8 06.9	36	91	80.3	8 17.5	36	91	79.8	8 28.2	35	91	79.3	8 38.8	35	91	78.9
7	7 12.1	36	91	79.9	7 22.8	36	91	79.5	7 33.5	36	91	79.0	7 44.2	36	91	78.5
8	6 17.3	36	91	79.6	6 28.2	36	91	79.1	6 39.0	36	91	78.6	6 49.8	36	91	78.2
9	5 22.6	36	91	79.2	5 33.6	36	91	78.7	5 44.5	36	91	78.3	5 55.4	36	91	77.8
90													5 01.0	37	91	77.4

14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
° ′			°	° ′			°	° ′			°	° ′			°	°
82 00.0	1.0	06	180.0	82 30.0	1.0	06	180.0	83 00.0	1.0	06	180.0	83 30.0	1.0	07	180.0	00
81 56.6	99	17	173.1	82 26.4	99	18	172.6	82 56.2	99	19	172.1	83 25.9	99	20	171.5	1
81 46.6	97	27	166.3	82 15.8	97	28	165.5	82 44.9	97	30	164.5	83 13.8	96	32	163.4	2
81 30.4	94	36	159.9	81 58.7	94	38	158.7	82 26.7	93	40	157.4	82 54.4	92	43	155.9	3
81 08.6	91	45	153.9	81 35.7	90	47	152.5	82 02.4	88	49	150.9	82 28.7	87	52	149.1	4
80 41.8	87	52	148.4	81 07.5	85	54	146.8	81 32.8	84	56	145.1	81 57.6	82	59	143.1	05
80 10.6	82	58	143.5	80 35.1	81	60	141.8	80 58.9	79	62	139.9	81 22.2	76	65	137.8	6
79 35.8	78	63	139.1	79 58.9	76	65	137.3	80 21.4	74	67	135.4	80 43.2	71	70	133.3	7
78 57.9	74	68	135.1	79 19.8	72	70	133.3	79 41.0	69	72	131.4	80 01.4	67	74	129.3	8
78 17.5	70	71	131.6	78 38.1	68	73	129.8	78 58.1	65	75	127.8	79 17.2	63	76	125.8	9
77 34.8	66	74	128.4	77 54.4	64	76	126.6	78 13.2	61	77	124.8	78 31.3	59	79	122.8	10
76 50.4	63	76	125.6	77 09.0	61	78	123.8	77 26.8	58	80	122.0	77 43.8	55	81	120.1	1
76 04.5	60	79	123.0	76 22.1	58	80	121.3	76 39.0	55	82	119.6	76 55.1	52	83	117.7	2
75 17.2	57	80	120.7	75 34.0	55	82	119.1	75 50.1	52	83	117.4	76 05.4	50	84	115.6	3
74 28.9	55	82	118.7	74 44.9	52	83	117.1	75 00.2	50	84	115.4	75 14.8	47	85	113.7	4
73 39.7	52	83	116.8	73 55.0	50	84	115.2	74 09.6	48	85	113.7	74 23.6	45	86	112.0	15
72 49.6	50	84	115.1	73 04.3	48	86	113.6	73 18.4	46	86	112.1	73 31.7	43	87	110.5	6
71 58.9	48	86	113.5	72 13.0	46	86	112.1	72 26.5	44	87	110.6	72 39.4	42	88	109.1	7
71 07.6	46	86	112.0	71 21.2	44	87	110.7	71 34.2	42	88	109.2	71 46.6	40	89	107.8	8
70 15.8	45	87	110.7	70 29.0	43	88	109.4	70 41.5	41	88	108.0	70 53.4	39	89	106.6	9
69 23.5	43	88	109.5	69 36.3	41	88	108.2	69 48.4	40	89	106.8	70 00.0	37	90	105.5	20
68 30.9	42	88	108.3	68 43.3	40	89	107.1	68 55.0	38	89	105.8	69 06.2	36	90	104.5	1
67 37.9	41	89	107.2	67 49.9	39	89	106.0	68 01.4	37	90	104.8	68 12.3	35	90	103.5	2
66 44.6	40	89	106.2	66 56.3	38	90	105.0	67 07.5	36	90	103.9	67 18.1	34	91	102.6	3
65 51.1	39	90	105.3	66 02.5	37	90	104.1	66 13.4	35	90	103.0	66 23.7	34	91	101.8	4
64 57.3	38	90	104.4	65 08.4	36	90	103.3	65 19.1	35	91	102.2	65 29.2	33	91	101.0	25
64 03.3	37	90	103.5	64 14.2	35	91	102.5	64 24.6	34	91	101.4	64 34.5	32	91	100.3	6
63 09.2	36	91	102.7	63 19.8	35	91	101.7	63 30.0	33	91	100.6	63 39.7	32	92	99.6	7
62 14.8	36	91	102.0	62 25.3	34	91	101.0	62 35.3	33	91	99.9	62 44.8	31	92	98.9	8
61 20.3	35	91	101.3	61 30.6	33	91	100.3	61 40.4	32	92	99.3	61 49.8	31	92	98.3	9
60 25.7	34	91	100.6	60 35.8	33	92	99.6	60 45.4	32	92	98.6	60 54.7	30	92	97.7	30
59 31.0	34	91	99.9	59 40.9	32	92	99.0	59 50.4	31	92	98.0	59 59.5	30	92	97.1	1
58 36.1	33	92	99.3	58 45.9	32	92	98.4	58 55.3	31	92	97.4	59 04.3	29	92	96.5	2
57 41.1	33	92	98.7	57 50.8	32	92	97.8	58 00.1	30	92	96.9	58 09.0	29	92	96.0	3
56 46.1	32	92	98.1	56 55.6	31	92	97.2	57 04.8	30	92	96.3	57 13.6	29	92	95.5	4
55 51.0	32	92	97.5	56 00.4	31	92	96.7	56 09.5	30	92	95.8	56 18.2	28	92	95.0	35
54 55.8	32	92	97.0	55 05.1	31	92	96.1	55 14.1	29	92	95.3	55 22.8	28	92	94.5	6
54 00.6	31	92	96.4	54 09.8	30	92	95.6	54 18.7	29	92	94.8	54 27.3	28	92	94.0	7
53 05.2	31	92	95.9	53 14.4	30	92	95.1	53 23.3	29	92	94.3	53 31.8	28	92	93.5	8
52 09.9	31	92	95.4	52 19.0	30	92	94.7	52 27.8	29	92	93.9	52 36.3	28	93	93.1	9
51 14.5	31	92	95.0	51 23.5	30	92	94.2	51 32.3	29	93	93.4	51 40.7	28	93	92.7	40
50 19.0	30	92	94.5	50 28.0	29	92	93.7	50 36.7	28	93	93.0	50 45.1	28	93	92.2	1
49 23.6	30	92	94.0	49 32.5	29	92	93.3	49 41.2	28	93	92.6	49 49.5	27	93	91.8	2
48 28.1	30	92	93.6	48 37.0	29	93	92.9	48 45.6	28	93	92.1	48 53.9	27	93	91.4	3
47 32.5	30	93	93.2	47 41.4	29	93	92.4	47 50.0	28	93	91.7	47 58.3	27	93	91.0	4
46 37.0	30	93	92.7	46 45.8	29	93	92.0	46 54.4	28	93	91.3	47 02.7	27	93	90.6	45
45 41.4	30	93	92.3	45 50.2	29	93	91.6	45 58.7	28	93	90.9	46 07.0	27	93	90.2	6
44 45.8	30	93	91.9	44 54.6	29	93	91.2	45 03.1	28	93	90.6	45 11.4	27	93	89.9	7
43 50.2	30	93	91.5	43 59.0	29	93	90.8	44 07.5	28	93	90.2	44 15.8	27	93	89.5	8
42 54.6	30	93	91.1	43 03.3	29	93	90.5	43 11.9	28	93	89.8	43 20.1	27	93	89.1	9
41 59.0	29	93	90.7	42 07.7	29	93	90.1	42 16.2	28	93	89.4	42 24.5	27	93	88.8	50
41 03.3	29	93	90.3	41 12.1	29	93	89.7	41 20.6	28	93	89.1	41 28.9	27	93	88.4	1
40 07.7	29	93	90.0	40 16.4	29	93	89.3	40 25.0	28	93	88.7	40 33.3	27	93	88.1	2
39 12.1	29	93	89.6	39 20.8	29	93	89.0	39 29.4	28	93	88.4	39 37.7	28	93	87.7	3
38 16.4	30	93	89.2	38 25.2	29	93	88.6	38 33.8	28	93	88.0	38 42.1	28	92	87.4	4
37 20.8	30	93	88.9	37 29.6	29	93	88.3	37 38.2	28	93	87.7	37 46.6	28	92	87.0	55
36 25.2	30	93	88.5	36 34.0	29	93	87.9	36 42.6	28	93	87.3	36 51.0	28	92	86.7	6
35 29.6	30	93	88.1	35 38.4	29	93	87.6	35 47.0	29	92	87.0	35 55.5	28	92	86.4	7
34 34.0	30	93	87.8	34 42.8	29	92	87.2	34 51.5	29	92	86.6	35 00.0	28	92	86.0	8
33 38.4	30	93	87.4	33 47.3	29	92	86.9	33 56.0	29	92	86.3	34 04.5	28	92	85.7	9
32 42.8	30	93	87.1	32 51.7	29	92	86.5	33 00.5	29	92	86.0	33 09.0	28	92	85.4	60
31 47.3	30	93	86.8	31 56.2	29	92	86.2	32 05.0	29	92	85.6	32 13.6	28	92	85.1	1
30 51.8	30	93	86.4	31 00.7	30	92	85.9	31 09.5	29	92	85.3	31 18.2	29	92	84.7	2
29 56.2	30	92	86.1	30 05.2	30	92	85.5	30 14.1	29	92	85.0	30 22.8	29	92	84.4	3
29 00.8	30	92	85.7	29 09.8	30	92	85.2	29 18.7	29	92	84.6	29 27.4	29	92	84.1	4
28 05.3	30	92	85.4	28 14.4	30	92	84.9	28 23.3	30	92	84.3	28 32.1	29	92	83.8	65
27 09.9	31	92	85.1	27 19.0	30	92	84.5	27 28.0	30	92	84.0	27 36.8	29	92	83.5	6
26 14.4	31	92	84.7	26 23.6	30	92	84.2	26 32.7	30	92	83.7	26 41.6	30	92	83.1	7
25 19.1	31	92	84.4	25 28.3	31	92	83.9	25 37.4	30	92	83.3	25 46.4	30	92	82.8	8
24 23.7	31	92	84.1	24 33.0	31	92	83.6	24 42.1	30	92	83.0	24 51.2	30	92	82.5	9
23 28.4	31	92	83.7	23 37.7	31	92	83.2	23 46.9	31	92	82.7	23 56.1	30	92	82.2	70
22 33.1	31	92	83.4	22 42.5	31	92	82.9	22 51.8	31	92	82.4	23 01.0	30	92	81.9	1
21 37.9	32	92	83.1	21 47.3	31	92	82.6	21 56.7	31	92	82.1	22 05.9	31	92	81.5	2
20 42.7	32	92	82.7	20 52.2	32	92	82.2	21 01.6	31	92	81.7	21 10.9	31	92	81.2	3
19 47.5	32	92	82.4	19 57.1	32	92	81.9	20 06.6	31	92	81.4	20 16.0	31	92	80.9	4
18 52.4	32	92	82.1	19 02.0	32	92	81.6	19 11.6	32	92	81.1	19 21.1	31	92	80.6	75
17 57.3	33	92	81.8	18 07.0	32	92	81.3	18 16.6	32	92	80.8	18 26.2	32	91	80.3	6
17 02.3	33	92	81.4	17 12.0	33	92	80.9	17 21.8	32	91	80.4	17 31.4	32	91	79.9	7
16 07.3	33	92	81.1	16 17.1	33	91	80.6	16 26.9	33	91	80.1	16 36.7	32	91	79.6	8
15 12.3	33	91	80.8	15 22.3	33	91	80.3	15 32.2	33	91	79.8	15 42.0	33	91	79.3	9
14 17.5	33	91	80.4	14 27.5	33	91	79.9	14 37.4	33	91	79.5	14 47.3	33	91	79.0	80
13 22.6	34	91	80.1	13 32.7	34	91	79.6	13 42.8	33	91	79.1	13 52.8	33	91	78.6	1
12 27.9	34	91	79.8	12 38.0	34	91	79.3	12 48.2	34	91	78.8	12 58.3	34	91	78.3	2
11 33.1	34	91	79.4	11 43.4	34	91	78.9	11 53.6	34	91	78.5	12 03.8	34	91	78.0	3
10 38.5	35	91	79.1	10 48.8	34	91	78.6	10 59.2	34	91	78.1	11 09.4	34	90	77.6	4
9 43.9	35	91	78.7	9 54.4	35	91	78.3	10 04.8	35	91	77.8	10 15.1	34	90	77.3	85
8 49.4	35	91	78.4	8 59.9	35	90	77.9	9 10.4	35	90	77.4	9 20.9	35	90	77.0	6
7 54.9	36	91	78.0	8 05.6	35	90	77.6	8 16.2	35	90	77.1	8 26.7	35	90	76.6	7
7 00.5	36	90	77.7	7 11.3	36	90	77.2	7 22.0	36	90	76.7	7 32.7	36	90	76.3	8
6 06.2	36	90	77.3	6 17.1	36	90	76.9	6 27.9	36	90	76.4	6 38.6	36	90	75.9	9
5 12.0	36	90	77.0	5 22.9	36	90	76.5	5 33.8	36	90	76.0	5 44.7	36	90	75.6	90

H.A.	12° 00′		12° 30′		13° 00′		13° 30′		14° 00′		14° 30′		15° 00′		15° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	56 00.0 1.0 01	180.0	55 30.0 1.0 01	180.0	55 00.0 1.0 01	180.0	54 30.0 1.0 01	180.0	54 00.0 1.0 01	180.0	53 30.0 1.0 01	180.0	53 00.0 1.0 01	180.0	52 30.0 1.0 01	180.0	00
1	55 59.2 1.0 04	178.3	55 29.2 1.0 04	178.3	54 59.2 1.0 04	178.3	54 29.2 1.0 04	178.3	53 59.2 1.0 04	178.3	53 29.2 1.0 04	178.4	52 59.2 1.0 04	178.4	52 29.2 1.0 04	178.4	1
2	55 56.6 1.0 07	176.5	55 26.7 1.0 07	176.6	54 56.7 1.0 07	176.6	54 26.8 1.0 07	176.7	53 56.8 1.0 07	176.7	53 26.8 1.0 06	176.7	52 56.9 1.0 06	176.8	52 26.9 1.0 06	176.8	2
3	55 52.4 1.0 10	174.8	55 22.5 1.0 10	174.8	54 52.6 1.0 10	174.9	54 22.7 1.0 10	175.0	53 52.8 1.0 09	175.1	53 22.9 1.0 09	175.1	52 53.0 1.0 09	175.2	52 23.1 1.0 09	175.3	3
4	55 46.5 99 13	173.0	55 16.7 99 12	173.1	54 46.8 99 12	173.2	54 17.0 99 12	173.3	53 47.2 99 12	173.4	53 17.4 99 12	173.5	52 47.6 99 12	173.6	52 17.7 99 11	173.7	4
05	55 38.9 99 15	171.3	55 09.2 99 15	171.4	54 39.5 99 15	171.6	54 09.8 99 15	171.7	53 40.1 99 14	171.8	53 10.3 99 14	171.9	52 40.6 99 14	172.0	52 10.9 99 14	172.1	05
6	55 29.7 99 18	169.6	55 00.1 99 18	169.8	54 30.5 99 18	169.9	54 00.9 99 17	170.0	53 31.3 99 17	170.2	53 01.7 99 17	170.3	52 32.1 99 17	170.4	52 02.5 99 16	170.6	6
7	55 18.8 98 21	167.9	54 49.4 98 20	168.1	54 20.0 98 20	168.2	53 50.5 98 20	168.4	53 21.1 98 20	168.6	52 51.6 98 19	168.7	52 22.1 98 19	168.9	51 52.7 98 19	169.0	7
8	55 06.4 97 23	166.2	54 37.1 97 23	166.4	54 07.9 98 23	166.6	53 38.6 98 22	166.8	53 09.3 98 22	167.0	52 40.0 98 22	167.2	52 10.7 98 22	167.3	51 41.3 98 21	167.5	8
9	54 52.3 97 26	164.6	54 23.3 97 26	164.8	53 54.2 97 25	165.0	53 25.1 97 25	165.2	52 56.0 97 24	165.4	52 26.9 97 24	165.6	51 57.8 97 24	165.8	51 28.6 97 24	166.0	9
10	54 36.8 96 28	162.9	54 07.9 96 28	163.2	53 39.1 96 28	163.4	53 10.2 96 27	163.6	52 41.3 96 27	163.9	52 12.4 96 27	164.1	51 43.4 97 26	164.3	51 14.4 97 26	164.5	10
1	54 19.7 95 31	161.3	53 51.1 95 30	161.6	53 22.5 96 30	161.8	52 53.8 96 30	162.1	52 25.1 96 29	162.3	51 56.4 96 29	162.6	51 27.6 96 28	162.8	50 58.9 96 28	163.0	1
2	54 01.2 94 33	159.7	53 32.8 95 33	160.0	53 04.4 95 32	160.3	52 36.0 95 32	160.6	52 07.5 95 32	160.8	51 39.0 95 31	161.1	51 10.5 95 31	161.3	50 41.9 95 30	161.6	2
3	53 41.2 94 36	158.2	53 13.1 94 35	158.5	52 45.0 94 35	158.8	52 16.8 94 34	159.1	51 48.6 94 34	159.3	51 20.3 94 33	159.6	50 52.0 94 33	159.9	50 23.7 94 33	160.1	3
4	53 19.9 93 38	156.7	52 52.0 93 37	157.0	52 24.2 93 37	157.3	51 56.2 93 36	157.6	51 28.3 93 36	157.9	51 00.3 93 36	158.1	50 32.2 94 35	158.4	50 04.1 94 35	158.7	4
15	52 57.1 92 40	155.2	52 29.6 92 40	155.5	52 02.0 92 39	155.8	51 34.4 92 39	156.1	51 06.7 92 38	156.4	50 38.9 93 38	156.7	50 11.1 93 37	157.0	49 43.3 93 37	157.3	15
6	52 33.1 91 42	153.7	52 05.9 91 42	154.0	51 38.6 91 41	154.4	51 11.2 91 41	154.7	50 43.8 91 40	155.0	50 16.3 92 40	155.3	49 48.8 92 39	155.6	49 21.2 92 39	155.9	6
7	52 07.8 90 44	152.2	51 40.9 90 44	152.6	51 13.9 90 43	152.9	50 46.8 90 43	153.3	50 19.7 91 42	153.6	49 52.5 91 42	153.9	49 25.2 91 41	154.3	48 57.9 91 41	154.6	7
8	51 41.3 89 46	150.8	51 14.7 89 46	151.2	50 48.0 89 45	151.6	50 21.2 89 45	151.9	49 54.3 90 44	152.3	49 27.4 90 44	152.6	49 00.5 90 43	152.9	48 33.5 90 43	153.3	8
9	51 13.6 88 48	149.4	50 47.3 88 48	149.8	50 20.9 88 47	150.2	49 54.4 88 46	150.6	49 27.9 89 46	150.9	49 01.3 89 46	151.3	48 34.6 89 45	151.6	48 07.9 89 44	152.0	9
20	50 44.7 87 50	148.1	50 18.7 87 49	148.5	49 52.7 87 49	148.9	49 26.5 87 48	149.2	49 00.3 88 48	149.6	48 34.0 88 47	150.0	48 07.6 88 47	150.3	47 41.2 88 46	150.7	20
1	50 14.8 85 52	146.8	49 49.1 86 51	147.2	49 23.3 86 51	147.6	48 57.5 86 50	147.9	48 31.6 87 50	148.3	48 05.6 87 49	148.7	47 39.5 87 48	149.1	47 13.4 87 48	149.4	1
2	49 43.8 84 54	145.5	49 18.4 85 53	145.9	48 53.0 85 52	146.3	48 27.5 85 52	146.7	48 01.9 85 51	147.1	47 36.2 86 51	147.5	47 10.4 86 50	147.8	46 44.6 86 50	148.2	2
3	49 11.7 83 55	144.2	48 46.7 84 54	144.6	48 21.6 84 54	145.0	47 56.4 84 53	145.4	47 31.1 84 53	145.8	47 05.8 85 52	146.2	46 40.3 85 52	146.6	46 14.8 85 51	147.0	3
4	48 38.7 82 57	143.0	48 14.0 82 56	143.4	47 49.2 83 56	143.8	47 24.4 83 55	144.2	46 59.4 83 54	144.7	46 34.4 84 54	145.1	46 09.3 84 53	145.4	45 44.1 84 53	145.8	4
25	48 04.7 81 58	141.8	47 40.4 81 58	142.2	47 15.9 82 57	142.6	46 51.4 82 56	143.1	46 26.8 82 56	143.5	46 02.1 83 55	143.9	45 37.2 83 55	144.3	45 12.4 83 54	144.7	25
6	47 29.9 80 60	140.6	47 05.9 80 59	141.0	46 41.7 81 58	141.5	46 17.5 81 58	141.9	45 53.2 81 57	142.3	45 28.8 81 57	142.7	45 04.3 82 56	143.2	44 39.8 82 56	143.6	6
7	46 54.1 79 61	139.5	46 30.5 79 60	139.9	46 06.7 79 60	140.4	45 42.8 80 59	140.8	45 18.8 80 59	141.2	44 54.7 80 58	141.6	44 30.5 81 58	142.1	44 06.3 81 57	142.5	7
8	46 17.6 78 62	138.4	45 54.2 78 62	138.8	45 30.8 78 61	139.2	45 07.2 79 61	139.7	44 43.5 79 60	140.1	44 19.8 79 60	140.6	43 55.9 80 59	141.0	43 32.0 80 58	141.4	8
9	45 40.2 77 64	137.3	45 17.2 77 63	137.7	44 54.0 77 62	138.2	44 30.8 78 62	138.6	44 07.5 78 61	139.1	43 44.0 78 61	139.5	43 20.5 79 60	139.9	42 56.9 79 60	140.3	9
30	45 02.1 75 65	136.2	44 39.4 76 64	136.7	44 16.6 76 64	137.1	43 53.7 77 63	137.6	43 30.6 77 63	138.0	43 07.5 77 62	138.5	42 44.3 78 62	138.9	42 21.0 78 61	139.3	30
1	44 23.2 74 66	135.2	44 00.8 75 65	135.6	43 38.3 75 65	136.1	43 15.8 75 64	136.6	42 53.1 76 64	137.0	42 30.2 76 63	137.4	42 07.3 77 63	137.9	41 44.3 77 62	138.3	1
2	43 43.6 73 67	134.2	43 21.6 74 66	134.6	42 59.4 74 66	135.1	42 37.1 74 65	135.6	42 14.8 75 65	136.0	41 52.3 75 64	136.5	41 29.7 75 64	136.9	41 07.0 76 64	137.3	2
3	43 03.4 72 68	133.2	42 41.7 73 68	133.7	42 19.8 73 67	134.1	41 57.9 73 67	134.6	41 35.8 74 66	135.0	41 13.6 74 66	135.5	40 51.3 74 65	135.9	40 28.9 75 64	136.4	3
4	42 22.5 71 69	132.2	42 01.1 72 69	132.7	41 39.6 72 68	133.2	41 17.9 72 68	133.6	40 56.1 73 67	134.1	40 34.3 73 67	134.5	40 12.3 73 66	135.0	39 50.2 74 66	135.4	4
35	41 41.0 70 70	131.3	41 19.9 71 70	131.8	40 58.7 71 69	132.2	40 37.3 71 68	132.7	40 15.9 72 68	133.2	39 54.3 72 68	133.6	39 32.6 72 67	134.1	39 10.9 73 67	134.5	35
6	40 59.0 69 71	130.4	40 38.1 70 70	130.9	40 17.2 70 70	131.3	39 56.2 70 70	131.8	39 35.0 71 69	132.3	39 13.7 71 68	132.7	38 52.4 71 68	133.2	38 30.9 72 68	133.6	6
7	40 16.3 68 72	129.5	39 55.8 69 72	130.0	39 35.2 69 71	130.5	39 14.4 69 70	130.9	38 53.5 70 70	131.4	38 32.6 70 70	131.8	38 11.5 70 69	132.3	37 50.3 71 68	132.7	7
8	39 33.1 67 73	128.6	39 12.9 68 72	129.1	38 52.6 68 72	129.6	38 32.1 68 71	130.1	38 11.5 69 71	130.5	37 50.9 69 70	131.0	37 30.1 69 70	131.4	37 09.2 70 70	131.9	8
9	38 49.4 66 74	127.8	38 29.5 67 73	128.3	38 09.4 67 73	128.8	37 49.3 67 72	129.2	37 29.0 68 72	129.7	37 08.6 68 71	130.2	36 48.1 68 71	130.6	36 27.5 69 70	131.1	9
40	38 05.2 65 74	127.0	37 45.6 66 74	127.5	37 25.8 66 74	127.9	37 05.9 66 73	128.4	36 45.9 67 73	128.9	36 25.8 67 72	129.3	36 05.6 68 72	129.8	35 45.3 68 71	130.2	40
1	37 20.6 64 75	126.2	37 01.2 65 75	126.7	36 41.7 65 74	127.1	36 22.1 66 74	127.6	36 02.4 66 73	128.1	35 42.6 66 73	128.5	35 22.6 67 72	129.0	35 02.6 67 72	129.4	1
2	36 35.4 63 76	125.4	36 16.3 64 76	125.9	35 57.1 64 75	126.4	35 37.8 65 75	126.8	35 18.3 65 74	127.3	34 58.8 65 74	127.8	34 39.2 66 73	128.2	34 19.4 66 73	128.7	2
3	35 49.9 63 77	124.6	35 31.0 63 76	125.1	35 12.1 63 76	125.6	34 53.0 64 75	126.1	34 33.9 64 75	126.5	34 14.6 64 74	127.0	33 55.2 65 74	127.5	33 35.7 65 74	127.9	3
4	35 03.9 62 77	123.9	34 45.3 62 77	124.4	34 26.6 62 76	124.8	34 07.8 63 76	125.3	33 48.9 63 76	125.8	33 29.9 64 75	126.2	33 10.8 64 75	126.7	32 51.6 64 74	127.2	4
45	34 17.5 61 78	123.2	33 59.2 61 78	123.6	33 40.8 62 77	124.1	33 22.2 62 77	124.6	33 03.6 62 76	125.1	32 44.9 63 76	125.5	32 26.0 63 75	126.0	32 07.1 63 75	126.4	45
6	33 30.7 60 78	122.4	33 12.7 60 78	122.9	32 54.5 61 78	123.4	32 36.2 61 77	123.9	32 17.9 61 77	124.3	31 59.4 62 76	124.8	31 40.8 62 76	125.3	31 22.1 62 76	125.7	6
7	32 43.6 59 79	121.7	32 25.8 60 79	122.2	32 07.9 60 78	122.7	31 49.9 60 78	123.2	31 31.7 61 78	123.6	31 13.5 61 77	124.1	30 55.2 61 77	124.6	30 36.8 62 76	125.0	7
8	31 56.1 58 80	121.1	31 38.6 59 79	121.5	31 20.9 59 79	122.0	31 03.1 59 78	122.5	30 45.2 60 78	123.0	30 27.3 60 78	123.4	30 09.2 60 77	123.9	29 51.0 61 77	124.3	8
9	31 08.3 58 80	120.4	30 51.0 58 80	120.9	30 33.6 58 79	121.4	30 16.0 59 79	121.8	29 58.4 59 79	122.3	29 40.7 59 78	122.8	29 22.8 60 78	123.2	29 04.9 60 78	123.7	9
50	30 20.2 57 81	119.8	30 03.1 57 80	120.2	29 45.9 58 80	120.7	29 28.6 58 80	121.2	29 11.2 58 79	121.6	28 53.7 58 79	122.1	28 36.1 59 78	122.6	28 18.4 59 78	123.0	50
1	29 31.7 56 81	119.1	29 14.9 56 81	119.6	28 57.9 57 80	120.1	28 40.8 57 80	120.5	28 23.7 57 80	121.0	28 06.4 58 79	121.5	27 49.1 58 79	121.9	27 31.6 58 78	122.4	1
2	28 43.0 55 82	118.5	28 26.3 56 81	119.0	28 09.6 56 81	119.4	27 52.8 56 81	119.9	27 35.8 57 80	120.4	27 18.8 57 80	120.8	27 01.7 57 79	121.3	26 44.5 58 79	121.8	2
3	27 53.9 55 82	117.9	27 37.5 55 82	118.4	27 21.0 55 81	118.8	27 04.4 56 81	119.3	26 47.7 56 81	119.8	26 30.9 56 80	120.2	26 14.0 56 80	120.7	25 57.0 57 80	121.1	3
4	27 04.6 54 83	117.3	26 48.4 54 82	117.8	26 32.1 54 82	118.2	26 15.7 55 82	118.7	25 59.2 55 81	119.2	25 42.7 55 81	119.6	25 26.0 56 80	120.1	25 09.2 56 80	120.5	4
55	26 15.1 53 83	116.7	25 59.1 53 83	117.2	25 43.0 54 82	117.6	25 26.8 54 82	118.1	25 10.5 54 82	118.6	24 54.2 55 81	119.0	24 37.7 55 81	119.5	24 21.2 55 81	120.0	55
6	25 25.2 52 83	116.1	25 09.4 53 83	116.6	24 53.6 53 83	117.1	24 37.6 53 82	117.5	24 21.5 54 82	118.0	24 05.4 54 82	118.5	23 49.2 54 81	118.9	23 32.8 54 81	119.4	6
7	24 35.2 52 84	115.6	24 19.6 52 84	116.0	24 03.9 52 83	116.5	23 48.1 53 83	117.0	23 32.3 53 82	117.4	23 16.3 53 82	117.9	23 00.3 54 82	118.3	22 44.2 54 81	118.8	7
8	23 44.9 51 84	115.0	23 29.5 51 84	115.5	23 14.0 52 84	115.9	22 58.4 52 83	116.4	22 42.8 52 83	116.9	22 27.0 53 82	117.3	22 11.2 53 82	117.8	21 55.4 53 82	118.2	8
9	22 54.3 51 84	114.5	22 39.1 51 84	114.9	22 23.8 51 84	115.4	22 08.5 51 84	115.9	21 53.0 52 83	116.3	21 37.5 52 83	116.8	21 21.9 52 83	117.2	21 06.2 52 82	117.7	9
60	22 03.6 50 85	113.9	21 48.6 50 85	114.4	21 33.5 50 84	114.9	21 18.3 51 84	115.3	21 03.0 51 84	115.8	20 47.7 51 83	116.3	20 32.3 51 83	116.7	20 16.8 52 83	117.2	60
1	21 12.6 49 85	113.4	20 57.8 50 85	113.9	20 42.9 50 85	114.3	20 27.9 50 84	114.8	20 12.8 50 84	115.3	19 57.7 51 84	115.7	19 42.5 51 83	116.2	19 27.2 51 83	116.6	1
2	20 21.5 49 85	112.9	20 06.8 49 85	113.4	19 52.1 49 85	113.8	19 37.3 49 85	114.3	19 22.4 50 84	114.7	19 07.5 50 84	115.2	18 52.5 50 84	115.7	18 37.4 50 84	116.1	2
3	19 30.2 48 86	112.4	19 15.7 48 86	112.9	19 01.1 49 85	113.3	18 46.5 49 85	113.8	18 31.8 49 85	114.2	18 17.1 49 84	114.7	18 02.2 50 84	115.2	17 47.3 50 84	115.6	3
4	18 38.6 48 86	111.9	18 24.3 48 86	112.4	18 09.9 48 86	112.8	17 55.5 48 85	113.3	17 41.0 48 85	113.7	17 26.4 49 85	114.2	17 11.8 49 84	114.7	16 57.1 49 84	115.1	4
65	17 46.9 47 86	111.4	17 32.8 47 86	111.9	17 18.6 47 86	112.3	17 04.3 48 86	112.8	16 50.0 48 85	113.3	16 35.6 48 85	113.7	16 21.1 48 85	114.2	16 06.6 48 84	114.6	65
6	16 55.0 46 87	110.9	16 41.1 47 86	111.4	16 27.0 47 86	111.9	16 12.9 47 86	112.3	15 58.8 47 86	112.8	15 44.5 48 85	113.2	15 30.3 48 85	113.7	15 15.9 48 85	114.1	6
7	16 03.0 46 87	110.5	15 49.2 46 87	110.9	15 35.3 46 86	111.4	15 21.4 47 86	111.8	15 07.4 47 86	112.3	14 53.3 47 86	112.8	14 39.2 47 85	113.2	14 25.1 47 85	113.7	7
8	15 10.8 45 87	110.0	14 57.1 46 87	110.5	14 43.4 46 87	110.9	14 29.7 46 86	111.4	14 15.8 46 86	111.8	14 01.9 46 86	112.3	13 48.0 47 86	112.7	13 34.0 47 85	113.2	8
9	14 18.5 45 88	109.5	14 04.9 45 87	110.0	13 51.4 45 87	110.5	13 37.8 45 87	110.9	13 24.1 46 86	111.4	13 10.4 46 86	111.8	12 56.6 46 86	112.3	12 42.8 46 86	112.7	9
70	13 26.0 44 88	109.1	13 12.6 45 88	109.5	12 59.2 45 87	110.0	12 45.7 45 87	110.5	12 32.2 45 87	110.9	12 18.7 45 86	111.4	12 05.1 45 86	111.8	11 51.4 46 86	112.3	70
1	12 33.3 44 88	108.6	12 20.1 44 88	109.1	12 06.8 44 87	109.6	11 53.5 44 87	110.0	11 40.2 45 87	110.5	11 26.8 45 87	110.9	11 13.4 45 86	111.4	10 59.9 45 86	111.8	1
2	11 40.5 43 88	108.2	11 27.5 44 88	108.7	11 14.3 44 88	109.1	11 01.2 44 88	109.6	10 48.0 44 87	110.0	10 34.8 44 87	110.5	10 21.5 44 87	111.0	10 08.2 44 86	111.4	2
3	10 47.6 43 88	107.8	10 34.7 43 88	108.2	10 21.7 43 88	108.7	10 08.7 43 88	109.2	9 55.7 44 88	109.6	9 42.6 44 87	110.1	9 29.5 44 87	110.5	9 16.3 44 87	111.0	3
4	9 54.6 43 89	107.4	9 41.8 43 88	107.8	9 29.0 43 88	108.3	9 16.1 43 88	108.7	9 03.2 43 88	109.2	8 50.2 43 87	109.6	8 37.3 43 87	110.1	8 24.3 43 87	110.6	4
75	9 01.4 42 89	106.9	8 48.8 42 89	107.4	8 36.1 42 88	107.8	8 23.3 42 88	108.3	8 10.6 43 88	108.8	7 57.8 43 88	109.2	7 45.0 43 87	109.7	7 32.1 43 87	110.1	75
6	8 08.1 42 89	106.5	7 55.6 42 89	107.0	7 43.1 42 88	107.4	7 30.5 42 88	107.9	7 17.8 42 88	108.3	7 05.2 42 88	108.8	6 52.5 42 88	109.3	6 39.8 42 87	109.7	6
7	7 14.8 41 89	106.1	7 02.3 41 89	106.6	6 49.9 41 89	107.0	6 37.5 42 89	107.5	6 25.0 42 88	107.9	6 12.5 42 88	108.4	5 59.9 42 88	108.9	5 47.4 42 87	109.3	7
8	6 21.3 41 89	105.7	6 09.0 41 89	106.2	5 56.7 41 89	106.6	5 44.3 41 89	107.1	5 32.0 41 88	107.5	5 19.6 41 88	108.0	5 07.2 41 88	108.4			8
9	5 27.6 41 90	105.3	5 15.5 41 89	105.8	5 03.3 41 89	106.2											9

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	12° 00′				12° 30′				13° 00′				13° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	80 00.0	1.0	04	180.0	80 30.0	1.0	05	180.0	81 00.0	1.0	05	180.0	81 30.0	1.0	05	180.0
1	79 57.3	1.0	14	174.4	80 27.1	1.0	14	174.1	80 57.0	99	15	173.8	81 26.8	99	16	173.4
2	79 49.2	98	22	168.9	80 18.6	98	23	168.3	80 48.0	98	24	167.7	81 17.4	98	26	167.0
3	79 35.9	96	30	163.5	80 04.7	96	32	162.7	80 33.4	96	33	161.9	81 02.0	95	35	160.9
4	79 17.7	94	38	158.4	79 45.8	93	39	157.5	80 13.6	92	41	156.4	80 41.2	92	43	155.2
05	78 55.1	91	44	153.7	79 22.2	90	46	152.5	79 49.1	89	48	151.3	80 15.6	88	50	149.9
6	78 28.5	87	50	149.2	78 54.6	86	52	148.0	79 20.3	85	54	146.6	79 45.7	84	56	145.1
7	77 58.4	84	56	145.1	78 23.4	83	57	143.8	78 48.0	81	59	142.3	79 12.2	80	61	140.8
8	77 25.0	81	60	141.3	77 49.0	79	62	139.9	78 12.5	78	64	138.4	78 35.5	76	66	136.8
9	76 49.0	77	64	137.9	77 11.9	76	66	136.4	77 34.3	74	68	134.9	77 56.2	72	69	133.3
10	76 10.5	74	68	134.7	76 32.4	73	69	133.3	76 53.8	70	71	131.7	77 14.6	68	72	130.1
1	75 30.0	71	71	131.8	75 50.9	69	72	130.4	76 11.4	67	74	128.8	76 31.2	65	75	127.3
2	74 47.6	68	73	129.2	75 07.7	66	74	127.7	75 27.2	64	76	126.2	75 46.2	62	77	124.7
3	74 03.8	65	75	126.7	74 23.0	63	77	125.3	74 41.7	61	78	123.9	74 59.8	59	79	122.3
4	73 18.5	62	77	124.5	73 37.0	61	78	123.1	73 54.9	59	80	121.7	74 12.2	57	81	120.2
15	72 32.2	60	79	122.5	72 49.9	57	80	121.1	73 07.1	56	81	119.7	73 23.7	54	82	118.3
6	71 44.7	58	80	120.6	72 01.8	56	82	119.3	72 18.3	54	82	117.9	72 34.3	52	84	116.5
7	70 56.4	56	82	118.9	71 12.9	54	83	117.6	71 28.8	52	84	116.2	71 44.2	50	85	114.9
8	70 07.3	54	83	117.3	70 23.2	52	84	116.0	70 38.6	50	85	114.7	70 53.4	48	86	113.4
9	69 17.5	52	84	115.8	69 32.9	50	85	114.5	69 47.8	49	86	113.3	70 02.1	47	86	112.0
20	68 27.2	50	85	114.4	68 42.0	49	86	113.2	68 56.4	47	86	112.0	69 10.3	45	87	110.7
1	67 36.2	49	86	113.1	67 50.7	47	86	111.9	68 04.6	46	87	110.7	68 18.0	44	88	109.5
2	66 44.8	48	86	111.9	66 58.8	46	87	110.7	67 12.4	44	88	109.6	67 25.4	43	88	108.4
3	65 53.0	46	87	110.7	66 06.6	45	88	109.6	66 19.8	43	88	108.5	66 32.5	41	89	107.4
4	65 00.8	45	88	109.6	65 14.0	44	88	108.6	65 26.9	42	89	107.5	65 39.2	40	89	106.4
25	64 08.2	44	88	108.6	64 21.2	42	89	107.6	64 33.7	41	89	106.5	64 45.7	39	90	105.5
6	63 15.3	43	89	107.7	63 28.0	41	89	106.7	63 40.2	40	90	105.6	63 52.0	39	90	104.6
7	62 22.2	42	89	106.8	62 34.6	41	90	105.8	62 46.5	39	90	104.8	62 58.1	38	90	103.8
8	61 28.8	41	89	105.9	61 40.9	40	90	104.9	61 52.6	38	90	104.0	62 03.9	37	90	103.0
9	60 35.2	40	90	105.1	60 47.1	39	90	104.1	60 58.6	38	90	103.2	61 09.7	36	91	102.2
30	59 41.4	40	90	104.3	59 53.0	38	90	103.4	60 04.3	37	91	102.4	60 15.2	36	91	101.5
1	58 47.4	39	90	103.5	58 58.8	38	90	102.6	59 09.9	36	91	101.7	59 20.6	35	91	100.8
2	57 53.2	38	90	102.8	58 04.5	37	91	101.9	58 15.4	36	91	101.1	58 25.9	35	91	100.2
3	56 58.9	38	91	102.1	57 10.0	36	91	101.3	57 20.7	35	91	100.4	57 31.1	34	92	99.5
4	56 04.4	37	91	101.5	56 15.4	36	91	100.6	56 26.0	35	92	99.8	56 36.2	34	92	98.9
35	55 09.9	37	91	100.8	55 20.6	35	91	100.0	55 31.1	34	92	99.2	55 41.2	33	92	98.4
6	54 15.2	36	91	100.2	54 25.8	35	92	99.4	54 36.1	34	92	98.6	54 46.1	33	92	97.8
7	53 20.4	36	92	99.6	53 30.9	35	92	98.8	53 41.1	34	92	98.0	53 51.0	32	92	97.3
8	52 25.5	36	92	99.1	52 35.9	34	92	98.3	52 46.0	33	92	97.5	52 55.8	32	92	96.7
9	51 30.5	35	92	98.5	51 40.8	34	92	97.7	51 50.8	33	92	97.0	52 00.5	32	92	96.2
40	50 35.4	34	92	98.0	50 45.6	34	92	97.2	50 55.5	33	92	96.5	51 05.2	32	92	95.7
1	49 40.3	34	92	97.4	49 50.4	33	92	96.7	50 00.2	32	92	96.0	50 09.8	31	92	95.2
2	48 45.1	34	92	96.9	48 55.1	33	92	96.2	49 04.9	32	92	95.5	49 14.4	31	92	94.8
3	47 49.9	34	92	96.4	47 59.8	33	92	95.7	48 09.5	32	92	95.0	48 18.9	31	92	94.3
4	46 54.5	33	92	95.9	47 04.4	33	92	95.3	47 14.0	32	92	94.6	47 23.4	31	92	93.9
45	45 59.2	33	92	95.5	46 09.0	32	92	94.8	46 18.6	31	92	94.1	46 27.9	31	92	93.4
6	45 03.8	33	92	95.0	45 13.6	32	92	94.3	45 23.1	31	92	93.7	45 32.4	31	93	93.0
7	44 08.4	33	92	94.6	44 18.1	32	93	93.9	44 27.5	31	93	93.2	44 36.8	30	93	92.6
8	43 12.9	33	92	94.1	43 22.5	32	93	93.5	43 32.0	31	93	92.8	43 41.2	30	93	92.2
9	42 17.4	32	93	93.7	42 27.0	32	93	93.0	42 36.4	31	93	92.4	42 45.6	30	93	91.8
50	41 21.9	32	93	93.3	41 31.4	32	93	92.6	41 40.8	31	93	92.0	41 50.0	30	93	91.4
1	40 26.3	32	93	92.8	40 35.9	32	93	92.2	40 45.2	31	93	91.6	40 54.4	30	93	91.0
2	39 30.7	32	93	92.4	39 40.3	31	93	91.8	39 49.6	31	93	91.2	39 58.8	30	93	90.6
3	38 35.1	32	93	92.0	38 44.7	31	93	91.4	38 54.0	31	93	90.8	39 03.1	30	93	90.2
4	37 39.5	32	93	91.6	37 49.0	31	93	91.0	37 58.4	31	93	90.4	38 07.5	30	93	89.8
55	36 43.9	32	93	91.2	36 53.4	31	93	90.7	37 02.7	31	93	90.1	37 11.9	30	93	89.5
6	35 48.3	32	93	90.9	35 57.8	31	93	90.3	36 07.1	31	93	89.7	36 16.2	30	93	89.1
7	34 52.7	32	93	90.5	35 02.2	31	93	89.9	35 11.5	31	93	89.3	35 20.6	30	93	88.7
8	33 57.0	32	93	90.1	34 06.5	31	93	89.5	34 15.8	31	93	88.9	34 25.0	30	93	88.4
9	33 01.4	32	93	89.7	33 10.9	31	93	89.2	33 20.2	31	93	88.6	33 29.4	30	93	88.0
60	32 05.8	32	93	89.4	32 15.3	31	93	88.8	32 24.6	31	93	88.2	32 33.8	30	93	87.7
1	31 10.2	32	93	89.0	31 19.7	31	93	88.4	31 29.0	31	93	87.9	31 38.2	30	92	87.3
2	30 14.5	32	93	88.6	30 24.1	31	93	88.1	30 33.4	31	93	87.5	30 42.7	31	92	87.0
3	29 18.9	32	93	88.3	29 28.5	32	93	87.7	29 37.9	31	93	87.2	29 47.1	31	92	86.6
4	28 23.3	32	93	87.9	28 32.9	32	93	87.4	28 42.3	31	93	86.8	28 51.6	31	92	86.3
65	27 27.7	32	93	87.6	27 37.3	32	92	87.0	27 46.8	31	92	86.5	27 56.1	31	92	85.9
6	26 32.2	32	93	87.2	26 41.8	32	92	86.7	26 51.3	31	92	86.1	27 00.6	31	92	85.6
7	25 36.6	32	93	86.8	25 46.2	32	92	86.3	25 55.8	32	92	85.8	26 05.2	31	92	85.3
8	24 41.1	32	92	86.5	24 50.7	32	92	86.0	25 00.3	32	92	85.5	25 09.7	31	92	84.9
9	23 45.6	32	92	86.1	23 55.3	32	92	85.6	24 04.8	32	92	85.1	24 14.3	31	92	84.6
70	22 50.1	33	92	85.8	22 59.8	32	92	85.3	23 09.4	32	92	84.8	23 19.0	32	92	84.3
1	21 54.6	33	92	85.5	22 04.4	32	92	84.9	22 14.1	32	92	84.4	22 23.6	32	92	83.9
2	20 59.2	33	92	85.1	21 09.0	33	92	84.6	21 18.7	32	92	84.1	21 28.3	32	92	83.6
3	20 03.7	33	92	84.8	20 13.6	33	92	84.3	20 23.4	32	92	83.8	20 33.1	32	92	83.3
4	19 08.4	33	92	84.4	19 18.3	33	92	83.9	19 28.1	33	92	83.4	19 37.8	32	92	82.9
75	18 13.0	33	92	84.1	18 23.0	33	92	83.6	18 32.8	33	92	83.1	18 42.7	33	92	82.6
6	17 17.7	33	92	83.7	17 27.7	33	92	83.2	17 37.6	33	92	82.8	17 47.5	33	92	82.3
7	16 22.4	34	92	83.4	16 32.5	33	92	82.9	16 42.5	33	92	82.4	16 52.4	33	92	81.9
8	15 27.2	34	92	83.1	15 37.3	34	92	82.6	15 47.4	33	92	82.1	15 57.3	33	92	81.6
9	14 32.0	34	92	82.7	14 42.2	34	92	82.2	14 52.3	34	92	81.7	15 02.3	33	92	81.2
80	13 36.8	34	92	82.4	13 47.1	34	92	81.9	13 57.2	34	92	81.4	14 07.4	34	92	80.9
1	12 41.7	34	92	82.0	12 52.0	34	92	81.5	13 02.3	34	92	81.1	13 12.5	34	92	80.6
2	11 46.6	35	92	81.7	11 57.0	35	92	81.2	12 07.3	34	92	80.7	12 17.6	34	91	80.2
3	10 51.6	35	92	81.3	11 02.1	35	92	80.8	11 12.5	35	91	80.4	11 22.8	34	91	79.9
4	9 56.6	35	91	81.0	10 07.2	35	92	80.5	10 17.6	35	91	80.0	10 28.1	35	91	79.5
85	9 01.7	35	91	80.6	9 12.3	35	91	80.2	9 22.9	35	91	79.7	9 33.4	35	91	79.2
6	8 06.9	36	91	80.3	8 17.5	36	91	79.8	8 28.2	35	91	79.3	8 38.8	35	91	78.9
7	7 12.1	36	91	79.9	7 22.8	36	91	79.5	7 33.5	36	91	79.0	7 44.2	36	91	78.5
8	6 17.3	36	91	79.6	6 28.2	36	91	79.1	6 39.0	36	91	78.6	6 49.8	36	91	78.2
9	5 22.6	36	91	79.2	5 33.6	36	91	78.7	5 44.5	36	91	78.3	5 55.4	36	91	77.8
90													5 01.0	37	91	77.4

H.A.	14° 00′				14° 30′				15° 00′				15° 30′			
	Alt.			Az.	Alt.			Az.	Alt.			Az.	Alt.			Az.
°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°	° ′	Δd	Δt	°
00	82 00.0	1.0	06	180.0	82 30.0	1.0	06	180.0	83 00.0	1.0	06	180.0	83 30.0	1.0	07	180.0
1	81 56.6	99	17	173.1	82 26.4	99	18	172.6	82 56.2	99	19	172.1	83 25.9	99	20	171.5
2	81 46.6	97	27	166.3	82 15.8	97	28	165.5	82 44.9	97	30	164.5	83 13.8	96	32	163.4
3	81 30.4	94	36	159.9	81 58.7	94	38	158.7	82 26.7	93	40	157.4	82 54.4	92	43	155.9
4	81 08.6	91	45	153.9	81 35.7	90	47	152.5	82 02.4	88	49	150.9	82 28.7	87	52	149.1
05	80 41.8	87	52	148.4	81 07.5	85	54	146.8	81 32.8	84	56	145.1	81 57.6	82	59	143.1
6	80 10.6	82	58	143.5	80 35.1	81	60	141.8	80 58.9	79	62	139.9	81 22.2	76	65	137.8
7	79 35.8	78	63	139.1	79 58.9	76	65	137.3	80 21.4	74	67	135.4	80 43.2	71	70	133.3
8	78 57.9	74	68	135.1	79 19.8	72	70	133.3	79 41.0	69	72	131.4	80 01.4	67	74	129.3
9	78 17.5	70	71	131.6	78 38.1	68	73	129.8	78 58.1	65	75	127.8	79 17.2	63	76	125.8
10	77 34.8	66	74	128.4	77 54.4	64	76	126.6	78 13.2	61	77	124.8	78 31.3	59	79	122.8
1	76 50.4	63	76	125.6	77 09.0	61	78	123.8	77 26.8	58	80	122.0	77 43.8	55	81	120.1
2	76 04.5	60	79	123.0	76 22.1	58	80	121.3	76 39.0	55	82	119.6	76 55.1	52	83	117.7
3	75 17.2	57	80	120.7	75 34.0	55	82	119.1	75 50.1	52	83	117.4	76 05.4	50	84	115.6
4	74 28.9	55	82	118.7	74 44.9	52	83	117.1	75 00.2	50	84	115.4	75 14.8	47	85	113.7
15	73 39.7	52	83	116.8	73 55.0	50	84	115.2	74 09.6	48	85	113.7	74 23.6	45	86	112.0
6	72 49.6	50	84	115.1	73 04.3	48	86	113.6	73 18.4	46	86	112.1	73 31.7	43	87	110.5
7	71 58.9	48	86	113.5	72 13.0	46	86	112.1	72 26.5	44	87	110.6	72 39.4	42	88	109.1
8	71 07.6	46	86	112.0	71 21.2	44	87	110.7	71 34.2	42	88	109.2	71 46.6	40	89	107.8
9	70 15.8	45	87	110.7	70 29.0	43	88	109.4	70 41.5	41	88	108.0	70 53.4	39	89	106.6
20	69 23.5	43	88	109.5	69 36.3	41	88	108.2	69 48.4	40	89	106.8	70 00.0	37	90	105.5
1	68 30.9	42	88	108.3	68 43.3	40	89	107.1	68 55.0	38	89	105.8	69 06.2	36	90	104.5
2	67 37.9	41	89	107.2	67 49.9	39	89	106.0	68 01.4	37	90	104.8	68 12.3	35	90	103.5
3	66 44.6	40	89	106.2	66 56.3	38	90	105.0	67 07.5	36	90	103.9	67 18.1	34	91	102.6
4	65 51.1	39	90	105.3	66 02.5	37	90	104.1	66 13.4	35	90	103.0	66 23.7	34	91	101.8
25	64 57.3	38	90	104.4	65 08.4	36	90	103.3	65 19.1	35	91	102.2	65 29.2	33	91	101.0
6	64 03.3	37	90	103.5	64 14.2	35	91	102.5	64 24.6	34	91	101.4	64 34.5	32	91	100.3
7	63 09.2	36	91	102.7	63 19.8	35	91	101.7	63 30.0	33	91	100.6	63 39.7	32	92	99.6
8	62 14.8	36	91	102.0	62 25.3	34	91	101.0	62 35.3	33	91	99.9	62 44.8	31	92	98.9
9	61 20.3	35	91	101.3	61 30.6	33	91	100.3	61 40.4	32	92	99.3	61 49.8	31	92	98.3
30	60 25.7	34	91	100.6	60 35.8	33	92	99.6	60 45.4	32	92	98.6	60 54.7	30	92	97.7
1	59 31.0	34	91	99.9	59 40.9	32	92	99.0	59 50.4	31	92	98.0	59 59.5	30	92	97.1
2	58 36.1	33	92	99.3	58 45.9	32	92	98.4	58 55.3	31	92	97.4	59 04.3	29	92	96.5
3	57 41.1	33	92	98.7	57 50.8	32	92	97.8	58 00.1	30	92	96.9	58 09.0	29	92	96.0
4	56 46.1	32	92	98.1	56 55.6	31	92	97.2	57 04.8	30	92	96.3	57 13.6	29	92	95.5
35	55 51.0	32	92	97.5	56 00.4	31	92	96.7	56 09.5	30	92	95.8	56 18.2	28	92	95.0
6	54 55.8	32	92	97.0	55 05.1	31	92	96.1	55 14.1	29	92	95.3	55 22.8	28	92	94.5
7	54 00.6	31	92	96.4	54 09.8	30	92	95.6	54 18.7	29	92	94.8	54 27.3	28	92	94.0
8	53 05.2	31	92	95.9	53 14.4	30	92	95.1	53 23.3	29	92	94.3	53 31.8	28	92	93.5
9	52 09.9	31	92	95.4	52 19.0	30	92	94.7	52 27.8	29	92	93.9	52 36.3	28	93	93.1
40	51 14.5	31	92	95.0	51 23.5	30	92	94.2	51 32.3	29	93	93.4	51 40.7	28	93	92.7
1	50 19.0	30	92	94.5	50 28.0	29	92	93.7	50 36.7	28	93	93.0	50 45.1	28	93	92.2
2	49 23.6	30	92	94.0	49 32.5	29	92	93.3	49 41.2	28	93	92.6	49 49.5	27	93	91.8
3	48 28.1	30	92	93.6	48 37.0	29	93	92.9	48 45.6	28	93	92.1	48 53.9	27	93	91.4
4	47 32.5	30	93	93.2	47 41.4	29	93	92.4	47 50.0	28	93	91.7	47 58.3	27	93	91.0
45	46 37.0	30	93	92.7	46 45.8	29	93	92.0	46 54.4	28	93	91.3	47 02.7	27	93	90.6
6	45 41.4	30	93	92.3	45 50.2	29	93	91.6	45 58.7	28	93	90.9	46 07.0	27	93	90.2
7	44 45.8	30	93	91.9	44 54.6	29	93	91.2	45 03.1	28	93	90.6	45 11.4	27	93	89.9
8	43 50.2	30	93	91.5	43 59.0	29	93	90.8	44 07.5	28	93	90.2	44 15.8	27	93	89.5
9	42 54.6	30	93	91.1	43 03.3	29	93	90.5	43 11.9	28	93	89.8	43 20.1	27	93	89.1
50	41 59.0	29	93	90.7	42 07.7	29	93	90.1	42 16.2	28	93	89.4	42 24.5	27	93	88.8
1	41 03.3	29	93	90.3	41 12.1	29	93	89.7	41 20.6	28	93	89.1	41 28.9	27	93	88.4
2	40 07.7	29	93	90.0	40 16.4	29	93	89.3	40 25.0	28	93	88.7	40 33.3	27	93	88.1
3	39 12.1	29	93	89.6	39 20.8	29	93	89.0	39 29.4	28	93	88.4	39 37.7	28	93	87.7
4	38 16.4	30	93	89.2	38 25.2	29	93	88.6	38 33.8	28	93	88.0	38 42.1	28	92	87.4
55	37 20.8	30	93	88.9	37 29.6	29	93	88.3	37 38.2	28	93	87.7	37 46.6	28	92	87.0
6	36 25.2	30	93	88.5	36 34.0	29	93	87.9	36 42.6	28	93	87.3	36 51.0	28	92	86.7
7	35 29.6	30	93	88.1	35 38.4	29	93	87.6	35 47.0	29	92	87.0	35 55.5	28	92	86.4
8	34 34.0	30	93	87.8	34 42.8	29	92	87.2	34 51.5	29	92	86.6	35 00.0	28	92	86.0
9	33 38.4	30	93	87.4	33 47.3	29	92	86.9	33 56.0	29	92	86.3	34 04.5	28	92	85.7
60	32 42.8	30	93	87.1	32 51.7	29	92	86.5	33 00.5	29	92	86.0	33 09.0	28	92	85.4
1	31 47.3	30	93	86.8	31 56.2	29	92	86.2	32 05.0	29	92	85.6	32 13.6	28	92	85.1
2	30 51.8	30	93	86.4	31 00.7	30	92	85.9	31 09.5	29	92	85.3	31 18.2	29	92	84.7
3	29 56.2	30	92	86.1	30 05.2	30	92	85.5	30 14.1	29	92	85.0	30 22.8	29	92	84.4
4	29 00.8	30	92	85.7	29 09.8	30	92	85.2	29 18.7	29	92	84.6	29 27.4	29	92	84.1
65	28 05.3	30	92	85.4	28 14.4	30	92	84.9	28 23.3	30	92	84.3	28 32.1	29	92	83.8
6	27 09.9	31	92	85.1	27 19.0	30	92	84.5	27 28.0	30	92	84.0	27 36.8	29	92	83.5
7	26 14.4	31	92	84.7	26 23.6	30	92	84.2	26 32.7	30	92	83.7	26 41.6	30	92	83.1
8	25 19.1	31	92	84.4	25 28.3	31	92	83.9	25 37.4	30	92	83.3	25 46.4	30	92	82.8
9	24 23.7	31	92	84.1	24 33.0	31	92	83.6	24 42.1	30	92	83.0	24 51.2	30	92	82.5
70	23 28.4	31	92	83.7	23 37.7	31	92	83.2	23 46.9	31	92	82.7	23 56.1	30	92	82.2
1	22 33.1	31	92	83.4	22 42.5	31	92	82.9	22 51.8	31	92	82.4	23 01.0	30	92	81.9
2	21 37.9	32	92	83.1	21 47.3	31	92	82.6	21 56.7	31	92	82.1	22 05.9	31	92	81.5
3	20 42.7	32	92	82.7	20 52.2	32	92	82.2	21 01.6	31	92	81.7	21 10.9	31	92	81.2
4	19 47.5	32	92	82.4	19 57.1	32	92	81.9	20 06.6	31	92	81.4	20 16.0	31	92	80.9
75	18 52.4	32	92	82.1	19 02.0	32	92	81.6	19 11.6	32	92	81.1	19 21.1	31	92	80.6
6	17 57.3	33	92	81.8	18 07.0	32	92	81.3	18 16.6	32	92	80.8	18 26.2	32	91	80.3
7	17 02.3	33	92	81.4	17 12.0	33	92	80.9	17 21.8	32	91	80.4	17 31.4	32	91	79.9
8	16 07.3	33	92	81.1	16 17.1	33	91	80.6	16 26.9	33	91	80.1	16 36.7	32	91	79.6
9	15 12.3	33	91	80.8	15 22.3	33	91	80.3	15 32.2	33	91	79.8	15 42.0	33	91	79.3
80	14 17.5	33	91	80.4	14 27.5	33	91	79.9	14 37.4	33	91	79.5	14 47.3	33	91	79.0
1	13 22.6	34	91	80.1	13 32.7	34	91	79.6	13 42.8	33	91	79.1	13 52.8	33	91	78.6
2	12 27.9	34	91	79.8	12 38.0	34	91	79.3	12 48.2	34	91	78.8	12 58.3	34	91	78.3
3	11 33.1	34	91	79.4	11 43.4	34	91	78.9	11 53.6	34	91	78.5	12 03.8	34	91	78.0
4	10 38.5	35	91	79.1	10 48.8	34	91	78.6	10 59.2	34	91	78.1	11 09.4	34	90	77.6
85	9 43.9	35	91	78.7	9 54.4	35	91	78.3	10 04.8	35	91	77.8	10 15.1	34	90	77.3
6	8 49.4	35	91	78.4	8 59.9	35	90	77.9	9 10.4	35	90	77.4	9 20.9	35	90	77.0
7	7 54.9	36	91	78.0	8 05.6	35	90	77.6	8 16.2	35	90	77.1	8 26.7	35	90	76.6
8	7 00.5	36	90	77.7	7 11.3	36	90	77.2	7 22.0	36	90	76.7	7 32.7	36	90	76.3
9	6 06.2	36	90	77.3	6 17.1	36	90	76.9	6 27.9	36	90	76.4	6 38.6	36	90	75.9
90	5 12.0	36	90	77.0	5 22.9	36	90	76.5	5 33.8	36	90	76.0	5 44.7	36	90	75.6

Lat. 22°

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	56 00.0	1.0	01	180.0	55 30.0	1.0	01	180.0	55 00.0	1.0	01	180.0	54 30.0	1.0	01	180.0	54 00.0	1.0	01	180.0	53 30.0	1.0	01	180.0	53 00.0	1.0	01	180.0	52 30.0	1.0	01	180.0	00
1	55 59.2	1.0	04	178.3	55 29.2	1.0	04	178.3	54 59.2	1.0	04	178.3	54 29.2	1.0	04	178.3	53 59.2	1.0	04	178.3	53 29.2	1.0	04	178.4	52 59.2	1.0	04	178.4	52 29.2	1.0	04	178.4	1
2	55 56.6	1.0	07	176.5	55 26.7	1.0	07	176.6	54 56.7	1.0	07	176.6	54 26.8	1.0	07	176.7	53 56.8	1.0	07	176.7	53 26.8	1.0	06	176.7	52 56.9	1.0	06	176.8	52 26.9	1.0	06	176.8	2
3	55 52.4	1.0	10	174.8	55 22.5	1.0	10	174.8	54 52.6	1.0	10	174.9	54 22.7	1.0	10	175.0	53 52.8	1.0	09	175.1	53 22.9	1.0	09	175.1	52 53.0	1.0	09	175.2	52 23.1	1.0	09	175.3	3
4	55 46.5	99	13	173.0	55 16.7	99	12	173.1	54 46.8	99	12	173.2	54 17.0	99	12	173.3	53 47.2	99	12	173.4	53 17.4	99	12	173.5	52 47.6	99	12	173.6	52 17.7	99	11	173.7	4
05	55 38.9	99	15	171.3	55 09.2	99	15	171.4	54 39.5	99	15	171.6	54 09.8	99	15	171.7	53 40.1	99	14	171.8	53 10.3	99	14	171.9	52 40.6	99	14	172.0	52 10.9	99	14	172.1	05
6	55 29.7	99	18	169.6	55 00.1	99	18	169.8	54 30.5	99	18	169.9	54 00.9	99	17	170.0	53 31.3	99	17	170.2	53 01.7	99	17	170.3	52 32.1	99	17	170.4	52 02.5	99	16	170.6	6
7	55 18.8	98	21	167.9	54 49.4	98	20	168.1	54 20.0	98	20	168.2	53 50.5	98	20	168.4	53 21.1	98	20	168.6	52 51.6	98	19	168.7	52 22.1	98	19	168.9	51 52.7	98	19	169.0	7
8	55 06.4	97	23	166.2	54 37.1	97	23	166.4	54 07.9	98	23	166.6	53 38.6	98	22	166.8	53 09.3	98	22	167.0	52 40.0	98	22	167.2	52 10.7	98	22	167.3	51 41.3	98	21	167.5	8
9	54 52.3	97	26	164.6	54 23.3	97	26	164.8	53 54.2	97	25	165.0	53 25.1	97	25	165.2	52 56.0	97	24	165.4	52 26.9	97	24	165.6	51 57.8	97	24	165.8	51 28.6	97	24	166.0	9
10	54 36.8	96	28	162.9	54 07.9	96	28	163.2	53 39.1	96	28	163.4	53 10.2	96	27	163.6	52 41.3	96	27	163.9	52 12.4	96	27	164.1	51 43.4	97	26	164.3	51 14.4	97	26	164.5	10
1	54 19.7	95	31	161.3	53 51.1	95	30	161.6	53 22.5	96	30	161.8	52 53.8	96	30	162.1	52 25.1	96	29	162.3	51 56.4	96	29	162.6	51 27.6	96	28	162.8	50 58.9	96	28	163.0	1
2	54 01.2	94	33	159.7	53 32.8	95	33	160.0	53 04.4	95	32	160.3	52 36.0	95	32	160.6	52 07.5	95	32	160.8	51 39.0	95	31	161.1	51 10.5	95	31	161.3	50 41.9	95	30	161.6	2
3	53 41.2	94	36	158.2	53 13.1	94	35	158.5	52 45.0	94	35	158.8	52 16.8	94	34	159.1	51 48.6	94	34	159.3	51 20.3	94	33	159.6	50 52.0	94	33	159.9	50 23.7	94	33	160.1	3
4	53 19.9	93	38	156.7	52 52.0	93	37	157.0	52 24.2	93	37	157.3	51 56.2	93	36	157.6	51 28.3	93	36	157.9	51 00.3	93	36	158.1	50 32.2	94	35	158.4	50 04.1	94	35	158.7	4
15	52 57.1	92	40	155.2	52 29.6	92	40	155.5	52 02.0	92	39	155.8	51 34.4	92	39	156.1	51 06.7	92	38	156.4	50 38.9	93	38	156.7	50 11.1	93	37	157.0	49 43.3	93	37	157.3	15
6	52 33.1	91	42	153.7	52 05.9	91	42	154.0	51 38.6	91	41	154.4	51 11.2	91	41	154.7	50 43.8	91	40	155.0	50 16.3	92	40	155.3	49 48.8	92	39	155.6	49 21.2	92	39	155.9	6
7	52 07.8	90	44	152.2	51 40.9	90	44	152.6	51 13.9	90	43	152.9	50 46.8	90	43	153.3	50 19.7	91	42	153.6	49 52.5	91	42	153.9	49 25.2	91	41	154.3	48 57.9	91	41	154.6	7
8	51 41.3	89	46	150.8	51 14.7	89	46	151.2	50 48.0	89	45	151.6	50 21.2	89	45	151.9	49 54.3	90	44	152.3	49 27.4	90	44	152.6	49 00.5	90	43	152.9	48 33.5	90	43	153.3	8
9	51 13.6	88	48	149.4	50 47.3	88	48	149.8	50 20.9	88	47	150.2	49 54.4	88	46	150.6	49 27.9	89	46	150.9	49 01.3	89	46	151.3	48 34.6	89	45	151.6	48 07.9	89	44	152.0	9
20	50 44.7	87	50	148.1	50 18.7	87	49	148.5	49 52.7	87	49	148.9	49 26.5	87	48	149.2	49 00.3	88	48	149.6	48 34.0	88	47	150.0	48 07.6	88	47	150.3	47 41.2	88	46	150.7	20
1	50 14.8	85	52	146.8	49 49.1	86	51	147.2	49 23.3	86	51	147.6	48 57.5	86	50	147.9	48 31.6	87	50	148.3	48 05.6	87	49	148.7	47 39.5	87	48	149.1	47 13.4	87	48	149.4	1
2	49 43.8	84	54	145.5	49 18.4	85	53	145.9	48 53.0	85	52	146.3	48 27.5	85	52	146.7	48 01.9	85	51	147.1	47 36.2	86	51	147.5	47 10.4	86	50	147.8	46 44.6	86	50	148.2	2
3	49 11.7	83	55	144.2	48 46.7	84	54	144.6	48 21.6	84	54	145.0	47 56.4	84	53	145.4	47 31.1	84	53	145.8	47 05.8	85	52	146.2	46 40.3	85	52	146.6	46 14.8	85	51	147.0	3
4	48 38.7	82	57	143.0	48 14.0	82	56	143.4	47 49.2	83	56	143.8	47 24.4	83	55	144.2	46 59.4	83	54	144.7	46 34.4	84	54	145.1	46 09.3	84	53	145.4	45 44.1	84	53	145.8	4
25	48 04.7	81	58	141.8	47 40.4	81	58	142.2	47 15.9	82	57	142.6	46 51.4	82	56	143.1	46 26.8	82	56	143.5	46 02.1	83	55	143.9	45 37.2	83	55	144.3	45 12.4	83	54	144.7	25
6	47 29.9	80	60	140.6	47 05.9	80	59	141.0	46 41.7	81	58	141.5	46 17.5	81	58	141.9	45 53.2	81	57	142.3	45 28.8	81	57	142.7	45 04.3	82	56	143.2	44 39.8	82	56	143.6	6
7	46 54.1	79	61	139.5	46 30.5	79	60	139.9	46 06.7	79	60	140.4	45 42.8	80	59	140.8	45 18.8	80	59	141.2	44 54.7	80	58	141.6	44 30.5	81	58	142.1	44 06.3	81	57	142.5	7
8	46 17.6	78	62	138.4	45 54.2	78	62	138.8	45 30.8	78	61	139.2	45 07.2	79	61	139.7	44 43.5	79	60	140.1	44 19.8	79	60	140.6	43 55.9	80	59	141.0	43 32.0	80	58	141.4	8
9	45 40.2	77	64	137.3	45 17.2	77	63	137.7	44 54.0	77	62	138.2	44 30.8	78	62	138.6	44 07.5	78	61	139.1	43 44.0	78	61	139.5	43 20.5	79	60	139.9	42 56.9	79	60	140.3	9
30	45 02.1	75	65	136.2	44 39.4	76	64	136.7	44 16.6	76	64	137.1	43 53.7	77	63	137.6	43 30.6	77	63	138.0	43 07.5	77	62	138.5	42 44.3	78	62	138.9	42 21.0	78	61	139.3	30
1	44 23.2	74	66	135.2	44 00.8	75	65	135.6	43 38.3	75	65	136.1	43 15.8	75	64	136.6	42 53.1	76	64	137.0	42 30.2	76	63	137.4	42 07.3	77	63	137.9	41 44.3	77	62	138.3	1
2	43 43.6	73	67	134.2	43 21.6	74	66	134.6	42 59.4	74	66	135.1	42 37.1	74	65	135.6	42 14.8	75	65	136.0	41 52.3	75	64	136.5	41 29.7	75	64	136.9	41 07.0	76	64	137.3	2
3	43 03.4	72	68	133.2	42 41.7	73	68	133.7	42 19.8	73	67	134.1	41 57.9	73	67	134.6	41 35.8	74	66	135.0	41 13.6	74	66	135.5	40 51.3	74	65	135.9	40 28.9	75	64	136.4	3
4	42 22.5	71	69	132.2	42 01.1	72	69	132.7	41 39.6	72	68	133.2	41 17.9	72	68	133.6	40 56.1	73	67	134.1	40 34.3	73	67	134.5	40 12.3	73	66	135.0	39 50.2	74	66	135.4	4
35	41 41.0	70	70	131.3	41 19.9	71	70	131.8	40 58.7	71	69	132.2	40 37.3	71	68	132.7	40 15.9	72	68	133.2	39 54.3	72	68	133.6	39 32.6	72	67	134.1	39 10.9	73	67	134.5	35
6	40 59.0	69	71	130.4	40 38.1	70	70	130.9	40 17.2	70	70	131.3	39 56.2	70	70	131.8	39 35.0	71	69	132.3	39 13.7	71	68	132.7	38 52.4	71	68	133.2	38 30.9	72	68	133.6	6
7	40 16.3	68	72	129.5	39 55.8	69	72	130.0	39 35.2	69	71	130.5	39 14.4	69	70	130.9	38 53.5	70	70	131.4	38 32.6	70	70	131.8	38 11.5	70	69	132.3	37 50.3	71	68	132.7	7
8	39 33.1	67	73	128.6	39 12.9	68	72	129.1	38 52.6	68	72	129.6	38 32.1	68	71	130.1	38 11.5	69	71	130.5	37 50.9	69	70	131.0	37 30.1	69	70	131.4	37 09.2	70	70	131.9	8
9	38 49.4	66	74	127.8	38 29.5	67	73	128.3	38 09.4	67	73	128.8	37 49.3	67	72	129.2	37 29.0	68	72	129.7	37 08.6	68	71	130.2	36 48.1	68	71	130.6	36 27.5	69	70	131.1	9
40	38 05.2	65	74	127.0	37 45.6	66	74	127.5	37 25.8	66	74	127.9	37 05.9	66	73	128.4	36 45.9	67	73	128.9	36 25.8	67	72	129.3	36 05.6	68	72	129.8	35 45.3	68	71	130.2	40
1	37 20.6	64	75	126.2	37 01.2	65	75	126.7	36 41.7	65	74	127.1	36 22.1	66	74	127.6	36 02.4	66	73	128.1	35 42.6	66	73	128.5	35 22.6	67	72	129.0	35 02.6	67	72	129.4	1
2	36 35.4	63	76	125.4	36 16.3	64	76	125.9	35 57.1	64	75	126.4	35 37.8	65	75	126.8	35 18.3	65	74	127.3	34 58.8	65	74	127.8	34 39.2	66	73	128.2	34 19.4	66	73	128.7	2
3	35 49.9	63	77	124.6	35 31.0	63	76	125.1	35 12.1	63	76	125.6	34 53.0	64	75	126.1	34 33.9	64	75	126.5	34 14.6	64	74	127.0	33 55.2	65	74	127.5	33 35.7	65	74	127.9	3
4	35 03.9	62	77	123.9	34 45.3	62	77	124.4	34 26.6	62	76	124.8	34 07.8	63	76	125.3	33 48.9	63	76	125.8	33 29.9	64	75	126.2	33 10.8	64	75	126.7	32 51.6	64	74	127.2	4
45	34 17.5	61	78	123.2	33 59.2	61	78	123.6	33 40.8	62	77	124.1	33 22.2	62	77	124.6	33 03.6	62	76	125.1	32 44.9	63	76	125.5	32 26.0	63	75	126.0	32 07.1	63	75	126.4	45
6	33 30.7	60	78	122.4	33 12.7	60	78	122.9	32 54.5	61	78	123.4	32 36.2	61	77	123.9	32 17.9	61	77	124.3	31 59.4	62	76	124.8	31 40.8	62	76	125.3	31 22.1	62	76	125.7	6
7	32 43.6	59	79	121.7	32 25.8	60	79	122.2	32 07.9	60	78	122.7	31 49.9	60	78	123.2	31 31.7	61	78	123.6	31 13.5	61	77	124.1	30 55.2	61	77	124.6	30 36.8	62	76	125.0	7
8	31 56.1	58	80	121.1	31 38.6	59	79	121.5	31 20.9	59	79	122.0	31 03.1	59	78	122.5	30 45.2	60	78	123.0	30 27.3	60	78	123.4	30 09.2	60	77	123.9	29 51.0	61	77	124.3	8
9	31 08.3	58	80	120.4	30 51.0	58	80	120.9	30 33.6	58	79	121.4	30 16.0	59	79	121.8	29 58.4	59	79	122.3	29 40.7	59	78	122.8	29 22.8	60	78	123.2	29 04.9	60	78	123.7	9
50	30 20.2	57	81	119.8	30 03.1	57	80	120.2	29 45.9	58	80	120.7	29 28.6	58	80	121.2	29 11.2	58	79	121.6	28 53.7	58	79	122.1	28 36.1	59	78	122.6	28 18.4	59	78	123.0	50
1	29 31.7	56	81	119.1	29 14.9	56	81	119.6	28 57.9	57	80	120.1	28 40.8	57	80	120.5	28 23.7	57	80	121.0	28 06.4	58	79	121.5	27 49.1	58	79	121.9	27 31.6	58	78	122.4	1
2	28 43.0	55	82	118.5	28 26.3	56	81	119.0	28 09.6	56	81	119.4	27 52.8	56	81	119.9	27 35.8	57	80	120.4	27 18.8	57	80	120.8	27 01.7	57	79	121.3	26 44.5	58	79	121.8	2
3	27 53.9	55	82	117.9	27 37.5	55	82	118.4	27 21.0	55	81	118.8	27 04.4	56	81	119.3	26 47.7	56	81	119.8	26 30.9	56	80	120.2	26 14.0	56	80	120.7	25 57.0	57	80	121.1	3
4	27 04.6	54	83	117.3	26 48.4	54	82	117.8	26 32.1	54	82	118.2	26 15.7	55	82	118.7	25 59.2	55	81	119.2	25 42.7	55	81	119.6	25 26.0	56	80	120.1	25 09.2	56	80	120.5	4
55	26 15.1	53	83	116.7	25 59.1	53	83	117.2	25 43.0	54	82	117.6	25 26.8	54	82	118.1	25 10.5	54	82	118.6	24 54.2	55	81	119.0	24 37.7	55	81	119.5	24 21.2	55	81	120.0	55
6	25 25.2	52	83	116.1	25 09.4	53	83	116.6	24 53.6	53	83	117.1	24 37.6	53	82	117.5	24 21.5	54	82	118.0	24 05.4	54	82	118.5	23 49.2	54	81	118.9	23 32.8	54	81	119.4	6
7	24 35.2	52	84	115.6	24 19.6	52	84	116.0	24 03.9	52	83	116.5	23 48.1	53	83	117.0	23 32.3	53	82	117.4	23 16.3	53	82	117.9	23 00.3	54	82	118.3	22 44.2	54	81	118.8	7
8	23 44.9	51	84	115.0	23 29.5	51	84	115.5	23 14.0	52	84	115.9	22 58.4	52	83	116.4	22 42.8	52	83	116.9	22 27.0	53	82	117.3	22 11.2	53	82	117.8	21 55.4	53	82	118.2	8
9	22 54.3	51	84	114.5	22 39.1	51	84	114.9	22 23.8	51	84	115.4	22 08.5	51	84	115.9	21 53.0	52	83	116.3	21 37.5	52	83	116.8	21 21.9	52	83	117.2	21 06.2	52	82	117.7	9
60	22 03.6	50	85	113.9	21 48.6	50	85	114.4	21 33.5	50	84	114.9	21 18.3	51	84	115.3	21 03.0	51	84	115.8	20 47.7	51	83	116.3	20 32.3	51	83	116.7	20 16.8	52	83	117.2	60
1	21 12.6	49	85	113.4	20 57.8	50	85	113.9	20 42.9	50	85	114.3	20 27.9	50	84	114.8	20 12.8	50	84	115.3	19 57.7	51	84	115.7	19 42.5	51	83	116.2	19 27.2	51	83	116.6	1
2	20 21.5	49	85	112.9	20 06.8	49	85	113.4	19 52.1	49	85	113.8	19 37.3	49	85	114.3	19 22.4	50	84	114.7	19 07.5	50	84	115.2	18 52.5	50	84	115.7	18 37.4	50	84	116.1	2
3	19 30.2	48	86	112.4	19 15.7	48	86	112.9	19 01.1	49	85	113.3	18 46.5	49	85	113.8	18 31.8	49	85	114.2	18 17.1	49	84	114.7	18 02.2	50	84	115.2	17 47.3	50	84	115.6	3
4	18 38.6	48	86	111.9	18 24.3	48	86	112.4	18 09.9	48	86	112.8	17 55.5	48	85	113.3	17 41.0	48	85	113.7	17 26.4	49	85	114.2	17 11.8	49	84	114.7	16 57.1	49	84	115.1	4
65	17 46.9	47	86	111.4	17 32.8	47	86	111.9	17 18.6	47	86	112.3	17 04.3	48	86	112.8	16 50.0	48	85	113.3	16 35.6	48	85	113.7	16 21.1	48	85	114.2	16 06.6	48	84	114.6	65
6	16 55.0	46	87	110.9	16 41.1	47	86	111.4	16 27.0	47	86	111.9	16 12.9	47	86	112.3	15 58.8	47	86	112.8	15 44.5	48	85	113.2	15 30.3	48	85	113.7	15 15.9	48	85	114.1	6
7	16 03.0	46	87	110.5	15 49.2	46	87	110.9	15 35.3	46	86	111.4	15 21.4	47	86	111.8	15 07.4	47	86	112.3	14 53.3	47	86	112.8	14 39.2	47	85	113.2	14 25.1	47	85	113.7	7
8	15 10.8	45	87	110.0	14 57.1	46	87	110.5	14 43.4	46	87	110.9	14 29.7	46	86	111.4	14 15.8	46	86	111.8	14 01.9	46	86	112.3	13 48.0	47	86	112.7	13 34.0	47	85	113.2	8
9	14 18.5	45	88	109.5	14 04.9	45	87	110.0	13 51.4	45	87	110.5	13 37.8	45	87	110.9	13 24.1	46	86	111.4	13 10.4	46	86	111.8	12 56.6	46	86	112.3	12 42.8	46	86	112.7	9
70	13 26.0	44	88	109.1	13 12.6	45	88	109.5	12 59.2	45	87	110.0	12 45.7	45	87	110.5	12 32.2	45	87	110.9	12 18.7	45	86	111.4	12 05.1	45	86	111.8	11 51.4	46	86	112.3	70
1	12 33.3	44	88	108.6	12 20.1	44	88	109.1	12 06.8	44	87	109.6	11 53.5	44	87	110.0	11 40.2	45	87	110.5	11 26.8	45	87	110.9	11 13.4	45	86	111.4	10 59.9	45	86	111.8	1
2	11 40.5	43	88	108.2	11 27.5	44	88	108.7	11 14.3	44	88	109.1	11 01.2	44	88	109.6	10 48.0	44	87	110.0	10 34.8	44	87	110.5	10 21.5	44	87	111.0	10 08.2	44	86	111.4	2
3	10 47.6	43	88	107.8	10 34.7	43	88	108.2	10 21.7	43	88	108.7	10 08.7	43	88	109.2	9 55.7	44	88	109.6	9 42.6	44	87	110.1	9 29.5	44	87	110.5	9 16.3	44	87	111.0	3
4	9 54.6	43	89	107.4	9 41.8	43	88	107.8	9 29.0	43	88	108.3	9 16.1	43	88	108.7	9 03.2	43	88	109.2	8 50.2	43	87	109.6	8 37.3	43	87	110.1	8 24.3	43	87	110.6	4
75	9 01.4	42	89	106.9	8 48.8	42	89	107.4	8 36.1	42	88	107.8	8 23.3	42	88	108.3	8 10.6	43	88	108.8	7 57.8	43	88	109.2	7 45.0	43	87	109.7	7 32.1	43	87	110.1	75
6	8 08.1	42	89	106.5	7 55.6	42	89	107.0	7 43.1	42	88	107.4	7 30.5	42	88	107.9	7 17.8	42	88	108.3	7 05.2	42	88	108.8	6 52.5	42	88	109.3	6 39.8	42	87	109.7	6
7	7 14.8	41	89	106.1	7 02.3	41	89	106.6	6 49.9	41	89	107.0	6 37.5	42	89	107.5	6 25.0	42	88	107.9	6 12.5	42	88	108.4	5 59.9	42	88	108.9	5 47.4	42	87	109.3	7
8	6 21.3	41	89	105.7	6 09.0	41	89	106.2	5 56.7	41	89	106.6	5 44.3	41	89	107.1	5 32.0	41	88	107.5	5 19.6	41	88	108.0	5 07.2	41	88	108.4					8
9	5 27.6	41	90	105.3	5 15.5	41	89	105.8	5 03.3	41	89	106.2																					9

Lat. 23°

Lat. 24°

Lat. 25

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	84 00.0	1.0 07	180.0	84 30.0	1.0 08	180.0	85 00.0	1.0 09	180.0	85 30.0	1.0 10	180.0	86 00.0	1.0 11	180.0	86 30.0	1.0 12	180.0	87 00.0	1.0 14	180.0	87 30.0	1.0 17	180.0	00
1	83 55.6	99 22	170.9	84 25.2	99 24	170.1	84 54.7	98 26	169.2	85 24.2	98 28	168.0	85 53.5	97 31	166.6	86 22.6	97 35	164.8	86 51.4	96 39	162.5	87 19.8	94 45	159.3	1
2	83 42.6	96 35	162.2	84 11.1	95 37	160.7	84 39.4	94 40	159.0	85 07.3	92 43	157.0	85 34.8	91 47	154.5	86 01.7	88 52	151.5	86 27.8	85 57	147.7	86 52.7	80 64	142.8	2
3	83 21.8	91 46	154.2	83 48.9	89 48	152.2	84 15.4	87 52	150.0	84 41.3	85 56	147.4	85 06.4	82 60	144.3	85 30.5	78 64	140.7	85 53.4	74 69	136.3	86 14.6	67 74	131.2	3
4	82 54.5	85 54	147.1	83 19.8	83 58	144.8	83 44.3	81 61	142.3	84 08.0	77 64	139.4	84 30.7	74 68	136.1	84 52.1	69 72	132.3	85 12.0	63 76	128.0	85 30.1	57 80	123.0	4
05	82 21.8	79 62	140.9	82 45.2	77 65	138.5	83 07.8	74 68	135.8	83 29.4	70 71	132.8	83 49.8	66 74	129.5	84 08.9	61 78	125.8	84 26.3	55 81	121.7	84 41.9	48 84	117.2	05
6	81 44.7	74 68	135.6	82 06.4	71 70	133.1	82 27.2	67 73	130.4	82 46.9	64 76	127.5	83 05.3	59 78	124.3	83 22.4	54 81	120.8	83 37.8	49 84	117.0	83 51.5	42 86	112.9	6
7	81 04.2	69 72	131.0	81 24.3	65 74	128.6	81 43.4	62 77	125.9	82 01.4	58 79	123.1	32 18.2	54 82	120.1	82 33.6	49 84	116.8	82 47.5	43 86	113.3	82 59.6	38 88	109.6	7
8	80 21.0	64 76	127.1	80 39.6	61 78	124.7	80 57.3	57 80	122.2	81 13.9	53 82	119.5	81 29.2	49 84	116.6	81 43.2	44 86	113.6	81 55.8	39 88	110.4	82 06.8	34 89	107.0	8
9	79 35.6	60 78	123.6	79 53.0	56 80	121.4	80 09.4	53 82	118.9	80 24.7	49 84	116.4	80 38.9	45 86	113.7	80 51.7	41 87	110.9	81 03.3	36 89	108.0	81 13.3	31 90	104.9	9
10	78 48.5	56 81	120.7	79 04.8	53 82	118.5	79 20.1	49 84	116.2	79 34.3	46 86	113.8	79 47.5	42 87	111.3	79 59.4	38 88	108.7	80 10.0	33 90	106.0	80 19.4	29 91	103.2	10
1	78 00.0	53 83	118.1	78 15.3	49 84	116.0	78 29.6	46 85	113.8	78 43.0	43 87	111.6	78 55.3	39 88	109.2	79 06.4	35 89	106.8	79 16.3	31 90	104.3	79 25.0	27 91	101.7	1
2	77 10.4	50 84	115.8	77 24.8	47 85	113.8	77 38.4	43 87	111.8	77 50.9	40 88	109.6	78 02.4	37 89	107.4	78 12.9	33 90	105.1	78 22.2	29 91	102.8	78 30.4	25 91	100.4	2
3	76 19.9	47 86	113.8	76 33.6	44 87	111.9	76 46.4	41 88	109.9	76 58.2	38 88	107.9	77 09.1	35 90	105.8	77 19.0	31 90	103.7	77 27.9	28 91	101.5	77 35.6	24 92	99.3	3
4	75 28.6	45 86	112.0	75 41.6	42 87	110.2	75 53.8	39 88	108.3	76 05.1	36 89	106.4	76 15.4	33 90	104.4	76 24.8	30 91	102.4	76 33.2	26 91	100.4	76 40.6	23 92	98.3	4
15	74 36.7	43 87	110.3	74 49.2	40 88	108.6	75 00.7	37 89	106.8	75 11.5	34 90	105.0	75 21.4	31 90	103.2	75 30.4	28 91	101.3	75 38.4	25 92	99.3	75 45.5	22 92	97.4	15
6	73 44.3	41 88	108.9	73 56.2	38 89	107.2	74 07.3	36 90	105.5	74 17.6	33 90	103.8	74 27.1	30 91	102.0	74 35.7	27 91	100.3	74 43.4	24 92	98.4	74 50.3	21 92	96.6	6
7	72 51.5	39 89	107.5	73 02.9	37 89	106.0	73 13.6	34 90	104.3	73 23.5	32 91	102.7	73 32.6	29 91	101.0	73 40.9	26 92	99.3	73 48.4	23 92	97.6	73 55.0	21 92	95.8	7
8	71 58.3	38 89	106.3	72 09.3	35 90	104.8	72 19.5	33 90	103.3	72 29.1	31 91	101.7	72 37.9	28 91	100.1	72 45.9	25 92	98.5	72 53.2	23 92	96.8	72 59.6	20 92	95.2	8
9	71 04.7	37 90	105.2	71 15.3	34 90	103.7	71 25.3	32 91	102.3	71 34.5	30 91	100.8	71 43.1	27 92	99.2	71 50.9	25 92	97.7	71 57.9	22 92	96.1	72 04.2	20 92	94.5	9
20	70 10.9	35 90	104.1	70 21.2	33 91	102.7	70 30.8	31 91	101.3	70 39.8	29 92	99.9	70 48.1	26 92	98.4	70 55.7	24 92	97.0	71 02.6	22 92	95.5	71 08.7	19 92	94.0	20
1	69 16.8	34 90	103.2	69 26.8	32 91	101.8	69 36.2	30 91	100.5	69 44.9	28 92	99.1	69 53.0	26 92	97.7	70 00.4	24 92	96.3	70 07.1	21 92	94.9	70 13.2	19 93	93.4	1
2	68 22.6	33 91	102.3	68 32.3	31 91	101.0	68 41.4	29 92	99.7	68 49.9	27 92	98.4	68 57.8	25 92	97.0	69 05.1	23 92	95.7	69 11.7	21 92	94.3	69 17.6	19 93	92.9	2
3	67 28.1	33 91	101.4	67 37.6	31 91	100.2	67 46.5	29 92	98.9	67 54.9	27 92	97.7	68 02.6	25 92	96.4	68 09.7	23 92	95.1	68 16.2	21 93	93.7	68 22.1	19 93	92.4	3
4	66 33.5	32 91	100.6	66 42.8	30 92	99.4	66 51.5	28 92	98.2	66 59.7	26 92	97.0	67 07.3	24 92	95.8	67 14.3	22 92	94.5	67 20.7	20 93	93.2	67 26.5	18 93	92.0	4
25	65 38.8	31 92	99.9	65 47.9	29 92	98.7	65 56.4	28 92	97.5	66 04.4	26 92	96.4	66 11.9	24 92	95.2	66 18.8	22 92	94.0	66 25.1	20 93	92.7	66 30.9	18 93	91.5	25
6	64 43.9	31 92	99.2	64 52.8	29 92	98.1	65 01.2	27 92	96.9	65 09.1	25 92	95.8	65 16.5	24 92	94.6	65 23.3	22 93	93.5	65 29.5	20 93	92.3	65 35.3	18 93	91.1	6
7	63 48.9	30 92	98.5	63 57.7	28 92	97.4	64 06.0	27 92	96.3	64 13.7	25 92	95.2	64 21.0	23 92	94.1	64 27.7	22 93	93.0	64 33.9	20 93	91.8	64 39.6	18 93	90.7	7
8	62 53.9	30 92	97.9	63 02.5	28 92	96.8	63 10.6	26 92	95.8	63 18.3	25 92	94.7	63 25.5	23 93	93.6	63 32.2	21 93	92.5	63 38.3	20 93	91.4	63 44.0	18 93	90.3	8
9	61 58.7	29 92	97.3	62 07.2	28 92	96.2	62 15.3	26 92	95.2	62 22.8	24 92	94.2	62 29.9	23 93	93.1	62 36.6	21 93	92.1	62 42.7	20 93	91.0	62 48.4	18 93	89.9	9
30	61 03.5	29 92	96.7	61 11.9	27 92	95.7	61 19.8	26 92	94.7	61 27.3	24 92	93.7	61 34.4	23 93	92.7	61 41.0	21 93	91.6	61 47.1	20 93	90.6	61 52.7	16 93	89.6	30
1	60 08.2	28 92	96.1	60 16.5	27 92	95.2	60 24.4	25 92	94.2	60 31.8	24 92	93.2	60 38.8	23 93	92.2	60 45.4	21 93	91.2	60 51.5	20 93	90.2	60 57.1	18 93	89.2	1
2	59 12.9	28 92	95.6	59 21.1	27 92	94.6	59 28.9	25 92	93.7	59 36.3	24 93	92.7	59 43.2	22 93	91.8	59 49.7	21 93	90.8	59 55.8	20 93	89.8	60 01.5	18 93	88.8	2
3	58 17.5	28 92	95.1	58 25.6	26 92	94.2	58 33.3	25 92	93.2	58 40.7	24 93	92.3	58 47.6	22 93	91.4	58 54.1	21 93	90.4	59 00.2	20 93	89.5	59 05.9	18 93	88.5	3
4	57 22.1	27 92	94.6	57 30.1	26 92	93.7	57 37.8	25 93	92.8	57 45.1	24 93	91.9	57 52.0	22 93	91.0	57 58.5	21 93	90.0	58 04.6	20 93	89.1	58 10.3	18 93	88.2	4
35	56 26.6	27 92	94.1	56 34.6	26 93	93.2	56 42.2	25 93	92.3	56 49.5	24 93	91.5	56 56.3	22 93	90.6	57 02.8	21 93	89.7	57 08.9	20 93	88.8	57 14.7	18 93	87.9	35
6	55 31.1	27 92	93.6	55 39.0	26 93	92.8	55 46.6	25 93	91.9	55 53.9	23 93	91.0	56 00.7	22 93	90.2	56 07.2	21 93	89.3	56 13.3	20 93	88.4	56 19.1	19 93	87.5	6
7	54 35.6	27 93	93.2	54 43.5	26 93	92.3	54 51.0	25 93	91.5	54 58.2	23 93	90.7	55 05.1	22 93	89.8	55 11.6	21 93	88.9	55 17.7	20 93	88.1	55 23.5	19 93	87.2	7
8	53 40.0	27 93	92.7	53 47.9	26 93	91.9	53 55.4	25 93	91.1	54 02.6	23 93	90.3	54 09.5	22 93	89.4	54 16.0	21 93	88.6	54 22.1	20 93	87.8	54 28.0	19 93	86.9	8
9	52 44.4	27 93	92.3	52 52.3	26 93	91.5	52 59.8	25 93	90.7	53 07.0	23 93	89.9	53 13.8	22 93	89.1	53 20.4	21 93	88.3	53 26.6	20 93	87.4	53 32.4	19 92	86.6	9
40	51 48.8	27 93	91.9	51 56.6	26 93	91.1	52 04.2	25 93	90.3	52 11.3	23 93	89.5	52 18.2	22 93	88.7	52 24.8	21 93	87.9	52 31.0	20 93	87.1	52 36.9	19 92	86.3	40
1	50 53.2	26 93	91.5	51 01.0	25 93	90.7	51 08.5	25 93	89.9	51 15.7	23 93	89.2	51 22.6	22 93	88.4	51 29.2	21 93	87.6	51 35.4	20 93	86.8	51 41.4	19 92	86.0	1
2	49 57.6	26 93	91.1	50 05.4	25 93	90.3	50 12.9	25 93	89.6	50 20.1	24 93	88.8	50 27.0	23 93	88.0	50 33.6	22 93	87.3	50 39.9	21 93	86.5	50 45.9	19 92	85.7	2
3	49 02.0	26 93	90.7	49 09.8	25 93	89.9	49 17.3	25 93	89.2	49 24.5	24 93	88.5	49 31.4	23 93	87.7	49 38.0	22 92	87.0	49 44.4	21 92	86.2	49 50.4	20 92	85.4	3
4	48 06.3	26 93	90.3	48 14.1	25 93	89.6	48 21.6	25 93	88.8	48 28.9	24 93	88.1	48 35.8	23 93	87.4	48 42.5	22 92	86.6	48 48.9	21 92	85.9	48 55.0	20 92	85.2	4
45	47 10.7	26 93	89.9	47 18.5	26 93	89.2	47 26.0	25 93	88.5	47 33.3	24 93	87.8	47 40.3	23 93	87.1	47 47.0	22 92	86.3	47 53.4	21 92	85.6	47 59.6	20 92	84.9	45
6	46 15.1	26 93	89.6	46 22.9	26 93	88.9	46 30.4	25 93	88.1	46 37.7	24 93	87.4	46 44.7	23 92	86.7	46 51.5	22 92	86.0	46 57.9	21 92	85.3	47 04.2	20 92	84.6	6
7	45 19.5	26 93	89.2	45 27.3	26 93	88.5	45 34.8	25 93	87.8	45 42.1	24 93	87.1	45 49.2	23 92	86.4	45 56.0	22 92	85.7	46 02.5	21 92	85.0	46 08.8	21 92	84.3	7
8	44 23.8	26 93	88.8	44 31.7	26 93	88.2	44 39.2	25 93	87.5	44 46.6	24 93	86.8	44 53.7	23 92	86.1	45 00.5	22 92	85.4	45 07.1	22 92	84.7	45 13.4	21 92	84.0	8
9	43 28.2	27 93	88.5	43 36.1	26 93	87.8	43 43.7	25 93	87.1	43 51.0	24 92	86.5	43 58.2	23 92	85.8	44 05.1	23 92	85.1	44 11.7	22 92	84.4	44 18.1	21 92	83.8	9
50	42 32.6	27 93	88.1	42 40.5	26 93	87.5	42 48.1	25 93	86.8	42 55.5	24 92	86.2	43 02.7	24 92	85.5	43 09.6	23 92	84.8	43 16.4	22 92	84.2	43 22.8	21 92	83.5	50
1	41 37.0	27 93	87.8	41 44.9	26 93	87.1	41 52.6	25 92	86.5	42 00.0	24 92	85.8	42 07.3	24 92	85.2	42 14.3	23 92	84.5	42 21.0	22 92	83.9	42 27.6	21 92	83.2	1
2	40 41.4	27 93	87.4	40 49.4	26 93	86.8	40 57.1	25 92	86.2	41 04.6	25 92	85.5	41 11.8	24 92	84.9	41 18.9	23 92	84.2	41 25.7	22 92	83.6	41 32.4	22 92	82.9	2
3	39 45.9	27 93	87.1	39 53.8	26 92	86.5	40 01.6	25 92	85.8	40 09.1	25 92	85.2	40 16.4	24 92	84.6	40 23.6	23 92	83.9	40 30.5	23 92	83.3	40 37.2	22 92	82.7	3
4	38 50.3	27 93	86.8	38 58.3	26 92	86.1	39 06.1	26 92	85.5	39 13.7	25 92	84.9	39 21.1	24 92	84.3	39 28.3	24 92	83.6	39 35.2	23 92	83.0	39 42.0	22 92	82.4	4
55	37 54.8	27 92	86.4	38 02.8	26 92	85.8	38 10.6	26 92	85.2	38 18.3	25 92	84.6	38 25.7	25 92	84.0	38 33.0	24 92	83.4	38 40.0	23 92	82.7	38 46.9	23 92	82.1	55
6	36 59.3	27 92	86.1	37 07.3	27 92	85.5	37 15.2	26 92	84.9	37 22.9	25 92	84.3	37 30.4	25 92	83.7	37 37.7	24 92	83.1	37 44.9	23 92	82.5	37 51.8	23 92	81.8	6
7	36 03.8	27 92	85.8	36 11.9	27 92	85.2	36 19.8	26 92	84.6	36 27.6	26 92	84.0	36 35.1	25 92	83.4	36 42.5	24 92	82.8	36 49.7	24 92	82.2	36 56.8	23 92	81.6	7
8	35 08.3	27 92	85.5	35 16.5	27 92	84.9	35 24.4	26 92	84.3	35 32.3	26 92	83.7	35 39.9	25 92	83.1	35 47.4	25 92	82.5	35 54.6	24 92	81.9	36 01.7	23 92	81.3	8
9	34 12.9	28 92	85.1	34 21.1	27 92	84.6	34 29.1	27 92	84.0	34 37.0	26 92	83.4	34 44.7	25 92	82.8	34 52.2	25 92	82.2	34 59.6	24 92	81.6	35 06.8	24 92	81.0	9
60	33 17.4	28 92	84.8	33 25.7	27 92	84.2	33 33.8	27 92	83.7	33 41.7	26 92	83.1	33 49.5	26 92	82.5	33 57.1	25 92	81.9	34 04.6	25 92	81.3	34 11.8	24 91	80.8	60
1	32 22.1	28 92	84.5	32 30.4	27 92	83.9	32 38.5	27 92	83.4	32 46.5	26 92	82.8	32 54.4	26 92	82.2	33 02.1	25 92	81.6	33 09.6	25 92	81.1	33 17.0	24 91	80.5	1
2	31 26.7	28 92	84.2	31 35.1	28 92	83.6	31 43.3	27 92	83.1	31 51.4	27 92	82.5	31 59.3	26 92	81.9	32 07.0	26 92	81.3	32 14.7	25 92	80.8	32 22.1	25 91	80.2	2
3	30 31.4	28 92	83.9	30 39.8	28 92	83.3	30 48.1	27 92	82.7	30 56.2	27 92	82.2	31 04.2	26 92	81.6	31 12.1	26 92	81.1	31 19.8	25 91	80.5	31 27.3	25 91	79.9	3
4	29 36.1	29 92	83.5	29 44.6	28 92	83.0	29 52.9	28 92	82.4	30 01.1	27 92	81.9	30 09.2	27 92	81.3	30 17.1	26 92	80.8	30 24.9	26 91	80.2	30 32.6	25 91	79.7	4
65	28 40.8	29 92	83.2	28 49.4	28 92	82.7	28 57.8	28 92	82.1	29 06.1	27 92	81.6	29 14.2	27 92	81.0	29 22.2	26 91	80.5	29 30.1	26 91	79.9	29 37.9	26 91	79.4	65
6	27 45.6	29 92	82.9	27 54.2	29 92	82.4	28 02.7	28 92	81.8	28 11.1	28 92	81.3	28 19.3	27 91	80.7	28 27.4	27 91	80.2	28 35.4	26 91	79.6	28 43.2	26 91	79.1	6
7	26 50.4	29 92	82.6	26 59.1	29 92	82.1	27 07.7	28 92	81.5	27 16.1	28 92	81.0	27 24.4	28 91	80.4	27 32.6	27 91	79.9	27 40.7	27 91	79.4	27 48.6	26 91	78.8	7
8	25 55.3	29 92	82.3	26 04.0	29 92	81.8	26 12.7	29 92	81.2	26 21.2	28 92	80.7	26 29.6	28 91	80.2	26 37.9	27 91	79.6	26 46.0	27 91	79.1	26 54.1	27 91	78.5	8
9	25 00.1	30 92	82.0	25 09.0	29 92	81.4	25 17.7	29 92	80.9	25 26.3	28 91	80.4	25 34.8	28 91	79.9	25 43.2	28 91	79.3	25 51.4	27 91	78.8	25 59.6	27 91	78.3	9
70	24 05.1	30 92	81.7	24 14.0	30 92	81.1	24 22.8	29 92	80.6	24 31.5	29 91	80.1	24 40.1	28 91	79.6	24 48.5	28 91	79.0	24 56.9	28 91	78.5	25 05.1	27 90	78.0	70
1	23 10.1	30 92	81.3	23 19.0	30 92	80.8	23 27.9	29 91	80.3	23 36.7	29 91	79.8	23 45.4	29 91	79.3	23 53.9	28 91	78.7	24 02.4	28 91	78.2	24 10.8	28 90	77.7	1
2	22 15.1	30 92	81.0	22 24.1	30 91	80.5	22 33.1	30 91	80.0	22 42.0	29 91	79.5	22 50.7	29 91	79.0	22 59.4	29 91	78.4	23 08.0	28 91	77.9	23 16.4	28 90	77.4	2
3	21 20.2	31 92	80.7	21 29.3	30 91	80.2	21 38.4	30 91	79.7	21 47.3	30 91	79.2	21 56.2	29 91	78.7	22 04.9	29 91	78.1	22 13.6	29 90	77.6	22 22.2	28 90	77.1	3
4	20 25.3	31 91	80.4	20 34.5	31 91	79.9	20 43.7	30 91	79.4	20 52.7	30 91	78.9	21 01.7	30 91	78.4	21 10.5	29 90	77.8	21 19.3	29 90	77.3	21 28.0	29 90	76.8	4
75	19 30.5	31 91	80.1	19 39.8	31 91	79.6	19 49.0	31 91	79.1	19 58.1	30 91	78.6	20 07.2	30 91	78.1	20 16.2	30 90	77.5	20 25.1	29 90	77.0	20 33.8	29 90	76.5	75
6	18 35.7	31 91	79.8	18 45.1	31 91	79.3	18 54.4	31 91	78.8	19 03.6	31 91	78.3	19 12.8	30 91	77.8	19 21.9	30 90	77.2	19 30.9	30 90	76.7	19 39.8	30 90	76.2	6
7	17 41.0	32 91	79.4	17 50.5	32 91	78.9	17 59.9	31 91	78.4	18 09.2	31 91	77.9	18 18.5	31 90	77.4	18 27.7	30 90	76.9	18 36.8	30 90	76.4	18 45.8	30 90	75.9	7
8	16 46.3	32 91	79.1	16 55.9	32 91	78.6	17 05.4	32 91	78.1	17 14.8	31 90	77.6	17 24.2	31 90	77.1	17 33.5	31 90	76.6	17 42.7	31 90	76.1	17 51.9	30 90	75.6	8
9	15 51.7	32 91	78.8	16 01.4	32 91	78.3	16 11.0	32 91	77.8	16 20.5	32 90	77.3	16 30.0	31 90	76.8	16 39.4	31 90	76.3	16 48.7	31 90	75.8	16 58.0	31 90	75.3	9
80	14 57.2	33 91	78.5	15 06.9	32 91	78.0	15 16.6	32 90	77.5	15 26.3	32 90	77.0	15 35.9	32 90	76.5	15 45.4	32 90	76.0	15 54.8	31 90	75.5	16 04.2	31 90	75.0	80
1	14 02.7	33 91	78.1	14 12.6	33 91	77.7	14 22.4	33 90	77.2	14 32.1	32 90	76.7	14 41.8	32 90	76.2	14 51.4	32 90	75.7	15 01.0	32 90	75.2	15 10.5	32 89	74.7	1
2	13 08.3	33 91	77.8	13 18.2	33 90	77.3	13 28.2	33 90	76.9	13 38.0	33 90	76.4	13 47.8	33 90	75.9	13 57.6	32 90	75.4	14 07.3	32 89	74.9	14 16.9	32 89	74.4	2
3	12 13.9	34 90	77.5	12 24.0	33 90	77.0	12 34.0	33 90	76.5	12 44.0	33 90	76.0	12 53.9	33 90	75.6	13 03.8	33 90	75.1	13 13.6	33 89	74.6	13 23.3	32 89	74.1	3
4	11 19.7	34 90	77.2	11 29.8	34 90	76.7	11 40.0	34 90	76.2	11 50.0	34 90	75.7	12 00.1	33 90	75.2	12 10.1	33 89	74.8	12 20.0	33 89	74.3	12 29.9	33 89	73.8	4
85	10 25.5	34 90	76.8	10 35.7	34 90	76.3	10 46.0	34 90	75.9	10 56.2	34 90	75.4	11 06.3	34 89	74.9	11 16.5	34 89	74.4	11 26.5	33 89	73.9	11 36.5	33 89	73.5	85
6	9 31.3	35 90	76.5	9 41.7	35 90	76.0	9 52.1	34 90	75.5	10 02.4	34 90	75.1	10 12.7	34 89	74.6	10 22.9	34 89	74.1	10 33.1	34 89	73.6	10 43.2	34 89	73.1	6
7	8 37.3	35 90	76.1	8 47.8	35 90	75.7	8 58.2	35 90	75.2	9 08.7	35 90	74.7	9 19.1	35 89	74.3	9 29.4	34 89	73.8	9 39.7	34 89	73.3	9 50.0	34 88	72.8	7
8	7 43.3	35 90	75.8	7 53.9	35 90	75.3	8 04.5	35 90	74.9	8 15.0	35 89	74.4	8 25.6	35 89	73.9	8 36.1	35 89	73.4	8 46.5	35 89	73.0	8 56.9	35 88	72.5	8
9	6 49.4	36 90	75.5	7 00.1	36 90	75.0	7 10.8	36 89	74.5	7 21.5	36 89	74.0	7 32.2	35 89	73.6	7 42.8	35 89	73.1	7 53.4	35 88	72.6	8 03.9	35 88	72.2	9
90	5 55.6	36 90	75.1	6 06.4	36 89	74.6	6 17.3	36 89	74.2	6 28.1	36 89	73.7	6 38.8	36 89	73.2	6 49.6	36 88	72.8	7 00.3	36 88	72.3	7 11.0	36 88	71.8	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	52 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	49 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	00
1	51 59.2	1.0 04	178.4	51 29.3	1.0 04	178.5	50 59.3	1.0 04	178.5	50 29.3	1.0 04	178.5	49 59.3	1.0 04	178.5	49 29.3	1.0 04	178.6	48 59.3	1.0 04	178.6	48 29.3	1.0 04	178.6	1
2	51 57.0	1.0 06	176.9	51 27.0	1.0 06	176.9	50 57.1	1.0 06	177.0	50 27.1	1.0 06	177.0	49 57.1	1.0 06	177.0	49 27.2	1.0 06	177.1	48 57.2	1.0 06	177.1	48 27.2	1.0 06	177.2	2
3	51 53.2	1.0 09	175.3	51 23.3	1.0 09	175.4	50 53.4	1.0 08	175.4	50 23.5	1.0 08	175.5	49 53.5	1.0 08	175.6	49 23.6	1.0 08	175.6	48 53.7	1.0 08	175.7	48 23.8	1.0 08	175.7	3
4	51 47.9	99 11	173.8	51 18.1	99 11	173.9	50 48.2	99 11	173.9	50 18.4	99 11	174.0	49 48.5	99 11	174.1	49 18.7	1.0 11	174.2	48 48.8	1.0 10	174.3	48 19.0	1.0 10	174.3	4
05	51 41.1	99 14	172.2	51 11.4	99 14	172.3	50 41.6	99 13	172.4	50 11.9	99 13	172.5	49 42.1	99 13	172.6	49 12.3	99 13	172.7	48 42.6	99 13	172.8	48 12.8	99 12	172.9	05
6	51 32.9	99 16	170.7	51 03.2	99 16	170.8	50 33.6	99 16	170.9	50 03.9	99 16	171.1	49 34.3	99 15	171.2	49 04.6	99 15	171.3	48 34.9	99 15	171.4	48 05.3	99 15	171.5	6
7	51 23.2	98 19	169.2	50 53.6	98 18	169.3	50 24.1	98 18	169.5	49 54.6	98 18	169.6	49 25.1	98 18	169.7	48 55.5	99 18	169.9	48 26.0	99 17	170.0	47 56.4	99 17	170.1	7
8	51 12.0	98 21	167.7	50 42.6	98 21	167.8	50 13.3	98 20	168.0	49 43.9	98 20	168.2	49 14.5	98 20	168.3	48 45.0	98 20	168.5	48 15.6	98 19	168.6	47 46.2	98 19	168.7	8
9	50 59.4	97 23	166.2	50 30.2	97 23	166.4	50 01.0	97 23	166.5	49 31.8	97 22	166.7	49 02.5	98 22	166.9	48 33.2	98 22	167.0	48 04.0	98 22	167.2	47 34.7	98 21	167.4	9
10	50 45.4	97 26	164.7	50 16.4	97 25	164.9	49 47.4	97 25	165.1	49 18.3	97 25	165.3	48 49.2	97 24	165.5	48 20.1	97 24	165.7	47 51.0	97 24	165.8	47 21.9	97 24	166.0	10
1	50 30.1	96 28	163.2	50 01.2	96 28	163.5	49 32.4	96 27	163.7	49 03.5	96 27	163.9	48 34.6	96 26	164.1	48 05.7	96 26	164.3	47 36.8	96 26	164.5	47 07.8	97 26	164.7	1
2	50 13.3	95 30	161.8	49 44.7	95 30	162.0	49 16.1	96 29	162.3	48 47.4	96 29	162.5	48 18.7	96 29	162.7	47 50.0	96 28	162.9	47 21.2	96 28	163.1	46 52.5	96 28	163.3	2
3	49 55.3	95 32	160.4	49 26.9	95 32	160.6	48 58.5	95 32	160.9	48 30.0	95 31	161.1	48 01.5	95 31	161.3	47 33.0	95 30	161.6	47 04.5	95 30	161.8	46 35.9	95 30	162.0	3
4	49 36.0	94 34	159.0	49 07.8	94 34	159.2	48 39.6	94 34	159.5	48 11.4	94 33	159.8	47 43.1	94 33	160.0	47 14.8	94 32	160.2	46 46.5	94 32	160.5	46 18.1	95 32	160.7	4
15	49 15.4	93 36	157.6	48 47.5	93 36	157.9	48 19.5	93 36	158.1	47 51.5	93 35	158.4	47 23.5	94 35	158.7	46 55.4	94 34	158.9	46 27.3	94 34	159.2	45 59.2	94 34	159.4	15
6	48 53.6	92 38	156.2	48 25.9	92 38	156.5	47 58.2	92 38	156.8	47 30.5	93 37	157.1	47 02.7	93 37	157.4	46 34.8	93 36	157.6	46 07.0	93 36	157.9	45 39.1	93 36	158.2	6
7	48 30.6	91 40	154.9	48 03.2	91 40	155.2	47 35.7	92 39	155.5	47 08.2	92 39	155.8	46 40.7	92 38	156.1	46 13.1	92 38	156.4	45 45.5	92 38	156.7	45 17.8	92 37	156.9	7
8	48 06.4	90 42	153.6	47 39.3	91 42	153.9	47 12.1	91 41	154.2	46 44.9	91 41	154.5	46 17.6	91 40	154.8	45 50.3	91 40	155.1	45 22.9	91 40	155.4	44 55.5	91 39	155.7	8
9	47 41.1	89 44	152.3	47 14.2	90 44	152.6	46 47.3	90 43	153.0	46 20.4	90 43	153.3	45 53.4	90 42	153.6	45 26.3	90 42	153.9	44 59.2	90 41	154.2	44 32.1	91 41	154.5	9
20	47 14.7	88 46	151.0	46 48.1	89 45	151.4	46 21.5	89 45	151.7	45 54.8	89 44	152.0	45 28.1	89 44	152.4	45 01.3	89 43	152.7	44 34.5	90 43	153.0	44 07.6	90 42	153.3	20
1	46 47.2	87 48	149.8	46 21.0	88 47	150.1	45 54.6	88 46	150.5	45 28.2	88 46	150.8	45 01.8	88 46	151.2	44 35.3	88 45	151.5	44 08.7	89 45	151.8	43 42.1	89 44	152.1	1
2	46 18.7	86 49	148.6	45 52.8	87 49	148.9	45 26.7	87 48	149.3	45 00.6	87 48	149.6	44 34.5	87 47	150.0	44 08.2	88 47	150.3	43 42.0	88 46	150.7	43 15.6	88 46	151.0	2
3	45 49.2	85 51	147.4	45 23.6	86 50	147.8	44 57.8	86 50	148.1	44 32.0	86 49	148.5	44 06.2	86 49	148.8	43 40.2	87 48	149.2	43 14.2	87 48	149.5	42 48.2	87 47	149.9	3
4	45 18.8	84 52	146.2	44 53.4	85 52	146.6	44 28.0	85 51	147.0	44 02.5	85 51	147.3	43 36.9	85 50	147.7	43 11.3	86 50	148.1	42 45.6	86 49	148.4	42 19.8	86 49	148.8	4
25	44 47.4	83 54	145.1	44 22.3	84 53	145.5	43 57.2	84 53	145.8	43 32.0	84 52	146.2	43 06.7	84 52	146.6	42 41.4	85 51	147.0	42 16.0	85 51	147.3	41 50.5	85 50	147.7	25
6	44 15.1	82 55	144.0	43 50.3	83 55	144.4	43 25.5	83 54	144.7	43 00.6	83 54	145.1	42 35.6	83 53	145.5	42 10.6	84 53	145.9	41 45.5	84 52	146.2	41 20.3	84 52	146.6	6
7	43 41.9	81 57	142.9	43 17.5	82 56	143.3	42 53.0	82 56	143.7	42 28.4	82 55	144.1	42 03.7	82 55	144.4	41 39.0	83 54	144.8	41 14.1	83 54	145.2	40 49.2	83 53	145.6	7
8	43 07.9	80 58	141.8	42 43.8	81 58	142.2	42 19.6	81 57	142.6	41 55.3	81 56	143.0	41 31.0	81 56	143.4	41 06.5	82 56	143.8	40 42.0	82 55	144.2	40 17.4	82 54	144.5	8
9	42 33.1	79 59	140.8	42 09.3	80 59	141.2	41 45.4	80 58	141.6	41 21.4	80 58	142.0	40 57.4	80 57	142.4	40 33.2	81 57	142.8	40 09.0	81 56	143.2	39 44.7	81 56	143.5	9
30	41 57.6	78 61	139.7	41 34.1	78 60	140.2	41 10.5	79 60	140.6	40 46.8	79 59	141.0	40 23.0	79 58	141.4	39 59.2	80 58	141.8	39 35.3	80 58	142.2	39 11.3	80 57	142.5	30
1	41 21.2	77 62	138.7	40 58.0	77 61	139.2	40 34.8	78 61	139.6	40 11.4	78 60	140.0	39 47.9	78 60	140.4	39 24.4	79 59	140.8	39 00.8	79 59	141.2	38 37.1	79 58	141.6	1
2	40 44.2	76 63	137.8	40 21.3	76 62	138.2	39 58.3	77 62	138.6	39 35.3	77 62	139.0	39 12.1	77 61	139.4	38 48.9	78 60	139.8	38 25.5	78 60	140.2	38 02.1	78 59	140.6	2
3	40 06.4	75 64	136.8	39 43.9	75 64	137.2	39 21.2	76 63	137.7	38 58.4	76 62	138.1	38 35.6	76 62	138.5	38 12.6	77 62	138.9	37 49.6	77 61	139.3	37 26.5	77 60	139.7	3
4	39 28.0	74 65	135.9	39 05.8	74 65	136.3	38 43.4	75 64	136.7	38 20.9	75 64	137.2	37 58.4	75 63	137.6	37 35.7	76 62	138.0	37 13.0	76 62	138.4	36 50.2	76 62	138.8	4
35	38 49.0	73 66	135.0	38 27.0	73 66	135.4	38 04.9	74 65	135.8	37 42.8	74 65	136.3	37 20.5	74 64	136.7	36 58.2	75 64	137.1	36 35.7	75 63	137.5	36 13.2	75 63	137.9	35
6	38 09.3	72 67	134.1	37 47.6	72 66	134.5	37 25.9	73 66	134.9	37 04.0	73 66	135.4	36 42.0	73 65	135.8	36 20.0	74 65	136.2	35 57.9	74 64	136.6	35 35.6	74 64	137.0	6
7	37 29.0	71 68	133.2	37 07.7	71 68	133.6	36 46.2	72 67	134.1	36 24.6	72 66	134.5	36 03.0	72 66	134.9	35 41.2	73 66	135.4	35 19.4	73 65	135.8	34 57.4	73 65	136.2	7
8	36 48.2	70 69	132.3	36 27.1	70 68	132.8	36 05.9	71 68	133.2	35 44.7	71 68	133.7	35 23.3	71 67	134.1	35 01.8	72 66	134.5	34 40.3	72 66	134.9	34 18.6	72 66	135.4	8
9	36 06.8	69 70	131.5	35 46.0	70 69	132.0	35 25.1	70 69	132.4	35 04.1	70 68	132.8	34 43.1	70 68	133.3	34 21.9	71 68	133.7	34 00.6	71 67	134.1	33 39.3	71 67	134.5	9
40	35 24.9	68 71	130.7	35 04.4	69 70	131.1	34 43.8	69 70	131.6	34 23.1	69 69	132.0	34 02.3	69 69	132.5	33 41.4	70 68	132.9	33 20.4	70 68	133.3	32 59.3	70 67	133.7	40
1	34 42.5	67 72	129.9	34 22.2	68 71	130.4	34 01.9	68 71	130.8	33 41.5	68 70	131.2	33 21.0	69 70	131.7	33 00.4	69 69	132.1	32 39.7	69 69	132.5	32 18.9	69 68	133.0	1
2	33 59.5	66 72	129.1	33 39.6	67 72	129.6	33 19.6	67 71	130.0	32 59.4	67 71	130.5	32 39.2	68 70	130.9	32 18.8	68 70	131.3	31 58.4	68 70	131.8	31 37.9	68 69	132.2	2
3	33 16.2	65 73	128.4	32 56.5	66 73	128.8	32 36.7	66 72	129.3	32 16.8	66 72	129.7	31 56.9	67 71	130.1	31 36.8	67 71	130.6	31 16.7	67 70	131.0	30 56.5	68 70	131.4	3
4	32 32.3	65 74	127.6	32 12.9	65 73	128.1	31 53.4	65 73	128.5	31 33.8	65 72	129.0	31 14.1	66 72	129.4	30 54.4	66 72	129.8	30 34.5	66 71	130.3	30 14.5	67 71	130.7	4
45	31 48.0	64 74	126.9	31 28.9	64 74	127.3	31 09.7	64 74	127.8	30 50.3	65 73	128.2	30 30.9	65 73	128.7	30 11.4	65 72	129.1	29 51.8	65 72	129.6	29 32.1	66 71	130.0	45
6	31 03.3	63 75	126.2	30 44.5	63 75	126.6	30 25.5	63 74	127.1	30 06.4	64 74	127.5	29 47.3	64 74	128.0	29 28.0	64 73	128.4	29 08.7	65 72	128.9	28 49.3	65 72	129.3	6
7	30 18.2	62 76	125.5	29 59.6	62 75	125.9	29 40.9	63 75	126.4	29 22.1	63 74	126.8	29 03.2	63 74	127.3	28 44.2	63 74	127.7	28 25.2	64 73	128.2	28 06.0	64 73	128.6	7
8	29 32.7	61 76	124.8	29 14.4	61 76	125.3	28 55.9	62 76	125.7	28 37.4	62 75	126.2	28 18.8	62 75	126.6	28 00.0	63 74	127.0	27 41.2	63 74	127.5	27 22.4	63 74	127.9	8
9	28 46.9	60 77	124.1	28 28.8	61 77	124.6	28 10.6	61 76	125.0	27 52.3	61 76	125.5	27 33.9	61 75	125.9	27 15.4	62 75	126.4	26 56.9	62 74	126.8	26 38.3	62 74	127.3	9
50	28 00.7	59 78	123.5	27 42.8	60 77	123.9	27 24.8	60 77	124.4	27 06.8	60 76	124.8	26 48.7	61 76	125.3	26 30.5	61 76	125.7	26 12.2	61 75	126.2	25 53.8	61 75	126.6	50
1	27 14.1	59 78	122.8	26 56.5	59 78	123.3	26 38.8	59 77	123.7	26 21.0	59 77	124.2	26 03.1	60 76	124.6	25 45.1	60 76	125.1	25 27.1	60 76	125.5	25 09.0	61 75	126.0	1
2	26 27.2	58 79	122.2	26 09.8	58 78	122.7	25 52.3	58 78	123.1	25 34.8	59 78	123.6	25 17.1	59 77	124.0	24 59.4	59 77	124.5	24 41.6	59 76	124.9	24 23.8	60 76	125.3	2
3	25 40.0	57 79	121.6	25 22.8	57 79	122.1	25 05.6	58 78	122.5	24 48.3	58 78	123.0	24 30.9	58 78	123.4	24 13.4	58 77	123.9	23 55.8	59 77	124.3	23 38.2	59 76	124.7	3
4	24 52.4	56 80	121.0	24 35.5	57 79	121.5	24 18.5	57 79	121.9	24 01.4	57 78	122.4	23 44.3	57 78	122.8	23 27.0	58 78	123.2	23 09.7	58 77	123.7	22 52.3	58 77	124.1	4
55	24 04.6	55 80	120.4	23 47.9	56 80	120.9	23 31.1	56 79	121.3	23 14.3	56 79	121.8	22 57.4	57 79	122.2	22 40.4	57 78	122.6	22 23.3	57 78	123.1	22 06.1	57 78	123.5	55
6	23 16.5	55 81	119.8	23 00.0	55 80	120.3	22 43.5	55 80	120.7	22 26.8	56 80	121.2	22 10.1	56 79	121.6	21 53.4	56 79	122.1	21 36.5	56 78	122.5	21 19.6	56 78	123.0	6
7	22 28.1	54 81	119.3	22 11.8	54 81	119.7	21 55.5	55 80	120.2	21 39.1	55 80	120.6	21 22.6	55 80	121.1	21 06.1	55 79	121.5	20 49.5	55 79	122.0	20 32.8	56 78	122.4	7
8	21 39.4	53 82	118.7	21 23.4	54 81	119.2	21 07.3	54 81	119.6	20 51.1	54 80	120.1	20 34.8	54 80	120.5	20 18.5	55 80	121.0	20 02.1	55 79	121.4	19 45.7	55 79	121.9	8
9	20 50.5	53 82	118.2	20 34.7	53 82	118.6	20 18.8	53 81	119.1	20 02.8	53 81	119.5	19 46.8	54 80	120.0	19 30.7	54 80	120.4	19 14.5	54 80	120.9	18 58.3	54 80	121.3	9
60	20 01.3	52 82	117.6	19 45.7	52 82	118.1	19 30.0	52 82	118.5	19 14.3	53 81	119.0	18 58.5	53 81	119.4	18 42.6	53 81	119.9	18 26.6	53 80	120.3	18 10.6	53 80	120.8	60
1	19 11.9	51 83	117.1	18 56.5	51 82	117.5	18 41.0	52 82	118.0	18 25.5	52 82	118.5	18 09.9	52 81	118.9	17 54.2	52 81	119.4	17 38.5	53 81	119.8	17 22.7	53 80	120.2	1
2	18 22.3	51 83	116.6	18 07.1	51 83	117.0	17 51.8	51 83	117.5	17 36.4	51 82	117.9	17 21.1	51 82	118.4	17 05.6	52 82	118.8	16 50.1	52 81	119.3	16 34.5	52 81	119.7	2
3	17 32.4	50 83	116.1	17 17.4	50 83	116.5	17 02.3	50 83	117.0	16 47.2	51 82	117.4	16 32.0	51 82	117.9	16 16.7	51 82	118.3	16 01.4	51 81	118.8	15 46.1	51 81	119.2	3
4	16 42.3	49 84	115.6	16 27.5	49 84	116.0	16 12.6	50 83	116.5	15 57.7	50 83	116.9	15 42.7	50 82	117.4	15 27.7	50 82	117.8	15 12.6	50 82	118.3	14 57.4	51 82	118.7	4
65	15 52.0	49 84	115.1	15 37.4	49 84	115.5	15 22.7	49 84	116.0	15 08.0	49 83	116.4	14 53.2	49 83	116.9	14 38.4	50 83	117.3	14 23.5	50 82	117.8	14 08.5	50 82	118.2	65
6	15 01.6	48 84	114.6	14 47.1	48 84	115.1	14 32.6	48 84	115.5	14 18.1	49 84	116.0	14 03.5	49 83	116.4	13 48.8	49 83	116.9	13 34.1	49 82	117.3	13 19.4	49 82	117.8	6
7	14 10.9	47 85	114.1	13 56.6	48 84	114.6	13 42.3	48 84	115.0	13 28.0	48 84	115.5	13 13.5	48 84	115.9	12 59.1	48 83	116.4	12 44.6	48 83	116.8	12 30.0	49 82	117.3	7
8	13 20.0	47 85	113.7	13 05.9	47 85	114.1	12 51.8	47 84	114.6	12 37.6	47 84	115.0	12 23.4	47 84	115.5	12 09.2	48 84	115.9	11 54.8	48 83	116.4	11 40.5	48 83	116.8	8
9	12 29.0	46 85	113.2	12 15.1	46 85	113.7	12 01.1	47 85	114.1	11 47.1	47 84	114.6	11 33.1	47 84	115.0	11 19.0	47 84	115.5	11 04.9	47 83	115.9	10 50.8	47 83	116.4	9
70	11 37.7	46 86	112.7	11 24.0	46 85	113.2	11 10.2	46 85	113.7	10 56.4	46 85	114.1	10 42.6	46 84	114.6	10 28.7	46 84	115.0	10 14.8	46 84	115.5	10 00.8	47 84	115.9	70
1	10 46.4	45 86	112.3	10 32.8	45 86	112.8	10 19.2	45 85	113.2	10 05.6	46 85	113.7	9 51.9	46 85	114.1	9 38.2	46 84	114.6	9 24.5	46 84	115.0	9 10.7	46 84	115.5	1
2	9 54.8	45 86	111.9	9 41.4	45 86	112.3	9 28.0	45 86	112.8	9 14.5	45 85	113.2	9 01.0	45 85	113.7	8 47.5	45 85	114.1	8 34.0	45 84	114.6	8 20.4	45 84	115.0	2
3	9 03.1	44 86	111.4	8 49.9	44 86	111.9	8 36.6	44 86	112.3	8 23.3	44 86	112.8	8 10.0	44 85	113.2	7 56.7	45 85	113.7	7 43.3	45 85	114.2	7 29.9	45 84	114.6	3
4	8 11.2	43 87	111.0	7 58.2	44 86	111.5	7 45.1	44 86	111.9	7 32.0	44 86	112.4	7 18.8	44 86	112.8	7 05.6	44 85	113.3	6 52.4	44 85	113.7	6 39.2	44 85	114.2	4
75	7 19.2	43 87	110.6	7 06.3	43 87	111.0	6 53.4	43 86	111.5	6 40.4	43 86	112.0	6 27.5	43 86	112.4	6 14.4	43 86	112.9	6 01.4	43 85	113.3	5 48.4	44 85	113.8	75
6	6 27.1	42 87	110.2	6 14.3	43 87	110.6	6 01.6	43 87	111.1	5 48.8	43 86	111.5	5 35.9	43 86	112.0	5 23.1	43 86	112.4	5 10.2	43 86	112.9				6
7	5 34.8	42 87	109.8	5 22.2	42 87	110.2	5 09.6	42 87	110.7																7

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
90	5 00.9	37 90	74.8	5 12.9	37 89	74.3	5 23.8	36 89	73.8	5 34.7	36 89	73.4	5 45.6	36 88	72.9	5 56.5	36 88	72.4	6 07.4	36 88	72.0	6 18.2	36 88	71.5	91
1	[illegible]															5 03.5	37 88	72.1	5 14.5	37 88	71.6	5 25.5	37 88	71.1	2

Lat. 22°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	88 00.0	1.0 21	180.0	88 30.0	1.0 27	180.0	89 00.0	1.0 37	180.0	89 30.0	1.0 56	180.0	90 00.0	.. 93	....	89 30.0	1.0 55	00.0	89 00.0	1.0 36	00.0	88 30.0	1.0 26	00.0	00
1	87 47.6	91 53	154.8	88 14.0	85 63	148.0	88 38.0	73 75	136.9	88 56.7	48 87	118.1	89 04.4	00 93	89.8	88 56.9	47 86	61.4	88 38.4	73 74	42.5	88 14.4	85 62	31.4	1
2	87 15.8	74 70	136.6	87 36.4	63 78	128.5	87 53.2	48 85	117.9	88 04.6	27 91	104.7	88 08.7	01 93	89.6	88 05.0	25 90	74.5	87 54.0	47 85	61.2	87 37.4	63 77	50.5	2
3	86 33.5	59 80	125.0	86 49.6	48 84	117.7	87 02.1	35 89	109.2	87 10.2	19 92	99.6	87 13.1	01 93	89.4	87 10.7	17 91	79.2	87 03.2	33 88	69.6	86 51.2	47 84	61.0	3
4	85 45.8	48 84	117.4	85 58.9	38 88	111.2	86 08.8	27 90	104.3	86 15.1	15 92	96.9	86 17.5	01 93	89.3	86 15.9	12 92	81.6	86 10.3	25 90	74.1	86 01.1	36 87	67.1	4
05	84 55.3	41 87	112.3	85 06.3	32 89	106.9	85 14.5	23 91	101.2	85 19.8	12 92	95.2	85 21.8	02 93	89.1	85 20.7	09 92	82.9	85 16.4	20 90	76.8	85 09.1	29 88	71.0	05
6	84 03.2	35 89	108.6	84 12.7	28 90	103.9	84 19.7	20 92	99.0	84 24.3	11 92	94.0	84 26.2	02 93	88.9	84 25.5	07 92	83.7	84 22.1	16 91	78.6	84 16.1	24 90	73.7	6
7	83 10.0	31 90	105.7	83 18.4	25 91	101.7	83 24.7	17 92	97.4	83 28.8	10 93	93.1	83 30.6	02 93	88.7	83 30.2	05 92	84.3	83 27.4	13 91	79.9	83 22.4	20 90	75.6	7
8	82 16.2	28 90	103.5	82 23.7	22 92	99.9	82 29.4	16 92	96.2	82 33.2	09 93	92.4	82 35.0	03 93	88.5	82 34.8	04 92	84.6	82 32.6	11 92	80.8	82 28.4	17 91	77.0	8
9	81 21.9	26 91	101.7	81 28.8	20 92	98.5	81 34.1	15 92	95.1	81 37.6	09 93	91.7	81 39.4	03 93	88.3	81 39.4	03 92	84.9	81 37.6	09 92	81.4	81 34.0	15 91	78.0	9
10	80 27.3	24 91	100.3	80 33.7	19 92	97.3	80 38.6	14 92	94.3	80 42.0	09 93	91.2	80 43.8	03 93	88.1	80 44.0	02 92	85.0	80 42.6	07 92	81.9	80 39.5	13 91	78.8	10
1	79 32.4	22 92	99.0	79 38.5	18 92	96.3	79 43.1	13 92	93.5	79 46.4	08 93	90.7	79 48.2	04 93	87.9	79 48.5	01 92	85.1	79 47.4	06 92	82.3	79 44.9	11 91	79.5	1
2	78 37.4	21 92	97.9	78 43.1	17 92	95.4	78 47.6	13 93	92.9	78 50.8	08 93	90.3	78 52.6	04 93	87.7	78 53.1	00 92	85.2	78 52.3	05 92	82.6	78 50.2	09 92	80.0	2
3	77 42.2	20 92	97.0	77 47.7	16 92	94.7	77 52.0	12 93	92.3	77 55.1	08 93	89.9	77 57.0	04 93	87.6	77 57.7	00 92	85.2	77 57.1	04 92	82.8	77 55.3	08 92	80.4	3
4	76 47.0	19 92	96.1	76 52.2	16 92	94.0	76 56.4	12 93	91.8	76 59.5	08 93	89.6	77 01.4	05 93	87.4	77 02.3	01 92	85.1	77 01.9	03 92	82.9	77 00.5	07 92	80.7	4
15	75 51.6	19 92	95.4	75 56.7	15 92	93.4	76 00.8	12 93	91.3	76 03.9	08 93	89.3	76 05.9	05 93	87.2	76 06.8	01 92	85.1	76 06.7	02 92	83.0	76 05.5	06 92	80.9	15
6	74 56.2	18 92	94.7	75 01.2	15 93	92.8	75 05.2	12 93	90.9	75 08.2	09 93	88.9	75 10.3	05 93	87.0	75 11.4	02 92	85.0	75 11.5	01 92	83.1	75 10.6	05 92	81.1	6
7	74 00.7	18 92	94.1	74 05.6	15 93	92.3	74 09.6	12 93	90.5	74 12.6	09 93	88.6	74 14.8	06 92	86.8	74 16.0	03 92	85.0	74 16.3	01 92	83.1	74 15.6	04 92	81.3	7
8	73 05.2	17 93	93.5	73 10.0	15 93	91.8	73 13.9	12 93	90.1	73 17.0	09 93	88.3	73 19.2	06 92	86.6	73 20.6	03 92	84.9	73 21.0	00 92	83.1	73 20.6	03 92	81.4	8
9	72 09.7	17 93	92.9	72 14.4	14 93	91.3	72 18.3	12 93	89.7	72 21.4	09 93	88.1	72 23.7	06 92	86.4	72 25.2	04 92	84.8	72 25.8	01 92	83.1	72 25.6	02 92	81.4	9
20	71 14.1	17 93	92.4	71 18.8	14 93	90.9	71 22.7	12 93	89.3	71 25.8	09 93	87.8	71 28.2	07 92	86.2	71 29.8	04 92	84.6	71 30.6	01 92	83.1	71 30.6	01 92	81.5	20
1	70 18.5	17 93	92.0	70 23.1	14 93	90.5	70 27.1	12 93	89.0	70 30.2	09 93	87.5	70 32.7	07 92	86.0	70 34.4	04 92	84.5	70 35.4	02 92	83.0	70 35.6	00 92	81.5	1
2	69 22.9	16 93	91.5	69 27.5	14 93	90.1	69 31.4	12 93	88.7	69 34.7	10 93	87.3	69 37.2	07 92	85.8	69 39.0	05 92	84.4	69 40.1	03 92	83.0	69 40.6	00 92	81.5	2
3	68 27.3	16 93	91.1	68 31.9	14 93	89.7	68 35.8	12 93	88.4	68 39.1	10 93	87.0	68 41.7	08 92	85.6	68 43.7	05 92	84.3	68 44.9	03 92	82.9	68 45.5	01 92	81.5	3
4	67 31.7	16 93	90.7	67 36.3	14 93	89.4	67 40.2	12 93	88.1	67 43.5	10 92	86.8	67 46.3	08 92	85.4	67 48.3	06 92	84.1	67 49.7	04 92	82.8	67 50.5	02 92	81.5	4
25	66 36.0	16 93	90.3	66 40.6	14 93	89.0	66 44.6	12 93	87.8	66 48.0	10 92	86.5	66 50.8	08 92	85.3	66 53.0	06 92	84.0	66 54.5	04 92	82.7	66 55.5	02 92	81.4	25
6	65 40.4	16 93	89.9	65 45.0	14 93	88.7	65 49.0	12 93	87.5	65 52.5	11 92	86.3	65 55.4	09 92	85.1	65 57.7	07 92	83.8	65 59.4	05 92	82.6	66 00.5	03 92	81.4	6
7	64 44.8	16 93	89.5	64 49.4	14 93	88.4	64 53.5	13 93	87.2	64 57.0	11 92	86.0	65 00.0	09 92	84.9	65 02.4	07 92	83.7	65 04.2	05 92	82.5	65 05.5	03 92	81.3	7
8	63 49.2	16 93	89.2	63 53.8	15 93	88.1	63 57.9	13 93	86.9	64 01.5	11 92	85.8	64 04.6	09 92	84.7	64 07.1	08 92	83.5	64 09.1	06 92	82.4	64 10.5	04 92	81.2	8
9	62 53.5	16 93	88.8	62 58.2	15 93	87.8	63 02.4	13 93	86.7	63 06.0	11 92	85.6	63 09.2	10 92	84.5	63 11.8	08 92	83.4	63 13.9	06 92	82.3	63 15.5	04 92	81.1	9
30	61 57.9	16 93	88.5	62 02.6	15 93	87.5	62 06.8	13 92	86.4	62 10.6	12 92	85.3	62 13.8	10 92	84.3	62 16.6	08 92	83.2	62 18.8	07 92	82.1	62 20.6	05 92	81.1	30
1	61 02.3	17 93	88.2	61 07.0	15 93	87.2	61 11.3	13 92	86.1	61 15.1	12 92	85.1	61 18.5	10 92	84.1	61 21.3	09 92	83.0	61 23.7	07 92	82.0	61 25.6	06 92	80.9	1
2	60 06.7	17 93	87.9	60 11.5	15 93	86.9	60 15.8	14 92	85.9	60 19.7	12 92	84.9	60 23.1	11 92	83.9	60 26.1	09 92	82.9	60 28.6	08 92	81.9	60 30.7	06 92	80.8	2
3	59 11.1	17 93	87.6	59 16.0	15 93	86.6	59 20.3	14 92	85.6	59 24.3	12 92	84.6	59 27.8	11 92	83.7	59 30.9	10 92	82.7	59 33.6	08 92	81.7	59 35.8	07 92	80.7	3
4	58 15.6	17 93	87.2	58 20.4	16 92	86.3	58 24.9	14 92	85.4	58 28.9	13 92	84.4	58 32.6	11 92	83.5	58 35.8	10 92	82.5	58 38.5	09 92	81.6	58 40.9	07 92	80.6	4
35	57 20.0	17 93	86.9	57 24.9	16 92	86.0	57 29.5	14 92	85.1	57 33.6	13 92	84.2	57 37.3	12 92	83.3	57 40.6	10 92	82.3	57 43.5	09 92	81.4	57 46.0	08 91	80.5	35
6	56 24.4	17 93	86.7	56 29.4	16 92	85.8	56 34.0	15 92	84.9	56 38.2	13 92	84.0	56 42.1	12 92	83.1	56 45.5	11 92	82.2	56 48.5	09 92	81.2	56 51.2	08 91	80.3	6
7	55 28.9	17 92	86.4	55 34.0	16 92	85.5	55 38.6	15 92	84.6	55 42.9	14 92	83.7	55 46.9	12 92	82.9	55 50.4	11 92	82.0	55 53.6	10 92	81.1	55 56.3	09 91	80.2	7
8	54 33.4	18 92	86.1	54 38.5	16 92	85.2	54 43.3	15 92	84.4	54 47.6	14 92	83.5	54 51.7	13 92	82.7	54 55.3	12 92	81.8	54 58.6	10 92	80.9	55 01.5	09 91	80.1	8
9	53 37.9	18 92	85.8	53 43.1	17 92	85.0	53 47.9	16 92	84.1	53 52.4	14 92	83.3	53 56.5	13 92	82.4	54 00.3	12 92	81.6	54 03.7	11 92	80.8	54 06.7	10 91	79.9	9
40	52 42.5	18 92	85.5	52 47.7	17 92	84.7	52 52.6	16 92	83.9	52 57.1	15 92	83.1	53 01.4	14 92	82.2	53 05.3	12 92	81.4	53 08.8	11 92	80.6	53 12.0	10 91	79.8	40
1	51 47.0	18 92	85.2	51 52.3	17 92	84.4	51 57.3	16 92	83.6	52 01.9	15 92	82.8	52 06.3	14 92	82.0	52 10.3	13 92	81.2	52 13.9	12 91	80.4	52 17.3	11 91	79.6	1
2	50 51.6	18 92	85.0	50 56.9	17 92	84.2	51 02.0	16 92	83.4	51 06.8	15 92	82.6	51 11.2	14 92	81.8	51 15.3	13 92	81.0	51 19.1	12 91	80.2	51 22.6	11 91	79.4	2
3	49 56.2	19 92	84.7	50 01.6	18 92	83.9	50 06.8	17 92	83.1	50 11.6	16 92	82.4	50 16.1	15 92	81.6	50 20.4	14 92	80.8	50 24.3	13 91	80.1	50 27.9	11 91	79.3	3
4	49 00.8	19 92	84.4	49 06.3	18 92	83.7	49 11.5	17 92	82.9	49 16.5	16 92	82.2	49 21.1	15 92	81.4	49 25.5	14 92	80.6	49 29.5	13 91	79.9	49 33.2	12 91	79.1	4
45	48 05.4	19 92	84.1	48 11.0	18 92	83.4	48 16.4	17 92	82.7	48 21.4	16 92	81.9	48 26.1	15 92	81.2	48 30.6	14 92	80.4	48 34.7	13 91	79.7	48 38.6	12 91	78.9	45
6	47 10.1	19 92	83.9	47 15.8	18 92	83.1	47 21.2	18 92	82.4	47 26.3	17 92	81.7	47 31.2	16 92	81.0	47 35.7	15 91	80.2	47 40.0	14 91	79.5	47 44.0	13 91	78.8	6
7	46 14.8	20 92	83.6	46 20.6	19 92	82.9	46 26.1	18 92	82.2	46 31.3	17 92	81.5	46 36.2	16 92	80.7	46 40.9	15 91	80.0	46 45.3	14 91	79.3	46 49.5	13 91	78.6	7
8	45 19.5	20 92	83.3	45 25.4	19 92	82.6	45 31.0	18 92	81.9	45 36.3	17 92	81.2	45 41.4	16 91	80.5	45 46.2	16 91	79.8	45 50.7	15 91	79.1	45 55.0	14 91	78.4	8
9	44 24.3	20 92	83.1	44 30.2	19 92	82.4	44 35.9	19 92	81.7	44 41.3	18 92	81.0	44 46.5	17 91	80.3	44 51.4	16 91	79.6	44 56.1	15 91	78.9	45 00.5	14 91	78.2	9
50	43 29.1	20 92	82.8	43 35.1	20 92	82.1	43 40.9	19 92	81.5	43 46.4	18 92	80.8	43 51.7	17 91	80.1	43 56.7	16 91	79.4	44 01.5	16 91	78.7	44 06.1	15 91	78.0	50
1	42 33.9	21 92	82.5	42 40.0	20 92	81.9	42 45.9	19 92	81.2	42 51.5	18 92	80.5	42 56.9	18 91	79.9	43 02.1	17 91	79.2	43 07.0	16 91	78.5	43 11.7	15 91	77.8	1
2	41 38.8	21 92	82.3	41 45.0	20 92	81.6	41 50.9	19 92	81.0	41 56.6	19 91	80.3	42 02.2	18 91	79.6	42 07.4	17 91	79.0	42 12.5	16 91	78.3	42 17.3	16 90	77.7	2
3	40 43.7	21 92	82.0	40 49.9	21 92	81.4	40 56.0	20 92	80.7	41 01.8	19 91	80.1	41 07.4	18 91	79.4	41 12.8	18 91	78.8	41 18.0	17 91	78.1	41 23.0	16 90	77.5	3
4	39 48.6	22 92	81.8	39 55.0	21 92	81.1	40 01.1	20 91	80.5	40 07.1	19 91	79.8	40 12.8	19 91	79.2	40 18.3	18 91	78.6	40 23.6	17 91	77.9	40 28.7	17 90	77.3	4
55	38 53.6	22 92	81.5	39 00.0	21 92	80.9	39 06.3	21 91	80.2	39 12.3	20 91	79.6	39 18.2	19 91	79.0	39 23.8	18 91	78.3	39 29.2	18 90	77.7	39 34.4	17 90	77.1	55
6	37 58.6	22 92	81.2	38 05.1	22 92	80.6	38 11.5	21 91	80.0	38 17.6	20 91	79.4	38 23.6	20 91	78.7	38 29.3	19 91	78.1	38 34.9	18 90	77.5	38 40.3	18 90	76.9	6
7	37 03.6	22 92	81.0	37 10.2	22 91	80.3	37 16.7	21 91	79.7	37 23.0	21 91	79.1	37 29.0	20 91	78.5	37 34.9	19 91	77.9	37 40.6	19 90	77.3	37 46.1	18 90	76.6	7
8	36 08.7	23 91	80.7	36 15.4	22 91	80.1	36 22.0	22 91	79.5	36 28.4	21 91	78.9	36 34.5	20 91	78.3	36 40.6	20 91	77.7	36 46.4	19 90	77.0	36 52.0	18 90	76.4	8
9	35 13.8	23 91	80.4	35 20.6	23 91	79.8	35 27.3	22 91	79.2	35 33.8	21 91	78.6	35 40.1	21 91	78.0	35 46.2	20 90	77.4	35 52.2	20 90	76.8	35 57.9	19 90	76.2	9
60	34 19.0	23 91	80.2	34 25.9	23 91	79.6	34 32.7	22 91	79.0	34 39.3	22 91	78.4	34 45.7	21 91	77.8	34 52.0	21 90	77.2	34 58.0	20 90	76.6	35 03.9	19 90	76.0	60
1	33 24.2	24 91	79.9	33 31.2	23 91	79.3	33 38.1	23 91	78.7	33 44.8	22 91	78.1	33 51.4	22 90	77.6	33 57.7	21 90	77.0	34 03.9	20 90	76.4	34 10.0	20 90	75.8	1
2	32 29.4	24 91	79.6	32 36.6	24 91	79.1	32 43.6	23 91	78.5	32 50.4	22 91	77.9	32 57.1	22 90	77.3	33 03.6	21 90	76.7	33 09.9	21 90	76.1	33 16.1	20 90	75.6	2
3	31 34.7	24 91	79.4	31 42.0	24 91	78.8	31 49.1	23 91	78.2	31 56.0	23 90	77.6	32 02.8	22 90	77.1	32 09.4	22 90	76.5	32 15.9	21 90	75.9	32 22.2	21 90	75.3	3
4	30 40.1	25 91	79.1	30 47.4	24 91	78.5	30 54.6	24 90	78.0	31 01.7	23 90	77.4	31 08.6	23 90	76.8	31 15.4	22 90	76.3	31 22.0	22 90	75.7	31 28.4	21 90	75.1	4
65	29 45.5	25 91	78.8	29 52.9	25 91	78.3	30 00.3	24 90	77.7	30 07.4	24 90	77.1	30 14.5	23 90	76.6	30 21.4	23 90	76.0	30 28.1	22 90	75.4	30 34.7	22 90	74.9	65
6	28 50.9	25 91	78.5	28 58.5	25 91	78.0	29 05.9	25 90	77.4	29 13.2	24 90	76.9	29 20.4	24 90	76.3	29 27.4	23 90	75.8	29 34.3	23 90	75.2	29 41.0	22 89	74.6	6
7	27 56.4	26 91	78.3	28 04.1	25 90	77.7	28 11.7	25 90	77.2	28 19.1	25 90	76.6	28 26.4	24 90	76.1	28 33.5	24 90	75.5	28 40.5	23 90	75.0	28 47.4	23 89	74.4	7
8	27 02.0	26 91	78.0	27 09.8	26 90	77.5	27 17.4	25 90	76.9	27 25.0	25 90	76.4	27 32.4	25 90	75.8	27 39.7	24 90	75.3	27 46.8	24 89	74.7	27 53.9	23 89	74.2	8
9	26 07.6	27 91	77.7	26 15.5	26 90	77.2	26 23.3	26 90	76.6	26 31.0	25 90	76.1	26 38.5	25 90	75.6	26 45.9	25 90	75.0	26 53.2	24 89	74.5	27 00.4	24 89	73.9	9
70	25 13.3	27 90	77.4	25 21.3	27 90	76.9	25 29.2	26 90	76.4	25 37.0	26 90	75.8	25 44.7	25 90	75.3	25 52.2	25 89	74.8	25 59.6	25 89	74.2	26 07.0	24 89	73.7	70
1	24 19.0	27 90	77.2	24 27.1	27 90	76.6	24 35.2	27 90	76.1	24 43.1	26 90	75.6	24 50.9	26 90	75.0	24 58.6	25 89	74.5	25 06.1	25 89	74.0	25 13.6	25 89	73.4	1
2	23 24.8	28 90	76.9	23 33.0	27 90	76.4	23 41.2	27 90	75.8	23 49.2	27 90	75.3	23 57.2	26 89	74.8	24 05.0	26 89	74.2	24 12.7	26 89	73.7	24 20.3	25 89	73.2	2
3	22 30.6	28 90	76.6	22 39.0	28 90	76.1	22 47.3	27 90	75.6	22 55.5	27 90	75.0	23 03.5	27 89	74.5	23 11.5	26 89	74.0	23 19.3	26 89	73.5	23 27.1	26 89	72.9	3
4	21 36.6	28 90	76.3	21 45.1	28 90	75.8	21 53.4	28 90	75.3	22 01.7	28 89	74.8	22 09.9	27 89	74.2	22 18.0	27 89	73.7	22 26.0	26 89	73.2	22 33.9	26 88	72.7	4
75	20 42.5	29 90	76.0	20 51.2	29 90	75.5	20 59.7	28 90	75.0	21 08.1	28 89	74.5	21 16.4	28 89	74.0	21 24.7	27 89	73.4	21 32.8	27 89	72.9	21 40.9	27 88	72.4	75
6	19 48.6	29 90	75.7	19 57.3	29 90	75.2	20 06.0	29 89	74.7	20 14.5	28 89	74.2	20 23.0	28 89	73.7	20 31.4	28 89	73.2	20 39.7	27 88	72.7	20 47.9	27 88	72.1	6
7	18 54.7	30 90	75.4	19 03.6	29 90	74.9	19 12.4	29 89	74.4	19 21.1	29 89	73.9	19 29.7	29 89	73.4	19 38.2	28 88	72.9	19 46.6	28 88	72.4	19 55.0	28 88	71.9	7
8	18 00.9	30 90	75.1	18 09.9	30 89	74.6	18 18.8	30 89	74.1	18 27.6	29 89	73.6	18 36.4	29 89	73.1	18 45.1	29 88	72.6	18 53.6	28 88	72.1	19 02.1	28 88	71.6	8
9	17 07.2	31 89	74.8	17 16.3	30 89	74.3	17 25.3	30 89	73.8	17 34.3	30 89	73.3	17 43.2	30 88	72.8	17 52.0	29 88	72.3	18 00.7	29 88	71.8	18 09.4	29 88	71.3	9
80	16 13.5	31 89	74.5	16 22.8	31 89	74.0	16 31.9	30 89	73.5	16 41.0	30 88	73.0	16 50.1	30 88	72.6	16 59.0	30 88	72.1	17 07.9	30 88	71.6	17 16.7	29 88	71.1	80
1	15 19.9	31 89	74.2	15 29.3	31 89	73.7	15 38.6	31 89	73.2	15 47.9	31 88	72.8	15 57.0	30 88	72.3	16 06.2	30 88	71.8	16 15.2	30 88	71.3	16 24.2	30 88	70.8	1
2	14 26.4	32 89	73.9	14 36.0	32 89	73.4	14 45.4	31 88	72.9	14 54.8	31 88	72.5	15 04.1	31 88	72.0	15 13.4	31 88	71.5	15 22.6	31 88	71.0	15 31.7	30 87	70.5	2
3	13 33.0	32 89	73.6	13 42.7	32 89	73.1	13 52.3	32 88	72.6	14 01.8	32 88	72.2	14 11.3	31 88	71.7	14 20.7	31 88	71.2	14 30.0	31 87	70.7	14 39.3	31 87	70.2	3
4	12 39.7	33 89	73.3	12 49.5	33 88	72.8	12 59.2	32 88	72.3	13 08.9	32 88	71.8	13 18.5	32 88	71.4	13 28.1	32 88	70.9	13 37.6	32 87	70.4	13 47.0	31 87	69.9	4
85	11 46.5	33 89	73.0	11 56.4	33 88	72.5	12 06.2	33 88	72.0	12 16.1	33 88	71.5	12 25.8	32 88	71.1	12 35.5	32 87	70.6	12 45.2	32 87	70.1	12 54.8	32 87	69.6	85
6	10 53.3	34 88	72.7	11 03.4	33 88	72.2	11 13.4	33 88	71.7	11 23.3	33 88	71.2	11 33.3	33 88	70.7	11 43.1	33 87	70.3	11 53.0	33 87	69.8	12 02.7	33 87	69.3	6
7	10 00.3	34 88	72.3	10 10.5	34 88	71.9	10 20.6	34 88	71.4	10 30.7	34 88	70.9	10 40.8	34 87	70.4	10 50.8	33 87	70.0	11 00.8	33 87	69.5	11 10.7	33 86	69.0	7
8	9 07.3	35 88	72.0	9 17.6	34 88	71.5	9 27.9	34 88	71.1	9 38.2	34 87	70.6	9 48.4	34 87	70.1	9 58.6	34 87	69.6	10 08.8	34 87	69.2	10 18.9	34 86	68.7	8
9	8 14.4	35 88	71.7	8 24.9	35 88	71.2	8 35.4	35 88	70.7	8 45.8	35 87	70.3	8 56.2	35 87	69.8	9 06.5	34 87	69.3	9 16.8	34 86	68.8	9 27.1	34 86	68.4	9
90	7 21.7	35 88	71.4	7 32.3	35 88	70.9	7 42.9	35 87	70.4	7 53.5	35 87	69.9	8 04.0	35 87	69.5	8 14.5	35 86	69.0	8 25.0	35 86	68.5	8 35.4	35 86	68.0	90

Lat. 22°

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	48 00.0	1.0	01	180.0	47 30.0	1.0	01	180.0	47 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	46 00.0	1.0	01	180.0	45 30.0	1.0	01	180.0	45 00.0	1.0	01	180.0	44 30.0	1.0	01	180.0	00
1	47 59.3	1.0	08	178.6	47 29.3	1.0	08	178.6	46 59.3	1.0	08	178.6	46 29.3	1.0	08	178.6	45 59.4	1.0	08	178.7	45 29.4	1.0	08	178.7	44 59.4	1.0	08	178.7	44 29.4	1.0	08	178.7	1
2	47 57.3	1.0	06	177.2	47 27.3	1.0	06	177.2	46 57.3	1.0	06	177.3	46 27.4	1.0	06	177.3	45 57.4	1.0	05	177.3	45 27.4	1.0	05	177.4	44 57.5	1.0	05	177.4	44 27.5	1.0	06	177.4	2
3	47 53.9	1.0	08	175.8	47 24.0	1.0	08	175.8	46 54.0	1.0	08	175.9	46 24.1	1.0	08	176.0	45 54.2	1.0	08	176.0	45 24.2	1.0	07	176.1	44 54.3	1.0	07	176.1	44 24.4	1.0	07	176.1	3
4	47 49.1	1.0	10	174.4	47 19.3	1.0	10	174.5	46 49.4	1.0	10	174.5	46 19.5	1.0	10	174.6	45 49.7	1.0	10	174.7	45 19.8	1.0	10	174.7	44 49.9	1.0	10	174.8	44 20.0	1.0	09	174.9	4
05	47 43.0	99	12	173.0	47 13.2	99	12	173.1	46 43.4	99	12	173.2	46 13.6	99	12	173.3	45 43.8	99	12	173.4	45 14.0	99	12	173.4	44 44.2	99	12	173.5	44 14.4	99	11	173.6	05
6	47 35.6	99	15	171.6	47 05.9	99	14	171.7	46 36.2	99	14	171.8	46 06.5	99	14	171.9	45 36.8	99	14	172.0	45 07.1	99	14	172.1	44 37.3	99	14	172.2	44 07.6	99	13	172.3	6
7	47 26.8	99	17	170.3	46 57.2	99	16	170.4	46 27.6	99	16	170.5	45 58.0	99	16	170.6	45 28.4	99	16	170.7	44 58.8	99	16	170.8	44 29.2	99	16	171.0	43 59.6	99	16	171.1	7
8	47 16.7	98	19	168.9	46 47.3	98	19	169.0	46 17.8	98	18	169.2	45 48.3	98	18	169.3	45 18.9	98	18	169.4	44 49.4	98	18	169.6	44 19.9	98	18	169.7	43 50.3	98	17	169.8	8
9	47 05.4	98	21	167.5	46 36.1	98	21	167.7	46 06.7	98	20	167.8	45 37.4	98	20	168.0	45 08.0	98	20	168.1	44 38.7	98	20	168.3	44 09.3	98	20	168.4	43 39.9	98	19	168.6	9
10	46 52.7	97	23	166.2	46 23.6	97	23	166.4	45 54.4	97	23	166.5	45 25.2	97	22	166.7	44 56.0	97	22	166.9	44 26.8	97	22	167.0	43 57.5	97	22	167.2	43 28.3	98	21	167.3	10
1	46 38.8	97	25	164.9	46 09.8	97	25	165.0	45 40.8	97	25	165.2	45 11.8	97	24	165.4	44 42.7	97	24	165.6	44 13.7	97	24	165.8	43 44.6	97	24	165.9	43 15.5	97	23	166.1	1
2	46 23.7	96	27	163.5	45 54.9	96	27	163.7	45 26.0	96	27	163.9	44 57.2	96	26	164.1	44 28.3	96	26	164.3	43 59.4	96	26	164.5	43 30.5	96	26	164.7	43 01.6	96	25	164.9	2
3	46 07.3	95	29	162.2	45 38.7	95	29	162.5	45 10.0	96	29	162.7	44 41.4	96	28	162.9	44 12.7	96	28	163.1	43 44.0	96	28	163.3	43 15.2	96	27	163.5	42 46.5	96	27	163.7	3
4	45 49.7	95	31	161.0	45 21.3	95	31	161.2	44 52.9	95	30	161.4	44 24.4	95	30	161.6	43 55.9	95	30	161.9	43 27.4	95	30	162.1	42 58.9	95	29	162.3	42 30.3	96	29	162.5	4
15	45 31.0	94	33	159.7	45 02.8	94	33	159.9	44 34.6	94	32	160.2	44 06.3	94	32	160.4	43 38.0	94	32	160.6	43 09.7	94	31	160.9	42 41.4	95	31	161.1	42 13.0	95	31	161.3	15
6	45 11.1	93	35	158.4	44 43.2	93	35	158.7	44 15.2	93	34	158.9	43 47.1	94	34	159.2	43 19.0	94	34	159.4	42 50.9	94	33	159.7	42 22.8	94	33	159.9	41 54.6	94	32	160.1	6
7	44 50.1	92	37	157.2	44 22.4	93	36	157.5	43 54.6	93	36	157.7	43 26.8	93	36	158.0	42 59.0	93	35	158.3	42 31.1	93	35	158.5	42 03.2	93	34	158.7	41 35.2	93	34	159.0	7
8	44 28.0	92	39	156.0	44 00.5	92	38	156.3	43 33.0	92	38	156.5	43 05.4	92	37	156.8	42 37.8	92	37	157.1	42 10.2	92	37	157.3	41 42.5	92	36	157.6	41 14.8	92	36	157.9	8
9	44 04.9	91	40	154.8	43 37.6	91	40	155.1	43 10.3	91	40	155.4	42 43.0	91	39	155.7	42 15.6	91	39	155.9	41 48.2	91	38	156.2	41 20.8	92	38	156.5	40 53.3	92	38	156.7	9
20	43 40.7	90	42	153.6	43 13.7	90	42	153.9	42 46.6	90	41	154.2	42 19.6	90	41	154.5	41 52.4	90	40	154.8	41 25.3	91	40	155.1	40 58.1	91	40	155.4	40 30.8	91	39	155.6	20
1	43 15.4	89	44	152.5	42 48.7	89	43	152.8	42 21.9	89	43	153.1	41 55.1	89	42	153.4	41 28.3	90	42	153.7	41 01.3	90	41	154.0	40 34.4	90	41	154.3	40 07.4	90	41	154.5	1
2	42 49.2	88	45	151.3	42 22.8	88	45	151.6	41 56.3	88	44	152.0	41 29.7	89	44	152.3	41 03.1	89	44	152.6	40 36.5	89	43	152.9	40 09.8	89	43	153.2	39 43.0	89	42	153.5	2
3	42 22.0	87	47	150.2	41 55.9	87	46	150.5	41 29.6	88	46	150.9	41 03.4	88	46	151.2	40 37.0	88	45	151.5	40 10.6	88	44	151.8	39 44.2	88	44	152.1	39 17.7	88	44	152.4	3
4	41 53.9	86	48	149.1	41 28.0	86	48	149.4	41 02.1	87	47	149.8	40 36.1	87	47	150.1	40 10.0	87	46	150.4	39 43.9	87	46	150.7	39 17.7	87	46	151.1	38 51.5	87	45	151.4	4
25	41 24.9	85	50	148.0	40 59.3	85	49	148.4	40 33.6	86	49	148.7	40 07.9	86	48	149.0	39 42.1	86	48	149.4	39 16.3	86	48	149.7	38 50.4	86	47	150.0	38 24.4	87	46	150.4	25
6	40 55.0	84	51	147.0	40 29.7	85	51	147.3	40 04.3	85	50	147.7	39 38.9	85	50	148.0	39 13.4	85	49	148.4	38 47.8	85	49	148.7	38 22.2	86	48	149.0	37 56.5	86	48	149.4	6
7	40 24.3	83	53	145.9	39 59.3	84	52	146.3	39 34.1	84	52	146.6	39 09.0	84	51	147.0	38 43.8	84	51	147.3	38 18.5	84	50	147.7	37 53.1	85	50	148.0	37 27.7	85	49	148.4	7
8	39 52.7	82	54	144.9	39 28.0	83	54	145.3	39 03.2	83	53	145.6	38 38.3	83	52	146.0	38 13.3	83	52	146.4	37 48.3	83	52	146.7	37 23.3	84	51	147.1	36 58.1	84	50	147.4	8
9	39 20.3	81	55	143.9	38 55.9	82	55	144.3	38 31.4	82	54	144.7	38 06.8	82	54	145.0	37 42.1	82	53	145.4	37 17.4	83	53	145.7	36 52.6	83	52	146.1	36 27.8	83	52	146.4	9
30	38 47.2	80	56	142.9	38 23.0	81	56	143.3	37 58.8	81	56	143.7	37 34.5	81	55	144.1	37 10.1	81	54	144.4	36 45.7	82	54	144.8	36 21.2	82	54	145.1	35 56.6	82	53	145.5	30
1	38 13.3	79	58	142.0	37 49.4	80	57	142.4	37 25.5	80	57	142.7	37 01.5	80	56	143.1	36 37.4	80	56	143.5	36 13.3	81	55	143.9	35 49.0	81	55	144.2	35 24.8	81	54	144.6	1
2	37 38.6	78	59	141.0	37 15.1	79	58	141.4	36 51.4	79	58	141.8	36 27.7	79	57	142.2	36 03.9	79	57	142.6	35 40.1	80	56	142.9	35 16.2	80	56	143.3	34 52.2	80	56	143.7	2
3	37 03.3	77	60	140.1	36 40.0	78	60	140.5	36 16.7	78	59	140.9	35 53.3	78	59	141.3	35 29.8	78	58	141.7	35 06.2	79	58	142.0	34 42.6	79	57	142.4	34 18.9	79	57	142.8	3
4	36 27.3	76	61	139.2	36 04.3	77	61	139.6	35 41.3	77	60	140.0	35 18.1	77	60	140.4	34 54.9	77	59	140.8	34 31.7	78	59	141.2	34 08.3	78	58	141.5	33 44.9	78	58	141.9	4
35	35 50.6	75	62	138.3	35 27.9	76	62	138.7	35 05.2	76	61	139.1	34 42.3	76	61	139.5	34 19.4	77	60	139.9	33 56.4	77	60	140.3	33 33.4	77	59	140.7	33 10.3	77	59	141.1	35
6	35 13.3	74	63	137.5	34 50.9	75	63	137.9	34 28.5	75	62	138.3	34 05.9	75	62	138.7	33 43.3	76	61	139.1	33 20.6	76	61	139.5	32 57.8	76	60	139.8	32 35.0	76	60	140.2	6
7	34 35.4	74	64	136.6	34 13.3	74	64	137.0	33 51.1	74	63	137.4	33 28.9	74	63	137.8	33 06.5	75	62	138.2	32 44.1	75	62	138.6	32 21.6	75	61	139.0	31 59.1	75	61	139.4	7
8	33 56.9	73	65	135.8	33 35.1	73	65	136.2	33 13.2	73	64	136.6	32 51.2	73	64	137.0	32 29.2	74	63	137.4	32 07.1	74	63	137.8	31 44.9	74	62	138.2	31 22.6	74	62	138.6	8
9	33 17.8	72	66	135.0	32 56.3	72	66	135.4	32 34.7	72	65	135.8	32 13.0	72	65	136.2	31 51.2	73	64	136.6	31 29.4	73	64	137.0	31 07.5	73	63	137.4	30 45.5	73	63	137.8	9
40	32 38.2	71	67	134.2	32 17.0	71	66	134.6	31 55.6	71	66	135.0	31 34.2	71	66	135.4	31 12.8	72	65	135.8	30 51.2	72	64	136.2	30 29.6	72	64	136.6	30 07.9	72	64	137.0	40
1	31 58.0	70	68	133.4	31 37.1	70	67	133.8	31 16.0	70	67	134.2	30 54.9	71	66	134.6	30 33.7	71	66	135.1	30 12.5	71	66	135.5	29 51.1	71	65	135.9	29 29.7	71	64	136.3	1
2	31 17.3	69	69	132.6	30 56.7	69	68	133.0	30 35.9	69	68	133.5	30 15.1	70	67	133.9	29 54.2	70	67	134.3	29 33.2	70	66	134.7	29 12.1	70	66	135.1	28 51.0	70	66	135.5	2
3	30 36.2	68	69	131.9	30 15.8	68	69	132.3	29 55.3	68	68	132.7	29 34.7	69	68	133.1	29 14.1	69	68	133.6	28 53.4	69	67	134.0	28 32.6	69	67	134.4	28 11.7	70	66	134.8	3
4	29 54.5	67	70	131.1	29 34.4	67	70	131.6	29 14.2	67	69	132.0	28 53.9	68	69	132.4	28 33.5	68	68	132.8	28 13.1	68	68	133.3	27 52.6	68	68	133.7	27 32.0	69	67	134.1	4
45	29 12.4	66	71	130.4	28 52.5	66	70	130.9	28 32.6	67	70	131.3	28 12.6	67	70	131.7	27 52.5	67	69	132.1	27 32.4	67	69	132.5	27 12.1	68	68	133.0	26 51.8	68	68	133.4	45
6	28 29.8	65	72	129.7	28 10.2	65	71	130.2	27 50.6	66	71	130.6	27 30.8	66	70	131.0	27 11.0	66	70	131.4	26 51.1	66	69	131.8	26 31.2	67	69	132.3	26 11.1	67	68	132.7	6
7	27 46.8	64	72	129.0	27 27.5	65	72	129.5	27 08.1	65	72	129.9	26 48.6	65	71	130.3	26 29.1	65	71	130.7	26 09.5	66	70	131.2	25 49.8	66	70	131.6	25 30.0	66	69	132.0	7
8	27 03.4	63	73	128.4	26 44.3	64	72	128.8	26 25.2	64	72	129.2	26 06.0	64	72	129.7	25 46.7	64	71	130.1	25 27.4	65	71	130.5	25 08.0	65	70	130.9	24 48.5	65	70	131.3	8
9	26 19.6	62	74	127.7	26 00.8	63	73	128.1	25 41.9	63	73	128.6	25 23.0	63	72	129.0	25 04.0	63	72	129.4	24 44.9	64	72	129.8	24 25.7	64	71	130.3	24 06.5	64	71	130.7	9
50	25 35.4	62	74	127.0	25 16.8	62	74	127.5	24 58.2	62	74	127.9	24 39.5	62	73	128.3	24 20.8	63	73	128.8	24 02.0	63	72	129.2	23 43.1	63	72	129.6	23 24.1	63	71	130.1	50
1	24 50.8	61	75	126.4	24 32.5	61	74	126.8	24 14.1	61	74	127.3	23 55.7	62	74	127.7	23 37.2	62	73	128.1	23 18.7	62	73	128.6	23 00.0	62	72	129.0	22 41.3	62	72	129.4	1
2	24 05.8	60	76	125.8	23 47.8	60	75	126.2	23 29.7	60	75	126.7	23 11.5	61	74	127.1	22 53.3	61	74	127.5	22 35.0	61	74	128.0	22 16.6	61	73	128.4	21 58.2	62	73	128.8	2
3	23 20.5	59	76	125.2	23 02.7	59	76	125.6	22 44.9	60	75	126.1	22 27.0	60	75	126.5	22 09.0	60	74	126.9	21 50.9	60	74	127.3	21 32.8	61	74	127.8	21 14.6	61	73	128.2	3
4	22 34.9	58	77	124.6	22 17.4	59	76	125.0	21 59.8	59	76	125.5	21 42.1	59	75	125.9	21 24.3	59	75	126.3	21 06.5	59	74	126.8	20 48.7	60	74	127.2	20 30.7	60	74	127.6	4
55	21 48.9	58	77	124.0	21 31.6	58	77	124.4	21 14.3	58	76	124.9	20 56.9	58	76	125.3	20 39.4	58	76	125.7	20 21.8	59	75	126.2	20 04.2	59	75	126.6	19 46.5	59	74	127.0	55
6	21 02.6	57	78	123.4	20 45.6	57	77	123.9	20 28.5	57	77	124.3	20 11.3	57	76	124.7	19 54.0	58	76	125.2	19 36.7	58	76	125.6	19 19.4	58	75	126.0	19 01.9	58	75	126.5	6
7	20 16.0	56	78	122.8	19 59.2	56	78	123.3	19 42.4	56	77	123.7	19 25.4	57	77	124.2	19 08.4	57	76	124.6	18 51.3	57	76	125.0	18 34.2	57	76	125.5	18 17.0	57	75	125.9	7
8	19 29.2	55	79	122.3	19 12.6	55	78	122.7	18 55.9	56	78	123.2	18 39.2	56	77	123.6	18 22.5	56	77	124.1	18 05.6	56	77	124.5	17 48.8	56	76	124.9	17 31.8	57	76	125.4	8
9	18 42.0	54	79	121.7	18 25.6	55	79	122.2	18 09.2	55	78	122.6	17 52.8	55	78	123.1	17 36.2	55	78	123.5	17 19.6	55	77	123.9	17 03.0	56	77	124.4	16 46.3	56	76	124.8	9
60	17 54.6	54	80	121.2	17 38.4	54	79	121.7	17 22.2	54	79	122.1	17 06.0	54	78	122.5	16 49.7	54	78	123.0	16 33.3	55	78	123.4	16 16.9	55	77	123.9	16 00.5	55	77	124.3	60
1	17 06.8	53	80	120.7	16 50.9	53	80	121.1	16 35.0	53	79	121.6	16 19.0	53	79	122.0	16 02.9	54	78	122.5	15 46.8	54	78	122.9	15 30.6	54	78	123.3	15 14.4	54	77	123.8	1
2	16 18.9	52	80	120.2	16 03.2	52	80	120.6	15 47.5	53	80	121.1	15 31.7	53	79	121.5	15 15.8	53	79	121.9	14 59.9	53	78	122.4	14 44.0	53	78	122.8	14 28.0	53	78	123.3	2
3	15 30.7	51	81	119.7	15 15.2	52	80	120.1	14 59.7	52	80	120.6	14 44.1	52	80	121.0	14 28.5	52	79	121.4	14 12.8	52	79	121.9	13 57.1	52	79	122.3	13 41.3	53	78	122.8	3
4	14 42.2	51	81	119.2	14 27.0	51	81	119.6	14 11.6	51	80	120.1	13 56.3	51	80	120.5	13 40.9	51	80	120.9	13 25.4	52	79	121.4	13 09.9	52	79	121.8	12 54.4	52	79	122.3	4
65	13 53.5	50	82	118.7	13 38.5	50	81	119.1	13 23.4	50	81	119.6	13 08.2	51	80	120.0	12 53.1	51	80	120.5	12 37.8	51	80	120.9	12 22.6	51	80	121.3	12 07.2	51	79	121.8	65
6	13 04.6	49	82	118.2	12 49.8	50	82	118.6	12 34.9	50	81	119.1	12 20.0	50	81	119.5	12 05.0	50	80	120.0	11 50.0	50	80	120.4	11 34.9	50	80	120.9	11 19.8	50	79	121.3	6
7	12 15.5	49	82	117.7	12 00.8	49	82	118.2	11 46.2	49	82	118.6	11 31.4	49	81	119.1	11 16.7	49	81	119.5	11 01.9	49	80	120.0	10 47.0	50	80	120.4	10 32.2	50	80	120.8	7
8	11 26.1	48	83	117.3	11 11.7	48	82	117.7	10 57.2	48	82	118.2	10 42.7	48	82	118.6	10 28.2	49	81	119.0	10 13.6	49	81	119.5	9 59.0	49	81	119.9	9 44.3	49	80	120.4	8
9	10 36.6	47	83	116.8	10 22.3	48	82	117.3	10 08.1	48	82	117.7	9 53.8	48	82	118.1	9 39.4	48	82	118.6	9 25.0	48	81	119.0	9 10.6	48	81	119.5	8 56.2	48	80	119.9	9
70	9 46.8	47	83	116.4	9 32.8	47	83	116.8	9 18.7	47	83	117.3	9 04.6	47	82	117.7	8 50.5	47	82	118.1	8 36.3	47	82	118.6	8 22.1	47	81	119.0	8 07.9	47	81	119.5	70
1	8 56.9	46	84	115.9	8 43.0	46	83	116.4	8 29.2	46	83	116.8	8 15.2	46	82	117.3	8 01.3	46	82	117.7	7 47.3	47	82	118.2	7 33.4	47	82	118.6	7 19.3	47	81	119.0	1
2	8 06.7	45	84	115.5	7 53.1	46	84	115.9	7 39.4	46	83	116.4	7 25.7	46	83	116.8	7 12.0	46	83	117.3	6 58.2	46	82	117.7	6 44.4	46	82	118.2	6 30.6	46	82	118.6	2
3	7 16.4	45	84	115.1	7 03.0	45	84	115.5	6 49.5	45	84	116.0	6 36.0	45	83	116.4	6 22.4	45	83	116.9	6 08.9	45	83	117.3	5 55.3	45	82	117.7	5 41.7	45	82	118.2	3
4	6 25.9	44	84	114.6	6 12.7	44	84	115.1	5 59.4	44	84	115.5	5 46.0	44	83	116.0	5 32.7	45	83	116.4	5 19.3	45	83	116.9	5 05.9	45	83	117.3					4
75	5 35.3	44	85	114.2	5 22.2	44	84	114.7	5 09.1	44	84	115.1																					75

Lat. 23°

Lat. 24°

Lat 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	6 29.0	36	88	71.0	6 39.8	36	87	70.5	6 50.5	36	87	70.1	7 01.3	36	87	69.6	7 12.0	36	86	69.1	7 22.6	36	86	68.7	7 33.3	35	86	68.2	7 43.9	35	86	67.7	91
2	5 36.5	36	88	70.7	5 47.4	36	87	70.2	5 58.3	36	87	69.7	6 09.2	36	87	69.3	6 20.1	36	86	68.8	6 30.9	36	86	68.3	6 41.7	36	86	67.9	6 52.5	36	86	67.4	2
3									5 06.2	37	87	69.4	5 17.2	37	87	68.9	5 28.2	37	86	68.5	5 39.3	37	86	68.0	5 50.2	37	86	67.5	6 01.2	36	85	67.1	3
4																													5 10.0	37	85	66.7	4

Lat. 22°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	88 00.0	1.0 20	00.0	87 30.0	1.0 16	00.0	87 00.0	1.0 14	00.0	86 30.0	1.0 12	00.0	86 00.0	1.0 10	00.0	85 30.0	1.0 09	00.0	85 00.0	1.0 08	00.0	84 30.0	1.0 08	00.0	00
1	87 47.9	91 52	24.5	87 20.2	94 44	20.0	86 51.8	96 38	16.8	86 22.9	97 33	14.5	85 53.8	97 29	12.7	85 24.5	98 26	11.3	84 55.1	98 24	10.1	84 25.5	99 22	09.2	1
2	87 16.9	73 69	42.3	86 53.9	80 62	35.9	86 29.0	85 55	31.1	86 03.0	88 50	27.2	85 36.2	91 45	24.1	85 08.7	92 41	21.7	84 40.8	94 38	19.6	84 12.5	95 34	17.9	2
3	86 35.4	58 78	53.5	86 16.7	66 72	47.2	85 55.8	73 67	41.9	85 33.1	78 62	37.5	85 09.1	82 57	33.8	84 44.1	85 53	30.7	84 18.2	87 49	28.0	83 51.8	89 45	25.7	3
4	85 48.6	47 83	60.7	85 33.3	55 78	55.0	85 15.7	62 74	49.9	84 56.1	68 70	45.5	84 35.0	73 65	41.6	84 12.5	77 61	38.2	83 49.0	80 58	35.2	83 24.6	83 54	32.6	4
05	84 58.9	38 86	65.5	84 46.2	46 82	60.5	84 31.3	53 79	55.8	84 14.4	59 75	51.6	83 55.8	65 71	47.8	83 35.7	69 68	44.4	83 14.5	73 64	41.3	82 52.2	76 61	38.5	05
6	84 07.6	32 87	68.9	83 56.9	39 85	64.4	83 44.0	46 82	60.2	83 29.3	52 79	56.3	83 13.0	57 76	52.7	82 55.1	62 72	49.4	82 35.9	66 69	46.3	82 15.6	69 66	43.5	6
7	83 15.3	27 88	71.4	83 06.1	34 86	67.4	82 55.0	40 84	63.6	82 42.1	46 82	60.0	82 27.6	51 79	56.6	82 11.6	55 76	53.4	81 54.3	60 73	50.5	81 35.8	63 70	47.7	7
8	82 22.2	24 89	73.3	82 14.3	30 88	69.7	82 04.6	35 86	66.2	81 53.2	41 83	62.9	81 40.3	45 81	59.7	81 26.0	50 79	56.7	81 10.4	54 76	53.9	80 53.5	58 74	51.2	8
9	81 28.8	20 90	74.9	81 21.8	26 88	71.4	81 13.3	31 87	68.3	81 03.2	36 85	65.2	80 51.6	41 83	62.3	80 38.7	45 81	59.5	80 24.6	49 79	56.8	80 09.2	53 76	54.2	9
10	80 35.0	18 90	75.8	80 28.8	23 89	72.8	80 21.3	28 88	69.9	80 12.3	32 86	67.1	80 01.9	37 84	64.4	79 50.2	41 82	61.7	79 37.4	45 80	59.2	79 23.4	49 78	56.8	10
1	79 40.9	16 90	76.7	79 35.5	20 89	74.0	79 28.8	25 88	71.3	79 20.7	29 87	68.7	79 11.4	33 85	66.1	79 00.8	37 84	63.6	78 49.1	41 82	61.2	78 36.3	45 80	58.9	1
2	78 46.7	14 91	77.4	78 41.9	18 90	74.9	78 35.9	22 89	72.4	78 28.7	26 88	70.0	78 20.2	30 86	67.6	78 10.6	34 85	65.2	77 59.9	37 83	63.0	77 48.1	41 82	60.8	2
3	77 52.3	12 91	78.0	77 48.1	16 90	75.7	77 42.8	20 89	73.3	77 36.2	24 88	71.0	77 28.6	27 87	68.8	77 19.8	31 86	66.6	77 10.0	34 84	64.5	76 59.2	38 83	62.4	3
4	76 57.9	11 91	78.5	76 54.2	14 90	76.3	76 49.4	18 89	74.1	76 43.5	21 88	72.0	76 36.5	25 87	69.9	76 28.5	28 86	67.8	76 19.5	32 85	65.8	76 09.6	35 84	63.8	4
15	76 03.3	09 91	78.9	76 00.1	13 90	76.8	75 55.8	16 90	74.8	75 50.4	19 80	72.7	75 44.1	23 88	70.8	75 36.8	26 87	68.8	75 28.6	29 86	66.9	75 19.4	32 84	65.0	15
6	75 08.7	08 91	79.2	75 05.8	11 90	77.2	75 02.0	14 90	75.3	74 57.2	18 89	73.4	74 51.5	21 88	71.5	74 44.8	24 87	69.7	74 37.2	27 86	67.8	74 28.8	30 85	66.0	6
7	74 14.0	07 91	79.4	74 11.5	10 90	77.6	74 08.1	13 90	75.8	74 03.8	16 89	74.0	73 58.6	19 88	72.2	73 52.5	22 88	70.4	73 45.6	25 87	68.7	73 37.8	27 86	66.9	7
8	73 19.3	06 91	79.6	73 17.2	09 91	77.9	73 14.2	11 90	76.2	73 10.3	14 90	74.5	73 05.6	17 89	72.8	73 00.0	20 88	71.1	72 53.6	23 87	69.4	72 46.4	25 86	67.8	8
9	72 24.6	05 91	79.8	72 22.8	07 91	78.1	72 20.1	10 90	76.5	72 16.6	13 90	74.9	72 12.4	16 89	73.2	72 07.3	18 88	71.6	72 01.4	21 87	70.0	71 54.8	23 86	68.5	9
20	71 29.8	04 91	79.9	71 28.3	06 91	78.3	71 26.0	09 90	76.8	71 22.9	12 90	75.2	71 19.0	14 89	73.7	71 14.4	17 88	72.1	71 09.1	19 88	70.6	71 03.0	22 87	69.1	20
1	70 35.1	03 91	80.0	70 33.8	05 91	78.5	70 31.8	08 90	77.0	70 29.1	10 90	75.5	70 25.6	13 89	74.0	70 21.4	15 88	72.6	70 16.5	18 88	71.1	70 10.9	20 87	69.6	1
2	69 40.3	02 91	80.1	69 39.3	04 91	78.6	69 37.6	07 90	77.2	69 35.2	09 90	75.8	69 32.1	11 89	74.4	69 28.3	14 89	72.9	69 23.8	16 88	71.5	69 18.6	18 87	70.1	2
3	68 45.5	01 91	80.1	68 44.7	04 91	78.8	68 43.3	06 90	77.4	68 41.2	08 90	76.0	68 38.5	10 90	74.6	68 35.0	12 89	73.3	68 31.0	15 88	71.9	68 26.2	17 88	70.6	3
4	67 50.7	01 91	80.2	67 50.2	03 91	78.8	67 49.0	05 90	77.5	67 47.2	07 90	76.2	67 44.8	09 90	74.9	67 41.7	11 89	73.6	67 38.1	13 88	72.3	67 33.7	15 88	71.0	4
25	66 55.8	00 91	80.2	66 55.6	02 91	78.9	66 54.7	04 91	77.6	66 53.2	06 90	76.3	66 51.1	08 90	75.1	66 48.3	10 89	73.8	66 45.0	12 88	72.5	66 41.1	14 88	71.3	25
6	66 01.0	01 91	80.2	66 01.0	01 91	78.9	66 00.3	03 91	77.7	65 59.1	05 90	76.5	65 57.3	07 90	75.2	65 54.9	09 89	74.0	65 51.9	11 89	72.8	65 48.4	13 88	71.6	6
7	65 06.2	01 91	80.1	65 06.4	00 91	78.9	65 06.0	02 91	77.8	65 05.0	04 90	76.6	65 03.5	06 90	75.4	65 01.4	08 89	74.2	64 58.7	10 89	73.0	64 55.5	12 88	71.8	7
8	64 11.4	02 91	80.1	64 11.8	00 91	78.9	64 11.6	01 91	77.8	64 10.9	03 90	76.6	64 09.6	05 90	75.5	64 07.8	07 89	74.3	64 05.5	09 89	73.2	64 02.6	10 88	72.1	8
9	63 16.6	03 91	80.0	63 17.2	01 91	78.9	63 17.2	01 91	77.8	63 16.8	02 90	76.7	63 15.8	04 90	75.6	63 14.3	06 89	74.5	63 12.2	08 89	73.4	63 09.7	09 88	72.3	9
30	62 21.8	03 91	80.0	62 22.6	02 91	78.9	62 22.9	00 91	77.8	62 22.6	02 90	76.7	62 21.9	03 90	75.7	62 20.6	05 89	74.6	62 18.9	07 89	73.5	62 16.7	08 88	72.4	30
1	61 27.1	04 91	79.9	61 28.0	02 91	78.9	61 28.5	01 91	77.8	61 28.5	01 90	76.8	61 28.0	02 90	75.7	61 27.0	04 89	74.7	61 25.5	06 89	73.6	61 23.6	07 88	72.6	1
2	60 32.3	05 91	79.8	60 33.4	03 91	78.8	60 34.1	01 91	77.8	60 34.3	00 90	76.8	60 34.0	02 90	75.8	60 33.3	03 89	74.7	60 32.1	05 89	73.7	60 30.5	06 88	72.7	2
3	59 37.5	05 91	79.7	59 38.9	04 91	78.7	59 39.7	02 91	77.8	59 40.2	01 90	76.8	59 40.1	01 90	75.8	59 39.7	02 90	74.8	59 38.7	04 89	73.8	59 37.4	05 89	72.8	3
4	58 42.8	06 91	79.6	58 44.3	04 91	78.7	58 45.4	03 91	77.7	58 46.0	01 90	76.7	58 46.2	00 90	75.8	58 46.0	01 90	74.8	58 45.3	02 89	73.9	58 44.2	04 89	72.9	4
35	57 48.1	06 91	79.5	57 49.8	05 91	78.6	57 51.0	03 90	77.7	57 51.9	02 90	76.7	57 52.3	01 90	75.8	57 52.3	01 90	74.8	57 51.9	02 89	73.9	57 51.0	03 89	73.0	35
6	56 53.4	07 91	79.4	56 55.2	05 91	78.5	56 56.7	04 90	77.6	56 57.7	03 90	76.7	56 58.3	01 90	75.8	56 58.6	00 90	74.8	56 58.4	01 89	73.9	56 57.8	03 89	73.0	6
7	55 58.7	07 91	79.3	56 00.7	06 91	78.4	56 02.4	05 90	77.5	56 03.6	03 90	76.6	56 04.4	02 90	75.7	56 04.9	01 90	74.8	56 05.0	00 89	73.9	56 04.6	02 89	73.0	7
8	55 04.1	08 91	79.2	55 06.2	07 91	78.3	55 08.0	05 90	77.4	55 09.5	04 90	76.6	55 10.5	03 90	75.7	55 11.2	02 90	74.8	55 11.5	00 89	73.9	55 11.4	01 89	73.1	8
9	54 09 4	08 91	79.1	54 11.8	07 91	78.2	54 13.8	06 90	77.4	54 15.4	05 90	76.5	54 16.6	04 90	75.6	54 17.5	02 90	74.8	54 18.0	01 89	73.9	54 18.2	00 89	73.1	9
40	53 14.8	09 91	78.9	53 17.3	08 91	78.1	53 19.5	07 90	77.3	53 21.3	05 90	76.4	53 22.7	04 90	75.6	53 23.8	03 90	74.7	53 24.6	02 89	73.9	53 25.0	01 89	73.1	40
1	52 20.3	09 91	78.8	52 22.9	08 91	78.0	52 25.2	07 90	77.2	52 27.2	06 90	76.3	52 28.9	05 90	75.5	52 30.2	04 90	74.7	52 31.1	03 89	73.9	52 31.8	02 89	73.0	1
2	51 25.7	10 91	78.6	51 28.5	09 91	77.8	51 31.0	08 90	77.0	51 33.2	07 90	76.2	51 35.0	06 90	75.4	51 36.5	04 89	74.6	51 37.7	03 89	73.8	51 38.5	02 89	73.0	2
3	50 31.2	10 91	78.5	50 34.1	09 90	77.7	50 36.8	08 90	76.9	50 39.1	07 90	76.1	50 41.2	06 90	75.4	50 42.9	05 89	74.6	50 44.3	04 89	73.8	50 45.3	03 89	73.0	3
4	49 36.7	11 91	78.3	49 39.8	10 90	77.6	49 42.6	09 90	76.8	49 45.2	08 90	76.0	49 47.4	07 90	75.3	49 49.3	06 89	74.5	49 50.9	05 89	73.7	49 52.1	04 89	72.9	4
45	48 42.2	11 91	78.2	48 45.5	10 90	77.4	48 48.5	09 90	76.7	48 51.2	08 90	75.9	48 53.6	07 90	75.2	48 55.7	07 89	74.4	48 57.5	05 89	73.6	48 59.0	05 89	72.9	45
6	47 47.8	12 91	78.0	47 51.2	11 90	77.3	47 54.4	10 90	76.5	47 57.2	09 90	75.8	47 59.8	08 90	75.1	48 02.1	07 89	74.3	48 04.1	06 89	73.6	48 05.8	05 88	72.8	6
7	46 53.4	12 91	77.9	46 57.0	12 90	77.1	47 00.3	11 90	76.4	47 03.3	10 90	75.7	47 06.1	09 90	74.9	47 08.6	08 89	74.2	47 10.8	07 89	73.5	47 12.7	06 88	72.7	7
8	45 59.0	13 91	77.7	46 02.7	12 90	77.0	46 06.2	11 90	76.3	46 09.4	10 90	75.5	46 12.4	09 90	74.8	46 15.0	08 89	74.1	46 17.4	08 89	73.4	46 19.6	07 88	72.7	8
9	45 04.7	13 91	77.5	45 08.6	13 90	76.8	45 12.2	12 90	76.1	45 15.6	11 90	75.4	45 18.7	10 90	74.7	45 21.6	09 89	74.0	45 24.1	08 89	73.3	45 26.5	07 88	72.6	9
50	44 10.4	14 90	77.3	44 14.4	13 90	76.7	44 18.2	12 90	76.0	44 21.8	11 90	75.3	44 25.1	11 89	74.6	44 28.1	10 89	73.9	44 30.9	09 89	73.2	44 33.4	08 88	72.5	50
1	43 16.1	14 90	77.2	43 20.3	14 90	76.5	43 24.3	13 90	75.8	43 28.0	12 90	75.1	43 31.4	11 89	74.4	43 34.7	10 89	73.7	43 37.6	10 89	73.1	43 40.4	09 88	72.4	1
2	42 21.9	15 90	77.0	42 26.2	14 90	76.3	42 30.3	13 90	75.6	42 34.2	13 90	75.0	42 37.9	12 89	74.3	42 41.3	11 89	73.6	42 44.4	10 89	72.9	42 47.4	09 88	72.3	2
3	41 27.7	15 90	76.8	41 32.2	15 90	76.1	41 36.5	14 90	75.5	41 40.5	13 89	74.8	41 44.3	12 89	74.2	41 47.9	12 89	73.5	41 51.3	11 89	72.8	41 54.4	10 88	72.1	3
4	40 33.6	16 90	76.6	40 38.2	15 90	76.0	40 42.6	14 90	75.3	40 46.9	14 89	74.7	40 50.8	13 89	74.0	40 54.6	12 89	73.3	40 58.2	11 88	72.7	41 01.5	11 88	72.0	4
55	39 39.5	16 90	76.4	39 44.3	16 90	75.8	39 48.9	15 90	75.1	39 53.2	14 89	74.5	39 57.4	14 89	73.8	40 01.3	13 89	73.2	40 05.1	12 88	72.5	40 08.6	11 88	71.9	55
6	38 45.4	17 90	76.2	38 50.4	16 90	75.6	38 55.1	15 89	75.0	38 59.6	15 89	74.3	39 04.0	14 89	73.7	39 08.1	13 89	73.0	39 12.0	13 88	72.4	39 15.7	12 88	71.8	6
7	37 51.4	17 90	76.0	37 56.5	17 90	75.4	38 01.4	16 89	74.8	38 06.1	15 89	74.2	38 10.6	15 89	73.5	38 14.9	14 88	72.9	38 19.0	13 88	72.3	38 22.9	13 88	71.6	7
8	36 57.4	18 90	75.8	37 02.7	17 90	75.2	37 07.8	17 89	74.6	37 12.6	16 89	74.0	37 17.3	15 80	73.3	37 21.8	15 88	72.7	37 26.0	14 88	72.1	37 30.1	13 88	71.5	8
9	36 03.5	18 90	75.6	36 08.9	18 90	75.0	36 14.1	17 89	74.4	36 19.2	16 89	73.8	36 24.0	16 89	73.2	36 28.7	15 88	72.6	36 33.1	15 88	71.9	36 37.4	14 88	71.3	9
60	35 09.7	19 90	75.4	35 15.2	18 89	74.8	35 20.6	18 89	74.2	35 25.8	17 89	73.6	35 30.8	16 89	73.0	35 35.6	16 88	72.4	35 40.3	15 88	71.8	35 44.7	15 88	71.2	60
1	34 15.9	19 90	75.2	34 21.6	19 89	74.6	34 27.1	18 89	74.0	34 32.4	18 89	73.4	34 37.6	17 88	72.8	34 42.6	16 88	72.2	34 47.4	16 88	71.6	34 52.1	15 88	71.0	1
2	33 22.1	20 90	75.0	33 28.0	19 89	74.4	33 33.6	19 89	73.8	33 39.2	18 89	73.2	33 44.5	18 88	72.6	33 49.7	17 88	72.0	33 54.7	16 88	71.4	33 59.5	16 88	70.8	2
3	32 28.4	20 89	74.7	32 34.4	20 89	74.2	32 40.2	19 89	73.6	32 45.9	19 89	73.0	32 51.4	18 88	72.4	32 56.8	18 88	71.8	33 02.0	17 88	71.3	33 07.0	16 88	70.7	3
4	31 34.8	21 89	74.5	31 40.9	20 89	74.0	31 46.9	20 89	73.4	31 52.7	19 88	72.8	31 58.4	19 88	72.2	32 04.0	18 88	71.7	32 09.3	18 88	71.1	32 14.5	17 87	70.5	4
65	30 41.2	21 89	74.3	30 47.5	21 89	73.7	30 53.6	20 89	73.2	30 59.6	20 88	72.6	31 05.5	19 88	72.0	31 11.2	19 88	71.5	31 16.7	18 88	70.9	31 22.1	18 87	70.3	65
6	29 47.6	22 89	74.1	29 54.1	21 89	73.5	30 00.4	21 89	73.0	30 06.6	20 88	72.4	30 12.6	20 88	71.8	30 18.5	19 88	71.3	30 24.2	19 87	70.7	30 29.8	18 87	70.1	6
7	28 54.2	22 89	73.9	29 00.8	22 89	73.3	29 07.2	21 88	72.7	29 13.6	21 88	72.2	29 19.8	20 88	71.6	29 25.8	20 88	71.1	29 31.7	19 87	70.5	29 37.5	19 87	69.9	7
8	28 00.8	23 89	73.6	28 07.5	22 89	73.1	28 14.2	22 88	72.5	28 20.6	21 88	72.0	28 27.0	21 88	71.4	28 33.2	21 88	70.9	28 39.3	20 87	70.3	28 45.3	20 87	69.7	8
9	27 07.4	23 89	73.4	27 14.3	23 88	72.8	27 21.1	22 88	72.3	27 27.8	22 88	71.7	27 34.3	22 88	71.2	27 40.7	21 87	70.6	27 47.0	21 87	70.1	27 53.1	20 87	69.5	9
70	26 14.1	24 89	73.1	26 21.2	23 88	72.6	26 28.2	23 88	72.1	26 35.0	23 88	71.5	26 41.7	22 88	71.0	26 48.3	22 87	70.4	26 54.7	21 87	69.9	27 01.0	21 87	69.3	70
1	25 20.9	24 88	72.9	25 28.2	24 88	72.4	25 35.3	23 88	71.8	25 42.3	23 88	71.3	25 49.1	23 87	70.7	25 55.9	22 87	70.2	26 02.5	22 87	69.7	26 09.0	22 86	69.1	1
2	24 27.8	25 88	72.7	24 35.2	24 88	72.1	24 42.5	24 88	71.6	24 49.6	24 88	71.1	24 56.7	23 87	70.5	25 03.6	23 87	70.0	25 10.4	22 87	69.4	25 17.1	22 86	68.9	2
3	23 34.7	25 88	72.4	23 42.3	25 88	71.9	23 49.7	25 88	71.3	23 57.0	24 88	70.8	24 04.2	24 87	70.3	24 11.3	23 87	69.8	24 18.3	23 87	69.2	24 25.2	23 86	68.7	3
4	22 41.7	26 88	72.2	22 49.4	25 88	71.6	22 57.0	25 88	71.1	23 04.5	25 87	70.6	23 11.9	24 87	70.0	23 19.2	24 87	69.5	23 26.4	24 86	69.0	23 33.4	23 86	68.5	4
75	21 48.8	26 88	71.9	21 56.7	26 88	71.4	22 04.4	26 88	70.9	22 12.1	25 87	70.3	22 19.7	25 87	69.8	22 27.1	25 87	69.3	22 34.5	24 86	68.8	22 41.7	24 86	68.2	75
6	20 56.0	27 88	71.6	21 04.0	26 88	71.1	21 11.9	26 87	70.6	21 19.8	26 87	70.1	21 27.5	26 87	69.6	21 35.1	25 86	69.0	21 42.7	25 86	68.5	21 50.1	25 86	68.0	6
7	20 03.2	27 88	71.4	20 11.4	27 88	70.9	20 19.5	27 87	70.3	20 27.5	26 87	69.8	20 35.4	26 87	69.3	20 43.2	26 86	68.8	20 50.9	26 86	68.3	20 58.6	25 86	67.8	7
8	19 10.6	28 88	71.1	19 18.9	28 87	70.6	19 27.2	27 87	70.1	19 35.3	27 87	69.6	19 43.4	27 86	69.1	19 51.4	26 86	68.5	19 59.3	26 86	68.0	20 07.1	26 86	67.5	8
9	18 18.0	28 88	70.8	18 26.5	28 87	70.3	18 34.9	28 87	69.8	18 43.2	28 87	69.3	18 51.5	27 86	68.8	18 59.7	27 86	68.3	19 07.8	27 86	67.8	19 15.8	27 86	67.3	9
80	17 25.5	29 87	70.6	17 34.1	29 87	70.1	17 42.7	28 87	69.6	17 51.2	28 86	69.0	17 59.7	28 86	68.5	18 08.0	28 86	68.0	18 16.3	27 86	67.5	18 24.5	27 85	67.0	80
1	16 33.1	30 87	70.3	16 41.9	29 87	69.8	16 50.6	29 87	69.3	16 59.3	29 86	68.8	17 07.9	29 86	68.3	17 16.5	28 86	67.8	17 24.9	28 85	67.3	17 33.3	28 85	66.8	1
2	15 40.7	30 87	70.0	15 49.7	30 87	69.5	15 58.7	30 86	69.0	16 07.5	29 86	68.5	16 16.3	29 86	68.0	16 25.0	29 86	67.5	16 33.7	29 85	67.0	16 42.3	28 85	66.5	2
3	14 48.5	31 87	69.7	14 57.7	30 87	69.2	15 06.8	30 86	68.7	15 15.8	30 86	68.2	15 24.8	30 86	67.7	15 33.7	30 86	67.2	15 42.5	29 85	66.7	15 51.3	29 85	66.2	3
4	13 56.4	31 87	69.4	14 05.7	31 86	68.9	14 15.0	31 86	68.4	14 24.2	31 86	67.9	14 33.4	30 86	67.4	14 42.4	30 85	67.0	14 51.5	30 85	66.5	15 00.4	30 84	66.0	4
85	13 04.4	32 86	69.1	13 13.9	32 86	68.6	13 23.3	31 86	68.1	13 32.7	31 86	67.6	13 42.0	31 85	67.2	13 51.3	31 85	66.7	14 00.5	31 85	66.2	14 09.7	30 84	65.7	85
6	12 12.4	32 86	68.8	12 22.1	32 86	68.3	12 31.7	32 86	67.8	12 41.3	32 86	67.4	12 50.8	32 85	66.9	13 00.3	31 85	66.4	13 09.7	31 84	65.9	13 19.0	31 84	65.4	6
7	11 20.6	33 86	68.5	11 30.5	33 86	68.0	11 40.3	33 86	67.5	11 50.0	32 85	67.1	11 59.7	32 85	66.6	12 09.4	32 85	66.1	12 19.0	32 84	65.6	12 28.5	32 84	65.1	7
8	10 28.9	33 86	68.2	10 38.9	33 86	67.7	10 48.9	33 85	67.2	10 58.8	33 85	66.8	11 08.7	33 85	66.3	11 18.6	33 84	65.8	11 28.4	33 84	65.3	11 38.1	32 84	64.8	8
9	9 37.3	34 86	67.9	9 47.5	34 86	67.4	9 57.7	34 85	66.9	10 07.8	34 85	66.5	10 17.9	33 85	66.0	10 27.9	33 84	65.5	10 37.9	33 84	65.0	10 47.8	33 84	64.5	9
90	8 45.8	35 86	67.6	8 56.2	35 85	67.1	9 06.5	34 85	66.6	9 16.8	34 85	66.1	9 27.1	34 84	65.7	9 37.3	34 84	65.2	9 47.5	34 84	64.7	9 57.6	34 83	64.2	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	00
1	43 59.4	1.0 03	178.7	43 29.4	1.0 03	178.7	42 59.4	1.0 03	178.8	42 29.4	1.0 03	178.8	41 59.4	1.0 03	178.8	41 29.4	1.0 03	178.8	40 59.4	1.0 03	178.8	40 29.4	1.0 03	178.8	1
2	43 57.5	1.0 05	177.5	43 27.6	1.0 05	177.5	42 57.6	1.0 05	177.5	42 27.6	1.0 05	177.6	41 57.7	1.0 05	177.6	41 27.7	1.0 05	177.6	40 57.7	1.0 05	177.6	40 27.7	1.0 05	177.7	2
3	43 54.5	1.0 07	176.2	43 24.5	1.0 07	176.2	42 54.6	1.0 07	176.3	42 24.7	1.0 07	176.3	41 54.7	1.0 07	176.4	41 24.8	1.0 07	176.4	40 54.8	1.0 07	176.5	40 24.9	1.0 06	176.5	3
4	43 50.2	1.0 09	174.9	43 20.3	1.0 09	175.0	42 50.4	1.0 09	175.1	42 20.5	1.0 09	175.1	41 50.6	1.0 09	175.2	41 20.7	1.0 09	175.2	40 50.8	1.0 09	175.3	40 21.0	1.0 08	175.3	4
05	43 44.6	99 11	173.7	43 14.8	99 11	173.7	42 45.0	99 11	173.8	42 15.2	99 11	173.9	41 45.4	99 11	174.0	41 15.5	99 10	174.0	40 45.7	99 10	174.1	40 15.9	99 10	174.2	05
6	43 37.9	99 13	172.4	43 08.2	99 13	172.5	42 38.4	99 13	172.6	42 08.7	99 13	172.7	41 38.9	99 12	172.8	41 09.2	99 12	172.9	40 39.4	99 12	172.9	40 09.7	99 12	173.0	6
7	43 30.0	99 15	171.2	43 00.3	99 15	171.3	42 30.7	99 15	171.4	42 01.0	99 15	171.5	41 31.4	99 14	171.6	41 01.7	99 14	171.7	40 32.0	99 14	171.8	40 02.4	99 14	171.9	7
8	43 20.8	98 17	169.9	42 51.3	98 17	170.1	42 21.8	98 17	170.2	41 52.2	98 16	170.3	41 22.7	99 16	170 4	40 53.1	99 16	170.5	40 23.5	99 16	170.6	39 54.0	99 16	170.7	8
9	43 10.5	98 19	168.7	42 41.1	98 19	168.8	42 11.7	98 19	169.0	41 42.3	98 18	169.1	41 12.8	98 18	169.2	40 43.4	98 18	169.4	40 13.9	98 18	169.5	39 44.5	98 18	169.6	9
10	42 59.0	98 21	167.5	42 29.8	98 21	167.6	42 00.5	98 21	167.8	41 31.2	98 20	167.9	41 01.9	98 20	168.1	40 32.6	98 20	168.2	40 03.2	98 20	168.3	39 33.9	98 20	168.5	10
1	42 46.4	97 23	166.3	42 17.3	97 23	166.4	41 48.1	97 22	166.6	41 19.0	97 22	166.7	40 49.8	97 22	166.9	40 20.6	97 22	167.1	39 51.5	97 21	167.2	39 22.2	97 21	167.4	1
2	42 32.6	97 25	165.1	42 03.6	97 25	165.2	41 34.7	97 24	165.4	41 05.7	97 24	165.6	40 36.7	97 24	165.7	40 07.6	97 23	165.9	39 38.6	97 23	166.1	39 09.5	97 23	166.2	2
3	42 17.7	96 27	163.9	41 48.9	96 26	164.1	41 20.1	96 26	164.2	40 51.3	96 26	164.4	40 22.4	96 26	164.6	39 53.6	96 25	164.8	39 24.7	96 25	165.0	38 55.8	96 25	165.1	3
4	42 01.7	96 28	162.7	41 33.1	96 28	162.9	41 04.5	96 28	163.1	40 35.8	96 28	163.3	40 07.1	96 27	163.5	39 38.4	96 27	163.7	39 09.7	96 27	163.9	38 41.0	96 26	164.0	4
15	41 44.6	95 30	161.5	41 16.2	95 30	161.7	40 47.7	95 30	162.0	40 19.3	95 29	162.2	39 50.8	95 29	162.4	39 22.3	95 29	162.6	38 53.8	95 28	162.8	38 25.2	95 28	163.0	15
6	41 26.4	94 32	160.4	40 58.2	94 32	160.6	40 30.0	94 31	160.8	40 01.7	94 31	161.0	39 33.4	94 30	161.3	39 05.1	94 30	161.5	38 36.8	94 30	161.7	38 08.4	95 30	161.9	6
7	41 07.2	93 34	159.2	40 39.2	93 33	159.5	40 11.2	93 33	159.7	39 43.1	94 32	159.9	39 15.1	94 32	160.2	38 46.9	94 32	160.4	38 18.8	94 32	160.6	37 50.6	94 31	160.8	7
8	40 47.0	93 35	158.1	40 19.2	93 35	158.5	39 51.4	93 35	158.6	39 23.6	93 34	158.8	38 55.7	93 34	159.1	38 27.8	93 34	159.3	37 59.8	93 33	159.6	37 31.9	93 33	159.8	8
9	40 25.8	92 37	157.0	39 58.2	92 37	157.3	39 30.6	92 36	157.5	39 03.0	92 36	157.8	38 35.3	92 36	158.0	38 07.6	92 35	158.3	37 39.9	92 35	158.5	37 12.2	93 34	158.7	9
20	40 03.5	91 39	155.9	39 36.2	91 38	156.2	39 08.9	91 38	156.4	38 41.5	91 38	156.7	38 14.0	91 37	157.0	37 46.6	92 37	157.2	37 19.1	92 36	157.5	36 51.5	92 36	157.7	20
1	39 40.4	90 40	154.8	39 13.3	90 40	155.1	38 46.2	90 39	155.4	38 19.0	91 39	155.7	37 51.8	91 39	155.9	37 24.6	91 38	156.2	36 57.3	91 38	156.4	36 30.0	91 37	156.7	1
2	39 16.2	89 42	153.8	38 49.4	90 41	154.1	38 22.5	90 41	154.3	37 55.6	90 40	154.6	37 28.6	90 40	154.9	37 01.7	90 40	155.2	36 34.6	90 39	155.4	36 07.6	90 39	155.7	2
3	38 51.2	89 43	152.7	38 24.6	89 43	153.0	37 58.0	89 42	153.3	37 31.3	89 42	153.6	37 04.6	89 42	153.9	36 37.9	89 41	154.2	36 11.1	89 41	154.4	35 44.2	89 40	154.7	3
4	38 25.2	88 45	151.7	37 58.9	88 44	152.0	37 32.6	88 44	152.3	37 06.1	88 43	152.6	36 39.7	88 43	152.9	36 13.2	88 42	153.2	35 46.6	89 42	153.5	35 20.1	89 42	153.8	4
25	37 58.4	87 46	150.7	37 32.4	87 46	151.0	37 06.3	87 45	151.3	36 40.1	87 45	151.6	36 13.9	87 44	151.9	35 47.7	88 44	152.2	35 21.4	88 44	152.5	34 55.0	88 43	152.8	25
6	37 30.8	86 48	149.7	37 05.0	86 47	150.0	36 39.1	86 46	150.3	36 13.2	86 46	150.6	35 47.3	87 46	150.9	35 21.3	87 45	151.2	34 55.3	87 45	151.6	34 29.2	87 44	151.9	6
7	37 02.3	85 49	148.7	36 36.7	85 48	149.0	36 11.2	85 48	149.4	35 45.5	85 47	149.7	35 19.9	86 47	150.0	34 54.1	86 46	150.3	34 28.4	86 46	150.6	34 02.6	86 46	150.9	7
8	36 32.9	84 50	147.7	36 07.7	84 50	148.1	35 42.4	84 49	148.4	35 17.1	85 49	148.7	34 51.7	85 48	149.1	34 26.2	85 48	149.4	34 00.7	85 48	149.7	33 35.1	85 47	150.0	8
9	36 02.9	83 52	146.8	35 37.9	83 51	147.1	35 12.9	84 50	147.5	34 47.8	84 50	147.8	34 22.7	84 50	148.1	33 57.5	84 49	148.5	33 32.2	84 49	148.8	33 06.9	84 48	149.1	9
30	35 32.0	82 53	145.9	35 07.3	82 52	146.2	34 42.6	82 52	146.5	34 17.8	83 51	146.9	33 52.9	83 51	147.2	33 28.0	83 50	147.6	33 03.0	83 50	147.9	32 38.0	83 49	148.2	30
1	35 00.4	81 54	144.9	34 36.0	81 53	145.3	34 11.5	82 53	145.6	33 47.0	82 52	146.0	33 22.4	82 52	146.3	32 57.8	82 52	146.7	32 33.1	82 51	147.0	32 08.4	83 51	147.3	1
2	34 28.1	80 55	144.0	34 04.0	81 54	144.4	33 39.8	81 54	144.8	33 15.6	81 54	145.1	32 51.2	81 53	145.5	32 26.9	81 53	145.8	32 02.5	81 52	146.2	31 38.0	82 52	146.5	2
3	33 55.1	79 56	143.2	33 31.3	80 56	143.5	33 07.4	80 55	143.9	32 43.4	80 55	144.2	32 19.4	80 54	144.6	31 55.3	80 54	145.0	31 31.1	81 53	145.3	31 06.9	81 53	145.6	3
4	33 21.4	78 57	142.3	32 57.8	79 57	142.7	32 34.2	79 56	143.0	32 10.5	79 56	143.4	31 46.8	79 55	143.8	31 23.0	79 55	144.1	30 59.1	80 54	144.5	30 35.2	80 54	144.8	4
35	32 47.0	77 58	141.4	32 23.8	78 58	141.8	32 00.4	78 57	142.2	31 37.0	78 57	142.6	31 13.6	78 56	142.9	30 50.1	79 56	143.3	30 26.5	79 55	143.6	30 02.8	79 55	144.0	35
6	32 12.1	76 59	140.6	31 49.1	77 59	141.0	31 26.0	77 58	141.4	31 02.9	77 58	141.7	30 39.7	77 57	142.1	30 16.5	78 57	142.5	29 53.2	78 56	142.8	29 29.8	78 56	143.2	6
7	31 36.5	76 60	139.8	31 13.8	76 60	140.2	30 51.0	76 59	140.6	30 28.2	76 59	140.9	30 05.3	76 58	141.3	29 42.3	77 58	141.7	29 19.3	77 57	142.0	28 56.2	77 57	142.4	7
8	31 00.2	75 61	139.0	30 37.8	75 61	139.4	30 15.3	75 60	139.8	29 52.8	75 60	140.1	29 30.2	75 59	140.5	29 07.5	76 59	140.9	28 44.8	76 58	141.3	28 22.0	76 58	141.6	8
9	30 23.4	74 62	138.2	30 01.3	74 62	138.6	29 39.1	74 61	139.0	29 16.9	74 61	139.4	28 54.5	75 60	139.7	28 32.1	75 60	140.1	28 09.7	75 59	140.5	27 47.2	75 59	140.9	9
40	29 46.1	73 63	137.4	29 24.2	73 63	137.8	29 02.3	73 62	138.2	28 40.3	73 62	138.6	28 18.3	74 61	139.0	27 56.2	74 61	139.4	27 34.0	74 60	139.8	27 11.8	74 60	140.1	40
1	29 08.2	72 64	136.7	28 46.6	72 64	137.1	28 25.0	72 63	137.5	28 03.3	72 63	137.9	27 41.5	73 62	138.2	27 19.7	73 62	138.6	26 57.8	73 61	139.0	26 35.8	73 61	139.4	1
2	28 29.8	71 65	135.9	28 08.5	71 64	136.3	27 47.1	71 64	136.7	27 25.7	72 64	137.1	27 04.2	72 63	137.5	26 42.7	72 63	137.9	26 21.0	72 62	138.3	25 59.4	72 62	138.7	2
3	27 50.8	70 66	135.2	27 29.8	70 65	135.6	27 08.7	70 65	136.0	26 47.6	71 64	136.4	26 26.4	71 64	136.8	26 05.1	71 63	137.2	25 43.8	71 63	137.6	25 22.4	71 62	138.0	3
4	27 11.4	69 67	134.5	26 50.6	69 66	134.9	26 29.8	69 66	135.3	26 09.0	70 65	135.7	25 48.0	70 65	136.1	25 27.1	70 64	136.5	25 06.0	70 64	136.9	24 44.9	71 63	137.3	4
45	26 31.4	68 67	133.8	26 11.0	68 67	134.2	25 50.5	69 66	134.6	25 29.9	69 66	135.0	25 09.2	69 66	135.4	24 48.5	69 65	135.8	24 27.7	69 65	136.2	24 06.9	70 64	136.6	45
6	25 51.0	67 68	133.1	25 30.9	67 68	133.5	25 10.6	68 67	133.9	24 50.3	68 67	134.3	24 29.9	68 66	134.7	24 09.5	68 66	135.1	23 49.0	68 65	135.5	23 28.4	69 65	135.9	6
7	25 10.2	66 69	132.4	24 50.3	66 68	132.8	24 30.3	67 68	133.2	24 10.3	67 68	133.7	23 50.2	67 67	134.1	23 30.0	67 66	134.5	23 09.8	68 66	134.9	22 49.5	68 66	135.3	7
8	24 28.9	65 70	131.8	24 09.3	66 69	132.2	23 49.6	66 69	132.6	23 29.8	66 68	133.0	23 10.0	66 68	133.4	22 50.1	66 67	133.8	22 30.1	67 67	134.2	22 10.1	67 66	134.6	8
9	23 47.2	64 70	131.1	23 27.8	65 70	131.5	23 08.4	65 69	131.9	22 48.9	65 69	132.4	22 29.3	65 68	132.8	22 09.7	65 68	133.2	21 50.0	66 68	133.6	21 30.3	66 67	134.0	9
50	23 05.1	64 71	130.5	22 46.0	64 70	130.9	22 26.8	64 70	131.3	22 07.6	64 70	131.7	21 48.3	64 69	132.1	21 28.9	65 68	132.5	21 09.5	65 68	133.0	20 50.1	65 68	133.4	50
1	22 22.6	63 72	129.8	22 03.7	63 71	130.3	21 44.8	63 71	130.7	21 25.9	63 70	131.1	21 06.8	64 70	131.5	20 47.8	64 69	131.9	20 28.6	64 69	132.3	20 09.4	64 68	132.8	1
2	21 39.7	62 72	129.2	21 21.1	62 72	129.7	21 02.5	62 71	130.1	20 43.8	62 71	130.5	20 25.0	63 70	130.9	20 06.2	63 70	131.3	19 47.3	63 70	131.7	19 28.4	63 69	132.2	2
3	20 56.4	61 73	128.6	20 38.1	61 72	129.1	20 19.7	61 72	129.5	20 01.3	62 72	129.9	19 42.8	62 71	130.3	19 24.2	62 70	130.7	19 05.6	62 70	131.1	18 46.9	62 70	131.6	3
4	20 12.7	60 73	128.0	19 54.7	60 73	128.5	19 36.6	60 72	128.9	19 18.4	61 72	129.3	19 00.2	61 72	129.7	18 41.9	61 71	130.1	18 23.5	61 71	130.6	18 05.1	61 70	131.0	4
55	19 28.8	59 74	127.5	19 11.0	59 74	127.9	18 53.1	60 73	128.3	18 35.2	60 73	128.7	18 17.2	60 72	129.2	17 59.2	60 72	129.6	17 41.1	60 71	130.0	17 22.9	61 71	130.4	55
6	18 44.4	58 74	126.9	18 26.9	59 74	127.3	18 09.3	59 74	127.7	17 51.6	59 73	128.2	17 33.9	59 73	128.6	17 16.1	59 72	129.0	16 58.3	60 72	129.4	16 40.4	60 72	129.9	6
7	17 59.8	58 75	126.3	17 42.5	58 74	126.8	17 25.1	58 74	127.2	17 07.7	58 74	127.6	16 50.2	58 73	128.0	16 32.7	58 73	128.5	16 15.2	59 72	128.9	15 57.5	59 72	129.3	7
8	17 14.8	57 76	125.8	16 57.8	57 75	126.2	16 40.6	57 75	126.6	16 23.5	57 74	127.1	16 06.3	57 74	127.5	15 49.0	58 73	127.9	15 31.7	58 73	128.3	15 14.3	58 72	128.8	8
9	16 29.5	56 76	125.2	16 12.7	56 76	125.7	15 55.9	56 75	126.1	15 38.9	56 75	126.5	15 22.0	57 74	127.0	15 05.0	57 74	127.4	14 47.9	57 73	127.8	14 30.8	57 73	128.2	9
60	15 43.9	55 76	124.7	15 27.4	55 76	125.2	15 10.8	55 76	125.6	14 54.1	56 75	126.0	14 37.4	56 75	126.4	14 20.6	56 74	126.9	14 03.8	56 74	127.3	13 47.0	56 74	127.7	60
1	14 58.1	54 77	124.2	14 41.7	55 76	124.6	14 25.4	55 76	125.1	14 08.9	55 76	125.5	13 52.5	55 75	125.9	13 36.0	55 75	126.4	13 19.4	55 74	126.8	13 02.8	55 74	127.2	1
2	14 11.9	54 77	123.7	13 55.8	54 77	124.1	13 39.7	54 77	124.6	13 23.5	54 76	125.0	13 07.3	54 76	125.4	12 51.0	54 75	125.9	12 34.7	54 75	126.3	12 18.3	55 74	126.7	2
3	13 25.5	53 78	123.2	13 09.7	53 78	123.6	12 53.7	53 77	124.1	12 37.8	53 77	124.5	12 21.8	53 76	124.9	12 05.8	53 76	125.4	11 49.7	54 75	125.8	11 33.6	54 75	126.2	3
4	12 38.8	52 78	122.7	12 23.2	52 78	123.1	12 07.5	52 78	123.6	11 51.8	52 77	124.0	11 36.1	53 77	124.4	11 20.3	53 76	124.9	11 04.5	53 76	125.3	10 48.6	53 76	125.7	4
65	11 51.9	51 79	122.2	11 36.5	51 78	122.7	11 21.1	52 78	123.1	11 05.6	52 78	123.5	10 50.1	52 77	124.0	10 34.5	52 77	124.4	10 18.9	52 76	124.8	10 03.3	52 76	125.3	65
6	11 04.7	51 79	121.7	10 49.5	51 79	122.2	10 34.3	51 78	122.6	10 19.1	51 78	123.1	10 03.8	51 78	123.5	9 48.5	51 77	123.9	9 33.1	51 77	124.4	9 17.8	51 76	124.8	6
7	10 17.3	50 80	121.3	10 02.3	50 79	121.7	9 47.3	50 79	122.2	9 32.3	50 78	122.6	9 17.3	50 78	123.0	9 02.2	50 78	123.5	8 47.1	50 77	123.9	8 32.0	51 77	124.3	7
8	9 29.6	49 80	120.8	9 14.9	49 80	121.3	9 00.1	49 79	121.7	8 45.3	49 79	122.1	8 30.5	49 78	122.6	8 15.7	50 78	123.0	8 00.8	50 78	123.5	7 45.9	50 77	123.9	8
9	8 41.7	48 80	120.4	8 27.2	48 80	120.8	8 12.7	48 80	121.3	7 58.1	49 79	121.7	7 43.5	49 79	122.1	7 28.9	49 78	122.6	7 14.3	49 78	123.0	6 59.6	49 78	123.5	9
70	7 53.6	48 80	119.9	7 39.3	48 80	120.4	7 25.0	48 80	120.8	7 10.7	48 80	121.3	6 56.3	48 79	121.7	6 41.9	48 79	122.1	6 27.5	48 78	122.6	6 13.1	48 78	123.0	70
1	7 05.3	47 81	119.5	6 51.2	47 80	119.9	6 37.1	47 80	120.4	6 23.0	47 80	120.8	6 08.9	47 79	121.3	5 54.7	47 79	121.7	5 40.5	47 79	122.2	5 26.3	47 78	122.6	1
2	6 16.8	46 81	119.1	6 02.9	46 81	119.5	5 49.0	46 80	120.0	5 35.1	46 80	120.4	5 21.2	46 80	120.8	5 07.3	46 79	121.3							2
3	5 28.0	45 82	118.6	5 14.4	46 81	119.1	5 00.7	46 81	119.5																3

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	7 54.5	35 85	67.2	8 05.0	35 85	66.8	8 15.5	35 85	66.3	8 26.0	35 84	65.8	8 36.5	35 84	65.4	8 46.9	35 84	64.9	8 57.3	35 84	64.4	9 07.6	34 83	63.9	91
2	7 03.2	36 85	66.9	7 14.0	36 85	66.4	7 24.7	36 85	66.0	7 35.3	36 84	65.5	7 46.0	35 84	65.0	7 56.6	35 84	64.6	8 07.2	35 83	64.1	8 17.7	35 83	63.6	2
3	6 12.1	36 85	66.6	6 23.0	36 85	66.1	6 33.9	36 84	65.6	6 44.8	36 84	65.2	6 55.6	36 84	64.7	7 06.4	36 83	64.2	7 17.2	36 83	63.8	7 27.9	36 83	63.3	3
4	5 21.1	37 85	66.2	5 32.2	37 85	65.8	5 43.3	37 84	65.3	5 54.4	37 84	64.8	6 05.4	37 84	64.4	6 16.4	37 83	63.9	6 27.4	37 83	63.4	6 38.3	36 82	63.0	4
95	[illegible]									5 04.1	37 84	64.5	5 15.3	37 83	64.0	5 26.5	37 83	63.6	5 37.7	37 83	63.1	5 48.8	37 82	62.6	95

Lat. 22°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	88 00.0	1.0 21	180.0	88 30.0	1.0 27	180.0	89 00.0	1.0 37	180.0	89 30.0	1.0 56	180.0
1	87 47.6	91 53	154.8	88 14.0	85 63	148.0	88 38.0	73 75	136.9	88 56.7	48 87	118.1
2	87 15.8	74 70	136.6	87 36.4	63 78	128.5	87 53.2	48 85	117.9	88 04.6	27 91	104.7
3	86 33.5	59 80	125.0	86 49.6	48 84	117.7	87 02.1	35 89	109.2	87 10.2	19 92	99.6
4	85 45.8	48 84	117.4	85 58.9	38 88	111.2	86 08.8	27 90	104.3	86 15.1	15 92	96.9
05	84 55.3	41 87	112.3	85 06.3	32 89	106.9	85 14.5	23 91	101.2	85 19.8	12 92	95.2
6	84 03.2	35 89	108.6	84 12.7	28 90	103.9	84 19.7	20 92	99.0	84 24.3	11 92	94.0
7	83 10.0	31 90	105.7	83 18.4	25 91	101.7	83 24.7	17 92	97.4	83 28.8	10 93	93.1
8	82 16.2	28 90	103.5	82 23.7	22 92	99.9	82 29.4	16 92	96.2	82 33.2	09 93	92.4
9	81 21.9	26 91	101.7	81 28.8	20 92	98.5	81 34.1	15 92	95.1	81 37.6	09 93	91.7
10	80 27.3	24 91	100.3	80 33.7	19 92	97.3	80 38.6	14 92	94.3	80 42.0	09 93	91.2
1	79 32.4	22 92	99.0	79 38.5	18 92	96.3	79 43.1	13 92	93.5	79 46.4	08 93	90.7
2	78 37.4	21 92	97.9	78 43.1	17 92	95.4	78 47.6	13 93	92.9	78 50.8	08 93	90.3
3	77 42.2	20 92	97.0	77 47.7	16 92	94.7	77 52.0	12 93	92.3	77 55.1	08 93	89.9
4	76 47.0	19 92	96.1	76 52.2	16 92	94.0	76 56.4	12 93	91.8	76 59.5	08 93	89.6
15	75 51.6	19 92	95.4	75 56.7	15 92	93.4	76 00.8	12 93	91.3	76 03.9	08 93	89.3
6	74 56.2	18 92	94.7	75 01.2	15 93	92.8	75 05.2	12 93	90.9	75 08.2	09 93	88.9
7	74 00.7	18 92	94.1	74 05.6	15 93	92.3	74 09.6	12 93	90.5	74 12.6	09 93	88.6
8	73 05.2	17 93	93.5	73 10.0	15 93	91.8	73 13.9	12 93	90.1	73 17.0	09 93	88.3
9	72 09.7	17 93	92.9	72 14.4	14 93	91.3	72 18.3	12 93	89.7	72 21.4	09 93	88.1
20	71 14.1	17 93	92.4	71 18.8	14 93	90.9	71 22.7	12 93	89.3	71 25.8	09 93	87.8
1	70 18.5	17 93	92.0	70 23.1	14 93	90.5	70 27.1	12 93	89.0	70 30.2	09 93	87.5
2	69 22.9	16 93	91.5	69 27.5	14 93	90.1	69 31.4	12 93	88.7	69 34.7	10 93	87.3
3	68 27.3	16 93	91.1	68 31.9	14 93	89.7	68 35.8	12 93	88.4	68 39.1	10 93	87.0
4	67 31.7	16 93	90.7	67 36.3	14 93	89.4	67 40.2	12 93	88.1	67 43.5	10 92	86.8
25	66 36.0	16 93	90.3	66 40.6	14 93	89.0	66 44.6	12 93	87.8	66 48.0	10 92	86.5
6	65 40.4	16 93	89.9	65 45.0	14 93	88.7	65 49.0	12 93	87.5	65 52.5	11 92	86.3
7	64 44.8	16 93	89.5	64 49.4	14 93	88.4	64 53.5	13 93	87.2	64 57.0	11 92	86.0
8	63 49.2	16 93	89.2	63 53.8	15 93	88.1	63 57.9	13 93	86.9	64 01.5	11 92	85.8
9	62 53.5	16 93	88.8	62 58.2	15 93	87.8	63 02.4	13 93	86.7	63 06.0	11 92	85.6
30	61 57.9	16 93	88.5	62 02.6	15 93	87.5	62 06.8	13 92	86.4	62 10.6	12 92	85.3
1	61 02.3	17 93	88.2	61 07.0	15 93	87.2	61 11.3	13 92	86.1	61 15.1	12 92	85.1
2	60 06.7	17 93	87.9	60 11.5	15 93	86.9	60 15.8	14 92	85.9	60 19.7	12 92	84.9
3	59 11.1	17 93	87.6	59 16.0	15 93	86.6	59 20.3	14 92	85.6	59 24.3	12 92	84.6
4	58 15.6	17 93	87.2	58 20.4	16 92	86.3	58 24.9	14 92	85.4	58 28.9	13 92	84.4
35	57 20.0	17 93	86.9	57 24.9	16 92	86.0	57 29.5	14 92	85.1	57 33.6	13 92	84.2
6	56 24.4	17 93	86.7	56 29.4	16 92	85.8	56 34.0	15 92	84.9	56 38.2	13 92	84.0
7	55 28.9	17 92	86.4	55 34.0	16 92	85.5	55 38.6	15 92	84.6	55 42.9	14 92	83.7
8	54 33.4	18 92	86.1	54 38.5	16 92	85.2	54 43.3	15 92	84.4	54 47.6	14 92	83.5
9	53 37.9	18 92	85.8	53 43.1	17 92	85.0	53 47.9	16 92	84.1	53 52.4	14 92	83.3
40	52 42.5	18 92	85.5	52 47.7	17 92	84.7	52 52.6	16 92	83.9	52 57.1	15 92	83.1
1	51 47.0	18 92	85.2	51 52.3	17 92	84.4	51 57.3	16 92	83.6	52 01.9	15 92	82.8
2	50 51.6	18 92	85.0	50 56.9	17 92	84.2	51 02.0	16 92	83.4	51 06.8	15 92	82.6
3	49 56.2	19 92	84.7	50 01.6	18 92	83.9	50 06.8	17 92	83.1	50 11.6	16 92	82.4
4	49 00.8	19 92	84.4	49 06.3	18 92	83.7	49 11.5	17 92	82.9	49 16.5	16 92	82.2
45	48 05.4	19 92	84.1	48 11.0	18 92	83.4	48 16.4	17 92	82.7	48 21.4	16 92	81.9
6	47 10.1	19 92	83.9	47 15.8	18 92	83.1	47 21.2	18 92	82.4	47 26.3	17 92	81.7
7	46 14.8	20 92	83.6	46 20.6	19 92	82.9	46 26.1	18 92	82.2	46 31.3	17 92	81.5
8	45 19.5	20 92	83.3	45 25.4	19 92	82.6	45 31.0	18 92	81.9	45 36.3	17 92	81.2
9	44 24.3	20 92	83.1	44 30.2	19 92	82.4	44 35.9	19 92	81.7	44 41.3	18 92	81.0
50	43 29.1	20 92	82.8	43 35.1	20 92	82.1	43 40.9	19 92	81.5	43 46.4	18 92	80.8
1	42 33.9	21 92	82.5	42 40.0	20 92	81.9	42 45.9	19 92	81.2	42 51.5	18 92	80.5
2	41 38.8	21 92	82.3	41 45.0	20 92	81.6	41 50.9	19 92	81.0	41 56.6	19 91	80.3
3	40 43.7	21 92	82.0	40 49.9	21 92	81.4	40 56.0	20 92	80.7	41 01.8	19 91	80.1
4	39 48.6	22 92	81.8	39 55.0	21 92	81.1	40 01.1	20 91	80.5	40 07.1	19 91	79.8
55	38 53.6	22 92	81.5	39 00.0	21 92	80.9	39 06.3	21 91	80.2	39 12.3	20 91	79.6
6	37 58.6	22 92	81.2	38 05.1	22 92	80.6	38 11.5	21 91	80.0	38 17.6	20 91	79.4
7	37 03.6	22 92	81.0	37 10.2	22 91	80.3	37 16.7	21 91	79.7	37 23.0	21 91	79.1
8	36 08.7	23 91	80.7	36 15.4	22 91	80.1	36 22.0	22 91	79.5	36 28.4	21 91	78.9
9	35 13.8	23 91	80.4	35 20.6	23 91	79.8	35 27.3	22 91	79.2	35 33.8	21 91	78.6
60	34 19.0	23 91	80.2	34 25.9	23 91	79.6	34 32.7	22 91	79.0	34 39.3	22 91	78.4
1	33 24.2	24 91	79.9	33 31.2	23 91	79.3	33 38.1	23 91	78.7	33 44.8	22 91	78.1
2	32 29.4	24 91	79.6	32 36.6	24 91	79.1	32 43.6	23 91	78.5	32 50.4	22 91	77.9
3	31 34.7	24 91	79.4	31 42.0	24 91	78.8	31 49.1	23 91	78.2	31 56.0	23 90	77.6
4	30 40.1	25 91	79.1	30 47.4	24 91	78.5	30 54.6	24 90	78.0	31 01.7	23 90	77.4
65	29 45.5	25 91	78.8	29 52.9	25 91	78.3	30 00.3	24 90	77.7	30 07.4	24 90	77.1
6	28 50.9	25 91	78.5	28 58.5	25 91	78.0	29 05.9	25 90	77.4	29 13.2	24 90	76.9
7	27 56.4	26 91	78.3	28 04.1	25 90	77.7	28 11.7	25 90	77.2	28 19.1	25 90	76.6
8	27 02.0	26 91	78.0	27 09.8	26 90	77.5	27 17.4	25 90	76.9	27 25.0	25 90	76.4
9	26 07.6	27 91	77.7	26 15.5	26 90	77.2	26 23.3	26 90	76.6	26 31.0	25 90	76.1
70	25 13.3	27 90	77.4	25 21.3	27 90	76.9	25 29.2	26 90	76.4	25 37.0	26 90	75.8
1	24 19.0	27 90	77.2	24 27.1	27 90	76.6	24 35.2	27 90	76.1	24 43.1	26 90	75.6
2	23 24.8	28 90	76.9	23 33.0	27 90	76.4	23 41.2	27 90	75.8	23 49.2	27 90	75.3
3	22 30.6	28 90	76.6	22 39.0	28 90	76.1	22 47.3	27 90	75.6	22 55.5	27 90	75.0
4	21 36.6	28 90	76.3	21 45.1	28 90	75.8	21 53.4	28 90	75.3	22 01.7	28 89	74.8
75	20 42.5	29 90	76.0	20 51.2	29 90	75.5	20 59.7	28 90	75.0	21 08.1	28 89	74.5
6	19 48.6	29 90	75.7	19 57.3	29 90	75.2	20 06.0	29 89	74.7	20 14.5	28 89	74.2
7	18 54.7	30 90	75.4	19 03.6	29 90	74.9	19 12.4	29 89	74.4	19 21.1	29 89	73.9
8	18 00.9	30 90	75.1	18 09.9	30 89	74.6	18 18.8	30 89	74.1	18 27.6	29 89	73.6
9	17 07.2	31 89	74.8	17 16.3	30 89	74.3	17 25.3	30 89	73.8	17 34.3	30 89	73.3
80	16 13.5	31 89	74.5	16 22.8	31 89	74.0	16 31.9	30 89	73.5	16 41.0	30 88	73.0
1	15 19.9	31 89	74.2	15 29.3	31 89	73.7	15 38.6	31 89	73.2	15 47.9	31 88	72.8
2	14 26.4	32 89	73.9	14 36.0	32 89	73.4	14 45.4	31 88	72.9	14 54.8	31 88	72.5
3	13 33.0	32 89	73.6	13 42.7	32 89	73.1	13 52.3	32 88	72.6	14 01.8	32 88	72.2
4	12 39.7	33 89	73.3	12 49.5	33 88	72.8	12 59.2	32 88	72.3	13 08.9	32 88	71.8
85	11 46.5	33 89	73.0	11 56.4	33 88	72.5	12 06.2	33 88	72.0	12 16.1	33 88	71.5
6	10 53.3	34 88	72.7	11 03.4	33 88	72.2	11 13.4	33 88	71.7	11 23.3	33 88	71.2
7	10 00.3	34 88	72.3	10 10.5	34 88	71.9	10 20.6	34 88	71.4	10 30.7	34 88	70.9
8	9 07.3	35 88	72.0	9 17.6	34 88	71.5	9 27.9	34 88	71.1	9 38.2	34 87	70.6
9	8 14.4	35 88	71.7	8 24.9	35 88	71.2	8 35.4	35 88	70.7	8 45.8	35 87	70.3
90	7 21.7	35 88	71.4	7 32.3	35 88	70.9	7 42.9	35 87	70.4	7 53.5	35 87	69.9

H.A.	22° 00′			22° 30′			23° 00′			23° 30′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	90 00.0	.. 93	....	89 30.0	1.0 55	00.0	89 00.0	1.0 36	00.0	88 30.0	1.0 26	00.0
1	89 04.4	00 93	89.8	88 56.9	47 86	61.4	88 38.4	73 74	42.5	88 14.4	85 62	31.4
2	88 08.7	01 93	89.6	88 05.0	25 90	74.5	87 54.0	47 85	61.2	87 37.4	63 77	50.5
3	87 13.1	01 93	89.4	87 10.7	17 91	79.2	87 03.2	33 88	69.6	86 51.2	47 84	61.0
4	86 17.5	01 93	89.3	86 15.9	12 92	81.6	86 10.3	25 90	74.1	86 01.1	36 87	67.1
05	85 21.8	02 93	89.1	85 20.7	09 92	82.9	85 16.4	20 90	76.8	85 09.1	29 88	71.0
6	84 26.2	02 93	88.9	84 25.5	07 92	83.7	84 22.1	16 91	78.6	84 16.1	24 90	73.7
7	83 30.6	02 93	88.7	83 30.2	05 92	84.3	83 27.4	13 91	79.9	83 22.4	20 90	75.6
8	82 35.0	03 93	88.5	82 34.8	04 92	84.6	82 32.6	11 92	80.8	82 28.4	17 91	77.0
9	81 39.4	03 93	88.3	81 39.4	03 92	84.9	81 37.6	09 92	81.4	81 34.0	15 91	78.0
10	80 43.8	03 93	88.1	80 44.0	02 92	85.0	80 42.6	07 92	81.9	80 39.5	13 91	78.8
1	79 48.2	04 93	87.9	79 48.5	01 92	85.1	79 47.4	06 92	82.3	79 44.9	11 91	79.5
2	78 52.6	04 93	87.7	78 53.1	00 92	85.2	78 52.3	05 92	82.6	78 50.2	09 92	80.0
3	77 57.0	04 93	87.6	77 57.7	00 92	85.2	77 57.1	04 92	82.8	77 55.3	08 92	80.4
4	77 01.4	05 93	87.4	77 02.3	01 92	85.1	77 01.9	03 92	82.9	77 00.5	07 92	80.7
15	76 05.9	05 93	87.2	76 06.8	01 92	85.1	76 06.7	02 92	83.0	76 05.5	06 92	80.9
6	75 10.3	05 93	87.0	75 11.4	02 92	85.0	75 11.5	01 92	83.1	75 10.6	05 92	81.1
7	74 14.8	06 92	86.8	74 16.0	03 92	85.0	74 16.3	01 92	83.1	74 15.6	04 92	81.3
8	73 19.2	06 92	86.6	73 20.6	03 92	84.9	73 21.0	00 92	83.1	73 20.6	03 92	81.4
9	72 23.7	06 92	86.4	72 25.2	04 92	84.8	72 25.8	01 92	83.1	72 25.6	02 92	81.4
20	71 28.2	07 92	86.2	71 29.8	04 92	84.6	71 30.6	01 92	83.1	71 30.6	01 92	81.5
1	70 32.7	07 92	86.0	70 34.4	04 92	84.5	70 35.4	02 92	83.0	70 35.6	00 92	81.5
2	69 37.2	07 92	85.8	69 39.0	05 92	84.4	69 40.1	03 92	83.0	69 40.6	00 92	81.5
3	68 41.7	08 92	85.6	68 43.7	05 92	84.3	68 44.9	03 92	82.9	68 45.5	01 92	81.5
4	67 46.3	08 92	85.4	67 48.3	06 92	84.1	67 49.7	04 92	82.8	67 50.5	02 92	81.5
25	66 50.8	08 92	85.3	66 53.0	06 92	84.0	66 54.5	04 92	82.7	66 55.5	02 92	81.4
6	65 55.4	09 92	85.1	65 57.7	07 92	83.8	65 59.4	05 92	82.6	66 00.5	03 92	81.4
7	65 00.0	09 92	84.9	65 02.4	07 92	83.7	65 04.2	05 92	82.5	65 05.5	03 92	81.3
8	64 04.6	09 92	84.7	64 07.1	08 92	83.5	64 09.1	06 92	82.4	64 10.5	04 92	81.2
9	63 09.2	10 92	84.5	63 11.8	08 92	83.4	63 13.9	06 92	82.3	63 15.5	04 92	81.1
30	62 13.8	10 92	84.3	62 16.6	08 92	83.2	62 18.8	07 92	82.1	62 20.6	05 92	81.1
1	61 18.5	10 92	84.1	61 21.3	09 92	83.0	61 23.7	07 92	82.0	61 25.6	06 92	80.9
2	60 23.1	11 92	83.9	60 26.1	09 92	82.9	60 28.6	08 92	81.9	60 30.7	06 92	80.8
3	59 27.8	11 92	83.7	59 30.9	10 92	82.7	59 33.6	08 92	81.7	59 35.8	07 92	80.7
4	58 32.6	11 92	83.5	58 35.8	10 92	82.5	58 38.5	09 92	81.6	58 40.9	07 92	80.6
35	57 37.3	12 92	83.3	57 40.6	10 92	82.3	57 43.5	09 92	81.4	57 46.0	08 91	80.5
6	56 42.1	12 92	83.1	56 45.5	11 92	82.2	56 48.5	09 92	81.2	56 51.2	08 91	80.3
7	55 46.9	12 92	82.9	55 50.4	11 92	82.0	55 53.6	10 92	81.1	55 56.3	09 91	80.2
8	54 51.7	13 92	82.7	54 55.3	12 92	81.8	54 58.6	10 92	80.9	55 01.5	09 91	80.1
9	53 56.5	13 92	82.4	54 00.3	12 92	81.6	54 03.7	11 92	80.8	54 06.7	10 91	79.9
40	53 01.4	14 92	82.2	53 05.3	12 92	81.4	53 08.8	11 92	80.6	53 12.0	10 91	79.8
1	52 06.3	14 92	82.0	52 10.3	13 92	81.2	52 13.9	12 91	80.4	52 17.3	11 91	79.6
2	51 11.2	14 92	81.8	51 15.3	13 92	81.0	51 19.1	12 91	80.2	51 22.6	11 91	79.4
3	50 16.1	15 92	81.6	50 20.4	14 92	80.8	50 24.3	13 91	80.1	50 27.9	11 91	79.3
4	49 21.1	15 92	81.4	49 25.5	14 92	80.6	49 29.5	13 91	79.9	49 33.2	12 91	79.1
45	48 26.1	15 92	81.2	48 30.6	14 92	80.4	48 34.7	13 91	79.7	48 38.6	12 91	78.9
6	47 31.2	16 92	81.0	47 35.7	15 91	80.2	47 40.0	14 91	79.5	47 44.0	13 91	78.8
7	46 36.2	16 92	80.7	46 40.9	15 91	80.0	46 45.3	14 91	79.3	46 49.5	13 91	78.6
8	45 41.4	16 91	80.5	45 46.2	16 91	79.8	45 50.7	15 91	79.1	45 55.0	14 91	78.4
9	44 46.5	17 91	80.3	44 51.4	16 91	79.6	44 56.1	15 91	78.9	45 00.5	14 91	78.2
50	43 51.7	17 91	80.1	43 56.7	16 91	79.4	44 01.5	16 91	78.7	44 06.1	15 91	78.0
1	42 56.9	18 91	79.9	43 02.1	17 91	79.2	43 07.0	16 91	78.5	43 11.7	15 91	77.8
2	42 02.2	18 91	79.6	42 07.4	17 91	79.0	42 12.5	16 91	78.3	42 17.3	16 90	77.7
3	41 07.4	18 91	79.4	41 12.8	18 91	78.8	41 18.0	17 91	78.1	41 23.0	16 90	77.5
4	40 12.8	19 91	79.2	40 18.3	18 91	78.6	40 23.6	17 91	77.9	40 28.7	17 90	77.3
55	39 18.2	19 91	79.0	39 23.8	18 91	78.3	39 29.2	18 90	77.7	39 34.4	17 90	77.1
6	38 23.6	20 91	78.7	38 29.3	19 91	78.1	38 34.9	18 90	77.5	38 40.3	18 90	76.9
7	37 29.0	20 91	78.5	37 34.9	19 91	77.9	37 40.6	19 90	77.3	37 46.1	18 90	76.6
8	36 34.5	20 91	78.3	36 40.6	20 91	77.7	36 46.4	19 90	77.0	36 52.0	18 90	76.4
9	35 40.1	21 91	78.0	35 46.2	20 90	77.4	35 52.2	20 90	76.8	35 57.9	19 90	76.2
60	34 45.7	21 91	77.8	34 52.0	21 90	77.2	34 58.0	20 90	76.6	35 03.9	19 90	76.0
1	33 51.4	22 90	77.6	33 57.7	21 90	77.0	34 03.9	20 90	76.4	34 10.0	20 90	75.8
2	32 57.1	22 90	77.3	33 03.6	21 90	76.7	33 09.9	21 90	76.1	33 16.1	20 90	75.6
3	32 02.8	22 90	77.1	32 09.4	22 90	76.5	32 15.9	21 90	75.9	32 22.2	21 90	75.3
4	31 08.6	23 90	76.8	31 15.4	22 90	76.3	31 22.0	22 90	75.7	31 28.4	21 90	75.1
65	30 14.5	23 90	76.6	30 21.4	23 90	76.0	30 28.1	22 90	75.4	30 34.7	22 90	74.9
6	29 20.4	24 90	76.3	29 27.4	23 90	75.8	29 34.3	23 90	75.2	29 41.0	22 89	74.6
7	28 26.4	24 90	76.1	28 33.5	24 90	75.5	28 40.5	23 90	75.0	28 47.4	23 89	74.4
8	27 32.4	25 90	75.8	27 39.7	24 90	75.3	27 46.8	24 89	74.7	27 53.9	23 89	74.2
9	26 38.5	25 90	75.6	26 45.9	25 90	75.0	26 53.2	24 89	74.5	27 00.4	24 89	73.9
70	25 44.7	25 90	75.3	25 52.2	25 89	74.8	25 59.6	25 89	74.2	26 07.0	24 89	73.7
1	24 50.9	26 90	75.0	24 58.6	25 89	74.5	25 06.1	25 89	74.0	25 13.6	25 89	73.4
2	23 57.2	26 89	74.8	24 05.0	26 89	74.2	24 12.7	26 89	73.7	24 20.3	25 89	73.2
3	23 03.5	27 89	74.5	23 11.5	26 89	74.0	23 19.3	26 89	73.5	23 27.1	26 89	72.9
4	22 09.9	27 89	74.2	22 18.0	27 89	73.7	22 26.0	26 89	73.2	22 33.9	26 88	72.7
75	21 16.4	28 89	74.0	21 24.7	27 89	73.4	21 32.8	27 89	72.9	21 40.9	27 88	72.4
6	20 23.0	28 89	73.7	20 31.4	28 89	73.2	20 39.7	27 88	72.7	20 47.9	27 88	72.1
7	19 29.7	29 89	73.4	19 38.2	28 88	72.9	19 46.6	28 88	72.4	19 55.0	28 88	71.9
8	18 36.4	29 89	73.1	18 45.1	29 88	72.6	18 53.6	28 88	72.1	19 02.1	28 88	71.6
9	17 43.2	30 88	72.8	17 52.0	29 88	72.3	18 00.7	29 88	71.8	18 09.4	29 88	71.3
80	16 50.1	30 88	72.6	16 59.0	30 88	72.1	17 07.9	30 88	71.6	17 16.7	29 88	71.1
1	15 57.0	30 88	72.3	16 06.2	30 88	71.8	16 15.2	30 88	71.3	16 24.2	30 88	70.8
2	15 04.1	31 88	72.0	15 13.4	31 88	71.5	15 22.6	31 88	71.0	15 31.7	30 87	70.5
3	14 11.3	31 88	71.7	14 20.7	31 88	71.2	14 30.0	31 87	70.7	14 39.3	31 87	70.2
4	13 18.5	32 88	71.4	13 28.1	32 88	70.9	13 37.6	32 87	70.4	13 47.0	31 87	69.9
85	12 25.8	32 88	71.1	12 35.5	32 87	70.6	12 45.2	32 87	70.1	12 54.8	32 87	69.6
6	11 33.3	33 88	70.7	11 43.1	33 87	70.3	11 53.0	33 87	69.8	12 02.7	33 87	69.3
7	10 40.8	34 87	70.4	10 50.8	33 87	70.0	11 00.8	33 87	69.5	11 10.7	33 86	69.0
8	9 48.4	34 87	70.1	9 58.6	34 87	69.6	10 08.8	34 87	69.2	10 18.9	34 86	68.7
9	8 56.2	35 87	69.8	9 06.5	34 87	69.3	9 16.8	34 86	68.8	9 27.1	34 86	68.4
90	8 04.0	35 87	69.5	8 14.5	35 86	69.0	8 25.0	35 86	68.5	8 35.4	35 86	68.0

H.A.	20° 00′		20° 30′		21° 00′		21° 30′		22° 00′		22° 30′		23° 00′		23° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	48 00.0 1.0 01	180.0	47 30.0 1.0 01	180.0	47 00.0 1.0 01	180.0	46 30.0 1.0 01	180.0	46 00.0 1.0 01	180.0	45 30.0 1.0 01	180.0	45 00.0 1.0 01	180.0	44 30.0 1.0 01	180.0	00
1	47 59.3 1.0 03	178.6	47 29.3 1.0 03	178.6	46 59.3 1.0 03	178.6	46 29.3 1.0 03	178.6	45 59.4 1.0 03	178.7	45 29.4 1.0 03	178.7	44 59.4 1.0 03	178.7	44 29.4 1.0 03	178.7	1
2	47 57.3 1.0 06	177.2	47 27.3 1.0 06	177.2	46 57.3 1.0 06	177.3	46 27.4 1.0 06	177.3	45 57.4 1.0 05	177.3	45 27.4 1.0 05	177.4	44 57.5 1.0 05	177.4	44 27.5 1.0 06	177.4	2
3	47 53.9 1.0 08	175.8	47 24.0 1.0 08	175.8	46 54.0 1.0 08	175.9	46 24.1 1.0 08	176.0	45 54.2 1.0 08	176.0	45 24.2 1.0 07	176.1	44 54.3 1.0 07	176.1	44 24.4 1.0 07	176.1	3
4	47 49.1 1.0 10	174.4	47 19.3 1.0 10	174.5	46 49.4 1.0 10	174.5	46 19.5 1.0 10	174.6	45 49.7 1.0 10	174.7	45 19.8 1.0 10	174.7	44 49.9 1.0 10	174.8	44 20.0 1.0 09	174.9	4
05	47 43.0 99 12	173.0	47 13.2 99 12	173.1	46 43.4 99 12	173.2	46 13.6 99 12	173.3	45 43.8 99 12	173.4	45 14.0 99 12	173.4	44 44.2 99 12	173.5	44 14.4 99 11	173.6	05
6	47 35.6 99 15	171.6	47 05.9 99 14	171.7	46 36.2 99 14	171.8	46 06.5 99 14	171.9	45 36.8 99 14	172.0	45 07.1 99 14	172.1	44 37.3 99 14	172.2	44 07.6 99 13	172.3	6
7	47 26.8 99 17	170.3	46 57.2 99 16	170.4	46 27.6 99 16	170.5	45 58.0 99 16	170.6	45 28.4 99 16	170.7	44 58.8 99 16	170.8	44 29.2 99 16	171.0	43 59.6 99 16	171.1	7
8	47 16.7 98 19	168.9	46 47.3 98 19	169.0	46 17.8 98 18	169.2	45 48.3 98 18	169.3	45 18.9 98 18	169.4	44 49.4 98 18	169.6	44 19.9 98 18	169.7	43 50.3 98 17	169.8	8
9	47 05.4 98 21	167.5	46 36.1 98 21	167.7	46 06.7 98 20	167.8	45 37.4 98 20	168.0	45 08.0 98 20	168.1	44 38.7 98 20	168.3	44 09.3 98 20	168.4	43 39.9 98 19	168.6	9
10	46 52.7 97 23	166.2	46 23.6 97 23	166.4	45 54.4 97 23	166.5	45 25.2 97 22	166.7	44 56.0 97 22	166.9	44 26.8 97 22	167.0	43 57.5 97 22	167.2	43 28.3 98 21	167.3	10
1	46 38.8 97 25	164.9	46 09.8 97 25	165.0	45 40.8 97 25	165.2	45 11.8 97 24	165.4	44 42.7 97 24	165.6	44 13.7 97 24	165.8	43 44.6 97 24	165.9	43 15.5 97 23	166.1	1
2	46 23.7 96 27	163.5	45 54.9 96 27	163.7	45 26.0 96 27	163.9	44 57.2 96 26	164.1	44 28.3 96 26	164.3	43 59.4 96 26	164.5	43 30.5 96 26	164.7	43 01.6 96 25	164.9	2
3	46 07.3 95 29	162.2	45 38.7 95 29	162.5	45 10.0 96 29	162.7	44 41.4 96 28	162.9	44 12.7 96 28	163.1	43 44.0 96 28	163.3	43 15.2 96 27	163.5	42 46.5 96 27	163.7	3
4	45 49.7 95 31	161.0	45 21.3 95 31	161.2	44 52.9 95 30	161.4	44 24.4 95 30	161.6	43 55.9 95 30	161.9	43 27.4 95 30	162.1	42 58.9 95 29	162.3	42 30.3 95 29	162.5	4
15	45 31.0 94 33	159.7	45 02.8 94 33	159.9	44 34.6 94 32	160.2	44 06.3 94 32	160.4	43 38.0 94 32	160.6	43 09.7 94 31	160.9	42 41.4 95 31	161.1	42 13.0 95 31	161.3	15
6	45 11.1 93 35	158.4	44 43.2 93 35	158.7	44 15.2 93 34	158.9	43 47.1 94 34	159.2	43 19.0 94 34	159.4	42 50.9 94 33	159.7	42 22.8 94 33	159.9	41 54.6 94 32	160.1	6
7	44 50.1 92 37	157.2	44 22.4 93 36	157.5	43 54.6 93 36	157.7	43 26.8 93 36	158.0	42 59.0 93 35	158.3	42 31.1 93 35	158.5	42 03.2 93 34	158.7	41 35.2 93 34	159.0	7
8	44 28.0 92 39	156.0	44 00.5 92 38	156.3	43 33.0 92 38	156.5	43 05.4 92 37	156.8	42 37.8 92 37	157.1	42 10.2 92 37	157.3	41 42.5 92 36	157.6	41 14.8 92 36	157.9	8
9	44 04.9 91 40	154.8	43 37.6 91 40	155.1	43 10.3 91 40	155.4	42 43.0 91 39	155.7	42 15.6 91 39	155.9	41 48.2 91 38	156.2	41 20.8 92 38	156.5	40 53.3 92 38	156.7	9
20	43 40.7 90 42	153.6	43 13.7 90 42	153.9	42 46.6 90 41	154.2	42 19.6 90 41	154.5	41 52.4 90 40	154.8	41 25.3 91 40	155.1	40 58.1 91 40	155.4	40 30.8 91 39	155.6	20
1	43 15.4 89 44	152.5	42 48.7 89 43	152.8	42 21.9 89 43	153.1	41 55.1 89 42	153.4	41 28.3 90 42	153.7	41 01.3 90 41	154.0	40 34.4 90 41	154.3	40 07.4 90 41	154.5	1
2	42 49.2 88 45	151.3	42 22.8 88 45	151.6	41 56.3 88 44	152.0	41 29.7 89 44	152.3	41 03.1 89 44	152.6	40 36.5 89 43	152.9	40 09.8 89 43	153.2	39 43.0 89 42	153.5	2
3	42 22.0 87 47	150.2	41 55.9 87 46	150.5	41 29.6 88 46	150.9	41 03.4 88 46	151.2	40 37.0 88 45	151.5	40 10.6 88 44	151.8	39 44.2 88 44	152.1	39 17.7 88 44	152.4	3
4	41 53.9 86 48	149.1	41 28.0 86 48	149.4	41 02.1 87 47	149.8	40 36.1 87 47	150.1	40 10.0 87 46	150.4	39 43.9 87 46	150.7	39 17.7 87 46	151.1	38 51.5 87 45	151.4	4
25	41 24.9 85 50	148.0	40 59.3 85 49	148.4	40 33.6 86 49	148.7	40 07.9 86 48	149.0	39 42.1 86 48	149.4	39 16.3 86 48	149.7	38 50.4 86 47	150.0	38 24.4 87 46	150.4	25
6	40 55.0 84 51	147.0	40 29.7 85 51	147.3	40 04.3 85 50	147.7	39 38.9 85 50	148.0	39 13.4 85 49	148.4	38 47.8 85 49	148.7	38 22.2 86 48	149.0	37 56.5 86 48	149.4	6
7	40 24.3 83 53	145.9	39 59.3 84 52	146.3	39 34.1 84 52	146.6	39 09.0 84 51	147.0	38 43.8 84 51	147.3	38 18.5 84 50	147.7	37 53.1 85 50	148.0	37 27.7 85 49	148.4	7
8	39 52.7 82 54	144.9	39 28.0 83 54	145.3	39 03.2 83 53	145.6	38 38.3 83 52	146.0	38 13.3 83 52	146.4	37 48.3 83 52	146.7	37 23.3 84 51	147.1	36 58.1 84 50	147.4	8
9	39 20.3 81 55	143.9	38 55.9 82 55	144.3	38 31.4 82 54	144.7	38 06.8 82 54	145.0	37 42.1 82 53	145.4	37 17.4 83 53	145.7	36 52.6 83 52	146.1	36 27.8 83 52	146.4	9
30	38 47.2 80 56	142.9	38 23.0 81 56	143.3	37 58.8 81 56	143.7	37 34.5 81 55	144.1	37 10.1 81 54	144.4	36 45.7 82 54	144.8	36 21.2 82 54	145.1	35 56.6 82 53	145.5	30
1	38 13.3 79 58	142.0	37 49.4 80 57	142.4	37 25.5 80 57	142.7	37 01.5 80 56	143.1	36 37.4 80 56	143.5	36 13.3 81 55	143.9	35 49.0 81 55	144.2	35 24.8 81 54	144.6	1
2	37 38.6 78 59	141.0	37 15.1 79 58	141.4	36 51.4 79 58	141.8	36 27.7 79 57	142.2	36 03.9 79 57	142.6	35 40.1 80 56	142.9	35 16.2 80 56	143.3	34 52.2 80 56	143.7	2
3	37 03.3 77 60	140.1	36 40.0 78 60	140.5	36 16.7 78 59	140.9	35 53.3 78 59	141.3	35 29.8 78 58	141.7	35 06.2 79 58	142.0	34 42.6 79 57	142.4	34 18.9 79 57	142.8	3
4	36 27.3 76 61	139.2	36 04.3 77 61	139.6	35 41.3 77 60	140.0	35 18.1 77 60	140.4	34 54.9 77 59	140.8	34 31.7 78 59	141.2	34 08.3 78 58	141.5	33 44.9 78 58	141.9	4
35	35 50.6 75 62	138.3	35 27.9 76 62	138.7	35 05.2 76 61	139.1	34 42.3 76 61	139.5	34 19.4 77 60	139.9	33 56.4 77 60	140.3	33 33.4 77 59	140.7	33 10.3 77 59	141.1	35
6	35 13.3 74 63	137.5	34 50.9 75 63	137.9	34 28.5 75 62	138.3	34 05.9 75 62	138.7	33 43.3 76 61	139.1	33 20.6 76 61	139.5	32 57.8 76 60	139.8	32 35.0 76 60	140.2	6
7	34 35.4 74 64	136.6	34 13.3 74 64	137.0	33 51.1 74 63	137.4	33 28.9 74 63	137.8	33 06.5 75 62	138.2	32 44.1 75 62	138.6	32 21.6 75 61	139.0	31 59.1 75 61	139.4	7
8	33 56.9 73 65	135.8	33 35.1 73 65	136.2	33 13.2 73 64	136.6	32 51.2 73 64	137.0	32 29.2 74 63	137.4	32 07.1 74 63	137.8	31 44.9 74 62	138.2	31 22.6 74 62	138.6	8
9	33 17.8 72 66	135.0	32 56.3 72 66	135.4	32 34.7 72 65	135.8	32 13.0 72 65	136.2	31 51.2 73 64	136.6	31 29.4 73 64	137.0	31 07.5 73 63	137.4	30 45.5 73 63	137.8	9
40	32 38.2 71 67	134.2	32 17.0 71 66	134.6	31 55.6 71 66	135.0	31 34.2 71 66	135.4	31 12.8 72 65	135.8	30 51.2 72 64	136.2	30 29.6 72 64	136.6	30 07.9 72 64	137.0	40
1	31 58.0 70 68	133.4	31 37.1 70 67	133.8	31 16.0 70 67	134.2	30 54.9 71 66	134.6	30 33.7 71 66	135.1	30 12.5 71 66	135.5	29 51.1 71 65	135.9	29 29.7 71 64	136.3	1
2	31 17.3 69 69	132.6	30 56.7 69 68	133.0	30 35.9 69 68	133.5	30 15.1 70 67	133.9	29 54.2 70 67	134.3	29 33.2 70 66	134.7	29 12.1 70 66	135.1	28 51.0 70 66	135.5	2
3	30 36.2 68 69	131.9	30 15.8 68 69	132.3	29 55.3 68 68	132.7	29 34.7 69 68	133.1	29 14.1 69 68	133.6	28 53.4 69 67	134.0	28 32.6 69 67	134.4	28 11.7 70 66	134.8	3
4	29 54.5 67 70	131.1	29 34.4 67 70	131.6	29 14.2 67 69	132.0	28 53.9 68 69	132.4	28 33.5 68 68	132.8	28 13.1 68 68	133.3	27 52.6 68 68	133.7	27 32.0 69 67	134.1	4
45	29 12.4 66 71	130.4	28 52.5 66 70	130.9	28 32.6 67 70	131.3	28 12.6 67 70	131.7	27 52.5 67 69	132.1	27 32.4 67 69	132.5	27 12.1 68 68	133.0	26 51.8 68 68	133.4	45
6	28 29.8 65 72	129.7	28 10.2 65 71	130.2	27 50.6 66 71	130.6	27 30.8 66 70	131.0	27 11.0 66 70	131.4	26 51.1 66 69	131.8	26 31.2 67 69	132.3	26 11.1 67 68	132.7	6
7	27 46.8 64 72	129.0	27 27.5 65 72	129.5	27 08.1 65 72	129.9	26 48.6 65 71	130.3	26 29.1 65 71	130.7	26 09.5 66 70	131.2	25 49.8 66 70	131.6	25 30.0 66 69	132.0	7
8	27 03.4 63 73	128.4	26 44.3 64 72	128.8	26 25.2 64 72	129.2	26 06.0 64 72	129.7	25 46.7 64 71	130.1	25 27.4 65 71	130.5	25 08.0 65 70	130.9	24 48.5 65 70	131.3	8
9	26 19.6 62 74	127.7	26 00.8 63 73	128.1	25 41.9 63 73	128.6	25 23.0 63 72	129.0	25 04.0 63 72	129.4	24 44.9 64 72	129.8	24 25.7 64 71	130.3	24 06.5 64 71	130.7	9
50	25 35.4 62 74	127.0	25 16.8 62 74	127.5	24 58.2 62 74	127.9	24 39.5 62 73	128.3	24 20.8 63 73	128.8	24 02.0 63 72	129.2	23 43.1 63 72	129.6	23 24.1 63 71	130.1	50
1	24 50.8 61 75	126.4	24 32.5 61 74	126.8	24 14.1 61 74	127.3	23 55.7 62 74	127.7	23 37.2 62 73	128.1	23 18.7 62 73	128.6	23 00.0 62 72	129.0	22 41.3 62 72	129.4	1
2	24 05.8 60 76	125.8	23 47.8 60 75	126.2	23 29.7 60 75	126.7	23 11.5 61 74	127.1	22 53.3 61 74	127.5	22 35.0 61 74	128.0	22 16.6 61 73	128.4	21 58.2 62 73	128.8	2
3	23 20.5 59 76	125.2	23 02.7 59 76	125.6	22 44.9 60 75	126.1	22 27.0 60 75	126.5	22 09.0 60 74	126.9	21 50.9 60 74	127.3	21 32.8 61 74	127.8	21 14.6 61 73	128.2	3
4	22 34.9 58 77	124.6	22 17.4 59 76	125.0	21 59.8 59 76	125.5	21 42.1 59 75	125.9	21 24.3 59 75	126.3	21 06.5 59 74	126.8	20 48.7 60 74	127.2	20 30.7 60 74	127.6	4
55	21 48.9 58 77	124.0	21 31.6 58 77	124.4	21 14.3 58 76	124.9	20 56.9 58 76	125.3	20 39.4 58 76	125.7	20 21.8 59 75	126.2	20 04.2 59 75	126.6	19 46.5 59 74	127.0	55
6	21 02.6 57 78	123.4	20 45.6 57 77	123.9	20 28.5 57 77	124.3	20 11.3 57 76	124.7	19 54.0 58 76	125.2	19 36.7 58 76	125.6	19 19.4 58 75	126.0	19 01.9 58 75	126.5	6
7	20 16.0 56 78	122.8	19 59.2 56 78	123.3	19 42.4 56 77	123.7	19 25.4 57 77	124.2	19 08.4 57 76	124.6	18 51.3 57 76	125.0	18 34.2 57 76	125.5	18 17.0 57 75	125.9	7
8	19 29.2 55 79	122.3	19 12.6 55 78	122.7	18 55.9 56 78	123.2	18 39.2 56 77	123.6	18 22.5 56 77	124.1	18 05.6 56 77	124.5	17 48.8 56 76	124.9	17 31.8 57 76	125.4	8
9	18 42.0 54 79	121.7	18 25.6 55 79	122.2	18 09.2 55 78	122.6	17 52.8 55 78	123.1	17 36.2 55 78	123.5	17 19.6 55 77	123.9	17 03.0 56 77	124.4	16 46.3 56 76	124.8	9
60	17 54.6 54 80	121.2	17 38.4 54 79	121.7	17 22.2 54 79	122.1	17 06.0 54 78	122.5	16 49.7 54 78	123.0	16 33.3 55 78	123.4	16 16.9 55 77	123.9	16 00.5 55 77	124.3	60
1	17 06.8 53 80	120.7	16 50.9 53 80	121.1	16 35.0 53 79	121.6	16 19.0 53 79	122.0	16 02.9 54 78	122.5	15 46.8 54 78	122.9	15 30.6 54 78	123.3	15 14.4 54 77	123.8	1
2	16 18.9 52 80	120.2	16 03.2 52 80	120.6	15 47.5 53 80	121.1	15 31.7 53 79	121.5	15 15.8 53 79	121.9	14 59.9 53 78	122.4	14 44.0 53 78	122.8	14 28.0 53 78	123.3	2
3	15 30.7 51 81	119.7	15 15.2 52 80	120.1	14 59.7 52 80	120.6	14 44.1 52 80	121.0	14 28.5 52 79	121.4	14 12.8 52 79	121.9	13 57.1 52 79	122.3	13 41.3 53 78	122.8	3
4	14 42.2 51 81	119.2	14 27.0 51 81	119.6	14 11.6 51 80	120.1	13 56.3 51 80	120.5	13 40.9 51 80	120.9	13 25.4 52 79	121.4	13 09.9 52 79	121.8	12 54.4 52 79	122.3	4
65	13 53.5 50 82	118.7	13 38.5 50 81	119.1	13 23.4 50 81	119.6	13 08.2 51 80	120.0	12 53.1 51 80	120.5	12 37.8 51 80	120.9	12 22.6 51 80	121.3	12 07.2 51 79	121.8	65
6	13 04.6 49 82	118.2	12 49.8 50 82	118.6	12 34.9 50 81	119.1	12 20.0 50 81	119.5	12 05.0 50 80	120.0	11 50.0 50 80	120.4	11 34.9 50 80	120.9	11 19.8 50 79	121.3	6
7	12 15.5 49 82	117.7	12 00.8 49 82	118.2	11 46.2 49 82	118.6	11 31.4 49 81	119.1	11 16.7 49 81	119.5	11 01.9 49 80	120.0	10 47.0 50 80	120.4	10 32.2 50 80	120.8	7
8	11 26.1 48 83	117.3	11 11.7 48 82	117.7	10 57.2 48 82	118.2	10 42.7 48 82	118.6	10 28.2 49 81	119.0	10 13.6 49 81	119.5	9 59.0 49 81	119.9	9 44.3 49 80	120.4	8
9	10 36.6 47 83	116.8	10 22.3 48 82	117.3	10 08.1 48 82	117.7	9 53.8 48 82	118.1	9 39.4 48 82	118.6	9 25.0 48 81	119.0	9 10.6 48 81	119.5	8 56.2 48 80	119.9	9
70	9 46.8 47 83	116.4	9 32.8 47 83	116.8	9 18.7 47 83	117.3	9 04.6 47 82	117.7	8 50.5 47 82	118.1	8 36.3 47 82	118.6	8 22.1 47 81	119.0	8 07.9 47 81	119.5	70
1	8 56.9 46 84	115.9	8 43.0 46 83	116.4	8 29.2 46 83	116.8	8 15.2 46 82	117.3	8 01.3 46 82	117.7	7 47.3 47 82	118.2	7 33.4 47 82	118.6	7 19.3 47 81	119.0	1
2	8 06.7 45 84	115.5	7 53.1 46 84	115.9	7 39.4 46 83	116.4	7 25.7 46 83	116.8	7 12.0 46 83	117.3	6 58.2 46 82	117.7	6 44.4 46 82	118.2	6 30.6 46 82	118.6	2
3	7 16.4 45 84	115.1	7 03.0 45 84	115.5	6 49.5 45 84	116.0	6 36.0 45 83	116.4	6 22.4 45 83	116.9	6 08.9 45 83	117.3	5 55.3 45 82	117.7	5 41.7 45 82	118.2	3
4	6 25.9 44 84	114.6	6 12.7 44 84	115.1	5 59.4 44 84	115.5	5 46.0 44 83	116.0	5 32.7 45 83	116.4	5 19.3 45 83	116.9	5 05.9 45 83	117.3			4
75	5 35.3 44 85	114.2	5 22.2 44 84	114.7	5 09.1 44 84	115.1											75

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′		20° 30′		21° 00′		21° 30′		22° 00′		22° 30′		23° 00′		23° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	6 29.0 36 88	71.0	6 39.8 36 87	70.5	6 50.5 36 87	70.1	7 01.3 36 87	69.6	7 12.0 36 86	69.1	7 22.6 36 86	68.7	7 33.3 35 86	68.2	7 43.9 35 86	67.7	91
2	5 36.5 36 88	70.7	5 47.4 36 87	70.2	5 58.3 36 87	69.7	6 09.2 36 87	69.3	6 20.1 36 86	68.8	6 30.9 36 86	68.3	6 41.7 36 86	67.9	6 52.5 36 86	67.4	2
3	[illegible]				5 06.2 37 87	69.4	5 17.2 37 87	68.9	5 28.2 37 86	68.5	5 39.3 37 86	68.0	5 50.2 37 86	67.5	6 01.2 36 85	67.1	3
4	[illegible]														5 10.0 37 85	66.7	4

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	88 00.0	1.0 20	00.0	87 30.0	1.0 16	00.0	87 00.0	1.0 14	00.0	86 30.0	1.0 12	00.0	86 00.0	1.0 10	00.0	85 30.0	1.0 09	00.0	85 00.0	1.0 08	00.0	84 30.0	1.0 06	00.0	00
1	87 47.9	91 52	24.5	87 20.2	94 44	20.0	86 51.8	96 38	16.8	86 22.9	97 33	14.5	85 53.8	97 29	12.7	85 24.5	98 26	11.3	84 55.1	98 24	10.1	84 25.5	99 22	09.2	1
2	87 16.9	73 60	42.3	86 53.9	80 62	35.9	86 29.0	85 55	31.1	86 03.0	88 50	27.2	85 36.2	91 45	24.1	85 08.7	92 41	21.7	84 40.8	94 38	19.6	84 12.5	95 34	17.9	2
3	86 35.4	58 78	53.5	86 16.7	66 72	47.2	85 55.8	73 67	41.9	85 33.1	78 62	37.5	85 09.1	82 57	33.8	84 44.1	85 53	30.7	84 18.2	87 49	28.0	83 51.8	89 45	25.7	3
4	85 48.6	47 83	60.7	85 33.3	55 78	55.0	85 15.7	62 74	49.9	84 56.1	68 70	45.5	84 35.0	73 65	41.6	84 12.5	77 61	38.2	83 49.0	80 58	35.2	83 24.6	83 54	32.6	4
05	84 58.9	38 86	65.5	84 46.2	46 82	60.5	84 31.3	53 79	55.8	84 14.4	59 75	51.6	83 55.8	65 71	47.8	83 35.7	69 68	44.4	83 14.5	73 64	41.3	82 52.2	76 61	38.5	05
6	84 07.6	32 87	68.9	83 56.9	39 85	64.4	83 44.0	46 82	60.2	83 29.3	52 79	56.3	83 13.0	57 76	52.7	82 55.1	62 72	49.4	82 35.9	66 69	46.3	82 15.6	69 66	43.5	6
7	83 15.3	27 88	71.4	83 06.1	34 86	67.4	82 55.0	40 84	63.6	82 42.1	46 82	60.0	82 27.6	51 79	56.6	82 11.6	55 76	53.4	81 54.3	60 73	50.5	81 35.8	63 70	47.7	7
8	82 22.2	24 89	73.3	82 14.3	30 88	69.7	82 04.6	35 86	66.2	81 53.2	41 83	62.9	81 40.3	45 81	59.7	81 26.0	50 79	56.7	81 10.4	54 76	53.9	80 53.5	58 74	51.2	8
9	81 28.8	20 90	74.9	81 21.8	26 88	71.4	81 13.3	31 87	68.3	81 03.2	36 85	65.2	80 51.6	41 83	62.3	80 38.7	45 81	59.5	80 24.6	49 79	56.8	80 09.2	53 76	54.2	9
10	80 35.0	18 90	75.8	80 28.8	23 89	72.8	80 21.3	28 88	69.9	80 12.3	32 86	67.1	80 01.9	37 84	64.4	79 50.2	41 82	61.7	79 37.4	45 80	59.2	79 23.4	49 78	56.8	10
1	79 40.9	16 90	76.7	79 35.5	20 89	74.0	79 28.8	25 88	71.3	79 20.7	29 87	68.7	79 11.4	33 85	66.1	79 00.8	37 84	63.6	78 49.1	41 82	61.2	78 36.3	45 80	58.9	1
2	78 46.7	14 91	77.4	78 41.9	18 90	74.9	78 35.9	22 89	72.4	78 28.7	26 88	70.0	78 20.2	30 86	67.6	78 10.6	34 85	65.2	77 59.9	37 83	63.0	77 48.1	41 82	60.8	2
3	77 52.3	12 91	78.0	77 48.1	16 90	75.7	77 42.8	20 89	73.3	77 36.2	24 88	71.0	77 28.6	27 87	68.8	77 19.8	31 86	66.6	77 10.0	34 84	64.5	76 59.2	38 83	62.4	3
4	76 57.9	11 91	78.5	76 54.2	14 90	76.3	76 49.4	18 89	74.1	76 43.5	21 88	72.0	76 36.5	25 87	69.9	76 28.5	28 86	67.8	76 19.5	32 85	65.8	76 09.6	35 84	63.8	4
15	76 03.3	09 91	78.9	76 00.1	13 90	76.8	75 55.8	16 90	74.8	75 50.4	19 89	72.7	75 44.1	23 88	70.8	75 36.8	26 87	68.8	75 28.6	29 86	66.9	75 19.4	32 84	65.0	15
6	75 08.7	08 91	79.2	75 05.8	11 90	77.2	75 02.9	14 90	75.3	74 57.2	18 89	73.4	74 51.5	21 88	71.5	74 44.8	24 87	69.7	74 37.2	27 86	67.8	74 28.8	30 85	66.0	6
7	74 14.0	07 91	79.4	74 11.5	10 90	77.6	74 08.1	13 90	75.8	74 03.8	16 89	74.0	73 58.6	19 88	72.2	73 52.5	22 88	70.4	73 45.6	25 87	68.7	73 37.8	27 86	66.9	7
8	73 19.3	06 91	79.6	73 17.2	09 91	77.9	73 14.2	11 90	76.2	73 10.3	14 90	74.5	73 05.6	17 89	72.8	73 00.0	20 88	71.1	72 53.6	23 87	69.4	72 46.4	25 86	67.8	8
9	72 24.6	05 91	79.8	72 22.8	07 91	78.1	72 20.1	10 90	76.5	72 16.6	13 90	74.9	72 12.4	16 89	73.2	72 07.3	18 88	71.6	72 01.4	21 87	70.0	71 54.8	23 86	68.5	9
20	71 29.8	04 91	79.9	71 28.3	06 91	78.3	71 26.0	09 90	76.8	71 22.9	12 90	75.2	71 19.0	14 89	73.7	71 14.4	17 88	72.1	71 09.1	19 88	70.6	71 03.0	22 87	69.1	20
1	70 35.1	03 91	80.0	70 33.8	05 91	78.5	70 31.8	08 90	77.0	70 29.1	10 90	75.5	70 25.6	13 89	74.0	70 21.4	15 88	72.6	70 16.5	18 88	71.1	70 10.9	20 87	69.6	1
2	69 40.3	02 91	80.1	69 39.3	04 91	78.6	69 37.6	07 90	77.2	69 35.2	09 90	75.8	69 32.1	11 89	74.4	69 28.3	14 89	72.9	69 23.8	16 88	71.5	69 18.6	18 87	70.1	2
3	68 45.5	01 91	80.1	68 44.7	04 91	78.8	68 43.3	06 90	77.4	68 41.2	08 90	76.0	68 38.5	10 90	74.6	68 35.0	12 89	73.3	68 31.0	15 88	71.9	68 26.2	17 88	70.6	3
4	67 50.7	01 91	80.2	67 50.2	03 91	78.8	67 49.0	05 90	77.5	67 47.2	07 90	76.2	67 44.8	09 90	74.9	67 41.7	11 89	73.6	67 38.1	13 88	72.3	67 33.7	15 88	71.0	4
25	66 55.8	00 91	80.2	66 55.6	02 91	78.9	66 54.7	04 91	77.6	66 53.2	06 90	76.3	66 51.1	08 90	75.1	66 48.3	10 89	73.8	66 45.0	12 88	72.5	66 41.1	14 88	71.3	25
6	66 01.0	01 91	80.2	66 01.0	01 91	78.9	66 00.3	03 91	77.7	65 59.1	05 90	76.5	65 57.3	07 90	75.2	65 54.9	09 89	74.0	65 51.9	11 89	72.8	65 48.4	13 88	71.6	6
7	65 06.2	01 91	80.1	65 06.4	00 91	78.9	65 06.0	02 91	77.8	65 05.0	04 90	76.6	65 03.5	06 90	75.4	65 01.4	08 89	74.2	64 58.7	10 89	73.0	64 55.5	12 88	71.8	7
8	64 11.4	02 91	80.1	64 11.8	00 91	78.9	64 11.6	01 91	77.8	64 10.9	03 90	76.6	64 09.6	05 90	75.5	64 07.8	07 89	74.3	64 05.5	09 89	73.2	64 02.6	10 88	72.1	8
9	63 16.6	03 91	80.0	63 17.2	01 91	78.9	63 17.2	01 91	77.8	63 16.8	02 90	76.7	63 15.8	04 90	75.6	63 14.3	06 89	74.5	63 12.2	08 89	73.4	63 09.7	09 88	72.3	9
30	62 21.8	03 91	80.0	62 22.6	02 91	78.9	62 22.9	00 91	77.8	62 22.6	02 90	76.7	62 21.9	03 90	75.7	62 20.6	05 89	74.6	62 18.9	07 89	73.5	62 16.7	08 88	72.4	30
1	61 27.1	04 91	79.9	61 28.0	02 91	78.9	61 28.5	01 91	77.8	61 28.5	01 90	76.8	61 28.0	02 90	75.7	61 27.0	04 89	74.7	61 25.5	06 89	73.6	61 23.6	07 88	72.6	1
2	60 32.3	05 91	79.8	60 33.4	03 91	78.8	60 34.1	01 91	77.8	60 34.3	00 90	76.8	60 34.0	02 90	75.8	60 33.3	03 89	74.7	60 32.1	06 89	73.7	60 30.5	06 88	72.7	2
3	59 37.5	05 91	79.7	59 38.9	04 91	78.7	59 39.7	02 91	77.8	59 40.2	01 90	76.8	59 40.1	01 90	75.8	59 39.7	02 90	74.8	59 38.7	04 89	73.8	59 37.4	05 89	72.8	3
4	58 42.8	06 91	79.6	58 44.3	04 91	78.7	58 45.4	03 91	77.7	58 46.0	01 90	76.7	58 46.2	00 90	75.8	58 46.0	01 90	74.8	58 45.3	02 89	73.9	58 44.2	04 89	72.9	4
35	57 48.1	06 91	79.5	57 49.8	05 91	78.6	57 51.0	03 90	77.7	57 51.9	02 90	76.7	57 52.3	01 90	75.8	57 52.3	01 90	74.8	57 51.9	02 89	73.9	57 51.0	03 89	73.0	35
6	56 53.4	07 91	79.4	56 55.2	05 91	78.5	56 56.7	04 90	77.6	56 57.7	03 90	76.7	56 58.3	01 90	75.8	56 58.6	00 90	74.8	56 58.4	01 89	73.9	56 57.8	03 89	73.0	6
7	55 58.7	07 91	79.3	56 00.7	06 91	78.4	56 02.4	05 90	77.5	56 03.6	03 90	76.6	56 04.4	02 90	75.7	56 04.9	01 90	74.8	56 05.0	00 89	73.9	56 04.6	02 89	73.0	7
8	55 04.1	08 91	79.2	55 06.2	07 91	78.3	55 08.0	05 90	77.4	55 09.5	04 90	76.6	55 10.5	03 90	75.7	55 11.2	02 90	74.8	55 11.5	00 89	73.9	55 11.4	01 89	73.1	8
9	54 09.4	08 91	79.1	54 11.8	07 91	78.2	54 13.8	06 90	77.4	54 15.4	05 90	76.5	54 16.6	04 90	75.6	54 17.5	02 90	74.8	54 18.0	01 89	73.9	54 18.2	00 89	73.1	9
40	53 14.8	09 91	78.9	53 17.3	08 91	78.1	53 19.5	07 90	77.3	53 21.3	05 90	76.4	53 22.7	04 90	75.6	53 23.8	03 90	74.7	53 24.6	02 89	73.9	53 25.0	01 89	73.1	40
1	52 20.3	09 91	78.8	52 22.9	08 91	78.0	52 25.2	07 90	77.2	52 27.2	06 90	76.3	52 28.9	05 90	75.5	52 30.2	04 90	74.7	52 31.1	03 89	73.9	52 31.8	02 89	73.0	1
2	51 25.7	10 91	78.6	51 28.5	09 91	77.8	51 31.0	08 90	77.0	51 33.2	07 90	76.2	51 35.0	06 90	75.4	51 36.5	04 89	74.6	51 37.7	03 89	73.8	51 38.5	02 89	73.0	2
3	50 31.2	10 91	78.5	50 34.1	09 90	77.7	50 36.8	08 90	76.9	50 39.1	07 90	76.1	50 41.2	06 90	75.4	50 42.9	06 89	74.6	50 44.3	04 89	73.8	50 45.3	03 89	73.0	3
4	49 36.7	11 91	78.3	49 39.8	10 90	77.6	49 42.6	09 90	76.8	49 45.2	08 90	76.0	49 47.4	07 90	75.3	49 49.3	06 89	74.5	49 50.9	05 89	73.7	49 52.1	04 89	72.9	4
45	48 42.2	11 91	78.2	48 45.5	10 90	77.4	48 48.5	09 90	76.7	48 51.2	08 90	75.9	48 53.6	07 90	75.2	48 55.7	07 89	74.4	48 57.5	05 89	73.6	48 59.0	05 89	72.9	45
6	47 47.8	12 91	78.0	47 51.2	11 90	77.3	47 54.4	10 90	76.5	47 57.2	09 90	75.8	47 59.8	08 90	75.1	48 02.1	07 89	74.3	48 04.1	06 89	73.6	48 05.8	05 88	72.8	6
7	46 53.4	12 91	77.9	46 57.0	12 90	77.1	47 00.3	11 90	76.4	47 03.3	10 90	75.7	47 06.1	09 90	74.9	47 08.6	08 89	74.2	47 10.8	07 89	73.5	47 12.7	06 88	72.7	7
8	45 59.0	13 91	77.7	46 02.7	12 90	77.0	46 06.2	11 90	76.3	46 09.4	10 90	75.5	46 12.4	09 90	74.8	46 15.0	08 89	74.1	46 17.4	08 89	73.4	46 19.6	07 88	72.7	8
9	45 04.7	13 91	77.5	45 08.6	13 90	76.8	45 12.2	12 90	76.1	45 15.6	11 90	75.4	45 18.7	10 90	74.7	45 21.6	09 89	74.0	45 24.1	08 89	73.3	45 26.5	07 88	72.6	9
50	44 10.4	14 90	77.3	44 14.4	13 90	76.7	44 18.2	12 90	76.0	44 21.8	11 90	75.3	44 25.1	11 89	74.6	44 28.1	10 89	73.9	44 30.9	09 89	73.2	44 33.4	08 88	72.5	50
1	43 16.1	14 90	77.2	43 20.3	14 90	76.5	43 24.3	13 90	75.8	43 28.0	12 90	75.1	43 31.4	11 89	74.4	43 34.7	10 89	73.7	43 37.6	10 89	73.1	43 40.4	09 88	72.4	1
2	42 21.9	15 90	77.0	42 26.2	14 90	76.3	42 30.3	13 90	75.6	42 34.2	13 90	75.0	42 37.9	12 89	74.3	42 41.3	11 89	73.6	42 44.4	10 89	72.9	42 47.4	09 88	72.3	2
3	41 27.7	15 90	76.8	41 32.2	15 90	76.1	41 36.5	14 90	75.5	41 40.5	13 89	74.8	41 44.3	12 89	74.2	41 47.9	12 89	73.5	41 51.3	11 89	72.8	41 54.4	10 88	72.1	3
4	40 33.6	16 90	76.6	40 38.2	15 90	76.0	40 42.6	14 90	75.3	40 46.9	14 89	74.7	40 50.8	13 89	74.0	40 54.6	12 89	73.3	40 58.2	11 88	72.7	41 01.5	11 88	72.0	4
55	39 39.5	16 90	76.4	39 44.3	16 90	75.8	39 48.9	15 90	75.1	39 53.2	14 89	74.5	39 57.4	14 89	73.8	40 01.3	13 89	73.2	40 05.1	12 88	72.5	40 08.6	11 88	71.9	55
6	38 45.4	17 90	76.2	38 50.4	16 90	75.6	38 55.1	15 89	75.0	38 59.6	15 89	74.3	39 04.0	14 89	73.7	39 08.1	13 89	73.0	39 12.0	13 88	72.4	39 15.7	12 88	71.8	6
7	37 51.4	17 90	76.0	37 56.5	17 90	75.4	38 01.4	16 89	74.8	38 06.1	15 89	74.2	38 10.6	15 89	73.5	38 14.9	14 88	72.9	38 19.0	13 88	72.3	38 22.9	13 88	71.6	7
8	36 57.4	18 90	75.8	37 02.7	17 90	75.2	37 07.8	17 89	74.6	37 12.6	16 89	74.0	37 17.3	15 89	73.3	37 21.8	15 88	72.7	37 26.0	14 88	72.1	37 30.1	13 88	71.5	8
9	36 03.5	18 90	75.6	36 08.9	18 90	75.0	36 14.1	17 89	74.4	36 19.2	16 89	73.8	36 24.0	16 89	73.2	36 28.7	15 88	72.6	36 33.1	15 88	71.9	36 37.4	14 88	71.3	9
60	35 09.7	19 90	75.4	35 15.2	18 89	74.8	35 20.6	18 89	74.2	35 25.8	17 89	73.6	35 30.8	16 89	73.0	35 35.6	16 88	72.4	35 40.3	15 88	71.8	35 44.7	15 88	71.2	60
1	34 15.9	19 90	75.2	34 21.6	19 89	74.6	34 27.1	18 89	74.0	34 32.4	18 89	73.4	34 37.6	17 88	72.8	34 42.6	16 88	72.2	34 47.4	16 88	71.6	34 52.1	15 88	71.0	1
2	33 22.1	20 90	75.0	33 28.0	19 89	74.4	33 33.6	19 89	73.8	33 39.2	18 89	73.2	33 44.5	18 88	72.6	33 49.7	17 88	72.0	33 54.7	16 88	71.4	33 59.5	16 88	70.8	2
3	32 28.4	20 89	74.7	32 34.4	20 89	74.2	32 40.2	19 89	73.6	32 45.9	19 89	73.0	32 51.4	18 88	72.4	32 56.8	18 88	71.8	33 02.0	17 88	71.3	33 07.0	16 88	70.7	3
4	31 34.8	21 89	74.5	31 40.9	20 89	74.0	31 46.9	20 89	73.4	31 52.7	19 88	72.8	31 58.4	19 88	72.2	32 04.0	18 88	71.7	32 09.3	18 88	71.1	32 14.5	17 87	70.5	4
65	30 41.2	21 89	74.3	30 47.5	21 89	73.7	30 53.6	20 89	73.2	30 59.6	20 88	72.6	31 05.5	19 88	72.0	31 11.2	19 88	71.5	31 16.7	18 88	70.9	31 22.1	18 87	70.3	65
6	29 47.6	22 89	74.1	29 54.1	21 89	73.5	30 00.4	21 89	73.0	30 06.6	20 88	72.4	30 12.6	20 88	71.8	30 18.5	19 88	71.3	30 24.2	19 87	70.7	30 29.8	18 87	70.1	6
7	28 54.2	22 89	73.9	29 00.8	22 89	73.3	29 07.2	21 88	72.7	29 13.6	21 88	72.2	29 19.8	20 88	71.6	29 25.8	20 88	71.1	29 31.7	19 87	70.5	29 37.5	19 87	69.9	7
8	28 00.8	23 89	73.6	28 07.5	22 89	73.1	28 14.2	22 88	72.5	28 20.6	21 88	72.0	28 27.0	21 88	71.4	28 33.2	21 88	70.9	28 39.3	20 87	70.3	28 45.3	20 87	69.7	8
9	27 07.4	23 89	73.4	27 14.3	23 88	72.8	27 21.1	22 88	72.3	27 27.8	22 88	71.7	27 34.3	22 88	71.2	27 40.7	21 87	70.6	27 47.0	21 87	70.1	27 53.1	20 87	69.5	9
70	26 14.1	24 89	73.1	26 21.2	23 88	72.6	26 28.2	23 88	72.1	26 35.0	23 88	71.5	26 41.7	22 88	71.0	26 48.3	22 87	70.4	26 54.7	21 87	69.9	27 01.0	21 87	69.3	70
1	25 20.9	24 88	72.9	25 28.2	24 88	72.4	25 35.3	23 88	71.8	25 42.3	23 88	71.3	25 49.1	23 87	70.7	25 55.9	22 87	70.2	26 02.5	22 87	69.7	26 09.0	22 86	69.1	1
2	24 27.8	25 88	72.7	24 35.2	24 88	72.1	24 42.5	24 88	71.6	24 49.6	24 88	71.1	24 56.7	23 87	70.5	25 03.6	23 87	70.0	25 10.4	22 87	69.4	25 17.1	22 86	68.9	2
3	23 34.7	25 88	72.4	23 42.3	25 88	71.9	23 49.7	25 88	71.3	23 57.0	24 88	70.8	24 04.2	24 87	70.3	24 11.3	23 87	69.8	24 18.3	23 87	69.2	24 25.2	23 86	68.7	3
4	22 41.7	26 88	72.2	22 49.4	25 88	71.6	22 57.0	25 88	71.1	23 04.5	25 87	70.6	23 11.9	24 87	70.0	23 19.2	24 87	69.5	23 26.4	24 86	69.0	23 33.4	23 86	68.5	4
75	21 48.8	26 88	71.9	21 56.7	26 88	71.4	22 04.4	26 88	70.9	22 12.1	25 87	70.3	22 19.7	25 87	69.8	22 27.1	25 87	69.3	22 34.5	24 86	68.8	22 41.7	24 86	68.2	75
6	20 56.0	27 88	71.6	21 04.0	26 88	71.1	21 11.9	26 87	70.6	21 19.8	26 87	70.1	21 27.5	26 87	69.6	21 35.1	25 86	69.0	21 42.7	25 86	68.5	21 50.1	25 86	68.0	6
7	20 03.2	27 88	71.4	20 11.4	27 88	70.9	20 19.5	27 87	70.3	20 27.5	26 87	69.8	20 35.4	26 87	69.3	20 43.2	26 86	68.8	20 50.9	26 86	68.3	20 58.6	25 86	67.8	7
8	19 10.6	28 88	71.1	19 18.9	28 87	70.6	19 27.2	27 87	70.1	19 35.3	27 87	69.6	19 43.4	27 86	69.1	19 51.4	26 86	68.5	19 59.3	26 86	68.0	20 07.1	26 86	67.5	8
9	18 18.0	28 88	70.8	18 26.5	28 87	70.3	18 34.9	28 87	69.8	18 43.2	28 87	69.3	18 51.5	27 86	68.8	18 59.7	27 86	68.3	19 07.8	27 86	67.8	19 15.8	27 86	67.3	9
80	17 25.5	29 87	70.6	17 34.1	29 87	70.1	17 42.7	28 87	69.6	17 51.2	28 86	69.0	17 59.7	28 86	68.5	18 08.0	28 86	68.0	18 16.3	27 86	67.5	18 24.5	27 85	67.0	80
1	16 33.1	30 87	70.3	16 41.9	29 87	69.8	16 50.6	29 87	69.3	16 59.3	29 86	68.8	17 07.9	29 86	68.3	17 16.5	28 86	67.8	17 24.9	28 85	67.3	17 33.3	28 85	66.8	1
2	15 40.7	30 87	70.0	15 49.7	30 87	69.5	15 58.7	30 86	69.0	16 07.5	29 86	68.5	16 16.3	29 86	68.0	16 25.0	29 86	67.5	16 33.7	29 85	67.0	16 42.3	28 85	66.5	2
3	14 48.5	31 87	69.7	14 57.7	30 87	69.2	15 06.8	30 86	68.7	15 15.8	30 86	68.2	15 24.8	30 86	67.7	15 33.7	30 86	67.2	15 42.5	29 85	66.7	15 51.3	29 85	66.2	3
4	13 56.4	31 87	69.4	14 05.7	31 86	68.9	14 15.0	31 86	68.4	14 24.2	31 86	67.9	14 33.4	30 86	67.4	14 42.4	30 85	67.0	14 51.5	30 85	66.5	15 00.4	30 84	66.0	4
85	13 04.4	32 86	69.1	13 13.9	32 86	68.6	13 23.3	31 86	68.1	13 32.7	31 86	67.6	13 42.0	31 85	67.2	13 51.3	31 85	66.7	14 00.5	31 85	66.2	14 09.7	30 84	65.7	85
6	12 12.4	32 86	68.8	12 22.1	32 86	68.3	12 31.7	32 86	67.8	12 41.3	32 86	67.4	12 50.8	32 85	66.9	13 00.3	31 85	66.4	13 09.7	31 84	65.9	13 19.0	31 84	65.4	6
7	11 20.6	33 86	68.5	11 30.5	33 86	68.0	11 40.3	33 86	67.5	11 50.0	32 85	67.1	11 59.7	32 85	66.6	12 09.4	32 85	66.1	12 19.0	32 84	65.6	12 28.5	32 84	65.1	7
8	10 28.9	33 86	68.2	10 38.9	33 86	67.7	10 48.9	33 85	67.2	10 58.8	33 85	66.8	11 08.7	33 85	66.3	11 18.6	33 84	65.8	11 28.4	33 84	65.3	11 38.1	32 84	64.8	8
9	9 37.3	34 86	67.9	9 47.5	34 86	67.4	9 57.7	34 85	66.9	10 07.8	34 85	66.5	10 17.9	33 85	66.0	10 27.9	33 84	65.5	10 37.9	33 84	65.0	10 47.8	33 84	64.5	9
90	8 45.8	35 86	67.6	8 56.2	35 85	67.1	9 06.5	34 85	66.6	9 16.8	34 85	66.1	9 27.1	34 84	65.7	9 37.3	34 84	65.2	9 47.5	34 84	64.7	9 57.6	34 83	64.2	90

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	44 00.0	1.0	01	180.0	43 30.0	1.0	01	180.0	43 00.0	1.0	01	180.0	42 30.0	1.0	01	180.0	42 00.0	1.0	01	180.0	41 30.0	1.0	01	180.0	41 00.0	1.0	01	180.0	40 30.0	1.0	01	180.0	00
1	43 59.4	1.0	03	178.7	43 29.4	1.0	03	178.7	42 59.4	1.0	03	178.8	42 29.4	1.0	03	178.8	41 59.4	1.0	03	178.8	41 29.4	1.0	03	178.8	40 59.4	1.0	03	178.8	40 29.4	1.0	03	178.8	1
2	43 57.5	1.0	05	177.5	43 27.6	1.0	05	177.5	42 57.6	1.0	05	177.5	42 27.6	1.0	05	177.6	41 57.7	1.0	05	177.6	41 27.7	1.0	05	177.6	40 57.7	1.0	05	177.6	40 27.7	1.0	05	177.7	2
3	43 54.5	1.0	07	176.2	43 24.5	1.0	07	176.2	42 54.6	1.0	07	176.3	42 24.7	1.0	07	176.3	41 54.7	1.0	07	176.4	41 24.8	1.0	07	176.4	40 54.8	1.0	07	176.5	40 24.9	1.0	06	176.5	3
4	43 50.2	1.0	09	174.9	43 20.3	1.0	09	175.0	42 50.4	1.0	09	175.1	42 20.5	1.0	09	175.1	41 50.6	1.0	09	175.2	41 20.7	1.0	09	175.2	40 50.8	1.0	09	175.3	40 21.0	1.0	08	175.3	4
05	43 44.6	99	11	173.7	43 14.8	99	11	173.7	42 45.0	99	11	173.8	42 15.2	99	11	173.9	41 45.4	99	11	174.0	41 15.5	99	10	174.0	40 45.7	99	10	174.1	40 15.9	99	10	174.2	05
6	43 37.9	99	13	172.4	43 08.2	99	13	172.5	42 38.4	99	13	172.6	42 08.7	99	13	172.7	41 38.9	99	12	172.8	41 09.2	99	12	172.9	40 39.4	99	12	172.9	40 09.7	99	12	173.0	6
7	43 30.0	99	15	171.2	43 00.3	99	15	171.3	42 30.7	99	15	171.4	42 01.0	99	15	171.5	41 31.4	99	14	171.6	41 01.7	99	14	171.7	40 32.0	99	14	171.8	40 02.4	99	14	171.9	7
8	43 20.8	98	17	169.9	42 51.3	98	17	170.1	42 21.8	98	17	170.2	41 52.2	98	16	170.3	41 22.7	99	16	170 4	40 53.1	99	16	170.5	40 23.5	99	16	170.6	39 54.0	99	16	170.7	8
9	43 10.5	98	19	168.7	42 41.1	98	19	168.8	42 11.7	98	19	169.0	41 42.3	98	18	169.1	41 12.8	98	18	169.2	40 43.4	98	18	169.4	40 13.9	98	18	169.5	39 44.5	98	18	169.6	9
10	42 59.0	98	21	167.5	42 29.8	98	21	167.6	42 00.5	98	21	167.8	41 31.2	98	20	167.9	41 01.9	98	20	168.1	40 32.6	98	20	168.2	40 03.2	98	20	168.3	39 33.9	98	20	168.5	10
1	42 46.4	97	23	166.3	42 17.3	97	23	166.4	41 48.1	97	22	166.6	41 19.0	97	22	166.7	40 49.8	97	22	166.9	40 20.6	97	22	167.1	39 51.5	97	21	167.2	39 22.2	97	21	167.4	1
2	42 32.6	97	25	165.1	42 03.6	97	25	165.2	41 34.7	97	24	165.4	41 05.7	97	24	165.6	40 36.7	97	24	165.7	40 07.6	97	23	165.9	39 38.6	97	23	166.1	39 09.5	97	23	166.2	2
3	42 17.7	96	27	163.9	41 48.9	96	26	164.1	41 20.1	96	26	164.2	40 51.3	96	26	164.4	40 22.4	96	26	164.6	39 53.6	96	25	164.8	39 24.7	96	25	165.0	38 55.8	96	25	165.1	3
4	42 01.7	95	28	162.7	41 33.1	95	28	162.9	41 04.5	95	28	163.1	40 35.8	96	28	163.3	40 07.1	96	27	163.5	39 38.4	96	27	163.7	39 09.7	96	27	163.9	38 41.0	96	26	164.0	4
15	41 44.6	95	30	161.5	41 16.2	95	30	161.7	40 47.7	95	30	162.0	40 19.3	95	29	162.2	39 50.8	95	29	162.4	39 22.3	95	29	162.6	38 53.8	95	28	162.8	38 25.2	95	28	163.0	15
6	41 26.4	94	32	160.4	40 58.2	94	32	160.6	40 30.0	94	31	160.8	40 01.7	94	31	161.0	39 33.4	94	30	161.3	39 05.1	94	30	161.5	38 36.8	94	30	161.7	38 08.4	95	30	161.9	6
7	41 07.2	93	34	159.2	40 39.2	93	33	159.5	40 11.2	93	33	159.7	39 43.1	94	32	159.9	39 15.1	94	32	160.2	38 46.9	94	32	160.4	38 18.8	94	32	160.6	37 50.6	94	31	160.8	7
8	40 47.0	93	35	158.1	40 19.2	93	35	158.5	39 51.4	93	35	158.6	39 23.6	93	34	158.8	38 55.7	93	34	159.1	38 27.8	93	34	159.3	37 59.8	93	33	159.6	37 31.9	93	33	159.8	8
9	40 25.8	92	37	157.0	39 58.2	92	37	157.3	39 30.6	92	36	157.5	39 03.0	92	36	157.8	38 35.3	92	36	158.0	38 07.6	92	35	158.3	37 39.9	92	35	158.5	37 12.2	93	34	158.7	9
20	40 03.5	91	39	155.9	39 36.2	91	38	156.2	39 08.9	91	38	156.4	38 41.5	91	38	156.7	38 14.0	91	37	157.0	37 46.6	92	37	157.2	37 19.1	92	36	157.5	36 51.5	92	36	157.7	20
1	39 40.4	90	40	154.8	39 13.3	90	40	155.1	38 46.2	90	39	155.4	38 19.0	91	39	155.7	37 51.8	91	39	155.9	37 24.6	91	38	156.2	36 57.3	91	38	156.4	36 30.0	91	37	156.7	1
2	39 16.2	89	42	153.8	38 49.4	90	41	154.1	38 22.5	90	41	154.3	37 55.6	90	40	154.6	37 28.6	90	40	154.9	37 01.7	90	40	155.2	36 34.6	90	39	155.4	36 07.6	90	39	155.7	2
3	38 51.2	89	43	152.7	38 24.6	89	43	153.0	37 58.0	89	42	153.3	37 31.3	89	42	153.6	37 04.6	89	42	153.9	36 37.9	89	41	154.2	36 11.1	89	41	154.4	35 44.2	89	40	154.7	3
4	38 25.2	88	45	151.7	37 58.9	88	44	152.0	37 32.6	88	44	152.3	37 06.1	88	43	152.6	36 39.7	88	43	152.9	36 13.2	88	42	153.2	35 46.6	89	42	153.5	35 20.1	89	42	153.8	4
25	37 58.4	87	46	150.7	37 32.4	87	46	151.0	37 06.3	87	45	151.3	36 40.1	87	45	151.6	36 13.9	87	44	151.9	35 47.7	88	44	152.2	35 21.4	88	44	152.5	34 55.0	88	43	152.8	25
6	37 30.8	86	48	149.7	37 05.0	86	47	150.0	36 39.1	86	46	150.3	36 13.2	86	46	150.6	35 47.3	87	46	150.9	35 21.3	87	45	151.2	34 55.3	87	45	151.6	34 29.2	87	44	151.9	6
7	37 02.3	85	49	148.7	36 36.7	85	48	149.0	36 11.2	85	48	149.4	35 45.5	85	47	149.7	35 19.9	86	47	150.0	34 54.1	86	46	150.3	34 28.4	86	46	150.6	34 02.6	86	46	150.9	7
8	36 32.9	84	50	147.7	36 07.7	84	50	148.1	35 42.4	84	49	148.4	35 17.1	85	49	148.7	34 51.7	85	48	149.1	34 26.2	85	48	149.4	34 00.7	85	48	149.7	33 35.1	85	47	150.0	8
9	36 02.9	83	52	146.8	35 37.9	83	51	147.1	35 12.9	84	50	147.5	34 47.8	84	50	147.8	34 22.7	84	50	148.1	33 57.5	84	49	148.5	33 32.2	84	49	148.8	33 06.9	84	48	149.1	9
30	35 32.0	82	53	145.9	35 07.3	82	52	146.2	34 42.6	83	52	146.5	34 17.8	83	51	146.9	33 52.9	83	51	147.2	33 28.0	83	50	147.6	33 03.0	83	50	147.9	32 38.0	83	49	148.2	30
1	35 00.4	81	54	144.9	34 36.0	81	53	145.3	34 11.5	82	53	145.6	33 47.0	82	52	146.0	33 22.4	82	52	146.3	32 57.8	82	52	146.7	32 33.1	82	51	147.0	32 08.4	83	51	147.3	1
2	34 28.1	80	55	144.0	34 04.0	81	54	144.4	33 39.8	81	54	144.8	33 15.6	81	54	145.1	32 51.2	81	53	145.5	32 26.9	81	53	145.8	32 02.5	81	52	146.2	31 38.0	82	52	146.5	2
3	33 55.1	79	56	143.2	33 31.3	80	56	143.5	33 07.4	80	55	143.9	32 43.4	80	55	144.2	32 19.4	80	54	144.6	31 55.3	80	54	145.0	31 31.1	81	53	145.3	31 06.9	81	53	145.6	3
4	33 21.4	78	57	142.3	32 57.8	79	57	142.7	32 34.2	79	56	143.0	32 10.5	79	56	143.4	31 46.8	79	55	143.8	31 23.0	79	55	144.1	30 59.1	80	54	144.5	30 35.2	80	54	144.8	4
35	32 47.0	77	58	141.4	32 23.8	78	58	141.8	32 00.4	78	57	142.2	31 37.0	78	57	142.6	31 13.6	78	56	142.9	30 50.1	79	56	143.3	30 26.5	79	55	143.6	30 02.8	79	55	144.0	35
6	32 12.1	76	59	140.6	31 49.1	77	59	141.0	31 26.0	77	58	141.4	31 02.9	77	58	141.7	30 39.7	77	57	142.1	30 16.5	78	57	142.5	29 53.2	78	56	142.8	29 29.8	78	56	143.2	6
7	31 36.5	76	60	139.8	31 13.8	76	60	140.2	30 51.0	76	59	140.6	30 28.2	76	59	140.9	30 05.3	76	58	141.3	29 42.3	77	58	141.7	29 19.3	77	57	142.0	28 56.2	77	57	142.4	7
8	31 00.2	75	61	139.0	30 37.8	75	61	139.4	30 15.3	75	60	139.8	29 52.8	75	60	140.1	29 30.2	75	59	140.5	29 07.5	76	59	140.9	28 44.8	76	58	141.3	28 22.0	76	58	141.6	8
9	30 23.4	74	62	138.2	30 01.3	74	62	138.6	29 39.1	74	61	139.0	29 16.9	74	61	139.4	28 54.5	75	60	139.7	28 32.1	75	60	140.1	28 09.7	75	59	140.5	27 47.2	75	59	140.9	9
40	29 46.1	73	63	137.4	29 24.2	73	63	137.8	29 02.3	73	62	138.2	28 40.3	73	62	138.6	28 18.3	74	61	139.0	27 56.2	74	61	139.4	27 34.0	74	60	139.8	27 11.8	74	60	140.1	40
1	29 08.2	72	64	136.7	28 46.6	72	64	137.1	28 25.0	72	63	137.5	28 03.3	72	63	137.9	27 41.5	73	62	138.2	27 19.7	73	62	138.6	26 57.8	73	61	139.0	26 35.8	73	61	139.4	1
2	28 29.8	71	65	135.9	28 08.5	71	64	136.3	27 47.1	71	64	136.7	27 25.7	72	64	137.1	27 04.2	72	63	137.5	26 42.7	72	63	137.9	26 21.0	72	62	138.3	25 59.4	72	62	138.7	2
3	27 50.8	70	66	135.2	27 29.8	70	65	135.6	27 08.7	70	65	136.0	26 47.6	71	64	136.4	26 26.4	71	64	136.8	26 05.1	71	63	137.2	25 43.8	71	63	137.6	25 22.4	71	62	138.0	3
4	27 11.4	69	67	134.5	26 50.6	69	66	134.9	26 29.8	69	66	135.3	26 09.0	70	65	135.7	25 48.0	70	65	136.1	25 27.1	70	64	136.5	25 06.0	70	64	136.9	24 44.9	71	63	137.3	4
45	26 31.4	68	67	133.8	26 11.0	68	67	134.2	25 50.5	69	66	134.6	25 29.9	69	66	135.0	25 09.2	69	66	135.4	24 48.5	69	65	135.8	24 27.7	69	65	136.2	24 06.9	70	64	136.6	45
6	25 51.0	67	68	133.1	25 30.9	67	68	133.5	25 10.6	68	67	133.9	24 50.3	68	67	134.3	24 29.9	68	66	134.7	24 09.5	68	66	135.1	23 49.0	68	65	135.5	23 28.4	69	65	135.9	6
7	25 10.2	66	69	132.4	24 50.3	66	68	132.8	24 30.3	67	68	133.2	24 10.3	67	68	133.7	23 50.2	67	67	134.1	23 30.0	67	66	134.5	23 09.8	68	66	134.9	22 49.5	68	66	135.3	7
8	24 28.9	65	70	131.8	24 09.3	66	69	132.2	23 49.6	66	69	132.6	23 29.8	66	68	133.0	23 10.0	66	68	133.4	22 50.1	66	67	133.8	22 30.1	67	67	134.2	22 10.1	67	66	134.6	8
9	23 47.2	64	70	131.1	23 27.8	65	70	131.5	23 08.4	65	69	131.9	22 48.9	65	69	132.4	22 29.3	65	68	132.8	22 09.7	65	68	133.2	21 50.0	66	68	133.6	21 30.3	66	67	134.0	9
50	23 05.1	64	71	130.5	22 46.0	64	70	130.9	22 26.8	64	70	131.3	22 07.6	64	70	131.7	21 48.3	64	69	132.1	21 28.9	65	68	132.5	21 09.5	65	68	133.0	20 50.1	65	68	133.4	50
1	22 22.6	63	72	129.8	22 03.7	63	71	130.3	21 44.8	63	71	130.7	21 25.9	63	70	131.1	21 06.8	64	70	131.5	20 47.8	64	69	131.9	20 28.6	64	69	132.3	20 09.4	64	68	132.8	1
2	21 39.7	62	72	129.2	21 21.1	62	72	129.7	21 02.5	62	71	130.1	20 43.8	62	71	130.5	20 25.0	63	70	130.9	20 06.2	63	70	131.3	19 47.3	63	70	131.7	19 28.4	63	69	132.2	2
3	20 56.4	61	73	128.6	20 38.1	61	72	129.1	20 19.7	61	72	129.5	20 01.3	62	72	129.9	19 42.8	62	71	130.3	19 24.2	62	70	130.7	19 05.6	62	70	131.1	18 46.9	62	70	131.6	3
4	20 12.7	60	73	128.0	19 54.7	60	73	128.5	19 36.6	60	72	128.9	19 18.4	61	72	129.3	19 00.2	61	72	129.7	18 41.9	61	71	130.1	18 23.5	61	71	130.6	18 05.1	61	70	131.0	4
55	19 28.8	59	74	127.5	19 11.0	59	74	127.9	18 53.1	60	73	128.3	18 35.2	60	73	128.7	18 17.2	60	72	129.2	17 59.2	60	72	129.6	17 41.1	60	71	130.0	17 22.9	61	71	130.4	55
6	18 44.4	58	74	126.9	18 26.9	59	74	127.3	18 09.3	59	74	127.7	17 51.6	59	73	128.2	17 33.9	59	73	128.6	17 16.1	59	72	129.0	16 58.3	60	72	129.4	16 40.4	60	72	129.9	6
7	17 59.8	58	75	126.3	17 42.5	58	74	126.8	17 25.1	58	74	127.2	17 07.7	58	74	127.6	16 50.2	58	73	128.0	16 32.7	58	73	128.5	16 15.2	59	72	128.9	15 57.5	59	72	129.3	7
8	17 14.8	57	76	125.8	16 57.8	57	75	126.2	16 40.6	57	75	126.6	16 23.5	57	74	127.1	16 06.3	57	74	127.5	15 49.0	58	73	127.9	15 31.7	58	73	128.3	15 14.3	58	72	128.8	8
9	16 29.5	56	76	125.2	16 12.7	56	76	125.7	15 55.9	56	75	126.1	15 38.9	56	75	126.5	15 22.0	57	74	127.0	15 05.0	57	74	127.4	14 47.9	57	73	127.8	14 30.8	57	73	128.2	9
60	15 43.9	55	76	124.7	15 27.4	55	76	125.2	15 10.8	55	76	125.6	14 54.1	56	75	126.0	14 37.4	56	75	126.4	14 20.6	56	74	126.9	14 03.8	56	74	127.3	13 47.0	56	74	127.7	60
1	14 58.1	54	77	124.2	14 41.7	55	76	124.6	14 25.4	55	76	125.1	14 08.9	55	76	125.5	13 52.5	55	75	125.9	13 36.0	55	75	126.4	13 19.4	55	74	126.8	13 02.8	55	74	127.2	1
2	14 11.9	54	77	123.7	13 55.8	54	77	124.1	13 39.7	54	77	124.6	13 23.5	54	76	125.0	13 07.3	54	76	125.4	12 51.0	54	75	125.9	12 34.7	54	75	126.3	12 18.3	55	74	126.7	2
3	13 25.5	53	78	123.2	13 09.7	53	78	123.6	12 53.7	53	77	124.1	12 37.8	53	77	124.5	12 21.8	53	76	124.9	12 05.8	53	76	125.4	11 49.7	54	75	125.8	11 33.6	54	75	126.2	3
4	12 38.8	52	78	122.7	12 23.2	52	78	123.1	12 07.5	52	78	123.6	11 51.8	52	77	124.0	11 36.1	53	77	124.4	11 20.3	53	76	124.9	11 04.5	53	76	125.3	10 48.6	53	76	125.7	4
65	11 51.9	51	79	122.2	11 36.5	51	78	122.7	11 21.1	52	78	123.1	11 05.6	52	78	123.5	10 50.1	52	77	124.0	10 34.5	52	77	124.4	10 18.9	52	76	124.8	10 03.3	52	76	125.3	65
6	11 04.7	51	79	121.7	10 49.5	51	79	122.2	10 34.3	51	78	122.6	10 19.1	51	78	123.1	10 03.8	51	78	123.5	9 48.5	51	77	123.9	9 33.1	51	77	124.4	9 17.8	51	76	124.8	6
7	10 17.3	50	80	121.3	10 02.3	50	79	121.7	9 47.3	50	79	122.2	9 32.3	50	78	122.6	9 17.3	50	78	123.0	9 02.2	50	78	123.5	8 47.1	50	77	123.9	8 32.0	51	77	124.3	7
8	9 29.6	49	80	120.8	9 14.9	49	80	121.3	9 00.1	49	79	121.7	8 45.3	49	79	122.1	8 30.5	49	78	122.6	8 15.7	50	78	123.0	8 00.8	50	78	123.5	7 45.9	50	77	123.9	8
9	8 41.7	48	80	120.4	8 27.2	48	80	120.8	8 12.7	48	80	121.3	7 58.1	49	79	121.7	7 43.5	49	79	122.1	7 28.9	49	78	122.6	7 14.3	49	78	123.0	6 59.6	49	78	123.5	9
70	7 53.6	48	80	119.9	7 39.3	48	80	120.4	7 25.0	48	80	120.8	7 10.7	48	80	121.3	6 56.3	48	79	121.7	6 41.9	48	79	122.1	6 27.5	48	78	122.6	6 13.1	48	78	123.0	70
1	7 05.3	47	81	119.5	6 51.2	47	80	119.9	6 37.1	47	80	120.4	6 23.0	47	80	120.8	6 08.9	47	79	121.3	5 54.7	47	79	121.7	5 40.5	47	79	122.2	5 26.3	47	78	122.6	1
2	6 16.8	46	81	119.1	6 02.9	46	81	119.5	5 49.0	46	80	120.0	5 35.1	46	80	120.4	5 21.2	46	80	120.8	5 07.3	46	79	121.3									2
3	5 28.0	45	82	118.6	5 14.4	46	81	119.1	5 00.7	46	81	119.5																					3

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	7 54.5	35	85	67.2	8 05.0	35	85	66.8	8 15.5	35	85	66.3	8 26.0	35	84	65.8	8 36.5	35	84	65.4	8 46.9	35	84	64.9	8 57.3	35	84	64.4	9 07.6	34	83	63.9	91
2	7 03.2	36	85	66.9	7 14.0	36	85	66.4	7 24.7	36	85	66.0	7 35.3	36	84	65.5	7 46.0	35	84	65.0	7 56.6	35	84	64.6	8 07.2	35	83	64.1	8 17.7	35	83	63.6	2
3	6 12.1	36	85	66.6	6 23.0	36	85	66.1	6 33.9	36	84	65.6	6 44.8	36	84	65.2	6 55.6	36	84	64.7	7 06.4	36	83	64.2	7 17.2	36	83	63.8	7 27.9	36	83	63.3	3
4	5 21.1	37	85	66.2	5 32.2	37	85	65.8	5 43.3	37	84	65.3	5 54.4	37	84	64.8	6 05.4	37	84	64.4	6 16.4	37	83	63.9	6 27.4	37	83	63.4	6 38.3	36	82	63.0	4
95													5 04.1	37	84	64.5	5 15.3	37	83	64.0	5 26.5	37	83	63.6	5 37.7	37	83	63.1	5 48.8	37	82	62.6	95

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	d d t	°	° ′	d d t	°	° ′	d d t	°	° ′	d d t	°	° ′	d d t	°	° ′	d d t	°	° ′	d d t	°	° ′	d d t	°	°
00	84 00.0	1.0 07	00.0	83 30.0	1.0 06	00.0	83 00.0	1.0 06	00.0	82 00.0	1.0 05	00.0	80 00.0	1.0 04	00.0	78 00.0	1.0 03	00.0	77 30.0	1.0 03	00.0	76 30.0	1.0 03	00.0	00
1	83 55.9	99 20	08.4	83 26.2	99 18	07.7	82 56.5	99 17	07.1	81 57.0	99 15	06.2	79 57.6	1.0 12	04.9	77 58.1	1.0 10	04.0	77 28.2	1.0 09	03.8	76 28.3	1.0 08	03.5	1
2	83 44.0	96 32	16.4	83 15.2	96 30	15.1	82 46.3	97 28	14.0	81 48.1	97 24	12.2	79 50.6	98 19	09.7	77 52.3	99 16	07.9	77 22.6	99 15	07.6	76 23.3	99 14	06.9	2
3	83 24.8	91 42	23.8	82 57.4	92 39	22.0	82 29.7	93 37	20.5	81 33.5	94 33	18.0	79 39.0	96 26	14.3	77 42.8	97 22	11.8	77 13.5	98 21	11.2	76 14.9	98 19	10.3	3
4	82 59.5	85 51	30.3	82 33.8	87 48	28.3	82 07.5	88 45	26.4	81 13.9	91 40	23.3	79 23.2	94 33	18.7	77 29.7	95 28	15.5	77 01.0	96 26	14.8	76 03.4	96 24	13.6	4
05	82 29.0	79 58	36.0	82 05.0	81 55	33.8	81 40.4	83 52	31.8	80 49.6	86 47	28.3	79 03.4	90 39	22.9	77 13.1	93 33	19.1	76 45.1	94 32	18.3	75 48.7	94 29	16.8	05
6	81 54.3	73 63	41.0	81 32.2	75 61	38.6	81 09.2	78 58	36.5	80 21.4	82 53	32.7	78 40.0	87 44	26.8	76 53.4	90 38	22.5	76 26.2	91 36	21.5	75 31.2	92 34	19.9	6
7	81 16.3	67 68	45.2	80 55.8	70 65	42.8	80 34.5	72 63	40.6	79 49.7	77 58	36.7	78 13.3	83 49	30.4	76 30.7	87 42	25.7	76 04.3	88 41	24.7	75 10.9	90 38	22.8	7
8	80 35.6	61 71	48.8	80 16.7	65 69	46.4	79 57.0	67 66	44.2	79 15.1	72 62	40.3	77 43.8	79 54	33.7	76 05.3	84 46	28.7	75 39.8	85 45	27.6	74 48.1	87 42	25.6	8
9	79 52.8	56 74	51.8	79 35.4	60 72	49.5	79 17.1	63 70	47.4	78 37.9	68 65	43.4	77 11.7	76 57	36.8	75 37.4	81 50	31.5	75 12.9	82 49	30.3	74 22.9	84 46	28.2	9
10	79 08.3	52 76	54.5	78 52.2	55 74	52.2	78 35.2	58 72	50.1	77 58.7	63 68	46.2	76 37.3	72 61	39.5	75 07.2	78 54	34.1	74 43.7	79 52	32.9	73 55.5	81 49	30.7	10
1	78 22.4	48 78	56.7	78 07.5	51 76	54.6	77 51.8	54 75	52.5	77 17.7	59 71	48.7	76 00.9	68 63	42.0	74 35.1	75 57	36.5	74 12.5	76 55	35.3	73 26.2	78 52	33.0	1
2	77 35.4	44 80	58.7	77 21.6	47 78	56.6	77 07.0	50 76	54.6	76 35.2	56 73	50.9	75 22.9	65 66	44.3	74 01.1	71 59	38.8	73 39.5	73 58	37.5	72 55.0	75 55	35.2	2
3	76 47.4	41 81	60.4	76 34.7	44 80	58.4	76 21.1	47 78	56.5	75 51.4	52 75	52.9	74 43.3	61 68	46.4	73 25.5	68 62	40.8	73 04.8	70 60	39.6	72 22.1	73 57	37.2	3
4	75 58.7	38 82	61.8	75 46.9	41 81	60.0	75 34.3	44 79	58.1	75 06.5	49 76	54.6	74 02.4	58 70	48.3	72 48.4	65 64	42.7	72 28.6	67 62	41.5	71 47.7	70 60	39.1	4
15	75 09.4	35 83	63.1	74 58.4	38 82	61.3	74 46.7	41 80	59.6	74 20.7	46 78	56.2	73 20.3	55 72	50.0	72 10.0	62 66	44.5	71 51.2	64 64	43.2	71 12.0	67 62	40.8	15
6	74 19.5	32 84	64.3	74 09.3	35 83	62.5	73 58.4	38 81	60.8	73 34.2	43 79	57.6	72 37.2	52 73	51.5	71 30.5	59 68	46.1	71 12.5	61 66	44.8	70 35.0	64 64	42.5	6
7	73 29.2	30 84	65.3	73 19.7	33 83	63.6	73 09.5	35 82	62.0	72 46.9	40 80	58.8	71 53.3	49 75	52.9	70 49.9	56 69	47.6	70 32.7	58 68	46.3	69 56.9	61 65	44.0	7
8	72 38.5	28 85	66.1	72 29.7	30 84	64.5	72 20.2	33 83	63.0	71 59.0	38 81	59.9	71 08.5	46 76	54.2	70 08.4	54 70	48.9	69 52.0	55 69	47.7	69 17.8	59 67	45.4	8
9	71 47.4	26 86	66.9	71 39.3	28 84	65.4	71 30.5	31 84	63.9	71 10.6	35 81	60.9	70 23.1	44 77	55.3	69 26.1	51 72	50.2	69 10.5	53 71	49.0	68 37.8	56 68	46.7	9
20	70 56.1	24 86	67.6	70 48.6	26 85	66.1	70 40.3	29 84	64.7	70 21.8	33 82	61.8	69 37.0	41 78	56.4	68 42.9	49 73	51.4	68 28.1	50 72	50.2	67 56.9	54 69	47.9	20
1	70 04.6	22 86	68.2	69 57.6	24 86	66.8	69 49.9	27 84	65.4	69 32.6	31 83	62.6	68 50.5	39 78	57.3	67 59.2	46 74	52.4	67 45.0	48 73	51.3	67 15.3	51 70	49.0	1
2	69 12.8	21 86	68.8	69 06.3	23 86	67.4	68 59.2	25 85	66.0	68 43.0	29 83	63.4	68 03.4	37 79	58.2	67 14.8	44 75	53.4	67 01.3	46 74	52.3	66 33.0	49 72	50.0	2
3	68 20.9	19 87	69.2	68 14.9	21 86	67.9	68 08.3	23 85	66.6	67 53.2	27 84	64.0	67 15.9	35 80	59.0	66 29.8	42 76	54.3	66 17.1	43 75	53.2	65 50.0	47 72	51.0	3
4	67 28.8	17 87	69.7	67 23.3	20 86	68.4	67 17.1	22 80	67.1	67 03.0	25 84	64.6	66 28.0	33 80	59.8	65 44.4	40 76	55.2	65 32.3	41 76	54.0	65 06.5	44 73	51.9	4
25	66 36.6	16 87	70.0	66 31.5	18 87	68.8	66 25.8	20 86	67.6	66 12.7	24 84	65.1	65 39.8	31 81	60.4	64 58.5	38 77	55.9	64 47.0	39 76	54.8	64 22.5	42 74	52.7	25
6	65 44.2	15 87	70.4	65 39.5	17 87	69.2	65 34.3	18 86	68.0	65 22.1	22 85	65.6	64 51.3	29 81	61.0	64 12.3	36 78	56.6	64 01.3	37 77	55.6	63 38.0	40 75	53.5	6
7	64 51.8	13 88	70.7	64 47.5	15 87	69.5	64 42.6	17 86	68.4	64 31.3	21 85	66.1	64 02.5	27 82	61.6	63 25.6	34 78	57.3	63 15.3	35 78	56.2	62 53.1	38 76	54.2	7
8	63 59.2	12 88	70.9	63 55.3	14 87	69.8	63 50.9	16 86	68.7	63 40.4	19 85	66.5	63 13.4	26 82	62.1	62 38.7	32 79	57.9	62 28.8	34 78	56.9	62 07.8	36 76	54.8	8
9	63 06.6	11 88	71.2	63 03.0	13 87	70.1	62 59.0	14 87	69.0	62 49.3	18 85	66.8	62 24.1	24 82	62.6	61 51.4	30 79	58.4	61 42.1	32 78	57.4	61 22.2	35 77	55.5	9
30	62 13.9	10 88	71.4	62 10.7	12 87	70.3	62 07.0	13 87	69.2	61 58.1	16 86	67.1	61 34.7	23 83	63.0	61 03.9	29 80	59.0	60 55.1	30 79	58.0	60 36.2	33 77	56.0	30
1	61 21.2	09 88	71.5	61 18.3	10 88	70.5	61 14.9	12 87	69.5	61 06.8	15 86	67.4	60 45.0	21 83	63.4	60 16.1	27 80	59.4	60 07.8	28 79	58.5	59 49.9	31 78	56.5	1
2	60 28.4	08 88	71.7	60 25.8	09 88	70.7	60 22.8	11 87	69.7	60 15.4	14 86	67.7	59 55.2	20 83	63.7	59 28.1	25 80	59.9	59 20.3	27 80	58.9	59 03.4	29 78	57.0	2
3	59 35.6	07 88	71.8	59 33.3	08 88	70.8	59 30.6	10 87	69.9	59 23.9	13 86	67.9	59 05.3	18 84	64.0	58 39.9	24 81	60.3	58 32.5	25 80	59.3	58 16.6	28 78	57.5	3
4	58 42.7	06 88	71.9	58 40.7	07 88	71.0	58 38.4	09 87	70.0	58 32.3	11 86	68.1	58 15.2	17 84	64.3	57 51.5	22 81	60.6	57 44.6	24 80	59.7	57 29.6	26 79	57.9	4
35	57 49.8	05 88	72.0	57 48.1	06 88	71.1	57 46.0	08 87	70.1	57 40.7	10 86	68.3	57 25.0	16 84	64.6	57 02.9	21 81	61.0	56 56.4	22 80	60.1	56 42.3	25 79	58.3	35
6	56 56.9	04 88	72.1	56 55.5	05 88	71.2	56 53.7	07 87	70.3	56 48.9	09 86	68.4	56 34.7	14 84	64.8	56 14.2	20 81	61.3	56 08.2	21 81	60.4	55 54.9	23 79	58.6	6
7	56 03.9	03 88	72.1	56 02.8	04 88	71.3	56 01.3	06 87	70.4	55 57.2	08 86	68.6	55 44.3	13 84	65.0	55 25.4	18 82	61.5	55 19.7	19 81	60.7	55 07.3	22 80	59.0	7
8	55 11.0	02 88	72.2	55 10.1	03 88	71.3	55 08.9	05 87	70.4	55 05.4	07 86	68.7	54 53.8	12 84	65.2	54 36.4	17 82	61.8	54 31.2	18 81	60.9	54 19.6	20 80	59.3	8
9	54 18.0	01 88	72.2	54 17.4	03 88	71.4	54 16.5	04 88	70.5	54 13.5	06 86	68.8	54 03.3	11 84	65.4	53 47.3	16 82	62.0	53 42.5	17 81	61.2	53 31.7	19 80	59.5	9
40	53 25.0	00 88	72.2	53 24.7	02 88	71.4	53 24.0	03 88	70.6	53 21.7	05 86	68.9	53 12.7	10 84	65.5	52 58.2	14 82	62.2	52 53.7	16 82	61.4	52 43.7	18 80	59.8	40
1	52 32.0	00 88	72.2	52 32.0	01 88	71.4	52 31.6	02 88	70.6	52 29.7	04 86	68.9	52 22.0	09 85	65.7	52 08.9	13 82	62.4	52 04.8	14 82	61.6	51 55.6	16 80	60.0	1
2	51 39.1	01 88	72.2	51 39.2	00 88	71.4	51 39.1	01 88	70.6	51 37.8	03 86	69.0	51 31.3	08 85	65.8	51 19.5	12 82	62.6	51 15.8	13 82	61.8	51 07.3	15 80	60.2	2
3	50 46.1	02 88	72.2	50 46.5	01 88	71.4	50 46.6	00 88	70.6	50 45.9	02 86	69.0	50 40.5	07 85	65.9	50 30.1	11 82	62.7	50 26.7	12 82	62.0	50 19.0	14 81	60.4	3
4	49 53.1	03 88	72.2	49 53.8	02 88	71.4	49 54.1	01 88	70.6	49 53.9	01 87	69.1	49 49.8	06 85	66.0	49 40.6	10 83	62.9	49 37.6	11 82	62.1	49 30.6	13 81	60.6	4
45	49 00.2	03 88	72.1	49 01.1	03 88	71.4	49 01.7	01 88	70.6	49 02.0	01 87	69.1	48 58.9	05 85	66.0	48 51.1	09 83	63.0	48 48.4	09 82	62.2	48 42.1	11 81	60.7	45
6	48 07.2	04 88	72.1	48 08.4	03 88	71.3	48 09.2	02 88	70.6	48 10.0	00 87	69.1	48 08.1	04 85	66.1	48 01.5	07 83	63.1	47 59.2	08 82	62.3	47 53.5	10 81	60.9	6
7	47 14.3	05 88	72.0	47 15.7	04 88	71.3	47 16.8	03 87	70.5	47 18.0	01 86	69.1	47 17.2	03 85	66.1	47 11.9	06 83	63.2	47 09.9	07 82	62.4	47 04.9	09 81	61.0	7
8	46 21.4	06 88	71.9	46 23.0	05 88	71.2	46 24.3	04 87	70.5	46 26.1	02 86	69.0	46 26.4	02 85	66.1	46 22.2	05 83	63.2	46 20.5	06 82	62.5	46 16.3	08 81	61.1	8
9	45 28.5	06 88	71.9	45 30.3	06 88	71.2	45 31.9	05 87	70.4	45 34.1	03 86	69.0	45 35.5	01 85	66.2	45 32.6	04 83	63.3	45 31.2	05 82	62.6	45 27.6	07 81	61.2	9
50	44 35.7	07 88	71.8	44 37.7	06 88	71.1	44 39.5	05 87	70.4	44 42.2	04 86	69.0	44 44.6	00 85	66.2	44 42.8	03 83	63.3	44 41.8	04 82	62.6	44 38.8	06 81	61.2	50
1	43 42.9	08 88	71.7	43 45.1	07 88	71.0	43 47.1	06 87	70.3	43 50.3	05 86	68.9	43 53.7	01 85	66.2	43 53.1	02 83	63.4	43 52.3	03 82	62.7	43 50.0	05 81	61.3	1
2	42 50.1	09 88	71.6	42 52.5	08 88	70.9	42 54.7	07 87	70.2	42 58.4	05 86	68.9	43 02.8	02 85	66.1	43 03.4	01 83	63.4	43 02.9	02 82	62.7	43 01.2	04 81	61.3	2
3	41 57.3	09 88	71.5	42 00.0	08 88	70.8	42 02.4	08 87	70.1	42 06.5	06 86	68.8	42 12.0	03 85	66.1	42 13.6	00 83	63.4	42 13.5	01 82	62.7	42 12.4	03 81	61.4	3
4	41 04.6	10 88	71.4	41 07.4	09 88	70.7	41 10.1	08 87	70.0	41 14.7	07 86	68.7	41 21.1	04 85	66.1	41 23.9	01 83	63.4	41 24.0	00 82	62.7	41 23.6	02 81	61.4	4
55	40 11.9	11 88	71.2	40 14.9	10 87	70.6	40 17.8	09 87	69.9	40 22.8	08 86	68.6	40 30.3	05 85	66.0	40 34.2	02 83	63.4	40 34.6	01 82	62.7	40 34.7	00 81	61.4	55
6	39 19.2	11 88	71.1	39 22.5	11 87	70.5	39 25.6	10 87	69.8	39 31.1	08 86	68.5	39 39.5	06 85	66.0	39 44.4	03 83	63.4	39 45.1	02 82	62.7	39 45.9	00 81	61.4	6
7	38 26.6	12 88	71.0	38 30.1	11 87	70.4	38 33.4	11 87	69.7	38 39.3	09 86	68.4	38 48.7	06 85	65.9	38 54.7	04 83	63.3	38 55.7	03 82	62.7	38 57.0	02 81	61.4	7
8	37 34.0	13 88	70.9	37 37.7	12 87	70.2	37 41.2	11 87	69.6	37 47.6	10 86	68.3	37 57.9	07 85	65.8	38 05.0	05 83	63.3	38 06.3	04 82	62.6	38 08.2	03 81	61.4	8
9	36 41.5	13 88	70.7	36 45.4	13 87	70.1	36 49.1	12 87	69.5	36 55.9	11 86	68.2	37 07.2	08 84	65.7	37 15.3	05 83	63.2	37 16.9	05 82	62.6	37 19.4	03 81	61.3	9
60	35 49.0	14 87	70.6	35 53.1	13 87	69.9	35 57.0	13 87	69.3	36 04.3	11 86	68.1	36 16.5	09 84	65.6	36 25.7	06 83	63.2	36 27.5	06 82	62.5	36 30.6	04 81	61.3	60
1	34 56.6	15 87	70.4	35 00.9	14 87	69.8	35 05.0	13 87	69.2	35 12.7	12 86	68.0	35 25.8	10 84	65.5	35 36.1	07 83	63.1	35 38.1	07 82	62.5	35 41.8	05 81	61.3	1
2	34 04.2	15 87	70.2	34 08.7	15 87	69.6	34 13.0	14 86	69.0	34 21.1	13 86	67.8	34 35.2	11 84	65.4	34 46.5	08 83	63.0	34 48.8	08 82	62.4	34 53.0	06 81	61.2	2
3	33 11.9	16 87	70.1	33 16.5	15 87	69.5	33 21.1	15 86	68.9	33 29.6	14 86	67.7	33 44.6	11 84	65.3	33 56.9	09 83	62.9	33 59.5	08 82	62.3	34 04.3	07 81	61.1	3
4	32 19.6	17 87	69.9	32 24.5	16 87	69.3	32 29.2	15 86	68.7	32 38.2	14 86	67.6	32 54.1	12 84	65.2	33 07.4	10 82	62.8	33 10.3	09 82	62.2	33 15.6	08 81	61.1	4
65	31 27.4	17 87	69.7	31 32.5	17 87	69.2	31 37.4	16 86	68.6	31 46.8	15 86	67.4	32 03.6	13 84	65.1	32 17.9	11 82	62.7	32 21.1	10 82	62.1	32 26.9	09 81	61.0	65
6	30 35.2	18 87	69.6	30 40.5	17 86	69.0	30 45.6	17 86	68.4	30 55.4	16 85	67.3	31 13.2	14 84	64.9	31 28.5	12 82	62.6	31 31.9	11 82	62.0	31 38.3	10 81	60.9	6
7	29 43.1	19 87	69.4	29 48.6	18 86	68.8	29 53.9	18 86	68.2	30 04.2	17 85	67.1	30 22.8	15 84	64.8	30 41 1	13 82	62.5	30 42.8	12 82	61.9	30 49.7	11 81	60.8	7
8	28 51.1	19 87	69.2	28 56.8	19 86	68.6	29 02.3	18 86	68.1	29 12.9	17 85	66.9	29 32.5	15 84	64.7	29 49.8	13 82	62.4	29 53.7	13 82	61.8	30 01.2	12 81	60.7	8
9	27 59.1	20 86	69.0	28 05.0	19 86	68.4	28 10.7	19 86	67.9	28 21.8	18 85	66.8	28 42.3	16 84	64.5	29 00.5	14 82	62.3	29 04.7	14 82	61.7	29 12.7	13 81	60.6	9
70	27 07.2	20 86	68.8	27 13.3	20 86	68.2	27 19.2	20 86	67.7	27 30.7	19 85	66.6	27 52.1	17 84	64.3	28 11.3	15 82	62.1	28 15.8	15 82	61.6	28 24.3	14 80	60.4	70
1	26 15.4	21 86	68.6	26 21.7	21 86	68.0	26 27.8	20 86	67.5	26 39.7	19 85	66.4	27 02.0	18 84	64.2	27 22.2	16 82	62.0	27 26.9	16 81	61.4	27 36.0	15 80	60.3	1
2	25 23.7	22 86	68.4	25 30.1	21 86	67.8	25 36.5	21 86	67.3	25 48.8	20 85	66.2	26 11.9	18 83	64.0	26 33.1	17 82	61.8	26 38.1	16 81	61.3	26 47.7	16 80	60.2	2
3	24 32.0	22 86	68.1	24 38.6	22 86	67.6	24 45.2	22 85	67.1	24 57.9	21 85	66.0	25 22.0	19 83	63.8	25 44.1	18 82	61.7	25 49.4	17 81	61.1	25 59.5	16 80	60.0	3
4	23 40.4	23 86	67.9	23 47.2	23 86	67.4	23 54.0	22 85	66.9	24 07.1	22 84	65.8	24 32.1	20 83	63.7	24 55.2	18 81	61.5	25 00.7	18 81	60.9	25 11.3	17 80	59.9	4
75	22 48.9	24 86	67.7	22 55.9	23 85	67.2	23 02.9	23 85	66.6	23 16.4	22 84	65.6	23 42.3	21 83	63.5	24 06.4	19 81	61.3	24 12.1	19 81	60.8	24 23.2	18 80	59.7	75
6	21 57.4	24 86	67.5	22 04.7	24 85	67.0	22 11.8	24 85	66.4	22 25.8	23 84	65.4	22 52.5	22 83	63.3	23 17.6	20 81	61.1	23 23.6	20 81	60.6	23 35.2	19 80	59.5	6
7	21 06.1	25 85	67.2	21 13.5	25 85	66.7	21 20.9	24 85	66.2	21 35.3	24 84	65.2	22 02.9	22 83	63.1	22 28.9	21 81	61.0	22 35.2	21 81	60.4	22 47.3	20 80	59.4	7
8	20 14.8	26 85	67.0	20 22.5	25 85	66.5	20 30.0	25 85	66.0	20 44.8	24 84	64.9	21 13.4	23 82	62.9	21 40.3	22 81	60.8	21 46.8	21 80	60.2	21 59.5	21 80	59.2	8
9	19 23.7	26 85	66.8	19 31.5	26 85	66.3	19 39.3	26 84	65.7	19 54.5	25 84	64.7	20 23.9	24 82	62.6	20 51.8	23 81	60.6	20 58.6	22 80	60.0	21 11.8	22 80	59.0	9
80	18 32.6	27 85	66.5	18 40.6	27 84	66.0	18 48.6	26 84	65.5	19 04.2	26 84	64.5	19 34.5	25 82	62.4	20 03.4	23 80	60.4	20 10.4	23 80	59.8	20 24.1	23 79	58.8	80
1	17 41.6	28 85	66.3	17 49.9	27 84	65.8	17 58.0	27 84	65.2	18 14.1	27 83	64.2	18 45.3	25 82	62.2	19 15.1	24 80	60.2	19 22.4	24 80	59.6	19 36.6	23 79	58.6	1
2	16 50.8	28 85	66.0	16 59.2	28 84	65.5	17 07.6	28 84	65.0	17 24.0	27 83	64.0	17 56.1	26 82	62.0	18 26.9	25 80	59.9	18 34.4	25 80	59.4	18 49.2	24 79	58.4	2
3	16 00.0	29 84	65.7	16 08.6	29 84	65.2	16 17.2	28 84	64.7	16 34.1	28 83	63.7	17 07.1	27 82	61.7	17 38.8	26 80	59.7	17 46.6	26 80	59.2	18 01.8	25 79	58.2	3
4	15 09.3	30 84	65.5	15 18.2	29 84	65.0	15 26.9	29 84	64.5	15 44.3	29 83	63.5	16 18.1	28 81	61.5	16 50.8	27 80	59.5	16 58.8	27 79	59.0	17 14.6	26 78	58.0	4
85	14 18.8	30 84	65.2	14 27.8	30 84	64.7	14 36.8	30 83	64.2	14 54.5	29 83	63.2	15 29.3	29 81	61.2	16 03.0	28 80	59.2	16 11.2	27 79	58.7	16 27.5	27 78	57.7	85
6	13 28.3	31 84	64.9	13 37.6	31 84	64.4	13 46.8	31 83	63.9	14 04.9	30 82	63.0	14 40.6	29 81	61.0	15 15.2	28 79	59.0	15 23.7	28 79	58.5	15 40.5	28 78	57.5	6
7	12 38.0	32 84	64.6	12 47.4	31 83	64.1	12 56.8	31 83	63.7	13 15.4	31 82	62.7	13 52.0	30 81	60.7	14 27.6	29 79	58.8	14 36.4	29 79	58.3	14 53.7	29 78	57.3	7
8	11 47.8	32 84	64.3	11 57.4	32 83	63.9	12 07.0	32 83	63.4	12 26.1	32 82	62.4	13 03.5	31 80	60.5	13 40.1	30 79	58.5	13 49.1	30 78	58.0	14 06.9	30 78	57.0	8
9	10 57.7	33 83	64.1	11 07.6	33 83	63.6	11 17.4	33 83	63.1	11 36.8	32 82	62.1	12 15.2	32 80	60.2	12 52.7	31 79	58.2	13 02.0	31 78	57.8	13 20.3	30 77	56.8	9
90	10 07.7	34 83	63.8	10 17.8	33 83	63.3	10 27.8	33 82	62.8	10 47.7	33 82	61.8	11 27.0	32 80	59.9	12 05.5	32 78	58.0	12 15.0	32 78	57.5	12 33.9	31 77	56.5	90

Lat. 22°

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	40 00.0	1.0	01	180.0	39 30.0	1.0	01	180.0	39 00.0	1.0	01	180.0	38 00.0	1.0	01	180.0	36 00.0	1.0	01	180.0	34 00.0	1.0	01	180.0	33 30.0	1.0	01	180.0	32 30.0	1.0	01	180.0	00
1	39 59.4	1.0	03	178.8	39 29.4	1.0	03	178.9	38 59.5	1.0	03	178.9	37 59.5	1.0	03	178.9	35 59.5	1.0	02	179.0	33 59.5	1.0	02	179.0	33 29.5	1.0	02	179.0	32 29.5	1.0	02	179.0	1
2	39 57.8	1.0	05	177.7	39 27.8	1.0	05	177.7	38 57.8	1.0	04	177.8	37 57.9	1.0	04	177.8	35 58.0	1.0	04	177.9	33 58.1	1.0	04	178.0	33 28.1	1.0	04	178.0	32 28.1	1.0	04	178.1	2
3	39 55.0	1.0	06	176.5	39 25.0	1.0	06	176.6	38 55.1	1.0	06	176.6	37 55.2	1.0	06	176.7	35 55.4	1.0	06	176.9	33 55.6	1.0	06	177.0	33 25.7	1.0	06	177.0	32 25.8	1.0	06	177.1	3
4	39 51.1	1.0	08	175.4	39 21.2	1.0	08	175.5	38 51.3	1.0	08	175.5	37 51.5	1.0	08	175.6	35 51.9	1.0	08	175.8	33 52.2	1.0	07	176.0	33 22.3	1.0	07	176.1	32 22.5	1.0	07	176.1	4
05	39 46.0	99	10	174.3	39 16.2	99	10	174.3	38 46.4	99	10	174.4	37 46.7	99	10	174.5	35 47.3	1.0	09	174.8	33 47.9	1.0	09	175.0	33 18.0	1.0	09	175.1	32 18.3	1.0	08	175.2	05
6	39 39.9	99	12	173.1	39 10.2	99	12	173.2	38 40.4	99	12	173.3	37 40.9	99	12	173.4	35 41.7	99	11	173.7	33 42.6	99	10	174.0	33 12.8	99	10	174.1	32 13.2	99	10	174.2	6
7	39 32.7	99	14	172.0	39 03.0	99	14	172.1	38 33.3	99	14	172.2	37 34.0	99	13	172.3	35 35.2	99	13	172.7	33 36.3	99	12	173.0	33 06.6	99	12	173.1	32 07.1	99	12	173.3	7
8	39 24.4	99	16	170.8	38 54.8	99	16	171.0	38 25.2	99	15	171.1	37 26.0	99	15	171.3	35 27.6	99	14	171.7	33 29.1	99	14	172.0	32 59.4	99	13	172.1	32 00.1	99	13	172.3	8
9	39 15.0	98	18	169.7	38 45.5	98	17	169.8	38 16.1	98	17	170.0	37 17.1	98	17	170.2	35 19.0	98	16	170.6	33 20.9	98	15	171.1	32 51.4	98	15	171.2	31 52.3	99	15	171.4	9
10	39 04.6	98	19	168.6	38 35.2	98	19	168.7	38 05.8	98	19	168.9	37 07.1	98	18	169.1	35 09.5	98	18	169.6	33 11.8	98	17	170.1	32 42.4	98	17	170.2	31 43.5	98	16	170.4	10
1	38 53.0	97	21	167.5	38 23.8	97	21	167.6	37 54.6	97	20	167.8	36 56.1	98	20	168.1	34 59.0	98	19	168.6	33 01.8	98	18	169.1	32 32.4	98	18	169.2	31 33.8	98	18	169.5	1
2	38 40.5	97	23	166.4	38 11.4	97	22	166.6	37 42.3	97	22	166.7	36 44.1	97	22	167.0	34 47.5	97	21	167.6	32 50.8	97	20	168.2	32 21.6	97	20	168.3	31 23.2	97	19	168.6	2
3	38 26.9	96	24	165.3	37 58.0	96	24	165.5	37 29.0	96	24	165.6	36 31.1	97	23	166.0	34 35.1	97	22	166.6	32 38.9	97	21	167.2	32 09.9	97	21	167.3	31 11.7	97	20	167.6	3
4	38 12.3	96	26	164.2	37 43.5	96	26	164.4	37 14.7	96	26	164.6	36 17.1	96	25	164.9	34 21.8	96	24	165.6	32 26.2	96	23	166.3	31 57.2	96	22	166.4	30 59.4	97	22	166.7	4
15	37 56.6	95	28	163.2	37 28.1	95	28	163.3	36 59.5	95	27	163.5	36 02.2	95	26	163.9	34 07.5	96	25	164.6	32 12.5	96	24	165.3	31 43.7	96	24	165.5	30 46.1	96	23	165.8	15
6	37 40.0	95	29	162.1	37 11.6	95	29	162.3	36 43.2	95	29	162.5	35 46.3	95	28	162.9	33 52.3	95	27	163.6	31 58.0	95	26	164.4	31 29.3	95	25	164.6	30 32.1	95	25	164.9	6
7	37 22.4	94	31	161.0	36 54.2	94	30	161.3	36 26.0	94	30	161.5	35 29.5	94	30	161.9	33 36.2	95	28	162.7	31 42.5	95	27	163 4	31 14.1	95	27	163.6	30 17.2	95	26	164.0	7
8	37 03.9	93	32	160.0	36 35.9	93	32	160.2	36 07.8	93	32	160.4	35 11.7	94	31	160.9	33 19.1	94	30	161.7	31 26.3	94	28	162.5	30 58.0	94	28	162.7	30 01.4	94	28	163.1	8
9	36 44.4	93	34	159.0	36 16.6	93	34	159.2	35 48.8	93	33	159.4	34 53.0	93	33	159.9	33 01.3	93	31	160.8	31 09.1	94	30	161.6	30 41.1	94	30	161.8	29 44.8	94	29	162.2	9
20	36 24.0	92	36	158.0	35 56.4	92	35	158.2	35 28.8	92	35	158.4	34 33.5	92	34	158.9	32 42.5	93	33	159.8	30 51.2	93	31	160.7	30 23.3	93	31	160.9	29 27.4	93	30	161.4	20
1	36 02.7	91	37	157.0	35 35.3	91	37	157.2	35 07.9	91	36	157.5	34 13.0	92	36	158.0	32 22.9	92	34	158.9	30 32.4	92	33	159.8	30 04.7	92	32	160.0	29 09.3	92	32	160.5	1
2	35 40.5	90	38	156.0	35 13.3	91	38	156.2	34 46.1	91	38	156.5	33 51.7	91	37	157.0	32 02.5	91	36	158.0	30 12.8	92	34	158.9	29 45.3	92	34	159.2	28 50.3	92	33	159.6	2
3	35 17.4	90	40	155.0	34 50.5	90	40	155.3	34 23.5	90	39	155.5	33 29.6	90	38	156.1	31 41.2	90	37	157.1	29 52.4	91	35	158.1	29 25.1	91	35	158.3	28 30.5	91	34	158.8	3
4	34 53.4	89	41	154.0	34 26.8	89	41	154.3	34 00.1	89	40	154.6	33 06.6	89	40	155.1	31 19.2	90	38	156.2	29 31.2	90	36	157.2	29 04.2	90	36	157.4	28 10.0	90	36	157.9	4
25	34 28.7	88	43	153.1	34 02.3	88	42	153.4	33 35.8	88	42	153.7	32 42.8	88	41	154.2	30 56.3	89	39	155.3	29 09.3	89	38	156.3	28 42.5	89	38	156.6	27 48.7	90	37	157.1	25
6	34 03.1	87	44	152.2	33 36.9	87	44	152.4	33 10.7	87	43	152.7	32 18.2	88	42	153.3	30 32.7	88	41	154.4	28 46.6	89	39	155.5	28 20.0	89	39	155.8	27 26.7	89	38	156.3	6
7	33 36.7	86	45	151.2	33 10.8	86	45	151.5	32 44.8	87	44	151.8	31 52.8	87	44	152.4	30 08.3	87	42	153.6	28 23.2	88	40	154.7	27 56.8	88	40	154.9	27 04.0	88	39	155.5	7
8	33 09.5	85	46	150.3	32 43.9	86	46	150.6	32 18.2	86	46	150.9	31 26.7	86	45	151.5	29 43.1	87	43	152.7	27 59.0	87	42	153.8	27 32.9	87	41	154.1	26 40.6	87	40	154.7	8
9	32 41.6	85	48	149.4	32 16.2	85	47	149.7	31 50.8	85	47	150.1	30 59.8	85	46	150.7	29 17.3	86	44	151.9	27 34.1	86	43	153.0	27 08.3	86	42	153.3	26 16.4	87	41	153.9	9
30	32 12.9	84	49	148.5	31 47.8	84	48	148.9	31 22.7	84	48	149.2	30 32.2	84	47	149.8	28 50.7	85	46	151.0	27 08.6	85	44	152.2	26 42.9	85	43	152.5	25 51.6	86	42	153.1	30
1	31 43.6	83	50	147.7	31 18.7	83	50	148.0	30 53.8	83	49	148.3	30 03.9	83	48	149.0	28 23.4	84	47	150.2	26 42.3	85	45	151.4	26 16.9	85	44	151.7	25 26.1	85	44	152.3	1
2	31 13.5	82	51	146.8	30 48.9	82	51	147.2	30 24.3	82	50	147.5	29 34.8	83	50	148.2	27 55.5	83	48	149.4	26 15.4	84	46	150.7	25 50.3	84	46	151.0	24 59.9	84	45	151.6	2
3	30 42.7	81	52	146.0	30 18.4	81	52	146.3	29 54.0	81	52	146.7	29 05.2	82	51	147.3	27 26.8	82	49	148.6	25 47.8	83	47	149.9	25 23.0	83	47	150.2	24 33.1	83	46	150.8	3
4	30 11.2	80	53	145.2	29 47.2	80	53	145.5	29 23.1	80	53	145.9	28 34.8	81	52	146.5	26 57.6	81	50	147.9	25 19.6	82	48	149.1	24 55.0	82	48	149.5	24 05.7	82	47	150.1	4
35	29 39.1	79	54	144.4	29 15.4	79	54	144.7	28 51.6	79	54	145.1	28 03.8	80	53	145.7	26 27.6	80	51	147.1	24 50.8	81	49	148.4	24 26.4	81	49	148.7	23 37.7	81	48	149.4	35
6	29 06.4	78	55	143.6	28 42.9	78	55	143.9	28 19.4	79	55	144.3	27 32.2	79	54	145.0	25 57.1	80	52	146.3	24 21.3	80	50	147.7	23 57.2	80	50	148.0	23 09.0	81	49	148.6	6
7	28 33.1	77	56	142.8	28 09.9	77	56	143.1	27 46.6	78	56	143.5	26 59.9	78	55	144.2	25 26.0	79	53	145.6	23 51.2	79	51	146.9	23 27.5	79	51	147.3	22 39.8	80	50	147.9	7
8	27 59.1	76	57	142.0	27 36.2	77	57	142.4	27 13.2	77	57	142.7	26 27.1	77	56	143.5	24 54.2	78	54	144.9	23 20.6	78	52	146.2	22 57.1	78	52	146.6	22 09.9	79	51	147.2	8
9	27 24.6	75	58	141.3	27 01.9	76	58	141.6	26 39.2	76	58	142.0	25 53.7	76	57	142.7	24 21.9	77	55	144.1	22 49.4	77	53	145.5	22 26.2	78	52	145.9	21 39.5	78	52	146.5	9
40	26 49.5	74	59	140.5	26 27.1	75	59	140.9	26 04.7	75	58	141.3	25 19.7	75	58	142.0	23 49.1	76	56	143.4	22 17.6	76	54	144.8	21 54.7	77	54	145.2	21 08.6	77	52	145.9	40
1	26 13.8	73	60	139.8	25 51.7	74	60	140.2	25 29.6	74	59	140.5	24 45.2	74	58	141.3	23 15.6	75	57	142.7	21 45.3	76	55	144.2	21 22.6	76	54	144.5	20 37.1	76	53	145.2	1
2	25 37.6	73	61	139.1	25 15.8	73	61	139.4	24 54.0	73	60	139.8	24 10.1	73	59	140.6	22 41.7	74	58	142.0	21 12.5	75	56	143.5	20 50.1	75	55	143.8	20 05.1	75	54	144.5	2
3	25 00.9	72	62	138.4	24 39.4	72	62	138.7	24 17.8	72	61	139.1	23 34.5	72	60	139.9	22 07.2	73	58	141.4	20 39.1	74	56	142.8	20 17.0	74	56	143.2	19 32.6	74	55	143.9	3
4	24 23.7	71	63	137.7	24 02.5	71	62	138.1	23 41.2	71	62	138.4	22 58.4	71	61	139.2	21 32.2	72	59	140.7	20 05.3	73	57	142.2	19 43.4	73	57	142.5	18 59.6	73	56	143.3	4
45	23 46.0	70	64	137.0	23 25.0	70	63	137.4	23 04.0	70	63	137.8	22 21.8	71	62	138.5	20 56.7	71	60	140.1	19 30.9	72	58	141.5	19 09.3	72	58	141.9	18 26.0	72	56	142.6	45
6	23 07.8	69	64	136.3	22 47.1	69	64	136.7	22 26.4	69	64	137.1	21 44.7	70	62	137.9	20 20.8	70	61	139.4	18 56.1	71	59	140.9	18 34.8	71	58	141.3	17 52.1	71	58	142.0	6
7	22 29.1	68	65	135.7	22 08.7	68	65	136.1	21 48.3	68	64	136.5	21 07.2	69	63	137.2	19 44.4	69	62	138.8	18 20.8	70	60	140.3	17 59.7	70	59	140.7	17 17.6	70	58	141.4	7
8	21 50.0	67	66	135.0	21 29.9	67	66	135.4	21 09.7	67	65	135.8	20 29.2	68	64	136.6	19 07.5	68	62	138.2	17 45.0	69	60	139.7	17 24.3	69	60	140.1	16 42.7	69	59	140.8	8
9	21 10.5	66	67	134.4	20 50.6	66	66	134.8	20 30.7	66	66	135.2	19 50.7	67	65	136.0	18 30.1	67	63	137.6	17 08.8	68	61	139.1	16 48.3	68	60	139.5	16 07.3	69	60	140.2	9
50	20 30.5	65	67	133.8	20 11.0	65	67	134.2	19 51.3	66	66	134.6	19 11.9	66	66	135.4	17 52.4	67	64	137.0	16 32.1	67	62	138.5	16 12.0	67	61	138.9	15 31.5	68	60	139.7	50
1	19 50.2	64	68	133.2	19 30.8	64	68	133.6	19 11.5	65	67	134.0	18 32.6	65	66	134.8	17 14.2	66	64	136.4	15 55.1	66	62	137.9	15 35.2	66	62	138.3	14 55.3	67	61	139.1	1
2	19 09.4	63	69	132.6	18 50.3	64	68	133.0	18 31.2	64	68	133.4	17 52.9	64	67	134.2	16 35.6	65	65	135.8	15 17.6	65	63	137.4	14 58.0	65	63	137.8	14 18.7	66	62	138.5	2
3	18 28.2	63	69	132.0	18 09.4	63	69	132.4	17 50.6	63	68	132.8	17 12.8	63	68	133.6	15 56.6	64	66	135.2	14 39.7	64	64	136.8	14 20.4	64	63	137.2	13 41.6	65	62	138.0	3
4	17 46.7	62	70	131.4	17 28.2	62	70	131.8	17 09.6	62	69	132.2	16 32.3	62	68	133.0	15 17.2	63	66	134.7	14 01.5	63	64	136.3	13 42.4	64	64	136.7	13 04.2	64	63	137.5	4
55	17 04.8	61	70	130.8	16 46.5	61	70	131.2	16 28.2	61	70	131.7	15 51.5	61	69	132.5	14 37.5	62	67	134.1	13 22.8	63	65	135.7	13 04.1	63	65	136.1	12 26.4	63	64	136.9	55
6	16 22.5	60	71	130.3	16 04.5	60	70	130.7	15 46.5	60	70	131.1	15 10.3	60	69	131.9	13 57.4	61	68	133.6	12 43.8	62	66	135.2	12 25.3	62	65	135.6	11 48.2	62	64	136.4	6
7	15 39.9	59	72	129.7	15 22.2	59	71	130.1	15 04.4	59	71	130.6	14 28.7	60	70	131.4	13 16.9	60	68	133.0	12 04.4	61	66	134.7	11 46.2	61	66	135.1	11 09.7	61	65	135.9	7
8	14 56.9	58	72	129.2	14 39.5	58	72	129.6	14 22.0	58	71	130.0	13 46.8	59	70	130.9	12 36.1	59	69	132.5	11 24.7	60	67	134.2	11 06.8	60	66	134.6	10 30.8	60	65	135.4	8
9	14 13.6	57	73	128.7	13 56.4	57	72	129.1	13 39.2	58	72	129.5	13 04.6	58	71	130.4	11 54.9	58	69	132.0	10 44.6	59	67	133.7	10 27.0	59	67	134.1	9 51.6	59	66	134.9	9
60	13 30.1	56	73	128.2	13 13.1	57	73	128.6	12 56.1	57	72	129.0	12 22.0	57	71	129.8	11 13.4	57	70	131.5	10 04.2	58	68	133.2	9 46.8	58	67	133.6	9 12.0	58	66	134.4	60
1	12 46.2	56	74	127.6	12 29.5	56	73	128.1	12 12.7	56	73	128.5	11 39.2	56	72	129.3	10 31.6	57	70	131.0	9 23.5	57	68	132.7	9 06.4	57	68	133.1	8 32.1	57	67	133.9	1
2	12 02.0	55	74	127.1	11 45.5	55	74	127.6	11 29.1	55	73	128.0	10 56.0	55	72	128.9	9 49.5	56	71	130.5	8 42.5	56	69	132.2	8 25.6	56	68	132.6	7 51.9	56	68	133.5	2
3	11 17.5	54	75	126.7	11 01.3	54	74	127.1	10 45.1	54	74	127.5	10 12.5	54	73	128.4	9 07.1	55	71	130.1	8 01.1	55	69	131.8	7 44.6	55	69	132.2	7 11.4	55	68	133.0	3
4	10 32.7	53	75	126.2	10 16.8	53	75	126.6	10 00.8	53	74	127.0	9 28.8	53	73	127.9	8 24.3	54	72	129.6	7 19.5	54	70	131.3	7 03.2	54	70	131.7	6 30.6	54	69	132.6	4
65	9 47.7	52	76	125.7	9 32.0	52	75	126.1	9 16.3	52	75	126.6	8 44.7	53	74	127.4	7 41.3	53	72	129.1	6 37.5	53	70	130.9	6 21.5	53	70	131.3	5 49.4	54	69	132.1	65
6	9 02.3	51	76	125.2	8 46.9	52	76	125.7	8 31.4	52	75	126.1	8 00.4	52	74	127.0	6 58.0	52	73	128.7	5 55.3	52	71	130.4	5 39.6	52	70	130.8	5 08.0	53	69	131.7	6
7	8 16.8	51	76	124.8	8 01.6	51	76	125.2	7 46.4	51	76	125.7	7 15.8	51	75	126.5	6 14.5	51	73	128.3	5 12.8	52	71	130.0									7
8	7 31.0	50	77	124.3	7 16.0	50	76	124.8	7 01.0	50	76	125.2	6 31.0	50	75	126.1	5 30.7	50	74	127.8													8
9	6 44.9	49	77	123.9	6 30.2	49	77	124.3	6 15.5	49	76	124.8	5 45.9	49	76	125.6																	9
70	5 58.6	48	78	123.5	5 44.1	48	77	123.9	5 29.6	48	77	124.3	5 00.6	48	76	125.2																	70
1	5 12.1	47	78	123.0																													1

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	9 17.9	34	83	63.5	9 28.2	34	82	63.0	9 38.4	34	82	62.5	9 58.7	34	81	61.5	10 38.9	33	80	59.6	11 18.4	33	78	57.7	11 28.2	32	78	57.2	11 47.5	32	77	56.3	91
2	8 28.2	35	83	63.1	8 38.7	35	82	62.7	8 49.1	35	82	62.2	9 09.9	35	81	61.2	9 51.0	34	80	59.3	10 31.5	33	78	57.4	10 41.5	33	78	56.9	11 01.3	33	77	56.0	2
3	7 38.7	36	82	62.8	7 49.3	36	82	62.4	8 00.0	35	82	61.9	8 21.2	35	81	60.9	9 03.2	35	79	59.0	9 44.6	34	78	57.1	9 54.9	34	77	56.7	10 15.3	34	76	55.7	3
4	6 49.2	36	82	62.5	7 00.1	36	82	62.0	7 11.0	36	81	61.6	7 32.7	36	81	60.6	8 15.6	36	79	58.7	8 58.0	35	78	56.9	9 08.5	35	77	56.4	9 29.4	35	76	55.4	4
95	6 00.0	37	82	62.2	6 11.1	37	82	61.7	6 22.2	37	81	61.2	6 44.2	37	80	60.3	7 28.1	36	79	58.4	8 11.5	36	77	56.6	8 22.3	36	77	56.1	8 43.7	36	76	55.1	95
6	5 10.8	38	82	61.8	5 22.2	38	82	61.4	5 33.5	38	81	60.9	5 56.0	37	80	60.0	6 40.8	37	79	58.1	7 25.2	37	77	56.2	7 36.2	37	76	55.8	7 58.1	36	76	54.8	6
7													5 07.9	38	80	59.7	5 53.6	38	78	57.8	6 39.0	38	77	55.9	6 50.3	38	76	55.5	7 12.7	37	75	54.5	7
8																	5 06.6	39	78	57.5	5 53.0	38	76	55.6	6 04.5	38	76	55.2	6 27.5	38	75	54.2	8
9																					5 07.2	39	76	55.3	5 18.9	39	76	54.8	5 42.5	39	75	53.9	9

Lat. 22°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	Alt.	Δd	Δt	
	Az.			Az.			Az.			Az.			Az.			Az.			Az.			Az.			
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	°
00	76 00.0	1.0 03	00.0	75 00.0	1.0 02	00.0	73 30.0	1.0 02	00.0	72 00.0	1.0 02	00.0	70 00.0	1.0 02	00.0	69 30.0	1.0 02	00.0	69 00.0	1.0 02	00.0	67 00.0	1.0 02	00.0	00
1	75 58.4	1.0 08	03.3	74 58.5	1.0 08	03.1	73 28.7	1.0 07	02.8	71 58.8	1.0 06	02.5	69 58.9	1.0 05	02.2	69 29.0	1.0 05	02.1	68 59.0	1.0 05	02.0	66 59.1	1.0 04	01.8	1
2	75 53.5	99 13	06.7	74 54.0	99 12	06.1	73 24.7	99 11	05.5	71 55.2	99 10	04.9	69 55.8	1.0 09	04.3	69 25.9	1.0 08	04.2	68 56.0	1.0 08	04.1	66 56.5	1.0 07	03.6	2
3	75 45.5	98 18	09.9	74 46.6	98 17	09.2	73 18.0	98 15	08.2	71 49.2	99 14	07.4	69 50.5	99 12	06.5	69 20.8	99 12	06.3	68 51.1	99 12	06.1	66 52.1	99 10	05.4	3
4	75 34.4	97 24	13.1	74 36.3	97 22	12.1	73 08.8	97 20	10.9	71 40.9	98 18	09.8	69 43.2	98 16	08.6	69 13.8	98 15	08.3	68 44.2	98 15	08.1	66 46.0	99 13	07.2	4
05	75 20.4	95 28	16.2	74 23.3	95 26	15.0	72 57.1	96 24	13.5	71 30.3	97 21	12.2	69 33.9	97 19	10.7	69 04.7	97 18	10.4	68 35.5	98 18	10.1	66 38.2	98 16	08.9	05
6	75 03.5	93 33	19.1	74 07.6	94 30	17.8	72 43.0	95 28	16.0	71 17.5	95 25	14.5	69 22.6	96 22	12.7	68 53.8	96 22	12.4	68 24.8	96 21	12.0	66 28.7	97 18	10.7	6
7	74 43.9	90 37	22.0	73 49.4	91 34	20.4	72 26.5	93 31	18.4	71 02.6	94 28	16.7	69 09.4	95 25	14.7	68 40.9	95 24	14.3	68 12.4	95 24	13.9	66 17.6	96 21	12.4	7
8	74 21.9	88 41	24.7	73 28.8	89 38	23.0	72 07.8	91 34	20.8	70 45.6	92 32	18.9	68 54.3	93 28	16.7	68 26.3	94 27	16.2	67 58.1	94 26	15.7	66 04.9	95 24	14.0	8
9	73 57.5	85 44	27.3	73 06.0	87 42	25.5	71 47.1	89 38	23.1	70 26.6	90 35	21.0	68 37.4	92 31	18.6	68 09.9	92 30	18.1	67 42.2	92 29	17.6	65 50.6	94 26	15.7	9
10	73 31.0	82 48	29.7	72 41.0	84 45	27.8	71 24.3	86 41	25.2	70 05.8	88 38	23.0	68 18.9	90 34	20.4	67 51.8	90 33	19.9	67 24.6	91 32	19.3	65 34.8	92 29	17.3	10
1	73 02.5	80 50	32.0	72 14.2	81 48	30.0	70 59.7	84 44	27.3	69 43.2	86 40	24.9	67 58.6	88 36	22.2	67 32.1	89 35	21.6	67 05.4	89 34	21.0	65 17.6	91 31	18.8	1
2	72 32.1	77 53	34.1	71 45.5	79 50	32.0	70 33.3	82 47	29.3	69 18.9	84 43	26.8	67 36.8	86 39	23.9	67 10.9	87 38	23.3	66 44.7	87 37	22.7	64 58.9	89 33	20.3	2
3	72 00.2	74 56	36.1	71 15.2	76 53	34.0	70 05.3	79 49	31.1	68 53.0	82 46	28.6	67 13.5	84 41	25.6	66 48.1	85 40	24.9	66 22.6	85 39	24.2	64 38.9	87 36	21.8	3
4	71 26.7	71 58	38.0	70 43.3	73 55	35.8	69 35.8	77 52	32.9	68 25.7	79 48	30.3	66 48.8	82 43	27.2	66 24.0	83 42	26.5	65 59.1	83 41	25.8	64 17.6	86 38	23.2	4
15	70 51.8	68 60	39.7	70 10.1	71 58	37.5	69 04.9	74 54	34.6	67 57.0	77 50	31.9	66 22.7	80 46	28.7	65 58.6	81 44	28.0	65 34.3	81 44	27.2	63 55.1	84 40	24.6	15
6	70 15.6	65 62	41.3	69 35.6	68 60	39.1	68 32.7	72 56	36.1	67 27.0	75 52	33.4	65 55.4	78 48	30.1	65 31.9	79 46	29.4	65 08.2	79 46	28.6	63 31.3	82 42	25.9	6
7	69 38.3	63 64	42.8	68 59.9	65 61	40.7	67 59.4	69 58	37.6	66 55.8	72 54	34.9	65 26.9	75 49	31.5	65 04.0	77 48	30.8	64 40.9	77 47	30.0	63 06.5	80 43	27.2	7
8	69 00.0	60 65	44.2	68 23.1	63 63	42.1	67 24.9	67 59	39.0	66 23.4	70 56	36.2	64 57.2	74 51	32.9	64 35.0	74 50	32.1	64 12.6	75 49	31.3	62 40.5	78 45	28.4	8
9	68 20.8	58 67	45.5	67 45.4	60 64	43.4	66 49.3	64 61	40.3	65 50.0	68 57	37.5	64 26 6	71 53	34.1	64 05.0	72 52	33.3	63 43.2	73 51	32.5	62 13.5	76 47	29.6	9
20	67 40.6	55 68	46.8	67 06.7	58 66	44.6	66 12.9	62 62	41.6	65 15.6	65 59	38.8	63 54.9	69 54	35.3	63 34.0	70 53	34.5	63 12.8	71 52	33.7	61 45.5	74 48	30.7	20
1	66 59.7	53 69	47.9	66 27.3	56 67	45.8	65 35.5	59 64	42.7	64 40.4	63 60	39.9	63 22.3	67 56	36.5	63 02.0	68 55	35.6	62 41.4	69 54	34.8	61 16.7	72 50	31.8	1
2	66 18.1	50 70	48.9	65 47.0	53 68	46.8	64 57.4	57 65	43.8	64 04.3	61 62	41.0	62 48.8	65 57	37.5	62 29.1	66 56	36.7	62 09.2	67 55	35.9	60 46.9	70 51	32.9	2
3	65 35.8	48 71	49.9	65 06.1	51 69	47.8	64 18.5	55 66	44.9	63 27.4	59 63	42.1	62 14.5	63 58	38.6	61 55.5	64 57	37.7	61 36.2	65 56	36.9	60 16.3	68 52	33.9	3
4	64 53.0	46 72	50.8	64 24.6	49 70	48.8	63 38.9	53 67	45.8	62 49.8	56 64	43.0	61 39.4	61 60	39.5	61 21.1	62 59	38.7	61 02.4	63 58	37.9	59 44.9	66 54	34.8	4
25	64 09.6	44 73	51.7	63 42.5	47 71	49.6	62 58.7	51 68	46.7	62 11.5	54 65	43.9	61 03.7	59 61	40.5	60 45.9	60 60	39.6	60 27.9	61 59	38.8	59 12.8	64 55	35.7	25
6	63 25.7	42 74	52.5	62 59.8	45 72	50.5	62 17.9	49 69	47.6	61 32.6	52 66	44.8	60 27.2	57 62	41.3	60 10.1	58 61	40.5	59 52.6	59 60	39.7	58 40.0	62 56	36.6	6
7	62 41.4	40 74	53.2	62 16.7	43 73	51.2	61 36.6	46 70	48.4	60 53.1	50 67	45.6	59 50.2	55 63	42.2	59 33.6	56 62	41.4	59 16.8	57 61	40.5	58 06.5	60 57	37.4	7
8	61 56.7	38 75	53.9	61 33.1	41 73	51.9	60 54.8	45 70	49.1	60 13.1	48 68	46.4	59 12.5	53 64	43.0	58 56.6	54 63	42.1	58 40.3	55 62	41.3	57 32.4	58 58	38.2	8
9	61 11.6	36 76	54.5	60 49.1	39 74	52.6	60 12.5	43 71	49.8	59 32.5	46 68	47.1	58 34.4	51 64	43.7	58 19.0	52 64	42.9	58 03.3	53 62	42.1	56 57.7	57 59	39.0	9
30	60 26.1	34 76	55.1	60 04.8	37 74	53.2	59 29.8	41 72	50.4	58 51.6	44 69	47.8	57 55.7	49 65	44.4	57 40.9	50 64	43.6	57 25.8	51 63	42.8	56 22.4	55 60	39.7	30
1	59 40.4	33 77	55.6	59 20.1	35 75	53.8	58 46.8	39 72	51.0	58 10.1	42 70	48.4	57 16.5	47 66	45.1	57 02.3	48 65	44.3	56 47.8	49 64	43.5	55 46.7	53 60	40.4	1
2	58 54.3	31 77	56.1	58 35.1	33 76	54.3	58 03.3	37 73	51.6	57 28.3	41 70	49.0	56 36.9	45 67	45.7	56 23.2	46 66	44.9	56 09.3	47 65	44.1	55 10.4	51 61	41.0	2
3	58 08.0	29 78	56.6	57 49.7	32 76	54.8	57 19.6	35 74	52.1	56 46.2	39 71	49.6	55 56.9	43 67	46.3	55 43.8	44 66	45.5	55 30.3	45 66	44.7	54 33.7	49 62	41.6	3
4	57 21.5	28 78	57.0	57 04.2	30 76	55.2	56 35.5	34 74	52.6	56 03.6	37 71	50.1	55 16.5	41 68	46.8	55 03.9	42 67	46.1	54 51.0	43 66	45.3	53 56.5	47 63	42.2	4
35	56 34.7	26 78	57.4	56 18.4	28 77	55.7	55 51.1	32 74	53.1	55 20.8	35 72	50.6	54 35.7	40 68	47.4	54 23.7	41 68	46.6	54 11.3	42 67	45.8	53 18.9	46 63	42.8	35
6	55 47.7	25 79	57.8	55 32.3	27 77	56.1	55 06.5	30 75	53.5	54 37.7	34 72	51.1	53 54.6	38 69	47.9	53 43.1	39 68	47.1	53 31.3	40 67	46.3	52 41.0	44 64	43.3	6
7	55 00.6	23 79	58.1	54 46.1	25 77	56.4	54 21.7	29 75	53.9	53 54.3	32 73	51.5	53 13.2	36 70	48.3	53 02.2	37 69	47.6	52 50.9	38 68	46.8	52 02.7	42 64	43.8	7
8	54 13.3	22 79	58.4	53 59.6	24 78	56.8	53 36.6	27 76	54.3	53 10.6	30 73	51.9	52 31.5	35 70	48.8	52 21.0	36 69	48.0	52 10.2	37 68	47.2	51 24.0	40 65	44.2	8
9	53 25.8	20 79	58.7	53 13.0	22 78	57.1	52 51.3	26 76	54.7	52 26.7	29 74	52.3	51 49.6	33 70	49.2	51 39.5	34 70	48.4	51 29.2	35 69	47.7	50 45.0	39 66	44.7	9
40	52 38.2	19 80	59.0	52 26.2	21 78	57.4	52 05.8	24 76	55.0	51 42.6	27 74	52.6	51 07.4	31 71	49.6	50 57.8	32 70	48.8	50 48.0	33 69	48.1	50 05.8	37 66	45.1	40
1	51 50.5	18 80	59.2	51 39.3	20 78	57.6	51 20.2	23 76	55.3	50 58.3	26 74	53.0	50 24.9	30 71	49.9	50 15.8	31 70	49.2	50 06.5	32 70	48.4	49 26.2	35 66	45.5	1
2	51 02.6	16 80	59.4	50 52.3	18 79	57.9	50 34.4	21 76	55.5	50 13.8	24 74	53.3	49 42.2	28 72	50.3	49 33.6	29 71	49.5	49 24.7	30 70	48.8	48 46.4	34 67	45.9	2
3	50 14.7	15 80	59.6	50 05.1	17 79	58.1	49 48.5	20 77	55.8	49 29.2	23 75	53.5	48 59.4	27 72	50.6	48 51.2	28 71	49.8	48 42.8	29 70	49.1	48 06.3	32 67	46.2	3
4	49 26.6	14 80	59.8	49 17.8	16 79	58.3	49 02.4	19 77	56.0	48 44.3	22 75	53.8	48 16.3	25 72	50.9	48 08.6	26 71	50.1	48 00.6	27 70	49.4	47 26.0	31 68	46.6	4
45	48 38.5	12 80	60.0	48 30.5	14 79	58.5	48 16.2	17 77	56.2	47 59.4	20 75	54.0	47 33.1	24 72	51.1	47 25.8	25 72	50.4	47 18.3	25 71	49.7	46 45.5	29 68	46.9	45
6	47 50.3	11 80	60.1	47 43.0	13 79	58.6	47 29.9	16 77	56.4	47 14.3	19 75	54.3	46 49.7	22 73	51.4	46 42.9	23 72	50.7	46 35.8	24 71	50.0	46 04.8	27 68	47.2	6
7	47 02.0	10 81	60.2	46 55.5	12 79	58.8	46 43.5	15 78	56.6	46 29.1	17 76	54.5	46 06.1	21 73	51.6	45 59.7	22 72	50.9	45 53.1	23 71	50.2	45 24.0	26 68	47.4	7
8	46 13.7	09 81	60.4	46 07.8	11 79	58.9	45 57.0	13 78	56.8	45 43.8	16 76	54.6	45 22.5	19 73	51.8	45 16.5	20 72	51.1	45 10.3	21 72	50.4	44 42.9	24 69	47.7	8
9	45 25.4	08 81	60.4	45 20.2	10 80	59.0	45 10.4	12 78	56.9	44 58.4	15 76	54.8	44 38.7	18 73	52.0	44 33.1	19 72	51.3	44 27.3	20 72	50.6	44 01.7	23 69	47.9	9
50	44 36.9	07 81	60.5	44 32.4	08 80	59.1	44 23.8	11 78	57.0	44 12.8	13 76	55.0	43 54.8	17 73	52.2	43 49.6	18 73	51.5	43 44.2	18 72	50.8	43 20.3	21 69	48.1	50
1	43 48.5	06 81	60.6	43 44.7	07 80	59.2	43 37.1	10 78	57.2	43 27.3	12 76	55.1	43 10.8	15 74	52.4	43 06.0	16 73	51.7	43 01.1	17 72	51.0	42 38.8	20 69	48.3	1
2	43 00.0	04 81	60.7	42 56.9	06 80	59.3	42 50.3	08 78	57.2	42 41.6	11 76	55.2	42 26.6	14 74	52.5	42 22.3	15 73	51.9	42 17.8	16 72	51.2	41 57.2	19 70	48.4	2
3	42 11.5	03 81	60.7	42 09.0	05 80	59.4	42 03.5	07 78	57.3	41 55.9	10 76	55.3	41 42.5	13 74	52.7	41 38.5	13 73	52.0	41 34.4	14 72	51.3	41 15.5	17 70	48.7	3
4	41 23.0	02 81	60.7	41 21.1	04 80	59.4	41 16.7	06 78	57.4	41 10.1	08 76	55.4	40 58.2	11 74	52.8	40 54.7	12 73	52.1	40 50.9	13 73	51.5	40 33.6	16 70	48.9	4
55	40 34.5	01 81	60.7	40 33.3	03 80	59.4	40 29.8	05 78	57.5	40 24.3	07 76	55.5	40 13.9	10 74	52.9	40 10.7	11 73	52.2	40 07.3	12 73	51.6	39 51.7	14 70	49.0	55
6	39 45.9	00 81	60.8	39 45.3	02 80	59.5	39 42.9	04 78	57.5	39 38.4	06 76	55.6	39 29.5	09 74	53.0	39 26.7	10 73	52.3	39 23.7	10 73	51.7	39 09.7	13 70	49.1	6
7	38 57.4	01 81	60.8	38 57.4	01 80	59.5	38 55.9	03 78	57.5	38 52.5	05 76	55.6	38 45.0	08 74	53.1	38 42.7	08 74	52.4	38 40.1	09 73	51.8	38 27.6	12 70	49.2	7
8	38 08.8	02 81	60.7	38 09.5	00 80	59.5	38 09.0	02 78	57.6	38 06.6	04 76	55.7	38 00.6	06 74	53.1	37 58.6	07 74	52.5	37 56.3	08 73	51.9	37 45.4	10 70	49.3	8
9	37 20.3	03 81	60.7	37 21.6	01 80	59.5	37 22.0	01 78	57.6	37 20.7	03 77	55.7	37 16.1	05 74	53.2	37 14.4	06 74	52.5	37 12.6	06 73	51.9	37 03.2	09 70	49.4	9
60	36 31.8	04 81	60.7	36 33.7	03 80	59.4	36 35.1	01 78	57.6	36 34.7	01 77	55.7	36 31.5	04 74	53.2	36 30.2	05 74	52.6	36 28.8	05 73	52.0	36 20.9	08 70	49.5	60
1	35 43.3	05 81	60.6	35 45.8	04 80	59.4	35 48.1	02 78	57.6	35 48.8	00 77	55.7	35 47.0	03 74	53.2	35 46.0	03 74	52.6	35 44.9	04 73	52.0	35 38.6	07 71	49.6	1
2	34 54.8	06 81	60.6	34 57.9	05 80	59.4	35 01.2	03 78	57.5	35 02.8	01 77	55.7	35 02.4	02 74	53.3	35 01.8	02 74	52.7	35 01.1	03 73	52.0	34 56.2	05 71	49.6	2
3	34 06.4	07 81	60.5	34 10.1	06 80	59.3	34 14.2	04 78	57.5	34 16.8	02 77	55.7	34 17.8	00 74	53.3	34 17.6	01 74	52.7	34 17.2	02 73	52.1	34 13.9	04 71	49.6	3
4	33 18.0	08 81	60.5	33 22.2	07 80	59.3	33 27.3	05 78	57.5	33 30.9	03 77	55.7	33 33.2	01 74	53.3	33 33.3	00 74	52.7	33 33.3	00 73	52.1	33 31.5	03 71	49.7	4
65	32 29.6	09 81	60.4	32 34.4	08 80	59.2	32 40.4	06 78	57.4	32 45.0	04 77	55.6	32 48.6	02 74	53.3	32 49.1	01 74	52.7	32 49.4	01 73	52.1	32 49.0	01 71	49.7	65
6	31 41.2	10 80	60.3	31 46.7	08 80	59.1	31 53.6	07 78	57.4	31 59.0	05 76	55.6	32 04.0	03 74	53.2	32 04.9	03 74	52.6	32 05.6	02 73	52.1	32 06.6	00 71	49.7	6
7	30 52.9	11 80	60.2	30 58.9	09 80	59.0	31 06.8	08 78	57.3	31 13.2	06 76	55.5	31 19.5	04 74	53.2	31 20.7	04 74	52.6	31 21.7	03 73	52.0	31 24.2	01 71	49.7	7
8	30 04.7	11 80	60.1	30 11.3	10 80	58.9	30 20.0	09 78	57.2	30 27.3	07 76	55.5	30 34.9	05 74	53.2	30 36.5	05 74	52.6	30 37.8	04 73	52.0	30 41.8	02 71	49.7	8
9	29 16.5	12 80	60.0	29 23.6	11 79	58.8	29 33.2	10 78	57.1	29 41.5	08 76	55.4	29 50.4	06 74	53.1	29 52.3	06 74	52.5	29 54.0	06 73	52.0	29 59.4	03 71	49.7	9
70	28 28.4	13 80	59.9	28 36.0	12 79	58.7	28 46.5	11 78	57.0	28 55.7	09 76	55.3	29 06.0	08 74	53.1	29 08.2	07 74	52.5	29 10.2	07 73	51.9	29 17.0	05 71	49.6	70
1	27 40.3	14 80	59.7	27 48.5	13 79	58.6	27 59.9	12 78	56.9	28 10.0	11 76	55.2	28 21.5	09 74	53.0	28 24.0	08 73	52.4	28 26.4	08 73	51.9	28 34.6	06 71	49.6	1
2	26 52.3	15 80	59.6	27 01.1	14 79	58.5	27 13.3	13 78	56.8	27 24.3	12 76	55.2	27 37.1	10 74	52.9	27 40.0	09 73	52.3	27 42.7	09 73	51.8	27 52.3	07 70	49.5	2
3	26 04.3	16 80	59.5	26 13.7	15 79	58.4	26 26.7	14 77	56.7	26 38.7	13 76	55.0	26 52.8	11 74	52.8	26 56.0	10 73	52.3	26 59.0	10 73	51.7	27 10.0	08 70	49.5	3
4	25 16.4	17 80	59.3	25 26.3	16 79	58.2	25 40.3	15 77	56.6	25 53.1	14 76	54.9	26 08.5	12 74	52.7	26 12.0	12 73	52.2	26 15.4	11 73	51.6	26 27.7	09 70	49.4	4
75	24 28.6	18 80	59.2	24 39.1	17 79	58.1	24 53.9	16 77	56.4	25 07.6	15 76	54.8	25 24.2	13 74	52.6	25 28.1	13 73	52.1	25 31.8	12 73	51.5	25 45.5	11 70	49.3	75
6	23 40.9	19 79	59.0	23 51.9	18 78	57.9	24 07.5	17 77	56.3	24 22.2	16 76	54.7	24 40.1	14 74	52.5	24 44.2	14 73	52.0	24 48.3	13 72	51.4	25 03.3	12 70	49.2	6
7	22 53.3	20 79	58.8	23 04.8	19 78	57.8	23 21.3	18 77	56.2	23 36.8	17 76	54.6	23 55.9	15 73	52.4	24 00.4	15 73	51.9	24 04.8	14 72	51.3	24 21.2	13 70	49.1	7
8	22 05.7	20 79	58.7	22 17.8	20 78	57.6	22 35.1	19 77	56.0	22 51.5	18 75	54.4	23 11.9	16 73	52.3	23 16.7	16 73	51.7	23 21.4	16 72	51.2	23 39.2	14 70	49.0	8
9	21 18.2	21 79	58.5	21 30.9	21 78	57.4	21 49.1	20 77	55.8	22 06.3	19 75	54.3	22 28.0	17 73	52.1	22 33.1	17 73	51.6	22 38.1	17 72	51.1	22 57.2	15 70	48.9	9
80	20 30.9	22 79	58.3	20 44.0	22 78	57.2	21 03.1	21 76	55.7	21 21.2	20 75	54.1	21 44.1	18 73	52.0	21 49.5	18 72	51.5	21 54.9	18 72	50.9	22 15.3	16 70	48.8	80
1	19 43.6	23 79	58.1	19 57.3	23 78	57.1	20 17.2	22 76	55.5	20 36.2	21 75	53.9	21 00.3	19 73	51.8	21 06.1	19 72	51.3	21 11.8	19 72	50.8	21 33.5	17 70	48.7	1
2	18 56.4	24 78	57.9	19 10.7	23 78	56.9	19 31.4	23 76	55.3	19 51.3	22 75	53.8	20 16.6	20 73	51.7	20 22.7	20 72	51.2	20 28.7	20 72	50.6	20 51.8	19 69	48.5	2
3	18 09.4	25 78	57.7	18 24.1	24 77	56.7	18 45.7	24 76	55.1	19 06.5	23 74	53.6	19 33.0	22 72	51.5	19 39.4	21 72	51.0	19 45.7	21 72	50.5	20 10.1	20 69	48.4	3
4	17 22.4	26 78	57.5	17 37.7	25 77	56.4	18 00.1	24 76	54.9	18 21.8	24 74	53.4	18 49.5	23 72	51.3	18 56.2	22 72	50.8	19 02.9	22 71	50.3	19 28.6	21 69	48.2	4
85	16 35.6	27 78	57.2	16 51.4	26 77	56.2	17 14.6	25 76	54.7	17 37.2	25 74	53.2	18 06.1	24 72	51.2	18 13.2	23 72	50.6	18 20.1	23 71	50.1	18 47.1	22 69	48.1	85
6	15 48.8	28 78	57.0	16 05.2	27 77	56.0	16 29.3	26 76	54.5	16 52.7	26 74	53.0	17 22.9	25 72	51.0	17 30.2	24 71	50.5	17 37.5	24 71	50.0	18 05.8	23 69	47.9	6
7	15 02.2	28 78	56.8	15 19.2	28 77	55.8	15 44.0	27 75	54.3	16 08.3	27 74	52.8	16 39.7	26 72	50.8	16 47.4	25 71	50.3	16 55.0	25 71	49.8	17 24.6	24 68	47.7	7
8	14 15.8	29 77	56.5	14 33.2	29 76	55.5	14 58.9	28 75	54.1	15 24.1	28 74	52.6	15 56.7	27 72	50.6	16 04.7	26 71	50.1	16 12.6	26 70	49.6	16 43.5	25 68	47.6	8
9	13 29.4	30 77	56.3	13 47.4	30 76	55.3	14 14.0	29 75	53.8	14 40.0	29 73	52.3	15 13.8	28 71	50.4	15 22.1	28 71	49.9	15 30.3	27 70	49.4	16 02.5	26 68	47.4	9
90	12 43.2	31 77	56.0	13 01.7	31 76	55.1	13 29.1	30 74	53.6	13 56.0	30 73	52.1	14 31.0	29 71	50.1	14 39.6	29 70	49.6	14 48.1	28 70	49.2	15 21.6	27 68	47.2	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	32 00.0	1.0 01	180.0	31 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	28 00.0	1.0 01	180.0	26 00.0	1.0 01	180.0	25 30.0	1.0 01	180.0	25 00.0	1.0 01	180.0	23 00.0	1.0 01	180.0	00
1	31 59.5	1.0 02	179.0	30 59.5	1.0 02	179.1	29 29.6	1.0 02	179.1	27 59.6	1.0 02	179.1	25 59.6	1.0 02	179.2	25 29.6	1.0 02	179.2	24 59.6	1.0 02	179.2	22 59.6	1.0 02	179.2	1
2	31 58.1	1.0 04	178.1	30 58.2	1.0 04	178.1	29 28.3	1.0 04	178.2	27 58.3	1.0 04	178.3	25 58.4	1.0 03	178.3	25 28.4	1.0 03	178.4	24 58.4	1.0 03	178.4	22 58.5	1.0 03	178.5	2
3	31 55.8	1.0 05	177.1	30 55.9	1.0 05	177.2	29 26.1	1.0 05	177.3	27 56.2	1.0 05	177.4	25 56.4	1.0 05	177.5	25 26.4	1.0 04	177.6	24 56.5	1.0 05	177.6	22 56.6	1.0 04	177.7	3
4	31 52.6	1.0 07	176.2	30 52.8	1.0 07	176.3	29 23.0	1.0 06	176.4	27 53.3	1.0 06	176.5	25 53.6	1.0 06	176.7	25 23.7	1.0 06	176.7	24 53.7	1.0 06	176.8	22 54.0	1.0 06	176.9	4
05	31 48.4	1.0 08	175.2	30 48.7	1.0 08	175.4	29 19.1	1.0 08	175.5	27 49.5	1.0 08	175.7	25 50.0	1.0 07	175.9	25 20.1	1.0 07	175.9	24 50.2	1.0 07	176.0	22 50.7	1.0 07	176.2	05
6	31 43.4	99 10	174.3	30 43.8	99 10	174.4	29 14.3	99 09	174.6	27 44.9	99 09	174.8	25 45.6	99 09	175.1	25 15.8	99 09	175.1	24 45.9	99 08	175.2	22 46.6	99 08	175.4	6
7	31 37.4	99 12	173.4	30 37.9	99 11	173.5	29 08.7	99 11	173.7	27 39.4	99 10	173.9	25 40.4	99 10	174.2	25 10.6	99 10	174.3	24 40.9	99 10	174.4	22 41.8	99 09	174.6	7
8	31 30.5	99 13	172.4	30 31.2	99 13	172.6	29 02.2	99 12	172.8	27 33.1	99 12	173.1	25 34.4	99 11	173.4	25 04.7	99 11	173.5	24 35.0	99 11	173.6	22 36.2	99 10	173.9	8
9	31 22.7	99 14	171.5	30 23.6	99 14	171.7	28 54.8	99 14	172.0	27 26.0	99 13	172.2	25 27.6	99 13	172.6	24 58.0	99 12	172.7	24 28.4	99 12	172.8	22 29.9	99 12	173.1	9
10	31 14.0	98 16	170.5	30 15.1	98 16	170.8	28 46.6	98 15	171.1	27 18.1	98 14	171.4	25 20.1	98 14	171.8	24 50.6	98 14	171.9	24 21.0	98 14	172.0	22 22.9	98 13	172.4	10
1	31 04.4	98 18	169.6	30 05.7	98 17	169.9	28 37.6	98 16	170.2	27 09.4	98 16	170.5	25 11.7	98 15	171.0	24 42.3	98 15	171.1	24 12.9	98 15	171.2	22 15.1	98 14	171.6	1
2	30 53.9	97 19	168.7	29 55.5	97 18	169.0	28 27.7	98 18	169.3	26 59.8	98 17	169.7	25 02.6	98 16	170.2	24 33.3	98 16	170.3	24 04.0	98 16	170.4	22 06.7	98 15	170.9	2
3	30 42.6	97 20	167.8	29 44.4	97 20	168.1	28 17.0	97 19	168.5	26 49.5	97 18	168.9	24 52.8	97 18	169.4	24 23.6	97 18	169.5	23 54.4	97 17	169.6	21 57.5	97 16	170.1	3
4	30 30.4	97 22	166.9	29 32.4	97 21	167.2	28 05.4	97 20	167.6	26 38.4	97 20	168.0	24 42.1	97 19	168.6	24 13.1	97 19	168.7	23 44.0	97 18	168.9	21 47.6	97 18	169.4	4
15	30 17.3	96 23	166.0	29 19.7	96 23	166.3	27 53.1	96 22	166.8	26 26.4	96 21	167.2	24 30.8	96 20	167.8	24 01.8	96 20	167.9	23 32.9	97 20	168.1	21 37.0	97 19	168.6	15
6	30 03.4	96 25	165.1	29 06.1	96 24	165.4	27 40.0	96 23	165.9	26 13.7	96 22	166.4	24 18.6	96 22	167.0	23 49.8	96 21	167.2	23 21.0	96 21	167.3	21 25.7	96 20	167.9	6
7	29 48.7	95 26	164.2	28 51.6	95 25	164.5	27 26.0	95 24	165.1	26 00.2	95 24	165.6	24 05.7	95 23	166.2	23 37.1	96 22	166.4	23 08.4	96 22	166.5	21 13.7	96 21	167.2	7
8	29 33.1	94 27	163.3	28 36.4	95 27	163.7	27 11.3	95 26	164.2	25 46.0	95 25	164.8	23 52.1	95 24	165.5	23 23.6	95 24	165.6	22 55.1	95 23	165.8	21 01.0	95 22	166.5	8
9	29 16.7	94 29	162.4	28 20.4	94 28	162.8	26 55.8	94 27	163.4	25 31.0	94 26	164.0	23 37.8	94 25	164.7	23 09.5	94 25	164.9	22 41.1	94 24	165.0	20 47.7	95 23	165.7	9
20	28 59.5	93 30	161.6	28 03.5	93 29	162.0	26 39.5	93 28	162.6	25 15.3	94 28	163.2	23 22.8	94 26	163.9	22 54.6	94 26	164.1	22 26.4	94 26	164.3	20 33.6	94 24	165.0	20
1	28 41.5	93 31	160.7	27 45.9	93 31	161.1	26 22.4	93 30	161.8	24 58.8	93 29	162.4	23 07.0	93 28	163.2	22 39.0	93 27	163.4	22 11.0	93 27	163.6	20 18.9	94 26	164.3	1
2	28 22.7	92 33	159.9	27 27.6	92 32	160.3	26 04.7	92 31	161.0	24 41.6	92 30	161.6	22 50.5	93 29	162.4	22 22.8	93 28	162.6	21 54.9	93 28	162.8	20 03.6	93 27	163.6	2
3	28 03.2	91 34	159.0	27 08.4	91 33	159.5	25 46.1	92 32	160.2	24 23.6	92 31	160.8	22 33.4	92 30	161.7	22 05.8	92 29	161.9	21 38.2	92 29	162.1	19 47.5	92 28	162.9	3
4	27 42.9	90 35	158.2	26 48.6	91 34	158.7	25 26.9	91 33	159.4	24 05.0	91 32	160.0	22 15.6	91 31	160.9	21 48.2	91 30	161.2	21 20.7	91 30	161.4	19 30.9	92 29	162.2	4
25	27 21.8	90 36	157.4	26 27.9	90 36	157.9	25 06.9	90 34	158.6	23 45.7	90 33	159.3	21 57.1	91 32	160.2	21 29.9	91 32	160.4	21 02.6	91 31	160.7	19 13.6	91 30	161.5	25
6	27 00.1	89 38	156.5	26 06.6	89 37	157.1	24 46.2	89 36	157.8	23 25.7	90 34	158.5	21 37.9	90 33	159.5	21 10.9	90 33	159.7	20 43.9	90 32	160.0	18 55.7	90 31	160.9	6
7	26 37.6	88 39	155.7	25 44.6	88 38	156.3	24 24.9	89 37	157.0	23 05.0	89 36	157.8	21 18.1	89 34	158.8	20 51.3	89 34	159.0	20 24.5	89 33	159.3	18 37.1	90 32	160.2	7
8	26 14.3	87 40	154.9	25 21.8	88 39	155.5	24 02.8	88 38	156.3	22 43.6	88 37	157.1	20 57.6	88 35	158.1	20 31.1	89 35	158.3	20 04.5	89 34	158.6	18 18.0	89 33	159.5	8
9	25 50.4	87 41	154.2	24 58.4	87 40	154.7	23 40.1	87 39	155.5	22 21.6	87 38	156.3	20 36.5	88 36	157.4	20 10.2	88 36	157.6	19 43.8	88 36	157.9	17 58.2	88 34	158.9	9
30	25 25.9	86 42	153.4	24 34 3	86 41	154.0	23 16.7	86 40	154.8	21 58.9	87 39	155.6	20 14.8	87 37	156.7	19 48.7	87 37	156.9	19 22.6	87 36	157.2	17 37.9	87 35	158.2	30
1	25 00.6	85 43	152.6	24 09.6	85 42	153.2	22 52.7	86 41	154.1	21 35.6	86 40	154.9	19 52.4	86 38	156.0	19 26.6	86 38	156.3	19 00.7	86 37	156.5	17 17.0	87 36	157.6	1
2	24 34.7	84 44	151.9	23 44.1	84 43	152.5	22 28.1	85 42	153.3	21 11.7	85 41	154.2	19 29.5	85 39	155.3	19 03.9	85 39	155.6	18 38.3	86 38	155.9	16 55.5	86 37	156.9	2
3	24 08.2	83 45	151.1	23 18.1	84 44	151.7	22 02.8	84 43	152.6	20 47.2	84 42	153.5	19 06.0	85 40	154.6	18 40.6	85 40	154.9	18 15.2	85 39	155.2	16 33.4	85 38	156.3	3
4	23 41.0	82 46	150.4	22 51.5	83 46	151.0	21 36.9	83 44	151.9	20 22.1	83 43	152.8	18 41.9	84 41	154.0	18 16.7	84 41	154.3	17 51.6	84 40	154.6	16 10.8	84 39	155.7	4
35	23 13.2	82 47	149.7	22 24.2	82 46	150.3	21 10.4	82 45	151.2	19 56.3	83 44	152.1	18 17.2	83 42	153.3	17 52.3	83 42	153.6	17 27.4	83 41	153.9	15 47.6	83 40	155.1	35
6	22 44.8	81 48	149.0	21 56.3	81 47	149.6	20 43.3	81 46	150.5	19 30.1	82 45	151.5	17 51.9	82 43	152.7	17 27.3	82 42	153.0	17 02.7	82 42	153.3	15 23.9	82 40	154.5	6
7	22 15.8	80 49	148.3	21 27.9	80 48	148.9	20 15.7	80 47	149.9	19 03.2	81 46	150.8	17 26.1	81 44	152.0	17 01.8	81 44	152.4	16 37.4	81 43	152.7	14 59.6	82 41	153.9	7
8	21 46.3	79 50	147.6	20 58.9	79 49	148.2	19 47.5	79 48	149.2	18 35.8	80 47	150.2	16 59.8	80 45	151.4	16 35.7	80 44	151.7	16 11.6	80 44	152.0	14 34.9	81 42	153.3	8
9	21 16.2	78 51	146.9	20 29.3	78 50	147.6	19 18.7	79 49	148.5	18 07.8	79 48	149.5	16 32.9	79 46	150.8	16 09.1	79 45	151.1	15 45.2	80 45	151.4	14 09.6	80 43	152.7	9
40	20 45.5	77 52	146.2	19 59.2	77 51	146.9	18 49.4	78 50	147.9	17 39.4	78 48	148.9	16 05.5	78 46	150.2	15 41.9	79 46	150.5	15 18.4	79 46	150.8	13 43.8	79 44	152.1	40
1	20 14.3	76 53	145.5	19 28.5	76 52	146.2	18 19.6	77 50	147.3	17 10.4	77 49	148.3	15 37.6	78 47	149.6	15 14.3	78 47	149.9	14 51.0	78 46	150.2	13 17.5	78 45	151.5	1
2	19 42.6	75 54	144.9	18 57.4	75 53	145.6	17 49.3	76 52	146.6	16 40.8	76 50	147.6	15 09.2	77 48	149.0	14 46.2	77 48	149.3	14 23.1	77 47	149.7	12 50.8	77 45	151.0	2
3	19 10.3	74 54	144.3	18 25.7	75 54	145.0	17 18.4	75 52	146.0	16 10.8	75 51	147.0	14 40.2	76 49	148.4	14 17.5	76 48	148.7	13 54.8	76 48	149.1	12 23.5	76 46	150.4	3
4	18 37.6	73 55	143.6	17 53.5	74 54	144.3	16 47.1	74 53	145.4	15 40.3	74 52	146.4	14 10.9	75 50	147.8	13 48.4	75 49	148.2	13 26.0	75 49	148.5	11 55.8	75 47	149.9	4
45	18 04.3	72 56	143.0	17 20.8	73 55	143.7	16 15.2	73 54	144.8	15 09.3	73 52	145.9	13 41.0	74 50	147.3	13 18.9	74 50	147.6	12 56.7	74 50	148.0	11 27.7	74 48	149.3	45
6	17 30.6	71 57	142.4	16 47.7	72 56	143.1	15 42.9	72 54	144.2	14 37.9	72 53	145.3	13 10.7	73 51	146.7	12 48.8	73 51	147.0	12 26.9	73 50	147.4	10 59.1	73 48	148.8	6
7	16 56.4	71 58	141.8	16 14.0	71 57	142.5	15 10.2	71 55	143.6	14 06.0	71 54	144.7	12 39.9	72 52	146.1	12 18.3	72 52	146.5	11 56.7	72 51	146.9	10 30.0	72 49	148.3	7
8	16 21.8	70 58	141.2	15 40.0	70 58	141.9	14 37.0	70 56	143.1	13 33.6	71 55	144.2	12 08.7	71 53	145.6	11 47.4	71 52	146.0	11 26.1	71 52	146.3	10 00.6	71 50	147.8	8
9	15 46.7	69 59	140.6	15 05.5	69 58	141.4	14 03.3	69 57	142.5	13 00.8	70 55	143.6	11 37.1	70 54	145.1	11 16.1	70 53	145.4	10 55.0	70 52	145.8	9 30.7	70 50	147.2	9
50	15 11.2	68 60	140.0	14 30.5	68 59	140.8	13 29.2	68 58	141.9	12 27.6	69 56	143.1	11 05.0	69 54	144.5	10 44.3	69 54	144.9	10 23.6	69 53	145.3	9 00.4	69 51	146.7	50
1	14 35.3	67 60	139.5	13 55.2	67 60	140.3	12 54.7	67 58	141.4	11 54.0	68 57	142.5	10 32.5	68 55	144.0	10 12.1	68 54	144.4	9 51.7	68 54	144.8	8 29.6	69 52	146.3	1
2	13 58.9	66 61	138.9	13 19.4	66 60	139.7	12 19.8	66 59	140.9	11 19.9	66 57	142.0	9 59.7	67 56	143.5	9 39.5	67 55	143.9	9 19.4	67 54	144.3	7 58.5	68 52	145.8	2
3	13 22.2	65 62	138.4	12 43.2	65 61	139.2	11 44.5	65 60	140.3	10 45.5	66 58	141.5	9 26.4	66 56	143.0	9 06.5	66 56	143.4	8 46.7	66 55	143.8	7 27.0	67 53	145.3	3
4	12 45.1	64 62	137.9	12 06.6	64 62	138.6	11 08.8	64 60	139.8	10 10.6	65 59	141.0	8 52.7	65 57	142.5	8 33.2	65 56	142.9	8 13.6	65 56	143.3	6 55.2	65 54	144.8	4
55	12 07.5	63 63	137.3	11 29.7	63 62	138.1	10 32.7	63 61	139.3	9 35.4	64 59	140.5	8 18.7	64 57	142.0	7 59.4	64 57	142.4	7 40.2	64 56	142.8	6 22.9	64 54	144.4	55
6	11 29.6	62 64	136.8	10 52.4	62 63	137.6	9 56.2	63 61	138.8	8 59.8	63 60	140.0	7 44.3	63 58	141.6	7 25.3	63 57	141.9	7 06.4	63 57	142.3	5 50.3	63 55	143.9	6
7	10 51.4	61 64	136.3	10 14.7	61 64	137.1	9 19.4	62 62	138.3	8 23.9	62 60	139.5	7 09.5	62 58	141.1	6 50.9	62 58	141.5	6 32.2	62 58	141.9	5 17.4	62 56	143.4	7
8	10 12.8	60 65	135.8	9 36.6	60 64	136.6	8 42.2	61 62	137.8	7 47.6	61 61	139.0	6 34.4	61 59	140.6	6 16.0	61 58	141.0	5 57.7	61 58	141.4				8
9	9 33.8	59 66	135.3	8 58.3	59 65	136.1	8 04.7	60 63	137.3	7 10.9	60 62	138.6	5 58.9	60 60	140.2	5 40.9	60 59	140.6	5 22.8	60 59	141.0				9
60	8 54.5	58 66	134.8	8 19.5	58 65	135.7	7 26.8	59 64	136.9	6 33.9	59 62	138.1	5 23.1	59 60	139.7	5 05.4	59 59	140.1							60
1	8 14.9	57 66	134.4	7 40.5	57 66	135.2	6 48.6	58 64	136.4	5 56.6	58 63	137.7													1
2	7 35.0	56 67	133.9	7 01.1	57 66	134.7	6 10.1	57 65	136.0	5 19.0	57 63	137.2													2
3	6 54.7	55 68	133.4	6 21.4	56 67	134.3	5 31.3	56 65	135.5																3
4	6 14.2	55 68	133.0	5 41.5	55 67	133.8																			4
65	5 33.4	54 68	132.5	5 01.2	54 68	133.4																			65

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 57.1	32 76	55.8	12 16.2	32 76	54.8	12 44.4	31 74	53.3	13 12.2	31 73	51.9	13 48.4	30 71	49.9	13 57.3	30 70	49.4	14 06.1	29 70	48.9	14 40.9	29 68	47.0	91
2	11 11.2	33 76	55.5	11 30.8	33 75	54.5	11 59.9	32 74	53.1	12 28.5	32 73	51.6	13 05.9	31 71	49.7	13 15.1	31 70	49.2	13 24.2	30 70	48.7	14 00.3	30 67	46.7	2
3	10 25.4	34 76	55.2	10 45.6	33 75	54.3	11 15.5	33 74	52.8	11 44.9	33 72	51.4	12 23.5	32 70	49.4	12 33.0	32 70	49.0	12 42.5	31 69	48.5	13 19.9	31 67	46.5	3
4	9 39.8	35 76	55.0	10 00.5	34 75	54.0	10 31.2	34 74	52.6	11 01.5	33 72	51.1	11 41.3	33 70	49.2	11 51.2	33 70	48.7	12 00.9	33 69	48.2	12 39.6	32 67	46.3	4
95	8 54.4	35 76	54.7	9 15.6	35 75	53.7	9 47.1	35 73	52.3	10 18.3	34 72	50.9	10 59.3	34 70	49.0	11 09.4	34 69	48.5	11 19.5	34 69	48.0	11 59.4	33 67	46.1	95
6	8 09.1	36 75	54.4	8 39.8	36 74	53.4	9 03.2	36 73	52.0	9 35.2	35 72	50.6	10 17.4	35 70	48.7	10 27.9	35 69	48.2	10 38.3	35 68	47.7	11 19.4	34 66	45.8	6
7	7 23.9	37 75	54.1	7 46.2	37 74	53.1	8 19.4	37 73	51.7	8 52.3	36 71	50.3	9 35.7	36 69	48.4	9 46.5	36 69	47.9	9 57.2	36 68	47.5	10 39.6	35 66	45.6	7
8	6 39.0	38 75	53.8	7 01.8	38 74	52.8	7 35.8	38 72	51.4	8 09.6	37 71	50.0	8 54.2	37 69	48.1	9 05.3	37 68	47.7	9 16.3	37 68	47.2	10 00.0	36 66	45.3	8
9	5 54.2	39 74	53.4	6 17.6	39 74	52.5	6 52.4	39 72	51.1	7 27.1	38 71	49.7	8 12.8	38 68	47.9	8 24.2	38 68	47.4	8 35.5	38 68	46.9	9 20.5	37 66	45.1	9
100	5 09.6	40 74	53.1	5 33.5	40 73	52.2	6 09.2	40 72	50.8	6 44.7	39 70	49.4	7 31.7	39 68	47.6	7 43.4	39 68	47.1	7 55.0	39 67	46.6	8 41.2	38 65	44.8	100
1							5 26.2	41 71	50.5	6 02.6	40 70	49.1	6 50.7	40 68	47.3	7 02.7	40 68	46.8	7 14.6	40 67	46.4	8 02.1	39 65	44.5	1
2										5 20.6	41 70	48.8	6 09.9	41 68	47.0	6 22.2	41 67	46.5	6 34.5	41 67	46.1	7 23.2	40 64	44.2	2
3													5 29.4	42 68	46.7	5 42.0	42 67	46.2	5 54.5	42 66	45.8	6 44.5	42 64	43.9	3
4																5 01.9	43 67	45.9	5 14.8	43 66	45.4	6 06.1	43 64	43.6	4
105																						5 27.8	44 64	43.3	105

Lat. 22°

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

La 29

Lat. 22°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
00	66 00.0	1.0 01	00.0	65 00.0	1.0 01	00.0	63 30.0	1.0 01	00.0	62 30.0	1.0 01	00.0	61 30.0	1.0 01	00.0	60 30.0	1.0 01	00.0	59 30.0	1.0 01	00.0	58 00.0	1.0 01	00.0	00
1	65 59.2	1.0 04	01.7	64 59.2	1.0 04	01.6	63 29.3	1.0 04	01.5	62 29.3	1.0 03	01.4	61 29.4	1.0 03	01.3	60 29.4	1.0 03	01.3	59 29.4	1.0 03	01.2	57 59.5	1.0 03	01.1	1
2	65 56.7	1.0 07	03.4	64 56.9	1.0 06	03.2	63 27.1	1.0 06	03.0	62 27.3	1.0 06	02.8	61 27.4	1.0 05	02.7	60 27.5	1.0 05	02.5	59 27.7	1.0 05	02.4	57 57.8	1.0 04	02.2	2
3	65 52.6	99 10	05.1	64 53.0	99 09	04.8	63 23.5	99 08	04.4	62 23.9	99 08	04.2	61 24.2	99 06	04.0	60 24.5	1.0 07	03.8	59 24.8	1.0 07	03.6	57 55.2	1.0 06	03.3	3
4	65 46.8	99 12	06.8	64 47.5	99 12	06.4	63 18.5	99 11	05.9	62 19.1	99 10	05.6	61 19.7	99 10	05.3	60 20.2	99 09	05.0	59 20.7	99 09	04.8	57 51.4	99 08	04.4	4
05	65 39.4	98 15	08.4	64 40.5	98 14	08.0	63 12.1	98 13	07.4	62 13.0	98 12	07.0	61 13.9	99 12	06.6	60 14.7	99 11	06.3	59 15.5	99 10	06.0	57 46.6	99 10	05.5	05
6	65 30.5	97 18	10.1	64 32.1	97 17	09.5	63 04.3	98 15	08.8	62 05.6	98 14	08.3	61 06.9	98 14	07.9	60 08.0	98 13	07.5	59 09.2	98 12	07.1	57 40.7	98 12	06.6	6
7	65 19.9	96 20	11.7	64 22.1	97 19	11.1	62 55.1	97 18	10.2	61 56.9	97 17	09.7	60 58.6	97 16	09.2	60 00.2	97 15	08.7	59 01.7	98 14	08.3	57 33.8	98 13	07.7	7
8	65 07.9	96 22	13.3	64 10.7	96 21	12.6	62 44.5	96 20	11.6	61 46.9	96 19	11.0	60 49.1	96 18	10.5	59 51.2	97 17	09.9	58 53.1	97 16	09.4	57 25.9	97 15	08.7	8
9	64 54.4	94 25	14.8	63 57.9	94 24	14.1	62 32.7	95 22	13.0	61 35.6	95 21	12.3	60 38.4	96 20	11.7	59 41.0	96 19	11.1	58 43.5	96 18	10.6	57 16.9	96 17	09.8	9
10	64 39.4	93 27	16.4	63 43.7	93 26	15.5	62 19.5	94 24	14.3	61 23.1	94 23	13.6	60 26.5	95 22	12.9	59 29.7	95 21	12.3	58 32.7	95 20	11.7	57 06.9	96 18	10.8	10
1	64 23.8	91 30	17.9	63 28.1	92 28	16.9	62 05.1	93 26	15.7	61 09.4	93 25	14.9	60 13.5	93 24	14.1	59 17.3	94 22	13.4	58 20.9	94 21	12.8	56 56.0	95 20	11.9	1
2	64 05.3	90 32	19.3	63 11.3	90 30	18.3	61 49.5	91 28	17.0	60 54.6	92 27	16.1	59 59.3	92 25	15.3	59 03.8	93 24	14.6	58 08.1	93 23	13.9	56 44.1	94 22	12.9	2
3	63 46.3	88 34	20.7	62 53.2	89 32	19.7	61 32.7	90 30	18.2	60 38.5	90 28	17.3	59 44.1	91 27	16.5	58 49.3	92 26	15.7	57 54.3	92 25	14.9	56 31.2	93 23	13.9	3
4	63 26.0	87 36	22.1	62 33.8	87 34	21.0	61 14.7	88 32	19.5	60 21.4	89 30	18.5	59 27.8	90 29	17.6	58 33.8	90 28	16.8	57 39.4	91 26	16.0	56 17.4	91 24	14.8	4
15	63 04.5	85 38	23.4	62 13.3	86 36	22.2	60 55.6	87 34	20.7	60 03.2	88 32	19.7	59 10.4	88 31	18.7	58 17.2	89 29	17.8	57 23.6	90 28	17.0	56 02.7	90 26	15.8	15
6	62 41.8	83 40	24.7	61 51.7	84 38	23.5	60 35.4	85 35	21.8	59 44.0	86 34	20.8	58 52.0	87 32	19.8	57 59.7	88 31	18.9	57 06.9	88 29	18.0	55 47.1	89 28	16.7	6
7	62 18.1	81 42	25.9	61 29.0	82 40	24.7	60 14.2	84 37	23.0	59 23.7	85 35	21.9	58 32.7	85 34	20.9	57 41.2	86 32	19.9	56 49.3	87 31	19.0	55 30.7	88 29	17.7	7
8	61 53.2	79 43	27.1	61 05.2	81 41	25.8	59 52.0	82 38	24.1	59 02.5	83 37	23.0	58 12.4	84 35	21.9	57 21.8	85 34	20.9	56 30.7	85 32	19.9	55 13.4	86 30	18.6	8
9	61 27.4	78 45	28.2	60 40.5	79 43	27.0	59 28.9	80 40	25.1	58 40.3	81 38	24.0	57 51.2	82 37	22.9	57 01.5	83 35	21.9	56 11.3	84 34	20.9	54 55.2	85 32	19.5	9
20	61 00.6	76 46	29.4	60 14.8	77 44	28.0	59 04.8	79 42	26.2	58 17.2	80 40	25.0	57 29.1	81 38	23.9	56 40.4	82 37	22.8	55 51.1	82 35	21.8	54 36.3	84 33	20.3	20
1	60 32.9	74 48	30.4	59 48.2	75 46	29.1	58 39.8	77 43	27.2	57 53.3	78 41	26.0	57 06.2	79 40	24.8	56 18.4	80 38	23.7	55 30.1	81 36	22.7	54 16.6	82 34	21.1	1
2	60 04.3	72 49	31.4	59 20.8	73 47	30.1	58 14.0	75 44	28.1	57 28.5	76 42	26.9	56 42.4	77 41	25.7	55 55.6	78 39	24.6	55 08.3	79 38	23.5	53 56.2	81 35	22.0	2
3	59 34.8	70 50	32.4	58 52.5	71 48	31.0	57 47.4	73 46	29.1	57 03.0	75 44	27.8	56 17.9	76 42	26.6	55 32.1	77 40	25.5	54 45.7	78 39	24.3	53 35.0	79 36	22.8	3
4	59 04.7	68 52	33.4	58 23.4	69 50	31.9	57 20.0	72 47	30.0	56 36.7	73 45	28.7	55 52.6	74 43	27.5	55 07.8	75 42	26.3	54 22.4	76 40	25.2	53 13.2	78 38	23.5	4
25	58 33.7	66 53	34.3	57 53.6	68 51	32.8	56 51.8	70 48	30.8	56 09.6	71 46	29.5	55 26.6	72 44	28.3	54 42.8	73 43	27.1	53 58.4	75 41	25.9	52 50.6	76 39	24.3	25
6	58 02.0	64 54	35.1	57 23.1	66 52	33.7	56 23.0	68 49	31.6	55 41.8	69 47	30.3	54 59.9	71 46	29.1	54 17.2	72 44	27.9	53 33.8	73 42	26.7	52 27.4	75 40	25.0	6
7	57 29.7	62 55	35.9	56 51.9	64 53	34.5	55 53.5	66 50	32.4	55 13.4	67 48	31.1	54 32.5	69 47	29.9	53 50.8	70 45	28.6	53 08.4	71 43	27.4	52 03.6	73 41	25.7	7
8	56 56.7	60 56	36.7	56 20.1	62 54	35.3	55 23.3	64 51	33.2	54 44.3	66 50	31.9	54 04.5	67 48	30.6	53 23.9	68 46	29.4	52 42.5	70 44	28.1	51 39.1	71 42	26.4	8
9	56 23.2	58 57	37.5	55 47.7	60 55	36.0	54 52.5	62 52	33.9	54 14.6	64 50	32.6	53 35.9	65 49	31.3	52 56.3	67 47	30.1	52 16.0	68 45	28.8	51 14.1	70 43	27.1	9
30	55 49.1	56 58	38.2	55 14.7	58 56	36.7	54 21.2	61 53	34.6	53 44.4	62 51	33.3	53 06.7	64 50	32.0	52 28.2	65 48	30.7	51 48.8	66 46	29.5	50 48.5	68 44	27.7	30
1	55 14.4	55 58	38.9	54 41.1	56 57	37.4	53 49.3	59 54	35.3	53 13.6	60 52	34.0	52 36.9	62 50	32.7	51 59.5	63 49	31.4	51 21.2	64 47	30.1	50 22.3	66 44	28.3	1
2	54 39.3	53 59	39.5	54 07.1	55 58	38.1	53 16.9	57 55	36.0	52 42.2	59 53	34.6	52 06.7	60 51	33.3	51 30.2	61 50	32.0	50 53.0	63 48	30.8	49 55.7	65 45	28.9	2
3	54 03.6	51 60	40.1	53 32.5	53 58	38.7	52 44.0	55 56	36.6	52 10.4	57 54	35.2	51 35.9	58 52	33.9	51 00.5	60 50	32.6	50 24.3	61 49	31.3	49 28.5	63 46	29.5	3
4	53 27.5	49 61	40.7	52 57.5	51 59	39.3	52 10.6	53 56	37.2	51 38.1	55 55	35.8	51 04.6	56 53	34.5	50 30.3	58 51	33.2	49 55.1	59 49	31.9	49 00.9	61 47	30.1	4
35	52 51.0	47 62	41.3	52 22.1	49 60	39.8	51 36.7	52 57	37.7	51 05.3	53 55	36.4	50 32.9	55 54	35.0	49 59.6	56 52	33.7	49 25.5	57 50	32.5	48 32.8	60 48	30.6	35
6	52 14.1	46 62	41.8	51 46.2	47 60	40.4	51 02.5	50 58	38.3	50 32.1	51 56	36.9	50 00.7	53 54	35.6	49 28.5	54 52	34.3	48 55.4	56 51	33.0	48 04.2	58 48	31.1	6
7	51 36.9	44 63	42.3	51 10.0	46 61	40.9	50 27.8	48 58	38.8	49 58.5	50 57	37.4	49 28.2	51 55	36.1	48 57.0	53 53	34.8	48 24.9	54 52	33.5	47 35.2	56 49	31.6	7
8	50 59.2	42 63	42.8	50 33.4	44 62	41.4	49 52.8	46 59	39.3	49 24.5	48 57	37.9	48 55.2	50 56	36.6	48 25.0	51 54	35.3	47 54.0	52 52	34.0	47 05.9	54 50	32.1	8
9	50 21.3	40 64	43.2	49 56.5	42 62	41.8	49 17.4	45 60	39.7	48 50.1	46 58	38.4	48 21.9	48 56	37.0	47 52.7	49 54	35.7	47 22.7	51 53	34.5	46 36.1	53 50	32.6	9
40	49 43.0	39 64	43.7	49 19.2	40 63	42.3	48 41.7	43 60	40.2	48 15.4	45 58	38.8	47 48.2	46 57	37.5	47 20.1	48 55	36.2	46 51.1	49 53	34.9	46 06.0	51 51	33.0	40
1	49 04.5	37 65	44.1	48 41.7	39 63	42.7	48 05.6	41 60	40.6	47 40.3	43 59	39.2	47 14.1	44 57	37.9	46 47.0	46 56	36.6	46 19.1	47 54	35.3	45 35.5	49 51	33.4	1
2	48 25.6	35 65	44.5	48 03.8	37 64	43.1	47 29.3	40 61	41.0	47 05.0	41 60	39.6	46 39.8	43 58	38.3	46 13.7	44 56	37.0	45 46.7	46 54	35.7	45 04.7	48 52	33.8	2
3	47 46.5	34 66	44.8	47 25.7	36 64	43.4	46 52.6	38 62	41.4	46 29.3	40 60	40.0	46 05.2	41 58	38.7	45 40.1	43 57	37.4	45 14.1	44 55	36.1	44 33.5	46 52	34.2	3
4	47 07.2	32 66	45.2	46 47.3	34 64	43.8	46 15.7	36 62	41.7	45 53.4	38 60	40.4	45 30.2	39 59	39.1	45 06.1	41 57	37.8	44 41.1	42 55	36.5	44 02.1	44 53	34.6	4
45	46 27.6	31 66	45.5	46 08.7	32 65	44.1	45 38.5	35 62	42.1	45 17.2	36 61	40.7	44 55.0	38 59	39.4	44 31.9	39 58	38.1	44 07.9	41 56	36.9	43 30.3	43 53	35.0	45
6	45 47.9	29 67	45.8	45 29.9	31 65	44.4	45 01.1	33 63	42.4	44 40.8	35 61	41.1	44 19.6	36 60	39.8	43 57.4	38 58	38.5	43 34.4	39 56	37.2	42 58.3	41 54	35.3	6
7	45 07.9	28 67	46.1	44 50.9	29 65	44.7	44 23.5	32 63	42.7	44 04.1	33 61	41.4	43 43.9	35 60	40.1	43 22.7	36 58	38.8	43 00.7	37 57	37.5	42 26.0	39 54	35.6	7
8	44 27.7	26 67	46.3	44 11.6	28 66	45.0	43 45.7	30 63	43.0	43 27.3	31 62	41.7	43 07.9	33 60	40.4	42 47.7	34 59	39.1	42 26.7	36 57	37.8	41 53.5	38 54	35.9	8
9	43 47.4	25 68	46.6	43 32.2	26 66	45.2	43 07.7	28 64	43.3	42 50.2	30 62	41.9	42 31.8	31 60	40.6	42 12.5	33 59	39.4	41 52.5	34 58	38.1	41 20.8	36 55	36.2	9
50	43 06.9	23 68	46.8	42 52.6	25 66	45.5	42 29.5	27 64	43.5	42 12.9	28 62	42.2	41 55.5	30 61	40.9	41 37.2	31 59	39.6	41 18.0	33 58	38.4	40 47.8	35 55	36.5	50
1	42 26.3	22 68	47.0	42 12.9	23 66	45.7	41 51.1	25 64	43.7	41 35.4	27 63	42.4	41 18.9	28 61	41.2	41 01.6	30 60	39.9	40 43.4	31 58	38.6	40 14.6	33 56	36.8	1
2	41 45.6	20 68	47.2	41 33.0	22 67	45.9	41 12.5	24 64	44.0	40 57.8	25 63	42.7	40 42.2	27 61	41.4	40 25.8	28 60	40.1	40 08.6	29 58	38.9	39 41.2	31 56	37.0	2
3	41 04.7	19 68	47.4	40 53.0	20 67	46.1	40 33.9	22 65	44.2	40 20.0	24 63	42.9	40 05.4	25 62	41.6	39 49.9	26 60	40.3	39 33.6	28 59	39.1	39 07.6	30 56	37.2	3
4	40 23.7	17 68	47.6	40 12.9	19 67	46.3	39 55.0	21 65	44.3	39 42.1	22 63	43.1	39 28.4	24 62	41.8	39 13.8	25 60	40.6	38 58.4	26 59	39.3	38 33.9	28 56	37.5	4
55	39 42.6	16 69	47.7	39 32.6	17 67	46.4	39 16.1	19 65	44.5	39 04.1	21 64	43.2	38 51.2	22 62	42.0	38 37.5	23 60	40.7	38 23.1	25 59	39.5	38 00.0	27 57	37.7	55
6	39 01.4	15 69	47.8	38 52.3	16 67	46.6	38 37.0	18 65	44.7	38 25.9	19 64	43.4	38 13.9	21 62	42.2	38 01.2	22 61	40.9	37 47.6	23 59	39.7	37 25.9	25 57	37.9	6
7	38 20.1	13 69	48.0	38 11.8	14 68	46.7	37 57.9	16 66	44.8	37 47.6	18 64	43.6	37 36.5	19 62	42.3	37 24.7	20 61	41.1	37 12.0	22 60	39.9	36 51.7	24 57	38.0	7
8	37 38.7	12 69	48.1	37 31.3	13 68	46.8	37 18.6	15 66	45.0	37 09.2	16 64	43.7	36 59.0	18 63	42.5	36 48.0	19 61	41.2	36 36.3	20 60	40.0	36 17.4	22 58	38.2	8
9	36 57.3	10 69	48.2	36 50.7	12 68	46.9	36 39.3	14 66	45.1	36 30.7	15 64	43.8	36 21.4	16 63	42.6	36 11.3	17 61	41.4	36 00.5	19 60	40.2	35 42.9	20 58	38.4	9
60	36 15.8	09 69	48.3	36 10.0	10 68	47.0	35 59.8	12 66	45.2	35 52.1	13 64	43.9	35 43.7	15 63	42.7	35 34.5	16 62	41.5	35 24.6	17 60	40.3	35 08.3	19 58	38.5	60
1	35 34.3	08 69	48.3	35 29.3	09 68	47.1	35 20.4	11 66	45.3	35 13.5	12 64	44.1	35 05.9	13 63	42.8	34 57.6	14 62	41.6	34 48.5	16 60	40.4	34 33.6	17 58	38.6	1
2	34 52.7	06 69	48.4	34 48.5	08 68	47.2	34 40.8	09 66	45.4	34 34.8	11 65	44.1	34 28.0	12 63	42.9	34 20.6	13 62	41.7	34 12.4	14 60	40.5	33 58.9	16 58	38.7	2
3	34 11.1	05 69	48.4	34 07.7	06 68	47.2	34 01.2	08 66	45.4	33 56.0	09 65	44.2	33 50.1	10 63	43.0	33 43.5	12 62	41.8	33 36.2	13 60	40.6	33 24.0	14 58	38.9	3
4	33 29.5	04 69	48.5	33 26.8	05 68	47.3	33 21.6	07 66	45.5	33 17.2	08 65	44.3	33 12.1	09 63	43.1	33 06.4	10 62	41.9	32 59.9	11 60	40.7	32 49.1	13 58	38.9	4
65	32 47.8	03 69	48.5	32 46.0	04 68	47.3	32 41.9	05 66	45.5	32 38.3	06 65	44.3	32 34.1	08 64	43.2	32 29.2	09 62	42.0	32 23.6	10 60	40.8	32 14.1	11 58	39.0	65
6	32 06.2	01 70	48.5	32 05.1	02 68	47.3	32 02.2	04 66	45.6	31 59.4	05 65	44.4	31 56.0	06 64	43.2	31 52.0	07 62	42.0	31 47.3	08 61	40.9	31 39.0	10 58	39.1	6
7	31 24.5	00 70	48.5	31 24.1	01 68	47.3	31 22.4	03 66	45.6	31 20.5	04 65	44.4	31 17.9	05 64	43.2	31 14.7	06 62	42.1	31 10.8	07 61	40.9	31 03.9	09 59	39.2	7
8	30 42.8	01 70	48.5	30 43.2	00 68	47.3	30 42.7	01 66	45.6	30 41.5	02 65	44.4	30 39.8	03 64	43.3	30 37.4	04 62	42.1	30 34.4	06 61	41.0	30 28.7	07 59	39.2	8
9	30 01.1	02 69	48.5	30 02.3	01 68	47.3	30 02.9	00 66	45.6	30 02.6	01 65	44.5	30 01.6	02 64	43.3	30 00.1	03 62	42.2	29 57.9	04 61	41.0	29 53.5	06 59	39.3	9
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1	28 37.8	05 69	48.4	28 40.5	04 68	47.3	28 43.4	03 66	45.6	28 44.6	02 65	44.5	28 45.3	01 64	43.3	28 45.4	00 62	42.2	28 44.9	01 61	41.0	28 43.1	03 59	39.3	1
2	27 56.2	06 69	48.4	27 59.6	05 68	47.3	28 03.7	04 66	45.6	28 05.7	03 65	44.4	28 07.1	02 64	43.3	28 08.0	01 62	42.2	28 08.4	00 61	41.0	28 07.8	01 59	39.3	2
3	27 14.6	07 69	48.3	27 18.8	06 68	47.2	27 24.0	05 66	45.5	27 26.7	04 65	44.4	27 29.0	03 64	43.3	27 30.7	02 62	42.2	27 31.8	01 61	41.0	27 32.5	00 59	39.3	3
4	26 33.1	09 69	48.3	26 37.9	08 68	47.2	26 44.3	06 66	45.5	26 47.8	05 65	44.4	26 50.8	05 64	43.3	26 53.3	04 62	42.1	26 55.3	03 61	41.0	26 57.3	02 59	39.3	4
75	25 51.6	10 69	48.2	25 57.2	09 68	47.1	26 04.6	08 66	45.4	26 08.9	07 65	44.3	26 12.7	06 63	43.2	26 16.0	05 62	42.1	26 18.8	04 61	41.0	26 22.0	03 59	39.3	75
6	25 10.1	11 69	48.1	25 16.4	10 68	47.0	25 25.0	09 66	45.4	25 30.1	08 65	44.3	25 34.7	07 63	43.2	25 38.7	06 62	42.1	25 42.3	06 61	41.0	25 46.8	04 59	39.3	6
7	24 28.7	12 69	48.0	24 35.8	11 68	46.9	24 45.4	10 66	45.3	24 51.2	09 64	44.2	24 56.6	09 63	43.1	25 01.5	08 62	42.0	25 05.9	07 61	40.9	25 11.5	06 59	39.3	7
8	23 47.4	13 69	48.0	23 55.1	13 68	46.9	24 05.9	11 66	45.2	24 12.5	11 64	44.1	24 18.6	10 63	43.1	24 24.3	09 62	42.0	24 29.5	08 61	40.9	24 36.3	07 59	39.2	8
9	23 06.1	14 69	47.8	23 14.6	14 68	46.8	23 26.4	13 66	45.1	23 33.8	12 64	44.1	23 40.6	11 63	43.0	23 47.1	10 62	41.9	23 53.1	10 61	40.8	24 01.2	08 59	39.2	9
80	22 24.9	16 68	47.7	22 34.1	15 67	46.7	22 47.0	14 66	45.1	22 55.1	13 64	44.0	23 02.7	12 63	42.9	23 10.0	12 62	41.8	23 16.7	11 60	40.7	23 26.1	10 58	39.1	80
1	21 43.8	17 68	47.6	21 53.6	16 67	46.5	22 07.7	15 66	44.9	22 16.5	14 64	43.9	22 24.9	14 63	42.8	22 32.9	13 62	41.7	22 40.5	12 60	40.7	22 51.0	11 58	39.0	1
2	21 02.7	18 68	47.5	21 13.3	17 67	46.4	21 28.4	16 65	44.8	21 38.0	16 64	43.8	21 47.1	15 63	42.7	21 55.9	14 62	41.6	22 04.2	14 60	40.6	22 16.0	13 58	39.0	2
3	20 21.8	19 68	47.3	20 33.0	18 67	46.3	20 49.2	18 65	44.7	20 59.5	17 64	43.7	21 09.4	16 63	42.6	21 19.0	16 62	41.5	21 28.1	15 60	40.5	21 41.0	14 58	38.9	3
4	19 40.9	20 68	47.2	19 52.9	20 67	46.2	20 10.1	19 65	44.6	20 21.2	18 64	43.5	20 31.8	17 62	42.5	20 42.1	17 61	41.4	20 52.0	16 60	40.4	21 06.1	15 58	38.8	4
85	19 00.1	21 68	47.0	19 12.8	21 67	46.0	19 31.1	20 65	44.5	19 42.9	19 64	43.4	19 54.3	19 62	42.4	20 05.3	18 61	41.3	20 16.0	17 60	40.3	20 31.3	17 58	38.7	85
6	18 19.5	22 68	46.9	18 32.8	22 66	45.9	18 52.2	21 65	44.3	19 04.7	21 64	43.3	19 16.8	20 62	42.2	19 28.6	19 61	41.2	19 40.1	19 60	40.2	19 56.6	18 58	38.6	6
7	17 38.9	24 67	46.7	17 52.9	23 66	45.7	18 13.4	22 64	44.2	18 26.6	22 63	43.1	18 39.5	21 62	42.1	18 52.0	21 61	41.1	19 04.2	20 60	40.0	19 21.9	19 58	38.5	7
8	16 58.5	25 67	46.5	17 13.2	24 66	45.5	17 34.7	23 64	44.0	17 48.6	23 63	43.0	18 02.2	22 62	42.0	18 15.5	22 60	40.9	18 28.5	21 59	39.9	18 47.3	21 58	38.4	8
9	16 18.2	26 67	46.4	16 33.6	26 66	45.3	16 56.1	25 64	43.8	17 10.8	24 63	42.8	17 25.1	24 62	41.8	17 39.2	23 60	40.8	17 52.9	23 59	39.8	18 12.9	22 57	38.2	9
90	15 38.0	27 67	46.2	15 54.0	27 66	45.2	16 17.6	26 64	43.7	16 33.0	26 63	42.6	16 48.1	26 62	41.6	17 02.9	24 60	40.6	17 17.4	24 59	39.6	17 38.5	23 57	38.1	90

Lat. 22°

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	22 00.0	1.0	01	180.0	21 00.0	1.0	01	180.0	19 30.0	1.0	00	180.0	18 30.0	1.0	00	180.0	17 30.0	1.0	00	180.0	16 30.0	1.0	00	180.0	15 30.0	1.0	00	180.0	14 00.0	1.0	00	180.0	00
1	21 59.6	1.0	02	179.3	20 59.6	1.0	02	179.3	19 29.7	1.0	02	179.3	18 29.7	1.0	02	179.3	17 29.7	1.0	02	179.3	16 29.7	1.0	02	179.4	15 29.7	1.0	02	179.4	13 59.7	1.0	02	179.4	1
2	21 58.5	1.0	03	178.5	20 58.6	1.0	03	178.5	19 28.6	1.0	03	178.6	18 28.7	1.0	03	178.6	17 28.7	1.0	03	178.7	16 28.7	1.0	03	178.7	15 28.8	1.0	03	178.7	13 58.8	1.0	02	178.8	2
3	21 56.7	1.0	04	177.8	20 56.8	1.0	04	177.8	19 26.9	1.0	04	177.9	18 27.0	1.0	04	177.9	17 27.1	1.0	04	178.0	16 27.2	1.0	04	178.1	15 27.2	1.0	04	178.1	13 57.4	1.0	04	178.2	3
4	21 54.2	1.0	06	177.0	20 54.3	1.0	05	177.1	19 24.5	1.0	05	177.2	18 24.7	1.0	05	177.3	17 24.8	1.0	05	177.3	16 25.0	1.0	05	177.4	15 25.1	1.0	06	177.5	13 55.3	1.0	04	177.6	4
05	21 50.9	1.0	07	176.3	20 51.1	1.0	06	176.4	19 21.5	1.0	06	176.5	18 21.7	1.0	06	176.6	17 21.9	1.0	06	176.7	16 22.1	1.0	06	176.8	15 22.3	1.0	06	176.8	13 52.7	1.0	05	177.0	05
6	21 46.9	99	08	175.5	20 47.3	99	08	175.6	19 17.7	99	07	175.8	18 18.0	99	07	175.9	17 18.4	99	07	176.0	16 18.7	99	07	176.1	15 19.0	99	07	176.2	13 49.4	1.0	06	176.4	6
7	21 42.2	99	09	174.8	20 42.7	99	09	174.9	19 13.3	99	08	175.1	18 13.7	99	08	175.2	17 14.2	99	08	175.3	16 14.6	99	08	175.5	15 15.0	99	08	175.6	13 45.6	99	07	175.8	7
8	21 36.8	99	10	174.0	20 37.4	99	10	174.2	19 08.2	99	10	174.4	18 08.8	99	09	174.5	17 09.3	99	09	174.7	16 09.9	99	09	174.8	15 10.4	99	09	175.0	13 41.2	99	08	175.2	8
9	21 30.6	99	11	173.3	20 31.4	99	11	173.5	19 02.5	99	11	173.7	18 03.2	99	10	173.9	17 03.9	99	10	174.0	16 04.5	99	10	174.2	15 05.2	99	10	174.3	13 36.2	99	09	174.6	9
10	21 23.8	98	13	172.6	20 24.7	99	12	172.7	18 56.0	99	12	173.0	17 56.9	99	12	173.2	16 57.8	99	11	173.4	15 58.6	99	11	173.5	14 59.4	99	10	173.7	13 30.7	99	10	174.0	10
1	21 16.2	98	14	171.8	20 17.3	98	13	172.0	18 48.9	98	13	172.3	17 50.0	98	13	172.5	16 51.0	98	12	172.7	15 52.0	98	12	172.9	14 53.1	98	12	173.1	13 24.6	98	11	173.4	1
2	21 08.0	98	15	171.1	20 09.3	98	15	171.3	18 41.2	98	14	171.6	17 42.4	98	14	171.9	16 43.6	98	13	172.1	15 44.9	98	13	172.3	14 46.1	98	13	172.5	13 17.9	98	12	172.8	2
3	20 59.0	97	16	170.4	20 00.5	98	16	170.6	18 32.7	98	15	171.0	17 34.2	98	15	171.2	16 35.6	98	14	171.4	15 37.1	98	14	171.6	14 38.5	98	14	171.9	13 10.6	98	13	172.2	3
4	20 49.4	97	17	169.6	19 51.1	97	17	169.9	18 23.7	97	16	170.3	17 25.4	97	16	170.5	16 27.0	97	15	170.8	15 28.7	97	15	171.0	14 30.3	97	14	171.3	13 02.8	97	14	171.6	4
15	20 39.0	97	18	168.9	19 41.0	97	18	169.2	18 13.9	97	17	169.6	17 15.9	97	17	169.9	16 17.8	97	16	170.1	15 19.7	97	16	170.4	14 21.6	97	16	170.6	12 54.4	97	15	171.0	15
6	20 28.0	96	20	168.2	19 30.2	96	19	168.5	18 03.6	96	18	168.9	17 05.8	96	18	169.2	16 07.9	96	17	169.5	15 10.1	96	17	169.8	14 12.2	96	16	170.0	12 45.4	97	16	170.4	6
7	20 16.3	96	21	167.5	19 18.8	96	20	167.8	17 52.6	96	20	168.3	16 55.0	96	19	168.6	15 57.5	96	18	168.8	14 59.9	96	18	169.1	14 02.3	96	18	169.4	12 35.9	96	17	169.9	7
8	20 03.9	95	22	166.8	19 06.7	95	21	167.1	17 40.9	96	20	167.6	16 43.7	95	20	167.9	15 46.4	95	19	168.2	14 49.1	96	19	168.5	13 51.8	96	18	168.8	12 25.8	96	18	169.3	8
9	19 50.8	95	23	166.1	18 54.0	95	22	166.4	17 28.7	95	22	166.9	16 31.7	95	21	167.3	15 34.8	95	20	167.6	14 37.8	95	20	167.9	13 40.8	95	19	168.2	12 15.2	95	19	168.7	9
20	19 37.1	94	24	165.4	18 40.6	94	23	165.7	17 15.8	94	22	166.3	16 19.2	94	22	166.6	15 22.5	94	21	167.0	14 25.8	94	21	167.3	13 29.1	95	20	167.6	12 04.0	95	20	168.1	20
1	19 22.8	94	25	164.7	18 26.6	94	24	165.1	17 02.3	94	24	165.6	16 06.0	94	23	166.0	15 09.7	94	22	166.3	14 13.3	94	22	166.7	13 16.9	94	21	167.0	11 52.3	94	20	167.6	1
2	19 07.8	93	26	164.0	18 12.0	93	26	164.4	16 48.1	93	24	165.0	15 52.2	93	24	165.3	14 56.2	93	23	165.7	14 00.2	93	23	166.1	13 04.2	93	22	166.5	11 40.1	94	21	167.0	2
3	18 52.1	92	27	163.3	17 56.7	92	26	163.7	16 33.4	93	26	164.3	15 37.8	93	25	164.7	14 42.2	93	24	165.1	13 46.6	93	24	165.5	12 50.9	93	23	165.9	11 27.3	93	22	166.4	3
4	18 35.9	92	28	162.7	17 40.8	92	28	163.1	16 18.1	92	26	163.7	15 22.9	92	26	164.1	14 27.7	92	25	164.5	13 32.4	92	25	164.9	12 37.0	92	24	165.3	11 14.0	92	23	165.9	4
25	18 19.0	91	29	162.0	17 24.3	91	28	162.4	16 02.2	91	28	163.1	15 07.4	91	27	163.5	14 12.5	91	26	163.9	13 17.6	92	26	164.3	12 22.7	92	25	164.7	11 00.2	92	24	165.3	25
6	18 01.5	90	30	161.3	17 07.2	91	30	161.8	15 45.7	91	28	162.4	14 51.3	91	28	162.9	13 56.8	91	27	163.3	13 02.3	91	26	163.7	12 07.7	91	26	164.2	10 45.8	91	25	164.8	6
7	17 43.3	90	31	160.7	16 49.5	90	30	161.1	15 28.6	90	30	161.8	14 34.6	90	29	162.3	13 40.5	90	28	162.7	12 46.4	90	27	163.2	11 52.3	90	27	163.6	10 31.0	90	26	164.3	7
8	17 24.6	89	32	160.0	16 31.2	89	32	160.5	15 10.9	89	30	161.2	14 17.4	89	30	161.7	13 23.7	89	29	162.1	12 30.1	90	28	162.6	11 36.3	90	28	163.0	10 15.7	90	26	163.7	8
9	17 05.3	88	33	159.4	16 12.3	88	32	159.9	14 52.7	89	31	160.6	13 59.6	89	30	161.1	13 06.4	89	30	161.5	12 13.1	89	29	162.0	11 19.8	89	28	162.5	9 59.8	89	27	163.2	9
30	16 45.4	87	34	158.7	15 52.9	88	33	159.2	14 34.0	88	32	160.0	13 41.3	88	32	160.5	12 48.5	88	31	161.0	11 55.7	88	30	161.5	11 02.8	88	29	161.9	9 43.5	88	28	162.7	30
1	16 25.0	87	35	158.1	15 32.9	87	34	158.6	14 14.7	87	33	159.4	13 22.4	87	32	159.9	12 30.1	87	32	160.4	11 37.7	87	31	160.9	10 45.3	87	30	161.4	9 26.6	88	29	162.1	1
2	16 03.9	86	36	157.5	15 12.3	86	35	158.0	13 54.8	86	34	158.8	13 03.0	86	33	159.3	12 11.2	86	32	159.8	11 19.3	87	32	160.3	10 27.3	87	31	160.9	9 09.3	87	30	161.6	2
3	15 42.3	85	37	156.9	14 51.2	85	36	157.4	13 34.4	85	35	158.2	12 43.1	86	34	158.7	11 51.7	86	33	159.3	11 00.3	86	32	159.8	10 08.8	86	32	160.3	8 51.5	86	30	161.1	3
4	15 20.2	84	38	156.2	14 29.6	84	37	156.8	13 13.5	85	36	157.6	12 22.7	85	35	158.2	11 31.8	85	34	158.7	10 40.9	85	33	159.3	9 49.9	85	32	159.8	8 33.3	85	31	160.6	4
35	14 57.5	83	39	155.6	14 07.4	84	38	156.2	12 52.1	84	37	157.1	12 01.7	84	36	157.6	11 11 3	84	35	158.2	10 20.9	84	34	158.7	9 30.4	84	33	159.3	8 14.5	84	32	160.1	35
6	14 34.3	83	40	155.0	13 44.7	83	39	155.6	12 30.1	83	37	156.5	11 40.3	83	36	157.1	10 50.4	83	36	157.6	10 00.5	83	35	158.2	9 10.5	83	34	158.7	7 55.4	84	33	159.6	6
7	14 10.6	82	40	154.5	13 21.5	82	40	155.0	12 07.7	82	38	155.9	11 18.4	82	37	156.5	10 29.0	82	36	157.1	9 39.6	82	36	157.7	8 50.1	83	35	158.2	7 35.7	83	34	159.1	7
8	13 46.4	81	41	153.9	12 57.8	81	40	154.5	11 44.7	81	39	155.4	10 56.0	81	38	156.0	10 07.1	81	37	156.6	9 18.2	82	36	157.1	8 29.2	82	36	157.7	7 15.7	82	34	158.6	8
9	13 21.6	80	42	153.3	12 33.6	80	41	153.9	11 21.3	80	40	154.8	10 33.1	80	39	155.4	9 44.7	81	38	156.0	8 56.4	81	37	156.6	8 07.9	81	36	157.2	6 55.2	81	35	158.1	9
40	12 56.4	79	43	152.7	12 08.8	79	42	153.4	10 57.4	79	41	154.3	10 09.7	80	40	154.9	9 21.9	80	39	155.5	8 34.1	80	38	156.1	7 46.2	80	37	156.7	6 34.2	80	36	157.6	40
1	12 30.6	78	44	152.2	11 43.7	78	43	152.8	10 33.0	79	41	153.8	9 45.9	79	40	154.4	8 58.6	79	40	155.0	8 11.3	79	38	155.6	7 24.0	79	38	156.2	6 12.8	79	36	157.2	1
2	12 04.4	77	44	151.6	11 18.0	77	44	152.3	10 08.2	78	42	153.2	9 21.6	78	41	153.9	8 34.9	78	40	154.5	7 48.2	78	39	155.1	7 01.4	78	38	155.8	5 51.1	78	37	156.7	2
3	11 37.8	76	45	151.1	10 51.9	77	44	151.7	9 42.9	77	43	152.7	8 56.9	77	42	153.4	8 10.7	77	41	154.0	7 24.6	77	40	154.7	6 38.3	77	39	155.3	5 28.9	77	38	156.3	3
4	11 10.6	75	46	150.5	10 25.3	76	45	151.2	9 17.2	76	44	152.2	8 31.7	76	43	152.9	7 46.2	76	42	153.5	7 00.5	76	41	154.2	6 14.9	76	40	154.8	5 06.2	76	38	155.8	4
45	10 43.0	74	47	150.0	9 58.3	75	46	150.7	8 51.0	75	44	151.7	8 06.1	75	43	152.4	7 21.1	75	42	153.0	6 36.1	75	42	153.7	5 51.0	75	40	154.4					45
6	10 15.0	74	48	149.5	9 30.8	74	46	150.2	8 24.5	74	45	151.2	7 40.1	74	44	151.9	6 55.7	74	43	152.6	6 11.2	74	42	153.2	5 26.7	74	41	153.9					6
7	9 46.5	73	48	149.0	9 03.0	73	47	149.7	7 57.4	73	46	150.7	7 13.7	73	45	151.4	6 29.9	73	44	152.1	5 46.0	73	43	152.8	5 02.0	73	42	153.5					7
8	9 17.6	72	49	148.5	8 34.6	72	48	149.2	7 30.0	72	46	150.2	6 46.8	72	45	150.9	6 03.6	72	44	151.6	5 20.3	72	43	152.3									8
9	8 48.3	71	50	148.0	8 05.9	71	48	148.7	7 02.2	71	47	149.7	6 19.6	71	46	150.5	5 37.0	71	45	151.2													9
50	8 18.6	70	50	147.5	7 36.8	70	49	148.2	6 34.0	70	48	149.3	5 52.0	70	47	150.0	5 09.9	70	45	150.7													50
1	7 48.5	69	51	147.0	7 07.3	69	50	147.7	6 05.3	69	48	148.8	5 24.0	69	47	149.5																	1
2	7 18.0	68	52	146.5	6 37.4	68	50	147.2	5 36.3	68	49	148.4																					2
3	6 47.1	67	52	146.0	6 07.1	67	51	146.8	5 07.0	67	49	147.9																					3
4	6 15.8	66	53	145.6	5 36.4	66	52	146.3																									4
55	5 44.2	65	53	145.1	5 05.4	65	52	145.9																									55
6	5 12.2	64	54	144.7																													6

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	14 57.9	28	66	46.0	15 14.7	28	65	45.0	15 39.3	27	64	43.5	15 55.4	27	62	42.5	16 11.2	26	61	41.5	16 26.7	26	60	40.5	16 41.9	25	59	39.5	17 04.2	24	57	37.9	91
2	14 18.0	29	66	45.8	14 35.4	29	65	44.8	15 01.1	28	64	43.3	15 17.9	28	62	42.3	15 34.4	27	61	41.3	15 50.7	27	60	40.3	16 06.7	26	59	39.3	16 30.1	26	57	37.8	2
3	13 38.2	30	66	45.5	13 56.3	30	65	44.6	14 23.0	29	63	43.1	14 40.5	29	62	42.1	14 57.8	29	61	41.1	15 14.8	28	60	40.1	15 31.5	28	58	39.1	15 56.1	27	56	37.6	3
4	12 58.6	31	66	45.3	13 17.3	31	65	44.4	13 45.1	31	63	42.9	14 03.3	30	62	41.9	14 21.3	30	61	40.9	14 39.0	29	60	39.9	14 56.5	29	58	38.9	15 22.2	28	56	37.5	4
95	12 19.1	32	66	45.1	12 38.5	32	64	44.1	13 07.3	32	63	42.7	13 26.2	31	62	41.7	13 44.9	31	60	40.7	14 03.3	31	59	39.7	14 21.6	30	58	38.8	14 48.4	30	56	37.3	95
6	11 39.7	34	65	44.9	11 59.9	33	64	43.9	12 29.7	33	62	42.5	12 49.3	33	61	41.5	13 08.7	32	60	40.5	13 27.9	32	59	39.5	13 46.8	31	58	38.6	14 14.8	31	56	37.1	6
7	11 00.6	35	65	44.6	11 21.4	34	64	43.7	11 52.2	34	62	42.2	12 12.5	34	61	41.3	12 32.6	33	60	40.3	12 52.5	33	59	39.3	13 12.2	33	57	38.4	13 41.3	32	56	36.9	7
8	10 21.6	36	65	44.4	10 43.0	36	64	43.4	11 14.9	35	62	42.0	11 35.9	35	61	41.0	11 56.7	35	60	40.1	12 17.3	34	58	39.1	12 37.8	34	57	38.2	13 08.0	33	55	36.7	8
9	9 42.8	37	64	44.1	10 04.9	37	63	43.2	10 37.8	36	62	41.7	10 59.5	36	60	40.8	11 21.0	36	59	39.9	11 42.3	35	58	38.9	12 03.5	35	57	37.9	12 34.8	35	55	36.5	9
100	9 04.2	38	64	43.8	9 26.9	38	63	42.9	10 00.8	37	61	41.5	10 23.2	37	60	40.6	10 45.4	37	59	39.6	11 07.5	37	58	38.7	11 29.3	36	56	37.7	12 01.8	36	55	36.3	100
1	8 25.7	39	64	43.6	8 49.1	39	62	42.6	9 24.0	39	61	41.2	9 47.1	38	60	40.3	10 10.0	38	59	39.4	10 32.8	38	58	38.4	10 55.4	38	56	37.5	11 29.0	37	54	36.1	1
2	7 47.5	40	64	43.3	8 11.6	40	62	42.4	8 47.5	40	61	41.0	9 11.2	40	60	40.1	9 34.8	39	58	39.1	9 58.3	39	57	38.2	10 21.6	39	56	37.3	10 56.3	38	54	35.8	2
3	7 09.4	41	63	43.0	7 34.2	41	62	42.1	8 11.1	41	60	40.7	8 35.5	41	59	39.8	8 59.8	40	58	38.9	9 24.0	40	57	37.9	9 48.1	40	56	37.0	10 23.8	40	54	35.6	3
4	6 31.6	42	63	42.7	6 57.0	42	62	41.8	7 34.9	42	60	40.4	8 00.0	42	59	39.5	8 25.0	42	58	38.6	8 49.9	41	56	37.7	9 14.7	41	55	36.8	9 51.5	41	54	35.4	4
105	5 53.9	44	62	42.4	6 20.0	43	61	41.5	6 58.9	43	60	40.2	7 24.7	43	58	39.2	7 50.4	43	57	38.3	8 16.0	43	56	37.4	8 41.5	42	55	36.5	9 19.4	42	53	35.1	105
6	5 16.5	45	62	42.1	5 43.2	44	61	41.2	6 23.1	44	59	39.9	6 49.6	44	58	39.0	7 16.0	44	57	38.1	7 42.3	44	56	37.1	8 08.5	44	55	36.2	8 47.5	43	53	34.9	6
7					5 06.7	45	61	40.9	5 47.6	45	59	39.6	6 14.8	45	58	38.7	6 41.8	45	56	37.8	7 08.8	45	55	36.9	7 35.7	45	54	36.0	8 15.8	44	52	34.6	7
8									5 12.3	47	59	39.3	5 40.1	46	57	38.4	6 07.9	46	56	37.5	6 35.6	46	55	36.6	7 03.1	46	54	35.7	7 44.3	46	52	34.3	8
9													5 05.7	47	57	38.1	5 34.2	47	56	37.2	6 02.5	47	55	36.3	6 30.8	47	54	35.4	7 13.0	47	52	34.1	9
110																	5 00.7	48	56	36.9	5 29.7	48	55	36.0	5 58.7	48	53	35.1	6 42.0	48	51	33.8	110
1																									5 26.8	49	53	34.8	6 11.2	49	51	33.5	1
2																													5 40.6	50	51	33.2	2
3																													5 10.2	52	50	32.9	3

Lat. 22°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	57 30.0	1.0 01	00.0	57 00.0	1.0 01	00.0	56 00.0	1.0 01	00.0	55 30.0	1.0 01	00.0	55 00.0	1.0 01	00.0	54 30.0	1.0 01	00.0	53 00.0	1.0 01	00.0	52 30.0	1.0 01	00.0	00
1	57 29.5	1.0 03	01.1	56 59.5	1.0 02	01.1	55 59.5	1.0 02	01.0	55 29.5	1.0 02	01.0	54 59.5	1.0 02	00.9	54 29.6	1.0 02	00.9	52 59.6	1.0 02	00.9	52 29.6	1.0 02	00.8	1
2	57 27.9	1.0 04	02.2	56 58.0	1.0 04	02.1	55 58.1	1.0 04	02.0	55 28.1	1.0 04	01.9	54 58.2	1.0 04	01.9	54 28.2	1.0 04	01.8	52 58.3	1.0 04	01.7	52 28.4	1.0 03	01.7	2
3	57 25.3	1.0 06	03.2	56 55.4	1.0 06	03.2	55 55.6	1.0 06	03.0	55 25.7	1.0 06	02.9	54 55.9	1.0 06	02.8	54 26.0	1.0 05	02.8	52 56.3	1.0 05	02.6	52 26.4	1.0 05	02.5	3
4	57 21.6	99 08	04.3	56 51.8	99 08	04.2	55 52.2	99 07	04.0	55 22.4	99 07	03.9	54 52.6	99 07	03.8	54 22.8	99 07	03.7	52 53.4	99 06	03.4	52 23.5	99 06	03.3	4
05	57 16.9	99 10	05.4	56 47.3	99 09	05.2	55 47.9	99 09	05.0	55 18.2	99 09	04.8	54 48.5	99 08	04.7	54 18.8	99 08	04.6	52 49.6	99 08	04.3	52 19.9	99 07	04.2	05
6	57 11.2	98 11	06.4	56 41.7	98 11	06.3	55 42.6	99 10	06.0	55 13.0	99 10	05.8	54 43.5	99 10	05.7	54 13.9	99 10	05.5	52 45.1	99 09	05.1	52 15.5	99 09	05.0	6
7	57 04.5	98 13	07.5	56 35.1	98 13	07.3	55 36.4	98 12	06.9	55 07.0	98 12	06.7	54 37.5	98 11	06.6	54 08.1	98 11	06.4	52 39.7	98 10	05.9	52 10.3	98 10	05.8	7
8	56 56.7	97 14	08.5	56 27.6	97 14	08.3	55 29.2	97 14	07.9	55 00.0	97 13	07.7	54 30.7	97 13	07.5	54 01.5	98 12	07.3	52 33.6	98 12	06.8	52 04.3	98 11	06.6	8
9	56 48.0	96 16	09.5	56 19.0	97 16	09.3	55 21.1	97 15	08.9	54 52.1	97 15	08.6	54 23.0	97 14	08.4	53 54.0	97 14	08.2	52 26.6	97 13	07.6	51 57.5	97 13	07.4	9
10	56 38.3	96 18	10.6	56 09.6	96 17	10.3	55 12.1	96 16	09.8	54 43.3	96 16	09.6	54 14.4	96 16	09.3	53 45.6	96 15	09.1	52 18.9	96 14	08.4	51 49.9	97 14	08.2	10
1	56 27.6	96 19	11.6	55 59.2	96 19	11.3	55 02.2	96 18	10.7	54 33.6	96 18	10.5	54 05.0	96 17	10.2	53 36.4	96 17	10.0	52 10.4	96 16	09.2	51 41.6	96 15	09.0	1
2	56 16.0	94 21	12.5	55 47.8	94 20	12.2	54 51.4	94 20	11.7	54 23.1	94 19	11.4	53 54.7	94 18	11.1	53 26.4	96 18	10.8	52 01.1	96 17	10.0	51 32.6	96 16	09.8	2
3	56 03.4	93 22	13.5	55 35.6	93 22	13.2	54 39.7	93 21	12.6	54 11.7	93 20	12.2	53 43.6	94 20	12.0	53 15.5	94 19	11.7	51 51.0	94 18	10.8	51 22.7	94 18	10.5	3
4	55 49.9	92 24	14.5	55 22.4	92 23	14.1	54 27.2	92 22	13.5	53 59.5	92 22	13.1	53 31.7	93 21	12.8	53 03.9	93 21	12.5	51 40.2	93 19	11.6	51 12.2	93 19	11.3	4
15	55 35.6	91 25	15.4	55 08.4	91 25	15.1	54 13.8	91 24	14.3	53 46.4	91 23	14.0	53 19.0	92 22	13.6	52 51.5	92 22	13.3	51 28.7	92 20	12.4	51 00.9	92 20	12.1	15
6	55 20.4	89 27	16.3	54 53.5	90 26	16.0	53 59.6	90 25	15.2	53 32.6	90 24	14.8	53 05.5	90 24	14.5	52 38.3	91 23	14.1	51 16.4	91 22	13.1	50 49.0	91 21	12.8	6
7	55 04.3	88 28	17.2	54 37.8	88 28	16.8	53 44.6	89 26	16.0	53 17.9	89 26	15.7	52 51.2	89 25	15.3	52 24.3	90 24	14.9	51 03.4	90 23	13.9	50 36.3	90 22	13.5	7
8	54 47.4	87 30	18.1	54 21.3	87 29	17.7	53 28.9	88 28	16.9	53 02.5	88 27	16.5	52 36.1	88 26	16.1	52 09.6	88 26	15.7	50 49.7	89 24	14.6	50 23.0	89 23	14.2	8
9	54 29.7	85 31	19.0	54 04.0	86 30	18.6	53 12.3	86 29	17.7	52 46.4	87 28	17.3	52 20.3	87 28	16.9	51 54.2	87 27	16.5	50 35.4	88 25	15.3	50 09.0	88 24	14.9	9
20	54 11.2	84 32	19.8	53 45.9	84 31	19.4	52 55.1	85 30	18.5	52 29.5	85 29	18.1	52 03.8	86 29	17.6	51 38.1	86 28	17.2	50 20.4	87 26	16.0	49 54.3	87 26	15.6	20
1	53 51.9	83 33	20.7	53 27.1	83 33	20.2	52 37.1	84 31	19.3	52 11.9	84 30	18.8	51 46.6	84 30	18.4	51 21.3	85 29	18.0	50 04.7	86 27	16.7	49 39.0	86 27	16.3	1
2	53 31.9	81 34	21.5	53 07.5	82 34	21.0	52 18.3	82 32	20.0	51 53.6	83 32	19.6	51 28.7	83 31	19.1	51 03.8	83 30	18.7	49 48.4	84 28	17.4	49 23.0	85 28	17.0	2
3	53 11.2	80 36	22.2	52 47.2	80 35	21.8	51 58.9	81 33	20.8	51 34.6	81 33	20.3	51 10.2	82 32	19.8	50 45.7	82 31	19.4	49 31.4	83 29	18.1	49 06.5	83 29	17.6	3
4	52 49.8	78 37	23.0	52 26.3	79 36	22.5	51 38.9	79 34	21.5	51 15.0	80 34	21.0	50 51.0	80 33	20.5	50 26.9	81 32	20.1	49 13.9	82 30	18.7	48 49.3	82 30	18.3	4
25	52 27.7	77 38	23.8	52 04.7	77 37	23.2	51 18.2	78 35	22.2	50 54.7	78 35	21.7	50 31.2	79 34	21.2	50 07.5	79 33	20.7	48 55.7	80 31	19.3	48 31.6	81 30	18.9	25
6	52 05.0	76 39	24.5	51 42.4	75 38	23.9	50 56.8	76 36	22.9	50 33.9	77 36	22.4	50 10.7	77 35	21.9	49 47.5	78 34	21.4	48 37.0	79 32	20.0	48 13.3	79 32	19.5	6
7	51 41.6	73 40	25.2	51 19.5	74 39	24.6	50 34.9	75 37	23.6	50 12.4	75 37	23.0	49 49.7	76 36	22.5	49 26.9	76 35	22.0	48 17.7	77 33	20.6	47 54.4	78 32	20.1	7
8	51 17.7	72 41	25.8	50 56.0	72 40	25.3	50 12.4	73 38	24.2	49 50.3	74 38	23.7	49 28.1	74 37	23.2	49 05.7	75 36	22.7	47 57.9	76 34	21.2	47 35.1	76 33	20.7	8
9	50 53.1	70 42	26.5	50 32.0	71 41	25.9	49 49.3	72 39	24.8	49 27.7	72 39	24.3	49 05.9	73 38	23.8	48 44.0	73 37	23.3	47 37.6	75 35	21.7	47 15.1	75 34	21.3	9
30	50 28.0	69 43	27.1	50 07.4	69 42	26.6	49 25.6	70 40	25.5	49 04.5	71 40	24.9	48 43.2	71 39	24.4	48 21.8	72 38	23.9	47 16.7	73 36	22.3	46 54.7	73 35	21.8	30
1	50 02.4	67 44	27.7	49 42.2	67 43	27.2	49 01.4	69 41	26.1	48 40.8	69 40	25.5	48 20.0	70 40	25.0	47 59.0	70 39	24.4	46 55.3	71 36	22.9	46 33.8	72 36	22.3	1
2	49 36.2	65 44	28.3	49 16.6	66 44	27.8	48 36.7	67 42	26.6	48 16.6	67 41	26.1	47 56.3	68 40	25.5	47 35.8	68 40	25.0	46 33.5	70 37	23.4	46 12.4	70 36	22.9	2
3	49 09.5	64 45	28.9	48 50.4	64 44	28.3	48 11.6	65 43	27.2	47 51.9	66 42	26.6	47 32.1	66 41	26.1	47 12.1	67 40	25.5	46 11.2	68 38	23.9	45 50.6	69 37	23.4	3
4	48 42.4	62 46	29.5	48 23.8	62 45	28.9	47 45.9	64 44	27.7	47 26.7	64 43	27.2	47 07.4	65 42	26.6	46 47.9	65 41	26.0	45 48.4	67 39	24.4	45 28.3	67 38	23.9	4
35	48 14.8	60 47	30.0	47 56.7	61 46	29.4	47 19.8	62 44	28.2	47 01.1	63 43	27.7	46 42.3	63 43	27.1	46 23.3	64 42	26.5	45 25.2	65 39	24.9	45 05.6	66 39	24.4	35
6	47 46.8	58 48	30.5	47 29.1	59 47	29.9	46 53.3	60 45	28.7	46 35.1	61 44	28.2	46 16.7	61 43	27.6	45 58.2	62 42	27.0	45 01.6	64 40	25.4	44 42.4	64 39	24.8	6
7	47 18.3	57 48	31.0	47 01.2	57 47	30.4	46 26.3	59 46	29.2	46 08.6	59 45	28.6	45 50.7	60 44	28.1	45 32.7	60 43	27.5	44 37.6	62 41	25.8	44 18.9	63 40	25.3	7
8	46 49.4	55 49	31.5	46 32.8	56 48	30.9	45 58.9	57 46	29.7	45 41.7	58 45	29.1	45 24.4	58 45	28.5	45 06.8	59 44	28.0	44 13.1	60 41	26.3	43 54.9	61 40	25.7	8
9	46 20.2	53 50	32.0	46 04.0	54 48	31.3	45 31.2	55 47	30.1	45 14.5	56 46	29.6	44 57.6	57 45	29.0	44 40.6	57 44	28.4	43 48.3	59 42	26.7	43 30.6	59 41	26.1	9
40	45 50.5	52 50	32.4	45 34.9	52 49	31.8	45 03.1	54 47	30.6	44 46.9	54 47	30.0	44 30.5	55 46	29.4	44 13.9	56 45	28.8	43 23.2	57 42	27.1	43 05.9	58 42	26.5	40
1	45 20.6	50 51	32.8	45 05.4	51 50	32.2	44 34.6	52 48	31.0	44 18.9	53 47	30.4	44 03.0	53 46	29.8	43 46.9	54 46	29.2	42 57.7	56 43	27.5	42 40.9	56 42	26.9	1
2	44 50.2	48 51	33.2	44 35.6	49 50	32.6	44 05.8	50 48	31.4	43 50.6	51 48	30.8	43 35.2	52 47	30.2	43 19.6	52 46	29.6	42 31.8	54 44	27.9	42 15.5	55 43	27.3	2
3	44 19.6	47 52	33.6	44 05.5	47 51	33.0	43 36.6	49 49	31.8	43 21.9	49 48	31.2	43 07.0	50 47	30.6	42 51.9	51 46	30.0	42 05.6	52 44	28.3	41 49.8	53 43	27.7	3
4	43 48.6	45 52	34.0	43 35.0	46 51	33.4	43 07.2	47 50	32.2	42 53.0	48 49	31.5	42 38.6	48 48	31.0	42 24.0	49 47	30.4	41 39.1	51 45	28.6	41 23.9	51 44	28.0	4
45	43 17.4	43 52	34.3	43 04.3	44 52	33.7	42 37.4	45 50	32.5	42 23.7	46 49	31.9	42 09.8	47 48	31.3	41 55.7	47 48	30.7	41 12.4	49 45	29.0	40 57.6	50 44	28.4	45
6	42 45.9	42 53	34.7	42 33.2	42 52	34.1	42 07.4	44 50	32.8	41 54.2	44 50	32.2	41 40.8	45 49	31.6	41 27.2	46 48	31.0	40 45.3	47 46	29.3	40 31.0	48 45	28.7	6
7	42 14.1	40 53	35.0	42 02.0	41 53	34.4	41 37.1	42 51	33.2	41 24.4	43 50	32.6	41 11.4	43 49	32.0	40 58.3	44 48	31.4	40 17.9	46 46	29.6	40 04.1	46 45	29.0	7
8	41 42.1	38 54	35.3	41 30.4	39 53	34.7	41 06.5	40 51	33.5	40 54.3	41 50	32.9	40 41.9	42 50	32.3	40 29.3	42 49	31.7	39 50.3	44 46	29.9	39 37.0	45 46	29.3	8
9	41 09.8	37 54	35.6	40 58.6	38 53	35.0	40 35.7	39 52	33.8	40 24.0	39 51	33.2	40 12.0	40 50	32.6	39 59.9	41 49	32.0	39 22.5	42 47	30.2	39 09.7	43 46	29.6	9
50	40 37.3	35 54	35.9	40 26.6	36 54	35.3	40 04.7	37 52	34.0	39 53.4	38 51	33.4	39 42.0	38 50	32.8	39 30.4	39 50	32.2	38 54.4	41 47	30.5	38 42.1	41 46	29.9	50
1	40 04.6	34 55	36.1	39 54.4	34 54	35.5	39 33.4	36 52	34.3	39 22.7	36 52	33.7	39 11.7	37 51	33.1	39 00.6	37 50	32.5	38 26.1	39 48	30.7	38 14.2	40 47	30.1	1
2	39 31.7	32 55	36.4	39 22.0	33 54	35.8	39 02.0	34 53	34.6	38 51.7	35 52	34.0	38 41.2	35 51	33.4	38 30.6	36 50	32.8	37 57.6	38 48	31.0	37 46.2	38 47	30.4	2
3	38 58.6	30 56	36.6	38 49.4	31 55	36.0	38 30.3	32 53	34.8	38 20.5	33 52	34.2	38 10.5	34 52	33.6	38 00.4	34 51	33.0	37 28.8	36 48	31.2	37 17.9	37 47	30.6	3
4	38 25.3	29 56	36.8	38 16.6	29 55	36.2	37 58.5	31 53	35.0	37 49.2	31 53	34.4	37 39.7	32 52	33.8	37 30.0	33 51	33.2	36 59.9	34 48	31.4	36 49.5	35 48	30.9	4
55	37 51.9	27 56	37.0	37 43.6	28 55	36.4	37 26.5	29 54	35.2	37 17.6	30 53	34.6	37 08.6	30 52	34.0	36 59.4	31 51	33.4	36 30.8	33 49	31.7	36 20.9	33 48	31.1	55
6	37 18.3	26 56	37.2	37 10.5	26 56	36.6	36 54.3	28 54	35.4	36 45.9	28 53	34.8	36 37.4	29 52	34.2	36 28.7	29 52	33.6	36 01.5	31 49	31.9	35 52.1	32 48	31.3	6
7	36 44.5	24 56	37.4	36 37.2	25 56	36.8	36 22.0	26 54	35.6	36 14.1	27 53	35.0	36 06.0	27 52	34.4	35 57.8	28 52	33.8	35 32.0	29 49	32.1	35 23.1	30 48	31.5	7
8	36 10.7	23 57	37.6	36 03.8	23 56	37.0	35 49.5	24 54	35.8	35 42.1	25 54	35.2	35 34.5	26 53	34.6	35 26.7	26 52	34.0	35 02.4	28 50	32.2	34 54.0	28 49	31.7	8
9	35 36.7	21 57	37.8	35 30.3	22 56	37.2	35 16.9	23 54	36.0	35 10.0	23 54	35.4	35 02.9	24 53	34.8	34 55.6	25 52	34.2	34 32.7	26 50	32.4	34 24.7	27 49	31.8	9
60	35 02.5	20 57	37.9	34 56.6	20 56	37.3	34 44.2	21 55	36.1	34 37.7	22 54	35.5	34 31.1	22 53	34.9	34 24.3	23 52	34.3	34 02.8	25 50	32.6	33 55.3	25 49	32.0	60
1	34 28.3	18 57	38.0	34 22.8	19 56	37.4	34 11.3	20 55	36.2	34 05.3	20 54	35.7	33 59.2	21 53	35.1	33 52.8	21 52	34.5	33 32.8	23 50	32.7	33 25.8	24 50	32.1	1
2	33 54.0	16 57	38.2	33 49.0	17 57	37.6	33 38.4	18 55	36.4	33 32.9	19 54	35.8	33 27.2	19 54	35.2	33 21.3	20 53	34.6	33 02.7	22 50	32.9	32 56.1	22 50	32.3	2
3	33 19.6	15 58	38.3	33 15.0	16 57	37.7	33 05.4	17 55	36.5	33 00.3	17 54	35.9	32 55.0	18 54	35.3	32 49.6	18 53	34.7	32 32.4	20 50	33.0	32 26.4	20 50	32.4	3
4	32 45.1	13 58	38.4	32 41.0	14 57	37.8	32 32.2	15 55	36.6	32 27.6	16 54	36.0	32 22.8	16 54	35.4	32 17.9	17 53	34.8	32 02.1	18 51	33.1	31 56.5	19 50	32.5	4
65	32 10.5	12 58	38.4	32 06.9	13 57	37.9	31 59.0	14 56	36.7	31 54.9	14 55	36.1	31 50.5	15 54	35.5	31 46.1	15 53	34.9	31 31.7	17 51	33.2	31 26.6	17 50	32.6	65
6	31 35.9	11 58	38.5	31 32.7	11 57	37.9	31 25.8	12 56	36.8	31 22.0	13 55	36.2	31 18.2	13 54	35.6	31 14.2	14 53	35.0	31 01.2	15 51	33.3	30 56.5	16 50	32.7	6
7	31 01.2	09 58	38.6	30 58.5	10 57	38.0	30 52.4	11 56	36.8	30 49.2	11 55	36.3	30 45.8	12 54	35.7	30 42.2	12 53	35.1	30 30.6	14 51	33.4	30 26.4	14 50	32.8	7
8	30 26.5	08 58	38.6	30 24.2	08 57	38.1	30 19.0	09 56	36.9	30 16.2	10 55	36.3	30 13.3	10 54	35.8	30 10.2	11 54	35.2	30 00.0	12 51	33.5	29 56.2	13 50	32.9	8
9	29 51.8	06 58	38.7	29 49.9	07 57	38.1	29 45.6	08 56	37.0	29 43.2	08 55	36.4	29 40.7	09 54	35.8	29 38.1	09 54	35.2	29 29.3	11 51	33.5	29 26.0	11 50	33.0	9
70	29 17.0	05 58	38.7	29 15.5	05 57	38.2	29 12.1	06 56	37.0	29 10.2	07 55	36.4	29 08.2	07 54	35.9	29 06.0	08 54	35.3	28 58.5	09 51	33.6	28 55.7	09 50	33.0	70
1	28 42.2	03 58	38.8	28 41.1	04 57	38.2	28 38.6	05 56	37.1	28 37.2	05 55	36.5	28 35.5	06 54	35.9	28 33.8	06 54	35.3	28 27.7	07 51	33.6	28 25.4	08 51	33.1	1
2	28 07.3	02 58	38.8	28 06.7	02 57	38.2	28 05.1	03 56	37.1	28 04.1	04 55	36.5	28 02.9	04 54	35.9	28 01.6	05 54	35.4	27 56.9	06 52	33.7	27 55.0	06 51	33.1	2
3	27 32.5	00 58	38.8	27 32.3	01 57	38.2	27 31.6	02 56	37.1	27 31.0	02 55	36.5	27 30.3	03 54	35.9	27 29.4	03 54	35.4	27 26.0	04 52	33.7	27 24.6	05 51	33.1	3
4	26 57.6	01 58	38.8	26 57.9	01 57	38.2	26 58.0	00 56	37.1	26 57.9	01 55	36.5	26 57.6	01 54	36.0	26 57.2	02 54	35.4	26 55.1	03 52	33.7	26 54.2	03 51	33.2	4
75	26 22.8	02 58	38.8	26 23.5	02 57	38.2	26 24.5	01 56	37.1	26 24.7	01 55	36.5	26 24.9	00 54	36.0	26 24.9	00 54	35.4	26 24.2	01 52	33.7	26 23.7	02 51	33.2	75
6	25 48.0	04 58	38.7	25 49.1	03 57	38.2	25 50.9	03 56	37.1	25 51.6	02 55	36.5	25 52.2	02 54	36.0	25 52.7	01 54	35.4	25 53.3	00 52	33.7	25 53.3	00 51	33.2	6
7	25 13.2	06 58	38.7	25 14.7	06 57	38.2	25 17.4	04 56	37.1	25 18.5	04 55	36.5	25 19.6	03 54	35.9	25 20.5	03 54	35.4	25 22.4	02 52	33.7	25 22.8	01 51	33.2	7
8	24 38.4	07 58	38.7	24 40.3	06 57	38.1	24 43.9	06 56	37.0	24 45.4	05 55	36.5	24 46.9	05 54	35.9	24 48.2	04 54	35.4	24 51.5	03 52	33.7	24 52.4	03 51	33.2	8
9	24 03.7	08 58	38.6	24 06.0	08 57	38.1	24 10.4	07 56	37.0	24 12.4	06 55	36.4	24 14.3	06 54	35.9	24 16.0	06 54	35.3	24 20.7	05 51	33.7	24 22.0	04 51	33.2	9
80	23 28.9	09 58	38.6	23 31.7	09 57	38.0	23 36.9	08 56	36.9	23 39.4	08 55	36.4	23 41.7	08 54	35.8	23 43.9	07 54	35.3	23 49.8	06 51	33.7	23 51.5	06 51	33.1	80
1	22 54.3	11 58	38.5	22 57.5	10 57	38.0	23 03.5	10 56	36.9	23 06.4	09 55	36.3	23 09.1	09 54	35.8	23 11.7	09 54	35.3	23 19.0	07 51	33.6	23 21.2	07 51	33.1	1
2	22 19.7	12 58	38.4	22 23.3	12 57	37.9	22 30.1	11 56	36.8	22 33.4	11 55	36.3	22 36.6	10 54	35.7	22 39.6	10 53	35.2	22 48.2	09 51	33.6	22 50.8	09 50	33.1	2
3	21 45.1	14 58	38.3	21 49.1	13 57	37.8	21 56.8	12 55	36.8	22 00.5	12 55	36.2	22 04.1	12 54	35.7	22 07.6	11 53	35.1	22 17.4	10 51	33.5	22 20.5	10 50	33.0	3
4	21 10.6	15 57	38.3	21 15.0	15 57	37.7	21 23.6	14 55	36.7	21 27.7	14 55	36.1	21 31.7	13 54	35.6	21 35.6	13 53	35.1	21 46.7	12 51	33.5	21 50.2	11 50	32.9	4
85	20 36.2	16 57	38.2	20 41.0	16 56	37.6	20 50.4	15 55	36.6	20 54.9	15 54	36.1	20 59.3	15 54	35.5	21 03.6	14 53	35.0	21 16.0	13 51	33.4	21 20.0	13 50	32.9	85
6	20 01.9	18 57	38.1	20 07.1	17 56	37.5	20 17.2	17 55	36.5	20 22.2	16 54	36.0	20 27.0	16 54	35.4	20 31.8	16 53	34.9	20 45.4	15 51	33.3	20 49.8	14 50	32.8	6
7	19 27.6	19 57	38.0	19 33.2	19 56	37.4	19 44.2	18 55	36.4	19 49.5	18 54	35.9	19 54.8	17 54	35.3	20 00.0	17 53	34.8	20 14.9	16 51	33.2	20 19.7	16 50	32.7	7
8	18 53.4	20 57	37.8	18 59.5	20 56	37.3	19 11.2	19 55	36.3	19 17.0	19 54	35.8	19 22.7	19 53	35.2	19 28.2	18 53	34.7	19 44.5	18 51	33.2	19 49.7	17 50	32.6	8
9	18 19.4	22 57	37.7	18 25.8	21 56	37.2	18 38.4	21 55	36.2	18 44.5	20 54	35.6	18 50.6	20 53	35.1	18 56.6	20 52	34.6	19 14.1	19 50	33.1	19 19.7	19 50	32.5	9
90	17 45.4	23 56	37.6	17 52.2	22 56	37.1	18 05.6	22 54	36.0	18 12.2	22 54	35.5	18 18.6	22 53	35.0	18 25.1	21 52	34.5	18 43.8	20 50	32.9	18 49.8	20 50	32.4	90

Lat. 22°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	13 30.0	1.0 00	180.0	13 00.0	1.0 00	180.0	12 00.0	1.0 00	180.0	11 30.0	1.0 00	180.0	11 00.0	1.0 00	180.0	10 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 30.0	1.0 00	180.0	00
1	13 29.7	1.0 02	179.4	12 59.7	1.0 01	179.4	11 59.7	1.0 01	179.4	11 29.7	1.0 01	179.4	10 59.7	1.0 01	179.4	10 29.7	1.0 01	179.5	8 59.7	1.0 01	179.5	8 29.8	1.0 01	179.5	1
2	13 28.8	1.0 02	178.8	12 58.9	1.0 02	178.8	11 58.9	1.0 02	178.9	11 28.9	1.0 02	178.9	10 58.9	1.0 02	178.9	10 28.9	1.0 02	178.9	8 59.0	1.0 02	179.0	8 29.0	1.0 02	179.0	2
3	13 27.4	1.0 03	178.2	12 57.4	1.0 03	178.2	11 57.5	1.0 03	178.3	11 27.5	1.0 03	178.3	10 57.6	1.0 03	178.3	10 27.6	1.0 03	178.4	8 57.7	1.0 03	178.4	8 27.8	1.0 03	178.5	3
4	13 25.4	1.0 04	177.6	12 55.4	1.0 04	177.6	11 55.6	1.0 04	177.7	11 25.6	1.0 04	177.7	10 55.7	1.0 04	177.8	10 25.8	1.0 04	177.8	8 56.0	1.0 04	177.9	8 26.0	1.0 04	177.9	4
05	13 22.8	1.0 05	177.0	12 52.9	1.0 05	177.1	11 53.1	1.0 05	177.1	11 23.2	1.0 05	177.2	10 53.3	1.0 05	177.2	10 23.4	1.0 05	177.3	8 53.7	1.0 05	177.4	8 23.8	1.0 05	177.4	05
6	13 19.6	1.0 06	176.4	12 49.7	1.0 06	176.5	11 50.0	1.0 06	176.6	11 20.2	1.0 06	176.6	10 59.3	1.0 06	176.7	10 20.5	1.0 06	176.7	8 50.9	1.0 06	176.9	8 21.0	1.0 05	176.9	6
7	13 15.8	99 07	175.8	12 46.0	99 07	175.9	11 46.4	99 07	176.0	11 16.6	99 07	176.1	10 46.8	99 07	176.1	10 17.0	99 06	176.2	8 47.6	99 06	176.4	8 17.8	99 06	176.4	7
8	13 11.5	99 08	175.2	12 41.8	99 08	175.3	11 42.3	99 08	175.4	11 12.5	99 08	175.5	10 42.8	99 08	175.6	10 13.1	99 08	175.6	8 43.8	99 07	175.8	8 14.1	99 07	175.9	8
9	13 06.6	99 09	174.6	12 36.9	99 09	174.7	11 37.6	99 09	174.9	11 07.9	99 09	175.0	10 38.2	99 08	175.0	10 08.6	99 08	175.1	8 39.5	99 08	175.3	8 09.9	99 08	175.4	9
10	13 01.1	99 10	174.1	12 31.5	99 10	174.1	11 32.3	99 10	174.3	11 02.7	99 10	174.4	10 33.2	99 09	174.5	10 03.6	99 09	174.6	8 34.8	99 09	174.8	8 05.2	99 09	174.9	10
1	12 55.1	98 11	173.5	12 25.6	98 11	173.6	11 26.6	98 10	173.8	10 57.0	98 10	173.8	10 27.5	98 10	173.9	9 58.0	98 10	174.0	8 29.5	98 10	174.3	8 00.0	98 10	174.4	1
2	12 48.5	98 12	172.9	12 19.1	98 12	173.0	11 20.2	98 12	173.2	10 50.8	98 11	173.3	10 21.4	98 11	173.4	9 52.0	98 11	173.5	8 23.7	98 10	173.8	7 54.3	98 10	173.9	2
3	12 41.3	98 13	172.3	12 12.0	98 13	172.4	11 13.4	98 12	172.6	10 44.0	98 12	172.7	10 14.7	98 12	172.8	9 45.4	98 12	173.0	8 17.4	98 11	173.3	7 48.1	98 11	173.4	3
4	12 33.6	97 14	171.7	12 04.4	97 14	171.8	11 06.0	97 13	172.1	10 36.8	97 13	172.2	10 07.5	97 13	172.3	9 38.3	97 13	172.4	8 10.7	97 12	172.8	7 41.5	97 12	172.9	4
15	12 25.3	97 15	171.1	11 56.2	97 14	171.3	10 58.0	97 14	171.5	10 28.9	97 14	171.6	9 59.8	97 14	171.8	9 30.7	97 14	171.9	8 03.4	97 13	172.3	7 34.3	97 13	172.4	15
6	12 16.4	97 16	170.6	11 47.5	97 15	170.7	10 49.6	97 15	171.0	10 20.6	97 15	171.1	9 51.6	97 14	171.2	9 22.6	97 14	171.4	7 55.7	97 14	171.8	7 26.7	97 14	171.9	6
7	12 07.1	96 17	170.0	11 38.2	96 16	170.1	10 40.6	96 16	170.4	10 11.7	96 16	170.6	9 42.9	96 15	170.7	9 14.0	96 15	170.8	7 47.5	96 14	171.3	7 18.6	96 14	171.4	7
8	11 57.1	96 18	169.4	11 28.4	96 17	169.6	10 31.0	96 17	169.9	10 02.4	96 16	170.0	9 33.6	96 16	170.2	9 04.9	96 16	170.3	7 38.8	96 15	170.8	7 10.1	96 15	170.9	8
9	11 46.6	95 18	168.9	11 18.1	95 18	169.0	10 21.8	95 18	169.3	9 52.5	95 17	169.5	9 23.9	95 17	169.6	8 55.3	95 17	169.8	7 29.6	95 16	170.3	7 01.0	95 16	170.4	9
20	11 35.6	95 19	168.3	11 07.3	95 19	168.5	10 10.5	95 18	168.8	9 42.1	95 18	169.0	9 13.7	95 18	169.1	8 45.2	95 18	169.3	7 20.0	95 17	169.8	6 51.6	95 17	169.9	20
1	11 24.1	94 20	167.7	10 55.9	94 20	167.9	9 59.4	94 19	168.3	9 31.2	94 19	168.4	9 02.9	94 19	168.6	8 34.6	94 18	168.8	7 09.9	94 18	169.3	6 41.6	94 17	169.4	1
2	11 12.0	94 21	167.2	10 44.0	94 21	167.4	9 47.8	94 20	167.7	9 19.7	94 20	167.9	8 51.7	94 20	168.1	8 23.6	94 19	168.3	6 59.3	94 18	168.8	6 31.2	94 18	169.0	2
3	10 59.4	93 22	166.6	10 31.5	93 22	166.8	9 35.7	93 21	167.2	9 07.8	93 21	167.4	8 39.9	93 20	167.6	8 12.0	93 20	167.8	6 48.2	93 19	168.3	6 20.3	93 19	168.5	3
4	10 46.3	92 23	166.1	10 18.6	92 22	166.3	9 23.2	92 22	166.7	8 55.4	92 21	166.9	8 27.7	92 21	167.1	8 00.0	93 21	167.3	6 36.7	93 20	167.8	6 09.0	93 20	168.0	4
25	10 32.7	92 24	165.5	10 05.2	92 23	165.7	9 10.1	92 23	166.2	8 42.6	92 22	166.4	8 15.0	92 22	166.6	7 47.5	92 22	166.8	6 24.8	92 21	167.3	5 57.2	92 20	167.5	25
6	10 18.5	91 24	165.0	9 51.2	91 24	165.2	8 56.5	91 23	165.6	8 29.2	91 23	165.8	8 01.8	91 23	166.0	7 34.5	91 22	166.3	6 12.4	91 22	166.9	5 45.0	91 21	167.1	6
7	10 03.9	90 25	164.5	9 36.8	90 25	164.7	8 42.5	90 24	165.1	8 15.3	90 24	165.3	7 48.2	91 24	165.5	7 21.0	91 23	165.8	5 59.5	91 22	166.4	5 32.3	91 22	166.6	7
8	9 48.7	90 26	163.9	9 21.8	90 26	164.2	8 28.0	90 25	164.6	8 01.0	90 25	164.8	7 34.1	90 24	165.1	7 07.1	90 24	165.3	5 46.2	90 23	165.9	5 19.2	90 22	166.2	8
9	9 33.1	89 27	163.4	9 06.4	89 26	163.6	8 13.0	89 26	164.1	7 46.2	89 25	164.3	7 19.5	89 25	164.6	6 52.7	89 25	164.8	5 32.5	89 24	165.5	5 05.7	89 23	165.7	9
30	9 17.9	88 28	162.9	8 50.5	88 27	163.1	7 57.5	88 26	163.6	7 31.0	88 26	163.8	7 04.5	88 26	164.1	6 37.9	88 25	164.3	5 18.3	88 24	165.0				30
1	9 00.4	88 28	162.4	8 34.1	88 28	162.6	7 41.6	88 27	163.1	7 15.3	88 27	163.3	6 49.0	88 27	163.6	6 22.7	88 26	163.8	5 03.7	88 25	164.6				1
2	8 43.3	87 29	161.9	8 17.3	87 29	162.1	7 25.2	87 28	162.6	6 59.1	87 28	162.9	6 33.0	87 27	163.1	6 06.9	87 27	163.4							2
3	8 25.7	86 30	161.4	7 59.9	86 30	161.6	7 08.3	86 29	162.1	6 42.5	86 28	162.4	6 16.6	86 28	162.6	5 50.8	86 28	162.9							3
4	8 07.7	85 31	160.9	7 42.2	85 30	161.1	6 51.0	85 30	161.6	6 25.4	85 29	161.9	5 59.8	85 29	162.2	5 34.2	85 28	162.4							4
35	7 49.2	84 32	160.4	7 23.9	84 31	160.6	6 33.3	84 30	161.2	6 07.9	84 30	161.4	5 42.6	85 30	161.7	5 17.2	85 29	162.0							35
6	7 30.3	84 32	159.9	7 05.2	84 32	160.1	6 15.1	84 31	160.7	5 50.0	84 31	161.0	5 24.9	84 30	161.2										6
7	7 10.9	83 33	159.4	6 46.1	83 33	159.7	5 56.5	83 32	160.2	5 31.6	83 31	160.5	5 06.8	83 31	160.8										7
8	6 51.1	82 34	158.9	6 26.6	82 33	159.2	5 37.4	82 32	159.8	5 12.9	82 32	160.0													8
9	6 30.9	81 34	158.4	6 06.6	81 34	158.7	5 18.0	81 33	159.3																9
40	6 10.2	80 35	157.9	5 46.2	80 35	158.2																			40
1	5 49.1	79 36	157.5	5 25.4	79 35	157.8																			1
2	5 27.6	78 36	157.0	5 04.1	78 36	157.3																			2
3	5 05.7	77 37	156.6																						3

Lat. 23°

Lat. 24°

DECLINATION SAME NAME AS LATITUDE

Lat. 25°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	17 11.5	24 56	37.4	17 18.7	24 56	36.9	17 32.9	23 54	35.9	17 39.9	23 54	35.4	17 46.8	23 53	34.9	17 53.6	23 52	34.4	18 13.6	22 50	32.8	18 20.1	22 50	32.3	91
2	16 37.8	25 56	37.3	16 45.4	25 55	36.8	17 00.3	25 54	35.8	17 07.7	24 53	35.3	17 15.0	24 53	34.7	17 22.2	24 52	34.2	17 43.4	23 50	32.7	17 50.4	23 49	32.2	2
3	16 04.1	27 56	37.1	16 12.1	26 55	36.6	16 27.9	26 54	35.6	16 35.7	26 53	35.1	16 43.4	26 52	34.6	16 51.0	25 52	34.1	17 13.4	25 50	32.6	17 20.8	24 49	32.1	3
4	15 30.6	28 56	37.0	15 39.0	28 55	36.5	15 55.6	27 54	35.5	16 03.7	27 53	35.0	16 11.8	27 52	34.4	16 19.9	27 52	34.0	16 43.5	26 50	32.4	16 51.3	26 49	31.9	4
95	14 57.3	29 56	36.8	15 06.0	29 55	36.3	15 23.4	29 54	35.3	15 31.9	28 53	34.8	15 40.4	28 52	34.3	15 48.9	28 52	33.8	16 13.8	27 50	32.3	16 21.9	27 49	31.8	95
6	14 24.0	31 55	36.6	14 33.2	30 54	36.1	14 51.3	30 53	35.2	15 00.2	30 52	34.6	15 09.1	30 52	34.1	15 18.0	29 51	33.6	15 44.1	29 49	32.2	15 52.7	28 49	31.7	6
7	13 50.9	32 55	36.4	14 00.4	32 54	35.9	14 19.3	31 53	34.9	14 28.7	31 52	34.5	14 38.0	31 52	34.0	14 47.2	31 51	33.5	15 14.5	30 49	32.0	15 23.5	30 48	31.5	7
8	13 18.0	33 55	36.2	13 27.9	33 54	35.7	13 47.5	33 53	34.8	13 57.3	32 52	34.3	14 07.0	32 52	33.8	14 16.6	32 51	33.3	14 45.1	31 49	31.8	14 54.5	31 48	31.3	8
9	12 45.2	34 54	36.0	12 55.5	34 54	35.5	13 15.9	34 52	34.6	13 26.0	34 52	34.1	13 36.1	34 51	33.6	13 46.1	33 50	33.1	14 15.9	33 48	31.7	14 25.7	33 48	31.2	9
100	12 12.5	36 54	35.8	12 23.2	36 54	35.3	12 44.4	35 52	34.4	12 54.9	35 52	33.9	13 05.4	35 51	33.4	13 15.8	35 50	32.9	13 46.7	34 48	31.5	13 56.9	34 48	31.0	100
1	11 40.1	37 54	35.6	11 51.1	37 53	35.1	12 13.1	36 52	34.2	12 24.0	36 51	33.7	12 34.8	36 51	33.2	12 45.7	36 50	32.7	13 17.8	35 48	31.3	13 28.4	35 48	30.8	1
2	11 07.8	38 54	35.4	11 19.2	38 53	34.9	11 41.9	38 52	34.0	11 53.2	38 51	33.5	12 04.5	37 50	33.0	12 15.7	37 50	32.5	12 48.9	37 48	31.1	12 59.9	37 47	30.6	2
3	10 35.7	39 53	35.1	10 47.5	39 53	34.7	11 10.9	39 51	33.7	11 22.6	39 51	33.3	11 34.2	39 50	32.8	11 45.8	39 49	32.3	12 20.3	38 48	30.9	12 31.7	38 47	30.4	3
4	10 03.7	41 53	34.9	10 15.9	41 52	34.4	10 40.1	40 51	33.5	10 52.2	40 50	33.0	11 04.2	40 50	32.6	11 16.2	40 49	32.1	11 51.8	39 47	30.7	12 03.6	39 47	30.2	4
105	9 32.0	42 52	34.7	9 44.5	42 52	34.2	10 09.5	41 51	33.3	10 21.9	41 50	32.8	10 34.3	41 50	32.4	10 46.7	41 49	31.9	11 23.5	41 47	30.5	11 35.6	41 46	30.0	105
6	9 00.5	43 52	34.4	9 13.4	43 52	34.0	9 39.1	43 50	33.0	9 51.9	43 50	32.6	10 04.6	42 49	32.1	10 17.4	42 48	31.7	10 55.3	42 47	30.3	11 07.9	42 46	29.8	6
7	8 29.1	44 52	34.2	8 42.4	44 51	33.7	9 08.8	44 50	32.8	9 22.0	44 49	32.3	9 35.2	44 49	31.9	9 48.3	44 48	31.4	10 27.4	43 46	30.1	10 40.3	43 46	29.6	7
8	7 58.0	46 52	33.9	8 11.6	45 51	33.4	8 38.8	45 50	32.5	8 52.4	45 49	32.1	9 05.9	45 48	31.6	9 19.4	45 48	31.2	9 59.6	45 46	29.8	10 12.9	44 45	29.4	8
9	7 27.1	47 51	33.6	7 41.1	47 50	33.2	8 09.0	46 49	32.3	8 22.9	46 49	31.8	8 36.8	46 48	31.4	8 50.7	46 48	30.9	9 32.0	46 46	29.6	9 45.7	46 45	29.1	9
110	6 56.4	48 51	33.3	7 10.7	48 50	32.9	7 39.4	48 49	32.0	7 53.7	48 48	31.6	8 07.9	47 48	31.1	8 22.2	47 47	30.7	9 04.7	47 45	29.3	9 18.8	47 45	28.9	110
1	6 25.9	49 50	33.1	6 40.6	49 50	32.6	7 10.0	49 49	31.7	7 24.7	49 48	31.3	7 39.3	49 47	30.9	7 53.9	49 47	30.4	8 37.5	48 45	29.1	8 52.0	48 44	28.7	1
2	5 55.7	50 50	32.8	6 10.8	50 49	32.3	6 40.9	50 48	31.5	6 55.9	50 48	31.0	7 10.9	50 47	30.6	7 25.8	50 46	30.2	8 10.6	50 44	28.8	8 25.4	49 44	28.4	2
3	5 25.7	51 50	32.5	5 41.1	51 49	32.0	6 11.9	51 48	31.2	6 27.3	51 47	30.7	6 42.7	51 47	30.3	6 58.0	51 46	29.9	7 43.8	51 44	28.6	7 59.1	51 44	28.1	3
4				5 11.7	53 49	31.7	5 43.2	52 47	30.9	5 59.0	52 47	30.5	6 14.7	52 46	30.0	6 30.4	52 46	29.6	7 17.3	52 44	28.3	7 32.9	52 43	27.9	4
115							5 14.8	54 47	30.6	5 30.9	54 46	30.2	5 47.0	54 46	29.7	6 03.0	53 45	29.3	6 51.1	53 43	28.0	7 07.0	53 43	27.6	115
6										5 03.1	55 46	29.9	5 19.5	55 46	29.4	5 35.9	55 45	29.0	6 25.0	54 43	27.8	6 41.3	54 42	27.3	6
7																5 09.0	56 44	28.7	5 59.2	56 42	27.5	6 15.9	56 42	27.1	7
8																			5 33.7	57 42	27.2	5 50.7	57 42	26.8	8
9																			5 08.4	58 42	26.9	5 25.8	58 41	26.5	9
120																						5 01.1	59 41	26.2	120

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 22°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	52 00.0	1.0 01	00.0	51 30.0	1.0 01	00.0	50 00.0	1.0 01	00.0	49 30.0	1.0 00	00.0	49 00.0	1.0 00	00.0	43 00.0	1.0 00	00.0	42 30.0	1.0 00	00.0	37 30.0	1.0 00	00.0	00
1	51 59.6	1.0 02	00.8	51 29.6	1.0 02	00.8	49 59.6	1.0 02	00.7	49 29.7	1.0 02	00.7	48 59.7	1.0 02	00.7	42 59.8	1.0 01	00.5	42 29.8	1.0 01	00.5	37 29.8	1.0 01	00.3	1
2	51 58.4	1.0 03	01.6	51 28.5	1.0 03	01.6	49 58.6	1.0 03	01.5	49 28.6	1.0 03	01.4	48 58.7	1.0 03	01.4	42 59.0	1.0 02	01.0	42 29.1	1.0 02	00.9	37 29.3	1.0 01	00.7	2
3	51 56.5	1.0 05	02.4	51 26.5	1.0 04	02.4	49 56.8	1.0 04	02.2	49 26.9	1.0 04	02.1	48 57.0	1.0 04	02.1	42 57.9	1.0 03	01.5	42 27.9	1.0 03	01.4	37 28.5	1.0 02	01.0	3
4	51 53.7	99 06	03.2	51 23.9	99 06	03.2	49 54.3	99 05	02.9	49 24.5	1.0 05	02.8	48 54.6	1.0 05	02.8	42 56.2	1.0 04	02.0	42 26.3	1.0 04	01.9	37 27.4	1.0 02	01.3	4
05	51 50.2	99 07	04.0	51 20.4	99 07	03.9	49 51.2	99 06	03.6	49 21.4	99 06	03.5	48 51.6	99 06	03.4	42 54.1	99 04	02.4	42 24.2	99 04	02.4	37 25.9	99 03	01.7	05
6	51 45.9	99 08	04.8	51 16.2	99 08	04.7	49 47.3	99 08	04.4	49 17.6	99 07	04.2	48 47.9	99 07	04.1	42 51.5	99 05	02.9	42 21.7	99 05	02.8	37 24.1	99 04	02.0	6
7	51 40.8	98 10	05.6	51 11.3	98 10	05.5	49 42.7	98 09	05.1	49 13.2	98 09	04.9	48 43.6	99 08	04.8	42 48.4	99 06	03.4	42 18.7	99 06	03.3	37 22.0	99 04	02.3	7
8	51 34.9	98 11	06.4	51 05.6	98 11	06.3	49 37.4	98 10	05.8	49 08.0	98 10	05.6	48 38.6	98 09	05.5	42 44.8	98 07	03.9	42 15.3	98 06	03.8	37 19.6	99 05	02.7	8
9	51 28.3	97 12	07.2	50 59.1	97 12	07.0	49 31.5	97 11	06.5	49 02.2	98 11	06.3	48 33.0	98 10	06.2	42 40.8	98 08	04.4	42 11.4	98 07	04.2	37 16.8	98 05	03.0	9
10	51 21.0	97 14	08.0	50 52.0	97 13	07.8	49 24.8	97 12	07.2	48 55.8	97 12	07.0	48 26.7	97 12	06.8	42 36.3	98 08	04.9	42 07.1	98 08	04.7	37 13.7	98 06	03.3	10
1	51 12.9	96 15	08.8	50 44.1	96 14	08.5	49 17.5	96 13	07.9	48 48.7	96 13	07.7	48 19.7	96 12	07.5	42 31.4	97 09	05.3	42 02.3	97 09	05.2	37 10.3	98 06	03.7	1
2	51 04.0	95 16	09.5	50 35.4	95 16	09.3	49 09.6	96 14	08.6	48 40.9	96 14	08.4	48 12.2	96 14	08.1	42 26.0	97 10	05.8	41 57.1	97 10	05.6	37 06.6	97 07	04.0	2
3	50 54.4	94 17	10.3	50 26.1	94 17	10.0	49 00.9	95 15	09.3	48 32.5	96 15	09.0	48 04.0	95 15	08.8	42 20.2	96 10	06.3	41 51.4	96 10	06.1	37 02.6	97 07	04.3	3
4	50 44.2	94 18	11.0	50 16.1	94 18	10.7	48 51.7	94 17	09.9	48 23.4	94 16	09.7	47 55.2	94 16	09.4	42 13.9	95 11	06.7	41 45.3	95 11	06.5	36 58.2	96 08	04.6	4
15	50 33.2	93 20	11.8	50 05.4	93 19	11.5	48 41.7	93 18	10.6	48 13.8	93 17	10.3	47 45.8	93 17	10.1	42 07.2	95 12	07.2	41 38.8	95 12	07.0	36 53.6	95 08	05.0	15
6	50 21.5	92 21	12.5	49 54.0	92 20	12.2	48 31.2	92 19	11.3	48 03.5	92 18	11.0	47 35.7	93 18	10.7	42 00.0	94 13	07.6	41 31.8	94 12	07.4	36 48.6	95 09	05.3	6
7	50 09.2	91 22	13.2	49 41.9	91 21	12.9	48 20.0	91 20	11.9	47 52.6	91 19	11.6	47 25.1	92 19	11.3	41 52.4	93 14	08.1	41 24.4	93 13	07.8	36 43.3	94 09	05.6	7
8	49 56.1	90 23	13.9	49 29.2	90 22	13.5	48 08.2	90 21	12.6	47 41.1	90 20	12.2	47 13.9	91 20	11.9	41 44.3	92 14	08.5	41 16.6	92 14	08.3	36 37.8	93 10	05.9	8
9	49 42.5	88 24	14.6	49 15.9	89 23	14.2	47 55.8	89 22	13.2	47 29.0	89 21	12.9	47 02.1	90 20	12.5	41 35.9	91 15	09.0	41 08.4	92 14	08.7	36 31.9	93 10	06.2	9
20	49 28.1	87 25	15.3	49 01.9	88 24	14.9	47 42.8	88 22	13.8	47 16.3	88 22	13.5	46 49.8	89 22	13.1	41 27.0	91 16	09.4	40 59.8	91 15	09.1	36 25.7	92 11	06.5	20
1	49 13.2	86 26	15.9	48 47.3	86 25	15.5	47 29.3	87 24	14.4	47 03.1	87 23	14.1	46 36.9	88 22	13.7	41 17.7	90 16	09.8	40 50.7	90 16	09.6	36 19.2	91 11	06.8	1
2	48 57.6	85 27	16.6	48 32.1	85 26	16.2	47 15.1	86 24	15.0	46 49.3	86 24	14.6	46 23.4	86 23	14.3	41 08.0	89 17	10.3	40 41.3	89 16	10.0	36 12.5	90 12	07.1	2
3	48 41.4	84 28	17.2	48 16.3	84 27	16.8	47 00.4	85 25	15.6	46 35.0	85 25	15.2	46 09.5	85 24	14.8	40 57.8	88 18	10.7	40 31.5	88 17	10.4	36 05.4	89 12	07.4	3
4	48 24.7	82 29	17.8	48 00.0	83 28	17.4	46 45.2	83 26	16.2	46 20.1	84 26	15.8	45 55.0	84 25	15.4	40 47.3	87 18	11.1	40 21.3	87 18	10.8	35 58.1	88 13	07.7	4
25	48 07.4	81 30	18.5	47 43.0	81 29	18.0	46 29.4	82 27	16.7	46 04.7	83 26	16.3	45 39.9	83 26	15.9	40 36.4	86 19	11.5	40 10.7	86 18	11.2	35 50.5	88 13	08.0	25
6	47 49.5	80 31	19.1	47 25.5	80 30	18.6	46 13.1	81 28	17.3	45 48.8	81 27	16.9	45 24.4	82 27	16.5	40 25.1	85 19	11.9	39 59.7	85 19	11.6	35 42.6	87 14	08.3	6
7	47 31.0	78 32	19.6	47 07.5	79 31	19.2	45 56.3	80 29	17.8	45 32.4	80 28	17.4	45 08.4	80 28	17.0	40 13.5	83 20	12.3	39 48.4	84 20	11.9	35 34.4	86 14	08.6	7
8	47 12.1	77 32	20.2	46 49.0	77 32	19.7	45 39.1	78 30	18.4	45 15.5	79 29	17.9	44 51.9	79 28	17.5	40 01.4	82 21	12.7	39 36.7	83 20	12.3	35 26.0	85 14	08.9	8
9	46 52.6	75 33	20.8	46 29.9	76 32	20.3	45 21.3	77 30	18.9	44 58.2	77 30	18.4	44 34.9	78 29	18.0	39 49.0	81 21	13.1	39 24.7	81 21	12.7	35 17.3	83 15	09.1	9
30	46 32.6	74 34	21.3	46 10.4	74 33	20.8	45 03.0	75 31	19.4	44 40.3	76 30	18.9	44 17.5	76 30	18.5	39 36.3	80 22	13.5	39 12.3	80 21	13.1	35 08.4	82 16	09.4	30
1	46 12.2	72 35	21.8	45 50.4	73 34	21.3	44 44.3	74 32	19.9	44 22.0	74 31	19.4	43 59.7	75 30	19.0	39 23.1	79 22	13.8	38 59.5	79 22	13.4	34 59.1	81 16	09.7	1
2	45 51.2	71 36	22.4	45 29.9	71 35	21.9	44 25.1	73 32	20.4	44 03.3	73 32	19.9	43 41.4	73 31	19.4	39 09.7	77 23	14.2	38 46.4	78 22	13.8	34 49.7	80 16	09.9	2
3	45 29.8	69 36	22.9	45 09.0	70 36	22.4	44 05.6	71 34	20.9	43 44.2	72 33	20.4	43 22.6	72 32	19.9	38 55.9	76 24	14.5	38 33.0	76 23	14.1	34 39.9	79 16	10.2	3
4	45 08.0	68 37	23.3	44 47.6	68 36	22.8	43 45.5	70 34	21.3	43 24.6	70 33	20.8	43 03.5	70 32	20.3	38 41.8	75 24	14.9	38 19.3	75 23	14.5	34 30.0	78 17	10.4	4
35	44 45.8	66 38	23.8	44 25.8	67 37	23.3	43 25.1	68 35	21.8	43 04.6	69 34	21.3	42 44.0	69 33	20.8	38 27.3	73 24	15.2	38 05.3	74 24	14.8	34 19.8	77 18	10.7	35
6	44 23.1	65 38	24.3	44 03.6	65 38	23.8	43 04.3	67 35	22.2	42 44.3	67 35	21.7	42 24.1	67 34	21.2	38 12.6	72 25	15.6	37 50.9	72 24	15.1	34 09.3	75 18	10.9	6
7	44 00.0	63 39	24.7	43 41.0	64 38	24.2	42 43.1	65 36	22.6	42 23.5	66 35	22.1	42 03.8	66 34	21.6	37 57.5	71 26	15.9	37 36.3	71 25	15.4	33 58.7	74 18	11.2	7
8	43 36.5	62 40	25.2	43 18.0	62 39	24.6	42 21.5	63 36	23.0	42 02.4	64 36	22.5	41 43.1	64 35	22.0	37 42.1	69 26	16.2	37 21.3	70 25	15.7	33 47.7	73 18	11.4	8
9	43 12.7	60 40	25.6	42 54.7	60 40	25.0	41 59.6	62 37	23.4	41 40.9	62 36	22.9	41 22.1	63 36	22.4	37 26.5	68 27	16.5	37 06.1	68 26	16.0	33 36.6	71 19	11.6	9
40	42 48.5	58 41	26.0	42 30.9	59 40	25.4	41 37.3	60 38	23.8	41 19.1	61 37	23.3	41 00.8	61 36	22.8	37 10.5	66 27	16.8	36 50.6	67 26	16.3	33 25.3	70 19	11.9	40
1	42 24.0	57 42	26.4	42 06.9	57 41	25.8	41 14.7	59 38	24.2	40 57.0	59 38	23.6	40 39.1	60 37	23.1	36 54.3	65 28	17.1	36 34.8	65 27	16.6	33 13.7	69 20	12.1	1
2	41 59.1	55 42	26.7	41 42.5	56 41	26.2	40 51.7	57 39	24.5	40 34.5	58 38	24.0	40 17.1	58 37	23.5	36 37.8	63 28	17.4	36 18.7	64 27	16.9	33 02.0	67 20	12.3	2
3	41 33.9	53 43	27.1	41 17.8	54 42	26.6	40 28.5	56 39	24.9	40 11.7	56 38	24.3	39 54.8	57 38	23.8	36 21.1	62 28	17.7	36 02.4	62 28	17.2	32 50.0	66 20	12.5	3
4	41 08.4	52 43	27.4	40 52.8	52 42	26.9	40 04.9	54 40	25.2	39 48.6	54 39	24.7	39 32.2	55 38	24.1	36 04.1	60 29	17.9	35 45.9	61 28	17.4	32 37.8	64 20	12.7	4
45	40 42.6	50 44	27.8	40 27.4	51 43	27.2	39 41.0	52 40	25.6	39 25.2	53 39	25.0	39 09.3	53 39	24.5	35 46.8	59 29	18.2	35 29.1	59 28	17.7	32 25.5	63 21	12.9	45
6	40 16.5	49 44	28.1	40 01.8	49 43	27.6	39 16.9	51 41	25.9	39 01.6	51 40	25.3	38 46.1	52 39	24.8	35 29.3	57 30	18.5	35 12.0	58 29	18.0	32 12.9	62 21	13.1	6
7	39 50.1	47 44	28.4	39 36.0	47 44	27.9	38 52.5	49 41	26.2	38 37.7	50 40	25.6	38 22.7	50 40	25.1	35 11.6	56 30	18.7	34 54.8	56 29	18.2	32 00.2	60 22	13.3	7
8	39 23.5	45 45	28.7	39 09.8	46 44	28.2	38 27.8	48 42	26.5	38 13.5	48 41	25.9	37 59.0	49 40	25.3	34 53.6	54 30	18.9	34 37.3	55 30	18.4	31 47.3	59 22	13.5	8
9	38 56.6	44 45	29.0	38 43.5	44 44	28.4	38 02.9	46 42	26.7	37 49.1	46 41	26.2	37 35.1	47 40	25.6	34 35.5	53 31	19.2	34 19.6	53 30	18.7	31 34.2	57 22	13.7	9
50	38 29.5	42 46	29.3	38 16.9	43 45	28.7	37 37.8	44 42	27.0	37 24.4	45 42	26.4	37 10.9	45 41	25.9	34 17.1	51 31	19.4	34 01.7	52 30	18.9	31 20.9	56 22	13.9	50
1	38 02.2	40 46	29.6	37 50.0	41 45	29.0	37 12.4	43 43	27.3	36 59.5	43 42	26.7	36 46.5	44 41	26.1	33 58.5	49 31	19.6	33 43.6	50 30	19.1	31 07.5	54 22	14.0	1
2	37 34.7	39 46	29.8	37 22.9	39 45	29.2	36 46.8	41 43	27.5	36 34.4	41 42	26.9	36 21.9	42 41	26.4	33 39.7	48 32	19.8	33 25.3	48 31	19.3	30 54.0	52 23	14.2	2
3	37 06.9	37 47	30.1	36 55.7	38 46	29.5	36 21.0	39 43	27.7	36 09.1	40 42	27.2	35 57.1	40 42	26.6	33 20.8	46 32	20.0	33 06.8	47 31	19.5	30 40.2	51 23	14.4	3
4	36 38.9	35 47	30.3	36 28.2	36 46	29.7	35 55.0	38 44	28.0	35 43.6	38 43	27.4	35 32.1	39 42	26.8	33 01.6	45 32	20.2	32 48.1	45 31	19.7	30 26.4	49 24	14.5	4
55	36 10.8	34 47	30.5	36 00.6	34 46	29.9	35 28.8	36 44	28.2	35 17.9	37 43	27.6	35 06.9	37 42	27.0	32 42.3	43 32	20.4	32 29.3	43 32	19.9	30 12.3	48 24	14.7	55
6	35 42.5	32 48	30.7	35 32.7	33 47	30.1	35 02.5	34 44	28.4	34 52.1	35 44	27.8	34 41.5	36 43	27.2	32 22.8	41 33	20.6	32 10.3	42 32	20.1	29 58.2	46 24	14.8	6
7	35 14.0	31 48	30.9	35 04.7	31 47	30.3	34 36.0	33 44	28.6	34 26.0	33 44	28.0	34 15.9	34 43	27.4	32 03.1	40 33	20.8	31 51.1	40 32	20.2	29 43.9	45 24	14.9	7
8	34 45.4	29 48	31.1	34 36.6	30 47	30.5	34 09.3	31 45	28.8	33 59.8	32 44	28.2	33 50.2	32 43	27.6	31 43.3	38 33	20.9	31 31.8	39 32	20.4	29 29.5	43 24	15.1	8
9	34 16.6	27 48	31.2	34 08.3	28 47	30.7	33 42.4	30 45	28.9	33 33.5	30 44	28.4	33 24.4	31 43	27.8	31 23.4	36 34	21.1	31 12.4	37 33	20.5	29 14.9	41 24	15.2	9
60	33 47.7	26 48	31.4	33 39.9	26 48	30.8	33 15.4	28 45	29.1	33 07.0	28 44	28.5	32 58.4	29 44	27.9	31 03.3	35 34	21.2	30 52.8	35 33	20.7	29 00.2	40 24	15.3	60
1	33 18.6	24 49	31.6	33 11.3	25 48	31.0	32 48.3	26 45	29.2	32 40.4	27 45	28.7	32 32.2	27 44	28.1	30 43.1	33 34	21.4	30 33.1	34 33	20.8	28 45.5	38 25	15.5	1
2	32 49.4	23 49	31.7	32 42.6	23 48	31.1	32 21.1	25 46	29.4	32 13.6	25 45	28.8	32 06.0	26 44	28.2	30 22.7	32 34	21.5	30 13.2	32 33	21.0	28 30.6	36 25	15.6	2
3	32 20.2	21 49	31.8	32 13.8	22 48	31.2	31 53.7	23 46	29.5	31 46.7	24 45	28.9	31 39.6	24 44	28.4	30 02.3	30 34	21.6	29 53.2	30 33	21.1	28 15.6	35 25	15.7	3
4	31 50.8	19 49	31.9	31 44.9	20 48	31.4	31 26.3	21 46	29.6	31 19.8	22 45	29.1	31 13.1	22 44	28.5	29 41.7	28 34	21.8	29 33.2	29 34	21.2	28 00.5	33 25	15.8	4
65	31 21.3	18 49	32.0	31 15.9	18 48	31.5	30 58.7	20 46	29.7	30 52.7	20 45	29.2	30 46.5	21 44	28.6	29 21.0	27 35	21.9	29 13.0	27 34	21.3	27 45.3	31 25	15.9	65
6	30 51.7	16 50	32.1	30 46.8	17 49	31.6	30 31.1	18 46	29.9	30 25.5	19 45	29.3	30 19.8	19 44	28.7	29 00.2	26 35	22.0	28 52.7	25 34	21.4	27 30.1	30 26	16.0	6
7	30 22.1	15 50	32.2	30 17.6	15 49	31.7	30 03.3	17 46	30.0	29 58.3	17 46	29.4	29 53.1	18 45	28.8	28 39.4	23 35	22.1	28 32.3	24 34	21.5	27 14.7	28 26	16.1	7
8	29 52.4	13 50	32.3	29 48.4	14 49	31.7	29 35.5	15 46	30.0	29 30.9	16 46	29.5	29 26.2	16 45	28.9	28 18.4	22 35	22.2	28 11.9	22 34	21.6	26 59.3	26 26	16.1	8
9	29 22.6	12 50	32.4	29 19.1	12 49	31.8	29 07.6	13 46	30.1	29 03.5	14 46	29.5	28 59.3	14 45	29.0	27 57.4	20 35	22.3	27 51.3	20 34	21.7	26 43.8	25 26	16.2	9
70	28 52.8	10 50	32.5	28 49.7	10 49	31.9	28 39.7	12 47	30.2	28 36.1	12 46	29.6	28 32.3	13 45	29.1	27 36.3	18 35	22.3	27 30.7	19 34	21.8	26 28.2	23 26	16.3	70
1	28 22.9	08 50	32.5	28 20.3	09 49	31.9	28 11.7	10 47	30.2	28 08.5	11 46	29.7	28 05.2	11 45	29.1	27 15.1	17 35	22.4	27 10.1	17 35	21.9	26 12.6	21 26	16.4	1
2	27 53.0	07 50	32.5	27 50.9	07 49	32.0	27 43.7	09 47	30.3	27 41.0	09 46	29.7	27 38.2	10 45	29.2	26 53.9	15 36	22.5	26 49.3	15 35	21.9	25 56.9	20 26	16.4	2
3	27 23.1	05 50	32.6	27 21.4	06 49	32.0	27 15.6	07 47	30.3	27 13.4	08 46	29.8	27 11.0	08 45	29.2	26 32.6	13 36	22.5	26 28.5	14 35	22.0	25 41.1	18 26	16.5	3
4	26 53.1	04 50	32.6	26 51.9	04 49	32.0	26 47.5	06 47	30.4	26 45.7	06 46	29.8	26 43.9	06 46	29.3	26 11.3	12 36	22.6	26 07.7	12 35	22.0	25 25.3	16 26	16.5	4
75	26 23.1	02 50	32.6	26 22.4	03 49	32.1	26 19.3	04 47	30.4	26 18.1	04 46	29.8	26 16.7	05 45	29.3	25 49.9	10 36	22.6	25 46.8	10 35	22.1	25 09.5	14 26	16.6	75
6	25 53.1	01 50	32.6	25 52.8	01 49	32.1	25 51.2	02 47	30.4	25 50.4	03 46	29.9	25 49.4	03 45	29.3	25 28.5	08 36	22.7	25 25.9	09 35	22.1	24 53.6	13 26	16.6	6
7	25 23.1	01 50	32.6	25 23.3	00 49	32.1	25 23.0	01 47	30.4	25 22.7	01 46	29.9	25 22.2	02 45	29.3	25 07.0	07 36	22.7	25 05.0	07 35	22.1	24 37.7	11 27	16.6	7
8	24 53.1	02 50	32.6	24 53.7	02 49	32.1	24 54.8	01 47	30.4	24 55.0	00 46	29.9	24 55.0	00 45	29.3	24 45.6	05 36	22.7	24 44.0	05 35	22.2	24 21.7	09 27	16.7	8
9	24 23.1	04 50	32.6	24 24.2	03 49	32.1	24 26.7	02 47	30.4	24 27.3	02 46	29.9	24 27.7	01 45	29.3	24 24.1	03 36	22.7	24 23.0	04 35	22.2	24 05.7	08 27	16.7	9
80	23 53.2	06 50	32.6	23 54.7	06 49	32.0	23 58.5	04 47	30.4	23 59.6	03 46	29.9	24 00.5	03 45	29.3	24 02.6	02 36	22.7	24 02.0	02 35	22.2	23 49.7	06 27	16.7	80
1	23 23.2	07 50	32.5	23 25.2	06 49	32.0	23 30.4	05 47	30.4	23 31.9	05 46	29.8	23 33.3	04 45	29.3	23 41.1	00 36	22.7	23 41.0	01 35	22.2	23 33.7	04 27	16.7	1
2	22 53.3	08 50	32.5	22 55.7	08 49	32.0	23 02.3	07 47	30.3	23 04.2	06 46	29.8	23 06.1	06 45	29.3	23 19.6	02 36	22.7	23 20.0	01 35	22.2	23 17.7	03 27	16.7	2
3	22 23.4	10 50	32.5	22 26.3	09 49	31.9	22 34.2	08 47	30.3	22 36.6	08 46	29.8	22 38.9	08 45	29.2	22 58.1	03 36	22.7	22 59.0	03 35	22.2	23 01.7	01 27	16.8	3
4	21 53.6	11 50	32.4	21 56.9	11 49	31.9	22 06.1	10 47	30.3	22 09.0	09 46	29.7	22 11.8	09 45	29.2	22 36.6	05 36	22.7	22 38.0	04 35	22.2	22 45.6	01 27	16.8	4
85	21 23.8	13 50	32.3	21 27.5	12 49	31.8	21 38.1	11 47	30.2	21 41.4	11 46	29.7	21 44.7	11 45	29.1	22 15.1	06 36	22.7	22 17.0	06 35	22.2	22 29.6	02 27	16.7	85
6	20 54.1	14 49	32.3	20 58.2	14 49	31.7	21 10.1	13 46	30.1	21 13.9	12 46	29.6	21 17.6	12 45	29.1	21 53.7	08 36	22.7	21 56.0	08 35	22.1	22 13.6	04 27	16.7	6
7	20 24.4	16 49	32.2	20 29.0	15 49	31.7	20 42.2	14 46	30.1	20 46.5	14 46	29.5	20 50.6	14 45	29.0	21 32.3	10 36	22.6	21 35.1	09 35	22.1	21 57.6	06 27	16.7	7
8	19 54.8	17 49	32.1	19 59.8	17 48	31.6	20 14.4	16 46	30.0	20 19.0	15 46	29.5	20 23.6	15 45	28.9	21 10.9	11 36	22.6	21 14.2	11 35	22.1	21 41.6	07 27	16.7	8
9	19 25.3	18 49	32.0	19 30.7	18 48	31.5	19 46.6	17 46	29.9	19 51.7	17 46	29.4	19 56.7	17 45	28.9	20 49.5	13 36	22.5	20 53.3	12 35	22.0	21 25.6	09 27	16.7	9
90	18 55.8	20 49	31.9	19 01.7	20 48	31.4	19 18.9	19 46	29.8	19 24.4	18 45	29.3	19 29.9	18 45	28.8	20 28.2	14 35	22.5	20 32.5	14 35	22.0	21 09.6	11 26	16.7	90

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.	63° 00′ Alt.	Δd	Δt	Az.	69° 00′ Alt.	Δd	Δt	Az.	69° 30′ Alt.	Δd	Δt	Az.	74° 30′ Alt.	Δd	Δt	Az.	H.A.
°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	
91	18 26.5	21	49	31.8	18 32.8	21	48	31.3	18 51.3	20	46	29.7	18 57.2	20	45	29.2	19 03.1	20	44	28.7	20 07.0	16	35	22.4	20 11.7	16	34	21.9	20 53.7	12	26	16.6	91
2	17 57.2	23	49	31.7	18 03.9	22	48	31.2	18 23.7	22	46	29.6	18 30.1	21	45	29.1	18 36.5	21	44	28.6	19 45.8	17	35	22.4	19 51.0	17	34	21.8	20 37.8	14	26	16.6	2
3	17 28.0	24	48	31.6	17 35.2	24	48	31.1	17 56.2	23	46	29.5	18 03.1	23	45	29.0	18 09.9	22	44	28.5	19 24.6	19	35	22.3	19 30.3	19	34	21.8	20 22.0	16	26	16.5	3
4	16 59.0	25	48	31.4	17 06.5	25	48	30.9	17 28.9	24	46	29.4	17 36.2	24	45	28.9	17 43.4	24	44	28.4	19 03.6	21	35	22.2	19 09.7	20	34	21.7	20 06.1	17	26	16.5	4
95	16 30.0	27	48	31.3	16 38.0	27	47	30.8	17 01.6	26	45	29.3	17 09.3	26	44	28.8	17 17.0	25	44	28.3	18 42.6	22	35	22.1	18 49.2	22	34	21.6	19 50.4	19	26	16.4	95
6	16 01.2	28	48	31.1	16 09.6	28	47	30.7	16 34.5	27	45	29.2	16 42.6	27	44	28.7	16 50.7	27	44	28.1	18 21.6	24	35	22.1	18 28.7	23	34	21.5	19 34.7	21	26	16.4	6
7	15 32.4	30	48	31.0	15 41.3	29	47	30.5	16 07.4	29	45	29.0	16 16.0	28	44	28.5	16 24.5	28	44	28.0	18 00.8	25	35	22.0	18 08.3	25	34	21.5	19 19.0	22	26	16.3	7
8	15 03.8	31	48	30.8	15 13.1	31	47	30.4	15 40.5	30	45	28.9	15 49.5	30	44	28.4	15 58.4	30	43	27.9	17 40.0	27	34	21.9	17 48.0	26	34	21.4	19 03.4	24	26	16.3	8
9	14 35.4	32	47	30.7	14 45.1	32	47	30.2	15 13.7	31	44	28.7	15 23.1	31	44	28.2	15 32.5	31	43	27.7	17 19.3	28	34	21.8	17 27.8	28	34	21.3	18 47.8	25	26	16.2	9
100	14 07.1	34	47	30.5	14 17.1	33	46	30.0	14 47.0	33	44	28.6	14 56.9	33	44	28.1	15 06.6	32	43	27.6	16 58.8	30	34	21.7	17 07.6	30	33	21.2	18 32.4	27	26	16.1	100
1	13 38.9	35	47	30.3	13 49.4	35	46	29.9	14 20.5	34	44	28.4	14 30.7	34	43	27.9	14 40.9	34	42	27.4	16 38.3	31	34	21.5	16 47.6	31	33	21.0	18 17.0	28	26	16.0	1
2	13 10.9	36	46	30.2	13 21.8	36	46	29.7	13 54.1	36	44	28.2	14 04.8	35	43	27.8	14 15.4	35	42	27.3	16 17.9	33	34	21.4	16 27.7	33	33	20.9	18 01.6	30	25	15.9	2
3	12 43.0	38	46	30.0	12 54.3	38	46	29.5	13 27.9	37	44	28.1	13 38.9	37	43	27.6	13 50.0	37	42	27.1	15 57.7	34	34	21.3	16 07.9	34	33	20.8	17 46.4	32	25	15.9	3
4	12 15.3	39	46	29.8	12 27.0	39	45	29.3	13 01.8	38	43	27.9	13 13.3	38	43	27.4	13 24.7	38	42	26.9	15 37.5	36	33	21.2	15 48.2	35	33	20.7	17 31.2	33	25	15.8	4
105	11 47.8	40	46	29.6	11 59.9	40	45	29.1	12 35.8	40	43	27.7	12 47.7	40	42	27.2	12 59.6	39	42	26.7	15 17.5	37	33	21.0	15 28.6	37	32	20.5	17 16.1	35	25	15.7	105
6	11 20.4	42	45	29.4	11 32.9	42	45	28.9	12 10.1	41	43	27.5	12 22.4	41	42	27.0	12 34.6	41	41	26.6	14 57.6	39	33	20.9	15 09.1	38	32	20.4	17 01.1	36	25	15.6	6
7	10 53.2	43	45	29.1	11 06.1	43	44	28.7	11 44.5	42	42	27.3	11 57.2	42	42	26.8	12 09.8	42	41	26.4	14 37.8	40	33	20.7	14 49.8	40	32	20.3	16 46.2	38	25	15.5	7
8	10 26.2	44	45	28.9	10 39.5	44	44	28.5	11 19.1	44	42	27.1	11 32.2	44	42	26.6	11 45.2	43	41	26.2	14 18.2	41	32	20.6	14 30.6	41	32	20.1	16 31.4	39	24	15.4	8
9	9 59.4	46	44	28.7	10 13.1	45	44	28.2	10 53.8	45	42	26.9	11 07.3	45	41	26.4	11 20.8	45	40	26.0	13 58.7	43	32	20.4	14 11.5	43	32	20.0	16 16.7	41	24	15.3	9
110	9 32.8	47	44	28.5	9 46.9	47	44	28.0	10 28.8	46	42	26.7	10 42.7	46	41	26.2	10 56.5	46	40	25.8	13 39.3	44	32	20.3	13 52.6	44	31	19.8	16 02.1	42	24	15.1	110
1	9 06.4	48	44	28.2	9 20.8	48	43	27.8	10 03.9	48	41	26.4	10 18.2	48	40	26.0	10 32.4	47	40	25.5	13 20.1	46	32	20.1	13 33.8	46	31	19.7	15 47.7	44	24	15.0	1
2	8 40.2	49	43	28.0	8 55.0	49	43	27.5	9 39.2	49	41	26.2	9 53.9	49	40	25.8	10 08.5	49	40	25.3	13 01.1	47	32	19.9	13 15.2	47	31	19.5	15 33.3	45	24	14.9	2
3	8 14.3	51	43	27.7	8 29.4	51	42	27.3	9 14.8	50	40	26.0	9 29.8	50	40	25.5	9 44.8	50	39	25.1	12 42.2	48	31	19.8	12 56.7	48	30	19.3	15 19.0	47	24	14.8	3
4	7 48.5	52	42	27.5	8 04.0	52	42	27.0	8 50.5	52	40	25.7	9 06.0	51	40	25.3	9 21.4	51	39	24.9	12 23.5	50	31	19.6	12 38.4	50	30	19.1	15 04.9	48	23	14.6	4
115	7 23.0	53	42	27.2	7 38.9	53	42	26.8	8 26.5	53	40	25.5	8 42.3	53	39	25.0	8 58.1	53	38	24.6	12 04.9	51	31	19.4	12 20.2	51	30	19.0	14 50.9	49	23	14.5	115
6	6 57.7	54	42	26.9	7 13.9	54	41	26.5	8 02.7	54	39	25.2	8 18.9	54	39	24.8	8 35.0	54	38	24.4	11 46.5	52	30	19.2	12 02.2	52	30	18.8	14 37.0	51	23	14.4	6
7	6 32.6	56	41	26.6	6 49.2	55	41	26.2	7 39.1	55	39	25.0	7 55.6	55	38	24.5	8 12.2	55	38	24.1	11 28.3	54	30	19.0	11 44.4	54	29	18.6	14 23.3	52	23	14.2	7
8	6 07.8	57	41	26.4	6 24.8	57	40	25.9	7 15.7	56	38	24.7	7 32.6	56	38	24.3	7 49.5	56	37	23.9	11 10.2	55	30	18.8	11 26.8	55	29	18.4	14 09.7	54	22	14.1	8
9	5 43.2	58	40	26.1	6 00.6	58	40	25.7	6 52.6	58	38	24.4	7 09.9	58	38	24.0	7 27.2	58	37	23.6	10 52.4	56	30	18.6	11 09.3	56	29	18.2	13 56.2	55	22	13.9	9
120	5 18.9	59	40	25.8	5 36.6	59	40	25.4	6 29.7	59	38	24.2	6 47.4	59	37	23.7	7 05.0	59	36	23.3	10 34.7	58	29	18.4	10 52.0	58	28	18.0	13 42.9	56	22	13.8	120
1					5 12.9	60	39	25.1	6 07.1	60	37	23.9	6 25.1	60	37	23.5	6 43.1	60	36	23.1	10 17.3	59	29	18.2	10 34.9	59	28	17.8	13 29.7	58	22	13.6	1
2									5 44.7	61	37	23.6	6 03.0	61	36	23.2	6 21.4	61	36	22.8	10 00.0	60	28	18.0	10 18.0	60	28	17.6	13 16.7	59	22	13.5	2
3									5 22.5	62	36	23.3	5 41.3	62	36	22.9	6 00.0	62	35	22.5	9 42.9	61	28	17.8	10 01.4	61	28	17.4	13 03.8	60	21	13.3	3
4									5 00.7	64	36	23.0	5 19.7	64	35	22.6	5 38.8	64	35	22.2	9 26.1	63	28	17.5	9 44.9	63	27	17.1	12 51.1	62	21	13.1	4
125																	5 17.9	65	34	21.9	9 09.4	64	27	17.3	9 28.6	64	27	16.9	12 38.5	63	21	13.0	125
																					8 53.0	65	27	17.1	9 12.5	65	26	16.7	12 26.1	64	20	12.8	6
																					8 36.8	66	27	16.8	8 56.6	66	26	16.4	12 13.9	65	20	12.6	7
																					8 20.8	67	26	16.6	8 41.0	67	26	16.2	12 01.8	66	20	12.4	8
																					8 05.0	69	26	16.3	8 25.6	69	25	16.0	11 49.9	68	20	12.3	9
																					7 49.5	70	26	16.1	8 10.4	70	25	15.7	11 38.2	69	19	12.1	130
																					7 34.2	71	25	15.8	7 55.4	71	24	15.5	11 26.7	70	19	11.9	1
																					7 19.1	72	25	15.6	7 40.7	72	24	15.2	11 15.3	71	18	11.7	2
																					7 04.3	73	24	15.3	7 26.2	73	24	15.0	11 04.2	72	18	11.5	3
																					6 49.7	74	24	15.1	7 12.0	74	23	14.7	10 53.2	73	18	11.3	4
																					6 35.4	75	23	14.8	6 58.0	75	23	14.4	10 42.4	74	18	11.1	135
																					6 21.4	76	23	14.5	6 44.2	76	22	14.2	10 31.8	76	17	10.9	6
																					6 07.6	77	23	14.2	6 30.7	77	22	13.9	10 21.4	77	17	10.7	7
																					5 54.0	78	22	13.9	6 17.5	78	22	13.6	10 11.2	78	17	10.5	8
																					5 40.7	79	22	13.7	6 04.5	79	21	13.4	10 01.2	79	16	10.3	9
																					5 27.7	80	21	13.4	5 51.8	80	21	13.1	9 51.4	80	16	10.0	140
																					5 15.0	81	21	13.1	5 39.3	81	20	12.8	9 41.8	81	16	09.8	1
																					5 02.5	82	20	12.8	5 27.1	82	20	12.5	9 32.4	82	15	09.6	2
																									5 15.2	83	19	12.2	9 23.2	82	15	09.4	3
																									5 03.6	84	19	11.9	9 14.2	83	14	09.2	4
																													9 05.5	84	14	08.9	145
																													8 57.0	85	14	08.7	6
																													8 48.7	86	14	08.5	7
																													8 40.6	87	13	08.2	8
																													8 32.7	88	13	08.0	9
																													8 25.1	88	12	07.8	150
																													8 17.7	89	12	07.5	1
																													8 10.5	90	12	07.3	2
																													8 03.6	91	11	07.0	3
																													7 56.9	91	11	06.8	4
																													7 50.4	92	10	06.5	155
																													7 44.2	92	10	06.3	6
																													7 38.2	93	10	06.0	7
																													7 32.5	94	09	05.8	8
																													7 27.0	94	09	05.5	9
																													7 21.7	95	08	05.3	160
																													7 16.7	95	08	05.0	1
																													7 12.0	96	08	04.8	2
																													7 07.5	96	07	04.5	3
																													7 03.2	97	07	04.3	4
																													6 59.2	97	06	04.0	165
																													6 55.5	97	06	03.7	6
																													6 52.0	98	06	03.5	7
																													6 48.7	98	05	03.2	8
																													6 45.8	98	05	02.9	9
																													6 43.0	99	04	02.7	170
																													6 40.6	99	04	02.4	1
																													6 38.3	99	03	02.1	2
																													6 36.4	99	03	01.9	3
																													6 34.7	1.0	02	01.6	4
																													6 33.3	1.0	02	01.3	175
																													6 32.1	1.0	02	01.1	6
																													6 31.2	1.0	01	00.8	7
																													6 30.5	1.0	01	00.5	8
																													6 30.1	1.0	00	00.3	9
																													6 30.0	1.0	00	00.0	180

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.	63° 00′ Alt.	Δd	Δt	Az.	H.A.
°	′			°	′			°	′			°	′			°	′			°	
00	8 00.0	1.0	00	180.0	7 30.0	1.0	00	180.0	6 00.0	1.0	00	180.0	5 30.0	1.0	00	180.0	5 00.0	1.0	00	180.0	00
1	7 59.8	1.0	01	179.5	7 29.8	1.0	01	179.5	5 59.8	1.0	01	179.5	5 29.8	1.0	01	179.5					1
2	7 59.0	1.0	02	179.0	7 29.0	1.0	02	179.0	5 59.1	1.0	02	179.1	5 29.1	1.0	02	179.1					2
3	7 57.8	1.0	03	178.5	7 27.8	1.0	03	178.5	5 57.9	1.0	03	178.6	5 28.0	1.0	03	178.6					3
4	7 56.1	1.0	04	178.0	7 26.1	1.0	04	178.0	5 56.3	1.0	03	178.1	5 26.4	1.0	03	178.1					4
05	7 53.9	1.0	04	177.5	7 24.0	1.0	04	177.5	5 54.3	1.0	04	177.6	5 24.4	1.0	04	177.7					05
6	7 51.2	1.0	05	177.0	7 21.3	1.0	05	177.0	5 51.8	1.0	05	177.2	5 21.9	1.0	05	177.2					6
7	7 48.0	99	06	176.5	7 18.2	99	06	176.5	5 48.8	99	06	176.7	5 19.0	99	06	176.8					7
8	7 44.3	99	07	176.0	7 14.6	99	07	176.0	5 45.4	99	06	176.2	5 15.6	99	06	176.3					8
9	7 40.2	99	08	175.5	7 10.5	99	08	175.5	5 41.5	99	07	175.8	5 11.8	99	07	175.8					9
10	7 35.6	99	08	175.0	7 06.0	99	08	175.1	5 37.1	99	08	175.3	5 07.5	99	08	175.4					10
1	7 30.4	98	09	174.5	7 00.9	98	09	174.6	5 32.4	98	09	174.8	5 02.8	98	08	174.9					1
2	7 24.9	98	10	174.0	6 55.4	98	10	174.1	5 27.1	98	09	174.4									2
3	7 18.8	98	11	173.5	6 49.5	98	11	173.6	5 21.5	98	10	173.9									3
4	7 12.2	97	12	173.0	6 43.0	97	12	173.1	5 15.3	97	11	173.5									4
15	7 05.2	97	12	172.5	6 36.1	97	12	172.6	5 08.8	97	12	173.0									15
6	6 57.7	97	13	172.0	6 28.7	97	13	172.1	5 01.8	97	12	172.5									6
7	6 49.8	96	14	171.5	6 20.9	96	14	171.7													7
8	6 41.4	96	15	171.1	6 12.6	96	14	171.2													8
9	6 32.5	95	16	170.6	6 03.9	95	15	170.7													9
20	6 23.1	95	16	170.1	5 54.7	95	16	170.3													20
1	6 13.3	94	17	169.6	5 45.0	94	17	169.8													1
2	6 03.1	94	18	169.1	5 35.0	94	18	169.3													2
3	5 52.4	93	19	168.7	5 24.4	93	18	168.9													3
4	5 41.2	93	19	168.2	5 13.5	93	19	168.4													4
25	5 29.6	92	20	167.7	5 02.9	92	20	167.9													25
6	5 17.6	91	21	167.3																	6
7	5 05.1	91	22	166.8																	7

Lat. 22°

Lat. 23°

Lat. 24°

Lat 25°

Lat. 26°

Lat. 27°

Lat. 28°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 22°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	72	00	68	00	00
4	72	167	75	164	79	158	83	147	86	117	86	61	83	30	79	19	76	13	72	10	68	08	4
8	70	156	74	150	77	141	80	127	82	104	82	73	81	49	78	34	74	25	71	19	67	15	8
12	69	145	72	139	75	129	77	116	79	98	79	77	78	59	75	44	73	34	69	27	66	21	12
16	66	137	69	130	72	121	74	109	75	95	75	79	74	64	73	51	70	41	67	33	64	27	16
20	64	130	66	123	68	114	70	104	71	92	71	80	71	68	70	56	68	47	65	39	62	32	20
24	61	124	63	118	65	110	67	101	68	91	68	80	67	70	66	60	65	51	63	43	60	36	24
28	57	120	60	113	61	106	63	98	64	89	64	80	64	71	63	62	62	54	60	46	58	40	28
32	54	116	56	110	58	103	59	96	60	88	61	80	60	72	60	64	59	56	57	49	56	43	32
36	51	112	53	106	54	100	56	94	56	87	57	79	57	72	57	65	56	58	55	51	53	45	36
40	47	109	49	104	51	98	52	92	53	86	53	79	53	72	53	66	53	59	52	53	50	47	40
44	44	106	45	101	47	96	48	90	49	84	50	78	50	72	50	66	49	60	49	54	48	48	44
48	40	104	42	99	43	94	44	89	45	83	46	78	46	72	46	66	46	60	46	55	45	49	48
52	37	102	38	97	40	92	41	87	42	82	42	77	43	72	43	66	43	61	43	55	42	50	52
56	33	100	34	95	36	91	37	86	38	81	39	76	39	71	40	66	40	61	40	56	39	50	56
60	29	98	31	94	32	89	33	85	34	80	35	75	36	71	36	66	37	61	37	56	36	51	60
64	26	96	27	92	28	88	30	84	31	79	32	75	32	70	33	65	33	60	34	56	34	51	64
68	22	95	23	91	25	86	26	82	27	78	28	74	29	69	30	65	30	60	30	55	31	51	68
72	18	93	20	89	21	85	22	81	23	77	24	73	25	68	26	64	27	60	27	55	28	51	72
76	14	92	16	88	17	84	19	80	20	76	21	72	22	67	23	63	24	59	24	55	25	50	76
80	11	90	12	86	14	82	15	78	16	75	17	71	19	67	20	62	21	58	21	54	22	50	80
84	07	89	09	85	10	81	11	77	13	73	14	69	15	65	16	61	17	57	18	53	19	49	84
88	03	87	05	83	06	80	08	76	09	72	10	68	12	64	13	60	14	57	15	53	16	49	88
92	*00*	86	01	82	03	78	04	74	06	71	07	67	08	63	10	59	11	56	12	52	14	48	92
96	*04*	84	*03*	80	*01*	77	01	73	02	69	04	66	05	62	07	58	08	54	10	51	11	47	96
100	*08*	82	*06*	79	*05*	75	*03*	71	*01*	68	00	64	02	60	04	57	05	53	07	49	08	46	100
104	*11*	81	*10*	77	*08*	73	*06*	70	*05*	66	*03*	63	*01*	59	00	55	02	52	04	48	06	45	104
108	*15*	79	*13*	76	*12*	72	*10*	68	*08*	65	*06*	61	*04*	57	*03*	54	*01*	50	01	47	03	43	108
112	*19*	78	*17*	74	*15*	70	*13*	66	*11*	63	*09*	59	*08*	56	*06*	52	*03*	49	*01*	45	01	42	112
116	*22*	76	*21*	72	*19*	68	*17*	64	*15*	61	*13*	57	*11*	54	*08*	50	*06*	47	*04*	44	*02*	40	116
120	*26*	74	*24*	70	*22*	66	*20*	62	*18*	59	*16*	55	*14*	52	*11*	48	*09*	45	*07*	42	*04*	39	120
124	*29*	72	*27*	68	*25*	64	*23*	60	*21*	57	*19*	53	*16*	50	*14*	46	*11*	43	*09*	40	*06*	37	124
128	*33*	69	*31*	65	*29*	62	*26*	58	*24*	54	*22*	51	*19*	47	*17*	44	*14*	41	*11*	38	*09*	35	128
132	*36*	67	*34*	63	*32*	59	*30*	55	*27*	52	*24*	48	*22*	45	*19*	42	*16*	39	*14*	36	*11*	33	132
136	*40*	64	*37*	60	*35*	56	*33*	52	*30*	49	*27*	46	*24*	42	*22*	39	*19*	36	*16*	34	*13*	31	136
140	*43*	61	*41*	57	*38*	53	*35*	49	*33*	46	*30*	43	*27*	39	*24*	37	*21*	34	*18*	31	*15*	29	140
144	*46*	58	*44*	54	*41*	50	*38*	46	*35*	43	*32*	39	*29*	36	*26*	34	*23*	31	*20*	29	*16*	26	144
148	*49*	54	*47*	50	*44*	46	*41*	42	*38*	39	*34*	36	*31*	33	*28*	31	*25*	28	*21*	26	*18*	24	148
152	*52*	50	*49*	46	*46*	42	*43*	38	*40*	35	*37*	32	*33*	30	*30*	27	*26*	25	*23*	23	*19*	21	152
156	*55*	45	*52*	41	*49*	37	*45*	34	*42*	31	*38*	28	*35*	26	*31*	24	*28*	22	*24*	20	*20*	18	156
160	*57*	39	*54*	35	*51*	32	*47*	29	*44*	26	*40*	24	*36*	22	*33*	20	*29*	18	*25*	17	*22*	15	160
164	*60*	33	*56*	29	*53*	26	*49*	24	*45*	22	*41*	20	*38*	18	*34*	16	*30*	15	*26*	14	*22*	12	164
168	*61*	26	*58*	23	*54*	20	*50*	18	*46*	16	*43*	15	*39*	14	*35*	12	*31*	11	*27*	10	*23*	09	168
172	*63*	18	*59*	16	*55*	14	*51*	12	*47*	11	*43*	10	*39*	09	*35*	08	*32*	08	*28*	07	*24*	06	172
176	*64*	09	*60*	08	*56*	07	*52*	06	*48*	06	*44*	05	*40*	05	*36*	04	*32*	04	*28*	03	*24*	03	176
180	*64*	00	*60*	00	*56*	00	*52*	00	*48*	00	*44*	00	*40*	00	*36*	00	*32*	00	*28*	00	*24*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	64	00	60	00	56	00	52	00	48	00	44	00	40	00	36	00	32	00	28	00	24	00	00
4	64	06	60	05	56	04	52	03	48	03	44	02	40	02	36	01	32	01	28	00	24	00	4
8	63	12	59	10	55	08	52	06	48	05	44	04	40	03	36	02	32	02	28	01	24	00	8
12	62	17	59	14	55	12	51	10	47	08	43	06	40	05	36	04	32	02	28	01	24	00	12
16	61	22	58	18	54	15	50	12	47	10	43	08	39	06	35	05	32	03	28	02	24	01	16
20	59	27	56	22	53	18	49	15	46	12	42	10	39	08	35	06	31	04	28	02	24	01	20
24	58	31	55	26	52	21	48	18	45	15	42	12	38	09	35	07	31	05	27	03	24	01	24
28	56	34	53	29	50	24	47	20	44	17	41	13	38	11	34	08	31	05	27	03	24	01	28
32	54	37	51	31	49	27	46	22	43	19	40	15	37	12	34	09	30	06	27	04	24	01	32
36	51	39	49	34	47	29	44	24	42	20	39	16	36	13	33	10	30	07	27	04	24	01	36
40	49	41	47	36	45	31	43	26	40	22	38	18	35	14	32	11	29	07	27	04	24	01	40
44	46	42	45	37	43	32	41	27	39	23	37	19	34	15	32	11	29	08	26	05	23	02	44
48	44	44	43	38	41	33	39	29	37	24	35	20	33	16	31	12	28	08	26	05	23	02	48
52	41	45	40	39	39	35	38	30	36	25	34	21	32	17	30	13	28	09	26	05	23	02	52
56	39	45	38	40	37	35	36	31	34	26	33	22	31	17	29	13	27	09	25	05	23	02	56
60	36	46	35	41	35	36	34	31	33	27	31	22	30	18	28	14	27	10	25	06	23	02	60
64	33	46	33	41	33	37	32	32	31	27	30	23	29	18	28	14	26	10	25	06	23	02	64
68	31	46	31	42	30	37	30	32	29	28	29	23	28	19	27	15	25	10	24	06	23	02	68
72	28	46	28	42	28	37	28	33	28	28	27	24	26	19	26	15	25	10	24	06	23	02	72
76	25	46	26	42	26	37	26	33	26	28	26	24	25	19	25	15	24	11	23	06	22	02	76
80	23	46	23	41	24	37	24	33	24	28	24	24	24	19	24	15	23	11	23	06	22	02	80
84	20	45	21	41	21	37	22	32	22	28	23	24	23	19	23	15	23	11	23	06	22	02	84
88	17	45	18	40	19	36	20	32	21	28	21	24	21	19	22	15	22	11	22	06	22	02	88
92	15	44	16	40	17	36	18	32	19	28	20	23	20	19	21	15	21	11	22	06	22	02	92
96	12	43	14	39	15	35	16	31	17	27	18	23	19	19	20	15	21	11	21	06	22	02	96
100	10	42	11	38	13	34	14	31	15	27	17	23	18	19	19	15	20	10	21	06	22	02	100
104	07	41	09	37	11	34	12	30	14	26	15	22	17	18	18	14	19	10	20	06	22	02	104
108	05	40	07	36	09	33	10	29	12	25	14	22	16	18	17	14	19	10	20	06	21	02	108
112	03	38	05	35	07	31	09	28	11	24	13	21	14	17	16	14	18	10	20	06	21	02	112
116	00	37	03	34	05	30	07	27	09	24	11	20	13	17	15	13	17	09	19	06	21	02	116
120	*02*	35	01	32	03	29	05	26	08	23	10	19	12	16	15	13	17	09	19	05	21	02	120
124	*04*	34	*01*	31	01	28	03	25	06	21	09	18	11	15	14	12	16	09	19	05	21	02	124
128	*06*	32	*03*	29	*00*	26	02	23	05	20	08	17	10	14	13	11	16	08	18	05	21	02	128
132	*08*	30	*05*	27	*02*	25	01	22	04	19	07	16	09	13	12	11	15	08	18	05	21	02	132
136	*10*	28	*07*	26	*04*	23	*01*	20	03	18	06	15	09	13	12	10	15	07	18	04	21	01	136
140	*11*	26	*08*	24	*05*	21	*02*	19	01	16	05	14	08	12	11	09	14	07	17	04	20	01	140
144	*13*	24	*10*	22	*06*	19	*03*	17	00	15	04	13	07	11	10	08	14	06	17	04	20	01	144
148	*14*	21	*11*	19	*07*	17	*04*	15	*00*	13	03	11	07	09	10	07	13	05	17	03	20	01	148
152	*16*	19	*12*	17	*08*	15	*05*	14	*01*	12	02	10	06	08	10	07	13	05	17	03	20	01	152
156	*17*	17	*13*	15	*09*	13	*06*	12	*02*	10	02	09	05	07	09	06	13	04	16	03	20	01	156
160	*18*	14	*14*	13	*10*	11	*06*	10	*03*	09	01	07	05	06	09	05	13	03	16	02	20	01	160
164	*19*	11	*15*	10	*11*	09	*07*	08	*03*	07	01	06	05	05	09	04	12	03	16	02	20	01	164
168	*19*	08	*15*	08	*11*	07	*07*	06	*03*	05	00	04	04	04	08	03	12	02	16	01	20	00	168
172	*20*	06	*16*	05	*12*	05	*08*	04	*04*	04	00	03	04	02	08	02	12	01	16	01	20	00	172
176	*20*	03	*16*	03	*12*	02	*08*	02	*04*	02	00	01	04	01	08	01	12	01	16	00	20	00	176
180	*20*	00	*16*	00	*12*	00	*08*	00	*04*	00	00	00	04	00	08	00	12	00	16	00	20	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 22°
Lat. 23°
Lat. 24°
Lat. 25°
Lat. 26°
Lat. 27°
Lat. 28°

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 23°

H.A.	0° 00′ Alt.	Δd	Δt	Az.	0° 30′ Alt.	Δd	Δt	Az.	1° 00′ Alt.	Δd	Δt	Az.	1° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	67 00.0	1.0	02	180.0	67 30.0	1.0	02	180.0	68 00.0	1.0	02	180.0	68 30.0	1.0	02	180.0
1	66 58.8	1.0	06	177.4	67 28.7	1.0	06	177.4	67 58.7	1.0	06	177.3	68 28.7	1.0	06	177.3
2	66 55.1	1.0	10	174.9	67 25.0	1.0	10	174.8	67 54.9	1.0	11	174.7	68 24.8	1.0	11	174.6
3	66 48.9	99	14	172.4	67 18.7	99	14	172.2	67 48.5	99	15	172.0	68 18.2	99	15	171.9
4	66 40.4	99	18	169.9	67 10.0	99	18	169.6	67 39.6	99	19	169.4	68 09.1	99	19	169.2
05	66 29.5	98	22	167.4	66 58.9	98	22	167.1	67 28.2	98	23	166.9	67 57.5	98	23	166.6
6	66 16.3	97	26	164.9	66 45.4	97	26	164.6	67 14.5	97	27	164.3	67 43.5	97	27	164.0
7	66 00.8	96	29	162.6	66 29.6	96	30	162.2	66 58.4	96	30	161.8	67 27.1	96	31	161.5
8	65 43.2	95	33	160.2	66 11.7	95	34	159.8	66 40.1	95	34	159.4	67 08.4	94	35	159.0
9	65 23.5	94	36	157.9	65 51.6	94	37	157.5	66 19.6	93	38	157.1	66 47.6	93	38	156.6
10	65 01.7	93	40	155.7	65 29.5	92	40	155.3	65 57.1	92	41	154.8	66 24.6	92	42	154.3
1	64 38.1	91	42	153.6	65 05.4	91	43	153.1	65 32.6	91	44	152.6	65 59.7	90	45	152.0
2	64 12.6	90	46	151.5	64 39.4	89	46	150.9	65 06.2	89	47	150.4	65 32.9	89	48	149.9
3	63 45.3	88	48	149.4	64 11.8	88	49	148.9	64 38.1	88	50	148.3	65 04.3	87	50	147.8
4	63 16.4	87	51	147.5	63 42.4	86	52	146.9	64 08.3	86	52	146.3	64 34.0	86	53	145.7
15	62 45.9	85	53	145.6	63 11.5	85	54	145.0	63 36.9	84	55	144.4	64 02.1	84	56	143.8
6	62 14.0	84	56	143.7	62 39.0	83	56	143.1	63 04.0	83	57	142.5	63 28.7	82	58	141.9
7	61 40.6	82	58	142.0	62 05.2	82	58	141.4	62 29.7	81	59	140.7	62 54.0	81	60	140.1
8	61 05.9	81	60	140.3	61 30.1	80	61	139.6	61 54.1	80	61	139.0	62 17.9	79	62	138.4
9	60 30.0	79	62	138.6	60 53.7	79	62	138.0	61 17.3	78	63	137.3	61 40.6	78	64	136.7
20	59 52.9	78	64	137.0	60 16.2	77	64	136.4	60 39.3	77	65	135.8	61 02.2	76	66	135.1
1	59 14.7	76	65	135.5	59 37.6	76	66	134.9	60 00.2	75	67	134.2	60 22.6	74	68	133.5
2	58 35.5	75	67	134.0	58 57.9	74	68	133.4	59 20.1	74	68	132.7	59 42.1	73	69	132.1
3	57 55.3	74	68	132.6	58 17.3	73	69	132.0	58 39.1	72	70	131.3	59 00.7	72	71	130.7
4	57 14.3	72	70	131.3	57 35.8	72	70	130.6	57 57.2	71	71	130.0	58 18.3	70	72	129.3
25	56 32.3	71	71	130.0	56 53.5	70	72	129.3	57 14.5	70	72	128.7	57 35.2	69	73	128.0
6	55 49.6	70	72	128.7	56 10.4	69	73	128.1	56 30.9	68	74	127.4	56 51.3	67	74	126.7
7	55 06.1	68	74	127.5	55 26.5	68	74	126.8	55 46.7	67	75	126.2	56 06.7	66	76	125.5
8	54 22.0	67	75	126.3	54 42.0	66	75	125.7	55 01.8	66	76	125.0	55 21.4	65	76	124.4
9	53 37.1	66	76	125.2	53 56.8	65	76	124.5	54 16.3	65	77	123.9	54 35.5	64	78	123.2
30	52 51.7	65	77	124.1	53 11.0	64	77	123.5	53 30.1	63	78	122.8	53 49.0	63	78	122.2
1	52 05.7	64	78	123.0	52 24.7	63	78	122.4	52 43.4	62	79	121.8	53 02.0	62	79	121.1
2	51 19.1	63	78	122.0	51 37.8	62	79	121.4	51 56.2	61	80	120.8	52 14.5	60	80	120.1
3	50 32.0	61	79	121.0	50 50.4	61	80	120.4	51 08.5	60	80	119.8	51 26.4	59	81	119.1
4	49 44.5	60	80	120.1	50 02.5	60	80	119.5	50 20.4	59	81	118.8	50 38.0	58	82	118.2
35	48 56.5	59	81	119.2	49 14.2	59	81	118.5	49 31.8	58	82	117.9	49 49.1	57	82	117.3
6	48 08.0	59	81	118.3	48 25.5	58	82	117.7	48 42.8	57	82	117.0	48 59.8	57	83	116.4
7	47 19.2	58	82	117.4	47 36.4	57	82	116.8	47 53.4	56	83	116.2	48 10.2	56	83	115.6
8	46 30.0	57	83	116.6	46 46.9	56	83	116.0	47 03.6	55	84	115.4	47 20.2	55	84	114.7
9	45 40.4	56	83	115.8	45 57.1	55	84	115.2	46 13.6	55	84	114.6	46 29.9	54	84	114.0
40	44 50.5	55	84	115.0	45 06.9	54	84	114.4	45 23.2	54	84	113.8	45 39.3	53	85	113.2
1	44 00.3	54	84	114.2	44 16.5	54	85	113.6	44 32.5	53	85	113.0	44 48.3	52	85	112.4
2	43 09.7	54	85	113.5	43 25.7	53	85	112.9	43 41.5	52	85	112.3	43 57.2	52	86	111.7
3	42 18.9	53	85	112.7	42 34.7	52	86	112.2	42 50.3	52	86	111.6	43 05.7	51	86	111.0
4	41 27.9	52	86	112.0	41 43.4	52	86	111.5	41 58.8	51	86	110.9	42 14.0	50	86	110.3
45	40 36.5	51	86	111.3	40 51.9	51	86	110.8	41 07.1	50	86	110.2	41 22.1	50	87	109.6
6	39 45.0	51	86	110.7	40 00.2	50	87	110.1	40 15.2	50	87	109.5	40 30.0	49	87	109.0
7	38 53.2	50	87	110.0	39 08.2	50	87	109.5	39 23.0	49	87	108.9	39 37.7	49	88	108.3
8	38 01.2	50	87	109.4	38 16.0	49	87	108.8	38 30.7	49	88	108.3	38 45.1	48	88	107.7
9	37 09.0	49	87	108.8	37 23.6	49	88	108.2	37 38.1	48	88	107.7	37 52.4	47	88	107.1
50	36 16.6	48	88	108.2	36 31.1	48	88	107.6	36 45.4	47	88	107.1	36 59.6	47	88	106.5
1	35 24.0	48	88	107.6	35 38.4	47	88	107.0	35 52.5	47	88	106.5	36 06.5	46	88	105.9
2	34 31.3	47	88	107.0	34 45.5	47	88	106.4	34 59.5	46	89	105.9	35 13.4	46	89	105.4
3	33 38.4	47	88	106.4	33 52.4	46	89	105.9	34 06.3	46	89	105.3	34 20.0	46	89	104.8
4	32 45.3	46	89	105.8	32 59.2	46	89	105.3	33 13.0	46	89	104.8	33 26.6	45	89	104.3
55	31 52.1	46	89	105.3	32 05.9	46	89	104.8	32 19.5	45	89	104.3	32 33.0	45	90	103.7
6	30 58.8	46	89	104.8	31 12.4	45	89	104.2	31 25.9	45	90	103.7	31 39.3	44	90	103.2
7	30 05.3	45	89	104.2	30 18.8	45	90	103.7	30 32.2	44	90	103.2	30 45.4	44	90	102.7
8	29 11.7	45	90	103.7	29 25.1	44	90	103.2	29 38.4	44	90	102.7	29 51.5	44	90	102.2
9	28 18.0	44	90	103.2	28 31.3	44	90	102.7	28 44.4	44	90	102.2	28 57.4	43	90	101.7
60	27 24.2	44	90	102.7	27 37.4	44	90	102.2	27 50.4	43	90	101.7	28 03.3	43	90	101.2
1	26 30.3	44	90	102.2	26 43.3	43	90	101.7	26 56.3	43	90	101.2	27 09.1	43	90	100.7
2	25 36.2	43	90	101.7	25 49.2	43	90	101.2	26 02.0	43	90	100.7	26 14.8	42	91	100.2
3	24 42.1	43	90	101.3	24 55.0	43	90	100.8	25 07.7	42	91	100.3	25 20.4	42	91	99.8
4	23 47.9	43	90	100.8	24 00.7	42	91	100.3	24 13.3	42	91	99.8	24 25.9	42	91	99.3
65	22 53.6	42	91	100.3	23 06.3	42	91	99.8	23 18.9	42	91	99.3	23 31.4	41	91	98.8
6	21 59.2	42	91	99.9	22 11.8	42	91	99.4	22 24.4	42	91	98.9	22 36.8	41	91	98.4
7	21 04.8	42	91	99.4	21 17.3	42	91	98.9	21 29.8	41	91	98.4	21 42.1	41	91	98.0
8	20 10.3	42	91	99.0	20 22.7	41	91	98.5	20 35.1	41	91	98.0	20 47.4	41	91	97.5
9	19 15.7	41	91	98.5	19 28.1	41	91	98.0	19 40.4	41	91	97.6	19 52.6	41	91	97.1
70	18 21.0	41	91	98.1	18 33.4	41	91	97.6	18 45.6	41	91	97.1	18 57.8	40	92	96.6
1	17 26.3	41	91	97.7	17 38.6	41	91	97.2	17 50.8	40	92	96.7	18 02.9	40	92	96.2
2	16 31.6	41	91	97.2	16 43.8	41	92	96.8	16 55.9	40	92	96.3	17 07.9	40	92	95.8
3	15 36.7	41	92	96.8	15 48.9	40	92	96.3	16 01.0	40	92	95.9	16 13.0	40	92	95.4
4	14 41.9	40	92	96.4	14 54.0	40	92	95.9	15 06.0	40	92	95.4	15 18.0	40	92	95.0
75	13 47.0	40	92	96.0	13 59.0	40	92	95.5	14 11.0	40	92	95.0	14 22.9	40	92	94.6
6	12 52.0	40	92	95.6	13 04.0	40	92	95.1	13 16.0	40	92	94.6	13 27.9	40	92	94.2
7	11 57.0	40	92	95.2	12 09.0	40	92	94.7	12 20.9	40	92	94.2	12 32.8	39	92	93.7
8	11 02.0	40	92	94.7	11 13.9	40	92	94.3	11 25.8	40	92	93.8	11 37.6	39	92	93.3
9	10 07.0	40	92	94.3	10 18.8	40	92	93.9	10 30.7	39	92	93.4	10 42.5	39	92	92.9
80	9 11.9	40	92	93.9	9 23.7	39	92	93.5	9 35.5	39	92	93.0	9 47.3	39	92	92.5
1	8 16.8	39	92	93.5	8 28.6	39	92	93.1	8 40.4	39	92	92.6	8 52.1	39	92	92.1
2	7 21.6	39	92	93.1	7 33.4	39	92	92.7	7 45.2	39	92	92.2	7 56.9	39	92	91.8
3	6 26.5	39	92	92.7	6 38.2	39	92	92.3	6 50.0	39	92	91.8	7 01.7	39	92	91.4
4	5 31.3	39	92	92.4	5 43.1	39	92	91.9	5 54.8	39	92	91.4	6 06.5	39	92	91.0
85													5 11.3	39	92	90.6
6																

H.A.	2° 00′ Alt.	Δd	Δt	Az.	2° 30′ Alt.	Δd	Δt	Az.	3° 00′ Alt.	Δd	Δt	Az.	3° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	69 00.0	1.0	02	180.0	69 30.0	1.0	02	180.0	70 00.0	1.0	02	180.0	70 30.0	1.0	02	180.0
1	68 58.7	1.0	07	177.2	69 28.6	1.0	07	177.1	69 58.6	1.0	07	177.1	70 28.6	1.0	07	177.0
2	68 54.6	1.0	11	174.4	69 24.5	1.0	11	174.3	69 54.4	1.0	12	174.2	70 24.2	1.0	12	174.0
3	68 48.0	99	16	171.7	69 17.7	99	16	171.5	69 47.4	99	16	171.3	70 17.1	99	16	171.1
4	68 38.7	98	20	169.0	69 08.2	98	20	168.7	69 37.7	98	21	168.5	70 07.2	98	21	168.2
05	68 26.8	98	24	166.3	68 56.1	97	24	166.0	69 25.3	97	25	165.7	69 54.5	97	26	165.3
6	68 12.5	97	28	163.7	68 41.5	96	28	163.3	69 10.4	96	29	162.9	69 39.2	96	30	162.5
7	67 55.8	95	32	161.1	68 24.4	95	32	160.7	68 52.9	95	33	160.3	69 21.4	95	34	159.8
8	67 36.7	94	36	158.6	68 05.0	94	36	158.1	68 33.1	94	37	157.7	69 01.1	93	38	157.2
9	67 15.5	93	39	156.1	67 43.3	93	40	155.7	68 11.0	93	40	155.1	68 38.6	92	41	154.6
10	66 52.1	91	42	153.8	67 19.5	91	43	153.3	67 46.7	91	44	152.7	68 13.8	90	45	152.1
1	66 26.7	90	46	151.5	66 53.6	89	46	150.9	67 20.4	89	47	150.4	67 47.0	89	48	149.8
2	65 59.4	88	48	149.3	66 25.8	88	49	148.7	66 52.1	87	50	148.1	67 18.2	87	51	147.5
3	65 30.3	87	51	147.2	65 56.3	86	52	146.6	66 22.0	86	53	145.9	66 47.6	85	54	145.3
4	64 59.6	85	54	145.1	65 25.0	84	55	144.5	65 50.2	84	56	143.8	66 15.3	83	56	143.2
15	64 27.2	83	56	143.1	64 52.1	83	57	142.5	65 16.9	82	58	141.8	65 41.4	82	59	141.1
6	63 53.3	82	59	141.3	64 17.8	81	60	140.6	64 42.0	80	60	139.9	65 06.0	80	61	139.2
7	63 18.1	80	61	139.4	63 42.0	79	62	138.8	64 05.7	79	62	138.1	64 29.3	78	63	137.3
8	62 41.5	78	63	137.7	63 05.0	78	64	137.0	63 28.2	77	64	136.3	63 51.2	76	65	135.6
9	62 03.8	77	65	136.0	62 26.7	76	66	135.3	62 49.5	75	66	134.6	63 12.0	75	67	133.9
20	61 24.8	75	67	134.4	61 47.3	75	67	133.7	62 09.6	74	68	133.0	62 31.6	73	69	132.3
1	60 44.9	74	68	132.9	61 06.9	73	69	132.2	61 28.7	72	70	131.5	61 50.3	72	70	130.7
2	60 03.9	72	70	131.4	60 25.5	72	70	130.7	60 46.8	71	71	130.0	61 08.0	70	72	129.2
3	59 22.0	71	71	130.0	59 43.2	70	72	129.3	60 04.1	69	73	128.6	60 24.7	69	73	127.8
4	58 39.3	69	73	128.6	59 00.0	69	73	127.9	59 20.5	68	74	127.2	59 40.7	67	75	126.5
25	57 55.7	68	74	127.3	58 16.0	67	74	126.6	58 36.1	67	75	125.9	58 55.9	66	76	125.2
6	57 11.4	67	75	126.0	57 31.3	66	76	125.4	57 51.0	65	76	124.6	58 10.4	64	77	123.9
7	56 26.4	65	76	124.8	56 46.0	65	77	124.2	57 05.2	64	77	123.4	57 24.3	63	78	122.7
8	55 40.8	64	77	123.7	55 59.9	63	78	123.0	56 18.9	63	78	122.3	56 37.5	62	79	121.6
9	54 54.5	63	78	122.6	55 13.3	62	78	121.9	55 31.9	61	79	121.2	55 50.2	61	80	120.5
30	54 07.7	62	79	121.5	54 26.2	61	80	120.8	54 44.4	60	80	120.1	55 02.4	60	81	119.4
1	53 20.3	61	80	120.4	53 38.5	60	80	119.8	53 56.4	59	81	119.1	54 14.0	58	81	118.4
2	52 32.5	60	80	119.5	52 50.3	59	81	118.8	53 07.9	58	82	118.1	53 25.2	57	82	117.4
3	51 44.2	59	81	118.5	52 01.7	58	82	117.8	52 18.9	57	82	117.2	52 36.0	56	83	116.5
4	50 55.4	58	82	117.6	51 12.6	57	82	116.9	51 29.6	56	83	116.2	51 46.4	56	83	115.6
35	50 06.2	57	83	116.7	50 23.2	56	83	116.0	50 39.9	55	84	115.4	50 56.4	55	84	114.7
6	49 16.7	56	83	115.8	49 33.4	55	84	115.1	49 49.8	54	84	114.5	50 06.0	54	84	113.8
7	48 26.8	55	84	114.9	48 43.2	54	84	114.3	48 59.4	54	84	113.7	49 15.3	53	85	113.0
8	47 36.5	54	84	114.1	47 52.7	53	85	113.5	48 08.6	53	85	112.9	48 24.4	52	86	112.2
9	46 46.0	53	85	113.3	47 01.9	53	85	112.7	47 17.6	52	86	112.1	47 33.1	51	86	111.5
40	45 55.1	53	85	112.6	46 10.8	52	86	112.0	46 26.3	51	86	111.3	46 41.6	51	86	110.7
1	45 04.0	52	86	111.8	45 19.4	51	86	111.2	45 34.7	51	86	110.6	45 49.8	50	87	110.0
2	44 12.6	51	86	111.1	44 27.8	51	86	110.5	44 42.9	50	87	109.9	44 57.8	49	87	109.3
3	43 20.9	50	86	110.4	43 36.0	50	87	109.8	43 50.8	49	87	109.2	44 05.5	49	87	108.6
4	42 29.1	50	87	109.7	42 43.9	49	87	109.1	42 58.6	49	88	108.5	43 13.1	48	88	107.9
45	41 37.0	49	87	109.0	41 51.6	49	88	108.5	42 06.1	48	88	107.9	42 20.4	47	88	107.3
6	40 44.7	49	88	108.4	40 59.1	48	88	107.8	41 13.5	47	88	107.2	41 27.6	47	88	106.6
7	39 52.1	48	88	107.8	40 06.5	47	88	107.2	40 20.6	47	88	106.6	40 34.6	46	89	106.0
8	38 59.5	47	88	107.1	39 13.6	47	88	106.6	39 27.6	46	89	106.0	39 41.4	46	89	105.4
9	38 06.6	47	88	106.5	38 20.6	46	89	106.0	38 34.5	46	89	105.4	38 48.1	45	89	104.8
50	37 13.6	46	89	106.0	37 27.4	46	89	105.4	37 41.1	45	89	104.8	37 54.7	45	89	104.3
1	36 20.4	46	89	105.4	36 34.1	45	89	104.8	36 47.7	45	89	104.3	37 01.1	44	90	103.7
2	35 27.1	46	89	104.8	35 40.7	45	89	104.3	35 54.1	45	90	103.7	36 07.4	44	90	103.2
3	34 33.6	45	89	104.3	34 47.1	45	90	103.7	35 00.4	44	90	103.2	35 13.5	44	90	102.6
4	33 40.0	45	90	103.7	33 53.3	44	90	103.2	34 06.5	44	90	102.6	34 19.6	43	90	102.1
55	32 46.3	44	90	103.2	32 59.5	44	90	102.7	33 12.6	43	90	102.1	33 25.5	43	90	101.6
6	31 52.5	44	90	102.7	32 05.6	43	90	102.1	32 18.5	43	90	101.6	32 31.4	43	90	101.1
7	30 58.5	43	90	102.2	31 11.5	43	90	101.6	31 24.4	43	90	101.1	31 37.1	42	90	100.6
8	30 04.5	43	90	101.7	30 17.4	43	90	101.1	30 30.1	42	90	100.6	30 42.8	42	91	100.1
9	29 10.4	43	90	101.2	29 23.1	42	90	100.6	29 35.8	42	91	100.1	29 48.4	42	91	99.6
60	28 16.1	43	90	100.7	28 28.8	42	91	100.2	28 41.4	42	91	99.6	28 53.9	41	91	99.1
1	27 21.8	42	91	100.2	27 34.4	42	91	99.7	27 46.9	41	91	99.2	27 59.3	41	91	98.7
2	26 27.4	42	91	99.7	26 39.9	42	91	99.2	26 52.4	41	91	98.7	27 04.7	41	91	98.2
3	25 32.9	42	91	99.3	25 45.4	41	91	98.8	25 57.7	41	91	98.2	26 10.0	41	91	97.7
4	24 38.4	41	91	98.8	24 50.8	41	91	98.3	25 03.0	41	91	97.8	25 15.2	40	91	97.3
65	23 43.8	41	91	98.3	23 56.1	41	91	97.8	24 08.3	41	91	97.3	24 20.4	40	92	96.8
6	22 49.1	41	91	97.9	23 01.3	41	91	97.4	23 13.5	40	92	96.9	23 25.5	40	92	96.4
7	21 54.4	41	91	97.5	22 06.5	40	91	97.0	22 18.6	40	92	96.5	22 30.6	40	92	96.0
8	20 59.6	41	91	97.0	21 11.7	40	92	96.5	21 23.7	40	92	96.0	21 35.7	40	92	95.5
9	20 04.7	40	92	96.6	20 16.8	40	92	96.1	20 28.8	40	92	95.6	20 40.7	40	92	95.1
70	19 09.8	40	92	96.2	19 21.9	40	92	95.7	19 33.8	40	92	95.2	19 45.7	39	92	94.7
1	18 14.9	40	92	95.7	18 26.9	40	92	95.3	18 38.8	40	92	94.8	18 50.6	39	92	94.3
2	17 19.9	40	92	95.3	17 31.9	40	92	94.8	17 43.7	39	92	94.4	17 55.5	39	92	93.9
3	16 24.9	40	92	94.9	16 36.8	40	92	94.4	16 48.6	39	92	93.9	17 00.4	39	92	93.5
4	15 29.9	40	92	94.5	15 41.7	39	92	94.0	15 53.5	39	92	93.5	16 05.3	39	92	93.1
75	14 34.8	40	92	94.1	14 46.6	39	92	93.6	14 58.4	39	92	93.1	15 10.1	39	92	92.7
6	13 39.7	39	92	93.7	13 51.5	39	92	93.2	14 03.2	39	92	92.7	14 14.9	39	92	92.3
7	12 44.6	39	92	93.3	12 56.3	39	92	92.8	13 08.1	39	92	92.3	13 19.7	39	92	91.9
8	11 49.4	39	92	92.9	12 01.2	39	92	92.4	12 12.9	39	92	91.9	12 24.5	39	92	91.5
9	10 54.3	39	92	92.5	11 06.0	39	92	92.0	11 17.7	39	92	91.5	11 29.3	39	92	91.1
80	9 59.1	39	92	92.1	10 10.8	39	92	91.6	10 22.4	39	92	91.1	10 34.1	39	92	90.7
1	9 03.9	39	92	91.7	9 15.6	39	92	91.2	9 27.2	39	92	90.7	9 38.8	39	92	90.3
2	8 08.7	39	92	91.3	8 20.3	39	92	90.8	8 32.0	39	92	90.4	8 43.6	39	92	89.9
3	7 13.4	39	92	90.9	7 25.1	39	92	90.4	7 36.8	39	92	90.0	7 48.4	39	92	89.5
4	6 18.2	39	92	90.5	6 29.9	39	92	90.0	6 41.5	39	92	89.6	6 53.2	39	92	89.1
85	5 23.0	39	92	90.1	5 34.7	39	92	89.6	5 46.3	39	92	89.2	5 57.9	39	92	88.7
6													5 02.7	39	92	88.3

Lat. 23°

H.A.	0° 00′ Alt.	Δd Δt	Az.	0° 30′ Alt.	Δd Δt	Az.	1° 00′ Alt.	Δd Δt	Az.	1° 30′ Alt.	Δd Δt	Az.	2° 00′ Alt.	Δd Δt	Az.	2° 30′ Alt.	Δd Δt	Az.	3° 00′ Alt.	Δd Δt	Az.	3° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°	° ′		°
00	67 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	66 00.0	1.0 02	180.0	65 30.0	1.0 02	180.0	65 00.0	1.0 02	180.0	64 30.0	1.0 02	180.0	64 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0
1	66 58.8	1.0 06	177.4	66 28.8	1.0 06	177.5	65 58.8	1.0 06	177.5	65 28.8	1.0 06	177.6	64 58.9	1.0 06	177.6	64 28.9	1.0 06	177.7	63 58.9	1.0 06	177.7	63 28.9	1.0 05	177.8
2	66 55.1	1.0 10	174.9	66 25.2	1.0 10	175.0	65 55.3	1.0 10	175.1	65 25.4	1.0 10	175.2	64 55.4	1.0 10	175.3	64 25.5	1.0 09	175.4	63 55.6	1.0 09	175.5	63 25.7	1.0 09	175.5
3	66 48.9	99 14	172.4	66 19.2	99 14	172.5	65 49.4	99 14	172.7	65 19.6	99 14	172.8	64 49.8	99 13	172.9	64 20.0	99 13	173.1	63 50.1	99 13	173.2	63 20.3	99 12	173.3
4	66 40.4	99 18	169.9	66 10.8	99 18	170.1	65 41.2	99 18	170.2	65 11.5	99 17	170.4	64 41.9	99 17	170.6	64 12.2	99 16	170.8	63 42.5	99 16	171.0	63 12.8	99 16	171.1
05	66 29.5	98 22	167.4	66 00.1	98 22	167.6	65 30.7	98 21	167.9	65 01.2	98 21	168.1	64 31.8	98 20	168.3	64 02.3	98 20	168.5	63 32.8	98 20	168.7	63 03.3	98 20	168.9
6	66 16.3	97 26	164.9	65 47.1	97 25	165.2	65 18.0	97 25	165.5	64 48.8	97 24	165.8	64 19.5	98 24	166.0	63 50.3	98 24	166.3	63 21.0	98 23	166.5	62 51.6	98 23	166.8
7	66 00.8	96 29	162.6	65 32.0	96 29	162.9	65 03.1	96 28	163.2	64 34.1	97 28	163.5	64 05.2	97 27	163.8	63 36.1	97 27	164.1	63 07.1	97 26	164.4	62 38.0	97 26	164.7
8	65 43.2	95 33	160.2	65 14.7	95 32	160.6	64 46.1	95 32	160.9	64 17.4	96 31	161.3	63 48.8	96 31	161.6	63 20.0	96 30	162.0	62 51.2	96 30	162.3	62 22.4	96 29	162.6
9	65 23.5	94 36	157.9	64 55.3	94 36	158.3	64 27.0	94 35	158.7	63 58.7	94 34	159.1	63 30.4	95 34	159.5	63 01.9	95 33	159.8	62 33.5	95 33	160.2	62 04.9	95 32	160.5
10	65 01.7	93 40	155.7	64 33.9	93 39	156.2	64 06.0	93 38	156.6	63 38.1	93 38	157.0	63 10.1	94 37	157.4	62 42.0	94 36	157.8	62 13.8	94 36	158.1	61 45.6	94 35	158.5
1	64 38.1	91 42	153.6	64 10.7	92 42	154.0	63 43.2	92 41	154.5	63 15.6	92 40	154.9	62 47.9	92 40	155.3	62 20.2	93 39	155.8	61 52.4	93 39	156.2	61 24.5	93 38	156.5
2	64 12.6	90 46	151.5	63 45.6	90 45	152.0	63 18.5	90 44	152.4	62 51.3	91 43	152.9	62 24.0	91 43	153.4	61 56.6	91 42	153.8	61 29.2	92 41	154.2	61 01.7	92 41	154.6
3	63 45.3	88 48	149.4	63 18.7	89 47	149.9	62 52.1	89 47	150.4	62 25.3	89 46	150.9	61 58.4	90 45	151.4	61 31.4	90 45	151.9	61 04.4	90 44	152.3	60 37.2	91 43	152.8
4	63 16.4	87 51	147.5	62 50.3	87 50	148.0	62 24.0	88 49	148.5	61 57.7	88 49	149.0	61 31.2	88 48	149.5	61 04.6	89 47	150.0	60 37.9	89 47	150.5	60 11.2	89 46	150.9
15	62 45.9	85 53	145.6	62 20.2	86 52	146.1	61 54.4	86 52	146.7	61 28.5	87 51	147.2	61 02.4	87 50	147.7	60 36.3	87 50	148.2	60 10.0	88 49	148.7	59 43.6	88 48	149.2
6	62 14.0	84 56	143.7	61 48.7	84 55	144.3	61 23.3	85 54	144.9	60 57.8	85 53	145.4	60 32.2	86 53	145.9	60 06.4	86 52	146.5	59 40.6	86 51	147.0	59 14.6	87 51	147.5
7	61 40.6	82 58	142.0	61 15.8	83 57	142.5	60 50.9	83 56	143.1	60 25.8	84 56	143.7	60 00.6	84 55	144.2	59 35.2	85 54	144.8	59 09.8	85 54	145.3	58 44.2	86 53	145.8
8	61 05.9	81 60	140.3	60 41.6	81 59	140.9	60 17.1	82 58	141.4	59 52.4	82 58	142.0	59 27.7	83 57	142.6	59 02.7	83 56	143.1	58 37.7	84 56	143.6	58 12.5	84 55	144.2
9	60 30.0	79 62	138.6	60 06.1	80 61	139.2	59 42.0	80 60	139.8	59 17.8	81 60	140.4	58 53.5	81 59	141.0	58 29.0	82 58	141.5	58 04.3	82 58	142.1	57 39.5	83 57	142.6
20	59 52.9	78 64	137.0	59 29.5	78 63	137.6	59 05.8	79 62	138.3	58 42.1	80 62	138.8	58 18.1	80 61	139.4	57 54.0	81 60	140.0	57 29.8	81 60	140.5	57 05.4	81 59	141.1
1	59 14.7	76 65	135.5	58 51.7	77 65	136.1	58 28.5	78 64	136.7	58 05.2	78 63	137.3	57 41.6	79 62	137.9	57 18.0	79 62	138.5	56 54.1	80 61	139.1	56 30.1	80 60	139.6
2	58 35.5	75 67	134.0	58 12.9	76 66	134.7	57 50.2	76 66	135.3	57 27.2	77 65	135.9	57 04.1	77 64	136.5	56 40.8	78 64	137.1	56 17.4	78 63	137.6	55 53.8	79 62	138.2
3	57 55.3	74 68	132.6	57 33.2	74 68	133.3	57 10.8	75 67	133.9	56 48.3	75 66	134.5	56 25.6	76 66	135.1	56 02.7	77 65	135.7	55 39.7	77 64	136.2	55 16.5	78 64	136.8
4	57 14.3	72 70	131.3	56 52.5	73 69	131.9	56 30.6	73 68	132.5	56 08.4	74 68	133.1	55 46.1	75 67	133.7	55 23.7	75 67	134.3	55 01.0	76 66	134.9	54 38.2	76 65	135.5
25	56 32.3	71 71	130.0	56 11.0	72 71	130.6	55 49.4	72 70	131.2	55 27.7	73 69	131.8	55 05.8	73 60	132.4	54 43.7	74 68	133.0	54 21.4	74 67	133.6	53 59.0	75 67	134.2
6	55 49.6	70 72	128.7	55 28.6	70 72	129.3	55 07.5	71 71	130.0	54 46.1	71 70	130.6	54 24.6	72 70	131.2	54 02.9	73 69	131.8	53 41.0	73 69	132.3	53 19.0	74 68	132.9
7	55 06.1	68 74	127.5	54 45.6	69 73	128.1	54 24.8	70 72	128.7	54 03.8	70 72	129.4	53 42.6	71 71	130.0	53 21.3	71 70	130.5	52 59.8	72 70	131.1	52 38.1	73 69	131.7
8	54 22.0	67 75	126.3	54 01.8	68 74	126.9	53 41.3	68 74	127.6	53 20.7	69 73	128.2	52 59.9	70 72	128.8	52 39.0	70 72	129.4	52 17.8	71 71	130.0	51 56.5	71 70	130.5
9	53 37.1	66 76	125.2	53 17.3	67 75	125.8	52 57.2	67 75	126.4	52 37.0	68 74	127.0	52 16.5	68 74	127.6	51 55.9	69 73	128.2	51 35.1	70 72	128.8	51 14.2	70 72	129.4
30	52 51.7	65 77	124.1	52 32.2	65 76	124.7	52 12.5	66 76	125.3	51 52.6	67 75	125.9	51 32.5	67 74	126.5	51 12.2	68 74	127.1	50 51.8	68 73	127.7	50 31.2	69 73	128.3
1	52 05.7	64 78	123.0	51 46.5	64 77	123.7	51 27.1	65 76	124.3	51 07.6	66 76	124.9	50 47.8	66 76	125.5	50 27.9	67 75	126.1	50 07.8	67 74	126.6	49 47.5	68 74	127.2
2	51 19.1	63 78	122.0	51 00.3	63 78	122.6	50 41.2	64 78	123.2	50 22.0	64 77	123.9	50 02.5	65 76	124.4	49 42.9	66 76	125.0	49 23.2	66 75	125.6	49 03.2	67 75	126.2
3	50 32.0	61 79	121.0	50 13.5	62 79	121.7	49 54.8	63 78	122.3	49 35.8	63 78	122.9	49 16.7	64 77	123.5	48 57.4	65 77	124.0	48 38.0	65 76	124.6	48 18.4	66 76	125.2
4	49 44.5	60 80	120.1	49 26.2	61 80	120.7	49 07.8	62 79	121.3	48 49.2	62 78	121.9	48 30.4	63 78	122.5	48 11.4	64 78	123.1	47 52.3	64 77	123.6	47 32.9	65 76	124.2
35	48 56.5	59 81	119.2	48 38.5	60 80	119.8	48 20.4	61 80	120.4	48 02.1	61 79	121.0	47 43.6	62 79	121.6	47 24.9	63 78	122.1	47 06.0	63 78	122.7	46 47.0	64 77	123.3
6	48 08.0	59 81	118.3	47 50.4	59 81	118.9	47 32.5	60 80	119.5	47 14.5	60 80	120.1	46 56.3	61 80	120.6	46 37.9	62 79	121.2	46 19.3	62 79	121.8	46 00.6	63 78	122.4
7	47 19.2	58 82	117.4	47 01.8	58 82	118.0	46 44.2	59 81	118.6	46 26.5	59 81	119.2	46 08.5	60 80	119.8	45 50.5	61 80	120.3	45 32.2	61 79	120.9	45 13.7	62 79	121.5
8	46 30.0	57 83	116.6	46 12.8	57 82	117.2	45 55.5	58 82	117.8	45 38.1	59 81	118.3	45 20.4	59 81	118.9	45 02.6	60 80	119.5	44 44.6	60 80	120.0	44 26.4	61 80	120.6
9	45 40.4	56 83	115.8	45 23.5	57 83	116.3	45 06.5	57 82	116.9	44 49.3	58 82	117.5	44 31.9	58 82	118.1	44 14.3	59 81	118.7	43 56.6	59 81	119.2	43 38.7	60 80	119.8
40	44 50.5	55 84	115.0	44 33.9	56 83	115.6	44 17.1	56 83	116.1	44 00.1	57 82	116.7	43 42.9	57 82	117.3	43 25.6	58 82	117.8	43 08.2	59 81	118.4	42 50.5	59 81	119.0
1	44 00.3	54 84	114.2	43 43.9	55 84	114.8	43 27.3	55 84	115.4	43 10.6	56 83	115.9	42 53.7	57 83	116.5	42 36.6	57 82	117.1	42 19.4	58 82	117.6	42 02.0	58 82	118.2
2	43 09.7	54 85	113.5	42 53.6	54 84	114.0	42 37.3	55 84	114.6	42 20.8	55 84	115.2	42 04.1	56 83	115.7	41 47.3	56 83	116.3	41 30.3	57 82	116.8	41 13.1	57 82	117.4
3	42 18.9	53 85	112.7	42 03.0	53 85	113.3	41 46.9	54 84	113.9	41 30.6	55 84	114.4	41 14.2	55 84	115.0	40 57.6	56 83	115.5	40 40.8	56 83	116.1	40 23.9	57 82	116.6
4	41 27.9	52 86	112.0	41 12.1	53 85	112.6	40 56.3	53 85	113.2	40 40.2	54 84	113.7	40 24.0	54 84	114.3	40 07.6	55 84	114.8	39 51.1	55 83	115.4	39 34.4	56 83	115.9
45	40 36.5	51 86	111.3	40 21.0	52 86	111.9	40 05.3	53 85	112.5	39 49.5	53 85	113.0	39 33.5	54 85	113.6	39 17.3	54 84	114.1	39 01.0	55 84	114.7	38 44.6	55 84	115.2
6	39 45.0	51 86	110.7	39 29.7	51 86	111.2	39 14.2	52 86	111.8	38 58.5	52 85	112.3	38 42.7	53 85	112.9	38 26.8	53 85	113.4	38 10.7	54 84	114.0	37 54.5	54 84	114.5
7	38 53.2	50 87	110.0	38 38.1	51 86	110.6	38 22.8	51 86	111.1	38 07.3	52 86	111.7	37 51.7	52 86	112.2	37 36.0	53 85	112.7	37 20.1	53 85	113.3	37 04.1	54 84	113.8
8	38 01.2	50 87	109.4	37 46.2	50 87	109.9	37 31.1	51 86	110.5	37 15.9	51 86	111.0	37 00.5	52 86	111.6	36 44.9	52 86	112.1	36 29.2	53 85	112.6	36 13.4	53 85	113.2
9	37 09.0	49 87	108.8	36 54.2	50 87	109.3	36 39.3	50 87	109.8	36 24.2	51 86	110.4	36 09.0	51 86	110.9	35 53.6	51 86	111.5	35 38.1	52 86	112.0	35 22.5	52 85	112.5
50	36 16.6	48 88	108.2	36 02.0	49 87	108.7	35 47.2	49 87	109.2	35 32.3	50 87	109.8	35 17.3	50 86	110.3	35 02.1	51 86	110.8	34 46.8	51 86	111.3	34 31.4	52 86	111.9
1	35 24.0	48 88	107.6	35 09.6	48 88	108.1	34 55.0	49 87	108.6	34 40.3	49 87	109.2	34 25.4	50 87	109.7	34 10.4	50 86	110.2	33 55.3	51 86	110.7	33 40.0	51 86	111.2
2	34 31.3	47 88	107.0	34 17.0	48 88	107.5	34 02.6	48 88	108.0	33 48.0	49 87	108.6	33 33.3	49 87	109.1	33 18.5	50 87	109.6	33 03.5	50 87	110.1	32 48.4	51 86	110.6
3	33 38.4	47 88	106 4	33 24.3	47 88	106.9	33 10.0	48 88	107.5	32 55.6	48 88	108.0	32 41.0	49 88	108.5	32 26.3	49 87	109.0	32 11.5	50 87	109.5	31 56.6	50 87	110.0
4	32 45.3	46 89	105.8	32 31.3	47 88	106.4	32 17.2	47 88	106.9	32 02.9	48 88	107.4	31 48.6	48 88	107.9	31 34.0	49 87	108.4	31 19.4	49 87	109.0	31 04.6	49 87	109.5
55	31 52.1	46 89	105.3	31 38.3	46 89	105.8	31 24.3	47 88	106.3	31 10.2	47 88	106.9	30 55.9	48 88	107.4	30 41.6	48 88	107.9	30 27.1	48 88	108.4	30 12.5	49 87	108.9
6	30 58.8	46 89	104.8	30 45.1	46 89	105.3	30 31.2	46 89	105.8	30 17.2	47 88	106.3	30 03.1	47 88	106.8	29 48.9	48 88	107.3	29 34.6	48 88	107.8	29 20.1	48 88	108.3
7	30 05.3	45 89	104.2	29 51.7	46 89	104.8	29 38.0	46 89	105.3	29 24.2	46 89	105.8	29 10.2	47 88	106.3	28 56.1	47 88	106.8	28 41.9	47 88	107.3	28 27.6	48 88	107.8
8	29 11.7	45 90	103.7	28 58.3	45 89	104.2	28 44.7	46 89	104.7	28 30.9	46 89	105.2	28 17.1	46 89	105.8	28 03.2	47 88	106.3	27 49.1	47 88	106.8	27 35.0	47 88	107.3
9	28 18.0	44 90	103.2	28 04.7	45 90	103.7	27 51.2	45 89	104.2	27 37.6	45 89	104.7	27 23.9	46 89	105.2	27 10.1	46 89	105.7	26 56.2	47 88	106.2	26 42.1	47 88	106.7
60	27 24.2	44 90	102.7	27 10.9	44 90	103.2	26 57.6	45 90	103.7	26 44.1	45 89	104.2	26 30.5	45 89	104.7	26 16.9	46 89	105.2	26 03.1	46 89	105.7	25 49.2	46 88	106.2
1	26 30.3	44 90	102.2	26 17.1	44 90	102.7	26 03.9	44 90	103.2	25 50.5	45 90	103.7	25 37.1	45 89	104.2	25 23.5	45 89	104.7	25 09.8	46 89	105.2	24 56.1	46 89	105.7
2	25 36.2	43 90	101.7	25 23.2	44 90	102.2	25 10.1	44 90	102.7	24 56.8	44 90	103.2	24 43.5	45 90	103.7	24 30.0	45 89	104.2	24 16.5	45 89	104.7	24 02.8	46 89	105.2
3	24 42.1	43 90	101.3	24 29.2	43 90	101.8	24 16.1	44 90	102.2	24 03.0	44 90	102.7	23 49.7	44 90	103.2	23 36.4	45 90	103.7	23 23.0	45 89	104.2	23 09.5	45 89	104.7
4	23 47.9	43 90	100.8	23 35.1	43 90	101.3	23 22.1	43 90	101.8	23 09.1	44 90	102.3	22 55.9	44 90	102.8	22 42.7	44 90	103.2	22 29.4	45 90	103.7	22 16.0	45 89	104.2
65	22 53.6	42 91	100.3	22 40.9	43 90	100.8	22 28.0	43 90	101.3	22 15.0	43 90	101.8	22 02.0	44 90	102.3	21 48.9	44 90	102.8	21 35.7	44 90	103.2	21 22.4	44 90	103.7
6	21 59.2	42 91	99.9	21 46.6	42 91	100.4	21 33.8	43 90	100.8	21 20.9	43 90	101.3	21 08.0	43 90	101.8	20 55.0	44 90	102.3	20 41.9	44 90	102.8	20 28.7	44 90	103.3
7	21 04.8	42 91	99.4	20 52.2	42 91	99.9	20 39.5	42 91	100.4	20 26.7	43 90	100.9	20 13.9	43 90	101.4	20 01.0	43 90	101.8	19 48.0	43 90	102.3	19 34.9	44 90	102.8
8	20 10.3	42 91	99.0	19 57.7	42 91	99.5	19 45.1	42 91	99.9	19 32.5	42 91	100.4	19 19.7	43 90	100.9	19 06.9	43 90	101.4	18 54.0	43 90	101.9	18 41.0	43 90	102.3
9	19 15.7	41 91	98.5	19 03.2	42 91	99.0	18 50.7	42 91	99.5	18 38.1	42 91	100.0	18 25.4	42 91	100.4	18 12.7	43 90	100.9	17 59.9	43 90	101.4	17 47.0	43 90	101.9
70	18 21.0	41 91	98.1	18 08.7	41 91	98.6	17 56.2	42 91	99.1	17 43.7	42 91	99.5	17 31.1	42 91	100.0	17 18.4	42 90	100.5	17 05.7	43 90	101.0	16 52.9	43 90	101.4
1	17 26.3	41 91	97.7	17 14.0	41 91	98.1	17 01.6	41 91	98.6	16 49.2	42 91	99.1	16 36.6	42 91	99.6	16 24.1	42 91	100.0	16 11.4	42 91	100.5	15 58.7	42 90	101.0
2	16 31.6	41 91	97.2	16 19.3	41 91	97.7	16 07.0	41 91	98.2	15 54.6	41 91	98.7	15 42.1	42 91	99.1	15 29.6	42 91	99.6	15 17.1	42 91	100.1	15 04.4	42 90	100.5
3	15 36.7	41 92	96.8	15 24.5	41 91	97.3	15 12.3	41 91	97.8	15 00.0	41 91	98.2	14 47.6	41 91	98.7	14 35.1	42 01	99.2	14 22.7	42 91	99.6	14 10.1	42 91	100.1
4	14 41.9	40 92	96.4	14 29.7	41 91	96.9	14 17.5	41 91	97.3	14 05.3	41 91	97.8	13 53.0	41 91	98.3	13 40.6	41 91	98.7	13 28.2	41 91	99.2	13 15.7	42 91	99.7
75	13 47.0	40 92	96.0	13 34.9	40 92	96.4	13 22.7	41 92	96.9	13 10.5	41 91	97.4	12 58.3	41 91	97.9	12 46.0	41 91	98.3	12 33.6	41 91	98.8	12 21.2	41 91	99.3
6	12 52.0	40 92	95.6	12 40.0	40 92	96.0	12 27.9	40 92	96.5	12 15.7	41 91	97.0	12 03.5	41 91	97.4	11 51.3	41 91	97.9	11 39.0	41 91	98.4	11 26.7	41 91	98.8
7	11 57.0	40 92	95.2	11 45.0	40 92	95.6	11 33.0	40 92	96.1	11 20.9	40 92	96.6	11 08.7	41 92	97.0	10 56.6	41 91	97.5	10 44.3	41 91	98.0	10 32.1	41 91	98.4
8	11 02.0	40 92	94.7	10 50.0	40 92	95.2	10 38.0	40 92	95.7	10 26.0	40 92	96.1	10 13.9	40 92	96.6	10 01.8	40 92	97.1	9 49.6	41 91	97.5	9 37.4	41 91	98.0
9	10 07.0	40 92	94.3	9 55.0	40 92	94.8	9 43.1	40 92	95.3	9 31.1	40 92	95.7	9 19.0	40 92	96.2	9 06.9	40 92	96.7	8 54.8	40 91	97.1	8 42.7	41 91	97.6
80	9 11.9	40 92	93.9	9 00.0	40 92	94.4	8 48.1	40 92	94.9	8 36.1	40 92	95.3	8 24.1	40 92	95.8	8 12.1	40 92	96.3	8 00.0	40 92	96.7	7 47.9	40 91	97.2
1	8 16.8	39 92	93.5	8 04.9	40 92	94.0	7 53.0	40 92	94.5	7 41.1	40 92	94.9	7 29.1	40 92	95.4	7 17.1	40 92	95.9	7 05.1	40 92	96.3	6 53.1	40 92	96.8
2	7 21.6	39 92	93.1	7 09.8	40 92	93.6	6 57.9	40 92	94.1	6 46.0	40 92	94.5	6 34.1	40 92	95.0	6 22.2	40 92	95.5	6 10.2	40 92	95.9	5 58.2	40 92	96.4
3	6 26.5	39 92	92.7	6 14.7	39 92	93.2	6 02.8	39 92	93.7	5 51.0	40 92	94.1	5 39.1	40 92	94.6	5 27.2	40 92	95.1	5 15.3	40 92	95.5	5 03.3	40 92	96.0
4	5 31.3	39 92	92.4	5 19.5	39 92	92.8	5 07.7	39 92	93.3															

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	72 00.0	1.0 03	180.0	72 30.0	1.0 03	180.0	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	00
1	70 58.5	1.0 07	176.9	71 28.5	1.0 08	176.9	71 58.4	1.0 08	176.8	72 28.4	1.0 08	176.7	72 58.4	1.0 08	176.6	73 28.3	1.0 08	176.5	73 58.3	1.0 09	176.4	74 28.2	1.0 09	176.3	1
2	70 54.1	1.0 12	173.9	71 24.0	99 12	173.7	71 53.8	99 13	173.6	72 23.6	99 13	173.4	72 53.5	99 14	173.2	73 23.3	99 14	173.0	73 53.1	99 14	172.8	74 22.9	99 15	172.6	2
3	70 46.8	99 17	170.9	71 16.5	99 18	170.6	71 46.1	99 18	170.4	72 15.7	99 18	170.2	72 45.3	99 19	169.9	73 14.9	99 19	169.6	73 44.5	99 20	169.3	74 14.0	98 20	169.0	3
4	70 36.6	98 22	167.9	71 06.9	98 22	167.6	71 35.4	98 23	167.3	72 04.8	98 23	167.0	72 34.1	98 24	166.6	73 03.4	98 24	166.2	73 32.6	97 25	165.9	74 01.8	97 26	165.4	4
05	70 23.7	97 26	165.0	70 52.8	97 27	164.6	71 21.8	97 27	164.2	71 50.8	97 28	163.8	72 19.8	96 29	163.4	72 48.7	96 29	163.0	73 17.6	96 30	162.5	73 46.3	96 31	162.0	05
6	70 08.0	96 30	162.1	70 36.8	96 31	161.7	71 05.4	95 32	161.3	71 34.1	95 33	160.8	72 02.6	95 33	160.3	72 31.1	95 34	159.8	72 59.4	94 35	159.2	73 27.7	94 36	158.6	6
7	69 49.8	95 34	159.4	70 18.1	94 35	158.9	70 46.4	94 36	158.4	71 14.5	94 37	157.8	71 42.6	93 38	157.3	72 10.6	93 39	156.7	72 38.4	93 40	156.1	73 06.2	92 40	155.4	7
8	69 29.1	93 38	156.7	69 57.0	93 39	156.1	70 24.8	92 40	155.6	70 52.4	92 41	155.0	71 20.0	92 42	154.4	71 47.4	91 43	153.7	72 14.7	91 44	153.1	72 41.9	90 45	152.4	8
9	69 06.1	91 42	154.1	69 33.5	91 43	153.5	70 00.7	91 44	152.9	70 27.9	90 45	152.2	70 54.9	90 46	151.6	71 21.8	89 47	150.9	71 48.5	89 48	150.2	72 15.0	88 49	149.4	9
10	68 40.8	90 46	151.5	69 07.7	89 46	150.9	69 34.5	89 47	150.3	70 01.0	88 48	149.6	70 27.5	88 49	148.9	70 53.8	87 50	148.2	71 19.8	87 51	147.4	71 45.7	86 52	146.6	10
1	68 13.5	88 49	149.1	68 39.8	88 50	148.5	69 06.0	87 51	147.8	69 32.1	86 52	147.1	69 57.9	86 53	146.4	70 23.6	85 54	145.6	70 49.0	85 55	144.8	71 14.3	84 56	144.0	1
2	67 44.2	86 52	146.8	68 10.0	86 53	146.1	68 35.6	85 54	145.4	69 01.1	85 55	144.7	69 26.4	84 56	143.9	69 51.4	83 57	143.1	70 16.2	82 58	142.3	70 40.8	82 59	141.5	2
3	67 13.1	84 55	144.6	67 38.3	84 56	143.9	68 03.4	83 57	143.2	68 28.3	83 58	142.4	68 52.9	82 58	141.6	69 17.4	81 60	140.8	69 41.6	80 61	140.0	70 05.5	79 62	139.1	3
4	66 40.2	83 57	142.5	67 04.9	82 58	141.7	67 29.4	81 59	141.0	67 53.7	81 60	140.2	68 17.8	80 61	139.4	68 41.6	79 62	138.6	69 05.2	78 63	137.7	69 28.5	77 64	136.8	4
15	66 05.8	81 60	140.4	66 30.0	80 61	139.7	66 53.9	79 62	138.9	67 17.6	79 62	138.1	67 41.1	78 64	137.3	68 04.3	77 64	136.5	68 27.3	76 66	135.6	68 50.0	75 66	134.7	15
6	65 29.9	79 62	138.5	65 53.5	78 63	137.7	66 16.9	78 64	136.9	66 40.1	77 65	136.2	67 03.0	76 66	135.3	67 25.6	75 67	134.5	67 48.0	74 68	133.6	68 10.1	73 69	132.7	6
7	64 52.6	77 64	136.6	65 15.7	77 65	135.9	65 38.5	76 66	135.1	66 01.1	75 67	134.3	66 23.5	74 68	133.4	66 45.6	73 69	132.6	67 07.4	72 70	131.7	67 28.9	71 71	130.8	7
8	64 14.0	76 66	134.8	64 36.6	75 67	134.1	64 58.9	74 68	133.3	65 21.0	73 69	132.5	65 42.8	72 70	131.7	66 04.3	71 70	130.8	66 25.6	70 72	129.9	66 46.5	69 72	129.0	8
9	63 34.3	74 68	133.1	63 56.3	73 69	132.4	64 18.2	72 70	131.6	64 39.7	71 70	130.8	65 01.0	70 71	129.9	65 22.0	70 72	129.1	65 42.7	68 73	128.2	66 03.1	67 74	127.3	9
20	62 53.5	72 70	131.5	63 15.0	71 70	130.8	63 36.3	71 71	130.0	63 57.4	70 72	129.2	64 18.1	69 73	128.3	64 38.6	68 74	127.5	64 58.8	67 75	126.6	65 18.7	66 76	125.7	20
1	62 11.6	71 71	130.0	62 32.7	70 72	129.2	62 53.5	69 73	128.4	63 14.1	68 74	127.6	63 34.4	67 74	126.8	63 54.4	66 75	126.0	64 14.0	65 76	125.1	64 33.4	64 77	124.2	1
2	61 28.8	69 73	128.5	61 49.5	68 74	127.7	62 09.8	67 74	126.9	62 29.9	67 75	126.1	62 49.7	66 76	125.3	63 09.2	65 76	124.5	63 28.5	64 77	123.6	63 47.4	62 78	122.8	2
3	60 45.2	68 74	127.1	61 05.4	67 75	126.3	61 25.3	66 76	125.5	61 44.9	65 76	124.7	62 04.3	64 77	123.9	62 23.3	63 78	123.1	62 42.1	62 78	122.3	63 00.6	61 79	121.4	3
4	60 09.7	66 75	125.7	60 29.5	65 76	125.0	60 48.8	65 77	124.2	61 08.2	64 78	123.4	61 27.4	63 78	122.6	61 46.4	62 79	121.8	62 05.1	61 79	121.0	62 23.4	60 80	120.1	4
25	59 15.5	65 76	124.4	59 34.9	64 77	123.7	59 53.9	63 78	122.9	60 12.7	62 78	122.1	60 31.2	61 79	121.3	60 49.5	60 80	120.5	61 07.4	59 80	119.7	61 25.0	58 81	118.9	25
6	58 29.6	64 78	123.2	58 48.6	63 78	122.5	59 07.2	62 79	121.7	59 25.6	61 79	120.9	59 43.8	60 80	120.1	60 01.6	59 81	119.3	60 19.1	58 81	118.5	60 36.4	57 82	117.7	6
7	57 43.1	62 78	122.0	58 01.7	61 79	121.3	58 20.0	61 80	120.5	58 38.0	60 80	119.8	58 55.7	59 81	119.0	59 13.2	58 82	118.2	59 30.3	57 82	117.4	59 47.2	56 83	116.6	7
8	56 56.0	61 80	120.9	57 14.2	60 80	120.1	57 32.1	59 81	119.4	57 49.8	58 81	118.6	58 07.1	58 82	117.9	58 24.3	57 82	117.1	58 41.1	56 83	116.3	58 57.6	55 83	115.5	8
9	56 06.3	60 80	119.8	56 26.1	59 81	119.1	56 43.7	58 82	118.3	57 01.0	57 82	117.6	57 18.1	56 82	116.8	57 34.8	55 83	116.0	57 51.3	54 84	115.3	58 07.5	53 84	114.5	9
30	55 20.1	59 81	118.7	55 37.6	58 82	118.0	55 54.9	57 82	117.3	56 11.9	56 83	116.5	56 28.6	55 83	115.8	56 45.0	54 84	115.0	57 01.2	53 84	114.3	57 17.0	52 85	113.5	30
1	54 31.5	58 82	117.7	54 48.6	57 82	117.0	55 05.6	56 83	116.3	55 22.2	55 83	115.6	55 38.6	54 84	114.8	55 54.8	53 84	114.1	56 10.6	52 85	113.3	56 26.2	51 85	112.5	1
2	53 42.3	57 82	116.7	53 59.2	56 83	116.0	54 15.8	55 84	115.3	54 32.2	54 84	114.6	54 48.3	53 84	113.9	55 04.2	52 85	113.1	55 19.7	51 85	112.4	55 35.0	51 86	111.6	2
3	52 52.8	56 83	115.8	53 09.4	55 84	115.1	53 25.7	54 84	114.4	53 41.8	53 84	113.7	53 57.6	52 85	113.0	54 13.2	51 86	112.2	54 28.5	51 86	111.5	54 43.5	50 86	110.8	3
4	52 02.9	55 84	114.9	52 19.2	54 84	114.2	52 35.3	53 85	113.5	52 51.1	52 85	112.8	53 06.6	51 86	112.1	53 21.9	51 86	111.4	53 37.0	50 86	110.7	53 51.8	49 87	109.9	4
35	51 12.6	54 84	114.0	51 28.7	53 85	113.4	51 44.5	52 85	112.7	52 00.0	51 86	112.0	52 15.3	51 86	111.3	52 30.4	50 86	110.6	52 45.2	49 87	109.8	52 59.7	48 87	109.1	35
6	50 22.0	53 85	113.2	50 37.8	52 85	112.5	50 53.3	51 86	111.8	51 08.6	51 86	111.2	51 23.7	50 86	110.5	51 38.5	49 87	109.8	51 53.1	48 87	109.1	52 07.4	47 88	108.3	6
7	49 31.1	52 85	112.4	49 46.6	51 86	111.7	50 01.9	51 86	111.0	50 17.0	50 86	110.4	50 31.8	49 87	109.7	50 46.4	48 87	109.0	51 00.8	47 88	108.3	51 14.9	47 88	107.6	7
8	48 39.9	51 86	111.6	48 55.2	51 86	110.9	49 10.2	50 86	110.3	49 25.1	49 87	109.6	49 39.7	48 87	108.9	49 54.1	48 88	108.3	50 08.2	47 88	107.6	59 22.1	46 88	106.9	8
9	47 48.4	51 86	110.8	48 03.5	50 87	110.2	48 18.3	49 87	109.5	48 32.9	48 87	108.9	48 47.4	48 88	108.2	49 01.5	47 88	107.5	49 15.5	46 88	106.9	49 29.2	45 89	106.2	9
40	46 56.6	50 87	110.1	47 11.5	49 87	109.4	47 26.1	48 87	108.8	47 40.6	48 88	108.1	47 54.8	47 88	107.5	48 08.8	46 88	106.8	48 22.5	45 88	106.2	48 36.0	45 89	105.5	40
1	46 04.6	49 87	109.4	46 19.3	49 87	108.7	46 33.7	48 88	108.1	46 48.0	47 88	107.5	47 02.0	46 88	106.8	47 15.8	46 88	106.2	47 29.4	45 89	105.5	47 42.7	44 89	104.8	1
2	45 12.4	49 87	108.7	45 26.9	48 88	108.0	45 41.1	47 88	107.4	45 55.2	46 88	106.8	46 09.0	46 88	106.1	46 22.7	45 89	105.5	46 36.1	44 89	104.8	46 49.2	44 89	104.2	2
3	44 20.0	48 88	108.0	44 34.3	47 88	107.4	44 48.4	47 88	106.7	45 02.2	46 88	106.1	45 15.9	45 89	105.5	45 29.4	45 89	104.9	45 42.6	44 89	104.2	45 55.6	43 90	103.6	3
4	43 27.4	47 88	107.3	43 41.5	47 88	106.7	43 55.4	46 89	106.1	44 09.1	45 89	105.5	44 22.6	45 89	104.9	44 35.9	44 89	104.2	44 49.0	43 90	103.6	45 01.9	43 90	103.0	4
45	42 34.6	47 88	106.7	42 48.5	46 89	106.1	43 02.2	46 89	105.5	43 15.8	45 89	104.9	43 29.1	44 89	104.2	43 42.3	43 90	103.6	43 55.2	43 90	103.0	44 08.0	42 90	102.4	45
6	41 41.6	46 89	106.1	41 55.3	46 89	105.5	42 08.9	45 89	104.9	42 22.3	44 89	104.3	42 35.5	44 90	103.6	42 48.5	43 90	103.0	43 01.4	42 90	102.4	43 14.0	42 90	101.8	6
7	40 48.4	46 89	105.4	41 02.0	45 89	104.9	41 15.5	44 89	104.3	41 28.7	44 90	103.7	41 41.8	43 90	103.1	41 54.7	43 90	102.5	42 07.4	42 90	101.9	42 19.9	41 90	101.2	7
8	39 55.1	45 89	104.9	40 08.6	45 89	104.3	40 21.9	44 90	103.7	40 35.0	43 90	103.1	40 47.9	43 90	102.5	41 00.7	42 90	101.9	41 13.3	42 90	101.3	41 25.6	41 90	100.7	8
9	39 01.6	45 89	104.3	39 15.0	44 90	103.7	39 28.1	44 90	103.1	39 41.1	43 90	102.5	39 54.0	42 90	101.9	40 06.6	42 90	101.3	40 19.0	41 90	100.8	40 31.3	41 91	100.2	9
50	38 08.0	44 90	103.7	38 21.3	44 90	103.1	38 34.3	43 90	102.6	38 47.2	43 90	102.0	38 59.9	42 90	101.4	39 12.4	41 90	100.8	39 24.7	41 91	100.2	39 36.9	40 91	99.6	50
1	37 14.3	44 90	103.1	37 27.4	43 90	102.6	37 40.3	43 90	102.0	37 53.1	42 90	101.4	38 05.7	42 90	100.9	38 18.1	41 91	100.3	38 30.3	41 91	99.7	38 42.4	40 91	99.1	1
2	36 20.5	43 90	102.6	36 33.4	43 90	102.0	36 46.3	42 90	101.5	36 58.9	42 90	100.9	37 11.4	41 91	100.3	37 23.7	41 91	99.8	37 35.9	40 91	99.2	37 47.8	40 91	98.6	2
3	35 26.5	43 90	102.1	35 39.4	43 90	101.5	35 52.1	42 90	101.0	36 04.6	42 90	100.4	36 17.0	41 91	99.8	36 29.2	40 91	99.3	36 41.3	40 91	98.7	36 53.2	39 91	98.1	3
4	34 32.5	43 90	101.5	34 45.2	42 90	101.0	34 57.8	42 91	100.4	35 10.3	41 91	99.9	35 22.6	41 91	99.3	35 34.7	40 91	98.8	35 46.7	40 91	98.2	35 58.5	39 91	97.6	4
55	33 38.3	42 90	101.0	33 51.0	42 91	100.5	34 03.5	41 91	99.9	34 15.8	41 91	99.4	34 28.0	40 91	98.8	34 40.1	40 91	98.3	34 52.0	39 91	97.7	35 03.7	39 91	97.2	55
6	32 44.0	42 90	100.5	32 56.6	42 91	100.0	33 09.0	41 91	99.4	33 21.3	41 91	98.9	33 33.4	40 91	98.4	33 45.4	40 91	97.8	33 57.2	39 91	97.3	34 08.9	39 92	96.7	6
7	31 49.7	42 91	100.0	32 02.2	41 91	99.5	32 14.5	41 91	99.0	32 26.7	40 91	98.4	32 38.7	40 91	97.9	32 50.6	39 91	97.3	33 02.4	39 92	96.8	33 14.0	38 92	96.2	7
8	30 55.3	41 91	99.6	31 07.7	41 91	99.0	31 19.9	41 91	98.5	31 32.0	40 91	97.9	31 44.0	40 91	97.4	31 55.8	39 91	96.9	32 07.5	39 92	96.3	32 19.1	38 92	95.8	8
9	30 00.8	41 91	99.1	30 13.1	41 91	98.5	30 25.2	40 91	98.0	30 37.3	40 91	97.5	30 49.2	39 91	97.0	31 01.0	39 92	96.4	31 12.6	39 92	95.9	31 24.1	38 92	95.3	9
60	29 06.2	41 91	98.6	29 18.4	41 91	98.1	29 30.5	40 91	97.6	29 42.5	40 91	97.0	29 54.3	39 92	96.5	30 06.1	39 92	96.0	30 17.7	38 92	95.4	30 29.1	38 92	94.9	60
1	28 11.6	41 91	98.1	28 23.7	40 91	97.6	28 35.7	40 91	97.1	28 47.7	40 92	96.6	28 59.4	39 92	96.0	29 11.1	39 92	95.5	29 22.6	38 92	95.0	29 34.1	38 92	94.5	1
2	27 16.9	40 91	97.7	27 28.9	40 91	97.2	27 40.9	40 92	96.6	27 52.8	39 92	96.1	28 04.5	39 92	95.6	28 16.1	39 92	95.1	28 27.6	38 92	94.6	28 39.0	38 92	94.0	2
3	26 22.1	40 91	97.2	26 34.1	40 92	96.7	26 46.0	40 92	96.2	26 57.8	39 92	95.7	27 09.5	39 92	95.2	27 21.1	38 92	94.7	27 32.5	38 92	94.1	27 43.9	38 92	93.6	3
4	25 27.3	40 92	96.8	25 39.2	40 92	96.3	25 51.1	39 92	95.8	26 02.8	39 92	95.3	26 14.5	39 92	94.7	26 26.[illegible]	38 92	94.2	26 37.4	38 92	93.7	26 48.7	38 92	93.2	4
65	24 32.4	40 92	96.3	24 44.3	40 92	95.8	24 56.1	39 92	95.3	25 07.8	39 92	94.8	25 19.4	38 92	94.3	25 30.9	38 92	93.8	25 42.3	38 92	93.3	25 53.6	37 92	92.8	65
6	23 37.5	40 92	95.9	23 49.4	39 92	95.4	24 01.1	39 92	94.9	24 12.8	39 92	94.4	24 24.3	38 92	93.9	24 35.8	38 92	93.4	24 47.2	38 92	92.9	24 58.4	37 92	92.4	6
7	22 42.5	40 92	95.5	22 54.3	39 92	95.0	23 06.1	39 92	94.5	23 17.7	39 92	94.0	23 29.2	38 92	93.5	23 40.7	38 92	93.0	23 52.0	38 92	92.5	24 03.2	37 92	92.0	7
8	21 47.5	39 92	95.1	21 59.3	39 92	94.6	22 11.0	39 92	94.1	22 22.6	38 92	93.6	22 34.1	38 92	93.1	22 45.5	38 92	92.6	22 56.8	38 92	92.1	23 08.0	37 92	91.6	8
9	20 52.5	39 92	94.6	21 04.2	39 92	94.1	21 15.9	39 92	93.6	21 27.4	38 92	93.2	21 38.9	38 92	92.7	21 50.3	38 92	92.2	22 01.6	37 92	91.7	22 12.8	37 92	91.2	9
70	19 57.4	39 92	94.2	20 09.1	39 92	93.7	20 20.8	39 92	93.2	20 32.3	38 92	92.7	20 43.7	38 92	92.2	20 55.1	38 92	91.8	21 06.4	37 92	91.3	21 17.6	37 92	90.8	70
1	19 02.3	39 92	93.8	19 14.0	39 92	93.3	19 25.6	39 92	92.8	19 37.1	38 92	92.3	19 48.5	38 92	91.8	19 59.9	38 92	91.4	20 11.2	37 92	90.9	20 22.4	37 92	90.4	1
2	18 07.2	39 92	93.4	18 18.9	39 92	92.9	18 30.4	38 92	92.4	18 41.9	38 92	91.9	18 53.3	38 92	91.4	19 04.7	38 92	91.0	19 15.9	37 92	90.5	19 27.1	37 92	90.0	2
3	17 12.1	39 92	93.0	17 23.7	39 92	92.5	17 35.2	38 92	92.0	17 46.7	38 92	91.5	17 58.1	38 92	91.0	18 09.5	38 92	90.6	18 20.7	37 92	90.1	18 31.9	37 92	89.6	3
4	16 16.9	39 92	92.6	16 28.5	39 92	92.1	16 40.0	38 92	91.6	16 51.5	38 92	91.1	17 02.9	38 92	90.7	17 14.2	38 92	90.2	17 25.5	37 92	89.7	17 36 7	37 92	89.2	4
75	15 21.7	39 92	92.2	15 33.3	38 92	91.7	15 44.8	38 92	91.2	15 56.3	38 92	90.7	16 07.7	38 92	90.3	16 19.0	38 92	89.8	16 30.3	37 92	89.3	16 41.4	37 92	88.8	75
6	14 26.5	39 92	91.8	14 38.1	38 92	91.3	14 49.6	38 92	90.8	15 01.1	38 92	90.3	15 12.4	38 92	89.9	15 23.8	38 92	89.4	15 35.0	37 92	88.9	15 46.2	37 92	88.4	6
7	13 31.3	39 92	91.4	13 42.9	38 92	90.9	13 54.4	38 92	90.4	14 05.8	38 92	90.0	14 17.2	38 92	89.5	14 28.5	38 92	89.0	14 39.8	37 92	88.5	14 51.0	37 92	88.0	7
8	12 36.1	39 92	91.0	12 47.7	38 92	90.5	12 59.1	38 92	90.0	13 10.6	38 92	89.6	13 22.0	38 92	89.1	13 33.3	38 92	88.6	13 44.6	38 92	88.1	13 55.8	37 92	87.7	8
9	11 40.9	39 92	90.6	11 52.4	38 92	90.1	12 03.9	38 92	89.7	12 15.4	38 92	89.2	12 26.8	38 92	88.7	12 38.1	38 92	88.2	12 49.4	38 92	87.8	13 00.7	37 92	87.3	9
80	10 45.7	39 92	90.2	10 57.2	38 92	89.7	11 08.7	38 92	89.3	11 20.1	38 92	88.8	11 31.6	38 92	88.3	11 42.9	38 92	87.8	11 54.2	38 92	87.4	12 05.5	37 92	86.9	80
1	9 50.4	39 92	89.8	10 02.0	38 92	89.3	10 13.5	38 92	88.9	10 24.9	38 92	88.4	10 36.4	38 92	87.9	10 47.7	38 92	87.5	10 59.1	38 92	87.0	11 10.4	38 92	86.5	1
2	8 55.2	39 92	89.4	9 06.7	38 92	89.0	9 18.3	38 92	88.5	9 29.7	38 92	88.0	9 41.2	38 92	87.5	9 52.6	38 92	87.1	10 03.9	38 92	86.6	10 15.2	38 92	86.1	2
3	8 00.0	39 92	89.0	8 11.5	38 92	88.6	8 23.0	38 92	88.1	8 34.5	38 92	87.6	8 46.0	38 92	87.2	8 57.4	38 92	86.7	9 08.8	38 92	86.2	9 20.2	38 92	85.8	3
4	7 04.8	39 92	88.6	7 16.3	39 92	88.2	7 27.9	38 92	87.7	7 39.4	38 92	87.2	7 50.8	38 92	86.8	8 02.3	38 92	86.3	8 13.7	38 92	85.8	8 25.1	38 92	85.4	4
85	6 09.5	39 92	88.3	6 21.1	39 92	87.8	6 32.7	38 92	87.3	6 44.2	38 92	86.9	6 55.7	38 92	86.4	7 07.2	38 92	85.9	7 18.6	38 92	85.5	7 30.1	38 92	85.0	85
6	5 14.3	39 92	87.9	5 25.9	39 92	87.4	5 37.5	39 92	86.9	5 49.1	38 92	86.5	6 00.6	38 92	86.0	6 12.1	38 92	85.6	6 23.6	38 92	85.1	6 35.0	38 92	84.6	6
7													5 05.5	39 92	85.6	5 17.1	38 92	85.2	5 28.6	38 92	84.7	5 40.1	38 92	84.2	7

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	63 08.0	1.0 02	180.0	62 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	00
1	62 58.9	1.0 05	177.8	62 29.0	1.0 05	177.8	61 59.0	1.0 05	177.9	61 29.0	1.0 05	177.9	60 59.0	1.0 05	177.9	60 29.0	1.0 05	178.0	59 59.0	1.0 05	178.0	59 29.1	1.0 05	178.0	1
2	62 55.8	1.0 09	175.6	62 25.8	1.0 08	175.7	61 55.9	1.0 08	175.8	61 26.0	1.0 08	175.8	60 56.0	1.0 08	175.9	60 26.1	1.0 08	176.0	59 56.2	1.0 08	176.0	59 26.2	1.0 08	176.1	2
3	62 59.5	99 12	173.4	62 20.7	99 12	173.5	61 50.8	99 12	173.7	61 21.0	99 12	173.8	60 51.1	1.0 12	173.9	60 21.3	1.0 11	174.0	59 51.4	1.0 11	174.1	59 21.5	1.0 11	174.2	3
4	62 43.1	99 16	171.3	62 13.4	99 15	171.4	61 43.7	99 15	171.6	61 14.0	99 15	171.7	60 44.3	99 15	171.8	60 14.5	99 14	172.0	59 44.8	99 14	172.1	59 15.0	99 14	172.2	4
05	62 33.7	98 19	169.1	62 04.2	99 19	169.3	61 34.6	99 18	169.5	61 05.0	99 18	169.7	60 35.5	99 18	169.8	60 05.9	99 18	170.0	59 36.2	99 17	170.2	59 06.6	99 17	170.3	05
6	62 22.3	98 22	167.0	61 53.0	98 22	167.2	61 23.6	98 22	167.4	60 54.2	98 21	167.6	60 24.8	98 21	167.8	59 55.3	98 20	168.0	59 25.9	98 20	168.2	58 56.4	98 20	168.4	6
7	62 08.9	97 26	164.9	61 39.8	97 25	165.2	61 10.6	97 25	165.4	60 41.4	97 24	165.7	60 12.2	97 24	165.9	59 43.0	97 24	166.1	59 13.7	98 23	166.3	58 44.4	98 23	166.5	7
8	61 53.6	96 29	162.9	61 24.7	96 28	163.1	60 55.8	96 28	163.4	60 26.8	97 27	163.7	59 57.8	97 27	163.9	59 28.8	97 26	164.2	58 59.8	97 26	164.4	58 30.7	97 26	164.7	8
9	61 36.4	95 32	160.8	61 07.8	95 31	161.2	60 39.1	96 31	161.5	60 10.4	96 30	161.8	59 41.7	96 30	162.0	59 12.9	96 29	162.3	58 44.1	96 29	162.6	58 15.3	96 28	162.9	9
10	61 17.4	94 35	158.9	60 49.0	94 34	159.2	60 20.7	95 34	159.5	59 52.3	95 33	159.9	59 23.8	95 33	160.2	58 55.3	95 32	160.5	58 26.7	95 32	160.8	57 58.2	95 31	161.1	10
1	60 56.6	93 38	156.9	60 28.6	93 37	157.3	60 00.5	94 36	157.7	59 32.4	94 36	158.0	59 04.2	94 35	158.3	58 36.0	94 35	158.7	58 07.7	94 34	159.0	57 39.4	94 34	159.3	1
2	60 34.1	92 40	155.0	60 06.4	92 40	155.4	59 38.7	93 39	155.8	59 10.9	93 38	156.2	58 43.0	93 38	156.5	58 15.1	93 37	156.9	57 47.1	93 37	157.2	57 19.1	94 36	157.6	2
3	60 10.0	91 43	153.2	59 42.6	91 42	153.6	59 15.3	91 42	154.0	58 47.8	92 41	154.4	58 20.3	92 40	154.8	57 52.7	92 40	155.1	57 25.0	92 39	155.5	56 57.3	93 39	155.9	3
4	59 44.3	90 45	151.4	59 17.3	90 45	151.8	58 50.3	90 44	152.2	58 23.2	91 44	152.7	57 56.0	91 43	153.1	57 28.7	91 42	153.4	57 01.4	91 42	153.8	56 34.0	91 41	154.2	4
15	59 17.1	88 48	149.6	58 50.5	89 47	150.1	58 23.8	89 46	150.5	57 57.1	89 46	151.0	57 30.2	90 45	151.4	57 03.3	90 45	151.8	56 36.3	90 44	152.2	56 09.2	90 44	152.6	15
6	58 48.5	87 50	147.9	58 22.3	88 50	148.4	57 56.0	88 49	148.9	57 29.6	88 48	149.3	57 03.1	88 48	149.7	56 36.5	89 47	150.2	56 09.8	89 46	150.6	55 43.1	89 46	151.0	6
7	58 18.5	86 52	146.3	57 52.6	86 52	146.8	57 26.7	87 51	147.2	57 00.7	87 50	147.7	56 34.6	87 50	148.1	56 08.3	88 49	148.6	55 42.0	88 48	149.0	55 15.6	88 48	149.4	7
8	57 47.2	85 54	144.7	57 21.7	85 54	145.2	56 56.2	85 53	145.6	56 30.5	86 52	146.1	56 04.8	86 52	146.6	55 38.9	86 51	147.0	55 13.0	87 50	147.5	54 46.9	87 50	147.9	8
9	57 14.6	83 56	143.1	56 49.6	84 56	143.6	56 24.4	84 55	144.1	55 59.1	84 54	144.6	55 33.8	85 54	145.1	55 08.3	85 53	145.5	54 42.7	85 52	146.0	54 17.0	86 52	146.4	9
20	56 40.9	82 58	141.6	56 16.2	82 57	142.1	55 51.5	83 57	142.6	55 26.6	83 56	143.1	55 01.6	84 56	143.6	54 36.4	84 55	144.1	54 11.2	84 54	144.5	53 45.9	85 54	145.0	20
1	56 06.0	81 60	140.1	55 41.8	81 59	140.7	55 17.4	82 59	141.2	54 52.9	82 58	141.7	54 28.2	82 57	142.2	54 03.5	83 57	142.7	53 38.6	83 56	143.1	53 13.6	83 56	143.6	1
2	55 30.1	79 62	138.7	55 06.2	80 61	139.2	54 42.2	80 60	139.8	54 18.1	81 60	140.3	53 53.8	81 59	140.8	53 29.4	81 58	141.3	53 04.9	82 58	141.8	52 40.3	82 57	142.2	2
3	54 53.2	78 63	137.3	54 29.7	79 62	137.9	54 06.1	79 62	138.4	53 42.3	79 61	138.9	53 18.4	80 61	139.4	52 54.4	80 60	139.9	52 30.2	81 60	140.4	52 06.0	81 59	140.9	3
4	54 15.3	77 65	136.0	53 52.2	77 64	136.6	53 28.9	78 63	137.1	53 05.5	78 63	137.6	52 42.0	79 62	138.1	52 18.3	79 62	138.6	51 54.6	79 61	139.1	51 30.7	80 60	139.6	4
25	53 36.5	76 66	134.7	53 13.7	76 66	135.3	52 50.9	76 65	135.8	52 27.8	77 64	136.3	52 04.7	77 64	136.9	51 41.4	78 63	137.4	51 18.0	78 62	137.9	50 54.4	79 62	138.4	25
6	52 56.8	74 68	133.5	52 34.4	75 67	134.0	52 11.9	75 66	134.6	51 49.3	76 66	135.1	51 26.5	76 65	135.6	51 03.5	77 64	136.1	50 40.5	77 64	136.6	50 17.3	78 63	137.1	6
7	52 16.3	73 69	132.3	51 54.3	74 68	132.8	51 32.2	74 68	133.4	51 09.9	75 67	133.9	50 47.4	75 66	134.4	50 24.9	75 66	134.9	50 02.1	76 65	135.4	49 39.3	76 65	136.0	7
8	51 35.0	72 70	131.1	51 13.4	72 69	131.6	50 51.6	73 69	132.2	50 29.7	73 68	132.7	50 07.6	74 68	133.3	49 45.4	74 67	133.8	49 23.0	75 66	134.3	49 00.5	75 66	134.8	8
9	50 53.1	71 71	130.0	50 31.8	71 71	130.5	50 10.3	72 70	131.1	49 48.7	72 69	131.6	49 27.0	73 69	132.1	49 05.1	73 68	132.7	48 43.1	74 68	133.2	48 20.9	74 67	133.7	9
30	59 10.4	70 72	128.9	49 49.4	70 72	129.4	49 28.3	71 71	130.0	49 07.1	71 70	130.5	48 45.7	72 70	131.0	48 24.1	72 69	131.6	48 02.4	73 69	132.1	47 40.6	73 68	132.6	30
1	49 27.1	68 73	127.8	49 06.4	69 73	128.3	48 45.7	69 72	128.9	48 24.8	70 72	129.4	48 03.7	70 71	130.0	47 42.5	71 71	130.5	47 21.1	71 70	131.0	46 59.6	72 70	131.5	1
2	48 43.1	67 74	126.8	48 22.8	68 74	127.3	48 02.4	68 73	127.9	47 41.8	69 73	128.4	47 21.0	69 72	128.9	47 00.1	70 72	129.5	46 39.1	70 71	130.0	46 17.9	71 70	130.5	2
3	47 58.6	66 75	125.7	47 38.6	67 75	126.3	47 18.5	67 74	126.9	46 58.2	68 74	127.4	46 37.8	68 73	127.9	46 17.2	69 72	128.5	45 56.5	69 72	129.0	45 35.6	70 72	129.5	3
4	47 13.5	65 76	124.8	46 53.8	66 76	125.3	46 34.0	66 75	125.9	46 14.0	67 74	126.4	45 53.9	67 74	127.0	45 33.7	68 74	127.5	45 13.2	68 73	128.0	44 52.7	69 72	128.5	4
35	46 27.8	64 77	123.8	46 08.5	65 76	124.4	45 49.0	65 76	124.9	45 29.3	66 75	125.5	45 09.5	66 75	126.0	44 49.6	67 74	126.5	44 29.4	67 74	127.1	44 09.2	68 73	127.6	35
6	45 41.7	63 78	122.9	45 22.7	64 77	123.5	45 03.4	64 77	124.0	44 44.1	65 76	124.6	44 24.6	65 76	125.1	44 04.9	66 75	125.6	43 45.1	66 75	126.1	43 25.2	67 74	126.6	6
7	44 55.1	62 78	122.0	44 36.4	63 78	122.6	44 17.4	63 78	123.1	43 58.4	64 77	123.7	43 39.1	64 76	124.2	43 19.8	65 76	124.7	43 00.2	65 76	125.2	42 40.6	66 75	125.8	7
8	44 08.1	61 79	121.2	43 49.6	62 79	121.7	43 30.9	62 78	122.2	43 12.1	63 78	122.8	42 53.2	63 77	123.3	42 34.1	64 77	123.8	42 14.9	64 76	124.4	41 55.5	65 76	124.9	8
9	43 20.6	60 80	120.3	43 02.4	61 79	120.9	42 44.0	61 79	121.4	42 25.5	62 78	121.9	42 06.8	62 78	122.5	41 48.0	63 78	123.0	41 29.1	63 77	123.5	41 10.0	64 77	124.0	9
40	42 32.7	60 80	119.5	42 14.8	60 80	120.0	41 56.7	61 80	120.6	41 38.4	61 79	121.1	41 20.0	62 79	121.6	41 01.5	62 78	122.2	40 42.8	63 78	122.7	40 24.0	63 78	123.2	40
1	41 44.5	59 81	118.7	41 26.8	59 81	119.2	41 08.9	60 80	119.8	40 50.9	60 80	120.3	40 32.8	61 79	120.8	40 14.5	61 79	121.4	39 56.1	62 78	121.9	39 37.5	62 78	122.4	1
2	40 55.8	58 82	117.9	40 38.4	58 81	118.5	40 20.8	59 81	119.0	40 03.1	59 80	119.5	39 45.2	60 80	120.1	39 27.2	60 80	120.6	39 09.0	61 79	121.1	38 50.7	61 79	121.6	2
3	40 06.9	57 82	117.2	39 49.7	58 82	117.7	39 32.3	58 81	118.2	39 14.8	59 81	118.8	38 57.2	59 81	119.3	38 39.4	59 80	119.8	38 21.5	60 80	120.3	38 03.5	60 80	120.8	3
4	39 17.6	56 83	116.4	39 00.6	57 82	117.0	38 43.5	57 82	117.5	38 26.2	58 82	118.0	38 08.8	58 81	118.5	37 51.3	59 81	119.1	37 33.6	59 80	119.6	37 15.8	60 80	120.1	4
45	38 28.0	56 83	115.7	38 11.2	56 83	116.3	37 54.3	57 82	116.8	37 37.3	57 82	117.3	37 20.2	57 82	117.8	37 02.9	58 81	118.3	36 45.4	58 81	118.8	36 27.9	59 80	119.3	45
6	37 38.1	55 84	115.0	37 21.5	55 83	115.5	37 04.9	56 83	116.1	36 48.1	56 83	116.6	36 31.1	57 82	117.1	36 14.1	57 82	117.6	35 56.9	58 82	118.1	35 39.6	58 81	118.6	6
7	36 47.9	54 84	114.3	36 31.6	55 84	114.9	36 15.1	55 83	115.4	35 58.5	55 83	115.9	35 41.8	56 83	116.4	35 25.0	56 82	116.9	35 08.0	57 82	117.4	34 50.9	57 82	117.9	7
8	35 57.4	53 84	113.7	35 41.3	54 84	114.2	35 25.1	54 84	114.7	35 08.7	55 84	115.2	34 52.2	55 83	115.7	34 35.6	56 83	116.2	34 18.8	56 82	116.7	34 02.0	56 82	117.2	8
9	35 06.7	53 85	113.0	34 50.8	53 84	113.5	34 34.8	54 84	114.1	34 18.6	54 84	114.6	34 02.3	55 84	115.1	33 45.9	55 83	115.6	33 29.4	55 83	116.1	33 12.7	56 82	116.6	9
50	34 15.8	52 85	112.4	34 00.1	53 85	112.9	33 44.2	53 85	113.4	33 28.3	53 84	113.9	33 12.2	54 84	114.4	32 56.0	54 84	114.9	32 39.6	55 83	115.4	32 23.2	55 83	115.9	50
1	33 24.6	52 86	111.8	33 09.1	52 85	112.3	32 53.4	52 85	112.8	32 37.7	53 85	113.3	32 21.8	53 84	113.8	32 05.7	54 84	114.3	31 49.6	54 84	114.8	31 33.4	54 84	115.3	1
2	32 33.2	51 86	111.2	32 17.9	51 86	111.7	32 02.4	52 86	112.2	31 46.8	52 85	112.7	31 31.1	53 85	113.2	31 15.3	53 84	113.7	30 59.4	53 84	114.2	30 43.3	54 84	114.7	2
3	31 41.6	50 86	110.6	31 26.4	51 86	111.1	31 11.1	51 86	111.6	30 55.7	52 86	112.1	30 40.2	52 85	112.6	30 24.6	52 85	113.1	30 08.8	53 85	113.6	29 53.0	53 84	114.0	3
4	30 49.8	50 87	110.0	30 34.8	50 86	110.5	30 19.7	51 86	111.0	30 04.4	51 86	111.5	29 49.1	51 86	112.0	29 33.7	52 85	112.5	29 18.1	52 85	113.0	29 02.4	52 84	113.4	4
55	29 57.8	49 87	109.4	29 42.9	50 87	109.9	29 28.0	50 86	110.4	29 12.9	50 86	110.9	28 57.8	51 86	111.4	28 42.5	51 86	111.9	28 27.1	51 85	112.4	28 11.7	52 85	112.9	55
6	29 05.6	49 87	108.8	28 50.9	49 87	109.3	28 36.1	49 87	109.8	28 21.2	50 86	110.3	28 06.3	50 86	110.8	27 51.2	51 86	111.3	27 36.0	51 86	111.8	27 20.7	51 86	112.3	6
7	28 13.2	48 88	108.3	27 58.7	49 87	108.8	27 44.1	49 87	109.3	27 29.4	49 87	109.8	27 14.5	50 86	110.3	26 59.6	50 86	110.7	26 44.6	50 86	111.2	26 29.4	51 86	111.7	7
8	27 20.7	48 88	107.7	27 06.3	48 88	108.2	26 51.9	48 87	108.7	26 37.3	49 87	109.2	26 22.6	49 87	109.7	26 07.9	49 87	110.2	25 53.0	50 86	110.7	25 38.0	50 86	111.2	8
9	26 28.0	47 88	107.2	26 13.8	48 88	107.7	25 59.5	48 88	108.2	25 45.1	48 87	108.7	25 30.5	49 87	109.2	25 15.9	49 87	109.7	25 01.2	49 87	110.1	24 46.4	49 86	110.6	9
60	25 35.2	47 88	106.7	25 21.1	47 88	107.2	25 06.9	47 88	107.7	24 52.7	48 88	108.2	24 38.3	48 87	108.6	24 23.8	48 87	109.1	24 09.3	49 87	109.6	23 54.6	49 86	110.1	60
1	24 42.2	46 88	106.2	24 28.3	47 88	106.7	24 14.2	47 88	107.2	24 00.1	47 88	107.6	23 45.9	48 88	108.1	23 31.6	48 88	108.6	23 17.2	48 87	109.1	23 02.7	48 87	109.6	1
2	23 49.1	46 89	105.7	23 35.3	46 88	106.2	23 21.4	47 88	106.6	23 07.4	47 88	107.1	22 53.3	47 88	107.6	22 39.1	47 88	108.1	22 24.9	48 87	108.6	22 10.6	48 87	109.0	2
3	22 55.9	46 89	105.2	22 42.2	46 88	105.7	22 28.4	46 88	106.1	22 14.5	46 88	106.6	22 00.6	47 88	107.1	21 46.6	47 88	107.6	21 32.5	47 88	108.1	21 18.3	47 88	108.5	3
4	22 02.5	45 89	104.7	21 48.9	45 89	105.2	21 35.3	46 89	105.7	21 21.6	46 89	106.1	21 07.7	46 88	106.6	20 53.8	46 88	107.1	20 39.9	47 88	107.6	20 25.8	47 88	108.0	4
65	21 09.0	45 89	104.2	20 55.6	45 89	104.7	20 42.0	45 89	105.2	20 28.4	46 89	105.6	20 14.7	46 88	106.1	20 01.0	46 88	106.6	19 47.1	46 88	107.1	19 33.2	46 88	107.5	65
6	20 15.4	44 90	103.7	20 02.1	45 89	104.2	19 48.7	45 89	104.7	19 35.2	45 89	105.2	19 21.6	45 89	105.6	19 08.0	46 88	106.1	18 54.3	46 88	106.6	18 40.5	46 88	107.0	6
7	19 21.7	44 90	103.3	19 08.5	44 90	103.7	18 55.2	44 89	104.2	18 41.8	45 89	104.7	18 28.4	45 89	105.2	18 14.9	45 89	105.6	18 01.3	45 88	106.1	17 47.6	46 88	106.6	7
8	18 27.9	44 90	102.8	18 14.8	44 90	103.3	18 01.6	44 90	103.8	17 48.3	44 89	104.2	17 35.0	45 89	104.7	17 21.6	45 89	105.2	17 08.2	45 89	105.6	16 54.6	45 88	106.1	8
9	17 34.0	43 90	102.3	17 21.0	44 90	102.8	17 07.9	44 90	103.2	16 54.7	44 90	103.8	16 41.5	44 89	104.2	16 28.2	44 89	104.7	16 14.9	45 89	105.2	16 01.5	45 89	105.6	9
70	16 40.0	43 90	101.9	16 27.1	43 90	102.4	16 14.1	43 90	102.8	16 01.1	44 90	103.3	15 47.9	44 90	103.8	15 34.8	44 89	104.2	15 21.5	44 89	104.7	15 08.3	44 89	105.2	70
1	15 45.9	43 90	101.5	15 33.1	43 90	101.9	15 20.2	43 90	102.4	15 07.3	43 90	102.9	14 54.2	43 90	103.3	14 41.2	44 90	103.8	14 28.1	44 89	104.3	14 14.9	44 89	104.7	1
2	14 51.8	42 90	101.0	14 39.0	43 90	101.5	14 26.2	43 90	101.9	14 13.4	43 90	102.4	14 00.5	43 90	102.9	13 47.5	43 90	103.3	13 34.5	43 90	103.8	13 21.4	44 89	104.3	2
3	13 57.5	42 90	100.6	13 44.9	43 90	101.0	13 32.1	42 90	101.5	13 19.4	43 90	102.0	13 06.6	43 90	102.4	12 53.7	43 90	102.9	12 40.8	43 90	103.4	12 27.8	43 89	103.8	3
4	13 03.2	42 91	100.1	12 50.6	42 90	100.6	12 38.0	42 90	101.1	12 25.3	42 90	101.5	12 12.6	42 90	102.0	11 59.8	43 90	102.5	11 47.0	43 90	102.9	11 34.2	43 90	103.4	4
75	12 08.8	42 91	99.7	11 56.3	42 91	100.2	11 43.7	42 90	100.7	11 31.2	42 90	101.1	11 18.5	42 90	101.6	11 05.9	42 90	102.0	10 53.1	42 90	102.5	10 40.4	43 90	103.0	75
6	11 14.3	41 91	99.3	11 01.9	41 91	99.8	10 49.4	42 91	100.2	10 36.9	42 90	100.7	10 24.4	42 90	101.2	10 11.8	42 90	101.6	9 59.2	42 90	102.1	9 46.5	42 90	102.5	6
7	10 19.8	41 91	98.9	10 07.4	41 91	99.3	9 55.0	41 91	99.8	9 42.6	41 91	100.3	9 30.2	42 90	100.7	9 17.7	42 90	101.2	9 05.1	42 90	101.7	8 52.6	42 90	102.1	7
8	9 25.2	41 91	98.5	9 12.9	41 91	98.9	9 00.6	41 91	99.4	8 48.2	41 91	99.9	8 35.9	41 91	100.3	8 23.4	41 90	100.8	8 11.0	42 90	101.2	7 58.5	42 90	101.7	8
9	8 30.5	41 91	98.1	8 18.3	41 91	98.5	8 06.1	41 91	99.0	7 53.8	41 91	99.4	7 41.5	41 91	99.9	7 29.1	41 90	100.4	7 16.8	41 90	100.8	7 04.4	41 90	101.3	9
80	7 35.8	40 91	97.6	7 23.7	41 91	98.1	7 11.5	41 91	98.6	6 59.3	41 91	99.0	6 47.0	41 91	99.5	6 34.8	41 91	99.9	6 22.5	41 91	100.4	6 10.2	41 90	100.9	80
1	6 41.0	40 91	97.2	6 29.0	40 91	97.7	6 16.8	40 91	98.2	6 04.7	41 91	98.6	5 52.5	41 91	99.1	5 40.3	41 91	99.5	5 28.1	41 91	100.0	5 15.9	41 90	100.5	1
2	5 46.2	40 93	96.8	5 34.2	40 91	97.3	5 22.1	40 91	97.8	5 10.1	40 91	98.2													2

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	77 00.0	1.0 04	180.0	77 30.0	1.0 04	180.0	78 00.0	1.0 04	180.0	78 30.0	1.0 04	180.0	00
1	74 58.2	1.0 09	176.2	75 28.1	1.0 10	176.1	75 58.0	1.0 10	175.9	76 28.0	1.0 10	175.8	76 57.9	1.0 10	175.6	77 27.8	1.0 11	175.5	77 57.7	1.0 11	175.3	78 27.6	1.0 12	175.1	1
2	74 52.7	99 15	172.4	75 22.4	99 16	172.1	75 52.2	99 16	171.9	76 21.9	99 17	171.6	76 51.6	99 17	171.3	77 21.3	99 18	171.0	77 51.0	99 18	170.6	78 20.6	99 19	170.3	2
3	74 43.6	98 21	168.7	75 13.0	98 22	168.3	75 42.5	98 22	167.9	76 11.9	98 23	167.5	76 41.2	98 24	167.1	77 10.5	98 25	166.6	77 39.8	97 26	166.1	78 09.0	97 26	165.5	3
4	74 31.0	97 26	165.0	75 00.1	97 28	164.5	75 29.1	97 28	164.0	75 58.0	96 29	163.5	76 26.9	96 30	163.0	76 55.7	96 31	162.3	77 24.5	96 32	161.7	77 53.1	95 33	161.0	4
05	74 15.0	96 32	161.5	74 43.6	95 33	160.9	75 12.2	95 34	160.3	75 40.6	95 35	159.7	76 08.9	94 36	159.0	76 37.1	94 37	158.3	77 05.2	93 38	157.5	77 33.1	93 40	156.7	05
6	73 55.9	94 37	158.0	74 24.0	93 38	157.4	74 51.9	93 39	156.7	75 19.7	92 40	156.0	75 47.4	92 41	155.2	76 14.9	91 42	154.4	76 42.3	91 44	153.5	77 09.4	90 45	152.6	6
7	73 33.8	92 42	154.8	74 01.2	91 42	154.0	74 28.6	91 44	153.3	74 55.7	90 45	152.5	75 22.7	90 46	151.6	75 49.5	89 48	150.7	76 16.0	88 49	149.7	76 42.3	87 50	148.7	7
8	73 08.9	90 46	151.6	73 35.7	89 47	150.8	74 02.3	88 48	150.0	74 28.8	88 50	149.1	74 55.0	87 51	148.2	75 21.0	86 52	147.2	75 46.7	85 53	146.2	76 12.2	84 55	145.1	8
9	72 41.3	88 50	148.6	73 07.5	87 51	147.8	73 33.4	86 52	146.9	73 59.1	85 53	146.0	74 24.6	84 55	145.0	74 49.8	84 56	144.0	75 14.7	82 58	142.9	75 39.3	81 59	141.8	9
10	72 11.4	85 54	145.8	72 36.9	84 55	144.9	73 02.1	84 56	144.0	73 27.1	83 57	143.0	73 51.8	82 58	142.0	74 16.1	81 60	141.0	74 40.2	80 61	139.9	75 03.9	78 62	138.7	10
1	71 39.3	83 57	143.1	72 04.1	82 58	142.2	72 28.6	81 59	141.3	72 52.8	80 60	140.3	73 16.7	79 62	139.2	73 40.3	78 63	138.1	74 03.6	77 64	137.0	74 26.4	76 66	135.8	1
2	71 05.2	81 60	140.6	71 29.2	80 61	139.6	71 53.0	79 62	138.7	72 16.5	78 63	137.7	72 39.7	77 65	136.6	73 02.5	75 66	135.5	73 25.0	74 67	134.4	73 47.0	73 68	133.2	2
3	70 29.2	78 63	138.2	70 52.6	77 64	137.2	71 15.7	76 65	136.2	71 38.5	75 66	135.2	72 00.9	74 67	134.2	72 23.0	73 69	133.0	72 44.6	72 70	131.9	73 05.9	70 71	130.7	3
4	69 51.6	76 65	135.9	70 14.3	75 66	135.0	70 36.7	74 68	134.0	70 58.8	73 69	132.9	71 20.5	72 70	131.9	71 41.8	71 71	130.8	72 02.8	69 72	129.6	72 23.3	68 73	128.4	4
15	69 12.4	74 68	133.8	69 34.5	73 69	132.8	69 56.2	72 70	131.8	70 17.6	71 71	130.8	70 38.7	70 72	129.7	70 59.3	68 73	128.6	71 19.6	67 74	127.5	71 39.4	65 75	126.3	15
6	68 31.8	72 70	131.8	68 53.3	71 71	130.8	69 14.4	70 72	129.8	69 35.2	69 73	128.8	69 55.6	67 74	127.7	70 15.6	66 75	126.6	70 35.2	65 76	125.5	70 54.3	63 77	124.3	6
7	67 50.0	70 72	129.9	68 10.9	69 72	128.9	68 31.4	68 74	127.9	68 51.6	67 74	126.9	69 11.4	65 76	125.9	69 30.7	64 76	124.8	69 49.7	63 77	123.7	70 08.2	61 78	122.5	7
8	67 07.1	68 73	128.1	67 27.4	67 74	127.1	67 47.3	66 75	126.2	68 06.9	65 76	125.1	68 26.1	63 77	124.1	68 44.9	62 78	123.0	69 03.3	61 79	121.9	69 21.2	59 80	120.8	8
9	66 23.1	66 75	126.4	66 42.9	65 76	125.5	67 02.3	64 77	124.5	67 21.3	63 78	123.5	67 39.9	61 78	122.5	67 58.2	60 79	121.4	68 16.0	59 80	120.3	68 33.4	57 81	119.2	9
20	65 38.2	65 76	124.8	65 57.5	63 77	123.9	66 16.3	62 78	122.9	66 34.8	61 79	121.9	66 52.9	60 80	120.9	67 10.7	58 80	119.9	67 28.0	57 81	118.8	67 44.9	56 82	117.7	20
1	64 52.5	63 78	123.3	65 11.2	62 78	122.4	65 29.6	61 79	121.4	65 47.6	59 80	120.5	66 05.2	58 81	119.5	66 22.4	57 81	118.5	66 39.3	55 82	117.4	66 55.7	54 83	116.3	1
2	64 05.9	61 79	121.9	64 24.2	60 80	121.0	64 42.1	59 80	120.0	64 59.6	58 81	119.1	65 16.8	57 82	118.1	65 33.6	55 82	117.1	65 49.9	54 83	116.1	66 05.9	52 84	115.0	2
3	63 18.7	60 80	120.5	63 36.5	59 80	119.6	63 53.9	58 81	118.7	64 11.0	56 82	117.8	64 27.8	55 83	116.8	64 44.1	54 83	115.8	65 00.1	52 84	114.8	65 15.6	51 84	113.8	3
4	62 30.8	58 81	119.2	62 48.2	57 82	118.3	63 05.2	56 82	117.4	63 21.9	55 83	116.5	63 38.2	54 84	115.6	63 54.1	52 84	114.6	64 09.7	51 85	113.6	64 24.9	50 85	112.6	4
25	61 42.3	57 82	118.0	61 59.3	56 82	117.1	62 15.9	55 83	116.2	62 32.2	54 84	115.3	62 48.1	52 84	114.4	63 03.7	51 85	113.5	63 18.9	50 85	112.5	63 33.7	49 86	111.5	25
6	60 53.3	56 82	116.8	61 09.9	55 83	116.0	61 26.1	54 84	115.1	61 42.1	52 84	114.2	61 57.6	51 85	113.3	62 12.8	50 85	112.4	62 27.7	49 86	111.5	62 42.1	48 86	110.5	6
7	60 03.8	55 83	115.7	60 20.0	54 84	114.9	60 35.9	52 84	114.0	60 51.5	51 85	113.2	61 06.7	50 86	112.3	61 21.6	49 86	111.4	61 36.1	48 86	110.4	61 50.2	46 87	109.5	7
8	59 13.8	54 84	114.7	59 29.7	52 84	113.8	59 45.3	51 85	113.0	60 00.5	50 86	112.1	60 15.4	49 86	111.3	60 30.0	48 86	110.4	60 44.2	47 87	109.5	60 58.0	46 88	108.6	8
9	58 23.4	52 85	113.7	58 39.0	51 85	112.8	58 54.2	50 86	112.0	59 09.2	49 86	111.2	59 23.8	48 86	110.3	59 38.1	47 87	109.4	59 52.0	46 88	108.6	60 05.5	45 88	107.7	9
30	57 32.6	51 85	112.7	57 47.9	50 86	111.9	58 02.9	49 86	111.1	58 17.5	48 87	110.2	58 31.8	47 87	109.4	58 45.8	46 88	108.5	58 59.5	45 88	107.7	59 12.8	44 88	106.8	30
1	56 41.5	50 86	111.8	56 56.5	49 86	111.0	57 11.2	48 87	110.2	57 25.5	47 87	109.4	57 39.6	46 88	108.5	57 53.3	45 88	107.7	58 06.7	44 88	106.8	58 19.8	43 89	106.0	1
2	55 50.0	50 86	110.9	56 04.8	49 87	110.1	56 19.2	48 87	109.3	56 33.3	47 88	108.5	56 47.1	46 88	107.7	57 00.6	44 88	106.9	57 13.8	43 89	106.0	57 26.6	42 89	105.2	2
3	54 58.3	49 87	110.0	55 12.8	48 87	109.2	55 26.9	47 88	108.5	55 40.8	46 88	107.7	55 54.4	45 88	106.9	56 07.6	44 88	106.1	56 20.6	43 89	105.3	56 33.2	42 89	104.5	3
4	54 06.3	48 87	109.2	54 20.5	47 88	108.4	54 34.4	46 88	107.7	54 48.1	45 88	106.9	55 01.4	44 89	106.1	55 14.5	43 89	105.3	55 27.2	42 89	104.5	55 39.6	41 90	103.7	4
35	53 14.0	47 88	108.4	53 28.0	46 88	107.7	53 41.7	45 88	106.9	53 55.1	44 88	106.1	54 08.3	43 89	105.4	54 21.1	42 89	104.6	54 33.7	41 90	103.8	54 45.9	40 90	103.0	35
6	52 21.4	46 88	107.6	52 35.2	45 88	106.9	52 48.7	45 88	106.2	53 02.0	44 89	105.4	53 14.9	43 89	104.7	53 27.6	42 90	103.9	53 40.0	41 90	103.1	53 52.0	40 90	102.4	6
7	51 28.7	46 88	106.9	51 42.3	45 89	106.2	51 55.6	44 89	105.4	52 08.6	43 89	104.7	52 21.4	42 90	104.0	52 33.9	41 90	103.2	52 46.1	40 90	102.5	52 58.0	39 90	101.7	7
8	50 35.8	45 88	106.2	50 49.1	44 89	105.5	51 02.3	43 89	104.8	51 15.1	42 89	104.0	51 27.7	42 90	103.3	51 40.1	41 90	102.6	51 52.1	40 90	101.8	52 03.9	39 90	101.1	8
9	49 42.6	44 89	105.5	49 55.8	44 89	104.8	50 08.8	43 90	104.1	50 21.5	42 90	103.4	50 33.9	41 90	102.7	50 46.1	40 90	101.9	50 58.0	39 90	101.2	51 09.6	38 90	100.5	9
40	48 49.3	44 89	104.8	49 02.3	43 89	104.1	49 15.1	42 90	103.4	49 27.7	41 90	102.7	49 40.0	41 90	102.0	49 52.0	40 90	101.3	50 03.8	39 90	100.6	50 15.3	38 91	99.9	40
1	47 55.8	43 89	104.2	48 08.7	43 90	103.5	48 21.3	42 90	102.8	48 33.7	41 90	102.1	48 45.9	40 90	101.4	48 57.8	39 90	100.7	49 09.4	38 91	100.0	49 20.8	38 91	99.3	1
2	47 02.2	43 90	103.5	47 14.9	42 90	102.9	47 27.4	41 90	102.2	47 39.7	40 90	101.5	47 51.7	40 90	100.8	48 03.5	39 91	100.1	48 15.0	38 91	99.5	48 26.3	37 91	98.8	2
3	46 08.4	42 90	102.9	46 21.0	42 90	102.3	46 33.4	41 90	101.6	46 45.5	40 90	100.9	46 57.4	39 91	100.3	47 09.1	38 91	99.6	47 20.5	38 91	98.9	47 31.6	37 91	98.2	3
4	45 14.5	42 90	102.3	45 27.0	41 90	101.7	45 39.2	40 90	101.0	45 51.2	40 90	100.4	46 03.0	39 91	99.7	46 14.5	38 91	99.0	46 25.9	37 91	98.4	46 36.9	37 91	97.7	4
45	44 20.5	41 90	101.7	44 32.8	41 90	101.1	44 45.0	40 91	100.5	44 56.9	39 91	99.8	45 08.5	39 91	99.2	45 20.0	38 91	98.5	45 31.2	37 91	97.8	45 42.2	36 91	97.2	45
6	43 26.4	41 90	101.2	43 38.6	40 90	100.5	43 50.6	40 91	99.9	44 02.4	39 91	99.3	44 14.0	38 91	98.6	44 25.3	37 91	98.0	44 36.4	37 91	97.3	44 47.3	36 91	96.7	6
7	42 32.2	41 90	100.6	42 44.3	40 91	100.0	42 56.1	39 91	99.4	43 07.8	39 91	98.7	43 19.3	38 91	98.1	43 30.6	37 91	97.5	43 41.6	36 92	96.8	43 52.5	36 92	96.2	7
8	41 37.8	40 91	100.1	41 49.8	40 91	99.5	42 01.6	39 91	98.8	42 13.2	38 91	98.2	42 24.6	38 91	97.6	42 35.8	37 92	97.0	42 46.8	36 92	96.3	42 57.5	36 92	95.7	8
9	40 43.4	40 91	99.6	40 55.3	39 91	98.9	41 07.0	39 91	98.3	41 18.5	38 91	97.7	41 29.8	37 91	97.1	41 40.9	37 92	96.5	41 51.8	36 92	95.9	42 02.5	35 92	95.2	9
50	39 48.9	40 91	99.0	40 00.7	39 91	98.4	40 12.3	38 91	97.8	40 23.7	38 91	97.2	40 35.0	37 92	96.6	40 46.0	36 92	96.0	40 56.9	36 92	95.4	41 07.5	35 92	94.8	50
1	38 54.3	39 91	98.5	39 06.0	39 91	97.9	39 17.6	38 91	97.3	39 28.9	38 91	96.7	39 40.1	37 92	96.1	39 51.1	36 92	95.5	40 01.9	36 92	94.9	40 12.5	35 92	94.3	1
2	37 59.7	39 91	98.0	38 11.3	39 91	97.4	38 22.8	38 92	96.9	38 34.1	37 92	96.3	38 45.2	37 92	95.7	38 56.1	36 92	95.1	39 06.8	35 92	94.5	39 17.4	35 92	93.9	2
3	37 04.9	39 91	97.5	37 16.5	38 91	97.0	37 27.9	38 92	96.4	37 39.1	37 92	95.8	37 50.2	37 92	95.2	38 01.1	36 92	94.6	38 11.7	35 92	94.0	38 22.3	35 92	93.4	3
4	36 10.2	39 91	97.1	36 21.7	38 92	96.5	36 33.0	38 92	95.9	36 44.2	37 92	95.3	36 55.2	36 92	94.8	37 06.0	36 92	94.2	37 16.6	35 92	93.6	37 27.1	35 92	93.0	4
55	35 15.3	38 92	96.6	35 26.8	38 92	96.0	35 38.0	37 92	95.5	35 49.1	37 92	94.9	36 00.1	36 92	94.3	36 10.9	36 92	93.7	36 21.5	35 92	93.2	36 32.0	35 92	92.6	55
6	34 20.4	38 92	96.1	34 31.8	38 92	95.6	34 43.0	37 92	95.0	34 54.1	37 92	94.4	35 05.0	36 92	93.9	35 15.8	36 92	93.3	35 26.3	35 92	92.7	35 36.8	34 92	92.2	6
7	33 25.5	38 92	95.7	33 36.8	38 92	95.1	33 48.0	37 92	94.6	33 59.0	36 92	94.0	34 09.9	36 92	93.4	34 20.6	35 92	92.9	34 31.2	35 92	92.3	34 41.6	34 92	91.7	7
8	32 30.5	38 92	95.2	32 41.8	37 92	94.7	32 52.9	37 92	94.1	33 03.9	36 92	93.6	33 14.7	36 92	93.0	33 25.4	35 92	92.5	33 36.0	35 92	91.9	33 46.4	34 92	91.3	8
9	31 35.5	38 92	94.8	31 46.7	37 92	94.2	31 57.8	37 92	93.7	32 08.8	36 92	93.2	32 19.6	36 92	92.6	32 30.3	35 92	92.0	32 40.8	35 92	91.5	32 51.1	34 92	90.9	9
60	30 40.4	38 92	94.4	30 51.6	37 92	93.8	31 02.7	37 92	93.3	31 13.6	36 92	92.7	31 24.4	36 92	92.2	31 35.1	35 92	91.6	31 45.6	35 92	91.1	31 55.9	34 92	90.5	60
1	29 45.4	37 92	93.9	29 56.5	37 92	93.4	30 07.5	37 92	92.9	30 18.4	36 92	92.3	30 29.2	36 92	91.8	30 39.8	35 92	91.2	30 50.3	35 92	90.7	31 00.7	34 92	90.1	1
2	28 50.2	37 92	93.5	29 01.4	37 92	93.0	29 12.4	36 92	92.4	29 23.2	36 92	91.9	29 34.0	36 92	91.4	29 44.6	35 92	90.8	29 55.1	35 92	90.3	30 05.5	34 92	89.8	2
3	27 55.1	37 92	93.1	28 06.2	37 92	92.6	28 17.2	36 92	92.0	28 28.0	36 92	91.5	28 38.8	36 92	91.0	28 49.4	35 92	90.4	28 59.9	35 92	89.9	29 10.2	34 92	89.4	3
4	26 59.9	37 92	92.7	27 11.0	37 92	92.1	27 22.0	36 92	91.6	27 32.8	36 92	91.1	27 43.6	36 93	90.6	27 54.2	35 92	90.0	28 04.6	35 92	89.5	28 15.0	34 92	89.0	4
65	26 04.8	37 92	92.3	26 15.8	37 92	91.7	26 26.8	36 92	91.2	26 37.6	36 92	90.7	26 48.3	36 92	90.2	26 58.9	35 92	89.7	27 09.4	35 92	89.1	27 19.8	34 92	88.6	65
6	25 09.6	37 92	91.9	25 20.6	37 92	91.3	25 31.5	36 92	90.8	25 42.4	36 92	90.3	25 53.1	36 92	89.8	26 03.7	35 92	89.3	26 14.2	35 92	88.7	26 24.6	34 92	88.2	6
7	24 14.4	37 92	91.5	24 25.4	37 92	90.9	24 36.3	36 92	90.4	24 47.1	36 92	89.9	24 57.9	36 92	89.4	25 08.5	35 92	88.9	25 19.0	35 92	88.4	25 29.4	34 92	87.8	7
8	23 19.1	37 92	91.1	23 30.2	37 92	90.5	23 41.1	36 92	90.0	23 51.9	36 92	89.5	24 02.6	36 92	89.0	24 13.3	35 92	88.5	24 23.8	35 92	88.0	24 34.2	35 92	87.5	8
9	22 23.9	37 92	90.7	22 34.9	37 92	90.2	22 45.9	36 92	89.6	22 56.7	36 92	89.1	23 07.4	36 92	88.6	23 18.1	35 92	88.1	23 28.6	35 92	87.6	23 39.0	35 92	87.1	9
70	21 28.7	37 92	90.3	21 39.7	37 92	89.8	21 50.6	36 92	89.3	22 01.5	36 92	88.8	22 12.2	36 92	88.3	22 22.9	35 92	87.7	22 33.4	35 92	87.2	22 43.9	35 92	86.7	70
1	20 33.5	37 92	89.9	20 44.5	37 92	89.4	20 55.4	36 92	88.9	21 06.3	36 92	88.4	21 17.0	36 92	87.9	21 27.7	35 92	87.4	21 38.3	35 92	86.9	21 48.7	35 92	86.4	1
2	19 38.2	37 92	89.5	19 49.3	37 92	89.0	20 00.2	36 92	88.5	20 11.1	36 92	88.0	20 21.8	36 92	87.5	20 32.5	35 92	87.0	20 43.1	35 92	86.5	20 53.6	35 92	86.0	2
3	18 43.0	37 92	89.1	18 54.0	37 92	88.6	19 05.0	36 92	88.1	19 15.9	36 92	87.6	19 26.7	36 92	87.1	19 37.4	36 92	86.6	19 48.0	35 92	86.1	19 58.6	35 92	85.6	3
4	17 47.8	37 92	88.7	17 58.8	37 92	88.2	18 09.8	36 92	87.7	18 20.7	36 92	87.2	18 31.5	36 92	86.7	18 42.3	36 92	86.3	18 52.9	35 92	85.8	19 03.5	35 92	85.3	4
75	16 52.6	37 92	88.3	17 03.6	37 92	87.8	17 14.6	37 92	87.4	17 25.5	36 92	86.9	17 36.4	36 92	86.4	17 47.1	36 92	85.9	17 57.8	36 92	85.4	18 08.5	35 92	84.9	75
6	15 57.4	37 92	87.9	16 08.4	37 92	87.5	16 19.5	37 92	87.0	16 30.4	36 92	86.5	16 41.3	36 92	86.0	16 52.1	36 92	85.5	17 02.8	36 92	85.0	17 13.5	35 92	84.5	6
7	15 02.2	37 92	87.6	15 13.3	37 92	87.1	15 24.3	37 92	86.6	15 35.3	36 92	86.1	15 46.2	36 92	85.6	15 57.0	36 92	85.1	16 07.8	36 92	84.7	16 18.5	36 92	84.2	7
8	14 07.0	37 92	87.2	14 18.1	37 92	86.7	14 29.2	37 92	86.2	14 40.2	37 92	85.7	14 51.1	36 92	85.3	15 02.0	36 92	84.8	15 12.8	36 92	84.3	15 23.6	36 92	83.8	8
9	13 11.9	37 92	86.8	13 23.0	37 92	86.3	13 34.1	37 92	85.8	13 45.1	37 92	85.4	13 56.1	37 92	84.9	14 07.0	36 92	84.4	14 17.9	36 92	83.9	14 28.7	36 91	83.4	9
80	12 16.7	37 92	86.4	12 27.9	37 92	86.0	12 39.0	37 92	85.5	12 50.1	37 92	85.0	13 01.1	37 92	84.5	13 12.1	36 92	84.0	13 23.0	36 92	83.6	13 33.9	36 91	83.1	80
1	11 21.6	37 92	86.0	11 32.8	37 92	85.6	11 44.0	37 92	85.1	11 55.1	37 92	84.6	12 06.1	37 92	84.2	12 17.2	37 92	83.7	12 28.1	36 91	83.2	12 39.0	36 91	82.7	1
2	10 26.5	38 92	85.7	10 37.8	37 92	85.2	10 49.0	37 92	84.7	11 00.1	37 92	84.3	11 11.2	37 92	83.8	11 22.3	37 91	83.3	11 33.3	37 91	82.8	11 44.3	36 91	82.4	2
3	9 31.5	38 92	85.3	9 42.7	38 92	84.8	9 54.0	37 92	84.4	10 05.2	37 92	83.9	10 16.3	37 91	83.4	10 27.5	37 91	82.9	10 38.5	37 91	82.5	10 49.6	37 91	82.0	3
4	8 36.4	38 92	84.9	8 47.8	38 92	84.4	8 59.0	38 92	84.0	9 10.3	37 92	83.5	9 21.5	37 91	83.0	9 32.7	37 91	82.6	9 43.8	37 91	82.1	9 54.9	37 91	81.6	4
85	7 41.4	38 92	84.5	7 52.8	38 92	84.1	8 04.1	38 92	83.6	8 15.4	38 91	83.1	8 26.7	37 91	82.7	8 37.9	37 91	82.2	8 49.1	37 91	81.7	9 00.3	37 91	81.3	85
6	6 46.5	38 92	84.2	6 57.9	38 92	83.7	7 09.3	38 91	83.2	7 20.6	38 91	82.8	7 31.9	38 91	82.3	7 43.2	38 91	81.8	7 54.5	37 91	81.4	8 05.7	37 91	80.9	6
7	5 51.6	38 92	83.8	6 03.0	38 91	83.3	6 14.4	38 91	82.8	6 25.9	38 91	82.4	6 37.2	38 91	81.9	6 48.6	38 91	81.4	6 59.9	38 91	81.0	7 11.2	38 91	80.5	7
8				5 08.2	38 91	82.9	5 19.7	38 91	82.5	5 31.1	38 91	82.0	5 42.6	38 91	81.5	5 54.0	38 91	81.1	6 05.4	38 91	80.6	6 16.8	38 91	80.1	8
9																			5 10.9	38 91	80.2	5 22.4	38 90	79.8	9

Lat. 23°

H.A.	8° 00′ Alt.	Az.	8° 30′ Alt.	Az.	9° 00′ Alt.	Az.	9° 30′ Alt.	Az.	10° 00′ Alt.	Az.	10° 30′ Alt.	Az.	11° 00′ Alt.	Az.	11° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	59 00.0 1.0 02 180.0		58 30.0 1.0 02 180.0		58 00.0 1.0 02 180.0		57 30.0 1.0 02 180.0		57 00.0 1.0 02 180.0		56 30.0 1.0 02 180.0		56 00.0 1.0 01 180.0		55 30.0 1.0 01 180.0		00
1	58 59.1 1.0 05 178.1		58 29.1 1.0 04 178.1		57 59.1 1.0 04 178.1		57 29.1 1.0 04 178.2		56 59.1 1.0 04 178.2		56 29.1 1.0 04 178.2		55 59.2 1.0 04 178.2		55 29.2 1.0 04 178.3		1
2	58 56.3 1.0 08 176.2		58 26.4 1.0 08 176.2		57 56.4 1.0 08 176.3		57 26.5 1.0 07 176.3		56 56.5 1.0 07 176.4		56 26.6 1.0 07 176.4		55 56.6 1.0 07 176.5		55 26.7 1.0 07 176.5		2
3	58 51.7 1.0 11 174.2		58 21.8 1.0 11 174.3		57 51.9 1.0 10 174.4		57 22.1 1.0 10 174.5		56 52.2 1.0 10 174.6		56 22.3 1.0 10 174.7		55 52.4 1.0 10 174.7		55 22.5 1.0 10 174.8		3
4	58 45.2 99 14 172.3		58 15.5 99 14 172.5		57 45.7 99 13 172.6		57 15.9 99 13 172.7		56 46.1 99 13 172.8		56 16.3 99 13 172.9		55 46.5 99 13 173.0		55 16.7 99 12 173.1		4
05	58 37.0 99 17 170.5		58 07.3 99 17 170.6		57 37.7 99 16 170.7		57 08.0 99 16 170.9		56 38.3 99 16 171.0		56 08.6 99 16 171.2		55 39.0 99 15 171.3		55 09.3 99 15 171.4		05
6	58 26.9 98 20 168.6		57 57.4 98 19 168.8		57 27.9 98 19 168.9		56 58.4 98 19 169.1		56 28.9 98 18 169.3		55 59.3 99 18 169.4		55 29.8 99 18 169.6		55 00.2 99 18 169.7		6
7	58 15.1 98 22 166.7		57 45.8 98 22 166.9		57 16.5 98 22 167.1		56 47.1 98 22 167.3		56 17.7 98 21 167.5		55 48.4 98 21 167.7		55 19.0 98 21 167.9		54 49.5 98 20 168.0		7
8	58 01.6 97 25 164.9		57 32.5 97 25 165.1		57 03.3 97 25 165.4		56 34.2 97 24 165.6		56 05.0 97 24 165.8		55 35.8 97 24 166.0		55 06.6 97 23 166.2		54 37.3 98 23 166.4		8
9	57 46.4 96 28 163.1		57 17.5 96 28 163.4		56 48.6 96 27 163.6		56 19.6 97 27 163.8		55 50.6 97 26 164.1		55 21.6 97 26 164.3		54 52.6 97 26 164.5		54 23.5 97 26 164.7		9
10	57 29.5 95 31 161.3		57 00.9 96 30 161.6		56 32.2 96 30 161.9		56 03.5 96 30 162.1		55 34.7 96 29 162.4		55 05.9 96 29 162.6		54 37.1 96 28 162.9		54 08.2 96 28 163.1		10
1	57 11.1 95 33 159.6		56 42.7 95 33 159.9		56 14.2 95 32 160.2		55 45.7 95 32 160.5		55 17.2 95 32 160.7		54 48.7 95 31 161.0		54 20.1 95 31 161.3		53 51.5 95 30 161.5		1
2	56 51.8 94 36 157.9		56 22.9 94 35 158.2		55 54.7 94 35 158.5		55 26.5 94 34 158.8		54 58.3 94 34 159.1		54 30.0 94 34 159.4		54 01.6 95 33 159.7		53 33.2 95 33 159.9		2
3	56 29.5 93 38 156.2		56 01.7 93 38 156.5		55 33.8 93 37 156.9		55 05.8 93 37 157.2		54 37.8 93 36 157.5		54 09.8 94 36 157.8		53 41.7 94 36 158.1		53 13.6 94 35 158.4		3
4	56 06.5 92 41 154.6		55 38.9 92 40 154.9		55 11.4 92 40 155.3		54 43.7 92 39 155.6		54 16.0 92 39 155.9		53 48.2 93 38 156.2		53 20.4 93 38 156.6		52 52.6 93 37 156.9		4
15	55 42.1 91 43 152.9		55 14.8 91 42 153.3		54 47.5 91 42 153.7		54 20.2 91 41 154.0		53 52.8 91 41 154.4		53 25.3 92 40 154.7		52 57.8 92 40 155.1		52 30.2 92 39 155.4		15
6	55 16.3 90 45 151.4		54 49.4 90 45 151.8		54 22.4 90 44 152.1		53 55.4 90 44 152.5		53 28.2 90 43 152.9		53 01.1 91 42 153.2		52 33.8 91 42 153.6		52 06.6 91 42 153.9		6
7	54 49.1 88 47 149.8		54 22.6 89 47 150.2		53 55.9 89 46 150.6		53 29.2 89 46 151.0		53 02.4 89 45 151.4		52 35.6 90 45 151.8		52 08.6 90 44 152.1		51 41.6 90 44 152.5		7
8	54 20.8 87 49 148.3		53 54.5 88 49 148.7		53 28.2 88 48 149.2		53 01.8 88 48 149.5		52 35.4 88 47 149.9		52 08.8 89 46 150.3		51 42.2 89 46 150.7		51 15.5 89 46 151.1		8
9	53 51.2 86 51 146.9		53 25.3 86 51 147.3		52 59.3 87 50 147.7		52 33.3 87 50 148.1		52 07.1 87 49 148.5		51 40.9 88 48 148.9		51 14.6 88 48 149.3		50 48.2 88 47 149.7		9
20	53 20.4 85 53 145.4		52 54.9 85 53 145.9		52 29.2 86 52 146.3		52 03.5 86 51 146.7		51 37.7 86 51 147.1		51 11.8 86 50 147.5		50 45.8 87 50 147.9		50 19.8 87 49 148.3		20
1	52 48.5 84 55 144.0		52 23.3 84 54 144.5		51 58.0 84 54 144.9		51 32.7 85 53 145.4		51 07.2 85 53 145.8		50 41.6 85 52 146.2		50 16.0 86 52 146.6		49 50.2 86 51 147.0		1
2	52 15.6 83 57 142.7		51 50.7 83 56 143.2		51 25.8 83 56 143.6		51 00.8 84 55 144.0		50 35.6 84 54 144.5		50 10.4 84 54 144.9		49 45.0 85 53 145.3		49 19.6 85 53 145.7		2
3	51 41.6 81 58 141.4		51 17.1 82 58 141.8		50 52.5 82 57 142.3		50 27.8 83 56 142.7		50 03.0 83 56 143.2		49 38.1 83 55 143.6		49 13.1 83 55 144.0		48 48.0 84 54 144.5		3
4	51 06.6 80 60 140.1		50 42.5 81 59 140.6		50 18.2 81 59 141.0		49 53.9 81 58 141.5		49 29.4 82 58 141.9		49 04.9 82 57 142.4		48 40.2 82 56 142.8		48 15.4 83 56 143.2		4
25	50 30.7 79 61 138.8		50 07.0 79 61 139.3		49 43.0 80 60 139.8		49 19.0 80 60 140.3		48 54.9 81 59 140.7		48 30.7 81 58 141.2		48 06.3 81 58 141.6		47 41.9 82 57 142.0		25
6	49 54.0 78 63 137.6		49 30.5 78 62 138.1		49 07.0 79 62 138.6		48 43.3 79 61 139.1		48 19.5 79 60 139.5		47 55.6 80 60 140.0		47 31.6 80 59 140.4		47 07.5 81 59 140.9		6
7	49 16.3 77 64 136.4		48 53.2 77 64 136.9		48 30.0 78 63 137.4		48 06.7 78 62 137.9		47 43.2 78 62 138.4		47 19.6 79 61 138.8		46 56.0 79 61 139.3		46 32.2 79 60 139.7		7
8	48 37.9 76 65 135.3		48 15.1 76 65 135.8		47 52.2 76 64 136.3		47 29.2 77 64 136.7		47 06.1 77 63 137.2		46 42.9 78 63 137.7		46 19.5 78 62 138.1		45 56.1 78 62 138.6		8
9	47 58.6 75 67 134.2		47 36 2 75 66 134.7		47 13.7 75 66 135.2		46 51.0 76 65 135.6		46 28.2 76 64 136.1		46 05.3 77 64 136.6		45 42.3 77 63 137.0		45 19.1 77 63 137.5		9
30	47 18.7 73 68 133.1		46 56.6 74 67 133.6		46 34.3 74 67 134.1		46 12.0 75 66 134.6		45 49.5 75 66 135.0		45 26.9 75 65 135.5		45 04.2 76 65 136.0		44 41.4 76 64 136.4		30
1	46 38.0 72 69 132.0		46 16.2 73 68 132.5		45 54.3 73 68 133.0		45 32.3 74 67 133.5		45 10.1 74 67 134.0		44 47.9 74 66 134.5		44 25.5 75 66 134.9		44 03.0 75 65 135.4		1
2	45 56.6 71 70 131.0		45 35.2 72 70 131.5		45 13.6 72 69 132.0		44 51.9 73 68 132.5		44 30.1 73 68 133.0		44 08.1 73 67 133.4		43 46.1 74 67 133.9		43 23.9 74 66 134.4		2
3	45 14.6 70 71 130.0		44 53.5 71 70 130.5		44 32.2 71 70 131.0		44 10.8 72 69 131.5		43 49.3 72 69 132.0		43 27.7 72 68 132.5		43 05.9 73 68 132.9		42 44.1 73 68 133.4		3
4	44 32.0 69 72 129.0		44 11.2 70 72 129.5		43 50.2 70 71 130.0		43 29.2 70 70 130.5		43 08.0 71 70 131.0		42 46.6 71 69 131.5		42 25.2 72 69 132.0		42 03.6 72 68 132.4		4
35	43 48.8 68 73 128.1		43 28.3 69 72 128.6		43 07.7 69 72 129.1		42 46.9 69 72 129.6		42 26.0 70 71 130.1		42 05.0 70 70 130.5		41 43.8 71 70 131.0		41 22.6 71 70 131.5		35
6	43 05.1 67 74 127.2		42 44.9 68 73 127.7		42 24.5 68 73 128.2		42 04.0 68 72 128.7		41 43.4 69 72 129.1		41 22.7 69 71 129.6		41 01.9 70 71 130.1		40 40.9 70 70 130.6		6
7	42 20.8 66 75 126.3		42 00.9 67 74 126.8		41 40.8 67 74 127.3		41 20.6 67 73 127.8		41 00.3 68 73 128.2		40 39.9 68 72 128.7		40 19.3 69 72 129.2		39 58.7 69 71 129.7		7
8	41 36.0 65 76 125.4		41 16.4 66 75 125.9		40 56.6 66 74 126.4		40 36.7 67 74 126.9		40 16.7 67 74 127.4		39 56.5 67 73 127.9		39 36.3 68 73 128.3		39 15.9 68 72 128.8		8
9	40 50.7 64 76 124.5		40 31.4 65 76 125.0		40 11.9 65 75 125.5		39 52.3 66 75 126.0		39 32.5 66 74 126.5		39 12.7 66 74 127.0		38 52.7 67 74 127.5		38 32.6 67 73 128.0		9
40	40 05.0 63 77 123.7		39 45.9 64 76 124.2		39 26.7 64 76 124.7		39 07.4 65 76 125.2		38 47.9 65 75 125.7		38 28.3 65 75 126.2		38 08.6 66 74 126.6		37 48.8 66 74 127.1		40
1	39 18.9 63 78 122.9		39 00.0 63 77 123.4		38 41.1 63 77 123.9		38 22.0 64 76 124.4		38 02.8 64 76 124.9		37 43.5 65 75 125.4		37 24.1 65 75 125.8		37 04.5 65 74 126.3		1
2	38 32.3 62 78 122.1		38 13.7 62 78 122.6		37 55.0 62 78 123.1		37 36.2 63 77 123.6		37 17.3 63 77 124.1		36 58.3 64 76 124.6		36 39.1 64 76 125.0		36 19.8 64 75 125.5		2
3	37 45.3 61 79 121.3		37 27.0 61 78 121.8		37 08.6 62 78 122.3		36 50.0 62 78 122.8		36 31.3 62 77 123.3		36 12.6 63 77 123.8		35 53.7 63 76 124.3		35 34.6 64 76 124.7		3
4	36 57.9 60 80 120.6		36 39.9 60 79 121.1		36 21.7 61 79 121.6		36 03.4 61 78 122.1		35 45.0 62 78 122.5		35 26.5 62 78 123.0		35 07.8 62 77 123.5		34 49.0 63 76 124.0		4
45	36 10.2 59 80 119.8		35 52.4 60 80 120.3		35 34.5 60 79 120.8		35 16.4 60 79 121.3		34 58.2 61 78 121.8		34 40.0 61 78 122.3		34 21.6 61 78 122.8		34 03.1 62 77 123.2		45
6	35 22.1 58 81 119.1		35 04.5 59 80 119.6		34 46.9 59 80 120.1		34 29.0 60 80 120.6		34 11.1 60 79 121.1		33 53.1 60 79 121.6		33 34.9 61 78 122.0		33 16.7 61 78 122.5		6
7	34 33.7 58 81 118.4		34 16.4 58 81 118.9		33 58.9 58 80 119.4		33 41.3 59 80 119.9		33 23.6 59 80 120.4		33 05.8 60 79 120.9		32 47.9 60 79 121.3		32 29.9 60 78 121.8		7
8	33 45.0 57 82 117.7		33 27.9 57 81 118.2		33 10.6 58 81 118.7		32 53.3 58 81 119.2		32 35.8 58 80 119.7		32 18.3 59 80 120.2		32 00.6 59 80 120.7		31 42.8 59 79 121.1		8
9	32 55.9 56 82 117.1		32 39.1 56 82 117.6		32 22.0 57 82 118.1		32 04.9 57 81 118.5		31 47.7 58 81 119.0		31 30.4 58 80 119.5		31 12.9 58 80 120.0		30 55.4 59 80 120.4		9
50	32 06.6 55 83 116.4		31 49.9 56 82 116.9		31 33.2 56 82 117.4		31 16.3 57 82 117.9		30 59.2 57 81 118.4		30 42.1 57 81 118.8		30 24.9 58 80 119.3		30 07.6 58 80 119.8		50
1	31 17.0 55 83 115.8		31 00.6 55 83 116.3		30 44.0 55 82 116.7		30 27.3 56 82 117.2		30 10.5 56 82 117.7		29 53.6 56 81 118.2		29 36.6 57 81 118.7		29 19.5 57 81 119.1		1
2	30 27.2 54 84 115.1		30 10.9 54 83 115.6		29 54.5 55 83 116.1		29 38.0 55 82 116.6		29 21.5 55 82 117.1		29 04.8 56 82 117.6		28 48.0 56 82 118.0		28 31.1 56 81 118.5		2
3	29 37.0 53 84 114.5		29 21.0 54 84 115.0		29 04.8 54 83 115.5		28 48.5 54 83 116.0		28 32.1 55 83 116.5		28 15.7 55 82 116.9		27 59.1 55 82 117.4		27 42.4 56 82 117.9		3
4	28 46.7 53 84 113.9		28 30.8 53 84 114.4		28 14.8 53 84 114.9		27 58.7 54 83 115.4		27 42.6 54 83 115.9		27 26.3 54 83 116.3		27 09.9 55 82 116.8		26 53.5 55 82 117.3		4
55	27 56.1 52 85 113.3		27 40.4 52 84 113.8		27 24.6 53 84 114.3		27 08.7 53 84 114.8		26 52.7 53 84 115.3		26 36.7 54 83 115.7		26 20.5 54 83 116.2		26 04.2 54 82 116.7		55
6	27 05.3 52 85 112.8		26 49.8 52 85 113.2		26 34.2 52 84 113.7		26 18.5 52 84 114.2		26 02.7 53 84 114.7		25 46.8 53 84 115.1		25 30.8 53 83 115.6		25 14.8 54 83 116.1		6
7	26 14.2 51 85 112.2		25 58.9 51 85 112.7		25 43.5 52 85 113.2		25 28.0 52 84 113.6		25 12.4 52 84 114.1		24 56.7 52 84 114.6		24 40.9 53 84 115.0		24 25.0 53 83 115.5		7
8	25 23.0 50 86 111.6		25 07.8 51 85 112.1		24 52.6 51 85 112.6		24 37.3 51 85 113.1		24 21.8 52 84 113.5		24 06.3 52 84 114.0		23 50.7 52 84 114.5		23 35.1 52 84 114.9		8
9	24 31.5 50 86 111.1		24 16.6 50 86 111.6		24 01.5 50 86 112.0		23 46.3 51 85 112.5		23 31.1 51 85 113.0		23 15.8 51 85 113.5		23 00.4 52 84 113.9		22 44.9 52 84 114.4		9
60	23 39.9 49 86 110.6		23 25.1 50 86 111.0		23 10.2 50 86 111.5		22 55.2 50 86 112.0		22 40.2 50 85 112.4		22 25.0 51 85 112.9		22 09.8 51 85 113.4		21 54.5 51 84 113.8		60
1	22 48.1 49 87 110.0		22 33.5 49 86 110.5		22 18.7 49 86 111.0		22 03.9 50 86 111.4		21 49.0 50 86 111.9		21 34.0 50 85 112.4		21 19.0 50 85 112.8		21 03.8 51 85 113.3		1
2	21 56.1 48 87 109.5		21 41.6 48 86 110.0		21 27.1 49 86 110.4		21 12.4 49 86 110.9		20 57.7 49 86 111.4		20 42.9 49 86 111.8		20 28.0 50 85 112.3		20 13.0 50 85 112.8		2
3	21 04.0 48 87 109.0		20 49.7 48 87 109.5		20 35.2 48 87 109.9		20 20.7 48 86 110.4		20 06.2 49 86 110.9		19 51.5 49 86 111.3		19 36.8 49 86 111.8		19 22 0 49 85 112.3		3
4	20 11.7 47 87 108.5		19 57.5 47 87 109.0		19 43.2 48 87 109.4		19 28.9 48 87 109.9		19 14.5 48 86 110.4		19 00.0 48 86 110.8		18 45.4 49 86 111.3		18 30.8 49 86 111.7		4
65	19 19.2 47 88 108.0		19 05.2 47 88 108.5		18 51.1 47 87 108.9		18 36.9 47 87 109.4		18 22.6 48 87 109.9		18 08.3 48 86 110.3		17 53.9 48 86 110.8		17 39.4 48 86 111.2		65
6	18 26.6 46 88 107.5		18 12.7 47 88 108.0		17 58.7 47 88 108.4		17 44.7 47 87 108.9		17 30.6 47 87 109.4		17 16.4 47 87 109.8		17 02.1 48 86 110.3		16 47.8 48 86 110.8		6
7	17 33.9 46 88 107.0		17 20.1 46 88 107.5		17 06.3 46 88 108.0		16 52.4 46 88 108.4		16 38.4 47 87 108.9		16 24.4 47 87 109.4		16 10.3 47 87 109.8		15 56.1 47 86 110.3		7
8	16 41.0 45 88 106.6		16 27.4 46 88 107.0		16 13.7 46 88 107.5		15 59.9 46 88 108.0		15 46.1 46 88 108.4		15 32.2 46 87 108.9		15 18.2 47 87 109.3		15 04.2 47 87 109.8		8
9	15 48.0 45 88 106.1		15 34.5 45 88 106.6		15 20.9 45 88 107.0		15 07.3 46 88 107.5		14 53.6 46 88 107.9		14 39.8 46 87 108.4		14 26.0 46 87 108.9		14 12.2 46 87 109.3		9
70	14 54.9 45 89 105.6		14 41.5 45 88 106.1		14 28.1 45 88 106.6		14 14.5 45 88 107.0		14 01.0 45 88 107.5		13 47.4 45 88 107.9		13 33.7 46 88 108.4		13 20.0 46 87 108.9		70
1	14 01.7 44 89 105.2		13 48.4 44 89 105.6		13 35.1 45 88 106.1		13 21.7 45 88 106.6		13 08.2 45 88 107.0		12 54.8 45 88 107.5		12 41.2 45 88 107.9		12 27.6 45 87 108.4		1
2	13 08.3 44 89 104.7		12 55.1 44 89 105.2		12 41.9 44 89 105.7		12 28.7 44 89 106.1		12 15.4 44 88 106.6		12 02.0 45 88 107.0		11 48.6 45 88 107.5		11 35.2 45 88 107.9		2
3	12 14.8 43 89 104.3		12 01.8 44 89 104.8		11 48.7 44 89 105.2		11 35.5 44 89 105.7		11 22.4 44 88 106.1		11 09.1 44 88 106.6		10 55.9 44 88 107.0		10 42.6 44 88 107.5		3
4	11 21.3 43 90 103.9		11 08.3 43 89 104.3		10 55.3 43 89 104.8		10 42.3 43 89 105.2		10 29.3 44 89 105.7		10 16.1 44 88 106.1		10 03.0 44 88 106.6		9 49.8 44 88 107.1		4
75	10 27.6 43 90 103.4		10 14.8 43 90 103.9		10 01.9 43 89 104.3		9 49.0 43 89 104.8		9 36.0 43 89 105.3		9 23.0 43 89 105.7		9 10.0 43 88 106.2		8 57.0 44 88 106.6		75
6	9 33.8 42 90 103.0		9 21.1 42 90 103.5		9 08.3 43 90 103.9		8 55.5 43 89 104.4		8 42.7 43 89 104.8		8 29.8 43 89 105.3		8 16.9 43 89 105.7		8 04.0 43 88 106.2		6
7	8 40.0 42 90 102.6		8 27.3 42 90 103.0		8 14.7 42 90 103.5		8 02.0 42 90 103.9		7 49.2 42 89 104.4		7 36.5 43 89 104.9		7 23.7 43 89 105.3		7 10.9 43 89 105.8		7
8	7 46.0 42 90 102.2		7 33.5 42 90 102.6		7 20.9 42 90 103.1		7 08.3 42 90 103.5		6 55.7 42 89 104.0		6 43.0 42 89 104.4		6 30.4 42 89 104.9		6 17.7 42 89 105.4		8
9	6 52.0 41 90 101.7		6 39.5 42 90 102.2		6 27.1 42 90 102.7		6 14.6 42 90 103.1		6 02.1 42 90 103.6		5 49.5 42 89 104.0		5 37.0 42 89 104.5		5 24.4 42 89 104.9		9
80	5 57.9 41 90 101.3		5 45.5 41 90 101.8		5 33.1 41 90 102.2		5 20.7 41 90 102.7		5 08.3 41 90 103.2								80
1	5 03.7 41 90 100.9																1

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	80 00.0	1.0 04	180.0	80 30.0	1.0 05	180.0	81 00.0	1.0 05	180.0	81 30.0	1.0 05	180.0	82 00.0	1.0 06	180.0	82 30.0	1.0 06	180.0	00
1	78 57.5	1.0 12	174.9	79 27.4	1.0 13	174.7	79 57.3	1.0 13	174.4	80 27.2	1.0 14	174.1	80 57.0	99 15	173.8	81 26.9	99 16	173.5	81 56.7	99 16	173.1	82 26.5	99 18	172.7	1
2	78 50.2	99 20	169.8	79 19.8	98 21	169.4	79 49.3	98 22	168.9	80 18.8	98 23	168.4	80 48.2	98 24	167.8	81 17.5	98 25	167.1	81 46.8	97 27	166.4	82 16.0	97 28	165.5	2
3	78 38.1	97 28	164.9	79 07.2	97 29	164.3	79 36.1	96 30	163.6	80 05.0	96 31	162.8	80 33.7	96 33	162.0	81 02.3	95 34	161.0	81 30.8	95 36	160.0	81 59.0	94 38	158.8	3
4	78 21.6	95 34	160.2	78 50.0	94 36	159.4	79 18.2	94 37	158.5	79 46.2	93 39	157.5	80 14.1	93 40	156.5	80 41.8	92 42	155.3	81 09.2	91 44	154.0	81 36.3	90 46	152.6	4
05	78 00.9	92 41	155.8	78 28.5	92 42	154.8	78 55.8	91 44	153.7	79 23.0	90 46	152.6	79 49.8	89 47	151.4	80 16.4	88 49	150.0	80 42.6	87 51	148.6	81 08.4	85 54	147.0	05
6	77 36.4	89 47	151.6	78 03.1	89 48	150.5	78 29.5	88 50	149.3	78 55.6	87 52	148.0	79 21.4	85 53	146.7	79 46.8	84 55	145.2	80 11.8	82 58	143.6	80 36.3	81 60	141.9	6
7	77 08.4	86 52	147.6	77 34.1	85 53	146.4	77 59.6	84 55	145.2	78 24.7	83 57	143.8	78 49.3	82 59	142.4	79 13.6	80 61	140.9	79 37.3	78 62	139.2	80 00.5	76 65	137.4	7
8	76 37.3	83 56	144.0	77 02.1	82 58	142.7	77 26.6	81 60	141.4	77 50.6	79 61	140.0	78 14.2	78 63	138.5	78 37.2	76 65	136.9	78 59.8	74 67	135.2	79 21.7	72 69	133.4	8
9	76 03.5	80 60	140.6	76 27.4	79 62	139.3	76 50.8	77 64	137.9	77 13.8	76 65	136.5	77 36.3	74 67	135.0	77 58.3	72 69	133.4	78 19.7	70 70	131.7	78 40.4	68 72	129.9	9
10	75 27.3	77 64	137.4	75 50.2	76 66	136.1	76 12.7	74 67	134.8	76 34.7	73 68	133.3	76 56.2	71 70	131.8	77 17.1	69 72	130.2	77 37.4	67 74	128.5	77 57.1	64 75	126.7	10
1	74 48.9	74 67	134.6	75 10.9	73 68	133.2	75 32.5	71 70	131.9	75 53.6	69 72	130.4	76 14.1	67 73	128.9	76 34.0	65 74	127.3	76 53.3	63 76	125.7	77 12.0	61 78	123.9	1
2	74 08.6	71 70	131.9	74 29.8	70 71	130.6	74 50.5	68 72	129.2	75 10.7	66 74	127.8	75 30.3	64 75	126.3	75 49.3	62 77	124.7	76 07.7	60 78	123.1	76 25.5	58 80	121.4	2
3	73 26.7	69 72	129.4	73 47.1	67 74	128.1	74 07.0	65 75	126.8	74 26.3	64 76	125.4	74 45.1	62 77	123.9	75 03.3	60 79	122.4	75 20.9	57 80	120.8	75 37.8	55 81	119.1	3
4	72 43.4	66 74	127.2	73 03.0	65 76	125.9	73 22.1	63 77	124.6	73 40.7	61 78	123.2	73 58.7	59 79	121.7	74 16.1	57 80	120.2	74 32.9	55 82	118.7	74 49.1	53 83	117.1	4
15	71 58.8	64 76	125.1	72 17.7	62 77	123.8	72 36.1	60 78	122.5	72 53.9	59 80	121.1	73 11.2	57 81	119.7	73 27.9	55 82	118.3	73 44.0	53 83	116.8	73 59.5	50 84	115.3	15
6	71 13.0	62 78	123.1	71 31.3	60 79	121.9	71 49.0	58 80	120.6	72 06.2	56 81	119.3	72 22.8	55 82	117.9	72 38.9	53 83	116.5	72 54.4	51 84	115.1	73 09.2	48 85	113.6	6
7	70 26.3	59 79	121.3	70 43.9	58 80	120.1	71 01.0	56 81	118.9	71 17.6	54 82	117.6	71 33.7	53 83	116.2	71 49.1	51 84	114.9	72 04.0	49 85	113.5	72 18.3	46 86	112.0	7
8	69 38.7	58 81	119.7	69 55.8	56 82	118.5	70 12.3	54 82	117.2	70 28.3	53 83	116.0	70 43.8	51 84	114.7	70 58.7	49 85	113.4	71 13.1	47 86	112.0	71 26.8	45 86	110.6	8
9	68 50.4	56 82	118.1	69 06.9	54 83	116.9	69 22.9	53 83	115.7	69 38.4	51 84	114.5	69 53.3	49 85	113.3	70 07.8	47 86	112.0	70 21.6	45 86	110.7	70 34.9	43 87	109.3	9
20	68 01.3	54 83	116.6	68 17.3	52 84	115.5	68 32.8	51 84	114.3	68 47.8	49 85	113.1	69 02.3	47 86	111.9	69 16.3	46 86	110.7	69 29.7	44 87	109.4	69 42.6	42 88	108.1	20
1	67 11.6	52 84	115.3	67 27.2	51 84	114.2	67 42.2	49 85	113.0	67 56.8	48 86	111.9	68 10.9	46 86	110.7	68 24.4	44 87	109.5	68 37.5	43 88	108.2	68 50.0	41 88	107.0	1
2	66 21.4	51 84	114.0	66 36.5	50 85	112.9	66 51.2	48 86	111.8	67 05.3	46 86	110.7	67 19.0	45 87	109.5	67 32.2	43 88	108.3	67 44.9	41 88	107.2	67 57.0	40 89	105.9	2
3	65 30.7	50 85	112.8	65 45.4	48 86	111.7	65 59.7	47 86	110.6	66 13.5	45 87	109.5	66 26.8	44 88	108.4	66 39.6	42 88	107.3	66 51.9	40 89	106.1	67 03.8	39 89	105.0	3
4	64 39.6	48 86	111.6	64 53.9	47 86	110.6	65 07.8	46 87	109.6	65 21.2	44 88	108.5	65 34.2	42 88	107.4	65 46.7	41 88	106.3	65 58.7	39 89	105.2	66 10.3	38 90	104.0	4
25	63 48.1	47 86	110.6	64 02.0	46 87	109.5	64 15.6	44 88	108.5	64 28.7	43 88	107.5	64 41.4	41 88	106.4	64 53.6	40 89	105.4	65 05.3	38 89	104.3	65 16.6	37 90	103.2	25
6	62 56.2	46 87	109.5	63 09.8	45 88	108.6	63 23.1	43 88	107.6	63 35.9	42 88	106.5	63 48.3	41 89	105.5	64 00.2	39 89	104.5	64 11.7	38 90	103.4	64 22.7	36 90	102.3	6
7	62 04.0	45 88	108.6	62 17.3	44 88	107.6	62 30.3	42 88	106.6	62 42.8	41 89	105.6	62 55.0	40 89	104.6	63 06.6	38 90	103.6	63 17.9	37 90	102.6	63 28.7	35 90	101.6	7
8	61 11.5	44 88	107.6	61 24.6	43 88	106.7	61 37.3	42 89	105.8	61 49.5	40 89	104.8	62 01.4	39 90	103.8	62 12.9	37 90	102.8	62 23.9	36 90	101.8	62 34.5	35 90	100.8	8
9	60 18.7	43 88	106.8	60 31.6	42 89	105.9	60 44.0	41 89	104.9	60 56.0	40 89	104.0	61 07.7	38 90	103.0	61 19.0	37 90	102.1	61 29.8	35 90	101.1	61 40.2	34 91	100.1	9
30	59 25.7	43 89	105.9	59 38.3	41 89	105.0	59 50.5	40 89	104.1	60 02.4	39 90	103.2	60 13.8	38 90	102.3	60 24.9	36 90	101.3	60 35.5	35 91	100.4	60 45.8	33 91	99.4	30
1	58 32.5	42 89	105.1	58 44.9	41 89	104.3	58 56.9	39 90	103.4	59 08.5	38 90	102.5	59 19.8	37 90	101.6	59 30.7	36 91	100.7	59 41.1	34 91	99.7	59 51.2	33 91	98.8	1
2	57 39.1	41 89	104.4	57 51.3	40 90	103.5	58 03.1	39 90	102.6	58 14.5	38 90	101.8	58 25.6	36 90	100.9	58 36.3	35 91	100.0	58 46.6	34 91	99.1	58 56.6	33 91	98.2	2
3	56 45.5	40 90	103.6	56 57.5	39 90	102.8	57 09.1	38 90	101.9	57 20.4	37 90	101.1	57 31.3	36 91	100.2	57 41.9	35 91	99.3	57 52.1	33 91	98.5	58 01.9	32 91	97.6	3
4	55 51.8	40 90	102.9	56 03.5	39 90	102.1	56 15.0	38 90	101.3	56 26.1	36 91	100.4	56 36.9	35 91	99.6	56 47.3	34 91	98.7	56 57.4	33 91	97.9	57 07.1	32 91	97.0	4
35	54 57.9	39 90	102.2	55 09.5	38 90	101.4	55 20.8	37 91	100.6	55 31.7	36 91	99.8	55 42.4	35 91	99.0	55 52.7	34 91	98.1	56 02.7	33 91	97.3	56 12.3	31 92	96.4	35
6	54 03.8	39 90	101.6	54 15.3	38 90	100.8	54 26.4	37 91	100.0	54 37.3	36 91	99.2	54 47.8	35 91	98.4	54 58.0	33 91	97.6	55 07.8	32 92	96.7	55 17.4	31 92	95.9	6
7	53 09.6	38 90	100.9	53 21.0	37 91	100.2	53 32.0	36 91	99.4	53 42.7	35 91	98.6	53 53.1	34 91	97.8	54 03.2	33 92	97.0	54 13.0	32 92	96.2	54 22.4	31 92	95.4	7
8	52 15.4	38 91	100.3	52 26.6	37 91	99.6	52 37.5	36 91	98.8	52 48.1	35 91	98.0	52 58.4	34 91	97.3	53 08.3	33 92	96.5	53 18.0	32 92	95.7	53 27.4	31 92	94.9	8
9	51 21.0	37 91	99.7	51 32.1	36 91	99.0	51 42.8	35 91	98.2	51 53.3	35 91	97.5	52 03.5	34 92	96.7	52 13.4	33 92	96.0	52 23.0	32 92	95.2	52 32.3	30 92	94.4	9
40	50 26.5	37 91	99.2	50 37.5	36 91	98.4	50 48.1	35 91	97.7	50 58.5	34 91	96.9	51 08.7	33 92	96.2	51 18.5	32 92	95.4	51 28.0	31 92	94.7	51 37.3	30 92	93.9	40
1	49 31.9	37 91	98.6	49 42.8	36 91	97.9	49 53.4	35 91	97.2	50 03.7	34 92	96.4	50 13.7	33 92	95.7	50 23.5	32 92	94.9	50 33.0	31 92	94.2	50 42.1	30 92	93.5	1
2	48 37.3	36 91	98.1	48 48.0	35 91	97.3	48 58.5	35 92	96.6	49 08.8	34 92	95.9	49 18.7	33 92	95.2	49 28.4	32 92	94.5	49 37.9	31 92	93.7	49 47.0	30 92	93.0	2
3	47 42.6	36 91	97.5	47 53.2	35 91	96.8	48 03.7	34 92	96.1	48 13.8	33 92	95.4	48 23.7	33 92	94.7	48 33.4	32 92	94.0	48 42.7	31 92	93.3	48 51.8	30 92	92.6	3
4	46 47.8	36 91	97.0	46 58.4	35 92	96.3	47 08.7	34 92	95.6	47 18.8	33 92	94.9	47 28.7	32 92	94.2	47 38.2	32 92	93.5	47 47.6	31 92	92.8	47 56.6	30 92	92.1	4
45	45 52.9	35 92	96.5	46 03.4	35 92	95.8	46 13.7	34 92	95.2	46 23.8	33 92	94.5	46 33.6	32 92	93.8	46 43.1	31 92	93.1	46 52.4	31 92	92.4	47 01.4	30 92	91.7	45
6	44 58.0	35 92	96.0	45 08.5	34 92	95.3	45 18.7	34 92	94.7	45 28.7	33 92	94.0	45 38.4	32 92	93.3	45 47.9	31 92	92.7	45 57.2	30 92	92.0	46 06.2	30 92	91.3	6
7	44 03.1	35 92	95.5	44 13.5	34 92	94.9	44 23.6	34 92	94.2	44 33.6	33 92	93.6	44 43.3	32 92	92.9	44 52.8	31 92	92.2	45 02.0	30 92	91.6	45 11.0	30 92	90.9	7
8	43 08.1	35 92	95.1	43 18.4	34 92	94.4	43 28.5	33 92	93.8	43 38.4	33 92	93.1	43 48.1	32 92	92.5	43 57.6	31 92	91.8	44 06.8	30 92	91.1	44 15.8	30 92	90.5	8
9	42 13.0	35 92	94.6	42 23.3	34 92	94.0	42 33.4	33 92	93.3	42 43.3	33 92	92.7	42 52.9	32 92	92.0	43 02.4	31 92	91.4	43 11.6	30 92	90.7	43 20.6	30 92	90.1	9
50	41 18.0	35 92	94.1	41 28.2	34 92	93.5	41 38.3	33 92	92.9	41 48.1	32 92	92.3	41 57.7	32 92	91.6	42 07.1	31 92	91.0	42 16.3	30 92	90.3	42 25.3	30 92	89.7	50
1	40 22.9	34 92	93.7	40 33.1	34 92	93.1	40 43.1	33 92	92.5	40 52.9	32 92	91.8	41 02.5	32 92	91.2	41 11.9	31 92	90.6	41 21.1	30 92	89.9	41 30.1	30 92	89.3	1
2	39 27.7	34 92	93.3	39 37.9	34 92	92.7	39 47.9	33 92	92.0	39 57.7	32 92	91.4	40 07.3	32 92	90.8	40 16.7	31 92	90.2	40 25.9	30 92	89.6	40 34.9	30 92	88.9	2
3	38 32.6	34 92	92.8	38 42.7	34 92	92.2	38 52.7	33 92	91.6	39 02.5	32 92	91.0	39 12.1	32 92	90.4	39 21.5	31 92	89.8	39 30.7	30 92	89.2	39 39.7	30 92	88.6	3
4	37 37.4	34 92	92.4	37 47.6	33 92	91.8	37 57.5	33 92	91.2	38 07.3	32 92	90.6	38 16.8	32 92	90.0	38 26.2	31 92	89.4	38 35.4	30 92	88.8	38 44.5	30 92	88.2	4
55	36 42.2	34 92	92.0	36 52.3	33 92	91.4	37 02.3	33 92	90.8	37 12.0	32 92	90.2	37 21.6	32 92	89.6	37 31.0	31 92	89.0	37 40.2	30 92	88.4	37 49.3	30 92	87.8	55
6	35 47.0	34 92	91.6	35 57.1	33 92	91.0	36 07.0	33 92	90.4	36 16.8	32 92	89.8	36 26.4	32 92	89.2	36 35.8	31 92	88.6	36 45.0	30 92	88.1	36 54.1	30 92	87.5	6
7	34 51.8	34 92	91.2	35 01.9	33 92	90.6	35 11.8	33 92	90.0	35 21.6	32 92	89.4	35 31.2	32 92	88.9	35 40.6	31 92	88.3	35 49.8	31 92	87.7	35 58.9	30 92	87.1	7
8	33 56.6	34 92	90.8	34 06.7	33 92	90.2	34 16.6	33 92	89.6	34 26.3	32 92	89.1	34 35.9	32 92	88.5	34 45.4	31 92	87.9	34 54.6	31 92	87.3	35 03.8	30 92	86.7	8
9	33 01.4	34 92	90.4	33 11.4	33 92	89.8	33 21.4	33 92	89.2	33 31.1	32 92	88.7	33 40.7	32 92	88.1	33 50.2	31 92	87.5	33 59.5	31 92	87.0	34 08.6	30 92	86.4	9
60	32 06.1	34 92	90.0	32 16.2	33 92	89.4	32 26.1	33 92	88.9	32 35.9	32 92	88.3	32 45.5	32 92	87.7	32 55.0	31 92	87.2	33 04.3	31 92	86.6	33 13.5	30 92	86.0	60
1	31 10.9	34 92	89.6	31 21.0	33 92	89.0	31 30.9	33 92	88.5	31 40.7	32 92	87.9	31 50.4	32 92	87.4	31 59.9	31 92	86.8	32 09.2	31 92	86.3	32 18.4	30 92	85.7	1
2	30 15.7	34 92	89.2	30 25.8	33 92	88.7	30 35.7	33 92	88.1	30 45.5	32 92	87.6	30 55.2	32 92	87.0	31 04.7	32 92	86.5	31 14.1	31 92	85.9	31 23.4	31 92	85.3	2
3	29 20.5	34 92	88.8	29 30.6	33 92	88.3	29 40.5	33 92	87.7	29 50.4	33 92	87.2	30 00.1	32 92	86.7	30 09.6	32 92	86.1	30 19.0	31 92	85.6	30 28.3	31 92	85.0	3
4	28 25.2	34 92	88.4	28 35.4	33 92	87.9	28 45.3	33 92	87.4	28 55.2	33 92	86.8	29 04.9	32 92	86.3	29 14.5	32 92	85.8	29 24.0	31 92	85.2	29 33.3	31 92	84.7	4
65	27 30.0	34 92	88.1	27 40.2	34 92	87.5	27 50.2	33 92	87.0	28 00.1	33 92	86.5	28 09.8	32 92	85.9	28 19.5	32 92	85.4	28 29.0	31 92	84.9	28 38.4	31 92	84.3	65
6	26 34.8	34 92	87.7	26 45.0	34 92	87.2	26 55.0	33 92	86.6	27 04.9	33 92	86.1	27 14.7	32 92	85.6	27 24.4	32 92	85.0	27 34.0	32 92	84.5	27 43.4	31 92	84.0	6
7	25 39.7	34 92	87.3	25 49.8	34 92	86.8	25 59.9	33 92	86.3	26 09.9	33 92	85.8	26 19.7	33 92	85.2	26 29.4	32 92	84.7	26 39.0	32 92	84.2	26 48.5	31 92	83.6	7
8	24 44.5	34 92	87.0	24 54.7	34 92	86.4	25 04.8	33 92	85.9	25 14.8	33 92	85.4	25 24.7	33 92	84.9	25 34.4	32 92	84.4	25 44.1	32 92	83.8	25 53.6	32 91	83.3	8
9	23 49.4	34 92	86.6	23 59.6	34 92	86.1	24 09.7	34 92	85.6	24 19.8	33 92	85.0	24 29.7	33 92	84.5	24 39.5	33 92	84.0	24 49.2	32 92	83.5	24 58.8	32 91	83.0	9
70	22 54.2	34 92	86.2	23 04.5	34 92	85.7	23 14.7	34 92	85.2	23 24.7	33 92	84.7	23 34.7	33 92	84.2	23 44.6	33 92	83.7	23 54.3	32 91	83.1	24 04.0	32 91	82.6	70
1	21 59.1	35 92	85.9	22 09.4	34 92	85.4	22 19.7	34 92	84.8	22 29.8	34 92	84.3	22 39.8	33 92	83.8	22 49.7	33 91	83.3	22 59.5	33 91	82.8	23 09.2	32 91	82.3	1
2	21 04.1	35 92	85.5	21 14.4	34 92	85.0	21 24.7	34 92	84.5	21 34.8	34 92	84.0	21 44.9	33 92	83.5	21 54.9	33 91	83.0	22 04.8	33 91	82.5	22 14.5	32 91	81.9	2
3	20 09.0	35 92	85.1	20 19.4	34 92	84.6	20 29.7	34 92	84.1	20 39.9	34 92	83.6	20 50.0	34 91	83.1	21 00.1	33 91	82.6	21 10.0	33 91	82.1	21 19.9	33 91	81.6	3
4	19 14.0	35 92	84.8	19 24.4	35 92	84.3	19 34.8	34 92	83.8	19 45.0	34 91	83.3	19 55.2	34 91	82.8	20 05.3	34 91	82.3	20 15.3	33 91	81.8	20 25.3	33 91	81.3	4
75	18 19.0	35 92	84.4	18 29.5	35 92	83.9	18 39.9	35 92	83.4	18 50.2	34 91	82.9	19 00.5	34 91	82.4	19 10.6	34 91	81.9	19 20.7	33 91	81.4	19 30.7	33 91	80.9	75
6	17 24.1	35 92	84.0	17 34.6	35 92	83.6	17 45.0	35 91	83.1	17 55.4	34 91	82.6	18 05.7	34 91	82.1	18 16.0	34 91	81.6	18 26.1	34 91	81.1	18 36.2	33 91	80.6	6
7	16 29.2	35 92	83.7	16 39.7	35 91	83.2	16 50.2	35 91	82.7	17 00.7	35 91	82.2	17 11.1	34 91	81.7	17 21.3	34 91	81.2	17 31.6	34 91	80.7	17 41.7	34 91	80.3	7
8	15 34.3	36 91	83.3	15 44.9	35 91	82.8	15 55.5	35 91	82.4	16 06.0	35 91	81.9	16 16.4	35 91	81.4	16 26.8	34 91	80.9	16 37.1	34 91	80.4	16 47.3	34 90	79.9	8
9	14 39.4	36 91	83.0	14 50.1	36 91	82.5	15 00.8	35 91	82.0	15 11.3	35 91	81.5	15 21.8	35 91	81.0	15 32.3	35 91	80.5	15 42.6	34 91	80.1	15 53.0	34 90	79.6	9
80	13 44.7	36 91	82.6	13 55.4	36 91	82.1	14 06.1	36 91	81.6	14 16.7	35 91	81.2	14 27.3	35 91	80.7	14 37.8	35 91	80.2	14 48.3	35 90	79.7	14 58.7	35 90	79.2	80
1	12 49.9	36 91	82.2	13 00.7	36 91	81.8	13 11.5	36 91	81.3	13 22.2	36 91	80.8	13 32.8	35 91	80.3	13 43.4	35 90	79.8	13 54.0	35 90	79.4	14 04.5	35 90	78.9	1
2	11 55.2	36 91	81.9	12 06.1	36 91	81.4	12 16.9	36 91	80.9	12 27.7	36 91	80.4	12 38.4	36 91	80.0	12 49.1	36 90	79.5	12 59.7	35 90	79.0	13 10.3	35 90	78.5	2
3	11 00.6	37 91	81.5	11 11.5	36 91	81.0	11 22.4	36 91	80.6	11 33.3	36 91	80.1	11 44.1	36 90	79.6	11 54.8	36 90	79.1	12 05.5	35 90	78.7	12 16.2	35 90	78.2	3
4	10 06.0	37 91	81.2	10 17.0	37 91	80.7	10 27.9	37 91	80.2	10 38.9	36 90	79.7	10 49.8	36 90	79.3	11 00.6	36 90	78.8	11 11.4	36 90	78.3	11 22.2	36 90	77.8	4
85	9 11.4	37 91	80.8	9 22.5	37 91	80.3	9 33.6	37 90	79.8	9 44.6	37 90	79.4	9 55.5	37 90	78.9	10 06.5	36 90	78.4	10 17.4	36 90	78.0	10 28.2	36 90	77.5	85
6	8 16.9	37 91	80.4	8 28.1	37 91	79.9	8 39.2	37 90	79.5	8 50.3	37 90	79.0	9 01.4	37 90	78.5	9 12.4	37 90	78.1	9 23.4	37 90	77.6	9 34.3	36 90	77.1	6
7	7 22.5	38 91	80.0	7 33.7	37 90	79.6	7 44.9	37 90	79.1	7 56.1	37 90	78.6	8 07.3	37 90	78.2	8 18.4	37 90	77.7	8 29.5	37 90	77.2	8 40.5	37 90	76.8	7
8	6 28.1	38 90	79.7	6 39.4	38 90	79.2	6 50.7	38 90	78.7	7 02.0	38 90	78.3	7 13.3	37 90	77.8	7 24.5	37 90	77.3	7 35.7	37 90	76.9	7 46.8	37 90	76.4	8
9	5 33.8	38 90	79.3	5 45.2	38 90	78.8	5 56.6	38 90	78.4	6 08.0	38 90	77.9	6 19.3	38 90	77.4	6 30.6	38 90	77.0	6 41.9	38 90	76.5	6 53.2	37 90	76.0	9
90							5 02.6	38 90	78.0	5 14.0	38 90	77.5	5 25.4	38 90	77.1	5 36.9	38 90	76.6	5 48.2	38 90	76.1	5 59.6	38 90	75.7	90

Lat. 23°

H.A.	12° 00′ Alt.	Az.	Δd	Δt	12° 30′ Alt.	Az.	Δd	Δt	13° 00′ Alt.	Az.	Δd	Δt	13° 30′ Alt.	Az.	Δd	Δt	14° 00′ Alt.	Az.	Δd	Δt	14° 30′ Alt.	Az.	Δd	Δt	15° 00′ Alt.	Az.	Δd	Δt	15° 30′ Alt.	Az.	Δd	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
00	55 00.0	180.0	1.0	01	54 30.0	180.0	1.0	01	54 00.0	180.0	1.0	01	53 30.0	180.0	1.0	01	53 00.0	180.0	1.0	01	52 30.0	180.0	1.0	01	52 00.0	180.0	1.0	01	51 30.0	180.0	1.0	01	00
1	54 59.2	178.3	1.0	04	54 29.2	178.3	1.0	04	53 59.2	178.3	1.0	04	53 29.2	178.4	1.0	04	52 59.2	178.4	1.0	04	52 29.2	178.4	1.0	04	51 59.2	178.4	1.0	04	51 29.3	178.5	1.0	04	1
2	54 56.7	176.6	1.0	07	54 26.8	176.6	1.0	07	53 56.8	176.7	1.0	07	53 26.9	176.7	1.0	07	52 56.9	176.8	1.0	06	52 26.9	176.8	1.0	06	51 57.0	176.9	1.0	06	51 27.0	176.9	1.0	06	2
3	54 52.6	174.9	1.0	10	54 22.7	175.0	1.0	09	53 52.8	175.0	1.0	09	53 22.9	175.1	1.0	09	52 53.0	175.2	1.0	09	52 23.1	175.2	1.0	09	51 53.2	175.3	1.0	09	51 23.3	175.4	1.0	09	3
4	54 46.9	173.2	99	12	54 17.1	173.3	99	12	53 47.3	173.4	99	12	53 17.4	173.5	99	12	52 47.6	173.6	99	12	52 17.8	173.7	99	12	51 47.9	173.7	99	11	51 18.1	173.8	99	11	4
05	54 39.6	171.5	99	15	54 09.8	171.6	99	15	53 40.1	171.8	99	14	53 10.4	171.9	99	14	52 40.7	172.0	99	14	52 10.9	172.1	99	14	51 41.2	172.2	99	14	51 11.4	172.3	99	14	05
6	54 30.6	169.9	99	18	54 01.0	170.0	99	17	53 31.4	170.1	99	17	53 01.8	170.3	99	17	52 32.2	170.4	99	17	52 02.6	170.5	99	16	51 32.9	170.7	99	16	51 03.3	170.8	99	16	6
7	54 20.1	168.2	98	20	53 50.7	168.4	98	20	53 21.2	168.5	98	20	52 51.7	168.7	98	19	52 22.2	168.8	98	19	51 52.8	169.0	98	19	51 23.2	169.1	98	19	50 53.7	169.3	98	18	7
8	54 08.0	166.6	98	23	53 38.8	166.7	98	22	53 09.5	166.9	98	22	52 40.1	167.1	98	22	52 10.8	167.3	98	22	51 41.5	167.4	98	21	51 12.1	167.6	98	21	50 42.7	167.8	98	21	8
9	53 54.4	164.9	97	25	53 25.4	165.2	97	25	52 56.2	165.4	97	24	52 27.1	165.5	97	24	51 57.9	165.7	97	24	51 28.7	165.9	97	24	50 59.6	166.1	97	23	50 30.3	166.3	97	23	9
10	53 39.4	163.3	96	28	53 10.5	163.6	96	27	52 41.5	163.8	96	27	52 12.6	164.0	97	26	51 43.6	164.2	97	26	51 14.6	164.4	97	26	50 45.6	164.6	97	26	50 16.6	164.8	97	25	10
1	53 22.8	161.8	96	30	52 54.1	162.0	96	30	52 25.4	162.2	96	29	51 56.7	162.5	96	29	51 27.9	162.7	96	28	50 59.1	162.9	96	28	50 30.3	163.2	96	28	50 01.4	163.4	96	27	1
2	53 04.8	160.2	95	32	52 36.4	160.5	95	32	52 07.9	160.7	95	32	51 39.3	161.0	95	31	51 10.8	161.2	95	31	50 42.2	161.5	95	30	50 13.6	161.7	95	30	49 45.0	161.9	96	30	2
3	52 45.4	158.7	94	35	52 17.2	159.0	94	34	51 49.0	159.2	94	34	51 20.7	159.5	94	33	50 52.4	159.8	94	33	50 24.0	160.0	95	32	49 55.6	160.3	95	32	49 27.2	160.5	95	32	3
4	52 24.7	157.2	93	37	51 56.7	157.5	93	36	51 28.7	157.8	93	36	51 00.7	158.0	94	36	50 32.6	158.3	94	35	50 04.5	158.6	94	35	49 36.3	158.9	94	34	49 08.1	159.1	94	34	4
15	52 02.6	155.7	92	39	51 34.9	156.0	92	38	51 07.2	156.3	93	38	50 39.4	156.6	93	38	50 11.6	156.9	93	37	49 43.7	157.2	93	37	49 15.8	157.5	93	36	48 47.8	157.8	93	36	15
6	51 39.2	154.2	91	41	51 11.8	154.6	91	40	50 44.3	154.9	92	40	50 16.8	155.2	92	40	49 49.3	155.5	92	39	49 21.7	155.8	92	39	48 54.0	156.1	92	38	48 26.3	156.4	92	38	6
7	51 14.6	152.8	90	43	50 47.5	153.2	90	43	50 20.3	153.5	91	42	49 53.1	153.8	91	42	49 25.8	154.1	91	41	48 58.4	154.5	91	41	48 31.1	154.8	91	40	48 03.6	155.1	92	40	7
8	50 48.8	151.4	89	45	50 21.9	151.8	90	44	49 55.1	152.1	90	44	49 28.1	152.5	90	44	49 01.0	152.8	90	43	48 34.0	153.1	90	42	48 06.9	153.4	90	42	47 39.8	153.8	91	42	8
9	50 21.8	150.1	88	47	49 55.2	150.4	89	46	49 28.7	150.8	89	46	49 02.0	151.1	89	45	48 35.3	151.5	89	45	48 08.5	151.8	89	44	47 41.7	152.1	90	44	47 14.8	152.5	90	44	9
20	49 53.6	148.7	87	49	49 27.4	149.1	87	48	49 01.1	149.5	88	48	48 34.8	149.8	88	47	48 08.4	150.2	88	47	47 41.9	150.5	88	46	47 15.3	150.9	89	46	46 48.7	151.2	89	45	20
1	49 24.4	147.4	86	50	48 58.5	147.8	86	50	48 32.5	148.2	87	49	48 06.5	148.5	87	49	47 40.4	148.9	87	48	47 14.2	149.3	87	48	46 47.9	149.6	88	47	46 21.6	150.0	88	47	1
2	48 54.1	146.1	85	52	48 28.6	146.5	85	52	48 02.9	146.9	86	51	47 37.2	147.3	86	51	47 11.3	147.7	86	50	46 45.5	148.0	86	50	46 19.5	148.4	87	49	45 53.5	148.8	87	49	2
3	48 22.8	144.9	84	54	47 57.6	145.3	84	53	47 32.2	145.7	85	53	47 06.8	146.1	85	52	46 41.3	146.4	85	52	46 15.7	146.8	85	51	45 50.1	147.2	86	51	45 24.3	147.6	86	50	3
4	47 50.6	143.5	83	55	47 25.6	143.9	83	55	47 00.6	144.1	84	54	46 35.5	144.5	84	54	46 10.3	144.9	84	53	45 45.0	145.3	84	53	45 19.7	145.6	85	52	44 54.2	146.0	85	52	4
25	47 17.4	142.4	82	57	46 52.8	142.9	82	56	46 28.0	143.3	83	56	46 03.2	143.7	83	55	45 38.4	144.1	83	55	45 13.4	144.5	83	54	44 48.3	144.9	84	54	44 23.2	145.3	84	53	25
6	46 43.3	141.3	81	58	46 19.0	141.7	81	58	45 54.6	142.1	81	57	45 30.1	142.5	82	57	45 05.5	143.0	82	56	44 40.9	143.4	82	56	44 16.1	143.7	83	55	43 51.3	144.1	83	55	6
7	46 08.3	140.1	80	60	45 44.3	140.6	80	59	45 20.2	141.0	80	59	44 56.1	141.4	81	58	44 31.8	141.8	81	58	44 07.5	142.2	81	57	43 43.0	142.6	82	56	43 18.5	143.0	82	56	7
8	45 32.5	139.0	79	61	45 08.8	139.5	79	60	44 45.1	139.9	79	60	44 21.2	140.3	80	59	43 57.3	140.7	80	59	43 33.2	141.2	80	58	43 09.1	141.6	81	58	42 44.9	142.0	81	57	8
9	44 55.9	137.9	78	62	44 32.6	138.4	78	62	44 09.1	138.8	78	61	43 45.6	139.3	79	61	43 21.9	139.7	79	60	42 58.2	140.1	79	60	42 34.4	140.5	80	59	42 10.5	140.9	80	59	9
30	44 18.5	136.9	77	64	43 55.5	137.3	77	63	43 32.4	137.8	77	62	43 09.1	138.2	78	62	42 45.8	138.6	78	62	42 22.4	139.1	78	61	41 58.9	139.5	79	60	41 35.3	139.9	79	60	30
1	43 40.4	135.9	76	65	43 17.7	136.3	76	64	42 54.9	136.7	76	64	42 32.0	137.2	77	63	42 08.9	137.6	77	63	41 45.8	138.0	77	62	41 22.6	138.5	78	62	40 59.3	138.9	78	61	1
2	43 01.6	134.8	74	66	42 39.2	135.3	75	65	42 16.7	135.7	75	65	41 54.1	136.2	76	64	41 31.4	136.6	76	64	41 08.6	137.1	76	63	40 45.7	137.5	77	63	40 22.7	137.9	77	62	2
3	42 22.1	133.7	73	67	42 00.0	134.3	74	66	41 37.8	134.8	74	66	41 15.5	135.2	75	65	40 53.1	135.7	75	65	40 30.6	136.1	75	64	40 08.0	136.5	76	64	39 45.3	136.9	76	63	3
4	41 41.9	132.9	72	68	41 20.2	133.4	73	68	40 58.3	133.8	73	67	40 36.3	134.3	74	66	40 14.2	134.7	74	66	39 52.0	135.1	74	66	39 29.7	135.6	75	65	39 07.3	136.0	75	64	4
35	41 01.2	132.0	71	69	40 39.7	132.4	72	68	40 18.1	132.9	72	68	39 56.4	133.3	73	68	39 34.6	133.8	73	67	39 12.7	134.2	73	66	38 50.7	134.7	74	66	38 28.6	135.1	74	66	35
6	40 19.8	131.0	70	70	39 58.6	131.5	71	69	39 37.3	132.0	71	69	39 15.9	132.4	72	68	38 54.4	132.9	72	68	38 32.8	133.3	72	68	38 11.1	133.8	73	67	37 49.3	134.2	73	66	6
7	39 37.9	130.2	69	71	39 17.0	130.6	70	70	38 56.0	131.1	70	70	38 34.9	131.5	71	70	38 13.6	132.0	71	69	37 52.3	132.4	71	68	37 30.9	132.9	72	68	37 09.4	133.3	72	68	7
8	38 55.4	129.3	69	72	38 34.8	129.7	69	71	38 14.1	130.2	69	71	37 53.2	130.7	70	70	37 32.3	131.1	70	70	37 11.3	131.6	70	69	36 50.1	132.0	71	69	36 28.9	132.5	71	68	8
9	38 12.4	128.4	68	72	37 52.1	128.9	68	72	37 31.6	129.4	68	72	37 11.1	129.8	69	71	36 50.4	130.3	69	71	36 29.7	130.7	69	70	36 08.8	131.2	70	70	35 47.9	131.6	70	69	9
40	37 28.9	127.6	67	73	37 08.8	128.1	67	73	36 48.7	128.5	67	72	36 28.4	129.0	68	72	36 08.0	129.4	68	72	35 47.6	129.9	68	71	35 27.0	130.3	69	71	35 06.3	130.8	69	70	40
1	36 44.9	126.8	66	74	36 25.1	127.3	66	73	36 05.2	127.7	66	73	35 45.2	128.2	67	73	35 25.1	128.6	67	72	35 04.9	129.1	67	72	34 44.7	129.5	68	71	34 24.3	130.0	68	71	1
2	36 00.4	126.0	65	75	35 40.9	126.5	65	74	35 21.3	126.9	66	74	35 01.6	127.4	66	74	34 41.8	127.8	66	73	34 21.8	128.3	67	72	34 01.8	128.7	67	72	33 41.7	129.2	67	72	2
3	35 15.5	125.2	64	76	34 56.3	125.7	64	75	34 36.9	126.2	65	74	34 17.5	126.6	65	74	33 57.9	127.1	65	74	33 38.3	127.5	66	74	33 18.5	128.0	66	73	32 58.7	128.4	66	72	3
4	34 30.2	124.5	63	76	34 11.2	124.9	63	76	33 52.1	125.4	64	75	33 32.9	125.9	64	75	33 13.6	126.3	64	74	32 54.2	126.8	65	74	32 34.8	127.2	65	74	32 15.2	127.7	65	73	4
45	33 44.4	123.7	62	77	33 25.7	124.2	63	76	33 06.9	124.7	63	76	32 48.0	125.1	63	76	32 28.9	125.6	64	75	32 09.8	126.0	64	75	31 50.6	126.5	64	74	31 31.2	126.9	65	74	45
6	32 58.3	123.0	61	78	32 39.8	123.5	62	77	32 21.3	123.9	62	77	32 02.6	124.4	62	76	31 43.8	124.9	63	76	31 24.9	125.3	63	76	31 05.9	125.8	63	75	30 46.9	126.2	64	75	6
7	32 11.8	122.3	61	78	31 53.6	122.8	61	77	31 35.2	123.2	61	77	31 16.8	123.7	62	77	30 58.3	124.1	62	76	30 39.6	124.6	62	76	30 20.9	125.1	63	76	30 02.1	125.5	63	75	7
8	31 24.9	121.6	60	79	31 07.0	122.1	60	78	30 48.9	122.5	60	78	30 30.7	123.0	61	78	30 12.4	123.5	61	77	29 54.0	123.9	61	77	29 35.5	124.4	62	76	29 17.0	124.8	62	76	8
9	30 37.7	120.9	59	79	30 20.0	121.4	59	79	30 02.1	121.9	60	78	29 44.2	122.3	60	78	29 26.1	122.8	60	78	29 08.0	123.2	61	77	28 49.7	123.7	61	77	28 31.4	124.1	61	76	9
50	29 50.2	120.3	58	80	29 32.6	120.7	59	79	29 15.0	121.2	59	79	28 57.3	121.6	59	79	28 39.5	122.1	60	78	28 21.6	122.6	60	78	28 03.6	123.0	60	78	27 45.5	123.5	60	77	50
1	29 02.3	119.6	58	80	28 45.0	120.1	58	80	28 27.6	120.5	58	80	28 10.1	121.0	58	79	27 52.6	121.5	59	79	27 34.9	121.9	59	78	27 17.1	122.4	59	78	26 59.3	122.8	60	77	1
2	28 14.1	119.0	57	81	27 57.1	119.4	57	80	27 39.9	119.9	57	80	27 22.6	120.4	58	80	27 05.3	120.8	58	79	26 47.8	121.3	58	79	26 30.3	121.7	59	78	26 12.7	122.2	59	78	2
3	27 25.7	118.3	56	81	27 08.8	118.8	56	81	26 51.9	119.3	57	80	26 34.8	119.7	57	80	26 17.7	120.2	57	80	26 00.5	120.6	58	80	25 43.2	121.1	58	79	25 25.8	121.6	58	79	3
4	26 36.9	117.7	55	82	26 20.3	118.2	56	81	26 03.5	118.7	56	81	25 46.7	119.1	56	81	25 29.8	119.6	56	80	25 12.8	120.0	57	80	24 55.7	120.5	57	80	24 38.6	120.9	57	79	4
55	25 47.9	117.1	55	82	25 31.5	117.6	55	82	25 14.9	118.1	55	82	24 58.3	118.5	56	81	24 41.6	119.0	56	81	24 24.9	119.4	56	80	24 08.0	119.9	56	80	23 51.1	120.3	57	80	55
6	24 58.6	116.5	54	82	24 42.4	117.0	54	82	24 26.1	117.5	55	82	24 09.7	117.9	55	82	23 53.2	118.4	55	81	23 36.6	118.8	55	81	23 20.0	119.3	56	80	23 03.2	119.7	56	80	6
7	24 09.1	116.0	53	83	23 53.1	116.4	54	83	23 36.9	116.9	54	82	23 20.7	117.4	54	82	23 04.5	117.8	54	82	22 48.1	118.3	55	81	22 31.7	118.7	55	81	22 15.2	119.2	55	81	7
8	23 19.3	115.4	53	83	23 03.5	115.9	53	83	22 47.6	116.3	53	83	22 31.6	116.8	53	82	22 15.5	117.2	54	82	21 59.3	117.7	54	82	21 43.1	118.1	54	81	21 26.8	118.6	54	81	8
9	22 29.3	114.8	52	84	22 13.7	115.3	52	84	21 57.9	115.8	53	83	21 42.1	116.2	53	83	21 26.2	116.7	53	82	21 10.3	117.1	53	82	20 54.3	117.6	54	82	20 38.2	118.0	54	82	9
60	21 39.1	114.3	51	84	21 23.6	114.8	52	84	21 08.1	115.2	52	84	20 52.5	115.7	52	83	20 36.8	116.1	52	83	20 21.0	116.6	53	82	20 05.2	117.0	53	82	19 49.3	117.5	53	82	60
1	20 48.6	113.8	51	84	20 33.4	114.2	51	84	20 18.0	114.7	52	84	20 02.6	115.1	52	84	19 47.1	115.6	52	83	19 31.5	116.0	52	83	19 15.9	116.5	52	82	19 00.2	117.0	52	82	1
2	19 58.0	113.2	50	85	19 42.9	113.7	50	84	19 27.7	114.2	51	84	19 12.5	114.6	51	84	18 57.2	115.1	51	84	18 41.8	115.5	51	83	18 26.3	116.0	52	83	18 10.8	116.4	52	82	2
3	19 07.1	112.7	50	85	18 52.2	113.2	50	85	18 37.2	113.6	50	84	18 22.2	114.1	50	84	18 07.0	114.5	51	84	17 51.8	115.0	51	84	17 36.6	115.5	51	83	17 21.3	115.9	51	83	3
4	18 16.1	112.2	49	85	18 01.3	112.7	49	85	17 46.5	113.1	50	85	17 31.6	113.6	50	84	17 16.7	114.0	50	84	17 01.7	114.5	50	84	16 46.6	114.9	50	84	16 31.5	115.4	51	83	4
65	17 24.9	111.7	49	86	17 10.3	112.2	49	86	16 55.6	112.6	49	85	16 40.9	113.1	49	85	16 26.1	113.5	49	84	16 11.3	114.0	50	84	15 56.4	114.4	50	84	15 41.5	114.9	50	84	65
6	16 33.5	111.2	48	86	16 19.0	111.7	48	86	16 04.6	112.1	49	85	15 50.0	112.6	49	85	15 35.4	113.0	49	85	15 20.8	113.5	49	85	15 06.0	113.9	49	84	14 51.3	114.4	49	84	6
7	15 41.9	110.7	47	86	15 27.6	111.2	48	86	15 13.3	111.6	48	86	14 58.9	112.1	48	85	14 44.5	112.5	48	85	14 30.0	113.0	48	85	14 15.5	113.5	49	85	14 00.9	113.9	49	84	7
8	14 50.2	110.2	47	86	14 36.1	110.7	47	86	14 21.9	111.2	47	86	14 07.7	111.6	47	86	13 53.4	112.1	48	86	13 39.1	112.5	48	85	13 24.7	113.0	48	85	13 10.3	113.4	48	85	8
9	13 58.3	109.8	46	87	13 44.3	110.2	47	86	13 30.3	110.7	47	86	13 16.2	111.1	47	86	13 02.1	111.6	47	86	12 48.0	112.0	48	86	12 33.8	112.5	48	85	12 19.5	112.9	48	85	9
70	13 06.2	109.3	46	87	12 52.4	109.8	46	87	12 38.5	110.2	46	86	12 24.6	110.7	46	86	12 10.7	111.1	47	86	11 56.7	111.6	47	86	11 42.7	112.0	47	86	11 28.6	112.5	47	85	70
1	12 14.0	108.9	45	87	12 00.4	109.3	46	87	11 46.6	109.8	46	87	11 32.9	110.2	46	86	11 19.1	110.7	46	86	11 05.3	111.1	46	86	10 51.4	111.6	46	86	10 37.5	112.0	46	86	1
2	11 21.7	108.4	45	88	11 08.2	108.9	45	87	10 54.6	109.3	45	87	10 41.0	109.8	45	87	10 27.3	110.2	46	86	10 13.7	110.7	46	86	9 59.9	111.1	46	86	9 46.2	111.6	46	86	2
3	10 29.2	108.0	45	88	10 15.8	108.4	45	87	10 02.4	108.9	45	87	9 48.9	109.3	45	87	9 35.4	109.8	45	87	9 21.9	110.2	45	86	9 08.3	110.7	45	86	8 54.7	111.1	45	86	3
4	9 36.6	107.5	44	88	9 23.4	108.0	44	88	9 10.1	108.4	44	88	8 56.8	108.8	44	87	8 43.4	109.3	45	87	8 30.0	109.8	45	87	8 16.6	110.2	45	86	8 03.1	110.7	45	86	4
75	8 43.9	107.1	44	88	8 30.8	107.5	44	88	8 17.6	108.0	44	88	8 04.4	108.4	44	87	7 51.2	108.9	44	87	7 38.0	109.3	44	87	7 24.7	109.8	44	87	7 11.4	110.3	44	86	75
6	7 51.0	106.6	43	88	7 38.0	107.1	43	88	7 25.0	107.6	43	88	7 12.0	108.0	44	88	6 58.9	108.5	44	87	6 45.8	108.9	44	87	6 32.7	109.4	44	87	6 19.5	109.8	44	87	6
7	6 58.0	106.2	43	88	6 45.2	106.7	43	88	6 32.3	107.1	43	88	6 19.4	107.6	43	88	6 06.4	108.0	43	88	5 53.5	108.5	43	88	5 40.5	108.9	43	87	5 27.5	109.4	43	87	7
8	6 05.0	105.8	42	89	5 52.2	106.3	43	88	5 39.5	106.7	43	88	5 26.7	107.2	43	88	5 13.9	107.6	43	88	5 01.0	108.1	43	88									8
9	5 11.8	105.4	42	89																													9

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Az.	Δd	Δt	12° 30′ Alt.	Az.	Δd	Δt	13° 00′ Alt.	Az.	Δd	Δt	13° 30′ Alt.	Az.	Δd	Δt	14° 00′ Alt.	Az.	Δd	Δt	14° 30′ Alt.	Az.	Δd	Δt	15° 00′ Alt.	Az.	Δd	Δt	15° 30′ Alt.	Az.	Δd	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
91																													5 06.1	75.3	38	89		91

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	83 00.0	1.0 06	180.0	83 30.0	1.0 07	180.0	84 00.0	1.0 07	180.0	84 30.0	1.0 08	180.0	85 00.0	1.0 09	180.0	85 30.0	1.0 10	180.0	86 00.0	1.0 11	180.0	86 30.0	1.0 12	180.0	00
1	82 56.2	99 19	172.2	83 25.9	99 20	171.6	83 55.6	99 21	170.9	84 25.2	99 23	170.1	84 54.8	98 25	169.2	85 24.2	98 28	168.1	85 53.6	97 31	166.7	86 22.7	97 34	164.9	1
2	82 45.1	97 30	164.6	83 14.0	96 32	163.5	83 42.8	96 34	162.3	84 11.3	95 37	160.8	84 39.7	94 40	159.1	85 07.6	93 43	157.1	85 35.2	91 47	154.6	86 02.1	89 52	151.6	2
3	82 27.1	93 40	157.5	82 54.8	92 42	156.0	83 22.3	91 45	154.3	83 49.3	89 48	152.4	84 15.9	88 51	150.1	84 41.9	85 55	147.5	85 07.0	82 59	144.5	85 31.2	79 63	140.8	3
4	82 03.0	89 49	151.0	82 29.4	87 51	149.2	82 55.3	85 54	147.2	83 20.6	83 57	145.0	83 45.2	81 60	142.4	84 09.0	78 64	139.5	84 31.7	74 68	136.2	84 53.2	69 71	132.5	4
05	81 33.8	84 56	145.2	81 58.6	82 58	143.2	82 22.9	80 61	141.0	82 46.4	77 64	138.6	83 09.0	74 67	136.0	83 30.7	70 70	133.0	83 51.2	66 74	129.7	84 10.4	61 77	126.0	05
6	81 00.2	79 62	140.0	81 23.5	77 64	138.0	81 46.2	74 67	135.7	82 07.9	71 70	133.3	82 28.8	68 72	130.6	82 48.6	64 75	127.6	83 07.1	60 78	124.4	83 24.3	55 81	120.9	6
7	80 23.1	74 67	135.5	80 44.9	72 69	133.4	81 06.0	69 72	131.1	81 26.2	66 74	128.7	81 45.4	62 76	126.1	82 03.5	58 78	123.2	82 20.4	54 81	120.2	82 35.9	49 83	116.9	7
8	79 43.0	70 71	131.5	80 03.5	67 73	129.4	80 23.2	64 75	127.2	80 41.9	61 77	124.8	80 59.7	57 79	122.3	81 16.4	54 81	119.6	81 31.8	49 83	116.7	81 45.9	45 85	113.7	8
9	79 00.5	66 74	127.9	79 19.7	63 76	125.9	79 38.2	60 78	123.7	79 55.7	57 80	121.5	80 12.2	53 82	119.0	80 27.6	50 83	116.5	80 41.8	45 85	113.8	80 54.8	41 86	111.0	9
10	78 16.0	62 77	124.8	78 34.1	59 78	122.9	78 51.4	56 80	120.8	79 07.8	53 82	118.6	79 23.2	50 83	116.3	79 37.6	46 85	113.9	79 50.8	42 86	111.3	80 02.9	38 88	108.7	10
1	77 29.9	58 79	122.1	77 47.0	56 80	120.2	78 03.3	53 82	118.2	78 18.7	50 83	116.1	78 33.2	47 85	113.9	78 46.7	43 86	111.6	78 59.0	39 87	109.2	79 10.3	36 88	106.8	1
2	76 42.5	55 81	119.6	76 58.7	53 82	117.8	77 14.1	50 84	115.9	77 28.7	47 85	113.9	77 42.3	44 86	111.8	77 55.0	41 87	109.6	78 06.6	37 88	107.4	78 17.2	33 89	105.1	2
3	75 53.9	53 82	117.4	76 09.4	50 84	115.7	76 24.0	47 85	113.8	76 37.8	45 86	111.9	76 50.7	41 87	109.9	77 02.7	38 88	107.9	77 13.7	35 89	105.8	77 23.7	32 90	103.7	3
4	75 04.5	50 84	115.5	75 19.2	48 85	113.8	75 33.1	45 86	112.0	75 46.2	42 87	110.2	75 58.5	39 88	108.3	76 09.9	36 89	106.4	76 20.4	33 89	104.4	76 29.9	30 90	102.4	4
15	74 14.2	48 85	113.7	74 28.3	46 86	112.0	74 41.6	43 87	110.3	74 54.1	40 88	108.6	75 05.8	38 88	106.8	75 16.7	35 89	105.0	75 26.7	32 90	103.1	75 35.8	29 90	101.2	15
6	73 23.4	46 86	112.0	73 36.8	44 87	110.5	73 49.6	41 88	108.9	74 01.6	39 88	107.2	74 12.8	36 89	105.5	74 23.2	33 90	103.8	74 32.8	31 90	102.0	74 41.5	28 91	100.2	6
7	72 31.9	44 86	110.6	72 44.8	42 87	109.1	72 57.1	40 88	107.5	73 08.6	37 89	105.9	73 19.4	35 89	104.3	73 29.4	32 90	102.7	73 38.7	29 90	101.0	73 47.1	27 91	99.3	7
8	71 40.0	43 87	109.2	71 52.4	40 88	107.8	72 04.2	38 89	106.3	72 15.4	36 89	104.8	72 25.8	33 90	103.2	72 35.5	31 90	101.6	72 44.4	28 91	100.0	72 52.5	26 91	98.4	8
9	70 47.6	41 88	108.0	70 59.7	39 88	106.6	71 11.1	37 89	105.1	71 21.8	35 90	103.7	71 31.9	32 90	102.2	71 41.3	30 91	100.7	71 49.9	28 91	99.2	71 57.8	25 91	97.6	9
20	69 54.9	40 88	106.8	70 06.6	38 89	105.4	70 17.6	36 90	104.1	70 28.1	34 90	102.7	70 37.8	31 90	101.3	70 46.9	29 91	99.8	70 55.3	27 91	98.4	71 03.0	25 91	96.9	20
1	69 01.9	39 89	105.7	69 13.2	37 89	104.4	69 23.9	35 90	103.1	69 34.1	33 90	101.8	69 43.6	31 91	100.4	69 52.4	28 91	99.0	70 00.6	26 91	97.6	70 08.2	24 92	96.2	1
2	68 08.6	38 89	104.7	68 19.6	36 90	103.5	68 30.1	34 90	102.2	68 39.9	32 90	100.9	68 49.2	30 91	99.6	68 57.8	28 91	98.2	69 05.8	26 92	96.9	69 13.2	24 92	95.5	2
3	67 15.0	37 90	103.8	67 25.8	35 90	102.6	67 36.0	33 90	101.3	67 45.6	31 91	100.1	67 54.7	29 91	98.8	68 03.1	27 91	97.5	68 11.0	25 92	96.2	68 18.2	23 92	94.9	3
4	66 21.3	36 90	102.9	66 31.8	34 90	101.7	66 41.7	32 91	100.5	66 51.2	30 91	99.3	67 00.0	29 91	98.1	67 08.3	27 91	96.9	67 16.0	25 92	95.6	67 23.2	23 92	94.4	4
25	65 27.4	35 90	102.0	65 37.6	33 90	100.9	65 47.4	32 91	99.8	65 56.6	30 91	98.6	66 05.3	28 91	97.4	66 13.5	26 92	96.2	66 21.0	24 92	95.0	66 28.1	22 92	93.8	25
6	64 33.3	34 90	101.3	64 43.3	33 91	100.2	64 52.9	31 91	99.0	65 02.0	29 91	97.9	65 10.5	28 92	96.8	65 18.5	26 92	95.6	65 26.0	24 92	94.5	65 33.0	22 92	93.3	6
7	63 39.0	34 91	100.5	63 48.9	32 91	99.4	63 58.3	31 91	98.4	64 07.2	29 91	97.3	64 15.6	27 92	96.2	64 23.5	26 92	95.1	64 30.9	24 92	93.9	64 37.8	22 92	92.8	7
8	62 44.7	33 91	99.8	62 54.4	32 91	98.8	63 03.6	30 91	97.7	63 12.4	28 92	96.7	63 20.7	27 92	95.6	63 28.5	25 92	94.5	63 35.8	24 92	93.4	63 42.6	22 92	92.3	8
9	61 50.2	33 91	99.1	61 59.7	31 91	98.1	62 08.8	30 91	97.1	62 17.5	28 92	96.1	62 25.7	27 92	95.0	62 33.4	25 92	94.0	62 40.7	23 92	92.9	62 47.4	22 92	91.9	9
30	60 55.6	32 91	98.5	61 05.0	31 91	97.5	61 14.0	29 92	96.5	61 22.5	28 92	95.5	61 30.6	26 92	94.5	61 38.3	25 92	93.5	61 45.5	23 92	92.5	61 52.2	22 92	91.4	30
1	60 00.9	32 91	97.8	60 10.2	30 91	96.9	60 19.1	29 92	95.9	60 27.5	27 92	95.0	60 35.6	26 92	94.0	60 43.2	25 92	93.0	60 50.3	23 92	92.0	60 57.0	22 92	91.0	1
2	59 06.2	31 91	97.2	59 15.4	30 92	96.3	59 24.1	29 92	95.4	59 32.5	27 92	94.4	59 40.4	26 92	93.5	59 48.0	24 92	92.5	59 55.1	23 92	91.6	60 01.8	22 92	90.6	2
3	58 11.4	31 92	96.7	58 20.4	30 92	95.8	58 29.1	28 92	94.9	58 37.4	27 92	93.9	58 45.3	26 92	93.0	58 52.8	24 92	92.1	58 59.9	23 92	91.1	59 06.6	22 92	90.2	3
4	57 16.5	31 92	96.1	57 25.5	29 92	95.2	57 34.1	28 92	94.3	57 42.3	27 92	93.4	57 50.1	26 92	92.5	57 57.6	24 92	91.6	58 04.7	23 92	90.7	58 11.3	22 92	89.8	4
35	56 21.5	30 92	95.6	56 30.4	29 92	94.7	56 39.0	28 92	93.9	56 47.2	27 92	93.0	56 55.0	25 92	92.1	57 02.4	24 92	91.2	57 09.4	23 92	90.3	57 16.1	22 92	89.4	35
6	55 26.5	30 92	95.1	55 35.4	29 92	94.2	55 43.9	28 92	93.4	55 52.0	26 92	92.5	55 59.8	25 92	91.7	56 07.2	24 92	90.8	56 14.2	23 92	89.9	56 20.9	22 92	89.0	6
7	54 31.5	30 92	94.6	54 40.3	29 92	93.7	54 48.7	28 92	92.9	54 56.8	26 92	92.1	55 04.5	25 92	91.2	55 11.9	24 92	90.4	55 19.0	23 92	89.5	55 25.7	22 92	88.7	7
8	53 36.4	30 92	94.1	53 45.2	29 92	93.3	53 53.5	27 92	92.5	54 01.6	26 92	91.6	54 09.3	25 92	90.8	54 16.7	24 92	90.0	54 23.7	23 92	89.2	54 30.4	22 92	88.3	8
9	52 41.3	29 92	93.6	52 50.0	28 92	92.8	52 58.4	27 92	92.0	53 06.4	26 92	91.2	53 14.1	25 92	90.4	53 21.5	24 92	89.6	53 28.5	23 92	88.8	53 35.2	22 92	88.0	9
40	51 46.2	29 92	93.1	51 54.8	28 92	92.4	52 03.2	27 92	91.6	52 11.2	26 92	90.8	52 18.9	25 92	90.0	52 26.3	24 92	89.2	52 33.3	23 92	88.4	52 40.1	22 92	87.6	40
1	50 51.0	29 92	92.7	50 59.6	28 92	91.9	51 07.9	27 92	91.2	51 15.9	26 92	90.4	51 23.6	25 92	89.6	51 31.0	24 92	88.9	51 38.1	23 92	88.1	51 44.9	22 92	87.3	1
2	49 55.9	29 92	92.3	50 04.4	28 92	91.5	50 12.7	27 92	90.8	50 20.7	26 92	90.0	50 28.4	25 92	89.3	50 35.8	24 92	88.5	50 42.9	23 92	87.7	50 49.7	22 92	87.0	2
3	49 00.7	29 92	91.8	49 09.2	28 92	91.1	49 17.5	27 92	90.4	49 25.5	26 92	89.6	49 33.2	25 92	88.9	49 40.6	24 92	88.1	49 47.7	23 92	87.4	49 54.6	22 92	86.6	3
4	48 05.5	29 92	91.4	48 14.0	28 92	90.7	48 22.3	27 92	90.0	48 30.3	26 92	89.2	48 38.0	25 92	88.5	48 45.4	24 92	87.8	48 52.6	23 92	87.0	48 59.4	22 92	86.3	4
45	47 10.2	29 92	91.0	47 18.8	28 92	90.3	47 27.0	27 92	89.6	47 35.0	26 92	88.9	47 42.8	25 92	88.2	47 50.2	24 92	87.4	47 57.4	24 92	86.7	48 04.3	23 92	86.0	45
6	46 15.0	29 92	90.6	46 23.5	28 92	89.9	46 31.8	27 92	89.2	46 39.8	26 92	88.5	46 47.6	25 92	87.8	46 55.1	25 92	87.1	47 02.3	24 92	86.4	47 09.3	23 92	85.7	6
7	45 19.8	29 92	90.2	45 28.3	28 92	89.5	45 36.6	27 92	88.8	45 44.6	26 92	88.1	45 52.4	26 92	87.4	45 59.9	25 92	86.8	46 07.2	24 92	86.1	46 14.2	23 92	85.4	7
8	44 24.5	29 92	89.8	44 33.1	28 92	89.1	44 41.4	27 92	88.5	44 49.4	26 92	87.8	44 57.2	26 92	87.1	45 04.8	25 92	86.4	45 12.1	24 92	85.7	45 19.2	23 92	85.0	8
9	43 29.3	29 92	89.4	43 37.9	28 92	88.8	43 46.2	27 92	88.1	43 54.2	27 92	87.4	44 02.1	26 92	86.8	44 09.7	25 92	86.1	44 17.0	24 92	85.4	44 24.2	23 92	84.7	9
50	42 34.1	29 92	89.0	42 42.6	28 92	88.4	42 51.0	27 92	87.7	42 59.1	27 92	87.1	43 06.9	26 92	86.4	43 14.6	25 92	85.8	43 22.0	24 92	85.1	43 29.2	24 92	84.4	50
1	41 38.9	29 92	88.7	41 47.4	28 92	88.0	41 55.8	27 92	87.4	42 03.9	27 92	86.7	42 11.8	26 92	86.1	42 19.5	25 92	85.4	42 27.0	25 92	84.8	42 34.2	24 92	84.1	1
2	40 43.7	29 92	88.3	40 52.2	28 92	87.7	41 00.6	28 92	87.0	41 08.8	27 92	86.4	41 16.7	26 92	85.8	41 24.5	25 92	85.1	41 32.0	25 92	84.5	41 39.3	24 92	83.8	2
3	39 48.5	29 92	87.9	39 57.1	28 92	87.3	40 05.5	28 92	86.7	40 13.7	27 92	86.1	40 21.7	26 92	85.4	40 29.5	26 92	84.8	40 37.0	25 92	84.2	40 44.4	24 92	83.5	3
4	38 53.3	29 92	87.6	39 01.9	28 92	87.0	39 10.3	28 92	86.3	39 18.6	27 92	85.7	39 26.6	26 92	85.1	39 34.5	26 92	84.5	39 42.1	25 92	83.8	39 49.5	24 91	83.2	4
55	37 58.1	29 92	87.2	38 06.8	29 92	86.6	38 15.2	28 92	86.0	38 23.5	27 92	85.4	38 31.6	27 92	84.8	38 39.5	26 92	84.2	38 47.2	25 92	83.5	38 54.7	25 91	82.9	55
6	37 02.9	29 92	86.9	37 11.6	29 92	86.3	37 20.2	28 92	85.7	37 28.5	27 92	85.1	37 36.6	27 92	84.4	37 44.6	26 92	83.8	37 52.3	26 91	83.2	37 59.9	25 91	82.6	6
7	36 07.8	29 92	86.5	36 16.5	29 92	85.9	36 25.1	28 92	85.3	36 33.5	28 92	84.7	36 41.7	27 92	84.1	36 49.7	26 92	83.5	36 57.5	26 91	82.9	37 05.2	25 91	82.3	7
8	35 12.7	30 92	86.2	35 21.5	29 92	85.6	35 30.1	28 92	85.0	35 38.5	28 92	84.4	35 46.7	27 92	83.8	35 54.8	27 91	83.2	36 02.7	26 91	82.6	36 10.5	25 91	82.0	8
9	34 17.6	30 92	85.8	34 26.4	29 92	85.2	34 35.1	29 92	84.7	34 43.5	28 92	84.1	34 51.9	27 92	83.5	35 00.0	27 91	82.9	35 08.0	26 91	82.3	35 15.8	26 91	81.7	9
60	33 22.5	30 92	85.5	33 31.4	29 92	84.9	33 40.1	29 92	84.3	33 48.6	28 92	83.7	33 57.0	28 91	83.2	34 05.2	27 91	82.6	34 13.3	27 91	82.0	34 21.1	26 91	81.4	60
1	32 27.5	30 92	85.1	32 36.4	29 92	84.6	32 45.1	29 92	84.0	32 53.7	28 91	83.4	33 02.2	28 91	82.9	33 10.5	27 91	82.3	33 18.6	27 91	81.7	33 26.6	26 91	81.1	1
2	31 32.5	30 92	84.8	31 41.4	30 92	84.2	31 50.2	29 92	83.7	31 58.9	29 91	83.1	32 07.4	28 91	82.5	32 15.8	28 91	82.0	32 24.0	27 91	81.4	32 32.0	27 91	80.8	2
3	30 37.5	30 92	84.5	30 46.5	30 92	83.9	30 55.4	29 91	83.3	31 04.1	29 91	82.8	31 12.7	28 91	82.2	31 21.1	28 91	81.7	31 29.4	27 91	81.1	31 37.5	27 91	80.5	3
4	29 42.5	30 92	84.1	29 51.6	30 92	83.6	30 00.5	30 91	83.0	30 09.3	29 91	82.5	30 18.0	29 91	81.9	30 26.5	28 91	81.4	30 34.8	28 91	80.8	30 43.1	27 91	80.2	4
65	28 47.6	31 92	83.8	28 56.7	30 91	83.2	29 05.7	30 91	82.7	29 14.6	29 91	82.1	29 23.3	29 91	81.6	29 31.9	28 91	81.0	29 40.3	28 91	80.5	29 48.6	27 90	79.9	65
6	27 52.7	31 91	83.4	28 01.9	30 91	82.9	28 11.0	30 91	82.4	28 19.9	30 91	81.8	28 28.7	29 91	81.3	28 37.3	29 91	80.7	28 45.9	28 91	80.2	28 54.3	28 90	79.6	6
7	26 57.9	31 91	83.1	27 07.1	31 91	82.6	27 16.2	30 91	82.0	27 25.2	30 91	81.5	27 34.1	29 91	81.0	27 42.9	29 91	80.4	27 51.5	29 90	79.9	28 00.0	28 90	79.3	7
8	26 03.1	31 91	82.8	26 12.4	31 91	82.2	26 21.6	30 91	81.7	26 30.6	30 91	81.2	26 39.6	30 91	80.6	26 48.4	29 91	80.1	26 57.1	29 90	79.6	27 05.7	28 90	79.0	8
9	25 08.3	31 91	82.4	25 17.7	31 91	81.9	25 26.9	31 91	81.4	25 36.1	30 91	80.9	25 45.1	30 91	80.3	25 54.0	30 90	79.8	26 02.9	29 90	79.3	26 11.5	29 90	78.7	9
70	24 13.6	32 91	82.1	24 23.0	31 91	81.6	24 32.3	31 91	81.1	24 41.6	31 91	80.5	24 50.7	30 91	80.0	24 59.7	30 90	79.5	25 08.6	29 90	79.0	25 17.4	29 90	78.4	70
1	23 18.9	32 91	81.8	23 28.4	32 91	81.3	23 37.8	31 91	80.7	23 47.1	31 91	80.2	23 56.3	31 90	79.7	24 05.4	30 90	79.2	24 14.4	30 90	78.7	24 23.3	29 90	78.1	1
2	22 24.2	32 91	81.4	22 33.8	32 91	80.9	22 43.3	31 91	80.4	22 52.7	31 90	79.9	23 02.0	31 90	79.4	23 11.2	30 90	78.9	23 20.3	30 90	78.3	23 29.3	30 90	77.8	2
3	21 29.6	32 91	81.1	21 39.3	32 91	80.6	21 48.9	32 91	80.1	21 58.4	31 90	79.6	22 07.8	31 90	79.1	22 17.1	31 90	78.5	22 26.3	30 90	78.0	22 35.4	30 90	77.5	3
4	20 35.1	33 91	80.8	20 44.9	32 91	80.3	20 54.5	32 90	79.8	21 04.1	32 90	79.2	21 13.6	31 90	78.7	21 23.0	31 90	78.2	21 32.3	31 90	77.7	21 41.5	31 90	77.2	4
75	19 40.6	33 91	80.4	19 50.4	33 90	79.9	20 00.2	32 90	79.4	20 09.9	32 90	78.9	20 19.4	32 90	78.4	20 28.9	31 90	77.9	20 38.3	31 90	77.4	20 47.6	31 90	76.9	75
6	18 46.2	33 91	80.1	18 56.1	33 90	79.6	19 05.9	33 90	79.1	19 15.7	32 90	78.6	19 25.4	32 90	78.1	19 34.9	32 90	77.6	19 44.5	32 90	77.1	19 53.9	31 90	76.6	6
7	17 51.8	33 90	79.8	18 01.8	33 90	79.3	18 11.7	33 90	78.8	18 21.6	33 90	78.3	18 31.3	32 90	77.8	18 41.0	32 90	77.3	18 50.7	32 90	76.8	19 00.2	32 89	76.3	7
8	16 57.5	34 90	79.4	17 07.6	34 90	78.9	17 17.6	33 90	78.4	17 27.5	33 90	77.9	17 37.4	33 90	77.4	17 47.2	33 90	76.9	17 56.9	32 90	76.5	18 06.6	32 89	76.0	8
9	16 03.2	34 90	79.1	16 13.4	34 90	78.6	16 23.5	34 90	78.1	16 33.6	33 90	77.6	16 43.5	33 90	77.1	16 53.4	33 90	76.6	17 03.3	33 89	76.1	17 13.0	32 89	75.6	9
80	15 09.0	34 90	78.7	15 19.3	34 90	78.3	15 29.5	34 90	77.8	15 39.6	34 90	77.3	15 49.7	33 90	76.8	15 59.7	33 89	76.3	16 09.7	33 89	75.8	16 19.6	33 89	75.3	80
1	14 14.9	35 90	78.4	14 25.3	34 90	77.9	14 35.6	34 90	77.4	14 45.8	34 90	76.9	14 56.0	34 90	76.5	15 06.1	34 89	76.0	15 16.2	33 89	75.5	15 26.2	33 89	75.0	1
2	13 20.8	35 90	78.1	13 31.3	35 90	77.6	13 41.7	35 90	77.1	13 52.0	34 89	76.6	14 02.3	34 89	76.1	14 12.6	34 89	75.6	14 22.8	34 89	75.1	14 32.9	34 89	74.7	2
3	12 26.8	35 90	77.7	12 37.4	35 90	77.2	12 47.9	35 90	76.7	12 58.4	35 89	76.3	13 08.8	35 89	75.8	13 19.1	34 89	75.3	13 29.4	34 89	74.8	13 39.7	34 89	74.3	3
4	11 32.9	36 90	77.4	11 43.6	35 90	76.9	11 54.2	35 89	76.4	12 04.7	35 89	75.9	12 15.3	35 89	75.4	12 25.7	35 89	75.0	12 36.2	35 89	74.5	12 46.5	34 88	74.0	4
85	10 39.0	36 90	77.0	10 49.8	36 90	76.5	11 00.5	36 89	76.1	11 11.2	36 89	75.6	11 21.8	35 89	75.1	11 32.4	35 89	74.6	11 43.0	35 88	74.1	11 53.5	35 88	73.7	85
6	9 45.3	36 90	76.7	9 56.1	36 89	76.2	10 07.0	36 89	75.7	10 17.8	36 89	75.2	10 28.5	36 89	74.8	10 39.2	36 88	74.3	10 49.9	35 88	73.8	11 00.5	35 88	73.3	6
7	8 51.6	37 89	76.3	9 02.5	37 89	75.8	9 13.5	36 89	75.4	9 24.4	36 89	74.9	9 35.3	36 89	74.4	9 46.1	36 88	73.9	9 56.9	36 88	73.5	10 07.7	36 88	73.0	7
8	7 57.9	37 89	75.9	8 09.0	37 89	75.5	8 20.1	37 89	75.0	8 31.1	37 89	74.5	8 42.1	37 88	74.1	8 53.1	36 88	73.6	9 04.0	36 88	73.1	9 14.9	36 88	72.6	8
9	7 04.4	37 89	75.6	7 15.6	37 89	75.1	7 26.8	37 89	74.6	7 37.9	37 88	74.2	7 49.1	37 88	73.7	8 00.1	37 88	73.2	8 11.2	37 88	72.8	8 22.2	37 88	72.3	9
90	6 11.0	38 89	75.2	6 22.3	38 89	74.7	6 33.6	38 88	74.3	6 44.9	38 88	73.8	6 56.1	37 88	73.3	7 07.3	37 88	72.9	7 18.5	37 88	72.4	7 29.7	37 88	71.9	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
00	51 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	49 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	48 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	00
1	50 59.3	1.0 04	178.5	50 29.3	1.0 04	178.5	49 59.3	1.0 04	178.5	49 29.3	1.0 04	178.5	48 59.3	1.0 04	178.6	48 29.3	1.0 04	178.6	47 59.3	1.0 03	178:6	47 29.3	1.0 03	178.6	1
2	50 57.1	1.0 06	176.9	50 27.1	1.0 06	177.0	49 57.1	1.0 06	177.0	49 27.2	1.0 06	177.1	48 57.2	1.0 06	177.1	48 27.2	1.0 06	177.1	47 57.3	1.0 06	177.2	47 27.3	1.0 06	177.2	2
3	50 53.4	1.0 08	175.4	50 23.5	1.0 08	175.5	49 53.6	1.0 08	175.5	49 23.6	1.0 08	175.6	48 53.7	1.0 08	175.7	48 23.8	1.0 08	175.7	47 53.9	1.0 08	175.8	47 24.0	1.0 08	175.8	3
4	50 48.2	99 11	173.9	50 18.4	99 11	174.0	49 48.6	1.0 11	174.1	49 18.7	1.0 10	174.1	48 48.8	1.0 10	174.2	48 19.0	1.0 10	174.3	47 49.1	1.0 10	174.4	47 19.3	1.0 10	174.4	4
05	50 41.7	99 13	172.4	50 11.9	99 13	172.5	49 42.1	99 13	172.6	49 12.4	99 13	172.7	48 42.6	99 13	172.8	48 12.8	99 12	172.9	47 43.0	99 12	173.0	47 13.2	99 12	173.1	05
6	50 33.6	99 16	170.9	50 04.0	99 16	171.0	49 34.3	99 15	171.1	49 04.7	99 15	171.2	48 35.0	99 15	171.4	48 05.3	99 15	171.5	47 35.6	99 14	171.6	47 05.9	99 14	171.7	6
7	50 24.2	98 18	169.4	49 54.7	98 18	169.5	49 25.1	99 18	169.7	48 55.6	99 18	169.8	48 26.0	99 17	169.9	47 56.4	99 17	170.1	47 26.8	99 17	170.2	46 57.3	99 17	170.3	7
8	50 13.3	98 20	167.9	49 44.0	98 20	168.1	49 14.5	98 20	168.2	48 45.1	98 20	168.4	48 15.7	98 19	168.5	47 46.2	98 19	168.7	47 16.8	98 19	168.8	46 47.3	98 19	169.0	8
9	50 01.1	97 23	166.5	49 31.9	98 22	166.6	49 02.6	98 22	166.8	48 33.3	98 22	167.0	48 04.0	98 22	167.1	47 34.7	98 21	167.3	47 05.4	98 21	167.5	46 36.1	98 21	167.6	9
10	49 47.5	97 25	165.0	49 18.4	97 24	165.2	48 49.3	97 24	165.4	48 20.2	97 24	165.6	47 51.1	97 24	165.8	47 22.0	97 24	165.9	46 52.8	97 23	166.1	46 23.6	97 23	166.3	10
1	49 32.6	96 27	163.6	49 03.7	96 27	163.8	48 34.8	96 26	164.0	48 05.8	96 26	164.2	47 36.9	97 26	164.4	47 07.9	97 26	164.6	46 38.9	97 25	164.8	46 09.9	97 25	164.9	1
2	49 16.3	96 29	162.2	48 47.6	96 29	162.4	48 18.9	96 29	162.6	47 50.1	96 28	162.8	47 21.4	96 28	163.0	46 52.6	96 28	163.2	46 23.8	96 27	163.4	45 54.9	96 27	163.6	2
3	48 58.7	95 31	160.8	48 30.2	95 31	161.0	48 01.7	95 31	161.2	47 33.2	95 30	161.5	47 04.6	95 30	161.7	46 36.0	95 30	161.9	46 07.4	95 29	162.1	45 38.8	96 29	162.3	3
4	48 39.9	94 33	159.4	48 11.6	94 33	159.6	47 43.4	94 33	159.9	47 15.0	94 32	160.1	46 46.7	95 32	160.4	46 18.3	95 32	160.6	45 49.9	95 31	160.8	45 21.4	95 31	161.1	4
15	48 19.8	93 36	158.0	47 51.8	93 35	158.3	47 23.8	94 35	158.6	46 55.7	94 34	158.8	46 27.5	94 34	159.1	45 59.4	94 34	159.3	45 31.2	94 33	159.6	45 02.9	94 33	159.8	15
6	47 58.6	93 38	156.7	47 30.8	93 37	157.0	47 03.0	93 37	157.2	46 35.1	93 36	157.5	46 07.2	93 36	157.8	45 39.3	93 35	158.0	45 11.3	93 35	158.3	44 43.3	93 34	158.6	6
7	47 36.1	92 39	155.4	47 08.6	92 39	155.7	46 41.0	92 38	155.9	46 13.4	92 38	156.2	45 45.8	92 38	156.5	45 18.1	92 37	156.8	44 50.3	93 37	157.1	44 22.6	93 36	157.3	7
8	47 12.6	91 41	154.1	46 45.3	91 41	154.4	46 18.0	91 40	154.7	45 50.6	91 40	155.0	45 23.2	91 40	155.3	44 55.7	92 39	155.5	44 28.3	92 38	155.8	44 00.7	92 38	156.1	8
9	46 47.8	90 43	152.8	46 20.8	90 42	153.1	45 53.8	90 42	153.4	45 26.7	90 42	153.7	44 59.5	91 41	154.0	44 32.4	91 41	154.3	44 05.1	91 40	154.6	43 37.8	91 40	154.9	9
20	46 22.1	89 45	151.5	45 55.3	89 44	151.9	45 28.6	89 44	152.2	45 01.7	90 43	152.5	44 34.8	90 43	152.8	44 07.9	90 42	153.1	43 40.9	90 42	153.4	43 13.9	90 42	153.7	20
1	45 55.2	88 46	150.3	45 28.8	88 46	150.7	45 02.3	88 46	151.0	44 35.7	89 45	151.3	44 09.1	89 44	151.6	43 42.4	89 44	152.0	43 15.7	89 44	152.3	42 49.0	89 43	152.6	1
2	45 27.4	87 48	149.1	45 01.2	87 48	149.5	44 35.0	88 47	149.8	44 08.7	88 47	150.1	43 42.4	88 46	150.5	43 16.0	88 46	150.8	42 49.5	88 45	151.1	42 23.0	88 45	151.4	2
3	44 58.5	86 50	147.9	44 32.7	86 49	148.3	44 06.7	87 49	148.6	43 40.7	87 48	149.0	43 14.7	87 48	149.3	42 48.6	87 47	149.7	42 22.4	87 47	150.0	41 56.2	88 46	150.3	3
4	44 28.7	85 51	146.8	44 03.2	85 51	147.1	43 37.5	86 50	147.5	43 11.8	86 50	147.9	42 46.0	86 49	148.2	42 20.2	86 49	148.5	41 54.3	86 48	148.9	41 28.4	87 48	149.2	4
25	43 58.0	84 53	145.6	43 32.7	84 52	146.0	43 07.4	85 52	146.4	42 42.0	85 51	146.7	42 16.5	85 51	147.1	41 50.9	85 50	147.4	41 25.3	85 50	147.8	40 59.6	86 49	148.1	25
6	43 26.4	83 54	144.5	43 01.4	83 54	144.9	42 36.4	84 53	145.3	42 11.2	84 52	145.6	41 46.0	84 52	146.0	41 20.8	84 52	146.4	40 55.5	85 51	146.7	40 30.1	85 51	147.1	6
7	42 53.9	82 56	143.4	42 29.2	82 55	143.8	42 04.5	83 54	144.2	41 39.7	83 54	144.6	41 14.8	83 54	145.0	40 49.8	83 53	145.3	40 24.7	84 52	145.7	39 59.6	84 52	146.0	7
8	42 20.6	81 57	142.4	41 56.2	81 56	142.8	41 31.8	82 56	143.2	41 07.2	82 55	143.5	40 42.6	82 55	143.9	40 17.9	82 54	144.3	39 53.2	83 54	144.7	39 28.4	83 54	145.0	8
9	41 46.5	80 58	141.3	41 22.4	80 58	141.7	40 58.2	81 57	142.1	40 34.0	81 57	142.5	40 09.7	81 56	142.9	39 45.3	81 56	143.3	39 20.8	82 55	143.6	38 56.3	82 55	144.0	9
30	41 11.6	79 60	140.3	40 47.8	79 59	140.7	40 24.0	80 58	141.1	40 00.0	80 58	141.5	39 36.0	80 57	141.9	39 11.9	80 57	142.3	38 47.7	81 56	142.7	38 23.5	81 56	143.0	30
1	40 35.9	78 61	139.3	40 12.5	78 60	139.7	39 48.9	79 60	140.1	39 25.3	79 59	140.5	39 01.5	79 59	140.9	38 37.7	79 58	141.3	38 13.8	80 58	141.7	37 49.9	80 57	142.1	1
2	39 59.6	77 62	138.3	39 36.4	77 61	138.7	39 13.1	78 61	139.1	38 49.8	78 60	139.6	38 26.3	78 60	140.0	38 02.8	79 59	140.3	37 39.2	79 59	140.7	37 15.6	79 58	141.1	2
3	39 22.5	76 63	137.4	38 59.6	76 62	137.8	38 36.7	77 62	138.2	38 13.6	77 62	138.6	37 50.5	77 61	139.0	37 27.2	78 60	139.4	37 03.9	78 60	139.8	36 40.6	78 60	140.2	3
4	38 44.8	75 64	136.4	38 22.2	75 64	136.9	37 59.5	76 63	137.3	37 36.7	76 62	137.7	37 13.9	76 62	138.1	36 51.0	77 62	138.5	36 28.0	77 61	138.9	36 04.9	77 61	139.3	4
35	38 06.4	74 65	135.5	37 44.1	74 64	135.9	37 21.7	75 64	136.4	36 59.2	75 64	136.8	36 36.7	75 63	137.2	36 14.1	76 63	137.6	35 51.3	76 62	138.0	35 28.5	76 62	138.4	35
6	37 27.4	73 66	134.6	37 05.4	73 66	135.0	36 43.3	74 65	135.5	36 21.1	74 64	135.9	35 58.8	74 64	136.3	35 36.5	75 64	136.7	35 14.1	75 63	137.1	34 51.5	75 63	137.5	6
7	36 47.8	72 67	133.7	36 26.1	73 66	134.2	36 04.3	73 66	134.6	35 42.4	73 66	135.0	35 20.4	73 65	135.4	34 58.3	74 64	135.9	34 36.2	74 64	136.3	34 13.9	74 64	136.7	7
8	36 07.6	71 68	132.9	35 46.2	72 68	133.3	35 24.6	72 67	133.7	35 03.0	72 66	134.2	34 41.3	72 66	134.6	34 19.6	73 66	135.0	33 57.7	73 65	135.4	33 35.8	73 65	135.8	8
9	35 26.8	70 69	132.0	35 05.7	71 68	132.5	34 44.5	71 68	132.9	34 23.1	71 67	133.3	34 01.7	72 67	133.8	33 40.2	72 66	134.2	33 18.7	72 66	134.6	32 57.0	72 66	135.0	9
40	34 45.6	69 70	131.2	34 24.7	70 69	131.7	34 03.8	70 69	132.1	33 42.7	70 68	132.5	33 21.6	71 68	133.0	33 00.4	71 67	133.4	32 39.1	71 67	133.8	32 17.7	71 66	134.2	40
1	34 03.8	68 70	130.4	33 43.2	69 70	130.9	33 22.5	69 70	131.3	33 01.7	69 69	131.7	32 40.9	70 69	132.2	32 20.0	70 68	132.6	31 58.9	70 68	133.0	31 37.8	70 67	133.4	1
2	33 21.5	68 71	129.6	33 01.2	68 71	130.1	32 40.8	68 70	130.5	32 20.3	68 70	130.9	31 59.7	69 70	131.4	31 39.0	69 69	131.8	31 18.3	69 68	132.2	30 57.5	70 68	132.6	2
3	32 38.7	67 72	128.9	32 18.7	67 72	129.3	31 58.5	67 71	129.7	31 38.3	68 71	130.2	31 18.0	68 70	130.6	30 57.6	68 70	131.0	30 37.1	68 69	131.5	30 16.6	69 69	131.9	3
4	31 55.5	66 73	128.1	31 35.7	66 72	128.6	31 15.8	66 72	129.0	30 55.9	67 72	129.4	30 35.9	67 71	129.9	30 15.7	67 70	130.3	29 55.5	67 70	130.7	29 35.2	68 70	131.1	4
45	31 11.8	65 74	127.4	30 52.3	65 73	127.8	30 32.7	65 73	128.3	30 13.0	66 72	128.7	29 53.2	66 72	129.1	29 33.4	66 71	129.6	29 13.4	67 71	130.0	28 53.4	67 70	130.4	45
6	30 27.7	64 74	126.7	30 08.5	64 74	127.1	29 49.1	65 73	127.5	29 29.7	65 73	128.0	29 10.2	65 72	128.4	28 50.6	65 72	128.9	28 30.9	66 72	129.3	28 11.1	66 71	129.7	6
7	29 43.2	63 75	126.0	29 24.2	63 74	126.4	29 05.1	64 74	126.8	28 45.9	64 74	127.3	28 26.7	64 73	127.7	28 07.4	65 73	128.1	27 47.9	65 72	128.6	27 28.4	65 72	129.0	7
8	28 58.3	62 76	125.3	28 39.6	63 75	125.7	28 20.7	63 75	126.1	28 01.8	63 74	126.6	27 42.8	63 74	127.0	27 23.7	64 73	127.5	27 04.6	64 73	127.9	26 45.3	64 72	128.3	8
9	28 13.0	62 76	124.6	27 54.5	62 76	125.0	27 35.9	62 75	125.5	27 17.3	62 75	125.9	26 58.5	63 74	126.4	26 39.7	63 74	126.8	26 20.8	63 74	127.2	26 01.8	63 73	127.7	9
50	27 27.4	61 77	123.9	27 09.1	61 76	124.4	26 50.8	61 76	124.8	26 32.3	62 75	125.3	26 13.8	62 75	125.7	25 55.3	62 75	126.1	25 36.6	62 74	126.6	25 17.9	63 74	127.0	50
1	26 41.4	60 77	123.3	26 23.3	60 77	123.7	26 05.2	60 76	124.2	25 47.1	61 76	124.6	25 28.8	61 76	125.0	25 10.5	61 75	125.5	24 52.1	61 75	125.9	24 33.6	62 74	126.3	1
2	25 55.0	59 78	122.6	25 37.2	59 77	123.1	25 19.4	60 77	123.5	25 01.4	60 76	124.0	24 43.4	60 76	124.4	24 25.3	60 76	124.8	24 07.1	61 76	125.3	23 48.9	61 75	125.7	2
3	25 08.3	58 78	122.0	24 50.8	59 78	122.5	24 33.2	59 78	122.9	24 15.5	59 77	123.3	23 57.7	59 77	123.8	23 39.8	60 76	124.2	23 21.9	60 76	124.7	23 03.9	60 76	125.1	3
4	24 21.3	58 79	121.4	24 04.0	58 78	121.8	23 46.6	58 78	122.3	23 29.1	58 78	122.7	23 11.6	59 77	123.2	22 54.0	59 77	123.6	22 36.3	59 76	124.0	22 18.5	59 76	124.5	4
55	23 34.0	57 79	120.8	23 16.9	57 79	121.2	22 59.8	57 78	121.7	22 42.5	58 78	122.1	22 25.2	58 78	122.6	22 07.8	58 77	123.0	21 50.4	58 77	123.4	21 32.8	59 77	123.9	55
6	22 46.4	56 80	120.2	22 29.6	56 80	120.6	22 12.6	57 79	121.1	21 55.6	57 79	121.5	21 38.5	57 78	122.0	21 21.4	57 78	122.4	21 04.1	58 78	122.9	20 46.8	58 77	123.3	6
7	21 58.6	55 80	119.6	21 41.9	56 80	120.1	21 25.2	56 80	120.5	21 08.4	56 79	121.0	20 51.5	56 79	121.4	20 34.6	57 78	121.8	20 17.6	57 78	122.3	20 00.5	57 78	122.7	7
8	21 10.4	55 81	119.0	20 54.0	55 80	119.5	20 37.5	55 80	119.9	20 20.9	55 80	120.4	20 04.2	56 79	120.8	19 47.5	56 79	121.3	19 30.7	56 78	121.7	19 13.9	56 78	122.1	8
9	20 22.0	54 81	118.5	20 05.8	54 81	118.9	19 49.5	54 80	119.4	19 33.1	55 80	119.8	19 16.7	55 80	120.3	19 00.2	55 79	120.7	18 43.6	55 79	121.2	18 27.0	56 79	121.6	9
60	19 33.3	53 82	117.9	19 17.3	54 81	118.4	19 01.2	54 81	118.8	18 45.1	54 80	119.3	18 28.8	54 80	119.7	18 12.6	54 80	120.2	17 56.2	55 80	120.6	17 39.8	55 79	121.0	60
1	18 44.4	53 82	117.4	18 28.6	53 82	117.8	18 12.7	53 81	118.3	17 56.8	53 81	118.7	17 40.7	53 81	119.2	17 24.7	54 80	119.6	17 08.5	54 80	120.1	16 52.4	54 80	120.5	1
2	17 55.3	52 82	116.9	17 39.6	52 82	117.3	17 24.0	52 82	117.8	17 08.2	53 81	118.2	16 52.4	53 81	118.7	16 36.5	53 80	119.1	16 20.6	53 80	119.5	16 04.6	53 80	120.0	2
3	17 05.9	51 83	116.4	16 50.5	52 82	116.8	16 35.0	52 82	117.2	16 19.4	52 82	117.7	16 03.8	52 81	118.1	15 48.2	52 81	118.6	15 32.4	52 81	119.0	15 16.7	53 80	119.5	3
4	16 16.3	51 83	115.8	16 01.1	51 83	116.3	15 45.8	51 82	116.7	15 30.4	51 82	117.2	15 15.0	51 82	117.6	14 59.5	52 81	118.1	14 44.0	52 81	118.5	14 28.5	52 81	119.0	4
65	15 26.5	50 83	115.3	15 11.4	50 83	115.8	14 56.3	50 83	116.2	14 41.2	51 82	116.7	14 26.0	51 82	117.1	14 10.7	51 82	117.6	13 55.4	51 82	118.0	13 40.0	51 81	118.5	65
6	14 36.5	49 84	114.8	14 21.6	50 83	115.3	14 06.7	50 83	115.7	13 51.7	50 83	116.2	13 36.7	50 82	116.6	13 21.6	50 82	117.1	13 06.5	50 82	117.5	12 51.4	51 82	118.0	6
7	13 46.2	49 84	114.4	13 31.6	49 84	114.8	13 16.8	49 83	115.2	13 02.0	49 83	115.7	12 47.2	49 83	116.1	12 32.3	50 82	116.6	12 17.4	50 82	117.0	12 02.5	50 82	117.5	7
8	12 55.8	48 84	113.9	12 41.3	48 84	114.3	12 26.8	49 84	114.8	12 12.2	49 84	115.2	11 57.5	49 83	115.7	11 42.8	49 83	116.1	11 28.1	49 82	116.6	11 13.4	49 82	117.0	8
9	12 05.2	48 85	113.4	11 50.9	48 84	113.8	11 36.5	48 84	114.3	11 22.1	48 84	114.7	11 07.6	48 84	115.2	10 53.1	48 83	115.6	10 38.6	49 83	116.1	10 24.0	49 82	116.5	9
70	11 14.5	47 85	112.9	11 00.3	47 85	113.4	10 46.1	47 84	113.8	10 31.8	48 84	114.3	10 17.6	48 84	114.7	10 03.3	48 84	115.2	9 48.9	48 83	115.6	9 34.5	48 83	116.1	70
1	10 23.5	47 85	112.5	10 09.5	47 85	112.9	9 55.5	47 85	113.4	9 41.4	47 84	113.8	9 27.3	47 84	114.3	9 13.2	47 84	114.7	8 59.0	47 84	115.2	8 44.8	47 83	115.6	1
2	9 32.4	46 86	112.0	9 18.6	46 85	112.5	9 04.7	46 85	112.9	8 50.8	46 85	113.4	8 36.9	46 84	113.8	8 22.9	47 84	114.3	8 08.9	47 84	114.7	7 54.9	47 84	115.2	2
3	8 41.1	46 86	111.6	8 27.4	46 85	112.0	8 13.7	46 85	112.5	8 00.0	46 85	112.9	7 46.3	46 85	113.4	7 32.5	46 84	113.8	7 18.7	46 84	114.3	7 04.8	46 84	114.7	3
4	7 49.7	45 86	111.1	7 36.2	45 86	111.6	7 22.6	45 86	112.0	7 09.1	45 85	112.5	6 55.5	45 85	112.9	6 41.9	45 85	113.4	6 28.2	46 84	113.8	6 14.6	46 84	114.3	4
75	6 58.1	44 86	110.7	6 44.7	45 86	111.2	6 31.4	45 86	111.6	6 18.0	45 86	112.1	6 04.5	45 85	112.5	5 51.1	45 85	113.0	5 37.6	45 85	113.4	5 24.1	45 84	113.9	75
6	6 06.3	44 86	110.3	5 53.1	44 86	110.7	5 39.9	44 86	111.2	5 26.7	44 86	111.6	5 13.4	44 86	112.1	5 00.2	44 85	112.5							6
7	5 14.5	43 87	109.9	5 01.4	44 86	110.3																			7

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
91	5 17.6	38 89	74.8	5 29.0	38 89	74.4	5 40.5	38 88	73.9	5 51.9	38 88	73.5	6 03.2	38 88	73.0	6 14.6	38 88	72.5	6 25.9	38 88	72.1	6 37.2	38 87	71.6	91
													5 10.5	38 88	72.6	5 22.0	38 88	72.2	5 33.4	38 87	71.7	5 44.8	38 87	71.2	2

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		°
00	87 00.0	1.0 14	180.0	87 30.0	1.0 17	180.0	88 00.0	1.0 20	180.0	88 30.0	1.0 26	180.0	89 00.0	1.0 36	180.0	89 30.0	1.0 55	180.0	90 00.0	.. 92	....	89 30.0	1.0 54	00.0	00
1	86 51.6	96 39	162.6	87 20.0	94 45	159.4	87 47.7	91 52	154.9	88 14.2	85 62	148.1	88 38.3	67 74	132.1	88 57.1	48 86	118.3	89 04.8	00 92	89.8	88 57.3	47 86	61.2	1
2	86 28.2	85 57	147.8	86 53.1	81 63	143.0	87 16.4	74 70	136.8	87 37.1	63 77	128.6	87 54.0	48 85	118.0	88 05.3	27 90	104.8	88 09.6	01 92	89.6	88 05.8	26 90	74.4	2
3	85 54.2	74 68	136.5	86 15.4	67 74	131.3	86 34.5	59 79	125.1	86 50.7	48 84	117.8	87 03.2	35 88	109.3	87 11.3	19 91	99.7	87 14.3	01 92	89.4	87 11.9	17 91	79.1	3
4	85 13.2	64 76	128.1	85 31.3	57 80	123.2	85 47.2	49 84	117.6	86 00.3	39 87	111.3	86 10.3	27 90	104.4	86 16.7	15 92	96.9	86 19.1	01 92	89.2	86 17.5	12 91	81.5	4
05	84 27.9	56 80	121.9	84 43.6	49 83	117.4	84 57.1	41 86	112.4	85 08.1	32 89	107.0	85 16.4	23 91	101.2	85 21.7	12 92	95.2	85 23.9	02 92	89.0	85 22.8	09 92	82.8	05
6	83 39.8	49 83	117.1	83 53.6	43 86	113.0	84 05.3	36 88	108.6	84 14.9	28 90	104.0	84 22.1	20 91	99.1	84 26.7	11 92	94.0	84 28.6	02 92	88.8	84 27.9	07 92	83.6	6
7	82 49.9	44 85	113.4	83 02.1	38 87	109.7	83 12.6	32 89	105.8	83 21.0	25 90	101.7	83 27.4	18 91	97.4	83 31.6	10 92	93.1	83 33.4	02 92	88.6	83 33.0	05 92	84.2	7
8	81 58.6	40 87	110.4	82 09.7	34 88	107.1	82 19.1	29 90	103.6	82 26.8	22 91	99.9	82 32.6	16 92	96.2	82 36.4	09 92	92.3	82 38.2	03 92	88.4	82 38.0	04 92	84.5	8
9	81 06.4	36 88	108.0	81 16.6	31 89	104.9	81 25.2	26 90	101.8	81 32.3	21 91	98.5	81 37.6	15 92	95.1	81 41.2	09 92	91.7	81 43.0	03 92	88.2	81 43.0	03 92	84.8	9
10	80 13.6	34 89	106.0	80 23.0	29 90	103.2	80 31.0	24 91	100.3	80 37.6	19 92	97.3	80 42.5	14 92	94.2	80 46.0	09 92	91.2	80 47.8	03 92	88.0	80 48.0	02 92	84.9	10
1	79 20.3	31 90	104.3	79 29.1	27 90	101.7	79 36.6	23 91	99.0	79 42.7	18 92	96.3	79 47.4	13 92	93.5	79 50.8	09 92	90.7	79 52.6	04 92	87.8	79 53.0	01 92	85.0	1
2	78 26.6	30 90	102.8	78 34.9	26 91	100.4	78 41.9	22 91	97.9	78 47.8	17 92	95.4	78 52.3	13 92	92.8	78 55.5	09 92	90.3	78 57.4	04 92	87.6	78 58.0	00 92	85.0	2
3	77 32.6	28 90	101.5	77 40.5	24 91	99.2	77 47.2	21 92	96.9	77 52.7	17 92	94.6	77 57.1	13 92	92.2	78 00.3	09 92	89.9	78 02.2	04 92	87.5	78 03.0	00 92	85.0	3
4	76 38.4	27 91	100.3	76 45.9	23 91	98.2	76 52.3	20 92	96.1	76 57.7	16 92	93.9	77 01.9	12 92	91.7	77 05.1	09 92	89.5	77 07.1	05 92	87.3	77 07.9	01 92	85.0	4
15	75 44.0	26 91	99.3	75 51.1	22 91	97.3	75 57.3	19 92	95.3	76 02.5	16 92	93.3	76 06.7	12 92	91.2	76 09.8	09 92	89.1	76 11.9	05 92	87.1	76 12.9	02 92	85.0	15
6	74 49.4	25 91	98.4	74 56.3	22 92	96.5	75 02.3	18 92	94.6	75 07.4	15 92	92.7	75 11.5	12 92	90.8	75 14.6	09 92	88.8	75 16.8	05 92	86.9	75 17.9	02 92	84.9	6
7	73 54.7	24 91	97.5	74 01.4	21 92	95.8	74 07.2	18 92	94.0	74 12.2	15 92	92.2	74 16.3	12 92	90.3	74 19.4	09 92	88.5	74 21.6	06 92	86.7	74 22.9	03 92	84.8	7
8	72 59.9	23 92	96.7	73 06.4	20 92	95.1	73 12.1	18 92	93.4	73 17.0	15 92	91.7	73 21.0	12 92	89.9	73 24.2	09 92	88.2	73 26.5	06 92	86.5	73 27.9	03 92	84.7	8
9	72 05.0	23 92	96.0	72 11.4	20 92	94.4	72 17.0	17 92	92.8	72 21.8	15 92	91.2	72 25.8	12 92	89.6	72 29.0	09 92	87.9	72 31.4	07 92	86.3	72 32.9	04 92	84.6	9
20	71 10.0	22 92	95.4	71 16.3	20 92	93.8	71 21.8	17 92	92.3	71 26.6	15 92	90.8	71 30.6	12 92	89.2	71 33.8	09 92	87.6	71 36.3	07 92	86.1	71 37.9	04 92	84.5	20
1	70 15.0	22 92	94.7	70 21.2	19 92	93.3	70 26.6	17 92	91.8	70 31.3	15 92	90.3	70 35.4	12 92	88.9	70 38.6	10 92	87.4	70 41.2	07 92	85.9	70 43.0	05 92	84.3	1
2	69 20.0	21 92	94.2	69 26.0	19 92	92.8	69 31.4	17 92	91.4	69 36.1	15 92	90.0	69 40.1	12 92	88.5	69 43.5	10 92	87.1	69 46.1	08 92	85.7	69 48.0	05 92	84.2	2
3	68 24.8	21 92	93.6	68 30.8	19 92	92.3	68 36.2	17 92	90.9	68 40.9	15 92	89.6	68 44.9	12 92	88.2	68 48.3	10 92	86.8	68 51.0	08 92	85.5	68 53.1	06 92	84.1	3
4	67 29.7	21 92	93.1	67 35.6	19 92	91.8	67 41.0	17 92	90.5	67 45.7	15 92	89.2	67 49.7	13 92	87.9	67 53.2	10 92	86.6	67 56.0	08 92	85.3	67 58.1	06 92	83.9	4
25	66 34.5	21 92	92.6	66 40.4	19 92	91.4	66 45.7	17 92	90.1	66 50.4	15 92	88.9	66 54.5	13 92	87.6	66 58.0	11 92	86.3	67 00.9	09 92	85.0	67 03.2	07 92	83.8	25
6	65 39.4	20 92	92.1	65 45.2	19 92	90.9	65 50.5	17 92	89.7	65 55.2	15 92	88.5	65 59.4	13 92	87.3	66 02.9	11 92	86.1	66 05.9	09 92	84.8	66 08.3	07 92	83.6	6
7	64 44.2	20 92	91.7	64 50.0	19 92	90.5	64 55.3	17 92	89.3	65 00.0	15 92	88.2	65 04.2	13 92	87.0	65 07.8	11 92	85.8	65 10.9	09 92	84.6	65 13.4	07 91	83.5	7
8	63 48.9	20 92	91.2	63 54.8	19 92	90.1	64 00.0	17 92	89.0	64 04.8	15 92	87.9	64 09.1	13 92	86.7	64 12.8	11 92	85.6	64 15.9	10 92	84.4	64 18.6	08 91	83.3	8
9	62 53.7	20 92	90.8	62 59.5	19 92	89.7	63 04.8	17 92	88.6	63 09.6	15 92	87.5	63 13.9	13 92	86.4	63 17.7	12 92	85.3	63 21.0	10 92	84.2	63 23.7	08 91	83.1	9
30	61 58.5	20 92	90.4	62 04.3	19 92	89.3	62 09.6	17 92	88.3	62 14.5	15 92	87.2	62 18.8	14 92	86.2	62 22.7	12 92	85.1	62 26.0	10 92	84.0	62 28.9	09 91	82.9	30
1	61 03.3	20 92	90.0	61 09.1	19 92	89.0	61 14.4	17 92	88.0	61 19.3	16 92	86.9	61 23.7	14 92	85.9	61 27.7	12 92	84.9	61 31.1	11 92	83.8	61 34.1	09 91	82.8	1
2	60 08.0	20 92	89.6	60 13.9	19 92	88.6	60 19.2	17 92	87.6	60 24.2	16 92	86.6	60 28.6	14 92	85.6	60 32.7	13 92	84.6	60 36.2	11 92	83.6	60 39.3	10 91	82.6	2
3	59 12.8	20 92	89.2	59 18.6	19 92	88.3	59 24.1	17 92	87.3	59 29.0	16 92	86.3	59 33.6	14 92	85.4	59 37.7	13 92	84.4	59 41.4	12 91	83.4	59 44.6	10 91	82.4	3
4	58 17.6	20 92	88.9	58 23.4	19 92	87.9	58 28.9	17 92	87.0	58 33.9	16 92	86.0	58 38.5	15 92	85.1	58 42.7	13 92	84.1	58 46.5	12 91	83.2	58 49.8	10 91	82.2	4
35	57 22.4	20 92	88.5	57 28.3	19 92	87.6	57 33.7	18 92	86.7	57 38.8	16 92	85.8	57 43.5	15 92	84.8	57 47.8	14 92	83.9	57 51.7	12 91	83.0	57 55.1	11 91	82.0	35
6	56 27.2	20 92	88.2	56 33.1	19 92	87.3	56 38.6	18 92	86.4	56 43.8	17 92	85.5	56 48.5	15 92	84.6	56 52.9	14 92	83.7	56 56.9	13 91	82.8	57 00.5	11 91	81.9	6
7	55 32.0	20 92	87.8	55 37.9	19 92	86.9	55 43.5	18 92	86.1	55 48.7	17 92	85.2	55 53.6	16 92	84.3	55 58.0	14 91	83.4	56 02.1	13 91	82.6	56 05.8	12 91	81.7	7
8	54 36.8	21 92	87.5	54 42.8	19 92	86.6	54 48.4	18 92	85.8	54 53.7	17 92	84.9	54 58.6	16 92	84.1	55 03.2	15 91	83.2	55 07.3	13 91	82.3	55 11.2	12 91	81.5	8
9	53 41.6	21 92	87.1	53 47.7	20 92	86.3	53 53.3	18 92	85.5	53 58.7	17 92	84.6	54 03.7	16 92	83.8	54 08.3	15 91	83.0	54 12.6	14 91	82.1	54 16.6	13 91	81.3	9
40	52 46.5	21 92	86.8	52 52.5	20 92	86.0	52 58.3	19 92	85.2	53 03.7	17 92	84.4	53 08.8	16 92	83.6	53 13.5	15 91	82.7	53 17.9	14 91	81.9	53 22.0	13 91	81.1	40
1	51 51.3	21 92	86.5	51 57.5	20 92	85.7	52 03.3	19 92	84.9	52 08.8	18 92	84.1	52 13.9	17 91	83.3	52 18.8	16 91	82.5	52 23.3	14 91	81.7	52 27.4	13 91	80.9	1
2	50 56.2	21 92	86.2	51 02.4	20 92	85.4	51 08.3	19 92	84.6	51 13.8	18 92	83.8	51 19.1	17 91	83.1	51 24.0	16 91	82.3	51 28.6	15 91	81.5	51 32.9	14 91	80.7	2
3	50 01.1	21 92	85.9	50 07.4	20 92	85.1	50 13.3	19 92	84.3	50 18.9	18 91	83.6	50 24.3	17 91	82.8	50 29.3	16 91	82.0	50 34.0	15 91	81.2	50 38.4	14 91	80.5	3
4	49 06.0	22 92	85.6	49 12.3	21 92	84.8	49 18.4	20 92	84.1	49 24.1	19 91	83.3	49 29.5	18 91	82.5	49 34.6	17 91	81.8	49 39.4	16 91	81.0	49 44.0	15 91	80.3	4
45	48 11.0	22 92	85.3	48 17.4	21 92	84.5	48 23.4	20 92	83.8	48 29.2	19 91	83.0	48 34.7	18 91	82.3	48 40.0	17 91	81.6	48 44.9	16 91	80.8	48 49.6	15 91	80.1	45
6	47 16.0	22 92	84.9	47 22.4	21 92	84.2	47 28.5	20 91	83.5	47 34.4	19 91	82.8	47 40.0	18 91	82.0	47 45.4	17 91	81.3	47 50.4	16 91	80.6	47 55.2	15 91	79.8	6
7	46 21.0	22 92	84.6	46 27.4	21 92	83.9	46 33.7	20 91	83.2	46 39.6	19 91	82.5	46 45.3	19 91	81.8	46 50.8	18 91	81.1	46 55.9	17 91	80.4	47 00.8	16 90	79.6	7
8	45 26.0	22 92	84.3	45 32.5	21 91	83.6	45 38.9	21 91	83.0	45 44.9	20 91	82.2	45 50.7	19 91	81.5	45 56.2	18 91	80.8	46 01.5	17 91	80.1	46 06.5	16 90	79.4	8
9	44 31.0	23 92	84.0	44 37.7	22 91	83.4	44 44.1	21 91	82.7	44 50.2	20 91	82.0	44 56.1	19 91	81.3	45 01.7	18 91	80.6	45 07.1	18 91	79.9	45 12.2	17 90	79.2	9
50	43 36.1	23 92	83.8	43 42.8	22 91	83.1	43 49.3	21 91	82.4	43 55.5	20 91	81.7	44 01.5	20 91	81.0	44 07.3	19 91	80.4	44 12.8	18 90	79.7	44 18.0	17 90	79.0	50
1	42 41.2	23 92	83.5	42 48.0	22 91	82.8	42 54.6	21 91	82.1	43 00.9	21 91	81.5	43 07.0	20 91	80.8	43 12.8	19 91	80.1	43 18.4	18 90	79.4	43 23.8	18 90	78.8	1
2	41 46.4	23 91	83.2	41 53.2	22 91	82.5	41 59.9	22 91	81.9	42 06.3	21 91	81.2	42 12.5	20 91	80.5	42 18.4	19 90	79.9	42 24.2	19 90	79.2	42 29.7	18 90	78.5	2
3	40 51.6	23 91	82.9	40 58.5	23 91	82.2	41 05.2	22 91	81.6	41 11.7	21 91	80.9	41 18.0	21 91	80.3	41 24.1	20 90	79.6	41 29.9	19 90	79.0	41 35.6	18 90	78.3	3
4	39 56.8	24 91	82.6	40 03.8	23 91	81.9	40 10.6	22 91	81.3	40 17.2	22 91	80.7	40 23.6	21 91	80.0	40 29.8	20 90	79.4	40 35.7	20 90	78.7	40 41.5	19 90	78.1	4
55	39 02.0	24 91	82.3	39 09.1	23 91	81.7	39 16.0	23 91	81.0	39 22.7	22 91	80.4	39 29.2	21 90	79.8	39 35.5	21 90	79.1	39 41.6	20 90	78.5	39 47.5	19 90	77.9	55
6	38 07.3	24 91	82.0	38 14.5	24 91	81.4	38 21.5	23 91	80.8	38 28.3	22 91	80.1	38 34.9	22 90	79.5	38 41.3	21 90	78.9	38 47.5	20 90	78.3	38 53.5	20 90	77.6	6
7	37 12.6	25 91	81.7	37 19.9	24 91	81.1	37 27.0	23 91	80.5	37 33.9	23 90	79.9	37 40.6	22 90	79.3	37 47.1	21 90	78.6	37 53.5	21 90	78.0	37 59.6	20 90	77.4	7
8	36 18.0	25 91	81.4	36 25.4	24 91	80.8	36 32.6	24 91	80.2	36 39.6	23 90	79.6	36 46.4	22 90	79.0	36 53.0	22 90	78.4	36 59.4	21 90	77.8	37 05.7	21 90	77.2	8
9	35 23.4	25 91	81.1	35 30.9	25 91	80.5	35 38.2	24 91	79.9	35 45.3	23 90	79.3	35 52.2	23 90	78.7	35 58.9	22 90	78.1	36 05.5	22 90	77.5	36 11.9	21 90	76.9	9
60	34 28.9	25 91	80.8	34 36.4	25 91	80.3	34 43.8	24 90	79.7	34 51.0	24 90	79.1	34 58.0	23 90	78.5	35 04.9	23 90	77.9	35 11.6	22 90	77.3	35 18.1	21 90	76.7	60
1	33 34.4	26 91	80.5	33 42.0	25 91	80.0	33 49.5	25 90	79.4	33 56.8	24 90	78.8	34 03.9	24 90	78.2	34 10.9	23 90	77.6	34 17.7	22 90	77.0	34 24.4	22 90	76.4	1
2	32 39.9	26 91	80.3	32 47.6	26 90	79.7	32 55.2	25 90	79.1	33 02.6	24 90	78.5	33 09.9	24 90	78.0	33 17.0	23 90	77.4	33 23.9	23 90	76.8	33 30.7	22 89	76.2	2
3	31 45.5	26 91	80.0	31 53.3	26 90	79.4	32 01.0	25 90	78.8	32 08.5	25 90	78.3	32 15.9	24 90	77.7	32 23.1	24 90	77.1	32 30.2	23 90	76.5	32 37.1	23 89	76.0	3
4	30 51.1	27 90	79.7	30 59.1	26 90	79.1	31 06.9	26 90	78.5	31 14.5	25 90	78.0	31 22.0	25 90	77.4	31 29.3	24 90	76.8	31 36.5	24 89	76.3	31 43.6	23 89	75.7	4
65	29 56.8	27 90	79.4	30 04.9	27 90	78.8	30 12.8	26 90	78.3	30 20.5	26 90	77.7	30 28.1	25 90	77.1	30 35.6	25 90	76.6	30 42.9	24 89	76.0	30 50.1	24 89	75.5	65
6	29 02.6	27 90	79.1	29 10.7	27 90	78.5	29 18.7	26 90	78.0	29 26.6	26 90	77.4	29 34.3	26 90	76.9	29 41.9	25 89	76.3	29 49.3	25 89	75.8	29 56.6	24 89	75.2	6
7	28 08.4	28 90	78.8	28 16.6	27 90	78.2	28 24.7	27 90	77.7	28 32.7	26 90	77.2	28 40.5	26 90	76.6	28 48.3	25 89	76.1	28 55.8	25 89	75.5	29 03.3	25 89	74.9	7
8	27 14.2	28 90	78.5	27 22.6	28 90	78.0	27 30.8	27 90	77.4	27 38.9	27 90	76.9	27 46.8	26 89	76.3	27 54.7	26 89	75.8	28 02.4	25 89	75.2	28 10.0	25 89	74.7	8
9	26 20.1	28 90	78.2	26 28.6	28 90	77.7	26 36.9	28 90	77.1	26 45.1	27 90	76.6	26 53.2	27 89	76.1	27 01.2	26 89	75.5	27 09.0	26 89	75.0	27 16.7	26 88	74.4	9
70	25 26.1	29 90	77.9	25 34.6	28 90	77.4	25 43.1	28 90	76.8	25 51.4	28 89	76.3	25 59.6	27 89	75.8	26 07.7	27 89	75.2	26 15.7	26 89	74.7	26 23.6	26 88	74.2	70
1	24 32.1	29 90	77.6	24 40.8	29 90	77.1	24 49.3	28 90	76.5	24 57.8	28 89	76.0	25 06.1	28 89	75.5	25 14.4	27 89	75.0	25 22.5	27 89	74.4	25 30.5	26 88	73.9	1
2	23 38.2	29 90	77.3	23 47.0	29 90	76.8	23 55.7	29 90	76.3	24 04.2	28 89	75.7	24 12.7	28 89	75.2	24 21.1	28 89	74.7	24 29.3	27 88	74.2	24 37.4	27 88	73.6	2
3	22 44.4	30 90	77.0	22 53.3	29 90	76.5	23 02.0	29 89	76.0	23 10.7	29 89	75.4	23 19.3	28 89	74.9	23 27.8	28 88	74.4	23 36.2	28 88	73.9	23 44.5	27 88	73.3	3
4	21 50.6	30 90	76.7	21 59.6	30 89	76.2	22 08.5	30 89	75.7	22 17.3	29 89	75.1	22 26.0	29 89	74.6	22 34.7	29 88	74.1	22 43.2	28 88	73.6	22 51.6	28 88	73.1	4
75	20 56.9	31 89	76.4	21 06.0	30 89	75.9	21 15.0	30 89	75.4	21 24.0	30 89	74.9	21 32.8	29 88	74.3	21 41.6	29 88	73.8	21 50.3	29 88	73.3	21 58.8	28 88	72.8	75
6	20 03.2	31 89	76.1	20 12.5	31 89	75.6	20 21.6	30 89	75.1	20 30.7	30 89	74.6	20 39.7	30 88	74.0	20 48.6	29 88	73.5	20 57.4	29 88	73.0	21 06.1	29 88	72.5	6
7	19 09.6	31 89	75.8	19 19.0	31 89	75.3	19 28.3	31 89	74.8	19 37.5	31 88	74.3	19 46.6	30 88	73.7	19 55.7	30 88	73.2	20 04.6	30 88	72.7	20 13.5	29 88	72.2	7
8	18 16.1	32 89	75.5	18 25.6	32 89	75.0	18 35.1	31 89	74.5	18 44.4	31 88	74.0	18 53.6	31 88	73.5	19 02.8	30 88	72.9	19 11.9	30 88	72.4	19 20.9	30 88	71.9	8
9	17 22.7	32 89	75.1	17 32.3	32 89	74.6	17 41.9	32 88	74.1	17 51.3	31 88	73.6	18 00.7	31 88	73.1	18 10.1	31 88	72.6	18 19.3	31 88	72.1	18 28.4	30 87	71.6	9
80	16 29.4	33 89	74.8	16 39.1	32 88	74.3	16 48.8	32 88	73.8	16 58.4	32 88	73.3	17 07.9	32 88	72.8	17 17.4	31 88	72.3	17 26.8	31 87	71.8	17 36.1	31 87	71.3	80
1	15 36.1	33 89	74.5	15 46.0	33 88	74.0	15 55.8	33 88	73.5	16 05.5	32 88	73.0	16 15.2	32 88	72.5	16 24.8	32 88	72.0	16 34.3	32 87	71.5	16 43.8	31 87	71.1	1
2	14 42.9	33 88	74.2	14 52.9	33 88	73.7	15 02.9	33 88	73.2	15 12.7	33 88	72.7	15 22.6	33 88	72.2	15 32.3	32 87	71.7	15 42.0	32 87	71.2	15 51.6	32 87	70.7	2
3	13 49.8	34 88	73.8	14 00.0	34 88	73.4	14 10.0	33 88	72.9	14 20.1	33 88	72.4	14 30.0	33 87	71.9	14 39.9	33 87	71.4	14 49.7	33 87	70.9	14 59.5	32 87	70.4	3
4	12 56.8	34 88	73.5	13 07.1	34 88	73.0	13 17.3	34 88	72.6	13 27.5	34 88	72.1	13 37.6	34 87	71.6	13 47.6	33 87	71.1	13 57.6	33 87	70.6	14 07.5	33 86	70.1	4
85	12 03.9	35 88	73.2	12 14.3	35 88	72.7	12 24.7	34 88	72.2	12 35.0	34 87	71.7	12 45.2	34 87	71.3	12 55.4	34 87	70.8	13 05.5	34 86	70.3	13 15.6	34 86	69.8	85
6	11 11.1	35 88	72.9	11 21.6	35 88	72.4	11 32.1	35 87	71.9	11 42.6	35 87	71.4	11 53.0	35 87	70.9	12 03.3	34 87	70.5	12 13.6	34 86	70.0	12 23.8	34 86	69.5	6
7	10 18.4	36 88	72.5	10 29.0	36 88	72.0	10 39.7	35 87	71.6	10 50.3	35 87	71.1	11 00.8	35 87	70.6	11 11.3	35 86	70.1	11 21.8	35 86	69.7	11 32.2	35 86	69.2	7
8	9 25.7	36 88	72.2	9 36.5	36 87	71.7	9 47.3	36 87	71.2	9 58.1	36 87	70.8	10 08.8	36 86	70.3	10 19.4	35 86	69.8	10 30.0	35 86	69.3	10 40.6	35 86	68.9	8
9	8 33.2	37 87	71.8	8 44.2	36 87	71.4	8 55.1	36 87	70.9	9 06.0	36 87	70.4	9 16.8	36 86	69.9	9 27.6	36 86	69.5	9 38.4	36 86	69.0	9 49.1	36 86	68.5	9
90	7 40.8	37 87	71.5	7 51.9	37 87	71.0	8 03.0	37 87	70.5	8 14.0	37 86	70.1	8 25.0	37 86	69.6	8 36.0	37 86	69.1	8 46.9	36 86	68.7	8 57.8	36 85	68.2	90

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	47 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	46 00.0	1.0	01	180.0	45 30.0	1.0	01	180.0	45 00.0	1.0	01	180.0	44 30.0	1.0	01	180.0	44 00.0	1.0	01	180.0	43 30.0	1.0	01	180.0	00
1	46 59.3	1.0	03	178.6	46 29.3	1.0	03	178.6	45 59.4	1.0	03	178.7	45 29.4	1.0	03	178.7	44 59.4	1.0	03	178.7	44 29.4	1.0	03	178.7	43 59.4	1.0	03	178.7	43 29.4	1.0	03	178.7	1
2	46 57.3	1.0	06	177.2	46 27.4	1.0	06	177.3	45 57.4	1.0	05	177.3	45 27.4	1.0	05	177.3	44 57.5	1.0	05	177.4	44 27.5	1.0	05	177.4	43 57.5	1.0	05	177.4	43 27.6	1.0	05	177.5	2
3	46 54.0	1.0	08	175.9	46 24.1	1.0	08	175.9	45 54.2	1.0	08	176.0	45 24.2	1.0	07	176.0	44 54.3	1.0	07	176.1	44 24.4	1.0	07	176.1	43 54.5	1.0	07	176.2	43 24.5	1.0	07	176.2	3
4	46 49.4	1.0	10	174.5	46 19.5	1.0	10	174.6	45 49.7	1.0	10	174.6	45 19.8	1.0	10	174.7	44 49.9	1.0	10	174.8	44 20.0	1.0	09	174.8	43 50.1	1.0	09	174.9	43 20.3	1.0	09	175.0	4
05	46 43.5	99	12	173.1	46 13.7	99	12	173.2	45 43.9	99	12	173.3	45 14.1	99	12	173.4	44 44.2	99	12	173.5	44 14.4	99	11	173.5	43 44.6	99	11	173.6	43 14.8	99	11	173.7	05
6	46 36.2	99	14	171.8	46 06.5	99	14	171.9	45 36.8	99	14	172.0	45 07.1	99	14	172.1	44 37.3	99	14	172.2	44 07.6	99	13	172.3	43 37.9	99	13	172.4	43 08.2	99	13	172.5	6
7	46 27.7	99	16	170.4	45 58.1	99	16	170.5	45 28.5	99	16	170.7	44 58.8	99	16	170.8	44 29.2	99	16	170.9	43 59.6	99	16	171.0	43 29.9	99	15	171.1	43 00.3	99	15	171.2	7
8	46 17.8	98	18	169.1	45 48.4	98	18	169.2	45 18.9	98	18	169.4	44 49.4	98	18	169.5	44 19.9	98	18	169.6	43 50.3	98	17	169.7	43 20.8	98	17	169.9	42 51.3	98	17	170.0	8
9	46 06.8	96	20	167.8	45 37.4	98	20	167.9	45 08.6	98	20	168.1	44 38.7	98	20	168.2	44 09.3	98	20	168.3	43 39.9	98	19	168.5	43 10.5	98	19	168.6	42 41.1	98	19	168.7	9
10	45 54.4	97	23	166.4	45 25.2	97	22	166.6	44 56.0	97	22	166.8	44 26.8	97	22	166.9	43 57.5	98	22	167.1	43 28.3	98	21	167.2	42 59.0	98	21	167.4	42 29.7	98	21	167.5	10
1	45 40.9	97	25	165.1	45 11.8	97	24	165.3	44 42.8	97	24	165.5	44 13.7	97	24	165.7	43 44.6	97	24	165.8	43 15.5	97	23	166.0	42 46.4	97	23	166.2	42 17.2	97	23	166.3	1
2	45 26.1	96	27	163.8	44 57.2	96	26	164.0	44 28.3	96	26	164.2	43 59.4	96	26	164.4	43 30.5	96	25	164.6	43 01.5	97	25	164.8	42 32.6	97	25	164.9	42 03.6	97	24	165.1	2
3	45 10.1	96	29	162.6	44 41.4	96	28	162.8	44 12.7	96	28	163.0	43 44.0	96	28	163.2	43 15.2	96	27	163.4	42 46.5	96	27	163.6	42 17.7	96	27	163.7	41 48.9	96	26	163.9	3
4	44 53.0	95	30	161.3	44 24.5	95	30	161.5	43 56.0	95	30	161.7	43 27.4	95	30	161.9	42 58.9	95	29	162.1	42 30.3	95	29	162.4	42 01.7	95	28	162.6	41 33.0	95	28	162.8	4
15	44 34.7	94	32	160.0	44 06.4	94	32	160.3	43 38.1	94	32	160.5	43 09.7	95	31	160.7	42 41.4	95	31	160.9	42 13.0	95	31	161.2	41 44.6	95	30	161.4	41 16.1	95	30	161.6	15
6	44 15.3	94	34	158.8	43 47.2	94	34	159.0	43 19.1	94	34	159.3	42 51.0	94	33	159.5	42 22.8	94	33	159.8	41 54.6	94	32	160.0	41 26.4	94	32	160.2	40 58.2	94	32	160.4	6
7	43 54.7	93	36	157.6	43 26.9	93	36	157.8	42 59.0	93	35	158.1	42 31.1	93	35	158.3	42 03.2	93	34	158.6	41 35.2	93	34	158.8	41 07.2	93	34	159.1	40 39.1	93	33	159.3	7
8	43 33.1	92	38	156.4	43 05.5	92	37	156.6	42 37.9	92	37	156.9	42 10.2	92	36	157.2	41 42.5	92	36	157.4	41 14.7	93	36	157.7	40 46.9	93	35	157.9	40 19.1	93	35	158.2	8
9	43 10.5	91	40	155.2	42 43.1	91	39	155.5	42 15.7	91	39	155.8	41 48.3	92	38	156.0	41 20.8	92	38	156.3	40 53.3	92	38	156.6	40 25.7	92	37	156.8	39 58.1	92	37	157.1	9
20	42 46.8	90	41	154.0	42 19.7	90	41	154.3	41 52.5	91	40	154.6	41 25.3	91	40	154.9	40 58.1	91	40	155.2	40 30.8	91	39	155.4	40 03.5	91	39	155.7	39 36.1	91	38	156.0	20
1	42 22.1	89	43	152.9	41 55.3	90	42	153.2	41 28.4	90	42	153.5	41 01.4	90	42	153.8	40 34.4	90	41	154.1	40 07.3	90	40	154.3	39 40.3	90	40	154.6	39 13.1	90	40	154.9	1
2	41 56.5	89	44	151.8	41 29.9	89	44	152.1	41 03.2	89	43	152.4	40 36.5	89	43	152.7	40 09.8	89	43	153.0	39 43.0	89	42	153.3	39 16.1	90	42	153.6	38 49.2	90	41	153.8	2
3	41 29.9	88	46	150.6	41 03.5	88	45	151.0	40 37.1	88	45	151.3	40 10.7	88	44	151.6	39 44.2	88	44	151.9	39 17.7	89	44	152.2	38 51.1	89	43	152.5	38 24.4	89	43	152.8	3
4	41 02.3	87	47	149.6	40 36.3	87	47	149.9	40 10.1	87	46	150.2	39 44.0	87	46	150.5	39 17.7	88	46	150.8	38 51.4	88	45	151.1	38 25.1	88	45	151.5	37 58.7	88	44	151.8	4
25	40 33.9	86	49	148.5	40 08.1	86	48	148.8	39 42.3	86	48	149.1	39 16.3	86	47	149.5	38 50.4	87	47	149.8	38 24.4	87	47	150.1	37 58.3	87	46	150.4	37 32.2	87	46	150.7	25
6	40 04.6	85	50	147.4	39 39.1	85	50	147.8	39 13.5	85	49	148.1	38 47.9	86	49	148.4	38 22.2	86	48	148.8	37 56.4	86	48	149.1	37 30.6	86	48	149.4	37 04.8	86	47	149.7	6
7	39 34.4	84	52	146.4	39 09.2	84	51	146.7	38 43.9	84	51	147.1	38 18.5	85	50	147.4	37 53.1	85	50	147.8	37 27.6	85	49	148.1	37 02.1	85	49	148.4	36 36.5	85	48	148.8	7
8	39 03.5	83	53	145.4	38 38.5	83	52	145.7	38 13.5	84	52	146.1	37 48.4	84	52	146.4	37 23.3	84	51	146.8	36 58.1	84	51	147.1	36 32.8	84	50	147.5	36 07.5	84	50	147.8	8
9	38 31.7	82	54	144.4	38 07.0	82	54	144.7	37 42.3	83	53	145.1	37 17.5	83	53	145.5	36 52.6	83	52	145.8	36 27.7	83	52	146.2	36 02.7	83	52	146.5	35 37.7	84	51	146.8	9
30	37 59.2	81	56	143.4	37 34.8	81	55	143.8	37 10.3	82	54	144.1	36 45.8	82	54	144.5	36 21.2	82	54	144.9	35 56.5	82	53	145.2	35 31.8	82	53	145.6	35 07.1	83	52	145.9	30
1	37 25.9	80	57	142.4	37 01.8	80	56	142.8	36 37.6	81	56	143.2	36 13.3	81	55	143.6	35 49.0	81	55	143.9	35 24.7	81	54	144.3	35 00.2	82	54	144.6	34 35.7	82	53	145.0	1
2	36 51.8	79	58	141.5	36 28.0	80	57	141.9	36 04.1	80	57	142.3	35 40.2	80	56	142.6	35 16.2	80	56	143.0	34 52.1	80	56	143.4	34 27.9	81	55	143.7	34 03.7	81	55	144.1	2
3	36 17.1	78	59	140.6	35 53.6	79	58	141.0	35 30.0	79	58	141.4	35 06.3	79	58	141.7	34 42.6	79	57	142.1	34 18.8	79	57	142.5	33 54.9	80	56	142.8	33 30.9	80	56	143.2	3
4	35 41.7	77	60	139.7	35 18.5	78	60	140.1	34 55.2	78	59	140.5	34 31.8	78	59	140.8	34 08.3	78	58	141.2	33 44.8	79	58	141.6	33 21.2	79	57	142.0	32 57.5	79	57	142.3	4
35	35 05.6	76	61	138.8	34 42.7	77	61	139.2	34 19.7	77	60	139.6	33 56.6	77	60	140.0	33 33.4	77	59	140.3	33 10.1	78	59	140.7	32 46.8	78	58	141.1	32 23.4	78	58	141.5	35
6	34 29.0	75	62	137.9	34 06.3	76	62	138.3	33 43.5	76	61	138.7	33 20.7	76	61	139.1	32 57.8	76	60	139.5	32 34.9	77	60	139.9	32 11.8	77	59	140.3	31 48.7	77	59	140.6	6
7	33 51.6	74	63	137.1	33 29.3	75	63	137.5	33 06.8	75	62	137.9	32 44.3	75	62	138.3	32 21.6	75	61	138.7	31 59.0	76	61	139.0	31 36.2	76	60	139.4	31 13.4	76	60	139.8	7
8	33 13.7	74	64	136.2	32 51.6	74	64	136.6	32 29.4	74	63	137.0	32 07.2	74	63	137.4	31 44.9	75	62	137.8	31 22.5	75	62	138.2	31 00.0	75	61	138.6	30 37.4	75	61	139.0	8
9	32 35.3	73	65	135.4	32 13.4	73	64	135.8	31 51.5	73	64	136.2	31 29.5	73	64	136.6	31 07.5	74	63	137.0	30 45.4	74	63	137.4	30 23.2	74	62	137.8	30 00.9	74	62	138.2	9
40	31 56.2	72	66	134.6	31 34.7	72	65	135.0	31 13.0	72	65	135.4	30 51.3	72	64	135.8	30 29.6	73	64	136.2	30 07.7	73	64	136.6	29 45.8	73	63	137.0	29 23.8	73	63	137.4	40
1	31 16.6	71	67	133.8	30 55.4	71	66	134.2	30 34.0	71	66	134.7	30 12.6	72	66	135.1	29 51.1	72	65	135.5	29 29.5	72	64	135.9	29 07.9	72	64	136.3	28 46.2	72	64	136.7	1
2	30 36.5	70	68	133.1	30 15.5	70	67	133.5	29 54.5	70	67	133.9	29 33.3	71	66	134.3	29 12.1	71	66	134.7	28 50.8	71	65	135.1	28 29.4	71	65	135.5	28 08.0	72	64	135.9	2
3	29 55.9	69	68	132.3	29 35.2	69	68	132.7	29 14.4	69	68	133.1	28 53.5	70	67	133.6	28 32.6	70	67	134.0	28 11.6	70	66	134.4	27 50.5	70	66	134.8	27 29.3	71	65	135.2	3
4	29 14.9	68	69	131.6	28 54.4	68	69	132.0	28 33.9	69	68	132.4	28 13.3	69	68	132.8	27 52.6	69	68	133.2	27 31.8	69	67	133.6	27 11.0	70	67	134.0	26 50.1	70	66	134.4	4
45	28 33.3	67	70	130.8	28 13.1	67	70	131.3	27 52.9	68	69	131.7	27 32.5	68	69	132.1	27 12.1	68	68	132.5	26 51.6	68	68	132.9	26 31.1	69	67	133.3	26 10.5	69	67	133.7	45
6	27 51.3	66	71	130.1	27 31.4	67	70	130.6	27 11.4	67	70	131.0	26 51.3	67	69	131.4	26 31.2	67	69	131.8	26 11.0	67	69	132.2	25 50.7	68	68	132.6	25 30.3	68	68	133.0	6
7	27 08.9	65	71	129.4	26 49.2	66	71	129.9	26 29.5	66	71	130.3	26 09.7	66	70	130.7	25 49.8	66	70	131.1	25 29.8	67	69	131.5	25 09.8	67	69	131.9	24 49.7	67	68	132.4	7
8	26 26.0	65	72	128.8	26 06.6	65	72	129.2	25 47.1	65	71	129.6	25 27.6	65	71	130.0	25 08.0	65	70	130.4	24 48.3	66	70	130.9	24 28.5	66	70	131.3	24 08.7	66	69	131.7	8
9	25 42.7	64	73	128.1	25 23.6	64	72	128.5	25 04.4	64	72	128.9	24 45.1	64	72	129.4	24 25.7	65	71	129.8	24 06.3	65	71	130.2	23 46.8	65	70	130.6	23 27.2	65	70	131.0	9
50	24 59.1	63	74	127.4	24 40.2	63	73	127.9	24 21.2	63	72	128.3	24 02.2	64	72	128.7	23 43.1	64	72	129.1	23 23.9	64	71	129.5	23 04.7	64	71	130.0	22 45.4	64	70	130.4	50
1	24 15.0	62	74	126.8	23 56.4	62	74	127.2	23 37.7	62	73	127.6	23 18.9	63	73	128.1	23 00.0	63	72	128.5	22 41.1	63	72	128.9	22 22.1	63	72	129.3	22 03.1	64	71	129.7	1
2	23 30.6	61	75	126.1	23 12.2	61	74	126.6	22 53.7	62	74	127.0	22 35.2	62	73	127.4	22 16.6	62	73	127.9	21 58.0	62	73	128.3	21 39.2	63	72	128.7	21 20.4	63	72	129.1	2
3	22 45.8	60	75	125.5	22 27.7	61	75	126.0	22 09.4	61	74	126.4	21 51.2	61	74	126.8	21 32.8	61	74	127.2	21 14.4	61	73	127.7	20 55.9	62	73	128.1	20 37.4	62	72	128.5	3
4	22 00.7	60	76	124.9	21 42.8	60	75	125.3	21 24.8	60	75	125.8	21 06.8	60	75	126.2	20 48.7	60	74	126.6	20 30.5	61	74	127.1	20 12.3	61	73	127.5	19 54.0	61	73	127.9	4
55	21 15.2	59	76	124.3	20 57.6	59	76	124.8	20 39.8	59	76	125.2	20 22.0	59	75	125.6	20 04.2	60	75	126.0	19 46.3	60	74	126.5	19 28.3	60	74	126.9	19 10.2	60	73	127.3	55
6	20 29.5	58	77	123.7	20 12.0	58	76	124.2	19 54.5	58	76	124.6	19 37.0	59	76	125.0	19 19.4	59	75	125.5	19 01.7	59	75	125.9	18 43.9	59	74	126.3	18 26.2	59	74	126.7	6
7	19 43.4	57	77	123.2	19 26.2	57	77	123.6	19 08.9	58	76	124.0	18 51.6	58	76	124.5	18 34.2	58	76	124.9	18 16.8	58	75	125.3	17 59.3	58	75	125.7	17 41.7	59	74	126.2	7
8	18 57.0	56	78	122.6	18 40.0	57	77	123.0	18 23.0	57	77	123.5	18 05.9	57	77	123.9	17 48.8	57	76	124.3	17 31.6	57	76	124.8	17 14.3	58	76	125.2	16 57.0	58	75	125.6	8
9	18 10.3	56	78	122.0	17 53.6	56	78	122.5	17 36.8	56	78	122.9	17 19.9	56	77	123.3	17 03.0	56	77	123.8	16 46.0	57	76	124.2	16 29.0	57	76	124.6	16 11.9	57	76	125.1	9
60	17 23.3	55	79	121.5	17 06.8	55	78	121.9	16 50.2	55	78	122.4	16 33.6	56	78	122.8	16 16.9	56	77	123.2	16 00.2	56	77	123.7	15 43.4	56	76	124.1	15 26.6	56	76	124.5	60
1	16 36.1	54	79	120.9	16 19.8	54	79	121.4	16 03.5	55	78	121.8	15 47.0	55	78	122.3	15 30.6	55	78	122.7	15 14.1	55	77	123.1	14 57.5	55	77	123.6	14 40.9	55	76	124.0	1
2	15 48.6	54	80	120.4	15 32.5	54	79	120.9	15 16.4	54	79	121.3	15 00.2	54	78	121.7	14 44.0	54	78	122.2	14 27.7	54	78	122.6	14 11.4	55	77	123.0	13 55.0	55	77	123.5	2
3	15 00.9	53	80	119.9	14 45.0	53	80	120.3	14 29.1	53	79	120.8	14 13.1	53	79	121.2	13 57.1	53	79	121.7	13 41.0	54	78	122.1	13 24.9	54	78	122.5	13 08.8	54	78	123.0	3
4	14 12.9	52	80	119.4	13 57.2	52	80	119.8	13 41.5	52	80	120.3	13 25.7	53	79	120.7	13 09.9	53	79	121.1	12 54.1	53	79	121.6	12 38.2	53	78	122.0	12 22.3	53	78	122.5	4
65	13 24.6	51	81	118.9	13 09.2	52	80	119.3	12 53.7	52	80	119.8	12 38.1	52	80	120.2	12 22.6	52	79	120.6	12 06.9	52	79	121.1	11 51.3	52	79	121.5	11 35.6	52	78	122.0	65
6	12 36.1	51	81	118.4	12 20.9	51	81	118.8	12 05.6	51	80	119.3	11 50.3	51	80	119.7	11 34.9	51	80	120.2	11 19.5	51	79	120.6	11 04.1	52	79	121.0	10 48.6	52	79	121.5	6
7	11 47.5	50	82	117.9	11 32.4	50	81	118.4	11 17.3	50	81	118.8	11 02.2	50	80	119.2	10 47.0	51	80	119.7	10 31.9	51	80	120.1	10 16.6	51	80	120.6	10 01.4	51	79	121.0	7
8	10 58.5	49	82	117.4	10 43.7	50	82	117.9	10 28.8	50	81	118.3	10 13.9	50	81	118.8	9 59.0	50	80	119.2	9 44.0	50	80	119.6	9 28.9	50	80	120.1	9 13.9	50	80	120.5	8
9	10 09.4	49	82	117.0	9 54.8	49	82	117.4	9 40.1	49	82	117.9	9 25.4	49	81	118.3	9 10.6	49	81	118.7	8 55.9	49	81	119.2	8 41.0	49	80	119.6	8 26.2	50	80	120.1	9
70	9 20.1	48	82	116.5	9 05.6	48	82	117.0	8 51.2	48	82	117.4	8 36.6	48	82	117.8	8 22.1	49	81	118.3	8 07.5	49	81	118.7	7 52.9	49	80	119.2	7 38.3	49	80	119.6	70
1	8 39.6	47	83	116.1	8 16.3	48	82	116.5	8 02.0	48	82	116.9	7 47.7	48	82	117.4	7 33.4	48	82	117.8	7 19.0	48	81	118.3	7 04.6	48	81	118.7	6 50.2	48	81	119.2	1
2	7 48.9	47	83	115.6	7 26.8	47	83	116.1	7 12.7	47	82	116.5	6 58.6	47	82	116.9	6 44.4	47	82	117.4	6 30.2	47	82	117.8	6 16.0	47	81	118.3	6 01.8	47	81	118.7	2
3	6 51.0	46	84	115.2	6 37.1	46	83	115.6	6 23.2	46	83	116.1	6 09.2	46	82	116.5	5 55.3	47	82	116.9	5 41.3	47	82	117.4	5 27.3	47	82	117.8	5 13.3	47	81	118.3	3
4	6 00.9	46	84	114.7	5 47.2	46	84	115.2	5 33.5	46	83	115.6	5 19.7	46	83	116.1	5 05.9	46	82	116.5														4
75	5 10.6	45	84	114.3																													75

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	6 48.5	38	87	71.1	6 59.7	37	87	70.7	7 10.9	37	86	70.2	7 22.1	37	86	69.7	7 33.3	37	86	69.3	7 44.4	37	86	68.8	7 55.5	37	85	68.3	8 06.6	37	85	67.8	91
2	5 56.3	38	87	70.8	6 07.7	38	87	70.3	6 19.0	38	86	69.8	6 30.4	38	86	69.4	6 41.7	38	86	68.9	6 53.0	38	86	68.4	7 04.3	38	85	68.0	7 15.5	37	85	67.5	2
3	5 04.2	39	87	70.4	5 15.7	38	87	69.9	5 27.3	38	86	69.5	5 38.8	38	86	69.0	5 50.2	38	86	68.6	6 01.7	38	85	68.1	6 13.1	38	85	67.6	6 24.5	38	85	67.2	3
4																					5 10.5	39	85	67.7	5 22.1	39	85	67.3	5 33.7	39	84	66.8	4

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	89 00.0	1.0 36	00.0	88 30.0	1.0 26	00.0	88 00.0	1.0 20	00.0	87 30.0	1.0 16	00.0	87 00.0	1.0 14	00.0	86 30.0	1.0 12	00.0	86 00.0	1.0 10	00.0	85 30.0	1.0 09	00.0	00
1	88 38.6	73 73	42.3	88 14.6	85 61	31.2	87 48.1	91 51	24.3	87 20.3	94 43	19.8	86 51.9	96 37	16.7	86 23.0	97 33	14.3	85 53.9	97 29	12.6	85 24.6	98 26	11.2	1
2	87 54.7	47 84	61.0	87 38.0	63 76	50.3	87 17.5	73 68	42.0	86 54.3	80 61	35.7	86 29.5	85 55	30.8	86 03.4	88 49	27.0	85 36.5	91 44	24.0	85 09.0	92 40	21.5	2
3	87 04.4	33 88	69.5	86 52.3	47 83	60.8	86 36.4	58 77	53.3	86 17.7	67 72	47.0	85 56.7	73 66	41.7	85 33.9	78 61	37.3	85 09.8	82 56	33.6	84 44.8	85 52	30.5	3
4	86 11.9	25 89	74.0	86 02.6	37 86	66.9	85 50.1	47 82	60.5	85 34.7	55 78	54.8	85 17.0	62 73	49.7	84 57.4	68 69	45.2	84 36.2	73 65	41.4	84 13.6	77 60	38.0	4
05	85 18.4	20 90	76.7	85 11.1	29 88	70.9	85 00.8	38 85	65.4	84 48.1	46 82	60.2	84 33.1	54 78	55.6	84 16.1	60 74	51.3	83 57.4	65 70	47.5	83 37.3	69 67	44.1	05
6	84 24.5	16 90	78.5	84 18.4	24 89	73.5	84 10.0	32 86	68.8	83 59.2	40 84	64.2	83 46.3	46 81	60.0	83 31.5	52 78	56.1	83 15.1	57 75	52.4	82 57.1	62 72	49.1	6
7	83 30.2	13 91	79.8	83 25.2	20 89	75.4	83 18.0	27 88	71.2	83 08.8	34 86	67.2	82 57.6	40 83	63.4	82 44.7	46 81	59.7	82 30.2	51 78	56.3	82 14.1	56 75	53.1	7
8	82 35.8	11 91	80.7	82 31.6	17 90	76.8	82 25.5	24 88	73.1	82 17.5	30 87	69.5	82 07.7	35 85	66.0	81 56.3	41 83	62.6	81 43.3	46 80	59.5	81 29.0	50 78	56.5	8
9	81 41.3	09 91	81.3	81 37.7	15 90	77.9	81 32.4	20 89	74.5	81 25.4	26 88	71.2	81 16.9	31 86	68.1	81 06.7	36 84	65.0	80 55.1	41 82	62.0	80 42.2	45 80	59.2	9
10	80 46.6	07 91	81.8	80 43.6	13 90	78.7	80 39.0	18 89	75.6	80 32.9	23 88	72.6	80 25.3	28 87	69.7	80 16.3	32 85	66.9	80 05.9	37 83	64.1	79 54.2	41 82	61.5	10
1	79 51.9	06 91	82.2	79 49.4	11 90	79.3	79 45.4	16 90	76.5	79 40.1	20 89	73.8	79 33.3	25 87	71.1	79 25.2	29 86	68.4	79 15.8	33 84	65.9	79 05.2	37 83	63.4	1
2	78 57.2	05 91	82.4	78 55.1	09 91	79.8	78 51.6	14 90	77.3	78 46.9	18 89	74.7	78 40.9	22 88	72.2	78 33.6	26 87	69.7	78 25.1	30 85	67.3	78 15.5	34 84	65.0	2
3	78 02.4	04 91	82.6	78 00.7	08 91	80.2	77 57.7	12 90	77.8	77 53.5	16 89	75.5	77 48.1	20 88	73.1	77 41.6	24 87	70.8	77 33.9	27 86	68.6	77 25.2	31 85	66.4	3
4	77 07.7	03 91	82.8	77 06.2	07 91	80.5	77 03.7	10 90	78.3	77 00.0	14 90	76.1	76 55.2	18 89	73.9	76 49.3	21 88	71.7	76 42.3	25 86	69.6	76 34.3	28 85	67.5	4
15	76 12.9	02 91	82.9	76 11.7	06 91	80.8	76 09.6	09 90	78.7	76 06.3	13 90	76.6	76 02.0	16 89	74.5	75 56.7	19 88	72.5	75 50.4	23 87	70.5	75 43.1	26 86	68.5	15
6	75 18.1	01 91	82.9	75 17.2	04 91	81.0	75 15.4	08 90	79.0	75 12.5	11 90	77.0	75 08.7	14 89	75.1	75 03.9	18 88	73.2	74 58.2	21 87	71.3	74 51.6	24 86	69.4	6
7	74 23.2	00 91	82.9	74 22.7	04 91	81.1	74 21.1	07 90	79.2	74 18.7	10 90	77.4	74 15.3	13 89	75.6	74 11.0	16 88	73.7	74 05.8	19 88	71.9	73 59.7	22 87	70.2	7
8	73 28.4	00 91	82.9	73 28.1	03 91	81.2	73 26.9	06 90	79.4	73 24.7	08 90	77.7	73 21.8	11 89	75.9	73 17.9	14 89	74.2	73 13.2	17 88	72.5	73 07.7	20 87	70.8	8
9	72 33.6	01 91	82.9	72 33.5	02 91	81.3	72 32.5	05 90	79.6	72 30.8	07 90	77.9	72 28.1	10 89	76.3	72 24.7	13 89	74.6	72 20.5	15 88	73.0	72 15.4	18 87	71.4	9
20	71 38.8	02 91	82.9	71 38.9	01 91	81.3	71 38.2	04 91	79.7	71 36.7	06 90	78.1	71 34.5	09 90	76.6	71 31.4	11 89	75.0	71 27.6	14 88	73.4	71 23.0	17 88	71.9	20
1	70 44.0	02 91	82.8	70 44.3	00 91	81.3	70 43.9	03 91	79.8	70 42.7	05 90	78.3	70 40.7	08 90	76.8	70 38.0	10 89	75.3	70 34.6	13 88	73.8	70 30.5	15 88	72.3	1
2	69 49.2	03 91	82.8	69 49.7	00 91	81.3	69 49.5	02 91	79.9	69 48.6	04 90	78.4	69 46.9	07 90	77.0	69 44.6	09 89	75.5	69 41.5	11 89	74.1	69 37.8	14 88	72.7	2
3	68 54.4	03 91	82.7	68 55.1	01 91	81.3	68 55.1	01 91	79.9	68 54.5	03 90	78.5	68 53.1	06 90	77.1	68 51.1	08 89	75.7	68 48.4	10 89	74.4	68 45.0	12 88	73.0	3
4	67 59.7	04 91	82.6	68 00.5	02 91	81.3	68 00.7	00 91	79.9	68 00.3	03 90	78.6	67 59.2	05 90	77.3	67 57.5	07 89	75.9	67 55.2	09 89	74.6	67 52.2	11 88	73.3	4
25	67 04.9	05 91	82.5	67 05.9	02 91	81.2	67 06.4	00 91	79.9	67 06.2	02 90	78.6	67 05.4	04 90	77.4	67 03.9	06 89	76.1	67 01.9	08 89	74.8	66 59.2	10 88	73.5	25
6	66 10.1	05 91	82.4	66 11.4	03 91	81.1	66 12.0	01 91	79.9	66 12.0	01 90	78.7	66 11.5	03 90	77.4	66 10.3	05 89	76.2	66 08.6	07 89	75.0	66 06.2	09 88	73.7	6
7	65 15.4	06 91	82.3	65 16.8	04 91	81.1	65 17.6	02 91	79.9	65 17.9	00 90	78.7	65 17.6	02 90	77.5	65 16.7	04 90	76.3	65 15.2	06 89	75.1	65 13.2	08 88	73.9	7
8	64 20.7	06 91	82.1	64 22.2	04 91	81.0	64 23.3	02 91	79.8	64 23.7	01 90	78.7	64 23.6	01 90	77.5	64 23.0	03 90	76.4	64 21.8	05 89	75.2	64 20.1	07 88	74.0	8
9	63 26.0	07 91	82.0	63 27.7	05 91	80.9	63 28.9	03 91	79.8	63 29.6	01 90	78.6	63 29.7	00 90	77.5	63 29.3	02 90	76.4	63 28.4	04 89	75.3	63 27.0	06 88	74.2	9
30	62 31.3	07 91	81.9	62 33.2	05 91	80.8	62 34.6	04 91	79.7	62 35.4	02 90	78.6	62 35.8	00 90	77.5	62 35.6	01 90	76.4	62 35.0	03 89	75.4	62 33.9	05 89	74.3	30
1	61 36.6	08 91	81.7	61 38.7	06 91	80.7	61 40.2	04 90	79.6	61 41.3	03 90	78.6	61 41.9	01 90	77.5	61 42.0	00 90	76.5	61 41.6	02 89	75.4	61 40.7	04 89	74.4	1
2	60 42.0	08 91	81.6	60 44.2	07 91	80.6	60 45.9	05 90	79.5	60 47.1	03 90	78.5	60 47.9	02 90	77.5	60 48.3	00 90	76.5	60 48.1	01 89	75.4	60 47.5	03 89	74.4	2
3	59 47.4	09 91	81.4	59 49.7	07 91	80.4	59 51.6	06 90	79.4	59 53.0	04 90	78.4	59 54.0	03 90	77.4	59 54.6	01 90	76.5	59 54.6	00 89	75.5	59 54.3	02 89	74.5	3
4	58 52.8	09 91	81.3	58 55.3	08 91	80.3	58 57.3	06 90	79.3	58 58.9	05 90	78.4	59 00.1	03 90	77.4	59 00.9	02 90	76.4	59 01.2	00 89	75.5	59 01.1	01 89	74.5	4
35	57 58.2	09 91	81.1	58 00.8	08 91	80.2	58 03.0	07 90	79.2	58 04.8	05 90	78.3	58 06.2	04 90	77.3	58 07.2	03 90	76.4	58 07.7	01 89	75.4	58 07.8	00 89	74.5	35
6	57 03.6	10 91	80.9	57 06.4	09 91	80.0	57 0°.8	07 90	79.1	57 10.8	06 90	78.2	57 12.3	05 90	77.3	57 13.5	03 90	76.3	57 14.3	02 89	75.4	57 14.6	00 89	74.5	6
7	56 09.1	10 91	80.8	56 12.0	09 91	79.9	56 14.6	08 90	79.0	56 16.7	06 90	78.1	56 18.5	05 90	77.2	56 19.8	04 89	76.3	56 20.8	03 89	75.4	56 21.4	01 89	74.5	7
8	55 14.6	11 91	80.6	55 17.7	10 91	79.7	55 20.4	08 90	78.8	55 22.7	07 90	78.0	55 24.6	06 90	77.1	55 26.2	05 89	76.2	55 27.4	03 89	75.3	55 28.2	02 89	74.5	8
9	54 20.1	11 91	80.4	54 23.3	10 90	79.6	54 26.2	09 90	78.7	54 28.7	08 90	77.9	54 30.8	06 90	77.0	54 32.6	05 89	76.1	54 34.0	04 89	75.3	54 35.0	03 89	74.4	9
40	53 25.7	12 91	80.2	53 29.0	11 90	79.4	53 32.0	09 90	78.6	53 34.7	08 90	77.7	53 37.0	07 90	76.9	53 39.0	06 89	76.1	53 40.6	05 89	75.2	53 41.8	04 89	74.4	40
1	52 31.3	12 91	80.1	52 34.8	11 90	79.2	52 37.9	10 90	78.4	52 40.7	09 90	77.6	52 43.2	08 90	76.8	52 45.4	07 89	76.0	52 47.2	05 89	75.1	52 48.6	04 89	74.3	1
2	51 36.9	13 91	79.9	51 40.5	12 90	79.1	51 43.8	11 90	78.3	51 46.8	09 90	77.5	51 49.5	08 90	76.7	51 51.8	07 89	75.9	51 53.8	06 89	75.1	51 55.5	05 89	74.2	2
3	50 42.5	13 90	79.7	50 46.3	12 90	78.9	50 49.8	11 90	78.1	50 52.9	10 90	77.3	50 55.7	09 90	76.5	50 58.3	08 89	75.8	51 00.4	07 89	75.0	51 02.3	06 88	74.2	3
4	49 48.2	14 90	79.5	49 52.1	13 90	78.7	49 55.7	12 90	78.0	49 59.0	11 90	77.2	50 02.0	09 89	76.4	50 04.7	08 89	75.6	50 07.1	07 89	74.9	50 09.2	06 88	74.1	4
45	48 53.9	14 90	79.3	48 58.0	13 90	78.6	49 01.7	12 90	77.8	49 05.2	11 90	77.0	49 08.4	10 89	76.3	49 11.2	09 89	75.5	49 13.8	08 89	74.8	49 16.1	07 88	74.0	45
6	47 59.7	14 90	79.1	48 03.9	14 90	78.4	48 07.8	13 90	77.6	48 11.4	12 90	76.9	48 14.7	11 89	76.1	48 17.8	10 89	75.4	48 20.5	09 89	74.6	48 23.0	08 88	73.9	6
7	47 05.4	15 90	78.9	47 09.8	14 90	78.2	47 13.8	13 90	77.5	47 17.6	12 90	76.7	47 21.1	11 89	76.0	47 24.4	10 89	75.3	47 27.3	09 89	74.5	47 30.0	08 88	73.8	7
8	46 11.3	15 90	78.7	46 15.7	14 90	78.0	46 20.0	14 90	77.3	46 23.9	13 90	76.6	46 27.6	12 89	75.8	46 31.0	11 89	75.1	46 34.1	10 89	74.4	46 36.9	09 88	73.7	8
9	45 17.1	16 90	78.5	45 21.7	15 90	77.8	45 26.1	14 90	77.1	45 30.2	13 90	76.4	45 34.0	12 89	75.7	45 37.6	11 89	75.0	45 40.9	11 89	74.3	45 44.0	10 88	73.6	9
50	44 23.0	16 90	78.3	44 27.8	15 90	77.6	44 32.3	15 90	76.9	44 36.5	14 89	76.2	44 40.5	13 89	75.5	44 44.3	12 89	74.8	44 47.8	11 88	74.1	44 51.0	10 88	73.4	50
1	43 29.0	17 90	78.1	43 33.9	16 90	77.4	43 38.5	15 90	76.7	43 42.9	14 89	76.0	43 47.1	13 89	75.4	43 51.0	13 89	74.7	43 54.7	12 88	74.0	43 58.1	11 88	73.3	1
2	42 34.9	17 90	77.9	42 40.0	16 90	77.2	42 44.8	16 90	76.5	42 49.3	15 89	75.9	42 53.7	14 89	75.2	42 57.8	13 89	74.5	43 01.6	12 88	73.8	43 05.2	12 88	73.2	2
3	41 41.0	18 90	77.7	41 46.1	17 90	77.0	41 51.1	16 90	76.3	41 55.8	15 89	75.7	42 00.3	15 89	75.0	42 04.6	14 89	74.3	42 08.6	13 88	73.7	42 12.4	12 88	73.0	3
4	40 47.0	18 90	77.4	40 52.3	17 90	76.8	40 57.4	17 89	76.1	41 02.3	16 89	75.5	41 07.0	15 89	74.8	41 11.4	14 88	74.2	41 15.6	14 88	73.5	41 19.6	13 88	72.9	4
55	39 53.1	19 90	77.2	39 58.6	18 90	76.6	40 03.8	17 89	75.9	40 08.9	16 89	75.3	40 13.7	16 89	74.7	40 18.3	15 88	74.0	40 22.7	14 88	73.4	40 26.8	14 88	72.7	55
6	38 59.3	19 90	77.0	39 04.9	18 90	76.4	39 10.3	18 89	75.7	39 15.5	17 89	75.1	39 20.4	16 89	74.5	39 25.2	16 88	73.8	39 29.8	15 88	73.2	39 34.1	14 88	72.5	6
7	38 05.5	19 90	76.8	38 11.2	19 89	76.2	38 16.8	18 89	75.5	38 22.1	17 89	74.9	38 27.3	17 89	74.3	38 32.2	16 88	73.6	38 36.9	15 88	73.0	38 41.4	15 88	72.4	7
8	37 11.8	20 90	76.6	37 17.6	19 89	75.9	37 23.3	19 89	75.3	37 28.8	18 89	74.7	37 34.1	17 88	74.1	37 39.2	17 88	73.5	37 44.1	16 88	72.8	37 48.8	15 88	72.2	8
9	36 18.1	20 89	76.3	36 24.1	20 89	75.7	36 29.9	19 89	75.1	36 35.6	19 89	74.5	36 41.0	18 88	73.9	36 46.3	17 88	73.3	36 51.4	17 88	72.7	36 56.3	16 88	72.0	9
60	35 24.4	21 89	76.1	35 30.6	20 89	75.5	35 36.6	20 89	74.9	35 42.4	19 89	74.3	35 48.0	18 88	73.7	35 53.4	18 88	73.1	35 58.7	17 88	72.5	36 03.8	17 88	71.9	60
1	34 30.9	21 89	75.9	34 37.2	21 89	75.3	34 43.3	20 89	74.7	34 49.2	20 88	74.1	34 55.0	19 88	73.5	35 00.6	18 88	72.9	35 06.1	18 88	72.3	35 11.3	17 87	71.7	1
2	33 37.3	22 89	75.6	33 43.8	21 89	75.0	33 50.1	21 89	74.4	33 56.2	20 88	73.9	34 02.1	20 88	73.3	34 07.9	19 88	72.7	34 13.5	18 88	72.1	34 18.9	18 87	71.5	2
3	32 43.9	22 89	75.4	32 50.4	22 89	74.8	32 56.9	21 88	74.2	33 03.1	21 88	73.6	33 09.2	20 88	73.0	33 15.2	20 88	72.5	33 21.0	19 88	71.9	33 26.6	18 87	71.3	3
4	31 50.4	23 89	75.1	31 57.2	22 89	74.6	32 03.8	22 88	74.0	32 10.2	21 88	73.4	32 16.4	21 88	72.8	32 22.5	20 88	72.3	32 28.5	20 87	71.7	32 34.3	19 87	71.1	4
65	30 57.1	23 89	74.9	31 04.0	23 89	74.3	31 10.7	22 88	73.8	31 17.3	22 88	73.2	31 23.7	21 88	72.6	31 30.0	21 88	72.0	31 36.1	20 87	71.5	31 42.1	20 87	70.9	65
6	30 03.8	24 89	74.6	30 10.8	23 88	74.1	30 17.7	23 88	73.5	30 24.4	22 88	73.0	30 31.0	22 88	72.4	30 37.5	21 88	71.8	30 43.8	21 87	71.3	30 49.9	20 87	70.7	6
7	29 10.6	24 89	74.4	29 17.8	24 88	73.8	29 24.8	23 88	73.3	29 31.7	23 88	72.7	29 38.4	22 88	72.2	29 45.0	22 87	71.6	29 51.5	21 87	71.0	29 57.8	21 87	70.5	7
8	28 17.4	25 88	74.1	28 24.7	24 88	73.6	28 31.9	24 88	73.0	28 39.0	23 88	72.5	28 45.9	23 88	71.9	28 52.7	22 87	71.4	28 59.3	22 87	70.8	29 05.8	21 86	70.3	8
9	27 24.3	25 88	73.9	27 31.8	25 88	73.3	27 39.1	24 88	72.8	27 46.3	24 88	72.2	27 53.4	23 87	71.7	28 00.4	23 87	71.1	28 07.2	22 87	70.6	28 13.9	22 86	70.0	9
70	26 31.3	26 88	73.6	26 38.9	25 88	73.1	26 46.4	25 88	72.5	26 53.8	24 88	72.0	27 01.0	24 87	71.5	27 08.1	24 87	70.9	27 15.1	23 87	70.4	27 22.0	23 86	69.8	70
1	25 38.4	26 88	73.4	25 46.1	26 88	72.8	25 53.8	25 88	72.3	26 01.3	25 87	71.7	26 08.7	24 87	71.2	26 16.0	24 87	70.7	26 23.1	24 86	70.1	26 30.2	23 86	69.6	1
2	24 45.5	27 88	73.1	24 53.4	26 88	72.6	25 01.2	26 88	72.0	25 08.9	25 87	71.5	25 16.4	25 87	71.0	25 23.9	25 87	70.4	25 31.2	24 86	69.9	25 38.5	24 86	69.3	2
3	23 52.7	27 88	72.8	24 00.7	27 88	72.3	24 08.7	26 87	71.8	24 16.5	26 87	71.2	24 24.3	26 87	70.7	24 31.9	25 86	70.2	24 39.4	25 86	69.6	24 46.8	24 86	69.1	3
4	22 59.9	28 88	72.6	23 08.2	27 88	72.0	23 16.3	27 87	71.5	23 24.3	27 87	71.0	23 32.2	26 87	70.5	23 40.0	26 86	69.9	23 47.7	25 86	69.4	23 55.3	25 86	68.9	4
75	22 07.3	28 88	72.3	22 15.7	28 88	71.8	22 23.9	27 87	71.2	22 32.1	27 87	70.7	22 40.2	27 86	70.2	22 48.2	26 86	69.7	22 56.0	26 86	69.2	23 03.8	26 86	68.6	75
6	21 14.7	29 88	72.0	21 23.2	28 87	71.5	21 31.7	28 87	71.0	21 40.0	28 87	70.5	21 48.3	27 86	69.9	21 56.4	27 86	69.4	22 04.5	27 86	68.9	22 12.4	26 86	68.4	6
7	20 22.2	29 87	71.7	20 30.9	29 87	71.2	20 39.5	28 87	70.7	20 48.0	28 86	70.2	20 56.4	28 86	69.7	21 04.7	28 86	69.2	21 13.0	27 86	68.6	21 21.1	27 85	68.1	7
8	19 29.8	30 87	71.4	19 38.7	29 87	70.9	19 47.4	29 87	70.4	19 56.1	29 86	69.9	20 04.7	28 86	69.4	20 13.2	28 86	68.9	20 21.6	28 86	68.4	20 29.9	28 85	67.9	8
9	18 37.5	30 87	71.1	18 46.5	30 87	70.6	18 55.4	30 86	70.1	19 04.3	29 86	69.6	19 13.0	29 86	69.1	19 21.7	29 86	68.6	19 30.3	28 85	68.1	19 38.8	28 85	67.6	9
80	17 45.3	31 87	70.8	17 54.5	30 87	70.4	18 03.5	30 86	69.8	18 12.6	30 86	69.3	18 21.5	30 86	68.8	18 30.3	29 86	68.3	18 39.1	29 85	67.8	18 47.8	29 85	67.3	80
1	16 53.2	31 87	70.6	17 02.5	31 86	70.1	17 11.7	31 86	69.6	17 20.9	30 86	69.1	17 30.0	30 86	68.6	17 39.0	30 85	68.1	17 48.0	30 85	67.6	17 56.9	29 85	67.1	1
2	16 01.1	32 86	70.3	16 10.6	31 86	69.8	16 20.0	31 86	69.3	16 29.4	31 86	68.8	16 38.7	31 86	68.3	16 47.9	31 85	67.8	16 57.0	30 85	67.3	17 06.0	30 84	66.8	2
3	15 09.2	32 86	70.0	15 18.9	32 86	69.5	15 28.4	32 86	69.0	15 38.0	32 86	68.5	15 47.4	31 85	68.0	15 56.8	31 85	67.5	16 06.1	31 85	67.0	16 15.3	31 84	66.5	3
4	14 17.4	33 86	69.6	14 27.2	33 86	69.2	14 36.9	32 86	68.7	14 46.6	32 85	68.2	14 56.3	32 85	67.7	15 05.8	32 85	67.2	15 15.3	32 84	66.7	15 24.8	31 84	66.2	4
85	13 25.7	33 86	69.3	13 35.6	33 86	68.8	13 45.5	33 86	68.4	13 55.4	33 85	67.9	14 05.2	33 85	67.4	14 15.0	32 85	66.9	14 24.6	32 84	66.4	14 34.3	32 84	65.9	85
6	12 34.0	34 86	69.0	12 44.2	34 86	68.5	12 54.3	34 85	68.1	13 04.3	33 85	67.6	13 14.3	33 85	67.1	13 24.2	33 84	66.6	13 34.1	33 84	66.1	13 43.9	33 84	65.6	6
7	11 42.5	34 86	68.7	11 52.8	34 85	68.2	12 03.1	34 85	67.7	12 13.3	34 85	67.3	12 23.5	34 84	66.8	12 33.6	33 84	66.3	12 43.6	33 84	65.8	12 53.7	33 84	65.3	7
8	10 51.1	35 86	68.4	11 01.6	35 85	67.9	11 12.0	35 85	67.4	11 22.4	35 84	66.9	11 32.8	34 84	66.5	11 43.1	34 84	66.0	11 53.3	34 84	65.5	12 03.5	34 83	65.0	8
9	9 59.8	36 85	68.0	10 10.5	35 85	67.6	10 21.1	35 85	67.1	10 31.7	35 84	66.6	10 42.2	35 84	66.1	10 52.7	35 84	65.7	11 03.1	35 84	65.2	11 13.5	35 83	64.7	9
90	9 08.7	36 85	67.7	9 19.5	36 85	67.2	9 30.3	36 84	66.8	9 41.0	36 84	66.3	9 51.8	36 84	65.8	10 02.4	36 84	65.3	10 13.1	35 83	64.9	10 23.7	35 83	64.4	90

Lat. 23°

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	43 00.0	1.0	01	180.0	42 30.0	1.0	01	180.0	42 00.0	1.0	01	180.0	41 30.0	1.0	01	180.0	41 00.0	1.0	01	180.0	40 30.0	1.0	01	180.0	40 00.0	1.0	01	180.0	39 30.0	1.0	01	180.0	00
1	42 59.4	1.0	03	178.8	42 29.4	1.0	03	178.8	41 59.4	1.0	03	178.8	41 29.4	1.0	03	178.8	40 59.4	1.0	03	178.8	40 29.4	1.0	03	178.8	39 59.4	1.0	03	178.8	39 29.4	1.0	03	178.9	1
2	42 57.6	1.0	05	177.5	42 27.6	1.0	05	177.5	41 57.6	1.0	05	177.6	41 27.7	1.0	05	177.6	40 57.7	1.0	05	177.6	40 27.7	1.0	05	177.6	39 57.8	1.0	05	177.7	39 27.8	1.0	05	177.7	2
3	42 54.6	1.0	07	176.3	42 24.7	1.0	07	176.3	41 54.7	1.0	07	176.3	41 24.8	1.0	07	176.4	40 54.8	1.0	07	176.4	40 24.9	1.0	07	176.5	39 55.0	1.0	06	176.5	39 25.0	1.0	06	176.6	3
4	42 50.4	1.0	09	175.0	42 20.5	1.0	09	175.1	41 50.6	1.0	09	175.1	41 20.7	1.0	09	175.2	40 50.8	1.0	08	175.3	40 20.9	1.0	08	175.3	39 51.0	1.0	08	175.4	39 21.1	1.0	08	175.4	4
05	42 45.0	99	11	173.8	42 15.2	99	11	173.8	41 45.3	99	11	173.9	41 15.5	99	10	174.0	40 45.7	99	10	174.1	40 15.9	99	10	174.1	39 46.0	99	10	174.2	39 16.2	99	10	174.3	05
6	42 38.4	99	13	172.5	42 08.7	99	13	172.6	41 38.9	99	13	172.7	41 09.2	99	12	172.8	40 39.4	99	12	172.9	40 09.6	99	12	173.0	39 39.9	99	12	173.1	39 10.1	99	12	173.1	6
7	42 30.7	99	15	171.3	42 01.0	99	15	171.4	41 31.3	99	14	171.5	41 01.7	99	14	171.6	40 32.0	99	14	171.7	40 02.3	99	14	171.8	39 32.7	99	14	171.9	39 03.0	99	14	172.0	7
8	42 21.7	98	17	170.1	41 52.2	99	17	170.2	41 22.6	99	16	170.3	40 53.1	99	16	170.4	40 23.5	99	16	170.5	39 53.9	99	16	170.7	39 24.3	99	16	170.8	38 54.7	99	15	170.9	8
9	42 11.6	98	19	168.9	41 42.2	98	18	169.0	41 12.8	98	18	169.1	40 43.3	98	18	169.3	40 13.9	98	18	169.4	39 44.4	98	18	169.5	39 14.9	98	18	169.6	38 45.5	98	17	169.8	9
10	42 00.4	98	21	167.7	41 31.1	98	20	167.8	41 01.8	98	20	168.0	40 32.5	98	20	168.1	40 03.2	98	20	168.2	39 33.8	98	20	168.4	39 04.5	98	19	168.5	38 35.1	98	19	168.6	10
1	41 48.1	97	22	166.5	41 18.9	97	22	166.6	40 49.7	97	22	166.8	40 20.6	97	22	166.9	39 51.4	97	22	167.1	39 22.1	97	21	167.2	38 52.9	97	21	167.4	38 23.7	97	21	167.5	1
2	41 34.6	97	24	165.3	41 05.6	97	24	165.5	40 36.6	97	24	165.6	40 07.5	97	24	165.8	39 38.5	97	23	166.0	39 09.4	97	23	166.1	38 40.3	97	23	166.3	38 11.2	97	22	166.4	2
3	41 20.0	96	26	164.1	40 51.2	96	26	164.3	40 22.3	96	26	164.5	39 53.4	96	25	164.7	39 24.6	96	25	164.8	38 55.6	96	25	165.0	38 26.7	96	24	165.2	37 57.8	96	24	165.3	3
4	41 04.4	96	28	163.0	40 35.7	96	28	163.1	40 07.0	96	27	163.3	39 38.3	96	27	163.5	39 09.6	96	27	163.7	38 40.8	96	26	163.9	38 12.1	96	26	164.1	37 43.3	96	26	164.3	4
15	40 47.7	95	30	161.8	40 19.2	95	29	162.0	39 50.7	95	29	162.2	39 22.1	95	29	162.4	38 53.6	95	28	162.6	38 25.0	95	28	162.8	37 56.4	95	28	163.0	37 27.8	95	27	163.2	15
6	40 29.9	94	31	160.7	40 01.6	94	31	160.9	39 33.3	94	31	161.1	39 04.9	95	30	161.3	38 36.6	95	30	161.5	38 08.2	95	30	161.7	37 39.8	95	29	161.9	37 11.4	95	29	162.1	6
7	40 11.1	94	33	159.5	39 43.0	94	33	159.8	39 14.9	94	32	160.0	38 46.7	94	32	160.2	38 18.6	94	32	160.4	37 50.4	94	31	160.7	37 22.2	94	31	160.9	36 53.9	94	31	161.1	7
8	39 51.3	93	35	158.4	39 23.4	93	34	158.7	38 55.5	93	34	158.9	38 27.5	93	34	159.1	37 59.6	93	33	159.4	37 31.6	93	33	159.6	37 03.6	93	32	159.8	36 35.5	94	32	160.0	8
9	39 30.5	92	36	157.3	39 02.8	92	36	157.6	38 35.1	92	36	157.8	38 07.4	92	35	158.1	37 39.6	93	35	158.3	37 11.9	93	34	158.5	36 44.1	93	34	158.8	36 16.2	93	34	159.0	9
20	39 08.7	91	38	156.2	38 41.3	92	38	156.5	38 13.8	92	37	156.8	37 46.3	92	37	157.0	37 18.8	92	36	157.3	36 51.2	92	36	157.5	36 23.6	92	36	157.8	35 56.0	92	35	158.0	20
1	38 46.0	91	39	155.2	38 18.8	91	39	155.4	37 51.5	91	39	155.7	37 24.3	91	38	156.0	36 57.0	91	38	156.2	36 29.6	91	38	156.5	36 02.2	91	37	156.7	35 34.8	91	37	157.0	1
2	38 22.3	90	41	154.1	37 55.4	90	41	154.4	37 28.4	90	40	154.7	37 01.3	90	40	154.9	36 34.2	90	39	155.2	36 07.1	90	39	155.5	35 40.0	91	38	155.7	35 12.8	91	38	156.0	2
3	37 57.8	89	42	153.1	37 31.0	89	42	153.4	37 04.3	89	42	153.7	36 37.5	89	41	153.9	36 10.7	90	41	154.2	35 43.8	90	40	154.5	35 16.9	90	40	154.8	34 49.9	90	40	155.0	3
4	37 32.3	88	44	152.1	37 05.9	88	44	152.4	36 39.3	88	43	152.6	36 12.8	89	43	152.9	35 46.2	89	42	153.2	35 19.6	89	43	153.5	34 52.9	89	41	153.8	34 26.2	89	41	154.1	4
25	37 06.0	87	45	151.0	36 39.8	87	45	151.4	36 13.5	88	44	151.7	35 47.2	88	44	152.0	35 20.9	88	44	152.2	34 54.5	88	43	152.5	34 28.1	88	43	152.8	34 01.6	88	42	153.1	25
6	36 38.9	86	47	150.1	36 12.9	87	46	150.4	35 46.9	87	46	150.7	35 20.9	87	45	151.0	34 54.8	87	45	151.3	34 28.6	87	44	151.6	34 02.4	87	44	151.9	33 36.2	87	44	152.2	6
7	36 10.9	86	48	149.1	35 45.2	86	48	149.4	35 19.4	86	47	149.7	34 53.7	86	47	150.0	34 27.8	86	46	150.3	34 01.9	86	46	150.6	33 36.0	87	45	150.9	33 10.0	87	45	151.2	7
8	35 42.1	85	49	148.1	35 16.7	85	49	148.4	34 51.2	85	48	148.8	34 25.7	85	48	149.1	34 00.1	85	48	149.4	33 34.5	85	47	149.7	33 08.8	86	47	150.0	32 43.1	86	46	150.3	8
9	35 12.6	84	50	147.2	34 47.4	84	50	147.5	34 22.2	84	50	147.8	33 56.9	84	49	148.2	33 31.6	84	49	148.5	33 06.2	85	48	148.8	32 40.8	85	48	149.1	32 15.4	85	48	149.4	9
30	34 42.2	83	52	146.2	34 17.4	83	51	146.6	33 52.4	83	51	146.9	33 27.4	83	50	147.3	33 02.4	84	50	147.6	32 37.3	84	50	147.9	32 12.1	84	49	148.2	31 46.9	84	49	148.6	30
1	34 11.2	82	53	145.3	33 46.6	82	52	145.7	33 21.9	82	52	146.0	32 57.2	83	52	146.4	32 32.4	83	51	146.7	32 07.6	83	51	147.0	31 42.7	83	50	147.4	31 17.7	83	50	147.7	1
2	33 39.4	81	54	144.4	33 15.1	81	54	144.8	32 50.7	81	53	145.1	32 26.2	82	53	145.5	32 01.7	82	52	145.8	31 37.2	82	52	146.2	31 12.5	82	51	146.5	30 47.9	82	51	146.8	2
3	33 06.9	80	55	143.6	32 42.9	80	55	143.9	32 18.8	81	54	144.3	31 54.6	81	54	144.6	31 30.3	81	53	145.0	31 06.1	81	53	145.3	30 41.7	81	52	145.6	30 17.3	81	52	146.0	3
4	32 33.8	79	56	142.7	32 10.0	79	56	143.1	31 46.2	80	56	143.4	31 22.3	80	55	143.8	30 58.3	80	54	144.1	30 34.3	80	54	144.5	30 10.2	80	54	144.8	29 46.1	81	53	145.2	4
35	32 00.0	78	57	141.8	31 36.5	78	57	142.2	31 12.9	79	56	142.6	30 49.3	79	56	142.9	30 25.6	79	56	143.3	30 01.9	79	55	143.6	29 38.1	79	55	144.0	29 14.2	80	54	144.3	35
6	31 25.6	77	58	141.0	31 02.3	78	58	141.4	30 39.0	78	58	141.7	30 15.7	78	57	142.1	29 52.3	78	57	142.5	29 28.8	78	56	142.8	29 05.3	79	56	143.2	28 41.7	79	55	143.5	6
7	30 50.5	76	60	140.2	30 27.5	77	59	140.6	30 04.5	77	58	140.9	29 41.4	77	58	141.3	29 18.3	77	58	141.7	28 55.1	77	57	142.0	28 31.9	78	57	142.4	28 08.5	78	56	142.7	7
8	30 14.8	75	60	139.4	29 52.2	76	60	139.8	29 29.4	76	60	140.1	29 06.6	76	59	140.5	28 43.8	76	59	140.9	28 20.8	77	58	141.2	27 57.8	77	58	141.6	27 34.8	77	57	142.0	8
9	29 38.6	75	61	138.6	29 16.2	75	61	139.0	28 53.7	75	60	139.3	28 31.2	75	60	139.7	28 08.6	75	60	140.1	27 46.0	76	59	140.5	27 23.3	76	59	140.8	27 00.5	76	58	141.2	9
40	29 01.8	74	62	137.8	28 39.6	74	62	138.2	28 17.5	74	61	138.6	27 55.2	74	61	139.0	27 32.9	74	60	139.3	27 10.5	75	60	139.7	26 48.1	75	60	140.1	26 25.6	75	59	140.5	40
1	28 24.4	73	63	137.0	28 02.6	73	63	137.4	27 40.7	73	62	137.8	27 18.7	73	62	138.2	26 56.6	74	61	138.6	26 34.5	74	61	139.0	26 12.4	74	60	139.3	25 50.2	74	60	139.7	1
2	27 46.5	72	64	136.3	27 24.9	72	64	136.7	27 03.3	72	63	137.1	26 41.6	72	63	137.5	26 19.8	73	62	137.9	25 58.0	73	62	138.2	25 36.1	73	61	138.6	25 14.2	73	61	139.0	2
3	27 08.1	71	65	135.6	26 46.8	71	64	136.0	26 25.4	71	64	136.4	26 04.0	72	64	136.7	25 42.5	72	63	137.1	25 21.0	72	63	137.5	24 59.4	72	62	137.9	24 37.7	72	62	138.3	3
4	26 29.2	70	66	134.8	26 08.2	70	65	135.2	25 47.1	70	65	135.6	25 25.9	71	64	136.0	25 04.7	71	64	136.4	24 43.4	71	63	136.8	24 22.1	71	63	137.2	24 00.7	71	62	137.6	4
45	25 49.8	69	66	134.1	25 29.0	69	66	134.5	25 08.2	70	66	134.9	24 47.3	70	65	135.3	24 26.4	70	65	135.7	24 05.4	70	64	136.1	23 44.3	70	64	136.5	23 23.2	71	63	136.9	45
6	25 09.9	68	67	133.4	24 49.4	68	67	133.8	24 28.9	69	66	134.3	24 08.3	69	66	134.6	23 47.6	69	66	135.0	23 26.9	69	65	135.4	23 06.1	69	64	135.8	22 45.2	70	64	136.2	6
7	24 29.6	67	68	132.8	24 09.4	67	68	133.2	23 49.1	68	67	133.6	23 28.7	68	66	134.0	23 08.3	68	66	134.4	22 47.9	68	66	134.8	22 27.3	69	65	135.2	22 06.8	69	65	135.6	7
8	23 48.8	66	69	132.1	23 28.9	67	68	132.5	23 08.8	67	68	132.9	22 48.8	67	67	133.3	22 28.6	67	67	133.7	22 08.4	67	66	134.1	21 48.2	68	66	134.5	21 27.9	68	66	134.9	8
9	23 07.6	66	69	131.4	22 47.9	66	69	131.8	22 28.2	66	68	132.3	22 08.4	66	68	132.7	21 48.5	66	68	133.1	21 28.6	67	67	133.5	21 08.6	67	67	133.9	20 48.5	67	66	134.3	9
50	22 26.0	65	70	130.8	22 06.6	65	70	131.2	21 47.1	65	69	131.6	21 27.5	65	69	132.0	21 07.9	65	68	132.4	20 48.3	66	68	132.8	20 28.5	66	67	133.2	20 08.8	66	67	133.6	50
1	21 44.0	64	71	130.2	21 24.8	64	70	130.6	21 05.6	64	70	131.0	20 46.3	64	69	131.4	20 27.0	65	69	131.8	20 07.6	65	68	132.2	19 48.1	65	68	132.6	19 28.6	65	68	133.0	1
2	21 01.6	63	71	129.5	20 42.7	63	71	130.0	20 23.7	63	70	130.4	20 04.7	64	70	130.8	19 45.6	64	70	131.2	19 26.5	64	69	131.6	19 07.3	64	69	132.0	18 48.0	64	68	132.4	2
3	20 18.8	62	72	128.9	20 00.1	62	71	129.3	19 41.4	62	71	129.8	19 22.7	63	71	130.2	19 03.8	63	70	130.6	18 45.0	63	70	131.0	18 26.0	63	69	131.4	18 07.0	63	69	131.8	3
4	19 35.7	61	72	128.3	19 17.3	61	72	128.7	18 58.8	62	72	129.2	18 40.3	62	71	129.6	18 21.7	62	71	130.0	18 03.1	62	70	130.4	17 44.4	62	70	130.8	17 25.7	63	70	131.2	4
55	18 52.2	60	73	127.7	18 34.0	61	73	128.2	18 15.8	61	72	128.6	17 57.5	61	72	129.0	17 39.2	61	71	129.4	17 20.8	61	71	129.8	17 02.4	61	70	130.2	16 44.0	62	70	130.6	55
6	18 08.3	60	74	127.2	17 50.4	60	73	127.6	17 32.4	60	73	128.0	17 14.4	60	72	128.4	16 56.4	60	72	128.8	16 38.2	60	72	129.3	16 20.1	61	71	129.7	16 01.9	61	71	130.1	6
7	17 24.1	59	74	126.6	17 06.5	59	74	127.0	16 48.8	59	73	127.4	16 31.0	59	73	127.9	16 13.2	59	72	128.3	15 55.3	60	72	128.7	15 37.4	60	72	129.1	15 19.4	60	71	129.5	7
8	16 39.6	58	75	126.0	16 22.2	58	74	126.5	16 04.7	58	74	126.9	15 47.2	58	74	127.3	15 29.7	59	73	127.7	15 12.0	59	73	128.1	14 54.4	59	72	128.6	14 36.7	59	72	129.0	8
9	15 54.8	57	75	125.5	15 37.6	57	75	125.9	15 20.4	58	74	126.3	15 03.1	58	74	126.8	14 45.8	58	74	127.2	14 28.4	58	73	127.6	14 11.0	58	73	128.0	13 53.6	58	72	128.4	9
60	15 09.7	56	76	124.9	14 52.7	57	75	125.4	14 35.8	57	75	125.8	14 18.7	57	74	126.2	14 01.6	57	74	126.7	13 44.5	57	74	127.1	13 27.4	57	73	127.5	13 10.2	57	73	127.9	60
1	14 24.3	56	76	124.4	14 07.6	56	76	124.8	13 50.8	56	75	125.3	13 34.0	56	75	125.7	13 17.2	56	75	126.1	13 00.3	56	74	126.6	12 43.4	56	74	127.0	12 26.4	57	73	127.4	1
2	13 38.6	55	77	123.9	13 22.1	55	76	124.3	13 05.6	55	76	124.8	12 49.0	55	76	125.2	12 32.4	55	75	125.6	12 15.8	56	75	126.0	11 59.1	56	74	126.5	11 42.4	56	74	126.9	2
3	12 52.6	54	77	123.4	12 36.3	54	77	123.8	12 20.1	54	76	124.2	12 03.7	54	76	124.7	11 47.4	55	76	125.1	11 31.0	55	75	125.5	11 14.6	55	75	126.0	10 58.1	55	74	126.4	3
4	12 06.3	53	78	122.9	11 50.3	53	77	123.3	11 34.3	54	77	123.8	11 18.2	54	76	124.2	11 02.1	54	76	124.6	10 45.9	54	76	125.0	10 29.7	54	75	125.5	10 13.5	54	75	125.9	4
65	11 19.8	53	78	122.4	11 04.0	53	78	122.8	10 48.2	53	77	123.3	10 32.4	53	77	123.7	10 16.5	53	76	124.1	10 00.5	53	76	124.6	9 44.6	53	76	125.0	9 28.6	53	75	125.4	65
6	10 33.1	52	78	121.9	10 17.5	52	78	122.3	10 01.9	52	78	122.8	9 46.3	52	77	123.2	9 30.6	52	77	123.6	9 14.9	52	76	124.1	8 59.2	52	76	124.5	8 43.5	53	76	124.9	6
7	9 46.0	51	79	121.4	9 30.7	51	78	121.9	9 15.3	51	78	122.3	8 59.9	51	78	122.7	8 44.5	51	77	123.2	8 29.1	52	77	123.6	8 13.6	52	76	124.0	7 58.1	52	76	124.5	7
8	8 58.8	50	79	121.0	8 43.7	50	79	121.4	8 28.5	51	78	121.8	8 13.4	51	78	122.3	7 58.2	51	78	122.7	7 42.9	51	77	123.1	7 27.7	51	77	123.6	7 12.4	51	76	124.0	8
9	8 11.3	50	80	120.5	7 56.4	50	79	120.9	7 41.5	50	79	121.4	7 26.5	50	78	121.8	7 11.6	50	78	122.2	6 56.6	50	78	122.7	6 41.5	50	77	123.1	6 26.5	50	77	123.6	9
70	7 23.6	49	80	120.0	7 08.9	49	80	120.5	6 54.2	49	79	120.9	6 39.5	49	79	121.4	6 24.7	49	78	121.8	6 10.0	49	78	122.2	5 55.2	49	78	122.7	5 40.3	49	77	123.1	70
1	6 35.7	48	80	119.6	6 21.2	48	80	120.0	6 06.7	48	80	120.5	5 52.2	48	79	120.9	5 37.7	48	79	121.4	5 23.1	49	79	121.8	5 08.6	49	78	122.2					1
2	5 47.6	48	80	119.2	5 33.3	48	80	119.6	5 19.0	48	80	120.0	5 04.7	48	79	120.5																	2

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	8 17.6	37	85	67.4	8 28.6	37	84	66.9	8 39.6	37	84	66.4	8 50.5	36	84	66.0	9 01.4	36	84	65.5	9 12.3	36	83	65.0	9 23.1	36	83	64.5	9 33.9	36	83	64.1	91
2	7 26.7	37	85	67.0	7 37.9	37	84	66.6	7 49.0	37	84	66.1	8 00.2	37	84	65.6	8 11.2	37	83	65.2	8 22.3	37	83	64.7	8 33.3	37	83	64.2	8 44.3	37	82	63.8	2
3	6 35.9	38	84	66.7	6 47.3	38	84	66.2	6 58.6	38	84	65.8	7 09.9	38	84	65.3	7 21.2	38	83	64.8	7 32.4	37	83	64.4	7 43.7	37	82	63.9	7 54.8	37	82	63.4	3
4	5 45.3	39	84	66.3	5 56.8	38	84	65.9	6 08.3	38	84	65.4	6 19.8	38	83	64.9	6 31.3	38	83	64.5	6 42.7	38	83	64.0	6 54.1	38	82	63.6	7 05.5	38	82	63.1	4
95					5 06.5	39	84	65.5	5 18.2	39	83	65.1	5 29.8	39	83	64.6	5 41.5	39	83	64.1	5 53.1	39	82	63.7	6 04.8	39	82	63.2	6 16.3	39	82	62.7	95
6																					5 03.7	39	82	63.3	5 15.5	39	82	62.9	5 27.3	39	82	62.4	6

Lat. 23°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	85 00.0	1.0 08	00.0	84 30.0	1.0 07	00.0	84 00.0	1.0 07	00.0	83 00.0	1.0 06	00.0	81 00.0	1.0 04	00.0	79 00.0	1.0 04	00.0	78 30.0	1.0 03	00.0	77 30.0	1.0 03	00.0	00
1	84 55.2	98 24	10.0	84 25.6	99 21	09.1	83 56.0	99 20	08.3	82 56.6	99 17	07.1	80 57.4	99 13	05.4	78 57.9	1.0 10	04.3	78 28.0	1.0 10	04.1	77 28.2	1.0 09	03.8	1
2	84 41.1	94 37	19.4	84 12.8	95 34	17.7	83 44.2	96 31	16.2	82 46.5	97 27	13.9	80 49.6	98 21	10.7	78 51.7	99 17	08.6	78 22.1	99 16	08.2	77 22.8	99 15	07.5	2
3	84 18.9	87 48	27.8	83 52.4	89 45	25.5	83 25.4	91 42	23.6	82 30.2	93 36	20.3	80 37.0	96 29	15.8	78 41.4	97 24	12.8	78 12.3	97 22	12.2	77 13.9	98 21	11.1	3
4	83 50.0	80 57	35.0	83 25.6	83 53	32.4	83 00.4	85 50	30.1	82 08.4	88 44	26.2	80 19.7	92 36	20.6	78 27.3	95 30	16.8	77 58.8	95 28	16.0	77 01.5	96 26	14.7	4
05	83 16.0	73 64	41.0	82 53.6	76 60	38.3	82 30.4	79 57	35.8	81 41.7	83 51	31.5	79 58.2	89 42	25.1	78 09.6	92 35	20.6	77 41.9	92 34	19.7	76 46.0	94 31	18.1	05
6	82 37.9	66 69	46.0	82 17.5	70 66	43.2	81 56.2	73 62	40.7	81 10.9	78 57	36.2	79 33.0	85 48	29.3	77 48.5	89 40	24.2	77 21.7	90 39	23.2	76 27.4	91 36	21.3	6
7	81 56.8	60 72	50.2	81 38.2	64 70	47.4	81 18.6	67 67	44.9	80 36.7	73 62	40.3	79 04.4	81 52	33.0	77 24.3	86 45	27.6	76 58.5	87 43	26.5	76 05.9	88 40	24.4	7
8	81 13.3	54 76	53.6	80 56.4	58 73	51.0	80 38.4	61 70	48.5	79 59.6	68 66	43.9	78 32.9	76 57	36.5	76 57.4	82 49	30.7	76 32.5	83 47	29.5	75 41.8	86 44	27.3	8
9	80 28.0	49 78	56.5	80 12.6	53 76	53.9	79 56.1	57 73	51.5	79 20.2	63 69	47.1	77 58.8	72 60	39.6	76 28.0	79 53	33.7	76 04.1	80 51	32.4	75 15.3	82 48	30.0	9
10	79 41.3	45 80	58.9	79 27.2	49 78	56.5	79 12.1	52 76	54.2	78 38.9	58 72	49.8	77 22.6	68 64	42.4	75 56.3	75 56	36.3	75 33.5	77 54	35.0	74 46.6	79 51	32.6	10
1	78 53.5	41 81	61.0	78 40.6	45 80	58.7	78 26.7	48 78	56.4	77 55.9	54 74	52.2	76 44.5	64 66	44.9	75 22.6	72 59	38.8	75 00.8	73 57	37.5	74 15.9	76 54	34.9	1
2	78 04.8	38 82	62.7	77 52.9	41 81	60.5	77 40.1	44 79	58.4	77 11.6	50 76	54.3	76 04.8	61 69	47.1	74 47.1	68 62	41.1	74 26.4	70 60	39.7	73 43.4	73 57	37.2	2
3	77 15.3	35 83	64.2	77 04.5	38 82	62.1	76 52.7	41 80	60.1	76 26.2	47 77	56.2	75 23.6	57 71	49.2	74 10.1	65 64	43.1	73 50.3	67 62	41.8	73 09.3	70 59	39.2	3
4	76 25.3	32 84	65.5	76 15.4	35 83	63.5	76 04.4	38 81	61.5	75 39.9	44 78	57.8	74 41.3	54 72	51.0	73 31.7	62 66	45.0	73 12.8	64 64	43.7	72 33.7	67 62	41.1	4
15	75 34.9	29 85	66.6	75 25.7	32 84	64.7	75 15.6	35 82	62.8	74 52.8	41 80	59.2	73 57.8	51 74	52.6	72 52.0	59 68	46.8	72 34.1	61 66	45.4	71 56.7	64 64	42.8	15
6	74 44.0	27 85	67.6	74 35.5	30 84	65.7	74 26.2	33 83	64.0	74 05.0	38 80	60.5	73 13.5	48 75	54.1	72 11.3	56 70	48.3	71 54.2	58 68	47.0	71 18.6	61 65	44.4	6
7	73 52.8	25 86	68.4	73 45.0	27 85	66.7	73 36.4	30 84	65.0	73 16.7	35 81	61.6	72 28.4	45 76	55.4	71 29.5	53 71	49.8	71 13.4	55 70	48.5	70 39.4	58 67	45.9	7
8	73 01.3	23 86	69.1	72 54.1	25 85	67.5	72 46.1	28 84	65.8	72 27.9	33 82	62.6	71 42.6	42 77	56.6	70 47.0	50 72	51.1	70 31.6	52 71	49.8	69 59.2	56 68	47.3	8
9	72 09.6	21 86	69.8	72 03.0	23 86	68.2	71 55.6	26 85	66.6	71 38.6	31 83	63.5	70 56.2	40 78	57.7	70 03.6	48 73	52.3	69 49.0	50 72	51.0	69 18.2	53 70	48.6	9
20	71 17.7	19 87	70.3	71 11.6	22 86	68.8	71 04.8	24 85	67.3	70 49.0	29 83	64.3	70 09.3	37 79	58.7	69 19.6	45 74	53.4	69 05.7	47 73	52.2	68 36.4	51 71	49.8	20
1	70 25.6	17 87	70.8	70 20.0	20 86	69.4	70 13.7	22 86	67.9	69 59.0	27 84	65.1	69 21.8	35 80	59.6	68 34.9	43 75	54.4	68 21 8	45 74	53.2	67 53.9	48 72	50.8	1
2	69 33.4	16 87	71.3	69 28.2	18 86	69.8	69 22.4	20 86	68.4	69 08.8	25 84	65.7	68 34.0	33 80	60.4	67 49.7	41 76	55.4	67 37.3	42 75	54.2	67 10.8	46 73	51.8	2
3	68 41.0	15 88	71.6	68 36.3	17 87	70.3	68 31.0	19 86	68.9	68 18.4	23 84	66.3	67 45.8	31 81	61.1	67 04.0	38 77	56.2	66 52.2	40 76	55.1	66 27.1	44 74	52.8	3
4	67 48.5	13 88	72.0	67 44.3	15 87	70.6	67 39.4	17 86	69.3	67 27.7	21 85	66.8	66 57.3	29 81	61.8	66 17.9	36 78	57.0	66 06.7	38 76	55.9	65 42.9	41 74	53.6	4
25	66 56.0	12 88	72.2	66 52.1	14 87	71.0	66 47.6	16 86	69.7	66 36.9	20 85	67.2	66 08.5	27 82	62.4	65 31.4	34 78	57.7	65 20.8	36 77	56.6	64 58.2	39 75	54.4	25
6	66 03.3	11 88	72.5	65 59.8	13 87	71.3	65 55.8	15 87	70.1	65 45.9	18 85	67.6	65 19.4	26 82	62.9	64 44.5	33 79	58.4	64 34.5	34 78	57.3	64 13.1	37 76	55.1	6
7	65 10.6	10 88	72.7	65 07.5	11 87	71.5	65 03.8	13 87	70.4	64 54.7	17 86	68.0	64 30.2	24 82	63.4	63 57.3	31 79	59.0	63 47.9	32 78	57.9	63 27.6	35 76	55.8	7
8	64 17.9	08 88	72.9	64 15.1	10 88	71.8	64 11.7	12 87	70.6	64 03.5	16 86	68.3	63 40.7	22 83	63.9	63 09.8	29 80	59.6	63 00.9	30 79	58.5	62 41.7	34 77	56.4	8
9	63 25.0	07 88	73.1	63 22.6	09 88	71.9	63 19.6	11 87	70.8	63 12.1	14 86	68.6	62 51.0	21 83	64.3	62 22.1	27 80	60.1	62 13.7	29 79	59.0	61 55.5	32 77	57.0	9
30	62 32.2	06 88	73.2	62 30.0	08 88	72.1	62 27.4	10 87	71.0	62 20.6	13 86	68.9	62 01.1	19 83	64.7	61 34.1	26 80	60.5	61 26.2	27 80	59.5	61 09.1	30 78	57.5	30
1	61 39.3	05 88	73.3	61 37.5	07 88	72.2	61 35.1	09 87	71.2	61 29.0	12 86	69.1	61 11.2	18 84	65.0	60 45.9	24 81	61.0	60 38.5	25 80	60.0	60 22.3	28 78	58.0	1
2	60 46.4	04 88	73.4	60 44.8	06 88	72.4	60 42.8	08 87	71.3	60 37.4	11 86	69.3	60 21.0	17 84	65.3	59 57.5	22 81	61.4	59 50.6	24 80	60.4	59 35.4	27 79	58.5	2
3	59 53.5	03 88	73.5	59 52.2	05 88	72.5	59 50.5	06 87	71.5	59 45.7	09 86	69.5	59 30.8	15 84	65.6	59 09.0	21 81	61.7	59 02.5	22 80	60.8	58 48.2	25 79	58.9	3
4	59 00.5	03 88	73.5	58 59.5	04 88	72.5	58 58.1	05 87	71.6	58 53.9	08 86	69.6	58 40.5	14 84	65.8	58 20.3	20 81	62.0	58 14.2	21 81	61.1	58 00.8	24 79	59.3	4
35	58 07.5	02 88	73.5	58 06.8	03 88	72.6	58 05.7	05 87	71.7	58 02.1	07 86	69.8	57 50.1	13 84	66.0	57 31.4	18 82	62.3	57 25.8	20 81	61.4	57 13.3	22 80	59.6	35
6	57 14.6	01 88	73.6	57 14.1	02 88	72.6	57 13.2	04 87	71.7	57 10.3	06 86	69.9	56 59.6	12 84	66.2	56 42.5	17 82	62.6	56 37.2	18 81	61.7	56 25.6	21 80	59.9	6
7	56 21.6	00 88	73.6	56 21.4	01 88	72.7	56 20.8	03 88	71.8	56 18.4	05 86	70.0	56 09.0	10 84	66.4	55 53.4	16 82	62.8	55 48.5	17 81	62.0	55 37.7	19 80	60.2	7
8	55 28.6	01 88	73.6	55 28.7	00 88	72.7	55 28.3	02 88	71.8	55 26.5	04 86	70.0	55 18.4	09 84	66.5	55 04.2	14 82	63.1	54 59.7	16 82	62.2	54 49.7	18 80	60.5	8
9	54 35.6	02 88	73.6	54 35.9	00 88	72.7	54 35.9	01 88	71.8	54 34.6	03 86	70.1	54 27.7	08 84	66.7	54 14.9	13 82	63.2	54 10.8	14 82	62.4	54 01.6	17 80	60.7	9
40	53 42.7	02 88	73.5	53 43.2	01 88	72.7	53 43.4	00 88	71.8	53 42.7	02 87	70.1	53 36.9	07 85	66.8	53 25.6	12 82	63.4	53 21.8	13 82	62.6	53 13.4	15 81	60.9	40
1	52 49.7	03 88	73.5	52 50.5	02 88	72.7	52 50.9	01 88	71.8	52 50.7	01 87	70.2	52 46.2	06 85	66.9	52 36.1	11 82	63.6	52 32.8	12 82	62.8	52 25.1	14 81	61.1	1
2	51 56.8	04 88	73.4	51 57.8	03 88	72.6	51 58.4	02 88	71.8	51 58.7	01 87	70.2	51 55.4	05 85	66.9	51 46.6	09 82	63.7	51 43.6	11 82	62.9	51 36.6	13 81	61.3	2
3	51 03.8	05 88	73.4	51 05.1	04 88	72.6	51 06.0	02 87	71.8	51 06.8	00 87	70.2	51 04.5	04 85	67.0	50 57.1	08 83	63.8	50 54.4	09 82	63.0	50 48.2	12 81	61.5	3
4	50 10.9	05 88	73.3	50 12.4	04 88	72.5	50 13.5	03 87	71.7	50 14.8	01 87	70.2	50 13.7	03 85	67.1	50 07.5	07 83	63.9	50 05.2	08 82	63.2	49 59.6	10 81	61.6	4
45	49 18.0	06 88	73.2	49 19.7	05 88	72.5	49 21.1	04 87	71.7	49 22.9	02 87	70.2	49 22.8	02 85	67.1	49 17.9	06 83	64.0	49 15.9	07 82	63.3	49 11.0	09 81	61.7	45
6	48 25.2	07 88	73.1	48 27.1	06 88	72.4	48 28.6	05 87	71.6	48 30.9	03 86	70.1	48 31.9	01 85	67.1	48 28.2	05 83	64.1	48 26.5	06 82	63.3	48 22.3	08 81	61.8	6
7	47 32.3	07 88	73.0	47 34.4	07 88	72.3	47 36.2	06 87	71.6	47 39.0	04 86	70.1	47 41.1	00 85	67.1	47 38.5	04 83	64.1	47 37.2	05 82	63.4	47 33.6	07 81	61.9	7
8	46 39.5	08 88	72.9	46 41.8	07 88	72.2	46 43.8	06 87	71.5	46 47.1	04 86	70.0	46 50.2	01 85	67.1	46 48.8	03 83	64.2	46 47.8	04 82	63.5	46 44.9	06 81	62.0	8
9	45 46.7	09 88	72.8	45 49.2	08 88	72.1	45 51.5	07 87	71.4	45 55.2	05 86	70.0	45 59.3	02 85	67.1	45 59.1	02 83	64.2	45 58.4	03 82	63.5	45 56.1	05 81	62.1	9
50	44 54.0	09 88	72.7	44 56.7	09 88	72.0	44 59.2	08 87	71.3	45 03.3	06 86	69.9	45 08.4	03 85	67.1	45 09.3	01 83	64.2	45 08.9	02 82	63.5	45 07.3	04 81	62.1	50
1	44 01.3	10 88	72.6	44 04.2	09 88	71.9	44 06.9	08 87	71.2	44 11.4	07 86	69.8	44 17.6	03 85	67.0	44 19.6	00 83	64.2	44 19.5	01 82	63.5	44 18.5	03 81	62.1	1
2	43 08.6	11 88	72.5	43 11.7	10 87	71.8	43 14.6	09 87	71.1	43 19.6	08 86	69.7	43 26.7	04 85	67.0	43 29.9	01 83	64.2	43 30.0	00 82	63.5	43 29.6	02 81	62.2	2
3	42 15.9	11 88	72.3	42 19.3	11 87	71.7	42 22.3	10 87	71.0	42 27.8	08 86	69.6	42 35.9	05 85	66.9	42 40.1	02 83	64.2	42 40.6	01 82	63.5	42 40.8	00 81	62.2	3
4	41 23.3	12 88	72.2	41 26.8	11 87	71.5	41 30.1	11 87	70.9	41 36.0	09 86	69.5	41 45.1	06 85	66.9	41 50.4	03 83	64.2	41 51.1	02 82	63.5	41 51.9	01 81	62.2	4
55	40 30.8	13 88	72.1	40 34.5	12 87	71.4	40 38.0	11 87	70.7	40 44.3	10 86	69.4	40 54.3	07 85	66.8	41 00.7	04 83	64.2	41 01.7	03 82	63.5	41 03.1	02 81	62.2	55
6	39 38.2	13 88	71.9	39 42.2	13 87	71.3	39 45.9	12 87	70.6	39 52.6	11 86	69.3	40 03.6	08 84	66.7	40 11.0	05 83	64.1	40 12.3	04 82	63.5	40 14.2	03 81	62.1	6
7	38 45.8	14 87	71.7	38 49.9	13 87	71.1	38 53.8	13 87	70.5	39 01.0	11 86	69.2	39 12.8	08 84	66.6	39 21.3	06 83	64.1	39 22.9	05 82	63.4	39 25.4	03 81	62.1	7
8	37 53.3	15 87	71.6	37 57.6	14 87	71.0	38 01.8	13 87	70.3	38 09.4	12 86	69.1	38 22.2	09 84	66.5	38 31.7	07 83	64.0	38 33.5	06 82	63.4	38 36.6	04 81	62.1	8
9	37 01.0	15 87	71.4	37 05.5	15 87	70.8	37 09.8	14 86	70.2	37 17.8	13 86	68.9	37 31.5	10 84	66.4	37 42.0	07 83	63.9	37 44.2	07 82	63.3	37 47.8	05 81	62.0	9
60	36 08.6	16 87	71.2	36 13.3	15 87	70.6	36 17.8	15 86	70.0	36 26.3	13 86	68.8	36 40.9	11 84	66.3	36 52.5	08 83	63.8	36 54.9	08 82	63.2	36 59.1	06 81	62.0	60
1	35 16.4	17 87	71.1	35 21.3	16 87	70.5	35 26.0	15 86	69.9	35 34.8	14 86	68.6	35 50.4	12 84	66.2	36 02.9	09 82	63.7	36 05.6	09 82	63.1	36 10.3	07 81	61.9	1
2	34 24.2	17 87	70.9	34 29.2	17 86	70.3	34 34.1	16 86	69.7	34 43.4	15 86	68.5	34 59.8	13 84	66.1	35 13.4	10 82	63.6	35 16.3	09 82	63.0	35 21.6	08 81	61.8	2
3	33 32.0	18 87	70.7	33 37.3	17 86	70.1	33 42.4	17 86	69.5	33 52.1	16 86	68.3	34 09.4	13 84	65.9	34 23.9	11 82	63.5	34 27.1	10 82	62.9	34 33.0	09 81	61.7	3
4	32 39.9	18 87	70.5	32 45.4	18 86	69.9	32 50.7	17 86	69.3	33 00.8	16 85	68.2	33 19.0	14 84	65.8	33 34.5	12 82	63.4	33 38.0	11 82	62.8	33 44.3	10 81	61.6	4
65	31 47.9	19 87	70.3	31 53.5	19 86	69.7	31 59.0	18 86	69.2	32 09.5	17 85	68.0	32 28.6	15 84	65.7	32 45.1	13 82	63.3	32 48.8	12 82	62.7	32 55.8	11 81	61.5	65
6	30 55.9	20 86	70.1	31 01.7	19 86	69.5	31 07.4	19 86	69.0	31 18.4	18 85	67.8	31 38.3	16 84	65.5	31 55.8	13 82	63.2	31 59.8	13 82	62.6	32 07.2	12 81	61.4	6
7	30 04.0	20 86	69.9	30 10.0	20 86	69.3	30 15.9	19 86	68.8	30 27.2	18 85	67.6	30 48.1	16 84	65.3	31 06.6	14 82	63.0	31 10.8	14 82	62.5	31 18.8	13 81	61.3	7
8	29 12.2	21 86	69.7	29 18.4	21 86	69.1	29 24.5	20 86	68.6	29 36.2	19 85	67.4	29 58.0	17 84	65.2	30 17.4	15 82	62.9	30 21.8	15 81	62.3	30 30.4	14 81	61.2	8
9	28 20.4	22 86	69.5	28 26.8	21 86	68.9	28 33.1	21 86	68.4	28 45.2	20 85	67.3	29 07.9	18 83	65.0	29 28.2	16 82	62.7	29 33.0	16 81	62.2	29 42.0	15 80	61.0	9
70	27 28.7	22 86	69.3	27 35.3	22 86	68.7	27 41.8	21 85	68.2	27 54.3	20 85	67.1	28 17.8	19 83	64.8	28 39.2	17 82	62.6	28 44.2	16 81	62.0	28 53.7	15 80	60.9	70
1	26 37.1	23 86	69.0	26 43.9	22 86	68.5	26 50.6	22 85	67.9	27 03.5	21 84	66.9	27 27.9	19 83	64.6	27 50.2	18 82	62.4	27 55.4	17 81	61.9	28 05.5	16 80	60.8	1
2	25 45.6	23 86	68.8	25 52.5	23 85	68.3	25 59.4	23 85	67.7	26 12.8	22 84	66.6	26 38.0	20 83	64.5	27 01.3	19 81	62.3	27 06.7	18 81	61.7	27 17.3	17 80	60.6	2
3	24 54.1	24 86	68.6	25 01.3	24 85	68.0	25 08.3	23 85	67.5	25 22.1	23 84	66.4	25 48.2	21 83	64.3	26 12.4	19 81	62.1	26 18.1	19 81	61.5	26 29.2	18 80	60.4	3
4	24 02.7	25 86	68.3	24 10.1	24 85	67.8	24 17.4	24 85	67.3	24 31.5	23 84	66.2	24 58.5	22 83	64.1	25 23.6	20 81	61.9	25 29.6	20 81	61.4	25 41.2	19 80	60.3	4
75	23 11.4	25 85	68.1	23 19.0	25 85	67.6	23 26.5	25 85	67.0	23 41.0	24 84	66.0	24 08.9	22 82	63.9	24 35.0	21 81	61.7	24 41.2	21 80	61.2	24 53.3	20 80	60.1	75
6	22 20.2	26 85	67.9	22 28.0	26 85	67.3	22 35.6	25 84	66.8	22 50.6	25 84	65.8	23 19.4	23 82	63.6	23 46.4	22 81	61.5	23 52.9	21 80	61.0	24 05.5	21 80	59.9	6
7	21 29.1	27 85	67.6	21 37.1	26 85	67.1	21 44.9	26 84	66.6	22 00.3	25 84	65.5	22 29.9	24 82	63.4	22 57.9	23 81	61.3	23 04.6	22 80	60.8	23 17.7	22 79	59.7	7
8	20 38.1	27 85	67.3	20 46.3	27 85	66.8	20 54.3	27 84	66.3	21 10.1	26 84	65.3	21 40.6	25 82	63.2	22 09.5	23 80	61.1	22 16.4	23 80	60.6	22 30.1	22 79	59.5	8
9	19 47.2	28 85	67.1	19 55.5	28 84	66.6	20 03.8	27 84	66.1	20 20.0	27 83	65.0	20 51.3	25 82	62.9	21 21.2	24 80	60.9	21 28.4	24 80	60.4	21 42.5	23 79	59.3	9
80	18 56.4	29 84	66.8	19 04.9	28 84	66.3	19 13.3	28 84	65.8	19 30.0	27 83	64.8	20 02.2	26 82	62.7	20 32.9	25 80	60.7	20 40.4	25 80	60.2	20 55.1	24 79	59.1	80
1	18 05.7	29 84	66.6	18 14.4	29 84	66.1	18 23.0	29 84	65.5	18 40.0	28 83	64.5	19 13.1	27 82	62.5	19 44.8	26 80	60.5	19 52.5	26 80	59.9	20 07.7	25 79	58.9	1
2	17 15.0	30 84	66.3	17 23.9	30 84	65.8	17 32.8	29 84	65.3	17 50.2	29 83	64.3	18 24.2	28 81	62.3	18 56.8	27 80	60.2	19 04.8	26 79	59.7	19 20.5	26 79	58.7	2
3	16 24.5	30 84	66.0	16 33.6	30 84	65.5	16 42.7	30 83	65.0	17 00.5	30 83	64.0	17 35.4	29 81	62.0	18 09.0	27 80	60.0	18 17.2	27 79	59.5	18 33.3	27 78	58.5	3
4	15 34.1	31 84	65.7	15 43.4	31 84	65.2	15 52.7	31 83	64.7	16 10.9	30 82	63.7	16 46.6	29 81	61.8	17 21.2	28 79	59.7	17 29.7	28 79	59.2	17 46.3	28 78	58.2	4
85	14 43.8	32 84	65.4	14 53.3	32 83	64.9	15 02.8	31 83	64.5	15 21.5	31 82	63.5	15 58.1	30 81	61.5	16 33.6	29 79	59.5	16 42.2	29 79	59.0	16 59.4	28 78	58.0	85
6	13 53.7	32 84	65.1	14 03.4	32 83	64.7	14 13.0	32 83	64.2	14 32.1	32 82	63.2	15 09.6	31 81	61.2	15 46.0	30 79	59.2	15 55.0	30 79	58.7	16 12.7	29 78	57.8	6
7	13 03.6	33 83	64.8	13 13.5	33 83	64.4	13 23.4	33 82	63.9	13 42.9	32 82	62.9	14 21.2	32 80	60.9	14 58.6	31 79	59.0	15 07.8	31 78	58.5	15 26.0	30 78	57.5	7
8	12 13.7	34 83	64.5	12 23.8	34 83	64.1	12 33.8	33 82	63.6	12 53.8	33 82	62.6	13 33.0	32 80	60.7	14 11.4	32 78	58.7	14 20.8	31 78	58.2	14 39.5	31 77	57.2	8
9	11 23.9	34 83	64.2	11 34.2	34 82	63.8	11 44.4	34 82	63.3	12 04.8	34 81	62.3	12 44.9	33 80	60.4	13 24.2	32 78	58.4	13 33.9	32 78	58.0	13 53.1	32 77	57.0	9
90	10 34.2	35 82	63.9	10 44.7	35 82	63.5	10 55.2	35 82	63.0	11 16.0	35 81	62.0	11 57.0	34 80	60.1	12 37.2	33 78	58.2	12 47.2	33 78	57.7	13 06.9	33 77	56.7	90

H.A.	28° 00′ Alt.	Az.	28° 30′ Alt.	Az.	29° 00′ Alt.	Az.	30° 00′ Alt.	Az.	32° 00′ Alt.	Az.	34° 00′ Alt.	Az.	34° 30′ Alt.	Az.	35° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	39 00.0 1.0 01	180.0	38 30.0 1.0 01	180.0	38 00.0 1.0 01	180.0	37 00.0 1.0 01	180.0	35 00.0 1.0 01	180.0	33 00.0 1.0 01	180.0	32 30.0 1.0 01	180.0	31 30.0 1.0 01	180.0	00
1	38 59.5 1.0 03	178.9	38 29.5 1.0 03	178.9	37 59.5 1.0 03	178.9	36 59.5 1.0 03	178.9	34 59.5 1.0 02	179.0	32 59.5 1.0 02	179.0	32 29.5 1.0 02	179.0	31 29.5 1.0 02	179.0	1
2	38 57.8 1.0 04	177.7	38 27.8 1.0 04	177.8	37 57.9 1.0 04	177.8	36 57.9 1.0 04	177.8	34 58.0 1.0 04	177.9	32 58.1 1.0 04	178.0	32 28.1 1.0 04	178.1	31 28.2 1.0 04	178.1	2
3	38 55.1 1.0 06	176.6	38 25.1 1.0 06	176.7	37 55.2 1.0 06	176.7	36 55.3 1.0 06	176.8	34 55.5 1.0 06	176.9	32 55.7 1.0 06	177.0	32 25.8 1.0 06	177.1	31 25.9 1.0 06	177.1	3
4	38 51.3 1.0 08	175.5	38 21.4 1.0 08	175.5	37 51.5 1.0 08	175.6	36 51.6 1.0 08	175.7	34 52.0 1.0 08	175.9	32 52.4 1.0 07	176.1	32 22.5 1.0 07	176.1	31 22.6 1.0 07	176.2	4
05	38 46.3 99 10	174.3	38 16.5 99 10	174.4	37 46.7 99 10	174.5	36 47.0 99 10	174.6	34 47.5 1.0 09	174.8	32 48.1 1.0 09	175.1	32 18.2 1.0 08	175.1	31 18.5 1.0 08	175.2	05
6	38 40.3 99 12	173.2	38 10.6 99 12	173.3	37 40.8 99 12	173.4	36 41.2 99 11	173.5	34 42.1 99 11	173.8	32 42.9 99 10	174.1	32 13.1 99 10	174.2	31 13.5 99 10	174.3	6
7	38 33.3 99 14	172.1	38 03.6 99 13	172.2	37 33.9 99 13	172.3	36 34.5 99 13	172.4	34 35.6 99 12	172.8	32 36.7 99 12	173.1	32 07.0 99 12	173.2	31 07.5 99 11	173.3	7
8	38 25.2 99 15	171.0	37 55.6 99 15	171.1	37 26.0 99 15	171.2	36 26.7 99 15	171.4	34 28.2 99 14	171.8	32 29.6 99 13	172.1	32 00.9 99 13	172.2	31 00.7 99 13	172.4	8
9	38 16.0 98 17	169.9	37 46.5 98 17	170.0	37 17.0 98 17	170.1	36 17.9 98 16	170.3	34 19.8 98 16	170.8	32 21.6 99 15	171.2	31 52.1 99 15	171.3	30 52.9 99 14	171.5	9
10	38 05.7 98 19	168.8	37 36.3 98 18	168.9	37 07.0 98 18	169.0	36 08.2 98 18	169.3	34 10.5 98 17	169.7	32 12.7 98 16	170.2	31 43.2 98 16	170.3	30 44.3 98 16	170.5	10
1	37 54.4 97 20	167.7	37 25.2 98 20	167.8	36 55.9 98 20	167.9	35 57.4 98 20	168.2	34 00.2 98 19	168.7	32 02.8 98 18	169.2	31 33.5 98 18	169.4	30 34.8 98 17	169.6	1
2	37 42.1 97 22	166.6	37 13.0 97 22	166.7	36 43.9 97 22	166.9	35 45.6 97 21	167.2	33 48.9 97 20	167.7	31 52.1 97 20	168.3	31 22.8 97 19	168.4	30 24.4 98 19	168.7	2
3	37 28.8 97 24	165.5	36 59.9 97 24	165.7	36 30.9 97 23	165.8	35 32.9 97 23	166.1	33 36.7 97 22	166.8	31 40.4 97 21	167.3	31 11.3 97 21	167.5	30 13.1 97 20	167.8	3
4	37 14.5 96 26	164.4	36 45.7 96 25	164.6	36 16.9 96 25	164.8	35 19.2 96 24	165.1	33 23.6 96 23	165.8	31 27.9 97 22	166.4	30 58.9 97 22	166.6	30 00.9 97 22	166.9	4
15	36 59.2 95 27	163.4	36 30.5 96 27	163.6	36 01.9 96 26	163.7	35 04.5 96 26	164.1	33 09.6 96 25	164.8	31 14.4 96 24	165.5	30 45.6 96 24	165.6	29 48.0 96 23	165.9	15
6	36 42.9 95 29	162.3	36 14.5 95 28	162.5	35 45.9 95 28	162.7	34 48.9 95 28	163.1	32 54.7 95 26	163.8	31 00.2 96 25	164.5	30 31.5 96 25	164.7	29 34.1 96 24	165.0	6
7	36 25.7 94 30	161.3	35 57.4 94 30	161.5	35 29.1 94 30	161.7	34 32.4 95 29	162.1	32 38.8 95 28	162.9	30 45.0 95 27	163.6	30 16.5 95 26	163.8	29 19.5 95 26	164.2	7
8	36 07.5 94 32	160.3	35 39.4 94 32	160.5	35 11.3 94 31	160.7	34 15.0 94 30	161.1	32 22.1 94 29	161.9	30 29.0 94 28	162.7	30 00.7 94 28	162.9	29 04.0 95 27	163.3	8
9	35 48.4 93 33	159.2	35 20.5 93 33	159.5	34 52.5 93 33	159.7	33 56.6 93 32	160.1	32 04.6 94 31	161.0	30 12.2 94 30	161.8	29 44.0 94 29	162.0	28 47.7 94 28	162.4	9
20	35 28.3 92 35	158.2	35 00.6 92 34	158.5	34 32.9 92 34	158.7	33 37.4 93 34	159.2	31 46.2 93 32	160.1	29 54.5 93 31	160.9	29 26.6 93 30	161.1	28 30.6 93 30	161.5	20
1	35 07.4 92 36	157.2	34 39.9 92 36	157.5	34 12.4 92 36	157.7	33 17.4 92 35	158.2	31 26.9 92 34	159.1	29 36.0 93 32	160.0	29 08.3 93 32	160.2	28 12.7 93 31	160.7	1
2	34 45.6 91 38	156.3	34 18.3 91 37	156.5	33 51.1 91 37	156.8	32 56.4 91 36	157.3	31 06.8 92 35	158.2	29 16.8 92 34	159.1	28 49.2 92 33	159.4	27 54.0 92 32	159.8	2
3	34 22.9 90 39	155.3	33 55.9 90 39	155.6	33 28.9 90 38	155.8	32 34.7 90 38	156.3	30 45.9 91 36	157.3	28 56.7 91 35	158.3	28 29.4 91 34	158.5	27 34.6 91 34	159.0	3
4	33 59.4 89 40	154.3	33 32.6 89 40	154.6	33 05.8 89 40	154.9	32 12.1 90 39	155.4	30 24.2 90 38	156.4	28 35.9 90 36	157.4	28 08.7 91 36	157.7	27 14.4 91 35	158.1	4
25	33 35.1 88 42	153.4	33 08.5 89 42	153.7	32 42.0 89 41	153.9	31 48.7 89 40	154.5	30 01.7 89 39	155.5	28 14.3 90 37	156.6	27 47.4 90 37	156.8	26 53.4 90 36	157.3	25
6	33 10.0 88 43	152.5	32 43.6 88 43	152.7	32 17.3 88 42	153.0	31 24.5 88 42	153.6	29 38.5 89 40	154.7	27 52.0 89 38	155.7	27 25.3 89 38	156.0	26 31.8 89 37	156.5	6
7	32 44.0 87 44	151.5	32 18.0 87 44	151.8	31 51.9 87 44	152.1	30 59.6 87 43	152.7	29 14.5 88 41	153.8	27 28.9 88 40	154.9	27 02.4 88 39	155.2	26 09.4 88 38	155.7	7
8	32 17.3 86 46	150.6	31 51.5 86 45	150.9	31 25.7 86 45	151.2	30 33.9 87 44	151.8	28 49.8 87 42	153.0	27 05.1 87 41	154.1	26 38.9 88 40	154.4	25 46.3 88 40	154.9	8
9	31 49.9 85 47	149.8	31 24.3 85 46	150.1	30 58.7 85 46	150.4	30 07.4 86 45	151.0	28 24.3 86 44	152.1	26 40.6 87 42	153.3	26 14.6 87 42	153.5	25 22.5 87 41	154.1	9
30	31 21.7 84 48	148.9	30 56.4 84 48	149.2	30 31.0 85 47	149.5	29 40.2 85 46	150.1	27 58.1 85 45	151.3	26 15.4 86 43	152.5	25 49.7 86 43	152.8	24 58.0 86 42	153.3	30
1	30 52.8 83 49	148.0	30 27.7 84 49	148.3	30 02.7 84 48	148.6	29 12.4 84 48	149.3	27 31.3 85 46	150.5	25 49.6 85 44	151.7	25 24.0 85 44	152.0	24 32.9 85 43	152.6	1
2	30 23.1 82 50	147.2	29 58.4 83 50	147.5	29 33.6 83 50	147.8	28 43.8 83 49	148.4	27 03.7 84 47	149.7	25 23.0 84 45	150.9	24 57.8 84 45	151.2	24 07.1 85 44	151.8	2
3	29 52.9 82 52	146.3	29 28.4 82 51	146.7	29 03.8 82 51	147.0	28 14.6 82 50	147.6	26 35.5 83 48	148.9	24 55.8 83 46	150.1	24 30.8 83 46	150.4	23 40.7 84 45	151.0	3
4	29 21.9 81 53	145.5	28 57.7 81 52	145.8	28 33.4 81 52	146.2	27 44.7 81 51	146.8	26 06.7 82 49	148.1	24 28.0 82 47	149.4	24 03.3 83 47	149.7	23 13.6 83 46	150.3	4
35	28 50.3 80 54	144.7	28 26.3 80 53	145.0	28 02.3 80 53	145.4	27 14.1 80 52	146.0	25 37.2 81 50	147.4	23 59.6 82 48	148.6	23 35.1 82 48	148.9	22 46.0 82 47	149.6	35
6	28 18.0 79 55	143.9	27 54.3 79 54	144.2	27 30.6 79 54	144.6	26 43.0 80 53	145.3	25 07.1 80 51	146.6	23 30.5 81 49	147.9	23 06.3 81 49	148.2	22 17.7 81 48	148.9	6
7	27 45.2 78 56	143.1	27 21.8 78 55	143.5	26 58.3 78 55	143.8	26 11.2 79 54	144.5	24 36.4 79 52	145.8	23 00.9 80 50	147.2	22 36.9 80 50	147.5	21 48.8 80 49	148.1	7
8	27 11.7 77 57	142.3	26 48.6 77 56	142.7	26 25.4 77 56	143.0	25 38.8 78 55	143.7	24 05.1 78 53	145.1	22 30.7 79 51	146.5	22 07.0 79 51	146.8	21 19.4 79 50	147.4	8
9	26 37.7 76 58	141.6	26 14.8 76 57	141.9	25 51.9 77 57	142.3	25 05.9 77 56	143.0	23 33.2 78 54	144.4	21 59.9 78 52	145.8	21 36.4 78 52	146.1	20 49.4 78 51	146.8	9
40	26 03.1 75 59	140.8	25 40.5 75 58	141.2	25 17.8 76 58	141.6	24 32.3 76 57	142.3	23 00.8 77 55	143.7	21 28.5 77 53	145.1	21 05.3 77 53	145.4	20 18.9 78 52	146.1	40
1	25 27.9 74 60	140.1	25 05.6 75 59	140.5	24 43.2 75 59	140.8	23 58.3 75 58	141.6	22 27.8 76 56	143.0	20 56.6 76 54	144.4	20 33.7 76 54	144.7	19 47.8 77 53	145.4	1
2	24 52.2 73 60	139.4	24 30.1 74 60	139.7	24 08.0 74 60	140.1	23 23.7 74 58	140.8	21 54.3 75 57	142.3	20 24.2 75 55	143.7	20 01.6 76 54	144.1	19 16.2 76 54	144.8	2
3	24 16.0 73 61	138.7	23 54.2 73 61	139.0	23 32.4 73 60	139.4	22 48.5 73 59	140.2	21 20.3 74 58	141.6	19 51.2 74 56	143.0	19 28.9 75 55	143.4	18 44.0 75 54	144.1	3
4	23 39.2 72 62	138.0	23 17.7 72 62	138.3	22 56.2 72 61	138.7	22 12.9 72 60	139.5	20 45.7 73 58	140.9	19 17.8 74 57	142.4	18 55.7 74 56	142.8	18 11.4 74 55	143.5	4
45	23 02.0 71 63	137.3	22 40.8 71 62	137.7	22 19.5 71 62	138.0	21 36.7 71 61	138.8	20 10.7 72 59	140.3	18 43.8 73 57	141.8	18 22.0 73 57	142.1	17 38.3 73 56	142.8	45
6	22 24.3 70 64	136.6	22 03.3 70 63	137.0	21 42.3 70 63	137.4	21 00.1 71 62	138.1	19 35.1 71 60	139.6	18 09.4 72 58	141.1	17 47.9 72 58	141.5	17 04.7 72 57	142.2	6
7	21 46.1 69 64	135.9	21 25.4 69 64	136.3	21 04.7 69 64	136.7	20 23.0 70 62	137.5	18 59.1 70 61	139.0	17 34.5 71 59	140.5	17 13.3 71 58	140.9	16 30.6 71 58	141.6	7
8	21 07.5 68 65	135.3	20 47.1 68 65	135.7	20 26.6 68 64	136.1	19 45.5 69 63	136.9	18 22.7 69 62	138.4	16 59.2 70 60	139.9	16 38.2 70 59	140.3	15 56.1 70 58	141.0	8
9	20 28.4 67 66	134.7	20 08.3 67 66	135.1	19 48.1 67 65	135.4	19 07.5 68 64	136.2	17 45.8 68 62	137.8	16 23.4 69 60	139.3	16 02.7 69 60	139.7	15 21.1 69 59	140.4	9
50	19 48.9 66 66	134.0	19 29.0 66 66	134.4	19 09.1 67 66	134.8	18 29.1 67 65	135.6	17 08.5 67 63	137.2	15 47.1 68 61	138.7	15 26.7 68 61	139.1	14 45.7 68 60	139.8	50
1	19 09.0 65 67	133.4	18 49.4 65 67	133.8	18 29.7 66 66	134.2	17 50.2 66 65	135.0	16 30.7 67 64	136.6	15 10.5 67 62	138.1	14 50.3 67 61	138.5	14 09.9 67 60	139.3	1
2	18 28.7 64 68	132.8	18 09.3 65 67	133.2	17 49.9 65 67	133.6	17 11.0 65 66	134.4	15 52.5 66 64	136.0	14 33.4 66 62	137.5	14 13.5 66 62	137.9	13 33.6 67 61	138.7	2
3	17 48.0 64 68	132.2	17 28.9 64 68	132.6	17 09.8 64 68	133.0	16 31.3 64 67	133.8	15 14.0 65 65	135.4	13 55.9 65 63	137.0	13 36.3 65 63	137.4	12 57.0 66 62	138.2	3
4	17 06.9 63 69	131.6	16 48.1 63 69	132.0	16 29.2 63 68	132.5	15 51.3 63 67	133.3	14 35.0 64 66	134.9	13 18.1 64 64	136.4	12 58.7 65 63	136.8	12 20.0 65 62	137.6	4
55	16 25.4 62 70	131.1	16 06.9 62 69	131.5	15 48.3 62 69	131.9	15 10.9 62 68	132.7	13 55.7 63 66	134.3	12 39.8 63 64	135.9	12 20.7 64 64	136.3	11 42.5 64 63	137.1	55
6	15 43.6 61 70	130.5	15 25.3 61 70	130.9	15 06.9 61 69	131.3	14 30.1 62 68	132.1	13 15.9 62 67	133.8	12 01.2 63 65	135.4	11 42.4 63 64	135.8	11 04.7 63 64	136.5	6
7	15 01.4 60 71	130.0	14 43.4 60 70	130.4	14 25.3 60 70	130.8	13 49.0 61 69	131.6	12 35.9 61 67	133.2	11 22.2 62 66	134.8	11 03.7 62 65	135.2	10 26.6 62 64	136.0	7
8	14 18.9 59 71	129.4	14 01.1 59 71	129.8	13 43.3 60 70	130.2	13 07.5 60 70	131.1	11 55.4 60 68	132.7	10 42.8 61 66	134.3	10 24.6 61 66	134.7	9 48.0 61 65	135.5	8
9	13 36.1 58 72	128.9	13 18.5 59 72	129.3	13 01.0 59 71	129.7	12 25.7 59 70	130.5	11 14.7 59 68	132.2	10 03.1 60 67	133.8	9 45.2 60 66	134.2	9 09.2 60 65	135.0	9
60	12 52.9 58 72	128.3	12 35.6 58 72	128.8	12 18.3 58 72	129.2	11 43.5 58 71	130.0	10 33.6 59 69	131.7	9 23.1 59 67	133.3	9 05.4 59 67	133.7	8 30.0 59 66	134.5	60
1	12 09.4 57 73	127.8	11 52.4 57 72	128.2	11 35.3 57 72	128.7	11 01.1 57 71	129.5	9 52.2 58 70	131.2	8 42.8 58 68	132.8	8 25.3 58 67	133.2	7 50.4 58 66	134.0	1
2	11 25.7 56 74	127.3	11 08.9 56 73	127.7	10 52.0 56 73	128.2	10 18.3 56 72	129.0	9 10.4 57 70	130.7	8 02.1 57 68	132.3	7 44.9 57 68	132.7	7 10.6 57 67	133.6	2
3	10 41.6 55 74	126.8	10 25.0 55 74	127.2	10 08.5 55 73	127.7	9 35.2 56 72	128.5	8 28.4 56 70	130.2	7 21.1 56 69	131.9	7 04.2 56 68	132.3	6 30.4 56 68	133.1	3
4	9 57.2 54 74	126.3	9 40.9 54 74	126.7	9 24.6 54 74	127.2	8 51.9 55 73	128.0	7 46.0 55 71	129.7	6 39.8 55 69	131.4	6 23.2 55 69	131.8	5 49.9 56 68	132.6	4
65	9 12.6 53 75	125.8	8 56.5 54 74	126.3	8 40.5 54 74	126.7	8 08.2 54 73	127.5	7 03.4 54 72	129.2	5 58.2 54 70	130.9	5 41.9 55 69	131.4	5 09.2 55 68	132.2	65
6	8 27.7 53 75	125.4	8 11.9 53 75	125.8	7 56.0 53 74	126.2	7 24.3 53 74	127.1	6 20.5 53 72	128.8	5 16.4 54 70	130.5	5 00.3 54 70	130.9			6
7	7 42.5 52 76	124.9	7 26.9 52 75	125.3	7 11.3 52 75	125.8	6 40.1 52 74	126.6	5 37.3 52 72	128.3							7
8	6 57.1 51 76	124.5	6 41.8 51 76	124.9	6 26.4 51 75	125.3	5 55.6 51 74	126.2									8
9	6 11.4 50 76	124.0	5 56.3 50 76	124.4	5 41.2 50 76	124.9	5 10.9 51 75	125.7									9
70	5 25.5 49 77	123.5	5 10.6 50 76	124.0													70

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′ Alt.	Az.	28° 30′ Alt.	Az.	29° 00′ Alt.	Az.	30° 00′ Alt.	Az.	32° 00′ Alt.	Az.	34° 00′ Alt.	Az.	34° 30′ Alt.	Az.	35° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
91	9 44.7 36 82	63.6	9 55.4 36 82	63.1	10 06.0 35 82	62.7	10 27.3 35 81	61.7	11 09.2 35 80	59.8	11 50.4 34 78	57.9	12 00.6 34 78	57.4	12 20.8 34 77	56.4	91
2	8 55.3 36 82	63.3	9 06.2 36 82	62.8	9 17.1 36 81	62.3	9 38.7 36 81	61.4	10 21.5 35 79	59.5	11 03.7 35 78	57.6	11 14.1 35 77	57.1	11 34.8 34 76	56.2	2
3	8 06.0 37 82	63.0	8 17.1 37 82	62.5	8 28.2 37 81	62.0	8 50.3 37 80	61.1	9 34.0 36 79	59.2	10 17.1 36 77	57.3	10 27.8 36 77	56.8	10 49.0 35 76	55.9	3
4	7 16.9 38 82	62.6	7 28.2 38 81	62.2	7 39.5 38 81	61.7	8 02.0 37 80	60.7	8 46.7 37 79	58.9	9 30.7 36 77	57.0	9 41.7 36 77	56.5	10 03.4 36 76	55.6	4
95	6 27.9 39 81	62.3	6 39.5 38 81	61.8	6 51.0 38 81	61.3	7 13.9 38 80	60.4	7 59.5 38 78	58.6	8 44.5 37 77	56.7	8 55.7 37 76	56.2	9 17.9 37 76	55.3	95
6	5 39.1 39 81	61.9	5 50.9 39 81	61.5	6 02.6 39 80	61.0	6 26.0 39 80	60.1	7 12.4 39 78	58.2	7 58.4 38 76	56.4	8 09.9 38 76	55.9	8 32.6 38 75	55.0	6
7			5 02.4 40 81	61.1	5 14.4 40 80	60.7	5 38.2 40 80	59.7	6 25.6 39 78	57.9	7 12.5 39 76	56.0	7 24.2 39 76	55.6	7 47.5 39 75	54.6	7
8									5 38.9 40 78	57.6	6 26.8 40 76	55.7	6 38.8 40 76	55.2	7 02.5 40 74	54.3	8
9											5 41.3 41 76	55.4	5 53.5 41 75	54.9	6 17.8 40 74	54.0	9
100													5 08.4 41 75	54.6	5 33.2 41 74	53.7	100

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	77 00.0	1.0 03	00.0	76 00.0	1.0 03	00.0	74 30.0	1.0 02	00.0	73 00.0	1.0 02	00.0	71 00.0	1.0 02	00.0	70 30.0	1.0 02	00.0	70 00.0	1.0 02	00.0	68 00.0	1.0 02	00.0	00
1	76 58.3	1.0 09	03.6	75 58.4	1.0 08	03.3	74 28.6	1.0 07	02.9	72 58.7	1.0 06	02.6	70 58.9	1.0 06	02.3	70 28.9	1.0 05	02.2	69 59.0	1.0 05	02.1	67 59.1	1.0 04	01.9	1
2	76 53.1	99 14	07.1	75 53.7	99 13	06.6	74 24.4	99 12	05.8	72 55.0	99 10	05.2	70 55.6	1.0 09	04.6	70 25.7	1.0 09	04.4	69 55.9	1.0 08	04.3	67 56.4	1.0 08	03.8	2
3	76 44.6	98 20	10.6	75 45.8	98 18	09.8	74 17.4	98 16	08.7	72 48.7	99 14	07.8	70 50.1	99 13	06.8	70 20.5	99 12	06.6	69 50.8	99 12	06.4	67 51.8	99 10	05.6	3
4	76 32.7	96 25	14.0	75 34.9	97 23	12.9	74 07.7	97 20	11.5	72 40.0	98 18	10.3	70 42.5	98 16	09.0	70 13.1	98 16	08.7	69 43.6	98 15	08.5	67 45.5	99 14	07.5	4
05	76 17.8	94 30	17.3	75 21.1	95 28	16.0	73 55.4	96 25	14.3	72 28.9	96 22	12.8	70 32.8	97 20	11.2	70 03.7	97 19	10.9	69 34.5	97 18	10.5	67 37.5	98 16	09.3	05
6	75 59.9	92 34	20.5	75 04.6	93 32	18.9	73 40.5	94 29	16.9	72 15.5	95 26	15.2	70 21.1	96 23	13.4	69 52.3	96 22	12.9	69 23.5	96 22	12.5	67 27.7	97 19	11.1	6
7	75 39.3	89 39	23.4	74 45.4	90 36	21.7	73 23.3	92 33	19.5	71 59.9	93 30	17.6	70 07.3	94 26	15.5	69 39.0	95 25	15.0	69 10.5	95 24	14.5	67 16.2	96 22	12.9	7
8	75 16.0	86 43	26.3	74 23.7	88 40	24.4	73 03.7	90 36	22.0	71 42.2	91 33	19.9	69 51.7	93 29	17.5	69 23.8	93 28	17.0	68 55.8	93 28	16.5	67 03.0	94 24	14.6	8
9	74 50.4	83 46	28.9	73 59.8	85 43	26.9	72 42.0	87 40	24.3	71 22.4	89 36	22.0	69 34.2	91 32	19.5	69 06.8	91 31	18.9	68 39.3	92 30	18.3	66 48.3	93 27	16.3	9
10	74 22.6	80 50	31.4	73 33.7	83 47	29.3	72 18.3	85 43	26.6	71 00.8	87 39	24.1	69 14.9	89 35	21.4	68 48.1	90 34	20.7	68 21.1	90 33	20.1	66 32.0	92 30	18.0	10
1	73 52.9	77 53	33.8	73 05.7	80 50	31.6	71 52.7	83 46	28.7	70 37.3	85 42	26.1	68 54.0	87 38	23.2	68 27.7	88 36	22.5	68 01.3	88 36	21.9	66 14.3	90 32	19.6	1
2	73 21.3	74 55	36.0	72 35.9	77 52	33.7	71 25.3	80 48	30.7	70 12.2	83 45	28.1	68 31.4	85 40	25.0	68 05.8	86 39	24.3	67 39.9	86 38	23.6	65 55.1	88 34	21.1	2
3	72 48.1	71 58	38.0	72 04.4	74 55	35.7	70 56.3	77 51	32.6	69 45.4	80 47	29.9	68 07.4	83 42	26.7	67 42.3	84 41	25.9	67 17.1	84 40	25.2	65 34.5	87 36	22.6	3
4	72 13.4	68 60	39.9	71 31.5	71 57	37.6	70 25.8	75 53	34.4	69 17.2	78 49	31.6	67 41.9	81 45	28.3	67 17.5	82 44	27.5	66 52.9	82 43	26.8	65 12.6	85 39	24.1	4
15	71 37.3	65 62	41.6	70 57.1	68 59	39.3	69 53.9	72 55	36.1	68 47.6	75 52	33.2	67 15.1	79 47	29.8	66 51.3	80 46	29.0	66 27.4	80 45	28.3	64 49.4	83 41	25.5	15
6	71 00.0	63 64	43.2	70 21.5	66 61	40.9	69 20.7	69 57	37.7	68 16.7	73 54	34.8	66 47.0	77 49	31.3	66 23.9	77 48	30.5	66 00.6	78 47	29.7	64 25.1	81 42	26.8	6
7	70 21.7	60 66	44.7	69 44.8	63 63	42.4	68 46.4	67 59	39.2	67 44.6	70 55	36.3	66 17.7	74 51	32.7	65 55.3	75 50	31.9	65 32.6	76 48	31.1	63 59.6	79 44	28.1	7
8	69 42.3	57 67	46.1	69 07.1	60 64	43.8	68 10.9	64 61	40.6	67 11.4	68 57	37.6	65 47.3	72 52	34.1	65 25.6	73 51	33.2	65 03.5	74 50	32.4	63 33.0	77 46	29.4	8
9	69 02.1	55 68	47.4	68 28.4	58 66	45.1	67 34.5	62 62	41.9	66 37.2	66 59	38.9	65 15.9	70 54	35.3	64 54.8	71 53	34.5	64 33.4	72 52	33.7	63 05.4	75 48	30.6	9
20	68 21.0	52 70	48.6	67 48.8	55 67	46.3	66 57.2	59 64	43.1	66 02.0	63 60	40.2	64 43.5	68 56	36.5	64 23.0	69 54	35.7	64 02.3	69 53	34.8	62 36.9	73 49	31.7	20
1	67 39.3	50 71	49.7	67 06.5	53 68	47.5	66 19.0	57 65	44.3	65 25.9	61 62	41.3	64 10.1	65 57	37.7	63 50.4	66 56	36.8	63 30.3	67 55	36.0	62 07.4	71 51	32.8	1
2	66 56.8	47 72	50.7	66 27.5	50 70	48.5	65 40.1	55 66	45.4	64 49.1	59 63	42.4	63 36.0	63 58	38.8	63 16.9	64 57	37.9	62 57.5	65 56	37.1	61 37.0	69 52	33.9	2
3	66 13.8	45 73	51.7	65 45.8	48 70	49.5	65 00.4	52 67	46.4	64 11.4	56 64	43.4	63 01.0	61 60	39.8	62 42.6	62 58	38.9	62 23.8	63 57	38.1	61 05.8	67 53	34.9	3
4	65 30.2	43 74	52.5	65 03.5	46 71	50.4	64 20.2	50 68	47.3	63 33.1	54 65	44.4	62 25.3	59 61	40.8	62 07.5	60 60	39.9	61 49.4	61 58	39.0	60 33.9	65 54	35.8	4
25	64 46.1	41 74	53.3	64 20.7	44 72	51.2	63 39.3	48 69	48.2	62 54.2	52 66	45.3	61 48.9	57 62	41.7	61 31.7	58 61	40.8	61 14.2	59 60	40.0	60 01.2	63 56	36.7	25
6	64 01.6	39 75	54.1	63 37.4	42 73	52.0	62 57.8	46 70	49.0	62 14.6	50 67	46.1	61 11.9	55 63	42.5	60 55.3	56 62	41.7	60 38.4	57 61	40.8	59 27.8	61 57	37.6	6
7	63 16.7	37 76	54.8	62 53.7	40 74	52.7	62 15.9	44 71	49.8	61 34.6	48 68	46.9	60 34.2	53 64	43.4	60 18.3	54 63	42.5	60 02.0	55 62	41.7	58 53.8	59 58	38.4	7
8	62 31.4	35 76	55.4	62 09.5	38 74	53.4	61 33.5	42 71	50.5	60 54.0	46 68	47.7	59 56.0	51 64	44.1	59 40.7	52 64	43.3	59 25.0	53 62	42.4	58 19.2	57 59	39.2	8
9	61 45.8	33 76	56.0	61 25.0	36 75	54.0	60 50.7	40 72	51.2	60 12.9	44 69	48.4	59 17.3	49 65	44.9	59 02.6	50 64	44.0	58 47.5	51 63	43.2	57 44.0	55 60	40.0	9
30	60 59.9	31 77	56.5	60 40.1	34 75	54.6	60 07.5	38 72	51.8	59 31.4	42 70	49.0	58 38.1	47 66	45.6	58 23.9	48 65	44.7	58 09.4	49 64	43.9	57 08.3	53 60	40.7	30
1	60 13.6	30 78	57.0	59 55.0	32 76	55.1	59 24.0	36 73	52.4	58 49.5	40 70	49.7	57 58.5	45 67	46.2	57 44.9	46 66	45.4	57 30.9	47 65	44.5	56 32.0	51 61	41.3	1
2	59 27.2	28 78	57.5	59 09.5	31 76	55.6	58 40.1	35 74	52.9	58 07.2	38 71	50.2	57 18.4	43 68	46.8	57 05.3	44 66	46.0	56 52.0	45 66	45.2	55 55.3	49 62	42.0	2
3	58 40.5	26 78	57.9	58 23.8	29 77	56.1	57 55.9	33 74	53.4	57 24.6	37 72	50.8	56 37.9	41 68	47.4	56 25.4	42 67	46.6	56 12.6	43 66	45.7	55 18.2	47 63	42.6	3
4	57 53.6	25 78	58.3	57 37.8	28 77	56.5	57 11.4	31 74	53.9	56 41.6	35 72	51.3	55 57.1	39 69	47.9	55 45.2	40 68	47.1	55 32.9	41 67	46.3	54 40.6	46 63	43.1	4
35	57 06.5	23 79	58.7	56 51.7	26 77	56.9	56 26.7	30 75	54.3	55 58.4	33 72	51.7	55 16.0	38 69	48.4	55 04.5	39 68	47.6	54 52.8	40 67	46.8	54 02.7	44 64	43.7	35
6	56 19.2	22 79	59.0	56 05.3	24 78	57.3	55 41.7	28 75	54.7	55 14.9	31 73	52.2	54 34.5	36 70	48.9	54 23.6	37 69	48.1	54 12.3	38 68	47.3	53 24.3	42 64	44.2	6
7	55 31.7	21 79	59.3	55 18.7	23 78	57.6	54 56.5	26 76	55.1	54 31.2	30 73	52.6	53 52.7	34 70	49.3	53 42.3	35 69	48.6	53 31.6	36 68	47.8	52 45.6	40 65	44.7	7
8	54 44.2	19 80	59.6	54 32.0	21 78	57.9	54 11.1	25 76	55.4	53 47.2	28 74	53.0	53 10.7	33 70	49.8	53 00.8	34 70	49.0	52 50.6	35 69	48.2	52 06.7	39 66	45.1	8
9	53 56.4	18 80	59.9	53 45.1	20 78	58.2	53 25.6	23 76	55.7	53 03.0	27 74	53.3	52 28.4	31 71	50.2	52 19.0	32 70	49.4	52 09.2	33 69	48.6	51 27.4	37 66	45.6	9
40	53 08.6	16 80	60.1	52 58.1	19 78	58.5	52 39.8	22 76	56.0	52 18.6	25 74	53.6	51 45.9	29 71	50.5	51 36.9	30 70	49.8	51 27.7	31 70	49.0	50 47.8	35 66	46.0	40
1	52 20.7	15 80	60.3	52 11.0	17 79	58.7	51 53.9	21 77	56.3	51 34.0	24 74	54.0	51 03.2	28 72	50.9	50 54.7	29 71	50.1	50 45.9	30 70	49.3	50 07.9	34 67	46.4	1
2	51 32.7	14 80	60.5	51 23.7	16 79	58.9	51 07.9	19 77	56.6	50 49.3	22 75	54.2	50 20.2	26 72	51.2	50 12.2	27 71	50.4	50 03.9	28 70	49.7	49 27.8	32 67	46.7	2
3	50 44.5	13 80	60.7	50 36.4	15 79	59.1	50 21.8	18 77	56.8	50 04.4	21 75	54.5	49 37.1	25 72	51.5	49 29.5	26 71	50.7	49 21.7	27 71	50.0	48 47.5	30 68	47.1	3
4	49 56.3	11 80	60.8	49 48.9	13 79	59.3	49 35.5	16 77	57.0	49 19.4	19 75	54.7	48 53.8	23 72	51.7	48 46.7	24 72	51.0	48 39.3	25 71	50.3	48 07.0	29 68	47.4	4
45	49 08.1	10 80	61.0	49 01.4	12 79	59.4	48 49.1	15 77	57.2	48 34.2	18 76	54.9	48 10.4	22 73	52.0	48 03.7	23 72	51.3	47 56.8	24 71	50.5	47 26.3	27 68	47.7	45
6	48 19.8	09 81	61.1	48 13.8	11 80	59.6	48 02.7	14 78	57.4	47 49.0	17 76	55.1	47 26.8	20 73	52.2	47 20.5	21 72	51.5	47 14.0	22 72	50.8	46 45.3	26 68	47.9	6
7	47 31.4	08 81	61.2	47 26.1	10 80	59.7	47 16.1	13 78	57.5	47 03.6	15 76	55.3	46 43.1	19 73	52.4	46 37.2	20 72	51.7	46 31.2	21 72	51.0	46 04.3	24 69	48.2	7
8	46 43.0	07 81	61.3	46 38.4	09 80	59.8	46 29.5	11 78	57.6	46 18.1	14 76	55.5	45 59.2	18 73	52.6	45 53.8	18 72	51.9	45 48.2	19 72	51.2	45 23.0	23 69	48.4	8
9	45 54.5	06 81	61.3	45 50.7	07 80	59.9	45 42.8	10 78	57.8	45 32.6	13 76	55.6	45 15.3	16 73	52.8	45 10.3	17 73	52.1	45 05.1	18 72	51.4	44 41.6	21 69	48.6	9
50	45 06.1	04 81	61.4	45 02.8	06 80	60.0	44 56.1	09 78	57.9	44 46.9	11 76	55.8	44 31.2	15 74	53.0	44 26.6	16 73	52.3	44 21.8	16 72	51.6	44 00.1	20 69	48.9	50
1	44 17.6	03 81	61.4	44 15.0	05 80	60.1	44 09.3	08 78	58.0	44 01.3	10 76	55.9	43 47.1	13 74	53.1	43 42.9	14 73	52.4	43 38.5	15 72	51.8	43 18.4	18 70	49.0	1
2	43 29.0	02 81	61.5	43 27.1	04 80	60.1	43 22.4	06 78	58.0	43 15.5	09 76	56.0	43 02.9	12 74	53.3	42 59.1	13 73	52.6	42 55.1	14 72	51.9	42 36.7	17 70	49.2	2
3	42 40.5	01 81	61.5	42 39.2	03 80	60.1	42 35.6	05 78	58.1	42 29.7	08 76	56.1	42 18.6	11 74	53.4	42 15.2	12 73	52.7	42 11.6	12 73	52.0	41 54.8	16 70	49.4	3
4	41 52.0	00 81	61.5	41 51.3	02 80	60.2	41 48.6	04 78	58.2	41 43.9	06 76	56.1	41 34.2	10 74	53.5	41 31.2	10 73	52.8	41 28.0	11 73	52.1	41 12.8	14 70	49.5	4
55	41 03.4	01 81	61.5	41 03.4	01 80	60.2	41 01.7	03 78	58.2	40 58.0	05 76	56.2	40 49.8	08 74	53.6	40 47.2	09 74	52.9	40 44.4	10 73	52.2	40 30.8	13 70	49.6	55
6	40 14.9	02 81	61.5	40 15.5	00 80	60.2	40 14.8	02 78	58.2	40 12.1	04 76	56.3	40 05.3	07 74	53.6	40 03.1	08 74	53.0	40 00.7	09 73	52.3	39 48.7	11 70	49.7	6
7	39 26.4	03 81	61.5	39 27.6	01 80	60.2	39 27.8	01 78	58.2	39 26.1	03 77	56.3	39 20.8	06 74	53.7	39 19.0	07 74	53.1	39 16.9	07 73	52.4	39 06.5	10 70	49.8	7
8	38 37.8	04 81	61.4	38 39.7	02 80	60.2	38 40.9	00 78	58.2	38 40.2	02 77	56.3	38 36.3	05 74	53.8	38 34.8	05 74	53.1	38 33.1	06 73	52.5	38 24.3	09 70	49.9	8
9	37 49.3	05 81	61.4	37 51.8	03 80	60.1	37 53.9	01 78	58.2	37 54.2	01 77	56.3	37 51.8	03 74	53.8	37 50.6	04 74	53.2	37 49.3	05 73	52.5	37 42.0	07 70	50.0	9
60	37 00.9	06 81	61.3	37 03.9	04 80	60.1	37 07.0	02 78	58.2	37 08.3	00 77	56.3	37 07.2	02 74	53.8	37 06.4	03 74	53.2	37 05.5	04 73	52.6	36 59.7	06 71	50.1	60
1	36 12.4	07 81	61.3	36 16.0	05 80	60.0	36 20.0	03 78	58.2	36 22.3	02 77	56.3	36 22.6	01 74	53.8	36 22.2	02 74	53.2	36 21.6	02 73	52.6	36 17.3	05 71	50.1	1
2	35 24.0	08 81	61.2	35 28.2	06 80	60.0	35 33.1	05 78	58.1	35 36.3	03 77	56.3	35 38.0	00 74	53.8	35 38.0	00 74	53.2	35 37.7	01 73	52.6	35 34.9	04 71	50.1	2
3	34 35.6	09 81	61.1	34 40.4	07 80	59.9	34 46.2	06 78	58.1	34 50.4	04 76	56.3	34 53.4	01 74	53.8	34 53.7	01 74	53.2	34 53.9	00 73	52.6	34 52.5	02 71	50.2	3
4	33 47.3	09 80	61.0	33 52.6	08 80	59.8	33 59.3	07 78	58.0	34 04.5	05 76	56.2	34 08.9	02 74	53.8	34 09.5	02 74	53.2	34 10.0	01 73	52.6	34 10.1	01 71	50.2	4
65	32 59.0	10 80	60.9	33 04.9	09 80	59.8	33 12.5	08 78	58.0	33 18.6	06 76	56.2	33 24.3	04 74	53.8	33 25.3	03 74	53.2	33 26.1	02 73	52.6	33 27.7	00 71	50.2	65
6	32 10.7	11 80	60.8	32 17.2	10 79	59.7	32 25.7	09 78	57.9	32 32.7	07 76	56.1	32 39.7	05 74	53.7	32 41.1	04 74	53.2	32 42.2	04 73	52.6	32 45.2	01 71	50.2	6
7	31 22.5	12 80	60.7	31 29.6	11 79	59.6	31 38.9	10 78	57.8	31 46.9	08 76	56.0	31 55.2	06 74	53.7	31 56.9	05 74	53.1	31 58.4	05 73	52.5	32 02.8	03 71	50.2	7
8	30 34.4	13 80	60.6	30 42.0	12 79	59.4	30 52.2	11 78	57.7	31 01.1	09 76	56.0	31 10.7	07 74	53.6	31 12.7	06 74	53.1	31 14.6	06 73	52.5	31 20.4	04 71	50.1	8
9	29 46.3	14 80	60.5	29 54.5	13 79	59.3	30 05.6	12 78	57.6	30 15.3	10 76	55.9	30 26.3	08 74	53.6	30 28.6	08 74	53.0	30 30.8	07 73	52.4	30 38.0	05 71	50.1	9
70	28 58.3	15 80	60.3	29 07.0	14 79	59.2	29 19.0	13 78	57.5	29 29.6	11 76	55.8	29 41.8	09 74	53.5	29 44.5	09 73	52.9	29 47.0	08 73	52.4	29 55.7	06 70	50.1	70
1	28 10.3	16 80	60.2	28 19.6	15 79	59.1	28 32.4	14 78	57.4	28 44.0	12 76	55.7	28 57.5	10 74	53.4	29 00.5	10 73	52.9	29 03.3	09 73	52.3	29 13.3	07 70	50.0	1
2	27 22.4	17 80	60.0	27 32.2	16 79	58.9	27 45.9	15 77	57.3	27 58.4	13 76	55.6	28 13.1	11 74	53.3	28 16.5	11 73	52.8	28 19.7	10 73	52.2	28 31.0	09 70	49.9	2
3	26 34.6	18 80	59.9	26 44.9	17 79	58.8	26 59.5	16 77	57.1	27 12.9	14 76	55.5	27 28.9	12 74	53.2	27 32.5	12 73	52.7	27 36.0	12 73	52.1	27 48.8	10 70	49.9	3
4	25 46.9	19 80	59.7	25 57.7	18 78	58.6	26 13.1	16 77	57.0	26 27.4	15 76	55.3	26 44.6	14 74	53.1	26 48.6	13 73	52.6	26 52.5	13 72	52.0	27 06.6	11 70	49.8	4
75	24 59.2	19 79	59.6	25 10.6	19 78	58.5	25 26.9	17 77	56.8	25 42.0	16 76	55.2	26 00.5	15 74	53.0	26 04.8	14 73	52.5	26 09.0	14 72	51.9	26 24.5	12 70	49.7	75
6	24 11.6	20 79	59.4	24 23.6	20 78	58.3	24 40.7	18 77	56.7	24 56.7	17 75	55.1	25 16.4	16 73	52.9	25 21.0	15 73	52.3	25 25.6	15 72	51.8	25 42.4	13 70	49.6	6
7	23 24.2	21 79	59.2	23 36.6	20 78	58.1	23 54.6	19 77	56.5	24 11.5	18 75	54.9	24 32.4	17 73	52.8	24 37.4	16 73	52.2	24 42.2	16 72	51.7	25 00.3	14 70	49.5	7
8	22 36.8	22 79	59.0	22 49.8	21 78	58.0	23 08.5	20 76	56.4	23 26.3	19 75	54.8	23 48.5	18 73	52.6	23 53.8	17 73	52.1	23 58.9	17 72	51.5	24 18.4	15 70	49.4	8
9	21 49.5	23 79	58.8	22 03.0	22 78	57.8	22 22.6	21 76	56.2	22 41.3	20 75	54.6	23 04.7	19 73	52.5	23 10.2	18 72	51.9	23 15.7	18 72	51.4	23 36.5	17 70	49.2	9
80	21 02.3	24 78	58.6	21 16.4	23 78	57.6	21 36.8	22 76	56.0	21 56.3	21 75	54.4	22 20.9	20 73	52.3	22 26.8	19 72	51.8	22 32.6	19 72	51.2	22 54.7	18 70	49.1	80
1	20 15.2	25 78	58.4	20 29.8	24 78	57.4	20 51.0	23 76	55.8	21 11.4	22 75	54.2	21 37.2	21 73	52.1	21 43.5	21 72	51.6	21 49.6	20 72	51.1	22 13.0	19 69	49.0	1
2	19 28.2	26 78	58.2	19 43.3	25 77	57.2	20 05.4	24 76	55.6	20 26.7	23 74	54.1	20 53.7	22 72	52.0	21 00.2	22 72	51.5	21 06.6	21 71	50.9	21 31.4	20 69	48.8	2
3	18 41.3	26 78	58.0	18 57.0	26 77	56.9	19 19.9	25 76	55.4	19 42.0	24 74	53.9	20 10.2	23 72	51.8	20 17.1	23 72	51.3	20 23.8	22 71	50.8	20 49.9	21 69	48.7	3
4	17 54.6	27 78	57.7	18 10.8	27 77	56.7	18 34.5	26 76	55.2	18 57.4	25 74	53.7	19 26.9	24 72	51.6	19 34.0	24 72	51.1	19 41.1	23 71	50.6	20 08.4	22 69	48.5	4
85	17 07.9	28 78	57.5	17 24.6	28 77	56.5	17 49.2	27 75	55.0	18 13.0	26 74	53.5	18 43.7	25 72	51.4	18 51.1	25 71	50.9	18 58.5	24 71	50.4	19 27.1	23 69	48.3	85
6	16 21.4	29 77	57.3	16 38.7	29 76	56.3	17 04.0	28 75	54.8	17 28.7	27 74	53.2	18 00.5	26 72	51.2	18 08.3	26 71	50.7	18 16.0	25 71	50.2	18 45.9	24 68	48.2	6
7	15 35.0	30 77	57.0	15 52.8	29 76	56.0	16 19.0	29 75	54.5	16 44.5	28 73	53.0	17 17.6	27 72	51.0	17 25.6	27 71	50.5	17 33.6	27 70	50.0	18 04.8	25 68	48.0	7
8	14 48.7	31 77	56.8	15 07.1	30 76	55.8	15 34.1	30 75	54.3	16 00.5	29 73	52.8	16 34.7	28 71	50.8	16 43.1	28 71	50.3	16 51.4	28 70	49.8	17 23.9	27 68	47.8	8
9	14 02.6	32 77	56.5	14 21.5	31 76	55.5	14 49.3	31 74	54.0	15 16.5	30 73	52.6	15 52.0	29 71	50.6	16 00.6	29 70	50.1	16 09.3	29 70	49.6	16 43.0	28 68	47.6	9
90	13 16.6	32 76	56.2	13 36.0	32 76	55.3	14 04.7	32 74	53.8	14 32.8	31 73	52.3	15 09.4	30 71	50.3	15 18.4	30 70	49.9	15 27.3	30 70	49.4	16 02.3	29 68	47.4	90

Lat. 23°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	31 00.0	1.0 01	180.0	30 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	27 00.0	1.0 01	180.0	25 00.0	1.0 01	180.0	24 30.0	1.0 01	180.0	24 00.0	1.0 01	180.0	22 00.0	1.0 01	180.0	00
1	30 59.5	1.0 02	179.1	29 59.6	1.0 02	179.1	28 29.6	1.0 02	179.1	26 59.6	1.0 02	179.1	24 59.6	1.0 02	179.2	24 29.6	1.0 02	179.2	23 59.6	1.0 02	179.2	21 59.6	1.0 02	179.2	1
2	30 58.2	1.0 04	178.1	29 58.2	1.0 04	178.2	28 28.3	1.0 04	178.2	26 58.3	1.0 04	178.3	24 58.4	1.0 03	178.4	24 28.4	1.0 03	178.4	23 58.5	1.0 03	178.4	21 58.5	1.0 03	178.5	2
3	30 55.9	1.0 05	177.2	29 56.0	1.0 05	177.2	28 26.1	1.0 05	177.3	26 56.3	1.0 05	177.4	24 56.4	1.0 05	177.5	24 26.5	1.0 04	177.6	23 56.5	1.0 04	177.6	21 56.7	1.0 04	177.7	3
4	30 52.7	1.0 07	176.2	29 52.9	1.0 07	176.3	28 23.1	1.0 06	176.4	26 53.4	1.0 06	176.6	24 53.7	1.0 06	176.7	24 23.8	1.0 06	176.8	23 53.8	1.0 06	176.8	21 54.1	1.0 06	177.0	4
05	30 48.6	1.0 08	175.3	29 48.9	1.0 08	175.4	28 19.3	1.0 08	175.6	26 49.7	1.0 08	175.7	24 50.1	1.0 07	175.9	24 20.2	1.0 07	176.0	23 50.4	1.0 07	176.0	21 50.8	1.0 07	176.2	05
6	30 43.7	99 10	174.4	29 44.0	99 10	174.5	28 14.6	99 09	174.7	26 45.1	99 09	174.9	24 45.8	99 08	175.1	24 16.0	99 08	175.2	23 46.1	99 08	175.2	21 46.8	99 08	175.4	6
7	30 37.8	99 11	173.4	29 38.3	99 11	173.6	28 09.0	99 11	173.8	26 39.8	99 10	174.0	24 40.7	99 10	174.3	24 10.9	99 10	174.3	23 41.1	99 10	174.4	21 42.0	99 09	174.7	7
8	30 31.0	99 13	172.5	29 31.7	99 12	172.7	28 02.6	99 12	172.9	26 33.6	99 12	173.2	24 34.8	99 11	173.5	24 05.1	99 11	173.6	23 35.4	99 11	173.6	21 36.5	99 10	173.9	8
9	30 23.3	99 14	171.6	29 24.2	99 14	171.8	27 55.4	99 14	172.0	26 26.6	99 13	172.3	24 28.1	99 12	172.7	23 58.5	99 12	172.7	23 28.9	99 12	172.8	21 30.3	99 12	173.2	9
10	30 14.8	98 10	170.6	29 15.8	98 15	170.9	27 47.3	98 15	171.2	26 18.8	98 14	171.5	24 20.7	98 14	171.9	23 51.1	98 14	172.0	23 21.6	98 13	172.0	21 23.4	99 13	172.4	10
1	30 05.4	98 17	169.7	29 06.6	98 17	170.0	27 38.4	98 16	170.3	26 10.2	98 16	170.6	24 12.5	98 15	171.1	23 43.0	98 15	171.2	23 13.6	98 15	171.3	21 15.8	98 14	171.7	1
2	29 55.1	98 19	168.8	28 56.6	98 18	169.1	27 28.7	98 18	169.4	26 00.8	98 17	169.8	24 03.5	98 16	170.3	23 34.2	98 16	170.4	23 04.8	98 16	170.5	21 07.4	98 15	170.9	2
3	29 43.9	97 20	167.9	28 45.7	97 20	168.2	27 18.2	97 19	168.6	25 50.6	97 18	169.0	23 53.8	97 18	169.5	23 24.6	97 17	169.6	22 55.3	97 17	169.7	20 58.4	98 16	170.2	3
4	29 31.9	97 21	167.0	28 33.9	97 21	167.3	27 06.8	97 20	167.7	25 39.7	97 20	168.1	23 43.3	97 19	168.7	23 14.2	97 18	168.8	22 45.1	97 18	168.9	20 48.6	97 18	169.5	4
15	29 19.1	96 23	166.1	28 21.4	96 22	166.4	26 54.7	96 22	166.9	25 27.9	96 21	167.3	23 32.1	97 20	167.9	23 03.1	97 20	168.0	22 34.1	97 20	168.2	20 38.2	97 19	168.7	15
6	29 05.4	96 24	165.2	28 08.0	96 24	165.5	26 41.7	96 23	166.0	25 15.4	96 22	166.5	23 20.1	96 21	167.1	22 51.3	96 21	167.3	22 22.5	96 21	167.4	20 27.0	96 20	168.0	6
7	28 50.9	95 26	164.3	27 53.8	95 25	164.7	26 28.0	95 24	165.2	25 02.1	95 23	165.7	23 07.5	96 22	166.3	22 38.8	96 22	166.5	22 10.1	96 22	166.7	20 15.2	96 21	167.3	7
8	28 35.6	95 27	163.5	27 38.8	95 26	163.8	26 13.5	95 26	164.4	24 48.1	95 25	164.9	22 54.1	95 24	165.6	22 25.5	95 23	165.7	21 57.0	95 23	165.9	20 02.7	95 22	166.6	8
9	28 19.5	94 28	162.6	27 23.0	94 28	163.0	25 58.2	94 27	163.5	24 33.3	94 26	164.1	22 39.9	95 25	164.8	22 11.5	95 24	165.0	21 43.2	95 24	165.1	19 49.5	95 23	165.8	9
20	28 02.6	93 30	161.7	27 06.5	94 29	162.1	25 42.2	94 28	162.7	24 17.8	94 27	163.3	22 25.1	94 26	164.0	21 56.9	94 26	164.2	21 28.7	94 25	164.4	19 35.6	94 24	165.1	20
1	27 44.8	93 31	160.9	26 49.1	93 30	161.3	25 25.4	93 29	161.9	24 01.6	93 28	162.5	22 09.6	93 27	163.3	21 41.5	93 27	163.5	21 13.5	94 26	163.7	19 21.1	94 25	164.4	1
2	27 26.4	92 32	160.0	26 31.0	92 31	160.5	25 07.9	92 30	161.1	23 44.6	93 30	161.7	21 53.3	93 28	162.5	21 25.5	93 28	162.7	20 57.6	93 28	162.9	19 06.0	93 26	163.7	2
3	27 07.1	91 33	159.2	26 12.2	92 33	159.6	24 49.7	92 32	160.3	23 26.9	92 31	161.0	21 36.4	92 29	161.8	21 08.7	92 29	162.0	20 41.1	92 29	162.2	18 50.2	92 27	163.0	3
4	26 47.1	91 34	158.4	25 52.6	91 34	158.8	24 30.7	91 33	159.5	23 08.6	91 32	160.2	21 18.8	92 30	161.1	20 51.4	92 30	161.3	20 23.9	92 30	161.5	18 33.7	92 28	162.3	4
25	26 26.4	90 36	157.6	25 32.3	90 35	158.0	24 11.0	90 34	158.7	22 49.5	91 33	159.4	21 00.6	91 32	160.3	20 33.3	91 31	160.6	20 06.0	91 31	160.8	18 16.7	91 30	161.7	25
6	26 05.0	89 37	156.7	25 11.3	90 36	157.2	23 50.7	90 35	158.0	22 29.8	90 34	158.7	20 41.7	90 33	159.6	20 14.6	90 32	159.8	19 47.5	90 32	160.1	17 59.0	91 30	161.0	6
7	25 42.8	89 38	155.9	24 49.6	89 37	156.5	23 29.6	89 36	157.2	22 09.4	89 35	157.9	20 22.1	90 34	158.9	19 55.3	90 33	159.1	19 28.4	90 33	159.4	17 40.7	90 32	160.3	7
8	25 19.9	88 39	155.2	24 27.2	88 38	155.7	23 07.9	88 37	156.5	21 48.3	89 36	157.2	20 01.9	89 35	158.2	19 35.3	89 34	158.4	19 08.6	89 34	158.7	17 21.8	89 32	159.6	8
9	24 56.4	87 40	154.4	24 04.1	87 40	154.9	22 45.5	88 38	155.7	21 26.6	88 37	156.5	19 41.1	88 36	157.5	19 14.7	88 35	157.8	18 48.2	88 35	158.0	17 02.2	88 34	159.0	9
30	24 32.2	86 42	153.6	23 40.4	86 41	154.2	22 22.4	87 40	155.0	21 04.2	87 38	155.8	19 19.7	87 37	156.8	18 53.5	87 36	157.1	18 27.2	87 36	157.3	16 42.2	88 34	158.3	30
1	24 07.3	85 43	152.8	23 15.9	86 42	153.4	21 58.7	86 40	154.2	20 41.3	86 39	155.1	18 57.6	87 38	156.1	18 31.6	87 37	156.4	18 05.6	87 37	156.7	16 21.5	87 36	157.7	1
2	23 41.7	85 44	152.1	22 50.9	85 43	152.7	21 34.4	85 42	153.5	20 17.7	85 40	154.4	18 35.0	86 39	155.5	18 09.2	86 38	155.7	17 43.5	86 38	156.0	16 00.2	86 36	157.1	2
3	23 15.6	84 45	151.3	22 25.2	84 44	151.9	21 09.5	84 43	152.8	19 53.5	85 41	153.7	18 11.7	85 40	154.8	17 46.2	85 39	155.1	17 20.7	85 39	155.3	15 38.4	85 37	156.4	3
4	22 48.8	83 46	150.6	21 58.9	83 45	151.2	20 43.9	83 44	152.1	19 28.7	84 42	153.0	17 47.9	84 41	154.1	17 22.7	84 40	154.4	16 57.4	84 40	154.7	15 16.1	85 38	155.8	4
35	22 21.4	82 47	149.9	21 32.0	82 46	150.5	20 17.8	83 44	151.4	19 03.3	83 43	152.3	17 23.5	83 42	153.5	16 58.5	83 41	153.8	16 33.5	83 41	154.0	14 53.1	84 39	155.2	35
6	21 53.3	81 48	149.2	21 04.5	81 47	149.8	19 51.1	82 46	150.7	18 37.3	82 44	151.6	16 58.6	82 42	152.8	16 33.8	83 42	153.1	16 09.0	83 42	153.4	14 29.7	83 40	154.6	6
7	21 24.8	80 49	148.5	20 36.5	81 48	149.1	19 23.8	81 46	150.0	18 10.8	81 45	151.0	16 33.1	82 43	152.2	16 08.6	82 43	152.5	15 44.1	82 42	152.8	14 05.7	82 41	154.0	7
8	20 55.6	79 50	147.8	20 07.8	80 49	148.4	18 55.9	80 47	149.4	17 43.7	80 46	150.3	16 07.0	81 44	151.6	15 42.8	81 44	151.9	15 18.5	81 43	152.2	13 41.2	81 42	153.4	8
9	20 25.9	79 50	147.1	19 38.6	79 50	147.7	18 27.5	79 48	148.7	17 16.1	79 47	149.7	15 40.5	80 45	150.9	15 16.5	80 45	151.3	14 52.5	80 44	151.6	13 16.2	80 42	152.8	9
40	19 55.6	78 51	146.4	19 08.9	78 50	147.1	17 58.6	78 49	148.1	16 47.9	79 48	149.0	15 13.4	79 46	150.3	14 49.7	79 46	150.6	14 25.9	79 45	151.0	12 50.7	79 43	152.2	40
1	19 24.8	77 52	145.8	18 38.6	77 51	146.4	17 29.1	77 50	147.4	16 19.3	78 49	148.4	14 45.8	78 47	149.7	14 22.3	78 46	150.0	13 58.9	78 46	150.4	12 24.7	79 44	151.6	1
2	18 53.4	76 53	145.1	18 07.8	76 52	145.8	16 59.1	76 51	146.8	15 50.1	77 50	147.8	14 17.7	77 48	149.1	13 54.5	77 47	149.5	13 31.3	77 47	149.8	11 58.3	78 45	151.1	2
3	18 21.6	75 54	144.5	17 36.5	75 53	145.1	16 28.6	76 52	146.2	15 20.4	76 50	147.2	13 49.1	76 48	148.5	13 26.2	76 48	148.9	13 03.3	76 48	149.2	11 31.3	77 46	150.5	3
4	17 49.2	74 55	143.8	17 04.7	74 54	144.5	15 57.6	75 52	145.6	14 50.3	75 51	146.6	13 20.0	75 49	148.0	12 57.4	75 49	148.3	12 34.8	76 48	148.6	11 03.9	76 46	150.0	4
45	17 16.4	73 56	143.2	16 32.4	73 55	143.9	15 26.2	74 53	145.0	14 19.6	74 52	146.0	12 50.5	74 50	147.4	12 28.2	75 50	147.7	12 05.8	75 49	148.1	10 36.0	75 47	149.4	45
6	16 43.0	72 56	142.6	15 59.6	72 55	143.3	14 54.2	73 54	144.4	13 48.5	73 53	145.4	12 20.5	74 51	146.8	11 58.4	74 50	147.2	11 36.3	74 50	147.5	10 07.7	74 48	148.9	6
7	16 09.2	71 57	142.0	15 26.4	72 56	142.7	14 21.8	72 55	143.8	13 16.9	72 53	144.9	11 50.1	73 52	146.3	11 28.3	73 51	146.6	11 06.5	73 50	147.0	9 39.0	73 49	148.4	7
8	15 35.0	70 58	141.4	14 52.7	71 57	142.1	13 49.0	71 56	143.2	12 44.9	71 54	144.3	11 19.2	72 52	145.7	10 57.7	72 52	146.1	10 36.1	72 51	146.4	9 09.8	72 49	147.8	8
9	15 00.3	69 58	140.8	14 18.5	70 58	141.5	13 15.7	70 56	142.6	12 12.5	70 55	143.7	10 47.9	71 53	145.2	10 26.6	71 52	145.5	10 05.4	71 52	145.9	8 40.2	71 50	147.3	9
50	14 25.2	69 59	140.2	13 44.0	69 58	141.0	12 41.9	69 57	142.1	11 39.6	69 56	143.2	10 16.1	70 54	144.7	9 55.2	70 53	145.0	9 34.2	70 53	145.4	8 10.2	70 51	146.8	50
1	13 49.6	68 60	139.6	13 09.0	68 59	140.4	12 07.8	68 58	141.5	11 06.3	68 56	142.7	9 43.9	69 54	144.1	9 23.3	69 54	144.5	9 02.6	69 53	144.9	7 39.7	69 51	146.3	1
2	13 13.7	67 61	139.1	12 33.6	67 60	139.9	11 33.2	67 58	141.0	10 32.6	67 57	142.1	9 11.4	68 55	143.6	8 51.0	68 54	144.0	8 30.6	68 54	144.4	7 08.9	68 52	145.8	2
3	12 37.3	66 61	138.5	11 57.8	66 60	139.3	10 58.2	66 59	140.5	9 58.5	67 58	141.6	8 38.4	67 56	143.1	8 18.4	67 55	143.5	7 58.3	67 55	143.9	6 37.7	67 53	145.4	3
4	12 00.5	65 62	138.0	11 21.6	65 61	138.8	10 22.9	65 60	139.9	9 24.0	66 58	141.1	8 05.1	66 56	142.6	7 45.3	66 56	143.0	7 25.5	66 55	143.4	6 06.1	66 53	144.9	4
55	11 23.4	64 62	137.5	10 45.0	64 62	138.2	9 47.1	64 60	139.4	8 49.1	65 59	140.6	7 31.3	65 57	142.1	7 11.9	65 56	142.5	6 52.4	65 56	142.9	5 34.2	65 54	144.4	55
6	10 45.9	63 63	136.9	10 08.0	63 62	137.7	9 11.0	63 61	138.9	8 13.8	64 59	140.1	6 57.3	64 57	141.6	6 38.1	64 57	142.0	6 18.8	64 56	142.4	5 01.8	64 54	144.0	6
7	10 08.0	62 64	136.4	9 30.7	62 63	137.2	8 34.6	62 62	138.4	7 38.2	63 60	139.6	6 22.8	63 58	141.2	6 03.9	63 58	141.6	5 45.0	63 57	141.9				7
8	9 29.7	61 64	135.9	8 53.0	61 63	136.7	7 57.7	62 62	137.9	7 02.2	62 60	139.1	5 48.0	62 59	140.7	5 29.4	62 58	141.1	5 10.8	62 58	141.5				8
9	8 51.1	60 65	135.4	8 15.0	60 64	136.2	7 20.5	61 62	137.4	6 25.9	61 61	138.6	5 12.8	61 59	140.2										9
60	8 12.2	59 66	134.9	7 36.6	59 64	135.8	6 43.0	60 63	137.0	5 49.2	60 62	138.2													60
1	7 32.9	58 66	134.5	6 57.9	58 65	135.3	6 05.2	59 64	136.5	5 12.3	59 62	137.7													1
2	6 53.4	57 66	134.0	6 18.9	58 66	134.8	5 27.0	58 64	136.0																2
3	6 13.5	56 67	133.5	5 39.5	57 66	134.4																			3
4	5 33.3	56 68	133.1																						4

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
91	12 30.8	33 76	56.0	12 50.7	33 75	55.0	13 20.2	32 74	53.5	13 49.1	32 72	52.1	14 26.9	31 70	50.1	14 36.2	31 70	49.6	14 45.5	31 70	49.1	15 21.8	30 67	47.2	91
2	11 45.1	34 76	55.7	12 05.6	34 75	54.7	12 35.8	33 74	53.3	13 05.6	33 72	51.8	13 44.6	32 70	49.9	13 54.2	32 70	49.4	14 03.8	32 69	48.9	14 41.3	31 67	46.9	2
3	10 59.6	35 76	55.4	11 20.5	35 75	54.4	11 51.6	34 73	53.0	12 22.3	34 72	51.6	13 02.5	33 70	49.6	13 12.4	33 70	49.1	13 22.2	33 69	48.6	14 01.1	32 67	46.7	3
4	10 14.2	36 75	55.1	10 35.7	36 74	54.1	11 07.6	35 73	52.7	11 39.1	35 72	51.3	12 20.5	34 70	49.4	12 30.7	34 69	48.9	12 40.8	34 69	48.4	13 20.9	33 67	46.5	4
95	9 29.0	37 75	54.8	9 51.0	37 74	53.9	10 23.8	36 73	52.4	10 56.1	36 71	51.0	11 38.6	35 69	49.1	11 49.2	35 69	48.6	11 59.6	35 68	48.1	12 41.0	34 66	46.2	95
6	8 44.0	38 75	54.5	9 06.5	37 74	53.6	9 40.1	37 73	52.1	10 13.3	37 71	50.7	10 57.0	36 69	48.8	11 07.8	36 69	48.4	11 18.6	36 68	47.9	12 01.2	35 66	46.0	6
7	7 59.1	39 74	54.2	8 22.2	38 74	53.2	8 56.5	38 72	51.8	9 30.6	38 71	50.4	10 15.5	37 69	48.6	10 26.6	37 68	48.1	10 37.7	37 68	47.6	11 21.6	36 66	45.7	7
8	7 14.4	39 74	53.9	7 38.0	39 73	52.9	8 13.2	39 72	51.5	8 48.1	39 70	50.1	9 34.2	38 68	48.3	9 45.6	38 68	47.8	9 57.0	38 68	47.3	10 42.1	37 66	45.4	8
9	6 29.9	40 74	53.5	6 54.0	40 73	52.6	7 30.1	40 72	51.2	8 05.8	40 70	49.8	8 53.1	39 68	48.0	9 04.8	39 68	47.5	9 16.5	39 67	47.0	10 02.9	38 65	45.2	9
100	5 45.6	41 74	53.2	6 10.2	41 73	52.3	6 47.1	41 71	50.9	7 23.7	41 70	49.5	8 12.1	40 68	47.7	8 24.1	40 67	47.2	8 36.1	40 67	46.8	9 23.8	39 65	44.9	100
1	5 01.4	42 73	52.9	5 26.6	42 72	52.0	6 04.3	42 71	50.6	6 41.8	41 70	49.2	7 31.4	41 68	47.4	7 43.7	41 67	46.9	7 56.0	41 66	46.5	8 44.9	41 64	44.6	1
2							5 21.8	43 71	50.3	6 00.1	42 69	48.9	6 50.8	42 67	47.1	7 03.5	42 67	46.6	7 16.1	42 66	46.2	8 06.2	42 64	44.3	2
3										5 18.6	43 69	48.6	6 10.5	43 67	46.7	6 23.4	43 66	46.3	6 36.3	43 66	45.8	7 27.7	43 64	44.0	3
4													5 30.4	44 66	46.4	5 43.6	44 66	46.0	5 56.8	44 66	45.5	6 49.4	44 64	43.7	4
105																5 04.0	45 66	45.6	5 17.5	45 65	45.2	6 11.4	45 63	43.4	105
6																						5 33.6	46 63	43.1	6

Lat. 23°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	67 00.0	1.0 02	00.0	66 00.0	1.0 01	00.0	64 30.0	1.0 01	00.0	63 30.0	1.0 01	00.0
1	66 59.1	1.0 04	01.8	65 59.2	1.0 04	01.7	64 29.3	1.0 04	01.5	63 29.3	1.0 04	01.5
2	66 56.6	1.0 07	03.5	65 56.8	1.0 07	03.3	64 27.0	1.0 06	03.1	63 27.2	1.0 06	02.9
3	66 52.3	99 10	05.3	65 52.7	99 09	05.0	64 23.3	99 08	04.6	63 23.7	99 08	04.4
4	66 46.4	99 13	07.1	65 47.1	99 12	06.7	64 18.2	99 11	06.1	63 18.8	99 10	05.8
05	66 38.7	98 16	08.8	65 39.9	98 14	08.3	64 11.6	98 14	07.6	63 12.6	98 13	07.2
6	66 29.5	97 18	10.5	65 31.2	97 17	09.9	64 03.5	98 16	09.1	63 05.0	98 15	08.6
7	66 18.6	96 21	12.2	65 20.9	96 20	11.5	63 54.1	97 18	10.6	62 56.0	97 17	10.0
8	66 06.2	95 23	13.8	65 09.2	95 22	13.1	63 43.3	96 20	12.0	62 45.7	96 19	11.4
9	65 52.3	94 26	15.4	64 56.0	94 24	14.6	63 31.1	95 22	13.4	62 34.2	95 21	12.7
10	65 36.9	92 28	17.0	64 41.4	93 27	16.1	63 17.6	93 25	14.8	62 21.4	94 23	14.1
1	65 20.0	91 30	18.5	64 25.4	91 29	17.5	63 02.8	92 27	16.2	62 07.4	93 26	15.4
2	65 01.8	89 33	20.0	64 08.1	90 31	19.0	62 46.8	91 29	17.5	61 52.1	91 27	16.6
3	64 42.3	87 35	21.5	63 49.5	88 33	20.4	62 29.6	89 31	18.8	61 35.7	90 29	17.9
4	64 21.4	86 37	22.9	63 29.7	87 35	21.7	62 11.2	88 33	20.1	61 18.2	89 31	19.1
15	63 59.4	84 39	24.2	63 08.7	85 37	23.0	61 51.6	86 34	21.3	60 59.6	87 33	20.3
6	63 36.2	82 40	25.5	62 46.6	83 39	24.3	61 31.0	85 36	22.5	60 39.9	86 34	21.4
7	63 11.8	80 42	26.8	62 23.3	81 40	25.5	61 09.3	83 38	23.7	60 19.3	84 36	22.6
8	62 46.4	78 44	28.0	61 59.1	80 42	26.7	60 46.7	81 40	24.8	59 57.6	82 38	23.6
9	62 20.0	76 46	29.2	61 33.8	78 44	27.8	60 23.0	80 41	25.9	59 35.0	81 39	24.7
20	61 52.7	74 47	30.3	61 07.6	76 45	28.9	59 58.5	78 42	26.9	59 11.5	79 41	25.7
1	61 24.4	72 49	31.3	60 40.4	74 47	29.9	59 33.0	76 44	27.9	58 47.1	77 42	26.7
2	60 55.2	70 50	32.4	60 12.5	72 48	30.9	59 06.7	74 45	28.9	58 21.9	75 43	27.6
3	60 25.2	68 51	33.4	59 43.7	70 49	31.9	58 39.6	72 46	29.9	57 55.9	74 45	28.6
4	59 54.5	67 52	34.3	59 14.1	68 50	32.8	58 11.7	70 48	30.8	57 29.1	72 46	29.4
25	59 23.0	65 54	35.2	58 43.8	66 52	33.7	57 43.1	69 49	31.6	57 01.6	70 47	30.3
6	58 50.8	63 55	36.1	58 12.8	64 53	34.6	57 13.8	67 50	32.5	56 33.4	68 48	31.1
7	58 18.0	61 56	36.9	57 41.1	62 54	35.4	56 43.9	65 51	33.3	56 04.5	66 49	31.9
8	57 44.5	59 57	37.7	57 08.8	60 55	36.2	56 13.3	63 52	34.0	55 35.1	64 50	32.6
9	57 10.5	57 58	38.4	56 35.9	59 56	36.9	55 42.1	61 53	34.8	55 05.0	63 51	33.4
30	56 35.9	55 58	39.1	56 02.5	57 57	37.6	55 10.3	59 54	35.5	54 34.3	61 52	34.1
1	56 00.8	53 59	39.8	55 28.5	55 58	38.3	54 38.0	57 55	36.1	54 03.1	59 53	34.7
2	55 25.2	51 60	40.4	54 54.0	53 58	38.9	54 05.2	56 56	36.8	53 31.4	57 54	35.4
3	54 49.2	49 61	41.0	54 19.1	51 59	39.6	53 31.9	54 56	37.4	52 59.2	55 54	36.0
4	54 12.7	47 62	41.6	53 43.7	49 60	40.1	52 58.1	52 57	38.0	52 26.5	54 55	36.6
35	53 35.8	46 62	42.2	53 07.9	48 60	40.7	52 23.9	50 58	38.5	51 53.4	52 56	37.1
6	52 58.6	44 63	42.7	52 31.7	46 61	41.2	51 49.3	48 58	39.1	51 19.8	50 56	37.7
7	52 20.9	42 63	43.2	51 55.1	44 62	41.7	51 14.3	47 59	39.6	50 45.9	48 57	38.2
8	51 43.0	40 64	43.7	51 18.2	42 62	42.2	50 39.0	45 60	40.0	50 11.6	47 58	38.6
9	51 04.7	39 64	44.1	50 40.9	41 63	42.6	50 03.3	43 60	40.5	49 36.9	45 58	39.1
40	50 26.1	37 65	44.5	50 03.4	39 63	43.1	49 27.2	41 60	40.9	49 01.9	43 59	39.5
1	49 47.3	35 65	44.9	49 25.5	37 64	43.5	48 50.9	40 61	41.3	48 26.6	41 59	40.0
2	49 08.1	34 66	45.3	48 47.4	35 64	43.8	48 14.3	38 62	41.7	47 51.0	40 60	40.4
3	48 28.8	32 66	45.6	48 09.0	34 64	44.2	47 37.4	36 62	42.1	47 15.0	38 60	40.7
4	47 49.2	31 66	45.9	47 30.4	32 65	44.5	47 00.2	35 62	42.5	46 38.9	36 61	41.1
45	47 09.4	29 67	46.2	46 51.5	31 65	44.8	46 22.8	33 63	42.8	46 02.5	35 61	41.4
6	46 29.4	27 67	46.5	46 12.5	29 65	45.1	45 45.2	32 63	43.1	45 25.8	33 62	41.7
7	45 49.2	26 67	46.8	45 33.2	28 66	45.4	45 07.4	30 64	43.4	44 48.9	32 62	42.0
8	45 08.9	24 68	47.1	44 53.8	26 66	45.7	44 29.3	28 64	43.7	44 11.9	30 62	42.3
9	44 28.4	23 68	47.3	44 14.2	24 66	45.9	43 51.1	27 64	43.9	43 34.6	28 62	42.6
50	43 47.7	21 68	47.5	43 34.5	23 66	46.1	43 12.7	25 64	44.1	42 57.1	27 63	42.8
1	43 07.0	20 68	47.7	42 54.6	21 67	46.4	42 34.2	24 64	44.4	42 19.5	25 63	43.1
2	42 26.1	18 68	47.9	42 14.5	20 67	46.5	41 55.5	22 65	44.6	41 41.7	24 63	43.3
3	41 45.0	17 68	48.0	41 34.4	19 67	46.7	41 16.7	21 65	44.8	41 03.8	22 64	43.5
4	41 03.9	16 69	48.2	40 54.1	17 67	46.9	40 37.7	19 65	44.9	40 25.7	21 64	43.6
55	40 22.7	14 69	48.3	40 13.7	16 67	47.0	39 58.7	18 65	45.1	39 47.6	19 64	43.8
6	39 41.4	13 69	48.5	39 33.3	14 68	47.2	39 19.5	16 66	45.2	39 09.3	18 64	44.0
7	39 00.0	11 69	48.6	38 52.7	13 68	47.3	38 40.2	15 66	45.4	38 30.9	16 64	44.1
8	38 18.6	10 69	48.7	38 12.1	11 68	47.4	38 00.9	14 66	45.5	37 52.4	15 64	44.2
9	37 37.1	09 69	48.7	37 31.4	10 68	47.5	37 21.4	12 66	45.6	37 13.8	13 64	44.4
60	36 55.6	07 69	48.8	36 50.7	09 68	47.6	36 41.9	11 66	45.7	36 35.1	12 64	44.5
1	36 14.0	06 69	48.9	36 09.9	07 68	47.6	36 02.4	09 66	45.8	35 56.4	11 65	44.6
2	35 32.4	05 69	48.9	35 29.1	06 68	47.7	35 22.8	08 66	45.9	35 17.6	09 65	44.6
3	34 50.7	04 70	49.0	34 48.2	05 68	47.7	34 43.1	07 66	45.9	34 38.8	08 65	44.7
4	34 09.1	02 70	49.0	34 07.4	03 68	47.8	34 03.4	05 66	46.0	34 00.0	06 65	44.8
65	33 27.4	01 70	49.0	33 26.4	02 68	47.8	33 23.7	04 66	46.0	33 21.0	05 65	44.8
6	32 45.7	00 70	49.0	32 45.5	01 68	47.8	32 44.0	03 66	46.0	32 42.1	04 65	44.8
7	32 04.0	02 70	49.0	32 04.6	00 68	47.8	32 04.2	01 66	46.0	32 03.2	02 65	44.9
8	31 22.4	03 70	49.0	31 23.7	02 68	47.8	31 24.5	00 66	46.0	31 24.2	01 65	44.9
9	30 40.7	04 69	48.9	30 42.8	03 68	47.8	30 44.7	01 66	46.0	30 45.2	00 65	44.9
70	29 59.1	05 69	48.9	30 01.9	04 68	47.8	30 05.0	03 66	46.0	30 06.3	02 65	44.9
1	29 17.5	06 69	48.9	29 21.0	05 68	47.7	29 25.2	04 66	46.0	29 27.3	03 65	44.8
2	28 35.9	08 69	48.8	28 40.2	07 68	47.7	28 45.5	05 66	46.0	28 48.4	04 65	44.8
3	27 54.4	09 69	48.7	27 59.4	08 68	47.6	28 05.8	07 66	45.9	28 09.5	06 65	44.8
4	27 12.9	10 69	48.7	27 18.6	09 68	47.5	27 26.2	08 66	45.9	27 30.6	07 65	44.7
75	26 31.4	11 69	48.6	26 37.9	10 68	47.5	26 46.6	09 66	45.8	26 51.7	08 65	44.7
6	25 50.0	12 69	48.5	25 57.2	12 68	47.4	26 07.0	10 66	45.7	26 12.9	09 65	44.6
7	25 08.7	14 69	48.4	25 16.6	13 68	47.3	25 27.5	11 66	45.6	25 34.1	11 64	44.5
8	24 27.4	15 69	48.3	24 36.0	14 68	47.2	24 48.0	13 66	45.6	24 55.4	12 64	44.5
9	23 46.2	16 68	48.2	23 55.5	15 67	47.1	24 08.6	14 66	45.5	24 16.8	13 64	44.4
80	23 05.1	17 68	48.0	23 15.1	16 67	47.0	23 29.3	15 66	45.4	23 38.2	14 64	44.3
1	22 24.1	18 68	47.9	22 34.8	17 67	46.8	22 50.0	16 65	45.2	22 59.6	16 64	44.2
2	21 43.2	19 68	47.8	21 54.5	19 67	46.7	22 10.8	18 65	45.1	22 21.2	17 64	44.1
3	21 02.3	20 68	47.6	21 14.4	20 67	46.6	21 31.7	19 65	45.0	21 42.8	18 64	43.9
4	20 21.6	22 68	47.5	20 34.3	21 67	46.4	20 52.7	20 65	44.9	21 04.6	19 64	43.8
85	19 40.9	23 68	47.3	19 54.4	22 66	46.3	20 13.8	21 65	44.7	20 26.4	21 64	43.7
6	19 00.4	24 67	47.1	19 14.5	23 66	46.1	19 35.0	22 64	44.6	19 48.3	22 63	43.5
7	18 20.0	25 67	47.0	18 34.8	24 66	45.9	18 56.3	24 64	44.4	19 10.3	23 63	43.4
8	17 39.7	26 67	46.8	17 55.1	26 66	45.8	18 17.8	25 64	44.2	18 32.4	24 63	43.2
9	16 59.5	27 67	46.6	17 15.6	27 66	45.6	17 39.3	26 64	44.0	17 54.7	25 63	43.0
90	16 19.4	28 66	46.4	16 36.3	28 65	45.4	17 01.0	27 64	43.9	17 17.1	27 62	42.9

50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
° ′		°	° ′		°	° ′		°	° ′		°	°
62 30.0	1.0 01	00.0	61 30.0	1.0 01	00.0	60 30.0	1.0 01	00.0	59 00.0	1.0 01	00.0	00
62 29.3	1.0 03	01.4	61 29.4	1.0 03	01.3	60 29.4	1.0 03	01.2	58 59.5	1.0 03	01.1	1
62 27.3	1.0 06	02.8	61 27.5	1.0 05	02.6	60 27.6	1.0 05	02.5	58 57.8	1.0 05	02.3	2
62 24.0	99 08	04.1	61 24.4	99 07	03.9	60 24.6	1.0 07	03.7	58 55.1	1.0 06	03.4	3
62 19.4	99 10	05.5	61 20.0	99 09	05.2	60 20.5	99 09	04.9	58 51.2	99 08	04.5	4
62 13.5	99 12	06.8	61 14.4	99 12	06.5	60 15.2	99 11	06.1	58 46.3	99 10	05.7	05
62 06.3	98 14	08.2	61 07.5	98 13	07.7	60 08.7	98 13	07.3	58 40.3	98 12	06.8	6
61 57.8	97 16	09.5	60 59.5	97 16	09.0	60 01.1	97 15	08.5	58 33.3	98 14	07.9	7
61 48.1	96 18	10.8	60 50.2	96 17	10.2	59 52.3	97 16	09.7	58 25.1	97 15	09.0	8
61 37.1	95 20	12.1	60 39.8	96 19	11.5	59 42.4	96 18	10.9	58 16.0	96 17	10.1	9
61 25.0	94 22	13.3	60 28.3	95 21	12.7	59 31.4	95 20	12.0	58 05.8	95 19	11.1	10
61 11.6	93 24	14.6	60 15.6	94 23	13.9	59 19.4	94 22	13.2	57 54.7	94 20	12.2	1
60 57.1	92 26	15.8	60 01.9	92 25	15.0	59 06.3	93 24	14.3	57 42.5	93 22	13.2	2
60 41.5	91 28	17.0	59 47.0	91 26	16.2	58 52.2	92 25	15.4	57 29.4	92 23	14.2	3
60 24.9	89 30	18.2	59 31.1	90 28	17.3	58 37.1	90 27	16.4	57 15.4	91 25	15.2	4
60 07.1	88 31	19.3	59 14.2	88 30	18.4	58 21.0	89 28	17.5	57 00.4	90 26	16.2	15
59 48.4	86 33	20.4	58 56.3	87 31	19.4	58 03.9	88 30	18.5	56 44.5	89 28	17.2	6
59 28.6	85 34	21.5	58 37.5	86 33	20.5	57 45.9	86 32	19.5	56 27.8	87 29	18.1	7
59 07.9	83 36	22.5	58 17.7	84 34	21.5	57 27.0	85 33	20.5	56 10.2	86 31	19.0	8
58 46.3	82 38	23.5	57 57.1	83 36	22.5	57 07.3	83 34	21.4	55 51.7	85 32	19.9	9
58 23.8	80 39	24.5	57 35.6	81 37	23.4	56 46.7	82 36	22.3	55 32.5	83 33	20.8	20
58 00.5	78 40	25.5	57 13.2	79 38	24.3	56 25.3	80 37	23.2	55 12.5	82 35	21.7	1
57 36.3	77 42	26.4	56 50.1	78 40	25.2	56 03.2	79 38	24.1	54 51.7	80 36	22.5	2
57 11.4	75 43	27.3	56 26.1	76 41	26.1	55 40.2	77 39	24.9	54 30.2	79 37	23.3	3
56 45.7	73 44	28.2	56 01.5	74 42	26.9	55 16.6	75 41	25.8	54 08.0	77 38	24.1	4
56 19.2	71 45	29.0	55 36.1	73 44	27.8	54 52.2	74 42	26.6	53 45.2	75 39	24.8	25
55 52.1	69 46	29.8	55 10.0	71 44	28.5	54 27.2	72 43	27.3	53 21.6	74 40	25.6	6
55 24.3	68 47	30.6	54 43.3	69 46	29.3	54 01.5	70 44	28.1	52 57.5	72 41	26.3	7
54 55.9	66 48	31.3	54 16.0	67 46	30.0	53 35.2	69 45	28.8	52 32.7	70 42	27.0	8
54 26.9	64 49	32.0	53 48.1	65 48	30.7	53 08.4	67 46	29.5	52 07.4	69 43	27.7	9
53 57.4	62 50	32.7	53 19.6	64 48	31.4	52 40.9	65 47	30.2	51 41.5	67 44	28.3	30
53 27.2	61 51	33.4	52 50.5	62 49	32.1	52 12.9	63 48	30.8	51 15.0	65 45	28.9	1
52 56.6	59 52	34.0	52 20.9	60 50	32.7	51 44.4	62 48	31.4	50 48.0	64 46	29.5	2
52 25.5	57 53	34.6	51 50.9	58 51	33.3	51 15.4	60 49	32.0	50 20.6	62 47	30.1	3
51 53.9	55 54	35.2	51 20.3	57 52	33.9	50 45.9	58 50	32.6	49 52.6	60 47	30.7	4
51 21.8	53 54	35.8	50 49.3	55 52	34.4	50 15.9	56 51	33.1	49 24.2	58 48	31.2	35
50 49.3	52 55	36.3	50 17.9	53 53	34.9	49 45.5	55 51	33.6	48 55.4	57 49	31.7	6
50 16.4	50 55	36.8	49 46.0	51 54	35.5	49 14.7	53 52	34.1	48 26.2	55 49	32.2	7
49 43.2	48 56	37.3	49 13.8	50 54	35.9	48 43.6	51 53	34.6	47 56.5	53 50	32.7	8
49 09.5	46 56	37.7	48 41.2	48 55	36.4	48 12.0	49 53	35.1	47 26.5	52 51	33.2	9
48 35.6	45 57	38.2	48 08.3	46 56	36.8	47 40.1	48 54	35.5	46 56.1	50 51	33.6	40
48 01.3	43 58	38.6	47 35.0	45 56	37.3	47 07.8	46 54	35.9	46 25.4	48 52	34.0	1
47 26.7	41 58	39.0	47 01.4	43 56	37.7	46 35.2	44 55	36.4	45 54.3	47 52	34.4	2
46 51.8	40 59	39.4	46 27.5	41 57	38.0	46 02.4	43 55	36.7	45 23.0	45 53	34.8	3
46 16.6	38 59	39.7	45 53.3	40 57	38.4	45 29.2	41 56	37.1	44 51.3	43 53	35.2	4
45 41.1	36 59	40.1	45 18.9	38 58	38.8	44 55.7	39 56	37.5	44 19.3	41 54	35.5	45
45 05.5	35 60	40.4	44 44.2	36 58	39.1	44 22.0	38 56	37.8	43 47.1	40 54	35.8	6
44 29.6	33 60	40.7	44 09.3	35 59	39.4	43 48.1	36 57	38.1	43 14.7	38 54	36.2	7
43 53.4	31 60	41.0	43 34.1	33 59	39.7	43 13.9	34 57	38.4	42 41.9	37 55	36.5	8
43 17.1	30 61	41.3	42 58.7	31 59	40.0	42 39.5	33 58	38.7	42 09.0	35 55	36.8	9
42 40.6	28 61	41.5	42 23.2	30 60	40.2	42 04.9	31 58	38.9	41 35.9	33 56	37.0	50
42 03.9	27 62	41.7	41 47.4	28 60	40.5	41 30.1	30 58	39.2	41 02.5	32 56	37.3	1
41 27.0	25 62	42.0	41 11.5	27 60	40.7	40 55.1	28 58	39.4	40 29.0	30 56	37.5	2
40 50.0	24 62	42.2	40 35.4	25 60	40.9	40 20.0	26 59	39.6	39 55.2	28 56	37.7	3
40 12.9	22 62	42.4	39 59.2	24 61	41.1	39 44.7	25 59	39.8	39 21.4	27 57	38.0	4
39 35.6	21 62	42.5	39 22.8	22 61	41.3	39 09.2	23 59	40.0	38 47.3	25 57	38.1	55
38 58.2	19 62	42.7	38 46.3	20 61	41.4	38 33.6	22 60	40.2	38 13.1	24 57	38.3	6
38 20.7	18 63	42.9	38 09.7	19 61	41.6	37 57.9	20 60	40.4	37 38.8	22 57	38.5	7
37 43.1	16 63	43.0	37 33.0	17 61	41.8	37 22.1	19 60	40.5	37 04.4	21 58	38.7	8
37 05.4	15 63	43.1	36 56.2	16 62	41.9	36 46.2	17 60	40.6	36 29.8	19 58	38.8	9
36 27.6	13 63	43.2	36 19.2	15 62	42.0	36 10.2	16 60	40.8	35 55.1	18 58	38.9	60
35 49.7	12 63	43.3	35 42.2	13 62	42.1	35 34.0	14 60	40.9	35 20.4	16 58	39.1	1
35 11.8	10 63	43.4	35 05.2	12 62	42.2	34 57.9	13 60	41.0	34 45.5	15 58	39.2	2
34 33.8	09 63	43.5	34 28.0	10 62	42.3	34 21.6	11 60	41.1	34 10.6	13 58	39.3	3
33 55.8	08 64	43.6	33 50.9	09 62	42.4	33 45.3	10 61	41.2	33 35.6	12 58	39.4	4
33 17.7	06 64	43.6	33 13.6	07 62	42.4	33 08.9	08 61	41.2	33 00.5	10 58	39.4	65
32 39.6	05 64	43.6	32 36.4	06 62	42.5	32 32.5	07 61	41.3	32 25.4	09 59	39.5	6
32 01.4	03 64	43.7	31 59.1	05 62	42.5	31 56.0	06 61	41.3	31 50.3	07 59	39.6	7
31 23.3	02 64	43.7	31 21.7	03 62	42.5	31 19.6	04 61	41.4	31 15.1	06 59	39.6	8
30 45.1	01 64	43.7	30 44.4	02 62	42.5	30 43.1	03 61	41.4	30 39.9	04 59	39.6	9
30 07.0	01 64	43.7	30 07.1	00 62	42.6	30 06.5	01 61	41.4	30 04.6	03 59	39.7	70
29 28.8	02 64	43.7	29 29.7	01 62	42.6	29 30.0	00 61	41.4	29 29.4	01 59	39.7	1
28 50.7	03 64	43.7	28 52.4	02 62	42.5	28 53.5	01 61	41.4	28 54.1	00 59	39.7	2
28 12.5	05 64	43.7	28 15.0	04 62	42.5	28 17.0	03 61	41.4	28 18.8	01 59	39.7	3
27 34.4	06 64	43.6	27 37.7	05 62	42.5	27 40.5	04 61	41.4	27 43.6	03 59	39.7	4
26 56.3	07 63	43.6	27 00.4	06 62	42.4	27 04.0	05 61	41.3	27 08.3	04 59	39.6	75
26 18.3	09 63	43.5	26 23.2	08 62	42.4	26 27.5	07 61	41.3	26 33.1	06 59	39.6	6
25 40.3	10 63	43.4	25 45.9	09 62	42.3	25 51.1	08 61	41.2	25 57.9	07 59	39.6	7
25 02.3	11 63	43.4	25 08.8	10 62	42.3	25 14.7	09 60	41.2	25 22.7	08 58	39.5	8
24 24.4	12 63	43.3	24 31.6	12 62	42.2	24 38.4	11 60	41.1	24 47.6	10 58	39.5	9
23 46.6	14 63	43.2	23 54.6	13 62	42.1	24 02.1	12 60	41.0	24 12.5	11 58	39.4	80
23 08.8	15 63	43.1	23 17.6	14 62	42.0	23 25.9	13 60	40.9	23 37.5	12 58	39.3	1
22 31.1	16 63	43.0	22 40.6	16 61	41.9	22 49.7	15 60	40.8	23 02.5	14 58	39.2	2
21 53.5	17 62	42.9	22 03.8	17 61	41.8	22 13.6	16 60	40.7	22 27.6	15 58	39.1	3
21 16.0	19 62	42.8	21 27.0	18 61	41.7	21 37.6	17 60	40.6	21 52.8	16 58	39.0	4
20 38.5	20 62	42.6	20 50.3	19 61	41.6	21 01.7	19 60	40.5	21 18.0	18 58	38.9	85
20 01.2	21 62	42.5	20 13.7	21 61	41.4	20 25.9	20 60	40.4	20 43.4	19 58	38.8	6
19 23.9	22 62	42.3	19 37.2	22 61	41.3	19 50.1	21 59	40.3	20 08.8	20 58	38.7	7
18 46.8	24 62	42.2	19 00.8	23 60	41.2	19 14.5	22 59	40.1	19 34.3	22 57	38.6	8
18 09.8	25 62	42.0	18 24.5	24 60	41.0	18 38.9	24 59	40.0	18 59.9	23 57	38.4	9
17 32.9	26 61	41.8	17 48.3	26 60	40.8	18 03.5	25 59	39.8	18 25.7	24 57	38.3	90

Lat. 23°

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	°
00	21 00.0	1.0	01	180.0	20 00.0	1.0	00	180.0	18 30.0	1.0	00	180.0	17 30.0	1.0	00	180.0	16 30.0	1.0	00	180.0	15 30.0	1.0	00	180.0	14 30.0	1.0	00	180.0	13 00.0	1.0	00	180.0	00
1	20 59.6	1.0	02	179.3	19 59.7	1.0	02	179.3	18 29.7	1.0	02	179.3	17 29.7	1.0	02	179.3	16 29.7	1.0	02	179.3	15 29.7	1.0	02	179.4	14 29.7	1.0	02	179.4	12 59.7	1.0	02	179.4	1
2	20 58.6	1.0	03	178.5	19 58.6	1.0	03	178.5	18 28.7	1.0	03	178.6	17 28.7	1.0	03	178.6	16 28.7	1.0	03	178.7	15 28.8	1.0	02	178.7	14 28.8	1.0	02	178.7	12 58.8	1.0	02	178.8	2
3	20 56.8	1.0	04	177.8	19 56.9	1.0	04	177.8	18 27.0	1.0	04	177.9	17 27.0	1.0	04	178.0	16 27.1	1.0	04	178.0	15 27.2	1.0	04	178.1	14 27.3	1.0	04	178.1	12 57.4	1.0	03	178.2	3
4	20 54.3	1.0	05	177.0	19 54.4	1.0	05	177.1	18 24.6	1.0	05	177.2	17 24.8	1.0	05	177.3	16 24.9	1.0	05	177.3	15 25.0	1.0	05	177.4	14 25.2	1.0	05	177.5	12 55.4	1.0	04	177.6	4
05	20 51.0	1.0	06	176.3	19 51.3	1.0	06	176.4	18 21.6	1.0	06	176.5	17 21.8	1.0	06	176.6	16 22.0	1.0	06	176.7	15 22.2	1.0	06	176.8	14 22.4	1.0	06	176.9	12 52.7	1.0	05	177.0	05
6	20 47.1	99	08	175.5	19 47.4	99	08	175.7	18 17.9	99	07	175.8	17 18.2	99	07	175.9	16 18.5	99	07	176.0	15 18.8	1.0	07	176.1	14 19.1	1.0	06	176.2	12 49.5	1.0	06	176.4	6
7	20 42.5	99	09	174.8	19 42.9	99	09	174.9	18 13.5	99	08	175.1	17 13.9	99	08	175.2	16 14.4	99	08	175.4	15 14.8	99	08	175.5	14 15.2	99	08	175.6	12 45.8	99	07	175.8	7
8	20 37.1	99	10	174.1	19 37.7	99	10	174.2	18 08.5	99	10	174.4	17 09.0	99	09	174.6	16 09.6	99	09	174.7	15 10.1	99	09	174.9	14 10.6	99	08	175.0	12 41.4	99	08	175.2	8
9	20 31.1	99	11	173.3	19 31.8	99	11	173.5	18 02.8	99	10	173.7	17 03.5	99	10	173.9	16 04.2	99	10	174.1	15 04.9	99	10	174.2	14 05.5	99	10	174.4	12 36.5	99	09	174.6	9
10	20 24.3	99	12	172.6	19 25.2	99	12	172.8	17 56.5	99	12	173.1	16 57.3	99	11	173.2	15 58.2	99	11	173.4	14 59.0	99	11	173.6	13 59.8	99	10	173.7	12 31.0	99	10	174.0	10
1	20 16.8	98	14	171.9	19 17.9	98	13	172.1	17 49.5	98	13	172.4	16 50.5	98	12	172.6	15 51.5	98	12	172.8	14 52.5	98	12	172.9	13 53.5	98	12	173.1	12 25.0	98	11	173.4	1
2	20 08.7	98	15	171.2	19 09.9	98	14	171.4	17 41.8	98	14	171.7	16 43.0	98	14	171.9	15 44.2	98	13	172.1	14 45.4	98	13	172.3	13 46.6	98	12	172.5	12 18.3	98	12	172.8	2
3	19 59.8	98	16	170.4	19 01.3	98	16	170.7	17 33.5	98	15	171.0	16 34.9	98	14	171.2	15 36.3	98	14	171.5	14 37.7	98	14	171.7	13 39.1	98	14	171.9	12 11.2	98	13	172.2	3
4	19 50.3	97	17	169.7	18 52.0	97	17	170.0	17 24.5	97	16	170.3	16 26.2	97	16	170.6	15 27.8	97	15	170.8	14 29.4	97	15	171.1	13 31.0	97	14	171.3	12 03.4	97	14	171.6	4
15	19 40.1	97	18	169.0	18 42.1	97	18	169.3	17 14.9	97	17	169.7	16 16.8	97	17	169.9	15 18.7	97	16	170.2	14 20.5	97	16	170.4	13 22.4	97	16	170.7	11 55.1	97	15	171.1	15
6	19 29.2	96	19	168.3	18 31.4	96	19	168.6	17 04.7	96	18	169.0	16 06.8	96	18	169.3	15 09.0	96	17	169.5	14 11.1	97	17	169.8	13 13.1	97	16	170.1	11 46.2	97	16	170.5	6
7	19 17.7	96	20	167.6	18 20.2	96	20	167.9	16 53.8	96	19	168.3	15 56.2	96	19	168.6	14 58.6	96	18	168.9	14 01.0	96	18	169.2	13 03.3	96	17	169.5	11 36.8	96	17	169.9	7
8	19 05.5	95	22	166.9	18 08.2	95	21	167.2	16 42.3	95	20	167.7	15 45.0	96	20	168.0	14 47.7	96	19	168.3	13 50.3	96	19	168.6	12 53.0	96	18	168.9	11 26.9	96	18	169.3	8
9	18 52.6	95	22	166.2	17 55.7	95	22	166.5	16 30.2	95	21	167.0	15 33.2	95	21	167.3	14 36.2	95	20	167.6	13 39.1	95	20	168.0	12 42.0	95	19	168.3	11 16.3	95	18	168.7	9
20	18 39.1	94	24	165.5	17 42.5	94	23	165.8	16 17.5	94	22	166.3	15 20.8	95	22	166.7	14 24.1	95	21	167.0	13 27.3	95	21	167.4	12 30.5	95	20	167.7	11 05.3	95	19	168.2	20
1	18 24.9	94	25	164.8	17 28.6	94	24	165.2	16 04.1	94	23	165.7	15 07.8	94	23	166.0	14 11.4	94	22	166.4	13 14.9	94	22	166.8	12 18.5	94	21	167.1	10 53.7	94	20	167.6	1
2	18 10.1	93	26	164.1	17 14.2	93	25	164.5	15 50.2	93	24	165.0	14 54.2	93	24	165.4	13 58.1	93	23	165.8	13 02.0	94	22	166.2	12 05.9	94	22	166.5	10 41.6	94	21	167.1	2
3	17 54.6	93	27	163.4	16 59.1	93	26	163.8	15 35.6	93	25	164.4	14 40.0	93	25	164.8	13 44.2	93	24	165.2	12 48.5	93	24	165.6	11 52.7	93	23	165.9	10 29.0	93	22	166.5	3
4	17 38.6	92	28	162.8	16 43.4	92	27	163.2	15 20.5	92	26	163.8	14 25.2	92	26	164.2	13 29.8	92	25	164.6	12 34.4	92	24	165.0	11 39.0	92	24	165.4	10 15.8	92	23	165.9	4
25	17 21.9	91	29	162.1	16 27.1	91	28	162.5	15 04.8	92	27	163.1	14 09.8	92	26	163.6	13 14.8	92	26	164.0	12 19.8	92	25	164.4	11 24.8	92	25	164.8	10 02.1	92	24	165.4	25
6	17 04.6	91	30	161.4	16 10.2	91	29	161.9	14 48.5	91	28	162.5	13 53.9	91	28	162.9	12 59.3	91	27	163.4	12 04.7	91	26	163.8	11 10.0	91	26	164.2	9 47.9	91	24	164.8	6
7	16 46.7	90	31	160.8	15 52.7	90	30	161.2	14 31.6	90	29	161.9	13 37.4	90	28	162.3	12 43.2	90	28	162.8	11 49.0	90	27	163.2	10 54.7	90	26	163.7	9 33.2	91	25	164.3	7
8	16 28.2	89	32	160.1	15 34.6	89	31	160.6	14 14.1	90	30	161.3	13 20.4	90	29	161.7	12 26.6	90	28	162.2	11 32.8	90	28	162.6	10 38.9	90	27	163.1	9 18.1	90	26	163.8	8
9	16 09.2	89	33	159.5	15 16.0	89	32	160.0	13 56.1	89	31	160.7	13 02.8	89	30	161.1	12 09.5	89	30	161.6	11 16.1	89	29	162.1	10 22.6	89	28	162.5	9 02.4	89	27	163.2	9
30	15 49.5	88	34	158.8	14 56.8	88	33	159.3	13 37.6	88	32	160.1	12 44.7	88	31	160.6	11 51.8	88	30	161.0	10 58.8	88	30	161.5	10 05.8	88	29	162.0	8 46.2	88	28	162.7	30
1	15 29.3	87	35	158.2	14 37.0	87	34	158.7	13 18.5	87	33	159.5	12 26.0	87	32	160.0	11 33.6	88	31	160.5	10 41.0	88	30	161.0	9 48.5	88	30	161.4	8 29.5	88	29	162.2	1
2	15 08.5	86	36	157.6	14 16.7	86	35	158.1	12 58.8	87	34	158.9	12 06.9	87	33	159.4	11 14.8	87	32	159.9	10 22.8	87	31	160.4	9 30.6	87	30	160.9	8 12.4	87	29	161.7	2
3	14 47.2	86	36	157.0	13 55.8	86	36	157.5	12 38.7	86	34	158.3	11 47.2	86	34	158.8	10 55.6	86	33	159.3	10 04.0	86	32	159.9	9 12.3	86	31	160.4	7 54.8	86	30	161.1	3
4	14 25.3	85	37	156.4	13 34.4	85	36	156.9	12 18.0	85	35	157.7	11 27.0	85	35	158.3	10 35.9	85	34	158.8	9 44.7	85	33	159.3	8 53.5	85	32	159.8	7 36.7	85	31	160.6	4
35	14 02.9	84	38	155.7	13 12.5	84	37	156.3	11 56.8	84	36	157.1	11 06.2	84	35	157.7	10 15.6	84	34	158.2	9 25.0	84	34	158.8	8 34.3	85	33	159.3	7 18.1	85	32	160.1	35
6	13 39.9	83	39	155.2	12 50.0	83	38	155.7	11 35.1	83	37	156.6	10 45.0	83	36	157.1	9 54.9	84	35	157.7	9 04.8	84	34	158.3	8 14.5	84	34	158.8	6 59.1	84	32	159.6	6
7	13 16.4	82	40	154.6	12 27.1	82	39	155.1	11 12.9	83	38	156.0	10 23.3	83	37	156.6	9 33.7	83	36	157.2	8 44.1	83	35	157.7	7 54.3	83	34	158.3	6 39.7	83	33	159.1	7
8	12 52.5	81	41	154.0	12 03.6	81	40	154.6	10 50.2	82	39	155.5	10 01.1	82	38	156.0	9 12.0	82	37	156.6	8 22.9	82	36	157.2	7 33.7	82	35	157.8	6 19.8	82	34	158.6	8
9	12 28.0	80	42	153.4	11 39.6	81	41	154.0	10 27.0	81	40	154.9	9 38.5	81	38	155.5	8 49.9	81	38	156.1	8 01.3	81	37	156.7	7 12.6	81	36	157.3	5 59.5	81	34	158.2	9
40	12 03.0	80	42	152.8	11 15.2	80	42	153.5	10 03.3	80	40	154.4	9 15.3	80	39	155.0	8 27.3	80	38	155.6	7 39.2	80	38	156.2	6 51.0	80	37	156.8	5 38.7	80	35	157.7	40
1	11 37.6	79	43	152.3	10 50.3	79	42	152.9	9 39.2	79	41	153.8	8 51.8	79	40	154.5	8 04.2	79	39	155.1	7 16.7	79	38	155.7	6 29.0	79	37	156.3	5 17.5	80	36	157.2	1
2	11 11.6	78	44	151.7	10 24.9	78	43	152.4	9 14.6	78	42	153.3	8 27.7	78	41	153.9	7 40.7	78	40	154.6	6 53.7	78	39	155.2	6 06.6	78	38	155.8					2
3	10 45.2	77	45	151.2	9 59.0	77	44	151.8	8 49.6	77	42	152.8	8 03.2	77	42	153.4	7 16.8	77	41	154.1	6 30.3	78	40	154.7	5 43.8	78	39	155.3					3
4	10 18.4	76	46	150.6	9 32.7	76	45	151.3	8 24.1	76	43	152.3	7 38.3	76	42	152.9	6 52.4	76	41	153.6	6 06.5	77	40	154.2	5 20.5	77	39	154.9					4
45	9 51.0	75	46	150.1	9 06.0	75	45	150.8	7 58.2	75	44	151.8	7 13.0	75	43	152.4	6 27.6	76	42	153.1	5 42.3	76	41	153.7									45
6	9 23.3	74	47	149.6	8 38.8	74	46	150.3	7 31.9	74	45	151.3	6 47.2	75	44	151.9	6 02.4	75	43	152.6	5 17.6	75	42	153.3									6
7	8 55.1	73	48	149.1	8 11.1	73	47	149.7	7 05.1	73	45	150.8	6 21.0	74	44	151.5	5 36.8	74	43	152.1													7
8	8 26.5	72	48	148.5	7 43.1	72	48	149.2	6 37.9	72	46	150.3	5 54.4	73	45	151.0	5 10.8	73	44	151.7													8
9	7 57.5	71	49	148.0	7 14.7	71	48	148.7	6 10.3	72	46	149.8	5 27.4	72	46	150.5																	9
50	7 28.0	70	50	147.5	6 45.8	70	49	148.3	5 42.4	71	47	149.3	5 00.0	71	46	150.0																	50
1	6 58.2	69	50	147.1	6 16.5	69	49	147.8	5 14.0	70	47	148.9																					1
2	6 27.9	68	51	146.6	5 46.9	68	50	147.3																									2
3	5 57.3	67	52	146.1	5 16.9	67	51	146.8																									3
4	5 26.3	66	52	145.6																													4

Lat. 24°

Lat 25°

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′ Alt.	Δd	Δt	Az.	47° 00′ Alt.	Δd	Δt	Az.	48° 30′ Alt.	Δd	Δt	Az.	49° 30′ Alt.	Δd	Δt	Az.	50° 30′ Alt.	Δd	Δt	Az.	51° 30′ Alt.	Δd	Δt	Az.	52° 30′ Alt.	Δd	Δt	Az.	54° 00′ Alt.	Δd	Δt	Az.	H.A.
°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	′			°	°
91	15 39.5	29	66	46.2	15 57.0	29	65	45.2	16 22.8	28	64	43.7	16 39.6	28	62	42.7	16 56.1	27	61	41.7	17 12.3	27	60	40.7	17 28.2	26	59	39.7	17 51.5	25	57	38.1	91
2	14 59.8	30	66	45.9	15 17.9	30	65	45.0	15 44.7	29	63	43.5	16 02.2	29	62	42.5	16 19.4	28	61	41.5	16 36.4	28	60	40.5	16 53.0	28	58	39.5	17 17.5	27	56	38.0	2
3	14 20.1	32	66	45.7	14 39.0	31	65	44.7	15 06.8	31	63	43.3	15 25.0	30	62	42.3	15 42.9	30	61	41.3	16 00.6	29	60	40.3	16 18.0	29	58	39.3	16 43.5	28	56	37.8	3
4	13 40.7	33	66	45.5	14 00.2	32	64	44.5	14 29.0	32	63	43.1	14 47.9	31	62	42.1	15 06.5	31	60	41.1	15 24.9	30	59	40.1	15 43.1	30	58	39.1	16 09.8	29	56	37.6	4
95	13 01.4	34	65	45.3	13 21.5	33	64	44.3	13 51.4	33	62	42.8	14 10.9	32	61	41.9	14 30.3	32	60	40.9	14 49.4	32	59	39.9	15 08.3	31	58	38.9	15 36.1	31	56	37.4	95
6	12 22.2	35	65	45.0	12 43.0	35	64	44.1	13 13.9	34	62	42.6	13 34.2	34	61	41.6	13 54.2	33	60	40.7	14 14.1	33	59	39.7	14 33.7	32	58	38.7	15 02.6	32	56	37.3	6
7	11 43.2	36	65	44.8	12 04.7	36	64	43.8	12 36.6	35	62	42.4	12 57.6	35	61	41.4	13 18.3	34	60	40.4	13 38.9	34	58	39.5	13 59.2	34	57	38.5	14 29.3	33	55	37.1	7
8	11 04.4	37	64	44.5	11 26.6	37	63	43.6	11 59.4	36	62	42.1	12 21.1	36	60	41.2	12 42.6	36	59	40.2	13 03.8	35	58	39.3	13 24.9	35	57	38.3	13 56.1	34	55	36.8	8
9	10 25.8	38	64	44.2	10 48.6	38	63	43.3	11 22.5	37	61	41.9	11 44.8	37	60	40.9	12 07.0	37	59	40.0	12 29.0	36	58	39.0	12 50.7	36	56	38.1	13 23.0	36	55	36.6	9
100	9 47.4	39	64	44.0	10 10.8	39	63	43.0	10 45.7	39	61	41.6	11 08.7	38	60	40.7	11 31.6	38	59	39.7	11 54.3	38	58	38.8	12 16.8	37	56	37.8	12 50.1	37	54	36.4	100
1	9 09.1	40	63	43.7	9 33.2	40	62	42.8	10 09.1	40	61	41.4	10 32.8	39	60	40.4	10 56.4	39	58	39.5	11 19.8	39	57	38.6	11 43.0	39	56	37.6	12 17.4	38	54	36.2	1
2	8 31.1	41	63	43.4	8 55.8	41	62	42.5	9 32.7	41	60	41.1	9 57.1	41	59	40.2	10 21.4	40	58	39.2	10 45.4	40	57	38.3	11 09.4	40	56	37.4	11 44.9	39	54	36.0	2
3	7 53.2	42	63	43.1	8 18.6	42	62	42.2	8 56.5	42	60	40.8	9 21.6	42	59	39.9	9 46.5	41	58	39.0	10 11.3	41	56	38.0	10 35.9	41	55	37.1	11 12.6	40	54	35.7	3
4	7 15.6	44	62	42.8	7 41.7	43	61	41.9	8 20.5	43	60	40.5	8 46.3	43	58	39.6	9 11.9	43	57	38.7	9 37.4	42	56	37.8	10 02.7	42	55	36.9	10 40.4	42	53	35.5	4
105	6 38.2	45	62	42.5	7 04.9	44	61	41.6	7 44.7	44	59	40.2	8 11.2	44	58	39.3	8 37.5	44	57	38.4	9 03.6	44	56	37.5	9 29.7	43	55	36.6	10 08.5	43	53	35.2	105
6	6 01.0	46	62	42.2	6 28.3	46	60	41.3	7 09.2	45	59	39.9	7 36.3	45	58	39.0	8 03.2	45	56	38.1	8 30.1	45	56	37.2	8 56.9	44	54	36.3	9 36.7	44	53	35.0	6
7	5 24.0	47	61	41.9	5 52.0	47	60	41.0	6 33.8	46	58	39.6	7 01.6	46	58	38.7	7 29.3	46	56	37.8	7 56.8	46	55	36.9	8 24.2	46	54	36.0	9 05.2	45	52	34.7	7
8					5 15.9	48	60	40.6	5 58.7	47	58	39.3	6 27.1	47	57	38.4	6 55.5	47	56	37.5	7 23.7	47	55	36.7	7 51.8	47	54	35.8	8 33.8	47	52	34.4	8
9									5 23.8	49	58	39.0	5 52.9	48	56	38.1	6 21.9	48	56	37.2	6 50.9	48	54	36.4	7 19.7	48	53	35.5	8 02.7	48	52	34.1	9
110													5 19.0	50	56	37.8	5 48.6	49	55	36.9	6 18.2	49	54	36.1	6 47.7	49	53	35.2	7 31.8	49	51	33.9	110
1																	5 15.6	51	55	36.6	5 45.9	50	54	35.7	6 16.0	50	52	34.9	7 01.2	50	51	33.6	1
2																					5 13.7	52	53	35.4	5 44.6	51	52	34.6	6 30.8	51	50	33.3	2
3																									5 13.4	53	52	34.2	6 00.6	52	50	33.0	3
4																													5 30.7	54	50	32.6	4
115																													5 01.0	55	49	32.3	115

Lat 26°

Lat 27°

Lat 28°

Lat. 23°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	58 30.0	1.0 01	00.0	58 00.0	1.0 01	00.0	57 00.0	1.0 01	00.0	56 30.0	1.0 01	00.0	56 00.0	1.0 01	00.0	55 30.0	1.0 01	00.0	54 00.0	1.0 01	00.0	53 30.0	1.0 01	00.0	00
1	58 29.5	1.0 03	01.1	57 59.5	1.0 03	01.1	56 59.5	1.0 02	01.0	56 29.5	1.0 02	01.0	55 59.5	1.0 02	01.0	55 29.5	1.0 02	00.9	53 59.6	1.0 02	00.9	53 29.6	1.0 02	00.9	1
2	58 27.9	1.0 04	02.2	57 57.9	1.0 04	02.2	56 58.0	1.0 04	02.1	56 28.1	1.0 04	02.0	55 58.1	1.0 04	02.0	55 28.2	1.0 04	01.9	53 58.3	1.0 04	01.8	53 28.4	1.0 03	01.7	2
3	58 25.2	1.0 06	03.3	57 55.3	1.0 06	03.3	56 55.6	1.0 06	03.1	56 25.7	1.0 06	03.0	55 55.8	1.0 06	02.9	55 25.9	1.0 05	02.8	53 56.2	1.0 05	02.6	53 26.3	1.0 05	02.6	3
4	58 21.4	99 08	04.4	57 51.7	99 08	04.3	56 52.1	99 07	04.1	56 22.3	99 07	04.0	55 52.5	99 07	03.9	55 22.7	99 07	03.8	53 53.3	99 06	03.5	53 23.4	99 06	03.4	4
05	58 16.7	99 10	05.5	57 47.0	99 10	05.4	56 47.7	99 09	05.1	56 18.0	99 09	05.0	55 48.3	99 08	04.8	55 18.6	99 08	04.7	53 49.5	99 08	04.4	53 19.7	99 08	04.2	05
6	58 10.8	98 12	06.6	57 41.3	98 11	06.4	56 42.3	98 11	06.1	56 12.7	98 10	06.0	55 43.2	99 10	05.8	55 13.6	99 10	05.7	53 44.9	99 09	05.2	53 15.2	99 09	05.1	6
7	58 03.9	98 13	07.7	57 34.6	98 13	07.5	56 35.9	98 12	07.1	56 06.5	98 12	06.9	55 37.1	98 12	06.8	55 07.7	98 11	06.6	53 39.4	98 10	06.1	53 10.0	98 10	05.9	7
8	57 56.0	97 15	08.8	57 26.9	97 14	08.5	56 28.6	97 14	08.1	55 59.4	97 13	07.9	55 30.2	97 13	07.7	55 01.0	97 13	07.5	53 33.2	98 12	06.9	53 03.9	98 12	06.8	8
9	57 47.1	96 16	09.8	57 18.2	96 16	09.6	56 20.4	97 15	09.1	55 51.4	97 15	08.8	55 22.4	97 14	08.6	54 53.3	97 14	08.4	53 26.1	97 13	07.8	52 57.0	97 13	07.6	9
10	57 37.2	95 18	10.9	57 08.6	96 18	10.6	56 11.2	96 17	10.0	55 42.4	96 16	09.8	55 13.6	96 16	09.5	54 44.8	96 16	09.3	53 18.2	96 14	08.6	52 49.3	96 14	08.4	10
1	57 26.3	95 20	11.9	56 58.6	95 19	11.6	56 01.1	95 18	11.0	55 32.6	95 18	10.7	55 04.0	95 17	10.5	54 35.5	95 17	10.2	53 09.6	96 16	09.4	52 40.9	96 15	09.2	1
2	57 14.5	94 21	12.9	56 46.4	94 21	12.6	55 50.1	94 20	11.9	55 21.9	94 19	11.6	54 53.6	94 19	11.4	54 25.3	94 18	11.1	53 00.1	95 17	10.3	52 31.7	95 17	10.0	2
3	57 01.7	92 23	13.9	56 33.9	93 22	13.5	55 38.2	93 21	12.9	55 10.3	93 21	12.6	54 42.3	93 20	12.3	54 14.3	94 20	11.9	52 49.9	94 18	11.1	52 21.7	94 18	10.8	3
4	56 48.0	91 24	14.9	56 20.5	92 24	14.5	55 25.5	92 23	13.8	54 57.9	92 22	13.5	54 30.2	92 22	13.1	54 02.4	93 21	12.8	52 38.9	93 20	11.9	52 11.0	93 19	11.6	4
15	56 33.4	90 26	15.8	56 06.3	90 25	15.4	55 11.9	91 24	14.7	54 44.6	91 24	14.3	54 17.2	91 23	14.0	53 49.8	91 22	13.6	52 27.2	92 21	12.6	51 59.6	92 20	12.3	15
6	56 17.9	89 27	16.8	55 51.1	88 27	16.4	54 57.5	90 25	15.6	54 30.5	90 25	15.2	54 03.5	90 24	14.8	53 36.4	90 24	14.5	52 14.8	91 22	13.4	51 47.5	91 22	13.1	6
7	56 01.5	88 29	17.7	55 35.2	88 28	17.3	54 42.2	88 27	16.4	54 15.7	89 26	16.0	53 49.0	89 26	15.6	53 22.3	89 25	15.3	52 01.6	90 23	14.2	51 34.6	90 22	13.8	7
8	55 44.3	86 30	18.6	55 18.4	87 29	18.1	54 26.2	87 28	17.3	54 00.0	88 27	16.9	53 33.7	88 27	16.5	53 07.3	88 26	16.1	51 47.8	89 24	14.9	51 21.1	89 24	14.5	8
9	55 26.3	85 31	19.5	55 00.8	85 31	19.0	54 09.4	86 29	18.1	53 43.6	86 28	17.7	53 17.7	87 28	17.3	52 51.7	87 27	16.8	51 33.2	88 25	15.6	51 06.9	88 25	15.3	9
20	55 07.5	83 33	20.3	54 42.4	84 32	19.8	53 51.9	85 30	18.9	53 26.5	85 30	18.5	53 01.0	85 29	18.0	52 35.3	86 28	17.6	51 18.0	86 26	16.4	50 52.0	87 26	16.0	20
1	54 47.9	82 34	21.2	54 23.3	82 33	20.7	53 33.6	83 32	19.7	53 08.6	84 31	19.3	52 43.5	84 30	18.8	52 18.3	84 30	18.4	51 02.1	85 28	17.1	50 36.5	85 27	16.7	1
2	54 27.6	81 35	22.0	54 03.4	81 34	21.5	53 14.6	82 33	20.5	52 50.1	82 32	20.0	52 25.4	82 31	19.5	52 00.6	83 31	19.1	50 45.6	84 29	17.8	50 20.4	84 28	17.3	2
3	54 06.6	79 36	22.8	53 42.9	79 36	22.3	52 55.0	80 34	21.2	52 30.8	81 33	20.8	52 06.6	81 32	20.3	51 42.2	81 32	19.8	50 28.4	82 30	18.4	50 03.6	83 29	18.0	3
4	53 44.9	77 37	23.5	53 21.6	78 36	23.0	52 34.6	79 35	22.0	52 10.9	79 34	21.5	51 47.1	80 33	21.0	51 23.2	80 33	20.5	50 10.6	81 31	19.1	49 46.2	82 30	18.6	4
25	53 22.5	76 38	24.3	52 59.7	76 38	23.8	52 13.6	77 36	22.7	51 50.4	78 35	22.2	51 27.0	78 34	21.7	51 03.5	79 34	21.2	49 52.3	80 32	19.7	49 28.3	80 31	19.3	25
6	52 59.5	74 40	25.0	52 37.1	75 39	24.5	51 52.0	76 37	23.4	51 29.2	76 36	22.9	51 06.3	77 36	22.3	50 43.3	77 35	21.8	49 33.3	78 32	20.4	49 09.8	79 32	19.9	6
7	52 35.8	73 40	25.7	52 13.9	73 40	25.2	51 29.8	74 38	24.1	51 07.5	75 37	23.5	50 45.0	75 36	23.0	50 22.4	76 36	22.5	49 13.8	77 33	21.0	48 50.7	77 33	20.5	7
8	52 11.5	71 41	26.4	51 50.2	71 41	25.8	51 07.0	73 39	24.7	50 45.1	73 38	24.2	50 23.1	74 37	23.6	50 01.0	74 36	23.1	48 53.8	75 34	21.6	48 31.1	76 34	21.1	8
9	51 46.7	69 42	27.1	51 25.8	70 42	26.5	50 43.6	71 40	25.4	50 22.2	71 39	24.8	50 00.7	72 38	24.3	49 39.1	72 38	23.7	48 33.2	74 35	22.2	48 11.6	74 34	21.7	9
30	51 21.3	68 43	27.7	51 00.9	68 42	27.1	50 19.7	69 41	26.0	49 58.8	70 40	25.4	49 37.8	70 39	24.9	49 16.6	71 38	24.3	48 12.1	72 36	22.7	47 50.4	73 35	22.2	30
1	50 55.3	66 44	28.3	50 35.5	67 43	27.7	49 55.2	68 42	26.6	49 34.8	68 41	26.0	49 14.3	69 40	25.4	48 53.6	69 39	24.9	47 50.5	71 37	23.3	47 29.2	71 36	22.8	1
2	50 28.9	64 45	28.9	50 09.5	65 44	28.3	49 30.3	66 42	27.2	49 10.4	67 42	26.6	48 50.3	67 41	26.0	48 30.1	68 40	25.4	47 28.5	69 38	23.8	47 07.6	70 37	23.3	2
3	50 01.9	63 46	29.5	49 43.1	63 45	28.9	49 04.8	64 43	27.7	48 45.4	65 42	27.1	48 25.9	66 42	26.6	48 06.1	66 41	26.0	47 05.9	68 38	24.3	46 45.6	68 38	23.8	3
4	49 34.5	61 46	30.1	49 16.2	61 46	29.4	48 38.9	63 44	28.2	48 20.0	63 43	27.7	48 00.9	64 42	27.1	47 41.7	64 42	26.5	46 43.0	66 39	24.8	46 23.1	67 38	24.3	4
35	49 06.6	59 47	30.6	48 48.8	60 46	30.0	48 12.5	61 45	28.8	47 54.1	62 44	28.2	47 35.6	62 43	27.6	47 16.8	63 42	27.0	46 19.5	64 40	25.3	46 00.1	65 39	24.8	35
6	48 38.3	57 48	31.1	48 21.0	58 47	30.5	47 45.7	59 45	29.3	47 27.9	60 45	28.7	47 09.8	61 44	28.1	46 51.5	61 43	27.5	45 55.7	63 40	25.8	45 36.8	63 40	25.2	6
7	48 09.6	56 49	31.6	47 52.7	56 48	31.0	47 18.5	58 46	29.8	47 01.1	58 45	29.2	46 43.6	59 44	28.6	46 25.8	60 44	28.0	45 31.5	61 41	26.3	45 13.0	62 40	25.7	7
8	47 40.4	54 49	32.1	47 24.1	55 48	31.4	46 50.9	56 47	30.2	46 34.0	57 46	29.6	46 17.0	57 45	29.0	45 59.7	58 44	28.4	45 06.8	60 42	26.7	44 48.9	60 41	26.1	8
9	47 10.9	52 50	32.5	46 55.1	53 49	31.9	46 22.9	54 47	30.7	46 06.6	55 46	30.1	45 50.0	56 46	29.5	45 33.2	56 45	28.9	44 41.8	58 42	27.1	44 24.4	59 42	26.6	9
40	46 41.0	51 50	33.0	46 25.8	51 50	32.3	45 54.6	53 48	31.1	45 38.7	53 47	30.5	45 22.6	54 46	29.9	45 06.4	55 45	29.3	44 16.5	56 43	27.5	43 59.5	57 42	27.0	40
1	46 10.8	49 51	33.4	45 56.0	50 50	32.8	45 25.9	51 48	31.5	45 10.5	52 48	30.9	44 54.9	52 47	30.3	44 39.2	53 46	29.7	43 50.8	55 43	27.9	43 34.3	55 43	27.4	1
2	45 40.3	47 52	33.8	45 26.0	48 51	33.2	44 56.8	49 49	31.9	44 42.0	50 48	31.3	44 26.9	51 47	30.7	44 11.6	51 46	30.1	43 24.7	53 44	28.3	43 08.7	54 43	27.7	2
3	45 09.4	46 52	34.2	44 55.6	46 51	33.5	44 27.5	48 49	32.3	44 13.1	48 48	31.7	43 58.5	49 48	31.1	43 43.8	50 47	30.5	42 58.4	51 44	28.7	42 42.9	52 44	28.1	3
4	44 38.2	44 52	34.5	44 25.0	45 52	33.9	43 57.8	46 50	32.7	43 44.0	47 49	32.0	43 29.9	47 48	31.4	43 15.6	48 47	30.8	42 31.7	50 45	29.0	42 16.7	50 44	28.5	4
45	44 06.8	42 53	34.9	43 54.0	43 52	34.3	43 27.9	44 50	33.0	43 14.5	45 50	32.4	43 00.9	46 49	31.8	42 47.2	46 48	31.2	42 04.8	48 45	29.4	41 50.2	49 44	28.8	45
6	43 35.1	41 53	35.2	43 22.8	41 52	34.6	42 57.7	43 51	33.3	42 44.8	43 50	32.7	42 31.7	44 49	32.1	42 18.4	45 48	31.5	41 37.5	46 46	29.7	41 23.5	47 45	29.1	6
7	43 03.1	39 54	35.5	42 51.3	40 53	34.9	42 27.2	41 51	33.7	42 14.8	42 50	33.0	42 02.2	42 50	32.4	41 49.4	43 49	31.8	41 10.0	45 46	30.0	40 56.5	45 46	29.4	7
8	42 30.9	37 54	35.8	42 19.6	38 53	35.2	41 56.4	39 52	34.0	41 44.5	40 51	33.3	41 32.5	41 50	32.7	41 20.2	41 49	32.1	40 42.2	43 47	30.3	40 29.2	44 46	29.7	8
9	41 58.4	36 54	36.1	41 47.6	36 54	35.5	41 25.5	38 52	34.3	41 14.1	38 51	33.6	41 02.5	39 50	33.0	40 50.7	40 50	32.4	40 14.2	41 47	30.6	40 01.7	42 46	30.0	9
50	41 25.8	34 55	36.4	41 15.5	35 54	35.8	40 54.3	36 52	34.5	40 43.4	37 52	33.9	40 32.3	37 51	33.3	40 21.0	38 50	32.7	39 46.0	40 47	30.9	39 34.0	40 47	30.3	50
1	40 52.9	32 55	36.6	40 43.1	33 54	36.0	40 22.9	34 53	34.8	40 12.5	35 52	34.2	40 01.9	36 51	33.6	39 51.1	36 50	32.9	39 17.6	38 48	31.1	39 06.0	39 47	30.5	1
2	40 19.8	31 55	36.9	40 10.5	31 55	36.3	39 51.3	33 53	35.0	39 41.3	33 52	34.4	39 31.2	34 51	33.8	39 20.9	35 50	33.2	38 48.9	37 48	31.4	38 37.8	37 47	30.8	2
3	39 46.6	29 56	37.1	39 37.7	30 55	36.5	39 19.5	31 53	35.3	39 10.0	32 52	34.6	39 00.4	32 52	34.0	38 50.6	33 51	33.4	38 20.0	35 48	31.6	38 09.5	35 48	31.0	3
4	39 13.2	28 56	37.3	39 04.8	28 55	36.7	38 47.5	30 54	35.5	38 38.5	30 53	34.9	38 29.4	31 52	34.3	38 20.1	31 51	33.7	37 51.0	33 49	31.8	37 40.9	34 48	31.3	4
55	38 39.6	26 56	37.5	38 31.7	27 56	36.9	38 15.3	28 54	35.7	38 06.9	29 53	35.1	37 58.2	29 52	34.5	37 49.4	30 52	33.9	37 21.7	32 49	32.1	37 12.2	32 48	31.5	55
6	38 05.9	24 56	37.7	37 58.5	25 56	37.1	37 43.1	26 54	35.9	37 35.1	27 53	35.3	37 26.9	28 52	34.7	37 18.5	28 52	34.1	36 52.3	30 49	32.3	36 43.2	31 48	31.7	6
7	37 32.0	23 56	37.9	37 25.1	23 56	37.3	37 18.6	25 54	36.1	37 03.1	25 54	35.5	36 55.4	26 53	34.8	36 47.5	27 52	34.2	36 22.8	28 50	32.4	36 14.2	29 49	31.9	7
8	36 58.1	21 57	38.1	36 51.6	22 56	37.4	36 38.0	23 54	36.2	36 31.0	24 54	35.6	36 23.8	24 53	35.0	36 16.4	25 52	34.4	35 53.1	27 50	32.6	35 45.0	27 49	32.0	8
9	36 23.9	20 57	38.2	36 17.9	20 56	37.6	36 05.3	22 55	36.4	35 58.8	22 54	35.8	35 52.0	23 53	35.2	35 45.1	23 52	34.6	35 23.2	25 50	32.8	35 15.6	26 49	32.2	9
60	35 49.7	18 57	38.3	35 44.2	19 56	37.7	35 32.5	20 55	36.5	35 26.4	21 54	35.9	35 20.1	21 53	35.3	35 13.7	22 52	34.7	34 53.3	24 50	32.9	34 46.1	24 49	32.3	60
1	35 15.4	17 57	38.5	35 10.3	17 56	37.9	34 59.6	18 55	36.7	34 54.0	19 54	36.1	34 48.2	20 54	35.5	34 42.2	20 53	34.9	34 23.2	22 50	33.1	34 16.5	23 50	32.5	1
2	34 41.0	15 58	38.6	34 36.4	16 57	38.0	34 26.6	17 55	36.8	34 21.4	18 54	36.2	34 16.1	18 54	35.6	34 10.5	19 53	35.0	33 53.0	20 50	33.2	33 46.8	21 50	32.6	2
3	34 06.6	14 58	38.7	34 02.4	14 57	38.1	33 53.5	15 55	36.9	33 48.8	16 55	36.3	33 43.9	17 54	35.7	33 38.8	17 53	35.1	33 22.7	19 51	33.3	33 16.9	19 50	32.7	3
4	33 32.0	12 58	38.8	33 28.3	13 57	38.2	33 20.3	14 56	37.0	33 16.0	14 55	36.4	33 11.6	15 54	35.8	33 07.0	16 53	35.2	32 52.3	17 51	33.4	32 47.0	18 50	32.9	4
65	32 57.4	11 58	38.8	32 54.1	11 57	38.3	32 47.0	12 56	37.1	32 43.2	13 55	36.5	32 39.3	13 54	35.9	32 35.1	14 53	35.3	32 21.8	16 51	33.5	32 17.0	16 50	33.0	65
6	32 22.7	09 58	38.9	32 19.9	10 57	38.3	32 13.7	11 56	37.1	32 10.4	11 55	36.6	32 06.9	12 54	36.0	32 03.2	12 53	35.4	31 51.2	14 51	33.6	31 46.9	15 50	33.1	6
7	31 48.0	08 58	39.0	31 45.6	08 57	38.4	31 40.3	09 56	37.2	31 37.4	10 55	36.6	31 34.4	10 54	36.0	31 31.2	11 54	35.5	31 20.6	13 51	33.7	31 16.8	13 50	33.1	7
8	31 13.3	06 58	39.0	31 11.3	07 57	38.4	31 06.9	08 56	37.3	31 04.5	08 55	36.7	31 01.9	09 54	36.1	30 59.1	09 54	35.5	30 49.9	11 51	33.8	30 46.5	11 50	33.2	8
9	30 38.5	05 58	39.1	30 37.0	05 57	38.5	30 33.4	06 56	37.3	30 31.4	07 55	36.7	30 29.3	07 54	36.2	30 27.0	08 54	35.6	30 19.2	09 51	33.9	30 16.3	10 51	33.3	9
70	30 03.7	03 58	39.1	30 02.6	04 57	38.5	29 59.9	05 56	37.4	29 58.4	05 55	36.8	29 56.7	06 54	36.2	29 54.8	06 54	35.6	29 48.4	08 51	33.9	29 45.9	08 51	33.3	70
1	29 28.8	02 58	39.1	29 28.2	02 57	38.5	29 26.4	03 56	37.4	29 25.3	04 55	36.8	29 24.0	04 54	36.2	29 22.6	05 54	35.7	29 17.6	06 51	33.9	29 15.6	07 51	33.4	1
2	28 54.0	01 58	39.1	28 53.8	01 57	38.5	28 52.9	02 56	37.4	28 52.2	02 55	36.8	28 51.4	03 54	36.3	28 50.4	03 54	35.7	28 46.7	05 52	34.0	28 45.2	05 51	33.4	2
3	28 19.2	01 58	39.1	28 19.4	00 57	38.5	28 19.3	01 56	37.4	28 19.1	01 55	36.8	28 18.7	01 54	36.3	28 18.2	02 54	35.7	28 15.8	03 52	34.0	28 14.8	04 51	33.4	3
4	27 44.3	02 58	39.1	27 44.9	02 57	38.5	27 45.8	01 56	37.4	27 46.0	00 55	36.8	27 46.0	00 54	36.3	27 46.0	00 54	35.7	27 44.9	02 52	34.0	27 44.3	02 51	33.5	4
75	27 09.5	04 58	39.1	27 10.5	03 57	38.5	27 12.2	02 56	37.4	27 12.9	02 55	36.8	27 13.4	01 54	36.3	27 13.7	01 54	35.7	27 14.0	00 52	34.0	27 13.9	01 51	33.5	75
6	26 34.7	05 58	39.1	26 36.2	05 57	38.5	26 38.7	04 56	37.4	26 39.8	03 55	36.8	26 40.7	03 54	36.3	26 41.5	02 54	35.7	26 43.1	01 52	34.0	26 43.4	01 51	33.5	6
7	25 59.9	06 58	39.0	26 01.8	06 57	38.5	26 05.2	05 56	37.3	26 06.7	05 55	36.8	26 08.0	04 54	36.2	26 09.3	04 54	35.7	26 12.2	03 52	34.0	26 13.0	02 51	33.5	7
8	25 25.2	08 58	39.0	25 27.4	07 57	38.4	25 31.7	07 56	37.3	25 33.6	06 55	36.8	25 35.4	06 54	36.2	25 37.1	05 54	35.7	25 41.4	04 52	34.0	25 42.5	04 51	33.4	8
9	24 50.4	09 58	38.9	24 53.2	09 57	38.4	24 58.2	08 56	37.3	25 00.6	08 55	36.7	25 02.8	07 54	36.2	25 04.9	07 54	35.6	25 10.5	06 51	34.0	25 12.1	06 51	33.4	9
80	24 15.8	11 58	38.9	24 18.9	10 57	38.3	24 24.8	09 56	37.2	24 27.6	09 55	36.7	24 30.2	09 54	36.1	24 32.8	08 54	35.6	24 39.6	07 51	33.9	24 41.7	07 51	33.4	80
1	23 41.1	12 58	38.8	23 44.7	12 57	38.2	23 51.4	11 56	37.2	23 54.6	10 55	36.6	23 57.7	10 54	36.1	24 00.7	10 54	35.5	24 08.8	09 51	33.9	24 11.3	08 50	33.3	1
2	23 06.6	13 58	38.7	23 10.5	13 57	38.2	23 18.1	12 56	37.1	23 21.7	12 55	36.5	23 25.2	11 54	36.0	23 28.6	11 53	35.5	23 38.1	10 51	33.8	23 41.0	10 50	33.3	2
3	22 32.1	15 57	38.6	22 36.4	14 57	38.1	22 44.8	14 55	37.0	22 48.8	13 54	36.5	22 52.8	13 54	35.9	22 56.6	13 53	35.4	23 07.4	11 51	33.8	23 10.7	11 50	33.2	3
4	21 57.7	16 57	38.5	22 02.4	16 56	38.0	22 11.6	15 55	36.9	22 16.1	15 54	36.4	22 20.4	14 54	35.8	22 24.6	14 53	35.3	22 36.7	13 51	33.7	22 40.5	13 50	33.2	4
85	21 23.3	17 57	38.4	21 28.5	17 56	37.9	21 38.5	16 55	36.8	21 43.3	16 54	36.3	21 48.1	16 54	35.8	21 52.7	15 53	35.2	22 06.1	14 51	33.6	22 10.3	14 50	33.1	85
6	20 49.0	19 57	38.3	20 54.6	18 56	37.8	21 05.4	18 55	36.7	21 10.7	17 54	36.2	21 15.8	17 54	35.7	21 20.9	17 53	35.1	21 35.5	16 51	33.5	21 40.2	15 50	33.0	6
7	20 14.8	20 57	38.2	20 20.8	20 56	37.7	20 32.4	19 55	36.6	20 38.1	19 54	36.1	20 43.7	18 54	35.6	20 49.2	18 53	35.0	21 05.0	17 51	33.5	21 10.1	17 50	32.9	7
8	19 40.8	21 57	38.1	19 47.1	21 56	37.5	19 59.5	20 55	36.5	20 05.6	20 54	36.0	20 11.6	20 53	35.4	20 17.5	20 53	34.9	20 34.6	19 50	33.4	20 40.1	18 50	32.8	8
9	19 06.8	23 56	37.9	19 13.5	22 56	37.4	19 26.7	22 54	36.4	19 33.2	21 54	35.8	19 39.6	21 53	35.3	19 45.9	21 52	34.8	20 04.3	20 50	33.2	20 10.2	20 50	32.7	9
90	18 32.9	24 56	37.8	18 40.0	24 56	37.3	18 54.0	23 54	36.2	19 00.9	23 54	35.7	19 07.7	23 53	35.2	19 14.4	22 52	34.7	19 34.1	21 50	33.1	19 40.4	21 50	32.6	90

Lat. 23°

H.A.	54° 30′ Alt.	Δd	Δt	Az.	55° 00′ Alt.	Δd	Δt	Az.	56° 00′ Alt.	Δd	Δt	Az.	56° 30′ Alt.	Δd	Δt	Az.	57° 00′ Alt.	Δd	Δt	Az.	57° 30′ Alt.	Δd	Δt	Az.	59° 00′ Alt.	Δd	Δt	Az.	59° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	12 30.0	1.0	00	180.0	12 00.0	1.0	00	180.0	11 00.0	1.0	00	180.0	10 30.0	1.0	00	180.0	10 00.0	1.0	00	180.0	9 30.0	1.0	00	180.0	8 00.0	1.0	00	180.0	7 30.0	1.0	00	180.0	00
1	12 29.7	1.0	01	179.4	11 59.7	1.0	01	179.4	10 59.7	1.0	01	179.4	10 29.7	1.0	01	179.4	9 59.7	1.0	01	179.4	9 29.7	1.0	01	179.5	7 59.7	1.0	01	179.5	7 29.8	1.0	01	179.5	1
2	12 28.9	1.0	02	178.8	11 58.9	1.0	02	178.8	10 58.9	1.0	02	178.9	10 28.9	1.0	02	178.9	9 58.9	1.0	02	178.9	9 29.0	1.0	02	179.0	7 59.0	1.0	02	179.0	7 29.0	1.0	02	179.0	2
3	12 27.4	1.0	03	178.2	11 57.5	1.0	03	178.2	10 57.5	1.0	03	178.3	10 27.6	1.0	03	178.3	9 57.6	1.0	03	178.3	9 27.6	1.0	03	178.4	7 57.7	1.0	03	178.4	7 27.8	1.0	03	178.5	3
4	12 25.4	1.0	04	177.6	11 55.5	1.0	04	177.7	10 55.6	1.0	04	177.7	10 25.7	1.0	04	177.8	9 55.7	1.0	04	177.8	9 25.8	1.0	04	177.8	7 56.0	1.0	04	177.9	7 26.1	1.0	04	178.0	4
05	12 22.8	1.0	05	177.0	11 52.9	1.0	05	177.1	10 53.1	1.0	05	177.2	10 23.2	1.0	05	177.2	9 53.3	1.0	05	177.2	9 23.4	1.0	05	177.3	7 53.7	1.0	05	177.4	7 23.8	1.0	04	177.4	05
6	12 19.7	1.0	06	176.4	11 49.8	1.0	06	176.5	10 50.1	1.0	06	176.6	10 20.3	1.0	06	176.6	9 50.4	1.0	06	176.7	9 20.6	1.0	06	176.7	7 51.0	1.0	06	176.9	7 21.1	1.0	05	176.9	6
7	12 16.0	99	07	175.8	11 46.2	99	07	175.9	10 46.6	99	07	176.0	10 16.8	99	07	176.1	9 47.0	99	07	176.1	9 17.2	99	07	176.2	7 47.7	99	06	176.4	7 17.9	99	06	176.4	7
8	12 11.7	99	08	175.3	11 42.0	99	08	175.3	10 42.5	99	08	175.5	10 12.7	99	08	175.5	9 43.0	99	08	175.6	9 13.2	99	07	175.7	7 44.0	99	07	175.9	7 14.2	99	07	175.9	8
9	12 06.8	99	09	174.7	11 37.2	99	09	174.7	10 37.8	99	09	174.9	10 08.1	99	08	175.0	9 38.5	99	08	175.0	9 08.8	99	08	175.1	7 39.7	99	08	175.3	7 10.1	99	08	175.4	9
10	12 01.4	99	10	174.1	11 31.8	99	10	174.2	10 32.6	99	10	174.3	10 03.0	99	09	174.4	9 33.4	99	09	174.5	9 03.8	99	09	174.6	7 35.0	99	09	174.8	7 05.4	99	08	174.9	10
1	11 55.5	98	11	173.5	11 25.9	98	11	173.6	10 26.9	98	10	173.8	9 57.4	98	10	173.9	9 27.9	98	10	174.0	8 58.4	98	10	174.0	7 29.8	98	10	174.3	7 00.3	98	10	174.4	1
2	11 48.9	98	12	172.9	11 19.5	98	12	173.0	10 20.7	98	11	173.2	9 51.2	98	11	173.3	9 21.8	98	11	173.4	8 52.4	98	11	173.5	7 24.1	98	10	173.8	6 54.6	98	10	173.9	2
3	11 41.8	98	13	172.3	11 12.5	98	12	172.4	10 13.9	98	12	172.7	9 44.5	98	12	172.8	9 15.2	98	12	172.9	8 45.9	98	12	173.0	7 17.9	98	11	173.3	6 48.5	98	11	173.4	3
4	11 34.2	97	14	171.8	11 05.0	97	14	171.9	10 06.5	97	13	172.1	9 37.3	97	13	172.2	9 08.1	97	13	172.3	8 38.9	97	13	172.4	7 11.2	97	12	172.8	6 41.9	97	12	172.9	4
15	11 26.0	97	14	171.2	10 56.9	97	14	171.3	9 58.7	97	14	171.6	9 29.6	97	14	171.7	9 00.5	97	14	171.8	8 31.3	97	13	171.9	7 04.0	97	13	172.3	6 34.9	97	13	172.4	15
6	11 17.3	97	16	170.6	10 48.3	97	15	170.7	9 50.3	97	15	171.0	9 21.3	97	15	171.1	8 52.3	97	14	171.3	8 23.3	97	14	171.4	6 56.3	97	14	171.8	6 27.3	97	13	171.9	6
7	11 08.0	96	16	170.0	10 39.1	96	16	170.2	9 41.4	96	16	170.5	9 12.5	96	15	170.6	8 43.7	96	15	170.7	8 14.8	96	15	170.9	6 48.2	96	14	171.3	6 19.3	96	14	171.4	7
8	10 58.1	96	17	169.5	10 29.4	96	17	169.6	9 32.0	96	16	169.9	9 03.3	96	16	170.1	8 34.5	96	16	170.2	8 05.8	96	16	170.3	6 39.6	96	15	170.8	6 10.8	96	15	170.9	8
9	10 47.8	95	18	168.9	10 19.2	95	18	169.1	9 22.0	95	17	169.4	8 53.5	95	17	169.5	8 24.9	95	17	169.7	7 56.3	95	17	169.8	6 30.5	95	16	170.3	6 01.9	95	16	170.4	9
20	10 36.9	95	19	168.3	10 08.5	95	19	168.5	9 11.6	95	18	168.8	8 43.2	95	18	169.0	8 14.7	95	18	169.2	7 46.3	95	18	169.3	6 20.9	95	17	169.8	5 52.5	95	16	170.0	20
1	10 25.5	94	20	167.8	9 57.2	94	20	168.0	9 00.6	94	19	168.3	8 32.4	94	19	168.5	8 04.1	94	18	168.6	7 35.8	94	18	168.8	6 10.9	94	18	169.3	5 42.6	94	17	169.5	1
2	10 13.5	94	21	167.2	9 45.4	94	20	167.4	8 49.2	94	20	167.8	8 21.1	94	20	167.9	7 53.0	94	19	168.1	7 24.8	94	19	168.3	6 00.4	94	18	168.8	5 32.3	94	18	169.0	2
3	10 01.0	93	22	166.7	9 33.1	93	21	166.9	8 37.2	93	21	167.2	8 09.3	93	20	167.4	7 41.3	93	20	167.6	7 13.4	93	20	167.8	5 49.5	93	19	168.3	5 21.5	93	19	168.5	3
4	9 48.1	92	22	166.1	9 20.3	93	22	166.3	8 24.8	93	22	166.7	7 57.0	93	21	166.9	7 29.2	93	21	167.1	7 01.5	93	21	167.3	5 38.1	93	20	167.8	5 10.3	93	19	168.0	4
25	9 34.6	92	23	165.6	9 07.0	92	23	165.8	8 11.8	92	22	166.2	7 44.2	92	22	166.4	7 16.7	92	22	166.6	6 49.1	92	22	166.8	5 26.2	92	20	167.4					25
6	9 20.6	91	24	165.0	8 53.2	91	24	165.3	7 58.4	91	23	165.7	7 31.0	91	23	165.9	7 03.6	91	22	166.1	6 36.2	91	22	166.3	5 13.9	91	21	166.9					6
7	9 06.1	91	25	164.5	8 38.9	91	25	164.7	7 44.5	91	24	165.2	7 17.3	91	24	165.4	6 50.1	91	23	165.6	6 22.9	91	23	165.8	5 01.2	91	22	166.4					7
8	8 51.1	90	26	164.0	8 24.1	90	26	164.2	7 30.1	90	25	164.6	7 03.1	90	24	164.9	6 36.1	90	24	165.1	6 09.1	90	24	165.3									8
9	8 35.6	89	27	163.5	8 08.8	89	26	163.7	7 15.2	89	26	164.1	6 48.5	89	25	164.4	6 21.7	89	25	164.6	5 54.8	89	24	164.8									9
30	8 19.6	89	27	162.9	7 53.1	89	27	163.2	6 59.9	89	26	163.6	6 33.3	89	26	163.9	6 06.7	89	26	164.1	5 40.2	89	25	164.4									30
1	8 03.2	88	28	162.4	7 36.8	88	28	162.7	6 44.1	88	27	163.1	6 17.8	88	27	163.4	5 51.4	88	26	163.6	5 25.0	88	26	163.9									1
2	7 46.3	87	29	161.9	7 20.1	87	29	162.2	6 27.9	87	28	162.6	6 01.8	87	28	162.9	5 35.6	87	27	163.1	5 09.5	87	26	163.4									2
3	7 28.9	86	30	161.4	7 03.0	86	29	161.7	6 11.2	86	29	162.2	5 45.3	86	28	162.4	5 19.4	86	28	162.7													3
4	7 11.0	85	30	160.9	6 45.4	86	30	161.2	5 54.1	86	29	161.7	5 28.4	86	29	161.9	5 02.7	86	28	162.2													4
35	6 52.7	85	31	160.4	6 27.3	85	31	160.7	5 36.5	85	30	161.2	5 11.0	85	30	161.5																	35
6	6 34.0	84	32	159.9	6 08.8	84	32	160.2	5 18.5	84	31	160.7																					6
7	6 14.8	83	33	159.4	5 49.9	83	32	159.7	5 00.0	83	31	160.3																					7
8	5 55.1	82	33	158.9	5 30.5	82	33	159.2																									8
9	5 35.1	81	34	158.5	5 10.7	81	34	158.7																									9
40	5 14.6	80	35	158.0																													40

Lat. 24°

DECLINATION SAME NAME AS LATITUDE

Lat. 25°

H.A.	54° 30′ Alt.	Δd	Δt	Az.	55° 00′ Alt.	Δd	Δt	Az.	56° 00′ Alt.	Δd	Δt	Az.	56° 30′ Alt.	Δd	Δt	Az.	57° 00′ Alt.	Δd	Δt	Az.	57° 30′ Alt.	Δd	Δt	Az.	59° 00′ Alt.	Δd	Δt	Az.	59° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	17 59.1	25	56	37.6	18 06.6	25	56	37.1	18 21.5	24	54	36.1	18 28.7	24	53	35.6	18 35.9	24	53	35.1	18 43.1	24	52	34.6	19 03.9	23	50	33.0	19 10.7	22	49	32.5	91
2	17 25.5	27	56	37.5	17 33.4	26	55	37.0	17 49.0	26	54	35.9	17 56.7	25	53	35.4	18 04.3	25	53	34.9	18 11.8	25	52	34.4	18 33.9	24	50	32.9	18 41.1	24	49	32.4	2
3	16 51.9	28	56	37.3	17 00.2	28	55	36.8	17 16.6	27	54	35.8	17 24.7	27	53	35.3	17 32.7	27	52	34.8	17 40.6	26	52	34.3	18 04.0	26	50	32.8	18 11.6	25	49	32.2	3
4	16 18.5	29	55	37.1	16 27.2	29	55	36.6	16 44.4	28	54	35.6	16 52.9	28	53	35.1	17 01.3	28	52	34.6	17 09.6	28	52	34.1	17 34.1	27	50	32.6	17 42.2	27	49	32.1	4
95	15 45.3	30	55	36.9	15 54.3	30	55	36.5	16 12.3	30	53	35.5	16 21.1	29	52	35.0	16 29.9	29	52	34.5	16 38.7	29	51	34.0	17 04.4	28	49	32.5	17 12.9	28	49	32.0	95
6	15 12.1	32	55	36.8	15 21.6	31	54	36.3	15 40.3	31	53	35.3	15 49.6	31	52	34.8	15 58.8	31	52	34.3	16 07.9	30	51	33.8	16 34.8	30	49	32.3	16 43.7	29	48	31.8	6
7	14 39.2	33	55	36.6	14 49.0	33	54	36.1	15 08.5	32	53	35.1	15 18.1	32	52	34.6	15 27.7	32	52	34.1	15 37.2	32	51	33.6	16 05.4	31	49	32.1	16 14.6	31	48	31.6	7
8	14 06.3	34	54	36.4	14 16.5	34	54	35.9	14 36.8	34	52	34.9	14 46.8	33	52	34.4	14 56.8	33	51	33.9	15 06.7	33	50	33.4	15 36.1	32	49	32.0	15 45.7	32	48	31.5	8
9	13 33.7	35	54	36.2	13 44.2	35	54	35.7	14 05.3	35	52	34.7	14 15.7	35	52	34.2	14 26.0	34	51	33.7	14 36.4	34	50	33.3	15 06.9	34	48	31.8	15 17.0	33	48	31.3	9
100	13 01.2	37	54	35.9	13 12.1	36	53	35.5	13 33.9	36	52	34.5	13 44.7	36	51	34.0	13 55.4	36	51	33.5	14 06.1	36	50	33.1	14 37.9	35	48	31.6	14 48.3	35	47	31.1	100
1	12 28.8	38	54	35.7	12 40.2	38	53	35.3	13 02.7	37	52	34.3	13 13.9	37	51	33.8	13 25.0	37	50	33.3	13 36.1	37	50	32.9	14 09.0	36	48	31.4	14 19.9	36	47	30.9	1
2	11 56.7	39	53	35.5	12 08.4	39	53	35.0	12 31.7	39	52	34.1	12 43.2	38	51	33.6	12 54.7	38	50	33.1	13 06.2	38	50	32.7	13 40.3	38	48	31.2	13 51.5	37	47	30.8	2
3	11 24.7	40	53	35.3	11 36.8	40	52	34.8	12 00.8	40	51	33.9	12 12.7	40	50	33.4	12 24.6	40	50	32.9	12 36.5	39	49	32.4	13 11.7	39	47	31.0	13 23.4	39	47	30.6	3
4	10 52.9	42	53	35.0	11 05.4	41	52	34.6	11 30.1	41	51	33.6	11 42.4	41	50	33.2	11 54.7	41	50	32.7	12 06.9	41	49	32.2	12 43.3	40	47	30.8	12 55.4	40	46	30.3	4
105	10 21.3	43	52	34.8	10 34.1	43	52	34.3	10 59.6	42	50	33.4	11 12.3	42	50	32.9	11 25.0	42	49	32.5	11 37.6	42	49	32.0	12 15.1	41	47	30.6	12 27.6	41	46	30.1	105
6	9 49.9	44	52	34.5	10 03.1	44	51	34.1	10 29.3	44	50	33.1	10 42.4	43	50	32.7	10 55.4	43	49	32.2	11 08.4	43	48	31.8	11 47.1	43	46	30.4	11 59.9	43	46	29.9	6
7	9 18.7	45	52	34.2	9 32.3	45	51	33.8	9 59.3	45	50	32.9	10 12.7	45	49	32.4	10 26.1	45	48	32.0	10 39.4	44	48	31.5	11 19.3	44	46	30.2	11 32.5	44	46	29.7	7
8	8 47.8	46	51	34.0	9 01.7	46	51	33.5	9 29.4	46	50	32.6	9 43.2	46	49	32.2	9 56.9	46	48	31.7	10 10.7	46	48	31.3	10 51.6	45	46	29.9	11 05.2	45	45	29.5	8
9	8 17.0	48	51	33.7	8 31.3	47	50	33.3	8 59.7	47	49	32.4	9 13.9	47	48	31.9	9 28.0	47	48	31.5	9 42.1	47	47	31.0	10 24.2	47	45	29.7	10 38.1	46	45	29.2	9
110	7 46.5	49	50	33.4	8 01.1	49	50	33.0	8 30.2	48	49	32.1	8 44.8	48	48	31.7	8 59.3	48	48	31.2	9 13.7	48	47	30.8	9 56.9	48	45	29.4	10 11.3	48	44	29.0	110
1	7 16.2	50	50	33.1	7 31.1	50	50	32.7	8 01.0	50	48	31.8	8 15.9	50	48	31.4	8 30.8	49	47	30.9	8 45.6	49	46	30.5	9 29.9	49	45	29.2	9 44.6	49	44	28.7	1
2	6 46.1	51	50	32.8	7 01.4	51	49	32.4	7 32.0	51	48	31.5	7 47.3	51	47	31.1	8 02.5	51	47	30.7	8 17.7	51	46	30.2	9 03.1	50	44	28.9	9 18.2	50	44	28.5	2
3	6 16.3	52	49	32.5	6 32.0	52	49	32.1	7 03.2	52	48	31.2	7 18.9	52	47	30.8	7 34.4	52	46	30.4	7 50.0	52	46	29.9	8 36.5	52	44	28.7	8 51.9	51	43	28.2	3
4	5 46.7	53	49	32.2	6 02.7	53	48	31.8	6 34.7	53	47	30.9	6 50.7	53	46	30.5	7 06.6	53	46	30.1	7 22.5	53	45	29.7	8 10.1	53	44	28.4	8 25.9	53	43	28.0	4
115	5 17.4	55	49	31.9	5 33.8	55	48	31.5	6 06.4	54	47	30.6	6 22.8	54	46	30.2	6 39.0	54	46	29.8	6 55.3	54	45	29.4	7 44.0	54	43	28.1	8 00.2	54	43	27.7	115
6					5 05.0	56	48	31.2	5 38.4	56	46	30.3	5 55.1	56	46	29.9	6 11.7	55	45	29.5	6 28.4	55	45	29.1	7 18.1	55	43	27.8	7 34.6	55	42	27.4	6
7									5 10.7	57	46	30.0	5 27.7	57	45	29.6	5 44.7	57	45	29.2	6 01.6	57	44	28.8	6 52.4	56	42	27.5	7 09.3	56	42	27.1	7
8													5 00.5	58	45	29.3	5 17.9	58	44	28.9	5 35.2	58	44	28.5	6 27.0	58	42	27.2	6 44.3	57	41	26.8	8
9																					5 09.0	59	43	28.2	6 01.9	59	42	26.9	6 19.5	59	41	26.5	9
120																									5 37.0	60	41	26.6	5 55.0	60	40	26.2	120
1																									5 12.4	61	41	26.3	5 30.7	61	40	25.9	1
2																													5 06.7	62	40	25.6	2

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 23°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	53 00.0	1.0 01	00.0	52 30.0	1.0 01	00.0	51 00.0	1.0 01	00.0	50 30.0	1.0 01	00.0	50 00.0	1.0 00	00.0	44 00.0	1.0 00	00.0	43 30.0	1.0 00	00.0	38 30.0	1.0 00	00.0	00
1	52 59.6	1.0 02	00.8	52 29.6	1.0 02	00.8	50 59.6	1.0 02	00.8	50 29.6	1.0 02	00.7	49 59.7	1.0 02	00.7	43 59.8	1.0 01	00.5	43 29.8	1.0 01	00.5	38 29.8	1.0 01	00.3	1
2	52 58.4	1.0 03	01.7	52 28.4	1.0 03	01.6	50 58.6	1.0 03	01.5	50 28.6	1.0 03	01.5	49 58.6	1.0 03	01.4	43 59.0	1.0 02	01.0	43 29.1	1.0 02	01.0	38 29.3	1.0 01	00.7	2
3	52 56.4	1.0 05	02.5	52 26.5	1.0 04	02.4	50 56.8	1.0 04	02.2	50 26.9	1.0 04	02.2	49 56.9	1.0 04	02.1	43 57.8	1.0 03	01.5	43 27.9	1.0 03	01.4	38 28.5	1.0 02	01.0	3
4	52 53.6	99 06	03.3	52 23.8	99 06	03.2	50 54.3	99 06	03.0	50 24.4	99 05	02.9	49 54.6	1.0 05	02.8	43 56.2	1.0 04	02.0	43 26.3	1.0 04	01.9	38 27.4	1.0 02	01.4	4
05	52 50.0	99 07	04.1	52 20.3	99 07	04.0	50 51.0	99 06	03.7	50 21.3	99 06	03.6	49 51.5	99 06	03.5	43 54.0	99 04	02.5	43 24.2	99 04	02.4	38 25.9	99 03	01.7	05
6	52 45.6	99 09	05.0	52 16.0	99 08	04.8	50 47.1	99 08	04.5	50 17.4	99 08	04.3	49 47.8	99 07	04.2	43 51.4	99 05	03.0	43 21.6	99 05	02.9	38 24.1	99 04	02.0	6
7	52 40.5	98 10	05.8	52 11.0	98 10	05.6	50 42.5	98 09	05.2	50 12.9	98 09	05.0	49 43.4	98 08	04.9	43 48.3	99 06	03.5	43 18.6	99 06	03.4	38 22.0	99 04	02.4	7
8	52 34.5	98 11	06.6	52 05.2	98 11	06.4	50 37.1	98 10	05.9	50 07.7	98 10	05.8	49 38.3	98 10	05.6	43 44.7	98 07	04.0	43 15.2	98 07	03.8	38 19.5	99 05	02.7	8
9	52 27.8	97 12	07.4	51 58.7	97 12	07.2	50 31.1	97 11	06.6	50 01.9	97 11	06.5	49 32.6	98 11	06.3	43 40.6	98 08	04.4	43 11.2	98 07	04.3	38 16.7	98 05	03.1	9
10	52 20.4	97 14	08.2	51 51.4	97 13	08.0	50 24.4	97 12	07.3	49 55.3	97 12	07.2	49 26.2	97 12	07.0	43 36.1	98 08	04.9	43 06.9	98 08	04.8	38 13.6	98 06	03.4	10
1	52 12.1	96 15	09.0	51 43.4	96 15	08.7	50 17.0	96 14	08.1	49 48.1	96 13	07.8	49 19.2	96 13	07.6	43 31.2	97 09	05.4	43 02.0	97 09	05.2	38 10.2	97 06	03.7	1
2	52 03.2	95 16	09.7	51 34.6	95 16	09.5	50 08.9	95 15	08.8	49 40.2	96 14	08.5	49 11.6	96 14	08.3	43 25.7	96 10	05.9	42 56.8	97 10	05.7	38 06.5	97 07	04.0	2
3	51 53.5	94 17	10.5	51 25.2	94 17	10.2	50 00.1	95 16	09.5	49 31.7	95 15	09.2	49 03.3	95 15	09.0	43 19.8	96 10	06.4	42 51.1	96 10	06.2	38 02.4	96 07	04.4	3
4	51 43.0	93 18	11.3	51 15.0	93 18	11.0	49 50.7	94 17	10.1	49 22.6	94 16	09.9	48 54.4	94 16	09.6	43 13.5	95 11	06.8	42 44.9	95 11	06.6	37 58.0	96 08	04.7	4
15	51 31.9	92 20	12.0	51 04.2	93 19	11.7	49 40.7	93 18	10.8	49 12.8	93 17	10.5	48 44.8	93 17	10.3	43 06.7	95 12	07.3	42 38.3	95 12	07.1	37 53.3	95 08	05.0	15
6	51 20.1	91 21	12.7	50 52.6	92 20	12.4	49 30.0	92 19	11.5	49 02.4	92 18	11.2	48 34.7	92 18	10.9	42 59.4	94 13	07.8	42 31.3	94 12	07.5	37 48.3	95 09	05.3	6
7	51 07.5	90 22	13.5	50 40.4	91 22	13.1	49 18.7	91 20	12.2	48 51.3	91 19	11.8	48 23.9	91 19	11.5	42 51.8	93 14	08.2	42 23.8	93 13	08.0	37 43.0	94 09	05.7	7
8	50 54.3	89 23	14.2	50 27.5	89 22	13.8	49 06.7	90 21	12.8	48 39.7	90 20	12.5	48 12.6	90 20	12.2	42 43.7	92 14	08.7	42 16.0	92 14	08.4	37 37.4	93 10	06.0	8
9	50 40.5	88 24	14.9	50 14.0	88 24	14.5	48 54.2	89 22	13.4	48 27.5	89 21	13.1	48 00.7	89 21	12.8	42 35.1	91 15	09.1	42 07.7	91 14	08.8	37 31.5	93 10	06.3	9
20	50 26.0	87 25	15.6	49 59.9	87 25	15.2	48 41.1	88 23	14.1	48 14.7	88 22	13.7	47 48.2	88 22	13.4	42 26.1	90 16	09.6	41 59.0	91 15	09.3	37 25.3	92 11	06.6	20
1	50 10.8	86 26	16.2	49 45.1	86 26	15.9	48 27.3	87 24	14.7	48 01.3	87 23	14.3	47 35.1	87 23	14.0	42 16.8	90 16	10.0	41 49.9	90 16	09.7	37 18.8	91 11	06.9	1
2	49 55.1	84 27	16.9	49 29.7	85 27	16.5	48 13.0	86 25	15.3	47 47.3	86 24	14.9	47 21.5	86 24	14.5	42 07.0	89 17	10.4	41 40.4	89 16	10.1	37 12.0	90 12	07.2	2
3	49 38.7	83 28	17.6	49 13.7	83 28	17.1	47 58.2	84 26	15.9	47 32.8	85 25	15.5	47 07.4	85 24	15.1	41 56.8	88 18	10.9	41 30.5	88 17	10.5	37 04.9	89 12	07.5	3
4	49 21.7	82 29	18.2	48 57.1	82 28	17.8	47 42.8	83 27	16.5	47 17.8	83 26	16.1	46 52.8	84 25	15.7	41 46.2	86 18	11.3	41 20.2	87 18	10.9	36 57.6	88 13	07.8	4
25	49 04.2	80 30	18.8	48 40.0	81 30	18.4	47 26.8	82 27	17.1	47 02.3	82 27	16.6	46 37.6	82 26	16.2	41 35.2	85 19	11.7	41 09.5	86 18	11.3	36 49.9	87 13	08.1	25
6	48 46.1	79 31	19.4	48 22.3	79 30	19.0	47 10.4	80 28	17.6	46 46.2	81 28	17.2	46 21.9	81 27	16.8	41 23.8	84 20	12.1	40 58.5	85 19	11.7	36 42.0	86 14	08.4	6
7	48 27.5	78 32	20.0	48 04.1	78 31	19.5	46 53.4	79 29	18.2	46 29.6	79 28	17.7	46 05.7	80 28	17.3	41 12.1	83 20	12.5	40 47.1	83 20	12.1	36 33.8	85 14	08.7	7
8	48 08.3	76 33	20.6	47 45.4	77 32	20.1	46 35.9	78 30	18.7	46 12.6	78 29	18.3	45 49.1	78 28	17.8	40 59.9	82 21	12.9	40 35.3	82 20	12.5	36 25.3	84 15	09.0	8
9	47 48.6	75 34	21.2	47 26.2	75 33	20.7	46 18.0	76 31	19.2	45 55.0	77 30	18.8	45 32.0	77 29	18.3	40 47.4	81 21	13.3	40 23.2	81 21	12.9	36 16.5	83 15	09.2	9
30	47 28.5	73 34	21.7	47 06.4	74 34	21.2	45 59.6	75 32	19.7	45 37.0	75 31	19.3	45 14.4	76 30	18.8	40 34.6	80 22	13.6	40 10.7	80 21	13.2	36 07.5	82 15	09.5	30
1	47 07.8	72 35	22.2	46 46.2	72 34	21.7	45 40.7	73 32	20.2	45 18.6	74 32	19.8	44 56.3	74 31	19.3	40 21.4	78 23	14.0	39 57.9	79 22	13.6	35 58.3	81 16	09.8	1
2	46 46.6	70 36	22.8	46 25.5	71 35	22.2	45 21.3	72 33	20.7	44 59.7	72 32	20.2	44 37.9	73 32	19.8	40 07.8	77 23	14.4	39 44.7	77 22	14.0	35 48.8	80 16	10.1	2
3	46 25.1	69 37	23.3	46 04.4	69 36	22.7	45 01.6	70 34	21.2	44 40.3	71 33	20.7	44 19.0	71 32	20.2	39 54.0	76 24	14.7	39 31.2	76 23	14.3	35 39.0	79 17	10.3	3
4	46 03.0	67 37	23.8	45 42.8	68 37	23.2	44 41.4	69 34	21.7	44 20.6	69 34	21.2	43 59.7	70 33	20.7	39 39.7	74 24	15.1	39 17.4	75 24	14.7	35 29.0	77 17	10.6	4
35	45 40.6	65 38	24.2	45 20.8	66 37	23.7	44 20.8	67 35	22.1	44 00.5	68 34	21.6	43 40.0	68 33	21.1	39 25.2	73 25	15.4	39 03.3	73 24	15.0	35 18.7	76 18	10.8	35
6	45 17.7	64 39	24.7	44 58.4	64 38	24.2	43 59.8	66 36	22.6	43 39.9	66 35	22.0	43 20.0	67 34	21.5	39 10.3	72 25	15.8	38 48.8	72 24	15.3	35 08.2	75 18	11.1	6
7	44 54.4	62 40	25.1	44 35.6	63 38	24.6	43 38.4	64 36	23.0	43 19.0	65 35	22.5	42 59.5	65 35	21.9	38 55.2	70 26	16.1	38 34.1	71 25	15.6	34 57.5	74 18	11.3	7
8	44 30.8	61 40	25.6	44 12.5	61 39	25.0	43 16.7	63 37	23.4	42 57.8	63 36	22.9	42 38.7	64 35	22.3	38 39.7	69 26	16.4	38 19.0	69 26	16.0	34 46.5	72 18	11.6	8
9	44 06.7	59 41	26.0	43 48.9	60 40	25.4	42 54.6	61 38	23.8	42 36.1	62 37	23.3	42 17.5	62 36	22.7	38 24.0	67 27	16.7	38 03.7	68 26	16.3	34 35.4	71 19	11.8	9
40	43 42.4	57 41	26.4	43 25.0	58 40	25.8	42 32.1	60 38	24.2	42 14.1	60 37	23.6	41 56.0	61 36	23.1	38 07.9	66 27	17.0	37 48.1	66 26	16.6	34 24.0	70 19	12.0	40
1	43 17.6	56 42	26.8	43 00.8	56 41	26.2	42 09.3	58 38	24.5	41 51.8	59 38	24.0	41 34.2	59 37	23.5	37 51.6	64 28	17.3	37 32.3	65 27	16.8	34 12.4	68 20	12.2	1
2	42 52.6	54 42	27.2	42 36.2	55 41	26.6	41 46.2	56 39	24.9	41 29.2	57 38	24.4	41 12.1	57 38	23.8	37 35.1	63 28	17.6	37 16.1	63 27	17.1	34 00.6	67 20	12.5	2
3	42 27.2	53 43	27.5	42 11.4	53 42	27.0	41 22.8	55 40	25.3	41 06.3	55 39	24.7	40 49.6	56 38	24.2	37 18.2	61 28	17.9	36 59.7	62 28	17.4	33 48.6	65 20	12.7	3
4	42 01.5	51 43	27.9	41 46.2	51 42	27.3	40 59.1	53 40	25.6	40 43.1	54 39	25.0	40 26.9	54 38	24.5	37 01.1	60 29	18.2	36 43.1	60 28	17.7	33 36.3	64 21	12.9	4
45	41 35.6	49 44	28.2	41 20.7	50 43	27.6	40 35.1	52 40	25.9	40 19.5	52 40	25.4	40 03.8	53 39	24.8	36 43.8	58 29	18.4	36 26.2	59 28	17.9	33 23.9	63 21	13.1	45
6	41 09.3	48 44	28.5	40 54.9	48 43	28.0	40 10.8	50 41	26.2	39 55.8	50 40	25.7	39 40.5	51 39	25.1	36 26.2	57 30	18.7	36 09.1	57 29	18.2	33 11.3	61 21	13.3	6
7	40 42.8	46 45	28.8	40 28.9	47 44	28.3	39 46.3	48 41	26.5	39 31.7	49 40	26.0	39 17.0	49 40	25.4	36 08.4	55 30	18.9	35 51.7	56 29	18.4	32 58.6	60 22	13.5	7
8	40 16.0	44 45	29.1	40 02.6	45 44	28.6	39 21.5	47 42	26.8	39 07.4	47 41	26.3	38 53.2	48 40	25.7	35 50.3	54 30	19.2	35 34.2	54 30	18.7	32 45.6	58 22	13.7	8
9	39 49.0	43 45	29.4	39 36.1	43 44	28.8	38 56.4	45 42	27.1	38 42.8	46 41	26.5	38 29.1	46 40	26.0	35 32.1	52 31	19.4	35 16.4	53 30	18.9	32 32.5	57 22	13.8	9
50	39 21.8	41 46	29.7	39 09.4	42 45	29.1	38 31.1	43 42	27.4	38 18.1	44 42	26.8	38 04.8	44 41	26.2	35 13.6	50 31	19.6	34 58.4	51 30	19.1	32 19.2	55 22	14.0	50
1	38 54.3	39 46	30.0	38 42.4	40 45	29.4	38 05.7	42 43	27.6	37 53.1	42 42	27.0	37 40.3	43 41	26.5	34 55.0	49 32	19.9	34 40.2	49 30	19.3	32 05.7	54 23	14.2	1
2	38 26.6	38 46	30.2	38 15.2	38 46	29.6	37 39.9	40 43	27.9	37 27.8	41 42	27.3	37 15.6	41 42	26.7	34 36.1	47 32	20.1	34 21.9	48 31	19.5	31 52.1	52 23	14.4	2
3	37 58.7	36 47	30.4	37 47.8	37 46	29.8	37 14.0	38 44	28.1	37 02.4	39 43	27.5	36 50.7	40 42	26.9	34 17.1	46 32	20.3	34 03.3	46 31	19.7	31 38.3	50 23	14.5	3
4	37 30.7	34 47	30.7	37 20.2	35 46	30.1	36 47.9	37 44	28.3	36 36.8	37 43	27.7	36 25.5	38 42	27.2	33 57.9	44 32	20.5	33 44.6	44 32	19.9	31 24.4	49 23	14.7	4
55	37 02.4	33 47	30.9	36 52.5	33 47	30.3	36 21.6	35 44	28.5	36 11.0	36 43	27.9	36 00.2	36 42	27.4	33 38.5	42 33	20.6	33 25.7	43 32	20.1	31 10.4	47 24	14.8	55
6	36 34.0	31 48	31.1	36 24.5	32 47	30.5	35 55.2	33 44	28.7	35 45.1	34 44	28.1	35 34.8	35 43	27.6	33 18.9	41 33	20.8	33 06.6	41 32	20.3	30 56.2	46 24	15.0	6
7	36 05.4	30 48	31.3	35 56.4	30 47	30.7	35 28.6	32 45	28.9	35 18.9	32 44	28.3	35 09.1	33 43	27.8	32 59.2	39 33	21.0	32 47.4	40 32	20.4	30 41.8	44 24	15.1	7
8	35 36.7	28 48	31.4	35 28.2	29 47	30.8	35 01.8	30 45	29.1	34 52.6	31 44	28.5	34 43.3	31 43	27.9	32 39.3	37 33	21.2	32 28.0	38 32	20.6	30 27.4	42 24	15.2	8
9	35 07.8	26 48	31.6	34 59.8	27 48	31.0	34 34.9	29 45	29.3	34 26.2	29 44	28.7	34 17.4	30 44	28.1	32 19.3	36 34	21.3	32 08.5	36 33	20.8	30 12.8	41 24	15.4	9
60	34 38.8	25 48	31.8	34 31.3	25 48	31.2	34 07.8	27 45	29.4	33 59.6	27 44	28.8	33 51.3	28 44	28.3	31 59.2	34 34	21.5	31 48.9	35 33	20.9	29 58.1	39 25	15.5	60
1	34 09.7	23 49	31.9	34 02.6	24 48	31.3	33 40.6	25 46	29.6	33 32.9	26 45	29.0	33 25.1	26 44	28.4	31 38.9	33 34	21.6	31 29.1	33 33	21.0	29 43.3	37 25	15.6	1
2	33 40.4	22 49	32.0	33 33.9	22 48	31.5	33 13.3	24 46	29.7	33 06.1	24 45	29.1	32 58.8	25 44	28.5	31 18.5	31 34	21.7	31 09.2	31 33	21.2	29 28.4	36 25	15.7	2
3	33 11.1	20 49	32.2	33 05.0	20 48	31.6	32 45.9	22 46	29.8	32 39.2	23 45	29.3	32 32.3	23 44	28.7	30 58.0	29 34	21.9	30 49.2	30 34	21.3	29 13.3	34 25	15.8	3
4	32 41.6	18 49	32.3	32 36.0	19 48	31.7	32 18.3	20 46	29.9	32 12.1	21 45	29.4	32 05.8	22 44	28.8	30 37.4	28 34	22.0	30 29.1	28 34	21.4	28 58.2	33 25	15.9	4
65	32 12.1	17 49	32.4	32 07.0	17 49	31.8	31 50.7	19 46	30.1	31 45.0	19 45	29.5	31 39.1	20 44	28.9	30 16.7	26 35	22.1	30 08.8	26 34	21.5	28 43.0	31 26	16.0	65
6	31 42.5	15 50	32.5	31 37.8	16 49	31.9	31 23.0	17 46	30.2	31 17.8	18 46	29.6	31 12.4	18 45	29.0	29 55.8	24 35	22.2	29 48.5	25 34	21.6	28 27.7	29 26	16.1	6
7	31 12.8	14 50	32.6	31 08.6	14 49	32.0	30 55.2	16 46	30.2	30 50.5	16 46	29.7	30 45.6	17 45	29.1	29 34.9	23 35	22.3	29 28.1	23 34	21.7	28 12.3	27 26	16.2	7
8	30 43.0	12 50	32.6	30 39.3	12 49	32.1	30 27.4	14 46	30.3	30 23.1	15 46	29.8	30 18.7	15 45	29.2	29 13.9	21 35	22.4	29 07.6	21 34	21.8	27 56.9	26 26	16.3	8
9	30 13.2	10 50	32.7	30 10.0	11 49	32.1	29 59.5	12 47	30.4	29 55.7	13 46	29.8	29 51.7	13 45	29.3	28 52.9	19 35	22.5	28 47.1	20 34	21.9	27 41.4	24 26	16.4	9
70	29 43.3	09 50	32.8	29 40.6	09 49	32.2	29 31.5	11 47	30.5	29 28.2	11 46	29.9	29 24.7	12 45	29.3	28 31.7	18 35	22.5	28 26.4	18 34	22.0	27 25.8	22 26	16.4	70
1	29 13.4	07 50	32.8	29 11.2	08 49	32.2	29 03.5	09 47	30.5	29 00.6	10 46	29.9	28 57.6	10 45	29.4	28 10.5	16 35	22.6	28 05.7	16 34	22.0	27 10.1	21 26	16.5	1
2	28 43.5	06 50	32.8	28 41.7	06 49	32.3	28 35.4	08 47	30.6	28 33.0	08 46	30.0	28 30.5	09 45	29.4	27 49.3	14 36	22.7	27 45.0	15 35	22.1	26 54.4	19 26	16.6	2
3	28 13.5	04 50	32.9	28 12.2	05 49	32.3	28 07.3	06 47	30.6	28 05.4	07 46	30.0	28 03.3	07 45	29.5	27 28.0	13 36	22.7	27 24.1	13 35	22.2	26 38.6	17 26	16.6	3
4	27 43.6	03 50	32.9	27 42.7	03 49	32.3	27 39.2	05 47	30.6	27 37.7	05 46	30.1	27 36.1	05 45	29.5	27 06.6	11 36	22.8	27 03.3	11 35	22.2	26 22.8	16 26	16.7	4
75	27 13.6	01 50	32.9	27 13.1	02 49	32.3	27 11.0	03 47	30.6	27 10.0	03 46	30.1	27 08.9	04 45	29.5	26 45.2	09 36	22.8	26 42.4	10 35	22.3	26 07.0	14 26	16.7	75
6	26 43.6	00 50	32.9	26 43.6	00 49	32.3	26 42.9	01 47	30.7	26 42.3	02 46	30.1	26 41.7	02 45	29.5	26 23.8	08 36	22.8	26 21.5	08 35	22.3	25 51.1	12 27	16.7	6
7	26 13.6	02 50	32.9	26 14.0	01 49	32.3	26 14.7	00 47	30.7	26 14.6	00 46	30.1	26 14.5	01 45	29.6	26 02.4	06 36	22.9	26 00.5	06 35	22.3	25 35.1	11 27	16.8	7
8	25 43.6	03 50	32.9	25 44.5	03 49	32.3	25 46.5	02 47	30.7	25 46.9	01 46	30.1	25 47.2	01 45	29.6	25 40.9	04 36	22.9	25 39.5	05 35	22.3	25 19.2	09 27	16.8	8
9	25 13.6	05 50	32.9	25 15.0	04 49	32.3	25 18.4	03 47	30.6	25 19.2	03 46	30.1	25 20.0	02 45	29.5	25 19.4	03 36	22.9	25 18.5	03 35	22.4	25 03.2	07 27	16.8	9
80	24 43.7	06 50	32.8	24 45.5	06 49	32.3	24 50.2	05 47	30.6	24 51.6	04 46	30.1	24 52.8	04 45	29.5	24 57.9	01 36	22.9	24 57.5	01 35	22.4	24 47.2	05 27	16.9	80
1	24 13.7	08 50	32.8	24 16.0	07 49	32.2	24 22.1	06 47	30.6	24 23.9	06 46	30.1	24 25.6	05 45	29.5	24 36.4	01 36	22.9	24 36.5	00 35	22.4	24 31.2	04 27	16.9	1
2	23 43.8	09 50	32.7	23 46.5	09 49	32.2	23 54.0	08 47	30.6	23 56.2	07 46	30.0	23 58.4	07 45	29.5	24 14.9	02 36	22.9	24 15.5	02 35	22.4	24 15.1	02 27	16.9	2
3	23 14.0	11 50	32.7	23 17.1	10 49	32.1	23 25.9	09 47	30.5	23 28.6	09 46	30.0	23 31.2	08 45	29.4	23 53.4	04 36	22.9	23 54.5	03 35	22.3	23 59.1	00 27	16.9	3
4	22 44.2	12 50	32.6	22 47.8	12 49	32.1	22 57.9	11 47	30.5	23 01.0	10 46	29.9	23 04.1	10 45	29.4	23 31.9	05 36	22.9	23 33.5	05 35	22.3	23 43.1	01 27	16.9	4
85	22 14.4	14 50	32.6	22 18.5	13 49	32.0	22 29.9	12 46	30.4	22 33.5	12 46	29.9	22 37.0	11 45	29.3	23 10.5	07 36	22.9	23 12.5	07 35	22.3	23 27.0	02 27	16.9	85
6	21 44.7	15 49	32.5	21 49.2	15 49	31.9	22 02.0	14 46	30.3	22 06.0	13 46	29.8	22 10.0	13 45	29.3	22 49.0	09 36	22.8	22 51.6	08 35	22.3	23 11.0	05 27	16.9	6
7	21 15.1	16 49	32.4	21 20.0	16 49	31.9	21 34.1	15 46	30.3	21 38.6	15 46	29.7	21 43.0	14 45	29.2	22 27.6	10 36	22.8	22 30.7	10 35	22.2	22 55.0	06 27	16.8	7
8	20 45.6	18 49	32.3	20 50.8	18 48	31.8	21 06.3	17 46	30.2	21 11.2	16 46	29.7	21 16.1	16 45	29.1	22 06.2	12 36	22.7	22 09.8	12 35	22.2	22 39.0	08 27	16.8	8
9	20 16.1	19 49	32.2	20 21.9	19 48	31.7	20 38.6	18 46	30.1	20 43.9	18 45	29.6	20 49.2	17 45	29.1	21 44.9	13 36	22.7	21 48.9	13 35	22.2	22 23.0	10 26	16.8	9
90	19 46.7	21 49	32.1	19 52.9	20 48	31.6	20 10.9	20 46	30.0	20 16.7	19 45	29.5	20 22.4	19 44	29.0	21 23.6	15 35	22.6	21 28.1	15 35	22.1	22 07.1	11 26	16.8	90

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.	63° 00′ Alt.	Δd	Δt	Az.	69° 00′ Alt.	Δd	Δt	Az.	69° 30′ Alt.	Δd	Δt	Az.	74° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	19 17.4	22	49	32.0	19 24.0	22	48	31.5	19 43.3	21	46	29.9	19 49.6	21	45	29.4	19 55.7	20	44	28.9	21 02.4	17	35	22.6	21 07.3	16	34	22.0	21 51.2	13	26	16.7	91
2	18 48.2	24	48	31.9	18 55.2	23	48	31.3	19 15.8	22	46	29.8	19 22.5	22	45	29.3	19 29.1	22	44	28.8	20 41.2	18	35	22.5	20 46.6	18	34	22.0	21 35.3	15	26	16.7	2
3	18 19.1	25	48	31.7	18 26.5	25	48	31.2	18 48.4	24	46	29.7	18 55.5	24	45	29.2	19 02.6	23	44	28.7	20 20.1	20	35	22.4	20 26.0	19	34	21.9	21 19.5	16	26	16.6	3
4	17 50.1	26	48	31.6	17 58.0	26	48	31.1	18 21.1	25	45	29.6	18 28.7	25	45	29.1	18 36.1	25	44	28.5	19 59.1	21	35	22.4	20 05.4	21	34	21.8	21 03.7	18	26	16.6	4
95	17 21.2	28	48	31.5	17 29.5	28	47	31.0	17 53.9	27	45	29.4	18 01.9	26	44	28.9	18 09.8	26	44	28.4	19 38.1	23	35	22.3	19 44.9	23	34	21.8	20 47.9	19	26	16.5	95
6	16 52.5	29	48	31.3	17 01.2	29	47	30.8	17 26.8	28	45	29.3	17 35.2	28	44	28.8	17 43.5	28	44	28.3	19 17.2	24	35	22.2	19 24.5	24	34	21.7	20 32.2	21	26	16.5	6
7	16 23.8	30	48	31.2	16 32.9	30	47	30.7	16 59.8	30	45	29.2	17 08.7	29	44	28.7	17 17.4	29	43	28.2	18 56.4	26	34	22.1	19 04.1	26	34	21.6	20 16.6	23	26	16.4	7
8	15 55.3	32	47	31.0	16 04.8	32	46	30.5	16 33.0	31	44	29.0	16 42.2	31	44	28.5	16 51.4	30	43	28.0	18 35.7	27	34	22.0	18 43.8	27	34	21.5	20 01.0	24	26	16.4	8
9	15 27.0	33	47	30.8	15 36.9	33	46	30.3	16 06.3	32	44	28.9	16 15.9	32	44	28.4	16 25.5	32	43	27.9	18 15.0	29	34	21.9	18 23.7	29	34	21.4	19 45.4	26	26	16.3	9
100	14 58.7	35	47	30.6	15 09.1	34	46	30.2	15 39.7	34	44	28.7	15 49.8	33	44	28.2	15 59.8	33	43	27.7	17 54.5	30	34	21.8	18 03.6	30	33	21.3	19 30.0	27	26	16.2	100
1	14 30.6	36	46	30.5	14 41.4	36	46	30.0	15 13.2	35	44	28.5	15 23.7	35	43	28.0	15 34.2	35	42	27.6	17 34.1	32	34	21.7	17 43.6	32	33	21.2	19 14.6	29	26	16.1	1
2	14 02.7	37	46	30.3	14 13.9	37	46	29.8	14 46.9	36	44	28.4	14 57.8	36	43	27.9	15 08.7	36	42	27.4	17 13.8	33	34	21.5	17 23.7	33	33	21.0	18 59.3	31	25	16.0	2
3	13 35.0	39	46	30.1	13 46.5	38	45	29.6	14 20.8	38	43	28.2	14 32.1	38	43	27.7	14 43.3	37	42	27.2	16 53.5	35	33	21.4	17 03.9	35	33	20.9	18 44.1	32	25	16.0	3
4	13 07.4	40	46	29.9	13 19.3	40	45	29.4	13 54.8	39	43	28.0	14 06.5	39	42	27.5	14 18.2	39	42	27.0	16 33.5	36	33	21.3	16 44.3	36	32	20.8	18 28.9	34	25	15.9	4
105	12 39.9	41	45	29.7	12 52.3	41	45	29.2	13 28.9	40	43	27.8	13 41.1	40	42	27.3	13 53.1	40	41	26.9	16 13.5	38	33	21.1	16 24.8	38	32	20.6	18 13.9	35	25	15.8	105
6	12 12.7	42	45	29.5	12 25.4	42	44	29.0	13 03.3	42	42	27.6	13 15.8	42	42	27.1	13 28.3	41	41	26.7	15 53.6	39	33	21.0	16 05.3	39	32	20.5	17 58.9	37	25	15.7	6
7	11 45.6	44	45	29.2	11 58.7	44	44	28.8	12 37.8	43	42	27.4	12 50.7	43	42	26.9	13 03.6	43	41	26.5	15 33.9	41	33	20.8	15 46.1	40	32	20.4	17 44.0	38	24	15.6	7
8	11 18.7	45	44	29.0	11 32.2	45	44	28.6	12 12.5	44	42	27.2	12 25.8	44	41	26.7	12 39.0	44	40	26.3	15 14.3	42	32	20.7	15 26.9	42	32	20.2	17 29.3	40	24	15.5	8
9	10 52.1	46	44	28.8	11 05.9	46	44	28.3	11 47.3	46	42	27.0	12 01.0	46	41	26.5	12 14.7	45	40	26.1	14 54.9	43	32	20.5	15 07.9	43	32	20.1	17 14.6	41	24	15.3	9
110	10 25.6	48	44	28.5	10 39.8	47	43	28.1	11 22.4	47	41	26.7	11 36.5	47	41	26.3	11 50.5	47	40	25.8	14 35.6	45	32	20.4	14 49.0	45	31	19.9	17 00.0	43	24	15.2	110
1	9 59.3	49	44	28.3	10 13.9	49	43	27.8	10 57.6	48	41	26.5	11 12.1	48	40	26.1	11 26.5	48	40	25.6	14 16.4	46	32	20.2	14 30.3	46	31	19.7	16 45.6	44	24	15.1	1
2	9 33.2	50	43	28.0	9 48.2	50	42	27.6	10 33.0	50	40	26.3	10 47.9	49	40	25.8	11 02.8	49	39	25.4	13 57.5	48	32	20.0	14 11.7	47	31	19.6	16 31.3	46	24	15.0	2
3	9 07.4	51	43	27.8	9 22.7	51	42	27.3	10 08.7	51	40	26.0	10 24.0	51	40	25.6	10 39.2	51	39	25.2	13 38.6	49	31	19.8	13 53.3	49	30	19.4	16 17.1	47	24	14.8	3
4	8 41.7	53	42	27.5	8 57.5	52	42	27.1	9 44.6	52	40	25.8	10 00.2	52	39	25.4	10 15.8	52	39	24.9	13 20.0	50	31	19.7	13 35.0	50	30	19.2	16 03.0	48	23	14.7	4
115	8 16.3	54	42	27.3	8 32.4	54	41	26.8	9 20.6	53	40	25.5	9 36.6	53	39	25.1	9 52.6	53	38	24.7	13 01.5	52	31	19.5	13 16.9	52	30	19.0	15 49.0	50	23	14.6	115
6	7 51.1	55	42	27.0	8 07.6	55	41	26.5	8 56.9	55	39	25.3	9 13.3	55	38	24.9	9 29.7	54	38	24.4	12 43.1	53	30	19.3	12 59.0	53	30	18.8	15 35.2	51	23	14.5	6
7	7 26.2	56	41	26.7	7 43.1	56	41	26.3	8 33.5	56	39	25.0	8 50.2	56	38	24.6	9 06.9	56	38	24.2	12 25.0	54	30	19.1	12 41.3	54	29	18.7	15 21.5	53	23	14.3	7
8	7 01.5	57	41	26.4	7 18.7	57	40	26.0	8 10.2	57	38	24.8	8 27.3	57	38	24.3	8 44.4	57	37	23.9	12 07.0	56	30	18.9	12 23.7	55	29	18.5	15 07.9	54	22	14.1	8
9	6 37.1	59	40	26.1	6 54.6	58	40	25.7	7 47.2	58	38	24.5	8 04.7	58	37	24.1	8 22.1	58	37	23.7	11 49.3	57	29	18.7	12 06.3	57	29	18.3	14 54.5	55	22	14.0	9
120	6 12.9	60	40	25.8	6 30.8	60	39	25.4	7 24.4	59	38	24.2	7 42.3	59	37	23.8	8 00.1	59	36	23.4	11 31.7	58	29	18.5	11 49.1	58	28	18.1	14 41.2	57	22	13.8	120
1	5 49.0	61	40	25.5	6 07.2	61	39	25.1	7 01.9	61	37	23.9	7 20.1	61	36	23.5	7 38.3	61	36	23.1	11 14.3	59	29	18.3	11 32.1	59	28	17.8	14 28.0	58	22	13.7	1
2	5 25.3	62	39	25.2	5 43.9	62	38	24.8	6 39.6	62	37	23.6	6 58.2	62	36	23.2	7 16.7	62	36	22.8	10 57.1	61	28	18.0	11 15.2	61	28	17.6	14 15.0	59	21	13.5	2
3	5 01.9	63	39	24.9	5 20.9	63	38	24.5	6 17.6	63	36	23.3	6 36.5	63	36	22.9	6 55.4	63	35	22.6	10 40.1	62	28	17.8	10 58.6	62	27	17.4	14 02.2	61	21	13.4	3
4									5 55.9	64	36	23.0	6 15.1	64	35	22.6	6 34.3	64	35	22.3	10 23.3	63	28	17.6	10 42.2	63	27	17.2	13 49.5	62	21	13.2	4
125									5 34.4	65	35	22.7	5 54.0	65	35	22.3	6 13.5	65	34	22.0	10 06.7	64	27	17.4	10 26.0	64	27	17.0	13 37.0	63	21	13.0	125
6									5 13.2	66	35	22.4	5 33.1	66	34	22.0	5 53.0	66	34	21.7	9 50.3	65	27	17.1	10 10.0	65	26	16.7	13 24.6	64	20	12.8	6
7													5 12.5	67	34	21.7	5 32.8	67	33	21.4	9 34.2	67	26	16.9	9 54.2	67	26	16.5	13 12.4	66	20	12.7	7
8																	5 12.8	69	33	21.1	9 18.3	68	26	16.6	9 38.6	68	26	16.3	13 00.4	67	20	12.5	8
9																					9 02.6	69	26	16.4	9 23.3	69	25	16.0	12 48.6	68	20	12.3	9
130																					8 47.1	70	25	16.1	9 08.1	70	25	15.8	12 36.9	69	19	12.1	130
1																					8 31.9	71	25	15.9	8 53.2	71	24	15.5	12 25.4	70	19	11.9	1
2																					8 16.9	72	24	15.6	8 38.6	72	24	15.3	12 14.1	71	18	11.7	2
3																					8 02.2	73	24	15.3	8 24.2	73	24	15.0	12 03.0	73	18	11.5	3
4																					7 47.7	74	24	15.1	8 10.0	74	23	14.7	11 52.0	74	18	11.3	4
135																					7 33.4	75	23	14.8	7 56.1	75	23	14.5	11 41.3	75	18	11.1	135
																					7 19.5	76	23	14.5	7 42.4	76	22	14.2	11 30.7	76	17	10.9	6
																					7 05.7	77	22	14.3	7 28.9	77	22	13.9	11 20.3	77	17	10.7	7
																					6 52.2	78	22	14.0	7 15.8	78	22	13.7	11 10.2	78	17	10.5	8
																					6 39.0	79	22	13.7	7 02.9	79	21	13.4	11 00.2	79	16	10.3	9
																					6 26.1	80	21	13.4	6 50.2	80	21	13.1	10 50.4	80	16	10.1	140
																					6 13.4	81	21	13.1	6 37.8	81	20	12.8	10 40.9	81	16	09.9	1
																					6 01.0	82	20	12.8	6 25.7	82	20	12.5	10 31.5	82	15	09.6	2
																					5 48.9	83	20	12.5	6 13.8	83	19	12.2	10 22.4	83	15	09.4	3
																					5 37.1	84	19	12.2	6 02.3	84	19	11.9	10 13.5	84	14	09.2	4
																					5 25.6	85	19	11.9	5 51.0	85	18	11.6	10 04.8	84	14	09.0	145
																					5 14.3	86	18	11.6	5 40.0	86	18	11.3	9 56.3	85	14	08.7	6
																					5 03.3	86	18	11.3	5 29.2	86	17	11.0	9 48.0	86	13	08.5	7
																									5 18.8	87	18	10.7	9 40.0	87	13	08.3	8
																									5 08.7	88	17	10.4	9 32.1	88	13	08.0	9
																													9 24.5	88	12	07.8	150
																													9 17.2	89	12	07.5	1
																													9 10.0	90	12	07.3	2
																													9 03.1	91	11	07.1	3
																													8 56.5	91	11	06.8	4
																													8 50.0	92	10	06.6	155
																													8 43.9	93	10	06.3	6
																													8 37.9	93	10	06.1	7
																													8 32.2	94	09	05.8	8
																													8 26.7	94	09	05.6	9
																													8 21.5	95	08	05.3	160
																													8 16.5	95	08	05.0	1
																													8 11.8	96	08	04.8	2
																													8 07.3	96	07	04.5	3
																													8 03.1	97	07	04.3	4
																													7 59.1	97	06	04.0	165
																													7 55.3	97	06	03.7	6
																													7 51.9	98	06	03.5	7
																													7 48.6	98	05	03.2	8
																													7 45.7	98	04	03.0	9
																													7 43.0	99	04	02.7	170
																													7 40.5	99	04	02.4	1
																													7 38.3	99	03	02.2	2
																													7 36.4	99	03	01.9	3
																													7 34.7	1.0	02	01.6	4
																													7 33.3	1.0	02	01.3	175
																													7 32.1	1.0	02	01.1	6
																													7 31.2	1.0	01	00.8	7
																													7 30.5	1.0	01	00.5	8
																													7 30.1	1.0	00	00.3	9
																													7 30.0	1.0	00	00.0	180

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	°
00	7 00.0	1.0	00	180.0	6 30.0	1.0	00	180.0	5 00.0	1.0	00	180.0	00
1	6 59.8	1.0	01	179.5	6 29.8	1.0	01	179.5					1
2	6 59.0	1.0	02	179.0	6 29.0	1.0	02	179.0					2
3	6 57.8	1.0	03	178.5	6 27.9	1.0	03	178.5					3
4	6 56.1	1.0	04	178.0	6 26.2	1.0	04	178.0					4
05	6 53.9	1.0	04	177.5	6 24.0	1.0	04	177.5					05
6	6 51.3	1.0	05	177.0	6 21.4	1.0	05	177.0					6
7	6 48.1	99	06	176.5	6 18.3	99	06	176.5					7
8	6 44.5	99	07	176.0	6 14.7	99	07	176.0					8
9	6 40.4	99	08	175.5	6 10.7	99	08	175.6					9
10	6 35.8	99	08	175.0	6 06.2	99	08	175.1					10
1	6 30.7	98	09	174.5	6 01.2	98	09	174.6					1
2	6 25.2	98	10	174.0	5 55.7	98	10	174.1					2
3	6 19.2	98	11	173.5	5 49.8	98	11	173.6					3
4	6 12.7	97	12	173.0	5 43.4	97	12	173.1					4
15	6 05.7	97	12	172.5	5 36.5	97	12	172.6					15
6	5 58.3	97	13	172.0	5 29.3	97	13	172.2					6
7	5 50.4	96	14	171.6	5 21.5	96	14	171.7					7
8	5 42.1	96	15	171.1	5 13.3	96	14	171.2					8
9	5 33.3	95	16	170.6	5 04.7	95	15	170.7					9
20	5 24.0	95	16	170.1									20
1	5 14.3	94	17	169.6									1
2	5 04.1	94	18	169.2									2

Lat. 23°

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 23°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	77	00	73	00	69	00	00
4	71	168	75	165	78	160	82	151	85	128	86	74	84	35	80	21	77	14	73	10	69	08	4
8	69	157	73	152	77	144	80	131	82	110	83	81	81	54	79	36	75	26	72	20	68	16	8
12	68	147	71	141	74	132	77	120	78	103	79	82	78	63	76	47	73	36	70	28	67	22	12
16	65	138	69	132	71	123	73	112	75	98	75	83	75	68	73	54	71	43	68	35	65	28	16
20	63	132	66	125	68	117	70	107	71	95	72	83	71	70	70	59	68	49	66	40	63	33	20
24	60	126	63	119	65	112	66	103	67	93	68	83	68	72	67	62	66	53	64	44	61	37	24
28	57	121	59	115	61	108	63	100	64	91	64	82	64	73	64	64	63	55	61	48	59	41	28
32	54	117	56	111	58	104	59	97	60	90	61	82	61	73	60	65	59	58	58	50	56	44	32
36	50	113	52	108	54	102	55	95	56	88	57	81	57	74	57	66	56	59	55	52	54	46	36
40	47	110	49	105	50	99	52	93	53	87	53	80	54	74	54	67	53	60	52	54	51	47	40
44	43	107	45	102	47	97	48	91	49	86	50	79	50	73	50	67	50	61	49	55	48	49	44
48	40	105	42	100	43	95	44	90	45	84	46	79	47	73	47	67	47	61	46	55	46	50	48
52	36	103	38	98	39	93	41	88	42	83	43	78	43	72	43	67	43	61	43	56	43	51	52
56	33	101	34	96	36	92	37	87	38	82	39	77	40	72	40	67	40	61	40	56	40	51	56
60	29	99	31	94	32	90	33	85	34	81	35	76	36	71	37	66	37	61	37	56	37	51	60
64	25	97	27	93	28	88	30	84	31	80	32	75	33	71	33	66	34	61	34	56	34	51	64
68	22	95	23	91	25	87	26	83	27	78	28	74	29	70	30	65	31	61	31	56	31	51	68
72	18	93	20	89	21	85	22	81	24	77	25	73	26	69	27	64	27	60	28	56	28	51	72
76	14	92	16	88	17	84	19	80	20	76	21	72	22	68	23	64	24	59	25	55	26	51	76
80	11	90	12	86	14	83	15	79	16	75	18	71	19	67	20	63	21	59	22	54	23	50	80
84	07	89	09	85	10	81	12	77	13	74	14	70	16	66	17	62	18	58	19	54	20	50	84
88	03	87	05	83	06	80	08	76	09	72	11	68	12	65	14	61	15	57	16	53	17	49	88
92	*00*	86	01	82	03	78	04	74	06	71	07	67	09	63	10	59	12	56	13	52	14	48	92
96	*04*	84	*02*	80	*01*	77	01	73	02	69	04	66	06	62	07	58	09	54	10	51	12	47	96
100	*08*	82	*06*	79	*04*	75	*03*	71	*01*	68	01	64	02	60	04	57	06	53	07	50	09	46	100
104	*11*	81	*10*	77	*08*	73	*06*	70	*04*	66	*03*	63	*01*	59	01	55	03	52	05	48	06	45	104
108	*15*	79	*13*	75	*11*	72	*10*	68	*08*	64	*06*	61	*04*	57	*02*	54	*00*	50	02	47	04	43	108
112	*18*	77	*17*	73	*15*	70	*13*	66	*11*	63	*09*	59	*07*	56	*05*	52	*03*	49	*01*	45	01	42	112
116	*22*	75	*20*	72	*18*	68	*16*	64	*14*	61	*12*	57	*10*	54	*08*	50	*06*	47	*03*	44	*01*	40	116
120	*26*	73	*24*	69	*22*	66	*20*	62	*17*	59	*15*	55	*13*	52	*11*	48	*08*	45	*06*	42	*03*	39	120
124	*29*	71	*27*	67	*25*	63	*23*	60	*20*	56	*18*	53	*16*	50	*13*	46	*11*	43	*08*	40	*06*	37	124
128	*33*	69	*30*	65	*28*	61	*26*	57	*24*	54	*21*	50	*18*	47	*16*	44	*13*	41	*11*	38	*08*	35	128
132	*36*	66	*34*	62	*31*	58	*29*	55	*26*	51	*24*	48	*21*	45	*18*	42	*16*	39	*13*	36	*10*	33	132
136	*39*	64	*37*	59	*35*	56	*32*	52	*29*	48	*26*	45	*24*	42	*21*	39	*18*	36	*15*	33	*12*	31	136
140	*43*	60	*40*	56	*37*	52	*35*	49	*32*	45	*29*	42	*26*	39	*23*	36	*20*	34	*17*	31	*14*	28	140
144	*46*	57	*43*	53	*40*	49	*37*	45	*34*	42	*31*	39	*28*	36	*25*	33	*22*	31	*19*	28	*15*	26	144
148	*49*	53	*46*	49	*43*	45	*40*	42	*37*	38	*34*	36	*30*	33	*27*	30	*24*	28	*20*	26	*17*	23	148
152	*52*	49	*49*	45	*46*	41	*42*	38	*39*	35	*36*	32	*32*	29	*29*	27	*25*	25	*22*	23	*18*	21	152
156	*54*	44	*51*	40	*48*	36	*44*	33	*41*	30	*38*	28	*34*	26	*30*	24	*27*	22	*23*	20	*19*	18	156
160	*57*	38	*53*	35	*50*	31	*46*	28	*43*	26	*39*	24	*35*	22	*32*	20	*28*	18	*24*	17	*21*	15	160
164	*59*	32	*55*	29	*52*	26	*48*	23	*44*	21	*40*	19	*37*	18	*33*	16	*29*	15	*25*	14	*21*	12	164
168	*61*	25	*57*	22	*53*	20	*49*	18	*45*	16	*42*	15	*38*	13	*34*	12	*30*	11	*26*	10	*22*	09	168
172	*62*	17	*58*	15	*54*	13	*50*	12	*46*	11	*42*	10	*38*	09	*34*	08	*31*	08	*27*	07	*23*	06	172
176	*63*	09	*59*	08	*55*	07	*51*	06	*47*	05	*43*	05	*39*	05	*35*	04	*31*	04	*27*	03	*23*	03	176
180	*63*	00	*59*	00	*55*	00	*51*	00	*47*	00	*43*	00	*39*	00	*35*	00	*31*	00	*27*	00	*23*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

Lat. 23°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	65	00	61	00	57	00	53	00	49	00	45	00	41	00	37	00	33	00	29	00	25	00	00
4	65	06	61	05	57	04	53	03	49	03	45	02	41	02	37	01	33	01	29	00	25	00	4
8	64	12	60	10	56	08	53	07	49	05	45	04	41	03	37	02	33	02	29	01	25	00	8
12	63	18	60	15	56	12	52	10	48	08	44	06	41	05	37	04	33	02	29	01	25	00	12
16	62	23	59	19	55	16	51	13	48	10	44	08	40	06	36	05	33	03	29	02	25	01	16
20	60	28	57	23	54	19	50	16	47	13	43	10	40	08	36	06	32	04	29	02	25	01	20
24	59	31	56	26	53	22	49	18	46	15	43	12	39	09	36	07	32	05	28	03	25	01	24
28	57	35	54	29	51	25	48	21	45	17	42	14	39	11	35	08	32	06	28	03	25	01	28
32	54	37	52	32	50	27	47	23	44	19	41	15	38	12	35	09	31	06	28	04	25	01	32
36	52	40	50	34	48	29	45	25	43	21	40	17	37	13	34	10	31	07	28	04	25	01	36
40	50	42	48	36	46	31	44	26	41	22	39	18	36	14	33	11	30	07	28	04	25	01	40
44	47	43	46	38	44	33	42	28	40	23	38	19	35	15	33	12	30	08	27	05	24	02	44
48	45	44	43	39	42	34	40	29	38	25	36	20	34	16	32	12	29	09	27	05	24	02	48
52	42	45	41	40	40	35	38	30	37	26	35	21	33	17	31	13	29	09	27	05	24	02	52
56	39	46	39	41	38	36	37	31	35	26	34	22	32	18	30	13	28	09	26	06	24	02	56
60	37	46	36	41	36	37	35	32	34	27	32	23	31	18	29	14	28	10	26	06	24	02	60
64	34	47	34	42	33	37	33	32	32	28	31	23	30	19	28	14	27	10	26	06	24	02	64
68	31	47	31	42	31	37	31	33	30	28	29	24	29	19	28	15	26	10	25	06	24	02	68
72	29	47	29	42	29	37	29	33	28	28	28	24	27	19	27	15	26	11	25	06	24	02	72
76	26	46	26	42	27	37	27	33	27	28	26	24	26	20	26	15	25	11	24	06	23	02	76
80	23	46	24	42	24	37	25	33	25	29	25	24	25	20	25	15	24	11	24	06	23	02	80
84	21	45	22	41	22	37	23	33	23	28	23	24	24	20	24	15	24	11	23	07	23	02	84
88	18	45	19	41	20	36	21	32	21	28	22	24	22	20	23	15	23	11	23	07	23	02	88
92	16	44	17	40	18	36	19	32	20	28	21	24	21	19	22	15	22	11	23	06	23	02	92
96	13	43	14	39	16	35	17	31	18	27	19	23	20	19	21	15	22	11	22	06	23	02	96
100	11	42	12	38	14	35	15	31	16	27	18	23	19	19	20	15	21	11	22	06	23	02	100
104	08	41	10	37	12	34	13	30	15	26	16	22	18	18	19	14	20	10	21	06	23	02	104
108	06	40	08	36	09	33	11	29	13	25	15	22	16	18	18	14	20	10	21	06	22	02	108
112	03	38	05	35	08	32	10	28	12	25	13	21	15	17	17	14	19	10	21	06	22	02	112
116	01	37	03	34	06	30	08	27	10	24	12	20	14	17	16	13	18	09	20	06	22	02	116
120	*01*	35	01	32	04	29	06	26	09	23	11	19	13	16	16	13	18	09	20	06	22	02	120
124	*03*	34	*01*	31	02	28	05	25	07	21	10	18	12	15	15	12	17	09	20	05	22	02	124
128	*05*	32	*02*	29	00	26	03	23	06	20	09	17	11	14	14	11	17	08	19	05	22	02	128
132	*07*	30	*04*	27	*01*	25	02	22	05	19	08	16	10	14	13	11	16	08	19	05	22	02	132
136	*09*	28	*06*	25	*03*	23	00	20	03	18	07	15	10	13	13	10	16	07	19	04	22	01	136
140	*10*	26	*07*	24	*04*	21	*01*	19	02	16	06	14	09	12	12	09	15	07	18	04	21	01	140
144	*12*	24	*09*	21	*05*	19	*02*	17	01	15	05	13	08	11	11	08	15	06	18	04	21	01	144
148	*13*	21	*10*	19	*06*	17	*03*	15	01	13	04	11	07	10	11	08	14	05	18	03	21	01	148
152	*15*	19	*11*	17	*08*	15	*04*	14	*00*	12	03	10	07	08	11	07	14	05	18	03	21	01	152
156	*16*	16	*12*	15	*08*	13	*05*	12	*01*	10	03	09	06	07	10	06	14	04	17	03	21	01	156
160	*17*	14	*13*	12	*09*	11	*05*	10	*02*	09	02	07	06	06	10	05	14	04	17	02	21	01	160
164	*18*	11	*14*	10	*10*	09	*06*	08	*02*	07	02	06	06	05	10	04	13	03	17	02	21	01	164
168	*18*	08	*14*	08	*10*	07	*06*	06	*03*	05	01	04	05	04	09	03	13	02	17	01	21	00	168
172	*19*	06	*15*	05	*11*	05	*07*	04	*03*	04	01	03	05	02	09	02	13	01	17	01	21	00	172
176	*19*	03	*15*	03	*11*	02	*07*	02	*03*	02	01	02	05	01	09	01	13	01	17	00	21	00	176
180	*19*	00	*15*	00	*11*	00	*07*	00	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 24°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	66 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	67 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0	68 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	00
1	65 58.8	1.0 06	177.5	66 28.8	1.0 06	177.5	66 58.8	1.0 06	177.4	67 28.8	1.0 06	177.4	67 58.7	1.0 06	177.3	68 28.7	1.0 06	177.3	68 58.7	1.0 07	177.2	69 28.6	1.0 07	177.2	1
2	65 55.3	1.0 10	175.1	66 25.2	1.0 10	175.0	66 55.1	1.0 10	174.9	67 25.0	1.0 10	174.8	67 54.9	1.0 10	174.7	68 24.8	1.0 11	174.6	68 54.7	1.0 11	174.4	69 24.6	1.0 11	174.3	2
3	65 49.5	99 14	172.7	66 19.2	99 14	172.5	66 49.0	99 14	172.4	67 18.8	99 14	172.2	67 48.6	99 15	172.0	68 18.3	99 15	171.9	68 48.1	99 15	171.7	69 17.8	99 16	171.5	3
4	65 41.3	99 17	170.2	66 10.9	99 18	170.1	66 40.6	99 18	169.9	67 10.2	99 18	169.6	67 39.7	99 19	169.4	68 09.3	99 19	169.2	68 38.9	98 20	169.0	69 08.4	98 20	168.7	4
05	65 30.9	98 21	167.9	66 00.3	98 21	167.6	66 29.7	98 22	167.4	66 59.1	98 22	167.1	67 28.5	98 23	166.9	67 57.8	98 23	166.6	68 27.1	98 24	166.3	68 56.4	98 24	166.0	05
6	65 18.3	97 25	165.5	65 47.5	97 25	165.2	66 16.6	97 26	164.9	66 45.7	97 26	164.6	67 14.8	97 26	164.3	67 43.9	97 27	164.0	68 12.9	97 28	163.7	68 41.9	96 28	163.3	6
7	65 03.5	96 28	163.2	65 32.4	96 29	162.9	66 01.3	96 29	162.6	66 30.1	96 30	162.2	66 58.9	96 30	161.9	67 27.6	96 31	161.5	67 56.3	96 32	161.1	68 24.9	95 32	160.7	7
8	64 46.6	95 32	160.9	65 15.2	95 32	160.6	65 43.8	95 33	160.2	66 12.3	95 33	159.8	66 40.7	95 34	159.4	67 09.1	94 34	159.0	67 37.4	94 35	158.6	68 05.6	94 36	158.1	8
9	64 27.7	94 35	158.7	64 56.0	94 35	158.3	65 24.2	94 36	157.9	65 52.3	94 36	157.5	66 20.4	93 37	157.1	66 48.4	93 38	156.6	67 16.3	93 39	156.2	67 44.1	93 39	155.7	9
10	64 06.9	93 38	156.6	64 34.8	93 38	156.1	65 02.6	93 39	155.7	65 30.4	92 40	155.2	65 58.0	92 40	154.8	66 25.6	92 41	154.3	66 53.1	91 42	153.8	67 20.5	91 43	153.3	10
1	63 44.1	92 41	154.5	64 11.7	92 42	154.0	64 39.1	91 42	153.5	65 06.5	91 43	153.1	65 33.7	91 44	152.6	66 00.9	90 44	152.0	66 27.9	90 45	151.5	66 54.9	90 46	150.9	1
2	63 19.6	91 44	152.4	63 46.8	90 44	151.9	64 13.8	90 45	151.4	64 40.7	90 46	150.9	65 07.5	89 47	150.4	65 34.3	89 47	149.9	66 00.8	88 48	149.3	66 27.3	88 49	148.7	2
3	62 53.4	89 46	150.4	63 20.1	89 47	149.9	63 46.7	89 48	149.4	64 13.2	88 48	148.9	64 39.6	88 49	148.3	65 05.9	87 50	147.7	65 32.0	87 51	147.2	65 57.9	86 52	146.5	3
4	62 25.5	88 49	148.5	62 51.8	87 50	148.0	63 18.0	87 50	147.4	63 44.1	87 51	146.9	64 10.0	86 52	146.3	64 35.8	86 53	145.7	65 01.4	85 54	145.1	65 26.9	85 54	144.5	4
15	61 56.1	86 52	146.6	62 22.0	86 52	146.1	62 47.7	86 53	145.5	63 13.3	85 54	145.0	63 38.8	85 54	144.4	64 04.1	84 55	143.8	64 29.3	84 56	143.1	64 54.3	83 57	142.5	15
6	61 25.2	85 54	144.8	61 50.7	85 54	144.3	62 16.0	84 55	143.7	62 41.1	84 56	143.1	63 06.1	83 57	142.5	63 31.0	83 58	141.9	63 55.7	82 58	141.2	64 20.2	81 59	140.6	6
7	60 53.0	84 56	143.1	61 18.0	83 57	142.5	61 42.8	83 58	141.9	62 07.5	82 58	141.3	62 32.1	82 59	140.7	62 56.5	81 60	140.1	63 20.6	80 60	139.4	63 44.7	80 61	138.7	7
8	60 19.4	82 58	141.4	60 44.0	82 59	140.8	61 08.4	81 60	140.2	61 32.6	81 60	139.6	61 56.7	80 61	139.0	62 20.6	79 62	138.3	62 44.3	79 62	137.6	63 07.9	78 63	137.0	8
9	59 44.6	81 60	139.8	60 08.7	80 61	139.2	60 32.7	80 62	138.5	60 56.5	79 62	137.9	61 20.1	78 63	137.3	61 43.6	78 64	136.6	62 06.8	77 64	136.0	62 29.9	76 65	135.3	9
20	59 08.6	79 62	138.2	59 32.3	79 62	137.6	59 55.8	78 63	137.0	60 19.2	78 64	136.3	60 42.4	77 65	135.7	61 05.4	76 66	135.0	61 28.2	76 66	134.3	61 50.8	75 67	133.7	20
1	58 31.5	78 64	136.7	58 54.8	77 64	136.0	59 17.9	77 65	135.4	59 40.8	76 66	134.8	60 03.6	75 66	134.1	60 26.1	75 67	133.5	60 48.4	74 68	132.8	61 10.6	73 69	132.1	1
2	57 53.4	77 65	135.2	58 16.2	76 66	134.6	58 38.9	75 66	134.0	59 01.4	75 67	133.3	59 23.7	74 68	132.7	59 45.8	73 68	132.0	60 07.8	73 69	131.3	60 29.4	72 70	130.6	2
3	57 14.3	75 67	133.8	57 36.7	75 67	133.2	57 59.0	74 68	132.5	58 21.1	73 69	131.9	58 43.0	73 70	131.2	59 04.7	72 70	130.6	59 26.1	71 71	129.9	59 47.4	70 72	129.2	3
4	56 34.2	74 68	132.4	56 56.3	73 69	131.8	57 18.2	73 70	131.2	57 39.8	72 70	130.5	58 01.3	71 71	129.9	58 22.6	71 72	129.2	58 43.7	70 72	128.5	59 04.5	69 73	127.8	4
25	55 53.3	73 70	131.1	56 15.0	72 70	130.5	56 36.5	71 71	129.8	56 57.8	71 72	129.2	57 18.8	70 72	128.5	57 39.7	69 73	127.9	58 00.4	68 73	127.2	58 20.8	68 74	126.5	25
6	55 11.6	71 71	129.8	55 32.9	71 71	129.2	55 54.0	70 72	128.6	56 14.9	69 73	127.9	56 35.6	69 73	127.3	56 56.1	68 74	126.6	57 16.3	67 74	125.9	57 36.4	66 75	125.2	6
7	54 29.2	70 72	128.6	54 50.1	69 73	128.0	55 10.8	69 73	127.3	55 31.3	68 74	126.7	55 51.6	67 74	126.1	56 11.7	67 75	125.4	56 31.6	66 76	124.7	56 51.3	65 76	124.0	7
8	53 46.0	69 73	127.4	54 06.5	68 74	126.8	54 26.9	68 74	126.2	54 47.0	67 75	125.5	55 07.0	66 76	124.9	55 26.7	65 76	124.2	55 46.3	65 77	123.5	56 05.6	64 77	122.9	8
9	53 02.1	68 74	126.3	53 22.3	67 75	125.7	53 42.3	66 75	125.0	54 02.1	66 76	124.4	54 21.7	65 76	123.7	54 41.1	64 77	123.1	55 00.3	64 78	122.4	55 19.2	63 78	121.7	9
30	52 17.6	67 75	125.2	52 37.5	66 76	124.5	52 57.1	65 76	123.9	53 16.6	65 77	123.3	53 35.8	64 77	122.6	53 54.9	63 78	122.0	54 13.7	62 78	121.3	54 32.3	62 79	120.7	30
1	51 32.5	65 76	124.1	51 52.0	65 77	123.5	52 11.4	64 77	122.9	52 30.5	63 78	122.2	52 49.4	63 78	121.6	53 08.1	62 79	120.9	53 26.6	61 79	120.3	53 44.9	61 80	119.6	1
2	50 46.8	64 77	123.1	51 06.0	64 78	122.5	51 25.1	63 78	121.8	51 43.9	62 79	121.2	52 02.5	62 79	120.6	52 20.9	61 80	119.9	52 39.1	60 80	119.3	52 57.0	60 80	118.6	2
3	50 00.6	63 78	122.1	50 19.5	63 78	121.5	50 38.2	62 79	120.8	50 56.7	61 79	120.2	51 15.0	61 80	119.6	51 33.1	60 80	118.9	51 51.0	59 81	118.3	52 08.7	59 81	117.6	3
4	49 13.9	62 79	121.1	49 32.5	62 79	120.5	49 50.9	61 80	119.9	50 09.1	60 80	119.3	50 27.2	60 80	118.6	50 45.0	59 81	118.0	51 02.5	58 82	117.4	51 19.9	58 82	116.7	4
35	48 26.8	61 79	120.2	48 45.1	61 80	119.6	49 03.2	60 80	118.9	49 21.1	59 81	118.3	49 38.8	59 81	117.7	49 56.4	58 82	117.1	50 13.7	57 82	116.4	50 30.8	57 83	115.8	35
6	47 39.2	60 80	119.2	47 57.2	60 80	118.6	48 15.0	59 81	118.0	48 32.7	58 82	117.4	48 50.1	58 82	116.8	49 07.4	57 82	116.2	49 24.4	56 83	115.6	49 41.2	56 83	114.9	6
7	46 51.1	59 81	118.4	47 08.9	59 81	117.8	47 26.4	58 82	117.2	47 43.8	58 82	116.6	48 01.0	57 82	116.0	48 18.0	56 83	115.3	48 34.8	56 83	114.7	48 51.4	55 84	114.1	7
8	46 02.7	59 81	117.5	46 20.2	58 82	116.9	46 37.5	57 82	116.3	46 54.6	57 82	115.7	47 11.5	56 83	115.1	47 28.3	55 84	114.5	47 44.8	55 84	113.9	48 01.2	54 84	113.3	8
9	45 13.9	58 82	116.7	45 31.1	57 82	116.1	45 48.2	57 83	115.5	46 05.1	56 83	114.9	46 21.8	55 84	114.3	46 38.2	55 84	113.7	46 54.6	54 84	113.1	47 10.7	53 85	112.5	9
40	44 24.7	57 82	115.9	44 41.7	56 83	115.3	44 58.5	56 83	114.7	45 15.2	55 84	114.1	45 31.6	55 84	113.5	45 47.9	54 84	112.9	46 04.0	53 85	112.3	46 19.9	53 85	111.7	40
1	43 35.3	56 83	115.1	43 52.0	56 83	114.5	44 08.6	55 84	113.9	44 25.0	54 84	113.3	44 41.2	54 84	112.7	44 57.3	53 85	112.2	45 13.1	53 85	111.6	45 28.8	52 86	110.9	1
2	42 45.4	55 84	114.3	43 02.0	55 84	113.7	43 18.3	54 84	113.2	43 34.5	54 84	112.6	43 50.5	53 85	112.0	44 06.4	52 85	111.4	44 22.0	52 86	110.8	44 37.5	51 86	110.2	2
3	41 55.4	55 84	113.6	42 11.7	54 84	113.0	42 27.8	54 85	112.4	42 43.8	53 85	111.9	42 59.6	52 85	111.3	43 15.2	52 86	110.7	43 30.7	51 86	110.1	43 45.9	51 86	109.5	3
4	41 05.0	54 84	112.8	41 21.1	53 85	112.3	41 37.0	53 85	111.7	41 52.8	52 85	111.1	42 08.4	52 86	110.6	42 23.8	51 86	110.0	42 39.1	51 86	109.4	42 54.2	50 87	108.8	4
45	40 14.3	53 85	112.1	40 30.2	53 85	111.6	40 46.0	52 86	111.0	41 01.6	52 86	110.5	41 17.0	51 86	109.9	41 32.2	51 86	109.3	41 47.3	50 87	108.7	42 02.2	49 87	108.1	45
6	39 23.4	53 85	111.4	39 39.1	52 86	110.9	39 54.7	52 86	110.3	40 10.1	51 86	109.8	40 25.3	50 86	109.2	40 40.4	50 87	108.6	40 55.3	49 87	108.1	41 10.0	49 87	107.5	6
7	38 32.3	52 86	110.8	38 47.8	51 86	110.2	39 03.2	51 86	109.7	39 18.4	50 86	109.1	39 33.4	50 87	108.6	39 48.3	49 87	108.0	40 03.1	49 87	107.4	40 17.6	48 88	106.9	7
8	37 40.9	51 86	110.1	37 56.3	51 86	109.6	38 11.5	50 86	109.0	38 26.5	50 87	108.5	38 41.4	49 87	107.9	38 56.1	49 87	107.4	39 10.7	48 88	106.8	39 25.1	48 88	106.2	8
9	36 49.4	51 86	109.5	37 04.5	50 86	108.9	37 19.5	50 87	108.4	37 34.4	49 87	107.8	37 49.1	49 87	107.3	38 03.7	48 88	106.7	38 18.1	48 88	106.2	38 32.4	47 88	105.6	9
50	35 57.6	50 87	108.8	36 12.6	50 87	108.3	36 27.4	49 87	107.8	36 42.2	49 88	107.2	36 56.7	48 88	106.7	37 11.1	48 88	106.1	37 25.4	47 88	105.6	37 39.5	47 88	105.0	50
1	35 05.6	50 87	108.2	35 20.5	49 87	107.7	35 35.2	49 87	107.2	35 49.7	48 88	106.6	36 04.1	48 88	106.1	36 18.4	47 88	105.5	36 32.5	47 88	105.0	36 46.5	46 89	104.4	1
2	34 13.5	49 87	107.6	34 28.2	49 88	107.1	34 42.7	48 88	106.6	34 57.1	48 88	106.0	35 11.4	47 88	105.5	35 25.5	47 88	105.0	35 39.5	46 89	104.4	35 53.3	46 89	103.9	2
3	33 21.1	49 88	107.0	33 35.7	48 88	106.5	33 50.1	48 88	106.0	34 04.4	47 88	105.5	34 18.5	47 88	104.9	34 32.5	46 89	104.4	34 46.3	46 89	103.8	35 00.1	45 89	103.3	3
4	32 28.7	48 88	106.5	32 43.1	48 88	105.9	32 57.3	47 88	105.4	33 11.5	47 88	104.9	33 25.5	46 89	104.4	33 39.3	46 89	103.8	33 53.1	46 89	103.3	34 06.7	45 89	102.8	4
55	31 36.0	48 88	105.9	31 50.3	47 88	105.4	32 04.4	47 88	104.9	32 18.4	46 88	104.3	32 32.3	46 89	103.8	32 46.0	46 89	103.3	32 59.7	45 89	102.8	33 13.1	45 89	102.2	55
6	30 43.2	47 88	105.3	30 57.4	47 88	104.8	31 11.4	47 89	104.3	31 25.3	46 89	103.8	31 39.0	46 89	103.3	31 52.6	45 89	102.7	32 06.1	45 89	102.2	32 19.5	44 90	101.7	6
7	29 50.3	47 88	104.8	30 04.3	47 89	104.3	30 18.2	46 89	103.8	30 32.0	46 89	103.3	30 45.6	45 89	102.7	30 59.1	45 89	102.2	31 12.5	44 90	101.7	31 25.8	44 90	101.2	7
8	28 57.2	46 89	104.3	29 11.1	46 89	103.8	29 24.9	46 89	103.2	29 38.5	45 89	102.7	29 52.1	45 89	102.2	30 05.5	45 90	101.7	30 18.8	44 90	101.2	30 32.0	44 90	100.7	8
9	28 04.0	46 89	103.7	28 17.8	46 89	103.2	28 31.5	45 89	102.7	28 45.0	45 89	102.2	28 58.5	45 90	101.7	29 11.8	44 90	101.2	29 25.0	44 90	100.7	29 38.1	43 90	100.2	9
60	27 10.7	46 89	103.2	27 24.4	45 89	102.7	27 38.0	45 89	102.2	27 51.4	45 90	101.7	28 04.7	44 90	101.2	28 18.0	44 90	100.7	28 31.1	43 90	100.2	28 44.1	43 90	99.7	60
1	26 17.3	45 89	102.7	26 30.9	45 89	102.2	26 44.3	45 90	101.7	26 57.7	44 90	101.2	27 10.9	44 90	100.7	27 24.1	44 90	100.2	27 37.1	43 90	99.7	27 50.0	43 90	99.2	1
2	25 23.8	45 89	102.2	25 37.3	45 90	101.7	25 50.6	44 90	101.2	26 03.9	44 90	100.7	26 17.0	44 90	100.2	26 30.1	43 90	99.7	26 43.0	43 90	99.2	26 55.8	43 90	98.7	2
3	24 30.2	45 90	101.7	24 43.5	44 90	101.2	24 56.8	44 90	100.7	25 10.0	44 90	100.2	25 23.0	43 90	99.7	25 36.0	43 90	99.2	25 48.9	43 90	98.7	26 01.6	42 90	98.2	3
4	23 36.5	44 90	101.2	23 49.7	44 90	100.7	24 02.9	44 90	100.2	24 16.0	43 90	99.7	24 29.0	43 90	99.3	24 41.9	43 90	98.8	24 54.7	42 90	98.3	25 07.4	42 91	97.8	4
65	22 42.7	44 90	100.7	22 55.8	44 90	100.3	23 08.9	43 90	99.8	23 21.9	43 90	99.3	23 34.8	43 90	98.8	23 47.7	43 90	98.3	24 00.4	42 90	97.8	24 13.0	42 91	97.3	65
6	21 48.8	44 90	100.3	22 01.9	44 90	99.8	22 14.9	43 90	99.3	22 27.8	43 90	98.8	22 40.6	43 90	98.3	22 53.4	42 90	97.8	23 06.0	42 91	97.3	23 18.6	42 91	96.8	6
7	20 54.8	44 90	99.8	21 07.8	43 90	99.3	21 20.7	43 90	98.8	21 33.6	43 90	98.3	21 46.4	42 90	97.9	21 59.1	42 91	97.4	22 11.7	42 91	96.9	22 24.2	42 91	96.4	7
8	20 00.7	43 90	99.3	20 13.7	43 90	98.9	20 26.5	43 90	98.4	20 39.3	42 90	97.9	20 52.0	42 91	97.4	21 04.7	42 91	96.9	21 17.2	42 91	96.4	21 29.7	41 91	95.9	8
9	19 06.6	43 90	98.9	19 19.5	43 90	98.4	19 32.3	43 90	97.9	19 45.0	42 91	97.4	19 57.7	42 91	97.0	20 10.2	42 91	96.5	20 22.7	41 91	96.0	20 35.1	41 91	95.5	9
70	18 12.4	43 90	98.4	18 25.2	43 90	97.9	18 38.0	42 91	97.5	18 50.6	42 91	97.0	19 03.2	42 91	96.5	19 15.7	42 91	96.0	19 28.2	41 91	95.5	19 40.6	41 91	95.1	70
·1	17 18.2	43 90	98.0	17 30.9	42 91	97.5	17 43.6	42 91	97.0	17 56.2	42 91	96.5	18 08.7	42 91	96.1	18 21.2	41 91	95.6	18 33.6	41 91	95.1	18 45.9	41 91	94.6	1
2	16 23.9	42 91	97.5	16 36.5	42 91	97.1	16 49.2	42 91	96.6	17 01.7	42 91	96.1	17 14.2	42 91	95.6	17 26.6	41 91	95.2	17 39.0	41 91	94.7	17 51.3	41 91	94.2	2
3	15 29.5	42 91	97.1	15 42.1	42 91	96.6	15 54.7	42 91	96.1	16 07.2	42 91	95.7	16 19.6	41 91	95.2	16 32.0	41 91	94.7	16 44.4	41 91	94.2	16 56.6	41 91	93.8	3
4	14 35.1	42 91	96.7	14 47.6	42 91	96.2	15 00.2	42 91	95.7	15 12.6	41 91	95.2	15 25.0	41 91	94.8	15 37.4	41 91	94.3	15 49.7	41 91	93.8	16 01.9	41 91	93.3	4
75	13 40.6	42 91	96.2	13 53.1	42 91	95.8	14 05.6	41 91	95.3	14 18.0	41 91	94.8	14 30.4	41 91	94.3	14 42.7	41 91	93.9	14 55.0	41 91	93.4	15 07.2	41 91	92.9	75
6	12 46.1	42 91	95.8	12 58.6	42 91	95.3	13 11.0	41 91	94.9	13 23.4	41 91	94.4	13 35.7	41 91	93.9	13 48.0	41 91	93.5	14 00.2	41 91	93.0	14 12.4	40 91	92.5	6
7	11 51.5	42 91	95.4	12 04.0	41 91	94.9	12 16.4	41 91	94.4	12 28.7	41 91	94.0	12 41.0	41 91	93.5	12 53.3	41 91	93.0	13 05.5	41 91	92.6	13 17.6	40 91	92.1	7
8	10 56.9	41 91	94.9	11 09.4	41 91	94.5	11 21.7	41 91	94.0	11 34.0	41 91	93.5	11 46.3	41 91	93.1	11 58.5	41 91	92.6	12 10.7	41 91	92.1	12 22.9	40 91	91.7	8
9	10 02.3	41 91	94.5	10 14.7	41 91	94.1	10 27.0	41 91	93.6	10 39.3	41 91	93.1	10 51.6	41 91	92.7	11 03.8	41 91	92.2	11 15.9	40 91	91.7	11 28.1	40 91	91.3	9
80	9 07.7	41 91	94.1	9 20.0	41 91	93.6	9 32.3	41 91	93.2	9 44.6	41 91	92.7	9 56.8	41 91	92.3	10 09.0	41 91	91.8	10 21.2	40 91	91.3	10 33.3	40 91	90.9	80
1	8 13.0	41 91	93.7	8 25.3	41 91	93.2	8 37.6	41 91	92.8	8 49.8	41 91	92.3	9 02.0	41 91	91.8	9 14.2	41 91	91.4	9 26.4	40 91	90.9	9 38.5	40 91	90.4	1
2	7 18.3	41 91	93.3	7 30.6	41 91	92.8	7 42.8	41 91	92.4	7 55.0	41 91	91.9	8 07.2	41 91	91.4	8 19.4	41 91	91.0	8 31.5	40 91	90.5	8 43.6	40 91	90.0	2
3	6 23.5	41 91	92.9	6 35.8	41 91	92.4	6 48.0	41 91	91.9	7 00.3	41 91	91.5	7 12.4	41 91	91.0	7 24.6	40 91	90.6	7 36.7	40 91	90.1	7 48.8	40 91	89.6	3
4	5 28.8	41 91	92.4	5 41.0	41 91	92.0	5 53.3	41 91	91.5	6 05.4	41 91	91.1	6 17.6	41 91	90.6	6 29.8	40 91	90.2	6 41.9	40 91	89.7	6 54.0	40 91	89.2	4
85										5 10.6	41 91	90.7	5 22.8	41 91	90.2	5 35.0	40 91	89.7	5 47.1	40 91	89.3	5 59.2	40 91	88.8	85
6																						6 04.4	40 91	88.4	6

Lat. 24°

H.A.	0° 00′ Alt.	Δd	Δt	Az.	0° 30′ Alt.	Δd	Δt	Az.	1° 00′ Alt.	Δd	Δt	Az.	1° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	66 00.0	1.0	02	180.0	65 30.0	1.0	02	180.0	65 00.0	1.0	02	180.0	64 30.0	1.0	02	180.0
1	65 58.8	1.0	06	177.5	65 28.8	1.0	06	177.6	64 58.9	1.0	06	177.6	64 28.9	1.0	06	177.7
2	65 55.3	1.0	10	175.1	65 25.4	1.0	10	175.2	64 55.5	1.0	09	175.3	64 25.6	1.0	09	175.4
3	65 49.5	99	14	172.7	65 19.7	99	13	172.8	64 49.8	99	13	172.9	64 20.0	99	13	173.1
4	65 41.3	99	17	170.2	65 11.7	99	17	170.4	64 42.0	99	17	170.6	64 12.3	99	16	170.8
05	65 30.9	98	21	167.9	65 01.4	98	21	168.1	64 32.0	98	20	168.3	64 02.5	98	20	168.5
6	65 18.3	97	25	165.5	64 49.0	97	24	165.8	64 19.8	98	24	166.0	63 50.5	98	23	166.3
7	65 03.5	96	28	163.2	64 34.5	97	28	163.5	64 05.5	97	27	163.8	63 36.5	97	27	164.1
8	64 46.6	95	32	160.9	64 18.0	96	31	161.3	63 49.2	96	30	161.6	63 20.5	96	30	161.9
9	64 27.7	94	35	158.7	63 59.4	95	34	159.1	63 31.0	95	34	159.5	63 02.5	95	33	159.8
10	64 06.9	93	38	156.6	63 38.9	93	37	157.0	63 10.8	94	37	157.4	62 42.7	94	36	157.8
1	63 44.1	92	41	154.5	63 16.5	92	40	154.9	62 48.8	92	40	155.3	62 21.1	93	39	155.7
2	63 19.6	91	44	152.4	62 52.4	91	43	152.9	62 25.1	91	42	153.3	61 57.7	91	42	153.8
3	62 53.4	89	46	150.4	62 26.6	90	46	150.9	61 59.6	90	45	151.4	61 32.6	90	44	151.8
4	62 25.5	88	49	148.5	61 59.1	88	48	149.0	61 32.6	89	48	149.5	61 06.0	89	47	150.0
15	61 56.1	86	52	146.6	61 30.1	87	51	147.2	61 04.0	87	50	147.7	60 37.8	88	50	148.2
6	61 25.2	85	54	144.8	60 59.7	85	53	145.4	60 34.0	86	52	145.9	60 08.1	86	52	146.4
7	60 53.0	84	56	143.1	60 27.8	84	55	143.6	60 02.6	84	54	144.2	59 37.1	85	54	144.7
8	60 19.4	82	58	141.4	59 54.7	83	57	142.0	59 29.8	83	57	142.5	59 04.8	84	56	143.0
9	59 44.6	81	60	139.8	59 20.3	81	59	140.3	58 55.8	82	59	140.9	58 31.3	82	58	141.4
20	59 08.6	79	62	138.2	58 44.7	80	61	138.8	58 20.7	80	60	139.3	57 56.5	81	60	139.9
1	58 31.5	78	64	136.7	58 08.0	78	63	137.3	57 44.4	79	62	137.8	57 20.7	79	62	138.4
2	57 53.4	77	65	135.2	57 30.3	77	64	135.8	57 07.1	78	64	136.4	56 43.8	78	63	137.0
3	57 14.3	75	67	133.8	56 51.6	76	66	134.4	56 28.8	76	65	135.0	56 05.8	77	65	135.6
4	56 34.2	74	68	132.4	56 12.0	74	68	133.0	55 49.6	75	67	133.6	55 27.0	76	66	134.2
25	55 53.3	73	70	131.1	55 31.5	73	69	131.7	55 09.5	74	68	132.3	54 47.3	74	68	132.9
6	55 11.6	71	71	129.8	54 50.2	72	70	130.4	54 28.5	72	70	131.0	54 06.7	73	69	131.6
7	54 29.2	70	72	128.6	54 08.1	71	72	129.2	53 46.8	71	71	129.8	53 25.3	72	70	130.4
8	53 46.0	69	73	127.4	53 25.2	69	72	128.0	53 04.3	70	72	128.6	52 43.2	71	71	129.2
9	53 02.1	68	74	126.3	52 41.7	68	74	126.9	52 21.2	69	73	127.5	52 00.4	69	72	128.1
30	52 17.6	67	75	125.2	51 57.6	67	75	125.8	51 37.3	68	74	126.4	51 16.9	68	74	127.0
1	51 32.5	65	76	124.1	51 12.8	66	76	124.7	50 52.9	67	75	125.3	50 32.8	67	74	125.9
2	50 46.8	64	77	123.1	50 27.4	65	76	123.7	50 07.9	66	76	124.3	49 48.1	66	75	124.8
3	50 00.6	63	78	122.1	49 41.6	64	77	122.7	49 22.3	65	77	123.2	49 02.9	65	76	123.8
4	49 13.9	62	79	121.1	48 55.2	63	78	121.7	48 36.2	63	78	122.3	48 17.1	64	77	122.9
35	48 26.8	61	79	120.2	48 08.3	62	79	120.7	47 49.6	63	78	121.3	47 30.8	63	78	121.9
6	47 39.2	60	80	119.2	47 20.9	61	80	119.8	47 02.6	62	79	120.4	46 44.0	62	79	121.0
7	46 51.1	59	81	118.4	46 33.2	60	80	118.9	46 15.1	61	80	119.5	45 56.8	61	79	120.1
8	46 02.7	59	81	117.5	45 45.0	59	81	118.1	45 27.2	60	80	118.7	45 09.2	60	80	119.2
9	45 13.9	58	82	116.7	44 56.5	58	82	117.2	44 38.9	59	81	117.8	44 21.1	59	81	118.4
40	44 24.7	57	82	115.9	44 07.6	58	82	116.4	43 50.2	58	82	117.0	43 32.7	59	81	117.6
1	43 35.3	56	83	115.1	43 18.3	57	83	115.6	43 01.2	57	82	116.2	42 44.0	58	82	116.8
2	42 45.4	55	84	114.3	42 28.7	56	83	114.9	42 11.9	56	83	115.4	41 54.9	57	82	116.0
3	41 55.4	55	84	113.6	41 38.9	55	84	114.1	41 22.2	56	83	114.7	41 05.4	56	83	115.2
4	41 05.0	54	84	112.8	40 48.7	54	84	113.4	40 32.3	55	84	113.9	40 15.7	56	83	114.5
45	40 14.3	53	85	112.1	39 58.3	54	84	112.7	39 42.0	54	84	113.2	39 25.7	55	84	113.8
6	39 23.4	53	85	111.4	39 07.6	53	85	112.0	38 51.5	54	84	112.5	38 35.4	54	84	113.1
7	38 32.3	52	86	110.8	38 16.6	52	85	111.3	38 00.8	53	85	111.9	37 44.8	53	85	112.4
8	37 40.9	51	86	110.1	37 25.4	52	86	110.7	37 09.8	52	85	111.2	36 54.0	53	85	111.7
9	36 49.4	51	86	109.5	36 34.0	51	86	110.0	36 18.6	52	86	110.5	36 03.0	52	86	111.1
50	35 57.6	50	87	108.8	35 42.4	51	86	109.4	35 27.1	51	86	109.9	35 11.7	52	86	110.4
1	35 05.6	50	87	108.2	34 50.6	50	87	108.8	34 35.5	51	86	109.3	34 20.3	51	86	109.8
2	34 13.5	49	87	107.6	33 58.6	50	87	108.2	33 43.7	50	87	108.7	33 28.6	51	86	109.2
3	33 21.1	49	88	107.0	33 06.5	49	87	107.6	32 51.7	50	87	108.1	32 36.7	50	87	108.6
4	32 28.7	48	88	106.5	32 14.1	49	88	107.0	31 59.5	49	87	107.5	31 44.7	49	87	108.0
55	31 36.0	48	88	105.9	31 21.6	48	88	106.4	31 07.1	49	88	106.9	30 52.5	49	87	107.4
6	30 43.2	47	88	105.3	30 29.0	48	88	105.9	30 14.6	48	88	106.4	30 00.1	48	88	106.9
7	29 50.3	47	88	104.8	29 36.2	47	88	105.3	29 21.9	48	88	105.8	29 07.6	48	88	106.3
8	28 57.2	46	89	104.3	28 43.2	47	88	104.8	28 29.1	47	88	105.3	28 14.9	48	88	105.8
9	28 04.0	46	89	103.7	27 50.2	46	89	104.2	27 36.2	47	88	104.7	27 22.1	47	88	105.2
60	27 10.7	46	89	103.2	26 57.0	46	89	103.7	26 43.1	46	89	104.2	26 29.1	47	88	104.7
1	26 17.3	45	89	102.7	26 03.7	46	89	103.2	25 49.9	46	89	103.7	25 36.0	46	89	104.2
2	25 23.8	45	89	102.2	25 10.2	45	89	102.7	24 56.6	46	89	103.2	24 42.8	46	89	103.7
3	24 30.2	45	90	101.7	24 16.7	45	89	102.2	24 03.2	45	89	102.7	23 49.5	46	89	103.2
4	23 36.5	44	90	101.2	23 23.1	45	90	101.7	23 09.6	45	89	102.2	22 56.1	45	89	102.7
65	22 42.7	44	90	100.7	22 29.4	44	90	101.2	22 16.0	45	90	101.7	22 02.6	45	89	102.2
6	21 48.8	44	90	100.3	21 35.6	44	90	100.7	21 22.3	44	90	101.2	21 09.0	45	90	101.7
7	20 54.8	44	90	99.8	20 41.7	44	90	100.3	20 28.5	44	90	100.8	20 15.2	44	90	101.2
8	20 00.7	43	90	99.3	19 47.7	44	90	99.8	19 34.6	44	90	100.3	19 21.4	44	90	100.8
9	19 06.6	43	90	98.9	18 53.7	43	90	99.4	18 40.6	44	90	99.8	18 27.5	44	90	100.3
70	18 12.4	43	90	98.4	17 59.5	43	90	98.9	17 46.6	43	90	99.4	17 33.6	43	90	99.8
1	17 18.2	43	90	98.0	17 05.4	43	90	98.4	16 52.5	43	90	98.9	16 39.5	43	90	99.4
2	16 23.9	42	91	97.5	16 11.1	43	90	98.0	15 58.3	43	90	98.5	15 45.4	43	90	98.9
3	15 29.5	42	91	97.1	15 16.8	42	91	97.6	15 04.0	43	90	98.0	14 51.2	43	90	98.5
4	14 35.1	42	91	96.7	14 22.4	42	91	97.1	14 09.7	42	91	97.6	13 57.0	43	90	98.1
75	13 40.6	42	91	96.2	13 28.0	42	91	96.7	13 15.4	42	91	97.2	13 02.7	42	91	97.6
6	12 46.1	42	91	95.8	12 33.6	42	91	96.3	12 21.0	42	91	96.7	12 08.3	42	91	97.2
7	11 51.5	42	91	95.4	11 39.0	42	91	95.8	11 26.5	42	91	96.3	11 13.9	42	91	96.8
8	10 56.9	41	91	94.9	10 44.5	42	91	95.4	10 32.0	42	91	95.9	10 19.5	42	91	96.3
9	10 02.3	41	91	94.5	9 49.9	41	91	95.0	9 37.5	42	91	95.4	9 25.0	42	91	95.9
80	9 07.7	41	91	94.1	8 55.3	41	91	94.6	8 42.9	41	91	95.0	8 30.4	42	91	95.5
1	8 13.0	41	91	93.7	8 00.6	41	91	94.1	7 48.3	41	91	94.6	7 35.9	41	91	95.1
2	7 18.3	41	91	93.3	7 05.9	41	91	93.7	6 53.6	41	91	94.2	6 41.2	41	91	94.6
3	6 23.5	41	91	92.9	6 11.2	41	91	93.3	5 58.9	41	91	93.8	5 46.6	41	91	94.2
4	5 28.8	41	91	92.4	5 16.5	41	91	92.9	5 04.2	41	91	93.4				

H.A.	2° 00′ Alt.	Δd	Δt	Az.	2° 30′ Alt.	Δd	Δt	Az.	3° 00′ Alt.	Δd	Δt	Az.	3° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	64 00.0	1.0	02	180.0	63 30.0	1.0	02	180.0	63 00.0	1.0	02	180.0	62 30.0	1.0	02	180.0
1	63 58.9	1.0	06	177.7	63 28.9	1.0	05	177.8	62 58.9	1.0	05	177.8	62 29.0	1.0	05	177.8
2	63 55.6	1.0	09	175.4	63 25.7	1.0	09	175.5	62 55.8	1.0	09	175.6	62 25.9	1.0	09	175.7
3	63 50.2	99	13	173.2	63 20.4	99	12	173.3	62 50.6	99	12	173.4	62 20.7	99	12	173.5
4	63 42.6	99	16	170.9	63 13.0	99	16	171.1	62 43.3	99	16	171.3	62 13.5	99	15	171.4
05	63 33.0	98	20	168.7	63 03.4	98	19	168.9	62 33.9	98	19	169.1	62 04.3	99	18	169.3
6	63 21.2	98	23	166.5	62 51.9	98	22	166.8	62 22.6	98	22	167.0	61 53.2	98	22	167.2
7	63 07.5	97	26	164.4	62 38.4	97	26	164.6	62 09.2	97	25	164.9	61 40.1	97	25	165.1
8	62 51.7	96	30	162.2	62 22.9	96	29	162.5	61 54.0	96	28	162.8	61 25.1	96	28	163.1
9	62 34.0	95	32	160.2	62 05.5	95	32	160.5	61 36.9	95	32	160.8	61 08.3	96	31	161.1
10	62 14.5	94	36	158.1	61 46.3	94	35	158.5	61 18.0	94	34	158.8	60 49.7	95	34	159.2
1	61 53.2	93	38	156.1	61 25.3	93	38	156.5	60 57.3	93	37	156.9	60 29.3	94	37	157.3
2	61 30.2	92	41	154.2	61 02.6	92	40	154.6	60 35.0	92	40	155.0	60 07.3	92	39	155.4
3	61 05.5	91	44	152.3	60 38.3	91	43	152.7	60 11.0	91	42	153.1	59 43.7	91	42	153.6
4	60 39.2	89	46	150.4	60 12.4	90	46	150.9	59 45.5	90	45	151.3	59 18.5	90	44	151.8
15	60 11.4	88	49	148.6	59 45.0	88	48	149.1	59 18.5	89	48	149.6	58 51.8	89	47	150.0
6	59 42.2	87	51	146.9	59 16.2	87	50	147.4	58 50.0	87	50	147.9	58 23.7	88	49	148.3
7	59 11.6	85	53	145.2	58 45.9	86	52	145.7	58 20.2	86	52	146.2	57 54.3	86	51	146.7
8	58 39.7	84	55	143.6	58 14.4	84	54	144.1	57 49.0	85	54	144.6	57 23.6	85	53	145.1
9	58 06.5	83	57	142.0	57 41.7	83	57	142.5	57 16.7	84	56	143.0	56 51.6	84	55	143.5
20	57 32.2	81	59	140.4	57 07.7	82	58	141.0	56 43.1	82	58	141.5	56 18.4	83	57	142.0
1	56 56.7	80	61	139.0	56 32.7	80	60	139.5	56 08.5	81	60	140.0	55 44.1	81	59	140.6
2	56 20.2	79	62	137.5	55 56.6	79	62	138.1	55 32.7	80	61	138.6	55 08.8	80	61	139.1
3	55 42.7	77	64	136.1	55 19.4	78	63	136.7	54 56.0	78	63	137.2	54 32.4	79	62	137.8
4	55 04.3	76	66	134.8	54 41.4	77	65	135.3	54 18.3	77	64	135.9	53 55.1	78	64	136.4
25	54 24.9	75	67	133.5	54 02.4	75	66	134.0	53 39.7	76	66	134.6	53 16.9	76	65	135.1
6	53 44.7	74	68	132.2	53 22.6	74	68	132.8	53 00.2	75	67	133.3	52 37.8	75	66	133.9
7	53 03.7	72	70	131.0	52 41.9	73	69	131.5	52 20.0	73	68	132.1	51 57.9	74	68	132.7
8	52 22.0	71	71	129.8	52 00.5	72	70	130.4	51 38.9	72	70	130.9	51 17.2	73	69	131.5
9	51 39.5	70	72	128.6	51 18.4	71	71	129.2	50 57.1	71	71	129.8	50 35.7	72	70	130.3
30	50 56.3	69	73	127.5	50 35.6	69	72	128.1	50 14.7	70	72	128.7	49 53.6	71	71	129.2
1	50 12.6	68	74	126.5	49 52.2	68	74	127.0	49 31.6	69	73	127.6	49 10.8	69	72	128.1
2	49 28.2	67	75	125.4	49 08.1	67	74	126.0	48 47.8	68	74	126.5	48 27.4	68	73	127.1
3	48 43.2	66	76	124.4	48 23.5	66	75	125.0	48 03.5	67	75	125.5	47 43.4	67	74	126.1
4	47 57.8	65	77	123.4	47 38.3	65	76	124.0	47 18.6	66	76	124.6	46 58.8	66	75	125.1
35	47 11.8	64	78	122.5	46 52.6	64	77	123.0	46 33.2	65	76	123.6	46 13.7	65	76	124.1
6	46 25.3	63	78	121.6	46 06.4	63	78	122.1	45 47.3	64	77	122.7	45 28.1	64	77	123.2
7	45 38.3	62	79	120.7	45 19.7	62	78	121.2	45 01.0	63	78	121.8	44 42.0	63	78	122.3
8	44 51.0	61	80	119.8	44 32.6	61	79	120.3	44 14.1	62	79	120.9	43 55.5	62	78	121.4
9	44 03.2	60	80	118.9	43 45.1	61	80	119.5	43 26.9	61	79	120.0	43 08.5	62	79	120.6
40	43 15.1	59	81	118.1	42 57.2	60	80	118.7	42 39.2	60	80	119.2	42 21.1	61	80	119.8
1	42 26.5	58	82	117.3	42 09.0	59	81	117.9	41 51.2	59	81	118.4	41 33.3	60	80	118.9
2	41 37.7	58	82	116.5	41 20.3	58	82	117.1	41 02.8	59	81	117.6	40 45.2	59	81	118.2
3	40 48.5	57	82	115.8	40 31.4	57	82	116.3	40 14.1	58	82	116.9	39 56.7	58	82	117.4
4	39 59.0	56	83	115.0	39 42.1	57	83	115.6	39 25.0	57	82	116.1	39 07.8	58	82	116.6
45	39 09.1	55	84	114.3	38 52.5	56	83	114.9	38 35.7	56	83	115.4	38 18.7	57	82	115.9
6	38 19.1	55	84	113.6	38 02.6	55	84	114.1	37 46.0	56	83	114.7	37 29.2	56	83	115.2
7	37 28.7	54	84	112.9	37 12.4	54	84	113.5	36 56.0	55	84	114.0	36 39.5	55	83	114.5
8	36 38.1	53	85	112.3	36 22.0	54	84	112.8	36 05.8	54	84	113.3	35 49.5	55	84	113.8
9	35 47.2	53	85	111.6	35 31.4	53	85	112.1	35 15.4	54	84	112.6	34 59.2	54	84	113.2
50	34 56.2	52	86	111.0	34 40.5	53	85	111.5	34 24.7	53	85	112.0	34 08.7	53	85	112.5
1	34 04.9	52	86	110.3	33 49.4	52	86	110.8	33 33.7	52	85	111.4	33 17.9	53	85	111.9
2	33 13.4	51	86	109.7	32 58.0	51	86	110.2	32 42.6	52	86	110.7	32 27.0	52	85	111.2
3	32 21.7	50	86	109.1	32 06.5	51	86	109.6	31 51.2	51	86	110.1	31 35.8	52	86	110.6
4	31 29.8	50	87	108.5	31 14.8	50	86	109.0	30 59.6	51	86	109.5	30 44.4	51	86	110.0
55	30 37.7	49	87	107.9	30 22.9	50	87	108.4	30 07.9	50	86	108.9	29 52.8	51	86	109.4
6	29 45.5	49	87	107.4	29 30.8	49	87	107.9	29 15.9	50	87	108.4	29 01.0	50	87	108.9
7	28 53.1	48	88	106.8	28 38.5	49	87	107.3	28 23.8	49	87	107.8	28 09.0	49	87	108.3
8	28 00.6	48	88	106.3	27 46.1	48	88	106.8	27 31.6	49	87	107.3	27 16.9	49	87	107.7
9	27 07.9	48	88	105.7	26 53.6	48	88	106.2	26 39.2	48	88	106.7	26 24.6	49	87	107.2
60	26 15.0	47	88	105.2	26 00.9	47	88	105.7	25 46.6	48	88	106.2	25 32.2	48	88	106.7
1	25 22.1	47	88	104.7	25 08.0	47	88	105.2	24 53.9	47	88	105.7	24 39.6	48	88	106.1
2	24 29.0	46	89	104.2	24 15.1	47	88	104.7	24 01.0	47	88	105.1	23 46.9	47	88	105.6
3	23 35.8	46	89	103.7	23 22.0	46	89	104.1	23 08.0	47	88	104.6	22 54.0	47	88	105.1
4	22 42.5	46	89	103.2	22 28.8	46	89	103.6	22 15.0	46	89	104.1	22 01.1	46	88	104.6
65	21 49.0	45	89	102.7	21 35.4	46	89	103.2	21 21.7	46	89	103.6	21 08.0	46	89	104.1
6	20 55.5	45	89	102.2	20 42.0	45	89	102.7	20 28.4	45	89	103.1	20 14.7	46	89	103.6
7	20 01.9	45	90	101.7	19 48.5	45	89	102.2	19 35.0	45	89	102.7	19 21.4	45	89	103.1
8	19 08.2	44	90	101.2	18 54.9	45	90	101.7	18 41.5	45	89	102.2	18 28.0	45	89	102.7
9	18 14.4	44	90	100.8	18 01.1	44	90	101.2	17 47.8	44	90	101.7	17 34.5	45	90	102.2
70	17 20.5	44	90	100.3	17 07.3	44	90	100.8	16 54.1	44	90	101.3	16 40.8	44	90	101.7
1	16 26.5	43	90	99.9	16 13.5	44	90	100.3	16 00.3	44	90	100.8	15 47.1	44	90	101.3
2	15 32.5	43	90	99.4	15 19.5	43	90	99.9	15 06.4	44	90	100.3	14 53.3	44	90	100.8
3	14 38.4	43	90	99.0	14 25.5	43	90	99.4	14 12.5	43	90	99.9	13 59.4	44	90	100.4
4	13 44.2	43	90	98.5	13 31.3	43	90	99.0	13 18.4	43	90	99.5	13 05.5	43	90	99.9
75	12 50.0	43	90	98.1	12 37.2	43	90	98.5	12 24.3	43	90	99.0	12 11.5	43	90	99.5
6	11 55.7	42	91	97.6	11 42.9	42	90	98.1	11 30.2	43	90	98.6	11 17.4	43	90	99.0
7	11 01.3	42	91	97.2	10 48.6	42	90	97.7	10 35.9	42	90	98.1	10 23.2	43	90	98.6
8	10 06.9	42	91	96.8	9 54.3	42	91	97.3	9 41.7	42	90	97.7	9 29.0	42	90	98.2
9	9 12.5	42	91	96.4	8 59.9	42	91	96.8	8 47.3	42	91	97.3	8 34.7	42	91	97.7
80	8 18.0	42	91	95.9	8 05.5	42	91	96.4	7 52.9	42	91	96.9	7 40.3	42	91	97.3
1	7 23.4	41	91	95.5	7 11.0	42	91	96.0	6 58.5	42	91	96.4	6 46.0	42	91	96.9
2	6 28.8	41	91	95.1	6 16.4	41	91	95.6	6 04.0	42	91	96.0	5 51.5	42	91	96.5
3	5 34.2	41	91	94.7	5 21.8	41	91	95.2	5 09.4	41	91	95.6				
4																

Lat. 24°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	72 00.0	1.0 02	180.0	72 30.0	1.0 03	180.0	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	00
1	69 58.6	1.0 07	177.1	70 28.6	1.0 07	177.0	70 58.5	1.0 07	176.9	71 28.5	1.0 08	176.9	71 58.5	1.0 08	176.8	72 28.4	1.0 08	176.7	72 58.4	1.0 08	176.6	73 28.3	1.0 08	176.5	1
2	69 54.4	1.0 12	174.2	70 24.3	1.0 12	174.0	70 54.2	1.0 12	173.9	71 24.0	1.0 12	173.7	71 53.9	99 13	173.6	72 23.7	99 13	173.4	72 53.5	99 13	173.2	73 23.3	99 14	173.0	2
3	69 47.5	99 16	171.3	70 17.2	99 16	171.1	70 46.9	99 17	170.9	71 16.6	99 17	170.7	71 46.2	99 18	170.4	72 15.9	99 18	170.2	72 45.5	99 19	169.9	73 15.1	99 19	169.6	3
4	69 37.9	98 20	168.5	70 07.4	98 21	168.2	70 36.8	98 21	167.9	71 06.2	98 22	167.6	71 35.6	98 22	167.3	72 05.0	98 23	167.0	72 34.3	98 24	166.6	73 03.6	98 24	166.3	4
05	69 25.6	97 25	165.7	69 54.8	97 25	165.3	70 24.0	97 26	165.0	70 53.1	97 26	164.6	71 22.2	97 27	164.3	71 51.2	97 28	163.9	72 20.2	97 28	163.4	72 49.1	96 29	163.0	05
6	69 10.8	96 29	162.9	69 39.7	96 30	162.6	70 08.5	96 30	162.1	70 37.2	96 31	161.7	71 05.9	96 32	161.3	71 34.6	95 32	160.8	72 03.1	95 33	160.3	72 31.6	95 34	159.8	6
7	68 53.5	95 33	160.3	69 22.0	95 34	159.8	69 50.4	95 34	159.4	70 18.8	94 35	158.9	70 47.0	94 36	158.4	71 15.2	94 36	157.9	71 43.3	93 37	157.3	72 11.3	93 38	156.7	7
8	68 33.8	94 36	157.7	69 01.9	93 37	157.2	69 29.9	93 38	156.7	69 57.8	93 39	156.2	70 25.6	93 40	155.6	70 53.3	92 40	155.0	71 20.9	92 42	154.4	71 48.4	91 42	153.8	8
9	68 11.9	92 40	155.2	68 39.5	92 41	154.6	69 07.1	92 42	154.1	69 34.5	91 43	153.5	70 01.8	91 44	152.9	70 29.0	90 44	152.3	70 56.0	90 45	151.6	71 22.9	89 46	150.9	9
10	67 47.8	91 44	152.7	68 15.0	90 44	152.2	68 42.0	90 45	151.6	69 08.9	90 46	150.9	69 35.7	89 47	150.3	70 02.4	89 48	149.6	70 28.8	88 49	148.9	70 55.2	87 50	148.2	10
1	67 21.7	89 47	150.4	67 48.4	89 48	149.8	68 14.9	88 48	149.1	68 41.3	88 49	148.5	69 07.5	87 50	147.8	69 33.6	87 51	147.1	69 59.5	86 52	146.4	70 25.2	85 53	145.6	1
2	66 53.6	88 50	148.1	67 19.8	87 51	147.5	67 45.8	86 52	146.8	68 11.7	86 52	146.1	68 37.4	85 53	145.4	69 02.9	85 54	144.7	69 28.2	84 55	144.0	69 53.3	83 56	143.2	2
3	66 23.8	86 53	145.9	66 49.4	85 53	145.3	67 14.9	85 54	144.6	67 40.3	84 55	143.9	68 05.4	83 56	143.2	68 30.3	83 57	142.4	68 55.1	82 58	141.6	69 19.6	81 59	140.8	3
4	65 52.2	84 55	143.8	66 17.4	84 56	143.1	66 42.3	83 57	142.5	67 07.1	82 58	141.7	67 31.7	82 59	141.0	67 56.1	81 60	140.2	68 20.2	80 61	139.4	68 44.1	79 62	138.6	4
15	65 19.1	82 58	141.8	65 43.7	82 58	141.1	66 08.2	81 60	140.4	66 32.4	80 60	139.7	66 56.4	80 61	138.9	67 20.2	79 62	138.1	67 43.8	78 63	137.3	68 07.1	77 64	136.5	15
6	64 44.5	81 60	139.9	65 08.6	80 61	139.2	65 32.5	79 62	138.5	65 56.2	79 62	137.7	66 19.7	78 64	136.9	66 42.9	77 64	136.1	67 05.9	76 65	135.3	67 28.7	75 66	134.5	6
7	64 08.5	79 62	138.0	64 32.1	78 63	137.3	64 55.5	78 64	136.6	65 18.7	77 65	135.8	65 41.6	76 66	135.1	66 04.3	75 66	134.3	66 26.8	74 67	133.4	66 48.9	73 68	132.6	7
8	63 31.2	77 64	136.3	63 54.3	77 65	135.5	64 17.2	76 66	134.8	64 39.9	75 67	134.0	65 02.3	74 68	133.3	65 24.5	73 68	132.5	65 46.4	73 69	131.6	66 08.0	72 70	130.8	8
9	62 52.7	76 66	134.6	63 15.3	75 67	133.8	63 37.7	74 68	133.1	63 59.9	73 68	132.3	64 21.8	73 69	131.6	64 43.5	72 70	130.7	65 04.9	71 71	129.9	65 26.0	70 72	129.1	9
20	62 13.1	74 68	132.9	62 35.3	73 68	132.2	62 57.2	73 69	131.5	63 18.9	72 70	130.7	63 40.3	71 71	129.9	64 01.4	70 72	129.1	64 22.3	69 72	128.3	64 42.9	68 73	127.4	20
1	61 32.5	73 69	131.4	61 54.2	72 70	130.7	62 15.6	71 71	129.9	62 36.8	70 72	129.1	62 57.8	69 72	128.4	63 18.4	68 73	127.6	63 38.8	68 74	126.7	63 59.0	67 75	125.9	1
2	60 50.9	71 71	129.9	61 12.1	70 72	129.2	61 33.1	70 72	128.4	61 53.9	69 73	127.7	62 14.4	68 74	126.9	62 34.6	67 74	126.1	62 54.5	66 75	125.3	63 14.2	65 76	124.4	2
3	60 08.4	70 72	128.5	60 29.2	69 73	127.7	60 49.8	68 74	127.0	61 10.1	67 74	126.2	61 30.1	66 75	125.5	61 49.9	65 76	124.7	62 09.4	65 76	123.9	62 28.6	64 77	123.0	3
4	59 25.1	68 74	127.1	59 45.5	68 74	126.4	60 05.6	67 75	125.6	60 25.5	66 76	124.9	60 45.1	65 76	124.1	61 04.4	64 77	123.3	61 23.5	63 78	122.5	61 42.3	62 78	121.7	4
25	58 41.0	67 75	125.8	59 01.0	66 75	125.1	59 20.7	65 76	124.3	59 40.2	64 77	123.6	59 59.4	64 77	122.8	60 18.3	63 78	122.0	60 37.0	62 79	121.2	60 55.3	61 79	120.4	25
6	57 56.2	66 76	124.5	58 15.8	65 76	123.8	58 35.1	64 77	123.1	58 54.2	63 78	122.3	59 13.0	62 78	121.6	59 31.5	61 79	120.8	59 49.8	60 80	120.0	60 07.8	59 80	119.2	6
7	57 10.7	64 77	123.3	57 29.9	64 78	122.6	57 48.9	63 78	121.9	58 07.6	62 79	121.2	58 26.0	61 79	120.4	58 44.2	60 80	119.6	59 02.1	59 80	118.9	59 19.7	58 81	118.1	7
8	56 24.6	63 78	122.2	56 43.4	62 78	121.5	57 02.0	62 79	120.7	57 20.4	61 80	120.0	57 38.5	60 80	119.3	57 56.3	59 81	118.5	58 13.8	58 81	117.7	58 31.1	57 82	117.0	8
9	55 37.9	62 79	121.0	55 56.4	61 79	120.3	56 14.7	60 80	119.6	56 32.6	60 80	118.9	56 50.4	59 81	118.2	57 07.9	58 82	117.4	57 25.1	57 82	116.7	57 42.0	56 82	115.9	9
30	54 50.7	61 80	120.0	55 08.9	60 80	119.3	55 26.8	59 81	118.6	55 44.4	58 81	117.9	56 01.8	58 82	117.1	56 19.0	57 82	116.4	56 35.9	56 83	115.6	56 52.5	55 83	114.9	30
1	54 03.0	60 80	118.9	54 20.8	59 81	118.2	54 38.4	58 81	117.6	54 55.7	57 82	116.8	55 12.8	57 82	116.1	55 29.7	56 83	115.4	55 46.2	55 83	114.7	56 02.6	54 84	113.9	1
2	53 14.8	59 81	117.9	53 32.3	58 82	117.3	53 49.6	57 82	116.6	54 06.6	56 82	115.9	54 23.4	56 83	115.2	54 40.0	55 84	114.4	54 56.2	54 84	113.7	55 12.3	53 84	113.0	2
3	52 26.1	58 82	117.0	52 43.4	57 82	116.3	53 00.4	56 83	115.6	53 17.1	55 83	114.9	53 33.6	55 84	114.2	53 49.9	54 84	113.5	54 05.9	53 84	112.8	54 21.6	52 85	112.1	3
4	51 37.1	57 82	116.0	51 54.0	56 83	115.4	52 10.7	55 83	114.7	52 27.2	55 84	114.0	52 43.5	54 84	113.3	52 59.4	53 84	112.6	53 15.2	52 85	111.9	53 30.7	51 86	111.2	4
35	50 47.7	56 83	115.2	51 04.3	55 83	114.5	51 20.8	54 84	113.8	51 37.0	54 84	113.1	51 53.0	53 85	112.5	52 08.7	52 85	111.8	52 24.2	51 86	111.1	52 39.4	50 86	110.4	35
6	49 57.9	55 84	114.3	50 14.3	54 84	113.6	50 30.5	54 84	113.0	50 46.4	53 85	112.3	51 02.2	52 85	111.6	51 17.6	51 86	110.9	51 32.9	50 86	110.3	51 47.9	50 86	109.6	6
7	49 07.7	54 84	113.4	49 23.9	54 84	112.8	49 39.8	53 85	112.1	49 55.6	52 85	111.5	50 11.1	51 86	110.8	50 26.3	50 86	110.1	50 41.3	50 86	109.5	50 56.1	49 87	108.8	7
8	48 17.3	53 84	112.6	48 33.2	53 85	112.0	48 48.9	52 85	111.3	49 04.4	51 86	110.7	49 19.7	51 86	110.0	49 34.7	50 86	109.4	49 49.5	49 87	108.7	50 04.1	48 87	108.0	8
9	47 26.6	53 85	111.8	47 42.3	52 86	111.2	47 57.7	51 86	110.6	48 13.0	51 86	109.9	48 28.1	50 86	109.3	48 42.9	49 87	108.6	48 57.5	48 87	108.0	49 11.9	48 87	107.3	9
40	46 35.5	52 86	111.1	46 51.0	51 86	110.4	47 06.3	51 86	109.8	47 21.4	50 86	109.2	47 36.2	49 87	108.5	47 50.9	48 87	107.9	48 05.3	48 87	107.2	48 19.5	47 88	106.6	40
1	45 44.3	51 86	110.3	45 59.5	51 86	109.7	46 14.6	50 86	109.1	46 29.5	49 87	108.5	46 44.1	49 87	107.8	46 58.6	48 88	107.2	47 12.8	47 88	106.5	47 26.8	46 88	105.9	1
2	44 52.8	51 86	109.6	45 07.8	50 86	109.0	45 22.7	49 87	108.4	45 37.4	49 87	107.8	45 51.9	48 88	107.1	46 06.1	47 88	106.5	46 20.2	46 88	105.9	46 34.0	46 88	105.2	2
3	44 01.0	50 87	108.9	44 15.9	49 87	108.3	44 30.6	49 87	107.7	44 45.1	48 88	107.1	44 59.4	47 88	106.5	45 13.5	47 88	105.8	45 27.4	46 88	105.2	45 41.0	45 88	104.6	3
4	43 09.1	49 87	108.2	43 23.8	49 87	107.6	43 38.3	48 88	107.0	43 52.6	47 88	106.4	44 06.7	47 88	105.8	44 20.7	46 88	105.2	44 34.4	45 88	104.6	44 47.9	45 89	103.9	4
45	42 16.9	49 87	107.6	42 31.4	48 88	107.0	42 45.8	48 88	106.4	42 59.9	47 88	105.8	43 13.9	46 88	105.2	43 27.7	46 88	104.6	43 41.3	45 89	103.9	43 54.6	44 89	103.3	45
6	41 24.5	48 88	106.9	41 38.9	48 88	106.3	41 53.1	47 88	105.7	42 07.1	46 88	105.1	42 20.9	46 88	104.5	42 34.6	45 89	103.9	42 48.0	44 89	103.3	43 01.2	44 89	102.7	6
7	40 32.9	48 88	106.3	40 46.2	47 88	105.7	41 00.3	46 88	105.1	41 14.1	46 88	104.5	41 27.8	45 89	103.9	41 41.3	45 89	103.3	41 54.6	44 89	102.7	42 07.7	43 89	102.1	7
8	39 39.3	47 88	105.7	39 53.4	47 88	105.1	40 07.3	46 88	104.5	40 21.0	45 89	103.9	40 34.5	45 89	103.3	40 47.9	44 89	102.7	41 01.1	44 89	102.1	41 14.1	43 90	101.6	8
9	38 46.4	47 88	105.1	39 00.4	46 89	104.5	39 14.1	46 89	103.9	39 27.7	45 89	103.3	39 41.1	44 89	102.8	39 54.4	44 90	102.2	40 07.4	43 90	101.6	40 20.3	43 90	101.0	9
50	37 53.4	46 89	104.5	38 07.2	46 89	103.9	38 20.9	45 89	103.3	38 34.3	45 89	102.8	38 47.6	44 89	102.2	39 00.7	43 90	101.6	39 13.7	43 90	101.0	39 26.5	42 90	100.4	50
1	37 00.3	46 89	103.9	37 14.0	45 89	103.3	37 27.5	45 89	102.8	37 40.8	44 89	102.2	37 54.0	44 90	101.6	38 07.0	43 90	101.1	38 19.8	43 90	100.5	38 32.5	42 90	99.9	1
2	36 07.0	45 89	103.3	36 20.6	45 89	102.8	36 33.9	44 89	102.2	36 47.2	44 90	101.6	37 00.2	43 90	101.1	37 13.1	43 90	100.5	37 25.9	42 90	100.0	37 38.5	42 90	99.4	2
3	35 13.6	45 89	102.8	35 27.0	44 89	102.2	35 40.3	44 90	101.7	35 53.4	43 90	101.1	36 06.4	43 90	100.6	36 19.2	42 90	100.0	36 31.9	42 90	99.4	36 44.3	41 90	98.9	3
4	34 20.1	45 89	102.2	34 33.4	44 90	101.7	34 46.6	44 90	101.1	34 59.6	43 90	100.6	35 12.5	43 90	100.0	35 25.2	42 90	99.5	35 37.7	42 90	98.9	35 50.1	41 90	98.4	4
55	33 26.5	44 90	101.7	33 39.7	44 90	101.1	33 52.8	43 90	100.6	34 05.7	43 90	100.1	34 18.4	42 90	99.5	34 31.1	42 90	99.0	34 43.6	41 90	98.4	34 55.9	41 90	97.9	55
6	32 32.8	44 90	101.2	32 45.9	43 90	100.6	32 58.8	43 90	100.1	33 11.7	43 90	99.6	33 24.3	42 90	99.0	33 36.9	42 90	98.5	33 49.3	41 90	97.9	34 01.6	41 91	97.4	6
7	31 38.9	44 90	100.6	31 51.9	43 90	100.1	32 04.8	43 90	99.6	32 17.6	42 90	99.0	32 30.2	42 90	98.5	32 42.6	41 90	98.0	32 55.0	41 91	97.4	33 07.2	40 91	96.9	7
8	30 45.0	43 90	100.1	30 57.9	43 90	99.6	31 10.7	42 90	99.1	31 23.4	42 90	98.6	31 35.9	42 90	98.0	31 48.3	41 90	97.5	32 00.6	41 91	96.9	32 12.7	40 91	96.4	8
9	29 51.0	43 90	99.6	30 03.9	43 90	99.1	30 16.6	42 90	98.6	30 29.2	42 90	98.1	30 41.6	41 91	97.5	30 54.0	41 91	97.0	31 06.2	40 91	96.5	31 18.2	40 91	95.9	9
60	28 56.9	43 90	99.2	29 09.7	42 90	98.6	29 22.3	42 90	98.1	29 34.9	42 91	97.6	29 47.3	41 91	97.1	29 59.5	41 91	96.5	30 11.7	40 91	96.0	30 23.7	40 91	95.5	60
1	28 02.8	42 90	98.7	28 15.5	42 90	98.2	28 28.0	42 91	97.6	28 40.5	41 91	97.1	28 52.8	41 91	96.6	29 05.0	41 91	96.1	29 17.1	40 91	95.6	29 29.1	40 91	95.0	1
2	27 08.6	42 90	98.2	27 21.2	42 91	97.7	27 33.7	41 91	97.2	27 46.1	41 91	96.7	27 58.4	41 91	96.1	28 10.5	40 91	95.6	28 22.6	40 91	95.1	28 34.5	40 91	94.6	2
3	26 14.3	42 90	97.7	26 26.8	42 91	97.2	26 39.3	41 91	96.7	26 51.6	41 91	96.2	27 03.8	41 91	95.7	27 15.9	40 91	95.2	27 27.9	40 91	94.7	27 39.8	39 91	94.1	3
4	25 19.9	42 91	97.3	25 32.4	41 91	96.8	25 44.8	41 91	96.2	25 57.1	41 91	95.7	26 09.3	40 91	95.2	26 21.3	40 91	94.7	26 33.3	40 91	94.2	26 45.1	39 91	93.7	4
65	24 25.5	42 91	96.8	24 38.0	41 91	96.3	24 50.3	41 91	95.8	25 02.5	41 91	95.3	25 14.7	40 91	94.8	25 26.7	40 91	94.3	25 38.6	40 91	93.8	25 50.4	39 91	93.3	65
6	23 31.1	41 91	96.3	23 43.5	41 91	95.8	23 55.8	41 91	95.3	24 07.9	40 91	94.8	24 20.0	40 91	94.3	24 32.0	40 91	93.8	24 43.9	39 91	93.3	24 55.7	39 91	92.8	6
7	22 36.6	41 91	95.9	22 48.9	41 91	95.4	23 01.2	41 91	94.9	23 13.3	40 91	94.4	23 25.4	40 91	93.9	23 37.3	40 91	93.4	23 49.2	39 91	92.9	24 00.9	39 91	92.4	7
8	21 42.0	41 91	95.5	21 54.3	41 91	95.0	22 06.5	41 91	94.5	22 18.6	40 91	94.0	22 30.7	40 91	93.5	22 42.6	40 91	93.0	22 54.4	39 91	92.5	23 06.2	39 91	92.0	8
9	20 47.5	41 91	95.0	20 59.7	41 91	94.5	21 11.9	40 91	94.0	21 23.9	40 91	93.5	21 35.9	40 91	93.1	21 47.8	40 91	92.6	21 59.7	39 91	92.1	22 11.4	39 91	91.6	9
70	19 52.8	41 91	94.6	20 05.0	41 91	94.1	20 17.2	40 91	93.6	20 29.2	40 91	93.1	20 41.2	40 91	92.6	20 53.1	39 91	92.1	21 04.9	39 91	91.6	21 16.6	39 91	91.1	70
1	18 58.2	41 91	94.1	19 10.4	40 91	93.7	19 22.5	40 91	93.2	19 34.5	40 01	92.7	19 46.4	40 91	92.2	19 58.3	39 91	91.7	20 10.1	39 91	91.2	20 21.8	39 91	90.7	1
2	18 03.5	41 91	93.7	18 15.6	40 91	93.2	18 27.7	40 91	92.8	18 39.7	40 91	92.3	18 51.6	40 91	91.8	19 03.5	39 91	91.3	19 15.3	39 91	90.8	19 27.0	39 91	90.3	2
3	17 08.8	41 91	93.3	17 20.9	40 91	92.8	17 33.0	40 91	92.3	17 44.9	40 91	91.9	17 56.9	40 91	91.4	18 08.7	39 91	90.9	18 20.5	39 91	90.4	18 32.2	39 91	89.9	3
4	16 14.1	40 91	92.9	16 26.2	40 91	92.4	16 38.2	40 91	91.9	16 50.2	40 91	91.4	17 02.1	40 91	91.0	17 13.9	39 91	90.5	17 25.7	39 91	90.0	17 37.3	39 91	89.5	4
75	15 19.3	40 91	92.5	15 31.4	40 91	92.0	15 43.4	40 91	91.5	15 55.4	40 91	91.0	16 07.2	40 91	90.5	16 19.1	39 91	90.1	16 30.8	39 91	89.6	16 42.5	39 91	89.1	75
6	14 24.5	40 91	92.0	14 36.6	40 91	91.6	14 48.6	40 91	91.1	15 00.5	40 91	90.6	15 12.4	40 91	90.1	15 24.3	39 91	89.7	15 36.0	39 91	89.2	15 47.7	39 91	88.7	6
7	13 29.8	40 91	91.6	13 41.8	40 91	91.2	13 53.8	40 91	90.7	14 05.7	40 91	90.2	14 17.6	40 91	89.7	14 29.5	39 91	89.3	14 41.2	39 91	88.8	14 52.9	39 91	88.3	7
8	12 35.0	40 91	91.2	12 47.0	40 91	90.7	12 59.0	40 91	90.3	13 10.9	40 91	89.8	13 22.8	40 91	89.3	13 34.6	39 91	88.9	13 46.4	39 91	88.4	13 58.2	39 91	87.9	8
9	11 40.2	40 91	90.8	11 52.2	40 91	90.3	12 04.2	40 91	89.9	12 16.1	40 91	89.4	12 28.0	40 91	88.9	12 39.8	39 91	88.5	12 51.6	39 91	88.0	13 03.4	39 91	87.5	9
80	10 45.3	40 91	90.4	10 57.4	40 91	89.9	11 09.4	40 91	89.5	11 21.3	40 91	89.0	11 33.2	40 91	88.5	11 45.1	39 91	88.1	11 56.9	39 91	87.6	12 08.6	39 91	87.1	80
1	9 50.5	40 91	90.0	10 02.6	40 91	89.5	10 14.6	40 91	89.1	10 26.5	40 91	88.6	10 38.4	40 91	88.1	10 50.3	40 91	87.7	11 02.1	39 91	87.2	11 13.9	39 91	86.7	1
2	8 55.7	40 91	89.6	9 07.8	40 91	89.1	9 19.8	40 91	88.7	9 31.7	40 91	88.2	9 43.6	40 91	87.7	9 55.5	40 91	87.3	10 07.4	39 91	86.8	10 19.2	39 91	86.3	2
3	8 00.9	40 91	89.2	8 12.9	40 91	88.7	8 25.0	40 91	88.2	8 36.9	40 91	87.8	8 48.9	40 91	87.3	9 00.8	40 91	86.9	9 12.7	40 91	86.4	9 24.5	39 91	85.9	3
4	7 06.1	40 91	88.8	7 18.2	40 91	88.3	7 30.2	40 91	87.8	7 42.2	40 91	87.4	7 54.1	40 91	86.9	8 06.1	40 91	86.5	8 18.0	40 91	86.0	8 29.8	40 91	85.5	4
85	6 11.3	40 91	88.4	6 23.4	40 91	87.9	6 35.4	40 91	87.4	6 47.4	40 91	87.0	6 59.4	40 91	86.5	7 11.4	40 91	86.1	7 23.3	40 91	85.6	7 35.2	40 91	85.1	85
6	5 16.5	40 91	88.0	5 28.6	40 91	87.5	5 40.7	40 91	87.0	5 52.7	40 91	86.6	6 04.7	40 91	86.1	6 16.7	40 91	85.7	6 28.7	40 91	85.2	6 40.6	40 91	84.7	6
7													5 10.0	40 91	85.7	5 22.1	40 91	85.3	5 34.1	40 91	84.8	5 46.1	40 91	84.3	7

Lat. 24°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	62 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	59 00.0	1.0 02	180.0	58 30.0	1.0 02	180.0	00
1	61 59.0	1.0 05	177.9	61 29.0	1.0 05	177.9	60 59.0	1.0 05	177.9	60 29.0	1.0 05	178.0	59 59.0	1.0 05	178.0	59 29.1	1.0 05	178.0	58 59.1	1.0 05	178.1	58 29.1	1.0 04	178.1	1
2	61 55.9	1.0 08	175.8	61 26.0	1.0 08	175.8	60 56.1	1.0 08	175.9	60 26.1	1.0 06	176.0	59 56.2	1.0 08	176.0	59 26.3	1.0 08	176.1	58 56.3	1.0 08	176.2	58 26.4	1.0 08	176.2	2
3	61 50.9	99 12	173.6	61 21.0	1.0 12	173.8	60 51.2	1.0 11	173.9	60 21.3	1.0 11	174.0	59 51.5	1.0 11	174.0	59 21.6	1.0 11	174.1	58 51.7	1.0 11	174.2	58 21.8	1.0 10	174.3	3
4	61 43.8	99 15	171.5	61 14.1	99 15	171.7	60 44.3	99 14	171.8	60 14.6	99 14	172.0	59 44.8	99 14	172.1	59 15.1	99 14	172.2	58 45.3	99 14	172.3	58 15.5	99 14	172.4	4
05	61 34.8	99 18	169.5	61 05.2	99 18	169.6	60 35.6	99 18	169.8	60 06.0	99 18	170.0	59 36.4	99 17	170.1	59 06.7	99 17	170.3	58 37.1	99 17	170.4	58 07.4	99 16	170.6	05
6	61 23.8	98 22	167.4	60 54.4	98 21	167.6	60 25.0	98 21	167.8	59 55.5	98 20	168.0	59 26.1	98 20	168.2	58 56.6	98 20	168.4	58 27.1	98 20	168.6	57 57.6	98 19	168.7	6
7	61 10.9	97 25	165.4	60 41.7	97 24	165.6	60 12.5	97 24	165.9	59 43.2	98 23	166.1	59 14.0	98 23	166.3	58 44.7	98 23	166.5	58 15.4	98 22	166.7	57 46.0	98 22	166.9	7
8	60 56.2	97 28	163.4	60 27.2	97 27	163.7	59 58.2	97 27	163.9	59 29.2	97 26	164.2	59 00.1	97 26	164.4	58 31.0	97 26	164.6	58 01.9	97 25	164.9	57 32.8	97 25	165.1	8
9	60 39.6	96 30	161.4	60 10.9	96 30	161.7	59 42.1	96 30	162.0	59 13.3	96 29	162.3	58 44.5	96 29	162.6	58 15.7	96 28	162.8	57 46.8	96 28	163.1	57 17.9	96 28	163.3	9
10	60 21.3	95 33	159.5	59 52.8	95 33	159.8	59 24.3	95 32	160.1	58 55.8	95 32	160.4	58 27.3	95 32	160.7	57 58.6	95 31	161.0	57 30.0	96 31	161.3	57 01.3	96 30	161.6	10
1	60 01.2	94 36	157.6	59 33.1	94 36	158.0	59 04.9	94 35	158.3	58 36.6	94 34	158.6	58 08.4	94 34	158.9	57 40.0	95 34	159.2	57 11.6	95 33	159.5	56 43.2	95 33	159.8	1
2	59 39.5	93 39	155.8	59 11.7	93 38	156.1	58 43.8	93 38	156.5	58 15.9	93 37	156.8	57 47.9	93 37	157.2	57 19.8	94 36	157.5	56 51.7	94 36	157.8	56 23.5	94 35	158.1	2
3	59 16.2	92 41	154.0	58 48.7	92 41	154.3	58 21.2	92 40	154.7	57 53.5	92 40	155.1	57 25.8	92 39	155.4	56 58.1	93 39	155.8	56 30.3	93 38	156.1	56 02.4	93 38	156.5	3
4	58 51.4	90 44	152.2	58 24.2	91 43	152.6	57 57.0	91 43	153.0	57 29.7	91 42	153.4	57 02.3	91 42	153.8	56 34.9	92 41	154.1	56 07.4	92 40	154.5	55 39.8	92 40	154.8	4
15	58 25.1	89 46	150.5	57 58.3	90 46	150.9	57 31.4	90 45	151.3	57 04.4	90 44	151.7	56 37.4	90 44	152.1	56 10.2	91 43	152.5	55 43.1	91 43	152.9	55 15.8	91 42	153.2	15
6	57 57.4	88 48	148.8	57 30.9	88 48	149.2	57 04.4	89 47	149.7	56 37.8	89 47	150.1	56 11.0	89 46	150.5	55 44.3	89 46	150.9	55 17.4	90 45	151.3	54 50.4	90 44	151.7	6
7	57 28.3	87 51	147.2	57 02.2	87 50	147.6	56 36.0	87 49	148.1	56 09.8	88 49	148.5	55 43.4	88 48	148.9	55 16.9	88 48	149.3	54 50.4	89 47	149.7	54 23.8	89 46	150.1	7
8	56 57.9	86 53	145.6	56 32.2	86 52	146.0	56 06.4	86 52	146.5	55 40.5	87 51	146.9	55 14.5	87 50	147.4	54 48.4	87 50	147.8	54 22.2	87 49	148.2	53 55.9	88 48	148.6	8
9	56 26.3	84 55	144.0	56 01.0	85 54	144.5	55 35.5	85 53	145.0	55 10.0	85 53	145.4	54 44.3	86 52	145.9	54 18.6	86 52	146.3	53 52.7	86 51	146.8	53 26.8	87 50	147.2	9
20	55 53.6	83 56	142.5	55 28.6	83 56	143.0	55 03.5	84 55	143.5	54 38.3	84 55	144.0	54 13.0	85 54	144.4	53 47.6	85 54	144.9	53 22.1	85 53	145.3	52 56.5	86 52	145.8	20
1	55 19.7	82 58	141.1	54 55.1	82 58	141.6	54 30.3	83 57	142.1	54 05.5	83 56	142.5	53 40.6	83 56	143.0	53 15.5	84 55	143.5	52 50.3	84 55	143.9	52 25.1	84 54	144.4	1
2	54 44.7	81 60	139.7	54 20.5	81 60	140.2	53 56.1	81 59	140.7	53 31.6	82 58	141.1	53 07.1	82 58	141.6	52 42.4	83 57	142.1	52 17.5	83 56	142.6	51 52.6	83 56	143.0	2
3	54 08.7	79 62	138.3	53 44.8	80 61	138.8	53 20.9	80 60	139.3	52 56.8	81 60	139.8	52 32.5	81 59	140.3	52 08.2	81 59	140.8	51 43.7	82 58	141.2	51 19.1	82 57	141.7	3
4	53 31.8	78 63	137.0	53 08.3	79 62	137.5	52 44.6	79 62	138.0	52 20.9	79 61	138.5	51 57.0	80 61	139.0	51 33.0	80 60	139.5	51 08.9	81 60	139.9	50 44.7	81 59	140.4	4
25	52 53.9	77 64	135.7	52 30.8	77 64	136.2	52 07.5	78 63	136.7	51 44.1	78 63	137.2	51 20.6	79 62	137.7	50 56.9	79 62	138.2	50 33.2	79 61	138.7	50 09.3	80 60	139.2	25
6	52 15.2	76 66	134.4	51 52.4	76 65	134.9	51 29.5	77 65	135.5	51 06.4	77 64	136.0	50 43.3	77 64	136.5	50 20.0	78 63	137.0	49 56.6	78 62	137.5	49 33.0	79 62	137.9	6
7	51 35.6	74 67	133.2	51 13.2	75 67	133.7	50 50.6	75 66	134.3	50 27.9	76 66	134.8	50 05.1	76 65	135.3	49 42.2	77 64	135.8	49 19.1	77 64	136.3	48 55.9	78 63	136.8	7
8	50 55.2	73 68	132.0	50 33.2	74 68	132.6	50 11.0	74 67	133.1	49 48.6	75 67	133.6	49 26.2	75 66	134.1	49 03.5	76 66	134.6	48 40.8	76 65	135.1	48 17.9	76 64	135.6	8
9	50 14.2	72 70	130.9	49 52.4	73 69	131.4	49 30.6	73 68	131.9	49 08.6	74 68	132.5	48 46.4	74 68	133.0	48 24.1	74 67	133.5	48 01.7	75 66	134.0	47 39.2	75 66	134.5	9
30	49 32.4	71 71	129.8	49 11.0	72 70	130.3	48 49.5	72 70	130.8	48 27.8	72 69	131.4	48 06.0	73 69	131.9	47 44.0	73 68	132.4	47 21.9	74 68	132.9	46 59.7	74 67	133.4	30
1	48 49.9	70 72	128.7	48 28.9	70 71	129.2	48 07.7	71 71	129.8	47 46.3	71 70	130.3	47 24.8	72 70	130.8	47 03.2	72 69	131.3	46 41.4	73 69	131.8	46 19.5	73 68	132.3	1
2	48 06.8	69 73	127.6	47 46.1	69 72	128.2	47 25.2	70 72	128.7	47 04.2	70 71	129.2	46 43.0	71 71	129.8	46 21.7	71 70	130.3	46 00.2	72 70	130.8	45 38.6	72 69	131.3	2
3	47 23.1	68 74	126.6	47 02.7	68 73	127.2	46 42.1	69 73	127.7	46 21.4	69 72	128.2	46 00.5	70 72	128.8	45 39.5	70 71	129.3	45 18.4	71 71	129.8	44 57.1	71 70	130.3	3
4	46 38.9	67 75	125.7	46 18.7	67 74	126.2	45 58.5	68 74	126.7	45 38.1	68 73	127.2	45 17.5	69 73	127.8	44 56.8	69 72	128.3	44 36.0	70 72	128.8	44 15.0	70 71	129.3	4
35	45 54.1	66 76	124.7	45 34.2	66 75	125.2	45 14.3	67 74	125.8	44 54.2	67 74	126.3	44 33.9	68 74	126.8	44 13.5	68 73	127.3	43 53.0	69 73	127.8	43 32.3	69 72	128.3	35
6	45 08.7	65 76	123.8	44 49.2	65 76	124.3	44 29.5	66 75	124.8	44 09.7	66 75	125.4	43 49.7	67 74	125.9	43 29.6	67 74	126.4	43 09.4	68 74	126.9	42 49.0	68 73	127.4	6
7	44 22.9	64 77	122.9	44 03.7	64 77	123.4	43 44.3	65 76	123.9	43 24.8	65 76	124.4	43 05.1	66 75	125.0	42 45.3	66 75	125.5	42 25.3	67 74	126.0	42 05.2	67 74	126.5	7
8	43 36.7	63 78	122.0	43 17.7	63 78	122.5	42 58.6	64 77	123.0	42 39.3	64 76	123.6	42 19.9	65 76	124.1	42 00.4	65 76	124.6	41 40.7	66 75	125.1	41 20.9	66 75	125.6	8
9	42 49.9	62 78	121.1	42 31.2	63 78	121.7	42 12.4	63 78	122.2	41 53.4	64 77	122.7	41 34.3	64 77	123.2	41 15.0	64 76	123.7	40 55.6	65 76	124.2	40 36.1	65 76	124.7	9
40	42 02.8	61 79	120.3	41 44.4	62 79	120.8	41 25.8	62 78	121.3	41 07.1	63 78	121.9	40 48.2	63 78	122.4	40 29.2	64 77	122.9	40 10.1	64 77	123.4	39 50.8	64 76	123.9	40
1	41 15.3	60 80	119.5	40 57.1	61 79	120.0	40 38.8	61 79	120.5	40 20.3	62 78	121.0	40 01.7	62 78	121.6	39 43.0	63 78	122.1	39 24.1	63 77	122.6	39 05.1	64 77	123.1	1
2	40 27.4	60 80	118.7	40 09.5	60 80	119.2	39 51.4	61 80	119.7	39 33.2	61 79	120.2	39 14.8	61 79	120.8	38 56.3	62 78	121.3	38 37.7	62 78	121.8	38 19.0	63 78	122.3	2
3	39 39.1	59 81	117.9	39 21.4	59 80	118.4	39 03.6	60 80	119.0	38 45.6	60 80	119.5	38 27.5	61 80	120.0	38 09.3	61 79	120.5	37 50.9	61 79	121.0	37 32.4	62 78	121.5	3
4	38 50.5	58 82	117.2	38 33.1	58 81	117.7	38 15.5	59 81	118.2	37 57.7	59 80	118.7	37 39.9	60 80	119.2	37 21.9	60 80	119.7	37 03.7	61 79	120.2	36 45.5	61 79	120.7	4
45	38 01.6	57 82	116.4	37 44.4	58 82	117.0	37 27.0	58 81	117.5	37 09.5	59 81	118.0	36 51.8	59 81	118.5	36 34.1	59 80	119.0	36 16.2	60 80	119.5	35 58.2	60 80	120.0	45
6	37 12.4	57 82	115.7	36 55.3	57 82	116.2	36 38.2	57 82	116.7	36 20.9	58 82	117.3	36 03.5	58 81	117.8	35 46.0	59 81	118.3	35 28.3	59 80	118.8	35 10.5	59 80	119.2	6
7	36 22.8	56 83	115.0	36 06.0	56 83	115.5	35 49.1	57 82	116.0	35 32.0	57 82	116.5	35 14.8	58 82	117.0	34 57.5	58 81	117.5	34 40.1	58 81	118.0	34 22.5	59 80	118.5	7
8	35 33.0	55 84	114.3	35 16.4	56 83	114.8	34 59.7	56 83	115.4	34 42.9	56 82	115.9	34 25.9	57 82	116.4	34 08.8	57 82	116.9	33 51.6	58 81	117.3	33 34.2	58 81	117.8	8
9	34 43.0	54 84	113.7	34 26.6	55 84	114.2	34 10.0	55 83	114.7	33 53.4	56 83	115.2	33 36.6	56 82	115.7	33 19.7	56 82	116.2	33 02.7	57 82	116.7	32 45.6	57 82	117.2	9
50	33 52.6	54 84	113.0	33 36.4	54 84	113.5	33 20.1	55 84	114.0	33 03.6	55 83	114.5	32 47.1	55 83	115.0	32 30.4	56 83	115.5	32 13.6	56 82	116.0	31 56.7	57 82	116.5	50
1	33 02.1	53 85	112.4	32 46.0	54 84	112.9	32 29.9	54 84	113.4	32 13.6	54 84	113.9	31 57.3	55 84	114.4	31 40.8	55 83	114.9	31 24.2	56 83	115.3	31 07.5	56 82	115.8	1
2	32 11.3	53 85	111.7	31 55.4	53 85	112.2	31 39.5	53 84	112.7	31 23.4	54 84	113.2	31 07.2	54 84	113.7	30 50.9	54 84	114.2	30 34.5	55 83	114.7	30 18.0	55 83	115.2	2
3	31 20.2	52 85	111.1	31 04.6	52 85	111.6	30 48.8	53 85	112.1	30 32.9	53 84	112.6	30 16.9	54 84	113.1	30 00.8	54 84	113.6	29 44.6	54 84	114.1	29 28.3	55 83	114.6	3
4	30 29.0	51 86	110.5	30 13.5	52 85	111.0	29 57.9	52 85	111.5	29 42.2	53 85	112.0	29 26.4	53 85	112.5	29 10.5	53 84	113.0	28 54.5	54 84	113.5	28 38.3	54 84	113.9	4
55	29 37.6	51 86	109.9	29 22.3	51 86	110.4	29 06.8	52 86	110.9	28 51.3	52 85	111.4	28 35.6	52 85	111.9	28 19.9	53 85	112.4	28 04.1	53 84	112.9	27 48.1	53 84	113.3	55
6	28 46.0	50 86	109.4	28 30.8	51 86	109.9	28 15.5	51 86	110.3	28 00.2	51 86	110.8	27 44.7	52 85	111.3	27 29.1	52 85	111.8	27 13.4	52 85	112.3	26 57.7	53 84	112.8	6
7	27 54.1	50 87	108.8	27 39.1	50 86	109.3	27 24.0	51 86	109.8	27 08.8	51 86	110.3	26 53.5	51 86	110.7	26 38.1	52 85	111.2	26 22.6	52 85	111.7	26 07.0	52 85	112.2	7
8	27 02.2	49 87	108.2	26 47.3	50 87	108.7	26 32.4	50 86	109.2	26 17.3	50 86	109.7	26 02.2	51 86	110.2	25 46.9	51 86	110.7	25 31.6	51 85	111.1	25 16.2	52 85	111.6	8
9	26 10.0	49 87	107.7	25 55.3	49 87	108.2	25 40.5	50 87	108.7	25 25.6	50 86	109.1	25 10.6	50 86	109.6	24 55.5	50 86	110.1	24 40.4	51 86	110.6	24 25.1	51 86	111.0	9
60	25 17.7	48 87	107.2	25 03.2	49 87	107.6	24 48.5	49 87	108.1	24 33.8	49 87	108.6	24 18.9	50 86	109.1	24 04.0	50 86	109.5	23 49.0	50 86	110.0	23 33.8	51 86	110.5	60
1	24 25.3	48 88	106.6	24 10.9	48 88	107.1	23 56.3	49 87	107.6	23 41.7	49 87	108.1	23 27.0	49 87	108.5	23 12.2	49 86	109.0	22 57.4	50 86	109.5	22 42.4	50 86	110.0	1
2	23 32.7	48 88	106.1	23 18.4	48 88	106.6	23 04.0	48 88	107.1	22 49.5	48 87	107.5	22 35.0	49 87	108.0	22 20.3	49 87	108.5	22 05.6	49 86	108.9	21 50.8	49 86	109.4	2
3	22 40.0	47 88	105.6	22 25.8	47 88	106.1	22 11.5	48 88	106.5	21 57.2	48 88	107.0	21 42.8	48 87	107.5	21 28.3	48 87	108.0	21 13.7	49 87	108.4	20 59.0	49 86	108.9	3
4	21 47.1	47 88	105.1	21 33.0	47 88	105.6	21 18.9	47 88	106.0	21 04.7	48 88	106.5	20 50.4	48 88	107.0	20 36.0	48 87	107.4	20 21.6	48 87	107.9	20 07.1	49 87	108.4	4
65	20 54.1	46 88	104.6	20 40.2	47 88	105.1	20 26.2	47 88	105.5	20 12.1	47 88	106.0	19 57.9	47 88	106.5	19 43.7	48 88	106.9	19 29.4	48 87	107.4	19 15.0	48 87	107.9	65
6	20 01.0	46 89	104.1	19 47.2	46 88	104.6	19 33.3	46 88	105.0	19 19.3	47 88	105.5	19 05.3	47 88	106.0	18 51.2	47 88	106.4	18 37.0	47 88	106.9	18 22.7	48 87	107.4	6
7	19 07.8	46 89	103.6	18 54.1	46 89	104.1	18 40.3	46 88	104.5	18 26.4	46 88	105.0	18 12.5	47 88	105.5	17 58.5	47 88	105.9	17 44.5	47 88	106.4	17 30.4	47 88	106.9	7
8	18 14.5	45 89	103.1	18 00.9	45 89	103.6	17 47.2	46 89	104.1	17 33.4	46 88	104.5	17 19.6	46 88	105.0	17 05.8	46 88	105.5	16 51.8	47 88	105.9	16 37.8	47 88	106.4	8
9	17 21.0	45 89	102.7	17 07.5	45 89	103.1	16 54.0	45 89	103.6	16 40.3	46 89	104.1	16 26.6	46 88	104.5	16 12.9	46 88	105.0	15 59.1	46 88	105.4	15 45.2	46 88	105.9	9
70	16 27.5	45 89	102.2	16 14.1	45 89	102.7	16 00.6	45 89	103.1	15 47.1	45 89	103.6	15 33.5	45 89	104.0	15 19.9	46 88	104.5	15 06.2	46 88	105.0	14 52.4	46 88	105.4	70
1	15 33.9	44 90	101.7	15 20.6	44 90	102.2	15 07.2	45 89	102.7	14 53.8	45 89	103.1	14 40.3	45 89	103.6	14 26.8	45 89	104.0	14 13.2	45 88	104.5	13 59.5	46 88	105.0	1
2	14 40.2	44 90	101.3	14 26.9	44 90	101.7	14 13.7	44 89	102.2	14 00.3	45 89	102.7	13 47.0	45 89	103.1	13 33.5	45 89	103.6	13 20.0	45 89	104.0	13 06.5	45 88	104.5	2
3	13 46.4	44 90	100.8	13 33.2	44 90	101.3	13 20.0	44 90	101.7	13 06.8	44 89	102.2	12 53.5	44 89	102.7	12 40.2	45 89	103.1	12 26.8	45 89	103.6	12 13.4	45 89	104.0	3
4	12 52.5	43 90	100.4	12 39.4	44 90	100.8	12 26.3	44 90	101.3	12 13.2	44 90	101.8	12 00.0	44 89	102.2	11 46.8	44 89	102.7	11 33.5	44 89	103.1	11 20.2	44 89	103.6	4
75	11 58.5	43 90	99.9	11 45.6	43 90	100.4	11 32.5	43 90	100.9	11 19.5	44 90	101.3	11 06.4	44 90	101.8	10 53.2	44 89	102.2	10 40.1	44 89	102.7	10 26.8	44 89	103.1	75
6	11 04.5	43 90	99.5	10 51.6	43 90	100.0	10 38.7	43 90	100.4	10 25.7	43 90	100.9	10 12.7	43 90	101.3	9 59.6	44 90	101.8	9 46.5	44 89	102.2	9 33.4	44 89	102.7	6
7	10 10.4	43 90	99.1	9 57.6	43 90	99.5	9 44.7	43 90	100.0	9 31.8	43 90	100.4	9 18.9	43 90	100.9	9 05.9	43 90	101.3	8 52.9	43 90	101.8	8 39.9	43 89	102.3	7
8	9 16.3	42 90	98.6	9 03.5	43 90	99.1	8 50.7	43 90	99.5	8 37.9	43 90	100.0	8 25.0	43 90	100.5	8 12.1	43 90	100.9	7 59.2	43 90	101.4	7 46.3	43 90	101.8	8
9	8 22.0	42 90	98.2	8 09.3	42 90	98.7	7 56.6	42 90	99.1	7 43.9	43 90	99.6	7 31.1	43 90	100.0	7 18.3	43 90	100.5	7 05.5	43 90	100.9	6 52.6	43 90	101.4	9
80	7 27.7	42 90	97.8	7 15.1	42 90	98.2	7 02.5	42 90	98.7	6 49.8	42 90	99.1	6 37.1	42 90	99.6	6 24.4	42 90	100.1	6 11.6	43 90	100.5	5 58.8	43 90	101.0	80
1	6 33.4	42 91	97.4	6 20.8	42 90	97.8	6 08.3	42 90	98.3	5 55.6	42 90	98.7	5 43.0	42 90	99.2	5 30.4	42 90	99.6	5 17.7	42 90	100.1	5 05.0	42 90	100.5	1
2	5 39.0	42 91	96.9	5 26.5	42 90	97.4	5 14.0	42 90	97.9	5 01.4	42 90	98.3													2

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 24°

H.A	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	77 00.0	1.0 04	180.0	77 30.0	1.0 04	180.0	00
1	73 58.3	1.0 08	176.4	74 28.2	1.0 09	176.3	74 58.2	1.0 09	176.2	75 28.1	1.0 09	176.1	75 58.1	1.0 10	175.9	76 28.0	1.0 10	175.8	76 57.9	1.0 10	175.6	77 27.8	1.0 11	175.5	1
2	73 53.2	99 14	172.8	74 23.0	99 15	172.6	74 52.7	99 15	172.4	75 22.5	99 16	172.2	75 52.2	99 16	171.9	76 22.0	99 16	171.6	76 51.7	99 17	171.3	77 21.4	99 18	171.0	2
3	73 44.7	99 20	169.3	74 14.2	98 20	169.0	74 43.7	98 21	168.7	75 13.2	98 21	168.3	75 42.6	98 22	167.9	76 12.1	98 23	167.5	76 41.4	98 24	167.1	77 10.8	98 24	166.6	3
4	73 32.9	97 25	165.9	74 02.1	97 26	165.5	74 31.3	97 26	165.0	75 00.4	97 27	164.6	75 29.4	97 28	164.1	75 58.4	96 29	163.6	76 27.3	96 30	163.0	76 56.1	96 31	162.4	4
05	73 18.0	96 30	162.5	73 46.8	96 31	162.0	74 15.5	96 32	161.5	74 44.1	95 32	160.9	75 12.7	95 33	160.4	75 41.1	95 34	159.7	76 09.5	94 36	159.0	76 37.7	94 37	158.3	05
6	73 00.0	95 35	159.3	73 28.3	94 36	158.7	73 56.5	94 36	158.1	74 24.6	93 38	157.4	74 52.6	93 38	156.8	75 20.5	93 40	156.0	75 48.2	92 41	155.3	76 15.7	92 42	154.4	6
7	72 39.2	93 39	156.1	73 07.0	92 40	155.5	73 34.6	92 41	154.8	74 02.1	91 42	154.1	74 29.5	91 43	153.3	74 56.7	90 44	152.5	75 23.7	90 46	151.7	75 50.5	89 47	150.8	7
8	72 15.7	91 43	153.1	72 42.9	90 44	152.4	73 09.9	90 46	151.7	73 36.8	89 46	150.9	74 03.5	89 48	150.1	74 30.0	88 49	149.2	74 56.2	87 50	148.3	75 22.3	86 52	147.3	8
9	71 49.7	89 47	150.2	72 16.3	88 48	149.5	72 42.6	88 49	148.7	73 08.9	87 51	147.8	73 34.8	86 52	147.0	74 00.6	85 53	146.1	74 26.1	85 54	145.1	74 51.4	84 56	144.1	9
10	71 21.3	87 51	147.5	71 47.2	86 52	146.7	72 13.0	85 53	145.8	72 38.5	85 54	145.0	73 03.8	84 55	144.1	73 28.8	83 56	143.1	73 53.6	82 58	142.1	74 18.1	81 59	141.0	10
1	70 50.8	85 54	144.8	71 16.1	84 55	144.0	71 41.2	83 56	143.1	72 06.0	82 58	142.2	72 30.6	81 59	141.3	72 54.9	81 60	140.3	73 18.9	79 61	139.3	73 42.5	78 62	138.2	1
2	70 18.2	83 57	142.3	70 42.9	82 58	141.5	71 07.3	81 60	140.6	71 31.5	80 61	139.7	71 55.3	79 62	138.7	72 18.9	78 63	137.7	72 42.2	77 64	136.7	73 05.1	76 66	135.6	2
3	69 43.8	81 60	140.0	70 07.9	80 61	139.1	70 31.6	79 62	138.2	70 55.1	78 63	137.3	71 18.3	77 64	136.3	71 41.2	76 66	135.3	72 03.7	74 67	134.2	72 25.8	73 68	133.1	3
4	69 07.8	78 63	137.7	69 31.2	78 64	136.9	69 54.3	77 65	135.9	70 17.1	76 66	135.0	70 39.6	74 67	134.0	71 01.8	73 68	133.0	71 23.6	72 69	131.9	71 45.1	71 70	130.8	4
15	68 30.2	76 65	135.6	68 53.0	75 66	134.7	69 15.4	74 67	133.8	69 37.6	73 68	132.8	69 59.5	72 69	131.8	70 21.0	71 70	130.8	70 42.1	70 71	129.8	71 02.9	69 72	128.7	15
6	67 51.2	74 67	133.6	68 13.3	73 68	132.7	68 35.2	72 69	131.8	68 56.8	71 70	130.8	69 18.0	70 71	129.8	69 38.9	69 72	128.8	69 59.4	68 73	127.7	70 19.5	66 74	126.7	6
7	67 10.8	72 69	131.7	67 32.4	71 70	130.8	67 53.7	70 71	129.9	68 14.7	69 72	128.9	68 35.3	68 73	127.9	68 55.6	67 74	126.9	69 15.5	66 75	125.9	69 35.0	64 76	124.8	7
8	66 29.4	71 71	129.9	66 50.4	70 72	129.0	67 11.1	69 73	128.1	67 31.5	67 74	127.1	67 51.6	66 74	126.1	68 11.3	65 76	125.1	68 30.6	64 76	124.1	68 49.5	62 77	123.0	8
9	65 46.8	69 73	128.2	66 07.3	68 74	127.3	66 27.5	67 74	126.4	66 47.3	66 75	125.4	67 06.8	64 76	124.5	67 26.0	63 77	123.5	67 44.8	62 78	122.4	68 03.1	61 78	121.4	9
20	65 03.2	67 74	126.6	65 23.2	66 75	125.7	65 42.9	65 76	124.8	66 02.2	64 76	123.8	66 21.2	63 77	122.9	66 39.8	61 78	121.9	66 58.1	60 79	120.9	67 16.0	59 80	119.9	20
1	64 18.8	66 76	125.0	64 38.3	64 76	124.2	64 57.5	63 77	123.3	65 16.3	62 78	122.3	65 34.8	61 78	121.4	65 52.9	60 79	120.4	66 10.7	59 80	119.4	66 28.1	57 81	118.4	1
2	63 33.5	64 77	123.6	63 52.5	63 77	122.7	64 11.3	62 78	121.8	64 29.6	61 79	120.9	64 47.7	60 80	120.0	65 05.3	58 80	119.0	65 22.6	57 81	118.0	65 39.6	56 82	117.0	2
3	62 47.5	62 78	122.2	63 06.1	61 79	121.3	63 24.3	60 79	120.5	63 42.3	59 80	119.6	63 59.9	58 81	118.6	64 17.1	57 81	117.7	64 34.0	56 82	116.7	64 50.5	54 83	115.8	3
4	62 00.8	61 79	120.9	62 18.9	60 80	120.0	62 36.8	59 80	119.2	62 54.3	58 81	118.3	63 11.5	57 82	117.4	63 28.3	55 82	116.4	63 44.8	54 83	115.5	64 00.8	53 83	114.5	4
25	61 13.4	60 80	119.6	61 31.2	59 81	118.8	61 48.6	58 81	117.9	62 05.7	57 82	117.0	62 22.5	55 82	116.2	62 39.0	54 83	115.2	62 55.0	53 84	114.3	63 10.8	52 84	113.4	25
6	60 25.5	58 81	118.4	60 42.8	57 81	117.6	60 59.9	56 82	116.7	61 16.7	55 83	115.9	61 33.1	54 83	115.0	61 49.2	53 84	114.1	62 04.9	52 84	113.2	62 20.2	51 85	112.3	6
7	59 37.0	57 82	117.3	59 54.0	56 82	116.5	60 10.7	55 83	115.6	60 27.1	54 83	114.8	60 43.2	53 84	113.9	60 58.9	52 84	113.0	61 14.3	51 85	112.2	61 29.3	49 85	111.2	7
8	58 48.0	56 82	116.2	59 04.7	55 83	115.4	59 21.1	54 84	114.5	59 37.1	53 84	113.7	59 52.9	52 84	112.9	60 08.3	51 85	112.0	60 23.4	50 86	111.1	60 38.1	48 86	110.3	8
9	57 58.6	55 83	115.1	58 15.0	54 84	114.3	58 31.0	53 84	113.5	58 46.8	52 85	112.7	59 02.2	51 85	111.9	59 17.3	50 86	111.0	59 32.1	49 86	110.2	59 46.5	48 86	109.3	9
30	57 08.8	54 84	114.1	57 24.8	53 84	113.3	57 40.6	52 85	112.5	57 56.0	51 85	111.7	58 11.2	50 86	110.9	58 26.0	49 86	110.1	58 40.5	48 86	109.3	58 54.6	47 87	108.4	30
1	56 18.6	53 84	113.2	56 34.3	52 85	112.4	56 49.8	51 85	111.6	57 04.9	50 86	110.8	57 19.8	49 86	110.0	57 34.4	48 86	109.2	57 48.6	47 87	108.4	58 02.5	46 87	107.5	1
2	55 28.0	52 85	112.2	55 43.5	51 85	111.5	55 58.7	50 86	110.7	56 13.6	49 86	109.9	56 28.2	48 86	109.1	56 42.5	47 87	108.3	56 56.4	46 87	107.5	57 10.1	45 88	106.7	2
3	54 37.1	51 85	111.3	54 52.3	50 86	110.6	55 07.2	49 86	109.8	55 21.9	48 86	109.1	55 36.2	47 87	108.3	55 50.3	46 87	107.5	56 04.1	45 88	106.7	56 17.5	44 88	105.9	3
4	53 45.9	50 86	110.5	54 00.9	49 86	109.7	54 15.5	48 86	109.0	54 30.0	48 87	108.2	54 44.1	47 87	107.5	54 57.9	46 88	106.7	55 11.4	45 88	105.9	55 24.7	44 88	105.1	4
35	52 54.4	50 86	109.6	53 09.1	49 86	108.9	53 23.6	48 87	108.2	53 37.8	47 87	107.5	53 51.7	46 88	106.7	54 05.3	45 88	105.9	54 18.6	44 88	105.2	54 31.7	43 89	104.4	35
6	52 02.7	49 87	108.9	52 17.2	48 87	108.1	52 31.4	47 87	107.4	52 45.4	46 88	106.7	52 59.1	45 88	105.9	53 12.5	44 88	105.2	53 25.7	43 89	104.5	53 38.5	42 89	103.7	6
7	51 10.7	48 87	108.1	51 25.0	47 88	107.4	51 39.0	46 88	106.7	51 52.8	45 88	105.9	52 06.3	45 88	105.2	52 19.5	44 88	104.5	52 32.5	43 89	103.7	52 45.2	42 89	103.0	7
8	50 18.5	47 87	107.3	50 32.5	47 88	106.6	50 46.4	46 88	105.9	51 00.0	45 88	105.2	51 13.3	44 89	104.5	51 26.4	43 89	103.8	51 39.2	42 89	103.1	51 51.7	41 89	102.3	8
9	49 26.0	47 88	106.6	49 39.9	46 88	105.9	49 53.6	45 88	105.2	50 07.0	44 88	104.5	50 20.2	43 89	103.8	50 33.1	43 89	103.1	50 45.7	42 89	102.4	50 58.1	41 90	101.7	9
40	48 33.4	46 88	105.9	48 47.1	45 88	105.2	49 00.6	45 88	104.6	49 13.9	44 89	103.9	49 26.9	43 89	103.2	49 39.6	42 89	102.5	49 52.1	41 90	101.8	50 04.4	40 90	101.1	40
1	47 40.6	46 88	105.2	47 54.2	45 89	104.6	48 07.5	44 89	103.9	48 20.6	43 89	103.2	48 33.4	42 89	102.5	48 46.0	42 90	101.8	48 58.4	41 90	101.2	49 10.5	40 90	100.5	1
2	46 47.6	45 88	104.6	47 01.0	44 89	103.9	47 14.2	44 89	103.3	47 27.1	43 89	102.6	47 39.9	42 90	101.9	47 52.3	41 90	101.2	48 04.6	40 90	100.6	48 16.6	40 90	99.9	2
3	45 54.5	45 89	103.9	46 07.8	44 89	103.3	46 20.8	43 89	102.6	46 33.6	42 90	102.0	46 46.2	42 90	101.3	46 58.5	41 90	100.6	47 10.6	40 90	100.0	47 22.5	39 90	99.3	3
4	45 01.2	44 89	103.3	45 14.3	43 89	102.7	45 27.2	43 90	102.0	45 39.9	42 90	101.4	45 52.4	41 90	100.7	46 04.6	40 90	100.1	46 16.6	40 90	99.4	46 28.4	39 90	98.7	4
45	44 07.8	44 89	102.7	44 20.8	43 90	102.1	44 33.6	42 90	101.4	44 46.1	41 90	100.8	44 58.5	41 90	100.1	45 10.6	40 90	99.5	45 22.5	39 90	98.8	45 34.2	39 90	98.2	45
6	43 14.3	43 90	102.1	43 27.1	42 90	101.5	43 39.8	42 90	100.8	43 52.2	41 90	100.2	44 04.5	40 90	99.6	44 16.5	40 90	98.9	44 28.3	39 90	98.3	44 39.9	38 91	97.7	6
7	42 20.6	43 90	101.5	42 33.4	42 90	100.9	42 45.9	41 90	100.3	42 58.2	41 90	99.7	43 10.4	40 90	99.0	43 22.3	39 90	98.4	43 34.0	39 90	97.8	43 45.5	38 91	97.1	7
8	41 26.9	42 90	101.0	41 39.5	42 90	100.3	41 51.9	41 90	99.7	42 04.2	40 90	99.1	42 16.2	40 90	98.5	42 28.0	39 90	97.9	42 39.7	38 91	97.3	42 51.1	38 91	96.6	8
9	40 33.0	42 90	100.4	40 45.5	41 90	99.8	40 57.9	41 90	99.2	41 10.0	40 90	98.6	41 21.9	40 90	98.0	41 33.7	39 91	97.4	41 45.3	38 91	96.7	41 56.6	38 91	96.1	9
50	39 39.1	42 90	99.9	39 51.5	41 90	99.3	40 03.7	40 90	98.7	40 15.8	40 90	98.1	40 27.6	39 91	97.5	40 39.3	39 91	96.9	40 50.8	38 91	96.2	41 02.1	37 91	95.6	50
1	38 45.0	41 90	99.3	38 57.3	41 90	98.7	39 09.5	40 90	98.1	39 21.5	40 91	97.6	39 33.3	39 91	97.0	39 44.9	38 91	96.4	39 56.3	38 91	95.8	40 07.5	37 91	95.2	1
2	37 50.9	41 90	98.8	38 03.1	41 90	98.2	38 15.2	40 91	97.6	38 27.1	39 91	97.1	38 38.8	39 91	96.5	38 50.4	38 91	95.9	39 01.7	38 91	95.3	39 12.9	37 91	94.7	2
3	36 56.7	41 90	98.3	37 08.8	40 90	97.7	37 20.8	40 91	97.1	37 32.7	39 91	96.6	37 44.3	39 91	96.0	37 55.8	38 91	95.4	38 07.1	37 91	94.8	38 18.3	37 91	94.2	3
4	36 02.4	41 90	97.8	36 14.5	40 91	97.2	36 26.4	40 91	96.7	36 38.2	39 91	96.1	36 49.8	38 91	95.5	37 01.2	38 91	94.9	37 12.5	37 91	94.3	37 23.6	37 91	93.8	4
55	35 08.1	40 91	97.3	35 20.1	40 91	96.7	35 31.9	39 91	96.2	35 43.7	39 91	95.6	35 55.2	38 91	95.0	36 06.6	38 91	94.5	36 17.8	37 91	93.9	36 28.9	37 91	93.3	55
6	34 13.7	40 91	96.8	34 25.6	40 91	96.3	34 37.4	39 91	95.7	34 49.1	39 91	95.1	35 00.6	38 91	94.6	35 11.9	38 91	94.0	35 23.1	37 91	93.4	35 34.1	36 91	92.9	6
7	33 19.2	40 91	96.3	33 31.1	39 91	95.8	33 42.9	39 91	95.2	33 54.5	38 91	94.7	34 05.9	38 91	94.1	34 17.2	37 91	93.6	34 28.4	37 91	93.0	34 39.4	36 91	92.4	7
8	32 24.7	40 91	95.9	32 36.6	39 91	95.3	32 48.3	39 91	94.8	32 59.8	38 91	94.2	33 11.2	38 91	93.7	33 22.5	37 91	93.1	33 33.6	37 91	92.6	33 44.6	36 91	92.0	8
9	31 30.2	40 91	95.4	31 42.0	39 91	94.9	31 53.6	39 91	94.3	32 05.1	38 91	93.8	32 16.5	38 91	93.2	32 27.8	37 91	92.7	32 38.9	37 91	92.1	32 49.8	36 91	91.6	9
60	30 35.6	39 91	94.9	30 47.3	39 91	94.4	30 59.0	39 91	93.9	31 10.4	38 91	93.3	31 21.8	38 91	92.8	31 33.0	37 91	92.3	31 44.1	37 91	91.7	31 55.0	36 91	91.2	60
1	29 40.9	39 91	94.5	29 52.7	39 91	94.0	30 04.3	38 91	93.4	30 15.7	38 91	92.9	30 27.0	38 91	92.4	30 38.2	37 91	91.8	30 49.3	37 91	91.3	31 00.2	36 91	90.7	1
2	28 46.3	39 91	94.1	28 58.0	39 91	93.5	29 09.5	38 91	93.0	29 21.0	38 91	92.5	29 32.3	37 91	91.9	29 43.4	37 91	91.4	29 54.5	37 91	90.9	30 05.4	36 91	90.3	2
3	27 51.6	39 91	93.6	28 03.2	39 91	93.1	28 14.8	38 91	92.6	28 26.2	38 91	92.0	28 37.5	37 91	91.5	28 48.6	37 91	91.0	28 59.7	37 91	90.5	29 10.6	36 91	89.9	3
4	26 56.9	39 91	93.2	27 08.5	39 91	92.7	27 20.0	38 91	92.1	27 31.4	38 91	91.6	27 42.7	37 91	91.1	27 53.8	37 91	90.6	28 04.9	37 91	90.0	28 15.8	36 91	89.5	4
65	26 02.1	39 91	92.7	26 13.7	38 91	92.2	26 25.2	38 91	91.7	26 36.6	38 91	91.2	26 47.9	37 91	90.7	26 59.0	37 91	90.2	27 10.1	37 91	89.6	27 21.0	36 91	89.1	65
6	25 07.4	39 91	92.3	25 19.0	38 91	91.8	25 30.4	38 91	91.3	25 41.8	38 91	90.8	25 53.1	37 91	90.3	26 04.2	37 91	89.8	26 15.3	37 91	89.2	26 26.2	36 91	88.7	6
7	24 12.6	39 91	91.9	24 24.2	38 91	91.4	24 35.6	38 91	90.9	24 47.0	38 91	90.4	24 58.2	37 91	89.9	25 09.4	37 91	89.4	25 20.4	37 91	88.8	25 31.4	36 91	88.3	7
8	23 17.8	39 91	91.5	23 29.4	38 91	91.0	23 40.8	38 91	90.5	23 52.2	38 91	90.0	24 03.4	37 91	89.5	24 14.6	37 91	89.0	24 25.6	37 91	88.4	24 36.6	36 91	87.9	8
9	22 23.0	39 91	91.1	22 34.6	38 91	90.6	22 46.0	38 91	90.1	22 57.4	38 91	89.6	23 08.6	37 91	89.1	23 19.8	37 91	88.6	23 30.9	37 91	88.0	23 41.8	36 91	87.5	9
70	21 28.2	39 91	90.7	21 39.8	38 91	90.2	21 51.2	38 91	89.7	22 02.6	38 91	89.2	22 13.8	37 91	88.7	22 25.0	37 91	88.2	22 36.1	37 91	87.7	22 47.1	36 91	87.2	70
1	20 33.4	39 91	90.2	20 44.9	38 91	89.8	20 56.4	38 91	89.3	21 07.8	38 91	88.8	21 19.0	37 91	88.3	21 30.2	37 91	87.8	21 41.3	37 91	87.3	21 52.3	37 91	86.8	1
2	19 38.6	39 91	89.8	19 50.1	38 91	89.3	20 01.6	38 91	88.9	20 13.0	38 91	88.4	20 24.3	38 91	87.9	20 35.5	37 91	87.4	20 46.6	37 91	86.9	20 57.6	37 91	86.4	2
3	18 43.8	39 91	89.4	18 55.3	38 91	88.9	19 06.8	38 91	88.5	19 18.2	38 91	88.0	19 29.5	38 91	87.5	19 40.7	37 91	87.0	19 51.9	37 91	86.5	20 02.9	37 91	86.0	3
4	17 49.0	39 91	89.0	18 00.5	38 91	88.5	18 12.0	38 91	88.1	18 23.4	38 91	87.6	18 34.7	38 91	87.1	18 46.0	37 91	86.6	18 57.2	37 91	86.1	19 08.3	37 91	85.6	4
75	16 54.2	39 91	88.6	17 05.7	38 91	88.1	17 17.2	38 91	87.7	17 28.6	38 91	87.2	17 40.0	38 91	86.7	17 51.3	37 91	86.2	18 02.5	37 91	85.7	18 13.6	37 91	85.2	75
6	15 59.4	39 91	88.2	16 10.9	39 91	87.7	16 22.5	38 91	87.3	16 33.9	38 91	86.8	16 45.3	38 91	86.3	16 56.6	38 91	85.8	17 07.9	37 91	85.3	17 19.0	37 91	84.8	6
7	15 04.6	39 91	87.8	15 16.2	39 91	87.4	15 27.7	38 91	86.9	15 39.2	38 91	86.4	15 50.6	38 91	85.9	16 02.0	38 91	85.4	16 13.2	37 91	85.0	16 24.5	37 91	84.5	7
8	14 09.8	39 91	87.4	14 21.4	39 91	87.0	14 33.0	38 91	86.5	14 44.5	38 91	86.0	14 55.9	38 91	85.5	15 07.3	38 91	85.0	15 18.7	38 91	84.6	15 29.9	37 91	84.1	8
9	13 15.1	39 91	87.0	13 26.7	39 91	86.6	13 38.3	39 91	86.1	13 49.8	38 91	85.6	14 01.3	38 91	85.1	14 12.7	38 91	84.7	14 24.1	38 91	84.2	14 35.4	38 91	83.7	9
80	12 20.4	39 91	86.6	12 32.0	39 91	86.2	12 43.6	39 91	85.7	12 55.2	38 91	85.2	13 06.7	38 91	84.8	13 18.2	38 91	84.3	13 29.6	38 91	83.8	13 40.9	38 91	83.3	80
1	11 25.6	39 91	86.2	11 37.3	39 91	85.8	11 49.0	39 91	85.3	12 00.6	39 91	84.8	12 12.2	38 91	84.4	12 23.7	38 91	83.9	12 35.1	38 91	83.4	12 46.5	38 91	82.9	1
2	10 31.0	39 91	85.9	10 42.7	39 91	85.4	10 54.4	39 91	84.9	11 06.0	39 91	84.4	11 17.6	39 91	84.0	11 29.2	38 91	83.5	11 40.7	38 91	83.0	11 52.1	38 90	82.6	2
3	9 36.3	39 91	85.5	9 48.1	39 91	85.0	9 59.8	39 91	84.5	10 11.5	39 91	84.1	10 23.1	39 91	83.6	10 34.7	39 91	83.1	10 46.3	38 90	82.7	10 57.8	38 90	82.2	3
4	8 41.7	39 91	85.1	8 53.5	39 91	84.6	9 05.3	39 91	84.1	9 17.0	39 91	83.7	9 28.7	39 91	83.2	9 40.3	39 90	82.7	9 52.0	39 90	82.3	10 03.5	39 90	81.8	4
85	7 47.1	40 91	84.7	7 58.9	39 91	84.2	8 10.7	39 91	83.7	8 22.5	39 91	83.3	8 34.3	39 91	82.8	8 46.0	39 90	82.3	8 57.7	39 90	81.9	9 09.3	39 90	81.4	85
6	6 52.5	40 91	84.3	7 04.4	40 91	83.8	7 16.3	39 91	83.3	7 28.1	39 91	82.9	7 39.9	39 90	82.4	7 51.7	39 90	82.0	8 03.4	39 90	81.5	8 15.2	39 90	81.0	6
7	5 58.0	40 91	83.9	6 09.9	40 91	83.4	6 21.9	40 91	83.0	6 33.7	40 90	82.5	6 45.6	40 90	82.0	6 57.4	39 90	81.6	7 09.3	39 90	81.1	7 21.0	39 90	80.6	7
8	5 03.5	40 91	83.5	5 15.5	40 91	83.0	5 27.5	40 90	82.6	5 39.4	40 90	82.1	5 51.4	40 90	81.6	6 03.3	40 90	81.2	6 15.1	40 90	80.7	6 27.0	39 90	80.3	8
9																5 09.1	40 90	80.8	5 21.1	40 90	80.3	5 33.0	40 90	79.9	9

Lat. 24°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	58 00.0	1.0 02	180.0	57 30.0	1.0 02	180.0	57 00.0	1.0 02	180.0	56 30.0	1.0 02	180.0	56 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	00
1	57 59.1	1.0 04	178.1	57 29.1	1.0 04	178.2	56 59.1	1.0 04	178.2	56 29.1	1.0 04	178.2	55 59.2	1.0 04	178.2	55 29.2	1.0 04	178.3	54 59.2	1.0 04	178.3	54 29.2	1.0 04	178.3	1
2	57 56.4	1.0 08	176.3	57 26.5	1.0 07	176.3	56 56.5	1.0 07	176.4	56 26.6	1.0 07	176.4	55 56.6	1.0 07	176.5	55 26.7	1.0 07	176.5	54 56.7	1.0 07	176.6	54 26.8	1.0 07	176.6	2
3	57 52.0	1.0 10	174.4	57 22.1	1.0 10	174.5	56 52.2	1.0 10	174.6	56 22.3	1.0 10	174.7	55 52.4	1.0 10	174.7	55 22.5	1.0 10	174.8	54 52.6	1.0 10	174.9	54 22.7	1.0 09	175.0	3
4	57 45.8	99 13	172.6	57 16.0	99 13	172.7	56 46.2	99 13	172.8	56 16.4	99 13	172.9	55 46.6	99 12	173.0	55 16.8	99 12	173.1	54 46.9	99 12	173.2	54 17.1	99 12	173.3	4
05	57 37.8	99 16	170.7	57 08.1	99 16	170.9	56 38.4	99 16	171.0	56 08.7	99 15	171.1	55 39.0	99 15	171.3	55 09.3	99 15	171.4	54 39.6	99 15	171.5	54 09.9	99 15	171.6	05
6	57 28.1	98 19	168.9	56 58.6	98 19	169.1	56 29.0	98 18	169.2	55 59.5	99 18	169.4	55 29.9	99 18	169.5	55 00.3	99 18	169.7	54 30.7	99 18	169.8	54 01.1	99 17	170.0	6
7	57 16.7	98 22	167.1	56 47.3	98 22	167.3	56 17.9	98 21	167.5	55 48.5	98 21	167.6	55 19.1	98 21	167.8	54 49.7	98 20	168.0	54 20.3	98 20	168.2	53 50.8	98 20	168.3	7
8	57 03.6	97 24	165.3	56 34.4	97 24	165.5	56 05.2	97 24	165.7	55 36.0	97 24	165.9	55 06.8	97 23	166.1	54 37.5	98 23	166.3	54 08.2	98 22	166.5	53 39.0	98 22	166.7	8
9	56 48.9	97 27	163.6	56 19.9	97 27	163.8	55 50.9	97 26	164.0	55 21.9	97 26	164.2	54 52.9	97 26	164.5	54 23.8	97 25	164.7	53 54.7	97 25	164.9	53 25.6	97 25	165.1	9
10	56 32.6	96 30	161.8	56 03.9	96 30	162.1	55 35.1	96 29	162.3	55 06.3	96 29	162.6	54 37.4	96 28	162.8	54 08.6	96 28	163.1	53 39.7	96 28	163.3	53 10.8	96 27	163.5	10
1	56 14.7	95 32	160.1	55 46.2	95 32	160.4	55 17.7	95 32	160.7	54 49.1	95 31	160.9	54 20.5	95 31	161.2	53 51.9	96 30	161.4	53 23.2	96 30	161.7	52 54.5	96 30	161.9	1
2	55 55.3	94 35	158.4	55 27.1	94 34	158.7	54 58.8	94 34	159.0	54 30.5	94 34	159.3	54 02.1	95 33	159.6	53 33.7	95 33	159.9	53 05.3	95 32	160.1	52 36.8	95 32	160.4	2
3	55 34.5	93 37	156.8	55 06.5	93 37	157.1	54 38.5	93 36	157.4	54 10.4	94 36	157.7	53 42.3	94 35	158.0	53 14.1	94 35	158.3	52 45.9	94 34	158.6	52 17.7	94 34	158.9	3
4	55 12.2	92 40	155.2	54 44.5	92 39	155.5	54 16.7	93 38	155.8	53 48.9	93 38	156.2	53 21.1	93 38	156.5	52 53.2	93 37	156.8	52 25.3	93 37	157.1	51 57.3	93 36	157.4	4
15	54 48.5	91 42	153.6	54 21.1	91 41	153.9	53 53.6	92 41	154.3	53 26.1	92 40	154.6	52 58.6	92 40	155.0	52 30.9	92 39	155.3	52 03.3	92 39	155.6	51 35.6	92 38	155.9	15
6	54 23.4	90 44	152.0	53 56.3	90 43	152.4	53 29.2	91 43	152.8	53 02.0	91 42	153.1	52 34.7	91 42	153.5	52 07.4	91 41	153.8	51 40.0	91 41	154.1	51 12.5	92 40	154.5	6
7	53 57.1	89 46	150.5	53 30.3	89 45	150.9	53 03.5	90 45	151.3	52 36.6	90 44	151.6	52 09.6	90 44	152.0	51 42.6	90 44	152.4	51 15.5	90 43	152.7	50 48.3	91 42	153.0	7
8	53 29.5	88 48	149.0	53 03.1	88 48	149.4	52 36.5	89 47	149.8	52 09.9	89 46	150.2	51 43.3	89 46	150.6	51 16.5	89 45	150.9	50 49.7	89 45	151.3	50 22.9	90 44	151.6	8
9	53 00.7	87 50	147.6	52 34.6	87 49	148.0	52 08.4	87 49	148.4	51 42.1	88 48	148.8	51 15.8	88 48	149.2	50 49.3	88 47	149.6	50 22.8	88 47	149.9	49 56.3	89 46	150.3	9
20	52 30.8	86 52	146.2	52 05.0	86 51	146.6	51 39.1	86 51	147.0	51 13.2	87 50	147.4	50 47.1	87 50	147.8	50 21.0	87 49	148.2	49 54.8	87 48	148.6	49 28.5	88 48	148.9	20
1	51 59.7	85 54	144.8	51 34.3	85 53	145.2	51 08.7	85 52	145.7	50 43.1	86 52	146.1	50 17.4	86 51	146.5	49 51.6	86 51	146.9	49 25.7	86 50	147.3	48 59.7	87 50	147.6	1
2	51 27.6	84 55	143.5	51 02.5	84 55	143.9	50 37.3	84 54	144.3	50 12.0	85 54	144.7	49 46.6	85 53	145.2	49 21.1	85 52	145.6	48 55.5	85 52	146.0	48 29.9	86 52	146.4	2
3	50 54.5	82 57	142.1	50 29.7	83 56	142.6	50 04.8	83 56	143.0	49 39.8	83 55	143.5	49 14.8	84 55	143.9	48 49.6	84 54	144.3	48 24.3	84 54	144.7	47 59.0	85 53	145.1	3
4	50 20.4	81 58	140.9	49 55.9	82 58	141.3	49 31.4	82 57	141.8	49 06.7	82 57	142.2	48 42.0	83 56	142.6	48 17.1	83 56	143.1	47 52.2	83 55	143.5	47 27.2	84 55	143.9	4
25	49 45.3	80 60	139.6	49 21.2	81 59	140.1	48 57.0	81 59	140.5	48 32.7	81 58	141.0	48 08.2	82 58	141.4	47 43.7	82 57	141.8	47 19.1	82 57	142.3	46 54.4	82 56	142.7	25
6	49 09.4	79 61	138.4	48 45.6	79 61	138.9	48 21.7	80 60	139.3	47 57.7	80 60	139.8	47 33.6	80 59	140.2	47 09.4	81 59	140.7	46 45.1	81 58	141.1	46 20.7	81 58	141.5	6
7	48 32.5	78 63	137.2	48 09.1	78 62	137.7	47 45.6	79 62	138.2	47 21.9	79 61	138.6	46 58.1	79 60	139.1	46 34.2	80 60	139.5	46 10.3	80 60	139.9	45 46.2	80 59	140.4	7
8	47 54.9	77 64	136.1	47 31.8	77 64	136.6	47 08.6	78 63	137.0	46 45.2	78 62	137.5	46 21.8	78 62	137.9	45 58.2	79 61	138.4	45 34.6	79 61	138.8	45 10.8	79 60	139.3	8
9	47 16.5	76 65	135.0	46 53.7	76 65	135.4	46 30.8	77 64	135.9	46 07.8	77 64	136.4	45 44.7	77 63	136.8	45 21.4	78 62	137.3	44 58.1	78 62	137.7	44 34.7	78 62	138.2	9
30	46 37.4	75 66	133.9	46 14.9	75 66	134.3	45 52.3	75 65	134.8	45 29.6	76 65	135.3	45 06.8	76 64	135.8	44 43.9	77 64	136.2	44 20.9	77 63	136.7	43 57.7	77 63	137.1	30
1	45 57.5	74 68	132.8	45 35.4	74 67	133.3	45 13.1	74 66	133.8	44 50.7	75 66	134.2	44 28.2	75 66	134.7	44 05.6	76 65	135.2	43 42.9	76 64	135.6	43 20.0	76 64	136.1	1
2	45 16.9	73 69	131.8	44 55.1	73 68	132.3	44 33.2	73 68	132.7	44 11.1	74 67	133.2	43 48.9	74 67	133.7	43 26.6	75 66	134.1	43 04.2	75 66	134.6	42 41.7	75 65	135.0	2
3	44 35.7	72 70	130.8	44 14.2	72 69	131.3	43 52.6	72 69	131.7	43 30.8	73 68	132.2	43 08.9	73 68	132.7	42 46.9	74 67	133.1	42 24.8	74 67	133.6	42 02.6	74 66	134.1	3
4	43 53.9	71 71	129.8	43 32.7	71 70	130.3	43 11.4	71 70	130.8	42 49.9	72 69	131.2	42 28.3	72 69	131.7	42 06.6	73 68	132.2	41 44.8	73 68	132.6	41 22.9	73 67	133.1	4
35	43 11.5	70 72	128.8	42 50.6	70 71	129.3	42 29.5	70 71	129.8	42 08.4	71 70	130.3	41 47.1	71 70	130.8	41 25.7	72 69	131.2	41 04.2	72 69	131.7	40 42.5	72 68	132.1	35
6	42 28.5	69 72	127.9	42 07.9	69 72	128.4	41 47.1	69 72	128.9	41 26.3	70 71	129.3	41 05.3	70 71	129.8	40 44.2	71 70	130.3	40 22.9	71 70	130.8	40 01.6	71 69	131.2	6
7	41 45.0	68 73	127.0	41 24.7	68 73	127.5	41 04.2	68 72	128.0	40 43.6	69 72	128.4	40 22.9	69 72	128.9	40 02.1	70 71	129.4	39 41.1	70 71	129.9	39 20.1	70 70	130.3	7
8	41 01.0	67 74	126.1	40 40.9	67 74	126.6	40 20.7	67 73	127.1	40 00.4	68 73	127.6	39 40.0	68 72	128.0	39 19.5	69 72	128.5	38 58.8	69 72	129.0	38 38.0	69 71	129.4	8
9	40 16.4	66 75	125.2	39 56.6	66 74	125.7	39 36.7	67 74	126.2	39 16.7	67 74	126.7	38 56.6	67 73	127.2	38 36.3	68 73	127.6	38 15.9	68 72	128.1	37 55.4	68 72	128.6	9
40	39 31.4	65 76	124.4	39 11.9	65 75	124.9	38 52.3	66 75	125.4	38 32.5	66 74	125.9	38 12.6	66 74	126.3	37 52.7	67 74	126.8	37 32.6	67 73	127.3	37 12.3	68 73	127.7	40
1	38 46.0	64 76	123.6	38 26.7	64 76	124.1	38 07.4	65 76	124.5	37 47.9	65 75	125.0	37 28.3	66 75	125.5	37 08.5	66 74	126.0	36 48.7	66 74	126.4	36 28.7	67 73	126.9	1
2	38 00.1	63 77	122.8	37 41.1	64 77	123.3	37 22.0	64 76	123.7	37 02.8	64 76	124.2	36 43.4	65 76	124.7	36 23.9	65 75	125.2	36 04.4	65 75	125.6	35 44.7	66 74	126.1	2
3	37 13.8	62 78	122.0	36 55.1	63 78	122.5	36 36.2	63 77	123.0	36 17.2	63 76	123.4	35 58.1	64 76	123.9	35 38.9	64 76	124.4	35 19.6	65 75	124.9	35 00.2	65 75	125.3	3
4	36 27.1	61 78	121.2	36 08.6	62 78	121.7	35 50.0	62 78	122.2	35 31.3	63 77	122.7	35 12.4	63 77	123.1	34 53.5	63 76	123.6	34 34.4	64 76	124.1	34 15.3	64 76	124.6	4
45	35 40.1	61 79	120.5	35 21.8	61 79	121.0	35 03.4	61 78	121.4	34 44.9	62 78	121.9	34 26.4	62 78	122.4	34 07.6	63 77	122.9	33 48.8	63 77	123.3	33 29.9	63 76	123.8	45
6	34 52.6	60 80	119.7	34 34.6	60 79	120.2	34 16.5	61 79	120.7	33 58.2	61 78	121.2	33 39.9	61 78	121.7	33 21.4	62 78	122.1	33 02.8	62 77	122.6	32 44.2	62 77	123.1	6
7	34 04.9	59 80	119.0	33 47.1	60 80	119.5	33 29.2	60 79	120.0	33 11.2	60 79	120.5	32 53.0	61 79	120.9	32 34.8	61 78	121.4	32 16.5	61 78	121.9	31 58.1	62 78	122.4	7
8	33 16.8	58 81	118.3	32 59.2	59 80	118.8	32 41.5	59 80	119.3	32 23.8	59 80	119.8	32 05.9	60 79	120.2	31 47.9	60 79	120.7	31 29.8	61 78	121.2	31 11.6	61 78	121.6	8
9	32 28.4	58 81	117.6	32 11.0	58 81	118.1	31 53.6	58 80	118.6	31 36.0	59 80	119.1	31 18.3	59 80	119.6	31 00.6	59 79	120.0	30 42.7	60 79	120.5	30 24.7	60 78	121.0	9
50	31 39.7	57 82	117.0	31 22.5	57 81	117.5	31 05.3	58 81	117.9	30 48.0	58 81	118.4	30 30.5	58 80	118.9	30 13.0	59 80	119.3	29 55.3	60 80	119.8	29 37.6	59 79	120.3	50
1	30 50.7	56 82	116.3	30 33.8	57 82	116.8	30 16.7	57 82	117.3	29 59.6	57 81	117.7	29 42.4	58 81	118.2	29 25.0	58 80	118.7	29 07.6	58 80	119.2	28 50.1	59 80	119.6	1
2	30 01.4	56 82	115.7	29 44.7	56 82	116.2	29 27.9	56 82	116.6	29 10.9	57 82	117.1	28 53.9	57 81	117.6	28 36.8	57 81	118.0	28 19.6	58 80	118.5	28 02.3	58 80	119.0	2
3	29 11.9	55 83	115.0	28 55.4	55 83	115.5	28 38.7	56 82	116.0	28 22.0	56 82	116.5	28 05.2	56 82	116.9	27 48.3	57 81	117.4	27 31.3	57 81	117.9	27 14.2	57 81	118.3	3
4	28 22.1	54 83	114.4	28 05.8	55 83	114.9	27 49.3	55 83	115.4	27 32.8	55 82	115.8	27 16.2	56 82	116.3	26 59.5	56 82	116.8	26 42.7	56 82	117.2	26 25.8	56 81	117.7	4
55	27 32.1	54 84	113.8	27 15.9	54 83	114.3	26 59.7	54 83	114.8	26 43.4	55 83	115.2	26 26.9	55 82	115.7	26 10.4	55 82	116.2	25 53.8	55 82	116.6	25 37.1	56 82	117.1	55
6	26 41.8	53 84	113.2	26 25.9	53 84	113.7	26 09.8	54 84	114.2	25 53.7	54 83	114.6	25 37.4	54 83	115.1	25 21.1	55 83	115.6	25 04.7	55 82	116.0	24 48.2	55 82	116.5	6
7	25 51.3	52 84	112.6	25 35.6	53 84	113.1	25 19.7	53 84	113.6	25 03.7	53 84	114.1	24 47.7	54 83	114.5	24 31.5	54 83	115.0	24 15.3	54 83	115.4	23 59.0	54 82	115.9	7
8	25 00.6	52 85	112.1	24 45.0	52 84	112.5	24 29.3	52 84	113.0	24 13.6	53 84	113.5	23 57.7	53 84	113.9	23 41.7	53 83	114.4	23 25.7	54 83	114.9	23 09.6	54 83	115.3	8
9	24 09.7	51 85	111.5	23 54.3	52 85	112.0	23 38.8	52 85	112.5	23 23.2	52 84	112.9	23 07.5	52 84	113.4	22 51.7	53 84	113.8	22 35.9	53 83	114.3	22 19.9	53 83	114.8	9
60	23 18.7	51 86	111.0	23 03.4	51 85	111.4	22 48.0	51 85	111.9	22 32.6	52 85	112.4	22 17.1	52 84	112.8	22 01.5	52 84	113.3	21 45.8	52 84	113.7	21 30.0	53 84	114.2	60
1	22 27.4	50 86	110.4	22 12.3	51 86	110.9	21 57.1	51 85	111.3	21 41.8	51 85	111.8	21 26.4	51 85	112.3	21 11.0	52 84	112.7	20 55.5	52 84	113.2	20 39.9	52 84	113.7	1
2	21 35.9	50 86	109.9	21 21.0	50 86	110.4	21 05.9	50 86	110.8	20 50.8	51 85	111.3	20 35.6	51 85	111.7	20 20.4	51 85	112.2	20 05.0	51 84	112.7	19 49.6	51 84	113.1	2
3	20 44.3	49 86	109.4	20 29.5	49 86	109.8	20 14.6	50 86	110.3	19 59.6	50 86	110.7	19 44.6	50 85	111.2	19 29.5	50 85	111.7	19 14.3	51 85	112.1	18 59.1	51 84	112.6	3
4	19 52.5	49 87	108.8	19 37.8	49 86	109.3	19 23.1	49 86	109.8	19 08.3	49 86	110.2	18 53.4	50 86	110.7	18 38.5	50 85	111.1	18 23.5	50 85	111.6	18 08.4	50 85	112.1	4
65	19 00.5	48 87	108.3	18 46.0	49 86	108.8	18 31.4	49 86	109.3	18 16.8	49 86	109.7	18 02.1	49 86	110.2	17 47.3	49 86	110.6	17 32.4	50 85	111.1	17 17.5	50 85	111.5	65
6	18 08.4	48 87	107.8	17 54.1	48 87	108.3	17 39.6	48 87	108.8	17 25.1	48 86	109.2	17 10.5	49 86	109.7	16 55.9	49 86	110.1	16 41.2	49 86	110.6	16 26.4	49 85	111.0	6
7	17 16.2	47 87	107.3	17 01.9	48 87	107.8	16 47.6	48 87	108.3	16 33.3	48 87	108.7	16 18.8	48 86	109.2	16 04.3	48 86	109.6	15 49.8	49 86	110.1	15 35.2	49 86	110.5	7
8	16 23.8	47 88	106.8	16 09.7	47 87	107.3	15 55.5	47 87	107.8	15 41.3	48 87	108.2	15 27.0	48 87	108.7	15 12.6	48 86	109.1	14 58.2	48 86	109.6	14 43.8	48 86	110.0	8
9	15 31.3	47 88	106.4	15 17.3	47 88	106.8	15 03.2	47 87	107.3	14 49.1	47 87	107.7	14 35.0	47 87	108.2	14 20.8	47 87	108.6	14 06.5	48 86	109.1	13 52.2	48 86	109.6	9
70	14 38.6	46 88	105.9	14 24.7	46 88	106.3	14 10.8	46 88	106.8	13 56.9	47 88	107.3	13 42.8	47 87	107.7	13 28.8	47 87	108.2	13 14.7	47 87	108.6	13 00.5	47 86	109.1	70
1	13 45.8	46 88	105.4	13 32.1	46 88	105.9	13 18.3	46 88	106.3	13 04.4	46 88	106.8	12 50.6	46 87	107.2	12 36.6	47 87	107.7	12 22.6	47 87	108.2	12 08.6	47 87	108.6	1
2	12 52.9	45 88	105.0	12 39.3	46 88	105.4	12 25.6	46 88	105.9	12 11.9	46 88	106.3	11 58.1	46 88	106.8	11 44.3	46 87	107.2	11 30.5	46 87	107.7	11 16.6	46 87	108.1	2
3	11 59.9	45 88	104.5	11 46.4	45 88	105.0	11 32.8	45 88	105.4	11 19.2	45 88	105.9	11 05.6	46 88	106.3	10 51.9	46 88	106.8	10 38.2	46 87	107.2	10 24.4	46 87	107.7	3
4	11 06.8	45 89	104.0	10 53.4	45 88	104.5	10 39.9	45 88	105.0	10 26.4	45 88	105.4	10 12.9	45 88	105.9	9 59.4	45 88	106.3	9 45.8	45 88	106.8	9 32.1	46 87	107.2	4
75	10 13.6	44 89	103.6	10 00.3	44 89	104.1	9 46.9	45 88	104.5	9 33.6	45 88	105.0	9 20.2	45 88	105.4	9 06.7	45 88	105.9	8 53.2	45 88	106.3	8 39.7	45 88	106.8	75
6	9 20.2	44 89	103.2	9 07.0	44 89	103.6	8 53.8	44 89	104.1	8 40.6	44 89	104.5	8 27.3	44 88	105.0	8 13.9	44 88	105.4	8 00.6	45 88	105.9	7 47.2	45 88	106.3	6
7	8 26.8	44 89	102.7	8 13.7	44 89	103.2	8 00.6	44 89	103.6	7 47.4	44 89	104.1	7 34.3	44 88	104.5	7 21.0	44 88	105.0	7 07.8	44 88	105.4	6 54.5	44 88	105.9	7
8	7 33.3	43 89	102.3	7 20.3	43 89	102.7	7 07.3	43 89	103.2	6 54.2	44 89	103.6	6 41.1	44 89	104.1	6 28.0	44 88	104.6	6 14.9	44 88	105.0	6 01.7	44 88	105.5	8
9	6 39.7	43 90	101.9	6 26.8	43 89	102.3	6 13.9	43 89	102.8	6 00.9	43 89	103.2	5 47.9	43 89	103.7	5 34.9	43 88	104.1	5 21.9	43 88	104.6	5 08.9	43 88	105.0	9
80	5 46.0	43 90	101.4	5 33.2	43 89	101.9	5 20.4	43 89	102.3	5 07.5	43 89	102.8													80

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 24°

H.A.	12° 00′ Alt.	Az.	12° 30′ Alt.	Az.	13° 00′ Alt.	Az.	13° 30′ Alt.	Az.	14° 00′ Alt.	Az.	14° 30′ Alt.	Az.	15° 00′ Alt.	Az.	15° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	78 00.0 1.0 04	180.0	78 30.0 1.0 04	180.0	79 00.0 1.0 04	180.0	79 30.0 1.0 04	180.0	80 00.0 1.0 04	180.0	80 30.0 1.0 05	180.0	81 00.0 1.0 05	180.0	81 30.0 1.0 05	180.0	00
1	77 57.8 1.0 11	175.3	78 27.7 1.0 12	175.1	78 57.6 1.0 12	174.9	79 27.5 1.0 13	174.7	79 57.3 1.0 13	174.4	80 27.2 1.0 14	174.2	80 57.1 99 14	173.8	81 26.9 99 15	173.5	1
2	77 51.1 99 18	170.7	78 20.7 99 19	170.3	78 50.3 99 20	169.9	79 19.9 99 21	169.4	79 49.4 98 22	169.0	80 18.9 98 23	168.4	80 48.3 98 24	167.8	81 17.7 98 25	167.2	2
3	77 40.0 97 25	166.1	78 09.2 97 26	165.6	78 38.4 97 27	165.0	79 07.4 97 28	164.4	79 36.4 96 30	163.7	80 05.3 96 31	162.9	80 34.0 96 32	162.0	81 02.7 95 34	161.1	3
4	77 24.9 96 32	161.8	77 53.5 95 33	161.1	78 22.0 95 34	160.3	78 50.4 94 36	159.5	79 18.7 94 37	158.6	79 46.7 93 38	157.6	80 14.7 93 40	156.6	80 42.3 92 42	155.4	4
05	77 05.8 93 38	157.6	77 33.7 93 39	156.7	78 01.5 92 40	155.8	78 29.1 92 42	154.9	78 56.5 91 44	153.8	79 23.7 90 45	152.7	79 50.6 89 47	151.5	80 17.2 88 49	150.1	05
6	76 43.1 91 43	153.6	77 10.3 90 45	152.6	77 37.3 90 46	151.6	78 04.0 89 48	150.6	78 30.5 88 49	149.4	78 56.6 87 51	148.1	79 22.5 86 53	146.8	79 48.0 84 55	145.3	6
7	76 17.1 88 48	149.8	76 43.5 87 50	148.8	77 09.6 87 51	147.7	77 35.4 86 53	146.5	78 00.9 84 54	145.3	78 26.0 83 56	144.0	78 50.8 82 58	142.5	79 15.1 80 60	141.0	7
8	75 48.1 86 53	146.3	76 13.6 85 54	145.2	76 38.8 83 56	144.0	77 03.7 82 58	142.8	77 28.2 81 59	141.5	77 52.3 80 61	140.1	78 15.9 78 62	138.6	78 39.1 76 64	137.0	8
9	75 16.4 83 57	143.0	75 41.0 82 58	141.9	76 05.3 80 60	140.7	76 29.2 79 61	139.4	76 52.8 78 63	138.0	77 15.8 76 65	136.6	77 38.4 74 66	135.1	78 00.5 73 68	133.5	9
10	74 42.2 80 60	139.9	75 06.0 79 62	138.8	75 29.4 77 63	137.5	75 52.4 76 65	136.2	76 15.0 74 66	134.9	76 37.1 73 68	133.4	76 58.7 71 70	131.9	77 19.7 69 71	130.3	10
1	74 05.9 77 64	137.1	74 28.8 76 65	135.9	74 51.4 74 66	134.6	75 13.5 73 68	133.3	75 35.2 71 69	131.9	75 56.3 70 71	130.5	76 16.9 68 72	129.0	76 37.0 66 74	127.4	1
2	73 27.6 74 67	134.4	73 49.7 73 68	133.2	74 11.5 72 69	132.0	74 32.7 70 70	130.7	74 53.5 68 72	129.3	75 13.8 67 73	127.9	75 33.5 65 75	126.4	75 52.7 63 76	124.8	2
3	72 47.6 72 69	131.9	73 09.0 71 70	130.7	73 29.9 69 72	129.5	73 50.4 67 73	128.2	74 10.4 66 74	126.8	74 29.8 64 75	125.4	74 48.7 62 77	124.0	75 07.0 60 78	122.4	3
4	72 06.1 69 72	129.6	72 26.7 68 72	128.5	72 46.9 67 74	127.2	73 06.6 65 75	125.9	73 25.9 63 76	124.6	73 44.6 61 77	123.2	74 02.7 59 78	121.8	74 20.2 57 80	120.3	4
15	71 23.3 67 74	127.5	71 43.2 66 74	126.3	72 02.7 64 76	125.1	72 21.7 63 77	123.8	72 40.2 61 78	122.5	72 58.2 59 79	121.2	73 15.6 57 80	119.8	73 32.4 55 81	118.3	15
6	70 39.2 65 75	125.5	70 58.5 64 76	124.4	71 17.3 62 77	123.2	71 35.6 60 78	121.9	71 53.5 59 79	120.6	72 10.8 57 80	119.3	72 27.6 55 81	117.9	72 43.8 53 82	116.5	6
7	69 54.1 63 77	123.7	70 12.7 61 78	122.5	70 30.9 60 79	121.3	70 48.7 58 80	120.1	71 05.9 57 81	118.9	71 22.6 55 82	117.6	71 38.8 53 82	116.2	71 54.4 51 83	114.9	7
8	69 08.0 61 78	121.9	69 26.1 60 79	120.8	69 43.7 58 80	119.7	70 00.9 56 81	118.5	70 17.5 55 82	117.2	70 33.7 53 83	116.0	70 49.3 51 84	114.7	71 04.4 49 84	113.4	8
9	68 21.1 59 80	120.3	68 38.6 58 80	119.2	68 55.7 56 81	118.1	69 12.3 55 82	116.9	69 28.5 53 83	115.7	69 44.1 51 84	114.5	69 59.2 49 84	113.2	70 13.8 48 85	112.0	9
20	67 33.4 57 81	118.8	67 50.4 56 81	117.7	68 07.0 55 82	116.6	68 23.1 53 83	115.5	68 38.8 51 84	114.3	68 53.9 50 84	113.1	69 08.6 48 85	111.9	69 22.7 46 86	110.6	20
1	66 45.0 56 82	117.4	67 01.6 54 82	116.3	67 17.7 53 83	115.2	67 33.4 51 84	114.1	67 48.6 50 84	113.0	68 03.3 48 85	111.8	68 17.5 47 86	110.6	68 31.2 45 86	109.4	1
2	65 56.1 54 82	116.0	66 12.2 53 83	115.0	66 27.9 52 84	113.9	66 43.1 50 84	112.8	66 57.9 48 85	111.7	67 12.2 47 86	110.6	67 26.0 45 86	109.5	67 39.3 44 87	108.3	2
3	65 06.6 53 83	114.8	65 22.2 52 84	113.7	65 37.5 50 85	112.7	65 52.4 49 85	111.6	66 06.8 47 86	110.6	66 20.7 46 86	109.5	66 34.1 44 87	108.4	66 47.1 42 88	107.2	3
4	64 16.5 52 84	113.6	64 31.8 50 85	112.6	64 46.7 49 85	111.6	65 01.2 48 86	110.5	65 15.2 46 86	109.5	65 28.8 45 87	108.4	65 42.0 43 88	107.3	65 54.6 41 88	106.2	4
25	63 26.1 50 85	112.4	63 41.0 49 85	111.5	63 55.6 48 86	110.5	64 09.7 46 86	109.5	64 23.4 45 87	108.4	64 36.7 43 88	107.4	64 49.5 42 88	106.3	65 01.9 40 88	105.3	25
6	62 35.2 49 85	111.4	62 49.8 48 86	110.4	63 04.0 47 86	109.4	63 17.9 45 87	108.4	63 31.3 44 87	107.5	63 44.2 43 88	106.4	63 56.8 41 88	105.4	64 08.9 40 89	104.4	6
7	61 44.0 48 86	110.3	61 58.3 47 86	109.4	62 12.2 46 87	108.5	62 25.7 44 87	107.5	62 38.8 43 88	106.5	62 51.5 42 88	105.5	63 03.8 40 89	104.5	63 15.7 39 89	103.5	7
8	60 52.4 47 86	109.4	61 06.4 46 87	108.4	61 20.1 45 87	107.5	61 33.3 43 88	106.6	61 46.2 42 88	105.6	61 58.6 41 88	104.7	62 10.7 39 89	103.7	62 22.3 38 89	102.7	8
9	60 00.6 46 87	108.4	60 14.3 45 87	107.5	60 27.7 44 88	106.6	60 40.7 43 88	105.7	60 53.3 41 88	104.8	61 05.5 40 89	103.8	61 17.3 39 89	102.9	61 28.7 37 90	101.9	9
30	59 08.4 46 87	107.5	59 21.9 44 88	106.7	59 35.0 43 88	105.8	59 47.8 42 88	104.9	60 00.2 41 89	104.0	60 12.2 39 89	103.1	60 23.8 38 89	102.1	60 35.0 37 90	101.2	30
1	58 16.1 45 88	106.7	58 29.3 44 88	105.8	58 42.2 42 88	105.0	58 54.7 41 89	104.1	59 06.9 40 89	103.2	59 18.7 39 89	102.3	59 30.1 37 90	101.4	59 41.2 36 90	100.5	1
2	57 23.4 44 88	105.9	57 36.5 43 88	105.0	57 49.1 42 89	104.2	58 01.5 41 89	103.3	58 13.5 39 89	102.5	58 25.1 38 90	101.6	58 36.3 37 90	100.7	58 47.2 36 90	99.8	2
3	56 30.6 43 88	105.1	56 43.4 42 89	104.3	56 55.9 41 89	103.4	57 08.1 40 89	102.6	57 19.9 39 90	101.8	57 31.3 38 90	100.9	57 42.4 36 90	100.0	57 53.2 35 90	99.2	3
4	55 37.6 43 89	104.3	55 50.2 42 89	103.5	56 02.5 40 89	102.7	56 14.5 39 90	101.9	56 26.1 38 90	101.1	56 37.4 37 90	100.2	56 48.4 36 90	99.4	56 59.0 35 90	98.5	4
35	54 44.4 42 89	103.6	54 56.9 41 89	102.8	55 09.0 40 90	102.0	55 20.8 39 90	101.2	55 32.3 38 90	100.4	55 43.4 37 90	99.6	55 54.3 36 90	98.8	56 04.8 34 91	97.9	35
6	53 51.1 41 89	102.9	54 03.3 40 89	102.1	54 15.3 39 90	101.4	54 27.0 38 90	100.6	54 38.3 37 90	99.8	54 49.4 36 90	99.0	55 00.1 35 90	98.2	55 10.4 34 91	97.3	6
7	52 57.6 41 89	102.2	53 09.7 40 90	101.5	53 21.5 39 90	100.7	53 33.0 38 90	99.9	53 44.3 37 90	99.2	53 55.2 36 90	98.4	54 05.8 35 91	97.6	54 16.0 34 91	96.8	7
8	52 04.0 40 90	101.6	52 15.9 39 90	100.8	52 27.6 38 90	100.1	52 39.0 37 90	99.3	52 50.1 36 90	98.6	53 00.9 35 90	97.8	53 11.4 34 91	97.0	53 21.6 33 91	96.2	8
9	51 10.2 40 90	101.0	51 22.0 39 90	100.2	51 33.6 38 90	99.5	51 44.9 37 90	98.7	51 55.9 36 90	98.0	52 06.6 35 91	97.2	52 17.0 34 91	96.5	52 27.1 33 91	95.7	9
40	50 16.3 39 90	100.4	50 28.0 39 90	99.6	50 39.5 38 90	98.9	50 50.6 37 90	98.2	51 01.5 36 91	97.4	51 12.1 35 91	96.7	51 22.5 34 91	95.9	51 32.5 33 91	95.2	40
1	49 22.4 39 90	99.8	49 34.0 38 90	99.0	49 45.3 37 90	98.3	49 56.4 36 91	97.6	50 07.2 36 91	96.9	50 17.7 35 91	96.2	50 27.9 34 91	95.4	50 37.9 33 91	94.7	1
2	48 28.3 39 90	99.2	48 39.8 38 90	98.5	48 51.0 37 91	97.8	49 02.0 36 91	97.1	49 12.7 35 91	96.4	49 23.2 34 91	95.6	49 33.3 33 91	94.9	49 43.2 33 91	94.2	2
3	47 34.1 38 90	98.6	47 45.5 38 90	97.9	47 56.7 37 91	97.2	48 07.6 36 91	96.5	48 18.2 35 91	95.8	48 28.6 34 91	95.1	48 38.7 33 91	94.4	48 48.6 32 91	93.7	3
4	46 39.9 38 90	98.1	46 51.2 37 91	97.4	47 02.3 36 91	96.7	47 13.1 36 91	96.0	47 23.6 35 91	95.3	47 34.0 34 91	94.6	47 44.0 33 91	93.9	47 53.8 32 91	93.2	4
45	45 45.6 38 91	97.5	45 56.8 37 91	96.9	46 07.8 36 91	96.2	46 18.5 35 91	95.5	46 29.1 35 91	94.8	46 39.3 34 91	94.2	46 49.3 33 91	93.5	46 59.1 32 91	92.8	45
6	44 51.2 38 91	97.0	45 02.4 37 91	96.3	45 13.3 36 91	95.7	45 24.0 35 91	95.0	45 34.4 34 91	94.4	45 44.6 34 91	93.7	45 54.6 33 91	93.0	46 04.3 32 91	92.3	6
7	43 56.8 37 91	96.5	44 07.9 37 91	95.8	44 18.7 36 91	95.2	44 29.3 35 91	94.5	44 39.7 34 91	93.9	44 49.9 34 91	93.2	44 59.9 33 91	92.6	45 09.6 32 91	91.9	7
8	43 02.3 37 91	96.0	43 13.3 36 91	95.4	43 24.1 36 91	94.7	43 34.7 35 91	94.1	43 45.0 34 91	93.4	43 55.2 33 91	92.8	44 05.1 33 91	92.1	44 14.8 32 91	91.5	8
9	42 07.8 37 91	95.5	42 18.7 36 91	94.9	42 29.5 35 91	94.2	42 40.0 35 91	93.6	42 50.3 34 91	93.0	43 00.4 33 91	92.3	43 10.3 33 91	91.7	43 20.0 32 91	91.0	9
50	41 13.2 37 91	95.0	41 24.1 36 91	94.4	41 34.8 35 91	93.8	41 45.3 35 91	93.1	41 55.6 34 91	92.5	42 05.6 33 91	91.9	42 15.5 33 91	91.2	42 25.2 32 91	90.6	50
1	40 18.6 37 91	94.5	40 29.4 36 91	93.9	40 40.1 35 91	93.3	40 50.5 35 91	92.7	41 00.8 34 91	92.1	41 10.9 33 91	91.5	41 20.7 33 91	90.8	41 30.4 32 91	90.2	1
2	39 23.9 36 91	94.1	39 34.7 36 91	93.5	39 45.3 35 91	92.9	39 55.8 34 91	92.3	40 06.0 34 91	91.6	40 16.1 33 91	91.0	40 25.9 33 91	90.4	40 35.6 32 91	89.8	2
3	38 29.2 36 91	93.6	38 40.0 36 91	93.0	38 50.6 35 91	92.4	39 01.0 34 91	91.8	39 11.2 34 91	91.2	39 21.2 33 91	90.6	39 31.1 33 91	90.0	39 40.7 32 91	89.4	3
4	37 34.5 36 91	93.2	37 45.2 36 91	92.6	37 55.8 35 91	92.0	38 06.2 34 91	91.4	38 16.4 34 91	90.8	38 26.4 33 91	90.2	38 36.3 33 91	89.6	38 45.9 32 91	89.0	4
55	36 39.8 36 91	92.7	36 50.5 35 91	92.2	37 01.0 35 91	91.6	37 11.4 34 91	91.0	37 21.6 34 91	90.4	37 31.6 33 91	89.8	37 41.5 33 91	89.2	37 51.1 32 91	88.6	55
6	35 45.9 36 91	92.3	35 55.7 35 91	91.7	36 06.2 35 91	91.1	36 16.6 34 91	90.6	36 26.8 34 91	90.0	36 36.8 33 91	89.4	36 46.7 33 91	88.8	36 56.3 32 91	88.2	6
7	34 50.2 36 91	91.9	35 00.9 35 91	91.3	35 11.4 35 91	90.7	35 21.8 34 91	90.2	35 32.0 34 91	89.6	35 42.0 33 91	89.0	35 51.9 33 91	88.4	36 01.6 32 91	87.8	7
8	33 55.4 36 91	91.4	34 06.1 35 91	90.9	34 16.6 35 91	90.3	34 27.0 34 91	89.7	34 37.2 34 91	89.2	34 47.2 33 91	88.6	34 57.1 33 91	88.0	35 06.8 32 91	87.4	8
9	33 00.6 36 91	91.0	33 11.3 35 91	90.5	33 21.8 35 91	89.9	33 32.2 34 91	89.3	33 42.4 34 91	88.8	33 52.4 33 91	88.2	34 02.3 33 91	87.6	34 12.0 32 91	87.1	9
60	32 05.8 36 91	90.6	32 16.5 35 91	90.1	32 27.0 35 91	89.5	32 37.4 34 91	88.9	32 47.6 34 91	88.4	32 57.6 33 91	87.8	33 07.6 33 91	87.3	33 17.3 32 91	86.7	60
1	31 11.0 36 91	90.2	31 21.7 35 91	89.7	31 32.2 35 91	89.1	31 42.6 34 91	88.6	31 52.8 34 91	88.0	32 02.9 33 91	87.4	32 12.8 33 91	86.9	32 22.6 32 91	86.3	1
2	30 16.2 36 91	89.8	30 26.9 35 91	89.2	30 37.4 35 91	88.7	30 47.8 34 91	88.2	30 58.0 34 91	87.6	31 08.1 33 91	87.1	31 18.1 33 91	86.5	31 27.9 33 91	86.0	2
3	29 21.4 36 91	89.4	29 32.1 35 91	88.9	29 42.6 35 91	88.3	29 53.0 34 91	87.8	30 03.3 34 91	87.2	30 13.4 34 91	86.7	30 23.4 33 91	86.1	30 33.2 33 91	85.6	3
4	28 26.6 36 91	89.0	28 37.3 35 91	88.5	28 47.8 35 91	87.9	28 58.2 35 91	87.4	29 08.5 34 91	86.8	29 18.7 34 91	86.3	29 28.7 33 91	85.8	29 38.6 33 91	85.2	4
65	27 31.8 36 91	88.6	27 42.5 35 91	88.1	27 53.0 35 91	87.5	28 03.5 35 91	87.0	28 13.8 34 91	86.5	28 24.0 34 91	85.9	28 34.1 33 91	85.4	28 44.0 33 91	84.9	65
6	26 37.0 36 91	88.2	26 47.7 35 91	87.7	26 58.3 35 91	87.1	27 08.7 35 91	86.6	27 19.1 34 91	86.1	27 29.3 34 91	85.6	27 39.4 33 91	85.0	27 49.4 33 91	84.5	6
7	25 42.2 36 91	87.8	25 52.9 36 91	87.3	26 03.5 35 91	86.8	26 14.0 35 91	86.2	26 24.4 34 91	85.7	26 34.7 34 91	85.2	26 44.8 34 91	84.7	26 54.9 33 91	84.1	7
8	24 47.4 36 91	87.4	24 58.2 36 91	86.9	25 08.8 35 91	86.4	25 19.4 35 91	85.9	25 29.8 35 91	85.4	25 40.1 34 91	84.8	25 50.3 34 91	84.3	26 00.4 33 91	83.8	8
9	23 52.7 36 91	87.0	24 03.5 36 91	86.5	24 14.1 35 91	86.0	24 24.7 35 91	85.5	24 35.2 35 91	85.0	24 45.5 34 91	84.5	24 55.8 34 91	83.9	25 05.9 34 91	83.4	9
70	22 58.0 36 91	86.6	23 08.8 36 91	86.1	23 19.5 36 91	85.6	23 30.1 35 91	85.1	23 40.6 35 91	84.6	23 51.0 35 91	84.1	24 01.3 34 91	83.6	24 11.5 34 91	83.1	70
1	22 03.3 36 91	86.3	22 14.1 36 91	85.8	22 24.8 36 91	85.3	22 35.5 35 91	84.7	22 46.0 35 91	84.2	22 56.5 35 91	83.7	23 06.8 34 91	83.2	23 17.1 34 91	82.7	1
2	21 08.6 36 91	85.9	21 19.4 36 91	85.4	21 30.2 36 91	84.9	21 40.9 35 91	84.4	21 51.5 35 91	83.9	22 02.0 35 91	83.4	22 12.4 35 91	82.9	22 22.7 34 90	82.4	2
3	20 13.9 36 91	85.5	20 24.8 36 91	85.0	20 35.6 36 91	84.5	20 46.4 36 91	84.0	20 57.0 35 91	83.5	21 07.6 35 91	83.0	21 18.1 35 90	82.5	21 28.4 34 90	82.0	3
4	19 19.3 37 91	85.1	19 30.2 36 91	84.6	19 41.1 36 91	84.1	19 51.9 36 91	83.6	20 02.6 36 91	83.1	20 13.2 35 90	82.6	20 23.7 35 90	82.1	20 34.2 35 90	81.6	4
75	18 24.7 37 91	84.7	18 35.7 37 91	84.2	18 46.6 36 91	83.8	18 57.4 36 91	83.3	19 08.2 36 91	82.8	19 18.9 35 90	82.3	19 29.5 35 90	81.8	19 40.0 35 90	81.3	75
6	17 30.1 37 91	84.4	17 41.2 37 91	83.9	17 52.1 36 91	83.4	18 03.0 36 91	82.9	18 13.8 36 90	82.4	18 24.6 36 90	81.9	18 35.2 35 90	81.4	18 45.8 35 90	80.9	6
7	16 35.6 37 91	84.0	16 46.7 37 91	83.5	16 57.7 37 91	83.0	17 08.6 36 90	82.5	17 19.5 36 90	82.0	17 30.3 36 90	81.5	17 41.1 36 90	81.1	17 51.7 35 90	80.6	7
8	15 41.1 37 91	83.6	15 52.2 37 91	83.1	16 03.3 37 90	82.6	16 14.3 37 90	82.2	16 25.3 36 90	81.7	16 36.1 36 90	81.2	16 46.9 36 90	80.7	16 57.7 36 90	80.2	8
9	14 46.7 37 91	83.2	14 57.8 37 90	82.7	15 09.0 37 90	82.3	15 20.0 37 90	81.8	15 31.1 37 90	81.3	15 42.0 36 90	80.8	15 52.9 36 90	80.3	16 03.7 36 90	79.8	9
80	13 52.3 38 91	82.8	14 03.5 37 90	82.4	14 14.7 37 90	81.9	14 25.8 37 90	81.4	14 36.9 37 90	80.9	14 47.9 37 90	80.5	14 58.9 36 90	80.0	15 09.8 36 90	79.5	80
1	12 57.9 38 90	82.5	13 09.2 38 90	82.0	13 20.4 37 90	81.5	13 31.7 37 90	81.0	13 42.8 37 90	80.6	13 53.9 37 90	80.1	14 04.9 37 90	79.6	14 15.9 36 90	79.1	1
2	12 03.6 38 90	82.1	12 14.9 38 90	81.6	12 26.3 38 90	81.1	12 37.5 37 90	80.7	12 48.8 37 90	80.2	12 59.9 37 90	79.7	13 11.0 37 90	79.2	13 22.1 37 90	78.8	2
3	11 09.3 38 90	81.7	11 20.7 38 90	81.2	11 32.1 38 90	80.8	11 43.5 38 90	80.3	11 54.8 38 90	79.8	12 06.0 37 90	79.3	12 17.2 37 90	78.9	12 28.4 37 90	78.4	3
4	10 15.1 38 90	81.3	10 26.6 38 90	80.9	10 38.1 38 90	80.4	10 49.5 38 90	79.9	11 00.9 38 90	79.4	11 12.2 38 90	79.0	11 23.5 38 90	78.5	11 34.7 37 89	78.0	4
85	9 20.9 39 90	80.9	9 32.5 39 90	80.5	9 44.0 38 90	80.0	9 55.5 38 90	79.5	10 07.0 38 90	79.1	10 18.4 38 90	78.6	10 29.8 38 89	78.1	10 41.1 38 89	77.7	85
6	8 26.8 39 90	80.6	8 38.5 39 90	80.1	8 50.1 39 90	79.6	9 01.7 39 90	79.2	9 13.2 38 90	78.7	9 24.7 38 89	78.2	9 36.2 38 89	77.8	9 47.6 38 89	77.3	6
7	7 32.8 39 90	80.2	7 44.5 39 90	79.7	7 56.2 39 90	79.2	8 07.9 39 90	78.8	8 19.5 39 89	78.3	8 31.1 39 89	77.9	8 42.7 39 89	77.4	8 54.2 38 89	76.9	7
8	6 38.8 39 90	79.8	6 50.6 39 90	79.3	7 02.4 39 90	78.9	7 14.1 39 89	78.4	7 25.9 39 89	77.9	7 37.6 39 89	77.5	7 49.2 39 89	77.0	8 00.9 39 89	76.5	8
9	5 44.9 40 90	79.4	5 56.8 40 90	78.9	6 08.7 40 90	78.5	6 20.5 39 89	78.0	6 32.3 39 89	77.6	6 44.1 39 89	77.1	6 55.9 39 89	76.6	7 07.6 39 89	76.2	9
90			5 03.0 40 90	78.6	5 15.0 40 90	78.1	5 26.9 40 89	77.6	5 38.8 40 89	77.2	5 50.7 40 89	76.7	6 02.6 40 89	76.2	6 14.4 39 88	75.8	90

Lat. 24°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	54 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	00
1	53 59.2	1.0 04	178.3	53 29.2	1.0 04	178.4	52 59.2	1.0 04	178.4	52 29.2	1.0 04	178.4	51 59.2	1.0 04	178.4	51 29.3	1.0 04	178.4	50 59.3	1.0 04	178.5	50 29.3	1.0 04	178.5	1
2	53 56.8	1.0 07	176.7	53 26.9	1.0 07	176.7	52 56.9	1.0 06	176.8	52 26.9	1.0 06	176.8	51 57.0	1.0 06	176.9	51 27.0	1.0 06	176.9	50 57.1	1.0 06	176.9	50 27.1	1.0 06	177.0	2
3	53 52.8	1.0 09	175.0	53 22.9	1.0 09	175.1	52 53.0	1.0 09	175.2	52 23.1	1.0 09	175.2	51 53.2	1.0 09	175.3	51 23.3	1.0 09	175.3	50 53.4	1.0 08	175.4	50 23.5	1.0 08	175.5	3
4	53 47.3	99 12	173.4	53 17.5	99 12	173.5	52 47.6	99 12	173.5	52 17.8	99 11	173.6	51 48.0	99 11	173.7	51 18.1	99 11	173.8	50 48.3	99 11	173.9	50 18.4	1.0 11	174.0	4
05	53 40.2	99 14	171.7	53 10.5	99 14	171.8	52 40.7	99 14	171.9	52 11.0	99 14	172.1	51 41.2	99 14	172.2	51 11.5	99 14	172.3	50 41.7	99 13	172.4	50 12.0	99 13	172.5	05
6	53 31.5	99 17	170.1	53 01.9	99 17	170.2	52 32.3	99 16	170.4	52 02.7	99 16	170.5	51 33.0	99 16	170.6	51 03.4	99 16	170.7	50 33.7	99 16	170.9	50 04.1	99 16	171.0	6
7	53 21.3	98 20	168.5	52 51.9	98 19	168.6	52 22.4	98 19	168.8	51 52.9	98 19	168.9	51 23.4	98 18	169.1	50 53.8	98 18	169.2	50 24.3	98 18	169.4	49 54.8	98 18	169.5	7
8	53 09.6	98 22	166.9	52 40.3	98 22	167.1	52 11.0	98 22	167.2	51 41.6	98 21	167.4	51 12.3	98 21	167.6	50 42.9	98 21	167.7	50 13.5	98 20	167.9	49 44.1	98 20	168.0	8
9	52 56.5	97 24	165.3	52 27.3	97 24	165.5	51 58.1	97 24	165.7	51 28.9	97 23	165.9	50 59.7	97 23	166.0	50 30.5	97 23	166.2	50 01.3	97 23	166.4	49 32.0	98 22	166.6	9
10	52 41.8	97 27	163.7	52 12.9	97 26	163.9	51 43.9	97 26	164.1	51 14.9	97 26	164.4	50 45.8	97 26	164.6	50 16.8	97 25	164.7	49 47.7	97 25	164.9	49 18.6	97 24	165.1	10
1	52 25.7	96 29	162.2	51 57.0	96 29	162.4	51 28.2	96 28	162.6	50 59.4	96 28	162.9	50 30.5	96 28	163.1	50 01.7	96 27	163.3	49 32.8	96 27	163.5	49 03.9	96 27	163.7	1
2	52 08.3	95 31	160.6	51 39.7	95 31	160.9	51 11.2	95 31	161.1	50 42.6	95 30	161.4	50 13.9	95 30	161.6	49 45.3	96 30	161.8	49 16.6	96 29	162.1	48 47.9	96 29	162.3	2
3	51 49.4	94 34	159.1	51 21.1	94 33	159.4	50 52.8	95 33	159.7	50 24.4	95 32	159.9	49 56.0	95 32	160.2	49 27.5	95 32	160.4	48 59.1	95 31	160.7	48 30.6	95 31	160.9	3
4	51 29.3	93 36	157.7	51 01.2	94 35	157.9	50 33.1	94 35	158.2	50 04.9	94 34	158.5	49 36.8	94 34	158.8	49 08.5	94 34	159.0	48 40.3	94 33	159.3	48 12.0	94 33	159.5	4
15	51 07.8	93 38	156.2	50 40.0	93 38	156.5	50 12.1	93 37	156.8	49 44.2	93 36	157.1	49 16.3	93 36	157.4	48 48.3	93 36	157.6	48 20.3	93 35	157.9	47 52.2	94 35	158.2	15
6	50 45.0	92 40	154.8	50 17.5	92 40	155.1	49 49.9	92 39	155.4	49 22.3	92 39	155.7	48 54.6	92 38	156.0	48 26.8	93 38	156.3	47 59.1	93 37	156.6	47 31.2	93 37	156.8	6
7	50 21.1	91 42	153.4	49 53.8	91 42	153.7	49 26.5	91 41	154.0	48 59.1	91 40	154.3	48 31.7	92 40	154.6	48 04.2	92 40	154.9	47 36.7	92 39	155.2	47 09.1	92 39	155.5	7
8	49 55.9	90 44	152.0	49 28.9	90 43	152.3	49 01.9	90 43	152.7	48 34.8	90 42	153.0	48 07.6	91 42	153.3	47 40.4	91 42	153.6	47 13.2	91 41	153.9	46 45.8	91 40	154.2	8
9	49 29.6	89 46	150.6	49 02.9	89 45	151.0	48 36.2	89 45	151.3	48 09.3	90 44	151.7	47 42.4	90 44	152.0	47 15.5	90 43	152.3	46 48.5	90 43	152.6	46 21.5	90 42	153.0	9
20	49 02.2	88 48	149.3	48 35.8	88 47	149.7	48 09.3	88 46	150.0	47 42.8	89 46	150.4	47 16.2	89 46	150.7	46 49.5	89 45	151.1	46 22.8	89 45	151.4	45 56.0	89 44	151.7	20
1	48 33.7	87 49	148.0	48 07.6	87 49	148.4	47 41.4	87 48	148.8	47 15.2	88 48	149.1	46 48.8	88 47	149.5	46 22.5	88 47	149.8	45 56.0	88 46	150.2	45 29.5	88 46	150.5	1
2	48 04.1	86 51	146.7	47 38.3	86 50	147.1	47 12.5	86 50	147.5	46 46.5	87 49	147.9	46 20.5	87 49	148.2	45 54.4	87 48	148.6	45 28.2	87 48	148.9	45 02.0	87 48	149.3	2
3	47 33.6	85 52	145.5	47 08.1	85 52	145.9	46 42.5	85 52	146.3	46 16.9	86 51	146.7	45 51.1	86 50	147.0	45 25.3	86 50	147.4	44 59.5	86 50	147.7	44 33.5	87 49	148.1	3
4	47 02.1	84 54	144.3	46 36.9	84 54	144.7	46 11.6	84 53	145.1	45 46.2	85 52	145.5	45 20.8	85 52	145.8	44 55.3	85 52	146.2	44 29.7	85 51	146.6	44 04.1	86 50	146.9	4
25	46 29.6	83 56	143.1	46 04.7	83 55	143.5	45 39.8	83 54	143.9	45 14.7	84 54	144.3	44 49.6	84 54	144.7	44 24.4	84 53	145.1	43 59.1	84 52	145.4	43 33.8	85 52	145.8	25
6	45 56.2	82 57	141.9	45 31.7	82 56	142.3	45 07.0	82 56	142.8	44 42.3	83 56	143.1	44 17.5	83 55	143.5	43 52.5	83 54	143.9	43 27.6	83 54	144.3	43 02.5	84 54	144.7	6
7	45 22.0	81 58	140.8	44 57.8	81 58	141.2	44 33.4	81 57	141.6	44 09.0	82 57	142.0	43 44.5	82 56	142.4	43 19.8	82 56	142.8	42 55.2	82 55	143.2	42 30.4	83 55	143.6	7
8	44 47.0	80 60	139.7	44 23.0	80 59	140.1	43 59.0	80 59	140.5	43 34.8	81 58	140.9	43 10.6	81 58	141.3	42 46.3	81 57	141.7	42 21.9	81 57	142.1	41 57.5	82 56	142.5	8
9	44 11.1	79 61	138.6	43 47.5	79 61	139.0	43 23.7	79 60	139.5	42 59.9	80 60	139.9	42 36.0	80 59	140.3	42 12.0	80 58	140.7	41 47.9	80 58	141.1	41 23.7	81 58	141.5	9
30	43 34.5	78 62	137.5	43 11.1	78 62	138.0	42 47.7	78 61	138.4	42 24.2	79 61	138.8	42 00.6	79 60	139.2	41 36.9	79 60	139.6	41 13.1	79 59	140.1	40 49.2	80 59	140.5	30
1	42 57.1	77 64	136.5	42 34.1	77 63	136.9	42 11.0	77 62	137.4	41 47.7	78 62	137.8	41 24.4	78 62	138.2	41 01.0	78 61	138.6	40 37.5	78 60	139.0	40 13.9	79 60	139.5	1
2	42 19.0	76 65	135.5	41 56.3	76 64	135.9	41 33.5	76 64	136.4	41 10.6	77 63	136.8	40 47.5	77 63	137.2	40 24.4	77 62	137.6	40 01.2	77 62	138.1	39 37.9	78 61	138.5	2
3	41 40.3	75 66	134.5	41 17.8	75 65	134.9	40 55.3	75 65	135.4	40 32.7	76 64	135.8	40 10.0	76 64	136.2	39 47.2	76 63	136.7	39 24.2	77 63	137.1	39 01.2	77 62	137.5	3
4	41 00.9	74 67	133.5	40 38.7	74 66	134.0	40 16.5	74 66	134.4	39 54.2	75 65	134.9	39 31.7	75 65	135.3	39 09.2	75 64	135.7	38 46.6	76 64	136.1	38 23.9	76 63	136.6	4
35	40 20.8	73 68	132.6	39 59.0	73 67	133.0	39 37.0	73 67	133.5	39 15.0	74 66	133.9	38 52.9	74 66	134.4	38 30.6	74 65	134.8	38 08.3	75 65	135.2	37 45.9	75 64	135.6	35
6	39 40.2	72 69	131.7	39 18.6	72 68	132.1	38 57.0	72 68	132.6	38 35.2	73 67	133.0	38 13.4	73 67	133.5	37 51.4	73 66	133.9	37 29.4	74 66	134.3	37 07.3	74 66	134.7	6
7	38 58.9	71 70	130.8	38 37.7	71 69	131.2	38 16.3	71 69	131.7	37 54.9	72 68	132.1	37 33.3	72 68	132.6	37 11.6	72 67	133.0	36 49.9	73 67	133.4	36 28.0	73 66	133.9	7
8	38 17.2	70 70	129.9	37 56.2	70 70	130.4	37 35.1	70 70	130.8	37 13.9	71 69	131.2	36 52.6	71 69	131.7	36 31.2	71 68	132.1	36 09.8	72 68	132.6	35 48.2	72 67	133.0	8
9	37 34.8	69 71	129.0	37 14.1	69 71	129.5	36 53.3	70 70	129.9	36 32.4	70 70	130.4	36 11.4	70 70	130.8	35 50.3	71 69	131.3	35 29.1	71 69	131.7	35 07.8	71 68	132.1	9
40	36 52.0	68 72	128.2	36 31.6	68 72	128.7	36 11.1	69 71	129.1	35 50.4	69 71	129.6	35 29.7	69 70	130.0	35 08.9	70 70	130.4	34 47.9	70 70	130.9	34 26.9	70 69	131.3	40
1	36 08.7	67 73	127.4	35 48.5	67 72	127.8	35 28.3	68 72	128.3	35 07.9	68 72	128.7	34 47.5	68 71	129.2	34 26.9	69 71	129.6	34 06.2	69 70	130.1	33 45.5	69 70	130.5	1
2	35 24.9	66 74	126.6	35 05.0	66 73	127.0	34 45.0	67 73	127.5	34 24.9	67 72	127.9	34 04.7	67 72	128.4	33 44.4	68 72	128.8	33 24.0	68 71	129.3	33 03.6	68 71	129.7	2
3	34 40.7	65 74	125.8	34 21.0	66 74	126.2	34 01.3	66 74	126.7	33 41.5	66 73	127.2	33 21.5	67 73	127.6	33 01.5	67 72	128.0	32 41.4	67 72	128.5	32 21.2	68 72	128.9	3
4	33 56.0	64 75	125.0	33 36.6	65 75	125.5	33 17.1	65 74	125.9	32 57.6	65 74	126.4	32 37.9	66 74	126.8	32 18.1	66 73	127.3	31 58.2	66 73	127.7	31 38.3	67 72	128.2	4
45	33 10.9	64 76	124.3	32 51.8	64 76	124.7	32 32.5	64 75	125.2	32 13.2	65 74	125.6	31 53.8	65 74	126.1	31 34.3	65 74	126.5	31 14.7	66 73	127.0	30 55.0	66 73	127.4	45
6	32 25.4	63 76	123.5	32 06.5	63 76	124.0	31 47.5	63 76	124.4	31 28.5	64 75	124.9	31 09.3	64 75	125.4	30 50.0	64 74	125.8	30 30.7	65 74	126.2	30 11.2	65 74	126.7	6
7	31 39.5	62 77	122.8	31 20.9	62 77	123.3	31 02.1	63 76	123.7	30 43.3	63 76	124.2	30 24.4	63 76	124.6	30 05.4	64 75	125.1	29 46.3	64 75	125.5	29 27.1	64 74	126.0	7
8	30 53.3	61 78	122.1	30 34.9	61 77	122.6	30 16.4	62 77	123.0	29 57.8	62 76	123.5	29 39.1	62 76	123.9	29 20.3	63 76	124.4	29 01.5	63 75	124.8	28 42.5	63 75	125.3	8
9	30 06.7	60 78	121.4	29 48.5	61 78	121.9	29 30.2	61 78	122.3	29 11.9	61 77	122.8	28 53.4	62 77	123.2	28 34.9	62 76	123.7	28 16.3	62 76	124.1	27 57.6	63 76	124.6	9
50	29 19.7	60 79	120.7	29 01.8	60 78	121.2	28 43.7	60 78	121.7	28 25.6	61 78	122.1	28 07.4	61 77	122.6	27 49.1	61 77	123.0	27 30.7	61 76	123.5	27 12.3	62 76	123.9	50
1	28 32.4	59 79	120.1	28 14.7	59 79	120.5	27 56.9	60 79	121.0	27 39.0	60 78	121.4	27 21.0	60 78	121.9	27 03.0	60 78	122.3	26 44.8	61 77	122.8	26 26.6	61 77	123.2	1
2	27 44.9	58 80	119.4	27 27.4	58 80	119.9	27 09.8	59 79	120.3	26 52.1	59 79	120.8	26 34.3	59 78	121.3	26 16.5	60 78	121.7	25 58.6	60 78	122.1	25 40.6	60 77	122.6	2
3	26 57.0	57 80	118.8	26 39.7	58 80	119.3	26 22.3	58 80	119.7	26 04.9	58 79	120.2	25 47.3	59 79	120.6	25 29.7	59 78	121.1	25 12.0	59 78	121.5	24 54.2	59 78	122.0	3
4	26 08.8	57 81	118.2	25 51.7	57 80	118.6	25 34.6	57 80	119.1	25 17.3	58 80	119.5	25 00.0	58 79	120.0	24 42.6	58 79	120.4	24 25.1	58 79	120.9	24 07.6	59 78	121.3	4
55	25 20.3	56 81	117.6	25 03.5	56 81	118.0	24 46.5	57 80	118.5	24 29.5	57 80	118.9	24 12.4	57 80	119.4	23 55.2	57 80	119.8	23 37.9	58 79	120.3	23 20.6	58 79	120.7	55
6	24 31.6	55 82	117.0	24 14.9	56 81	117.4	23 58.2	56 81	117.9	23 41.4	56 81	118.3	23 24.5	56 80	118.8	23 07.5	57 80	119.2	22 50.4	57 80	119.7	22 33.3	57 79	120.1	6
7	23 42.6	55 82	116.4	23 26.2	55 82	116.8	23 09.6	55 82	117.3	22 53.0	56 81	117.7	22 36.3	56 81	118.2	22 19.5	56 80	118.6	22 02.7	56 80	119.1	21 45.8	57 80	119.5	7
8	22 53.4	54 82	115.8	22 37.1	54 82	116.2	22 20.8	55 82	116.7	22 04.3	55 82	117.1	21 47.8	55 81	117.6	21 31.3	55 81	118.0	21 14.6	56 80	118.5	20 57.9	56 80	118.9	8
9	22 03.9	53 83	115.2	21 47.8	54 82	115.7	21 31.7	54 82	116.1	21 15.4	54 82	116.6	20 59.1	54 82	117.0	20 42.8	55 81	117.5	20 26.3	55 81	117.9	20 09.8	55 80	118.4	9
60	21 14.2	53 83	114.7	20 58.3	53 83	115.1	20 42.3	53 83	115.6	20 26.3	54 82	116.0	20 10.2	54 82	116.5	19 54.0	54 82	116.9	19 37.8	54 81	117.4	19 21.5	54 81	117.8	60
1	20 24.3	52 84	114.1	20 08.6	52 83	114.6	19 52.8	53 83	115.0	19 36.9	53 83	115.5	19 21.0	53 82	115.9	19 05.0	53 82	116.4	18 49.0	54 82	116.8	18 32.9	54 82	117.3	1
2	19 34.2	52 84	113.6	19 18.6	52 84	114.0	19 03.0	52 83	114.5	18 47.3	52 83	114.9	18 31.6	53 83	115.4	18 15.8	53 82	115.8	17 59.9	53 82	116.3	17 44.0	53 82	116.7	2
3	18 43.8	51 84	113.0	18 28.4	51 84	113.5	18 13.0	52 84	113.9	17 57.5	52 83	114.4	17 42.0	52 83	114.8	17 26.3	52 83	115.3	17 10.7	52 82	115.7	16 54.9	53 82	116.2	3
4	17 53.3	51 84	112.5	17 38.1	51 84	113.0	17 22.8	51 84	113.4	17 07.5	51 84	113.9	16 52.1	51 83	114.3	16 36.7	52 83	114.8	16 21.2	52 83	115.2	16 05.6	52 82	115.7	4
65	17 02.5	50 85	112.0	16 47.5	50 84	112.4	16 32.4	50 84	112.9	16 17.3	51 84	113.3	16 02.1	51 84	113.8	15 46.8	51 84	114.2	15 31.5	51 83	114.7	15 16.1	51 83	115.1	65
6	16 11.6	49 85	111.5	15 56.8	50 85	111.9	15 41.8	50 85	112.4	15 26.8	50 84	112.8	15 11.8	50 84	113.3	14 56.7	50 84	113.7	14 41.6	51 84	114.2	14 26.4	51 83	114.6	6
7	15 20.5	49 86	111.0	15 05.8	49 85	111.4	14 51.1	49 85	111.9	14 36.2	49 84	112.3	14 21.4	50 84	112.8	14 06.5	50 84	113.2	13 51.5	50 84	113.7	13 36.5	50 84	114.1	7
8	14 29.3	48 86	110.5	14 14.7	49 86	110.9	14 00.1	49 85	111.4	13 45.5	49 85	111.8	13 30.7	49 85	112.3	13 16.0	49 84	112.7	13 01.2	49 84	113.2	12 46.3	50 84	113.6	8
9	13 37.9	48 86	110.0	13 23.4	48 86	110.5	13 09.0	48 85	110.9	12 54.5	48 85	111.4	12 39.9	49 85	111.8	12 25.3	49 85	112.3	12 10.7	49 84	112.7	11 56.0	49 84	113.1	9
70	12 46.3	47 86	109.5	12 32.0	48 86	110.0	12 17.7	48 86	110.4	12 03.4	48 86	110.9	11 49.0	48 85	111.3	11 34.5	48 85	111.8	11 20.1	48 85	112.2	11 05.5	48 84	112.7	70
1	11 54.5	47 86	109.1	11 40.4	47 86	109.5	11 26.3	47 86	110.0	11 12.1	47 86	110.4	10 57.8	48 86	110.9	10 43.5	48 85	111.3	10 29.2	48 85	111.7	10 14.9	48 85	112.2	1
2	11 02.7	47 87	108.6	10 48.7	47 86	109.0	10 34.7	47 86	109.5	10 20.6	47 86	109.9	10 06.5	47 86	110.4	9 52.4	47 86	110.8	9 38.2	47 85	111.3	9 24.0	47 85	111.7	2
3	10 10.6	46 87	108.1	9 56.8	46 87	108.6	9 42.9	46 86	109.0	9 29.0	46 86	109.5	9 15.1	47 86	109.9	9 01.1	47 86	110.4	8 47.1	47 86	110.8	8 33.0	47 85	111.3	3
4	9 18.5	46 87	107.7	9 04.8	46 87	108.1	8 51.0	46 87	108.6	8 37.3	46 86	109.0	8 23.5	46 86	109.5	8 09.6	46 86	109.9	7 55.8	46 86	110.4	7 41.9	46 86	110.8	4
75	8 26.2	45 87	107.2	8 12.6	45 87	107.7	7 59.0	45 87	108.1	7 45.4	45 87	108.6	7 31.7	46 86	109.0	7 18.0	46 86	109.5	7 04.3	46 86	109.9	6 50.6	46 86	110.4	75
6	7 33.8	45 88	106.8	7 20.3	45 87	107.2	7 06.8	45 87	107.7	6 53.4	45 87	108.1	6 39.8	45 87	108.6	6 26.3	45 86	109.0	6 12.7	45 86	109.5	5 59.1	45 86	109.9	6
7	6 41.2	44 88	106.3	6 27.9	44 88	106.8	6 14.6	45 87	107.2	6 01.2	45 87	107.7	5 47.8	45 87	108.1	5 34.4	45 87	108.6	5 21.0	45 86	109.0	5 07.5	45 86	109.5	7
8	5 48.6	44 88	105.9	5 35.4	44 88	106.4	5 22.2	44 88	106.8	5 08.9	44 87	107.3													8

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91																			5 09.4	40 88	75.9	5 21.3	40 88	75.4	91

Lat. 25°

Lat. 26°

Lat 27°

Lat 28°

Lat. 24°

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	82 00.0	1.0 06	180.0	82 30.0	1.0 06	180.0	83 00.0	1.0 06	180.0	83 30.0	1.0 07	180.0
1	81 56.7	99 16	173.1	82 26.5	99 17	172.7	82 56.3	99 18	172.2	83 26.0	99 20	171.6
2	81 47.0	97 26	166.4	82 16.2	97 28	165.6	82 45.2	97 30	164.7	83 14.2	96 32	163.6
3	81 31.1	96 36	160.1	81 59.4	94 38	158.9	82 27.5	93 40	157.6	82 55.3	92 42	156.1
4	81 09.8	91 44	154.1	81 36.9	90 46	152.7	82 03.7	89 48	151.1	82 30.1	87 51	149.3
05	80 43.5	87 51	148.7	81 09.4	86 53	147.1	81 34.8	84 55	145.3	81 59.7	82 58	143.4
6	80 13.0	83 57	143.7	80 37.6	81 59	142.0	81 01.6	79 61	140.1	81 25.0	77 64	138.1
7	79 38.9	78 62	139.3	80 02.1	77 64	137.5	80 24.8	74 66	135.6	80 46.7	72 68	133.5
8	79 01.7	74 66	135.3	79 23.7	72 68	133.5	79 45.1	70 70	131.6	80 05.7	67 72	129.5
9	78 22.0	71 70	131.8	78 42.8	68 72	130.0	79 02.9	66 74	128.0	79 22.3	63 75	126.0
10	77 40.1	67 73	128.6	77 59.8	65 74	126.8	78 18.9	62 76	124.9	78 37.1	59 78	122.9
1	76 56.4	64 75	125.7	77 15.1	61 77	124.0	77 33.2	59 78	122.2	77 50.4	56 80	120.2
2	76 11.2	61 78	123.2	76 29.0	58 79	121.5	76 46.1	56 80	119.7	77 02.5	53 82	117.8
3	75 24.7	58 79	120.8	75 41.7	56 80	119.2	75 58.0	53 82	117.5	76 13.5	51 83	115.7
4	74 37.1	55 81	118.7	74 53.4	53 82	117.1	75 08.9	51 83	115.5	75 23.8	48 84	113.8
15	73 48.6	53 82	116.8	74 04.2	51 83	115.3	74 19.1	48 84	113.7	74 33.3	46 85	112.1
6	72 59.4	51 83	115.1	73 14.3	49 84	113.6	73 28.6	46 85	112.1	73 42.2	44 86	110.5
7	72 09.4	49 84	113.5	72 23.8	47 85	112.0	72 37.5	45 86	110.6	72 50.6	42 87	109.0
8	71 18.8	47 85	112.0	71 32.7	45 86	110.6	71 46.0	43 87	109.2	71 58.6	41 87	107.7
9	70 27.8	46 86	110.6	70 41.2	44 86	109.3	70 54.0	42 87	107.9	71 06.2	40 88	106.5
20	69 36.3	44 86	109.4	69 49.3	42 87	108.1	70 01.7	40 88	106.7	70 13.5	38 88	105.4
1	68 44.4	43 87	108.2	68 57.0	41 88	106.9	69 09.0	39 88	105.7	69 20.5	37 89	104.4
2	67 52.1	42 88	107.1	68 04.4	40 88	105.9	68 16.1	38 89	104.6	68 27.3	36 89	103.4
3	66 59.6	41 88	106.1	67 11.6	39 88	104.9	67 23.0	37 89	103.7	67 33.9	35 89	102.5
4	66 06.8	40 88	105.1	66 18.5	38 89	103.9	66 29.6	36 89	102.8	66 40.3	35 90	101.6
25	65 13.8	39 89	104.2	65 25.2	37 89	103.1	65 36.1	36 90	101.9	65 46.5	34 90	100.8
6	64 20.5	38 89	103.3	64 31.7	36 90	102.2	64 42.4	35 90	101.1	64 52.6	33 90	100.0
7	63 27.1	37 89	102.5	63 38.0	36 90	101.4	63 48.5	34 90	100.4	63 58.6	33 90	99.3
8	62 33.5	37 90	101.7	62 44.2	35 90	100.7	62 54.6	34 90	99.7	63 04.4	32 90	98.6
9	61 39.7	36 90	100.9	61 50.3	35 90	100.0	62 00.5	33 90	99.0	62 10.2	32 91	98.0
30	60 45.9	35 90	100.2	60 56.3	34 90	99.3	61 06.3	33 90	98.3	61 15.8	31 91	97.3
1	59 51.9	35 90	99.6	60 02.1	34 90	98.6	60 12.0	32 91	97.7	60 21.4	31 91	96.7
2	58 57.8	34 90	98.9	59 07.9	33 90	98.0	59 17.6	32 91	97.1	59 27.0	30 91	96.1
3	58 03.6	34 90	98.3	58 13.6	33 91	97.4	58 23.2	31 91	96.5	58 32.4	30 91	95.6
4	57 09.3	34 91	97.7	57 19.2	32 91	96.8	57 28.7	31 91	95.9	57 37.9	30 91	95.0
35	56 14.9	33 91	97.1	56 24.7	32 91	96.2	56 34.2	31 91	95.4	56 43.2	30 91	94.5
6	55 20.5	33 91	96.5	55 30.2	32 91	95.7	55 39.6	31 91	94.8	55 48.6	29 91	94.0
7	54 26.0	33 91	96.0	54 35.6	32 91	95.1	54 44.9	30 91	94.3	54 53.9	29 91	93.5
8	53 31.5	32 91	95.4	53 41.0	31 91	94.6	53 50.2	30 91	93.8	53 59.2	29 91	93.0
9	52 36.9	32 91	94.9	52 46.4	31 91	94.1	52 55.5	30 91	93.3	53 04.4	29 91	92.6
40	51 42.2	32 91	94.4	51 51.7	31 91	93.6	52 00.8	30 91	92.9	52 09.6	29 91	92.1
1	50 47.6	32 91	93.9	50 57.0	31 91	93.2	51 06.1	30 91	92.4	51 14.9	29 91	91.7
2	49 52.9	32 91	93.4	50 02.2	31 91	92.7	50 11.3	30 91	92.0	50 20.1	29 91	91.2
3	48 58.1	32 91	93.0	49 07.5	31 91	92.3	49 16.5	30 91	91.5	49 25.3	29 91	90.8
4	48 03.4	31 91	92.5	48 12.7	31 91	91.8	48 21.7	30 91	91.1	48 30.5	29 91	90.4
45	47 08.6	31 91	92.1	47 17.9	30 91	91.4	47 26.9	30 91	90.7	47 35.6	29 91	90.0
6	46 13.8	31 91	91.6	46 23.1	30 91	91.0	46 32.1	30 91	90.3	46 40.8	29 91	89.6
7	45 19.0	31 91	91.2	45 28.3	30 91	90.5	45 37.3	30 91	89.9	45 46.0	29 91	89.2
8	44 24.2	31 91	90.8	44 33.5	30 91	90.1	44 42.5	30 91	89.4	44 51.2	29 91	88.8
9	43 29.4	31 91	90.4	43 38.7	30 91	89.7	43 47.6	30 91	89.1	43 56.4	29 91	88.4
50	42 34.6	31 91	90.0	42 43.8	30 91	89.3	42 52.8	30 91	88.7	43 01.6	29 91	88.0
1	41 39.8	31 91	89.6	41 49.0	30 91	88.9	41 58.1	30 91	88.3	42 06.9	29 91	87.6
2	40 45.0	31 91	89.2	40 54.2	30 91	88.5	41 03.3	30 91	87.9	41 12.1	29 91	87.3
3	39 50.2	31 91	88.8	39 59.4	31 91	88.1	40 08.5	30 91	87.5	40 17.4	29 91	86.9
4	38 55.4	31 91	88.4	39 04.7	31 91	87.8	39 13.8	30 91	87.2	39 22.6	29 91	86.5
55	38 00.6	31 91	88.0	38 09.9	31 91	87.4	38 19.0	30 91	86.8	38 27.9	29 91	86.2
6	37 05.8	31 91	87.6	37 15.2	31 91	87.0	37 24.3	30 91	86.4	37 33.3	30 91	85.8
7	36 11.1	31 91	87.2	36 20.4	31 91	86.7	36 29.6	30 91	86.1	36 38.6	30 91	85.5
8	35 16.3	32 91	86.9	35 25.7	31 91	86.3	35 34.9	30 91	85.7	35 44.0	30 91	85.1
9	34 21.6	32 91	86.5	34 31.0	31 91	85.9	34 40.3	31 91	85.3	34 49.4	30 91	84.8
60	33 26.9	32 91	86.1	33 36.4	31 91	85.6	33 45.7	31 91	85.0	33 54.8	30 91	84.4
1	32 32.2	32 91	85.8	32 41.7	31 91	85.2	32 51.1	31 91	84.6	33 00.3	30 91	84.1
2	31 37.6	32 91	85.4	31 47.1	32 91	84.8	31 56.5	31 91	84.3	32 05.8	31 91	83.7
3	30 43.0	32 91	85.0	30 52.6	32 91	84.5	31 02.0	31 91	83.9	31 11.3	31 91	83.4
4	29 48.4	32 91	84.7	29 58.0	32 91	84.1	30 07.5	31 91	83.6	30 16.9	31 91	83.0
65	28 53.8	33 91	84.3	29 03.5	32 91	83.8	29 13.1	32 91	83.2	29 22.5	31 91	82.7
6	27 59.3	33 91	84.0	28 09.0	32 91	83.4	28 18.6	32 91	82.9	28 28.1	31 90	82.4
7	27 04.8	33 91	83.6	27 14.6	32 91	83.1	27 24.3	32 90	82.6	27 33.8	32 90	82.0
8	26 10.3	33 91	83.3	26 20.2	33 90	82.7	26 29.9	32 90	82.2	26 39.6	32 90	81.7
9	25 15.9	33 91	82.9	25 25.9	33 90	82.4	25 35.7	33 90	81.9	25 45.4	32 90	81.3
70	24 21.6	33 90	82.6	24 31.6	33 90	82.0	24 41.4	33 90	81.5	24 51.2	32 90	81.0
1	23 27.2	34 90	82.2	23 37.3	33 90	81.7	23 47.2	33 90	81.2	23 57.1	33 90	80.7
2	22 33.0	34 90	81.8	22 43.1	34 90	81.3	22 53.1	33 90	80.8	23 03.0	33 90	80.3
3	21 38.7	34 90	81.5	21 48.9	34 90	81.0	21 59.0	34 90	80.5	22 09.0	33 90	80.0
4	20 44.5	34 90	81.1	20 54.8	34 90	80.6	21 05.0	34 90	80.1	21 15.1	33 90	79.6
75	19 50.4	35 90	80.8	20 00.8	34 90	80.3	20 11.0	34 90	79.8	20 21.2	34 90	79.3
6	18 56.3	35 90	80.4	19 06.8	35 90	79.9	19 17.1	34 90	79.4	19 27.4	34 90	78.9
7	18 02.3	35 90	80.1	18 12.8	35 90	79.6	18 23.2	35 90	79.1	18 33.6	34 90	78.6
8	17 08.3	35 90	79.7	17 18.9	35 90	79.2	17 29.5	35 90	78.7	17 39.9	35 89	78.2
9	16 14.4	36 90	79.4	16 25.1	35 90	78.9	16 35.7	35 89	78.4	16 46.2	35 89	77.9
80	15 20.6	36 90	79.0	15 31.4	36 90	78.5	15 42.1	36 89	78.0	15 52.7	35 89	77.6
1	14 26.8	36 89	78.6	14 37.7	36 89	78.2	14 48.5	36 89	77.7	14 59.2	36 89	77.2
2	13 33.1	37 89	78.3	13 44.1	36 89	77.8	13 55.0	36 89	77.3	14 05.8	36 89	76.8
3	12 39.5	37 89	77.9	12 50.5	37 89	77.4	13 01.5	37 89	77.0	13 12.5	36 89	76.5
4	11 45.9	37 89	77.6	11 57.1	37 89	77.1	12 08.2	37 89	76.6	12 19.2	37 88	76.1
85	10 52.4	38 89	77.2	11 03.7	37 89	76.7	11 14.9	37 89	76.2	11 26.1	37 88	75.8
6	9 59.0	38 89	76.8	10 10.4	38 89	76.4	10 21.7	38 88	75.9	10 33.0	38 88	75.4
7	9 05.7	38 89	76.5	9 17.2	38 89	76.0	9 28.6	38 88	75.5	9 40.0	38 88	75.0
8	8 12.5	39 89	76.1	8 24.0	39 88	75.6	8 35.6	38 88	75.1	8 47.1	38 88	74.7
9	7 19.3	39 88	75.7	7 31.0	39 88	75.2	7 42.6	39 88	74.8	7 54.2	39 88	74.3
90	6 26.2	39 88	75.3	6 38.0	39 88	74.9	6 49.8	39 88	74.4	7 01.5	39 88	73.9

H.A.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	84 00.0	1.0 07	180.0	84 30.0	1.0 08	180.0	85 00.0	1.0 08	180.0	85 30.0	1.0 10	180.0
1	83 55.7	99 21	171.0	84 25.3	99 23	170.2	84 54.9	98 25	169.3	85 24.3	98 27	168.1
2	83 43.0	96 34	162.3	84 11.6	95 36	160.9	84 39.9	94 39	159.2	85 07.9	93 42	157.2
3	83 22.8	91 44	154.4	83 49.9	90 48	152.5	84 16.5	88 51	150.3	84 42.5	86 54	147.7
4	82 56.1	86 53	147.4	83 21.4	83 56	145.1	83 46.1	81 60	142.6	84 09.9	78 63	139.7
05	82 24.0	80 60	141.2	82 47.6	77 64	138.8	83 10.3	74 66	136.1	83 32.1	71 70	133.1
6	81 47.7	74 66	135.9	82 09.5	71 69	133.4	82 30.5	68 72	130.7	82 50.3	64 74	127.8
7	81 07.9	69 71	131.2	81 28.2	66 73	128.8	81 47.5	63 76	126.2	82 05.7	59 78	123.3
8	80 25.4	64 74	127.3	80 44.3	61 76	124.9	81 02.2	58 78	122.4	81 19.0	54 81	119.7
9	79 40.8	60 77	123.8	79 58.5	57 79	121.6	80 15.1	54 81	119.1	80 30.6	50 83	116.6
10	78 54.5	57 80	120.9	79 11.0	53 81	118.7	79 26.6	50 83	116.3	79 41.0	46 84	113.9
1	78 06.8	53 81	118.2	78 22.4	50 83	116.1	78 36.9	47 84	113.9	78 50.5	43 86	111.7
2	77 18.0	50 83	115.9	77 32.7	47 84	113.9	77 46.4	44 85	111.8	77 59.2	41 86	109.7
3	76 28.3	48 84	113.9	76 42.2	45 85	111.9	76 55.2	42 86	110.0	77 07.3	39 87	107.9
4	75 37.8	45 85	112.0	75 51.0	43 86	110.2	76 03.4	40 87	108.3	76 14.9	37 88	106.4
15	74 46.7	43 86	110.4	74 59.3	41 87	108.6	75 11.2	38 88	106.8	75 22.2	35 88	105.0
6	73 55.1	42 87	108.9	74 07.2	39 88	107.2	74 18.5	36 88	105.5	74 29.1	34 89	103.8
7	73 03.0	40 88	107.5	73 14.6	38 88	105.9	73 25.6	35 89	104.3	73 35.7	33 89	102.6
8	72 10.5	39 88	106.2	72 21.8	36 89	104.7	72 32.3	34 89	103.2	72 42.1	31 90	101.6
9	71 17.7	37 88	105.1	71 28.6	35 89	103.6	71 38.8	33 90	102.1	71 48.3	30 90	100.6
20	70 24.7	36 89	104.0	70 35.2	34 89	102.6	70 45.1	32 90	101.2	70 54.4	30 90	99.7
1	69 31.4	35 89	103.0	69 41.7	33 90	101.7	69 51.3	31 90	100.3	70 00.3	29 90	98.9
2	68 37.9	34 90	102.1	68 47.9	32 90	100.8	68 57.3	30 90	99.5	69 06.1	28 90	98.1
3	67 44.2	34 90	101.2	67 54.0	32 90	100.0	68 03.2	30 90	98.7	68 11.8	28 91	97.4
4	66 50.4	33 90	100.4	66 59.9	31 90	99.2	67 08.9	29 90	98.0	67 17.4	27 91	96.7
25	65 56.4	32 90	99.6	66 05.8	30 90	98.5	66 14.6	29 91	97.3	66 22.9	27 91	96.1
6	65 02.3	32 90	98.9	65 11.5	30 90	97.8	65 20.2	28 91	96.6	65 28.4	26 91	95.5
7	64 08.1	31 90	98.2	64 17.2	29 91	97.1	64 25.7	28 91	96.0	64 33.8	26 91	94.9
8	63 13.8	31 91	97.6	63 22.7	29 91	96.5	63 31.2	27 91	95.4	63 39.1	26 91	94.3
9	62 19.4	30 91	96.9	62 28.2	29 91	95.9	62 36.6	27 91	94.9	62 44.5	25 91	93.8
30	61 25.0	30 91	96.3	61 33.7	28 91	95.3	61 42.0	27 91	94.3	61 49.8	25 91	93.3
1	60 30.5	29 91	95.7	60 39.1	28 91	94.8	60 47.3	27 91	93.8	60 55.0	25 91	92.8
2	59 35.9	29 91	95.2	59 44.4	28 91	94.2	59 52.6	26 91	93.3	60 00.3	25 91	92.3
3	58 41.3	29 91	94.7	58 49.8	28 91	93.7	58 57.8	26 91	92.8	59 05.5	25 91	91.9
4	57 46.6	29 91	94.1	57 55.1	27 91	93.2	58 03.1	26 91	92.3	58 10.7	25 91	91.4
35	56 52.0	28 91	93.6	57 00.3	27 91	92.7	57 08.3	26 91	91.9	57 15.9	25 91	91.0
6	55 57.2	28 91	93.1	56 05.6	27 91	92.3	56 13.5	26 91	91.4	56 21.1	25 91	90.5
7	55 02.5	28 91	92.7	55 10.8	27 91	91.8	55 18.7	26 91	91.0	55 26.3	25 91	90.1
8	54 07.7	28 91	92.2	54 16.0	27 91	91.4	54 23.9	26 91	90.6	54 31.5	25 91	89.7
9	53 13.0	28 91	91.8	53 21.2	27 91	90.9	53 29.1	26 91	90.1	53 36.7	25 91	89.3
40	52 18.2	28 91	91.3	52 26.4	27 91	90.5	52 34.3	26 91	89.7	52 41.9	25 91	88.9
1	51 23.4	28 91	90.9	51 31.6	27 91	90.1	51 39.5	26 91	89.3	51 47.1	25 91	88.6
2	50 28.6	28 91	90.5	50 36.8	27 91	89.7	50 44.7	26 91	88.9	50 52.3	25 91	88.2
3	49 33.7	28 91	90.1	49 41.9	27 91	89.3	49 49.9	26 91	88.6	49 57.5	25 91	87.8
4	48 38.9	28 91	89.6	48 47.1	27 91	88.9	48 55.1	26 91	88.2	49 02.7	25 91	87.5
45	47 44.1	28 91	89.3	47 52.3	27 91	88.5	48 00.3	26 91	87.8	48 08.0	25 91	87.1
6	46 49.3	28 91	88.9	46 57.6	27 91	88.2	47 05.5	26 91	87.5	47 13.2	25 91	86.7
7	45 54.5	28 91	88.5	46 02.8	27 91	87.8	46 10.8	26 91	87.1	46 18.5	25 91	86.4
8	44 59.7	28 91	88.1	45 08.0	27 91	87.4	45 16.0	26 91	86.7	45 23.8	26 91	86.0
9	44 05.0	28 91	87.7	44 13.3	27 91	87.1	44 21.3	26 91	86.4	44 29.2	26 91	85.7
50	43 10.2	28 91	87.4	43 18.5	27 91	86.7	43 26.6	27 91	86.0	43 34.5	26 91	85.4
1	42 15.4	28 91	87.0	42 23.8	28 91	86.3	42 32.0	27 91	85.7	42 39.9	26 91	85.0
2	41 20.7	28 91	86.6	41 29.1	28 91	86.0	41 37.3	27 91	85.3	41 45.3	26 91	84.7
3	40 26.0	29 91	86.3	40 34.5	28 91	85.6	40 42.7	27 91	85.0	40 50.7	26 91	84.4
4	39 31.3	29 91	85.9	39 39.8	28 91	85.3	39 48.1	27 91	84.7	39 56.2	27 91	84.0
55	38 36.7	29 91	85.6	38 45.2	28 91	85.0	38 53.5	28 91	84.3	39 01.7	27 91	83.7
6	37 42.0	29 91	85.2	37 50.6	28 91	84.6	37 59.0	28 91	84.0	38 07.2	27 91	83.4
7	36 47.4	29 91	84.9	36 56.1	29 91	84.3	37 04.5	28 91	83.7	37 12.8	27 91	83.1
8	35 52.8	29 91	84.5	36 01.5	29 91	83.9	36 10.1	28 91	83.3	36 18.4	28 90	82.7
9	34 58.3	29 91	84.2	35 07.1	29 91	83.6	35 15.6	28 91	83.0	35 24.1	28 90	82.4
60	34 03.8	30 91	83.8	34 12.6	29 91	83.3	34 21.3	29 91	82.7	34 29.7	28 90	82.1
1	33 09.3	30 91	83.5	33 18.2	29 91	82.9	33 26.9	29 90	82.4	33 35.5	28 90	81.8
2	32 14.9	30 91	83.2	32 23.8	30 90	82.6	32 32.6	29 90	82.0	32 41.2	29 90	81.5
3	31 20.5	30 91	82.8	31 29.5	30 90	82.3	31 38.3	29 90	81.7	31 47.1	29 90	81.1
4	30 26.1	31 90	82.5	30 35.2	30 90	81.9	30 44.1	30 90	81.4	30 52.9	29 90	80.8
65	29 31.8	31 90	82.2	29 40.9	30 90	81.6	29 50.0	30 90	81.1	29 58.8	29 90	80.5
6	28 37.5	31 90	81.8	28 46.7	31 90	81.3	28 55.8	30 90	80.7	29 04.8	30 90	80.2
7	27 43.3	31 90	81.5	27 52.6	31 90	80.9	28 01.8	30 90	80.4	28 10.8	30 90	79.9
8	26 49.1	31 90	81.1	26 58.5	31 90	80.6	27 07.7	31 90	80.1	27 16.9	30 90	79.5
9	25 55.0	32 90	80.8	26 04.4	31 90	80.3	26 13.8	31 90	79.8	26 23.0	31 90	79.2
70	25 00.9	32 90	80.5	25 10.4	32 90	79.9	25 19.9	31 90	79.4	25 29.2	31 90	78.9
1	24 06.8	32 90	80.1	24 16.5	32 90	79.6	24 26.0	32 90	79.1	24 35.4	31 90	78.6
2	23 12.9	33 90	79.8	23 22.6	32 90	79.3	23 32.2	32 90	78.8	23 41.7	32 89	78.3
3	22 18.9	33 90	79.5	22 28.8	33 90	79.0	22 38.5	32 90	78.4	22 48.1	32 89	77.9
4	21 25.1	33 90	79.1	21 35.0	33 90	78.6	21 44.8	33 89	78.1	21 54.5	32 89	77.6
75	20 31.3	34 90	78.8	20 41.3	33 89	78.3	20 51.2	33 89	77.8	21 01.0	33 89	77.3
6	19 37.6	34 90	78.4	19 47.7	34 89	77.9	19 57.7	33 89	77.4	20 07.6	33 89	76.9
7	18 43.9	34 89	78.1	18 54.1	34 89	77.6	19 04.2	34 89	77.1	19 14.3	33 89	76.6
8	17 50.3	34 89	77.8	18 00.6	34 89	77.3	18 10.8	34 89	76.8	18 21.0	34 89	76.3
9	16 56.8	35 89	77.4	17 07.2	35 89	76.9	17 17.5	34 89	76.4	17 27.8	34 89	75.9
80	16 03.3	35 89	77.1	16 13.8	35 89	76.6	16 24.3	35 89	76.1	16 34.6	34 88	75.6
1	15 09.9	36 89	76.7	15 20.5	35 89	76.2	15 31.1	35 88	75.7	15 41.6	35 88	75.3
2	14 16.6	36 89	76.4	14 27.3	36 88	75.9	14 38.0	35 88	75.4	14 48.6	35 88	74.9
3	13 23.4	36 89	76.0	13 34.2	36 88	75.5	13 45.0	36 88	75.1	13 55.7	36 88	74.6
4	12 30.2	37 88	75.7	12 41.2	36 88	75.2	12 52.1	36 88	74.7	13 02.9	36 88	74.2
85	11 37.2	37 88	75.3	11 48.2	37 88	74.8	11 59.3	37 88	74.3	12 10.2	36 88	73.9
6	10 44.2	37 88	74.9	10 55.4	37 88	74.5	11 06.5	37 88	74.0	11 17.6	37 88	73.5
7	9 51.3	38 88	74.6	10 02.6	38 88	74.1	10 13.9	38 88	73.6	10 25.1	37 87	73.2
8	8 58.5	38 88	74.2	9 10.0	38 88	73.7	9 21.4	38 88	73.3	9 32.7	38 87	72.8
9	8 05.8	39 88	73.8	8 17.4	38 88	73.4	8 28.9	38 87	72.9	8 40.4	38 87	72.4
90	7 13.2	39 88	73.5	7 24.9	39 87	73.0	7 36.6	39 87	72.5	7 48.2	39 87	72.1

Lat. 24°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	50 00.0	1.0	01	180.0	49 30.0	1.0	01	180.0	49 00.0	1.0	01	180.0	48 30.0	1.0	01	180.0	48 00.0	1.0	01	180.0	47 30.0	1.0	01	180.0	47 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	00
1	49 59.3	1.0	04	178.5	49 29.3	1.0	04	178.5	48 59.3	1.0	04	178.5	48 29.3	1.0	04	178.6	47 59.3	1.0	03	178.6	47 29.3	1.0	03	178.6	46 59.3	1.0	03	178.6	46 29.3	1.0	03	178.6	1
2	49 57.1	1.0	06	177.0	49 27.2	1.0	06	177.0	48 57.2	1.0	06	177.1	48 27.2	1.0	06	177.1	47 57.3	1.0	06	177.2	47 27.3	1.0	06	177.2	46 57.4	1.0	06	177.2	46 27.4	1.0	06	177.3	2
3	49 53.6	1.0	08	175.5	49 23.7	1.0	08	175.6	48 53.7	1.0	08	175.6	48 23.8	1.0	08	175.7	47 53.9	1.0	08	175.7	47 24.0	1.0	08	175.8	46 54.0	1.0	08	175.8	46 24.1	1.0	08	175.9	3
4	49 48.6	1.0	11	174.0	49 18.7	1.0	10	174.1	48 48.9	1.0	10	174.2	48 19.0	1.0	10	174.3	47 49.1	1.0	10	174.3	47 19.3	1.0	10	174.4	46 49.4	1.0	10	174.5	46 19.5	1.0	10	174.5	4
05	49 42.2	99	13	172.6	49 12.4	99	13	172.7	48 42.6	99	13	172.7	48 12.8	99	12	172.8	47 43.1	99	12	172.9	47 13.3	99	12	173.0	46 43.5	99	12	173.1	46 13.7	99	12	173.2	05
6	49 34.4	99	15	171.1	49 04.7	99	15	171.2	48 35.0	99	15	171.3	48 05.3	99	15	171.4	47 35.6	99	14	171.5	47 05.9	99	14	171.6	46 36.2	99	14	171.7	46 06.5	99	14	171.8	6
7	49 25.2	99	18	169.6	48 55.6	99	17	169.8	48 26.1	99	17	169.9	47 56.5	99	17	170.0	47 26.9	99	17	170.1	46 57.3	99	16	170.3	46 27.7	99	16	170.4	45 58.1	99	16	170.5	7
8	49 14.6	98	20	168.2	48 45.2	98	20	168.3	48 15.8	98	19	168.5	47 46.3	98	19	168.6	47 16.9	98	19	168.7	46 47.4	98	19	168.9	46 17.9	98	18	169.0	45 48.4	98	18	169.2	8
9	49 02.7	98	22	166.7	48 33.5	98	22	166.9	48 04.2	98	22	167.1	47 34.8	98	21	167.2	47 05.5	98	21	167.4	46 36.2	98	21	167.5	46 06.8	98	20	167.7	45 37.5	98	20	167.8	9
10	48 49.5	97	24	165.3	48 20.4	97	24	165.5	47 51.2	97	24	165.7	47 22.1	97	24	165.8	46 52.9	97	23	166.0	46 23.7	97	23	166.2	45 54.5	97	22	166.4	45 25.3	97	22	166.5	10
1	48 35.0	96	26	163.9	48 06.0	97	26	164.1	47 37.0	97	26	164.3	47 08.0	97	25	164.5	46 39.0	97	25	164.7	46 10.0	97	25	164.9	45 41.0	97	24	165.0	45 11.9	97	24	165.2	1
2	48 19.1	96	28	162.5	47 50.4	96	28	162.7	47 21.6	96	28	162.9	46 52.8	96	28	163.1	46 23.9	96	27	163.3	45 55.1	96	27	163.5	45 26.2	96	26	163.7	44 57.3	96	26	163.9	2
3	48 02.0	95	30	161.1	47 33.5	95	30	161.4	47 04.9	95	30	161.6	46 36.3	95	30	161.8	46 07.6	96	29	162.0	45 39.0	96	29	162.2	45 10.3	96	28	162.4	44 41.6	96	28	162.6	3
4	47 43.7	94	32	159.8	47 15.3	95	32	160.0	46 46.9	95	32	160.3	46 18.5	95	32	160.5	45 50.1	95	31	160.7	45 21.6	95	31	160.9	44 53.1	95	30	161.2	44 24.6	95	30	161.4	4
15	47 24.1	94	34	158.4	46 56.0	94	34	158.7	46 27.8	94	34	158.9	45 59.6	94	33	159.2	45 31.4	94	33	159.4	45 03.2	94	33	159.7	44 34.9	94	32	159.9	44 06.6	94	32	160.1	15
6	47 03.4	93	36	157.1	46 35.5	93	36	157.4	46 07.6	93	36	157.6	45 39.6	93	35	157.9	45 11.6	93	35	158.2	44 43.6	94	35	158.4	44 15.5	94	34	158.7	43 47.4	94	34	158.9	6
7	46 41.5	92	38	155.8	46 13.8	92	38	156.1	45 46.2	92	38	156.4	45 18.4	93	37	156.6	44 50.6	93	37	156.9	44 22.8	93	36	157.2	43 55.0	93	36	157.4	43 27.1	93	36	157.7	7
8	46 18.5	91	40	154.5	45 51.1	91	40	154.8	45 23.6	92	39	155.1	44 56.1	92	39	155.4	44 28.6	92	38	155.7	44 01.0	92	38	156.0	43 33.4	92	38	156.2	43 05.8	92	37	156.5	8
9	45 54.4	90	42	153.3	45 27.2	91	42	153.6	45 00.0	91	41	153.9	44 32.8	91	41	154.2	44 05.5	91	40	154.5	43 38.2	91	40	154.7	43 10.8	91	39	155.0	42 43.4	91	39	155.3	9
20	45 29.2	90	44	152.0	45 02.3	90	43	152.3	44 35.4	90	43	152.7	44 08.4	90	42	153.0	43 41.4	90	42	153.3	43 14.3	90	42	153.6	42 47.2	90	41	153.9	42 20.0	91	41	154.1	20
1	45 03.0	89	45	150.8	44 36.4	89	45	151.1	44 09.7	89	44	151.5	43 43.0	89	44	151.8	43 16.2	89	44	152.1	42 49.4	89	43	152.4	42 22.5	90	43	152.7	41 55.6	90	42	153.0	1
2	44 35.7	88	47	149.6	44 09.4	88	46	150.0	43 43.0	88	46	150.3	43 16.6	88	46	150.6	42 50.1	88	45	150.9	42 23.5	89	45	151.2	41 56.9	89	44	151.6	41 30.2	89	44	151.9	2
3	44 07.5	87	49	148.4	43 41.5	87	48	148.8	43 15.4	87	48	149.1	42 49.2	87	47	149.5	42 23.0	88	47	149.8	41 56.7	88	46	150.1	41 30.3	88	46	150.4	41 03.9	88	45	150.8	3
4	43 38.4	86	50	147.3	43 12.6	86	50	147.7	42 46.8	86	49	148.0	42 20.9	86	49	148.3	41 54.9	87	48	148.7	41 28.9	87	48	149.0	41 02.8	87	47	149.3	40 36.7	87	47	149.7	4
25	43 08.3	85	52	146.2	42 42.8	85	51	146.5	42 17.3	85	51	146.9	41 51.7	86	50	147.2	41 26.0	86	50	147.6	41 00.2	86	49	147.9	40 34.4	86	49	148.3	40 08.6	86	48	148.6	25
6	42 37.4	84	53	145.1	42 12.2	84	53	145.4	41 46.9	84	52	145.8	41 21.6	85	52	146.2	40 56.2	85	51	146.5	40 30.7	85	51	146.9	40 05.2	85	50	147.2	39 39.6	85	50	147.5	6
7	42 05.6	83	54	144.0	41 40.6	83	54	144.4	41 15.7	83	54	144.7	40 50.6	84	53	145.1	40 25.5	84	52	145.4	40 00.3	84	52	145.8	39 35.0	84	52	146.2	39 09.7	84	51	146.5	7
8	41 32.9	82	56	142.9	41 08.3	82	55	143.3	40 43.6	82	55	143.7	40 18.8	83	54	144.0	39 54.0	83	54	144.4	39 29.1	83	53	144.8	39 04.1	83	53	145.1	38 39.1	84	52	145.5	8
9	40 59.5	81	57	141.9	40 35.1	81	56	142.3	40 10.7	81	56	142.6	39 46.2	82	56	143.0	39 21.7	82	55	143.4	38 57.1	82	55	143.8	38 32.4	82	54	144.1	38 07.6	83	54	144.5	9
30	40 25.2	80	58	140.9	40 01.2	80	58	141.2	39 37.1	81	57	141.6	39 12.9	81	57	142.0	38 48.6	81	56	142.4	38 24.3	81	56	142.8	37 59.9	81	56	143.1	37 35.4	82	55	143.5	30
1	39 50.3	79	60	139.9	39 26.5	79	59	140.2	39 02.7	80	58	140.6	38 38.8	80	58	141.0	38 14.8	80	58	141.4	37 50.7	80	57	141.8	37 26.6	81	57	142.2	37 02.4	81	56	142.5	1
2	39 14.6	78	61	138.9	38 51.1	78	60	139.3	38 27.6	79	60	139.7	38 03.9	79	59	140.1	37 40.2	79	59	140.5	37 16.5	79	58	140.8	36 52.6	80	58	141.2	36 28.7	80	57	141.6	2
3	38 38.2	77	62	137.9	38 15.0	77	61	138.3	37 51.7	78	61	138.7	37 28.4	78	60	139.1	37 05.0	78	60	139.5	36 41.5	78	59	139.9	36 17.9	79	59	140.3	35 54.3	79	58	140.7	3
4	38 01.1	76	63	137.0	37 38.2	76	62	137.4	37 15.3	77	62	137.8	36 52.2	77	62	138.2	36 29.1	77	61	138.6	36 05.9	77	60	139.0	35 42.6	78	60	139.4	35 19.2	78	60	139.8	4
35	37 23.4	75	64	136.1	37 00.8	75	64	136.5	36 38.1	76	63	136.9	36 15.3	76	62	137.3	35 52.5	76	62	137.7	35 29.6	77	62	138.1	35 06.6	77	61	138.5	34 43.5	77	61	138.9	35
6	36 45.0	74	65	135.2	36 22.7	75	64	135.6	36 00.3	75	64	136.0	35 37.8	75	64	136.4	35 15.3	75	63	136.8	34 52.6	76	62	137.2	34 29.9	76	62	137.6	34 07.1	76	62	138.0	6
7	36 06.1	73	66	134.3	35 44.1	74	66	134.7	35 21.9	74	65	135.1	34 59.7	74	64	135.5	34 37.5	74	64	135.9	34 15.1	75	64	136.3	33 52.7	75	63	136.7	33 30.1	75	62	137.1	7
8	35 26.5	72	67	133.4	35 04.8	73	66	133.8	34 43.0	73	66	134.3	34 21.0	73	65	134.7	33 59.0	73	65	135.1	33 37.0	74	65	135.5	33 14.8	74	64	135.9	32 52.6	74	64	136.3	8
9	34 46.5	71	68	132.6	34 25.0	72	67	133.0	34 03.4	72	67	133.4	33 41.8	72	66	133.8	33 20.1	73	66	134.2	32 58.2	73	65	134.7	32 36.4	73	65	135.1	32 14.4	73	64	135.5	9
40	34 05.8	71	69	131.7	33 44.6	71	68	132.2	33 23.3	71	68	132.6	33 02.0	71	67	133.0	32 40.5	72	67	133.4	32 19.0	72	66	133.8	31 57.4	72	66	134.2	31 35.7	72	66	134.7	40
1	33 24.7	70	70	130.9	33 03.7	70	69	131.4	32 42.7	70	68	131.8	32 21.6	70	68	132.2	32 00.4	71	68	132.6	31 39.2	71	67	133.0	31 17.8	71	67	133.5	30 56.4	72	66	133.9	1
2	32 43.0	69	70	130.1	32 22.3	69	70	130.6	32 01.6	69	69	131.0	31 40.8	70	69	131.4	31 19.9	70	68	131.8	30 58.9	70	68	132.3	30 37.8	70	68	132.7	30 16.6	71	67	133.1	2
3	32 00.9	68	71	129.4	31 40.5	68	71	129.8	31 20.0	68	70	130.2	30 59.4	69	70	130.6	30 38.8	69	69	131.1	30 18.0	69	69	131.5	29 57.2	69	68	131.9	29 36.4	70	68	132.3	3
4	31 18.2	67	72	128.6	30 58.1	67	71	129.0	30 37.9	68	71	129.5	30 17.6	68	70	129.9	29 57.2	68	70	130.3	29 36.7	68	70	130.7	29 16.2	69	69	131.2	28 55.6	69	69	131.6	4
45	30 35.2	66	72	127.9	30 15.3	66	72	128.3	29 55.4	67	72	128.7	29 35.3	67	71	129.1	29 15.2	67	71	129.6	28 55.0	67	70	130.0	28 34.7	68	70	130.4	28 14.3	68	70	130.8	45
6	29 51.7	65	73	127.1	29 32.1	66	73	127.6	29 12.4	66	72	128.0	28 52.6	66	72	128.4	28 32.7	66	72	128.8	28 12.8	67	71	129.3	27 52.7	67	71	129.7	27 32.6	67	70	130.1	6
7	29 07.8	64	74	126.4	28 48.4	65	73	126.8	28 29.0	65	73	127.3	28 09.4	65	72	127.7	27 49.8	66	72	128.1	27 30.1	66	72	128.6	27 10.4	66	71	129.0	26 50.5	66	71	129.4	7
8	28 23.5	64	74	125.7	28 04.4	64	74	126.1	27 45.1	64	74	126.6	27 25.9	64	73	127.0	27 06.5	65	73	127.4	26 47.1	65	72	127.9	26 27.5	65	72	128.3	26 07.9	65	72	128.7	8
9	27 38.8	63	75	125.0	27 19.9	63	75	125.5	27 00.9	63	74	125.9	26 41.9	64	74	126.3	26 22.8	64	74	126.8	26 03.6	64	73	127.2	25 44.3	64	73	127.6	25 25.0	65	72	128.0	9
50	26 53.7	62	76	124.3	26 35.1	62	75	124.8	26 16.3	63	75	125.2	25 57.5	63	74	125.7	25 38.7	63	74	126.1	25 19.7	63	74	126.5	25 00.7	64	73	126.9	24 41.6	64	73	127.4	50
1	26 08.3	61	76	123.7	25 49.9	61	76	124.1	25 31.4	62	76	124.6	25 12.8	62	75	125.0	24 54.2	62	75	125.4	24 35.5	62	74	125.9	24 16.7	63	74	126.3	23 57.8	63	74	126.7	1
2	25 22.5	60	77	123.0	25 04.3	61	76	123.5	24 46.1	61	76	123.9	24 27.7	61	76	124.3	24 09.3	61	75	124.8	23 50.9	62	75	125.2	23 32.3	62	74	125.6	23 13.7	62	74	126.1	2
3	24 36.4	60	77	122.4	24 18.4	60	77	122.8	24 00.4	60	77	123.3	23 42.3	60	76	123.7	23 24.2	61	76	124.1	23 05.9	61	76	124.6	22 47.6	61	75	125.0	22 29.2	61	75	125.4	3
4	23 49.9	59	78	121.8	23 32.2	59	78	122.2	23 14.4	59	77	122.6	22 56.6	60	77	123.1	22 38.6	60	76	123.5	22 20.6	60	76	124.0	22 02.5	60	76	124.4	21 44.4	61	75	124.8	4
55	23 03.2	58	78	121.2	22 45.7	58	78	121.6	22 28.1	59	78	122.0	22 10.5	59	77	122.5	21 52.8	59	77	122.9	21 35.0	59	77	123.3	21 17.1	60	76	123.8	20 59.2	60	76	124.2	55
6	22 16.1	57	79	120.6	21 58.8	58	78	121.0	21 41.5	58	78	121.4	21 24.1	58	78	121.9	21 06.6	58	78	122.3	20 49.0	59	77	122.7	20 31.4	59	77	123.2	20 13.7	59	76	123.6	6
7	21 28.8	57	79	120.0	21 11.7	57	79	120.4	20 54.6	57	79	120.8	20 37.4	57	78	121.3	20 20.1	58	78	121.7	20 02.8	58	78	122.2	19 45.4	58	77	122.6	19 27.9	58	77	123.0	7
8	20 41.1	56	80	119.4	20 24.3	56	80	119.8	20 07.4	56	79	120.3	19 50.4	57	79	120.7	19 33.3	57	78	121.1	19 16.2	57	78	121.6	18 59.1	57	78	122.0	18 41.8	58	77	122.4	8
9	19 53.2	55	80	118.8	19 36.6	56	80	119.3	19 19.9	56	80	119.7	19 03.1	56	79	120.1	18 46.3	56	79	120.6	18 29.4	56	78	121.0	18 12.4	57	78	121.4	17 55.4	57	78	121.9	9
60	19 05.1	55	81	118.2	18 48.6	55	80	118.7	18 32.1	55	80	119.1	18 15.6	55	80	119.6	17 59.0	56	79	120.0	17 42.3	56	79	120.4	17 25.5	56	79	120.9	17 08.7	56	78	121.3	60
1	18 16.7	54	81	117.7	18 00.4	54	81	118.1	17 44.1	54	80	118.6	17 27.8	55	80	119.0	17 11.4	55	80	119.5	16 54.9	55	80	119.9	16 38.4	55	79	120.3	16 21.8	55	79	120.8	1
2	17 28.0	53	82	117.2	17 12.0	54	81	117.6	16 55.9	54	81	118.0	16 39.7	54	80	118.5	16 23.5	54	80	118.9	16 07.2	54	80	119.4	15 50.9	54	80	119.8	15 34.5	55	79	120.2	2
3	16 39.1	53	82	116.6	16 23.3	53	82	117.1	16 07.4	53	81	117.5	15 51.4	53	81	117.9	15 35.4	53	80	118.4	15 19.3	54	80	118.8	15 03.2	54	80	119.3	14 47.1	54	80	119.7	3
4	15 50.0	52	82	116.1	15 34.4	52	82	116.5	15 18.6	52	82	117.0	15 02.9	53	81	117.4	14 47.1	53	81	117.9	14 31.2	53	81	118.3	14 15.3	53	80	118.7	13 59.3	53	80	119.2	4
65	15 00.7	52	82	115.6	14 45.2	52	82	116.0	14 29.7	52	82	116.5	14 14.1	52	82	116.9	13 58.5	52	81	117.3	13 42.8	52	81	117.8	13 27.1	52	81	118.2	13 11.3	53	80	118.7	65
6	14 11.1	51	83	115.1	13 55.9	51	83	115.5	13 40.5	51	82	116.0	13 25.1	51	82	116.4	13 09.7	52	82	116.8	12 54.2	52	81	117.3	12 38.7	52	81	117.7	12 23.1	52	81	118.2	6
7	13 21.4	50	83	114.6	13 06.3	50	83	115.0	12 51.1	51	83	115.5	12 35.9	51	82	115.9	12 20.7	51	82	116.3	12 05.4	51	82	116.8	11 50.1	51	81	117.2	11 34.7	51	81	117.7	7
8	12 31.4	50	84	114.1	12 16.5	50	83	114.5	12 01.5	50	83	115.0	11 46.5	50	83	115.4	11 31.5	50	82	115.8	11 16.4	50	82	116.3	11 01.2	51	82	116.7	10 46.0	51	81	117.2	8
9	11 41.3	49	84	113.6	11 26.5	49	84	114.0	11 11.7	49	83	114.5	10 56.9	50	83	114.9	10 42.0	50	83	115.4	10 27.1	50	82	115.8	10 12.2	50	82	116.2	9 57.2	50	82	116.7	9
70	10 51.0	49	84	113.1	10 36.4	49	84	113.6	10 21.8	49	84	114.0	10 07.1	49	83	114.4	9 52.4	49	83	114.9	9 37.7	49	83	115.3	9 22.9	49	82	115.8	9 08.1	49	82	116.2	70
1	10 00.5	48	84	112.6	9 46.1	48	84	113.1	9 31.6	48	84	113.5	9 17.1	48	84	114.0	9 02.6	48	83	114.4	8 48.0	49	83	114.9	8 33.4	49	83	115.3	8 18.8	49	82	115.7	1
2	9 09.8	47	85	112.2	8 55.6	48	84	112.6	8 41.3	48	84	113.1	8 26.9	48	84	113.5	8 12.6	48	84	114.0	7 58.2	48	83	114.4	7 43.8	48	83	114.8	7 29.3	48	83	115.3	2
3	8 19.0	47	85	111.7	8 04.9	47	85	112.2	7 50.7	47	84	112.6	7 36.6	47	84	113.1	7 22.4	47	84	113.5	7 08.2	47	84	113.9	6 54.0	47	83	114.4	6 39.7	48	83	114.8	3
4	7 28.0	46	85	111.3	7 14.0	47	85	111.7	7 00.1	47	85	112.2	6 46.1	47	84	112.6	6 32.0	47	84	113.0	6 18.0	47	84	113.5	6 03.9	47	84	113.9	5 49.9	47	84	114.4	4
75	6 36.8	46	86	110.8	6 23.0	46	85	111.3	6 09.2	46	85	111.7	5 55.4	46	85	112.2	5 41.5	46	84	112.6	5 27.6	46	84	113.0	5 13.8	46	84	113.5					75
6	5 45.5	45	86	110.4	5 31.9	45	86	110.8	5 18.2	46	85	111.3	5 04.5	46	85	111.7																	6

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	5 33.2	40	88	74.9	5 45.2	40	88	74.5	5 57.0	40	88	74.0	6 08.9	40	88	73.6	6 20.7	39	87	73.1	6 32.5	39	87	72.6	6 44.3	39	87	72.2	6 56.1	39	87	71.7	91
2									5 04.4	40	88	73.6	5 16.4	40	88	73.2	5 28.3	40	87	72.7	5 40.3	40	87	72.3	5 52.2	40	87	71.8	6 04.1	40	86	71.3	2
3																									5 00.2	40	86	71.4	5 12.2	40	86	71.0	3

Lat. 24°

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	86 00.0	1.0	11	180.0	86 30.0	1.0	12	180.0	87 00.0	1.0	14	180.0	87 30.0	1.0	16	180.0
1	85 53.6	97	30	166.8	86 22.8	97	34	165.0	86 51.7	96	38	162.7	87 20.1	94	44	159.6
2	85 35.5	91	46	154.7	86 02.5	89	51	151.7	86 28.6	85	56	148.0	86 53.6	81	62	143.2
3	85 07.7	83	58	144.6	85 31.9	79	62	141.0	85 55.0	74	68	136.7	86 16.3	68	73	131.5
4	84 32.8	74	67	136.4	84 54.4	70	71	132.6	85 14.4	64	75	128.3	85 32.7	57	79	123.3
05	83 52.7	67	73	129.8	84 11.9	62	76	126.1	84 29.6	56	80	122.0	84 45.3	49	82	117.5
6	83 09.0	60	77	124.6	83 26.2	55	80	121.1	83 41.9	49	83	117.2	83 55.8	43	85	113.1
7	82 22.7	54	80	120.3	82 38.3	50	83	117.0	82 52.3	44	85	113.5	83 04.7	38	87	109.8
8	81 34.5	50	83	116.8	81 48.7	45	84	113.7	82 01.5	40	86	110.5	82 12.7	35	88	107.1
9	80 45.0	46	84	113.9	80 58.1	41	86	111.0	81 09.8	37	87	108.1	81 20.0	32	88	105.0
10	79 54.4	42	86	111.4	80 06.5	38	87	108.8	80 17.4	34	88	106.0	80 26.9	29	89	103.2
1	79 03.0	40	87	109.3	79 14.3	36	88	106.8	79 24.5	32	89	104.3	79 33.3	27	90	101.7
2	78 11.0	37	88	107.4	78 21.6	34	88	105.1	78 31.2	30	89	102.8	78 39.5	26	90	100.4
3	77 18.4	35	88	105.8	77 28.5	32	89	103.7	77 37.6	28	90	101.5	77 45.5	25	90	99.2
4	76 25.5	34	89	104.4	76 35.1	30	89	102.4	76 43.7	27	90	100.3	76 51.3	24	90	98.2
15	75 32.3	32	89	103.1	75 41.5	29	90	101.2	75 49.7	26	90	99.3	75 57.0	23	91	97.3
6	74 38.8	31	90	102.0	74 47.6	28	90	100.2	74 55.6	25	90	98.3	75 02.6	22	91	96.4
7	73 45.0	30	90	100.9	73 53.6	27	90	99.2	74 01.3	24	91	97.5	74 08.1	21	91	95.7
8	72 51.1	29	90	100.0	72 59.4	26	90	98.3	73 06.9	24	91	96.7	73 13.5	21	91	95.0
9	71 57.1	28	90	99.1	72 05.1	26	91	97.5	72 12.4	23	91	95.9	72 18.9	20	91	94.3
20	71 02.9	27	90	98.3	71 10.7	25	91	96.8	71 17.8	22	91	95.3	71 24.2	20	91	93.7
1	70 08.6	27	91	97.5	70 16.3	24	91	96.1	70 23.2	22	91	94.6	70 29.5	20	91	93.2
2	69 14.2	26	91	96.8	69 21.7	24	91	95.4	69 28.6	22	91	94.0	69 34.8	19	91	92.6
3	68 19.8	26	91	96.1	68 27.1	24	91	94.8	68 33.9	21	91	93.5	68 40.0	19	91	92.1
4	67 25.2	25	91	95.5	67 32.5	23	91	94.2	67 39.2	21	91	92.9	67 45.2	19	91	91.7
25	66 30.6	25	91	94.9	66 37.8	23	91	93.7	66 44.4	21	91	92.4	66 50.4	19	91	91.2
6	65 36.0	25	91	94.3	65 43.1	23	91	93.1	65 49.6	21	91	91.9	65 55.6	19	91	90.7
7	64 41.3	24	91	93.8	64 48.3	23	91	92.6	64 54.8	21	91	91.5	65 00.8	19	91	90.3
8	63 46.6	24	91	93.2	63 53.6	22	91	92.1	64 00.0	21	91	91.0	64 06.0	19	91	89.9
9	62 51.9	24	91	92.7	62 58.8	22	91	91.7	63 05.2	21	91	90.6	63 11.2	19	91	89.5
30	61 57.1	24	91	92.3	62 04.0	22	91	91.2	62 10.4	21	91	90.2	62 16.4	19	91	89.1
1	61 02.3	24	91	91.8	61 09.2	22	91	90.8	61 15.6	21	91	89.8	61 21.6	19	91	88.8
2	60 07.5	24	91	91.3	60 14.4	22	91	90.4	60 20.8	21	91	89.4	60 26.8	19	91	88.4
3	59 12.7	23	91	90.9	59 19.6	22	91	90.0	59 26.0	21	91	89.0	59 32.0	19	91	88.0
4	58 17.9	23	91	90.5	58 24.8	22	91	89.6	58 31.2	21	91	88.6	58 37.2	19	91	87.7
35	57 23.1	23	91	90.1	57 30.0	22	91	89.2	57 36.4	21	91	88.3	57 42.4	20	91	87.3
6	56 28.3	23	91	89.7	56 35.2	22	91	88.8	56 41.6	21	91	87.9	56 47.7	20	91	87.0
7	55 33.5	23	91	89.3	55 40.4	22	91	88.4	55 46.8	21	91	87.5	55 53.0	20	91	86.7
8	54 38.7	24	91	88.9	54 45.6	22	91	88.0	54 52.1	21	91	87.2	54 58.3	20	91	86.3
9	53 43.9	24	91	88.5	53 50.8	22	91	87.7	53 57.4	21	91	86.9	54 03.6	20	91	86.0
40	52 49.1	24	91	88.1	52 56.0	23	91	87.3	53 02.6	21	91	86.5	53 08.9	20	91	85.7
1	51 54.3	24	91	87.8	52 01.3	23	91	87.0	52 07.9	22	91	86.2	52 14.2	21	91	85.4
2	50 59.6	24	91	87.4	51 06.6	23	91	86.6	51 13.3	22	91	85.9	51 19.6	21	91	85.1
3	50 04.8	24	91	87.1	50 11.9	23	91	86.3	50 18.6	22	91	85.5	50 25.0	21	91	84.8
4	49 10.1	24	91	86.7	49 17.2	23	91	86.0	49 24.0	22	91	85.2	49 30.5	21	91	84.5
45	48 15.4	24	91	86.4	48 22.5	23	91	85.6	48 29.3	22	91	84.9	48 35.9	21	91	84.2
6	47 20.7	24	91	86.0	47 27.9	23	91	85.3	47 34.8	23	91	84.6	47 41.4	22	91	83.9
7	46 26.0	25	91	85.7	46 33.2	24	91	85.0	46 40.2	23	91	84.3	46 46.9	22	91	83.6
8	45 31.4	25	91	85.4	45 38.7	24	91	84.7	45 45.7	23	91	84.0	45 52.5	22	91	83.3
9	44 36.7	25	91	85.0	44 44.1	24	91	84.3	44 51.2	23	91	83.7	44 58.0	22	90	83.0
50	43 42.2	25	91	84.7	43 49.6	24	91	84.0	43 56.7	24	91	83.4	44 03.7	23	90	82.7
1	42 47.6	25	91	84.4	42 55.1	25	91	83.7	43 02.3	24	91	83.1	43 09.3	23	90	82.4
2	41 53.1	25	91	84.1	42 00.6	25	91	83.4	42 07.9	24	91	82.7	42 15.0	23	90	82.1
3	40 58.6	26	91	83.7	41 06.2	25	91	83.1	41 13.6	24	91	82.4	41 20.7	24	90	81.8
4	40 04.1	26	91	83.4	40 11.8	25	91	82.8	40 19.2	25	90	82.1	40 26.5	24	90	81.5
55	39 09.7	26	91	83.1	39 17.4	26	90	82.5	39 25.0	25	90	81.8	39 32.3	24	90	81.2
6	38 15.3	26	91	82.8	38 23.1	26	90	82.2	38 30.7	25	90	81.5	38 38.2	24	90	80.9
7	37 20.9	27	90	82.5	37 28.8	26	90	81.9	37 36.5	25	90	81.2	37 44.1	25	90	80.6
8	36 26.6	27	90	82.1	36 34.6	26	90	81.5	36 42.4	26	90	80.9	36 50.0	25	90	80.3
9	35 32.3	27	90	81.8	35 40.4	27	90	81.2	35 48.3	26	90	80.6	35 56.0	25	90	80.0
60	34 38.1	27	90	81.5	34 46.2	27	90	80.9	34 54.2	26	90	80.3	35 02.0	26	90	79.8
1	33 43.9	28	90	81.2	33 52.1	27	90	80.6	34 00.2	27	90	80.0	34 08.1	26	90	79.5
2	32 49.7	28	90	80.9	32 58.1	28	90	80.3	33 06.2	27	90	79.7	33 14.2	26	90	79.2
3	31 55.6	28	90	80.6	32 04.1	28	90	80.0	32 12.3	27	90	79.4	32 20.4	27	90	78.9
4	31 01.6	29	90	80.3	31 10.1	28	90	79.7	31 18.5	28	90	79.1	31 26.7	27	90	78.6
65	30 07.6	29	90	80.0	30 16.2	28	90	79.4	30 24.7	28	90	78.8	30 33.0	28	90	78.3
6	29 13.6	29	90	79.6	29 22.3	29	90	79.1	29 30.9	28	90	78.5	29 39.3	28	89	78.0
7	28 19.7	30	90	79.3	28 28.5	29	90	78.8	28 37.2	29	89	78.2	28 45.8	28	89	77.7
8	27 25.9	30	90	79.0	27 34.8	29	90	78.5	27 43.6	29	89	77.9	27 52.2	29	89	77.4
9	26 32.1	30	90	78.7	26 41.1	30	89	78.2	26 50.0	29	89	77.6	26 58.8	29	89	77.1
70	25 38.4	31	89	78.4	25 47.5	30	89	77.8	25 56.5	30	89	77.3	26 05.4	29	89	76.8
1	24 44.8	31	89	78.1	24 54.0	31	89	77.5	25 03.1	30	89	77.0	25 12.1	30	89	76.5
2	23 51.2	31	89	77.7	24 00.5	31	89	77.2	24 09.7	31	89	76.7	24 18.8	30	89	76.2
3	22 57.6	32	89	77.4	23 07.1	31	89	76.9	23 16.4	31	89	76.4	23 25.6	31	88	75.9
4	22 04.2	32	89	77.1	22 13.7	32	89	76.6	22 23.2	31	89	76.1	22 32.5	31	88	75.5
75	21 10.8	32	89	76.8	21 20.4	32	89	76.3	21 30.0	32	88	75.7	21 39.5	31	88	75.2
6	20 17.5	33	89	76.4	20 27.2	32	88	75.9	20 36.9	32	88	75.4	20 46.5	32	88	74.9
7	19 24.2	33	89	76.1	19 34.1	33	88	75.6	19 43.9	33	88	75.1	19 53.6	32	88	74.6
8	18 31.0	33	88	75.8	18 41.0	33	88	75.3	18 51.0	33	88	74.8	19 00.8	33	88	74.3
9	17 38.0	34	88	75.4	17 48.1	34	88	74.9	17 58.1	33	88	74.5	18 08.1	33	88	74.0
80	16 44.9	34	88	75.1	16 55.2	34	88	74.6	17 05.4	34	88	74.1	17 15.5	34	88	73.6
1	15 52.0	35	88	74.8	16 02.4	34	88	74.3	16 12.7	34	88	73.8	16 22.9	34	87	73.3
2	14 59.2	35	88	74.4	15 09.7	35	88	73.9	15 20.1	35	88	73.5	15 30.4	34	87	73.0
3	14 06.4	35	88	74.1	14 17.0	35	88	73.6	14 27.6	35	87	73.1	14 38.1	35	87	72.6
4	13 13.7	36	88	73.7	13 24.5	36	88	73.3	13 35.2	36	87	72.8	13 45.8	35	87	72.3
85	12 21.2	36	88	73.4	12 32.0	36	87	72.9	12 42.9	36	87	72.4	12 53.6	36	87	72.0
6	11 28.7	37	87	73.0	11 39.7	37	87	72.6	11 50.7	36	87	72.1	12 01.6	36	87	71.6
7	10 36.3	37	87	72.7	10 47.5	37	87	72.2	10 58.6	37	87	71.7	11 09.6	37	86	71.3
8	9 44.0	38	87	72.3	9 55.3	38	87	71.9	10 06.6	37	86	71.4	10 17.8	37	86	70.9
9	8 51.9	38	87	72.0	9 03.3	38	86	71.5	9 14.7	38	86	71.0	9 26.0	38	86	70.6
90	7 59.8	39	87	71.6	8 11.4	38	86	71.1	8 22.9	38	86	70.7	8 34.4	38	86	70.2

H.A.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	88 00.0	1.0	20	180.0	88 30.0	1.0	26	180.0	89 00.0	1.0	36	180.0	89 30.0	1.0	54	180.0	00
1	87 47.9	91	52	155.1	88 14.5	85	61	148.3	88 38.6	74	73	137.3	88 57.4	48	85	118.4	1
2	87 16.9	74	69	137.0	87 37.7	64	77	128.8	87 54.7	48	84	118.2	88 06.2	27	90	104.9	2
3	86 35.4	59	78	125.3	86 51.7	49	83	118.0	87 04.4	35	88	109.4	87 12.5	19	90	99.7	3
4	85 48.6	49	83	117.7	86 01.8	39	86	111.4	86 11.9	28	89	104.4	86 18.3	15	91	97.0	4
05	84 58.9	41	86	112.5	85 10.1	33	88	107.1	85 18.4	23	90	101.3	85 23.8	13	91	95.2	05
6	84 07.6	36	87	108.7	84 17.2	28	89	104.0	84 24.5	20	90	99.1	84 29.1	11	91	94.0	6
7	83 15.3	32	88	105.9	83 23.8	25	90	101.7	83 30.2	18	91	97.4	83 34.4	10	91	93.0	7
8	82 22.2	29	89	103.6	82 30.0	23	90	99.9	82 35.8	16	91	96.2	82 39.7	10	91	92.3	8
9	81 28.8	26	90	101.8	81 35.9	21	90	98.5	81 41.3	15	91	95.1	81 44.9	09	91	91.7	9
10	80 35.0	25	90	100.3	80 41.6	19	91	97.3	80 46.6	14	91	94.2	80 50.1	09	91	91.1	10
1	79 40.9	23	90	99.0	79 47.1	18	91	96.2	79 51.9	14	91	93.4	79 55.3	09	91	90.6	1
2	78 46.7	22	91	97.9	78 52.6	18	91	95.3	78 57.2	13	91	92.8	79 00.5	09	91	90.2	2
3	77 52.3	21	91	96.9	77 58.0	17	91	94.6	78 02.4	13	91	92.2	78 05.7	09	91	89.8	3
4	76 57.9	20	91	96.0	77 03.3	16	91	93.8	77 07.7	13	91	91.6	77 10.9	09	91	89.4	4
15	76 03.3	19	91	95.3	76 08.6	16	91	93.2	76 12.9	12	91	91.1	76 16.1	09	91	89.0	15
6	75 08.7	19	91	94.5	75 13.9	16	91	92.6	75 18.1	12	91	90.7	75 21.3	09	91	88.7	6
7	74 14.0	18	91	93.9	74 19.1	15	91	92.1	74 23.2	12	91	90.2	74 26.5	09	91	88.4	7
8	73 19.3	18	91	93.3	73 24.3	15	91	91.6	73 28.4	12	91	89.8	73 31.7	09	91	88.1	8
9	72 24.6	18	91	92.7	72 29.5	15	91	91.1	72 33.6	12	91	89.4	72 36.9	10	91	87.8	9
20	71 29.8	18	91	92.2	71 34.7	15	91	90.6	71 38.8	12	91	89.1	71 42.1	10	91	87.5	20
1	70 35.1	17	91	91.7	70 39.9	15	91	90.2	70 44.0	12	91	88.7	70 47.4	10	91	87.2	1
2	69 40.3	17	91	91.2	69 45.1	15	91	89.8	69 49.2	13	91	88.4	69 52.6	10	91	86.9	2
3	68 45.5	17	91	90.8	68 50.3	15	91	89.4	68 54.4	13	91	88.0	68 57.9	11	91	86.7	3
4	67 50.7	17	91	90.4	67 55.5	15	91	89.0	67 59.7	13	91	87.7	68 03.2	11	91	86.4	4
25	66 55.8	17	91	89.9	67 00.7	15	91	88.7	67 04.9	13	91	87.4	67 08.5	11	91	86.1	25
6	66 01.0	17	91	89.5	66 05.9	15	91	88.3	66 10.1	13	91	87.1	66 13.8	11	91	85.9	6
7	65 06.2	17	91	89.2	65 11.1	15	91	88.0	65 15.4	13	91	86.8	65 19.2	12	91	85.6	7
8	64 11.4	17	91	88.8	64 16.3	15	91	87.6	64 20.7	14	91	86.5	64 24.5	12	91	85.4	8
9	63 16.6	17	91	88.4	63 21.6	16	91	87.3	63 26.0	14	91	86.2	63 29.9	12	91	85.1	9
30	62 21.8	17	91	88.1	62 26.8	16	91	87.0	62 31.3	14	91	85.9	62 35.3	13	91	84.9	30
1	61 27.1	18	91	87.7	61 32.1	16	91	86.7	61 36.6	14	91	85.7	61 40.7	13	91	84.6	1
2	60 32.3	18	91	87.4	60 37.4	16	91	86.4	60 42.0	15	91	85.4	60 46.2	13	91	84.4	2
3	59 37.5	18	91	87.1	59 42.7	16	91	86.1	59 47.4	15	91	85.1	59 51.6	13	91	84.1	3
4	58 42.8	18	91	86.7	58 48.0	17	91	85.8	58 52.8	15	91	84.8	58 57.1	14	91	83.9	4
35	57 48.1	18	91	86.4	57 53.3	17	91	85.5	57 58.2	15	91	84.6	58 02.6	14	91	83.6	35
6	56 53.4	18	91	86.1	56 58.7	17	91	85.2	57 03.6	16	91	84.3	57 08.2	14	91	83.4	6
7	55 58.7	19	91	85.8	56 04.1	17	91	84.9	56 09.1	16	91	84.0	56 13.7	15	91	83.1	7
8	55 04.1	19	91	85.5	55 09.5	18	91	84.6	55 14.6	16	91	83.8	55 19.3	15	91	82.9	8
9	54 09.4	19	91	85.2	54 15.0	18	91	84.3	54 20.1	17	91	83.5	54 24.8	15	90	82.7	9
40	53 14.8	19	91	84.9	53 20.4	18	91	84.1	53 25.7	17	91	83.2	53 30.6	16	90	82.4	40
1	52 20.3	19	91	84.6	52 25.9	18	91	83.8	52 31.3	17	91	83.0	52 36.3	16	90	82.2	1
2	51 25.7	20	91	84.3	51 31.4	19	91	83.5	51 36.9	18	91	82.7	51 42.0	17	90	81.9	2
3	50 31.2	20	91	84.0	50 37.0	19	91	83.2	50 42.5	18	90	82.5	50 47.7	17	90	81.7	3
4	49 36.7	20	91	83.7	49 42.6	19	91	83.0	49 48.2	18	90	82.2	49 53.5	17	90	81.4	4
45	48 42.2	20	91	83.4	48 48.2	20	91	82.7	48 53.9	19	90	81.9	48 59.3	18	90	81.2	45
6	47 47.8	21	91	83.1	47 53.8	20	90	82.4	47 59.7	19	90	81.7	48 05.2	18	90	80.9	6
7	46 53.4	21	91	82.9	46 59.5	20	90	82.1	47 05.4	19	90	81.4	47 11.1	18	90	80.7	7
8	45 59.0	21	91	82.6	46 05.3	20	90	81.9	46 11.3	20	90	81.2	46 17.0	19	90	80.4	8
9	45 04.7	22	91	82.3	45 11.0	21	90	81.6	45 17.1	20	90	80.9	45 23.0	19	90	80.2	9
50	44 10.4	22	90	82.0	44 16.8	21	90	81.3	44 23.0	20	90	80.6	44 29.0	19	90	79.9	50
1	43 16.1	22	90	81.7	43 22.6	21	90	81.0	43 29.0	21	90	80.4	43 35.0	20	90	79.7	1
2	42 21.9	23	90	81.4	42 28.5	22	90	80.8	42 34.9	21	90	80.1	42 41.1	20	90	79.4	2
3	41 27.7	23	90	81.2	41 34.4	22	90	80.5	41 41.0	21	90	79.8	41 47.3	21	90	79.2	3
4	40 33.6	23	90	80.9	40 40.4	22	90	80.2	40 47.0	22	90	79.6	40 53.4	21	90	78.9	4
55	39 39.5	23	90	80.6	39 46.4	23	90	80.0	39 53.1	22	90	79.3	39 59.7	21	90	78.7	55
6	38 45.4	24	90	80.3	38 52.5	23	90	79.7	38 59.3	22	90	79.1	39 05.9	22	89	78.4	6
7	37 51.4	24	90	80.0	37 58.6	24	90	79.4	38 05.5	23	90	78.8	38 12.3	22	89	78.2	7
8	36 57.4	25	90	79.7	37 04.7	24	90	79.1	37 11.8	23	90	78.5	37 18.7	23	89	77.9	8
9	36 03.5	25	90	79.5	36 10.9	24	90	78.9	36 18.1	24	89	78.2	36 25.1	23	89	77.6	9
60	35 09.7	25	90	79.2	35 17.1	25	90	78.6	35 24.4	24	89	78.0	35 31.6	23	89	77.4	60
1	34 15.9	26	90	78.9	34 23.4	25	89	78.3	34 30.9	24	89	77.7	34 38.1	24	89	77.1	1
2	33 22.1	26	90	78.6	33 29.8	25	89	78.0	33 37.3	25	89	77.4	33 44.7	24	89	76.9	2
3	32 28.4	26	89	78.3	32 36.2	26	89	77.7	32 43.9	25	89	77.2	32 51.4	25	89	76.6	3
4	31 34.8	27	89	78.0	31 42.7	26	89	77.5	31 50.4	26	89	76.9	31 58.1	25	89	76.3	4
65	30 41.2	27	89	77.7	30 49.2	27	89	77.2	30 57.1	26	89	76.6	31 04.8	26	88	76.0	65
6	29 47.6	27	89	77.4	29 55.8	27	89	76.9	30 03.8	26	89	76.3	30 11.7	26	88	75.8	6
7	28 54.2	28	89	77.1	29 02.4	27	89	76.6	29 10.6	27	89	76.0	29 18.6	26	88	75.5	7
8	28 00.8	28	89	76.8	28 09.2	28	89	76.3	28 17.4	27	88	75.8	28 25.6	27	88	75.2	8
9	27 07.4	29	89	76.5	27 15.9	28	88	76.0	27 24.3	28	88	75.5	27 32.6	27	88	74.9	9
70	26 14.1	29	89	76.2	26 22.8	29	88	75.7	26 31.3	28	88	75.2	26 39.7	28	88	74.6	70
1	25 20.9	29	88	75.9	25 29.7	29	88	75.4	25 38.4	29	88	74.9	25 46.9	28	88	74.4	1
2	24 27.8	30	88	75.6	24 36.7	29	88	75.1	24 45.5	29	88	74.6	24 54.1	29	88	74.1	2
3	23 34.7	30	88	75.3	23 43.8	30	88	74.8	23 52.7	30	88	74.3	24 01.5	29	88	73.8	3
4	22 41.7	31	88	75.0	22 50.9	30	88	74.5	22 59.9	30	88	74.0	23 08.9	30	88	73.5	4
75	21 48.8	31	88	74.7	21 58.1	31	88	74.2	22 07.3	30	88	73.7	22 16.4	30	88	73.2	75
6	20 56.0	32	88	74.4	21 05.4	31	88	73.9	21 14.7	31	88	73.4	21 23.9	31	87	72.9	6
7	20 03.2	32	88	74.1	20 12.8	32	88	73.6	20 22.2	31	87	73.1	20 31.6	31	87	72.6	7
8	19 10.6	32	88	73.8	19 20.2	32	87	73.3	19 29.8	32	87	72.8	19 39.3	32	87	72.3	8
9	18 18.0	33	88	73.5	18 27.8	33	87	73.0	18 37.5	32	87	72.5	18 47.2	32	87	72.0	9
80	17 25.5	33	87	73.1	17 35.4	33	87	72.6	17 45.3	33	87	72.1	17 55.1	33	87	71.7	80
1	16 33.1	34	87	72.8	16 43.2	34	87	72.3	16 53.2	33	87	71.8	17 03.1	33	86	71.3	1
2	15 40.7	34	87	72.5	15 51.0	34	87	72.0	16 01.1	34	86	71.5	16 11.3	34	86	71.0	2
3	14 48.5	35	87	72.2	14 58.9	35	87	71.7	15 09.2	34	86	71.2	15 19.5	34	86	70.7	3
4	13 56.4	35	87	71.8	14 06.9	35	86	71.3	14 17.4	35	86	70.9	14 27.8	35	86	70.4	4
85	13 04.4	36	86	71.5	13 15.0	35	86	71.0	13 25.7	35	86	70.5	13 36.2	35	86	70.0	85
6	12 12.4	36	86	71.1	12 23.3	36	86	70.7	12 34.0	36	86	70.2	12 44.7	36	86	69.7	6
7	11 20.6	37	86	70.8	11 31.6	36	86	70.3	11 42.5	36	86	69.8	11 53.4	36	85	69.4	7
8	10 28.9	37	86	70.4	10 40.0	37	86	70.0	10 51.1	37	86	69.5	11 02.2	37	85	69.0	8
9	9 37.3	38	86	70.1	9 48.6	38	86	69.6	9 59.8	37	85	69.2	10 11.0	37	85	68.7	9
90	8 45.8	38	86	69.7	8 57.3	38	85	69.3	9 08.7	38	85	68.8	9 20.0	38	85	68.3	90

Lat. 24°

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	46 00.0	1.0	01	180.0	45 30.0	1.0	01	180.0	45 00.0	1.0	01	180.0	44 30.0	1.0	01	180.0	44 00.0	1.0	01	180.0	43 30.0	1.0	01	180.0	43 00.0	1.0	01	180.0	42 30.0	1.0	01	180.0	00
1	45 59.4	1.0	03	178.6	45 29.4	1.0	03	178.7	44 59.4	1.0	03	178.7	44 29.4	1.0	03	178.7	43 59.4	1.0	03	178.7	43 29.4	1.0	03	178.7	42 59.4	1.0	03	178.7	42 29.4	1.0	03	178.8	1
2	45 57.4	1.0	05	177.3	45 27.4	1.0	05	177.3	44 57.5	1.0	05	177.4	44 27.5	1.0	05	177.4	43 57.5	1.0	05	177.4	43 27.6	1.0	05	177.5	42 57.6	1.0	05	177.5	42 27.6	1.0	05	177.5	2
3	45 54.2	1.0	08	175.9	45 24.3	1.0	08	176.0	44 54.3	1.0	07	176.0	44 24.4	1.0	07	176.1	43 54.5	1.0	07	176.1	43 24.5	1.0	07	176.2	42 54.6	1.0	07	176.2	42 24.6	1.0	07	176.3	3
4	45 49.7	1.0	10	174.6	45 19.8	1.0	10	174.7	44 49.9	1.0	09	174.7	44 20.0	1.0	09	174.8	43 50.2	1.0	09	174.9	43 20.3	1.0	09	174.9	42 50.4	1.0	09	175.0	42 20.5	1.0	09	175.0	4
05	45 43.9	99	12	173.3	45 14.1	99	12	173.3	44 44.3	99	12	173.4	44 14.4	99	11	173.5	43 44.6	99	11	173.6	43 14.8	99	11	173.7	42 45.0	99	11	173.7	42 15.2	99	11	173.8	05
6	45 36.8	99	14	171.9	45 07.1	99	14	172.0	44 37.4	99	14	172.1	44 07.6	99	13	172.2	43 37.9	99	13	172.3	43 08.2	99	13	172.4	42 38.4	99	13	172.5	42 08.7	99	13	172.6	6
7	45 28.5	99	16	170.6	44 58.9	99	16	170.7	44 29.2	99	16	170.8	43 59.6	99	15	170.9	43 30.0	99	15	171.0	43 00.3	99	15	171.1	42 30.7	99	15	171.2	42 01.0	99	15	171.3	7
8	45 18.9	98	18	169.3	44 49.4	98	18	169.4	44 19.9	98	18	169.5	43 50.4	98	18	169.7	43 20.8	98	17	169.8	42 51.3	98	17	169.9	42 21.7	99	17	170.0	41 52.2	99	17	170.1	8
9	45 08.1	98	20	168.0	44 38.7	98	20	168.1	44 09.3	98	20	168.3	43 39.9	98	19	168.4	43 10.5	98	19	168.5	42 41.1	98	19	168.7	42 11.6	98	19	168.8	41 42.2	98	18	168.9	9
10	44 56.1	97	22	166.7	44 26.8	98	22	166.8	43 57.6	98	22	167.0	43 28.3	98	21	167.1	42 59.0	98	21	167.3	42 29.7	98	21	167.4	42 00.4	98	21	167.6	41 31.1	98	20	167.7	10
1	44 42.8	97	24	165.4	44 13.7	97	24	165.6	43 44.6	97	24	165.7	43 15.5	97	23	165.9	42 46.4	97	23	166.1	42 17.2	97	23	166.2	41 48.1	97	22	166.4	41 18.9	97	22	166.5	1
2	44 28.4	96	26	164.1	43 59.5	96	26	164.3	43 30.5	97	25	164.5	43 01.6	97	25	164.7	42 32.6	97	25	164.8	42 03.6	97	24	165.0	41 34.6	97	24	165.2	41 05.6	97	24	165.3	2
3	44 12.8	96	28	162.8	43 44.1	96	28	163.0	43 15.3	96	27	163.2	42 46.5	96	27	163.4	42 17.7	96	27	163.6	41 48.9	96	26	163.8	41 20.0	96	26	164.0	40 51.2	96	26	164.2	3
4	43 56.1	95	30	161.6	43 27.5	95	29	161.8	42 58.9	95	29	162.0	42 30.3	95	29	162.2	42 01.7	95	28	162.4	41 33.0	96	28	162.6	41 04.4	96	28	162.8	40 35.7	96	28	163.0	4
15	43 38.2	95	32	160.4	43 09.9	95	31	160.6	42 41.5	95	31	160.8	42 13.0	95	30	161.0	41 44.6	95	30	161.2	41 16.1	95	30	161.4	40 47.7	95	30	161.7	40 19.1	95	29	161.9	15
6	43 19.3	94	34	159.1	42 51.1	94	33	159.4	42 22.9	94	33	159.6	41 54.7	94	32	159.8	41 26.4	94	32	160.1	40 58.2	94	32	160.3	40 29.9	94	31	160.5	40 01.6	94	31	160.7	6
7	42 59.2	93	35	157.9	42 31.3	93	35	158.2	42 03.3	93	34	158.4	41 35.3	93	34	158.7	41 07.2	94	34	158.9	40 39.2	94	33	159.1	40 11.1	94	33	159.4	39 43.0	94	33	159.6	7
8	42 38.1	92	37	156.8	42 10.4	92	36	157.0	41 42.6	93	36	157.3	41 14.8	93	36	157.5	40 47.0	93	35	157.8	40 19.2	93	35	158.0	39 51.3	93	35	158.3	39 23.4	93	34	158.5	8
9	42 15.9	92	39	155.6	41 48.5	92	38	155.9	41 20.9	92	38	156.1	40 53.4	92	38	156.4	40 25.8	92	37	156.6	39 58.1	92	37	156.9	39 30.5	92	36	157.1	39 02.8	92	36	157.4	9
20	41 52.8	91	40	154.4	41 25.5	91	40	154.7	40 58.2	91	39	155.0	40 30.9	91	39	155.3	40 03.5	91	39	155.5	39 36.1	91	38	155.8	39 08.7	92	38	156.0	38 41.2	92	38	156.3	20
1	41 28.6	90	42	153.3	41 01.6	90	41	153.6	40 34.6	90	41	153.9	40 07.5	90	41	154.1	39 40.4	91	40	154.4	39 13.2	91	40	154.7	38 46.0	91	39	155.0	38 18.7	91	39	155.2	1
2	41 03.5	89	43	152.2	40 36.8	89	43	152.5	40 10.0	89	43	152.8	39 43.1	90	42	153.1	39 16.2	90	42	153.3	38 49.3	90	41	153.6	38 22.3	90	41	153.9	37 55.3	90	40	154.2	2
3	40 37.5	88	45	151.1	40 11.0	88	44	151.4	39 44.4	89	44	151.7	39 17.8	89	44	152.0	38 51.2	89	43	152.3	38 24.5	89	43	152.6	37 57.8	89	42	152.9	37 31.0	89	42	153.1	3
4	40 10.5	87	46	150.0	39 44.3	88	46	150.3	39 18.0	88	46	150.6	38 51.6	88	45	150.9	38 25.2	88	45	151.2	37 58.8	88	44	151.5	37 32.3	88	44	151.8	37 05.8	88	44	152.1	4
25	39 42.6	87	48	148.9	39 16.7	87	48	149.2	38 50.6	87	47	149.6	38 24.5	87	46	149.9	37 58.4	87	46	150.2	37 32.2	87	46	150.5	37 06.0	88	45	150.8	36 39.7	88	45	151.1	25
6	39 13.9	86	49	147.9	38 48.2	86	49	148.2	38 22.4	86	48	148.5	37 56.6	86	48	148.9	37 30.8	86	48	149.2	37 04.8	86	47	149.5	36 38.9	87	47	149.8	36 12.8	87	46	150.1	6
7	38 44.3	85	51	146.8	38 18.9	85	50	147.2	37 53.4	85	50	147.5	37 27.9	85	49	147.8	37 02.3	85	49	148.2	36 36.6	86	48	148.5	36 10.9	86	48	148.8	35 45.1	86	48	149.1	7
8	38 14.0	84	52	145.8	37 48.8	84	52	146.2	37 23.6	84	51	146.5	36 58.3	84	51	146.9	36 32.9	85	50	147.2	36 07.6	85	50	147.5	35 42.1	85	49	147.8	35 16.6	85	49	148.2	8
9	37 42.8	83	53	144.8	37 17.9	83	53	145.2	36 52.9	83	52	145.5	36 27.9	83	52	145.9	36 02.9	84	52	146.2	35 37.7	84	51	146.6	35 12.6	84	50	146.9	34 47.3	84	50	147.2	9
30	37 10.8	82	54	143.9	36 46.2	82	54	144.2	36 21.5	82	54	144.6	35 56.8	83	53	144.9	35 32.0	83	53	145.3	35 07.2	83	52	145.6	34 42.2	83	52	146.0	34 17.3	83	51	146.3	30
1	36 38.1	81	56	142.9	36 13.8	81	55	143.3	35 49.4	81	55	143.6	35 24.9	82	54	144.0	35 00.4	82	54	144.3	34 35.8	82	53	144.7	34 11.2	82	53	145.0	33 46.5	82	52	145.4	1
2	36 04.7	80	57	142.0	35 40.7	80	56	142.3	35 16.5	81	56	142.7	34 52.4	81	56	143.1	34 28.1	81	55	143.4	34 03.8	81	55	143.8	33 39.4	81	54	144.1	33 15.0	82	54	144.5	2
3	35 30.6	79	58	141.0	35 06.8	79	58	141.4	34 43.0	80	57	141.8	34 19.1	80	57	142.2	33 55.1	80	56	142.5	33 31.0	80	56	142.9	33 06.9	80	55	143.2	32 42.8	81	55	143.6	3
4	34 55.8	78	59	140.1	34 32.3	78	59	140.5	34 08.7	79	58	140.9	33 45.1	79	58	141.3	33 21.4	79	57	141.6	32 57.6	79	57	142.0	32 33.8	80	56	142.4	32 09.9	80	56	142.7	4
35	34 20.3	77	60	139.3	33 57.1	78	60	139.6	33 33.8	78	59	140.0	33 10.5	78	59	140.4	32 47.0	78	58	140.8	32 23.6	78	58	141.1	32 00.0	79	57	141.5	31 36.4	79	57	141.9	35
6	33 44.3	76	61	138.4	33 21.3	77	61	138.8	32 58.3	77	60	139.1	32 35.2	77	60	139.5	32 12.1	77	59	139.9	31 48.8	78	59	140.3	31 25.6	78	58	140.6	31 02.2	78	58	141.0	6
7	33 07.5	75	62	137.5	32 44.9	76	62	137.9	32 22.1	76	61	138.3	31 59.3	76	61	138.7	31 36.5	76	60	139.1	31 13.5	77	60	139.4	30 50.5	77	60	139.8	30 27.4	77	59	140.2	7
8	32 30.2	75	63	136.7	32 07.8	75	63	137.1	31 45.4	75	62	137.5	31 22.8	75	62	137.9	31 00.2	75	61	138.2	30 37.6	76	61	138.6	30 14.8	76	60	139.0	29 52.0	76	60	139.4	8
9	31 52.3	74	64	135.9	31 30.2	74	64	136.3	31 08.0	74	63	136.7	30 45.8	74	63	137.0	30 23.4	75	62	137.4	30 01.0	75	62	137.8	29 38.6	75	61	138.2	29 16.1	75	61	138.6	9
40	31 13.9	73	65	135.1	30 52.1	73	65	135.5	30 30.1	73	64	135.9	30 08.2	73	64	136.2	29 46.1	74	63	136.6	29 24.0	74	63	137.0	29 01.8	74	62	137.4	28 39.5	74	62	137.8	40
1	30 34.9	72	66	134.3	30 13.3	72	65	134.7	29 51.7	72	65	135.1	29 30.0	73	64	135.5	29 08.2	73	64	135.9	28 46.3	73	64	136.3	28 24.4	73	63	136.6	28 02.4	73	63	137.0	1
2	29 55.4	71	67	133.5	29 34.1	71	66	133.9	29 12.7	71	66	134.3	28 51.3	72	65	134.7	28 29.8	72	65	135.1	28 08.2	72	64	135.5	27 46.5	72	64	135.9	27 24.8	73	64	136.3	2
3	29 15.4	70	68	132.7	28 54.4	70	67	133.1	28 33.2	70	67	133.5	28 12.1	71	66	133.9	27 50.8	71	66	134.3	27 29.5	71	65	134.7	27 08.1	71	65	135.1	26 46.6	72	64	135.5	3
4	28 34.9	69	68	132.0	28 14.1	69	68	132.4	27 53.3	70	68	132.8	27 32.3	70	67	133.2	27 11.4	70	66	133.6	26 50.3	70	66	134.0	26 29.2	71	66	134.4	26 08.0	71	65	134.8	4
45	27 53.9	68	69	131.2	27 33.4	68	69	131.7	27 12.8	69	68	132.1	26 52.2	69	68	132.5	26 31.4	69	67	132.9	26 10.6	69	67	133.3	25 49.8	70	66	133.7	25 28.9	70	66	134.1	45
6	27 12.5	67	70	130.5	26 52.2	68	69	130.9	26 31.9	68	69	131.4	26 11.5	68	68	131.8	25 51.0	68	68	132.2	25 30.5	69	68	132.6	25 09.9	69	67	133.0	24 49.3	69	67	133.4	6
7	26 30.6	67	70	129.8	26 10.6	67	70	130.2	25 50.5	67	70	130.7	25 30.4	67	69	131.1	25 10.2	67	69	131.5	24 49.9	68	68	131.9	24 29.6	68	68	132.3	24 09.2	68	68	132.7	7
8	25 48.3	66	71	129.1	25 28.5	66	71	129.6	25 08.7	66	70	130.0	24 48.9	66	70	130.4	24 28.9	67	70	130.8	24 08.9	67	69	131.2	23 48.8	67	69	131.6	23 28.7	67	68	132.0	8
9	25 05.6	65	72	128.5	24 46.1	65	72	128.9	24 26.5	65	71	129.3	24 06.9	66	71	129.7	23 47.2	66	70	130.1	23 27.4	66	70	130.5	23 07.6	66	69	130.9	22 47.7	66	69	131.3	9
50	24 22.4	64	72	127.8	24 03.2	64	72	128.2	23 43.9	64	72	128.6	23 24.5	65	71	129.0	23 05.1	65	71	129.5	22 45.6	65	70	129.9	22 26.0	65	70	130.3	22 06.4	66	70	130.7	50
1	23 38.9	63	73	127.1	23 19.9	63	73	127.6	23 00.9	64	72	128.0	22 41.8	64	72	128.4	22 22.6	64	72	128.8	22 03.3	64	71	129.2	21 44.0	64	71	129.6	21 24.6	65	70	130.0	1
2	22 55.0	62	74	126.5	22 36.3	63	73	126.9	22 17.5	63	73	127.3	21 58.6	63	72	127.8	21 39.7	63	72	128.2	21 20.7	63	72	128.6	21 01.6	64	71	129.0	20 42.5	64	71	129.4	2
3	22 10.8	62	74	125.9	21 52.3	62	74	126.3	21 33.7	62	74	126.7	21 15.1	62	73	127.1	20 56.4	62	73	127.5	20 37.6	63	72	128.0	20 18.8	63	72	128.4	19 59.9	63	72	128.8	3
4	21 26.2	61	75	125.2	21 07.9	61	74	125.7	20 49.6	61	74	126.1	20 31.2	61	74	126.5	20 12.7	62	73	126.9	19 54.2	62	73	127.4	19 35.7	62	72	127.8	19 17.0	62	72	128.2	4
55	20 41.3	60	76	124.6	20 23.2	60	75	125.1	20 05.1	60	75	125.5	19 47.0	61	74	125.9	19 28.8	61	74	126.3	19 10.5	61	74	126.8	18 52.2	61	73	127.2	18 33.8	61	73	127.6	55
6	19 56.0	59	76	124.0	19 38.2	59	76	124.5	19 20.3	60	75	124.9	19 02.4	60	75	125.3	18 44.4	60	74	125.7	18 26.4	60	74	126.2	18 08.3	60	74	126.6	17 50.2	61	73	127.0	6
7	19 10.4	58	76	123.4	18 52.9	59	76	123.9	18 35.2	59	76	124.3	18 17.5	59	75	124.7	17 59.8	59	75	125.2	17 42.0	59	75	125.6	17 24.1	60	74	126.0	17 06.2	60	74	126.4	7
8	18 24.5	58	77	122.9	18 07.2	58	77	123.3	17 49.8	58	76	123.7	17 32.3	58	76	124.2	17 14.8	58	76	124.6	16 57.2	59	75	125.0	16 39.6	59	75	125.4	16 21.9	59	74	125.8	8
9	17 38.4	57	78	122.3	17 21.2	57	77	122.7	17 04.1	57	77	123.2	16 46.8	58	76	123.6	16 29.5	58	76	124.0	16 12.2	58	76	124.4	15 54.8	58	75	124.9	15 37.4	58	75	125.3	9
60	16 51.9	56	78	121.7	16 35.0	56	78	122.2	16 18.0	57	77	122.6	16 01.0	57	77	123.0	15 43.9	57	76	123.5	15 26.8	57	76	123.9	15 09.7	57	76	124.3	14 52.5	57	75	124.7	60
1	16 05.1	56	78	121.2	15 48.4	56	78	121.6	15 31.7	56	78	122.1	15 14.9	56	77	122.5	14 58.1	56	77	122.9	14 41.2	56	76	123.3	14 24.3	57	76	123.8	14 07.3	57	76	124.2	1
2	15 18.1	55	79	120.7	15 01.6	55	78	121.1	14 45.1	55	78	121.5	14 28.5	55	78	122.0	14 11.9	55	77	122.4	13 55.3	56	77	122.8	13 38.6	56	77	123.2	13 21.8	56	76	123.7	2
3	14 30.8	54	79	120.1	14 14.6	54	79	120.6	13 58.3	54	78	121.0	13 41.9	55	78	121.4	13 25.5	55	78	121.9	13 09.1	55	78	122.3	12 52.6	55	77	122.7	12 36.0	55	77	123.1	3
4	13 43.3	53	80	119.6	13 27.3	54	79	120.0	13 11.2	54	79	120.5	12 55.0	54	78	120.9	12 38.8	54	78	121.3	12 22.6	54	78	121.8	12 06.3	54	78	122.2	11 50.0	54	77	122.6	4
65	12 55.5	53	80	119.1	12 39.7	53	80	119.5	12 23.8	53	79	120.0	12 07.9	53	79	120.4	11 51.9	53	79	120.8	11 35.9	53	78	121.3	11 19.8	54	78	121.7	11 03.7	54	78	122.1	65
6	12 07.5	52	80	118.6	11 51.9	52	80	119.0	11 36.2	52	80	119.5	11 20.5	52	80	119.9	11 04.7	53	79	120.3	10 48.9	53	79	120.8	10 33.1	53	78	121.2	10 17.2	53	78	121.6	6
7	11 19.3	51	81	118.1	11 03.8	52	80	118.5	10 48.3	52	80	119.0	10 32.8	52	80	119.4	10 17.3	52	80	119.8	10 01.7	52	79	120.3	9 46.0	52	79	120.7	9 30.4	52	78	121.1	7
8	10 30.8	51	81	117.6	10 15.6	51	81	118.0	10 00.3	51	80	118.5	9 45.0	51	80	118.9	9 29.6	51	80	119.4	9 14.2	51	80	119.8	8 58.8	51	79	120.2	8 43.4	52	79	120.7	8
9	9 42.1	50	82	117.1	9 27.1	50	81	117.6	9 12.0	50	81	118.0	8 56.9	50	80	118.4	8 41.7	51	80	118.9	8 26.5	51	80	119.3	8 11.3	51	80	119.7	7 56.1	51	79	120.2	9
70	8 53.3	49	82	116.6	8 38.4	50	82	117.1	8 23.5	50	81	117.5	8 08.6	50	81	118.0	7 53.6	50	80	118.4	7 38.6	50	80	118.8	7 23.6	50	80	119.3	7 08.6	50	80	119.7	70
1	8 04.2	49	82	116.2	7 49.5	49	82	116.6	7 34.8	49	82	117.1	7 20.1	49	81	117.5	7 05.3	49	81	117.9	6 50.5	49	80	118.4	6 35.7	49	80	118.8	6 20.9	49	80	119.3	1
2	7 14.9	48	82	115.7	7 00.4	48	82	116.2	6 45.9	48	82	116.6	6 31.3	49	82	117.0	6 16.8	49	81	117.5	6 02.2	49	81	117.9	5 47.6	49	80	118.4	5 33.0	49	80	118.8	2
3	6 25.4	48	83	115.3	6 11.1	48	82	115.7	5 56.8	48	82	116.2	5 42.4	48	82	116.6	5 28.0	48	82	117.0	5 13.7	48	81	117.5									3
4	5 35.7	47	83	114.8	5 21.6	47	83	115.3	5 07.5	47	82	115.7																					4

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	7 07.8	39	86	71.2	7 19.5	39	86	70.8	7 31.2	39	86	70.3	7 42.9	39	86	69.8	7 54.5	39	85	69.4	8 06.1	39	85	68.9	8 17.6	38	85	68.4	8 29.1	38	84	68.0	91
2	6 16.0	40	86	70.9	6 27.8	39	86	70.4	6 39.7	39	86	69.9	6 51.5	39	86	69.5	7 03.2	39	85	69.0	7 15.0	39	85	68.6	7 26.7	39	85	68.1	7 38.4	39	84	67.6	2
3	5 24.3	40	86	70.5	5 36.3	40	86	70.0	5 48.2	40	86	69.6	6 00.2	40	85	69.1	6 12.1	40	85	68.6	6 24.0	40	85	68.2	6 35.9	40	84	67.7	6 47.8	39	84	67.3	3
4													5 09.0	40	85	68.7	5 21.1	40	85	68.3	5 33.2	40	85	67.8	5 45.3	40	84	67.4	5 57.3	40	84	66.9	4
95																													5 06.9	41	84	66.5	95

Lat. 24°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	90 00.0	.. 91	....	89 30.0	1.0 54	00.0	89 00.0	1.0 35	00.0	88 30.0	1.0 25	00.0	88 00.0	1.0 20	00.0	87 30.0	1.0 16	00.0	87 00.0	1.0 13	00.0	86 30.0	1.0 11	00.0	00
1	89 05.2	00 91	89.8	88 57.6	48 85	61.1	88 38.9	74 72	42.1	88 14.8	85 60	31.0	87 48.3	91 50	24.2	87 20.5	94 43	19.7	86 52.0	96 37	16.5	86 23.2	97 32	14.2	1
2	88 10.4	01 91	89.6	88 06.6	26 89	74.2	87 55.4	48 83	60.8	87 38.7	63 76	50.0	87 18.1	74 68	41.8	86 54.9	81 60	35.5	86 30.0	85 54	30.6	86 03.8	89 48	26.8	2
3	87 15.6	01 91	89.4	87 13.2	17 90	79.0	87 05.6	33 87	69.3	86 53.4	47 82	60.5	86 37.5	58 76	53.0	86 18.6	67 71	46.7	85 57.5	73 65	41.4	85 34.7	78 60	37.0	3
4	86 20.8	01 91	89.2	86 19.1	12 90	81.4	86 13.5	25 88	73.8	86 04.2	37 85	66.7	85 51.6	47 81	60.3	85 36.2	56 77	54.5	85 18.4	63 72	49.4	84 58.7	69 68	45.0	4
05	85 26.0	02 91	89.0	85 24.8	09 91	82.7	85 20.5	20 89	76.6	85 13.1	30 87	70.7	85 02.8	39 84	65.1	84 50.0	47 81	60.0	84 34.9	54 77	55.3	84 17.9	60 74	51.1	05
6	84 31.2	02 91	88.8	84 30.4	07 91	83.5	84 27.0	16 90	78.4	84 21.0	24 88	73.4	84 12.4	32 86	68.6	84 01.6	40 83	64.0	83 48.6	46 80	59.7	83 33.8	52 77	55.8	6
7	83 36.4	03 91	88.6	83 35.9	05 91	84.1	83 33.2	13 90	79.6	83 28.2	20 89	75.3	83 21.0	28 87	71.0	83 11.7	34 85	67.0	83 00.5	40 82	63.1	82 47.5	46 80	59.5	7
8	82 41.6	03 91	88.4	82 41.4	04 91	84.4	82 39.2	11 90	80.5	82 35.0	17 89	76.7	82 28.8	24 88	72.9	82 20.8	30 86	69.3	82 11.0	36 84	65.7	81 59.5	41 82	62.4	8
9	81 46.8	03 91	88.2	81 46.8	03 91	84.7	81 45.1	09 90	81.2	81 41.5	15 89	77.7	81 36.2	21 88	74.3	81 29.2	26 87	71.0	81 20.6	31 85	67.8	81 10.4	36 83	64.7	9
10	80 52.0	04 91	88.0	80 52.2	02 91	84.8	80 50.9	07 90	81.7	80 47.9	13 90	78.5	80 43.3	18 89	75.5	80 37.2	23 88	72.4	80 29.5	28 86	69.5	80 20.5	33 84	66.6	10
1	79 57.2	04 91	87.8	79 57.6	01 91	84.9	79 56.6	06 90	82.0	79 54.1	11 90	79.2	79 50.1	16 89	76.4	79 44.7	20 88	73.6	79 38.0	25 87	70.9	79 29.8	29 85	68.2	1
2	79 02.4	04 91	87.6	79 03.1	00 91	84.9	79 02.3	05 90	82.3	79 00.2	09 90	79.7	78 56.8	14 89	77.1	78 52.0	18 88	74.5	78 46.0	22 87	72.0	78 38.7	26 86	69.5	2
3	78 07.7	05 91	87.3	78 08.5	00 91	84.9	78 08.0	04 91	82.5	78 06.2	08 90	80.1	78 03.3	12 89	77.6	77 59.1	16 88	75.3	77 53.7	20 88	72.9	77 47.2	24 86	70.6	3
4	77 12.9	05 91	87.1	77 13.9	01 91	84.9	77 13.6	03 91	82.6	77 12.2	07 90	80.4	77 09.7	10 90	78.1	77 06.0	14 89	75.9	77 01.2	18 88	73.7	76 55.3	21 87	71.5	4
15	76 18.2	05 91	86.9	76 19.3	02 91	84.8	76 19.3	02 91	82.7	76 18.2	05 90	80.6	76 16.0	09 90	78.5	76 12.8	12 89	76.4	76 08.5	16 88	74.3	76 03.2	19 87	72.3	15
6	75 23.5	06 91	86.7	75 24.7	02 91	84.7	75 24.9	01 91	82.8	75 24.1	04 90	80.8	75 22.3	08 90	78.8	75 19.5	11 89	76.8	75 15.7	14 88	74.9	75 10.9	17 87	72.9	6
7	74 28.8	06 91	86.5	74 30.1	03 91	84.7	74 30.5	00 91	82.8	74 30.0	03 90	80.9	74 28.5	07 90	79.0	74 26.1	10 89	77.2	74 22.7	13 88	75.3	74 18.5	16 88	73.5	7
8	73 34.0	06 91	86.3	73 35.5	03 91	84.5	73 36.1	01 91	82.8	73 35.8	02 90	81.0	73 34.7	05 90	79.2	73 32.6	08 89	77.5	73 29.6	11 89	75.7	73 25.8	14 88	74.0	8
9	72 39.4	07 91	86.1	72 41.0	04 91	84.4	72 41.8	01 91	82.7	72 41.7	02 90	81.1	72 40.8	04 90	79.4	72 39.1	07 89	77.7	72 36.5	10 89	76.0	72 33.1	13 88	74.4	9
20	71 44.7	07 91	85.9	71 46.4	05 91	84.3	71 47.4	02 91	82.7	71 47.5	01 90	81.1	71 46.9	03 90	79.5	71 45.5	06 89	77.9	71 43.3	09 89	76.3	71 40.3	11 88	74.7	20
1	70 50.0	08 91	85.7	70 51.9	05 91	84.2	70 53.0	03 91	82.6	70 53.4	00 90	81.1	70 53.0	03 90	79.6	70 51.9	05 90	78.1	70 50.0	08 89	76.5	70 47.3	10 88	75.0	1
2	69 55.4	08 91	85.5	69 57.4	06 91	84.0	69 58.7	03 91	82.6	69 59.2	01 90	81.1	69 59.1	02 90	79.6	69 58.2	04 90	78.2	69 56.7	06 89	76.7	69 54.4	09 88	75.3	2
3	69 00.7	08 91	85.3	69 02.9	06 91	83.9	69 04.3	04 90	82.5	69 05.1	01 90	81.1	69 05.2	01 90	79.7	69 04.6	03 90	78.3	69 03.3	05 89	76.9	69 01.3	08 88	75.5	3
4	68 06.1	09 91	85.1	68 06.4	06 91	83.7	68 10.0	04 90	82.4	68 10.9	02 90	81.0	68 11.2	00 90	79.7	68 10.9	02 90	78.3	68 09.9	04 89	77.0	68 08.2	07 88	75.7	4
25	67 11.5	09 91	84.8	67 13.9	07 91	83.6	67 15.7	05 90	82.3	67 16.8	03 90	81.0	67 17.3	01 90	79.7	67 17.2	01 90	78.4	67 16.5	03 89	77.1	67 15.1	06 88	75.8	25
6	66 16.9	09 91	84.6	66 19.4	07 91	83.4	66 21.4	05 90	82.2	66 22.7	03 90	80.9	66 23.4	01 90	79.7	66 23.5	01 90	78.4	66 23.0	03 89	77.2	66 22.0	05 89	75.9	6
7	65 22.4	10 91	84.4	65 25.0	08 91	83.2	65 27.1	06 90	82.0	65 28.6	04 90	80.8	65 29.5	02 90	79.6	65 29.8	00 90	78.4	65 29.6	02 89	77.2	65 28.8	04 89	76.0	7
8	64 27.8	10 91	84.2	64 30.6	08 91	83.1	64 32.8	06 90	81.9	64 34.4	05 90	80.7	64 35.6	03 90	79.6	64 36.1	01 90	78.4	64 36.1	01 89	77.2	64 35.6	03 89	76.1	8
9	63 33.3	10 91	84.0	63 36.2	09 91	82.9	63 38.5	07 90	81.8	63 40.4	05 90	80.6	63 41.7	03 90	79.5	63 42.4	02 90	78.4	63 42.7	00 89	77.2	63 42.4	02 89	76.1	9
30	62 38.8	11 91	83.8	62 41.8	09 91	82.7	62 44.3	07 90	81.6	62 46.3	06 90	80.5	62 47.8	04 90	79.4	62 48.7	02 89	78.3	62 49.2	01 89	77.2	62 49.2	01 89	76.1	30
1	61 44.3	11 91	83.6	61 47.4	10 90	82.5	61 50.1	08 90	81.5	61 52.2	06 90	80.4	61 53.9	05 90	79.3	61 55.1	03 89	78.3	61 55.8	01 89	77.2	61 56.0	00 89	76.2	1
2	60 49.9	12 91	83.3	60 53.1	10 90	82.3	60 55.9	08 90	81.3	60 58.2	07 90	80.3	61 00.0	05 90	79.3	61 01.4	04 89	78.2	61 02.3	02 89	77.2	61 02.7	01 89	76.2	2
3	59 55.4	12 91	83.1	59 58.8	10 90	82.1	60 01.7	09 90	81.1	60 04.2	07 90	80.1	60 06.2	06 90	79.1	60 07.8	04 89	78.1	60 08.9	03 89	77.1	60 09.5	01 89	76.1	3
4	59 01.0	12 91	82.9	59 04.5	11 90	81.9	59 07.6	09 90	81.0	59 10.2	08 90	80.0	59 12.4	07 90	79.0	59 14.1	06 89	78.1	59 15.4	04 89	77.1	59 16.3	02 89	76.1	4
35	58 06.6	13 91	82.7	58 10.3	11 90	81.7	58 13.4	10 90	80.8	58 16.2	09 90	79.9	58 18.6	07 90	78.9	58 20.5	06 89	78.0	58 22.0	04 89	77.0	58 23.1	03 89	76.1	35
6	57 12.3	13 90	82.5	57 16.0	12 90	81.6	57 19.3	10 90	80.6	57 22.3	09 90	79.7	57 24.8	08 90	78.8	57 26.9	06 89	77.9	57 28.6	05 89	76.9	57 29.9	04 89	76.0	6
7	56 18.0	13 90	82.3	56 21.8	12 90	81.4	56 25.3	11 90	80.5	56 28.4	10 90	79.6	56 31.0	08 90	78.7	56 33.3	07 89	77.8	56 35.2	06 89	76.8	56 36.7	04 89	75.9	7
8	55 23.7	14 90	82.0	55 27.6	13 90	81.2	55 31.2	11 90	80.3	55 34.5	10 90	79.4	55 37.3	09 90	78.5	55 39.8	08 89	77.6	55 41.9	06 89	76.8	55 43.6	05 89	75.9	8
9	54 29.4	14 90	81.8	54 33.5	13 90	81.0	54 37.2	12 90	80.1	54 40.6	11 90	79.2	54 43.6	09 90	78.4	54 46.2	08 89	77.5	54 48.5	07 89	76.6	54 50.4	06 88	75.8	9
40	53 35.2	15 90	81.6	53 39.4	13 90	80.7	53 43.2	12 90	79.9	53 46.8	11 90	79.1	53 49.9	10 89	78.2	53 52.7	09 89	77.4	53 55.2	08 89	76.5	53 57.3	06 88	75.7	40
1	52 41.0	15 90	81.4	52 45.3	14 90	80.5	52 49.3	13 90	79.7	52 53.0	12 90	78.9	52 56.3	11 89	78.1	52 59.3	09 89	77.2	53 01.9	08 89	76.4	53 04.2	07 88	75.6	1
2	51 46.8	15 90	81.1	51 51.2	14 90	80.3	51 55.4	13 90	79.5	51 59.2	12 90	78.7	52 02.7	11 89	77.9	52 05.8	10 89	77.1	52 08.6	09 89	76.3	52 11.1	08 88	75.5	2
3	50 52.6	16 90	80.9	50 57.2	15 90	80.1	51 01.5	14 90	79.3	51 05.5	13 90	78.5	51 09.1	12 89	77.7	51 12.4	11 89	77.0	51 15.4	09 89	76.2	51 18.1	08 88	75.4	3
4	49 58.5	16 90	80.7	50 03.2	15 90	79.9	50 07.7	14 90	79.1	50 11.8	13 90	78.4	50 15.5	12 89	77.6	50 19.0	11 89	76.8	50 22.2	10 89	76.0	50 25.1	09 88	75.2	4
45	49 04.5	17 90	80.4	49 09.3	16 90	79.7	49 13.8	15 90	78.9	49 18.1	14 89	78.2	49 22.0	13 89	77.4	49 25.7	12 89	76.6	49 29.0	11 89	75.9	49 32.1	10 88	75.1	45
6	48 10.4	17 90	80.2	48 15.4	16 90	79.5	48 20.1	15 90	78.7	48 24.5	14 89	78.0	48 28.6	13 89	77.2	48 32.4	12 89	76.5	48 35.9	11 88	75.7	48 39.1	10 88	75.0	6
7	47 16.4	17 90	80.0	47 21.5	17 90	79.2	47 26.3	16 90	78.5	47 30.9	15 89	77.8	47 35.1	14 89	77.0	47 39.1	13 89	76.3	47 42.8	12 88	75.6	47 46.2	11 88	74.8	7
8	46 22.5	18 90	79.7	46 27.7	17 90	79.0	46 32.6	16 89	78.3	46 37.3	15 89	77.6	46 41.7	14 89	76.9	46 45.9	13 89	76.1	46 49.7	12 88	75.4	46 53.3	11 88	74.7	8
9	45 28.6	18 90	79.5	45 33.9	17 90	78.8	45 39.0	17 89	78.1	45 43.8	16 89	77.4	45 48.4	15 89	76.7	45 52.7	14 89	76.0	45 56.7	13 88	75.3	46 00.5	12 88	74.5	9
50	44 34.7	19 90	79.3	44 40.2	18 90	78.6	44 45.4	17 89	77.9	44 50.3	16 89	77.2	44 55.0	15 89	76.5	44 59.5	14 88	75.8	45 03.7	14 88	75.1	45 07.6	13 88	74.4	50
1	43 40.9	19 90	79.0	43 46.5	18 90	78.3	43 51.8	17 89	77.7	43 56.9	17 89	77.0	44 01.8	16 89	76.3	44 06.4	15 88	75.6	44 10.8	14 88	74.9	44 14.9	13 88	74.2	1
2	42 47.1	19 90	78.8	42 52.8	19 89	78.1	42 58.3	18 89	77.4	43 03.5	17 89	76.8	43 08.5	16 89	76.1	43 13.3	16 88	75.4	43 17.9	15 88	74.7	43 22.1	14 88	74.1	2
3	41 53.3	20 90	78.5	41 59.2	19 89	77.9	42 04.8	18 89	77.2	42 10.3	18 89	76.6	42 15.4	17 89	75.9	42 20.3	16 88	75.2	42 25.0	15 88	74.6	42 29.5	14 88	73.9	3
4	40 59.6	20 90	78.3	41 05.6	20 89	77.6	41 11.4	19 89	77.0	41 16.9	18 89	76.3	41 22.2	17 88	75.7	41 27.3	17 88	75.0	41 32.2	16 88	74.4	41 36.8	15 88	73.7	4
55	40 06.0	21 89	78.0	40 12.1	20 89	77.4	40 18.0	19 89	76.8	40 23.7	19 89	76.1	40 29.1	18 88	75.5	40 34.4	17 88	74.8	40 39.4	16 88	74.2	40 44.2	16 88	73.5	55
6	39 12.4	21 89	77.8	39 18.6	20 89	77.2	39 24.7	20 89	76.5	39 30.5	19 88	75.9	39 36.1	18 88	75.3	39 41.5	18 88	74.6	39 46.7	17 88	74.0	39 51.7	16 88	73.3	6
7	38 18.8	22 89	77.5	38 25.2	21 89	76.9	38 31.4	20 89	76.3	38 37.4	20 88	75.7	38 43.1	19 88	75.0	38 48.7	18 88	74.4	38 54.1	18 88	73.8	38 59.2	17 87	73.1	7
8	37 25.3	22 89	77.3	37 31.8	21 89	76.7	37 38.2	21 89	76.1	37 44.3	20 88	75.4	37 50.2	19 88	74.8	37 55.9	19 88	74.2	38 01.5	18 88	73.6	38 06.8	17 87	73.0	8
9	36 31.9	22 89	77.0	36 38.5	22 89	76.4	36 45.0	21 88	75.8	36 51.3	21 88	75.2	36 57.3	20 88	74.6	37 03.2	19 88	74.0	37 08.9	19 88	73.4	37 14.4	18 87	72.8	9
60	35 38.5	23 89	76.8	35 45.3	22 89	76.2	35 51.9	22 88	75.6	35 58.3	21 88	75.0	36 04.5	20 88	74.4	36 10.6	20 88	73.8	36 16.4	19 87	73.2	36 22.1	19 87	72.6	60
1	34 45.2	23 89	76.5	34 52.1	23 89	75.9	34 58.8	22 88	75.3	35 05.4	22 88	74.7	35 11.8	21 88	74.1	35 18.0	20 88	73.5	35 24.0	20 87	72.9	35 29.8	19 87	72.3	1
2	33 51.9	24 89	76.3	33 58.9	23 88	75.7	34 05.8	23 88	75.1	34 12.5	22 88	74.5	34 19.1	22 88	73.9	34 25.4	21 88	73.3	34 31.6	20 87	72.7	34 37.6	20 87	72.1	2
3	32 58.7	24 89	76.0	33 05.9	24 88	75.4	33 12.9	23 88	74.8	33 19.7	23 88	74.3	33 26.4	22 88	73.7	33 32.9	21 87	73.1	33 39.3	21 87	72.5	33 45.5	20 87	71.9	3
4	32 05.5	25 88	75.7	32 12.8	24 88	75.2	32 20.0	24 88	74.6	32 27.0	23 88	74.0	32 33.8	23 88	73.4	32 40.5	22 87	72.9	32 47.1	21 87	72.3	32 53.4	21 87	71.7	4
65	31 12.4	25 88	75.5	31 19.9	25 88	74.9	31 27.2	24 88	74.3	31 34.3	24 88	73.8	31 41.3	23 87	73.2	31 48.2	23 87	72.6	31 54.9	22 87	72.1	32 01.4	22 86	71.5	65
6	30 19.4	26 88	75.2	30 27.0	25 88	74.6	30 34.4	25 88	74.1	30 41.7	24 88	73.5	30 48.9	24 87	73.0	30 55.9	23 87	72.4	31 02.8	23 87	71.8	31 09.5	22 86	71.2	6
7	29 26.5	26 88	74.9	29 34.2	26 88	74.4	29 41.8	25 88	73.8	29 49.2	25 87	73.3	29 56.5	24 87	72.7	30 03.7	24 87	72.1	30 10.7	23 87	71.6	30 17.6	23 86	71.0	7
8	28 33.6	26 88	74.7	28 41.4	26 88	74.1	28 49.2	26 88	73.6	28 56.8	25 87	73.0	29 04.2	25 87	72.5	29 11.6	24 87	71.9	29 18.8	24 86	71.3	29 25.8	23 86	70.8	8
9	27 40.7	27 88	74.4	27 48.7	26 88	73.8	27 56.6	26 88	73.3	28 04.4	26 87	72.7	28 12.0	25 87	72.2	28 19.5	25 87	71.6	28 26.9	24 86	71.1	28 34.1	24 86	70.5	9
70	26 48.0	27 88	74.1	26 56.1	27 88	73.6	27 04.2	27 87	73.0	27 12.1	26 87	72.5	27 19.9	26 87	71.9	27 27.5	25 86	71.4	27 35.0	25 86	70.8	27 42.4	24 86	70.3	70
1	25 55.3	28 88	73.8	26 03.6	27 88	73.3	26 11.8	27 87	72.8	26 19.8	27 87	72.2	26 27.8	26 87	71.7	26 35.6	26 86	71.1	26 43.3	25 86	70.6	26 50.9	25 86	70.1	1
2	25 02.7	28 88	73.5	25 11.1	28 87	73.0	25 19.5	28 87	72.5	25 27.7	27 87	71.9	25 35.8	27 86	71.4	25 43.8	26 86	70.9	25 51.6	26 86	70.3	25 59.4	26 86	69.8	2
3	24 10.2	29 87	73.2	24 18.8	28 87	72.7	24 27.2	28 87	72.2	24 35.6	28 87	71.7	24 43.9	27 86	71.1	24 52.0	27 86	70.6	25 00.1	27 86	70.1	25 08.0	26 86	69.5	3
4	23 17.7	29 87	73.0	23 26.5	29 87	72.4	23 35.1	29 87	71.9	23 43.6	28 86	71.4	23 52.1	28 86	70.9	24 00.4	28 86	70.3	24 08.6	27 86	69.8	24 16.7	27 85	69.3	4
75	22 25.4	30 87	72.7	22 34.2	29 87	72.2	22 43.0	29 87	71.6	22 51.7	29 86	71.1	23 00.3	28 86	70.6	23 08.8	28 86	70.1	23 17.2	28 86	69.5	23 25.5	27 85	69.0	75
6	21 33.1	30 87	72.4	21 42.1	30 87	71.9	21 51.1	30 86	71.3	21 59.9	29 86	70.8	22 08.7	29 86	70.3	22 17.3	29 86	69.8	22 25.9	28 85	69.3	22 34.3	28 85	68.8	6
7	20 40.9	31 87	72.1	20 50.1	30 87	71.6	20 59.2	30 86	71.1	21 08.2	30 86	70.5	21 17.1	30 86	70.0	21 25.9	29 86	69.5	21 34.6	29 85	69.0	21 43.3	29 85	68.5	7
8	19 48.8	31 87	71.8	19 58.1	31 86	71.3	20 07.4	31 86	70.8	20 16.5	30 86	70.3	20 25.6	30 86	69.7	20 34.6	30 85	69.2	20 43.5	30 85	68.7	20 52.3	29 85	68.2	8
9	18 56.8	32 86	71.5	19 06.3	32 86	71.0	19 15.7	31 86	70.5	19 25.0	31 86	70.0	19 34.3	31 86	69.5	19 43.4	30 85	68.9	19 52.5	30 85	68.4	20 01.5	30 85	67.9	9
80	18 04.8	32 86	71.2	18 14.5	32 86	70.7	18 24.1	32 86	70.2	18 33.6	32 86	69.7	18 43.0	31 85	69.2	18 52.3	31 85	68.7	19 01.6	31 85	68.2	19 10.7	30 84	67.6	80
1	17 13.0	33 86	70.8	17 22.8	33 86	70.3	17 32.6	32 86	69.9	17 42.2	32 85	69.4	17 51.8	32 85	68.9	18 01.3	32 85	68.4	18 10.7	31 84	67.9	18 20.1	31 84	67.4	1
2	16 21.3	33 86	70.5	16 31.3	33 86	70.1	16 41.1	33 86	69.5	16 51.0	33 85	69.1	17 00.7	32 85	68.6	17 10.4	32 85	68.1	17 20.0	32 84	67.6	17 29.6	32 84	67.1	2
3	15 29.7	34 86	70.2	15 39.8	34 86	69.7	15 49.8	33 85	69.2	15 59.8	33 85	68.7	16 09.8	33 85	68.2	16 19.6	33 84	67.8	16 29.4	33 84	67.3	16 39.1	32 84	66.8	3
4	14 38.1	34 86	69.9	14 48.4	34 85	69.4	14 58.6	34 85	68.9	15 08.8	34 85	68.4	15 18.9	34 84	67.9	15 28.9	33 84	67.4	15 38.9	33 84	67.0	15 48.8	33 84	66.5	4
85	13 46.7	35 86	69.6	13 57.2	35 85	69.1	14 07.6	35 85	68.6	14 17.9	34 85	68.1	14 28.2	34 84	67.6	14 38.4	34 84	67.1	14 48.5	34 84	66.7	14 58.6	34 83	66.2	85
6	12 55.4	35 85	69.2	13 06.0	35 85	68.7	13 16.6	35 85	68.3	13 27.1	35 84	67.8	13 37.5	35 84	67.3	13 47.9	35 84	66.8	13 58.3	34 84	66.3	14 08.6	34 83	65.9	6
7	12 04.2	36 85	68.9	12 15.0	36 85	68.4	12 25.7	36 85	67.9	12 36.4	36 84	67.5	12 47.0	35 84	67.0	12 57.6	35 84	66.5	13 08.1	35 83	66.0	13 18.6	35 83	65.5	7
8	11 13.1	37 85	68.6	11 24.1	36 85	68.1	11 35.0	36 84	67.6	11 45.8	36 84	67.1	11 56.6	36 84	66.7	12 07.4	36 84	66.2	12 18.1	36 83	65.7	12 28.8	35 83	65.2	8
9	10 22.2	37 85	68.2	10 33.3	37 84	67.7	10 44.4	37 84	67.3	10 55.4	37 84	66.8	11 06.4	37 84	66.3	11 17.3	36 83	65.8	11 28.2	36 83	65.4	11 39.1	36 83	64.9	9
90	9 31.3	38 84	67.9	9 42.6	38 84	67.4	9 53.9	37 84	66.9	10 05.1	37 84	66.5	10 16.3	37 84	66.0	10 27.4	37 83	65.5	10 38.5	37 83	65.0	10 49.5	37 82	64.6	90

Lat. 24°

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	42 00.0	1.0	01	180.0	41 30.0	1.0	01	180.0	41 00.0	1.0	01	180.0	40 30.0	1.0	01	180.0	40 00.0	1.0	01	180.0	39 30.0	1.0	01	180.0	39 00.0	1.0	01	180.0	38 30.0	1.0	01	180.0	00
1	41 59.4	1.0	03	178.8	41 29.4	1.0	03	178.8	40 59.4	1.0	03	178.8	40 29.4	1.0	03	178.8	39 59.4	1.0	03	178.8	39 29.4	1.0	03	178.8	38 59.5	1.0	03	178.9	38 29.5	1.0	03	178.9	1
2	41 57.6	1.0	05	177.5	41 27.7	1.0	05	177.6	40 57.7	1.0	05	177.6	40 27.7	1.0	05	177.6	39 57.8	1.0	05	177.7	39 27.8	1.0	05	177.7	38 57.8	1.0	04	177.7	38 27.8	1.0	04	177.7	2
3	41 54.7	1.0	07	176.3	41 24.8	1.0	07	176.4	40 54.8	1.0	07	176.4	40 24.9	1.0	07	176.4	39 55.0	1.0	07	176.5	39 25.0	1.0	06	176.5	38 55.1	1.0	06	176.6	38 25.1	1.0	06	176.6	3
4	41 50.6	1.0	09	175.1	41 20.7	1.0	09	175.2	40 50.8	1.0	09	175.2	40 20.9	1.0	08	175.3	39 51.0	1.0	08	175.3	39 21.1	1.0	08	175.4	38 51.2	1.0	08	175.4	38 21.3	1.0	08	175.5	4
05	41 45.3	99	11	173.9	41 15.5	99	10	173.9	40 45.7	99	10	174.0	40 15.8	99	10	174.1	39 46.0	99	10	174.2	39 16.2	99	10	174.2	38 46.3	99	10	174.3	38 16.5	99	10	174.3	05
6	41 38.9	99	13	172.7	41 09.2	99	12	172.7	40 39.4	99	12	172.8	40 09.6	99	12	172.9	39 39.9	99	12	173.0	39 10.1	99	12	173.1	38 40.3	99	12	173.1	38 10.5	99	12	173.2	6
7	41 31.3	99	14	171.4	41 01.7	99	14	171.5	40 32.0	99	14	171.6	40 02.3	99	14	171.7	39 32.6	99	14	171.8	39 02.9	99	14	171.9	38 33.2	99	14	172.0	38 03.5	99	13	172.1	7
8	41 22.6	99	16	170.2	40 53.0	99	16	170.4	40 23.5	99	16	170.5	39 53.9	99	16	170.6	39 24.3	99	16	170.7	38 54.7	99	16	170.8	38 25.1	99	15	170.9	37 55.5	99	15	171.0	8
9	41 12.8	98	18	169.0	40 43.3	98	18	169.2	40 13.8	98	18	169.3	39 44.4	98	18	169.4	39 14.9	98	18	169.5	38 45.4	98	17	169.7	38 15.9	98	17	169.8	37 46.4	98	17	169.9	9
10	41 01.8	98	20	167.9	40 32.5	98	20	168.0	40 03.1	98	20	168.1	39 33.8	98	20	168.3	39 04.4	98	19	168.4	38 35.0	98	19	168.5	38 05.6	98	19	168.7	37 36.3	98	19	168.8	10
1	40 49.7	97	22	166.7	40 20.5	97	22	166.8	39 51.3	97	22	167.0	39 22.1	97	21	167.1	38 52.8	97	21	167.3	38 23.6	97	21	167.4	37 54.4	98	20	167.6	37 25.1	98	20	167.7	1
2	40 36.5	97	24	165.5	40 07.5	97	24	165.7	39 38.4	97	23	165.8	39 09.3	97	23	166.0	38 40.2	97	23	166.2	38 11.1	97	22	166.3	37 42.0	97	22	166.5	37 12.9	97	22	166.6	2
3	40 22.3	96	26	164.4	39 53.4	96	25	164.5	39 24.5	96	25	164.7	38 55.6	96	25	164.9	38 26.6	96	24	165.0	37 57.7	97	24	165.2	37 28.7	97	24	165.4	36 59.7	97	24	165.5	3
4	40 07.0	96	27	163.2	39 38.2	96	27	163.4	39 09.5	96	27	163.6	38 40.7	96	26	163.8	38 12.0	96	26	163.9	37 43.2	96	26	164.1	37 14.3	96	26	164.3	36 45.5	96	25	164.5	4
15	39 50.6	95	29	162.1	39 22.1	95	29	162.3	38 53.5	95	28	162.5	38 24.9	95	28	162.7	37 56.3	95	28	162.8	37 27.7	95	28	163.0	36 59.0	96	27	163.2	36 30.3	96	27	163.4	15
6	39 33.2	95	31	160.9	39 04.9	95	30	161.1	38 36.5	95	30	161.4	38 08.1	95	30	161.6	37 39.6	95	29	161.8	37 11.2	95	29	162.0	36 42.7	95	29	162.2	36 14.2	95	28	162.4	6
7	39 14.8	94	32	159.8	38 46.6	94	32	160.0	38 18.4	94	32	160.3	37 50.2	94	31	160.5	37 22.0	94	31	160.7	36 53.7	94	31	160.9	36 25.4	94	30	161.1	35 57.1	94	30	161.3	7
8	38 55.4	93	34	158.7	38 27.4	93	34	159.0	37 59.5	93	33	159.2	37 31.4	93	33	159.4	37 03.4	94	33	159.6	36 35.3	94	32	159.9	36 07.2	94	32	160.1	35 39.1	94	32	160.3	8
9	38 35.0	92	36	157.6	38 07.3	93	35	157.9	37 39.5	93	35	158.1	37 11.7	93	34	158.4	36 43.8	93	34	158.6	36 16.0	93	34	158.8	35 48.1	93	33	159.0	35 20.1	93	33	159.3	9
20	38 13.7	92	37	156.6	37 46.2	92	37	156.8	37 18.6	92	36	157.1	36 51.0	92	36	157.3	36 23.4	92	36	157.6	35 55.7	92	35	157.8	35 28.0	92	35	158.0	35 00.3	92	35	158.3	20
1	37 51.4	91	39	155.5	37 24.1	91	38	155.8	36 56.8	91	38	156.0	36 29.4	91	38	156.3	36 02.0	91	37	156.5	35 34.5	92	37	156.8	35 07.1	92	36	157.0	34 39.5	92	36	157.3	1
2	37 28.3	90	40	154.5	37 01.2	90	40	154.7	36 34.1	90	39	155.0	36 06.9	91	39	155.3	35 39.7	91	38	155.5	35 12.5	91	38	155.8	34 45.2	91	38	156.0	34 17.9	91	37	156.3	2
3	37 04.2	89	42	153.4	36 37.3	90	41	153.7	36 10.4	90	41	154.0	35 43.5	90	40	154.3	35 16.6	90	40	154.5	34 49.6	90	40	154.8	34 22.5	90	39	155.1	33 55.5	90	39	155.3	3
4	36 39.2	89	43	152.4	36 12.6	89	42	152.7	35 46.0	89	42	153.0	35 19.3	89	42	153.3	34 52.6	89	41	153.5	34 25.8	89	41	153.8	33 59.0	89	41	154.1	33 32.2	90	40	154.4	4
25	36 13.4	88	44	151.4	35 47.1	88	44	151.7	35 20.6	88	44	152.0	34 54.2	88	43	152.3	34 27.7	88	43	152.6	34 01.2	88	42	152.8	33 34.6	89	42	153.1	33 08.0	89	42	153.4	25
6	35 46.8	87	46	150.4	35 20.7	87	45	150.7	34 54.5	87	45	151.0	34 28.3	87	44	151.3	34 02.1	88	44	151.6	33 35.8	88	44	151.9	33 09.4	88	43	152.2	32 43.1	88	43	152.5	6
7	35 19.3	86	47	149.4	34 53.5	86	47	149.8	34 27.5	86	46	150.1	34 01.6	87	46	150.4	33 35.6	87	45	150.7	33 09.6	87	45	151.0	32 43.5	87	45	151.3	32 17.4	87	44	151.6	7
8	34 51.1	85	48	148.5	34 25.5	85	48	148.8	33 59.8	86	48	149.1	33 34.1	86	47	149.4	33 08.4	86	47	149.7	32 42.6	86	46	150.0	32 16.7	86	46	150.3	31 50.9	86	46	150.6	8
9	34 22.0	81	50	147.6	33 56.7	85	49	147.9	33 31.3	85	49	148.2	33 05.8	85	48	148.5	32 40.4	85	48	148.8	32 14.8	85	48	149.1	31 49.2	85	47	149.4	31 23.6	85	47	149.8	9
30	33 52.2	84	51	146.6	33 27.2	84	50	147.0	33 02.0	84	50	147.3	32 36.8	84	50	147.6	32 11.6	84	49	147.9	31 46.3	84	49	148.2	31 21.0	84	48	148.6	30 55.6	85	48	148.9	30
1	33 21.7	83	52	145.7	32 56.9	83	52	146.0	32 32.0	83	51	146.4	32 07.1	83	51	146.7	31 42.2	83	50	147.0	31 17.1	83	50	147.4	30 52.1	84	49	147.7	30 27.0	84	49	148.0	1
2	32 50.5	82	53	144.8	32 25.9	82	53	145.2	32 01.3	82	52	145.5	31 36.7	82	52	145.8	31 12.0	82	51	146.2	30 47.2	83	51	146.5	30 22.4	83	50	146.8	29 57.6	83	50	147.1	2
3	32 18.6	81	54	143.9	31 54.3	81	54	144.3	31 29.9	81	54	144.6	31 05.6	81	53	145.0	30 41.1	82	52	145.3	30 16.6	82	52	145.6	29 52.1	82	52	146.0	29 27.5	82	51	146.3	3
4	31 46.0	80	55	143.1	31 22.0	80	55	143.4	30 57.9	80	54	143.8	30 33.8	81	54	144.1	30 09.6	81	54	144.5	29 45.4	81	53	144.8	29 21.1	81	53	145.1	28 56.7	81	52	145.5	4
35	31 12.7	79	56	142.2	30 49.0	79	56	142.6	30 25.2	79	56	142.9	30 01.3	80	55	143.3	29 37.4	80	55	143.6	29 13.4	80	54	144.0	28 49.4	80	54	144.3	28 25.3	80	53	144.7	35
6	30 38.8	78	58	141.4	30 15.3	78	57	141.7	29 51.8	79	57	142.1	29 28.2	79	56	142.5	29 04.6	79	56	142.8	28 40.9	79	55	143.2	28 17.1	79	55	143.5	27 53.3	79	54	143.9	6
7	30 04.3	77	58	140.6	29 41.1	77	58	140.9	29 17.8	78	58	141.3	28 54.5	78	57	141.6	28 31.1	78	57	142.0	28 07.7	78	56	142.4	27 44.2	78	56	142.7	27 20.7	79	56	143.1	7
8	29 29.2	76	60	139.8	29 06.2	77	59	140.1	28 43.2	77	59	140.5	28 20.2	77	58	140.9	27 57.1	77	58	141.2	27 33.9	77	57	141.6	27 10.7	77	57	141.9	26 47.4	78	56	142.3	8
9	28 53.5	75	60	139.0	28 30.8	76	60	139.3	28 08.1	76	60	139.7	27 45.3	76	59	140.1	27 22.5	76	59	140.4	26 59.6	76	58	140.8	26 36.6	77	58	141.2	26 13.6	77	57	141.5	9
40	28 17.2	75	61	138.2	27 54.8	75	61	138.6	27 32.3	75	60	138.9	27 09.8	75	60	139.3	26 47.3	75	60	139.7	26 24.7	76	59	140.0	26 02.0	76	59	140.4	25 39.2	76	58	140.8	40
1	27 40.4	74	62	137.4	27 18.2	74	62	137.8	26 56.1	74	61	138.2	26 33.8	74	61	138.5	26 11.5	74	60	138.9	25 49.2	75	60	139.3	25 26.8	75	60	139.7	25 04.3	75	59	140.0	1
2	27 03.0	73	63	136.7	26 41.2	73	63	137.0	26 19.2	73	62	137.4	25 57.3	73	62	137.8	25 35.2	74	61	138.2	25 13.2	74	61	138.6	24 51.0	74	60	138.9	24 28.8	74	60	139.3	2
3	26 25.1	72	64	135.9	26 03.5	72	64	136.3	25 41.9	72	63	136.7	25 20.2	72	63	137.1	24 58.4	73	62	137.5	24 36.6	73	62	137.8	24 14.7	73	61	138.2	23 52.8	73	61	138.6	3
4	25 46.7	71	65	135.2	25 25.4	71	64	135.6	25 04.0	71	64	136.0	24 42.6	72	64	136.4	24 21.1	72	63	136.7	23 59.6	72	63	137.1	23 38.0	72	62	137.5	23 16.3	72	62	137.9	4
45	25 07.9	70	66	134.5	24 46.8	70	65	135.3	24 25.7	70	65	135.3	24 04.5	71	64	135.7	23 43.3	71	64	136.0	23 22.0	71	63	136.4	23 00.7	71	63	136.8	22 39.3	71	62	137.2	45
6	24 28.5	69	66	133.8	24 07.7	69	66	134.2	23 46.9	70	66	134.6	23 26.0	70	65	135.0	23 05.0	70	65	135.4	22 44.0	70	64	135.7	22 22.9	70	64	136.1	22 01.8	71	63	136.5	6
7	23 48.7	69	67	133.1	23 28.2	69	67	133.5	23 07.6	69	66	133.9	22 47.0	69	66	134.3	22 26.3	69	65	134.7	22 05.5	69	65	135.1	21 44.7	69	64	135.4	21 23.8	70	64	135.8	7
8	23 08.5	67	68	132.4	22 48.2	68	67	132.8	22 27.9	68	67	133.2	22 07.5	68	66	133.6	21 47.1	68	66	134.0	21 26.6	68	66	134.4	21 06.0	69	65	134.8	20 45.4	69	65	135.2	8
9	22 27.8	67	68	131.7	22 07.8	67	68	132.2	21 47.7	67	68	132.6	21 27.6	67	67	133.0	21 07.4	67	67	133.3	20 47.2	68	66	133.7	20 26.9	68	66	134.1	20 06.6	68	66	134.5	9
50	21 46.7	66	69	131.1	21 26.9	66	69	131.5	21 07.1	66	68	131.9	20 47.3	66	68	132.3	20 27.3	67	67	132.7	20 07.4	67	67	133.1	19 47.3	67	67	133.5	19 27.3	67	66	133.9	50
1	21 05.2	65	70	130.5	20 45.7	65	70	130.9	20 26.1	65	69	131.3	20 06.5	65	68	131.7	19 46.9	66	68	132.1	19 27.1	66	68	132.5	19 07.4	66	67	132.9	18 47.6	66	67	133.3	1
2	20 23.3	64	70	129.8	20 04.0	64	70	130.2	19 44.7	64	70	130.6	19 25.4	65	69	131.0	19 06.0	65	69	131.5	18 46.5	65	68	131.9	18 27.0	65	68	132.3	18 07.4	65	68	132.7	2
3	19 41.0	63	71	129.2	19 22.0	63	71	129.6	19 03.0	64	70	130.0	18 43.9	64	70	130.4	18 24.7	64	69	130.8	18 05.5	64	69	131.2	17 46.2	64	68	131.6	17 26.9	64	68	132.0	3
4	18 58.3	62	72	128.6	18 39.6	63	71	129.0	18 20.8	63	71	129.4	18 01.9	63	70	129.8	17 43.0	63	70	130.2	17 24.1	63	70	130.6	17 05.1	63	69	131.1	16 46.0	64	69	131.5	4
55	18 15.3	62	72	128.0	17 56.8	62	72	128.4	17 38.3	62	72	128.8	17 19.7	62	71	129.2	17 01.0	62	71	129.6	16 42.3	62	70	130.1	16 23.6	63	70	130.5	16 04.8	63	69	130.9	55
6	17 32.0	61	73	127.4	17 13.7	61	72	127.8	16 55.4	61	72	128.2	16 37.0	61	72	128.7	16 18.6	61	71	129.1	16 00.2	62	71	129.5	15 41.7	62	70	129.9	15 23.2	62	70	130.3	6
7	16 48.3	60	73	126.8	16 30.2	60	73	127.3	16 12.2	60	73	127.7	15 54.1	60	72	128.1	15 35.9	61	72	128.5	15 17.7	61	71	128.9	14 59.5	61	71	129.3	14 41.1	61	70	129.7	7
8	16 04.2	59	74	126.3	15 46.4	59	74	126.7	15 28.6	59	73	127.1	15 10.8	60	73	127.5	14 52.8	60	72	127.9	14 34.9	60	72	128.4	14 16.9	60	72	128.8	13 58.8	60	71	129.2	8
9	15 19.9	58	74	125.7	15 02.3	59	74	126.1	14 44.8	59	74	126.6	14 27.1	59	73	127.0	14 09.5	59	73	127.4	13 51.7	59	72	127.8	13 34.0	59	72	128.2	13 16.2	59	72	128.6	9
60	14 35.2	58	75	125.2	14 17.9	58	74	125.6	14 00.6	58	74	126.0	13 43.2	58	74	126.4	13 25.7	58	73	126.8	13 08.3	58	73	127.3	12 50.8	58	72	127.7	12 33.2	59	72	128.1	60
1	13 50.3	57	76	124.6	13 33.2	57	75	125.0	13 16.1	57	75	125.5	12 58.9	57	74	125.9	12 41.7	57	74	126.3	12 24.5	58	74	126.7	12 07.2	58	73	127.1	11 49.9	58	73	127.6	1
2	13 05.0	56	76	124.1	12 48.2	56	76	124.5	12 31.3	56	75	124.9	12 14.4	56	75	125.4	11 57.4	57	74	125.8	11 40.4	57	74	126.2	11 23.4	57	74	126.6	11 06.3	57	73	127.0	2
3	12 19.5	55	76	123.6	12 02.9	55	76	124.0	11 46.2	56	76	124.4	11 29.5	56	75	124.8	11 12.8	56	75	125.3	10 56.1	56	74	125.7	10 39.3	56	74	126.1	10 22.4	56	74	126.5	3
4	11 33.7	55	77	123.1	11 17.3	55	76	123.5	11 00.9	55	76	123.9	10 44.4	55	76	124.3	10 27.9	55	75	124.8	10 11.4	55	75	125.2	9 54.8	55	74	125.6	9 38.2	55	74	126.0	4
65	10 47.6	54	77	122.6	10 31.4	54	77	123.0	10 15.2	54	76	123.4	9 59.0	54	76	123.8	9 42.8	54	76	124.3	9 26.5	54	75	124.7	9 10.1	54	75	125.1	8 53.8	55	75	125.5	65
6	10 01.3	53	78	122.1	9 45.3	53	77	122.5	9 29.4	53	77	122.9	9 13.4	53	77	123 3	8 57.3	54	76	123.8	8 41.3	54	76	124.2	8 25.2	54	75	124.6	8 09.0	54	75	125.1	6
7	9 14.7	52	78	121.6	8 59.0	52	78	122.0	8 43.2	53	77	122.4	8 27.4	53	77	122.9	8 11.6	53	77	123.3	7 55.8	53	76	123.7	7 39.9	53	76	124.1	7 24.0	53	75	124.6	7
8	8 27.9	52	78	121.1	8 12.4	52	78	121.5	7 56.8	52	78	122.0	7 41.3	52	77	122.4	7 25.7	52	77	122.8	7 10.1	52	77	123.2	6 54.4	52	76	123.7	6 38.8	52	76	124.1	8
9	7 40.8	51	79	120.6	7 25.5	51	78	121.1	7 10.2	51	78	121.5	6 54.9	51	78	121 9	6 39.5	51	77	122.3	6 24.1	51	77	122.8	6 08.7	51	77	123.2	5 53.3	51	76	123.6	9
70	6 53.5	50	79	120.2	6 38.5	50	79	120.6	6 23.4	50	78	121.0	6 08.2	50	78	121.5	5 53.1	51	78	121.9	5 37.9	51	77	122.3	5 22.7	51	77	122.8	5 07.5	51	76	123.2	70
1	6 06.0	50	80	119.7	5 51.2	50	79	120.1	5 36.3	50	79	120.6	5 21.4	50	78	121.0	5 06.4	50	78	121.4													1
2	5 18.3	49	80	119.2	5 03.6	49	79	119.7																									2

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	8 40.6	38	84	67.5	8 52.1	38	84	67.0	9 03.5	38	84	66.6	9 14.9	38	83	66.1	9 26.2	38	83	65.6	9 37.6	38	83	65.2	9 48.8	38	82	64.7	10 00.1	37	82	64.2	91
2	7 50.1	39	84	67.2	8 01.7	39	84	66.7	8 13.3	39	84	66.2	8 24.9	39	83	65.8	8 36.4	38	83	65.3	8 47.9	38	83	64.8	8 59.3	38	82	64.4	9 10.8	38	82	63.9	2
3	6 59.6	39	84	66.8	7 11.4	39	84	66.3	7 23.2	39	83	65.9	7 34.9	39	83	65.4	7 46.7	39	83	64.9	7 58.3	39	82	64.5	8 10.0	39	82	64.0	8 21.6	39	82	63.5	3
4	6 09.3	40	84	66.4	6 21.3	40	83	66.0	6 33.2	40	83	65.5	6 45.2	40	83	65.0	6 57.1	40	82	64.6	7 09.0	40	82	64.1	7 20.8	39	82	63.7	7 32.6	39	81	63.2	4
95	5 19.1	41	83	66.1	5 31.3	40	83	65.6	5 43.4	40	83	65.1	5 55.6	40	82	64.7	6 07.6	40	82	64.2	6 19.7	40	82	63.8	6 31.8	40	82	63.3	6 43.8	40	81	62.8	95
6													5 06.1	41	82	64.3	5 18.4	41	82	63.9	5 30.6	41	82	63.4	5 42.9	41	81	62.9	5 55.1	41	81	62.5	6
7																													5 06.6	41	81	62.1	7

Lat. 24°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	86 00.0	1.0 10	00.0	85 30.0	1.0 09	00.0	85 00.0	1.0 08	00.0	84 00.0	1.0 06	00.0
1	85 54.0	97 28	12.4	85 24.7	98 26	11.1	84 55.2	98 23	09.9	83 56.1	99 19	08.2
2	85 36.9	91 44	23.8	85 09.4	93 40	21.3	84 41.4	94 36	19.3	83 44.5	96 31	16.1
3	85 10.6	82 55	33.3	84 45.4	85 51	30.2	84 19.5	88 47	27.6	83 25.9	91 41	23.3
4	84 37.4	73 64	41.1	84 14.8	77 60	37.7	83 51.1	80 56	34.7	83 01.4	85 49	29.8
05	83 59.1	65 70	47.3	83 38.9	69 66	43.8	83 17.5	73 63	40.7	82 31.8	79 56	35.5
6	83 17.3	58 74	52.1	82 59.2	62 71	48.8	82 39.9	66 68	45.7	81 58.0	73 62	40.4
7	82 32.8	51 77	56.1	82 16.7	56 74	52.9	81 59.3	60 72	49.9	81 21.0	67 66	44.6
8	81 46.5	46 80	59.2	81 32.1	50 77	56.2	81 16.3	55 75	53.3	80 41.3	62 70	48.1
9	80 58.8	41 81	61.8	80 45.8	46 79	58.9	80 31.5	50 77	56.2	79 59.5	57 72	51.2
10	80 10.0	37 83	63.9	79 58.3	41 81	61.2	79 45.3	45 79	58.6	79 16.0	52 75	53.8
1	79 20.4	33 84	65.6	79 09.8	37 82	63.1	78 58.0	41 80	60.7	78 31.1	48 77	56.1
2	78 30.2	30 84	67.1	78 20.6	34 83	64.7	78 09.8	38 82	62.4	77 45.0	45 78	58.1
3	77 39.5	27 85	68.3	77 30.7	31 84	66.1	77 20.8	35 82	63.9	76 58.1	41 80	59.8
4	76 48.4	25 86	69.4	76 40.4	28 85	67.3	76 31.3	32 83	65.2	76 10.4	38 81	61.2
15	75 56.9	23 86	70.3	75 49.6	26 85	68.3	75 41.4	29 84	66.3	75 22.0	35 82	62.5
6	75 05.2	21 86	71.0	74 58.6	24 86	69.1	74 51.0	27 84	67.3	74 33.1	33 82	63.7
7	74 13.3	19 87	71.7	74 07.2	22 86	69.9	74 00.3	25 85	68.1	73 43.8	30 83	64.7
8	73 21.2	17 87	72.3	73 15.6	20 86	70.5	73 09.3	23 85	68.8	72 54.1	28 83	65.5
9	72 28.9	15 87	72.7	72 23.9	18 87	71.1	72 18.0	21 86	69.5	72 04.0	26 84	66.3
20	71 36.5	14 88	73.2	71 31.9	16 87	71.6	71 26.6	19 86	70.0	71 13.7	24 84	67.0
1	70 44.0	13 88	73.5	70 39.8	15 87	72.0	70 35.0	17 86	70.5	70 23.1	22 85	67.6
2	69 51.4	11 88	73.8	69 47.6	14 87	72.4	69 43.2	16 86	71.0	69 32.4	20 85	68.1
3	68 58.7	10 88	74.1	68 55.4	12 87	72.7	68 51.4	14 87	71.3	68 41.4	19 85	68.6
4	68 05.9	09 88	74.3	68 03.0	11 88	73.0	67 59.4	13 87	71.7	67 50.3	17 85	69.0
25	67 13.1	08 88	74.5	67 10.5	10 88	73.2	67 07.3	12 87	71.9	66 59.0	16 86	69.4
6	66 20.3	07 88	74.7	66 18.0	09 88	73.4	66 15.2	11 87	72.2	66 07.7	14 86	69.7
7	65 27.4	06 88	74.8	65 25.5	07 88	73.6	65 22.9	09 87	72.4	65 16.2	13 86	70.0
8	64 34.5	05 88	74.9	64 32.9	06 88	73.7	64 30.7	08 87	72.6	64 24.7	12 86	70.3
9	63 41.6	04 88	75.0	63 40.2	05 88	73.9	63 38.3	07 87	72.7	63 33.0	11 86	70.5
30	62 48.6	03 88	75.1	62 47.5	04 88	74.0	62 46.0	06 87	72.9	62 41.3	09 86	70.7
1	61 55.7	02 88	75.1	61 54.9	03 88	74.0	61 53.6	05 87	73.0	61 49.6	08 86	70.9
2	61 02.7	01 88	75.1	61 02.2	03 88	74.1	61 01.2	04 87	73.1	60 57.8	07 86	71.0
3	60 09.7	00 88	75.1	60 09.4	02 88	74.1	60 08.7	03 87	73.1	60 05.9	06 86	71.1
4	59 16.7	01 88	75.1	59 16.7	01 88	74.1	59 16.3	02 88	73.2	59 14.0	05 86	71.2
35	58 23.8	01 88	75.1	58 24.0	00 88	74.2	58 23.8	01 88	73.2	58 22.1	04 86	71.3
6	57 30.8	02 88	75.1	57 31.3	01 88	74.1	57 31.3	00 88	73.2	57 30.2	03 87	71.4
7	56 37.8	03 88	75.0	56 38.5	02 88	74.1	56 38.8	00 88	73.2	56 38.3	02 87	71.4
8	55 44.9	04 88	75.0	55 45.8	02 88	74.1	55 46.4	01 88	73.2	55 46.3	01 87	71.4
9	54 52.0	04 88	74.9	54 53.1	03 88	74.0	54 53.9	02 88	73.2	54 54.4	00 87	71.4
40	53 59.0	05 88	74.8	54 00.4	04 88	74.0	54 01.4	03 88	73.1	54 02.4	00 87	71.4
1	53 06.1	06 88	74.8	53 07.7	05 88	73.9	53 09.0	04 87	73.1	53 10.4	01 87	71.4
2	52 13.3	07 88	74.7	52 15.1	05 88	73.9	52 16.6	04 87	73.0	52 18.5	02 87	71.4
3	51 20.4	07 88	74.6	51 22.4	06 88	73.8	51 24.1	05 87	73.0	51 26.5	03 86	71.4
4	50 27.6	08 88	74.5	50 29.8	07 88	73.7	50 31.7	06 87	72.9	50 34.6	04 86	71.3
45	49 34.8	09 88	74.3	49 37.2	08 88	73.6	49 39.4	07 87	72.8	49 42.7	05 86	71.3
6	48 42.0	09 88	74.2	48 44.7	08 88	73.5	48 47.0	07 87	72.7	48 50.8	05 86	71.2
7	47 49.3	10 88	74.1	47 52.1	09 88	73.4	47 54.7	08 87	72.6	47 58.9	06 86	71.1
8	46 56.6	11 88	74.0	46 59.6	10 87	73.2	47 02.4	09 87	72.5	47 07.1	07 86	71.0
9	46 03.9	11 88	73.8	46 07.2	10 87	73.1	46 10.1	09 87	72.4	46 15.2	08 86	71.0
50	45 11.3	12 88	73.7	45 14.7	11 87	73.0	45 17.9	10 87	72.3	45 23.4	08 86	70.9
1	44 18.7	12 88	73.5	44 22.4	12 87	72.8	44 25.7	11 87	72.1	44 31.7	09 86	70.7
2	43 26.2	13 88	73.4	43 30.0	12 87	72.7	43 33.6	11 87	72.0	43 40.0	10 86	70.6
3	42 33.7	14 87	73.2	42 37.7	13 87	72.5	42 41.5	12 87	71.9	42 48.3	11 86	70.5
4	41 41.2	14 87	73.0	41 45.4	14 87	72.4	41 49.4	13 87	71.7	41 56.6	11 86	70.4
55	40 48.8	15 87	72.9	40 53.2	14 87	72.2	40 57.4	13 87	71.6	41 05.0	12 86	70.2
6	39 56.5	16 87	72.7	40 01.0	15 87	72.1	40 05.4	14 86	71.4	40 13.4	13 86	70.1
7	39 04.2	16 87	72.5	39 08.9	15 87	71.9	39 13.5	15 86	71.2	39 21.9	13 86	70.0
8	38 11.9	17 87	72.3	38 16.9	16 87	71.7	38 21.6	15 86	71.1	38 30.4	14 86	69.8
9	37 19.7	17 87	72.1	37 24.8	17 86	71.5	37 29.8	16 86	70.9	37 39.0	15 86	69.6
60	36 27.6	18 87	71.9	36 32.9	17 86	71.3	36 38.0	17 86	70.7	36 47.7	15 86	69.5
1	35 35.5	19 87	71.7	35 41.0	18 86	71.1	35 46.3	17 86	70.5	35 56.4	16 85	69.3
2	34 43.5	19 87	71.5	34 49.2	19 86	70.9	34 54.6	18 86	70.3	35 05.1	17 85	69.1
3	33 51.5	20 86	71.3	33 57.4	19 86	70.7	34 03.1	19 86	70.1	34 13.9	18 85	69.0
4	32 59.6	20 86	71.1	33 05.7	20 86	70.5	33 11.5	19 86	69.9	33 22.8	18 85	68.8
65	32 07.8	21 86	70.9	32 14.0	20 86	70.3	32 20.1	20 86	69.7	32 31.7	19 85	68.6
6	31 16.0	22 86	70.7	31 22.4	21 86	70.1	31 28.7	21 86	69.5	31 40.7	20 85	68.4
7	30 24.3	22 86	70.5	30 30.9	22 86	69.9	30 37.4	21 86	69.3	30 49.8	20 85	68.2
8	29 32.7	23 86	70.2	29 39.5	22 86	69.7	29 46.1	22 85	69.1	29 59.0	21 85	68.0
9	28 41.2	23 86	70.0	28 48.1	23 85	69.4	28 55.0	22 85	68.9	29 08.2	22 84	67.8
70	27 49.7	24 86	69.8	27 56.9	24 85	69.2	28 03.9	23 85	68.7	28 17.5	22 84	67.5
1	26 58.3	25 86	69.5	27 05.7	24 85	69.0	27 12.9	24 85	68.4	27 26.9	23 84	67.3
2	26 07.0	25 85	69.3	26 14.5	25 85	68.7	26 21.9	24 85	68.2	26 36.3	24 84	67.1
3	25 15.8	26 85	69.0	25 23.5	25 85	68.5	25 31.1	25 85	67.9	25 45.9	24 84	66.9
4	24 24.7	26 85	68.8	24 32.6	26 85	68.2	24 40.3	26 84	67.7	24 55.5	25 84	66.6
75	23 33.6	27 85	68.5	23 41.7	27 85	68.0	23 49.7	26 84	67.4	24 05.3	26 84	66.4
6	22 42.7	28 85	68.2	22 50.9	27 84	67.7	22 59.1	27 84	67.2	23 15.1	26 84	66.1
7	21 51.8	28 85	68.0	22 00.3	28 84	67.5	22 08.6	28 84	66.9	22 25.0	27 83	65.9
8	21 01.1	29 84	67.7	21 09.7	29 84	67.2	21 18.2	28 84	66.7	21 35.0	28 83	65.6
9	20 10.4	30 84	67.4	20 19.2	29 84	66.9	20 27.9	29 84	66.4	20 45.1	28 83	65.4
80	19 19.8	30 84	67.1	19 28.8	30 84	66.6	19 37.8	30 84	66.1	19 55.4	29 83	65.1
1	18 29.4	31 84	66.9	18 38.6	31 84	66.4	18 47.7	30 83	65.9	19 05.7	30 83	64.8
2	17 39.0	31 84	66.6	17 48.4	31 84	66.1	17 57.7	31 83	65.6	18 16.1	30 82	64.6
3	16 48.8	32 84	66.3	16 58.3	32 83	65.8	17 07.9	32 83	65.3	17 26.7	31 82	64.3
4	15 58.7	33 83	66.0	16 08.4	32 83	65.5	16 18.2	32 83	65.0	16 37.4	32 82	64.0
85	15 08.7	33 83	65.7	15 18.6	33 83	65.2	15 28.5	33 82	64.7	15 48.1	32 82	63.7
6	14 18.8	34 83	65.4	14 28.9	34 82	64.9	14 39.0	34 82	64.4	14 59.1	33 82	63.4
7	13 29.0	35 83	65.1	13 39.4	34 82	64.6	13 49.7	34 82	64.1	14 10.1	34 81	63.1
8	12 39.4	35 82	64.7	12 49.9	35 82	64.3	13 00.4	35 82	63.8	13 21.3	35 81	62.8
9	11 49.9	36 82	64.4	12 00.6	36 82	63.9	12 11.3	36 82	63.5	12 32.6	35 81	62.5
90	11 00.5	37 82	64.1	11 11.5	36 82	63.6	11 22.4	36 81	63.1	11 44.0	36 81	62.2

H.A.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	82 00.0	1.0 05	00.0	80 00.0	1.0 04	00.0	79 30.0	1.0 04	00.0	78 30.0	1.0 03	00.0
1	81 57.1	99 14	06.1	79 57.7	1.0 11	04.8	79 27.8	1.0 11	04.5	78 28.0	1.0 10	04.1
2	81 48.5	98 23	12.0	79 50.9	98 18	09.4	79 21.4	99 18	09.0	78 22.2	99 16	08.1
3	81 34.4	95 32	17.6	79 39.8	96 26	14.0	79 10.8	97 24	13.3	78 12.6	97 22	12.1
4	81 15.4	91 39	22.9	79 24.5	94 32	18.3	78 56.3	94 30	17.4	77 59.4	95 28	15.8
05	80 52.0	87 46	27.8	79 05.4	91 38	22.4	78 38.1	91 36	21.4	77 42.8	93 33	19.5
6	80 24.6	82 51	32.1	78 42.8	87 43	26.3	78 16.4	88 41	25.1	77 23.0	90 38	22.9
7	79 53.8	77 56	36.1	78 17.0	84 48	29.8	77 51.7	85 46	28.5	77 00.2	87 42	26.2
8	79 20.1	73 60	39.6	77 48.3	80 52	33.1	77 24.2	81 50	31.7	76 34.7	84 47	29.2
9	78 44.0	68 64	42.8	77 17.2	76 56	36.1	76 54.1	78 54	34.7	76 06.7	80 50	32.0
10	78 05.8	64 67	45.6	76 43.8	73 59	38.8	76 21.9	74 57	37.4	75 36.6	77 54	34.7
1	77 25.8	60 69	48.0	76 08.5	69 62	41.3	75 47.7	70 60	39.8	75 04.5	74 57	37.1
2	76 44.4	56 71	50.2	75 31.5	65 64	43.6	75 11.7	67 62	42.1	74 30.5	70 59	39.3
3	76 01.7	52 73	52.2	74 53.0	62 66	45.7	74 34.2	64 65	44.2	73 55.0	67 62	41.4
4	75 17.8	49 75	53.9	74 13.2	58 68	47.5	73 55.4	60 67	46.1	73 18.1	64 64	43.3
15	74 33.1	46 76	55.5	73 32.2	55 70	49.2	73 15.4	57 68	47.8	72 39.9	61 66	45.0
6	73 47.5	43 77	56.9	72 50.2	52 72	50.7	72 34.3	54 70	49.3	72 00.6	58 67	46.6
7	73 01.3	40 78	58.1	72 07.3	49 73	52.1	71 52.3	51 72	50.7	71 20.3	55 69	48.1
8	72 14.5	38 79	59.2	71 23.7	47 74	53.4	71 09.4	49 73	52.0	70 39.1	52 70	49.4
9	71 27.1	35 80	60.2	70 39.3	44 75	54.6	70 25.8	46 74	53.2	69 57.1	50 71	50.6
20	70 39.4	33 80	61.1	69 54.4	42 76	55.6	69 41.6	44 75	54.3	69 14.4	47 72	51.8
1	69 51.2	31 81	61.9	69 08.9	39 77	56.6	68 56.8	41 76	55.3	68 31.0	45 73	52.8
2	69 02.6	29 81	62.6	68 22.9	37 77	57.5	68 11.5	39 76	56.2	67 47.1	43 74	53.8
3	68 13.8	27 82	63.3	67 36.5	35 78	58.2	67 25.7	37 77	57.0	67 02.6	40 75	54.6
4	67 24.7	25 82	63.9	66 49.7	33 78	59.0	66 39.6	35 78	57.8	66 17.7	38 76	55.5
25	66 35.4	24 82	64.4	66 02.6	31 79	59.6	65 53.0	33 78	58.5	65 32.3	36 76	56.2
6	65 45.8	22 83	64.9	65 15.1	29 80	60.2	65 06.1	31 79	59.1	64 46.6	34 77	56.9
7	64 56.1	20 83	65.3	64 27.4	27 80	60.8	64 18.9	29 79	59.7	64 00.5	32 77	57.5
8	64 06.2	19 83	65.7	63 39.4	26 80	61.3	63 31.5	27 80	60.2	63 14.2	30 78	58.1
9	63 16.2	17 84	66.1	62 51.3	24 81	61.8	62 43.8	26 80	60.7	62 27.5	29 78	58.6
30	62 26.0	16 84	66.4	62 02.9	22 81	62.2	61 55.9	24 80	61.1	61 40.6	27 78	59.1
1	61 35.7	15 84	66.7	61 14.3	21 81	62.5	61 07.8	22 80	61.5	60 53.5	25 79	59.5
2	60 45.4	13 84	66.9	60 25.6	20 82	62.9	60 19.5	21 81	61.9	60 06.1	24 79	59.9
3	59 54.9	12 84	67.1	59 36.7	18 82	63.2	59 31.1	19 81	62.2	59 18.6	22 80	60.3
4	59 04.3	11 84	67.3	58 47.8	17 82	63.5	58 42.5	18 81	62.5	58 30.9	21 80	60.7
35	58 13.7	10 84	67.5	57 58.7	15 82	63.7	57 53.8	17 81	62.8	57 43.0	19 80	61.0
6	57 23.1	09 84	67.6	57 09.4	14 82	64.0	57 05.0	15 82	63.1	56 55.0	18 80	61.2
7	56 32.4	08 85	67.8	56 20.2	13 82	64.2	56 16.1	14 82	63.3	56 06.9	17 80	61.5
8	55 41.6	06 85	67.9	55 30.8	12 82	64.3	55 27.1	13 82	63.5	55 18.7	15 80	61.7
9	54 50.8	05 85	68.0	54 41.3	10 82	64.5	54 38.1	12 82	63.6	54 30.4	14 81	61.9
40	54 00.0	04 85	68.0	53 51.8	09 82	64.6	53 48.9	10 82	63.8	53 42.0	13 81	62.1
1	53 09.1	03 85	68.1	53 02.3	08 83	64.8	52 59.7	09 82	63.9	52 53.5	11 81	62.3
2	52 18.3	02 85	68.1	52 12.7	07 83	64.9	52 10.4	08 82	64.1	52 04.9	10 81	62.4
3	51 27.4	01 85	68.2	51 23.0	06 83	65.0	51 21.1	07 82	64.2	51 16.3	09 81	62.6
4	50 36.5	01 85	68.2	50 33.4	06 83	65.0	50 31.8	06 82	64.2	50 27.6	08 81	62.7
45	49 45.7	00 85	68.2	49 43.7	04 83	65.1	49 42.4	05 82	64.3	49 38.9	07 81	62.8
6	48 54.8	01 85	68.2	48 53.9	03 83	65.1	48 53.0	04 82	64.4	48 50.2	06 81	62.8
7	48 03.9	02 85	68.1	48 04.2	02 83	65.1	48 03.6	03 82	64.4	48 01.4	05 81	62.9
8	47 13.0	03 85	68.1	47 14.5	01 83	65.2	47 14.1	02 82	64.4	47 12.6	04 81	63.0
9	46 22.2	04 85	68.1	46 24.7	00 83	65.2	46 24.7	01 82	64.4	46 23.8	02 81	63.0
50	45 31.3	05 85	68.0	45 35.0	01 83	65.2	45 35.2	00 82	64.4	45 34.9	01 81	63.0
1	44 40.5	06 85	67.9	44 45.3	02 83	65.1	44 45.8	01 82	64.4	44 46.1	00 81	63.0
2	43 49.7	07 85	67.9	43 55.5	03 83	65.1	43 56.4	02 82	64.4	43 57.2	01 81	63.0
3	42 59.0	07 84	67.8	43 05.8	04 83	65.1	43 06.9	03 82	64.4	43 08.4	02 81	63.0
4	42 08.3	08 84	67.7	42 16.1	05 83	65.0	42 17.5	04 82	64.3	42 19.6	03 81	63.0
55	41 17.6	09 84	67.6	41 26.5	06 83	64.9	41 28.1	05 82	64.3	41 30.7	04 81	62.9
6	40 26.9	10 84	67.5	40 36.8	07 83	64.9	40 38.8	06 82	64.2	40 41.9	05 81	62.9
7	39 36.3	11 84	67.4	39 47.2	08 83	64.8	39 49.4	07 82	64.1	39 53.1	05 81	62.9
8	38 45.7	11 84	67.3	38 57.6	09 82	64.7	39 00.1	08 82	64.1	39 04.4	06 81	62.8
9	37 55.2	12 84	67.1	38 08.1	09 82	64.6	38 10.8	09 82	64.0	38 15.7	07 81	62.7
60	37 04.7	13 84	67.0	37 18.6	10 82	64.5	37 21.6	10 82	63.9	37 27.0	08 81	62.6
1	36 14.3	14 84	66.9	36 29.1	11 82	64.4	36 32.4	11 82	63.8	36 38.3	09 81	62.5
2	35 23.9	14 84	66.7	35 39.7	12 82	64.3	35 43.2	11 82	63.7	35 49.7	10 81	62.4
3	34 33.6	15 84	66.6	34 50.4	13 82	64.2	34 54.1	12 82	63.6	35 01.1	11 81	62.3
4	33 43.3	16 84	66.4	34 01.1	14 82	64.0	34 05.1	13 82	63.4	34 12.6	12 81	62.2
65	32 53.1	17 84	66.2	33 11.8	14 82	63.9	33 16.1	14 82	63.3	33 24.1	13 81	62.1
6	32 03.0	17 84	66.1	32 22.6	15 82	63.7	32 27.2	15 82	63.2	32 35.7	14 81	62.0
7	31 12.9	18 83	65.9	31 33.5	16 82	63.6	31 38.3	16 81	63.0	31 47.3	15 80	61.8
8	30 22.9	19 83	65.7	30 44.5	17 82	63.4	30 49.5	16 81	62.8	30 59.0	15 80	61.7
9	29 33.0	20 83	65.5	29 55.5	18 82	63.3	30 00.7	17 81	62.7	30 10.8	16 80	61.5
70	28 43.1	20 83	65.3	29 06.6	19 81	63.1	29 12.1	18 81	62.5	29 22.7	17 80	61.4
1	27 53.4	21 83	65.1	28 17.7	19 81	62.9	28 23.5	19 81	62.3	28 34.6	18 80	61.2
2	27 03.7	22 83	64.9	27 29.0	20 81	62.7	27 35.0	20 81	62.2	27 46.6	19 80	61.1
3	26 14.1	23 82	64.7	26 40.3	21 81	62.5	26 46.5	21 80	62.0	26 58.6	20 80	60.9
4	25 24.6	23 82	64.5	25 51.7	22 81	62.3	25 58.2	21 80	61.8	26 10.8	21 80	60.7
75	24 35.1	24 82	64.3	25 03.2	23 81	62.1	25 09.9	22 80	61.6	25 23.0	21 79	60.5
6	23 45.8	25 82	64.0	24 14.8	23 80	61.9	24 21.8	23 80	61.4	24 35.4	22 79	60.3
7	22 56.6	26 82	63.8	23 26.5	24 80	61.7	23 33.7	24 80	61.2	23 47.8	23 79	60.1
8	22 07.4	26 82	63.6	22 38.3	25 80	61.5	22 45.7	25 80	61.0	23 00.3	24 79	59.9
9	21 18.4	27 82	63.3	21 50.2	26 80	61.2	21 57.9	25 80	60.7	22 13.0	25 79	59.7
80	20 29.5	28 81	63.1	21 02.2	27 80	61.0	21 10.1	26 79	60.5	21 25.7	26 78	59.5
1	19 40.7	29 81	62.8	20 14.3	27 80	60.8	20 22.5	27 79	60.3	20 38.6	27 78	59.2
2	18 52.0	29 81	62.6	19 26.5	28 79	60.5	19 34.9	28 79	60.0	19 51.5	27 78	59.0
3	18 03.4	30 81	62.3	18 38.8	29 79	60.3	18 47.5	29 79	59.8	19 04.6	28 78	58.8
4	17 14.9	31 81	62.0	17 51.3	30 79	60.0	18 00.2	30 79	59.5	18 17.8	29 78	58.5
85	16 26.6	32 80	61.7	17 03.9	31 79	59.8	17 13.0	30 78	59.3	17 31.1	30 78	58.3
6	15 38.4	32 80	61.5	16 16.6	31 79	59.5	16 26.0	31 78	59.0	16 44.6	31 78	58.0
7	14 50.3	33 80	61.2	15 29.4	32 78	59.2	15 39.1	32 78	58.7	15 58.1	32 77	57.7
8	14 02.3	34 80	60.9	14 42.4	33 78	58.9	14 52.3	33 78	58.4	15 11.9	32 77	57.5
9	13 14.5	35 80	60.6	13 55.5	34 78	58.7	14 05.7	34 78	58.2	14 25.7	33 77	57.2
90	12 26.8	35 79	60.3	13 08.8	35 78	58.4	13 19.2	34 77	57.9	13 39.7	34 76	56.9

Lat. 24°

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	38 00.0	1.0	01	180.0	37 30.0	1.0	01	180.0	37 00.0	1.0	01	180.0	36 00.0	1.0	01	180.0	34 00.0	1.0	01	180.0	32 00.0	1.0	01	180.0	31 30.0	1.0	01	180.0	30 30.0	1.0	01	180.0	00
1	37 59.5	1.0	03	178.9	37 29.5	1.0	03	178.9	36 59.5	1.0	03	178.9	35 59.5	1.0	02	178.9	33 59.5	1.0	02	179.0	31 59.5	1.0	02	179.0	31 29.5	1.0	02	179.0	30 29.5	1.0	02	179.1	1
2	37 57.9	1.0	04	177.8	37 27.9	1.0	04	177.8	36 57.9	1.0	04	177.8	35 58.0	1.0	04	177.9	33 58.0	1.0	04	178.0	31 58.1	1.0	04	178.0	31 28.2	1.0	04	178.1	30 28.2	1.0	04	178.1	2
3	37 55.2	1.0	06	176.6	37 25.2	1.0	06	176.7	36 55.3	1.0	06	176.7	35 55.4	1.0	06	176.8	33 55.6	1.0	06	176.9	31 55.8	1.0	06	177.1	31 25.8	1.0	05	177.1	30 25.9	1.0	05	177.2	3
4	37 51.4	1.0	08	175.5	37 21.5	1.0	08	175.6	36 51.6	1.0	08	175.6	35 51.8	1.0	08	175.7	33 52.2	1.0	07	175.9	31 52.5	1.0	07	176.1	31 22.6	1.0	07	176.1	30 22.8	1.0	07	176.2	4
05	37 46.6	99	10	174.4	37 16.8	99	10	174.5	36 46.9	1.0	10	174.5	35 47.2	1.0	09	174.7	33 47.8	1.0	09	174.9	31 48.3	1.0	08	175.1	31 18.5	1.0	08	175.2	30 18.7	1.0	08	175.3	05
6	37 40.8	99	12	173.3	37 11.0	99	12	173.4	36 41.2	99	11	173.5	35 41.6	99	11	173.6	33 42.4	99	10	173.9	31 43.2	99	10	174.2	31 13.4	99	10	174.2	30 13.8	99	10	174.3	6
7	37 33.8	99	13	172.2	37 04.1	99	13	172.3	36 34.4	99	13	172.4	35 35.0	99	13	172.5	33 36.1	99	12	172.9	31 37.2	99	12	173.2	31 07.4	99	12	173.3	30 07.9	99	11	173.4	7
8	37 25.9	99	15	171.1	36 56.3	99	15	171.2	36 26.6	99	15	171.3	35 27.4	99	14	171.5	33 28.8	99	14	171.9	31 30.2	99	13	172.2	31 00.5	99	13	172.3	30 01.2	99	13	172.5	8
9	37 16.9	98	17	170.0	36 47.4	98	16	170.1	36 17.8	98	16	170.2	35 18.8	98	16	170.4	33 20.6	99	15	170.9	31 22.3	99	15	171.3	30 52.8	99	14	171.4	29 53.6	99	14	171.6	9
10	37 06.9	98	18	168.9	36 37.5	98	18	169.0	36 08.0	98	18	169.2	35 09.2	98	18	169.4	33 11.4	98	17	169.9	31 13.6	98	16	170.3	30 44.1	98	16	170.4	29 45.1	98	16	170.6	10
1	36 55.8	98	20	167.8	36 26.5	98	20	168.0	35 57.2	98	20	168.1	34 58.6	98	19	168.4	33 01.3	98	18	168.9	31 03.9	98	18	169.4	30 34.5	98	17	169.5	29 35.7	98	17	169.7	1
2	36 43.8	97	22	166.8	36 14.6	97	22	166.9	35 45.4	97	21	167.1	34 47.1	97	21	167.3	32 50.3	97	20	167.9	30 53.3	98	19	168.4	30 24.1	98	19	168.5	29 25.5	98	18	168.8	2
3	36 30.7	97	23	165.7	36 01.7	97	23	165.9	35 32.7	97	23	166.0	34 34.6	97	22	166.3	32 38.3	97	22	166.9	30 41.9	97	20	167.5	30 12.7	97	20	167.6	29 14.4	97	20	167.9	3
4	36 16.7	96	25	164.6	35 47.8	96	25	164.8	35 18.9	96	24	165.0	34 21.2	96	24	165.3	32 25.4	97	23	165.9	30 29.5	97	22	166.5	30 00.5	97	22	166.7	29 02.5	97	21	167.0	4
15	36 01.7	96	27	163.6	35 33.0	96	26	163.8	35 04.3	96	26	163.9	34 06.8	96	26	164.3	32 11.7	96	24	165.0	30 16.3	96	24	165.6	29 47.5	96	23	165.8	28 49.7	96	23	166.1	15
6	35 45.7	95	28	162.5	35 17.2	95	28	162.7	34 48.6	95	28	162.9	33 51.5	95	27	163.3	31 57.0	95	26	164.0	30 02.3	96	25	164.7	29 33.6	96	24	164.9	28 36.1	96	24	165.2	6
7	35 28.8	94	30	161.5	35 00.4	95	29	161.7	34 32.1	95	29	161.9	33 35.3	95	28	162.3	31 41.5	95	27	163.1	29 47.4	95	26	163.8	29 18.9	96	26	164.0	28 21.7	95	25	164.3	7
8	35 11.0	94	31	160.5	34 42.8	94	31	160.7	34 14.6	94	31	160.9	33 18.2	94	30	161.3	31 25.1	94	29	162.1	29 31.7	95	28	162.9	29 03.3	95	27	163.1	28 06.5	95	27	163.4	8
9	34 52.2	93	33	159.5	34 24.2	93	32	159.7	33 56.2	93	32	159.9	33 00.2	94	32	160.4	31 07.8	94	30	161.2	29 15.1	94	29	162.0	28 46.9	94	29	162.2	27 50.5	94	28	162.6	9
20	34 32.5	93	34	158.5	34 04.8	93	34	158.7	33 37.0	93	34	158.9	32 41.3	93	33	159.4	30 49.7	93	32	160.3	28 57.8	93	30	161.1	28 29.7	93	30	161.3	27 33.6	94	29	161.7	20
1	34 12.0	92	36	157.5	33 44.4	92	35	157.7	33 16.9	92	35	158.0	32 21.6	92	34	158.4	30 30.8	92	33	159.3	28 39.6	93	32	160.2	28 11.8	93	31	160.4	27 16.0	93	30	160.8	1
2	33 50.6	91	37	156.5	33 23.3	91	37	156.8	32 55.9	91	36	157.0	32 01.0	91	36	157.5	30 11.0	92	34	158.4	28 20.7	92	33	159.3	27 53.0	92	32	159.6	26 57.7	92	32	160.0	2
3	33 28.4	90	38	155.6	33 01.2	90	38	155.8	32 34.1	91	38	156.1	31 39.7	91	37	156.6	29 50.5	91	36	157.5	28 00.9	91	34	158.5	27 33.5	92	34	158.7	26 38.5	92	33	159.2	3
4	33 05.3	90	40	154.6	32 38.4	90	40	154.9	32 11.4	90	39	155.1	31 17.5	90	38	155.7	29 29.2	90	37	156.7	27 40.4	91	36	157.6	27 13.2	91	35	157.9	26 18.6	91	34	158.3	4
25	32 41.4	89	41	153.7	32 14.7	89	41	154.0	31 48.0	89	40	154.2	30 54.5	89	40	154.7	29 07.1	90	38	155.8	27 19.2	90	37	156.8	26 52.2	90	36	157.0	25 58.0	90	36	157.5	25
6	32 16.7	88	42	152.8	31 50.2	88	42	153.0	31 23.8	88	42	153.3	30 30.7	89	41	153.9	28 44.2	89	39	154.9	26 57.2	89	38	155.9	26 30.4	89	38	156.2	25 36.7	90	37	156.7	6
7	31 51.2	87	44	151.8	31 25.0	87	43	152.1	30 58.8	88	43	152.4	30 06.2	88	42	153.0	28 20.6	88	40	154.1	26 34.5	89	39	155.1	26 07.9	89	39	155.4	25 14.6	89	38	155.9	7
8	31 25.0	86	45	150.9	30 59.0	87	45	151.2	30 33.0	87	44	151.5	29 40.9	87	43	152.1	27 56.3	87	42	153.2	26 11.1	88	40	154.3	25 44.7	88	40	154.6	24 51.9	88	39	155.1	8
9	30 58.0	86	46	150.1	30 32.2	86	46	150.4	30 06.5	86	45	150.6	29 14.9	86	44	151.2	27 31.2	87	43	152.4	25 47.0	87	41	153.5	25 20.8	87	41	153.8	24 28.5	87	40	154.3	9
30	30 30.2	85	47	149.2	30 04.8	85	47	149.5	29 39.3	85	46	149.8	28 48.1	85	46	150.4	27 05.4	86	44	151.6	25 22.2	86	42	152.7	24 56.3	86	42	153.0	24 04.4	87	41	153.5	30
1	30 01.8	84	48	148.3	29 36.6	84	48	148.6	29 11.3	84	48	148.9	28 20.7	85	47	149.6	26 39.0	85	45	150.7	24 56.7	85	44	151.9	24 31.0	86	43	152.2	23 39.6	86	42	152.8	1
2	29 32.7	83	50	147.5	29 07.7	83	49	147.8	28 42.7	83	49	148.1	27 52.6	84	48	148.7	26 11.9	84	46	149.9	24 30.5	85	45	151.1	24 05.1	85	44	151.4	23 14.2	85	44	152.0	2
3	29 02.8	82	51	146.6	28 38.1	82	50	147.0	28 13.4	83	50	147.3	27 23.8	83	49	147.9	25 44.1	83	47	149.2	24 03.8	84	46	150.4	23 38.6	84	45	150.7	22 48.1	84	44	151.3	3
4	28 32.4	81	52	145.8	28 07.9	82	51	146.1	27 43.4	82	51	146.5	26 54.4	82	50	147.1	25 15.7	83	48	148.4	23 36.3	83	47	149.6	23 11.4	83	46	149.9	22 21.5	83	46	150.5	4
35	28 01.2	81	53	145.0	27 37.1	81	52	145.3	27 12.8	81	52	145.7	26 24.3	81	51	146.3	24 46.6	82	50	147.6	23 08.3	82	48	148.9	22 43.6	82	47	149.2	21 54.2	83	46	149.8	35
6	27 29.5	80	54	144.2	27 05.6	80	54	144.5	26 41.6	80	53	144.9	25 53.6	80	52	145.5	24 16.9	81	50	146.8	22 39.7	81	49	148.1	22 15.2	81	48	148.4	21 26.3	82	48	149.1	6
7	26 57.1	79	55	143.4	26 33.5	79	54	143.8	26 09.8	79	54	144.1	25 22.2	79	53	144.8	23 46.7	80	52	146.1	22 10.4	80	50	147.4	21 46.3	81	49	147.7	20 57.8	81	48	148.4	7
8	26 24.1	78	56	142.6	26 00.8	78	56	143.0	25 37.3	78	55	143.3	24 50.3	78	54	144.0	23 15.8	79	52	145.4	21 40.6	80	51	146.7	21 16.7	80	50	147.0	20 28.8	80	49	147.7	8
9	25 50.6	77	57	141.9	25 27.5	77	56	142.2	25 04.3	77	56	142.6	24 17.8	78	55	143.3	22 44.4	78	53	144.6	21 10.2	79	52	146.0	20 46.6	79	51	146.3	19 59.2	79	50	147.0	9
40	25 16.4	76	58	141.1	24 53.6	76	57	141.5	24 30.7	76	57	141.8	23 44.8	77	56	142.5	22 12.4	77	54	143.9	20 39.3	78	52	145.3	20 15.9	78	52	145.6	19 29.0	78	51	146.3	40
1	24 41.8	75	59	140.4	24 19.2	75	58	140.8	23 56.6	75	58	141.1	23 11.2	76	57	141.8	21 39.8	76	55	143.2	20 07.8	77	53	144.6	19 44.7	77	53	144.9	18 58.3	77	52	145.6	1
2	24 06.6	74	00	139.7	23 44.3	74	59	140.0	23 21.9	75	59	140.4	22 37.0	75	58	141.1	21 06.7	76	56	142.5	19 35.8	76	54	143.9	19 12.9	76	54	144.3	18 27.1	76	53	145.0	2
3	23 30.8	73	60	139.0	23 08.8	74	60	139.3	22 46.7	74	60	139.7	22 02.4	74	59	140.4	20 33.1	75	57	141.9	19 03.2	75	55	143.3	18 40.6	75	54	143.6	17 55.4	76	54	144.3	3
4	22 54.6	72	61	138.2	22 32.8	73	61	138.6	22 11.0	73	60	139.0	21 27.2	73	60	139.7	19 59.0	74	58	141.2	18 30.2	74	56	142.6	18 07.9	74	56	143.0	17 23.1	75	54	143.7	4
45	22 17.8	72	62	137.6	21 56.3	72	62	137.9	21 34.8	72	61	138.3	20 51.5	72	60	139.1	19 24.4	73	58	140.5	17 56.7	73	57	142.0	17 34.6	74	56	142.3	16 50.4	74	55	143.0	45
6	21 40.6	71	63	136.9	21 19.4	71	62	137.3	20 58.1	71	62	137.6	20 15.4	71	61	138.4	18 49.3	72	59	139.9	17 22.6	73	58	141.3	17 00.9	73	57	141.7	16 17.2	73	56	142.4	6
7	21 02.9	70	64	136.2	20 41.9	70	63	136.6	20 20.9	70	63	137.0	19 38.7	70	62	137.7	18 13.8	71	60	139.2	16 48.2	72	58	140.7	16 26.7	72	58	141.1	15 43.5	72	57	141.8	7
8	20 24.8	69	64	135.6	20 04.0	69	64	135.9	19 43.3	69	64	136.3	19 01.6	70	62	137.1	17 37.8	70	61	138.6	16 13.2	71	59	140.1	15 52.0	71	58	140.5	15 09.4	71	58	141.2	8
9	19 46.2	68	65	134.9	19 25.7	68	64	135.3	19 05.2	68	64	135.7	18 24.1	69	63	136.5	17 01.3	69	62	138.0	15 37.8	70	60	139.5	15 16.9	70	59	139.9	14 34.8	70	58	140.6	9
50	19 07.1	67	66	134.3	18 47.0	67	65	134.7	18 26.7	68	65	135.1	17 46.1	68	64	135.8	16 24.4	68	62	137.4	15 02.0	69	60	138.9	14 41.3	69	60	139.3	13 59.8	69	59	140.0	50
1	18 27.7	66	66	133.7	18 07.8	66	66	134.1	17 47.8	67	66	134.4	17 07.7	67	65	135.2	15 47.1	67	63	136.8	14 25.7	68	61	138.3	14 05.3	68	61	138.7	13 24.4	68	60	139.4	1
2	17 47.8	65	67	133.1	17 28.2	66	67	133.4	17 08.5	66	66	133.8	16 28.9	66	65	134.6	15 09.3	67	64	136.2	13 49.1	67	62	137.7	13 28.9	67	61	138.1	12 48.5	67	60	138.9	2
3	17 07.6	65	68	132.4	16 48.2	65	67	132.8	16 28.7	65	67	133.2	15 49.7	65	66	134.0	14 31.2	66	64	135.6	13 12.0	66	62	137.2	12 52.1	66	62	137.5	12 12.2	67	61	138.3	3
4	16 26.9	64	68	131.9	16 07.8	64	68	132.3	15 48.6	64	68	132.7	15 10.1	64	67	133.5	13 52.6	65	65	135.0	12 34.5	65	63	136.6	12 14.9	65	63	137.0	11 35.6	66	62	137.8	4
55	15 45.9	63	69	131.3	15 27.1	63	69	131.7	15 08.1	63	68	132.1	14 30.1	63	67	132.9	13 13.7	64	66	134.5	11 56.7	64	64	136.0	11 37.3	65	63	136.4	10 58.5	65	62	137.2	55
6	15 04.6	62	70	130.7	14 45.9	62	69	131.1	14 27.3	62	69	131.5	13 49.8	63	68	132.3	12 34.4	63	66	133.9	11 18.4	64	64	135.5	10 59.4	64	64	135.9	10 21.1	64	63	136.7	6
7	14 22.8	61	70	130.1	14 04.5	61	70	130.6	13 46.0	61	69	131.0	13 09.1	62	68	131.8	11 54.7	62	67	133.4	10 39.8	63	65	135.0	10 21.0	63	64	135.4	9 43.3	63	64	136.2	7
8	13 40.8	60	71	129.6	13 22.6	60	70	130.0	13 04.5	61	70	130.4	12 28.0	61	69	131.2	11 14.7	61	67	132.8	10 00.9	62	66	134.4	9 42.3	62	65	134.8	9 05.2	62	64	135.6	8
9	12 58.4	60	71	129.0	12 40.5	60	71	129.5	12 22.6	60	70	129.9	11 46.6	60	70	130.7	10 34.3	60	68	132.3	9 21.6	61	66	133.9	9 03.3	61	66	134.3	8 26.7	61	65	135.1	9
60	12 15.6	59	72	128.5	11 58.0	59	71	128.9	11 40.3	59	71	129.3	11 04.9	59	70	130.2	9 53.6	60	68	131.8	8 41.9	60	67	133.4	8 23.9	60	66	133.8	7 47.9	60	65	134.6	60
1	11 32.6	58	72	128.0	11 15.2	58	72	128.4	10 57.8	58	72	128.8	10 22.9	58	71	129.6	9 12.6	59	69	131.3	8 01.9	59	67	132.9	7 44.2	59	67	133.3	7 08.7	59	66	134.1	1
2	10 49.2	57	73	127.5	10 32.1	57	72	127.9	10 14.9	57	72	128.3	9 40.5	57	71	129.1	8 31.3	58	70	130.8	7 21.6	58	68	132.4	7 04.2	58	67	132.8	6 29.2	58	66	133.7	2
3	10 05.6	56	73	127.0	9 48.7	56	73	127.4	9 31.8	57	72	127.8	8 57.8	57	72	128.6	7 49.6	57	70	130.3	6 41.0	57	68	131.9	6 23.8	57	68	132.4	5 49.4	58	67	133.2	3
4	9 21.6	55	74	126.5	9 05.0	56	73	126.9	8 48.3	56	73	127.3	8 14.9	56	72	128.1	7 07.7	56	70	129.8	6 00.1	56	69	131.5	5 43.2	56	68	131.9	5 09.3	57	67	132.7	4
65	8 37.4	55	74	126.0	8 21.0	55	74	126.4	8 04.6	55	73	126.8	7 31.6	55	72	127.7	6 25.4	55	71	129.3	5 18.9	56	69	131.0	5 02.2	56	69	131.4					65
6	7 52.9	54	75	125.5	7 36.7	54	74	125.9	7 20.5	54	74	126.3	6 48.1	54	73	127.2	5 42.9	54	71	128.9													6
7	7 08.1	53	75	125.0	6 52.2	53	75	125.4	6 36.2	53	74	125.9	6 04.3	53	74	126.7	5 00.1	54	72	128.4													7
8	6 23.1	52	76	124.5	6 07.4	52	75	125.0	5 51.7	52	75	125.4	5 20.2	53	74	126.2																	8
9	5 37.8	52	76	124.1	5 22.4	52	76	124.5	5 06.9	52	75	124.9																					9

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	10 11.3	37	82	63.8	10 22.4	37	82	63.3	10 33.5	37	81	62.8	10 55.6	37	80	61.9	11 39.3	36	79	60.0	12 22.2	35	78	58.1	12 32.8	35	77	57.6	12 53.9	35	76	56.6	91
2	9 22.2	38	82	63.4	9 33.5	38	81	63.0	9 44.8	38	81	62.5	10 07.4	37	80	61.5	10 51.9	37	79	59.7	11 35.8	36	77	57.8	11 46.6	36	77	57.3	12 08.2	36	76	56.3	2
3	8 33.2	39	81	63.1	8 44.8	38	81	62.6	8 56.3	38	81	62.1	9 19.2	38	80	61.2	10 04.7	38	78	59.3	10 49.5	37	77	57.4	11 00.6	37	76	57.0	11 22.6	37	76	56.0	3
4	7 44.4	39	81	62.7	7 56.2	39	81	62.3	8 07.9	39	80	61.8	8 31.3	39	80	60.9	9 17.6	38	78	59.0	10 03.4	38	77	57.1	10 14.7	38	76	56.7	10 37.3	37	75	55.7	4
95	6 55.8	40	81	62.4	7 07.7	40	80	61.9	7 19.7	40	80	61.5	7 43.5	40	79	60.5	8 30.7	39	78	58.7	9 17.4	39	76	56.8	9 29.0	39	76	56.3	9 52.1	38	75	55.4	95
6	6 07.3	41	80	62.0	6 19.5	41	80	61.6	6 31.6	40	80	61.1	6 55.8	40	79	60.2	7 44.0	40	78	58.3	8 31.6	40	76	56.5	8 43.5	39	76	56.0	9 07.0	39	75	55.1	6
7	5 19.0	41	80	61.7	5 31.3	41	80	61.2	5 43.7	41	80	60.7	6 08.4	41	79	59.8	6 57.4	41	77	58.0	7 46.0	40	76	56.1	7 58.1	40	75	55.7	8 22.2	40	74	54.8	7
8													5 21.1	42	79	59.5	6 11.0	41	77	57.6	7 00.6	41	75	55.8	7 12.9	41	75	55.3	7 37.5	41	74	54.4	8
9																	5 24.8	42	77	57.3	6 15.3	42	75	55.5	6 27.9	42	75	55.0	6 53.0	42	74	54.1	9
100																					5 30.3	43	75	55.1	5 43.1	43	74	54.7	6 08.7	43	74	53.7	100
1																													5 24.6	43	73	53.4	1

Lat. 24°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	78 00.0	1.0 00	00.0	77 00.0	1.0 00	00.0	75 30.0	1.0 02	00.0	74 00.0	1.0 02	00.0	72 00.0	1.0 02	00.0	71 30.0	1.0 02	00.0	71 00.0	1.0 02	00.0	69 00.0	1.0 02	00.0	00
1	77 58.1	1.0 00	03.9	76 58.3	1.0 00	03.5	75 28.5	1.0 00	03.1	73 58.7	1.0 01	02.8	71 58.8	1.0 00	02.4	71 28.9	1.0 00	02.3	70 58.9	1.0 00	02.2	68 59.1	1.0 00	02.0	1
2	77 52.6	99 15	07.7	76 53.2	99 14	07.1	75 24.0	99 12	06.2	73 54.7	99 11	05.5	71 55.4	99 10	04.8	71 25.6	99 09	04.6	70 55.7	1.0 00	04.5	68 56.2	1.0 00	03.9	2
3	77 43.4	97 21	11.5	76 44.9	98 19	10.5	75 16.6	98 17	09.3	73 48.1	99 15	08.3	71 49.7	99 13	07.2	71 20.0	99 13	06.9	70 50.4	99 12	06.7	68 51.5	99 11	05.9	3
4	77 30.8	96 26	15.1	76 33.3	96 24	13.9	75 00.4	97 22	12.3	73 39.0	97 19	10.9	71 41.8	98 17	09.5	71 12.4	98 16	09.2	70 42.9	98 16	08.9	68 45.0	98 14	07.8	4
05	77 14.9	93 32	18.6	76 18.6	94 29	17.1	74 53.4	96 26	15.2	73 27.3	96 23	13.6	71 31.6	97 20	11.8	71 02.6	97 20	11.4	70 33.5	97 19	11.0	68 36.6	98 17	09.7	05
6	76 55.9	91 36	22.0	76 01.1	92 34	20.2	74 37.8	93 30	18.0	73 13.3	94 27	16.1	71 19.4	95 24	14.0	70 50.7	96 23	13.6	70 22.0	96 22	13.2	68 26.5	97 20	11.6	6
7	76 34.0	88 41	25.1	75 40.8	89 38	23.2	74 19.6	91 34	20.7	72 57.0	93 31	18.6	71 05.1	94 27	16.2	70 36.8	94 26	15.7	70 08.5	94 26	15.2	68 14.6	95 23	13.4	7
8	76 09.4	85 45	28.1	75 18.0	87 42	26.0	73 59.1	89 38	23.3	72 38.4	90 34	20.9	70 48.8	92 30	18.3	70 21.0	93 29	17.8	69 53.2	93 28	17.2	68 01.0	94 25	15.2	8
9	75 42.5	82 49	30.8	74 52.9	84 46	28.6	73 36.4	86 41	25.7	72 17.8	88 38	23.2	70 30.6	90 33	20.4	70 03.4	91 32	19.8	69 36.1	91 31	19.2	67 45.8	93 28	17.0	9
10	75 13.3	78 52	33.4	74 25.6	81 49	31.1	73 11.6	84 44	28.0	71 55.3	86 41	25.4	70 10.6	88 36	22.4	69 44.0	89 35	21.7	69 17.3	89 34	21.0	67 29.0	91 30	18.7	10
1	74 42.1	75 55	35.8	73 56.3	78 52	33.4	72 44.9	81 48	30.2	71 30.9	84 44	27.5	69 48.9	86 39	24.3	69 22.9	87 38	23.5	68 56.8	87 37	22.9	67 10.7	89 33	20.4	1
2	74 09.2	72 58	38.0	73 25.3	75 54	35.6	72 16.4	78 50	32.3	71 04.8	81 46	29.4	69 25.6	84 41	26.1	69 00.2	85 40	25.3	68 34.7	85 39	24.6	66 50.9	88 35	22.0	2
3	73 34.7	69 60	40.1	72 52.6	72 57	37.6	71 46.4	75 53	34.3	70 37.1	79 49	31.3	69 00.7	82 44	27.8	68 36.0	83 43	27.0	68 11.2	83 42	26.3	66 29.7	86 38	23.5	3
4	72 58.7	66 62	42.0	72 18.4	69 59	39.5	71 14.8	73 55	36.1	70 07.9	76 51	33.0	68 34.4	80 46	29.5	68 10.4	80 45	28.7	67 46.2	81 44	27.9	66 07.2	84 40	25.0	4
15	72 21.4	63 64	43.7	71 42.9	66 61	41.2	70 41.8	70 57	37.8	69 37.3	73 53	34.7	68 06.8	77 48	31.1	67 43.5	78 47	30.2	67 19.9	79 46	29.4	65 43.4	82 42	26.4	15
6	71 43.0	60 66	45.3	71 06.2	63 63	42.8	70 07.7	67 59	39.4	69 05.5	71 55	36.3	67 37.9	75 50	32.6	67 15.3	76 49	31.7	66 52.4	77 48	30.9	65 18.4	80 44	27.8	6
7	71 03.5	57 67	46.8	70 28.4	60 65	44.3	69 32.3	65 61	40.9	68 32.5	68 57	37.8	67 07.8	73 52	34.0	66 45.9	74 51	33.1	66 23.7	75 50	32.3	64 52.3	78 45	29.1	7
8	70 23.2	54 69	48.1	69 49.7	57 66	45.7	68 55.9	62 62	42.3	67 58.4	66 58	39.1	66 36.6	70 54	35.3	66 15.4	71 52	34.5	65 53.9	72 51	33.6	64 25.0	76 47	30.4	8
9	69 41.9	52 70	49.4	69 10.0	55 68	47.0	68 18.6	59 64	43.6	67 23.3	63 60	40.4	66 04.4	68 55	36.6	65 43.9	69 54	35.7	65 23.0	70 53	34.9	63 56.8	74 49	31.6	9
20	69 00.0	49 71	50.5	68 29.6	52 69	48.2	67 40.4	57 65	44.8	66 47.3	61 61	41.7	65 31.3	66 57	37.8	65 11.4	67 56	36.9	64 51.2	68 54	36.1	63 27.6	71 50	32.8	20
1	68 17.3	47 72	51.6	67 48.4	50 70	49.3	67 01.4	54 66	45.9	66 10.5	59 63	42.8	64 57.2	63 58	39.0	64 38.0	65 57	38.1	64 18.5	66 56	37.2	62 57.5	69 52	33.9	1
2	67 34.1	44 73	52.6	67 06.5	48 71	50.3	66 21.6	52 67	47.0	65 32.8	56 64	43.9	64 22.3	61 60	40.1	64 03.8	62 58	39.2	63 45.0	63 57	38.3	62 26.5	67 53	34.9	2
3	66 50.3	42 74	53.5	66 24.1	45 72	51.2	65 41.2	50 68	48.0	64 54.5	54 65	44.9	63 46.7	59 61	41.1	63 28.8	60 60	40.2	63 10.6	61 58	39.3	61 54.7	65 54	35.9	3
4	66 06.0	40 74	54.3	65 41.1	43 72	52.1	65 00.2	48 69	48.9	64 15.5	52 66	45.8	63 10.3	57 62	42.0	62 53.1	58 61	41.1	62 35.6	59 60	40.3	61 22.2	63 55	36.9	4
25	65 21.2	38 75	55.1	64 57.6	41 73	52.9	64 18.7	45 70	49.7	63 35.9	50 67	46.7	62 33.3	55 63	43.0	62 16.7	56 62	42.1	61 59.8	57 61	41.2	60 49.0	61 56	37.8	25
6	64 36.1	36 76	55.8	64 13.7	39 74	53.6	63 36.6	43 71	50.5	62 55.7	48 68	47.6	61 55.6	53 64	43.8	61 39.7	54 63	42.9	61 23.4	55 62	42.0	60 15.0	59 58	38.7	6
7	63 50.6	34 76	56.4	63 29.3	37 74	54.3	62 54.1	41 72	51.3	62 15.0	45 69	48.3	61 17.4	50 65	44.6	61 02.1	52 64	43.7	60 46.4	53 63	42.8	59 40.5	57 58	39.5	7
8	63 04.8	32 77	57.0	62 44.6	35 75	54.9	62 11.1	39 72	51.9	61 33.8	43 69	49.0	60 38.6	48 65	45.4	60 23.9	50 64	44.5	60 08.9	51 63	43.6	59 05.3	55 60	40.3	8
9	62 18.7	30 77	57.6	61 59.6	33 76	55.5	61 27.8	38 73	52.6	60 52.2	41 70	49.7	59 59.4	46 66	46.1	59 45.3	48 65	45.2	59 30.8	49 64	44.3	58 29.7	53 60	41.0	9
30	61 32.3	29 78	58.1	61 14.3	31 76	56.1	60 44.1	36 74	53.2	60 10.2	40 71	50.4	59 19.7	45 67	46.8	59 06.1	46 66	45.9	58 52.3	47 65	45.0	57 53.4	51 61	41.7	30
1	60 45.6	27 78	58.5	60 28.6	30 76	56.6	60 00.0	34 74	53.7	59 27.8	38 71	50.9	58 39.5	43 68	47.4	58 26.6	44 67	46.5	58 13.3	45 66	45.7	57 16.7	49 62	42.4	1
2	59 58.8	25 78	59.0	59 42.8	28 77	57.0	59 15.7	32 74	54.2	58 45.1	36 72	51.5	57 59.0	41 68	48.0	57 46.6	42 67	47.1	57 33.9	43 66	46.3	56 39.6	47 63	43.0	2
3	59 11.7	24 79	59.4	58 56.7	26 77	57.5	58 31.1	30 75	54.7	58 02.0	34 72	52.0	57 18.1	39 69	48.5	57 06.3	40 68	47.7	56 54.1	41 67	46.8	56 02.0	46 63	43.6	3
4	58 24.4	22 79	59.7	58 10.3	25 78	57.9	57 46.2	29 75	55.1	57 18.7	32 73	52.5	56 36.9	37 69	49.0	56 25.6	38 68	48.2	56 13.9	39 68	47.4	55 24.0	44 64	44.1	4
35	57 37.0	21 79	60.0	57 23.8	23 78	58.2	57 01.1	27 76	55.5	56 35.1	31 73	52.9	55 55.3	35 70	49.5	55 44.6	37 69	48.7	55 33.4	38 68	47.9	54 45.7	42 64	44.7	35
6	56 49.5	19 80	60.3	56 37.1	22 78	58.6	56 15.8	26 76	55.9	55 51.2	29 74	53.3	55 13.5	34 70	50.0	55 03.2	35 69	49.2	54 52.6	36 68	48.3	54 07.0	40 65	45.2	6
7	56 01.8	18 80	60.6	55 50.3	20 78	58.9	55 30.3	24 76	56.3	55 07.2	28 74	53.7	54 31.4	32 71	50.4	54 21.6	33 70	49.6	54 11.5	34 69	48.8	53 28.0	38 66	45.6	7
8	55 13.9	17 80	60.9	55 03.3	19 78	59.1	54 44.7	22 76	56.6	54 22.9	26 74	54.1	53 49.0	30 71	50.8	53 39.8	31 70	50.0	53 30.2	33 69	49.2	52 48.6	37 66	46.1	8
9	54 26.0	15 80	61.1	54 16.2	18 79	59.4	53 58.8	21 76	56.9	53 38.4	24 74	54.4	53 06.4	29 71	51.2	52 57.6	30 70	50.4	52 48.5	31 70	49.6	52 09.0	35 66	46.5	9
40	53 38.0	14 80	61.3	53 29.0	16 79	59.6	53 12.9	20 77	57.1	52 53.7	23 75	54.7	52 23.6	27 72	51.5	52 15.3	28 71	50.7	52 06.7	29 70	50.0	51 29.1	33 67	46.9	40
1	52 49.9	13 80	61.5	52 41.6	15 79	59.8	52 26.8	18 77	57.4	52 08.9	21 75	55.0	51 40.6	26 72	51.8	51 32.8	27 71	51.1	51 24.6	28 70	50.3	50 49.0	32 67	47.2	1
2	52 01.7	11 80	61.6	51 54.2	14 79	60.0	51 40.5	17 77	57.6	51 23.9	20 75	55.2	50 57.4	24 72	52.1	50 50.1	25 72	51.4	50 42.4	26 71	50.6	50 08.6	30 68	47.6	2
3	51 13.4	10 80	61.8	51 06.7	12 79	60.2	50 54.2	15 78	57.8	50 38.8	19 75	55.5	50 14.1	23 72	52.4	50 07.2	24 72	51.6	49 59.9	25 71	50.9	49 28.1	28 68	47.9	3
4	50 25.1	09 81	61.9	50 19.1	11 80	60.3	50 07.7	14 78	58.0	49 53.6	17 76	55.7	49 30.6	21 73	52.7	49 24.1	22 72	51.9	49 17.3	23 71	51.2	48 47.3	27 68	48.2	4
45	49 36.7	08 81	62.0	49 31.4	10 80	60.5	49 21.2	13 78	58.2	49 08.3	16 76	55.9	48 46.9	20 73	52.9	48 40.9	21 72	52.1	48 34.5	22 72	51.4	48 06.3	25 68	48.5	45
6	48 48.3	07 81	62.1	48 43.7	09 80	60.6	48 34.6	12 78	58.3	48 22.9	14 76	56.1	48 03.2	18 73	53.1	47 57.5	19 72	52.4	47 51.6	20 72	51.6	47 25.2	24 69	48.7	6
7	47 59.9	06 81	62.2	47 56.0	07 80	60.7	47 47.9	10 78	58.4	47 37.3	13 76	56.2	47 19.3	17 73	53.3	47 14.1	18 73	52.6	47 08.6	19 72	51.8	46 43.9	22 69	49.0	7
8	47 11.4	04 81	62.2	47 08.2	06 80	60.7	47 01.2	09 78	58.6	46 51.7	12 76	56.4	46 35.3	16 74	53.5	46 30.5	16 73	52.8	46 25.4	17 72	52.0	46 02.5	21 69	49.2	8
9	46 22.9	03 81	62.3	46 20.3	05 80	60.8	46 14.4	08 78	58.6	46 06.1	11 76	56.5	45 51.2	14 74	53.6	45 46.8	15 73	52.9	45 42.1	16 72	52.2	45 21.0	19 70	49.4	9
50	45 34.4	02 81	62.3	45 32.5	04 80	60.9	45 27.6	07 78	58.7	45 20.3	09 76	56.6	45 07.0	13 74	53.8	45 03.0	14 73	53.1	44 58.8	15 72	52.4	44 39.3	18 70	49.6	50
1	44 45.8	01 81	62.3	44 44.6	03 80	60.9	44 40.7	06 78	58.8	44 34.6	08 76	56.7	44 22.7	12 74	53.9	44 19.2	12 73	53.2	44 15.3	13 73	52.5	43 57.5	17 70	49.8	1
2	43 57.3	00 81	62.3	43 56.7	02 80	60.9	43 53.8	04 78	58.9	43 48.7	07 76	56.8	43 38.4	10 74	54.0	43 35.2	11 73	53.3	43 31.8	12 73	52.6	43 15.6	15 70	49.9	2
3	43 08.8	01 81	62.3	43 06.8	01 80	60.9	43 06.9	03 78	58.9	42 02.9	06 76	56.8	42 54.0	09 74	54.1	42 51.2	10 73	53.4	42 48.2	11 73	52.8	42 33.6	14 70	50.1	3
4	42 20.2	02 81	62.3	42 20.8	00 80	61.0	42 20.0	02 78	58.9	42 17.0	05 76	56.9	42 09.6	08 74	54.2	42 07.2	08 74	53.5	42 04.5	09 73	52.9	41 51.5	12 70	50.2	4
55	41 31.7	03 81	62.3	41 32.9	01 80	60.9	41 33.0	01 78	58.9	41 31.0	03 76	56.9	41 25.1	06 74	54.3	41 23.1	07 74	53.6	41 20.8	08 73	52.9	41 09.4	11 70	50.3	55
6	40 43.2	04 81	62.2	40 45.0	02 80	60.9	40 46.1	00 78	58.9	40 45.1	02 77	57.0	40 40.6	05 74	54.3	40 38.9	06 74	53.7	40 37.0	07 73	53.0	40 27.2	10 70	50.4	6
7	39 54.7	05 81	62.2	39 57.1	03 80	60.9	39 59.1	01 78	58.9	39 59.1	01 77	57.0	39 56.1	04 74	54.4	39 54.8	05 74	53.7	39 53.2	05 73	53.1	39 45.0	08 70	50.5	7
8	39 06.2	06 81	62.1	39 09.2	04 80	60.9	39 12.2	02 78	58.9	39 13.2	00 77	57.0	39 11.5	03 74	54.4	39 10.6	04 74	53.8	39 09.4	04 73	53.1	39 02.7	07 70	50.5	8
9	38 17.8	07 81	62.1	38 21.4	05 80	60.8	38 25.2	03 78	58.9	38 27.2	01 77	57.0	38 26.9	02 74	54.4	38 26.4	02 74	53.8	38 25.6	03 73	53.1	38 20.3	06 71	50.6	9
60	37 29.3	08 81	62.0	37 33.5	06 80	60.7	37 38.3	04 78	58.9	37 41.2	02 77	57.0	37 42.4	00 74	54.4	37 42.1	01 74	53.8	37 41.7	02 73	53.2	37 37.9	04 71	50.6	60
1	36 41.0	09 81	61.9	36 45.7	07 80	60.7	36 51.4	06 78	58.8	36 55.3	03 76	56.9	36 57.8	01 74	54.4	36 57.9	00 74	53.8	36 57.8	01 73	53.2	36 55.5	03 71	50.7	1
2	35 52.6	09 80	61.8	35 57.9	08 80	60.6	36 04.5	06 78	58.8	36 09.4	04 76	56.9	36 13.2	02 74	54.4	36 13.7	01 74	53.8	36 13.9	01 73	53.2	36 13.1	02 71	50.7	2
3	35 04.3	10 80	61.7	35 10.2	09 80	60.5	35 17.7	07 78	58.7	35 23.5	06 76	56.9	35 28.6	03 74	54.4	35 29.4	02 74	53.8	35 30.1	02 73	53.2	35 30.7	01 71	50.7	3
4	34 16.1	11 80	61.6	34 22.5	10 79	60.4	34 30.9	08 78	58.6	34 37.6	07 76	56.8	34 44.0	04 74	54.4	34 45.2	04 74	53.8	34 46.2	03 73	53.2	34 48.3	01 71	50.7	4
65	33 27.9	12 80	61.5	33 34.9	11 79	60.3	33 44.1	09 78	58.5	33 51.7	08 76	56.7	33 59.5	05 74	54.3	34 01.0	05 74	53.7	34 02.3	04 73	53.1	34 05.9	02 71	50.7	65
6	32 39.7	13 80	61.4	32 47.3	12 79	60.2	32 57.4	10 78	58.4	33 05.9	09 76	56.7	33 15.0	06 74	54.3	33 16.8	06 74	53.7	33 18.5	06 73	53.1	33 23.5	03 71	50.7	6
7	31 51.6	14 80	61.3	31 59.7	13 79	60.1	32 10.7	11 78	58.3	32 20.2	10 76	56.6	32 30.5	08 74	54.2	32 32.7	07 74	53.6	32 34.7	06 73	53.0	32 41.1	04 71	50.7	7
8	31 03.6	15 80	61.1	31 12.2	14 79	60.0	31 24.1	12 78	58.2	31 34.4	11 76	56.5	31 46.1	09 74	54.1	31 48.6	08 74	53.6	31 50.9	08 73	53.0	31 58.7	05 70	50.6	8
9	30 15.6	16 80	61.0	30 24.8	15 79	59.8	30 37.5	13 78	58.1	30 48.8	12 76	56.4	31 01.7	10 74	54.1	31 04.5	09 73	53.5	31 07.2	09 73	52.9	31 16.3	07 70	50.6	9
70	29 27.7	17 80	60.8	29 37.5	16 79	59.7	29 51.0	14 77	58.0	30 03.2	13 76	56.3	30 17.3	11 74	54.0	30 20.5	10 73	53.4	30 23.5	10 73	52.8	30 34.0	08 70	50.5	70
1	28 39.9	18 80	60.7	28 50.2	17 79	59.5	29 04.6	15 77	57.9	29 17.6	14 76	56.2	29 33.0	12 74	53.9	29 36.5	11 73	53.3	29 39.8	11 73	52.7	29 51.7	09 70	50.4	1
2	27 52.2	18 80	60.5	28 03.0	18 79	59.4	28 18.2	16 77	57.7	28 32.1	15 76	56.0	28 48.8	13 74	53.8	28 52.6	12 73	53.2	28 56.3	12 72	52.6	29 09.5	10 70	50.4	2
3	27 04.5	19 79	60.3	27 15.8	18 78	59.2	27 31.9	17 77	57.6	27 46.7	16 76	55.9	28 04.6	14 74	53.7	28 08.7	14 73	53.1	28 12.7	13 72	52.5	28 27.3	11 70	50.3	3
4	26 16.9	20 79	60.2	26 28.8	19 78	59.1	26 45.6	18 77	57.4	27 01.4	17 76	55.8	27 20.5	15 74	53.5	27 24.9	15 73	53.0	27 29.2	14 72	52.4	27 45.2	12 70	50.2	4
75	25 29.4	21 79	60.0	25 41.8	20 78	58.9	25 59.5	19 77	57.2	26 16.1	18 75	55.6	26 36.4	16 73	53.4	26 41.2	16 73	52.9	26 45.8	15 72	52.3	27 03.1	14 70	50.1	75
6	24 42.0	22 79	59.8	24 54.9	21 78	58.7	25 13.5	20 77	57.1	25 30.9	19 75	55.4	25 52.5	17 73	53.3	25 57.6	17 73	52.7	26 02.5	16 72	52.2	26 21.1	15 70	50.0	6
7	23 54.7	23 79	59.6	24 08.2	22 78	58.5	24 27.5	21 76	56.9	24 45.8	20 75	55.3	25 08.6	18 73	53.1	25 14.0	18 72	52.6	25 19.3	17 72	52.0	25 39.2	16 70	49.8	7
8	23 07.5	24 78	59.4	23 21.5	23 78	58.3	23 41.6	22 76	56.7	24 00.8	21 75	55.1	24 24.8	19 73	53.0	24 30.5	19 72	52.4	24 36.1	18 72	51.9	24 57.3	17 70	49.7	8
9	22 20.4	25 78	59.2	22 34.9	24 78	58.1	22 55.8	23 76	56.5	23 15.9	22 75	54.9	23 41.1	20 73	52.8	23 47.1	20 72	52.3	23 53.0	20 72	51.7	24 15.5	18 70	49.6	9
80	21 33.4	26 78	58.9	21 48.4	26 77	57.9	22 10.2	24 76	56.3	22 31.1	23 74	54.8	22 57.5	21 72	52.6	23 03.8	21 72	52.1	23 10.0	21 72	51.6	23 33.9	19 69	49.4	80
1	20 46.5	26 78	58.7	21 02.0	26 77	57.7	21 24.6	26 76	56.1	21 46.3	24 74	54.6	22 13.9	22 72	52.5	22 20.6	22 72	51.9	22 27.1	22 71	51.4	22 52.3	20 69	49.3	1
2	19 59.7	27 78	58.5	20 15.7	26 77	57.5	20 39.2	26 76	55.9	21 01.7	25 74	54.4	21 30.5	23 72	52.3	21 37.5	23 72	51.8	21 44.3	23 71	51.2	22 10.8	21 69	49.1	2
3	19 13.0	28 78	58.3	19 29.6	27 77	57.2	19 53.8	26 75	55.7	20 17.3	26 74	54.2	20 47.2	24 72	52.1	20 54.5	24 72	51.6	21 01.7	24 71	51.0	21 29.4	22 69	49.0	3
4	18 26.5	29 77	58.0	18 43.6	28 76	57.0	19 08.6	27 75	55.5	19 32.9	27 74	53.9	20 04.0	25 72	51.9	20 11.6	25 71	51.4	20 19.1	25 71	50.9	20 48.1	24 69	48.8	4
85	17 40.0	30 77	57.8	17 57.7	29 76	56.8	18 23.5	28 75	55.2	18 48.6	28 74	53.7	19 21.0	26 72	51.7	19 28.8	26 71	51.2	19 36.6	26 70	50.7	20 06.9	25 68	48.6	85
6	16 53.7	30 77	57.5	17 11.9	30 76	56.5	17 38.5	29 75	55.0	18 04.5	28 73	53.5	18 38.0	27 71	51.5	18 46.2	27 71	51.0	18 54.3	27 70	50.5	19 25.8	26 68	48.4	6
7	16 07.6	31 77	57.2	16 26.2	31 76	56.3	16 53.7	30 74	54.8	17 20.5	29 73	53.3	17 55.2	28 71	51.3	18 03.7	28 71	50.8	18 12.1	28 70	50.2	18 44.9	27 68	48.2	7
8	15 21.5	32 76	57.0	15 40.7	32 76	56.0	16 09.0	31 74	54.5	16 36.6	30 73	53.0	17 12.5	29 71	51.0	17 21.3	29 70	50.5	17 30.0	29 70	50.0	18 04.1	28 68	48.0	8
9	14 35.7	33 76	56.7	14 55.4	33 75	55.7	15 24.4	32 74	54.3	15 52.9	31 73	52.8	16 30.0	30 71	50.8	16 39.1	30 70	50.3	16 48.1	30 70	49.8	17 23.4	29 68	47.8	9
90	13 49.9	34 76	56.4	14 10.1	33 75	55.5	14 40.0	33 74	54.0	15 09.4	32 72	52.5	15 47.6	31 70	50.6	15 57.0	31 70	50.1	16 06.3	31 70	49.6	16 42.9	30 67	47.6	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	30 00.0	1.0 01	180.0	29 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	26 00.0	1.0 01	180.0	24 00.0	1.0 01	180.0	23 30.0	1.0 01	180.0	23 00.0	1.0 01	180.0	21 00.0	1.0 01	180.0	00
1	29 59.6	1.0 02	179.1	28 59.6	1.0 02	179.1	27 29.6	1.0 02	179.1	25 59.6	1.0 02	179.1	23 59.6	1.0 02	179.2	23 29.6	1.0 02	179.2	22 59.6	1.0 02	179.2	20 59.6	1.0 02	179.2	1
2	29 58.2	1.0 04	178.1	28 58.3	1.0 04	178.2	27 28.3	1.0 04	178.2	25 58.4	1.0 03	178.3	23 58.4	1.0 03	178.4	23 28.5	1.0 03	178.4	22 58.5	1.0 03	178.4	20 58.6	1.0 03	178.5	2
3	29 56.0	1.0 05	177.2	28 56.1	1.0 05	177.3	27 26.2	1.0 05	177.4	25 56.3	1.0 05	177.4	23 56.5	1.0 04	177.6	23 26.5	1.0 04	177.6	22 56.6	1.0 04	177.6	20 56.7	1.0 04	177.7	3
4	29 52.9	1.0 07	176.3	28 53.0	1.0 06	176.4	27 23.3	1.0 06	176.5	25 53.5	1.0 06	176.6	23 53.8	1.0 06	176.7	23 23.9	1.0 06	176.8	22 53.9	1.0 06	176.8	20 54.2	1.0 05	177.0	4
05	29 48.8	1.0 08	175.3	28 49.1	1.0 08	175.4	27 19.5	1.0 08	175.6	25 49.8	1.0 08	175.7	23 50.3	1.0 07	175.9	23 20.4	1.0 07	176.0	22 50.5	1.0 07	176.0	20 51.0	1.0 07	176.2	05
6	29 44.0	99 10	174.4	28 44.3	99 10	174.5	27 14.8	99 09	174.7	25 45.4	99 09	174.9	23 46.0	99 08	175.1	23 16.2	99 08	175.2	22 46.3	99 08	175.2	20 47.0	99 08	175.5	6
7	29 38.2	99 11	173.5	28 38.7	99 11	173.6	27 09.4	99 10	173.8	25 40.1	99 10	174.1	23 41.0	99 10	174.3	23 11.2	99 10	174.4	22 41.4	99 10	174.5	20 42.3	99 09	174.7	7
8	29 31.5	99 12	172.6	28 32.2	99 12	172.7	27 03.1	99 12	173.0	25 34.0	99 12	173.2	23 35.2	99 11	173.5	23 05.5	99 11	173.6	22 35.8	99 11	173.7	20 36.9	99 10	174.0	8
9	29 24.0	99 14	171.6	28 24.8	99 14	171.8	26 56.0	99 13	172.1	25 27.1	99 13	172.4	23 28.6	99 12	172.7	22 59.0	99 12	172.8	22 29.3	99 12	172.9	20 30.8	99 11	173.2	9
10	29 15.6	98 16	170.7	28 16.6	98 15	170.9	26 48.0	98 14	171.2	25 19.5	98 14	171.5	23 21.3	98 14	171.9	22 51.7	99 13	172.0	22 22.2	99 13	172.1	20 23.9	99 12	172.5	10
1	29 06.3	98 17	169.8	28 07.5	98 16	170.0	26 39.3	98 16	170.4	25 11.0	98 15	170.7	23 13.2	98 15	171.1	22 43.7	98 14	171.2	22 14.3	98 14	171.3	20 16.4	98 14	171.7	1
2	28 56.2	98 18	168.9	27 57.6	98 18	169.2	26 29.7	98 17	169.5	25 01.7	98 17	169.9	23 04.4	98 16	170.3	22 35.0	98 16	170.4	22 05.7	98 16	170.6	20 08.2	98 15	171.0	2
3	28 45.3	97 20	168.0	27 46.9	97 19	168.3	26 19.4	97 19	168.7	24 51.7	97 18	169.1	22 54.8	97 17	169.5	22 25.5	97 17	169.7	21 56.3	98 17	169.8	19 59.2	98 16	170.3	3
4	28 33.5	97 21	167.1	27 35.4	97 20	167.4	26 08.2	97 20	167.8	24 40.9	97 19	168.2	22 44.5	97 18	168.8	22 15.3	97 18	168.9	21 46.2	97 18	169.0	19 49.6	97 17	169.5	4
15	28 20.8	96 22	166.2	27 23.0	96 22	166.5	25 56.2	96 21	167.0	24 29.4	97 20	167.4	22 33.4	97 20	168.0	22 04.4	97 19	168.1	21 35.4	97 19	168.3	19 39.3	97 18	168.8	15
6	28 07.4	96 24	165.4	27 09.9	96 23	165.7	25 43.5	96 22	166.1	24 17.0	96 22	166.6	22 21.6	96 21	167.2	21 52.8	96 21	167.4	21 23.9	96 20	167.5	19 28.3	96 20	168.1	6
7	27 53.1	96 25	164.5	26 55.9	96 25	164.8	25 30.0	96 24	165.3	24 04.0	96 23	165.8	22 09.1	96 22	166.4	21 40.4	96 22	166.6	21 11.7	96 22	166.7	19 16.6	96 21	167.3	7
8	27 38.1	95 26	163.6	26 41.2	95 26	164.0	25 15.7	95 25	164.5	23 50.2	95 24	165.0	21 55.9	95 23	165.7	21 27.3	95 23	165.8	20 58.8	95 23	166.0	19 04.3	95 22	166.6	8
9	27 22.2	94 28	162.7	26 25.6	94 27	163.1	25 00.7	94 26	163.7	23 35.6	95 26	164.2	21 42.0	95 24	164.9	21 13.6	95 24	165.1	20 45.1	95 24	165.2	18 51.3	95 23	165.9	9
20	27 05.6	94 29	161.9	26 09.3	94 28	162.3	24 44.9	94 28	162.9	23 20.3	94 27	163.4	21 27.4	94 26	164.2	20 59.1	94 25	164.3	20 30.8	94 25	164.5	18 37.6	94 24	165.2	20
1	26 48.1	93 30	161.0	25 52.3	93 30	161.5	24 28.4	93 29	162.1	23 04.3	93 28	162.6	21 12.1	94 27	163.4	20 44.0	94 26	163.6	20 15.9	94 26	163.8	18 23.3	94 25	164.5	1
2	26 29.9	92 32	160.2	25 34.5	93 31	160.6	24 11.1	93 30	161.3	22 47.6	93 29	161.9	20 56.1	93 28	162.7	20 28.2	93 28	162.9	20 00.2	93 27	163.1	18 08.4	93 26	163.8	2
3	26 11.0	92 33	159.4	25 15.9	92 32	159.8	23 53.1	92 31	160.5	22 30.2	92 30	161.1	20 39.4	92 29	161.9	20 11.7	92 29	162.1	19 43.9	93 28	162.3	17 52.8	93 27	163.1	3
4	25 51.3	91 34	158.6	24 56.6	91 33	159.0	23 34.5	91 32	159.7	22 12.1	92 31	160.3	20 22.1	92 30	161.2	19 54.5	92 30	161.4	19 26.9	92 29	161.6	17 36.5	92 28	162.4	4
25	25 30.9	90 35	157.7	24 36.6	91 34	158.2	23 15.1	91 34	158.9	21 53.3	91 32	159.6	20 04.1	91 31	160.5	19 36.7	91 31	160.7	19 09.3	91 30	160.9	17 19.7	91 29	161.8	25
6	25 09.8	90 36	156.9	24 16.0	90 36	157.4	22 55.0	90 35	158.1	21 33.9	90 34	158.8	19 45.4	90 32	159.8	19 18.3	91 32	160.0	18 51.1	91 32	160.2	17 02.2	91 30	161.1	6
7	24 48.0	89 38	156.1	23 54.6	89 37	156.6	22 34.2	89 36	157.4	21 13.7	90 35	158.1	19 26.1	90 33	159.0	18 59.2	90 33	159.3	18 32.2	90 32	159.5	16 44.2	90 31	160.4	7
8	24 25.5	88 39	155.3	23 32.5	88 38	155.9	22 12.8	89 37	156.6	20 53.0	89 36	157.4	19 06.2	89 34	158.3	18 39.4	89 34	158.6	18 12.7	89 34	158.8	16 25.5	89 32	159.8	8
9	24 02.3	87 40	154.6	23 09.7	88 39	155.1	21 50.7	88 38	155.9	20 31.5	88 37	156.6	18 45.6	88 35	157.6	18 19.1	88 35	157.9	17 52.6	89 34	158.1	16 06.2	89 33	159.1	9
30	23 38.4	87 41	153.8	22 46.3	87 40	154.3	21 28.0	87 39	155.1	20 09.5	87 38	155.9	18 24.5	88 36	156.9	17 58.2	88 36	157.2	17 31.9	88 36	157.5	15 46.4	88 34	158.4	30
1	23 13.8	86 42	153.0	22 22.3	86 41	153.6	21 04.7	86 40	154.4	19 46.8	87 39	155.2	18 02.7	87 37	156.3	17 36.6	87 37	156.5	17 10.5	87 36	156.8	15 25.9	87 35	157.8	1
2	22 48.7	85 43	152.3	21 57.6	85 42	152.8	20 40.7	86 41	153.7	19 23.5	86 40	154.5	17 40.4	86 38	155.6	17 14.5	86 38	155.9	16 48.6	86 38	156.1	15 05.0	87 36	157.2	2
3	22 22.9	84 44	151.5	21 32.2	84 43	152.1	20 16.1	85 42	153.0	18 59.6	85 41	153.8	17 17.4	85 39	154.9	16 51.8	85 39	155.2	16 26.2	85 38	155.5	14 43.4	86 37	156.5	3
4	21 56.4	83 45	150.8	21 06.3	84 44	151.4	19 50.9	84 43	152.3	18 35.2	84 42	153.1	16 53.9	85 40	154.3	16 28.5	85 40	154.5	16 03.1	85 39	154.8	14 21.3	85 38	155.9	4
35	21 29.4	83 46	150.1	20 39.8	83 45	150.7	19 25.1	83 44	151.6	18 10.1	83 43	152.5	16 29.8	84 41	153.6	16 04.7	84 41	153.9	15 39.5	84 40	154.2	13 58.7	84 39	155.3	35
6	21 01.8	82 47	149.4	20 12.6	82 46	150.0	18 58.7	82 45	150.9	17 44.5	83 44	151.8	16 05.2	83 42	153.0	15 40.3	83 42	153.2	15 15.4	83 41	153.5	13 35.5	83 40	154.7	6
7	20 33.6	81 48	148.7	19 44.9	81 47	149.3	18 31.7	81 46	150.2	17 18.3	82 45	151.1	15 40.0	82 43	152.3	15 15.3	82 42	152.6	14 50.7	82 42	152.9	13 11.8	83 40	154.1	7
8	20 04.8	80 49	148.0	19 16.7	80 48	148.6	18 04.2	81 47	149.5	16 51.5	81 46	150.5	15 14.2	81 44	151.7	14 49.9	81 44	152.0	14 25.4	81 43	152.3	12 47.6	82 41	153.5	8
9	19 35.4	79 50	147.3	18 47.8	79 49	147.9	17 36.2	80 48	148.9	16 24.3	80 46	149.8	14 48.0	80 45	151.1	14 23.8	80 44	151.4	13 59.7	81 44	151.7	12 22.9	81 42	152.9	9
40	19 05.5	78 51	146.6	18 18.5	79 50	147.3	17 07.6	79 48	148.2	15 56.5	79 47	149.2	14 21.2	80 46	150.5	13 57.3	80 45	150.8	13 33.4	80 45	151.1	11 57.6	80 43	152.3	40
1	18 35.1	77 52	145.9	17 48.6	78 51	146.6	16 38.5	78 50	147.6	15 28.1	78 48	148.6	13 53.9	79 46	149.9	13 30.3	79 46	150.2	13 06.7	79 46	150.5	11 31.9	79 44	151.7	1
2	18 04.2	77 52	145.3	17 18.1	77 52	146.0	16 08.8	77 50	147.0	14 59.3	77 49	148.0	13 26.2	78 47	149.3	13 02.8	78 47	149.6	12 39.4	78 46	149.9	11 05.7	78 44	151.2	2
3	17 32.7	76 53	144.6	16 47.2	76 52	145.3	15 38.7	76 51	146.3	14 30.0	77 50	147.3	12 57.9	77 48	148.7	12 34.8	77 48	149.0	12 11.7	77 47	149.3	10 39.1	77 45	150.6	3
4	17 00.7	75 54	144.0	16 15.8	75 53	144.7	15 08.1	75 52	145.7	14 00.1	76 50	146.7	12 29.1	76 49	148.1	12 06.3	76 48	148.4	11 43.5	76 48	148.7	10 11.9	76 46	150.1	4
45	16 28.3	74 55	143.4	15 43.8	74 54	144.1	14 37.0	74 53	145.1	13 29.8	75 51	146.1	11 59.9	75 50	147.5	11 37.4	75 49	147.8	11 14.8	75 48	148.2	9 44.4	76 47	149.5	45
6	15 55.3	73 56	142.8	15 11.5	73 55	143.5	14 05.4	74 53	144.5	12 59.1	74 52	145.6	11 30.3	74 50	146.9	11 08.0	74 50	147.3	10 45.7	74 49	147.6	9 16.3	75 48	149.0	6
7	15 21.9	72 56	142.1	14 38.6	72 56	142.9	13 33.4	73 54	143.9	12 27.8	73 53	145.0	11 00.1	73 51	146.4	10 38.1	73 50	146.7	10 16.1	73 50	147.1	8 47.9	74 48	148.4	7
8	14 48.1	71 57	141.5	14 05.3	71 56	142.3	13 00.9	72 55	143.4	11 56.2	72 54	144.4	10 29.6	72 52	145.8	10 07.8	72 51	146.2	9 46.1	72 51	146.5	8 19.0	73 49	147.9	8
9	14 13.8	70 58	141.0	13 31.5	71 57	141.7	12 27.9	71 56	142.8	11 24.1	71 54	143.9	9 58.6	71 52	145.3	9 37.1	71 52	145.6	9 15.7	72 52	146.0	7 49.6	72 50	147.4	9
50	13 39.0	69 59	140.4	12 57.3	70 58	141.1	11 54.5	70 56	142.2	10 51.5	70 55	143.3	9 27.1	70 53	144.8	9 06.0	71 53	145.1	8 44.8	71 52	145.5	7 19.9	71 50	146.9	50
1	13 03.8	68 59	139.8	12 22.7	69 58	140.5	11 20.8	69 57	141.7	10 18.6	69 56	142.8	8 55.3	70 54	144.2	8 34.4	70 53	144.6	8 13.5	70 53	145.0	6 49.8	70 51	146.4	1
2	12 28.3	68 60	139.2	11 47.7	68 59	140.0	10 46.5	68 58	141.1	9 45.2	68 56	142.2	8 23.1	69 54	143.7	8 02.5	69 54	144.1	7 41.9	69 54	144.4	6 19.2	69 52	145.9	2
3	11 52.3	67 61	138.7	11 12.2	67 60	139.4	10 11.9	67 58	140.6	9 11.4	67 57	141.7	7 50.4	68 55	143.2	7 30.1	68 54	143.6	7 09.8	68 54	143.9	5 48.3	68 52	145.4	3
4	11 15.9	66 61	138.1	10 36.4	66 60	138.9	9 36.9	66 59	140.0	8 37.3	66 58	141.2	7 17.4	67 56	142.7	6 57.4	67 55	143.1	6 37.3	67 55	143.4	5 17.0	67 53	144.9	4
55	10 39.1	65 62	137.6	10 00.2	65 61	138.4	9 01.5	65 60	139.5	8 02.7	65 58	140.7	6 44.0	66 56	142.2	6 24.2	66 56	142.6	6 04.5	66 55	143.0				55
6	10 02.0	64 62	137.1	9 23.6	64 62	137.8	8 25.8	64 60	139.0	7 27.8	65 59	140.2	6 10.2	65 57	141.7	5 50.7	65 56	142.1	5 31.3	65 56	142.5				6
7	9 24.4	63 63	136.5	8 46.6	63 62	137.3	7 49.6	63 61	138.5	6 52.5	64 60	139.7	5 36.0	64 58	141.2	5 16.9	64 57	141.6							7
8	8 46.6	62 64	136.0	8 09.3	62 63	136.8	7 13.2	62 61	138.0	6 16.8	63 60	139.2	5 01.5	63 58	140.8										8
9	8 08.3	61 64	135.5	7 31.6	61 63	136.3	6 36.3	62 62	137.5	5 40.8	62 60	138.7													9
60	7 29.8	60 65	135.0	6 53.6	60 64	135.8	5 59.1	61 62	137.0	5 04.5	61 61	138.2													60
1	6 50.9	59 65	134.5	6 15.2	59 64	135.4	5 21.6	60 63	136.6																1
2	6 11.7	58 66	134.1	5 36.5	59 65	134.9																			2
3	5 32.1	58 66	133.6																						3

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	13 04.3	35 76	56.1	13 25.1	34 75	55.2	13 55.7	34 74	53.7	14 25.9	33 72	52.3	15 05.3	32 70	50.3	15 15.0	32 70	49.8	15 24.6	32 69	49.3	16 02.5	31 67	47.4	91
2	12 18.9	35 76	55.8	12 40.1	35 75	54.9	13 11.6	35 73	53.4	13 42.7	34 72	52.0	14 23.2	33 70	50.1	14 33.2	33 69	49.6	14 43.1	33 69	49.1	15 22.2	32 67	47.1	2
3	11 33.6	36 75	55.6	11 55.4	36 74	54.6	12 27.7	36 73	53.2	12 59.5	35 72	51.7	13 41.3	34 70	49.8	13 51.6	34 69	49.3	14 01.8	34 69	48.8	14 42.1	33 67	46.9	3
4	10 48.5	37 75	55.2	11 10.8	37 74	54.3	11 43.9	37 73	52.9	12 16.6	36 71	51.4	12 59.5	35 69	49.5	13 10.1	35 69	49.1	13 20.6	35 68	48.6	14 02.2	34 66	46.6	4
95	10 03.5	38 75	54.9	10 26.4	38 74	54.0	11 00.3	37 72	52.6	11 33.8	37 71	51.2	12 17.9	36 69	49.3	12 28.8	36 69	48.8	12 39.6	36 68	48.3	13 22.4	35 66	46.4	95
6	9 18.8	39 74	54.6	9 42.1	39 74	53.7	10 16.8	38 72	52.3	10 51.2	38 71	50.9	11 36.4	37 69	49.0	11 47.6	37 68	48.5	11 58.7	37 68	48.0	12 42.8	36 66	46.1	6
7	8 34.1	40 74	54.3	8 58.0	40 73	53.4	9 33.6	39 72	52.0	10 08.8	39 70	50.6	10 55.1	38 68	48.7	11 06.6	38 68	48.2	11 18.1	38 68	47.8	12 03.4	37 65	45.9	7
8	7 49.7	41 74	54.0	8 14.1	41 73	53.0	8 50.5	40 72	51.7	9 26.5	40 70	50.3	10 14.1	39 68	48.4	10 25.9	39 68	47.9	10 37.6	39 67	47.5	11 24.2	39 65	45.6	8
9	7 05.5	42 73	53.6	7 30.4	41 72	52.7	8 07.6	41 71	51.3	8 44.5	41 70	50.0	9 33.2	40 68	48.1	9 45.3	40 67	47.6	9 57.3	40 67	47.2	10 45.1	40 65	45.3	9
100	6 21.5	42 73	53.3	6 46.9	42 72	52.4	7 24.9	42 71	51.0	8 02.6	42 70	49.6	8 52.5	41 68	47.8	9 04.9	41 67	47.3	9 17.2	41 66	46.9	10 06.2	41 64	45.0	100
1	5 37.6	43 73	52.9	6 03.6	43 72	52.0	6 42.4	43 70	50.7	7 20.9	43 69	49.3	8 12.0	42 67	47.5	8 24.7	42 67	47.0	8 37.3	42 66	46.6	9 27.6	42 64	44.7	1
2				5 20.5	44 72	51.7	6 00.1	44 70	50.3	6 39.5	44 69	49.0	7 31.7	43 67	47.2	7 44.7	43 66	46.7	7 57.6	43 66	46.2	8 49.1	43 64	44.4	2
3							5 18.0	45 70	50.0	5 58.2	45 68	48.6	6 51.6	44 66	46.8	7 04.9	44 66	46.4	7 18.1	44 66	45.9	8 10.8	44 63	44.1	3
4										5 17.2	46 68	48.3	6 11.7	45 66	46.5	6 25.3	45 66	46.0	6 38.8	45 65	45.6	7 32.8	45 63	43.8	4
105													5 32.1	46 66	46.2	5 46.0	46 65	45.7	5 59.8	46 65	45.3	6 55.0	46 63	43.5	105
6																5 06.9	47 65	45.4	5 21.0	47 64	44.9	6 17.4	47 62	43.1	6
7																						5 40.0	48 62	42.8	7
8																						5 02.9	49 62	42.5	8

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 29°

Lat. 24°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	68 00.0	1.0 02	00.0	67 00.0	1.0 01	00.0	65 30.0	1.0 01	00.0	64 30.0	1.0 01	00.0	63 30.0	1.0 01	00.0	62 30.0	1.0 01	00.0	61 30.0	1.0 01	00.0	60 00.0	1.0 01	00.0	00
1	67 59.1	1.0 04	01.9	66 59.2	1.0 04	01.7	65 29.2	1.0 04	01.6	64 29.3	1.0 04	01.5	63 29.3	1.0 03	01.4	62 29.4	1.0 03	01.3	61 29.4	1.0 03	01.2	59 59.4	1.0 03	01.2	1
2	67 56.5	1.0 07	03.7	66 56.7	1.0 07	03.5	65 26.9	1.0 06	03.2	64 27.1	1.0 06	03.0	63 27.3	1.0 06	02.8	62 27.4	1.0 05	02.7	61 27.6	1.0 05	02.5	59 57.8	1.0 05	02.3	2
3	67 52.0	99 10	05.5	66 52.5	99 10	05.2	65 23.1	99 09	04.8	64 23.5	99 08	04.5	63 23.9	99 08	04.3	62 24.2	99 08	04.0	61 24.5	1.0 07	03.8	59 54.9	1.0 06	03.5	3
4	67 45.9	99 13	07.4	66 46.7	99 12	06.9	65 17.8	99 11	06.3	64 18.5	99 11	06.0	63 19.1	99 10	05.7	62 19.7	99 10	05.4	61 20.3	99 09	05.1	59 51.0	99 08	04.7	4
05	67 38.0	98 16	09.2	66 39.3	98 15	08.6	65 11.0	98 14	07.9	64 12.1	98 13	07.5	63 13.0	98 12	07.1	62 14.0	99 12	06.7	61 14.8	99 11	06.3	59 46.0	99 10	05.8	05
6	67 28.5	97 19	10.9	66 30.3	97 18	10.3	65 02.7	97 16	09.4	64 04.2	98 15	08.9	63 05.6	98 14	08.4	62 07.0	98 14	08.0	61 08.2	98 13	07.6	59 39.9	98 12	07.0	6
7	67 17.2	96 21	12.7	66 19.7	96 20	11.9	64 53.0	97 18	11.0	63 55.1	97 18	10.4	62 56.9	97 16	09.8	61 58.7	97 16	09.3	61 00.4	97 15	08.8	59 32.7	98 14	08.1	7
8	67 04.4	96 24	14.4	66 07.6	96 23	13.6	64 41.9	96 21	12.5	63 44.5	96 20	11.8	62 47.0	96 19	11.2	61 49.3	96 18	10.6	60 51.4	97 17	10.0	59 24.4	97 16	09.2	8
9	66 50.1	93 26	16.0	65 54.0	94 25	15.1	64 29.4	94 23	13.9	63 32.7	95 22	13.2	62 35.7	95 21	12.5	61 38.6	95 20	11.8	60 41.3	96 19	11.2	59 15.1	96 17	10.4	9
10	66 34.2	92 29	17.7	65 39.0	92 27	16.7	64 15.5	93 25	15.4	63 19.5	94 24	14.5	62 23.3	94 23	13.8	61 26.8	94 22	13.1	60 30.1	96 20	12.4	59 04.7	95 19	11.5	10
1	66 16.8	90 31	19.2	65 22.5	91 30	18.2	64 00.3	92 27	16.8	63 05.1	92 26	15.9	62 09.6	93 25	15.1	61 13.8	93 24	14.3	60 17.8	94 22	13.6	58 53.3	94 21	12.5	1
2	65 58.1	88 34	20.8	65 04.7	89 32	19.7	63 43.9	90 30	18.1	62 49.5	91 28	17.2	61 54.8	92 27	16.3	60 59.7	92 25	15.5	60 04.4	92 24	14.7	58 40.9	93 22	13.6	2
3	65 38.0	87 36	22.3	64 45.7	88 34	21.1	63 26.2	89 31	19.5	62 32.7	90 30	18.5	61 38.8	90 28	17.5	60 44.6	91 27	16.7	59 50.0	91 26	15.8	58 27.5	92 24	14.6	3
4	65 16.6	85 38	23.7	64 25.3	86 36	22.5	63 07.4	87 33	20.8	62 14.8	88 32	19.7	61 21.8	89 30	18.7	60 28.3	89 29	17.8	59 34.5	90 27	16.9	58 13.2	91 26	15.7	4
15	64 53.9	83 40	25.1	64 03.8	84 38	23.8	62 47.4	86 35	22.0	61 55.8	86 34	20.9	61 03.7	87 32	19.9	60 11.1	88 30	18.9	59 18.1	89 29	18.0	57 57.9	90 27	16.7	15
6	64 30.1	81 42	26.4	63 41.1	82 40	25.1	62 26.3	84 37	23.2	61 35.7	85 35	22.1	60 44.5	86 34	21.0	59 52.8	87 32	20.0	59 00.7	87 30	19.0	57 41.8	88 28	17.6	6
7	64 05.2	79 43	27.7	63 17.3	80 41	26.3	62 04.1	82 38	24.4	61 14.5	83 37	23.2	60 24.3	84 35	22.1	59 33.6	85 34	21.1	58 42.4	86 32	20.0	57 24.7	87 30	18.6	7
8	63 39.2	77 45	28.9	62 52.5	79 43	27.5	61 41.0	80 40	25.6	60 52.4	81 38	24.4	60 03.2	82 37	23.2	59 13.5	83 35	22.1	58 23.2	84 34	21.0	57 06.8	85 31	19.5	8
9	63 12.2	75 47	30.1	62 26.7	77 45	28.7	61 16.8	79 42	26.7	60 29.3	80 40	25.4	59 41.2	81 38	24.2	58 52.4	82 36	23.1	58 03.1	83 35	22.0	56 48.0	84 32	20.5	9
20	62 44.2	73 48	31.2	61 59.9	75 46	29.8	60 51.8	77 43	27.7	60 05.4	78 42	26.5	59 18.3	79 40	25.2	58 30.5	80 38	24.1	57 42.1	81 36	22.9	56 28.5	82 34	21.3	20
1	62 15.3	71 50	32.3	61 32.2	73 48	30.9	60 25.8	75 45	28.8	59 40.5	76 43	27.4	58 54.5	77 41	26.2	58 07.7	78 39	25.0	57 20.3	79 38	23.8	56 08.1	81 35	22.2	1
2	61 45.6	69 51	33.4	61 03.7	71 49	31.9	59 59.0	73 46	29.7	59 14.8	74 44	28.4	58 29.9	76 42	27.1	57 44.2	77 40	25.9	56 57.8	78 39	24.7	55 47.1	79 36	23.1	2
3	61 15.1	67 52	34.4	60 34.3	69 50	32.8	59 31.4	71 47	30.7	58 48.4	72 46	29.3	58 04.5	74 44	28.0	57 19.9	75 42	26.8	56 34.5	76 40	25.6	55 25.2	78 38	23.9	3
4	60 43.8	65 53	35.3	60 04.2	67 51	33.8	59 03.1	69 48	31.6	58 21.1	71 46	30.2	57 38.4	72 45	28.9	56 54.8	73 43	27.6	56 10.5	74 41	26.4	55 02.7	76 39	24.7	4
25	60 11.7	63 54	36.2	59 33.4	65 52	34.7	58 34.0	67 50	32.5	57 53.2	69 48	31.1	57 11.5	70 46	29.7	56 29.0	71 44	28.5	55 45.7	73 42	27.2	54 39.5	74 40	25.4	25
6	59 39.0	62 56	37.1	59 01.9	63 54	35.5	58 04.2	65 51	33.3	57 24.6	67 49	31.9	56 44.0	68 47	30.6	56 02.6	70 45	29.2	55 20.4	71 44	28.0	54 15.6	73 41	26.2	6
7	59 05.7	59 56	37.9	58 29.7	61 55	36.3	57 33.8	63 52	34.1	56 55.3	65 50	32.7	56 15.8	67 48	31.3	55 35.5	68 46	30.0	54 54.3	69 44	28.7	53 51.1	71 42	26.9	7
8	58 31.7	57 58	38.7	57 56.9	59 56	37.1	57 02.7	62 53	34.9	56 25.3	63 51	33.5	55 47.0	65 49	32.1	55 07.8	66 47	30.7	54 27.7	67 46	29.5	53 26.0	69 43	27.6	8
9	57 57.2	55 58	39.4	57 23.6	57 56	37.8	56 31.1	60 54	35.6	55 54.8	61 52	34.2	55 17.6	63 50	32.8	54 39.4	64 48	31.4	54 00.4	66 46	30.1	53 00.4	68 44	28.3	9
30	57 22.2	53 59	40.1	56 49.7	55 57	38.6	55 58.9	58 54	36.3	55 23.8	59 53	34.9	54 47.6	61 51	33.5	54 10.6	63 49	32.1	53 32.6	64 47	30.8	52 34.1	66 45	28.9	30
1	56 46.6	51 60	40.8	56 15.3	53 58	39.2	55 26.2	56 55	37.0	54 52.2	58 54	35.5	54 17.1	59 52	34.1	53 41.2	61 50	32.8	53 04.3	62 48	31.5	52 07.4	64 46	29.5	1
2	56 10.6	49 61	41.4	55 40.4	51 59	39.9	54 53.0	54 56	37.6	54 20.1	56 54	36.2	53 46.1	57 52	34.8	53 11.2	59 51	33.4	52 35.4	60 49	32.1	51 40.1	63 46	30.1	2
3	55 34.1	48 62	42.0	55 05.0	49 60	40.5	54 19.3	52 57	38.2	53 47.5	54 55	36.8	53 14.6	56 53	35.4	52 40.8	57 52	34.0	52 06.1	59 50	32.7	51 12.3	61 47	30.7	3
4	54 57.2	46 62	42.6	54 29.3	48 60	41.0	53 45.2	50 58	38.8	53 14.4	52 56	37.4	52 42.7	54 54	36.0	52 09.9	55 52	34.6	51 36.3	57 50	33.2	50 44.1	59 48	31.3	4
35	54 20.0	44 63	43.1	53 53.1	46 61	41.6	53 10.6	49 58	39.4	52 40.9	50 56	37.9	52 10.3	52 55	36.5	51 38.6	54 53	35.1	51 06.0	55 51	33.8	50 15.4	57 48	31.8	35
6	53 42.3	42 63	43.6	53 16.5	44 62	42.1	52 35.6	47 59	39.9	52 07.1	49 57	38.4	51 37.5	50 55	37.0	51 06.9	52 54	35.7	50 35.3	53 52	34.3	49 46.3	56 49	32.3	6
7	53 04.4	40 64	44.1	52 39.6	42 62	42.6	52 00.3	45 60	40.4	51 32.8	47 58	38.9	51 04.3	48 56	37.5	50 34.7	50 54	36.2	50 04.2	52 52	34.8	49 16.8	54 50	32.8	7
8	52 26.1	39 64	44.5	52 02.3	40 63	43.0	51 24.6	43 60	40.8	50 58.2	45 58	39.4	50 30.7	47 56	38.0	50 02.2	48 55	36.6	49 32.7	50 53	35.3	48 46.8	52 50	33.3	8
9	51 47.5	37 65	45.0	51 24.8	39 63	43.5	50 48.6	41 60	41.3	50 23.2	43 59	39.9	49 56.8	45 57	38.5	49 29.3	47 55	37.1	49 00.9	48 54	35.7	48 16.6	50 51	33.8	9
40	51 08.6	35 65	45.4	50 46.9	37 64	43.9	50 12.3	40 61	41.7	49 47.9	42 59	40.3	49 22.5	43 58	38.9	48 56.1	45 56	37.5	48 28.7	46 54	36.2	47 45.9	49 52	34.2	40
1	50 29.4	34 66	45.8	50 08.8	35 64	44.3	49 35.7	38 62	42.1	49 12.3	40 60	40.7	48 47.9	41 58	39.3	48 22.5	43 56	37.9	47 56.2	45 55	36.6	47 14.9	47 52	34.6	1
2	49 50.1	32 66	46.1	49 30.4	34 64	44.6	48 58.8	36 62	42.5	48 36.4	38 60	41.1	48 13.0	40 58	39.7	47 48.7	41 57	38.3	47 23.4	43 55	37.0	46 43.7	45 53	35.0	2
3	49 10.5	30 66	46.4	48 51.7	32 65	45.0	48 21.6	35 62	42.9	48 00.3	36 61	41.5	47 37.9	38 59	40.1	47 14.5	40 57	38.7	46 50.2	41 56	37.4	46 12.1	44 53	35.4	3
4	48 30.6	29 67	46.8	48 12.9	30 65	45.3	47 44.2	33 63	43.2	47 23.9	35 61	41.8	47 02.5	36 60	40.4	46 40.1	38 58	39.1	46 16.8	40 56	37.7	45 40.2	42 54	35.8	4
45	47 50.6	27 67	47.0	47 33.8	29 66	45.6	47 06.6	31 63	43.5	46 47.2	33 62	42.1	46 26.8	35 60	40.8	46 05.5	36 58	39.4	45 43.2	38 56	38.1	45 08.0	40 54	36.1	45
6	47 10.4	26 67	47.3	46 54.5	27 66	45.9	46 28.8	30 64	43.8	46 10.3	32 62	42.4	45 50.9	33 60	41.1	45 30.6	35 59	39.7	45 09.3	36 57	38.4	44 35.6	39 54	36.4	6
7	46 30.0	24 68	47.6	46 15.1	26 66	46.2	45 50.7	28 64	44.1	45 33.3	30 62	42.7	45 14.8	32 60	41.4	44 55.4	33 59	40.0	44 35.1	35 57	38.7	44 02.9	37 55	36.7	7
8	45 49.5	23 68	47.8	45 35.5	24 66	46.4	45 12.5	27 64	44.3	44 56.0	28 62	43.0	44 38.5	30 61	41.6	44 20.1	31 59	40.3	44 00.7	33 58	39.0	43 30.0	35 55	37.0	8
9	45 08.8	21 68	48.0	44 55.7	23 66	46.6	44 34.1	25 64	44.6	44 18.5	27 63	43.2	44 02.0	28 61	41.9	43 44.5	30 60	40.6	43 26.1	31 58	39.3	42 56.9	34 56	37.3	9
50	44 28.0	20 68	48.2	44 15.8	21 67	46.8	43 55.6	24 64	44.8	43 40.9	25 63	43.5	43 25.3	27 61	42.1	43 08.8	28 60	40.8	42 51.4	30 58	39.5	42 23.6	32 56	37.6	50
1	43 47.1	18 68	48.4	43 35.7	20 67	47.0	43 16.9	22 65	45.0	43 03.1	24 63	43.7	42 48.5	25 62	42.4	42 32.9	27 60	41.0	42 16.4	28 58	39.7	41 50.1	30 56	37.8	1
2	43 06.0	17 68	48.6	42 55.5	18 67	47.2	42 38.0	21 65	45.2	42 25.2	22 64	43.9	42 11.4	24 62	42.6	41 56.8	25 60	41.3	41 41.3	27 59	40.0	41 16.4	29 56	38.0	2
3	42 24.9	15 69	48.7	42 15.3	17 67	47.4	41 59.1	19 65	45.4	41 47.1	21 64	44.1	41 34.3	22 62	42.8	41 20.6	24 61	41.5	41 06.0	25 59	40.2	40 42.5	27 57	38.3	3
4	41 43.7	14 69	48.9	41 34.9	15 68	47.5	41 20.0	18 65	45.6	41 08.9	19 64	44.2	40 57.0	21 62	42.9	40 44.2	22 61	41.7	40 30.6	23 59	40.4	40 08.5	26 57	38.5	4
55	41 02.3	13 69	49.0	40 54.4	14 68	47.7	40 40.8	16 66	45.7	40 30.6	18 64	44.4	40 19.6	19 62	43.1	40 07.7	21 61	41.8	39 55.0	22 60	40.6	39 34.3	24 57	38.7	55
6	40 21.0	11 69	49.1	40 13.8	13 68	47.8	40 01.5	15 66	45.8	39 52.2	16 64	44.5	39 42.1	18 63	43.3	39 31.1	19 61	42.0	39 19.3	20 60	40.7	39 00.0	22 57	38.8	6
7	39 39.5	10 69	49.2	39 33.2	11 68	47.9	39 22.2	13 66	46.0	39 13.7	15 64	44.7	39 04.5	16 63	43.4	38 54.4	18 61	42.1	38 43.5	19 60	40.9	38 25.6	21 58	39.0	7
8	38 58.0	08 69	49.3	38 52.5	10 68	48.0	38 42.7	12 66	46.1	38 35.1	13 64	44.8	38 26.8	15 63	43.5	38 17.6	16 62	42.3	38 07.5	17 60	41.0	37 51.0	19 58	39.1	8
9	38 16.5	07 69	49.3	38 11.8	08 68	48.1	38 03.2	11 66	46.2	37 56.5	12 64	44.9	37 49.0	13 63	43.6	37 40.6	15 62	42.4	37 31.5	16 60	41.1	37 16.4	18 58	39.3	9
60	37 34.9	06 69	49.4	37 31.0	07 68	48.1	37 23.6	09 66	46.2	37 17.8	10 65	45.0	37 11.1	12 63	43.7	37 03.7	13 62	42.5	36 55.4	14 60	41.3	36 41.6	16 58	39.4	60
1	36 53.2	05 69	49.4	36 50.1	06 68	48.2	36 44.0	08 66	46.3	36 39.0	09 65	45.1	36 33.2	10 63	43.8	36 26.6	12 62	42.6	36 19.2	13 60	41.4	36 06.8	15 58	39.5	1
2	36 11.6	03 70	49.5	36 09.3	05 68	48.2	36 04.4	06 66	46.4	36 00.2	08 65	45.1	35 55.2	09 63	43.9	35 49.5	10 62	42.7	35 43.0	11 60	41.5	35 31.9	13 58	39.6	2
3	35 29.9	02 70	49.5	35 28.4	03 68	48.3	35 24.7	05 66	46.4	35 21.3	06 65	45.2	35 17.1	07 63	44.0	35 12.3	09 62	42.8	35 06.7	10 61	41.5	34 56.9	12 58	39.7	3
4	34 48.2	01 70	49.5	34 47.5	02 68	48.3	34 45.0	04 66	46.5	34 42.4	05 65	45.2	34 39.1	06 64	44.0	34 35.0	07 62	42.8	34 30.3	09 61	41.6	34 21.8	10 58	39.8	4
65	34 06.6	01 70	49.5	34 06.6	01 68	48.3	34 05.2	02 66	46.5	34 03.4	04 65	45.3	34 01.0	05 64	44.1	33 57.8	06 62	42.9	33 53.9	07 61	41.7	33 46.7	09 59	39.9	65
6	33 24.9	02 70	49.5	33 25.6	01 68	48.3	33 25.5	01 66	46.5	33 24.5	02 65	45.3	33 22.8	03 64	44.1	33 20.5	05 62	42.9	33 17.4	06 61	41.7	33 11.6	07 59	39.9	6
7	32 43.2	03 70	49.5	32 44.7	02 68	48.3	32 45.7	00 66	46.5	32 45.5	01 65	45.3	32 44.7	02 64	44.1	32 43.2	03 62	42.9	32 41.0	04 61	41.7	32 36.4	06 59	40.0	7
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9	31 19.9	05 69	49.4	31 22.9	04 68	48.2	31 26.2	03 66	46.5	31 27.6	02 65	45.3	31 28.4	01 64	44.1	31 28.5	00 62	43.0	31 27.9	01 61	41.8	31 25.9	03 59	40.0	9
70	30 38.3	07 69	49.3	30 42.1	06 68	48.2	30 46.5	04 66	46.4	30 48.7	03 65	45.3	30 50.2	02 64	44.1	30 51.1	01 62	43.0	30 51.4	00 61	41.8	30 50.7	02 59	40.0	70
1	29 56.8	08 69	49.3	30 01.2	07 68	48.1	30 06.8	05 66	46.4	30 09.7	04 65	45.3	30 12.0	03 64	44.1	30 13.8	02 62	42.9	30 14.9	01 61	41.8	30 15.4	00 59	40.0	1
2	29 15.3	09 69	49.2	29 20.4	08 68	48.1	29 27.1	07 66	46.4	29 30.8	06 65	45.2	29 33.9	05 64	44.1	29 36.4	04 62	42.9	29 38.4	03 61	41.8	29 40.1	01 59	40.0	2
3	28 33.8	10 69	49.1	28 39.7	09 68	48.0	28 47.4	08 66	46.3	28 51.9	07 65	45.2	28 55.8	06 64	44.0	28 59.1	05 62	42.9	29 01.9	04 61	41.7	29 04.9	03 59	40.0	3
4	27 52.3	11 69	49.1	27 58.9	11 68	47.9	28 07.8	09 66	46.2	28 13.1	08 65	45.1	28 17.7	07 63	44.0	28 21.8	06 62	42.8	28 25.4	05 61	41.7	28 29.6	04 59	40.0	4
75	27 11.0	13 69	49.0	27 18.3	12 68	47.8	27 28.3	10 66	46.2	27 34.2	10 64	45.0	27 39.7	09 63	43.9	27 44.6	08 62	42.8	27 48.9	07 61	41.7	27 54.4	05 59	40.0	75
6	26 29.6	14 69	48.9	26 37.7	13 68	47.8	26 48.7	12 66	46.1	26 55.5	11 64	45.0	27 01.7	10 63	43.9	27 07.4	09 62	42.7	27 12.5	08 61	41.6	27 19.2	07 59	39.9	6
7	25 48.4	15 69	48.7	25 57.1	14 68	47.6	26 09.3	13 66	46.0	26 16.8	12 64	44.9	26 23.7	11 63	43.8	26 30.2	10 62	42.7	26 36.1	09 60	41.6	26 44.0	08 58	39.9	7
8	25 07.2	16 68	48.6	25 16.7	15 67	47.5	25 29.9	14 66	45.9	25 38.1	13 64	44.8	25 45.8	12 63	43.7	25 53.1	12 62	42.6	25 59.8	11 60	41.5	26 08.9	10 58	39.8	8
9	24 26.1	17 68	48.5	24 36.3	16 67	47.4	24 50.6	15 66	45.8	24 59.5	15 64	44.7	25 08.0	14 63	43.6	25 16.0	13 62	42.5	25 23.5	12 60	41.4	25 33.8	11 58	39.8	9
80	23 45.1	18 68	48.4	23 55.9	18 67	47.3	24 11.3	17 65	45.7	24 21.0	16 64	44.6	24 30.2	15 63	43.5	24 39.0	14 62	42.4	24 47.3	13 60	41.3	24 58.8	12 58	39.7	80
1	23 04.2	20 68	48.2	23 15.7	19 67	47.2	23 32.2	18 65	45.5	23 42.6	17 64	44.5	23 52.5	16 63	43.4	24 02.0	15 61	42.3	24 11.1	15 60	41.2	24 23.8	14 58	39.6	1
2	22 23.4	21 68	48.1	22 35.6	20 67	47.0	22 53.1	19 65	45.4	23 04.2	18 64	44.4	23 14.9	17 62	43.3	23 25.2	17 61	42.2	23 35.0	16 60	41.1	23 48.9	15 58	39.5	2
3	21 42.6	22 68	47.9	21 55.5	21 66	46.9	22 14.1	20 65	45.3	22 25.9	19 64	44.2	22 37.4	19 62	43.2	22 48.4	18 61	42.1	22 59.0	17 60	41.0	23 14.1	16 58	39.4	3
4	21 02.0	23 68	47.7	21 15.6	22 66	46.7	21 35.2	21 65	45.1	21 47.8	21 64	44.1	21 59.9	20 62	43.0	22 11.7	19 61	42.0	22 23.1	19 60	40.9	22 39.3	18 58	39.3	4
85	20 21.5	24 67	47.6	20 35.7	23 66	46.5	20 56.4	22 64	45.0	21 09.7	22 63	43.9	21 22.6	21 62	42.9	21 35.1	21 61	41.8	21 47.2	20 60	40.8	22 04.6	19 58	39.2	85
6	19 41.1	25 67	47.4	19 56.0	25 66	46.4	20 17.7	24 64	44.8	20 31.7	23 63	43.8	20 45.3	22 62	42.7	20 58.6	22 61	41.7	21 11.5	21 60	40.6	21 30.0	20 58	39.1	6
7	19 00.8	26 67	47.2	19 16.4	26 66	46.2	19 39.1	25 64	44.6	19 53.8	24 63	43.6	20 08.2	24 62	42.6	20 22.2	23 60	41.5	20 35.8	22 59	40.5	20 55.6	21 57	38.9	7
8	18 20.7	27 67	47.0	18 36.9	27 66	46.0	19 00.7	26 64	44.5	19 16.1	25 63	43.4	19 31.2	25 62	42.4	19 45.9	24 60	41.4	20 00.3	24 59	40.4	20 21.2	23 57	38.8	8
9	17 40.6	28 66	46.8	17 57.6	28 65	45.8	18 22.3	27 64	44.3	18 38.5	27 62	43.3	18 54.3	26 61	42.2	19 09.7	25 60	41.2	19 24.8	25 59	40.2	19 46.9	24 57	38.6	9
90	17 00.8	30 66	46.6	17 18.3	29 65	45.6	17 44.1	28 63	44.1	18 01.0	28 62	43.1	18 17.5	27 61	42.1	18 33.7	27 60	41.0	18 49.5	26 59	40.0	19 12.7	26 57	38.5	90

Lat. 24°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		°
00	20 00.0	1.0 01	180.0	19 00.0	1.0 00	180.0	17 30.0	1.0 00	180.0	16 30.0	1.0 00	180.0	15 30.0	1.0 00	180.0	14 30.0	1.0 00	180.0	13 30.0	1.0 00	180.0	12 00.0	1.0 00	180.0	00
1	19 59.6	1.0 02	179.3	18 59.7	1.0 02	179.3	17 29.7	1.0 02	179.3	16 29.7	1.0 02	179.3	15 29.7	1.0 02	179.3	14 29.7	1.0 02	179.4	13 29.7	1.0 02	179.4	11 59.7	1.0 02	179.4	1
2	19 58.6	1.0 03	178.5	18 58.6	1.0 03	178.6	17 28.7	1.0 03	178.6	16 28.7	1.0 03	178.6	15 28.7	1.0 02	178.7	14 28.8	1.0 03	178.7	13 28.8	1.0 02	178.7	11 58.9	1.0 02	178.8	2
3	19 56.8	1.0 04	177.8	18 56.9	1.0 04	177.8	17 27.0	1.0 04	177.9	16 27.1	1.0 04	178.0	15 27.2	1.0 04	178.0	14 27.2	1.0 04	178.1	13 27.3	1.0 04	178.1	11 57.4	1.0 03	178.2	3
4	19 54.3	1.0 05	177.0	18 54.5	1.0 05	177.1	17 24.7	1.0 05	177.2	16 24.8	1.0 05	177.3	15 25.0	1.0 05	177.4	14 25.1	1.0 05	177.4	13 25.2	1.0 04	177.5	11 55.4	1.0 04	177.6	4
05	19 51.2	1.0 06	176.3	18 51.4	1.0 06	176.4	17 21.7	1.0 06	176.5	16 21.9	1.0 06	176.6	15 22.1	1.0 06	176.7	14 22.3	1.0 06	176.8	13 22.5	1.0 06	176.9	11 52.8	1.0 05	177.0	05
6	19 47.3	99 08	175.6	18 47.6	99 08	175.7	17 18.1	1.0 07	175.8	16 18.4	1.0 07	175.9	15 18.7	1.0 07	176.0	14 18.9	1.0 07	176.1	13 19.2	1.0 06	176.3	11 49.7	1.0 06	176.4	6
7	19 42.7	99 09	174.8	18 43.1	99 09	175.0	17 13.7	99 08	175.2	16 14.2	99 08	175.3	15 14.6	99 08	175.4	14 15.0	99 08	175.5	13 15.4	99 08	175.6	11 45.9	99 07	175.8	7
8	19 37.4	99 10	174.1	18 38.0	99 10	174.3	17 08.8	99 09	174.5	16 09.3	99 09	174.6	15 09.8	99 09	174.7	14 10.4	99 09	174.9	13 10.9	99 08	175.0	11 41.6	99 08	175.2	8
9	19 31.5	99 11	173.4	18 32.1	99 11	173.5	17 03.2	99 10	173.8	16 03.8	99 10	173.9	15 04.5	99 10	174.1	14 05.2	99 10	174.2	13 05.8	99 09	174.4	11 36.8	99 09	174.6	9
10	19 24.8	99 12	172.7	18 25.6	99 12	172.8	16 56.9	99 12	173.1	15 57.7	99 11	173.3	14 58.5	99 11	173.4	13 59.4	99 11	173.6	13 00.2	99 10	173.8	11 31.4	99 10	174.0	10
1	19 17.4	98 13	171.9	18 18.5	98 13	172.1	16 50.0	98 12	172.4	15 51.0	98 12	172.6	14 52.0	98 12	172.8	13 53.0	98 12	173.0	12 53.9	98 11	173.2	11 25.4	98 11	173.4	1
2	19 09.4	98 14	171.2	18 10.6	98 14	171.4	16 42.4	98 14	171.7	15 43.6	98 13	171.9	14 44.8	98 13	172.1	13 45.9	98 13	172.3	12 47.1	98 12	172.5	11 18.8	98 12	172.8	2
3	19 00.7	98 16	170.5	18 02.1	98 15	170.7	16 34.2	98 15	171.1	15 35.6	98 14	171.3	14 37.0	98 14	171.5	13 38.3	98 14	171.7	12 39.7	98 13	171.9	11 11.7	98 13	172.3	3
4	18 51.3	97 17	169.8	17 52.9	97 16	170.0	16 25.4	97 16	170.4	15 27.0	97 16	170.6	14 28.6	97 15	170.8	13 30.1	97 14	171.1	12 31.7	97 14	171.3	11 04.0	97 14	171.7	4
15	18 41.2	97 18	169.1	17 43.1	97 18	169.3	16 15.9	97 17	169.7	15 17.7	97 16	170.0	14 19.6	97 16	170.2	13 21.4	97 16	170.5	12 23.2	97 15	170.7	10 55.8	97 15	171.1	15
6	18 30.5	96 19	168.4	17 32.6	96 18	168.6	16 05.8	97 18	169.0	15 07.9	97 18	169.3	14 09.9	97 17	169.6	13 12.0	97 17	169.8	12 14.0	97 16	170.1	10 47.1	97 16	170.5	6
7	18 19.1	96 20	167.6	17 21.5	96 20	167.9	15 55.1	96 19	168.4	14 57.4	96 18	168.7	13 59.7	96 18	169.0	13 02.0	96 18	169.2	12 04.3	96 17	169.5	10 37.7	96 16	169.9	7
8	18 07.0	95 21	166.9	17 09.7	96 21	167.3	15 43.7	96 20	167.7	14 46.3	96 19	168.0	13 48.9	96 19	168.3	12 51.5	96 18	168.6	11 54.1	96 18	168.9	10 27.9	96 17	169.4	8
9	17 54.3	95 22	166.3	16 57.3	95 22	166.6	15 31.7	95 21	167.1	14 34.7	95 20	167.4	13 37.5	95 20	167.7	12 40.4	95 20	168.0	11 43.3	95 19	168.3	10 17.5	95 18	168.8	9
20	17 41.0	94 23	165.6	16 44.3	95 23	165.9	15 19.2	95 22	166.4	14 22.4	95 22	166.7	13 25.6	95 21	167.1	12 28.7	95 20	167.4	11 31.9	95 20	167.7	10 06.6	95 19	168.2	20
1	17 27.0	94 24	164.9	16 30.6	94 24	165.2	15 06.0	94 23	165.8	14 09.5	94 22	166.1	13 13.0	94 22	166.5	12 16.5	94 21	166.8	11 20.0	94 21	167.1	9 55.1	94 20	167.7	1
2	17 12.4	93 25	164.2	16 16.3	93 25	164.6	14 52.2	94 24	165.1	13 56.1	94 24	165.5	12 59.9	94 23	165.8	12 03.7	94 22	166.2	11 07.5	94 22	166.6	9 43.1	94 21	167.1	2
3	16 57.1	93 26	163.5	16 01.4	93 26	163.9	14 37.8	93 25	164.5	13 42.0	93 24	164.9	12 46.2	93 24	165.2	11 50.4	93 23	165.6	10 54.5	93 23	166.0	9 30.6	93 22	166.5	3
4	16 41.3	92 28	162.8	15 45.9	92 27	163.2	14 22.9	92 26	163.8	13 27.4	92 25	164.2	12 32.0	92 25	164.6	11 36.5	93 24	165.0	10 40.9	93 23	165.4	9 17.6	93 22	166.0	4
25	16 24.8	92 28	162.2	15 29.8	92 28	162.6	14 07.3	92 27	163.2	13 12.3	92 26	163.6	12 17.2	92 26	164.0	11 22.0	92 25	164.4	10 26.9	92 24	164.8	9 04.1	92 23	165.4	25
6	16 07.7	91 30	161.5	15 13.2	91 29	162.0	13 51.2	91 28	162.6	12 56.5	91 27	163.0	12 01.8	91 26	163.4	11 07.1	91 26	163.8	10 12.3	91 25	164.3	8 50.0	91 24	164.9	6
7	15 50.0	90 30	160.9	14 55.9	90 30	161.3	13 34.5	90 29	162.0	12 40.3	91 28	162.4	11 45.9	91 27	162.8	10 51.6	91 27	163.3	9 57.1	91 26	163.7	8 35.5	91 25	164.3	7
8	15 31.8	90 31	160.2	14 38.0	90 31	160.7	13 17.3	90 30	161.4	12 23.4	90 29	161.8	11 29.5	90 28	162.3	10 35.5	90 28	162.7	9 41.5	90 27	163.1	8 20.4	90 26	163.8	8
9	15 12.9	89 32	159.6	14 19.6	89 32	160.0	12 59.5	89 30	160.8	12 06.0	89 30	161.2	11 12.5	89 29	161.7	10 19.0	89 28	162.1	9 25.4	89 28	162.6	8 04.9	89 27	163.3	9
30	14 53.5	88 33	158.9	14 00.6	88 32	159.4	12 41.2	88 32	160.1	11 48.1	88 31	160.6	10 55.0	89 30	161.1	10 01.9	89 29	161.6	9 08.7	89 28	162.0	7 48.9	89 28	162.7	30
1	14 33.5	87 34	158.3	13 41.1	87 34	158.8	12 22.3	88 32	159.6	11 29.7	88 32	160.0	10 37.0	88 31	160.5	9 44.3	88 30	161.0	8 51.6	88 30	161.5	7 32.4	88 28	162.2	1
2	14 13.0	87 35	157.7	13 21.0	87 34	158.2	12 02.9	87 33	159.0	11 10.7	87 32	159.5	10 18.5	87 32	160.0	9 26.2	87 31	160.5	8 33.9	87 30	161.0	7 15.4	87 29	161.7	2
3	13 51.9	86 36	157.1	13 00.4	86 35	157.6	11 42.9	86 34	158.4	10 51.2	86 33	158.9	9 59.5	86 33	159.4	9 07.7	86 32	159.9	8 15.8	86 31	160.4	6 58.0	87 30	161.2	3
4	13 30.3	85 37	156.5	12 39.2	85 36	157.0	11 22.5	85 35	157.8	10 31.2	85 34	158.3	9 39.9	85 33	158.9	8 48.6	86 33	159.4	7 57.2	86 32	159.9	6 40.1	86 31	160.7	4
35	13 08.1	84 38	155.8	12 17.5	84 37	156.4	11 01.5	85 36	157.2	10 10.7	85 35	157.8	9 19.9	85 34	158.3	8 29.0	85 33	158.8	7 38.1	85 32	159.4	6 21.7	85 31	160.2	35
6	12 45.4	83 39	155.3	11 55.3	84 38	155.8	10 40.0	84 37	156.7	9 49.7	84 36	157.2	8 59.4	84 35	157.8	8 09.0	84 34	158.3	7 18.6	84 33	158.9	6 02.9	84 32	159.7	6
7	12 22.2	83 40	154.7	11 32.6	83 39	155.2	10 18.0	83 37	156.1	9 28.3	83 37	156.7	8 38.4	83 36	157.2	7 48.5	83 35	157.8	6 58.6	83 34	158.3	5 43.6	83 33	159.2	7
8	11 58.5	82 40	154.1	11 09.4	82 40	154.7	9 55.6	82 38	155.5	9 06.3	82 37	156.1	8 17.0	82 37	156.7	7 27.6	82 36	157.3	6 38.1	82 35	157.8	5 23.9	83 34	158.7	8
9	11 34.3	81 41	153.5	10 45.7	81 40	154.1	9 32.6	81 39	155.0	8 43.9	81 38	155.6	7 55.0	81 37	156.2	7 06.1	82 36	156.7	6 17.2	82 36	157.3	5 03.8	82 34	158.2	9
40	11 09.6	80 42	152.9	10 21.5	80 41	153.5	9 09.2	80 40	154.4	8 21.0	80 39	155.0	7 32.6	81 38	155.6	6 44.3	81 37	156.2	5 55.9	81 36	156.8				40
1	10 44.4	79 43	152.4	9 56.8	79 42	153.0	8 45.3	80 40	153.9	7 57.6	80 40	154.5	7 09.8	80 39	155.1	6 22.0	80 38	155.7	5 34.1	80 37	156.3				1
2	10 18.8	78 44	151.8	9 31.7	78 43	152.4	8 21.0	79 41	153.4	7 33.8	79 40	154.0	6 46.5	79 40	154.6	5 59.2	79 38	155.2	5 11.9	79 38	155.9				2
3	9 52.6	77 44	151.3	9 06.1	78 43	151.9	7 56.2	78 42	152.9	7 09.6	78 41	153.5	6 22.8	78 40	154.1	5 36.1	78 39	154.7							3
4	9 26.0	77 45	150.7	8 40.1	77 44	151.4	7 31.0	77 43	152.3	6 44.9	77 42	153.0	5 58.7	77 41	153.6	5 12.5	77 39	154.3							4
45	8 59.0	76 46	150.2	8 13.6	76 45	150.8	7 05.3	76 44	151.8	6 19.8	76 43	152.5	5 34.1	76 42	153.1										45
6	8 31.5	75 46	149.6	7 46.7	75 46	150.3	6 39.2	75 44	151.3	5 54.2	75 43	152.0	5 09.2	75 42	152.7										6
7	8 03.6	74 47	149.1	7 19.3	74 46	149.8	6 12.7	74 45	150.8	5 28.3	74 44	151.5													7
8	7 35.3	73 48	148.6	6 51.5	73 47	149.3	5 45.8	73 46	150.3	5 01.9	73 44	151.0													8
9	7 06.5	72 49	148.1	6 23.3	72 48	148.8	5 18.5	72 46	149.9																9
50	6 37.4	71 49	147.6	5 54.8	71 48	148.3																			50
1	6 07.8	70 50	147.1	5 25.8	70 49	147.8																			1
2	5 37.8	69 51	146.6																						2
3	5 07.5	68 51	146.2																						3

Lat. 25°

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		′	Δt °		°
91	16 21.0	31 66	46.4	16 39.3	30 65	45.4	17 06.1	29 63	43.9	17 23.6	29 62	42.9	17 40.8	28 61	41.9	17 57.7	28 60	40.9	18 14.3	27 58	39.9	18 38.6	27 56	38.3	91
2	15 41.4	32 66	46.1	16 00.3	31 65	45.2	16 28.2	31 63	43.7	16 46.4	30 62	42.7	17 04.3	30 61	41.7	17 21.9	29 59	40.7	17 39.3	29 58	39.7	18 04.7	28 56	38.2	2
3	15 02.0	33 66	45.9	15 21.5	32 64	44.9	15 50.4	32 63	43.5	16 09.3	31 62	42.5	16 27.9	31 60	41.5	16 46.3	30 59	40.5	17 04.3	30 58	39.5	17 30.9	29 56	38.0	3
4	14 22.7	34 65	45.7	14 42.9	33 64	44.7	15 12.8	33 62	43.2	15 32.4	32 61	42.3	15 51.7	32 60	41.3	16 10.8	32 59	40.3	16 29.6	31 58	39.3	16 57.2	30 56	37.8	4
95	13 43.5	35 65	45.4	14 04.4	35 64	44.5	14 35.3	34 62	43.0	14 55.6	34 61	42.0	15 15.6	33 60	41.1	15 35.4	33 59	40.1	15 54.9	32 58	39.1	16 23.7	32 56	37.6	95
6	13 04.6	36 65	45.2	13 26.1	36 64	44.2	13 58.0	35 62	42.8	14 19.0	35 61	41.8	14 39.7	34 60	40.8	15 00.2	34 58	39.9	15 20.4	34 57	38.9	15 50.3	33 55	37.4	6
7	12 25.8	37 64	44.9	12 48.0	37 63	44.0	13 20.9	36 62	42.5	13 42.5	36 60	41.6	14 03.9	36 59	40.6	14 25.1	35 58	39.6	14 46.1	35 57	38.7	15 17.1	34 55	37.2	7
8	11 47.2	38 64	44.6	12 10.0	38 63	43.7	12 43.9	37 61	42.3	13 06.2	37 60	41.3	13 28.3	37 59	40.4	13 50.2	36 58	39.4	14 11.9	36 57	38.4	14 44.0	35 55	37.0	8
9	11 08.8	39 64	44.4	11 32.2	39 63	43.4	12 07.1	39 61	42.0	12 30.1	38 60	41.1	12 52.9	38 59	40.1	13 15.5	38 58	39.2	13 37.9	37 56	38.2	14 11.1	37 55	36.8	9
100	10 30.5	40 63	44.1	10 54.6	40 62	43.2	11 30.5	40 61	41.8	11 54.2	39 60	40.8	12 17.7	39 58	39.9	12 41.0	39 57	38.9	13 04.1	38 56	38.0	13 38.4	38 54	36.6	100
1	9 52.5	41 63	43.8	10 17.2	41 62	42.9	10 54.1	41 60	41.5	11 18.5	40 59	40.6	11 42.6	40 58	39.6	12 06.6	40 57	38.7	12 30.5	40 56	37.7	13 05.8	39 54	36.3	1
2	9 14.6	42 63	43.5	9 40.1	42 62	42.6	10 17.9	42 60	41.2	10 42.9	42 59	40.3	11 07.8	41 58	39.4	11 32.5	41 57	38.4	11 57.0	41 56	37.5	12 33.4	40 54	36.1	2
3	8 37.0	44 62	43.2	9 03.1	43 61	42.3	9 41.9	43 60	40.9	10 07.6	43 58	40.0	10 33.1	42 57	39.1	10 58.5	42 56	38.2	11 23.7	42 55	37.2	12 01.2	41 53	35.8	3
4	7 59.6	45 62	42.9	8 26.3	44 61	42.0	9 06.1	44 59	40.6	9 32.5	44 58	39.7	9 58.7	44 57	38.8	10 24.8	43 56	37.9	10 50.7	43 55	37.0	11 29.2	43 53	35.6	4
105	7 22.4	46 62	42.6	7 49.7	45 60	41.7	8 30.5	45 59	40.3	8 57.5	45 58	39.4	9 24.4	45 57	38.5	9 51.2	44 56	37.6	10 17.8	44 54	36.7	10 57.4	44 53	35.3	105
6	6 45.4	47 61	42.3	7 13.4	47 60	41.4	7 55.1	46 58	40.0	8 22.8	46 57	39.1	8 50.4	46 56	38.2	9 17.9	46 55	37.3	9 45.2	45 54	36.4	10 25.8	45 52	35.1	6
7	6 08.7	48 61	41.9	6 37.3	48 60	41.0	7 20.0	47 58	39.7	7 48.4	47 57	38.8	8 16.6	47 56	37.9	8 44.7	47 55	37.0	9 12.7	47 54	36.1	9 54.5	46 52	34.8	7
8	5 32.2	49 61	41.6	6 01.4	49 59	40.7	6 45.1	48 58	39.4	7 14.1	48 57	38.5	7 43.0	48 56	37.6	8 11.8	48 54	36.7	8 40.5	48 53	35.8	9 23.3	47 52	34.5	8
9				5 25.8	50 59	40.4	6 10.4	50 57	39.1	6 40.1	49 56	38.2	7 09.7	49 55	37.3	7 39.2	49 54	36.4	8 08.5	49 53	35.6	8 52.4	49 51	34.2	9
110							5 36.0	51 57	38.7	6 06.3	50 56	37.9	6 36.6	50 55	37.0	7 06.7	50 54	36.1	7 36.8	50 52	35.2	8 21.6	50 51	33.9	110
1							5 01.9	52 57	38.4	5 32.8	52 55	37.5	6 03.7	51 54	36.7	6 34.5	51 53	35.8	7 05.3	51 52	34.9	7 51.2	51 50	33.6	1
2													5 31.1	53 54	36.3	6 02.6	52 53	35.5	6 34.0	52 52	34.6	7 20.9	52 50	33.3	2
3																5 30.9	54 53	35.1	6 03.0	53 51	34.3	6 50.9	53 50	33.0	3
4																			5 32.2	54 51	34.0	6 21.2	54 49	32.7	4
115																			5 01.7	56 50	33.6	5 51.7	55 49	32.4	115
6																						5 22.5	57 48	32.0	6

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 24°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			58° 00′			58° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	° ′	°	°	°
00	59 30.0	1.0 01	00.0	59 00.0	1.0 01	00.0	58 00.0	1.0 01	00.0	57 30.0	1.0 01	00.0	57 00.0	1.0 01	00.0	56 30.0	1.0 01	00.0	55 00.0	1.0 01	00.0	54 30.0	1.0 01	00.0	00
1	59 29.5	1.0 03	01.1	58 59.5	1.0 03	01.1	57 59.5	1.0 02	01.1	57 29.5	1.0 02	01.0	56 59.5	1.0 02	01.0	56 29.5	1.0 02	01.0	54 59.6	1.0 02	00.9	54 29.6	1.0 02	00.9	1
2	59 27.8	1.0 04	02.3	58 57.9	1.0 04	02.2	57 58.0	1.0 04	02.1	57 28.0	1.0 04	02.1	56 58.1	1.0 04	02.0	56 28.1	1.0 04	01.9	54 58.3	1.0 04	01.8	54 28.3	1.0 04	01.7	2
3	59 25.1	1.0 06	03.4	58 55.2	1.0 06	03.3	57 55.5	1.0 06	03.2	57 25.6	1.0 06	03.1	56 55.7	1.0 06	03.0	56 25.8	1.0 05	02.9	54 56.1	1.0 05	02.7	54 26.2	1.0 05	02.6	3
4	59 21.3	99 08	04.6	58 51.5	99 08	04.4	57 51.9	99 08	04.2	57 22.2	99 07	04.1	56 52.4	99 07	04.0	56 22.6	99 07	03.9	54 53.1	99 06	03.6	54 23.3	99 06	03.5	4
05	59 16.4	99 10	05.7	58 46.7	99 10	05.5	57 47.4	99 09	05.2	57 17.8	99 09	05.1	56 48.1	99 09	05.0	56 18.4	99 08	04.8	54 49.3	99 08	04.5	54 19.6	99 08	04.4	05
6	59 10.4	98 12	06.8	58 40.9	98 11	06.6	57 41.9	98 11	06.3	57 12.4	98 10	06.1	56 42.9	98 10	06.0	56 13.3	99 10	05.8	54 44.6	99 09	05.4	54 15.0	99 09	05.2	6
7	59 03.4	98 14	07.9	58 34.1	98 13	07.7	57 35.4	98 12	07.3	57 06.1	98 12	07.1	56 36.7	98 12	06.9	56 07.3	98 12	06.7	54 39.1	98 10	06.2	54 09.6	98 10	06.1	7
8	58 55.3	97 15	09.0	58 26.2	97 15	08.8	57 28.0	97 14	08.3	56 58.8	97 14	08.1	56 29.6	97 13	07.9	56 00.4	97 13	07.7	54 32.7	98 12	07.1	54 03.4	98 12	06.9	8
9	58 46.2	96 17	10.1	58 17.4	96 16	09.8	57 19.6	96 16	09.3	56 50.6	97 15	09.1	56 21.7	97 15	08.8	55 52.7	97 14	08.6	54 25.5	97 13	08.0	53 56.4	97 13	07.8	9
10	58 36.1	95 18	11.2	58 07.5	95 18	10.9	57 10.2	96 17	10.3	56 41.5	96 17	10.1	56 12.8	96 16	09.8	55 44.0	96 16	09.5	54 17.5	96 15	08.8	53 48.6	96 14	08.6	10
1	58 25.0	94 20	12.2	57 56.7	94 20	11.9	56 59.9	95 19	11.3	56 31.5	95 18	11.0	56 03.0	95 18	10.7	55 34.5	95 17	10.4	54 08.7	95 16	09.7	53 40.1	96 16	09.4	1
2	58 12.9	93 22	13.3	57 44.9	93 21	12.9	56 48.8	94 20	12.3	56 20.6	94 20	12.0	55 52.4	94 19	11.6	55 24.1	94 19	11.3	53 59.1	95 17	10.5	53 30.7	95 17	10.2	2
3	57 59.9	92 23	14.3	57 32.2	92 23	13.9	56 36.7	93 22	13.2	56 08.8	93 21	12.9	55 40.9	93 20	12.6	55 12.9	93 20	12.2	53 48.8	94 18	11.3	53 20.6	94 18	11.0	3
4	57 45.9	91 25	15.3	57 18.6	91 24	14.9	56 23.7	92 23	14.1	55 56.2	92 22	13.8	55 28.6	92 22	13.4	55 00.9	92 21	13.1	53 37.6	93 20	12.1	53 09.8	93 19	11.8	4
15	57 31.0	90 26	16.3	57 04.1	90 26	15.8	56 09.9	91 24	15.1	55 42.7	91 24	14.7	55 15.4	91 23	14.3	54 48.1	91 23	14.0	53 25.7	92 21	12.9	52 58.2	92 20	12.6	15
6	57 15.3	88 28	17.2	56 48.7	89 27	16.8	55 55.2	89 26	16.0	55 28.4	90 25	15.6	55 01.5	90 24	15.2	54 34.5	90 24	14.8	53 13.1	91 22	13.7	52 45.9	91 22	13.4	6
7	56 58.6	87 29	18.2	56 32.4	87 28	17.7	55 39.7	88 27	16.8	55 13.3	88 26	16.4	54 46.7	89 26	16.0	54 20.1	89 25	15.6	52 59.8	90 24	14.5	52 32.8	90 23	14.1	7
8	56 41.1	86 30	19.1	56 15.3	86 30	18.6	55 23.4	87 28	17.7	54 57.4	87 28	17.3	54 31.2	87 27	16.9	54 04.9	88 26	16.4	52 45.7	88 25	15.2	52 19.1	89 24	14.9	8
9	56 22.8	84 32	20.0	55 57.4	85 31	19.5	55 06.4	85 30	18.6	54 40.7	86 29	18.1	54 14.9	86 28	17.7	53 49.1	86 28	17.2	52 30.9	87 26	16.0	52 04.7	88 25	15.6	9
20	56 03.7	83 33	20.8	55 38.8	83 32	20.3	54 48.6	84 31	19.4	54 23.3	84 30	18.9	53 57.9	85 30	18.5	53 32.5	85 29	18.0	52 15.5	86 27	16.7	51 49.6	86 26	16.3	20
1	55 43.8	81 34	21.7	55 19.3	82 34	21.2	54 30.0	83 32	20.2	54 05.2	83 32	19.7	53 40.2	83 31	19.2	53 15.2	84 30	18.8	51 59.4	85 28	17.4	51 33.9	85 27	17.0	1
2	55 23.2	80 36	22.5	54 59.2	80 35	22.0	54 10.7	81 33	21.0	53 46.3	82 32	20.5	53 21.8	82 32	20.0	52 57.2	82 31	19.5	51 42.6	83 29	18.1	51 17.6	84 28	17.7	2
3	55 01.8	78 37	23.3	54 38.3	79 36	22.8	53 50.8	80 34	21.7	53 26.8	80 34	21.2	53 02.8	80 33	20.7	52 38.6	81 32	20.2	51 25.3	82 30	18.8	51 00.6	82 29	18.4	3
4	54 39.8	77 38	24.1	54 16.7	77 37	23.6	53 30.2	78 36	22.5	53 06.7	79 35	22.0	52 43.0	79 34	21.5	52 19.3	79 33	20.9	51 07.3	81 31	19.5	50 43.0	81 30	19.0	4
25	54 17.1	75 39	24.9	53 54.5	76 38	24.3	53 08.9	77 36	23.2	52 45.8	77 36	22.7	52 22.7	77 35	22.2	51 59.4	78 34	21.6	50 48.7	79 32	20.2	50 24.9	80 31	19.7	25
6	53 53.7	73 40	25.6	53 31.6	74 39	25.0	52 47.0	75 38	23.9	52 24.4	75 37	23.4	52 01.7	76 36	22.8	51 38.9	76 35	22.3	50 29.5	78 33	20.8	50 06.1	78 32	20.3	6
7	53 29.7	72 41	26.3	53 08.1	72 40	25.7	52 24.4	73 38	24.6	52 02.4	74 38	24.0	51 40.1	74 37	23.5	51 17.8	75 36	23.0	50 09.8	76 34	21.4	49 46.8	77 33	20.9	7
8	53 05.1	70 42	27.0	52 44.0	71 41	26.4	52 01.4	72 39	25.3	51 39.8	72 39	24.7	51 18.0	73 38	24.1	50 56.1	73 37	23.6	49 49.5	75 35	22.0	49 27.0	75 34	21.5	8
9	52 40.0	68 43	27.7	52 19.4	69 42	27.1	51 37.7	70 40	25.9	51 16.6	71 40	25.3	50 55.3	71 39	24.8	50 33.9	72 38	24.2	49 28.7	73 36	22.6	49 06.7	74 35	22.1	9
30	52 14.3	67 44	28.3	51 54.2	67 43	27.7	51 13.5	68 41	26.5	50 52.9	69 40	25.9	50 32.1	70 40	25.4	50 11.1	70 39	24.8	49 07.4	72 36	23.2	48 45.8	72 36	22.6	30
1	51 48.0	65 45	28.9	51 28.4	66 44	28.3	50 48.7	67 42	27.1	50 28.6	67 41	26.5	50 08.4	68 40	26.0	49 47.9	68 40	25.4	48 45.6	70 37	23.7	48 24.5	71 36	23.2	1
2	51 21.2	63 45	29.5	51 02.2	64 44	28.9	50 23.5	65 43	27.7	50 03.9	66 42	27.1	49 44.1	66 41	26.5	49 24.2	67 40	25.9	48 23.3	68 38	24.3	48 02.7	69 37	23.7	2
3	50 54.0	61 46	30.1	50 35.5	62 45	29.5	49 57.8	63 44	28.3	49 38.7	64 43	27.7	49 19.4	65 42	27.1	48 59.9	65 41	26.5	48 00.5	67 39	24.8	47 40.4	67 38	24.2	3
4	50 26.3	60 47	30.7	50 08.2	60 46	30.0	49 31.6	62 44	28.8	49 13.0	62 44	28.2	48 54.2	63 43	27.6	48 35.3	64 42	27.0	47 17.3	65 39	25.3	47 17.7	66 39	24.7	4
35	49 58.1	58 48	31.2	49 40.6	59 47	30.6	49 05.0	60 45	29.3	48 46.9	61 44	28.7	48 28.6	61 43	28.1	48 10.1	62 42	27.5	47 13.7	64 40	25.8	46 54.5	64 39	25.2	35
6	49 29.5	56 48	31.7	49 12.5	57 48	31.1	48 37.9	58 46	29.8	48 20.4	59 45	29.2	48 02.6	60 44	28.6	47 44.6	60 43	28.0	46 49.6	62 41	26.3	46 30.9	63 40	25.7	6
7	49 00.5	55 49	32.2	48 44.0	55 48	31.6	48 10.5	57 46	30.3	47 53.4	57 46	29.7	47 36.1	58 45	29.1	47 18.7	59 44	28.5	46 25.2	60 41	26.7	46 07.0	61 41	26.1	7
8	48 31.1	53 50	32.7	48 15.2	54 49	32.0	47 42.6	55 47	30.8	47 26.1	56 46	30.2	47 09.3	56 45	29.5	46 52.3	57 44	28.9	46 00.3	59 42	27.2	45 42.6	59 41	26.6	8
9	48 01.3	51 50	33.1	47 45.9	52 49	32.5	47 14.4	53 48	31.2	46 58.3	54 47	30.6	46 42.1	55 46	30.0	46 25.6	55 45	29.4	45 35.1	57 43	27.6	45 17.9	58 42	27.0	9
40	47 31.2	49 51	33.6	47 16.3	50 50	32.9	46 45.8	51 48	31.6	46 30.3	52 48	31.0	46 14.5	53 46	30.4	45 58.6	53 46	29.8	45 09.6	55 43	28.0	44 52.9	56 42	27.4	40
1	47 00.8	48 51	34.0	46 46.3	48 50	33.3	46 16.9	50 49	32.1	46 01.8	50 48	31.4	45 46.6	51 47	30.8	45 31.2	52 46	30.2	44 43.7	54 44	28.4	44 27.5	54 43	27.8	1
2	46 30.0	46 52	34.4	46 16.1	47 51	33.7	45 47.6	48 49	32.5	45 33.1	49 48	31.8	45 18.4	49 48	31.2	45 03.4	50 47	30.6	44 17.4	52 44	28.8	44 01.7	53 43	28.2	2
3	45 58.9	44 52	34.7	45 45.5	45 52	34.1	45 18.1	46 50	32.8	45 04.0	47 49	32.2	44 49.8	48 48	31.6	44 35.4	48 47	31.0	43 50.9	50 45	29.1	43 35.7	51 44	28.6	3
4	45 27.5	43 53	35.1	45 14.6	43 52	34.5	44 48.2	45 50	33.2	44 34.7	45 50	32.6	44 20.9	46 48	31.9	44 07.0	47 48	31.3	43 24.1	49 45	29.5	43 09.3	49 44	28.9	4
45	44 55.8	41 53	35.5	44 43.5	42 52	34.8	44 18.0	43 51	33.5	44 05.0	44 50	32.9	43 51.8	44 49	32.3	43 38.4	45 48	31.7	42 56.9	47 46	29.8	42 42.7	48 45	29.2	45
6	44 23.9	39 54	35.8	44 12.0	40 53	35.1	43 47.6	41 51	33.9	43 35.1	42 50	33.2	43 22.4	43 50	32.6	43 09.5	43 49	32.0	42 29.5	45 46	30.2	42 15.8	46 45	29.6	6
7	43 51.7	38 54	36.1	43 40.4	38 53	35.4	43 17.0	40 52	34.2	43 04.9	40 51	33.6	42 52.7	41 50	32.9	42 40.3	42 49	32.3	42 01.8	44 46	30.5	41 48.6	44 46	29.9	7
8	43 19.3	36 54	36.4	43 08.5	37 54	35.7	42 46.0	38 52	34.5	42 34.5	39 51	33.8	42 22.8	39 50	33.2	42 10.9	40 50	32.6	41 33.9	42 47	30.8	41 21.2	43 46	30.2	8
9	42 46.7	34 55	36.7	42 36.3	35 54	36.0	42 14.9	36 52	34.8	42 03.9	37 52	34.1	41 52.7	38 51	33.5	41 41.2	38 50	32.9	41 05.8	40 47	31.0	40 53.6	41 46	30.4	9
50	42 13.9	33 55	36.9	42 04.0	33 54	36.3	41 43.5	35 53	35.0	41 33.0	35 52	34.4	41 22.3	36 51	33.8	41 11.4	37 50	33.2	40 37.4	39 48	31.3	40 25.7	39 47	30.7	50
1	41 40.9	31 55	37.2	41 31.4	32 54	36.5	41 12.0	33 53	35.3	41 02.0	34 52	34.7	40 51.7	34 51	34.0	40 41.3	35 50	33.4	40 08.8	37 48	31.6	39 57.6	38 47	31.0	1
2	41 07.7	29 56	37.4	40 58.7	30 55	36.8	40 40.2	31 53	35.5	40 30.7	32 52	34.9	40 20.9	33 52	34.3	40 11.0	33 51	33.7	39 40.0	35 48	31.8	39 29.3	36 48	31.2	2
3	40 34.3	28 56	37.6	40 25.8	29 55	37.0	40 08.3	30 54	35.7	39 59.2	31 53	35.1	39 50.0	31 52	34.5	39 40.5	32 51	33.9	39 11.0	34 49	32.0	39 00.8	34 48	31.4	3
4	40 00.7	26 56	37.8	39 52.8	27 55	37.2	39 36.2	28 54	36.0	39 27.6	29 53	35.3	39 18.8	30 52	34.7	39 09.9	30 51	34.1	38 41.8	32 49	32.3	38 32.1	33 48	31.7	4
55	39 27.0	25 56	38.0	39 19.5	25 56	37.4	39 03.9	27 54	36.2	38 55.8	27 53	35.5	38 47.6	28 52	34.9	38 39.1	29 52	34.3	38 12.5	30 49	32.5	38 03.2	31 48	31.9	55
6	38 53.2	23 57	38.2	38 46.2	24 56	37.6	38 31.5	25 54	36.3	38 23.9	26 54	35.7	38 16.1	26 53	35.1	38 08.1	27 52	34.5	37 43.0	29 49	32.7	37 34.2	29 49	32.1	6
7	38 19.2	22 57	38.4	38 12.7	22 56	37.8	37 59.0	23 54	36.5	37 51.8	24 54	35.9	37 44.5	25 53	35.3	37 37.0	25 52	34.7	37 13.3	27 50	32.9	37 05.0	28 49	32.2	7
8	37 45.2	20 57	38.5	37 39.1	21 56	37.9	37 26.3	22 55	36.7	37 19.6	23 54	36.1	37 12.8	23 53	35.4	37 05.7	24 52	34.8	36 43.5	26 50	33.0	36 35.7	26 49	32.4	8
9	37 11.0	18 57	38.7	37 05.3	19 56	38.0	36 53.5	20 55	36.8	36 47.3	21 54	36.2	36 40.9	22 53	35.6	36 34.4	22 52	35.0	36 13.6	24 50	33.2	36 06.3	25 49	32.6	9
60	36 36.7	17 57	38.8	36 31.5	18 56	38.2	36 20.6	19 55	37.0	36 14.9	19 54	36.3	36 09.0	20 54	35.7	36 02.9	21 53	35.1	35 43.5	22 50	33.3	35 36.7	23 50	32.7	60
1	36 02.3	14 58	38.9	35 57.6	16 57	38.3	35 47.6	17 55	37.1	35 42.3	18 54	36.5	35 36.9	18 54	35.9	35 31.3	19 53	35.3	35 13.3	21 50	33.5	35 07.0	21 50	32.9	1
2	35 27.8	14 58	39.0	35 23.6	14 57	38.4	35 14.5	16 55	37.2	35 09.7	16 54	36.6	35 04.7	17 54	36.0	34 59.6	17 53	35.4	34 43.1	19 51	33.6	34 37.2	20 50	33.0	2
3	34 53.3	12 58	39.1	34 49.5	13 57	38.5	34 41.3	14 55	37.3	34 37.0	15 55	36.7	34 32.5	15 54	36.1	34 27.8	16 53	35.5	34 12.7	18 51	33.7	34 07.3	18 50	33.1	3
4	34 18.7	11 58	39.2	34 15.3	11 57	38.6	34 08.1	13 56	37.4	34 04.2	13 55	36.8	34 00.2	14 54	36.2	33 55.9	14 53	35.6	33 42.2	16 51	33.8	33 37.3	17 50	33.2	4
65	33 44.0	09 58	39.3	33 41.1	10 57	38.7	33 34.8	11 56	37.5	33 31.3	12 55	36.9	33 27.8	12 54	36.3	33 24.0	13 53	35.7	33 11.7	15 51	33.9	33 07.3	15 50	33.3	65
6	33 09.3	08 58	39.3	33 06.8	08 57	38.7	33 01.4	10 56	37.5	32 58.4	10 55	36.9	32 55.3	11 54	36.4	32 52.0	11 54	35.8	32 41.1	13 51	34.0	32 37.1	14 50	33.4	6
7	32 34.5	06 58	39.4	32 32.5	07 57	38.8	32 28.0	08 56	37.6	32 25.5	09 55	37.0	32 22.8	09 54	36.4	32 19.9	10 54	35.8	32 10.4	11 51	34.1	32 06.9	12 50	33.5	7
8	31 59.8	05 58	39.4	31 58.2	06 57	38.8	31 54.5	07 56	37.6	31 52.5	07 55	37.1	31 50.2	08 54	36.5	31 47.8	08 54	35.9	31 39.7	10 51	34.1	31 36.6	10 50	33.5	8
9	31 24.9	04 58	39.4	31 23.8	04 57	38.9	31 21.0	05 56	37.7	31 19.4	06 55	37.1	31 17.6	06 54	36.5	31 15.7	07 54	35.9	31 08.9	08 51	34.2	31 06.3	09 50	33.6	9
70	30 50.1	02 58	39.5	30 49.4	03 57	38.9	30 47.5	04 56	37.7	30 46.3	04 55	37.1	30 45.0	05 54	36.6	30 43.5	05 54	36.0	30 38.1	07 51	34.2	30 36.0	07 51	33.6	70
1	30 15.3	01 58	39.5	30 15.0	01 57	38.9	30 14.0	02 56	37.7	30 13.2	03 55	37.2	30 12.3	03 54	36.6	30 11.3	04 54	36.0	30 07.2	05 52	34.3	30 05.6	06 51	33.7	1
2	29 40.4	01 58	39.5	29 40.6	00 57	38.9	29 40.4	01 56	37.7	29 40.1	01 55	37.2	29 39.7	02 54	36.6	29 39.1	02 54	36.0	29 36.4	04 52	34.3	29 35.2	04 51	33.7	2
3	29 05.6	02 58	39.5	29 06.2	02 57	38.9	29 06.9	01 56	37.7	29 07.0	00 55	37.2	29 07.0	00 54	36.6	29 06.8	01 54	36.0	29 05.5	02 52	34.3	29 04.7	03 51	33.7	3
4	28 30.8	04 58	39.4	28 31.8	03 57	38.9	28 33.3	02 56	37.7	28 33.9	02 55	37.2	28 34.3	01 54	36.6	28 34.6	01 54	36.0	28 34.6	01 52	34.3	28 34.3	01 51	33.7	4
75	27 56.0	05 58	39.4	27 57.4	04 57	38.8	27 59.8	04 56	37.7	28 00.8	03 55	37.1	28 01.6	03 54	36.6	28 02.4	02 54	36.0	28 03.7	01 52	34.3	28 03.8	00 51	33.7	75
6	27 21.2	06 58	39.4	27 23.0	06 57	38.8	27 26.3	05 56	37.7	27 27.7	05 55	37.1	27 29.0	04 54	36.6	27 30.1	04 54	36.0	27 32.8	02 52	34.3	27 33.4	02 51	33.7	6
7	26 46.4	06 58	39.3	26 48.7	07 57	38.8	26 52.8	06 56	37.7	26 54.6	06 55	37.1	26 56.3	06 54	36.5	26 57.9	05 54	36.0	27 01.9	04 52	34.3	27 03.0	03 51	33.7	7
8	26 11.7	09 58	39.3	26 14.4	09 57	38.7	26 19.3	08 56	37.6	26 21.6	07 55	37.1	26 23.7	07 54	36.5	26 25.8	07 54	35.9	26 31.0	06 51	34.3	26 32.5	05 51	33.7	8
9	25 37.0	10 58	39.2	25 40.1	10 57	38.7	25 45.9	09 56	37.6	25 48.6	09 55	37.0	25 51.1	08 54	36.4	25 53.6	08 54	35.9	26 00.2	07 51	34.2	26 02.1	06 51	33.7	9
80	25 02.4	12 58	39.1	25 05.9	11 57	38.6	25 12.5	11 56	37.5	25 15.6	10 55	36.9	25 18.6	10 54	36.4	25 21.5	09 54	35.8	25 29.4	08 51	34.2	25 31.7	08 50	33.6	80
1	24 27.8	13 58	39.1	24 31.7	13 57	38.5	24 39.2	12 56	37.4	24 42.7	12 55	36.9	24 46.1	11 54	36.3	24 49.4	11 53	35.8	24 58.6	10 51	34.1	25 01.4	09 50	33.6	1
2	23 53.3	15 57	39.0	23 57.6	14 57	38.4	24 05.9	13 55	37.3	24 09.8	13 55	36.8	24 13.7	13 54	36.3	24 17.4	12 53	35.7	24 27.8	11 51	34.1	24 31.1	11 50	33.5	2
3	23 18.9	16 57	38.9	23 23.6	15 57	38.3	23 32.7	15 55	37.3	23 37.0	14 54	36.7	23 41.3	14 54	36.2	23 45.4	14 53	35.6	23 57.2	12 51	34.0	24 00.8	12 50	33.5	3
4	22 44.5	17 57	38.8	22 49.6	17 56	38.2	22 59.5	16 55	37.2	23 04.3	16 54	36.6	23 09.0	15 54	36.1	23 13.5	15 53	35.6	23 26.5	14 51	33.9	23 30.6	14 50	33.4	4
85	22 10.2	19 57	38.7	22 15.7	18 56	38.1	22 26.4	17 55	37.1	22 31.6	17 54	36.5	22 36.7	17 54	36.0	22 41.7	16 53	35.5	22 56.0	15 51	33.9	23 00.5	15 50	33.3	85
6	21 36.0	20 57	38.5	21 41.9	19 56	38.0	21 53.4	19 55	37.0	21 59.0	18 54	36.4	22 04.5	18 54	35.9	22 09.9	18 53	35.4	22 25.5	17 51	33.8	22 30.4	16 50	33.2	6
7	21 01.9	21 57	38.4	21 08.2	21 56	37.9	21 20.5	20 55	36.8	21 26.5	20 54	36.3	21 32.4	20 53	35.8	21 38.2	19 53	35.3	21 55.0	18 50	33.7	22 00.4	18 50	33.1	7
8	20 27.9	22 56	38.3	20 34.6	22 56	37.8	20 47.7	22 54	36.7	20 54.1	21 54	36.2	21 00.4	21 53	35.7	21 06.6	21 52	35.1	21 24.7	20 50	33.6	21 30.5	19 50	33.0	8
9	19 54.9	24 56	38.1	20 01.1	23 56	37.6	20 15.0	23 54	36.6	20 21.8	23 54	36.1	20 28.5	22 53	35.5	20 35.1	22 52	35.0	20 54.4	21 50	33.5	21 00.7	21 50	32.9	9
90	19 29.2	25 56	38.0	19 27.7	25 56	37.5	19 42.4	24 54	36.4	19 49.6	24 54	35.9	19 56.7	24 53	35.4	20 03.7	23 52	34.9	20 24.3	22 50	33.3	20 30.9	22 49	32.8	90

Lat. 24°

H.A.	54° 30′ Alt.	Δd	Δt	Az.	55° 00′ Alt.	Δd	Δt	Az.	56° 00′ Alt.	Δd	Δt	Az.	56° 30′ Alt.	Δd	Δt	Az.	57° 00′ Alt.	Δd	Δt	Az.	57° 30′ Alt.	Δd	Δt	Az.	59° 00′ Alt.	Δd	Δt	Az.	59° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	11 30.0	1.0	00	180.0	11 00.0	1.0	00	180.0	10 00.0	1.0	00	180.0	9 30.0	1.0	00	180.0	9 00.0	1.0	00	180.0	8 30.0	1.0	00	180.0	7 00.0	1.0	00	180.0	6 30.0	1.0	00	180.0	00
1	11 29.7	1.0	01	179.4	10 59.7	1.0	01	179.4	9 59.7	1.0	01	179.4	9 29.7	1.0	01	179.4	8 59.7	1.0	01	179.4	8 29.7	1.0	01	179.5	6 59.8	1.0	01	179.5	6 29.8	1.0	01	179.5	1
2	11 28.9	1.0	02	178.8	10 58.9	1.0	02	178.8	9 58.9	1.0	02	178.9	9 28.9	1.0	02	178.9	8 58.9	1.0	02	178.9	8 29.0	1.0	02	178.9	6 59.0	1.0	02	179.0	6 29.0	1.0	02	179.0	2
3	11 27.5	1.0	03	178.2	10 57.5	1.0	03	178.2	9 57.6	1.0	03	178.3	9 27.6	1.0	03	178.3	8 57.6	1.0	03	178.3	8 27.7	1.0	03	178.4	6 57.8	1.0	03	178.4	6 27.8	1.0	03	178.5	3
4	11 25.5	1.0	04	177.6	10 55.5	1.0	04	177.7	9 55.7	1.0	04	177.7	9 25.7	1.0	04	177.8	8 55.8	1.0	04	177.8	8 25.8	1.0	04	177.8	6 56.0	1.0	04	177.9	6 26.1	1.0	04	178.0	4
05	11 22.9	1.0	05	177.0	10 53.0	1.0	05	177.1	9 53.2	1.0	05	177.2	9 23.3	1.0	05	177.2	8 53.4	1.0	05	177.2	8 23.5	1.0	05	177.3	6 53.8	1.0	04	177.4	6 23.9	1.0	04	177.4	05
6	11 19.8	1.0	06	176.5	10 50.0	1.0	06	176.5	9 50.2	1.0	06	176.6	9 20.4	1.0	06	176.6	8 50.5	1.0	06	176.7	8 20.7	1.0	06	176.7	6 51.1	1.0	06	176.9	6 21.2	1.0	05	176.9	6
7	11 16.1	99	07	175.9	10 46.3	99	07	175.9	9 46.7	99	07	176.0	9 16.9	99	07	176.1	8 47.1	99	06	176.1	8 17.3	99	06	176.2	6 47.9	99	06	176.4	6 18.0	99	06	176.4	7
8	11 11.9	99	08	175.3	10 42.1	99	08	175.3	9 42.7	99	08	175.5	9 12.9	99	08	175.5	8 43.2	99	08	175.6	8 13.4	99	07	175.7	6 44.1	99	07	175.9	6 14.4	99	07	175.9	8
9	11 07.1	99	09	174.7	10 37.4	99	09	174.8	9 38.1	99	08	174.9	9 08.4	99	08	175.0	8 38.7	99	08	175.1	8 09.0	99	08	175.1	6 39.9	99	08	175.3	6 10.3	99	08	175.4	9
10	11 01.7	99	10	174.1	10 32.1	99	10	174.2	9 32.9	99	10	174.3	9 03.3	99	09	174.4	8 33.7	99	09	174.5	8 04.1	99	09	174.6	6 35.3	99	09	174.8	6 05.6	99	08	174.9	10
1	10 55.8	98	11	173.5	10 26.3	98	11	173.6	9 27.3	98	10	173.8	8 57.7	98	10	173.9	8 28.2	98	10	174.0	7 58.7	98	10	174.1	6 30.1	98	10	174.3	6 00.5	98	09	174.4	1
2	10 49.4	98	12	172.9	10 19.9	98	12	173.0	9 21.1	98	11	173.2	8 51.6	98	11	173.3	8 22.2	98	11	173.4	7 52.7	98	11	173.5	6 24.4	98	10	173.8	5 55.0	98	10	173.9	2
3	10 42.4	98	13	172.4	10 13.0	98	12	172.5	9 14.3	98	12	172.7	8 45.0	98	12	172.8	8 15.7	98	12	172.9	7 46.3	98	12	173.0	6 18.3	98	11	173.3	5 48.9	98	11	173.4	3
4	10 34.8	97	14	171.8	10 05.6	97	13	171.9	9 07.1	97	13	172.1	8 37.9	97	13	172.2	8 08.6	97	12	172.4	7 39.4	97	12	172.5	6 11.6	97	12	172.8	5 42.4	98	12	172.9	4
15	10 26.7	97	14	171.2	9 57.6	97	14	171.3	8 59.3	97	14	171.6	8 30.2	97	14	171.7	8 01.1	97	13	171.8	7 31.9	97	13	171.9	6 04.5	97	13	172.3	5 35.4	97	12	172.4	15
6	10 18.1	97	15	170.6	9 49.0	97	15	170.8	8 51.0	97	15	171.0	8 22.0	97	14	171.2	7 53.0	97	14	171.3	7 24.0	97	14	171.4	5 56.9	97	14	171.8	5 27.9	97	13	171.9	6
7	10 06.9	96	16	170.1	9 40.0	96	16	170.2	8 42.2	96	16	170.5	8 13.3	96	15	170.6	7 44.5	96	15	170.8	7 15.6	96	15	170.9	5 48.9	96	14	171.3	5 20.0	96	14	171.4	7
8	9 59.1	96	17	169.5	9 30.4	96	17	169.6	8 32.9	96	16	169.9	8 04.2	96	16	170.1	7 35.4	96	16	170.2	7 06.6	96	16	170.4	5 40.3	96	15	170.8	5 11.6	96	15	170.9	8
9	9 48.9	95	18	168.9	9 20.3	95	18	169.1	8 23.1	95	17	169.4	7 54.5	95	17	169.5	7 25.8	95	17	169.7	6 57.2	96	16	169.8	5 31.3	95	16	170.3	5 02.7	96	16	170.5	9
20	9 38.1	95	19	168.4	9 09.7	95	19	168.5	8 12.7	95	18	168.9	7 44.3	95	18	169.0	7 15.8	95	18	169.2	6 47.3	95	17	169.3	5 21.9	95	16	169.8					20
1	9 26.8	94	20	167.8	8 58.5	94	20	168.0	8 01.9	94	19	168.3	7 33.6	94	19	168.5	7 05.3	94	18	168.7	6 36.9	94	18	168.8	5 11.9	94	17	169.3					1
2	9 15.0	94	20	167.3	8 46.8	94	20	167.4	7 50.5	94	20	167.8	7 22.4	94	20	168.0	6 54.2	94	19	168.1	6 26.1	94	19	168.3	5 01.6	94	18	168.8					2
3	9 02.7	93	22	166.7	8 34.7	93	21	166.9	7 38.7	93	20	167.3	7 10.7	93	20	167.4	6 42.7	93	20	167.6	6 14.7	93	20	167.8									3
4	8 49.8	93	22	166.2	8 22.0	93	22	166.4	7 26.4	93	21	166.7	6 58.6	93	21	166.9	6 30.7	93	21	167.1	6 02.9	93	20	167.3									4
25	8 36.4	92	23	165.6	8 08.8	92	23	165.8	7 13.6	92	22	166.2	6 45.9	92	22	166.4	6 18.3	92	22	166.6	5 50.6	92	21	166.8									25
6	8 22.6	91	24	165.1	7 55.2	91	24	165.3	7 00.3	91	23	165.7	6 32.8	92	23	165.9	6 05.4	92	22	166.1	5 37.9	92	22	166.3									6
7	8 08.2	91	25	164.6	7 41.0	91	24	164.8	6 46.5	91	24	165.2	6 19.2	91	23	165.4	5 52.0	91	23	165.6	5 24.7	91	23	165.8									7
8	7 53.4	90	26	164.0	7 26.4	90	25	164.2	6 32.2	90	24	164.7	6 05.2	90	24	164.9	5 38.1	90	24	165.1	5 11.0	90	24	165.3									8
9	7 38.1	89	26	163.5	7 11.2	89	26	163.7	6 17.5	90	25	164.2	5 50.7	90	25	164.4	5 23.8	90	25	164.6													9
30	7 22.3	89	27	163.0	6 55.6	89	27	163.2	6 02.3	89	26	163.7	5 35.7	89	26	163.9	5 09.0	89	26	164.1													30
1	7 06.0	88	28	162.5	6 39.6	88	28	162.7	5 46.7	88	27	163.2	5 20.3	88	26	163.4																	1
2	6 49.2	87	29	162.0	6 23.0	87	28	162.2	5 30.6	87	28	162.7	5 04.4	87	27	162.9																	2
3	6 32.0	87	30	161.4	6 06.0	87	29	161.7	5 14.1	87	28	162.2																					3
4	6 14.3	86	30	160.9	5 48.6	86	30	161.2																									4
35	5 56.2	85	31	160.4	5 30.7	85	31	160.7																									35
6	5 37.6	84	32	159.9	5 12.4	84	32	160.2																									6
7	5 18.6	83	32	159.5																													7

DECLINATION SAME NAME AS LATITUDE

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

H.A.	54° 30′ Alt.	Δd	Δt	Az.	55° 00′ Alt.	Δd	Δt	Az.	56° 00′ Alt.	Δd	Δt	Az.	56° 30′ Alt.	Δd	Δt	Az.	57° 00′ Alt.	Δd	Δt	Az.	57° 30′ Alt.	Δd	Δt	Az.	59° 00′ Alt.	Δd	Δt	Az.	59° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	18 46.6	26	56	37.8	18 54.4	26	55	37.3	19 09.9	25	54	36.3	19 17.5	25	53	35.8	19 25.0	25	53	35.3	19 32.4	25	52	34.8	19 54.2	24	50	33.2	20 01.3	23	49	32.7	91
2	18 13.0	28	56	37.7	18 21.3	27	55	37.2	18 37.5	27	54	36.1	18 45.5	27	53	35.6	18 53.4	26	52	35.1	19 01.2	26	52	34.6	19 24.2	25	50	33.1	19 31.7	25	49	32.6	2
3	17 39.6	29	56	37.5	17 48.2	29	55	37.0	18 05.2	28	54	36.0	18 13.6	28	53	35.5	18 21.9	28	52	35.0	18 30.2	27	52	34.5	18 54.4	26	50	32.9	19 02.3	26	49	32.4	3
4	17 06.3	30	55	37.3	17 15.3	30	55	36.8	17 33.1	29	53	35.8	17 41.9	29	53	35.3	17 50.6	29	52	34.8	17 59.2	29	51	34.3	18 24.6	28	49	32.8	18 32.9	28	49	32.3	4
95	16 33.2	31	55	37.1	16 42.5	31	54	36.6	17 01.1	31	53	35.6	17 10.3	30	52	35.1	17 19.4	30	52	34.6	17 28.4	30	51	34.1	17 55.0	29	49	32.6	18 03.7	29	48	32.1	95
6	16 00.1	33	55	36.9	16 09.9	32	54	36.4	16 29.2	32	53	35.4	16 38.8	32	52	35.0	16 48.3	32	52	34.5	16 57.7	31	51	34.0	17 25.5	31	49	32.5	17 34.6	30	48	32.0	6
7	15 27.3	34	54	36.7	15 37.4	34	54	36.2	15 57.5	33	53	35.3	16 07.5	33	52	34.8	16 17.3	33	51	34.3	16 27.1	33	51	33.8	16 56.2	32	49	32.3	17 05.7	32	48	31.8	7
8	14 54.6	35	54	36.5	15 05.1	35	54	36.0	15 26.0	35	52	35.1	15 36.3	34	52	34.6	15 46.5	34	51	34.1	15 56.7	34	50	33.6	16 26.9	33	48	32.1	16 36.9	33	48	31.6	8
9	14 22.1	36	54	36.3	14 32.9	36	53	35.8	14 54.5	36	52	34.9	15 05.3	36	52	34.4	15 15.9	35	51	33.9	15 26.5	35	50	33.4	15 57.9	35	48	31.9	16 08.2	34	48	31.5	9
100	13 49.7	38	54	36.1	14 00.9	37	53	35.6	14 23.3	37	52	34.6	14 34.4	37	51	34.2	14 45.4	37	50	33.7	14 56.4	36	50	33.2	15 28.9	36	48	31.8	15 39.7	36	47	31.3	100
1	13 17.5	39	53	35.9	13 29.1	39	53	35.4	13 52.2	38	52	34.4	14 03.7	38	51	34.0	14 15.1	38	50	33.5	14 26.4	38	50	33.0	15 00.2	37	48	31.6	15 11.3	37	47	31.1	1
2	12 45.5	40	53	35.6	12 57.5	40	52	35.1	13 21.3	40	51	34.2	13 33.2	39	51	33.7	13 44.9	39	50	33.3	13 56.7	39	49	32.8	14 31.6	38	47	31.4	14 43.1	38	47	30.9	2
3	12 13.7	41	53	35.4	12 26.0	41	52	34.9	12 50.6	41	51	34.0	13 02.8	41	50	33.5	13 15.0	40	50	33.0	13 27.1	40	49	32.6	14 03.1	40	47	31.2	14 15.0	40	46	30.7	3
4	11 42.0	42	52	35.1	11 54.7	42	52	34.7	12 20.1	42	50	33.7	12 32.6	42	50	33.3	12 45.2	42	49	32.8	12 57.7	42	49	32.3	13 34.8	41	47	30.9	13 47.1	41	46	30.5	4
105	11 10.6	44	52	34.9	11 23.7	44	52	34.4	11 49.7	43	50	33.5	12 02.7	43	50	33.0	12 15.6	43	49	32.6	12 28.4	43	48	32.1	13 06.8	42	46	30.7	13 19.4	42	46	30.3	105
6	10 39.3	45	52	34.6	10 52.8	45	51	34.2	11 19.6	44	50	33.2	11 32.9	44	49	32.8	11 46.2	44	49	32.3	11 59.4	44	48	31.9	12 38.8	44	46	30.5	12 51.9	43	46	30.0	6
7	10 08.3	46	51	34.3	10 22.1	46	51	33.9	10 49.6	46	50	33.0	11 03.3	46	49	32.5	11 17.0	45	48	32.1	11 30.6	45	48	31.6	12 11.1	45	46	30.3	12 24.6	45	45	29.8	7
8	9 37.5	47	51	34.1	9 51.7	47	50	33.6	10 19.9	47	49	32.7	10 33.9	47	48	32.3	10 47.9	47	48	31.8	11 01.9	47	47	31.4	11 43.6	46	46	30.0	11 57.4	46	45	29.6	8
9	9 06.9	48	51	33.8	9 21.4	48	50	33.3	9 50.4	48	49	32.5	10 04.8	48	48	32.0	10 19.1	48	48	31.6	10 33.5	48	47	31.1	11 16.3	47	45	29.8	11 30.5	47	45	29.3	9
110	8 36.5	50	50	33.5	8 51.4	50	50	33.1	9 21.1	49	48	32.2	9 35.8	49	48	31.7	9 50.6	49	47	31.3	10 05.3	49	47	30.9	10 49.2	49	45	29.5	11 03.7	48	44	29.1	110
1	8 06.4	51	50	33.2	8 21.6	51	49	32.8	8 52.0	51	48	31.9	9 07.1	50	48	31.5	9 22.2	50	47	31.0	9 37.3	50	46	30.6	10 22.3	50	44	29.3	10 37.2	50	44	28.8	1
2	7 36.5	52	49	32.9	7 52.1	52	49	32.5	8 23.1	52	48	31.6	8 38.6	52	47	31.2	8 54.1	51	46	30.7	9 09.5	51	46	30.3	9 55.6	51	44	29.0	10 10.9	51	44	28.6	2
3	7 06.9	53	49	32.6	7 22.8	53	48	32.2	7 54.5	53	47	31.3	8 10.4	53	47	30.9	8 26.2	53	46	30.5	8 42.0	53	46	30.0	9 29.1	52	44	28.7	9 44.8	52	43	28.3	3
4	6 37.5	54	49	32.3	6 53.7	54	48	31.9	7 26.2	54	47	31.0	7 42.4	54	46	30.6	7 58.5	54	46	30.2	8 14.7	54	45	29.7	9 02.9	53	43	28.5	9 18.9	53	43	28.0	4
115	6 08.3	55	48	32.0	6 24.9	55	48	31.5	6 58.0	55	46	30.7	7 14.6	55	46	30.3	7 31.1	55	45	29.9	7 47.6	55	45	29.4	8 36.9	55	43	28.2	8 53.3	55	42	27.7	115
6	5 39.4	56	48	31.6	5 56.4	56	47	31.2	6 30.2	56	46	30.4	6 47.1	56	46	30.0	7 03.9	56	45	29.6	7 20.8	56	44	29.1	8 11.1	56	42	27.9	8 27.9	56	42	27.5	6
7	5 10.8	58	47	31.3	5 28.1	58	47	30.9	6 02.6	57	46	30.1	6 19.8	57	45	29.7	6 37.0	57	44	29.2	6 54.2	57	44	28.8	7 45.6	57	42	27.6	8 02.7	57	42	27.2	7
8					5 00.1	59	46	30.6	5 35.3	59	45	29.7	5 52.8	59	44	29.3	6 10.4	58	44	28.9	6 27.9	58	43	28.5	7 20.4	58	42	27.3	7 37.8	58	41	26.9	8
9									5 08.2	60	45	29.4	5 26.1	60	44	29.0	5 44.0	60	44	28.6	6 01.9	60	43	28.2	6 55.4	59	41	27.0	7 13.2	59	41	26.6	9
120																	5 17.9	61	43	28.3	5 36.1	61	42	27.9	6 30.6	60	41	26.7	6 48.8	60	40	26.3	120
1																					5 10.6	62	42	27.5	6 06.2	62	40	26.4	6 24.6	62	40	26.0	1
2																									5 42.0	63	40	26.0	6 00.8	63	39	25.6	2
3																									5 18.0	64	40	25.7	5 37.2	64	39	25.3	3
4																													5 13.9	65	38	25.0	4

Lat. 24°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	54 00.0	1.0 01	00.0	53 30.0	1.0 01	00.0	52 00.0	1.0 01	00.0	51 30.0	1.0 01	00.0
1	53 59.6	1.0 02	00.9	53 29.6	1.0 02	00.8	51 59.6	1.0 02	00.8	51 29.6	1.0 02	00.7
2	53 58.4	1.0 03	01.7	53 28.4	1.0 03	01.7	51 58.5	1.0 03	01.5	51 28.6	1.0 03	01.5
3	53 56.3	1.0 05	02.5	53 26.4	1.0 04	02.5	51 56.7	1.0 04	02.3	51 26.8	1.0 04	02.2
4	53 53.5	99 06	03.4	53 23.7	99 06	03.3	51 54.2	99 06	03.0	51 24.3	99 05	03.0
05	53 49.9	99 07	04.2	53 20.1	99 07	04.1	51 50.9	99 07	03.8	51 21.2	99 06	03.7
6	53 45.4	99 09	05.1	53 15.8	99 08	04.9	51 46.9	99 08	04.6	51 17.3	99 08	04.4
7	53 40.2	98 10	05.9	53 10.7	98 10	05.7	51 42.2	98 09	05.3	51 12.7	98 09	05.2
8	53 34.1	98 11	06.7	53 04.8	98 11	06.6	51 36.8	98 10	06.0	51 07.4	98 10	05.9
9	53 27.3	97 13	07.5	52 58.2	97 12	07.3	51 30.7	97 11	06.8	51 01.5	97 11	06.6
10	53 19.7	96 14	08.4	52 50.8	96 14	08.1	51 23.9	97 12	07.5	50 54.8	97 12	07.3
1	53 11.4	96 15	09.2	52 42.7	96 15	08.9	51 16.4	96 14	08.2	50 47.5	96 13	08.0
2	53 02.3	95 16	10.0	52 33.8	95 16	09.7	51 08.2	95 15	08.9	50 39.6	95 14	08.7
3	52 52.4	94 18	10.7	52 24.2	94 17	10.5	50 59.3	95 16	09.7	50 30.9	95 15	09.4
4	52 41.9	93 19	11.5	52 13.9	93 18	11.2	50 49.8	94 17	10.4	50 21.7	94 17	10.1
15	52 30.6	92 20	12.3	52 02.9	92 20	12.0	50 39.6	93 18	11.1	50 11.7	93 18	10.8
6	52 18.6	91 21	13.0	51 51.2	91 21	12.7	50 28.8	92 19	11.7	50 01.2	92 19	11.4
7	52 05.9	90 22	13.8	51 38.8	90 22	13.4	50 17.3	91 20	12.4	49 50.0	91 20	12.1
8	51 52.5	89 23	14.5	51 25.8	89 23	14.1	50 05.2	90 21	13.1	49 38.2	90 21	12.7
9	51 38.4	88 24	15.2	51 12.1	88 24	14.8	49 52.5	89 22	13.7	49 25.9	89 22	13.4
20	51 23.7	87 26	15.9	50 57.7	87 25	15.5	49 39.2	88 23	14.4	49 12.9	88 23	14.0
1	51 08.4	85 27	16.6	50 42.7	86 26	16.2	49 25.3	86 24	15.0	48 59.4	87 24	14.6
2	50 52.4	84 28	17.3	50 27.2	84 27	16.8	49 10.9	85 25	15.6	48 45.3	85 24	15.2
3	50 35.8	83 29	17.9	50 11.0	83 28	17.5	48 55.8	84 26	16.2	48 30.6	84 25	15.8
4	50 18.7	81 30	18.6	49 54.2	82 29	18.1	48 40.3	83 27	16.8	48 15.4	83 26	16.4
25	50 00.9	80 30	19.2	49 36.9	80 30	18.7	48 24.2	81 28	17.4	47 59.7	82 27	17.0
6	49 42.6	79 31	19.8	49 19.0	79 31	19.3	48 07.5	80 29	18.0	47 43.5	80 28	17.5
7	49 23.8	77 32	20.4	49 00.6	77 32	19.9	47 50.4	79 30	18.5	47 26.7	79 29	18.1
8	49 04.4	76 33	21.0	48 41.7	76 32	20.5	47 32.7	77 30	19.1	47 09.5	78 30	18.6
9	48 44.5	74 34	21.6	48 22.2	75 33	21.1	47 14.5	76 31	19.6	46 51.8	76 30	19.1
30	48 24.1	73 35	22.1	48 02.3	73 34	21.6	46 56.0	74 32	20.1	46 33.6	75 31	19.6
1	48 03.2	71 36	22.7	47 41.9	72 35	22.1	46 36.9	73 32	20.6	46 15.0	73 32	20.1
2	47 41.9	69 36	23.2	47 21.0	70 36	22.7	46 17.4	71 33	21.1	45 55.9	72 32	20.6
3	47 20.1	68 37	23.7	46 59.6	68 36	23.2	45 57.4	70 34	21.6	45 36.4	70 33	21.1
4	46 57.8	66 38	24.2	46 37.9	67 37	23.6	45 37.1	68 35	22.0	45 16.5	69 34	21.5
35	46 35.2	65 38	24.7	46 15.7	65 38	24.1	45 16.3	67 35	22.5	44 56.2	67 34	22.0
6	46 12.1	63 39	25.1	45 53.1	64 38	24.6	44 55.1	65 36	22.9	44 35.5	66 35	22.4
7	45 48.6	61 40	25.6	45 30.1	62 39	25.0	44 33.6	64 37	23.4	44 14.4	64 36	22.8
8	45 24.8	60 40	26.0	45 06.7	60 40	25.4	44 11.6	62 37	23.8	43 53.0	63 36	23.2
9	45 00.6	58 41	26.4	44 43.0	59 40	25.9	43 49.4	60 38	24.2	43 31.2	61 37	23.6
40	44 36.0	57 42	26.8	44 18.9	57 41	26.3	43 26.8	59 38	24.6	43 09.0	59 37	24.0
1	44 11.1	55 42	27.2	43 54.5	55 41	26.6	43 03.8	57 39	24.9	42 46.6	58 38	24.4
2	43 45.9	53 42	27.6	43 29.8	54 42	27.0	42 40.5	56 39	25.3	42 23.8	56 38	24.7
3	43 20.3	52 43	28.0	43 04.7	52 42	27.4	42 17.0	54 40	25.6	42 00.7	54 39	25.1
4	42 54.5	50 44	28.3	42 39.4	51 43	27.7	41 53.1	52 40	26.0	41 37.3	53 39	25.4
45	42 28.3	48 44	28.6	42 13.8	49 43	28.0	41 28.9	51 41	26.3	41 13.7	51 40	25.7
6	42 01.9	47 44	29.0	41 47.8	47 44	28.4	41 04.5	49 41	26.6	40 49.8	50 40	26.0
7	41 35.2	45 45	29.3	41 21.7	46 44	28.7	40 39.9	47 42	26.9	40 25.6	48 41	26.3
8	41 08.3	43 45	29.6	40 55.2	44 44	29.0	40 14.9	46 42	27.2	40 01.1	46 41	26.6
9	40 41.2	42 46	29.8	40 28.6	42 45	29.2	39 49.7	44 42	27.5	39 36.4	45 42	26.9
50	40 13.8	40 46	30.1	40 01.7	41 45	29.5	39 24.3	42 43	27.7	39 11.5	43 42	27.2
1	39 46.2	38 46	30.4	39 34.6	39 46	29.8	38 58.7	41 43	28.0	38 46.4	41 42	27.4
2	39 18.4	37 47	30.6	39 07.3	37 46	30.0	38 32.9	39 43	28.2	38 21.1	40 42	27.6
3	38 50.4	35 47	30.8	38 39.8	36 46	30.2	38 06.9	37 44	28.5	37 55.6	38 43	27.9
4	38 22.2	33 47	31.1	38 12.1	34 46	30.5	37 40.7	36 44	28.7	37 29.8	36 43	28.1
55	37 53.8	32 48	31.3	37 44.2	32 47	30.7	37 14.3	34 44	28.9	37 03.9	35 43	28.3
6	37 25.3	30 48	31.5	37 16.1	31 47	30.9	36 47.7	32 44	29.1	36 37.9	33 44	28.5
7	36 56.6	28 48	31.6	36 48.0	29 47	31.0	36 21.0	31 45	29.3	36 11.7	31 44	28.7
8	36 27.8	27 48	31.8	36 19.6	27 48	31.2	35 54.1	29 45	29.4	35 45.3	30 44	28.8
9	35 58.8	25 48	32.0	35 51.1	26 48	31.4	35 27.1	28 45	29.6	35 18.8	28 44	29.0
60	35 29.7	24 49	32.1	35 22.5	24 48	31.5	35 00.0	26 46	29.8	34 52.1	26 45	29.2
1	35 00.5	22 49	32.3	34 53.8	23 48	31.7	34 32.7	24 46	29.9	34 25.3	25 45	29.3
2	34 31.2	20 49	32.4	34 25.0	21 48	31.8	34 05.3	23 46	30.0	33 58.4	23 45	29.4
3	34 01.7	19 49	32.5	33 56.0	19 48	31.9	33 37.8	21 46	30.2	33 31.4	22 45	29.6
4	33 32.2	17 49	32.6	33 27.0	18 48	32.0	33 10.2	19 46	30.3	33 04.3	20 45	29.7
65	33 02.6	16 50	32.7	32 57.9	16 49	32.1	32 42.6	18 46	30.4	32 37.1	18 45	29.8
6	32 33.0	14 50	32.8	32 28.7	15 49	32.2	32 14.8	16 46	30.5	32 09.9	17 46	29.9
7	32 03.2	12 50	32.9	31 59.4	13 49	32.3	31 47.0	15 46	30.6	31 42.5	15 46	30.0
8	31 33.5	11 50	33.0	31 30.1	11 49	32.4	31 19.1	13 47	30.6	31 15.1	14 46	30.1
9	31 03.6	09 50	33.0	31 00.7	10 49	32.4	30 51.1	11 47	30.7	30 47.6	12 46	30.1
70	30 33.7	08 50	33.1	30 31.3	08 49	32.5	30 23.1	10 47	30.8	30 20.1	10 46	30.2
1	30 03.8	06 50	33.1	30 01.8	07 49	32.5	29 55.1	08 47	30.8	29 52.5	09 46	30.2
2	29 33.8	05 50	33.1	29 32.3	05 49	32.6	29 27.0	07 47	30.8	29 24.9	07 46	30.3
3	29 03.9	03 50	33.2	29 02.8	04 49	32.6	28 58.9	05 47	30.9	28 57.3	06 46	30.3
4	28 33.9	02 50	33.2	28 33.3	02 49	32.6	28 30.7	04 47	30.9	28 29.6	04 46	30.3
75	28 03.9	00 50	33.2	28 03.8	01 49	32.6	28 02.6	02 47	30.9	28 01.9	02 46	30.3
6	27 33.9	01 50	33.2	27 34.2	01 49	32.6	27 34.4	00 47	30.9	27 34.2	01 46	30.4
7	27 03.9	03 50	33.2	27 04.7	02 49	32.6	27 06.2	01 47	30.9	27 06.5	01 46	30.4
8	26 33.9	04 50	33.1	26 35.1	04 49	32.6	26 38.1	03 47	30.9	26 38.8	02 46	30.4
9	26 03.9	06 50	33.1	26 05.6	05 49	32.6	26 09.9	04 47	30.9	26 11.1	04 46	30.3
80	25 34.0	07 50	33.1	25 36.1	07 49	32.5	25 41.8	06 47	30.9	25 43.4	05 46	30.3
1	25 04.1	09 50	33.0	25 06.7	08 49	32.5	25 13.7	07 47	30.8	25 15.8	07 46	30.3
2	24 34.2	10 50	33.0	24 37.3	10 49	32.4	24 45.6	09 47	30.8	24 48.1	08 46	30.2
3	24 04.4	12 50	32.9	24 07.9	11 49	32.4	24 17.5	10 47	30.7	24 20.5	10 46	30.2
4	23 34.7	13 50	32.9	23 38.5	13 49	32.3	23 49.6	12 47	30.7	23 53.0	11 46	30.1
85	23 04.9	15 49	32.8	23 09.3	14 49	32.2	23 21.6	13 46	30.6	23 25.5	13 46	30.1
6	22 35.3	16 49	32.7	22 40.1	16 49	32.2	22 53.7	15 46	30.6	22 58.0	14 46	30.0
7	22 05.7	17 49	32.6	22 10.9	17 48	32.1	22 25.9	16 46	30.5	22 30.6	16 46	29.9
8	21 36.2	19 49	32.5	21 41.8	19 48	32.0	21 58.1	18 46	30.4	22 03.3	17 45	29.9
9	21 00.8	20 49	32.4	21 12.9	20 48	31.9	21 30.4	19 46	30.3	21 36.1	19 45	29.8
90	20 37.5	22 49	32.3	20 44.0	21 48	31.8	21 02.8	20 46	30.2	21 08.9	20 45	29.7

H.A.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	51 00.0	1.0 00	00.0	45 00.0	1.0 00	00.0	44 30.0	1.0 00	00.0	39 30.0	1.0 00	00.0
1	50 59.7	1.0 02	00.7	44 59.8	1.0 01	00.5	44 29.8	1.0 01	00.5	39 29.8	1.0 01	00.3
2	50 58.6	1.0 03	01.4	44 59.0	1.0 02	01.0	44 29.1	1.0 02	01.0	39 29.3	1.0 01	00.7
3	50 56.9	1.0 04	02.2	44 57.8	1.0 03	01.5	44 27.9	1.0 03	01.5	39 28.5	1.0 02	01.0
4	50 54.5	99 05	02.9	44 56.1	1.0 04	02.0	44 26.2	1.0 04	02.0	39 27.4	1.0 02	01.4
05	50 51.4	99 06	03.6	44 53.9	99 04	02.5	44 24.1	99 04	02.4	39 25.9	99 03	01.7
6	50 47.6	99 07	04.3	44 51.3	99 05	03.0	44 21.6	99 05	02.9	39 24.0	99 04	02.1
7	50 43.2	98 09	05.0	44 48.2	99 06	03.5	44 18.5	99 06	03.4	39 21.9	99 04	02.4
8	50 38.0	98 10	05.7	44 44.5	98 07	04.0	44 15.0	98 06	03.9	39 19.4	99 05	02.8
9	50 32.2	97 11	06.4	44 40.5	98 08	04.5	44 11.1	98 07	04.4	39 16.6	98 05	03.1
10	50 25.8	97 12	07.1	44 35.9	97 08	05.0	44 06.7	98 08	04.9	39 13.5	98 06	03.4
1	50 18.7	96 13	07.8	44 30.9	97 09	05.5	44 01.8	97 09	05.3	39 10.1	97 06	03.8
2	50 10.9	96 14	08.5	44 25.4	96 10	06.0	43 56.5	96 10	05.8	39 06.3	97 07	04.1
3	50 02.5	95 15	09.2	44 19.4	96 11	06.5	43 50.7	96 10	06.3	39 02.2	96 07	04.4
4	49 53.5	94 16	09.8	44 13.0	95 11	06.9	43 44.5	95 11	06.7	38 57.8	96 08	04.8
15	49 43.8	93 17	10.5	44 06.2	94 12	07.4	43 37.8	95 12	07.2	38 53.1	95 08	05.1
6	49 33.6	92 18	11.1	43 58.9	94 13	07.9	43 30.8	94 12	07.6	38 48.1	96 09	05.4
7	49 22.7	91 19	11.8	43 51.1	93 14	08.4	43 23.3	93 13	08.1	38 42.7	94 09	05.7
8	49 11.2	90 20	12.4	43 43.0	92 14	08.8	43 15.3	92 14	08.5	38 37.1	93 10	06.1
9	48 59.2	89 21	13.0	43 34.3	91 15	09.3	43 07.0	91 15	09.0	38 31.2	92 10	06.4
20	48 46.5	88 22	13.6	43 25.3	90 16	09.7	42 58.2	90 15	09.4	38 24.9	92 11	06.7
1	48 33.3	87 23	14.2	43 15.8	89 16	10.2	42 49.0	89 16	09.9	38 18.4	91 12	07.0
2	48 19.6	86 24	14.8	43 06.0	88 17	10.6	42 39.4	89 17	10.3	38 11.5	90 12	07.3
3	48 05.3	85 25	15.4	42 55.7	87 18	11.0	42 29.5	88 17	10.7	38 04.4	89 12	07.6
4	47 50.5	83 26	16.0	42 45.0	86 18	11.4	42 19.1	86 18	11.1	37 57.0	88 13	07.9
25	47 35.1	82 26	16.5	42 33.9	85 19	11.9	42 08.4	85 19	11.5	37 49.3	87 13	08.2
6	47 19.3	81 27	17.1	42 22.5	84 20	12.3	41 57.2	84 19	11.9	37 41.3	86 14	08.5
7	47 03.0	79 28	17.6	42 10.6	83 20	12.7	41 45.7	83 20	12.3	37 33.1	85 14	08.8
8	46 46.1	78 29	18.1	41 58.4	82 21	13.1	41 33.9	82 20	12.7	37 24.5	84 14	09.1
9	46 28.9	77 30	18.6	41 45.8	80 22	13.5	41 21.6	81 21	13.1	37 15.8	83 15	09.4
30	46 11.1	75 30	19.1	41 32.9	79 22	13.9	41 09.1	79 22	13.4	37 06.7	82 16	09.6
1	45 52.9	74 31	19.6	41 19.6	78 23	14.2	40 56.1	78 22	13.8	36 57.4	81 16	09.9
2	45 34.3	72 32	20.1	41 05.9	77 23	14.6	40 42.9	77 23	14.2	36 47.8	80 16	10.2
3	45 15.2	71 32	20.6	40 51.9	75 24	15.0	40 29.3	76 23	14.5	36 38.0	78 17	10.4
4	44 55.8	69 33	21.0	40 37.6	74 24	15.3	40 15.4	74 24	14.9	36 27.9	77 17	10.7
35	44 35.9	68 34	21.5	40 23.0	73 25	15.7	40 01.2	73 24	15.2	36 17.6	76 18	11.0
6	44 15.7	66 34	21.9	40 08.1	71 26	16.0	39 46.7	72 25	15.5	36 07.1	75 18	11.2
7	43 55.1	65 35	22.3	39 52.8	70 26	16.3	39 31.8	70 25	15.9	35 56.3	73 18	11.5
8	43 34.1	63 36	22.7	39 37.3	68 26	16.6	39 16.7	69 26	16.2	35 45.3	72 19	11.7
9	43 12.8	61 36	23.1	39 21.4	67 27	17.0	39 01.3	67 26	16.5	35 34.1	71 19	11.9
40	42 51.2	60 37	23.5	39 05.3	65 27	17.3	38 45.6	66 27	16.8	35 22.7	69 20	12.2
1	42 29.2	58 37	23.8	38 48.9	64 28	17.6	38 29.6	64 27	17.1	35 11.0	68 20	12.4
2	42 06.9	57 38	24.2	38 32.2	62 28	17.9	38 13.4	63 28	17.4	34 59.1	67 20	12.6
3	41 44.3	55 38	24.5	38 15.3	61 29	18.1	37 56.9	61 28	17.6	34 47.1	65 20	12.8
4	41 21.4	53 39	24.8	37 58.1	59 29	18.4	37 40.2	60 28	17.9	34 34.8	64 21	13.0
45	40 58.2	52 39	25.2	37 40.7	58 30	18.7	37 23.3	58 29	18.2	34 22.4	62 21	13.2
6	40 34.8	50 40	25.5	37 23.0	56 30	18.9	37 06.1	57 29	18.4	34 09.7	61 21	13.4
7	40 11.1	49 40	25.8	37 05.1	55 30	19.2	36 48.6	55 29	18.7	33 56.9	59 22	13.6
8	39 47.2	47 40	26.0	36 47.0	53 31	19.4	36 31.0	54 30	18.9	33 43.9	58 22	13.8
9	39 23.0	45 41	26.3	36 28.6	51 31	19.7	36 13.1	52 30	19.1	33 30.7	56 22	14.0
50	38 58.6	44 41	26.6	36 10.1	50 31	19.9	35 55.1	50 30	19.3	33 17.4	55 22	14.2
1	38 33.9	42 41	26.8	35 51.4	48 32	20.1	35 36.8	49 31	19.6	33 03.9	53 23	14.3
2	38 09.1	40 42	27.1	35 32.4	47 32	20.3	35 18.4	47 31	19.8	32 50.2	52 23	14.5
3	37 44.1	39 42	27.3	35 13.3	45 32	20.5	34 59.8	46 31	20.0	32 36.4	50 23	14.7
4	37 18.8	37 42	27.5	34 54.0	43 32	20.7	34 41.0	44 32	20.2	32 22.4	48 24	14.8
55	36 53.4	35 42	27.7	34 34.6	42 33	20.9	34 22.0	42 32	20.3	32 08.3	47 24	15.0
6	36 27.9	34 43	27.9	34 15.0	40 33	21.1	34 02.9	41 32	20.5	31 54.1	45 24	15.1
7	36 02.1	32 43	28.1	33 55.2	38 33	21.2	33 43.6	39 32	20.7	31 39.7	44 24	15.3
8	35 36.3	30 44	28.3	33 35.2	37 33	21.4	33 24.1	37 32	20.8	31 25.2	42 24	15.4
9	35 10.2	29 44	28.4	33 15.2	35 34	21.6	33 04.6	36 33	21.0	31 10.6	40 24	15.5
60	34 44.1	27 44	28.6	32 55.0	33 34	21.7	32 44.9	34 33	21.1	30 55.9	39 25	15.7
1	34 17.8	25 44	28.7	32 34.7	32 34	21.8	32 25.0	32 33	21.3	30 41.0	37 25	15.8
2	33 51.4	24 44	28.9	32 14.2	30 34	22.0	32 05.1	31 34	21.4	30 26.1	35 25	15.9
3	33 24.9	22 44	29.0	31 53.6	28 34	22.1	31 45.0	29 34	21.5	30 11.0	34 25	16.0
4	32 58.3	21 44	29.1	31 33.0	27 35	22.2	31 24.9	27 34	21.6	29 55.9	32 25	16.1
65	32 31.6	19 45	29.2	31 12.2	25 35	22.3	31 04.6	26 34	21.8	29 40.7	30 26	16.2
6	32 04.8	17 45	29.3	30 51.4	23 35	22.4	30 44.3	24 34	21.9	29 25.3	29 26	16.3
7	31 37.9	16 45	29.4	30 30.4	22 35	22.5	30 23.8	22 34	21.9	29 09.9	27 26	16.4
8	31 11.0	14 45	29.5	30 09.4	20 35	22.6	30 03.3	21 34	22.0	28 54.5	25 26	16.4
9	30 44.0	12 45	29.5	29 48.3	18 35	22.7	29 42.7	19 34	22.1	28 38.9	24 26	16.5
70	30 16.9	11 45	29.6	29 27.1	17 35	22.8	29 22.0	17 34	22.2	28 23.3	22 26	16.6
1	29 49.8	09 45	29.7	29 05.9	15 36	22.8	29 01.3	16 35	22.3	28 07.6	20 26	16.6
2	29 22.7	08 45	29.7	28 44.6	13 36	22.9	28 40.5	14 35	22.3	27 51.9	18 26	16.7
3	28 55.5	06 45	29.7	28 23.3	12 36	22.9	28 19.7	12 35	22.4	27 36.1	17 26	16.8
4	28 28.3	05 45	29.8	28 01.9	10 36	23.0	27 58.8	11 35	22.4	27 20.3	15 26	16.8
75	28 01.1	03 45	29.8	27 40.5	08 36	23.0	27 37.9	09 35	22.4	27 04.4	13 26	16.9
6	27 33.9	01 45	29.8	27 19.1	07 36	23.0	27 16.9	07 35	22.5	26 48.5	12 26	16.9
7	27 06.6	00 45	29.8	26 57.6	05 36	23.1	26 56.0	06 35	22.5	26 32.6	10 27	16.9
8	26 39.4	02 45	29.8	26 36.1	04 36	23.1	26 35.0	04 35	22.5	26 16.6	08 27	16.9
9	26 12.1	03 45	29.8	26 14.6	02 36	23.1	26 14.0	02 35	22.5	26 00.6	07 27	17.0
80	25 44.9	05 45	29.8	25 53.1	00 36	23.1	25 53.0	01 35	22.5	25 44.6	05 27	17.0
1	25 17.7	06 45	29.7	25 31.6	01 36	23.1	25 32.0	01 35	22.5	25 28.6	03 27	17.0
2	24 50.6	08 45	29.7	25 10.1	03 36	23.1	25 11.0	03 35	22.5	25 12.5	02 27	17.0
3	24 23.4	09 45	29.7	24 48.6	05 36	23.1	24 50.0	04 35	22.5	24 56.5	00 27	17.0
4	23 56.3	11 45	29.6	24 27.2	06 36	23.0	24 29.0	06 35	22.5	24 40.5	02 27	17.0
85	23 29.3	12 45	29.5	24 05.7	08 36	23.0	24 08.0	07 35	22.5	24 24.4	04 27	17.0
6	23 02.3	14 45	29.5	23 44.3	09 36	23.0	23 47.1	09 35	22.4	24 08.4	05 27	17.0
7	22 35.3	15 45	29.4	23 22.9	11 36	22.9	23 26.2	11 35	22.4	23 52.4	07 27	17.0
8	22 08.4	17 45	29.3	23 01.6	13 36	22.9	23 05.3	12 35	22.4	23 36.4	09 27	16.9
9	21 41.6	18 44	29.2	22 40.2	14 35	22.8	22 44.4	14 35	22.3	23 20.5	10 27	16.9
90	21 14.9	20 44	29.2	22 19.0	16 35	22.8	22 23.7	15 35	22.3	23 04.5	12 26	16.9

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.	63° 00′ Alt.	Δd	Δt	Az.	69° 00′ Alt.	Δd	Δt	Az.	69° 30′ Alt.	Δd	Δt	Az.	74° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	20 08.2	23	48	32.2	20 15.1	23	48	31.7	20 35.3	22	46	30.1	20 41.8	22	45	29.6	20 48.2	21	44	29.1	21 57.8	17	35	22.7	22 02.9	17	34	22.2	22 48.6	13	26	16.8	91
2	19 39.1	25	48	32.0	19 46.4	24	48	31.5	20 07.8	23	46	30.0	20 14.8	23	45	29.5	20 21.6	23	44	28.9	21 36.6	19	35	22.7	21 42.2	19	34	22.1	22 32.8	15	26	16.8	2
3	19 10.1	26	48	31.9	19 17.8	26	48	31.4	19 40.5	25	46	29.9	19 47.9	24	45	29.4	19 55.2	24	44	28.8	21 15.6	20	35	22.6	21 21.6	20	34	22.1	22 16.9	17	26	16.8	3
4	18 41.2	27	48	31.8	18 49.3	27	47	31.3	19 13.2	26	45	29.7	19 21.1	26	44	29.2	19 28.8	26	44	28.7	20 54.5	22	35	22.5	21 01.1	22	34	22.0	22 01.1	18	26	16.7	4
95	18 12.4	29	48	31.6	18 20.9	28	47	31.1	18 46.1	28	45	29.6	18 54.4	27	44	29.1	19 02.5	27	44	28.6	20 33.6	24	35	22.4	20 40.6	23	34	21.9	21 45.4	20	26	16.7	95
6	17 43.7	30	48	31.5	17 52.7	30	47	31.0	18 19.1	29	45	29.5	18 27.8	29	44	29.0	18 36.3	28	43	28.5	20 12.7	25	34	22.3	20 20.2	25	34	21.8	21 29.7	22	26	16.6	6
7	17 15.1	31	47	31.3	17 24.5	31	47	30.8	17 52.2	30	45	29.3	18 01.3	30	44	28.8	18 10.3	30	43	28.3	19 52.0	27	34	22.2	19 59.9	26	34	21.7	21 14.1	23	26	16.5	7
8	16 46.7	33	47	31.1	16 56.5	33	46	30.6	17 25.4	32	44	29.2	17 34.9	32	44	28.7	17 44.3	31	43	28.2	19 31.3	28	34	22.1	19 39.7	28	34	21.6	20 58.5	25	26	16.5	8
9	16 18.4	34	47	31.0	16 28.6	34	46	30.5	16 58.8	33	44	29.0	17 08.7	33	44	28.5	17 18.5	33	43	28.0	19 10.7	30	34	22.0	19 19.5	29	33	21.5	20 43.0	26	26	16.4	9
100	15 50.3	35	47	30.8	16 00.9	35	46	30.3	16 32.3	35	44	28.8	16 42.6	34	43	28.3	16 52.9	34	43	27.9	18 50.2	31	34	21.9	18 59.5	31	33	21.4	20 27.6	28	26	16.3	100
1	15 22.3	37	46	30.6	15 33.3	37	46	30.1	16 05.9	36	44	28.7	16 16.7	36	43	28.2	16 27.3	35	42	27.7	18 29.8	33	34	21.8	18 39.5	32	33	21.3	20 12.2	29	26	16.2	1
2	14 54.5	38	46	30.4	15 05.9	38	46	29.9	15 39.7	37	44	28.5	15 50.8	37	43	28.0	16 01.9	37	42	27.5	18 09.5	34	34	21.6	18 19.7	34	33	21.2	19 56.9	31	25	16.1	2
3	14 26.8	39	46	30.2	14 38.6	39	45	29.7	15 13.6	39	43	28.3	15 25.2	38	42	27.8	15 36.7	38	42	27.3	17 49.4	35	34	21.5	18 00.0	35	33	21.0	19 41.7	33	25	16.1	3
4	13 59.4	41	46	30.0	14 11.5	40	45	29.5	14 47.7	40	43	28.1	14 59.7	40	42	27.6	15 11.6	40	42	27.2	17 29.3	37	33	21.4	17 40.4	37	32	20.9	19 26.6	34	25	16.0	4
105	13 32.0	42	45	29.8	13 44.6	42	44	29.3	14 22.0	41	43	27.9	14 34.3	41	42	27.4	14 46.6	41	41	27.0	17 09.4	38	33	21.2	17 20.9	38	32	20.8	19 11.6	36	25	15.9	105
6	13 04.9	43	45	29.6	13 17.9	43	44	29.1	13 56.4	43	42	27.7	14 09.2	42	42	27.2	14 21.9	42	41	26.8	16 49.6	40	33	21.1	17 01.5	40	32	20.6	18 56.7	37	25	15.8	6
7	12 38.0	43	45	29.3	12 51.3	44	44	28.9	13 31.0	44	42	27.5	13 44.2	44	42	27.0	13 57.3	44	41	26.6	16 30.0	41	33	20.9	16 42.3	41	32	20.5	18 41.8	39	24	15.7	7
8	12 11.2	46	44	29.1	12 24.9	46	44	28.7	13 05.8	45	42	27.3	13 19.3	45	41	26.8	13 32.8	45	40	26.4	16 10.4	43	32	20.8	16 23.2	42	32	20.3	18 27.1	40	24	15.5	8
9	11 44.6	47	44	28.9	11 58.7	47	43	28.4	12 40.8	46	42	27.1	12 54.7	46	41	26.6	13 08.6	46	40	26.2	15 51.1	44	32	20.6	16 04.2	44	31	20.2	18 12.5	42	24	15.4	9
110	11 18.3	48	44	28.6	11 32.7	48	43	28.2	12 15.9	48	41	26.8	12 30.2	48	40	26.4	12 44.5	47	40	25.9	15 31.8	45	32	20.5	15 45.4	45	31	20.0	17 57.9	43	24	15.3	110
1	10 52.1	50	43	28.4	11 07.0	49	43	27.9	11 51.3	49	41	26.6	12 06.0	49	40	26.2	12 20.6	49	40	25.7	15 12.7	47	32	20.3	15 26.7	47	31	19.8	17 43.5	45	24	15.2	1
2	10 26.1	51	43	28.1	10 41.4	51	42	27.7	11 26.8	50	40	26.4	11 41.9	50	40	25.9	11 56.9	50	39	25.5	14 53.8	48	31	20.1	15 08.2	48	30	19.7	17 29.2	46	24	15.1	2
3	10 00.4	52	42	27.9	10 16.0	52	42	27.4	11 02.6	52	40	26.1	11 18.0	51	39	25.7	11 33.5	51	39	25.2	14 35.0	49	31	19.9	14 49.9	49	30	19.5	17 15.0	47	23	14.9	3
4	9 34.9	53	42	27.6	9 50.9	53	42	27.2	10 38.6	53	40	25.9	10 54.4	53	39	25.4	11 10.2	53	38	25.0	14 16.4	51	31	19.7	14 31.7	51	30	19.3	17 01.0	49	23	14.8	4
115	9 09.6	54	42	27.3	9 26.0	54	41	26.9	10 14.8	54	39	25.6	10 31.0	54	39	25.2	10 47.1	54	38	24.8	13 58.0	52	30	19.6	14 13.6	52	30	19.1	16 47.1	50	23	14.7	115
6	8 44.6	56	41	27.0	9 01.3	56	41	26.6	9 51.2	55	39	25.4	10 07.7	55	38	24.9	10 24.3	55	38	24.5	13 39.8	53	30	19.4	13 55.8	53	30	18.9	16 33.3	52	23	14.5	6
7	8 19.8	57	41	26.8	8 36.8	57	40	26.3	9 27.8	56	38	25.1	9 44.7	56	38	24.7	10 01.6	56	37	24.3	13 21.7	55	30	19.2	13 38.1	55	29	18.7	16 19.6	53	22	14.4	7
8	7 55.2	58	40	26.5	8 12.6	58	40	26.1	9 04.7	58	38	24.8	9 22.0	58	38	24.4	9 39.2	58	37	24.0	13 03.8	56	30	19.0	13 20.6	56	29	18.5	16 06.1	54	22	14.2	8
9	7 30.9	59	40	26.2	7 48.7	59	40	25.8	8 41.8	59	38	24.5	8 59.4	59	37	24.1	9 17.1	59	37	23.7	12 46.1	57	29	18.7	13 03.3	57	29	18.3	15 52.7	56	22	14.1	9
120	7 06.9	60	40	25.9	7 25.0	60	39	25.5	8 19.1	60	37	24.3	8 37.1	60	37	23.9	8 55.1	60	36	23.5	12 28.6	59	29	18.5	12 46.1	58	28	18.1	15 39.4	57	22	13.9	120
1	6 43.1	61	39	25.6	7 01.5	61	38	25.2	7 56.7	61	37	24.0	8 15.1	61	36	23.6	8 33.4	61	36	23.2	12 11.2	60	28	18.3	12 29.2	60	28	17.9	15 26.3	58	22	13.7	1
2	6 19.6	63	39	25.3	6 38.4	63	38	24.9	7 34.6	62	36	23.7	7 53.3	62	36	23.3	8 12.0	62	35	22.9	11 54.1	61	28	18.1	12 12.4	61	28	17.7	15 13.4	60	21	13.6	2
3	5 56.3	64	38	24.9	6 15.5	64	38	24.5	7 12.7	64	36	23.4	7 31.8	63	36	23.0	7 50.8	63	35	22.6	11 37.2	62	28	17.9	11 55.9	62	27	17.5	15 00.6	61	21	13.4	3
4	5 33.4	65	38	24.6	5 52.8	65	37	24.2	6 51.1	65	36	23.1	7 10.5	65	35	22.7	7 29.9	65	34	22.3	11 20.5	64	28	17.6	11 39.5	63	27	17.2	14 47.9	62	21	13.2	4
125	5 10.7	66	38	24.3	5 30.5	66	37	23.9	6 29.7	66	35	22.8	6 49.5	66	35	22.4	7 09.2	66	34	22.0	11 04.0	65	27	17.4	11 23.4	65	27	17.0	14 35.4	63	20	13.1	125
6					5 08.4	67	36	23.6	6 08.7	67	35	22.5	6 28.7	67	34	22.1	6 48.8	67	34	21.7	10 47.7	66	27	17.2	11 07.4	66	26	16.8	14 23.1	65	20	12.9	6
7									5 47.9	68	34	22.1	6 08.3	68	34	21.8	6 28.6	68	33	21.4	10 31.6	67	26	16.9	10 51.7	67	26	16.5	14 11.0	66	20	12.7	7
8									5 27.4	69	34	21.8	5 48.1	69	33	21.5	6 08.8	69	33	21.1	10 15.8	68	26	16.7	10 36.2	68	26	16.3	13 59.0	67	20	12.5	8
9									5 07.1	70	34	21.5	5 28.2	70	33	21.1	5 49.2	70	32	20.8	10 00.1	69	26	16.4	10 20.9	69	25	16.1	13 47.2	68	19	12.3	9
130													5 08.6	71	32	20.8	5 29.9	71	32	20.4	9 44.8	70	25	16.2	10 05.9	70	25	15.8	13 35.6	69	19	12.2	130
1																	5 10.9	72	31	20.1	9 29.6	72	25	15.9	9 51.1	71	24	15.6	13 24.1	71	19	12.0	1
2																					9 14.7	73	24	15.7	9 36.5	73	24	15.3	13 12.8	72	18	11.8	2
3																					9 00.0	74	24	15.4	9 22.1	74	24	15.0	13 01.7	73	18	11.6	3
4																					8 45.6	75	24	15.1	9 08.0	75	23	14.8	12 50.8	74	18	11.4	4
135																					8 31.4	76	23	14.8	8 54.2	76	23	14.5	12 40.1	75	18	11.2	135
																					8 17.5	77	23	14.6	8 40.5	77	22	14.2	12 29.6	76	17	11.0	6
																					8 03.9	78	22	14.3	8 27.2	78	22	14.0	12 19.3	77	17	10.8	7
																					7 50.5	79	22	14.0	8 14.1	79	22	13.7	12 09.2	78	17	10.5	8
																					7 37.3	80	21	13.7	8 01.2	80	21	13.4	11 59.2	79	16	10.3	9
																					7 24.5	81	21	13.4	7 48.6	81	20	13.1	11 49.5	80	16	10.1	140
																					7 11.9	81	21	13.1	7 36.3	81	20	12.8	11 40.0	81	16	09.9	1
																					6 59.5	82	20	12.8	7 24.3	82	20	12.6	11 30.7	82	15	09.7	2
																					6 47.5	83	20	12.5	7 12.5	83	19	12.3	11 21.6	83	15	09.4	3
																					6 35.7	84	19	12.2	7 01.0	84	19	12.0	11 12.7	84	14	09.2	4
																					6 24.3	85	19	11.9	6 49.7	85	18	11.7	11 04.0	85	14	09.0	145
																					6 13.1	86	18	11.6	6 38.8	86	18	11.4	10 55.6	85	14	08.8	6
																					6 02.2	87	18	11.3	6 28.1	87	17	11.1	10 47.3	86	13	08.5	7
																					5 51.5	87	17	11.0	6 17.8	87	17	10.8	10 39.3	87	13	08.3	8
																					5 41.2	88	17	10.7	6 07.7	88	16	10.5	10 31.6	88	13	08.0	9
																					5 31.2	89	16	10.4	5 57.9	89	16	10.1	10 24.0	89	12	07.8	150
																					5 21.5	90	16	10.0	5 48.4	90	15	09.8	10 16.7	89	12	07.6	1
																					5 12.1	90	15	09.7	5 39.2	90	15	09.5	10 09.6	90	12	07.3	2
																					5 03.0	91	15	09.4	5 30.3	91	14	09.2	10 02.7	91	11	07.1	3
																									5 21.6	92	14	08.9	9 56.1	91	11	06.8	4
																									5 13.3	92	13	08.5	9 49.7	92	10	06.6	155
																									5 05.4	93	13	08.2	9 43.5	93	10	06.3	6
																													9 37.6	93	10	06.1	7
																													9 31.9	94	09	05.8	8
																													9 26.4	94	09	05.6	9
																													9 21.2	95	08	05.3	160
																													9 16.3	95	08	05.1	1
																													9 11.6	96	08	04.8	2
																													9 07.1	96	07	04.5	3
																													9 02.9	97	07	04.3	4
																													8 58.9	97	06	04.0	165
																													8 55.2	97	06	03.8	6
																													8 51.8	98	05	03.5	7
																													8 48.6	98	05	03.2	8
																													8 45.6	98	04	03.0	9
																													8 42.9	99	04	02.7	170
																													8 40.5	99	04	02.4	1
																													8 38.3	99	03	02.2	2
																													8 36.3	99	03	01.9	3
																													8 34.6	1.0	02	01.6	4
																													8 33.2	1.0	02	01.3	175
																													8 32.1	1.0	02	01.1	6
																													8 31.2	1.0	01	00.8	7
																													8 30.5	1.0	01	00.5	8
																													8 30.1	1.0	00	00.3	9
																													8 30.0	1.0	00	00.0	180

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	°
00	6 00.0	1.0	00	180.0	5 30.0	1.0	00	180.0	00
1	5 59.8	1.0	01	179.5	5 29.8	1.0	01	179.5	1
2	5 59.0	1.0	02	179.0	5 29.1	1.0	02	179.0	2
3	5 57.8	1.0	03	178.5	5 27.9	1.0	03	178.5	3
4	5 56.2	1.0	04	178.0	5 26.2	1.0	04	178.0	4
05	5 54.0	1.0	04	177.5	5 24.1	1.0	04	177.5	05
6	5 51.4	1.0	05	177.0	5 21.5	1.0	05	177.0	6
7	5 48.2	99	06	176.5	5 18.4	99	06	176.5	7
8	5 44.6	99	07	176.0	5 14.9	99	07	176.1	8
9	5 40.6	99	08	175.5	5 10.9	99	08	175.6	9
10	5 36.0	99	08	175.0	5 06.4	99	08	175.1	10
1	5 31.0	98	09	174.5	5 01.5	98	09	174.6	1
2	5 25.5	98	10	174.0					2
3	5 19.6	98	11	173.5					3
4	5 13.1	98	12	173.0					4
15	5 06.2	97	12	172.5					15

Lat. 24°

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 24°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	70	180	74	180	78	180	82	180	86	180	90	...	86	00	82	00	78	00	74	00	70	00	00
4	70	168	74	166	77	162	81	154	85	136	86	89	85	41	81	23	78	15	74	11	70	08	4
8	69	158	72	153	76	146	79	135	82	117	83	88	82	59	79	40	76	28	73	21	69	16	8
12	67	148	70	142	73	134	76	123	78	107	79	88	79	67	77	50	74	38	71	29	68	23	12
16	65	140	68	134	71	126	73	115	75	102	75	87	75	71	74	57	72	45	69	36	66	29	16
20	62	133	65	127	68	119	70	109	71	98	72	86	72	73	71	61	69	51	67	42	64	34	20
24	59	127	62	121	64	114	66	105	67	95	68	85	68	74	67	64	66	54	64	46	62	39	24
28	56	122	59	116	61	109	63	102	64	93	64	84	65	75	64	66	63	57	62	49	60	42	28
32	53	118	55	112	57	106	59	99	60	91	61	83	61	75	61	67	60	59	59	51	57	45	32
36	50	114	52	109	54	103	55	97	56	90	57	82	58	75	57	68	57	60	56	53	55	47	36
40	47	111	49	106	50	100	52	94	53	88	54	82	54	75	54	68	54	61	53	55	52	48	40
44	43	108	45	103	47	98	48	93	49	87	50	81	50	74	51	68	50	62	50	56	49	50	44
48	40	106	41	101	43	96	44	91	46	85	46	80	47	74	47	68	47	62	47	56	46	51	48
52	36	103	38	99	39	94	41	89	42	84	43	79	43	73	44	68	44	62	44	57	43	51	52
56	33	101	34	97	36	92	37	88	38	83	39	78	40	73	40	68	41	62	41	57	41	52	56
60	29	99	31	95	32	91	33	86	35	82	36	77	36	72	37	67	37	62	38	57	38	52	60
64	25	97	27	93	28	89	30	85	31	80	32	76	33	71	34	66	34	62	35	57	35	52	64
68	22	95	23	91	25	87	26	83	27	79	29	75	30	70	30	66	31	61	32	56	32	52	68
72	18	94	20	90	21	86	23	82	24	78	25	74	26	69	27	65	28	61	29	56	29	52	72
76	14	92	16	88	18	84	19	80	20	76	22	72	23	68	24	64	25	60	26	55	26	51	76
80	11	90	12	87	14	83	15	79	17	75	18	71	19	67	20	63	22	59	23	55	23	51	80
84	*07*	89	*09*	85	10	81	12	78	13	74	15	70	16	66	17	62	18	58	20	54	21	50	84
88	*03*	87	*05*	83	*07*	80	*08*	76	10	72	11	69	13	65	14	61	15	57	17	53	18	49	88
92	*00*	86	*01*	82	*03*	78	*05*	*75*	*06*	71	*08*	67	*09*	63	11	60	12	56	14	*52*	15	48	92
96	*04*	84	*02*	80	*01*	77	01	73	*03*	69	04	66	06	62	08	58	09	55	11	51	12	47	96
100	*07*	82	*06*	79	*04*	75	*02*	71	*01*	68	01	64	*03*	61	05	57	06	53	08	50	10	46	100
104	*11*	81	*09*	77	*08*	73	*06*	70	*04*	66	*02*	62	*00*	59	02	55	03	52	05	48	07	45	104
108	*15*	79	*13*	75	*11*	71	*09*	68	*07*	64	*05*	61	*03*	57	*01*	54	01	50	03	47	05	43	108
112	*18*	77	*16*	73	*14*	70	*13*	66	*11*	62	*08*	59	*06*	55	*04*	52	*02*	49	*00*	45	02	42	112
116	*22*	75	*20*	71	*18*	67	*16*	64	*14*	60	*12*	57	*09*	54	*07*	50	*05*	47	*03*	44	*00*	40	116
120	*25*	73	*23*	69	*21*	65	*19*	62	*17*	58	*15*	55	*12*	51	*10*	48	*07*	45	*05*	42	*03*	39	120
124	*29*	71	*27*	67	*25*	63	*22*	59	*20*	56	*18*	53	*15*	49	*13*	46	*10*	43	*07*	40	*05*	37	124
128	*32*	68	*30*	64	*28*	61	*25*	57	*23*	54	*20*	50	*18*	47	*15*	44	*12*	41	*10*	38	*07*	35	128
132	*36*	66	*33*	62	*31*	57	*28*	54	*26*	51	*23*	48	*20*	44	*18*	41	*15*	38	*12*	36	*09*	33	132
136	*39*	63	*36*	59	*34*	55	*31*	51	*29*	48	*26*	45	*23*	42	*20*	39	*17*	36	*14*	33	*11*	31	136
140	*42*	60	*40*	56	*37*	52	*34*	48	*31*	45	*28*	42	*25*	39	*22*	36	*19*	33	*16*	31	*13*	28	140
144	*45*	56	*42*	52	*40*	48	*37*	45	*34*	42	*31*	39	*27*	36	*24*	33	*21*	31	*18*	28	*14*	26	144
148	*48*	52	*45*	48	*42*	45	*39*	41	*36*	38	*33*	35	*30*	33	*26*	30	*23*	28	*19*	25	*16*	23	148
152	*51*	48	*48*	44	*45*	40	*42*	37	*38*	34	*35*	32	*31*	29	*28*	27	*24*	25	*21*	23	*17*	21	152
156	*54*	43	*50*	39	*47*	36	*44*	33	*40*	30	*37*	28	*33*	25	*29*	23	*26*	21	*22*	20	*19*	18	156
160	*56*	37	*53*	34	*49*	31	*45*	28	*42*	26	*38*	23	*35*	22	*31*	20	*27*	18	*23*	17	*20*	15	160
164	*58*	31	*54*	28	*51*	25	*47*	23	*43*	21	*40*	19	*36*	17	*32*	16	*28*	15	*24*	13	*20*	12	164
168	*60*	24	*56*	22	*52*	19	*48*	17	*44*	16	*41*	14	*37*	13	*33*	12	*29*	11	*25*	10	*21*	09	168
172	*61*	17	*57*	15	*53*	13	*49*	12	*45*	11	*41*	10	*37*	09	*33*	08	*30*	07	*26*	07	*22*	06	172
176	*62*	08	*58*	07	*54*	07	*50*	06	*46*	05	*42*	05	*38*	04	*34*	04	*30*	04	*26*	03	*22*	03	176
180	*62*	00	*58*	00	*54*	00	*50*	00	*46*	00	*42*	00	*38*	00	*34*	00	*30*	00	*26*	00	*22*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 24°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	66	00	62	00	58	00	54	00	50	00	46	00	42	00	38	00	34	00	30	00	26	00	00
4	66	07	62	05	58	04	54	03	50	03	46	02	42	02	38	01	34	01	30	00	26	00	4
8	65	13	61	10	57	08	54	07	50	05	46	04	42	03	38	02	34	02	30	01	26	00	8
12	64	19	61	15	57	12	53	10	49	08	45	06	42	05	38	04	34	02	30	01	26	00	12
16	63	24	59	20	56	16	52	13	49	11	45	08	41	06	37	05	34	03	30	02	26	01	16
20	61	28	58	23	55	19	51	16	48	13	44	10	41	08	37	06	33	04	30	02	26	01	20
24	59	32	57	27	54	22	50	19	47	15	44	12	40	09	37	07	33	05	29	03	26	01	24
28	57	36	55	30	52	25	49	21	46	17	43	14	40	11	36	08	33	06	29	03	26	01	28
32	55	38	53	33	50	28	48	23	45	19	42	15	39	12	36	09	32	06	29	04	26	01	32
36	53	41	51	35	49	30	46	25	44	21	41	17	38	13	35	10	32	07	29	04	26	01	36
40	50	42	49	37	47	32	45	27	42	22	40	18	37	14	34	11	31	08	29	04	26	01	40
44	48	44	46	38	45	33	43	28	41	24	39	19	36	15	34	12	31	08	28	05	25	02	44
48	45	45	44	40	43	34	41	30	39	25	37	20	35	16	33	12	30	09	28	05	25	02	48
52	43	46	42	41	41	36	39	31	38	26	36	21	34	17	32	13	30	09	28	05	25	02	52
56	40	46	39	41	39	36	37	31	36	27	35	22	33	18	31	14	29	10	27	06	25	02	56
60	37	47	37	42	36	37	35	32	34	27	33	23	32	18	30	14	29	10	27	06	25	02	60
64	35	47	35	42	34	37	34	33	33	28	32	23	31	19	29	14	28	10	27	06	25	02	64
68	32	47	32	42	32	38	32	33	31	28	30	24	30	19	29	15	27	10	26	06	25	02	68
72	29	47	30	42	30	38	30	33	29	29	29	24	28	19	28	15	27	11	26	06	25	02	72
76	27	47	27	42	27	38	28	33	28	29	27	24	27	20	27	15	26	11	25	06	24	02	76
80	24	46	25	42	25	37	26	33	26	29	26	24	26	20	26	15	25	11	25	07	24	02	80
84	21	46	22	41	23	37	24	33	24	29	24	24	25	20	25	15	25	11	24	07	24	02	84
88	19	45	20	41	21	37	22	33	22	28	23	24	23	20	24	15	24	11	24	07	24	02	88
92	16	44	18	40	19	36	20	32	21	28	21	24	22	19	23	15	23	11	24	07	24	02	92
96	14	43	15	39	16	35	18	31	19	27	20	23	21	19	22	15	23	11	23	06	24	02	96
100	11	42	13	38	14	35	16	31	17	27	19	23	20	19	21	15	22	11	23	06	24	02	100
104	09	41	11	37	12	34	14	30	16	26	17	22	19	18	20	14	21	10	22	06	24	02	104
108	07	40	08	36	10	33	12	29	14	25	16	22	17	18	19	14	21	10	22	06	23	02	108
112	04	38	06	35	08	32	10	28	12	25	14	21	16	17	18	14	20	10	22	06	23	02	112
116	02	37	04	34	07	30	09	27	11	24	13	20	15	17	17	13	19	10	21	06	23	02	116
120	*00*	35	02	32	05	29	07	26	10	23	12	19	14	16	17	13	19	09	21	06	23	02	120
124	*02*	34	00	31	03	28	06	25	08	22	11	18	13	15	16	12	18	09	21	05	23	02	124
128	*04*	32	*01*	29	01	26	04	23	07	20	10	17	12	14	15	11	18	08	20	05	23	02	128
132	*06*	30	*03*	27	*00*	25	03	22	06	19	09	16	11	14	14	11	17	08	20	05	23	02	132
136	*08*	28	*05*	25	*02*	23	01	20	04	18	08	15	11	13	14	10	17	07	20	04	23	02	136
140	*10*	26	*06*	23	*03*	21	00	19	03	16	07	14	10	12	13	09	16	07	19	04	22	01	140
144	*11*	24	*08*	21	*04*	19	*01*	17	02	15	06	13	09	11	12	08	16	06	19	04	22	01	144
148	*12*	21	*09*	19	*06*	17	*02*	15	01	13	05	11	08	10	12	08	15	05	19	03	22	01	148
152	*14*	19	*10*	17	*07*	15	*03*	14	01	12	04	10	08	08	12	07	15	05	19	03	22	01	152
156	*15*	16	*11*	15	*07*	13	*04*	12	*00*	10	04	09	07	07	11	06	15	04	18	03	22	01	156
160	*16*	14	*12*	12	*08*	11	*04*	10	*01*	09	03	07	07	06	11	05	15	04	18	02	22	01	160
164	*17*	11	*13*	10	*09*	09	*05*	08	*01*	07	03	06	07	05	10	04	14	03	18	02	22	01	164
168	*17*	08	*13*	08	*09*	07	*05*	06	*01*	05	02	04	06	04	10	03	14	02	18	01	22	00	168
172	*18*	06	*14*	05	*10*	05	*06*	04	*02*	03	02	03	06	02	10	02	14	01	18	01	22	00	172
176	*18*	03	*14*	03	*10*	02	*06*	02	*02*	02	02	01	06	01	10	01	14	01	18	00	22	00	176
180	*18*	00	*14*	00	*10*	00	*06*	00	*02*	00	02	00	06	00	10	00	14	00	18	00	22	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

956619 O - 52 - 10

Lat. 25°

H.A.	0° 00′ Alt.	Δd	Δt	Az.	0° 30′ Alt.	Δd	Δt	Az.	1° 00′ Alt.	Δd	Δt	Az.	1° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	65 00.0	1.0	02	180.0	65 30.0	1.0	02	180.0	66 00.0	1.0	02	180.0	66 30.0	1.0	02	180.0
1	64 58.9	1.0	06	177.6	65 28.9	1.0	06	177.6	65 58.8	1.0	06	177.5	66 28.8	1.0	06	177.5
2	64 55.5	1.0	09	175.3	65 25.4	1.0	10	175.2	65 55.3	1.0	10	175.1	66 25.2	1.0	10	175.0
3	64 49.9	99	13	172.9	65 19.7	99	13	172.8	65 49.5	99	14	172.7	66 19.3	99	14	172.5
4	64 42.1	99	17	170.6	65 11.8	99	17	170.4	65 41.5	99	17	170.2	66 11.1	99	18	170.1
05	64 32.2	98	20	168.3	65 01.7	98	20	168.1	65 31.1	98	21	167.9	66 00.6	98	21	167.6
6	64 20.1	98	24	166.0	64 49.4	97	24	165.8	65 18.6	97	24	165.5	65 47.8	97	25	165.2
7	64 06.0	97	27	163.8	64 35.0	97	28	163.5	65 03.9	97	28	163.2	65 32.9	96	28	162.9
8	63 49.8	96	30	161.6	64 18.5	96	31	161.3	64 47.2	96	31	160.9	65 15.8	95	32	160.6
9	63 31.7	96	33	159.5	64 00.1	96	34	159.1	64 28.4	94	34	158.7	64 56.7	94	35	158.3
10	63 11.6	94	36	157.4	63 39.7	93	37	157.0	64 07.7	93	38	156.6	64 35.7	93	38	156.1
1	62 49.8	93	39	155.3	63 17.5	92	40	154.9	63 45.2	92	40	154.4	64 12.8	92	41	154.0
2	62 26.2	91	42	153.3	62 53.6	91	43	152.9	63 20.8	91	43	152.4	63 48.0	90	44	151.9
3	62 01.0	90	45	151.4	62 27.9	90	45	150.9	62 54.8	89	46	150.4	63 21.6	89	47	149.9
4	61 34.1	89	47	149.5	62 00.7	88	48	149.0	62 27.2	88	49	148.5	62 53.5	88	49	147.9
15	61 05.7	87	50	147.6	61 31.9	87	50	147.1	61 58.0	87	51	146.6	62 23.9	86	52	146.1
6	60 35.9	86	52	145.8	61 01.7	86	53	145.3	61 27.3	85	53	144.8	61 52.8	85	54	144.2
7	60 04.7	85	54	144.1	60 30.0	84	55	143.6	60 55.3	84	56	143.0	61 20.3	83	56	142.5
8	59 32.2	83	56	142.4	59 57.1	83	57	141.9	60 21.9	82	58	141.3	60 46.6	82	58	140.7
9	58 58.4	82	58	140.8	59 22.9	82	59	140.3	59 47.3	81	60	139.7	60 11.5	80	60	139.1
20	58 23.5	81	60	139.3	58 47.6	80	61	138.7	59 11.6	80	62	138.1	59 35.4	79	62	137.5
1	57 47.5	79	62	137.8	58 11.2	79	62	137.2	58 34.7	78	63	136.6	58 58.1	78	64	136.0
2	57 10.4	78	64	136.3	57 33.7	77	64	135.7	57 56.8	77	65	135.1	58 19.8	76	65	134.5
3	56 32.3	77	65	134.9	56 55.2	76	66	134.3	57 18.0	76	66	133.7	57 40.6	75	67	133.1
4	55 53.3	75	66	133.5	56 15.9	75	67	132.9	56 38.2	74	68	132.3	57 00.4	74	68	131.7
25	55 13.5	74	68	132.2	55 35.6	74	68	131.6	55 57.6	73	69	131.0	56 19.4	72	70	130.4
6	54 32.8	73	69	130.9	54 54.5	72	70	130.3	55 16.1	72	70	129.7	55 37.5	71	71	129.1
7	53 51.3	72	70	129.7	54 12.7	71	71	129.1	54 33.9	70	72	128.5	54 55.0	70	72	127.9
8	53 09.1	70	72	128.5	53 30.1	70	72	127.9	53 51.0	69	73	127.3	54 11.7	69	73	126.7
9	52 26.2	69	73	127.3	52 46.9	69	73	126.7	53 07.4	68	74	126.1	53 27.7	67	74	125.5
30	51 42.6	68	74	126.2	52 03.0	68	74	125.6	52 23.2	67	75	125.0	52 43.2	66	75	124.4
1	50 58.4	67	75	125.1	51 18.5	67	75	124.5	51 38.3	66	76	123.9	51 58.0	65	76	123.3
2	50 13.7	66	76	124.1	50 33.4	65	76	123.5	50 52.9	65	76	122.9	51 12.3	64	77	122.3
3	49 28.3	65	76	123.1	49 47.8	64	77	122.5	50 07.0	64	77	121.9	50 26.1	63	78	121.3
4	48 42.5	64	77	122.1	49 01.6	63	78	121.5	49 20.6	63	78	120.9	49 39.4	62	79	120.3
35	47 56.2	63	78	121.1	48 15.0	63	78	120.5	48 33.7	62	79	119.9	48 52.2	61	79	119.3
6	47 09.4	62	79	120.2	47 28.0	62	79	119.6	47 46.4	61	80	119.0	48 04.6	60	80	118.4
7	46 22.2	61	79	119.3	46 40.5	61	80	118.7	46 58.6	60	80	118.1	47 16.5	59	81	117.5
8	45 34.6	60	80	118.4	45 52.6	60	80	117.8	46 10.4	59	81	117.3	46 28.1	59	81	116.7
9	44 46.5	60	81	117.6	45 04.3	59	81	117.0	45 21.9	58	82	116.4	45 39.4	58	82	115.8
40	43 58.2	59	81	116.7	44 15.7	58	82	116.2	44 33.1	58	82	115.6	44 50.2	57	82	115.0
1	43 09.4	58	82	115.9	43 26.7	57	82	115.4	43 43.8	57	82	114.8	44 00.8	56	83	114.2
2	42 20.4	57	82	115.1	42 37.4	57	83	114.6	42 54.3	56	83	114.0	43 11.1	56	84	113.5
3	41 31.0	56	83	114.4	41 47.8	56	83	113.8	42 04.5	55	84	113.3	42 21.0	55	84	112.7
4	40 41.3	56	83	113.6	40 57.9	55	84	113.1	41 14.4	55	84	112.5	41 30.7	54	84	112.0
45	39 51.3	55	84	112.9	40 07.8	55	84	112.4	40 24.1	54	84	111.8	40 40.2	53	85	111.3
6	39 01.1	54	84	112.2	39 17.4	54	84	111.7	39 33.5	53	85	111.1	39 49.4	53	85	110.6
7	38 10.7	54	84	111.5	38 26.7	53	85	111.0	38 42.6	53	85	110.4	38 58.4	52	86	109.9
8	37 19.9	53	85	110.8	37 35.8	53	85	110.3	37 51.5	52	86	109.8	38 07.1	52	86	109.2
9	36 29.0	53	85	110.2	36 44.7	52	86	109.6	37 00.3	52	86	109.1	37 15.7	51	86	108.6
50	35 37.9	52	86	109.5	35 53.4	52	86	109.0	36 08.8	51	86	108.5	36 24.0	51	86	107.9
1	34 46.5	51	86	108.9	35 01.9	51	86	108.4	35 17.1	51	86	107.8	35 32.2	50	87	107.3
2	33 55.0	51	86	108.3	34 10.2	50	86	107.8	34 25.3	50	87	107.2	34 40.2	50	87	106.7
3	33 03.2	50	86	107.7	33 18.3	50	87	107.1	33 33.2	50	87	106.6	33 48.0	49	87	106.1
4	32 11.3	50	87	107.1	32 26.3	50	87	106.6	32 41.1	49	87	106.0	32 55.7	49	87	105.5
55	31 19.3	49	87	106.5	31 34.1	49	87	106.0	31 48.7	49	88	105.5	32 03.3	48	88	104.9
6	30 27.1	49	87	105.9	30 41.7	49	88	105.4	30 56.2	48	88	104.9	31 10.6	48	88	104.4
7	29 34.7	49	88	105.3	29 49.2	48	88	104.8	30 03.6	48	88	104.3	30 17.9	47	88	103.8
8	28 42.2	48	88	104.8	28 56.6	48	88	104.3	29 10.9	47	88	103.8	29 25.0	47	88	103.3
9	27 49.5	48	88	104.3	28 03.8	47	88	103.8	28 18.0	47	88	103.3	28 32.1	47	88	102.7
60	26 56.8	47	88	103.7	27 10.9	47	88	103.2	27 25.0	47	88	102.7	27 39.0	46	89	102.2
1	26 03.9	47	88	103.2	26 17.9	47	88	102.7	26 31.9	46	89	102.2	26 45.8	46	89	101.7
2	25 10.9	47	88	102.7	25 24.8	46	89	102.2	25 38.7	46	89	101.7	25 52.5	46	89	101.2
3	24 17.8	46	89	102.2	24 31.6	46	89	101.7	24 45.4	46	89	101.2	24 59.1	45	89	100.7
4	23 24.6	46	89	101.6	23 38.3	46	89	101.2	23 52.0	45	89	100.7	24 05.6	45	89	100.2
65	22 31.3	46	89	101.1	22 44.9	45	89	100.7	22 58.5	45	89	100.2	23 12.0	45	89	99.7
6	21 37.9	45	89	100.7	21 51.5	45	89	100.2	22 05.0	45	89	99.7	22 18.4	45	90	99.2
7	20 44.4	45	89	100.2	20 57.9	45	89	99.7	21 11.3	45	90	99.2	21 24.7	44	90	98.7
8	19 50.8	45	89	99.7	20 04.3	45	90	99.2	20 17.6	44	90	98.7	20 30.9	44	90	98.3
9	18 57.2	45	90	99.2	19 10.5	44	90	98.7	19 23.8	44	90	98.3	19 37.1	44	90	97.8
70	18 03.5	44	90	98.7	18 16.8	44	90	98.3	18 30.0	44	90	97.8	18 43.2	44	90	97.3
1	17 09.7	44	90	98.3	17 22.9	44	90	97.8	17 36.1	44	90	97.3	17 49.2	44	90	96.9
2	16 15.8	44	90	97.8	16 29.0	44	90	97.4	16 42.1	44	90	96.9	16 55.2	43	90	96.4
3	15 21.9	44	90	97.4	15 35.1	44	90	96.9	15 48.1	43	90	96.4	16 01.1	43	90	96.0
4	14 28.0	44	90	96.9	14 41.1	43	90	96.4	14 54.1	43	90	96.0	15 07.0	43	90	95.5
75	13 34.0	43	90	96.5	13 47.0	43	90	96.0	14 00.0	43	90	95.5	14 12.9	43	90	95.1
6	12 39.9	43	90	96.0	12 52.9	43	90	95.6	13 05.8	43	90	95.1	13 18.7	43	90	94.6
7	11 45.8	43	90	95.6	11 58.7	43	90	95.1	12 11.6	43	90	94.6	12 24.5	43	90	94.2
8	10 51.7	43	90	95.1	11 04.6	43	90	94.7	11 17.4	43	90	94.2	11 30.2	43	90	93.8
9	9 57.5	43	90	94.7	10 10.4	43	90	94.2	10 23.2	43	90	93.8	10 35.9	43	90	93.3
80	9 03.3	43	90	94.3	9 16.1	43	90	93.8	9 28.9	43	90	93.3	9 41.6	42	90	92.9
1	8 09.0	43	90	93.8	8 21.8	43	90	93.4	8 34.6	42	90	92.9	8 47.3	42	90	92.5
2	7 14.8	43	90	93.4	7 27.5	42	90	92.9	7 40.3	42	90	92.5	7 53.0	42	91	92.0
3	6 20.5	43	90	93.0	6 33.2	42	90	92.5	6 45.9	42	90	92.1	6 58.6	42	91	91.6
4	5 26.2	42	90	92.5	5 38.9	42	91	92.1	5 51.6	42	90	91.6	6 04.3	42	91	91.2
85													5 09.9	42	91	90.8
6																

H.A.	2° 00′ Alt.	Δd	Δt	Az.	2° 30′ Alt.	Δd	Δt	Az.	3° 00′ Alt.	Δd	Δt	Az.	3° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	67 00.0	1.0	02	180.0	67 30.0	1.0	02	180.0	68 00.0	1.0	02	180.0	68 30.0	1.0	02	180.0
1	66 58.8	1.0	06	177.4	67 28.8	1.0	06	177.4	67 58.7	1.0	06	177.3	68 28.7	1.0	06	177.3
2	66 55.2	1.0	10	174.9	67 25.1	1.0	10	174.8	67 55.0	1.0	10	174.7	68 24.8	1.0	11	174.6
3	66 49.1	99	14	172.4	67 18.9	99	14	172.2	67 48.7	99	15	172.0	68 18.4	99	15	171.9
4	66 40.7	99	18	169.9	67 10.3	99	18	169.7	67 39.9	99	19	169.4	68 09.5	99	19	169.2
05	66 30.0	98	22	167.4	66 59.4	98	22	167.1	67 28.7	98	22	166.9	67 58.1	98	23	166.6
6	66 17.0	97	25	164.9	66 46.1	97	26	164.6	67 15.2	97	26	164.3	67 44.3	97	27	164.0
7	66 01.8	96	29	162.6	66 30.6	96	30	162.2	66 59.4	96	30	161.9	67 28.2	96	31	161.5
8	65 44.4	95	32	160.2	66 12.9	95	33	159.8	66 41.4	95	34	159.4	67 09.8	95	34	159.0
9	65 25.0	94	36	157.9	65 53.1	94	36	157.5	66 21.2	94	37	157.1	66 49.3	93	38	156.6
10	65 03.6	93	39	155.7	65 31.3	93	40	155.2	65 59.1	92	40	154.8	66 26.7	92	41	154.3
1	64 40.2	91	42	153.5	65 07.6	91	42	153.0	65 34.9	91	43	152.6	66 02.1	90	44	152.0
2	64 15.1	90	45	151.4	64 42.1	90	46	150.9	65 09.0	89	46	150.4	65 35.7	89	47	149.9
3	63 48.2	89	48	149.4	64 14.8	88	48	148.9	64 41.2	88	49	148.3	65 07.5	87	50	147.7
4	63 19.8	87	50	147.4	63 45.9	87	51	146.9	64 11.8	86	52	146.3	64 37.7	86	52	145.7
15	62 49.7	86	52	145.5	63 15.4	85	53	144.9	63 40.9	85	54	144.3	64 06.3	84	55	143.7
6	62 18.2	84	55	143.7	62 43.4	84	56	143.1	63 08.5	83	56	142.5	63 33.4	83	57	141.8
7	61 45.3	83	57	141.9	62 10.0	82	58	141.3	62 34.7	82	58	140.7	62 59.1	81	59	140.0
8	61 11.1	81	59	140.2	61 35.4	81	60	139.5	61 59.6	80	60	138.9	62 23.5	80	61	138.3
9	60 35.6	80	61	138.5	60 59.5	79	62	137.9	61 23.2	79	62	137.2	61 46.8	78	63	136.6
20	59 59.0	78	63	136.9	60 22.5	78	64	136.3	60 45.7	77	64	135.6	61 08.8	77	65	135.0
1	59 21.3	77	64	135.4	59 44.4	76	65	134.7	60 07.2	76	66	134.1	60 29.8	75	66	133.4
2	58 42.6	76	66	133.9	59 05.2	75	67	133.2	59 27.6	74	68	132.6	59 49.9	74	68	131.9
3	58 02.9	74	68	132.4	58 25.1	74	68	131.8	58 47.1	73	69	131.2	59 08.9	72	70	130.5
4	57 22.4	73	69	131.1	57 44.2	72	70	130.4	58 05.8	72	70	129.8	58 27.2	71	71	129.1
25	56 41.0	72	70	129.7	57 02.4	71	71	129.1	57 23.6	70	72	128.4	57 44.6	70	72	127.8
6	55 58.8	70	72	128.5	56 19.8	70	72	127.8	56 40.6	69	73	127.2	57 01.2	68	73	126.5
7	55 15.8	69	73	127.2	55 36.5	69	73	126.6	55 56.9	68	74	125.9	56 17.2	67	74	125.3
8	54 32.2	68	74	126.0	54 52.5	67	74	125.4	55 12.6	67	75	124.7	55 32.5	66	76	124.1
9	53 47.9	67	75	124.9	54 07.8	66	75	124.2	54 27.6	65	76	123.6	54 47.1	65	76	122.9
30	53 03.0	66	76	123.8	53 22.6	65	76	123.1	53 42.0	64	77	122.5	54 01.2	64	78	121.8
1	52 17.5	65	77	122.7	52 36.8	64	77	122.1	52 55.9	63	78	121.4	53 14.7	63	78	120.8
2	51 31.5	64	78	121.7	51 50.4	63	78	121.0	52 09.2	62	78	120.4	52 27.8	62	79	119.8
3	50 44.9	63	78	120.7	51 03.6	62	79	120.0	51 22.1	61	79	119.4	51 40.3	61	80	118.8
4	49 57.9	62	79	119.7	50 16.3	61	80	119.1	50 34.5	60	80	118.4	50 52.4	60	80	117.8
35	49 10.5	61	80	118.7	49 28.5	60	80	118.1	49 46.4	59	81	117.5	50 04.1	59	81	116.9
6	48 22.6	60	80	117.8	48 40.4	59	81	117.2	48 58.0	58	81	116.6	49 15.5	58	82	116.0
7	47 34.3	59	81	116.9	47 51.8	58	82	116.3	48 09.2	58	82	115.7	48 26.4	57	82	115.1
8	46 45.6	58	82	116.1	47 02.9	57	82	115.5	47 20.1	57	82	114.9	47 37.0	56	83	114.3
9	45 56.6	57	82	115.2	46 13.7	57	83	114.7	46 30.6	56	83	114.1	46 47.3	55	84	113.5
40	45 07.3	56	83	114.4	45 24.1	56	83	113.9	45 40.8	55	84	113.3	45 57.2	55	84	112.7
1	44 17.6	56	83	113.7	44 34.2	55	84	113.1	44 50.6	54	84	112.5	45 06.9	54	84	111.9
2	43 27.6	55	84	112.9	43 44.0	54	84	112.3	44 00.3	54	84	111.7	44 16.3	53	85	111.1
3	42 37.4	54	84	112.1	42 53.6	54	84	111.6	43 09.6	53	85	111.0	43 25.5	52	85	110.4
4	41 46.9	54	85	111.4	42 02.9	53	85	110.8	42 18.7	52	85	110.3	42 34.4	52	86	109.7
45	40 56.2	53	85	110.7	41 12.0	52	85	110.1	41 27.6	52	86	109.6	41 43.1	51	86	109.0
6	40 05.2	52	85	110.0	40 20.8	52	86	109.4	40 36.3	51	86	108.9	40 51.5	51	86	108.3
7	39 14.0	52	86	109.3	39 29.4	51	86	108.8	39 44.7	51	86	108.2	39 59.8	50	86	107.7
8	38 22.6	51	86	108.7	38 37.8	51	86	108.1	38 53.0	50	86	107.6	39 07.9	50	87	107.0
9	37 30.9	51	86	108.0	37 46.1	50	87	107.5	38 01.0	50	87	106.9	38 15.8	49	87	106.4
50	36 39.1	50	87	107.4	36 54.1	50	87	106.9	37 08.9	49	87	106.3	37 23.6	49	87	105.8
1	35 47.2	50	87	106.8	36 02.0	49	87	106.2	36 16.6	49	87	105.7	36 31.2	48	88	105.2
2	34 55.0	49	87	106.2	35 09.7	49	88	105.6	35 24.2	48	88	105.1	35 38.6	48	88	104.6
3	34 02.7	49	88	105.6	34 17.2	48	88	105.1	34 31.6	48	88	104.5	34 45.9	47	88	104.0
4	33 10.3	48	88	105.0	33 24.7	48	88	104.5	33 38.9	47	88	103.9	33 53.1	47	88	103.4
55	32 17.7	48	88	104.4	32 31.9	47	88	103.9	32 46.1	47	88	103.4	33 00.1	47	88	102.9
6	31 24.9	47	88	103.9	31 39.1	47	88	103.4	31 53.1	47	88	102.8	32 07.0	46	88	102.3
7	30 32.1	47	88	103.3	30 46.1	47	88	102.8	31 00.1	46	89	102.3	31 13.9	46	89	101.8
8	29 39.1	47	88	102.8	29 53.0	46	88	102.3	30 06.9	46	89	101.8	30 20.6	45	89	101.2
9	28 46.0	46	89	102.2	28 59.9	46	89	101.7	29 13.6	46	89	101.2	29 27.2	45	89	100.7
60	27 52.8	46	89	101.7	28 06.6	46	89	101.2	28 20.2	45	89	100.7	28 33.7	45	89	100.2
1	26 59.5	46	89	101.2	27 13.2	45	89	100.7	27 26.7	45	89	100.2	27 40.2	45	90	99.7
2	26 06.1	45	89	100.7	26 19.7	45	89	100.2	26 33.2	45	90	99.7	26 46.5	44	90	99.2
3	25 12.7	45	89	100.2	25 26.1	45	89	99.7	25 39.5	44	90	99.2	25 52.8	44	90	98.7
4	24 19.1	45	89	99.7	24 32.5	45	90	99.2	24 45.8	44	90	98.7	24 59.0	44	90	98.2
65	23 25.5	45	90	99.2	23 38.8	44	90	98.7	23 52.0	44	90	98.2	24 05.2	44	90	97.7
6	22 31.7	44	90	98.7	22 45.0	44	90	98.2	22 58.2	44	90	97.8	23 11.2	43	90	97.3
7	21 38.0	44	90	98.3	21 51.2	44	90	97.8	22 04.3	44	90	97.3	22 17.3	43	90	96.8
8	20 44.1	44	90	97.8	20 57.2	44	90	97.3	21 10.3	43	90	96.8	21 23.3	43	90	96.3
9	19 50.2	44	90	97.3	20 03.3	43	90	96.8	20 16.3	43	90	96.4	20 29.2	43	90	95.9
70	18 56.2	44	90	96.9	19 09.3	43	90	96.4	19 22.2	43	90	95.9	19 35.1	43	90	95.4
1	18 02.2	43	90	96.4	18 15.2	43	90	95.9	18 28.1	43	90	95.4	18 40.9	43	90	95.0
2	17 08.2	43	90	95.9	17 21.1	43	90	95.5	17 33.9	43	90	95.0	17 46.7	42	90	94.5
3	16 14.1	43	90	95.5	16 26.9	43	90	95.0	16 39.8	43	90	94.5	16 52.5	42	90	94.1
4	15 19.9	43	90	95.0	15 32.7	43	90	94.6	15 45.5	42	90	94.1	15 58.2	42	90	93.6
75	14 25.7	43	90	94.6	14 38.5	43	90	94.1	14 51.3	42	90	93.7	15 04.0	42	90	93.2
6	13 31.5	43	90	94.2	13 44.3	42	90	93.7	13 57.0	42	90	93.2	14 09.7	42	91	92.8
7	12 37.3	43	90	93.7	12 50.0	42	90	93.3	13 02.7	42	90	92.8	13 15.3	42	91	92.3
8	11 43.0	42	90	93.3	11 55.7	42	90	92.8	12 08.4	42	90	92.4	12 21.0	42	91	91.9
9	10 48.7	42	90	92.9	11 01.4	42	91	92.4	11 14.0	42	91	91.9	11 26.6	42	91	91.5
80	9 54.4	42	90	92.4	10 07.0	42	91	92.0	10 19.7	42	91	91.5	10 32.3	42	91	91.0
1	9 00.0	42	90	92.0	9 12.7	42	91	91.5	9 25.3	42	91	91.1	9 37.9	42	91	90.6
2	8 05.7	42	91	91.6	8 18.3	42	91	91.1	8 30.9	42	91	90.7	8 43.5	42	91	90.2
3	7 11.3	42	91	91.1	7 23.9	42	91	90.7	7 36.6	42	91	90.2	7 49.1	42	91	89.8
4	6 16.9	42	91	90.7	6 29.6	42	91	90.3	6 42.2	42	91	89.8	6 54.8	42	91	89.4
85	5 22.6	42	91	90.3	5 35.2	42	91	89.8	5 47.8	42	91	89.4	6 00.4	42	91	88.9
6													5 06.0	42	91	88.5

Lat. 25°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	65 00.0 1.0 02	180.0	64 30.0 1.0 02	180.0	64 00.0 1.0 02	180.0	63 30.0 1.0 02	180.0	63 00.0 1.0 02	180.0	62 30.0 1.0 02	180.0	62 00.0 1.0 02	180.0	61 30.0 1.0 02	180.0	00
1	64 58.9 1.0 06	177.6	64 28.9 1.0 06	177.7	63 58.9 1.0 06	177.7	63 28.9 1.0 06	177.8	62 59.0 1.0 06	177.8	62 29.0 1.0 06	177.8	61 59.0 1.0 05	177.9	61 29.0 1.0 05	177.9	1
2	64 55.5 1.0 09	175.3	64 25 6 1.0 09	175.4	63 55.7 1.0 09	175.4	63 25.8 1.0 09	175.5	62 55.8 1.0 09	175.6	62 25.9 1.0 08	175.7	61 56.0 1.0 08	175.8	61 26.0 1.0 08	175.8	2
3	64 49.9 99 13	172.9	64 20 1 99 13	173.1	63 50.3 99 12	173.2	63 20.5 99 12	173.3	62 50.6 99 12	173.4	62 20.8 99 12	173.5	61 50.9 99 12	173.6	61 21.1 1.0 12	173.7	3
4	64 42.1 99 17	170.6	64 12 5 99 16	170.8	63 42.8 99 16	170.9	63 13.1 99 16	171.1	62 43.4 99 16	171.3	62 13.7 99 15	171.4	61 43.9 99 15	171.5	61 14.2 99 15	171.7	4
05	64 32.2 98 20	168.3	64 02 7 98 20	168 5	63 33.2 98 20	168.7	63 03.6 98 19	168.9	62 34.1 99 19	169.1	62 04.5 99 18	169.3	61 35.0 99 18	169.5	61 05.4 99 18	169.6	05
6	64 20.1 98 24	166.0	63 50.8 98 23	166.3	63 21.5 98 23	166.5	62 52.2 98 22	166.8	62 22.8 98 22	167.0	61 53.4 98 22	167.2	61 24.0 98 21	167.4	60 54.6 98 21	167.6	6
7	64 06.0 97 27	163.8	63 36.9 97 26	164.1	63 07.8 97 26	164.4	62 38.7 97 26	164.6	62 09.6 97 26	164.9	61 40.4 97 26	165.1	61 11.2 97 24	165.4	60 42.0 97 24	165.6	7
8	63 49.8 96 30	161.6	63 21.0 96 30	161.9	62 52.2 96 29	162.2	62 23.4 96 29	162.5	61 54.5 96 28	162.8	61 25.6 96 28	163.1	60 56.6 97 27	163.4	60 27.6 97 27	163.6	8
9	63 31.7 95 33	159.5	63 03.2 95 33	159.8	62 34.7 95 32	160.1	62 06.1 95 32	160.5	61 37.5 95 31	160.8	61 08.8 96 31	161.1	60 40.1 96 30	161.4	60 11.4 96 30	161.7	9
10	63 11.6 94 36	157.4	62 43.5 94 36	157.7	62 15.3 94 35	158.1	61 47.0 94 35	158.5	61 18.7 94 34	158.8	60 50.3 95 34	159.1	60 21.9 95 33	159.5	59 53.5 95 33	159.8	10
1	62 49.8 93 39	155.3	62 22.0 93 39	155.7	61 54.1 93 38	156.1	61 26.2 93 38	156.5	60 58.2 93 37	156.9	60 30.1 94 36	157.2	60 02.0 94 36	157.6	59 33.8 94 35	157.9	1
2	62 26.2 91 42	153.3	61 58.8 92 42	153.7	61 31.3 92 41	154.2	61 03.7 92 40	154.6	60 36.0 92 40	155.0	60 08.3 93 39	155.3	59 40.5 93 39	155.7	59 12.6 93 38	156.1	2
3	62 01.0 90 45	151.4	61 33.9 90 44	151.8	61 06.7 91 44	152.3	60 39.5 91 43	152.7	60 12.2 91 42	153.1	59 44.8 91 42	153.5	59 17.3 92 41	153.9	58 49.8 92 41	154.3	3
4	61 34.1 89 47	149.5	61 07.4 89 47	149.9	60 40.6 89 46	150.4	60 13.8 90 45	150.9	59 46.8 90 45	151.3	59 19.8 90 44	151.7	58 52.6 91 44	152.1	58 25.4 91 43	152.5	4
15	61 05.7 87 50	147.6	60 39.4 88 49	148.1	60 13.0 88 48	148.6	59 46.6 88 48	149.1	59 20.0 89 47	149.5	58 53.3 89 46	150.0	58 26.5 89 46	150.4	57 59.6 90 45	150.8	15
6	60 35.9 86 52	145.8	60 10.0 86 51	146.4	59 44.0 87 51	146.9	59 17.9 87 50	147.3	58 51.7 88 49	147.8	58 25.4 88 49	148.3	57 59.0 88 48	148.7	57 32.4 89 48	149.2	6
7	60 04.7 85 54	144.1	59 39.2 85 54	144.6	59 13.6 86 53	145.2	58 47.9 86 52	145.7	58 22.0 86 52	146.1	57 56.1 87 51	146.6	57 30.1 87 50	147.1	57 03.9 87 50	147.5	7
8	59 32.2 83 56	142.4	59 07.1 84 56	143.0	58 41.9 84 55	143.5	58 16.6 85 54	144.0	57 51.1 85 54	144.5	57 25.6 85 53	145.0	56 59.9 86 52	145.5	56 34.1 86 52	146.0	8
9	58 58.4 82 58	140.8	58 33.8 82 58	141.4	58 08.9 83 57	141.9	57 44.0 83 56	142.4	57 18.9 84 56	142.9	56 53.8 84 55	143.4	56 28.5 85 54	143.9	56 03.0 85 54	144.4	9
20	58 23.5 81 60	139.3	57 59.2 81 59	139.8	57 34.8 82 59	140.4	57 10.3 82 58	140.9	56 45.6 82 58	141.4	56 20.8 83 57	141.9	55 55.9 83 56	142.4	55 30.8 84 56	142.9	20
1	57 47.5 79 62	137.8	57 23.6 80 61	138.3	56 59.6 80 60	138.9	56 35.4 81 60	139.4	56 11.1 81 59	139.9	55 46.7 82 58	140.5	55 22.2 82 58	141.0	54 57.5 82 57	141.5	1
2	57 10.4 78 64	136.3	56 46.9 78 63	136.9	56 23.3 79 62	137.4	55 59.5 79 62	138.0	55 35.6 80 61	138.5	55 11.6 80 60	139.0	54 47.4 81 60	139.5	54 23.1 81 59	140.1	2
3	56 32.3 77 65	134.9	56 09.3 77 64	135.5	55 46.0 78 64	136.0	55 22.6 78 63	136.6	54 59.1 79 62	137.1	54 35.4 79 62	137.6	54 11.6 80 61	138.2	53 47.7 80 61	138.7	3
4	55 53.3 75 66	133.5	55 30.7 76 66	134.1	55 07.8 76 65	134.7	54 44.8 77 65	135.2	54 21.6 77 64	135.8	53 58.3 78 63	136.3	53 34.9 78 63	136.8	53 11.3 79 62	137.3	4
25	55 13.5 74 68	132.2	54 51.2 75 67	132.8	54 28.7 75 67	133.3	54 06.0 76 66	133.9	53 43.3 76 65	134.5	53 20.3 77 65	135.0	52 57.2 77 64	135.5	52 34.0 78 64	136.1	25
6	54 32.8 73 69	130.9	54 10.8 73 68	131.5	53 48.7 74 68	132.1	53 26.4 75 67	132.6	53 04.0 75 67	133.2	52 41.4 76 66	133.7	52 18.7 76 66	134.3	51 55.8 76 65	134.8	6
7	53 51.3 72 70	129.7	53 29.7 72 70	130.3	53 08.0 73 69	130.8	52 46.0 73 68	131.4	52 24.0 74 68	132.0	52 01.7 74 67	132.5	51 39.4 75 67	133.0	51 16.8 75 66	133.6	7
8	53 09.1 70 72	128.5	52 47.9 71 71	129.1	52 26.5 72 70	129.6	52 04.9 72 70	130.2	51 43.2 73 69	130.8	51 21.3 73 69	131.3	50 59.2 74 68	131.9	50 37.1 74 68	132.4	8
9	52 26.2 69 73	127.3	52 05.3 70 72	127.9	51 44.2 70 72	128.5	51 23.0 71 71	129.1	51 01.6 72 70	129.6	50 40.1 72 70	130.2	50 18.4 73 69	130.7	49 56.5 73 69	131.2	9
30	51 42.6 68 74	126.2	51 22.1 69 73	126.8	51 01.3 69 72	127.4	50 40.4 70 72	127.9	50 19.4 70 72	128.5	49 58.2 71 71	129.0	49 36.8 71 70	129.6	49 15.3 72 70	130.1	30
1	50 58.4 67 75	125.1	50 38.2 68 74	125.7	50 17.8 68 74	126.3	49 57.2 69 73	126.8	49 36.5 69 72	127.4	49 15.6 70 72	128.0	48 54.6 70 72	128.5	48 33.4 71 71	129.0	1
2	50 13.7 66 76	124.1	49 53.8 67 75	124.7	49 33.7 67 74	125.2	49 13.4 68 74	125.8	48 53.0 68 74	126.4	48 32.4 69 73	126.9	48 11.7 69 72	127.5	47 50.8 70 72	128.0	2
3	49 28.3 65 76	123.1	49 08.7 66 76	123.6	48 49.0 66 75	124.2	48 29.0 67 75	124.8	48 08.9 67 74	125.3	47 48.7 68 74	125.9	47 28.3 68 73	126.4	47 07.7 69 73	127.0	3
4	48 42.5 64 77	122.1	48 23.2 65 77	122.6	48 03.7 65 76	123.2	47 44.1 66 76	123.8	47 24.3 66 75	124.3	47 04.3 67 75	124.9	46 44.2 67 74	125.4	46 23.9 68 74	126.0	4
35	47 56.2 63 78	121.1	47 37.2 64 78	121.7	47 18.0 64 77	122.3	46 58.7 65 77	122.8	46 39.1 65 76	123.4	46 19.5 66 76	123.9	45 59.6 66 75	124.5	45 39.7 67 75	125.0	35
6	47 09.4 62 79	120.2	46 50.7 63 78	120.8	46 31.8 63 78	121.3	46 12.7 64 77	121.9	45 53.5 64 77	122.4	45 34.1 65 76	123.0	45 14.6 65 76	123.5	44 54.9 66 76	124.1	6
7	46 22.2 61 79	119.3	46 03.7 62 79	119.9	45 45.1 62 78	120.4	45 26.3 63 78	121.0	45 07.4 63 78	121.5	44 48.3 64 77	122.1	44 29.0 64 77	122.6	44 09.6 65 76	123.1	7
8	45 34.6 60 80	118.4	45 16.4 61 80	119.0	44 58.0 61 79	119.5	44 39.5 62 79	120.1	44 20.8 63 78	120.6	44 01.9 63 78	121.2	43 43.0 64 78	121.7	43 23.8 64 77	122.3	8
9	44 46.5 60 81	117.6	44 28.6 60 80	118.1	44 10.5 61 80	118.7	43 52.2 61 79	119.2	43 33.8 62 79	119.8	43 15.2 62 78	120.3	42 56.5 63 78	120.9	42 37.6 63 78	121.4	9
40	43 58.2 59 81	116.7	43 40.5 59 81	117.3	43 22.6 60 80	117.8	43 04.6 60 80	118.4	42 46.4 61 80	118.9	42 28.1 61 79	119.5	42 09.6 62 79	120.0	41 51.0 62 78	120.5	40
1	43 09.4 58 82	115.9	42 52.0 58 82	116.5	42 34.3 59 81	117.0	42 16.6 60 81	117.6	41 58.6 60 80	118.1	41 40.5 61 80	118.7	41 22.3 61 80	119.2	41 03.9 61 79	119.7	1
2	42 20.4 57 82	115.1	42 03.1 58 82	115.7	41 45.7 58 82	116.2	41 28.2 59 81	116.8	41 10.5 59 81	117.3	40 52.6 60 80	117.9	40 34.7 60 80	118.4	40 16.5 61 80	118.9	2
3	41 31.0 56 83	114.4	41 14.0 57 82	114.9	40 56.8 57 82	115.5	40 39.5 58 82	116.0	40 22.0 58 81	116.5	40 04.4 59 81	117.1	39 46.6 59 81	117.6	39 28.7 60 80	118.1	3
4	40 41.3 56 83	113.6	40 24.5 56 83	114.2	40 07.5 57 82	114.7	39 50.4 57 82	115.3	39 33.2 58 82	115.8	39 15.8 58 82	116.3	38 58.3 59 81	116.8	38 40.6 59 81	117.4	4
45	39 51.3 55 84	112.9	39 34.8 56 84	113.5	39 18.0 56 83	114.0	39 01.1 57 83	114.5	38 44.1 57 82	115.1	38 26.9 57 82	115.6	38 09.6 58 82	116.1	37 52.2 58 81	116.6	45
6	39 01.1 54 84	112.2	38 44.7 55 84	112.7	38 28.2 55 84	113.3	38 11.5 56 83	113.8	37 54.7 56 83	114.3	37 37.7 57 82	114.8	37 20.6 57 82	115.4	37 03.4 58 82	115.9	6
7	38 10.7 54 84	111.5	37 54.5 54 84	112.0	37 38.1 55 84	112.6	37 21.6 55 84	113.1	37 05.0 56 83	113.6	36 48.2 56 83	114.1	36 31.3 57 83	114.7	36 14.3 57 82	115.2	7
8	37 19.9 53 85	110.8	37 03.9 54 84	111.4	36 47.8 54 84	111.9	36 31.5 55 84	112.4	36 15.0 55 84	112.9	35 58.5 55 83	113.5	35 41.8 56 83	114.0	35 25.0 56 83	114.5	8
9	36 29.0 53 85	110.2	36 13.2 53 85	110.7	35 57.2 53 85	111.2	35 41.1 54 84	111.7	35 24.8 54 84	112.3	35 08.5 55 84	112.8	34 52.0 55 84	113.3	34 35.3 56 83	113.8	9
50	35 37.9 52 86	109.5	35 22.2 52 85	110.0	35 06.4 53 85	110.6	34 50.5 53 85	111.1	34 34.4 54 84	111.6	34 18.2 54 84	112.1	34 01.9 55 84	112.6	33 45.4 55 84	113.1	50
1	34 46.5 51 86	108.9	34 31.0 52 86	109.4	34 15.4 52 85	109.9	33 59.6 53 85	110.4	33 43.7 53 85	111.0	33 27.7 54 84	111.5	33 11.6 54 84	112.0	32 55.3 54 84	112.5	1
2	33 55.0 51 86	108.3	33 39.6 51 86	108.8	33 24.2 52 86	109.3	33 08.6 52 86	109.8	32 52.8 53 85	110.3	32 37.0 53 85	110.8	32 21.0 53 85	111.3	32 04.9 54 84	111.8	2
3	33 03.2 50 86	107.7	32 48.1 51 86	108.2	32 32.7 51 86	108.7	32 17.3 52 86	109.2	32 01.7 52 86	109.7	31 46.1 52 85	110.2	31 30.3 53 85	110.7	31 14.4 53 85	111.2	3
4	32 11.3 50 87	107.1	31 56.3 50 86	107.6	31 41.1 51 86	108.1	31 25.9 51 86	108.6	31 10.4 52 86	109.1	30 54.9 52 86	109.6	30 39.3 52 85	110.1	30 23.5 53 85	110.6	4
55	31 19.3 49 87	106.5	31 04.4 50 87	107.0	30 49.4 50 86	107.5	30 34.2 51 86	108.0	30 19.0 51 86	108.5	30 03.6 51 86	109.0	29 48.1 52 86	109.5	29 32.5 52 85	110.0	55
6	30 27.1 49 87	105.9	30 12.3 49 87	106.4	29 57.4 50 87	106.9	29 42.4 50 86	107.4	29 27.3 51 86	107.9	29 12.1 51 86	108.4	28 56.8 51 86	108.9	28 41.3 52 86	109.4	6
7	29 34.7 49 88	105.3	29 20.1 49 87	105.8	29 05.3 49 87	106.3	28 50.5 50 87	106.8	28 35.5 50 87	107.3	28 20.4 50 86	107.8	28 05.2 51 86	108.3	27 50.0 51 86	108.8	7
8	28 42.2 48 88	104.8	28 27.7 49 88	105.3	28 13.1 49 87	105.8	27 58.3 49 87	106.3	27 43.5 50 87	106.8	27 28.6 50 87	107.3	27 13.5 50 86	107.8	26 58.4 51 86	108.2	8
9	27 49.5 48 88	104.3	27 35.2 48 88	104.7	27 20.7 48 88	105.2	27 06.1 49 88	105.7	26 51.4 49 87	106.2	26 36.6 49 87	106.7	26 21.7 50 87	107.2	26 06.7 50 86	107.7	9
60	26 56.8 47 88	103.7	26 42.5 48 88	104.2	26 28.1 48 88	104.7	26 13.6 48 88	105.2	25 59.1 49 87	105.7	25 44.4 49 87	106.2	25 29.6 49 87	106.6	25 14.8 50 87	107.1	60
1	26 03.9 47 88	103.2	25 49.7 47 88	103.7	25 35.5 48 88	104.2	25 21.1 48 88	104.6	25 06.6 48 88	105.1	24 52.1 49 87	105.6	24 37.5 49 87	106.1	24 22.7 49 87	106.6	1
2	25 10.9 47 88	102.7	24 56.8 47 88	103.2	24 42.7 47 88	103.6	24 28.4 48 88	104.1	24 14.1 48 88	104.6	23 59.7 48 88	105.1	23 45.1 49 88	105.6	23 30.5 49 87	106.0	2
3	24 17.8 46 89	102.2	24 03.8 47 88	102.6	23 49.8 47 88	103.1	23 35.6 47 88	103.6	23 21.4 48 88	104.1	23 07.1 48 88	104.6	22 52.7 48 88	105.0	22 38.2 48 88	105.5	3
4	23 24.6 46 89	101.6	23 10.7 46 89	102.1	22 56.8 47 88	102.6	22 42.7 47 88	103.1	22 28.6 47 88	103.6	22 14.4 47 88	104.0	22 00.1 48 88	104.5	21 45.7 48 88	105.0	4
65	22 31.3 46 89	101.1	22 17.5 46 89	101.6	22 03.6 46 89	102.1	21 49.7 47 88	102.6	21 35.7 47 88	103.1	21 21.6 47 88	103.5	21 07.4 47 88	104.0	20 53.2 48 88	104.5	65
6	21 37.9 45 89	100.7	21 24.2 46 89	101.1	21 10.4 46 89	101.6	20 56.6 46 89	102.1	20 42.7 47 88	102.6	20 28.7 47 88	103.0	20 14.6 47 88	103.5	20 00.4 47 88	104.0	6
7	20 44.4 45 89	100.2	20 30.8 45 89	100.6	20 17.1 46 89	101.1	20 03.4 46 89	101.6	19 49.5 46 89	102.1	19 35.6 46 88	102.5	19 21.7 47 88	103.0	19 07.6 47 88	103.5	7
8	19 50.8 45 89	99.7	19 37.3 45 89	100.2	19 23.7 45 89	100.6	19 10.0 46 89	101.1	18 56.3 46 89	101.6	18 42.5 46 89	102.0	18 28.6 46 88	102.5	18 14.7 47 88	103.0	8
9	18 57.2 45 90	99.2	18 43.7 45 89	99.7	18 30.2 45 89	100.2	18 16.6 45 89	100.6	18 03.0 46 89	101.1	17 49.3 46 89	101.6	17 35.5 46 89	102.0	17 21.6 46 88	102.5	9
70	18 03.5 44 90	98.7	17 50.1 45 90	99.2	17 36.7 45 89	99.7	17 23.2 45 89	100.2	17 09.6 45 89	100.6	16 56.0 46 89	101.1	16 42.3 46 89	101.6	16 28.5 46 89	102.0	70
1	17 09.7 44 90	98.3	16 56.4 44 90	98.7	16 43.0 45 90	99.2	16 29.6 45 90	99.7	16 16.1 45 89	100.1	16 02.5 45 89	100.6	15 48.9 45 89	101.1	15 35.3 46 89	101.5	1
2	16 15.8 44 90	97.8	16 02.6 44 90	98.3	15 49.3 44 90	98.8	15 35.9 45 90	99.2	15 22.5 45 89	99.7	15 09.1 45 89	100.1	14 55.5 45 89	100.6	14 41.9 45 89	101.1	2
3	15 21.9 44 90	97.4	15 08.8 44 90	97.8	14 55.5 44 90	98.3	14 42.2 44 90	98.8	14 28.9 45 90	99.2	14 15.5 45 89	99.7	14 02.0 45 89	100.1	13 48.5 45 89	100.6	3
4	14 28.0 44 90	96.9	14 14.9 44 90	97.4	14 01.7 44 90	97.8	13 48.5 44 90	98.3	13 35.2 44 90	98.8	13 21.9 45 90	99.2	13 08.5 45 89	99.7	12 55.0 45 89	100.1	4
75	13 34.0 43 90	96.5	13 20.9 44 90	96.9	13 07.8 44 90	97.4	12 54.6 44 90	97.8	12 41.4 44 90	98.3	12 28.1 44 90	98.8	12 14.8 44 90	99.2	12 01.5 45 90	99.7	75
6	12 39.9 43 90	96.0	12 26.9 43 90	96.5	12 13.8 44 90	96.9	12 00.7 44 90	97.4	11 47.6 44 90	97.9	11 34.4 44 90	98.3	11 21.1 44 90	98.8	11 07.8 44 90	99.2	6
7	11 45.8 43 90	95.6	11 32.8 43 90	96.0	11 19.8 43 90	96.5	11 06.8 44 90	97.0	10 53.7 44 90	97.4	10 40.5 44 90	97.9	10 27.3 44 90	98.3	10 14.1 44 90	98.8	7
8	10 51.7 43 90	95.1	10 38.7 43 90	95.6	10 25.8 43 90	96.1	10 12.8 43 90	96.5	9 59.7 44 90	97.0	9 46.6 44 90	97.4	9 33.5 44 90	97.9	9 20.4 44 90	98.3	8
9	9 57.5 43 90	94.7	9 44.6 43 90	95.2	9 31.7 43 90	95.6	9 18.7 43 90	96.1	9 05.7 43 90	96.5	8 52.7 43 90	97.0	8 39.6 44 90	97.4	8 26.5 44 90	97.9	9
80	9 03.3 43 90	94.3	8 50.4 43 90	94.7	8 37.5 43 90	95.2	8 24.6 43 90	95.6	8 11.7 43 90	96.1	7 58.7 43 90	96.5	7 45.7 43 90	97.0	7 32.6 44 90	97.5	80
1	8 09.0 43 90	93.8	7 56.2 43 90	94.3	7 43.4 43 90	94.7	7 30.5 43 90	95.2	7 17.6 43 90	95.7	7 04.6 43 90	96.1	6 51.7 43 90	96.6	6 38.7 43 90	97.0	1
2	7 14.8 43 90	93.4	7 02.0 43 90	93.9	6 49.2 43 90	94.3	6 36.3 43 90	94.8	6 23.4 43 90	95.2	6 10.5 43 90	95.7	5 57.6 43 90	96.1	5 44.7 43 90	96.6	2
3	6 20.5 43 90	93.0	6 07.7 43 90	93.4	5 54.9 43 90	93.9	5 42.1 43 90	94.3	5 29.3 43 90	94.8	5 16.4 43 90	95.2	5 03.5 43 90	95.7			3
4	5 26.2 42 90	92.5	5 13.4 43 90	93.0	5 00.7 43 90	93.5											4

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 25°

H.A.	4° 00′ Alt.	Az.	4° 30′ Alt.	Az.	5° 00′ Alt.	Az.	5° 30′ Alt.	Az.	6° 00′ Alt.	Az.	6° 30′ Alt.	Az.	7° 00′ Alt.	Az.	7° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	69 00.0 1.0 02	180.0	69 30.0 1.0 02	180.0	70 00.0 1.0 02	180.0	70 30.0 1.0 02	180.0	71 00.0 1.0 02	180.0	71 30.0 1.0 02	180.0	72 00.0 1.0 02	180.0	72 30.0 1.0 03	180.0	00
1	68 58.7 1.0 07	177.2	69 28.6 1.0 07	177.2	69 58.6 1.0 07	177.1	70 28.6 1.0 07	177.0	70 58.6 1.0 07	176.9	71 28.5 1.0 07	176.9	71 58.5 1.0 08	176.8	72 28.4 1.0 08	176.7	1
2	68 54.7 1.0 11	174.4	69 24.6 1.0 11	174.3	69 54.5 1.0 11	174.2	70 24.4 1.0 12	174.1	70 54.2 1.0 12	173.9	71 24.1 1.0 12	173.8	71 53.9 99 13	173.6	72 23.8 99 13	173.4	2
3	68 48.2 99 15	171.7	69 17.9 99 16	171.5	69 47.6 99 16	171.3	70 17.3 99 16	171.1	70 47.0 99 17	170.9	71 16.7 99 17	170.7	71 46.4 99 18	170.4	72 16.0 99 18	170.2	3
4	68 39.0 98 19	169.0	69 08.6 98 20	168.7	69 38.1 98 20	168.5	70 07.6 98 21	168.2	70 37.0 98 21	167.9	71 06.5 98 22	167.6	71 35.9 98 22	167.3	72 05.3 98 23	167.0	4
05	68 27.4 98 23	166.3	68 56.7 98 24	166.0	69 25.9 97 24	165.7	69 55.1 97 26	165.4	70 24.3 97 26	165.0	70 53.5 97 26	164.7	71 22.5 97 27	164.3	71 51.6 97 28	163.9	05
6	68 13.3 97 27	163.7	68 42.3 97 28	163.3	69 11.2 96 29	163.0	69 40.1 96 29	162.6	70 09.0 96 30	162.2	70 37.7 96 30	161.8	71 06.5 96 31	161.3	71 35.1 95 32	160.8	6
7	67 56.9 96 31	161.1	68 25.5 96 32	160.7	68 54.1 96 32	160.3	69 22.6 96 33	159.9	69 51.1 96 34	159.4	70 19.4 94 34	158.9	70 47.7 94 35	158.4	71 16.0 94 36	157.9	7
8	67 38.1 94 35	158.6	68 06.4 94 36	158.2	68 34.6 94 36	157.7	69 02.7 94 37	157.2	69 30.7 93 38	156.7	69 58.7 93 38	156.2	70 26.5 93 39	155.6	70 54.2 92 40	155.1	8
9	67 17.2 93 38	156.2	67 45.1 93 39	155.7	68 12.8 92 40	155.2	68 40.5 92 40	154.6	69 08.1 92 41	154.1	69 35.6 91 42	153.5	70 02.9 91 43	152.9	70 30.1 91 44	152.3	9
10	66 54.2 92 42	153.8	67 21.6 91 42	153.3	67 49.0 91 43	152.7	68 16.2 91 44	152.2	68 43.3 90 45	151.6	69 10.2 90 46	151.0	69 37.1 89 46	150.3	70 03.8 89 48	149.7	10
1	66 29.2 90 45	151.5	66 56.2 90 46	150.9	67 23.1 89 46	150.4	67 49.8 89 47	149.8	68 16.4 88 48	149.2	68 42.8 88 49	148.5	69 09.1 87 50	147.8	69 35.3 87 51	147.2	1
2	66 02.4 89 48	149.3	66 28.9 88 49	148.7	66 55.2 88 49	148.1	67 21.5 87 50	147.5	67 47.6 87 51	146.8	68 13.5 86 52	146.2	68 39.2 86 53	145.5	69 04.8 85 54	144.7	2
3	65 33.7 87 50	147.2	65 59.7 87 51	146.5	66 25.6 86 52	145.9	66 51.4 86 53	145.3	67 16.9 85 54	144.6	67 42.3 84 55	143.9	68 07.5 84 56	143.2	68 32.5 83 56	142.4	3
4	65 03.4 85 53	145.1	65 28.9 85 54	144.5	65 54.3 84 55	143.8	66 19.6 84 56	143.2	66 44.6 83 56	142.5	67 09.5 83 58	141.7	67 34.1 82 58	141.0	67 58.6 81 59	140.2	4
15	64 31.5 84 56	143.1	64 56.6 83 56	142.5	65 21.5 83 57	141.8	65 46.2 82 58	141.1	66 10.7 81 59	140.4	66 35.0 81 60	139.7	66 59.1 80 61	138.9	67 23.0 79 62	138.1	15
6	63 58.1 82 58	141.2	64 22.7 82 59	140.5	64 47.1 81 60	139.9	65 11.3 80 60	139.2	65 35.3 80 61	138.4	65 59.1 79 62	137.7	66 22.7 78 63	136.9	66 46.0 77 64	136.2	6
7	63 23.4 81 60	139.4	63 47.5 80 61	138.7	64 11.4 79 62	138.0	64 35.1 79 62	137.3	64 58.6 78 63	136.6	65 21.9 77 64	135.8	65 44.9 76 65	135.0	66 07.7 76 66	134.3	7
8	62 47.4 79 62	137.6	63 11.0 78 63	136.9	63 34.4 78 64	136.2	63 57.6 77 64	135.5	64 20.6 76 65	134.8	64 43.4 75 66	134.0	65 05.9 75 67	133.2	65 28.2 74 68	132.4	8
9	62 10.1 77 64	135.9	62 33.3 77 65	135.2	62 56.2 76 66	134.5	63 18.9 75 66	133.8	63 41.4 75 67	133.1	64 03.7 74 68	132.3	64 25.7 73 69	131.5	64 47.5 72 70	130.7	9
20	61 31.7 76 66	134.3	61 54.4 75 66	133.6	62 16.9 75 67	132.9	62 39.1 74 68	132.2	63 01.2 73 69	131.4	63 23.0 72 70	130.7	63 44.5 71 70	129.9	64 05.8 70 71	129.1	20
1	60 52.3 74 67	132.7	61 14.5 74 68	132.0	61 36.6 73 69	131.3	61 58.3 72 70	130.6	62 19.9 71 70	129.9	62 41.2 71 71	129.1	63 02.3 70 72	128.3	63 23.1 69 73	127.5	1
2	60 11.9 73 69	131.2	60 33.7 72 70	130.6	60 55.3 72 70	129.8	61 16.6 71 71	129.1	61 37.7 70 72	128.4	61 58.6 69 72	127.6	62 19.2 68 73	126.8	62 39.5 67 74	126.0	2
3	59 30.5 72 70	129.8	59 51.9 71 71	129.1	60 13.1 70 72	128.4	60 34.0 69 72	127.7	60 54.7 69 73	126.9	61 15.1 68 74	126.2	61 35.3 67 74	125.4	61 55.2 66 75	124.6	3
4	58 48.4 70 72	128.4	59 09.3 70 72	127.7	59 30.0 69 73	127.0	59 50.6 68 74	126.3	60 10.8 67 74	125.6	60 30.8 66 75	124.8	60 50.6 65 76	124.0	61 10.0 64 76	123.3	4
25	58 05.4 69 73	127.1	58 25.9 68 74	126.4	58 46.3 67 74	125.7	59 06.4 67 75	125.0	59 26.2 66 76	124.3	59 45.8 65 76	123.5	60 05.2 64 77	122.7	60 24.2 63 77	122.0	25
6	57 21.6 68 74	125.8	57 41.8 67 75	125.1	58 01.8 66 75	124.4	58 21.5 65 76	123.7	58 40.9 64 76	123.0	59 00.1 64 77	122.2	59 19.1 63 78	121.5	59 37.8 62 78	120.7	6
7	56 37.2 66 75	124.6	56 57.0 66 76	123.9	57 16.6 65 76	123.2	57 35.9 64 77	122.5	57 55.0 63 78	121.8	58 13.9 62 78	121.0	58 32.4 62 79	120.3	58 50.8 61 79	119.5	7
8	55 52.1 65 76	123.4	56 11.6 64 77	122.7	56 30.8 64 77	122.0	56 49.8 63 78	121.3	57 08.5 62 78	120.6	57 27.0 61 79	119.9	57 45.2 60 80	119.2	58 03.2 59 80	118.4	8
9	55 06.4 64 77	122.3	55 25.5 63 78	121.6	55 44.4 63 78	120.9	56 03.0 62 79	120.2	56 21.4 61 79	119.5	56 39.6 60 80	118.8	56 57.5 59 80	118.1	57 15.1 58 81	117.3	9
30	54 20.2 63 78	121.2	54 38.9 62 78	120.5	54 57.5 61 79	119.8	55 15.8 61 80	119.1	55 33.9 60 80	118.4	55 51.7 59 81	117.7	56 09.3 58 81	117.0	56 26.6 57 82	116.3	30
1	53 33.4 62 79	120.1	53 51.8 61 79	119.5	54 10.1 60 80	118.8	54 28.1 60 80	118.1	54 45.8 59 81	117.4	55 03.3 58 81	116.7	55 20.6 57 82	116.0	55 37.6 56 82	115.3	1
2	52 46.1 61 80	119.1	53 04.3 60 80	118.4	53 22.2 59 80	117.8	53 39.9 59 81	117.1	53 57.3 58 82	116.4	54 14.5 57 82	115.7	54 31.5 56 82	115.0	54 48.2 55 83	114.3	2
3	51 58.4 60 80	118.1	52 16.2 59 81	117.5	52 33.9 58 81	116.8	52 51.2 58 82	116.1	53 08.4 57 82	115.4	53 25.3 56 82	114.8	53 42.0 55 83	114.1	53 58.5 54 84	113.4	3
4	51 10.2 59 81	117.2	51 27.8 58 82	116.5	51 45.1 57 82	115.9	52 02.2 57 82	115.2	52 19.1 56 83	114.5	52 35.8 55 83	113.8	52 52.2 54 84	113.1	53 08.4 54 84	112.4	4
35	50 21.6 58 82	116.2	50 38.9 57 82	115.6	50 56.0 57 82	115.0	51 12.8 56 83	114.3	51 29.5 55 83	113.6	51 45.9 54 84	113.0	52 02.0 53 84	112.3	52 18.0 53 85	111.6	35
6	49 32.7 57 82	115.4	49 49.7 56 83	114.7	50 06.5 56 83	114.1	50 23.1 55 83	113.4	50 39.5 54 84	112.8	50 55.6 53 84	112.1	51 11.6 53 85	111.4	51 27.2 52 85	110.7	6
7	48 43.4 56 83	114.5	49 00.1 56 83	113.9	49 16.7 55 84	113.2	49 33.1 54 84	112.6	49 49.2 53 84	111.9	50 05.1 53 85	111.3	50 20.8 52 85	110.6	50 36.3 51 86	109.9	7
8	47 53.7 55 83	113.7	48 10.3 55 84	113.0	48 26.6 54 84	112.4	48 42.7 53 84	111.8	48 58.6 53 85	111.1	49 14.3 52 85	110.5	49 29.8 51 86	109.8	49 45.0 50 86	109.1	8
9	47 03.8 55 84	112.8	47 20.1 54 84	112.2	47 36.2 53 84	111.6	47 52.1 53 85	111.0	48 07.7 52 85	110.3	48 23.2 51 86	109.7	48 38.5 51 86	109.0	48 53.5 50 86	108.4	9
40	46 13.5 54 84	112.1	46 29.6 53 85	111.4	46 45.5 53 85	110.8	47 01.2 52 85	110.2	47 16.6 51 86	109.6	47 31.9 51 86	108.9	47 47.0 50 86	108.3	48 01.8 49 86	107.6	40
1	45 23.0 53 85	111.3	45 38.8 53 85	110.7	45 54.5 52 85	110.1	46 10.0 51 86	109.5	46 25.3 51 86	108.8	46 40.4 50 86	108.2	46 55.2 49 86	107.6	47 09.9 49 87	106.9	1
2	44 32.2 53 85	110.5	44 47.8 52 85	109.9	45 03.3 51 86	109.3	45 18.6 51 86	108.7	45 33.7 50 86	108.1	45 48.6 49 87	107.5	46 03.3 49 87	106.9	46 17.8 48 87	106.2	2
3	43 41.1 52 86	109.8	43 56.6 51 86	109.2	44 11.9 51 86	108.6	44 27.0 50 86	108.0	44 41.9 49 87	107.4	44 56.6 49 87	106.8	45 11.1 48 87	106.2	45 25.5 47 88	105.5	3
4	42 49.8 51 86	109.1	43 05.1 51 86	108.5	43 20.3 50 86	107.9	43 35.2 49 87	107.3	43 49.9 49 87	106.7	44 04.5 48 87	106.1	44 18.8 48 88	105.5	44 33.0 47 88	104.9	4
45	41 58.4 51 86	108.4	42 13.5 50 86	107.8	42 28.4 49 87	107.2	42 43.2 49 87	106.7	42 57.8 48 87	106.1	43 12.1 48 87	105.5	43 26.3 47 88	104.9	43 40.4 46 88	104.2	45
6	41 06.7 50 86	107.7	41 21.6 50 87	107.2	41 36.4 49 87	106.6	41 51.0 48 87	106.0	42 05.4 48 88	105.4	42 19.7 47 88	104.8	42 33.7 47 88	104.2	42 47.6 46 88	103.6	6
7	40 14.8 50 87	107.1	40 29.6 49 87	106.5	40 44.2 48 87	105.9	40 58.6 48 88	105.4	41 12.9 47 88	104.8	41 27.0 47 88	104.2	41 40.9 46 88	103.6	41 54.7 45 88	103.0	7
8	39 22.7 49 87	106.4	39 37.4 49 87	105.9	39 51.8 48 88	105.3	40 06.1 47 88	104.7	40 20.3 47 88	104.2	40 34.2 46 88	103.6	40 48.0 46 88	103.0	41 01.6 45 89	102.4	8
9	38 39.5 49 87	105.8	38 45.0 48 88	105.3	38 59.3 47 88	104.7	39 13.5 47 88	104.1	39 27.5 46 88	103.6	39 41.3 46 88	103.0	39 55.0 45 89	102.4	40 08.4 45 89	101.8	9
50	37 38.1 48 88	105.2	37 52.4 48 88	104.7	38 06.6 47 88	104.1	38 20.7 47 88	103.5	38 34.5 46 88	103.0	38 48.2 45 88	102.4	39 01.8 45 89	101.8	39 15.2 44 89	101.2	50
1	36 45.5 48 88	104.6	36 59.8 47 88	104.1	37 13.8 47 88	103.5	37 27.7 46 88	102.9	37 41.5 46 89	102.4	37 55.1 45 89	101.8	38 08.5 44 89	101.3	38 21.8 44 89	100.7	1
2	35 52.8 47 88	104.0	36 06.9 47 88	103.5	36 20.9 46 88	102.9	36 34.7 46 89	102.4	36 48.3 45 89	101.8	37 01.8 45 89	101.3	37 15.1 44 90	100.7	37 28.3 44 89	100.1	2
3	35 00.0 47 88	103.4	35 14.0 46 88	102.9	35 27.8 46 89	102.4	35 41.5 45 89	101.8	35 55.0 45 89	101.3	36 08.4 44 89	100.7	36 21.6 44 89	100.2	36 34.7 43 89	99.6	3
4	34 07.1 46 88	102.9	34 20.9 46 88	102.3	34 34.7 46 89	101.8	34 48.2 45 89	101.3	35 01.7 45 89	100.7	35 14.9 44 89	100.2	35 28.1 44 90	99.6	35 41.1 43 90	99.1	4
55	33 14.0 46 89	102.3	33 27.8 46 89	101.8	33 41.4 45 89	101.3	33 54.8 45 89	100.7	34 08.2 44 89	100.2	34 21.4 44 90	99.6	34 34.4 43 90	99.1	34 47.3 43 90	98.5	55
6	32 20.8 46 89	101.8	32 34.5 45 89	101.3	32 48.0 45 89	100.7	33 01.4 44 89	100.2	33 14.6 44 89	99.7	33 27.7 43 90	99.1	33 40.7 43 90	98.6	33 53.5 42 90	98.0	6
7	31 27.5 45 89	101.2	31 41.1 45 89	100.7	31 54.5 45 89	100.2	32 07.8 44 89	99.7	32 21.0 44 90	99.1	32 34.0 43 90	98.6	32 46.9 43 90	98.1	32 59.6 42 90	97.5	7
8	30 34.2 45 89	100.7	30 47.6 45 89	100.2	31 01.0 44 89	99.7	31 14.2 44 90	99.2	31 27.2 43 90	98.6	31 40.2 43 90	98.1	31 53.0 42 90	97.6	32 05.7 42 90	97.0	8
9	29 40.7 45 89	100.2	29 54.1 44 90	99.7	30 07.3 44 90	99.2	30 20.4 44 90	98.6	30 33.4 43 90	98.1	30 46.3 43 90	97.6	30 59.1 42 90	97.1	31 11.7 42 90	96.5	9
60	28 47.1 44 89	99.7	29 00.4 44 90	99.2	29 13.6 44 90	98.7	29 26.6 43 90	98.2	29 39.6 43 90	97.6	29 52.4 42 90	97.1	30 05.1 42 90	96.6	30 17.7 42 90	96.1	60
1	27 53.5 44 90	99.2	28 06.7 44 90	98.7	28 19.8 43 90	98.2	28 32.8 43 90	97.7	28 45.7 43 90	97.1	28 58.4 42 90	96.6	29 11.0 42 90	96.1	29 23.6 41 90	95.6	1
2	26 59.8 44 90	98.7	27 12.9 44 90	98.2	27 25.9 43 90	97.7	27 38.9 43 90	97.2	27 51.7 42 90	96.7	28 04.4 42 90	96.2	28 16.9 42 90	95.6	28 29.4 41 90	95.1	2
3	26 06.0 44 90	98.2	26 19.1 43 90	97.7	26 32.0 43 90	97.2	26 44.9 43 90	96.7	26 57.6 42 90	96.2	27 10.3 42 90	95.7	27 22.8 42 90	95.2	27 35.2 41 90	94.7	3
4	25 12.1 44 90	97.7	25 25.1 43 90	97.2	25 38.0 43 90	96.7	25 50.8 42 90	96.2	26 03.5 42 90	95.7	26 16.1 42 90	95.2	26 28.6 41 90	94.7	26 41.0 41 90	94.2	4
65	24 18.2 43 90	97.2	24 31.2 43 90	96.8	24 44.0 43 90	96.3	24 56.8 42 90	95.8	25 09.4 42 90	95.3	25 22.0 42 90	94.8	25 34.4 41 90	94.2	25 46.8 41 90	93.7	65
6	23 24.2 43 90	96.8	23 37.1 43 90	96.3	23 49.9 43 90	95.8	24 02.6 42 90	95.3	24 15.2 42 90	94.8	24 27.8 42 90	94.3	24 40.2 41 90	93.8	24 52.5 41 90	93.3	6
7	22 30.2 43 90	96.3	22 43.1 43 90	95.8	22 55.8 42 90	95.3	23 08.5 42 90	94.8	23 21.0 42 90	94.3	23 33.5 41 90	93.8	23 45.9 41 90	93.3	23 58.2 41 90	92.8	7
8	21 36.1 43 90	95.8	21 48.9 43 90	95.4	22 01.6 42 90	94.9	22 14.3 42 90	94.4	22 26.8 42 90	93.9	22 39.3 41 90	93.4	22 51.6 41 90	92.9	23 03.9 41 91	92.4	8
9	20 42.0 43 90	95.4	20 54.8 42 90	94.9	21 07.4 42 90	94.4	21 20.0 42 90	93.9	21 32.5 42 90	93.4	21 45.0 41 91	93.0	21 57.3 41 90	92.5	22 09.5 41 91	92.0	9
70	19 47.9 42 90	94.9	20 00.6 42 90	94.5	20 13.2 42 90	94.0	20 25.8 42 90	93.5	20 38.2 41 90	93.0	20 50.6 41 91	92.5	21 03.0 41 91	92.0	21 15.2 41 91	91.5	70
1	18 53.7 42 90	94.5	19 06.3 42 90	94.0	19 19.0 42 90	93.5	19 31.5 42 91	93.0	19 43.9 41 90	92.6	19 56.3 41 91	92.1	20 08.6 41 91	91.6	20 20.8 41 91	91.1	1
2	17 59.4 42 90	94.0	18 12.1 42 90	93.6	18 24.7 42 90	93.1	18 37.2 42 91	92.6	18 49.6 41 91	92.1	19 02.0 41 91	91.6	19 14.2 41 91	91.2	19 26.4 41 91	90.7	2
3	17 05.2 42 90	93.6	17 17.8 42 90	93.1	17 30.4 42 90	92.7	17 42.8 41 91	92.2	17 55.3 41 91	91.7	18 07.6 41 91	91.2	18 19.9 41 91	90.7	18 32.1 41 91	90.3	3
4	16 10.9 42 90	93.2	16 23.5 42 90	92.7	16 36.0 42 90	92.2	16 48.5 41 91	91.7	17 00.9 41 91	91.3	17 13.2 41 91	90.8	17 25.5 41 91	90.3	17 37.7 41 91	89.8	4
75	15 16.6 42 90	92.7	15 29.2 42 91	92.3	15 41.7 42 91	91.8	15 54.1 41 91	91.3	16 06.5 41 91	90.8	16 18.8 41 91	90.4	16 31.1 41 91	89.9	16 43.3 41 91	89.4	75
6	14 22.3 42 90	92.3	14 34.8 42 91	91.8	14 47.3 42 91	91.4	14 59.8 41 91	90.9	15 12.1 41 91	90.4	15 24.5 41 91	89.9	15 36.7 41 91	89.5	15 48.9 41 91	89.0	6
7	13 27.9 42 91	91.9	13 40.5 42 91	91.4	13 53.0 42 91	90.9	14 05.4 41 91	90.5	14 17.8 41 91	90.0	14 30.1 41 91	89.5	14 42.4 41 91	89.0	14 54.6 41 91	88.6	7
8	12 33.6 42 91	91.4	12 46.1 42 91	91.0	12 58.6 42 91	90.5	13 11.0 41 91	90.0	13 23.4 41 91	89.6	13 35.7 41 91	89.1	13 48.0 41 91	88.6	14 00.2 41 91	88.2	8
9	11 39.2 42 91	91.0	11 51.7 42 91	90.5	12 04.2 42 91	90.1	12 16.6 41 91	89.6	12 29.0 41 91	89.1	12 41.4 41 91	88.7	12 53.6 41 91	88.2	13 05.9 41 91	87.7	9
80	10 44.8 42 91	90.6	10 57.3 42 91	90.1	11 09.8 42 91	89.7	11 22.3 41 91	89.2	11 34.6 41 91	88.7	11 47.0 41 91	88.3	11 59.3 41 90	87.8	12 11.5 41 90	87.3	80
1	9 50.5 42 91	90.2	10 03.0 42 91	89.7	10 15.4 42 91	89.2	10 27.9 41 91	88.8	10 40.3 41 91	88.3	10 52.6 41 90	87.8	11 05.0 41 90	87.4	11 17.2 41 90	86.9	1
2	8 56.1 42 91	89.7	9 08.6 42 91	89.3	9 21.1 42 91	88.8	9 33.5 41 91	88.4	9 45.9 41 90	87.9	9 58.3 41 90	87.4	10 10.6 41 90	87.0	10 22.9 41 90	86.5	2
3	8 01.7 42 91	89.3	8 14.2 42 91	88.9	8 26.7 42 91	88.4	8 39.2 41 91	87.9	8 51.6 41 90	87.5	9 04.0 41 90	87.0	9 16.4 41 90	86.6	9 28.7 41 90	86.1	3
4	7 07.3 42 91	88.9	7 19.9 42 91	88.4	7 32.4 42 91	88.0	7 44.8 42 90	87.5	7 57.3 41 90	87.1	8 09.7 41 90	86.6	8 22.1 41 90	86.1	8 34.4 41 90	85.7	4
85	6 13.0 42 91	88.5	6 25.5 42 91	88.0	6 38.0 42 90	87.6	6 50.5 42 90	87.1	7 03.0 42 90	86.6	7 15.4 41 90	86.2	7 27.8 41 90	85.7	7 40.2 41 90	85.3	85
6	5 18.6 42 91	88.1	5 31.2 42 91	87.6	5 43.7 42 90	87.1	5 56.2 42 90	86.7	6 08.7 42 90	86.2	6 21.2 42 90	85.8	6 33.6 41 90	85.3	6 46.1 41 90	84.9	6
7							5 01.9 42 90	86.3	5 14.5 42 90	85.8	5 27.0 42 90	85.4	5 39.5 42 90	84.9	5 51.9 41 90	84.4	7

Lat. 25°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′	′	°	°	° ′	′	°	°	° ′	′	°	°	° ′	′	°	°	° ′	′	°	°	° ′	′	°	°	° ′	′	°	°	° ′	′	°	°	°
00	61 00.0	1.0	02	180.0	60 30.0	1.0	02	180.0	60 00.0	1.0	02	180.0	59 30.0	1.0	02	180.0	59 00.0	1.0	02	180.0	58 30.0	1.0	02	180.0	58 00.0	1.0	02	180.0	57 30.0	1.0	02	180.0	00
1	60 59.0	1.0	05	177.9	60 29.0	1.0	05	178.0	59 59.1	1.0	05	178.0	59 29.1	1.0	05	178.0	58 59.1	1.0	05	178.1	58 29.1	1.0	04	178.1	57 59.1	1.0	04	178.1	57 29.1	1.0	04	178.2	1
2	60 56.1	1.0	08	175.9	60 26.2	1.0	08	176.0	59 56.2	1.0	08	176.0	59 26.3	1.0	08	176.1	58 56.3	1.0	08	176.1	58 26.4	1.0	08	176.2	57 56.4	1.0	07	176.3	57 26.5	1.0	07	176.3	2
3	60 51.2	1.0	11	173.8	60 21.4	1.0	11	173.9	59 51.5	1.0	11	174.0	59 21.6	1.0	11	174.1	58 51.8	1.0	11	174.2	58 21.9	1.0	10	174.3	57 52.0	1.0	10	174.4	57 22.1	1.0	10	174.5	3
4	60 44.4	99	14	171.8	60 14.7	99	14	171.9	59 44.9	99	14	172.1	59 15.2	99	14	172.2	58 45.4	99	14	172.3	58 15.6	99	13	172.4	57 45.8	99	13	172.5	57 16.0	99	13	172.7	4
05	60 35.8	99	18	169.8	60 06.1	99	17	170.0	59 36.5	99	17	170.1	59 06.9	99	17	170.3	58 37.2	99	17	170.4	58 07.6	99	16	170.6	57 37.9	99	16	170.7	57 08.2	99	16	170.8	05
6	60 25.2	98	21	167.8	59 55.7	98	20	168.0	59 26.3	98	20	168.2	58 56.8	98	20	168.4	58 27.3	98	20	168.5	57 57.8	98	19	168.7	57 28.3	98	19	168.9	56 58.7	98	19	169.0	6
7	60 12.8	97	24	165.8	59 43.5	98	23	166.1	59 14.3	98	23	166.3	58 45.0	98	23	166.5	58 15.6	98	22	166.7	57 46.3	98	22	166.9	57 16.9	98	22	167.1	56 47.6	98	22	167.3	7
8	59 58.6	97	27	163.9	59 29.5	97	26	164.1	59 00.5	97	26	164.4	58 31.4	97	26	164.6	58 02.3	97	25	164.8	57 33.1	97	25	165.1	57 03.9	97	24	165.3	56 34.7	97	24	165.5	8
9	59 42.6	96	30	162.0	59 13.8	96	29	162.3	58 45.0	96	29	162.5	58 16.1	96	28	162.8	57 47.2	96	28	163.0	57 18.3	96	28	163.3	56 49.3	97	27	163.5	56 20.3	97	27	163.8	9
10	59 25.0	95	33	160.1	58 56.4	95	32	160.4	58 27.8	95	31	160.7	57 59.2	95	31	161.0	57 30.5	96	30	161.2	57 01.8	96	30	161.5	56 33.1	96	30	161.8	56 04.3	96	29	162.0	10
1	59 05.6	94	35	158.2	58 37.4	94	34	158.6	58 09.0	94	34	158.9	57 40.7	95	34	159.2	57 12.3	95	33	159.5	56 43.8	95	32	159.8	56 15.3	95	32	160.1	55 46.8	95	32	160.3	1
2	58 44.7	93	38	156.4	58 16.7	93	37	156.8	57 48.7	94	36	157.1	57 20.6	94	36	157.4	56 52.4	94	36	157.8	56 24.3	94	35	158.1	55 56.0	94	35	158.4	55 27.8	94	34	158.7	2
3	58 22.2	92	40	154.7	57 54.5	92	40	155.0	57 26.8	93	39	155.4	56 59.0	93	38	155.7	56 31.1	93	38	156.1	56 03.2	93	38	156.4	55 35.3	93	37	156.7	55 07.3	93	36	157.0	3
4	57 58.2	91	42	152.9	57 30.8	91	42	153.3	57 03.4	92	41	153.7	56 35.9	92	41	154.1	56 08.4	92	40	154.4	55 40.7	92	40	154.8	55 13.1	92	39	155.1	54 45.4	92	39	155.4	4
15	57 32.7	90	45	151.2	57 05.7	90	44	151.6	56 38.6	90	44	152.0	56 11.4	91	43	152.4	55 44.2	91	42	152.8	55 16.9	91	42	153.2	54 49.5	91	42	153.5	54 22.1	92	41	153.9	15
6	57 05.9	89	47	149.6	56 39.2	89	46	150.0	56 12.4	89	46	150.4	55 45.6	90	45	150.8	55 18.6	90	45	151.2	54 51.7	90	44	151.6	54 24.6	90	44	152.0	53 57.5	91	43	152.3	6
7	56 37.7	88	49	148.0	56 11.3	88	48	148.4	55 44.9	88	48	148.8	55 18.4	88	47	149.2	54 51.8	89	47	149.7	54 25.1	89	46	150.0	53 58.4	89	46	150.4	53 31.6	90	45	150.8	7
8	56 08.2	86	51	146.4	55 42.2	87	50	146.9	55 16.1	87	50	147.3	54 50.0	87	50	147.7	54 23.7	88	49	148.1	53 57.4	88	48	148.5	53 30.9	88	48	148.9	53 04.4	88	47	149.3	8
9	55 37.5	85	53	144.9	55 11.9	86	52	145.3	54 46.2	86	52	145.8	54 20.3	86	51	146.2	53 54.4	87	51	146.7	53 28.4	87	50	147.1	53 02.3	87	50	147.5	52 36.1	87	49	147.9	9
20	55 05.7	84	55	143.4	54 40.4	84	54	143.9	54 15.0	85	54	144.3	53 49.5	85	53	144.8	53 24.0	85	53	145.2	52 58.3	86	52	145.6	52 32.5	86	52	146.1	52 06.7	86	51	146.5	20
1	54 32.7	83	57	142.0	54 07.8	83	56	142.4	53 42.8	84	56	142.9	53 17.6	84	55	143.4	52 52.4	84	54	143.8	52 27.0	85	54	144.2	52 01.6	85	53	144.7	51 36.1	85	53	145.1	1
2	53 58.7	82	58	140.5	53 34.1	82	58	141.0	53 09.4	82	57	141.5	52 44.6	83	57	142.0	52 19.8	83	56	142.4	51 54.8	83	56	142.9	51 29.7	84	55	143.3	51 04.5	84	54	143.8	2
3	53 23.6	80	60	139.2	52 59.4	81	60	139.7	52 35.1	81	59	140.2	52 10.6	82	58	140.6	51 46.1	82	58	141.1	51 21.4	82	57	141.6	50 56.7	83	57	142.0	50 31.8	83	56	142.5	3
4	52 47.6	79	62	137.9	52 23.7	80	61	138.4	51 59.8	80	60	138.8	51 35.7	80	60	139.3	51 11.5	81	59	139.8	50 47.2	81	59	140.3	50 22.7	82	58	140.7	49 58.2	82	58	141.2	4
25	52 10.6	78	63	136.6	51 47.1	79	62	137.1	51 23.5	79	62	137.6	50 59.8	79	61	138.1	50 35.9	80	61	138.5	50 11.9	80	60	139.0	49 47.8	80	60	139.5	49 23.6	81	59	139.9	25
6	51 32.8	77	64	135.3	51 09.7	77	64	135.8	50 46.4	78	63	136.3	50 23.0	78	63	136.8	49 59.5	79	62	137.3	49 35.8	79	62	137.8	49 12.1	79	61	138.2	48 48.2	80	60	138.7	6
7	50 51.2	76	66	134.1	50 31.4	76	65	134.6	50 08.4	77	65	135.1	49 45.4	77	64	135.6	49 22.2	78	64	136.1	48 58.9	78	63	136.6	48 35.4	78	62	137.1	48 11.9	79	62	137.5	7
8	50 14.7	75	67	132.9	49 52.3	75	66	133.4	49 29.7	76	66	133.9	49 06.9	76	65	134.4	48 44.1	76	65	134.9	48 21.1	77	64	135.4	47 58.0	77	64	135.9	47 34.8	78	63	136.4	8
9	49 34.5	74	68	131.8	49 12.4	74	68	132.3	48 50.1	74	67	132.8	48 27.7	75	66	133.3	48 05.2	75	66	133.8	47 42.5	76	65	134.3	47 19.8	76	65	134.8	46 56.9	77	64	135.2	9
30	48 53.6	72	69	130.7	48 31.8	73	69	131.2	48 09.9	73	68	131.7	47 47.8	74	68	132.2	47 25.6	74	67	132.7	47 03.3	75	67	133.2	46 40.8	75	66	133.7	46 18.2	75	66	134.1	30
1	48 12.0	71	70	129.6	47 50.6	72	70	130.1	47 28.9	72	69	130.6	47 07.2	73	69	131.1	46 45.3	73	68	131.6	46 23.3	74	68	132.1	46 01.1	74	67	132.6	45 38.8	74	67	133.1	1
2	47 29.8	70	71	128.5	47 08.6	71	71	129.0	46 47.3	71	70	129.6	46 25.9	72	70	130.1	46 04.3	72	69	130.6	45 42.6	73	69	131.1	45 20.7	73	68	131.6	44 58.8	73	68	132.0	2
3	46 47.0	69	72	127.5	46 26.1	70	72	128.0	46 05.1	70	71	128.5	45 43.9	71	71	129.0	45 22.7	71	70	129.5	45 01.3	72	70	130.0	44 39.7	72	69	130.5	44 18.1	72	69	131.0	3
4	46 03.5	68	73	126.5	45 43.0	69	73	127.0	45 22.3	69	72	127.5	45 01.4	70	72	128.0	44 40.4	70	71	128.6	44 19.3	71	71	129.0	43 58.1	71	70	129.5	43 36.7	71	70	130.0	4
35	45 19.5	67	74	125.5	44 59.3	68	74	126.1	44 38.9	68	73	126.6	44 18.3	69	73	127.1	43 57.6	69	72	127.6	43 36.8	70	72	128.1	43 15.9	70	71	128.6	42 54.8	70	71	129.1	35
6	44 35.0	66	75	124.6	44 15.0	67	74	125.1	43 54.9	67	74	125.6	43 34.7	68	74	126.1	43 14.3	68	73	126.6	42 53.7	69	73	127.1	42 33.1	69	72	127.6	42 12.3	69	72	128.1	6
7	43 50.0	65	76	123.7	43 30.3	66	75	124.2	43 10.5	66	75	124.7	42 50.5	67	74	125.2	42 30.4	67	74	125.7	42 10.1	68	74	126.2	41 49.7	68	73	126.7	41 29.2	69	72	127.2	7
8	43 04.5	65	76	122.8	42 45.1	65	76	123.3	42 25.5	65	76	123.8	42 05.8	66	75	124.3	41 46.0	66	75	124.8	41 26.0	67	74	125.3	41 05.9	67	74	125.8	40 45.7	68	74	126.3	8
9	42 18.6	64	77	121.9	41 59.4	64	77	122.4	41 40.1	65	76	122.9	41 20.7	65	76	123.4	41 01.1	65	76	124.0	40 41.4	66	75	124.4	40 21.6	66	75	124.9	40 01.6	67	74	125.4	9
40	41 32.2	63	78	121.1	41 13.3	63	78	121.6	40 54.3	64	77	122.1	40 35.1	64	77	122.6	40 15.8	65	76	123.1	39 56.3	65	76	123.6	39 36.8	65	76	124.1	39 17.1	66	75	124.6	40
1	40 45.4	62	79	120.2	40 26.8	62	78	120.7	40 08.0	63	78	121.3	39 49.0	63	77	121.8	39 30.0	64	77	122.3	39 10.8	64	76	122.8	38 51.5	65	76	123.3	38 32.1	65	76	123.7	1
2	39 58.2	61	79	119.4	39 39.8	62	79	119.9	39 21.3	62	78	120.4	39 02.6	62	78	121.0	38 43.8	63	78	121.5	38 24.9	63	77	122.0	38 05.8	64	77	122.4	37 46.6	64	76	122.9	2
3	39 10.7	60	80	118.6	38 52.5	61	79	119.2	38 34.2	61	79	119.7	38 15.8	62	79	120.2	37 57.2	62	78	120.7	37 38.5	63	78	121.2	37 19.7	63	78	121.6	37 00.8	63	77	122.1	3
4	38 22.8	60	80	117.9	38 04.9	60	80	118.4	37 46.8	60	80	118.9	37 28.6	61	79	119.4	37 10.3	61	79	119.9	36 51.8	62	78	120.4	36 33.2	62	78	120.9	36 14.5	63	78	121.4	4
45	37 34.6	59	81	117.1	37 16.9	59	81	117.6	36 59.0	60	80	118.1	36 41.0	60	80	118.6	36 22.9	61	80	119.1	36 04.7	61	79	119.6	35 46.4	61	79	120.1	35 27.9	62	78	120.6	45
6	36 46.0	58	82	116.4	36 28.5	59	81	116.9	36 10.9	59	81	117.4	35 53.1	59	80	117.9	35 35.3	60	80	118.4	35 17.3	60	80	118.9	34 59.2	61	79	119.4	34 40.9	61	79	119.9	6
7	35 57.2	57	82	115.7	35 39.9	58	82	116.2	35 22.5	58	81	116.7	35 04.9	59	81	117.2	34 47.3	59	80	117.7	34 29.5	59	80	118.2	34 11.6	60	80	118.6	33 53.6	60	80	119.1	7
8	35 08.0	57	82	115.0	34 50.9	57	82	115.5	34 33.7	58	82	116.0	34 16.4	58	81	116.5	33 59.0	58	81	117.0	33 41.4	59	81	117.4	33 23.7	59	80	117.9	33 05.9	59	80	118.4	8
9	34 18.6	56	83	114.3	34 01.7	56	82	114.8	33 44.7	57	82	115.3	33 27.6	57	82	115.8	33 10.3	58	82	116.3	32 53.0	58	81	116.8	32 35.5	58	81	117.2	32 18.0	59	80	117.7	9
50	33 28.9	55	83	113.6	33 12.2	56	83	114.1	32 55.4	56	83	114.6	32 38.5	57	82	115.1	32 21.4	57	82	115.6	32 04.3	57	82	116.1	31 47.0	58	81	116.6	31 29.7	58	81	117.0	50
1	32 38.9	55	84	113.0	32 22.4	55	83	113.5	32 05.8	56	83	114.0	31 49.1	56	83	114.4	31 32.3	56	82	114.9	31 15.3	57	82	115.4	30 58.3	57	82	115.9	30 41.1	57	82	116.4	1
2	31 48.7	54	84	112.3	31 32.4	55	84	112.8	31 16.0	55	84	113.3	30 59.5	55	83	113.8	30 42.8	56	83	114.3	30 26.1	56	82	114.8	30 09.2	56	82	115.2	29 52.2	57	82	115.7	2
3	30 58.3	54	84	111.7	30 42.2	54	84	112.2	30 25.9	54	84	112.7	30 09.6	55	84	113.2	29 53.1	55	83	113.6	29 36.6	55	83	114.1	29 19.9	56	83	114.6	29 03.1	56	82	115.1	3
4	30 07.7	53	85	111.1	29 51.7	53	84	111.6	29 35.7	54	84	112.1	29 19.5	54	84	112.5	29 03.2	54	84	113.0	28 46.8	55	83	113.5	28 30.3	55	83	114.0	28 13.7	55	83	114.4	4
55	29 16.8	52	85	110.5	29 01.0	53	85	111.0	28 45.1	53	84	111.4	28 29.1	54	84	111.9	28 13.0	54	84	112.4	27 56.8	54	84	112.9	27 40.5	55	83	113.4	27 24.1	55	83	113.8	55
6	28 25.8	52	85	109.9	28 10.2	52	85	110.4	27 54.4	53	85	110.8	27 38.6	53	85	111.3	27 22.6	53	84	111.8	27 06.6	54	84	112.3	26 50.5	54	84	112.7	26 34.2	54	83	113.2	6
7	27 34.6	51	86	109.3	27 19.1	52	86	109.8	27 03.5	52	85	110.3	26 47.8	52	85	110.7	26 32.0	53	85	111.2	26 16.2	53	84	111.7	26 00.2	53	84	112.2	25 44.2	54	84	112.6	7
8	26 43.2	51	86	108.7	26 27.8	51	86	109.2	26 12.4	52	86	109.7	25 56.9	52	85	110.2	25 41.3	52	85	110.6	25 25.5	53	85	111.1	25 09.7	53	84	111.6	24 53.9	53	84	112.0	8
9	25 51.6	50	86	108.2	25 36.4	51	86	108.6	25 21.1	51	86	109.1	25 05.7	51	86	109.6	24 50.3	52	85	110.1	24 34.7	52	85	110.5	24 19.1	52	85	111.0	24 03.4	53	85	111.5	9
60	24 59.8	50	86	107.6	24 44.8	50	86	108.1	24 29.6	51	86	108.5	24 14.4	51	86	109.0	23 59.1	51	86	109.5	23 43.7	51	85	110.0	23 28.2	52	85	110.4	23 12.6	52	85	110.9	60
1	24 07.9	50	87	107.1	23 53.0	50	86	107.5	23 38.0	50	86	108.0	23 22.9	50	86	108.5	23 07.7	51	86	108.9	22 52.5	51	86	109.4	22 37.2	51	85	109.9	22 21.7	52	85	110.3	1
2	23 15.8	49	87	106.5	23 01.1	49	87	107.0	22 46.2	50	87	107.5	22 31.3	50	86	107.9	22 16.2	50	86	108.4	22 01.1	51	86	108.9	21 45.9	51	86	109.3	21 30.7	51	86	109.8	2
3	22 23.6	49	87	106.0	22 09.0	49	87	106.5	21 54.3	49	87	106.9	21 39.4	49	86	107.4	21 24.5	50	86	107.9	21 09.6	50	86	108.3	20 54.5	50	86	108.8	20 39.4	51	86	109.3	3
4	21 31.3	48	88	105.5	21 16.8	49	87	105.9	21 02.2	49	87	106.4	20 47.5	49	87	106.9	20 32.7	49	87	107.3	20 17.9	50	86	107.8	20 03.0	50	86	108.3	19 48.0	50	86	108.7	4
65	20 38.8	48	88	104.9	20 24.4	48	88	105.4	20 09.9	48	87	105.9	19 55.4	49	87	106.3	19 40.7	49	87	106.8	19 26.0	49	87	107.3	19 11.3	49	86	107.7	18 56.4	50	86	108.2	65
6	19 46.2	48	88	104.4	19 31.9	48	88	104.9	19 17.6	48	88	105.4	19 03.1	48	87	105.8	18 48.6	48	87	106.3	18 34.0	49	87	106.8	18 19.4	49	87	107.2	18 04.7	49	86	107.7	6
7	18 53.5	47	88	103.9	18 39.3	47	88	104.4	18 25.1	48	88	104.9	18 10.7	48	88	105.3	17 56.4	48	87	105.8	17 41.9	48	87	106.3	17 27.4	49	87	106.7	17 12.8	49	87	107.2	7
8	18 00.7	47	88	103.4	17 46.6	47	88	103.9	17 32.4	47	88	104.4	17 18.2	47	88	104.8	17 04.0	48	88	105.3	16 49.6	48	87	105.8	16 35.2	48	87	106.2	16 20.8	48	87	106.7	8
9	17 07.7	46	88	103.0	16 53.7	47	88	103.4	16 39.7	47	88	103.9	16 25.6	47	88	104.3	16 11.4	47	88	104.8	15 57.2	47	88	105.3	15 43.0	48	87	105.7	15 28.6	48	87	106.2	9
70	16 14.7	46	88	102.5	16 00.8	46	88	102.9	15 46.9	47	88	103.4	15 32.9	47	88	103.9	15 18.8	47	88	104.3	15 04.7	47	88	104.8	14 50.5	47	88	105.2	14 36.3	47	87	105.7	70
1	15 21.5	46	89	102.0	15 07.8	46	89	102.5	14 53.9	46	88	102.9	14 40.0	46	88	103.4	14 26.1	47	88	103.8	14 12.1	47	88	104.3	13 58.0	47	88	104.7	13 43.9	47	88	105.2	1
2	14 28.3	46	89	101.5	14 14.6	46	89	102.0	14 00.9	46	89	102.4	13 47.1	46	88	102.9	13 33.2	46	88	103.4	13 19.3	46	88	103.8	13 05.4	47	88	104.3	12 51.4	47	88	104.7	2
3	13 35.0	45	89	101.1	13 21.4	45	89	101.5	13 07.7	46	89	102.0	12 54.0	46	88	102.4	12 40.3	46	88	102.9	12 26.5	46	88	103.3	12 12.6	46	88	103.8	11 58.7	46	88	104.2	3
4	12 41.6	45	89	100.6	12 28.0	45	89	101.1	12 14.5	45	89	101.5	12 00.9	45	89	102.0	11 47.2	46	89	102.4	11 33.5	46	88	102.9	11 19.8	46	88	103.3	11 06.0	46	88	103.8	4
75	11 48.1	45	89	100.1	11 34.6	45	89	100.6	11 21.1	45	89	101.1	11 07.6	45	89	101.5	10 54.0	45	89	102.0	10 40.4	45	88	102.4	10 26.8	46	88	102.9	10 13.1	46	88	103.3	75
6	10 54.5	44	89	99.7	10 41.1	45	89	100.1	10 27.7	45	89	100.6	10 14.3	45	89	101.1	10 00.8	45	89	101.5	9 47.3	45	89	102.0	9 33.7	45	89	102.4	9 20.1	45	88	102.9	6
7	10 00.9	44	90	99.2	9 47.6	44	90	99.7	9 34.2	44	89	100.1	9 20.9	45	89	100.6	9 07.5	45	89	101.1	8 54.0	45	89	101.5	8 40.6	45	89	102.0	8 27.1	45	89	102.4	7
8	9 07.2	44	90	98.8	8 53.9	44	90	99.2	8 40.7	44	89	99.7	8 27.4	44	89	100.2	8 14.1	44	89	100.6	8 00.7	45	89	101.1	7 47.3	45	89	101.5	7 33.9	45	89	102.0	8
9	8 13.4	44	90	98.3	8 00.2	44	90	98.8	7 47.0	44	90	99.3	7 33.8	44	89	99.7	7 20.6	44	89	100.2	7 07.3	44	89	100.6	6 54.0	44	89	101.1	6 40.7	44	89	101.5	9
80	7 19.6	44	90	97.9	7 06.5	44	90	98.4	6 53.3	44	90	98.8	6 40.2	44	90	99.3	6 27.0	44	89	99.7	6 13.8	44	89	100.2	6 00.6	44	89	100.6	5 47.4	44	89	101.1	80
1	6 25.7	43	90	97.5	6 12.6	43	90	97.9	5 59.6	44	90	98.4	5 46.5	44	90	98.8	5 33.4	44	90	99.3	5 20.3	44	89	99.7	5 07.1	44	89	100.2					1
2	5 31.7	43	90	97.0	5 18.7	43	90	97.5	5 05.7	43	90	97.9																					2

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 25°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	00
1	72 58.4	1.0 08	176.6	73 28.4	1.0 08	176.5	73 58.3	1.0 08	176.4	74 28.3	1.0 09	176.3	74 58.2	1.0 09	176.2	75 28.1	1.0 09	176.1	75 58.1	1.0 10	175.9	76 28.0	1.0 10	175.8	1
2	72 53.6	99 13	173.3	73 23.4	99 14	173.1	73 53.2	99 14	172.9	74 23.0	99 14	172.7	74 52.8	99 15	172.4	75 22.6	99 15	172.2	75 52.3	99 16	171.9	76 22.1	99 16	171.7	2
3	72 45.6	99 18	169.9	73 15.2	99 19	169.7	73 44.8	99 19	169.4	74 14.4	98 20	169.0	74 43.9	98 20	168.7	75 13.4	98 21	168.4	75 42.8	98 22	168.0	76 12.3	98 23	167.6	3
4	72 34.6	98 23	166.7	73 03.9	98 24	166.3	73 33.2	97 25	165.9	74 02.4	97 25	165.5	74 31.6	97 26	165.1	75 00.7	97 27	164.6	75 29.7	97 28	164.1	75 58.7	97 28	163.6	4
05	72 20.6	97 28	163.5	72 49.5	96 29	163.0	73 18.4	96 30	162.6	73 47.2	96 30	162.1	74 15.9	96 31	161.5	74 44.6	95 32	161.0	75 13.2	95 33	160.4	75 41.6	95 34	159.8	05
6	72 03.7	95 33	160.4	72 32.2	95 34	159.8	73 00.6	95 34	159.3	73 29.0	94 35	158.7	73 57.2	94 36	158.1	74 25.3	94 37	157.5	74 53.3	93 38	156.8	75 21.2	93 39	156.1	6
7	71 44.1	94 37	157.4	72 12.1	93 38	156.8	72 40.0	93 39	156.2	73 07.8	92 40	155.5	73 35.5	92 41	154.9	74 03.0	92 42	154.1	74 30.4	91 43	153.4	74 57.7	90 44	152.6	7
8	71 21.9	92 41	154.4	71 49.4	91 42	153.8	72 16.7	91 43	153.2	72 44.0	91 44	152.5	73 11.1	90 45	151.7	73 38.0	89 46	150.9	74 04.7	89 47	150.1	74 31.2	88 48	149.3	8
9	70 57.2	90 45	151.7	71 24.2	90 46	151.0	71 51.0	89 47	150.3	72 17.6	88 48	149.5	72 44.0	88 49	148.7	73 10.3	87 50	147.9	73 36.3	86 51	147.0	74 02.2	86 52	146.1	9
10	70 30.3	88 48	149.0	70 56.7	88 50	148.3	71 22.9	87 50	147.5	71 48.9	86 52	146.7	72 14.7	86 52	145.9	72 40.2	85 54	145.0	73 05.6	84 55	144.1	73 30.7	83 56	143.2	10
1	70 01.2	86 52	146.4	70 27.0	86 53	145.7	70 52.6	85 54	144.9	71 18.0	84 55	144.1	71 43.1	83 56	143.2	72 08.0	83 57	142.3	72 32.7	82 58	141.4	72 57.0	81 59	140.4	1
2	69 30.2	84 55	144.0	69 55.4	84 56	143.2	70 20.3	83 57	142.4	70 45.1	82 58	141.5	71 09.6	81 59	140.7	71 33.8	80 60	139.7	71 57.8	79 61	138.8	72 21.4	78 62	137.8	2
3	68 57.3	82 58	141.7	69 21.9	82 58	140.9	69 46.3	81 60	140.0	70 10.4	80 61	139.1	70 34.2	79 62	138.2	70 57.8	78 63	137.3	71 21.0	77 64	136.3	71 44.0	76 65	135.3	3
4	68 22.8	80 60	139.4	68 46.8	80 61	138.6	69 10.5	79 62	137.8	69 34.0	78 63	136.9	69 57.2	77 64	136.0	70 20.1	76 65	135.0	70 42.7	75 66	134.0	71 05.0	74 68	133.0	4
15	67 46.7	78 62	137.3	68 10.1	78 64	136.5	68 33.2	77 64	135.6	68 56.1	76 66	134.7	69 18.7	75 66	133.8	69 41.0	74 68	132.9	70 02.9	73 68	131.9	70 24.5	71 70	130.9	15
6	67 09.1	77 65	135.3	67 32.0	76 66	134.5	67 54.5	75 67	133.6	68 16.8	74 68	132.7	68 38.8	73 69	131.8	69 00.4	72 70	130.8	69 21.8	71 70	129.9	69 42.8	69 72	128.8	6
7	66 30.2	75 67	133.4	66 52.5	74 68	132.6	67 14.5	73 69	131.7	67 36.2	72 70	130.8	67 57.6	71 70	129.9	68 18.7	70 71	128.9	68 39.5	69 72	127.9	68 59.8	67 73	126.9	7
8	65 50.2	73 69	131.6	66 11.9	72 70	130.8	66 33.4	71 70	129.9	66 54.5	70 71	129.0	67 15.4	69 72	128.1	67 35.9	68 73	127.1	67 56.0	67 74	126.2	68 15.9	65 75	125.1	8
9	65 09.0	71 70	129.9	65 30.2	70 71	129.1	65 51.1	69 72	128.2	66 11.8	68 73	127.3	66 32.1	67 74	126.4	66 52.0	66 74	125.4	67 11.7	65 76	124.5	67 30.9	64 76	123.5	9
20	64 26.8	70 72	128.3	64 47.5	69 73	127.4	65 07.9	68 74	126.6	65 28.0	67 74	125.7	65 47.8	65 75	124.8	66 07.3	64 76	123.8	66 26.4	63 77	122.9	66 45.2	62 78	121.9	20
1	63 43.6	68 73	126.7	64 03.8	67 74	125.9	64 23.8	66 75	125.0	64 43.4	65 76	124.1	65 02.7	64 76	123.2	65 21.7	63 77	122.3	65 40.3	62 78	121.4	65 58.6	60 79	120.4	1
2	62 59.6	66 75	125.2	63 19.4	65 76	124.4	63 38.9	64 76	123.5	63 58.0	63 77	122.7	64 16.9	62 78	121.8	64 35.4	61 78	120.9	64 53.6	60 79	119.9	65 11.4	59 80	119.0	2
3	62 14.8	65 76	123.8	62 34.1	64 76	123.0	62 53.2	63 77	122.1	63 11.9	62 78	121.3	63 30.3	61 79	120.4	63 48.4	60 79	119.5	64 06.1	59 80	118.6	64 23.5	57 81	117.6	3
4	61 29.3	64 77	122.5	61 48.2	63 78	121.6	62 06.8	62 78	120.8	62 25.1	61 79	120.0	62 43.1	59 80	119.1	63 00.8	58 80	118.2	63 18.1	57 81	117.3	63 35.0	56 82	116.4	4
25	60 43.0	62 78	121.2	61 01.6	61 79	120.4	61 19.8	60 79	119.5	61 37.7	59 80	118.7	61 55.3	58 80	117.8	62 12.6	57 81	117.0	62 29.5	56 82	116.1	62 46.1	55 82	115.2	25
6	59 56.2	61 79	119.9	60 14.3	60 80	119.1	60 32.2	59 80	118.3	60 49.7	58 81	117.5	61 06.9	57 81	116.7	61 23.8	56 82	115.8	61 40.4	55 82	114.9	61 56.6	54 83	114.0	6
7	59 08.8	60 80	118.8	59 26.6	59 80	118.0	59 44.0	58 81	117.2	60 01.2	57 82	116.4	60 18.1	56 82	115.5	60 34.6	55 83	114.7	60 50.9	54 83	113.8	61 06.8	52 84	112.9	7
8	58 20.9	59 81	117.6	58 38.3	58 81	116.9	58 55.4	57 82	116.1	59 12.3	56 82	115.3	59 28.8	55 83	114.4	59 45.0	54 83	113.6	60 00.9	52 84	112.8	60 16.5	51 84	111.9	8
9	57 32.5	57 82	116.6	57 49.6	56 82	115.8	58 06.4	56 82	115.0	58 22.9	55 83	114.2	58 39.1	54 84	113.4	58 55.0	52 84	112.6	59 10.6	51 84	111.8	59 25.9	50 85	110.9	9
30	56 43.6	56 82	115.5	57 00.4	55 83	114.8	57 16.9	55 83	114.0	57 33.1	54 84	113.2	57 49.0	53 84	112.4	58 04.6	52 84	111.6	58 19.9	51 85	110.8	58 34.9	49 86	110.0	30
1	55 54.3	55 83	114.5	56 10.8	54 83	113.8	56 27.0	54 84	113.0	56 42.9	53 84	112.2	56 58.6	52 85	111.5	57 13.9	51 85	110.7	57 28.9	50 86	109.8	57 43.6	49 86	109.1	1
2	55 04.7	54 83	113.6	55 20.9	54 84	112.8	55 36.8	53 84	112.1	55 52.4	52 85	111.3	56 07.8	51 85	110.5	56 22.9	50 86	109.8	56 37.6	49 86	109.0	56 52.1	48 86	108.2	2
3	54 14.6	54 84	112.6	54 30.6	53 84	111.9	54 46.2	52 85	111.2	55 01.6	51 85	110.4	55 16.7	50 86	109.7	55 31.6	49 86	108.9	55 46.1	48 86	108.1	56 00.3	47 87	107.3	3
4	53 24.3	53 84	111.7	53 40.0	52 85	111.0	53 55.4	51 85	110.3	54 10.5	50 86	109.6	54 25.4	49 86	108.8	54 40.0	48 86	108.1	54 54.3	47 87	107.3	55 08.3	46 87	106.5	4
35	52 33.6	52 85	110.9	52 49.1	51 85	110.2	53 04.2	50 86	109.4	53 19.1	49 86	108.7	53 33.8	48 86	108.0	53 48.2	47 87	107.3	54 02.3	47 87	106.5	54 16.1	46 88	105.8	35
6	51 42.7	51 85	110.1	51 57.9	50 86	109.4	52 12.8	49 86	108.6	52 27.5	49 86	107.9	52 42.0	48 87	107.2	52 56.1	47 87	106.5	53 10.0	46 87	105.7	53 23.6	45 88	105.0	6
7	50 51.5	50 86	109.2	51 06.5	50 86	108.6	51 21.2	49 86	107.9	51 35.7	48 87	107.2	51 49.9	47 87	106.5	52 03.9	46 88	105.7	52 17.6	45 88	105.0	52 31.0	44 88	104.3	7
8	50 00.0	50 86	108.5	50 14.8	49 86	107.8	50 29.3	48 87	107.1	50 43.6	47 87	106.4	50 57.7	46 87	105.7	51 11.4	46 88	105.0	51 25.0	45 88	104.3	51 38.2	44 88	103.6	8
9	49 08.3	49 86	107.7	49 22.9	48 87	107.0	49 37.3	47 87	106.4	49 51.4	47 88	105.7	50 05.2	46 88	105.0	50 18.8	45 88	104.3	50 32.2	44 88	103.6	50 45.3	43 88	102.9	9
40	48 16.4	48 87	107.0	48 30.8	48 87	106.3	48 45.0	47 88	105.7	48 58.9	46 88	105.0	49 12.6	45 88	104.3	49 26.1	44 88	103.6	49 39.3	44 88	102.9	49 52.2	43 89	102.2	40
1	47 24.3	48 87	106.3	47 38.5	47 87	105.6	47 52.5	46 88	105.0	48 06.3	46 88	104.3	48 19.8	45 88	103.6	48 33.1	44 88	103.0	48 46.2	43 89	102.3	48 59.0	42 89	101.6	1
2	46 32.0	47 88	105.6	46 46.1	46 88	104.9	46 59.9	46 88	104.3	47 13.5	45 88	103.6	47 26.9	44 88	103.0	47 40.1	43 89	102.3	47 53.0	43 89	101.6	48 05.7	42 89	101.0	2
3	45 39.6	47 88	104.9	45 53.5	46 88	104.3	46 07.2	45 88	103.6	46 20.6	45 88	103.0	46 33.9	44 89	102.3	46 46.9	43 89	101.7	46 59.7	42 89	101.0	47 12.3	41 89	100.4	3
4	44 46.9	46 88	104.3	45 00.7	46 88	103.6	45 14.2	45 88	103.0	45 27.6	44 89	102.4	45 40.7	43 89	101.7	45 53.6	43 89	101.1	46 06.3	42 89	100.4	46 18.7	41 89	99.8	4
45	43 54.2	46 88	103.6	44 07.8	45 88	103.0	44 21.2	44 89	102.4	44 34.4	44 89	101.8	44 47.4	43 89	101.1	45 00.2	42 89	100.5	45 12.7	42 89	99.8	45 25.1	41 90	99.2	45
6	43 01.3	45 88	103.0	43 14.7	45 88	102.4	43 28.0	44 89	101.8	43 41.1	43 89	101.2	43 54.0	43 89	100.5	44 06.6	42 89	99.9	44 19.1	41 90	99.3	44 31.4	40 90	98.6	6
7	42 08.2	45 89	102.4	42 21.6	44 89	101.8	42 34.7	44 89	101.2	42 47.7	43 89	100.6	43 00.5	42 89	100.0	43 13.0	42 90	99.3	43 25.4	41 90	98.7	43 37.6	40 90	98.1	7
8	41 15.0	44 89	101.8	41 28.3	44 89	101.2	41 41.3	43 89	100.6	41 54.2	43 89	100.0	42 06.9	42 90	99.4	42 19.3	41 90	98.8	42 31.6	41 90	98.2	42 43.7	40 90	97.5	8
9	40 21.8	44 89	101.2	40 34.9	43 89	100.6	40 47.8	43 89	100.0	41 00.6	42 90	99.4	41 13.2	42 90	98.8	41 25.6	41 90	98.2	41 37.7	40 90	97.6	41 49.7	40 90	97.0	9
50	39 28.4	44 89	100.7	39 41.4	43 89	100.1	39 54.2	43 90	99.5	40 06.9	42 90	98.9	40 19.4	41 90	98.3	40 31.7	41 90	97.7	40 43.8	40 90	97.1	40 55.7	39 90	96.5	50
1	38 34.9	43 89	100.1	38 47.8	43 90	99.5	39 00.6	42 90	99.0	39 13.1	42 90	98.4	39 25.6	41 90	97.8	39 37.8	40 90	97.2	39 49.8	40 90	96.6	40 01.7	39 90	96.0	1
2	37 41.3	43 90	99.6	37 54.1	43 90	99.0	38 06.8	42 90	98.4	38 19.3	41 90	97.8	38 31.6	41 90	97.3	38 43.8	40 90	96.7	38 55.8	40 90	96.1	39 07.6	39 90	95.5	2
3	36 47.6	43 90	99.0	37 00.4	42 90	98.5	37 13.0	42 90	97.9	37 25.4	41 90	97.3	37 37.7	41 90	96.8	37 49.8	40 90	96.2	38 01.7	39 90	95.6	38 13.4	39 90	95.0	3
4	35 53.9	42 90	98.5	36 06.6	42 90	97.9	36 19.1	41 90	97.4	36 31.4	41 90	96.8	36 43.6	40 90	96.2	36 55.7	40 90	95.7	37 07.5	39 90	95.1	37 19.2	39 90	94.5	4
55	35 00.1	42 90	98.0	35 12.7	42 90	97.4	35 25.1	41 90	96.9	35 37.4	41 90	96.3	35 49.6	40 90	95.8	36 01.5	40 90	95.2	36 13.4	39 90	94.6	36 25.0	39 90	94.1	55
6	34 06.2	42 90	97.5	34 18.7	42 90	96.9	34 31.1	41 90	96.4	34 43.4	41 90	95.8	34 55.4	40 90	95.3	35 07.4	40 90	94.7	35 19.1	39 90	94.2	35 30.8	38 90	93.6	6
7	33 12.2	42 90	97.0	33 24.7	41 90	96.4	33 37.0	41 90	95.9	33 49.2	40 90	95.3	34 01.3	40 90	94.8	34 13.2	39 90	94.2	34 24.9	39 90	93.7	34 36.5	38 90	93.1	7
8	32 18.2	42 90	96.5	32 30.7	41 90	96.0	32 42.9	41 90	95.4	32 55.1	40 90	94.9	33 07.1	40 90	94.3	33 18.9	39 90	93.8	33 30.6	39 90	93.2	33 42.2	38 91	92.7	8
9	31 24.2	41 90	96.0	31 36.6	41 90	95.5	31 48.8	41 90	94.9	32 00.9	40 90	94.4	32 12.8	40 90	93.9	32 24.6	39 90	93.3	32 36.3	39 90	92.8	32 47.8	38 91	92.2	9
60	30 30.1	41 90	95.5	30 42.4	41 90	95.0	30 54.6	40 90	94.5	31 06.6	40 90	93.9	31 18.6	40 90	93.4	31 30.3	39 90	92.9	31 42.0	39 90	92.3	31 53.5	38 91	91.8	60
1	29 35.9	41 90	95.1	29 48.2	41 90	94.5	30 00.4	40 90	94.0	30 12.4	40 90	93.5	30 24.3	39 90	93.0	30 36.0	39 90	92.4	30 47.6	39 91	91.9	30 59.1	38 91	91.3	1
2	28 41.8	41 90	94.6	28 54.0	41 90	94.1	29 06.1	40 90	93.6	29 18.1	40 90	93.0	29 29.9	39 90	92.5	29 41.7	39 91	92.0	29 53.3	38 91	91.4	30 04.8	38 91	90.9	2
3	27 47.5	41 90	94.1	27 59.7	40 90	93.6	28 11.8	40 90	93.1	28 23.8	40 91	92.6	28 35.6	39 91	92.1	28 47.3	39 91	91.5	28 58.9	38 91	91.0	29 10.4	38 91	90.5	3
4	26 53.3	41 90	93.7	27 05.4	40 90	93.2	27 17.5	40 90	92.7	27 29.4	40 91	92.1	27 41.3	39 91	91.6	27 53.0	39 91	91.1	28 04.5	38 91	90.6	28 16.0	38 91	90.1	4
65	25 59.0	41 90	93.2	26 11.1	40 90	92.7	26 23.2	40 91	92.2	26 35.1	40 91	91.7	26 46.9	39 91	91.2	26 58.6	39 91	90.7	27 10.2	38 91	90.2	27 21.6	38 91	89.6	65
6	25 04.7	41 90	92.8	25 16.8	40 90	92.3	25 28.8	40 91	91.8	25 40.7	40 91	91.3	25 52.5	39 91	90.8	26 04.2	39 91	90.2	26 15.8	38 91	89.7	26 27.3	38 91	89.2	6
7	24 10.4	40 90	92.3	24 22.5	40 91	91.8	24 34.5	40 91	91.3	24 46.4	39 91	90.8	24 58.1	39 91	90.3	25 09.8	39 91	89.8	25 21.4	38 91	89.3	25 32.9	38 91	88.8	7
8	23 16.0	40 90	91.9	23 28.1	40 91	91.4	23 40.1	40 91	90.9	23 52.0	39 91	90.4	24 03.8	39 91	89.9	24 15.5	39 91	89.4	24 27.0	38 91	88.9	24 38.5	38 91	88.4	8
9	22 21.7	40 91	91.5	22 33.8	40 91	91.0	22 45.7	40 91	90.5	22 57.6	39 91	90.0	23 09.4	39 91	89.5	23 21.1	39 91	89.0	23 32.7	38 91	88.5	23 44.2	38 91	88.0	9
70	21 27.3	40 91	91.0	21 39.4	40 91	90.6	21 51.3	40 91	90.1	22 03.2	39 91	89.6	22 15.0	39 91	89.1	22 26.7	39 91	88.6	22 38.3	39 91	88.1	22 49.8	38 90	87.6	70
1	20 32.9	40 91	90.6	20 45.0	40 91	90.1	20 57.0	40 91	89.6	21 08.9	39 91	89.1	21 20.6	39 91	88.7	21 32.4	39 91	88.2	21 44.0	39 90	87.7	21 55.5	38 90	87.2	1
2	19 38.6	40 91	90.2	19 50.6	40 91	89.7	20 02.6	40 91	89.2	20 14.5	40 91	88.7	20 26.3	39 90	88.2	20 38.0	39 90	87.7	20 49.7	39 90	87.3	21 01.2	38 90	86.8	2
3	18 44.2	40 91	89.8	18 56.2	40 91	89.3	19 08.2	40 91	88.8	19 20.1	40 91	88.3	19 31.9	39 90	87.8	19 43.7	39 90	87.3	19 55.4	39 90	86.9	20 06.9	38 90	86.4	3
4	17 49.8	40 91	89.4	18 01.9	40 91	88.9	18 13.9	40 91	88.4	18 25.8	40 91	87.9	18 37.6	39 90	87.4	18 49.4	39 90	86.9	19 01.1	39 90	86.4	19 12.7	39 90	86.0	4
75	16 55.4	40 91	88.9	17 07.5	40 91	88.5	17 19.5	40 91	88.0	17 31.4	40 90	87.5	17 43.3	39 90	87.0	17 55.1	39 90	86.5	18 06.8	39 90	86.0	18 18.5	39 90	85.6	75
6	16 01.1	40 91	88.5	16 13.2	40 91	88.0	16 25.2	40 90	87.6	16 37.1	40 90	87.1	16 49.0	40 90	86.6	17 00.8	39 90	86.1	17 12.6	39 90	85.6	17 24.3	39 90	85.2	6
7	15 06.7	40 90	88.1	15 18.8	40 90	87.6	15 30.9	40 90	87.2	15 42.8	40 90	86.7	15 54.7	40 90	86.2	16 06.6	39 90	85.7	16 18.4	39 90	85.2	16 30.1	39 90	84.8	7
8	14 12.4	40 90	87.7	14 24.5	40 90	87.2	14 36.5	40 90	86.7	14 48.5	40 90	86.3	15 00.5	40 90	85.8	15 12.4	40 90	85.3	15 24.2	39 90	84.8	15 35.9	39 90	84.4	8
9	13 18.1	41 90	87.3	13 30.2	40 90	86.8	13 42.3	40 90	86.3	13 54.3	40 90	85.9	14 06.3	40 90	85.4	14 18.2	40 90	84.9	14 30.0	39 90	84.4	14 41.9	39 90	84.0	9
80	12 23.7	41 90	86.9	12 35.9	40 90	86.4	12 48.0	40 90	85.9	13 00.1	40 90	85.5	13 12.1	40 90	85.0	13 24.0	40 90	84.5	13 35.9	40 90	84.0	13 47.8	39 90	83.6	80
1	11 29.5	41 90	86.5	11 41.6	41 90	86.0	11 53.8	40 90	85.5	12 05.9	40 90	85.0	12 17.9	40 90	84.6	12 29.9	40 90	84.1	12 41.9	40 90	83.6	12 53.8	40 90	83.2	1
2	10 35.2	41 90	86.0	10 47.4	41 90	85.6	10 59.6	41 90	85.1	11 11.7	40 90	84.6	11 23.8	40 90	84.2	11 35.9	40 90	83.7	11 47.9	40 90	83.2	11 59.8	40 90	82.8	2
3	9 41.0	41 90	85.6	9 53.2	41 90	85.2	10 05.4	41 90	84.7	10 17.6	41 90	84.2	10 29.7	40 90	83.8	10 41.8	40 90	83.3	10 53.9	40 90	82.8	11 05.9	40 90	82.4	3
4	8 46.8	41 90	85.2	8 59.0	41 90	84.8	9 11.3	41 90	84.3	9 23.5	41 90	83.8	9 35.7	41 90	83.4	9 47.8	40 90	82.9	9 59.9	40 90	82.4	10 12.0	40 90	82.0	4
85	7 52.6	41 90	84.8	8 04.9	41 90	84.3	8 17.2	41 90	83.9	8 29.5	41 90	83.4	8 41.7	41 90	83.0	8 53.9	41 90	82.5	9 06.1	40 90	82.0	9 18.2	40 90	81.6	85
6	6 58.5	41 90	84.4	7 10.8	41 90	83.9	7 23.2	41 90	83.5	7 35.5	41 90	83.0	7 47.8	41 90	82.6	8 00.0	41 90	82.1	8 12.2	41 90	81.6	8 24.4	41 90	81.2	6
7	6 04.4	41 90	84.0	6 16.8	41 90	83.5	6 29.2	41 90	83.1	6 41.5	41 90	82.6	6 53.9	41 90	82.2	7 06.2	41 90	81.7	7 18.5	41 90	81.2	7 30.7	41 90	80.8	7
8	5 10.3	42 90	83.6	5 22.8	42 90	83.1	5 35.2	41 90	82.7	5 47.6	41 90	82.2	6 00.0	41 90	81.7	6 12.4	41 90	81.3	6 24.8	41 90	80.8	6 37.1	41 90	80.4	8
9													5 06.2	41 90	81.3	5 18.7	41 90	80.9	5 31.1	41 90	80.4	5 43.5	41 90	80.0	9

Lat. 25°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	57 00.0	1.0 02	180.0	56 30.0	1.0 01	180.0	56 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	00
1	56 59.1	1.0 04	178.2	56 29.2	1.0 04	178.2	55 59.2	1.0 04	178.2	55 29.2	1.0 04	178.3	54 59.2	1.0 04	178.3	54 29.2	1.0 04	178.3	53 59.2	1.0 04	178.3	53 29.2	1.0 04	178.4	1
2	56 56.6	1.0 07	176.4	56 26.6	1.0 07	176.4	55 56.7	1.0 07	176.5	55 26.7	1.0 07	176.5	54 56.7	1.0 07	176.6	54 26.8	1.0 07	176.6	53 56.8	1.0 07	176.7	53 26.9	1.0 06	176.7	2
3	56 52.2	1.0 10	174.6	56 22.4	1.0 10	174.6	55 52.5	1.0 10	174.7	55 22.6	1.0 10	174.8	54 52.7	1.0 10	174.9	54 22.8	1.0 09	174.9	53 52.9	1.0 09	175.0	53 23.0	1.0 09	175.1	3
4	56 46.2	99 13	172.8	56 16.4	99 12	172.9	55 46.6	99 12	173.0	55 16.8	99 12	173.1	54 47.0	99 12	173.2	54 17.2	99 12	173.3	53 47.4	99 12	173.3	53 17.5	99 12	173.4	4
05	56 38.5	99 16	171.0	56 08.9	99 16	171.1	55 39.2	99 15	171.2	55 09.4	99 15	171.3	54 39.7	99 15	171.5	54 10.0	99 14	171.6	53 40.3	99 14	171.7	53 10.5	99 14	171.8	05
6	56 29.2	99 18	169.2	55 59.6	99 18	169.3	55 30.0	99 18	169.5	55 00.5	99 18	169.6	54 30.9	99 17	169.8	54 01.3	99 17	169.9	53 31.7	99 17	170.1	53 02.0	99 17	170.2	6
7	56 18.2	98 21	167.4	55 48.8	98 21	167.6	55 19.3	98 20	167.8	54 49.9	98 20	168.0	54 20.5	98 20	168.1	53 51.0	98 20	168.3	53 21.5	98 19	168.4	52 52.0	98 19	168.6	7
8	56 05.5	97 24	165.7	55 36.3	97 23	165.9	55 07.0	98 23	166.1	54 37.8	98 23	166.3	54 08.5	98 22	166.5	53 39.2	98 22	166.7	53 09.9	98 22	166.8	52 40.5	98 22	167.0	8
9	55 51.3	97 26	164.0	55 22.3	97 26	164.2	54 53.2	97 26	164.4	54 24.1	97 25	164.6	53 55.0	97 25	164.8	53 25.9	97 25	165.0	52 56.7	97 24	165.2	52 27.6	97 24	165.4	9
10	55 35.5	96 29	162.3	55 06.7	96 28	162.5	54 37.8	96 28	162.8	54 09.0	96 28	163.0	53 40.0	96 27	163.2	53 11.1	96 27	163.4	52 42.2	97 27	163.7	52 13.2	97 26	163.9	10
1	55 18.2	96 31	160.6	54 49.6	96 31	160.9	54 21.0	96 30	161.1	53 52.3	96 30	161.4	53 23.6	96 30	161.6	52 54.9	96 29	161.9	52 26.2	96 29	162.1	51 57.4	96 29	162.3	1
2	54 59.4	94 34	159.0	54 31.1	96 33	159.3	54 02.7	96 33	159.5	53 34.3	96 32	159.8	53 05.8	96 32	160.1	52 37.3	96 32	160.3	52 08.8	96 31	160.6	51 40.2	96 31	160.8	2
3	54 39.2	94 36	157.4	54 11.1	94 36	157.7	53 43.0	94 35	157.9	53 14.8	94 35	158.2	52 46.6	94 34	158.5	52 18.3	94 34	158.8	51 50.0	94 34	159.1	51 21.7	96 33	159.3	3
4	54 17.6	93 38	155.8	53 49.7	93 38	156.1	53 21.9	93 37	156.4	52 54.0	93 37	156.7	52 26.0	93 36	157.0	51 58.0	93 36	157.3	51 29.9	94 36	157.6	51 01.8	94 35	157.9	4
15	53 54.6	92 40	154.2	53 27.0	92 40	154.5	52 59.4	92 40	154.9	52 31.8	92 39	155.2	52 04.1	92 39	155.5	51 36.3	93 38	155.8	51 08.5	93 38	156.1	50 40.7	92 37	156.4	15
6	53 30.3	91 43	152.7	53 03.0	91 42	153.0	52 35.7	91 42	153.4	52 08.3	91 41	153.7	51 40.9	92 41	154.0	51 13.4	92 40	154.4	50 45.9	92 40	154.7	50 18.3	92 39	155.0	6
7	53 04.7	90 45	151.2	52 37.7	90 44	151.6	52 10.7	90 44	151.9	51 43.6	90 43	152.3	51 16.5	91 43	152.6	50 49.3	91 42	152.9	50 22.0	91 42	153.3	49 54.7	91 41	153.6	7
8	52 37.9	89 47	149.7	52 11.2	89 46	150.1	51 44.5	89 46	150.5	51 17.7	89 45	150.8	50 50.8	90 45	151.2	50 23.9	90 44	151.5	49 57.0	90 44	151.9	49 29.9	90 43	152.2	8
9	52 09.9	88 49	148.3	51 43.5	88 48	148.7	51 17.1	88 48	149.1	50 50.6	88 47	149.4	50 24.1	89 46	149.8	49 57.4	89 46	150.2	49 30.7	89 46	150.5	49 04.0	89 45	150.9	9
20	51 40.7	87 50	146.9	51 14.7	87 50	147.3	50 48.6	87 49	147.7	50 22.4	87 49	148.1	49 56.2	88 48	148.4	49 29.8	88 48	148.8	49 03.4	88 47	149.2	48 37.0	88 47	149.5	20
1	51 10.5	86 52	145.5	50 44.8	86 52	145.9	50 19.0	86 51	146.3	49 53.1	86 50	146.7	49 27.2	87 50	147.1	49 01.1	87 50	147.5	48 35.0	87 49	147.9	48 08.9	87 49	148.2	1
2	50 39.2	84 54	144.2	50 13.8	85 53	144.6	49 48.3	85 53	145.0	49 22.8	85 52	145.4	48 57.1	86 52	145.8	48 31.4	86 51	146.2	48 05.6	86 51	146.6	47 39.7	86 50	147.0	2
3	50 06.9	83 56	142.9	49 41.8	84 55	143.3	49 16.6	84 54	143.7	48 51.4	84 54	144.1	48 26.1	85 53	144.6	48 00.7	85 53	145.0	47 35.2	85 52	145.3	47 09.6	85 52	145.7	3
4	49 33.6	82 57	141.6	49 08.8	83 56	142.0	48 44.0	83 56	142.5	48 19.1	83 56	142.9	47 54.1	84 55	143.3	47 29.0	84 54	143.7	47 03.8	84 54	144.1	46 38.5	84 53	144.5	4
25	48 59.3	81 58	140.4	48 34.9	82 58	140.8	48 10.4	82 58	141.2	47 45.8	82 57	141.7	47 21.1	82 56	142.1	46 56.3	83 56	142.5	46 31.4	83 55	142.9	46 06.5	83 55	143.3	25
6	48 24.2	80 60	139.2	48 00.1	80 59	139.6	47 35.9	81 59	140.1	47 11.6	81 58	140.5	46 47.3	81 58	140.9	46 22.8	82 57	141.3	45 58.2	82 57	141.7	45 33.6	82 56	142.2	6
7	47 48.2	79 61	138.0	47 24.5	79 61	138.4	47 00.6	80 60	138.9	46 36.6	80 60	139.3	46 12.6	80 59	139.8	45 48.4	81 59	140.2	45 24.1	81 58	140.6	44 59.8	81 58	141.0	7
8	47 11.4	78 63	136.8	46 48.0	78 62	137.3	46 24.4	79 62	137.7	46 00.8	79 61	138.2	45 37.0	79 60	138.6	45 13.2	80 60	139.1	44 49.2	80 60	139.5	44 25.1	80 59	139.9	8
9	46 33.8	77 64	135.7	46 10.7	77 63	136.2	45 47.5	78 63	136.6	45 24.1	78 62	137.1	45 00.7	78 62	137.5	44 37.1	79 61	138.0	44 13.5	79 61	138.4	43 49.7	79 60	138.8	9
30	45 55.5	76 65	134.6	45 32.7	76 65	135.1	45 09.8	77 64	135.5	44 46.7	77 64	136.0	44 23.6	77 63	136.4	44 00.3	78 62	136.9	43 37.0	78 62	137.3	43 13.5	78 62	137.7	30
1	45 16.4	75 66	133.6	44 53.9	75 66	134.0	44 31.3	76 65	134.5	44 08.6	76 65	134.9	43 45.7	76 64	135.4	43 22.8	77 64	135.8	42 59.7	77 63	136.3	42 36.6	77 63	136.7	1
2	44 36.7	74 67	132.5	44 14.5	74 67	133.0	43 52.2	75 66	133.4	43 29.7	75 66	133.9	43 07.2	75 65	134.4	42 44.6	76 65	134.8	42 21.8	76 64	135.2	41 59.0	76 64	135.7	2
3	43 56.3	73 68	131.5	43 34.4	73 68	132.0	43 12.4	74 68	132.4	42 50.2	74 67	132.9	42 28.0	74 66	133.4	42 05.6	75 66	133.8	41 43.2	75 66	134.3	41 20.6	75 65	134.7	3
4	43 15.2	72 69	130.5	42 53.6	72 69	131.0	42 31.9	73 68	131.5	42 10.1	73 68	131.9	41 48.1	73 68	132.4	41 26.1	74 67	132.8	41 03.9	74 66	133.3	40 41.7	74 66	133.7	4
35	42 33.6	71 70	129.5	42 12.3	71 70	130.0	41 50.9	72 69	130.5	41 29.3	72 69	131.0	41 07.7	72 68	131.4	40 45.9	73 68	131.9	40 24.0	73 68	132.3	40 02.0	73 67	132.8	35
6	41 51.4	70 71	128.6	41 30.4	70 71	129.1	41 09.2	71 70	129.6	40 48.0	71 70	130.0	40 26.6	71 69	130.5	40 05.1	72 69	130.9	39 43.5	72 68	131.4	39 21.8	72 68	131.8	6
7	41 08.6	69 72	127.7	40 47.9	69 72	128.2	40 27.0	70 71	128.6	40 06.0	70 71	129.1	39 44.9	70 70	129.6	39 23.7	71 70	130.0	39 02.4	71 69	130.5	38 41.0	72 69	130.9	7
8	40 25.3	68 73	126.8	40 04.9	68 73	127.3	39 44.3	69 72	127.7	39 23.6	69 72	128.2	39 02.8	70 71	128.7	38 41.8	70 71	129.1	38 20.8	70 70	129.6	37 59.7	71 70	130.0	8
9	39 41.5	67 74	125.9	39 21.3	68 73	126.4	39 01.0	68 73	126.9	38 40.6	68 72	127.3	38 20.0	69 72	127.8	37 59.4	69 72	128.3	37 38.6	69 71	128.7	37 17.8	70 71	129.2	9
40	38 57.2	66 74	125.1	38 37.3	67 74	125.5	38 17.3	67 74	126.0	37 57.1	67 73	126.5	37 36.8	68 73	127.0	37 16.5	68 72	127.4	36 56.0	68 72	127.9	36 35.4	69 72	128.3	40
1	38 12.5	65 75	124.2	37 52.8	66 75	124.7	37 33.1	66 74	125.2	37 13.2	67 74	125.7	36 53.1	67 74	126.1	36 33.0	67 73	126.6	36 12.8	68 73	127.0	35 52.5	68 72	127.5	1
2	37 27.3	65 76	123.4	37 07.9	65 76	123.9	36 48.4	65 75	124.4	36 28.7	66 75	124.8	36 09.0	66 74	125.3	35 49.1	66 74	125.8	35 29.2	67 74	126.2	35 09.1	67 73	126.7	2
3	36 41.7	64 77	122.6	36 22.6	64 76	123.1	36 03.3	64 76	123.6	35 43.9	65 76	124.0	35 24.4	65 75	124.5	35 04.8	66 75	125.0	34 45.1	66 74	125.4	34 25.3	66 74	125.9	3
4	35 55.7	63 77	121.8	35 36.8	63 77	122.3	35 17.8	64 76	122.8	34 58.6	64 76	123.3	34 39.4	64 76	123.7	34 20.0	65 75	124.2	34 00.6	65 75	124.7	33 41.0	65 74	125.1	4
45	35 09.4	62 78	121.1	34 50.7	62 78	121.6	34 31.9	63 77	122.0	34 13.0	63 77	122.5	33 54.0	64 76	123.0	33 34.8	64 76	123.4	33 15.6	64 76	123.9	32 56.3	65 75	124.3	45
6	34 22.6	61 78	120.3	34 04.1	62 78	120.8	33 45.6	62 78	121.3	33 26.9	62 77	121.8	33 08.1	63 77	122.2	32 49.3	63 77	122.7	32 30.3	63 76	123.1	32 11.2	64 76	123.6	6
7	33 35.5	61 79	119.6	33 17.3	61 79	120.1	32 58.9	61 78	120.6	32 40.5	62 78	121.0	32 22.0	62 78	121.5	32 03.3	62 77	122.0	31 44.6	63 77	122.4	31 25.7	63 76	122.9	7
8	32 48.0	60 80	118.9	32 30.0	60 79	119.4	32 11.9	61 79	119.8	31 53.7	61 78	120.3	31 35.4	61 78	120.8	31 17.0	62 78	121.2	30 58.5	62 77	121.7	30 39.9	62 77	122.2	8
9	32 00.3	59 80	118.2	31 42.5	59 80	118.7	31 24.6	60 79	119.1	31 06.6	60 79	119.6	30 48.5	60 79	120.1	30 30.3	61 78	120.5	30 12.0	61 78	121.0	29 53.6	61 78	121.5	9
50	31 12.2	58 81	117.5	30 54.6	59 80	118.0	30 36.9	59 80	118.5	30 19.2	59 80	118.9	30 01.3	60 79	119.4	29 43.3	60 79	119.9	29 25.3	60 78	120.3	29 07.1	61 78	120.8	50
1	30 23.8	58 81	116.8	30 06.5	58 81	117.3	29 49.0	58 80	117.8	29 31.4	59 80	118.3	29 13.8	59 80	118.7	28 56.0	59 79	119.2	28 38.1	60 79	119.6	28 20.2	60 79	120.1	1
2	29 35.2	57 82	116.2	29 18.0	57 81	116.7	29 00.7	58 81	117.1	28 43.4	58 81	117.6	28 25.9	58 80	118.1	28 08.4	59 80	118.5	27 50.7	59 80	119.0	27 33.0	59 79	119.4	2
3	28 46.2	56 82	115.5	28 29.3	57 82	116.0	28 12.2	57 81	116.5	27 55.0	57 81	116.9	27 37.8	58 81	117.4	27 20.4	58 80	117.9	27 03.0	58 80	118.3	26 45.5	59 80	118.8	3
4	27 57.0	56 82	114.9	27 40.3	56 82	115.4	27 23.4	56 82	115.8	27 06.4	57 81	116.3	26 49.4	57 81	116.8	26 32.2	57 81	117.2	26 15.0	58 80	117.7	25 57.7	58 80	118.1	4
55	27 07.6	55 83	114.3	26 51.0	55 82	114.8	26 34.3	56 82	115.2	26 17.6	56 82	115.7	26 00.7	56 82	116.2	25 43.7	57 81	116.6	25 26.7	57 81	117.1	25 09.6	57 81	117.5	55
6	26 17.9	55 83	113.7	26 01.5	55 83	114.2	25 45.0	55 83	114.6	25 28.4	55 82	115.1	25 11.8	56 82	115.5	24 55.0	56 82	116.0	24 38.2	56 81	116.5	24 21.2	57 81	116.9	6
7	25 28.0	54 84	113.1	25 11.8	54 83	113.6	24 55.5	55 83	114.0	24 39.1	55 83	114.5	24 22.5	55 82	114.9	24 06.0	55 82	115.4	23 49.3	56 82	115.9	23 32.6	56 82	116.3	7
8	24 37.9	53 84	112.5	24 21.8	54 84	113.0	24 05.7	54 83	113.4	23 49.5	54 83	113.9	23 33.1	54 83	114.3	23 16.8	55 82	114.8	23 00.3	55 82	115.3	22 43.7	55 82	115.7	8
9	23 47.5	53 84	111.9	23 31.6	53 84	112.4	23 15.7	53 84	112.9	22 59.6	54 83	113.3	22 43.5	54 83	113.8	22 27.3	54 83	114.2	22 11.0	54 82	114.7	21 54.6	55 82	115.1	9
60	22 57.0	52 84	111.4	22 41.3	53 84	111.8	22 25.5	53 84	112.3	22 09.6	53 84	112.7	21 53.6	53 84	113.2	21 37.6	54 83	113.7	21 21.5	54 83	114.1	21 05.3	54 83	114.6	60
1	22 06.3	52 85	110.8	21 50.7	52 85	111.3	21 35.0	53 84	111.7	21 19.3	53 84	112.2	21 03.5	53 84	112.6	20 47.7	53 84	113.1	20 31.7	53 83	113.5	20 15.7	53 83	114.0	1
2	21 15.3	51 85	110.3	20 59.9	52 85	110.7	20 44.4	52 85	111.2	20 28.9	52 84	111.6	20 13.2	52 84	112.1	19 57.5	52 84	112.5	19 41.8	53 84	113.0	19 25.9	53 83	113.4	2
3	20 24.2	51 86	109.7	20 09.0	51 85	110.2	19 53.6	51 85	110.6	19 38.2	51 85	111.1	19 22.7	52 84	111.5	19 07.2	52 84	112.0	18 51.6	52 84	112.4	18 35.9	52 84	112.9	3
4	19 33.0	50 86	109.2	19 17.8	51 86	109.6	19 02.6	51 85	110.1	18 47.4	51 85	110.6	18 32.1	51 85	111.0	18 16.7	51 84	111.5	18 01.2	52 84	111.9	17 45.7	52 84	112.4	4
65	18 41.5	50 86	108.7	18 26.5	50 86	109.1	18 11.5	50 86	109.6	17 56.4	50 85	110.0	17 41.2	51 85	110.5	17 26.0	51 85	110.9	17 10.7	51 84	111.4	16 55.3	51 84	111.8	65
6	17 49.9	49 86	108.1	17 35.1	50 86	108.6	17 20.2	50 86	109.0	17 05.2	50 86	109.5	16 50.2	50 85	110.0	16 35.1	50 85	110.4	16 20.0	51 85	110.9	16 04.8	51 85	111.3	6
7	16 58.2	49 86	107.6	16 43.5	49 86	108.1	16 28.7	49 86	108.5	16 13.9	49 86	109.0	15 59.0	50 86	109.4	15 44.1	50 86	109.9	15 29.1	50 85	110.3	15 14.0	50 85	110.8	7
8	16 06.3	48 87	107.1	15 51.7	49 86	107.6	15 37.1	49 86	108.0	15 22.4	49 86	108.5	15 07.6	49 86	108.9	14 52.8	49 86	109.4	14 38.0	50 85	109.8	14 23.1	50 85	110.3	8
9	15 14.2	48 87	106.6	14 59.8	48 87	107.1	14 45.3	48 86	107.5	14 30.7	49 86	108.0	14 16.1	49 86	108.4	14 01.5	49 86	108.9	13 46.8	49 86	109.3	13 32.0	49 85	109.8	9
70	14 22.1	48 87	106.1	14 07.7	48 87	106.6	13 53.4	48 87	107.0	13 38.9	48 86	107.5	13 24.5	48 86	107.9	13 09.9	48 86	108.4	12 55.4	49 86	108.8	12 40.8	49 86	109.3	70
1	13 29.8	47 87	105.7	13 15.6	47 87	106.1	13 01.3	48 87	106.6	12 47.0	48 87	107.0	12 32.7	48 87	107.5	12 18.3	48 86	107.9	12 03.8	48 86	108.4	11 49.4	48 86	108.8	1
2	12 37.3	47 88	105.2	12 23.2	47 87	105.6	12 09.1	47 87	106.1	11 54.9	47 87	106.5	11 40.7	47 87	107.0	11 26.5	48 87	107.4	11 12.2	48 86	107.9	10 57.8	48 86	108.3	2
3	11 44.8	47 88	104.7	11 30.8	47 88	105.2	11 16.8	47 87	105.6	11 02.7	47 87	106.1	10 48.6	47 87	106.5	10 34.5	47 87	107.0	10 20.3	47 86	107.4	10 06.1	47 86	107.8	3
4	10 52.1	46 88	104.2	10 38.3	46 88	104.7	10 24.4	46 88	105.1	10 10.4	47 87	105.6	9 56.4	47 87	106.0	9 42.4	47 87	106.5	9 28.4	47 87	106.9	9 14.3	47 87	107.4	4
75	9 59.4	46 88	103.8	9 45.6	46 88	104.2	9 31.8	46 88	104.7	9 18.0	46 88	105.1	9 04.1	46 87	105.6	8 50.2	46 87	106.0	8 36.3	46 87	106.5	8 22.3	47 87	106.9	75
6	9 06.5	45 88	103.3	8 52.8	46 88	103.8	8 39.2	46 88	104.2	8 25.4	46 88	104.7	8 11.7	46 88	105.1	7 57.9	46 87	105.6	7 44.1	46 87	106.0	7 30.2	46 87	106.5	6
7	8 13.5	45 88	102.9	8 00.0	45 88	103.3	7 46.4	45 88	103.8	7 32.8	45 88	104.2	7 19.1	46 88	104.7	7 05.5	46 88	105.1	6 51.8	46 87	105.6	6 38.0	46 87	106.0	7
8	7 20.5	45 89	102.4	7 07.0	45 88	102.9	6 53.5	45 88	103.3	6 40.0	45 88	103.8	6 26.5	45 88	104.2	6 12.9	45 88	104.7	5 59.3	45 88	105.1	5 45.7	45 87	105.6	8
9	6 27.3	45 89	102.0	6 14.0	45 89	102.4	6 00.6	45 88	102.9	5 47.1	45 88	103.3	5 33.7	45 88	103.8	5 20.2	45 88	104.2	5 06.8	45 88	104.7				9
80	5 34.1	44 89	101.5	5 20.8	44 89	102.0	5 07.5	44 89	102.4																80

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 25°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	77 00.0	1.0 04	180.0	77 30.0	1.0 04	180.0	78 00.0	1.0 04	180.0	78 30.0	1.0 04	180.0	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	80 00.0	1.0 04	180.0	80 30.0	1.0 05	180.0	00
1	76 57.9	1.0 10	175.7	77 27.9	1.0 11	175.5	77 57.8	1.0 11	175.3	78 27.7	1.0 12	175.1	78 57.6	1.0 12	174.9	79 27.5	1.0 12	174.7	79 57.4	1.0 13	174.5	80 27.2	1.0 14	174.2	1
2	76 51.8	99 17	171.4	77 21.5	99 18	171.0	77 51.2	99 18	170.7	78 20.8	99 19	170.3	78 50.4	99 20	169.9	79 20.0	99 20	169.5	79 49.5	98 21	169.0	80 19.0	98 22	168.5	2
3	76 41.6	98 23	167.1	77 11.0	98 24	166.7	77 40.3	98 25	166.2	78 09.5	97 26	165.6	78 38.6	97 27	165.1	79 07.7	97 28	164.4	79 36.7	96 29	163.7	80 05.6	96 30	163.0	3
4	76 27.7	96 29	163.1	76 56.5	96 30	162.5	77 25.3	96 31	161.8	77 53.9	95 32	161.1	78 22.5	95 34	160.4	78 50.9	95 35	159.6	79 19.2	94 36	158.7	79 47.3	93 38	157.7	4
05	76 10.0	94 35	159.1	76 38.3	94 36	158.4	77 06.4	94 37	157.6	77 34.4	93 39	156.8	78 02.2	92 40	155.9	78 29.9	92 42	155.0	78 57.3	91 43	153.9	79 24.5	90 45	152.8	05
6	75 49.0	92 40	155.3	76 16.5	92 42	154.5	76 44.0	91 43	153.7	77 11.2	90 44	152.7	77 38.2	90 46	151.7	78 05.0	89 47	150.7	78 31.5	88 49	149.5	78 57.7	87 50	148.3	6
7	75 24.7	90 45	151.8	75 51.6	89 46	150.9	76 18.2	88 48	149.9	76 44.7	88 49	148.9	77 10.8	87 51	147.8	77 36.7	86 52	146.6	78 02.2	85 54	145.4	78 27.4	83 56	144.1	7
8	74 57.6	87 50	148.4	75 23.7	87 51	147.4	75 49.5	86 52	146.4	76 15.1	85 54	145.3	76 40.4	84 55	144.1	77 05.3	83 57	142.9	77 29.9	81 58	141.6	77 54.0	80 60	140.2	8
9	74 27.8	85 54	145.2	74 53.1	84 55	144.1	75 18.1	83 56	143.1	75 42.8	82 58	141.9	76 07.2	81 59	140.7	76 31.2	79 61	139.5	76 54.8	78 62	138.1	77 18.0	76 64	136.7	9
10	73 55.5	82 57	142.2	74 20.1	81 59	141.1	74 44.3	80 60	140.0	75 08.1	79 61	138.8	75 31.6	78 63	137.6	75 54.7	76 64	136.3	76 17.4	75 66	135.0	76 39.6	73 67	133.5	10
1	73 21.1	80 61	139.3	73 44.9	79 62	138.3	74 08.3	77 63	137.1	74 31.3	76 64	136.0	74 54.0	75 66	134.7	75 16.2	73 67	133.4	75 37.9	72 69	132.0	75 59.2	70 70	130.6	1
2	72 44.7	77 64	136.7	73 07.7	76 65	135.6	73 30.4	75 66	134.5	73 52.6	73 67	133.3	74 14.4	72 69	132.0	74 35.8	70 70	130.7	74 56.7	69 71	129.4	75 17.1	67 73	127.9	2
3	72 06.6	75 66	134.3	72 28.9	74 67	133.1	72 50.8	72 68	132.0	73 12.2	71 70	130.8	73 33.3	69 71	129.6	73 53.8	68 72	128.3	74 13.9	66 74	126.9	74 33.5	64 75	125.5	3
4	71 26.9	72 68	131.9	71 48.5	71 70	130.8	72 09.6	70 71	129.7	72 30.3	68 72	128.5	72 50.6	67 73	127.3	73 10.5	65 74	126.0	73 29.8	64 76	124.7	73 48.6	62 77	123.3	4
15	70 45.8	70 71	129.8	71 06.6	69 72	128.7	71 27.1	68 73	127.6	71 47.2	66 74	126.4	72 06.8	65 75	125.2	72 25.9	63 76	123.9	72 44.5	61 77	122.6	73 02.6	59 78	121.2	15
6	70 03.4	68 72	127.8	70 23.6	67 74	126.7	70 43.4	65 75	125.6	71 02.8	64 76	124.4	71 21.8	62 77	123.2	71 40.2	61 78	121.9	71 58.2	59 79	120.7	72 15.7	57 80	119.3	6
7	69 19.9	66 74	125.9	69 39.5	65 75	124.8	69 58.7	63 76	123.7	70 17.5	62 77	122.5	70 35.8	60 78	121.4	70 53.6	59 79	120.1	71 11.0	57 80	118.9	71 27.8	55 81	117.6	7
8	68 35.3	64 76	124.1	68 54.3	63 77	123.0	69 13.0	61 78	121.9	69 31.2	60 78	120.8	69 48.9	58 79	119.7	70 06.2	57 80	118.5	70 23.0	55 81	117.2	70 39.3	53 82	116.0	8
9	67 49.8	62 77	122.4	68 08.3	61 78	121.4	68 26.4	60 79	120.3	68 44.1	58 80	119.2	69 01.3	57 80	118.1	69 18.1	55 81	116.9	69 34.3	53 82	115.7	69 50.1	52 83	114.5	9
20	67 03.5	61 78	120.9	67 21.5	59 79	119.8	67 39.1	58 80	118.8	67 56.3	56 81	117.7	68 13.0	55 81	116.6	68 29.3	53 82	115.4	68 45.1	52 83	114.3	69 00.3	50 84	113.1	20
1	66 16.5	59 79	119.4	66 34.0	58 80	118.4	66 51.1	56 81	117.3	67 07.8	55 82	116.3	67 24.1	53 82	115.2	67 39.9	52 83	114.1	67 55.2	50 84	112.9	68 10.1	49 84	111.8	1
2	65 28.8	58 80	118.0	65 45.9	56 81	117.0	66 02.5	55 82	116.0	66 18.8	53 83	114.9	66 34.6	52 83	113.9	66 50.0	51 84	112.8	67 04.9	49 84	111.7	67 19.4	47 85	110.6	2
3	64 40.5	56 81	116.7	64 57.1	55 82	115.7	65 13.4	53 83	114.7	65 29.2	52 83	113.7	65 44.6	51 84	112.7	65 59.6	49 84	111.6	66 14.2	48 85	110.5	66 28.3	46 86	109.4	3
4	63 51.7	55 82	115.4	64 07.9	53 83	114.5	64 23.8	52 84	113.5	64 39.2	51 84	112.5	64 54.3	49 85	111.5	65 08.9	48 85	110.5	65 23.1	47 86	109.4	65 36.8	45 86	108.3	4
25	63 02.3	54 83	114.2	63 18.2	52 84	113.3	63 33.7	51 84	112.4	63 48.8	50 85	111.4	64 03.5	48 85	110.4	64 17.8	47 86	109.4	64 31.6	45 86	108.3	64 45.0	44 87	107.3	25
6	62 12.5	52 84	113.1	62 28.0	51 84	112.2	62 43.2	50 85	111.3	62 57.9	49 85	110.3	63 12.3	47 86	109.3	63 26.3	46 86	108.4	63 39.9	44 87	107.4	63 53.0	43 87	106.3	6
7	61 22.3	51 84	112.1	61 37.5	50 85	111.1	61 52.3	49 85	110.2	62 06.8	48 86	109.3	62 20.9	46 86	108.4	62 34.5	45 87	107.4	62 47.8	44 87	106.4	63 00.7	42 88	105.4	7
8	60 31.7	50 85	111.0	60 46.6	49 85	110.1	61 01.1	48 86	109.2	61 15.3	47 86	108.3	61 29.1	45 87	107.4	61 42.5	44 87	106.5	61 55.5	43 88	105.5	62 08.2	41 88	104.5	8
9	59 40.8	49 85	110.1	59 55.4	48 86	109.2	60 09.7	47 86	108.3	60 23.6	46 87	107.4	60 37.1	44 87	106.5	60 50.3	43 88	105.6	61 03.0	42 88	104.7	61 15.4	41 88	103.7	9
30	58 49.6	48 86	109.1	59 03.9	47 86	108.3	59 17.9	46 87	107.4	59 31.5	45 87	106.5	59 44.8	44 88	105.6	59 57.8	42 88	104.7	60 10.3	41 88	103.8	60 22.5	40 88	102.9	30
1	57 58.1	47 86	108.2	58 12.1	46 87	107.4	58 25.9	45 87	106.5	58 39.3	44 88	105.7	58 52.4	43 88	104.8	59 05.1	42 88	103.9	59 17.4	41 88	103.1	59 29.4	39 89	102.2	1
2	57 06.3	47 87	107.4	57 20.1	46 87	106.6	57 33.7	45 87	105.7	57 46.8	43 88	104.9	57 59.7	42 88	104.0	58 12.2	41 88	103.2	58 24.4	40 89	102.3	58 36.2	39 89	101.4	2
3	56 14.3	46 87	106.5	56 27.9	45 87	105.7	56 41.2	44 88	104.9	56 54.2	43 88	104.1	57 06.9	42 88	103.3	57 19.2	41 89	102.4	57 31.2	39 89	101.6	57 42.8	38 89	100.7	3
4	55 22.0	45 87	105.8	55 35.5	44 88	105.0	55 48.6	43 88	104.2	56 01.4	42 88	103.4	56 13.9	41 89	102.5	56 26.0	40 89	101.7	56 37.8	39 89	100.9	56 49.3	38 89	100.0	4
35	54 29.6	45 88	105.0	54 42.8	44 88	104.2	54 55.8	43 88	103.4	55 08.4	42 88	102.6	55 20.7	41 89	101.8	55 32.7	39 89	101.0	55 44.4	38 89	100.2	55 55.7	37 90	99.4	35
6	53 37.0	44 88	104.2	53 50.0	43 88	103.5	54 02.8	42 88	102.7	54 15.3	41 89	101.9	54 27.4	40 89	101.2	54 39.3	39 89	100.4	54 50.8	38 90	99.6	55 02.0	37 90	98.8	6
7	52 44.2	43 88	103.5	52 57.1	42 88	102.8	53 09.7	42 89	102.0	53 22.0	41 89	101.3	53 34.0	40 89	100.5	53 45.7	39 89	99.7	53 57.1	38 90	98.9	54 08.2	36 90	98.1	7
8	51 51.2	43 88	102.8	52 04.0	42 89	102.1	52 16.4	41 89	101.4	52 28.6	40 89	100.6	52 40.5	39 89	99.9	52 52.1	38 90	99.1	53 03.4	37 90	98.3	53 14.4	36 90	97.6	8
9	50 58.2	42 89	102.2	51 10.7	41 89	101.5	51 23.1	41 89	100.7	51 35.1	40 89	100.0	51 46.9	39 90	99.2	51 58.3	38 90	98.5	52 09.5	37 90	97.7	52 20.4	36 90	97.0	9
40	50 04.9	42 89	101.5	50 17.4	41 89	100.8	50 29.6	40 89	100.1	50 41.5	39 90	99.4	50 53.1	38 90	98.6	51 04.5	37 90	97.9	51 15.6	37 90	97.2	51 26.4	36 90	96.4	40
1	49 11.6	41 89	100.9	49 23.9	41 89	100.2	49 36.0	40 90	99.5	49 47.8	39 90	98.8	49 59.3	38 90	98.1	50 10.6	37 90	97.3	50 21.6	36 90	96.6	50 32.4	35 90	95.9	1
2	48 18.2	41 89	100.3	48 30.4	40 90	99.6	48 42.3	39 90	98.9	48 54.0	39 90	98.2	49 05.5	38 90	97.5	49 16.7	37 90	96.8	49 27.6	36 90	96.1	49 38.2	35 90	95.4	2
3	47 24.6	41 89	99.7	47 36.7	40 90	99.0	47 48.5	39 90	98.3	48 00.2	38 90	97.6	48 11.5	37 90	96.9	48 22.6	37 90	96.2	48 33.5	36 90	95.5	48 44.1	35 90	94.8	3
4	46 30.9	40 90	99.1	46 42.9	40 90	98.4	46 54.7	39 90	97.8	47 06.2	38 90	97.1	47 17.5	37 90	96.4	47 28.6	36 90	95.7	47 39.3	36 90	95.0	47 49.9	35 90	94.3	4
45	45 37.2	40 90	98.5	45 49.1	39 90	97.9	46 00.8	39 90	97.2	46 12.2	38 90	96.6	46 23.4	37 90	95.9	46 34.4	36 90	95.2	46 45.2	35 90	94.5	46 55.6	35 90	93.8	45
6	44 43.4	40 90	98.0	44 55.2	39 90	97.3	45 06.8	38 90	96.7	45 18.2	38 90	96.0	45 29.3	37 90	95.4	45 40.2	36 90	94.7	45 50.9	35 90	94.0	46 01.4	34 90	93.4	6
7	43 49.5	39 90	97.4	44 01.3	39 90	96.8	44 12.8	38 90	96.2	44 24.1	37 90	95.5	44 35.2	37 90	94.9	44 46.0	36 90	94.2	44 56.7	35 90	93.6	45 07.1	34 90	92.9	7
8	42 55.6	39 90	96.9	43 07.2	39 90	96.3	43 18.7	38 90	95.7	43 29.9	37 90	95.0	43 41.0	36 90	94.4	43 51.8	36 90	93.7	44 02.4	35 90	93.1	44 12.8	34 91	92.4	8
9	42 01.5	39 90	96.4	42 13.2	38 90	95.8	42 24.5	38 90	95.2	42 35.7	37 90	94.5	42 46.7	36 90	93.9	42 57.5	36 90	93.3	43 08.1	35 90	92.6	43 18.4	34 91	92.0	9
50	41 07.5	39 90	95.9	41 19.0	38 90	95.3	41 30.4	37 90	94.7	41 41.5	37 90	94.0	41 52.5	36 90	93.4	42 03.2	35 90	92.8	42 13.7	35 91	92.2	42 24.1	34 91	91.5	50
1	40 13.4	39 90	95.4	40 24.9	38 90	94.8	40 36.2	37 90	94.2	40 47.3	37 90	93.6	40 58.2	36 90	92.9	41 08.9	35 91	92.3	41 19.4	35 91	91.7	41 29.7	34 91	91.1	1
2	39 19.2	38 90	94.9	39 30.6	38 90	94.3	39 41.9	37 90	93.7	39 53.0	37 90	93.1	40 03.8	36 90	92.5	40 14.5	35 91	91.9	40 25.0	35 91	91.3	40 35.3	34 91	90.6	2
3	38 25.0	38 90	94.4	38 36.4	38 90	93.8	38 47.6	37 90	93.2	38 58.7	36 91	92.6	39 09.5	36 91	92.0	39 20.2	35 91	91.4	39 30.7	35 91	90.8	39 40.9	34 91	90.2	3
4	37 30.8	38 90	93.9	37 42.1	38 90	93.4	37 53.3	37 90	92.8	38 04.3	36 91	92.2	38 15.2	36 91	91.6	38 25.8	35 91	91.0	38 36.3	35 91	90.4	38 46.6	34 91	89.8	4
55	36 36.5	38 90	93.5	36 47.8	37 90	92.9	36 59.0	37 90	92.3	37 10.0	36 91	91.7	37 20.8	36 91	91.1	37 31.4	35 91	90.6	37 41.9	35 91	90.0	37 52.2	34 91	89.4	55
6	35 42.2	38 90	93.0	35 53.5	37 90	92.4	36 04.7	37 90	91.9	36 15.6	36 91	91.3	36 26.4	36 91	90.7	36 37.1	35 91	90.1	36 47.5	35 91	89.5	36 57.8	34 91	89.0	6
7	34 47.9	38 90	92.6	34 59.2	37 91	92.0	35 10.3	37 91	91.4	35 21.3	36 91	90.9	35 32.1	36 91	90.3	35 42.7	35 91	89.7	35 53.2	35 91	89.1	36 03.5	34 91	88.6	7
8	33 53.6	38 90	92.1	34 04.8	37 91	91.6	34 15.9	37 91	91.0	34 26.9	36 91	90.4	34 37.7	36 91	89.9	34 48.3	35 91	89.3	34 58.8	35 91	88.7	35 09.1	34 91	88.2	8
9	32 59.2	38 90	91.7	33 10.5	37 91	91.1	33 21.6	37 91	90.6	33 32.5	36 91	90.0	33 43.3	36 91	89.4	33 53.9	35 91	88.9	34 04.4	35 90	88.3	34 14.8	34 91	87.8	9
60	32 04.9	38 91	91.2	32 16.1	37 91	90.7	32 27.2	37 91	90.1	32 38.1	36 91	89.6	32 48.9	36 91	89.0	32 59.6	35 91	88.5	33 10.1	35 90	87.9	33 20.4	34 90	87.4	60
1	31 10.5	38 91	90.8	31 21.7	37 91	90.3	31 32.8	37 91	89.7	31 43.8	36 91	89.2	31 54.6	36 91	88.6	32 05.2	35 91	88.1	32 15.7	35 90	87.5	32 26.1	34 90	87.0	1
2	30 16.1	38 91	90.4	30 27.3	37 91	89.8	30 38.4	37 91	89.3	30 49.4	36 91	88.8	31 00.2	36 91	88.2	31 10.9	35 91	87.7	31 21.4	35 90	87.1	31 31.8	34 90	86.6	2
3	29 21.7	38 91	90.0	29 33.0	37 91	89.4	29 44.1	37 91	88.9	29 55.0	36 91	88.3	30 05.9	36 90	87.8	30 16.6	35 91	87.3	30 27.1	35 90	86.7	30 37.6	35 90	86.2	3
4	28 27.4	38 91	89.5	28 38.6	37 91	89.0	28 49.7	37 91	88.5	29 00.7	36 91	87.9	29 11.5	36 90	87.4	29 22.2	36 90	86.9	29 32.8	35 90	86.3	29 43.3	35 90	85.8	4
65	27 33.0	38 91	89.1	27 44.2	37 91	88.6	27 55.3	37 90	88.1	28 06.3	36 90	87.5	28 17.2	36 90	87.0	28 28.0	36 90	86.5	28 38.6	35 90	85.9	28 49.1	35 90	85.4	65
6	26 38.6	38 90	88.7	26 49.9	37 91	88.2	27 01.0	37 90	87.7	27 12.0	37 90	87.1	27 22.9	36 90	86.6	27 33.7	36 90	86.1	27 44.4	35 90	85.6	27 54.9	35 90	85.0	6
7	25 44.3	38 90	88.3	25 55.5	37 90	87.8	26 06.7	37 90	87.3	26 17.7	37 90	86.7	26 28.6	36 90	86.2	26 39.5	36 90	85.7	26 50.2	35 90	85.2	27 00.7	35 90	84.6	7
8	24 49.9	38 90	87.9	25 01.2	37 90	87.4	25 12.4	37 90	86.9	25 23.4	37 90	86.3	25 34.4	36 90	85.8	25 45.2	36 90	85.3	25 56.0	36 90	84.8	26 06.6	35 90	84.3	8
9	23 55.6	38 90	87.5	24 06.9	38 90	87.0	24 18.1	37 90	86.5	24 29.2	37 90	85.9	24 40.2	36 90	85.4	24 51.1	36 90	84.9	25 01.9	36 90	84.4	25 12.5	35 90	83.9	9
70	23 01.3	38 90	87.1	23 12.6	38 90	86.6	23 23.8	37 90	86.1	23 35.0	37 90	85.6	23 46.0	37 90	85.0	23 56.9	36 90	84.5	24 07.7	36 90	84.0	24 18.5	36 90	83.5	70
1	22 07.0	38 90	86.7	22 18.3	38 90	86.2	22 29.6	37 90	85.7	22 40.8	37 90	85.2	22 51.8	37 90	84.7	23 02.8	36 90	84.2	23 13.7	36 90	83.6	23 24.5	36 90	83.1	1
2	21 12.7	38 90	86.3	21 24.1	38 90	85.8	21 35.4	38 90	85.3	21 46.6	37 90	84.8	21 57.7	37 90	84.3	22 08.7	37 90	83.8	22 19.7	36 90	83.3	22 30.5	36 90	82.8	2
3	20 18.4	38 90	85.9	20 29.9	38 90	85.4	20 41.2	38 90	84.9	20 52.4	37 90	84.4	21 03.6	37 90	83.9	21 14.7	37 90	83.4	21 25.7	36 90	82.9	21 36.6	36 90	82.4	3
4	19 24.2	38 90	85.5	19 35.7	38 90	85.0	19 47.1	38 90	84.5	19 58.3	38 90	84.0	20 09.6	37 90	83.5	20 20.7	37 90	83.0	20 31.7	37 90	82.5	20 42.7	36 90	82.0	4
75	18 30.0	38 90	85.1	18 41.5	38 90	84.6	18 52.9	38 90	84.1	19 04.3	38 90	83.6	19 15.6	37 90	83.1	19 26.7	37 90	82.6	19 37.9	37 90	82.1	19 48.9	37 90	81.6	75
6	17 35.9	39 90	84.7	17 47.4	38 90	84.2	17 58.9	38 90	83.7	18 10.3	38 90	83.2	18 21.6	38 90	82.7	18 32.8	37 90	82.2	18 44.0	37 90	81.8	18 55.1	37 90	81.3	6
7	16 41.7	39 90	84.3	16 53.3	39 90	83.8	17 04.8	38 90	83.3	17 16.3	38 90	82.8	17 27.7	38 90	82.3	17 39.0	38 90	81.9	17 50.2	37 90	81.4	18 01.4	37 90	80.9	7
8	15 47.6	39 90	83.9	15 59.3	39 90	83.4	16 10.9	38 90	82.9	16 22.4	38 90	82.4	16 33.8	38 90	82.0	16 45.2	38 90	81.5	16 56.5	38 90	81.0	17 07.7	37 89	80.5	8
9	14 53.6	39 90	83.5	15 05.3	39 90	83.0	15 16.9	39 90	82.5	15 28.5	38 90	82.1	15 40.0	38 90	81.6	15 51.4	38 90	81.1	16 02.8	38 89	80.6	16 14.1	38 89	80.1	9
80	13 59.6	39 90	83.1	14 11.3	39 90	82.6	14 23.0	39 90	82.1	14 34.6	39 90	81.7	14 46.2	38 90	81.2	14 57.7	38 89	80.7	15 09.2	38 89	80.2	15 20.6	38 89	79.8	80
1	13 05.6	39 90	82.7	13 17.4	39 90	82.2	13 29.2	39 90	81.8	13 40.9	39 90	81.3	13 52.5	39 89	80.8	14 04.1	39 89	80.3	14 15.6	38 89	79.9	14 27.1	38 89	79.4	1
2	12 11.7	40 90	82.3	12 23.6	39 90	81.8	12 35.4	39 90	81.4	12 47.1	39 89	80.9	12 58.9	39 89	80.4	13 10.5	39 89	79.9	13 22.1	39 89	79.5	13 33.7	38 89	79.0	2
3	11 17.9	40 90	81.9	11 29.8	40 90	81.4	11 41.7	40 90	81.0	11 53.5	39 89	80.5	12 05.3	39 89	80.0	12 17.0	39 89	79.6	12 28.7	39 89	79.1	12 40.3	39 89	78.6	3
4	10 24.0	40 90	81.5	10 36.0	40 90	81.0	10 48.0	40 89	80.6	10 59.9	40 89	80.1	11 11.7	39 89	79.6	11 23.6	39 89	79.2	11 35.3	39 89	78.7	11 47.1	39 89	78.2	4
85	9 30.3	40 90	81.1	9 42.3	40 89	80.6	9 54.4	40 89	80.2	10 06.3	40 89	79.7	10 18.3	40 89	79.3	10 30.2	40 89	78.8	10 42.0	39 89	78.3	10 53.9	39 89	77.8	85
6	8 36.6	40 89	80.7	8 48.7	40 89	80.2	9 00.8	40 89	79.8	9 12.9	40 89	79.3	9 24.9	40 89	78.9	9 36.9	40 89	78.4	9 48.8	40 88	77.9	10 00.7	40 88	77.5	6
7	7 43.0	41 89	80.3	7 55.2	41 89	79.8	8 07.3	41 89	79.4	8 19.5	40 89	78.9	8 31.6	40 89	78.5	8 43.7	40 89	78.0	8 55.7	40 88	77.5	9 07.7	40 88	77.1	7
8	6 49.4	41 89	79.9	7 01.7	41 89	79.4	7 13.9	41 89	79.0	7 26.1	41 89	78.5	7 38.3	41 89	78.1	7 50.5	41 88	77.6	8 02.6	40 88	77.1	8 14.7	40 88	76.7	8
9	5 55.9	41 89	79.5	6 08.2	41 89	79.0	6 20.6	41 89	78.6	6 32.9	41 89	78.1	6 45.2	41 88	77.7	6 57.4	41 88	77.2	7 09.7	41 88	76.7	7 21.9	41 88	76.3	9
90	5 02.5	41 89	79.1	5 14.9	41 89	78.6	5 27.3	41 89	78.2	5 39.7	41 89	77.7	5 52.1	41 88	77.3	6 04.4	41 88	76.8	6 16.8	41 88	76.4	6 29.1	41 88	75.9	90

Lat. 25°

H.A.	12° 00′ Alt.	Az.	12° 30′ Alt.	Az.	13° 00′ Alt.	Az.	13° 30′ Alt.	Az.	14° 00′ Alt.	Az.	14° 30′ Alt.	Az.	15° 00′ Alt.	Az.	15° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	53 00.0 1.0 01	180.0	52 30.0 1.0 01	180.0	52 00.0 1.0 01	180.0	51 30.0 1.0 01	180.0	51 00.0 1.0 01	180.0	50 30.0 1.0 01	180.0	50 00.0 1.0 01	180.0	49 30.0 1.0 01	180.0	00
1	52 59.2 1.0 04	178.4	52 29.2 1.0 04	178.4	51 59.2 1.0 04	178.4	51 29.3 1.0 04	178.4	50 59.3 1.0 04	178.5	50 29.3 1.0 04	178.5	49 59.3 1.0 04	178.5	49 29.3 1.0 04	178.5	1
2	52 56.9 1.0 06	176.8	52 27.0 1.0 06	176.8	51 57.0 1.0 06	176.8	51 27.0 1.0 06	176.9	50 57.1 1.0 06	176.9	50 27.1 1.0 06	177.0	49 57.2 1.0 06	177.0	49 27.2 1.0 06	177.0	2
3	52 53.1 1.0 09	175.1	52 23.2 1.0 09	175.2	51 53.2 1.0 09	175.3	51 23.3 1.0 08	175.3	50 53.4 1.0 08	175.4	50 23.5 1.0 08	175.4	49 53.6 1.0 08	175.5	49 23.7 1.0 08	175.6	3
4	52 47.7 99 12	173.5	52 17.9 99 11	173.6	51 48.0 99 11	173.7	51 18.2 99 11	173.8	50 48.3 99 11	173.9	50 18.5 1.0 11	173.9	49 48.6 1.0 11	174.0	49 18.8 1.0 10	174.1	4
05	52 40.8 99 14	171.9	52 11.1 99 14	172.0	51 41.3 99 14	172.1	51 11.5 99 13	172.2	50 41.8 99 13	172.3	50 12.0 99 13	172.4	49 42.2 99 13	172.5	49 12.5 99 13	172.6	05
6	52 32.4 99 16	170.3	52 02.8 99 16	170.4	51 33.1 99 16	170.6	51 03.5 99 16	170.7	50 33.8 99 16	170.8	50 04.1 99 15	170.9	49 34.5 99 15	171.0	49 04.8 99 15	171.2	6
7	52 22.5 98 19	168.7	51 53.0 98 19	168.9	51 23.5 98 18	169.0	50 54.0 98 18	169.2	50 24.4 98 18	169.3	49 54.9 99 18	169.4	49 25.3 99 18	169.6	48 55.7 99 17	169.7	7
8	52 11.2 98 21	167.2	51 41.8 98 21	167.3	51 12.4 98 21	167.5	50 43.0 98 20	167.7	50 13.6 98 20	167.8	49 44.2 98 20	168.0	49 14.8 98 20	168.1	48 45.3 98 20	168.3	8
9	51 58.4 97 24	165.6	51 29.2 97 24	165.8	51 00.0 97 23	166.0	50 30.7 97 23	166.2	50 01.5 98 22	166.3	49 32.2 98 22	166.5	49 02.9 98 22	166.7	48 33.6 98 22	166.8	9
10	51 44.2 97 26	164.1	51 15.1 97 26	164.3	50 46.1 97 25	164.5	50 17.0 97 25	164.7	49 47.9 97 25	164.9	49 18.8 97 24	165.1	48 49.7 97 24	165.2	48 20.6 97 24	165.4	10
1	51 28.6 96 28	162.6	50 59.7 96 28	162.8	50 30.9 96 28	163.0	50 02.0 96 27	163.2	49 33.1 96 27	163.4	49 04.2 96 27	163.6	48 35.2 97 26	163.8	48 06.2 97 26	164.0	1
2	51 11.6 96 30	161.1	50 43.0 96 30	161.3	50 14.3 96 30	161.5	49 45.6 96 29	161.8	49 16.9 96 29	162.0	48 48.2 96 29	162.2	48 19.4 96 28	162.4	47 50.6 96 28	162.6	2
3	50 53.3 95 33	159.6	50 24.9 95 32	159.8	49 56.4 95 32	160.1	49 28.0 95 32	160.3	48 59.5 95 31	160.6	48 30.9 95 31	160.8	48 02.4 95 30	161.0	47 33.8 95 30	161.3	3
4	50 33.7 94 35	158.1	50 05.5 94 34	158.4	49 37.3 94 34	158.7	49 09.0 94 34	158.9	48 40.8 94 33	159.2	48 12.4 94 33	159.4	47 44.1 95 32	159.7	47 15.7 95 32	159.9	4
15	50 12.8 93 37	156.7	49 44.8 93 36	157.0	49 16.9 93 36	157.3	48 48.9 93 36	157.5	48 20.8 94 35	157.8	47 52.7 94 35	158.1	47 24.6 94 34	158.3	46 56.4 94 34	158.6	15
6	49 50.7 92 39	155.3	49 23.0 92 38	155.6	48 55.2 92 38	155.9	48 27.5 93 38	156.2	47 59.7 93 37	156.4	47 31.8 93 37	156.7	47 03.9 93 36	157.0	46 36.0 93 36	157.3	6
7	49 27.3 91 41	153.9	48 59.9 91 40	154.2	48 32.4 92 40	154.5	48 04.9 92 40	154.8	47 37.4 92 39	155.1	47 09.7 92 39	155.4	46 42.1 92 38	155.7	46 14.4 92 38	156.0	7
8	49 02.8 90 43	152.5	48 35.7 91 42	152.9	48 08.5 91 42	153.2	47 41.2 91 41	153.5	47 13.9 91 41	153.8	46 46.5 91 40	154.1	46 19.1 91 40	154.4	45 51.7 92 40	154.7	8
9	48 37.2 89 44	151.2	48 10.3 90 44	151.5	47 43.4 90 44	151.9	47 16.4 90 43	152.2	46 49.3 90 43	152.5	46 22.2 90 42	152.8	45 55.1 91 42	153.1	45 27.9 91 41	153.4	9
20	48 10.4 89 46	149.9	47 43.8 89 46	150.2	47 17.2 89 45	150.6	46 50.5 89 45	150.9	46 23.7 89 44	151.2	45 56.9 90 44	151.6	45 30.0 90 44	151.9	45 03.1 90 43	152.2	20
1	47 42.6 88 48	148.6	47 16.3 88 48	149.0	46 50.0 88 47	149.3	46 23.5 88 47	149.7	45 57.0 88 46	150.0	45 30.5 89 46	150.3	45 03.9 89 45	150.7	44 37.2 89 45	151.0	1
2	47 13.8 87 50	147.3	46 47.8 87 49	147.7	46 21.7 87 49	148.1	45 55.5 87 48	148.4	45 29.3 87 48	148.8	45 03.0 88 47	149.1	44 36.7 88 47	149.5	44 10.3 88 46	149.8	2
3	46 44.0 86 51	146.1	46 18.2 86 51	146.5	45 52.4 86 50	146.9	45 26.6 86 50	147.2	45 00.6 87 49	147.6	44 34.6 87 49	147.9	44 08.6 87 48	148.3	43 42.5 87 48	148.6	3
4	46 13.2 85 53	144.9	45 47.7 85 52	145.3	45 22.2 85 52	145.7	44 56.7 85 52	146.0	44 31.0 86 51	146.4	44 05.3 86 50	146.8	43 39.5 86 50	147.1	43 13.7 86 50	147.5	4
25	45 41.4 84 54	143.7	45 16.3 84 54	144.1	44 51.1 84 53	144.5	44 25.8 84 53	144.9	44 00.5 85 52	145.2	43 35.0 85 52	145.6	43 09.5 85 52	146.0	42 44.0 85 51	146.3	25
6	45 08.8 83 56	142.6	44 44.0 83 55	143.0	44 19.1 83 55	143.3	43 54.1 83 54	143.7	43 29.0 84 54	144.1	43 03.9 84 53	144.5	42 38.7 84 53	144.9	42 13.4 84 52	145.2	6
7	44 35.3 82 57	141.4	44 10.8 82 57	141.8	43 46.2 82 56	142.2	43 21.5 82 56	142.6	42 56.7 83 55	143.0	42 31.9 83 55	143.4	42 06.9 83 54	143.8	41 41.9 83 54	144.1	7
8	44 01.0 81 58	140.3	43 36.8 81 58	140.7	43 12.5 81 58	141.1	42 48.1 81 57	141.5	42 23.6 82 56	141.9	41 59.0 82 56	142.3	41 34.4 82 56	142.7	41 09.7 82 55	143.1	8
9	43 25.9 80 60	139.2	43 02.0 80 59	139.6	42 37.9 80 59	140.1	42 13.8 80 58	140.5	41 49.6 81 58	140.9	41 25.4 81 57	141.2	41 01.0 81 57	141.6	40 36.6 82 56	142.0	9
30	42 50.0 79 61	138.2	42 26.4 79 61	138.6	42 02.6 79 60	139.0	41 38.8 80 60	139.4	41 14.9 80 59	139.8	40 51.0 80 59	140.2	40 26.9 80 58	140.6	40 02.7 81 58	141.0	30
1	42 13.4 78 62	137.1	41 50.0 78 62	137.6	41 26.6 78 61	138.0	41 03.1 79 61	138.4	40 39.5 79 60	138.8	40 15.8 79 60	139.2	39 52.0 79 59	139.6	39 28.2 80 59	140.0	1
2	41 36.0 77 63	136.1	41 13.0 77 63	136.5	40 49.8 77 62	137.0	40 26.6 78 62	137.4	40 03.3 78 62	137.8	39 39.9 78 61	138.2	39 16.4 78 60	138.6	38 52.8 79 60	139.0	2
3	40 58.0 76 64	135.1	40 35.2 76 64	135.6	40 12.4 76 64	136.0	39 49.5 77 63	136.4	39 26.4 77 63	136.8	39 03.3 77 62	137.2	38 40.1 77 62	137.6	38 16.8 78 61	138.0	3
4	40 19.3 75 66	134.2	39 56.8 75 65	134.6	39 34.3 75 65	135.0	39 11.6 76 64	135.4	38 48.9 76 64	135.9	38 26.1 76 63	136.3	38 03.1 77 63	136.7	37 40.1 77 62	137.1	4
35	39 40.0 74 66	133.2	39 17.8 74 66	133.6	38 55.5 74 66	134.1	38 33.2 75 65	134.5	38 10.7 75 65	134.9	37 48.2 75 64	135.3	37 25.5 76 64	135.8	37 02.8 76 63	136.2	35
6	39 00.0 73 68	132.3	38 38.1 73 67	132.7	38 16.2 73 67	133.2	37 54.1 74 66	133.6	37 31.9 74 66	134.0	37 09.6 74 65	134.4	36 47.3 75 65	134.9	36 24.8 75 64	135.3	6
7	38 19.5 72 68	131.4	37 57.9 72 68	131.8	37 36.2 73 68	132.3	37 14.4 73 67	132.7	36 52.5 73 67	133.1	36 30.5 73 66	133.5	36 08.4 74 66	134.0	35 46.3 74 65	134.4	7
8	37 38.4 71 69	130.5	37 17.1 71 69	130.9	36 55.7 72 68	131.4	36 34.1 72 68	131.8	36 12.5 72 68	132.2	35 50.8 73 67	132.7	35 29.0 73 67	133.1	35 07.1 73 66	133.5	8
9	36 56.8 70 70	129.6	36 35.8 70 70	130.1	36 14.6 71 69	130.5	35 53.3 71 69	130.9	35 32.0 71 68	131.4	35 10.5 72 68	131.8	34 49.0 72 68	132.2	34 27.4 72 67	132.7	9
40	36 14.7 69 71	128.8	35 53.9 69 71	129.2	35 33.0 70 70	129.7	35 12.0 70 70	130.1	34 50.9 70 69	130.5	34 29.7 71 69	131.0	34 08.5 71 68	131.4	33 47.1 71 68	131.8	40
1	35 32.0 68 72	127.9	35 11.5 69 72	128.4	34 50.9 69 71	128.8	34 30.1 69 70	129.3	34 09.3 70 70	129.7	33 48.4 70 70	130.1	33 27.4 70 69	130.6	33 06.3 70 69	131.0	1
2	34 48.9 67 73	127.1	34 28.6 68 72	127.6	34 08.3 68 72	128.0	33 47.8 68 71	128.5	33 27.3 69 71	128.9	33 06.6 69 70	129.3	32 45.9 69 70	129.8	32 25.0 70 70	130.2	2
3	34 05.3 67 73	126.3	33 45.3 67 73	126.8	33 25.2 67 72	127.2	33 05.0 68 72	127.7	32 44.7 68 72	128.1	32 24.3 68 71	128.6	32 03.8 68 71	129.0	31 43.3 69 70	129.4	3
4	33 21.3 66 74	125.6	33 01.6 66 74	126.0	32 41.7 66 73	126.5	32 21.7 67 73	126.9	32 01.7 67 72	127.3	31 41.6 67 72	127.8	31 21.3 68 72	128.2	31 01.0 68 71	128.6	4
45	32 36.9 65 75	124.8	32 17.4 65 74	125.3	31 57.7 66 74	125.7	31 38.0 66 74	126.1	31 18.2 66 73	126.6	30 58.4 66 73	127.0	30 38.4 67 72	127.5	30 18.3 67 72	127.9	45
6	31 52.0 64 75	124.1	31 32.7 64 75	124.5	31 13.4 65 75	125.0	30 53.9 65 74	125.4	30 34.4 65 74	125.8	30 14.7 66 73	126.3	29 55.0 66 73	126.7	29 35.2 66 73	127.1	6
7	31 06.8 63 76	123.3	30 47.7 64 76	123.8	30 28.6 64 75	124.2	30 09.4 64 75	124.7	29 50.1 65 74	125.1	29 30.7 65 74	125.5	29 11.2 65 74	126.0	28 51.6 65 73	126.4	7
8	30 21.2 63 77	122.6	30 02.4 63 76	123.1	29 43.5 63 76	123.5	29 24.5 63 76	124.0	29 05.4 64 75	124.4	28 46.2 64 75	124.8	28 27.0 64 74	125.3	28 07.7 65 74	125.7	8
9	29 35.2 62 77	121.9	29 16.6 62 77	122.4	28 57.9 62 76	122.8	28 39.2 63 76	123.3	28 20.3 63 76	123.7	28 01.4 63 75	124.1	27 42.4 63 75	124.6	27 23.3 64 74	125.0	9
50	28 48.8 61 78	121.2	28 30.5 61 78	121.7	28 12.1 62 77	122.1	27 53.5 62 77	122.6	27 34.9 62 76	123.0	27 16.2 62 76	123.4	26 57.5 63 76	123.9	26 38.6 63 75	124.3	50
1	28 02.2 60 78	120.5	27 44.0 61 78	121.0	27 25.8 61 78	121.4	27 07.5 61 77	121.9	26 49.1 61 77	122.3	26 30.7 62 76	122.8	26 12.1 62 76	123.2	25 53.5 62 76	123.6	1
2	27 15.2 60 79	119.9	26 57.3 60 78	120.3	26 39.3 60 78	120.8	26 21.2 60 78	121.2	26 03.0 61 77	121.7	25 44.8 61 77	122.1	25 26.5 61 77	122.6	25 08.1 61 76	123.0	2
3	26 27.9 59 79	119.2	26 10.2 59 79	119.7	25 52.4 59 79	120.1	25 34.5 60 78	120.6	25 16.6 60 78	121.0	24 58.6 60 78	121.5	24 40.5 60 77	121.9	24 22.3 61 77	122.3	3
4	25 40.3 58 80	118.6	25 22.8 58 80	119.0	25 05.2 59 79	119.5	24 47.6 59 79	119.9	24 29.8 59 78	120.4	24 12.0 59 78	120.8	23 54.1 60 78	121.3	23 36.2 60 77	121.7	4
55	24 52.4 57 80	118.0	24 35.1 58 80	118.4	24 17.7 58 80	118.9	24 00.3 58 79	119.3	23 42.8 59 79	119.8	23 25.2 59 79	120.2	23 07.5 59 78	120.6	22 49.8 59 78	121.1	55
6	24 04.2 57 81	117.4	23 47.1 57 80	117.8	23 30.0 57 80	118.3	23 12.7 58 80	118.7	22 55.4 58 79	119.1	22 38.0 58 79	119.6	22 20.6 58 79	120.0	22 03.0 59 78	120.5	6
7	23 15.8 56 81	116.8	22 58.9 56 81	117.2	22 41.9 57 80	117.7	22 24.9 57 80	118.1	22 07.8 57 80	118.5	21 50.6 57 80	119.0	21 33.4 58 79	119.4	21 16.0 58 79	119.9	7
8	22 27.1 56 82	116.2	22 10.4 56 81	116.6	21 53.6 56 81	117.1	21 36.8 56 81	117.5	21 19.9 56 80	117.9	21 02.9 57 80	118.4	20 45.9 57 80	118.8	20 28.7 57 79	119.3	8
9	21 38.2 55 82	115.6	21 21.7 55 82	116.0	21 05.1 55 81	116.5	20 48.4 56 81	116.9	20 31.7 56 81	117.4	20 14.9 56 80	117.8	19 58.1 56 80	118.2	19 41.2 56 80	118.7	9
60	20 49.0 54 82	115.0	20 32.7 55 82	115.5	20 16.3 55 82	115.9	19 59.8 55 81	116.3	19 43.3 55 81	116.8	19 26.7 55 81	117.2	19 10.1 56 80	117.7	18 53.3 56 80	118.1	60
1	19 59.6 54 83	114.4	19 43.5 54 82	114.9	19 27.3 54 82	115.3	19 11.0 54 82	115.8	18 54.6 55 82	116.2	18 38.2 55 81	116.7	18 21.8 55 81	117.1	18 05.2 55 80	117.5	1
2	19 10.0 53 83	113.9	18 54.0 53 83	114.3	18 38.0 54 82	114.8	18 21.9 54 82	115.2	18 05.7 54 82	115.7	17 49.5 54 82	116.1	17 33.2 54 81	116.6	17 16.9 55 81	117.0	2
3	18 20.2 53 83	113.3	18 04.4 53 83	113.8	17 48.5 53 83	114.2	17 32.6 53 82	114.7	17 16.6 53 82	115.1	17 00.6 54 82	115.6	16 44.5 54 82	116.0	16 28.3 54 81	116.4	3
4	17 30.2 52 84	112.8	17 14.5 52 83	113.3	16 58.8 52 83	113.7	16 43.1 53 83	114.1	16 27.3 53 82	114.6	16 11.4 53 82	115.0	15 55.5 53 82	115.5	15 39.5 53 82	115.9	4
65	16 39.9 51 84	112.3	16 24.5 52 84	112.7	16 08.9 52 84	113.2	15 53.4 52 83	113.6	15 37.7 52 83	114.1	15 22.0 52 82	114.5	15 06.3 53 82	114.9	14 50.5 53 82	115.4	65
6	15 49.5 51 84	111.8	15 34.2 51 84	112.2	15 18.9 51 84	112.6	15 03.4 51 84	113.1	14 48.0 52 83	113.5	14 32.5 52 83	114.0	14 16.9 52 83	114.4	14 01.3 52 82	114.9	6
7	14 58.9 50 85	111.2	14 43.8 51 84	111.7	14 28.6 51 84	112.1	14 13.3 51 84	112.6	13 58.0 51 84	113.0	13 42.7 51 83	113.5	13 27.3 51 83	113.9	13 11.8 52 83	114.3	7
8	14 08.2 50 85	110.7	13 53.2 50 85	111.2	13 38.1 50 84	111.6	13 23.0 50 84	112.1	13 07.9 51 84	112.5	12 52.7 51 84	113.0	12 37.5 51 83	113.4	12 22.2 51 83	113.8	8
9	13 17.2 49 85	110.2	13 02.4 50 85	110.7	12 47.5 50 85	111.1	12 32.5 50 84	111.6	12 17.6 50 84	112.0	12 02.5 50 84	112.5	11 47.5 50 84	112.9	11 32.4 50 84	113.3	9
70	12 26.1 49 86	109.7	12 11.4 49 85	110.2	11 56.7 49 85	110.6	11 41.9 49 85	111.1	11 27.1 49 84	111.5	11 12.2 50 84	112.0	10 57.3 50 84	112.4	10 42.3 50 84	112.8	70
1	11 34.8 48 86	109.3	11 20.3 49 86	109.7	11 05.7 49 85	110.1	10 51.1 49 85	110.6	10 36.4 49 85	111.0	10 21.7 49 84	111.5	10 06.9 49 84	111.9	9 52.1 49 84	112.4	1
2	10 43.4 48 86	108.8	10 29.0 48 86	109.2	10 14.6 48 86	109.7	10 00.1 48 85	110.1	9 45.5 48 85	110.6	9 31.0 49 85	111.0	9 16.4 49 84	111.4	9 01.8 49 84	111.9	2
3	9 51.9 48 86	108.3	9 37.6 48 86	108.7	9 23.3 48 86	109.2	9 08.9 48 86	109.6	8 54.5 48 85	110.1	8 40.1 48 85	110.5	8 25.7 48 85	111.0	8 11.2 48 84	111.4	3
4	9 00.2 47 86	107.8	8 46.0 47 86	108.3	8 31.8 47 86	108.7	8 17.6 47 86	109.2	8 03.4 48 86	109.6	7 49.1 48 85	110.1	7 34.8 48 85	110.5	7 20.5 48 85	110.9	4
75	8 08.3 47 87	107.4	7 54.3 47 86	107.8	7 40.3 47 86	108.3	7 26.2 47 86	108.7	7 12.1 47 86	109.1	6 58.0 47 86	109.6	6 43.8 47 85	110.0	6 29.6 47 85	110.5	75
6	7 16.4 46 87	106.9	7 02.5 46 87	107.4	6 48.6 46 86	107.8	6 34.6 47 86	108.2	6 20.7 47 86	108.7	6 06.7 47 86	109.1	5 52.7 47 86	109.6	5 38.6 47 85	110.0	6
7	6 24.3 46 87	106.5	6 10.5 46 87	106.9	5 56.7 46 87	107.3	5 42.9 46 86	107.8	5 29.1 46 86	108.2	5 15.2 46 86	108.7	5 01.3 46 86	109.1			7
8	5 32.1 45 87	106.0	5 18.4 46 87	106.4	5 04.8 46 87	106.9											8

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Az.	12° 30′ Alt.	Az.	13° 00′ Alt.	Az.	13° 30′ Alt.	Az.	14° 00′ Alt.	Az.	14° 30′ Alt.	Az.	15° 00′ Alt.	Az.	15° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91											5 11.5 41 88	76.4	5 24.0 41 88	76.0	5 36.4 41 88	75.5	91

Lat. 25°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	81 00.0	1.0 05	180.0	81 30.0	1.0 05	180.0	82 00.0	1.0 05	180.0	82 30.0	1.0 06	180.0	83 00.0	1.0 06	180.0	83 30.0	1.0 07	180.0	84 00.0	1.0 07	180.0	84 30.0	1.0 08	180.0	00
1	80 57.1	99 14	173.9	81 26.9	99 15	173.5	81 56.8	99 16	173.2	82 26.5	99 17	172.7	82 56.3	99 18	172.2	83 26.0	99 19	171.7	83 55.7	99 21	171.0	84 25.4	99 23	170.3	1
2	80 48.5	98 24	167.9	81 17.8	98 25	167.2	81 47.1	98 26	166.5	82 16.3	97 28	165.7	82 45.4	97 29	164.7	83 14.4	96 31	163.7	83 43.2	96 33	162.4	84 11.8	95 36	161.0	2
3	80 34.4	96 32	162.1	81 03.0	95 34	161.2	81 31.5	95 35	160.1	81 59.8	94 37	159.0	82 27.9	93 39	157.7	82 55.7	92 41	156.2	83 23.2	91 44	154.5	83 50.4	90 47	152.6	3
4	80 15.2	93 40	156.7	80 42.9	92 41	155.5	81 10.4	91 43	154.2	81 37.6	90 45	152.8	82 04.4	89 48	151.2	82 30.9	87 50	149.5	82 56.9	86 53	147.5	83 22.3	84 56	145.3	4
05	79 51.5	89 46	151.6	80 18.1	88 48	150.3	80 44.4	87 50	148.8	81 10.4	86 52	147.2	81 35.9	84 55	145.4	82 00.8	82 57	143.5	82 25.2	80 60	141.3	82 48.8	78 63	138.9	05
6	79 23.6	86 52	146.9	79 49.2	84 54	145.5	80 14.3	83 56	143.9	80 38.9	81 58	142.2	81 03.0	79 61	140.3	81 26.5	77 63	138.2	81 49.2	75 66	136.0	82 11.2	72 68	133.5	6
7	78 52.2	82 58	142.6	79 16.6	80 59	141.1	79 40.5	79 61	139.4	80 03.9	77 64	137.7	80 26.6	75 66	135.7	80 48.6	72 68	133.6	81 09.9	69 70	131.4	81 30.3	66 72	129.0	7
8	78 17.8	78 62	138.7	78 41.0	77 64	137.2	79 03.7	75 66	135.5	79 25.8	73 68	133.6	79 47.3	70 70	131.7	80 08.0	68 72	129.6	80 27.8	65 74	127.4	80 46.8	62 76	125.0	8
9	77 40.7	75 66	135.2	78 02.8	73 67	133.6	78 24.4	71 69	131.9	78 45.3	69 71	130.1	79 05.6	66 73	128.2	79 25.0	64 75	126.1	79 43.7	61 76	124.0	80 01.4	57 78	121.7	9
10	77 01.3	71 69	132.0	77 22.4	69 70	130.4	77 42.9	67 72	128.7	78 02.7	65 74	126.9	78 21.9	63 76	125.0	78 40.2	60 77	123.0	78 57.8	57 79	120.9	79 14.4	54 80	118.7	10
1	76 19.9	68 72	129.1	76 40.1	66 73	127.5	76 59.6	64 75	125.8	77 18.5	62 76	124.1	77 36.6	59 78	122.2	77 54.0	57 79	120.3	78 10.5	54 81	118.3	78 26.1	51 82	116.2	1
2	75 36.9	65 74	126.4	75 56.2	63 76	124.9	76 14.8	61 77	123.2	76 32.8	59 78	121.5	76 50.0	56 80	119.8	77 06.4	54 81	117.9	77 22.1	51 82	116.0	77 36.9	48 84	114.0	2
3	74 52.5	62 76	124.0	75 10.9	60 77	122.5	75 28.7	58 79	120.9	75 45.8	56 80	119.3	76 02.3	53 81	117.5	76 17.9	51 82	115.8	76 32.8	48 84	113.9	76 46.8	45 84	112.0	3
4	74 06.9	60 78	121.8	74 24.5	58 79	120.3	74 41.6	56 80	118.8	74 57.9	53 81	117.2	75 13.6	51 82	115.5	75 28.5	49 83	113.8	75 42.7	46 84	112.1	75 56.1	43 86	110.2	4
15	73 20.2	58 79	119.8	73 37.1	56 80	118.4	73 53.5	53 82	116.9	74 09.2	51 82	115.3	74 24.2	49 84	113.7	74 38.5	46 84	112.1	74 52.0	44 85	110.4	75 04.8	41 86	108.6	15
6	72 32.6	55 81	118.0	72 48.9	53 82	116.6	73 04.6	51 83	115.1	73 19.7	49 84	113.6	73 34.1	47 84	112.1	73 47.8	45 85	110.5	74 00.8	42 86	108.9	74 13.0	40 87	107.2	6
7	71 44.1	53 82	116.3	71 59.9	51 83	114.9	72 15.0	49 84	113.5	72 29.5	47 84	112.0	72 43.4	45 85	110.6	72 56.6	43 86	109.0	73 09.1	41 87	107.5	73 20.9	38 87	105.9	7
8	70 55.0	52 83	114.7	71 10.2	50 84	113.4	71 24.9	48 84	112.0	71 38.9	46 85	110.6	71 52.3	44 86	109.2	72 05.0	41 87	107.7	72 17.1	39 87	106.2	72 28.5	37 88	104.7	8
9	70 05.4	50 84	113.2	70 20.1	48 84	111.9	70 34.2	46 85	110.6	70 47.8	44 86	109.3	71 00.7	42 86	107.9	71 13.0	40 87	106.5	71 24.7	38 88	105.0	71 35.7	36 88	103.6	9
20	69 15.1	48 84	111.9	69 29.4	47 85	110.6	69 43.1	45 86	109.3	69 56.2	43 86	108.0	70 08.8	41 87	106.7	70 20.7	39 88	105.3	70 32.1	37 88	104.0	70 42.8	35 89	102.6	20
1	68 24.4	47 85	110.6	68 38.3	45 86	109.4	68 51.6	43 86	108.1	69 04.4	42 87	106.9	69 16.6	40 88	105.6	69 28.2	38 88	104.3	69 39.2	36 88	103.0	69 49.6	34 89	101.6	1
2	67 33.3	46 86	109.4	67 46.8	44 86	108.2	67 59.8	42 87	107.0	68 12.2	40 88	105.8	68 24.1	39 88	104.6	68 35.4	37 88	103.3	68 46.1	35 89	102.0	68 56.2	33 89	100.7	2
3	66 41.9	45 86	108.3	66 55.0	43 87	107.1	67 07.6	41 87	106.0	67 19.7	39 88	104.8	67 31.3	38 88	103.6	67 42.3	36 89	102.4	67 52.8	34 89	101.1	68 02.7	32 89	99.9	3
4	65 50.1	43 87	107.2	66 02.9	42 87	106.1	66 15.2	40 88	105.0	66 27.0	39 88	103.9	66 38.4	37 88	102.7	66 49.1	35 89	101.5	66 59.4	33 89	100.3	67 09.1	31 90	99.1	4
25	64 58.0	42 87	106.2	65 10.5	41 88	105.2	65 22.6	39 88	104.1	65 34.1	38 88	103.0	65 45.2	36 89	101.8	65 55.8	34 89	100.7	66 05.8	33 90	99.5	66 15.4	31 90	98.4	25
6	64 05.7	42 88	105.3	64 17.9	40 88	104.3	64 29.7	39 88	103.2	64 41.1	37 89	102.1	64 51.9	35 89	101.0	65 02.3	34 89	99.9	65 12.1	32 90	98.8	65 21.5	30 90	97.7	6
7	63 13.1	41 88	104.4	63 25.1	39 88	103.4	63 36.7	38 89	102.4	63 47.8	36 89	101.3	63 58.5	35 89	100.2	64 08.7	33 90	99.2	64 18.4	32 90	98.1	64 27.6	30 90	97.0	7
8	62 20.4	40 88	103.6	62 32.1	39 88	102.6	62 43.5	37 89	101.6	62 54.4	36 89	100.5	63 04.9	34 90	99.5	63 14.9	33 90	98.5	63 24.5	31 90	97.4	63 33.6	29 90	96.3	8
9	61 27.4	39 88	102.8	61 39.0	38 89	101.8	61 50.2	37 89	100.8	62 00.9	35 89	99.8	62 11.2	34 90	98.8	62 21.1	32 90	97.8	62 30.5	31 90	96.8	62 39.5	29 90	95.7	9
30	60 34.3	39 89	102.0	60 45.7	37 89	101.0	60 56.7	36 89	100.1	61 07.3	35 90	99.1	61 17.4	33 90	98.1	61 27.2	32 90	97.2	61 36.5	30 90	96.2	61 45.3	29 90	95.1	30
1	59 41.0	38 89	101.2	59 52.3	37 89	100.3	60 03.1	35 90	99.4	60 13.5	34 90	98.4	60 23.6	33 90	97.5	60 33.2	31 90	96.5	60 42.4	30 90	95.6	60 51.2	29 90	94.6	1
2	58 47.6	38 89	100.5	58 58.7	36 90	99.6	59 09.4	35 90	98.7	59 19.7	34 90	97.8	59 29.6	32 90	96.9	59 39.1	31 90	95.9	59 48.2	30 90	95.0	59 56.9	28 90	94.0	2
3	57 54.1	37 89	99.8	58 05.0	36 90	99.0	58 15.6	35 90	98.1	58 25.8	33 90	97.2	58 35.6	32 90	96.3	58 45.0	31 90	95.4	58 54.0	29 90	94.4	59 02.7	28 90	93.5	3
4	57 00.5	37 90	99.2	57 11.3	35 90	98.3	57 21.7	34 90	97.5	57 31.8	33 90	96.6	57 41.5	32 90	95.7	57 50.8	31 90	94.8	57 59.8	29 90	93.9	58 08.4	28 90	93.0	4
35	56 06.7	36 90	98.6	56 17.4	35 90	97.7	56 27.8	34 90	96.9	56 37.7	33 90	96.0	56 47.4	32 90	95.2	56 56.6	30 90	94.3	57 05.5	29 90	93.4	57 14.1	28 91	92.5	35
6	55 12.9	36 90	97.9	55 23.5	35 90	97.1	55 33.7	34 90	96.3	55 43.6	32 90	95.5	55 53.2	31 90	94.6	56 02.4	30 90	93.8	56 11.2	29 90	92.9	56 19.7	28 91	92.0	6
7	54 19.0	35 90	97.4	54 29.5	34 90	96.5	54 39.7	33 90	95.7	54 49.5	32 90	94.9	54 59.0	31 90	94.1	55 08.1	30 90	93.3	55 16.9	29 90	92.4	55 25.4	28 91	91.6	7
8	53 25.1	35 90	96.8	53 35.5	34 90	96.0	53 45.5	33 90	95.2	53 55.3	32 90	94.4	54 04.7	31 90	93.6	54 13.8	30 90	92.8	54 22.6	29 90	92.0	54 31.0	28 91	91.1	8
9	52 31.0	35 90	96.2	52 41.4	34 90	95.4	52 51.4	33 90	94.7	53 01.0	32 90	93.9	53 10.4	31 90	93.1	53 19.5	30 91	92.3	53 28.2	29 91	91.5	53 36.7	28 91	90.7	9
40	51 37.0	35 90	95.7	51 47.2	34 90	94.9	51 57.1	33 90	94.2	52 06.8	32 90	93.4	52 16.1	31 90	92.6	52 25.1	30 91	91.8	52 33.9	29 91	91.0	52 42.3	28 91	90.2	40
1	50 42.8	34 90	95.1	50 53.0	33 90	94.4	51 02.9	32 90	93.7	51 12.5	32 90	92.9	51 21.8	31 91	92.1	51 30.8	30 91	91.4	51 39.5	29 91	90.6	51 47.9	28 91	89.8	1
2	49 48.6	34 90	94.6	49 58.8	33 90	93.9	50 08.6	32 90	93.2	50 18.2	31 91	92.4	50 27.4	30 91	91.7	50 36.4	29 91	90.9	50 45.1	29 91	90.2	50 53.5	28 91	89.4	2
3	48 54.4	34 90	94.1	49 04.5	33 90	93.4	49 14.3	32 91	92.7	49 23.8	31 91	92.0	49 33.1	30 91	91.2	49 42.0	29 91	90.5	49 50.7	29 91	89.7	49 59.2	28 91	89.0	3
4	48 00.2	34 90	93.6	48 10.2	33 90	92.9	48 20.0	32 91	92.2	48 29.5	31 91	91.5	48 38.7	30 91	90.8	48 47.7	29 91	90.1	48 56.4	29 91	89.3	49 04.8	28 91	88.6	4
45	47 05.9	34 90	93.2	47 15.9	33 91	92.5	47 25.6	32 91	91.8	47 35.1	31 91	91.1	47 44.3	30 91	90.4	47 53.3	29 91	89.6	48 02.0	29 91	88.9	48 10.4	28 91	88.2	45
6	46 11.6	34 90	92.7	46 21.5	33 91	92.0	46 31.3	32 91	91.3	46 40.7	31 91	90.6	46 50.0	30 91	89.9	46 58.9	29 91	89.2	47 07.6	29 91	88.5	47 16.1	28 91	87.8	6
7	45 17.2	34 91	92.2	45 27.2	33 91	91.5	45 36.9	32 91	90.9	45 46.4	31 91	90.2	45 55.6	30 91	89.5	46 04.5	29 91	88.8	46 13.3	29 90	88.1	46 21.7	28 90	87.4	7
8	44 22.9	33 91	91.8	44 32.8	33 91	91.1	44 42.5	32 91	90.4	44 52.0	31 91	89.8	45 01.2	30 91	89.1	45 10.2	30 91	88.4	45 18.9	29 90	87.7	45 27.4	28 90	87.1	8
9	43 28.5	33 91	91.3	43 38.5	33 91	90.7	43 48.1	32 91	90.0	43 57.6	31 91	89.4	44 06.8	30 91	88.7	44 15.8	30 90	88.0	44 24.6	29 90	87.4	44 33.1	28 90	86.7	9
50	42 34.2	33 91	90.9	42 44.1	33 91	90.2	42 53.8	32 91	89.6	43 03.2	31 91	88.9	43 12.5	30 91	88.3	43 21.5	30 90	87.6	43 30.3	29 90	87.0	43 38.9	28 90	86.3	50
1	41 39.8	33 91	90.4	41 49.7	33 91	89.8	41 59.4	32 91	89.2	42 08.9	31 91	88.5	42 18.1	31 90	87.9	42 27.2	30 90	87.3	42 36.0	29 90	86.6	42 44.6	28 90	86.0	1
2	40 45.4	33 91	90.0	40 55.3	33 91	89.4	41 05.0	32 91	88.8	41 14.5	31 91	88.1	41 23.8	31 90	87.5	41 32.9	30 90	86.9	41 41.7	29 90	86.2	41 50.4	28 90	85.6	2
3	39 51.0	33 91	89.6	40 00.9	33 91	89.0	40 10.7	32 91	88.4	40 20.2	31 91	87.7	40 29.5	31 90	87.1	40 38.6	30 90	86.5	40 47.5	29 90	85.9	40 56.2	29 90	85.2	3
4	38 56.7	33 91	89.2	39 06.6	33 91	88.6	39 16.3	32 90	88.0	39 25.8	31 90	87.4	39 35.2	31 90	86.7	39 44.3	30 90	86.1	39 53.3	29 90	85.5	40 02.0	29 90	84.9	4
55	38 02.3	33 91	88.8	38 12.2	33 91	88.2	38 22.0	32 90	87.6	38 31.5	32 90	87.0	38 40.9	31 90	86.4	38 50.1	30 90	85.8	38 59.1	30 90	85.1	39 07.8	29 90	84.5	55
6	37 07.9	33 91	88.4	37 17.9	33 91	87.8	37 27.6	32 90	87.2	37 37.2	32 90	86.6	37 46.6	31 90	86.0	37 55.9	30 90	85.4	38 04.9	30 90	84.8	38 13.7	29 90	84.2	6
7	36 13.6	33 90	88.0	36 23.6	33 91	87.4	36 33.3	32 90	86.8	36 43.0	32 90	86.2	36 52.4	31 90	85.6	37 01.7	31 90	85.0	37 10.7	30 90	84.4	37 19.7	29 90	83.8	7
8	35 19.3	34 90	87.6	35 29.2	33 90	87.0	35 39.1	32 90	86.4	35 48.7	32 90	85.8	35 58.2	31 90	85.2	36 07.5	31 90	84.7	36 16.6	30 90	84.1	36 25.6	30 90	83.5	8
9	34 24.9	34 90	87.2	34 34.9	33 90	86.6	34 44.8	33 90	86.0	34 54.5	32 90	85.5	35 04.0	31 90	84.9	35 13.4	31 90	84.3	35 22.6	30 90	83.7	35 31.6	30 90	83.1	9
60	33 30.6	34 90	86.8	33 40.7	33 90	86.2	33 50.6	33 90	85.7	34 00.3	32 90	85.1	34 09.9	32 90	84.5	34 19.3	31 90	83.9	34 28.5	31 90	83.4	34 37.6	30 90	82.8	60
1	32 36.3	34 90	86.4	32 46.4	33 90	85.8	32 56.4	33 90	85.3	33 06.1	32 90	84.7	33 15.8	32 90	84.2	33 25.2	31 90	83.6	33 34.5	31 90	83.0	33 43.7	30 90	82.4	1
2	31 42.1	34 90	86.0	31 52.2	33 90	85.5	32 02.2	33 90	84.9	32 12.0	33 90	84.4	32 21.7	32 90	83.8	32 31.2	32 90	83.2	32 40.6	31 90	82.7	32 49.8	31 90	82.1	2
3	30 47.9	34 90	85.6	30 58.0	34 90	85.1	31 08.0	33 90	84.5	31 17.9	33 90	84.0	31 27.6	32 90	83.4	31 37.2	32 90	82.9	31 46.7	31 90	82.3	31 56.0	31 90	81.8	3
4	29 53.6	34 90	85.3	30 03.8	34 90	84.7	30 13.9	33 90	84.2	30 23.8	33 90	83.6	30 33.6	32 90	83.1	30 43.3	32 90	82.5	30 52.8	31 90	82.0	31 02.2	31 90	81.4	4
65	28 59.5	34 90	84.9	29 09.7	34 90	84.3	29 19.8	34 90	83.8	29 29.8	33 90	83.3	29 39.7	33 90	82.7	29 49.4	32 90	82.2	29 59.0	32 90	81.6	30 08.4	31 90	81.1	65
6	28 05.3	35 90	84.5	28 15.6	34 90	84.0	28 25.8	34 90	83.4	28 35.8	33 90	82.9	28 45.8	33 90	82.4	28 55.6	32 90	81.8	29 05.2	32 90	81.3	29 14.7	32 89	80.7	6
7	27 11.2	35 90	84.1	27 21.6	34 90	83.6	27 31.8	34 90	83.1	27 41.9	33 90	82.5	27 51.9	33 90	82.0	28 01.8	33 90	81.5	28 11.5	32 90	80.9	28 21.1	32 89	80.4	7
8	26 17.1	35 90	83.7	26 27.5	35 90	83.2	26 37.8	34 90	82.7	26 48.0	34 90	82.2	26 58.1	33 90	81.6	27 08.0	33 90	81.1	27 17.8	33 89	80.6	27 27.5	32 89	80.1	8
9	25 23.1	35 90	83.4	25 33.6	35 90	82.9	25 43.9	34 90	82.3	25 54.2	34 90	81.8	26 04.3	34 90	81.3	26 14.3	33 89	80.8	26 24.2	33 89	80.2	26 34.0	32 89	79.7	9
70	24 29.1	35 90	83.0	24 39.6	35 90	82.5	24 50.0	35 90	82.0	25 00.4	34 90	81.5	25 10.6	34 90	80.9	25 20.7	33 89	80.4	25 30.6	33 89	79.9	25 40.5	33 89	79.4	70
1	23 35.2	35 90	82.6	23 45.7	35 90	82.1	23 56.2	35 90	81.6	24 06.6	34 90	81.1	24 16.9	34 89	80.6	24 27.1	34 89	80.1	24 37.1	33 89	79.5	24 47.1	33 89	79.0	1
2	22 41.2	36 90	82.3	22 51.9	35 90	81.8	23 02.5	35 90	81.2	23 12.9	35 89	80.7	23 23.3	34 89	80.2	23 33.5	34 89	79.7	23 43.7	34 89	79.2	23 53.7	33 89	78.7	2
3	21 47.4	36 90	81.9	21 58.1	36 90	81.4	22 08.7	35 90	80.9	22 19.3	35 89	80.4	22 29.7	35 89	79.9	22 40.1	34 89	79.4	22 50.3	34 89	78.8	23 00.5	34 89	78.3	3
4	20 53.6	36 90	81.5	21 04.4	36 90	81.0	21 15.1	36 89	80.5	21 25.7	35 89	80.0	21 36.2	35 89	79.5	21 46.6	35 89	79.0	21 57.0	34 89	78.5	22 07.2	34 88	78.0	4
75	19 59.8	36 90	81.1	20 10.7	36 89	80.6	20 21.5	36 89	80.2	20 32.2	36 89	79.7	20 42.8	35 89	79.2	20 53.3	35 89	78.7	21 03.7	35 89	78.1	21 14.1	34 88	77.6	75
6	19 06.1	37 89	80.8	19 17.1	36 89	80.3	19 27.9	36 89	79.8	19 38.7	36 89	79.3	19 49.4	36 89	78.8	20 00.0	35 89	78.3	20 10.5	35 88	77.8	20 21.0	35 88	77.3	6
7	18 12.5	37 89	80.4	18 23.5	37 89	79.9	18 34.4	36 89	79.4	18 45.3	36 89	78.9	18 56.1	36 89	78.4	19 06.8	36 88	77.9	19 17.4	35 88	77.4	19 28.0	35 88	76.9	7
8	17 18.9	37 89	80.0	17 30.0	37 89	79.5	17 41.0	37 89	79.1	17 52.0	36 89	78.6	18 02.9	36 89	78.1	18 13.7	36 88	77.6	18 24.4	36 88	77.1	18 35.0	35 88	76.6	8
9	16 25.4	37 89	79.7	16 36.5	37 89	79.2	16 47.7	37 89	78.7	16 58.7	37 89	78.2	17 09.7	36 88	77.7	17 20.6	36 88	77.2	17 31.4	36 88	76.7	17 42.2	36 88	76.2	9
80	15 31.9	38 89	79.3	15 43.2	37 89	78.8	15 54.4	37 89	78.3	16 05.5	37 88	77.8	16 16.6	37 88	77.3	16 27.6	37 88	76.9	16 38.5	36 88	76.4	16 49.4	36 88	75.9	80
1	14 38.5	38 89	78.9	14 49.9	38 89	78.4	15 01.2	38 88	77.9	15 12.4	37 88	77.5	15 23.6	37 88	77.0	15 34.7	37 88	76.5	15 45.7	37 88	76.0	15 56.7	37 88	75.5	1
2	13 45.2	38 89	78.5	13 56.6	38 88	78.0	14 08.0	38 88	77.6	14 19.4	38 88	77.1	14 30.6	37 88	76.6	14 41.8	37 88	76.1	14 53.0	37 88	75.7	15 04.1	37 88	75.2	2
3	12 51.9	39 89	78.1	13 03.5	38 88	77.7	13 15.0	38 88	77.2	13 26.4	38 88	76.7	13 37.8	38 88	76.2	13 49.1	38 88	75.8	14 00.4	37 88	75.3	14 11.6	37 88	74.8	3
4	11 58.7	39 88	77.8	12 10.4	39 88	77.3	12 22.0	39 88	76.8	12 33.5	38 88	76.3	12 45.0	38 88	75.9	12 56.4	38 88	75.4	13 07.8	38 88	74.9	13 19.1	38 87	74.4	4
85	11 05.6	39 88	77.4	11 17.4	39 88	76.9	11 29.1	39 88	76.4	11 40.7	39 88	76.0	11 52.3	39 88	75.5	12 03.8	38 87	75.0	12 15.4	38 87	74.6	12 26.8	38 87	74.1	85
6	10 12.6	40 88	77.0	10 24.4	39 88	76.5	10 36.2	39 88	76.1	10 48.0	39 88	75.6	10 59.7	39 88	75.1	11 11.4	39 87	74.7	11 23.0	39 87	74.2	11 34.6	39 87	73.7	6
7	9 19.7	40 88	76.6	9 31.6	40 88	76.1	9 43.5	40 88	75.7	9 55.4	39 88	75.2	10 07.2	39 87	74.7	10 19.0	39 87	74.3	10 30.7	39 87	73.8	10 42.4	39 87	73.3	7
8	8 26.8	40 88	76.2	8 38.9	40 88	75.8	8 50.9	40 88	75.3	9 02.8	40 87	74.8	9 14.8	40 87	74.4	9 26.7	40 87	73.9	9 38.5	40 87	73.4	9 50.4	39 87	73.0	8
9	7 34.0	41 88	75.8	7 46.2	40 88	75.4	7 58.3	40 87	74.9	8 10.4	40 87	74.4	8 22.5	40 87	74.0	8 34.5	40 87	73.5	8 46.5	40 87	73.1	8 58.4	40 86	72.6	9
90	6 41.4	41 88	75.4	6 53.6	41 87	75.0	7 05.9	41 87	74.5	7 18.1	41 87	74.1	7 30.2	41 87	73.6	7 42.4	40 87	73.1	7 54.5	40 86	72.7	8 06.6	40 86	72.2	90

Lat. 25°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	49 00.0	1.0	01	180.0	48 30.0	1.0	01	180.0	48 00.0	1.0	01	180.0	47 30.0	1.0	01	180.0	47 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	46 00.0	1.0	01	180.0	45 30.0	1.0	01	180.0	00
1	48 59.3	1.0	04	178.5	48 29.3	1.0	03	178.5	47 59.3	1.0	03	178.6	47 29.3	1.0	03	178.6	46 59.3	1.0	03	178.6	46 29.3	1.0	03	178.6	45 59.4	1.0	03	178.6	45 29.4	1.0	03	178.7	1
2	48 57.2	1.0	06	177.1	48 27.3	1.0	06	177.1	47 57.3	1.0	06	177.1	47 27.3	1.0	06	177.2	46 57.4	1.0	06	177.2	46 27.4	1.0	06	177.2	45 57.4	1.0	05	177.3	45 27.5	1.0	05	177.3	2
3	48 53.8	1.0	08	175.6	48 23.8	1.0	08	175.7	47 53.9	1.0	08	175.7	47 24.0	1.0	08	175.8	46 54.1	1.0	08	175.8	46 24.1	1.0	08	175.9	45 54.2	1.0	08	175.9	45 24.3	1.0	08	176.0	3
4	48 48.9	1.0	10	174.2	48 19.0	1.0	10	174.2	47 49.2	1.0	10	174.3	47 19.3	1.0	10	174.4	46 49.4	1.0	10	174.4	46 19.6	1.0	10	174.5	45 49.7	1.0	10	174.6	45 19.8	1.0	10	174.6	4
05	48 42.7	99	13	172.7	48 12.9	99	12	172.8	47 43.1	99	12	172.9	47 13.3	99	12	173.0	46 43.5	99	12	173.1	46 13.7	99	12	173.1	45 43.9	99	12	173.2	45 14.1	99	12	173.3	05
6	48 35.1	99	15	171.3	48 05.4	99	15	171.4	47 35.7	99	14	171.5	47 06.0	99	14	171.6	46 36.3	99	14	171.7	46 06.6	99	14	171.8	45 36.8	99	14	171.9	45 07.1	99	14	172.0	6
7	48 26.2	99	17	169.8	47 56.6	99	17	170.0	47 27.0	99	17	170.1	46 57.4	99	16	170.2	46 27.8	99	16	170.3	45 58.2	99	16	170.4	45 28.5	99	16	170.5	44 58.9	99	16	170.7	7
8	48 15.9	98	19	168.4	47 46.4	98	19	168.5	47 17.0	98	19	168.7	46 47.5	98	19	168.8	46 18.0	98	18	169.0	45 48.5	98	18	169.1	45 19.0	98	18	169.2	44 49.5	98	18	169.3	8
9	48 04.3	98	22	167.0	47 35.0	98	21	167.2	47 05.7	98	21	167.3	46 36.3	98	21	167.5	46 06.9	98	20	167.6	45 37.6	98	20	167.8	45 08.2	98	20	167.9	44 38.8	98	20	168.0	9
10	47 51.4	97	24	165.6	47 22.3	97	23	165.8	46 53.1	97	23	165.9	46 23.9	97	23	166.1	45 54.7	97	22	166.3	45 25.4	97	22	166.4	44 56.2	97	22	166.6	44 26.9	98	22	166.7	10
1	47 37.3	97	26	164.2	47 08.3	97	26	164.4	46 39.2	97	25	164.6	46 10.2	97	25	164.8	45 41.1	97	24	164.9	45 12.1	97	24	165.1	44 43.0	97	24	165.3	44 13.9	97	24	165.5	1
2	47 21.8	96	28	162.8	46 53.0	96	28	163.0	46 24.2	96	27	163.2	45 55.3	96	27	163.4	45 26.4	96	26	163.6	44 57.5	96	26	163.8	44 28.6	96	26	164.0	43 59.6	97	26	164.2	2
3	47 05.2	95	30	161.5	46 36.5	95	29	161.7	46 07.9	96	29	161.9	45 39.2	96	29	162.1	45 10.5	96	28	162.3	44 41.8	96	28	162.5	44 13.0	96	28	162.7	43 44.2	96	28	162.9	3
4	46 47.3	95	32	160.1	46 18.9	95	32	160.4	45 50.4	95	31	160.6	45 21.9	95	31	160.8	44 53.4	95	30	161.0	44 24.9	95	30	161.3	43 56.3	95	30	161.5	43 27.7	95	29	161.7	4
15	46 28.3	94	34	158.8	46 00.0	94	33	159.1	45 31.8	94	33	159.3	45 03.5	94	33	159.5	44 35.2	94	32	159.8	44 06.8	95	32	160.0	43 38.5	95	32	160.2	43 10.1	95	31	160.5	15
6	46 08.0	93	36	157.5	45 40.0	93	35	157.8	45 12.0	94	35	158.0	44 43.9	94	34	158.3	44 15.8	94	34	158.5	43 47.7	94	34	158.8	43 19.5	94	33	159.0	42 51.3	94	33	159.2	6
7	45 46.7	92	38	156.2	45 18.9	93	37	156.5	44 51.1	93	37	156.8	44 23.3	93	36	157.0	43 55.4	93	36	157.3	43 27.5	93	36	157.5	42 59.5	93	35	157.8	42 31.5	93	35	158.0	7
8	45 24.2	92	39	155.0	44 56.7	92	39	155.3	44 29.1	92	38	155.5	44 01.5	92	38	155.8	43 33.9	92	38	156.1	43 06.2	92	37	156.3	42 38.4	92	37	156.6	42 10.7	93	36	156.9	8
9	45 00.7	91	41	153.7	44 33.4	91	41	154.0	44 06.1	91	40	154.3	43 38.7	91	40	154.6	43 11.3	91	39	154.9	42 43.8	92	39	155.1	42 16.3	92	38	155.4	41 48.8	92	38	155.7	9
20	44 36.1	90	43	152.5	44 09.0	90	42	152.8	43 42.0	90	42	153.1	43 14.8	90	41	153.4	42 47.7	91	41	153.7	42 20.5	91	41	154.0	41 53.2	91	40	154.3	41 25.9	91	40	154.5	20
1	44 10.5	89	44	151.3	43 43.7	89	44	151.6	43 16.9	89	44	151.9	42 50.0	90	43	152.2	42 23.1	90	43	152.5	41 56.1	90	42	152.8	41 29.1	90	42	153.1	41 02.0	90	41	153.4	1
2	43 43.9	88	46	150.1	43 17.3	88	46	150.4	42 50.8	89	45	150.8	42 24.2	89	45	151.1	41 57.5	89	44	151.4	41 30.8	89	44	151.7	41 04.0	89	43	152.0	40 37.2	89	43	152.3	2
3	43 16.3	87	48	148.9	42 50.0	88	47	149.3	42 23.7	88	47	149.6	41 57.4	88	46	149.9	41 31.0	88	46	150.2	41 04.5	88	45	150.6	40 38.0	88	45	150.9	40 11.5	89	44	151.2	3
4	42 47.8	86	49	147.8	42 21.8	87	49	148.1	41 55.8	87	48	148.5	41 29.7	87	48	148.8	41 03.5	87	47	149.1	40 37.3	87	47	149.5	40 11.1	88	46	149.8	39 44.8	88	46	150.1	4
25	42 18.3	86	50	146.7	41 52.6	86	50	147.0	41 26.9	86	50	147.4	41 01.1	86	49	147.7	40 35.2	86	49	148.0	40 09.3	87	48	148.4	39 43.3	87	48	148.7	39 17.2	87	47	149.0	25
6	41 48.0	85	52	145.6	41 22.6	85	52	145.9	40 57.1	85	51	146.3	40 31 6	85	50	146.6	40 06.0	85	50	147.0	39 40.3	86	50	147.3	39 14.6	86	49	147.6	38 48.8	86	49	148.0	6
7	41 16.9	84	53	144.5	40 51.7	84	53	144.9	40 26.5	84	52	145.2	40 01.3	84	52	145.6	39 35.9	85	52	145.9	39 10.5	85	51	146.3	38 45.1	85	50	146.6	38 19.6	85	50	146.9	7
8	40 44.9	83	55	143.4	40 20.0	83	54	143.8	39 55.1	83	54	144.2	39 30.1	83	53	144.5	39 05.0	84	53	144.9	38 39.9	84	52	145.2	38 14.7	84	52	145.6	37 49.5	84	52	145.9	8
9	40 12.1	82	56	142.4	39 47.5	82	56	142.8	39 22.9	82	55	143.1	38 58.2	82	55	143.5	38 33.4	83	54	143.9	38 08.5	83	54	144.2	37 43.6	83	53	144.6	37 18.6	83	53	144.9	9
30	39 38.5	81	57	141.4	39 14.2	81	57	141.8	38 49.9	81	56	142.1	38 25.4	82	56	142.5	38 00.9	82	55	142.9	37 36.4	82	55	143.2	37 11.7	82	54	143.6	36 47.0	82	54	144.0	30
1	39 04.2	80	58	140.4	38 40.2	80	58	140.8	38 16.1	80	58	141.1	37 52.0	81	57	141.5	37 27.7	81	56	141.9	37 03.4	81	56	142.3	36 39.1	81	56	142.6	36 14.6	82	55	143.0	1
2	38 29.2	79	60	139.4	38 05.5	79	59	139.8	37 41.7	79	59	140.2	37 17.8	80	58	140.6	36 53.8	80	58	140.9	36 29.8	80	57	141.3	36 05.7	80	57	141.7	35 41.5	81	56	142.0	2
3	37 53.5	78	61	138.4	37 30.0	78	60	138.8	37 06.5	79	60	139.2	36 42.9	79	59	139.6	36 19.2	79	59	140.0	35 55.5	79	58	140.4	35 31.6	80	58	140.7	35 07.8	80	58	141.1	3
4	37 17.0	77	62	137.5	36 53.9	77	61	137.9	36 30.6	78	61	138.3	36 07.3	78	60	138.7	35 43.9	78	60	139.1	35 20.4	78	59	139.5	34 56.9	79	59	139.8	34 33.3	79	58	140.2	4
35	36 40.0	76	63	136.6	36 17.1	76	62	137.0	35 54.1	77	62	137.4	35 31.1	77	61	137.8	35 08.0	77	61	138.2	34 44.8	77	60	138.6	34 21.5	78	60	138.9	33 58.2	78	60	139.3	35
6	36 02.3	75	64	135.7	35 39.7	76	63	136.1	35 17.0	76	63	136.5	34 54.3	76	62	136.9	34 31.4	76	62	137.3	34 08.5	77	62	137.7	33 45.5	77	61	138.1	33 22.4	77	61	138.4	6
7	35 24.0	74	65	134.8	35 01.7	75	64	135.2	34 39.2	75	64	135.6	34 16.8	75	64	136.0	33 54.2	75	63	136.4	33 31.5	76	62	136.8	33 08.8	76	62	137.2	32 46.0	76	62	137.6	7
8	34 45.1	73	66	133.9	34 23.1	74	65	134.3	34 00.9	74	65	134.7	33 38.7	74	64	135.1	33 16.4	74	64	135.5	32 54.0	75	64	135.9	32 31.5	75	63	136.3	32 09.0	75	62	136.7	8
9	34 05.7	72	67	133.1	33 43.9	73	66	133.5	33 22.0	73	66	133.9	33 00.0	73	65	134.3	32 38.0	74	65	134.7	32 15.9	74	64	135.1	31 53.7	74	64	135.5	31 31.5	74	64	135.9	9
40	33 25.7	72	68	132.2	33 04.2	72	67	132.7	32 42.5	72	67	133.1	32 20.9	72	66	133.5	31 59.1	73	66	133.9	31 37.3	73	65	134.3	31 15.3	73	65	134.7	30 53.3	73	64	135.1	40
1	32 45.2	71	68	131.4	32 23.9	71	68	131.8	32 02.6	71	68	132.3	31 41.1	72	67	132.7	31 19.6	72	67	133.1	30 58.1	72	66	133.5	30 36.4	72	66	133.9	30 14.7	73	65	134.3	1
2	32 04.1	70	69	130.6	31 43.1	70	69	131.0	31 22.1	70	68	131.5	31 00.9	71	68	131.9	30 39.7	71	68	132.3	30 18.3	71	67	132.7	29 57.0	71	67	133.1	29 35.5	72	66	133.5	2
3	31 22.6	69	70	129.8	31 01.9	69	70	130.3	30 41.1	70	69	130.7	30 20.2	70	69	131.1	29 59.2	70	68	131.5	29 38.1	70	68	131.9	29 17.0	71	68	132.3	28 55.8	71	67	132.7	3
4	30 40.6	68	71	129.1	30 20.1	68	70	129.5	29 59.6	69	70	129.9	29 38.9	69	69	130.3	29 18.2	69	69	130.7	28 57.4	69	68	131.2	28 36.6	70	68	131.6	28 15.6	70	68	132.0	4
45	29 58.2	67	72	128.3	29 38.0	68	71	128.7	29 17.6	68	71	129.2	28 57.3	68	70	129.6	28 36.8	68	70	130.0	28 16.3	69	70	130.4	27 55.6	69	69	130.8	27 34.9	69	68	131.2	45
6	29 15.3	66	72	127.6	28 55.3	67	72	128.0	28 35.3	67	71	128.4	28 15.1	67	71	128.8	27 54.9	67	70	129.3	27 34.6	68	70	129.7	27 14.3	68	70	130.1	26 53.8	68	69	130.5	6
7	28 32.0	66	73	126.8	28 12.3	66	72	127.3	27 52.4	66	72	127.7	27 32.6	66	72	128.1	27 12.6	67	71	128.5	26 52.6	67	71	129.0	26 32.4	67	70	129.4	26 12.3	67	70	129.8	7
8	27 48.3	65	74	126.1	27 28.8	65	73	126.6	27 09.2	65	73	127.0	26 49.6	66	72	127.4	26 29.9	66	72	127.8	26 10.1	66	72	128.3	25 50.2	66	71	128.7	25 30.3	67	71	129.1	8
9	27 04.2	64	74	125.4	26 44.9	64	74	125.9	26 25.6	65	73	126.3	26 06.2	65	73	126.7	25 46.7	65	72	127.1	25 27.2	65	72	127.6	25 07.5	66	72	128.0	24 47.9	66	72	128.4	9
50	26 19.7	63	75	124.8	26 00.7	63	74	125.2	25 41.6	64	74	125.6	25 22.4	64	74	126.0	25 03.2	64	73	126.5	24 43.9	64	73	126.9	24 24.5	65	72	127.3	24 05.0	65	72	127.7	50
1	25 34.8	62	75	124.1	25 16.0	63	75	124.5	24 57.2	63	75	124.9	24 38.3	63	74	125.4	24 19.3	63	74	125.8	24 00.2	64	74	126.2	23 41.0	64	73	126.6	23 21.8	64	72	127.1	1
2	24 49.6	62	76	123.4	24 31.0	62	76	123.9	24 12.4	62	75	124.3	23 53.7	62	75	124.7	23 35.0	63	74	125.1	23 16.1	63	74	125.6	22 57.2	63	74	126.0	22 38.3	63	73	126.4	2
3	24 04.0	61	76	122.8	23 45.7	61	76	123.2	23 27.3	61	76	123.6	23 08.9	62	76	124.1	22 50.3	62	75	124.5	22 31.7	62	74	124.9	22 13.0	62	74	125.3	21 54.3	63	74	125.8	3
4	23 18.2	60	77	122.1	23 00.1	60	77	122.6	22 41.9	61	76	123.0	22 23.6	61	76	123.4	22 05.3	61	76	123.9	21 47.0	61	75	124.3	21 28.5	62	75	124.7	21 10.0	62	74	125.1	4
55	22 32.0	60	78	121.5	22 14.1	60	77	121.9	21 56.1	60	77	122.4	21 38.1	60	76	122.8	21 20.0	60	76	123.2	21 01.9	61	76	123.7	20 43.7	61	75	124.1	20 25.4	61	75	124.5	55
6	21 45.4	59	78	120.9	21 27.8	59	78	121.3	21 10.0	59	77	121.8	20 52.2	59	77	122.2	20 34.4	60	76	122.6	20 16.4	60	76	123.1	19 58.5	60	76	123.5	19 40.4	60	76	123.9	6
7	20 58.6	58	78	120.3	20 41.2	58	78	120.7	20 23.7	59	78	121.2	20 06.1	59	78	121.6	19 48.4	59	77	122.0	19 30.7	59	77	122.5	19 12.9	59	76	122.9	18 55.1	60	76	123.3	7
8	20 11.6	57	79	119.7	19 54.3	58	79	120.1	19 37.0	58	78	120.6	19 19.6	58	78	121.0	19 02.2	58	78	121.4	18 44.7	58	77	121.9	18 27.1	59	77	122.3	18 09.5	59	76	122.7	8
9	19 24.2	57	79	119.1	19 07.1	57	79	119.6	18 50.0	57	79	120.0	18 32.9	57	78	120.4	18 15.6	58	78	120.9	17 58.4	58	78	121.3	17 41.0	58	77	121.7	17 23.6	58	77	122.1	9
60	18 36.5	56	80	118.6	18 19.7	56	80	119.0	18 02.8	56	79	119.4	17 45.8	57	79	119.9	17 28.8	57	78	120.3	17 11.7	57	78	120.7	16 54.6	57	78	121.1	16 37.4	57	77	121.6	60
1	17 48.7	55	80	118.0	17 32.0	56	80	118.4	17 15.3	56	80	118.9	16 58.5	56	79	119.3	16 41.7	56	79	119.7	16 24.9	56	79	120.2	16 07.9	56	78	120.6	15 51.0	57	78	121.0	1
2	17 00.5	55	81	117.4	16 44.1	55	80	117.9	16 27.6	55	80	118.3	16 11.0	55	80	118.7	15 54.4	55	79	119.2	15 37.7	56	79	119.6	15 21.0	56	79	120.0	15 04.2	56	78	120.5	2
3	16 12.1	54	81	116.9	15 55.9	54	81	117.3	15 39.6	54	80	117.8	15 23.2	55	80	118.2	15 06.8	55	80	118.6	14 50.3	55	80	119.1	14 33.8	55	79	119.5	14 17.2	55	79	119.9	3
4	15 23.5	53	81	116.3	15 07.4	54	81	116.8	14 51.3	54	81	117.2	14 35.1	54	80	117.7	14 18.9	54	80	118.1	14 02.6	54	80	118.5	13 46.3	54	80	119.0	13 30.0	55	79	119.4	4
65	14 34.7	53	82	115.8	14 18.8	53	82	116.3	14 02.8	53	81	116.7	13 46.9	53	81	117.1	13 30.8	54	80	117.6	13 14.8	54	80	118.0	12 58.6	54	80	118.4	12 42.5	54	80	118.9	65
6	13 45.6	52	82	115.3	13 29.9	52	82	115.7	13 14.1	53	82	116.2	12 58.4	53	81	116.6	12 42.5	53	81	117.0	12 26.6	53	80	117.5	12 10.7	53	80	117.9	11 54.7	53	80	118.3	6
7	12 56.3	52	82	114.8	12 40.8	52	82	115.2	12 25.2	52	82	115.7	12 09.6	52	82	116.1	11 54.0	52	81	116.5	11 38.3	52	81	117.0	11 22.5	53	81	117.4	11 06.8	53	80	117.8	7
8	12 06.9	51	83	114.3	11 51.5	51	82	114.7	11 36.1	51	82	115.2	11 20.7	52	82	115.6	11 05.2	52	82	116.0	10 49.7	52	81	116.5	10 34.1	52	81	116.9	10 18.6	52	81	117.3	8
9	11 17.2	51	83	113.8	11 02.0	51	83	114.2	10 46.8	51	82	114.7	10 31.5	51	82	115.1	10 16.2	51	82	115.5	10 00.9	51	82	116.0	9 45.5	51	81	116.4	9 30.1	51	81	116.8	9
70	10 27.4	50	83	113.3	10 12.3	50	83	113.7	9 57.3	50	83	114.2	9 42.2	50	82	114.6	9 27.1	50	82	115.0	9 11.9	51	82	115.5	8 56.7	51	82	115.9	8 41.5	51	81	116.4	70
1	9 37.3	49	84	112.8	9 22.5	50	84	113.2	9 07.6	50	83	113.7	8 52.7	50	83	114.1	8 37.7	50	83	114.6	8 22.7	50	82	115.0	8 07.7	50	82	115.4	7 52.7	50	82	115.9	1
2	8 47.1	49	84	112.3	8 32.4	49	84	112.8	8 17.7	49	84	113.2	8 02.9	49	83	113.6	7 48.2	49	83	114.1	7 33.4	49	83	114.5	7 18.5	49	82	115.0	7 03.7	50	82	115.4	2
3	7 56.7	48	84	111.8	7 42.2	48	84	112.3	7 27.6	49	84	112.7	7 13.1	49	84	113.2	6 58.4	49	83	113.6	6 43.8	49	83	114.1	6 29.1	49	83	114.5	6 14.4	49	82	114.9	3
4	7 06.2	48	84	111.4	6 51.8	48	84	111.8	6 37.4	48	84	112.3	6 23.0	48	84	112.7	6 08.5	48	84	113.1	5 54.0	48	83	113.6	5 39.6	48	83	114.0	5 25.1	48	82	114.5	4
75	6 15.4	47	85	110.9	6 01.2	47	84	111.4	5 47.0	48	84	111.8	5 32.7	48	84	112.2	5 18.4	48	84	112.7	5 04.1	48	83	113.1									75
6	5 24.6	47	85	110.5	5 10.5	47	84	110.9																									6

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	5 48.8	41	88	75.0	6 01.2	41	87	74.6	6 13.5	41	87	74.1	6 25.8	41	87	73.7	6 38.1	41	87	73.2	6 50.4	41	86	72.7	7 02.7	41	86	72.3	7 14.9	41	86	71.8	91
2					5 08.8	42	87	74.2	5 21.3	42	87	73.7	5 33.7	41	87	73.3	5 46.1	41	86	72.8	5 58.5	41	86	72.3	6 10.9	41	86	71.9	6 23.3	41	85	71.4	2
3																					5 06.8	42	86	72.0	5 19.3	42	86	71.5	5 31.8	42	86	71.0	3

Lat. 25°

H.A.	20° 00′				20° 30′				21° 00′				21° 30′			
°	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °
00	85 00.0	1.0	08	180.0	85 30.0	1.0	09	180.0	86 00.0	1.0	10	180.0	86 30.0	1.0	12	180.0
1	84 54.9	98	24	169.3	85 24.4	98	27	168.2	85 53.7	98	30	166.8	86 22.9	97	34	165.1
2	84 40.2	94	39	159.3	85 08.2	93	42	157.3	85 35.8	91	46	154.9	86 02.8	89	50	151.9
3	84 17.0	88	50	150.4	84 43.1	86	54	147.8	85 08.4	83	58	144.8	85 32.7	79	62	141.2
4	83 47.0	81	59	142.7	84 10.9	78	62	139.9	84 33.9	74	66	136.6	84 55.5	70	70	132.8
05	83 11.7	75	66	136.3	83 33.5	71	69	133.3	83 54.2	67	72	130.0	84 13.5	62	75	126.3
6	82 32.2	68	71	130.9	82 52.2	65	74	127.9	83 10.9	60	76	124.7	83 28.3	55	79	121.2
7	81 49.7	63	75	126.3	82 08.0	59	77	123.5	82 25.1	55	80	120.4	82 40.8	50	82	117.1
8	81 04.8	58	78	122.5	81 21.7	54	80	119.8	81 37.4	50	82	116.9	81 51.7	45	84	113.8
9	80 18.1	54	80	119.2	80 33.8	50	82	116.7	80 48.2	46	84	114.0	81 01.4	42	85	111.1
10	79 30.0	50	82	116.4	79 44.6	47	84	114.0	79 58.1	43	85	111.5	80 10.3	39	86	108.8
1	78 40.8	47	83	114.0	78 54.5	44	85	111.7	79 07.1	40	86	109.3	79 18.5	36	87	106.9
2	77 50.7	45	85	111.9	78 03.6	41	86	109.7	78 15.5	38	87	107.5	78 26.3	34	88	105.2
3	77 00.0	42	86	110.0	77 12.2	39	87	108.0	77 23.4	36	88	105.9	77 33.6	32	88	103.7
4	76 08.6	40	86	108.3	76 20.2	37	87	106.4	76 30.9	34	88	104.4	76 40.6	31	89	102.4
15	75 16.7	38	87	106.8	75 27.9	36	88	105.0	75 38.1	33	88	103.1	75 47.4	29	89	101.2
6	74 24.5	37	88	105.5	74 35.2	34	88	103.7	74 45.0	31	89	102.0	74 54.0	28	90	100.1
7	73 32.0	36	88	104.3	73 42.2	33	89	102.6	73 51.7	30	89	100.9	74 00.3	27	90	99.2
8	72 39.1	34	88	103.1	72 49.0	32	89	101.5	72 58.2	29	89	99.9	73 06.6	27	90	98.3
9	71 46.1	33	89	102.1	71 55.7	31	89	100.6	72 04.6	28	90	99.0	72 12.7	26	90	97.5
20	70 52.8	32	89	101.1	71 02.2	30	90	99.7	71 10.8	28	90	98.2	71 18.8	25	90	96.7
1	69 59.4	31	89	100.2	70 08.5	29	90	98.8	70 16.9	27	90	97.4	70 24.7	25	90	96.0
2	69 05.8	31	90	99.4	69 14.7	29	90	98.1	69 23.0	27	90	96.7	69 30.6	24	90	95.3
3	68 12.1	30	90	98.6	68 20.8	28	90	97.3	68 28.9	26	90	96.0	68 36.4	24	90	94.7
4	67 18.2	30	90	97.9	67 26.8	28	90	96.6	67 34.8	26	90	95.4	67 42.2	24	90	94.1
25	66 24.3	29	90	97.2	66 32.8	27	90	96.0	66 40.6	25	90	94.8	66 47.9	23	90	93.5
6	65 30.3	29	90	96.5	65 38.7	27	90	95.3	65 46.4	25	90	94:2	65 53.7	23	91	93.0
7	64 36.3	28	90	95.9	64 44.5	26	90	94.7	64 52.2	25	90	93.6	64 59.3	23	91	92.5
8	63 42.2	28	90	95.3	63 50.3	26	90	94.2	63 57.9	25	90	93.1	64 05.0	23	91	92.0
9	62 48.0	28	90	94.7	62 56.0	26	90	93.6	63 03.6	24	91	92.6	63 10.6	23	91	91.5
30	61 53.8	27	90	94.1	62 01.7	26	90	93.1	62 09.2	24	91	92.1	62 16.3	23	91	91.0
1	60 59.5	27	90	93.6	61 07.4	26	90	92.6	61 14.9	24	91	91.6	61 21.9	23	91	90.6
2	60 05.2	27	90	93.1	60 13.1	26	91	92.1	60 20.5	24	91	91.1	60 27.5	23	91	90.2
3	59 10.9	27	90	92.6	59 18.7	25	91	91.6	59 26.2	24	91	90.7	59 33.2	23	91	89.7
4	58 16.6	27	91	92.1	58 24.4	25	91	91.2	58 31.8	24	91	90.3	58 38.8	23	91	89.3
35	57 22.2	27	91	91.6	57 30.0	25	91	90.7	57 37.4	24	91	89.8	57 44.4	23	91	88.9
6	56 27.9	26	91	91.2	56 35.6	25	91	90.3	56 43.0	24	91	89.4	56 50.0	23	91	88.5
7	55 33.5	26	91	90.7	55 41.3	25	91	89.9	55 48.7	24	91	89.0	55 55.7	23	91	88.1
8	54 39.1	26	91	90.3	54 46.9	25	91	89.5	54 54.3	24	91	88.6	55 01.3	23	90	87.8
9	53 44.7	26	91	89.9	53 52.5	25	91	89.1	53 59.9	24	91	88.2	54 07.0	23	90	87.4
40	52 50.4	26	91	89.5	52 58.1	25	91	88.7	53 05.6	24	91	87.8	53 12.7	23	90	87.0
1	51 56.0	26	91	89.0	52 03.8	25	91	88.3	52 11.2	24	91	87.5	52 18.4	23	90	86.7
2	51 01.6	27	91	88.6	51 09.4	26	90	87.9	51 16.9	25	90	87.1	51 24.1	23	90	86.3
3	50 07.3	27	91	88.3	50 15.1	26	90	87.5	50 22.6	25	90	86.7	50 29.9	24	90	86.0
4	49 12.9	27	90	87.9	49 20.8	26	90	87.1	49 28.4	25	90	86.4	49 35.6	24	90	85.6
45	48 18.6	27	90	87.5	48 26.5	26	90	86.8	48 34.1	25	90	86.0	48 41.4	24	90	85.3
6	47 24.3	27	90	87.1	47 32.2	26	90	86.4	47 39.9	25	90	85.7	47 47.2	24	90	85.0
7	46 30.0	27	90	86.7	46 37.9	26	90	86.0	46 45.6	25	90	85.3	46 53.1	24	90	84.6
8	45 35.7	27	90	86.4	45 43.7	26	90	85.7	45 51.5	25	90	85.0	45 59.0	25	90	84.3
9	44 41.4	27	90	86.0	44 49.5	26	90	85.3	44 57.3	26	90	84.7	45 04.9	25	90	84.0
50	43 47.2	27	90	85.7	43 55.3	27	90	85.0	44 03.2	26	90	84.3	44 10.8	25	90	83.6
1	42 53.0	28	90	85.3	43 01.1	27	90	84.6	43 09.1	26	90	84.0	43 16.8	25	90	83.3
2	41 58.8	28	90	84.9	42 07.0	27	90	84.3	42 15.0	26	90	83.6	42 22.8	26	90	83.0
3	41 04.7	28	90	84.6	41 12.9	27	90	84.0	41 21.0	27	90	83.3	41 28.8	26	90	82.7
4	40 10.5	28	90	84.3	40 18.9	27	90	83.6	40 27.0	27	90	83.0	40 34.9	26	90	82.4
55	39 16.4	28	90	83.9	39 24.8	28	90	83.3	39 33.0	27	90	82.7	39 41.1	26	90	82.0
6	38 22.4	29	90	83.6	38 30.9	28	90	82.9	38 39.1	27	90	82.3	38 47.2	27	90	81.7
7	37 28.4	29	90	83.2	37 36.9	28	90	82.6	37 45.3	28	90	82.0	37 53.4	27	90	81.4
8	36 34.4	29	90	82.9	36 43.0	28	90	82.3	36 51.4	28	90	81.7	36 59.7	27	90	81.1
9	35 40.5	29	90	82.5	35 49.1	29	90	82.0	35 57.7	28	90	81.4	36 06.0	27	90	80.8
60	34 46.6	29	90	82.2	34 55.3	29	90	81.6	35 03.9	28	90	81.0	35 12.3	28	89	80.4
1	33 52.7	30	90	81.9	34 01.5	29	90	81.3	34 10.2	29	89	80.7	34 18.7	28	89	80.1
2	32 58.9	30	90	81.5	33 07.8	29	90	81.0	33 16.6	29	89	80.4	33 25.2	28	89	79.8
3	32 05.1	30	90	81.2	32 14.1	30	89	80.6	32 23.0	29	89	80.1	32 31.7	29	89	79.5
4	31 11.4	31	89	80.9	31 20.5	30	89	80.3	31 29.5	30	89	79.7	31 38.3	29	89	79.2
65	30 17.8	31	89	80.5	30 26.9	30	89	80.0	30 36.0	30	89	79.4	30 44.9	29	89	78.9
6	29 24.1	31	89	80.2	29 33.4	31	89	79.6	29 42.5	30	89	79.1	29 51.5	30	89	78.5
7	28 30.6	31	89	79.9	28 40.0	31	89	79.3	28 49.2	31	89	78.8	28 58.3	30	89	78.2
8	27 37.1	32	89	79.5	27 46.5	31	89	79.0	27 55.9	31	89	78.4	28 05.1	30	89	77.9
9	26 43.7	32	89	79.2	26 53.2	32	89	78.6	27 02.6	31	89	78.1	27 11.9	31	88	77.6
70	25 50.3	32	89	78.8	25 59.9	32	89	78.3	26 09.4	32	88	77.8	26 18.9	31	88	77.3
1	24 57.0	33	89	78.5	25 06.7	32	89	78.0	25 16.3	32	88	77.5	25 25.9	32	88	76.9
2	24 03.7	33	89	78.2	24 13.5	33	88	77.6	24 23.3	32	88	77.1	24 32.9	32	88	76.6
3	23 10.5	33	88	77.8	23 20.5	33	88	77.3	23 30.3	33	88	76.8	23 40.1	32	88	76.3
4	22 17.4	34	88	77.5	22 27.4	33	88	77.0	22 37.4	33	88	76.5	22 47.3	33	88	76.0
75	21 24.3	34	88	77.1	21 34.5	34	88	76.6	21 44.6	33	88	76.1	21 54.6	33	88	75.6
6	20 31.4	34	88	76.8	20 41.6	34	88	76.3	20 51.8	34	88	75.8	21 01.9	34	88	75.3
7	19 38.5	35	88	76.5	19 48.8	34	88	76.0	19 59.1	34	88	75.5	20 09.4	34	88	75.0
8	18 45.6	35	88	76.1	18 56.1	35	88	75.6	19 06.6	35	88	75.1	19 16.9	34	87	74.6
9	17 52.9	36	88	75.8	18 03.5	35	88	75.3	18 14.0	35	87	74.8	18 24.5	35	87	74.3
80	17 00.2	36	88	75.4	17 11.0	36	88	74.9	17 21.6	35	87	74.4	17 32.2	35	87	73.9
1	16 07.6	36	88	75.0	16 18.5	36	87	74.6	16 29.3	36	87	74.1	16 40.0	36	87	73.6
2	15 15.1	37	87	74.7	15 26.1	36	87	74.2	15 37.0	36	87	73.7	15 47.9	36	87	73.2
3	14 22.7	37	87	74.3	14 33.8	37	87	73.9	14 44.9	37	87	73.4	14 55.9	36	87	72.9
4	13 30.4	38	87	74.0	13 41.7	37	87	73.5	13 52.8	37	87	73.0	14 03.9	37	86	72.5
85	12 38.2	38	87	73.6	12 49.6	38	87	73.1	13 00.9	38	86	72.7	13 12.1	37	86	72.2
6	11 46.1	38	87	73.2	11 57.6	38	86	72.8	12 09.0	38	86	72.3	12 20.4	38	86	71.8
7	10 54.1	39	86	72.9	11 05.7	39	86	72.4	11 17.3	39	86	71.9	11 28.8	38	86	71.5
8	10 02.2	39	86	72.5	10 13.9	39	86	72.0	10 25.6	39	86	71.6	10 37.3	39	86	71.1
9	9 10.3	40	86	72.1	9 22.2	40	86	71.7	9 34.1	39	86	71.2	9 45.9	39	86	70.7
90	8 18.7	40	86	71.7	8 30.7	40	86	71.3	8 42.7	40	86	70.8	8 54.6	40	85	70.4

H.A.	22° 00′				22° 30′				23° 00′				23° 30′			
°	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °	Alt. ° ′	Δd	Δt	Az. °
00	87 00.0	1.0	14	180.0	87 30.0	1.0	16	180.0	88 00.0	1.0	20	180.0	88 30.0	1.0	26	180.0
1	86 51.8	96	38	162.8	87 20.3	94	44	159.7	87 48.1	91	51	155.2	88 14.7	86	61	148.5
2	86 29.0	86	55	148.2	86 54.1	81	62	143.4	87 17.5	74	68	137.2	87 38.3	64	76	129.0
3	85 55.8	74	67	136.9	86 17.2	68	72	131.7	86 36.4	60	77	125.5	86 52.8	49	82	118.1
4	85 15.7	64	74	128.5	85 34.0	58	78	123.5	85 50.1	49	82	117.9	86 03.4	39	86	111.5
05	84 31.3	56	79	122.2	84 47.1	49	82	117.6	85 00.8	42	85	112.6	85 12.1	33	87	107.2
6	83 44.0	50	82	117.4	83 58.0	43	84	113.2	84 10.0	36	86	108.8	84 19.7	28	88	104.1
7	82 55.0	44	84	113.6	83 07.4	39	86	109.9	83 18.0	32	88	105.9	83 26.7	25	89	101.8
8	82 04.6	40	86	110.6	82 15.8	35	87	107.2	82 25.5	29	88	103.7	82 33.3	23	90	100.0
9	81 13.3	37	87	108.1	81 23.6	32	88	105.0	81 32.4	27	89	101.8	81 39.6	21	90	98.5
10	80 21.3	34	88	106.1	80 30.9	30	88	103.2	80 39.0	25	89	100.3	80 45.7	20	90	97.3
1	79 28.8	32	88	104.3	79 37.8	28	89	101.7	79 45.4	23	90	99.0	79 51.7	19	90	96.2
2	78 35.9	30	89	102.8	78 44.4	26	89	100.4	78 51.6	22	90	97.9	78 57.6	18	90	95.3
3	77 42.8	29	89	101.5	77 50.8	25	90	99.2	77 57.7	21	90	96.9	78 03.4	17	90	94.5
4	76 49.4	27	89	100.3	76 57.0	24	90	98.2	77 03.7	20	90	96.0	77 09.2	17	90	93.8
15	75 55.8	26	90	99.2	76 03.2	23	90	97.2	76 09.6	20	90	95.2	76 14.9	16	90	93.1
6	75 02.0	25	90	98.3	75 09.2	22	90	96.4	75 15.4	19	90	94.5	75 20.6	16	90	92.5
7	74 08.1	25	90	97.4	74 15.1	22	90	95.6	74 21.1	19	90	93.8	74 26.3	16	91	92.0
8	73 14.2	24	90	96.6	73 20.9	21	90	94.9	73 26.9	18	90	93.2	73 31.9	15	91	91.5
9	72 20.1	23	90	95.9	72 26.7	21	90	94.2	72 32.5	18	90	92.6	72 37.6	15	91	91.0
20	71 26.0	23	90	95.2	71 32.5	20	90	93.6	71 38.2	18	91	92.1	71 43.2	15	91	90.5
1	70 31.8	22	90	94.5	70 38.2	20	90	93.1	70 43.9	18	91	91.6	70 48.8	15	91	90.1
2	69 37.6	22	90	93.9	69 43.9	20	91	92.5	69 49.5	18	91	91.1	69 54.4	15	91	89.7
3	68 43.3	22	90	93.3	68 49.5	20	91	92.0	68 55.1	18	91	90.6	69 00.1	15	91	89.3
4	67 49.0	22	90	92.8	67 55.2	20	91	91.5	68 00.7	18	91	90.2	68 05.7	15	91	88.9
25	66 54.7	21	91	92.3	67 00.8	19	91	91.0	67 06.4	18	91	89.8	67 11.3	15	91	88.5
6	66 00.3	21	91	91.8	66 06.4	19	91	90.6	66 12.0	18	91	89.4	66 17.0	16	91	88.1
7	65 06.0	21	91	91.3	65 12.1	19	91	90.1	65 17.6	18	91	89.0	65 22.6	16	90	87.8
8	64 11.6	21	91	90.9	64 17.7	19	91	89.7	64 23.3	18	91	88.6	64 28.3	16	90	87.4
9	63 17.2	21	91	90.4	63 23.3	19	91	89.3	63 28.9	18	91	88.2	63 34.0	16	90	87.1
30	62 22.9	21	91	90.0	62 28.9	20	91	88.9	62 34.6	18	91	87.9	62 39.7	16	90	86.8
1	61 28.5	21	91	89.6	61 34.6	20	91	88.5	61 40.2	18	90	87.5	61 45.4	16	90	86.5
2	60 34.1	21	91	89.2	60 40.2	20	91	88.2	60 45.9	18	90	87.2	60 51.1	17	90	86.1
3	59 39.7	21	91	88.8	59 45.9	20	91	87.8	59 51.6	18	90	86.8	59 56.9	17	90	85.8
4	58 45.4	21	91	88.4	58 51.5	20	90	87.4	58 57.3	19	90	86.5	59 02.6	17	90	85.5
35	57 51.0	21	90	88.0	57 57.2	20	90	87.1	58 03.0	19	90	86.2	58 08.4	17	90	85.2
6	56 56.7	21	90	87.6	57 02.9	20	90	86.7	57 08.8	19	90	85.8	57 14.3	18	90	84.9
7	56 02.4	22	90	87.3	56 08.7	20	90	86.4	56 14.6	19	90	85.5	56 20.1	18	90	84.6
8	55 08.0	22	90	86.9	55 14.4	21	90	86.1	55 20.4	19	90	85.2	55 26.0	18	90	84.3
9	54 13.8	22	90	86.6	54 20.2	21	90	85.7	54 26.2	20	90	84.9	54 31.9	18	90	84.0
40	53 19.5	22	90	86.2	53 25.9	21	90	85.4	53 32.0	20	90	84.6	53 37.8	19	90	83.8
1	52 25.2	22	90	85.9	52 31.7	21	90	85.1	52 37.9	20	90	84.3	52 43.8	19	90	83.5
2	51 31.0	22	90	85.5	51 37.6	21	90	84.8	51 43.8	20	90	84.0	51 49.8	19	90	83.2
3	50 36.8	23	90	85.2	50 43.4	22	90	84.4	50 49.8	21	90	83.7	50 55.8	20	90	82.9
4	49 42.6	23	90	84.9	49 49.3	22	90	84.1	49 55.7	21	90	83.4	50 01.8	20	90	82.6
45	48 48.5	23	90	84.6	48 55.3	22	90	83.8	49 01.7	21	90	83.1	49 07.9	20	90	82.3
6	47 54.4	23	90	84.2	48 01.2	22	90	83.5	48 07.8	21	90	82.8	48 14.1	21	90	82.0
7	47 00.3	24	90	83.9	47 07.2	23	90	83.2	47 13.8	22	90	82.5	47 20.2	21	90	81.8
8	46 06.2	24	90	83.6	46 13.2	23	90	82.9	46 20.0	22	90	82.2	46 26.4	21	90	81.5
9	45 12.2	24	90	83.3	45 19.3	23	90	82.6	45 26.1	22	90	81.9	45 32.7	21	90	81.2
50	44 18.2	24	90	83.0	44 25.4	23	90	82.3	44 32.3	23	90	81.6	44 39.0	22	90	80.9
1	43 24.3	25	90	82.7	43 31.5	24	90	82.0	43 38.5	23	90	81.3	43 45.3	22	90	80.6
2	42 30.3	25	90	82.3	42 37.7	24	90	81.7	42 44.8	23	90	81.0	42 51.6	23	89	80.4
3	41 36.5	25	90	82.0	41 43.9	24	90	81.4	41 51.1	24	89	80.7	41 58.1	23	89	80.1
4	40 42.6	25	90	81.7	40 50.1	25	90	81.1	40 57.4	24	89	80.4	41 04.5	23	89	79.8
55	39 48.9	26	90	81.4	39 56.4	25	89	80.8	40 03.8	24	89	80.1	40 11.0	24	89	79.5
6	38 55.1	26	89	81.1	39 02.8	25	89	80.5	39 10.3	25	89	79.9	39 17.6	24	89	79.2
7	38 01.4	26	89	80.8	38 09.2	26	89	80.2	38 16.8	25	89	79.6	38 24.2	24	89	78.9
8	37 07.8	27	89	80.5	37 15.6	26	89	79.9	37 23.3	25	89	79.3	37 30.8	25	89	78.7
9	36 14.1	27	89	80.2	36 22.1	26	89	79.6	36 29.9	26	89	79.0	36 37.5	25	89	78.4
60	35 20.6	27	89	79.9	35 28.7	27	89	79.3	35 36.6	26	89	78.7	35 44.3	25	89	78.1
1	34 27.1	28	89	79.6	34 35.3	27	89	79.0	34 43.3	26	89	78.4	34 51.1	26	88	77.8
2	33 33.6	28	89	79.2	33 41.9	27	89	78.7	33 50.1	27	89	78.1	33 58.0	26	88	77.5
3	32 40.2	28	89	78.9	32 48.6	28	89	78.4	32 56.9	27	88	77.8	33 05.0	27	88	77.2
4	31 46.9	29	89	78.6	31 55.4	28	89	78.1	32 03.8	28	88	77.5	32 12.0	27	88	76.9
65	30 53.6	29	89	78.3	31 02.2	28	88	77.7	31 10.7	28	88	77.2	31 19.0	27	88	76.6
6	30 00.4	29	89	78.0	30 09.1	29	88	77.4	30 17.7	28	88	76.9	30 26.2	28	88	76.3
7	29 07.2	30	88	77.7	29 16.1	29	88	77.1	29 24.8	29	88	76.6	29 33.3	28	88	76.0
8	28 14.2	30	88	77.4	28 23.1	30	88	76.8	28 31.9	29	88	76.3	28 40.6	29	88	75.7
9	27 21.1	30	88	77.0	27 30.2	30	88	76.5	27 39.1	30	88	76.0	27 47.9	29	88	75.4
70	26 28.2	31	88	76.7	26 37.3	30	88	76.2	26 46.4	30	88	75.7	26 55.4	30	88	75.1
1	25 35.3	31	88	76.4	25 44.6	31	88	75.9	25 53.8	30	88	75.4	26 02.8	30	87	74.8
2	24 42.5	32	88	76.1	24 51.9	31	88	75.6	25 01.2	31	88	75.0	25 10.4	30	87	74.5
3	23 49.7	32	88	75.8	23 59.3	32	88	75.2	24 08.7	31	87	74.7	24 18.0	31	87	74.2
4	22 57.0	32	88	75.4	23 06.7	32	88	74.9	23 16.3	32	87	74.4	23 25.7	31	87	73.9
75	22 04.4	33	88	75.1	22 14.2	32	87	74.6	22 23.9	32	87	74.1	22 33.5	32	87	73.6
6	21 11.9	33	87	74.8	21 21.9	33	87	74.3	21 31.7	33	87	73.8	21 41.4	32	87	73.3
7	20 19.5	34	87	74.5	20 29.6	33	87	73.9	20 39.5	33	87	73.4	20 49.4	33	87	72.9
8	19 27.2	34	87	74.1	19 37.3	34	87	73.6	19 47.4	34	87	73.1	19 57.4	33	86	72.6
9	18 34.9	35	87	73.8	18 45.2	34	87	73.3	18 55.4	34	86	72.8	19 05.6	34	86	72.3
80	17 42.7	35	87	73.4	17 53.2	35	87	73.0	18 03.5	34	86	72.5	18 13.8	34	86	72.0
1	16 50.7	35	87	73.1	17 01.2	35	86	72.6	17 11.7	35	86	72.1	17 22.2	35	86	71.6
2	15 58.7	36	86	72.8	16 09.4	36	86	72.3	16 20.0	35	86	71.8	16 30.6	35	86	71.3
3	15 06.8	36	86	72.4	15 17.6	36	86	71.9	15 28.4	36	86	71.4	15 39.2	36	86	71.0
4	14 15.0	37	86	72.1	14 26.0	37	86	71.6	14 36.9	36	86	71.1	14 47.8	36	85	70.6
85	13 23.3	37	86	71.7	13 34.5	37	86	71.2	13 45.5	37	86	70.8	13 56.6	37	85	70.3
6	12 31.7	38	86	71.3	12 43.0	38	86	70.9	12 54.3	37	85	70.4	13 05.5	37	85	69.9
7	11 40.3	38	86	71.0	11 51.7	38	85	70.5	12 03.1	38	85	70.0	12 14.4	38	85	69.6
8	10 48.9	39	85	70.6	11 00.5	39	85	70.2	11 12.0	38	85	69.7	11 23.5	38	84	69.2
9	9 57.7	39	85	70.3	10 09.4	39	85	69.8	10 21.1	39	85	69.3	10 32.8	39	84	68.9
90	9 06.5	40	85	69.9	9 18.4	40	85	69.4	9 30.3	39	84	69.0	9 42.1	39	84	68.5

Lat. 25°

H.A.	20° 00′ Alt.	Az.	20° 30′ Alt.	Az.	21° 00′ Alt.	Az.	21° 30′ Alt.	Az.	22° 00′ Alt.	Az.	22° 30′ Alt.	Az.	23° 00′ Alt.	Az.	23° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
60	45 00.0 1.0 01	180.0	44 30.0 1.0 01	180.0	44 00.0 1.0 01	180.0	43 30.0 1.0 01	180.0	43 00.0 1.0 01	180.0	42 30.0 1.0 01	180.0	42 00.0 1.0 01	180.0	41 30.0 1.0 01	180.0	60
1	44 59.4 1.0 03	178.7	44 29.4 1.0 03	178.7	43 59.4 1.0 03	178.7	43 29.4 1.0 03	178.7	42 59.4 1.0 03	178.7	42 29.4 1.0 03	178.7	41 59.4 1.0 03	178.8	41 29.4 1.0 03	178.8	1
2	44 57.5 1.0 05	177.3	44 27.5 1.0 05	177.4	43 57.5 1.0 05	177.4	43 27.6 1.0 05	177.4	42 57.6 1.0 05	177.5	42 27.6 1.0 05	177.5	41 57.6 1.0 05	177.5	41 27.7 1.0 05	177.6	2
3	44 54.3 1.0 07	176.0	44 24.4 1.0 07	176.1	43 54.5 1.0 07	176.1	43 24.5 1.0 07	176.2	42 54.6 1.0 07	176.2	42 24.7 1.0 07	176.2	41 54.7 1.0 07	176.3	41 24.8 1.0 07	176.3	3
4	44 49.9 1.0 09	174.7	44 20.0 1.0 09	174.8	43 50.2 1.0 09	174.8	43 20.3 1.0 09	174.9	42 50.4 1.0 09	174.9	42 20.5 1.0 09	175.0	41 50.6 1.0 09	175.1	41 20.7 1.0 09	175.1	4
05	44 44.3 99 11	173.4	44 14.5 99 11	173.5	43 44.6 99 11	173.5	43 14.8 99 11	173.6	42 45.0 99 11	173.7	42 15.2 99 11	173.8	41 45.3 99 11	173.8	41 15.5 99 10	173.9	05
6	44 37.4 99 14	172.1	44 07.7 99 13	172.2	43 37.9 99 13	172.3	43 08.2 99 13	172.3	42 38.4 99 13	172.4	42 08.7 99 13	172.5	41 38.9 99 13	172.6	41 09.2 99 12	172.7	6
7	44 29.3 99 16	170.8	43 59.6 99 15	170.9	43 30.0 99 15	171.0	43 00.3 99 15	171.1	42 30.7 99 15	171.2	42 01.0 99 15	171.3	41 31.3 99 14	171.4	41 01.7 99 14	171.5	7
8	44 19.9 98 18	169.5	43 50.4 98 17	169.6	43 20.9 98 17	169.7	42 51.3 99 17	169.8	42 21.8 99 17	169.9	41 52.2 99 17	170.1	41 22.6 99 16	170.2	40 53.0 99 16	170.3	8
9	44 09.4 98 20	168.2	43 40.0 98 19	168.3	43 10.6 98 19	168.4	42 41.1 98 19	168.6	42 11.7 98 19	168.7	41 42.2 98 18	168.8	41 12.8 98 18	169.0	40 43.3 98 18	169.1	9
10	43 57.7 98 22	166.9	43 28.4 98 21	167.0	42 59.1 98 21	167.2	42 29.8 98 21	167.3	42 00.5 98 21	167.5	41 31.1 98 20	167.6	41 01.8 98 20	167.8	40 32.5 98 20	167.9	10
1	43 44.7 97 23	165.6	43 15.6 97 23	165.8	42 46.5 97 23	166.0	42 17.3 97 23	166.1	41 48.1 97 22	166.3	41 18.9 97 22	166.4	40 49.7 97 22	166.6	40 20.5 97 22	166.7	1
2	43 30.7 97 25	164.4	43 01.7 97 25	164.5	42 32.7 97 25	164.7	42 03.7 97 24	164.9	41 34.7 97 24	165.1	41 05.6 97 24	165.2	40 36.6 97 24	165.4	40 07.5 97 24	165.6	2
3	43 15.5 96 27	163.1	42 46.6 96 27	163.3	42 17.8 96 27	163.5	41 49.0 96 26	163.7	41 20.1 96 26	163.9	40 51.2 96 26	164.1	40 22.3 96 26	164.2	39 53.4 96 26	164.4	3
4	42 59.1 95 29	161.9	42 30.5 95 29	162.1	42 01.8 96 28	162.3	41 33.2 96 28	162.5	41 04.5 96 28	162.7	40 35.7 96 28	162.9	40 07.0 96 27	163.1	39 38.3 96 27	163.3	4
15	42 41.7 95 31	160.7	42 13.2 95 30	160.9	41 44.8 95 30	161.1	41 16.3 95 30	161.3	40 47.7 95 30	161.5	40 19.2 95 29	161.7	39 50.7 95 29	161.9	39 22.1 95 29	162.1	15
6	42 23.1 94 33	159.5	41 54.9 94 32	159.7	41 26.6 94 32	159.9	40 58.3 94 32	160.1	40 30.0 94 31	160.4	40 01.6 95 31	160.6	39 33.3 95 31	160.8	39 04.9 95 30	161.0	6
7	42 03.5 93 34	158.3	41 35.5 94 34	158.5	41 07.4 94 34	158.8	40 39.3 94 33	159.0	40 11.2 94 33	159.2	39 43.1 94 33	159.4	39 14.9 94 32	159.7	38 46.7 94 32	159.9	7
8	41 42.9 93 36	157.1	41 15.1 93 36	157.4	40 47.2 93 35	157.6	40 19.3 93 35	157.8	39 51.4 93 35	158.1	39 23.5 93 34	158.3	38 55.5 93 34	158.6	38 27.5 93 34	158.8	8
9	41 21.2 92 38	155.9	40 53.6 92 37	156.2	40 26.0 92 37	156.5	39 58.3 92 37	156.7	39 30.6 92 36	157.0	39 02.9 92 36	157.2	38 35.1 93 36	157.5	38 07.3 93 35	157.7	9
20	40 58.6 91 39	154.8	40 31.2 91 39	155.1	40 03.8 91 39	155.3	39 36.3 92 38	155.6	39 08.9 92 38	155.9	38 41.3 92 37	156.1	38 13.8 92 37	156.4	37 46.2 92 37	156.6	20
1	40 34.9 90 41	153.7	40 07.8 91 40	154.0	39 40.6 91 40	154.2	39 13.4 91 40	154.5	38 46.2 91 39	154.8	38 18.9 91 39	155.0	37 51.5 91 39	155.3	37 24.2 91 38	155.6	1
2	40 10.4 90 43	152.6	39 43.5 90 42	152.9	39 16.5 90 42	153.1	38 49.5 90 41	153.4	38 22.5 90 41	153.7	37 55.5 90 40	154.0	37 28.4 90 40	154.2	37 01.2 91 40	154.5	2
3	39 44.8 89 44	151.5	39 18.2 89 44	151.8	38 51.5 89 43	152.1	38 24.8 89 43	152.4	37 58.0 89 42	152.6	37 31.2 89 42	152.9	37 04.3 90 42	153.2	36 37.4 90 41	153.5	3
4	39 18.4 88 46	150.4	38 52.0 88 45	150.7	38 25.6 88 45	151.0	37 59.1 88 44	151.3	37 32.6 89 44	151.6	37 06.0 89 44	151.9	36 39.3 89 43	152.2	36 12.7 89 43	152.5	4
25	38 51.1 87 47	149.3	38 25.0 87 46	149.7	37 58.8 87 46	150.0	37 32.5 88 46	150.3	37 06.3 88 45	150.6	36 39.9 88 45	150.9	36 13.5 88 44	151.2	35 47.1 88 44	151.5	25
6	38 23.0 86 48	148.3	37 57.1 86 48	148.6	37 31.2 87 48	148.9	37 05.2 87 47	149.3	36 39.1 87 46	149.6	36 13.0 87 46	149.9	35 46.9 87 46	150.2	35 20.7 87 45	150.5	6
7	37 54.0 85 50	147.3	37 28.4 86 49	147.6	37 02.7 86 49	147.9	36 36.9 86 48	148.2	36 11.2 86 48	148.6	35 45.3 86 48	148.9	35 19.4 86 47	149.2	34 53.5 87 47	149.5	7
8	37 24.2 84 51	146.3	36 58.8 85 50	146.6	36 33.4 85 50	146.9	36 07.9 85 50	147.3	35 42.4 85 49	147.6	35 16.8 85 49	147.9	34 51.2 86 48	148.2	34 25.5 86 48	148.5	8
9	36 53.6 84 52	145.3	36 28.5 84 52	145.6	36 03.3 84 51	146.0	35 38.1 84 51	146.3	35 12.9 84 50	146.6	34 47.6 84 50	146.9	34 22.2 85 50	147.3	33 56.8 85 49	147.6	9
30	36 22.2 83 54	144.3	35 57.4 83 53	144.6	35 32.5 83 53	145.0	35 07.6 83 52	145.3	34 42.6 83 52	145.7	34 17.5 84 51	146.0	33 52.4 84 51	146.3	33 27.2 84 50	146.7	30
1	35 50.1 82 55	143.3	35 25.6 82 54	143.7	35 01.0 82 54	144.0	34 36.3 82 53	144.4	34 11.5 83 53	144.7	33 46.8 83 52	145.1	33 21.9 83 52	145.4	32 57.0 83 52	145.7	1
2	35 17.3 81 56	142.4	34 53.0 81 55	142.8	34 28.7 81 55	143.1	34 04.3 81 54	143.5	33 39.8 82 54	143.8	33 15.3 82 54	144.2	32 50.7 82 53	144.5	32 26.0 82 53	144.8	2
3	34 43.8 80 57	141.5	34 19.8 80 56	141.8	33 55.7 80 56	142.2	33 31.6 81 56	142.6	33 07.4 81 55	142.9	32 43.1 81 55	143.3	32 18.8 81 54	143.6	31 54.4 81 54	144.0	3
4	34 09.6 79 58	140.6	33 45.9 79 58	140.9	33 22.0 79 57	141.3	32 58.2 80 57	141.7	32 34.2 80 56	142.0	32 10.2 80 56	142.4	31 46.2 80 56	142.7	31 22.1 80 55	143.1	4
35	33 34.7 78 59	139.7	33 11.3 78 59	140.1	32 47.7 79 58	140.4	32 24.1 79 58	140.8	32 00.4 79 57	141.2	31 36.7 79 57	141.5	31 12.9 79 56	141.9	30 49.1 80 56	142.2	35
6	32 59.2 77 60	138.8	32 36.0 77 60	139.2	32 12.8 78 59	139.6	31 49.4 78 59	139.9	31 26.0 78 58	140.3	31 02.6 78 58	140.7	30 39.0 79 58	141.0	30 15.4 79 57	141.4	6
7	32 23.1 76 61	138.0	32 00.2 77 61	138.3	31 37.2 77 60	138.7	31 14.1 77 60	139.1	30 51.0 77 59	139.5	30 27.8 77 59	139.8	30 04.5 78 58	140.2	29 41.2 78 58	140.6	7
8	31 46.4 75 62	137.1	31 23.8 76 62	137.5	31 01.0 76 61	137.9	30 38.2 76 61	138.3	30 15.3 76 60	138.6	29 52.4 77 60	139.0	29 29.4 77 60	139.4	29 06.4 77 59	139.7	8
9	31 09.1 75 63	136.3	30 46.7 75 63	136.7	30 24.3 75 62	137.1	30 01.7 75 62	137.4	29 39.1 75 61	137.8	29 16.5 76 61	138.2	28 53.7 76 60	138.6	28 30.9 76 60	138.9	9
40	30 31.3 74 64	135.5	30 09.1 74 64	135.9	29 46.9 74 63	136.3	29 24.7 74 63	136.6	29 02.3 75 62	137.0	28 39.9 75 62	137.4	28 17.5 75 61	137.8	27 54.9 75 61	138.2	40
1	29 52.9 73 65	134.7	29 31.0 73 64	135.1	29 09.1 73 64	135.5	28 47.1 73 64	135.9	28 25.0 74 63	136.2	28 02.9 74 63	136.6	27 40.7 74 62	137.0	27 18.4 74 62	137.4	1
2	29 14.0 72 66	133.9	28 52.3 72 65	134.3	28 30.7 72 65	134.7	28 08.9 73 64	135.1	27 47.1 73 64	135.5	27 25.2 73 64	135.9	27 03.3 73 63	136.2	26 41.3 73 63	136.6	2
3	28 34.5 71 67	133.1	28 13.2 71 66	133.5	27 51.8 71 66	133.9	27 30.3 72 65	134.3	27 08.7 72 65	134.7	26 47.1 72 64	135.1	26 25.4 72 64	135.5	26 03.7 73 64	135.9	3
4	27 54.6 70 67	132.4	27 33.5 70 67	132.8	27 12.4 71 66	133.2	26 51.1 71 66	133.6	26 29.8 71 66	134.0	26 08.5 71 65	134.4	25 47.1 71 65	134.8	25 25.6 72 64	135.1	4
45	27 14.2 69 68	131.6	26 53.4 70 68	132.0	26 32.5 70 67	132.4	26 11.5 70 67	132.8	25 50.5 70 66	133.2	25 29.4 70 66	133.6	25 08.2 71 66	134.0	24 47.0 71 65	134.4	45
6	26 33.3 68 69	130.9	26 12.7 69 68	131.3	25 52.1 69 68	131.7	25 31.4 69 68	132.1	25 10.6 69 67	132.5	24 49.8 70 67	132.9	24 28.9 70 66	133.3	24 07.9 70 66	133.7	6
7	25 52.0 68 70	130.2	25 31.7 68 69	130.6	25 11.3 68 69	131.0	24 50.8 68 68	131.4	24 30.3 69 68	131.8	24 09.7 69 68	132.2	23 49.1 69 67	132.6	23 28.4 69 67	133.0	7
8	25 10.3 67 70	129.5	24 50.2 67 70	129.9	24 30.0 67 69	130.3	24 09.8 67 69	130.7	23 49.6 68 69	131.1	23 29.2 68 68	131.5	23 08.8 68 68	131.9	22 48.4 68 67	132.3	8
9	24 28.1 66 71	128.8	24 08.3 66 71	129.2	23 48.4 66 70	129.6	23 28.4 67 70	130.0	23 08.4 67 69	130.4	22 48.3 67 69	130.9	22 28.2 67 68	131.3	22 08.0 67 68	131.7	9
50	23 45.5 65 72	128.1	23 25.9 65 71	128.6	23 06.3 66 71	129.0	22 46.6 66 70	129.4	22 26.8 66 70	129.8	22 07.0 66 70	130.2	21 47.1 66 69	130.6	21 27.1 67 69	131.0	50
1	23 02.6 64 72	127.5	22 43.2 65 72	127.9	22 23.8 65 71	128.3	22 04.4 65 71	128.7	21 44.8 65 71	129.1	21 25.2 65 70	129.5	21 05.6 66 70	129.9	20 45.9 66 70	130.3	1
2	22 19.2 64 73	126.8	22 00.1 64 72	127.2	21 41.0 64 72	127.7	21 21.7 64 72	128.1	21 02.5 64 71	128.5	20 43.1 65 71	128.9	20 23.7 65 70	129.3	20 04.2 65 70	129.7	2
3	21 35.5 63 73	126.2	21 16.6 63 73	126.6	20 57.7 63 73	127.0	20 38.7 63 72	127.4	20 19.7 64 72	127.8	20 00.6 64 72	128.3	19 41.4 64 71	128.7	19 22.2 64 71	129.1	3
4	20 51.4 62 74	125.6	20 32.8 62 74	126.0	20 14.1 62 73	126.4	19 55.4 63 73	126.8	19 36.6 63 72	127.2	19 17.7 63 72	127.6	18 58.8 63 72	128.0	18 39.8 63 71	128.5	4
55	20 07.0 61 74	124.9	19 48.6 61 74	125.4	19 30.2 62 74	125.8	19 11.7 62 74	126.2	18 53.1 62 73	126.6	18 34.5 62 73	127.0	18 15.8 62 72	127.4	17 57.1 63 72	127.8	55
6	19 22.3 60 75	124.3	19 04.1 61 75	124.8	18 45.9 61 74	125.2	18 27.6 61 74	125.6	18 09.3 61 74	126.0	17 50.9 61 73	126.4	17 32.4 62 73	126.8	17 13.9 62 72	127.2	6
7	18 37.2 60 76	123.7	18 19.3 60 75	124.2	18 01.3 60 75	124.6	17 43.2 60 74	125.0	17 25.1 60 74	125.4	17 07.0 61 74	125.8	16 48.8 61 73	126.2	16 30.5 61 73	126.7	7
8	17 51.9 59 76	123.1	17 34.1 59 76	123.6	17 16.4 59 75	124.0	16 58.5 60 75	124.4	16 40.6 60 75	124.8	16 22.7 60 74	125.3	16 04.7 60 74	125.7	15 46.7 60 74	126.1	8
9	17 06.2 58 77	122.6	16 48.7 58 76	123.0	16 31.1 59 76	123.4	16 13.5 59 76	123.8	15 55.9 59 75	124.3	15 38.2 59 75	124.7	15 20.4 59 74	125.1	15 02.6 59 74	125.5	9
60	16 20.2 58 77	122.0	16 02.9 58 77	122.4	15 45.6 58 76	122.9	15 28.2 58 76	123.3	15 10.8 58 76	123.7	14 53.3 58 75	124.1	14 35.8 58 75	124.5	14 18.2 59 74	125.0	60
1	15 33.9 57 78	121.4	15 16.9 57 77	121.9	14 59.8 57 77	122.3	14 42.6 57 76	122.7	14 25.4 57 76	123.1	14 08.1 58 76	123.6	13 50.8 58 75	124.0	13 33.5 58 75	124.4	1
2	14 47.4 56 78	120.9	14 30.6 56 78	121.3	14 13.6 56 77	121.7	13 56.7 57 77	122.2	13 39.7 57 77	122.6	13 22.7 57 76	123.0	13 05.6 57 76	123.4	12 48.5 57 76	123.9	2
3	14 00.6 55 78	120.4	13 44.0 56 78	120.8	13 27.3 56 78	121.2	13 10.5 56 77	121.6	12 53.7 56 77	122.1	12 36.9 56 77	122.5	12 20.1 56 76	122.9	12 03.2 56 76	123.3	3
4	13 13.6 55 79	119.8	12 57.1 55 78	120.2	12 40.6 55 78	120.7	12 24.1 55 78	121.1	12 07.5 55 78	121.5	11 50.9 55 77	122.0	11 34.3 56 77	122.4	11 17.6 56 76	122.8	4
65	12 26.3 54 79	119.3	12 10.0 54 79	119.7	11 53.7 54 78	120.2	11 37.4 54 78	120.6	11 21.1 55 78	121.0	11 04.7 55 78	121.4	10 48.2 55 77	121.9	10 31.7 55 77	122.3	65
6	11 38.7 53 80	118.8	11 22.7 54 79	119.2	11 06.6 54 79	119.6	10 50.5 54 79	120.1	10 34.3 54 78	120.5	10 18.1 54 78	120.9	10 01.9 54 78	121.4	9 45.7 54 77	121.8	6
7	10 50.9 53 80	118.3	10 35.1 53 80	118.7	10 19.2 53 79	119.1	10 03.3 53 79	119.6	9 47.3 53 79	120.0	9 31.4 53 78	120.4	9 15.3 53 78	120.9	8 59.3 54 78	121.3	7
8	10 02.9 52 80	117.8	9 47.3 52 80	118.2	9 31.6 52 80	118.6	9 15.9 52 80	119.1	9 00.1 53 79	119.5	8 44.3 53 79	119.9	8 28.5 53 78	120.4	8 12.7 53 78	120.8	8
9	9 14.7 51 81	117.3	8 59.3 52 80	117.7	8 43.8 52 80	118.1	8 28.2 52 80	118.6	8 12.7 52 80	119.0	7 57.1 52 79	119.4	7 41.5 52 79	119.9	7 25.9 52 78	120.3	9
70	8 26.3 51 81	116.8	8 11.0 51 81	117.2	7 55.7 51 80	117.7	7 40.4 51 80	118.1	7 25.0 51 80	118.5	7 09.6 51 80	119.0	6 54.2 51 79	119.4	6 38.8 51 79	119.8	70
1	7 37.6 50 81	116.3	7 22.5 50 81	116.7	7 07.4 50 81	117.2	6 52.3 51 80	117.6	6 37.1 51 80	118.0	6 21.9 51 80	118.5	6 06.7 51 80	118.9	5 51.5 51 79	119.3	1
2	6 48.8 50 82	115.8	6 33.9 50 82	116.3	6 19.0 50 81	116.7	6 04.0 50 81	117.1	5 49.0 50 80	117.6	5 34.0 50 80	118.0	5 19.0 50 80	118.4	5 04.0 50 79	118.9	2
3	5 59.7 49 82	115.4	5 45.0 49 82	115.8	5 30.3 49 81	116.2	5 15.5 49 81	116.7	5 00.7 49 81	117.1							3
4	5 10.5 48 82	114.9															4

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Az.	20° 30′ Alt.	Az.	21° 00′ Alt.	Az.	21° 30′ Alt.	Az.	22° 00′ Alt.	Az.	22° 30′ Alt.	Az.	23° 00′ Alt.	Az.	23° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	7 27.1 41 86	71.4	7 39.2 40 86	70.9	7 51.4 40 85	70.4	8 03.5 40 85	70.0	8 15.5 40 85	69.5	8 27.6 40 84	69.1	8 39.6 40 84	68.6	8 51.6 40 84	68.1	91
2	6 35.6 41 86	71.0	6 47.9 41 85	70.5	7 00.2 41 85	70.1	7 12.4 41 85	69.6	7 24.7 41 85	69.1	7 36.9 41 84	68.7	7 49.0 41 84	68.2	8 01.2 40 84	67.8	2
3	5 44.3 42 85	70.6	5 56.7 41 85	70.1	6 09.1 41 85	69.7	6 21.5 41 84	69.2	6 33.9 41 84	68.8	6 46.3 41 84	68.3	6 58.6 41 84	67.8	7 10.9 41 84	67.4	3
4			5 05.6 42 85	69.7	5 18.2 42 85	69.3	5 30.8 42 84	68.8	5 43.3 42 84	68.4	5 55.8 42 84	67.9	6 08.3 42 84	67.5	6 20.8 42 83	67.0	4
95											5 05.5 42 84	67.5	5 18.2 42 83	67.1	5 30.8 42 83	66.6	95

Lat. 25°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	89 00.0	1.0 35	180.0	89 30.0	1.0 54	180.0	90 00.0	.. 91	....	89 30.0	1.0 53	00.0	89 00.0	1.0 35	00.0	88 30.0	1.0 25	00.0	88 00.0	1.0 19	00.0	87 30.0	1.0 16	00.0	00
1	88 38.9	74 72	137.5	88 57.8	49 85	118.6	89 05.6	00 91	89.8	88 58.0	48 84	60.9	88 39.2	74 72	41.9	88 15.0	86 59	30.8	87 48.4	91 50	24.0	87 20.6	94 42	19.5	1
2	87 55.4	49 83	118.4	88 07.0	27 89	105.0	88 11.3	01 91	89.6	88 07.4	26 88	74.1	87 56.2	48 82	60.6	87 39.4	63 75	49.8	87 18.7	74 67	41.5	86 55.4	81 60	35.2	2
3	87 05.6	35 87	109.5	87 13.8	19 90	99.8	87 16.9	01 91	89.4	87 14.5	17 89	78.9	87 06.8	34 86	69.1	86 54.6	48 81	60.3	86 38.6	59 76	52.8	86 19.7	67 70	46.4	3
4	86 13.5	28 88	104.5	86 20.0	15 90	97.0	86 22.5	01 91	89.2	86 20.9	12 90	81.3	86 15.2	25 88	73.7	86 05.9	37 84	66.5	85 53.2	47 80	60.0	85 37.7	56 76	54.3	4
05	85 20.5	23 89	101.4	85 25.9	13 90	95.2	85 28.1	02 91	88.9	85 27.0	09 90	82.6	85 22.7	20 88	76.4	85 15.2	30 86	70.5	85 04.9	39 83	64.9	84 52.0	47 80	59.8	05
6	84 27.0	20 90	99.1	84 31.7	11 90	94.0	84 33.8	02 91	88.7	84 33.0	07 90	83.5	84 29.6	16 89	78.3	84 23.5	25 87	73.2	84 15.0	33 85	68.4	84 04.0	40 82	63.8	6
7	83 33.2	18 90	97.5	83 37.4	10 90	93.0	83 39.4	03 91	88.5	83 39.0	05 90	84.0	83 36.2	13 89	79.5	83 31.2	21 88	75.1	83 24.0	28 86	70.9	83 14.6	34 84	66.8	7
8	82 39.2	16 90	96.2	82 43.1	10 90	92.3	82 45.0	03 91	88.3	82 44.9	04 90	84.3	82 42.7	11 90	80.4	82 38.5	17 88	76.5	82 32.3	24 87	72.7	82 24.2	30 85	69.0	8
9	81 45.1	15 90	95.1	81 48.8	09 91	91.6	81 50.7	03 91	88.1	81 50.8	03 90	84.6	81 49.0	09 90	81.1	81 45.5	15 89	77.6	81 40.2	21 88	74.2	81 33.2	26 86	70.8	9
10	80 50.9	14 90	94.2	80 54.4	09 91	91.0	80 56.3	04 90	87.9	80 56.6	02 90	84.7	80 55.3	07 90	81.5	80 52.3	13 89	78.4	80 47.7	18 88	75.3	80 41.6	23 87	72.2	10
1	79 56.6	14 90	93.4	80 00.0	09 91	90.5	80 02.0	04 90	87.7	80 02.5	01 90	84.8	80 01.5	06 90	81.9	79 59.0	11 89	79.0	79 55.0	16 88	76.2	79 49.6	20 87	73.4	1
2	79 02.3	13 90	92.7	79 05.7	09 91	90.1	79 07.7	04 90	87.5	79 08.3	00 90	84.8	79 07.6	05 90	82.2	79 05.5	09 89	79.5	79 02.1	14 88	76.9	78 57.4	18 88	74.3	2
3	78 08.0	13 91	92.1	78 11.3	09 91	89.7	78 13.4	05 90	87.2	78 14.2	01 90	84.8	78 13.7	04 90	82.3	78 12.0	08 89	79.9	78 09.1	12 88	77.5	78 04.9	16 88	75.1	3
4	77 13.6	13 91	91.6	77 16.9	09 91	89.3	77 19.0	05 90	87.0	77 20.0	01 90	84.8	77 19.8	03 90	82.5	77 18.5	06 89	80.2	77 16.0	10 89	77.9	77 12.3	14 88	75.7	4
15	76 19.3	13 91	91.0	76 22.5	09 91	88.9	76 24.7	06 90	86.8	76 25.9	02 90	84.7	76 25.9	02 90	82.6	76 24.9	05 90	80.4	76 22.7	09 89	78.3	76 19.5	12 88	76.2	15
6	75 24.9	13 91	90.6	75 28.2	09 91	88.6	75 30.5	06 90	86.6	75 31.7	03 90	84.6	75 32.0	01 90	82.6	75 31.2	04 90	80.6	75 29.5	08 89	78.6	75 26.7	11 88	76.6	6
7	74 30.5	13 91	90.1	74 33.8	09 91	88.3	74 36.2	06 90	86.4	74 37.6	03 90	84.5	74 38.1	00 90	82.6	74 37.6	03 90	80.7	74 36.1	05 89	78.8	74 33.7	10 88	77.0	7
8	73 36.1	13 91	89.7	73 39.5	10 91	87.9	73 41.9	07 90	86.2	73 43.5	04 90	84.4	73 44.1	01 90	82.6	73 43.9	02 90	80.8	73 42.8	05 89	79.0	73 40.7	08 88	77.3	8
9	72 41.8	13 91	89.3	72 45.1	10 90	87.6	72 47.7	07 90	86.0	72 49.4	04 90	84.3	72 50.2	01 90	82.6	72 50.2	01 90	80.9	72 49.4	04 89	79.2	72 47.7	07 88	77.5	9
20	71 47.4	13 91	88.9	71 50.8	10 90	87.3	71 53.4	07 90	85.7	71 55.3	05 90	84.1	71 56.3	02 90	82.5	71 56.5	01 90	80.9	71 55.9	03 89	79.3	71 54.6	06 89	77.7	20
1	70 53.0	13 91	88.6	70 56.5	10 90	87.0	70 59.2	08 90	85.5	71 01.2	05 90	84.0	71 02.4	03 90	82.5	71 02.8	00 90	80.9	71 02.5	02 89	79.4	71 01.4	05 89	77.8	1
2	69 58.7	13 91	88.2	70 02.2	11 90	86.8	70 05.0	08 90	85.3	70 07.1	06 90	83.8	70 08.5	03 90	82.4	70 09.1	01 90	80.9	70 09.1	01 89	79.4	70 08.2	04 89	78.0	2
3	69 04.3	13 90	87.9	69 07.9	11 90	86.5	69 10.8	09 90	85.1	69 13.0	06 90	83.7	69 14.6	04 90	82.3	69 15.4	02 90	80.9	69 15.6	01 89	79.5	69 15.1	03 89	78.0	3
4	68 10.0	13 90	87.5	68 13.6	11 90	86.2	68 16.6	09 90	84.9	68 19.0	07 90	83.5	68 20.7	05 90	82.2	68 21.8	02 90	80.8	68 22.1	00 89	79.5	68 21.9	02 89	78.1	4
25	67 15.7	13 90	87.2	67 19.4	11 90	85.9	67 22.5	09 90	84.6	67 25.0	07 90	83.4	67 26.8	05 90	82.1	67 28.1	03 90	80.7	67 28.7	01 89	79.4	67 28.6	01 89	78.1	25
6	66 21.4	14 90	86.9	66 25.2	12 90	85.7	66 28.4	10 90	84.4	66 31.0	08 90	83.2	66 33.0	06 90	81.9	66 34.4	04 90	80.7	66 35.2	02 89	79.4	66 35.4	00 89	78.2	6
7	65 27.1	14 90	86.6	65 30.9	12 90	85.4	65 34.3	10 90	84.2	65 37.0	08 90	83.0	65 39.2	06 90	81.8	65 40.8	04 90	80.6	65 41.8	02 89	79.4	65 42.2	00 89	78.2	7
8	64 32.8	14 90	86.3	64 36.7	12 90	85.1	64 40.2	10 90	84.0	64 43.0	09 90	82.8	64 45.4	07 90	81.7	64 47.1	05 89	80.5	64 48.3	03 89	79.3	64 49.0	01 89	78.1	8
9	63 38.5	14 90	86.0	63 42.6	13 90	84.9	63 46.1	11 90	83.8	63 49.1	09 90	82.6	63 51.6	07 90	81.5	63 53.5	06 89	80.4	63 54.9	04 89	79.2	63 55.8	02 89	78.1	9
30	62 44.3	15 90	85.7	62 48.4	13 90	84.6	62 52.0	11 90	83.5	62 55.2	10 90	82.4	62 57.8	08 90	81.4	62 59.9	06 89	80.3	63 01.5	04 89	79.2	63 02.6	03 89	78.1	30
1	61 50.1	15 90	85.4	61 54.3	13 90	84.4	61 58.0	12 90	83.3	62 01.3	10 90	82.3	62 04.0	08 90	81.2	62 06.3	07 89	80.1	62 08.1	05 89	79.1	62 09.4	03 89	78.0	1
2	60 55.9	15 90	85.1	61 00.2	14 90	84.1	61 04.0	12 90	83.1	61 07.4	10 90	82.1	61 10.3	09 90	81.0	61 12.7	07 89	80.0	61 14.7	06 89	79.0	61 16.2	04 89	77.9	2
3	60 01.7	15 90	84.9	60 06.1	14 90	83.9	60 10.1	12 90	82.9	60 13.6	11 90	81.9	60 16.6	09 90	80.9	60 19.2	08 89	79.9	60 21.3	06 89	78.8	60 23.0	05 89	77.8	3
4	59 07.6	16 90	84.6	59 12.1	14 90	83.6	59 16.1	13 90	82.6	59 19.7	11 90	81.7	59 22.9	10 89	80.7	59 25.7	08 89	79.7	59 28.0	07 89	78.7	59 29.9	05 89	77.7	4
35	58 13.4	16 90	84.3	58 18.0	15 90	83.4	58 22.2	13 90	82.4	58 26.0	12 90	81.5	58 29.3	10 89	80.5	58 32.2	09 89	79.6	58 34.7	08 89	78.6	58 36.7	06 88	77.6	35
6	57 19.3	16 90	84.0	57 24.0	15 90	83.1	57 28.3	14 90	82.2	57 32.2	12 90	81.3	57 35.7	11 89	80.3	57 38.7	10 89	79.4	57 41.4	08 89	78.5	57 43.6	07 88	77.5	6
7	56 25.3	17 90	83.7	56 30.1	15 90	82.8	56 34.5	14 90	82.0	56 38.5	13 90	81.1	56 42.1	11 89	80.1	56 45.3	10 89	79.2	56 48.1	09 89	78.3	56 50.6	07 88	77.4	7
8	55 31.2	17 90	83.5	55 36.1	16 90	82.6	55 40.6	14 90	81.7	55 44.8	13 90	80.8	55 48.5	12 89	80.0	55 51.9	11 89	79.1	55 54.9	09 89	78.2	55 57.5	08 88	77.3	8
9	54 37.2	17 90	83.2	54 42.2	16 90	82.3	54 46.8	15 90	81.5	54 51.1	14 89	80.6	54 55.0	12 89	79.8	54 58.5	11 89	78.9	55 01.7	10 89	78.0	55 04.5	09 88	77.2	9
40	53 43.2	18 90	82.9	53 48.3	16 90	82.1	53 53.1	15 90	81.3	53 57.5	14 89	80.4	54 01.5	13 89	79.6	54 05.2	12 89	78.7	54 08.5	10 89	77.9	54 11.4	09 88	77.0	40
1	52 49.3	18 90	82.7	52 54.5	17 90	81.8	52 59.3	16 90	81.0	53 03.9	14 89	80.2	53 08.0	13 89	79.4	53 11.9	12 89	78.5	53 15.3	11 88	77.7	53 18.5	10 88	76.9	1
2	51 55.4	18 90	82.4	52 00.7	17 90	81.6	52 05.6	16 90	80.8	52 10.3	15 89	80.0	52 14.6	14 89	79.2	52 18.6	13 89	78.4	52 22.2	12 88	77.6	52 25.5	10 88	76.7	2
3	51 01.5	19 90	82.1	51 06.9	17 90	81.3	51 12.0	16 89	80.5	51 16.8	15 89	79.8	51 21.2	14 89	79.0	51 25.3	13 89	78.2	51 29.1	12 88	77.4	51 32.6	11 88	76.6	3
4	50 07.7	19 90	81.8	50 13.2	18 90	81.1	50 18.4	17 89	80.3	50 23.3	16 89	79.5	50 27.8	15 89	78.8	50 32.1	14 89	78.0	50 36.1	13 88	77.2	50 39.7	12 88	76.4	4
45	49 13.8	19 90	81.6	49 19.5	18 90	80.8	49 24.8	17 89	80.1	49 29.8	16 89	79.3	49 34.5	15 89	78.6	49 39.0	14 89	77.8	49 43.1	13 88	77.0	49 46.9	12 88	76.3	45
6	48 20.1	20 90	81.3	48 25.8	19 89	80.6	48 31.2	18 89	79.8	48 36.4	17 89	79.1	48 41.3	16 89	78.3	48 45.8	15 88	77.6	48 50.1	14 88	76.8	48 54.1	13 88	76.1	6
7	47 26.3	20 90	81.0	47 32.2	19 89	80.3	47 37.7	18 89	79.6	47 43.0	17 89	78.9	47 48.0	16 89	78.1	47 52.7	15 88	77.4	47 57.2	14 88	76.6	48 01.3	13 88	75.9	7
8	46 32.6	20 89	80.8	46 38.6	19 89	80.1	46 44.3	18 89	79.3	46 49.7	18 89	78.6	46 54.8	17 89	77.9	46 59.7	16 88	77.2	47 04.3	15 88	76.5	47 08.6	14 88	75.7	8
9	45 39.0	21 89	80.5	45 45.0	20 89	79.8	45 50.9	19 89	79.1	45 56.4	18 89	78.4	46 01.7	17 88	77.7	46 06.7	16 88	77.0	46 11.4	15 88	76.3	46 15.9	15 88	75.5	9
50	44 45.4	21 89	80.2	44 51.6	20 89	79.5	44 57.5	19 89	78.9	45 03.2	18 89	78.2	45 08.6	18 88	77.5	45 13.7	17 88	76.8	45 18.6	16 88	76.1	45 23.3	15 88	75.4	50
1	43 51.8	21 89	80.0	43 58.1	21 89	79.3	44 04.1	20 89	78.6	44 10.0	19 89	77.9	44 15.5	18 88	77.2	44 20.8	17 88	76.5	44 25.9	16 88	75.9	44 30.7	16 88	75.2	1
2	42 58.3	22 89	79.7	43 04.7	21 89	79.0	43 10.9	20 89	78.4	43 16.8	19 88	77.7	43 22.5	19 88	77.0	43 28.0	18 88	76.3	43 33.2	17 88	75.7	43 38.2	16 88	75.0	2
3	42 04.8	22 89	79.4	42 11.3	21 89	78.8	42 17.6	21 89	78.1	42 23.7	20 88	77.4	42 29.5	19 88	76.8	42 35.2	18 88	76.1	42 40.5	18 88	75.4	42 45.7	17 88	74.8	3
4	41 11.4	23 89	79.1	41 18.0	22 89	78.5	41 24.4	21 88	77.8	41 30.7	20 88	77.2	41 36.6	20 88	76.5	41 42.4	19 88	75.9	41 47.9	18 88	75.2	41 53.2	17 87	74.6	4
55	40 18.0	23 89	78.9	40 24.8	22 89	78.2	40 31.3	21 88	77.6	40 37.7	21 88	76.9	40 43.8	20 88	76.3	40 49.7	19 88	75.7	40 55.4	19 88	75.0	41 00.8	18 87	74.4	55
6	39 24.7	23 89	78.6	39 31.6	23 89	78.0	39 38.2	22 88	77.3	39 44.7	21 88	76.7	39 51.0	21 88	76.1	39 57.0	20 88	75.4	40 02.9	19 87	74.8	40 08.5	18 87	74.1	6
7	38 31.4	24 89	78.3	38 38.4	23 88	77.7	38 45.2	22 88	77.1	38 51.8	22 88	76.5	38 58.2	21 88	75.8	39 04.4	20 88	75.2	39 10.4	20 87	74.6	39 16.2	19 87	73.9	7
8	37 38.2	24 89	78.0	37 45.3	23 88	77.4	37 52.2	23 88	76.8	37 59.0	22 88	76.2	38 05.5	22 88	75.6	38 11.9	21 88	75.0	38 18.0	20 87	74.3	38 24.0	20 87	73.7	8
9	36 45.0	25 88	77.8	36 52.2	24 88	77.2	36 59.3	23 88	76.6	37 06.2	23 88	75.9	37 12.9	22 88	75.3	37 19.4	21 87	74.7	37 25.7	21 87	74.1	37 31.8	20 87	73.5	9
60	35 51.9	25 88	77.5	35 59.3	24 88	76.9	36 06.5	24 88	76.3	36 13.5	23 88	75.7	36 20.3	22 88	75.1	36 27.0	22 87	74.5	36 33.4	21 87	73.9	36 39.7	21 87	73.3	60
1	34 58.8	25 88	77.2	35 06.3	25 88	76.6	35 13.7	24 88	76.0	35 20.8	24 88	75.4	35 27.8	23 87	74.8	35 34.6	22 87	74.2	35 41.2	22 87	73.6	35 47.7	21 87	73.0	1
2	34 05.8	26 88	76.9	34 13.5	26 88	76.3	34 20.9	25 88	75.8	34 28.2	24 88	75.2	34 35.3	23 87	74.6	34 42.3	23 87	74.0	34 49.1	22 87	73.4	34 55.7	22 86	72.8	2
3	33 12.9	26 88	76.6	33 20.6	26 88	76.1	33 28.2	25 88	75.5	33 35.7	25 88	74.9	33 43.0	24 87	74.3	33 50.1	23 87	73.7	33 57.0	23 87	73.1	34 03.8	22 86	72.6	3
4	32 20.0	27 88	76.4	32 27.9	26 88	75.8	32 35.6	26 88	75.2	32 43.2	25 87	74.6	32 50.6	24 87	74.1	32 57.9	24 87	73.5	33 05.0	23 87	72.9	33 12.0	23 86	72.3	4
65	31 27.2	27 88	76.1	31 35.2	26 88	75.5	31 43.1	26 88	74.9	31 50.8	25 87	74.4	31 58.4	25 87	73.8	32 05.8	24 87	73.2	32 13.1	24 86	72.6	32 20.2	23 86	72.1	65
6	30 34.4	27 88	75.8	30 42.6	27 88	75.2	30 50.6	26 87	74.7	30 58.5	26 87	74.1	31 06.2	25 87	73.5	31 13.8	25 87	73.0	31 21.2	25 86	72.4	31 28.5	24 86	71.8	6
7	29 41.8	28 88	75.5	29 50.1	27 88	74.9	29 58.2	27 87	74.4	30 06.2	26 87	73.8	30 14.1	26 87	73.3	30 21.8	26 86	72.7	30 29.4	25 86	72.1	30 36.8	25 86	71.6	7
8	28 49.2	28 88	75.2	28 57.6	28 87	74.6	29 05.9	27 87	74.1	29 14.0	27 87	73.5	29 22.1	26 87	73.0	29 29.9	26 86	72.4	29 37.7	26 86	71.9	29 45.3	25 86	71.3	8
9	27 56.6	29 88	74.9	28 05.2	28 87	74.3	28 13.6	28 87	73.8	28 21.9	27 87	73.3	28 30.1	27 86	72.7	28 38.1	27 86	72.2	28 46.0	26 86	71.6	28 53.8	26 86	71.1	9
70	27 04.2	29 87	74.6	27 12.9	29 87	74.1	27 21.4	28 87	73.5	27 29.9	28 87	73.0	27 38.2	28 86	72.4	27 46.4	27 86	71.9	27 54.5	27 86	71.3	28 02.4	26 86	70.8	70
1	26 11.8	30 87	74.3	26 20.6	29 87	73.8	26 29.3	29 87	73.2	26 37.9	28 86	72.7	26 46.4	28 86	72.2	26 54.8	28 86	71.6	27 03.0	27 86	71.1	27 11.1	27 85	70.5	1
2	25 19.5	30 87	74.0	25 28.5	30 87	73.5	25 37.3	29 87	72.9	25 46.1	29 86	72.4	25 54.7	29 86	71.9	26 03.2	28 86	71.3	26 11.6	28 86	70.8	26 19.9	27 85	70.3	2
3	24 27.2	31 87	73.7	24 36.4	30 87	73.2	24 45.4	30 86	72.6	24 54.3	29 86	72.1	25 03.1	29 86	71.6	25 11.7	29 86	71.1	25 20.3	28 85	70.5	25 28.7	28 85	70.0	3
4	23 35.1	31 87	73.4	23 44.4	31 87	72.9	23 53.5	30 86	72.3	24 02.6	30 86	71.8	24 11.5	30 86	71.3	24 20.3	29 85	70.8	24 29.1	29 85	70.2	24 37.7	29 85	69.7	4
75	22 43.0	32 87	73.1	22 52.4	31 86	72.5	23 01.7	31 86	72.0	23 10.9	31 86	71.5	23 20.1	30 86	71.0	23 29.1	30 85	70.5	23 37.9	29 85	70.0	23 46.7	29 85	69.4	75
6	21 51.1	32 86	72.8	22 00.6	32 86	72.2	22 10.1	31 86	71.7	22 19.4	31 86	71.2	22 28.7	31 86	70.7	22 37.8	30 85	70.2	22 46.9	30 85	69.7	22 55.9	30 85	69.2	6
7	20 59.2	32 86	72.4	21 08.9	32 86	71.9	21 18.5	32 86	71.4	21 28.0	32 86	70.9	21 37.4	31 85	70.4	21 46.7	31 85	69.9	21 56.0	31 85	69.4	22 05.1	30 84	68.9	7
8	20 07.4	33 86	72.1	20 17.2	33 86	71.6	20 27.0	32 86	71.1	20 36.6	32 85	70.6	20 46.2	32 85	70.1	20 55.7	31 85	69.6	21 05.1	31 84	69.1	21 14.4	31 84	68.6	8
9	19 15.7	33 86	71.8	19 25.7	33 86	71.3	19 35.6	33 86	70.8	19 45.4	33 85	70.3	19 55.1	32 85	69.8	20 04.8	32 85	69.3	20 14.4	32 84	68.8	20 23.9	31 84	68.3	9
80	18 24.1	34 86	71.5	18 34.2	34 86	71.0	18 44.3	33 85	70.5	18 54.3	33 85	70.0	19 04.2	33 85	69.5	19 14.0	33 84	69.0	19 23.7	32 84	68.5	19 33.4	32 84	68.0	80
1	17 32.6	34 86	71.1	17 42.9	34 86	70.6	17 53.1	34 85	70.2	18 03.2	34 85	69.7	18 13.3	33 85	69.2	18 23.3	33 84	68.7	18 33.2	33 84	68.2	18 43.0	33 84	67.7	1
2	16 41.1	35 86	70.8	16 51.6	35 85	70.3	17 02.0	34 85	69.8	17 12.3	34 85	69.3	17 22.5	34 84	68.8	17 32.7	34 84	68.4	17 42.8	34 84	67.9	17 52.8	33 84	67.4	2
3	15 49.8	35 85	70.5	16 00.5	35 85	70.0	16 11.0	35 85	69.5	16 21.5	35 85	69.0	16 31.9	35 84	68.5	16 42.2	34 84	68.0	16 52.5	34 84	67.5	17 02.7	34 83	67.0	3
4	14 58.6	36 85	70.1	15 09.4	36 85	69.7	15 20.1	36 85	69.2	15 30.7	35 84	68.7	15 41.3	35 84	68.2	15 51.8	35 84	67.7	16 02.3	35 84	67.2	16 12.7	34 83	66.7	4
85	14 07.6	36 85	69.8	14 18.5	36 85	69.3	14 29.3	36 84	68.8	14 40.1	36 84	68.3	14 50.9	36 84	67.9	15 01.6	36 84	67.4	15 12.2	35 83	66.9	15 22.8	35 83	66.4	85
6	13 16.6	37 85	69.4	13 27.7	37 84	69.0	13 38.7	37 84	68.5	13 49.7	36 84	68.0	14 00.6	36 84	67.5	14 11.4	36 83	67.1	14 22.2	36 83	66.6	14 33.0	36 83	66.1	6
7	12 25.7	38 85	69.1	12 37.0	37 84	68.6	12 48.2	37 84	68.1	12 59.3	37 84	67.7	13 10.4	37 84	67.2	13 21.4	37 83	66.7	13 32.4	37 83	66.2	13 43.3	36 82	65.8	7
8	11 35.0	38 84	68.7	11 46.4	38 84	68.3	11 57.8	38 84	67.8	12 09.1	38 84	67.3	12 20.3	37 83	66.9	12 31.5	37 83	66.4	12 42.7	37 83	65.9	12 53.8	37 82	65.4	8
9	10 44.4	39 84	68.4	10 55.9	39 84	67.9	11 07.5	38 84	67.4	11 19.0	38 83	67.0	11 30.4	38 83	66.5	11 41.8	38 83	66.0	11 53.1	38 82	65.6	12 04.4	38 82	65.1	9
90	9 53.9	39 84	68.0	10 05.6	39 84	67.6	10 17.3	39 83	67.1	10 29.0	39 83	66.6	10 40.6	39 83	66.2	10 52.2	39 82	65.7	11 03.7	38 82	65.2	11 15.2	38 82	64.7	90

Lat. 25°

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	41 00.0	1.0	01	180.0	40 30.0	1.0	01	180.0	40 00.0	1.0	01	180.0	39 30.0	1.0	01	180.0	39 00.0	1.0	01	180.0	38 30.0	1.0	01	180.0	38 00.0	1.0	01	180.0	37 30.0	1.0	01	180.0	00
1	40 59.4	1.0	03	178.8	40 29.4	1.0	03	178.8	39 59.4	1.0	03	178.8	39 29.4	1.0	03	178.8	38 59.5	1.0	03	178.8	38 29.5	1.0	03	178.9	37 59.5	1.0	03	178.9	37 29.5	1.0	03	178.9	1
2	40 57.7	1.0	05	177.6	40 27.7	1.0	05	177.6	39 57.8	1.0	06	177.6	39 27.8	1.0	05	177.7	38 57.8	1.0	04	177.7	38 27.8	1.0	04	177.7	37 57.9	1.0	04	177.7	37 27.9	1.0	04	177.8	2
3	40 54.8	1.0	07	176.4	40 24.9	1.0	07	176.4	39 55.0	1.0	06	176.5	39 25.0	1.0	06	176.5	38 55.1	1.0	06	176.5	38 25.1	1.0	06	176.6	37 55.2	1.0	06	176.6	37 25.2	1.0	06	176.6	3
4	40 50.8	1.0	09	175.2	40 20.9	1.0	08	175.2	39 51.0	1.0	08	175.3	39 21.1	1.0	08	175.3	38 51.2	1.0	08	175.4	38 21.3	1.0	08	175.4	37 51.4	1.0	08	175.5	37 21.5	1.0	08	175.5	4
05	40 45.7	99	10	174.0	40 15.8	99	10	174.0	39 46.0	99	10	174.1	39 16.2	99	10	174.2	38 46.3	99	10	174.2	38 16.5	99	10	174.3	37 46.6	1.0	10	174.4	37 16.8	1.0	10	174.4	05
6	40 39.4	99	12	172.8	40 09.6	99	12	172.9	39 39.9	99	12	172.9	39 10.1	99	12	173.0	38 40.3	99	12	173.1	38 10.5	99	12	173.2	37 40.7	99	12	173.2	37 11.0	99	12	173.3	6
7	40 32.0	99	14	171.6	40 02.3	99	14	171.7	39 32.6	99	14	171.8	39 02.9	99	14	171.9	38 33.2	99	14	171.9	38 03.5	99	13	172.0	37 33.8	99	13	172.1	37 04.1	99	13	172.2	7
8	40 23.5	99	16	170.4	39 53.9	99	16	170.5	39 24.3	99	16	170.6	38 54.7	99	16	170.7	38 25.1	99	15	170.8	37 55.5	99	15	170.9	37 25.8	99	15	171.0	36 56.2	99	15	171.1	8
9	40 13.8	98	18	169.2	39 44.4	98	18	169.3	39 14.9	98	18	169.5	38 45.4	98	17	169.6	38 15.9	98	17	169.7	37 46.4	98	17	169.8	37 16.8	98	17	169.9	36 47.3	98	16	170.0	9
10	40 03.1	98	20	168.0	39 33.7	98	19	168.2	39 04.4	98	19	168.3	38 35.0	98	19	168.4	38 05.6	98	19	168.6	37 36.2	98	19	168.7	37 06.8	98	18	168.8	36 37.4	98	18	168.9	10
1	39 51.3	97	22	166.9	39 22.1	97	21	167.0	38 52.8	98	21	167.2	38 23.6	98	21	167.3	37 54.3	98	20	167.4	37 25.0	98	20	167.6	36 55.7	98	20	167.7	36 26.4	98	20	167.9	1
2	39 38.4	97	23	165.7	39 09.3	97	23	165.9	38 40.2	97	23	166.0	38 11.1	97	22	166.2	37 42.0	97	22	166.3	37 12.8	97	22	166.5	36 43.7	97	22	166.6	36 14.5	97	22	166.8	2
3	39 24.5	96	25	164.6	38 55.5	97	25	164.7	38 26.6	97	24	164.9	37 57.6	97	24	165.1	37 28.6	97	24	165.2	36 59.6	97	24	165.4	36 30.6	97	24	165.6	36 01.6	97	23	165.7	3
4	39 09.5	96	27	163.4	38 40.7	96	26	163.6	38 11.9	96	26	163.8	37 43.1	96	26	164.0	37 14.3	96	26	164.1	36 45.4	96	25	164.3	36 16.6	96	25	164.5	35 47.7	96	25	164.7	4
15	38 53.5	95	28	162.3	38 24.9	95	28	162.5	37 56.2	95	28	162.7	37 27.6	96	28	162.9	36 58.9	96	27	163.1	36 30.2	96	27	163.3	36 01.5	96	27	163.4	35 32.8	96	26	163.6	15
6	38 36.5	95	30	161.2	38 08.0	95	30	161.4	37 39.6	95	29	161.6	37 11.1	95	29	161.8	36 42.6	95	29	162.0	36 14.1	95	28	162.2	35 45.5	95	28	162.4	35 17.0	95	28	162.6	6
7	38 18.4	94	32	160.1	37 50.2	94	31	160.3	37 21.9	94	31	160.5	36 53.6	94	31	160.7	36 25.3	94	30	160.9	35 57.0	94	30	161.1	35 28.6	95	30	161.3	35 00.2	95	29	161.5	7
8	37 59.5	93	33	159.0	37 31.4	94	33	159.2	37 03.3	94	33	159.5	36 35.2	94	32	159.7	36 07.1	94	32	159.9	35 38.9	94	32	160.1	35 10.8	94	31	160.3	34 42.6	94	31	160.5	8
9	37 39.5	93	35	157.9	37 11.6	93	34	158.2	36 43.8	93	34	158.4	36 15.9	93	34	158.6	35 47.9	93	33	158.9	35 20.0	93	33	159.1	34 52.0	93	33	159.3	34 24.0	93	32	159.5	9
20	37 18.6	92	36	156.9	36 51.0	92	36	157.1	36 23.3	92	36	157.4	35 55.6	92	35	157.6	35 27.9	92	35	157.8	35 00.1	93	35	158.1	34 32.3	93	34	158.3	34 04.5	93	34	158.5	20
1	36 56.8	91	38	155.8	36 29.4	91	38	156.1	36 01.9	92	37	156.3	35 34.4	92	37	156.6	35 06.9	92	36	156.8	34 39.3	92	36	157.1	34 11.8	92	36	157.3	33 44.2	92	36	157.5	1
2	36 34.1	91	39	154.8	36 06.9	91	39	155.0	35 39.6	91	39	155.3	35 12.3	91	38	155.6	34 45.0	91	38	155.8	34 17.7	91	38	156.1	33 50.3	91	37	156.3	33 22.9	91	37	156.6	2
3	36 10.4	90	41	153.8	35 43.5	90	40	154.0	35 16.5	90	40	154.3	34 49.4	90	40	154.6	34 22.3	90	39	154.8	33 55.2	90	39	155.1	33 28.1	91	38	155.3	33 00.9	91	38	155.6	3
4	35 46.0	89	42	152.7	35 19.2	89	42	153.0	34 52.4	89	41	153.3	34 25.6	89	41	153.6	33 58.8	90	41	153.8	33 31.9	90	40	154.1	33 05.0	90	40	154.4	32 38.0	90	40	154.6	4
25	35 20.6	88	44	151.7	34 54.1	88	43	152.0	34 27.6	89	43	152.3	34 01.0	89	42	152.6	33 34.4	89	42	152.9	33 07.7	89	42	153.2	32 41.0	89	41	153.4	32 14.3	89	41	153.7	25
6	34 54.5	87	45	150.8	34 28.2	88	44	151.1	34 01.9	88	44	151.4	33 35.6	88	44	151.6	33 09.2	88	43	151.9	32 42.8	88	43	152.2	32 16.3	88	42	152.5	31 49.8	88	42	152.8	6
7	34 27.5	87	46	149.8	34 01.5	87	46	150.1	33 35.5	87	46	150.4	33 09.4	87	45	150.7	32 43.2	87	45	151.0	32 17.0	87	44	151.3	31 50.8	87	44	151.6	31 24.5	88	43	151.8	7
8	33 59.8	86	48	148.8	33 34.0	86	47	149.2	33 08.2	86	47	149.5	32 42.4	86	46	149.8	32 16.5	86	46	150.1	31 50.5	87	46	150.4	31 24.5	87	45	150.7	30 58.5	87	45	150.9	8
9	33 31.3	85	49	147.9	33 05.8	85	48	148.2	32 40.2	85	48	148.5	32 14.6	85	48	148.8	31 48.9	86	47	149.1	31 23.2	86	47	149.5	30 57.5	86	46	149.8	30 31.7	86	46	150.1	9
30	33 02.0	84	50	147.0	32 36.8	84	50	147.3	32 11.5	84	49	147.6	31 46.1	85	49	147.9	31 20.7	85	48	148.3	30 55.2	85	48	148.6	30 29.7	85	48	148.9	30 04.2	85	47	149.2	30
1	32 32.0	83	51	146.1	32 07.0	83	51	146.4	31 42.0	84	50	146.7	31 16.9	84	50	147.0	30 51.7	84	50	147.4	30 26.5	84	49	147.7	30 01.3	84	49	148.0	29 36.0	84	48	148.3	1
2	32 01.3	82	52	145.2	31 36.6	83	52	145.5	31 11.8	83	52	145.8	30 46.9	83	51	146.2	30 22.0	83	51	146.5	29 57.1	83	50	146.8	29 32.1	83	50	147.1	29 07.1	84	49	147.4	2
3	31 29.9	82	54	144.3	31 05.5	82	53	144.6	30 40.9	82	53	145.0	30 16.3	82	52	145.3	29 51.7	82	52	145.6	29 27.0	82	51	146.0	29 02.3	83	51	146.3	28 37.5	83	50	146.6	3
4	30 57.9	81	54	143.4	30 33.7	81	54	143.8	30 09.4	81	54	144.1	29 45.0	81	53	144.5	29 20.7	81	53	144.8	28 56.2	82	52	145.1	28 31.7	82	52	145.5	28 07.2	82	52	145.8	4
35	30 25.2	80	56	142.6	30 01.2	80	55	142.9	29 37.2	80	55	143.3	29 13.1	80	54	143.6	28 49.0	81	54	144.0	28 24.8	81	53	144.3	28 00.6	81	53	144.6	27 36.3	81	52	145.0	35
6	29 51.8	79	57	141.7	29 28.1	79	56	142.1	29 04.3	79	56	142.4	28 40.5	79	55	142.8	28 16.7	80	55	143.1	27 52.8	80	54	143.5	27 28.8	80	54	143.8	27 04.8	80	54	144.2	6
7	29 17.8	78	58	140.9	28 54.4	78	57	141.3	28 30.9	78	57	141.6	28 07.4	79	56	142.0	27 43.7	79	56	142.3	27 20.1	79	55	142.7	26 56.4	79	55	143.0	26 32.6	79	54	143.4	7
8	28 43.2	77	59	140.1	28 20.1	77	58	140.5	27 56.8	78	58	140.8	27 33.6	78	57	141.2	27 10.2	78	57	141.5	26 46.8	78	56	141.9	26 23.4	78	56	142.2	25 59.9	78	56	142.6	8
9	28 08.1	76	60	139.3	27 45.2	76	59	139.7	27 22.2	77	59	140.0	26 59.2	77	58	140.4	26 36.1	77	58	140.8	26 13.0	77	57	141.1	25 49.8	77	57	141.5	25 26.6	78	56	141.8	9
40	27 32.3	75	60	138.5	27 09.7	76	60	138.9	26 47.0	76	60	139.3	26 24.2	76	59	139.6	26 01.4	76	59	140.0	25 38.6	76	58	140.4	25 15.6	76	58	140.7	24 52.7	77	58	141.1	40
1	26 56.1	75	61	137.8	26 33.7	75	61	138.1	26 11.2	75	60	138.5	25 48.7	75	60	138.9	25 26.2	75	60	139.2	25 03.6	75	59	139.6	24 40.9	76	59	140.0	24 18.2	76	58	140.3	1
2	26 19.2	74	62	137.0	25 57.1	74	62	137.4	25 34.9	74	61	137.8	25 12.7	74	61	138.1	24 50.4	74	60	138.5	24 28.1	75	60	138.9	24 05.7	75	60	139.2	23 43.2	75	59	139.6	2
3	25 41.9	73	63	136.3	25 20.0	73	63	136.6	24 58.1	73	62	137.0	24 36.1	73	62	137.4	24 14.1	74	61	137.8	23 52.0	74	61	138.1	23 29.9	74	60	138.5	23 07.7	74	60	138.9	3
4	25 04.0	72	64	135.5	24 42.5	72	64	135.9	24 20.8	72	63	136.3	23 59.1	72	63	136.7	23 37.3	73	62	137.0	23 15.5	73	62	137.4	22 53.6	73	61	137.8	22 31.7	73	61	138.2	4
45	24 25.7	71	65	134.8	24 04.4	71	64	135.2	23 43.0	71	64	135.6	23 21.5	72	63	136.0	23 00.0	72	63	136.3	22 38.4	72	62	136.7	22 16.8	72	62	137.1	21 55.2	72	62	137.5	45
6	23 46.9	70	66	134.1	23 25.8	70	65	134.5	23 04.7	71	65	134.9	22 43.5	71	64	135.3	22 22.2	71	64	135.6	22 00.9	71	63	136.0	21 39.6	71	63	136.4	21 18.2	71	62	136.8	6
7	23 07.6	69	66	133.4	22 46.8	70	66	133.8	22 25.9	70	65	134.2	22 05.0	70	65	134.6	21 44.0	70	64	135.0	21 22.9	70	64	135.3	21 01.8	70	64	135.7	20 40.7	71	63	136.1	7
8	22 27.9	68	67	132.7	22 07.3	69	66	133.1	21 46.7	69	66	133.5	21 26.0	69	66	133.9	21 05.3	69	65	134.3	20 44.5	69	65	134.7	20 23.6	70	64	135.1	20 02.8	70	64	135.4	8
9	21 47.7	68	68	132.1	21 27.4	68	67	132.4	21 07.0	68	67	132.8	20 46.6	68	66	133.2	20 26.1	68	66	133.6	20 05.6	69	66	134.0	19 45.0	69	65	134.4	19 24.4	69	65	134.8	9
50	21 07.1	67	68	131.4	20 47.1	67	68	131.8	20 26.9	67	68	132.2	20 06.8	67	67	132.6	19 46.5	67	66	133.0	19 26.3	68	66	133.4	19 05.9	68	66	133.8	18 45.6	68	66	134.1	50
1	20 26.1	66	69	130.7	20 06.3	66	69	131.1	19 46.5	66	68	131.5	19 26.5	66	68	131.9	19 06.6	67	67	132.3	18 46.5	67	67	132.7	18 26.5	67	66	133.1	18 06.3	67	66	133.5	1
2	19 44.7	65	70	130.1	19 25.2	65	69	130.5	19 05.6	65	69	130.9	18 45.9	66	68	131.3	18 26.2	66	68	131.7	18 06.4	66	68	132.1	17 46.6	66	67	132.5	17 26.7	66	67	132.9	2
3	19 03.0	64	70	129.5	18 43.6	64	70	129.9	18 24.3	65	70	130.3	18 04.8	65	69	130.7	17 45.4	65	69	131.1	17 25.8	65	68	131.5	17 06.3	65	68	131.9	16 46.7	65	68	132.3	3
4	18 20.8	63	71	128.9	18 01.7	64	70	129.3	17 42.6	64	70	129.7	17 23.4	64	70	130.1	17 04.2	64	69	130.5	16 44.9	64	69	130.9	16 25.6	64	68	131.3	16 06.2	65	68	131.7	4
55	17 38.3	63	72	128.3	17 19.4	63	71	128.7	17 00.6	63	71	129.1	16 41.6	63	70	129.5	16 22.6	63	70	129.9	16 03.6	63	69	130.3	15 44.5	64	69	130.7	15 25.4	64	68	131.1	55
6	16 55.4	62	72	127.7	16 36.8	62	72	128.1	16 18.2	62	71	128.5	15 59.5	62	71	128.9	15 40.7	63	70	129.3	15 22.0	63	70	129.7	15 03.1	63	70	130.1	14 44.3	63	69	130.5	6
7	16 12.2	61	73	127.1	15 53.8	61	72	127.5	15 35.4	61	72	127.9	15 17.0	62	72	128.3	14 58.5	62	71	128.7	14 39.9	62	70	129.1	14 21.4	62	70	129.5	14 02.7	62	70	129.9	7
8	15 28.6	60	73	126.5	15 10.5	60	73	126.9	14 52.3	61	72	127.3	14 34.1	61	72	127.7	14 15.9	61	72	128.1	13 57.6	61	71	128.6	13 39.2	61	71	129.0	13 20.9	61	70	129.4	8
9	14 44.8	60	74	125.9	14 26.9	60	73	126.3	14 08.9	60	73	126.8	13 51.0	60	72	127.2	13 32.9	60	72	127.6	13 14.9	60	72	128.0	12 56.8	60	71	128.4	12 38.7	61	71	128.8	9
60	14 00.6	59	74	125.4	13 42.9	59	74	125.8	13 25.2	59	73	126.2	13 07.5	59	73	126.6	12 49.7	59	73	127.0	12 31.9	59	72	127.4	12 14.0	60	72	127.9	11 56.1	60	71	128.3	60
1	13 16.1	58	75	124.8	12 58.6	58	74	125.2	12 41.2	58	74	125.7	12 23.7	58	74	126.1	12 06.1	59	73	126.5	11 48.5	59	73	126.9	11 30.9	59	72	127.3	11 13.3	59	72	127.7	1
2	12 31.3	57	75	124.3	12 14.1	57	75	124.7	11 56.8	58	74	125.1	11 39.6	58	74	125.5	11 22.3	58	74	126.0	11 04.9	58	73	126.4	10 47.5	58	73	126.8	10 30.1	58	72	127.2	2
3	11 46.2	57	76	123.8	11 29.2	57	75	124.2	11 12.2	57	75	124.6	10 55.2	57	74	125.0	10 38.1	57	74	125.4	10 21.0	57	74	125.8	10 03.8	57	73	126.3	9 46.6	57	73	126.7	3
4	11 00.9	56	76	123.2	10 44.1	56	76	123.6	10 27.3	56	75	124.1	10 10.5	56	75	124.5	9 53.6	56	75	124.9	9 36.8	56	74	125.3	9 19.8	56	74	125.8	9 02.9	57	73	126.2	4
65	10 15.2	55	76	122.7	9 58.7	55	76	123.1	9 42.1	55	76	123.6	9 25.5	55	75	124.0	9 08.9	55	75	124.4	8 52.3	56	75	124.8	8 35.6	56	74	125.2	8 18.9	56	74	125.7	65
6	9 29.4	54	77	122.2	9 13.0	54	76	122.6	8 56.7	55	76	123.1	8 40.3	55	76	123.5	8 23.9	55	76	123.9	8 07.5	55	75	124.3	7 51.0	55	75	124.7	7 34.5	55	74	125.2	6
7	8 43.2	54	77	121.7	8 27.1	54	77	122.1	8 11.0	54	77	122.6	7 54.8	54	76	123.0	7 38.6	54	76	123.4	7 22.4	54	76	123.8	7 06.2	54	75	124.3	6 50.0	54	75	124.7	7
8	7 56.8	53	78	121.2	7 40.9	53	77	121.6	7 25.0	53	77	122.1	7 09.1	53	77	122.5	6 53.1	53	76	122.9	6 37.1	53	76	123.3	6 21.1	53	76	123.8	6 05.1	53	75	124.2	8
9	7 10.2	52	78	120.7	6 54.5	52	78	121.2	6 38.8	52	77	121.6	6 23.1	52	77	122.0	6 07.4	53	77	122.4	5 51.6	53	76	122.9	5 35.8	53	76	123.3	5 20.0	53	76	123.7	9
70	6 23.4	52	78	120.3	6 07.9	52	78	120.7	5 52.4	52	78	121.1	5 36.9	52	77	121.5	5 21.3	52	77	122.0	5 05.8	52	77	122.4									70
1	5 36.3	51	79	119.8	5 21.0	51	78	120.2	5 05.7	51	78	120.6																					1

Lat. 26°

Lat. 27°

Lat. 28°

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′ Alt.	Δd	Δt	Az.	24° 30′ Alt.	Δd	Δt	Az.	25° 00′ Alt.	Δd	Δt	Az.	25° 30′ Alt.	Δd	Δt	Az.	26° 00′ Alt.	Δd	Δt	Az.	26° 30′ Alt.	Δd	Δt	Az.	27° 00′ Alt.	Δd	Δt	Az.	27° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	9 03.5	40	84	67.7	9 15.4	40	83	67.2	9 27.3	40	83	66.7	9 39.1	39	83	66.3	9 50.9	39	82	65.8	10 02.7	39	82	65.3	10 14.4	39	82	64.9	10 26.1	39	82	64.4	91
2	8 13.3	40	84	67.3	8 25.4	40	83	66.8	8 37.4	40	83	66.4	8 49.4	40	82	65.9	9 01.4	40	82	65.4	9 13.3	40	82	65.0	9 25.2	40	82	64.5	9 37.1	40	81	64.0	2
3	7 23.2	41	83	66.9	7 35.4	41	83	66.5	7 47.7	41	83	66.0	7 59.9	41	82	65.5	8 12.0	40	82	65.1	8 24.1	40	82	64.6	8 36.2	40	82	64.1	8 48.3	40	81	63.7	3
4	6 33.2	41	83	66.5	6 45.7	41	83	66.1	6 58.1	41	82	65.6	7 10.4	41	82	65.2	7 22.8	41	82	64.7	7 35.1	41	82	64.2	7 47.4	41	81	63.8	7 59.6	41	81	63.3	4
95	5 43.4	42	83	66.2	5 56.0	42	82	65.7	6 08.6	42	82	65.2	6 21.2	42	82	64.8	6 33.7	42	82	64.3	6 46.2	42	81	63.9	6 58.7	42	81	63.4	7 11.1	41	80	63.0	95
6					5 06.5	43	82	65.3	5 19.3	42	82	64.9	5 32.0	42	82	64.4	5 44.8	42	81	63.9	5 57.4	42	81	63.5	6 10.1	42	81	63.0	6 22.8	42	80	62.6	6
7																					5 08.9	43	81	63.1	5 21.7	43	80	62.7	5 34.6	43	80	62.2	7

Lat. 25°

H.A.	28° 00′ Alt.	Δd Δt	Az.	28° 30′ Alt.	Δd Δt	Az.	29° 00′ Alt.	Δd Δt	Az.	30° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	87 00.0	1.0 13	00.0	86 30.0	1.0 11	00.0	86 00.0	1.0 10	00.0	85 00.0	1.0 08	00.0
1	86 52.2	96 36	16.4	86 23.3	97 32	14.1	85 54.1	98 28	12.3	84 55.3	98 23	09.8
2	86 30.4	85 53	30.4	86 04.3	89 48	26.6	85 37.3	91 43	23.6	84 41.7	94 36	19.1
3	85 58.5	74 64	41.2	85 35.6	79 59	36.8	85 11.4	82 55	33.1	84 20.2	88 47	27.3
4	85 19.8	63 72	49.2	85 00.0	69 67	44.7	84 38.6	74 63	40.8	83 52.2	81 55	34.5
05	84 36.8	54 76	55.1	84 19.7	60 73	50.8	84 00.8	65 69	47.0	83 19.1	73 62	40.4
6	83 51.0	47 80	59.5	83 36.1	53 76	55.5	83 19.5	58 73	51.9	82 42.0	67 67	45.4
7	83 03.4	41 82	62.9	82 50.3	46 79	59.2	82 35.6	52 76	55.8	82 01.9	60 71	49.6
8	82 14.4	36 83	65.5	82 02.9	41 81	62.1	81 49.8	46 79	58.9	81 19.4	55 74	53.0
9	81 24.5	32 84	67.6	81 14.3	37 82	64.5	81 02.6	41 80	61.5	80 35.1	50 76	55.9
10	80 33.9	28 85	69.3	80 24.8	33 84	66.4	80 14.3	37 82	63.6	79 49.5	45 78	58.3
1	79 42.8	25 86	70.6	79 34.7	29 84	68.0	79 25.2	34 83	65.4	79 02.6	41 80	60.4
2	78 51.3	22 86	71.8	78 44.0	26 85	69.3	78 35.5	30 84	66.8	78 15.0	38 81	62.1
3	77 59.5	20 87	72.7	77 53.0	24 86	70.4	77 45.3	28 84	68.1	77 26.6	35 82	63.6
4	77 07.5	18 87	73.5	77 01.6	21 86	71.3	76 54.6	25 85	69.1	76 37.6	32 82	64.9
15	76 15.3	16 87	74.1	76 10.0	19 86	72.0	76 03.7	23 85	70.0	75 48.1	29 83	66.0
6	75 22.9	14 88	74.7	75 18.2	17 87	72.7	75 12.5	21 86	70.8	74 58.2	27 84	67.0
7	74 30.4	13 88	75.1	74 26.2	16 87	73.3	74 21.0	19 86	71.4	74 08.0	25 84	67.8
8	73 37.8	11 88	75.5	73 34.0	14 87	73.7	73 29.4	17 86	72.0	73 17.5	23 84	68.6
9	72 45.1	10 88	75.8	72 41.8	13 87	74.1	72 37.6	15 86	72.5	72 26.8	21 85	69.2
20	71 52.4	09 88	76.1	71 49.4	11 87	74.5	71 45.7	14 87	72.9	71 35.8	19 85	69.8
1	70 59.6	07 88	76.3	70 57.0	10 88	74.8	70 53.6	12 87	73.3	70 44.7	17 85	70.2
2	70 06.7	06 88	76.5	70 04.5	09 88	75.0	70 01.5	11 87	73.6	69 53.5	16 86	70.7
3	69 13.8	05 88	76.6	69 11.9	07 88	75.2	69 09.3	10 87	73.8	69 02.1	14 86	71.0
4	68 20.9	04 88	76.7	68 19.3	06 88	75.4	68 17.1	09 87	74.0	68 10.6	13 86	71.4
25	67 28.0	03 88	76.8	67 26.7	05 88	75.5	67 24.8	07 87	74.2	67 19.1	12 86	71.6
6	66 35.0	02 88	76.9	66 34.0	04 88	75.6	66 32.4	06 87	74.4	66 27.4	10 86	71.9
7	65 42.1	01 88	76.9	65 41.3	03 88	75.7	65 40.0	05 87	74.5	65 35.7	09 86	72.1
8	64 49.1	01 88	77.0	64 48.6	02 88	75.8	64 47.6	04 87	74.6	64 43.9	08 86	72.3
9	63 56.1	00 88	77.0	63 55.9	02 88	75.8	63 55.2	03 88	74.7	63 52.1	07 86	72.4
30	63 03.1	01 88	76.9	63 03.2	01 88	75.8	63 02.7	02 88	74.7	63 00.3	06 86	72.5
1	62 10.2	02 88	76.9	62 10.5	00 88	75.9	62 10.3	02 88	74.8	62 08.4	05 86	72.6
2	61 17.2	03 88	76.9	61 17.7	01 88	75.8	61 17.8	01 88	74.8	61 16.5	04 86	72.7
3	60 24.2	03 88	76.8	60 25.0	02 88	75.8	60 25.3	00 88	74.8	60 24.5	03 86	72.8
4	59 31.3	04 88	76.8	59 32.3	03 88	75.8	59 32.8	01 88	74.8	59 32.6	02 87	72.8
35	58 38.4	05 88	76.7	58 39.6	03 88	75.7	58 40.4	02 88	74.8	58 40.6	01 87	72.8
6	57 45.5	05 88	76.6	57 46.9	04 88	75.7	57 47.9	03 88	74.7	57 48.7	00 87	72.9
7	56 52.6	06 88	76.5	56 54.2	05 88	75.6	56 55.4	03 87	74.7	56 56.7	01 87	72.8
8	55 59.7	07 88	76.4	56 01.6	05 88	75.5	56 03.0	04 87	74.6	56 04.7	02 87	72.8
9	55 06.9	07 88	76.3	55 08.9	06 88	75.4	55 10.6	05 87	74.5	55 12.8	02 86	72.8
40	54 14.1	08 88	76.2	54 16.3	07 88	75.3	54 18.2	06 87	74.5	54 20.8	03 86	72.8
1	53 21.3	09 88	76.1	53 23.7	08 88	75.2	53 25.8	06 87	74.4	53 28.9	04 86	72.7
2	52 28.5	09 88	75.9	52 31.1	08 88	75.1	52 33.4	07 87	74.3	52 37.0	05 86	72.6
3	51 35.8	10 88	75.8	51 38.6	09 88	75.0	51 41.1	08 87	74.2	51 45.1	06 86	72.6
4	50 43.1	11 88	75.6	50 46.1	10 88	74.8	50 48.8	08 87	74.1	50 53.2	06 86	72.5
45	49 50.4	11 88	75.5	49 53.6	10 87	74.7	49 56.5	09 87	73.9	50 01.4	07 86	72.4
6	48 57.8	12 88	75.3	49 01.2	11 87	74.6	49 04.3	10 87	73.8	49 09.6	08 86	72.3
7	48 05.2	12 88	75.2	48 08.8	11 87	74.4	48 12.1	10 87	73.7	48 17.8	09 86	72.2
8	47 12.7	13 88	75.0	47 16.4	12 87	74.3	47 19.9	11 87	73.5	47 26.0	09 86	72.1
9	46 20.2	14 87	74.8	46 24.1	13 87	74.1	46 27.8	12 87	73.4	46 34.3	10 86	71.9
50	45 27.7	14 87	74.7	45 31.8	13 87	73.9	45 35.7	12 87	73.2	45 42.6	11 86	71.8
1	44 35.3	15 87	74.5	44 39.6	14 87	73.8	44 43.6	13 87	73.1	44 51.0	11 86	71.7
2	43 42.9	15 87	74.3	43 47.4	15 87	73.6	43 51.6	14 86	72.9	43 59.4	12 86	71.5
3	42 50.6	16 87	74.1	42 55.3	15 87	73.4	42 59.7	14 86	72.7	43 07.8	13 86	71.4
4	41 58.3	17 87	73.9	42 03.2	16 87	73.2	42 07.8	15 86	72.6	42 16.3	13 86	71.2
55	41 06.1	17 87	73.7	41 11.1	16 87	73.0	41 15.9	16 86	72.4	41 24.9	14 86	71.1
6	40 13.9	18 87	73.5	40 19.1	17 86	72.9	40 24.1	16 86	72.2	40 33.5	15 86	70.9
7	39 21.8	18 87	73.3	39 27.2	18 86	72.7	39 32.4	17 86	72.0	39 42.1	16 86	70.7
8	38 29.8	19 87	73.1	38 35.3	18 86	72.5	38 40.7	18 86	71.8	38 59.8	16 85	70.6
9	37 37.8	19 86	72.9	37 43.5	19 86	72.2	37 49.0	18 86	71.6	37 59.5	17 85	70.4
60	36 45.8	20 86	72.6	36 51.7	19 86	72.0	36 57.5	19 86	71.4	37 08.3	17 85	70.2
1	35 54.0	21 86	72.4	36 00.0	20 86	71.8	36 06.0	19 86	71.2	36 17.2	18 85	70.0
2	35 02.2	21 86	72.2	35 08.4	21 86	71.6	35 14.5	20 86	71.0	35 26.1	19 85	69.8
3	34 10.4	22 86	72.0	34 16.9	21 86	71.4	34 23.1	21 86	70.8	34 35.1	19 85	69.6
4	33 18.7	22 86	71.7	33 25.4	22 86	71.2	33 31.8	21 85	70.6	33 44.2	20 85	69.4
65	32 27.1	23 86	71.5	32 33.9	22 86	70.9	32 40.6	22 85	70.3	32 53.4	21 85	69.2
6	31 35.6	23 86	71.3	31 42.6	23 86	70.7	31 49.4	22 85	70.1	32 02.6	21 84	69.0
7	30 44.1	24 86	71.0	30 51.3	24 85	70.4	30 58.3	23 85	69.9	31 11.8	22 84	68.7
8	29 52.8	25 86	70.8	30 00.1	24 85	70.2	30 07.3	24 85	69.6	30 21.2	23 84	68.5
9	29 01.5	25 85	70.5	29 09.0	25 85	70.0	29 16.3	24 85	69.4	29 30.6	23 84	68.3
70	28 10.2	26 85	70.3	28 17.9	25 85	69.7	28 25.5	25 85	69.2	28 40.2	24 84	68.0
1	27 19.1	26 85	70.0	27 27.0	26 85	69.4	27 34.7	26 84	68.9	27 49.8	25 84	67.8
2	26 28.0	27 85	69.7	26 36.1	27 85	69.2	26 44.9	26 84	68.6	26 59.5	25 84	67.6
3	25 37.1	28 85	69.5	25 45.3	27 84	68.9	25 53.4	27 84	68.4	26 09.2	26 84	67.3
4	24 46.2	28 85	69.2	24 54.6	28 84	68.7	25 02.9	27 84	68.1	25 19.1	27 83	67.1
75	23 55.4	29 84	68.9	24 04.0	28 84	68.4	24 12.5	28 84	67.9	24 29.1	27 83	66.8
6	23 04.7	29 84	68.6	23 13.5	29 84	68.1	23 22.2	29 84	67.6	23 39.2	28 83	66.5
7	22 14.1	30 84	68.3	22 23.1	30 84	67.8	22 31.9	29 84	67.3	22 49.3	29 83	66.3
8	21 23.7	31 84	68.1	21 32.8	30 84	67.5	21 41.8	30 83	67.0	21 59.6	29 83	66.0
9	20 33.3	31 84	67.8	20 42.6	31 84	67.3	20 51.8	31 83	66.8	21 10.0	30 82	65.7
80	19 43.0	32 84	67.5	19 52.5	32 83	67.0	20 01.9	31 83	66.5	20 20.4	31 82	65.4
1	18 52.8	32 84	67.2	19 02.5	32 83	66.7	19 12.1	32 83	66.2	19 31.0	31 82	65.2
2	18 02.7	33 83	66.9	18 12.6	33 83	66.4	18 22.4	33 83	65.9	18 41.7	32 82	64.9
3	17 12.8	34 83	66.6	17 22.9	33 83	66.1	17 32.8	33 82	65.6	17 52.6	33 82	64.6
4	16 23.0	34 83	66.2	16 33.2	34 82	65.8	16 43.4	34 82	65.3	17 03.5	33 82	64.3
85	15 33.3	35 83	65.9	15 43.7	35 82	65.4	15 54.1	34 82	65.0	16 14.6	34 81	64.0
6	14 43.7	36 82	65.6	14 54.3	35 82	65.1	15 04.9	35 82	64.6	15 25.8	35 81	63.7
7	13 54.2	36 82	65.3	14 05.0	36 82	64.8	14 15.8	36 82	64.3	14 37.1	35 81	63.4
8	13 04.9	37 82	64.9	13 15.9	37 82	64.5	13 26.8	36 81	64.0	13 48.6	36 81	63.0
9	12 15.7	37 82	64.6	12 26.9	37 82	64.1	12 38.0	37 81	63.7	13 00.2	37 80	62.7
90	11 26.6	38 82	64.3	11 38.0	38 81	63.8	11 49.4	38 81	63.3	12 11.9	37 80	62.4

H.A.	32° 00′ Alt.	Δd Δt	Az.	34° 00′ Alt.	Δd Δt	Az.	34° 30′ Alt.	Δd Δt	Az.	35° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	83 00.0	1.0 06	00.0	81 00.0	1.0 04	00.0	80 30.0	1.0 04	00.0	79 30.0	1.0 04	00.0
1	82 56.7	99 16	06.9	80 57.5	99 12	05.3	80 27.6	1.0 12	05.0	79 27.9	1.0 10	04.5
2	82 47.0	97 26	13.6	80 50.0	98 20	10.5	80 20.6	98 19	09.9	79 21.6	99 17	08.9
3	82 31.3	93 35	19.9	80 37.8	96 28	15.5	80 09.1	96 26	14.6	79 11.2	97 24	13.1
4	82 10.1	89 43	25.7	80 21.2	93 34	20.2	79 53.3	93 33	19.1	78 57.0	94 30	17.2
05	81 44.3	84 50	31.0	80 00.4	89 41	24.6	79 33.6	90 39	23.4	78 39.1	92 36	21.1
6	81 14.4	78 55	35.6	79 36.0	85 46	28.7	79 10.3	86 44	27.3	78 17.8	88 40	24.8
7	80 41.2	73 60	39.7	79 08.3	81 51	32.4	78 43.8	82 49	30.9	77 53.5	86 45	28.2
8	80 05.1	68 64	43.3	78 37.8	77 55	35.8	78 14.5	79 53	34.3	77 26.5	81 49	31.4
9	79 26.8	63 67	46.4	78 04.8	73 59	38.9	77 42.7	75 57	37.3	76 57.0	78 53	34.3
10	78 46.5	59 70	49.2	77 29.6	69 62	41.7	77 08.7	71 60	40.0	76 25.2	74 56	37.0
1	78 04.6	55 72	51.6	76 52.6	65 64	44.2	76 32.8	67 63	42.5	75 51.6	71 59	39.5
2	77 21.4	51 74	53.7	76 13.9	61 67	46.4	75 55.3	63 65	44.8	75 16.2	67 62	41.7
3	76 37.1	47 76	55.5	75 33.9	58 69	48.4	75 16.3	60 67	46.8	74 39.2	64 64	43.8
4	75 51.8	44 77	57.1	74 52.6	54 70	50.2	74 36.9	56 69	48.7	74 01.0	61 66	45.7
15	75 05.7	41 78	58.6	74 10.3	51 72	51.9	73 54.7	53 70	50.3	73 21.5	57 68	47.4
6	74 19.0	38 79	59.9	73 27.1	48 73	53.4	73 12.4	50 72	51.8	72 41.0	54 69	48.9
7	73 31.7	36 80	61.0	72 43.1	45 74	54.7	72 29.2	47 73	53.2	71 59.5	52 70	50.3
8	72 43.9	33 80	62.0	71 58.4	43 76	55.9	71 45.3	45 74	54.4	71 17.3	49 72	51.6
9	71 55.7	31 81	62.9	71 13.1	40 76	57.0	71 00.8	42 75	55.6	70 34.3	46 73	52.8
20	71 07.2	29 82	63.7	70 27.3	38 77	57.9	70 15.7	40 76	56.6	69 50.6	44 74	53.9
1	70 18.3	27 82	64.4	69 41.0	35 78	58.8	69 30.0	37 77	57.5	69 06.4	41 74	54.9
2	69 29.1	25 82	65.0	68 54.2	33 78	59.6	68 44.0	35 78	58.3	68 21.7	39 75	55.8
3	68 39.7	23 83	65.6	68 07.1	31 79	60.4	67 57.5	33 78	59.1	67 36.5	37 76	56.6
4	67 50.1	21 83	66.1	67 19.7	29 80	61.0	67 10.7	31 79	59.8	66 50.9	35 77	57.4
25	67 00.3	20 83	66.6	66 32.0	27 80	61.6	66 23.5	29 79	60.4	66 04.9	33 77	58.1
6	66 10.3	18 84	67.0	65 44.0	26 80	62.2	65 36.1	27 80	61.0	65 18.6	31 78	58.7
7	65 20.2	17 84	67.3	64 55.8	24 81	62.7	64 48.4	26 80	61.5	64 32.0	29 78	59.3
8	64 30.0	15 84	67.6	64 07.4	22 81	63.1	64 00.5	24 80	62.0	63 45.1	27 78	59.8
9	63 39.6	14 84	67.9	63 18.8	21 81	63.5	63 12.4	22 80	62.4	62 58.0	26 79	60.3
30	62 49.2	13 84	68.2	62 30.1	19 82	63.9	62 24.1	21 81	62.8	62 10.7	24 79	60.7
1	61 58.7	11 84	68.4	61 41.2	18 82	64.2	61 35.7	19 81	63.2	61 23.2	22 79	61.1
2	61 08.1	10 84	68.6	60 52.2	16 82	64.5	60 47.1	18 81	63.5	60 35.5	21 80	61.5
3	60 17.4	09 84	68.7	60 03.1	15 82	64.7	59 58.4	16 82	63.8	59 47.6	19 80	61.8
4	59 26.7	08 85	68.9	59 13.8	14 82	65.0	59 09.5	15 82	64.0	58 59.6	18 80	62.1
35	58 36.0	07 85	69.0	58 24.5	12 82	65.2	58 20.6	14 82	64.2	58 11.5	17 80	62.4
6	57 45.2	06 85	69.1	57 35.1	11 82	65.4	57 31.6	12 82	64.4	57 23.3	15 80	62.6
7	56 54.4	05 85	69.2	56 45.7	10 82	65.5	56 42.5	11 82	64.6	56 35.0	14 81	62.8
8	56 03.5	04 85	69.2	55 56.1	09 83	65.7	55 53.3	10 82	64.8	55 46.5	13 81	63.0
9	55 12.7	03 85	69.3	55 06.6	08 83	65.8	55 04.1	09 82	64.9	54 58.0	11 81	63.2
40	54 21.8	02 85	69.3	54 16.9	06 83	65.9	54 14.8	08 82	65.0	54 09.5	10 81	63.3
1	53 30.9	01 85	69.3	53 27.3	05 83	66.0	53 25.5	07 82	65.1	53 20.8	09 81	63.5
2	52 40.0	00 85	69.3	52 37.6	04 83	66.0	52 36.1	05 82	65.2	52 32.2	08 81	63.6
3	51 49.2	01 85	69.3	51 47.9	03 83	66.1	51 46.7	04 82	65.3	51 43.4	07 81	63.7
4	50 58.3	02 85	69.3	50 58.2	02 83	66.1	50 57.3	03 82	65.3	50 54.7	06 81	63.8
45	50 07.4	03 85	69.3	50 08.4	01 83	66.2	50 07.9	02 82	65.4	50 05.9	04 81	63.8
6	49 16.6	04 85	69.2	49 18.7	00 83	66.2	49 18.5	01 82	65.4	49 17.1	03 81	63.9
7	48 25.7	05 85	69.2	48 29.0	01 83	66.2	48 29.0	00 82	65.4	48 28.3	02 81	63.9
8	47 34.9	05 85	69.1	47 39.2	02 83	66.2	47 39.6	01 82	65.4	47 39.4	01 81	63.9
9	46 44.1	06 85	69.0	46 49.5	03 83	66.1	46 50.1	02 82	65.4	46 50.6	00 81	63.9
50	45 53.4	07 84	69.0	45 59.8	04 83	66.1	46 00.7	03 82	65.4	46 01.7	01 81	63.9
1	45 02.6	08 84	68.9	45 10.1	04 83	66.0	45 11.3	04 82	65.3	45 12.9	02 81	63.9
2	44 11.9	09 84	68.8	44 20.4	05 83	66.0	44 21.9	05 82	65.3	44 24.1	03 81	63.9
3	43 21.2	10 84	68.7	43 30.7	06 83	65.9	43 32.5	05 82	65.2	43 35.2	04 81	63.8
4	42 30.6	10 84	68.5	42 41.1	07 83	65.8	42 43.1	06 82	65.2	42 46.4	05 81	63.8
55	41 40.0	11 84	68.4	41 51.5	08 83	65.8	41 53.8	07 82	65.1	41 57.7	06 81	63.7
6	40 49.5	12 84	68.3	41 01.9	09 82	65.7	41 04.5	08 82	65.0	41 08.9	07 81	63.7
7	39 59.0	13 84	68.2	40 12.4	10 82	65.6	40 15.2	09 82	64.9	40 20.2	08 81	63.6
8	39 08.5	13 84	68.0	39 22.9	11 82	65.5	39 26.0	10 82	64.8	39 31.5	08 81	63.5
9	38 18.1	14 84	67.9	38 33.5	11 82	65.3	38 36.8	11 82	64.7	38 42.8	09 81	63.4
60	37 27.8	15 84	67.7	37 44.1	12 82	65.2	37 47.7	12 82	64.6	37 54.2	10 81	63.3
1	36 37.5	16 84	67.5	36 54.7	13 82	65.1	36 58.6	12 82	64.5	37 05.7	11 81	63.2
2	35 47.3	16 84	67.4	36 05.5	14 82	64.9	36 09.5	13 82	64.3	36 17.1	12 81	63.1
3	34 57.1	17 84	67.2	35 16.2	15 82	64.8	35 20.6	14 82	64.2	35 28.7	13 81	63.0
4	34 07.0	18 83	67.0	34 27.1	16 82	64.6	34 31.6	15 81	64.0	34 40.3	14 81	62.8
65	33 17.0	19 83	66.8	33 38.0	16 82	64.5	33 42.8	16 81	63.9	33 51.9	15 80	62.7
6	32 27.0	19 83	66.6	32 48.9	17 82	64.3	32 54.0	17 81	63.7	33 03.6	16 80	62.5
7	31 37.1	20 83	66.4	31 59.9	18 82	64.1	32 05.3	17 81	63.6	32 15.4	16 80	62.4
8	30 47.3	21 83	66.2	31 11.1	19 81	64.0	31 16.6	18 81	63.4	31 27.2	17 80	62.2
9	29 57.6	22 83	66.0	30 22.2	20 81	63.8	30 28.0	19 81	63.2	30 39.2	18 80	62.1
70	29 07.9	22 83	65.8	29 33.5	20 81	63.6	29 39.5	20 81	63.0	29 51.2	19 80	61.9
1	28 18.4	23 82	65.6	28 44.8	21 81	63.4	28 51.1	21 80	62.8	29 03.2	20 80	61.7
2	27 28.9	24 82	65.4	27 56.3	22 81	63.2	28 02.8	21 80	62.6	28 15.4	21 80	61.5
3	26 39.5	24 82	65.2	27 07.8	23 81	63.0	27 14.5	22 80	62.4	27 27.6	21 79	61.3
4	25 50.2	25 82	64.9	26 19.4	24 80	62.8	26 26.4	23 80	62.2	26 40.0	22 79	61.1
75	25 01.0	26 82	64.7	25 31.1	24 80	62.5	25 38.3	24 80	62.0	25 52.4	23 79	60.9
6	24 11.9	27 82	64.4	24 42.9	25 80	62.3	24 50.3	25 80	61.8	25 04.9	24 79	60.7
7	23 22.9	27 82	64.2	23 54.8	26 80	62.1	24 02.5	25 80	61.6	24 17.5	25 79	60.5
8	22 34.0	28 81	63.9	23 06.8	27 80	61.8	23 14.7	26 79	61.3	23 30.3	26 79	60.3
9	21 45.2	29 81	63.7	22 18.9	27 80	61.6	22 27.1	27 79	61.1	22 43.1	26 78	60.0
80	20 56.5	29 81	63.4	21 31.1	28 80	61.4	21 39.5	28 79	60.8	21 56.0	27 78	59.8
1	20 07.9	30 81	63.1	20 43.4	29 79	61.1	20 52.1	29 79	60.6	21 09.1	28 78	59.6
2	19 19.5	31 80	62.9	19 55.9	30 79	60.8	20 04.8	29 79	60.3	20 22.3	29 78	59.3
3	18 31.1	32 80	62.6	19 08.5	31 79	60.6	19 17.6	30 78	60.1	19 35.6	30 78	59.1
4	17 42.9	32 80	62.3	18 21.2	31 79	60.3	18 30.5	31 78	59.8	18 49.0	31 77	58.8
85	16 54.9	33 80	62.0	17 34.0	32 78	60.0	17 43.6	32 78	59.5	18 02.6	31 77	58.5
6	16 06.9	34 80	61.7	16 46.9	33 78	59.7	16 56.8	33 78	59.3	17 16.2	32 77	58.3
7	15 19.1	35 80	61.4	16 00.0	34 78	59.5	16 10.1	33 78	59.0	16 30.1	33 77	58.0
8	14 31.4	35 79	61.1	15 13.3	34 78	59.2	15 23.6	34 77	58.7	15 44.0	34 76	57.7
9	13 43.9	36 79	60.8	14 26.7	35 78	58.9	14 37.2	35 77	58.4	14 58.1	36 76	57.4
90	12 56.5	37 79	60.5	13 40.2	36 77	58.6	13 51.0	36 77	58.1	14 12.4	35 76	57.1

Lat. 25°

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	37 00.0	1.0	01	180.0	36 30.0	1.0	01	180.0	36 00.0	1.0	01	180.0	35 00.0	1.0	01	180.0	33 00.0	1.0	01	180.0	31 00.0	1.0	01	180.0	30 30.0	1.0	01	180.0	29 30.0	1.0	01	180.0	00
1	36 59.5	1.0	03	178.9	36 29.5	1.0	03	178.9	35 59.5	1.0	02	178.9	34 59.5	1.0	02	178.9	32 59.5	1.0	02	179.0	30 59.5	1.0	02	179.0	30 29.5	1.0	02	179.0	29 29.6	1.0	02	179.1	1
2	36 57.9	1.0	04	177.8	36 27.9	1.0	04	177.8	35 57.9	1.0	04	177.8	34 58.0	1.0	04	177.9	32 58.1	1.0	04	178.0	30 58.2	1.0	04	178.1	30 28.2	1.0	04	178.1	29 28.2	1.0	04	178.1	2
3	36 55.3	1.0	06	176.7	36 25.3	1.0	06	176.7	35 55.4	1.0	06	176.8	34 55.5	1.0	06	176.8	32 55.7	1.0	06	177.0	30 55.9	1.0	05	177.1	30 25.9	1.0	05	177.1	29 26.0	1.0	05	177.2	3
4	36 51.6	1.0	08	175.6	36 21.7	1.0	08	175.6	35 51.8	1.0	08	175.7	34 52.0	1.0	08	175.8	32 52.3	1.0	07	176.0	30 52.7	1.0	07	176.1	30 22.7	1.0	07	176.2	29 22.9	1.0	07	176.3	4
05	36 46.9	1.0	10	174.5	36 17.1	1.0	10	174.5	35 47.2	1.0	09	174.6	34 47.5	1.0	09	174.7	32 48.0	1.0	09	175.0	30 48.5	1.0	08	175.2	30 18.7	1.0	08	175.2	29 18.9	1.0	08	175.3	05
6	36 41.2	99	11	173.4	36 11.4	99	11	173.5	35 41.6	99	11	173.5	34 42.0	99	11	173.7	32 42.8	99	10	174.0	30 43.5	99	10	174.2	30 13.7	99	10	174.3	29 14.1	99	10	174.4	6
7	36 34.4	99	13	172.3	36 04.7	99	13	172.4	35 35.0	99	13	172.5	34 35.5	99	12	172.6	32 36.6	99	12	173.0	30 37.6	99	11	173.3	30 07.8	99	11	173.3	29 08.3	99	11	173.5	7
8	36 26.6	99	15	171.2	35 57.0	99	14	171.3	35 27.3	99	14	171.4	34 28.0	99	14	171.6	32 29.4	99	14	172.0	30 30.7	99	13	172.3	30 01.1	99	13	172.4	29 01.7	99	12	172.6	8
9	36 17.8	98	16	170.1	35 48.3	98	16	170.2	35 18.7	98	16	170.3	34 19.6	99	16	170.6	32 21.4	99	15	171.0	30 23.0	99	14	171.4	29 53.4	99	14	171.4	28 54.2	99	14	171.6	9
10	36 08.0	98	18	169.1	35 38.5	98	18	169.2	35 09.1	98	18	169.3	34 10.2	98	17	169.5	32 12.3	98	16	170.0	30 14.4	98	16	170.4	29 44.9	98	16	170.5	28 45.9	98	15	170.7	10
1	35 57.1	98	20	168.0	35 27.8	98	20	168.1	34 58.5	98	19	168.2	33 59.8	98	19	168.5	32 02.4	98	18	169.0	30 04.9	98	17	169.5	29 35.5	98	17	169.6	28 36.7	98	17	169.8	1
2	35 45.3	97	21	166.9	35 16.1	97	21	167.1	34 47.0	97	21	167.2	33 48.5	97	20	167.5	31 51.6	98	20	168.0	29 54.5	98	19	168.5	29 25.2	98	18	168.7	28 26.6	98	18	168.9	2
3	35 32.5	97	23	165.9	35 03.5	97	23	166.0	34 34.4	97	22	166.2	33 36.3	97	22	166.5	31 39.9	97	21	167.0	29 43.3	97	20	167.6	29 14.1	97	20	167.7	28 15.8	97	20	168.0	3
4	35 18.8	96	24	164.8	34 49.9	96	24	165.0	34 21.0	96	24	165.2	33 23.1	96	24	165.5	31 27.2	97	22	166.1	29 31.2	97	22	166.7	29 02.1	97	21	166.8	28 04.0	97	21	167.1	4
15	35 04.1	96	26	163.8	34 35.3	96	26	164.0	34 06.6	96	26	164.1	33 09.0	96	25	164.5	31 13.7	96	24	165.1	29 18.2	96	23	165.8	28 49.3	96	23	165.9	27 51.5	96	22	166.2	15
6	34 48.4	95	28	162.8	34 19.8	95	27	162.9	33 51.2	95	27	163.1	32 54.0	96	26	163.5	30 59.3	96	26	164.2	29 04.4	96	24	164.8	28 35.7	96	24	165.0	27 38.1	96	24	165.3	6
7	34 31.8	95	29	161.7	34 03.4	95	29	161.9	33 35.0	95	28	162.1	32 38.1	95	28	162.5	30 44.0	95	27	163.2	28 49.8	95	26	163.9	28 21.2	95	26	164.1	27 23.9	95	25	164.4	7
8	34 14.4	94	31	160.7	33 46.1	94	30	160.9	33 17.9	94	30	161.1	32 21.3	94	30	161.5	30 27.9	95	28	162.3	28 34.3	95	27	163.0	28 05.9	95	27	163.2	27 09.0	95	26	163.6	8
9	33 56.0	93	32	159.7	33 27.9	94	32	159.9	32 59.8	94	32	160.2	32 03.6	94	31	160.6	30 11.0	94	30	161.4	28 18.1	94	28	162.1	27 49.8	94	28	162.3	26 53.2	94	28	162.7	9
20	33 36.7	93	34	158.7	33 08.8	93	33	159.0	32 40.9	93	33	159.2	31 45.1	93	32	159.6	29 53.2	93	31	160.5	28 01.0	94	30	161.3	27 32.9	94	30	161.5	26 36.6	94	29	161.9	20
1	33 16.5	92	35	157.8	32 48.9	92	35	158.0	32 21.2	92	34	158.2	31 25.8	92	34	158.7	29 34.6	93	32	159.5	27 43.1	93	31	160.4	27 15.2	93	31	160.6	26 19.3	93	30	161.0	1
2	32 55.5	91	36	156.8	32 28.1	92	36	157.0	32 00.6	92	36	157.3	31 05.6	92	35	157.7	29 15.2	92	34	158.6	27 24.5	92	32	159.5	26 56.8	92	32	159.7	26 01.2	93	31	160.2	2
3	32 33.7	91	38	155.8	32 06.4	91	37	156.1	31 39.2	91	37	156.3	30 44.6	91	36	156.8	28 55.0	91	35	157.8	27 05.1	92	34	158.7	26 37.6	92	33	158.9	25 42.4	92	32	159.3	3
4	32 11.0	90	39	154.9	31 44.0	90	39	155.1	31 16.9	90	38	155.4	30 22.7	90	38	155.9	28 34.0	91	36	156.9	26 44.9	91	35	157.8	26 17.6	91	34	158.0	25 22.9	91	34	158.5	4
25	31 47.5	89	40	154.0	31 20.7	89	40	154.2	30 53.9	89	40	154.5	30 00.2	90	39	155.0	28 12.3	90	38	156.0	26 24.0	90	36	157.0	25 56.9	90	36	157.2	25 02.6	91	35	157.7	25
6	31 23.3	89	42	153.0	30 56.7	89	41	153.3	30 30.1	89	41	153.6	29 36.8	89	40	154.1	27 49.8	89	39	155.1	26 02.4	90	37	156.1	25 35.5	90	37	156.4	24 41.6	90	36	156.9	6
7	30 58.2	88	43	152.1	30 31.9	88	43	152.4	30 05.5	88	42	152.7	29 12.7	88	42	153.2	27 26.6	89	40	154.3	25 40.0	89	38	155.3	25 13.3	89	38	155.6	24 19.8	89	37	156.1	7
8	30 32.4	87	44	151.2	30 06.3	87	44	151.5	29 40.2	87	44	151.8	28 47.8	87	43	152.4	27 02.6	88	41	153.4	25 17.0	88	40	154.5	24 50.5	88	39	154.8	23 57.4	88	38	155.3	8
9	30 05.9	86	46	150.3	29 40.0	86	45	150.6	29 14.1	86	45	150.9	28 22.2	87	44	151.5	26 38.0	87	42	152.6	24 53.2	87	41	153.7	24 27.0	88	40	154.0	23 34.4	88	40	154.5	9
30	29 38.6	85	47	149.5	29 13.0	85	46	149.8	28 47.3	86	46	150.1	27 55.9	86	45	150.7	26 12.6	86	43	151.8	24 28.8	87	42	152.9	24 02.8	87	42	153.2	23 10.6	87	41	153.7	30
1	29 10.7	85	48	148.6	28 45.3	85	47	148.9	28 19.9	85	47	149.2	27 28.9	85	46	149.8	25 46.6	86	44	151.0	24 03.7	86	43	152.1	23 37.9	86	42	152.4	22 46.2	86	42	153.0	1
2	28 42.0	84	49	147.8	28 16.9	84	48	148.1	27 51.7	84	48	148.4	27 01.2	84	47	149.0	25 19.9	85	46	150.2	23 37.9	85	44	151.3	23 12.4	85	44	151.6	22 21.2	85	43	152.2	2
3	28 12.6	83	50	146.9	27 47.8	83	50	147.2	27 22.9	83	49	147.6	26 32.9	83	48	148.2	24 52.5	84	47	149.4	23 11.5	84	45	150.6	22 46.2	84	45	150.9	21 55.5	85	44	151.4	3
4	27 42.6	82	51	146.1	27 18.0	82	51	146.4	26 53.4	82	50	146.7	26 03.9	83	49	147.4	24 24.5	83	48	148.6	22 44.5	84	46	149.8	22 19.4	84	46	150.1	21 29.2	84	45	150.7	4
35	27 12.0	81	52	145.3	26 47.6	81	52	145.6	26 23.2	81	51	145.9	25 34.3	82	50	146.6	23 55.9	82	49	147.8	22 16.9	83	47	149.1	21 52.0	83	46	149.4	21 02.3	83	46	150.0	35
6	26 40.7	80	53	144.5	26 16.6	80	53	144.8	25 52.5	81	52	145.2	25 04.0	81	52	145.8	23 26.6	81	50	147.1	21 48.6	82	48	148.3	21 24.1	82	48	148.6	20 34.8	82	47	149.3	6
7	26 08.8	79	54	143.7	25 45.0	80	54	144.0	25 21.1	80	53	144.4	24 33.2	80	52	145.0	22 56.8	81	51	146.3	21 19.8	81	49	147.6	20 55.5	81	49	147.9	20 06.7	81	48	148.6	7
8	25 36.3	79	55	142.9	25 12.8	79	55	143.3	24 49.1	79	54	143.6	24 01.7	79	53	144.3	22 26.4	80	52	145.6	20 50.4	80	50	146.9	20 26.3	80	50	147.2	19 38.0	81	49	147.8	8
9	25 03.3	78	56	142.2	24 39.9	78	56	142.5	24 16.6	78	55	142.9	23 29.7	78	54	143.5	21 55.4	79	53	144.9	20 20.4	79	51	146.2	19 56.6	79	50	146.5	19 08.8	80	50	147.2	9
40	24 29.6	77	57	141.4	24 06.6	77	57	141.8	23 43.5	77	56	142.1	22 57.1	77	55	142.8	21 23.8	78	54	144.2	19 49.9	79	52	145.5	19 26.3	79	51	145.8	18 39.1	79	50	146.5	40
1	23 55.5	76	58	140.7	23 32.6	76	57	141.0	23 09.8	76	57	141.4	22 23.9	77	56	142.1	20 51.7	77	54	143.5	19 18.8	78	53	144.8	18 55.5	78	52	145.1	18 08.8	78	52	145.8	1
2	23 20.7	75	59	139.9	22 58.2	75	58	140.3	22 35.6	75	58	140.7	21 50.2	76	57	141.4	20 19.9	76	55	142.8	18 47.2	77	54	144.1	18 24.1	77	53	144.5	17 37.9	77	52	145.1	2
3	22 45.5	74	60	139.2	22 23.2	74	59	139.6	22 00.9	75	59	140.0	21 16.0	75	58	140.7	19 45.9	75	56	142.1	18 15.1	76	54	143.5	17 52.3	76	54	143.8	17 06.6	76	53	144.5	3
4	22 09.7	73	60	138.5	21 47.7	73	60	138.9	21 25.6	74	60	139.3	20 41.3	74	59	140.0	19 12.2	75	57	141.4	17 42.5	75	55	142.8	17 19.9	75	55	143.1	16 34.8	75	54	143.8	4
45	21 33.5	72	61	137.8	21 11.7	73	61	138.2	20 49.9	73	60	138.6	20 06.1	73	60	139.3	18 38.0	74	58	140.7	17 09.3	74	56	142.2	16 47.1	74	56	142.5	16 02.4	75	55	143.2	45
6	20 56.7	72	62	137.2	20 35.2	72	62	137.5	20 13.7	72	61	137.9	19 30.4	72	60	138.6	18 03.4	73	58	140.1	16 35.7	73	57	141.5	16 13.7	73	56	141.9	15 29.6	74	56	142.6	6
7	20 19.5	71	63	136.5	19 58.2	71	62	136.9	19 37.0	71	62	137.2	18 54.2	71	61	138.0	17 28.3	72	59	139.4	16 01.7	72	58	140.9	15 39.9	73	57	141.2	14 56.3	73	56	142.0	7
8	19 41.8	70	64	135.8	19 20.8	70	63	136.2	18 59.8	70	63	136.6	18 17.6	70	62	137.3	16 52.7	71	60	138.8	15 27.1	72	58	140.3	15 05.7	72	58	140.6	14 22.6	72	57	141.4	8
9	19 03.7	69	64	135.2	18 43.0	69	64	135.6	18 22.2	69	63	135.9	17 40.5	70	62	136.7	16 16.6	70	61	138.2	14 52.2	71	59	139.7	14 30.9	71	58	140.0	13 48.4	71	58	140.8	9
50	18 25.1	68	65	134.5	18 04.7	68	64	134.9	17 44.2	68	64	135.3	17 03.0	69	63	136.1	15 40.2	69	62	137.6	14 16.7	70	60	139.1	13 55.8	70	59	139.4	13 13.8	70	58	140.2	50
1	17 46.2	67	66	133.9	17 26.0	67	65	134.3	17 05.7	68	65	134.7	16 25.1	68	64	135.4	15 03.3	68	62	137.0	13 40.9	69	60	138.5	13 20.2	69	60	138.8	12 38.7	69	59	139.6	1
2	17 06.8	66	66	133.3	16 46.8	67	66	133.7	16 26.8	67	66	134.1	15 46.7	67	65	134.8	14 26.0	68	63	136.4	13 04.6	68	61	137.9	12 44.2	68	61	138.3	12 03.3	68	60	139.0	2
3	16 27.0	66	67	132.7	16 07.3	66	66	133.1	15 47.5	66	66	133.5	15 07.9	66	65	134.2	13 48.2	67	64	135.8	12 27.9	67	62	137.3	12 07.8	67	61	137.7	11 27.4	67	60	138.4	3
4	15 46.8	65	68	132.1	15 27.4	65	67	132.5	15 07.9	65	67	132.9	14 28.8	65	66	133.6	13 10.1	66	64	135.2	11 50.9	66	62	136.7	11 31.0	66	62	137.1	10 51.1	67	61	137.9	4
55	15 06.3	64	68	131.5	14 47.1	64	68	131.9	14 27.8	64	67	132.3	13 49.2	64	66	133.1	12 31.6	65	65	134.6	11 13.4	65	63	136.2	10 53.8	65	63	136.6	10 14.5	66	62	137.3	55
6	14 25.4	63	69	130.9	14 06.4	63	68	131.3	13 47.4	63	68	131.7	13 09.3	64	67	132.5	11 52.7	64	65	134.1	10 35.6	64	64	135.6	10 16.2	65	63	136.0	9 37.4	65	62	136.8	6
7	13 44.1	62	69	130.3	13 25.4	62	69	130.7	13 06.6	63	68	131.1	12 29.1	63	68	131.9	11 13.5	63	66	133.5	9 57.4	64	64	135.1	9 38.3	64	64	135.5	9 00.0	64	63	136.3	7
8	13 02.5	61	70	129.8	12 44.0	62	70	130.2	12 25.5	62	69	130.6	11 48.4	62	68	131.4	10 33.9	62	67	133.0	9 18.8	63	65	134.6	9 00.0	63	64	135.0	8 22.3	63	64	135.7	8
9	12 20.5	61	70	129.2	12 02.3	61	70	129.6	11 44.0	61	70	130.0	11 07.5	61	69	130.8	9 53.9	61	67	132.4	8 39.9	62	66	134.0	8 21.3	62	65	134.4	7 44.1	62	64	135.2	9
60	11 38.2	60	71	128.7	11 20.2	60	70	129.1	11 02.2	60	70	129.5	10 26.1	60	69	130.3	9 13.6	61	68	131.9	8 00.6	61	66	133.5	7 42.3	61	66	133.9	7 05.7	61	65	134.7	60
1	10 55.6	59	72	128.1	10 37.9	59	71	128.6	10 20.1	59	71	129.0	9 44.5	59	70	129.8	8 33.0	60	68	131.4	7 21.0	60	66	133.0	7 03.0	60	66	133.4	6 26.9	60	65	134.2	1
2	10 12.7	58	72	127.6	9 55.2	58	72	128.0	9 37.7	58	71	128.4	9 02.6	59	70	129.3	7 52.0	59	69	130.9	6 41.1	59	67	132.5	6 23.3	59	66	132.9	5 47.7	59	66	133.7	2
3	9 29.4	57	72	127.1	9 12.2	58	72	127.5	8 54.9	58	72	127.9	8 20.3	58	71	128.8	7 10.8	58	69	130.4	6 00.9	58	68	132.0	5 43.4	58	67	132.4	5 08.3	59	66	133.3	3
4	8 45.9	57	73	126.6	8 28.9	57	73	127.0	8 11.9	57	72	127.4	7 37.8	57	72	128.2	6 29.2	57	70	129.9	5 20.3	58	68	131.5	5 03.1	58	68	132.0					4
65	8 02.1	56	74	126.1	7 45.3	56	73	126.5	7 28.6	56	73	126.9	6 54.9	56	72	127.8	5 47.3	56	70	129.4													65
6	7 18.0	55	74	125.6	7 01.5	55	74	126.0	6 44.9	55	73	126.4	6 11.8	55	72	127.3	5 05.2	56	71	128.9													6
7	6 33.7	54	74	125.1	6 17.4	54	74	125.5	6 01.1	54	74	125.9	5 28.4	55	73	126.8																	7
8	5 49.1	54	75	124.6	5 33.0	54	74	125.0	5 16.9	54	74	125.5																					8
9	5 04.2	53	75	124.2																													9

DECLINATION SAME NAME AS LATITUDE

Lat. 26°

Lat. 27°

Lat. 28°

H.A.	28° 00′ Alt.	Δd	Δt	Az.	28° 30′ Alt.	Δd	Δt	Az.	29° 00′ Alt.	Δd	Δt	Az.	30° 00′ Alt.	Δd	Δt	Az.	32° 00′ Alt.	Δd	Δt	Az.	34° 00′ Alt.	Δd	Δt	Az.	34° 30′ Alt.	Δd	Δt	Az.	35° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	10 37.7	39	81	63.9	10 49.3	39	81	63.5	11 00.9	38	81	63.0	11 23.8	38	80	62.0	12 09.2	38	78	60.2	12 53.9	37	77	58.3	13 04.9	37	76	57.8	13 26.8	36	76	56.8	91
2	9 48.9	39	81	63.6	10 00.7	39	81	63.1	10 12.5	39	80	62.6	10 35.9	39	80	61.7	11 22.2	38	78	59.8	12 07.7	38	77	57.9	12 19.0	37	76	57.5	12 41.4	37	76	56.5	2
3	9 00.3	40	81	63.2	9 12.3	40	80	62.8	9 24.3	40	80	62.3	9 48.1	40	80	61.4	10 35.2	39	78	59.5	11 21.7	38	76	57.6	11 33.2	38	76	57.1	11 56.1	38	75	56.2	3
4	8 11.9	41	80	62.9	8 24.0	41	80	62.4	8 36.2	40	80	61.9	9 00.4	40	79	61.0	9 48.5	40	78	59.2	10 35.9	39	76	57.3	10 47.6	39	76	56.8	11 11.0	39	75	55.9	4
95	7 23.5	41	80	62.5	7 35.9	41	80	62.0	7 48.3	41	80	61.6	8 12.9	41	79	60.7	9 01.9	41	77	58.8	9 50.2	40	76	57.0	10 02.2	40	76	56.5	10 26.1	40	75	55.6	95
6	6 35.4	42	80	62.1	6 48.0	42	80	61.7	7 00.6	42	79	61.2	7 25.6	42	79	60.3	8 15.4	41	77	58.5	9 04.7	41	76	56.6	9 16.9	41	75	56.1	9 41.3	40	74	55.2	6
7	5 47.4	43	80	61.7	6 00.2	43	79	61.3	6 13.0	43	79	60.8	6 38.5	42	78	59.9	7 29.2	42	77	58.1	8 19.4	42	75	56.3	8 31.9	42	75	55.8	8 56.7	41	74	54.9	7
8					5 12.6	43	79	60.9	5 25.6	43	79	60.5	5 51.5	43	78	59.6	6 43.1	43	76	57.7	7 34.3	42	75	55.9	7 47.0	42	74	55.5	8 12.3	42	74	54.5	8
9													5 04.7	44	78	59.2	5 57.2	44	76	57.4	6 49.3	43	74	55.6	7 02.3	43	74	55.1	7 28.1	43	73	54.2	9
100																	5 11.5	44	76	57.0	6 04.6	44	74	55.2	6 17.8	44	74	54.7	6 44.1	44	73	53.8	100
1																					5 20.0	45	74	54.8	5 33.5	45	74	54.4	6 00.3	45	72	53.5	1
2																													5 16.8	46	72	53.1	2

Lat. 25°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	79 00.0	1.0 03	00.0	78 00.0	1.0 03	00.0	76 30.0	1.0 03	00.0	75 00.0	1.0 02	00.0	73 00.0	1.0 02	00.0	72 30.0	1.0 02	00.0	72 00.0	1.0 02	00.0	70 00.0	1.0 02	00.0	00
1	78 58.0	1.0 10	04.2	77 58.2	1.0 09	03.8	76 28.4	1.0 06	03.3	74 58.6	1.0 07	03.0	72 58.8	1.0 06	02.5	72 28.8	1.0 06	02.4	71 58.9	1.0 06	02.4	69 59.0	1.0 05	02.1	1
2	78 52.0	99 16	08.4	77 52.7	99 15	07.6	76 23.7	99 13	06.7	74 54.4	99 12	05.9	72 55.2	99 10	05.1	72 25.4	99 10	04.9	71 55.5	99 09	04.7	69 56.1	1.0 08	04.1	2
3	78 42.1	97 23	12.5	77 43.8	97 21	11.3	76 15.8	98 18	09.9	74 47.4	98 16	08.8	72 49.2	99 14	07.6	72 19.6	99 14	07.3	71 49.9	99 13	07.1	69 51.2	99 11	06.2	3
4	78 28.6	95 28	16.4	77 31.4	96 26	14.9	76 04.9	96 23	13.1	74 37.8	97 20	11.6	72 40.9	98 18	10.0	72 11.5	98 17	09.7	71 42.2	98 16	09.4	69 44.4	98 14	08.2	4
05	78 11.5	92 34	20.2	77 15.8	93 31	18.4	75 51.2	95 28	16.2	74 25.6	96 25	14.4	72 30.3	96 21	12.4	72 01.3	97 21	12.0	71 32.3	97 20	11.6	69 35.7	97 18	10.2	05
6	77 51.2	89 39	23.7	76 57.1	91 36	21.7	75 34.6	92 32	19.2	74 10.8	94 29	17.1	72 17.5	95 25	14.8	71 48.9	95 24	14.3	71 20.3	96 23	13.8	69 25.2	96 20	12.1	6
7	77 27.9	86 43	27.0	76 35.6	88 40	24.8	75 15.5	90 36	22.0	73 53.6	92 32	19.7	72 02.5	93 28	17.1	71 34.5	94 28	16.5	71 06.3	94 26	16.0	69 12.9	95 24	14.1	7
8	77 01.9	83 48	30.1	76 11.6	85 44	27.8	74 53.9	88 40	24.7	73 34.2	89 36	22.1	71 45.6	92 32	19.3	71 18.0	92 30	18.7	70 50.4	92 30	18.1	68 58.8	94 26	15.9	8
9	76 33.4	79 51	33.0	75 45.1	82 48	30.5	74 30.1	85 43	27.3	73 12.7	87 39	24.5	71 26.6	90 35	21.4	70 59.7	90 34	20.7	70 32.6	90 33	20.1	68 43.1	92 29	17.7	9
10	76 02.7	76 54	35.6	75 16.4	79 51	33.1	74 04.2	82 46	29.7	72 49.2	85 42	26.8	71 05.9	87 38	23.5	70 39.6	88 36	22.7	70 13.1	89 35	22.0	68 25.7	90 32	19.5	10
1	75 30.1	72 57	38.1	74 45.8	75 54	35.4	73 36.3	79 49	31.9	72 23.8	82 45	28.9	70 43.3	85 40	25.4	70 17.7	86 39	24.7	69 51.8	86 38	23.9	68 06.8	89 34	21.2	1
2	74 55.7	69 60	40.3	74 13.4	72 57	37.6	73 06.7	76 52	34.1	71 56.6	79 48	30.9	70 19.2	83 43	27.3	69 54.2	84 42	26.5	69 29.0	84 40	25.7	67 46.3	87 36	22.9	2
3	74 19.8	66 62	42.4	73 39.4	69 59	39.7	72 35.4	73 54	36.0	71 27.9	77 50	32.8	69 53.5	81 45	29.1	69 29.2	81 44	28.2	69 04.7	82 43	27.4	67 24.5	85 39	24.5	3
4	73 42.5	62 64	44.2	73 04.0	66 61	41.6	72 02.7	70 57	37.9	70 57.7	74 53	34.6	69 26.3	78 48	30.8	69 02.8	79 46	29.9	68 38.9	80 45	29.1	67 01.3	83 41	26.0	4
15	73 04.0	59 66	46.0	72 27.3	63 63	43.3	71 28.7	67 59	39.6	70 26.2	71 55	36.3	68 57.8	76 50	32.4	68 35.0	77 48	31.5	68 11.9	78 47	30.6	66 36.9	81 43	27.5	15
6	72 24.4	56 68	47.5	71 49.5	60 65	44.9	70 53.4	65 60	41.2	69 53.4	69 57	37.9	68 28.1	73 52	33.9	68 06.0	74 50	33.0	67 43.5	75 49	32.1	66 11.2	79 45	28.9	6
7	71 43.8	53 69	49.0	71 10.6	57 66	46.4	70 17.1	62 62	42.7	69 19.4	66 58	39.4	67 57.2	71 53	35.4	67 35.8	72 52	34.4	67 14.0	73 51	33.5	65 44.4	76 46	30.2	7
8	71 02.4	51 70	50.3	70 30.8	54 68	47.7	69 39.7	59 64	44.1	68 44.4	64 60	40.8	67 25.2	68 55	36.7	67 04.5	70 54	35.8	66 43.5	71 53	34.9	65 16.5	74 48	31.5	8
9	70 20.1	48 72	51.5	69 50.2	52 69	49.0	69 01.4	57 65	45.4	68 08.4	61 62	42.1	66 52.2	66 56	38.0	66 32.2	67 56	37.1	66 11.9	68 54	36.2	64 47.6	72 50	32.7	9
20	69 37.2	46 72	52.6	69 08.8	49 70	50.1	68 22.3	54 66	46.6	67 31.6	59 63	43.3	66 18.2	64 58	39.2	65 58.9	65 57	38.3	65 39.3	66 56	37.4	64 17.7	70 51	33.9	20
1	68 53.8	43 73	53.6	68 26.8	47 71	51.2	67 42.5	52 68	47.7	66 53.9	56 64	44.4	65 43.4	61 59	40.4	65 24.8	63 58	39.4	65 05.9	64 57	38.5	63 47.0	68 53	35.0	1
2	68 09.7	41 74	54.6	67 44.1	44 72	52.1	67 01.9	49 68	48.7	66 15.5	54 65	45.5	65 07.8	59 61	41.4	64 49.9	60 60	40.5	64 31.6	61 58	39.6	63 15.4	66 54	36.1	2
3	67 25.2	39 75	55.4	67 00.9	42 73	53.0	66 20.8	47 70	49.7	65 36.4	51 66	46.5	64 31.4	57 62	42.5	64 14.2	58 61	41.5	63 56.6	59 60	40.6	62 43.0	63 55	37.1	3
4	66 40.2	37 76	56.2	66 17.2	40 74	53.9	65 39.0	45 70	50.5	64 56.7	49 67	47.4	63 54.4	55 63	43.4	63 37.8	56 62	42.5	63 20.9	57 61	41.5	62 09.8	61 56	38.0	4
25	65 54.8	35 76	56.9	65 33.1	38 74	54.6	64 56.8	43 71	51.4	64 16.4	47 68	48.2	63 16.7	52 64	44.3	63 00.8	54 63	43.4	62 44.5	55 62	42.4	61 36.0	59 58	38.9	25
6	65 09.1	33 77	57.6	64 48.5	36 75	55.3	64 14.1	41 72	52.1	63 35.6	45 69	49.0	62 38.4	50 65	45.1	62 23.2	52 64	44.2	62 07.5	53 63	43.3	61 01.5	57 58	39.8	6
7	64 23.0	31 77	58.2	64 03.6	34 75	56.0	63 31.0	39 72	52.8	62 54.3	43 70	49.8	61 59.6	48 66	45.9	61 45.0	49 64	45.0	61 30.0	51 64	44.1	60 26.4	55 60	40.6	7
8	63 36.7	29 78	58.7	63 18.4	32 76	56.6	62 47.5	37 73	53.5	62 12.6	41 70	50.5	61 20.3	46 66	46.7	61 06.3	47 65	45.8	60 51.9	49 64	44.8	59 50.8	53 60	41.4	8
9	62 50.1	27 78	59.2	62 32.9	30 76	57.1	62 03.6	35 74	54.1	61 30.4	39 71	51.1	60 40.5	44 67	47.4	60 27.1	45 66	46.5	60 13.3	47 65	45.6	59 14.6	51 61	42.1	9
30	62 03.3	25 78	59.7	61 47.1	29 77	57.6	61 19.4	33 74	54.6	60 47.9	37 72	51.7	60 00.3	42 68	48.0	59 47.5	43 67	47.1	59 34.2	45 66	46.2	58 37.9	49 62	42.8	30
1	61 16.2	24 79	60.1	61 01.0	27 77	58.1	60 34.9	31 74	55.1	60 05.1	35 72	52.3	59 19.7	40 68	48.6	59 07.4	42 67	47.7	58 54.8	43 66	46.8	58 00.7	47 63	43.4	1
2	60 29.0	22 79	60.5	60 14.8	25 78	58.5	59 50.2	29 75	55.6	59 21.9	33 72	52.8	58 38.7	38 69	49.2	58 27.0	40 68	48.3	58 14.9	41 67	47.4	57 23.1	45 63	44.0	2
3	59 41.6	21 79	60.8	59 28.3	24 78	58.9	59 05.2	28 75	56.1	58 38.4	32 73	53.3	57 57.4	37 69	49.7	57 46.2	38 68	48.8	57 34.7	39 68	48.0	56 45.1	44 64	44.6	3
4	58 54.0	19 80	61.1	58 41.6	22 78	59.3	58 20.0	26 76	56.5	57 54.7	30 73	53.7	57 15.8	35 70	50.2	57 05.1	36 69	49.4	56 54.1	37 68	48.5	56 06.7	42 65	45.2	4
35	58 06.4	18 80	61.4	57 54.8	21 78	59.6	57 34.5	25 76	56.8	57 10.7	28 74	54.2	56 33.8	33 70	50.7	56 23.7	34 70	49.8	56 13.2	35 69	49.0	55 28.0	40 65	45.7	35
6	57 18.5	16 80	61.7	57 07.9	19 78	59.9	56 48.9	23 76	57.2	56 26.6	27 74	54.5	55 51.6	31 71	51.1	55 42.0	33 70	50.3	55 32.1	34 69	49.4	54 48.9	38 66	46.2	6
7	56 30.6	15 80	61.9	56 20.8	18 79	60.1	56 03.1	21 76	57.5	55 42.2	25 74	54.9	55 09.2	30 71	51.5	55 00.1	31 70	50.7	54 50.6	32 70	49.9	54 09.6	36 66	46.6	7
8	55 42.6	14 80	62.1	55 33.5	16 79	60.4	55 17.2	20 77	57.8	54 57.6	24 75	55.2	54 26.5	28 72	51.9	54 17.9	29 71	51.1	54 08.9	30 70	50.2	53 29.9	35 66	47.0	8
9	54 54.5	13 80	62.3	54 46.2	15 79	60.6	54 31.1	19 77	58.1	54 12.8	22 75	55.5	53 43.6	27 72	52.2	53 35.5	28 71	51.4	53 27.0	29 70	50.6	52 50.0	33 67	47.4	9
40	54 06.3	11 80	62.5	53 58.8	14 79	60.8	53 44.9	17 77	58.3	53 27.9	21 75	55.8	53 00.5	25 72	52.6	52 52.9	26 71	51.8	52 44.9	27 70	51.0	52 09.8	31 67	47.8	40
1	53 18.0	10 80	62.6	53 11.3	12 79	61.0	52 58.6	16 77	58.5	52 42.9	19 75	56.1	52 17.3	23 72	52.8	52 10.1	25 72	52.1	52 02.6	26 71	51.3	51 29.4	30 68	48.2	1
2	52 29.7	09 81	62.8	52 23.7	11 80	61.1	52 12.2	14 78	58.7	51 57.7	18 76	56.3	51 33.9	22 73	53.1	51 27.1	23 72	52.3	51 20.1	24 71	51.6	50 48.8	28 68	48.5	2
3	51 41.3	08 81	62.9	51 36.0	10 80	61.3	51 25.7	13 78	58.9	51 12.4	16 76	56.5	50 50.3	21 73	53.4	50 44.0	22 72	52.6	50 37.4	23 71	51.8	50 08.0	26 68	48.8	3
4	50 52.9	07 81	63.0	50 48.3	09 80	61.4	50 39.1	12 78	59.0	50 27.0	15 76	56.7	50 06.6	19 73	53.6	50 00.7	20 72	52.8	49 54.6	21 72	52.1	49 27.0	25 69	49.1	4
45	50 04.4	05 81	63.0	50 00.6	08 80	61.5	49 52.4	11 78	59.2	49 41.5	14 76	56.9	49 22.8	18 73	53.8	49 17.3	19 72	53.1	49 11.6	20 72	52.3	48 45.8	23 69	49.3	45
6	49 15.9	04 81	63.1	49 12.8	06 80	61.6	49 05.7	09 78	59.3	48 55.9	12 76	57.0	48 38.8	16 73	54.0	48 33.8	17 73	53.3	48 28.5	18 72	52.5	48 04.5	22 69	49.6	6
7	48 27.4	03 81	63.1	48 24.9	05 80	61.6	48 18.9	08 78	59.4	48 10.3	11 76	57.1	47 54.8	15 74	54.2	47 50.2	16 73	53.4	47 45.3	17 72	52.7	47 23.0	20 69	49.8	7
8	47 38.9	02 81	63.2	47 37.0	04 80	61.7	47 32.1	07 78	59.5	47 24.6	10 76	57.3	47 10.6	13 74	54.3	47 06.4	14 73	53.6	47 02.0	15 72	52.9	46 41.4	19 70	50.0	8
9	46 50.4	01 81	63.2	46 49.2	03 80	61.7	46 45.2	06 78	59.6	46 38.8	09 76	57.4	46 26.4	12 74	54.5	46 22.6	13 73	53.8	46 18.6	14 72	53.0	45 59.7	18 70	50.2	9
50	46 01.8	00 81	63.2	46 01.3	02 80	61.8	45 58.3	05 78	59.6	45 53.0	07 76	57.5	45 42.1	11 74	54.6	45 38.7	12 73	53.9	45 35.1	13 73	53.2	45 17.9	16 70	50.4	50
1	45 13.3	01 81	63.2	45 13.3	01 80	61.8	45 11.4	03 78	59.7	45 07.1	06 76	57.5	44 57.8	10 74	54.7	44 54.8	10 74	54.0	44 51.5	11 73	53.3	44 35.9	15 70	50.5	1
2	44 24.8	02 81	63.2	44 25.4	00 80	61.8	44 24.5	02 78	59.7	44 21.2	05 76	57.6	44 13.3	08 74	54.8	44 10.7	09 74	54.1	44 07.9	10 73	53.4	43 53.9	13 70	50.6	2
3	43 36.2	03 81	63.2	43 37.5	01 80	61.8	43 37.5	01 78	59.7	43 35.3	04 76	57.6	43 28.9	07 74	54.9	43 26.7	08 74	54.2	43 24.2	09 73	53.5	43 11.8	12 70	50.8	3
4	42 47.7	04 81	63.1	42 49.6	02 80	61.8	42 50.6	00 78	59.7	42 49.4	03 77	57.7	42 44.4	06 74	54.9	42 42.5	07 74	54.3	42 40.4	07 73	53.6	42 29.7	11 70	50.9	4
55	41 59.2	05 81	63.1	42 01.7	03 80	61.7	42 03.6	01 78	59.7	42 03.4	01 77	57.7	41 59.9	05 74	55.0	41 58.4	05 74	54.3	41 56.7	06 73	53.7	41 47.5	09 70	51.0	55
6	41 10.8	06 81	63.0	41 13.8	04 80	61.7	41 16.7	02 78	59.7	41 17.5	00 77	57.7	41 15.3	03 74	55.0	41 14.2	04 74	54.4	41 12.9	05 73	53.7	41 05.2	08 70	51.1	6
7	40 22.3	07 81	62.9	40 26.0	06 80	61.6	40 29.7	03 78	59.7	40 31.5	01 77	57.7	40 30.7	02 74	55.1	40 30.0	03 74	54.4	40 29.0	04 73	53.7	40 22.9	07 71	51.1	7
8	39 33.9	08 81	62.9	39 38.1	06 80	61.6	39 42.8	04 78	59.6	39 45.6	02 77	57.7	39 46.2	01 74	55.1	39 45.8	02 74	54.4	39 45.1	02 73	53.8	39 40.5	06 71	51.2	8
9	38 45.5	09 80	62.8	38 50.3	07 80	61.5	38 55.9	05 78	59.6	38 59.6	03 76	57.7	39 01.6	00 74	55.1	39 01.5	00 74	54.4	39 01.3	01 73	53.8	38 58.1	04 71	51.2	9
60	37 57.2	10 80	62.7	38 02.5	08 80	61.4	38 09.0	06 78	59.5	38 13.7	04 76	57.6	38 17.0	01 74	55.1	38 17.3	01 74	54.4	38 17.4	00 73	53.8	38 15.7	03 71	51.3	60
1	37 08.9	10 80	62.6	37 14.8	09 80	61.3	37 22.2	07 78	59.5	37 27.8	05 76	57.6	37 32.4	03 74	55.1	37 33.1	02 74	54.4	37 33.5	01 73	53.8	37 33.3	01 71	51.3	1
2	36 20.6	11 80	62.5	36 27.1	10 79	61.2	36 35.4	08 78	59.4	36 41.9	06 76	57.5	36 47.8	04 74	55.0	36 48.8	03 74	54.4	36 49.6	02 73	53.8	36 50.9	00 71	51.3	2
3	35 32.4	12 80	62.4	35 39.5	11 79	61.1	35 48.6	09 78	59.3	35 56.0	07 76	57.5	36 03.3	05 74	55.0	36 04.6	04 74	54.4	36 05.8	04 73	53.8	36 08.5	01 71	51.3	3
4	34 44.3	13 80	62.2	34 51.9	12 79	61.0	35 01.8	10 78	59.2	35 10.2	08 76	57.4	35 18.8	06 74	54.9	35 20.4	05 74	54.3	35 21.9	05 73	53.7	35 26.1	02 71	51.3	4
65	33 56.2	14 80	62.1	34 04.3	13 79	60.9	34 15.2	11 78	59.1	34 24.4	09 76	57.3	34 34.3	07 74	54.9	34 36.3	06 74	54.3	34 38.1	06 73	53.7	34 43.6	03 71	51.2	65
6	33 08.2	15 80	62.0	33 16.8	14 79	60.8	33 28.5	12 78	59.0	33 38.7	10 76	57.2	33 49.8	08 74	54.8	33 52.1	07 73	54.2	33 54.3	07 73	53.6	34 01.3	06 71	51.2	6
7	32 20.2	16 80	61.8	32 29.4	15 79	60.6	32 41.9	13 78	58.9	32 53.0	11 76	57.1	33 05.4	09 74	54.7	33 08.1	09 73	54.1	33 10.6	08 73	53.5	33 18.9	06 70	51.2	7
8	31 32.3	17 80	61.7	31 42.0	16 79	60.5	31 55.4	14 77	58.8	32 07.4	12 76	57.0	32 21.0	10 74	54.6	32 24.0	10 73	54.1	32 26.8	09 73	53.5	32 36.5	07 70	51.1	8
9	30 44.5	18 80	61.5	30 54.8	17 79	60.3	31 09.0	15 77	58.6	31 21.8	13 76	56.9	31 36.7	11 74	54.6	31 40.0	11 73	54.0	31 43.2	10 73	53.4	31 54.2	08 70	51.0	9
70	29 56.8	18 80	61.3	30 07.5	17 78	60.2	30 22.6	16 77	58.5	30 36.3	14 76	56.8	30 52.4	12 74	54.5	30 56.1	12 73	53.9	30 59.6	11 73	53.3	31 12.0	09 70	51.0	70
1	29 09.1	19 79	61.2	29 20.4	18 78	60.0	29 36.3	17 77	58.3	29 50.8	15 76	56.6	30 08.2	13 74	54.3	30 12.2	13 73	53.8	30 16.0	12 72	53.2	30 29.8	10 70	50.9	1
2	28 21.5	20 79	61.0	28 33.3	19 78	59.9	28 50.0	18 77	58.2	29 05.5	16 76	56.5	29 24.0	15 74	54.2	29 28.3	14 73	53.6	29 32.5	14 72	53.1	29 47.6	11 70	50.8	2
3	27 34.0	21 79	60.8	27 46.3	20 78	59.7	28 03.9	19 77	58.0	28 20.2	17 75	56.3	28 40.0	16 73	54.1	28 44.6	15 73	53.5	28 49.0	15 72	53.0	29 05.5	13 70	50.7	3
4	26 46.6	22 79	60.6	26 59.4	21 78	59.5	27 17.8	20 77	57.8	27 34.9	18 75	56.2	27 56.0	17 73	54.0	28 00.9	16 73	53.4	28 05.7	16 72	52.8	28 23.4	14 70	50.6	4
75	25 59.3	23 79	60.4	26 12.6	22 78	59.3	26 31.8	21 76	57.7	26 49.8	19 75	56.0	27 12.0	18 73	53.8	27 17.3	17 73	53.3	27 22.4	17 72	52.7	27 41.5	15 70	50.5	75
6	25 12.0	24 78	60.2	25 25.9	23 78	59.1	25 45.9	22 76	57.5	26 04.8	20 75	55.8	26 28.2	19 73	53.7	26 33.7	18 72	53.1	26 39.2	18 72	52.6	26 59.5	16 70	50.4	6
7	24 24.9	24 78	60.0	24 39.3	24 78	58.9	25 00.1	22 76	57.3	25 19.8	21 75	55.7	25 44.4	20 73	53.5	25 50.3	19 72	53.0	25 56.0	19 72	52.4	26 17.7	17 70	50.2	7
8	23 37.9	25 78	59.7	23 52.8	25 77	58.7	24 14.4	23 76	57.1	24 34.9	22 75	55.5	25 00.8	21 73	53.3	25 06.9	20 72	52.8	25 13.0	20 72	52.3	25 36.0	18 69	50.1	8
9	22 51.0	26 78	59.5	23 06.4	25 77	58.5	23 28.8	24 76	56.9	23 50.2	23 74	55.3	24 17.2	22 72	53.2	24 23.7	21 72	52.6	24 30.0	21 71	52.1	24 54.3	19 69	49.9	9
80	22 04.2	27 78	59.3	22 20.1	26 77	58.2	22 43.3	25 76	56.7	23 05.5	24 74	55.1	23 33.7	23 72	53.0	23 40.5	22 72	52.4	23 47.2	22 71	51.9	24 12.7	21 69	49.8	80
1	21 17.5	28 78	59.0	21 33.9	27 77	58.0	21 57.9	26 76	56.5	22 21.0	25 74	54.9	22 50.4	24 72	52.8	22 57.4	23 72	52.3	23 04.4	23 71	51.7	23 31.3	22 69	49.6	1
2	20 30.9	29 77	58.8	20 47.9	28 76	57.8	21 12.6	27 75	56.2	21 36.6	26 74	54.7	22 07.1	25 72	52.6	22 14.5	24 71	52.1	22 21.8	24 71	51.5	22 49.9	23 69	49.4	2
3	19 44.4	29 77	58.6	20 01.9	29 76	57.5	20 27.5	28 75	56.0	20 52.3	27 74	54.5	21 24.0	26 72	52.4	21 31.7	25 71	51.9	21 39.3	25 71	51.4	22 08.6	24 69	49.3	3
4	18 58.1	30 77	58.3	19 16.1	30 76	57.3	19 42.5	29 75	55.8	20 08.1	28 74	54.2	20 40.9	27 72	52.2	20 48.9	26 71	51.7	20 56.8	26 70	51.2	21 27.5	25 68	49.1	4
85	18 11.9	31 77	58.0	18 30.4	31 76	57.0	18 57.6	30 75	55.5	19 24.0	29 73	54.0	19 58.1	28 71	52.0	20 06.3	28 71	51.5	20 14.6	27 70	50.9	20 46.5	26 68	48.9	85
6	17 25.9	32 76	57.8	17 44.9	31 76	56.8	18 12.8	31 74	55.3	18 40.1	30 73	53.8	19 15.3	29 71	51.7	19 23.9	29 71	51.2	19 32.4	28 70	50.7	20 05.6	27 68	48.7	6
7	16 39.9	33 76	57.5	16 59.5	32 76	56.5	17 28.2	32 74	55.0	17 56.3	31 73	53.6	18 32.7	30 71	51.5	18 41.5	30 70	51.0	18 50.4	29 70	50.5	19 24.8	28 68	48.5	7
8	15 54.1	34 76	57.2	16 14.2	33 75	56.2	16 43.7	32 74	54.8	17 12.6	32 72	53.3	17 50.2	31 71	51.3	17 59.3	31 70	50.8	18 08.5	30 70	50.3	18 44.1	29 68	48.3	8
9	15 08.5	34 76	56.9	15 29.0	34 75	56.0	15 59.4	33 74	54.5	16 29.1	33 72	53.0	17 07.8	32 70	51.0	17 17.3	32 70	50.5	17 26.7	31 69	50.0	18 03.6	30 67	48.0	9
90	14 23.0	35 76	56.6	14 44.1	35 75	55.7	15 15.2	34 73	54.2	15 45.8	34 72	52.7	16 25.6	33 70	50.8	16 35.4	33 70	50.3	16 45.1	32 69	49.8	17 23.3	31 67	47.8	90

Lat. 25°

H.A.	36° 00′ Alt.	Δd	Δt	Az.	37° 00′ Alt.	Δd	Δt	Az.	38° 30′ Alt.	Δd	Δt	Az.	40° 00′ Alt.	Δd	Δt	Az.	42° 00′ Alt.	Δd	Δt	Az.	42° 30′ Alt.	Δd	Δt	Az.	43° 00′ Alt.	Δd	Δt	Az.	45° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	29 00.0	1.0	01	180.0	28 00.0	1.0	01	180.0	26 30.0	1.0	01	180.0	25 00.0	1.0	01	180.0	23 00.0	1.0	01	180.0	22 30.0	1.0	01	180.0	22 00.0	1.0	01	180.0	20 00.0	1.0	01	180.0	00
1	28 59.6	1.0	02	179.1	27 59.6	1.0	02	179.1	26 29.6	1.0	02	179.1	24 59.6	1.0	02	179.2	22 59.6	1.0	02	179.2	22 29.6	1.0	02	179.2	21 59.6	1.0	02	179.2	19 59.6	1.0	02	179.2	1
2	28 58.2	1.0	04	178.2	27 58.3	1.0	04	178.2	26 28.3	1.0	03	178.3	24 58.4	1.0	03	178.3	22 58.5	1.0	03	178.4	22 28.5	1.0	03	178.4	21 58.5	1.0	03	178.4	19 58.6	1.0	03	178.5	2
3	28 56.1	1.0	05	177.2	27 56.1	1.0	05	177.3	26 26.3	1.0	05	177.4	24 56.4	1.0	05	177.5	22 56.6	1.0	04	177.6	22 26.6	1.0	04	177.6	21 56.6	1.0	04	177.6	19 56.8	1.0	04	177.7	3
4	28 53.0	1.0	06	176.3	27 53.1	1.0	06	176.4	26 23.4	1.0	06	176.5	24 53.6	1.0	06	176.6	22 53.9	1.0	06	176.8	22 23.9	1.0	06	176.8	21 54.0	1.0	06	176.8	19 54.3	1.0	05	177.0	4
05	28 49.0	1.0	08	175.4	27 49.3	1.0	08	175.5	26 19.6	1.0	08	175.6	24 50.0	1.0	07	175.8	22 50.4	1.0	07	176.0	22 20.5	1.0	07	176.0	21 50.7	1.0	07	176.1	19 51.1	1.0	06	176.2	05
6	28 44.2	99	10	174.5	27 44.6	99	09	174.6	26 15.1	99	09	174.8	24 45.6	99	09	174.9	22 46.2	99	08	175.2	22 16.4	99	08	175.2	21 46.5	99	08	175.3	19 47.2	99	08	175.5	6
7	28 38.6	99	11	173.5	27 39.0	99	11	173.7	26 09.7	99	10	173.9	24 40.4	99	10	174.1	22 41.3	99	10	174.4	22 11.5	99	10	174.4	21 41.7	99	09	174.5	19 42.5	99	09	174.7	7
8	28 32.0	99	12	172.6	27 32.6	99	12	172.8	26 03.5	99	12	173.0	24 34.4	99	11	173.3	22 35.6	99	11	173.6	22 05.8	99	11	173.6	21 36.1	99	10	173.7	19 37.2	99	10	174.0	8
9	28 24.6	99	14	171.7	27 25.4	99	14	171.9	25 56.5	99	13	172.2	24 27.6	99	13	172.4	22 29.1	99	12	172.8	21 59.4	99	12	172.9	21 29.8	99	12	172.9	19 31.2	99	11	173.3	9
10	28 16.4	98	15	170.8	27 17.3	98	15	171.0	25 48.7	98	14	171.3	24 20.1	98	14	171.6	22 21.9	99	13	172.0	21 52.3	99	13	172.1	21 22.7	99	13	172.2	19 24.4	99	12	172.5	10
1	28 07.3	98	16	169.9	27 08.4	98	16	170.1	25 40.1	98	16	170.5	24 11.8	98	15	170.8	22 13.9	98	14	171.2	21 44.4	98	14	171.3	21 15.0	98	14	171.4	19 17.0	98	14	171.8	1
2	27 57.3	98	18	169.0	26 58.7	98	18	169.3	25 30.7	98	17	169.6	24 02.7	98	16	170.0	22 05.2	98	16	170.4	21 35.8	98	16	170.5	21 06.5	98	15	170.6	19 08.9	98	15	171.0	2
3	27 46.6	97	19	168.1	26 48.2	97	19	168.4	25 20.5	97	18	168.8	23 52.8	97	18	169.1	21 55.8	98	17	169.6	21 26.5	98	17	169.7	20 57.2	98	16	169.9	19 00.1	98	16	170.3	3
4	27 35.0	97	21	167.2	26 36.8	97	20	167.5	25 09.5	97	20	167.9	23 42.2	97	19	168.3	21 45.6	97	18	168.8	21 16.5	97	18	169.0	20 47.3	97	18	169.1	18 50.6	97	17	169.6	4
15	27 22.6	96	22	166.4	26 24.7	97	22	166.7	24 57.8	97	21	167.1	23 30.8	97	20	167.5	21 34.7	97	19	168.1	21 05.7	97	19	168.2	20 36.7	97	19	168.3	18 40.4	97	18	168.9	15
6	27 09.3	96	23	165.5	26 11.7	96	23	165.8	24 45.2	96	22	166.3	23 18.7	96	22	166.7	21 23.1	96	20	167.3	20 54.2	96	20	167.4	20 25.3	96	20	167.6	18 29.6	96	19	168.1	6
7	26 55.3	95	25	164.6	25 58.0	96	24	164.9	24 31.9	96	23	165.4	23 05.8	96	23	165.9	21 10.8	96	22	166.5	20 42.0	96	21	166.7	20 13.3	96	21	166.8	18 18.1	96	20	167.4	7
8	26 40.5	95	26	163.8	25 43.5	95	26	164.1	24 17.9	95	25	164.6	22 52.2	95	24	165.1	20 57.8	95	23	165.8	20 29.2	95	23	165.9	20 00.5	95	22	166.1	18 05.9	96	21	166.7	8
9	26 24.9	94	27	162.9	25 28.2	95	27	163.3	24 03.1	95	26	163.8	22 37.9	95	25	164.3	20 44.1	95	24	165.0	20 15.6	95	24	165.2	19 47.1	95	24	165.3	17 53.1	95	22	166.0	9
20	26 08.5	94	29	162.0	25 12.2	94	28	162.4	23 47.5	94	27	163.0	22 22.8	94	26	163.5	20 29.7	94	25	164.3	20 01.3	94	25	164.4	19 33.0	94	25	164.6	17 39.6	95	24	165.3	20
1	25 51.4	93	30	161.2	24 55.4	93	29	161.6	23 31.3	94	28	162.2	22 07.0	94	28	162.8	20 14.6	94	26	163.5	19 46.4	94	26	163.7	19 18.2	94	26	163.9	17 25.5	94	25	164.6	1
2	25 33.5	93	31	160.4	24 37.8	93	30	160.8	23 14.3	93	30	161.4	21 50.6	93	29	162.0	19 58.8	93	27	162.8	19 30.8	93	27	163.0	19 02.8	93	27	163.2	17 10.7	93	26	163.9	2
3	25 14.8	92	32	159.5	24 19.6	92	32	160.0	22 56.6	92	31	160.6	21 33.4	92	30	161.2	19 42.3	93	28	162.0	19 14.5	93	28	162.2	18 46.7	93	28	162.4	16 55.3	93	27	163.2	3
4	24 55.5	91	34	158.7	24 00.6	91	33	159.2	22 38.2	92	32	159.8	21 15.6	92	31	160.5	19 25.2	92	30	161.3	18 57.6	92	29	161.5	18 30.0	92	29	161.7	16 39.3	92	28	162.5	4
25	24 35.4	91	35	157.9	23 40.9	91	34	158.4	22 19.1	91	33	159.1	20 57.1	91	32	159.7	19 07.5	91	31	160.6	18 40.1	91	30	160.8	18 12.6	92	30	161.0	16 22.7	92	29	161.9	25
6	24 14.6	90	36	157.1	23 20.5	90	35	157.6	21 59.3	90	34	158.3	20 37.9	91	33	159.0	18 49.1	91	32	159.9	18 21.9	91	32	160.1	17 54.6	91	31	160.3	16 05.5	91	30	161.2	6
7	23 53.1	89	37	156.3	22 59.4	89	36	156.8	21 38.8	90	35	157.5	20 18.0	90	34	158.2	18 30.1	90	33	159.2	18 03.0	90	32	159.4	17 36.0	90	32	159.6	15 47.6	90	31	160.5	7
8	23 30.9	89	38	155.5	22 37.7	89	37	156.0	21 17.7	89	36	156.8	19 57.6	89	35	157.5	18 10.4	89	34	158.5	17 43.6	89	33	158.7	17 16.7	90	33	158.9	15 29.2	90	32	159.9	8
9	23 08.0	88	39	154.8	22 15.3	88	38	155.3	20 55.9	88	37	156.0	19 36.4	88	36	156.8	17 50.1	89	35	157.8	17 23.5	89	34	158.0	16 56.9	89	34	158.2	15 10.1	89	33	159.2	9
30	22 44.5	87	40	154.0	21 52.2	87	40	154.5	20 33.5	88	38	155.3	19 14.7	88	37	156.1	17 29.2	88	36	157.1	17 02.8	88	35	157.3	16 36.4	88	35	157.6	14 50.5	88	34	158.5	30
1	22 20.3	86	41	153.2	21 28.5	87	41	153.8	20 10.5	87	40	154.6	18 52.3	87	38	155.4	17 07.8	87	37	156.4	16 41.6	87	36	156.6	16 15.4	87	36	156.9	14 30.4	88	35	157.9	1
2	21 55.5	86	42	152.5	21 04.1	86	42	153.0	19 46.8	86	40	153.8	18 29.3	86	39	154.7	16 45.7	87	38	155.7	16 19.7	87	37	156.0	15 53.7	87	37	156.2	14 09.6	87	36	157.3	2
3	21 30.1	85	43	151.7	20 39.2	85	43	152.3	19 22.6	85	42	153.1	18 05.8	85	40	154.0	16 23.0	86	39	155.0	15 57.3	86	38	155.3	15 31.5	86	38	155.6	13 48.3	86	36	156.6	3
4	21 04.0	84	44	151.0	20 13.6	84	44	151.6	18 57.7	84	42	152.4	17 41.6	85	41	153.3	15 59.8	85	40	154.4	15 34.3	85	39	154.7	15 08.8	85	39	154.9	13 26.5	85	37	156.0	4
35	20 37.3	83	45	150.3	19 47.4	83	45	150.9	18 32.3	84	44	151.7	17 16.9	84	42	152.6	15 36.0	84	41	153.7	15 10.8	84	40	154.0	14 45.5	84	40	154.3	13 04.1	85	38	155.4	35
6	20 10.1	82	46	149.6	19 20.6	83	46	150.2	18 06.2	83	44	151.1	16 51.6	83	43	151.9	15 11.7	83	42	153.1	14 46.7	83	41	153.4	14 21.6	84	41	153.7	12 41.2	84	39	154.8	6
7	19 42.3	82	47	148.9	18 53.3	82	46	149.5	17 39.6	82	45	150.4	16 25.7	82	44	151.3	14 46.8	83	42	152.4	14 22.0	83	42	152.7	13 57.2	83	42	153.0	12 17.8	83	40	154.2	7
8	19 13.9	81	48	148.2	18 25.4	81	47	148.8	17 12.5	81	46	149.7	15 59.3	81	45	150.6	14 21.4	82	43	151.8	13 56.8	82	43	152.1	13 32.3	82	42	152.4	11 53.9	82	41	153.6	8
9	18 44.9	80	49	147.5	17 56.9	80	48	148.1	16 44.8	80	47	149.0	15 32.4	81	46	150.0	13 55.4	81	44	151.2	13 31.2	81	44	151.5	13 06.8	81	43	151.8	11 29.4	81	42	153.0	9
40	18 15.4	79	50	146.8	17 27.9	79	49	147.4	16 16.5	79	48	148.4	15 04.9	80	47	149.3	13 29.0	80	45	150.6	13 05.0	80	45	150.9	12 40.9	80	44	151.2	11 04.5	80	42	152.4	40
1	17 45.3	78	51	146.1	16 58.4	78	50	146.8	15 47.8	79	49	147.8	14 36.9	79	48	148.7	13 02.0	79	46	150.0	12 38.2	79	45	150.3	12 14.4	79	45	150.6	10 39.1	80	43	151.8	1
2	17 14.8	77	52	145.5	16 28.4	77	51	146.1	15 18.5	78	50	147.1	14 08.4	78	48	148.1	12 34.6	78	47	149.4	12 11.0	78	46	149.7	11 47.5	78	46	150.0	10 13.1	79	44	151.3	2
3	16 43.7	76	53	144.8	15 57.8	77	52	145.5	14 48.7	77	50	146.5	13 39.4	77	49	147.5	12 06.6	77	47	148.8	11 43.4	78	47	149.1	11 20.1	78	46	149.4	9 46.8	78	45	150.7	3
4	16 12.1	76	54	144.2	15 26.7	76	52	144.9	14 18.5	76	51	145.9	13 09.9	76	50	146.9	11 38.2	77	48	148.2	11 15.2	77	48	148.5	10 52.2	77	47	148.8	9 19.9	77	46	150.1	4
45	15 40.1	75	54	143.5	14 55.2	75	53	144.2	13 47.7	75	52	145.3	12 40.0	75	51	146.3	11 09.3	76	49	147.6	10 46.6	76	48	147.9	10 23.8	76	48	148.3	8 52.6	76	46	149.6	45
6	15 07.5	74	55	142.9	14 23.2	74	54	143.6	13 16.5	74	53	144.7	12 09.5	75	52	145.7	10 39.9	75	50	147.0	10 17.5	75	49	147.4	9 55.0	75	49	147.7	8 24.9	75	47	149.1	6
7	14 34.5	73	56	142.3	13 50.7	73	55	143.0	12 44.8	73	54	144.1	11 38.7	74	52	145.1	10 10.1	74	50	146.5	9 47.9	74	50	146.8	9 25.7	74	50	147.2	7 56.7	74	48	148.5	7
8	14 01.0	72	56	141.7	13 17.8	72	56	142.4	12 12.7	72	54	143.5	11 07.3	73	53	144.5	9 39.9	73	51	145.9	9 18.0	73	51	146.3	8 56.0	73	50	146.6	7 28.1	73	48	148.0	8
9	13 27.1	71	57	141.1	12 44.4	71	56	141.8	11 40.1	72	55	142.9	10 35.6	72	54	144.0	9 09.2	72	52	145.4	8 47.6	72	52	145.7	8 25.9	72	51	146.1	6 59.1	72	49	147.5	9
50	12 52.7	70	58	140.5	12 10.6	70	57	141.3	11 07.1	71	56	142.3	10 03.4	71	54	143.4	8 38.1	71	52	144.8	8 16.7	71	52	145.2	7 55.4	71	52	145.6	6 29.6	72	50	147.0	50
1	12 18.0	69	59	139.9	11 36.3	69	58	140.7	10 33.7	70	56	141.8	9 30.8	70	55	142.9	8 06.6	70	53	144.3	7 45.5	70	53	144.7	7 24.4	70	52	145.0	5 59.8	71	50	146.5	1
2	11 42.8	68	59	139.4	11 01.7	69	58	140.1	9 59.8	69	57	141.2	8 57.7	69	56	142.3	7 34.7	69	54	143.8	7 13.9	69	53	144.2	6 53.0	69	53	144.5	5 29.5	70	51	146.0	2
3	11 07.2	68	60	138.8	10 26.6	68	59	139.6	9 25.6	68	58	140.7	8 24.3	68	56	141.8	7 02.3	68	54	143.3	6 41.8	68	54	143.6	6 21.3	69	54	144.0					3
4	10 31.2	67	61	138.3	9 51.1	67	60	139.0	8 50.9	67	58	140.2	7 50.5	67	57	141.3	6 29.6	67	55	142.8	6 09.4	68	55	143.1	5 49.1	68	54	143.5					4
55	9 54.8	66	61	137.7	9 15.3	66	60	138.5	8 15.9	66	59	139.6	7 16.3	66	58	140.8	5 56.5	67	56	142.3	5 36.6	67	55	142.6	5 16.6	67	55	143.0					55
6	9 18.0	65	62	137.2	8 39.0	65	61	138.0	7 40.5	65	60	139.1	6 41.7	65	58	140.3	5 23.1	66	56	141.8	5 03.4	66	56	142.1									6
7	8 40.9	64	62	136.7	8 02.4	64	62	137.4	7 04.7	64	60	138.6	6 06.7	64	59	139.8																	7
8	8 03.3	63	63	136.1	7 25.5	63	62	136.9	6 28.5	63	61	138.1	5 31.4	64	59	139.3																	8
9	7 25.5	62	64	135.6	6 48.2	62	63	136.4	5 52.0	62	61	137.6																					9
60	6 47.3	61	64	135.1	6 10.5	61	63	135.9	5 15.2	62	62	137.1																					60
1	6 08.8	60	65	134.6	5 32.5	60	64	135.4																									1
2	5 29.9	59	65	134.1																													2

Lat. 26°

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′ Alt.	Δd	Δt	Az.	37° 00′ Alt.	Δd	Δt	Az.	38° 30′ Alt.	Δd	Δt	Az.	40° 00′ Alt.	Δd	Δt	Az.	42° 00′ Alt.	Δd	Δt	Az.	42° 30′ Alt.	Δd	Δt	Az.	43° 00′ Alt.	Δd	Δt	Az.	45° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	13 37.7	36	75	56.3	13 59.2	36	74	55.4	14 31.2	35	73	53.9	15 02.6	35	72	52.5	15 43.5	34	70	50.5	15 53.6	34	69	50.0	16 03.6	33	69	49.5	16 43.0	32	67	47.6	91
2	12 52.5	37	75	56.0	13 14.6	37	74	55.1	13 47.3	36	73	53.6	14 19.5	36	72	52.2	15 01.6	35	70	50.3	15 12.0	35	69	49.8	15 22.3	34	69	49.3	16 03.0	33	66	47.3	2
3	12 07.5	38	75	55.7	12 30.1	38	74	54.8	13 03.6	37	73	53.3	13 36.6	36	71	51.9	14 19.9	36	69	50.0	14 30.6	35	69	49.5	14 41.2	35	68	49.0	15 23.1	34	66	47.1	3
4	11 22.6	39	74	55.4	11 45.7	38	74	54.5	12 20.0	38	72	53.0	12 53.9	37	71	51.6	13 38.3	37	69	49.7	13 49.3	36	68	49.2	14 00.2	36	68	48.8	14 43.3	36	66	46.8	4
95	10 37.9	40	74	55.1	11 01.6	39	73	54.2	11 36.7	39	72	52.7	12 11.4	38	71	51.3	12 56.9	38	69	49.4	13 08.2	37	68	49.0	13 19.4	37	68	48.5	14 03.8	37	66	46.6	95
6	9 53.4	40	74	54.8	10 17.6	40	73	53.8	10 53.5	40	72	52.4	11 29.0	39	70	51.0	12 15.7	39	68	49.1	12 27.3	38	68	48.7	12 38.8	38	67	48.2	13 24.4	38	65	46.3	6
7	9 09.1	41	74	54.4	9 33.8	41	73	53.5	10 10.5	41	72	52.1	10 46.8	40	70	50.7	11 34.7	40	68	48.8	11 46.6	39	68	48.4	11 58.4	39	67	47.9	12 45.1	39	65	46.0	7
8	8 25.0	42	73	54.1	8 50.1	42	72	53.2	9 27.6	41	71	51.8	10 04.8	41	70	50.4	10 53.8	41	68	48.5	11 06.0	40	67	48.1	11 18.1	40	67	47.6	12 06.1	40	65	45.7	8
9	7 41.0	43	73	53.7	8 06.7	43	72	52.8	8 45.0	42	71	51.5	9 23.0	42	69	50.1	10 13.2	42	68	48.2	10 25.6	41	67	47.8	10 38.0	41	66	47.3	11 27.3	41	64	45.4	9
100	6 57.3	44	72	53.4	7 23.5	44	72	52.5	8 02.6	43	70	51.1	8 41.4	43	69	49.7	9 32.7	43	67	47.9	9 45.5	42	67	47.5	9 58.2	42	66	47.0	10 48.6	42	64	45.1	100
1	6 13.7	45	72	53.0	6 40.5	44	71	52.1	7 20.4	44	70	50.8	8 00.0	44	69	49.4	8 52.5	43	67	47.6	9 05.5	43	66	47.1	9 18.5	43	66	46.7	10 10.2	43	64	44.8	1
2	5 30.4	45	72	52.7	5 57.7	45	71	51.8	6 38.4	45	70	50.4	7 18.8	45	68	49.1	8 12.4	44	66	47.3	8 25.8	44	66	46.8	8 39.1	44	65	46.4	9 31.9	44	63	44.5	2
3					5 15.1	46	71	51.4	5 56.6	46	69	50.1	6 37.9	46	68	48.7	7 32.6	45	66	46.9	7 46.2	45	66	46.5	7 59.8	45	65	46.0	8 53.9	45	63	44.2	3
4									5 15.0	47	69	49.7	5 57.1	47	68	48.4	6 53.0	46	66	46.6	7 06.9	46	65	46.1	7 20.8	46	65	45.7	8 16.1	46	63	43.9	4
105													5 16.6	48	67	48.0	6 13.6	47	65	46.2	6 27.8	47	65	45.8	6 42.0	47	64	45.3	7 38.5	47	62	43.6	105
6																	5 34.5	48	65	45.9	5 49.0	48	64	45.4	6 03.4	48	64	45.0	7 01.1	48	62	43.2	6
7																					5 10.3	49	64	45.1	5 25.1	49	64	44.6	6 24.0	49	62	42.9	7
8																													5 47.1	50	61	42.5	8
9																													5 10.5	51	61	42.2	9

Lat. 27°

Lat. 28°

Lat. 25°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	69 00.0	1.0 02	00.0	68 00.0	1.0 02	00.0	66 30.0	1.0 01	00.0	65 30.0	1.0 01	00.0	64 30.0	1.0 01	00.0	63 30.0	1.0 01	00.0	62 30.0	1.0 01	00.0	61 00.0	1.0 01	00.0	00
1	68 59.1	1.0 05	01.9	67 59.1	1.0 04	01.8	66 29.2	1.0 04	01.7	65 29.3	1.0 04	01.6	64 29.3	1.0 04	01.5	63 29.3	1.0 03	01.4	62 29.4	1.0 03	01.3	60 59.4	1.0 03	01.2	1
2	68 56.3	1.0 08	03.9	67 56.6	1.0 07	03.6	66 26.8	1.0 06	03.3	65 27.0	1.0 06	03.1	64 27.2	1.0 06	08.0	63 27.4	1.0 06	02.8	62 27.5	1.0 05	02.6	60 57.7	1.0 05	02.4	2
3	68 51.8	99 11	05.8	67 52.2	99 10	05.4	66 22.9	99 09	05.0	65 23.3	99 08	04.7	64 23.7	99 08	04.4	63 24.1	99 08	04.2	62 24.4	99 07	03.9	60 54.8	1.0 07	03.6	3
4	68 45.4	98 14	07.7	67 46.2	99 13	07.2	66 17.4	99 12	06.6	65 18.2	99 11	06.2	64 18.8	99 10	05.9	63 19.4	99 10	05.6	62 20.0	99 09	05.2	60 50.8	99 08	04.8	4
05	68 37.2	98 16	09.6	67 38.6	98 16	09.0	66 10.4	98 14	08.2	65 11.5	98 13	07.8	64 12.6	98 13	07.3	63 13.5	98 12	06.9	62 14.4	99 11	06.5	60 45.7	99 10	06.0	05
6	68 27.3	97 19	11.4	67 29.3	97 18	10.7	66 01.9	97 17	09.8	65 03.5	97 16	09.3	64 05.0	98 15	08.8	63 06.3	98 14	08.3	62 07.6	98 13	07.8	60 39.4	98 12	07.2	6
7	68 15.7	95 22	13.2	67 18.3	96 21	12.4	65 51.9	96 19	11.4	64 54.0	97 18	10.8	63 56.0	97 17	10.2	62 57.9	97 16	09.6	61 59.6	97 15	09.1	60 32.0	97 14	08.4	7
8	68 02.5	94 25	15.0	67 05.9	95 23	14.1	65 40.4	95 21	12.9	64 43.2	96 20	12.2	63 45.8	96 19	11.6	62 48.2	96 18	10.9	61 50.5	96 17	10.3	60 23.6	97 16	09.5	8
9	67 47.6	93 27	16.7	66 51.8	93 26	15.8	65 27.6	94 24	14.5	64 31.0	94 22	13.7	63 34.3	95 21	12.9	62 37.3	95 20	12.2	61 40.1	95 19	11.6	60 14.0	96 18	10.7	9
10	67 31.2	91 30	18.4	66 36.3	92 28	17.4	65 13.3	93 26	15.9	64 17.5	93 24	15.1	63 21.5	94 23	14.3	62 25.2	94 22	13.5	61 28.6	94 21	12.8	60 03.4	95 19	11.8	10
1	67 13.3	89 32	20.0	66 19.4	90 30	18.9	64 57.7	91 28	17.4	64 02.8	92 27	16.4	63 07.5	92 25	15.6	62 11.9	93 24	14.8	61 16.1	93 23	14.0	59 51.8	94 21	12.9	1
2	66 54.9	88 34	21.6	66 01.1	89 33	20.4	64 40.8	90 30	18.8	63 46.8	90 29	17.8	62 52.3	91 27	16.9	61 57.5	92 26	16.0	61 02.4	92 25	15.2	59 39.2	93 23	14.0	2
3	66 33.3	86 37	23.1	65 41.5	87 35	21.9	64 22.7	88 32	20.2	63 29.5	89 30	19.1	62 36.0	90 29	18.1	61 42.0	90 28	17.2	60 47.6	91 26	16.3	59 25.5	92 24	15.1	3
4	66 11.3	84 39	24.6	65 20.6	85 37	23.3	64 03.4	87 34	21.5	63 11.2	87 32	20.4	62 18.5	88 31	19.3	61 25.4	89 30	18.4	60 31.9	90 28	17.4	59 10.9	90 26	16.1	4
15	65 48.1	82 41	26.0	64 58.5	83 39	24.7	63 42.9	85 36	22.8	62 51.7	86 34	21.6	62 00.0	87 33	20.5	61 07.7	87 31	19.5	60 15.1	88 30	18.5	58 55.3	89 28	17.1	15
6	65 23.6	80 42	27.4	64 35.2	81 41	26.0	63 21.3	83 38	24.0	62 31.1	84 36	22.8	61 40.4	85 34	21.7	60 49.1	86 33	20.6	59 57.3	87 31	19.6	58 38.9	88 29	18.1	6
7	64 58.1	78 44	28.7	64 10.9	79 42	27.2	62 58.6	81 40	25.2	62 09.5	82 38	24.0	61 19.8	83 36	22.8	60 29.5	84 34	21.7	59 38.6	85 33	20.6	58 21.5	86 30	19.1	7
8	64 31.4	76 46	29.9	63 45.5	77 44	28.5	62 34.9	79 41	26.4	61 46.9	81 39	25.1	60 58.2	82 38	23.9	60 08.9	83 36	22.7	59 19.0	84 34	21.6	58 03.2	85 32	20.1	8
9	64 03.8	74 48	31.1	63 19.1	75 46	29.6	62 10.2	77 42	27.5	61 23.4	79 41	26.2	60 35.7	80 39	24.9	59 47.5	81 37	23.8	58 58.6	82 36	22.6	57 44.2	83 33	21.0	9
20	63 35.2	72 49	32.3	62 51.7	73 47	30.8	61 44.7	76 44	28.6	60 58.9	77 42	27.3	60 12.4	78 40	26.0	59 25.1	79 38	24.7	58 37.2	80 37	23.6	57 24.3	82 34	21.9	20
1	63 05.7	70 50	33.4	62 23.5	71 48	31.8	61 18.2	74 46	29.6	60 33.6	75 44	28.3	59 48.1	76 42	26.9	59 02.0	78 40	25.7	58 15.1	79 38	24.5	57 03.6	80 36	22.8	1
2	62 35.4	68 52	34.4	61 54.4	69 50	32.9	60 50.9	72 47	30.6	60 07.4	73 45	29.2	59 23.1	75 43	27.9	58 38.0	76 41	26.6	57 52.2	77 40	25.4	56 42.1	79 37	23.6	2
3	62 04.3	65 53	35.4	61 24.5	67 51	33.8	60 22.8	70 48	31.6	59 40.5	71 46	30.2	58 57.3	73 44	28.8	58 13.2	74 42	27.5	57 28.5	75 41	26.3	56 20.0	77 38	24.5	3
4	61 32.4	63 54	36.4	60 53.8	65 52	34.8	59 53.9	68 49	32.5	59 12.8	69 47	31.1	58 30.7	71 46	29.7	57 47.8	72 44	28.4	57 04.0	73 42	27.1	55 57.1	75 39	25.3	4
25	60 59.8	61 56	37.3	60 22.5	63 53	35.7	59 24.4	66 50	33.4	58 44.4	67 48	31.9	58 03.4	69 47	30.5	57 21.6	70 45	29.2	56 38.9	72 43	27.9	55 33.5	74 40	26.1	25
6	60 26.6	59 56	38.1	59 50.4	61 54	36.5	58 54.1	64 52	34.2	58 15.3	66 50	32.8	57 35.4	67 48	31.3	56 54.7	69 46	30.0	56 13.2	70 44	28.7	55 09.3	72 41	26.8	6
7	59 52.7	57 58	38.9	59 17.7	59 55	37.3	58 23.2	62 52	35.0	57 45.5	64 50	33.6	57 06.8	65 49	32.1	56 27.2	67 47	30.8	55 46.8	68 45	29.4	54 44.5	70 42	27.5	7
8	59 18.2	55 58	39.7	58 44.5	57 56	38.1	57 51.7	60 54	35.8	57 15.2	62 52	34.3	56 37.6	63 50	32.9	55 59.1	65 48	31.5	55 19.7	66 46	30.2	54 19.1	68 43	28.2	8
9	58 43.2	53 59	40.4	58 10.7	55 57	38.8	57 19.6	58 54	36.5	56 44.2	60 52	35.0	56 07.8	62 51	33.6	55 30.4	63 49	32.2	54 52.1	65 47	30.9	53 53.1	67 44	28.9	9
30	58 07.7	51 60	41.1	57 36.3	53 58	39.5	56 47.0	56 55	37.2	56 12.7	58 53	35.7	55 37.4	60 51	34.3	55 01.2	61 50	32.9	54 24.0	63 48	31.5	53 26.5	65 45	29.6	30
1	57 31.7	49 61	41.8	57 01.4	51 59	40.2	56 13.8	54 56	37.9	55 40.7	56 54	36.4	55 06.6	58 52	34.9	54 31.4	59 50	33.5	53 55.3	61 49	32.2	52 59.4	63 46	30.2	1
2	56 55.2	48 62	42.4	56 26.1	50 60	40.8	55 40.2	52 57	38.5	55 08.2	54 55	37.0	54 35.2	56 53	35.6	54 01.1	58 51	34.2	53 26.1	59 50	32.8	52 31.8	61 47	30.8	2
3	56 18.4	46 62	43.0	55 50.4	48 60	41.4	55 06.1	51 58	39.1	54 35.3	52 56	37.6	54 03.3	54 54	36.2	53 30.3	56 52	34.8	52 56.4	57 50	33.4	52 03.7	60 48	31.4	3
4	55 41.1	44 63	43.6	55 14.2	46 61	42.0	54 31.6	49 58	39.7	54 01.8	51 56	38.2	53 31.0	52 54	36.7	52 59.1	54 53	35.3	52 26.2	56 51	33.9	51 35.2	58 48	31.9	4
35	55 03.4	42 63	44.1	54 37.6	44 62	42.5	53 56.7	47 59	40.2	53 28.0	49 57	38.7	52 58.3	50 55	37.3	52 27.5	52 54	35.9	51 55.7	54 52	34.5	51 06.2	56 49	32.5	35
6	54 25.4	40 64	44.6	54 00.7	42 62	43.0	53 21.4	45 60	40.7	52 53.8	47 58	39.3	52 25.1	49 56	37.8	51 55.4	50 54	36.4	51 24.7	52 52	35.0	50 36.8	54 50	33.0	6
7	53 47.1	38 64	45.0	53 23.4	40 63	43.5	52 45.7	43 60	41.2	52 19.2	45 58	39.7	51 51.6	47 56	38.3	51 22.9	49 55	36.9	50 53.3	50 53	35.5	50 07.0	53 50	33.5	7
8	53 08.5	37 65	45.5	52 45.9	39 63	43.9	52 09.7	42 60	41.7	51 44.3	43 59	40.2	51 17.7	45 57	38.8	50 50.1	47 55	37.4	50 21.5	48 54	36.0	49 36.8	51 51	34.0	8
9	52 29.6	35 65	45.9	52 08.0	37 64	44.4	51 33.4	40 61	42.1	51 09.0	42 60	40.7	50 43.5	43 58	39.2	50 16.9	45 56	37.8	49 49.4	47 54	36.4	49 06.3	49 52	34.4	9
40	51 50.4	33 66	46.3	51 29.8	35 64	44.8	50 56.8	38 62	42.5	50 33.4	40 60	41.1	50 08.9	42 58	39.6	49 43.4	43 56	38.2	49 16.9	45 54	36.9	48 35.4	47 52	34.8	40
1	51 11.0	32 66	46.6	50 51.4	34 64	45.1	50 19.9	36 62	42.9	49 57.5	38 60	41.5	49 34.1	40 58	40.0	49 09.6	42 57	38.6	48 44.2	43 55	37.3	48 04.1	46 52	35.2	1
2	50 31.3	30 66	47.0	50 12.7	32 65	45.5	49 42.7	35 62	43.3	49 21.4	36 61	41.8	48 59.0	38 59	40.4	48 35.5	40 57	39.0	48 11.1	42 56	37.7	47 32.6	44 53	35.6	2
3	49 51.5	28 67	47.3	49 33.9	30 65	45.8	49 05.3	33 63	43.6	48 45.0	35 61	42.2	48 23.6	37 60	40.8	48 01.1	38 58	39.4	47 37.7	40 56	38.0	47 00.8	42 54	36.0	3
4	49 11.4	27 67	47.6	48 54.8	29 66	46.1	48 27.7	31 63	44.0	48 08.3	33 61	42.5	47 47.9	35 60	41.1	47 26.5	37 58	39.7	47 04.1	38 56	38.4	46 28.7	41 54	36.4	4
45	48 31.2	25 67	47.9	48 15.5	27 66	46.4	47 49.9	30 64	44.3	47 31.5	32 62	42.8	47 12.0	33 60	41.5	46 51.6	35 58	40.1	46 30.2	36 57	38.7	45 56.3	39 54	36.7	45
6	47 50.8	24 68	48.1	47 36.0	26 66	46.7	47 11.8	28 64	44.5	46 54.4	30 62	43.1	46 35.9	32 60	41.8	46 16.5	33 59	40.4	45 56.1	35 57	39.0	45 23.7	37 55	37.0	6
7	47 10.2	22 68	48.4	46 56.3	24 66	46.9	46 33.6	27 64	44.8	46 17.1	28 62	43.4	45 59.6	30 61	42.0	45 41.2	32 59	40.7	45 21.7	33 58	39.3	44 50.8	35 55	37.3	7
8	46 29.5	21 68	48.6	46 16.5	22 66	47.2	45 55.2	25 64	45.1	45 39.6	27 62	43.7	45 23.1	28 61	42.3	45 05.6	30 60	40.9	44 47.2	32 58	39.6	44 17.7	34 56	37.6	8
9	45 48.7	19 68	48.8	45 36.6	21 67	47.4	45 16.6	23 64	45.3	45 02.0	25 63	43.9	44 46.4	27 61	42.6	44 29.9	28 60	41.2	44 12.4	30 58	39.9	43 44.4	32 56	37.9	9
50	45 07.7	18 68	49.0	44 56.5	19 67	47.6	44 37.9	22 65	45.5	44 24.2	24 63	44.1	44 09.6	25 62	42.8	43 54.0	27 60	41.4	43 37.5	28 59	40.1	43 11.0	31 56	38.1	50
1	44 26.6	16 69	49.1	44 16.3	18 67	47.7	43 59.0	20 65	45.7	43 46.3	22 64	44.3	43 32.6	24 62	43.0	43 17.9	25 60	41.7	43 02.3	27 59	40.3	42 37.3	29 56	38.4	1
2	43 45.5	15 69	49.3	43 36.0	17 67	47.9	43 20.0	19 65	45.9	43 08.2	21 64	44.5	42 55.4	22 62	43.2	42 41.7	24 61	41.9	42 27.1	25 59	40.6	42 03.5	27 57	38.6	2
3	43 04.2	14 69	49.4	42 55.6	15 68	48.1	42 40.9	17 65	46.0	42 30.0	19 64	44.7	42 18.1	21 62	43.4	42 05.3	22 61	42.1	41 51.6	24 59	40.8	41 29.5	26 57	38.8	3
4	42 22.9	12 69	49.5	42 15.1	14 68	48.2	42 01.8	16 66	46.2	41 51.7	18 64	44.9	41 40.7	19 62	43.6	41 28.8	21 61	42.2	41 16.1	22 60	40.9	40 55.3	24 57	39.0	4
55	41 41.5	11 69	49.6	41 34.6	12 68	48.3	41 22.5	15 66	46.3	41 13.3	16 64	45.0	41 03.2	18 63	43.7	40 52.2	19 61	42.4	40 40.4	20 60	41.1	40 21.0	23 57	39.2	55
6	41 00.0	09 69	49.7	40 53.9	11 68	48.4	40 43.1	13 66	46.5	40 34.8	15 64	45.1	40 25.6	16 63	43.8	40 15.5	18 61	42.6	40 04.6	19 60	41.3	39 46.6	21 58	39.3	6
7	40 18.5	08 69	49.8	40 13.2	10 68	48.5	40 03.6	12 66	46.6	39 56.2	13 64	45.3	39 47.9	15 63	44.0	39 38.7	16 62	42.7	39 28.7	17 60	41.4	39 12.1	19 58	39.5	7
8	39 36.9	07 69	49.9	39 32.4	08 68	48.6	39 24.1	10 66	46.7	39 17.5	12 64	45.4	39 10.1	13 63	44.1	39 01.8	15 62	42.8	38 52.6	16 60	41.5	38 37.4	18 58	39.6	8
9	38 55.3	05 69	49.9	38 51.6	07 68	48.7	38 44.6	09 66	46.7	38 38.8	10 65	45.5	38 32.2	12 63	44.2	38 24.8	13 62	42.9	38 16.5	14 60	41.7	38 02.7	16 58	39.8	9
60	38 13.7	04 70	50.0	38 10.8	05 68	48.7	38 04.9	08 66	46.8	38 00.0	09 65	45.5	37 54.3	10 63	44.3	37 47.7	12 62	43.0	37 40.4	13 60	41.8	37 27.8	15 58	39.9	60
1	37 32.0	03 70	50.0	37 29.9	04 68	48.8	37 25.3	06 66	46.9	37 21.2	07 65	45.6	37 16.3	09 64	44.4	37 10.6	10 62	43.1	37 04.1	11 60	41.9	36 52.9	13 58	40.0	1
2	36 50.4	02 70	50.0	36 49.0	03 68	48.8	36 45.6	05 66	46.9	36 42.3	06 65	45.7	36 38.2	07 64	44.4	36 33.4	09 62	43.2	36 27.8	10 61	41.9	36 17.9	12 58	40.1	2
3	36 08.7	00 70	50.0	36 08.1	02 68	48.8	36 05.8	03 66	46.9	36 03.4	05 65	45.7	36 00.1	06 64	44.5	35 56.2	07 62	43.2	35 51.4	09 61	42.0	35 42.9	10 58	40.2	3
4	35 27.0	01 70	50.0	35 27.2	00 68	48.8	35 26.1	02 66	47.0	35 24.4	03 65	45.7	35 22.0	05 64	44.5	35 18.9	06 62	43.3	35 15.0	07 61	42.1	35 07.8	09 59	40.2	4
65	34 45.3	02 70	50.0	34 46.3	01 68	48.8	34 46.4	01 66	47.0	34 45.5	02 65	45.8	34 43.9	03 64	44.5	34 41.6	04 62	43.3	34 38.6	06 61	42.1	34 32.6	07 59	40.3	65
6	34 03.7	03 69	50.0	34 05.4	02 68	48.8	34 06.6	00 66	47.0	34 06.5	01 65	45.8	34 05.8	02 64	44.6	34 04.3	03 62	43.4	34 02.1	04 61	42.2	33 57.5	06 59	40.3	6
7	33 22.0	05 69	50.0	33 24.5	03 68	48.8	33 26.8	02 66	47.0	33 27.6	01 65	45.8	33 27.6	01 64	44.6	33 26.9	02 62	43.4	33 25.6	03 61	42.2	33 22.2	05 59	40.4	7
8	32 40.4	06 69	49.9	32 43.6	06 68	48.7	32 47.1	03 66	47.0	32 48.6	02 65	45.8	32 49.4	01 64	44.6	32 49.6	00 62	43.4	32 49.1	01 61	42.2	32 47.0	03 59	40.4	8
9	31 58.8	07 69	49.9	32 02.7	06 68	48.7	32 07.4	04 66	46.9	32 09.6	03 65	45.7	32 11.3	02 64	44.6	32 12.2	01 62	43.4	32 12.5	00 61	42.2	32 11.7	02 59	40.4	9
70	31 17.3	08 69	49.8	31 21.9	07 68	48.6	31 27.7	06 66	46.9	31 30.7	05 65	45.7	31 33.1	03 64	44.5	31 34.9	02 62	43.4	31 36.0	01 61	42.2	31 36.5	00 59	40.4	70
1	30 35.7	09 69	49.7	30 41.1	08 68	48.6	30 48.0	07 66	46.8	30 51.8	06 65	45.7	30 55.0	05 64	44.5	30 57.5	04 62	43.3	30 59.5	03 61	42.2	31 01.2	01 59	40.4	1
2	29 54.3	11 69	49.7	30 00.3	10 68	48.5	30 08.3	08 66	46.8	30 12.9	07 65	45.6	30 16.9	06 64	44.5	30 20.2	05 62	43.3	30 23.0	04 61	42.2	30 26.0	03 59	40.4	2
3	29 12.9	12 69	49.6	29 19.6	11 68	48.4	29 28.7	09 66	46.7	29 34.1	08 65	45.6	29 38.8	07 63	44.4	29 42.9	06 62	43.3	29 46.5	05 61	42.1	29 50.7	04 59	40.4	3
4	28 31.5	13 69	49.5	28 39.0	12 68	48.3	28 49.2	11 66	46.6	28 55.3	10 65	45.5	29 00.8	09 63	44.4	29 05.7	08 62	43.2	29 10.0	07 61	42.1	29 15.5	05 59	40.4	4
75	27 50.2	14 69	49.4	27 58.4	13 68	48.2	28 09.7	12 66	46.6	28 16.5	11 64	45.4	28 22.8	10 63	44.3	28 28.5	09 62	43.2	28 33.6	08 61	42.0	28 40.3	07 59	40.3	75
6	27 09.0	15 69	49.2	27 17.9	14 68	48.1	27 30.2	13 66	46.5	27 37.8	12 64	45.3	27 44.8	11 63	44.2	27 51.3	10 62	43.1	27 57.2	09 60	42.0	28 05.1	08 58	40.3	6
7	26 27.8	16 68	49.1	26 37.4	16 67	48.0	26 50.8	14 66	46.4	26 59.1	13 64	45.2	27 06.9	13 63	44.1	27 14.2	12 62	43.0	27 20.9	11 60	41.9	27 30.0	09 58	40.2	7
8	25 46.7	18 68	49.0	25 57.0	17 67	47.9	26 11.5	15 65	46.2	26 20.6	15 64	45.1	26 29.1	14 63	44.0	26 37.1	13 62	42.9	26 44.6	12 60	41.8	26 54.9	11 58	40.1	8
9	25 05.8	19 68	48.9	25 16.7	18 67	47.8	25 32.3	17 65	46.1	25 42.0	16 64	45.0	25 51.3	15 63	43.9	26 00.1	14 62	42.8	26 08.4	13 60	41.7	26 19.8	12 58	40.1	9
80	24 24.9	20 68	48.7	24 36.5	19 67	47.6	24 53.1	18 65	46.0	25 03.6	17 64	44.9	25 13.6	16 63	43.8	25 23.2	16 62	42.7	25 32.2	15 60	41.6	25 44.9	13 58	40.0	80
1	23 44.0	21 68	48.5	23 56.4	20 67	47.5	24 14.1	19 65	45.9	24 25.3	18 64	44.8	24 36.0	18 62	43.7	24 46.3	17 61	42.6	24 56.1	16 60	41.5	25 10.0	15 58	39.9	1
2	23 03.3	22 68	48.4	23 16.4	21 66	47.3	23 35.1	20 65	45.7	23 47.0	20 64	44.7	23 58.5	19 62	43.6	24 09.5	18 61	42.5	24 20.1	17 60	41.4	24 35.1	16 58	39.8	2
3	22 22.7	23 68	48.2	22 36.4	22 66	47.2	22 56.2	21 65	45.6	23 08.8	21 63	44.5	23 21.0	20 62	43.4	23 32.8	19 61	42.4	23 44.2	19 60	41.3	24 00.3	17 58	39.7	3
4	21 42.3	24 67	48.0	21 56.6	24 66	47.0	22 17.4	23 64	45.4	22 30.8	22 63	44.4	22 43.7	21 62	43.3	22 56.2	21 61	42.2	23 08.3	20 60	41.2	23 25.7	19 58	39.6	4
85	21 01.9	25 67	47.9	21 16.9	25 66	46.8	21 38.7	24 64	45.2	21 52.8	23 63	44.2	22 06.5	22 62	43.2	22 19.7	22 61	42.1	22 32.6	21 60	41.0	22 51.1	20 58	39.5	85
6	20 21.6	26 67	47.7	20 37.3	26 66	46.6	21 00.2	25 64	45.1	21 14.9	24 63	44.0	21 29.3	24 62	43.0	21 43.3	23 60	41.9	21 56.9	22 59	40.9	22 16.5	21 57	39.3	6
7	19 41.5	28 67	47.5	19 57.8	27 66	46.4	20 21.7	26 64	44.9	20 37.2	25 63	43.9	20 52.3	25 62	42.8	21 07.0	24 60	41.8	21 21.4	24 59	40.7	21 42.1	23 57	39.2	7
8	19 01.5	29 66	47.3	19 18.5	28 65	46.2	19 43.4	27 64	44.7	19 59.6	27 62	43.7	20 15.4	26 61	42.7	20 30.8	25 60	41.6	20 45.9	25 59	40.6	21 07.8	24 57	39.0	8
9	18 21.6	30 66	47.0	18 39.3	29 65	46.0	19 05.2	28 63	44.5	19 22.1	28 62	43.5	19 38.6	27 61	42.5	19 54.8	27 60	41.5	20 10.6	26 59	40.4	20 33.7	25 57	38.9	9
90	17 41.9	31 66	46.8	18 00.2	30 65	45.8	18 27.2	30 63	44.3	18 44.7	29 62	43.3	19 01.9	28 61	42.3	19 18.8	28 60	41.3	19 35.4	27 58	40.3	19 59.6	26 57	38.7	90

Lat. 25°

H.A.	46° 00′ Alt.	Az.	47° 00′ Alt.	Az.	48° 30′ Alt.	Az.	49° 30′ Alt.	Az.	50° 30′ Alt.	Az.	51° 30′ Alt.	Az.	52° 30′ Alt.	Az.	54° 00′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	19 00.0 1.0 01	180.0	18 00.0 1.0 00	180.0	16 30.0 1.0 00	180.0	15 30.0 1.0 00	180.0	14 30.0 1.0 00	180.0	13 30.0 1.0 00	180.0	12 30.0 1.0 00	180.0	11 00.0 1.0 00	180.0	00
1	18 59.7 1.0 02	179.3	17 59.7 1.0 02	179.3	16 29.7 1.0 02	179.3	15 29.7 1.0 02	179.3	14 29.7 1.0 02	179.3	13 29.7 1.0 02	179.4	12 29.7 1.0 02	179.4	10 59.7 1.0 01	179.4	1
2	18 58.6 1.0 03	178.5	17 58.6 1.0 03	178.6	16 28.7 1.0 03	178.6	15 28.7 1.0 03	178.7	14 28.8 1.0 03	178.7	13 28.8 1.0 02	178.7	12 28.8 1.0 02	178.8	10 58.9 1.0 02	178.8	2
3	18 56.9 1.0 04	177.8	17 56.9 1.0 04	177.8	16 27.0 1.0 04	177.9	15 27.1 1.0 04	178.0	14 27.2 1.0 04	178.0	13 27.3 1.0 04	178.1	12 27.3 1.0 03	178.1	10 57.4 1.0 03	178.2	3
4	18 54.4 1.0 05	177.1	17 54.6 1.0 05	177.1	16 24.8 1.0 05	177.2	15 24.9 1.0 05	177.3	14 25.0 1.0 05	177.4	13 25.1 1.0 04	177.4	12 25.3 1.0 04	177.5	10 55.5 1.0 04	177.6	4
05	18 51.3 1.0 06	176.3	17 51.5 1.0 06	176.4	16 21.8 1.0 06	176.5	15 22.0 1.0 06	176.6	14 22.2 1.0 06	176.7	13 22.4 1.0 06	176.8	12 22.6 1.0 05	176.9	10 52.9 1.0 05	177.0	05
6	18 47.5 99 08	175.6	17 47.8 1.0 07	175.7	16 18.2 1.0 07	175.9	15 18.5 1.0 07	176.0	14 18.8 1.0 07	176.1	13 19.1 1.0 07	176.2	12 19.4 1.0 06	176.3	10 49.8 1.0 06	176.4	6
7	18 43.0 99 09	174.9	17 43.4 99 08	175.0	16 14.0 99 08	175.2	15 14.4 99 08	175.3	14 14.8 99 08	175.4	13 15.1 99 08	175.5	12 15.5 99 07	175.6	10 46.1 99 07	175.8	7
8	18 37.7 99 10	174.1	17 38.3 99 10	174.3	16 09.1 99 09	174.5	15 09.6 99 09	174.6	14 10.1 99 09	174.8	13 10.6 99 08	174.9	12 11.1 99 08	175.0	10 41.9 99 08	175.2	8
9	18 31.9 99 11	173.4	17 32.5 99 11	173.6	16 03.5 99 10	173.8	15 04.2 99 10	174.0	14 04.8 99 10	174.1	13 05.5 99 10	174.3	12 06.1 99 09	174.4	10 37.0 99 09	174.6	9
10	18 25.3 99 12	172.7	17 26.1 99 12	172.9	15 57.3 99 11	173.1	14 58.1 99 11	173.3	13 58.9 99 11	173.5	12 59.7 99 10	173.6	12 00.5 99 10	173.8	10 31.7 99 10	174.0	10
1	18 18.0 98 13	172.0	17 19.0 98 13	172.2	15 50.5 98 12	172.4	14 51.5 98 12	172.6	13 52.4 98 12	172.8	12 53.4 98 12	173.0	11 54.3 98 11	173.2	10 25.8 98 11	173.5	1
2	18 10.1 98 14	171.3	17 11.3 98 14	171.5	15 43.0 98 14	171.8	14 44.2 98 13	172.0	13 45.3 98 13	172.2	12 46.5 98 12	172.4	11 47.6 98 12	172.6	10 19.3 98 12	172.9	2
3	18 01.5 98 16	170.5	17 02.9 98 15	170.8	15 34.9 98 14	171.1	14 36.3 98 14	171.3	13 37.6 98 14	171.5	12 39.0 98 14	171.7	11 40.3 98 13	172.0	10 12.2 98 13	172.3	3
4	17 52.2 97 16	169.8	16 53.8 97 16	170.1	15 26.2 97 16	170.4	14 27.8 97 15	170.7	13 29.3 97 15	170.9	12 30.9 97 14	171.1	11 32.4 97 14	171.4	10 04.7 97 14	171.7	4
15	17 42.3 97 18	169.1	16 44.1 97 17	169.4	15 16.9 97 17	169.8	14 18.7 97 16	170.0	13 20.4 97 16	170.3	12 22.2 97 16	170.5	11 23.9 97 15	170.8	9 56.5 97 14	171.1	15
6	17 31.7 97 19	168.4	16 33.8 97 18	168.7	15 06.9 97 18	169.1	14 08.9 97 17	169.4	13 10.9 97 17	169.6	12 12.9 97 16	169.9	11 14.9 97 16	170.1	9 47.9 97 15	170.5	6
7	17 20.5 96 20	167.7	16 22.8 96 19	168.0	14 56.3 96 19	168.4	13 58.6 96 18	168.7	13 00.8 96 18	169.0	12 03.1 96 17	169.3	11 05.3 96 17	169.6	9 38.7 96 16	170.0	7
8	17 08.6 96 21	167.0	16 11.2 96 20	167.3	14 45.1 96 20	167.8	13 47.6 96 19	168.1	12 50.2 96 19	168.4	11 52.7 96 18	168.7	10 55.2 96 18	169.0	9 28.9 96 17	169.4	8
9	16 56.0 95 22	166.3	15 58.9 95 22	166.6	14 33.3 95 21	167.1	13 36.1 95 20	167.4	12 38.9 95 20	167.7	11 41.7 95 19	168.1	10 44.5 95 19	168.4	9 18.6 95 18	168.8	9
20	16 42.9 95 23	165.6	15 46.1 95 22	166.0	14 20.8 95 22	166.5	13 24.0 95 21	166.8	12 27.1 95 21	167.1	11 30.2 95 20	167.5	10 33.3 95 20	167.8	9 07.8 95 19	168.3	20
1	16 29.1 94 24	165.0	15 32.6 94 24	165.3	14 07.8 94 23	165.8	13 11.3 94 22	166.2	12 14.7 94 22	166.5	11 18.1 94 21	166.9	10 21.5 94 21	167.2	8 56.5 94 20	167.7	1
2	16 14.6 94 25	164.3	15 18.5 94 24	164.6	13 54.2 94 24	165.2	12 58.0 94 23	165.5	12 01.7 94 22	165.9	11 05.4 94 22	166.3	10 09.1 94 21	166.6	8 44.6 94 21	167.1	2
3	15 59.6 93 26	163.6	15 03.8 93 26	164.0	13 40.0 93 25	164.5	12 44.1 93 24	164.9	11 48.2 93 24	165.3	10 52.2 93 23	165.7	9 56.3 93 22	166.0	8 32.3 93 22	166.6	3
4	15 43.9 92 27	162.9	14 48.5 92 26	163.3	13 25.2 93 26	163.9	12 29.7 93 25	164.3	11 34.1 93 24	164.7	10 38.5 93 24	165.1	9 42.9 93 23	165.5	8 19.4 93 22	166.0	4
25	15 27.7 92 28	162.3	14 32.6 92 28	162.7	13 09.9 92 26	163.3	12 14.7 92 26	163.7	11 19.5 92 25	164.1	10 24.2 92 25	164.5	9 29.0 92 24	164.9	8 06.0 92 23	165.5	25
6	15 10.8 91 29	161.6	14 16.1 91 28	162.0	12 54.0 91 28	162.7	11 59.1 91 27	163.1	11 04.3 91 26	163.5	10 09.4 91 26	163.9	9 14.5 92 25	164.3	7 52.1 92 24	164.9	6
7	14 53.3 90 30	161.0	13 59.0 91 29	161.4	12 37.5 91 28	162.0	11 43.0 91 28	162.5	10 48.6 91 27	162.9	9 54.1 91 26	163.3	8 59.6 91 26	163.8	7 37.7 91 25	164.4	7
8	14 35.3 90 31	160.3	13 41.4 90 30	160.8	12 20.4 90 29	161.4	11 26.4 90 29	161.9	10 32.3 90 28	162.3	9 38.2 90 27	162.8	8 44.1 90 27	163.2	7 22.8 90 26	163.8	8
9	14 16.7 89 32	159.7	13 23.2 89 31	160.1	12 02.8 89 30	160.8	11 09.2 89 30	161.3	10 15.5 89 29	161.7	9 21.8 90 28	162.2	8 28.1 90 28	162.6	7 07.4 90 26	163.3	9
30	13 57.5 88 33	159.0	13 04.4 89 32	159.5	11 44.7 89 31	160.2	10 51.5 89 30	160.7	9 58.2 89 30	161.2	9 05.0 89 29	161.6	8 11.6 89 28	162.1	6 51.6 89 27	162.8	30
1	13 37.8 88 34	158.4	12 45.1 88 33	158.9	11 26.0 88 32	159.6	10 33.3 88 31	160.1	9 40.4 88 30	160.6	8 47.6 88 30	161.1	7 54.7 88 29	161.5	6 35.2 88 28	162.3	1
2	13 17.5 87 35	157.8	12 25.3 87 34	158.3	11 06.8 87 33	159.0	10 14.5 87 32	159.5	9 22.1 87 31	160.0	8 29.7 87 31	160.5	7 37.2 87 30	161.0	6 18.4 88 29	161.7	2
3	12 56.6 86 36	157.2	12 04.9 86 35	157.7	10 47.1 86 34	158.4	9 55.2 87 33	159.0	9 03.3 87 32	159.5	8 11.3 87 32	160.0	7 19.3 87 31	160.5	6 01.2 87 30	161.2	3
4	12 35.3 85 36	156.5	11 44.0 86 36	157.1	10 26.9 86 35	157.9	9 35.4 86 34	158.4	8 44.0 86 33	158.9	7 52.4 86 32	159.4	7 00.9 86 32	159.9	5 43.4 86 30	160.7	4
35	12 13.4 85 37	155.9	11 22.5 85 37	156.5	10 06.1 85 35	157.3	9 15.2 85 35	157.8	8 24.1 85 34	158.4	7 33.1 85 33	158.9	6 42.0 85 32	159.4	5 25.2 85 31	160.2	35
6	11 50.9 84 38	155.3	11 00.6 84 38	155.9	9 44.9 84 36	156.7	8 54.4 84 36	157.3	8 03.8 84 34	157.8	7 13.3 84 34	158.4	6 22.6 84 33	158.9	5 06.6 84 32	159.7	6
7	11 28.0 83 39	154.7	10 38.1 83 38	155.3	9 23.2 83 37	156.2	8 33.1 83 36	156.7	7 43.1 83 36	157.3	6 53.0 84 35	157.8	6 02.8 84 34	158.4			7
8	11 04.5 82 40	154.2	10 15.1 82 39	154.7	9 01.0 83 38	155.6	8 11.4 83 37	156.2	7 21.8 83 36	156.7	6 32.2 83 35	157.3	5 42.6 83 35	157.9			8
9	10 40.6 81 41	153.6	9 51.7 82 40	154.2	8 38.3 82 39	155.1	7 49.2 82 38	155.6	7 00.1 82 37	156.2	6 11.0 82 36	156.8	5 21.8 82 35	157.4			9
40	10 16.2 81 42	153.0	9 27.8 81 41	153.6	8 15.1 81 40	154.5	7 26.6 81 39	155.1	6 38.0 81 38	155.7	5 49.4 81 37	156.3	5 00.7 81 36	156.9			40
1	9 51.2 80 42	152.4	9 03.4 80 42	153.1	7 51.4 80 40	154.0	7 03.4 80 39	154.6	6 15.4 80 38	155.2	5 27.3 80 38	155.8					1
2	9 25.9 79 43	151.9	8 38.5 79 42	152.5	7 27.4 79 41	153.4	6 39.9 79 40	154.1	5 52.3 79 39	154.7	5 04.7 79 38	155.3					2
3	9 00.0 78 44	151.3	8 13.2 78 43	152.0	7 02.8 78 42	152.9	6 15.9 78 41	153.5	5 28.8 78 40	154.2							3
4	8 33.7 77 45	150.8	7 47.4 77 44	151.4	6 37.8 77 42	152.4	5 51.4 77 42	153.0	5 04.9 77 40	153.7							4
45	8 06.9 76 45	150.3	7 21.2 76 44	150.9	6 12.4 76 43	151.9	5 26.5 77 42	152.5									45
6	7 39.7 75 46	149.7	6 54.5 75 45	150.4	5 46.6 76 44	151.4	5 01.2 76 43	152.0									6
7	7 12.1 74 47	149.2	6 27.4 74 46	149.9	5 20.3 75 44	150.9											7
8	6 44.0 73 48	148.7	5 59.9 74 46	149.4													8
9	6 15.6 73 48	148.2	5 32.0 73 47	148.9													9
50	5 46.7 72 49	147.7	5 03.7 72 48	148.4													50
1	5 17.4 71 50	147.2															1

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′ Alt.	Az.	47° 00′ Alt.	Az.	48° 30′ Alt.	Az.	49° 30′ Alt.	Az.	50° 30′ Alt.	Az.	51° 30′ Alt.	Az.	52° 30′ Alt.	Az.	54° 00′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
91	17 02.3 32 66	46.6	17 21.3 31 65	45.6	17 49.3 31 63	44.1	18 07.5 30 62	43.1	18 25.4 30 61	42.1	18 43.0 29 59	41.1	19 00.3 29 58	40.1	19 25.6 28 56	38.5	91
2	16 22.9 33 66	46.4	16 42.5 33 64	45.4	17 11.5 32 63	43.9	17 30.4 31 62	42.9	17 49.0 31 60	41.9	18 07.4 30 59	40.9	18 25.4 30 58	39.9	18 51.8 29 56	38.4	2
3	15 43.6 34 65	46.1	16 03.9 34 64	45.1	16 33.9 33 62	43.7	16 53.5 32 61	42.7	17 12.8 32 60	41.7	17 31.8 31 59	40.7	17 50.6 31 58	39.7	18 18.1 30 56	38.2	3
4	15 04.5 35 65	45.9	15 25.5 35 64	44.9	15 56.4 34 62	43.4	16 16.7 34 61	42.5	16 36.7 33 60	41.5	16 56.5 33 59	40.5	17 15.9 32 58	39.5	17 44.6 31 56	38.0	4
95	14 25.6 36 65	45.6	14 47.2 36 64	44.6	15 19.1 35 62	43.2	15 40.1 35 61	42.2	16 00.8 34 60	41.2	16 21.2 34 58	40.3	16 41.4 33 57	39.3	17 11.2 33 55	37.8	95
6	13 46.8 37 64	45.3	14 09.0 37 63	44.4	14 42.0 36 62	42.9	15 03.6 36 60	42.0	15 25.0 35 59	41.0	15 46.2 35 58	40.0	16 07.1 35 57	39.1	16 37.9 34 55	37.6	6
7	13 08.2 38 64	45.1	13 31.1 38 63	44.1	14 05.0 37 61	42.7	14 27.3 37 60	41.7	14 49.4 37 59	40.8	15 11.3 36 58	39.8	15 32.9 36 57	38.8	16 04.8 35 55	37.4	7
8	12 29.8 39 64	44.8	12 53.3 39 63	43.9	13 28.2 39 61	42.4	13 51.2 38 60	41.5	14 14.0 38 59	40.5	14 36.5 37 58	39.6	14 58.9 37 56	38.6	15 31.9 36 55	37.2	8
9	11 51.6 40 63	44.5	12 15.8 40 62	43.6	12 51.6 40 61	42.2	13 15.3 39 60	41.2	13 38.8 39 58	40.3	14 02.0 39 57	39.3	14 25.0 38 56	38.4	14 59.1 38 54	36.9	9
100	11 13.6 41 63	44.2	11 38.4 41 62	43.3	12 15.2 41 60	41.9	12 39.6 40 59	41.0	13 03.7 40 58	40.0	13 27.6 40 57	39.1	13 51.3 39 56	38.1	14 26.5 39 54	36.7	100
1	10 35.7 43 63	43.9	11 01.2 42 62	43.0	11 39.0 42 60	41.6	12 04.0 42 59	40.7	12 28.8 41 58	39.8	12 53.4 41 56	38.8	13 17.9 41 56	37.9	13 54.1 40 54	36.5	1
2	9 58.1 44 62	43.6	10 24.2 43 61	42.7	11 03.0 43 60	41.3	11 28.7 43 59	40.4	11 54.1 42 57	39.5	12 19.5 42 56	38.6	12 44.6 42 55	37.6	13 21.9 41 53	36.2	2
3	9 20.7 45 62	43.3	9 47.4 44 61	42.4	10 27.2 44 59	41.0	10 53.5 44 58	40.1	11 19.7 43 57	39.2	11 45.7 43 56	38.3	12 11.5 43 55	37.4	12 49.8 42 53	36.0	3
4	8 43.5 46 62	43.0	9 10.9 45 60	42.1	9 51.6 45 59	40.7	10 18.6 45 58	39.8	10 45.4 45 57	38.9	11 12.1 44 56	38.0	11 38.6 44 54	37.1	12 18.0 44 53	35.7	4
105	8 06.6 47 61	42.7	8 34.5 46 60	41.8	9 16.2 46 58	40.4	9 43.9 46 58	39.5	10 11.3 46 56	38.6	10 38.7 45 55	37.7	11 05.9 45 54	36.8	11 46.4 45 52	35.4	105
6	7 29.8 48 61	42.3	7 58.4 48 60	41.5	8 41.1 47 58	40.1	9 09.4 47 57	39.2	9 37.5 47 56	38.3	10 05.5 47 55	37.4	10 33.4 46 54	36.5	11 14.9 46 52	35.2	6
7	6 53.3 49 60	42.0	7 22.5 49 59	41.1	8 06.1 48 58	39.8	8 35.1 48 57	38.9	9 03.9 48 56	38.0	9 32.6 48 54	37.1	10 01.1 47 53	36.2	10 43.7 47 52	34.9	7
8	6 17.0 50 60	41.7	6 46.9 50 59	40.8	7 31.5 49 58	39.5	8 01.0 49 56	38.6	8 30.5 49 55	37.7	8 59.9 49 54	36.8	9 29.1 49 53	35.9	10 12.7 48 51	34.6	8
9	5 41.0 51 60	41.3	6 11.5 51 59	40.4	6 57.0 50 57	39.1	7 27.2 50 56	38.3	7 57.4 50 55	37.4	8 27.4 50 54	36.5	8 57.3 50 53	35.6	9 41.9 49 51	34.3	9
110	5 05.3 52 59	40.9	5 36.3 52 58	40.1	6 22.8 52 56	38.8	6 53.7 51 56	37.9	7 24.5 51 54	37.1	7 55.2 51 53	36.2	8 25.7 51 52	35.3	9 11.4 51 50	34.0	110
1			5 01.5 53 58	39.7	5 48.9 53 56	38.4	6 20.4 52 55	37.6	6 51.8 52 54	36.7	7 23.2 52 53	35.9	7 54.4 52 52	35.0	8 41.1 52 50	33.7	1
2					5 15.2 54 56	38.1	5 47.3 54 54	37.2	6 19.4 53 54	36.4	6 51.4 53 52	35.5	7 23.3 53 51	34.7	8 11.0 53 50	33.4	2
3							5 14.6 55 54	36.9	5 47.3 54 53	36.1	6 19.9 54 52	35.2	6 52.5 54 51	34.4	7 41.2 54 49	33.1	3
4									5 15.4 56 53	35.7	5 48.7 55 52	34.9	6 22.0 55 50	34.0	7 11.6 55 49	32.8	4
115											5 17.8 57 51	34.5	5 51.7 56 50	33.7	6 42.3 56 48	32.4	115
6													5 21.7 58 50	33.3	6 13.3 57 48	32.1	6
7															5 44.6 58 48	31.8	7
8															5 16.1 60 47	31.4	8

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 25°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	60 30.0	1.0 01	00.0	60 00.0	1.0 01	00.0	59 00.0	1.0 01	00.0	58 30.0	1.0 01	00.0	58 00.0	1.0 01	00.0	57 30.0	1.0 01	00.0	56 00.0	1.0 01	00.0	55 30.0	1.0 01	00.0	00
1	60 29.4	1.0 03	01.2	59 59.5	1.0 03	01.1	58 59.5	1.0 02	01.1	58 29.5	1.0 02	01.1	57 59.5	1.0 02	01.0	57 29.5	1.0 02	01.0	55 59.6	1.0 02	00.9	55 29.6	1.0 02	00.9	1
2	60 27.8	1.0 05	02.4	59 57.8	1.0 04	02.3	58 57.9	1.0 04	02.2	58 28.0	1.0 04	02.1	57 58.0	1.0 04	02.1	57 28.1	1.0 04	02.0	55 58.3	1.0 04	01.8	55 28.3	1.0 04	01.8	2
3	60 25.0	1.0 06	03.5	59 55.1	1.0 06	03.4	58 55.4	1.0 06	03.3	58 25.5	1.0 06	03.2	57 55.6	1.0 06	03.1	57 25.7	1.0 06	03.0	55 56.1	1.0 05	02.8	55 26.2	1.0 05	02.7	3
4	60 21.1	99 08	04.7	59 51.3	99 08	04.6	58 51.8	99 08	04.3	58 22.0	99 08	04.2	57 52.2	99 07	04.1	57 22.4	99 07	04.0	55 53.0	99 06	03.7	55 23.2	99 06	03.6	4
05	60 16.1	99 10	05.9	59 46.4	99 10	05.7	58 47.2	99 09	05.4	58 17.5	99 09	05.3	57 47.8	99 09	05.1	57 18.2	99 09	05.0	55 49.1	99 08	04.6	55 19.4	99 08	04.5	05
6	60 10.0	98 12	07.0	59 40.5	98 12	06.8	58 41.5	98 11	06.5	58 12.0	98 11	06.3	57 42.5	98 10	06.1	57 13.0	98 10	06.0	55 44.3	99 09	05.5	55 14.8	99 09	05.3	6
7	60 02.8	98 14	08.1	59 33.5	98 13	07.9	58 34.9	98 13	07.5	58 05.6	98 12	07.3	57 36.3	98 12	07.1	57 06.9	98 12	06.9	55 38.7	98 11	06.4	55 09.3	98 10	06.2	7
8	59 54.6	97 16	09.3	59 25.5	97 15	09.0	58 27.3	97 14	08.6	57 58.2	97 14	08.3	57 29.1	97 14	08.1	56 59.9	97 13	07.9	55 32.2	97 12	07.3	55 03.0	98 12	07.1	8
9	59 45.3	96 17	10.4	59 16.5	96 17	10.1	58 18.8	96 16	09.6	57 49.9	96 16	09.3	57 20.9	96 15	09.1	56 52.0	97 15	08.8	55 24.9	97 14	08.2	54 55.9	97 13	07.9	9
10	59 35.0	95 19	11.5	59 06.4	95 18	11.2	58 09.2	95 18	10.6	57 40.6	96 17	10.3	57 11.9	96 16	10.1	56 43.2	96 16	09.8	55 16.8	96 15	09.0	54 48.0	96 14	08.8	10
1	59 23.6	94 20	12.6	58 55.4	94 20	12.2	57 58.8	95 19	11.6	57 30.4	95 18	11.3	57 01.9	95 18	11.0	56 33.5	95 18	10.7	55 07.9	95 16	09.9	54 39.3	95 16	09.6	1
2	59 11.3	93 22	13.6	58 43.4	93 22	13.3	57 47.4	94 20	12.6	57 19.3	94 20	12.3	56 51.1	94 20	12.0	56 22.9	94 19	11.6	54 58.1	94 18	10.8	54 29.8	95 17	10.5	2
3	58 58.0	92 24	14.7	58 30.4	92 23	14.3	57 35.0	92 22	13.6	57 07.3	93 22	13.2	56 39.4	93 21	12.9	56 11.5	93 20	12.5	54 47.6	94 19	11.6	54 19.5	94 18	11.3	3
4	58 43.7	91 25	15.7	58 16.5	91 25	15.3	57 21.8	91 24	14.5	56 54.4	92 23	14.2	56 26.9	92 22	13.8	55 59.3	92 22	13.4	54 36.3	93 20	12.4	54 08.5	93 20	12.1	4
15	58 28.6	89 27	16.7	58 01.7	90 26	16.3	57 07.8	90 25	15.5	56 40.7	90 24	15.1	56 13.5	91 24	14.7	55 46.3	91 23	14.3	54 24.2	92 21	13.2	53 56.7	92 21	12.9	15
6	58 12.5	88 28	17.7	57 46.0	88 28	17.2	56 52.8	89 26	16.4	56 26.1	89 26	16.0	55 59.3	89 25	15.6	55 32.4	90 24	15.2	54 11.4	90 23	14.0	53 44.2	91 22	13.7	6
7	57 55.5	87 30	18.6	57 29.5	87 29	18.2	56 37.1	88 28	17.3	56 10.8	88 27	16.9	55 44.3	88 26	16.4	55 17.8	89 26	16.0	53 57.8	89 24	14.8	53 31.0	90 23	14.5	7
8	57 37.7	85 31	19.6	57 12.1	86 30	19.1	56 20.5	86 29	18.2	55 54.6	87 28	17.7	55 28.6	87 28	17.3	55 02.4	87 27	16.8	53 43.5	88 25	15.6	53 17.1	88 24	15.2	8
9	57 19.1	84 32	20.5	56 53.9	84 32	20.0	56 03.2	85 30	19.0	55 37.7	85 30	18.6	55 12.0	86 29	18.1	54 46.3	86 28	17.7	53 28.6	87 26	16.4	53 02.5	87 26	16.0	9
20	56 59.7	82 34	21.4	56 34.9	83 33	20.9	55 45.1	83 32	19.9	55 20.0	84 31	19.4	54 54.8	84 30	18.9	54 29.5	85 29	18.4	53 12.9	86 27	17.1	52 47.2	86 27	16.7	20
1	56 39.4	81 35	22.2	56 15.2	81 34	21.7	55 26.2	82 33	20.7	55 01.6	82 32	20.2	54 36.8	83 31	19.7	54 11.9	83 30	19.2	52 56.6	84 28	17.8	52 31.2	85 28	17.4	1
2	56 18.5	79 36	23.1	55 54.7	80 35	22.5	55 06.7	80 34	21.5	54 42.5	81 33	21.0	54 18.1	81 32	20.5	53 53.7	82 32	20.0	52 39.6	83 29	18.5	52 14.7	83 29	18.1	2
3	55 56.8	77 37	23.9	55 33.5	78 36	23.3	54 46.4	79 35	22.3	54 22.7	79 34	21.7	53 58.8	80 33	21.2	53 34.8	80 33	20.7	52 22.0	81 30	19.2	51 57.5	82 30	18.8	3
4	55 34.4	76 38	24.7	55 11.6	76 38	24.1	54 25.5	77 36	23.0	54 02.2	78 35	22.5	53 38.8	78 34	21.9	53 15.2	79 34	21.4	52 03.8	80 31	19.9	51 39.7	80 31	19.4	4
25	55 11.4	74 40	25.5	54 49.0	75 39	24.9	54 03.9	76 37	23.7	53 41.1	76 36	23.2	53 18.1	77 35	22.7	52 55.0	77 34	22.1	51 44.9	79 32	20.6	51 21.3	79 32	20.1	25
6	54 47.7	72 40	26.2	54 25.9	73 40	25.6	53 41.7	74 38	24.5	53 19.4	75 37	23.9	52 56.9	75 36	23.3	52 34.3	76 36	22.8	51 25.5	77 33	21.2	51 02.3	78 32	20.7	6
7	54 23.4	71 42	26.9	54 02.0	71 41	26.3	53 18.9	72 39	25.1	52 57.1	73 38	24.6	52 35.1	74 37	24.0	52 12.9	74 36	23.5	51 05.6	76 34	21.9	50 42.8	76 33	21.3	7
8	53 58.4	69 42	27.6	53 37.6	70 42	27.0	52 55.5	71 40	25.8	52 34.2	71 39	25.2	52 12.6	72 38	24.7	51 51.0	72 38	24.1	50 45.0	74 35	22.5	50 22.8	74 34	21.9	8
9	53 33.0	67 44	28.3	53 12.7	68 42	27.7	52 31.5	69 41	26.5	52 10.7	70 40	25.9	51 49.7	70 39	25.3	51 28.5	71 38	24.7	50 24.0	72 36	23.1	50 02.2	73 35	22.5	9
30	53 06.9	66 44	28.9	52 47.2	66 43	28.3	52 07.0	67 42	27.1	51 46.7	68 41	26.5	51 26.2	69 40	25.9	51 05.5	69 39	25.3	50 02.4	71 37	23.6	49 41.1	71 36	23.1	30
1	52 40.4	64 45	29.6	52 21.1	65 44	28.9	51 42.0	66 42	27.7	51 22.2	66 42	27.1	51 02.2	67 41	26.5	50 42.0	68 40	25.9	49 40.4	69 38	24.2	49 19.5	70 37	23.6	1
2	52 13.3	62 46	30.2	51 54.6	63 45	29.5	51 16.5	64 43	28.3	50 57.2	65 42	27.7	50 37.7	65 42	27.1	50 18.0	66 41	26.5	49 17.9	68 38	24.7	48 57.5	68 38	24.2	2
3	51 45.7	60 47	30.7	51 27.5	61 46	30.1	50 50.5	62 44	28.8	50 31.7	63 43	28.2	50 12.7	64 42	27.6	49 53.5	64 42	27.0	48 54.9	66 39	25.3	48 35.0	67 38	24.7	3
4	51 17.7	59 47	31.3	51 00.0	59 46	30.6	50 24.1	61 45	29.4	50 05.8	61 44	28.8	49 47.3	62 43	28.1	49 28.6	63 42	27.5	48 31.5	64 40	25.8	48 12.1	65 39	25.2	4
35	50 49.3	57 48	31.8	50 32.1	58 47	31.2	49 57.2	59 46	29.9	49 39.4	60 45	29.3	49 21.4	60 44	28.7	49 03.2	61 43	28.1	48 07.6	63 40	26.3	47 48.7	63 40	25.7	35
6	50 20.4	55 49	32.3	50 03.8	56 48	31.7	49 29.8	57 46	30.4	49 12.6	58 45	29.8	48 55.1	59 44	29.2	48 37.5	59 44	28.5	47 43.3	61 41	26.7	47 24.9	62 40	26.2	6
7	49 51.1	53 50	32.8	49 35.0	54 49	32.2	49 02.1	55 47	30.9	48 45.4	56 46	30.3	48 28.4	57 45	29.6	48 11.3	58 44	29.0	47 18.7	59 42	27.2	47 00.7	60 41	26.6	7
8	49 21.4	52 50	33.3	49 05.8	52 49	32.6	48 34.0	54 48	31.3	48 17.8	54 47	30.7	48 01.4	55 46	30.1	47 44.7	56 45	29.5	46 53.6	58 42	27.6	46 36.2	58 42	27.1	8
9	48 51.4	50 51	33.7	48 36.3	51 50	33.1	48 05.6	52 48	31.8	47 49.8	53 47	31.2	47 33.9	53 46	30.5	47 17.8	54 46	29.9	46 28.2	56 43	28.1	46 11.3	57 42	27.5	9
40	48 21.0	48 51	34.2	48 06.5	49 50	33.5	47 36.7	50 49	32.2	47 21.5	51 48	31.6	47 06.1	52 47	31.0	46 50.5	52 46	30.3	46 02.4	54 44	28.5	45 46.0	55 43	27.9	40
1	47 50.3	46 52	34.6	47 36.3	47 51	33.9	47 07.6	49 49	32.6	46 52.9	49 48	32.0	46 38.0	50 48	31.4	46 22.9	51 47	30.7	45 36.3	53 44	28.9	45 20.4	53 43	28.3	1
2	47 19.3	45 52	35.0	47 05.8	45 51	34.3	46 38.1	47 50	33.0	46 23.9	48 49	32.4	46 09.5	48 48	31.7	45 54.9	49 47	31.1	45 09.9	51 44	29.3	44 54.5	52 44	28.7	2
3	46 48.0	43 53	35.3	46 35.0	44 52	34.7	46 08.3	45 50	33.4	45 54.6	46 49	32.8	45 40.8	47 48	32.1	45 26.7	47 48	31.5	44 43.2	49 45	29.6	44 28.3	50 44	29.0	3
4	46 16.4	41 53	35.7	46 03.9	42 52	35.0	45 38.2	43 50	33.8	45 25.1	44 50	33.1	45 11.7	45 49	32.5	44 58.1	46 48	31.8	44 16.2	48 46	30.0	44 01.8	48 45	29.4	4
45	45 44.5	40 54	36.0	45 32.5	40 53	35.4	45 07.9	42 51	34.1	44 55.2	43 50	33.4	44 42.4	43 49	32.8	44 29.3	44 48	32.2	43 48.8	46 46	30.3	43 35.0	47 45	29.7	45
6	45 12.4	38 54	36.4	45 00.9	39 53	35.7	44 37.3	40 52	34.4	44 25.1	41 50	33.8	44 12.8	42 50	33.1	44 00.2	42 49	32.5	43 21.3	44 46	30.6	43 07.9	45 46	30.0	6
7	44 40.1	36 54	36.7	44 29.1	37 54	36.0	44 06.4	38 52	34.7	43 54.8	39 51	34.1	43 42.9	40 50	33.4	43 30.9	41 49	32.8	42 53.4	43 47	30.9	42 40.6	43 46	30.3	7
8	44 07.5	35 55	37.0	43 57.0	35 54	36.3	43 35.3	37 52	35.0	43 24.2	37 51	34.4	43 12.8	38 50	33.7	43 01.3	39 50	33.1	42 25.4	41 47	31.2	42 13.0	42 46	30.6	8
9	43 34.7	33 55	37.2	43 24.7	34 54	36.6	43 04.0	35 52	35.3	42 53.4	36 52	34.6	42 42.5	37 51	34.0	42 31.5	37 50	33.4	41 57.0	39 48	31.5	41 45.2	40 47	30.9	9
50	43 01.7	31 55	37.5	42 52.2	32 54	36.8	42 32.5	33 53	35.5	42 22.4	34 52	34.9	42 12.0	35 51	34.3	42 01.4	36 50	33.6	41 28.5	38 48	31.8	41 17.1	38 47	31.2	50
1	42 28.5	30 56	37.7	42 19.5	30 55	37.1	42 00.8	32 53	35.8	41 51.2	33 52	35.2	41 41.3	33 52	34.5	41 31.2	34 51	33.9	40 59.8	36 48	32.0	40 48.9	37 47	31.4	1
2	41 55.1	28 56	38.0	41 46.6	29 55	37.3	41 28.9	30 54	36.0	41 19.8	31 53	35.4	41 10.4	32 52	34.8	41 00.8	32 51	34.1	40 38.8	34 48	32.3	40 20.5	35 48	31.6	2
3	41 21.6	26 56	38.2	41 13.6	27 55	37.5	40 56.8	29 54	36.2	40 48.2	29 53	35.6	40 39.3	30 52	35.0	40 30.2	31 51	34.4	40 01.7	33 49	32.5	39 51.8	33 48	31.9	3
4	40 47.9	25 56	38.4	40 40.4	26 56	37.7	40 24.6	27 54	36.5	40 16.4	28 53	35.8	40 08.0	28 52	35.2	39 59.4	29 52	34.6	39 32.4	31 49	32.7	39 23.0	32 48	32.1	4
55	40 14.1	23 56	38.5	40 07.0	24 56	37.9	39 52.2	25 54	36.6	39 44.5	26 53	36.0	39 36.6	27 53	35.4	39 28.5	27 52	34.8	39 03.0	29 49	32.9	38 54.1	30 49	32.3	55
6	39 40.2	22 57	38.7	39 33.6	22 56	38.1	39 19.7	24 54	36.8	39 12.5	24 54	36.2	39 05.0	25 53	35.6	38 57.4	26 52	34.9	38 33.3	28 50	33.1	38 24.9	28 49	32.5	6
7	39 06.1	20 57	38.9	39 00.0	21 56	38.2	38 47.1	22 55	37.0	38 40.3	23 54	36.4	38 33.4	24 53	35.7	38 26.2	24 52	35.1	38 03.6	26 50	33.3	37 55.7	27 49	32.7	7
8	38 31.9	19 57	39.0	38 26.2	19 56	38.4	38 14.3	21 55	37.1	38 08.0	21 54	36.5	38 01.5	22 53	35.9	37 54.9	23 52	35.3	37 33.7	24 50	33.4	37 26.3	25 49	32.8	8
9	37 57.6	17 57	39.1	37 52.4	18 56	38.5	37 41.4	19 55	37.3	37 35.6	20 54	36.7	37 29.6	20 53	36.0	37 23.4	21 53	35.4	37 03.7	23 50	33.6	36 56.7	23 49	33.0	9
60	37 23.3	16 58	39.3	37 18.5	16 57	38.6	37 08.4	17 55	37.4	37 03.1	18 54	36.8	36 57.5	19 54	36.2	36 51.8	19 53	35.6	36 33.5	21 50	33.7	36 27.1	22 50	33.1	60
1	36 48.8	14 58	39.4	36 44.5	15 57	38.8	36 35.3	16 55	37.5	36 30.5	17 54	36.9	36 25.4	17 54	36.3	36 20.1	18 53	35.7	36 03.3	20 50	33.9	35 57.3	20 50	33.3	1
2	36 14.3	13 58	39.5	36 10.4	13 57	38.9	36 02.2	14 55	37.6	35 57.8	15 55	37.0	35 53.2	16 54	36.4	35 48.4	16 53	35.8	35 32.9	18 51	34.0	35 27.4	19 50	33.4	2
3	35 39.7	11 58	39.6	35 36.3	12 57	38.9	35 28.9	13 56	37.7	35 25.0	13 55	37.1	35 20.8	14 54	36.5	35 16.5	15 53	35.9	35 02.5	17 51	34.1	34 57.5	17 50	33.5	3
4	35 05.0	10 58	39.6	35 02.1	10 57	39.0	34 55.6	11 56	37.8	34 52.1	12 55	37.2	34 48.5	13 54	36.6	34 44.6	13 53	36.0	34 32.0	15 51	34.2	34 27.4	16 50	33.6	4
65	34 30.3	08 58	39.7	34 27.8	09 57	39.1	34 22.3	10 56	37.9	34 19.2	10 55	37.3	34 16.0	11 54	36.7	34 12.6	12 53	36.1	34 01.4	13 51	34.3	33 57.3	14 50	33.7	65
6	33 55.6	07 58	39.7	33 53.5	07 57	39.1	33 48.8	08 56	37.9	33 46.3	09 55	37.3	33 43.5	09 54	36.7	33 40.6	10 54	36.1	33 30.7	12 51	34.4	33 27.1	12 50	33.8	6
7	33 20.8	06 58	39.8	33 19.2	06 57	39.2	33 15.4	07 56	38.0	33 13.3	07 55	37.4	33 10.9	08 54	36.8	33 08.5	09 54	36.2	33 00.0	10 51	34.5	32 56.9	11 50	33.8	7
8	32 46.0	04 58	39.8	32 44.8	04 57	39.2	32 41.9	06 56	38.0	32 40.2	06 55	37.4	32 38.4	06 54	36.8	32 36.3	07 54	36.3	32 29.2	09 51	34.5	32 26.6	09 51	33.9	8
9	32 11.2	02 58	39.8	32 10.4	03 57	39.2	32 08.4	04 56	38.1	32 07.1	04 55	37.5	32 05.7	05 54	36.9	32 04.2	06 54	36.3	31 58.4	07 51	34.5	31 56.2	08 51	33.9	9
70	31 36.3	01 58	39.8	31 36.0	01 57	39.3	31 34.9	02 56	38.1	31 34.0	03 55	37.5	31 33.1	03 54	36.9	31 32.0	04 54	36.3	31 27.6	06 52	34.6	31 25.8	06 51	34.0	70
1	31 01.5	01 58	39.8	31 01.6	00 57	39.3	31 01.3	01 56	38.1	31 00.9	01 55	37.5	31 00.4	02 54	36.9	30 59.7	03 54	36.3	30 56.7	04 52	34.6	30 55.4	05 51	34.0	1
2	30 26.6	02 58	39.8	30 27.2	02 57	39.3	30 27.8	00 56	38.1	30 27.8	00 55	37.5	30 27.7	01 54	36.9	30 27.5	01 54	36.4	30 25.9	03 52	34.6	30 25.0	03 51	34.0	2
3	29 51.8	03 58	39.8	29 52.8	03 57	39.2	29 54.2	02 56	38.1	29 54.7	01 55	37.5	29 55.1	01 54	36.9	29 55.3	00 54	36.4	29 55.0	01 52	34.6	29 54.6	02 51	34.1	3
4	29 17.0	05 58	39.8	29 18.4	04 57	39.2	29 20.7	03 56	38.1	29 21.6	03 55	37.5	29 22.4	02 54	36.9	29 23.0	02 54	36.4	29 24.1	00 52	34.6	29 24.1	00 51	34.1	4
75	28 42.2	06 58	39.8	28 44.0	06 57	39.2	28 47.1	05 56	38.0	28 48.5	04 55	37.5	28 49.7	04 54	36.9	28 50.8	03 54	36.3	28 53.2	02 52	34.6	28 53.7	01 51	34.1	75
6	28 07.4	08 58	39.7	28 09.7	07 57	39.1	28 13.6	06 56	38.0	28 15.4	06 55	37.4	28 17.1	06 54	36.9	28 18.6	06 54	36.3	28 22.3	03 52	34.6	28 23.2	03 51	34.0	6
7	27 32.7	09 58	39.7	27 35.3	09 57	39.1	27 40.2	08 56	38.0	27 42.4	07 55	37.4	27 44.5	07 54	36.8	27 46.4	08 54	36.3	27 51.4	05 52	34.6	27 52.8	04 51	34.0	7
8	26 58.0	10 58	39.6	27 01.1	10 57	39.0	27 06.7	09 56	37.9	27 09.4	09 55	37.4	27 11.9	08 54	36.8	27 14.2	08 54	36.2	27 20.5	06 51	34.6	27 22.4	06 51	34.0	8
9	26 23.4	12 58	39.5	26 26.9	11 57	39.0	26 33.3	10 56	37.9	26 36.4	10 55	37.3	26 39.3	10 54	36.7	26 42.1	09 54	36.2	26 49.7	08 51	34.5	26 52.0	07 51	34.0	9
80	25 48.8	13 58	39.4	25 52.7	13 57	38.9	26 00.0	12 56	37.8	26 03.5	11 55	37.2	26 06.8	11 54	36.7	26 10.0	11 53	36.1	26 18.9	09 51	34.5	26 21.6	09 50	33.9	80
1	25 14.3	14 57	39.4	25 18.6	14 57	38.8	25 26.7	13 55	37.7	25 30.6	13 55	37.2	25 34.4	12 54	36.6	25 38.0	12 53	36.1	25 48.2	11 51	34.4	25 51.3	10 50	33.9	1
2	24 39.9	16 57	39.3	24 44.5	15 57	38.7	24 53.5	15 55	37.6	24 57.8	14 55	37.1	25 02.0	14 54	36.5	25 06.0	13 53	36.0	25 17.5	12 51	34.3	25 21.0	12 50	33.8	2
3	24 05.5	17 57	39.2	24 10.6	17 56	38.6	24 20.3	16 55	37.5	24 25.0	16 54	37.0	24 29.6	15 54	36.4	24 34.1	15 53	35.9	24 46.8	14 51	34.3	24 50.8	13 50	33.7	3
4	23 31.2	18 57	39.0	23 36.7	18 56	38.5	23 47.2	17 55	37.4	23 52.4	17 54	36.9	23 57.4	16 54	36.3	24 02.2	16 53	35.8	24 16.2	15 51	34.2	24 20.7	15 50	33.6	4
85	22 57.0	20 57	38.9	23 02.9	19 56	38.4	23 14.2	19 55	37.3	23 19.7	18 54	36.8	23 25.2	18 54	36.2	23 30.5	18 53	35.7	23 45.7	16 51	34.1	23 50.6	16 50	33.6	85
6	22 22.9	21 57	38.8	22 29.1	21 56	38.3	22 41.3	20 55	37.2	22 47.2	20 54	36.7	22 53.1	19 53	36.1	22 58.8	19 53	35.6	23 15.3	18 51	34.0	23 20.6	17 50	33.5	6
7	21 48.9	23 56	38.7	21 55.5	22 56	38.1	22 08.5	21 54	37.1	22 14.8	21 54	36.5	22 21.0	21 53	36.0	22 27.2	20 53	35.5	22 44.9	19 50	33.9	22 50.6	19 50	33.4	7
8	21 15.0	24 56	38.5	21 22.0	23 56	38.0	21 35.7	23 54	36.9	21 42.5	22 54	36.4	21 49.1	22 53	35.9	21 55.6	22 52	35.4	22 14.6	21 50	33.8	22 20.7	20 50	33.3	8
9	20 41.2	25 56	38.4	20 48.6	25 56	37.8	21 03.1	24 54	36.8	21 10.2	24 54	36.3	21 17.3	23 53	35.8	21 24.2	23 52	35.2	21 44.4	22 50	33.7	21 51.0	22 50	33.1	9
90	20 07.5	26 56	38.2	20 15.3	25 55	37.7	20 30.6	25 54	36.7	20 38.1	25 53	36.1	20 45.5	25 53	35.6	20 52.9	24 52	35.1	21 14.3	23 50	33.5	21 21.3	23 49	33.0	90

Lat. 25°

H.A.	54° 30′ Alt.	Δd	Δt	Az.	55° 00′ Alt.	Δd	Δt	Az.	56° 00′ Alt.	Δd	Δt	Az.	56° 30′ Alt.	Δd	Δt	Az.	57° 00′ Alt.	Δd	Δt	Az.	57° 30′ Alt.	Δd	Δt	Az.	59° 00′ Alt.	Δd	Δt	Az.	59° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	10 30.0	1.0	00	180.0	10 00.0	1.0	00	180.0	9 00.0	1.0	00	180.0	8 30.0	1.0	00	180.0	8 00.0	1.0	00	180.0	7 30.0	1.0	00	180.0	6 00.0	1.0	00	180.0	5 30.0	1.0	00	180.0	00
1	10 29.7	1.0	01	179.4	9 59.7	1.0	01	179.4	8 59.7	1.0	01	179.4	8 29.7	1.0	01	179.4	7 59.7	1.0	01	179.5	7 29.7	1.0	01	179.5	5 59.8	1.0	01	179.5	5 29.8	1.0	01	179.5	1
2	10 28.9	1.0	02	178.8	9 58.9	1.0	02	178.8	8 58.9	1.0	02	178.9	8 28.9	1.0	02	178.9	7 59.0	1.0	02	178.9	7 29.0	1.0	02	178.9	5 59.0	1.0	02	179.0	5 29.0	1.0	02	179.0	2
3	10 27.5	1.0	03	178.2	9 57.5	1.0	03	178.3	8 57.6	1.0	03	178.3	8 27.6	1.0	03	178.3	7 57.7	1.0	03	178.4	7 27.7	1.0	03	178.4	5 57.8	1.0	03	178.4	5 27.8	1.0	03	178.5	3
4	10 25.5	1.0	04	177.6	9 55.6	1.0	04	177.7	8 55.7	1.0	04	177.7	8 25.8	1.0	04	177.8	7 55.8	1.0	04	177.8	7 25.9	1.0	04	177.8	5 56.1	1.0	04	177.9	5 26.1	1.0	04	178.0	4
05	10 23.0	1.0	05	177.1	9 53.1	1.0	05	177.1	8 53.3	1.0	05	177.2	8 23.4	1.0	05	177.2	7 53.5	1.0	05	177.3	7 23.6	1.0	05	177.3	5 53.9	1.0	04	177.4	5 24.0	1.0	04	177.5	05
6	10 19.9	1.0	06	176.5	9 50.1	1.0	06	176.5	8 50.3	1.0	06	176.6	8 20.5	1.0	06	176.7	7 50.6	1.0	06	176.7	7 20.8	1.0	06	176.8	5 51.2	1.0	05	176.9	5 21.3	1.0	06	176.9	6
7	10 16.3	99	07	175.9	9 46.5	99	07	175.9	8 46.9	99	07	176.0	8 17.0	99	07	176.1	7 47.2	99	06	176.2	7 17.4	99	06	176.2	5 48.0	99	06	176.4	5 18.2	99	06	176.4	7
8	10 12.1	99	08	175.3	9 42.3	99	08	175.4	8 42.8	99	08	175.5	8 13.1	99	08	175.5	7 43.3	99	07	175.6	7 13.6	99	07	175.7	5 44.3	99	07	175.9	5 14.5	99	07	175.9	8
9	10 07.4	99	09	174.7	9 37.7	99	09	174.8	8 38.3	99	08	174.9	8 08.6	99	08	175.0	7 38.9	99	08	175.1	7 09.2	99	08	175.1	5 40.1	99	08	175.4	5 10.4	99	08	175.4	9
10	10 02.1	99	10	174.1	9 32.5	99	10	174.2	8 33.2	99	09	174.4	8 03.6	99	09	174.4	7 34.0	99	09	174.5	7 04.4	99	09	174.6	5 35.5	99	08	174.8	5 05.9	99	08	174.9	10
1	9 56.2	98	11	173.5	9 26.7	98	10	173.6	8 27.6	98	10	173.8	7 58.1	98	10	173.9	7 28.5	98	10	174.0	6 59.0	98	10	174.1	5 30.4	98	09	174.3	5 00.8	98	09	174.4	1
2	9 49.8	98	12	173.0	9 20.4	98	11	173.1	8 21.5	98	11	173.3	7 52.0	98	11	173.3	7 22.6	98	11	173.4	6 53.1	98	10	173.5	5 24.8	98	10	173.8					2
3	9 42.9	98	12	172.4	9 13.5	98	12	172.5	8 14.8	98	12	172.7	7 45.5	98	12	172.8	7 16.1	98	12	172.9	6 46.8	98	12	173.0	5 18.7	98	11	173.3					3
4	9 35.4	97	13	171.8	9 06.2	98	13	171.9	8 07.7	98	13	172.1	7 38.4	98	13	172.3	7 09.2	98	12	172.4	6 39.9	98	12	172.5	5 12.1	98	12	172.8					4
15	9 27.4	97	14	171.2	8 58.3	97	14	171.4	8 00.0	97	14	171.6	7 30.8	97	14	171.7	7 01.7	97	13	171.8	6 32.5	97	13	172.0	5 05.1	97	13	172.3					15
6	9 18.8	97	15	170.7	8 49.8	97	15	170.8	7 51.8	97	14	171.0	7 22.7	97	14	171.2	6 53.7	97	14	171.3	6 24.7	97	14	171.4									6
7	9 09.8	96	16	170.1	8 40.9	96	16	170.2	7 43.1	96	15	170.5	7 14.1	96	15	170.6	6 45.2	96	15	170.8	6 16.3	96	15	170.9									7
8	9 00.1	96	17	169.5	8 31.4	96	17	169.7	7 33.8	96	16	170.0	7 05.0	96	16	170.1	6 36.3	96	16	170.2	6 07.5	96	16	170.4									8
9	8 50.0	95	18	169.0	8 21.4	95	18	169.1	7 24.1	95	17	169.4	6 55.5	95	17	169.6	6 26.8	95	16	169.7	5 58.2	96	16	169.9									9
20	8 39.3	95	18	168.4	8 10.9	95	18	168.6	7 13.9	95	18	168.9	6 45.4	95	18	169.0	6 16.9	95	17	169.2	5 48.4	95	17	169.4									20
1	8 28.2	94	20	167.9	7 59.8	94	19	168.0	7 03.1	94	19	168.4	6 34.8	95	18	168.5	6 06.4	95	18	168.7	5 38.1	95	18	168.8									1
2	8 16.5	94	20	167.3	7 48.3	94	20	167.5	6 51.9	94	20	167.8	6 23.7	94	19	168.0	5 55.5	94	19	168.2	5 27.3	94	19	168.3									2
3	8 04.3	93	21	166.8	7 36.2	93	21	166.9	6 40.2	93	20	167.3	6 12.2	93	20	167.5	5 44.1	93	20	167.7	5 16.1	93	20	167.8									3
4	7 51.5	93	22	166.2	7 23.7	93	22	166.4	6 28.0	93	21	166.8	6 00.1	93	21	167.0	5 32.3	93	20	167.1	5 04.4	93	20	167.3									4
25	7 38.3	92	23	165.7	7 10.6	92	22	165.9	6 15.3	92	22	166.2	5 47.6	92	22	166.4	5 19.9	92	21	166.6													25
6	7 24.6	92	24	165.1	6 57.1	92	23	165.3	6 02.1	92	23	165.7	5 34.6	92	22	165.9	5 07.1	92	22	166.1													6
7	7 10.4	91	24	164.6	6 43.1	91	24	164.8	5 48.5	91	24	165.2	5 21.2	91	23	165.4																	7
8	6 55.7	90	25	164.1	6 28.6	90	25	164.3	5 34.4	90	24	164.7	5 07.3	90	24	164.9																	8
9	6 40.5	90	26	163.5	6 13.6	90	26	163.8	5 19.8	90	25	164.2																					9
30	6 24.9	89	27	163.0	5 58.2	89	26	163.2	5 04.8	89	26	163.7																					30
1	6 08.8	88	28	162.5	5 42.3	88	27	162.7																									1
2	5 52.2	88	28	162.0	5 25.9	88	28	162.2																									2
3	5 35.1	87	29	161.5	5 09.1	87	29	161.7																									3
4	5 17.6	86	30	161.0																													4

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30′ Alt.	Δd	Δt	Az.	55° 00′ Alt.	Δd	Δt	Az.	56° 00′ Alt.	Δd	Δt	Az.	56° 30′ Alt.	Δd	Δt	Az.	57° 00′ Alt.	Δd	Δt	Az.	57° 30′ Alt.	Δd	Δt	Az.	59° 00′ Alt.	Δd	Δt	Az.	59° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	19 33.9	27	56	38.0	19 42.1	27	55	37.5	19 58.2	27	54	36.5	20 06.1	26	53	36.0	20 13.9	26	52	35.5	20 21.7	26	52	35.0	20 44.3	25	50	33.4	20 51.7	24	49	32.9	91
2	19 00.5	29	56	37.9	19 09.0	28	55	37.4	19 25.9	28	54	36.3	19 34.2	28	53	35.8	19 42.4	27	52	35.3	19 50.6	27	52	34.8	20 14.4	26	50	33.3	20 22.2	26	49	32.8	2
3	18 27.1	30	55	37.7	18 36.1	30	55	37.2	18 53.7	29	53	36.2	19 02.4	29	53	35.7	19 11.0	29	52	35.2	19 19.6	28	52	34.7	19 44.7	27	50	33.1	19 52.9	27	49	32.6	3
4	17 54.0	31	55	37.5	18 03.3	31	54	37.0	18 21.7	30	53	36.0	18 30.8	30	52	35.5	18 39.8	30	52	35.0	18 48.7	30	51	34.5	19 15.0	29	49	33.0	19 23.6	29	48	32.5	4
95	17 20.9	32	55	37.3	17 30.6	32	54	36.8	17 49.8	32	53	35.8	17 59.3	31	52	35.3	18 08.7	31	52	34.8	18 18.0	31	51	34.3	18 45.5	30	49	32.8	18 54.5	30	48	32.3	95
6	16 48.1	34	55	37.1	16 58.1	33	54	36.6	17 18.1	33	53	35.6	17 27.9	33	52	35.1	17 37.7	33	51	34.6	17 47.4	32	51	34.1	18 16.1	31	49	32.6	18 25.5	31	48	32.1	6
7	16 15.3	35	54	36.9	16 25.8	35	54	36.4	16 46.5	34	52	35.4	16 56.7	34	52	34.9	17 06.9	34	51	34.4	17 17.0	34	50	34.0	17 46.8	33	48	32.5	17 56.6	33	48	32.0	7
8	15 42.8	36	54	36.7	15 53.6	6	53	36.2	16 15.0	36	52	35.2	16 25.6	35	52	34.7	16 36.2	35	51	34.2	16 46.7	35	50	33.8	17 17.7	34	48	32.3	17 27.9	34	48	31.8	8
9	15 10.4	37	54	36.5	15 21.5	37	53	36.0	15 43.7	37	52	35.0	15 54.7	37	51	34.5	16 05.7	36	51	34.0	16 16.5	36	50	33.6	16 48.7	35	48	32.1	16 59.3	35	47	31.6	9
100	14 38.1	39	53	36.2	14 49.7	38	53	35.8	15 12.6	38	52	34.8	15 24.0	38	51	34.3	15 35.3	38	50	33.8	15 46.5	37	50	33.4	16 19.9	37	48	31.9	16 30.9	37	47	31.4	100
1	14 06.1	40	53	36.0	14 18.0	40	52	35.5	14 41.7	39	51	34.6	14 53.4	39	51	34.1	15 05.1	39	50	33.6	15 16.7	39	49	33.1	15 51.2	38	48	31.7	16 02.6	38	47	31.2	1
2	13 34.2	41	53	35.8	13 46.5	41	52	35.3	14 10.9	40	51	34.3	14 23.0	40	50	33.9	14 35.1	40	50	33.4	14 47.1	40	49	32.9	15 22.7	39	47	31.5	15 34.5	39	46	31.0	2
3	13 02.5	42	52	35.5	13 15.2	42	52	35.0	13 40.3	42	51	34.1	13 52.8	42	50	33.6	14 05.2	41	49	33.2	14 17.6	41	49	32.7	14 54.4	41	47	31.3	15 06.6	40	46	30.8	3
4	12 31.0	43	52	35.3	12 44.1	43	52	34.8	13 09.9	43	50	33.9	13 22.8	43	50	33.4	13 35.6	43	49	32.9	13 48.3	42	48	32.5	14 26.3	42	47	31.1	14 38.8	42	46	30.6	4
105	11 59.8	45	52	35.0	12 13.1	44	51	34.5	12 39.7	44	50	33.6	12 52.9	44	49	33.2	13 06.1	44	49	32.7	13 19.2	44	48	32.2	13 58.3	43	46	30.8	14 11.2	43	46	30.4	105
6	11 28.7	46	52	34.7	11 42.4	46	51	34.3	12 09.7	45	50	33.4	12 23.3	45	49	32.9	12 36.8	45	48	32.4	12 50.3	45	48	32.0	13 30.5	44	46	30.6	13 43.8	44	45	30.1	6
7	10 57.8	47	51	34.4	11 11.9	47	50	34.0	11 39.9	47	49	33.1	11 53.9	46	49	32.6	12 07.8	46	48	32.2	12 21.6	46	48	31.7	13 02.9	46	46	30.4	13 16.6	46	45	29.9	7
8	10 27.2	48	51	34.2	10 41.6	48	50	33.7	11 10.3	48	49	32.8	11 24.6	48	48	32.4	11 38.9	47	48	31.9	11 53.1	47	47	31.5	12 35.5	47	45	30.1	12 49.6	47	45	29.7	8
9	9 56.7	49	50	33.9	10 11.5	49	50	33.4	10 41.0	49	48	32.6	10 55.6	49	48	32.1	11 10.2	49	47	31.7	11 24.8	49	47	31.2	12 08.3	48	45	29.9	12 22.8	48	44	29.4	9
110	9 26.5	50	50	33.6	9 41.7	50	49	33.1	10 11.8	50	48	32.3	10 26.8	50	48	31.8	10 41.8	50	47	31.4	10 56.8	50	46	30.9	11 41.4	49	45	29.6	11 56.1	49	44	29.2	110
1	8 56.6	52	50	33.3	9 12.1	52	49	32.8	9 42.9	51	48	32.0	9 58.3	51	47	31.5	10 13.6	51	47	31.1	10 28.9	51	46	30.7	11 14.6	51	44	29.4	11 29.7	50	44	28.9	1
2	8 26.9	53	49	33.0	8 42.7	53	48	32.5	9 14.2	52	47	31.7	9 29.9	52	47	31.3	9 45.6	52	46	30.8	10 01.3	52	46	30.4	10 48.0	52	44	29.1	11 03.6	52	43	28.7	2
3	7 57.4	54	49	32.7	8 13.5	54	48	32.2	8 45.8	54	47	31.4	9 01.8	54	46	31.0	9 17.9	53	46	30.5	9 33.9	53	45	30.1	10 21.7	53	44	28.8	10 37.6	53	43	28.4	3
4	7 28.2	55	48	32.3	7 44.7	55	48	31.9	8 17.6	55	47	31.1	8 34.0	55	46	30.7	8 50.4	55	46	30.2	9 06.7	54	45	29.8	9 55.6	54	43	28.5	10 11.9	54	42	28.1	4
115	6 59.2	56	48	32.0	7 16.0	56	47	31.6	7 49.6	56	46	30.8	8 06.4	56	46	30.4	8 23.1	56	45	29.9	8 39.8	56	44	29.5	9 29.8	55	43	28.2	9 46.4	55	42	27.8	115
6	6 30.5	57	47	31.7	6 47.7	57	47	31.3	7 21.9	57	46	30.5	7 39.0	57	45	30.0	7 56.1	57	45	29.6	8 13.2	57	44	29.2	9 04.2	57	42	28.0	9 21.1	56	42	27.5	6
7	6 02.1	58	47	31.4	6 19.6	58	46	30.9	6 54.5	58	45	30.1	7 11.9	58	45	29.7	7 29.4	58	44	29.3	7 46.8	58	44	28.9	8 38.8	58	42	27.7	8 56.1	58	41	27.2	7
8	5 33.9	59	46	31.0	5 51.7	59	46	30.6	6 27.4	59	45	29.8	6 45.1	59	44	29.4	7 02.9	59	44	29.0	7 20.6	59	43	28.6	8 13.7	59	41	27.4	8 31.3	59	41	26.9	8
9	5 06.0	61	46	30.7	5 24.2	61	45	30.3	6 00.5	60	44	29.5	6 18.6	60	44	29.1	6 36.7	60	43	28.7	6 54.7	60	43	28.3	7 48.8	60	41	27.0	8 06.8	60	40	26.6	9
120									5 33.9	61	44	29.1	5 52.3	61	43	28.7	6 10.7	61	43	28.3	6 29.1	61	42	27.9	7 24.2	61	40	26.7	7 42.6	61	40	26.3	120
1									5 07.6	63	43	28.8	5 26.3	63	43	28.4	5 45.1	62	42	28.0	6 03.8	62	42	27.6	6 59.9	62	40	26.4	7 18.6	62	40	26.0	1
2													5 00.6	64	42	28.0	5 19.7	64	42	27.6	5 38.8	64	41	27.3	6 35.9	63	40	26.1	6 54.9	63	39	25.7	2
3																					5 14.0	65	41	26.9	6 12.1	64	39	25.8	6 31.4	64	38	25.4	3
4																									5 48.6	66	39	25.4	6 08.3	65	38	25.0	4
125																									5 25.4	67	38	25.1	5 45.4	67	38	24.7	125
6																									5 02.5	68	38	24.7	5 22.8	68	37	24.4	6
7																													5 00.5	69	37	24.0	7

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 25°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	55 00.0	1.0 01	00.0	54 30.0	1.0 01	00.0	53 00.0	1.0 01	00.0	52 30.0	1.0 01	00.0
1	54 59.6	1.0 02	00.9	54 29.6	1.0 02	00.8	52 59.6	1.0 02	00.8	52 29.6	1.0 02	00.8
2	54 58.3	1.0 04	01.7	54 28.4	1.0 03	01.7	52 58.5	1.0 03	01.6	52 28.6	1.0 03	01.5
3	54 56.3	1.0 05	02.6	54 26.4	1.0 05	02.5	52 56.7	1.0 04	02.3	52 26.8	1.0 04	02.3
4	54 53.4	99 06	03.5	54 23.6	99 06	03.4	52 54.1	99 06	03.1	52 24.2	99 05	03.0
05	54 49.7	99 08	04.3	54 20.0	99 07	04.2	52 50.8	99 07	03.9	52 21.0	99 06	03.8
6	54 45.2	99 09	05.2	54 15.6	99 09	05.1	52 46.7	99 08	04.7	52 17.1	99 08	04.5
7	54 39.8	98 10	06.0	54 10.4	98 10	05.9	52 41.9	98 09	05.4	52 12.4	98 09	05.3
8	54 33.7	98 12	06.9	54 04.4	98 11	06.7	52 36.5	98 10	06.2	52 07.1	98 10	06.0
9	54 26.8	97 13	07.7	53 57.7	97 12	07.5	52 30.2	97 12	06.9	52 01.1	97 11	06.7
10	54 19.1	96 14	08.6	53 50.2	96 14	08.3	52 23.3	97 13	07.7	51 54.3	97 12	07.5
1	54 10.6	96 15	09.4	53 41.9	96 15	09.1	52 15.7	96 14	08.4	51 46.9	96 13	08.2
2	54 01.4	95 17	10.2	53 32.9	95 16	09.9	52 07.4	95 15	09.1	51 38.9	95 15	08.9
3	53 51.4	94 18	11.0	53 23.2	94 17	10.7	51 58.4	94 16	09.9	51 30.1	94 16	09.6
4	53 40.6	93 19	11.8	53 12.7	93 18	11.5	51 48.8	93 17	10.6	51 20.7	94 17	10.3
15	53 29.2	92 20	12.6	53 01.6	92 20	12.2	51 38.5	93 18	11.3	51 10.7	93 18	11.0
6	53 17.0	91 22	13.3	52 49.7	91 21	13.0	51 27.5	92 19	12.0	51 00.0	92 19	11.7
7	53 04.1	90 23	14.1	52 37.1	90 22	13.7	51 15.9	91 20	12.7	50 48.7	91 20	12.3
8	52 50.5	89 24	14.8	52 23.9	89 23	14.4	51 03.6	90 21	13.3	50 36.7	90 21	13.0
9	52 36.3	87 25	15.5	52 10.0	88 24	15.2	50 50.8	88 22	14.0	50 24.2	89 22	13.6
20	52 21.4	86 26	16.3	51 55.5	86 25	15.8	50 37.3	87 23	14.7	50 11.1	88 23	14.3
1	52 05.8	85 27	17.0	51 40.3	85 26	16.5	50 23.3	86 24	15.3	49 57.4	86 24	14.9
2	51 49.7	84 28	17.6	51 24.5	84 27	17.2	50 08.6	85 25	15.9	49 43.1	85 25	15.5
3	51 32.9	82 29	18.3	51 08.2	83 28	17.9	49 53.4	84 26	16.5	49 28.3	84 26	16.1
4	51 15.5	81 30	19.0	50 51.2	81 29	18.5	49 37.7	82 27	17.1	49 12.9	83 26	16.7
25	50 57.5	79 31	19.6	50 33.7	80 30	19.1	49 21.4	81 28	17.7	48 57.0	81 27	17.3
6	50 39.0	78 32	20.2	50 15.6	78 31	19.7	49 04.5	80 29	18.3	48 40.6	80 28	17.9
7	50 19.9	76 33	20.8	49 56.9	77 32	20.3	48 47.2	78 30	18.9	48 23.7	78 29	18.4
8	50 00.3	75 34	21.4	49 37.8	75 33	20.9	48 29.4	77 31	19.4	48 06.3	77 30	18.9
9	49 40.2	73 34	22.0	49 18.1	74 34	21.5	48 11.0	75 31	20.0	47 48.4	76 31	19.5
30	49 19.6	72 35	22.6	48 58.0	72 34	22.0	47 52.2	74 32	20.5	47 30.0	74 31	20.0
1	48 58.5	70 36	23.1	48 37.4	71 35	22.6	47 33.0	72 33	21.0	47 11.2	73 32	20.5
2	48 37.0	69 37	23.6	48 16.3	69 36	23.1	47 13.3	71 34	21.5	46 52.0	71 33	21.0
3	48 14.9	67 37	24.1	47 54.7	68 37	23.6	46 53.1	69 34	22.0	46 32.3	70 34	21.4
4	47 52.5	65 38	24.6	47 32.7	66 37	24.1	46 32.6	68 35	22.4	46 12.2	68 34	21.9
35	47 29.6	64 39	25.1	47 10.4	64 38	24.6	46 11.6	66 36	22.9	45 51.8	67 35	22.4
6	47 06.3	62 40	25.6	46 47.6	63 39	25.0	45 50.3	64 36	23.3	45 30.9	65 36	22.8
7	46 42.7	61 40	26.0	46 24.4	61 39	25.5	45 28.6	63 37	23.8	45 09.6	63 36	23.2
8	46 18.6	59 41	26.5	46 00.8	60 40	25.9	45 06.5	61 38	24.2	44 48.0	62 36	23.6
9	45 54.2	57 41	26.9	45 36.9	58 40	26.3	44 44.0	60 38	24.6	44 26.1	60 37	24.0
40	45 29.4	56 42	27.3	45 12.6	56 41	26.7	44 21.2	58 38	25.0	44 03.8	59 38	24.4
1	45 04.3	54 42	27.7	44 48.1	55 42	27.1	43 58.1	56 39	25.3	43 41.1	57 38	24.8
2	44 38.9	52 43	28.1	44 23.1	53 42	27.5	43 34.7	55 40	25.7	43 18.2	55 39	25.1
3	44 13.2	51 43	28.4	43 57.9	51 42	27.8	43 11.0	53 40	26.0	42 55.0	54 39	25.5
4	43 47.2	49 44	28.8	43 32.4	50 43	28.2	42 47.0	51 40	26.4	42 31.4	52 40	25.8
45	43 20.9	47 44	29.1	43 06.6	48 44	28.5	42 22.7	50 41	26.7	42 07.6	50 40	26.1
6	42 54.3	46 45	29.4	42 40.5	46 44	28.8	41 58.1	48 41	27.0	41 43.6	49 41	26.4
7	42 27.5	44 45	29.7	42 14.2	45 44	29.1	41 33.3	46 42	27.3	41 19.2	47 41	26.7
8	42 00.4	42 46	30.0	41 47.6	43 45	29.4	41 08.2	45 42	27.6	40 54.7	45 41	27.0
9	41 33.1	41 46	30.3	41 20.8	41 45	29.7	40 42.9	43 42	27.9	40 29.9	44 42	27.3
50	41 05.6	39 46	30.5	40 53.8	40 45	29.9	40 17.4	41 43	28.1	40 04.8	42 42	27.5
1	40 37.8	37 46	30.8	40 26.6	38 46	30.2	39 51.6	40 43	28.4	39 39.6	40 42	27.8
2	40 09.9	36 47	31.0	39 59.1	36 46	30.4	39 25.7	38 44	28.6	39 14.1	39 43	28.0
3	39 41.8	34 47	31.3	39 31.5	35 46	30.7	38 59.5	36 44	28.8	38 48.5	37 43	28.2
4	39 13.4	32 48	31.5	39 03.7	33 47	30.9	38 33.2	35 44	29.1	38 22.7	35 43	28.5
55	38 45.0	31 48	31.7	38 35.7	31 47	31.1	38 06.7	33 44	29.3	37 56.7	34 44	28.7
6	38 16.3	29 48	31.9	38 07.5	30 47	31.3	37 40.1	31 45	29.5	37 30.5	32 44	28.9
7	37 47.6	27 48	32.0	37 39.2	28 47	31.4	37 13.2	30 45	29.6	37 04.2	30 44	29.0
8	37 18.6	26 48	32.2	37 10.8	26 48	31.6	36 46.3	28 45	29.8	36 37.7	29 44	29.2
9	36 49.6	24 49	32.4	36 42.2	25 48	31.8	36 19.2	27 45	30.0	36 11.1	27 44	29.4
60	36 20.4	22 49	32.5	36 13.6	23 48	31.9	35 52.0	25 46	30.1	35 44.4	25 45	29.5
1	35 51.1	21 49	32.7	35 44.8	21 48	32.0	35 24.6	23 46	30.3	35 17.6	24 45	29.7
2	35 21.7	19 49	32.8	35 15.9	20 48	32.2	34 57.2	22 46	30.4	34 50.6	22 45	29.8
3	34 52.2	18 49	32.9	34 46.8	18 48	32.3	34 29.6	20 46	30.5	34 23.5	21 45	29.9
4	34 22.7	16 50	33.0	34 17.8	17 49	32.4	34 02.0	18 46	30.6	33 56.4	19 46	30.0
65	33 53.0	14 50	33.1	33 48.6	15 49	32.5	33 34.3	17 46	30.7	33 29.1	17 46	30.1
6	33 23.3	13 50	33.2	33 19.3	13 49	32.6	33 06.4	15 46	30.8	33 01.8	16 46	30.2
7	32 53.5	11 50	33.2	32 50.0	12 49	32.6	32 38.6	14 47	30.9	32 34.4	14 46	30.3
8	32 23.7	10 50	33.3	32 20.7	10 49	32.7	32 10.6	12 47	30.9	32 07.0	13 46	30.4
9	31 53.8	08 50	33.4	31 51.3	09 49	32.8	31 42.6	10 47	31.0	31 39.4	11 46	30.4
70	31 23.9	07 50	33.4	31 21.8	07 49	32.8	31 14.6	09 47	31.1	31 11.9	09 46	30.5
1	30 54.0	05 50	33.4	30 52.3	06 49	32.9	30 46.5	07 47	31.1	30 44.3	08 46	30.5
2	30 24.0	04 50	33.5	30 22.8	04 49	32.9	30 18.4	06 47	31.1	30 16.6	06 46	30.6
3	29 54.0	02 50	33.5	29 53.3	03 49	32.9	29 50.3	04 47	31.2	29 49.0	05 46	30.6
4	29 24.0	01 50	33.5	29 23.8	01 49	32.9	29 22.1	03 47	31.2	29 21.3	03 46	30.6
75	28 54.0	02 50	33.5	28 54.2	00 49	32.9	28 54.0	01 47	31.2	28 53.6	01 46	30.6
6	28 24.0	02 50	33.5	28 24.7	02 49	32.9	28 25.8	01 47	31.2	28 25.9	00 46	30.6
7	27 54.0	04 50	33.5	27 55.1	03 49	32.9	27 57.6	02 47	31.2	27 58.2	02 46	30.6
8	27 24.1	05 50	33.4	27 25.6	05 49	32.9	27 29.5	04 47	31.2	27 30.5	03 46	30.6
9	26 54.1	07 50	33.4	26 56.1	06 49	32.8	27 01.3	05 47	31.2	27 02.8	05 46	30.6
80	26 24.2	08 50	33.4	26 26.6	08 49	32.8	26 33.2	07 47	31.1	26 35.1	06 46	30.6
1	25 54.3	10 50	33.3	25 57.2	09 49	32.7	26 05.1	08 47	31.1	26 07.5	08 46	30.5
2	25 24.5	11 50	33.2	25 27.8	11 49	32.7	25 37.1	10 47	31.0	25 39.9	09 46	30.5
3	24 54.7	13 50	33.2	24 58.5	12 49	32.6	25 09.1	11 47	31.0	25 12.3	11 46	30.4
4	24 25.0	14 50	33.1	24 29.2	14 49	32.6	24 41.1	13 46	30.9	24 44.8	12 46	30.4
85	23 55.3	16 49	33.0	24 00.0	15 49	32.5	24 13.2	14 46	30.9	24 17.3	14 46	30.3
6	23 25.7	17 49	32.9	23 30.8	17 48	32.4	23 45.3	16 46	30.8	23 49.9	15 46	30.2
7	22 56.2	18 49	32.8	23 01.7	18 48	32.3	23 17.5	17 46	30.7	23 22.6	17 46	30.2
8	22 26.8	20 49	32.7	22 32.7	20 48	32.2	22 49.8	19 46	30.6	22 55.3	18 45	30.1
9	21 57.4	21 49	32.6	22 03.7	21 48	32.1	22 22.2	20 46	30.5	22 28.1	20 45	30.0
90	21 28.1	23 49	32.5	21 34.9	22 48	32.0	21 54.6	21 46	30.4	22 01.9	21 45	29.9

H.A.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	52 00.0	1.0 01	00.0	46 00.0	1.0 00	00.0	45 30.0	1.0 00	00.0	40 30.0	1.0 00	00.0
1	51 59.6	1.0 02	00.7	45 59.8	1.0 01	00.5	45 29.8	1.0 01	00.5	40 29.8	1.0 01	00.4
2	51 58.6	1.0 03	01.5	45 59.0	1.0 02	01.0	45 29.1	1.0 02	01.0	40 29.3	1.0 01	00.7
3	51 56.9	1.0 04	02.2	45 57.8	1.0 03	01.5	45 27.9	1.0 03	01.5	40 28.5	1.0 02	01.1
4	51 54.4	99 05	02.9	45 56.1	1.0 04	02.1	45 26.2	1.0 04	02.0	40 27.3	1.0 02	01.4
05	51 51.3	99 06	03.7	45 53.9	99 04	02.6	45 24.1	99 04	02.5	40 25.8	99 03	01.8
6	51 47.4	99 08	04.4	45 51.2	99 05	03.1	45 21.5	99 05	03.0	40 24.0	99 04	02.1
7	51 42.9	98 09	05.1	45 48.0	99 06	03.6	45 18.4	99 06	03.5	40 21.8	99 04	02.4
8	51 37.7	98 10	05.8	45 44.4	98 07	04.1	45 14.9	98 07	04.0	40 19.4	99 05	02.8
9	51 31.9	97 11	06.6	45 40.3	98 08	04.6	45 10.9	98 08	04.5	40 16.5	98 05	03.1
10	51 25.3	97 12	07.3	45 35.7	97 08	05.1	45 06.4	97 08	04.9	40 13.4	98 06	03.5
1	51 18.1	96 13	08.0	45 30.6	97 09	05.6	45 01.5	97 09	05.4	40 09.9	97 06	03.8
2	51 10.3	95 14	08.7	45 25.1	96 10	06.1	44 56.2	96 10	05.9	40 06.1	97 07	04.2
3	51 01.7	95 15	09.3	45 19.1	96 11	06.6	44 50.3	96 10	06.4	40 02.0	96 07	04.5
4	50 52.6	94 16	10.0	45 12.6	95 12	07.1	44 44.1	95 11	06.8	39 57.6	96 08	04.8
15	50 42.8	93 17	10.7	45 05.7	94 12	07.5	44 37.4	94 12	07.3	39 52.9	95 08	05.2
6	50 32.4	92 18	11.4	44 58.3	94 13	08.0	44 30.2	94 13	07.8	39 47.8	95 09	05.5
7	50 21.4	91 19	12.0	44 50.5	93 14	08.5	44 22.6	93 13	08.2	39 42.4	94 09	05.8
8	50 09.8	90 20	12.6	44 42.2	92 14	09.0	44 14.6	92 14	08.7	39 36.8	93 10	06.2
9	49 57.6	89 21	13.3	44 33.5	91 15	09.4	44 06.2	91 15	09.1	39 30.8	92 10	06.5
20	49 44.8	88 22	13.9	44 24.4	90 16	09.9	43 57.4	90 16	09.6	39 24.5	92 11	06.8
1	49 31.5	87 23	14.5	44 14.9	89 17	10.3	43 48.1	89 16	10.0	39 17.9	91 12	07.1
2	49 17.6	85 24	15.1	44 04.9	88 17	10.8	43 38.5	88 17	10.4	39 11.0	90 12	07.4
3	49 03.1	84 25	15.7	43 54.6	87 18	11.2	43 28.4	87 17	10.9	39 03.9	89 12	07.7
4	48 48.1	83 26	16.3	43 43.8	86 19	11.6	43 18.0	86 18	11.3	38 56.4	88 13	08.0
25	48 32.6	82 27	16.8	43 32.6	85 19	12.1	43 07.1	85 19	11.7	38 48.7	87 14	08.3
6	48 16.6	80 28	17.4	43 21.1	84 20	12.5	42 55.9	84 19	12.1	38 40.6	86 14	08.6
7	48 00.1	79 28	17.9	43 09.1	83 20	12.9	42 44.3	83 20	12.5	38 32.4	85 14	08.9
8	47 43.1	77 29	18.5	42 56.8	81 21	13.3	42 32.4	82 20	12.9	38 23.8	84 15	09.2
9	47 25.7	76 30	19.0	42 44.1	80 22	13.7	42 20.1	80 21	13.3	38 14.9	83 15	09.5
30	47 07.7	75 30	19.5	42 31.1	79 22	14.1	42 07.4	79 22	13.7	38 05.8	82 16	09.8
1	46 49.4	73 31	20.0	42 17.7	78 23	14.4	41 54.4	78 22	14.0	37 56.5	81 16	10.1
2	46 30.6	72 32	20.5	42 04.0	76 24	14.8	41 41.0	77 23	14.4	37 46.9	79 16	10.3
3	46 11.4	70 33	20.9	41 49.9	75 24	15.2	41 27.4	75 23	14.7	37 37.0	78 17	10.6
4	45 51.7	69 33	21.4	41 35.5	74 24	15.5	41 13.4	74 24	15.1	37 26.9	77 17	10.8
35	45 31.7	67 34	21.8	41 20.8	72 25	15.9	40 59.0	72 24	15.4	37 16.5	76 18	11.1
6	45 11.3	65 35	22.2	41 05.7	71 26	16.2	40 44.4	71 25	15.8	37 05.9	74 18	11.4
7	44 50.5	64 35	22.7	40 50.4	69 26	16.6	40 29.5	70 25	16.1	36 55.1	73 18	11.6
8	44 29.4	62 36	23.1	40 34.7	68 26	16.9	40 14.3	68 26	16.4	36 44.1	72 19	11.8
9	44 07.9	61 36	23.5	40 18.8	66 27	17.2	39 58.8	67 26	16.7	36 32.8	70 19	12.1
40	43 46.1	59 37	23.8	40 02.5	65 28	17.5	39 43.0	65 27	17.0	36 21.3	69 20	12.3
1	43 24.0	57 38	24.2	39 46.0	63 28	17.8	39 27.0	64 27	17.3	36 09.6	68 20	12.5
2	43 01.5	56 38	24.6	39 29.3	62 28	18.1	39 10.7	62 28	17.6	35 57.7	66 20	12.8
3	42 38.8	54 38	24.9	39 12.3	60 29	18.4	38 54.1	61 28	17.9	35 45.6	65 21	13.0
4	42 15.8	53 39	25.2	38 55.0	59 29	18.7	38 37.3	59 28	18.1	35 33.2	63 21	13.2
45	41 52.5	51 39	25.5	38 37.5	57 30	18.9	38 20.2	58 29	18.4	35 20.7	62 21	13.4
6	41 28.9	49 40	25.8	38 19.7	56 30	19.2	38 02.9	56 29	18.7	35 08.1	60 22	13.6
7	41 05.1	48 40	26.1	38 01.7	54 30	19.4	37 45.4	55 30	18.9	34 55.2	59 22	13.8
8	40 41.0	46 40	26.4	37 43.5	52 31	19.7	37 27.7	53 30	19.1	34 42.1	57 22	14.0
9	40 16.7	44 41	26.7	37 25.1	51 31	19.9	37 09.8	51 30	19.4	34 28.9	56 22	14.2
50	39 52.1	43 41	26.9	37 06.5	49 31	20.1	36 51.6	50 30	19.6	34 15.5	54 22	14.3
1	39 27.4	41 42	27.2	36 47.7	48 32	20.4	36 33.3	48 31	19.8	34 02.0	53 23	14.5
2	39 02.4	39 42	27.4	36 28.7	46 32	20.6	36 14.8	46 31	20.0	33 48.3	51 23	14.7
3	38 37.3	38 42	27.7	36 09.5	44 32	20.8	35 56.1	45 32	20.2	33 34.4	50 23	14.8
4	38 12.0	36 42	27.9	35 50.1	43 32	21.0	35 37.2	43 32	20.4	33 20.4	48 24	15.0
55	37 46.5	34 43	28.1	35 30.6	41 33	21.1	35 18.2	42 32	20.6	33 06.3	46 24	15.1
6	37 20.8	33 43	28.3	35 10.9	39 33	21.3	34 59.0	40 32	20.8	32 52.0	45 24	15.3
7	36 55.0	31 43	28.4	34 51.1	38 33	21.5	34 39.7	38 32	20.9	32 37.6	43 24	15.4
8	36 29.0	29 44	28.6	34 31.1	36 34	21.6	34 20.2	37 33	21.1	32 23.1	41 24	15.6
9	36 02.9	28 44	28.8	34 10.9	34 34	21.8	34 00.6	35 33	21.2	32 08.4	40 25	15.7
60	35 36.7	26 44	28.9	33 50.7	33 34	21.9	33 40.8	33 33	21.4	31 53.6	38 25	15.8
1	35 10.3	24 44	29.1	33 30.3	31 34	22.1	33 20.9	32 33	21.5	31 38.8	36 25	15.9
2	34 43.9	23 44	29.2	33 09.8	29 34	22.2	33 00.9	30 34	21.6	31 23.8	35 25	16.0
3	34 17.3	21 44	29.3	32 49.2	28 34	22.3	32 40.8	28 34	21.8	31 08.7	33 25	16.2
4	33 50.6	20 45	29.4	32 28.5	26 35	22.4	32 20.6	27 34	21.9	30 53.5	31 25	16.3
65	33 23.8	18 45	29.5	32 07.7	24 35	22.6	32 00.3	25 34	22.0	30 38.3	30 26	16.3
6	32 57.0	16 45	29.6	31 46.8	23 35	22.7	31 39.9	23 34	22.1	30 22.9	28 26	16.4
7	32 30.1	15 45	29.7	31 25.8	21 35	22.7	31 19.4	22 34	22.2	30 07.5	26 26	16.5
8	32 03.1	13 45	29.8	31 04.7	19 35	22.8	30 58.8	20 34	22.3	29 52.0	25 26	16.6
9	31 36.1	11 45	29.8	30 43.6	18 35	22.9	30 38.2	18 34	22.3	29 36.4	23 26	16.7
70	31 09.0	10 45	29.9	30 22.4	16 35	23.0	30 17.5	16 34	22.4	29 20.8	21 26	16.7
1	30 41.9	08 45	29.9	30 01.2	14 36	23.0	29 56.8	15 35	22.5	29 05.1	20 26	16.8
2	30 14.7	07 45	30.0	29 39.8	13 36	23.1	29 36.0	13 35	22.5	28 49.3	18 26	16.9
3	29 47.5	05 45	30.0	29 18.5	11 36	23.1	29 15.1	11 35	22.6	28 33.5	16 26	16.9
4	29 20.3	04 45	30.0	28 57.1	09 36	23.2	28 54.2	10 35	22.6	28 17.7	15 26	17.0
75	28 53.1	02 45	30.1	28 35.7	08 36	23.2	28 33.3	08 35	22.7	28 01.8	13 26	17.0
6	28 25.8	00 45	30.1	28 14.2	06 36	23.2	28 12.3	07 35	22.7	27 45.9	11 27	17.0
7	27 58.6	01 45	30.1	27 52.8	04 36	23.3	27 51.4	05 35	22.7	27 29.9	09 27	17.1
8	27 31.4	03 45	30.0	27 31.3	03 36	23.3	27 30.4	03 35	22.7	27 14.0	08 27	17.1
9	27 04.2	04 45	30.0	27 09.8	01 36	23.3	27 09.4	02 35	22.7	26 58.0	06 27	17.1
80	26 36.9	06 45	30.0	26 48.3	00 36	23.3	26 48.4	00 35	22.7	26 41.9	04 27	17.1
1	26 09.8	07 45	30.0	26 26.8	02 36	23.3	26 27.3	02 35	22.7	26 25.9	03 27	17.1
2	25 42.6	09 45	29.9	26 05.3	04 36	23.3	26 06.3	03 35	22.7	26 09.9	01 27	17.1
3	25 15.5	10 45	29.9	25 43.8	05 36	23.3	25 45.3	05 35	22.7	25 53.9	01 27	17.1
4	24 48.4	12 45	29.8	25 22.3	07 36	23.2	25 24.4	07 35	22.7	25 37.8	02 27	17.1
85	24 21.4	13 45	29.8	25 00.9	09 36	23.2	25 03.4	08 35	22.7	25 21.8	04 27	17.1
6	23 54.4	15 45	29.7	24 39.5	10 36	23.2	24 42.5	10 35	22.6	25 05.8	06 27	17.1
7	23 27.5	16 45	29.6	24 18.1	12 36	23.1	24 21.6	11 35	22.6	24 49.8	07 27	17.1
8	23 00.7	18 44	29.5	23 56.8	13 36	23.1	24 00.7	13 35	22.5	24 33.8	09 27	17.1
9	22 33.9	19 44	29.4	23 35.5	15 35	23.0	23 39.9	15 35	22.5	24 17.9	11 27	17.0
90	22 07.2	21 44	29.3	23 14.3	16 35	23.0	23 19.2	16 35	22.4	24 01.9	12 26	17.0

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.	63° 00′ Alt.	Δd	Δt	Az.	69° 00′ Alt.	Δd	Δt	Az.	69° 30′ Alt.	Δd	Δt	Az.	74° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	20 59.0	24	48	32.4	21 06.2	24	48	31.9	21 27.1	23	46	30.3	21 33.9	22	45	29.8	21 40.6	22	44	29.2	22 53.1	18	35	22.9	22 58.4	18	34	22.4	23 46.0	14	26	17.0	91
2	20 29.9	25	48	32.2	20 37.5	25	48	31.7	20 59.8	24	46	30.2	21 07.0	24	45	29.6	21 14.1	24	44	29.1	22 32.0	20	35	22.8	22 37.8	19	34	22.3	23 30.2	16	26	16.9	2
3	20 01.0	27	48	32.1	20 09.0	27	48	31.6	20 32.5	26	45	30.0	20 40.1	25	44	29.5	20 47.7	25	44	29.0	22 10.9	21	35	22.7	22 17.2	21	34	22.2	23 14.4	17	26	16.9	3
4	19 32.1	28	48	32.0	19 40.5	28	47	31.4	20 05.3	27	45	29.9	20 13.4	27	44	29.4	20 21.4	26	44	28.9	21 49.9	23	35	22.7	21 56.7	22	34	22.1	22 58.6	19	26	16.8	4
95	19 03.4	30	48	31.8	19 12.2	29	47	31.3	19 38.2	28	45	29.8	19 46.7	28	44	29.3	19 55.2	28	44	28.8	21 29.0	24	35	22.6	21 36.2	24	34	22.0	22 42.9	21	26	16.8	95
6	18 34.8	31	48	31.6	18 44.1	31	47	31.1	19 11.3	30	45	29.6	19 20.2	30	44	29.1	19 29.1	29	43	28.6	21 08.2	26	34	22.5	21 15.9	25	34	21.9	22 27.2	22	26	16.7	6
7	18 06.3	32	47	31.5	18 16.0	32	46	31.0	18 44.5	31	44	29.5	18 53.8	31	44	29.0	19 03.1	31	43	28.5	20 47.5	27	34	22.4	20 55.6	27	34	21.8	22 11.6	24	26	16.6	7
8	17 38.0	34	47	31.3	17 48.1	33	46	30.8	18 17.8	33	44	29.3	18 27.5	32	44	28.8	18 37.2	32	43	28.3	20 26.8	29	34	22.3	20 35.4	28	34	21.7	21 56.0	25	26	16.6	8
9	17 09.8	35	47	31.1	17 20.3	35	46	30.6	17 51.2	34	44	29.2	18 01.4	34	43	28.7	18 11.5	33	43	28.2	20 06.3	30	34	22.1	20 15.3	30	33	21.6	21 40.6	27	26	16.5	9
100	16 41.8	36	46	30.9	16 52.7	36	46	30.4	17 24.8	35	44	29.0	17 35.4	35	43	28.5	17 45.9	35	42	28.0	19 45.8	32	34	22.0	19 55.3	31	33	21.5	21 25.2	28	26	16.4	100
1	16 13.9	38	46	30.7	16 25.2	37	46	30.3	16 58.5	37	44	28.8	17 09.5	36	43	28.3	17 20.4	36	42	27.8	19 25.5	33	34	21.9	19 35.4	33	33	21.4	21 09.8	30	25	16.3	1
2	15 46.2	39	46	30.5	15 57.9	39	45	30.1	16 32.4	38	43	28.6	16 43.8	38	43	28.1	16 55.1	38	42	27.7	19 05.3	35	34	21.8	19 15.6	34	33	21.3	20 54.6	32	25	16.2	2
3	15 18.7	40	46	30.3	15 30.7	40	45	29.9	16 06.4	39	43	28.4	16 18.2	39	42	28.0	16 29.9	39	42	27.5	18 45.2	36	33	21.6	18 56.0	36	33	21.1	20 39.4	33	25	16.2	3
4	14 51.3	41	45	30.1	15 03.7	41	45	29.7	15 40.6	41	43	28.2	15 52.8	41	42	27.8	16 04.9	40	41	27.3	18 25.2	38	33	21.5	18 36.4	37	32	21.0	20 24.3	35	25	16.1	4
105	14 24.1	43	45	29.9	14 36.9	43	44	29.4	15 15.0	42	42	28.0	15 27.6	42	42	27.6	15 40.1	42	41	27.1	18 05.3	39	33	21.4	18 17.0	39	32	20.9	20 09.3	36	25	16.0	105
6	13 57.1	44	45	29.7	14 10.3	44	44	29.2	14 49.5	43	42	27.8	15 02.5	43	42	27.4	15 15.4	43	41	26.9	17 45.6	40	33	21.2	17 57.7	40	32	20.7	19 54.4	38	25	15.9	6
7	13 30.2	45	44	29.5	13 43.8	45	44	29.0	14 24.2	45	42	27.6	14 37.6	44	41	27.2	14 50.9	44	40	26.7	17 26.0	42	32	21.1	17 38.5	42	32	20.6	19 39.6	39	24	15.7	7
8	13 03.6	47	44	29.2	13 17.5	46	43	28.8	13 59.1	46	42	27.4	14 12.9	46	41	26.9	14 26.6	46	40	26.5	17 06.5	43	32	20.9	17 19.4	43	32	20.4	19 24.9	41	24	15.6	8
9	12 37.1	48	44	29.0	12 51.5	48	43	28.5	13 34.2	47	41	27.2	13 48.3	47	40	26.7	14 02.4	47	40	26.3	16 47.2	45	32	20.7	17 00.5	44	31	20.3	19 10.3	42	24	15.5	9
110	12 10.9	49	43	28.7	12 25.6	49	43	28.3	13 09.4	48	41	26.9	13 24.0	48	40	26.5	13 38.4	48	40	26.0	16 28.0	46	32	20.6	16 41.8	46	31	20.1	18 55.8	44	24	15.4	110
1	11 44.9	50	43	28.5	11 59.9	50	42	28.0	12 44.9	50	40	26.7	12 59.8	50	40	26.3	13 14.7	49	39	25.8	16 09.0	47	32	20.4	16 23.2	47	31	19.9	18 41.4	45	24	15.3	1
2	11 19.0	52	43	28.2	11 34.5	51	42	27.8	12 20.6	51	40	26.5	12 35.8	51	40	26.0	12 51.1	51	39	25.6	15 50.1	49	31	20.2	16 04.7	49	30	19.8	18 27.1	46	24	15.1	2
3	10 53.4	53	42	27.9	11 09.3	53	42	27.5	11 56.4	52	40	26.2	12 12.1	52	39	25.8	12 27.7	52	39	25.3	15 31.4	50	31	20.0	15 46.4	50	30	19.6	18 13.6	48	23	15.0	3
4	10 28.1	54	42	27.7	10 44.2	54	41	27.2	11 32.5	53	40	26.0	11 48.6	53	39	25.5	12 04.5	53	38	25.1	15 12.9	51	31	19.8	15 28.3	51	30	19.4	17 59.0	49	23	14.9	4
115	10 02.9	55	42	27.4	10 19.5	55	41	27.0	11 08.8	55	39	25.7	11 25.2	55	38	25.3	11 41.6	54	38	24.8	14 54.5	53	30	19.6	15 10.3	53	30	19.2	17 45.1	51	23	14.7	115
6	9 38.0	56	41	27.1	9 54.9	56	40	26.7	10 45.4	56	39	25.4	11 02.1	56	38	25.0	11 18.8	56	38	24.6	14 36.4	54	30	19.4	14 52.5	54	29	19.0	17 31.3	52	23	14.6	6
7	9 13.4	58	41	26.8	9 30.6	57	40	26.4	10 22.1	57	38	25.2	10 39.2	57	38	24.7	10 56.3	57	37	24.3	14 18.3	55	30	19.2	14 34.9	55	29	18.8	17 17.7	53	22	14.4	7
8	8 48.9	59	40	26.5	9 06.5	59	40	26.1	9 59.1	58	38	24.9	10 16.6	58	37	24.5	10 34.0	58	37	24.1	14 00.5	57	29	19.0	14 17.5	56	29	18.6	17 04.2	55	22	14.3	8
9	8 24.8	60	40	26.2	8 42.7	60	39	25.8	9 36.4	59	38	24.6	9 54.2	59	37	24.2	10 12.0	59	36	23.8	13 42.9	58	29	18.8	14 00.2	58	28	18.4	16 50.9	56	22	14.1	9
120	8 00.9	61	39	25.9	8 19.1	61	39	25.5	9 13.8	61	37	24.3	9 32.0	61	36	23.9	9 50.2	60	36	23.5	13 25.4	59	29	18.6	13 43.1	59	28	18.2	16 37.6	57	22	14.0	120
1	7 37.2	62	39	25.6	7 55.8	62	38	25.2	8 51.6	62	37	24.0	9 10.1	62	36	23.6	9 28.6	62	36	23.2	13 08.2	60	28	18.4	13 26.2	60	28	18.0	16 24.6	59	22	13.8	1
2	7 13.8	63	38	25.3	7 32.8	63	38	24.9	8 29.5	63	36	23.7	8 48.4	63	36	23.3	9 07.3	63	35	23.0	12 51.1	62	28	18.2	13 09.6	61	28	17.8	16 11.7	60	21	13.7	2
3	6 50.7	64	38	25.0	7 10.0	64	38	24.6	8 07.8	64	36	23.4	8 27.0	64	35	23.0	8 46.2	64	35	22.7	12 34.3	63	28	17.9	12 53.1	63	27	17.5	15 58.9	61	21	13.5	3
4	6 27.9	65	38	24.7	6 47.5	65	37	24.3	7 46.3	65	35	23.1	8 05.8	65	35	22.7	8 25.4	65	34	22.4	12 17.6	64	27	17.7	12 36.8	64	27	17.3	15 46.3	62	21	13.3	4
125	6 05.4	67	37	24.3	6 25.3	66	36	23.9	7 25.1	66	35	22.8	7 44.9	66	34	22.4	8 04.8	66	34	22.1	12 01.2	65	27	17.5	12 20.7	65	26	17.1	15 33.9	64	20	13.1	125
6	5 43.1	68	37	24.0	6 03.4	68	36	23.6	7 04.1	67	34	22.5	7 24.3	67	34	22.1	7 44.5	67	33	21.8	11 45.0	66	27	17.2	12 04.9	66	26	16.8	15 21.6	65	20	13.0	6
7	5 21.2	69	36	23.6	5 41.7	69	36	23.3	6 43.4	68	34	22.2	7 04.0	68	34	21.8	7 24.5	68	33	21.4	11 29.0	67	26	17.0	11 49.2	67	26	16.6	15 09.5	66	20	12.8	7
8					5 20.4	70	35	22.9	6 23.1	70	34	21.9	6 43.9	69	33	21.5	7 04.7	69	32	21.1	11 13.2	69	26	16.7	11 33.8	68	25	16.4	14 57.6	67	20	12.6	8
9									6 03.0	71	33	21.5	6 24.1	71	32	21.2	6 45.3	70	32	20.8	10 57.7	70	26	16.5	11 18.6	70	25	16.1	14 45.8	69	19	12.4	9
130									5 43.2	72	33	21.2	6 04.6	72	32	20.8	6 26.1	72	32	20.5	10 42.4	71	25	16.2	11 03.6	71	24	15.9	14 34.2	70	19	12.2	130
1									5 23.6	73	32	20.8	5 45.4	73	32	20.5	6 07.2	73	31	20.2	10 27.3	72	25	16.0	10 48.9	72	24	15.6	14 22.8	71	19	12.0	1
2									5 04.4	74	32	20.5	5 26.5	74	31	20.2	5 48.6	74	30	19.8	10 12.5	73	24	15.7	10 34.3	73	24	15.4	14 11.6	72	18	11.8	2
3													5 08.0	75	31	19.8	5 30.3	75	30	19.5	9 57.9	74	24	15.4	10 20.1	74	24	15.1	14 00.5	73	18	11.6	3
4																	5 12.4	76	30	19.1	9 43.5	75	24	15.2	10 06.0	75	23	14.8	13 49.7	74	18	11.4	4
135																					9 29.4	76	23	14.9	9 52.2	76	22	14.6	13 39.0	75	18	11.2	135
6																					9 15.6	77	23	14.6	9 38.7	77	22	14.3	13 28.5	76	17	11.0	6
7																					9 02.0	78	22	14.3	9 25.4	78	22	14.0	13 18.2	77	17	10.8	7
8																					8 48.7	79	22	14.0	9 12.4	79	21	13.7	13 08.1	78	16	10.6	8
9																					8 35.6	80	21	13.8	8 59.6	80	21	13.5	12 58.3	79	16	10.4	9
140																					8 22.8	81	21	13.5	8 47.1	81	20	13.2	12 48.6	80	16	10.1	140
1																					8 10.3	82	20	13.2	8 34.8	82	20	12.9	12 39.1	81	16	09.9	1
2																					7 58.0	83	20	12.9	8 22.8	83	20	12.6	12 29.8	82	15	09.7	2
3																					7 46.1	83	20	12.6	8 11.1	83	19	12.3	12 20.8	83	15	09.5	3
4																					7 34.4	84	19	12.3	7 59.7	84	19	12.0	12 11.9	84	14	09.2	4
145																					7 23.0	85	19	12.0	7 48.5	85	18	11.7	12 03.3	85	14	09.0	145
6																					7 11.8	86	18	11.7	7 37.6	86	18	11.4	11 54.9	86	14	08.8	6
7																					7 01.0	87	18	11.3	7 27.0	87	17	11.1	11 46.7	86	13	08.6	7
8																					6 50.4	88	17	11.0	7 16.7	87	17	10.8	11 38.7	87	13	08.3	8
9																					6 40.2	88	17	10.7	7 06.7	88	16	10.5	11 31.0	88	13	08.1	9
150																					6 30.2	89	16	10.4	6 56.9	89	16	10.2	11 23.4	89	12	07.8	150
1																					6 20.6	90	16	10.1	6 47.5	90	15	09.8	11 16.1	89	12	07.6	1
2																					6 11.2	90	15	09.7	6 38.3	90	15	09.5	11 09.1	90	12	07.3	2
3																					6 02.2	91	15	09.4	6 29.5	91	14	09.2	11 02.2	91	11	07.1	3
4																					5 53.4	92	14	09.1	6 20.9	92	14	08.9	10 55.6	91	10	06.9	4
155																					5 45.0	92	14	08.8	6 12.7	92	13	08.6	10 49.3	92	10	06.6	155
6																					5 36.9	93	13	08.4	6 04.7	93	13	08.2	10 43.1	93	10	06.4	6
7																					5 29.1	93	12	08.1	5 57.1	93	12	07.9	10 37.2	93	09	06.1	7
8																					5 21.6	94	12	07.7	5 49.8	94	12	07.6	10 31.6	94	09	05.8	8
9																					5 14.4	95	11	07.4	5 42.8	95	11	07.2	10 26.2	94	09	05.6	9
160																					5 07.6	95	11	07.1	5 36.1	95	11	06.9	10 21.0	95	08	05.3	160
1																					5 01.0	96	11	06.7	5 29.7	96	10	06.6	10 16.0	95	08	05.1	1
2																									5 23.6	96	10	06.2	10 11.4	96	08	04.8	2
3																									5 17.9	96	09	05.9	10 06.9	96	07	04.6	3
4																									5 12.4	97	08	05.6	10 02.7	97	06	04.3	4
165																									5 07.3	97	08	05.2	9 58.8	97	06	04.0	165
6																									5 02.5	98	07	04.9	9 55.1	97	06	03.8	6
7																													9 51.6	98	05	03.5	7
8																													9 48.5	98	05	03.2	8
9																													9 45.5	98	04	03.0	9
170																													9 42.8	99	04	02.7	170
1																													9 40.4	99	04	02.4	1
2																													9 38.2	99	03	02.2	2
3																													9 36.3	99	03	01.9	3
4																													9 34.6	1	00	01.6	4
175																													9 33.2	1	00	01.4	175
6																													9 32.1	1	00	01.1	6
7																													9 31.2	1	00	00.8	7
8																													9 30.5	1	00	00.5	8
9																													9 30.1	1	00	00.3	
180																													9 30.0	1	00	00	

Lat. 25°

Lat. 26°

Lat. 27°

Lat. 28°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 25°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	69	180	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	75	00	71	00	00
4	69	169	73	167	76	163	80	157	84	143	86	105	85	49	82	26	78	16	75	12	71	09	4
8	68	159	71	154	75	148	78	139	81	122	83	96	82	66	80	43	77	30	74	22	70	17	8
12	66	149	70	144	73	137	76	126	78	112	79	93	79	72	77	54	75	40	72	31	69	24	12
16	64	141	67	135	70	128	73	118	74	105	75	91	75	75	74	60	72	48	70	38	67	30	16
20	62	134	64	128	67	121	69	112	71	101	72	89	72	76	71	64	70	53	68	43	65	36	20
24	59	128	61	122	64	115	66	107	67	98	68	88	68	77	68	66	67	56	65	47	63	40	24
28	56	123	58	118	61	111	62	104	64	95	65	86	65	77	64	68	64	59	62	50	60	43	28
32	53	119	55	114	57	107	59	101	60	93	61	85	61	77	61	69	60	60	59	53	58	46	32
36	50	115	52	110	54	104	55	98	56	91	57	84	58	77	58	69	57	62	56	55	55	48	36
40	46	112	48	107	50	102	52	96	53	89	54	83	54	76	54	69	54	62	53	56	52	49	40
44	43	109	45	104	47	99	48	94	49	88	50	82	51	76	51	69	51	63	50	57	50	51	44
48	39	106	41	102	43	97	44	92	46	86	47	81	47	75	48	69	48	63	47	57	47	51	48
52	36	104	38	100	39	95	41	90	42	85	43	80	44	74	44	69	44	63	44	58	44	52	52
56	32	102	34	97	36	93	37	88	38	84	39	79	40	74	41	68	41	63	41	58	41	52	56
60	29	100	31	96	32	91	34	87	35	82	36	77	37	73	37	68	38	63	38	58	38	53	60
64	25	98	27	94	28	90	30	85	31	81	32	76	33	72	34	67	35	62	35	57	35	52	64
68	22	96	23	92	25	88	26	84	28	80	29	75	30	71	31	66	32	62	32	57	33	52	68
72	18	94	20	90	21	86	23	82	24	78	25	74	26	70	27	65	28	61	29	56	30	52	72
76	14	92	16	89	18	85	19	81	21	77	22	73	23	69	24	64	25	60	26	56	27	51	76
80	11	91	12	87	14	83	16	79	17	75	18	71	20	67	21	63	22	59	23	55	24	51	80
84	07	89	09	85	10	82	12	78	14	74	15	70	16	66	18	62	19	58	20	54	21	50	84
88	03	87	05	84	07	80	08	76	10	72	12	69	13	65	15	61	16	57	17	53	18	49	88
92	*00*	86	02	82	03	79	05	75	07	71	08	67	10	64	11	60	13	56	14	52	16	48	92
96	*04*	84	*02*	80	*00*	77	01	73	03	69	05	66	07	62	08	58	10	55	11	51	13	47	96
100	*07*	82	*06*	78	*04*	75	*02*	71	*00*	68	02	64	03	61	05	57	07	53	09	50	10	46	100
104	*11*	80	*09*	77	*07*	73	*05*	70	*04*	66	*02*	62	00	59	02	56	04	52	06	48	08	45	104
108	*14*	78	*13*	75	*11*	71	*09*	68	*07*	64	*05*	61	*03*	57	*01*	54	01	50	03	47	05	43	108
112	*18*	77	*16*	73	*14*	69	*12*	66	*10*	62	*08*	59	*06*	55	*04*	52	*02*	49	01	45	03	42	112
116	*22*	75	*20*	71	*18*	67	*15*	64	*13*	60	*11*	57	*09*	53	*06*	50	*04*	47	*02*	44	00	40	116
120	*25*	72	*23*	69	*21*	65	*19*	61	*16*	58	*14*	55	*12*	51	*09*	48	*07*	45	*04*	42	*02*	39	120
124	*28*	70	*26*	66	*24*	63	*22*	59	*19*	56	*17*	52	*14*	49	*12*	46	*09*	43	*07*	40	*04*	37	124
128	*32*	68	*30*	64	*27*	60	*25*	57	*22*	53	*20*	50	*17*	47	*14*	44	*12*	41	*09*	38	*06*	35	128
132	*35*	65	*33*	61	*30*	57	*28*	54	*25*	50	*22*	47	*20*	44	*17*	41	*14*	38	*11*	35	*08*	33	132
136	*38*	62	*36*	58	*33*	54	*31*	51	*28*	48	*25*	44	*22*	41	*19*	39	*16*	36	*13*	33	*10*	31	136
140	*42*	59	*39*	55	*36*	51	*33*	48	*31*	45	*28*	41	*24*	39	*21*	36	*18*	33	*15*	31	*12*	28	140
144	*45*	55	*42*	51	*39*	48	*36*	44	*33*	41	*30*	38	*27*	36	*23*	33	*20*	30	*17*	28	*14*	26	144
148	*47*	51	*45*	47	*42*	44	*38*	41	*35*	38	*32*	35	*29*	32	*25*	30	*22*	28	*18*	25	*15*	23	148
152	*50*	47	*47*	43	*44*	40	*41*	37	*37*	34	*34*	31	*31*	29	*27*	27	*24*	24	*20*	22	*16*	21	152
156	*53*	42	*50*	38	*46*	35	*43*	32	*39*	30	*36*	27	*32*	25	*29*	23	*25*	21	*21*	20	*18*	18	156
160	*55*	37	*52*	33	*48*	30	*45*	28	*41*	25	*37*	23	*34*	21	*30*	20	*26*	18	*22*	16	*19*	15	160
164	*57*	30	*54*	27	*50*	25	*46*	22	*42*	21	*39*	19	*35*	17	*31*	16	*27*	15	*23*	13	*19*	12	164
168	*59*	24	*55*	21	*51*	19	*47*	17	*44*	16	*40*	14	*36*	13	*32*	12	*28*	11	*24*	10	*20*	09	168
172	*60*	16	*56*	14	*52*	13	*48*	12	*44*	11	*40*	10	*36*	09	*32*	08	*29*	07	*25*	07	*21*	06	172
176	*61*	08	*57*	07	*53*	06	*49*	06	*45*	05	*41*	05	*37*	04	*33*	04	*29*	04	*25*	03	*21*	03	176
180	*61*	00	*57*	00	*53*	00	*49*	00	*45*	00	*41*	00	*37*	00	*33*	00	*29*	00	*25*	00	*21*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 25°

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	67	00	63	00	59	00	55	00	51	00	47	00	43	00	39	00	35	00	31	00	27	00	00
4	67	07	63	05	59	04	55	03	51	03	47	02	43	02	39	01	35	01	31	00	27	00	4
8	66	13	62	11	58	09	55	07	51	06	47	04	43	03	39	02	35	02	31	01	27	00	8
12	65	19	61	16	58	13	54	10	50	08	46	06	43	05	39	04	35	03	31	01	27	00	12
16	64	25	60	20	57	16	53	13	50	11	46	09	42	07	38	05	35	03	31	02	27	01	16
20	62	29	59	24	56	20	52	16	49	13	45	10	42	08	38	06	34	04	31	02	27	01	20
24	60	33	57	28	54	23	51	19	48	15	45	12	41	10	38	07	34	05	30	03	27	01	24
28	58	37	56	31	53	26	50	21	47	18	44	14	40	11	37	08	34	06	30	03	27	01	28
32	56	39	54	33	51	28	49	24	46	19	43	16	40	12	37	09	33	06	30	04	27	01	32
36	54	41	52	36	49	30	47	26	45	21	42	17	39	14	36	10	33	07	30	04	27	01	36
40	51	43	50	38	48	32	45	27	43	23	41	19	38	15	35	11	32	08	30	04	27	01	40
44	49	45	47	39	46	34	44	29	42	24	39	20	37	16	35	12	32	08	29	05	26	02	44
48	46	46	45	40	44	35	42	30	40	25	38	21	36	17	34	12	31	09	29	05	26	02	48
52	43	47	43	41	41	36	40	31	39	26	37	22	35	17	33	13	31	09	29	05	26	02	52
56	41	47	40	42	39	37	38	32	37	27	36	22	34	18	32	14	30	10	28	06	26	02	56
60	38	47	38	42	37	37	36	33	35	28	34	23	33	19	31	14	30	10	28	06	26	02	60
64	35	48	35	43	35	38	34	33	34	28	33	24	32	19	30	15	29	10	28	06	26	02	64
68	33	48	33	43	33	38	32	33	32	29	31	24	30	19	29	15	28	11	27	06	26	02	68
72	30	47	30	43	30	38	30	33	30	29	30	24	29	20	29	15	28	11	27	06	26	02	72
76	27	47	28	43	28	38	28	33	28	29	28	24	28	20	28	15	27	11	26	06	25	02	76
80	25	47	25	42	26	38	26	33	27	29	27	24	27	20	27	15	26	11	26	07	25	02	80
84	22	46	23	42	24	37	24	33	25	29	25	24	26	20	26	15	26	11	25	07	25	02	84
88	20	45	21	41	22	37	22	33	23	28	24	24	24	20	25	15	25	11	25	07	25	02	88
92	17	44	18	40	19	36	20	32	21	28	22	24	23	20	24	15	24	11	25	07	25	02	92
96	15	43	16	40	17	36	19	32	20	28	21	23	22	19	23	15	24	11	24	07	25	02	96
100	12	42	14	39	15	35	17	31	18	27	19	23	21	19	22	15	23	11	24	06	25	02	100
104	10	41	11	38	13	34	15	30	16	26	18	22	20	19	21	15	22	10	23	06	25	02	104
108	07	40	09	36	11	33	13	29	15	26	17	22	18	18	20	14	22	10	23	06	24	02	108
112	05	39	07	35	09	32	11	28	13	25	15	21	17	17	19	14	21	10	23	06	24	02	112
116	03	37	05	34	07	30	10	27	12	24	14	20	16	17	18	13	20	10	22	06	24	02	116
120	01	35	03	32	06	29	08	26	10	23	13	19	15	16	17	13	20	09	22	06	24	02	120
124	*01*	34	01	31	04	28	06	25	09	22	12	18	14	15	17	12	19	09	22	05	24	02	124
128	*03*	32	*01*	29	02	26	05	23	08	20	11	17	13	14	16	11	19	08	21	05	24	02	128
132	*05*	30	*02*	27	01	25	04	22	07	19	09	16	12	14	15	11	18	08	21	05	24	02	132
136	*07*	28	*04*	25	*01*	23	02	20	05	18	08	15	12	13	15	10	18	07	21	04	24	02	136
140	*09*	26	*05*	23	*02*	21	01	19	04	16	08	14	11	12	14	09	17	07	20	04	23	01	140
144	*10*	24	*07*	21	*03*	19	*00*	17	03	15	07	13	10	11	13	08	17	06	20	04	23	01	144
148	*12*	21	*08*	19	*05*	17	*01*	15	02	13	06	12	09	10	13	08	16	06	20	03	23	01	148
152	*13*	19	*09*	17	*06*	15	*02*	14	02	12	05	10	09	08	13	07	16	05	20	03	23	01	152
156	*14*	16	*10*	15	*06*	13	*03*	12	01	10	05	09	08	07	12	06	16	04	19	03	23	01	156
160	*15*	14	*11*	12	*07*	11	*03*	10	00	09	04	07	08	06	12	05	16	04	19	02	23	01	160
164	*16*	11	*12*	10	*08*	09	*04*	08	*00*	07	04	06	08	05	11	04	15	03	19	02	23	01	164
168	*16*	08	*12*	08	*08*	07	*04*	06	*01*	05	03	04	07	04	11	03	15	02	19	01	23	00	168
172	*17*	06	*13*	05	*09*	05	*05*	04	*01*	03	03	03	07	02	11	02	15	01	19	01	23	00	172
176	*17*	03	*13*	03	*09*	02	*05*	02	*01*	02	03	01	07	01	11	01	15	01	19	00	23	00	176
180	*17*	00	*13*	00	*09*	00	*05*	00	*01*	00	03	00	07	00	11	00	15	00	19	00	23	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 26°

Lat. 27°

Lat. 28°

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 26°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	64 00.0	1.0 02	180.0	64 30.0	1.0 02	180.0	65 00.0	1.0 02	180.0	65 30.0	1.0 02	180.0	66 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	67 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0	00
1	63 58.9	1.0 05	177.7	64 28.9	1.0 06	177.7	64 58.9	1.0 06	177.6	65 28.9	1.0 06	177.6	65 58.8	1.0 06	177.5	66 28.8	1.0 06	177.5	66 58.8	1.0 06	177.4	67 28.8	1.0 06	177.4	1
2	63 55.7	1.0 09	175.4	64 25.6	1.0 09	175.3	64 55.6	1.0 09	175.3	65 25.5	1.0 10	175.2	65 55.4	1.0 10	175.1	66 25.3	1.0 10	175.0	66 55.2	1.0 10	174.9	67 25.1	1.0 10	174.8	2
3	63 50.4	99 12	173.2	64 20.2	99 13	173.1	64 50.0	99 13	172.9	65 19.8	99 13	172.8	65 49.6	99 13	172.7	66 19.4	99 14	172.5	66 49.2	99 14	172.4	67 19.0	99 14	172.2	3
4	63 42.9	99 16	170.9	64 12.6	99 16	170.8	64 42.3	99 16	170.6	65 12.0	99 17	170.4	65 41.6	99 17	170.2	66 11.3	99 18	170.1	66 40.9	99 18	169.9	67 10.5	99 18	169.7	4
05	63 33.4	98 19	168.7	64 02.9	98 20	168.5	64 32.4	98 20	168.3	65 01.9	98 20	168.1	65 31.4	98 21	167.9	66 00.8	98 21	167.6	66 30.3	98 22	167.4	66 59.7	98 22	167.1	05
6	63 21.8	98 22	166.5	63 51.1	98 23	166.3	64 20.4	98 23	166.0	64 49.7	98 24	165.8	65 19.0	97 24	165.5	65 48.2	97 25	165.2	66 17.4	97 25	165.0	66 46.5	97 26	164.6	6
7	63 08.3	97 26	164.4	63 37.3	97 26	164.1	64 06.4	97 27	163.8	64 35.4	97 27	163.5	65 04.4	97 28	163.2	65 33.4	96 28	162.9	66 02.3	96 29	162.6	66 31.1	96 29	162.2	7
8	62 52.7	96 29	162.2	63 21.6	96 30	161.9	63 50.4	96 30	161.6	64 19.1	96 30	161.3	64 47.8	96 31	160.9	65 16.5	95 32	160.6	65 45.1	95 32	160.2	66 13.6	95 33	159.8	8
9	62 35.4	95 32	160.1	63 03.9	95 32	159.8	63 32.4	95 33	159.5	64 00.8	95 34	159.1	64 29.2	95 34	158.7	64 57.5	94 35	158.3	65 25.8	94 35	157.9	65 54.0	94 36	157.5	9
10	62 16.1	94 35	158.1	62 44.4	94 36	157.7	63 12.5	94 36	157.3	63 40.6	94 37	157.0	64 08.7	93 37	156.5	64 36.7	93 38	156.1	65 04.6	93 38	155.7	65 32.4	93 39	155.3	10
1	61 55.1	93 38	156.1	62 23.0	93 38	155.7	62 50.9	93 39	155.3	63 18.6	92 40	154.9	63 46.3	92 40	154.4	64 13.9	92 41	154.0	64 41.5	92 42	153.5	65 08.9	91 42	153.0	1
2	61 32.4	92 40	154.1	62 00.0	92 41	153.7	62 27.5	91 42	153.3	62 54.9	91 42	152.8	63 22.2	91 43	152.4	63 49.4	91 44	151.9	64 16.5	90 44	151.4	64 43.6	90 45	150.9	2
3	61 08.1	91 43	152.2	61 35.3	91 44	151.8	62 02.4	90 44	151.3	62 29.4	90 45	150.9	62 56.3	90 46	150.4	63 23.2	89 46	149.9	63 49.9	89 47	149.4	64 16.5	88 48	148.8	3
4	60 42.2	90 46	150.4	61 09.0	89 46	149.9	61 35.7	89 47	149.4	62 02.4	89 48	148.9	62 28.9	88 48	148.5	62 55.3	88 49	147.9	63 21.6	87 50	147.4	63 47.8	87 50	146.8	4
15	60 14.8	88 48	148.6	60 41.2	88 49	148.1	61 07.6	88 49	147.6	61 33.8	87 50	147.1	61 59.9	87 51	146.6	62 25.9	86 51	146.0	62 51.8	86 52	145.5	63 17.5	86 53	144.9	15
6	59 46.0	87 50	146.8	60 12.0	87 51	146.3	60 38.0	86 52	145.8	61 03.8	86 52	145.3	61 29.5	85 53	144.7	61 55.1	85 54	144.2	62 20.5	85 54	143.6	62 45.8	84 55	143.0	6
7	59 15.8	86 52	145.1	59 41.4	85 53	144.6	60 07.0	85 54	144.1	60 32.4	85 54	143.5	60 57.7	84 55	143.0	61 22.9	84 56	142.4	61 47.9	83 57	141.8	62 12.7	83 57	141.2	7
8	58 44.3	84 54	143.5	59 09.6	84 55	142.9	59 34.7	84 56	142.4	59 59.7	83 56	141.8	60 24.6	83 57	141.3	60 49.3	82 58	140.7	61 13.9	82 59	140.1	61 38.3	81 59	139.5	8
9	58 11.6	83 56	141.9	58 36.5	83 57	141.3	59 01.2	82 58	140.8	59 25.8	82 58	140.2	59 50.3	81 59	139.6	60 14.6	81 60	139.1	60 38.7	80 60	138.5	61 02.7	80 61	137.8	9
20	57 37.7	82 58	140.3	58 02.2	81 59	139.8	58 26.5	81 60	139.2	58 50.7	80 60	138.6	59 14.8	80 61	138.1	59 38.7	79 62	137.5	60 02.4	79 62	136.8	60 26.0	78 63	136.2	20
1	57 02.7	81 60	138.8	57 26.8	80 61	138.2	57 50.8	80 62	137.7	58 14.6	79 62	137.1	58 38.2	79 63	136.5	59 01.7	78 63	135.9	59 25.0	77 64	135.3	59 48.1	77 65	134.7	1
2	56 26.6	79 62	137.3	56 50.4	79 62	136.8	57 13.9	78 63	136.2	57 37.3	78 64	135.6	58 00.6	77 64	135.0	58 23.7	77 65	134.4	58 46.6	76 66	133.8	59 09.3	75 66	133.2	2
3	55 49.6	78 63	135.9	56 13.0	78 64	135.5	56 36.1	77 64	134.8	56 59.1	76 65	134.2	57 22.0	76 66	133.6	57 44.7	75 66	133.0	58 07.2	75 67	132.4	58 29.5	74 68	131.7	3
4	55 11.6	77 65	134.6	55 34.6	76 65	134.0	55 57.4	76 66	133.4	56 20.0	75 66	132.8	56 42.5	75 67	132.2	57 04.8	74 68	131.6	57 26.9	73 68	131.0	57 48.8	73 69	130.4	4
25	54 32.8	76 66	133.2	54 55.4	75 67	132.7	55 17.8	74 67	132.1	55 40.1	74 68	131.5	56 02.1	73 68	130.9	56 24.1	73 69	130.3	56 45.8	72 70	129.6	57 07.3	71 70	129.0	25
6	53 53.1	74 68	131.9	54 15.3	74 68	131.4	54 37.4	73 69	130.8	54 59.3	73 69	130.2	55 21.0	72 70	129.6	55 42.5	71 70	129.0	56 03.9	71 71	128.4	56 25.0	70 72	127.7	6
7	53 12.6	73 69	130.7	53 34.5	73 69	130.1	53 56.2	72 70	129.6	54 17.7	71 70	129.0	54 39.1	71 71	128.4	55 00.2	70 72	127.7	55 21.2	70 72	127.1	55 42.0	69 73	126.5	7
8	52 31.3	72 70	129.5	52 52.9	72 70	128.9	53 14.2	71 71	128.3	53 35.4	70 72	127.8	53 56.4	70 72	127.1	54 17.2	69 73	126.5	54 37.9	68 73	125.9	54 58.3	68 74	125.3	8
9	51 49.4	71 71	128.3	52 10.6	70 72	127.8	52 31.6	70 72	127.2	52 52.4	69 73	126.6	53 13.1	69 73	126.0	53 33.6	68 74	125.4	53 53.9	67 74	124.7	54 14.0	67 75	124.1	9
30	51 06.7	70 72	127.2	51 27.6	69 73	126.6	51 48.3	69 73	126.1	52 08.8	68 74	125.5	52 29.2	67 74	124.9	52 49.3	67 75	124.2	53 09.3	66 75	123.6	53 29.0	66 76	123.0	30
1	50 23.5	69 73	126.1	50 44.0	68 74	125.5	51 04.4	68 74	125.0	51 24.6	67 75	124.4	51 44.6	66 75	123.8	52 04.4	66 76	123.2	52 24.1	65 76	122.5	52 43.5	64 77	121.9	1
2	49 39.6	68 74	125.1	49 59.9	67 75	124.5	50 19.9	67 75	123.9	50 39.8	66 76	123.3	50 59.5	65 76	122.7	51 19.0	65 76	122.1	51 38.4	64 77	121.5	51 57.5	63 78	120.9	2
3	48 55.2	67 75	124.0	49 15.1	66 75	123.5	49 34.9	66 76	122.9	49 54.5	65 76	122.3	50 13.9	64 77	121.7	50 33.1	64 77	121.1	50 52.1	63 78	120.5	51 11.0	62 78	119.9	3
4	48 10.2	66 76	123.0	48 29.9	65 76	122.5	48 49.3	65 77	121.9	49 08.6	64 77	121.3	49 27.7	63 78	120.7	49 46.7	63 78	120.1	50 05.4	62 78	119.5	50 24.0	61 79	118.9	4
35	47 24.8	65 77	122.0	47 44.1	64 77	121.5	48 03.3	64 78	120.9	48 22.3	63 78	120.3	48 41.1	62 78	119.7	48 59.8	62 79	119.2	49 18.3	61 79	118.5	49 36.5	61 80	117.9	35
6	46 38.8	64 77	121.1	46 57.9	63 78	120.5	47 16.8	63 78	120.0	47 35.5	62 79	119.4	47 54.1	62 79	118.8	48 12.5	61 80	118.2	48 30.7	60 80	117.6	48 48.7	60 80	117.0	6
7	45 52.4	63 78	120.2	46 11.2	62 78	119.6	46 29.9	62 79	119.1	46 48.3	61 79	118.5	47 06.6	61 80	117.9	47 24.8	60 80	117.3	47 42.7	59 81	116.7	48 00.4	59 81	116.1	7
8	45 05.6	62 79	119.3	45 24.2	62 79	118.7	45 42.5	61 80	118.2	46 00.8	60 80	117.6	46 18.8	60 80	117.0	46 36.7	59 81	116.4	46 54.3	59 81	115.9	47 11.9	58 82	115.3	8
9	44 18.4	61 79	118.4	44 36.7	61 80	117.9	44 54.8	60 80	117.3	45 12.8	60 81	116.8	45 30.6	59 81	116.2	45 48.2	58 81	115.6	46 05.6	58 82	115.0	46 22.9	57 82	114.4	9
40	43 30.8	60 80	117.6	43 48.8	60 80	117.0	44 06.7	59 81	116.5	44 24.4	59 81	115.9	44 42.0	58 82	115.4	44 59.4	58 82	114.8	45 16.6	57 82	114.2	45 33.6	56 82	113.6	40
1	42 42.8	60 80	116.8	43 00.6	59 81	116.2	43 18.3	59 81	115.7	43 35.8	58 82	115.1	43 53.1	58 82	114.5	44 10.3	57 82	114.0	44 27.3	56 83	113.4	44 44.1	56 83	112.8	1
2	41 54.5	59 81	116.0	42 12.1	58 82	115.4	42 29.5	58 82	114.9	42 46.8	57 82	114.3	43 03.9	57 82	113.7	43 20.8	56 83	113.2	43 37.6	56 83	112.6	43 54.2	55 84	112.0	2
3	41 05.8	58 82	115.2	41 23.2	58 82	114.6	41 40.4	57 82	114.1	41 57.5	57 83	113.5	42 14.4	56 83	113.0	42 31.1	56 83	112.4	42 47.7	55 84	111.9	43 04.1	54 84	111.3	3
4	40 16.9	57 82	114.4	40 34.0	57 82	113.9	40 51.0	56 83	113.3	41 07.9	56 83	112.8	41 24.6	55 83	112.2	41 41.1	55 84	111.7	41 57.5	54 84	111.1	42 13.7	54 84	110.6	4
45	39 27.6	57 82	113.7	39 44.6	56 83	113.1	40 01.4	56 83	112.6	40 18.0	55 84	112.1	40 34.6	55 84	111.5	40 50.9	54 84	111.0	41 07.1	54 84	110.4	41 23.1	53 85	109.8	45
6	38 38.1	56 83	112.9	38 54.9	56 83	112.4	39 11.5	55 84	111.9	39 27.9	55 84	111.3	39 44.3	54 84	110.8	40 00.4	54 84	110.2	40 16.4	53 85	109.7	40 32.3	53 85	109.1	6
7	37 48.3	55 83	112.2	38 04.9	55 84	111.7	38 21.3	55 84	111.2	38 37.6	54 84	110.6	38 53.7	54 84	110.1	39 09.7	53 85	109.6	39 25.5	53 85	109.0	39 41.2	52 85	108.5	7
8	36 58.3	55 84	111.5	37 14.7	54 84	111.0	37 30.9	54 84	110.5	37 47.0	53 85	110.0	38 03.0	53 85	109.4	38 18.8	52 85	108.9	38 34.5	52 86	108.3	38 50.0	51 86	107.8	8
9	36 08.0	54 84	110.9	36 24.2	54 84	110.3	36 40.3	53 85	109.8	36 56.2	53 85	109.3	37 12.0	52 85	108.8	37 27.7	52 86	108.2	37 43.2	51 86	107.7	37 58.5	51 86	107.1	9
50	35 17.5	54 84	110.2	35 33.5	53 85	109.7	35 49.4	53 85	109.2	36 05.2	52 85	108.6	36 20.8	52 86	108.1	36 36.3	51 86	107.6	36 51.7	51 86	107.0	37 06.9	50 86	106.5	50
1	34 26.8	53 85	109.6	34 42.6	53 85	109.0	34 58.4	52 85	108.5	35 14.0	52 86	108.0	35 29.5	51 86	107.5	35 44.8	51 86	106.9	36 00.0	50 86	106.4	36 15.1	50 86	105.9	1
2	33 35.8	53 85	108.9	33 51.6	52 86	108.4	34 07.2	52 86	107.9	34 22.6	51 86	107.4	34 38.0	51 86	106.8	34 53.2	50 86	106.3	35 08.2	50 86	105.8	35 23.2	50 87	105.3	2
3	32 44.7	52 86	108.3	33 00.3	52 86	107.8	33 15.8	51 86	107.3	33 31.1	51 86	106.8	33 46.3	50 86	106.2	34 01.3	50 87	105.7	34 16.3	50 87	105.2	34 31.1	49 87	104.7	3
4	31 53.4	52 86	107.7	32 08.9	51 86	107.2	32 24.2	51 86	106.7	32 39.4	50 86	106.1	32 54.4	50 87	105.6	33 09.3	50 87	105.1	33 24.1	49 87	104.6	33 38.8	49 87	104.1	4
55	31 02.0	51 86	107.1	31 17.3	51 86	106.6	31 32.4	50 86	106.1	31 47.5	50 87	105.6	32 02.4	50 87	105.0	32 17.2	49 87	104.5	32 31.9	49 87	104.0	32 46.4	48 88	103.5	55
6	30 10.3	51 86	106.5	30 25.5	50 86	106.0	30 40.5	50 87	105.5	30 55.4	50 87	105.0	31 10.3	49 87	104.5	31 24.9	49 87	103.9	31 39.5	48 88	103.4	31 53.9	48 88	102.9	6
7	29 18.5	50 86	105.9	29 33.6	50 87	105.4	29 48.5	50 87	104.9	30 03.3	49 87	104.4	30 18.0	49 87	103.9	30 32.5	48 88	103.4	30 47.0	48 88	102.9	31 01.3	48 88	102.4	7
8	28 26.6	50 87	105.3	28 41.5	49 87	104.8	28 56.3	49 87	104.3	29 11.0	49 87	103.8	29 25.6	48 88	103.3	29 40.0	48 88	102.8	29 54.4	48 88	102.3	30 08.6	47 88	101.8	8
9	27 34.5	49 87	104.8	27 49.3	49 87	104.3	28 04.0	49 88	103.8	28 18.6	48 88	103.3	28 33.0	48 88	102.8	28 47.4	48 88	102.3	29 01.6	47 88	101.8	29 15.8	47 88	101.3	9
60	26 42.3	49 87	104.2	26 57.0	49 88	103.7	27 11.5	48 88	103.2	27 26.0	48 88	102.7	27 40.4	48 88	102.2	27 54.6	47 88	101.7	28 08.8	47 88	101.2	28 22.8	47 88	100.8	60
1	25 50.0	49 88	103.7	26 04.5	48 88	103.2	26 19.0	48 88	102.7	26 33.3	48 88	102.2	26 47.6	47 88	101.7	27 01.8	47 88	101.2	27 15.8	47 88	100.7	27 29.8	46 88	100.2	1
2	24 57.5	48 88	103.1	25 12.0	48 88	102.6	25 26.3	48 88	102.2	25 40.6	47 88	101.7	25 54.8	47 88	101.2	26 08.8	47 88	100.7	26 22.8	46 88	100.2	26 36.7	46 89	99.7	2
3	24 04.9	48 88	102.6	24 19.3	48 88	102.1	24 33.5	47 88	101.6	24 47.7	47 88	101.1	25 01.8	47 88	100.7	25 15.8	46 88	100.2	25 29.7	46 89	99.7	25 43.5	46 89	99.2	3
4	23 12.2	48 88	102.1	23 26.5	47 88	101.6	23 40.7	47 88	101.1	23 54.8	47 88	100.6	24 08.8	47 89	100.1	24 22.7	46 89	99.7	24 36.5	46 89	99.2	24 50.2	46 89	98.7	4
65	22 19.5	47 88	101.6	22 33.6	47 88	101.1	22 47.7	47 88	100.6	23 01.7	47 88	100.1	23 15.6	46 89	99.6	23 29.5	46 89	99.2	23 43.2	46 89	98.7	23 56.9	45 89	98.2	65
6	21 26.6	47 88	101.0	21 40.7	47 88	100.6	21 54.7	47 89	100.1	22 08.6	46 89	99.6	22 22.4	46 89	99.1	22 36.2	46 89	98.7	22 49.9	45 89	98.2	23 03.4	45 89	97.7	6
7	20 33.6	47 88	100.5	20 47.6	47 88	100.1	21 01.5	46 89	99.6	21 15.4	46 89	99.1	21 29.2	46 89	98.6	21 42.8	46 89	98.2	21 56.4	45 89	97.7	22 10.0	45 89	97.2	7
8	19 40.5	47 88	100.0	19 54.5	46 89	99.6	20 08.3	46 89	99.1	20 22.1	46 89	98.6	20 35.8	46 89	98.2	20 49.4	45 89	97.7	21 03.0	45 89	97.2	21 16.4	45 89	96.7	8
9	18 47.4	46 89	99.6	19 01.3	46 89	99.1	19 15.0	46 89	98.6	19 28.7	46 89	98.1	19 42.4	45 89	97.7	19 56.0	45 89	97.2	20 09.4	45 89	96.7	20 22.9	45 90	96.2	9
70	17 54.2	46 89	99.1	18 08.0	46 89	98.6	18 21.7	46 89	98.1	18 35.3	45 89	97.7	18 48.9	45 89	97.2	19 02.4	45 89	96.7	19 15.9	45 90	96.2	19 29.2	44 90	95.8	70
1	17 00.9	46 89	98.6	17 14.6	46 89	98.1	17 28.3	45 89	97.7	17 41.9	45 89	97.2	17 55.4	45 89	96.7	18 08.8	45 89	96.2	18 22.2	45 90	95.8	18 35.5	44 90	95.3	1
2	16 07.5	46 89	98.1	16 21.2	45 89	97.6	16 34.8	45 89	97.2	16 48.3	45 89	96.7	17 01.8	45 89	96.2	17 15.2	45 90	95.8	17 28.5	44 90	95.3	17 41.8	44 90	94.8	2
3	15 14.1	45 89	97.6	15 27.7	45 89	97.2	15 41.3	45 89	96.7	15 54.7	45 89	96.2	16 08.2	45 90	95.8	16 21.5	44 90	95.3	16 34.8	44 90	94.8	16 48.1	44 90	94.4	3
4	14 20.6	45 89	97.2	14 34.2	45 89	96.7	14 47.7	45 89	96.2	15 01.1	45 90	95.8	15 14.5	45 90	95.3	15 27.8	44 90	94.8	15 41.1	44 90	94.4	15 54.3	44 90	93.9	4
75	13 27.1	45 89	96.7	13 40.6	45 89	96.2	13 54.0	45 90	95.8	14 07.4	45 90	95.3	14 20.8	44 90	94.9	14 34.1	44 90	94.4	14 47.3	44 90	93.9	15 00.5	44 90	93.5	75
6	12 33.5	45 89	96.2	12 47.0	45 90	95.8	13 00.4	45 90	95.3	13 13.7	44 90	94.9	13 27.0	44 90	94.4	13 40.3	44 90	93.9	13 53.5	44 90	93.5	14 06.6	44 90	93.0	6
7	11 39.9	45 90	95.8	11 53.3	45 90	95.3	12 06.7	44 90	94.9	12 20.0	44 90	94.4	12 33.2	44 90	93.9	12 46.5	44 90	93.5	12 59.6	44 90	93.0	13 12.8	44 90	92.6	7
8	10 46.2	45 90	95.3	10 59.6	44 90	94.9	11 12.9	44 90	94.4	11 26.2	44 90	94.0	11 39.4	44 90	93.5	11 52.6	44 90	93.0	12 05.8	44 90	92.6	12 18.9	44 90	92.1	8
9	9 52.5	44 90	94.9	10 05.8	44 90	94.4	10 19.1	44 90	94.0	10 32.4	44 90	93.5	10 45.6	44 90	93.0	10 58.7	44 90	92.6	11 11.9	44 90	92.1	11 25.0	44 90	91.7	9
80	8 58.7	44 90	94.4	9 12.0	44 90	94.0	9 25.3	44 90	93.5	9 38.5	44 90	93.1	9 51.7	44 90	92.6	10 04.9	44 90	92.1	10 18.0	44 90	91.7	10 31.1	44 90	91.2	80
1	8 05.0	44 90	94.0	8 18.2	44 90	93.5	8 31.5	44 90	93.1	8 44.7	44 90	92.6	8 57.8	44 90	92.2	9 11.0	44 90	91.7	9 24.1	44 90	91.2	9 37.2	43 90	90.8	1
2	7 11.1	44 90	93.5	7 24.4	44 90	93.1	7 37.6	44 90	92.6	7 50.8	44 90	92.2	8 03.9	44 90	91.7	8 17.1	44 90	91.3	8 30.2	44 90	90.8	8 43.2	43 90	90.4	2
3	6 17.3	44 90	93.1	6 30.5	44 90	92.6	6 43.7	44 90	92.2	6 56.9	44 90	91.7	7 10.0	44 90	91.3	7 23.2	44 90	90.8	7 36.2	44 90	90.4	7 49.3	43 90	89.9	3
4	5 23.5	44 90	92.6	5 36.7	44 90	92.2	5 49.8	44 90	91.7	6 03.0	44 90	91.3	6 16.1	44 90	90.8	6 29.2	44 90	90.4	6 42.3	44 90	89.9	6 55.4	43 90	89.5	4
85										5 09.1	44 90	90.8	5 22.2	44 90	90.4	5 35.3	44 90	89.9	5 48.4	44 90	89.5	6 01.5	44 90	89.0	85
6																						5 07.5	44 90	88.6	6

Lat. 26°

H.A.	0° 00′ Alt.	Δd Δt	Az.	0° 30′ Alt.	Δd Δt	Az.	1° 00′ Alt.	Δd Δt	Az.	1° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	64 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0	63 00.0	1.0 02	180.0	62 30.0	1.0 02	180.0
1	63 58.9	1.0 05	177.7	63 28.9	1.0 05	177.8	62 59.0	1.0 05	177.8	62 29.0	1.0 05	177.8
2	63 55.7	1.0 09	175.4	63 25.8	1.0 09	175.5	62 55.9	1.0 09	175.6	62 25.9	1.0 08	175.7
3	63 50.4	99 12	173.2	63 20.5	99 12	173.3	62 50.7	99 12	173.4	62 20.9	99 12	173.5
4	63 42.9	99 16	170.9	63 13.2	99 16	171.1	62 43.5	99 15	171.2	62 13.8	99 15	171.4
05	63 33.4	98 19	168.7	63 03.9	98 19	168.9	62 34.3	99 19	169.1	62 04.7	99 18	169.3
6	63 21.8	98 22	166.5	62 52.5	98 22	166.7	62 23.1	98 22	167.0	61 53.7	98 22	167.2
7	63 08.3	97 26	164.4	62 39.1	97 25	164.6	62 10.0	97 25	164.9	61 40.8	97 25	165.1
8	62 52.7	96 29	162.2	62 23.9	96 28	162.5	61 55.0	96 28	162.8	61 26.0	97 28	163.1
9	62 35.4	95 32	160.1	62 06.8	95 32	160.5	61 38.1	96 31	160.8	61 09.4	96 30	161.1
10	62 16.1	94 35	158.1	61 47.8	94 34	158.4	61 19.5	95 34	158.8	60 51.1	95 34	159.1
1	61 55.1	93 38	156.1	61 27.2	93 37	156.5	60 59.1	94 37	156.8	60 31.0	94 36	157.2
2	61 32.4	92 40	154.1	61 04.8	92 40	154.5	60 37.1	92 40	154.9	60 09.3	93 39	155.3
3	61 08.1	91 43	152.2	60 40.8	91 42	152.7	60 13.4	91 42	153.1	59 46.0	92 41	153.5
4	60 42.2	90 46	150.4	60 15.3	90 45	150.8	59 48.3	90 44	151.3	59 21.2	90 44	151.7
15	60 14.8	88 48	148.6	59 48.2	89 47	149.0	59 21.6	89 47	149.5	58 54.9	89 46	149.9
6	59 46.0	87 50	146.8	59 19.8	87 50	147.3	58 53.5	88 49	147.8	58 27.1	88 48	148.2
7	59 15.8	86 52	145.1	58 50.0	86 52	145.6	58 24.1	87 51	146.1	57 58.1	87 51	146.6
8	58 44.3	84 54	143.5	58 18.9	85 54	144.0	57 53.4	85 53	144.5	57 27.7	86 53	144.9
9	58 11.6	83 56	141.9	57 46.6	84 56	142.4	57 21.4	84 55	142.9	56 56.1	84 54	143.4
20	57 37.7	82 58	140.3	57 13.1	82 58	140.8	56 48.3	83 57	141.3	56 23.4	83 56	141.9
1	57 02.7	81 60	138.8	56 38.4	81 59	139.3	56 14.1	81 59	139.9	55 49.5	82 58	140.4
2	56 26.6	79 62	137.3	56 02.8	80 61	137.9	55 38.8	80 60	138.4	55 14.6	81 60	138.9
3	55 49.6	78 63	135.9	55 26.1	79 63	136.5	55 02.5	79 62	137.0	54 38.7	79 62	137.5
4	55 11.6	77 65	134.6	54 48.5	77 64	135.1	54 25.3	78 64	135.7	54 01.8	78 63	136.2
25	54 32.8	76 66	133.2	54 10.0	76 66	133.8	53 47.1	77 65	134.3	53 24.1	77 64	134.9
6	53 53.1	74 68	131.9	53 30.7	75 67	132.5	53 08.1	75 66	133.1	52 45.4	76 66	133.6
7	53 12.6	73 69	130.7	52 50.5	74 68	131.3	52 28.3	74 68	131.8	52 06.0	75 67	132.4
8	52 31.3	72 70	129.5	52 09.6	73 69	130.1	51 47.8	73 69	130.6	51 25.8	74 68	131.2
9	51 49.4	71 71	128.3	51 28.0	71 70	128.9	51 06.5	72 70	129.5	50 44.8	73 69	130.0
30	51 06.7	70 72	127.2	50 45.7	70 72	127.8	50 24.5	71 71	128.3	50 03.2	71 70	128.9
1	50 23.5	69 73	126.1	50 02.8	69 73	126.7	49 41.9	70 72	127.2	49 20.9	70 72	127.8
2	49 39.6	68 74	125.1	49 19.2	68 74	125.6	48 58.7	69 73	126.2	48 37.9	69 72	126.7
3	48 55.2	67 75	124.0	48 35.1	67 74	124.6	48 14.8	68 74	125.1	47 54.4	68 74	125.7
4	48 10.2	66 76	123.0	47 50.4	66 75	123.6	47 30.5	67 75	124.1	47 10.3	67 74	124.7
35	47 24.8	65 77	122.0	47 05.3	65 76	122.6	46 45.6	66 76	123.2	46 25.7	66 75	123.7
6	46 38.8	64 77	121.1	46 19.6	64 77	121.7	46 00.2	65 76	122.2	45 40.6	65 76	122.8
7	45 52.4	63 78	120.2	45 33.5	63 78	120.7	45 14.3	64 77	121.3	44 55.0	65 77	121.8
8	45 05.6	62 79	119.3	44 46.9	63 78	119.8	44 28.0	63 78	120.4	44 09.0	64 78	120.9
9	44 18.4	61 79	118.4	43 59.9	62 79	119.0	43 41.3	62 78	119.5	43 22.5	63 78	120.1
40	43 30.8	60 80	117.6	43 12.6	61 80	118.1	42 54.2	61 79	118.7	42 35.7	62 79	119.2
1	42 42.8	60 80	116.8	42 24.8	60 80	117.3	42 06.7	61 80	117.8	41 48.4	61 79	118.4
2	41 54.5	59 81	116.0	41 36.7	59 81	116.5	41 18.8	60 80	117.0	41 00.8	60 80	117.6
3	41 05.8	58 82	115.2	40 48.3	59 81	115.7	40 30.6	59 81	116.2	40 12.8	60 80	116.8
4	40 16.9	57 82	114.4	39 59.6	58 82	115.0	39 42.1	58 81	115.5	39 24.5	59 81	116.0
45	39 27.6	57 82	113.7	39 10.5	57 82	114.2	38 53.3	58 82	114.7	38 35.9	58 82	115.3
6	38 38.1	56 83	112.9	38 21.2	57 83	113.5	38 04.1	57 82	114.0	37 47.0	58 82	114.5
7	37 48.3	55 83	112.2	37 31.6	56 83	112.8	37 14.7	56 83	113.3	36 57.7	57 82	113.8
8	36 58.3	55 84	111.5	36 41.7	55 84	112.1	36 25.1	56 83	112.6	36 08.3	56 83	113.1
9	36 08.0	54 84	110.9	35 51.6	55 84	111.4	35 35.1	55 84	111.9	35 18.5	56 83	112.4
50	35 17.5	54 84	110.2	35 01.3	54 84	110.7	34 45.0	55 84	111.2	34 28.6	55 84	111.7
1	34 26.8	53 85	109.6	34 10.7	54 84	110.1	33 54.6	54 84	110.6	33 38.3	54 84	111.1
2	33 35.8	53 85	108.9	33 20.0	53 85	109.4	33 04.0	53 85	109.9	32 47.9	54 84	110.4
3	32 44.7	52 86	108.3	32 29.0	53 85	108.8	32 13.2	53 85	109.3	31 57.3	53 85	109.8
4	31 53.4	52 86	107.7	31 37.9	52 86	108.2	31 22.2	52 85	108.7	31 06.4	53 85	109.2
55	31 02.0	51 86	107.1	30 46.6	52 86	107.6	30 31.0	52 86	108.1	30 15.4	52 85	108.6
6	30 10.3	51 86	106.5	29 55.1	51 86	107.0	29 39.7	51 86	107.5	29 24.2	52 86	108.0
7	29 18.5	50 86	105.9	29 03.4	51 86	106.4	28 48.2	51 86	106.9	28 32.8	51 86	107.4
8	28 26.6	50 87	105.3	28 11.6	50 87	105.8	27 56.5	51 86	106.3	27 41.3	51 86	106.8
9	27 34.5	49 87	104.8	27 19.6	50 87	105.2	27 04.6	50 86	105.7	26 49.5	50 86	106.2
60	26 42.3	49 87	104.2	26 27.5	49 87	104.7	26 12.7	50 87	105.2	25 57.7	50 87	105.7
1	25 50.0	49 88	103.7	25 35.3	49 87	104.1	25 20.5	49 87	104.6	25 05.7	50 87	105.1
2	24 57.5	48 88	103.1	24 42.9	49 87	103.6	24 28.3	49 87	104.1	24 13.6	49 87	104.6
3	24 04.9	48 88	102.6	23 50.5	48 88	103.1	23 35.9	49 87	103.5	23 21.3	49 87	104.0
4	23 12.2	48 88	102.1	22 57.9	48 88	102.5	22 43.5	48 88	103.0	22 28.9	49 88	103.5
65	22 19.5	47 88	101.6	22 05.2	48 88	102.0	21 50.9	48 88	102.5	21 36.4	48 88	103.0
6	21 26.6	47 88	101.0	21 12.4	47 88	101.5	20 58.2	48 88	102.0	20 43.8	48 88	102.5
7	20 33.6	47 88	100.5	20 19.5	47 88	101.0	20 05.4	47 88	101.5	19 51.1	48 88	102.0
8	19 40.5	47 88	100.0	19 26.5	47 88	100.5	19 12.5	47 88	101.0	18 58.3	47 88	101.4
9	18 47.4	46 89	99.6	18 33.5	47 89	100.0	18 19.5	47 88	100.5	18 05.4	47 88	101.0
70	17 54.2	46 89	99.1	17 40.3	46 89	99.5	17 26.4	47 88	100.0	17 12.4	47 88	100.5
1	17 00.9	46 89	98.6	16 47.1	46 89	99.0	16 33.3	46 89	99.5	16 19.3	46 88	100.0
2	16 07.5	46 89	98.1	15 53.8	46 89	98.6	15 40.0	46 89	99.0	15 26.2	46 89	99.5
3	15 14.1	45 89	97.6	15 00.5	46 89	98.1	14 46.7	46 89	98.6	14 33.0	46 89	99.0
4	14 20.6	45 89	97.2	14 07.0	45 89	97.6	13 53.4	46 89	98.1	13 39.7	46 89	98.5
75	13 27.1	45 89	96.7	13 13.6	45 89	97.2	13 00.0	45 89	97.6	12 46.3	46 89	98.1
6	12 33.5	45 89	96.2	12 20.0	45 89	96.7	12 06.5	45 89	97.2	11 52.9	45 89	97.6
7	11 39.9	45 90	95.8	11 26.4	45 89	96.2	11 12.9	45 89	96.7	10 59.4	45 89	97.1
8	10 46.2	45 90	95.3	10 32.8	45 90	95.8	10 19.4	45 90	96.2	10 05.9	45 89	96.7
9	9 52.5	44 90	94.9	9 39.1	45 90	95.3	9 25.7	45 90	95.8	9 12.3	45 89	96.2
80	8 58.7	44 90	94.4	8 45.4	44 90	94.9	8 32.1	45 90	95.3	8 18.7	45 90	95.8
1	8 05.0	44 90	94.0	7 51.7	44 90	94.4	7 38.3	44 90	94.9	7 25.0	45 90	95.3
2	7 11.1	44 90	93.5	6 57.9	44 90	94.0	6 44.6	44 90	94.4	6 31.3	44 90	94.9
3	6 17.3	44 90	93.1	6 04.1	44 90	93.5	5 50.8	44 90	94.0	5 37.5	44 90	94.4
4	5 23.5	44 90	92.6	5 10.2	44 90	93.1						

H.A.	2° 00′ Alt.	Δd Δt	Az.	2° 30′ Alt.	Δd Δt	Az.	3° 00′ Alt.	Δd Δt	Az.	3° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	62 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0
1	61 59.0	1.0 05	177.9	61 29.0	1.0 05	177.9	60 59.0	1.0 05	177.9	60 29.0	1.0 05	178.0
2	61 56.0	1.0 08	175.7	61 26.1	1.0 08	175.8	60 56.1	1.0 08	175.9	60 26.2	1.0 08	176.0
3	61 51.0	1.0 12	173.6	61 21.2	1.0 12	173.7	60 51.3	1.0 11	173.8	60 21.4	1.0 11	173.9
4	61 44.0	99 15	171.5	61 14.3	99 15	171.7	60 44.6	99 14	171.8	60 14.8	99 14	171.9
05	61 35.1	99 18	169.5	61 05.5	99 18	169.6	60 35.9	99 18	169.8	60 06.3	99 17	169.9
6	61 24.3	98 21	167.4	60 54.9	98 21	167.6	60 25.4	98 20	167.8	59 56.0	98 20	168.0
7	61 11.6	97 24	165.4	60 42.4	97 24	165.6	60 13.1	98 24	165.8	59 43.9	98 23	166.0
8	60 57.1	97 27	163.4	60 28.1	97 27	163.6	59 59.0	97 26	163.9	59 30.0	97 26	164.1
9	60 40.7	96 30	161.4	60 12.0	96 30	161.7	59 43.2	96 29	162.0	59 14.4	96 29	162.2
10	60 22.7	95 33	159.4	59 54.2	95 32	159.8	59 25.6	95 32	160.1	58 57.1	95 32	160.4
1	60 02.9	94 36	157.5	59 34.7	94 35	157.9	59 06.4	94 35	158.2	58 38.1	94 34	158.5
2	59 41.5	93 38	155.7	59 13.6	93 38	156.0	58 45.6	93 37	156.4	58 17.6	93 37	156.7
3	59 18.5	92 41	153.9	58 50.9	92 40	154.3	58 23.3	92 40	154.6	57 55.6	92 39	155.0
4	58 54.0	91 43	152.1	58 26.7	91 43	152.5	57 59.4	91 42	152.9	57 32.0	91 42	153.3
15	58 28.0	90 46	150.4	58 01.1	90 45	150.8	57 34.1	90 44	151.2	57 07.1	90 44	151.6
6	58 00.7	88 48	148.7	57 34.1	89 47	149.1	57 07.5	89 47	149.5	56 40.7	89 46	149.9
7	57 32.0	87 50	147.0	57 05.8	88 50	147.5	56 39.5	88 49	147.9	56 13.1	88 48	148.3
8	57 02.0	86 52	145.4	56 36.1	86 51	145.9	56 10.2	87 51	146.3	55 44.1	87 50	146.8
9	56 30.8	85 54	143.9	56 05.3	85 53	144.3	55 39.7	85 53	144.8	55 14.0	86 52	145.3
20	55 58.4	84 56	142.4	55 33.3	84 55	142.8	55 08.0	84 54	143.3	54 42.7	85 54	143.8
1	55 24.9	82 58	140.9	55 00.1	83 57	141.4	54 35.3	83 56	141.9	54 10.3	84 56	142.3
2	54 50.4	81 59	139.5	54 26.0	82 59	140.0	54 01.4	82 58	140.4	53 36.8	82 58	140.9
3	54 14.8	80 61	138.1	53 50.8	80 60	138.6	53 26.6	81 60	139.1	53 02.3	81 59	139.6
4	53 38.3	79 62	136.7	53 14.6	79 62	137.2	52 50.8	80 61	137.7	52 26.9	80 61	138.2
25	53 00.9	78 64	135.4	52 37.5	78 63	135.9	52 14.1	78 63	136.4	51 50.5	79 62	136.9
6	52 22.6	76 65	134.1	51 59.6	77 65	134.7	51 36.5	77 64	135.2	51 13.2	78 64	135.7
7	51 43.5	75 66	132.9	51 20.8	76 66	133.4	50 58.1	76 65	134.0	50 35.1	77 65	134.5
8	51 03.6	74 68	131.7	50 41.3	75 67	132.2	50 18.9	75 67	132.8	49 56.3	76 66	133.3
9	50 23.0	73 69	130.6	50 01.0	73 67	131.1	49 38.9	74 68	131.6	49 16.6	74 67	132.1
30	49 41.7	72 70	129.4	49 20.0	72 68	130.0	48 58.2	73 69	130.5	48 36.3	73 68	131.0
1	48 59.7	71 71	128.3	48 38.3	71 70	128.9	48 16.9	72 70	129.4	47 55.3	72 70	129.9
2	48 17.1	70 72	127.3	47 56.0	70 72	127.8	47 34.9	71 71	128.3	47 13.6	71 70	128.8
3	47 33.9	69 73	126.2	47 13.1	69 72	126.8	46 52.3	70 72	127.3	46 31.3	70 72	127.8
4	46 50.1	68 74	125.2	46 29.6	68 73	125.8	46 09.1	69 73	126.3	45 48.4	69 72	126.8
35	46 05.8	67 75	124.2	45 45.6	67 74	124.8	45 25.3	68 74	125.3	45 04.9	68 73	125.8
6	45 20.9	66 76	123.3	45 01.1	66 75	123.8	44 41.1	67 75	124.4	44 20.9	67 74	124.9
7	44 35.6	65 76	122.4	44 16.0	66 76	122.9	43 56.3	66 75	123.4	43 36.4	66 75	123.9
8	43 49.8	64 77	121.5	43 30.5	65 76	122.0	43 11.1	65 76	122.5	42 51.4	66 76	123.0
9	43 03.6	63 78	120.6	42 44.6	64 77	121.1	42 25.4	64 77	121.6	42 06.0	65 76	122.2
40	42 17.0	62 78	119.7	41 58.2	63 78	120.3	41 39.2	63 78	120.8	41 20.1	64 77	121.3
1	41 30.0	62 79	118.9	41 11.4	62 78	119.4	40 52.7	63 78	119.9	40 33.9	63 78	120.5
2	40 42.6	61 80	118.1	40 24.3	61 79	118.6	40 05.8	62 79	119.1	39 47.2	62 78	119.6
3	39 54.8	60 80	117.3	39 36.7	61 80	117.8	39 18.5	61 79	118.3	39 00.1	61 79	118.8
4	39 06.8	59 81	116.5	38 48.9	60 80	117.0	38 30.9	60 80	117.6	38 12.7	61 80	118.1
45	38 18.3	59 81	115.8	38 00.7	59 81	116.3	37 42.9	60 80	116.8	37 25.0	60 80	117.3
6	37 29.6	58 82	115.0	37 12.2	58 81	115.5	36 54.6	59 81	116.0	36 36.9	59 81	116.6
7	36 40.6	57 82	114.3	36 23.4	58 82	114.8	36 06.0	58 81	115.3	35 48.5	59 81	115.8
8	35 51.3	57 82	113.6	35 34.3	57 82	114.1	35 17.1	57 82	114.6	34 59.8	58 82	115.1
9	35 01.8	56 83	112.9	34 44.9	56 83	113.4	34 27.9	57 82	113.9	34 10.8	57 82	114.4
50	34 12.0	55 83	112.2	33 55.3	56 83	112.7	33 38.5	56 83	113.2	33 21.6	57 82	113.7
1	33 22.0	55 84	111.6	33 05.5	55 84	112.1	32 48.8	56 83	112.6	32 32.1	56 83	113.1
2	32 31.7	54 84	110.9	32 15.4	55 84	111.4	31 58.9	55 84	111.9	31 42.4	55 83	112.4
3	31 41.2	54 84	110.3	31 25.1	54 84	110.8	31 08.8	54 84	111.3	30 52.4	55 84	111.8
4	30 50.5	53 85	109.7	30 34.5	54 84	110.2	30 18.4	54 84	110.6	30 02.2	54 84	111.1
55	29 59.7	53 85	109.0	29 43.8	53 85	109.5	29 27.8	53 84	110.0	29 11.8	54 84	110.5
6	29 08.6	52 86	108.4	28 52.9	53 85	108.9	28 37.1	53 85	109.4	28 21.2	53 85	109.9
7	28 17.3	52 86	107.9	28 01.8	52 86	108.3	27 46.1	52 85	108.8	27 30.4	53 85	109.3
8	27 25.9	51 86	107.3	27 10.5	52 86	107.8	26 55.0	52 85	108.2	26 39.4	52 85	108.7
9	26 34.4	51 86	106.7	26 19.1	51 86	107.2	26 03.7	51 86	107.7	25 48.2	52 86	108.1
60	25 42.6	50 86	106.1	25 27.5	51 86	106.6	25 12.2	51 86	107.1	24 56.9	51 86	107.6
1	24 50.8	50 87	105.6	24 35.7	50 86	106.1	24 20.6	51 86	106.5	24 05.4	51 86	107.0
2	23 58.7	50 87	105.0	23 43.8	50 87	105.5	23 28.8	50 86	106.0	23 13.7	50 86	106.5
3	23 06.6	49 87	104.5	22 51.8	49 87	105.0	22 36.9	50 87	105.4	22 22.0	50 87	105.9
4	22 14.3	49 87	104.0	21 59.6	49 87	104.4	21 44.9	49 87	104.9	21 30.0	50 87	105.4
65	21 21.9	48 88	103.4	21 07.4	49 88	103.9	20 52.7	49 87	104.4	20 38.0	49 87	104.8
6	20 29.4	48 88	102.9	20 14.9	48 88	103.4	20 00.4	49 87	103.9	19 45.8	49 87	104.3
7	19 36.8	48 88	102.4	19 22.4	48 88	102.9	19 08.0	48 88	103.3	18 53.5	49 88	103.8
8	18 44.1	48 88	101.9	18 29.8	48 88	102.4	18 15.5	48 88	102.8	18 01.0	48 88	103.3
9	17 51.3	47 88	101.4	17 37.1	47 88	101.9	17 22.8	48 88	102.3	17 08.5	48 88	102.8
70	16 58.4	47 88	100.9	16 44.3	47 58	101.4	16 30.1	47 88	101.8	16 15.9	48 88	102.3
1	16 05.4	47 88	100.4	15 51.4	47 88	100.9	15 37.3	47 88	101.4	15 23.1	47 88	101.8
2	15 12.3	46 89	100.0	14 58.4	47 88	100.4	14 44.4	47 88	100.9	14 30.3	47 88	101.3
3	14 19.1	46 89	99.5	14 05.3	46 89	99.9	13 51.3	47 88	100.4	13 37.4	47 88	100.8
4	13 25.9	46 89	99.0	13 12.1	46 89	99.5	12 58.3	46 89	99.9	12 44.4	46 88	100.4
75	12 32.6	46 89	98.5	12 18.9	46 89	99.0	12 05.1	46 89	99.4	11 51.3	46 89	99.9
6	11 39.3	46 89	98.1	11 25.6	46 89	98.5	11 11.9	46 89	99.0	10 58.1	46 89	99.4
7	10 45.8	45 89	97.6	10 32.2	45 89	98.1	10 18.6	46 89	98.5	10 04.9	46 89	99.0
8	9 52.4	45 89	97.1	9 38.8	45 89	97.6	9 25.2	45 89	98.0	9 11.6	45 89	98.5
9	8 58.8	45 89	96.7	8 45.3	45 89	97.1	8 31.8	45 89	97.6	8 18.2	45 89	98.0
80	8 05.2	45 89	96.2	7 51.8	45 89	96.7	7 38.3	45 89	97.1	7 24.8	45 89	97.6
1	7 11.6	45 90	95.8	6 58.2	45 89	96.2	6 44.8	45 89	96.7	6 31.3	45 89	97.1
2	6 17.9	45 90	95.3	6 04.6	45 90	95.8	5 51.2	45 90	96.2	5 37.8	45 89	96.7
3	5 24.2	44 90	94.9	5 10.9	44 90	95.3						
4												

Lat. 26°

Lat. 27°

Lat. 28°

Lat. 26°

H.A.	4° 00′ Alt.		Az.	4° 30′ Alt.		Az.	5° 00′ Alt.		Az.	5° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	68 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0
1	67 58.7	1.0 06	177.3	68 28.7	1.0 06	177.3	68 58.7	1.0 06	177.2	69 28.7	1.0 07	177.2
2	67 55.0	1.0 10	174.7	68 24.9	1.0 11	174.6	68 54.8	1.0 11	174.5	69 24.7	1.0 11	174.3
3	67 48.8	99 14	172.0	68 18.5	99 15	171.9	68 48.3	99 15	171.7	69 18.0	99 15	171.5
4	67 40.1	99 18	169.4	68 09.7	99 19	169.2	68 39.2	99 19	169.0	69 08.8	98 20	168.7
05	67 29.0	98 22	166.9	67 58.4	98 23	166.6	68 27.7	98 23	166.3	68 57.0	98 24	166.0
6	67 15.6	97 26	164.3	67 44.7	97 27	164.0	68 13.8	97 27	163.7	68 42.8	97 28	163.3
7	67 00.0	96 30	161.9	67 28.7	96 30	161.5	67 57.5	96 31	161.1	68 26.1	95 32	160.7
8	66 42.1	95 33	159.4	67 10.5	95 34	159.0	67 38.9	94 34	158.6	68 07.2	94 35	158.2
9	66 22.1	94 37	157.1	66 50.2	93 37	156.6	67 18.2	93 38	156.2	67 46.1	93 39	155.7
10	66 00.1	92 40	154.8	66 27.8	92 40	154.3	66 55.4	92 41	153.8	67 22.8	91 42	153.3
1	65 36.2	91 43	152.6	66 03.5	91 44	152.0	66 30.6	90 44	151.5	66 57.6	90 45	151.0
2	65 10.5	90 46	150.4	65 37.3	89 47	149.9	66 04.0	89 47	149.3	66 30.5	88 48	148.7
3	64 43.0	88 49	148.3	65 09.3	88 49	147.7	65 35.6	87 50	147.2	66 01.7	87 51	146.6
4	64 13.8	87 51	146.3	64 39.7	86 52	145.7	65 05.5	86 53	145.1	65 31.1	85 54	144.5
15	63 43.1	85 54	144.3	64 08.6	85 54	143.7	64 33.9	84 55	143.1	64 59.0	84 56	142.5
6	63 11.9	84 56	142.4	63 36.0	83 57	141.8	64 00.8	82 58	141.2	64 25.4	82 58	140.5
7	62 37.4	82 58	140.6	63 02.0	81 59	140.0	63 26.3	81 60	139.4	63 50.5	80 60	138.7
8	62 02.6	81 60	138.9	62 26.7	80 61	138.2	62 50.6	79 62	137.6	63 14.3	79 62	136.9
9	61 26.5	79 62	137.2	61 50.2	78 63	136.6	62 13.6	78 64	135.9	62 36.9	77 64	135.2
20	60 49.3	78 64	135.6	61 12.5	77 64	134.9	61 35.5	76 65	134.3	61 58.3	76 66	133.6
1	60 11.1	76 66	134.0	60 33.8	76 66	133.4	60 56.4	75 67	132.7	61 18.7	74 68	132.0
2	59 31.8	75 67	132.5	59 54.1	74 68	131.9	60 16.3	73 68	131.2	60 38.2	73 69	130.5
3	58 51.6	73 68	131.1	59 13.5	73 69	130.4	59 35.2	72 70	129.8	59 56.7	71 70	129.1
4	58 10.5	72 70	129.7	58 32.1	71 70	129.0	58 53.4	71 71	128.4	59 14.5	70 72	127.7
25	57 28.6	71 71	128.4	57 49.8	70 72	127.7	58 10.7	69 72	127.0	58 31.4	69 73	126.3
6	56 46.0	70 72	127.1	57 06.7	69 73	126.4	57 27.3	68 74	125.7	57 47.6	67 74	125.1
7	56 02.6	68 74	125.8	56 23.0	68 74	125.2	56 43.1	67 74	124.5	57 03.1	66 75	123.8
8	55 18.5	67 74	124.6	55 38.6	66 75	124.0	55 58.4	66 76	123.3	56 18.0	65 76	122.6
9	54 33.9	66 76	123.5	54 53.5	65 76	122.8	55 13.0	65 76	122.2	55 32.3	64 77	121.5
30	53 48.6	65 76	122.3	54 07.9	64 77	121.7	54 27.1	63 78	121.0	54 46.0	63 78	120.4
1	53 02.8	64 77	121.3	53 21.8	63 78	120.6	53 40.6	62 78	120.0	53 59.2	62 79	119.3
2	52 16.4	63 78	120.2	52 35.1	62 78	119.6	52 53.7	61 79	118.9	53 12.0	61 80	118.3
3	51 29.6	62 79	119.2	51 48.0	61 79	118.6	52 06.3	60 80	118.0	52 24.3	60 80	117.3
4	50 42.3	61 80	118.3	51 00.5	60 80	117.6	51 18.4	59 80	117.0	51 36.1	59 81	116.3
35	49 54.6	60 80	117.3	50 12.5	59 81	116.7	50 30.2	59 81	116.1	50 47.6	58 82	115.4
6	49 06.5	59 81	116.4	49 24.1	58 81	115.8	49 41.5	58 82	115.2	49 58.7	57 82	114.5
7	48 18.0	58 81	115.5	48 35.4	58 82	114.9	48 52.5	57 82	114.3	49 09.5	56 83	113.7
8	47 29.2	57 82	114.6	47 46.3	57 82	114.0	48 03.2	56 83	113.4	48 19.9	55 83	112.8
9	46 40.0	57 82	113.8	46 56.9	56 83	113.2	47 13.6	55 83	112.6	47 30.1	55 84	112.0
40	45 50.5	56 83	113.0	46 07.2	55 83	112.4	46 23.7	55 84	111.8	46 39.9	54 84	111.2
1	45 00.7	55 83	112.2	45 17.2	55 84	111.6	45 33.5	54 84	111.0	45 49.5	53 84	110.4
2	44 10.7	54 84	111.4	44 26.9	54 84	110.9	44 43.0	53 84	110.3	44 58.9	53 85	109.7
3	43 20.3	54 84	110.7	43 36.4	53 84	110.1	43 52.3	53 85	109.5	44 08.0	52 86	108.9
4	42 29.8	53 85	110.0	42 45.7	53 85	109.4	43 01.3	52 85	108.8	43 16.9	51 86	108.2
45	41 39.0	53 85	109.3	41 54.7	52 85	108.7	42 10.2	51 86	108.1	42 25.5	51 86	107.5
6	40 48.0	52 86	108.6	41 03.5	51 86	108.0	41 18.8	51 86	107.4	41 34.0	50 86	106.9
7	39 56.7	51 86	107.9	40 12.1	51 86	107.3	40 27.3	50 86	106.8	40 42.3	50 86	106.2
8	39 05.3	51 86	107.2	39 20.5	50 86	106.7	39 35.6	50 86	106.1	39 50.5	49 87	105.6
9	38 13.7	50 86	106.6	38 28.8	50 86	106.0	38 43.7	49 87	105.5	38 58.4	49 87	104.9
50	37 22.0	50 87	105.9	37 36.9	49 87	105.4	37 51.6	49 87	104.9	38 06.2	48 87	104.3
1	36 30.0	49 87	105.3	36 44.8	49 87	104.8	36 59.4	49 87	104.2	37 13.9	48 88	103.7
2	35 38.0	49 87	104.7	35 52.6	49 87	104.2	36 07.1	48 88	103.6	36 21.4	48 88	103.1
3	34 45.7	49 87	104.1	35 00.2	48 87	103.6	35 14.6	48 88	103.1	35 28.9	47 88	102.5
4	33 53.4	48 88	103.5	34 07.8	48 88	103.0	34 22.0	47 88	102.5	34 36.2	47 88	101.9
55	33 00.9	48 88	103.0	33 15.2	47 88	102.4	33 29.3	47 88	101.9	33 43.3	47 88	101.4
6	32 08.3	48 88	102.4	32 22.4	47 88	101.9	32 36.5	47 88	101.4	32 50.4	46 88	100.8
7	31 15.5	47 88	101.8	31 29.6	47 88	101.3	31 43.6	46 88	100.8	31 57.4	46 88	100.3
8	30 22.7	47 88	101.3	30 36.7	46 88	100.8	30 50.6	46 88	100.3	31 04.3	46 89	99.8
9	29 29.8	47 88	100.8	29 43.7	46 88	100.3	29 57.5	46 89	99.7	30 11.1	45 89	99.2
60	28 36.7	46 88	100.2	28 50.6	46 89	99.7	29 04.3	45 89	99.2	29 17.8	45 89	98.7
1	27 43.6	46 89	99.7	27 57.4	46 89	99.2	28 11.0	45 89	98.7	28 24.5	45 89	98.2
2	26 50.4	46 89	99.2	27 04.1	45 89	98.7	27 17.7	45 89	98.2	27 31.1	45 89	97.7
3	25 57.2	45 89	98.7	26 10.8	45 89	98.2	26 24.2	45 89	97.7	26 37.6	44 89	97.2
4	25 03.8	45 89	98.2	25 17.3	45 89	97.7	25 30.8	45 89	97.2	25 44.1	44 89	96.7
65	24 10.4	45 89	97.7	24 23.9	45 89	97.2	24 37.2	44 89	96.7	24 50.5	44 89	96.2
6	23 16.9	45 89	97.2	23 30.3	45 89	96.7	23 43.7	44 90	96.2	23 56.9	44 90	95.7
7	22 23.4	45 89	96.7	22 36.8	44 90	96.2	22 50.0	44 90	95.7	23 03.2	44 90	95.3
8	21 29.8	44 89	96.2	21 43.1	44 90	95.8	21 56.3	44 90	95.3	22 09.5	44 90	94.8
9	20 36.2	44 90	95.8	20 49.4	44 90	95.3	21 02.6	44 90	94.8	21 15.7	43 90	94.3
70	19 42.5	44 90	95.3	19 55.7	44 90	94.8	20 08.9	44 90	94.3	20 21.9	43 90	93.9
1	18 48.8	44 90	94.8	19 02.0	44 90	94.4	19 15.1	44 90	93.9	19 28.1	43 90	93.4
2	17 55.0	44 90	94.4	18 08.2	44 90	93.9	18 21.3	43 90	93.4	18 34.3	43 90	92.9
3	17 01.3	44 90	93.9	17 14.4	44 90	93.4	17 27.4	43 90	93.0	17 40.4	43 90	92.5
4	16 07.4	44 90	93.4	16 20.5	44 90	93.0	16 33.5	43 90	92.5	16 46.5	43 90	92.0
75	15 13.6	44 90	93.0	15 26.7	43 90	92.5	15 39.7	43 90	92.1	15 52.6	43 90	91.6
6	14 19.7	44 90	92.6	14 32.8	43 90	92.1	14 45.8	43 90	91.6	14 58.7	43 90	91.2
7	13 25.9	43 90	92.1	13 38.9	43 90	91.6	13 51.9	43 90	91.2	14 04.8	43 90	90.7
8	12 32.0	43 90	91.6	12 45.0	43 90	91.2	12 57.9	43 90	90.7	13 10.9	43 90	90.3
9	11 38.0	43 90	91.2	11 51.0	43 90	90.8	12 04.0	43 90	90.3	12 16.9	43 90	89.8
80	10 44.1	43 90	90.8	10 57.1	43 90	90.3	11 10.1	43 90	89.9	11 23.0	43 90	89.4
1	9 50.2	43 90	90.3	10 03.2	43 90	89.9	10 16.2	43 90	89.4	10 29.1	43 90	89.0
2	8 56.3	43 90	89.9	9 09.3	43 90	89.4	9 22.2	43 90	89.0	9 35.2	43 90	88.5
3	8 02.3	43 90	89.5	8 15.3	43 90	89.0	8 28.3	43 90	88.5	8 41.3	43 90	88.1
4	7 08.4	43 90	89.0	7 21.4	43 90	88.6	7 34.4	43 90	88.1	7 47.4	43 90	87.7
85	6 14.5	43 90	88.6	6 27.5	43 90	88.1	6 40.5	43 90	87.7	6 53.5	43 90	87.2
6	5 20.6	43 90	88.1	5 33.6	43 90	87.7	5 46.6	43 90	87.2	5 59.6	43 90	86.8
7										5 05.8	43 90	86.4
8												

H.A.	6° 00′ Alt.		Az.	6° 30′ Alt.		Az.	7° 00′ Alt.		Az.	7° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0
1	69 58.6	1.0 07	177.1	70 28.6	1.0 07	177.0	70 58.6	1.0 07	177.0	71 28.5	1.0 07	176.9
2	69 54.5	1.0 11	174.2	70 24.4	1.0 12	174.1	70 54.3	1.0 12	173.9	71 24.1	1.0 12	173.8
3	69 47.7	99 16	171.3	70 17.5	99 16	171.1	70 47.2	99 16	170.9	71 16.8	99 17	170.7
4	69 38.3	98 20	168.5	70 07.8	98 20	168.2	70 37.3	98 21	168.0	71 06.7	98 22	167.7
05	69 26.3	97 24	165.7	69 55.5	97 25	165.4	70 24.7	97 25	165.0	70 53.8	97 26	164.7
6	69 11.7	96 28	163.0	69 40.6	96 29	162.6	70 09.5	96 30	162.2	70 38.3	96 30	161.8
7	68 54.7	95 32	160.3	69 23.3	95 33	159.9	69 51.7	95 34	159.4	70 20.2	95 34	159.0
8	68 35.4	94 36	157.7	69 03.6	94 37	157.2	60 31.6	93 37	156.7	69 59.6	93 38	156.2
9	68 13.9	93 40	155.2	68 41.6	92 40	154.7	69 09.2	92 41	154.1	69 36.7	91 42	153.6
10	67 50.2	91 43	152.8	68 17.5	91 44	152.2	68 44.6	90 44	151.6	69 11.6	90 45	151.0
1	67 24.5	89 46	150.4	67 51.3	89 47	149.8	68 18.0	89 48	149.2	68 44.5	88 48	148.6
2	66 57.0	88 49	148.1	67 23.3	87 50	147.5	67 49.4	87 51	146.9	68 15.4	86 52	146.2
3	66 27.6	86 52	145.9	66 53.4	86 52	145.3	67 19.0	85 53	144.6	67 44.5	85 54	143.9
4	65 56.6	85 54	143.8	66 21.9	84 55	143.2	66 47.0	83 56	142.5	67 11.9	83 57	141.8
15	65 24.0	83 57	141.8	65 48.8	82 58	141.1	66 13.4	82 58	140.4	66 37.8	81 59	139.7
6	64 49.9	81 59	139.9	65 14.2	81 60	139.2	65 38.3	80 61	138.5	66 02.2	79 62	137.7
7	64 14.5	80 61	138.0	64 38.3	79 62	137.3	65 01.9	78 63	136.6	65 25.2	78 64	135.8
8	63 37.8	78 63	136.2	64 01.1	77 64	135.5	64 24.2	77 65	134.8	64 47.1	76 66	134.0
9	62 59.9	76 65	134.5	63 22.7	76 66	133.8	63 45.3	75 66	133.0	64 07.7	74 67	132.3
20	62 20.9	75 67	132.9	62 43.3	74 68	132.1	63 05.4	73 68	131.4	63 27.3	73 69	130.6
1	61 40.9	73 68	131.3	62 02.8	73 69	130.6	62 24.5	72 70	129.8	62 45.9	71 70	129.1
2	60 59.9	72 70	129.8	61 21.4	71 70	129.1	61 42.6	70 71	128.3	62 03.6	70 72	127.6
3	60 18.0	71 71	128.3	60 39.1	70 72	127.6	60 59.9	69 73	126.9	61 20.4	68 73	126.1
4	59 35.3	69 72	127.0	59 56.0	68 73	126.2	60 16.3	68 74	125.5	60 36.5	67 74	124.7
25	58 51.8	68 74	125.6	59 12.1	67 74	124.9	59 32.1	66 75	124.2	59 51.8	65 76	123.4
6	58 07.7	67 75	124.3	58 27.5	66 75	123.6	58 47.1	65 76	122.9	59 06.5	64 77	122.2
7	57 22.8	65 76	123.1	57 42.3	65 76	122.4	58 01.5	64 77	121.7	58 20.5	63 78	121.0
8	56 37.3	64 77	121.9	56 56.5	63 77	121.2	57 15.4	63 78	120.5	57 34.0	62 78	119.8
9	55 51.3	63 78	120.8	56 10.1	62 78	120.1	56 28.6	61 79	119.4	56 46.9	61 79	118.7
30	55 04.7	62 78	119.7	55 23.2	61 79	119.0	55 41.4	60 80	118.3	55 59.4	60 80	117.6
1	54 17.6	61 79	118.6	54 35.8	60 80	118.0	54 53.7	59 80	117.3	55 11.4	59 81	116.6
2	53 30.1	60 80	117.6	53 47.9	59 80	117.0	54 05.5	58 81	116.3	54 22.9	58 81	115.6
3	52 42.1	59 81	116.6	52 59.6	58 81	116.0	53 17.0	57 82	115.3	53 34.1	57 82	114.6
4	51 53.7	58 81	115.7	52 11.0	57 82	115.0	52 28.0	57 82	114.3	52 44.9	56 83	113.7
35	51 04.9	57 82	114.8	51 21.9	56 82	114.1	51 38.7	56 83	113.4	51 55.3	55 83	112.8
6	50 15.7	56 82	113.9	50 32.5	56 83	113.2	50 49.1	55 83	112.6	51 05.4	54 84	111.9
7	49 26.3	56 83	113.0	49 42.8	55 83	112.4	49 59.1	54 84	111.7	50 15.2	53 84	111.1
8	48 36.5	55 84	112.2	48 52.8	54 84	111.6	49 08.9	53 84	110.9	49 24.8	53 84	110.2
9	47 46.4	54 84	111.4	48 02.5	53 84	110.7	48 18.4	53 85	110.1	48 34.1	52 85	109.5
40	46 56.0	53 84	110.6	47 11.9	53 85	110.0	47 27.6	52 85	109.3	47 43.1	51 85	108.7
1	46 05.4	53 85	109.8	46 21.1	52 85	109.2	46 36.6	51 85	108.6	46 51.9	51 86	107.9
2	45 14.6	52 85	109.1	45 30.1	51 86	108.5	45 45.4	51 86	107.8	46 00.5	50 86	107.2
3	44 23.5	51 86	108.3	44 38.8	51 86	107.7	44 53.9	50 86	107.1	45 08.9	49 86	106.5
4	43 32.2	51 86	107.6	43 47.4	50 86	107.0	44 02.3	50 86	106.4	44 17.1	49 87	105.8
45	42 40.7	50 86	106.9	42 55.7	50 86	106.4	43 10.5	49 87	105.8	43 25.1	48 87	105.2
6	41 49.0	50 86	106.3	42 03.9	49 87	105.7	42 18.5	49 87	105.1	42 33.0	48 87	104.5
7	40 57.2	49 87	105.6	41 11.9	49 87	105.0	41 26.4	48 87	104.5	41 40.7	47 87	103.9
8	40 05.2	49 87	105.0	40 19.7	48 87	104.4	40 34.1	48 87	103.8	40 48.3	47 88	103.3
9	39 13.0	48 87	104.4	39 27.4	48 87	103.8	39 41.7	47 88	103.2	39 55.7	47 88	102.6
50	38 20.7	48 88	103.7	38 35.0	47 88	103.2	38 49.1	47 88	102.6	39 03.1	46 88	102.0
1	37 28.2	47 88	103.1	37 42.4	47 88	102.6	37 56.4	46 88	102.0	38 10.3	46 88	101.5
2	36 35.7	47 88	102.5	36 49.7	47 88	102.0	37 03.6	46 88	101.4	37 17.3	46 88	100.9
3	35 43.0	47 88	102.0	35 56.9	46 88	101.4	36 10.7	46 88	100.9	36 24.3	45 88	100.3
4	34 50.1	46 88	101.4	35 04.0	46 88	100.9	35 17.7	45 88	100.3	35 31.2	45 88	99.8
55	33 57.2	46 88	100.8	34 11.0	46 88	100.3	34 24.6	45 89	99.8	34 38.1	45 89	99.2
6	33 04.2	46 88	100.3	33 17.9	45 89	99.8	33 31.4	45 89	99.2	33 44.8	44 89	98.7
7	32 11.1	45 89	99.8	32 24.7	45 89	99.2	32 38.1	45 89	98.7	32 51.4	44 89	98.2
8	31 17.9	45 89	99.2	31 31.4	45 89	98.7	31 44.8	44 89	98.2	31 58.0	44.89	97.7
9	30 24.7	45 89	98.7	30 38.1	45 89	98.2	30 51.4	44 89	97.7	31 04.5	44 89	97.2
60	29 31.3	45 89	98.2	29 44.7	44 89	97.7	29 57.9	44 89	97.2	30 11.0	43 89	96.7
1	28 37.9	44 89	97.7	28 51.2	44 89	97.2	29 04.4	44 89	96.7	29 17.4	43 89	96.1
2	27 44.4	44 89	97.2	27 57.7	44 89	96.7	28 10.8	44 89	96.2	28 23.8	43 90	95.7
3	26 50.9	44 89	96.7	27 04.1	44 89	96.2	27 17.1	43 89	95.7	27 30.1	43 90	95.2
4	25 57.3	44 89	96.2	26 10.4	44 89	95.7	26 23.5	43 90	95.2	26 36.4	43 90	94.7
65	25 03.7	44 90	95.7	25 16.8	43 90	95.2	25 29.7	43 90	94.7	25 42.6	43 90	94.2
6	24 10.0	44 90	95.2	24 23.0	43 90	94.8	24 36.0	43 90	94.3	24 48.8	43 90	93.8
7	23 16.3	43 90	94.8	23 29.3	43 90	94.3	23 42.2	43 90	93.8	23 55.0	43 90	93.3
8	22 22.5	43 90	94.3	22 35.5	43 90	93.8	22 48.3	43 90	93.3	23 01.1	42 90	92.8
9	21 28.7	43 90	93.8	21 41.7	43 90	93.4	21 54.5	43 90	92.9	22 07.3	42 90	92.4
70	20 34.9	43 90	93.4	20 47.8	43 90	92.9	21 00.6	43 90	92.4	21 13.4	42 90	91.9
1	19 41.1	43 90	92.9	19 53.9	43 90	92.4	20 06.7	43 90	92.0	20 19.5	42 90	91.5
2	18 47.2	43 90	92.5	19 00.1	43 90	92.0	19 12.8	42 90	91.5	19 25.5	42 90	91.0
3	17 53.3	43 90	92.0	18 06.1	43 90	91.6	18 18.9	42 90	91.1	18 31.6	42 90	90.6
4	16 59.4	43 90	91.6	17 12.2	43 90	91.1	17 25.0	42 90	90.6	17 37.7	42 90	90.2
75	16 05.5	43 90	91.1	16 18.3	43 90	90.7	16 31.1	42 90	90.2	16 43.8	42 90	89.7
6	15 11.6	43 90	90.7	15 24.4	43 90	90.2	15 37.1	42 90	89.7	15 49.8	42 90	89.3
7	14 17.6	43 90	90.2	14 30.5	43 90	89.8	14 43.2	42 90	89.3	14 55.9	42 90	88.8
8	13 23.7	43 90	89.8	13 36.5	43 90	89.3	13 49.3	42 90	88.9	14 02.0	42 90	88.4
9	12 29.8	43 90	89.4	12 42.6	43 90	88.9	12 55.4	42 90	88.4	13 08.1	42 90	88.0
80	11 35.9	43 90	88.9	11 48.7	43 90	88.5	12 01.5	43 90	88.0	12 14.2	42 90	87.5
1	10 42.0	43 90	88.5	10 54.8	43 90	88.0	11 07.6	43 90	87.6	11 20.4	42 90	87.1
2	9 48.1	43 90	88.1	10 00.9	43 90	87.6	10 13.7	43 90	87.1	10 26.5	43 90	86.7
3	8 54.2	43 90	87.6	9 07.0	43 90	87.2	9 19.9	43 90	86.7	9 32.7	43 90	86.3
4	8 00.3	43 90	87.2	8 13.2	43 90	86.8	8 26.1	43 90	86.3	8 38.9	43 90	85.8
85	7 06.4	43 90	86.8	7 19.4	43 90	86.3	7 32.3	43 90	85.9	7 45.1	43 90	85.4
6	6 12.6	43 90	86.3	6 25.6	43 90	85.9	6 38.5	43 90	85.4	6 51.4	43 90	85.0
7	5 18.8	43 90	85.9	5 31.8	43 90	85.5	5 44.7	43 90	85.0	5 57.7	43 90	84.5
8										5 04.0	43 90	84.1

Lat. 26°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	60 00.0	1.0	02	180.0	59 30.0	1.0	02	180.0	59 00.0	1.0	02	180.0	58 30.0	1.0	02	180.0	58 00.0	1.0	02	180.0	57 30.0	1.0	02	180.0	57 00.0	1.0	02	180.0	56 30.0	1.0	01	180.0	00
1	59 59.1	1.0	05	178.0	59 29.1	1.0	05	178.0	58 59.1	1.0	04	178.1	58 29.1	1.0	04	178.1	57 59.1	1.0	04	178.1	57 29.1	1.0	04	178.2	56 59.1	1.0	04	178.2	56 29.2	1.0	04	178.2	1
2	59 56.2	1.0	08	176.0	59 26.3	1.0	08	176.1	58 56.4	1.0	08	176.1	58 26.4	1.0	08	176.2	57 56.5	1.0	07	176.3	57 26.5	1.0	07	176.3	56 56.6	1.0	07	176.4	56 26.6	1.0	07	176.4	2
3	59 51.6	1.0	11	174.0	59 21.7	1.0	11	174.1	58 51.8	1.0	10	174.2	58 21.9	1.0	10	174.3	57 52.1	1.0	10	174.4	57 22.2	1.0	10	174.5	56 52.3	1.0	10	174.5	56 22.4	1.0	10	174.6	3
4	59 45.0	99	14	172.1	59 15.3	99	14	172.2	58 45.5	99	14	172.3	58 15.7	99	13	172.4	57 45.9	99	13	172.5	57 16.1	99	13	172.6	56 46.3	99	13	172.7	56 16.5	99	12	172.8	4
05	59 36.7	99	17	170.1	59 07.0	99	17	170.3	58 37.4	99	16	170.4	58 07.7	99	16	170.5	57 38.0	99	16	170.7	57 08.4	99	16	170.8	56 38.7	99	16	170.9	56 09.0	99	15	171.1	05
6	59 26.5	98	20	168.2	58 57.0	98	20	168.3	58 27.5	98	19	168.5	57 58.0	98	19	168.7	57 28.5	98	19	168.9	56 58.9	99	18	169.0	56 29.4	99	18	169.2	55 59.8	99	18	169.3	6
7	59 14.6	98	23	166.2	58 45.3	98	22	166.5	58 15.9	98	22	166.7	57 46.6	98	22	166.8	57 17.2	98	22	167.0	56 47.8	98	21	167.2	56 18.4	98	21	167.4	55 49.0	98	21	167.6	7
8	59 00.9	97	26	164.4	58 31.8	97	25	164.6	58 02.6	97	25	164.8	57 33.5	97	25	165.0	57 04.3	97	24	165.2	56 35.1	97	24	165.5	56 05.9	97	24	165.7	55 36.6	98	23	165.9	8
9	58 45.5	96	28	162.5	58 16.6	96	28	162.7	57 47.7	96	28	163.0	57 18.7	97	27	163.2	56 49.7	97	27	163.5	56 20.7	97	26	163.7	55 51.7	97	26	163.9	55 22.7	97	26	164.2	9
10	58 28.4	96	31	160.7	57 59.8	96	31	160.9	57 31.1	96	30	161.2	57 02.4	96	30	161.5	56 33.6	96	29	161.7	56 04.8	96	29	162.0	55 36.0	96	29	162.2	55 07.2	96	28	162.5	10
1	58 09.8	95	34	158.8	57 41.4	95	33	159.2	57 13.0	95	33	159.4	56 44.5	95	32	159.7	56 16.0	95	32	160.0	55 47.4	95	32	160.3	55 18.8	95	31	160.6	54 50.2	95	31	160.8	1
2	57 49.5	94	36	157.1	57 21.4	94	36	157.4	56 53.3	94	35	157.7	56 25.0	94	35	158.0	55 56.8	94	34	158.3	55 28.5	94	34	158.6	55 00.1	95	34	158.9	54 31.8	95	33	159.2	2
3	57 27.8	93	39	155.3	57 00.0	93	38	155.7	56 32.1	93	38	156.0	56 04.1	93	37	156.4	55 36.1	93	37	156.7	55 08.1	94	36	157.0	54 40.0	94	36	157.3	54 11.9	94	35	157.6	3
4	57 04.6	92	41	153.6	56 37.0	92	40	154.0	56 09.4	92	40	154.4	55 41.8	92	40	154.7	55 14.1	92	39	155.0	54 46.3	93	38	155.4	54 18.5	93	38	155.7	53 50.7	93	38	156.0	4
15	56 39.9	91	43	152.0	56 12.7	91	43	152.4	55 45.4	91	42	152.7	55 18.1	91	42	153.1	54 50.7	91	41	153.4	54 23.2	92	41	153.8	53 55.7	92	40	154.1	53 28.1	92	40	154.5	15
6	56 13.9	90	46	150.4	55 47.0	90	45	150.7	55 20.0	90	44	151.1	54 53.0	90	44	151.5	54 25.9	90	44	151.9	53 58.7	91	43	152.2	53 31.5	91	42	152.6	53 04.2	91	42	152.9	6
7	55 46.6	88	48	148.8	55 20.0	89	47	149.2	54 53.4	89	47	149.6	54 26.6	89	46	150.0	53 59.8	89	46	150.4	53 33.0	90	45	150.7	53 06.0	90	44	151.1	52 39.0	90	44	151.5	7
8	55 18.0	87	50	147.2	54 51.8	88	49	147.6	54 25.4	88	48	148.1	53 59.0	88	48	148.5	53 32.5	88	47	148.9	53 06.0	89	47	149.2	52 39.4	89	46	149.6	52 12.7	89	46	150.0	8
9	54 48.2	86	52	145.7	54 22.3	86	51	146.1	53 56.3	87	50	146.6	53 30.2	87	50	147.0	53 04.1	87	49	147.4	52 37.8	88	49	147.8	52 11.5	88	48	148.2	51 45.1	88	48	148.6	9
20	54 17.2	85	53	144.2	53 51.7	85	53	144.7	53 26.0	86	52	145.1	53 00.3	86	52	145.5	52 34.5	86	51	146.0	52 08.5	87	51	146.4	51 42.5	87	50	146.8	51 16.4	87	50	147.2	20
1	53 45.2	84	55	142.8	53 20.0	84	55	143.3	52 54.6	85	54	143.7	52 29.2	85	54	144.1	52 03.7	85	53	144.6	51 38.1	85	52	145.0	51 12.4	86	52	145.4	50 46.7	86	52	145.8	1
2	53 12.0	83	57	141.4	52 47.2	83	56	141.9	52 22.2	83	56	142.3	51 57.1	84	55	142.8	51 31.9	84	55	143.2	51 06.7	84	54	143.6	50 41.3	85	54	144.1	50 15.8	85	53	144.5	2
3	52 37.9	82	58	140.0	52 13.4	82	58	140.5	51 48.7	82	57	141.0	51 24.0	83	57	141.4	50 59.1	83	56	141.9	50 34.2	83	56	142.3	50 09.2	84	55	142.8	49 44.0	84	55	143.2	3
4	52 02.8	80	60	138.7	51 38.6	81	60	139.2	51 14.3	81	59	139.7	50 49.9	82	58	140.1	50 25.4	82	58	140.6	50 00.8	82	57	141.0	49 36.0	83	57	141.5	49 11.2	83	56	141.9	4
25	51 26.8	79	62	137.4	51 02.9	80	61	137.9	50 38.9	80	60	138.4	50 14.9	80	60	138.9	49 50.7	81	59	139.3	49 26.4	81	59	139.8	49 02.0	82	58	140.2	48 37.5	82	58	140.7	25
6	50 49.8	78	63	136.2	50 26.3	79	62	136.7	50 02.7	79	62	137.2	49 39.0	79	61	137.6	49 15.1	80	61	138.1	48 51.1	80	60	138.6	48 27.0	80	60	139.0	48 02.9	81	59	139.4	6
7	50 12.1	77	64	135.0	49 48.9	77	64	135.5	49 25.6	78	63	135.9	49 02.2	78	63	136.4	48 38.7	79	62	136.9	48 15.0	79	62	137.4	47 51.2	79	61	137.8	47 27.4	80	60	138.3	7
8	49 33.5	76	66	133.8	49 10.7	76	65	134.3	48 47.7	77	64	134.8	48 24.6	77	64	135.3	48 01.4	78	63	135.7	47 38.1	78	63	136.2	47 14.6	78	62	136.7	46 51.1	79	62	137.1	8
9	48 54.2	75	67	132.6	48 31.7	75	66	133.1	48 09.1	76	66	133.6	47 46.3	76	65	134.1	47 23.4	77	65	134.6	47 00.4	77	64	135.1	46 37.2	77	64	135.5	46 14.0	78	63	136.0	9
30	48 14.2	74	68	131.5	47 52.0	74	67	132.0	47 29.7	75	67	132.5	47 07.2	75	66	133.0	46 44.6	75	66	133.5	46 21.9	76	65	134.0	45 59.1	76	65	134.4	45 36.1	77	64	134.9	30
1	47 33.5	73	69	130.4	47 11.6	73	68	130.9	46 49.6	74	68	131.4	46 27.4	74	68	131.9	46 05.1	74	67	132.4	45 42.7	75	66	132.9	45 20.2	75	66	133.3	44 57.6	76	66	133.8	1
2	46 52.1	72	70	129.4	46 30.5	72	70	129.9	46 08.8	73	69	130.4	45 46.9	73	68	130.9	45 25.0	73	68	131.3	45 02.9	74	68	131.8	44 40.6	74	67	132.3	44 18.3	75	66	132.8	2
3	46 10.1	71	71	128.3	45 48.8	71	70	128.8	45 27.4	72	70	129.3	45 05.8	72	70	129.8	44 44.2	72	69	130.3	44 22.4	73	69	130.8	44 00.4	73	68	131.3	43 38.4	74	68	131.7	3
4	45 27.5	70	72	127.3	45 06.5	70	72	127.8	44 45.4	71	71	128.3	44 24.1	71	70	128.8	44 02.7	71	70	129.3	43 41.2	72	70	129.8	43 19.6	72	69	130.3	42 57.8	73	68	130.7	4
35	44 44.3	69	73	126.3	44 23.6	69	72	126.8	44 02.8	70	72	127.3	43 41.8	70	71	127.8	43 20.7	71	71	128.3	42 59.5	71	70	128.8	42 38.2	71	70	129.3	42 16.7	72	70	129.8	35
6	44 00.6	68	74	125.4	43 40.2	68	73	125.9	43 19.6	69	73	126.4	42 59.0	69	72	126.9	42 38.1	70	72	127.4	42 17.2	70	71	127.9	41 56.1	70	71	128.3	41 35.0	71	70	128.8	6
7	43 16.4	67	74	124.5	42 56.3	67	74	125.0	42 36.0	68	74	125.5	42 15.6	68	73	126.0	41 55.0	69	73	126.5	41 34.4	69	72	126.9	41 13.6	69	72	127.4	40 52.7	70	71	127.9	7
8	42 31.7	66	75	123.6	42 11.8	67	75	124.1	41 51.8	67	74	124.6	41 31.7	67	74	125.1	41 11.4	68	74	125.5	40 51.0	68	73	126.0	40 30.5	69	73	126.5	40 09.9	69	72	127.0	8
9	41 46.5	65	76	122.7	41 26.9	66	76	123.2	41 07.2	66	75	123.7	40 47.3	66	75	124.2	40 27.3	67	74	124.7	40 07.1	67	74	125.1	39 46.9	68	74	125.6	39 26.5	68	73	126.1	9
40	41 00.9	64	77	121.8	40 41.6	65	76	122.3	40 22.1	65	76	122.8	40 02.4	66	75	123.3	39 42.7	66	75	123.8	39 22.8	66	75	124.3	39 02.8	67	74	124.8	38 42.7	67	74	125.2	40
1	40 14.9	63	78	121.0	39 55.8	64	77	121.5	39 36.5	64	76	122.0	39 17.2	65	76	122.5	38 57.7	65	76	123.0	38 38.0	66	75	123.4	38 18.3	66	75	123.9	37 58.5	66	75	124.4	1
2	39 28.4	62	78	120.1	39 09.6	63	78	120.7	38 50.6	64	77	121.1	38 31.4	64	77	121.6	38 12.2	64	76	122.1	37 52.8	65	76	122.6	37 33.3	65	76	123.1	37 13.7	66	75	123.6	2
3	38 41.6	62	79	119.3	38 23.0	62	78	119.8	38 04.2	63	78	120.3	37 45.3	63	78	120.8	37 26.3	64	77	121.3	37 07.2	64	77	121.8	36 48.0	64	76	122.3	36 28.6	65	76	122.8	3
4	37 54.4	61	79	118.6	37 36.0	62	79	119.1	37 17.5	62	78	119.6	36 58.8	62	78	120.1	36 40.1	63	78	120.5	36 21.2	63	77	121.0	36 02.2	64	77	121.5	35 43.0	64	76	122.0	4
45	37 06.9	60	80	117.8	36 48.7	61	79	118.3	36 30.4	61	79	118.8	36 12.0	62	79	119.3	35 53.4	62	78	119.8	35 34.8	62	78	120.3	35 16.0	63	78	120.7	34 57.1	63	77	121.2	45
6	36 19.0	60	80	117.1	36 01.1	60	80	117.5	35 43.0	60	80	118.0	35 24.8	61	79	118.5	35 06.4	61	79	119.0	34 48.0	62	78	119.5	34 29.5	62	78	120.0	34 10.8	62	78	120.4	6
7	35 30.8	59	81	116.3	35 13.1	59	80	116.8	34 55.2	60	80	117.3	34 37.2	60	80	117.8	34 19.1	61	79	118.3	34 00.9	61	79	118.8	33 42.6	61	79	119.2	33 24.1	62	78	119.7	7
8	34 42.4	58	81	115.6	34 24.8	59	81	116.1	34 07.1	59	81	116.6	33 49.4	59	80	117.1	33 31.5	60	80	117.6	33 13.5	60	80	118.0	32 55.3	61	79	118.5	32 37.1	61	79	119.0	8
9	33 53.6	58	82	114.9	33 36.2	58	81	115.4	33 18.8	58	81	115.9	33 01.2	59	81	116.4	32 43.5	59	80	116.9	32 25.7	60	80	117.3	32 07.8	60	80	117.8	31 49.8	60	80	118.3	9
50	33 04.5	57	82	114.2	32 47.4	57	82	114.7	32 30.1	58	82	115.2	32 12.7	58	81	115.7	31 55.2	58	81	116.2	31 37.7	59	81	116.6	31 19.9	59	80	117.1	31 02.1	60	80	117.6	50
1	32 15.2	56	83	113.6	31 58.3	57	82	114.0	31 41.2	57	82	114.5	31 24.0	57	82	115.0	31 06.7	58	81	115.5	30 49.3	58	81	116.0	30 31.8	59	81	116.4	30 14.2	59	80	116.9	1
2	31 25.7	56	83	112.9	31 08.9	56	83	113.4	30 52.0	56	82	113.9	30 35.0	57	82	114.3	30 17.9	57	82	114.8	30 00.7	58	82	115.3	29 43.4	58	81	115.8	29 26.0	58	81	116.2	2
3	30 35.9	55	83	112.2	30 19.3	56	83	112.7	30 02.6	56	83	113.2	29 45.7	56	82	113.7	29 28.8	57	82	114.2	29 11.8	57	82	114.6	28 54.7	57	82	115.1	28 37.4	58	81	115.6	3
4	29 45.9	55	84	111.6	29 29.4	55	84	112.1	29 12.9	55	83	112.6	28 56.2	56	83	113.0	28 39.5	56	83	113.5	28 22.6	56	82	114.0	28 05.7	57	82	114.5	27 48.7	57	82	114.9	4
55	28 55.6	54	84	111.0	28 39.3	54	84	111.5	28 23.0	55	84	111.9	28 06.5	55	83	112.4	27 49.9	55	83	112.9	27 33.3	56	83	113.4	27 16.5	56	82	113.8	26 59.6	56	82	114.3	55
6	28 05.2	54	84	110.4	27 49.0	54	84	110.9	27 32.8	54	84	111.3	27 16.5	55	84	111.8	27 00.1	55	83	112.3	26 43.6	55	83	112.7	26 27.0	55	83	113.2	26 10.4	56	82	113.7	6
7	27 14.5	53	85	109.8	26 58.6	53	84	110.3	26 42.5	54	84	110.7	26 26.4	54	84	111.2	26 10.1	54	84	111.7	25 53.8	55	84	112.1	25 37.4	55	83	112.6	25 20.9	55	83	113.1	7
8	26 23.7	53	85	109.2	26 07.9	53	85	109.7	25 52.0	53	85	110.1	25 36.0	53	84	110.6	25 19.9	54	84	111.1	25 03.7	54	84	111.5	24 47.5	54	84	112.0	24 31.1	55	83	112.5	8
9	25 32.6	52	85	108.6	25 17.0	52	85	109.1	25 01.2	53	85	109.6	24 45.4	53	85	110.0	24 29.5	53	84	110.5	24 13.5	54	84	111.0	23 57.4	54	84	111.4	23 41.2	54	84	111.9	9
60	24 41.5	52	86	108.0	24 25.9	52	85	108.5	24 10.3	52	85	109.0	23 54.6	52	85	109.4	23 38.9	53	85	109.9	23 23.0	53	84	110.4	23 07.1	53	84	110.8	22 51.0	54	84	111.3	60
1	23 50.1	51	86	107.5	23 34.7	51	86	107.9	23 19.2	52	85	108.4	23 03.7	52	85	108.9	22 48.1	52	85	109.3	22 32.4	52	85	109.8	22 16.6	53	84	110.3	22 00.7	53	84	110.7	1
2	22 58.6	51	86	106.9	22 43.3	51	86	107.4	22 28.0	51	86	107.9	22 12.6	52	86	108.3	21 57.1	52	85	108.8	21 41.5	52	85	109.2	21 25.9	52	85	109.7	21 10.2	53	84	110.2	2
3	22 06.9	50	86	106.4	21 51.8	51	86	106.8	21 36.6	51	86	107.3	21 21.3	51	86	107.8	21 06.0	51	85	108.2	20 50.5	52	85	108.7	20 35.0	52	85	109.1	20 19.5	52	85	109.6	3
4	21 15.1	50	87	105.8	21 00.1	50	86	106.3	20 45.0	50	86	106.8	20 29.9	51	86	107.2	20 14.7	51	86	107.7	19 59.4	51	86	108.1	19 44.0	51	85	108.6	19 28.6	52	85	109.1	4
65	20 23.2	49	87	105.3	20 08.3	50	87	105.8	19 53.3	50	86	106.2	19 38.3	50	86	106.7	19 23.2	50	86	107.2	19 08.1	51	86	107.6	18 52.8	51	86	108.1	18 37.5	51	85	108.5	65
6	19 31.1	49	87	104.8	19 16.3	49	87	105.2	19 01.5	50	87	105.7	18 46.6	50	86	106.2	18 31.6	50	86	106.6	18 16.6	50	86	107.1	18 01.5	50	86	107.5	17 46.3	51	86	108.0	6
7	18 38.9	49	87	104.3	18 24.2	49	87	104.7	18 09.5	49	87	105.2	17 54.7	49	87	105.6	17 39.9	50	86	106.1	17 25.0	50	86	106.6	17 10.0	50	86	107.0	16 54.9	50	86	107.5	7
8	17 46.6	48	88	103.8	17 32.0	49	87	104.2	17 17.4	49	87	104.7	17 02.7	49	87	105.1	16 48.0	49	87	105.6	16 33.2	49	86	106.0	16 18.3	50	86	106.5	16 03.4	50	86	106.9	8
9	16 54.1	48	88	103.3	16 39.7	48	88	103.7	16 25.2	48	87	104.2	16 10.6	49	87	104.6	15 56.0	49	87	105.1	15 41.3	49	87	105.5	15 26.6	49	86	106.0	15 11.8	49	86	106.4	9
70	16 01.6	48	88	102.8	15 47.2	48	88	103.2	15 32.8	48	87	103.7	15 18.4	48	87	104.1	15 03.8	48	87	104.6	14 49.3	49	87	105.0	14 34.7	49	87	105.5	14 20.0	49	86	105.9	70
1	15 08.9	47	88	102.3	14 54.7	48	88	102.7	14 40.4	48	88	103.2	14 26.0	48	88	103.6	14 11.6	48	87	104.1	13 57.1	48	87	104.5	13 42.6	48	87	105.0	13 28.1	49	87	105.4	1
2	14 16.2	47	88	101.8	14 02.0	47	88	102.2	13 47.8	47	88	102.7	13 33.5	48	88	103.1	13 19.2	48	87	103.6	13 04.9	48	87	104.0	12 50.5	48	87	104.5	12 36.0	48	87	104.9	2
3	13 23.3	47	88	101.3	13 09.3	47	88	101.7	12 55.1	47	88	102.2	12 41.0	47	88	102.7	12 26.8	47	88	103.1	12 12.5	48	88	103.6	11 58.2	48	87	104.0	11 43.9	48	87	104.5	3
4	12 30.4	47	88	100.8	12 16.4	47	88	101.3	12 02.4	47	88	101.7	11 48.3	47	88	102.2	11 34.2	47	88	102.6	11 20.0	47	88	103.1	11 05.8	47	87	103.5	10 51.6	48	87	104.0	4
75	11 37.4	46	88	100.3	11 23.5	46	88	100.8	11 09.5	47	88	101.2	10 55.6	47	88	101.7	10 41.5	47	88	102.1	10 27.4	47	88	102.6	10 13.3	47	88	103.0	9 59.2	47	88	103.5	75
6	10 44.3	46	88	99.9	10 30.5	46	88	100.3	10 16.6	46	88	100.8	10 02.7	46	88	101.2	9 48.8	47	88	101.7	9 34.8	47	88	102.1	9 20.8	47	88	102.6	9 06.7	47	88	103.0	6
7	9 51.2	46	89	99.4	9 37.4	46	89	99.9	9 23.6	46	88	100.3	9 09.8	46	88	100.8	8 55.9	46	88	101.2	8 42.0	46	88	101.7	8 28.1	46	88	102.1	8 14.1	47	88	102.6	7
8	8 57.9	46	89	98.9	8 44.2	46	89	99.4	8 30.5	46	89	99.8	8 16.7	46	88	100.3	8 03.0	46	88	100.7	7 49.1	46	88	101.2	7 35.3	46	88	101.6	7 21.4	46	88	102.1	8
9	8 04.6	45	89	98.5	7 51.0	45	89	98.9	7 37.3	46	89	99.4	7 23.6	46	88	99.8	7 09.9	46	88	100.3	6 56.2	46	88	100.7	6 42.4	46	88	101.2	6 28.6	46	88	101.6	9
80	7 11.2	45	89	98.0	6 57.7	45	89	98.5	6 44.1	45	89	98.9	6 30.5	45	89	99.4	6 16.8	46	89	99.8	6 03.2	46	88	100.3	5 49.5	46	88	100.7	5 35.8	46	88	101.2	80
1	6 17.8	45	89	97.6	6 04.3	45	89	98.0	5 50.8	45	89	98.5	5 37.2	45	89	98.9	5 23.7	45	89	99.4	5 10.1	45	88	99.8									1
2	5 24.3	45	89	97.1	5 10.9	45	89	97.6																									2

Lat. 27°

Lat. 28°

Lat. 26°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	72 00.0	1.0 02	180.0	72 30.0	1.0 02	180.0	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	00
1	71 58.5	1.0 08	176.8	72 28.5	1.0 08	176.7	72 58.4	1.0 08	176.6	73 28.4	1.0 08	176.5	73 58.3	1.0 08	176.4	74 28.3	1.0 09	176.3	74 58.2	1.0 09	176.2	75 28.2	1.0 09	176.1	1
2	71 54.0	99 12	173.6	72 23.8	99 13	173.4	72 53.7	99 13	173.3	73 23.5	99 14	173.1	73 53.3	99 14	172.9	74 23.1	99 14	172.7	74 52.9	99 15	172.5	75 22.7	99 15	172.2	2
3	71 46.5	99 17	170.5	72 16.2	99 18	170.2	72 45.8	99 18	170.0	73 15.4	99 19	169.7	73 45.0	99 19	169.4	74 14.5	98 20	169.1	74 44.1	98 20	168.8	75 13.6	98 21	168.4	3
4	71 36.1	98 22	167.4	72 05.5	98 22	167.0	72 34.9	98 23	166.7	73 04.2	98 24	166.3	73 33.5	98 24	166.0	74 02.7	97 25	165.6	74 31.9	97 26	165.1	75 01.0	97 26	164.7	4
05	71 22.9	97 26	164.3	71 52.0	97 27	163.9	72 21.0	97 28	163.5	72 50.0	96 29	163.1	73 18.9	96 29	162.6	73 47.7	96 30	162.1	74 16.4	96 31	161.6	74 45.1	95 32	161.0	05
6	71 07.0	96 31	161.3	71 35.7	95 32	160.9	72 04.3	95 32	160.4	72 32.8	95 33	159.9	73 01.3	95 34	159.4	73 29.6	94 35	158.8	73 57.9	94 36	158.2	74 26.0	94 37	157.6	6
7	70 48.5	94 35	158.5	71 16.7	94 36	157.9	71 44.9	94 37	157.4	72 12.9	93 38	156.8	72 40.9	93 38	156.2	73 08.7	93 39	155.6	73 36.4	92 40	154.9	74 04.0	92 41	154.2	7
8	70 27.5	93 39	155.7	70 55.2	92 40	155.1	71 22.9	92 41	154.5	71 50.4	92 42	153.9	72 17.8	91 42	153.2	72 45.1	91 44	152.5	73 12.2	90 44	151.8	73 39.2	90 46	151.0	8
9	70 04.1	91 43	153.0	70 31.4	91 44	152.4	70 58.5	90 44	151.7	71 25.5	90 46	151.0	71 52.3	89 46	150.3	72 19.0	89 47	149.6	72 45.5	88 48	148.8	73 11.8	87 50	148.0	9
10	69 38.5	89 46	150.4	70 05.2	89 47	149.7	70 31.8	88 48	149.0	70 58.2	88 49	148.3	71 24.5	87 50	147.6	71 50.6	87 51	146.8	72 16.4	86 52	146.0	72 42.1	85 53	145.1	10
1	69 10.8	88 49	147.9	69 37.0	87 50	147.2	70 03.0	86 51	146.5	70 28.9	86 52	145.7	70 54.5	85 53	144.9	71 20.0	84 54	144.1	71 45.2	84 55	143.3	72 10.2	83 56	142.4	1
2	68 41.2	86 52	145.5	69 06.8	85 53	144.8	69 32.3	85 54	144.0	69 57.5	84 55	143.2	70 22.6	83 56	142.4	70 47.4	82 57	141.6	71 12.0	81 58	140.7	71 36.3	81 60	139.8	2
3	68 09.8	84 55	143.2	68 34.9	83 56	142.5	68 59.7	83 57	141.7	69 24.4	82 58	140.9	69 48.8	81 59	140.1	70 13.0	80 60	139.2	70 36.9	79 61	138.3	71 00.6	78 62	137.4	3
4	67 36.7	82 58	141.0	68 01.2	81 59	140.3	68 25.5	81 60	139.5	68 49.6	80 61	138.7	69 13.4	79 62	137.8	69 37.0	78 63	136.9	70 00.3	77 64	136.0	70 23.3	76 65	135.1	4
15	67 02.0	80 60	138.9	67 25.9	80 61	138.2	67 49.7	79 62	137.4	68 13.2	78 63	136.5	68 36.4	77 64	135.7	68 59.4	76 65	134.8	69 22.1	75 66	133.9	69 44.5	74 67	132.9	15
6	66 25.8	78 62	137.0	66 49.3	78 63	136.2	67 12.5	77 64	135.4	67 35.4	76 65	134.5	67 58.1	75 66	133.6	68 20.4	74 67	132.8	68 42.5	73 68	131.8	69 04.3	72 69	130.9	6
7	65 48.4	77 64	135.1	66 11.3	76 65	134.3	66 33.9	75 66	133.4	66 56.3	74 67	132.6	67 18.4	73 68	131.7	67 40.2	72 69	130.8	68 01.8	71 70	129.9	68 22.9	70 71	129.0	7
8	65 09.7	75 66	133.2	65 32.1	74 67	132.4	65 54.2	73 68	131.6	66 16.0	72 69	130.8	66 37.6	71 70	129.9	66 58.9	70 71	129.0	67 19.8	69 72	128.1	67 40.5	68 72	127.1	8
9	64 29.8	73 68	131.5	64 51.7	72 69	130.7	65 13.3	72 70	129.9	65 34.7	71 71	129.0	65 55.7	70 71	128.2	66 16.5	69 72	127.3	66 36.9	68 73	126.4	66 57.0	66 74	125.4	9
20	63 48.9	72 70	129.9	64 10.3	71 70	129.1	64 31.5	70 71	128.2	64 52.3	69 72	127.4	65 12.9	68 73	126.5	65 33.1	67 74	125.7	65 53.0	66 74	124.7	66 12.6	65 75	123.8	20
1	63 07.1	70 71	128.3	63 28.0	69 72	127.5	63 48.7	68 73	126.7	64 09.0	67 74	125.8	64 29.1	66 74	125.0	64 48.9	65 75	124.1	65 08.3	64 76	123.2	65 27.4	63 76	122.3	1
2	62 24.3	69 73	126.8	62 44.8	68 73	126.0	63 05.0	67 74	125.2	63 24.9	66 75	124.4	63 44.5	65 76	123.5	64 03.8	64 76	122.6	64 22.8	63 77	121.7	64 41.5	62 78	120.8	2
3	61 40.7	67 74	125.4	62 00.8	66 75	124.6	62 20.5	65 75	123.8	62 40.0	64 76	122.9	62 59.2	63 77	122.1	63 18.0	62 77	121.2	63 36.6	61 78	120.4	63 54.8	60 79	119.5	3
4	60 56.4	66 75	124.0	61 16.0	65 76	123.2	61 35.3	64 76	122.4	61 54.4	63 77	121.6	62 13.2	62 78	120.8	62 31.6	61 78	119.9	52 49.7	60 79	119.0	63 07.6	59 80	118.1	4
25	60 11.3	65 76	122.7	60 30.5	64 77	121.9	60 49.5	63 78	121.1	61 08.1	62 78	120.3	61 26.5	61 79	119.5	61 44.6	60 79	118.6	62 02.3	59 80	117.8	62 19.7	58 80	116.9	25
6	59 25.6	63 77	121.4	59 44.4	62 78	120.6	60 03.0	61 78	119.9	60 21.3	60 79	119.1	60 39.3	59 80	118.2	60 57.0	58 80	117.4	61 14.3	57 81	116.6	61 31.4	56 81	115.7	6
7	58 39.3	62 78	120.2	58 57.8	61 79	119.4	59 16.0	60 79	118.7	59 33.9	59 80	117.9	59 51.5	58 80	117.1	60 08.8	57 81	116.3	60 25.9	56 82	115.4	60 42.6	55 82	114.6	7
8	57 52.4	61 79	119.0	58 10.5	60 80	118.3	58 28.4	59 80	117.5	58 46.0	58 81	116.8	59 03.3	57 81	116.0	59 20.2	56 82	115.2	59 36.9	55 82	114.3	59 53.3	54 83	113.5	8
9	57 05.0	60 80	117.9	57 22.8	59 80	117.2	57 40.3	58 81	116.4	57 57.6	57 81	115.7	58 14.5	56 82	114.9	58 31.2	55 82	114.1	58 47.6	54 83	113.3	59 03.7	53 83	112.5	9
30	56 17.1	59 80	116.9	56 34.6	58 81	116.1	56 51.8	57 82	115.4	57 08.8	56 82	114.6	57 25.4	55 82	113.9	57 41.8	54 83	113.1	57 57.9	53 84	112.3	58 13.7	52 84	111.5	30
1	55 28.8	58 81	115.8	55 46.0	57 82	115.1	56 02.9	56 82	114.4	56 19.5	55 82	113.6	56 35.9	54 83	112.9	56 52.0	53 84	112.1	57 07.8	52 84	111.3	57 23.3	51 84	110.5	1
2	54 40.1	57 82	114.9	54 57.0	56 82	114.1	55 13.6	55 83	113.4	55 30.0	54 83	112.7	55 46.1	53 84	111.9	56 01.9	52 84	111.2	56 17.4	51 84	110.4	56 32.7	50 85	109.6	2
3	53 50.9	56 82	113.9	54 07.6	55 83	113.2	54 23.9	54 83	112.5	54 40.0	53 84	111.7	54 55.9	52 84	111.0	55 11.4	51 84	110.3	55 26.7	51 85	109.5	55 41.7	50 85	108.7	3
4	53 01.5	55 83	113.0	53 17.8	54 83	112.3	53 33.9	53 84	111.6	53 49.8	52 84	110.9	54 05.4	52 85	110.1	54 20.7	51 85	109.4	54 35.8	50 86	108.6	54 50.6	49 86	107.9	4
35	52 11.7	54 84	112.1	52 27.8	53 84	111.4	52 43.6	52 84	110.7	52 59.2	52 85	110.0	53 14.6	51 85	109.3	53 29.7	50 85	108.6	53 44.5	49 86	107.8	53 59.1	48 86	107.1	35
6	51 21.5	53 84	111.2	51 37.4	53 84	110.5	51 53.0	52 85	109.9	52 08.4	51 85	109.2	52 23.6	50 86	108.5	52 38.5	49 86	107.7	52 53.1	48 86	107.0	53 07.5	47 86	106.3	6
7	50 31.1	53 84	110.4	50 46.8	52 85	109.7	51 02.2	51 85	109.0	51 17.4	50 86	108.4	51 32.3	49 86	107.7	51 47.0	49 86	107.0	52 01.4	48 86	106.2	52 15.6	47 87	105.5	7
8	49 40.4	52 85	109.6	49 55.9	51 85	108.9	50 11.1	50 86	108.3	50 26.1	50 86	107.6	50 40.8	49 86	106.9	50 55.3	48 86	106.2	51 09.6	47 87	105.5	51 23.5	46 87	104.8	8
9	48 49.5	51 85	108.8	49 04.8	50 86	108.2	49 19.8	50 86	107.5	49 34.6	49 86	106.8	49 49.1	48 86	106.2	50 03.4	47 87	105.5	50 17.5	47 87	104.8	50 31.3	46 87	104.1	9
40	47 58.4	51 86	108.1	48 13.4	50 86	107.4	48 28.2	49 86	106.8	48 42.8	48 86	106.1	48 57.2	48 87	105.4	49 11.4	47 87	104.7	49 25.3	46 87	104.1	49 38.9	45 88	103.4	40
1	47 07.0	50 86	107.3	47 21.8	49 86	106.7	47 36.5	48 86	106.0	47 50.9	48 87	105.4	48 05.1	47 87	104.7	48 19.1	46 87	104.1	48 32.9	45 88	103.4	48 46.4	45 88	102.7	1
2	46 15.4	49 86	106.6	46 30.1	49 86	106.0	46 44.6	48 87	105.3	46 58.9	47 87	104.7	47 12.9	46 87	104.0	47 26.7	46 88	103.4	47 40.3	45 88	102.7	47 53.7	44 88	102.1	2
3	45 23.6	49 86	105.9	45 38.2	48 87	105.3	45 52.5	47 87	104.6	46 06.6	47 87	104.0	46 20.5	46 88	103.4	46 34.2	45 88	102.7	46 47.7	45 88	102.1	47 00.9	44 88	101.4	3
4	44 31.7	48 87	105.2	44 46.1	48 87	104.6	45 00.2	47 87	104.0	45 14.2	46 88	103.4	45 28.0	46 88	102.7	45 41.5	45 88	102.1	45 54.9	44 88	101.4	46 08.0	43 88	100.8	4
45	43 39.6	48 87	104.6	43 53.8	47 87	104.0	44 07.8	46 88	103.3	44 21.7	46 88	102.7	44 35.3	45 88	102.1	44 48.7	44 88	101.5	45 02.0	44 88	100.8	45 15.0	43 88	100.2	45
6	42 47.3	47 87	103.9	43 01.4	47 88	103.3	43 15.3	46 88	102.7	43 29.0	45 88	102.1	43 42.5	45 88	101.5	43 55.8	44 88	100.9	44 09.0	43 89	100.2	44 21.9	43 89	99.6	6
7	41 54.9	47 88	103.3	42 08.8	46 88	102.7	42 22.6	46 88	102.1	42 36.2	45 88	101.5	42 49.6	44 88	100.9	43 02.8	44 88	100.3	43 15.8	43 89	99.6	43 28.6	42 89	99.0	7
8	41 02.3	46 88	102.7	41 16.2	46 88	102.1	41 29.8	45 88	101.5	41 43.3	45 88	100.9	41 56.6	44 88	100.3	42 09.7	43 89	99.7	42 22.6	43 89	99.1	42 35.3	42 89	98.5	8
9	40 09.6	46 88	102.1	40 23.4	45 88	101.5	40 36.9	45 88	100.9	40 50.3	44 88	100.3	41 03.5	44 89	99.7	41 16.5	43 89	99.1	41 29.3	42 89	98.5	41 42.0	42 89	97.9	9
50	39 16.8	46 88	101.5	39 30.5	45 88	100.9	39 43.9	45 88	100.3	39 57.2	44 89	99.7	40 10.3	43 89	99.1	40 23.2	43 89	98.6	40 36.0	42 89	98.0	40 48.5	42 89	97.4	50
1	38 23.9	45 88	100.9	38 37.5	45 88	100.3	38 50.8	44 89	99.8	39 04.0	44 89	99.2	39 17.0	43 89	98.6	39 29.8	42 89	98.0	39 42.5	42 89	97.4	39 55.0	41 89	96.8	1
2	37 30.9	45 88	100.3	37 44.4	44 89	99.8	37 57.6	44 89	99.2	38 10.7	43 89	98.6	38 23.7	43 89	98.0	38 36.4	42 89	97.5	38 49.0	42 89	96.9	39 01.4	41 89	96.3	2
3	36 37.8	45 89	99.8	36 51.2	44 89	99.2	37 04.3	44 89	98.6	37 17.4	43 89	98.1	37 30.2	43 89	97.5	37 42.9	42 89	96.9	37 55.4	41 89	96.4	38 07.8	41 90	95.8	3
4	35 44.6	44 89	99.2	35 57.9	44 89	98.7	36 11.0	43 89	98.1	36 23.9	43 89	97.6	36 36.7	42 89	97.0	36 49.4	42 89	96.4	37 01.8	41 90	95.9	37 14.1	41 90	95.3	4
55	34 51.4	44 89	98.7	35 04.5	44 89	98.1	35 17.6	43 89	97.6	35 30.4	43 89	97.0	35 43.2	42 89	96.5	35 55.7	42 89	95.9	36 08.1	41 90	95.4	36 20.4	41 90	94.8	55
6	33 58.0	44 89	98.2	34 11.1	43 89	97.6	34 24.1	43 89	97.1	34 36.9	42 89	96.5	34 49.6	42 90	96.0	35 02.1	41 90	95.4	35 14.4	41 90	94.9	35 26.6	40 90	94.3	6
7	33 04.6	44 89	97.6	33 17.6	43 89	97.1	33 30.5	43 89	96.6	33 43.3	42 90	96.0	33 55.9	42 90	95.5	34 08.4	41 90	94.9	34 20.7	41 90	94.4	34 32.8	40 90	93.8	7
8	32 11.1	43 89	97.1	32 24.1	43 89	96.6	32 36.9	43 89	96.1	32 49.6	42 90	95.5	33 02.2	42 90	95.0	33 14.6	41 90	94.4	33 26.9	41 90	93.9	33 39.0	40 90	93.3	8
9	31 17.6	43 89	96.6	31 30.5	43 89	96.1	31 43.3	42 90	95.6	31 55.9	42 90	95.0	32 08.5	41 90	94.5	32 20.8	41 90	94.0	32 33.1	41 90	93.4	32 45.2	40 90	92.9	9
60	30 24.0	43 89	96.1	30 36.9	43 90	95.6	30 49.6	42 90	95.1	31 02.2	42 90	94.5	31 14.7	41 90	94.0	31 27.0	41 90	93.5	31 39.2	40 90	92.9	31 51.3	40 90	92.4	60
1	29 30.4	43 90	95.6	29 43.2	42 90	95.1	29 55.9	42 90	94.6	30 08.4	42 90	94.1	30 20.9	41 90	93.5	30 33.2	41 90	93.0	30 45.4	40 90	92.5	30 57.4	40 90	91.9	1
2	28 36.7	43 90	95.1	28 49.4	42 90	94.6	29 02.1	42 90	94.1	29 14.6	42 90	93.6	29 27.0	41 90	93.1	29 39.3	41 90	92.5	29 51.5	40 90	92.0	30 03.5	40 90	91.5	2
3	27 42.9	43 90	94.7	27 55.7	42 90	94.2	28 08.3	42 90	93.6	28 20.8	41 90	93.1	28 33.2	41 90	92.6	28 45.4	41 90	92.1	28 57.6	40 90	91.6	29 09.6	40 90	91.0	3
4	26 49.2	42 90	94.2	27 01.9	42 90	93.7	27 14.4	42 90	93.2	27 26.9	41 90	92.7	27 39.3	41 90	92.2	27 51.5	41 90	91.6	28 03.7	40 90	91.1	28 15.7	40 90	90.6	4
65	25 55.4	42 90	93.7	26 08.0	42 90	93.2	26 20.6	42 90	92.7	26 33.0	41 90	92.2	26 45.4	41 90	91.7	26 57.6	41 90	91.2	27 09.7	40 90	90.7	27 21.7	40 90	90.2	65
6	25 01.5	42 90	93.3	25 14.2	42 90	92.8	25 26.7	42 90	92.3	25 39.1	41 90	91.7	25 51.5	41 90	91.2	26 03.7	41 90	90.7	26 15.8	40 90	90.2	26 27.8	40 90	89.7	6
7	24 07.7	42 90	92.8	24 20.3	42 90	92.3	24 32.8	42 90	91.8	24 45.2	41 90	91.3	24 57.6	41 90	90.8	25 09.8	41 90	90.3	25 21.9	40 90	89.8	25 33.9	40 90	89.3	7
8	23 13.8	42 90	92.3	23 26.4	42 90	91.8	23 38.9	42 90	91.4	23 51.3	41 90	90.9	24 03.6	41 90	90.4	24 15.8	41 90	89.9	24 28.0	40 90	89.4	24 40.0	40 90	88.8	8
9	22 19.9	42 90	91.9	22 32.5	42 90	91.4	22 45.0	41 90	90.9	22 57.4	41 90	90.4	23 09.7	41 90	89.9	23 21.9	41 90	89.4	23 34.0	40 90	88.9	23 46.1	40 90	88.4	9
70	21 26.0	42 90	91.4	21 38.6	42 90	91.0	21 51.1	41 90	90.5	22 03.5	41 90	90.0	22 15.8	41 90	89.5	22 28.0	41 90	89.0	22 40.1	40 90	88.5	22 52.2	40 90	88.0	70
1	20 32.1	42 90	91.0	20 44.7	42 90	90.5	20 57.1	41 90	90.0	21 09.5	41 90	89.5	21 21.9	41 90	89.0	21 34.1	41 90	88.6	21 46.2	40 90	88.1	21 58.3	40 90	87.6	1
2	19 38.2	42 90	90.6	19 50.7	42 90	90.1	20 03.2	41 90	89.6	20 15.6	41 90	89.1	20 27.9	41 90	88.6	20 40.2	41 90	88.1	20 52.3	40 90	87.6	21 04.4	40 90	87.1	2
3	18 44.3	42 90	90.1	18 56.8	42 90	89.6	19 09.3	41 90	89.1	19 21.7	41 90	88.7	19 34.0	41 90	88.2	19 46.3	41 90	87.7	19 58.5	40 90	87.2	20 10.6	40 90	86.7	3
4	17 50.3	42 90	89.7	18 02.9	42 90	89.2	18 15.4	42 90	88.7	18 27.8	41 90	88.2	18 40.1	41 90	87.8	18 52.4	41 90	87.3	19 04.6	41 90	86.8	19 16.7	40 90	86.3	4
75	16 56.4	42 90	89.2	17 09.0	42 90	88.8	17 21.5	42 90	88.3	17 33.9	41 90	87.8	17 46.3	41 90	87.3	17 58.6	41 90	86.9	18 10.8	41 90	86.4	18 22.9	40 90	85.9	75
6	16 02.5	42 90	88.8	16 15.1	42 90	88.3	16 27.6	42 90	87.9	16 40.0	41 90	87.4	16 52.4	41 90	86.9	17 04.7	41 90	86.4	17 17.0	41 90	86.0	17 29.1	40 90	85.5	6
7	15 08.6	42 90	88.4	15 21.2	42 90	87.9	15 33.7	42 90	87.4	15 46.2	41 90	87.0	15 58.6	41 90	86.5	16 10.9	41 90	86.0	16 23.2	41 90	85.5	16 35.4	41 90	85.1	7
8	14 14.7	42 90	87.9	14 27.3	42 90	87.5	14 39.8	42 90	87.0	14 52.3	42 90	86.5	15 04.7	41 90	86.1	15 17.1	41 90	85.6	15 29.4	41 90	85.1	15 41.7	41 90	84.6	8
9	13 20.8	42 90	87.5	13 33.4	42 90	87.0	13 46.0	42 90	86.6	13 58.5	42 90	86.1	14 11.0	41 90	85.6	14 23.4	41 90	85.2	14 35.7	41 90	84.7	14 48.0	41 89	84.2	9
80	12 26.9	42 90	87.1	12 39.6	42 90	86.6	12 52.2	42 90	86.2	13 04.7	42 90	85.7	13 17.2	42 90	85.2	13 29.7	41 90	84.8	13 42.0	41 89	84.3	13 54.4	41 89	83.8	80
1	11 33.1	42 90	86.7	11 45.7	42 90	86.2	11 58.4	42 90	85.7	12 10.9	42 90	85.3	12 23.5	42 90	84.8	12 36.0	42 90	84.3	12 48.4	41 89	83.9	13 00.8	41 89	83.4	1
2	10 39.2	42 90	86.2	10 51.9	42 90	85.8	11 04.6	42 90	85.3	11 17.2	42 90	84.8	11 29.8	42 90	84.4	11 42.3	42 89	83.9	11 54.8	42 89	83.4	12 07.2	41 89	83.0	2
3	9 45.5	43 90	85.8	9 58.2	42 90	85.3	10 10.9	42 90	84.9	10 23.5	42 89	84.4	10 36.1	42 89	84.0	10 48.7	42 89	83.5	11 01.3	42 89	83.0	11 13.7	42 89	82.6	3
4	8 51.7	43 90	85.4	9 04.5	42 90	84.9	9 17.2	42 90	84.5	9 29.9	42 89	84.0	9 42.5	42 89	83.5	9 55.2	42 89	83.1	10 07.8	42 89	82.6	10 20.3	42 89	82.2	4
85	7 57.9	43 90	84.9	8 10.8	43 90	84.5	8 23.5	43 89	84.0	8 36.3	42 89	83.6	8 49.0	42 89	83.1	9 01.7	42 89	82.7	9 14.3	42 89	82.2	9 26.9	42 89	81.7	85
6	7 04.2	43 89	84.5	7 17.1	43 89	84.1	7 29.9	43 89	83.6	7 42.7	43 89	83.2	7 55.5	42 89	82.7	8 08.2	42 89	82.2	8 20.9	42 89	81.8	8 33.6	42 89	81.3	6
7	6 10.6	43 89	84.1	6 23.5	43 89	83.6	6 36.3	43 89	83.2	6 49.2	43 89	82.7	7 02.0	43 89	82.3	7 14.8	43 89	81.8	7 27.6	42 89	81.4	7 40.3	42 89	80.9	7
8	5 17.0	43 89	83.7	5 29.9	43 89	83.2	5 42.8	43 89	82.8	5 55.7	43 89	82.3	6 08.6	43 89	81.8	6 21.4	43 89	81.4	6 34.3	43 89	80.9	6 47.1	43 89	80.5	8
9										5 02.3	43 89	81.9	5 15.2	43 89	81.4	5 28.1	43 89	81.0	5 41.0	43 89	80.5	5 53.9	43 88	80.1	9
																						5 00.8	43 88	79.6	90

Lat 26°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	56 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	00
1	55 59.2	1.0 04	178.2	55 29.2	1.0 04	178.3	54 59.2	1.0 04	178.3	54 29.2	1.0 04	178.3	53 59.2	1.0 04	178.3	53 29.2	1.0 04	178.3	52 59.2	1.0 04	178.4	52 29.2	1.0 04	178.4	1
2	55 56.7	1.0 07	176.5	55 26.7	1.0 07	176.5	54 56.8	1.0 07	176.6	54 26.8	1.0 07	176.6	53 56.8	1.0 06	176.7	53 26.9	1.0 06	176.7	52 56.9	1.0 06	176.7	52 27.0	1.0 06	176.8	2
3	55 52.5	1.0 10	174.7	55 22.6	1.0 10	174.8	54 52.7	1.0 09	174.8	54 22.8	1.0 09	174.9	53 52.9	1.0 09	175.0	53 23.0	1.0 09	175.1	52 53.1	1.0 09	175.1	52 23.2	1.0 09	175.2	3
4	55 46.7	99 12	172.9	55 16.9	99 12	173.0	54 47.1	99 12	173.1	54 17.2	99 12	173.2	53 47.4	99 12	173.3	53 17.6	99 12	173.4	52 47.8	99 12	173.5	52 17.9	99 11	173.6	4
05	55 39.3	99 15	171.2	55 09.6	99 15	171.3	54 39.8	99 15	171.4	54 10.1	99 14	171.6	53 40.4	99 14	171.7	53 10.6	99 14	171.8	52 40.9	99 14	171.9	52 11.1	99 14	172.0	05
6	55 30.2	99 18	169.5	55 00.6	99 18	169.6	54 31.0	99 17	169.8	54 01.4	99 17	169.9	53 31.8	99 17	170.0	53 02.2	99 17	170.2	52 32.5	99 16	170.3	52 02.9	99 16	170.4	6
7	55 19.6	98 20	167.8	54 50.1	98 20	167.9	54 20.7	98 20	168.1	53 51.2	98 20	168.2	53 21.7	98 19	168.4	52 52.2	98 19	168.5	52 22.7	98 19	168.7	51 53.2	98 19	168.8	7
8	55 07.3	98 23	166.1	54 38.1	98 23	166.2	54 08.8	98 22	166.4	53 39.4	98 22	166.6	53 10.1	98 22	166.8	52 40.8	98 22	167.0	52 11.4	98 21	167.1	51 42.0	98 21	167.3	8
9	54 53.6	97 26	164.4	54 24.5	97 25	164.6	53 55.4	97 25	164.8	53 26.2	97 24	165.0	52 57.1	97 24	165.2	52 27.9	97 24	165.4	51 58.7	97 24	165.6	51 29.5	97 23	165.7	9
10	54 38.3	96 28	162.7	54 09.4	96 28	162.9	53 40.5	96 27	163.2	53 11.5	97 27	163.4	52 42.5	97 26	163.6	52 13.5	97 26	163.8	51 44.5	97 26	164.0	51 15.5	97 26	164.2	10
1	54 21.5	96 30	161.1	53 52.9	96 30	161.3	53 24.1	96 30	161.6	52 55.4	96 29	161.8	52 26.6	96 29	162.0	51 57.8	96 28	162.3	51 29.0	96 28	162.5	51 00.1	96 28	162.7	1
2	54 03.3	95 33	159.5	53 34.9	95 32	159.7	53 06.4	95 32	160.0	52 37.9	95 32	160.3	52 09.3	95 31	160.5	51 40.7	95 31	160.8	51 12.1	95 30	161.0	50 43.4	96 30	161.2	2
3	53 43.7	94 35	157.9	53 15.5	94 34	158.2	52 47.3	94 34	158.4	52 19.0	94 34	158.7	51 50.6	94 33	159.0	51 22.3	95 33	159.2	50 53.9	95 33	159.5	50 25.4	95 32	159.8	3
4	53 22.7	93 37	156.3	52 54.8	93 37	156.6	52 26.8	93 36	156.9	51 58.7	94 36	157.2	51 30.6	94 35	157.5	51 02.5	94 35	157.8	50 34.3	94 34	158.0	50 06.1	94 34	158.3	4
15	53 00.4	92 39	154.8	52 32.7	92 39	155.1	52 05.0	93 38	155.4	51 37.2	93 38	155.7	51 09.4	93 38	156.0	50 41.5	93 37	156.3	50 13.6	93 37	156.6	49 45.6	93 36	156.9	15
6	52 36.8	91 41	153.3	52 09.4	91 41	153.6	51 41.9	92 40	153.9	51 14.4	92 40	154.3	50 46.8	92 40	154.6	50 19.2	92 39	154.9	49 51.5	92 39	155.2	49 23.8	92 38	155.5	6
7	52 12.0	90 44	151.8	51 44.8	91 43	152.2	51 17.6	91 42	152.5	50 50.4	91 42	152.8	50 23.1	91 42	153.2	49 55.7	91 41	153.5	49 28.3	91 41	153.8	49 00.8	92 40	154.1	7
8	51 45.9	89 46	150.4	51 19.0	90 45	150.7	50 52.1	90 44	151.1	50 25.2	90 44	151.4	49 58.1	90 43	151.8	49 31.0	90 43	152.1	49 03.9	91 42	152.4	48 36.7	91 42	152.7	8
9	51 18.6	88 47	149.0	50 52.1	89 47	149.3	50 25.5	89 46	149.7	49 58.8	89 46	150.0	49 32.1	89 45	150.4	49 05.2	89 45	150.7	48 38.4	90 44	151.1	48 11.4	90 44	151.4	9
20	50 50.3	87 49	147.6	50 24.0	88 48	147.9	49 57.7	88 48	148.3	49 31.3	88 48	148.7	49 04.9	88 47	149.1	48 38.3	89 46	149.4	48 11.8	89 46	149.8	47 45.1	89 46	150.1	20
1	50 20.8	86 51	146.2	49 54.9	87 50	146.6	49 28.9	87 50	147.0	49 02.8	87 49	147.4	48 36.6	87 49	147.7	48 10.4	88 48	148.1	47 44.1	88 48	148.5	47 17.7	88 47	148.8	1
2	49 50.3	85 52	144.9	49 24.7	86 52	145.3	48 59.0	86 52	145.7	48 33.2	86 51	146.1	48 07.3	86 50	146.5	47 41.4	87 50	146.8	47 15.3	87 50	147.2	46 49.3	87 49	147.6	2
3	49 18.8	84 54	143.6	48 53.5	85 54	144.0	48 28.1	85 53	144.4	48 02.6	85 53	144.8	47 37.0	85 52	145.2	47 11.4	86 52	145.6	46 45.6	86 51	146.0	46 19.8	86 50	146.3	3
4	48 46.3	83 56	142.3	48 21.3	84 55	142.7	47 56.2	84 55	143.2	47 31.0	84 54	143.6	47 05.7	84 54	144.0	46 40.4	85 53	144.3	46 15.0	85 53	144.7	45 49.5	85 52	145.1	4
25	48 12.9	82 57	141.1	47 48.2	82 57	141.5	47 23.4	83 56	141.9	46 58.5	83 56	142.3	46 33.6	83 55	142.8	46 08.5	84 55	143.1	45 43.4	84 54	143.5	45 18.2	84 54	143.9	25
6	47 38.6	81 59	139.9	47 14.2	81 58	140.3	46 49.7	82 58	140.7	46 25.1	82 57	141.2	46 00.5	82 57	141.6	45 35.7	83 56	142.0	45 10.9	83 56	142.4	44 46.0	83 55	142.8	6
7	47 03.4	80 60	138.7	46 39.3	80 60	139.1	46 15.2	81 59	139.6	45 50.9	81 58	140.0	45 26.5	81 58	140.4	45 02.1	82 58	140.8	44 37.5	82 57	141.2	44 12.9	82 56	141.6	7
8	46 27.4	79 61	137.6	46 03.6	79 61	138.0	45 39.8	80 60	138.4	45 15.8	80 60	138.9	44 51.8	80 59	139.3	44 27.6	81 59	139.7	44 03.4	81 58	140.1	43 39.0	81 58	140.5	8
9	45 50.6	78 62	136.4	45 27.2	78 62	136.9	45 03.6	79 62	137.3	44 39.9	79 61	137.8	44 16.2	79 60	138.2	43 52.3	80 60	138.6	43 28 4	80 60	139.0	43 04.4	80 59	139.4	9
30	45 13.1	77 64	135.3	44 49.9	77 63	135.8	44 26.7	78 63	136.2	44 03.3	78 62	136.7	43 39.9	78 62	137.1	43 16.3	79 61	137.5	42 52.6	79 61	138.0	42 28.9	79 60	138.4	30
1	44 34.8	76 65	134.3	44 12.0	76 64	134.7	43 49.0	77 64	135.2	43 25.9	77 63	135.6	43 02.8	77 63	136.0	42 39.5	78 62	136.5	42 16.2	78 62	136.9	41 52.7	78 62	137.3	1
2	43 55.9	75 66	133.2	43 33.3	75 66	133.7	43 10.6	76 65	134.1	42 47.9	76 65	134.6	42 25.0	76 64	135.0	42 02.0	77 64	135.5	41 39.0	77 63	135.9	41 15.8	77 63	136.3	2
3	43 16.2	74 67	132.2	42 54.0	74 67	132.7	42 31.6	75 66	133.1	42 09.1	75 66	133.6	41 46.5	75 65	134.0	41 23.9	76 65	134.4	41 01.1	76 64	134.9	40 38.2	76 64	135.3	3
4	42 36.0	73 68	131.2	42 14.0	73 68	131.7	41 51.9	74 67	132.1	41 29.7	74 67	132.6	41 07.4	74 66	133.0	40 45.0	75 66	133.5	40 22.6	75 65	133.9	40 00.0	75 65	134.3	4
35	41 55.1	72 69	130.2	41 33.4	72 68	130.7	41 11.6	73 68	131.2	40 49.7	73 68	131.6	40 27.7	74 67	132.1	40 05.6	74 67	132.5	39 43.4	74 66	132.9	39 21.1	75 66	133.4	35
6	41 13.7	71 70	129.3	40 52.3	72 70	129.8	40 30.7	72 69	130.2	40 09.1	72 69	130.7	39 47.4	73 68	131.1	39 25.5	73 68	131.6	39 03.6	73 67	132.0	38 41.6	74 67	132.4	6
7	40 31.7	70 71	128.4	40 10.5	71 70	128.8	39 49.3	71 70	129.3	39 27.9	71 70	129.7	39 06.5	72 69	130.2	38 44.9	72 69	130.6	38 23.2	72 68	131.1	38 01.5	73 68	131.5	7
8	39 49.1	69 72	127.5	39 28.2	70 71	127.9	39 07.3	70 71	128.4	38 46.2	70 70	128.8	38 25.0	71 70	129.3	38 03.7	71 70	129.7	37 42.3	71 69	130.2	37 20.8	72 69	130.6	8
9	39 06.0	68 73	126.6	38 45.5	69 72	127.0	38 24.7	69 72	127.5	38 03.9	70 71	128.0	37 43.0	70 71	128.4	37 22.0	70 70	128.9	37 00.9	71 70	129.3	36 39.6	71 70	129.8	9
40	38 22.5	68 73	125.7	38 02.2	68 73	126.2	37 41.7	68 72	126.6	37 21.2	69 72	127.1	37 00.5	69 72	127.6	36 39.7	69 71	128.0	36 18.9	70 71	128.5	35 57.9	70 70	128.9	40
1	37 38.5	67 74	124.9	37 18.4	67 74	125.3	36 58.2	67 73	125.8	36 37.9	68 73	126.3	36 17.5	68 72	126.7	35 57.0	69 72	127.2	35 36.4	69 72	127.6	35 15.7	69 71	128.1	1
2	36 54.0	66 75	124.0	36 34.2	66 74	124.5	36 14.3	67 74	125.0	35 54.2	67 74	125.4	35 34.1	67 73	125.9	35 13.8	68 73	126.3	34 53.5	68 72	126.8	34 33.0	68 72	127.2	2
3	36 09.1	65 76	123.2	35 49.5	65 75	123.7	35 29.8	66 75	124.2	35 10.1	66 74	124.6	34 50.2	67 74	125.1	34 30.2	67 74	125.5	34 10.0	67 73	126.0	33 49.9	67 73	126.4	3
4	35 23.8	64 76	122.4	35 04.5	65 76	122.9	34 45.0	65 75	123.4	34 25.5	65 75	123.9	34 05.8	66 74	124.3	33 46.1	66 74	124.8	33 26.2	66 74	125.2	33 06.2	67 73	125.6	4
45	34 38.1	64 77	121.7	34 19.0	64 76	122.1	33 59.8	64 76	122.6	33 40.5	65 76	123.1	33 21.1	65 75	123.5	33 01.5	65 75	124.0	32 41.9	66 74	124.4	32 22.2	66 74	124.9	45
6	33 52.0	63 77	120.9	33 33.2	63 77	121.4	33 14.2	63 77	121.8	32 55.1	64 76	122.3	32 35.9	64 76	122.8	32 16.6	64 76	123.2	31 57.2	65 75	123.7	31 37.8	65 75	124.1	6
7	33 05.6	62 78	120.2	32 46.9	62 78	120.6	32 28.2	63 77	121.1	32 09.3	63 77	121.6	31 50.4	63 76	122.0	31 31.3	64 76	122.5	31 12.2	64 76	122.9	30 52.9	64 75	123.4	7
8	32 18.8	61 78	119.5	32 00.4	62 78	119.9	31 41.8	62 78	120.4	31 23.2	62 78	120.8	31 04.5	63 77	121.3	30 45.6	63 77	121.8	30 26.7	63 76	122.2	30 07.7	64 76	122.7	8
9	31 31.7	61 79	118.7	31 13.5	61 79	119.2	30 55.1	61 78	119.7	30 36.7	62 78	120.1	30 18.2	62 78	120.6	29 59.6	62 77	121.0	29 40.9	62 77	121.5	29 22.1	63 76	121.9	9
50	30 44.2	60 80	118.0	30 26.2	60 79	118.5	30 08.1	61 79	119.0	29 49.9	61 78	119.4	29 31.6	61 78	119.9	29 13.2	61 78	120.3	28 54.8	62 78	120.8	28 36.2	62 77	121.2	50
1	29 56.5	59 80	117.4	29 38.7	60 80	117.8	29 20.8	60 79	118.3	29 02.8	60 79	118.7	28 44.7	60 79	119.2	28 26.5	61 78	119.7	28 08.3	61 78	120.1	27 49.9	61 78	120.6	1
2	29 08.5	59 81	116.7	28 50.8	59 80	117.2	28 33.2	59 80	117.6	28 15.4	59 80	118.1	27 57.5	60 79	118.5	27 39.5	60 79	119.0	27 21.5	60 79	119.4	27 03.3	61 78	119.9	2
3	28 20.1	58 81	116.0	28 02.7	58 81	116.5	27 45.2	58 80	117.0	27 27.6	59 80	117.4	27 10.0	59 80	117.9	26 52.2	59 79	118.3	26 34.3	60 79	118.8	26 16.4	60 79	119.2	3
4	27 31.5	57 81	115.4	27 14.3	58 81	115.9	26 57.0	58 81	116.3	26 39.6	58 80	116.8	26 22.1	58 80	117.2	26 04.6	59 80	117.7	25 46.9	59 80	118.1	25 29.2	59 79	118.6	4
55	26 42.7	57 82	114.8	26 25.7	57 82	115.2	26 08.5	57 81	115.7	25 51.3	58 81	116.1	25 34.0	58 80	116.6	25 16.7	58 80	117.0	24 59.2	58 80	117.5	24 41.7	59 80	117.9	55
6	25 53.6	56 82	114.1	25 36.8	56 82	114.6	25 19.8	57 82	115.1	25 02.8	57 81	115.5	24 45.7	57 81	116.0	24 28.5	57 81	116.4	24 11.2	58 80	116.9	23 53.9	58 80	117.3	6
7	25 04.3	55 83	113.5	24 47.6	56 82	114.0	24 30.8	56 82	114.4	24 14.0	56 82	114.9	23 57.1	57 81	115.3	23 40.1	57 81	115.8	23 23.0	57 81	116.2	23 05.8	57 80	116.7	7
8	24 14.7	55 83	112.9	23 58.2	55 83	113.4	23 41.6	55 82	113.8	23 25.0	56 82	114.3	23 08.2	56 82	114.7	22 51.4	56 82	115.2	22 34.5	56 81	115.6	22 17.5	57 81	116.1	8
9	23 24.9	54 83	112.3	23 08.6	55 83	112.8	22 52.2	55 83	113.2	22 35.7	55 82	113.7	22 19.1	55 82	114.1	22 02.5	56 82	114.6	21 45.8	56 82	115.0	21 29.0	56 81	115.5	9
60	22 35.0	54 84	111.8	22 18.8	54 84	112.2	22 02.5	54 83	112.7	21 46.2	55 83	113.1	21 29.8	55 82	113.6	21 13.3	55 82	114.0	20 56.8	55 82	114.5	20 40.2	55 82	114.9	60
1	21 44.8	53 84	111.2	21 28.7	54 84	111.6	21 12.7	54 84	112.1	20 56.5	54 83	112.5	20 40.3	54 83	113.0	20 24.0	54 83	113.4	20 07.6	55 82	113.9	19 51.1	55 82	114.3	1
2	20 54.4	53 84	110.6	20 38.5	53 84	111.1	20 22.6	53 84	111.5	20 06.6	53 84	112.0	19 50.5	54 83	112.4	19 34.4	54 83	112.9	19 18.2	54 83	113.3	19 01.9	54 82	113.8	2
3	20 03.8	52 84	110.1	19 48.1	52 84	110.5	19 32.3	53 84	111.0	19 16.5	53 84	111.4	19 00.6	53 84	111.9	18 44.6	53 83	112.3	18 28.5	54 83	112.8	18 12.4	54 83	113.2	3
4	19 13.1	52 85	109.5	18 57.5	52 85	110.0	18 41.9	52 84	110.4	18 26.2	52 84	110.9	18 10.4	53 84	111.3	17 54.6	53 84	111.8	17 38.7	53 83	112.2	17 22.8	53 83	112.6	4
65	18 22.2	51 85	109.0	18 06.7	52 85	109.4	17 51.2	52 85	109.9	17 35.7	52 84	110.3	17 20.1	52 84	110.8	17 04.4	52 84	111.2	16 48.7	53 84	111.7	16 32.9	53 84	112.1	65
6	17 31.1	51 85	108.4	17 15.8	51 85	108.9	17 00.4	51 85	109.3	16 45.0	51 85	109.8	16 29.6	52 84	110.2	16 14.1	52 84	110.7	15 58.5	52 84	111.1	15 42.8	52 84	111.6	6
7	16 39.8	50 86	107.9	16 24.7	51 86	108.4	16 09.5	51 85	108.8	15 54.2	51 85	109.3	15 38.9	51 85	109.7	15 23.5	51 84	110.2	15 08.1	52 84	110.6	14 52.6	52 84	111.0	7
8	15 48.5	50 86	107.4	15 33.4	50 86	107.8	15 18.4	50 86	108.3	15 03.2	51 85	108.7	14 48.0	51 85	109.2	14 32.8	51 85	109.6	14 17.5	51 84	110.1	14 02.2	51 84	110.5	8
9	14 56.9	50 86	106.9	14 42.0	50 86	107.3	14 27.1	50 86	107.8	14 12.1	50 86	108.2	13 57.0	50 85	108.7	13 41.9	50 85	109.1	13 26.8	51 85	109.6	13 11.6	51 85	110.0	9
70	14 05.3	49 86	106.4	13 50.5	49 86	106.8	13 35.7	49 86	107.3	13 20.8	50 86	107.7	13 05.9	50 86	108.2	12 50.9	50 85	108.6	12 35.9	50 85	109.1	12 20.8	50 85	109.5	70
1	13 13.4	49 87	105.9	12 58.8	49 86	106.3	12 44.1	49 86	106.8	12 29.3	49 86	107.2	12 14.6	49 86	107.7	11 59.7	50 86	108.1	11 44.8	50 85	108.6	11 29.9	50 85	109.0	1
2	12 21.5	48 87	105.4	12 07.0	49 87	105.8	11 52.4	49 86	106.3	11 37.8	49 86	106.7	11 23.1	49 86	107.2	11 08.4	49 86	107.6	10 53.6	49 85	108.1	10 38.9	49 85	108.5	2
3	11 29.5	48 87	104.9	11 15.0	48 87	105.3	11 00.6	48 87	105.8	10 46.1	48 86	106.2	10 31.5	49 86	106.7	10 16.9	49 86	107.1	10 02.3	49 86	107.6	9 47.7	49 86	108.0	3
4	10 37.3	48 87	104.4	10 23.0	48 87	104.9	10 08.6	48 87	105.3	9 54.2	48 86	105.8	9 39.8	48 86	106.2	9 25.3	48 86	106.6	9 10.8	48 86	107.1	8 56.3	48 86	107.5	4
75	9 45.0	47 87	103.9	9 30.8	47 87	104.4	9 16.5	48 87	104.8	9 02.3	48 87	105.3	8 47.9	48 86	105.7	8 33.6	48 86	106.2	8 19.2	48 86	106.6	8 04.8	48 86	107.1	75
6	8 52.6	47 88	103.5	8 38.5	47 87	103.9	8 24.4	47 87	104.4	8 10.2	47 87	104.8	7 56.0	47 87	105.2	7 41.7	47 86	105.7	7 27.5	48 86	106.1	7 13.2	48 86	106.6	6
7	8 00.1	47 88	103.0	7 46.1	47 88	103.4	7 32.1	47 87	103.9	7 18.0	47 87	104.3	7 03.9	47 87	104.8	6 49.8	47 87	105.2	6 35.6	47 87	105.7	6 21.4	47 86	106.1	7
8	7 07.5	46 88	102.5	6 53.6	46 88	103.0	6 39.7	47 88	103.4	6 25.7	47 87	103.9	6 11.7	47 87	104.3	5 57.7	47 87	104.8	5 43.6	47 87	105.2	5 29.6	47 86	105.6	8
9	6 14.8	46 88	102.1	6 01.0	46 88	102.5	5 47.1	46 88	103.0	5 33.3	46 87	103.4	5 19.4	46 87	103.9	5 05.4	46 87	104.3							9
80	5 22.1	46 88	101.6	5 08.3	46 88	102.1																			80

Lat. 26°

H.A.	12° 00′ Alt. ° ′	Δd	Δt	Az. °	12° 30′ Alt. ° ′	Δd	Δt	Az. °	13° 00′ Alt. ° ′	Δd	Δt	Az. °	13° 30′ Alt. ° ′	Δd	Δt	Az. °
00	76 00.0	1.0	03	180.0	76 30.0	1.0	03	180.0	77 00.0	1.0	03	180.0	77 30.0	1.0	04	180.0
1	75 58.1	1.0	10	176.0	76 28.0	1.0	10	175.8	76 58.0	1.0	10	175.7	77 27.9	1.0	10	175.5
2	75 52.4	99	16	172.0	76 22.2	99	16	171.7	76 51.9	99	17	171.4	77 21.6	99	17	171.1
3	75 43.1	98	22	168.0	76 12.5	98	22	167.6	76 41.9	98	23	167.2	77 11.2	98	24	166.7
4	75 30.1	97	27	164.2	75 59.1	97	28	163.7	76 28.0	96	29	163.1	76 56.9	96	30	162.5
05	75 13.7	95	33	160.5	75 42.2	95	34	159.8	76 10.6	94	35	159.2	76 38.9	94	36	158.5
6	74 54.1	93	38	156.9	75 22.0	93	39	156.2	75 49.8	92	40	155.4	76 17.4	92	41	154.6
7	74 31.4	91	42	153.5	74 58.7	91	44	152.7	75 25.8	90	45	151.8	75 52.7	89	46	150.9
8	74 06.0	89	47	150.2	74 32.6	88	48	149.4	74 59.0	88	49	148.4	75 25.1	87	50	147.5
9	73 37.9	87	51	147.1	74 03.8	86	52	146.2	74 29.5	85	53	145.2	74 54.8	84	54	144.2
10	73 07.5	84	54	144.2	73 32.7	83	56	143.2	73 57.6	83	57	142.2	74 22.2	82	58	141.2
1	72 34.9	82	58	141.4	72 59.3	81	59	140.4	73 23.5	80	60	139.4	73 47.3	79	61	138.4
2	72 00.3	80	61	138.8	72 24.0	79	62	137.8	72 47.5	78	63	136.8	73 10.6	76	64	135.7
3	71 23.9	77	63	136.4	71 47.0	76	64	135.4	72 09.7	75	66	134.3	72 32.1	74	67	133.2
4	70 46.0	75	66	134.1	71 08.3	74	67	133.1	71 30.4	73	68	132.0	71 52.0	72	69	130.9
15	70 06.5	73	68	131.9	70 28.2	72	69	130.9	70 49.6	71	70	129.8	71 10.6	69	71	128.7
6	69 25.8	71	70	129.9	69 46.9	70	71	128.9	70 07.6	68	72	127.8	70 27.9	67	73	126.7
7	68 43.8	69	72	128.0	69 04.3	68	73	127.0	69 24.4	66	74	125.9	69 44.2	65	75	124.8
8	68 00.8	67	73	126.2	68 20.7	66	74	125.2	68 40.3	65	75	124.1	68 59.4	63	76	123.1
9	67 16.8	65	75	124.5	67 36.2	64	76	123.5	67 55.2	63	76	122.4	68 13.8	61	77	121.4
20	66 31.9	64	76	122.9	66 50.8	62	77	121.9	67 09.3	61	78	120.9	67 27.4	60	78	119.8
1	65 46.2	62	77	121.3	66 04.6	61	78	120.4	66 22.6	59	79	119.4	66 40.3	58	80	118.4
2	64 59.8	60	78	119.9	65 17.7	59	79	118.9	65 35.3	58	80	118.0	65 52.5	57	80	117.0
3	64 12.7	59	80	118.5	64 30.2	58	80	117.6	64 47.4	57	81	116.6	65 04.2	55	82	115.7
4	63 25.0	58	80	117.2	63 42.2	56	81	116.3	63 58.9	55	82	115.4	64 15.3	54	82	114.4
25	62 36.8	56	81	116.0	62 53.6	55	82	115.1	63 10.0	54	82	114.2	63 26.0	53	83	113.2
6	61 48.1	55	82	114.8	62 04.5	54	82	114.0	62 20.5	53	83	113.0	62 36.2	52	84	112.1
7	60 59.0	54	83	113.7	61 15.0	53	83	112.9	61 30.7	52	84	112.0	61 46.1	51	84	111.1
8	60 09.4	53	83	112.7	60 25.1	52	84	111.8	60 40.5	51	84	110.9	60 55.6	50	85	110.0
9	59 19.4	52	84	111.6	59 34.9	51	84	110.8	59 50.0	50	85	109.9	60 04.8	49	85	109.1
30	58 29.2	51	84	110.7	58 44.3	50	85	109.8	58 59.2	49	85	109.0	59 13.7	48	86	108.1
1	57 38.5	50	85	109.7	57 53.4	49	85	108.9	58 08.0	48	86	108.1	58 22.3	47	86	107.3
2	56 47.6	49	85	108.8	57 02.3	48	86	108.0	57 16.6	47	86	107.2	57 30.7	46	86	106.4
3	55 56.5	49	86	108.0	56 10.9	48	86	107.2	56 25.0	47	86	106.4	56 38.8	46	87	105.6
4	55 05.0	48	86	107.1	55 19.3	47	86	106.4	55 33.2	46	87	105.6	55 46.8	45	87	104.8
35	54 13.4	47	86	106.3	54 27.4	46	87	105.6	54 41.1	45	87	104.8	54 54.6	44	87	104.0
6	53 21.5	47	87	105.6	53 35.4	46	87	104.8	53 48.9	45	87	104.1	54 02.2	44	88	103.3
7	52 29.5	46	87	104.8	52 43.1	45	87	104.1	52 56.5	44	88	103.3	53 09.6	43	88	102.6
8	51 37.3	45	87	104.1	51 50.8	44	88	103.4	52 04.0	44	88	102.6	52 16.9	43	88	101.9
9	50 44.9	45	88	103.4	50 58.2	44	88	102.7	51 11.3	43	88	101.9	51 24.1	42	88	101.2
40	49 52.4	44	88	102.7	50 05.5	43	88	102.0	50 18.4	43	88	101.3	50 31.1	42	88	100.6
1	48 59.7	44	88	102.0	49 12.7	43	88	101.3	49 25.5	42	88	100.6	49 38.0	41	88	99.9
2	48 06.9	43	88	101.4	48 19.8	43	88	100.7	48 32.4	42	88	100.0	48 44.9	41	89	99.3
3	47 13.9	43	88	100.8	47 26.7	42	88	100.1	47 39.3	41	89	99.4	47 51.6	41	89	98.7
4	46 20.9	43	88	100.1	46 33.6	42	89	99.5	46 46.0	41	89	98.8	46 58.3	40	89	98.2
45	45 27.8	42	89	99.5	45 40.4	42	89	98.9	45 52.7	41	89	98.2	46 04.9	40	89	97.6
6	44 34.6	42	89	99.0	44 47.0	41	89	98.3	44 59.3	41	89	97.7	45 11.4	40	89	97.0
7	43 41.2	42	89	98.4	43 53.6	41	89	97.8	44 05.8	40	89	97.1	44 17.8	40	89	96.5
8	42 47.9	41	89	97.8	43 00.2	41	89	97.2	43 12.3	40	89	96.6	43 24.2	39	90	96.0
9	41 54.4	41	89	97.3	42 06.6	40	89	96.7	42 18.7	40	90	96.1	42 30.5	39	90	95.4
50	41 00.9	41	89	96.8	41 13.1	40	90	96.2	41 25.0	40	90	95.5	41 36.8	39	90	94.9
1	40 07.3	41	89	96.2	40 19.4	40	90	95.6	40 31.3	39	90	95.0	40 43.1	39	90	94.4
2	39 13.7	40	90	95.7	39 25.7	40	90	95.1	39 37.6	39	90	94.5	39 49.3	39	90	93.9
3	38 20.0	40	90	95.2	38 32.0	40	90	94.6	38 43.8	39	90	94.0	38 55.5	39	90	93.4
4	37 26.3	40	90	94.7	37 38.2	40	90	94.1	37 50.0	39	90	93.5	38 01.6	38	90	93.0
55	36 32.5	40	90	94.2	36 44.4	39	90	93.6	36 56.2	39	90	93.1	37 07.8	38	90	92.5
6	35 38.7	40	90	93.7	35 50.6	39	90	93.2	36 02.3	39	90	92.6	36 13.9	38	90	92.0
7	34 44.9	40	90	93.3	34 56.7	39	90	92.7	35 08.4	39	90	92.1	35 20.0	38	90	91.6
8	33 51.0	40	90	92.8	34 02.8	39	90	92.2	34 14.5	39	90	91.7	34 26.1	38	90	91.1
9	32 57.1	40	90	92.3	33 09.0	39	90	91.8	33 20.6	39	90	91.2	33 32.2	38	90	90.7
60	32 03.2	40	90	91.9	32 15.0	39	90	91.3	32 26.7	39	90	90.8	32 38.2	38	90	90.2
1	31 09.3	40	90	91.4	31 21.1	39	90	90.9	31 32.8	39	90	90.3	31 44.3	38	90	89.8
2	30 15.4	39	90	91.0	30 27.2	39	90	90.4	30 38.9	39	90	89.9	30 50.4	38	90	89.4
3	29 21.5	39	90	90.5	29 33.3	39	90	90.0	29 44.9	39	90	89.5	29 56.5	38	90	88.9
4	28 27.6	39	90	90.1	28 39.3	39	90	89.6	28 51.0	39	90	89.0	29 02.5	38	90	88.5
65	27 33.6	39	90	89.6	27 45.4	39	90	89.1	27 57.1	39	90	88.6	28 08.6	38	90	88.1
6	26 39.7	39	90	89.2	26 51.5	39	90	88.7	27 03.2	39	90	88.2	27 14.7	38	90	87.7
7	25 45.8	40	90	88.8	25 57.6	39	90	88.2	26 09.3	39	90	87.7	26 20.9	38	90	87.2
8	24 51.9	40	90	88.3	25 03.7	39	90	87.8	25 15.4	39	90	87.3	25 27.0	39	90	86.8
9	23 58.0	40	90	87.9	24 09.8	39	90	87.4	24 21.6	39	90	86.9	24 33.2	39	90	86.4
70	23 04.1	40	90	87.5	23 16.0	39	90	87.0	23 27.7	39	90	86.5	23 39.4	39	90	86.0
1	22 10.2	40	90	87.1	22 22.1	39	90	86.6	22 33.9	39	90	86.1	22 45.6	39	90	85.6
2	21 16.4	40	90	86.7	21 28.3	40	90	86.2	21 40.1	39	90	85.7	21 51.8	39	90	85.2
3	20 22.6	40	90	86.2	20 34.5	40	90	85.8	20 46.4	39	90	85.3	20 58.1	39	90	84.8
4	19 28.8	40	90	85.8	19 40.7	40	90	85.3	19 52.6	40	90	84.8	20 04.4	39	89	84.4
75	18 35.0	40	90	85.4	18 47.0	40	90	84.9	18 58.9	40	89	84.4	19 10.8	39	89	84.0
6	17 41.3	40	90	85.0	17 53.3	40	90	84.5	18 05.3	40	89	84.0	18 17.2	40	89	83.6
7	16 47.6	40	90	84.6	16 59.6	40	89	84.1	17 11.7	40	89	83.6	17 23.6	40	89	83.1
8	15 53.9	41	89	84.2	16 06.0	40	89	83.7	16 18.1	40	89	83.2	16 30.1	40	89	82.7
9	15 00.3	41	89	83.8	15 12.4	40	89	83.3	15 24.6	40	89	82.8	15 36.6	40	89	82.3
80	14 06.7	41	89	83.3	14 18.9	41	89	82.9	14 31.1	40	89	82.4	14 43.2	40	89	81.9
1	13 13.1	41	89	82.9	13 25.4	41	89	82.5	13 37.7	41	89	82.0	13 49.8	41	89	81.5
2	12 19.6	41	89	82.5	12 32.0	41	89	82.1	12 44.3	41	89	81.6	12 56.5	41	89	81.1
3	11 26.2	41	89	82.1	11 38.6	41	89	81.6	11 51.0	41	89	81.2	12 03.3	41	89	80.7
4	10 32.8	42	89	81.7	10 45.3	41	89	81.2	10 57.7	41	89	80.8	11 10.1	41	88	80.3
85	9 39.5	42	89	81.3	9 52.0	42	89	80.8	10 04.5	42	88	80.4	10 17.0	41	88	79.9
6	8 46.2	42	89	80.9	8 58.8	42	88	80.4	9 11.4	42	88	79.9	9 23.9	42	88	79.5
7	7 53.0	42	89	80.4	8 05.7	42	88	80.0	8 18.3	42	88	79.5	8 30.9	42	88	79.1
8	6 59.8	43	88	80.0	7 12.6	42	88	79.6	7 25.3	42	88	79.1	7 38.0	42	88	78.7
9	6 06.8	43	88	79.6	6 19.6	43	88	79.2	6 32.4	43	88	78.7	6 45.2	43	88	78.2
90	5 13.8	43	88	79.2	5 26.7	43	88	78.7	5 39.6	43	88	78.3	5 52.4	43	88	77.8

H.A.	14° 00′ Alt. ° ′	Δd	Δt	Az. °	14° 30′ Alt. ° ′	Δd	Δt	Az. °	15° 00′ Alt. ° ′	Δd	Δt	Az. °	15° 30′ Alt. ° ′	Δd	Δt	Az. °
00	78 00.0	1.0	04	180.0	78 30.0	1.0	04	180.0	79 00.0	1.0	04	180.0	79 30.0	1.0	04	180.0
1	77 57.8	1.0	11	175.3	78 27.7	1.0	11	175.2	78 57.6	1.0	12	174.9	79 27.5	1.0	12	174.7
2	77 51.3	99	18	170.7	78 20.9	99	19	170.4	78 50.5	99	19	170.0	79 20.1	99	20	169.5
3	77 40.5	98	25	166.2	78 09.7	97	26	165.7	78 38.9	97	27	165.1	79 08.0	97	28	164.5
4	77 25.7	96	31	161.9	77 54.4	95	32	161.2	78 22.9	95	33	160.4	78 51.4	95	35	159.6
05	77 07.0	94	37	157.7	77 35.1	93	38	156.9	78 02.9	93	40	156.0	78 30.6	92	41	155.1
6	76 44.9	91	42	153.7	77 12.1	91	44	152.8	77 39.2	90	45	151.8	78 06.0	89	47	150.8
7	76 19.4	89	47	150.0	76 45.9	88	49	149.0	77 12.1	87	50	147.9	77 38.0	86	52	146.7
8	75 51.0	86	52	146.5	76 16.7	85	53	145.4	76 42.0	84	55	144.2	77 07.0	83	56	143.0
9	75 19.9	83	56	143.2	75 44.7	82	57	142.0	76 09.2	81	59	140.8	76 33.3	80	60	139.6
10	74 46.5	80	60	140.1	75 10.4	79	61	138.9	75 34.0	78	62	137.7	75 57.2	77	64	136.4
1	74 10.8	78	62	137.2	74 34.0	76	64	136.0	74 56.7	75	65	134.8	75 19.0	74	67	133.5
2	73 33.3	75	66	134.6	73 55.6	74	67	133.4	74 17.5	72	68	132.1	74 39.0	71	69	130.8
3	72 54.0	73	68	132.1	73 15.6	71	69	130.9	73 36.8	70	70	129.6	73 57.4	68	72	128.3
4	72 13.3	70	70	129.8	72 34.1	69	71	128.6	72 54.5	67	72	127.3	73 14.5	66	74	126.1
15	71 31.2	68	72	127.6	71 51.3	66	73	126.4	72 11.1	65	74	125.2	72 30.3	63	76	123.9
6	70 47.9	66	74	125.6	71 07.4	64	75	124.4	71 26.5	63	76	123.2	71 45.0	61	77	122.0
7	70 03.5	64	76	123.7	70 22.4	62	76	122.6	70 40.9	61	78	121.4	70 58.9	59	78	120.2
8	69 18.2	62	77	122.0	69 36.5	60	78	120.8	69 54.4	59	79	119.7	70 11.8	57	80	118.5
9	68 32.0	60	78	120.3	68 49.8	59	79	119.2	69 07.2	57	80	118.1	69 24.1	56	81	116.9
20	67 45.1	58	79	118.8	68 02.4	57	80	117.7	68 19.3	55	81	116.6	68 35.7	54	82	115.4
1	66 57.5	57	80	117.3	67 14.4	55	81	116.3	67 30.8	54	82	115.2	67 46.7	52	82	114.1
2	66 09.3	55	81	116.0	66 25.7	54	82	114.9	66 41.7	53	83	113.8	66 57.2	51	83	112.8
3	65 20.6	54	82	114.7	65 36.6	53	83	113.6	65 52.1	51	83	112.6	66 07.3	50	84	111.5
4	64 31.3	53	83	113.4	64 46.9	51	83	112.4	65 02.1	50	84	111.4	65 16.9	49	84	110.4
25	63 41.6	52	84	112.3	63 56.9	50	84	111.3	64 11.7	49	84	110.3	64 26.2	47	85	109.3
6	62 51.5	50	84	111.2	63 06.5	49	85	110.2	63 21.0	48	85	109.3	63 35.1	46	86	108.3
7	62 01.1	49	85	110.1	62 15.7	48	85	109.2	62 29.9	47	86	108.3	62 43.8	45	86	107.3
8	61 10.3	48	85	109.1	61 24.6	47	86	108.2	61 38.6	46	86	107.3	61 52.2	45	86	106.4
9	60 19.2	47	86	108.2	60 33.3	46	86	107.3	60 47.0	45	86	106.4	61 00.3	44	87	105.5
30	59 27.8	47	86	107.3	59 41.7	45	86	106.4	59 55.1	44	87	105.5	60 08.2	43	87	104.6
1	58 36.2	46	86	106.4	58 49.8	45	87	105.5	59 03.1	44	87	104.7	59 15.9	42	87	103.8
2	57 44.4	45	87	105.6	57 57.8	44	87	104.7	58 10.8	43	87	103.9	58 23.5	42	88	103.0
3	56 52.3	44	87	104.8	57 05.5	43	87	103.9	57 18.4	42	88	103.1	57 30.9	41	88	102.3
4	56 00.1	44	87	104.0	56 13.1	43	88	103.2	56 25.8	42	88	102.4	56 38.1	41	88	101.5
35	55 07.7	43	88	103.2	55 20.5	42	88	102.5	55 33.0	41	88	101.6	55 45.2	40	88	100.8
6	54 15.1	43	88	102.5	54 27.8	42	88	101.7	54 40.1	41	88	101.0	54 52.2	40	89	100.2
7	53 22.4	42	88	101.8	53 34.9	41	88	101.1	53 47.1	40	88	100.3	53 59.0	39	89	99.5
8	52 29.5	42	88	101.1	52 41.9	41	88	100.4	52 54.0	40	89	99.6	53 05.8	39	89	98.9
9	51 36.6	41	88	100.5	51 48.8	40	89	99.8	52 00.8	39	89	99.0	52 12.5	38	89	98.3
40	50 43.5	41	89	99.9	50 55.6	40	89	99.1	51 07.5	39	89	98.4	51 19.1	38	89	97.7
1	49 50.3	41	89	99.2	50 02.3	40	89	98.5	50 14.1	39	89	97.8	50 25.6	38	89	97.1
2	48 57.0	40	89	98.6	49 09.0	39	89	97.9	49 20.6	38	89	97.2	49 32.0	38	89	96.5
3	48 03.7	40	89	98.1	48 15.5	39	89	97.4	48 27.1	38	89	96.7	48 38.4	37	89	96.0
4	47 10.3	40	89	97.5	47 22.0	39	89	96.8	47 33.5	38	89	96.1	47 44.8	37	90	95.4
45	46 16.8	39	89	96.9	46 28.4	39	89	96.3	46 39.9	38	90	95.6	46 51.1	37	90	94.9
6	45 23.2	39	89	96.4	45 34.8	38	90	95.7	45 46.2	38	90	95.1	45 57.3	37	90	94.4
7	44 29.6	39	90	95.8	44 41.1	38	90	95.2	44 52.4	37	90	94.5	45 03.5	37	90	93.9
8	43 35.9	39	90	95.3	43 47.4	38	90	94.7	43 58.7	37	90	94.0	44 09.7	36	90	93.4
9	42 42.2	38	90	94.8	42 53.6	38	90	94.2	43 04.8	37	90	93.5	43 15.9	36	90	92.9
50	41 48.4	38	90	94.3	41 59.8	38	90	93.7	42 11.0	37	90	93.1	42 22.0	36	90	92.4
1	40 54.6	38	90	93.8	41 06.0	38	90	93.2	41 17.1	37	90	92.6	41 28.1	36	90	92.0
2	40 00.8	38	90	93.3	40 12.1	37	90	92.7	40 23.3	37	90	92.1	40 34.2	36	90	91.5
3	39 07.0	38	90	92.8	39 18.3	37	90	92.2	39 29.4	37	90	91.6	39 40.3	36	90	91.0
4	38 13.1	38	90	92.4	38 24.4	37	90	91.8	38 35.5	37	90	91.2	38 46.4	36	90	90.6
55	37 19.2	38	90	91.9	37 30.5	37	90	91.3	37 41.5	37	90	90.7	37 52.4	36	90	90.1
6	36 25.3	38	90	91.5	36 36.5	37	90	90.9	36 47.6	37	90	90.3	36 58.5	36	90	89.7
7	35 31.4	38	90	91.0	35 42.6	37	90	90.4	35 53.7	37	90	89.9	36 04.6	36	90	89.3
8	34 37.5	38	90	90.6	34 48.7	37	90	90.0	34 59.8	37	90	89.4	35 10.7	36	90	88.9
9	33 43.5	38	90	90.1	33 54.8	37	90	89.6	34 05.8	37	90	89.0	34 16.8	36	90	88.4
60	32 49.6	38	90	89.7	33 00.8	37	90	89.1	33 11.9	37	90	88.6	33 22.9	36	90	88.0
1	31 55.7	38	90	89.2	32 06.9	37	90	88.7	32 18.0	37	90	88.1	32 29.0	36	90	87.6
2	31 01.8	38	90	88.8	31 13.0	37	90	88.3	31 24.1	37	90	87.7	31 35.1	36	90	87.2
3	30 07.8	38	90	88.4	30 19.1	37	90	87.9	30 30.2	37	90	87.3	30 41.2	36	90	86.8
4	29 13.9	38	90	88.0	29 25.2	37	90	87.4	29 36.4	37	90	86.9	29 47.4	37	90	86.4
65	28 20.1	38	90	87.5	28 31.4	37	90	87.0	28 42.5	37	90	86.5	28 53.6	37	90	86.0
6	27 26.2	38	90	87.1	27 37.5	38	90	86.6	27 48.7	37	90	86.1	27 59.8	37	90	85.6
7	26 32.3	38	90	86.7	26 43.7	38	90	86.2	26 54.9	37	90	85.7	27 06.1	37	90	85.2
8	25 38.5	38	90	86.3	25 49.9	38	90	85.8	26 01.2	37	90	85.3	26 12.4	37	90	84.8
9	24 44.7	38	90	85.9	24 56.1	38	90	85.4	25 07.5	38	90	84.9	25 18.7	37	90	84.4
70	23 50.9	38	90	85.5	24 02.4	38	90	85.0	24 13.8	38	90	84.5	24 25.0	37	89	84.0
1	22 57.2	39	90	85.1	23 08.7	38	90	84.6	23 20.1	38	89	84.1	23 31.4	38	89	83.6
2	22 03.5	39	90	84.7	22 15.0	38	89	84.2	22 26.5	38	89	83.7	22 37.8	38	89	83.2
3	21 09.8	39	89	84.3	21 21.4	39	89	83.8	21 32.9	38	89	83.3	21 44.3	38	89	82.8
4	20 16.2	39	89	83.9	20 27.8	39	89	83.4	20 39.4	38	89	82.9	20 50.8	38	89	82.4
75	19 22.6	39	89	83.5	19 34.3	39	89	83.0	19 45.9	39	89	82.5	19 57.4	38	89	82.0
6	18 29.0	39	89	83.1	18 40.8	39	89	82.6	18 52.4	39	89	82.1	19 04.0	39	89	81.6
7	17 35.5	40	89	82.7	17 47.3	39	89	82.2	17 59.1	39	89	81.7	18 10.7	39	89	81.2
8	16 42.0	40	89	82.3	16 53.9	39	89	81.8	17 05.7	39	89	81.3	17 17.5	39	89	80.8
9	15 48.6	40	89	81.9	16 00.6	40	89	81.4	16 12.4	39	89	80.9	16 24.2	39	88	80.4
80	14 55.3	40	89	81.5	15 07.3	40	89	81.0	15 19.2	40	88	80.5	15 31.1	40	88	80.0
1	14 02.0	40	89	81.1	14 14.0	40	88	80.6	14 26.1	40	88	80.1	14 38.0	40	88	79.6
2	13 08.7	41	89	80.6	13 20.9	40	88	80.2	13 33.0	40	88	79.7	13 45.0	40	88	79.2
3	12 15.5	41	88	80.2	12 27.8	41	88	79.8	12 39.9	40	88	79.3	12 52.1	40	88	78.8
4	11 22.4	41	88	79.8	11 34.7	41	88	79.4	11 47.0	41	88	78.9	11 59.2	41	88	78.4
85	10 29.4	41	88	79.4	10 41.8	41	88	79.0	10 54.1	41	88	78.5	11 06.4	41	88	78.0
6	9 36.4	42	88	79.0	9 48.9	41	88	78.6	10 01.3	41	88	78.1	10 13.7	41	88	77.6
7	8 43.5	42	88	78.6	8 56.1	42	88	78.2	9 08.6	42	88	77.7	9 21.0	42	88	77.2
8	7 50.7	42	88	78.2	8 03.3	42	88	77.7	8 15.9	42	88	77.3	8 28.5	42	88	76.8
9	6 57.9	42	88	77.8	7 10.7	42	88	77.3	7 23.4	42	88	76.9	7 36.0	42	87	76.4
90	6 05.3	43	88	77.4	6 18.1	43	88	76.9	6 30.9	43	87	76.5	6 43.7	43	87	76.0

H.A.	12° 00′ Alt.	Az.	d	Δt	12° 30′ Alt.	Az.	d	Δt	13° 00′ Alt.	Az.	d	Δt	13° 30′ Alt.	Az.	d	Δt	14° 00′ Alt.	Az.	d	Δt	14° 30′ Alt.	Az.	d	Δt	15° 00′ Alt.	Az.	d	Δt	15° 30′ Alt.	Az.	d	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
00	52 00.0	180.0	1.0	0 1	51 30.0	180.0	1.0	0 1	51 00.0	180.0	1.0	0 1	50 30.0	180.0	1.0	0 1	50 00.0	180.0	1.0	0 1	49 30.0	180.0	1.0	0 1	49 00.0	180.0	1.0	0 1	48 30.0	180.0	1.0	0 1	00
1	51 59.3	178.4	1.0	0 4	51 29.3	178.4	1.0	0 4	50 59.3	178.5	1.0	0 4	50 29.3	178.5	1.0	0 4	49 59.3	178.5	1.0	0 4	49 29.3	178.5	1.0	0 4	48 59.3	178.5	1.0	0 3	48 29.3	178.5	1.0	0 3	1
2	51 57.0	176.8	1.0	0 6	51 27.1	176.9	1.0	0 6	50 57.1	176.9	1.0	0 6	50 27.1	176.9	1.0	0 6	49 57.2	177.0	1.0	0 6	49 27.2	177.0	1.0	0 6	48 57.2	177.1	1.0	0 6	48 27.3	177.1	1.0	0 6	2
3	51 53.3	175.2	1.0	0 9	51 23.4	175.3	1.0	0 9	50 53.5	175.4	1.0	0 8	50 23.5	175.4	1.0	0 8	49 53.6	175.5	1.0	0 8	49 23.7	175.5	1.0	0 8	48 53.8	175.6	1.0	0 8	48 23.8	175.6	1.0	0 8	3
4	51 48.1	173.7	99	11	51 18.2	173.7	99	11	50 48.4	173.8	1.0	11	50 18.5	173.9	1.0	11	49 48.7	174.0	1.0	11	49 18.8	174.1	1.0	10	48 48.9	174.1	1.0	10	48 19.1	174.2	1.0	10	4
05	51 41.4	172.1	99	14	51 11.6	172.2	99	13	50 41.9	172.3	99	13	50 12.1	172.4	99	13	49 42.3	172.5	99	13	49 12.5	172.6	99	13	48 42.7	172.7	99	12	48 12.9	172.8	99	12	05
6	51 33.2	170.5	99	16	51 03.6	170.7	99	16	50 33.9	170.8	99	16	50 04.2	170.9	99	15	49 34.6	171.0	99	15	49 04.9	171.1	99	15	48 35.2	171.2	99	15	48 05.5	171.3	99	15	6
7	51 23.7	169.0	98	18	50 54.1	169.1	98	18	50 24.6	169.3	99	18	49 55.0	169.4	99	18	49 25.4	169.5	99	17	48 55.9	169.7	99	17	48 26.3	169.8	99	17	47 56.7	169.9	99	17	7
8	51 12.6	167.4	98	21	50 43.2	167.6	98	20	50 13.8	167.8	98	20	49 44.4	167.9	98	20	49 15.0	168.1	98	20	48 45.5	168.2	98	20	48 16.0	168.3	98	19	47 46.6	168.5	98	19	8
9	51 00.2	165.9	97	23	50 31.0	166.1	98	23	50 01.7	166.3	98	22	49 32.4	166.4	98	22	49 03.1	166.6	98	22	48 33.8	166.8	98	22	48 04.5	166.9	98	21	47 35.2	167.1	98	21	9
10	50 46.4	164.4	97	25	50 17.3	164.6	97	25	49 48.2	164.8	97	25	49 19.1	165.0	97	24	48 50.0	165.2	97	24	48 20.8	165.3	97	24	47 51.7	165.5	97	24	47 22.5	165.7	97	23	10
1	50 31.3	162.9	96	28	50 02.4	163.1	96	27	49 33.4	163.3	96	27	49 04.5	163.5	97	26	48 35.5	163.7	97	26	48 06.6	163.9	97	26	47 37.5	164.1	97	26	47 08.5	164.3	97	25	1
2	50 14.8	161.5	96	30	49 46.1	161.7	96	29	49 17.3	161.9	96	29	48 48.6	162.1	96	29	48 19.8	162.3	96	28	47 51.0	162.5	96	28	47 22.2	162.8	96	28	46 53.3	163.0	96	27	2
3	49 57.0	160.0	95	32	49 28.5	160.2	95	32	49 00.0	160.5	95	31	48 31.4	160.7	95	31	48 02.8	160.9	95	30	47 34.2	161.2	95	30	47 05.6	161.4	95	30	46 36.9	161.6	96	29	3
4	49 37.9	158.6	94	34	49 09.6	158.8	94	34	48 41.3	159.1	94	33	48 13.0	159.3	95	33	47 44.6	159.6	95	32	47 16.2	159.8	95	32	46 47.8	160.0	95	32	46 19.3	160.3	95	31	4
15	49 17.6	157.2	93	36	48 49.5	157.4	94	36	48 21.4	157.7	94	35	47 53.3	158.0	94	35	47 25.2	158.2	94	34	46 57.0	158.5	94	34	46 28.8	158.7	94	34	46 00.5	159.0	94	33	15
6	48 56.0	155.8	93	38	48 28.2	156.1	93	37	48 00.4	156.3	93	37	47 32.5	156.6	93	37	47 04.6	156.9	93	36	46 36.6	157.1	93	36	46 08.6	157.4	93	36	45 40.6	157.7	94	35	6
7	48 33.3	154.4	92	40	48 05.8	154.7	92	39	47 38.2	155.0	92	39	47 10.5	155.3	92	38	46 42.8	155.6	92	38	46 15.1	155.8	92	38	45 47.3	156.1	93	37	45 19.5	156.4	93	37	7
8	48 09.5	153.1	91	42	47 42.2	153.4	91	41	47 14.8	153.7	91	41	46 47.4	154.0	91	40	46 20.0	154.3	92	40	45 52.5	154.6	92	40	45 24.9	154.8	92	39	44 57.4	155.1	92	39	8
9	47 44.5	151.7	90	44	47 17.4	152.1	90	43	46 50.3	152.4	90	42	46 23.2	152.7	91	42	45 56.0	153.0	91	42	45 28.8	153.3	91	41	45 01.5	153.6	91	41	44 34.1	153.9	91	40	9
20	47 18.4	150.4	89	45	46 51.6	150.8	89	45	46 24.8	151.1	90	44	45 57.9	151.4	90	44	45 31.0	151.7	90	44	45 04.0	152.0	90	43	44 37.0	152.3	90	43	44 09.9	152.6	90	42	20
1	46 51.3	149.2	88	47	46 24.8	149.5	88	46	45 58.2	149.8	89	46	45 31.6	150.2	89	46	45 04.9	150.5	89	45	44 38.2	150.8	89	45	44 11.4	151.1	89	44	43 44.6	151.4	90	44	1
2	46 23.1	147.9	87	48	45 56.9	148.3	88	48	45 30.6	148.6	88	48	45 04.3	149.0	88	47	44 37.9	149.3	88	47	44 11.4	149.6	88	46	43 44.9	149.9	88	46	43 18.3	150.3	89	45	2
3	45 54.0	146.7	86	50	45 28.0	147.0	87	50	45 02.0	147.4	87	49	44 36.0	147.8	87	49	44 09.9	148.1	87	48	43 43.7	148.4	87	48	43 17.4	148.7	88	47	42 51.1	149.1	88	47	3
4	45 23.9	145.5	85	52	44 58.2	145.9	86	51	44 32.5	146.2	86	51	44 06.7	146.6	86	50	43 40.9	146.9	86	50	43 15.0	147.3	86	49	42 49.0	147.6	87	49	42 23.0	148.0	87	48	4
25	44 52.9	144.3	84	53	44 27.5	144.7	85	53	44 02.1	145.1	85	52	43 36.6	145.4	85	52	43 11.0	145.8	85	51	42 45.4	146.1	86	51	42 19.7	146.5	86	50	41 53.9	146.8	86	50	25
6	44 21.0	143.2	83	55	43 55.9	143.5	84	54	43 30.8	143.9	84	54	43 05.5	144.3	84	53	42 40.2	144.7	84	53	42 14.9	145.0	85	52	41 49.4	145.4	85	52	41 24.0	145.7	85	51	6
7	43 48.2	142.0	82	56	43 23.4	142.4	83	56	42 58.6	142.8	83	55	42 33.6	143.2	83	54	42 08.6	143.6	84	54	41 43.5	143.9	84	54	41 18.4	144.3	84	53	40 53.2	144.6	84	53	7
8	43 14.6	140.9	82	57	42 50.1	141.3	82	57	42 25.6	141.7	82	56	42 00.9	142.1	82	56	41 36.2	142.5	83	56	41 11.4	142.8	83	55	40 46.5	143.2	83	54	40 21.5	143.6	83	54	8
9	42 40.2	139.8	81	58	42 16.0	140.2	81	58	41 51.7	140.6	81	58	41 27.4	141.0	81	57	41 02.9	141.4	82	57	40 38.4	141.8	82	56	40 13.8	142.2	82	55	39 49.1	142.5	82	55	9
30	42 05.1	138.7	80	60	41 41.2	139.2	80	60	41 17.2	139.6	80	59	40 53.1	140.0	80	58	40 28.9	140.4	81	58	40 04.7	140.8	81	58	39 40.3	141.1	81	57	39 16.0	141.5	81	57	30
1	41 29.2	137.7	79	61	41 05.5	138.1	79	60	40 41.8	138.6	79	60	40 18.0	139.0	79	60	39 54.1	139.4	80	59	39 30.2	139.7	80	59	39 06.1	140.1	80	58	38 42.0	140.5	81	58	1
2	40 52.5	136.7	78	62	40 29.2	137.1	78	62	40 05.8	137.5	78	61	39 42.3	138.0	79	61	39 18.7	138.4	79	60	38 55.0	138.7	79	60	38 31.2	139.1	79	59	38 07.4	139.5	80	59	2
3	40 15.2	135.7	77	63	39 52.2	136.1	77	62	39 29.0	136.6	77	62	39 05.8	137.0	78	62	38 42.5	137.4	78	61	38 19.1	137.8	78	61	37 55.6	138.2	78	60	37 32.0	138.6	79	60	3
4	39 37.3	134.8	76	64	39 14.5	135.2	76	63	38 51.6	135.6	76	63	38 28.7	136.0	77	63	38 05.6	136.4	77	62	37 42.5	136.8	77	62	37 19.3	137.2	77	62	36 56.0	137.6	78	61	4
35	38 58.7	133.8	75	65	38 36.2	134.2	75	65	38 13.6	134.6	75	64	37 50.9	135.1	76	64	37 28.1	135.5	76	63	37 05.3	135.9	76	63	36 42.3	136.3	77	62	36 19.3	136.7	77	62	35
6	38 19.4	132.9	74	66	37 57.2	133.3	74	66	37 34.9	133.7	75	65	37 12.5	134.1	75	65	36 50.0	134.6	75	64	36 27.4	135.0	75	64	36 04.8	135.4	76	64	35 42.0	135.8	76	63	6
7	37 39.6	132.0	73	67	37 17.7	132.4	73	67	36 55.6	132.8	74	66	36 33.5	133.2	74	66	36 11.3	133.7	74	65	35 49.0	134.1	75	65	35 26.6	134.5	75	65	35 04.1	134.9	75	64	7
8	36 59.2	131.1	72	68	36 37.6	131.5	72	68	36 15.8	131.9	73	67	35 53.9	132.4	73	67	35 32.0	132.8	73	66	35 09.9	133.2	74	66	34 47.8	133.6	74	66	34 25.6	134.0	74	65	8
9	36 18.3	130.2	71	69	35 56.9	130.6	72	69	35 35.4	131.1	72	68	35 13.8	131.5	72	68	34 52.1	131.9	72	67	34 30.3	132.3	73	67	34 08.5	132.7	73	66	33 46.5	133.1	73	66	9
40	35 36.9	129.3	70	70	35 15.7	129.8	71	70	34 54.5	130.2	71	69	34 33.1	130.6	71	69	34 11.7	131.1	72	68	33 50.2	131.5	72	68	33 28.6	131.9	72	67	33 06.9	132.3	72	67	40
1	34 54.9	128.5	69	71	34 34.0	128.9	70	70	34 13.0	129.4	70	70	33 52.0	129.8	70	70	33 30.8	130.2	71	69	33 09.5	130.6	71	68	32 48.2	131.1	71	68	32 26.8	131.5	72	68	1
2	34 12.5	127.7	69	72	33 51.8	128.1	69	71	33 31.1	128.6	70	70	33 10.3	129.0	70	70	32 49.4	129.4	70	70	32 28.4	129.8	70	69	32 07.3	130.3	71	68	31 46.1	130.7	71	68	2
3	33 29.6	126.9	68	72	33 09.2	127.3	68	72	32 48.7	127.8	68	72	32 28.1	128.2	69	71	32 07.5	128.6	69	71	31 46.7	129.0	70	70	31 25.9	129.5	70	70	31 05.0	129.9	70	69	3
4	32 46.2	126.1	67	73	32 26.1	126.5	67	73	32 05.8	127.0	68	72	31 45.5	127.4	68	72	31 25.1	127.8	68	71	31 04.6	128.3	68	71	30 44.0	128.7	69	70	30 23.4	129.1	69	70	4
45	32 02.4	125.3	66	74	31 42.5	125.8	66	73	31 22.5	126.2	67	73	31 02.4	126.6	67	72	30 42.3	127.1	67	72	30 22.0	127.5	68	72	30 01.7	127.9	68	71	29 41.3	128.3	68	71	45
6	31 18.2	124.6	65	74	30 58.5	125.0	66	74	30 38.8	125.4	66	74	30 19.0	125.9	66	73	29 59.0	126.3	67	73	29 39.0	126.7	67	72	29 18.9	127.2	67	72	28 58.8	127.6	67	72	6
7	30 33.6	123.8	65	75	30 14.2	124.3	65	74	29 54.7	124.7	65	74	29 35.1	125.1	65	74	29 15.4	125.6	66	74	28 55.6	126.0	66	73	28 35.8	126.4	66	73	28 15.8	126.9	67	72	7
8	29 48.6	123.1	64	76	29 29.4	123.5	64	75	29 10.1	124.0	64	75	28 50.8	124.4	65	74	28 31.3	124.8	65	74	28 11.8	125.3	65	74	27 52.2	125.7	66	73	27 32.5	126.1	66	73	8
9	29 03.2	122.4	63	76	28 44.3	122.8	63	76	28 25.2	123.3	64	75	28 06.1	123.7	64	75	27 46.9	124.1	64	75	27 27.6	124.6	64	74	27 08.2	125.0	65	74	26 48.7	125.4	65	74	9
50	28 17.5	121.7	62	77	27 58.8	122.1	63	76	27 40.0	122.6	63	76	27 21.0	123.0	63	76	27 02.0	123.4	63	75	26 43.0	123.9	64	75	26 23.8	124.3	64	74	26 04.6	124.7	64	74	50
1	27 31.5	121.0	62	77	27 12.9	121.4	62	77	26 54.3	121.9	62	76	26 35.6	122.3	62	76	26 16.9	122.8	63	76	25 58.0	123.2	63	75	25 39.1	123.6	63	75	25 20.1	124.0	63	75	1
2	26 45.1	120.3	61	78	26 26.8	120.8	61	77	26 08.4	121.2	61	77	25 49.9	121.6	62	77	25 31.3	122.1	62	76	25 12.7	122.5	62	76	24 54.0	122.9	62	75	24 35.2	123.4	63	75	2
3	25 58.4	119.7	60	78	25 40.3	120.1	60	78	25 22.1	120.5	61	78	25 03.8	120.9	61	77	24 45.5	121.4	61	77	24 27.1	121.9	61	77	24 08.6	122.3	62	76	23 50.0	122.7	62	76	3
4	25 11.4	119.0	60	79	24 53.5	119.5	60	78	24 35.5	119.9	60	78	24 17.4	120.3	60	78	23 59.3	120.8	61	77	23 41.1	121.2	61	77	23 22.8	121.6	61	77	23 04.5	122.1	61	76	4
55	24 24.1	118.4	59	79	24 06.4	118.8	59	79	23 48.6	119.3	59	79	23 30.7	119.7	60	78	23 12.8	120.1	60	78	22 54.8	120.6	60	78	22 36.8	121.0	60	77	22 18.6	121.4	61	77	55
6	23 36.5	117.8	58	80	23 19.0	118.2	58	80	23 01.4	118.6	59	79	22 43.8	119.1	59	79	22 26.0	119.5	59	78	22 08.3	119.9	59	78	21 50.4	120.4	60	78	21 32.5	120.8	60	78	6
7	22 48.6	117.1	58	80	22 31.3	117.6	58	80	22 13.9	118.0	58	80	21 56.5	118.5	59	79	21 39.0	118.9	59	79	21 21.4	119.3	59	79	21 03.7	119.8	59	78	20 46.0	120.2	59	78	7
8	22 00.5	116.5	57	81	21 43.4	117.0	57	80	21 26.2	117.4	57	80	21 08.9	117.9	58	80	20 51.6	118.3	58	79	20 34.2	118.7	58	79	20 16.8	119.2	58	79	19 59.3	119.6	58	78	8
9	21 12.1	115.9	56	81	20 55.2	116.4	57	81	20 38.2	116.8	57	80	20 21.1	117.3	57	80	20 04.0	117.7	57	80	19 46.8	118.1	57	80	19 29.5	118.6	58	79	19 12.2	119.0	58	79	9
60	20 23.5	115.3	56	82	20 06.7	115.8	56	81	19 49.9	116.2	56	81	19 33.1	116.7	56	81	19 16.1	117.1	57	80	18 59.1	117.5	57	80	18 42.0	118.0	57	80	18 24.9	118.4	57	79	60
1	19 34.6	114.8	55	82	19 18.1	115.2	55	82	19 01.4	115.7	56	81	18 44.7	116.1	56	81	18 28.0	116.5	56	81	18 11.2	116.9	56	80	17 54.3	117.4	57	80	17 37.4	117.8	57	80	1
2	18 45.6	114.2	55	82	18 29.2	114.6	55	82	18 12.7	115.1	55	82	17 56.2	115.5	55	81	17 39.6	116.0	55	81	17 23.0	116.4	56	81	17 06.3	116.8	56	80	16 49.5	117.3	56	80	2
3	17 56.3	113.6	54	83	17 40.0	114.1	54	82	17 23.8	114.5	54	82	17 07.4	115.0	55	82	16 51.0	115.4	55	81	16 34.6	115.8	55	81	16 18.1	116.3	55	81	16 01.5	116.7	55	80	3
4	17 06.8	113.1	53	83	16 50.7	113.5	54	82	16 34.6	114.0	54	82	16 18.4	114.4	54	82	16 02.2	114.9	54	82	15 45.9	115.3	54	82	15 29.6	115.7	55	81	15 13.2	116.2	55	81	4
65	16 17.1	112.5	53	83	16 01.2	113.0	53	83	15 45.2	113.4	53	83	15 29.2	113.9	53	82	15 13.2	114.3	54	82	14 57.0	114.7	54	82	14 40.9	115.2	54	81	14 24.7	115.6	54	81	65
6	15 27.2	112.0	52	84	15 11.4	112.5	53	83	14 55.6	112.9	53	83	14 39.8	113.3	53	83	14 23.9	113.8	53	82	14 08.0	114.2	53	82	13 52.0	114.6	53	82	13 35.9	115.1	54	82	6
7	14 37.1	111.5	52	84	14 21.5	111.9	52	84	14 05.9	112.4	52	83	13 50.2	112.8	52	83	13 34.4	113.2	53	83	13 18.7	113.7	53	82	13 02.9	114.1	53	82	12 47.0	114.6	53	82	7
8	13 46.8	111.0	51	84	13 31.4	111.4	52	84	13 15.9	111.8	52	84	13 00.4	112.3	52	83	12 44.8	112.7	52	83	12 29.2	113.2	52	83	12 13.5	113.6	52	82	11 57.8	114.0	52	82	8
9	12 56.4	110.5	51	84	12 41.1	110.9	51	84	12 25.7	111.3	51	84	12 10.4	111.8	51	84	11 55.0	112.2	51	83	11 39.5	112.6	52	83	11 24.0	113.1	52	83	11 08.5	113.5	52	82	9
70	12 05.7	109.9	50	85	11 50.6	110.4	51	84	11 35.4	110.8	51	84	11 20.2	111.3	51	84	11 05.0	111.7	51	84	10 49.7	112.1	51	83	10 34.3	112.6	51	83	10 19.0	113.0	51	83	70
1	11 15.0	109.4	50	85	11 00.0	109.9	50	85	10 44.9	110.3	50	84	10 29.9	110.8	50	84	10 14.8	111.2	50	84	9 59.6	111.6	51	84	9 44.4	112.1	51	83	9 29.2	112.5	51	83	1
2	10 24.0	108.9	49	85	10 09.2	109.4	50	85	9 54.3	109.8	50	85	9 39.4	110.3	50	84	9 24.4	110.7	50	84	9 09.4	111.1	50	84	8 54.4	111.6	50	84	8 39.3	112.0	50	84	2
3	9 33.0	108.5	49	85	9 18.2	108.9	49	85	9 03.5	109.3	49	85	8 48.7	109.8	49	85	8 33.9	110.2	49	84	8 19.0	110.7	50	84	8 04.2	111.1	50	84	7 49.2	111.5	50	84	3
4	8 41.7	108.0	49	86	8 27.1	108.4	49	85	8 12.5	108.9	49	85	7 57.9	109.3	49	85	7 43.2	109.7	49	85	7 28.5	110.2	49	84	7 13.8	110.6	49	84	6 59.0	111.1	49	84	4
75	7 50.4	107.5	48	86	7 35.9	107.9	48	86	7 21.4	108.4	48	85	7 06.9	108.8	48	85	6 52.4	109.3	49	85	6 37.8	109.7	49	85	6 23.2	110.1	49	84	6 08.6	110.6	49	84	75
6	6 58.9	107.0	48	86	6 44.5	107.5	48	86	6 30.2	107.9	48	86	6 15.8	108.3	48	86	6 01.4	108.8	48	85	5 47.0	109.2	48	85	5 32.5	109.7	48	84	5 18.0	110.1	48	84	6
7	6 07.2	106.6	47	86	5 53.0	107.0	47	86	5 38.8	107.4	48	86	5 24.5	107.9	48	86	5 10.3	108.3	48	85													7
8	5 15.5	106.1	47	87	5 01.4	106.5	47	86																									8

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Az.	d	Δt	12° 30′ Alt.	Az.	d	Δt	13° 00′ Alt.	Az.	d	Δt	13° 30′ Alt.	Az.	d	Δt	14° 00′ Alt.	Az.	d	Δt	14° 30′ Alt.	Az.	d	Δt	15° 00′ Alt.	Az.	d	Δt	15° 30′ Alt.	Az.	d	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
91																	5 12.7	77.0	43	88	5 25.6	76.5	43	87	5 38.5	76.0	43	87	5 51.4	75.6	43	87	91
2																																	2

Lat. 26°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	80 00.0	1.0	04	180.0	80 30.0	1.0	04	180.0	81 00.0	1.0	05	180.0	81 30.0	1.0	05	180.0
1	79 57.4	1.0	13	174.5	80 27.3	1.0	14	174.2	80 57.1	1.0	14	173.9	81 27.0	99	15	173.6
2	79 49.7	98	21	169.0	80 19.2	98	22	168.5	80 48.6	98	23	167.9	81 18.0	98	24	167.3
3	79 37.0	97	29	163.8	80 05.9	96	30	163.0	80 34.7	96	32	162.2	81 03.4	95	33	161.3
4	79 19.7	94	36	158.8	79 47.8	94	38	157.8	80 15.8	93	39	156.8	80 43.5	92	41	155.6
05	78 58.1	91	42	154.0	79 25.3	90	44	152.9	79 52.3	90	46	151.7	80 19.0	88	48	150.4
6	78 32.6	88	48	149.6	78 58.9	87	50	148.4	79 24.8	86	52	147.0	79 50.4	85	54	145.6
7	78 03.7	85	53	145.5	78 28.9	84	55	144.2	78 53.8	82	57	142.8	79 18.3	81	59	141.2
8	77 31.6	82	58	141.7	77 55.9	80	60	140.3	78 19.7	79	61	138.9	78 43.0	77	63	137.3
9	76 57.0	78	62	138.2	77 20.2	77	63	136.8	77 43.0	75	65	135.3	78 05.2	73	67	133.7
10	76 19.9	75	65	135.1	76 42.2	73	67	133.6	77 04.0	72	68	132.1	77 25.2	70	70	130.5
1	75 40.9	72	68	132.1	76 02.2	70	70	130.7	76 23.1	68	71	129.2	76 43.3	67	72	127.6
2	75 00.0	69	71	129.4	75 20.5	67	72	128.0	75 40.5	66	73	126.5	75 59.8	64	75	125.0
3	74 17.6	67	73	127.0	74 37.3	65	74	125.6	74 56.5	63	76	124.1	75 15.0	61	77	122.6
4	73 33.9	64	75	124.7	73 52.9	62	76	123.3	74 11.2	60	77	121.9	74 29.0	58	78	120.4
15	72 49.0	62	76	122.6	73 07.3	60	78	121.3	73 24.9	58	79	119.9	73 42.0	56	80	118.4
6	72 03.1	59	78	120.7	72 20.7	58	79	119.4	72 37.7	56	80	118.0	72 54.2	54	81	116.6
7	71 16.4	57	79	118.9	71 33.3	56	80	117.6	71 49.8	54	81	116.3	72 05.6	52	82	114.9
8	70 28.8	56	80	117.3	70 45.2	54	81	116.0	71 01.1	52	82	114.7	71 16.4	50	83	113.4
9	69 40.5	54	82	115.7	69 56.4	52	82	114.5	70 11.8	50	83	113.2	70 26.6	49	84	111.9
20	68 51.6	52	82	114.3	69 07.1	51	83	113.1	69 22.0	49	84	111.8	69 36.4	47	84	110.6
1	68 02.2	51	83	112.9	68 17.2	49	84	111.8	68 31.7	48	84	110.6	68 45.7	46	85	109.4
2	67 12.3	49	84	111.7	67 26.9	48	84	110.5	67 41.0	46	85	109.4	67 54.6	45	86	108.2
3	66 22.0	48	84	110.5	66 36.2	47	85	109.4	66 50.0	45	86	108.2	67 03.2	43	86	107.1
4	65 31.3	47	85	109.3	65 45.2	46	86	108.3	65 58.6	44	86	107.2	66 11.6	42	87	106.1
25	64 40.2	46	86	108.3	64 53.8	45	86	107.2	65 06.9	43	86	106.2	65 19.6	41	87	105.1
6	63 48.9	45	86	107.3	64 02.2	44	86	106.2	64 15.0	42	87	105.2	64 27.4	41	87	104.2
7	62 57.2	44	86	106.3	63 10.3	43	87	105.3	63 22.9	41	87	104.3	63 35.0	40	88	103.3
8	62 05.4	43	87	105.4	62 18.1	42	87	104.4	62 30.5	41	88	103.4	62 42.5	39	88	102.5
9	61 13.3	43	87	104.5	61 25.8	41	88	103.6	61 38.0	40	88	102.6	61 49.7	38	88	101.7
30	60 21.0	42	88	103.7	60 33.3	41	88	102.8	60 45.3	39	88	101.8	60 56.8	38	88	100.9
1	59 28.5	41	88	102.9	59 40.6	40	88	102.0	59 52.4	39	88	101.1	60 03.8	37	88	100.2
2	58 35.8	41	88	102.1	58 47.8	39	88	101.3	58 59.4	38	88	100.4	59 10.7	37	89	99.5
3	57 43.0	40	88	101.4	57 54.9	39	88	100.5	58 06.3	38	89	99.7	58 17.4	36	89	98.8
4	56 50.1	40	88	100.7	57 01.8	38	89	99.9	57 13.1	37	89	99.0	57 24.1	36	89	98.1
35	55 57.1	39	89	100.0	56 08.6	38	89	99.2	56 19.8	37	89	98.4	56 30.7	36	89	97.5
6	55 03.9	39	89	99.4	55 15.3	38	89	98.6	55 26.4	36	89	97.7	55 37.2	35	89	96.9
7	54 10.6	38	89	98.7	54 22.0	37	89	97.9	54 32.9	36	89	97.1	54 43.6	35	89	96.3
8	53 17.3	38	89	98.1	53 28.5	37	89	97.3	53 39.4	36	89	96.6	53 50.0	35	90	95.8
9	52 23.9	38	89	97.5	52 35.0	37	89	96.7	52 45.8	36	90	96.0	52 56.3	35	90	95.2
40	51 30.4	37	89	96.9	51 41.4	36	89	96.2	51 52.1	35	90	95.4	52 02.6	34	90	94.7
1	50 36.8	37	89	96.4	50 47.8	36	90	95.6	50 58.4	35	90	94.9	51 08.8	34	90	94.1
2	49 43.2	37	90	95.8	49 54.1	36	90	95.1	50 04.7	35	90	94.4	50 15.0	34	90	93.6
3	48 49.5	36	90	95.3	49 00.3	36	90	94.6	49 10.9	35	90	93.8	49 21.2	34	90	93.1
4	47 55.8	36	90	94.7	48 06.5	35	90	94.0	48 17.1	35	90	93.3	48 27.3	34	90	92.6
45	47 02.0	36	90	94.2	47 12.7	35	90	93.5	47 23.2	34	90	92.8	47 33.4	34	90	92.2
6	46 08.2	36	90	93.7	46 18.9	35	90	93.0	46 29.3	34	90	92.4	46 39.5	34	90	91.7
7	45 14.4	36	90	93.2	45 25.0	35	90	92.6	45 35.4	34	90	91.9	45 45.6	34	90	91.2
8	44 20.5	36	90	92.7	44 31.2	35	90	92.1	44 41.5	34	90	91.4	44 51.7	33	90	90.8
9	43 26.7	36	90	92.3	43 37.3	35	90	91.6	43 47.6	34	90	91.0	43 57.8	33	90	90.3
50	42 32.8	36	90	91.8	42 43.3	35	90	91.2	42 53.7	34	90	90.5	43 03.8	33	90	89.9
1	41 38.9	36	90	91.3	41 49.4	35	90	90.7	41 59.8	34	90	90.1	42 09.9	33	90	89.4
2	40 45.0	35	90	90.9	40 55.5	35	90	90.3	41 05.8	34	90	89.6	41 16.0	33	90	89.0
3	39 51.0	35	90	90.4	40 01.6	35	90	89.8	40 11.9	34	90	89.2	40 22.1	34	90	88.6
4	38 57.1	35	90	90.0	39 07.6	35	90	89.4	39 18.0	34	90	88.8	39 28.2	34	90	88.2
55	38 03.2	35	90	89.6	38 13.7	35	90	89.0	38 24.1	34	90	88.4	38 34.3	34	90	87.8
6	37 09.2	35	90	89.1	37 19.8	35	90	88.5	37 30.2	34	90	88.0	37 40.4	34	90	87.4
7	36 15.3	36	90	88.7	36 25.9	35	90	88.1	36 36.3	34	90	87.5	36 46.5	34	90	87.0
8	35 21.4	36	90	88.3	35 32.0	35	90	87.7	35 42.4	34	90	87.1	35 52.7	34	90	86.6
9	34 27.5	36	90	87.9	34 38.1	35	90	87.3	34 48.6	35	90	86.7	34 58.9	34	90	86.2
60	33 33.6	36	90	87.5	33 44.3	35	90	86.9	33 54.8	35	90	86.3	34 05.1	34	90	85.8
1	32 39.8	36	90	87.0	32 50.4	35	90	86.5	33 01.0	35	90	85.9	33 11.3	34	90	85.4
2	31 45.9	36	90	86.6	31 56.6	35	90	86.1	32 07.2	35	90	85.5	32 17.6	34	90	85.0
3	30 52.1	36	90	86.2	31 02.8	36	90	85.7	31 13.4	35	90	85.1	31 23.9	35	90	84.6
4	29 58.3	36	90	85.8	30 09.1	36	90	85.3	30 19.7	35	90	84.7	30 30.2	35	89	84.2
65	29 04.5	36	90	85.4	29 15.3	36	90	84.9	29 26.0	35	89	84.4	29 36.6	35	89	83.8
6	28 10.8	36	90	85.0	28 21.6	36	89	84.5	28 32.4	36	89	84.0	28 43.0	35	89	83.4
7	27 17.1	37	90	84.6	27 28.0	36	89	84.1	27 38.8	36	89	83.6	27 49.4	35	89	83.1
8	26 23.4	37	89	84.2	26 34.4	36	89	83.7	26 45.2	36	89	83.2	26 55.9	36	89	82.7
9	25 29.8	37	89	83.8	25 40.8	36	89	83.3	25 51.7	36	89	82.8	26 02.4	36	89	82.3
70	24 36.2	37	89	83.5	24 47.2	37	89	83.0	24 58.2	36	89	82.4	25 09.0	36	89	81.9
1	23 42.6	37	89	83.1	23 53.7	37	89	82.6	24 04.8	37	89	82.0	24 15.7	36	89	81.5
2	22 49.1	37	89	82.7	23 00.3	37	89	82.2	23 11.4	37	89	81.7	23 22.4	36	89	81.2
3	21 55.7	38	89	82.3	22 06.9	37	89	81.8	22 18.0	37	89	81.3	22 29.1	37	89	80.8
4	21 02.2	38	89	81.9	21 13.5	38	89	81.4	21 24.8	37	89	80.9	21 35.9	37	88	80.4
75	20 08.9	38	89	81.5	20 20.3	38	89	81.0	20 31.5	38	88	80.5	20 42.8	37	88	80.0
6	19 15.6	38	89	81.1	19 27.0	38	89	80.6	19 38.4	38	88	80.1	19 49.7	37	88	79.6
7	18 22.3	39	89	80.7	18 33.8	38	88	80.2	18 45.3	38	88	79.8	18 56.7	38	88	79.3
8	17 29.1	39	88	80.3	17 40.7	39	88	79.9	17 52.2	38	88	79.4	18 03.7	38	88	78.9
9	16 36.0	39	88	79.9	16 47.7	39	88	79.5	16 59.3	39	88	79.0	17 10.8	38	88	78.5
80	15 42.9	39	88	79.6	15 54.7	39	88	79.1	16 06.4	39	88	78.6	16 18.0	39	88	78.1
1	14 49.9	40	88	79.2	15 01.8	39	88	78.7	15 13.6	39	88	78.2	15 25.3	39	88	77.7
2	13 57.0	40	88	78.8	14 08.9	40	88	78.3	14 20.8	40	88	77.8	14 32.6	39	88	77.3
3	13 04.1	40	88	78.4	13 16.2	40	88	77.9	13 28.1	40	88	77.4	13 40.0	40	88	77.0
4	12 11.4	40	88	78.0	12 23.5	40	88	77.5	12 35.5	40	88	77.0	12 47.5	40	87	76.6
85	11 18.7	41	88	77.6	11 30.9	41	88	77.1	11 43.0	40	87	76.6	11 55.1	40	87	76.2
6	10 26.0	41	88	77.2	10 38.3	41	87	76.7	10 50.6	41	87	76.2	11 02.8	41	87	75.8
7	9 33.5	41	88	76.8	9 45.9	41	87	76.3	9 58.3	41	87	75.8	10 10.6	41	87	75.4
8	8 41.0	42	87	76.4	8 53.5	42	87	75.9	9 06.0	42	87	75.4	9 18.5	41	87	75.0
9	7 48.7	42	87	76.0	8 01.3	42	87	75.5	8 13.9	42	87	75.0	8 26.4	42	86	74.6
90	6 56.4	42	87	75.5	7 09.1	42	87	75.1	7 21.8	42	86	74.6	7 34.5	42	86	74.2

18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
° ′			°	° ′			°	° ′			°	° ′			°	°
82 00.0	1.0	05	180.0	82 30.0	1.0	06	180.0	83 00.0	1.0	06	180.0	83 30.0	1.0	06	180.0	00
81 56.8	99	16	173.2	82 26.6	99	17	172.8	82 56.4	99	18	172.3	83 26.1	99	19	171.7	1
81 47.3	98	26	166.6	82 16.5	97	27	165.7	82 45.6	97	29	164.8	83 14.6	96	31	163.8	2
81 31.9	95	35	160.3	82 00.2	94	36	159.1	82 28.3	93	38	157.8	82 56.2	92	41	156.3	3
81 11.0	91	43	154.3	81 38.3	90	45	152.9	82 05.2	89	47	151.4	82 31.7	88	50	149.6	4
80 45.4	87	50	148.9	81 11.4	86	52	147.3	81 36.9	84	54	145.6	82 02.0	82	57	143.6	05
80 15.6	83	56	144.0	80 40.3	81	58	142.3	81 04.5	80	60	140.4	81 28.0	77	62	138.4	6
79 42.2	79	61	139.6	80 05.6	77	63	137.8	80 28.5	75	65	135.9	80 50.6	73	67	133.8	7
79 05.8	75	65	135.6	79 28.0	73	67	133.8	79 49.6	71	69	131.8	80 10.4	68	71	129.8	8
78 26.9	71	68	132.0	78 47.9	69	70	130.2	79 08.3	67	72	128.3	79 27.9	64	74	126.2	9
77 45.8	68	71	128.8	78 05.8	65	73	127.0	78 25.0	63	75	125.1	78 43.5	60	76	123.2	10
77 03.0	64	74	125.9	77 21.9	62	76	124.2	77 40.2	60	77	122.3	77 57.7	57	78	120.4	1
76 18.6	61	76	123.3	76 36.6	59	77	121.6	76 54.0	57	79	119.8	77 10.6	54	80	118.0	2
75 32.9	59	78	121.0	75 50.2	56	79	119.3	76 06.7	54	80	117.6	76 22.5	51	82	115.8	3
74 46.2	56	80	118.9	75 02.7	54	81	117.3	75 18.5	51	82	115.6	75 33.5	49	83	113.9	4
73 58.5	54	81	116.9	74 14.3	52	82	115.3	74 29.5	49	83	113.8	74 43.9	47	84	112.1	15
73 10.0	52	82	115.1	73 25.2	50	83	113.6	73 39.8	47	84	112.1	73 53.7	45	85	110.5	6
72 20.9	50	83	113.5	72 35.5	48	84	112.1	72 49.6	46	85	110.6	73 02.9	43	85	109.0	7
71 31.2	48	84	112.0	71 45.3	46	84	110.6	71 58.8	44	85	109.2	72 11.7	42	86	107.7	8
70 40.9	47	84	110.6	70 54.6	45	85	109.3	71 07.7	43	86	107.9	71 20.2	40	86	106.5	9
69 50.2	45	85	109.3	70 03.5	43	86	108.0	70 16.2	41	86	106.7	70 28.3	39	87	105.3	20
68 59.2	44	86	108.1	69 12.1	42	86	106.8	69 24.4	40	87	105.6	69 36.2	38	87	104.2	1
68 07.7	43	86	107.0	68 20.3	41	87	105.8	68 32.3	39	87	104.5	68 43.8	37	88	103.2	2
67 16.0	42	87	105.9	67 28.3	40	87	104.7	67 40.0	38	88	103.5	67 51.2	36	88	102.3	3
66 24.0	41	87	104.9	66 36.0	39	88	103.8	66 47.5	37	88	102.6	66 58.4	36	88	101.4	4
65 31.8	40	87	104.0	65 43.5	38	88	102.9	65 54.8	37	88	101.7	66 05.5	35	88	100.6	25
64 39.4	39	88	103.1	64 50.9	38	88	102.0	65 01.9	36	88	100.9	65 12.4	34	89	99.8	6
63 46.8	38	88	102.2	63 58.0	37	88	101.2	64 08.9	35	89	100.1	64 19.2	34	89	99.1	7
62 54.0	38	88	101.4	63 05.1	36	88	100.4	63 15.7	35	89	99.4	63 25.9	33	89	98.3	8
62 01.1	37	88	100.7	62 12.0	36	89	99.7	62 22.5	34	89	98.7	62 32.5	33	89	97.7	9
61 08.0	37	89	99.9	61 18.8	35	89	99.0	61 29.1	34	89	98.0	61 39.0	32	89	97.0	30
60 14.8	36	89	99.2	60 25.4	35	89	98.3	60 35.6	33	89	97.3	60 45.4	32	89	96.4	1
59 21.5	36	89	98.6	59 32.0	34	89	97.6	59 42.1	33	89	96.7	59 51.8	32	90	95.8	2
58 28.2	35	89	97.9	58 38.5	34	89	97.0	58 48.5	33	89	96.1	58 58.1	31	90	95.2	3
57 34.7	35	89	97.3	57 45.0	34	89	96.4	57 54.9	32	90	95.5	58 04.4	31	90	94.6	4
56 41.2	35	89	96.7	56 51.4	33	90	95.8	57 01.2	32	90	94.9	57 10.6	31	90	94.1	35
55 47.6	34	90	96.1	55 57.7	33	90	95.2	56 07.4	32	90	94.4	56 16.8	31	90	93.5	6
54 53.9	34	90	95.5	55 04.0	33	90	94.7	55 13.6	32	90	93.9	55 23.0	31	90	93.0	7
54 00.2	34	90	95.0	54 10.2	33	90	94.2	54 19.8	32	90	93.3	54 29.1	30	90	92.5	8
53 06.5	34	90	94.4	53 16.4	32	90	93.6	53 26.0	31	90	92.8	53 35.2	30	90	92.0	9
52 12.7	33	90	93.9	52 22.6	32	90	93.1	52 32.1	31	90	92.3	52 41.3	30	90	91.6	40
51 18.9	33	90	93.4	51 28.7	32	90	92.6	51 38.2	31	90	91.9	51 47.4	30	90	91.1	1
50 25.0	33	90	92.9	50 34.8	32	90	92.1	50 44.3	31	90	91.4	50 53.5	30	90	90.7	2
49 31.2	33	90	92.4	49 40.9	32	90	91.7	49 50.4	31	90	90.9	49 59.6	30	90	90.2	3
48 37.3	33	90	91.9	48 47.0	32	90	91.2	48 56.5	31	90	90.5	49 05.6	30	90	89.8	4
47 43.4	33	90	91.5	47 53.1	32	90	90.7	48 02.5	31	90	90.0	48 11.7	30	90	89.3	45
46 49.5	33	90	91.0	46 59.2	32	90	90.3	47 08.6	31	90	89.6	47 17.8	30	90	88.9	6
45 55.5	33	90	90.5	46 05.2	32	90	89.9	46 14.7	31	90	89.2	46 23.9	30	90	88.5	7
45 01.6	33	90	90.1	45 11.3	32	90	89.4	45 20.8	31	90	88.8	45 30.0	30	90	88.1	8
44 07.7	33	90	89.7	44 17.4	32	90	89.0	44 26.9	31	90	88.3	44 36.1	30	90	87.7	9
43 13.8	33	90	89.2	43 23.5	32	90	88.6	43 33.0	31	90	87.9	43 42.2	30	90	87.3	50
42 19.8	33	90	88.8	42 29.6	32	90	88.2	42 39.1	31	90	87.5	42 48.4	31	90	86.9	1
41 25.9	33	90	88.4	41 35.7	32	90	87.8	41 45.2	31	90	87.1	41 54.5	31	90	86.5	2
40 32.0	33	90	88.0	40 41.8	32	90	87.4	40 51.4	32	90	86.7	41 00.7	31	90	86.1	3
39 38.1	33	90	87.6	39 47.9	32	90	87.0	39 57.5	32	90	86.3	40 06.9	31	90	85.7	4
38 44.3	33	90	87.2	38 54.1	32	90	86.6	39 03.7	32	90	85.9	39 13.1	31	90	85.3	55
37 50.4	33	90	86.8	38 00.3	33	90	86.2	38 09.9	32	90	85.6	38 19.4	31	90	85.0	6
36 56.6	33	90	86.4	37 06.5	33	90	85.8	37 16.2	32	90	85.2	37 25.7	31	90	84.6	7
36 02.8	33	90	86.0	36 12.7	33	90	85.4	36 22.5	32	90	84.8	36 32.0	32	89	84.2	8
35 09.0	34	90	85.6	35 19.0	33	90	85.0	35 28.8	32	90	84.4	35 38.4	32	89	83.8	9
34 15.3	34	90	85.2	34 25.3	33	90	84.6	34 35.1	33	89	84.0	34 44.8	32	89	83.5	60
33 21.5	34	90	84.8	33 31.6	33	89	84.2	33 41.5	33	89	83.7	33 51.3	32	89	83.1	1
32 27.8	34	89	84.4	32 38.0	33	89	83.9	32 47.9	33	89	83.3	32 57.7	32	89	82.7	2
31 34.2	34	89	84.0	31 44.4	34	89	83.5	31 54.4	33	89	82.9	32 04.3	33	89	82.4	3
30 40.6	34	89	83.7	30 50.8	34	89	83.1	31 00.9	33	89	82.6	31 10.8	33	89	82.0	4
29 47.0	35	89	83.3	29 57.3	34	89	82.7	30 07.4	34	89	82.2	30 17.5	33	89	81.6	65
28 53.5	35	89	82.9	29 03.8	34	89	82.4	29 14.0	34	89	81.8	29 24.1	33	89	81.3	6
28 00.0	35	89	82.5	28 10.4	35	89	82.0	28 20.7	34	89	81.5	28 30.8	34	89	80.9	7
27 06.5	35	89	82.2	27 17.0	35	89	81.6	27 27.4	34	89	81.1	27 37.6	34	89	80.6	8
26 13.1	35	89	81.8	26 23.7	35	89	81.3	26 34.1	35	89	80.7	26 44.4	34	88	80.2	9
25 19.8	36	89	81.4	25 30.4	35	89	80.9	25 40.9	35	88	80.4	25 51.3	35	88	79.8	70
24 26.5	36	89	81.0	24 37.2	36	89	80.5	24 47.8	35	88	80.0	24 58.3	35	88	79.5	1
23 33.2	36	89	80.7	23 44.0	36	88	80.1	23 54.7	35	88	79.6	24 05.3	35	88	79.1	2
22 40.1	36	89	80.3	22 50.9	36	88	79.8	23 01.7	36	88	79.3	23 12.4	35	88	78.8	3
21 46.9	37	88	79.9	21 57.9	36	88	79.4	22 08.7	36	88	78.9	22 19.5	36	88	78.4	4
20 53.9	37	88	79.5	21 04.9	37	88	79.0	21 15.9	36	88	78.5	21 26.7	36	88	78.0	75
20 00.9	37	88	79.1	20 12.0	37	88	78.7	20 23.0	37	88	78.2	20 34.0	36	88	77.7	6
19 07.9	38	88	78.8	19 19.2	37	88	78.3	19 30.3	37	88	77.8	19 41.4	37	88	77.3	7
18 15.1	38	88	78.4	18 26.4	38	88	77.9	18 37.6	37	88	77.4	18 48.8	37	88	76.9	8
17 22.3	38	88	78.0	17 33.7	38	88	77.5	17 45.0	38	88	77.0	17 56.3	37	87	76.6	9
16 29.6	38	88	77.6	16 41.1	38	88	77.2	16 52.5	38	87	76.7	17 03.9	38	87	76.2	80
15 36.9	39	88	77.3	15 48.5	39	87	76.8	16 00.1	38	87	76.3	16 11.6	38	87	75.8	1
14 44.4	39	88	76.9	14 56.1	39	87	76.4	15 07.7	39	87	75.9	15 19.3	39	87	75.4	2
13 51.9	39	87	76.5	14 03.7	39	87	76.0	14 15.5	39	87	75.5	14 27.2	39	87	75.1	3
12 59.5	40	87	76.1	13 11.4	40	87	75.6	13 23.3	39	87	75.3	13 35.1	39	86	74.7	4
12 07.2	40	87	75.7	12 19.2	40	87	75.2	12 31.2	40	87	74.8	12 43.2	40	86	74.3	85
11 15.0	41	87	75.3	11 27.1	40	87	74.8	11 39.2	40	86	74.4	11 51.3	40	86	73.9	6
10 22.9	41	87	74.9	10 35.1	41	86	74.5	10 47.4	41	86	74.0	10 59.5	40	86	73.5	7
9 30.9	41	87	74.5	9 43.2	41	86	74.1	9 55.6	41	86	73.6	10 07.9	41	86	73.1	8
8 38.9	42	86	74.1	8 51.4	42	86	73.7	9 03.9	41	86	73.2	9 16.3	41	86	72.7	9
7 47.1	42	86	73.7	7 59.7	42	86	73.3	8 12.3	42	86	72.8	8 24.9	42	86	72.3	90

Lat. 26°

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	48 00.0	1.0	01	180.0	47 30.0	1.0	01	180.0	47 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	46 00.0	1.0	01	180.0	45 30.0	1.0	01	180.0	45 00.0	1.0	01	180.0	44 30.0	1.0	01	180.0	00
1	47 59.3	1.0	03	178.6	47 29.3	1.0	03	178.6	46 59.3	1.0	03	178.6	46 29.3	1.0	03	178.6	45 59.4	1.0	03	178.6	45 29.4	1.0	03	178.6	44 59.4	1.0	03	178.7	44 29.4	1.0	03	178.7	1
2	47 57.3	1.0	06	177.1	47 27.3	1.0	06	177.2	46 57.4	1.0	06	177.2	46 27.4	1.0	06	177.2	45 57.4	1.0	05	177.3	45 27.5	1.0	05	177.3	44 57.5	1.0	05	177.3	44 27.5	1.0	05	177.4	2
3	47 53.9	1.0	08	175.7	47 24.0	1.0	08	175.7	46 54.1	1.0	08	175.8	46 24.1	1.0	08	175.8	45 54.2	1.0	08	175.9	45 24.3	1.0	08	175.9	44 54.3	1.0	07	176.0	44 24.4	1.0	07	176.0	3
4	47 49.2	1.0	10	174.3	47 19.3	1.0	10	174.3	46 49.5	1.0	10	174.4	46 19.6	1.0	10	174.5	45 49.7	1.0	10	174.5	45 19.8	1.0	10	174.6	44 49.9	1.0	09	174.7	44 20.1	1.0	09	174.7	4
05	47 43.2	99	12	172.8	47 13.4	99	12	172.9	46 43.6	99	12	173.0	46 13.7	99	12	173.1	45 43.9	99	12	173.2	45 14.1	99	12	173.3	44 44.3	99	12	173.3	44 14.5	99	11	173.4	05
6	47 35.8	99	14	171.4	47 06.1	99	14	171.5	46 36.4	99	14	171.6	46 06.6	99	14	171.7	45 36.9	99	14	171.8	45 07.2	99	14	171.9	44 37.4	99	14	172.0	44 07.7	99	13	172.1	6
7	47 27.1	99	17	170.0	46 57.5	99	16	170.1	46 27.9	99	16	170.3	45 58.2	99	16	170.4	45 28.6	99	16	170.5	44 59.0	99	16	170.6	44 29.3	99	16	170.7	43 59.7	99	15	170.8	7
8	47 17.1	98	19	168.6	46 47.6	98	18	168.8	46 18.1	98	18	168.9	45 48.6	98	18	169.0	45 19.1	98	18	169.2	44 49.6	98	18	169.3	44 20.0	98	18	169.4	43 50.5	98	17	169.5	8
9	47 05.8	98	21	167.2	46 36.5	98	21	167.4	46 07.1	98	20	167.5	45 37.7	98	20	167.7	45 08.3	98	20	167.8	44 38.9	98	20	168.0	44 09.5	98	20	168.1	43 40.1	98	19	168.2	9
10	46 53.3	97	23	165.9	46 24.1	97	23	166.0	45 54.8	97	22	166.2	45 25.6	97	22	166.4	44 56.3	98	22	166.5	44 27.1	98	22	166.7	43 57.8	98	22	166.8	43 28.5	98	21	167.0	10
1	46 39.5	97	25	164.5	46 10.4	97	25	164.7	45 41.4	97	24	164.9	45 12.3	97	24	165.0	44 43.2	97	24	165.2	44 14.0	97	24	165.4	43 44.9	97	23	165.5	43 15.8	97	23	165.7	1
2	46 24.5	96	27	163.2	45 55.6	96	27	163.3	45 26.7	96	26	163.5	44 57.7	96	26	163.7	44 28.8	97	26	163.9	43 59.8	97	26	164.1	43 30.9	97	25	164.3	43 01.9	97	25	164.4	2
3	46 08.2	96	29	161.8	45 39.5	96	29	162.0	45 10.8	96	28	162.2	44 42.0	96	28	162.4	44 13.3	96	28	162.6	43 44.5	96	28	162.8	43 15.7	96	27	163.0	42 46.8	96	27	163.2	3
4	45 50.8	95	31	160.5	45 22.3	95	31	160.7	44 53.8	95	30	160.9	44 25.2	95	30	161.2	43 56.6	95	30	161.4	43 28.0	95	29	161.6	42 59.4	95	29	161.8	42 30.7	96	29	162.0	4
15	45 32.2	94	33	159.2	45 03.9	94	32	159.4	44 35.6	95	32	159.7	44 07.2	95	32	159.9	43 38.8	95	32	160.1	43 10.4	95	31	160.3	42 42.0	95	31	160.5	42 13.5	95	30	160.8	15
6	45 12.5	94	35	157.9	44 44.4	94	34	158.2	44 16.3	94	34	158.4	43 48.1	94	34	158.6	43 19.9	94	33	158.9	42 51.7	94	33	159.1	42 23.5	94	33	159.3	41 55.2	94	32	159.6	6
7	44 51.7	93	36	156.6	44 23.8	93	36	156.9	43 55.9	93	36	157.2	43 27.9	93	35	157.4	43 00.0	93	35	157.7	42 31.9	93	35	157.9	42 03.9	94	34	158.1	41 35.8	94	34	158.4	7
8	44 29.8	92	38	155.4	44 02.1	92	38	155.7	43 34.4	92	38	155.9	43 06.7	92	37	156.2	42 38.9	93	37	156.4	42 11.1	93	36	156.7	41 43.3	93	36	157.0	41 15.4	93	36	157.2	8
9	44 06.8	91	40	154.2	43 39.4	91	40	154.4	43 11.9	92	39	154.7	42 44.4	92	39	155.0	42 16.9	92	38	155.3	41 49.3	92	38	155.5	41 21.7	92	38	155.8	40 54.0	92	37	156.0	9
20	43 42.8	91	42	152.9	43 15.6	91	41	153.2	42 48.4	91	41	153.5	42 21.1	91	40	153.8	41 53.8	91	40	154.1	41 26.5	91	40	154.4	40 59.1	91	39	154.6	40 31.7	91	39	154.9	20
1	43 17.7	90	43	151.8	42 50.8	90	43	152.1	42 23.8	90	42	152.4	41 56.8	90	42	152.6	41 29.7	90	42	152.9	41 02.6	90	41	153.2	40 35.5	91	41	153.5	40 08.3	91	40	153.8	1
2	42 51.7	89	45	150.6	42 25.0	89	44	150.9	41 58.3	89	44	151.2	41 31.5	89	44	151.5	41 04.7	89	43	151.8	40 37.9	90	43	152.1	40 11.0	90	42	152.4	39 44.0	90	42	152.7	2
3	42 24.7	88	46	149.4	41 58.3	88	46	149.7	41 31.9	88	46	150.1	41 05.3	88	45	150.4	40 38.8	89	45	150.7	40 12.2	89	44	151.0	39 45.5	89	44	151.3	39 18.8	89	44	151.6	3
4	41 56.9	87	48	148.3	41 30.7	87	48	148.6	41 04.5	87	47	148.9	40 38.2	88	47	149.3	40 11.9	88	46	149.6	39 45.5	88	46	149.9	39 19.1	88	45	150.2	38 52.7	88	45	150.5	4
25	41 28.1	86	50	147.2	41 02.2	86	49	147.5	40 36.2	87	48	147.8	40 10.2	87	48	148.2	39 44.2	87	48	148.5	39 18.0	87	47	148.8	38 51.9	87	47	149.1	38 25.7	87	46	149.4	25
6	40 58.4	85	51	146.1	40 32.8	86	50	146.4	40 07.1	86	50	146.8	39 41.3	86	50	147.1	39 15.5	86	49	147.4	38 49.7	86	49	147.7	38 23.8	86	48	148.1	37 57.8	87	48	148.4	6
7	40 27.9	84	52	145.0	40 02.5	85	52	145.3	39 37.1	85	51	145.7	39 11.6	85	51	146.0	38 46.1	85	50	146.4	38 20.5	85	50	146.7	37 54.9	86	50	147.0	37 29.2	86	49	147.4	7
8	39 56.5	84	54	143.9	39 31.5	84	53	144.3	39 06.3	84	53	144.7	38 41.1	84	52	145.0	38 15.8	84	52	145.3	37 50.5	85	51	145.7	37 25.1	85	51	146.0	36 59.7	85	50	146.4	8
9	39 24.4	83	55	142.9	38 59.6	83	54	143.3	38 34.7	83	54	143.6	38 09.8	83	54	144.0	37 44.8	83	53	144.3	37 19.7	84	53	144.7	36 54.6	84	52	145.0	36 29.4	84	52	145.4	9
30	38 51.5	82	56	141.9	38 27.0	82	56	142.3	38 02.3	82	55	142.6	37 37.7	82	55	143.0	37 12.9	83	54	143.3	36 48.1	83	54	143.7	36 23.3	83	53	144.0	35 58.4	83	53	144.4	30
1	38 17.8	81	57	140.9	37 53.6	81	57	141.3	37 29.2	81	56	141.6	37 04.8	81	56	142.0	36 40.4	82	56	142.4	36 15.8	82	55	142.7	35 51.2	82	54	143.1	35 26.6	82	54	143.4	1
2	37 43.5	80	58	139.9	37 19.5	80	58	140.3	36 55.4	80	58	140.7	36 31.3	81	57	141.0	36 07.1	81	57	141.4	35 42.8	81	56	141.8	35 18.5	81	56	142.1	34 54.1	81	55	142.5	2
3	37 08.4	79	60	138.9	36 44.7	79	59	139.3	36 20.9	79	59	139.7	35 57.0	80	58	140.1	35 33.1	80	58	140.5	35 09.1	80	57	140.8	34 45.0	80	57	141.2	34 20.9	81	56	141.6	3
4	36 32.6	78	61	138.0	36 09.2	78	60	138.4	35 45.7	79	60	138.8	35 22.1	79	59	139.2	34 58.4	79	59	139.5	34 34.7	79	58	139.9	34 10.9	79	58	140.3	33 47.0	80	58	140.6	4
35	35 56.2	77	62	137.1	35 33.1	77	61	137.5	35 09.8	78	61	137.9	34 46.5	78	60	138.2	34 23.1	78	60	138.6	33 59.6	78	60	139.0	33 36.1	79	59	139.4	33 12.5	79	59	139.7	35
6	35 19.2	76	63	136.2	34 56.3	76	62	136.6	34 33.3	77	62	137.0	34 10.3	77	62	137.3	33 47.1	77	61	137.7	33 23.9	77	60	138.1	33 00.7	78	60	138.5	32 37.3	78	60	138.9	6
7	34 41.5	75	64	135.3	34 18.9	76	63	135.7	33 56.2	76	63	136.1	33 33.4	76	62	136.5	33 10.6	76	62	136.9	32 47.6	77	62	137.2	32 24.6	77	61	137.6	32 01.6	77	61	138.0	7
8	34 03.3	74	65	134.4	33 40.9	75	64	134.8	33 18.5	75	64	135.2	32 56.0	75	63	135.6	32 33.4	75	63	136.0	32 10.7	76	62	136.4	31 48.0	76	62	136.8	31 25.2	76	62	137.2	8
9	33 24.5	74	66	133.6	33 02.4	74	65	134.0	32 40.2	74	65	134.4	32 18.0	74	64	134.8	31 55.6	75	64	135.2	31 33.2	75	63	135.5	31 10.8	75	63	135.9	30 48.2	75	62	136.3	9
40	32 45.2	73	66	132.7	32 23.3	73	66	133.1	32 01.4	73	66	133.5	31 39.4	73	65	133.9	31 17.3	74	65	134.3	30 55.2	74	64	134.7	30 33.0	74	64	135.1	30 10.7	74	64	135.5	40
1	32 05.3	72	67	131.9	31 43.7	72	67	132.3	31 22.0	72	66	132.7	31 00.3	73	66	133.1	30 38.5	73	66	133.5	30 16.6	73	65	133.9	29 54.7	73	65	134.3	29 32.6	74	64	134.7	1
2	31 24.9	71	68	131.1	31 03.6	71	68	131.5	30 42.2	71	67	131.9	30 20.7	72	67	132.3	29 59.1	72	66	132.7	29 37.5	72	66	133.1	29 15.8	72	66	133.5	28 54.0	73	65	133.9	2
3	30 44.0	70	69	130.3	30 22.9	70	68	130.7	30 01.8	71	68	131.1	29 40.6	71	68	131.5	29 19.3	71	67	131.9	28 57.9	71	67	132.3	28 36.4	72	66	132.7	28 14.9	72	66	133.1	3
4	30 02.6	69	70	129.5	29 41.8	70	69	129.9	29 20.9	70	69	130.3	28 59.9	70	68	130.8	28 38.9	70	68	131.2	28 17.8	71	68	131.6	27 56.6	71	67	132.0	27 35.3	71	67	132.4	4
45	29 20.8	68	70	128.8	29 00.2	69	70	129.2	28 39.6	69	70	129.6	28 18.9	69	69	130.0	27 58.1	69	69	130.4	27 37.2	70	68	130.8	27 16.3	70	68	131.2	26 55.2	70	68	131.6	45
6	28 38.5	68	71	128.0	28 18.2	68	71	128.4	27 57.8	68	70	128.8	27 37.3	68	70	129.3	27 16.8	69	70	129.7	26 56.2	69	69	130.1	26 35.5	69	69	130.5	26 14.7	69	68	130.9	6
7	27 55.8	67	72	127.3	27 35.7	67	71	127.7	27 15.6	67	71	128.1	26 55.4	68	71	128.5	26 35.0	68	70	128.9	26 14.7	68	70	129.4	25 54.2	68	69	129.8	25 33.7	68	69	130.2	7
8	27 12.7	66	72	126.6	26 52.9	66	72	127.0	26 32.9	67	72	127.4	26 13.0	67	72	127.8	25 52.9	67	71	128.2	25 32.8	67	71	128.6	25 12.6	67	70	129.0	24 52.3	68	70	129.5	8
9	26 29.2	65	73	125.9	26 09.6	65	73	126.3	25 49.9	66	72	126.7	25 30.1	66	72	127.1	25 10.3	66	72	127.5	24 50.4	66	71	127.9	24 30.5	67	71	128.3	24 10.4	67	70	128.8	9
50	25 45.3	64	74	125.2	25 25.9	65	73	125.6	25 06.5	65	73	126.0	24 46.9	65	72	126.4	24 27.4	65	72	126.8	24 07.7	66	72	127.3	23 48.0	66	72	127.7	23 28.2	66	71	128.1	50
1	25 01.0	64	74	124.5	24 41.9	64	74	124.9	24 22.6	64	74	125.3	24 03.4	64	73	125.7	23 44.0	65	73	126.2	23 24.6	65	72	126.6	23 05.1	65	72	127.0	22 45.5	65	72	127.4	1
2	24 16.4	63	75	123.8	23 57.5	63	75	124.2	23 38.5	63	74	124.7	23 19.4	64	74	125.1	23 00.3	64	74	125.5	22 41.1	64	73	125.9	22 21.8	64	73	126.3	22 02.5	65	72	126.7	2
3	23 31.4	62	76	123.1	23 12.7	62	75	123.6	22 53.9	63	75	124.0	22 35.1	63	74	124.4	22 16.2	63	74	124.8	21 57.2	63	74	125.3	21 38.2	64	73	125.7	21 19.1	64	73	126.1	3
4	22 46.1	61	76	122.5	22 27.6	62	76	122.9	22 09.1	62	75	123.4	21 50.4	62	75	123.8	21 31.8	62	75	124.2	21 13.0	63	74	124.6	20 54.2	63	74	125.0	20 35.3	63	74	125.4	4
55	22 00.4	61	76	121.9	21 42.2	61	76	122.3	21 23.8	61	76	122.7	21 05.4	61	76	123.1	20 47.0	62	75	123.6	20 28.5	62	75	124.0	20 09.9	62	74	124.4	19 51.2	62	74	124.8	55
6	21 14.5	60	77	121.2	20 56.4	60	77	121.7	20 38.3	61	76	122.1	20 20.1	61	76	122.5	20 01.9	61	76	122.9	19 43.6	61	75	123.4	19 25.2	61	75	123.8	19 06.8	61	75	124.2	6
7	20 28.2	59	78	120.6	20 10.4	60	77	121.1	19 52.5	60	77	121.5	19 34.5	60	76	121.9	19 16.5	60	76	122.3	18 58.4	60	76	122.8	18 40.2	61	75	123.2	18 22.0	61	75	123.6	7
8	19 41.7	59	78	120.0	19 24.0	59	78	120.4	19 06.3	59	77	120.9	18 48.6	59	77	121.3	18 30.8	59	77	121.7	18 12.9	60	76	122.2	17 55.0	60	76	122.6	17 37.0	60	76	123.0	8
9	18 54.8	58	79	119.4	18 37.4	58	78	119.9	18 19.9	58	78	120.3	18 02.4	59	78	120.7	17 44.7	59	77	121.1	17 27.1	59	77	121.6	17 09.4	59	76	122.0	16 51.6	59	76	122.4	9
60	18 07.7	57	79	118.8	17 50.5	58	79	119.3	17 33.2	58	78	119.7	17 15.8	58	78	120.1	16 58.4	58	78	120.6	16 41.0	58	77	121.0	16 23.5	58	77	121.4	16 05.9	59	77	121.8	60
1	17 20.4	57	79	118.3	17 03.3	57	79	118.7	16 46.2	57	79	119.1	16 29.1	57	78	119.6	16 11.9	57	78	120.0	15 54.6	58	78	120.4	15 37.3	58	77	120.8	15 19.9	58	77	121.3	1
2	16 32.8	56	80	117.7	16 15.9	56	80	118.1	15 59.0	56	79	118.6	15 42.0	57	79	119.0	15 25.0	57	78	119.4	15 08.0	57	78	119.8	14 50.9	57	78	120.3	14 33.7	57	78	120.7	2
3	15 44.9	55	80	117.1	15 28.2	56	80	117.6	15 11.5	56	80	118.0	14 54.7	56	79	118.4	14 37.9	56	79	118.9	14 21.1	56	79	119.3	14 04.2	56	78	119.7	13 47.2	57	78	120.1	3
4	14 56.8	55	81	116.6	14 40.3	55	80	117.0	14 23.8	55	80	117.5	14 07.2	55	80	117.9	13 50.6	55	79	118.3	13 33.9	56	79	118.7	13 17.2	56	79	119.2	13 00.4	56	78	119.6	4
65	14 08.4	54	81	116.0	13 52.1	54	80	116.5	13 35.8	55	80	116.9	13 19.4	55	80	117.3	13 03.0	55	80	117.8	12 46.5	55	80	118.2	12 30.0	55	79	118.6	12 13.4	55	79	119.1	65
6	13 19.9	54	81	115.5	13 03.8	54	81	115.9	12 47.6	54	81	116.4	12 31.4	54	80	116.8	12 15.1	54	80	117.2	11 58.8	54	80	117.7	11 42.5	54	80	118.1	11 26.2	55	79	118.5	6
7	12 31.1	53	82	115.0	12 15.2	53	82	115.4	11 59.2	53	81	115.9	11 43.1	53	81	116.3	11 27.1	54	80	116.7	11 11.0	54	80	117.1	10 54.8	54	80	117.6	10 38.7	54	80	118.0	7
8	11 42.1	53	82	114.5	11 26.3	53	82	114.9	11 10.5	53	81	115.3	10 54.7	53	81	115.8	10 38.8	53	81	116.2	10 22.9	53	80	116.6	10 06.9	53	80	117.1	9 50.9	53	80	117.5	8
9	10 52.9	52	82	114.0	10 37.3	52	82	114.4	10 21.7	52	82	114.8	10 06.0	52	82	115.3	9 50.3	52	81	115.7	9 34.6	53	81	116.1	9 18.8	53	81	116.6	9 03.0	53	80	117.0	9
70	10 03.6	51	83	113.5	9 48.1	52	82	113.9	9 32.6	52	82	114.3	9 17.1	52	82	114.8	9 01.6	52	81	115.2	8 46.0	52	81	115.6	8 30.4	52	81	116.1	8 14.8	52	80	116.5	70
1	9 14.0	51	83	113.0	8 58.7	51	83	113.4	8 43.4	51	82	113.8	8 28.1	51	82	114.3	8 12.7	51	82	114.7	7 57.3	51	82	115.1	7 41.9	51	81	115.6	7 26.5	52	81	116.0	1
2	8 24.2	50	83	112.5	8 09.1	50	83	112.9	7 54.0	51	83	113.3	7 38.8	51	82	113.8	7 23.6	51	82	114.2	7 08.4	51	82	114.6	6 53.1	51	82	115.1	6 37.9	51	81	115.5	2
3	7 34.3	50	84	112.0	7 19.4	50	83	112.4	7 04.4	50	83	112.8	6 49.4	50	83	113.3	6 34.3	50	82	113.7	6 19.3	50	82	114.2	6 04.2	50	82	114.6	5 49.1	50	82	115.0	3
4	6 44.2	49	84	111.5	6 29.4	49	84	111.9	6 14.6	50	83	112.4	5 59.7	50	83	112.8	5 44.9	50	83	113.2	5 30.0	50	82	113.7	5 15.1	50	82	114.1	5 00.2	50	82	114.6	4
75	5 54.0	49	84	111.0	5 39.3	49	84	111.5	5 24.6	49	84	111.9	5 09.9	49	83	112.3																	75
6	5 03.5	48	84	110.6																													6

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd	Δt	Az.	16° 30′ Alt.	Δd	Δt	Az.	17° 00′ Alt.	Δd	Δt	Az.	17° 30′ Alt.	Δd	Δt	Az.	18° 00′ Alt.	Δd	Δt	Az.	18° 30′ Alt.	Δd	Δt	Az.	19° 00′ Alt.	Δd	Δt	Az.	19° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	6 04.2	42	87	75.1	6 17.1	43	87	74.7	6 29.9	43	86	74.2	6 42.7	43	86	73.8	6 55.4	42	86	73.3	7 08.1	42	86	72.9	7 20.9	42	86	72.4	7 33.5	42	85	71.9	91
2	5 12.2	43	86	74.7	5 25.1	43	86	74.3	5 38.0	43	86	73.8	5 50.9	43	86	73.4	6 03.8	43	86	72.9	6 16.7	43	86	72.5	6 29.5	43	85	72.0	6 42.3	43	85	71.5	2
3																	5 12.3	43	86	72.5	5 25.3	43	86	72.0	5 38.3	43	85	71.6	5 51.2	43	85	71.1	3
4																													5 00.3	44	85	70.7	4

Lat. 26°

H.A.	20° 00′ Alt.	Δd Δt	Az.	20° 30′ Alt.	Δd Δt	Az.	21° 00′ Alt.	Δd Δt	Az.	21° 30′ Alt.	Δd Δt	Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	84 00.0	1.0 07	180.0	84 30.0	1.0 08	180.0	85 00.0	1.0 08	180.0	85 30.0	1.0 09	180.0
1	83 55.8	99 20	171.1	84 25.4	99 22	170.3	84 55.0	98 24	169.4	85 24.5	98 27	168.3
2	83 43.5	96 33	162.5	84 12.1	95 35	161.1	84 40.5	94 38	159.4	85 08.5	93 41	157.5
3	83 23.8	91 44	154.7	83 50.9	90 46	152.8	84 17.6	88 49	150.6	84 43.7	86 53	148.0
4	82 57.7	86 52	147.7	83 23.2	84 55	145.4	83 48.0	81 58	142.9	84 12.0	78 62	140.0
05	82 26.4	80 59	141.5	82 50.1	78 62	139.1	83 13.0	75 65	136.5	83 35.0	71 68	133.5
6	81 50.9	75 65	136.2	82 12.9	72 67	133.7	82 34.1	69 70	131.0	82 54.1	65 73	128.1
7	81 12.0	70 69	131.5	81 32.5	67 72	129.1	81 52.0	63 74	126.5	82 10.4	59 76	123.6
8	80 30.4	65 73	127.5	80 49.4	62 75	125.2	81 07.5	59 77	122.6	81 24.5	55 79	119.9
9	79 46.6	61 76	124.1	80 04.4	58 78	121.8	80 21.3	54 80	119.3	80 37.0	51 81	116.8
10	79 01.1	57 78	121.1	79 17.9	54 80	118.9	79 33.6	51 81	116.5	79 48.3	47 83	114.1
1	78 14.3	54 80	118.4	78 30.1	51 81	116.3	78 44.9	48 83	114.1	78 58.7	44 84	111.8
2	77 26.4	51 81	116.1	77 41.3	48 83	114.0	77 55.2	45 84	111.9	78 08.2	42 85	109.8
3	76 37.5	49 83	114.0	76 51.6	46 84	112.0	77 04.9	43 85	110.1	77 17.2	40 86	108.0
4	75 47.8	46 84	112.1	76 01.3	44 85	110.3	76 14.0	41 86	108.4	76 25.7	38 86	106.4
15	74 57.6	44 85	110.4	75 10.5	42 86	108.7	75 22.6	39 86	106.9	75 33.8	36 87	105.0
6	74 06.8	43 86	108.9	74 19.2	40 86	107.2	74 30.8	37 87	105.5	74 41.5	35 88	103.7
7	73 15.5	41 86	107.5	73 27.5	39 87	105.9	73 38.6	36 87	104.2	73 49.0	33 88	102.6
8	72 23.9	40 86	106.2	72 35.4	37 87	104.7	72 46.2	35 88	103.1	72 56.3	32 88	101.5
9	71 32.0	38 87	105.0	71 43.1	36 88	103.5	71 53.6	34 88	102.0	72 03.4	31 88	100.5
20	70 39.8	37 88	103.9	70 50.6	35 88	102.5	71 00.8	33 88	101.1	71 10.3	30 89	99.6
1	69 47.3	36 88	102.9	69 57.9	34 88	101.5	70 07.8	32 89	100.2	70 17.0	30 89	98.8
2	68 54.7	35 88	102.0	69 04.9	33 88	100.6	69 14.6	31 89	99.3	69 23.7	29 89	98.0
3	68 01.8	34 88	101.1	68 11.9	33 89	99.8	68 21.3	31 89	98.5	68 30.2	29 89	97.2
4	67 08.8	34 88	100.2	67 18.7	32 89	99.0	67 27.9	30 89	97.8	67 36.7	28 89	96.5
25	66 15.7	33 89	99.4	66 25.3	31 89	98.2	66 34.5	30 89	97.1	66 43.0	28 89	95.8
6	65 22.4	33 89	98.7	65 31.9	31 89	97.5	65 40.9	29 89	96.4	65 49.4	27 90	95.2
7	64 29.1	32 89	98.0	64 38.4	30 89	96.9	64 47.3	29 90	95.7	64 55.6	27 90	94.6
8	63 35.6	32 89	97.3	63 44.8	30 89	96.2	63 53.6	28 90	95.1	64 01.9	27 90	94.0
9	62 42.1	31 89	96.6	62 51.2	30 90	95.6	62 59.9	28 90	94.5	63 08.1	26 90	93.5
30	61 48.5	31 89	96.0	61 57.5	29 90	95.0	62 06.1	28 90	94.0	62 14.2	26 90	92.9
1	60 54.8	31 90	95.4	61 03.8	29 90	94.4	61 12.3	28 90	93.4	61 20.3	26 90	92.4
2	60 01.1	30 90	94.8	60 10.0	29 90	93.9	60 18.4	27 90	92.9	60 26.5	26 90	91.9
3	59 07.3	30 90	94.3	59 16.2	29 90	93.3	59 24.6	27 90	92.4	59 32.5	26 90	91.4
4	58 13.5	30 90	93.7	58 22.3	29 90	92.8	58 30.7	27 90	91.9	58 38.6	26 90	91.0
35	57 19.7	30 90	93.2	57 28.4	28 90	92.3	57 36.8	27 90	91.4	57 44.7	26 90	90.5
6	56 25.9	30 90	92.7	56 34.5	28 90	91.8	56 42.8	27 90	90.9	56 50.8	26 90	90.1
7	55 32.0	29 90	92.2	55 40.6	28 90	91.3	55 48.9	27 90	90.5	55 56.9	26 90	89.6
8	54 38.1	29 90	91.7	54 46.7	28 90	90.9	54 55.0	27 90	90.0	55 02.9	26 90	89.2
9	53 44.2	29 90	91.2	53 52.8	28 90	90.4	54 01.1	27 90	89.6	54 09.0	26 90	88.8
40	52 50.3	29 90	90.8	52 58.9	28 90	90.0	53 07.1	27 90	89.2	53 15.1	26 90	88.4
1	51 56.3	29 90	90.3	52 04.9	28 90	89.5	52 13.2	27 90	88.8	52 21.2	26 90	88.0
2	51 02.4	29 90	89.9	51 11.0	28 90	89.1	51 19.3	27 90	88.4	51 27.3	26 90	87.6
3	50 08.5	29 90	89.5	50 17.1	28 90	88.7	50 25.4	27 90	87.9	50 33.4	26 90	87.2
4	49 14.5	29 90	89.0	49 23.2	28 90	88.3	49 31.5	27 90	87.6	49 39.6	26 90	86.8
45	48 20.6	29 90	88.6	48 29.3	28 90	87.9	48 37.7	27 90	87.2	48 45.8	27 90	86.4
6	47 26.7	29 90	88.2	47 35.4	28 90	87.5	47 43.8	28 90	86.8	47 51.9	27 90	86.1
7	46 32.8	29 90	87.8	46 41.5	29 90	87.1	46 50.0	28 90	86.4	46 58.2	27 90	85.7
8	45 39.0	30 90	87.4	45 47.7	29 90	86.7	45 56.2	28 90	86.0	46 04.4	27 90	85.3
9	44 45.1	30 90	87.0	44 53.9	29 90	86.3	45 02.4	28 90	85.6	45 10.7	27 90	85.0
50	43 51.2	30 90	86.6	44 00.0	29 90	85.9	44 08.6	28 90	85.3	44 17.0	27 90	84.6
1	42 57.4	30 90	86.2	43 06.2	29 90	85.6	43 14.9	28 90	84.9	43 23.3	28 90	84.3
2	42 03.6	30 90	85.8	42 12.5	29 90	85.2	42 21.2	29 90	84.6	42 29.6	28 89	83.9
3	41 09.9	30 90	85.5	41 18.8	29 90	84.8	41 27.5	29 89	84.2	41 36.0	28 89	83.6
4	40 16.1	30 90	85.1	40 25.1	30 90	84.5	40 33.9	29 89	83.8	40 42.5	28 89	83.2
55	39 22.4	30 90	84.7	39 31.4	30 89	84.1	39 40.3	29 89	83.5	39 48.9	29 89	82.9
6	38 28.7	31 89	84.4	38 37.8	30 89	83.7	38 46.7	29 89	83.1	38 55.4	29 89	82.6
7	37 35.1	31 89	84.0	37 44.2	30 89	83.4	37 53.2	30 89	82.8	38 02.0	29 89	82.2
8	36 41.4	31 89	83.6	36 50.7	30 89	83.0	36 59.7	30 89	82.4	37 08.6	29 89	81.8
9	35 47.9	31 89	83.3	35 57.2	31 89	82.7	36 06.3	30 89	82.1	36 15.2	30 89	81.5
60	34 54.3	31 89	82.9	35 03.7	31 89	82.3	35 12.9	30 89	81.7	35 21.9	30 89	81.1
1	34 00.8	32 89	82.5	34 10.3	31 89	82.0	34 19.6	31 89	81.4	34 28.7	30 89	80.8
2	33 07.4	32 89	82.2	33 16.9	31 89	81.6	33 26.3	31 89	81.0	33 35.5	30 89	80.5
3	32 14.0	32 89	81.8	32 23.6	32 89	81.3	32 33.0	31 89	80.7	32 42.3	31 88	80.1
4	31 20.6	32 89	81.5	31 30.3	32 89	80.9	31 39.8	32 88	80.3	31 49.2	31 88	79.8
65	30 27.3	33 89	81.1	30 37.1	32 89	80.6	30 46.7	32 88	80.0	30 56.2	31 88	79.5
6	29 34.1	33 89	80.7	29 43.9	33 88	80.2	29 53.6	32 88	79.7	30 03.2	32 88	79.1
7	28 40.9	33 89	80.4	28 50.8	33 88	79.9	29 00.6	32 88	79.3	29 10.2	32 88	78.8
8	27 47.7	34 88	80.0	27 57.7	33 88	79.5	28 07.6	33 88	79.0	28 17.4	32 88	78.4
9	26 54.7	34 88	79.7	27 04.8	33 88	79.1	27 14.7	33 88	78.6	27 24.6	33 88	78.1
70	26 01.6	34 88	79.3	26 11.8	34 88	78.8	26 21.9	33 88	78.3	26 31.9	33 88	77.7
1	25 08.7	34 88	79.0	25 19.0	34 88	78.4	25 29.1	34 88	77.9	25 39.2	33 88	77.4
2	24 15.8	35 88	78.6	24 26.2	34 88	78.1	24 36.4	34 88	77.6	24 46.6	34 88	77.1
3	23 22.9	35 88	78.2	23 33.4	35 88	77.7	23 43.8	34 88	77.2	23 54.1	34 88	76.7
4	22 30.2	35 88	77.9	22 40.8	35 88	77.4	22 51.2	35 87	76.9	23 01.6	34 87	76.4
75	21 37.5	36 88	77.5	21 48.2	35 88	77.0	21 58.8	35 87	76.5	22 09.3	35 87	76.0
6	20 44.9	36 88	77.2	20 55.7	36 88	76.7	21 06.4	36 87	76.2	21 17.0	35 87	75.7
7	19 52.3	36 87	76.8	20 03.2	36 87	76.3	20 14.0	36 87	75.8	20 24.8	36 87	75.3
8	18 59.9	37 87	76.4	19 10.9	37 87	75.9	19 21.8	36 87	75.5	19 32.6	36 87	75.0
9	18 07.5	37 87	76.1	18 18.6	37 87	75.6	18 29.6	37 87	75.1	18 40.6	36 86	74.6
80	17 15.2	38 87	75.7	17 26.4	37 87	75.2	17 37.6	37 87	74.7	17 48.7	37 86	74.2
1	16 23.0	38 87	75.3	16 34.3	38 87	74.8	16 45.6	37 86	74.4	16 56.8	37 86	73.9
2	15 30.8	38 87	75.0	15 42.3	38 86	74.5	15 53.7	38 86	74.0	16 05.0	38 86	73.5
3	14 38.8	39 86	74.6	14 50.4	39 86	74.1	15 01.9	38 86	73.6	15 13.4	38 86	73.1
4	13 46.9	39 86	74.2	13 58.6	39 86	73.7	14 10.2	39 86	73.3	14 21.8	39 86	72.8
85	12 55.0	40 86	73.8	13 06.9	39 86	73.4	13 18.6	39 86	72.9	13 30.4	39 86	72.4
6	12 03.3	40 86	73.4	12 15.2	40 86	73.0	12 27.2	40 86	72.5	12 39.0	39 85	72.0
7	11 11.6	40 86	73.1	11 23.7	40 86	72.6	11 35.8	40 86	72.1	11 47.8	40 85	71.7
8	10 20.1	41 86	72.7	10 32.3	41 86	72.2	10 44.5	41 85	71.7	10 56.6	40 85	71.3
9	9 28.7	41 86	72.3	9 41.0	41 85	71.8	9 53.3	41 85	71.4	10 05.6	41 85	70.9
90	8 37.4	42 85	71.9	8 49.9	42 85	71.4	9 02.3	41 85	71.0	9 14.7	41 84	70.5

22° 00′ Alt.	Δd Δt	Az.	22° 30′ Alt.	Δd Δt	Az.	23° 00′ Alt.	Δd Δt	Az.	23° 30′ Alt.	Δd Δt	Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
86 00.0	1.0 10	180.0	86 30.0	1.0 12	180.0	87 00.0	1.0 14	180.0	87 30.0	1.0 16	180.0	00
85 53.8	98 29	166.9	86 23.0	97 33	165.2	86 51.9	96 37	162.9	87 20.4	94 43	159.8	1
85 36.2	91 45	155.0	86 03.2	89 50	152.1	86 29.5	86 55	148.3	86 54.6	81 61	143.6	2
85 09.1	83 57	145.0	85 33.5	79 61	141.4	85 56.7	75 66	137.1	86 18.2	68 71	131.9	3
84 35.0	75 65	136.8	84 56.8	70 69	133.0	85 17.0	65 73	128.7	85 35.5	58 78	123.7	4
83 55.8	67 71	130.2	84 15.2	62 75	126.5	84 33.1	57 78	122.3	84 49.0	50 81	117.8	05
83 13.0	61 76	124.9	83 30.4	56 78	121.3	83 46.3	50 81	117.5	84 00.4	44 84	113.4	6
82 27.6	55 79	120.6	82 43.4	50 81	117.3	82 57.6	45 83	113.7	83 10.2	39 85	110.0	7
81 40.3	50 81	117.0	81 54.7	46 83	113.9	82 07.7	41 85	110.7	82 19.1	35 86	107.3	8
80 51.6	47 83	114.1	81 04.9	42 84	111.2	81 16.9	37 86	108.2	81 27.3	32 87	105.1	9
80 01.9	43 84	111.5	80 14.3	39 86	108.9	80 25.3	35 87	106.1	80 35.0	30 88	103.3	10
79 11.4	40 85	109.4	79 22.9	37 86	106.9	79 33.3	32 87	104.3	79 42.4	28 88	101.7	1
78 20.2	38 86	107.5	78 31.1	34 87	105.2	78 40.9	31 88	102.8	78 49.4	27 88	100.3	2
77 28.6	36 87	105.9	77 38.9	33 88	103.7	77 48.1	29 88	101.5	77 56.3	25 89	99.2	3
76 36.5	34 87	104.4	76 46.4	31 88	102.4	76 55.2	28 89	100.3	77 03.0	24 89	98.1	4
75 44.1	33 88	103.1	75 53.6	30 88	101.2	76 02.0	27 89	99.2	76 09.5	23 89	97.2	15
74 51.5	32 88	101.9	75 00.6	29 89	100.1	75 08.7	26 89	98.2	75 16.0	23 90	96.3	6
73 58.6	31 88	100.9	74 07.4	28 89	99.1	74 15.3	25 89	97.3	74 22.3	22 90	95.6	7
73 05.6	30 89	99.9	73 14.1	27 89	98.2	73 21.8	24 89	96.5	73 28.6	22 90	94.8	8
72 12.4	29 89	99.0	72 20.6	26 89	97.4	72 28.1	24 89	95.8	72 34.9	21 90	94.2	9
71 19.0	28 89	98.1	71 27.1	26 89	96.6	71 34.5	23 90	95.1	71 41.1	21 90	93.5	20
70 25.6	28 89	97.3	70 33.5	25 90	95.9	70 40.7	23 90	94.4	70 47.2	20 90	92.9	1
69 32.1	27 89	96.6	69 39.8	25 90	95.2	69 46.9	23 90	93.8	69 53.4	20 90	92.4	2
68 38.5	26 90	95.9	68 46.1	24 90	94.6	68 53.1	22 90	93.2	68 59.5	20 90	91.9	3
67 44.8	26 90	95.2	67 52.3	24 90	94.0	67 59.2	22 90	92.7	68 05.6	20 90	91.4	4
66 51.1	26 90	94.6	66 58.5	24 90	93.4	67 05.4	22 90	92.1	67 11.6	20 90	90.9	25
65 57.3	25 90	94.0	66 04.7	24 90	92.8	66 11.5	22 90	91.6	66 17.7	20 90	90.4	6
65 03.5	25 90	93.5	65 10.8	23 90	92.3	65 17.6	22 90	91.1	65 23.8	20 90	90.0	7
64 09.6	25 90	92.9	64 16.9	23 90	91.8	64 23.6	22 90	90.7	64 29.9	20 90	89.5	8
63 15.8	25 90	92.4	63 23.0	23 90	91.3	63 29.7	22 90	90.2	63 35.9	20 90	89.1	9
62 21.9	25 90	91.9	62 29.1	23 90	90.8	62 35.8	22 90	89.8	62 42.0	20 90	88.7	30
61 28.0	25 90	91.4	61 35.1	23 90	90.4	61 41.9	22 90	89.4	61 48.1	20 90	88.3	1
60 34.0	25 90	90.9	60 41.2	23 90	89.9	60 47.9	22 90	88.9	60 54.2	20 90	87.9	2
59 40.1	25 90	90.5	59 47.3	23 90	89.5	59 54.0	22 90	88.5	60 00.3	20 90	87.6	3
58 46.2	25 90	90.0	58 53.4	23 90	89.1	59 00.1	22 90	88.1	59 06.5	20 90	87.2	4
57 52.3	25 90	89.6	57 59.4	23 90	88.7	58 06.2	22 90	87.8	58 12.6	21 90	86.8	35
56 58.3	25 90	89.2	57 05.5	23 90	88.3	57 12.3	22 90	87.4	57 18.8	21 90	86.5	6
56 04.4	25 90	88.8	56 11.6	23 90	87.9	56 18.5	22 90	87.0	56 24.9	21 90	86.1	7
55 10.5	25 90	88.4	55 17.8	24 90	87.5	55 24.6	22 90	86.6	55 31.2	21 90	85.8	8
54 16.6	25 90	88.0	54 23.9	24 90	87.1	54 30.8	22 90	86.3	54 37.4	21 90	85.4	9
53 22.7	25 90	87.6	53 30.0	24 90	86.8	53 37.0	23 90	85.9	53 43.6	22 90	85.1	40
52 28.9	25 90	87.2	52 36.2	24 90	86.4	52 43.2	23 90	85.6	52 49.9	22 90	84.8	1
51 35.0	25 90	86.8	51 42.4	24 90	86.0	51 49.5	23 90	85.2	51 56.2	22 89	84.4	2
50 41.2	25 90	86.4	50 48.6	24 90	85.7	50 55.7	23 90	84.9	51 02.6	22 89	84.1	3
49 47.4	25 90	86.1	49 54.9	24 90	85.3	50 02.0	23 89	84.6	50 08.9	22 89	83.8	4
48 53.6	26 90	85.7	49 01.1	25 90	85.0	49 08.4	24 89	84.2	49 15.4	23 89	83.5	45
47 59.8	26 90	85.3	48 07.4	25 90	84.6	48 14.7	24 89	83.9	48 21.8	23 89	83.2	6
47 06.1	26 90	85.0	47 13.7	25 89	84.3	47 21.1	24 89	83.6	47 28.3	23 89	82.8	7
46 12.4	26 90	84.6	46 20.1	25 89	83.9	46 27.6	24 89	83.2	46 34.8	24 89	82.5	8
45 18.7	26 89	84.3	45 26.5	26 89	83.6	45 34.0	25 89	82.9	45 41.3	24 89	82.2	9
44 25.1	27 89	83.9	44 32.9	26 89	83.3	44 40.5	25 89	82.6	44 47.9	24 89	81.9	50
43 31.4	27 89	83.6	43 39.4	26 89	82.9	43 47.1	25 89	82.3	43 54.5	25 89	81.6	1
42 37.9	27 89	83.3	42 45.9	26 89	82.6	42 53.7	26 89	81.9	43 01.2	25 89	81.3	2
41 44.3	27 89	82.9	41 52.4	27 89	82.3	42 00.3	26 89	81.6	42 07.9	25 89	81.0	3
40 50.8	28 89	82.6	40 59.0	27 89	81.9	41 07.0	26 89	81.3	41 14.7	25 89	80.7	4
39 57.4	28 89	82.2	40 05.6	27 89	81.6	40 13.7	26 89	81.0	40 21.5	26 88	80.3	55
39 04.0	28 89	81.9	39 12.3	27 89	81.3	39 20.4	27 89	80.7	39 28.4	26 88	80.0	6
38 10.6	28 89	81.6	38 19.0	28 89	81.0	38 27.3	27 89	80.3	38 35.3	26 88	79.7	7
37 17.3	29 89	81.2	37 25.8	28 89	80.6	37 34.1	27 88	80.0	37 42.3	27 88	79.4	8
36 24.0	29 89	80.9	36 32.6	28 88	80.3	36 41.0	28 88	79.7	36 49.3	27 88	79.1	9
35 30.8	29 89	80.6	35 39.5	29 88	80.0	35 48.0	28 88	79.4	35 56.3	28 88	78.8	60
34 37.6	30 88	80.2	34 46.4	29 88	79.6	34 55.0	28 88	79.1	35 03.5	28 88	78.5	1
33 44.5	30 88	79.9	33 53.4	29 88	79.3	34 02.1	29 88	78.7	34 10.7	28 88	78.2	2
32 51.4	30 88	79.6	33 00.4	30 88	79.0	33 09.2	29 88	78.4	33 17.9	29 88	77.9	3
31 58.4	31 88	79.2	32 07.5	30 88	78.7	32 16.4	30 88	78.1	32 25.2	29 88	77.5	4
31 05.5	31 88	78.9	31 14.7	30 88	78.3	31 23.7	30 88	77.8	31 32.6	29 88	77.2	65
30 12.6	31 88	78.6	30 21.9	31 88	78.0	30 31.0	30 88	77.5	30 40.0	30 88	76.9	6
29 19.8	32 88	78.2	29 29.2	31 88	77.7	29 38.4	31 88	77.1	29 47.5	30 87	76.6	7
28 27.0	32 88	77.9	28 36.5	31 88	77.4	28 45.9	31 88	76.8	28 55.1	31 87	76.3	8
27 34.3	32 88	77.6	27 43.9	32 88	77.0	27 53.4	31 87	76.5	28 02.8	31 87	75.9	9
26 41.7	33 88	77.2	26 51.4	32 87	76.7	27 01.0	32 87	76.2	27 10.5	31 87	75.6	70
25 49.1	33 87	76.9	25 59.0	33 87	76.4	26 08.7	32 87	75.8	26 18.3	32 87	75.3	1
24 56.7	33 87	76.5	25 06.6	33 87	76.0	25 16.4	33 87	75.5	25 26.2	32 87	75.0	2
24 04.2	34 87	76.2	24 14.3	33 87	75.7	24 24.3	33 87	75.2	24 34.1	33 86	74.6	3
23 11.9	34 87	75.9	23 22.1	34 87	75.3	23 32.2	33 87	74.8	23 42.2	33 86	74.3	4
22 19.7	35 87	75.5	22 30.0	34 87	75.0	22 40.2	34 86	74.5	22 50.3	34 86	74.0	75
21 27.5	35 87	75.2	21 37.9	35 86	74.7	21 48.3	34 86	74.2	21 58.5	34 86	73.6	6
20 35.4	35 87	74.8	20 46.0	35 86	74.3	20 56.4	35 86	73.8	21 06.8	34 86	73.3	7
19 43.4	36 86	74.5	19 54.1	35 86	74.0	20 04.7	35 86	73.5	20 15.2	35 86	73.0	8
18 51.5	36 86	74.1	19 02.3	36 86	73.6	19 13.0	36 86	73.1	19 23.7	35 86	72.6	9
17 59.7	37 86	73.8	18 10.6	36 86	73.3	18 21.5	36 86	72.8	18 32.3	36 86	72.3	80
17 07.9	37 86	73.4	17 19.0	37 86	72.9	17 30.0	37 86	72.4	17 40.9	36 85	71.9	1
16 16.3	37 86	73.0	16 27.5	37 86	72.6	16 38.7	37 86	72.1	16 49.7	37 85	71.6	2
15 24.8	38 86	72.7	15 36.1	38 86	72.2	15 47.4	37 85	71.7	15 58.6	37 85	71.2	3
14 33.4	38 86	72.3	14 44.8	38 85	71.8	14 56.3	38 85	71.3	15 07.6	38 85	70.9	4
13 42.0	39 85	71.9	13 53.7	39 85	71.5	14 05.2	38 85	71.0	14 16.7	38 85	70.5	85
12 50.8	39 85	71.6	13 02.6	39 85	71.1	13 14.3	39 85	70.6	13 25.9	39 84	70.1	6
11 59.7	40 85	71.2	12 11.6	40 85	70.7	12 23.5	39 84	70.2	12 35.3	39 84	69.8	7
11 08.7	40 85	70.8	11 20.8	40 85	70.3	11 32.8	40 84	69.9	11 44.7	40 84	69.4	8
10 17.9	41 85	70.4	10 30.0	41 84	70.0	10 42.2	40 84	69.5	10 54.3	40 84	69.0	9
9 27.1	41 84	70.0	9 39.4	41 84	69.6	9 51.8	41 84	69.1	10 04.0	41 84	68.7	90

Lat 26°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	41 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	00
1	43 59.4	1.0 03	178.7	43 29.4	1.0 03	178.7	42 59.4	1.0 03	178.7	42 29.4	1.0 03	178.7	41 59.4	1.0 03	178.7	41 29.4	1.0 03	178.8	40 59.4	1.0 03	178.8	40 29.4	1.0 03	178.8	1
2	43 57.5	1.0 05	177.4	43 27.6	1.0 05	177.4	42 57.6	1.0 05	177.4	42 27.6	1.0 05	177.5	41 57.7	1.0 05	177.5	41 27.7	1.0 05	177.5	40 57.7	1.0 05	177.6	40 27.7	1.0 05	177.6	2
3	43 54.5	1.0 07	176.1	43 24.5	1.0 07	176.1	42 54.6	1.0 07	176.2	42 24.7	1.0 07	176.2	41 54.7	1.0 07	176.3	41 24.8	1.0 07	176.3	40 54.8	1.0 07	176.3	40 24.9	1.0 07	176.4	3
4	43 50.2	1.0 09	174.8	43 20.3	1.0 09	174.8	42 50.4	1.0 09	174.9	42 20.5	1.0 09	175.0	41 50.6	1.0 09	175.0	41 20.7	1.0 09	175.1	40 50.8	1.0 08	175.1	40 20.9	1.0 08	175.2	4
05	43 44.7	99 11	173.5	43 14.8	99 11	173.6	42 45.0	99 11	173.6	42 15.2	99 11	173.7	41 45.4	99 11	173.8	41 15.5	99 10	173.9	40 45.7	99 10	173.9	40 15.8	99 10	174.0	05
6	43 38.0	99 13	172.2	43 08.2	99 13	172.3	42 38.5	99 13	172.4	42 08.7	99 13	172.5	41 38.9	99 12	172.5	41 09.2	99 12	172.6	40 39.4	99 12	172.7	40 09.6	99 12	172.8	6
7	43 30.0	99 15	170.9	43 00.4	99 15	171.0	42 30.7	99 15	171.1	42 01.0	99 15	171.2	41 31.4	99 14	171.3	41 01.7	99 14	171.4	40 32.0	99 14	171.5	40 02.3	99 14	171.6	7
8	43 20.9	99 17	169.6	42 51.4	99 17	169.8	42 21.8	99 17	169.9	41 52.2	99 16	170.0	41 22.7	99 16	170.1	40 53.1	99 16	170.2	40 23.5	99 16	170.3	39 53.9	99 16	170.4	8
9	43 10.6	98 19	168.4	42 41.2	98 19	168.5	42 11.8	98 19	168.6	41 42.3	98 18	168.8	41 12.8	98 18	168.9	40 43.4	98 18	169.0	40 13.9	98 18	169.1	39 44.4	98 18	169.2	9
10	42 59.2	98 21	167.1	42 29.9	98 21	167.3	42 00.6	98 21	167.4	41 31.2	98 20	167.5	41 01.9	98 20	167.7	40 32.5	98 20	167.8	40 03.2	98 20	167.9	39 33.8	98 20	168.1	10
1	42 46.6	97 23	165.9	42 17.4	97 23	166.0	41 48.2	97 22	166.2	41 19.0	97 22	166.3	40 49.8	97 22	166.5	40 20.6	97 22	166.6	39 51.4	97 22	166.8	39 22.1	98 21	166.9	1
2	42 32.9	97 25	164.6	42 03.8	97 24	164.8	41 34.8	97 24	165.0	41 05.7	97 24	165.1	40 36.7	97 24	165.3	40 07.6	97 24	165.5	39 38.5	97 23	165.6	39 09.4	97 23	165.8	2
3	42 18.0	96 27	163.4	41 49.1	96 26	163.6	41 20.2	96 26	163.8	40 51.3	96 26	163.9	40 22.4	96 26	164.1	39 53.5	96 25	164.3	39 24.6	97 25	164.5	38 55.6	97 25	164.6	3
4	42 02.0	96 28	162.2	41 33.3	96 28	162.4	41 04.6	96 28	162.6	40 35.9	96 28	162.8	40 07.1	96 27	162.9	39 38.4	96 27	163.1	39 09.6	96 27	163.3	38 40.8	96 26	163.5	4
15	41 45.0	95 30	161.0	41 16.5	95 30	161.2	40 47.9	95 30	161.4	40 19.4	95 29	161.6	39 50.8	95 29	161.8	39 22.2	95 29	162.0	38 53.6	95 28	162.2	38 24.9	95 28	162.4	15
6	41 26.9	94 32	159.8	40 58.6	94 32	160.0	40 30.2	95 31	160.2	40 01.8	95 31	160.4	39 33.4	95 30	160.6	39 05.0	95 30	160.8	38 36.6	95 30	161.1	38 08.1	95 30	161.3	6
7	41 07.7	94 34	158.6	40 39.6	94 33	158.8	40 11.4	94 33	159.1	39 43.3	94 33	159.3	39 15.1	94 32	159.5	38 46.8	94 32	159.7	38 18.6	94 32	159.9	37 50.3	94 31	160.2	7
8	40 47.5	93 35	157.4	40 19.6	93 35	157.7	39 51.7	93 35	157.9	39 23.7	93 34	158.2	38 55.7	93 34	158.4	38 27.6	93 34	158.6	37 59.6	94 33	158.8	37 31.5	94 33	159.1	8
9	40 26.4	92 37	156.3	39 58.7	92 37	156.5	39 30.9	93 36	156.8	39 03.1	93 36	157.0	38 35.3	93 36	157.3	38 07.5	93 35	157.5	37 39.6	93 35	157.8	37 11.8	93 34	158.0	9
20	40 04.2	92 38	155.2	39 36.7	92 38	155.4	39 09.2	92 38	155.7	38 41.6	92 37	155.9	38 14.0	92 37	156.2	37 46.4	92 37	156.4	37 18.8	92 36	156.7	36 51.1	92 36	156.9	20
1	39 41.1	91 40	154.0	39 13.8	91 40	154.3	38 46.5	91 39	154.6	38 19.2	91 39	154.8	37 51.8	91 39	155.1	37 24.4	91 38	155.4	36 57.0	92 38	155.6	36 29.5	92 38	155.9	1
2	39 17.0	90 42	152.9	38 50.0	90 41	153.2	38 22.9	90 41	153.5	37 55.8	90 40	153.8	37 28.6	91 40	154.0	37 01.4	91 40	154.3	36 34.2	91 39	154.6	36 07.0	91 39	154.8	2
3	38 52.0	89 43	151.9	38 25.2	89 43	152.2	37 58.4	90 42	152.4	37 31.5	90 42	152.7	37 04.6	90 42	153.0	36 37.6	90 41	153.3	36 10.7	90 41	153.5	35 43.6	90 40	153.8	3
4	38 26.2	88 45	150.8	37 59.6	89 44	151.1	37 33.0	89 44	151.4	37 06.4	89 44	151.7	36 39.7	89 43	152.0	36 13.0	89 43	152.2	35 46.2	89 42	152.5	35 19.4	89 42	152.8	4
25	37 59.4	88 46	149.7	37 33.1	88 46	150.0	37 06.7	88 45	150.3	36 40.3	88 45	150.6	36 13.9	88 44	150.9	35 47.4	88 44	151.2	35 20.9	88 44	151.5	34 54.3	89 43	151.8	25
6	37 31.8	87 47	148.7	37 05.8	87 47	149.0	36 39.6	87 46	149.3	36 13.5	87 46	149.6	35 47.3	87 46	149.9	35 21.0	88 45	150.2	34 54.8	88 45	150.5	34 28.4	88 44	150.8	6
7	37 03.4	86 49	147.7	36 37.6	86 48	148.0	36 11.7	86 48	148.3	35 45.8	86 47	148.6	35 19.9	87 47	148.9	34 53.9	87 47	149.2	34 27.8	87 46	149.5	34 01.7	87 46	149.8	7
8	36 34.2	85 50	146.7	36 08.6	85 50	147.0	35 43.0	85 49	147.3	35 17.4	86 49	147.6	34 51.7	86 48	148.0	34 25.9	86 48	148.3	34 00.1	86 48	148.6	33 34.3	86 47	148.9	8
9	36 04.2	84 51	145.7	35 38.9	84 51	146.0	35 13.5	85 50	146.4	34 48.1	85 50	146.7	34 22.7	85 50	147.0	33 57.2	85 49	147.3	33 31.6	85 49	147.6	33 06.0	85 48	147.9	9
30	35 33.4	83 52	144.7	35 08.4	84 52	145.1	34 43.3	84 52	145.4	34 18.1	84 51	145.7	33 52.9	84 51	146.1	33 27.7	84 50	146.4	33 02.4	84 50	146.7	32 37.0	85 50	147.0	30
1	35 01.9	82 54	143.8	34 37.1	83 53	144.1	34 12.3	83 53	144.5	33 47.4	83 52	144.8	33 22.4	83 52	145.1	32 57.4	83 52	145.5	32 32.4	84 51	145.8	32 07.3	84 51	146.1	1
2	34 29.6	82 55	142.8	34 05.1	82 54	143.2	33 40.6	82 54	143.5	33 15.9	82 54	143.9	32 51.2	82 53	144.2	32 26.5	83 53	144.5	32 01.7	83 52	144.9	31 36.9	83 52	145.2	2
3	33 56.7	81 56	141.9	33 32.5	81 56	142.3	33 08.2	81 55	142.6	32 43.8	81 55	143.0	32 19.4	82 54	143.3	31 54.9	82 54	143.6	31 30.3	82 53	144.0	31 05.8	82 53	144.3	3
4	33 23.1	80 57	141.0	32 59.1	80 57	141.4	32 35.1	80 56	141.7	32 11.0	80 56	142.1	31 46.8	81 55	142.4	31 22.6	81 55	142.8	30 58.3	81 54	143.1	30 34.0	81 54	143.4	4
35	32 48.8	79 58	140.1	32 25.1	79 58	140.5	32 01.3	79 57	140.8	31 37.5	80 57	141.2	31 13.6	80 56	141.5	30 49.6	80 56	141.9	30 25.6	80 56	142.2	30 01.5	80 55	142.6	35
6	32 13.9	78 59	139.2	31 50.5	78 59	139.6	31 27.0	79 58	140.0	31 03.4	79 58	140.3	30 39.7	79 57	140.7	30 16.0	79 57	141.0	29 52.3	79 57	141.4	29 28.4	79 56	141.7	6
7	31 38.4	77 60	138.4	31 15.2	77 60	138.7	30 52.0	78 59	139.1	30 28.6	78 59	139.5	30 05.3	78 58	139.8	29 41.8	78 58	140.2	29 18.3	78 58	140.6	28 54.8	79 57	140.9	7
8	31 02.3	76 61	137.5	30 39.4	77 61	137.9	30 16.4	77 60	138.3	29 53.3	77 60	138.6	29 30.2	77 59	139.0	29 07.0	77 59	139.4	28 43.8	78 59	139.7	28 20.5	78 58	140.1	8
9	30 25.6	75 62	136.7	30 02.9	76 62	137.1	29 40.2	76 61	137.5	29 17.4	76 61	137.8	28 54.5	76 60	138.2	28 31.6	77 60	138.6	28 08.6	77 60	138.9	27 45.6	77 59	139.3	9
40	29 48.3	75 63	135.9	29 25.9	75 62	136.3	29 03.5	75 62	136.6	28 40.9	75 62	137.0	28 18.3	75 61	137.4	27 55.6	76 61	137.8	27 32.9	76 60	138.1	27 10.1	76 60	138.5	40
1	29 10.5	74 64	135.1	28 48.4	74 64	135.5	28 26.2	74 63	135.9	28 03.9	74 63	136.2	27 41.5	75 62	136.6	27 19.1	75 62	137.0	26 56.6	75 61	137.4	26 34.1	75 61	137.7	1
2	28 32.2	73 65	134.3	28 10.3	73 64	134.7	27 48.3	73 64	135.1	27 26.3	74 64	135.5	27 04.2	74 63	135.8	26 42.1	74 63	136.2	26 19.8	74 62	136.6	25 57.6	74 62	137.0	2
3	27 53.3	72 66	133.5	27 31.7	72 65	133.9	27 10.0	72 65	134.3	26 48.2	73 64	134.7	26 26.4	73 64	135.1	26 04.5	73 64	135.5	25 42.5	73 63	135.8	25 20.5	73 63	136.2	3
4	27 14.0	71 66	132.8	26 52.6	71 66	133.2	26 31.2	72 66	133.5	26 09.6	72 65	133.9	25 48.0	72 65	134.3	25 26.4	72 64	134.7	25 04.7	72 64	135.1	24 42.9	73 63	135.5	4
45	26 34.2	70 67	132.0	26 13.0	71 67	132.4	25 51.8	71 66	132.8	25 30.6	71 66	133.2	25 09.2	71 66	133.6	24 47.8	71 65	134.0	24 26.4	72 65	134.4	24 04.9	72 64	134.7	45
6	25 53.9	70 68	131.3	25 33.0	70 68	131.7	25 12.0	70 67	132.1	24 51.0	70 67	132.5	24 29.9	70 66	132.9	24 08.8	71 66	133.3	23 47.6	71 66	133.6	23 26.3	71 65	134.0	6
7	25 13.1	69 69	130.6	24 52.5	69 68	131.0	24 31.8	69 68	131.4	24 11.0	69 67	131.8	23 50.2	70 67	132.2	23 29.3	70 67	132.5	23 08.3	70 66	132.9	22 47.3	70 66	133.3	7
8	24 31.9	68 69	129.9	24 11.6	68 69	130.3	23 51.1	69 68	130.7	23 30.6	69 68	131.1	23 10.0	69 68	131.5	22 49.3	69 67	131.8	22 28.6	69 67	132.2	22 07.9	69 66	132.6	8
9	23 50.3	67 70	129.2	23 30.2	67 70	129.6	23 10.0	67 69	130.0	22 49.7	68 69	130.4	22 29.3	68 68	130.8	22 08.9	68 68	131.2	21 48.5	68 68	131.6	21 28.0	68 67	132.0	9
50	23 08.3	66 71	128.5	22 48.4	67 70	128.9	22 28.4	67 70	129.3	22 08.4	67 70	129.7	21 48.3	67 69	130.1	21 28.1	67 69	130.5	21 07.9	67 68	130.9	20 47.7	68 68	131.3	50
1	22 25.9	65 71	127.8	22 06.2	66 71	128.2	21 46.5	66 70	128.6	21 26.7	66 70	129.0	21 06.8	66 70	129.4	20 46.9	66 69	129.8	20 27.0	67 69	130.2	20 06.9	67 68	130.6	1
2	21 43.1	65 72	127.1	21 23.7	65 72	127.6	21 04.2	65 71	128.0	20 44.6	65 71	128.4	20 25.0	65 70	128.8	20 05.3	66 70	129.2	19 45.6	66 70	129.6	19 25.8	66 69	130.0	2
3	21 00.0	64 73	126.5	20 40.7	64 72	126.9	20 21.5	64 72	127.3	20 02.1	65 71	127.7	19 42.8	65 71	128.1	19 23.3	65 70	128.5	19 03.8	65 70	128.9	18 44.3	65 70	129.3	3
4	20 16.4	63 73	125.9	19 57.4	63 73	126.3	19 38.4	64 72	126.7	19 19.3	64 72	127.1	19 00.2	64 72	127.5	18 41.0	64 71	127.9	18 21.7	64 71	128.3	18 02.4	64 70	128.7	4
55	19 32.5	62 74	125.2	19 13.8	63 73	125.6	18 55.0	63 73	126.1	18 36.1	63 72	126.5	18 17.2	63 72	126.9	17 58.2	63 72	127.3	17 39.2	63 71	127.7	17 20.1	64 71	128.1	55
6	18 48.3	62 74	124.6	18 29.8	62 74	125.0	18 11.2	62 74	125.4	17 52.6	62 73	125.9	17 33.9	62 73	126.3	17 15.2	63 72	126.7	16 56.4	63 72	127.1	16 37.5	63 72	127.5	6
7	18 03.8	61 75	124.0	17 45.5	61 74	124.4	17 27.1	61 74	124.8	17 08.7	62 74	125.3	16 50.2	62 73	125.7	16 31.7	62 73	126.1	16 13.2	62 72	126.5	15 54.6	62 72	126.9	7
8	17 18.9	60 75	123.4	17 00.8	60 75	123.8	16 42.7	61 74	124.2	16 24.5	61 74	124.7	16 06.3	61 74	125.1	15 48.0	61 74	125.5	15 29.7	61 73	125.9	15 11.3	61 73	126.3	8
9	16 33.8	60 76	122.8	16 15.9	60 76	123.2	15 58.0	60 75	123.7	15 40.0	60 75	124.1	15 22.0	60 74	124.5	15 03.9	60 74	124.9	14 45.8	60 74	125.3	14 27.7	61 73	125.7	9
60	15 48.3	59 76	122.2	15 30.6	59 76	122.7	15 12.9	59 75	123.1	14 55.2	59 75	123.5	14 37.4	59 75	123.9	14 19.5	60 74	124.3	14 01.6	60 74	124.7	13 43.7	60 74	125.2	60
1	15 02.5	58 77	121.7	14 45.1	58 76	122.1	14 27.6	58 76	122.5	14 10.1	59 76	122.9	13 52.5	59 75	123.4	13 34.9	59 75	123.8	13 17.2	59 75	124.2	12 59.5	59 74	124.6	1
2	14 16.5	57 77	121.1	13 59.3	58 77	121.5	13 42.0	58 76	122.0	13 24.7	58 76	122.4	13 07.3	58 76	122.8	12 49.9	58 76	123.2	12 32.4	58 75	123.6	12 14.9	58 75	124.0	2
3	13 30.2	57 78	120.6	13 13.2	57 77	121.0	12 56.1	57 77	121.4	12 39.0	57 77	121.8	12 21.8	57 76	122.2	12 04.6	57 76	122.7	11 47.4	58 76	123.1	11 30.1	58 75	123.5	3
4	12 43.6	56 78	120.0	12 26.8	56 78	120.4	12 09.9	56 77	120.9	11 53.0	56 77	121.3	11 36.1	57 77	121.7	11 19.1	57 76	122.1	11 02.1	57 76	122.5	10 45.0	57 76	123.0	4
65	11 56.8	55 78	119.5	11 40.2	56 78	119.9	11 23.5	56 78	120.3	11 06.8	56 78	120.8	10 50.1	56 77	121.2	10 33.3	56 77	121.6	10 16.5	56 76	122.0	9 59.6	56 76	122.4	65
6	11 09.8	55 79	119.0	10 53.3	55 78	119.4	10 36.8	55 78	119.8	10 20.3	55 78	120.2	10 03.8	55 78	120.7	9 47.2	55 77	121.1	9 30.6	55 77	121.5	9 14.0	56 76	121.9	6
7	10 22.5	54 79	118.4	10 06.2	54 79	118.9	9 49.9	54 78	119.3	9 33.6	54 78	119.7	9 17.3	55 78	120.1	9 00.9	55 78	120.6	8 44.5	55 77	121.0	8 28.1	55 77	121.4	7
8	9 34.9	53 80	117.9	9 18.9	54 79	118.3	9 02.8	54 79	118.8	8 46.7	54 79	119.2	8 30.5	54 78	119.6	8 14.4	54 78	120.1	7 58.2	54 78	120.5	7 41.9	54 77	120.9	8
9	8 47.2	53 80	117.4	8 31.3	53 80	117.8	8 15.4	53 79	118.3	7 59.5	53 79	118.7	7 43.5	53 79	119.1	7 27.6	53 78	119.6	7 11.6	53 78	120.0	6 55.5	53 78	120.4	9
70	7 59.2	52 80	116.9	7 43.5	52 80	117.3	7 27.8	52 80	117.8	7 12.1	52 80	118.2	6 56.3	53 79	118.6	6 40.5	53 79	119.1	6 24.7	53 78	119.5	6 08.9	53 78	119.9	70
1	7 11.0	52 81	116.4	6 55.5	52 80	116.9	6 40.0	52 80	117.3	6 24.4	52 80	117.7	6 08.9	52 79	118.1	5 53.3	52 79	118.6	5 37.7	52 79	119.0	5 22.1	52 78	119.4	1
2	6 22.6	51 81	115.9	6 07.3	51 81	116.4	5 51.9	51 80	116.8	5 36.6	51 80	117.2	5 21.2	51 80	117.7	5 05.8	51 79	118.1							2
3	5 34.0	50 81	115.5	5 18.9	50 81	115.9	5 03.7	51 81	116.3																3
4																									4

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	7 46.2	42 85	71.5	7 58.8	42 85	71.0	8 11.4	42 85	70.6	8 24.0	42 84	70.1	8 36.5	42 84	69.7	8 49.0	42 84	69.2	9 01.4	41 84	68.7	9 13.9	41 84	68.3	91
2	6 55.1	43 85	71.1	7 07.9	42 85	70.6	7 20.6	42 84	70.2	7 33.3	42 84	69.7	7 46.0	42 84	69.3	7 58.6	42 84	68.8	8 11.2	42 83	68.3	8 23.8	42 83	67.9	2
3	6 04.2	43 85	70.7	6 17.1	43 84	70.2	6 29.9	43 84	69.8	6 42.8	43 84	69.3	6 55.6	43 84	68.9	7 08.4	43 84	68.4	7 21.2	43 83	68.0	7 33.9	42 83	67.5	3
4	5 13.3	44 85	70.3	5 26.4	43 84	69.8	5 39.4	43 84	69.4	5 52.4	43 84	68.9	6 05.4	43 84	68.5	6 18.3	43 83	68.0	6 31.3	43 83	67.6	6 44.2	43 83	67.1	4
95																						5 54.6	44 82	66.7	95
6										5 02.2	44 84	68.5	5 15.3	44 83	68.1	5 28.4	44 83	67.6	5 41.5	44 83	67.2	5 05.1	44 82	66.3	6

Lat. 26°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	°
00	88 00.0	1.0 20	180.0	88 30.0	1.0 25	180.0	89 00.0	1.0 35	180.0	89 30.0	1.0 53	180.0	90 00.0	.. 90	....	89 30.0	1.0 53	00.0	89 00.0	1.0 34	00.0	88 30.0	1.0 41	00.0	00
1	87 48.3	91 50	155.4	88 14.9	86 60	148.7	88 39.2	74 72	137.7	88 58.2	49 84	118.8	89 06.1	00 90	89.8	88 58.4	48 84	60.6	88 39.5	74 71	41.6	88 15.3	86 59	30.5	1
2	87 18.1	75 68	137.4	87 39.0	64 75	129.2	87 56.2	49 82	118.6	88 07.8	27 88	105.1	88 12.1	01 90	89.6	88 08.3	26 88	74.0	87 57.0	48 82	60.4	87 40.1	64 74	49.5	2
3	86 37.5	60 76	125.7	86 54.0	49 82	118.3	87 06.8	36 86	109.6	87 15.1	19 89	99.8	87 18.2	01 90	89.3	87 15.8	17 88	78.8	87 08.1	34 85	68.9	86 55.8	48 80	60.1	3
4	85 51.6	50 81	118.0	86 05.0	40 85	111.7	86 15.2	28 88	104.6	86 21.8	15 89	97.0	86 24.3	02 90	89.1	86 22.7	12 89	81.2	86 17.0	25 87	73.5	86 07.6	37 84	66.3	4
05	85 02.8	42 84	112.7	85 14.2	33 87	107.3	85 22.7	23 88	101.4	85 28.2	13 90	95.2	85 30.4	02 90	88.9	85 29.3	09 89	82.5	85 24.9	20 88	76.3	85 17.4	30 85	70.3	05
6	84 12.4	37 86	108.9	84 22.2	29 88	104.2	84 29.6	20 89	99.2	84 34.4	11 90	94.0	84 36.5	02 90	88.7	84 35.8	07 89	83.4	84 32.3	16 88	78.1	84 26.2	25 86	73.0	6
7	83 21.0	32 87	106.0	83 29.7	26 88	101.8	83 36.2	18 89	97.5	83 40.6	11 90	93.0	83 42.6	03 90	88.5	83 42.2	05 89	83.9	83 39.4	13 88	79.4	83 34.4	21 87	74.9	7
8	82 28.8	29 88	103.7	82 36.7	23 89	100.0	82 42.7	17 90	96.1	82 46.7	10 90	92.2	82 48.6	03 90	88.2	82 48.5	04 89	84.2	82 46.3	11 89	80.3	82 42.1	18 88	76.4	8
9	81 36.2	27 88	101.8	81 43.5	21 89	98.5	81 49.0	16 90	95.1	81 52.8	10 90	91.6	81 54.8	03 90	88.0	81 54.9	03 90	84.5	81 53.1	09 89	80.9	81 49.6	15 88	77.4	9
10	80 43.3	25 89	100.3	80 50.1	20 89	97.3	80 55.3	15 90	94.1	80 58.9	09 90	91.0	81 00.9	04 90	87.8	81 01.2	02 90	84.6	80 59.8	07 89	81.4	80 56.9	13 88	78.2	10
1	79 50.1	24 89	99.0	79 56.5	19 90	96.2	80 01.5	14 90	93.4	80 05.0	09 90	90.5	80 07.0	04 90	87.6	80 07.5	01 90	84.7	80 06.5	06 89	81.8	80 04.0	11 88	78.9	1
2	78 56.8	22 89	97.8	79 02.8	18 90	95.3	79 07.6	14 90	92.7	79 11.0	09 90	90.0	79 13.1	05 90	87.4	79 13.8	00 90	84.7	79 13.1	05 89	82.0	79 11.1	09 88	79.4	2
3	78 03.3	21 89	96.8	78 09.1	17 90	94.5	78 13.7	13 90	92.0	78 17.1	09 90	89.6	78 19.2	05 90	87.1	78 20.1	01 90	84.7	78 19.7	03 89	82.2	78 18.0	08 88	79.7	3
4	77 09.7	21 90	95.9	77 15.3	17 90	93.7	77 19.8	13 90	91.5	77 23.2	09 90	89.2	77 25.4	05 90	86.9	77 26.4	01 90	84.6	77 26.3	02 89	82.3	77 24.9	06 88	80.0	4
15	76 16.0	20 90	95.1	76 21.5	17 90	93.1	76 25.9	13 90	91.0	76 29.3	09 90	88.8	76 31.5	06 90	86.7	76 32.7	02 90	84.6	76 32.8	02 89	82.4	76 31.8	05 89	80.3	15
6	75 22.3	19 90	94.4	75 27.6	16 90	92.4	75 32.0	13 90	90.5	75 35.3	10 90	88.5	75 37.7	06 90	86.5	75 39.0	03 89	84.5	75 39.3	01 89	82.4	75 38.6	04 89	80.4	6
7	74 28.5	19 90	93.7	74 33.7	16 90	91.9	74 38.1	13 90	90.0	74 41.4	10 90	88.1	74 43.9	07 90	86.3	74 45.4	03 89	84.4	74 45.9	00 89	82.5	74 45.5	03 89	80.5	7
8	73 34.7	19 90	93.1	73 39.8	16 90	91.4	73 44.1	13 90	89.6	73 47.6	10 90	87.8	73 50.1	07 90	86.0	73 51.7	04 89	84.2	73 52.4	01 89	82.4	73 52.2	02 89	80.6	8
9	72 40.8	18 90	92.5	72 45.9	16 90	90.9	72 50.2	13 90	89.2	72 53.7	10 90	87.5	72 56.3	07 90	85.8	72 58.1	04 89	84.1	72 59.0	02 89	82.4	72 59.0	01 89	80.7	9
20	71 46.9	18 90	92.0	71 52.0	16 90	90.4	71 56.3	13 90	88.8	71 59.8	10 90	87.2	72 02.5	08 90	85.6	72 04.4	05 89	84.0	72 05.5	02 89	82.3	72 05.8	00 89	80.7	20
1	70 53.0	18 90	91.5	70 58.1	16 90	89.9	71 02.4	13 90	88.4	71 05.9	11 90	86.9	71 08.8	08 90	85.4	71 10.8	06 89	83.8	71 12.1	03 89	82.3	71 12.6	00 89	80.7	1
2	69 59.1	18 90	91.0	70 04.1	16 90	89.5	70 08.5	13 90	88.1	70 12.1	11 90	86.6	70 15.0	09 90	85.1	70 17.2	06 89	83.7	70 18.6	04 89	82.2	70 19.4	01 89	80.7	2
3	69 05.2	18 90	90.5	69 10.2	16 90	89.1	69 14.6	13 90	87.7	69 18.3	11 90	86.3	69 21.3	09 90	84.9	69 23.6	07 89	83.5	69 25.2	04 89	82.1	69 26.2	02 89	80.6	3
4	68 11.2	18 90	90.0	68 16.3	16 90	88.7	68 20.7	14 90	87.4	68 24.5	11 90	86.0	68 27.6	09 90	84.7	68 30.0	07 89	83.3	68 31.8	05 89	82.0	68 33.0	03 89	80.6	4
25	67 17.3	18 90	89.6	67 22.4	16 90	88.3	67 26.8	14 90	87.0	67 30.7	12 90	85.8	67 33.9	10 90	84.4	67 36.5	08 89	83.1	67 38.4	05 89	81.8	67 39.8	03 89	80.5	25
6	66 23.4	18 90	89.2	66 28.5	16 90	88.0	66 33.0	14 90	86.7	66 36.9	12 90	85.5	66 40.2	10 89	84.2	66 43.0	08 89	83.0	66 45.1	06 89	81.7	66 46.6	04 89	80.4	6
7	65 29.5	18 90	88.8	65 34.6	16 90	87.6	65 39.2	14 90	86.4	65 43.2	12 90	85.2	65 46.6	10 89	84.0	65 49.4	09 89	82.8	65 51.7	07 89	81.6	65 53.4	05 88	80.3	7
8	64 35.6	18 90	88.4	64 40.7	16 90	87.3	64 45.4	15 90	86.1	64 49.4	13 90	84.9	64 53.0	11 89	83.8	64 56.0	09 89	82.6	64 58.4	07 89	81.4	65 00.3	05 88	80.2	8
9	63 41.7	18 90	88.0	63 46.9	17 90	86.9	63 51.6	15 90	85.8	63 55.7	13 90	84.7	63 59.4	11 89	83.5	64 02.5	09 89	82.4	64 05.1	08 89	81.3	64 07.1	06 88	80.1	9
30	62 47.8	18 90	87.6	62 53.0	17 90	86.6	62 57.8	15 90	85.5	63 02.0	13 89	84.4	63 05.8	12 89	83.3	63 09.0	10 89	82.2	63 11.8	08 89	81.1	63 14.0	07 88	80.0	30
1	61 53.9	18 90	87.3	61 59.2	17 90	86.2	62 04.0	15 90	85.2	62 08.4	14 89	84.1	62 12.3	12 89	83.1	62 15.6	10 89	82.0	62 18.5	09 89	80.9	62 20.9	07 88	79.9	1
2	61 00.0	19 90	86.9	61 05.4	17 90	85.9	61 10.3	16 90	84.9	61 14.8	14 89	83.9	61 18.7	12 89	82.8	61 22.2	11 89	81.8	61 25.3	09 89	80.8	61 27.8	08 88	79.7	2
3	60 06.2	19 90	86.6	60 11.6	17 90	85.6	60 16.6	16 90	84.6	60 21.2	14 89	83.6	60 25.2	13 89	82.6	60 28.9	11 89	81.6	60 32.1	10 89	80.6	60 34.8	08 88	79.6	3
4	59 12.4	19 90	86.2	59 17.9	18 90	85.3	59 22.9	16 89	84.3	59 27.6	15 89	83.3	59 31.8	13 89	82.4	59 35.5	12 89	81.4	59 38.9	10 89	80.4	59 41.8	09 88	79.4	4
35	58 18.6	19 90	85.9	58 24.1	18 90	85.0	58 29.3	16 89	84.0	58 34.0	15 89	83.1	58 38.3	14 89	82.1	58 42.2	12 89	81.2	58 45.7	11 88	80.2	58 48.8	09 88	79.3	35
6	57 24.8	19 90	85.6	57 30.4	18 90	84.7	57 35.7	17 89	83.7	57 40.5	15 89	82.8	57 44.9	14 89	81.9	57 49.0	13 89	81.0	57 52.6	11 88	80.0	57 55.8	10 88	79.1	6
7	56 31.0	20 90	85.2	56 36.7	18 89	84.4	56 42.1	17 89	83.5	56 47.0	16 89	82.6	56 51.6	15 89	81.7	56 55.7	13 89	80.8	56 59.5	12 88	79.8	57 02.8	11 88	78.9	7
8	55 37.3	20 90	84.9	55 43.1	19 89	84.1	55 48.5	17 89	83.2	55 53.6	16 89	82.3	55 58.2	15 89	81.4	56 02.5	14 89	80.5	56 06.4	12 88	79.6	56 09.9	11 88	78.7	8
9	54 43.6	20 90	84.6	54 49.5	19 89	83.7	54 55.0	18 89	82.9	55 00.1	17 89	82.0	55 04.9	15 89	81.2	55 09.3	14 88	80.3	55 13.4	13 88	79.4	55 17.1	12 88	78.6	9
40	53 49.9	20 89	84.3	53 55.9	19 89	83.5	54 01.5	18 89	82.6	54 06.7	17 89	81.8	54 11.6	16 89	80.9	54 16.2	15 88	80.1	54 20.4	13 88	79.2	54 24.2	12 88	78.4	40
1	52 56.3	21 89	84.0	53 02.3	20 89	83.2	53 08.0	18 89	82.3	53 13.4	17 89	81.5	53 18.4	16 89	80.7	53 23.1	15 88	79.9	53 27.4	14 88	79.0	53 31.4	13 88	78.2	1
2	52 02.7	21 89	83.7	52 08.8	20 89	82.9	52 14.6	19 89	82.1	52 20.1	18 89	81.3	52 25.2	17 88	80.4	52 30.0	16 88	79.6	52 34.5	14 88	78.8	52 38.6	13 88	78.0	2
3	51 09.1	21 89	83.3	51 15.3	20 89	82.6	51 21.2	19 89	81.8	51 26.8	18 89	81.0	51 32.1	17 88	80.2	51 37.0	16 88	79.4	51 41.6	15 88	78.6	51 45.9	14 88	77.8	3
4	50 15.5	22 89	83.0	50 21.9	21 89	82.3	50 27.8	19 89	81.5	50 33.5	18 89	80.7	50 38.9	17 88	80.0	50 44.0	16 88	79.2	50 48.8	15 88	78.4	50 53.2	14 88	77.6	4
45	49 22.0	22 89	82.7	49 28.4	21 89	82.0	49 34.5	20 89	81.2	49 40.3	19 88	80.5	49 45.8	18 88	79.7	49 51.1	17 88	78.9	49 56.0	16 88	78.2	50 00.6	15 88	77.4	45
6	48 28.6	22 89	82.4	48 35.1	21 89	81.7	48 41.3	20 89	80.9	48 47.2	19 88	80.2	48 52.8	18 88	79.5	48 58.2	17 88	78.7	49 03.2	16 88	78.0	49 08.0	15 88	77.2	6
7	47 35.1	22 89	82.1	47 41.7	22 89	81.4	47 48.0	21 89	80.7	47 54.1	20 88	79.9	47 59.8	19 88	79.2	48 05.3	18 88	78.5	48 10.5	17 88	77.7	48 15.4	16 88	77.0	7
8	46 41.7	23 89	81.8	46 48.4	22 89	81.1	46 54.8	21 89	80.4	47 01.0	20 88	79.7	47 06.9	19 88	79.0	47 12.5	18 88	78.2	47 17.8	17 88	77.5	47 22.9	16 88	76.8	8
9	45 48.4	23 89	81.5	45 55.2	22 89	80.8	46 01.7	21 88	80.1	46 07.9	20 88	79.4	46 14.0	20 88	78.7	46 19.7	19 88	78.0	46 25.2	18 88	77.3	46 30.4	17 87	76.6	9
50	44 55.0	23 89	81.2	45 01.9	23 89	80.5	45 08.6	22 88	79.8	45 15.0	21 88	79.1	45 21.1	20 88	78.4	45 27.0	19 88	77.7	45 32.6	18 88	77.0	45 38.0	17 87	76.3	50
1	44 01.8	24 89	80.9	44 08.8	23 89	80.2	44 15.5	22 88	79.6	44 22.0	21 88	78.9	44 28.3	20 88	78.2	44 34.3	20 88	77.5	44 40.1	19 88	76.8	44 45.6	18 87	76.1	1
2	43 08.5	24 89	80.6	43 15.6	23 88	79.9	43 22.5	22 88	79.3	43 29.1	22 88	78.6	43 35.5	21 88	77.9	43 41.7	20 88	77.3	43 47.6	19 87	76.6	43 53.3	19 87	75.9	2
3	42 15.4	24 89	80.3	42 22.6	24 88	79.7	42 29.5	23 88	79.0	42 36.3	22 88	78.3	42 42.8	21 88	77.7	42 49.1	21 88	77.0	42 55.2	20 87	76.3	43 01.0	19 87	75.7	3
4	41 22.2	25 88	80.0	41 29.5	24 88	79.4	41 36.6	23 88	78.7	41 43.5	23 88	78.1	41 50.2	22 88	77.4	41 56.6	21 88	76.8	42 02.8	20 87	76.1	42 08.8	20 87	75.4	4
55	40 29.1	25 88	79.7	40 36.6	24 88	79.1	40 43.8	24 88	78.4	40 50.8	23 88	77.8	40 57.6	22 88	77.1	41 04.1	22 87	76.5	41 10.5	21 87	75.9	41 16.6	20 87	75.2	55
6	39 36.1	25 88	79.4	39 43.6	25 88	78.8	39 51.0	24 88	78.2	39 58.1	23 88	77.5	40 05.0	23 88	76.9	40 11.7	22 87	76.2	40 18.2	21 87	75.6	40 24.5	21 87	75.0	6
7	38 43.1	26 88	79.1	38 50.8	25 88	78.5	38 58.2	24 88	77.9	39 05.5	24 88	77.2	39 12.5	23 87	76.6	39 19.4	22 87	76.0	39 26.0	22 87	75.4	39 32.4	21 87	74.7	7
8	37 50.2	26 88	78.8	37 58.0	26 88	78.2	38 05.5	25 88	77.6	38 12.9	24 88	77.0	38 20.1	24 87	76.3	38 27.1	23 87	75.7	38 33.9	22 87	75.1	38 40.4	22 86	74.5	8
9	36 57.3	27 88	78.5	37 05.2	26 88	77.9	37 12.9	25 88	77.3	37 20.4	25 88	76.7	37 27.7	24 87	76.1	37 34.8	23 87	75.5	37 41.8	23 87	74.8	37 48.5	22 86	74.2	9
60	36 04.5	27 88	78.2	36 12.5	26 88	77.6	36 20.3	26 88	77.0	36 27.9	25 87	76.4	36 35.4	25 87	75.8	36 42.7	24 87	75.2	36 49.8	23 87	74.6	36 56.7	23 86	74.0	60
1	35 11.8	27 88	77.9	35 19.9	27 88	77.3	35 27.8	26 87	76.7	35 35.6	26 87	76.1	35 43.2	25 87	75.5	35 50.6	24 87	74.9	35 57.8	24 86	74.3	36 04.9	23 86	73.7	1
2	34 19.1	28 88	77.6	34 27.3	27 88	77.0	34 35.3	27 87	76.4	34 43.2	26 87	75.8	34 51.0	25 87	75.2	34 58.5	25 86	74.7	35 05.9	24 86	74.1	35 13.1	24 86	73.5	2
3	33 26.4	28 88	77.3	33 34.8	28 88	76.7	33 43.0	27 87	76.1	33 51.0	26 87	75.5	33 58.9	26 87	75.0	34 06.6	25 86	74.4	34 14.1	25 86	73.8	34 21.5	24 86	73.2	3
4	32 33.8	29 88	77.0	32 42.3	28 87	76.4	32 50.6	27 87	75.8	32 58.8	27 87	75.3	33 06.8	26 87	74.7	33 14.7	26 86	74.1	33 22.3	25 86	73.5	33 29.9	25 86	72.9	4
65	31 41.3	29 87	76.7	31 49.9	28 87	76.1	31 58.4	28 87	75.5	32 06.7	27 87	75.0	32 14.8	27 86	74.4	32 22.8	26 86	73.8	32 30.7	26 86	73.3	32 38.3	25 86	72.7	65
6	30 48.9	29 87	76.3	30 57.6	29 87	75.8	31 06.2	28 87	75.2	31 14.6	28 86	74.7	31 22.9	27 86	74.1	31 31.1	27 86	73.5	31 39.1	26 86	73.0	31 46.9	26 86	72.4	6
7	29 56.5	30 87	76.0	30 05.4	29 87	75.5	30 14.1	29 87	74.9	30 22.7	28 86	74.4	30 31.1	28 86	73.8	30 39.4	27 86	73.3	30 47.5	27 86	72.7	30 55.5	26 86	72.1	7
8	29 04.2	30 87	75.7	29 13.2	30 87	75.2	29 22.1	29 87	74.6	29 30.8	29 86	74.1	29 39.3	28 86	73.5	29 47.8	28 86	73.0	29 56.1	27 86	72.4	30 04.2	27 85	71.9	8
9	28 12.0	31 87	75.4	28 21.1	30 87	74.9	28 30.1	30 86	74.3	28 39.0	29 86	73.8	28 47.7	29 86	73.2	28 56.3	28 86	72.7	29 04.7	28 86	72.1	29 13.0	28 85	71.6	9
70	27 19.9	31 87	75.1	27 29.1	31 86	74.6	27 38.2	30 86	74.0	27 47.2	30 86	73.5	27 56.1	29 86	72.9	28 04.8	29 86	72.4	28 13.4	28 85	71.9	28 21.9	28 85	71.3	70
1	26 27.8	31 87	74.8	26 37.2	31 86	74.2	26 46.4	31 86	73.7	26 55.6	30 86	73.2	27 04.6	30 86	72.6	27 13.5	29 86	72.1	27 22.2	29 85	71.6	27 30.9	29 85	71.0	1
2	25 35.8	32 86	74.4	25 45.3	32 86	73.9	25 54.7	31 86	73.4	26 04.0	31 86	72.9	26 13.1	30 86	72.3	26 22.2	30 85	71.8	26 31.1	30 85	71.3	26 39.9	29 85	70.7	2
3	24 43.9	32 86	74.1	24 53.5	32 86	73.6	25 03.1	32 86	73.1	25 12.5	31 86	72.6	25 21.8	31 86	72.0	25 31.0	30 85	71.5	25 40.1	30 85	71.0	25 49.1	30 85	70.4	3
4	23 52.1	33 86	73.8	24 01.8	32 86	73.3	24 11.5	32 86	72.8	24 21.1	32 86	72.2	24 30.5	31 85	71.7	24 39.9	31 85	71.2	24 49.1	31 85	70.7	24 58.3	30 84	70.1	4
75	23 00.3	33 86	73.5	23 10.2	33 86	73.0	23 20.1	33 86	72.4	23 29.8	32 86	71.9	23 39.4	32 85	71.4	23 48.9	32 85	70.9	23 58.3	31 84	70.4	24 07.6	31 84	69.8	75
6	22 08.7	34 86	73.1	22 18.7	33 86	72.6	22 28.7	33 86	72.1	22 38.5	33 85	71.6	22 48.3	32 85	71.1	22 58.0	32 85	70.6	23 07.6	32 84	70.1	23 17.0	31 84	69.5	6
7	21 17.1	34 86	72.8	21 27.3	34 86	72.3	21 37.4	34 85	71.8	21 47.4	33 85	71.3	21 57.3	33 85	70.8	22 07.2	33 84	70.3	22 16.9	32 84	69.8	22 26.6	32 84	69.2	7
8	20 25.6	35 86	72.5	20 36.0	34 86	72.0	20 46.2	34 85	71.5	20 56.4	34 85	71.0	21 06.5	33 85	70.5	21 16.5	33 84	69.9	21 26.4	33 84	69.4	21 36.2	33 84	68.9	8
9	19 34.3	35 86	72.1	19 44.7	35 85	71.6	19 55.1	35 85	71.1	20 05.5	34 85	70.6	20 15.7	34 84	70.1	20 25.9	34 84	69.6	20 35.9	33 84	69.1	20 45.9	33 84	68.6	9
80	18 43.0	36 85	71.8	18 53.6	35 85	71.3	19 04.2	35 85	70.8	19 14.6	35 84	70.3	19 25.0	35 84	69.8	19 35.4	34 84	69.3	19 45.6	34 84	68.8	19 55.7	34 83	68.3	80
1	17 51.8	36 85	71.4	18 02.6	36 85	71.0	18 13.3	36 85	70.5	18 23.9	35 84	70.0	18 34.5	35 84	69.5	18 45.0	35 84	69.0	18 55.4	35 84	68.5	19 05.7	34 83	68.0	1
2	17 00.7	37 85	71.1	17 11.7	36 85	70.6	17 22.5	36 84	70.1	17 33.3	36 84	69.6	17 44.0	36 84	69.1	17 54.7	35 84	68.6	18 05.3	35 83	68.2	18 15.8	35 83	67.7	2
3	16 09.8	37 85	70.7	16 20.9	37 84	70.3	16 31.9	37 84	69.8	16 42.8	36 84	69.3	16 53.7	36 84	68.8	17 04.5	36 83	68.3	17 15.3	36 83	67.8	17 25.9	35 83	67.3	3
4	15 18.9	38 84	70.4	15 30.1	37 84	69.9	15 41.3	37 84	69.4	15 52.4	37 84	68.9	16 03.5	37 84	68.5	16 14.5	36 83	68.0	16 25.4	36 83	67.5	16 36.2	36 83	67.0	4
85	14 28.2	38 84	70.0	14 39.6	38 84	69.6	14 50.9	38 84	69.1	15 02.2	37 84	68.6	15 13.4	37 83	68.1	15 24.5	37 83	67.6	15 35.6	37 83	67.2	15 46.6	37 82	66.7	85
6	13 37.5	39 84	69.7	13 49.1	38 84	69.2	14 00.6	38 84	68.7	14 12.0	38 83	68.2	14 23.4	38 83	67.8	14 34.7	38 83	67.3	14 46.0	37 82	66.8	14 57.2	37 82	66.3	6
7	12 47.0	39 84	69.3	12 58.7	39 84	68.8	13 10.4	39 84	68.4	13 22.0	39 83	67.9	13 33.5	38 83	67.4	13 45.0	38 82	66.9	13 56.5	38 82	66.5	14 07.9	38 82	66.0	7
8	11 56.6	40 84	68.9	12 08.5	39 84	68.5	12 20.3	39 83	68.0	12 32.1	39 83	67.5	12 43.8	39 83	67.1	12 55.5	39 82	66.6	13 07.1	39 82	66.1	13 18.7	38 82	65.6	8
9	11 06.4	40 84	68.6	11 18.4	40 83	68.1	11 30.4	40 83	67.6	11 42.3	40 83	67.2	11 54.2	40 82	66.7	12 06.1	39 82	66.2	12 17.9	39 82	65.8	12 29.6	39 82	65.3	9
90	10 16.3	41 84	68.2	10 28.4	41 83	67.7	10 40.6	40 83	67.3	10 52.7	40 82	66.8	11 04.8	40 82	66.3	11 16.8	40 82	65.9	11 28.8	40 82	65.4	11 40.7	40 81	64.9	90

Lat. 26°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	40 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	39 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	00
1	39 59.4	1.0 03	178.8	39 29.4	1.0 03	178.8	38 59.5	1.0 03	178.8	38 29.5	1.0 03	178.8	37 59.5	1.0 03	178.9	37 29.5	1.0 03	178.9	36 59.5	1.0 03	178.9	36 29.5	1.0 03	178.9	1
2	39 57.8	1.0 05	177.6	39 27.8	1.0 05	177.6	38 57.8	1.0 04	177.7	38 27.8	1.0 04	177.7	37 57.9	1.0 04	177.7	37 27.9	1.0 04	177.7	36 57.9	1.0 04	177.8	36 27.9	1.0 04	177.8	2
3	39 55.0	1.0 07	176.4	39 25.0	1.0 06	176.5	38 55.1	1.0 06	176.5	38 25.1	1.0 06	176.5	37 55.2	1.0 06	176.6	37 25.2	1.0 06	176.6	36 55.3	1.0 06	176.7	36 25.3	1.0 06	176.7	3
4	39 51.0	1.0 08	175.2	39 21.1	1.0 08	175.3	38 51.2	1.0 08	175.3	38 21.3	1.0 08	175.4	37 51.4	1.0 08	175.4	37 21.5	1.0 08	175.5	36 51.6	1.0 08	175.5	36 21.7	1.0 08	175.6	4
05	39 46.0	99 10	174.1	39 16.2	99 10	174.1	38 46.3	1.0 10	174.2	38 16.5	1.0 10	174.2	37 46.6	1.0 10	174.3	37 16.8	1.0 10	174.4	36 46.9	1.0 10	174.4	36 17.0	1.0 09	174.5	05
6	39 39.9	99 12	172.9	39 10.1	99 12	173.0	38 40.3	99 12	173.0	38 10.5	99 12	173.1	37 40.7	99 12	173.2	37 10.9	99 11	173.3	36 41.2	99 11	173.3	36 11.4	99 11	173.4	6
7	39 32.6	99 14	171.7	39 02.9	99 14	171.8	38 33.2	99 14	171.9	38 03.5	99 13	172.0	37 33.8	99 13	172.1	37 04.1	99 13	172.1	36 34.4	99 13	172.2	36 04.7	99 13	172.3	7
8	39 24.3	99 16	170.5	38 54.7	99 16	170.6	38 25.1	99 15	170.7	37 55.5	99 15	170.8	37 25.8	99 15	170.9	36 56.2	99 15	171.0	36 26.6	99 15	171.1	35 56.9	99 14	171.2	8
9	39 14.9	98 18	169.4	38 45.4	98 17	169.5	38 15.9	98 17	169.6	37 46.3	98 17	169.7	37 16.8	98 17	169.8	36 47.3	98 16	169.9	36 17.8	98 16	170.0	35 48.2	98 16	170.1	9
10	39 04.4	98 19	168.2	38 35.0	98 19	168.3	38 05.6	98 19	168.5	37 36.2	98 19	168.6	37 06.8	98 18	168.7	36 37.4	98 18	168.8	36 07.9	98 18	169.0	35 38.5	98 18	169.1	10
1	38 52.8	98 21	167.1	38 23.6	98 21	167.2	37 54.3	98 20	167.3	37 25.0	98 20	167.5	36 55.7	98 20	167.6	36 26.4	98 20	167.7	35 57.1	98 20	167.9	35 27.8	98 20	168.0	1
2	38 40.2	97 23	165.9	38 11.1	97 22	166.1	37 42.0	97 22	166.2	37 12.8	97 22	166.4	36 43.6	97 22	166.5	36 14.5	97 22	166.7	35 45.3	97 21	166.8	35 16.1	97 21	166.9	2
3	38 26.6	97 24	164.8	37 57.6	97 24	165.0	37 28.6	97 24	165.1	36 59.6	97 24	165.3	36 30.6	97 24	165.4	36 01.5	97 23	165.6	35 32.5	97 23	165.7	35 03.4	97 23	165.9	3
4	38 12.0	96 26	163.7	37 43.1	96 26	163.8	37 14.3	96 26	164.0	36 45.4	96 25	164.2	36 16.5	96 25	164.4	35 47.6	96 25	164.5	35 18.7	96 24	164.7	34 49.8	96 24	164.8	4
15	37 56.3	96 28	162.6	37 27.6	96 28	162.7	36 58.9	96 27	162.9	36 30.2	96 27	163.1	36 01.5	96 27	163.3	35 32.7	96 26	163.5	35 04.0	96 26	163.6	34 35.2	96 26	163.8	15
6	37 39.6	95 29	161.5	37 11.1	95 29	161.6	36 42.6	95 29	161.8	36 14.1	95 28	162.0	35 45.5	95 28	162.2	35 16.9	95 25	162.4	34 48.3	95 28	162.6	34 19.7	95 27	162.8	6
7	37 22.0	94 31	160.4	36 53.7	94 31	160.6	36 25.3	95 30	160.8	35 57.0	95 30	161.0	35 28.6	95 30	161.2	35 00.2	95 30	161.4	34 31.7	95 29	161.6	34 03.3	95 29	161.8	7
8	37 03.4	94 33	159.3	36 35.2	94 32	159.5	36 07.1	94 32	159.7	35 38.9	94 32	159.9	35 10.7	94 31	160.1	34 42.5	94 31	160.3	34 14.2	94 31	160.5	33 46.0	94 30	160.7	8
9	36 43.8	93 34	158.2	36 15.9	93 34	158.4	35 47.9	93 33	158.7	35 19.9	93 33	158.9	34 51.9	93 33	159.1	34 23.9	94 32	159.3	33 55.8	94 32	159.5	33 27.7	94 32	159.7	9
20	36 23.4	92 36	157.2	35 55.6	93 35	157.4	35 27.9	93 35	157.6	35 00.1	93 35	157.9	34 32.2	93 34	158.1	34 04.4	93 34	158.3	33 36.5	93 34	158.5	33 08.6	93 33	158.8	20
1	36 02.0	92 37	156.1	35 34.4	92 37	156.4	35 06.9	92 36	156.6	34 39.3	92 36	156.8	34 11.7	92 36	157.1	33 44.0	92 35	157.3	33 16.4	92 35	157.5	32 48.7	92 35	157.8	1
2	35 39.7	91 38	155.1	35 12.4	91 38	155.3	34 45.0	91 38	155.6	34 17.7	91 38	155.8	33 50.2	91 37	156.1	33 22.8	92 37	156.3	32 55.3	92 36	156.6	32 27.8	92 36	156.8	2
3	35 16.6	90 40	154.1	34 49.5	90 40	154.3	34 22.3	91 39	154.6	33 55.2	91 39	154.8	33 28.0	91 39	155.1	33 00.7	91 38	155.4	32 33.5	91 38	155.6	32 06.2	91 38	155.8	3
4	34 52.6	90 41	153.1	34 25.7	90 41	153.3	33 58.8	90 41	153.6	33 31.8	90 40	153.9	33 04.8	90 40	154.1	32 37.8	90 40	154.4	32 10.8	90 39	154.6	31 43.7	90 39	154.9	4
25	34 27.7	89 43	152.1	34 01.1	89 42	152.4	33 34.4	89 42	152.6	33 07.7	89 42	152.9	32 40.9	89 41	153.2	32 14.1	89 41	153.4	31 47.3	89 40	153.7	31 20.4	90 40	154.0	25
6	34 02.1	88 44	151.1	33 35.6	88 44	151.4	33 09.2	88 43	151.7	32 42.7	88 43	151.9	32 16.2	88 42	152.2	31 49.6	89 42	152.5	31 23.0	89 42	152.8	30 56.4	89 41	153.0	6
7	33 35.6	87 45	150.1	33 09.4	87 45	150.4	32 43.2	87 45	150.7	32 17.0	88 44	151.0	31 50.7	88 44	151.3	31 24.3	88 43	151.6	30 58.0	88 43	151.9	30 31.6	88 43	152.1	7
8	33 08.4	86 47	149.2	32 42.4	87 46	149.5	32 16.5	87 46	149.8	31 50.4	87 45	150.1	31 24.4	87 45	150.4	30 58.3	87 45	150.7	30 32.1	87 44	150.9	30 06.0	87 44	151.2	8
9	32 40.4	86 48	148.3	32 14.7	86 48	148.6	31 48.9	86 47	148.9	31 23.2	86 47	149.2	30 57.3	86 46	149.5	30 31.5	86 46	149.8	30 05.6	86 46	150.0	29 39.6	87 45	150.3	9
30	32 11.6	85 49	147.3	31 46.2	85 49	147.6	31 20.7	85 48	148.0	30 55.2	85 48	148.3	30 29.6	85 48	148.6	30 04.0	85 47	148.9	29 38.3	86 47	149.2	29 12.6	86 46	149.5	30
1	31 42.2	84 50	146.4	31 17.0	84 50	146.7	30 51.7	84 50	147.1	30 26.4	84 49	147.4	30 01.1	85 49	147.7	29 35.7	85 48	148.0	29 10.3	85 48	148.3	28 44.9	85 48	148.6	1
2	31 12.0	83 51	145.5	30 47.0	83 51	145.9	30 22.0	83 51	146.2	29 57.0	84 50	146.5	29 31.9	84 50	146.8	29 06.8	84 49	147.1	28 41.6	84 49	147.4	28 16.4	84 48	147.7	2
3	30 41.1	82 52	144.7	30 16.4	82 52	145.0	29 51.7	83 52	145.3	29 26.9	83 51	145.6	29 02.1	83 51	146.0	28 37.2	83 50	146.3	28 12.3	83 50	146.6	27 47.3	83 50	146.9	3
4	30 09.6	81 54	143.8	29 45.1	82 53	144.1	29 20.7	82 53	144.5	28 56.1	82 52	144.8	28 31.5	82 52	145.1	28 06.9	82 52	145.4	27 42.2	82 51	145.8	27 17.5	82 51	146.1	4
35	29 37.4	81 55	142.9	29 13.2	81 54	143.3	28 49.0	81 54	143.6	28 24.7	81 54	143.9	28 00.4	81 53	144.3	27 36.0	81 53	144.6	27 11.6	81 52	144.9	26 47.1	82 52	145.3	35
6	29 04.6	80 56	142.1	28 40.7	80 55	142.4	28 16.7	80 55	142.8	27 52.6	80 54	143.1	27 28.6	80 54	143.5	27 04.4	81 54	143.8	26 40.3	81 53	144.1	26 16.1	81 53	144.5	6
7	28 31.1	79 57	141.3	28 07.5	79 56	141.6	27 43.7	79 56	142.0	27 20.0	79 56	142.3	26 56.2	79 55	142.6	26 32.3	80 55	143.0	26 08.4	80 54	143.3	25 44.4	80 54	143.7	7
8	27 57.1	78 58	140.5	27 33.7	78 57	140.8	27 10.2	78 57	141.2	26 46.7	78 56	141.5	26 23.1	79 56	141.9	25 59.5	79 56	142.2	25 35.9	79 55	142.5	25 12.1	79 55	142.9	8
9	27 22.5	77 59	139.7	26 59.3	77 58	140.0	26 36.1	77 58	140.4	26 12.8	78 57	140.7	25 49.5	78 57	141.1	25 26.2	78 56	141.4	25 02.8	78 56	141.8	24 39.3	78 56	142.1	9
40	26 47.3	76 60	138.9	26 24.4	76 59	139.2	26 01.4	77 59	139.6	25 38.4	77 58	139.9	25 15.4	77 58	140.3	24 52.3	77 58	140.7	24 29.1	77 57	141.0	24 05.9	77 57	141.3	40
1	26 11.5	75 60	138.1	25 48.9	76 60	138.5	25 26.2	76 60	138.8	25 03.4	76 59	139.2	24 40.6	76 59	139.5	24 17.8	76 58	139.9	23 54.9	76 58	140.2	23 31.9	77 58	140.6	1
2	25 35.2	75 61	137.3	25 12.9	75 61	137.7	24 50.4	75 60	138.1	24 27.9	75 60	138.4	24 05.4	75 60	138.8	23 42.8	75 59	139.2	23 20.1	76 59	139.5	22 57.4	76 58	139.9	2
3	24 58.4	74 62	136.6	24 36.3	74 62	137.0	24 14.1	74 61	137.3	23 51.9	74 61	137.7	23 29.6	74 60	138.1	23 07.3	75 60	138.4	22 44.9	75 60	138.8	22 22.4	75 59	139.1	3
4	24 21.1	73 63	135.8	23 59.2	73 62	136.2	23 37.3	73 62	136.6	23 15.3	73 62	137.0	22 53.3	74 61	137.3	22 31.2	74 61	137.7	22 09.1	74 60	138.1	21 46.9	74 60	138.4	4
45	23 43.3	72 64	135.1	23 21.7	72 63	135.5	23 00.0	72 63	135.9	22 38.3	73 62	136.3	22 16.5	73 62	136.6	21 54.7	73 62	137.0	21 32.8	73 61	137.4	21 10.9	73 61	137.7	45
6	23 05.0	71 65	134.4	22 43.7	71 64	134.8	22 22.2	72 64	135.2	22 00.8	72 63	135.5	21 39.2	72 63	135.9	21 17.7	72 62	136.3	20 56.0	72 62	136.7	20 34.3	72 62	137.0	6
7	22 26.3	70 65	133.7	22 05.2	70 65	134.1	21 44.0	71 64	134.5	21 22.8	71 64	134.9	21 01.5	71 64	135.2	20 40.2	71 63	135.6	20 18.8	71 63	136.0	19 57.4	71 62	136.4	7
8	21 47.1	69 66	133.0	21 26.2	70 66	133.4	21 05.3	70 65	133.8	20 44.3	70 65	134.2	20 23.3	70 64	134.6	20 02.2	70 64	134.9	19 41.1	70 64	135.3	19 19.9	71 63	135.7	8
9	21 07.4	69 67	132.3	20 46.8	69 66	132.7	20 26.1	69 66	133.1	20 05.4	69 66	133.5	19 44.6	69 65	133.9	19 23.8	69 65	134.3	19 02.9	70 64	134.7	18 42.0	70 64	135.0	9
50	20 27.3	68 67	131.7	20 07.0	68 67	132.1	19 46.5	68 66	132.5	19 26.1	68 66	132.8	19 05.6	68 66	133.2	18 45.0	69 66	133.6	18 24.4	69 65	134.0	18 03.7	69 65	134.4	50
1	19 46.9	67 68	131.0	19 26.7	67 68	131.4	19 06.6	67 67	131.8	18 46.3	68 67	132.2	18 26.1	68 67	132.6	18 05.7	68 66	133.0	17 45.4	68 66	133.4	17 24.9	68 65	133.7	1
2	19 06.0	66 69	130.4	18 46.1	66 68	130.8	18 26.2	67 68	131.2	18 06.2	67 68	131.6	17 46.1	67 67	131.9	17 26.1	67 67	132.3	17 05.9	67 66	132.7	16 45.8	67 66	133.1	2
3	18 24.7	65 69	129.7	18 05.1	66 69	130.1	17 45.4	66 69	130.5	17 25.6	66 68	130.9	17 05.8	66 68	131.3	16 46.0	66 67	131.7	16 26.1	67 67	132.1	16 06.2	66 66	132.5	3
4	17 43.0	65 70	129.1	17 23.6	65 70	129.5	17 04.2	65 69	129.9	16 44.7	65 69	130.3	16 25.1	65 68	130.7	16 05.6	65 68	131.1	15 45.9	66 68	131.5	15 26.3	66 67	131.9	4
55	17 01.0	64 71	128.5	16 41.9	64 70	128.9	16 22.6	64 70	129.3	16 03.4	64 70	129.7	15 44.1	64 69	130.1	15 24.7	65 69	130.5	15 05.3	65 68	130.9	14 45.9	65 68	131.3	55
6	16 18.6	63 71	127.9	15 59.7	63 71	128.3	15 40.7	63 70	128.7	15 21.7	63 70	129.1	15 02.7	64 70	129.5	14 43.5	64 69	129.9	14 24.4	64 69	130.3	14 05.2	64 68	130.7	6
7	15 35.9	62 72	127.3	15 17.2	62 71	127.7	14 58.5	63 71	128.1	14 39.7	63 71	128.5	14 20.9	63 70	128.9	14 02.0	63 70	129.3	13 43.1	63 69	129.7	13 24.2	63 69	130.1	7
8	14 52.8	61 72	126.7	14 34.4	62 72	127.1	14 15.9	62 72	127.5	13 57.3	62 71	127.9	13 38.7	62 71	128.3	13 20.1	62 70	128.7	13 01.4	62 70	129.1	12 42.7	62 70	129.5	8
9	14 09.5	61 73	126.1	13 51.2	61 72	126.5	13 32.9	61 72	127.0	13 14.6	61 72	127.4	12 56.3	61 71	127.8	12 37.9	61 71	128.2	12 19.4	61 70	128.6	12 01.0	62 70	129.0	9
60	13 25.7	60 73	125.6	13 07.7	60 73	126.0	12 49.7	60 73	126.4	12 31.6	60 72	126.8	12 13.5	60 72	127.2	11 55.3	61 72	127.6	11 37.1	61 71	128.0	11 18.9	61 71	128.4	60
1	12 41.7	59 74	125.0	12 23.9	59 73	125.4	12 06.1	59 73	125.8	11 48.3	60 73	126.2	11 30.4	60 72	126.7	11 12.4	60 72	127.1	10 54.5	60 72	127.5	10 36.5	60 71	127.9	1
2	11 57.4	58 74	124.5	11 39.9	59 74	124.9	11 22.3	59 74	125.3	11 04.6	59 73	125.7	10 47.0	59 73	126.1	10 29.3	59 72	126.5	10 11.5	59 72	126.9	9 53.8	59 72	127.3	2
3	11 12.8	58 75	123.9	10 55.5	58 74	124.3	10 38.1	58 74	124.8	10 20.7	58 74	125.2	10 03.2	58 73	125.6	9 45.8	58 73	126.0	9 28.3	58 73	126.4	9 10.7	58 72	126.8	3
4	10 27.9	57 75	123.4	10 10.8	57 75	123.8	9 53.6	57 75	124.2	9 36.5	57 74	124.6	9 19.2	57 74	125.1	9 02.0	58 74	125.5	8 44.7	58 73	125.9	8 27.4	58 73	126.3	4
65	9 42.8	56 76	122.9	9 25.8	56 75	123.3	9 08.9	57 75	123.7	8 51.9	57 75	124.1	8 35.0	57 74	124.5	8 17.9	57 74	125.0	8 00.9	57 74	125.4	7 43.8	57 73	125.8	65
6	8 57.3	56 76	122.3	8 40.6	56 76	122.8	8 23.9	56 76	123.2	8 07.1	56 75	123.6	7 50.4	56 75	124.0	7 33.6	56 74	124.4	7 16.8	56 74	124.9	6 59.9	56 74	125.3	6
7	8 11.6	55 77	121.8	7 55.2	55 76	122.3	7 38.6	55 76	122.7	7 22.1	55 76	123.1	7 05.6	55 75	123.5	6 49.0	55 75	123.9	6 32.4	55 74	124.4	6 15.8	55 74	124.8	7
8	7 25.7	54 77	121.3	7 09.4	54 77	121.8	6 53.1	54 76	122.2	6 36.8	54 76	122.6	6 20.5	55 76	123.0	6 04.1	55 75	123.4	5 47.7	55 75	123.9	5 31.3	55 74	124.3	8
9	6 39.5	54 77	120.8	6 23.4	54 77	121.3	6 07.4	54 77	121.7	5 51.3	54 76	122.1	5 35.1	54 76	122.5	5 19.0	54 75	123.0	5 02.8	54 75	123.4				9
70	5 53.1	53 78	120.3	5 37.2	53 77	120.8	5 21.3	53 77	121.2	5 05.5	53 76	121.6													70
1	5 06.4	52 78	119.9																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	9 26.2	41 83	67.8	9 38.6	41 83	67.3	9 50.9	41 82	66.9	10 03.2	41 82	66.4	10 15.4	41 82	66.0	10 27.6	41 82	65.5	10 39.8	40 81	65.0	10 51.9	40 81	64.6	91
2	8 36.4	42 83	67.4	8 48.9	42 83	67.0	9 01.4	42 82	66.5	9 13.8	41 82	66.0	9 26.3	41 82	65.6	9 38.6	41 81	65.1	9 51.0	41 81	64.7	10 03.3	41 81	64.2	2
3	7 46.7	42 83	67.0	7 59.3	42 82	66.6	8 12.0	42 82	66.1	8 24.6	42 82	65.7	8 37.2	42 81	65.2	8 49.8	42 81	64.7	9 02.3	42 81	64.3	9 14.8	42 80	63.8	3
4	6 57.1	43 82	66.6	7 09.9	43 82	66.2	7 22.8	43 82	65.7	7 35.6	42 82	65.3	7 48.4	43 81	64.8	8 01.1	42 81	64.4	8 13.8	42 81	63.9	8 26.5	42 80	63.4	4
95	6 07.6	43 82	66.2	6 20.7	43 82	65.8	6 33.7	43 82	65.3	6 46.7	43 81	64.9	6 59.6	43 81	64.4	7 12.6	43 81	64.0	7 25.5	43 80	63.5	7 38.3	43 80	63.1	95
6	5 18.4	44 82	65.8	5 31.6	44 82	65.4	5 44.8	44 81	64.9	5 57.9	44 81	64.5	6 11.1	44 81	64.0	6 24.2	44 80	63.6	6 37.3	44 80	63.1	6 50.4	44 80	62.7	6
7										5 09.3	44 81	64.1	5 22.7	44 80	63.6	5 36.0	44 80	63.2	5 49.3	44 80	62.7	6 02.5	44 79	62.3	7
8																			5 01.4	45 80	62.3	5 14.9	45 79	61.9	8

Lat. 26°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	88 00.0	1.0 19	00.0	87 30.0	1.0 15	00.0	87 00.0	1.0 13	00.0	86 00.0	1.0 10	00.0	84 00.0	1.0 06	00.0	82 00.0	1.0 05	00.0	81 30.0	1.0 04	00.0	80 30.0	1.0 04	00.0	00
1	87 48.6	91 49	23.8	87 20.8	94 42	19.3	86 52.3	96 36	16.2	85 54.2	98 28	12.2	83 56.2	99 19	08.1	81 57.2	99 14	05.9	81 27.4	99 13	05.6	80 27.7	1.0 12	04.9	1
2	87 19.3	74 66	41.3	86 55.9	81 59	35.0	86 30.9	86 52	30.1	85 37.7	91 42	23.4	83 45.0	96 30	15.8	81 48.9	98 22	11.7	81 19.6	98 21	11.0	80 20.8	98 19	09.8	2
3	86 39.7	59 75	52.5	86 20.7	67 69	46.2	85 59.4	74 64	40.9	85 12.2	83 54	32.8	83 27.1	91 40	22.9	81 35.4	95 30	17.3	81 06.9	95 29	16.2	80 09.5	96 26	14.4	3
4	85 54.8	48 80	59.8	85 39.2	56 75	54.0	85 21.3	63 71	48.9	84 39.9	74 62	40.5	83 03.4	86 48	29.3	81 17.1	91 38	22.4	80 49.6	92 36	21.1	79 54.0	93 32	18.9	4
05	85 07.0	39 82	64.7	84 54.1	47 79	59.5	84 38.8	54 76	54.8	84 02.6	66 68	46.7	82 34.7	80 55	34.9	80 54.4	87 44	27.2	80 28.2	88 42	25.7	79 34.7	90 38	23.1	05
6	84 17.6	33 84	68.1	84 06.6	40 82	63.5	83 53.5	47 79	59.2	83 21.8	58 72	51.6	82 01.9	74 60	39.8	80 27.9	82 50	31.5	80 03.0	84 48	29.9	79 11.8	87 43	27.0	6
7	83 27.1	28 85	70.7	83 17.7	35 83	66.5	83 06.4	41 81	62.6	82 38.4	52 75	55.5	81 25.9	68 64	43.9	79 58.1	78 54	35.5	79 34.5	80 52	33.7	78 45.8	83 48	30.6	7
8	82 35.9	24 86	72.5	82 27.8	30 84	68.8	82 17.9	36 82	65.3	81 53.2	46 78	58.6	80 47.3	62 68	47.5	79 25.5	73 58	39.0	79 03.3	75 56	37.2	78 17.0	79 62	33.9	8
9	81 44.3	21 87	74.0	81 37.2	26 85	70.6	81 28.5	32 84	67.4	81 06.5	42 80	61.2	80 06.6	57 71	50.6	78 50.5	69 62	42.1	78 29.5	71 60	40.3	77 45.7	75 56	36.9	9
10	80 52.3	18 87	75.1	80 46.1	23 86	72.0	80 38.4	28 84	69.0	80 18.7	37 81	63.3	79 24.1	53 73	53.2	78 13.4	64 65	44.9	77 53.7	67 63	43.0	77 12.3	71 59	39.7	10
1	80 00.1	16 87	76.0	79 54.6	20 86	73.2	79 47.8	25 85	70.4	79 30.2	34 82	65.1	78 40.3	49 75	55.5	77 34.5	60 67	47.3	77 16.0	63 65	45.5	76 37.0	67 62	42.2	1
2	79 07.6	14 88	76.7	79 02.9	18 87	74.1	78 56.8	22 86	71.5	78 40.9	31 83	66.6	77 55.4	45 76	57.4	76 54.1	57 69	49.5	76 36.8	59 68	47.7	76 00.0	64 64	44.4	2
3	78 15.1	12 88	77.3	78 10.9	16 87	74.9	78 05.5	20 86	72.5	77 51.2	28 84	67.8	77 09.5	42 78	59.1	76 12.5	53 71	51.5	75 56.2	55 69	49.7	75 21.6	60 66	46.4	3
4	77 22.4	10 88	77.7	77 18.8	14 87	75.5	77 14.0	18 86	73.2	77 01.1	25 84	68.9	76 22.8	38 79	60.6	75 29.8	50 73	53.2	75 14.6	52 71	51.5	74 41.9	57 68	48.3	4
15	76 29.7	09 88	78.1	76 26.5	12 87	76.0	76 22.3	16 86	73.9	76 10.7	23 85	69.7	75 35.5	36 80	61.9	74 46.2	46 74	54.8	74 31.9	49 73	53.1	74 01.1	53 70	49.9	15
6	75 36.9	07 88	78.4	75 34.2	11 88	76.4	75 30.4	14 87	74.4	75 19.9	21 85	70.5	74 47.7	33 80	63.0	74 01.8	43 75	56.2	73 48.3	46 74	54.5	73 19.4	50 71	51.4	6
7	74 44.1	06 88	78.7	74 41.7	09 88	76.8	74 38.4	13 87	74.9	74 29.0	19 85	71.2	73 59.4	30 81	64.0	73 16.6	41 76	57.4	73 04.1	43 75	55.8	72 36.8	48 72	52.8	7
8	73 51.2	05 88	78.8	73 49.2	08 88	77.0	73 46.3	11 87	75.3	73 37.9	17 86	71.7	73 10.8	28 82	64.9	72 30.9	38 77	58.5	72 19.1	40 76	57.0	71 53.5	45 73	54.0	8
9	72 58.2	04 88	79.0	72 56.6	07 88	77.3	72 54.1	10 87	75.6	72 46.6	15 86	72.2	72 21.8	26 82	65.7	71 44.7	36 78	59.5	71 33.7	38 77	58.0	71 09.6	42 74	55.2	9
20	72 05.3	03 88	79.1	72 04.0	06 88	77.5	72 01.8	08 87	75.8	71 55.2	14 86	72.6	71 32.5	24 82	66.4	70 58.0	33 78	60.4	70 47.7	36 77	59.0	70 25.0	40 75	56.2	20
1	71 12.3	02 88	79.2	71 11.3	05 88	77.6	71 09.5	07 87	76.1	71 03.7	12 86	73.0	70 43.0	22 83	67.0	70 10.9	31 79	61.2	70 01.3	33 78	59.8	69 40.0	38 76	57.1	1
2	70 19.4	01 88	79.2	70 18.6	04 88	77.7	70 17.2	06 87	76.2	70 12.0	11 86	73.3	69 53.3	20 83	67.5	69 23.5	29 80	61.9	69 14.5	31 79	60.6	68 54.5	35 76	57.9	2
3	69 26.4	00 88	79.2	69 25.9	03 88	77.8	69 24.8	05 87	76.4	69 20.4	10 86	73.5	69 03.3	19 83	68.0	68 35.8	27 80	62.6	68 27.3	29 79	61.3	68 08.6	33 77	58.7	3
4	68 33.4	00 88	79.2	68 33.2	02 88	77.9	68 32.3	04 87	76.5	68 28.6	08 86	73.8	68 13.3	17 84	68.4	67 47.8	25 80	63.2	67 39.9	27 80	61.9	67 22.3	31 78	59.4	4
25	67 40.4	01 88	79.2	67 40.5	01 88	77.9	67 39.9	03 87	76.6	67 36.8	07 86	73.9	67 23.1	16 84	68.8	66 59.6	24 81	63.7	66 52.2	25 80	62.5	66 35.8	29 78	60.0	25
6	66 47.5	02 88	79.2	66 47.8	00 88	77.9	66 47.4	02 87	76.6	66 45.0	06 86	74.1	66 32.8	14 84	69.1	66 11.1	22 81	64.2	66 04.3	24 80	63.0	65 48.9	27 78	60.6	6
7	65 54.5	03 88	79.1	65 55.0	01 88	77.9	65 55.0	01 87	76.7	65 53.1	05 86	74.2	65 42.3	13 84	69.4	65 22.5	20 81	64.6	65 16.1	22 80	63.4	65 01.8	26 79	61.1	7
8	65 01.6	03 88	79.0	65 02.3	02 88	77.9	65 02.5	00 87	76.7	65 01.2	04 86	74.3	64 51.8	11 84	69.6	64 33.7	19 82	65.0	64 27.8	20 81	63.8	64 14.5	24 79	61.6	8
9	64 08.6	04 88	79.0	64 09.6	02 88	77.8	64 10.0	01 87	76.7	64 09.3	03 87	74.4	64 01.3	10 84	69.8	63 44.8	17 82	65.3	63 39.3	19 81	64.2	63 27.0	22 80	62.0	9
30	63 15.7	05 88	78.9	63 16.9	03 88	77.8	63 17.5	01 87	76.7	63 17.3	02 87	74.4	63 10.6	09 84	70.0	62 55.7	16 82	65.6	62 50.7	17 81	64.5	62 39.3	21 80	62.4	30
1	62 22.8	05 88	78.8	62 24.2	04 88	77.7	62 25.1	02 87	76.6	62 25.4	01 87	74.5	62 19.9	08 84	70.2	62 06.5	14 82	65.9	62 02.0	16 82	64.8	61 51.4	19 80	62.7	1
2	61 29.9	06 88	78.7	61 31.5	05 88	77.6	61 32.6	03 87	76.6	61 33.4	00 87	74.5	61 29.2	07 85	70.3	61 17.3	13 82	66.1	61 13.1	15 82	65.1	61 03.4	18 80	63.1	2
3	60 37.0	07 88	78.6	60 38.8	05 88	77.5	60 40.2	04 87	76.5	60 41.4	01 87	74.5	60 38.4	06 85	70.4	60 27.9	12 82	66.3	60 24.1	13 82	65.3	60 15.3	16 80	63.3	3
4	59 44.2	07 88	78.4	59 46.2	06 88	77.4	59 47.7	04 87	76.4	59 49.5	01 87	74.5	59 47.6	05 85	70.5	59 38.5	11 82	66.5	59 35.1	12 82	65.5	59 27.0	15 80	63.6	4
35	58 51.4	08 88	78.3	58 53.6	07 88	77.3	58 55.3	05 87	76.4	58 57.5	02 87	74.4	58 56.7	04 85	70.6	58 49.0	09 83	66.7	58 46.0	11 82	65.7	58 38.7	14 81	63.8	35
6	57 58.6	09 88	78.2	58 01.0	07 88	77.2	58 02.9	06 87	76.3	58 05.6	03 87	74.4	58 05.9	03 85	70.6	57 59.4	08 83	66.8	57 56.8	10 82	65.9	57 50.2	12 81	64.0	6
7	57 06.8	09 88	78.0	57 08.4	08 88	77.1	57 10.5	07 87	76.2	57 13.6	04 86	74.3	57 15.0	02 85	70.6	57 09.8	07 83	66.9	57 07.5	08 82	66.0	57 01.7	11 81	64.2	7
8	56 13.1	10 88	77.9	56 15.8	09 88	77.0	56 18.2	07 87	76.1	56 21.7	05 86	74.3	56 24.1	01 85	70.7	56 20.2	06 83	67.0	56 18.2	07 82	66.1	56 13.1	10 81	64.3	8
9	55 20.4	10 88	77.7	55 23.3	09 88	76.8	55 25.9	08 87	75.9	55 29.8	05 86	74.2	55 33.2	00 85	70.7	55 30.5	05 83	67.1	55 28.9	06 82	66.2	55 24.5	09 81	64.5	9
40	54 27.7	11 88	77.5	54 30.8	10 88	76.7	54 33.6	09 87	75.8	54 38.0	06 86	74.1	54 42.3	01 85	70.6	54 40.8	04 83	67.2	54 39.5	05 82	66.3	54 35.8	07 81	64.6	40
1	53 35.1	12 88	77.4	53 38.4	10 88	76.5	53 41.3	09 87	75.7	53 46.1	07 86	74.0	53 51.5	02 85	70.6	53 51.1	03 83	67.2	53 50.1	04 82	66.4	53 47.1	06 81	64.7	1
2	52 42.5	12 88	77.2	52 45.9	11 87	76.4	52 49.1	10 87	75.5	52 54.3	08 86	73.9	53 00.6	03 85	70.6	53 01.4	02 83	67.3	53 00.7	03 82	66.4	52 58.3	05 81	64.8	2
3	51 49.9	13 88	77.0	51 53.5	12 87	76.2	51 56.8	11 87	75.4	52 02.5	08 86	73.8	52 09.8	04 85	70.5	52 11.6	01 83	67.3	52 11.3	02 82	66.5	52 09.5	04 81	64.8	3
4	50 57.4	13 88	76.8	51 01.2	12 87	76.0	51 04.7	11 87	75.2	51 10.7	09 86	73.7	51 18.9	05 85	70.5	51 21.9	00 83	67.3	51 21.8	01 82	66.5	51 20.7	03 81	64.9	4
45	50 04.9	14 87	76.6	50 08.9	13 87	75.9	50 12.5	12 87	75.1	50 19.0	10 86	73.5	50 28.1	06 85	70.4	50 32.2	01 83	67.3	50 32.4	00 82	66.5	50 31.9	02 81	64.9	45
6	49 12.4	14 87	76.4	49 16.6	13 87	75.7	49 20.5	12 87	74.9	49 27.3	10 86	73.4	49 37.3	06 85	70.3	49 42.4	02 83	67.2	49 42.9	01 82	66.5	49 43.0	01 81	64.9	6
7	48 20.0	15 87	76.3	48 24.4	14 87	75.5	48 28.4	13 87	74.8	48 35.6	11 86	73.3	48 46.5	07 84	70.2	48 52.7	03 83	67.2	48 53.5	02 82	66.5	48 54.2	00 81	64.9	7
8	47 27.7	16 87	76.1	47 32.2	15 87	75.3	47 36.4	14 87	74.6	47 44.0	12 86	73.1	47 55.8	08 84	70.1	48 03.0	04 83	67.2	48 04.1	03 82	66.4	48 05.3	01 81	64.9	8
9	46 35.3	16 87	75.8	46 40.0	15 87	75.1	46 44.4	14 86	74.4	46 52.4	12 86	73.0	47 05.1	09 84	70.0	47 13.3	05 83	67.1	47 14.6	04 82	66.4	47 16.5	02 81	64.9	9
50	45 43.1	17 87	75.6	45 47.9	16 87	74.9	45 52.5	15 86	74.2	46 00.9	13 86	72.8	46 14.4	09 84	69.9	46 23.6	06 83	67.0	46 25.2	05 82	66.3	46 27.7	03 81	64.9	50
1	44 50.9	17 87	75.4	44 55.9	16 87	74.7	45 00.6	15 86	74.0	45 09.4	14 86	72.6	45 23.8	10 84	69.8	45 34.0	07 83	67.0	45 35.9	06 82	66.3	45 38.8	04 81	64.8	1
2	43 58.7	18 87	75.2	44 03.9	17 87	74.5	44 08.8	16 86	73.8	44 17.9	14 86	72.5	44 33.2	11 84	69.7	44 44.4	08 83	66.9	44 46.5	07 82	66.2	44 50.0	05 81	64.8	2
3	43 06.6	18 87	75.0	43 11.9	17 86	74.3	43 17.0	17 86	73.6	43 26.5	15 86	72.3	43 42.6	12 84	69.6	43 54.8	08 83	66.8	43 57.2	08 82	66.1	44 01.3	06 81	64.7	3
4	42 14.5	19 87	74.8	42 20.0	18 86	74.1	42 25.3	17 86	73.4	42 35.2	16 86	72.1	42 52.1	13 84	69.4	43 05.2	09 82	66.7	43 07.9	09 82	66.0	43 12.5	07 81	64.6	4
55	41 22.5	19 86	74.5	41 28.2	19 86	73.9	41 33.7	18 86	73.2	41 43.9	16 85	71.9	42 01.7	13 84	69.3	42 15.7	10 82	66.6	42 18.7	09 82	65.9	42 23.8	08 81	64.6	55
6	40 30.6	20 86	74.3	40 36.4	19 86	73.7	40 42.1	18 86	73.0	40 52.7	17 85	71.7	41 11.3	14 84	69.1	41 26.3	11 82	66.5	41 29.5	10 82	65.8	41 35.1	09 81	64.5	6
7	39 38.7	20 86	74.1	39 44.7	20 86	73.4	39 50.5	19 86	72.8	40 01.5	18 85	71.5	40 20.9	15 84	68.9	40 36.9	12 82	66.3	40 40.3	11 82	65.7	40 46.5	10 81	64.4	7
8	38 46.8	21 86	73.8	38 53.0	20 86	73.2	38 59.0	20 86	72.6	39 10.4	18 85	71.3	39 30.6	15 84	68.8	39 47.5	13 82	66.2	39 51.2	12 82	65.6	39 57.9	10 81	64.3	8
9	37 55.1	22 86	73.6	38 01.4	21 86	73.0	38 07.6	20 86	72.4	38 19.3	19 85	71.1	38 40.4	16 84	68.6	38 58.2	13 82	66.1	39 02.1	13 82	65.4	39 09.3	11 81	64.1	9
60	37 03.4	22 86	73.4	37 09.9	21 86	72.8	37 16.2	21 86	72.1	37 28.3	20 85	70.9	37 50.2	17 84	68.4	38 08.9	14 82	65.9	38 13.1	14 82	65.3	38 20.8	12 81	64.0	60
1	36 11.7	23 86	73.1	36 18.4	22 86	72.5	36 24.9	21 85	71.9	36 37.4	20 85	70.7	37 00.1	18 84	68.2	37 19.7	15 82	65.8	37 24.1	14 82	65.1	37 32.4	13 81	63.9	1
2	35 20.2	23 86	72.9	35 27.0	23 86	72.3	35 33.7	22 85	71.7	35 46.5	21 85	70.5	36 10.0	18 83	68.1	36 30.6	16 82	65.6	36 35.2	15 81	65.0	36 44.0	14 81	63.8	2
3	34 28.7	24 86	72.6	34 35.7	23 86	72.0	34 42.5	23 85	71.4	34 55.7	21 84	70.3	35 20.0	19 83	67.9	35 41.5	17 82	65.4	35 46.4	16 81	64.8	35 55.6	15 80	63.6	3
4	33 37.2	24 86	72.4	33 44.4	24 85	71.8	33 51.5	23 85	71.2	34 05.0	22 84	70.0	34 30.1	20 83	67.7	34 52.5	17 82	65.3	34 57.6	17 81	64.7	35 07.4	16 80	63.5	4
65	32 45.9	25 86	72.1	32 53.2	24 85	71.5	33 00.4	24 85	71.0	33 14.4	23 84	69.8	33 40.3	21 83	67.4	34 03.5	18 82	65.1	34 08.9	18 81	64.5	34 19.2	17 80	63.3	65
6	31 54.6	25 85	71.8	32 02.1	25 85	71.3	32 09.5	24 85	70.7	32 23.8	23 84	69.6	32 50.5	21 83	67.2	33 14.6	19 81	64.9	33 20.3	18 81	64.3	33 31.0	17 80	63.1	6
7	31 03.4	26 85	71.6	31 11.1	25 85	71.0	31 18.7	25 85	70.4	31 33.3	24 84	69.3	32 00.8	22 83	67.0	32 25.8	20 81	64.7	32 31.7	19 81	64.1	32 42.9	18 80	63.0	7
8	30 12.3	26 85	71.3	30 20.1	26 85	70.8	30 27.9	26 84	70.2	30 42.9	25 84	69.1	31 11.2	23 82	66.8	31 37.1	21 81	64.5	31 43.2	20 81	63.9	31 54.9	19 80	62.8	8
9	29 21.2	27 85	71.0	29 29.3	27 85	70.5	29 37.2	26 84	69.9	29 52.6	25 84	68.8	30 21.7	23 82	66.6	30 48.5	21 81	64.3	30 54.8	21 80	63.7	31 07.0	20 80	62.6	9
70	28 30.3	28 85	70.8	28 38.5	27 84	70.2	28 46.6	27 84	69.7	29 02.3	26 84	68.6	29 32.3	24 82	66.3	29 59.9	22 81	64.1	30 06.5	22 80	63.5	30 19.2	21 80	62.4	70
1	27 39.4	28 85	70.5	27 47.8	28 84	69.9	27 56.0	27 84	69.4	28 12.2	26 84	68.3	28 42.9	25 82	66.1	29 11.5	23 81	63.9	29 18.3	22 80	63.3	29 31.4	21 79	62.2	1
2	26 48.6	29 84	70.2	26 57.2	28 84	69.7	27 05.6	28 84	69.1	27 22.1	27 83	68.0	27 53.7	25 82	65.9	28 23.1	24 80	63.7	28 30.1	23 80	63.1	28 43.8	22 79	62.0	2
3	25 57.9	29 84	69.9	26 06.7	29 84	69.4	26 15.3	29 84	68.8	26 32.2	28 83	67.8	27 04.5	26 82	65.6	27 34.8	24 80	63.4	27 42.1	24 80	62.9	27 56.2	23 79	61.8	3
4	25 07.3	30 84	69.6	25 16.2	30 84	69.1	25 25.0	29 84	68.6	25 42.3	28 83	67.5	26 15.4	27 82	65.4	26 46.6	25 80	63.2	26 54.1	25 80	62.7	27 08.7	24 79	61.6	4
75	24 16.8	30 84	69.3	24 25.9	30 84	68.8	24 34.9	30 83	68.3	24 52.5	29 83	67.2	25 26.4	28 81	65.1	25 58.5	26 80	63.0	26 06.3	26 80	62.4	26 21.4	25 79	61.4	75
6	23 26.4	31 84	69.0	23 35.7	31 84	68.5	23 44.8	30 83	68.0	24 02.8	30 82	67.0	24 37.6	28 81	64.8	25 10.6	27 80	62.7	25 18.5	26 79	62.2	25 34.1	26 79	61.1	6
7	22 36.1	32 84	68.7	22 45.5	31 83	68.2	22 54.9	31 83	67.7	23 13.3	30 82	66.7	23 48.8	29 81	64.6	24 22.7	27 80	62.5	24 30.9	27 79	62.0	24 46.9	26 78	60.9	7
8	21 45.9	32 84	68.4	21 55.5	32 83	67.9	22 05.0	32 83	67.4	22 23.8	31 82	66.4	23 00.2	30 81	64.3	23 34.9	28 80	62.2	23 43.3	28 79	61.7	23 59.9	27 78	60.7	8
9	20 55.8	33 83	68.1	21 05.6	33 83	67.6	21 15.3	32 83	67.1	21 34.5	32 82	66.1	22 11.6	30 81	64.0	22 47.2	29 79	62.0	22 55.9	29 79	61.5	23 12.9	28 78	60.4	9
80	20 05.8	33 83	67.8	20 15.8	33 83	67.3	20 25.7	33 82	66.8	20 45.2	32 82	65.8	21 23.2	31 80	63.8	21 59.7	30 79	61.7	22 08.6	29 79	61.2	22 26.1	29 78	60.2	80
1	19 15.9	34 83	67.5	19 26.1	34 83	67.0	19 36.2	33 82	66.5	19 56.1	33 82	65.5	20 34.9	32 80	63.5	21 12.3	31 79	61.4	21 21.4	30 78	60.9	21 39.4	30 78	59.9	1
2	18 26.2	35 83	67.2	18 36.5	34 82	66.7	18 46.8	34 82	66.2	19 07.1	34 82	65.2	19 46.7	32 80	63.2	20 25.0	31 79	61.2	20 34.3	31 78	60.7	20 52.8	30 78	59.6	2
3	17 36.5	35 82	66.8	17 47.1	35 82	66.4	17 57.5	35 82	65.9	18 18.2	34 81	64.9	18 58.6	33 80	62.9	19 37.8	32 78	60.9	19 47.4	32 78	60.4	20 06.3	31 77	59.4	3
4	16 47.0	36 82	66.5	16 57.7	36 82	66.0	17 08.4	35 82	65.5	17 29.4	35 81	64.6	18 10.7	34 80	62.6	18 50.7	33 78	60.6	19 00.6	33 78	60.1	19 19.9	32 77	59.1	4
85	15 57.6	36 82	66.2	16 08.5	36 82	65.7	16 19.3	36 82	65.2	16 40.8	36 81	64.2	17 22.9	35 80	62.3	18 03.8	34 78	60.3	18 13.9	33 78	59.8	18 33.7	33 77	58.8	85
6	15 08.3	37 82	65.8	15 19.4	37 82	65.4	15 30.4	37 81	64.9	15 52.3	36 81	63.9	16 35.2	35 79	62.0	17 17.1	34 78	60.0	17 27.3	34 77	59.5	17 47.7	34 76	58.5	6
7	14 19.2	38 82	65.5	14 30.5	37 82	65.0	14 41.7	37 81	64.5	15 03.9	37 80	63.6	15 47.7	36 79	61.7	16 30.4	35 78	59.7	16 40.9	35 77	59.2	17 01.8	34 76	58.2	7
8	13 30.2	38 82	65.2	13 41.6	38 81	64.7	13 53.1	38 81	64.2	14 15.7	38 80	63.3	15 00.3	37 79	61.3	15 43.9	36 77	59.4	15 54.7	36 77	58.9	16 16.0	35 76	57.9	8
9	12 41.3	39 81	64.8	12 53.0	39 81	64.3	13 04.6	39 80	63.9	13 27.6	38 80	62.9	14 13.1	37 78	61.0	14 57.6	37 77	59.1	15 08.6	37 77	58.6	15 30.3	36 76	57.6	9
90	11 52.6	40 81	64.5	12 04.4	39 81	64.0	12 16.2	39 80	63.5	12 39.7	39 80	62.6	13 26.0	38 78	60.7	14 11.4	37 77	58.8	14 22.6	37 76	58.3	14 44.9	37 76	57.3	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	34 00.0	1.0 01	180.0	32 00.0	1.0 01	180.0	30 00.0	1.0 01	180.0	29 30.0	1.0 01	180.0	28 30.0	1.0 01	180.0	00
1	35 59.5	1.0 03	178.9	35 29.5	1.0 02	178.9	34 59.5	1.0 02	178.9	33 59.5	1.0 02	179.0	31 59.5	1.0 02	179.0	29 59.5	1.0 02	179.0	29 29.6	1.0 02	179.1	28 29.6	1.0 02	179.1	1
2	35 57.9	1.0 04	177.8	35 28.0	1.0 04	177.8	34 58.0	1.0 04	177.9	33 58.0	1.0 04	177.9	31 58.1	1.0 04	178.0	29 58.2	1.0 04	178.1	29 28.2	1.0 04	178.1	28 28.3	1.0 04	178.1	2
3	35 55.4	1.0 06	176.7	35 25.4	1.0 06	176.8	34 55.5	1.0 06	176.8	33 55.6	1.0 06	176.9	31 55.8	1.0 06	177.0	29 55.9	1.0 05	177.1	29 26.0	1.0 05	177.2	28 26.1	1.0 05	177.2	3
4	35 51.8	1.0 08	175.6	35 21.9	1.0 08	175.7	34 52.0	1.0 08	175.7	33 52.1	1.0 07	175.8	31 52.5	1.0 07	176.0	29 52.8	1.0 07	176.2	29 22.9	1.0 07	176.2	28 23.0	1.0 06	176.3	4
05	35 47.2	1.0 09	174.6	35 17.3	1.0 09	174.6	34 47.5	1.0 09	174.7	33 47.7	1.0 09	174.8	31 48.3	1.0 09	175.0	29 48.8	1.0 08	175.2	29 18.9	1.0 08	175.3	28 19.1	1.0 08	175.4	05
6	35 41.6	99 11	173.5	35 11.8	99 11	173.5	34 42.0	99 11	173.6	33 42.3	99 10	173.8	31 43.1	99 10	174.0	29 43.8	99 10	174.3	29 14.0	99 10	174.3	28 14.3	99 09	174.5	6
7	35 34.9	99 13	172.4	35 05.2	99 13	172.5	34 35.5	99 12	172.6	33 36.0	99 12	172.7	31 37.0	99 12	173.0	29 38.0	99 11	173.3	29 08.2	99 11	173.4	28 08.7	98 11	173.5	7
8	35 27.3	99 14	171.3	34 57.6	99 14	171.4	34 28.0	99 14	171.5	33 28.7	99 14	171.7	31 30.0	99 13	172.0	29 31.3	99 13	172.4	29 01.6	99 12	172.5	28 02.2	99 12	172.6	8
9	35 18.7	99 16	170.3	34 49.1	99 16	170.4	34 19.5	99 16	170.5	33 20.4	99 15	170.7	31 22.1	99 15	171.1	29 23.7	99 14	171.4	28 54.1	99 14	171.5	27 54.9	99 14	171.7	9
10	35 09.0	98 18	169.2	34 39.6	98 18	169.3	34 10.1	98 17	169.4	33 11.2	98 17	169.6	31 13.3	98 16	170.1	29 15.2	98 16	170.5	28 45.7	98 15	170.6	27 46.7	98 15	170.8	10
1	34 58.4	98 19	168.1	34 29.1	98 19	168.3	33 59.8	98 19	168.4	33 01.0	98 18	168.6	31 03.5	98 18	169.1	29 05.9	98 17	169.6	28 36.5	98 17	169.7	27 37.6	98 16	169.9	1
2	34 46.9	97 21	167.1	34 17.7	97 21	167.2	33 48.4	97 20	167.4	32 49.9	97 20	167.6	30 52.9	98 19	168.1	28 55.7	98 18	168.6	28 26.4	98 18	168.8	27 27.8	98 18	169.0	2
3	34 34.3	97 22	166.0	34 05.3	97 22	166.2	33 36.2	97 22	166.3	32 37.9	97 22	166.6	30 41.4	97 21	167.2	28 44.7	97 20	167.7	28 15.5	97 20	167.9	27 17.1	97 19	168.1	3
4	34 20.9	96 24	165.0	33 51.9	97 24	165.2	33 23.0	97 24	165.3	32 25.0	97 23	165.6	30 29.0	97 22	166.2	28 32.8	97 21	166.8	28 03.7	97 21	166.9	27 05.5	97 20	167.2	4
15	34 06.4	96 26	164.0	33 37.6	96 25	164.1	33 08.8	96 25	164.3	32 11.2	96 25	164.6	30 15.7	96 24	165.3	28 20.0	96 22	165.9	27 51.1	96 22	166.0	26 53.2	97 22	166.3	15
6	33 51.1	96 27	163.0	33 22.5	96 27	163.1	32 53.8	96 26	163.3	31 56.4	96 26	163.7	30 01.6	96 25	164.3	28 06.5	96 24	165.0	27 37.7	96 24	165.1	26 40.1	96 23	165.5	6
7	33 34.8	96 29	161.9	33 06.4	95 28	162.1	32 37.9	95 28	162.3	31 40.8	95 28	162.7	29 46.6	95 26	163.4	27 52.1	95 25	164.1	27 23.5	96 25	164.3	26 26.1	96 24	164.6	7
8	33 17.7	94 30	160.9	32 49.4	94 30	161.1	32 21.0	94 30	161.3	31 24.3	95 29	161.7	29 30.8	95 28	162.5	27 36.9	95 27	163.2	27 08.4	95 26	163.4	26 11.4	95 26	163.7	8
9	32 59.6	94 32	160.0	32 31.5	94 31	160.2	32 03.4	94 31	160.4	31 07.0	94 30	160.8	29 14.1	94 29	161.6	27 20.9	94 28	162.3	26 52.6	94 28	162.5	25 55.9	95 27	162.9	9
20	32 40.7	93 33	159.0	32 12.8	93 33	159.2	31 44.8	93 32	159.4	30 48.8	93 32	159.8	28 56.6	94 30	160.6	27 04.1	94 29	161.4	26 36.0	94 29	161.6	25 39.6	94 28	162.0	20
1	32 20.9	92 34	158.0	31 53.2	93 34	158.2	31 25.4	93 34	158.5	30 29.8	93 33	158.9	28 38.4	93 32	159.7	26 46.6	93 30	160.6	26 18.6	93 30	160.8	25 22.6	93 30	161.2	1
2	32 00.3	92 36	157.0	31 32.8	92 36	157.3	31 05.2	92 35	157.5	30 10.0	92 34	158.0	28 19.3	92 33	158.8	26 28.3	93 32	159.7	26 00.4	93 32	159.9	25 04.8	93 31	160.3	2
3	31 38.9	91 37	156.1	31 11.5	91 37	156.3	30 44.2	91 36	156.6	29 49.4	91 36	157.0	27 59.4	92 34	158.0	26 09.2	92 33	158.8	25 41.5	92 33	159.1	24 46.3	92 32	159.5	3
4	31 16.6	90 38	155.2	30 49.5	90 38	155.4	30 22.3	91 38	155.6	29 27.9	91 37	156.1	27 38.8	91 36	157.1	25 49.3	91 34	158.0	25 21.9	91 34	158.2	24 27.0	92 33	158.7	4
25	30 53.6	90 40	154.2	30 26.6	90 39	154.5	29 59.7	90 39	154.7	29 05.7	90 38	155.2	27 17.4	90 37	156.2	25 28.8	91 36	157.2	25 01.5	91 35	157.4	24 07.0	91 34	157.9	25
6	30 29.7	89 41	153.3	30 03.0	89 41	153.6	29 36.3	89 40	153.8	28 42.8	89 40	154.4	26 55.3	90 38	155.4	25 07.5	90 37	156.3	24 40.5	90 36	156.6	23 46.3	90 36	157.0	6
7	30 05.1	88 42	152.4	29 38.6	88 42	152.7	29 12.1	88 42	152.9	28 19.0	89 41	153.5	26 32.5	89 39	154.5	24 45.5	89 38	155.5	24 18.7	89 38	155.8	23 25.0	90 37	156.2	7
8	29 39.8	87 44	151.5	29 13.5	88 43	151.8	28 47.2	88 43	152.1	27 54.6	88 42	152.6	26 08.9	88 40	153.7	24 22.8	89 39	154.7	23 56.2	89 39	155.0	23 02.9	89 38	155.5	8
9	29 13.7	87 45	150.6	28 47.7	87 44	150.9	28 21.6	87 44	151.2	27 29.4	87 43	151.8	25 44.6	88 42	152.8	23 59.4	88 40	153.9	23 33.0	88 40	154.2	22 40.2	88 39	154.7	9
30	28 46.9	86 46	149.8	28 21.1	86 46	150.0	27 55.3	86 45	150.3	27 03.5	86 44	150.9	25 19.7	87 43	152.0	23 35.3	87 41	153.1	23 09.2	87 41	153.4	22 16.8	87 40	153.9	30
1	28 19.4	85 47	148.9	27 53.8	85 46	149.2	27 28.2	85 46	149.5	26 37.0	86 45	150.1	24 54.1	86 44	151.2	23 10.6	86 42	152.3	22 44.7	86 42	152.6	21 52.7	87 41	153.1	1
2	27 51.2	84 48	148.0	27 25.9	84 48	148.4	27 00.5	85 47	148.7	26 09.7	85 46	149.2	24 27.8	85 45	150.4	22 45.2	86 43	151.5	22 19.5	86 43	151.8	21 28.0	86 42	152.4	2
3	27 22.3	83 49	147.2	26 57.2	84 49	147.5	26 32.1	84 48	147.8	25 41.8	84 48	148.4	24 00.8	84 46	149.6	22 19.2	85 44	150.8	21 53.8	85 44	151.1	21 02.7	85 43	151.6	3
4	26 52.8	83 50	146.4	26 28.0	83 50	146.7	26 03.1	83 49	147.0	25 13.3	83 49	147.6	23 33.2	84 47	148.8	21 52.6	84 45	150.0	21 27.4	84 45	150.3	20 36.8	84 44	150.9	4
35	26 22.6	82 51	145.6	25 58.0	82 51	145.9	25 33.4	82 50	146.2	24 44.1	82 50	146.8	23 05.0	83 48	148.1	21 25.4	83 46	149.3	21 00.4	83 46	149.6	20 10.3	84 45	150.2	35
6	25 51.8	81 52	144.8	25 27.5	81 52	145.1	25 03.1	81 51	145.4	24 14.3	82 51	146.1	22 36.2	82 49	147.3	20 57.5	82 47	148.5	20 32.8	83 47	148.8	19 43.2	83 46	149.4	6
7	25 20.4	80 53	144.0	24 56.3	80 53	144.3	24 32.2	80 52	144.6	23 43.9	81 52	145.3	22 06.8	81 50	146.6	20 29.1	82 48	147.8	20 04.6	82 48	148.1	19 15.5	82 47	148.7	7
8	24 48.4	79 54	143.2	24 24.6	79 54	143.5	24 00.7	80 53	143.9	23 12.9	80 53	144.5	21 36.8	80 51	145.8	20 00.1	81 49	147.1	19 35.8	81 49	147.4	18 47.2	81 48	148.0	8
9	24 15.8	78 55	142.4	23 52.2	79 55	142.8	23 28.7	79 54	143.1	22 41.3	79 54	143.8	21 06.2	80 52	145.1	19 30.5	80 50	146.4	19 06.5	80 50	146.7	18 18.4	80 49	147.3	9
40	23 42.7	78 56	141.7	23 19.4	78 56	142.0	22 56.0	78 55	142.4	22 09.2	78 54	143.1	20 35.1	79 53	144.4	19 00.4	79 51	145.7	18 36.6	79 51	146.0	17 49.0	79 50	146.7	40
1	23 08.9	77 57	141.0	22 45.9	77 57	141.3	22 22.8	77 56	141.6	21 36.5	77 55	142.3	20 03.4	78 54	143.7	18 29.7	78 52	145.0	18 06.2	78 52	145.3	17 19.1	79 51	146.0	1
2	22 34.7	76 58	140.2	22 11.9	76 58	140.6	21 49.1	76 57	140.9	21 03.3	76 56	141.6	19 31.2	77 55	143.0	17 58.5	77 53	144.3	17 35.3	78 52	144.7	16 48.6	78 52	145.3	2
3	21 59.9	75 59	139.5	21 37.4	75 58	139.9	21 14.8	75 58	140.2	20 29.5	76 57	140.9	18 58.5	76 56	142.3	17 26.8	77 54	143.7	17 03.8	77 53	144.0	16 17.7	77 52	144.7	3
4	21 24.7	74 60	138.8	21 02.4	74 59	139.2	20 40.1	74 59	139.5	19 55.3	75 58	140.2	18 25.3	75 56	141.6	16 54.6	76 54	143.0	16 31.9	76 54	143.3	15 46.3	76 53	144.0	4
45	20 48.9	73 60	138.1	20 26.9	73 60	138.5	20 04.8	74 60	138.8	19 20.5	74 59	139.5	17 51.5	74 57	140.9	16 21.9	75 55	142.3	15 59.4	75 55	142.7	15 14.3	75 54	143.4	45
6	20 12.6	72 61	137.4	19 50.9	73 61	137.8	19 29.0	73 60	138.1	18 45.3	73 60	138.9	17 17.3	74 58	140.3	15 48.7	74 56	141.7	15 26.5	74 56	142.0	14 41.9	74 55	142.7	6
7	19 35.9	72 62	136.7	19 14.4	72 62	137.1	18 52.8	72 61	137.5	18 09.6	72 60	138.2	16 42.6	73 58	139.6	15 15.1	73 57	141.1	14 53.1	73 56	141.4	14 09.0	74 56	142.1	7
8	18 58.7	71 63	136.1	18 37.4	71 62	136.4	18 16.1	71 62	136.8	17 33.4	71 61	137.5	16 07.5	72 59	139.0	14 40.9	72 58	140.4	14 19.2	72 57	140.8	13 35.7	73 56	141.5	8
9	18 21.1	70 64	135.4	18 00.1	70 63	135.8	17 39.0	70 63	136.2	16 56.8	71 62	136.9	15 31.9	71 60	138.4	14 06.4	71 58	139.8	13 44.9	72 58	140.2	13 01.9	72 57	140.9	9
50	17 43.0	69 64	134.8	17 22.2	69 64	135.1	17 01.4	69 63	135.5	16 19.7	70 62	136.3	14 55.8	70 61	137.8	13 31.4	71 59	139.2	13 10.2	71 59	139.6	12 27.7	71 58	140.3	50
1	17 04.5	68 65	134.1	16 44.0	68 64	134.5	16 23.4	69 64	134.9	15 42.2	69 63	135.6	14 19.3	69 61	137.1	12 55.9	70 60	138.6	12 35.0	70 59	139.0	11 53.0	70 58	139.7	1
2	16 25.6	67 66	133.5	16 05.3	68 65	133.9	15 45.0	68 65	134.3	15 04.3	68 64	135.0	13 42.5	68 62	136.5	12 20.1	69 60	138.0	11 59.4	69 60	138.4	11 17.9	69 59	139.1	2
3	15 46.2	67 66	132.9	15 26.2	67 66	133.3	15 06.2	67 65	133.7	14 26.0	67 64	134.4	13 05.2	68 63	135.9	11 43.8	68 61	137.5	11 23.4	68 61	137.8	10 42.5	68 60	138.6	3
4	15 06.5	66 67	132.3	14 46.8	66 66	132.7	14 27.0	66 66	133.1	13 47.3	66 65	133.8	12 27.5	67 64	135.4	11 07.1	67 62	136.9	10 47.0	67 61	137.3	10 06.6	67 60	138.0	4
55	14 26.5	65 68	131.7	14 06.9	65 67	132.1	13 47.4	65 67	132.5	13 08.2	65 66	133.2	11 49.4	66 64	134.8	10 30.1	66 62	136.3	10 10.2	66 62	136.7	9 30.3	67 61	137.5	55
6	13 46.0	64 68	131.1	13 26.7	64 68	131.5	13 07.4	64 67	131.9	12 28.7	65 66	132.7	11 10.9	65 65	134.2	9 52.6	65 63	135.8	9 33.0	66 62	136.1	8 53.7	66 62	136.9	6
7	13 05.2	63 69	130.5	12 46.2	63 68	130.9	12 27.1	64 68	131.3	11 48.9	64 67	132.1	10 32.1	64 65	133.7	9 14.8	65 64	135.2	8 55.5	65 63	135.6	8 16.6	65 62	136.4	7
8	12 24.0	63 69	129.9	12 05.2	63 69	130.3	11 46.4	63 68	130.7	11 08.7	63 68	131.5	9 52.9	63 66	133.1	8 36.7	64 64	134.7	8 17.5	64 64	135.1	7 39.2	64 63	135.8	8
9	11 42.5	62 70	129.4	11 23.9	62 69	129.8	11 05.4	62 69	130.2	10 28.2	62 68	131.0	9 13.4	63 66	132.6	7 58.1	63 65	134.1	7 39.3	63 64	134.5	7 01.5	63 64	135.3	9
60	11 00.6	61 70	128.8	10 42.3	61 70	129.2	10 24.0	61 70	129.6	9 47.3	61 69	130.4	8 33.5	62 67	132.0	7 19.3	62 65	133.6	7 00.7	62 65	134.0	6 23.4	62 64	134.8	60
1	10 18.5	60 71	128.3	10 00.4	60 70	128.7	9 42.3	60 70	129.1	9 06.1	61 69	129.9	7 53.3	61 68	131.5	6 40.1	61 66	133.1	6 21.8	61 66	133.5	5 45.0	61 65	134.3	1
2	9 36.0	59 71	127.8	9 18.2	59 71	128.2	9 00.3	60 70	128.6	8 24.5	60 70	129.4	7 12.7	60 68	131.0	6 00.5	60 66	132.6	5 42.5	60 66	133.0	5 06.2	60 65	133.8	2
3	8 53.2	59 72	127.2	8 35.6	59 71	127.6	8 18.0	59 71	128.0	7 42.7	59 70	128.9	6 31.9	59 69	130.5	5 20.7	59 67	132.1	5 02.9	59 66	132.5				3
4	8 10.1	58 72	126.7	7 52.8	58 72	127.1	7 35.4	58 72	127.5	7 00.6	58 71	128.3	5 50.7	58 69	130.0										4
65	7 26.7	57 73	126.2	7 09.6	57 72	126.6	6 52.5	57 72	127.0	6 18.1	57 71	127.8	5 09.2	58 70	129.5										65
6	6 43.1	56 73	125.7	6 26.2	56 73	126.1	6 09.3	56 72	126.5	5 35.4	57 72	127.4													6
7	5 59.1	55 74	125.2	5 42.5	56 73	125.6	5 25.8	56 73	126.0																7
8	5 14.9	55 74	124.7																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 04.0	40 81	64.1	11 16.9	40 80	63.6	11 28.0	40 80	63.2	11 51.9	40 80	62.2	12 39.0	39 78	60.3	13 25.3	38 76	58.5	13 36.8	38 76	58.0	13 59.5	38 75	57.0	91
2	10 15.6	41 80	63.7	10 27.8	41 80	63.3	10 40.0	41 80	62.8	11 04.2	40 79	61.9	11 52.2	40 78	60.0	12 39.5	39 76	58.1	12 51.2	39 76	57.6	13 14.4	39 75	56.7	2
3	9 27.3	41 80	63.4	9 39.7	41 80	62.9	9 52.1	41 80	62.4	10 16.8	41 79	61.5	11 05.6	40 77	59.7	11 53.8	40 76	57.8	12 05.7	40 76	57.3	12 29.4	39 75	56.4	3
4	8 39.2	42 80	63.0	8 51.8	42 80	62.5	9 04.4	42 79	62.1	9 29.4	42 78	61.2	10 19.2	41 77	59.3	11 08.2	41 76	57.4	11 20.4	40 75	57.0	11 44.6	40 74	56.0	4
95	7 51.2	43 80	62.6	8 04.0	43 79	62.2	8 16.8	43 79	61.7	8 42.3	42 78	60.8	9 32.9	42 77	58.9	10 22.9	41 75	57.1	10 35.3	41 75	56.6	10 59.9	41 74	55.7	95
6	7 03.4	43 79	62.2	7 16.4	43 79	61.8	7 29.4	43 79	61.3	7 55.3	43 78	60.4	8 46.8	43 77	58.6	9 37.7	42 75	56.7	9 50.3	42 75	56.3	10 15.5	42 74	55.4	6
7	6 15.8	44 79	61.8	6 29.0	44 79	61.4	6 42.2	44 78	60.9	7 08.5	44 78	60.0	8 00.8	43 76	58.2	8 52.7	43 75	56.4	9 05.5	43 74	55.9	9 31.2	43 74	55.0	7
8	5 28.3	45 79	61.4	5 41.7	45 78	61.0	5 55.1	45 78	60.5	6 21.9	44 78	59.6	7 15.1	44 76	57.8	8 07.8	44 74	56.0	8 21.0	44 74	55.6	8 47.1	43 73	54.7	8
9							5 08.3	45 78	60.2	5 35.4	45 77	59.3	6 29.5	45 76	57.5	7 23.2	45 74	55.7	7 36.6	44 74	55.2	8 03.2	44 73	54.3	9
100													5 44.2	46 75	57.1	6 38.8	45 74	55.3	6 52.4	45 73	54.8	7 19.5	45 72	53.9	100
1																5 54.6	46 74	54.9	6 08.4	46 73	54.5	6 36.0	46 72	53.6	1
2																5 10.5	47 73	54.5	5 24.6	47 72	54.1	5 52.7	47 72	53.2	2
3																						5 09.7	48 72	52.8	3

Lat. 26°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	′ Δt		°	
00	80 00.0	1.0 04	00.0	79 00.0	1.0 03	00.0	77 30.0	1.0 03	00.0	76 00.0	1.0 02	00.0	74 00.0	1.0 02	00.0	73 30.0	1.0 02	00.0	73 00.0	1.0 02	00.0	71 00.0	1.0 02	00.0	00
1	79 57.8	1.0 11	04.6	78 58.0	1.0 10	04.2	77 28.3	1.0 08	03.6	75 58.5	1.0 07	03.2	73 58.7	1.0 06	02.7	73 28.8	1.0 06	02.6	72 58.8	1.0 06	02.5	70 59.0	1.0 05	02.2	1
2	79 51.3	98 18	09.2	78 52.2	99 16	08.3	77 23.2	99 14	07.2	75 54.1	99 12	06.3	73 54.9	99 10	05.4	73 25.1	99 10	05.2	72 55.3	99 10	05.0	70 55.9	1.0 08	04.3	2
3	79 40.6	96 24	13.7	78 42.5	97 22	12.3	77 14.8	98 19	10.7	75 46.7	98 17	09.4	73 48.7	99 15	08.0	73 19.1	99 14	07.7	72 49.5	99 14	07.4	70 50.8	99 12	06.5	3
4	79 25.9	94 31	17.9	78 29.2	95 28	16.2	77 03.3	96 24	14.1	75 36.5	97 22	12.4	73 39.9	97 18	10.6	73 10.6	98 18	10.2	72 41.3	98 17	09.9	70 43.8	98 15	08.6	4
05	79 07.5	91 36	21.9	78 12.5	92 33	19.9	76 48.6	94 29	17.4	75 23.5	95 26	15.4	73 28.8	96 22	13.2	72 59.9	96 22	12.7	72 31.0	97 21	12.2	70 34.7	97 18	10.7	05
6	78 45.7	88 42	25.7	77 52.6	89 38	23.4	76 31.1	92 34	20.5	75 08.0	93 30	18.2	73 15.4	95 26	15.6	72 47.0	95 25	15.1	72 18.5	95 24	14.6	70 23.8	96 21	12.7	6
7	78 20.8	84 46	29.2	77 29.7	86 42	26.7	76 10.8	89 38	23.5	74 49.9	91 34	20.9	72 59.7	93 30	18.0	72 31.9	93 29	17.4	72 03.9	93 28	16.8	70 11.0	95 24	14.7	7
8	77 53.1	80 50	32.4	77 04.2	83 47	29.8	75 48.1	86 42	26.4	74 29.5	88 38	23.5	72 42.0	91 33	20.4	72 14.7	91 32	19.7	71 47.3	92 31	19.0	69 56.4	93 27	16.7	8
9	77 23.0	77 54	35.4	76 36.2	79 50	32.6	75 23.0	83 45	29.0	74 07.0	86 41	26.0	72 22.3	89 36	22.6	71 55.6	89 35	21.8	71 28.8	90 34	21.1	69 40.1	91 30	18.6	9
10	76 50.7	73 57	38.1	76 06.1	76 54	35.3	74 55.8	80 48	31.5	73 42.4	83 44	28.3	72 00.6	86 39	24.7	71 34.7	87 38	23.9	71 08.5	88 37	23.1	69 22.1	90 33	20.4	10
1	76 16.5	69 60	40.6	75 34.0	73 56	37.7	74 26.7	77 52	33.8	73 15.9	80 47	30.5	71 37.2	84 42	26.7	71 12.0	85 41	25.9	70 46.4	85 39	25.1	69 02.5	88 35	22.2	1
2	75 40.6	66 62	42.8	75 00.2	69 59	39.9	73 55.8	74 54	36.0	72 47.7	78 50	32.6	71 12.2	81 44	28.7	70 47.6	82 43	27.8	70 22.8	83 42	26.9	68 41.4	86 38	23.9	2
3	75 03.3	62 64	44.9	74 24.9	66 61	42.0	73 23.3	71 56	38.0	72 17.9	75 52	34.5	70 45.6	79 47	30.5	70 21.7	80 46	29.6	69 57.6	81 44	28.7	68 18.9	84 40	25.5	3
4	74 24.6	59 66	46.7	73 48.1	63 63	43.8	72 49.4	68 59	39.9	71 46.6	72 54	36.3	70 17.5	76 49	32.2	69 54.4	77 48	31.3	69 31.0	78 46	30.4	67 55.0	82 42	27.1	4
15	73 44.8	56 68	48.4	73 10.2	60 65	45.6	72 14.2	65 60	41.6	71 14.0	69 56	38.0	69 48.1	74 51	33.9	69 25.8	75 50	32.9	69 03.1	76 48	32.0	67 29.9	79 44	28.6	15
6	73 03.9	53 70	50.0	72 31.2	57 67	47.1	71 37.9	62 62	43.2	70 40.2	66 58	39.6	69 17.4	71 53	35.4	68 55.9	72 52	34.4	68 34.0	73 50	33.5	67 03.5	77 46	30.0	6
7	72 22.2	50 71	51.4	71 51.2	54 68	48.6	71 00.4	59 64	44.7	70 05.2	64 60	41.1	68 45.6	69 55	36.9	68 24.8	70 54	35.9	68 03.7	71 52	34.9	66 35.9	75 48	31.4	7
8	71 39.7	47 72	52.6	71 10.4	51 70	49.9	70 22.1	56 66	46.0	69 29.3	61 62	42.5	68 12.8	66 56	38.2	67 52.7	68 55	37.2	67 32.3	69 54	36.3	66 07.4	73 50	32.7	8
9	70 56.6	44 73	53.8	70 28.7	48 70	51.1	69 42.8	54 67	47.3	68 52.4	58 63	43.8	67 38.9	64 58	39.5	67 19.6	65 57	38.5	66 59.9	66 56	37.5	65 37.7	71 51	33.9	9
20	70 12.8	42 74	54.8	69 46.5	46 72	52.2	69 02.8	51 68	48.5	68 14.7	56 64	45.0	67 04.2	61 59	40.7	66 45.6	63 58	39.7	66 26.6	64 57	38.7	65 07.2	68 52	35.1	20
1	69 28.4	40 75	55.8	69 03.6	43 72	53.2	68 22.1	49 69	49.5	67 36.2	53 65	46.1	66 28.6	59 61	41.9	66 10.7	60 60	40.9	65 52.4	62 58	39.9	64 35.8	66 54	36.2	1
2	68 43.6	37 76	56.6	68 20.1	41 73	54.1	67 40.8	46 70	50.5	66 57.0	51 66	47.1	65 52.2	57 62	42.9	65 35.0	58 61	41.9	65 17.4	59 60	41.0	64 03.5	64 55	37.3	2
3	67 58.3	35 76	57.4	67 36.2	39 74	55.0	66 58.9	44 71	51.4	66 17.1	49 67	48.1	65 15.2	54 63	43.9	64 58.6	56 62	42.9	64 41.7	57 60	42.0	63 30.5	62 56	38.3	3
4	67 12.7	33 77	58.2	66 51.8	37 75	55.8	66 16.5	42 72	52.3	65 36.7	46 68	49.0	64 37.4	52 64	44.9	64 21.6	53 63	43.9	64 05.3	55 62	42.9	62 56.7	60 57	39.2	4
25	66 26.7	31 77	58.8	66 07.0	35 75	56.5	65 33.6	40 72	53.1	64 55.8	44 69	49.8	63 59.1	50 65	45.7	63 43.9	51 64	44.8	63 28.3	53 63	43.8	62 22.3	57 58	40.1	25
6	65 40.4	29 78	59.4	65 21.9	33 76	57.1	64 50.3	38 73	53.8	64 14.3	42 70	50.6	63 20.2	48 66	46.5	63 05.7	49 65	45.6	62 50.7	50 64	44.6	61 47.2	55 59	41.0	6
7	64 53.9	27 78	60.0	64 36.4	31 76	57.7	64 06.6	36 74	54.5	63 32.4	40 70	51.3	62 40.8	46 66	47.3	62 26.9	47 66	46.4	62 12.6	48 64	45.4	61 11.6	53 60	41.8	7
8	64 07.1	26 78	60.5	63 50.7	29 77	58.3	63 22.5	34 74	55.1	62 50.2	38 71	52.0	62 01.0	44 67	48.0	61 47.6	45 66	47.1	61 33.9	46 65	46.1	60 35.4	51 61	42.5	8
9	63 20.0	24 79	60.9	63 04.7	27 77	58.8	62 38.2	32 74	55.6	62 07.5	36 72	52.6	61 20.6	42 68	48.7	61 07.9	43 67	47.8	60 54.8	44 66	46.8	59 58.7	49 62	43.2	9
30	62 32.8	22 79	61.3	62 18.5	26 78	59.2	61 53.5	30 75	56.2	61 24.5	34 72	53.2	60 39.9	40 68	49.3	60 27.8	41 68	48.4	60 15.3	42 67	47.5	59 21.5	47 63	43.9	30
1	61 45.4	21 79	61.7	61 32.0	24 78	59.7	61 08.6	28 75	56.6	60 41.2	33 73	53.7	59 58.9	38 69	49.9	59 47.3	39 68	49.0	59 35.3	41 67	48.1	58 43.9	45 64	44.6	1
2	60 57.9	19 80	62.0	60 45.4	22 78	60.0	60 23.4	27 76	57.1	59 57.6	31 73	54.2	59 17.4	36 70	50.5	59 06.4	37 69	49.5	58 55.0	39 68	48.6	58 05.8	43 64	45.2	2
3	60 10.2	18 80	62.3	59 58.6	21 78	60.4	59 38.1	25 76	57.5	59 13.7	29 74	54.6	58 35.7	34 70	51.0	58 25.2	36 69	50.1	58 14.4	37 68	49.2	57 27.4	41 65	45.7	3
4	59 22.3	16 80	62.6	59 11.7	19 78	60.7	58 52.5	23 76	57.8	58 29.6	27 74	55.1	57 53.7	33 70	51.4	57 43.7	34 70	50.5	57 33.4	35 69	49.7	56 48.6	40 65	46.2	4
35	58 34.4	15 80	62.9	58 24.6	18 79	61.0	58 06.7	22 76	58.2	57 45.3	26 74	55.4	57 11.4	31 71	51.9	57 01.9	32 70	51.0	56 52.2	33 69	50.1	56 09.5	38 66	46.7	35
6	57 46.3	14 80	63.1	57 37.3	16 79	61.2	57 20.8	20 77	58.5	57 00.8	24 74	55.8	56 28.8	29 71	52.3	56 19.9	30 70	51.4	56 10.6	32 70	50.6	55 30.1	36 66	47.2	6
7	56 58.2	12 80	63.3	56 50.0	15 79	61.5	56 34.8	19 77	58.8	56 16.1	23 75	56.1	55 46.1	27 72	52.7	55 37.6	29 71	51.8	55 28.9	30 70	51.0	54 50.4	34 67	47.6	7
8	56 10.0	11 80	63.5	56 02.6	14 79	61.7	55 48.6	17 77	59.0	55 31.3	21 75	56.4	55 03.1	26 72	53.0	54 55.2	27 71	52.2	54 46.9	28 70	51.3	54 10.4	33 67	48.1	8
9	55 21.7	10 80	63.6	55 15.1	12 79	61.9	55 02.3	16 77	59.3	54 46.3	20 75	56.7	54 19.9	24 72	53.3	54 12.5	25 72	52.5	54 04.7	27 71	51.7	53 30.2	31 68	48.4	9
40	54 33.4	09 81	63.7	54 27.5	11 80	62.0	54 15.9	15 78	59.5	54 01.1	18 75	56.9	53 36.6	23 72	53.6	53 29.6	24 72	52.8	53 22.3	25 71	52.0	52 49.7	29 68	48.8	40
1	53 45.0	07 81	63.8	53 39.8	10 80	62.2	53 29.4	13 78	59.7	53 15.9	17 76	57.2	52 53.1	21 73	53.9	52 46.6	22 72	53.1	52 39.7	23 71	52.3	52 09.0	28 68	49.1	1
2	52 56.6	06 81	63.9	52 52.1	09 80	62.3	52 42.8	12 78	59.8	52 30.5	15 76	57.4	52 09.4	20 73	54.1	52 03.4	21 72	53.4	51 57.0	22 72	52.6	51 28.2	26 68	49.4	2
3	52 08.1	05 81	64.0	52 04.4	07 80	62.4	51 56.2	11 78	60.0	51 45.1	14 76	57.6	51 25.7	18 73	54.4	51 20.0	19 72	53.6	51 14.1	20 72	52.8	50 47.1	25 69	49.7	3
4	51 19.6	04 81	64.1	51 16.6	06 80	62.5	51 09.5	09 78	60.1	50 59.5	13 76	57.7	50 41.8	17 73	54.6	50 36.6	18 73	53.8	50 31.0	19 72	53.0	50 05.9	23 69	50.0	4
45	50 31.1	03 81	64.1	50 28.7	05 80	62.6	50 22.7	08 78	60.2	50 13.9	11 76	57.9	49 57.8	15 74	54.8	49 53.0	16 73	54.0	49 47.9	17 72	53.2	49 24.5	21 69	50.2	45
6	49 42.6	02 81	64.2	49 40.8	04 80	62.6	49 35.9	07 78	60.3	49 28.2	10 76	58.0	49 13.7	14 74	54.9	49 09.3	15 73	54.2	49 04.6	16 72	53.4	48 43.0	20 69	50.4	6
7	48 54.1	01 81	64.2	48 53.0	03 80	62.6	48 49.0	06 78	60.4	48 42.4	09 76	58.1	48 29.5	13 74	55.1	48 25.5	14 73	54.3	48 21.3	15 72	53.6	48 01.4	18 70	50.6	7
8	48 05.5	00 81	64.2	48 05.0	02 80	62.7	48 02.1	05 78	60.4	47 56.6	08 76	58.2	47 45.2	11 74	55.2	47 41.7	12 73	54.5	47 37.8	13 72	53.8	47 19.6	17 70	50.8	8
9	47 17.0	01 81	64.2	47 17.1	01 80	62.7	47 15.2	04 78	60.5	47 10.8	06 76	58.3	47 00.9	10 74	55.3	46 57.7	11 73	54.6	46 54.3	12 73	53.9	46 37.8	16 70	51.0	9
50	46 28.5	02 81	64.1	46 29.2	00 80	62.7	46 28.3	02 78	60.5	46 24.9	05 76	58.3	46 16.5	09 74	55.4	46 13.7	10 73	54.7	46 10.7	11 73	54.0	45 55.8	14 70	51.2	50
1	45 39.9	03 81	64.1	45 41.3	01 80	62.7	45 41.3	01 78	60.5	45 39.0	04 77	58.4	45 32.1	08 74	55.5	45 29.7	08 74	54.8	45 27.0	09 73	54.1	45 13.8	13 70	51.3	1
2	44 51.4	04 81	64.1	44 53.4	02 80	62.7	44 54.4	00 78	60.5	44 53.0	03 77	58.4	44 47.6	06 74	55.6	44 45.6	07 74	54.9	44 43.3	08 73	54.2	44 31.7	11 70	51.4	2
3	44 02.9	05 81	64.0	44 05.5	03 80	62.6	44 07.4	01 78	60.5	44 07.1	02 77	58.5	44 03.1	05 74	55.7	44 01.4	06 74	55.0	43 59.5	07 73	54.3	43 49.5	10 70	51.5	3
4	43 14.5	06 81	64.0	43 17.6	04 80	62.6	43 20.5	02 78	60.5	43 21.1	01 77	58.5	43 18.5	04 74	55.7	43 17.3	05 74	55.0	43 15.7	05 73	54.3	43 07.2	09 70	51.6	4
55	42 26.0	07 81	63.9	42 29.7	05 80	62.5	42 33.5	03 78	60.5	42 35.2	01 77	58.5	42 34.0	03 74	55.7	42 33.1	03 74	55.1	42 31.9	04 73	54.4	42 25.0	07 71	51.7	55
6	41 37.6	08 81	63.8	41 41.9	06 80	62.5	41 46.6	04 78	60.5	41 49.2	02 76	58.4	41 49.4	01 74	55.8	41 48.8	02 74	55.1	41 48.1	03 73	54.4	41 42.6	06 71	51.7	6
7	40 49.3	09 81	63.7	40 54.1	07 80	62.4	40 59.7	05 78	60.4	41 03.3	03 76	58.4	41 04.8	00 74	55.8	41 04.6	01 74	55.1	41 04.2	02 73	54.4	41 00.3	05 71	51.8	7
8	40 00.9	10 80	63.6	40 06.3	08 80	62.3	40 12.8	06 78	60.4	40 17.3	04 76	58.4	40 20.2	01 74	55.8	40 20.4	00 74	55.1	40 20.3	01 73	54.5	40 17.9	04 71	51.8	8
9	39 12.6	11 80	63.5	39 18.6	09 80	62.2	39 26.0	07 78	60.3	39 31.4	05 76	58.3	39 35.6	02 74	55.8	39 36.1	01 74	55.1	39 36.4	01 73	54.5	39 35.5	02 71	51.9	9
60	38 24.4	12 80	63.4	38 30.9	10 79	62.1	38 39.1	08 78	60.2	38 45.5	06 76	58.3	38 51.0	03 74	55.7	38 51.9	02 74	55.1	38 52.6	02 73	54.4	38 53.0	01 71	51.9	60
1	37 36.2	12 80	63.3	37 43.3	11 79	62.0	37 52.4	09 78	60.1	37 59.6	07 76	58.2	38 06.5	04 74	55.7	38 07.7	04 74	55.1	38 08.7	03 73	54.4	38 10.6	00 71	51.9	1
2	36 48.1	13 80	63.1	36 55.7	12 79	61.9	37 05.6	10 78	60.0	37 13.8	08 76	58.2	37 22.0	05 74	55.6	37 23.5	05 74	55.0	37 24.8	04 73	54.4	37 28.2	01 71	51.9	2
3	36 00.0	14 80	63.0	36 08.1	13 79	61.8	36 18.9	11 78	59.9	36 28.0	09 76	58.1	36 37.4	07 74	55.6	36 39.3	06 74	55.0	36 41.0	05 73	54.3	36 45.8	03 71	51.9	3
4	35 12.0	15 80	62.9	35 20.6	14 79	61.6	35 32.3	12 78	59.8	35 42.3	10 76	58.0	35 53.0	08 74	55.5	35 55.2	07 74	54.9	35 57.2	06 73	54.3	36 03.4	04 71	51.8	4
65	34 24.0	16 80	62.7	34 33.2	15 79	61.5	34 45.7	13 78	59.7	34 56.6	11 76	57.9	35 08.5	09 74	55.5	35 11.1	08 74	54.8	35 13.4	08 73	54.2	35 21.0	05 71	51.8	65
6	33 36.1	17 80	62.5	33 45.9	16 79	61.4	33 59.2	14 78	59.6	34 10.9	12 76	57.8	34 24.1	10 74	55.4	34 27.0	09 73	54.8	34 29.7	09 73	54.2	34 38.6	06 70	51.7	6
7	32 48.3	18 80	62.4	32 58.6	17 79	61.2	33 12.7	15 77	59.4	33 25.3	13 76	57.7	33 39.8	11 74	55.3	33 43.0	10 73	54.7	33 46.0	10 73	54.1	33 56.3	07 70	51.7	7
8	32 00.6	19 80	62.2	32 11.3	17 78	61.0	32 26.3	16 77	59.3	32 39.8	14 76	57.5	32 55.5	12 74	55.2	32 59.0	11 73	54.6	33 02.3	11 73	54.0	33 14.0	09 70	51.6	8
9	31 12.9	19 79	62.0	31 24.2	18 78	60.9	31 40.0	17 77	59.1	31 54.3	15 76	57.4	32 11.3	13 74	55.1	32 15.1	12 73	54.5	32 18.8	12 73	53.9	32 31.8	10 70	51.5	9
70	30 25.3	20 79	61.8	30 37.1	19 78	60.7	30 53.7	18 77	59.0	31 08.9	16 76	57.3	31 27.1	14 74	54.9	31 31.2	14 73	54.4	31 35.2	13 72	53.8	31 49.6	11 70	51.4	70
1	29 37.8	21 79	61.6	29 50.1	20 78	60.5	30 07.5	19 77	58.8	30 23.6	17 75	57.1	30 43.0	15 74	54.8	30 47.4	15 73	54.2	30 51.7	14 72	53.7	31 07.4	12 70	51.4	1
2	28 50.4	22 79	61.4	29 03.2	21 78	60.3	29 21.4	20 77	58.6	29 38.4	18 75	57.0	29 58.9	16 73	54.7	30 03.7	16 73	54.1	30 08.3	15 72	53.5	30 25.3	13 70	51.2	2
3	28 03.1	23 79	61.2	28 16.4	22 78	60.1	28 35.4	20 76	58.5	28 53.2	19 75	56.8	29 15.0	17 73	54.5	29 20.1	17 73	54.0	29 25.0	16 72	53.4	29 43.3	14 70	51.1	3
4	27 15.9	24 79	61.0	27 29.7	23 78	59.9	27 49.5	21 76	58.3	28 08.1	20 75	56.6	28 31.1	18 73	54.4	28 36.5	18 72	53.8	28 41.7	17 72	53.3	29 01.4	15 70	51.0	4
75	26 28.7	24 78	60.8	26 43.1	24 78	59.7	27 03.7	22 76	58.1	27 23.2	21 75	56.4	27 47.3	19 73	54.2	27 53.0	19 72	53.7	27 58.6	18 72	53.1	28 19.5	17 70	50.9	75
6	25 41.7	25 78	60.6	25 56.6	24 77	59.5	26 18.0	23 76	57.9	26 38.3	22 75	56.3	27 03.6	20 73	54.1	27 09.6	20 72	53.5	27 15.5	19 72	53.0	27 37.7	18 70	50.8	6
7	24 54.8	26 78	60.4	25 10.1	25 77	59.3	25 32.3	24 76	57.7	25 53.5	23 74	56.1	26 20.0	21 73	53.9	26 26.3	21 72	53.3	26 32.5	20 72	52.8	26 56.0	19 70	50.6	7
8	24 08.0	27 78	60.1	24 23.8	26 77	59.1	24 46.8	25 76	57.5	25 08.8	24 74	55.9	25 36.4	22 72	53.7	25 43.1	22 72	53.2	25 49.5	21 71	52.6	26 14.3	20 69	50.5	8
9	23 21.2	28 78	59.9	23 37.6	27 77	58.8	24 01.4	26 76	57.3	24 24.2	25 74	55.7	24 53.0	23 72	53.5	24 59.9	23 72	53.0	25 06.7	22 71	52.5	25 32.8	21 69	50.3	9
80	22 34.7	28 78	59.6	22 51.5	28 76	58.6	23 16.1	27 75	57.0	23 39.7	26 74	55.5	24 09.7	24 72	53.3	24 16.9	24 72	52.8	24 24.0	24 71	52.3	24 51.3	22 69	50.1	80
1	21 48.2	29 77	59.4	22 05.6	29 76	58.4	22 30.9	28 75	56.8	22 55.4	27 74	55.2	23 26.5	25 72	53.1	23 34.0	25 71	52.6	23 41.4	25 71	52.1	24 10.0	23 69	50.0	1
2	21 01.8	30 77	59.1	21 19.7	30 76	58.1	21 45.9	29 75	56.6	22 11.1	28 74	55.0	22 43.4	26 72	52.9	22 51.2	26 71	52.4	22 59.0	26 71	51.9	23 28.8	24 68	49.8	2
3	20 15.6	31 77	58.9	20 34.0	30 76	57.8	21 00.9	29 75	56.3	21 27.0	29 73	54.8	22 00.5	27 72	52.7	22 08.6	27 71	52.2	22 16.6	27 70	51.7	22 47.7	25 68	49.6	3
4	19 29.5	32 76	58.6	19 48.4	31 76	57.6	20 16.1	30 74	56.1	20 43.0	29 73	54.5	21 17.6	28 71	52.5	21 26.0	28 71	52.0	21 34.4	28 70	51.5	22 06.7	26 68	49.4	4
85	18 43.6	33 76	58.3	19 03.0	32 76	57.3	19 31.4	31 74	55.8	19 59.1	30 73	54.3	20 34.9	29 71	52.3	20 43.6	29 70	51.7	20 52.2	29 70	51.2	21 25.8	27 68	49.2	85
6	17 57.7	33 76	58.0	18 17.6	33 75	57.0	18 46.9	32 74	55.5	19 15.4	31 73	54.0	19 52.3	30 71	52.0	20 01.3	30 70	51.5	20 10.3	30 70	51.0	20 45.1	28 68	49.0	6
7	17 12.1	34 76	57.8	17 32.5	34 75	56.8	18 02.5	33 74	55.3	18 31.8	32 72	53.8	19 09.9	31 70	51.8	19 19.2	31 70	51.3	19 28.4	31 70	50.8	20 04.5	29 68	48.7	7
8	16 26.5	35 76	57.5	16 47.4	35 75	56.5	17 18.2	34 74	55.0	17 48.4	33 72	53.5	18 27.6	32 70	51.5	18 37.2	32 70	51.0	18 46.7	32 69	50.5	19 24.0	31 67	48.5	8
9	15 41.1	36 75	57.2	16 02.5	35 74	56.2	16 34.1	35 73	54.7	17 06.1	34 72	53.3	17 45.4	33 70	51.3	17 55.3	33 70	50.8	18 05.1	33 69	50.3	18 43.6	32 67	48.3	9
90	14 55.9	37 75	56.9	15 17.8	36 74	55.9	15 50.2	36 73	54.4	16 22.0	35 72	53.0	17 03.4	34 70	51.0	17 13.6	34 69	50.5	17 23.7	34 69	50.0	18 03.5	33 67	48.1	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	28 00.0	1.0 01	180.0	27 00.0	1.0 01	180.0	25 30.0	1.0 01	180.0	24 00.0	1.0 01	180.0	22 00.0	1.0 01	180.0	21 30.0	1.0 01	180.0	21 00.0	1.0 01	180.0	19 00.0	1.0 01	180.0	00
1	27 59.6	1.0 02	179.1	26 59.6	1.0 02	179.1	25 29.6	1.0 02	179.1	23 59.6	1.0 02	179.2	21 59.6	1.0 02	179.2	21 29.6	1.0 02	179.2	20 59.6	1.0 02	179.2	18 59.6	1.0 02	179.3	1
2	27 58.3	1.0 04	178.2	26 58.3	1.0 04	178.2	25 28.4	1.0 04	178.3	23 58.4	1.0 03	178.3	21 58.5	1.0 03	178.4	21 28.5	1.0 03	178.4	20 58.5	1.0 03	178.4	18 58.6	1.0 03	178.5	2
3	27 56.1	1.0 05	177.3	26 56.2	1.0 05	177.3	25 26.3	1.0 05	177.4	23 56.5	1.0 05	177.5	21 56.6	1.0 04	177.6	21 26.6	1.0 04	177.6	20 56.7	1.0 04	177.7	18 56.8	1.0 04	177.8	3
4	27 53.1	1.0 06	176.3	26 53.3	1.0 06	176.4	25 23.5	1.0 06	176.5	23 53.7	1.0 06	176.6	21 54.0	1.0 06	176.8	21 24.0	1.0 06	176.8	20 54.1	1.0 06	176.9	18 54.4	1.0 05	177.0	4
05	27 49.2	1.0 08	175.4	26 49.5	1.0 08	175.5	25 19.8	1.0 08	175.7	23 50.1	1.0 07	175.8	21 50.6	1.0 07	176.0	21 20.7	1.0 07	176.0	20 50.8	1.0 07	176.1	18 51.2	1.0 06	176.3	05
6	27 44.5	99 09	174.5	26 44.8	99 09	174.6	25 15.3	99 09	174.8	23 45.8	99 08	175.0	21 46.4	99 08	175.2	21 16.6	99 08	175.3	20 46.8	99 08	175.3	18 47.3	1.0 08	175.5	6
7	27 38.9	99 11	173.6	26 39.4	99 10	173.7	25 10.1	99 10	174.0	23 40.7	99 10	174.1	21 41.6	99 09	174.4	21 11.8	99 09	174.5	20 42.0	99 09	174.5	18 42.8	99 09	174.8	7
8	27 32.5	99 12	172.7	26 33.1	99 12	172.9	25 04.0	99 12	173.1	23 34.8	99 11	173.3	21 35.9	99 10	173.6	21 06.2	99 10	173.7	20 36.5	99 10	173.8	18 37.5	99 10	174.0	8
9	27 25.2	99 14	171.8	26 26.0	99 13	172.0	24 57.1	99 13	172.2	23 28.2	99 12	172.5	21 29.6	99 12	172.8	20 59.9	99 12	172.9	20 30.2	99 12	173.0	18 31.6	99 11	173.3	9
10	27 17.1	98 15	170.9	26 18.1	98 15	171.1	24 49.4	99 14	171.4	23 20.7	99 14	171.7	21 22.5	99 13	172.0	20 52.9	99 13	172.1	20 23.3	99 13	172.2	18 25.0	99 12	172.6	10
1	27 08.2	98 16	170.0	26 09.3	98 16	170.2	24 40.9	98 15	170.5	23 12.5	98 15	170.8	21 14.6	98 14	171.2	20 45.1	98 14	171.3	20 15.6	98 14	171.4	18 17.6	98 13	171.8	1
2	26 58.4	98 18	169.1	25 59.7	98 17	169.4	24 31.7	98 17	169.7	23 03.6	98 16	170.0	21 06.1	98 16	170.5	20 36.7	98 15	170.6	20 07.3	98 15	170.7	18 09.6	98 14	171.1	2
3	26 47.8	97 19	168.2	25 49.4	97 19	168.5	24 21.7	98 18	168.9	22 53.9	98 18	169.2	20 56.8	98 17	169.7	20 27.5	98 16	169.8	19 58.2	98 16	169.9	18 00.9	98 16	170.4	3
4	26 36.4	97 20	167.4	25 38.2	97 20	167.6	24 10.8	97 19	168.0	22 43.4	97 19	168.4	20 46.7	97 18	168.9	20 17.6	97 18	169.0	19 48.4	97 18	169.2	17 51.6	97 17	169.6	4
15	26 24.2	97 22	166.5	25 26.3	97 21	166.8	23 59.3	97 21	167.2	22 32.2	97 20	167.6	20 36.0	97 19	168.1	20 07.0	97 19	168.3	19 37.9	97 19	168.4	17 41.6	97 18	168.9	15
6	26 11.2	96 23	165.6	25 13.5	96 22	165.9	23 46.9	96 22	166.4	22 20.3	96 21	166.8	20 24.6	96 20	167.4	19 55.7	96 20	167.5	19 26.7	96 20	167.7	17 30.9	97 19	168.2	6
7	25 57.4	96 24	164.7	25 00.0	96 24	165.1	23 33.8	96 23	165.5	22 07.6	96 22	166.0	20 12.5	96 21	166.6	19 43.6	96 21	166.8	19 14.8	96 21	166.9	17 19.5	96 20	167.5	7
8	25 42.9	95 26	163.9	24 45.8	95 25	164.2	23 20.0	95 24	164.7	21 54.2	95 24	165.2	19 59.6	96 22	165.9	19 31.0	96 22	166.0	19 02.3	96 22	166.2	17 07.5	96 21	166.8	8
9	25 27.5	95 27	163.0	24 30.7	95 26	163.4	23 05.4	95 26	163.9	21 40.1	95 25	164.4	19 46.1	95 24	165.1	19 17.6	95 24	165.3	18 49.1	95 23	165.4	16 54.9	95 22	166.1	9
20	25 11.4	94 28	162.2	24 14.9	94 28	162.6	22 50.1	94 27	163.1	21 25.2	94 26	163.7	19 31.9	95 25	164.4	19 03.5	95 24	164.5	18 35.2	95 24	164.7	16 41.6	95 23	165.4	20
1	24 54.5	93 29	161.4	23 58.4	94 29	161.7	22 34.1	94 28	162.3	21 09.7	94 27	162.9	19 17.0	94 26	163.6	18 48.8	94 26	163.8	18 20.6	94 25	164.0	16 27.6	94 24	164.7	1
2	24 36.9	93 30	160.5	23 41.2	93 30	160.9	22 17.4	93 29	161.5	20 53.5	93 28	162.1	19 01.5	93 27	162.9	18 33.4	93 27	163.1	18 05.4	94 26	163.2	16 13.1	94 25	164.0	2
3	24 18.6	92 32	159.7	23 23.2	92 31	160.1	22 00.0	93 30	160.7	20 36.6	93 29	161.4	18 45.3	93 28	162.1	18 17.4	93 28	162.3	17 49.5	93 27	162.5	15 57.9	93 26	163.3	3
4	23 59.5	92 33	158.9	23 04.5	92 32	159.3	21 41.8	92 31	160.0	20 19.0	92 30	160.6	18 28.4	92 29	161.4	18 00.7	92 29	161.6	17 33.0	92 28	161.8	15 42.1	93 27	162.6	4
25	23 39.7	91 34	158.1	22 45.1	91 34	158.5	21 23.0	91 32	159.2	20 00.8	91 32	159.8	18 10.9	92 30	160.7	17 43.4	92 30	160.9	17 15.9	92 30	161.1	15 25.7	92 28	161.9	25
6	23 19.3	90 35	157.3	22 25.0	90 35	157.7	21 03.5	91 34	158.4	19 41.9	91 33	159.1	17 52.7	91 31	160.0	17 25.4	91 31	160.2	16 58.1	91 31	160.4	15 08.6	91 29	161.3	6
7	22 58.1	90 36	156.5	22 04.3	90 36	157.0	20 43.4	90 35	157.7	19 22.3	90 34	158.4	17 34.0	90 32	159.3	17 06.8	90 32	159.5	16 39.7	90 32	159.7	14 51.0	91 30	160.6	7
8	22 36.2	89 38	155.7	21 42.8	89 37	156.2	20 22.5	89 36	156.9	19 02.1	89 35	157.6	17 14.6	90 33	158.6	16 47.7	90 33	158.8	16 20.7	90 33	159.0	14 32.8	90 31	159.9	8
9	22 13.7	88 39	154.9	21 20.7	88 38	155.4	20 01.1	89 37	156.2	18 41.3	89 36	156.9	16 54.6	89 34	157.9	16 27.9	89 34	158.1	16 01.1	89 34	158.4	14 14.0	89 32	159.3	9
30	21 50.5	88 40	154.2	20 58.0	88 39	154.7	19 39.0	88 38	155.4	18 19.8	88 37	156.2	16 34.0	88 35	157.2	16 07.5	88 35	157.4	15 40.9	88 35	157.7	13 54.7	89 33	158.6	30
1	21 26.7	87 41	153.4	20 34.6	87 40	153.9	19 16.3	87 39	154.7	17 57.7	87 38	155.5	16 12.8	88 36	156.5	15 46.5	88 36	156.8	15 20.2	88 36	157.0	13 34.8	88 34	158.0	1
2	21 02.3	86 42	152.7	20 10.6	86 41	153.2	18 52.9	86 40	154.0	17 35.1	87 39	154.8	15 51.0	87 37	155.8	15 24.9	87 37	156.1	14 58.8	87 37	156.3	13 14.3	87 35	157.4	2
3	20 37.2	85 43	151.9	19 46.0	85 42	152.5	18 29.0	86 41	153.3	17 11.8	86 40	154.1	15 28.6	86 38	155.2	15 02.8	86 38	155.4	14 36.9	86 38	155.7	12 53.2	86 36	156.7	3
4	20 11.5	84 44	151.2	19 20.8	85 43	151.8	18 04.5	85 42	152.6	16 48.0	85 41	153.4	15 05.7	85 39	154.5	14 40.1	85 39	154.8	14 14.4	86 38	155.0	12 31.7	86 37	156.1	4
35	19 45.2	84 45	150.5	18 54.9	84 44	151.0	17 39.4	84 43	151.9	16 23.6	84 42	152.7	14 42.2	85 40	153.9	14 16.8	85 40	154.1	13 51.4	85 39	154.4	12 09.6	85 38	155.5	35
6	19 18.3	83 46	149.7	18 28.5	83 45	150.3	17 13.7	83 44	151.2	15 58.6	84 43	152.1	14 18.2	84 41	153.2	13 53.0	84 40	153.5	13 27.8	84 40	153.8	11 46.9	84 39	154.9	6
7	18 50.9	82 47	149.0	18 01.6	82 46	149.6	16 47.4	83 45	150.5	15 33.1	83 44	151.4	13 53.6	83 42	152.6	13 28.7	83 42	152.9	13 03.7	83 41	153.1	11 23.8	83 40	154.3	7
8	18 22.8	81 48	148.3	17 34.0	81 47	149.0	16 20.6	82 46	149.9	15 07.0	82 44	150.8	13 28.5	82 43	151.9	13 03.8	82 42	152.2	12 39.1	82 42	152.5	11 00.1	83 40	153.7	8
9	17 54.2	80 48	147.7	17 05.9	81 48	148.3	15 53.3	81 46	149.2	14 40.4	81 45	150.1	13 02.8	81 44	151.3	12 38.4	81 43	151.6	12 13.9	82 43	151.9	10 35.9	82 41	153.1	9
40	17 25.1	80 49	147.0	16 37.3	80 49	147.6	15 25.4	80 47	148.5	14 13.2	80 46	149.5	12 36.7	81 44	150.7	12 12.5	81 44	151.0	11 48.3	81 44	151.3	10 11.3	81 42	152.5	40
1	16 55.5	79 50	146.3	16 08.2	79 50	146.9	14 57.0	79 48	147.9	13 45.6	79 47	148.8	12 10.0	80 45	150.1	11 46.1	80 45	150.4	11 22.2	80 44	150.7	9 46.1	80 43	151.9	1
2	16 25.3	78 51	145.6	15 38.5	78 50	146.3	14 28.1	78 49	147.3	13 17.4	79 48	148.2	11 42.9	79 46	149.5	11 19.2	79 46	149.8	10 55.5	79 45	150.1	9 20.5	79 44	151.3	2
3	15 54.6	77 52	145.0	15 08.3	77 51	145.7	13 58.7	78 50	146.6	12 48.8	78 49	147.6	11 15.3	78 47	148.9	10 51.8	78 46	149.2	10 28.4	78 46	149.5	8 54.4	78 44	150.8	3
4	15 23.4	77 53	144.3	14 37.6	76 52	145.0	13 28.8	77 51	146.0	12 19.6	77 49	147.0	10 47.2	77 48	148.3	10 24.0	77 47	148.6	10 00.8	77 47	148.9	8 27.9	78 45	150.2	4
45	14 51.7	75 54	143.7	14 06.5	76 53	144.4	12 58.4	76 52	145.4	11 50.0	76 50	146.4	10 18.6	76 48	147.7	9 55.7	76 48	148.0	9 32.8	76 48	148.4	8 00.9	77 46	149.7	45
6	14 19.6	74 54	143.1	13 34.8	75 54	143.8	12 27.5	75 52	144.8	11 20.0	75 51	145.8	9 49.6	75 49	147.1	9 26.9	76 49	147.5	9 04.3	76 48	147.8	7 33.4	76 46	149.1	6
7	13 47.0	74 55	142.5	13 02.7	74 54	143.2	11 56.2	74 53	144.2	10 49.4	74 52	145.2	9 20.1	75 50	146.6	8 57.7	75 50	146.9	8 35.3	75 49	147.3	7 05.5	75 47	148.6	7
8	13 13.9	73 56	141.9	12 30.2	73 55	142.6	11 24.4	73 54	143.6	10 18.4	73 52	144.6	8 50.2	74 51	146.0	8 28.0	74 50	146.4	8 05.9	74 50	146.7	6 37.2	74 48	148.1	8
9	12 40.4	72 57	141.3	11 57.2	72 56	142.0	10 52.2	72 54	143.0	9 47.0	73 53	144.1	8 19.8	73 51	145.5	7 58.0	73 51	145.8	7 36.1	73 50	146.2	6 08.5	73 49	147.5	9
50	12 06.4	71 57	140.7	11 23.7	71 56	141.4	10 19.6	71 55	142.5	9 15.2	72 54	143.5	7 49.0	72 52	144.9	7 27.4	72 52	145.3	7 05.9	72 51	145.6	5 39.3	72 49	147.0	50
1	11 32.0	70 58	140.1	10 49.9	70 57	140.8	9 46.5	71 56	141.9	8 42.9	71 54	143.0	7 17.8	71 53	144.4	6 56.5	71 52	144.7	6 35.2	71 52	145.1	5 09.8	71 50	146.5	1
2	10 57.2	69 59	139.5	10 15.6	69 58	140.2	9 13.0	70 56	141.3	8 10.2	70 55	142.4	6 46.2	70 53	143.9	6 25.2	70 53	144.2	6 04.1	70 52	144.6				2
3	10 22.0	68 60	138.9	9 40.9	69 58	139.7	8 39.1	69 57	140.8	7 37.1	69 56	141.9	6 14.2	69 54	143.3	5 53.5	69 54	143.7	5 32.7	69 53	144.1				3
4	9 46.3	67 60	138.4	9 05.8	68 59	139.1	8 04.8	68 58	140.2	7 03.6	68 56	141.4	5 41.8	68 54	142.8	5 21.4	68 54	143.2	5 00.9	68 54	143.6				4
55	9 10.3	67 61	137.8	8 30.3	67 60	138.6	7 30.1	67 58	139.7	6 29.8	67 57	140.8	5 09.1	67 55	142.3										55
6	8 33.9	66 61	137.3	7 54.5	66 60	138.1	6 55.1	66 59	139.2	5 55.5	66 58	140.3													6
7	7 57.2	65 62	136.8	7 18.2	65 61	137.5	6 19.6	65 60	138.7	5 20.9	65 58	139.8													7
8	7 20.1	64 62	136.2	6 41.6	64 62	137.0	5 43.8	64 60	138.2																8
9	6 42.6	63 63	135.7	6 04.7	63 62	136.5	5 07.7	63 60	137.7																9
60	6 04.7	62 64	135.2	5 27.4	62 63	136.0																			60
1	5 26.6	61 64	134.7																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	14 10.8	38 75	56.5	14 33.2	37 74	55.6	15 06.4	37 73	54.1	15 39.0	36 71	52.7	16 21.6	35 70	50.7	16 32.1	35 69	50.3	16 42.5	35 68	49.8	17 23.4	34 66	47.8	91
2	13 25.9	38 74	56.2	13 48.8	38 74	55.3	14 22.8	37 72	53.8	14 56.2	37 71	52.4	15 39.9	36 69	50.5	15 50.7	36 69	50.0	16 01.4	36 68	49.5	16 43.6	35 66	47.6	2
3	12 41.2	39 74	55.9	13 04.6	39 74	55.0	13 39.3	38 72	53.5	14 13.6	38 71	52.1	14 58.4	37 69	50.2	15 09.5	37 68	49.7	15 20.5	37 68	49.2	16 03.8	36 66	47.3	3
4	11 56.6	40 74	55.6	12 20.5	40 73	54.6	12 56.0	39 72	53.2	13 31.1	39 70	51.8	14 17.1	38 69	49.9	14 28.4	38 68	49.4	14 39.7	38 68	48.9	15 24.3	37 66	47.0	4
95	11 12.2	41 74	55.2	11 36.6	41 73	54.3	12 12.9	40 72	52.9	12 48.8	40 70	51.5	13 35.9	39 68	49.6	13 47.5	39 68	49.1	13 59.1	39 67	48.7	14 44.9	38 65	46.8	95
6	10 28.0	42 73	54.9	10 52.9	41 72	54.0	11 30.0	41 71	52.6	12 06.7	41 70	51.2	12 54.9	40 68	49.3	13 06.9	40 68	48.8	13 18.7	40 67	48.4	14 05.7	39 65	46.5	6
7	9 44.0	43 73	54.6	10 09.4	42 72	53.6	10 47.3	42 71	52.3	11 24.7	41 70	50.9	12 14.1	41 68	49.0	12 26.3	41 67	48.5	12 38.5	41 67	48.1	13 26.7	40 65	46.2	7
8	9 00.1	43 73	54.2	9 26.1	43 72	53.3	10 04.7	43 70	51.9	10 43.0	42 69	50.5	11 33.5	42 67	48.7	11 46.0	42 67	48.2	11 58.5	41 66	47.8	12 47.9	41 64	45.9	8
9	8 16.5	44 72	53.8	8 42.9	44 72	52.9	9 22.4	44 70	51.6	10 01.5	43 69	50.2	10 53.1	43 67	48.4	11 05.9	43 66	47.9	11 18.7	42 66	47.4	12 09.3	42 64	45.6	9
100	7 33.0	45 72	53.5	8 00.0	45 71	52.6	8 40.2	45 70	51.2	9 20.1	44 68	49.9	10 12.9	44 67	48.0	10 26.0	44 66	47.6	10 39.0	43 66	47.1	11 30.9	43 64	45.3	100
1	6 49.8	46 72	53.1	7 17.3	46 71	52.2	7 58.3	45 70	50.9	8 39.0	45 68	49.5	9 32.9	45 66	47.7	9 46.3	45 66	47.3	9 59.6	44 65	46.8	10 52.6	44 63	45.0	1
2	6 06.8	47 71	52.7	6 34.8	47 70	51.8	7 16.6	46 69	50.5	7 58.1	46 68	49.2	8 53.1	46 66	47.4	9 06.8	46 66	46.9	9 20.4	45 65	46.5	10 14.6	45 63	44.7	2
3	5 24.0	48 71	52.4	5 52.5	47 70	51.5	6 35.0	47 69	50.1	7 17.4	47 67	48.8	8 13.5	47 66	47.0	8 27.5	46 65	46.6	8 41.4	46 64	46.1	9 36.8	46 62	44.3	3
4				5 10.4	48 70	51.1	5 53.8	48 68	49.8	6 37.0	48 67	48.4	7 34.2	48 65	46.7	7 48.5	47 65	46.2	8 02.7	47 64	45.8	8 59.3	47 62	44.0	4
105							5 12.7	49 68	49.4	5 56.7	49 67	48.1	6 55.1	49 65	46.3	7 09.6	48 64	45.9	7 24.1	48 64	45.4	8 21.9	48 62	43.7	105
6										5 16.7	50 66	47.7	6 16.2	49 64	45.9	6 31.0	49 64	45.5	6 45.8	49 63	45.1	7 44.8	49 62	43.3	6
7													5 37.6	50 64	45.6	5 52.7	50 64	45.1	6 07.8	50 63	44.7	7 07.9	50 61	43.0	7
8																5 14.6	51 64	44.8	5 30.0	51 63	44.3	6 31.3	51 61	42.6	8
9																						5 54.9	52 61	42.2	9
110																						5 18.8	53 60	41.9	

Lat. 26°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	70 00.0	1.0 02	00.0	69 00.0	1.0 02	00.0	67 30.0	1.0 01	00.0	66 30.0	1.0 01	00.0	65 30.0	1.0 01	00.0	64 30.0	1.0 01	00.0	63 30.0	1.0 01	00.0	62 00.0	1.0 01	00.0	00
1	69 59.0	1.0 05	02.0	68 59.1	1.0 04	01.9	67 29.2	1.0 04	01.7	66 29.2	1.0 04	01.6	65 29.3	1.0 04	01.5	64 29.3	1.0 03	01.4	63 29.4	1.0 03	01.4	61 59.4	1.0 03	01.3	1
2	69 56.2	1.0 08	04.1	68 56.4	1.0 07	03.8	67 26.7	1.0 07	03.5	66 26.9	1.0 06	03.3	65 27.1	1.0 06	03.1	64 27.3	1.0 06	02.9	63 27.4	1.0 05	02.7	61 57.6	1.0 05	02.5	2
3	69 51.4	99 11	06.1	68 52.0	99 10	05.7	67 22.7	99 10	05.2	66 23.1	99 09	04.9	65 23.5	99 08	04.6	64 23.9	99 08	04.3	63 24.2	99 07	04.1	61 54.7	99 07	03.7	3
4	69 44.8	98 14	08.0	68 45.8	98 13	07.5	67 17.0	99 12	06.9	66 17.8	99 11	06.5	65 18.5	99 11	06.1	64 19.2	99 10	05.7	63 19.8	99 10	05.4	61 50.6	99 09	05.0	4
05	69 36.3	97 17	10.0	68 37.8	98 16	09.4	67 09.8	98 15	08.6	66 11.0	98 14	08.1	65 12.1	98 13	07.6	64 13.1	98 12	07.2	63 14.0	98 12	06.8	61 45.3	99 11	06.2	05
6	69 26.1	96 20	11.9	68 28.2	97 19	11.2	67 01.0	97 17	10.2	66 02.7	97 16	09.6	65 04.2	97 15	09.1	64 05.7	98 14	08.6	63 07.1	98 14	08.1	61 38.9	98 12	07.4	6
7	69 14.1	96 23	13.8	68 16.9	96 22	13.0	66 50.7	96 20	11.9	65 52.9	96 18	11.2	64 55.1	97 18	10.5	63 57.0	97 16	09.9	62 58.9	97 16	09.4	61 31.4	97 14	08.6	7
8	69 00.3	94 26	15.7	68 04.0	94 24	14.7	66 38.9	96 22	13.5	65 41.8	96 21	12.7	64 44.5	96 20	12.0	63 47.1	96 19	11.3	62 49.5	96 18	10.7	61 22.7	97 16	09.8	8
9	68 45.0	92 28	17.4	67 49.5	93 27	16.4	66 25.6	94 24	15.0	65 29.3	94 23	14.2	64 32.7	94 22	13.4	63 35.9	95 21	12.7	62 38.9	95 20	12.0	61 13.0	96 18	11.0	9
10	68 28.0	91 31	19.2	67 33.5	91 29	18.1	66 10.9	92 27	16.6	65 15.4	93 25	15.6	64 19.6	93 24	14.8	63 23.5	94 23	14.0	62 27.1	94 22	13.2	61 02.1	95 20	12.2	10
1	68 09.6	89 33	20.9	67 16.0	90 31	19.7	65 54.9	91 29	18.0	65 00.2	91 27	17.1	64 05.2	92 26	16.1	63 09.9	93 25	15.3	62 14.2	93 23	14.4	60 50.3	94 22	13.3	1
2	67 49.6	87 36	22.5	66 57.2	88 34	21.2	65 37.5	89 31	19.5	64 43.8	90 30	18.4	63 49.6	91 28	17.4	62 55.1	91 26	16.5	62 00.2	92 25	15.6	60 37.3	92 23	14.4	2
3	67 28.3	85 38	24.1	66 37.0	86 36	22.7	65 18.9	88 33	20.9	64 26.1	88 31	19.8	63 32.9	89 30	18.7	62 39.2	90 28	17.7	61 45.1	90 27	16.8	60 23.4	91 25	15.5	3
4	67 05.7	83 40	25.6	66 15.5	84 38	24.2	64 59.0	86 35	22.3	64 07.3	87 33	21.1	63 15.0	88 32	20.0	62 22.2	88 30	18.9	61 29.0	89 28	18.0	60 08.5	90 26	16.6	4
15	66 41.8	81 42	27.0	65 52.8	82 40	25.6	64 38.0	84 37	23.6	63 47.3	85 35	22.4	62 56.0	86 33	21.2	62 04.2	87 32	20.1	61 11.9	88 30	19.1	59 52.6	89 28	17.6	15
6	66 16.7	79 44	28.4	65 29.0	80 42	26.9	64 15.9	82 39	24.9	63 26.3	83 37	23.6	62 36.0	84 35	22.4	61 45.1	85 33	21.3	60 53.8	86 32	20.2	59 35.8	87 30	18.7	6
7	65 50.4	77 45	29.8	65 04.0	78 43	28.2	63 52.7	80 40	26.1	63 04.2	81 38	24.8	62 14.9	83 37	23.5	61 25.1	84 35	22.4	60 34.7	84 33	21.2	59 18.1	86 31	19.7	7
8	65 23.2	75 47	31.0	64 38.0	76 45	29.5	63 28.4	78 42	27.3	62 41.1	80 40	25.9	61 52.9	81 38	24.6	61 04.1	82 36	23.4	60 14.7	83 35	22.3	58 59.5	84 32	20.6	8
9	64 54.9	72 49	32.2	64 10.9	74 46	30.7	63 03.2	76 44	28.4	62 17.0	78 42	27.0	61 30.0	79 40	25.7	60 42.2	80 38	24.5	59 53.8	81 36	23.3	58 40.1	83 34	21.6	9
20	64 25.7	70 50	33.4	63 43.0	72 48	31.8	62 37.1	74 45	29.5	61 52.0	76 43	28.1	61 06.1	77 41	26.8	60 19.5	78 39	25.5	59 32.1	80 38	24.2	58 19.8	81 35	22.5	20
1	63 55.5	68 52	34.5	63 14.1	70 49	32.9	62 10.1	72 46	30.6	61 26.2	74 44	29.1	60 41.4	75 42	27.8	59 55.9	77 41	26.4	59 09.5	78 39	25.2	57 58.8	79 36	23.4	1
2	63 24.6	66 53	35.5	62 44.5	68 51	33.9	61 42.3	70 48	31.6	60 59.5	72 46	30.1	60 15.9	73 44	28.7	59 31.5	75 42	27.4	58 46.2	76 40	26.1	57 37.0	78 38	24.3	2
3	62 52.8	64 54	36.5	62 14.0	66 52	34.9	61 13.6	68 49	32.5	60 32.1	70 47	31.1	59 49.6	72 45	29.6	59 06.3	73 43	28.3	58 22.1	74 41	27.0	57 14.4	76 39	25.1	3
4	62 20.4	62 55	37.5	61 42.8	64 53	35.8	60 44.3	66 50	33.5	60 03.9	68 48	32.0	59 22.6	70 46	30.5	58 40.4	71 44	29.1	57 57.3	72 42	27.8	56 51.2	74 40	25.9	4
25	61 47.2	60 56	38.4	61 10.9	62 54	36.7	60 14.2	64 51	34.3	59 35.0	66 49	32.8	58 54.9	68 47	31.4	58 13.8	69 46	30.0	57 31.8	71 44	28.6	56 27.3	73 41	26.7	25
6	61 13.4	57 57	39.2	60 38.3	60 55	37.6	59 43.4	62 52	35.2	59 05.5	64 50	33.7	58 26.5	66 48	32.2	57 46.5	67 46	30.8	57 05.6	69 45	29.4	56 02.7	71 42	27.5	6
7	60 39.0	55 58	40.0	60 05.1	58 56	38.4	59 12.1	60 53	36.0	58 35.3	62 51	34.5	57 57.4	64 49	33.0	57 18.6	65 48	31.6	56 38.8	67 46	30.2	55 37.5	69 43	28.2	7
8	60 04.0	53 59	40.8	59 31.4	55 57	39.1	58 40.1	58 54	36.7	58 04.5	60 52	35.2	57 27.8	62 50	33.7	56 50.1	64 48	32.3	56 11.4	65 47	30.9	55 11.8	67 44	28.9	8
9	59 28.5	51 60	41.5	58 57.1	54 58	39.9	58 07.5	56 55	37.5	57 33.1	58 53	35.9	56 57.6	60 51	34.4	56 21.0	62 50	33.0	55 43.4	63 48	31.6	54 45.4	66 45	29.6	9
30	58 52.5	49 61	42.2	58 22.2	52 59	40.6	57 34.5	55 56	38.2	57 01.2	56 54	36.6	56 26.8	58 52	35.1	55 51.3	60 50	33.7	55 14.9	62 48	32.3	54 18.5	64 46	30.2	30
1	58 16.1	47 62	42.9	57 46.9	50 60	41.2	57 00.9	53 57	38.8	56 28.8	55 55	37.3	55 55.5	56 53	35.8	55 21.2	58 51	34.3	54 45.8	60 49	32.9	53 51.1	62 46	30.9	1
2	57 39.2	46 62	43.5	57 11.2	48 60	41.8	56 26.9	51 58	39.4	55 55.9	53 56	37.9	55 23.7	54 54	36.4	54 50.5	56 52	35.0	54 16.3	58 50	33.5	53 23.2	60 47	31.5	2
3	57 01.9	44 63	44.0	56 35.0	46 61	42.4	55 52.4	49 58	40.0	55 22.5	51 56	38.5	54 51.5	53 54	37.0	54 19.4	54 53	35.5	53 46.3	56 51	34.1	52 54.8	58 48	32.1	3
4	56 24.2	42 63	44.6	55 58.4	44 62	43.0	55 17.5	47 59	40.6	54 48.7	49 57	39.1	54 18.8	51 55	37.6	53 47.8	53 53	36.1	53 15.8	54 52	34.7	52 25.9	57 49	32.6	4
35	55 46.2	40 64	45.1	55 21.5	42 62	43.5	54 42.2	45 59	41.1	54 14.5	47 58	39.6	53 45.7	49 56	38.1	53 15.8	51 54	36.7	52 44.9	52 52	35.2	51 56.6	55 50	33.2	35
6	55 07.8	38 64	45.6	54 44.2	40 63	44.0	54 06.6	43 60	41.6	53 40.0	45 58	40.1	53 12.3	47 56	38.6	52 43.4	49 54	37.2	52 13.6	51 53	35.7	51 26.9	53 50	33.7	6
7	54 29.1	36 65	46.0	54 06.6	39 63	44.4	53 30.6	42 61	42.1	53 05.1	43 59	40.6	52 38.4	45 57	39.1	52 10.7	47 55	37.7	51 41.9	49 54	36.2	50 56.8	51 51	34.2	7
8	53 50.2	35 65	46.4	53 28.7	37 64	44.9	52 54.2	40 61	42.6	52 29.8	42 59	41.1	52 04.2	44 58	39.6	51 37.6	45 56	38.1	51 09.8	47 54	36.7	50 26.4	49 51	34.6	8
9	53 11.0	33 66	46.8	52 50.5	35 64	45.3	52 17.6	38 62	43.0	51 54.2	40 60	41.5	51 29.7	42 58	40.0	51 04.1	44 56	38.6	50 37.4	45 54	37.1	49 55.6	48 52	35.1	9
40	52 31.5	31 66	47.2	52 12.1	33 64	45.7	51 40.7	36 62	43.4	51 18.4	38 60	41.9	50 54.9	40 58	40.4	50 30.3	42 57	39.0	50 04.7	44 55	37.6	49 24.4	46 52	35.5	40
1	51 51.8	30 66	47.6	51 33.4	32 65	46.0	51 03.5	35 62	43.8	50 42.2	36 61	42.3	50 19.8	38 59	40.8	49 56.2	40 57	39.4	49 31.7	42 56	38.0	48 52.9	44 53	35.9	1
2	51 11.9	28 67	47.9	50 54.5	30 65	46.4	50 26.1	33 63	44.1	50 05.8	35 61	42.6	49 44.4	37 60	41.2	49 21.9	38 58	39.8	48 58.4	40 56	38.4	48 21.2	43 54	36.3	2
3	50 31.8	27 67	48.2	50 15.3	28 66	46.7	49 48.5	31 63	44.4	49 29.2	33 62	43.0	49 08.7	35 60	41.5	48 47.3	37 58	40.1	48 24.8	38 56	38.7	47 49.1	41 54	36.7	3
4	49 51.5	25 67	48.5	49 36.0	27 66	47.0	49 10.6	30 64	44.8	48 52.3	31 62	43.3	48 32.9	33 60	41.9	48 12.4	35 58	40.5	47 50.9	37 57	39.1	47 16.8	39 54	37.0	4
45	49 11.1	23 68	48.7	48 56.5	25 66	47.2	48 32.5	28 64	45.0	48 15.2	30 62	43.6	47 56.8	32 61	42.2	47 37.3	33 59	40.8	47 16.8	35 57	39.4	46 44.2	37 55	37.3	45
6	48 30.5	22 68	49.0	48 16.8	24 66	47.5	47 54.3	26 64	45.3	47 37.9	28 62	43.9	47 20.4	30 61	42.5	47 02.0	32 59	41.1	46 42.5	33 58	39.7	46 11.4	36 55	37.6	6
7	47 49.8	20 68	49.2	47 37.0	22 67	47.7	47 15.9	25 64	45.6	47 00.4	27 63	44.2	46 43.9	28 61	42.7	46 26.4	30 60	41.4	46 07.9	32 58	40.0	45 38.3	34 55	37.9	7
8	47 08.9	19 68	49.4	46 57.0	21 67	47.9	46 37.3	23 65	45.8	46 22.8	25 63	44.4	46 07.2	27 61	43.0	45 50.7	28 60	41.6	45 33.2	30 58	40.2	45 05.1	32 56	38.2	8
9	46 27.9	17 68	49.6	46 16.9	19 67	48.1	45 58.5	22 65	46.0	45 45.0	23 63	44.6	45 30.4	25 62	43.2	45 14.8	27 60	41.9	44 58.3	28 59	40.5	44 31.6	31 56	38.5	9
50	45 46.8	16 69	49.7	45 36.7	18 67	48.3	45 19.7	20 65	46.2	45 07.0	22 64	44.8	44 53.4	24 62	43.5	44 38.7	25 60	42.1	44 23.1	27 59	40.7	43 58.0	29 56	38.7	50
1	45 05.6	14 69	49.9	44 56.4	16 67	48.5	44 40.7	19 65	46.4	44 28.9	20 64	45.0	44 16.2	22 62	43.7	44 02.5	24 60	42.3	43 47.9	25 59	41.0	43 24.1	28 56	39.0	1
2	44 24.3	13 69	50.0	44 16.0	15 68	48.6	44 01.6	17 66	46.6	43 50.7	19 64	45.2	43 38.9	20 62	43.8	43 26.2	22 61	42.5	43 12.5	24 59	41.2	42 50.2	26 57	39.2	2
3	43 43.0	12 69	50.1	43 35.4	13 68	48.8	43 22.3	16 66	46.7	43 12.4	17 64	45.4	43 01.5	19 62	44.0	42 49.7	21 61	42.7	42 36.9	22 60	41.3	42 16.0	24 57	39.4	3
4	43 01.5	10 69	50.2	42 54.9	12 68	48.9	42 43.0	14 66	46.9	42 34.0	16 64	45.5	42 24.0	17 63	44.2	42 13.0	19 61	42.8	42 01.2	21 60	41.5	41 41.7	23 57	39.6	4
55	42 20.0	09 69	50.3	42 14.2	11 68	49.0	42 03.6	13 66	47.0	41 55.5	14 64	45.6	41 46.4	16 63	44.3	41 36.3	17 61	43.0	41 25.4	19 60	41.7	41 07.3	21 58	39.7	55
6	41 38.5	08 69	50.4	41 33.5	09 68	49.1	41 24.2	11 66	47.1	41 16.9	13 64	45.8	41 08.6	14 63	44.4	40 59.5	16 62	43.1	40 49.5	17 60	41.8	40 32.8	20 58	39.9	6
7	40 56.9	06 69	50.5	40 52.7	08 68	49.2	40 44.7	10 66	47.2	40 38.2	12 65	45.9	40 30.8	13 63	44.6	40 22.6	14 62	43.3	40 13.5	16 60	42.0	39 58.2	18 58	40.0	7
8	40 15.3	05 69	50.5	40 11.9	06 68	49.2	40 05.1	09 66	47.3	39 59.4	10 65	46.0	39 52.9	12 63	44.7	39 45.6	13 62	43.4	39 37.4	14 60	42.1	39 23.4	17 58	40.2	8
9	39 33.7	04 70	50.6	39 31.0	05 68	49.3	39 25.4	07 66	47.3	39 20.7	09 65	46.0	39 15.0	10 63	44.8	39 08.5	12 62	43.5	39 01.2	13 60	42.2	38 48.6	15 58	40.3	9
60	38 52.0	02 70	50.6	38 50.2	04 68	49.3	38 45.8	06 66	47.4	38 41.8	07 65	46.1	38 37.0	09 63	44.8	38 31.4	10 62	43.6	38 24.9	11 60	42.3	38 13.7	13 58	40.4	60
1	38 10.3	01 70	50.6	38 00.3	03 68	49.3	38 06.1	05 66	47.4	38 02.9	06 65	46.2	37 59.0	07 64	44.9	37 54.2	09 62	43.6	37 48.6	10 61	42.4	37 38.7	12 58	40.5	1
2	37 28.7	00 70	50.6	37 28.3	01 68	49.4	37 26.3	03 66	47.5	37 24.0	04 65	46.2	37 20.9	06 64	44.9	37 17.0	07 62	43.7	37 12.2	09 61	42.4	37 03.7	11 58	40.6	2
3	36 47.0	01 70	50.6	36 47.4	00 68	49.4	36 46.6	02 66	47.5	36 45.1	03 65	46.2	36 42.8	05 64	45.0	36 39.7	06 62	43.7	36 35.8	07 61	42.5	36 28.6	09 59	40.6	3
4	36 05.3	03 70	50.6	36 06.5	01 68	49.4	36 06.9	01 66	47.5	36 06.1	02 65	46.3	36 04.6	03 64	45.0	36 02.4	04 62	43.8	35 59.4	06 61	42.5	35 53.4	08 59	40.7	4
65	35 23.7	04 70	50.6	35 25.6	03 68	49.3	35 27.1	01 66	47.5	35 27.2	01 65	46.3	35 26.5	02 64	45.0	35 25.1	03 62	43.8	35 22.9	04 61	42.6	35 18.3	06 59	40.7	65
6	34 42.0	05 69	50.5	34 44.7	04 68	49.3	34 47.3	02 66	47.5	34 48.2	01 65	46.3	34 48.3	00 64	45.0	34 47.7	02 62	43.8	34 46.4	03 61	42.6	34 43.0	05 59	40.8	6
7	34 00.4	06 69	50.5	34 03.8	05 68	49.3	34 07.6	03 66	47.5	34 09.2	02 65	46.3	34 10.2	01 64	45.0	34 10.4	00 62	43.8	34 09.9	01 61	42.6	34 07.8	03 59	40.8	7
8	33 18.8	07 69	50.4	33 23.0	06 68	49.2	33 27.9	05 66	47.4	33 30.3	03 65	46.2	33 32.0	02 64	45.0	33 33.0	01 62	43.8	33 33.4	00 61	42.6	33 32.5	02 59	40.8	8
9	32 37.3	09 69	50.4	32 42.1	08 68	49.2	32 48.2	06 66	47.4	32 51.3	05 65	46.2	32 53.9	04 64	45.0	32 55.7	02 62	43.8	32 56.8	01 61	42.6	32 57.3	00 59	40.8	9
70	31 55.8	10 69	50.3	32 01.4	09 68	49.1	32 08.5	07 66	47.3	32 12.4	06 65	46.2	32 15.7	05 64	45.0	32 18.3	04 62	43.8	32 20.3	03 61	42.6	32 22.0	01 59	40.8	70
1	31 14.3	11 69	50.2	31 20.6	10 68	49.0	31 28.9	08 66	47.3	31 33.6	07 65	46.1	31 37.6	06 64	44.9	31 41.0	05 62	43.8	31 43.8	04 61	42.6	31 46.7	02 59	40.8	1
2	30 32.9	12 69	50.1	30 39.9	11 68	48.9	30 49.3	10 66	47.2	30 54.7	09 65	46.0	30 59.5	08 63	44.9	31 03.7	06 62	43.7	31 07.3	05 61	42.6	31 11.5	04 59	40.8	2
3	29 51.6	13 69	50.0	29 59.3	12 68	48.9	30 09.7	11 66	47.1	30 15.9	10 64	46.0	30 21.5	09 63	44.8	30 26.5	08 62	43.7	30 30.9	07 61	42.5	30 36.3	05 59	40.8	3
4	29 10.3	14 69	49.9	29 18.7	14 68	48.7	29 30.2	12 66	47.0	29 37.2	11 64	45.9	29 43.5	10 63	44.8	29 49.3	09 62	43.6	29 54.4	08 61	42.5	30 01.1	07 59	40.7	4
75	28 29.1	16 68	49.8	28 38.2	15 67	48.6	28 50.8	13 66	46.9	28 58.5	12 64	45.8	29 05.6	11 63	44.7	29 12.1	10 62	43.5	29 18.1	09 61	42.4	29 25.9	08 58	40.7	75
6	27 48.0	17 68	49.6	27 57.8	16 67	48.5	28 11.4	14 66	46.8	28 19.8	14 64	45.7	28 27.7	13 63	44.6	28 35.0	12 62	43.5	28 41.7	11 60	42.3	28 50.8	09 58	40.6	6
7	27 06.9	18 68	49.5	27 17.4	17 67	48.4	27 32.1	16 65	46.7	27 41.2	15 64	45.6	27 49.9	14 63	44.5	27 57.9	13 62	43.4	28 05.4	12 60	42.2	28 15.7	11 58	40.6	7
8	26 26.0	19 68	49.4	26 37.1	18 67	48.3	26 52.9	17 65	46.6	27 02.7	16 64	45.5	27 12.1	15 63	44.4	27 20.9	14 62	43.3	27 29.2	13 60	42.2	27 40.6	12 58	40.5	8
9	25 45.1	20 68	49.2	25 56.9	19 67	48.1	26 13.7	18 65	46.5	26 24.3	17 64	45.4	26 34.4	16 63	44.3	26 44.0	16 62	43.2	26 53.0	15 60	42.1	27 05.6	13 58	40.4	9
80	25 04.3	21 68	49.0	25 16.8	20 67	48.0	25 34.7	19 65	46.3	25 46.0	18 64	45.3	25 56.8	18 62	44.2	26 07.1	17 61	43.1	26 16.9	16 60	42.0	26 30.7	15 58	40.3	80
1	24 23.6	22 68	48.9	24 36.8	22 66	47.8	24 55.7	20 65	46.2	25 07.7	20 64	45.1	25 19.3	19 62	44.0	25 30.3	18 61	42.9	25 40.9	17 60	41.8	25 55.9	16 58	40.2	1
2	23 43.1	23 68	48.7	23 56.9	23 66	47.6	24 16.8	22 64	46.0	24 29.6	21 64	45.0	24 41.8	20 62	43.9	24 53.6	19 61	42.8	25 05.0	19 60	41.7	25 21.1	17 58	40.1	2
3	23 02.6	25 67	48.5	23 17.1	24 66	47.5	23 38.1	23 64	45.9	23 51.5	22 63	44.8	24 04.5	21 62	43.7	24 17.0	21 61	42.7	24 29.1	20 60	41.6	24 46.4	19 58	40.0	3
4	22 22.3	26 67	48.3	22 37.4	26 66	47.3	22 59.4	24 64	45.7	23 13.5	23 63	44.7	23 27.3	22 62	43.6	23 40.5	22 61	42.5	23 53.4	21 60	41.5	24 11.8	20 58	39.9	4
85	21 42.0	27 67	48.1	21 57.9	26 66	47.1	22 20.9	25 64	45.5	22 35.7	24 63	44.5	22 50.1	24 62	43.4	23 04.1	23 60	42.4	23 17.7	22 59	41.3	23 37.3	21 57	39.7	85
6	21 01.9	28 66	47.9	21 18.4	27 66	46.9	21 42.4	26 64	45.4	21 58.0	26 63	44.3	22 13.1	25 62	43.3	22 27.8	24 60	42.2	22 42.2	24 59	41.2	23 02.9	22 57	39.6	6
7	20 22.0	29 66	47.7	20 39.1	28 65	46.7	21 04.1	27 64	45.2	21 29.4	27 62	44.1	21 36.2	26 61	43.1	21 51.7	25 60	42.1	22 06.7	25 59	41.0	22 28.6	24 57	39.4	7
8	19 42.1	30 66	47.5	19 59.9	29 65	46.5	20 26.0	28 64	45.0	20 42.9	28 62	43.9	20 59.4	27 61	42.9	21 15.6	27 60	41.9	21 31.4	26 59	40.8	21 54.4	25 57	39.3	8
9	19 02.4	31 66	47.3	19 20.9	30 65	46.3	19 47.9	30 63	44.8	20 05.5	29 62	43.7	20 22.8	28 61	42.7	20 39.7	28 60	41.7	20 56.2	27 58	40.7	21 20.3	26 57	39.1	9
90	18 22.9	33 66	47.1	18 42.0	32 65	46.1	19 10.0	31 63	44.5	19 28.3	30 62	43.5	19 46.2	30 60	42.5	20 03.9	29 60	41.5	20 21.1	28 58	40.5	20 46.3	28 56	38.9	90

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	18 00.0	1.0 00	180.0	17 00.0	1.0 00	180.0	15 30.0	1.0 00	180.0	14 30.0	1.0 00	180.0	13 30.0	1.0 00	180.0	12 30.0	1.0 00	180.0	11 30.0	1.0 00	180.0	10 00.0	1.0 00	180.0	00
1	17 59.7	1.0 02	179.3	16 59.7	1.0 02	179.3	15 29.7	1.0 02	179.3	14 29.7	1.0 02	179.3	13 29.7	1.0 02	179.3	12 29.7	1.0 02	179.4	11 29.7	1.0 02	179.4	9 59.7	1.0 01	179.4	1
2	17 58.6	1.0 03	178.5	16 58.7	1.0 03	178.6	15 28.7	1.0 03	178.6	14 28.7	1.0 02	178.7	13 28.8	1.0 03	178.7	12 28.8	1.0 02	178.7	11 28.8	1.0 02	178.8	9 58.9	1.0 02	178.8	2
3	17 56.9	1.0 04	177.8	16 57.0	1.0 04	177.9	15 27.1	1.0 04	177.9	14 27.2	1.0 04	178.0	13 27.2	1.0 04	178.0	12 27.3	1.0 04	178.1	11 27.4	1.0 04	178.1	9 57.5	1.0 03	178.2	3
4	17 54.5	1.0 05	177.1	16 54.6	1.0 05	177.2	15 24.8	1.0 05	177.3	14 25.0	1.0 05	177.3	13 25.1	1.0 05	177.4	12 25.2	1.0 04	177.5	11 25.3	1.0 04	177.5	9 55.5	1.0 04	177.6	4
05	17 51.4	1.0 06	176.4	16 51.6	1.0 06	176.4	15 21.9	1.0 06	176.6	14 22.1	1.0 06	176.7	13 22.3	1.0 06	176.7	12 22.5	1.0 06	176.8	11 22.7	1.0 05	176.9	9 53.0	1.0 05	177.0	05
6	17 47.6	1.0 07	175.6	16 47.9	1.0 07	175.7	15 18.4	1.0 07	175.9	14 18.6	1.0 07	176.0	13 18.9	1.0 07	176.1	12 19.2	1.0 06	176.2	11 19.5	1.0 06	176.3	9 49.9	1.0 06	176.4	6
7	17 43.2	99 08	174.9	16 43.6	99 08	175.0	15 14.2	99 08	175.2	14 14.6	99 08	175.3	13 14.9	99 08	175.4	12 15.3	99 08	175.5	11 15.7	99 07	175.7	9 46.3	99 07	175.8	7
8	17 38.1	99 10	174.2	16 38.6	99 10	174.3	15 09.3	99 09	174.5	14 09.8	99 09	174.7	13 10.3	99 09	174.8	12 10.8	99 08	174.9	11 11.3	99 08	175.0	9 42.1	99 08	175.2	8
9	17 32.3	99 11	173.5	16 32.9	99 11	173.6	15 03.9	99 10	173.8	14 04.5	99 10	174.0	13 05.1	99 10	174.1	12 05.8	99 10	174.3	11 06.4	99 09	174.4	9 37.3	99 09	174.6	9
10	17 25.8	99 12	172.7	16 26.6	99 12	172.9	14 57.8	99 11	173.2	13 58.5	99 11	173.3	12 59.3	99 11	173.5	12 00.1	99 10	173.7	11 00.9	99 10	173.8	9 32.0	99 10	174.1	10
1	17 18.6	98 13	172.0	16 19.6	98 13	172.2	14 51.0	98 12	172.5	13 52.0	98 12	172.7	12 52.9	98 12	172.8	11 53.8	98 11	173.0	10 54.8	98 11	173.2	9 26.1	98 11	173.5	1
2	17 10.8	98 14	171.3	16 11.9	98 14	171.5	14 43.7	98 13	171.8	13 44.8	98 13	172.0	12 45.9	98 13	172.2	11 47.0	98 12	172.4	10 48.1	98 12	172.6	9 19.7	98 12	172.9	2
3	17 02.3	98 15	170.6	16 03.7	98 15	170.8	14 35.7	98 14	171.1	13 37.0	98 14	171.4	12 38.3	98 14	171.6	11 39.6	98 13	171.8	10 40.9	98 13	172.0	9 12.8	98 12	172.3	3
4	16 53.2	97 16	169.9	15 54.7	97 16	170.1	14 27.0	97 15	170.5	13 28.6	97 15	170.7	12 30.1	97 15	170.9	11 31.6	98 14	171.2	10 33.1	98 14	171.4	9 05.3	98 13	171.7	4
15	16 43.4	97 17	169.2	15 45.2	97 17	169.4	14 17.8	97 16	169.8	13 19.6	97 16	170.1	12 21.3	97 16	170.3	11 23.0	97 15	170.5	10 24.7	97 15	170.8	8 57.3	97 14	171.1	15
6	16 32.9	97 18	168.5	15 35.0	97 18	168.7	14 08.0	97 18	169.1	13 09.9	97 17	169.4	12 11.9	97 17	169.7	11 13.9	97 16	169.9	10 15.8	97 16	170.2	8 48.7	97 15	170.6	6
7	16 21.8	96 20	167.8	15 24.1	96 19	168.1	13 57.5	96 18	168.5	12 59.7	96 18	168.8	12 01.9	96 18	169.0	11 04.1	96 17	169.3	10 06.3	96 17	169.6	8 39.6	96 16	170.0	7
8	16 10.1	96 21	167.1	15 12.6	96 20	167.4	13 46.4	96 19	167.8	12 48.9	96 19	168.1	11 51.4	96 18	168.4	10 53.9	96 18	168.7	9 56.3	96 18	169.0	8 29.9	96 17	169.4	8
9	15 57.7	95 22	166.4	15 00.6	95 21	166.7	13 34.8	95 20	167.2	12 37.5	95 20	167.5	11 40.3	95 20	167.8	10 43.0	95 19	168.1	9 45.7	95 18	168.4	8 19.8	96 18	168.8	9
20	15 44.7	95 23	165.7	14 47.9	95 22	166.0	13 22.5	95 22	166.5	12 25.6	95 21	166.9	11 28.6	95 20	167.2	10 31.6	95 20	167.5	9 34.6	95 19	167.8	8 09.1	95 19	168.3	20
1	15 31.1	94 24	165.0	14 34.5	94 23	165.4	13 09.6	94 22	165.9	12 13.0	94 22	166.2	11 16.3	94 21	166.6	10 19.7	94 21	166.9	9 23.0	95 20	167.2	7 57.9	95 20	167.7	1
2	15 16.9	94 25	164.3	14 20.6	94 24	164.7	12 56.2	94 23	165.2	11 59.9	94 23	165.6	11 03.5	94 22	165.9	10 07.2	94 22	166.3	9 10.8	94 21	166.6	7 46.1	94 20	167.2	2
3	15 02.0	93 26	163.7	14 06.1	93 25	164.1	12 42.2	93 24	164.6	11 46.2	93 24	165.0	10 50.2	93 23	165.3	9 54.1	93 23	165.7	8 58.0	93 22	166.1	7 33.9	94 21	166.6	3
4	14 46.6	93 27	163.0	13 51.0	93 26	163.4	12 27.6	93 25	164.0	11 31.9	93 25	164.4	10 36.2	93 24	164.7	9 40.5	93 24	165.1	8 44.8	93 23	165.5	7 21.2	93 22	166.1	4
25	14 30.5	92 28	162.3	13 35.3	92 27	162.8	12 12.4	92 26	163.4	11 17.1	92 26	163.7	10 21.8	92 25	164.1	9 26.4	92 24	164.5	8 31.0	92 24	164.9	7 07.9	92 23	165.5	25
6	14 13.8	91 29	161.7	13 19.0	91 28	162.1	11 56.7	92 27	162.7	11 01.7	92 26	163.1	10 06.8	92 26	163.5	9 11.8	92 25	164.0	8 16.7	92 25	164.4	6 54.2	92 24	165.0	6
7	13 56.6	91 30	161.0	13 02.2	91 29	161.5	11 40.4	91 28	162.1	10 45.8	91 27	162.5	9 51.2	91 27	163.0	8 56.6	91 26	163.4	8 01.9	91 26	163.8	6 39.9	91 24	164.4	7
8	13 38.8	90 31	160.4	12 44.7	90 30	160.8	11 23.5	90 29	161.5	10 29.4	90 28	161.9	9 35.2	90 28	162.4	8 40.9	90 27	162.8	7 46.6	90 26	163.2	6 25.2	91 25	163.9	8
9	13 20.4	89 32	159.8	12 26.7	89 31	160.2	11 06.2	90 30	160.9	10 12.4	90 29	161.3	9 18.6	90 28	161.8	8 24.7	90 28	162.2	7 30.8	90 27	162.7	6 10.0	90 26	163.3	9
30	13 01.5	89 33	159.1	12 08.2	89 32	159.6	10 48.2	89 31	160.3	9 54.9	89 30	160.8	9 01.5	89 30	161.2	8 08.0	89 29	161.7	7 14.5	89 28	162.1	5 54.3	89 27	162.8	30
1	12 42.0	88 34	158.5	11 49.1	88 33	159.0	10 29.8	88 32	159.7	9 36.8	88 31	160.2	8 43.8	88 30	160.6	7 50.8	88 30	161.1	6 57.7	88 29	161.6	5 38.1	89 28	162.3	1
2	12 21.9	87 34	157.9	11 29.5	87 34	158.4	10 10.8	88 33	159.1	9 18.3	88 32	159.6	8 25.7	88 31	160.1	7 33.1	88 30	160.6	6 40.5	88 30	161.0	5 21.5	88 28	161.8	2
3	12 01.3	87 35	157.2	11 09.4	87 34	157.8	9 51.3	87 33	158.5	8 59.2	87 32	159.0	8 07.1	87 32	159.5	7 14.9	87 31	160.0	6 22.7	87 30	160.5	5 04.4	87 29	161.3	3
4	11 40.2	86 36	156.6	10 48.7	86 35	157.2	9 31.3	86 34	157.9	8 39.7	86 34	158.4	7 48.0	86 33	159.0	6 56.2	86 32	159.5	6 04.5	86 31	160.0				4
35	11 18.6	85 37	156.0	10 27.5	85 36	156.6	9 10.8	85 35	157.4	8 19.6	85 34	157.9	7 28.4	85 34	158.4	6 37.1	85 33	158.9	5 45.8	86 32	159.5				35
6	10 56.4	84 38	155.4	10 05.8	84 37	156.0	8 49.8	85 36	156.8	7 59.1	85 35	157.3	7 08.3	85 34	157.9	6 17.5	85 34	158.4	5 26.6	85 33	158.9				6
7	10 33.7	84 39	154.8	9 43.6	84 38	155.4	8 28.3	84 37	156.2	7 38.0	84 36	156.8	6 47.7	84 35	157.3	5 57.4	84 34	157.9	5 07.0	84 33	158.4				7
8	10 10.5	83 40	154.2	9 20.9	83 39	154.8	8 06.3	83 38	155.7	7 16.5	83 36	156.2	6 26.7	83 36	156.8	5 36.9	83 35	157.4							8
9	9 46.8	82 40	153.7	8 57.7	82 40	154.2	7 43.8	82 38	155.1	6 54.6	82 38	155.7	6 05.2	82 36	156.3	5 15.9	82 36	156.8							9
40	9 22.7	81 41	153.1	8 34.0	81 40	153.7	7 20.9	81 39	154.6	6 32.1	81 38	155.2	5 43.3	81 37	155.7										40
1	8 58.0	80 42	152.5	8 09.9	80 41	153.1	6 57.5	80 40	154.0	6 09.2	81 39	154.6	5 20.9	81 38	155.2										1
2	8 32.9	79 43	152.0	7 45.3	79 42	152.6	6 33.7	80 40	153.5	5 45.9	80 40	154.1													2
3	8 07.3	79 43	151.4	7 20.2	79 42	152.0	6 09.4	79 41	153.0	5 22.1	79 40	153.6													3
4	7 41.3	78 44	150.9	6 54.7	78 43	151.5	5 44.7	78 42	152.4																4
45	7 14.8	77 45	150.3	6 28.7	77 44	151.0	5 19.5	77 42	151.9																45
6	6 47.9	76 46	149.8	6 02.3	76 45	150.4																			6
7	6 20.5	75 46	149.3	5 35.5	75 45	149.9																			7
8	5 52.8	74 47	148.7	5 08.3	74 46	149.4																			8
9	5 24.6	73 48	148.2																						9

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	17 43.5	33 66	46.8	18 03.2	33 64	45.8	18 32.3	32 63	44.3	18 51.2	31 62	43.3	19 09.9	31 60	42.3	19 28.2	30 59	41.3	19 46.2	30 58	40.3	20 12.5	29 56	38.8	91
2	17 04.2	34 65	46.6	17 24.6	34 64	45.6	17 54.6	33 62	44.1	18 14.3	33 61	43.1	18 33.6	32 60	42.1	18 52.7	31 59	41.1	19 11.3	31 58	40.1	19 38.8	30 56	38.6	2
3	16 25.1	35 65	46.3	16 46.2	35 64	45.3	17 17.2	34 62	43.9	17 37.5	34 61	42.9	17 57.5	33 60	41.9	18 17.3	32 59	40.9	18 36.7	32 58	39.9	19 05.2	31 56	38.4	3
4	15 46.2	36 64	46.1	16 07.9	36 64	45.1	16 39.9	35 62	43.6	17 00.9	35 61	42.7	17 21.6	34 60	41.7	17 42.0	34 58	40.7	18 02.2	33 57	39.7	18 31.8	33 56	38.2	4
95	15 07.5	37 64	45.8	15 29.8	37 63	44.8	16 02.8	36 62	43.4	16 24.4	36 60	42.4	16 45.8	35 59	41.4	17 07.0	35 58	40.5	17 27.8	35 57	39.5	17 58.5	34 55	38.0	95
6	14 28.9	38 64	45.5	14 51.9	38 63	44.6	15 25.8	37 61	43.1	15 48.2	37 60	42.2	16 10.2	37 59	41.2	16 32.1	36 58	40.2	16 53.6	36 57	39.3	17 25.4	35 55	37.8	6
7	13 50.5	39 64	45.2	14 14.1	39 63	44.3	14 49.0	39 61	42.9	15 12.0	38 60	41.9	15 34.8	38 59	41.0	15 57.3	37 58	40.0	16 19.6	37 56	39.0	16 52.4	36 55	37.6	7
8	13 12.3	41 63	45.0	13 36.5	40 62	44.0	14 12.5	40 61	42.6	14 36.1	39 60	41.7	14 59.6	39 58	40.7	15 22.7	38 57	39.7	15 45.7	38 56	38.8	16 19.6	37 54	37.3	8
9	12 34.3	42 63	44.7	12 59.2	41 62	43.7	13 36.0	41 60	42.3	14 00.4	40 59	41.4	14 24.5	40 58	40.4	14 48.4	40 57	39.5	15 12.0	39 56	38.5	15 47.0	39 54	37.1	9
100	11 56.5	43 63	44.4	12 22.0	42 62	43.4	12 59.8	42 60	42.0	13 24.8	41 59	41.1	13 49.6	41 58	40.2	14 14.2	41 57	39.2	14 38.5	40 56	38.3	15 14.6	40 54	36.9	100
1	11 18.9	44 62	44.1	11 45.0	43 61	43.1	12 23.8	43 60	41.8	12 49.5	43 59	40.8	13 14.9	42 58	39.9	13 40.2	42 56	39.0	14 05.2	42 55	38.0	14 42.3	41 54	36.6	1
2	10 41.5	45 62	43.7	11 08.2	44 61	42.8	11 48.0	44 59	41.5	12 14.3	44 58	40.5	12 40.4	43 57	39.6	13 06.3	43 56	38.7	13 32.0	43 55	37.8	14 10.2	42 53	36.4	2
3	10 04.3	46 62	43.4	10 31.7	45 61	42.5	11 12.4	45 59	41.2	11 39.3	45 58	40.2	12 06.1	44 57	39.3	12 32.7	44 56	38.4	12 59.1	44 54	37.5	13 38.4	43 53	36.1	3
4	9 27.4	47 61	43.1	9 55.3	46 60	42.2	10 37.0	46 58	40.9	11 04.6	46 58	39.9	11 32.0	46 56	39.0	11 59.3	45 55	38.1	12 26.4	45 54	37.2	13 06.7	45 52	35.8	4
105	8 50.6	48 61	42.8	9 19.2	48 60	41.9	10 01.9	47 58	40.5	10 30.1	47 57	39.6	10 58.2	47 56	38.7	11 26.1	46 55	37.8	11 53.9	46 54	36.9	12 35.2	46 52	35.6	105
6	8 14.1	49 60	42.4	8 43.3	49 59	41.5	9 26.9	48 58	40.2	9 55.8	48 57	39.3	10 24.6	48 56	38.4	10 53.1	48 54	37.5	11 21.6	47 54	36.6	12 03.9	47 52	35.3	6
7	7 37.9	50 60	42.1	8 07.7	50 59	41.2	8 52.2	49 58	39.9	9 21.7	49 56	39.0	9 51.1	49 55	38.1	10 20.4	49 54	37.2	10 49.5	48 53	36.3	11 32.9	48 51	35.0	7
8	7 01.8	51 60	41.7	7 32.3	51 59	40.9	8 17.7	50 57	39.6	8 47.9	50 56	38.7	9 18.0	50 55	37.8	9 47.9	50 54	36.9	10 17.7	50 53	36.0	11 02.1	49 51	34.7	8
9	6 26.1	52 59	41.4	6 57.1	52 58	40.5	7 43.5	51 56	39.2	8 14.3	51 56	38.4	8 45.0	51 54	37.5	9 15.6	51 53	36.6	9 46.0	51 52	35.7	10 31.5	50 51	34.4	9
110	5 50.6	53 59	41.0	6 22.2	53 58	40.2	7 09.6	52 56	38.9	7 41.0	52 55	38.0	8 12.3	52 54	37.1	8 43.6	52 53	36.3	9 14.7	52 52	35.4	10 01.1	51 50	34.1	110
1	5 15.3	54 58	40.6	5 47.6	54 57	39.8	6 35.8	54 56	38.5	7 07.9	53 55	37.7	7 39.9	53 54	36.8	8 11.8	53 53	36.0	8 43.5	53 51	35.1	9 31.0	53 50	33.8	1
2				5 13.2	55 57	39.4	6 02.4	55 55	38.2	6 35.1	54 54	37.3	7 07.7	54 53	36.5	7 40.2	54 52	35.6	8 12.7	54 51	34.8	9 01.1	54 49	33.5	2
3							5 29.2	56 55	37.8	6 02.5	55 54	37.0	6 35.8	55 53	36.1	7 09.0	55 52	35.3	7 42.0	55 50	34.4	8 31.5	55 49	33.2	3
4										5 30.3	57 54	36.6	6 04.1	56 52	35.8	6 37.9	56 51	34.9	7 11.7	56 50	34.1	8 02.1	56 48	32.8	4
115													5 32.8	57 52	35.4	6 07.2	57 51	34.6	6 41.6	57 50	33.7	7 33.0	57 48	32.5	115
6													5 01.7	59 52	35.0	5 36.7	58 50	34.2	6 11.8	58 49	33.4	7 04.1	58 48	32.2	6
7																5 06.6	59 50	33.8	5 42.2	59 49	33.0	6 35.6	59 47	31.8	7
8																			5 13.0	60 48	32.7	6 07.3	60 47	31.5	8
9																						5 39.3	61 46	31.1	9
120																						5 11.5	62 46	30.7	120

Lat. 26°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	61 30.0	1.0 01	00.0	61 00.0	1.0 01	00.0	60 00.0	1.0 01	00.0	59 30.0	1.0 01	00.0	59 00.0	1.0 01	00.0	58 30.0	1.0 01	00.0	57 00.0	1.0 01	00.0	56 30.0	1.0 01	00.0	00
1	61 29.4	1.0 03	01.2	60 59.4	1.0 03	01.2	59 59.5	1.0 03	01.1	59 29.5	1.0 02	01.1	58 59.5	1.0 02	01.1	58 29.5	1.0 02	01.0	56 59.6	1.0 02	00.9	56 29.6	1.0 02	00.9	1
2	61 27.7	1.0 05	02.4	60 57.8	1.0 05	02.4	59 57.9	1.0 04	02.2	59 28.0	1.0 04	02.2	58 58.0	1.0 04	02.1	58 28.1	1.0 04	02.1	56 58.2	1.0 04	01.9	56 28.3	1.0 04	01.8	2
3	61 24.9	1.0 07	03.6	60 55.0	1.0 06	03.5	59 55.3	1.0 06	03.3	59 25.4	1.0 06	03.3	58 55.5	1.0 06	03.2	58 25.7	1.0 06	03.1	56 56.0	1.0 05	02.8	56 26.1	1.0 05	02.8	3
4	61 20.9	99 09	04.8	60 51.1	99 08	04.7	59 51.6	99 08	04.5	59 21.8	99 08	04.3	58 52.1	99 08	04.2	58 22.3	99 07	04.1	56 52.9	99 07	03.8	56 23.1	99 06	03.7	4
05	61 15.7	99 10	06.0	60 46.1	99 10	05.9	59 46.9	99 10	05.6	59 17.3	99 09	05.4	58 47.6	99 09	05.3	58 17.9	99 09	05.1	56 48.9	99 08	04.7	56 19.2	99 08	04.6	05
6	61 09.5	98 12	07.2	60 40.1	98 12	07.0	59 41.2	98 11	06.7	59 11.7	98 11	06.5	58 42.2	98 11	06.3	58 12.7	98 10	06.1	56 44.1	99 10	05.6	56 14.5	99 09	05.5	6
7	61 02.2	97 14	08.4	60 32.9	97 14	08.2	59 34.4	98 13	07.7	59 05.1	98 12	07.5	58 35.8	98 12	07.3	58 06.4	98 12	07.1	56 38.3	98 11	06.6	56 08.9	98 11	06.4	7
8	60 53.8	97 16	09.6	60 24.7	97 15	09.3	59 26.6	97 14	08.8	58 57.6	97 14	08.6	58 28.4	97 14	08.3	57 59.3	97 14	08.1	56 31.7	97 12	07.5	56 02.5	97 12	07.3	8
9	60 44.3	96 18	10.7	60 15.5	96 17	10.4	59 17.9	96 16	09.9	58 49.0	96 16	09.6	58 20.2	96 16	09.3	57 51.2	96 15	09.1	56 24.3	97 14	08.4	55 55.3	97 14	08.1	9
10	60 33.7	95 19	11.8	60 05.2	95 19	11.5	59 08.2	95 18	10.9	58 39.6	95 17	10.6	58 10.9	96 17	10.3	57 42.3	96 16	10.1	56 16.0	96 15	09.3	55 47.2	96 15	09.0	10
1	60 22.1	94 21	13.0	59 54.0	94 20	12.6	58 57.5	94 19	11.9	58 29.2	94 19	11.6	58 00.8	95 18	11.3	57 32.4	95 18	11.0	56 06.9	95 16	10.2	55 38.4	95 16	09.9	1
2	60 09.6	93 23	14.0	59 41.7	93 22	13.7	58 45.9	93 21	13.0	58 17.9	93 20	12.6	57 49.8	94 20	12.3	57 21.7	94 20	12.0	55 57.0	94 18	11.0	55 28.7	94 17	10.7	2
3	59 56.0	91 24	15.1	59 28.5	92 24	14.7	58 33.3	92 22	14.0	58 05.6	92 22	13.6	57 37.9	93 21	13.2	57 10.1	93 21	12.9	55 46.3	93 19	11.9	55 18.3	93 19	11.6	3
4	59 41.4	90 26	16.2	59 14.3	91 25	15.7	58 19.9	91 24	14.9	57 52.5	91 23	14.5	57 25.1	91 23	14.2	56 57.6	92 22	13.8	55 34.8	92 20	12.7	55 07.1	92 20	12.4	4
15	59 26.0	89 27	17.2	58 59.2	89 26	16.7	58 05.5	90 25	15.9	57 38.6	90 25	15.5	57 11.5	90 24	15.1	56 44.4	91 24	14.7	55 22.6	91 22	13.6	54 55.2	91 21	13.2	15
6	59 09.6	88 29	18.2	58 43.3	88 28	17.7	57 50.3	89 27	16.8	57 23.7	89 26	16.4	56 57.1	89 26	16.0	56 30.3	89 25	15.6	55 09.5	90 23	14.4	54 42.5	90 22	14.0	6
7	58 52.3	86 30	19.2	58 26.4	86 30	18.7	57 34.3	87 28	17.8	57 08.1	87 27	17.3	56 41.8	88 27	16.9	56 15.4	88 26	16.4	54 55.8	89 24	15.2	54 29.0	89 24	14.8	7
8	58 34.2	85 32	20.1	58 08.7	85 31	19.6	57 17.5	86 30	18.7	56 51.7	86 29	18.2	56 25.8	86 28	17.7	55 59.8	87 27	17.3	54 41.3	88 25	16.0	54 14.9	88 25	15.6	8
9	58 15.2	83 33	21.1	57 50.2	84 32	20.5	56 59.8	84 31	19.5	56 34.5	85 30	19.0	56 09.0	85 29	18.6	55 43.4	85 28	18.1	54 26.1	86 26	16.8	54 00.1	87 26	16.3	9
20	57 55.4	82 34	22.0	57 30.9	82 34	21.4	56 41.4	83 32	20.4	56 16.5	83 31	19.9	55 51.5	84 30	19.4	55 26.3	84 30	18.9	54 10.2	85 28	17.5	53 44.6	85 27	17.1	20
1	57 34.9	80 36	22.8	57 10.8	80 35	22.3	56 22.3	81 33	21.2	55 57.8	82 32	20.7	55 33.2	82 32	20.2	55 08.5	83 31	19.7	53 53.6	84 29	18.3	53 28.4	84 28	17.8	1
2	57 13.6	78 37	23.7	56 50.0	79 36	23.1	56 02.4	80 34	22.0	55 38.4	80 34	21.5	55 14.2	81 33	21.0	54 50.0	81 32	20.5	53 36.4	82 30	19.0	53 11.6	83 29	18.5	2
3	56 51.5	77 38	24.5	56 28.5	77 37	23.9	55 41.8	78 35	22.8	55 18.3	79 35	22.3	54 54.6	79 34	21.7	54 30.8	80 33	21.2	53 18.6	81 31	19.7	52 54.2	81 30	19.2	3
4	56 28.8	75 39	25.3	56 06.2	76 38	24.7	55 20.6	77 36	23.6	54 57.5	77 36	23.0	54 34.3	78 35	22.5	54 11.0	78 34	21.9	53 00.1	79 32	20.4	52 36.2	80 31	19.9	4
25	56 05.4	73 40	26.1	55 43.3	74 39	25.5	54 58.7	75 38	24.3	54 36.1	75 37	23.7	54 13.4	76 36	23.2	53 50.5	77 35	22.6	52 41.0	78 33	21.0	52 17.6	78 32	20.5	25
6	55 41.4	72 41	26.8	55 19.8	72 40	26.2	54 36.2	73 38	25.0	54 14.1	74 38	24.5	53 51.9	74 37	23.9	53 29.5	75 36	23.3	52 21.4	76 34	21.7	51 58.4	77 33	21.2	6
7	55 16.7	70 42	27.6	54 55.7	70 41	26.9	54 13.1	72 40	25.7	53 51.5	72 39	25.1	53 29.7	73 38	24.6	53 07.8	73 37	24.0	52 01.1	75 34	22.3	51 38.6	75 34	21.8	7
8	54 51.5	68 43	28.3	54 31.0	69 42	27.6	53 49.4	70 40	26.4	53 28.3	71 40	25.8	53 07.0	71 39	25.2	52 45.6	72 38	24.6	51 40.4	73 36	22.9	51 18.3	74 35	22.4	8
9	54 25.6	66 44	28.9	54 05.7	67 43	28.3	53 25.1	68 41	27.1	53 04.5	69 40	26.5	52 43.8	69 40	25.9	52 22.9	70 39	25.3	51 19.1	72 36	23.5	50 57.5	72 36	23.0	9
30	53 59.3	64 45	29.6	53 39.8	65 44	28.9	53 00.3	67 42	27.7	52 40.3	67 41	27.1	52 20.0	68 40	26.5	51 59.6	68 40	25.9	50 57.3	70 37	24.1	50 36.2	71 36	23.6	30
1	53 32.4	63 46	30.2	53 13.5	63 45	29.6	52 35.0	65 43	28.3	52 15.5	65 42	27.7	51 55.7	66 41	27.1	51 35.8	67 40	26.5	50 35.0	68 38	24.7	50 14.4	69 37	24.1	1
2	53 05.0	61 46	30.8	52 46.6	62 46	30.2	52 09.2	63 44	28.9	51 50.2	64 43	28.3	51 31.0	64 42	27.6	51 11.6	65 41	27.0	50 12.2	67 39	25.2	49 52.1	67 38	24.7	2
3	52 37.1	59 47	31.4	52 19.3	60 46	30.7	51 42.9	61 44	29.4	51 24.4	62 44	28.8	51 05.7	63 43	28.2	50 46.8	63 42	27.6	49 49.0	65 39	25.8	49 29.4	66 39	25.2	3
4	52 08.8	57 48	31.9	51 51.5	58 47	31.3	51 16.2	60 45	30.0	50 58.2	60 44	29.3	50 40.0	61 44	28.7	50 21.7	62 43	28.1	49 25.4	63 40	26.3	49 06.2	64 39	25.7	4
35	51 40.1	56 49	32.5	51 23.3	56 48	31.8	50 49.0	58 46	30.5	50 31.6	59 45	29.9	50 13.9	59 44	29.2	49 56.0	60 43	28.6	49 01.3	62 41	26.8	48 42.6	62 40	26.2	35
6	51 10.9	54 49	33.0	50 54.6	55 48	32.3	50 21.4	56 46	31.0	50 04.5	57 46	30.4	49 47.4	57 45	29.7	49 30.0	58 44	29.1	48 36.8	60 42	27.3	48 18.7	61 41	26.7	6
7	50 41.3	52 50	33.5	50 25.6	53 49	32.8	49 53.5	54 47	31.5	49 37.1	55 46	30.8	49 20.4	56 46	30.2	49 03.6	56 45	29.6	48 11.9	58 42	27.7	47 54.3	59 41	27.1	7
8	50 11.4	50 50	33.9	49 56.2	51 50	33.3	49 25.1	53 48	32.0	49 09.2	53 47	31.3	48 53.1	54 46	30.7	48 36.8	55 45	30.0	47 46.6	57 43	28.2	47 29.5	57 42	27.5	8
9	49 41.1	49 51	34.4	49 26.4	49 50	33.7	48 56.4	51 48	32.4	48 41.0	52 48	31.7	48 25.4	52 47	31.1	48 09.6	53 46	30.5	47 21.0	55 43	28.6	47 04.4	56 42	28.0	9
40	49 10.5	47 52	34.8	48 56.3	48 51	34.1	48 27.3	49 49	32.8	48 12.5	50 48	32.2	47 57.4	51 47	31.5	47 42.1	51 46	30.9	46 55.0	53 44	29.0	46 38.9	54 43	28.4	40
1	48 39.5	45 52	35.2	48 25.9	46 51	34.6	47 57.9	47 50	33.2	47 43.6	48 49	32.6	47 29.1	49 48	31.9	47 14.3	50 47	31.3	46 28.7	52 44	29.4	46 13.1	52 44	28.8	1
2	48 08.3	43 53	35.6	47 55.2	44 52	34.9	47 28.2	46 50	33.6	47 14.4	46 49	33.0	47 00.4	47 48	32.3	46 46.1	48 47	31.7	46 02.1	50 45	29.8	45 47.0	51 44	29.1	2
3	47 36.7	42 53	36.0	47 24.1	42 52	35.3	46 58.2	44 50	34.0	46 44.9	45 50	33.3	46 31.4	45 49	32.7	46 17.7	46 48	32.0	45 35.2	48 45	30.1	45 20.6	49 44	29.5	3
4	47 04.9	40 53	36.3	46 52.8	41 52	35.7	46 28.0	42 51	34.3	46 15.2	43 50	33.7	46 02.2	44 49	33.0	45 49.0	44 48	32.4	45 08.0	47 46	30.5	44 53.9	47 45	29.9	4
45	46 32.9	38 54	36.7	46 21.3	39 53	36.0	45 57.4	41 51	34.7	45 45.1	41 50	34.0	45 32.7	42 50	33.4	45 19.9	43 49	32.7	44 40.5	45 46	30.8	44 26.9	46 45	30.2	45
6	46 00.5	37 54	37.0	45 49.5	37 54	36.3	45 26.6	39 52	35.0	45 14.9	40 51	34.3	45 02.9	40 50	33.7	44 50.7	41 49	33.0	44 12.8	43 47	31.1	43 59.7	44 46	30.5	6
7	45 28.0	35 55	37.3	45 17.4	36 54	36.6	44 55.6	37 52	35.3	44 44.3	38 51	34.6	44 32.8	39 50	34.0	44 21.1	39 50	33.3	43 44.8	41 47	31.4	43 32.2	42 46	30.8	7
8	44 55.2	33 55	37.6	44 45.2	34 54	36.9	44 24.3	35 52	35.6	44 13.6	36 52	34.9	44 02.6	37 51	34.3	43 51.4	38 50	33.6	43 16.5	40 47	31.7	43 04.5	40 47	31.1	8
9	44 22.3	32 55	37.8	44 12.7	32 54	37.2	43 52.8	34 53	35.8	43 42.6	35 52	35.2	43 32.1	35 51	34.5	43 21.4	36 50	33.9	42 48.1	38 48	32.0	42 36.5	39 47	31.4	9
50	43 49.1	30 56	38.1	43 40.0	31 55	37.4	43 21.2	32 53	36.1	43 11.4	33 52	35.4	43 01.4	34 51	34.8	42 51.3	34 51	34.2	42 19.4	36 48	32.3	42 08.4	37 47	31.6	50
1	43 15.8	28 56	38.3	43 07.2	29 55	37.6	42 49.3	31 53	36.3	42 40.1	31 53	35.7	42 30.6	32 52	35.0	42 20.9	33 51	34.4	41 50.5	35 48	32.5	41 40.0	35 48	31.9	1
2	42 42.3	27 56	38.5	42 34.2	27 55	37.9	42 17.3	29 54	36.6	42 08.5	30 53	35.9	41 59.5	30 52	35.3	41 50.3	31 51	34.6	41 21.5	33 49	32.7	41 11.4	34 42	32.1	2
3	42 08.6	25 56	38.7	42 01.0	26 56	38.1	41 45.1	27 54	36.8	41 36.8	28 53	36.1	41 28.3	29 52	35.5	41 19.6	29 52	34.8	40 52.2	31 49	33.0	40 42.7	32 48	32.3	3
4	41 34.8	23 56	38.9	41 27.7	24 56	38.3	41 12.7	26 54	37.0	41 04.9	26 53	36.3	40 56.9	27 52	35.7	40 48.7	28 52	35.0	40 22.8	30 49	33.2	40 13.7	30 48	32.5	4
55	41 00.9	22 57	39.1	40 54.2	23 56	38.4	40 40.2	24 54	37.2	40 32.9	25 54	36.5	40 25.4	25 53	35.9	40 17.6	26 52	35.2	39 53.2	28 50	33.4	39 44.7	29 49	32.7	55
6	40 26.8	20 57	39.2	40 20.6	21 56	38.6	40 07.6	22 55	37.3	40 00.7	23 54	36.7	39 53.7	24 53	36.1	39 46.5	25 52	35.4	39 23.5	27 50	33.5	39 15.4	27 49	32.9	6
7	39 52.7	19 57	39.4	39 46.9	19 56	38.8	39 34.8	21 55	37.5	39 28.5	22 54	36.8	39 21.9	22 53	36.2	39 15.1	23 52	35.6	38 53.6	25 50	33.7	38 46.1	26 49	33.1	7
8	39 18.4	17 57	39.5	39 13.1	18 56	38.9	39 02.0	19 55	37.6	38 56.1	20 54	37.0	38 50.0	21 53	36.4	38 43.7	21 53	35.7	38 23.6	23 50	33.9	38 16.5	24 49	33.2	8
9	38 44.0	16 57	39.7	38 39.2	16 57	39.0	38 29.0	18 55	37.8	38 23.6	18 54	37.1	38 18.0	19 54	36.5	38 12.1	20 53	35.9	37 53.5	22 50	34.0	37 46.9	22 50	33.4	9
60	38 09.6	14 58	39.8	38 05.2	15 57	39.1	37 55.9	16 55	37.9	37 51.0	17 54	37.3	37 45.8	17 54	36.6	37 40.5	18 53	36.0	37 23.3	20 50	34.2	37 17.2	21 50	33.5	60
1	37 35.0	13 58	39.9	37 31.1	13 57	39.2	37 22.8	15 56	38.0	37 18.3	15 55	37.4	37 13.6	16 54	36.7	37 08.7	17 53	36.1	36 53.0	18 51	34.3	36 47.3	19 50	33.7	1
2	37 00.4	11 58	39.9	36 57.0	12 57	39.3	36 49.5	13 56	38.1	36 45.5	14 55	37.5	36 41.3	14 54	36.8	36 36.9	15 53	36.2	36 22.6	17 51	34.4	36 17.4	18 50	33.8	2
3	36 25.8	10 58	40.0	36 22.8	10 57	39.4	36 16.2	12 56	38.2	36 12.7	12 55	37.6	36 08.9	13 54	36.9	36 05.0	13 53	36.3	35 52.1	15 51	34.5	35 47.4	16 50	33.9	3
4	35 51.1	08 58	40.1	35 48.5	09 57	39.5	35 42.9	10 56	38.2	35 39.8	11 55	37.6	35 36.5	11 54	37.0	35 33.0	12 53	36.4	35 21.5	14 51	34.6	35 17.3	14 50	34.0	4
65	35 16.3	07 58	40.1	35 14.2	07 57	39.5	35 09.5	09 56	38.3	35 06.8	09 55	37.7	35 04.0	10 54	37.1	35 01.0	10 54	36.5	34 50.8	12 51	34.7	34 47.1	13 50	34.1	65
6	34 41.6	06 58	40.2	34 39.9	06 57	39.6	34 36.0	07 56	38.4	34 33.8	08 55	37.8	34 31.5	08 54	37.2	34 28.9	09 54	36.5	34 20.1	11 51	34.7	34 16.9	11 50	34.1	6
7	34 06.8	04 58	40.2	34 05.5	04 57	39.6	34 02.5	06 56	38.4	34 00.8	06 55	37.8	33 58.9	07 54	37.2	33 56.8	07 54	36.6	33 49.4	09 51	34.8	33 46.6	10 50	34.2	7
8	33 31.9	02 58	40.2	33 31.1	03 57	39.6	33 29.0	04 56	38.4	33 27.7	05 55	37.8	33 26.2	05 54	37.2	33 24.6	06 54	36.6	33 18.6	08 51	34.8	33 16.3	08 51	34.3	8
9	32 57.1	01 58	40.2	32 56.7	01 57	39.7	32 55.5	03 56	38.5	32 54.6	03 55	37.9	32 53.6	04 54	37.3	32 52.4	04 54	36.7	32 47.8	06 52	34.9	32 45.9	07 51	34.3	9
70	32 22.2	01 58	40.2	32 22.3	00 57	39.7	32 22.0	01 56	38.5	32 21.5	02 55	37.9	32 20.9	02 54	37.3	32 20.2	03 54	36.7	32 16.9	04 52	34.9	32 15.5	05 51	34.3	70
1	31 47.4	02 58	40.2	31 47.9	01 57	39.7	31 48.4	00 56	38.5	31 48.4	00 55	37.9	31 48.3	01 54	37.3	31 47.9	01 54	36.7	31 46.0	03 52	34.9	31 45.1	03 51	34.4	1
2	31 12.6	03 58	40.2	31 13.5	03 57	39.6	31 14.9	02 56	38.5	31 15.3	01 55	37.9	31 15.6	01 54	37.3	31 15.7	00 54	36.7	31 15.1	01 52	35.0	31 14.6	02 51	34.4	2
3	30 37.8	06 58	40.2	30 39.1	04 57	39.6	30 41.3	03 56	38.5	30 42.2	03 55	37.9	30 42.9	02 54	37.3	30 43.5	02 54	36.7	30 44.2	00 52	35.0	30 44.2	00 51	34.4	3
4	30 03.0	06 58	40.2	30 04.7	06 57	39.6	30 07.8	05 56	38.4	30 09.1	04 55	37.8	30 10.2	04 54	37.3	30 11.2	03 54	36.7	30 13.3	02 52	35.0	30 13.7	01 51	34.4	4
75	29 28.2	07 58	40.1	29 30.4	07 57	39.5	29 34.3	06 56	38.4	29 36.0	06 55	37.8	29 37.6	05 54	37.2	29 39.0	05 54	36.7	29 42.4	03 52	34.9	29 43.3	03 51	34.4	75
6	28 53.5	09 58	40.1	28 56.1	08 57	39.5	29 00.8	07 56	38.3	29 03.0	07 55	37.8	29 05.0	06 54	37.2	29 06.8	06 54	36.6	29 11.6	05 52	34.9	29 12.8	04 51	34.3	6
7	28 18.8	10 58	40.0	28 21.8	10 57	39.4	28 27.4	09 56	38.3	28 29.9	08 55	37.7	28 32.4	08 54	37.2	28 34.7	07 54	36.6	28 40.7	06 51	34.9	28 42.4	05 51	34.3	7
8	27 44.2	12 58	39.9	27 47.6	11 57	39.4	27 54.0	10 56	38.2	27 57.0	10 55	37.7	27 59.8	09 54	37.1	28 02.5	09 54	36.5	28 09.9	07 51	34.9	28 12.0	07 51	34.3	8
9	27 09.6	13 58	39.8	27 13.4	12 57	39.3	27 20.6	12 56	38.2	27 24.0	11 55	37.6	27 27.3	11 54	37.0	27 30.4	10 53	36.5	27 39.1	09 51	34.8	27 41.7	08 51	34.2	9
80	26 35.1	14 58	39.8	26 39.3	14 57	39.2	26 47.3	13 55	38.1	26 51.1	13 55	37.5	26 54.8	12 54	37.0	26 58.4	12 53	36.4	27 08.3	10 51	34.7	27 11.3	10 50	34.2	80
1	26 00.6	16 57	39.7	26 05.2	15 56	39.1	26 14.1	14 55	38.0	26 18.3	14 54	37.5	26 22.4	13 54	36.9	26 26.4	13 53	36.3	26 37.6	12 51	34.7	26 41.1	11 50	34.1	1
2	25 26.2	17 57	39.6	25 31.3	17 56	39.0	25 40.9	16 55	37.9	25 45.6	15 54	37.4	25 50.1	15 54	36.8	25 54.5	14 53	36.3	26 06.9	13 51	34.6	26 10.8	13 50	34.1	2
3	24 51.9	18 57	39.4	24 57.4	18 56	38.9	25 07.8	17 55	37.8	25 12.9	17 54	37.3	25 17.8	16 54	36.7	25 22.6	16 53	36.2	25 36.3	15 51	34.5	25 40.7	14 50	34.0	3
4	24 17.7	20 57	39.3	24 23.5	19 56	38.8	24 34.8	18 55	37.7	24 40.3	18 54	37.2	24 45.6	18 54	36.6	24 50.8	17 53	36.1	25 05.8	16 51	34.4	25 10.5	16 50	33.9	4
85	23 43.6	21 57	39.2	23 49.8	20 56	38.7	24 01.9	20 55	37.6	24 07.7	19 54	37.0	24 13.5	19 54	36.5	24 19.1	19 53	36.0	24 35.3	17 51	34.4	24 40.5	17 50	33.8	85
6	23 09.6	22 57	39.1	23 16.2	22 56	38.5	23 29.0	21 54	37.5	23 35.3	21 54	36.9	23 41.4	20 53	36.4	23 47.5	20 53	35.9	24 04.9	19 50	34.2	24 10.5	18 50	33.7	6
7	22 35.6	23 56	38.9	22 42.6	23 56	38.4	22 56.3	22 54	37.3	23 02.9	22 54	36.8	23 09.5	22 53	36.3	23 15.9	21 52	35.7	23 34.6	20 50	34.1	23 40.6	20 50	33.6	7
8	22 01.8	25 56	38.8	22 09.2	24 56	38.2	22 23.6	24 54	37.2	22 30.7	23 54	36.7	22 37.6	23 53	36.1	22 44.5	23 52	35.6	23 04.4	22 50	34.0	23 10.8	21 50	33.5	8
9	21 28.1	26 56	38.6	21 35.9	26 55	38.1	21 51.1	26 54	37.0	21 58.5	26 53	36.5	22 05.9	24 53	36.0	22 13.1	24 52	35.5	22 34.3	23 50	33.9	22 41.1	23 49	33.4	9
90	20 54.5	27 56	38.4	21 02.7	27 55	37.9	21 18.6	26 54	36.9	21 26.5	26 53	36.4	21 34.2	26 52	35.8	21 41.9	25 52	35.3	22 04.3	24 50	33.8	22 11.5	24 49	33.2	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	9 39.0	1.0 00	180.0	9 00.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	5 60.0	1.0 00	180.0				00
1	9 29.7	1.0 01	179.4	8 59.7	1.0 01	179.4	7 59.7	1.0 01	179.4	7 29.7	1.0 01	179.4	6 59.7	1.0 01	179.5	6 29.7	1.0 01	179.5							1
2	9 28.9	1.0 02	178.8	8 58.9	1.0 02	178.8	7 58.9	1.0 02	178.9	7 29.0	1.0 02	178.9	6 59.0	1.0 02	178.9	6 29.0	1.0 02	178.9							2
3	9 27.5	1.0 03	178.2	8 57.5	1.0 03	178.3	7 57.6	1.0 03	178.3	7 27.6	1.0 03	178.3	6 57.7	1.0 03	178.4	6 27.7	1.0 03	178.4							3
4	9 25.6	1.0 04	177.6	8 55.6	1.0 04	177.7	7 55.7	1.0 04	177.7	7 25.8	1.0 04	177.8	6 55.9	1.0 04	177.8	6 25.9	1.0 04	177.8							4
05	9 23.1	1.0 05	177.1	8 53.2	1.0 05	177.1	7 53.4	1.0 05	177.2	7 23.5	1.0 05	177.2	6 53.5	1.0 05	177.3	6 23.6	1.0 05	177.3							05
6	9 20.0	1.0 06	176.5	8 50.2	1.0 06	176.5	7 50.5	1.0 06	176.6	7 20.6	1.0 06	176.7	6 50.7	1.0 06	176.7	6 20.8	1.0 06	176.8							6
7	9 16.4	99 07	175.9	8 46.6	99 07	175.9	7 47.0	99 07	176.1	7 17.2	99 06	176.1	6 47.4	99 06	176.2	6 17.5	99 06	176.2							7
8	9 12.3	99 08	175.3	8 42.5	99 08	175.4	7 43.0	99 08	175.5	7 13.3	99 08	175.6	6 43.5	99 07	175.6	6 13.7	99 07	175.7							8
9	9 07.6	99 09	174.7	8 37.9	99 09	174.8	7 38.5	99 08	174.9	7 08.8	99 08	175.0	6 39.1	99 08	175.1	6 09.4	99 08	175.2							9
10	9 02.4	99 10	174.1	8 32.8	99 10	174.2	7 33.5	99 09	174.4	7 03.9	99 09	174.5	6 34.3	99 09	174.5	6 04.6	99 09	174.6							10
1	8 56.6	98 10	173.6	8 27.1	98 10	173.6	7 28.0	98 10	173.8	6 58.4	98 10	173.9	6 28.9	99 10	174.0	5 59.3	99 10	174.1							1
2	8 50.3	98 12	173.0	8 20.8	98 11	173.1	7 21.9	98 11	173.3	6 52.4	98 11	173.4	6 23.0	98 11	173.5	5 53.5	98 10	173.6							2
3	8 43.4	98 12	172.4	8 14.1	98 12	172.5	7 15.3	98 12	172.7	6 46.0	98 12	172.8	6 16.6	98 12	172.9	5 47.2	98 11	173.0							3
4	8 36.0	98 13	171.8	8 06.8	98 13	171.9	7 08.2	98 13	172.2	6 39.0	98 12	172.3	6 09.7	98 12	172.4	5 40.4	98 12	172.5							4
15	8 28.1	97 14	171.3	7 58.9	97 14	171.4	7 00.6	97 14	171.6	6 31.5	97 14	171.7	6 02.3	97 13	171.9	5 33.1	97 13	172.0							15
6	8 19.6	97 15	170.7	7 50.6	97 15	170.8	6 52.5	97 14	171.1	6 23.4	97 14	171.2	5 54.4	97 14	171.3	5 25.3	97 14	171.4							6
7	8 10.7	96 16	170.1	7 41.7	96 16	170.3	6 43.9	96 15	170.5	6 14.9	96 15	170.7	5 46.0	96 15	170.8	5 17.1	96 15	170.9							7
8	8 01.1	96 17	169.6	7 32.3	96 17	169.7	6 34.7	96 16	170.0	6 05.9	96 16	170.1	5 37.1	96 16	170.3	5 08.3	96 15	170.4							8
9	7 51.1	96 18	169.0	7 22.4	96 17	169.2	6 25.1	96 17	169.4	5 56.4	96 16	169.6	5 27.8	96 16	169.7										9
20	7 40.6	95 18	168.4	7 12.0	95 18	168.6	6 15.0	95 18	168.9	5 46.5	95 18	169.1	5 17.9	95 17	169.2										20
1	7 29.5	95 19	167.9	7 01.1	95 19	168.0	6 04.4	95 18	168.4	5 36.0	95 18	168.5	5 07.6	95 18	168.7										1
2	7 17.9	94 20	167.3	6 49.7	94 20	167.5	5 53.3	94 19	167.8	5 25.0	94 19	168.0													2
3	7 05.8	94 21	166.8	6 37.8	94 21	167.0	5 41.7	94 20	167.3	5 13.6	94 20	167.5													3
4	6 53.3	93 22	166.2	6 25.4	93 22	166.4	5 29.6	93 21	166.8	5 01.7	93 21	167.0													4
25	6 40.2	92 23	165.7	6 12.5	92 23	165.9	5 17.0	92 22	166.3																25
6	6 26.6	92 23	165.2	5 59.1	92 23	165.4	5 04.0	92 23	165.8																6
7	6 12.6	91 24	164.6	5 45.2	91 24	164.8																			7
8	5 58.0	91 25	164.1	5 30.8	91 25	164.3																			8
9	5 43.0	90 26	163.6	5 16.0	90 26	163.8																			9
30	5 27.5	89 27	163.0	5 00.7	89 26	163.3																			30
1	5 11.5	89 27	162.5																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
91	20 21.1	29 56	38.3	20 29.6	28 55	37.8	20 46.3	28 54	36.7	20 54.6	27 53	36.2	21 02.7	27 52	35.7	21 10.8	27 52	35.2	21 34.4	26 50	33.6	21 42.0	25 49	33.1	91
2	19 47.8	30 55	38.1	19 56.6	30 55	37.6	20 14.2	29 54	36.6	20 22.8	29 53	36.1	20 31.3	28 52	35.5	20 39.8	28 52	35.0	21 04.5	27 50	33.5	21 12.6	27 49	33.0	2
3	19 14.6	31 55	37.9	19 23.8	31 54	37.4	19 42.1	30 53	36.4	19 51.1	30 52	35.9	20 00.0	30 52	35.4	20 08.9	29 51	34.9	20 34.9	28 49	33.3	20 43.3	28 48	32.8	3
4	18 41.5	32 55	37.7	18 51.1	32 54	37.2	19 10.2	31 53	36.2	19 19.6	31 52	35.7	19 28.9	31 52	35.2	19 38.1	31 51	34.7	20 05.3	30 49	33.2	20 14.2	29 48	32.7	4
95	18 08.6	33 55	37.5	18 18.6	33 54	37.0	18 38.4	33 53	36.0	18 48.2	32 52	35.5	18 57.9	32 52	35.0	19 07.5	32 51	34.5	19 35.9	31 49	33.0	19 45.1	31 48	32.5	95
6	17 35.8	35 54	37.3	17 46.2	34 54	36.8	18 06.8	34 52	35.8	18 16.9	34 52	35.3	18 27.0	33 51	34.8	18 37.0	33 50	34.3	19 06.6	32 49	32.8	19 16.2	32 48	32.3	6
7	17 03.3	36 54	37.1	17 14.0	36 54	36.6	17 35.3	35 52	35.6	17 45.8	35 52	35.1	17 56.3	35 51	34.6	18 06.7	35 50	34.1	18 37.4	34 48	32.6	18 47.5	33 48	32.1	7
8	16 30.8	37 54	36.9	16 41.9	37 53	36.4	17 04.0	36 52	35.4	17 14.9	36 51	34.9	17 25.7	36 51	34.4	17 36.5	36 50	33.9	18 08.4	35 48	32.5	18 18.8	35 47	32.0	8
9	15 58.6	38 54	36.6	16 10.1	38 53	36.1	16 32.8	38 52	35.2	16 44.1	38 51	34.7	16 55.3	37 50	34.2	17 06.5	37 50	33.7	17 39.5	36 48	32.3	17 50.4	36 47	31.8	9
100	15 26.5	40 53	36.4	15 38.3	39 52	35.9	16 01.8	39 51	35.0	16 13.5	39 51	34.5	16 25.1	39 50	34.0	16 36.6	38 50	33.5	17 10.8	38 48	32.1	17 22.1	37 47	31.6	100
1	14 54.6	41 53	36.1	15 06.8	41 52	35.7	15 31.0	40 51	34.7	15 43.1	40 50	34.3	15 55.0	40 50	33.8	16 06.9	40 49	33.3	16 42.2	39 47	31.9	16 53.9	39 47	31.4	1
2	14 22.9	42 53	35.9	14 35.4	42 52	35.4	15 00.4	41 51	34.5	15 12.8	41 50	34.0	15 25.1	41 50	33.5	15 37.4	41 49	33.1	16 13.9	40 47	31.6	16 25.9	40 46	31.2	2
3	13 51.3	43 52	35.6	14 04.3	43 52	35.2	14 30.0	43 50	34.2	14 42.7	42 50	33.8	14 55.4	42 49	33.3	15 08.1	42 49	32.8	15 45.7	41 47	31.4	15 58.1	41 46	31.0	3
4	13 20.0	44 52	35.4	13 33.3	44 51	34.9	13 59.7	44 50	34.0	14 12.8	44 50	33.5	14 25.9	43 49	33.1	14 38.9	43 48	32.6	15 17.6	43 46	31.2	15 30.4	43 46	30.7	4
105	12 48.9	46 52	35.1	13 02.5	45 51	34.7	13 29.6	45 50	33.7	13 43.1	45 49	33.3	13 56.6	45 49	32.8	14 09.9	45 48	32.4	14 49.8	44 46	31.0	15 02.9	44 45	30.5	105
6	12 18.0	47 51	34.8	12 32.0	47 51	34.4	12 59.8	46 50	33.5	13 13.6	46 49	33.0	13 27.4	46 48	32.6	13 41.2	46 48	32.1	14 22.1	45 46	30.7	14 35.7	45 45	30.3	6
7	11 47.3	48 51	34.6	12 01.6	48 50	34.1	12 30.1	47 49	33.2	12 44.3	47 48	32.8	12 58.5	47 48	32.3	13 12.6	47 47	31.9	13 54.7	46 46	30.5	14 08.6	46 45	30.0	7
8	11 16.8	49 50	34.3	11 31.5	49 50	33.8	12 00.7	49 49	32.9	12 15.3	48 48	32.5	12 29.8	48 48	32.0	12 44.3	48 47	31.6	13 27.4	48 45	30.2	13 41.7	48 44	29.8	8
9	10 46.5	50 50	34.0	11 01.6	50 50	33.5	11 31.5	50 48	32.7	11 46.4	50 48	32.2	12 01.3	49 47	31.8	12 16.1	49 46	31.3	13 00.3	49 45	30.0	13 15.0	49 44	29.5	9
110	10 16.5	51 50	33.7	10 31.9	51 49	33.2	11 02.5	51 48	32.4	11 17.8	51 47	31.9	11 33.0	51 47	31.5	11 48.2	51 46	31.1	12 33.5	50 44	29.7	12 48.5	50 44	29.3	110
1	9 46.7	52 49	33.4	10 02.4	52 49	32.9	10 33.8	52 48	32.1	10 49.4	52 47	31.6	11 04.9	52 46	31.2	11 20.5	52 46	30.8	12 06.9	51 44	29.5	12 22.2	51 43	29.0	1
2	9 17.2	54 49	33.1	9 33.2	53 48	32.6	10 05.2	53 47	31.8	10 21.2	53 46	31.3	10 37.1	53 46	30.9	10 53.0	53 45	30.5	11 40.5	53 44	29.2	11 56.2	52 43	28.8	2
3	8 47.9	55 48	32.7	9 04.3	55 48	32.3	9 37.0	54 47	31.5	9 53.3	54 46	31.0	10 09.5	54 46	30.6	10 25.8	54 45	30.2	11 14.3	54 43	28.9	11 30.4	54 43	28.5	3
4	8 18.8	56 48	32.4	8 35.6	56 48	32.0	9 08.9	56 46	31.2	9 25.6	55 46	30.7	9 42.2	55 45	30.3	9 58.8	55 45	29.9	10 48.3	55 43	28.6	11 04.8	55 42	28.2	4
115	7 50.1	57 48	32.1	8 07.1	57 47	31.7	8 41.2	57 46	30.8	8 58.1	57 45	30.4	9 15.1	56 45	30.0	9 32.0	56 44	29.6	10 22.6	56 43	28.3	10 39.4	56 42	27.9	115
6	7 21.5	58 47	31.8	7 38.9	58 46	31.3	8 13.6	58 45	30.5	8 31.0	58 45	30.1	8 48.3	58 44	29.7	9 05.5	58 44	29.3	9 57.1	57 42	28.0	10 14.3	57 42	27.6	6
7	6 53.3	59 47	31.4	7 11.0	59 46	31.0	7 46.4	59 45	30.2	8 04.0	59 44	29.8	8 21.7	59 44	29.4	8 39.3	59 43	29.0	9 31.9	58 42	27.7	9 49.4	58 41	27.3	7
8	6 25.3	60 46	31.1	6 43.4	60 46	30.7	7 19.4	60 44	29.9	7 37.4	60 44	29.5	7 55.4	60 44	29.0	8 13.3	60 43	28.6	9 07.0	60 41	27.4	9 24.8	59 41	27.0	8
9	5 57.6	61 46	30.7	6 16.0	61 45	30.3	6 52.7	61 44	29.5	7 11.0	61 44	29.1	7 29.3	61 43	28.7	7 47.6	61 42	28.3	8 42.2	61 41	27.1	9 00.4	61 40	26.7	9
120	5 30.3	62 45	30.3	5 48.9	62 44	30.0	6 26.3	62 44	29.2	6 44.9	62 43	28.8	7 03.5	62 42	28.4	7 22.1	62 42	28.0	8 17.8	62 40	26.8	8 36.3	62 40	26.4	120
1	5 03.2	63 45	30.0	5 22.2	63 44	29.6	6 00.1	63 43	28.8	6 19.1	63 42	28.4	6 38.0	63 42	28.0	6 57.0	63 42	27.6	7 53.6	63 40	26.5	8 12.5	63 39	26.1	1
2							5 34.3	64 43	28.5	5 53.6	64 42	28.1	6 12.8	64 42	27.7	6 32.1	64 41	27.3	7 29.7	64 39	26.1	7 48.9	64 39	25.8	2
3							5 08.7	65 42	28.1	5 28.4	65 42	27.7	5 47.9	65 41	27.3	6 07.5	65 40	26.9	7 06.1	65 39	25.8	7 25.6	65 38	25.4	3
4										5 03.4	66 42	27.3	5 23.3	66 41	27.0	5 43.2	66 40	26.6	6 42.8	66 38	25.5	7 02.6	66 38	25.1	4
125																5 19.2	67 40	26.2	6 19.8	67 38	25.1	6 39.9	67 37	24.7	125
6																			5 57.0	68 37	24.8	6 17.5	68 37	24.4	6
7																			5 34.6	69 37	24.4	5 55.3	69 36	24.0	7
8																			5 12.4	70 37	24.1	5 33.5	70 36	23.7	8
9																						5 12.0	71 36	23.3	9

Lat. 26°

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	56 00.0	1.0 01	00.0	55 30.0	1.0 01	00.0	54 00.0	1.0 01	00.0	53 30.0	1.0 01	00.0	53 00.0	1.0 01	00.0	47 00.0	1.0 00	00.0	46 30.0	1.0 00	00.0	41 30.0	1.0 00	00.0	00
1	55 59.6	1.0 02	00.9	55 29.6	1.0 02	00.9	53 59.6	1.0 02	00.8	53 29.6	1.0 02	00.8	52 59.6	1.0 02	00.8	46 59.8	1.0 01	00.5	46 29.8	1.0 01	00.5	41 29.8	1.0 01	00.4	1
2	55 58.3	1.0 04	01.8	55 28.4	1.0 04	01.7	53 58.5	1.0 03	01.6	53 28.5	1.0 03	01.6	52 58.6	1.0 03	01.5	46 59.0	1.0 02	01.1	46 29.0	1.0 02	01.0	41 29.3	1.0 01	00.7	2
3	55 56.2	1.0 05	02.7	55 26.3	1.0 05	02.6	53 56.6	1.0 04	02.4	53 26.7	1.0 04	02.3	52 56.8	1.0 04	02.3	46 57.8	1.0 03	01.6	46 27.8	1.0 03	01.5	41 28.5	1.0 02	01.1	3
4	55 53.3	99 06	03.6	55 23.5	99 06	03.5	53 54.0	99 06	03.2	53 24.2	99 06	03.1	52 54.3	99 05	03.0	46 56.0	1.0 04	02.1	46 26.2	1.0 04	02.0	41 27.3	1.0 02	01.4	4
05	55 49.5	99 08	04.4	55 19.8	99 08	04.3	53 50.6	99 07	04.0	53 20.9	99 07	03.9	52 51.1	99 06	03.8	46 53.8	99 04	02.6	46 24.0	99 04	02.5	41 25.8	99 03	01.8	05
6	55 44.9	99 09	05.3	55 15.3	99 09	05.2	53 46.5	99 08	04.8	53 16.9	99 08	04.6	52 47.3	99 08	04.5	46 51.1	99 05	03.1	46 21.4	99 05	03.0	41 24.0	99 04	02.1	6
7	55 39.5	98 10	06.2	55 10.1	98 10	06.0	53 41.7	98 09	05.5	53 12.2	98 09	05.4	52 42.7	98 09	05.2	46 47.9	99 06	03.7	46 18.3	99 06	03.5	41 21.8	99 04	02.5	7
8	55 33.3	98 12	07.1	55 04.0	98 11	06.9	53 36.1	98 10	06.3	53 06.8	98 10	06.1	52 37.4	98 10	06.0	46 44.2	98 07	04.2	46 14.7	98 07	04.0	41 19.3	99 05	02.8	8
9	55 26.2	97 13	07.9	54 57.2	97 13	07.7	53 29.8	97 12	07.1	53 00.6	97 11	06.9	52 31.5	97 11	06.7	46 40.1	98 08	04.7	46 10.7	98 08	04.5	41 16.5	98 05	03.2	9
10	55 18.4	96 14	08.8	54 49.5	96 14	08.5	53 22.8	97 13	07.9	52 53.8	97 12	07.6	52 24.8	97 12	07.4	46 35.4	97 08	05.2	46 06.2	97 08	05.0	41 13.3	98 06	03.5	10
1	55 09.8	96 16	09.6	54 41.2	96 15	09.4	53 15.1	96 14	08.6	52 46.3	96 14	08.4	52 17.5	96 13	08.1	46 30.3	97 09	05.7	46 01.2	97 09	05.5	41 09.8	97 06	03.9	1
2	55 00.4	95 17	10.4	54 32.0	95 16	10.2	53 06.6	96 15	09.4	52 38.1	96 15	09.1	52 09.6	96 14	08.9	46 24.7	96 10	06.2	45 55.8	96 10	06.0	41 06.0	97 07	04.2	2
3	54 50.2	94 18	11.3	54 22.1	94 18	11.0	52 57.5	94 16	10.1	52 29.2	94 16	09.8	52 00.9	94 15	09.6	46 18.7	96 11	06.7	45 50.0	96 11	06.5	41 01.8	96 07	04.6	3
4	54 39.3	93 19	12.1	54 11.5	93 19	11.7	52 47.7	93 17	10.8	52 19.7	93 17	10.5	51 51.7	94 16	10.2	46 12.1	95 12	07.2	45 43.6	95 11	07.0	40 57.4	96 08	04.9	4
15	54 27.7	92 21	12.9	54 00.2	92 20	12.5	52 37.3	92 18	11.5	52 09.5	93 18	11.2	51 41.8	93 18	10.9	46 05.1	94 12	07.7	45 36.9	94 12	07.4	40 52.6	95 08	05.2	15
6	54 15.3	91 22	13.6	53 48.1	91 21	13.3	52 26.2	91 20	12.3	51 58.7	92 19	11.9	51 31.2	92 18	11.6	45 57.7	93 13	08.2	45 29.7	94 13	07.9	40 47.5	94 09	05.6	6
7	54 02.2	89 23	14.4	53 35.4	90 22	14.0	52 14.4	90 21	13.0	51 47.3	91 20	12.6	51 20.1	91 20	12.3	45 49.8	93 14	08.6	45 22.0	93 14	08.4	40 42.1	94 10	05.9	7
8	53 48.5	88 24	15.2	53 22.0	89 24	14.8	52 02.0	89 22	13.6	51 35.2	89 21	13.3	51 08.3	90 20	12.9	45 41.5	92 15	09.1	45 13.9	92 14	08.8	40 36.4	93 10	06.2	8
9	53 34.0	87 25	15.9	53 07.9	87 24	15.5	51 49.0	88 23	14.3	51 22.5	88 22	13.9	50 56.0	89 22	13.6	45 32.7	91 15	09.6	45 05.4	91 15	09.3	40 30.4	92 10	06.6	9
20	53 18.9	86 26	16.6	52 53.2	86 26	16.2	51 35.3	87 24	15.0	51 09.2	87 23	14.6	50 43.0	87 22	14.2	45 23.5	90 16	10.1	44 56.5	90 16	09.7	40 24.1	91 11	06.9	20
1	53 03.2	84 27	17.3	52 37.8	85 27	16.9	51 21.1	86 25	15.6	50 55.3	86 24	15.2	50 29.5	86 24	14.8	45 13.9	89 17	10.5	44 47.2	89 16	10.2	40 17.4	91 12	07.2	1
2	52 46.8	83 28	18.0	52 21.8	83 28	17.6	51 06.3	84 26	16.3	50 40.9	85 25	15.8	50 15.4	85 24	15.4	45 03.9	88 18	11.0	44 37.5	88 17	10.6	40 10.5	90 12	07.5	2
3	52 29.8	82 29	18.7	52 05.2	82 29	18.2	50 50.9	83 27	16.9	50 25.9	83 26	16.5	50 00.8	84 25	16.0	44 53.4	87 18	11.4	44 27.3	87 18	11.1	40 03.3	89 12	07.8	3
4	52 12.2	80 30	19.4	51 48.0	81 30	18.9	50 34.9	82 28	17.5	50 10.4	82 27	17.1	49 45.7	82 26	16.6	44 42.5	86 19	11.8	44 16.8	86 18	11.5	39 55.8	88 13	08.1	4
25	51 54.0	79 31	20.0	51 30.3	79 30	19.5	50 18.4	80 28	18.1	49 54.3	81 28	17.6	49 30.0	81 27	17.2	44 31.3	85 20	12.3	44 05.9	85 19	11.9	39 48.0	87 13	08.5	25
6	51 35.2	77 32	20.7	51 12.0	78 32	20.2	50 01.4	79 29	18.7	49 37.7	79 28	18.2	49 13.8	80 28	17.7	44 19.6	83 20	12.7	43 54.6	84 20	12.3	39 40.0	86 14	08.8	6
7	51 15.9	76 33	21.3	50 53.1	76 32	20.8	49 43.9	78 30	19.3	49 20.6	78 29	18.8	48 57.1	78 28	18.3	44 07.6	82 21	13.1	43 42.9	83 20	12.7	39 31.6	85 14	09.0	7
8	50 56.1	74 34	21.9	50 33.8	75 33	21.3	49 25.9	76 31	19.8	49 03.0	77 30	19.3	48 40.0	77 30	18.8	43 55.2	81 21	13.5	43 30.8	81 21	13.1	39 23.0	84 15	09.3	8
9	50 35.8	73 35	22.4	50 13.9	73 34	21.9	49 07.4	75 32	20.4	48 44.9	75 31	19.8	48 22.3	75 30	19.3	43 42.4	80 22	13.9	43 18.4	80 21	13.5	39 14.1	83 15	09.6	9
30	50 14.9	71 36	23.0	49 53.5	72 35	22.5	48 48.4	73 32	20.9	48 26.4	74 32	20.4	48 04.2	74 31	19.9	43 29.3	79 22	14.3	43 05.7	79 22	13.9	39 05.0	82 16	09.9	30
1	49 53.6	70 36	23.6	49 32.7	70 36	23.0	48 28.9	72 33	21.4	48 07.4	72 32	20.9	47 45.7	73 32	20.4	43 15.8	77 23	14.7	42 52.6	78 22	14.2	38 55.5	80 16	10.2	1
2	49 31.8	68 37	24.1	49 11.4	68 36	23.5	48 09.0	70 34	21.9	47 47.9	71 33	21.4	47 26.7	71 32	20.8	43 01.9	76 24	15.1	42 39.1	76 23	14.6	38 45.9	79 16	10.5	2
3	49 09.6	66 38	24.6	48 49.6	67 37	24.0	47 48.7	68 34	22.4	47 28.1	69 34	21.8	47 07.3	69 33	21.3	42 47.8	74 24	15.4	42 25.4	75 24	15.0	38 36.0	78 17	10.7	3
4	48 46.9	65 38	25.1	48 27.4	65 38	24.5	47 28.0	67 35	22.9	47 07.8	67 34	22.3	46 47.5	68 34	21.8	42 33.3	73 25	15.8	42 11.3	73 24	15.3	38 25.8	77 17	11.0	4
35	48 23.8	63 39	25.6	48 04.8	64 38	25.0	47 06.8	65 36	23.3	46 47.2	66 35	22.8	46 27.3	66 34	22.2	42 18.4	72 25	16.1	41 56.9	72 25	15.7	38 15.4	75 18	11.3	35
6	48 00.3	61 40	26.1	47 41.8	62 39	25.5	46 45.3	64 36	23.8	46 26.1	64 36	23.2	46 06.8	65 35	22.6	42 03.3	70 26	16.5	41 42.1	71 25	16.0	38 04.7	74 18	11.5	6
7	47 36.5	60 40	26.5	47 18.5	60 40	25.9	46 23.4	62 37	24.2	46 04.7	63 36	23.6	45 45.8	63 36	23.1	41 47.8	69 26	16.8	41 27.1	69 26	16.3	37 53.9	73 18	11.8	7
8	47 12.2	58 41	26.9	46 54.7	59 40	26.3	46 01.1	60 38	24.6	45 42.9	61 37	24.0	45 24.5	62 36	23.5	41 32.1	67 27	17.1	41 11.8	68 26	16.7	37 42.8	71 19	12.0	8
9	46 47.6	56 42	27.4	46 30.6	57 41	26.8	45 38.5	59 38	25.0	45 20.8	59 38	24.4	45 02.9	60 37	23.9	41 16.0	66 27	17.5	40 56.2	66 26	17.0	37 31.4	70 19	12.2	9
40	46 22.6	55 42	27.8	46 06.1	55 41	27.2	45 15.5	57 39	25.4	44 58.3	58 38	24.8	44 40.9	58 37	24.2	40 59.7	64 28	17.8	40 40.3	65 27	17.3	37 19.9	69 20	12.5	40
1	45 57.4	53 43	28.2	45 41.4	54 42	27.5	44 52.3	55 39	25.8	44 35.5	56 38	25.2	44 18.6	57 38	24.6	40 43.1	63 28	18.1	40 24.2	63 27	17.6	37 08.1	67 20	12.7	1
2	45 31.8	51 43	28.5	45 16.3	52 42	27.9	44 28.7	54 40	26.1	44 12.4	54 39	25.5	43 56.0	55 38	25.0	40 26.3	61 29	18.4	40 07.8	62 28	17.8	36 56.2	66 20	12.9	2
3	45 05.8	50 44	28.9	44 50.9	50 43	28.3	44 04.8	52 40	26.5	43 49.1	53 40	25.9	43 33.1	53 38	25.3	40 09.1	60 29	18.6	39 51.2	60 28	18.1	36 44.0	64 21	13.1	3
4	44 39.7	48 44	29.2	44 25.2	49 43	28.6	43 40.6	50 41	26.8	43 25.4	51 40	26.2	43 10.0	52 39	25.6	39 51.8	58 29	18.9	39 34.3	59 29	18.4	36 31.6	63 21	13.4	4
45	44 13.2	46 45	29.6	43 59.2	47 44	28.9	43 16.2	49 41	27.1	43 01.4	49 40	26.5	42 46.5	50 40	25.9	39 34.2	57 30	19.2	39 17.1	57 29	18.7	36 19.1	61 21	13.6	45
6	43 46.5	45 45	29.9	43 33.0	45 44	29.3	42 51.4	47 42	27.4	42 37.2	48 41	26.8	42 22.8	48 40	26.2	39 16.3	55 30	19.5	38 59.7	56 29	18.9	36 06.4	60 22	13.8	6
7	43 19.5	43 46	30.2	43 06.5	43 44	29.6	42 26.5	45 42	27.7	42 12.7	46 41	27.1	41 58.8	47 40	26.5	38 58.3	53 30	19.7	38 42.2	54 30	19.2	35 53.4	58 22	14.0	7
8	42 52.2	41 46	30.5	42 39.8	42 45	29.8	42 01.3	44 42	28.0	41 48.0	44 42	27.4	41 34.6	45 41	26.8	38 40.0	52 31	19.9	38 24.4	52 30	19.4	35 40.3	57 22	14.2	8
9	42 24.8	39 46	30.7	42 12.8	40 45	30.1	41 35.8	42 43	28.3	41 23.1	43 42	27.7	41 10.2	43 41	27.1	38 21.5	50 31	20.2	38 06.3	51 30	19.6	35 27.1	55 22	14.3	9
50	41 57.1	38 46	31.0	41 45.7	38 46	30.4	41 10.2	40 43	28.5	40 57.9	41 42	27.9	40 45.5	42 41	27.3	38 02.8	49 32	20.4	37 48.1	49 31	19.8	35 13.6	54 23	14.5	50
1	41 29.2	36 47	31.2	41 18.3	37 46	30.6	40 44.3	39 44	28.8	40 32.6	39 43	28.2	40 20.7	40 42	27.6	37 43.9	47 32	20.6	37 29.7	47 31	20.1	35 00.0	52 23	14.7	1
2	41 01.2	34 47	31.5	40 50.7	35 46	30.9	40 18.2	37 44	29.0	40 07.0	38 43	28.4	39 55.6	38 42	27.8	37 24.8	45 32	20.8	37 11.1	46 31	20.3	34 46.3	51 23	14.9	2
3	40 32.9	33 47	31.7	40 23.0	33 46	31.1	39 52.9	35 44	29.2	39 41.3	36 43	28.6	39 30.4	37 42	28.0	37 05.5	44 32	21.0	36 52.4	44 32	20.5	34 32.4	49 24	15.0	3
4	40 04.5	31 48	31.9	39 55.1	32 47	31.3	39 25.6	34 44	29.5	39 15.3	34 44	28.9	39 04.9	35 43	28.2	36 46.1	42 33	21.2	36 33.4	42 32	20.7	34 18.3	47 24	15.2	4
55	39 35.9	29 48	32.1	39 27.0	30 47	31.5	38 59.0	32 45	29.7	38 49.2	33 44	29.0	38 39.3	33 43	28.4	36 26.5	40 33	21.4	36 14.3	41 32	20.8	34 04.2	46 24	15.3	55
6	39 07.2	28 48	32.3	38 58.7	29 47	31.7	38 32.2	30 45	29.8	38 23.0	31 44	29.2	38 13.6	32 43	28.6	36 06.7	39 33	21.6	35 55.1	39 32	21.0	33 49.8	44 24	15.5	6
7	38 38.3	26 48	32.5	38 30.3	27 48	31.9	38 05.3	29 45	30.0	37 56.6	29 44	29.4	37 47.7	30 44	28.8	35 46.8	37 33	21.7	35 35.7	38 33	21.2	33 35.4	43 24	15.6	7
8	38 09.3	25 49	32.6	38 01.8	25 48	32.0	37 38.2	27 45	30.2	37 30.0	28 44	29.6	37 21.6	28 44	29.0	35 26.8	35 34	21.9	35 16.1	36 33	21.3	33 20.8	41 24	15.7	8
9	37 40.1	23 49	32.8	37 33.2	24 48	32.2	37 11.1	25 46	30.3	37 03.3	26 45	29.7	36 55.4	27 44	29.1	35 06.6	34 34	22.1	34 56.4	34 33	21.5	33 06.1	39 25	15.9	9
60	37 10.9	21 49	32.9	37 04.4	22 48	32.3	36 43.8	24 46	30.5	36 36.5	24 45	29.9	36 29.1	25 44	29.3	34 46.3	32 34	22.2	34 36.6	32 33	21.6	32 51.3	38 25	16.0	60
1	36 41.5	20 49	33.0	36 35.5	20 48	32.4	36 16.4	22 46	30.6	36 09.6	23 45	30.0	36 02.7	23 44	29.4	34 25.9	30 34	22.3	34 16.7	31 34	21.8	32 36.4	36 25	16.1	1
2	36 12.1	18 49	33.2	36 06.5	19 48	32.6	35 48.8	21 46	30.7	35 42.6	21 45	30.1	35 36.1	22 44	29.5	34 05.3	29 34	22.5	33 56.6	29 34	21.9	32 21.4	34 25	16.2	2
3	35 42.5	17 49	33.3	35 37.5	17 49	32.7	35 21.2	19 46	30.9	35 15.5	20 46	30.3	35 09.5	20 44	29.7	33 44.6	27 34	22.6	33 36.5	27 34	22.0	32 06.3	33 25	16.3	3
4	35 12.9	15 50	33.4	35 08.3	16 49	32.8	34 53.5	17 46	31.0	34 48.2	18 46	30.4	34 42.8	19 45	29.8	33 23.9	25 35	22.7	33 16.2	26 34	22.1	31 51.1	31 26	16.4	4
65	34 43.2	13 50	33.5	34 39.1	14 49	32.9	34 25.7	16 46	31.1	34 20.9	16 46	30.5	34 16.0	17 45	29.9	33 03.0	24 35	22.8	32 55.9	24 34	22.2	31 35.8	29 26	16.5	65
6	34 13.4	12 50	33.5	34 09.8	12 49	32.9	33 57.9	14 46	31.1	33 53.6	15 46	30.5	33 49.1	15 45	29.9	32 42.1	22 35	22.9	32 35.5	22 34	22.3	31 20.4	28 26	16.6	6
7	33 43.6	10 50	33.6	33 40.5	11 49	33.0	33 30.0	13 47	31.2	33 26.1	13 46	30.6	33 22.1	14 45	30.0	32 21.1	20 35	23.0	32 14.9	21 34	22.4	31 05.0	26 26	16.7	7
8	33 13.7	09 50	33.7	33 11.1	09 49	33.1	33 02.0	11 47	31.3	32 58.6	11 46	30.7	32 55.1	12 45	30.1	32 00.0	19 35	23.1	31 54.3	19 34	22.5	30 49.5	24 26	16.8	8
9	32 43.8	07 50	33.7	32 41.6	08 49	33.1	32 34.0	09 47	31.3	32 31.1	10 46	30.7	32 28.1	10 45	30.2	31 38.8	17 35	23.1	31 33.7	17 34	22.6	30 33.9	22 26	16.8	9
70	32 13.9	06 50	33.7	32 12.1	06 49	33.1	32 05.9	08 47	31.4	32 03.5	08 46	30.8	32 00.9	09 45	30.2	31 17.6	15 36	23.2	31 13.0	16 35	22.6	30 18.2	21 26	16.9	70
1	31 43.9	04 50	33.8	31 42.6	05 49	33.2	31 37.8	06 47	31.4	31 35.9	07 46	30.8	31 33.8	07 45	30.3	30 56.3	14 36	23.3	30 52.2	14 35	22.7	30 02.5	19 26	17.0	1
2	31 13.9	03 50	33.8	31 13.1	03 49	33.2	31 09.7	05 47	31.5	31 08.2	05 46	30.9	31 06.6	06 45	30.3	30 35.0	12 36	23.3	30 31.4	12 35	22.7	29 46.7	17 26	17.0	2
3	30 44.0	01 50	33.8	30 43.6	01 49	33.2	30 41.5	03 47	31.5	30 40.5	04 46	30.9	30 39.4	04 45	30.3	30 13.6	10 36	23.4	30 10.5	11 35	22.8	29 30.9	16 26	17.1	3
4	30 14.0	01 50	33.8	30 14.0	00 49	33.2	30 13.4	01 47	31.5	30 12.9	02 46	30.9	30 12.2	03 46	30.3	29 52.2	09 36	23.4	29 49.6	09 35	22.8	29 15.0	14 26	17.1	4
75	29 44.0	02 50	33.8	29 44.5	02 49	33.2	29 45.2	00 47	31.5	29 45.1	00 46	30.9	29 44.9	01 45	30.3	29 30.8	07 36	23.4	29 28.6	07 35	22.9	28 59.1	12 26	17.2	75
6	29 14.0	04 50	33.8	29 15.0	03 49	33.2	29 17.0	02 47	31.5	29 17.4	01 46	30.9	29 17.7	01 45	30.3	29 00.3	06 36	23.5	29 07.7	06 35	22.9	28 43.2	11 26	17.2	6
7	28 44.0	05 50	33.8	28 45.4	05 49	33.2	28 48.9	03 47	31.5	28 49.7	03 46	30.9	28 50.5	02 45	30.3	28 47.8	04 36	23.5	28 46.7	04 35	22.9	28 27.3	09 27	17.2	7
8	28 14.0	07 50	33.7	28 15.9	06 49	33.2	28 20.7	05 47	31.5	28 22.1	04 46	30.9	28 23.2	04 45	30.3	28 26.3	02 36	23.5	28 25.7	02 35	22.9	28 11.3	07 27	17.3	8
9	27 44.1	08 50	33.7	27 46.5	08 49	33.1	27 52.6	06 47	31.4	27 54.4	06 46	30.9	27 56.0	05 45	30.3	28 04.8	00 36	23.5	28 04.7	01 35	22.9	27 55.3	05 27	17.3	9
80	27 14.2	09 50	33.6	27 17.0	09 49	33.1	27 24.5	08 47	31.4	27 26.7	07 46	30.8	27 28.8	07 45	30.3	27 43.3	01 36	23.5	27 43.7	01 35	22.9	27 39.3	04 27	17.3	80
1	26 44.4	11 50	33.6	26 47.6	10 49	33.0	26 56.4	09 47	31.3	26 59.1	09 46	30.8	27 01.7	08 45	30.2	27 21.8	03 36	23.5	27 22.6	02 35	22.9	27 23.2	02 27	17.3	1
2	26 14.6	12 50	33.5	26 18.2	12 49	33.0	26 28.4	11 47	31.3	26 31.5	10 46	30.7	26 34.5	10 45	30.2	27 00.4	06 36	23.5	27 01.6	04 35	22.9	27 07.2	00 27	17.3	2
3	25 44.9	14 50	33.4	25 48.9	13 49	32.9	26 00.4	12 46	31.2	26 04.0	12 46	30.7	26 07.5	11 45	30.1	26 38.9	08 36	23.5	26 40.7	06 35	22.9	26 51.2	01 27	17.3	3
4	25 15.2	15 49	33.4	25 19.7	15 49	32.8	25 32.5	14 46	31.2	25 36.5	13 46	30.6	25 40.4	13 45	30.1	26 17.4	08 36	23.4	26 19.7	07 35	22.9	26 35.1	03 27	17.3	4
85	24 45.6	17 49	33.3	24 50.5	16 48	32.7	25 04.6	15 46	31.1	25 09.1	15 46	30.5	25 13.4	14 45	30.0	25 56.0	09 36	23.4	25 58.7	09 35	22.8	26 19.1	06 27	17.3	85
6	24 16.0	18 49	33.2	24 21.4	18 48	32.6	24 36.8	17 46	31.0	24 41.7	16 46	30.5	24 46.5	16 45	29.9	25 34.6	11 36	23.4	25 37.8	11 35	22.8	26 03.1	06 27	17.3	6
7	23 46.6	19 49	33.1	23 52.3	19 48	32.5	24 09.1	18 46	30.9	24 14.4	18 45	30.4	24 19.6	17 45	29.8	25 13.3	13 36	23.3	25 17.0	12 35	22.8	25 47.1	08 27	17.2	7
8	23 17.2	21 49	33.0	23 23.4	21 48	32.4	23 41.4	19 46	30.8	23 47.2	19 45	30.3	23 52.8	19 44	29.7	24 52.0	14 36	23.2	24 56.1	14 35	22.7	25 31.1	10 26	17.2	8
9	22 47.9	22 49	32.8	22 54.5	22 48	32.3	23 13.8	21 46	30.7	23 20.0	21 45	30.2	23 26.1	20 44	29.7	24 30.7	16 35	23.2	24 35.3	15 34	22.6	25 15.2	11 26	17.2	9
90	22 18.7	24 48	32.7	22 25.7	23 48	32.2	22 46.3	22 46	30.6	22 52.9	22 45	30.1	22 59.5	22 44	29.5	24 09.5	17 35	23.1	24 14.6	17 34	22.6	24 59.3	13 26	17.1	90

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	21 49.6	25 48	32.6	21 57.1	25 48	32.1	22 18.9	24 46	30.5	22 26.0	23 45	30.0	22 32.9	23 44	29.4	23 48.3	19 35	23.1	23 53.9	18 34	22.5	24 43.4	15 26	17.1	91
2	21 20.6	26 48	32.4	21 28.5	26 48	31.9	21 51.6	25 45	30.4	21 59.1	25 45	29.8	22 06.5	25 44	29.3	23 27.2	20 35	23.0	23 33.3	20 34	22.4	24 27.6	16 26	17.1	2
3	20 51.7	28 48	32.3	21 00.0	28 47	31.8	21 24.4	27 45	30.2	21 32.3	26 44	29.7	21 40.1	26 44	29.2	23 06.2	22 35	22.9	23 12.7	21 34	22.4	24 11.8	18 26	17.0	3
4	20 23.0	29 48	32.1	20 31.7	29 47	31.6	20 57.3	28 45	30.1	21 05.6	28 44	29.6	21 13.9	27 44	29.1	22 45.3	23 35	22.8	22 52.2	23 34	22.3	23 56.0	19 26	17.0	4
95	19 54.3	31 48	32.0	20 03.5	30 47	31.5	20 30.3	29 45	30.0	20 39.0	29 44	29.4	20 47.7	29 43	28.9	22 24.4	25 35	22.7	22 31.8	25 34	22.2	23 40.3	21 26	16.9	95
6	19 25.8	32 47	31.8	19 35.4	32 47	31.3	20 03.4	31 44	29.8	20 12.6	30 44	29.3	20 21.7	30 43	28.8	22 03.6	26 34	22.6	22 11.5	26 34	22.1	23 24.6	23 26	16.8	6
7	18 57.5	33 47	31.7	19 07.4	33 46	31.2	19 36.7	32 44	29.6	19 46.3	32 44	29.1	19 55.8	32 43	28.6	21 42.9	28 34	22.5	21 51.3	28 34	22.0	23 09.1	24 26	16.8	7
8	18 29.2	35 47	31.5	18 39.6	34 46	31.0	19 10.1	33 44	29.5	19 20.1	33 44	29.0	19 30.0	33 43	28.5	21 22.3	29 34	22.4	21 31.1	29 33	21.9	22 53.5	26 26	16.7	8
9	18 01.2	36 47	31.3	18 11.9	36 46	30.8	18 43.6	35 44	29.3	18 54.0	35 43	28.8	19 04.3	34 42	28.3	21 01.8	31 34	22.3	21 11.1	31 33	21.8	22 38.1	27 26	16.6	9
100	17 33.2	37 46	31.1	17 44.4	37 46	30.6	18 17.3	36 44	29.1	18 28.1	36 43	28.6	18 38.8	36 42	28.2	20 41.4	32 34	22.2	20 51.1	32 33	21.7	22 22.7	29 26	16.5	100
1	17 05.5	38 46	30.9	17 17.0	38 45	30.4	17 51.1	38 44	29.0	18 02.3	37 43	28.5	18 13.4	37 42	28.0	20 21.2	34 34	22.0	20 31.3	34 33	21.5	22 07.4	30 25	16.4	1
2	16 37.9	40 46	30.7	16 49.8	40 45	30.2	17 25.0	39 43	28.8	17 36.7	39 42	28.3	17 48.2	38 42	27.8	20 01.0	35 34	21.9	20 11.5	35 33	21.4	21 52.2	32 25	16.4	2
3	16 10.4	41 46	30.5	16 22.7	41 45	30.0	16 59.2	40 43	28.6	17 11.2	40 42	28.1	17 23.1	40 42	27.6	19 40.9	37 33	21.8	19 51.9	36 32	21.3	21 37.0	34 25	16.3	3
4	15 43.1	42 45	30.3	15 55.8	42 44	29.8	16 33.5	41 43	28.4	16 45.9	41 42	27.9	16 58.2	41 41	27.4	19 21.0	38 33	21.6	19 32.4	38 32	21.1	21 21.9	35 25	16.2	4
105	15 16.1	44 45	30.0	15 29.1	43 44	29.6	16 07.9	43 42	28.2	16 20.7	43 42	27.7	16 33.5	42 41	27.2	19 01.2	40 33	21.5	19 13.0	39 32	21.0	21 07.0	37 25	16.1	105
6	14 49.2	45 45	29.8	15 02.6	45 44	29.3	15 42.5	44 42	28.0	15 55.7	44 41	27.5	16 08.9	44 41	27.0	18 41.5	41 33	21.3	18 53.8	41 32	20.8	20 52.1	38 25	16.0	6
7	14 22.4	46 44	29.6	14 36.2	46 44	29.1	15 17.3	45 42	27.7	15 30.9	45 41	27.3	15 44.5	45 40	26.8	18 21.9	42 32	21.2	18 34.6	42 32	20.7	20 37.3	40 24	15.8	7
8	13 55.9	47 44	29.3	14 10.1	47 43	28.9	14 52.3	47 41	27.5	15 06.3	46 41	27.1	15 20.2	46 40	26.6	18 02.5	44 32	21.0	18 15.6	44 31	20.5	20 22.7	41 24	15.7	8
9	13 29.6	49 44	29.1	13 44.2	48 43	28.6	14 27.5	48 41	27.3	14 41.9	48 40	26.8	14 56.2	48 40	26.4	17 43.3	45 32	20.8	17 56.8	45 31	20.4	20 08.1	42 24	15.6	9
110	13 03.5	50 43	28.8	13 18.4	50 42	28.4	14 02.9	49 41	27.1	14 17.6	49 40	26.6	14 32.3	49 40	26.2	17 24.2	47 32	20.7	17 38.1	46 31	20.2	19 53.6	44 24	15.5	110
1	12 37.6	51 43	28.6	12 52.9	51 42	28.1	13 38.5	50 40	26.8	13 53.6	50 40	26.4	14 08.6	50 39	25.9	17 05.2	48 31	20.5	17 19.6	48 31	20.0	19 39.3	45 24	15.4	1
2	12 11.9	52 43	28.3	12 27.5	52 42	27.9	13 14.3	52 40	26.6	13 29.7	52 39	26.1	13 45.2	51 39	25.7	16 46.4	49 31	20.3	17 01.2	49 30	19.9	19 25.1	47 24	15.2	2
3	11 46.4	53 42	28.0	12 02.4	53 41	27.6	12 50.2	53 40	26.3	13 06.1	53 39	25.9	13 21.9	53 38	25.4	16 27.8	51 31	20.1	16 42.9	50 30	19.7	19 10.9	48 23	15.1	3
4	11 21.2	55 42	27.8	11 37.6	55 41	27.3	12 26.5	54 39	26.1	12 42.7	54 39	25.6	12 58.9	54 38	25.2	16 09.3	52 30	19.9	16 24.9	52 30	19.5	18 57.0	50 23	15.0	4
115	10 56.2	56 41	27.5	11 12.9	56 41	27.1	12 02.9	55 39	25.8	12 19.5	55 38	25.4	12 36.0	55 38	24.9	15 51.0	53 30	19.7	16 07.0	53 30	19.3	18 43.1	51 23	14.8	115
6	10 31.4	57 41	27.2	10 48.5	57 40	26.8	11 39.5	57 38	25.5	11 56.5	56 38	25.1	12 13.4	56 37	24.7	15 32.9	54 30	19.5	15 49.2	54 29	19.1	18 29.4	52 23	14.7	6
7	10 06.9	58 40	26.9	10 24.3	58 40	26.5	11 16.4	58 38	25.2	11 33.7	58 38	24.8	11 51.0	57 37	24.4	15 15.0	56 30	19.3	15 31.7	56 29	18.9	18 15.8	54 22	14.5	7
8	9 42.6	59 40	26.6	10 00.4	59 40	26.2	10 53.5	59 38	25.0	11 11.2	59 37	24.6	11 28.8	59 36	24.1	14 57.2	57 29	19.1	15 14.3	57 29	18.7	18 02.3	55 22	14.4	8
9	9 18.6	60 40	26.3	9 36.7	60 39	25.9	10 30.9	60 37	24.7	10 48.9	60 37	24.3	11 06.9	60 36	23.9	14 39.7	58 29	18.9	14 57.1	58 28	18.5	17 49.0	56 22	14.2	9
120	8 54.8	62 39	26.0	9 13.3	61 39	25.6	10 08.5	61 37	24.4	10 26.8	61 36	24.0	10 45.2	61 36	23.6	14 22.3	60 29	18.7	14 40.1	59 28	18.3	17 35.9	58 22	14.1	120
1	8 31.3	63 39	25.7	8 50.1	63 38	25.3	9 46.3	62 36	24.1	10 05.0	62 36	23.7	10 23.7	62 35	23.3	14 05.1	61 28	18.5	14 23.3	61 28	18.1	17 22.8	59 21	13.9	1
2	8 08.1	64 38	25.4	8 27.2	64 38	25.0	9 24.4	63 36	23.8	9 43.5	63 36	23.4	10 02.5	63 35	23.0	13 48.1	62 28	18.2	14 06.7	62 27	17.8	17 10.0	60 21	13.7	2
3	7 45.1	65 38	25.0	8 04.6	65 37	24.7	9 02.8	65 36	23.5	9 22.2	65 35	23.1	9 41.5	64 34	22.7	13 31.4	63 28	18.0	13 50.3	63 27	17.6	16 57.3	62 21	13.6	3
4	7 22.4	66 37	24.7	7 42.2	66 37	24.3	8 41.5	66 35	23.2	9 01.2	66 35	22.8	9 20.8	66 34	22.4	13 14.8	64 27	17.8	13 34.1	64 27	17.4	16 44.7	63 21	13.4	4
125	7 00.0	67 37	24.4	7 20.1	67 36	24.0	8 20.4	67 35	22.9	8 40.4	67 34	22.5	9 00.4	67 34	22.1	12 58.4	66 27	17.5	13 18.1	65 26	17.1	16 32.3	64 20	13.2	125
6	6 37.9	68 36	24.0	6 58.3	68 36	23.7	7 59.5	68 34	22.6	8 19.9	68 34	22.2	8 40.2	68 33	21.8	12 42.3	67 26	17.3	13 02.3	67 26	16.9	16 20.1	65 20	13.0	6
7	6 16.1	69 36	23.7	6 36.9	69 35	23.3	7 39.0	69 34	22.2	7 59.7	69 33	21.9	8 20.3	69 33	21.5	12 26.4	68 26	17.0	12 46.7	68 26	16.7	16 08.0	66 20	12.8	7
8	5 54.6	70 35	23.3	6 15.7	70 35	23.0	7 18.7	70 33	21.9	7 39.7	70 33	21.5	8 00.7	70 32	21.2	12 10.7	69 26	16.8	12 31.3	69 25	16.4	15 56.1	68 20	12.7	8
9	5 33.4	71 35	23.0	5 54.8	71 34	22.6	6 58.8	71 33	21.6	7 20.1	71 32	21.2	7 41.4	71 32	20.9	11 55.2	70 25	16.5	12 16.2	70 25	16.2	15 44.4	69 19	12.5	9
130	5 12.5	72 34	22.6	5 34.2	72 34	22.3	6 39.1	72 32	21.2	7 00.7	72 32	20.9	7 22.3	72 31	20.5	11 40.0	71 25	16.3	12 01.3	71 24	15.9	15 32.8	70 19	12.3	130
1				5 13.9	73 34	21.9	6 19.7	73 32	20.9	6 41.6	73 31	20.5	7 03.5	73 31	20.2	11 25.0	72 25	16.0	11 46.6	72 24	15.7	15 21.5	71 19	12.1	1
2							6 00.6	74 31	20.5	6 22.9	74 31	20.2	6 45.1	74 30	19.9	11 10.2	73 24	15.8	11 32.2	73 24	15.4	15 10.3	72 18	11.9	2
3							5 41.9	75 31	20.2	6 04.4	75 30	19.9	6 26.9	75 30	19.5	10 55.7	74 24	15.5	11 18.0	74 23	15.1	14 59.3	73 18	11.7	3
4							5 23.4	76 30	19.8	5 46.2	76 30	19.5	6 09.0	76 29	19.2	10 41.4	75 23	15.2	11 04.0	75 23	14.9	14 48.5	74 18	11.5	4
135							5 05.3	77 30	19.5	5 28.4	77 29	19.1	5 51.5	77 29	18.8	10 27.4	76 23	14.9	10 50.3	76 22	14.6	14 37.8	75 17	11.3	135
6										5 10.9	78 29	18.8	5 34.2	78 28	18.5	10 13.6	77 22	14.7	10 36.8	77 22	14.3	14 27.4	76 17	11.1	6
7													5 17.3	79 28	18.1	10 00.1	78 22	14.4	10 23.6	78 22	14.1	14 17.2	77 17	10.8	7
8													5 00.7	80 27	17.8	9 46.9	79 22	14.1	10 10.6	79 21	13.8	14 07.1	78 16	10.6	8
9																9 33.9	80 21	13.8	9 57.9	80 21	13.5	13 57.3	79 16	10.4	9
140																9 21.2	81 21	13.5	9 45.5	81 20	13.2	13 47.6	80 16	10.2	140
1																9 08.7	82 20	13.2	9 33.3	82 20	12.9	13 38.2	81 15	10.0	1
2																8 56.5	83 20	12.9	9 21.4	83 20	12.6	13 29.0	82 15	09.7	2
3																8 44.6	84 19	12.6	9 09.7	84 19	12.3	13 20.0	83 15	09.5	3
4																8 33.0	85 19	12.3	8 58.4	84 18	12.0	13 11.1	84 14	09.3	4
145																8 21.7	85 18	12.0	8 47.3	85 18	11.7	13 02.5	85 14	09.1	145
6																8 10.6	86 18	11.7	8 36.4	86 18	11.4	12 54.2	86 14	08.8	6
7																7 59.8	87 18	11.4	8 25.9	87 17	11.1	12 46.0	87 13	08.6	7
8																7 49.3	88 17	11.1	8 15.6	88 16	10.8	12 38.1	87 13	08.3	8
9																7 39.1	88 16	10.7	8 05.7	88 16	10.5	12 30.4	88 12	08.1	9
150																7 29.2	89 16	10.4	7 56.0	89 16	10.2	12 22.9	89 12	07.9	150
1																7 19.7	90 16	10.1	7 46.6	90 15	09.9	12 15.6	90 12	07.6	1
2																7 10.4	91 15	09.8	7 37.5	90 15	09.5	12 08.6	90 11	07.4	2
3																7 01.4	91 14	09.4	7 28.7	91 14	09.2	12 01.8	91 11	07.1	3
4																6 52.7	92 14	09.1	7 20.2	92 14	08.9	11 55.2	92 10	06.9	4
155																6 44.3	92 14	08.8	7 12.0	92 13	08.6	11 48.9	92 10	06.6	155
6																6 36.2	93 13	08.4	7 04.1	93 13	08.3	11 42.8	93 10	06.4	6
7																6 28.5	94 12	08.1	6 56.5	94 12	07.9	11 36.9	93 09	06.1	7
8																6 21.0	94 12	07.8	6 49.3	94 12	07.6	11 31.3	94 09	05.9	8
9																6 13.9	95 11	07.4	6 42.3	95 11	07.3	11 25.9	94 09	05.6	9
160																6 07.1	95 11	07.1	6 35.6	95 10	06.9	11 20.7	95 08	05.3	160
1																6 00.6	96 10	06.7	6 29.3	96 10	06.6	11 15.8	95 08	05.1	1
2																5 54.4	96 10	06.4	6 23.2	96 10	06.3	11 11.1	96 07	04.8	2
3																5 48.6	96 09	06.0	6 17.5	96 09	05.9	11 06.7	96 07	04.6	3
4																5 43.1	97 09	05.7	6 12.1	97 08	05.6	11 02.6	97 07	04.3	4
165																5 37.9	97 08	05.3	6 07.1	97 08	05.2	10 58.6	97 06	04.0	165
6																5 33.0	98 08	05.0	6 02.3	98 07	04.9	10 55.0	98 06	03.8	6
7																5 28.5	98 07	04.6	5 57.9	98 07	04.5	10 51.5	98 05	03.5	7
8																5 24.3	98 06	04.3	5 53.8	98 06	04.2	10 48.4	98 05	03.2	8
9																5 20.4	99 06	03.9	5 50.0	99 06	03.9	10 45.4	98 04	03.0	9
170																5 16.9	99 05	03.6	5 46.5	99 05	03.5	10 42.8	99 04	02.7	170
1																5 13.7	99 05	03.2	5 43.4	99 05	03.2	10 40.3	99 04	02.4	1
2																5 10.8	99 04	02.9	5 40.6	99 04	02.8	10 38.2	99 03	02.2	2
3																5 08.3	99 04	02.5	5 38.1	99 04	02.5	10 36.3	99 03	01.9	3
4																5 06.1	1.0 03	02.2	5 36.0	1.0 03	02.1	10 34.6	1.0 02	01.6	4
175																5 04.2	1.0 02	01.8	5 34.1	1.0 02	01.8	10 33.2	1.0 02	01.4	175
6																5 02.7	1.0 02	01.4	5 32.6	1.0 02	01.4	10 32.0	1.0 01	01.1	6
7																5 01.5	1.0 01	01.1	5 31.5	1.0 01	01.1	10 31.2	1.0 01	00.8	7
8																5 00.7	1.0 01	00.7	5 30.7	1.0 01	00.7	10 30.5	1.0 01	00.5	8
9																5 00.2	1.0 00	00.4	5 30.2	1.0 00	00.4	10 30.1	1.0 00	00.3	9
180																5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	10 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 26°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	72	00	00
4	68	169	72	167	76	164	79	159	83	148	86	118	86	60	83	29	79	18	76	12	72	09	4
8	67	159	70	156	74	150	78	142	81	128	82	104	83	73	81	48	78	32	74	23	71	18	8
12	65	150	69	146	72	139	75	129	77	116	79	98	79	77	78	57	76	43	73	33	70	25	12
16	63	142	66	137	69	130	72	121	74	109	75	94	76	78	75	63	73	50	71	40	68	32	16
20	61	136	64	130	67	123	69	114	71	104	72	92	72	79	72	66	70	55	68	45	66	37	20
24	58	130	61	124	63	117	66	109	67	100	68	90	69	79	68	68	67	58	66	49	64	41	24
28	55	125	58	119	60	113	62	105	64	97	65	88	65	79	65	70	64	60	63	52	61	44	28
32	52	120	55	115	57	109	59	102	60	95	61	87	61	79	61	70	61	62	60	54	59	47	32
36	49	116	51	111	53	106	55	99	56	93	57	86	58	78	58	71	58	63	57	56	56	49	36
40	46	113	48	108	50	103	52	97	53	91	54	84	54	78	55	71	55	64	54	57	53	50	40
44	42	110	45	105	46	100	48	95	49	89	50	83	51	77	51	70	51	64	51	58	50	52	44
48	39	107	41	103	43	98	44	93	46	87	47	82	47	76	48	70	48	64	48	58	47	52	48
52	36	105	38	100	39	96	41	91	42	86	43	81	44	75	45	70	45	64	45	58	45	53	52
56	32	102	34	98	36	94	37	89	38	84	40	79	41	74	41	69	42	64	42	58	42	53	56
60	29	100	30	96	32	92	34	87	35	83	36	78	37	73	38	68	38	63	39	58	39	53	60
64	25	98	27	94	28	90	30	86	31	81	33	77	34	72	35	68	35	63	36	58	36	53	64
68	21	96	23	92	25	88	26	84	28	80	29	76	30	71	31	67	32	62	33	58	33	53	68
72	18	94	20	91	21	87	23	83	24	79	26	74	27	70	28	66	29	61	30	57	30	52	72
76	14	93	16	89	18	85	19	81	21	77	22	73	23	69	25	65	26	61	27	56	27	52	76
80	11	91	12	87	14	83	16	80	17	76	19	72	20	68	21	64	23	60	24	55	25	51	80
84	07	89	09	85	11	82	12	78	14	74	15	70	17	67	18	63	19	59	21	55	22	50	84
88	04	87	05	84	07	80	09	76	10	73	12	69	14	65	15	61	16	57	18	54	19	50	88
92	00	86	02	82	03	78	05	75	07	71	09	67	10	64	12	60	13	56	15	52	16	49	92
96	04	84	02	80	00	77	02	73	04	69	05	66	07	62	09	59	10	55	12	51	14	47	96
100	07	82	05	78	04	75	02	71	00	68	02	64	04	61	06	57	08	53	09	50	11	46	100
104	11	80	09	77	07	73	05	69	03	66	01	62	01	59	03	55	05	52	07	48	09	45	104
108	14	78	12	75	10	71	08	68	06	64	04	61	02	57	00	54	02	50	04	47	06	43	108
112	18	76	16	73	14	69	12	66	10	62	07	59	05	55	03	52	01	49	01	45	04	42	112
116	21	74	19	70	17	67	15	63	13	60	10	57	08	53	06	50	04	47	01	44	01	40	116
120	25	72	23	68	20	65	18	61	16	58	13	54	11	51	09	48	06	45	04	42	01	39	120
124	28	70	26	66	24	62	21	59	19	55	16	52	14	49	11	46	09	43	06	40	03	37	124
128	31	67	29	63	27	60	24	56	22	53	19	50	16	46	14	43	11	40	08	38	05	35	128
132	35	64	32	61	30	57	27	53	25	50	22	47	19	44	16	41	13	38	10	35	07	33	132
136	38	61	35	58	33	54	30	50	27	47	24	44	21	41	18	38	15	36	12	33	09	30	136
140	41	58	38	54	36	51	33	47	30	44	27	41	24	38	21	36	17	33	14	31	11	28	140
144	44	55	41	51	38	47	35	44	32	41	29	38	26	35	23	33	19	30	16	28	13	26	144
148	47	51	44	47	41	43	38	40	34	37	31	34	28	32	24	30	21	27	18	25	14	23	148
152	50	46	46	42	43	39	40	36	37	33	33	31	30	28	26	26	23	24	19	22	15	21	152
156	52	41	49	38	45	35	42	32	38	29	35	27	31	25	28	23	24	21	20	19	17	18	156
160	54	36	51	32	47	30	44	27	40	25	36	23	33	21	29	19	25	18	21	16	18	15	160
164	56	30	53	27	49	24	45	22	41	19	38	19	34	17	30	16	26	14	22	13	18	12	164
168	58	23	54	21	50	19	46	17	43	15	39	14	35	13	31	12	27	11	23	10	19	09	168
172	59	16	55	14	51	13	47	11	43	10	39	09	36	09	32	08	28	07	24	07	20	06	172
176	60	08	56	07	52	06	48	06	44	05	40	05	36	04	32	04	28	04	24	03	20	03	176
180	60	00	56	00	52	00	48	00	44	00	40	00	36	00	32	00	28	00	24	00	20	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	68	00	64	00	60	00	56	00	52	00	48	00	44	00	40	00	36	00	32	00	28	00	00
4	68	07	64	06	60	04	56	04	52	03	48	02	44	02	40	01	36	01	32	00	28	00	4
8	67	14	63	11	59	09	56	07	52	06	48	04	44	03	40	03	36	02	32	01	28	00	8
12	66	20	62	16	59	13	55	10	51	08	47	07	44	05	40	04	36	03	32	01	28	00	12
16	65	26	61	21	58	17	54	14	51	11	47	09	43	07	39	05	36	03	32	02	28	01	16
20	63	30	60	25	57	20	53	17	50	13	46	11	43	08	39	06	35	04	32	02	28	01	20
24	61	34	58	28	55	24	52	19	49	16	46	13	42	10	39	07	35	05	31	03	28	01	24
28	59	38	57	32	54	26	51	22	48	18	45	14	41	11	38	08	35	06	31	03	28	01	28
32	57	40	55	34	52	29	50	24	47	20	44	16	41	12	38	09	34	06	31	04	28	01	32
36	54	42	52	36	50	31	48	26	45	22	43	17	40	14	37	10	34	07	31	04	28	01	36
40	52	44	50	38	48	33	46	28	44	23	42	19	39	15	36	11	33	08	31	04	28	01	40
44	49	45	48	40	46	34	45	29	43	24	40	20	38	16	36	12	33	08	30	05	27	02	44
48	47	47	46	41	44	36	43	30	41	26	39	21	37	17	35	13	32	09	30	05	27	02	48
52	44	47	43	42	42	37	41	31	40	27	38	22	36	18	34	13	32	09	30	05	27	02	52
56	41	48	41	42	40	37	39	32	38	27	36	23	35	18	33	14	31	10	29	06	27	02	56
60	39	48	38	43	38	38	37	33	36	28	35	23	34	19	32	14	31	10	29	06	27	02	60
64	36	48	36	43	36	38	35	33	35	29	34	24	33	19	31	15	30	10	28	06	27	02	64
68	33	48	34	43	33	38	33	34	33	29	32	24	31	20	30	15	29	11	28	06	27	02	68
72	31	48	31	43	31	38	31	34	31	29	31	24	30	20	30	15	29	11	28	06	27	02	72
76	28	47	29	43	29	38	29	34	29	29	29	25	29	20	29	16	28	11	27	07	26	02	76
80	25	47	26	43	27	38	27	34	28	29	28	25	28	20	28	16	27	11	27	07	26	02	80
84	23	46	24	42	25	38	25	33	26	29	26	25	26	20	27	16	27	11	26	07	26	02	84
88	20	45	21	41	22	37	23	33	24	29	25	24	25	20	26	16	26	11	26	07	26	02	88
92	18	45	19	41	20	37	21	32	22	28	23	24	24	20	25	15	25	11	26	07	26	02	92
96	15	44	17	40	18	36	19	32	21	28	22	24	23	19	24	15	25	11	25	07	26	02	96
100	13	43	14	39	16	35	18	31	19	27	20	23	22	19	23	15	24	11	25	07	26	02	100
104	10	41	12	38	14	34	16	30	17	26	19	23	20	19	22	15	23	11	24	06	26	02	104
108	08	40	10	36	12	33	14	29	16	26	18	22	19	18	21	14	23	10	24	06	25	02	108
112	06	39	08	35	10	32	12	28	14	25	16	21	18	18	20	14	22	10	24	06	25	02	112
116	04	37	06	34	08	31	11	27	13	24	15	20	17	17	19	13	21	10	23	06	25	02	116
120	01	35	04	32	06	29	09	26	11	23	14	20	16	16	18	13	21	09	23	06	25	02	120
124	*01*	34	02	31	05	28	07	25	10	22	13	19	15	15	18	12	20	09	23	05	25	02	124
128	*03*	32	00	29	03	26	06	23	09	20	11	18	14	15	17	11	20	08	22	05	25	02	128
132	*04*	30	*01*	27	02	25	05	22	07	19	10	16	13	14	16	11	19	08	22	05	25	02	132
136	*06*	28	*03*	25	00	23	03	20	06	18	09	15	13	13	16	10	19	07	22	04	25	02	136
140	*08*	26	*04*	23	*01*	21	02	19	05	16	09	14	12	12	15	09	18	07	21	04	24	01	140
144	*09*	23	*06*	21	*02*	19	01	17	04	15	08	13	11	11	14	08	18	06	21	04	24	01	144
148	*11*	21	*07*	19	*04*	17	*00*	15	03	13	07	12	10	10	14	08	17	06	21	03	24	01	148
152	*12*	19	*08*	17	*05*	15	*01*	14	03	12	06	10	10	08	13	07	17	05	21	03	24	01	152
156	*13*	16	*09*	15	*05*	13	*02*	12	02	10	06	09	09	07	13	06	17	04	20	03	24	01	156
160	*14*	14	*10*	12	*06*	11	*02*	10	01	09	05	07	09	06	13	05	17	04	20	02	24	01	160
164	*15*	11	*11*	10	*07*	09	*03*	08	01	07	05	06	09	05	12	04	16	03	20	02	24	01	164
168	*15*	08	*11*	08	*07*	07	*03*	06	00	05	04	04	08	04	12	03	16	02	20	01	24	00	168
172	*16*	06	*12*	05	*08*	05	*04*	04	00	03	04	03	08	02	12	02	16	01	20	01	24	00	172
176	*16*	03	*12*	03	*08*	02	*04*	02	00	02	04	02	08	01	12	01	16	01	20	00	24	00	176
180	*16*	00	*12*	00	*08*	00	*04*	00	00	00	04	00	08	00	12	00	16	00	20	00	24	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 27°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	63 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0	64 00.0	1.0 02	180.0	64 30.0	1.0 02	180.0	65 00.0	1.0 02	180.0	65 30.0	1.0 02	180.0	66 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	00
1	62 59.0	1.0 05	177.8	63 29.0	1.0 05	177.8	63 58.9	1.0 05	177.7	64 28.9	1.0 05	177.7	64 58.9	1.0 06	177.6	65 28.9	1.0 06	177.6	65 58.9	1.0 06	177.5	66 28.8	1.0 06	177.5	1
2	62 55.9	1.0 08	175.6	63 25.8	1.0 09	175.5	63 55.8	1.0 09	175.4	64 25.7	1.0 09	175.4	64 55.6	1.0 09	175.3	65 25.5	1.0 09	175.2	65 55.4	1.0 10	175.1	66 25.3	1.0 10	175.0	2
3	62 50.8	99 12	173.4	63 20.6	99 12	173.3	63 50.5	99 12	173.2	64 20.3	99 12	173.1	64 50.1	99 13	172.9	65 19.9	99 13	172.8	65 49.7	99 13	172.7	66 19.5	99 14	172.5	3
4	62 43.6	99 15	171.2	63 13.4	99 16	171.1	63 43.1	99 16	170.9	64 12.8	99 16	170.8	64 42.5	99 16	170.6	65 12.1	99 16	170.4	65 41.8	99 17	170.3	66 11.4	99 17	170.1	4
05	62 34.5	99 18	169.1	63 04.1	99 19	168.9	63 33.6	98 19	168.7	64 03.2	98 20	168.5	64 32.7	98 20	168.3	65 02.2	98 20	168.1	65 31.6	98 20	167.9	66 01.1	98 21	167.6	05
6	62 23.4	98 22	167.0	62 52.8	98 22	166.7	63 22.2	98 22	166.5	63 51.5	98 23	166.3	64 20.8	98 23	166.0	64 50.1	98 24	165.8	65 19.3	97 24	165.5	65 48.6	97 24	165.2	6
7	62 10.4	97 25	164.9	62 39.6	97 25	164.6	63 08.7	97 26	164.4	63 37.8	97 26	164.1	64 06.9	97 26	163.8	64 35.9	97 27	163.5	65 04.9	97 27	163.2	65 33.9	96 28	162.9	7
8	61 55.5	96 28	162.8	62 24.4	96 28	162.5	62 53.3	96 29	162.2	63 22.2	96 29	161.9	63 51.0	96 30	161.6	64 19.8	96 30	161.3	64 48.5	96 31	160.9	65 17.2	96 31	160.6	8
9	61 38.8	96 31	160.8	62 07.5	95 31	160.5	62 36.1	95 32	160.1	63 04.6	95 32	159.8	63 33.2	95 33	159.4	64 01.6	95 33	159.1	64 30.0	95 34	158.7	64 58.4	94 34	158.3	9
10	61 20.3	95 34	158.8	61 48.7	94 34	158.4	62 17.0	94 35	158.1	62 45.3	94 35	157.7	63 13.5	94 36	157.3	63 41.6	94 36	157.0	64 09.7	93 37	156.6	64 37.7	93 38	156.1	10
1	61 00.1	94 36	156.8	61 28.2	93 37	156.5	61 56.2	93 38	156.1	62 24.1	93 38	155.7	62 52.0	93 39	155.3	63 19.8	93 39	154.9	63 47.5	92 40	154.4	64 15.2	92 40	154.0	1
2	60 38.3	93 39	154.9	61 06.0	92 40	154.5	61 33.7	92 40	154.1	62 01.3	92 41	153.7	62 28.8	92 42	153.3	62 56.2	91 42	152.8	63 23.6	91 43	152.4	63 50.9	91 43	151.9	2
3	60 14.8	91 42	153.0	60 42.2	91 42	152.6	61 09.5	91 43	152.2	61 36.8	91 44	151.8	62 03.9	90 44	151.3	62 31.0	90 45	150.9	62 58.0	90 45	150.4	63 24.9	89 46	149.9	3
4	59 49.8	90 44	151.2	60 16.9	90 45	150.8	60 43.8	90 45	150.3	61 10.7	89 46	149.9	61 37.5	89 46	149.4	62 04.2	89 47	148.9	62 30.8	88 48	148.4	62 57.2	88 48	147.9	4
15	59 23.4	89 46	149.5	59 50.1	89 47	149.0	60 16.7	89 48	148.5	60 43.2	88 48	148.1	61 09.6	88 49	147.6	61 35.9	87 50	147.1	62 02.0	87 50	146.6	62 28.1	87 51	146.0	15
6	58 55.5	88 49	147.7	59 21.8	88 49	147.3	59 48.1	87 50	146.8	60 14.2	87 51	146.3	60 40.2	87 51	145.8	61 06.1	86 52	145.3	61 31.9	86 52	144.7	61 57.5	85 53	144.2	6
7	58 26.3	87 51	146.0	58 52.2	86 51	145.6	59 18.1	86 52	145.1	59 43.8	86 53	144.6	60 09.5	85 53	144.0	60 35.0	85 54	143.5	61 00.3	84 55	143.0	61 25.6	84 56	142.4	7
8	57 55.8	86 53	144.4	58 21.4	85 54	143.9	58 46.9	85 54	143.4	59 12.2	84 55	142.9	59 37.4	84 55	142.4	60 02.5	83 56	141.8	60 27.5	83 57	141.3	60 52.3	82 58	140.7	8
9	57 24.1	84 55	142.8	57 49.3	84 56	142.3	58 14.4	83 56	141.8	58 39.4	83 57	141.3	59 04.2	83 57	140.7	59 28.9	82 58	140.2	59 53.4	82 59	139.6	60 17.8	81 59	139.0	9
20	56 51.2	83 57	141.3	57 16.0	83 57	140.8	57 40.8	82 58	140.2	58 05.3	82 58	139.7	58 29.8	81 59	139.1	58 54.1	81 60	138.6	59 18.2	80 60	138.0	59 42.2	80 61	137.4	20
1	56 17.2	82 58	139.8	56 41.7	81 59	139.3	57 06.0	81 60	138.7	57 30.2	80 60	138.2	57 54.3	80 61	137.6	58 18.2	79 62	137.0	58 41.9	79 62	136.5	59 05.5	78 63	135.9	1
2	55 42.2	81 60	138.3	56 06.3	80 61	137.8	56 30.2	80 61	137.3	56 54.1	79 62	136.7	57 17.7	79 62	136.1	57 41.2	78 63	135.6	58 04.6	78 64	135.0	58 27.8	77 64	134.4	2
3	55 06.1	79 62	136.9	55 29.9	79 62	136.4	55 53.5	78 63	135.8	56 16.9	78 64	135.3	56 40.2	77 64	134.7	57 03.3	77 65	134.1	57 26.3	76 65	133.5	57 49.1	76 66	132.9	3
4	54 29.2	78 63	135.6	54 52.5	78 64	135.0	55 15.8	77 64	134.5	55 38.8	77 65	133.9	56 01.8	76 66	133.3	56 24.5	76 66	132.7	56 47.1	75 67	132.1	57 09.5	74 67	131.5	4
25	53 51.3	77 64	134.2	54 14.3	76 65	133.7	54 37.2	76 66	133.1	54 59.9	75 66	132.6	55 22.4	75 67	132.0	55 44.8	74 68	131.4	56 07.0	74 68	130.8	56 29.1	73 69	130.2	25
6	53 12.6	76 66	132.9	53 35.2	75 66	132.4	53 57.8	75 67	131.8	54 20.1	74 68	131.3	54 42.3	74 68	130.7	55 04.3	73 69	130.1	55 26.2	73 69	129.5	55 47.8	72 70	128.9	6
7	52 33.0	75 67	131.7	52 55.4	74 68	131.2	53 17.5	74 68	130.6	53 39.5	73 69	130.0	54 01.4	73 69	129.4	54 23.0	72 70	128.8	54 44.5	71 70	128.2	55 05.9	71 71	127.6	7
8	51 52.8	74 68	130.5	52 14.7	73 69	129.9	52 36.6	72 70	129.4	52 58.2	72 70	128.8	53 19.7	71 70	128.2	53 41.1	71 71	127.6	54 02.2	70 72	127.0	54 23.2	70 72	126.4	8
9	51 11.7	72 70	129.3	51 33.4	72 70	128.8	51 54.9	71 70	128.2	52 16.2	71 71	127.6	52 37.4	70 72	127.0	52 58.4	70 72	126.5	53 19.2	69 73	125.9	53 39.8	68 73	125.2	9
30	50 30.1	71 70	128.2	50 51.4	71 71	127.6	51 12.6	70 72	127.1	51 33.6	70 72	126.5	51 54.4	69 73	125.9	52 15.1	69 73	125.3	52 35.6	68 74	124.7	52 55.9	67 74	124.1	30
1	49 47.7	70 72	127.1	50 08.7	70 72	126.5	50 29.6	69 73	126.0	50 50.3	69 73	125.4	51 10.8	68 74	124.8	51 31.2	68 74	124.2	51 51.3	67 75	123.6	52 11.3	66 75	123.0	1
2	49 04.8	69 72	126.0	49 25.5	69 73	125.4	49 46.0	68 74	124.9	50 06.4	68 74	124.3	50 26.6	67 74	123.7	50 46.7	67 75	123.1	51 06.5	66 76	122.6	51 26.2	65 76	122.0	2
3	48 21.2	68 74	125.0	48 41.6	68 74	124.4	49 01.9	67 74	123.8	49 22.0	67 75	123.3	49 41.9	66 75	122.7	50 01.6	66 76	122.1	50 21.2	65 76	121.5	50 40.6	64 77	120.9	3
4	47 37.1	67 74	123.9	47 57.3	67 75	123.4	48 17.2	66 75	122.8	48 37.0	66 76	122.3	48 56.7	65 76	121.7	49 16.1	65 77	121.1	49 35.4	64 77	120.5	49 54.5	63 78	119.9	4
35	46 52.5	66 75	123.0	47 12.4	66 76	122.4	47 32.1	65 76	121.9	47 51.6	65 76	121.3	48 10.9	64 77	120.7	48 30.1	64 77	120.1	48 49.1	63 78	119.6	49 07.9	62 78	119.0	35
6	46 07.4	65 76	122.0	46 27.0	65 76	121.5	46 46.4	64 77	120.9	47 05.7	64 77	120.3	47 24.7	63 78	119.8	47 43.7	63 78	119.2	48 02.4	62 78	118.6	48 21.0	62 79	118.0	6
7	45 21.9	65 77	121.1	45 41.2	64 77	120.5	46 00.3	64 78	120.0	46 19.3	63 78	119.4	46 38.1	62 78	118.8	46 56.8	62 79	118.3	47 15.3	61 79	117.7	47 33.6	61 80	117.1	7
8	44 35.9	64 77	120.2	44 54.9	63 78	119.6	45 13.8	63 78	119.1	45 32.5	62 78	118.5	45 51.1	62 79	117.9	46 09.5	61 80	117.4	46 27.7	60 80	116.8	46 45.8	60 80	116.2	8
9	43 49.4	63 78	119.3	44 08.2	62 78	118.7	44 26.9	62 79	118.2	44 45.4	61 79	117.6	45 03.7	61 80	117.1	45 21.8	60 80	116.5	45 39.8	60 80	115.9	45 57.7	59 81	115.4	9
40	43 02.6	62 79	118.4	43 21.2	62 79	117.9	43 39.6	61 80	117.3	43 57.8	61 80	116.8	44 15.9	60 80	116.2	44 33.8	59 80	115.7	44 51.6	59 81	115.1	45 09.2	58 81	114.5	40
1	42 15.4	61 79	117.6	42 33.7	61 80	117.0	42 51.9	60 80	116.5	43 09.9	60 80	116.0	43 27.8	59 81	115.4	43 45.5	59 81	114.8	44 03.0	58 82	114.3	44 20.4	58 82	113.7	1
2	41 27.8	61 80	116.8	41 45.9	60 80	116.2	42 03.9	60 80	115.7	42 21.7	59 81	115.1	42 39.3	59 81	114.6	42 56.8	58 82	114.0	43 14.1	57 82	113.5	43 31.3	57 82	112.9	2
3	40 39.9	60 80	116.0	40 57.8	59 81	115.4	41 15.5	59 81	114.9	41 33.1	58 81	114.4	41 50.6	58 82	113.8	42 07.8	57 82	113.3	42 25.0	57 82	112.7	42 41.9	56 83	112.1	3
4	39 51.7	59 81	115.2	40 09.4	59 81	114.7	40 26.9	58 82	114.1	40 44.3	58 82	113.6	41 01.5	57 82	113.0	41 18.6	57 82	112.5	41 35.5	56 83	111.9	41 52.3	56 83	111.4	4
45	39 03.2	58 81	114.4	39 20.6	58 82	113.9	39 38.0	58 82	113.4	39 55.1	57 82	112.8	40 12.2	57 83	112.3	40 29.1	56 83	111.8	40 45.8	56 83	111.2	41 02.4	55 84	110.7	45
6	38 14.3	58 82	113.7	38 31.6	57 82	113.2	38 48.8	57 82	112.6	39 05.7	56 83	112.1	39 22.6	56 83	111.6	39 39.3	55 83	111.0	39 55.8	55 84	110.5	40 12.2	54 84	109.9	6
7	37 25.3	57 82	112.9	37 42.3	57 82	112.4	37 59.3	56 83	111.9	38 16.1	56 83	111.4	38 32.7	55 84	110.8	38 49.3	55 84	110.3	39 05.6	54 84	109.8	39 21.8	54 84	109.2	7
8	36 35.9	57 83	112.2	36 52.8	56 83	111.7	37 09.6	56 83	111.2	37 26.2	55 84	110.7	37 42.7	55 84	110.1	37 59.0	54 84	109.6	38 15.2	54 84	109.1	38 31.3	53 85	108.5	8
9	35 46.3	56 83	111.5	36 03.0	56 83	111.0	36 19.6	55 84	110.5	36 36.1	55 84	110.0	36 52.4	54 84	109.5	37 08.5	54 84	108.9	37 24.6	53 85	108.4	37 40.5	53 85	107.9	9
50	34 56.4	55 84	110.9	35 13.0	55 84	110.3	35 29.4	55 84	109.8	35 45.7	54 84	109.3	36 01.9	54 84	108.8	36 17.9	53 85	108.3	36 33.8	53 85	107.7	36 49.5	52 85	107.2	50
1	34 06.4	55 84	110.2	34 22.8	54 84	109.7	34 39.0	54 84	109.2	34 55.1	54 84	108.7	35 11.2	53 85	108.1	35 27.0	53 85	107.6	35 42.8	52 85	107.1	35 58.4	52 86	106.6	1
2	33 16.1	54 84	109.5	33 32.3	54 84	109.0	33 48.4	53 85	108.5	34 04.4	53 85	108.0	34 20.3	53 85	107.5	34 36.0	52 85	107.0	34 51.6	52 86	106.5	35 07.0	51 86	105.9	2
3	32 25.6	54 84	108.9	32 41.7	53 85	108.4	32 57.6	53 85	107.9	33 13.5	53 85	107.4	33 29.2	52 86	106.9	33 44.8	52 86	106.4	34 00.2	51 86	105.8	34 15.5	51 86	105.3	3
4	31 34.9	53 85	108.3	31 50.9	53 85	107.8	32 06.7	53 85	107.3	32 22.4	52 86	106.8	32 37.9	52 86	106.2	32 53.4	51 86	105.7	33 08.7	51 86	105.2	33 23.9	50 86	104.7	4
55	30 44.1	53 85	107.6	30 59.9	52 85	107.1	31 15.5	52 86	106.6	31 31.1	52 86	106.1	31 46.5	51 86	105.6	32 01.9	51 86	105.1	32 17.1	50 86	104.6	32 32.1	50 86	104.1	55
6	29 53.0	52 85	107.0	30 08.7	52 86	106.5	30 24.2	52 86	106.0	30 39.7	51 86	105.5	30 55.0	51 86	105.0	31 10.2	50 86	104.5	31 25.3	50 86	104.0	31 40.2	50 87	103.5	6
7	29 01.8	52 86	106.4	29 17.4	52 86	105.9	29 32.8	51 86	105.4	29 48.1	51 86	104.9	30 03.3	50 86	104.5	30 18.4	50 87	104.0	30 33.3	50 87	103.4	30 48.2	49 87	102.9	7
8	28 10.5	52 86	105.8	28 25.9	51 86	105.4	28 41.2	51 86	104.9	28 56.4	50 86	104.4	29 11.4	50 87	103.9	29 26.4	50 87	103.4	29 41.3	49 87	102.9	29 56.0	49 87	102.4	8
9	27 19.0	51 86	105.3	27 34.3	51 86	104.8	27 49.4	50 86	104.3	28 04.5	50 87	103.8	28 19.5	50 87	103.3	28 34.3	49 87	102.8	28 49.1	49 87	102.3	29 03.7	49 87	101.8	9
60	26 27.3	51 86	104.7	26 42.5	50 86	104.2	26 57.6	50 87	103.7	27 12.5	50 87	103.2	27 27.4	49 87	102.7	27 42.2	49 87	102.3	27 56.8	49 87	101.8	28 11.4	48 88	101.3	60
1	25 35.6	50 86	104.1	25 50.6	50 87	103.6	26 05.6	50 87	103.2	26 20.4	49 87	102.7	26 35.2	49 87	102.2	26 49.9	49 87	101.7	27 04.4	48 88	101.2	27 18.9	48 88	100.7	1
2	24 43.6	50 87	103.6	24 58.6	50 87	103.1	25 13.5	49 87	102.6	25 28.2	49 87	102.1	25 42.9	49 87	101.6	25 57.5	48 88	101.2	26 11.9	48 88	100.7	26 26.3	48 88	100.2	2
3	23 51.6	50 87	103.0	24 06.5	49 87	102.5	24 21.2	49 87	102.1	24 35.9	49 87	101.6	24 50.5	48 88	101.1	25 05.0	48 88	100.6	25 19.4	48 88	100.1	25 33.7	47 88	99.7	3
4	22 59.5	49 87	102.5	23 14.2	49 87	102.0	23 28.9	49 87	101.5	23 43.5	48 88	101.1	23 58.0	48 88	100.6	24 12.4	48 88	100.1	24 26.7	48 88	99.6	24 40.9	47 88	99.1	4
65	22 07.2	49 87	102.0	22 21.9	49 87	101.5	22 36.5	48 88	101.0	22 51.0	48 88	100.5	23 05.4	48 88	100.1	23 19.7	48 88	99.6	23 33.9	47 88	99.1	23 48.1	47 88	98.6	65
6	21 14.9	49 87	101.4	21 29.5	48 88	101.0	21 43.9	48 88	100.5	21 58.4	48 88	100.0	22 12.7	48 88	99.5	22 26.9	47 88	99.1	22 41.1	47 88	98.6	22 55.2	47 88	98.1	6
7	20 22.4	48 88	100.9	20 36.9	48 88	100.4	20 51.3	48 88	100.0	21 05.7	48 88	99.5	21 19.9	47 88	99.0	21 34.1	47 88	98.6	21 48.2	47 88	98.1	22 02.2	47 88	97.6	7
8	19 29.9	48 88	100.4	19 44.3	48 88	99.9	19 58.6	48 88	99.5	20 12.9	47 88	99.0	20 27.1	47 88	98.5	20 41.2	47 88	98.1	20 55.3	47 88	97.6	21 09.2	46 88	97.1	8
9	18 37.3	48 88	99.9	18 51.6	48 88	99.4	19 05.9	47 88	99.0	19 20.1	47 88	98.5	19 34.2	47 88	98.0	19 48.3	47 88	97.6	20 02.2	46 88	97.1	20 16.1	46 88	96.6	9
70	17 44.6	48 88	99.4	17 58.8	47 88	98.9	18 13.0	47 88	98.5	18 27.2	47 88	98.0	18 41.2	47 88	97.5	18 55.2	47 88	97.1	19 09.2	46 88	96.6	19 23.0	46 89	96.1	70
1	16 51.8	47 88	98.9	17 06.0	47 88	98.4	17 20.1	47 88	98.0	17 34.2	47 88	97.5	17 48.2	47 88	97.0	18 02.1	46 88	96.6	18 16.0	46 89	96.1	18 29.8	46 89	95.6	1
2	15 58.9	47 88	98.4	16 13.1	47 88	97.9	16 27.1	47 88	97.5	16 41.2	47 88	97.0	16 55.1	46 88	96.5	17 09.0	46 89	96.1	17 22.8	46 89	95.6	17 36.6	46 89	95.2	2
3	15 06.0	47 88	97.9	15 20.1	47 88	97.4	15 34.1	47 88	97.0	15 48.1	46 89	96.5	16 02.0	46 89	96.1	16 15.8	46 89	95.6	16 29.6	46 89	95.1	16 43.3	46 89	94.7	3
4	14 13.0	47 88	97.4	14 27.0	47 88	97.0	14 41.0	46 89	96.5	14 54.9	46 89	96.0	15 08.8	46 89	95.6	15 22.6	46 89	95.1	15 36.4	46 89	94.7	15 50.0	46 89	94.2	4
75	13 20.0	47 88	96.9	13 33.9	47 88	96.5	13 47.9	46 89	96.0	14 01.7	46 89	95.6	14 15.6	46 89	95.1	14 29.3	46 89	94.7	14 43.0	46 89	94.2	14 56.7	45 89	93.7	75
6	12 26.9	46 89	96.5	12 40.8	46 89	96.0	12 54.7	46 89	95.5	13 08.5	46 89	95.1	13 22.3	46 89	94.6	13 36.0	46 89	94.2	13 49.7	46 89	93.7	14 03.4	45 89	93.3	6
7	11 33.7	46 89	96.0	11 47.6	46 89	95.5	12 01.5	46 89	95.1	12 15.2	46 89	94.6	12 29.0	46 89	94.2	12 42.7	46 89	93.7	12 56.4	45 89	93.3	13 10.0	45 89	92.8	7
8	10 40.5	46 89	95.5	10 54.4	46 89	95.1	11 08.2	46 89	94.6	11 21.9	46 89	94.2	11 35.7	46 89	93.7	11 49.3	46 89	93.2	12 03.0	45 89	92.8	12 16.6	45 89	92.3	8
9	9 47.3	46 89	95.0	10 01.1	46 89	94.6	10 14.9	46 89	94.1	10 28.6	46 89	93.7	10 42.3	46 89	93.2	10 56.0	45 89	92.8	11 09.6	45 89	92.3	11 23.1	45 89	91.9	9
80	8 54.0	46 89	94.6	9 07.8	46 89	94.1	9 21.5	46 89	93.7	9 35.2	46 89	93.2	9 48.9	46 89	92.8	10 02.5	45 89	92.3	10 16.1	45 89	91.9	10 29.7	45 89	91.4	80
1	8 00.7	46 89	94.1	8 14.5	46 89	93.7	8 28.2	46 89	93.2	8 41.9	46 89	92.8	8 55.5	45 89	92.3	9 09.1	45 89	91.9	9 22.7	45 89	91.4	9 36.2	45 89	91.0	1
2	7 07.4	46 89	93.7	7 21.1	46 89	93.2	7 34.8	46 89	92.8	7 48.5	45 89	92.3	8 02.1	45 89	91.9	8 15.7	45 89	91.4	8 29.3	45 89	91.0	8 42.8	45 89	90.5	2
3	6 14.0	46 89	93.2	6 27.7	46 89	92.7	6 41.4	46 89	92.3	6 55.0	45 89	91.8	7 08.6	45 89	91.4	7 22.2	45 89	90.9	7 35.8	45 89	90.5	7 49.3	45 89	90.0	3
4	5 20.6	46 89	92.7	5 34.3	46 89	92.3	5 48.0	45 89	91.8	6 01.6	45 89	91.4	6 15.2	45 89	90.9	6 28.8	45 89	90.5	6 42.3	45 89	90.0	6 55.9	45 89	89.6	4
85										5 08.1	45 89	90.9	5 21.7	45 89	90.5	5 35.3	45 89	90.0	5 48.9	45 89	89.6	6 02.4	45 89	89.1	85
6																						5 09.0	45 89	88.7	6

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	63 00.0	1.0 02	180.0	62 30.0	1.0 02	180.0	62 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	00
1	62 59.0	1.0 05	177.8	62 29.0	1.0 05	177.8	61 59.0	1.0 05	177.9	61 29.0	1.0 05	177.9	60 59.0	1.0 05	177.9	60 29.1	1.0 05	178.0	59 59.1	1.0 05	178.0	59 29.1	1.0 05	178.0	1
2	62 55.9	1.0 08	175.6	62 26.0	1.0 08	175.7	61 56.0	1.0 08	175.7	61 26.1	1.0 08	175.8	60 56.2	1.0 08	175.9	60 26.2	1.0 08	175.9	59 56.3	1.0 08	176.0	59 26.3	1.0 08	176.1	2
3	62 50.8	99 12	173.4	62 20.9	99 12	173.5	61 51.1	1.0 12	173.6	61 21.2	1.0 11	173.7	60 51.4	1.0 11	173.8	60 21.5	1.0 11	173.9	59 51.6	1.0 11	174.0	59 21.8	1.0 11	174.1	3
4	62 43.6	99 15	171.2	62 13.9	99 15	171.4	61 44.2	99 15	171.5	61 14.4	99 14	171.7	60 44.7	99 14	171.8	60 14.9	99 14	171.9	59 45.2	99 14	172.1	59 15.4	99 14	172.2	4
05	62 34.5	99 18	169.1	62 04.9	99 18	169.3	61 35.3	99 18	169.4	61 05.7	99 18	169.6	60 36.1	99 17	169.8	60 06.5	99 17	169.9	59 36.9	99 17	170.1	59 07.2	99 16	170.2	05
6	62 23.4	98 22	167.0	61 54.0	98 21	167.2	61 24.6	98 21	167.4	60 55.2	98 21	167.6	60 25.7	98 20	167.8	59 56.2	98 20	168.0	59 26.8	98 20	168.2	58 57.3	98 20	168.3	6
7	62 10.4	97 25	164.9	61 41.2	97 24	165.1	61 12.0	97 24	165.3	60 42.8	98 24	165.6	60 13.5	98 23	165.8	59 44.2	98 23	166.0	59 14.9	98 23	166.2	58 45.6	98 22	166.4	7
8	61 55.5	96 28	162.8	61 26.6	97 28	163.1	60 57.6	97 27	163.3	60 28.6	97 27	163.6	59 59.5	97 26	163.9	59 30.4	97 26	164.1	59 01.3	97 26	164.3	58 32.2	97 25	164.6	8
9	61 38.8	96 31	160.8	61 10.1	96 30	161.1	60 41.4	96 30	161.4	60 12.6	96 30	161.7	59 43.8	96 29	161.9	59 14.9	96 28	162.2	58 46.1	96 28	162.5	58 17.1	96 28	162.7	9
10	61 20.3	95 34	158.8	60 51.9	95 33	159.1	60 23.4	95 33	159.4	59 54.9	95 32	159.7	59 26.4	95 32	160.0	58 57.8	95 31	160.3	58 29.1	96 31	160.6	58 00.5	96 30	160.9	10
1	61 00.1	94 36	156.8	60 32.0	94 36	157.2	60 03.8	94 35	157.5	59 35.6	94 35	157.9	59 07.3	94 34	158.2	58 39.0	95 34	158.5	58 10.6	95 34	158.8	57 42.2	95 33	159.1	1
2	60 38.3	93 39	154.9	60 10.4	93 38	155.3	59 42.6	93 38	155.7	59 14.6	93 38	156.0	58 46.6	93 37	156.4	58 18.6	94 36	156.7	57 50.5	94 36	157.0	57 22.4	94 36	157.4	2
3	60 14.8	91 42	153.0	59 47.3	92 41	153.4	59 19.8	92 40	153.8	58 52.1	92 40	154.2	58 24.5	92 40	154.6	57 56.7	93 39	154.9	57 28.9	93 38	155.3	57 01.0	93 38	155.6	3
4	59 49.8	90 44	151.2	59 22.7	91 44	151.6	58 55.4	91 43	152.1	58 28.2	91 42	152.5	58 00.8	91 42	152.8	57 33.3	92 41	153.2	57 05.8	92 41	153.6	56 38.3	92 40	154.0	4
15	59 23.4	89 46	149.5	58 56.6	89 46	149.9	58 29.7	90 45	150.3	58 02.7	90 45	150.7	57 35.7	90 44	151.1	57 08.6	91 44	151.5	56 41.4	91 43	151.9	56 14.1	91 42	152.3	15
6	58 55.5	88 49	147.7	58 29.1	88 48	148.2	58 02.5	89 48	148.6	57 35.9	89 47	149.1	57 09.2	89 46	149.5	56 42.4	89 46	149.9	56 15.5	90 45	150.3	55 48.6	90 45	150.7	6
7	58 26.3	87 51	146.0	58 00.2	87 50	146.5	57 34.0	87 50	147.0	57 07.8	88 49	147.4	56 41.4	88 48	147.9	56 14.9	88 48	148.3	55 48.4	89 47	148.7	55 21.8	89 47	149.1	7
8	57 55.8	86 53	144.4	57 30.1	86 52	144.9	57 04.3	86 52	145.4	56 38.3	87 51	145.8	56 12.3	87 50	146.3	55 46.2	87 50	146.7	55 20.0	88 49	147.1	54 53.7	88 49	147.6	8
9	57 24.1	84 55	142.8	56 58.7	85 54	143.3	56 33.3	85 54	143.8	56 07.7	85 53	144.3	55 42.0	86 52	144.7	55 16.3	86 52	145.2	54 50.4	86 51	145.6	54 24.4	87 51	146.1	9
20	56 51.2	83 57	141.3	56 26.2	83 56	141.8	56 01.1	84 56	142.3	55 35.9	84 55	142.8	55 10.6	85 54	143.2	54 45.2	85 54	143.7	54 19.7	85 53	144.1	53 54.0	86 52	144.6	20
1	56 17.2	82 58	139.8	55 52.6	82 58	140.3	55 27.9	83 57	140.8	55 03.0	83 56	141.3	54 38.1	83 56	141.8	54 13.0	84 56	142.2	53 47.8	84 55	142.7	53 22.5	84 54	143.2	1
2	55 42.2	81 60	138.3	55 17.9	81 59	138.9	54 53.6	81 59	139.4	54 29.1	82 58	139.9	54 04.5	82 58	140.4	53 39.7	83 57	140.8	53 14.9	83 56	141.3	52 49.9	83 56	141.8	2
3	55 06.1	79 62	136.9	54 42.3	80 61	137.5	54 18.3	80 60	138.0	53 54.1	81 60	138.5	53 29.9	81 59	139.0	53 05.5	81 59	139.4	52 41.0	82 58	139.9	52 16.4	82 58	140.4	3
4	54 29.2	78 63	135.6	54 05.7	79 63	136.1	53 42.0	79 62	136.6	53 18.2	80 61	137.1	52 54.3	80 61	137.6	52 30.2	80 60	138.1	52 06.1	81 60	138.6	51 41.8	81 59	139.1	4
25	53 51.3	77 64	134.2	53 28.1	77 64	134.8	53 04.8	78 63	135.3	52 41.4	78 63	135.8	52 17.8	79 62	136.3	51 54.1	79 62	136.8	51 30.3	80 61	137.3	51 06.3	80 60	137.8	25
6	53 12.6	76 66	132.9	52 49.8	76 65	133.5	52 26.8	77 65	134.0	52 03.7	77 64	134.5	51 40.5	78 64	135.1	51 17.1	78 63	135.6	50 53.6	79 62	136.1	50 30.0	79 62	136.5	6
7	52 33.0	75 67	131.7	52 10.6	75 67	132.2	51 48.0	76 66	132.8	51 25.2	76 66	133.3	51 02.3	77 65	133.8	50 39.3	77 64	134.3	50 16.1	77 64	134.8	49 52.8	78 63	135.3	7
8	51 52.8	74 68	130.5	51 30.6	74 68	131.0	51 08.3	75 67	131.6	50 45.9	75 67	132.1	50 23.3	75 66	132.6	50 00.6	76 66	133.1	49 37.8	76 65	133.6	49 14.8	77 64	134.1	8
9	51 11.7	72 70	129.3	50 49.9	73 69	129.9	50 28.0	73 68	130.4	50 05.9	74 68	130.9	49 43.6	74 67	131.5	49 21.2	75 67	132.0	48 58.7	75 66	132.5	48 36.1	76 66	133.0	9
30	50 30.1	71 70	128.2	50 08.6	72 70	128.7	49 46.9	72 70	129.3	49 25.1	73 69	129.8	49 03.2	73 68	130.3	48 41.1	74 68	130.8	48 18.9	74 68	131.3	47 56.6	75 67	131.8	30
1	49 47.7	70 72	127.1	49 26.5	71 71	127.6	49 05.2	71 70	128.2	48 43.7	72 70	128.7	48 22.1	72 70	129.2	48 00.3	73 69	129.7	47 38.4	73 68	130.2	47 16.4	74 68	130.7	1
2	49 04.8	69 72	126.0	48 43.9	70 72	126.5	48 22.9	70 72	127.1	48 01.7	71 71	127.6	47 40.4	71 70	128.1	47 18.9	72 70	128.7	46 57.3	72 70	129.2	46 35.6	73 69	129.7	2
3	48 21.2	68 74	125.0	48 00.6	69 73	125.5	47 39.9	69 72	126.0	47 19.0	70 72	126.6	46 58.0	70 72	127.1	46 36.9	71 71	127.6	46 15.6	71 70	128.1	45 54.1	72 70	128.6	3
4	47 37.1	67 74	123.9	47 16.9	68 74	124.5	46 56.4	68 73	125.0	46 35.8	69 73	125.6	46 15.1	69 72	126.1	45 54.2	70 72	126.6	45 33.2	70 72	127.1	45 12.1	71 71	127.6	4
35	46 52.5	66 75	123.0	46 32.5	67 75	123.5	46 12.4	67 74	124.0	45 52.1	68 74	124.6	45 31.6	68 73	125.1	45 11.0	69 73	125.6	44 50.3	69 72	126.1	44 29.4	70 72	126.6	35
6	46 07.4	65 76	122.0	45 47.7	66 76	122.5	45 27.8	67 75	123.1	45 07.8	67 75	123.6	44 47.6	67 74	124.1	44 27.3	68 74	124.6	44 06.9	68 73	125.2	43 46.3	69 73	125.7	6
7	45 21.9	65 77	121.1	45 02.4	65 76	121.6	44 42.8	66 76	122.1	44 23.0	66 75	122.7	44 03.1	67 75	123.2	43 43.1	67 74	123.7	43 22.9	67 74	124.2	43 02.6	68 74	124.7	7
8	44 35.9	64 77	120.2	44 16.7	64 77	120.7	43 57.3	65 76	121.2	43 37.8	65 76	121.8	43 18.2	66 76	122.3	42 58.4	66 75	122.8	42 38.5	67 75	123.3	42 18.4	67 74	123.8	8
9	43 49.4	63 78	119.3	43 30.5	63 78	119.8	43 11.4	64 77	120.3	42 52.1	64 77	120.9	42 32.7	65 76	121.4	42 13.2	65 76	121.9	41 53.5	66 76	122.4	41 33.7	66 75	122.9	9
40	43 02.6	62 79	118.4	42 43.9	63 78	118.9	42 25.0	63 78	119.5	42 06.0	64 78	120.0	41 46.9	64 77	120.5	41 27.6	65 77	121.0	41 08.2	65 76	121.5	40 48.6	65 76	122.0	40
1	42 15.4	61 79	117.6	41 56.9	62 79	118.1	41 38.3	62 78	118.6	41 19.5	63 78	119.2	41 00.6	63 78	119.7	40 41.6	64 77	120.2	40 22.4	64 77	120.7	40 03.1	65 76	121.2	1
2	41 27.8	61 80	116.8	41 09.6	61 80	117.3	40 51.2	62 79	117.8	40 32.7	62 79	118.3	40 14.0	62 78	118.8	39 55.2	63 78	119.4	39 36.2	63 78	119.9	39 17.2	64 77	120.4	2
3	40 39.9	60 80	116.0	40 21.9	60 80	116.5	40 03.7	61 80	117.0	39 45.4	61 79	117.5	39 27.0	62 79	118.0	39 08.4	62 78	118.5	38 49.7	63 78	119.0	38 30.9	63 78	119.5	3
4	39 51.7	59 81	115.2	39 33.9	60 80	115.7	39 15.9	60 80	116.2	38 57.8	61 80	116.7	38 39.6	61 80	117.2	38 21.3	61 79	117.7	38 02.8	62 79	118.3	37 44.2	62 78	118.7	4
45	39 03.2	58 81	114.4	38 45.6	59 81	114.9	38 27.8	59 81	115.5	38 09.9	60 80	116.0	37 51.9	60 80	116.5	37 33.8	61 80	117.0	37 15.5	61 79	117.5	36 57.1	62 79	118.0	45
6	38 14.3	58 82	113.7	37 56.9	58 82	114.2	37 39.4	59 81	114.7	37 21.7	59 81	115.2	37 03.9	60 80	115.7	36 46.0	60 80	116.2	36 27.9	60 80	116.7	36 09.7	61 80	117.2	6
7	37 25.3	57 82	112.9	37 08.0	58 82	113.5	36 50.7	58 82	114.0	36 33.2	58 81	114.5	36 15.6	59 81	115.0	35 57.9	59 81	115.5	35 40.0	60 80	116.0	35 22.0	60 80	116.5	7
8	36 35.9	57 83	112.2	36 18.9	57 82	112.7	36 01.7	57 82	113.3	35 44.4	58 82	113.8	35 27.0	58 82	114.3	35 09.5	59 81	114.8	34 51.8	59 81	115.2	34 34.0	59 80	115.7	8
9	35 46.3	56 83	111.5	35 29.4	56 83	112.0	35 12.5	57 82	112.6	34 55.4	57 82	113.1	34 38.1	58 82	113.6	34 20.8	58 82	114.0	34 03.3	58 81	114.5	33 45.7	59 81	115.0	9
50	34 56.4	55 84	110.9	34 39.8	56 83	111.4	34 23.0	56 83	111.9	34 06.0	57 82	112.4	33 49.0	57 82	112.9	33 31.8	57 82	113.4	33 14.5	58 82	113.8	32 57.2	58 82	114.3	50
1	34 06.4	55 84	110.2	33 49.9	55 84	110.7	33 33.2	56 83	111.2	33 16.5	56 83	111.7	32 59.6	56 83	112.2	32 42.6	57 82	112.7	32 25.5	57 82	113.2	32 08.3	58 82	113.6	1
2	33 16.1	54 84	109.5	32 59.7	55 84	110.0	32 43.3	55 84	110.5	32 26.7	55 83	111.0	32 10.0	56 83	111.5	31 53.2	56 83	112.0	31 36.2	57 82	112.5	31 19.2	57 82	113.0	2
3	32 25.6	54 84	108.9	32 09.4	54 84	109.4	31 53.1	55 84	109.9	31 36.7	55 84	110.4	31 20.1	55 83	110.9	31 03.5	56 83	111.3	30 46.7	56 83	111.8	30 29.9	56 83	112.3	3
4	31 34.9	53 85	108.3	31 18.9	54 84	108.7	31 02.7	54 84	109.2	30 46.5	54 84	109.7	30 30.1	55 84	110.2	30 13.6	55 84	110.7	29 57.0	55 83	111.2	29 40.3	56 83	111.7	4
55	30 44.1	53 85	107.6	30 28.2	53 85	108.1	30 12.2	54 85	108.6	29 56.0	54 84	109.1	29 39.8	54 84	109.6	29 23.5	55 84	110.1	29 07.0	55 84	110.6	28 50.5	55 83	111.0	55
6	29 53.0	52 85	107.0	29 37.3	53 85	107.5	29 21.4	53 85	108.0	29 05.4	53 85	108.5	28 49.3	54 84	109.0	28 33.2	54 84	109.5	28 16.9	54 84	109.9	28 00.5	55 84	110.4	6
7	29 01.8	52 86	106.4	28 46.2	52 85	106.9	28 30.5	53 85	107.4	28 14.6	53 85	107.9	27 58.7	53 85	108.4	27 42.7	54 84	108.8	27 26.5	54 84	109.3	27 10.3	54 84	109.8	7
8	28 10.5	52 86	105.8	27 55.0	52 86	106.3	27 39.4	52 86	106.8	27 23.7	52 85	107.3	27 07.9	53 85	107.8	26 52.0	53 85	108.2	26 36.0	53 84	108.7	26 19.9	54 84	109.2	8
9	27 19.0	51 86	105.3	27 03.6	51 86	105.7	26 48.1	52 86	106.2	26 32.5	52 85	106.7	26 16.9	52 85	107.2	26 01.1	53 85	107.6	25 45.3	53 85	108.1	25 29.3	53 84	108.6	9
60	26 27.3	51 86	104.7	26 12.1	51 86	105.2	25 56.7	51 86	105.6	25 41.3	52 86	106.1	25 25.7	52 86	106.6	25 10.1	52 85	107.1	24 54.4	53 85	107.5	24 38.6	53 85	108.0	60
1	25 35.6	50 86	104.1	25 20.4	51 86	104.6	25 05.2	51 86	105.1	24 49.8	51 86	105.6	24 34.4	52 86	106.0	24 18.9	52 86	106.5	24 03.3	52 85	107.0	23 47.6	52 85	107.4	1
2	24 43.6	50 87	103.6	24 28.6	50 86	104.0	24 13.5	51 86	104.5	23 58.3	51 86	105.0	23 43.0	51 86	105.5	23 27.6	51 86	105.9	23 12.1	52 86	106.4	22 56.5	52 85	106.9	2
3	23 51.6	50 87	103.0	23 36.7	50 87	103.5	23 21.7	50 86	104.0	23 06.6	51 86	104.4	22 51.4	51 86	104.9	22 36.1	51 86	105.4	22 20.7	51 86	105.8	22 05.3	52 86	106.3	3
4	22 59.5	49 87	102.5	22 44.6	50 87	103.0	22 29.7	50 87	103.4	22 14.7	50 86	103.9	21 59.6	50 86	104.4	21 44.5	51 86	104.8	21 29.2	51 86	105.3	21 13.9	51 86	105.8	4
65	22 07.2	49 87	102.0	21 52.5	49 87	102.4	21 37.7	50 87	102.9	21 22.8	50 87	103.4	21 07.8	50 87	103.8	20 52.7	50 86	104.3	20 37.6	51 86	104.7	20 22.4	51 86	105.2	65
6	21 14.9	49 87	101.4	21 00.2	49 87	101.9	20 45.5	49 87	102.4	20 30.7	49 87	102.8	20 15.8	50 87	103.3	20 00.9	50 87	103.8	19 45.8	50 86	104.2	19 30.8	50 86	104.7	6
7	20 22.4	48 88	100.9	20 07.9	49 88	101.4	19 53.2	49 87	101.8	19 38.5	49 87	102.3	19 23.7	49 87	102.8	19 08.9	50 87	103.2	18 54.0	50 87	103.7	18 39.0	50 86	104.1	7
8	19 29.9	48 88	100.4	19 15.4	48 88	100.9	19 00.9	49 88	101.3	18 46.2	49 87	101.8	18 31.5	49 87	102.2	18 16.8	49 87	102.7	18 02.0	50 87	103.2	17 47.1	50 87	103.6	8
9	18 37.3	48 88	99.9	18 22.9	48 88	100.3	18 08.4	48 88	100.8	17 53.8	49 87	101.3	17 39.2	49 87	101.7	17 24.6	49 87	102.2	17 09.9	49 87	102.6	16 55.1	49 87	103.1	9
70	17 44.6	48 88	99.4	17 30.2	48 88	99.8	17 15.8	48 88	100.3	17 01.4	48 88	100.8	16 46.9	49 88	101.2	16 32.3	49 87	101.7	16 17.6	49 87	102.1	16 02.9	49 87	102.6	70
1	16 51.8	47 88	98.9	16 37.5	48 88	99.3	16 23.2	48 88	99.8	16 08.8	48 88	100.3	15 54.4	48 88	100.7	15 39.9	48 88	101.2	15 25.3	49 87	101.6	15 10.7	49 87	102.1	1
2	15 58.9	47 88	98.4	15 44.7	47 88	98.8	15 30.5	48 88	99.3	15 16.2	48 88	99.8	15 01.8	48 88	100.2	14 47.4	48 88	100.7	14 32.9	48 88	101.1	14 18.4	49 87	101.6	2
3	15 06.0	47 88	97.9	14 51.9	47 88	98.4	14 37.7	47 88	98.8	14 23.4	48 88	99.3	14 09.1	48 88	99.7	13 54.8	48 88	100.2	13 40.4	48 88	100.6	13 26.0	48 88	101.1	3
4	14 13.0	47 88	97.4	13 58.9	47 88	97.9	13 44.8	47 88	98.3	13 30.6	47 88	98.8	13 16.4	48 88	99.2	13 02.1	48 88	99.7	12 47.8	48 88	100.1	12 33.5	48 88	100.6	4
75	13 20.0	47 88	96.9	13 06.0	47 88	97.4	12 51.9	47 88	97.8	12 37.8	47 88	98.3	12 23.6	47 88	98.7	12 09.4	47 88	99.2	11 55.2	48 88	99.6	11 40.9	48 88	100.1	75
6	12 26.9	46 89	96.5	12 12.9	47 88	96.9	11 58.9	47 88	97.4	11 44.8	47 88	97.8	11 30.7	47 88	98.3	11 16.6	47 88	98.7	11 02.4	47 88	99.2	10 48.2	47 88	99.6	6
7	11 33.7	46 89	96.0	11 19.8	46 88	96.4	11 05.8	47 88	96.9	10 51.8	47 88	97.3	10 37.8	47 88	97.8	10 23.7	47 88	98.2	10 09.6	47 88	98.7	9 55.4	47 88	99.1	7
8	10 40.5	46 89	95.5	10 26.7	46 89	96.0	10 12.7	46 89	96.4	9 58.8	47 88	96.9	9 44.8	47 88	97.3	9 30.8	47 88	97.8	9 16.7	47 88	98.2	9 02.6	47 88	98.7	8
9	9 47.3	46 89	95.0	9 33.5	46 89	95.5	9 19.6	46 89	95.9	9 05.7	46 89	96.4	8 51.8	47 88	96.8	8 37.8	47 88	97.3	8 23.8	47 88	97.7	8 09.7	47 88	98.2	9
80	8 54.0	46 89	94.6	8 40.2	46 89	95.0	8 26.4	46 89	95.5	8 12.5	46 89	95.9	7 58.6	46 89	96.4	7 44.7	46 88	96.8	7 30.8	47 88	97.3	7 16.8	47 88	97.7	80
1	8 00.7	46 89	94.1	7 47.0	46 89	94.6	7 33.2	46 89	95.0	7 19.3	46 89	95.5	7 05.5	46 89	95.9	6 51.6	46 88	96.4	6 37.7	46 88	96.8	6 23.8	46 88	97.2	1
2	7 07.4	46 89	93.7	6 53.7	46 89	94.1	6 39.9	46 89	94.5	6 26.1	46 89	95.0	6 12.3	46 89	95.4	5 58.5	46 89	95.9	5 44.6	46 89	96.3	5 30.7	46 88	96.8	2
3	6 14.0	46 89	93.2	6 00.3	46 89	93.6	5 46.6	46 89	94.1	5 32.8	46 89	94.5	5 19.1	46 89	95.0	5 05.3	46 89	95.4							3
4	5 20.6	46 89	92.7	5 07.0	46 89	93.2																			4

Lat. 27°

H.A.	4° 00′ Alt.	Δd	Δt	Az.	4° 30′ Alt.	Δd	Δt	Az.	5° 00′ Alt.	Δd	Δt	Az.	5° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	67 60.0	1.0	02	180.0	67 30.0	1.0	02	180.0	68 00.0	1.0	02	180.0	68 30.0	1.0	02	180.0
1	66 58.8	1.0	06	177.4	67 28.8	1.0	06	177.4	67 58.8	1.0	06	177.3	68 28.7	1.0	06	177.3
2	66 55.2	1.0	10	174.9	67 25.1	1.0	10	174.8	67 55.0	1.0	10	174.7	68 24.9	1.0	10	174.6
3	66 49.3	99	14	172.4	67 19.1	99	14	172.2	67 48.9	99	14	172.1	68 18.6	99	14	171.9
4	66 41.1	99	18	169.9	67 10.7	99	18	169.7	67 40.3	99	18	169.5	68 09.9	99	19	169.2
05	66 30.5	98	21	167.4	67 00.0	98	22	167.2	67 29.3	98	22	166.9	67 58.7	98	22	166.6
6	66 17.8	97	25	165.0	66 46.9	97	25	164.7	67 16.1	97	26	164.4	67 45.2	97	26	164.0
7	66 02.8	96	28	162.6	66 31.7	96	29	162.2	67 00.6	96	30	161.9	67 29.3	96	30	161.5
8	65 45.8	95	32	160.2	66 14.3	95	32	159.9	66 42.9	95	33	159.5	67 11.3	95	34	159.1
9	65 26.7	94	35	157.9	65 54.9	94	36	157.5	66 23.1	94	36	157.1	66 51.2	94	37	156.7
10	65 05.7	93	38	155.7	65 33.5	93	39	155.3	66 01.3	92	40	154.8	66 29.0	92	40	154.3
1	64 42.7	92	41	153.5	65 10.2	91	42	153.1	65 37.6	91	42	152.6	66 04.9	91	43	152.1
2	64 18.0	90	44	151.4	64 45.1	90	45	150.9	65 12.1	90	45	150.4	65 38.9	89	46	149.9
3	63 51.6	89	47	149.4	64 18.3	89	48	148.9	64 44.8	88	48	148.3	65 11.3	88	49	147.8
4	63 23.6	88	49	147.4	63 49.8	87	50	146.8	64 15.9	87	51	146.3	64 41.9	86	52	145.7
15	62 54.0	86	52	145.5	63 19.8	86	52	144.9	63 45.5	85	53	144.3	64 11.0	85	54	143.7
6	62 23.0	85	54	143.6	62 48.4	84	55	143.0	63 13.6	84	56	142.4	63 38.7	83	56	141.8
7	61 50.6	83	56	141.8	62 15.6	83	57	141.2	62 40.4	82	58	140.6	63 05.0	82	58	140.0
8	61 17.0	82	58	140.1	61 41.5	81	59	139.5	62 05.8	81	60	138.9	62 30.0	80	60	138.2
9	60 42.1	81	60	138.4	61 06.2	80	61	137.8	61 30.1	79	62	137.2	61 53.8	79	62	136.5
20	60 06.0	79	62	136.8	60 29.7	79	62	136.2	60 53.2	78	63	135.6	61 16.5	77	64	134.9
1	59 28.9	78	64	135.3	59 52.2	77	64	134.6	60 15.2	77	65	134.0	60 38.1	76	66	133.3
2	58 50.8	76	65	133.8	59 13.6	76	66	133.1	59 36.3	75	66	132.5	59 58.7	74	67	131.8
3	58 11.7	75	67	132.3	58 34.1	74	67	131.7	58 56.4	74	68	131.0	59 18.4	73	68	130.4
4	57 31.7	74	68	130.9	57 53.8	73	69	130.3	58 15.6	72	69	129.6	58 37.3	72	70	129.0
25	56 50.9	73	69	129.6	57 12.6	72	70	128.9	57 34.0	71	71	128.3	57 55.3	71	71	127.6
6	56 09.3	71	70	128.3	56 30.6	71	71	127.6	56 51.7	70	72	127.0	57 12.6	69	72	126.3
7	55 27.0	70	72	127.0	55 47.9	69	72	126.4	56 08.6	69	73	125.7	56 29.2	68	74	125.1
8	54 43.9	69	73	125.8	55 04.5	68	73	125.2	55 24.9	68	74	124.5	55 45.1	67	74	123.9
9	54 00.3	68	74	124.6	54 20.5	67	74	124.0	54 40.6	66	75	123.4	55 00.4	66	76	122.7
30	53 16.0	67	75	123.5	53 35.9	66	75	122.9	53 55.6	65	76	122.2	54 15.1	65	76	121.6
1	52 31.1	66	76	122.4	52 50.7	65	76	121.8	53 10.1	64	77	121.1	53 29.3	64	77	120.5
2	51 45.7	65	76	121.3	52 05.0	64	77	120.7	52 24.1	63	78	120.1	52 43.0	63	78	119.5
3	50 59.8	64	77	120.3	51 18.8	63	78	119.7	51 37.6	62	78	119.1	51 56.2	62	79	118.4
4	50 13.4	63	78	119.3	50 32.1	62	78	118.7	50 50.7	61	79	118.1	51 09.0	61	79	117.5
35	49 26.6	62	79	118.4	49 45.0	61	79	117.7	50 03.3	61	80	117.1	50 21.4	60	80	116.5
6	48 39.3	61	79	117.4	48 57.5	60	80	116.8	49 15.5	60	80	116.2	49 33.3	59	81	115.6
7	47 51.7	60	80	116.5	48 09.6	59	80	115.9	48 27.4	59	81	115.3	48 44.9	58	81	114.7
8	47 03.7	59	81	115.6	47 21.4	59	81	115.0	47 38.9	58	81	114.4	47 56.2	57	82	113.8
9	46 15.3	59	81	114.8	46 32.8	58	82	114.2	46 50.0	57	82	113.6	47 07.1	57	82	113.0
40	45 26.6	58	82	113.9	45 43.8	57	82	113.4	46 00.9	57	82	112.8	46 17.8	56	83	112.2
1	44 37.6	57	82	113.1	44 54.6	56	82	112.6	45 11.5	56	83	112.0	45 28.1	55	83	111.4
2	43 48.3	56	83	112.3	44 05.1	56	83	111.8	44 21.7	55	83	111.2	44 38.2	55	84	110.6
3	42 58.7	56	83	111.6	43 15.3	55	83	111.0	43 31.8	55	84	110.4	43 48.1	54	84	109.9
4	42 08.9	55	84	110.8	42 25.3	54	84	110.3	42 41.6	54	84	109.7	42 57.7	53	84	109.1
45	41 18.8	54	84	110.1	41 35.0	54	84	109.5	41 51.1	53	84	109.0	42 07.0	53	85	108.4
6	40 28.5	54	84	109.4	40 44.5	53	84	108.8	41 00.4	53	85	108.3	41 16.2	52	85	107.7
7	39 37.9	53	84	108.7	39 53.8	53	85	108.1	40 09.6	52	85	107.6	40 25.2	52	85	107.0
8	38 47.2	53	85	108.0	39 02.9	52	85	107.5	39 18.5	52	85	106.9	39 34.0	51	86	106.3
9	37 56.2	52	85	107.3	38 11.8	52	85	106.8	38 27.3	51	86	106.2	38 42.6	51	86	105.7
50	37 05.1	52	86	106.7	37 20.6	51	86	106.1	37 35.9	51	86	105.6	37 51.0	50	86	105.1
1	36 13.8	51	86	106.0	36 29.1	51	86	105.5	36 44.3	50	86	105.0	36 59.3	50	86	104.4
2	35 22.4	51	86	105.4	35 37.5	50	86	104.9	35 52.6	50	86	104.3	36 07.5	49	87	103.8
3	34 30.7	50	86	104.8	34 45.8	50	86	104.3	35 00.7	50	87	103.7	35 15.5	49	87	103.2
4	33 39.0	50	86	104.2	33 53.9	50	87	103.7	34 08.7	49	87	103.1	34 23.4	49	87	102.6
55	32 47.1	50	87	103.6	33 01.9	49	87	103.1	33 16.6	49	87	102.6	33 31.2	48	87	102.0
6	31 55.1	49	87	103.0	32 09.8	49	87	102.5	32 24.4	48	87	102.0	32 38.8	48	87	101.5
7	31 02.9	49	87	102.4	31 17.5	49	87	101.9	31 32.0	48	87	101.4	31 46.4	48	88	100.9
8	30 10.6	49	87	101.9	30 25.2	48	88	101.4	30 39.6	48	88	100.9	30 53.8	47	88	100.3
9	29 18.3	48	88	101.3	29 32.7	48	88	100.8	29 47.0	48	88	100.3	30 01.2	47	88	99.8
60	28 25.8	48	88	100.8	28 40.1	48	88	100.3	28 54.4	47	88	99.8	29 08.5	47	88	99.3
1	27 33.2	48	88	100.2	27 47.5	47	88	99.7	28 01.6	47	88	99.2	28 15.7	47	88	98.7
2	26 40.6	47	88	99.7	26 54.8	47	88	99.2	27 08.8	47	88	98.7	27 22.8	46	88	98.2
3	25 47.9	47	88	99.2	26 02.0	47	88	98.7	26 16.0	47	88	98.2	26 29.9	46	88	97.7
4	24 55.0	47	88	98.6	25 09.1	47	88	98.2	25 23.0	46	88	97.7	25 36.8	46	88	97.2
65	24 02.1	47	88	98.1	24 16.1	46	88	97.7	24 30.0	46	88	97.2	24 43.8	46	89	96.7
6	23 09.2	47	88	97.6	23 23.1	46	88	97.1	23 36.9	46	88	96.7	23 50.6	46	89	96.2
7	22 16.2	46	88	97.1	22 30.0	46	88	96.6	22 43.8	46	89	96.2	22 57.5	45	89	95.7
8	21 23.1	46	88	96.6	21 36.9	46	89	96.2	21 50.6	46	89	95.7	22 04.3	45	89	95.2
9	20 30.0	46	89	96.1	20 43.7	46	89	95.7	20 57.4	45	89	95.2	21 11.0	45	89	94.7
70	19 36.8	46	89	95.6	19 50.5	46	89	95.2	20 04.1	45	89	94.7	20 17.7	45	89	94.2
1	18 43.6	46	89	95.2	18 57.2	45	89	94.7	19 10.8	45	89	94.2	19 24.4	45	89	93.8
2	17 50.3	46	89	94.7	18 03.9	45	89	94.2	18 17.5	45	89	93.8	18 31.0	45	89	93.3
3	16 57.0	45	89	94.2	17 10.6	45	89	93.7	17 24.1	45	89	93.3	17 37.6	45	89	92.8
4	16 03.7	45	89	93.7	16 17.2	45	89	93.3	16 30.8	45	89	92.8	16 44.2	45	89	92.3
75	15 10.3	45	89	93.3	15 23.9	45	89	92.8	15 37.4	45	89	92.3	15 50.8	45	89	91.9
6	14 16.9	45	89	92.8	14 30.5	45	89	92.3	14 43.9	45	89	91.9	14 57.4	45	89	91.4
7	13 23.5	45	89	92.3	13 37.0	45	89	91.9	13 50.5	45	89	91.4	14 03.9	45	89	91.0
8	12 30.1	45	89	91.9	12 43.6	45	89	91.4	12 57.0	45	89	91.0	13 10.4	45	89	90.5
9	11 36.7	45	89	91.4	11 50.1	45	89	91.0	12 03.6	45	89	90.5	12 17.0	45	89	90.0
80	10 43.2	45	89	91.0	10 56.7	45	89	90.5	11 10.1	45	89	90.1	11 23.5	45	89	89.6
1	9 49.8	45	89	90.5	10 03.2	45	89	90.1	10 16.7	45	89	89.6	10 30.1	45	89	89.1
2	8 56.3	45	89	90.1	9 09.8	45	89	89.6	9 23.2	45	89	89.1	9 36.6	45	89	88.7
3	8 02.8	45	89	89.6	8 16.3	45	89	89.1	8 29.8	45	89	88.7	8 43.2	45	89	88.2
4	7 09.4	45	89	89.1	7 22.9	45	89	88.7	7 36.3	45	89	88.2	7 49.7	45	89	87.8
85	6 15.9	45	89	88.7	6 29.4	45	89	88.2	6 42.9	45	89	87.8	6 56.3	45	89	87.3
6	5 22.5	45	89	88.2	5 36.0	45	89	87.8	5 49.5	45	89	87.3	6 02.9	45	89	86.9
7													5 09.6	45	89	86.4
8																

H.A.	6° 00′ Alt.	Δd	Δt	Az.	6° 30′ Alt.	Δd	Δt	Az.	7° 00′ Alt.	Δd	Δt	Az.	7° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	69 00.0	1.0	02	180.0	69 30.0	1.0	02	180.0	70 00.0	1.0	02	180.0	70 30.0	1.0	02	180.0
1	68 58.7	1.0	06	177.2	69 28.7	1.0	07	177.2	69 58.6	1.0	07	177.1	70 28.6	1.0	07	177.0
2	68 54.8	1.0	11	174.5	69 24.7	1.0	11	174.3	69 54.6	1.0	11	174.2	70 24.5	1.0	12	174.1
3	68 48.4	99	15	171.7	69 18.1	99	15	171.5	69 47.9	99	16	171.3	70 17.6	99	16	171.1
4	68 39.5	99	19	169.0	69 09.0	98	20	168.8	69 38.5	98	20	168.5	70 08.0	98	20	168.3
05	68 28.0	98	23	166.3	68 57.3	98	24	166.0	69 26.6	98	24	165.7	69 55.9	97	25	165.4
6	68 14.2	97	27	163.7	68 43.2	97	27	163.4	69 12.2	96	28	163.0	69 41.1	96	28	162.6
7	67 58.1	96	31	161.1	68 26.8	96	31	160.8	68 55.4	95	32	160.3	69 24.0	95	32	159.9
8	67 39.7	95	34	158.6	68 08.0	94	35	158.2	68 36.3	94	36	157.7	69 04.5	94	36	157.3
9	67 19.2	93	38	156.2	67 47.1	93	38	155.7	68 15.0	93	39	155.2	68 42.7	92	40	154.7
10	66 56.6	92	41	153.8	67 24.1	92	42	153.3	67 51.5	91	42	152.8	68 18.8	91	43	152.2
1	66 32.1	90	44	151.5	66 59.1	90	45	151.0	67 26.1	90	46	150.4	67 52.9	89	46	149.8
2	66 05.7	89	47	149.3	66 32.3	89	48	148.7	66 58.8	88	48	148.1	67 25.1	88	49	147.5
3	65 37.5	87	50	147.2	66 03.7	87	50	146.6	66 29.7	86	51	146.0	66 55.6	86	52	145.3
4	65 07.8	86	52	145.1	65 33.4	85	53	144.5	65 59.0	85	54	143.8	66 24.3	84	55	143.2
15	64 36.4	84	55	143.1	65 01.6	84	56	142.5	65 26.7	83	56	141.8	65 51.5	83	57	141.1
6	64 03.6	83	57	141.2	64 28.3	82	58	140.5	64 52.9	82	58	139.9	65 17.3	81	59	139.2
7	63 29.4	81	59	139.3	63 53.7	81	60	138.7	64 17.8	80	61	138.0	64 41.7	79	62	137.3
8	62 54.0	80	61	137.6	63 17.8	79	62	136.9	63 41.4	78	63	136.2	64 04.8	78	63	135.5
9	62 17.3	78	63	135.9	62 40.7	77	64	135.2	63 03.8	77	64	134.5	63 26.8	76	65	133.8
20	61 39.6	77	65	134.2	62 02.5	76	66	133.5	62 25.2	75	66	132.8	62 47.6	75	67	132.1
1	61 00.7	75	66	132.7	61 23.2	75	67	132.0	61 45.4	74	08	131.3	62 07.5	73	68	130.5
2	60 20.9	74	68	131.1	60 43.0	73	68	130.5	61 04.8	72	69	129.7	61 26.4	72	70	129.0
3	59 40.2	72	69	129.7	60 01.9	72	70	129.0	60 23.3	71	71	128.3	60 44.4	70	71	127.6
4	58 58.7	71	71	128.3	59 19.9	70	71	127.6	59 40.9	70	72	126.9	60 01.7	69	72	126.2
25	58 16.3	70	72	126.9	58 37.2	69	72	126.3	58 57.8	68	73	125.6	59 18.2	08	74	124.8
6	57 33.3	69	73	125.6	57 53.7	68	74	125.0	58 13.9	67	74	124.3	58 33.9	66	75	123.6
7	56 49.5	67	74	124.4	57 09.6	67	75	123.7	57 29.4	66	75	123.0	57 49.1	65	76	122.3
8	56 05.0	66	75	123.2	56 24.8	65	76	122.5	56 44.3	65	76	121.8	57 03.6	64	77	121.1
9	55 20.0	65	76	122.0	55 39.4	64	76	121.4	55 58.6	64	77	120.7	56 17.6	63	78	120.0
30	54 34.4	64	77	120.9	54 53.5	63	77	120.3	55 12.4	62	78	119.6	55 31.0	62	78	118.9
1	53 48.3	63	78	119.8	54 07.1	62	78	119.2	54 25.6	61	79	118.5	54 44.0	61	79	117.8
2	53 01.7	62	78	118.8	53 20.2	61	79	118.1	53 38.4	60	79	117.5	53 56.4	60	80	116.8
3	52 14.6	61	79	117.8	52 32.8	60	80	117.1	52 50.8	60	80	116.5	53 08.5	59	80	115.8
4	51 27.1	60	80	116.8	51 45.0	59	80	116.2	52 02.7	59	81	115.5	52 20.2	58	81	114.9
35	50 39.2	59	80	115.9	50 56.9	58	81	115.2	51 14.3	58	81	114.6	51 31.5	57	82	113.9
6	49 50.9	58	81	115.0	50 08.3	58	82	114.3	50 25.5	57	82	113.7	50 42.5	56	82	113.0
7	49 02.3	58	82	114.1	49 19.4	57	82	113.4	49 36.4	56	82	112.8	49 53.1	55	83	112.2
8	48 13.3	57	82	113.2	48 30.2	56	82	112.6	48 47.0	55	83	112.0	49 03.5	55	83	111.3
9	47 24.0	56	83	112.4	47 40.7	55	83	111.8	47 57.2	55	83	111.1	48 13.5	54	84	110.5
40	46 34.5	55	83	111.6	46 51.0	55	84	111.0	47 07.2	54	84	110.3	47 23.3	53	84	109.7
1	45 44.6	55	84	110.8	46 00.9	54	84	110.2	46 17.0	53	84	109.6	46 32.9	53	84	109.0
2	44 54.5	54	84	110.0	45 10.6	53	84	109.4	45 26.5	53	84	108.8	45 42.2	52	85	108.2
3	44 04.1	53	84	109.3	44 20.1	53	85	108.7	44 35.8	52	85	108.1	44 51.3	52	85	107.5
4	43 13.6	53	85	108.5	43 29.3	52	85	108.0	43 44.9	52	85	107.4	44 00.3	51	86	106.8
45	42 22.8	52	85	107.8	42 38.4	52	85	107.2	42 53.8	51	86	106.7	43 09.0	50	86	106.1
6	41 31.8	52	85	107.1	41 47.2	51	86	106.6	42 02.5	51	86	106.0	42 17.5	50	86	105.4
7	40 40.6	51	86	106.5	40 55.9	51	86	105.9	41 11.0	50	86	105.3	41 25.9	49	86	104.7
8	39 49.2	51	86	105.8	40 04.4	50	86	105.2	40 19.3	50	86	104.7	40 34.1	49	86	104.1
9	38 57.7	50	86	105.1	39 12.7	50	86	104.6	39 27.5	49	87	104.0	39 42.2	49	87	103.5
50	38 06.0	50	86	104.5	38 20.9	49	87	104.0	38 35.6	49	87	103.4	38 50.1	48	87	102.8
1	37 14.2	49	87	103.9	37 28.9	49	87	103.3	37 43.5	48	87	102.8	37 57.9	48	87	102.2
2	36 22.2	49	87	103.3	36 36.9	48	87	102.7	36 51.3	48	87	102.2	37 05.6	47	87	101.6
3	35 30.2	49	87	102.7	35 44.7	48	87	102.1	35 59.0	48	87	101.6	36 13.2	47	88	101.0
4	34 37.9	48	87	102.1	34 52.3	48	87	101.5	35 06.6	47	88	101.0	35 20.7	47	88	100.5
55	33 45.6	48	87	101.5	33 59.9	47	88	101.0	34 14.1	47	88	100.4	34 28.1	47	88	99.9
6	32 53.2	48	88	100.9	33 07.4	47	88	100.4	33 21.4	47	88	99.9	33 35.4	46	88	99.4
7	32 00.6	47	88	100.4	32 14.7	47	88	99.9	32 28.7	46	88	99.3	32 42.6	46	88	98.8
8	31 08.0	47	88	99.8	31 22.0	47	88	99.3	31 35.9	46	88	98.8	31 49.7	46	88	98.3
9	30 15.3	47	88	99.3	30 29.2	46	88	98.8	30 43.1	46	88	98.3	30 56.8	46	88	97.7
60	29 22.5	46	88	98.8	29 36.4	46	88	98.2	29 50.1	46	88	97.7	30 03.8	45	88	97.2
1	28 29.6	46	88	98.2	28 43.4	46	88	97.7	28 57.1	45	88	97.2	29 10.7	45	88	96.7
2	27 36.7	46	88	97.7	27 50.4	46	88	97.2	28 04.1	45	88	96.7	28 17.6	45	89	96.2
3	26 43.6	46	88	97.2	26 57.3	45	88	96.7	27 10.9	45	89	96.2	27 24.4	45	89	95.7
4	25 50.6	46	88	96.7	26 04.2	45	89	96.2	26 17.8	45	89	95.7	26 31.2	45	89	95.2
65	24 57.5	45	89	96.2	25 11.0	45	89	95.7	25 24.5	45	89	95.2	25 37.9	44	89	94.7
6	24 04.3	45	89	95.7	24 17.8	45	89	95.2	24 31.3	45	89	94.7	24 44.6	44	89	94.2
7	23 11.1	45	89	95.2	23 24.6	45	89	94.7	23 38.0	45	89	94.2	23 51.3	44	89	93.7
8	22 17.8	45	89	94.7	22 31.3	45	89	94.2	22 44.6	44	89	93.7	22 57.9	44	89	93.3
9	21 24.5	45	89	94.2	21 37.9	45	89	93.7	21 51.3	44	89	93.3	22 04.6	44	89	92.8
70	20 31.2	45	89	93.8	20 44.6	45	89	93.3	20 57.9	44	89	92.8	21 11.1	44	89	92.3
1	19 37.8	45	89	93.3	19 51.2	44	89	92.8	20 04.5	44	89	92.3	20 17.7	44	89	91.8
2	18 44.4	45	89	92.8	18 57.8	44	89	92.3	19 11.1	44	89	91.9	19 24.3	44	89	91.4
3	17 51.0	45	89	92.3	18 04.4	44	89	91.9	18 17.6	44	89	91.4	18 30.8	44	89	90.9
4	16 57.6	45	89	91.9	17 10.9	44	89	91.4	17 24.2	44	89	90.9	17 37.4	44	89	90.5
75	16 04.2	44	89	91.4	16 17.5	44	89	90.9	16 30.7	44	89	90.5	16 43.9	44	89	90.0
6	15 10.7	44	89	91.0	15 24.0	44	89	90.5	15 37.3	44	89	90.0	15 50.5	44	89	89.6
7	14 17.3	44	89	90.5	14 30.6	44	89	90.0	14 43.8	44	89	89.6	14 57.0	44	89	89.1
8	13 23.8	44	89	90.0	13 37.1	44	89	89.6	13 50.4	44	89	89.1	14 03.5	44	89	88.7
9	12 30.3	44	89	89.6	12 43.6	44	89	89.1	12 56.9	44	89	88.7	13 10.1	44	89	88.2
80	11 36.9	44	89	89.1	11 50.2	44	89	88.7	12 03.5	44	89	88.2	12 16.7	44	89	87.8
1	10 43.4	44	89	88.7	10 56.8	44	89	88.2	11 10.0	44	89	87.8	11 23.3	44	89	87.3
2	9 50.0	45	89	88.2	10 03.3	44	89	87.8	10 16.6	44	89	87.3	10 29.9	44	89	86.9
3	8 56.6	45	89	87.8	9 09.9	44	89	87.3	9 23.2	44	89	86.9	9 36.5	44	89	86.4
4	8 03.1	45	89	87.3	8 16.5	45	89	86.9	8 29.9	44	89	86.4	8 43.2	44	89	86.0
85	7 09.8	45	89	86.9	7 23.2	45	89	86.4	7 36.5	45	89	86.0	7 49.9	44	89	85.5
6	6 16.4	45	89	86.4	6 29.8	45	89	86.0	6 43.2	45	89	85.5	6 56.6	45	89	85.1
7	5 23.0	45	89	86.0	5 36.5	45	89	85.5	5 49.9	45	89	85.1	6 03.4	45	89	84.6
8													5 10.1	45	89	84.2

H.A.	4° 00′		4° 30′		5° 00′		5° 30′		6° 00′		6° 30′		7° 00′		7° 30′		H.A.
	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	Alt.	Az.	
°	° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		° ′ Δd Δt °		°
00	59 00.0 1.0 02	180.0	58 30.0 1.0 02	180.0	58 00.0 1.0 02	180.0	57 30.0 1.0 02	180.0	57 00.0 1.0 02	180.0	56 30.0 1.0 01	180.0	56 00.0 1.0 01	180.0	55 30.0 1.0 01	180.0	00
1	58 59.1 1.0 04	178.1	58 29.1 1.0 04	178.1	57 59.1 1.0 04	178.1	57 29.1 1.0 04	178.1	56 59.1 1.0 04	178.2	56 29.2 1.0 04	178.2	55 59.2 1.0 04	178.2	55 29.2 1.0 04	178.2	1
2	58 56.4 1.0 08	176.1	58 26.4 1.0 07	176.2	57 56.5 1.0 07	176.2	57 26.5 1.0 07	176.3	56 56.6 1.0 07	176.4	56 26.6 1.0 07	176.4	55 56.7 1.0 07	176.5	55 26.7 1.0 07	176.5	2
3	58 51.9 1.0 10	174.2	58 22.0 1.0 10	174.3	57 52.1 1.0 10	174.4	57 22.2 1.0 10	174.5	56 52.3 1.0 10	174.5	56 22.5 1.0 10	174.6	55 52.6 1.0 10	174.7	55 22.7 1.0 10	174.8	3
4	58 45.6 99 14	172.3	58 15.8 99 13	172.4	57 46.0 99 13	172.5	57 16.2 99 13	172.6	56 46.4 99 13	172.7	56 16.6 99 12	172.8	55 46.8 99 12	172.9	55 17.0 99 12	173.0	4
05	58 37.5 99 16	170.4	58 07.9 99 16	170.5	57 38.2 99 16	170.7	57 08.5 99 16	170.8	56 38.8 99 16	170.9	56 09.1 99 15	171.1	55 39.4 99 15	171.2	55 09.7 99 15	171.3	05
6	58 27.8 98 19	168.5	57 58.2 98 19	168.7	57 28.7 98 19	168.8	56 59.1 99 18	169.0	56 29.6 99 18	169.1	56 00.0 99 18	169.3	55 30.4 99 18	169.4	55 00.8 99 17	169.6	6
7	58 16.2 98 22	166.6	57 46.9 98 22	166.8	57 17.5 98 21	167.0	56 48.1 98 21	167.2	56 18.7 98 21	167.4	55 49.3 98 20	167.6	55 19.8 98 20	167.7	54 50.4 98 20	167.9	7
8	58 03.0 97 25	164.8	57 33.9 97 24	165.0	57 04.7 97 24	165.2	56 35.5 97 24	165.4	56 06.2 97 24	165.6	55 37.0 98 23	165.8	55 07.7 98 23	166.0	54 38.4 98 22	166.2	8
9	57 48.2 97 28	163.0	57 19.2 97 27	163.2	56 50.2 97 27	163.4	56 21.2 97 26	163.7	55 52.2 97 26	163.9	55 23.1 97 26	164.1	54 54.0 97 25	164.3	54 24.9 97 25	164.5	9
10	57 31.7 96 30	161.2	57 03.0 96 30	161.4	56 34.2 96 29	161.7	56 05.4 96 29	162.0	55 36.6 96 28	162.2	55 07.7 96 28	162.4	54 38.8 96 28	162.7	54 09.9 96 27	162.9	10
1	57 13.7 95 32	159.4	56 45.2 95 32	159.7	56 16.7 95 32	160.0	55 48.1 95 31	160.2	55 19.5 95 31	160.5	54 50.8 96 30	160.8	54 22.2 96 30	161.0	53 53.5 96 30	161.3	1
2	56 54.2 94 35	157.7	56 25.9 94 35	158.0	55 57.6 94 34	158.3	55 29.3 95 34	158.6	55 00.9 95 33	158.9	54 32.5 95 33	159.1	54 04.1 95 32	159.4	53 35.6 95 32	159.7	2
3	56 33.1 93 38	156.0	56 05.1 93 37	156.3	55 37.1 93 36	156.6	55 09.1 94 36	156.9	54 40.9 94 36	157.2	54 12.8 94 35	157.5	53 44.6 94 35	157.8	53 16.3 94 34	158.1	3
4	56 10.6 92 40	154.3	55 43.0 92 39	154.6	55 15.2 93 39	155.0	54 47.4 93 38	155.3	54 19.6 93 38	155.6	53 51.7 93 38	155.9	53 23.7 93 37	156.3	52 55.7 93 36	156.6	4
15	55 46.8 91 42	152.7	55 19.4 91 42	153.0	54 51.9 92 41	153.4	54 24.4 92 40	153.7	53 56.8 92 40	154.1	53 29.2 92 40	154.4	53 01.5 92 39	154.7	52 33.8 93 39	155.0	15
6	55 21.6 90 44	151.1	54 54.5 90 44	151.4	54 27.3 91 43	151.8	54 00.1 91 43	152.2	53 32.8 91 42	152.5	53 05.5 91 42	152.9	52 38.1 91 41	153.2	52 10.6 92 41	153.5	6
7	54 55.1 89 46	149.5	54 28.3 89 46	149.9	54 01.4 90 45	150.3	53 34.5 90 45	150.7	53 07.5 90 44	151.0	52 40.5 90 44	151.4	52 13.3 91 43	151.7	51 46.2 91 43	152.1	7
8	54 27.3 88 48	148.0	54 00.9 88 48	148.4	53 34.3 89 47	148.8	53 07.7 89 47	149.2	52 41.0 89 46	149.5	52 14.3 89 46	149.9	51 47.4 90 45	150.3	51 20.5 90 45	150.6	8
9	53 58.4 87 50	146.5	53 32.3 87 50	146.9	53 06.0 88 49	147.3	52 39.7 88 48	147.7	52 13.3 88 48	148.1	51 46.9 88 48	148.5	51 20.3 89 47	148.9	50 53.7 89 46	149.2	9
20	53 28.3 86 52	145.0	53 02.5 86 52	145.5	52 36.6 87 51	145.9	52 10.6 87 50	146.3	51 44.5 87 50	146.7	51 18.4 87 49	147.1	50 52.1 88 49	147.5	50 25.8 88 48	147.8	20
1	52 57.1 85 54	143.6	52 31.6 85 53	144.0	52 06.0 85 53	144.5	51 40.4 86 52	144.9	51 14.6 86 52	145.3	50 48.8 86 51	145.7	50 22.8 87 50	146.1	49 56.8 87 50	146.5	1
2	52 24.9 84 55	142.2	51 59.7 84 55	142.7	51 34.5 84 54	143.1	51 09.1 85 54	143.5	50 43.7 85 53	143.9	50 18.1 85 53	144.4	49 52.5 86 52	144.8	49 26.8 86 52	145.2	2
3	51 51.6 83 57	140.9	51 26.8 83 56	141.3	51 01.9 83 56	141.8	50 36.8 84 55	142.2	50 11.7 84 55	142.6	49 46.5 84 54	143.0	49 21.2 85 54	143.5	48 55.8 85 53	143.9	3
4	51 17.4 81 58	139.5	50 52.9 82 58	140.0	50 28.3 82 58	140.5	50 03.6 83 57	140.9	49 38.8 83 56	141.3	49 13.9 83 56	141.8	48 48.9 84 55	142.2	48 23.8 84 55	142.6	4
25	50 42.3 80 60	138.3	50 18.1 81 60	138.7	49 53.8 81 59	139.2	49 29.4 81 58	139.6	49 04.9 82 58	140.1	48 40.3 82 57	140.5	48 15.6 82 57	140.9	47 50.8 83 56	141.4	25
6	50 06.2 79 62	137.0	49 42.4 80 61	137.5	49 18.4 80 60	137.9	48 54.4 80 60	138.4	48 30.2 81 59	138.9	48 05.9 81 59	139.3	47 41.5 81 58	139.7	47 17.0 82 58	140.2	6
7	49 29.4 78 63	135.8	49 05.9 79 62	136.3	48 42.2 79 62	136.7	48 18.4 79 61	137.2	47 54.6 80 61	137.7	47 30.6 80 60	138.1	47 06.5 80 60	138.5	46 42.4 81 59	139.0	7
8	48 51.7 77 64	134.6	48 28.5 78 64	135.1	48 05.2 78 63	135.6	47 41.7 78 62	136.0	47 18.2 79 62	136.5	46 54.5 79 62	136.9	46 30.7 79 61	137.4	46 06.9 80 60	137.8	8
9	48 13.3 76 65	133.5	47 50.4 77 65	133.9	47 27.4 77 64	134.4	47 04.2 77 64	134.9	46 41.0 78 63	135.3	46 17.6 78 63	135.8	45 54.1 78 62	136.3	45 30.6 79 62	136.7	9
30	47 34.1 75 66	132.3	47 11.5 76 66	132.8	46 48.8 76 66	133.3	46 26.0 76 65	133.8	46 03.0 77 64	134.2	45 40.0 77 64	134.7	45 16.8 77 64	135.1	44 53.5 78 63	135.6	30
1	46 54.3 74 68	131.2	46 32.0 75 67	131.7	46 09.6 75 66	132.2	45 47.0 75 66	132.7	45 24.4 76 66	133.1	45 01.6 76 65	133.6	44 38.7 76 65	134.1	44 15.8 77 64	134.5	1
2	46 13.7 73 69	130.2	45 51.7 74 68	130.7	45 29.6 74 68	131.1	45 07.4 74 67	131.6	44 45.0 75 67	132.1	44 22.6 75 66	132.6	44 00.0 75 66	133.0	43 37.3 76 65	133.5	2
3	45 32.6 72 70	129.1	45 10.9 73 69	129.6	44 49.0 73 69	130.1	44 27.1 73 68	130.6	44 05.0 74 68	131.1	43 42.9 74 67	131.5	43 20.6 74 67	132.0	42 58.2 75 66	132.4	3
4	44 50.8 71 70	128.1	44 29.4 72 70	128.6	44 07.8 72 70	129.1	43 46.2 72 69	129.6	43 24.4 73 69	130.0	43 02.5 73 68	130.5	42 40.5 74 68	131.0	42 18.4 74 67	131.4	4
35	44 08.4 70 72	127.1	43 47.3 71 71	127.6	43 26.1 71 70	128.1	43 04.7 71 70	128.6	42 43.2 72 70	129.1	42 21.6 72 69	129.5	41 59.9 73 69	130.0	41 38.0 73 68	130.5	35
6	43 25.5 69 72	126.2	43 04.7 70 72	126.7	42 43.7 70 72	127.1	42 22.6 71 71	127.6	42 01.4 71 70	128.1	41 40.1 71 70	128.6	41 18.6 72 70	129.0	40 57.1 72 69	129.5	6
7	42 42.1 68 73	125.2	42 21.6 69 73	125.7	42 00.8 69 72	126.2	41 40.0 70 72	126.7	41 19.1 70 71	127.2	40 58.0 70 71	127.6	40 36.8 71 70	128.1	40 15.5 71 70	128.6	7
8	41 58.2 67 74	124.3	41 37.9 68 74	124.8	41 17.5 68 73	125.3	40 56.9 69 73	125.8	40 36.2 69 72	126.2	40 15.4 70 72	126.7	39 54.5 70 71	127.2	39 33.5 70 71	127.7	8
9	41 13.8 67 75	123.4	40 53.8 67 74	123.9	40 33.6 67 74	124.4	40 13.3 68 74	124.9	39 52.9 68 73	125.4	39 32.3 69 73	125.8	39 11.7 69 72	126.3	38 50.9 69 72	126.8	9
40	40 29.0 66 76	122.5	40 09.2 66 75	123.0	39 49.2 67 75	123.5	39 29.2 67 74	124.0	39 09.0 67 74	124.5	38 48.7 68 73	125.0	38 28.3 68 73	125.4	38 07.8 69 72	125.9	40
1	39 43.7 65 76	121.7	39 24.1 65 76	122.2	39 04.4 66 75	122.7	38 44.6 66 75	123.1	38 24.7 67 74	123.6	38 04.7 67 74	124.1	37 44.5 67 74	124.6	37 24.3 68 73	125.0	1
2	38 58.0 64 77	120.9	38 38.7 65 76	121.3	38 19.2 65 76	121.8	37 59.7 65 76	122.3	37 40.0 66 75	122.8	37 20.2 66 75	123.3	37 00.3 67 74	123.7	36 40.3 67 74	124.2	2
3	38 11.9 63 78	120.0	37 52.8 64 77	120.5	37 33.6 64 77	121.0	37 14.3 65 76	121.5	36 54.8 65 76	122.0	36 35.3 65 76	122.4	36 15.6 66 75	122.9	35 55.9 66 75	123.4	3
4	37 25.4 63 78	119.2	37 06.6 63 78	119.7	36 47.6 63 77	120.2	36 28.5 64 77	120.7	36 09.3 64 76	121.2	35 50.0 65 76	121.6	35 30.5 65 76	122.1	35 11.0 65 75	122.6	4
45	36 38.6 62 79	118.5	36 20.0 62 78	118.9	36 01.2 63 78	119.4	35 42.3 63 78	119.9	35 23.4 63 77	120.4	35 04.3 64 77	120.9	34 45.1 64 76	121.3	34 25.8 65 76	121.8	45
6	35 51.4 61 79	117.7	35 33.0 62 79	118.2	35 14.5 62 78	118.7	34 55.8 62 78	119.1	34 37.1 63 78	119.6	34 18.2 63 77	120.1	33 59.2 63 77	120.6	33 40.1 64 77	121.0	6
7	35 03.9 61 80	117.0	34 45.7 61 79	117.4	34 27.4 61 79	117.9	34 09.0 62 79	118.4	33 50.4 62 78	118.9	33 31.8 62 78	119.3	33 13.0 63 78	119.8	32 54.1 63 77	120.3	7
8	34 16.1 60 80	116.2	33 58.1 60 80	116.7	33 40.0 61 80	117.2	33 21.8 61 79	117.7	33 03.4 61 79	118.1	32 45.0 62 78	118.6	32 26.4 62 78	119.1	32 07.8 62 78	119.5	8
9	33 28.0 59 81	115.5	33 10.2 60 80	116.0	32 52.3 60 80	116.5	32 34.3 60 80	116.9	32 16.1 61 79	117.4	31 57.9 61 79	117.9	31 39.6 61 79	118.4	31 21.1 62 78	118.8	9
50	32 39.6 59 81	114.8	32 22.0 59 81	115.3	32 04.3 59 80	115.8	31 46.5 60 80	116.2	31 28.5 60 80	116.7	31 10.5 60 80	117.2	30 52.4 61 79	117.6	30 34.1 61 79	118.1	50
1	31 51.0 58 82	114.1	31 33.6 58 81	114.6	31 16.0 59 81	115.1	30 58.4 59 81	115.5	30 40.6 59 80	116.0	30 22.8 60 80	116.5	30 04.8 60 80	116.9	29 46.8 60 79	117.4	1
2	31 02.1 57 82	113.4	30 44.8 58 82	113.9	30 27.5 58 81	114.4	30 10.0 58 81	114.9	29 52.5 59 81	115.3	29 34.8 59 80	115.8	29 17.1 59 80	116.3	28 59.2 60 80	116.7	2
3	30 12.9 57 82	112.8	29 55.8 57 82	113.3	29 38.7 57 82	113.7	29 21.4 58 82	114.2	29 04.0 58 81	114.7	28 46.5 58 81	115.1	28 29.0 59 80	115.6	28 11.3 59 80	116.1	3
4	29 23.5 56 83	112.1	29 06.6 57 82	112.6	28 49.6 57 82	113.1	28 32.5 57 82	113.6	28 15.3 57 82	114.0	27 58.0 58 81	114.5	27 40.6 58 81	114.9	27 23.2 58 81	115.4	4
55	28 33.9 56 83	111.5	28 17.1 56 83	112.0	28 00.3 56 82	112.4	27 43.4 57 82	112.9	27 26.3 57 82	113.4	27 09.2 57 82	113.8	26 52.0 58 81	114.3	26 34.7 58 81	114.8	55
6	27 44.0 55 83	110.9	27 27.4 55 83	111.3	27 10.8 56 83	111.8	26 54.0 56 83	112.3	26 37.2 56 82	112.7	26 20.2 57 82	113.2	26 03.2 57 82	113.7	25 46.1 57 82	114.1	6
7	26 54.0 55 84	110.3	26 37.5 55 84	110.7	26 21.0 55 83	111.2	26 04.4 55 83	111.7	25 47.7 56 83	112.1	25 31.0 56 82	112.6	25 14.1 56 82	113.0	24 57.2 57 82	113.5	7
8	26 03.7 54 84	109.7	25 47.4 54 84	110.1	25 31.1 55 84	110.6	25 14.6 55 83	111.0	24 58.1 55 83	111.5	24 41.5 56 83	112.0	24 24.8 56 82	112.4	24 08.0 56 82	112.9	8
9	25 13.3 54 84	109.1	24 57.2 54 84	109.5	24 40.9 54 84	110.0	24 24.6 54 84	110.4	24 08.3 55 83	110.9	23 51.8 55 83	111.4	23 35.3 55 83	111.8	23 18.6 56 82	112.3	9
60	24 22.7 53 85	108.5	24 06.7 53 84	108.9	23 50.6 54 84	109.4	23 34.5 54 84	109.9	23 18.2 54 84	110.3	23 01.9 54 84	110.8	22 45.5 55 83	111.2	22 29.1 55 83	111.7	60
1	23 31.9 53 85	107.9	23 16.0 53 85	108.4	23 00.1 53 84	108.8	22 44.1 53 84	109.3	22 28.0 54 84	109.7	22 11.8 54 84	110.2	21 55.6 54 84	110.6	21 39.3 54 83	111.1	1
2	22 40.9 52 85	107.3	22 25.2 53 85	107.8	22 09.4 53 85	108.2	21 53.5 53 84	108.7	21 37.6 53 84	109.2	21 21.6 54 84	109.6	21 05.5 54 84	110.1	20 49.3 54 84	110.5	2
3	21 49.8 52 86	106.8	21 34.2 52 85	107.2	21 18.6 52 85	107.7	21 02.8 53 85	108.1	20 47.0 53 85	108.6	20 31.1 53 84	109.0	20 15.2 53 84	109.5	19 59.2 54 84	110.0	3
4	20 58.5 51 86	106.2	20 43.1 52 86	106.7	20 27.5 52 85	107.1	20 11.9 52 85	107.6	19 56.3 52 85	108.0	19 40.5 53 85	108.5	19 24.7 53 84	108.9	19 08.8 53 84	109.4	4
65	20 07.1 51 86	105.7	19 51.8 51 86	106.1	19 36.4 52 86	106.6	19 20.9 52 85	107.0	19 05.3 52 85	107.5	18 49.7 52 85	107.9	18 34.0 52 85	108.4	18 18.3 53 84	108.8	65
6	19 15.6 51 86	105.1	19 00.4 51 86	105.6	18 45.1 51 86	106.0	18 29.7 51 86	106.5	18 14.3 52 85	106.9	17 58.8 52 85	107.4	17 43.2 52 85	107.8	17 27.6 52 85	108.3	6
7	18 23.9 50 86	104.6	18 08.8 51 86	105.1	17 53.6 51 86	105.5	17 38.4 51 86	106.0	17 23.1 51 86	106.4	17 07.7 51 85	106.9	16 52.3 52 85	107.3	16 36.8 52 85	107.8	7
8	17 32.1 50 86	104.1	17 17.1 50 86	104.5	17 02.0 50 86	105.0	16 46.9 51 86	105.4	16 31.7 51 86	105.9	16 16.5 51 86	106.3	16 01.2 51 86	106.8	15 45.8 51 85	107.2	8
9	16 40.2 50 87	103.6	16 25.3 50 86	104.0	16 10.3 50 86	104.5	15 55.3 50 86	104.9	15 40.2 50 86	105.4	15 25.1 51 86	105.8	15 09.9 51 86	106.2	14 54.7 51 86	106.7	9
70	15 48.2 49 87	103.0	15 33.4 49 87	103.5	15 18.5 50 86	103.9	15 03.6 50 86	104.4	14 48.6 50 86	104.8	14 33.6 50 86	105.3	14 18.5 50 86	105.7	14 03.4 51 86	106.2	70
1	14 56.0 49 87	102.5	14 41.3 49 87	103.0	14 26.6 49 87	103.4	14 11.7 49 86	103.9	13 56.9 50 86	104.3	13 42.0 50 86	104.8	13 27.0 50 86	105.2	13 12.0 50 86	105.7	1
2	14 03.8 49 87	102.0	13 49.2 49 87	102.5	13 34.5 49 87	102.9	13 19.8 49 87	103.4	13 05.0 49 87	103.8	12 50.2 49 86	104.3	12 35.3 50 86	104.7	12 20.4 50 86	105.2	2
3	13 11.5 48 87	101.5	12 56.9 49 87	102.0	12 42.4 49 87	102.4	12 27.7 49 87	102.9	12 13.0 49 87	103.3	11 58.3 49 86	103.8	11 43.6 49 86	104.2	11 28.8 49 86	104.7	3
4	12 19.0 48 88	101.0	12 04.6 48 87	101.5	11 50.1 48 87	101.9	11 35.6 49 87	102.4	11 21.0 49 87	102.8	11 06.4 49 87	103.3	10 51.7 49 87	103.7	10 37.0 49 86	104.2	4
75	11 26.5 48 88	100.5	11 12.2 48 88	101.0	10 57.7 48 87	101.4	10 43.3 48 87	101.9	10 28.8 48 87	102.3	10 14.3 48 87	102.8	9 59.7 49 87	103.2	9 45.1 49 87	103.7	75
6	10 33.9 48 88	100.1	10 19.6 48 88	100.5	10 05.3 48 88	101.0	9 50.9 48 87	101.4	9 36.5 48 87	101.8	9 22.1 48 87	102.3	9 07.6 48 87	102.7	8 53.1 48 87	103.2	6
7	9 41.3 47 88	99.6	9 27.0 47 88	100.0	9 12.8 48 88	100.5	8 58.5 48 88	100.9	8 44.2 48 88	101.4	8 29.8 48 87	101.8	8 15.4 48 87	102.2	8 01.0 48 87	102.7	7
8	8 48.5 47 88	99.1	8 34.3 47 88	99.5	8 20.2 47 88	100.0	8 05.9 47 88	100.4	7 51.7 48 88	100.9	7 37.4 48 87	101.3	7 23.1 48 87	101.8	7 08.8 48 87	102.2	8
9	7 55.7 47 88	98.6	7 41.6 47 88	99.1	7 27.5 47 88	99.5	7 13.3 47 88	100.0	6 59.2 47 88	100.4	6 45.0 47 88	100.8	6 30.7 47 88	101.3	6 16.5 48 87	101.7	9
80	7 02.8 47 88	98.2	6 48.8 47 88	98.6	6 34.7 47 88	99.0	6 20.6 47 88	99.5	6 06.5 47 88	99.9	5 52.4 47 88	100.4	5 38.3 47 88	100.8	5 24.1 47 87	101.3	80
1	6 09.8 47 88	97.7	5 55.9 47 88	98.1	5 41.9 47 88	98.6	5 27.9 47 88	99.0	5 13.8 47 88	99.5							1
2	5 16.8 46 88	97.2	5 02.9 46 88	97.7													2

Lat. 27°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	72 00.0	1.0 02	180.0	72 30.0	1.0 02	180.0	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	00
1	70 58.6	1.0 07	177.0	71 28.5	1.0 07	176.9	71 58.5	1.0 08	176.8	72 28.5	1.0 08	176.7	72 58.4	1.0 08	176.6	73 28.4	1.0 08	176.5	73 58.3	1.0 08	176.4	74 28.3	1.0 08	176.3	1
2	70 54.3	1.0 12	173.9	71 24.2	1.0 12	173.8	71 54.0	99 12	173.6	72 23.9	99 13	173.5	72 53.7	99 13	173.3	73 23.6	99 13	173.1	73 53.4	99 14	172.9	74 23.2	99 14	172.7	2
3	70 47.3	99 16	170.9	71 17.0	99 17	170.7	71 46.7	99 17	170.5	72 16.3	99 18	170.2	72 46.0	99 18	170.0	73 15.6	99 18	169.7	73 45.2	99 19	169.4	74 14.7	99 20	169.1	3
4	70 37.5	98 21	168.0	71 07.0	98 21	167.7	71 36.4	98 22	167.4	72 05.8	98 22	167.1	72 35.2	98 23	166.7	73 04.5	98 24	166.4	73 33.8	98 24	166.0	74 03.0	97 25	165.6	4
05	70 25.1	97 25	165.1	70 54.2	97 26	164.7	71 23.3	97 26	164.4	71 52.4	97 27	164.0	72 21.4	97 28	163.5	72 50.4	96 28	163.1	73 19.3	96 29	162.7	73 48.2	96 30	162.2	05
6	70 10.0	96 29	162.2	70 38.8	96 30	161.8	71 07.6	96 30	161.4	71 36.3	96 31	160.9	72 04.9	95 32	160.5	72 33.5	95 33	159.9	73 01.9	95 34	159.4	73 30.3	94 34	158.9	6
7	69 52.5	95 33	159.5	70 20.9	95 34	159.0	70 49.3	94 35	158.5	71 17.5	94 35	158.0	71 45.7	94 36	157.4	72 13.8	93 37	156.9	72 41.8	93 38	156.3	73 09.7	93 39	155.7	7
8	69 32.6	93 37	156.8	70 00.6	93 38	156.3	70 28.5	93 38	155.7	70 56.3	93 40	155.1	71 24.0	92 40	154.6	71 51.5	92 41	153.9	72 19.0	91 42	153.3	72 46.3	91 43	152.6	8
9	69 10.4	92 41	154.2	69 37.9	92 41	153.6	70 05.3	91 42	153.0	70 32.6	91 43	152.4	70 59.8	90 44	151.8	71 26.9	90 45	151.1	71 53.8	89 46	150.4	72 20.5	89 47	149.6	9
10	68 46.0	90 44	151.7	69 13.1	90 45	151.1	69 40.0	90 46	150.4	70 06.8	89 46	149.8	70 33.4	89 48	149.1	70 59.9	88 48	148.4	71 26.2	87 50	147.6	71 52.3	87 50	146.8	10
1	68 19.6	89 47	149.2	68 46.2	88 48	148.6	69 12.6	88 49	147.9	69 38.9	87 50	147.2	70 04.9	87 51	146.5	70 30.8	86 52	145.8	70 56.6	85 53	145.0	71 22.1	85 54	144.2	1
2	67 51.3	87 50	146.9	68 17.4	87 51	146.2	68 43.3	86 52	145.5	69 09.0	85 53	144.8	69 34.5	85 54	144.1	69 59.8	84 55	143.3	70 24.9	83 56	142.5	70 49.8	83 57	141.7	2
3	67 21.3	85 53	144.6	67 46.8	85 54	144.0	68 12.1	84 55	143.2	68 37.3	84 56	142.5	69 02.3	83 56	141.7	69 27.0	82 58	140.9	69 51.5	81 58	140.1	70 15.8	80 60	139.3	3
4	66 49.5	84 56	142.5	67 14.5	83 56	141.8	67 39.3	82 57	141.1	68 03.9	82 58	140.3	68 28.3	81 59	139.5	68 52.5	80 60	138.7	69 16.4	79 61	137.9	69 40.1	78 62	137.0	4
15	66 16.2	82 58	140.4	66 40.7	81 59	139.7	67 05.0	81 60	139.0	67 29.0	80 60	138.2	67 52.9	79 62	137.4	68 16.5	78 62	136.6	68 39.8	77 63	135.7	69 02.9	76 64	134.8	15
6	65 41.5	80 60	138.5	66 05.4	80 61	137.7	66 29.2	79 62	137.0	66 52.7	78 63	136.2	67 16.0	77 64	135.4	67 39.0	76 64	134.5	68 01.8	75 66	133.7	68 24.3	74 66	132.8	6
7	65 05.4	79 62	136.6	65 28.8	78 63	135.8	65 52.1	77 64	135.1	66 15.1	76 65	134.3	66 37.8	75 66	133.5	67 00.3	75 66	132.6	67 22.5	74 68	131.8	67 44.4	73 68	130.9	7
8	64 28.0	77 64	134.8	64 51.0	76 65	134.0	65 13.7	75 66	133.2	65 36.2	75 67	132.5	65 58.4	74 68	131.6	66 20.4	73 68	130.8	66 42.1	72 69	129.9	67 03.5	71 70	129.0	8
9	63 49.5	75 66	133.0	64 12.0	75 67	132.3	64 34.2	74 68	131.5	64 56.2	73 68	130.7	65 17.9	72 69	129.9	65 39.4	71 70	129.1	66 00.5	70 71	128.2	66 21.4	69 72	127.3	9
20	63 09.9	74 68	131.4	63 31.9	73 68	130.6	63 53.7	72 69	129.9	64 15.2	71 70	129.1	64 36.4	70 71	128.2	64 57.4	69 72	127.4	65 18.1	68 72	126.5	65 38.4	67 73	125.7	20
1	62 29.3	72 69	129.8	62 50.8	71 70	129.0	63 12.1	71 71	128.3	63 33.2	70 72	127.5	63 54.0	69 72	126.7	64 14.5	68 73	125.8	64 34.7	67 74	125.0	64 54.6	66 74	124.1	1
2	61 47.8	71 71	128.3	62 08.9	70 71	127.5	62 29.7	69 72	126.8	62 50.3	68 73	126.0	63 10.7	67 74	125.2	63 30.7	66 74	124.3	63 50.5	65 75	123.5	64 09.9	64 76	122.6	2
3	61 05.4	69 72	126.8	61 26.1	69 73	126.1	61 46.5	68 73	125.3	62 06.7	67 74	124.5	62 26.6	66 75	123.7	62 46.2	65 75	122.9	63 05.5	64 76	122.1	63 24.5	63 77	121.2	3
4	60 22.2	68 73	125.4	60 42.5	67 74	124.7	61 02.5	66 74	123.9	61 22.3	65 75	123.1	61 41.8	64 76	122.4	62 01.0	64 76	121.5	62 19.9	63 77	120.7	62 38.5	61 78	119.9	4
25	59 38.3	67 74	124.1	59 58.2	66 75	123.4	60 17.8	65 76	122.6	60 37.2	64 76	121.8	60 56.3	63 77	121.0	61 15.1	62 78	120.2	61 33.6	61 78	119.4	61 51.8	60 79	118.6	25
6	58 53.7	65 75	122.8	59 13.2	65 76	122.1	59 32.5	64 76	121.3	59 51.4	63 77	120.6	60 10.2	62 78	119.8	60 28.6	61 78	119.0	60 46.7	60 79	118.2	61 04.6	59 80	117.4	6
7	58 08.5	64 76	121.6	58 27.6	63 77	120.9	58 46.5	63 78	120.1	59 05.1	62 78	119.4	59 23.5	61 79	118.6	59 41.6	60 79	117.8	59 59.4	59 80	117.0	60 16.9	58 80	116.2	7
8	57 22.6	63 77	120.4	57 41.4	62 78	119.7	58 00.0	61 78	119.0	58 18.3	61 79	118.2	58 36.3	60 80	117.4	58 54.0	59 80	116.7	59 11.5	58 80	115.9	59 28.6	57 81	115.1	8
9	56 36.3	62 78	119.3	56 54.7	61 79	118.6	57 13.0	60 79	117.8	57 30.9	59 80	117.1	57 48.6	59 80	116.3	58 06.0	58 81	115.6	58 23.2	57 81	114.8	58 40.0	56 82	114.0	9
30	55 49.4	61 79	118.2	56 07.5	60 79	117.5	56 25.4	59 80	116.8	56 43.1	58 80	116.0	57 00.5	58 81	115.3	57 17.6	57 81	114.5	57 34.4	56 82	113.7	57 51.0	55 82	113.0	30
1	55 02.0	60 80	117.1	55 19.9	59 80	116.4	55 37.5	58 81	115.7	55 54.8	57 81	115.0	56 11.9	57 82	114.3	56 28.8	56 82	113.5	56 45.3	55 82	112.7	57 01.6	54 83	112.0	1
2	54 14.2	59 80	116.1	54 31.8	58 81	115.4	54 49.1	57 81	114.7	55 06.2	56 82	114.0	55 23.0	56 82	113.3	55 39.6	55 83	112.5	55 55.8	54 83	111.8	56 11.8	53 83	111.0	2
3	53 26.0	58 81	115.1	53 43.3	57 81	114.4	54 00.4	56 82	113.7	54 17.2	56 82	113.0	54 33.7	55 83	112.3	54 50.0	54 83	111.6	55 06.0	53 84	110.9	55 21.8	52 84	110.1	3
4	52 37.5	57 82	114.2	52 54.5	56 82	113.5	53 11.3	56 82	112.8	53 27.8	55 83	112.1	53 44.1	54 83	111.4	54 00.1	53 84	110.7	54 15.9	52 84	110.0	54 31.4	51 84	109.2	4
35	51 48.5	56 82	113.3	52 05.3	56 82	112.6	52 21.8	55 83	111.9	52 38.1	54 83	111.2	52 54.2	53 84	110.5	53 10.0	52 84	109.8	53 25.5	51 84	109.1	53 40.8	51 85	108.4	35
6	50 59.2	55 83	112.4	51 15.8	55 83	111.7	51 32.1	54 83	111.0	51 48.1	53 84	110.4	52 04.0	52 84	109.7	52 19.6	52 84	109.0	52 34.9	51 85	108.3	52 50.0	50 85	107.6	6
7	50 09.7	55 83	111.5	50 26.0	54 84	110.9	50 42.0	53 84	110.2	50 57.9	52 84	109.5	51 13.5	52 84	108.9	51 28.9	51 85	108.2	51 44.0	50 85	107.5	51 58.9	49 86	106.8	7
8	49 19.8	54 84	110.7	49 35.9	53 84	110.0	49 51.7	53 84	109.4	50 07.4	52 85	108.7	50 22.8	51 85	108.1	50 38.0	50 85	107.4	50 52.9	49 86	106.7	51 07.6	49 86	106.0	8
9	48 29.6	53 84	109.9	48 45.5	53 84	109.2	49 01.2	52 85	108.6	49 16.6	51 85	107.9	49 31.9	50 85	107.3	49 46.9	50 86	106.6	50 01.6	49 86	105.9	50 16.1	48 86	105.2	9
40	47 39.2	53 84	109.1	47 54.9	52 85	108.5	48 10.4	51 85	107.8	48 25.7	51 85	107.2	48 40.7	50 86	106.5	48 55.5	49 86	105.9	49 10.1	48 86	105.2	49 24.5	47 86	104.5	40
1	46 48.6	52 85	108.3	47 04.1	51 85	107.7	47 19.4	51 85	107.1	47 34.5	50 86	106.4	47 49.4	49 86	105.8	48 04.0	48 86	105.1	48 18.4	48 86	104.5	48 32.6	47 87	103.8	1
2	45 57.8	51 85	107.6	46 13.1	51 85	107.0	46 28.2	50 86	106.3	46 43.1	49 86	105.7	46 57.8	49 86	105.1	47 12.3	48 86	104.4	47 26.6	47 87	103.8	47 40.6	46 87	103.1	2
3	45 06.7	51 86	106.9	45 21.9	50 86	106.3	45 36.8	50 86	105.6	45 51.6	49 86	105.0	46 06.1	48 86	104.4	46 20.5	47 87	103.8	46 34.6	47 87	103.1	46 48.5	46 87	102.5	3
4	44 15.4	50 86	106.2	44 30.4	50 86	105.6	44 45.2	49 86	104.9	44 59.9	48 86	104.3	45 14.3	48 87	103.7	45 28.5	47 87	103.1	45 42.5	46 87	102.5	45 56.2	46 87	101.8	4
45	43 24.0	50 86	105.5	43 38.9	49 86	104.9	43 53.5	49 86	104.3	44 08.0	48 87	103.7	44 22.3	47 87	103.1	44 36.3	47 87	102.4	44 50.2	46 87	101.8	45 03.9	45 88	101.2	45
6	42 32.4	49 86	104.8	42 47.1	49 86	104.2	43 01.6	48 87	103.6	43 16.0	47 87	103.0	43 30.1	47 87	102.4	43 44.1	46 87	101.8	43 57.8	46 88	101.2	44 11.4	45 88	100.6	6
7	41 40.6	49 86	104.2	41 55.2	48 87	103.6	42 09.6	48 87	103.0	42 23.8	47 87	102.4	42 37.8	46 87	101.8	42 51.7	46 88	101.2	43 05.3	45 88	100.6	43 18.7	44 88	100.0	7
8	40 48.7	48 87	103.5	41 03.2	48 87	102.9	41 17.4	47 87	102.3	41 31.5	47 87	101.8	41 45.4	46 88	101.2	41 59.2	45 88	100.6	42 12.7	45 88	100.0	42 26.0	44 88	99.4	8
9	39 56.7	48 87	102.9	40 11.0	47 87	102.3	40 25.2	47 87	101.7	40 39.1	46 88	101.1	40 52.9	46 88	100.6	41 06.6	45 88	100.0	41 20.0	44 88	99.4	41 33.3	44 88	98.8	9
50	39 04.5	48 87	102.3	39 18.7	47 87	101.7	39 32.8	47 88	101.1	39 46.6	46 88	100.6	40 00.3	45 88	100.0	40 13.9	45 88	99.4	40 27.2	44 88	98.8	40 40.4	44 88	98.2	50
1	38 12.2	47 87	101.7	38 26.3	47 88	101.1	38 40.2	46 88	100.5	38 54.0	46 88	100.0	39 07.6	45 88	99.4	39 21.1	45 88	98.8	39 34.3	44 88	98.2	39 47.4	43 88	97.7	1
2	37 19.8	47 88	101.1	37 33.8	46 88	100.5	37 47.6	46 88	100.0	38 01.3	45 88	99.4	38 14.8	45 88	98.8	38 28.2	44 88	98.3	38 41.4	44 88	97.7	38 54.4	43 88	97.1	2
3	36 27.3	47 88	100.5	36 41.2	46 88	99.9	36 54.9	46 88	99.4	37 08.5	45 88	98.8	37 22.0	45 88	98.3	37 35.3	44 88	97.7	37 48.4	43 88	97.1	38 01.3	43 88	96.6	3
4	35 34.7	46 88	99.9	35 48.5	46 88	99.4	36 02.2	45 88	98.8	36 15.7	45 88	98.3	36 29.0	44 88	97.7	36 42.3	44 88	97.2	36 55.3	43 88	96.6	37 08.2	43 89	96.0	4
55	34 42.0	46 88	99.4	34 55.7	46 88	98.8	35 09.3	45 88	98.3	35 22.7	45 88	97.7	35 36.0	44 88	97.2	35 49.2	44 89	96.6	36 02.2	43 89	96.1	36 15.0	43 89	95.5	55
6	33 49.2	46 88	98.8	34 02.8	45 88	98.3	34 16.4	45 88	97.7	34 29.7	44 88	97.2	34 43.0	44 88	96.7	34 56.0	43 89	96.1	35 09.0	43 89	95.6	35 21.8	42 89	95.0	6
7	32 56.3	46 88	98.3	33 09.9	45 88	97.7	33 23.3	45 88	97.2	33 36.7	44 89	96.7	33 49.8	44 89	96.1	34 02.9	43 89	95.6	34 15.8	43 89	95.0	34 28.5	42 89	94.5	7
8	32 03.4	45 88	97.7	32 16.9	45 88	97.2	32 30.3	44 88	96.7	32 43.5	44 89	96.2	32 56.7	43 89	95.6	33 09.6	43 89	95.1	33 22.5	43 89	94.5	33 35.2	42 89	94.0	8
9	31 10.4	45 88	97.2	31 23.8	45 88	96.7	31 37.2	44 89	96.2	31 50.4	44 89	95.6	32 03.4	43 89	95.1	32 16.4	43 89	94.6	32 29.2	42 89	94.0	32 41.8	42 89	93.5	9
60	30 17.3	45 88	96.7	30 30.7	44 89	96.2	30 44.0	44 89	95.7	30 57.1	44 89	95.1	31 10.2	43 89	94.6	31 23.1	43 89	94.1	31 35.8	42 89	93.6	31 48.5	42 89	93.0	60
1	29 24.2	45 89	96.2	29 37.5	44 89	95.7	29 50.8	44 89	95.2	30 03.9	43 89	94.6	30 16.9	43 89	94.1	30 29.7	43 89	93.6	30 42.5	42 89	93.1	30 55.1	42 89	92.5	1
2	28 31.0	45 89	95.7	28 44.3	44 89	95.2	28 57.5	44 89	94.7	29 10.6	43 89	94.1	29 23.5	43 89	93.6	29 36.4	43 89	93.1	29 49.1	42 89	92.6	30 01.7	42 89	92.1	2
3	27 37.8	44 89	95.2	27 51.0	44 89	94.7	28 04.2	44 89	94.2	28 17.2	43 89	93.7	28 30.2	43 89	93.1	28 43.0	42 89	92.6	28 55.6	42 89	92.1	29 08.3	42 89	91.6	3
4	26 44.5	44 89	94.7	26 57.7	44 89	94.2	27 10.9	44 89	93.7	27 23.9	43 89	93.2	27 36.8	43 89	92.7	27 49.5	42 89	92.2	28 02.2	42 89	91.6	28 14.8	42 89	91.1	4
65	25 51.2	44 89	94.2	26 04.4	44 89	93.7	26 17.5	43 89	93.2	26 30.5	43 89	92.7	26 43.3	43 89	92.2	26 56.1	42 89	91.7	27 08.8	42 89	91.2	27 21.3	42 89	90.7	65
6	24 57.9	44 89	93.7	25 11.0	44 89	93.2	25 24.1	43 89	92.7	25 37.1	43 89	92.2	25 49.9	43 89	91.7	26 02.7	42 89	91.2	26 15.3	42 89	90.7	26 27.9	42 89	90.2	6
7	24 04.5	44 89	93.2	24 17.7	44 89	92.8	24 30.7	43 89	92.3	24 43.6	43 89	91.8	24 56.5	43 89	91.3	25 09.2	42 89	90.8	25 21.9	42 89	90.3	25 34.4	42 89	89.8	7
8	23 11.1	44 89	92.8	23 24.3	44 89	92.3	23 37.3	43 89	91.8	23 50.2	43 89	91.3	24 03.0	43 89	90.8	24 15.8	42 89	90.3	24 28.4	42 89	89.8	24 40.9	42 89	89.3	8
9	22 17.7	44 89	92.3	22 30.8	43 89	91.8	22 43.8	43 89	91.3	22 56.7	43 89	90.8	23 09.6	43 89	90.3	23 22.3	42 89	89.9	23 34.9	42 89	89.4	23 47.5	42 89	88.9	9
70	21 24.3	44 89	91.8	21 37.4	43 89	91.3	21 50.4	43 89	90.9	22 03.3	43 89	90.4	22 16.1	43 89	89.9	22 28.8	42 89	89.4	22 41.5	42 89	88.9	22 54.0	42 89	88.4	70
1	20 30.9	44 89	91.4	20 43.9	43 89	90.9	20 56.9	43 89	90.4	21 09.8	43 89	89.9	21 22.6	43 89	89.4	21 35.4	42 89	88.9	21 48.0	42 89	88.5	22 00.6	42 89	88.0	1
2	19 37.4	44 89	90.9	19 50.5	43 89	90.4	20 03.5	43 89	89.9	20 16.4	43 89	89.5	20 29.2	43 89	89.0	20 41.9	42 89	88.5	20 54.6	42 89	88.0	21 07.2	42 89	87.5	2
3	18 44.0	44 89	90.5	18 57.0	43 89	90.0	19 10.0	43 89	89.5	19 22.9	43 89	89.0	19 35.7	43 89	88.5	19 48.5	42 89	88.1	20 01.2	42 89	87.6	20 13.8	42 89	87.1	3
4	17 50.5	44 89	90.0	18 03.6	43 89	89.5	18 16.5	43 89	89.0	18 29.5	43 89	88.6	18 42.3	43 89	88.1	18 55.1	42 89	87.6	19 07.8	42 89	87.1	19 20.4	42 89	86.7	4
75	16 57.0	44 89	89.5	17 10.1	43 89	89.1	17 23.1	43 89	88.6	17 36.0	43 89	88.1	17 48.9	43 89	87.7	18 01.7	43 89	87.2	18 14.4	42 89	86.7	18 27.1	42 89	86.2	75
6	16 03.6	44 89	89.1	16 16.7	43 89	88.6	16 29.7	43 89	88.2	16 42.6	43 89	87.7	16 55.5	43 89	87.2	17 08.3	43 89	86.7	17 21.0	42 89	86.3	17 33.7	42 89	85.8	6
7	15 10.1	44 89	88.6	15 23.2	43 89	88.2	15 36.2	43 89	87.7	15 49.2	43 89	87.2	16 02.1	43 89	86.8	16 14.9	43 89	86.3	16 27.7	42 89	85.8	16 40.4	42 89	85.4	7
8	14 16.7	44 89	88.2	14 29.8	44 89	87.7	14 42.8	43 89	87.3	14 55.8	43 89	86.8	15 08.7	43 89	86.3	15 21.6	43 89	85.9	15 34.4	43 89	85.4	15 47.2	42 89	84.9	8
9	13 23.3	44 89	87.7	13 36.4	44 89	87.3	13 49.4	43 89	86.8	14 02.4	43 89	86.4	14 15.4	43 89	85.9	14 28.3	43 89	85.4	14 41.1	43 89	85.0	14 53.9	43 89	84.5	9
80	12 29.9	44 89	87.3	12 43.0	44 89	86.8	12 56.1	44 89	86.4	13 09.1	43 89	85.9	13 22.1	43 89	85.5	13 35.0	43 89	85.0	13 47.9	43 89	84.5	14 00.7	43 88	84.1	80
1	11 36.5	44 89	86.9	11 49.6	44 89	86.4	12 02.7	44 89	85.9	12 15.8	43 89	85.5	12 28.8	43 89	85.0	12 41.8	43 89	84.6	12 54.7	43 89	84.1	13 07.6	43 88	83.6	1
2	10 43.1	44 89	86.4	10 56.3	44 89	86.0	11 09.4	44 89	85.5	11 22.5	44 89	85.0	11 35.6	43 89	84.6	11 48.6	43 89	84.1	12 01.5	43 88	83.7	12 14.5	43 88	83.2	2
3	9 49.8	44 89	86.0	10 03.0	44 89	85.5	10 16.1	44 89	85.1	10 29.3	44 89	84.6	10 42.4	44 89	84.1	10 55.4	43 88	83.7	11 08.4	43 88	83.2	11 21.4	43 88	82.8	3
4	8 56.4	44 89	85.5	9 09.7	44 89	85.1	9 22.9	44 89	84.6	9 36.1	44 89	84.2	9 49.2	44 88	83.7	10 02.3	44 88	83.3	10 15.4	43 88	82.8	10 28.4	43 88	82.3	4
85	8 03.2	44 89	85.1	8 16.4	44 89	84.6	8 29.7	44 89	84.2	8 42.9	44 88	83.7	8 56.1	44 88	83.3	9 09.2	44 88	82.8	9 22.4	44 88	82.4	9 35.4	44 88	81.9	85
6	7 09.9	44 89	84.6	7 23.2	44 88	84.2	7 36.5	44 88	83.7	7 49.8	44 88	83.3	8 03.0	44 88	82.8	8 16.2	44 88	82.4	8 29.4	44 88	81.9	8 42.5	44 88	81.5	6
7	6 16.7	45 89	84.2	6 30.1	44 88	83.7	6 43.4	44 88	83.3	6 56.7	44 88	82.8	7 10.0	44 88	82.4	7 23.3	44 88	81.9	7 36.5	44 88	81.5	7 49.7	44 88	81.0	7
8	5 23.5	45 88	83.8	5 37.0	45 88	83.3	5 50.3	45 88	82.9	6 03.7	45 88	82.4	6 17.0	44 88	82.0	6 30.4	44 88	81.5	6 43.7	44 88	81.1	6 56.9	44 88	80.6	8
9										5 10.7	45 88	82.0	5 24.1	45 88	81.5	5 37.5	45 88	81.1	5 50.9	44 88	80.6	6 04.2	44 88	80.2	9
90																						5 11.6	45 88	79.7	90

H.A.	8° 00′ Alt.	Az.	8° 30′ Alt.	Az.	9° 00′ Alt.	Az.	9° 30′ Alt.	Az.	10° 00′ Alt.	Az.	10° 30′ Alt.	Az.	11° 00′ Alt.	Az.	11° 30′ Alt.	Az.	H.A.
°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	° ′ Δd Δt	°	°
00	55 00.0 1.0 01	180.0	54 30.0 1.0 01	180.0	54 00.0 1.0 01	180.0	53 30.0 1.0 01	180.0	53 00.0 1.0 01	180.0	52 30.0 1.0 01	180.0	52 00.0 1.0 01	180.0	51 30.0 1.0 01	180.0	00
1	54 59.2 1.0 04	178.3	54 29.2 1.0 04	178.3	53 59.2 1.0 04	178.3	53 29.2 1.0 04	178.3	52 59.2 1.0 04	178.4	52 29.2 1.0 04	178.4	51 59.3 1.0 04	178.4	51 29.3 1.0 04	178.4	1
2	54 56.8 1.0 07	176.5	54 26.8 1.0 06	176.6	53 56.9 1.0 06	176.6	53 26.9 1.0 06	176.7	52 56.9 1.0 06	176.7	52 27.0 1.0 06	176.8	51 57.0 1.0 06	176.8	51 27.1 1.0 06	176.9	2
3	54 52.8 1.0 09	174.8	54 22.9 1.0 09	174.9	53 53.0 1.0 09	175.0	53 23.0 1.0 09	175.0	52 53.1 1.0 09	175.1	52 23.2 1.0 09	175.2	51 53.3 1.0 09	175.2	51 23.4 1.0 08	175.3	3
4	54 47.2 99 12	173.1	54 17.3 99 12	173.2	53 47.5 99 12	173.3	53 17.7 99 12	173.4	52 47.8 99 11	173.5	52 18.0 99 11	173.6	51 48.1 99 11	173.6	51 18.3 1.0 11	173.7	4
05	54 40.0 99 15	171.4	54 10.2 99 14	171.5	53 40.5 99 14	171.6	53 10.7 99 14	171.8	52 41.0 99 14	171.9	52 11.2 99 14	172.0	51 41.5 99 14	172.1	51 11.7 99 13	172.2	05
6	54 31.2 99 17	169.7	54 01.6 99 17	169.9	53 32.0 99 17	170.0	53 02.3 99 16	170.1	52 32.7 99 16	170.3	52 03.0 99 16	170.4	51 33.4 99 16	170.5	51 03.7 99 16	170.6	6
7	54 20.9 98 20	168.1	53 51.4 98 20	168.2	53 21.9 98 19	168.4	52 52.4 98 19	168.5	52 22.9 98 19	168.7	51 53.4 98 18	168.8	51 23.8 98 18	168.9	50 54.3 99 18	169.1	7
8	54 09.1 98 22	166.4	53 39.7 98 22	166.6	53 10.4 98 22	166.7	52 41.0 98 21	166.9	52 11.7 98 21	167.1	51 42.3 98 21	167.2	51 12.9 98 20	167.4	50 43.5 98 20	167.6	8
9	53 55.7 97 25	164.7	53 26.6 97 24	164.9	52 57.4 97 24	165.1	52 28.2 97 24	165.3	51 59.0 97 24	165.5	51 29.8 97 23	165.7	51 00.5 98 23	165.9	50 31.3 98 23	166.0	9
10	53 41.0 97 27	163.1	53 12.0 97 27	163.3	52 43.0 97 26	163.6	52 14.0 97 26	163.8	51 44.9 97 26	164.0	51 15.9 97 26	164.2	50 46.8 97 25	164.4	50 17.7 97 25	164.6	10
1	53 24.7 96 29	161.5	52 55.9 96 29	161.8	52 27.1 96 29	162.0	51 58.3 96 28	162.2	51 29.5 96 28	162.4	51 00.6 96 28	162.7	50 31.7 96 27	162.9	50 02.8 96 27	163.1	1
2	53 07.1 95 32	159.9	52 38.5 95 31	160.2	52 09.9 95 31	160.4	51 41.3 95 30	160.7	51 12.7 96 30	160.9	50 44.0 96 30	161.2	50 15.3 96 30	161.4	49 46.6 96 29	161.6	2
3	52 48.0 94 34	158.4	52 19.7 94 34	158.7	51 51.4 95 33	158.9	51 23.0 95 33	159.2	50 54.5 95 32	159.4	50 26.1 95 32	159.7	49 57.6 95 32	159.9	49 29.1 95 31	160.2	3
4	52 27.7 94 36	156.8	51 59.6 94 36	157.1	51 31.5 94 35	157.4	51 03.3 94 35	157.7	50 35.1 94 34	158.0	50 06.9 94 34	158.2	49 38.6 94 34	158.5	49 10.3 94 33	158.7	4
15	52 06.0 93 38	155.3	51 38.2 93 38	155.6	51 10.3 93 37	155.9	50 42.4 93 37	156.2	50 14.4 93 36	156.5	49 46.4 93 36	156.8	49 18.4 94 36	157.1	48 50.3 94 35	157.3	15
6	51 43.1 92 40	153.9	51 15.5 92 40	154.2	50 47.9 92 39	154.5	50 20.2 92 39	154.8	49 52.5 92 38	155.1	49 24.8 93 38	155.4	48 57.0 93 38	155.7	48 29.1 93 37	156.0	6
7	51 18.9 91 42	152.4	50 51.6 91 42	152.7	50 24.3 91 41	153.1	49 56.9 91 41	153.4	49 29.4 92 40	153.7	49 01.9 92 40	154.0	48 34.3 92 40	154.3	48 06.7 92 39	154.6	7
8	50 53.6 90 44	151.0	50 26.5 90 44	151.3	49 59.5 90 43	151.7	49 32.3 91 43	152.0	49 05.1 91 42	152.3	48 37.9 91 42	152.6	48 10.6 91 42	152.9	47 43.2 91 41	153.2	8
9	50 27.1 89 46	149.6	50 00.3 89 46	149.9	49 33.5 89 45	150.3	49 06.7 90 45	150.6	48 39.7 90 44	151.0	48 12.8 90 44	151.3	47 45.7 90 43	151.6	47 18.6 90 43	151.9	9
20	49 59.4 88 48	148.2	49 33.0 88 47	148.6	49 06.5 88 47	148.9	48 39.9 89 46	149.3	48 13.2 89 46	149.6	47 46.5 89 45	150.0	47 19.8 89 45	150.3	46 52.9 90 44	150.6	20
1	49 30.8 87 50	146.9	49 04.6 87 49	147.2	48 38.4 88 48	147.6	48 12.1 88 48	148.0	47 45.7 88 48	148.3	47 19.3 88 47	148.7	46 52.8 88 47	149.0	46 26.2 89 46	149.4	1
2	49 01.0 86 51	145.6	48 35.2 86 51	145.9	48 09.2 87 50	146.3	47 43.2 87 50	146.7	47 17.1 87 49	147.1	46 51.0 87 49	147.4	46 24.8 87 48	147.8	45 58.5 88 48	148.1	2
3	48 30.3 85 53	144.3	48 04.7 85 52	144.7	47 39.1 86 52	145.0	47 13.4 86 52	145.4	46 47.6 86 51	145.8	46 21.7 86 50	146.2	45 55.8 87 50	146.5	45 29.8 87 50	146.9	3
4	47 58.6 84 54	143.0	47 33.3 84 54	143.4	47 08.0 85 53	143.8	46 42.5 85 53	144.2	46 17.0 85 52	144.6	45 51.5 85 52	145.0	45 25.8 86 52	145.3	45 00.1 86 51	145.7	4
25	47 26.0 83 56	141.8	47 01.0 83 55	142.2	46 35.9 84 55	142.6	46 10.8 84 54	143.0	45 45.6 84 54	143.4	45 20.3 84 53	143.8	44 54.9 85 53	144.1	44 29.5 85 52	144.5	25
6	46 52.5 82 57	140.6	46 27.8 82 57	141.0	46 03.0 83 56	141.4	45 38.2 83 56	141.8	45 13.3 83 55	142.2	44 48.3 83 55	142.6	44 23.2 84 54	143.0	43 58.0 84 54	143.4	6
7	46 18.1 81 59	139.4	45 53.7 81 58	139.8	45 29.3 82 58	140.2	45 04.7 82 57	140.6	44 40.1 82 57	141.0	44 15.4 83 56	141.4	43 50.6 83 56	141.8	43 25.7 83 55	142.2	7
8	45 42.9 80 60	138.3	45 18.8 80 60	138.7	44 54.7 81 59	139.1	44 30.4 81 58	139.5	44 06.1 81 58	139.9	43 41.6 82 58	140.3	43 17.1 82 57	140.7	42 52.5 82 56	141.1	8
9	45 06.9 79 61	137.1	44 43.1 79 61	137.6	44 19.3 80 60	138.0	43 55.3 80 60	138.4	43 31.2 80 59	138.8	43 07.1 81 59	139.2	42 42.9 81 58	139.6	42 18.6 81 58	140.0	9
30	44 30.2 78 62	136.0	44 06.7 78 62	136.5	43 43.1 79 62	136.9	43 19.4 79 61	137.3	42 55.7 79 60	137.7	42 31.8 80 60	138.2	42 07.9 80 60	138.6	41 43.9 80 59	139.0	30
1	43 52.7 77 64	135.0	43 29.5 77 63	135.4	43 06.2 78 63	135.8	42 42.8 78 62	136.3	42 19.4 78 62	136.7	41 55.8 79 61	137.1	41 32.1 79 61	137.5	41 08.4 79 60	137.9	1
2	43 14.5 76 65	133.9	42 51.6 76 64	134.4	42 28.6 77 64	134.8	42 05.5 77 63	135.2	41 42.3 77 63	135.7	41 19.0 78 62	136.1	40 55.7 78 62	136.5	40 32.2 78 62	136.9	2
3	42 35.7 75 66	132.9	42 13.1 76 65	133.3	41 50.3 76 65	133.8	41 27.5 76 64	134.2	41 04.6 77 64	134.6	40 41.6 77 64	135.1	40 18.5 77 63	135.5	39 55.3 77 62	135.9	3
4	41 56.2 74 67	131.9	41 33.9 75 66	132.3	41 11.4 75 66	132.8	40 48.9 75 66	133.2	40 26.3 76 65	133.7	40 03.5 76 64	134.1	39 40.7 76 64	134.5	39 17.8 77 64	134.9	4
35	41 16.1 73 68	130.9	40 54.0 74 67	131.4	40 31.9 74 67	131.8	40 09.6 74 66	132.2	39 47.3 75 66	132.7	39 24.8 75 66	133.1	39 02.3 75 65	133.5	38 39.6 76 64	134.0	35
6	40 35.4 72 69	130.0	40 13.6 73 68	130.4	39 51.7 73 68	130.9	39 29.8 73 68	131.3	39 07.7 74 67	131.7	38 45.5 74 66	132.2	38 23.2 74 66	132.6	38 00.9 75 66	133.0	6
7	39 54.1 72 70	129.0	39 32.6 72 69	129.5	39 11.0 72 69	129.9	38 49.3 73 68	130.4	38 27.5 73 68	130.8	38 05.6 73 68	131.2	37 43.6 74 67	131.7	37 21.5 74 67	132.1	7
8	39 12.3 71 70	128.1	38 51.1 71 70	128.6	38 29.8 71 70	129.0	38 08.3 72 69	129.5	37 46.8 72 69	129.9	37 25.1 72 68	130.3	37 03.4 73 68	130.8	36 41.5 73 68	131.2	8
9	38 30.0 70 71	127.2	38 09.0 70 71	127.7	37 48.0 70 70	128.1	37 26.8 71 70	128.6	37 05.5 71 70	129.0	36 44.1 71 69	129.5	36 22.6 72 69	129.9	36 01.0 72 68	130.3	9
40	37 47.2 69 72	126.3	37 26.5 69 72	126.8	37 05.7 70 71	127.3	36 44.7 70 71	127.7	36 23.7 70 70	128.1	36 02.6 71 70	128.6	35 41.3 71 70	129.0	35 20.0 71 69	129.5	40
1	37 03.9 68 73	125.5	36 43.4 68 72	126.0	36 22.9 69 72	126.4	36 02.2 69 72	126.9	35 41.4 69 71	127.3	35 20.5 70 71	127.7	34 59.6 70 70	128.2	34 38.5 70 70	128.6	1
2	36 20.2 67 74	124.7	35 59.9 68 73	125.1	35 39.6 68 73	125.6	35 19.2 68 72	126.0	34 58.6 69 72	126.5	34 38.0 69 72	126.9	34 17.3 69 71	127.3	33 56.5 70 71	127.8	2
3	35 36.0 66 74	123.8	35 16.0 67 74	124.3	34 55.9 67 74	124.8	34 35.7 67 73	125.2	34 15.4 68 73	125.6	33 55.0 68 72	126.1	33 34.6 68 72	126.5	33 14.0 69 72	127.0	3
4	34 51.4 66 75	123.0	34 31.6 66 75	123.5	34 11.8 66 74	124.0	33 51.8 67 74	124.4	33 31.8 67 74	124.8	33 11.6 67 73	125.3	32 51.4 68 73	125.7	32 31.1 68 72	126.2	4
45	34 06.3 65 76	122.3	33 46.8 65 75	122.7	33 27.2 66 75	123.2	33 07.5 66 74	123.6	32 47.7 66 74	124.1	32 27.8 67 74	124.5	32 07.8 67 73	125.0	31 47.7 67 73	125.4	45
6	33 20.9 64 76	121.5	33 01.7 64 76	121.9	32 42.3 65 76	122.4	32 22.8 65 75	122.8	32 03.2 65 75	123.3	31 43.5 66 74	123.7	31 23.8 66 74	124.2	31 03.9 66 74	124.6	6
7	32 35.2 63 77	120.7	32 16.1 64 76	121.2	31 56.9 64 76	121.6	31 37.7 64 76	122.1	31 18.3 65 76	122.5	30 58.9 65 75	123.0	30 39.3 65 75	123.4	30 19.7 66 74	123.9	7
8	31 49.0 63 78	120.0	31 30.2 63 77	120.5	31 11.2 63 77	120.9	30 52.2 64 76	121.4	30 33.1 64 76	121.8	30 13.8 64 76	122.3	29 54.5 65 75	122.7	29 35.1 65 75	123.1	8
9	31 02.6 62 78	119.3	30 43.9 62 78	119.7	30 25.2 63 77	120.2	30 06.4 63 77	120.6	29 47.5 63 77	121.1	29 28.5 64 76	121.5	29 09.4 64 76	122.0	28 50.2 64 76	122.4	9
50	30 15.8 61 78	118.6	29 57.4 62 78	119.0	29 38.8 62 78	119.5	29 20.2 62 78	119.9	29 01.5 63 77	120.4	28 42.7 63 77	120.8	28 23.8 63 76	121.3	28 04.9 63 76	121.7	50
1	29 28.7 61 79	117.9	29 10.4 61 79	118.3	28 52.1 61 78	118.8	28 33.7 62 78	119.2	28 15.2 62 78	119.7	27 56.6 62 77	120.1	27 38.0 62 77	120.6	27 19.2 63 77	121.0	1
2	28 41.3 60 80	117.2	28 23.2 60 79	117.6	28 05.1 61 79	118.1	27 46.9 61 78	118.5	27 28.6 61 78	119.0	27 10.2 61 78	119.4	26 51.8 62 78	119.9	26 33.2 62 77	120.3	2
3	27 53.6 59 80	116.5	27 35.7 60 80	117.0	27 17.8 60 79	117.4	26 59.8 60 79	117.9	26 41.7 60 79	118.3	26 23.5 61 78	118.8	26 05.3 61 78	119.2	25 46.9 61 78	119.6	3
4	27 05.6 59 80	115.9	26 47.9 59 80	116.3	26 30.2 59 80	116.8	26 12.4 60 80	117.2	25 54.5 60 79	117.7	25 36.5 60 79	118.1	25 18.4 60 78	118.5	25 00.3 61 78	119.0	4
55	26 17.4 58 81	115.2	25 59.9 58 80	115.7	25 42.3 59 80	116.1	25 24.7 59 80	116.6	25 07.0 59 80	117.0	24 49.2 59 79	117.5	24 31.3 60 79	117.9	24 13.4 60 79	118.3	55
6	25 28.9 57 81	114.6	25 11.6 58 81	115.0	24 54.2 58 81	115.5	24 36.8 58 80	115.9	24 19.2 59 80	116.4	24 01.6 59 80	116.8	23 43.9 59 80	117.3	23 26.2 59 79	117.7	6
7	24 40.1 57 82	113.9	24 23.0 57 81	114.4	24 05.8 57 81	114.8	23 48.5 58 81	115.3	23 31.2 58 80	115.7	23 13.8 58 80	116.2	22 56.3 58 80	116.6	22 38.7 59 80	117.1	7
8	23 51.1 56 82	113.3	23 34.2 57 82	113.8	23 17.2 57 82	114.2	23 00.1 57 81	114.7	22 42.9 57 81	115.1	22 25.7 58 81	115.6	22 08.4 58 80	116.0	21 51.0 58 80	116.4	8
9	23 01.9 56 82	112.7	22 45.2 56 82	113.2	22 28.3 56 82	113.6	22 11.4 57 82	114.1	21 54.4 57 81	114.5	21 37.3 57 81	115.0	21 20.2 57 81	115.4	21 03.0 57 80	115.8	9
60	22 12.5 55 83	112.1	21 55.9 56 82	112.6	21 39.2 56 82	113.0	21 22.5 56 82	113.5	21 05.6 56 82	113.9	20 48.7 56 81	114.4	20 31.8 57 81	114.8	20 14.7 57 81	115.2	60
1	21 22.9 55 83	111.5	21 06.5 55 83	112.0	20 49.9 55 82	112.4	20 33.3 55 82	112.9	20 16.7 56 82	113.3	19 59.9 56 82	113.8	19 43.1 56 82	114.2	19 26.3 56 81	114.7	1
2	20 33.1 54 83	111.0	20 16.8 54 83	111.4	20 00.4 55 83	111.9	19 44.0 55 83	112.3	19 27.5 55 82	112.8	19 10.9 55 82	113.2	18 54.3 56 82	113.6	18 37.6 56 82	114.1	2
3	19 43.1 54 84	110.4	19 26.9 54 83	110.8	19 10.7 54 83	111.3	18 54.4 54 83	111.7	18 38.1 55 83	112.2	18 21.7 55 82	112.6	18 05.2 55 82	113.1	17 48.7 55 82	113.5	3
4	18 52.9 53 84	109.8	18 36.9 53 84	110.3	18 20.8 54 84	110.7	18 04.7 54 83	111.2	17 48.5 54 83	111.6	17 32.2 54 83	112.1	17 15.9 54 82	112.5	16 59.5 55 82	112.9	4
65	18 02.5 53 84	109.3	17 46.6 53 84	109.7	17 30.7 53 84	110.2	17 14.7 53 84	110.6	16 58.7 54 83	111.1	16 42.6 54 83	111.5	16 26.4 54 83	111.9	16 10.2 54 82	112.4	65
6	17 12.0 52 84	108.7	16 56.2 53 84	109.2	16 40.4 53 84	109.6	16 24.6 53 84	110.1	16 08.7 53 84	110.5	15 52.7 53 83	111.0	15 36.7 53 83	111.4	15 20.7 54 83	111.8	6
7	16 21.2 52 85	108.2	16 05.6 52 84	108.6	15 50.0 52 84	109.1	15 34.3 52 84	109.5	15 18.5 53 84	110.0	15 02.7 53 84	110.4	14 46.8 53 83	110.8	14 30.9 53 83	111.3	7
8	15 30.4 51 85	107.7	15 14.9 52 85	108.1	14 59.4 52 85	108.6	14 43.8 52 84	109.0	14 28.2 52 84	109.4	14 12.5 52 84	109.9	13 56.8 52 84	110.3	13 41.0 53 83	110.8	8
9	14 39.4 51 85	107.1	14 24.0 51 85	107.6	14 08.6 51 85	108.0	13 53.2 52 85	108.5	13 37.7 52 84	108.9	13 22.2 52 84	109.3	13 06.6 52 84	109.8	12 51.0 52 84	110.2	9
70	13 48.2 51 86	106.6	13 33.0 51 85	107.1	13 17.7 51 85	107.5	13 02.4 51 85	107.9	12 47.0 51 85	108.4	12 31.6 51 84	108.8	12 16.2 52 84	109.3	12 00.7 52 84	109.7	70
1	12 56.9 50 86	106.1	12 41.8 50 86	106.5	12 26.7 51 85	107.0	12 11.5 51 85	107.4	11 56.2 51 85	107.9	11 41.0 51 85	108.3	11 25.7 51 84	108.8	11 10.3 51 84	109.2	1
2	12 05.5 50 86	105.6	11 50.5 50 86	106.0	11 35.5 50 86	106.5	11 20.4 50 85	106.9	11 05.3 50 85	107.4	10 50.1 51 85	107.8	10 35.0 51 85	108.2	10 19.7 51 84	108.7	2
3	11 13.9 50 86	105.1	10 59.1 50 86	105.5	10 44.1 50 86	106.0	10 29.2 50 86	106.4	10 14.2 50 85	106.9	9 59.2 50 85	107.3	9 44.1 50 85	107.7	9 29.0 50 85	108.2	3
4	10 22.3 49 86	104.6	10 07.5 49 86	105.0	9 52.7 49 86	105.5	9 37.8 50 86	105.9	9 23.0 50 86	106.4	9 08.1 50 86	106.8	8 53.1 50 85	107.2	8 38.1 50 85	107.7	4
75	9 30.5 49 86	104.1	9 15.8 49 86	104.5	9 01.1 49 86	105.0	8 46.4 49 86	105.4	8 31.6 49 86	105.9	8 16.8 49 86	106.3	8 02.0 49 86	106.7	7 47.1 50 85	107.2	75
6	8 38.6 49 87	103.6	8 24.0 49 86	104.1	8 09.4 49 86	104.5	7 54.8 49 86	104.9	7 40.1 49 86	105.4	7 25.4 49 86	105.8	7 10.7 49 86	106.3	6 56.0 49 86	106.7	6
7	7 46.6 48 87	103.1	7 32.1 48 87	103.6	7 17.6 48 86	104.0	7 03.1 48 86	104.5	6 48.5 49 86	104.9	6 33.9 49 86	105.3	6 19.4 49 86	105.8	6 04.7 49 86	106.2	7
8	6 54.4 48 87	102.7	6 40.1 48 87	103.1	6 25.7 48 87	103.5	6 11.2 48 86	104.0	5 56.8 48 86	104.4	5 42.3 48 86	104.9	5 27.8 48 86	105.3	5 13.3 48 86	105.7	8
9	6 02.2 48 87	102.2	5 47.9 48 87	102.6	5 33.6 48 87	103.1	5 19.3 48 87	103.5	5 05.0 48 86	103.9							9
80	5 09.9 47 87	101.7															80

Lat. 27°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 02	180.0	77 00.0	1.0 03	180.0	77 30.0	1.0 04	180.0	78 00.0	1.0 04	180.0	78 30.0	1.0 04	180.0	00
1	74 58.2	1.0 00	176.2	75 28.2	1.0 00	176.1	75 58.1	1.0 00	176.0	76 28.1	1.0 10	175.8	76 58.0	1.0 10	175.7	77 27.9	1.0 10	175.5	77 57.8	1.0 11	175.4	78 27.8	1.0 11	175.2	1
2	74 53.0	99 14	172.5	75 22.8	99 15	172.2	75 52.5	99 16	172.0	76 22.3	99 16	171.7	76 52.0	99 16	171.4	77 21.7	99 17	171.1	77 51.4	99 18	170.8	78 21.0	99 18	170.4	2
3	74 44.3	98 20	168.8	75 13.8	98 21	168.4	75 43.3	98 21	168.1	76 12.7	98 22	167.7	76 42.1	98 23	167.2	77 11.4	98 24	166.8	77 40.8	98 24	166.3	78 10.0	97 25	165.8	3
4	74 32.2	97 26	165.2	75 01.4	97 26	164.7	75 30.5	97 27	164.2	75 59.5	97 28	163.7	76 28.4	96 29	163.2	76 57.3	96 30	162.6	77 26.1	96 31	162.0	77 54.8	95 32	161.3	4
05	74 17.0	96 30	161.7	74 45.7	96 32	161.1	75 14.3	95 32	160.5	75 42.8	95 33	159.9	76 11.2	95 34	159.3	76 39.5	94 35	158.6	77 07.7	94 36	157.8	77 35.8	93 38	157.0	05
6	73 58.6	94 35	158.3	74 26.8	94 36	157.6	74 54.9	93 37	157.0	75 22.8	93 38	156.3	75 50.6	92 40	155.5	76 18.3	92 41	154.7	76 45.8	91 42	153.8	77 13.1	91 43	152.9	6
7	73 37.4	92 40	155.0	74 05.0	92 41	154.3	74 32.5	91 42	153.5	74 59.8	91 43	152.8	75 27.0	90 44	151.9	75 53.9	90 46	151.0	76 20.7	89 47	150.1	76 47.2	88 48	149.1	7
8	73 13.5	90 44	151.9	73 40.5	90 45	151.1	74 07.3	89 46	150.3	74 34.0	88 48	149.4	75 00.4	88 49	148.5	75 26.6	87 50	147.6	75 52.6	86 51	146.6	76 18.3	85 53	145.5	8
9	72 47.0	88 48	148.9	73 13.4	88 49	148.1	73 39.6	87 50	147.2	74 05.5	86 51	146.3	74 31.2	85 53	145.3	74 56.7	84 54	144.3	75 21.9	83 55	143.3	75 46.7	82 56	142.1	9
10	72 18.3	86 52	146.0	72 44.0	85 53	145.2	73 09.5	85 54	144.3	73 34.7	84 55	143.3	73 59.7	83 56	142.3	74 24.4	82 58	141.3	74 48.7	81 59	140.2	75 12.8	80 60	139.0	10
1	71 47.4	84 55	143.3	72 12.4	83 56	142.4	72 37.2	82 57	141.5	73 01.7	81 58	140.5	73 26.0	80 59	139.5	73 49.9	79 61	138.4	74 13.5	78 62	137.3	74 36.7	77 63	136.1	1
2	71 14.5	82 58	140.8	71 38.9	81 59	139.9	72 03.0	80 60	138.9	72 26.8	79 61	137.9	72 50.3	78 62	136.9	73 13.5	77 64	135.8	73 36.3	75 65	134.6	73 58.8	74 66	133.5	2
3	70 39.8	80 60	138.4	71 03.5	79 62	137.4	71 27.0	78 63	136.5	71 50.1	77 64	135.4	72 12.9	75 65	134.4	72 35.4	74 66	133.3	72 57.5	73 67	132.1	73 19.2	72 68	131.0	3
4	70 03.5	77 63	136.1	70 26.6	77 64	135.1	70 49.4	75 65	134.1	71 11.8	74 66	133.1	71 34.0	73 67	132.1	71 55.7	72 68	131.0	72 17.1	71 70	129.8	72 38.1	69 71	128.6	4
15	69 25.7	75 65	133.9	69 48.1	74 66	133.0	70 10.3	73 67	132.0	70 32.1	72 68	131.0	70 53.6	71 69	129.9	71 14.7	70 70	128.8	71 35.4	68 72	127.7	71 55.7	67 72	126.5	15
6	68 46.5	73 67	131.9	69 08.4	72 68	130.9	69 29.9	71 69	129.9	69 51.1	70 70	128.9	70 12.0	69 71	127.9	70 32.5	68 72	126.8	70 52.5	66 73	125.6	71 12.2	65 74	124.5	6
7	68 06.1	72 69	129.9	68 27.4	70 70	129.0	68 48.4	69 71	128.0	69 09.0	68 72	127.0	69 29.2	67 73	125.9	69 49.1	66 74	124.9	70 08.6	64 75	123.8	70 27.6	63 76	122.6	7
8	67 24.5	70 71	128.1	67 45.3	69 72	127.2	68 05.7	67 73	126.2	68 25.8	66 74	125.2	68 45.5	65 74	124.2	69 04.8	64 76	123.1	69 23.7	62 76	122.0	69 42.1	61 77	120.9	8
9	66 42.0	68 72	126.4	67 02.2	67 73	125.4	67 22.1	66 74	124.5	67 41.6	65 75	123.5	68 00.8	63 76	122.5	68 19.5	62 77	121.4	68 37.9	61 78	120.3	68 55.8	59 78	119.2	9
20	65 58.5	66 74	124.7	66 18.2	65 75	123.8	66 37.6	64 76	122.9	66 56.6	63 76	121.9	67 15.3	62 77	120.9	67 33.5	60 78	119.8	67 51.4	59 79	118.8	68 08.8	57 79	117.7	20
1	65 14.1	65 75	123.2	65 33.4	64 76	122.3	65 52.3	62 77	121.3	66 10.9	61 78	120.4	66 29.0	60 78	119.4	66 46.8	59 79	118.4	67 04.2	57 80	117.3	67 21.2	56 80	116.3	1
2	64 29.0	63 76	121.7	64 47.8	62 77	120.8	65 06.3	61 78	119.9	65 24.4	60 78	118.9	65 42.1	58 79	118.0	65 59.5	57 80	117.0	66 16.4	56 80	115.9	66 33.0	54 81	114.9	2
3	63 43.2	62 78	120.3	64 01.6	61 78	119.4	64 19.6	60 79	118.5	64 37.3	58 80	117.6	64 54.6	57 80	116.6	65 11.5	56 81	115.6	65 28.1	54 81	114.6	65 44.2	53 82	113.6	3
4	62 56.8	60 78	119.0	63 14.7	59 79	118.1	63 32.3	58 80	117.2	63 49.6	57 80	116.3	64 06.5	56 81	115.3	64 23.1	55 82	114.4	64 39.3	53 82	113.4	64 55.0	52 83	112.4	4
25	62 09.7	59 79	117.7	62 27.3	58 80	116.8	62 44.5	57 80	116.0	63 01.4	56 81	115.1	63 18.0	55 82	114.1	63 34.2	53 82	113.2	63 50.0	52 83	112.2	64 05.4	51 83	111.3	25
6	61 22.1	58 80	116.5	61 39.3	57 81	115.7	61 56.2	56 81	114.8	62 12.8	55 82	113.9	62 29.0	53 82	113.0	62 44.8	52 83	112.1	63 00.3	51 83	111.1	63 15.4	50 84	110.2	6
7	60 34.0	57 81	115.4	60 50.9	56 81	114.5	61 07.5	55 82	113.6	61 23.7	53 82	112.8	61 39.6	52 83	111.9	61 55.1	51 84	111.0	62 10.2	50 84	110.1	62 25.0	49 84	109.1	7
8	59 45.5	56 82	114.2	60 02.1	55 82	113.4	60 18.3	54 83	112.6	60 34.2	52 83	111.7	60 49.8	51 84	110.8	61 05.0	50 84	110.0	61 19.9	49 84	109.0	61 34.4	48 85	108.1	8
9	58 56.6	55 82	113.2	59 12.8	54 83	112.4	59 28.7	53 83	111.5	59 44.4	52 84	110.7	59 59.6	50 84	109.8	60 14.6	49 84	109.0	60 29.2	48 85	108.1	60 43.4	47 85	107.2	9
30	58 07.2	54 83	112.2	58 23.2	53 83	111.4	58 38.9	52 84	110.6	58 54.2	51 84	109.7	59 09.2	49 84	108.9	59 23.9	48 85	108.0	59 38.2	47 85	107.2	59 52.2	46 86	106.3	30
1	57 17.6	53 83	111.2	57 33.3	52 84	110.4	57 48.6	51 84	109.6	58 03.7	50 84	108.8	58 18.5	49 85	108.0	58 32.9	48 85	107.1	58 47.0	46 86	106.3	59 00.8	45 86	105.4	1
2	56 27.6	52 84	110.3	56 43.0	51 84	109.5	56 58.1	50 85	108.7	57 13.0	49 85	107.9	57 27.5	48 85	107.1	57 41.7	47 86	106.3	57 55.6	46 86	105.4	58 09.2	45 86	104.6	2
3	55 37.3	51 84	109.4	55 52.5	50 85	108.6	56 07.4	49 85	107.8	56 22.0	48 85	107.0	56 36.3	47 86	106.2	56 50.3	46 86	105.4	57 04.0	45 86	104.6	57 17.3	44 87	103.8	3
4	54 46.7	50 85	108.5	55 01.7	49 85	107.7	55 16.4	48 85	107.0	55 30.8	48 86	106.2	55 44.9	47 86	105.4	55 58.7	46 86	104.6	56 12.2	44 87	103.8	56 25.3	43 87	103.0	4
35	53 55.9	50 85	107.6	54 10.6	49 85	106.9	54 25.1	48 86	106.2	54 39.3	47 86	105.4	54 53.2	46 86	104.6	55 06.8	45 86	103.9	55 20.2	44 87	103.1	55 33.2	43 87	102.3	35
6	53 04.8	49 86	106.8	53 19.4	48 86	106.1	53 33.7	47 86	105.4	53 47.7	46 86	104.6	54 01.4	45 87	103.9	54 14.9	44 87	103.1	54 28.0	43 87	102.3	54 40.9	42 88	101.6	6
7	52 13.5	48 86	106.1	52 27.9	47 86	105.3	52 42.0	47 86	104.6	52 55.9	46 87	103.9	53 09.4	45 87	103.1	53 22.7	44 87	102.4	53 35.7	43 87	101.6	53 48.4	42 88	100.9	7
8	51 22.1	48 86	105.3	51 36.3	47 86	104.6	51 50.2	46 87	103.9	52 03.9	45 87	103.2	52 17.3	44 87	102.4	52 30.4	43 87	101.7	52 43.3	42 88	100.9	52 55.9	41 88	100.2	8
9	50 30.4	47 86	104.6	50 44.4	46 86	103.9	50 58.2	46 87	103.2	51 11.7	45 87	102.4	51 25.0	44 87	101.7	51 38.0	43 88	101.0	51 50.7	42 88	100.3	52 03.2	41 88	99.5	9
40	49 38.6	47 87	103.8	49 52.5	46 87	103.2	50 06.1	45 87	102.5	50 19.5	44 87	101.8	50 32.6	43 88	101.1	50 45.5	42 88	100.3	50 58.1	42 88	99.6	51 10.4	41 88	98.9	40
1	48 46.6	46 87	103.1	49 00.3	45 87	102.5	49 13.8	45 87	101.8	49 27.1	44 88	101.1	49 40.1	43 88	100.4	49 52.8	42 88	99.7	50 05.3	41 88	99.0	50 17.6	40 88	98.3	1
2	47 54.5	46 87	102.5	48 08.1	45 87	101.8	48 21.4	44 88	101.1	48 34.6	43 88	100.5	48 47.4	43 88	99.8	49 00.1	42 88	99.1	49 12.5	41 88	98.4	49 24.6	40 88	97.7	2
3	47 02.2	45 87	101.8	47 15.7	45 88	101.2	47 28.9	44 88	100.5	47 41.9	43 88	99.8	47 54.7	42 88	99.2	48 07.3	41 88	98.5	48 19.6	41 88	97.8	48 31.6	40 88	97.1	3
4	46 09.8	45 88	101.2	46 23.2	44 88	100.5	46 36.3	43 88	99.9	46 49.2	43 88	99.2	47 01.9	42 88	98.5	47 14.3	41 88	97.9	47 26.5	40 88	97.2	47 38.5	40 88	96.5	4
45	45 17.3	44 88	100.5	45 30.6	44 88	99.9	45 43.6	43 88	99.3	45 56.4	42 88	98.6	46 09.0	42 88	98.0	46 21.3	41 88	97.3	46 33.5	40 88	96.6	46 45.4	39 89	96.0	45
6	44 24.7	44 88	99.9	44 37.8	43 88	99.3	44 50.8	43 88	98.7	45 03.5	42 88	98.0	45 16.0	41 88	97.4	45 28.3	41 88	96.7	45 40.3	40 89	96.1	45 52.2	39 89	95.4	6
7	43 32.0	44 88	99.3	43 45.0	43 88	98.7	43 57.9	42 88	98.1	44 10.5	42 88	97.5	44 22.9	41 88	96.8	44 35.2	40 89	96.2	44 47.2	40 89	95.5	44 58.9	39 89	94.9	7
8	42 39.2	44 88	98.8	42 52.2	43 88	98.1	43 04.9	42 88	97.5	43 17.5	42 88	96.9	43 29.8	41 89	96.3	43 42.0	40 89	95.6	43 53.9	39 89	95.0	44 05.7	39 89	94.4	8
9	41 46.3	43 88	98.2	41 59.2	43 88	97.6	42 11.9	42 88	97.0	42 24.4	41 89	96.3	42 36.7	41 89	95.7	42 48.8	40 89	95.1	43 00.6	39 89	94.5	43 12.3	39 89	93.8	9
50	40 53.4	43 88	97.6	41 06.2	42 88	97.0	41 18.8	42 89	96.4	41 31.2	41 89	95.8	41 43.5	40 89	95.2	41 55.5	40 89	94.6	42 07.3	39 89	94.0	42 19.0	38 89	93.3	50
1	40 00.3	43 88	97.1	40 13.1	42 89	96.5	40 25.6	42 89	95.9	40 38.0	41 89	95.3	40 50.2	40 89	94.7	41 02.2	40 89	94.1	41 14.0	39 89	93.5	41 25.6	38 89	92.8	1
2	39 07.3	43 89	96.5	39 19.9	42 89	95.9	39 32.4	41 89	95.3	39 44.8	41 89	94.8	39 56.9	40 89	94.2	40 08.8	40 89	93.6	40 20.6	39 89	93.0	40 32.2	38 89	92.4	2
3	38 14.1	42 89	96.0	38 26.7	42 89	95.4	38 39.2	41 89	94.8	38 51.5	41 89	94.2	39 03.6	40 89	93.7	39 15.5	39 89	93.1	39 27.2	39 89	92.5	39 38.8	38 89	91.9	3
4	37 20.9	42 89	95.5	37 33.5	42 89	94.9	37 45.9	41 89	94.3	37 58.1	40 89	93.7	38 10.2	40 89	93.2	38 22.1	39 89	92.6	38 33.8	39 89	92.0	38 45.3	38 89	91.4	4
55	36 27.7	42 89	95.0	36 40.2	41 89	94.4	36 52.6	41 89	93.8	37 04.8	40 89	93.2	37 16.8	40 89	92.7	37 28.7	39 89	92.1	37 40.4	39 89	91.5	37 51.9	38 89	90.9	55
6	35 34.4	42 89	94.4	35 46.9	41 89	93.9	35 59.2	41 89	93.3	36 11.4	40 89	92.8	36 23.4	40 89	92.2	36 35.2	39 89	91.6	36 46.9	39 89	91.0	36 58.4	38 89	90.5	6
7	34 41.1	42 89	93.9	34 53.5	41 89	93.4	35 05.8	41 89	92.8	35 18.0	40 89	92.3	35 30.0	40 89	91.7	35 41.8	39 89	91.1	35 53.4	39 89	90.6	36 05.0	38 89	90.0	7
8	33 47.7	42 89	93.5	34 00.2	41 89	92.9	34 12.4	41 89	92.4	34 24.5	40 89	91.8	34 36.5	40 89	91.2	34 48.3	39 89	90.7	35 00.0	39 89	90.1	35 11.5	38 89	89.6	8
9	32 54.4	42 89	93.0	33 06.8	41 89	92.4	33 19.0	41 89	91.9	33 31.1	40 89	91.3	33 43.1	40 89	90.8	33 54.9	39 89	90.2	34 06.5	39 89	89.7	34 18.0	38 89	89.1	9
60	32 01.0	41 89	92.5	32 13.3	41 89	91.9	32 25.6	41 89	91.4	32 37.7	40 89	90.9	32 49.6	40 89	90.3	33 01.4	39 89	89.8	33 13.1	39 89	89.2	33 24.6	38 89	88.7	60
1	31 07.5	41 89	92.0	31 19.9	41 89	91.5	31 32.1	40 89	90.9	31 44.2	40 89	90.4	31 56.1	40 89	89.9	32 07.9	39 89	89.3	32 19.6	39 89	88.8	32 31.1	38 89	88.2	1
2	30 14.1	41 89	91.5	30 26.4	41 89	91.0	30 38.7	40 89	90.5	30 50.7	40 89	89.9	31 02.7	40 89	89.4	31 14.5	39 89	88.9	31 26.2	39 89	88.3	31 37.7	38 89	87.8	2
3	29 20.7	41 89	91.1	29 33.0	41 89	90.6	29 45.2	40 89	90.0	29 57.3	40 89	89.5	30 09.2	40 89	89.0	30 21.1	39 89	88.4	30 32.7	39 89	87.9	30 44.3	38 89	87.4	3
4	28 27.2	41 89	90.6	28 39.5	41 89	90.1	28 51.7	40 89	89.6	29 03.8	40 89	89.1	29 15.8	40 89	88.5	29 27.6	39 89	88.0	29 39.3	39 89	87.5	29 50.9	38 89	86.9	4
65	27 33.8	41 89	90.2	27 46.1	41 89	89.6	27 58.3	40 89	89.1	28 10.4	40 89	88.6	28 22.3	40 89	88.1	28 34.2	39 89	87.6	28 45.9	39 89	87.0	28 57.5	39 89	86.5	65
6	26 40.3	41 89	89.7	26 52.6	41 89	89.2	27 04.8	41 89	88.7	27 16.9	40 89	88.2	27 28.9	40 89	87.6	27 40.8	39 89	87.1	27 52.6	39 89	86.6	28 04.2	39 89	86.1	6
7	25 46.8	41 89	89.3	25 59.2	41 89	88.7	26 11.4	41 89	88.2	26 23.5	40 89	87.7	26 35.5	40 89	87.2	26 47.4	39 89	86.7	26 59.2	39 89	86.2	27 10.9	39 89	85.7	7
8	24 53.4	41 89	88.8	25 05.7	41 89	88.3	25 18.0	41 89	87.8	25 30.1	40 89	87.3	25 42.1	40 89	86.8	25 54.1	40 89	86.3	26 05.9	39 89	85.8	26 17.6	39 89	85.3	8
9	23 59.9	41 89	88.4	24 12.3	41 89	87.9	24 24.6	41 89	87.4	24 36.7	40 89	86.9	24 48.8	40 89	86.4	25 00.7	40 89	85.9	25 12.6	39 89	85.3	25 24.3	39 89	84.8	9
70	23 06.5	41 89	87.9	23 18.9	41 89	87.4	23 31.2	41 89	86.9	23 43.3	40 89	86.4	23 55.4	40 89	85.9	24 07.4	40 89	85.4	24 19.3	39 89	84.9	24 31.1	39 89	84.4	70
1	22 13.1	41 89	87.5	22 25.5	41 89	87.0	22 37.8	41 89	86.5	22 50.0	41 89	86.0	23 02.1	40 89	85.5	23 14.1	40 89	85.0	23 26.1	40 89	84.5	23 37.9	39 88	84.0	1
2	21 19.7	42 89	87.0	21 32.1	41 89	86.6	21 44.4	41 89	86.1	21 56.7	41 89	85.6	22 08.8	40 89	85.1	22 20.9	40 89	84.6	22 32.9	40 89	84.1	22 44.8	39 88	83.6	2
3	20 26.3	42 89	86.6	20 38.8	41 89	86.1	20 51.1	41 89	85.6	21 03.4	41 89	85.1	21 15.6	41 89	84.7	21 27.7	40 89	84.2	21 39.7	40 88	83.7	21 51.7	40 88	83.2	3
4	19 33.0	42 89	86.2	19 45.4	41 89	85.7	19 57.8	41 89	85.2	20 10.1	41 89	84.7	20 22.4	41 89	84.2	20 34.5	40 88	83.7	20 46.6	40 88	83.3	20 58.6	40 88	82.8	4
75	18 39.6	42 89	85.7	18 52.1	42 89	85.3	19 04.6	41 89	84.8	19 16.9	41 88	84.3	19 29.2	41 88	83.8	19 41.4	41 88	83.3	19 53.5	40 88	82.8	20 05.6	40 88	82.4	75
6	17 46.3	42 89	85.3	17 58.9	42 89	84.8	18 11.3	41 89	84.4	18 23.8	41 88	83.9	18 36.1	41 88	83.4	18 48.3	41 88	82.9	19 00.5	40 88	82.4	19 12.6	40 88	81.9	6
7	16 53.1	42 89	84.9	17 05.7	42 89	84.4	17 18.2	42 88	83.9	17 30.6	41 88	83.5	17 43.0	41 88	83.0	17 55.3	41 88	82.5	18 07.5	41 88	82.0	18 19.7	40 88	81.5	7
8	15 59.8	42 89	84.5	16 12.5	42 89	84.0	16 25.0	42 88	83.5	16 37.5	42 88	83.0	16 50.0	41 88	82.6	17 02.3	41 88	82.1	17 14.6	41 88	81.6	17 26.9	41 88	81.1	8
9	15 06.6	42 89	84.0	15 19.3	42 88	83.6	15 31.9	42 88	83.1	15 44.5	42 88	82.6	15 57.0	42 88	82.1	16 09.4	41 88	81.7	16 21.8	41 88	81.2	16 34.1	41 88	80.7	9
80	14 13.5	42 88	83.6	14 26.2	42 88	83.1	14 38.9	42 88	82.7	14 51.5	42 88	82.2	15 04.0	42 88	81.7	15 16.5	42 88	81.2	15 29.0	41 88	80.8	15 41.3	41 88	80.3	80
1	13 20.4	43 88	83.2	13 33.2	42 88	82.7	13 45.9	42 88	82.2	13 58.6	42 88	81.8	14 11.2	42 88	81.3	14 23.7	42 88	80.8	14 36.2	42 88	80.4	14 48.7	41 88	79.9	1
2	12 27.3	43 88	82.7	12 40.2	43 88	82.3	12 52.9	43 88	81.8	13 05.7	42 88	81.3	13 18.4	42 88	80.9	13 31.0	42 88	80.4	13 43.6	42 88	79.9	13 56.1	42 88	79.5	2
3	11 34.3	43 88	82.3	11 47.2	43 88	81.8	12 00.1	43 88	81.4	12 12.9	43 88	80.9	12 25.6	42 88	80.5	12 38.3	42 88	80.0	12 51.0	42 88	79.5	13 03.6	42 88	79.1	3
4	10 41.4	43 88	81.9	10 54.3	43 88	81.4	11 07.2	43 88	81.0	11 20.1	43 88	80.5	11 32.9	43 88	80.0	11 45.7	43 88	79.6	11 58.4	42 88	79.1	12 11.1	42 87	78.6	4
85	9 48.5	43 88	81.4	10 01.5	43 88	81.0	10 14.5	43 88	80.5	10 27.4	43 88	80.1	10 40.3	43 88	79.6	10 53.2	43 88	79.2	11 06.0	43 87	78.7	11 18.7	42 87	78.2	85
6	8 55.7	44 88	81.0	9 08.7	44 88	80.6	9 21.8	43 88	80.1	9 34.8	43 88	79.6	9 47.7	43 88	79.2	10 00.7	43 87	78.7	10 13.6	43 87	78.3	10 26.4	43 87	77.8	6
7	8 02.9	44 88	80.6	8 16.0	44 88	80.1	8 29.1	44 88	79.7	8 42.2	44 88	79.2	8 55.3	43 87	78.8	9 08.3	43 87	78.3	9 21.3	43 87	77.8	9 34.2	43 87	77.4	7
8	7 10.2	44 88	80.1	7 23.4	44 88	79.7	7 36.6	44 88	79.2	7 49.7	44 87	78.8	8 02.9	44 87	78.3	8 16.0	44 87	77.9	8 29.1	44 87	77.4	8 42.1	43 87	77.0	8
9	6 17.5	44 88	79.7	6 30.8	44 88	79.3	6 44.1	44 87	78.8	6 57.3	44 87	78.4	7 10.6	44 87	77.9	7 23.8	44 87	77.5	7 36.9	44 87	77.0	7 50.1	44 87	76.5	9
90	5 25.0	45 88	79.3	5 38.3	45 88	78.8	5 51.7	44 87	78.4	6 05.0	44 87	77.9	6 18.3	44 87	77.5	6 31.6	44 87	77.0	6 44.9	44 87	76.6	6 58.1	44 86	76.1	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	12° 00′ Alt.	Az.	Δd	Δt	12° 30′ Alt.	Az.	Δd	Δt	13° 00′ Alt.	Az.	Δd	Δt	13° 30′ Alt.	Az.	Δd	Δt	14° 00′ Alt.	Az.	Δd	Δt	14° 30′ Alt.	Az.	Δd	Δt	15° 00′ Alt.	Az.	Δd	Δt	15° 30′ Alt.	Az.	Δd	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
00	51 00.0	180.0	1.0	01	50 30.0	180.0	1.0	01	50 00.0	180.0	1.0	01	49 30.0	180.0	1.0	01	49 00.0	180.0	1.0	01	48 30.0	180.0	1.0	01	48 00.0	180.0	1.0	01	47 30.0	180.0	1.0	01	00
1	50 59.3	178.4	1.0	04	50 29.3	178.5	1.0	04	49 59.3	178.5	1.0	04	49 29.3	178.5	1.0	04	48 59.3	178.5	1.0	04	48 29.3	178.5	1.0	03	47 59.3	178.6	1.0	03	47 29.3	178.6	1.0	03	1
2	50 57.1	176.9	1.0	06	50 27.1	176.9	1.0	06	49 57.2	177.0	1.0	06	49 27.2	177.0	1.0	06	48 57.2	177.0	1.0	06	48 27.3	177.1	1.0	06	47 57.3	177.1	1.0	06	47 27.3	177.1	1.0	06	2
3	50 53.5	175.3	1.0	08	50 23.6	175.4	1.0	08	49 53.6	175.5	1.0	08	49 23.7	175.5	1.0	08	48 53.8	175.6	1.0	08	48 23.9	175.6	1.0	08	47 53.9	175.7	1.0	08	47 24.0	175.7	1.0	08	3
4	50 48.4	173.8	1.0	11	50 18.6	173.9	1.0	11	49 48.7	174.0	1.0	10	49 18.8	174.0	1.0	10	48 49.0	174.1	1.0	10	48 19.1	174.2	1.0	10	47 49.2	174.2	1.0	10	47 19.4	174.3	1.0	10	4
05	50 41.9	172.3	99	13	50 12.2	172.4	99	13	49 42.4	172.5	99	13	49 12.6	172.5	99	13	48 42.8	172.6	99	12	48 13.0	172.7	99	12	47 43.2	172.8	99	12	47 13.4	172.9	99	12	05
6	50 34.0	170.7	99	16	50 04.4	170.9	99	15	49 34.7	171.0	99	15	49 05.0	171.1	99	15	48 35.3	171.2	99	15	48 05.6	171.3	99	15	47 35.9	171.4	99	14	47 06.2	171.5	99	14	6
7	50 24.7	169.2	99	18	49 55.2	169.4	99	18	49 25.6	169.6	99	17	48 56.0	169.6	99	17	48 26.4	169.7	99	17	47 56.8	169.9	99	17	47 27.2	170.0	99	16	46 57.6	170.1	99	16	7
8	50 14.0	167.7	98	20	49 44.6	167.9	98	20	49 15.2	168.0	98	20	48 45.7	168.2	98	19	48 16.2	168.3	98	19	47 46.8	168.4	98	19	47 17.3	168.6	98	19	46 47.8	168.7	98	18	8
9	50 02.0	166.2	98	22	49 32.7	166.4	98	22	49 03.4	166.5	98	22	48 34.1	166.7	98	22	48 04.7	166.9	98	21	47 35.4	167.0	98	21	47 06.0	167.2	98	21	46 36.7	167.3	98	21	9
10	49 48.6	164.7	97	24	49 19.4	164.9	97	24	48 50.3	165.1	97	24	48 21.1	165.3	97	24	47 51.9	165.5	97	24	47 22.7	165.6	97	23	46 53.5	165.8	97	23	46 24.3	166.0	97	23	10
1	49 33.9	163.3	97	27	49 04.9	163.5	97	26	48 35.9	163.7	97	26	48 06.9	163.9	97	26	47 37.9	164.1	97	26	47 08.8	164.2	97	25	46 39.8	164.4	97	25	46 10.7	164.6	97	25	1
2	49 17.8	161.8	96	28	48 49.0	162.0	96	28	48 20.2	162.3	96	28	47 51.4	162.5	96	28	47 22.6	162.7	96	27	46 53.7	162.9	96	27	46 24.8	163.1	96	27	45 55.9	163.3	96	27	2
3	49 00.5	160.4	95	31	48 31.9	160.6	95	30	48 03.3	160.9	95	30	47 34.7	161.1	95	30	47 06.0	161.3	96	30	46 37.4	161.5	96	29	46 08.7	161.7	96	29	45 39.9	161.9	96	28	3
4	48 42.0	159.0	95	33	48 13.6	159.2	95	33	47 45.2	159.5	95	32	47 16.8	159.7	95	32	46 48.3	159.9	95	32	46 19.8	160.2	95	31	45 51.3	160.4	95	31	45 22.8	160.6	95	31	4
15	48 22.2	157.6	94	35	47 54.0	157.9	94	34	47 25.9	158.1	94	34	46 57.6	158.4	94	34	46 29.4	158.6	94	34	46 01.1	158.8	94	33	45 32.8	159.1	94	33	45 04.4	159.3	95	32	15
6	48 01.2	156.2	93	37	47 33.3	156.5	93	36	47 05.3	156.8	93	36	46 37.3	157.0	93	36	46 09.3	157.3	94	35	45 41.2	157.5	94	35	45 13.1	157.8	94	35	44 45.0	158.0	94	34	6
7	47 39.1	154.9	92	39	47 11.4	155.2	92	38	46 43.7	155.4	92	38	46 15.9	155.7	93	38	45 48.1	156.0	93	37	45 20.3	156.3	93	37	44 52.4	156.5	93	36	44 24.5	156.8	93	36	7
8	47 15.8	153.6	91	41	46 48.4	153.8	92	40	46 20.9	154.1	92	40	45 53.4	154.4	92	39	45 25.8	154.7	92	39	44 58.2	155.0	92	38	44 30.5	155.3	92	38	44 02.9	155.5	92	38	8
9	46 51.5	152.2	91	42	46 24.3	152.6	91	42	45 57.1	152.9	91	42	45 29.8	153.2	91	41	45 02.4	153.4	91	41	44 35.1	153.7	91	40	44 07.6	154.0	91	40	43 40.2	154.3	92	40	9
20	46 26.1	151.0	90	44	45 59.1	151.3	90	44	45 32.1	151.6	90	43	45 05.1	151.9	90	43	44 38.0	152.2	90	42	44 10.9	152.5	91	42	43 43.7	152.8	91	42	43 16.5	153.1	91	41	20
1	45 59.6	149.7	89	46	45 32.9	150.0	89	45	45 06.2	150.3	89	45	44 39.4	150.7	89	44	44 12.6	151.0	90	44	43 45.7	151.3	90	44	43 18.8	151.6	90	43	42 51.8	151.9	90	43	1
2	45 32.1	148.5	88	48	45 05.7	148.7	88	47	44 39.3	149.1	88	46	44 12.7	149.5	88	46	43 46.2	149.8	89	46	43 19.5	150.1	89	45	42 52.9	150.4	89	45	42 26.1	150.7	89	44	2
3	45 03.7	147.2	87	49	44 37.5	147.6	87	48	44 11.3	147.9	87	48	43 45.1	148.3	88	48	43 18.8	148.6	88	47	42 52.4	148.9	88	47	42 26.0	149.2	88	46	41 59.5	149.6	88	46	3
4	44 34.3	146.0	86	50	44 08.4	146.4	86	50	43 42.5	146.8	87	50	43 16.5	147.1	87	49	42 50.5	147.4	87	49	42 24.4	147.8	87	48	41 58.2	148.1	87	48	41 32.0	148.4	88	48	4
25	44 04.0	144.9	85	52	43 38.4	145.2	85	52	43 12.7	145.6	86	51	42 47.0	145.9	86	50	42 21.2	146.3	86	50	41 55.4	146.6	86	50	41 29.5	147.0	86	49	41 03.5	147.3	87	49	25
6	43 32.8	143.7	84	54	43 07.5	144.1	84	53	42 42.1	144.5	85	52	42 16.7	144.8	85	52	41 51.1	145.2	85	52	41 25.6	145.5	85	51	40 59.9	145.9	86	51	40 34.2	146.2	86	50	6
7	43 00.7	142.6	83	55	42 35.7	143.0	84	54	42 10.6	143.4	84	54	41 45.4	143.7	84	53	41 20.2	144.1	84	53	40 54.9	144.4	84	52	40 29.5	144.8	85	52	40 04.1	145.1	85	52	7
8	42 27.9	141.5	82	56	42 03.1	141.9	83	56	41 38.3	142.3	83	55	41 13.4	142.6	83	55	40 48.4	143.0	83	54	40 23.4	143.4	84	54	39 58.3	143.7	84	53	39 33.1	144.1	84	53	8
9	41 54.2	140.4	81	58	41 29.7	140.8	82	57	41 05.2	141.2	82	56	40 40.5	141.6	82	56	40 15.9	141.9	82	56	39 51.1	142.3	83	55	39 26.3	142.7	83	55	39 01.4	143.0	83	54	9
30	41 19.7	139.4	81	59	40 55.6	139.8	81	58	40 31.3	140.1	81	58	40 06.9	140.5	81	57	39 42.5	140.9	82	57	39 18.0	141.3	82	56	38 53.5	141.6	82	56	38 28.8	142.0	82	55	30
1	40 44.6	138.3	80	60	40 20.6	138.7	80	59	39 56.7	139.1	80	59	39 32.6	139.5	80	58	39 08.4	139.9	81	58	38 44.2	140.3	81	58	38 19.9	140.6	81	57	37 55.6	141.0	81	57	1
2	40 08.7	137.3	79	61	39 45.0	137.7	79	60	39 21.3	138.1	79	60	38 57.5	138.5	79	60	38 33.6	138.9	80	59	38 09.7	139.3	80	59	37 45.7	139.6	80	58	37 21.6	140.0	80	58	2
3	39 32.1	136.3	78	62	39 08.7	136.7	78	62	38 45.3	137.1	78	61	38 21.7	137.5	79	61	37 58.1	137.9	79	60	37 34.5	138.3	79	60	37 10.7	138.7	79	59	36 46.9	139.1	80	59	3
4	38 54.8	135.3	77	63	38 31.7	135.7	77	63	38 08.6	136.1	77	62	37 45.3	136.5	78	62	37 22.0	136.9	78	61	36 58.6	137.3	78	61	36 35.1	137.7	78	60	36 11.5	138.1	79	60	4
35	38 16.9	134.4	76	64	37 54.1	134.8	76	64	37 31.2	135.2	76	63	37 08.2	135.6	77	63	36 45.1	136.0	77	62	36 22.0	136.4	77	62	35 58.8	136.8	78	62	35 35.5	137.2	78	61	35
6	37 38.4	133.4	75	65	37 15.9	133.9	75	65	36 53.2	134.3	76	64	36 30.5	134.7	76	64	36 07.7	135.1	76	63	35 44.8	135.5	76	63	35 21.9	135.9	77	62	34 58.8	136.3	77	62	6
7	36 59.3	132.5	74	66	36 37.0	132.9	74	66	36 14.6	133.4	75	65	35 52.2	133.8	75	65	35 29.7	134.2	75	64	35 07.0	134.6	76	64	34 44.3	135.0	76	64	34 21.6	135.4	76	63	7
8	36 19.6	131.6	73	67	35 57.6	132.0	74	67	35 35.5	132.5	74	66	35 13.3	132.9	74	66	34 51.0	133.3	74	65	34 28.7	133.7	75	65	34 06.2	134.1	75	64	33 43.7	134.5	75	64	8
9	35 39.4	130.7	72	68	35 17.6	131.2	73	68	34 55.8	131.6	73	67	34 33.8	132.0	73	67	34 11.8	132.4	74	66	33 49.7	132.8	74	66	33 27.6	133.2	74	65	33 05.3	133.6	74	65	9
40	34 58.6	129.9	72	69	34 37.1	130.3	72	68	34 15.5	130.7	72	68	33 53.8	131.1	72	68	33 32.1	131.6	73	67	33 10.3	132.0	73	67	32 48.3	132.4	73	66	32 26.3	132.8	73	66	40
1	34 17.3	129.0	71	70	33 56.1	129.5	71	69	33 34.8	129.9	71	69	33 13.3	130.3	72	68	32 51.8	130.7	72	68	32 30.3	131.1	72	68	32 08.6	131.5	72	67	31 46.8	132.0	73	67	1
2	33 35.6	128.2	70	70	33 14.6	128.6	70	70	32 53.5	129.1	70	70	32 32.3	129.5	71	69	32 11.1	129.9	71	69	31 49.7	130.3	71	68	31 28.3	130.7	72	68	31 06.8	131.1	72	68	2
3	32 53.3	127.4	69	71	32 32.6	127.8	69	71	32 11.7	128.3	70	70	31 50.8	128.7	70	70	31 29.8	129.1	70	70	31 08.7	129.5	70	69	30 47.6	129.9	71	69	30 26.3	130.3	71	68	3
4	32 10.6	126.6	68	72	31 50.1	127.0	68	72	31 29.5	127.5	69	71	31 08.9	127.9	69	71	30 48.1	128.3	69	70	30 27.3	128.7	70	70	30 06.3	129.1	70	69	29 45.3	129.5	70	69	4
45	31 27.5	125.8	67	73	31 07.2	126.3	68	72	30 46.9	126.7	68	72	30 26.4	127.1	68	71	30 05.9	127.5	69	71	29 45.3	128.0	69	70	29 24.6	128.4	69	70	29 03.9	128.8	69	70	45
6	30 43.9	125.1	67	73	30 23.9	125.5	67	73	30 03.8	125.9	67	72	29 43.6	126.3	67	72	29 23.3	126.8	68	72	29 03.0	127.2	68	71	28 42.5	127.6	68	71	28 22.0	128.0	69	70	6
7	30 00.0	124.3	66	74	29 40.2	124.7	66	74	29 20.3	125.2	66	73	29 00.3	125.6	67	73	28 40.3	126.0	67	72	28 20.2	126.4	67	72	27 59.9	126.9	67	72	27 39.7	127.3	68	71	7
8	29 15.6	123.6	65	74	28 56.1	124.0	65	74	28 36.4	124.4	66	74	28 16.7	124.9	66	74	27 56.8	125.3	66	73	27 36.9	125.7	66	73	27 17.0	126.1	67	72	26 56.9	126.5	67	72	8
9	28 30.9	122.8	64	75	28 11.5	123.3	65	75	27 52.1	123.7	65	74	27 32.6	124.1	65	74	27 13.0	124.6	65	74	26 53.3	125.0	66	73	26 33.6	125.4	66	73	26 13.8	125.8	66	73	9
50	27 45.8	122.1	64	76	27 26.7	122.6	64	76	27 07.5	123.0	64	75	26 48.2	123.4	64	75	26 28.8	123.9	65	74	26 09.4	124.3	65	74	25 49.8	124.7	65	74	25 30.2	125.1	65	73	50
1	27 00.4	121.4	63	76	26 41.4	121.9	63	76	26 22.5	122.3	63	76	26 03.4	122.7	64	75	25 44.2	123.2	64	75	25 25.0	123.6	64	74	25 05.7	124.0	64	74	24 46.3	124.4	65	74	1
2	26 14.6	120.8	62	77	25 55.9	121.2	62	76	25 37.1	121.6	63	76	25 18.2	122.1	63	76	24 59.3	122.5	63	76	24 40.3	122.9	63	75	24 21.2	123.3	64	75	24 02.1	123.8	64	74	2
3	25 28.5	120.1	62	77	25 10.0	120.5	62	77	24 51.4	120.9	62	77	24 32.8	121.4	62	76	24 14.0	121.8	63	76	23 55.2	122.2	63	76	23 36.4	122.7	63	75	23 17.4	123.1	63	75	3
4	24 42.1	119.4	61	78	24 23.8	119.9	61	78	24 05.4	120.3	61	77	23 47.0	120.7	62	77	23 28.4	121.2	62	76	23 09.9	121.6	62	76	22 51.2	122.0	62	76	22 32.5	122.4	63	76	4
55	23 55.4	118.8	60	78	23 37.3	119.2	60	78	23 19.1	119.6	61	78	23 00.8	120.1	61	77	22 42.5	120.5	61	77	22 24.2	120.9	61	77	22 05.7	121.4	62	76	21 47.2	121.8	62	76	55
6	23 08.4	118.1	60	79	22 50.5	118.6	60	78	22 32.5	119.0	60	78	22 14.4	119.4	60	78	21 56.3	119.9	60	78	21 38.1	120.3	61	77	21 19.9	120.7	61	77	21 01.6	121.1	61	76	6
7	22 21.1	117.5	59	79	22 03.4	117.9	59	79	21 45.6	118.4	59	79	21 27.7	118.8	60	78	21 09.8	119.2	60	78	20 51.8	119.7	60	78	20 33.8	120.1	60	77	20 15.7	120.5	60	77	7
8	21 33.5	116.9	58	80	21 16.0	117.3	59	79	20 58.4	117.8	59	79	20 40.7	118.2	59	79	20 23.0	118.6	59	78	20 05.2	119.0	59	78	19 47.4	119.5	60	78	19 29.5	119.9	60	78	8
9	20 45.7	116.3	58	80	20 28.4	116.7	58	80	20 11.0	117.1	58	80	19 53.5	117.6	58	79	19 36.0	118.0	59	79	19 18.4	118.4	59	79	19 00.7	118.9	59	78	18 43.0	119.3	59	78	9
60	19 57.7	115.7	57	80	19 40.5	116.1	57	80	19 23.3	116.5	58	80	19 06.0	117.0	58	80	18 48.6	117.4	58	79	18 31.2	117.8	58	79	18 13.8	118.3	58	79	17 56.2	118.7	58	78	60
1	19 09.4	115.1	57	81	18 52.4	115.5	57	81	18 35.3	116.0	57	80	18 18.2	116.4	57	80	18 01.0	116.8	57	80	17 43.8	117.3	58	79	17 26.5	117.7	58	79	17 09.2	118.1	58	79	1
2	18 20.8	114.5	56	81	18 04.0	114.9	56	81	17 47.1	115.4	56	81	17 30.2	115.8	57	80	17 13.2	116.2	57	80	16 56.2	116.7	57	80	16 39.1	117.1	57	80	16 21.9	117.5	57	79	2
3	17 32.1	113.9	55	82	17 15.4	114.4	56	81	16 58.7	114.8	56	81	16 42.0	115.2	56	81	16 25.2	115.7	56	80	16 08.3	116.1	56	80	15 51.4	116.5	56	80	15 34.4	117.0	57	80	3
4	16 43.1	113.4	55	82	16 26.6	113.8	55	82	16 10.1	114.2	55	81	15 53.5	114.7	55	81	15 36.9	115.1	56	81	15 20.2	115.5	56	81	15 03.4	116.0	56	80	14 46.6	116.4	56	80	4
65	15 53.9	112.8	54	82	15 37.6	113.3	54	82	15 21.2	113.7	55	82	15 04.8	114.1	55	82	14 48.3	114.6	55	81	14 31.8	115.0	55	81	14 15.2	115.4	55	81	13 58.6	115.8	55	80	65
6	15 04.5	112.3	54	83	14 48.4	112.7	54	82	14 32.2	113.1	54	82	14 15.9	113.6	54	82	13 59.6	114.0	54	82	13 43.3	114.4	55	81	13 26.9	114.9	55	81	13 10.4	115.3	55	81	6
7	14 15.0	111.7	53	83	13 59.0	112.2	53	83	13 42.9	112.6	54	82	13 26.8	113.0	54	82	13 10.7	113.5	54	82	12 54.5	113.9	54	82	12 38.2	114.3	54	81	12 22.0	114.8	54	81	7
8	13 25.2	111.2	53	83	13 09.4	111.6	53	83	12 53.5	112.1	53	83	12 37.5	112.5	53	82	12 21.5	112.9	53	82	12 05.5	113.4	53	82	11 49.4	113.8	54	82	11 33.3	114.2	54	81	8
9	12 35.3	110.7	52	84	12 19.6	111.1	52	83	12 03.8	111.5	53	83	11 48.0	112.0	53	83	11 32.2	112.4	53	82	11 16.3	112.8	53	82	11 00.4	113.3	53	82	10 44.5	113.7	53	82	9
70	11 45.2	110.1	52	84	11 29.6	110.6	52	84	11 14.0	111.0	52	83	10 58.4	111.4	52	83	10 42.7	111.9	52	83	10 27.0	112.3	52	83	10 11.2	112.7	53	82	9 55.4	113.2	53	82	70
1	10 54.9	109.6	51	84	10 39.5	110.1	51	84	10 24.0	110.5	52	84	10 08.5	110.9	52	83	9 53.0	111.4	52	83	9 37.4	111.8	52	83	9 21.8	112.2	52	82	9 06.2	112.7	52	82	1
2	10 04.5	109.1	51	84	9 49.2	109.6	51	84	9 33.9	110.0	51	84	9 18.5	110.4	51	84	9 03.1	110.9	51	83	8 47.7	111.3	51	83	8 32.2	111.7	52	83	8 16.8	112.2	52	83	2
3	9 13.9	108.6	50	84	8 58.7	109.1	51	84	8 43.5	109.5	51	84	8 28.3	109.9	51	84	8 13.1	110.4	51	84	7 57.8	110.8	51	83	7 42.5	111.2	51	83	7 27.2	111.7	52	83	3
4	8 23.1	108.1	50	85	8 08.1	108.6	50	84	7 53.1	109.0	50	84	7 38.0	109.4	50	84	7 22.9	109.9	50	84	7 07.7	110.3	50	84	6 52.6	110.7	51	84	6 37.4	111.2	51	83	4
75	7 32.3	107.6	50	85	7 17.4	108.1	50	85	7 02.4	108.5	50	85	6 47.5	108.9	50	84	6 32.5	109.4	50	84	6 17.5	109.8	50	84	6 02.5	110.2	50	84	5 47.5	110.7	50	84	75
6	6 41.2	107.1	49	85	6 26.5	107.6	49	85	6 11.7	108.0	49	85	5 56.8	108.5	49	84	5 42.0	108.9	50	84	5 27.1	109.3	50	84	5 12.3	109.8	50	84					6
7	5 50.1	106.7	49	85	5 35.4	107.1	49	85	5 20.8	107.5	49	85	5 06.1	108.0	49	85																	7

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Az.	Δd	Δt	12° 30′ Alt.	Az.	Δd	Δt	13° 00′ Alt.	Az.	Δd	Δt	13° 30′ Alt.	Az.	Δd	Δt	14° 00′ Alt.	Az.	Δd	Δt	14° 30′ Alt.	Az.	Δd	Δt	15° 00′ Alt.	Az.	Δd	Δt	15° 30′ Alt.	Az.	Δd	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
91													5 12.8	77.5	45	87	5 26.2	77.0	45	87	5 39.6	76.6	45	87	5 52.9	76.1	44	86	6 06.3	75.7	44	86	91
2																									5 01.1	75.7	45	86	5 14.5	75.3	45	86	2

Lat. 27°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	80 00.0	1.0 04	180.0	80 30.0	1.0 04	180.0	81 00.0	1.0 05	180.0	81 30.0	1.0 05	180.0	82 00.0	1.0 05	180.0	82 30.0	1.0 06	180.0	00
1	78 57.7	1.0 12	175.0	79 27.5	1.0 13	174.8	79 57.4	1.0 13	174.5	80 27.3	1.0 13	174.2	80 57.2	1.0 14	173.9	81 27.0	99 15	173.6	81 56.8	99 16	173.2	82 26.6	99 16	172.8	1
2	78 50.7	99 19	170.0	79 20.3	99 20	169.6	79 49.8	98 21	169.1	80 19.3	98 22	168.6	80 48.8	98 23	168.0	81 18.2	98 24	167.4	81 47.5	98 25	166.6	82 16.7	97 27	165.8	2
3	78 39.2	97 26	165.2	79 08.3	97 27	164.6	79 37.3	97 28	163.9	80 06.2	96 30	163.1	80 35.0	96 31	162.3	81 03.7	95 32	161.4	81 32.3	95 34	160.3	82 00.6	94 36	159.2	3
4	78 23.4	95 33	160.5	78 51.9	95 34	159.7	79 20.2	94 36	158.9	79 48.4	94 37	157.9	80 16.4	93 39	156.9	80 44.2	92 40	155.7	81 11.7	91 42	154.5	81 39.0	90 44	153.1	4
05	78 03.7	93 39	156.1	78 31.4	92 40	155.2	78 58.9	91 42	154.1	79 26.2	91 44	153.0	79 53.2	90 45	151.8	80 20.0	89 47	150.5	80 46.4	87 49	149.1	81 12.5	86 51	147.5	05
6	77 40.2	90 45	151.9	78 07.1	89 46	150.9	78 33.7	88 48	149.7	79 00.1	87 49	148.5	79 26.1	86 51	147.2	79 51.7	85 53	145.7	80 17.0	83 55	144.2	80 41.7	82 57	142.5	6
7	77 13.5	87 50	148.0	77 39.4	86 51	146.9	78 05.1	85 53	145.6	78 30.5	84 54	144.3	78 55.4	82 56	142.9	79 19.9	81 58	141.4	79 44.0	79 60	139.7	80 07.5	77 62	137.9	7
8	76 43.7	84 54	144.4	77 08.8	83 56	143.1	77 33.5	82 57	141.8	77 57.8	80 59	140.5	78 21.7	79 60	139.0	78 45.1	77 62	137.4	79 08.0	75 64	135.7	79 30.3	73 66	133.9	8
9	76 11.2	81 58	141.0	76 35.4	80 60	139.7	76 59.2	79 61	138.4	77 22.5	77 63	137.0	77 45.4	75 64	135.4	78 07.7	74 66	133.8	78 29.5	72 68	132.2	78 50.6	69 70	130.3	9
10	75 36.4	78 62	137.8	75 59.7	77 63	136.5	76 22.6	75 64	135.2	76 44.9	74 66	133.7	77 06.8	72 68	132.2	77 28.1	70 69	130.6	77 48.9	68 71	128.9	78 08.9	66 72	127.2	10
1	74 59.5	75 65	134.9	75 22.0	74 66	133.6	75 43.9	72 67	132.2	76 05.4	71 69	130.8	76 26.3	69 70	129.3	76 46.7	67 72	127.7	77 06.4	65 73	126.0	77 25.5	62 75	124.3	1
2	74 20.8	73 67	132.2	74 42.4	71 69	130.9	75 03.5	70 70	129.5	75 24.1	68 71	128.1	75 44.2	66 73	126.6	76 03.6	64 74	125.1	76 22.5	62 75	123.4	76 40.7	59 77	121.7	2
3	73 40.4	70 70	129.7	74 01.2	69 71	128.4	74 21.5	67 72	127.1	74 41.3	65 73	125.7	75 00.6	63 75	124.2	75 19.2	61 76	122.7	75 37.3	59 77	121.1	75 54.7	57 78	119.4	3
4	72 58.6	68 72	127.4	73 18.7	66 73	126.1	73 38.2	64 74	124.8	73 57.3	63 75	123.4	74 15.8	61 76	122.0	74 33.7	59 78	120.5	74 51.0	57 79	118.9	75 07.6	54 80	117.3	4
15	72 15.5	65 74	125.3	72 34.9	64 75	124.0	72 53.8	62 76	122.7	73 12.1	60 77	121.3	73 29.9	58 78	119.9	73 47.2	56 79	118.5	74 03.8	54 80	117.0	74 19.7	52 81	115.4	15
6	71 31.4	63 75	123.3	71 50.1	62 76	122.0	72 08.3	60 77	120.8	72 26.0	58 78	119.4	72 43.2	56 79	118.1	72 59.8	54 80	116.6	73 15.7	52 81	115.2	73 31.1	50 82	113.7	6
7	70 46.2	61 77	121.4	71 04.3	60 78	120.2	71 21.9	58 79	119.0	71 39.0	56 80	117.7	71 55.6	54 80	116.3	72 11.6	52 81	114.9	72 27.0	50 82	113.5	72 41.8	48 83	112.1	7
8	70 00.2	59 78	119.7	70 17.7	58 79	118.5	70 34.8	56 80	117.3	70 51.3	54 80	116.0	71 07.4	53 82	114.7	71 22.8	51 82	113.4	71 37.7	49 83	112.0	71 52.0	47 84	110.6	8
9	69 13.3	58 79	118.1	69 30.4	56 80	116.9	69 46.9	54 81	115.7	70 03.0	53 82	114.5	70 18.5	51 82	113.2	70 33.5	49 83	111.9	70 47.9	47 84	110.6	71 01.8	45 84	109.3	9
20	68 25.9	56 80	116.6	68 42.4	54 81	115.4	68 58.5	53 82	114.3	69 14.1	51 82	113.1	69 29.1	49 83	111.8	69 43.7	48 84	110.6	69 57.7	46 84	109.3	70 11.1	44 85	108.0	20
1	67 37.7	54 81	115.2	67 53.8	53 82	114.0	68 09.5	51 82	112.9	68 24.6	50 83	111.7	68 39.3	48 84	110.5	68 53.4	46 84	109.3	69 07.0	44 85	108.1	69 20.1	43 86	106.8	1
2	66 49.1	53 82	113.8	67 04.8	52 82	112.7	67 20.0	50 83	111.6	67 34.8	48 84	110.5	67 49.0	47 84	109.3	68 02.8	45 85	108.2	68 16.1	43 86	106.9	68 28.8	41 86	105.7	2
3	66 00.0	52 83	112.6	66 15.3	50 83	111.5	66 30.1	49 84	110.4	66 44.5	47 84	109.3	66 58.4	46 85	108.2	67 11.8	44 85	107.0	67 24.8	42 86	105.9	67 37.2	40 86	104.7	3
4	65 10.4	51 83	111.4	65 25.3	49 84	110.3	65 39.8	48 84	109.3	65 53.9	46 85	108.2	66 07.5	45 85	107.1	66 20.6	43 86	106.0	66 33.2	41 86	104.9	66 45.4	40 87	103.7	4
25	64 20.4	49 84	110.3	64 35.0	48 84	109.2	64 49.2	47 85	108.2	65 02.9	45 85	107.2	65 16.2	44 86	106.1	65 29.1	42 86	105.0	65 41.4	40 87	103.9	65 53.3	39 87	102.8	25
6	63 30.1	48 84	109.2	63 44.4	47 85	108.2	63 58.3	46 85	107.2	64 11.7	44 86	106.2	64 24.7	43 86	105.1	64 37.3	41 86	104.1	64 49.4	40 87	103.0	65 01.1	38 87	101.9	6
7	62 39.4	47 85	108.2	62 53.5	46 85	107.2	63 07.1	45 86	106.2	63 20.3	43 86	105.2	63 33.0	42 86	104.2	63 45.4	40 87	103.2	63 57.3	39 87	102.1	64 08.7	37 88	101.1	7
8	61 48.5	46 85	107.2	62 02.3	45 86	106.3	62 15.6	44 86	105.3	62 28.6	42 86	104.3	62 41.1	41 87	103.3	62 53.2	40 87	102.3	63 04.9	38 88	101.3	63 16.2	37 88	100.3	8
9	60 57.3	46 86	106.3	61 10.8	44 86	105.4	61 23.9	43 86	104.4	61 36.7	42 87	103.5	61 49.0	40 87	102.5	62 00.9	39 87	101.5	62 12.4	38 88	100.5	62 23.5	36 88	99.5	9
30	60 05.9	45 86	105.4	60 19.2	44 86	104.5	60 32.1	42 87	103.6	60 44.6	41 87	102.7	60 56.7	40 87	101.7	61 08.5	38 88	100.8	61 19.8	37 88	99.8	61 30.7	36 88	98.8	30
1	59 14.2	44 86	104.5	59 27.3	43 87	103.7	59 40.0	42 87	102.8	59 52.4	41 87	101.9	60 04.3	39 88	100.9	60 15.9	38 88	100.0	60 27.1	37 88	99.1	60 37.9	35 88	98.1	1
2	58 22.4	43 87	103.7	58 35.3	42 87	102.9	58 47.8	41 87	102.0	59 00.0	40 88	101.1	59 11.8	39 88	100.2	59 23.2	37 88	99.3	59 34.2	36 88	98.4	59 44.9	35 88	97.5	2
3	57 30.4	43 87	103.0	57 43.1	42 87	102.1	57 55.4	41 88	101.3	58 07.4	39 88	100.4	58 19.1	38 88	99.5	58 30.4	37 88	98.6	58 41.3	36 88	97.7	58 51.9	35 89	96.8	3
4	56 38.2	42 87	102.2	56 50.7	41 87	101.4	57 02.9	40 88	100.5	57 14.8	39 88	99.7	57 26.3	38 88	98.8	57 37.5	37 88	98.0	57 48.3	35 88	97.1	57 58.7	34 89	96.2	4
35	55 45.9	42 87	101.5	55 58.3	41 88	100.7	56 10.3	40 88	99.8	56 22.0	39 88	99.0	56 33.4	37 88	98.2	56 44.5	36 88	97.3	56 55.2	35 89	96.5	57 05.6	34 89	95.6	35
6	54 53.4	41 88	100.8	55 05.7	40 88	100.0	55 17.6	39 88	99.2	55 29.2	38 88	98.4	55 40.5	37 88	97.5	55 51.4	36 88	96.7	56 02.1	35 89	95.9	56 12.3	34 89	95.0	6
7	54 00.8	41 88	100.1	54 13.0	40 88	99.3	54 24.8	39 88	98.5	54 36.3	38 88	97.7	54 47.4	37 88	96.9	54 58.3	36 89	96.1	55 08.9	35 89	95.3	55 19.1	33 89	94.5	7
8	53 08.2	40 88	99.4	53 20.2	40 88	98.7	53 31.9	39 88	97.9	53 43.3	37 88	97.1	53 54.3	36 89	96.3	54 05.1	35 89	95.5	54 15.6	34 89	94.7	54 25.7	33 89	93.9	8
9	52 15.4	40 88	98.8	52 27.3	39 88	98.0	52 38.9	38 88	97.3	52 50.2	37 89	96.5	53 01.2	36 89	95.7	53 11.9	35 89	95.0	53 22.3	34 89	94.2	53 32.4	33 89	93.4	9
40	51 22.5	40 88	98.2	51 34.3	39 88	97.4	51 45.8	38 88	96.7	51 57.0	37 89	95.9	52 08.0	36 89	95.2	52 18.6	35 89	94.4	52 29.0	34 89	93.6	52 39.0	33 89	92.9	40
1	50 29.5	39 88	97.6	50 41.2	39 88	96.8	50 52.7	38 89	96.1	51 03.8	37 89	95.4	51 14.7	36 89	94.6	51 25.3	35 89	93.9	51 35.6	34 89	93.1	51 45.6	33 89	92.4	1
2	49 36.5	39 88	97.0	49 48.1	38 88	96.3	49 59.5	37 89	95.5	50 10.6	37 89	94.8	50 21.4	36 89	94.1	50 31.9	35 89	93.4	50 42.2	34 89	92.6	50 52.2	33 89	91.9	2
3	48 43.4	39 89	96.4	48 55.0	38 89	95.7	49 06.2	37 89	95.0	49 17.3	36 89	94.3	49 28.1	35 89	93.6	49 38.6	35 89	92.8	49 48.8	34 89	92.1	49 58.7	33 89	91.4	3
4	47 50.2	39 89	95.8	48 01.7	38 89	95.2	48 13.0	37 89	94.5	48 24.0	36 89	93.8	48 34.7	35 89	93.1	48 45.2	34 89	92.3	48 55.4	34 89	91.6	49 05.3	33 89	90.9	4
45	46 57.0	38 89	95.3	47 08.5	38 89	94.6	47 19.7	37 89	93.9	47 30.6	36 89	93.2	47 41.3	35 89	92.6	47 51.7	34 89	91.9	48 01.9	34 89	91.2	48 11.8	33 89	90.4	45
6	46 03.8	38 89	94.8	46 15.2	38 89	94.1	46 26.3	37 89	93.4	46 37.2	36 89	92.7	46 47.9	35 89	92.1	46 58.3	34 89	91.4	47 08.5	33 89	90.7	47 18.4	33 89	90.0	6
7	45 10.5	38 89	94.2	45 21.8	37 89	93.6	45 32.9	37 89	92.9	45 43.8	36 89	92.2	45 54.4	35 89	91.6	46 04.8	34 89	90.9	46 15.0	33 89	90.2	46 24.9	33 89	89.5	7
8	44 17.2	38 89	93.7	44 28.5	37 89	93.1	44 39.5	37 89	92.4	44 50.4	36 89	91.8	45 01.0	35 89	91.1	45 11.4	34 89	90.4	45 21.5	33 89	89.8	45 31.5	33 89	89.1	8
9	43 23.8	38 89	93.2	43 35.1	37 89	92.6	43 46.1	36 89	91.9	43 56.9	36 89	91.3	44 07.5	35 89	90.6	44 17.9	34 89	90.0	44 28.1	33 89	89.3	44 38.0	33 89	88.7	9
50	42 30.4	38 89	92.7	42 41.6	37 89	92.1	42 52.7	36 89	91.5	43 03.5	36 89	90.8	43 14.1	35 89	90.2	43 24.5	34 89	89.5	43 34.6	34 89	88.9	43 44.6	33 89	88.2	50
1	41 37.0	38 89	92.2	41 48.2	37 89	91.6	41 59.2	36 89	91.0	42 10.0	36 89	90.4	42 20.6	35 89	89.7	42 31.0	34 89	89.1	42 41.2	34 89	88.4	42 51.1	33 89	87.8	1
2	40 43.6	38 89	91.7	40 54.8	37 89	91.1	41 05.8	36 89	90.5	41 16.6	36 89	89.9	41 27.2	35 89	89.3	41 37.6	34 89	88.6	41 47.7	34 89	88.0	41 57.7	33 89	87.4	2
3	39 50.1	38 89	91.3	40 01.3	37 89	90.7	40 12.3	36 89	90.1	40 23.1	36 89	89.4	40 33.7	35 89	88.8	40 44.1	34 89	88.2	40 54.3	34 89	87.6	41 04.3	33 89	87.0	3
4	38 56.7	38 89	90.8	39 07.9	37 89	90.2	39 18.8	36 89	89.6	39 29.6	36 89	89.0	39 40.3	35 89	88.4	39 50.7	34 89	87.8	40 00.9	34 89	87.2	40 11.0	33 89	86.6	4
55	38 03.2	38 89	90.3	38 14.4	37 89	89.8	38 25.4	36 89	89.2	38 36.2	36 89	88.6	38 46.8	35 89	88.0	38 57.3	35 89	87.4	39 07.5	34 89	86.8	39 17.6	33 89	86.1	55
6	37 09.8	38 89	89.9	37 20.9	37 89	89.3	37 31.9	36 89	88.7	37 42.8	36 89	88.1	37 53.4	35 89	87.5	38 03.9	35 89	86.9	38 14.2	34 89	86.3	38 24.3	33 89	85.7	6
7	36 16.3	38 89	89.4	36 27.5	37 89	88.9	36 38.5	36 89	88.3	36 49.3	36 89	87.7	37 00.0	35 89	87.1	37 10.5	35 89	86.5	37 20.8	34 89	85.9	37 31.0	34 89	85.3	7
8	35 22.8	38 89	89.0	35 34.0	37 89	88.4	35 45.1	36 89	87.9	35 55.9	36 89	87.3	36 06.6	35 89	86.7	36 17.2	35 89	86.1	36 27.5	34 89	85.5	36 37.7	34 89	84.9	8
9	34 29.4	38 89	88.6	34 40.6	37 89	88.0	34 51.6	37 89	87.4	35 02.5	36 89	86.9	35 13.3	35 89	86.3	35 23.8	35 89	85.7	35 34.2	34 89	85.1	35 44.5	34 89	84.6	9
60	33 36.0	38 89	88.1	33 47.2	37 89	87.6	33 58.3	37 89	87.0	34 09.2	36 89	86.4	34 19.9	36 89	85.9	34 30.5	35 89	85.3	34 41.0	35 89	84.7	34 51.3	34 89	84.2	60
1	32 42.5	38 89	87.7	32 53.8	37 89	87.1	33 04.9	37 89	86.6	33 15.8	36 89	86.0	33 26.6	36 89	85.5	33 37.3	35 89	84.9	33 47.8	35 89	84.3	33 58.1	34 88	83.8	1
2	31 49.1	38 89	87.3	32 00.4	37 89	86.7	32 11.5	37 89	86.2	32 22.5	36 89	85.6	32 33.3	36 89	85.1	32 44.0	35 89	84.5	32 54.6	35 88	83.9	33 05.0	34 88	83.4	2
3	30 55.7	38 89	86.8	31 07.0	37 89	86.3	31 18.2	37 89	85.7	31 29.2	37 89	85.2	31 40.1	36 89	84.7	31 50.8	36 88	84.1	32 01.4	35 88	83.6	32 11.9	35 88	83.0	3
4	30 02.4	38 89	86.4	30 13.7	38 89	85.9	30 24.9	37 89	85.3	30 36.0	37 89	84.8	30 46.9	36 89	84.3	30 57.7	36 88	83.7	31 08.3	35 88	83.2	31 18.9	35 88	82.6	4
65	29 09.0	38 89	86.0	29 20.4	38 89	85.5	29 31.6	37 89	84.9	29 42.7	37 89	84.4	29 53.7	36 88	83.9	30 04.6	36 88	83.3	30 15.3	36 88	82.8	30 25.9	35 88	82.2	65
6	28 15.7	38 89	85.6	28 27.1	38 89	85.0	28 38.4	37 89	84.5	28 49.6	37 89	84.0	29 00.6	37 88	83.5	29 11.5	36 88	82.9	29 22.3	36 88	82.4	29 32.9	35 88	81.8	6
7	27 22.4	38 89	85.1	27 33.9	38 89	84.6	27 45.2	38 89	84.1	27 56.4	37 88	83.6	28 07.5	37 88	83.1	28 18.5	36 88	82.5	28 29.3	36 88	82.0	28 40.0	36 88	81.5	7
8	26 29.2	38 89	84.7	26 40.7	38 89	84.2	26 52.0	38 88	83.7	27 03.3	37 88	83.2	27 14.4	37 88	82.7	27 25.5	37 88	82.1	27 36.4	36 88	81.6	27 47.2	36 88	81.1	8
9	25 36.0	39 89	84.3	25 47.5	38 88	83.8	25 58.9	38 88	83.3	26 10.2	38 88	82.8	26 21.5	37 88	82.3	26 32.5	37 88	81.7	26 43.5	36 88	81.2	26 54.4	36 88	80.7	9
70	24 42.8	39 88	83.9	24 54.4	38 88	83.4	25 05.9	38 88	82.9	25 17.2	38 88	82.4	25 28.5	37 88	81.9	25 39.7	37 88	81.4	25 50.7	37 88	80.8	26 01.7	36 88	80.3	70
1	23 49.6	39 88	83.5	24 01.3	39 88	83.0	24 12.8	38 88	82.5	24 24.3	38 88	82.0	24 35.6	38 88	81.5	24 46.8	37 88	81.0	24 58.0	37 88	80.5	25 09.0	37 88	79.9	1
2	22 56.5	39 88	83.1	23 08.2	39 88	82.6	23 19.8	39 88	82.1	23 31.4	38 88	81.6	23 42.8	38 88	81.1	23 54.1	38 88	80.6	24 05.3	37 88	80.1	24 16.4	37 88	79.6	2
3	22 03.5	39 88	82.7	22 15.3	39 88	82.2	22 26.9	39 88	81.7	22 38.5	38 88	81.2	22 50.0	38 88	80.7	23 01.4	38 88	80.2	23 12.7	37 88	79.7	23 23.9	37 88	79.2	3
4	21 10.5	40 88	82.3	21 22.3	39 88	81.8	21 34.1	39 88	81.3	21 45.7	39 88	80.8	21 57.3	38 88	80.3	22 08.7	38 88	79.8	22 20.1	38 88	79.3	22 31.4	37 87	78.8	4
75	20 17.5	40 88	81.9	20 29.4	39 88	81.4	20 41.2	39 88	80.9	20 53.0	39 88	80.4	21 04.6	39 88	79.9	21 16.1	38 88	79.4	21 27.6	38 87	78.9	21 39.0	38 87	78.4	75
6	19 24.7	40 88	81.5	19 36.6	40 88	81.0	19 48.5	39 88	80.5	20 00.3	39 88	80.0	20 12.0	39 88	79.5	20 23.6	39 87	79.0	20 35.2	38 87	78.5	20 46.6	38 87	78.0	6
7	18 31.8	40 88	81.1	18 43.8	40 88	80.6	18 55.8	40 88	80.1	19 07.7	39 88	79.6	19 19.5	39 88	79.1	19 31.2	39 87	78.6	19 42.8	39 87	78.1	19 54.4	38 87	77.6	7
8	17 39.0	40 88	80.6	17 51.1	40 88	80.2	18 03.2	40 88	79.7	18 15.1	40 88	79.2	18 27.0	39 87	78.7	18 38.8	39 87	78.2	18 50.5	39 87	77.7	19 02.2	39 87	77.3	8
9	16 46.3	41 88	80.2	16 58.5	40 88	79.8	17 10.6	40 88	79.3	17 22.6	40 87	78.8	17 34.6	40 87	78.3	17 46.5	40 87	77.8	17 58.3	39 87	77.4	18 10.1	39 87	76.9	9
80	15 53.7	41 88	79.8	16 05.9	41 88	79.4	16 18.1	41 87	78.9	16 30.2	40 87	78.4	16 42.3	40 87	77.9	16 54.3	40 87	77.4	17 06.2	40 87	77.0	17 18.1	39 87	76.5	80
1	15 01.1	41 88	79.4	15 13.4	41 87	78.9	15 25.7	41 87	78.5	15 37.9	41 87	78.0	15 50.0	40 87	77.5	16 02.1	40 87	77.1	16 14.2	40 87	76.6	16 26.1	40 86	76.1	1
2	14 08.6	41 87	79.0	14 21.0	41 87	78.5	14 33.3	41 87	78.1	14 45.6	41 87	77.6	14 57.9	41 87	77.1	15 10.1	41 87	76.7	15 22.2	40 86	76.2	15 34.3	40 86	75.7	2
3	13 16.1	42 87	78.6	13 28.6	42 87	78.1	13 41.1	41 87	77.7	13 53.5	41 87	77.2	14 05.8	41 87	76.7	14 18.1	41 86	76.3	14 30.3	41 86	75.8	14 42.5	40 86	75.3	3
4	12 23.8	42 87	78.2	12 36.3	42 87	77.7	12 48.9	42 87	77.3	13 01.4	42 87	76.8	13 13.8	41 86	76.3	13 26.2	41 86	75.9	13 38.6	41 86	75.4	13 50.9	41 86	74.9	4
85	11 31.5	42 87	77.8	11 44.1	42 87	77.3	11 56.8	42 87	76.8	12 09.4	42 86	76.4	12 21.9	42 86	75.9	12 34.4	42 86	75.5	12 46.9	41 86	75.0	12 59.3	41 86	74.5	85
6	10 39.3	43 87	77.4	10 52.0	43 87	76.9	11 04.8	42 86	76.4	11 17.5	42 86	76.0	11 30.1	42 86	75.5	11 42.7	42 86	75.0	11 55.3	42 86	74.6	12 07.8	42 86	74.1	6
7	9 47.1	43 87	76.9	10 00.0	43 86	76.5	10 12.9	43 86	76.0	10 25.6	43 86	75.6	10 38.4	42 86	75.1	10 51.1	42 86	74.6	11 03.8	42 86	74.2	11 16.4	42 85	73.7	7
8	8 55.1	43 86	76.5	9 08.1	43 86	76.1	9 21.0	43 86	75.6	9 33.9	43 86	75.1	9 46.8	43 86	74.7	9 59.6	43 86	74.2	10 12.4	43 86	73.8	10 25.2	42 85	73.3	8
9	8 03.2	44 86	76.1	8 16.2	44 86	75.6	8 29.3	43 86	75.2	8 42.3	43 86	74.7	8 55.3	43 86	74.2	9 08.2	43 86	73.8	9 21.1	43 85	73.4	9 34.0	43 85	72.9	9
90	7 11.3	44 86	75.7	7 24.5	44 86	75.2	7 37.7	44 86	74.8	7 50.8	44 86	74.3	8 03.9	44 86	73.9	8 16.9	43 85	73.4	8 30.0	43 85	72.9	8 43.0	43 85	72.5	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	47 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	46 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	00
1	46 59.3	1.0 03	178.6	46 29.4	1.0 03	178.6	45 59.4	1.0 03	178.6	45 29.4	1.0 03	178.6	44 59.4	1.0 03	178.7	44 29.4	1.0 03	178.7	43 59.4	1.0 03	178.7	43 29.4	1.0 03	178.7	1
2	46 57.4	1.0 06	177.2	46 27.4	1.0 05	177.2	45 57.4	1.0 05	177.2	45 27.5	1.0 05	177.3	44 57.5	1.0 05	177.3	44 27.5	1.0 05	177.3	43 57.5	1.0 05	177.4	43 27.6	1.0 05	177.4	2
3	46 54.1	1.0 08	175.8	46 24.2	1.0 08	175.8	45 54.2	1.0 08	175.9	45 24.3	1.0 07	175.9	44 54.4	1.0 07	176.0	44 24.4	1.0 07	176.0	43 54.5	1.0 07	176.1	43 24.5	1.0 07	176.1	3
4	46 49.5	1.0 10	174.4	46 19.6	1.0 10	174.4	45 49.7	1.0 10	174.5	45 19.9	1.0 10	174.6	44 50.0	1.0 09	174.6	44 20.1	1.0 09	174.7	43 50.2	1.0 09	174.8	43 20.3	1.0 09	174.8	4
05	46 43.6	99 12	173.0	46 13.8	99 12	173.1	45 44.0	99 12	173.1	45 14.2	99 12	173.2	44 44.4	99 11	173.3	44 14.5	99 11	173.4	43 44.7	99 11	173.5	43 14.9	99 11	173.5	05
6	46 36.4	99 14	171.6	46 06.7	99 14	171.7	45 37.0	99 14	171.8	45 07.2	99 14	171.9	44 37.5	99 14	172.0	44 07.8	99 13	172.1	43 38.0	99 13	172.2	43 08.3	99 13	172.2	6
7	46 28.0	99 16	170.2	45 58.4	99 16	170.3	45 28.7	99 16	170.4	44 59.1	99 16	170.5	44 29.4	99 16	170.6	43 59.8	99 15	170.8	43 30.1	99 15	170.9	43 00.4	99 15	171.0	7
8	46 18.3	98 18	168.8	45 48.7	98 18	169.0	45 19.2	98 18	169.1	44 49.7	98 18	169.2	44 20.1	98 18	169.3	43 50.6	99 17	169.5	43 21.0	99 17	169.6	42 51.5	99 17	169.7	8
9	46 07.3	98 20	167.5	45 37.9	98 20	167.6	45 08.5	98 20	167.8	44 39.1	98 20	167.9	44 09.6	98 20	168.0	43 40.2	98 19	168.2	43 10.8	98 19	168.3	42 41.3	98 19	168.4	9
10	45 55.1	97 22	166.1	45 25.8	98 22	166.3	44 56.5	98 22	166.4	44 27.3	98 22	166.6	43 58.0	98 22	166.7	43 28.7	98 21	166.9	42 59.3	98 21	167.0	42 30.0	98 21	167.2	10
1	45 41.6	97 24	164.8	45 12.5	97 24	164.9	44 43.4	97 24	165.1	44 14.3	97 24	165.3	43 45.1	97 23	165.4	43 16.0	97 23	165.6	42 46.8	97 23	165.8	42 17.6	97 23	165.9	1
2	45 27.0	96 26	163.4	44 58.0	97 26	163.6	44 29.1	97 26	163.8	44 00.1	97 26	164.0	43 31.1	97 25	164.2	43 02.1	97 25	164.4	42 33.1	97 25	164.5	42 04.0	97 24	164.7	2
3	45 11.2	96 28	162.1	44 42.4	96 28	162.3	44 13.6	96 28	162.5	43 44.8	96 27	162.7	43 16.0	96 27	162.9	42 47.1	96 27	163.1	42 18.2	96 26	163.3	41 49.4	96 26	163.5	3
4	44 54.2	95 30	160.8	44 25.6	95 30	161.0	43 57.0	95 30	161.3	43 28.4	95 29	161.5	42 59.7	96 29	161.7	42 31.0	96 29	161.9	42 02.3	96 28	162.1	41 33.6	96 28	162.3	4
15	44 36.1	95 32	159.5	44 07.7	95 32	159.8	43 39.3	95 31	160.0	43 10.8	95 31	160.2	42 42.3	95 31	160.4	42 13.8	95 30	160.6	41 45.3	95 30	160.8	41 16.8	95 30	161.1	15
6	44 16.8	94 34	158.3	43 48.6	94 34	158.5	43 20.4	94 33	158.8	42 52.2	94 33	159.0	42 23.9	94 32	159.2	41 55.6	94 32	159.4	41 27.3	94 32	159.7	40 58.9	95 32	159.9	6
7	43 56.5	93 36	157.0	43 28.5	93 35	157.3	43 00.5	93 35	157.5	42 32.5	94 35	157.8	42 04.4	94 34	158.0	41 36.3	94 34	158.2	41 08.2	94 34	158.5	40 40.0	94 33	158.7	7
8	43 35.1	92 37	155.8	43 07.4	93 37	156.1	42 39.6	93 37	156.3	42 11.7	93 36	156.6	41 43.9	93 36	156.8	41 16.0	93 36	157.1	40 48.0	93 35	157.3	40 20.1	93 35	157.5	8
9	43 12.7	92 39	154.6	42 45.1	92 39	154.8	42 17.6	92 38	155.1	41 49.9	92 38	155.4	41 22.3	92 38	155.6	40 54.6	92 37	155.9	40 26.9	92 37	156.1	39 59.1	93 36	156.4	9
20	42 49.2	91 41	153.4	42 21.9	91 40	153.7	41 54.6	91 40	153.9	41 27.2	91 40	154.2	40 59.7	91 39	154.5	40 32.3	92 39	154.7	40 04.8	92 38	155.0	39 37.2	92 38	155.3	20
1	42 24.8	90 42	152.2	41 57.7	90 42	152.5	41 30.6	90 42	152.8	41 03.4	91 41	153.0	40 36.2	91 41	153.3	40 09.0	91 40	153.6	39 41.7	91 40	153.9	39 14.4	91 40	154.1	1
2	41 59.3	89 44	151.0	41 32.5	90 44	151.3	41 05.6	90 43	151.6	40 38.7	90 43	151.9	40 11.8	90 42	152.2	39 44.7	90 42	152.5	39 17.7	90 42	152.8	38 50.6	90 41	153.0	2
3	41 33.0	89 46	149.9	41 06.4	89 45	150.2	40 39.8	89 45	150.5	40 13.1	89 44	150.8	39 46.4	89 44	151.1	39 19.6	89 44	151.4	38 52.8	89 43	151.7	38 25.9	90 43	152.0	3
4	41 05.7	88 47	148.7	40 39.4	88 47	149.1	40 13.0	88 46	149.4	39 46.5	88 46	149.7	39 20.1	88 45	150.0	38 53.5	88 45	150.3	38 27.0	89 44	150.6	38 00.3	89 44	150.9	4
25	40 37.5	87 48	147.6	40 11.4	87 48	148.0	39 45.3	87 48	148.3	39 19.1	87 47	148.6	38 52.9	88 47	148.9	38 26.6	88 46	149.2	38 00.3	88 46	149.5	37 33.9	88 46	149.8	25
6	40 08.5	86 50	146.5	39 42.6	86 49	146.9	39 16.8	86 49	147.2	38 50.8	87 48	147.5	38 24.9	87 48	147.9	37 58.8	87 48	148.2	37 32.8	87 47	148.5	37 06.6	87 47	148.8	6
7	39 38.6	85 51	145.5	39 13.0	85 51	145.8	38 47.4	85 50	146.2	38 21.7	86 50	146.5	37 56.0	86 50	146.8	37 30.2	86 49	147.1	37 04.4	86 49	147.5	36 38.5	86 48	147.8	7
8	39 07.9	84 52	144.4	38 42.6	84 52	144.8	38 17.2	85 52	145.1	37 51.8	85 51	145.4	37 26.3	85 51	145.8	37 00.8	85 50	146.1	36 35.2	85 50	146.4	36 09.6	86 50	146.8	8
9	38 36.4	83 54	143.4	38 11.4	84 53	143.7	37 46.3	84 53	144.1	37 21.1	84 52	144.4	36 55.9	84 52	144.8	36 30.6	84 52	145.1	36 05.3	85 51	145.4	35 39.9	85 51	145.8	9
30	38 04.1	82 55	142.4	37 39.4	83 55	142.7	37 14.5	83 54	143.1	36 49.6	83 54	143.4	36 24.7	83 53	143.8	35 59.7	83 53	144.1	35 34.6	84 52	144.5	35 09.5	84 52	144.8	30
1	37 31.1	82 56	141.4	37 06.6	82 56	141.7	36 42.0	82 55	142.1	36 17.4	82 55	142.5	35 52.7	82 54	142.8	35 28.0	83 54	143.2	35 03.2	83 54	143.5	34 38.3	83 53	143.8	1
2	36 57.4	81 57	140.4	36 33.2	81 57	140.8	36 08.8	81 56	141.1	35 44.5	81 56	141.5	35 20.0	82 56	141.8	34 55.6	82 55	142.2	34 31.0	82 55	142.5	34 06.4	82 54	142.9	2
3	36 23.0	80 58	139.4	35 59.0	80 58	139.8	35 35.0	80 58	140.2	35 10.8	80 57	140.5	34 46.7	81 57	140.9	34 22.4	81 56	141.3	33 58.1	81 56	141.6	33 33.8	81 56	142.0	3
4	35 47.9	79 60	138.5	35 24.2	79 59	138.9	35 00.4	79 59	139.2	34 36.5	80 58	139.6	34 12.6	80 58	140.0	33 48.6	80 57	140.3	33 24.6	80 57	140.7	33 00.5	80 56	141.1	4
35	35 12.1	78 61	137.6	34 48.7	78 60	137.9	34 25.2	78 60	138.3	34 01.6	79 59	138.7	33 37.9	79 59	139.1	33 14.2	79 58	139.4	32 50.4	79 58	139.8	32 26.6	80 58	140.2	35
6	34 35.7	77 62	136.7	34 12.5	77 61	137.0	33 49.3	78 61	137.4	33 26.0	78 60	137.8	33 02.6	78 60	138.2	32 39.1	78 60	138.5	32 15.6	79 59	138.9	31 52.0	79 59	139.3	6
7	33 58.7	76 63	135.8	33 35.8	77 62	136.2	33 12.8	77 62	136.5	32 49.8	77 62	136.9	32 26.6	77 61	137.3	32 03.4	77 60	137.7	31 40.2	78 60	138.0	31 16.8	78 60	138.4	7
8	33 21.1	75 64	134.9	32 58.5	76 63	135.3	32 35.8	76 63	135.7	32 12.9	76 62	136.1	31 50.1	76 62	136.4	31 27.1	77 61	136.8	31 04.1	77 61	137.2	30 41.0	77 60	137.6	8
9	32 43.0	75 64	134.0	32 20.6	75 64	134.4	31 58.1	75 64	134.8	31 35.6	75 63	135.2	31 12.9	76 63	135.6	30 50.3	76 62	136.0	30 27.5	76 62	136.3	30 04.7	76 62	136.7	9
40	32 04.3	74 65	133.2	31 42.1	74 65	133.6	31 19.9	74 64	134.0	30 57.6	74 64	134.4	30 35.2	75 64	134.8	30 12.8	75 63	135.1	29 50.3	75 63	135.5	29 27.8	75 62	135.9	40
1	31 25.0	73 66	132.4	31 03.1	73 66	132.8	30 41.2	73 65	133.2	30 19.1	74 65	133.5	29 57.0	74 64	133.9	29 34.8	74 64	134.3	29 12.6	74 64	134.7	28 50.3	74 63	135.1	1
2	30 45.3	72 67	131.5	30 23.6	72 67	131.9	30 01.9	73 66	132.3	29 40.1	73 66	132.7	29 18.3	73 66	133.1	28 56.3	73 65	133.5	28 34.3	73 65	133.9	28 12.3	74 64	134.3	2
3	30 05.0	71 68	130.7	29 43.6	71 68	131.1	29 22.1	72 67	131.6	29 00.6	72 67	131.9	28 39.0	72 66	132.3	28 17.3	72 66	132.7	27 55.6	73 66	133.1	27 33.8	73 65	133.5	3
4	29 24.3	70 69	130.0	29 03.1	71 68	130.4	28 41.9	71 68	130.8	28 20.6	71 68	131.2	27 59.2	71 67	131.6	27 37.8	72 67	132.0	27 16.3	72 66	132.4	26 54.7	72 66	132.7	4
45	28 43.1	70 70	129.2	28 22.2	70 69	129.6	28 01.2	70 69	130.0	27 40.1	70 68	130.4	27 19.0	71 68	130.8	26 57.8	71 67	131.2	26 36.6	71 67	131.6	26 15.2	71 66	132.0	45
6	28 01.4	69 70	128.4	27 40.7	69 70	128.8	27 20.0	69 69	129.3	26 59.2	69 69	129.7	26 38.3	70 68	130.1	26 17.4	70 68	130.5	25 56.4	70 68	130.9	25 35.3	70 67	131.3	6
7	27 19.3	68 71	127.7	26 58.9	68 70	128.1	26 38.4	68 70	128.5	26 17.8	69 70	128.9	25 57.2	69 69	129.3	25 36.5	69 69	129.7	25 15.7	69 68	130.1	24 54.9	70 68	130.5	7
8	26 36.8	67 72	127.0	26 16.6	67 71	127.4	25 56.3	68 71	127.8	25 36.0	68 70	128.2	25 15.6	68 70	128.6	24 55.1	68 70	129.0	24 34.6	69 69	129.4	24 14.0	69 69	129.8	8
9	25 53.9	66 72	126.2	25 33.9	67 72	126.7	25 13.9	67 72	127.1	24 53.8	67 71	127.5	24 33.6	67 71	127.9	24 13.4	68 70	128.3	23 53.1	68 70	128.7	23 32.7	68 70	129.1	9
50	25 10.6	66 73	125.5	24 50.8	66 72	126.0	24 31.0	66 72	126.4	24 11.2	66 72	126.8	23 51.2	67 71	127.2	23 31.2	67 71	127.6	23 11.2	67 70	128.0	22 51.0	67 70	128.4	50
1	24 26.9	65 73	124.9	24 07.4	65 73	125.3	23 47.8	65 73	125.7	23 28.2	66 72	126.1	23 08.5	66 72	126.5	22 48.7	66 72	126.9	22 28.8	66 71	127.3	22 09.0	66 71	127.7	1
2	23 42.8	64 74	124.2	23 23.6	64 74	124.6	23 04.2	65 73	125.0	22 44.8	65 73	125.4	22 25.3	65 72	125.8	22 05.8	65 72	126.2	21 46.1	65 72	126.7	21 26.5	66 72	127.1	2
3	22 58.4	63 75	123.5	22 39.4	64 74	123.9	22 20.2	64 74	124.3	22 01.0	64 74	124.8	21 41.8	64 73	125.2	21 22.4	65 73	125.6	21 03.1	65 72	126.0	20 43.6	65 72	126.4	3
4	22 13.7	63 75	122.8	21 54.8	63 75	123.3	21 35.9	63 74	123.7	21 16.9	63 74	124.1	20 57.9	64 74	124.5	20 38.8	64 73	124.9	20 19.6	64 73	125.3	20 00.4	64 72	125.7	4
55	21 28.6	62 76	122.2	21 10.0	62 75	122.6	20 51.3	62 75	123.0	20 32.5	63 75	123.5	20 13.7	63 74	123.9	19 54.8	63 74	124.3	19 35.9	63 74	124.7	19 16.9	63 73	125.1	55
6	20 43.2	61 76	121.6	20 24.8	62 76	122.0	20 06.3	62 76	122.4	19 47.7	62 75	122.8	19 29.1	62 75	123.2	19 10.5	62 74	123.7	18 51.7	63 74	124.1	18 33.0	63 74	124.5	6
7	19 57.5	61 77	120.9	19 39.3	61 76	121.4	19 21.0	61 76	121.8	19 02.7	61 76	122.2	18 44.3	61 75	122.6	18 25.8	62 75	123.0	18 07.3	62 75	123.5	17 48.7	62 74	123.9	7
8	19 11.5	60 77	120.3	18 53.5	60 77	120.7	18 35.4	60 76	121.2	18 17.3	61 76	121.6	17 59.1	61 76	122.0	17 40.8	61 75	122.4	17 22.5	61 75	122.8	17 04.2	61 75	123.3	8
9	18 25.2	59 78	119.7	18 07.4	60 77	120.1	17 49.5	60 77	120.6	17 31.6	60 77	121.0	17 13.6	60 76	121.4	16 55.6	60 76	121.8	16 37.5	60 76	122.2	16 19.3	61 75	122.7	9
60	17 38.7	59 78	119.1	17 21.0	59 78	119.5	17 03.3	59 77	120.0	16 45.6	59 77	120.4	16 27.8	59 77	120.8	16 10.0	60 76	121.2	15 52.1	60 76	121.6	15 34.2	60 76	122.1	60
1	16 51.8	58 78	118.5	16 34.4	58 78	119.0	16 16.9	58 78	119.4	15 59.4	59 78	119.8	15 41.8	59 77	120.2	15 24.1	59 77	120.6	15 06.4	59 76	121.1	14 48.7	59 76	121.5	1
2	16 04.7	57 79	118.0	15 47.5	58 79	118.4	15 30.2	58 78	118.8	15 12.8	58 78	119.2	14 55.4	58 78	119.7	14 38.0	58 77	120.1	14 20.5	58 77	120.5	14 03.0	59 77	120.9	2
3	15 17.4	57 79	117.4	15 00.3	57 79	117.8	14 43.2	57 79	118.2	14 26.1	57 78	118.7	14 08.9	57 78	119.1	13 51.6	58 78	119.5	13 34.3	58 78	119.9	13 17.0	58 77	120.3	3
4	14 29.8	56 80	116.8	14 12.9	56 79	117.3	13 56.0	56 79	117.7	13 39.0	57 79	118.1	13 22.0	57 78	118.5	13 05.0	57 78	118.9	12 47.9	57 78	119.4	12 30.7	57 78	119.8	4
65	13 42.0	56 80	116.3	13 25.3	56 80	116.7	13 08.5	56 80	117.1	12 51.7	56 79	117.5	12 34.9	56 79	118.0	12 18.0	56 78	118.4	12 01.1	56 78	118.8	11 44.2	57 78	119.2	65
6	12 53.9	55 80	115.7	12 37.4	55 80	116.2	12 20.8	55 80	116.6	12 04.2	55 80	117.0	11 47.6	56 79	117.4	11 30.9	56 79	117.9	11 14.2	56 79	118.3	10 57.4	56 78	118.7	6
7	12 05.7	54 81	115.2	11 49.3	55 80	115.6	11 32.9	55 80	116.0	11 16.5	55 80	116.5	11 00.0	55 80	116.9	10 43.5	55 79	117.3	10 27.0	55 79	117.7	10 10.4	55 79	118.2	7
8	11 17.2	54 81	114.7	11 01.0	54 81	115.1	10 44.8	54 81	115.5	10 28.5	54 80	115.9	10 12.2	54 80	116.4	9 55.9	54 80	116.8	9 39.6	55 79	117.2	9 23.2	55 79	117.6	8
9	10 28.5	53 82	114.1	10 12.5	53 81	114.6	9 56.4	54 81	115.0	9 40.3	54 81	115.4	9 24.2	54 80	115.8	9 08.1	54 80	116.3	8 51.9	54 80	116.7	8 35.7	54 80	117.1	9
70	9 39.6	53 82	113.6	9 23.7	53 82	114.0	9 07.9	53 81	114.5	8 51.9	53 81	114.9	8 36.0	53 81	115.3	8 20.0	53 80	115.8	8 04.0	53 80	116.2	7 48.0	53 80	116.6	70
1	8 50.5	52 82	113.1	8 34.8	52 82	113.5	8 19.1	52 82	114.0	8 03.4	53 81	114.4	7 47.6	53 81	114.8	7 31.8	53 81	115.2	7 16.0	53 80	115.7	7 00.1	53 80	116.1	1
2	8 01.3	52 82	112.6	7 45.7	52 82	113.0	7 30.2	52 82	113.5	7 14.6	52 82	113.9	6 59.0	52 81	114.3	6 43.3	52 81	114.7	6 27.7	52 81	115.2	6 12.0	52 80	115.6	2
3	7 11.8	51 83	112.1	6 56.4	51 82	112.5	6 41.0	51 82	113.0	6 25.6	51 82	113.4	6 10.2	52 82	113.8	5 54.7	52 82	114.3	5 39.2	52 81	114.7	5 23.7	52 81	115.1	3
4	6 22.2	51 83	111.6	6 07.0	51 83	112.0	5 51.7	51 82	112.5	5 36.4	51 82	112.9	5 21.2	51 82	113.3	5 05.8	51 82	113.8							4
75	5 32.4	50 83	111.1	5 17.3	50 83	111.5	5 02.2	50 83	112.0																75

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	6 19.6	44 86	75.2	6 32.9	44 86	74.8	6 46.1	44 86	74.3	6 59.4	44 86	73.9	7 12.6	44 85	73.4	7 25.8	44 85	73.0	7 38.9	44 85	72.5	7 52.1	44 85	72.1	91
2	5 27.9	45 86	74.8	5 41.3	45 86	74.4	5 54.7	45 86	73.9	6 08.1	44 85	73.5	6 21.4	44 85	73.0	6 34.7	44 85	72.6	6 48.0	44 85	72.1	7 01.3	44 84	71.7	2
3							5 03.4	45 85	73.5	5 16.9	45 85	73.0	5 30.3	45 85	72.6	5 43.8	45 85	72.1	5 57.2	45 84	71.7	6 10.6	45 84	71.2	3
4																			5 06.5	45 84	71.3	5 20.0	45 84	70.8	4

Lat. 27°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	83 00.0	1.0 06	180.0	83 30.0	1.0 06	180.0	84 00.0	1.0 07	180.0	84 30.0	1.0 08	180.0	85 00.0	1.0 08	180.0	85 30.0	1.0 09	180.0	86 00.0	1.0 10	180.0	86 30.0	1.0 12	180.0	00
1	82 56.4	99 18	172.3	83 26.2	99 19	171.8	83 55.9	99 20	171.1	84 25.5	99 22	170.4	84 55.1	98 24	169.5	85 24.6	98 26	168.4	85 53.9	98 29	167.0	86 23.1	97 32	165.3	1
2	82 45.8	97 28	164.9	83 14.9	96 30	163.9	83 43.7	96 32	162.6	84 12.4	95 35	161.2	84 40.8	94 38	159.6	85 08.8	93 41	157.6	85 36.5	91 44	155.2	86 03.6	89 49	152.2	2
3	82 28.8	93 38	157.9	82 56.7	93 40	156.5	83 24.3	91 43	154.8	83 51.5	90 46	152.9	84 18.2	88 49	150.7	84 44.4	86 52	148.2	85 09.8	83 56	145.1	85 34.3	80 60	141.6	3
4	82 05.9	89 46	151.5	82 32.5	88 49	149.8	82 58.6	86 52	147.8	83 24.1	84 54	145.6	83 49.0	82 58	143.1	84 13.1	79 61	140.2	84 36.2	75 65	137.0	84 58.0	71 68	133.2	4
05	81 38.1	85 54	145.7	82 03.2	83 56	143.8	82 27.7	81 58	141.7	82 51.5	78 61	139.3	83 14.5	75 64	136.6	83 36.5	72 67	133.7	83 57.4	68 71	130.4	84 17.0	63 74	126.6	05
6	81 06.0	80 59	140.6	81 29.6	78 62	138.6	81 52.6	75 64	136.3	82 14.7	72 67	133.9	82 35.9	69 69	131.2	82 56.1	65 72	128.3	83 15.1	61 75	125.0	83 32.6	56 78	121.5	6
7	80 30.4	75 64	136.0	80 52.6	73 66	133.9	81 14.1	70 69	131.7	81 34.7	67 71	129.3	81 54.3	64 73	126.6	82 12.9	60 76	123.8	82 30.2	55 78	120.7	82 46.1	51 80	117.4	7
8	79 51.9	71 68	132.0	80 12.8	68 70	129.9	80 32.9	66 72	127.7	80 52.1	62 74	125.3	81 10.4	59 76	122.8	81 27.5	55 78	120.0	81 43.3	51 80	117.1	81 57.9	46 82	114.1	8
9	79 11.1	67 71	128.4	79 30.8	64 73	126.4	79 49.6	61 75	124.2	80 07.6	58 77	121.9	80 24.6	55 79	119.5	80 40.4	51 80	116.9	80 55.1	47 82	114.2	81 08.6	42 84	111.3	9
10	78 28.3	63 74	125.3	78 46.9	61 76	123.3	79 04.6	58 77	121.2	79 21.5	55 79	119.0	79 37.4	51 80	116.6	79 52.2	48 82	114.2	80 05.9	44 83	111.6	80 18.4	39 85	109.0	10
1	77 43.9	60 76	122.5	78 01.5	57 78	120.5	78 18.3	54 79	118.5	78 34.2	51 81	116.4	78 49.1	48 82	114.2	79 03.0	45 83	111.9	79 15.8	41 84	109.5	79 27.5	37 86	107.0	1
2	76 58.2	57 78	119.9	77 14.9	54 80	118.1	77 30.8	52 81	116.1	77 45.8	49 82	114.1	77 59.9	45 83	112.0	78 13.0	42 84	109.8	78 25.1	39 85	107.6	78 36.1	35 86	105.2	2
3	76 11.3	54 80	117.7	76 27.2	52 81	115.9	76 42.4	49 82	114.0	76 56.6	46 83	112.1	77 10.0	43 84	110.1	77 22.5	40 85	108.0	77 33.9	37 86	105.9	77 44.4	33 87	103.7	3
4	75 23.5	52 81	115.7	75 38.7	49 82	113.9	75 53.2	47 83	112.2	76 06.8	44 84	110.3	76 19.5	41 85	108.4	76 31.4	38 86	106.5	76 42.3	35 86	104.4	76 52.3	32 87	102.4	4
15	74 35.0	50 82	113.8	74 49.5	47 83	112.2	75 03.4	45 84	110.4	75 16.4	42 85	108.7	75 28.6	39 86	106.9	75 40.0	36 86	105.0	75 50.4	33 87	103.1	76 00.0	30 88	101.2	15
6	73 45.8	48 83	112.1	73 59.7	45 84	110.5	74 13.0	43 85	108.9	74 25.5	40 85	107.2	74 37.2	38 86	105.5	74 48.2	35 87	103.7	74 58.2	32 87	101.9	75 07.4	29 88	100.1	6
7	72 56.0	46 84	110.6	73 09.4	44 84	109.1	73 22.2	41 85	107.5	73 34.3	39 86	105.9	73 45.6	36 87	104.2	73 56.1	34 87	102.6	74 05.8	31 88	100.8	74 14.7	28 88	99.1	7
8	72 05.7	44 84	109.2	72 18.7	42 85	107.7	72 31.1	40 86	106.2	72 42.7	38 86	104.7	72 53.6	35 87	103.1	73 03.8	33 88	101.5	73 13.2	30 88	99.8	73 21.8	27 88	98.2	8
9	71 15.0	43 85	107.9	71 27.6	41 86	106.4	71 39.6	39 86	105.0	71 50.9	36 87	103.5	72 01.4	34 87	102.0	72 11.3	32 88	100.5	72 20.5	29 88	98.9	72 28.9	27 88	97.3	9
20	70 24.0	42 86	106.7	70 36.2	40 86	105.3	70 47.8	38 87	103.9	70 58.8	35 87	102.5	71 09.1	33 88	101.0	71 18.7	31 88	99.6	71 27.6	29 88	98.1	71 35.8	26 89	96.5	20
1	69 32.6	41 86	105.5	69 44.5	39 87	104.2	69 55.8	37 87	102.9	70 06.5	35 88	101.5	70 16.5	32 88	100.1	70 25.9	30 88	98.7	70 34.6	28 88	97.3	70 42.6	26 89	95.8	1
2	68 40.9	40 86	104.5	68 52.5	38 87	103.2	69 03.6	36 87	101.9	69 14.0	34 88	100.6	69 23.8	32 88	99.2	69 33.0	30 88	97.9	69 41.5	27 89	96.5	69 49.4	25 89	95.1	2
3	67 49.1	39 87	103.5	68 00.4	37 87	102.2	68 11.2	35 88	101.0	68 21.4	33 88	99.7	68 31.0	31 88	98.4	68 40.0	29 88	97.1	68 48.4	27 89	95.8	68 56.2	25 89	94.5	3
4	66 57.0	38 87	102.5	67 08.1	36 88	101.3	67 18.6	34 88	100.1	67 28.6	32 88	98.9	67 38.1	30 88	97.7	67 46.9	29 89	96.4	67 55.2	27 89	95.1	68 02.8	25 89	93.8	4
25	66 04.7	37 87	101.7	66 15.6	35 88	100.5	66 25.9	34 88	99.3	66 35.7	32 88	98.1	66 45.0	30 88	96.9	66 53.7	28 89	95.7	67 01.9	26 89	94.5	67 09.5	24 89	93.3	25
6	65 12.3	36 88	100.8	65 22.9	35 88	99.7	65 33.1	33 88	98.6	65 42.8	31 88	97.4	65 51.9	30 89	96.3	66 00.5	28 89	95.1	66 08.6	26 89	93.9	66 16.1	24 89	92.7	6
7	64 19.7	36 88	100.0	64 30.2	34 88	98.9	64 40.2	33 88	97.8	64 49.7	31 88	96.7	64 58.7	29 89	95.6	65 07.2	27 89	94.5	65 15.2	26 89	93.3	65 22.7	24 89	92.2	7
8	63 27.0	35 88	99.3	63 37.3	34 88	98.2	63 47.2	32 88	97.1	63 56.6	31 89	96.1	64 05.5	29 89	95.0	64 13.9	27 89	93.9	64 21.8	26 89	92.8	64 29.2	24 89	91.6	8
9	62 34.2	35 88	98.5	62 44.4	33 88	97.5	62 54.1	32 89	96.5	63 03.4	30 89	95.4	63 12.2	29 89	94.4	63 20.6	27 89	93.3	63 28.4	25 89	92.2	63 35.8	24 89	91.1	9
30	61 41.2	34 88	97.8	61 51.3	33 88	96.8	62 01.0	31 89	95.8	62 10.2	30 89	94.8	62 18.9	28 89	93.8	62 27.2	27 89	92.8	62 35.0	25 89	91.7	62 42.3	24 89	90.7	30
1	60 48.2	34 88	97.2	60 58.2	33 89	96.2	61 07.7	31 89	95.2	61 16.9	30 89	94.2	61 25.5	28 89	93.2	61 33.8	27 89	92.2	61 41.6	25 89	91.2	61 48.9	24 89	90.2	1
2	59 55.2	34 89	96.5	60 05.0	32 89	95.6	60 14.5	31 89	94.6	60 23.5	29 89	93.7	60 32.1	28 89	92.7	60 40.3	27 89	91.7	60 48.1	25 89	90.7	60 55.4	24 89	89.7	2
3	59 02.0	33 89	95.9	59 11.8	32 89	95.0	59 21.2	31 89	94.1	59 30.2	29 89	93.1	59 38.7	28 89	92.2	59 46.9	26 89	91.2	59 54.6	25 89	90.3	60 02.0	24 89	89.3	3
4	58 08.8	33 89	95.3	58 18.5	32 89	94.4	58 27.8	30 89	93.5	58 36.8	29 89	92.6	58 45.3	28 89	91.7	58 53.4	26 89	90.7	59 01.2	25 89	89.8	59 08.5	24 89	88.9	4
35	57 15.6	33 89	94.7	57 25.2	32 89	93.9	57 34.5	30 89	93.0	57 43.4	29 89	92.1	57 51.9	28 89	91.2	58 00.0	26 89	90.3	58 07.7	25 89	89.4	58 15.1	24 89	88.4	35
6	56 22.3	33 89	94.2	56 31.8	31 89	93.3	56 41.1	30 89	92.5	56 49.9	29 89	91.6	56 58.4	28 89	90.7	57 06.5	26 89	89.8	57 14.3	25 89	88.9	57 21.6	24 89	88.0	6
7	55 28.9	32 89	93.6	55 38.5	31 89	92.8	55 47.6	30 89	92.0	55 56.5	29 89	91.1	56 05.0	28 89	90.2	56 13.1	26 89	89.4	56 20.8	25 89	88.5	56 28.2	24 89	87.6	7
8	54 35.6	32 89	93.1	54 45.0	31 89	92.3	54 54.2	30 89	91.5	55 03.0	29 89	90.6	55 11.5	28 89	89.8	55 19.6	26 89	88.9	55 27.4	25 89	88.1	55 34.8	24 89	87.2	8
9	53 42.2	32 89	92.6	53 51.6	31 89	91.8	54 00.8	30 89	91.0	54 09.6	29 89	90.2	54 18.0	28 89	89.3	54 26.2	27 89	88.5	54 34.0	25 89	87.7	54 41.4	24 89	86.9	9
40	52 48.7	32 89	92.1	52 58.2	31 89	91.3	53 07.3	30 89	90.5	53 16.1	29 89	89.7	53 24.6	28 89	88.9	53 32.7	27 89	88.1	53 40.6	26 89	87.3	53 48.0	24 89	86.5	40
1	51 55.3	32 89	91.6	52 04.7	31 89	90.8	52 13.8	30 89	90.1	52 22.6	29 89	89.3	52 31.1	28 89	88.5	52 39.3	27 89	87.7	52 47.2	26 89	86.9	52 54.7	25 89	86.1	1
2	51 01.9	32 89	91.1	51 11.3	31 89	90.4	51 20.4	30 89	89.6	51 29.2	29 89	88.8	51 37.7	28 89	88.1	51 45.9	27 89	87.3	51 53.8	26 89	86.5	52 01.4	25 89	85.7	2
3	50 08.4	32 89	90.6	50 17.8	31 89	89.9	50 26.9	30 89	89.2	50 35.7	29 89	88.4	50 44.3	28 89	87.7	50 52.5	27 89	86.9	51 00.4	26 89	86.1	51 08.1	25 89	85.4	3
4	49 15.0	32 89	90.2	49 24.4	31 89	89.5	49 33.5	30 89	88.7	49 42.3	29 89	88.0	49 50.9	28 89	87.2	49 59.1	27 89	86.5	50 07.1	26 89	85.7	50 14.8	25 89	85.0	4
45	48 21.5	32 89	89.7	48 30.9	31 89	89.0	48 40.0	30 89	88.3	48 48.9	29 89	87.6	48 57.5	28 89	86.8	49 05.8	27 89	86.1	49 13.8	26 89	85.4	49 21.6	25 89	84.6	45
6	47 28.0	32 89	89.3	47 37.4	31 89	88.6	47 46.6	30 89	87.9	47 55.5	29 89	87.2	48 04.1	28 89	86.5	48 12.5	27 89	85.7	48 20.5	26 89	85.0	48 28.4	26 89	84.3	6
7	46 34.6	32 89	88.8	46 44.0	31 89	88.2	46 53.2	30 89	87.5	47 02.1	29 89	86.8	47 10.8	28 89	86.1	47 19.2	28 89	85.4	47 27.3	27 89	84.6	47 35.2	26 89	83.9	7
8	45 41.1	32 89	88.4	45 50.6	31 89	87.7	45 59.8	30 89	87.1	46 08.7	29 89	86.4	46 17.4	29 89	85.7	46 25.9	28 89	85.0	46 34.1	27 89	84.3	46 42.0	26 88	83.6	8
9	44 47.7	32 89	88.0	44 57.2	31 89	87.3	45 06.4	30 89	86.7	45 15.4	30 89	86.0	45 24.1	29 89	85.3	45 32.7	28 89	84.6	45 40.9	27 89	83.9	45 48.9	26 88	83.2	9
50	43 54.3	32 89	87.6	44 03.8	31 89	86.9	44 13.0	31 89	86.3	44 22.1	30 89	85.6	44 30.9	29 89	84.9	44 39.4	28 89	84.2	44 47.8	27 88	83.6	44 55.9	27 88	82.9	50
1	43 00.9	32 89	87.2	43 10.4	31 89	86.5	43 19.7	31 89	85.9	43 28.8	30 89	85.2	43 37.6	29 89	84.5	43 46.3	28 89	83.9	43 54.7	28 88	83.2	44 02.8	27 88	82.5	1
2	42 07.5	32 89	86.7	42 17.1	32 89	86.1	42 26.4	31 89	85.5	42 35.5	30 89	84.8	42 44.4	29 89	84.2	42 53.1	29 88	83.5	43 01.6	28 88	82.9	43 09.8	27 88	82.2	2
3	41 14.1	32 89	86.3	41 23.7	32 89	85.7	41 33.1	31 89	85.1	41 42.3	30 89	84.4	41 51.3	30 89	83.8	42 00.0	29 88	83.2	42 08.6	28 88	82.5	42 16.9	27 88	81.9	3
4	40 20.8	32 89	85.9	40 30.4	32 89	85.3	40 39.9	31 89	84.7	40 49.1	30 89	84.1	40 58.2	30 88	83.4	41 07.0	29 88	82.8	41 15.6	28 88	82.2	41 24.0	28 88	81.5	4
55	39 27.5	33 89	85.5	39 37.2	32 89	84.9	39 46.7	31 89	84.3	39 56.0	31 89	83.7	40 05.1	30 88	83.1	40 14.0	29 88	82.4	40 22.7	29 88	81.8	40 31.1	28 88	81.2	55
6	38 34.2	33 89	85.1	38 43.9	32 89	84.5	38 53.5	32 89	83.9	39 02.8	31 88	83.3	39 12.0	30 88	82.7	39 21.0	30 88	82.1	39 29.8	29 88	81.5	39 38.3	28 88	80.8	6
7	37 40.9	33 89	84.8	37 50.7	32 89	84.2	38 00.3	32 88	83.6	38 09.8	31 88	83.0	38 19.0	30 88	82.3	38 28.1	30 88	81.7	38 36.9	29 88	81.1	38 45.6	29 88	80.5	7
8	36 47.7	33 89	84.4	36 57.6	33 89	83.8	37 07.2	32 88	83.2	37 16.7	31 88	82.6	37 26.0	31 88	82.0	37 35.2	30 88	81.4	37 44.1	30 88	80.8	37 52.9	29 88	80.2	8
9	35 54.5	33 88	84.0	36 04.4	33 88	83.4	36 14.2	32 88	82.8	36 23.7	32 88	82.2	36 33.1	31 88	81.6	36 42.3	30 88	81.0	36 51.4	30 88	80.4	37 00.2	29 88	79.8	9
60	35 01.4	33 88	83.6	35 11.1	33 88	83.0	35 21.2	32 88	82.4	35 30.8	32 88	81.9	35 40.3	31 88	81.3	35 49.6	31 88	80.7	35 58.7	30 88	80.1	36 07.6	30 88	79.5	60
1	34 08.3	34 88	83.2	34 18.3	33 88	82.6	34 28.2	33 88	82.1	34 37.9	32 88	81.5	34 47.4	32 88	80.9	34 56.8	31 88	80.3	35 06.1	30 88	79.8	35 15.1	30 88	79.2	1
2	33 15.2	34 88	82.8	33 25.3	33 88	82.3	33 35.3	33 88	81.7	33 45.1	32 88	81.1	33 54.7	32 88	80.6	34 04.2	31 88	80.0	34 13.5	31 88	79.4	34 22.6	30 87	78.8	2
3	32 22.2	34 88	82.4	32 32.4	34 88	81.9	32 42.4	33 88	81.3	32 52.3	33 88	80.8	33 02.0	32 88	80.2	33 11.5	32 88	79.6	33 21.0	31 88	79.1	33 30.2	31 87	78.5	3
4	31 29.2	34 88	82.1	31 39.5	34 88	81.5	31 49.6	33 88	81.0	31 59.5	33 88	80.4	32 09.3	32 88	79.8	32 19.0	32 88	79.3	32 28.5	31 87	78.7	32 37.9	31 87	78.2	4
65	30 36.3	35 88	81.7	30 46.6	34 88	81.1	30 56.8	34 88	80.6	31 06.8	33 88	80.0	31 16.7	33 88	79.5	31 26.5	32 87	78.9	31 36.1	32 87	78.4	31 45.6	31 87	77.8	65
6	29 43.4	35 88	81.3	29 53.8	34 88	80.8	30 04.1	34 88	80.2	30 14.2	34 88	79.7	30 24.2	33 87	79.1	30 34.1	33 87	78.6	30 43.8	32 87	78.0	30 53.3	32 87	77.5	6
7	28 50.6	35 88	80.9	29 01.1	35 88	80.4	29 11.4	34 88	79.9	29 21.6	34 88	79.3	29 31.7	33 87	78.8	29 41.7	33 87	78.2	29 51.5	33 87	77.7	30 01.2	32 87	77.1	7
8	27 57.9	35 88	80.6	28 08.4	35 88	80.0	28 18.8	35 88	79.5	28 29.1	34 87	79.0	28 39.3	34 87	78.4	28 49.4	33 87	77.9	28 59.3	33 87	77.3	29 09.1	32 87	76.8	8
9	27 05.2	36 88	80.2	27 15.8	35 88	79.7	27 26.3	35 88	79.1	27 36.7	34 87	78.6	27 47.0	34 87	78.1	27 57.1	34 87	77.5	28 07.2	33 87	77.0	28 17.1	33 87	76.5	9
70	26 12.5	36 88	79.8	26 23.2	36 88	79.3	26 33.8	35 87	78.8	26 44.3	35 87	78.2	26 54.7	34 87	77.7	27 05.0	34 87	77.2	27 15.1	34 87	76.7	27 25.1	33 86	76.1	70
1	25 19.9	36 88	79.4	25 30.7	36 87	78.9	25 41.4	35 87	78.4	25 52.0	35 87	77.9	26 02.5	35 87	77.4	26 12.9	34 87	76.8	26 23.1	34 86	76.3	26 33.3	34 86	75.8	1
2	24 27.4	37 88	79.1	24 38.3	36 87	78.5	24 49.1	36 87	78.0	24 59.8	35 87	77.5	25 10.4	35 87	77.0	25 20.9	35 87	76.5	25 31.2	34 86	76.0	25 41.5	34 86	75.4	2
3	23 34.9	37 87	78.7	23 45.9	36 87	78.2	23 56.8	36 87	77.7	24 07.6	36 87	77.1	24 18.3	35 87	76.6	24 28.9	35 86	76.1	24 39.4	35 86	75.6	24 49.8	34 86	75.1	3
4	22 42.6	37 87	78.3	22 53.7	37 87	77.8	23 04.7	37 87	77.3	23 15.6	36 87	76.8	23 26.4	36 86	76.3	23 37.1	36 86	75.8	23 47.7	35 86	75.3	23 58.2	35 86	74.7	4
75	21 50.3	37 87	77.9	22 01.4	37 87	77.4	22 12.5	37 87	76.9	22 23.6	37 87	76.4	22 34.5	36 86	75.9	22 45.3	36 86	75.4	22 56.0	36 86	74.9	23 06.6	35 86	74.4	75
6	20 58.0	38 87	77.5	21 09.3	38 87	77.0	21 20.5	37 87	76.5	21 31.6	37 86	76.0	21 42.7	37 86	75.5	21 53.6	36 86	75.0	22 04.5	36 86	74.5	22 15.2	36 86	74.0	6
7	20 05.9	38 87	77.2	20 17.2	38 86	76.7	20 28.6	38 86	76.2	20 39.8	37 86	75.7	20 50.9	37 86	75.2	21 02.0	37 86	74.7	21 13.0	36 86	74.2	21 23.9	36 86	73.7	7
8	19 13.8	38 87	76.8	19 25.3	38 86	76.3	19 36.7	38 86	75.8	19 48.0	38 86	75.3	19 59.3	37 86	74.8	20 10.5	37 86	74.3	20 21.6	37 86	73.8	20 32.6	37 85	73.3	8
9	18 21.8	39 86	76.4	18 33.4	39 86	75.9	18 44.9	38 86	75.4	18 56.4	38 86	74.9	19 07.8	38 86	74.4	19 19.1	38 86	73.9	19 30.3	37 85	73.5	19 41.4	37 85	73.0	9
80	17 29.9	39 86	76.0	17 41.6	39 86	75.5	17 53.2	39 86	75.0	18 04.8	38 86	74.6	18 16.3	38 86	74.1	18 27.7	38 85	73.6	18 39.1	38 85	73.1	18 50.4	37 85	72.6	80
1	16 38.0	40 86	75.6	16 49.9	39 86	75.1	17 01.6	39 86	74.7	17 13.3	39 86	74.2	17 24.9	39 85	73.7	17 36.5	38 85	73.2	17 48.0	38 85	72.7	17 59.4	38 85	72.2	1
2	15 46.3	40 86	75.2	15 58.2	40 86	74.8	16 10.1	40 86	74.3	16 21.9	39 86	73.8	16 33.7	39 85	73.3	16 45.4	39 85	72.8	16 57.0	39 85	72.4	17 08.5	38 84	71.9	2
3	14 54.6	40 86	74.8	15 06.7	40 86	74.4	15 18.7	40 86	73.9	15 30.6	40 85	73.4	15 42.5	40 85	72.9	15 54.3	39 85	72.5	16 06.1	39 85	72.0	16 17.8	39 84	71.5	3
4	14 03.1	41 86	74.4	14 15.3	41 86	74.0	14 27.4	40 85	73.5	14 39.5	40 85	73.0	14 51.5	40 85	72.6	15 03.4	40 85	72.1	15 15.3	40 84	71.6	15 27.1	39 84	71.1	4
85	13 11.6	41 86	74.0	13 23.9	41 85	73.6	13 36.2	41 85	73.1	13 48.4	41 85	72.6	14 00.5	40 85	72.2	14 12.6	40 84	71.7	14 24.6	40 84	71.2	14 36.6	40 84	70.8	85
6	12 20.3	41 85	73.7	12 32.7	41 85	73.2	12 45.1	41 85	72.7	12 57.4	41 85	72.2	13 09.7	41 84	71.8	13 21.9	41 84	71.3	13 34.1	40 84	70.8	13 46.2	40 84	70.4	6
7	11 29.0	42 85	73.3	11 41.6	42 85	72.8	11 54.1	42 85	72.3	12 06.6	41 85	71.9	12 19.0	41 84	71.4	12 31.3	41 84	70.9	12 43.6	41 84	70.5	12 55.9	41 84	70.0	7
8	10 37.9	42 85	72.8	10 50.6	42 85	72.4	11 03.2	42 85	71.9	11 15.8	42 84	71.5	11 28.4	42 84	71.0	11 40.9	42 84	70.5	11 53.3	41 84	70.1	12 05.7	41 83	69.6	8
9	9 46.9	43 85	72.4	9 59.7	43 85	72.0	10 12.4	42 84	71.5	10 25.2	42 84	71.1	10 37.9	42 84	70.6	10 50.5	42 84	70.1	11 03.1	42 84	69.7	11 15.7	42 83	69.2	9
90	8 56.0	43 85	72.0	9 08.9	43 84	71.6	9 21.8	43 84	71.1	9 34.7	43 84	70.7	9 47.5	43 84	70.2	10 00.3	43 84	69.7	10 13.1	42 83	69.3	10 25.8	42 83	68.8	90

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	
00	43 00.0	1.0	01	180.0	42 30.0	1.0	01	180.0	42 00.0	1.0	01	180.0	41 30.0	1.0	01	180.0	41 00.0	1.0	01	180.0	40 30.0	1.0	01	180.0	00
1	42 59.4	1.0	08	178.7	42 29.4	1.0	03	178.7	41 59.4	1.0	03	178.7	41 29.4	1.0	03	178.8	40 59.4	1.0	03	178.8	40 29.4	1.0	03	178.8	1
2	42 57.6	1.0	05	177.4	42 27.6	1.0	05	177.5	41 57.7	1.0	05	177.5	41 27.7	1.0	05	177.5	40 57.7	1.0	05	177.5	40 27.7	1.0	05	177.6	2
3	42 54.6	1.0	07	176.1	42 24.7	1.0	07	176.2	41 54.7	1.0	07	176.2	41 24.8	1.0	07	176.3	40 54.8	1.0	07	176.3	40 24.9	1.0	07	176.4	3
4	42 50.4	1.0	09	174.9	42 20.5	1.0	09	174.9	41 50.6	1.0	09	175.0	41 20.7	1.0	09	175.0	40 50.8	1.0	09	175.1	40 20.9	1.0	08	175.1	4
05	42 45.1	99	11	173.6	42 15.2	99	11	173.7	41 45.4	99	11	173.7	41 15.5	99	10	173.8	40 45.7	99	10	173.9	40 15.9	99	10	173.9	05
6	42 38.5	99	13	172.3	42 08.7	99	13	172.4	41 39.0	99	13	172.5	41 09.2	99	12	172.6	40 39.4	99	12	172.7	40 09.7	99	12	172.7	6
7	42 30.8	99	15	171.1	42 01.1	99	15	171.2	41 31.4	99	14	171.3	41 01.7	99	14	171.4	40 32.0	99	14	171.5	40 02.4	99	14	171.5	7
8	42 21.9	99	17	169.8	41 52.3	99	16	169.9	41 22.7	99	16	170.0	40 53.1	99	16	170.1	40 23.5	99	16	170.2	39 53.9	99	16	170.4	8
9	42 11.9	98	19	168.6	41 42.4	98	18	168.7	41 12.9	98	18	168.8	40 43.4	98	18	168.9	40 13.9	98	18	169.0	39 44.4	98	18	169.2	9
10	42 00.7	98	20	167.3	41 31.3	98	20	167.5	41 02.0	98	20	167.6	40 32.6	98	20	167.7	40 03.2	98	20	167.9	39 33.9	98	20	168.0	10
1	41 48.4	97	22	166.1	41 19.2	97	22	166.2	40 49.9	97	22	166.4	40 20.7	97	22	166.5	39 51.5	98	21	166.7	39 22.2	98	21	166.8	1
2	41 35.0	97	24	164.9	41 05.9	97	24	165.0	40 36.8	97	24	165.2	40 07.7	97	23	165.3	39 38.6	97	23	165.5	39 09.5	97	23	165.7	2
3	41 20.5	96	26	163.6	40 51.5	96	26	163.8	40 22.6	96	26	164.0	39 53.7	97	25	164.2	39 24.7	97	25	164.3	38 55.7	97	25	164.5	3
4	41 04.9	96	28	162.4	40 36.1	96	28	162.6	40 07.3	96	27	162.8	39 38.5	96	27	163.0	39 09.7	96	27	163.2	38 40.9	96	26	163.4	4
15	40 48.2	95	30	161.3	40 19.6	95	29	161.5	39 51.0	95	29	161.7	39 22.4	95	29	161.8	38 53.8	96	28	162.0	38 25.1	96	28	162.2	15
6	40 30.5	95	31	160.1	40 02.1	95	31	160.3	39 33.7	95	31	160.5	39 05.2	95	30	160.7	38 36.8	95	30	160.9	38 08.3	95	30	161.1	6
7	40 11.8	94	33	158.9	39 43.6	94	32	159.1	39 15.3	94	32	159.4	38 47.1	94	32	159.6	38 18.8	94	32	159.8	37 50.5	94	31	160.0	7
8	39 52.1	93	34	157.8	39 24.1	93	34	158.0	38 56.0	94	34	158.2	38 27.9	94	34	158.5	37 59.8	94	33	158.7	37 31.7	94	33	158.9	8
9	39 31.4	93	36	156.6	39 03.5	93	36	156.9	38 35.7	93	36	157.1	38 07.8	93	35	157.3	37 39.9	93	35	157.6	37 12.0	93	34	157.8	9
20	39 09.7	92	38	155.5	38 42.1	92	37	155.8	38 14.4	92	37	156.0	37 46.8	92	37	156.3	37 19.1	92	36	156.5	36 51.4	92	36	156.7	20
1	38 47.0	91	39	154.4	38 19.7	91	39	154.7	37 52.2	91	38	154.9	37 24.8	92	38	155.2	36 57.3	92	38	155.4	36 29.8	92	38	155.7	1
2	38 23.5	90	41	153.3	37 56.3	91	40	153.6	37 29.1	91	40	153.8	37 01.9	91	40	154.1	36 34.6	91	39	154.4	36 07.3	91	39	154.6	2
3	37 59.0	90	42	152.2	37 32.1	90	42	152.5	37 05.1	90	42	152.8	36 38.1	90	41	153.1	36 11.1	90	41	153.3	35 44.0	90	40	153.6	3
4	37 33.7	89	44	151.2	37 07.0	89	43	151.5	36 40.2	89	43	151.7	36 13.5	89	42	152.0	35 46.6	89	42	152.3	35 19.8	90	42	152.6	4
25	37 07.5	88	45	150.1	36 41.0	88	45	150.4	36 14.5	88	44	150.7	35 48.0	89	44	151.0	35 21.4	89	44	151.3	34 54.7	89	43	151.6	25
6	36 40.4	87	46	149.1	36 14.2	87	46	149.4	35 47.9	88	46	149.7	35 21.6	88	45	150.0	34 55.3	88	45	150.3	34 28.9	88	44	150.6	6
7	36 12.6	87	48	148.1	35 46.6	87	47	148.4	35 20.6	87	47	148.7	34 54.5	87	46	149.0	34 28.4	87	46	149.3	34 02.2	87	46	149.6	7
8	35 43.9	86	49	147.1	35 18.2	86	49	147.4	34 52.4	86	48	147.7	34 26.6	86	48	148.0	34 00.7	86	48	148.3	33 34.8	86	47	148.6	8
9	35 14.5	85	50	146.1	34 49.0	85	50	146.4	34 23.5	85	50	146.7	33 57.9	85	49	147.1	33 32.2	86	49	147.4	33 06.6	86	48	147.7	9
30	34 44.3	84	52	145.1	34 19.0	84	51	145.5	33 53.8	84	51	145.8	33 28.4	85	50	146.1	33 03.0	85	50	146.4	32 37.6	85	50	146.7	30
1	34 13.4	83	53	144.2	33 48.4	83	52	144.5	33 23.3	84	52	144.8	32 58.2	84	51	145.2	32 33.1	84	51	145.5	32 07.9	84	51	145.8	1
2	33 41.7	82	54	143.2	33 17.0	83	54	143.6	32 52.2	83	53	143.9	32 27.4	83	53	144.2	32 02.5	83	52	144.6	31 37.5	83	52	144.9	2
3	33 09.4	81	55	142.3	32 44.9	82	55	142.7	32 20.4	82	54	143.0	31 55.8	82	54	143.3	31 31.1	82	53	143.7	31 06.4	82	53	144.0	3
4	32 36.3	81	56	141.4	32 12.1	81	56	141.8	31 47.9	81	55	142.1	31 23.5	81	55	142.4	30 59.1	81	54	142.8	30 34.7	82	54	143.1	4
35	32 02.7	80	57	140.5	31 38.7	80	57	140.9	31 14.7	80	56	141.2	30 50.6	80	56	141.6	30 26.5	81	55	141.9	30 02.3	81	55	142.3	35
6	31 28.4	79	58	139.6	31 04.7	79	58	140.0	30 40.9	79	57	140.4	30 17.1	80	57	140.7	29 53.2	80	56	141.1	29 29.3	80	56	141.4	6
7	30 53.4	78	59	138.8	30 30.0	78	59	139.1	30 06.5	78	58	139.5	29 42.9	79	58	139.9	29 19.3	79	58	140.2	28 55.6	79	57	140.6	7
8	30 17.9	77	60	137.9	29 54.7	77	60	138.3	29 31.5	78	59	138.7	29 08.1	78	59	139.0	28 44.8	78	58	139.4	28 21.3	78	58	139.7	8
9	29 41.8	76	61	137.1	29 18.9	77	61	137.5	28 55.9	77	60	137.8	28 32.8	77	60	138.2	28 09.7	77	59	138.6	27 46.5	77	59	138.9	9
40	29 05.1	76	62	136.3	28 42.4	76	62	136.6	28 19.7	76	61	137.0	27 56.9	76	61	137.4	27 34.0	76	60	137.8	27 11.1	77	60	138.1	40
1	28 27.9	75	63	135.5	28 05.5	75	62	135.8	27 43.0	75	62	136.2	27 20.4	75	62	136.6	26 57.8	75	61	137.0	26 35.1	76	61	137.3	1
2	27 50.2	74	64	134.7	27 28.0	74	64	135.1	27 05.7	74	63	135.4	26 43.4	74	62	135.8	26 21.0	75	62	136.2	25 58.6	75	62	136.6	2
3	27 11.9	73	65	133.9	26 49.9	73	64	134.3	26 27.9	73	64	134.7	26 05.9	74	63	135.0	25 43.8	74	63	135.4	25 21.6	74	62	135.8	3
4	26 33.1	72	65	133.1	26 11.4	72	65	133.5	25 49.7	73	65	133.9	25 27.9	73	64	134.3	25 06.0	73	64	134.7	24 44.1	73	64	135.0	4
45	25 53.9	71	66	132.4	25 32.4	72	66	132.8	25 10.9	72	65	133.2	24 49.4	72	65	133.5	24 27.7	72	65	133.9	24 06.0	72	64	134.3	45
6	25 14.1	71	67	131.6	24 52.9	71	66	132.0	24 31.7	71	66	132.4	24 10.4	71	66	132.8	23 49.0	71	65	133.2	23 27.6	72	65	133.6	6
7	24 34.0	70	68	130.9	24 13.0	70	67	131.3	23 52.0	70	67	131.7	23 30.9	70	66	132.1	23 09.8	71	66	132.5	22 48.6	71	66	132.9	7
8	23 53.4	69	68	130.2	23 32.6	69	68	130.6	23 11.9	69	68	131.0	22 51.0	70	67	131.4	22 30.1	70	67	131.8	22 09.2	70	66	132.2	8
9	23 12.3	68	69	129.5	22 51.8	68	69	129.9	22 31.3	69	68	130.3	22 10.7	69	68	130.7	21 50.0	69	68	131.1	21 29.4	69	67	131.5	9
50	22 30.9	67	70	128.8	22 10.6	68	69	129.2	21 50.3	68	69	129.6	21 30.0	68	69	130.0	21 09.5	68	68	130.4	20 49.1	68	68	130.8	50
1	21 49.0	67	70	128.1	21 29.0	67	70	128.5	21 08.9	67	70	128.9	20 48.8	67	69	129.3	20 28.6	67	69	129.7	20 08.4	68	68	130.1	1
2	21 06.8	66	71	127.5	20 47.0	66	71	127.9	20 27.1	66	70	128.3	20 07.2	66	70	128.7	19 47.3	67	70	129.1	19 27.3	67	69	129.5	2
3	20 24.1	65	72	126.8	20 04.6	65	71	127.2	19 45.0	65	71	127.6	19 25.3	66	70	128.0	19 05.6	66	70	128.4	18 45.8	66	70	128.8	3
4	19 41.2	64	72	126.2	19 21.8	65	72	126.6	19 02.4	65	72	127.0	18 43.0	65	71	127.4	18 23.5	65	71	127.8	18 04.0	65	70	128.2	4
55	18 57.8	64	73	125.5	18 38.7	64	72	125.9	18 19.5	64	72	126.3	18 00.3	64	72	126.7	17 41.1	64	71	127.1	17 21.8	64	71	127.5	55
6	18 14.1	63	73	124.9	17 55.2	63	73	125.3	17 36.3	63	73	125.7	17 17.3	63	72	126.1	16 58.3	64	72	126.5	16 39.2	64	72	126.9	6
7	17 30.1	62	74	124.3	17 11.4	62	74	124.7	16 52.7	62	73	125.1	16 34.0	63	73	125.5	16 15.2	63	72	125.9	15 56.3	63	72	126.3	7
8	16 45.8	61	74	123.7	16 27.3	62	74	124.1	16 08.8	62	74	124.5	15 50.3	62	73	124.9	15 31.7	62	73	125.3	15 13.1	62	73	125.7	8
9	16 01.1	61	75	123.1	15 42.9	61	74	123.5	15 24.6	61	74	123.9	15 06.3	61	74	124.3	14 47.9	61	73	124.7	14 29.5	61	73	125.1	9
60	15 16.2	60	75	122.5	14 58.2	60	75	122.9	14 40.1	60	75	123.3	14 22.0	60	74	123.7	14 03.8	61	74	124.1	13 45.6	61	74	124.5	60
1	14 30.9	59	76	121.9	14 13.1	59	76	122.3	13 55.3	60	75	122.7	13 37.3	60	75	123.1	13 19.4	60	74	123.6	13 01.4	60	74	124.0	1
2	13 45.4	59	76	121.3	13 27.8	59	76	121.7	13 10.1	59	76	122.2	12 52.4	59	75	122.6	12 34.7	59	75	123.0	12 16.9	59	74	123.4	2
3	12 59.6	58	77	120.8	12 42.2	58	76	121.2	12 24.7	58	76	121.6	12 07.2	58	76	122.0	11 49.7	58	75	122.4	11 32.2	59	75	122.8	3
4	12 13.5	57	77	120.2	11 56.3	57	77	120.6	11 39.1	58	77	121.0	11 21.8	58	76	121.5	11 04.5	58	76	121.9	10 47.1	58	76	122.3	4
65	11 27.2	57	78	119.7	11 10.2	57	77	120.1	10 53.1	57	77	120.5	10 36.1	57	77	120.9	10 18.9	57	76	121.3	10 01.8	57	76	121.8	65
6	10 40.6	56	78	119.1	10 23.8	56	78	119.5	10 06.9	56	77	120.0	9 50.1	56	77	120.4	9 33.1	56	77	120.8	9 16.2	57	76	121.2	6
7	9 53.8	55	78	118.6	9 37.2	56	78	119.0	9 20.5	56	78	119.4	9 03.8	56	78	119.9	8 47.1	56	77	120.3	8 30.3	56	77	120.7	7
8	9 06.8	55	79	118.1	8 50.3	55	78	118.5	8 33.8	55	78	118.9	8 17.3	55	78	119.3	8 00.8	55	78	119.8	7 44.3	55	77	120.2	8
9	8 19.5	54	79	117.5	8 03.2	54	79	118.0	7 46.9	54	78	118.4	7 30.6	54	78	118.8	7 14.3	54	78	119.2	6 57.9	55	78	119.7	9
70	7 32.0	54	80	117.0	7 15.9	54	79	117.5	6 59.8	54	79	117.9	6 43.7	54	79	118.3	6 27.5	54	78	118.7	6 11.3	54	78	119.2	70
1	6 44.2	53	80	116.5	6 28.3	53	80	117.0	6 12.4	53	79	117.4	5 56.5	53	79	117.8	5 40.5	53	79	118.2	5 24.5	53	78	118.7	1
2	5 56.3	52	80	116.0	5 40.6	52	80	116.5	5 24.8	52	80	116.9	5 09.1	53	79	117.3									2
3	5 08.2	52	80	115.5																					3

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	′	d	Δt	°	
91	8 05.2	44	84	71.6	8 18.2	44	84	71.2	8 31.3	43	84	70.7	8 44.3	43	84	70.3	8 57.3	43	84	69.8	9 10.2	43	83	69.3	9 23.1	43	83	68.9	9 36.0	43	83	68.4	91
2	7 14.5	44	84	71.2	7 27.7	44	84	70.8	7 40.9	44	84	70.3	7 54.0	44	84	69.8	8 07.2	44	83	69.4	8 20.3	44	83	68.9	8 33.3	43	83	68.5	8 46.4	43	83	68.0	2
3	6 23.9	45	84	70.8	6 37.3	44	84	70.3	6 50.6	44	84	69.9	7 03.9	44	83	69.4	7 17.2	44	83	69.0	7 30.4	44	83	68.5	7 43.7	44	82	68.1	7 56.8	44	82	67.6	3
4	5 33.5	45	84	70.4	5 47.0	45	84	69.9	6 00.5	45	83	69.5	6 13.9	45	83	69.0	6 27.4	45	83	68.6	6 40.8	45	83	68.1	6 54.1	45	82	67.7	7 07.5	44	82	67.2	4
95									5 10.5	45	83	69.0	5 24.1	45	83	68.6	5 37.7	45	83	68.1	5 51.2	45	82	67.7	6 04.8	45	82	67.2	6 18.3	45	82	66.8	95
6																					5 01.8	46	82	67.3	5 15.5	46	82	66.8	5 29.2	46	82	66.4	6

Lat. 27°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	87 00.0	1.0 13	180.0	87 30.0	1.0 16	180.0	88 00.0	1.0 19	180.0	88 30.0	1.0 25	180.0	89 00.0	1.0 34	180.0	89 30.0	1.0 52	180.0	90 00.0	.. 89	....	89 30.0	1.0 52	00.0	00
1	86 52.0	96 37	163.0	87 20.6	94 42	160.0	87 48.4	91 50	155.6	88 15.1	86 59	148.9	88 39.5	75 71	138.0	88 58.6	49 83	119.0	89 06.6	00 89	89.8	88 58.8	49 83	60.4	1
2	86 30.0	86 54	148.5	86 55.1	82 60	143.8	87 18.7	75 67	137.6	87 39.7	65 74	129.5	87 57.0	49 82	118.7	88 08.7	28 87	105.2	88 13.1	01 89	89.5	88 09.2	26 87	73.8	2
3	85 57.5	75 65	137.3	86 19.1	68 70	132.1	86 38.6	60 76	125.9	86 55.2	50 81	118.5	87 08.1	36 85	109.8	87 16.5	19 88	99.9	87 19.6	01 89	89.3	87 17.2	17 88	78.7	3
4	85 18.4	65 72	128.8	85 36.9	58 76	123.9	85 53.2	50 80	118.2	86 06.7	40 84	111.8	86 17.0	28 87	104.7	86 23.6	15 88	97.1	86 26.2	02 89	89.1	86 24.6	12 88	81.1	4
05	84 34.9	57 77	122.5	84 51.0	50 80	117.9	85 04.9	42 83	112.9	85 16.3	34 86	107.4	85 24.9	24 88	101.5	85 30.5	13 89	95.3	85 32.7	02 89	88.9	85 31.6	09 88	82.4	05
6	83 48.6	50 80	117.7	84 02.8	44 83	113.5	84 15.0	37 85	109.0	84 24.9	29 87	104.2	84 32.3	21 88	99.2	84 37.2	12 89	94.0	84 39.3	02 89	88.6	84 38.6	07 88	83.3	6
7	83 00.5	45 82	113.9	83 13.1	39 84	110.1	83 24.0	33 86	106.1	83 32.8	26 88	101.9	83 39.4	18 88	97.5	83 43.8	11 89	93.0	83 45.8	03 89	88.4	83 45.5	05 89	83.8	7
8	82 11.0	41 84	110.8	82 22.5	36 86	107.4	82 32.3	30 87	103.8	82 40.3	23 88	100.0	82 46.3	17 89	96.2	82 50.4	10 89	92.2	82 52.4	03 89	88.2	82 52.3	04 89	84.2	8
9	81 20.6	38 85	108.3	81 31.2	33 86	105.1	81 40.2	27 88	101.9	81 47.5	22 88	98.5	81 53.1	16 89	95.1	81 57.0	10 89	91.5	81 59.0	04 89	88.0	81 59.1	03 89	84.4	9
10	80 29.5	35 86	106.2	80 39.3	30 87	103.3	80 47.7	25 88	100.3	80 54.6	20 88	97.3	80 59.8	15 89	94.1	81 03.5	09 89	90.9	81 05.5	04 89	87.7	81 05.9	02 89	84.5	10
1	79 38.0	33 87	104.4	79 47.1	28 87	101.7	79 55.0	24 88	99.0	80 01.5	19 89	96.2	80 06.5	14 89	93.3	80 10.1	09 89	90.4	80 12.1	04 89	87.5	80 12.7	01 89	84.6	1
2	78 46.0	31 87	102.8	78 54.7	27 88	100.4	79 02.1	23 88	97.8	79 08.3	18 89	95.2	79 13.1	14 89	92.6	79 16.6	09 89	90.0	79 18.7	05 89	87.3	79 19.5	01 89	84.6	2
3	77 53.7	29 88	101.5	78 02.0	26 88	99.2	78 09.1	22 88	96.8	78 15.0	18 89	94.4	78 19.7	14 89	92.0	78 23.1	09 89	89.5	78 25.3	05 89	87.0	78 26.2	00 89	84.5	3
4	77 01.2	28 88	100.3	77 09.1	25 88	98.1	77 16.0	21 89	95.9	77 21.7	17 89	93.7	77 26.3	13 89	91.4	77 29.7	09 89	89.1	77 31.9	06 89	86.8	77 33.0	02 89	84.5	4
15	76 08.5	27 88	99.2	76 16.2	24 88	97.1	76 22.7	20 89	95.1	76 28.3	17 89	93.0	76 32.8	13 89	90.9	76 36.2	10 89	88.7	76 38.6	06 89	86.6	76 39.8	02 89	84.4	15
6	75 15.7	26 88	98.2	75 23.1	23 89	96.3	75 29.5	20 89	94.3	75 34.9	16 89	92.4	75 39.3	13 89	90.4	75 42.8	10 89	88.4	75 45.2	06 89	86.3	75 46.6	03 89	84.3	6
7	74 22.7	25 88	97.3	74 29.9	22 89	95.5	74 36.1	19 89	93.7	74 41.5	16 89	91.8	74 45.9	13 89	89.9	74 49.4	10 89	88.0	74 51.9	07 89	86.1	74 53.4	04 89	84.2	7
8	73 29.6	25 89	96.5	73 36.6	22 89	94.8	73 42.8	19 89	93.0	73 48.0	16 89	91.3	73 52.4	13 89	89.5	73 55.9	10 89	87.7	73 58.5	07 89	85.9	74 00.2	04 89	84.1	8
9	72 36.5	24 89	95.7	72 43.3	21 89	94.1	72 49.4	19 89	92.4	72 54.6	16 89	90.8	72 59.0	13 89	89.1	73 02.5	10 89	87.4	73 05.2	08 89	85.7	73 07.1	05 89	83.9	9
20	71 43.3	24 89	95.0	71 50.0	21 89	93.4	71 55.9	19 89	91.9	72 01.1	16 89	90.3	72 05.5	13 89	88.7	72 09.1	11 89	87.0	72 11.9	08 89	85.4	72 13.9	05 89	83.8	20
1	70 50.0	23 89	94.3	70 56.6	21 89	92.8	71 02.5	18 89	91.3	71 07.7	16 89	89.8	71 12.1	13 89	88.3	71 15.7	11 89	86.7	71 18.6	08 89	85.2	71 20.8	06 89	83.6	1
2	69 56.7	23 89	93.7	70 03.2	21 89	92.3	70 09.1	18 89	90.8	70 14.2	16 89	89.4	70 18.6	14 89	87.9	70 22.4	11 89	86.4	70 25.4	09 89	85.0	70 27.6	06 88	83.5	2
3	69 03.3	23 89	93.1	69 09.8	21 89	91.7	69 15.6	18 89	90.4	69 20.8	16 89	89.0	69 25.2	14 89	87.6	69 29.0	12 89	86.1	69 32.1	09 89	84.7	69 34.5	07 88	83.3	3
4	68 09.9	22 89	92.5	68 16.3	20 89	91.2	68 22.1	18 89	89.9	68 27.3	16 89	88.6	68 31.8	14 89	87.2	68 35.7	12 89	85.9	68 38.9	10 89	84.5	68 41.5	07 88	83.1	4
25	67 16.5	22 89	92.0	67 22.9	20 89	90.7	67 28.7	18 89	89.5	67 33.9	16 89	88.2	67 38.4	14 89	86.9	67 42.4	12 89	85.6	67 45.7	10 89	84.3	67 48.4	08 88	82.9	25
6	66 23.0	22 89	91.5	66 29.4	20 89	90.3	66 35.2	18 89	89.0	66 40.4	16 89	87.8	66 45.1	14 89	86.5	66 49.1	12 89	85.3	66 52.5	10 89	84.0	66 55.4	08 88	82.7	6
7	65 29.6	22 89	91.0	65 36.0	20 89	89.8	65 41.8	18 89	88.6	65 47.0	17 89	87.4	65 51.7	15 89	86.2	65 55.8	13 89	85.0	65 59.4	11 88	83.8	66 02.3	09 88	82.6	7
8	64 36.1	22 89	90.5	64 42.5	20 89	89.4	64 48.3	19 89	88.2	64 53.6	17 89	87.1	64 58.4	15 89	85.9	65 02.6	13 89	84.7	65 06.2	11 88	83.5	65 09.3	09 88	82.4	8
9	63 42.7	22 89	90.0	63 49.0	20 89	88.9	63 54.9	19 89	87.8	64 00.2	17 89	86.7	64 05.1	15 89	85.6	64 09.4	13 89	84.4	64 13.1	12 88	83.3	64 16.4	10 88	82.2	9
30	62 49.2	22 89	89.6	62 55.6	20 89	88.5	63 01.5	19 89	87.4	63 06.9	17 89	86.4	63 11.8	15 89	85.3	63 16.2	14 89	84.2	63 20.0	12 88	83.1	63 23.4	10 88	82.0	30
1	61 55.8	22 89	89.2	62 02.2	21 89	88.1	62 08.1	19 89	87.1	62 13.5	17 89	86.0	62 18.5	16 89	85.0	62 23.0	14 89	83.9	62 27.0	13 88	82.8	62 30.5	11 88	81.7	1
2	61 02.3	22 89	88.7	61 08.7	21 89	87.7	61 14.7	19 89	86.7	61 20.2	18 89	85.7	61 25.3	16 89	84.7	61 29.9	14 89	83.6	61 34.0	13 88	82.6	61 37.6	11 88	81.5	2
3	60 08.9	22 89	88.3	60 15.3	21 89	87.3	60 21.3	19 89	86.4	60 26.9	18 89	85.4	60 32.1	16 89	84.4	60 36.7	15 88	83.4	60 41.0	13 88	82.3	60 44.7	12 88	81.3	3
4	59 15.4	22 89	87.9	59 21.9	21 89	87.0	59 28.0	20 89	86.0	59 33.6	18 89	85.0	59 38.9	17 89	84.1	59 43.7	15 88	83.1	59 48.0	14 88	82.1	59 51.9	12 88	81.1	4
35	58 22.0	22 89	87.5	58 28.6	21 89	86.6	58 34.7	20 89	85.7	58 40.4	18 89	84.7	58 45.7	17 88	83.8	58 50.6	16 88	82.8	58 55.1	14 88	81.9	58 59.1	13 88	80.9	35
6	57 28.6	23 89	87.1	57 35.2	21 89	86.2	57 41.4	20 89	85.3	57 47.2	19 89	84.4	57 52.6	17 88	83.5	57 57.6	16 88	82.5	58 02.2	15 88	81.6	58 06.3	13 88	80.7	6
7	56 35.2	23 89	86.8	56 41.9	21 89	85.9	56 48.1	20 89	85.0	56 54.0	19 89	84.1	56 59.5	18 88	83.2	57 04.6	16 88	82.3	57 09.3	15 88	81.4	57 13.6	14 88	80.4	7
8	55 41.9	23 89	86.4	55 48.6	22 89	85.5	55 54.9	20 89	84.6	56 00.8	19 88	83.8	56 06.4	18 88	82.9	56 11.6	17 88	82.0	56 16.4	15 88	81.1	56 20.9	14 88	80.2	8
9	54 48.5	23 89	86.0	54 55.3	22 89	85.2	55 01.7	21 89	84.3	55 07.7	20 88	83.5	55 13.4	18 88	82.6	55 18.7	17 88	81.7	55 23.6	16 88	80.9	55 28.2	15 88	80.0	9
40	53 55.2	23 89	85.6	54 02.0	22 89	84.8	54 08.5	21 89	84.0	54 14.6	20 88	83.2	54 20.4	19 88	82.3	54 25.8	17 88	81.5	54 30.9	16 88	80.6	54 35.6	15 88	79.8	40
1	53 01.9	23 89	85.3	53 08.8	22 89	84.5	53 15.3	21 88	83.7	53 21.6	20 88	82.8	53 27.4	19 88	82.0	53 33.0	18 88	81.2	53 38.2	17 88	80.4	53 43.0	16 88	79.5	1
2	52 08.6	24 89	84.9	52 15.6	23 89	84.1	52 22.2	22 88	83.3	52 28.5	20 88	82.5	52 34.5	19 88	81.7	52 40.2	18 88	80.9	52 45.5	17 88	80.1	52 50.5	16 88	79.3	2
3	51 15.4	24 89	84.6	51 22.4	23 88	83.8	51 29.1	22 88	83.0	51 35.5	21 88	82.2	51 41.6	20 88	81.4	51 47.4	19 88	80.7	51 52.8	18 88	79.9	51 57.9	17 87	79.1	3
4	50 22.2	24 89	84.2	50 29.3	23 88	83.5	50 36.1	22 88	82.7	50 42.6	21 88	81.9	50 48.8	20 88	81.2	50 54.7	19 88	80.4	51 00.2	18 88	79.6	51 05.5	17 87	78.8	4
45	49 29.0	24 89	83.9	49 36.2	23 88	83.1	49 43.1	22 88	82.4	49 49.7	21 88	81.6	49 56.0	20 88	80.9	50 02.0	20 88	80.1	50 07.7	18 88	79.4	50 13.0	17 87	78.6	45
6	48 35.9	25 88	83.5	48 43.1	24 88	82.8	48 50.1	23 88	82.1	48 56.8	22 88	81.3	49 03.2	21 88	80.6	49 09.3	20 88	79.8	49 15.1	19 88	79.1	49 20.7	18 87	78.3	6
7	47 42.8	25 88	83.2	47 50.1	24 88	82.5	47 57.2	23 88	81.8	48 04.0	22 88	81.0	48 10.5	21 88	80.3	48 16.7	20 88	79.6	48 22.7	19 87	78.8	48 28.3	18 87	78.1	7
8	46 49.7	25 88	82.9	46 57.1	24 88	82.2	47 04.3	23 88	81.5	47 11.2	23 88	80.7	47 17.8	22 88	80.0	47 24.2	21 88	79.3	47 30.2	20 87	78.6	47 35.8	19 87	77.8	8
9	45 56.7	25 88	82.5	46 04.2	25 88	81.8	46 11.4	24 88	81.1	46 18.4	23 88	80.4	46 25.2	22 88	79.7	46 31.7	21 88	79.0	46 37.9	20 87	78.3	46 43.8	19 87	77.6	9
50	45 03.7	26 88	82.2	45 11.3	25 88	81.5	45 18.6	24 88	80.8	45 25.8	23 88	80.1	45 32.6	22 88	79.4	45 39.2	22 87	78.7	45 45.5	21 87	78.0	45 51.6	20 87	77.3	50
1	44 10.8	26 88	81.9	44 18.4	25 88	81.2	44 25.9	24 88	80.5	44 33.1	24 88	79.8	44 40.1	23 88	79.2	44 46.8	22 87	78.5	44 53.3	21 87	77.8	44 59.5	20 87	77.1	1
2	43 17.9	26 88	81.5	43 25.6	26 88	80.9	43 33.2	25 88	80.2	43 40.5	24 88	79.5	43 47.6	23 87	78.9	43 54.4	22 87	78.2	44 01.0	22 87	77.5	44 07.4	21 87	76.8	2
3	42 25.0	27 88	81.2	42 32.9	26 88	80.6	42 40.5	25 88	79.9	42 48.0	24 88	79.2	42 55.2	24 87	78.6	43 02.1	23 87	77.9	43 08.9	22 87	77.2	43 15.4	21 87	76.6	3
4	41 32.2	27 88	80.9	41 40.2	26 88	80.2	41 47.9	26 88	79.6	41 55.5	25 88	78.9	42 02.8	24 87	78.3	42 09.9	23 87	77.6	42 16.8	23 87	77.0	42 23.4	22 86	76.3	4
55	40 39.4	27 88	80.6	40 47.5	27 88	79.9	40 55.4	26 88	79.3	41 03.0	25 87	78.6	41 10.5	24 87	78.0	41 17.7	24 87	77.4	41 24.7	23 87	76.7	41 31.5	22 86	76.1	55
6	39 46.7	28 88	80.2	39 54.9	27 88	79.6	40 02.9	26 87	79.0	40 10.6	26 87	78.3	40 18.2	25 87	77.7	40 25.6	24 87	77.1	40 32.7	23 86	76.4	40 39.6	23 86	75.8	6
7	38 54.1	28 88	79.9	39 02.3	27 88	79.3	39 10.4	27 87	78.7	39 18.3	26 87	78.0	39 26.0	25 87	77.4	39 33.5	25 87	76.8	39 40.8	24 86	76.2	39 47.8	23 86	75.5	7
8	38 01.5	28 88	79.6	38 09.8	28 87	79.0	38 18.0	27 87	78.3	38 26.0	26 87	77.7	38 33.9	26 87	77.1	38 41.5	25 87	76.5	38 48.9	24 86	75.9	38 56.1	24 86	75.3	8
9	37 08.9	29 88	79.2	37 17.4	28 87	78.6	37 25.7	27 87	78.0	37 33.8	27 87	77.4	37 41.8	26 87	76.8	37 49.5	26 86	76.2	37 57.1	25 86	75.6	38 04.4	24 86	75.0	9
60	36 16.4	29 87	78.9	36 25.0	28 87	78.3	36 33.4	28 87	77.7	36 41.7	27 87	77.1	36 49.8	27 87	76.5	36 57.6	26 86	75.9	37 05.3	25 86	75.3	37 12.8	25 86	74.7	60
1	35 24.0	29 87	78.6	35 32.7	29 87	78.0	35 41.2	28 87	77.4	35 49.6	28 87	76.8	35 57.8	27 86	76.2	36 05.8	26 86	75.6	36 13.7	26 86	75.0	36 21.3	25 86	74.4	1
2	34 31.6	30 87	78.3	34 40.4	29 87	77.7	34 49.1	29 87	77.1	34 57.6	28 87	76.5	35 05.9	27 86	75.9	35 14.1	27 86	75.3	35 22.0	26 86	74.7	35 29.9	26 86	74.1	2
3	33 39.3	30 87	77.9	33 48.2	30 87	77.4	33 57.0	29 87	76.8	34 05.6	28 86	76.2	34 14.1	28 86	75.6	34 22.4	27 86	75.0	34 30.5	27 86	74.5	34 38.5	26 86	73.9	3
4	32 47.1	30 87	77.6	32 56.1	30 87	77.0	33 05.0	29 87	76.5	33 13.8	29 86	75.9	33 22.3	28 86	75.3	33 30.8	28 86	74.7	33 39.0	27 86	74.2	33 47.1	27 85	73.6	4
65	31 54.9	31 87	77.3	32 04.0	30 87	76.7	32 13.1	30 86	76.1	32 21.9	29 86	75.6	32 30.7	29 86	75.0	32 39.2	28 86	74.4	32 47.6	28 86	73.9	32 55.9	27 85	73.3	65
6	31 02.8	31 87	76.9	31 12.1	31 86	76.4	31 21.2	30 86	75.8	31 30.2	30 86	75.3	31 39.1	29 86	74.7	31 47.8	29 86	74.1	31 56.3	28 85	73.6	32 04.7	28 85	73.0	6
7	30 10.7	32 87	76.6	30 20.1	31 86	76.0	30 29.4	31 86	75.5	30 38.5	30 86	74.9	30 47.5	30 86	74.4	30 56.4	29 86	73.8	31 05.1	29 85	73.3	31 13.6	28 85	72.7	7
8	29 18.8	32 86	76.3	29 28.3	32 86	75.7	29 37.7	31 86	75.2	29 47.0	31 86	74.6	29 56.1	30 86	74.1	30 05.1	30 85	73.5	30 13.9	29 85	73.0	30 22.6	29 85	72.4	8
9	28 26.9	32 86	75.9	28 36.5	32 86	75.4	28 46.0	32 86	74.8	28 55.4	31 86	74.3	29 04.7	31 86	73.8	29 13.9	30 85	73.2	29 22.9	30 85	72.7	29 31.7	29 85	72.1	9
70	27 35.0	33 86	75.6	27 44.8	32 86	75.1	27 54.5	32 86	74.5	28 04.0	32 86	74.0	28 13.4	31 85	73.4	28 22.7	31 85	72.9	28 31.9	30 85	72.4	28 40.9	30 85	71.8	70
1	26 43.3	33 86	75.3	26 53.2	33 86	74.7	27 03.0	32 86	74.2	27 12.7	32 86	73.7	27 22.2	32 85	73.1	27 31.7	31 85	72.6	27 41.0	31 85	72.1	27 50.1	30 84	71.5	1
2	25 51.6	34 86	74.9	26 01.7	33 86	74.4	26 11.6	33 86	73.9	26 21.4	33 85	73.3	26 31.1	32 85	72.8	26 40.7	32 85	72.3	26 50.1	31 84	71.7	26 59.5	31 84	71.2	2
3	25 00.1	34 86	74.6	25 10.2	34 86	74.0	25 20.3	33 85	73.5	25 30.2	33 85	73.0	25 40.1	33 85	72.5	25 49.8	32 85	72.0	25 59.4	32 84	71.4	26 08.9	31 84	70.9	3
4	24 08.6	35 86	74.2	24 18.9	34 86	73.7	24 29.1	34 85	73.2	24 39.2	33 85	72.7	24 49.1	33 85	72.2	24 59.0	33 84	71.6	25 08.8	32 84	71.1	25 18.4	32 84	70.6	4
75	23 17.2	35 86	73.9	23 27.6	35 85	73.4	23 37.9	34 85	72.9	23 48.2	34 85	72.3	23 58.3	34 84	71.8	24 08.3	33 84	71.3	24 18.3	33 84	70.8	24 28.1	33 84	70.3	75
6	22 25.9	35 85	73.5	22 36.4	35 85	73.0	22 46.9	35 85	72.5	22 57.3	34 85	72.0	23 07.6	34 84	71.5	23 17.7	34 84	71.0	23 27.8	33 84	70.5	23 37.8	33 84	70.0	6
7	21 34.6	36 85	73.2	21 45.4	36 85	72.7	21 56.0	35 85	72.2	22 06.5	35 84	71.7	22 16.9	35 84	71.2	22 27.2	34 84	70.7	22 37.5	34 84	70.1	22 47.6	34 83	69.6	7
8	20 43.5	36 85	72.8	20 54.4	36 85	72.3	21 05.1	36 84	71.8	21 15.8	35 84	71.3	21 26.4	35 84	70.8	21 36.9	35 84	70.3	21 47.3	35 84	69.8	21 57.6	34 83	69.3	8
9	19 52.5	37 85	72.5	20 03.5	36 85	72.0	20 14.4	36 84	71.5	20 25.2	36 84	71.0	20 35.9	36 84	70.5	20 46.6	35 84	70.0	20 57.1	35 83	69.5	21 07.6	35 83	69.0	9
80	19 01.6	37 85	72.1	19 12.7	37 84	71.6	19 23.7	37 84	71.1	19 34.7	36 84	70.6	19 45.6	36 84	70.1	19 56.4	36 84	69.6	20 07.1	36 83	69.1	20 17.8	35 83	68.6	80
1	18 10.7	38 84	71.8	18 22.0	37 84	71.3	18 33.2	37 84	70.8	18 44.3	37 84	70.3	18 55.4	37 84	69.8	19 06.3	36 83	69.3	19 17.2	36 83	68.8	19 28.0	36 83	68.3	1
2	17 20.0	38 84	71.4	17 31.4	38 84	70.9	17 42.8	38 84	70.4	17 54.1	37 84	69.9	18 05.3	37 83	69.4	18 16.4	37 83	69.0	18 27.4	37 83	68.5	18 38.4	36 82	68.0	2
3	16 29.4	39 84	71.0	16 41.0	38 84	70.5	16 52.5	38 84	70.1	17 03.9	38 83	69.6	17 15.3	38 83	69.1	17 26.5	38 83	68.6	17 37.8	37 83	68.1	17 48.9	37 82	67.6	3
4	15 38.9	39 84	70.6	15 50.6	39 84	70.2	16 02.3	39 84	69.7	16 13.9	39 83	69.2	16 25.4	38 83	68.7	16 36.8	38 83	68.2	16 48.2	38 82	67.8	16 59.5	38 82	67.3	4
85	14 48.5	40 84	70.3	15 00.4	39 84	69.8	15 12.2	39 83	69.3	15 23.9	39 83	68.8	15 35.6	39 83	68.4	15 47.2	39 82	67.9	15 58.8	38 82	67.4	16 10.3	38 82	66.9	85
6	13 58.3	40 84	69.9	14 10.3	40 83	69.4	14 22.2	40 83	69.0	14 34.1	40 83	68.5	14 46.0	39 82	68.0	14 57.8	39 82	67.5	15 09.5	39 82	67.1	15 21.2	39 82	66.6	6
7	13 08.1	41 83	69.5	13 20.3	40 83	69.1	13 32.4	40 83	68.6	13 44.5	40 83	68.1	13 56.5	40 82	67.6	14 08.4	40 82	67.2	14 20.3	40 82	66.7	14 32.2	39 82	66.2	7
8	12 18.1	41 83	69.1	12 30.4	41 83	68.7	12 42.7	41 83	68.2	12 54.9	41 82	67.7	13 07.1	40 82	67.3	13 19.2	40 82	66.8	13 31.3	40 82	66.3	13 43.3	40 81	65.9	8
9	11 28.2	42 83	68.8	11 40.7	42 83	68.3	11 53.1	41 82	67.8	12 05.5	41 82	67.4	12 17.9	41 82	66.9	12 30.2	41 82	66.4	12 42.4	41 81	66.0	12 54.6	41 81	65.5	9
90	10 38.5	42 83	68.4	10 51.1	42 82	67.9	11 03.7	42 82	67.4	11 16.3	42 82	67.0	11 28.8	42 82	66.5	11 41.2	41 81	66.0	11 53.7	41 81	65.6	12 06.0	41 81	65.1	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	39 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	00
1	38 59.5	1.0 03	178.8	38 29.5	1.0 03	178.8	37 59.5	1.0 03	178.8	37 29.5	1.0 03	178.9	36 59.5	1.0 03	178.9	36 29.5	1.0 03	178.9	35 59.5	1.0 02	178.9	35 29.5	1.0 02	178.9	1
2	38 57.8	1.0 04	177.6	38 27.8	1.0 04	177.7	37 57.9	1.0 04	177.7	37 27.9	1.0 04	177.7	36 57.9	1.0 04	177.8	36 27.9	1.0 04	177.8	35 57.9	1.0 04	177.8	35 28.0	1.0 04	177.8	2
3	38 55.1	1.0 06	176.5	38 25.1	1.0 06	176.5	37 55.2	1.0 06	176.6	37 25.2	1.0 06	176.6	36 55.3	1.0 06	176.6	36 25.3	1.0 06	176.7	35 55.4	1.0 06	176.7	35 25.4	1.0 06	176.7	3
4	38 51.2	1.0 08	175.3	38 21.3	1.0 08	175.4	37 51.4	1.0 08	175.4	37 21.5	1.0 08	175.5	36 51.6	1.0 08	175.5	36 21.7	1.0 08	175.6	35 51.8	1.0 08	175.6	35 21.9	1.0 08	175.6	4
05	38 46.3	1.0 10	174.1	38 16.5	1.0 10	174.2	37 46.6	1.0 10	174.3	37 16.8	1.0 10	174.3	36 46.9	1.0 10	174.4	36 17.0	1.0 09	174.4	35 47.2	1.0 09	174.5	35 17.3	1.0 09	174.6	05
6	38 40.3	99 12	173.0	38 10.5	99 12	173.1	37 40.7	99 12	173.1	37 10.9	99 11	173.2	36 41.2	99 11	173.3	36 11.4	99 11	173.3	35 41.6	99 11	173.4	35 11.8	99 11	173.5	6
7	38 33.2	99 14	171.8	38 03.5	99 13	171.9	37 33.8	99 13	172.0	37 04.1	99 13	172.1	36 34.4	99 13	172.2	36 04.7	99 13	172.2	35 34.9	99 13	172.3	35 05.2	99 13	172.4	7
8	38 25.1	99 15	170.7	37 55.5	99 15	170.8	37 25.8	98 15	170.9	36 56.2	99 15	171.0	36 26.6	99 15	171.1	35 56.9	99 14	171.1	35 27.3	99 14	171.2	34 57.6	99 14	171.3	8
9	38 15.9	98 17	169.5	37 46.4	98 17	169.6	37 16.8	98 17	169.7	36 47.3	98 16	169.8	36 17.8	98 16	170.0	35 48.2	99 16	170.1	35 18.6	99 16	170.2	34 49.1	99 16	170.3	9
10	38 05.6	98 19	168.4	37 36.2	98 19	168.5	37 06.8	98 18	168.6	36 37.4	98 18	168.7	36 07.9	98 18	168.9	35 38.5	98 18	169.0	35 09.0	98 18	169.1	34 39.6	98 18	169.2	10
1	37 54.4	98 20	167.2	37 25.0	98 20	167.4	36 55.7	98 20	167.5	36 26.4	98 20	167.6	35 57.1	98 20	167.8	35 27.8	98 20	167.9	34 58.4	98 19	168.0	34 29.1	98 19	168.2	1
2	37 42.0	97 22	166.1	37 12.9	97 22	166.3	36 43.7	97 22	166.4	36 14.5	97 22	166.5	35 45.3	97 21	166.7	35 16.1	97 21	166.8	34 46.8	97 21	167.0	34 17.6	97 21	167.1	2
3	37 28.7	97 24	165.0	36 59.7	97 24	165.2	36 30.6	97 24	165.3	36 01.5	97 23	165.5	35 32.5	97 23	165.6	35 03.4	97 23	165.8	34 34.3	97 22	165.9	34 05.2	97 22	166.1	3
4	37 14.3	96 26	163.9	36 45.5	96 25	164.1	36 16.6	96 25	164.2	35 47.6	96 25	164.4	35 18.7	96 24	164.5	34 49.8	96 24	164.7	34 20.8	97 24	164.9	33 51.9	97 24	165.0	4
15	36 59.0	96 27	162.8	36 30.3	96 27	163.0	36 01.5	96 27	163.1	35 32.8	96 26	163.3	35 04.0	96 26	163.5	34 35.2	96 26	163.7	34 06.4	96 26	163.8	33 37.6	96 25	164.0	15
6	36 42.7	95 29	161.7	36 14.1	95 28	161.9	35 45.5	95 28	162.1	35 16.9	95 28	162.3	34 48.3	95 28	162.4	34 19.7	95 27	162.6	33 51.0	96 27	162.8	33 22.4	96 27	163.0	6
7	36 25.4	95 30	160.6	35 57.0	95 30	160.8	35 28.6	95 30	161.0	35 00.2	95 30	161.2	34 31.7	95 29	161.4	34 03.3	95 29	161.6	33 34.8	95 29	161.8	33 06.3	95 28	162.0	7
8	36 07.2	94 32	159.5	35 39.0	94 32	159.8	35 10.8	94 31	160.0	34 42.5	94 31	160.2	34 14.2	94 31	160.4	33 45.9	94 30	160.6	33 17.6	94 30	160.8	32 49.3	94 30	161.0	8
9	35 48.1	93 33	158.5	35 20.0	93 33	158.7	34 52.0	94 33	158.9	34 23.9	94 32	159.1	33 55.8	94 32	159.3	33 27.7	94 32	159.6	32 59.6	94 32	159.8	32 31.4	94 31	160.0	9
20	35 28.0	93 35	157.4	35 00.2	93 35	157.7	34 32.3	93 34	157.9	34 04.4	93 34	158.1	33 36.5	93 34	158.3	33 08.6	93 33	158.6	32 40.6	93 33	158.8	32 12.7	93 33	159.0	20
1	35 07.1	92 36	156.4	34 39.4	92 36	156.6	34 11.8	92 36	156.9	33 44.1	92 35	157.1	33 16.4	92 35	157.3	32 48.6	92 35	157.6	32 20.9	93 34	157.8	31 53.1	93 34	158.0	1
2	34 45.2	91 38	155.4	34 17.8	91 38	155.6	33 50.3	92 37	155.9	33 22.9	92 37	156.1	32 55.3	92 36	156.4	32 27.8	92 36	156.6	32 00.2	92 36	156.8	31 32.6	92 35	157.1	2
3	34 22.5	91 39	154.4	33 55.3	91 39	154.6	33 28.1	91 38	154.9	33 00.8	91 38	155.1	32 33.5	91 38	155.4	32 06.1	91 37	155.6	31 38.8	91 37	155.9	31 11.4	91 37	156.1	3
4	33 59.0	90 41	153.4	33 32.0	90 40	153.6	33 05.0	90 40	153.9	32 37.9	90 40	154.2	32 10.8	90 39	154.4	31 43.7	90 39	154.7	31 16.5	91 38	154.9	30 49.3	91 38	155.2	4
25	33 34.6	89 42	152.4	33 07.8	89 42	152.7	32 41.0	89 41	152.9	32 14.2	90 41	153.2	31 47.3	90 40	153.5	31 20.4	90 40	153.7	30 53.4	90 40	154.0	30 26.5	90 40	154.2	25
6	33 09.4	88 43	151.4	32 42.9	89 43	151.7	32 16.3	89 42	152.0	31 49.7	89 42	152.2	31 23.0	89 42	152.5	30 56.3	89 41	152.8	30 29.6	89 41	153.0	30 02.8	89 40	153.3	6
7	32 43.5	88 45	150.5	32 17.2	88 44	150.7	31 50.8	88 44	151.0	31 24.4	88 43	151.3	30 58.0	88 43	151.6	30 31.5	88 43	151.9	30 05.0	88 42	152.1	29 38.5	89 42	152.4	7
8	32 16.7	87 46	149.5	31 50.6	87 45	149.8	31 24.5	87 45	150.1	30 58.4	87 45	150.4	30 32.1	87 44	150.7	30 05.9	88 44	150.9	29 39.6	88 44	151.2	29 13.3	88 43	151.5	8
9	31 49.2	86 47	148.6	31 23.4	86 47	148.9	30 57.5	86 46	149.2	30 31.6	87 46	149.5	30 05.6	87 46	149.8	29 39.6	87 45	150.0	29 13.5	87 45	150.3	28 47.4	87 44	150.6	9
30	31 21.0	85 48	147.7	30 55.4	85 48	148.0	30 29.7	86 48	148.3	30 04.0	86 47	148.6	29 38.3	86 47	148.9	29 12.5	86 46	149.2	28 46.7	86 46	149.5	28 20.9	86 46	149.7	30
1	30 52.1	85 49	146.8	30 26.7	85 49	147.1	30 01.3	85 49	147.4	29 35.8	85 48	147.7	29 10.3	85 48	148.0	28 44.8	85 48	148.3	28 19.2	85 47	148.6	27 53.6	85 47	148.9	1
2	30 22.4	84 50	145.9	29 57.3	84 50	146.2	29 32.1	84 50	146.5	29 06.9	84 49	146.8	28 41.6	84 49	147.1	28 16.3	84 48	147.4	27 51.0	85 48	147.7	27 25.6	85 48	148.0	2
3	29 52.1	83 52	145.0	29 27.2	83 51	145.3	29 02.3	83 51	145.6	28 37.3	83 50	145.9	28 12.3	83 50	146.3	27 47.2	84 50	146.6	27 22.1	84 49	146.9	26 56.9	84 49	147.2	3
4	29 21.1	82 53	144.1	28 56.4	82 52	144.4	28 31.7	82 52	144.8	28 07.0	83 52	145.1	27 42.2	83 51	145.4	27 17.4	83 51	145.7	26 52.6	83 50	146.0	26 27.6	83 50	146.4	4
35	28 49.4	81 54	143.3	28 25.0	81 53	143.6	28 00.6	82 53	143.9	27 36.1	82 52	144.3	27 11.6	82 52	144.6	26 47.0	82 52	144.9	26 22.4	82 51	145.2	25 57.7	82 51	145.5	35
6	28 17.1	80 55	142.4	27 53.0	81 54	142.8	27 28.8	81 54	143.1	27 04.6	81 54	143.4	26 40.3	81 53	143.8	26 15.9	81 53	144.1	25 51.6	81 52	144.4	25 27.2	81 52	144.7	6
7	27 44.2	80 56	141.6	27 20.3	80 55	141.9	26 56.4	80 55	142.3	26 32.4	80 55	142.6	26 08.4	80 54	142.9	25 44.3	80 54	143.3	25 20.2	81 53	143.6	24 56.0	81 53	143.9	7
8	27 10.7	79 57	140.8	26 47.1	79 56	141.1	26 23.4	79 56	141.5	25 59.6	79 56	141.8	25 35.9	79 55	142.2	25 12.0	80 55	142.5	24 48.1	80 54	142.8	24 24.2	80 54	143.2	8
9	26 36.6	78 58	140.0	26 13.2	78 57	140.3	25 49.8	78 57	140.7	25 26.3	78 56	141.0	25 02.8	79 56	141.4	24 39.2	79 56	141.7	24 15.5	79 55	142.0	23 51.9	79 55	142.4	9
40	26 02.0	77 59	139.2	25 38.8	77 58	139.5	25 15.6	77 58	139.9	24 52.4	78 58	140.2	24 29.1	78 57	140.6	24 05.8	78 57	140.9	23 42.4	78 56	141.3	23 19.0	78 56	141.6	40
1	25 26.8	76 60	138.4	25 03.9	76 59	138.8	24 40.9	77 59	139.1	24 17.9	77 58	139.5	23 54.9	77 58	139.8	23 31.8	77 58	140.2	23 08.7	77 57	140.5	22 45.5	77 57	140.9	1
2	24 51.0	75 60	137.6	24 28.4	76 60	138.0	24 05.7	76 60	138.4	23 42.9	76 59	138.7	23 20.1	76 59	139.1	22 57.3	76 58	139.4	22 34.4	76 58	139.8	22 11.5	77 58	140.1	2
3	24 14.7	75 61	136.9	23 52.3	75 61	137.3	23 29.9	75 60	137.6	23 07.4	75 60	138.0	22 44.9	75 60	138.3	22 22.3	75 59	138.7	21 59.6	76 59	139.1	21 37.0	76 58	139.4	3
4	23 38.0	74 62	136.2	23 15.8	74 62	136.5	22 53.6	74 61	136.9	22 31.4	74 61	137.3	22 09.1	74 60	137.6	21 46.7	75 60	138.0	21 24.3	75 60	138.3	21 01.9	75 59	138.7	4
45	23 00.7	73 63	135.4	22 38.8	73 62	135.8	22 16.8	73 62	136.2	21 54.8	73 62	136.5	21 32.8	74 61	136.9	21 10.7	74 61	137.3	20 48.6	74 60	137.6	20 26.4	74 60	138.0	45
6	22 22.9	72 64	134.7	22 01.3	72 63	135.1	21 39.6	72 63	135.5	21 17.8	73 62	135.8	20 56.0	73 62	136.2	20 34.2	73 62	136.6	20 12.3	73 61	136.9	19 50.4	73 61	137.3	6
7	21 44.7	71 64	134.0	21 23.3	71 64	134.4	21 01.8	72 64	134.8	20 40.3	72 63	135.1	20 18.8	72 63	135.5	19 57.2	72 62	135.9	19 35.5	72 62	136.2	19 13.9	72 62	136.6	7
8	21 06.0	70 65	133.3	20 44.9	71 65	133.7	20 23.6	71 64	134.1	20 02.4	71 64	134.4	19 41.1	71 64	134.8	19 19.7	71 63	135.2	18 58.3	71 63	135.6	18 36.9	72 62	135.9	8
9	20 26.9	70 66	132.6	20 06.0	70 66	133.0	19 45.0	70 65	133.4	19 24.0	70 65	133.8	19 02.9	70 64	134.1	18 41.8	70 64	134.5	18 20.7	71 64	134.9	17 59.5	71 63	135.3	9
50	19 47.3	69 67	131.9	19 26.7	69 66	132.3	19 05.9	69 66	132.7	18 45.2	69 66	133.1	18 24.4	69 65	133.5	18 03.5	70 65	133.9	17 42.6	70 64	134.2	17 21.6	70 64	134.6	50
1	19 07.4	68 67	131.3	18 46.9	68 67	131.7	18 26.5	68 66	132.1	18 05.9	69 66	132.4	17 45.4	69 66	132.8	17 24.7	69 65	133.2	17 04.1	69 65	133.6	16 43.4	69 64	134.0	1
2	18 27.0	67 68	130.6	18 06.8	67 68	131.0	17 46.6	68 67	131.4	17 26.3	68 67	131.8	17 05.9	68 66	132.2	16 45.6	68 66	132.6	16 25.1	68 66	132.9	16 04.7	68 65	133.3	2
3	17 46.2	66 68	130.0	17 26.3	67 68	130.4	17 06.3	67 68	130.8	16 46.2	67 67	131.2	16 26.1	67 67	131.5	16 06.0	67 67	131.9	15 45.8	67 66	132.3	15 25.6	67 66	132.7	3
4	17 05.1	66 69	129.4	16 45.4	66 69	129.8	16 25.6	66 68	130.1	16 05.8	66 68	130.5	15 45.9	66 68	130.9	15 26.0	66 67	131.3	15 06.1	67 67	131.7	14 46.1	67 66	132.1	4
55	16 23.6	65 70	128.7	16 04.1	65 70	129.1	15 44.5	65 69	129.5	15 25.0	65 69	129.9	15 05.3	65 68	130.3	14 45.7	66 68	130.7	14 26.0	66 68	131.1	14 06.3	66 67	131.5	55
6	15 41.7	64 70	128.1	15 22.4	64 70	128.5	15 03.1	64 70	128.9	14 43.8	65 69	129.3	14 24.4	65 69	129.7	14 05.0	65 68	130.1	13 45.5	65 68	130.5	13 26.0	65 68	130.9	6
7	14 59.5	63 71	127.5	14 40.4	63 70	127.9	14 21.4	64 70	128.3	14 02.2	64 70	128.7	13 43.1	64 69	129.1	13 23.9	64 69	129.5	13 04.7	64 69	129.9	12 45.4	64 68	130.3	7
8	14 16.9	63 72	126.9	13 58.1	63 71	127.3	13 39.2	63 71	127.7	13 20.4	63 70	128.1	13 01.4	63 70	128.5	12 42.5	63 70	128.9	12 23.5	63 69	129.3	12 04.5	63 69	129.7	8
9	13 34.0	62 72	126.3	13 15.4	62 72	126.7	12 56.8	62 71	127.1	12 38.1	62 71	127.5	12 19.4	62 70	127.9	12 00.7	62 70	128.3	11 42.0	63 70	128.7	11 23.2	63 70	129.1	9
60	12 50.8	61 72	125.8	12 32.4	61 72	126.2	12 14.0	61 72	126.6	11 55.6	61 72	127.0	11 37.1	62 71	127.4	11 18.6	62 71	127.8	11 00.1	62 70	128.2	10 41.5	62 70	128.6	60
1	12 07.2	60 73	125.2	11 49.1	61 73	125.6	11 30.9	61 72	126.0	11 12.7	61 72	126.4	10 54.5	61 72	126.8	10 36.2	61 71	127.2	10 17.9	61 71	127.6	9 59.6	61 70	128.0	1
2	11 23.4	60 74	124.6	11 05.5	60 73	125.0	10 47.5	60 73	125.5	10 29.5	60 72	125.9	10 11.5	60 72	126.3	9 53.5	60 72	126.7	9 35.4	60 71	127.1	9 17.3	60 71	127.5	2
3	10 39.3	59 74	124.1	10 21.6	59 74	124.5	10 03.8	59 73	124.9	9 46.1	59 73	125.3	9 28.3	59 73	125.7	9 10.5	59 72	126.1	8 52.6	60 72	126.5	8 34.7	60 71	126.9	3
4	9 54.8	58 74	123.5	9 37.4	58 74	123.9	9 19.8	58 74	124.4	9 02.3	59 74	124.8	8 44.7	59 73	125.2	8 27.1	59 73	125.6	8 09.5	59 72	126.0	7 51.9	59 72	126.4	4
65	9 10.1	58 75	123.0	8 52.9	58 75	123.4	8 35.6	58 74	123.8	8 18.2	58 74	124.2	8 00.9	58 74	124.7	7 43.5	58 73	125.1	7 26.1	58 73	125.5	7 08.7	58 72	125.9	65
6	8 25.2	57 75	122.5	8 08.1	57 75	122.9	7 51.0	57 75	123.3	7 33.9	57 74	123.7	7 16.8	57 74	124.1	6 59.6	57 74	124.5	6 42.4	57 73	125.0	6 25.2	57 73	125.4	6
7	7 39.9	56 76	122.0	7 23.1	56 76	122.4	7 06.2	56 75	122.8	6 49.3	56 75	123.2	6 32.4	56 74	123.6	6 15.4	56 74	124.0	5 58.5	57 74	124.4	5 41.5	57 73	124.9	7
8	6 54.4	55 76	121.4	6 37.8	56 76	121.9	6 21.1	56 76	122.3	6 04.4	56 75	122.7	5 47.7	56 75	123.1	5 31.0	56 74	123.5	5 14.3	56 74	123.9				8
9	6 08.7	55 77	120.9	5 52.3	55 76	121.4	5 35.8	55 76	121.8	5 19.3	55 75	122.2	5 02.8	55 75	122.6										9
70	5 22.7	54 77	120.4	5 06.5	54 77	120.9																			70

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	9 48.8	43 82	68.0	10 01.6	43 82	67.5	10 14.4	42 82	67.0	10 27.1	42 82	66.6	10 39.8	42 81	66.1	10 52.5	42 81	65.7	11 05.1	42 81	65.2	11 17.6	42 80	64.7	91
2	8 59.3	43 82	67.6	9 12.3	43 82	67.1	9 25.2	43 82	66.7	9 38.1	43 81	66.2	9 51.0	43 81	65.7	10 03.8	43 81	65.3	10 16.6	43 80	64.8	10 29.3	42 80	64.4	2
3	8 10.0	44 82	67.2	8 23.1	44 82	66.7	8 36.2	44 82	66.3	8 49.3	43 81	65.8	9 02.3	43 81	65.3	9 15.3	43 80	64.9	9 28.3	43 80	64.4	9 41.2	43 80	64.0	3
4	7 20.8	44 82	66.8	7 34.1	44 82	66.3	7 47.4	44 81	65.9	8 00.6	44 81	65.4	8 13.8	44 81	64.9	8 27.0	44 80	64.5	8 40.1	44 80	64.0	8 53.3	44 80	63.6	4
95	6 31.8	45 82	66.3	6 45.2	45 81	65.9	6 58.7	45 81	65.4	7 12.1	45 81	65.0	7 25.5	45 80	64.5	7 38.8	44 80	64.1	7 52.2	44 80	63.6	8 05.5	44 80	63.2	95
6	5 42.9	46 81	65.9	5 56.5	45 81	65.5	6 10.1	45 81	65.0	6 23.7	45 80	64.6	6 37.3	45 80	64.1	6 50.8	45 80	63.7	7 04.3	45 79	63.2	7 17.8	45 79	62.8	6
7				5 07.9	46 81	65.1	5 21.7	46 80	64.6	5 35.5	46 80	64.2	5 49.3	46 80	63.7	6 03.0	46 80	63.3	6 16.7	46 79	62.8	6 30.4	46 79	62.4	7
8													5 01.4	46 80	63.3	5 15.3	46 80	62.9	5 29.2	46 79	62.4	5 43.1	46 78	62.0	8
9																									9

Lat. 27°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	89 00.0	1.0 34	00.0	88 30.0	1.0 24	00.0	88 00.0	1.0 19	00.0	87 00.0	1.0 13	00.0	85 00.0	1.0 08	00.0	83 00.0	1.0 05	00.0	82 30.0	1.0 05	00.0	81 30.0	1.0 04	00.0	00
1	88 39.8	75 70	41.3	88 15.5	86 58	30.3	87 48.8	91 48	23.6	86 52.4	96 35	16.1	84 55.5	98 22	09.6	82 56.8	99 16	06.8	82 27.1	99 14	06.3	81 27.4	99 13	05.5	1
2	87 57.8	48 81	60.1	87 40.8	64 73	49.3	87 19.9	74 65	41.0	86 31.4	86 52	29.9	84 42.4	94 35	18.7	82 47.5	97 25	13.3	82 18.4	97 24	12.4	81 19.8	98 21	10.9	2
3	87 09.4	34 84	68.7	86 57.1	48 80	59.8	86 40.9	59 74	52.2	86 00.4	74 63	40.6	84 21.6	88 45	26.8	82 32.4	93 34	19.5	82 04.2	94 32	18.2	81 07.4	95 28	16.0	3
4	86 18.8	26 86	73.3	86 09.3	37 83	66.1	85 56.5	48 79	59.5	85 22.8	64 70	48.6	83 54.5	81 54	33.9	82 12.0	89 42	25.2	81 45.1	90 39	23.6	80 50.4	92 35	20.9	4
05	85 27.2	20 87	76.1	85 19.7	30 84	70.1	85 09.2	39 82	64.5	84 40.8	55 74	54.5	83 22.4	74 60	39.8	81 47.0	84 48	30.4	81 21.6	86 46	28.6	80 29.4	88 41	25.4	05
6	84 35.1	16 87	78.0	84 29.0	25 86	72.8	84 20.3	33 83	67.9	83 56.1	47 78	59.0	82 46.4	67 65	44.8	81 18.1	79 54	35.0	80 54.2	81 51	33.0	80 04.7	84 47	29.6	6
7	83 42.7	13 88	79.2	83 37.6	21 86	74.8	83 30.3	28 84	70.4	83 09.5	41 80	62.4	82 07.3	61 69	48.9	80 45.9	74 58	39.0	80 23.5	76 56	37.0	79 36.7	80 51	33.4	7
8	82 50.1	11 88	80.1	82 45.9	18 87	76.2	82 39.6	24 85	72.3	82 21.5	36 82	65.0	81 26.0	55 72	52.4	80 11.0	69 62	42.6	79 50.0	71 60	40.5	79 06.0	76 55	36.8	8
9	81 57.4	09 88	80.8	81 53.8	15 87	77.3	81 48.5	21 86	73.8	81 32.6	32 83	67.1	80 42.8	50 74	55.3	79 33.7	64 65	45.7	79 14.1	67 63	43.7	78 32.8	71 59	39.9	9
10	81 04.6	07 88	81.3	81 01.6	13 87	78.1	80 57.0	18 86	74.9	80 43.1	28 84	68.8	79 58.2	46 76	57.7	78 54.6	59 68	48.4	78 36.3	62 66	46.4	77 57.5	67 62	42.7	10
1	80 11.7	06 88	81.6	80 09.2	11 87	78.7	80 05.3	16 86	75.8	79 53.0	25 84	70.2	79 12.4	42 78	59.8	78 13.8	55 70	50.9	77 56.8	58 68	48.9	77 20.4	63 64	45.1	1
2	79 18.8	04 88	81.9	79 16.8	09 88	79.2	79 13.4	14 87	76.5	79 02.5	22 85	71.3	78 25.8	38 79	61.5	77 31.7	51 72	53.0	77 15.9	54 70	51.0	76 41.8	59 67	47.4	2
3	78 25.9	03 88	82.1	78 24.2	06 88	79.6	78 21.3	12 87	77.1	78 11.8	20 85	72.2	77 38.5	35 80	63.0	76 48.5	48 74	54.8	76 33.8	51 72	52.9	76 01.8	56 68	49.4	3
4	77 32.9	02 88	82.2	77 31.6	06 88	79.9	77 29.2	10 87	77.6	77 20.7	18 85	73.0	76 50.6	32 81	64.3	76 04.4	44 75	56.4	75 50.6	47 73	54.6	75 20.7	52 70	51.1	4
15	76 39.9	01 88	82.2	76 39.0	05 88	80.1	76 36.9	09 87	77.9	76 29.5	16 86	73.7	76 02.2	29 81	65.4	75 19.5	41 76	57.9	75 06.6	44 74	56.1	74 38.6	49 72	52.7	15
6	75 47.8	00 88	82.3	75 46.3	04 88	80.2	75 44.6	07 87	78.2	75 38.1	14 86	74.2	75 13.3	27 82	66.4	74 33.9	39 77	59.2	74 21.9	41 76	57.4	73 55.7	46 73	54.2	6
7	74 54.0	00 88	82.3	74 53.6	03 88	80.4	74 52.2	06 87	78.5	74 46.6	13 86	74.6	74 24.2	25 82	67.2	73 47.7	36 78	60.3	73 36.5	38 76	58.6	73 12.0	43 74	55.4	7
8	74 01.0	01 88	82.3	74 00.9	02 88	80.4	73 59.8	05 87	78.6	73 55.0	11 86	75.0	73 34.8	23 83	68.0	73 01.0	33 78	61.3	72 50.6	36 77	59.7	72 27.7	41 75	56.6	8
9	73 08.0	02 88	82.2	73 08.2	01 88	80.5	73 07.4	04 87	78.8	73 03.4	10 86	75.3	72 45.1	21 83	68.6	72 13.9	31 79	62.2	72 04.3	33 78	60.6	71 42.8	38 76	57.6	9
20	72 15.1	03 88	82.2	72 15.4	00 88	80.5	72 15.0	03 88	78.9	72 11.6	08 86	75.6	71 55.2	19 83	69.2	71 26.5	29 80	63.0	71 17.5	31 79	61.5	70 57.4	36 76	58.6	20
1	71 22.1	03 88	82.1	71 22.7	01 88	80.5	71 22.5	02 88	78.9	71 19.8	07 86	75.8	71 05.2	17 84	69.7	70 38.7	27 80	63.7	70 30.3	29 79	62.3	70 11.5	33 77	59.4	1
2	70 29.2	04 88	82.0	70 30.0	01 88	80.5	70 30.0	01 88	79.0	70 27.9	06 86	76.0	70 15.0	16 84	70.1	69 50.6	25 80	64.3	69 42.9	27 80	62.9	69 25.3	31 78	60.2	2
3	69 36.3	05 88	81.9	69 37.3	02 88	80.4	69 37.6	00 88	79.0	69 36.1	05 86	76.1	69 24.7	14 84	70.4	69 02.3	23 81	64.9	68 55.1	25 80	63.5	68 38.8	29 78	60.9	3
4	68 43.3	05 88	81.7	68 44.6	03 88	80.4	68 45.1	01 88	79.0	68 44.2	04 86	76.2	68 34.2	13 84	70.8	68 13.8	21 81	65.4	68 07.1	23 80	64.1	67 51.9	27 78	61.5	4
25	67 50.4	06 88	81.6	67 51.9	04 88	80.3	67 52.6	01 88	79.0	67 52.2	03 87	76.3	67 43.7	11 84	71.0	67 25.1	20 82	65.8	67 19.0	22 81	64.6	67 04.8	25 79	62.1	25
6	66 57.6	06 88	81.5	66 59.2	04 88	80.2	67 00.2	02 88	78.9	67 00.3	02 87	76.4	66 53.1	10 84	71.3	66 36.3	18 82	66.2	66 30.6	20 81	65.0	66 17.5	24 79	62.6	6
7	66 04.7	07 88	81.3	66 06.5	05 88	80.1	66 07.7	03 87	78.9	66 08.3	01 87	76.4	66 02.5	09 84	71.5	65 47.3	16 82	66.6	65 42.1	18 81	65.4	65 29.9	22 80	63.0	7
8	65 11.9	07 88	81.2	65 13.8	06 88	80.0	65 15.2	04 87	78.8	65 16.4	00 87	76.4	65 11.8	08 85	71.6	64 58.2	15 82	66.9	64 53.4	17 81	65.7	64 42.2	20 80	63.4	8
9	64 19.1	08 88	81.0	64 21.2	06 88	79.9	64 22.8	04 87	78.7	64 24.4	01 87	76.4	64 21.0	06 85	71.8	64 08.9	14 82	67.2	64 04.6	15 82	66.1	63 54.3	19 80	63.8	9
30	63 26.3	09 88	80.8	63 28.6	07 88	79.7	63 30.4	05 87	78.6	63 32.4	02 86	76.4	63 30.2	05 85	71.9	63 19.6	12 82	67.4	63 15.7	14 82	66.3	63 06.3	17 80	64.1	30
1	62 33.5	09 88	80.7	62 36.0	08 88	79.6	62 38.0	06 87	78.5	62 40.5	02 86	76.3	62 39.4	04 85	72.0	62 30.2	11 82	67.6	62 26.7	13 82	66.6	62 18.1	16 80	64.4	1
2	61 40.8	10 88	80.5	61 43.4	08 88	79.4	61 45.6	06 87	78.4	61 48.5	03 86	76.3	61 48.5	03 85	72.0	61 40.7	10 82	67.8	61 37.6	11 82	66.8	61 29.8	14 81	64.7	2
3	60 48.0	10 88	80.3	60 50.9	09 88	79.3	60 53.3	07 87	78.3	60 56.6	04 86	76.2	60 57.7	02 85	72.1	60 51.2	09 83	68.0	60 48.4	10 82	67.0	60 41.4	13 81	64.9	3
4	59 55.4	11 88	80.1	59 58.4	09 88	79.1	60 00.9	08 87	78.1	60 04.7	05 86	76.1	60 06.8	01 85	72.1	60 01.6	07 83	68.1	59 59.2	09 82	67.1	59 53.0	12 81	65.1	4
35	59 02.7	11 88	79.9	59 05.9	10 88	79.0	59 08.6	08 87	78.0	59 12.8	06 86	76.0	59 15.9	00 85	72.1	59 12.0	06 83	68.2	59 09.9	08 82	67.3	59 04.4	11 81	65.3	35
6	58 10.1	12 88	79.7	58 13.4	10 87	78.8	58 16.4	09 87	77.8	58 20.9	06 86	75.9	58 25.0	01 85	72.1	58 22.3	05 83	68.3	58 20.6	07 82	67.4	58 15.8	09 81	65.5	6
7	57 17.5	12 88	79.5	57 21.0	11 87	78.6	57 24.1	10 87	77.7	57 29.1	07 86	75.8	57 34.2	01 85	72.1	57 32.6	04 83	68.4	57 31.2	05 82	67.5	57 27.2	08 81	65.6	7
8	56 24.9	13 88	79.3	56 28.6	12 87	78.4	56 31.9	10 87	77.5	56 37.3	08 86	75.7	56 43.3	02 85	72.1	56 42.9	03 83	68.4	56 41.8	04 82	67.5	56 38.5	07 81	65.7	8
9	55 32.4	13 88	79.1	55 36.3	12 87	78.2	55 39.7	11 87	77.4	55 45.5	08 86	75.6	55 52.4	03 85	72.0	55 53.2	02 83	68.5	55 52.4	03 82	67.6	55 49.7	06 81	65.8	9
40	54 39.9	14 87	78.9	54 43.9	13 87	78.1	54 47.6	11 87	77.2	54 53.7	09 86	75.5	55 01.6	04 85	72.0	55 03.5	01 83	68.5	55 03.0	02 82	67.6	55 00.9	05 81	65.9	40
1	53 47.5	14 87	78.7	53 51.7	13 87	77.9	53 55.4	12 87	77.0	54 02.0	10 86	75.3	54 10.7	05 85	71.9	54 13.7	00 83	68.5	54 13.6	01 82	67.6	54 12.1	04 81	65.9	1
2	52 55.1	15 87	78.5	52 59.4	14 87	77.7	53 03.4	13 87	76.8	53 10.3	10 86	75.2	53 19.9	06 85	71.8	53 24.0	01 83	68.5	53 24.1	00 82	67.7	53 23.3	02 81	66.0	2
3	52 02.7	15 87	78.3	52 07.2	14 87	77.5	52 11.3	13 87	76.6	52 18.6	11 86	75.0	52 29.1	07 85	71.8	52 34.2	02 83	68.5	52 34.7	01 82	67.7	52 34.5	01 81	66.0	3
4	51 10.4	16 87	78.0	51 15.0	15 87	77.2	51 19.3	14 87	76.5	51 27.0	12 86	74.9	51 38.4	07 84	71.7	51 44.5	03 83	68.4	51 45.2	02 82	67.6	51 45.6	00 81	66.0	4
45	50 18.1	16 87	77.8	50 22.9	15 87	77.0	50 27.4	14 86	76.3	50 35.4	12 86	74.7	50 47.6	08 84	71.6	50 54.8	04 83	68.4	50 55.8	03 82	67.6	50 56.8	01 81	66.0	45
6	49 25.9	17 87	77.6	49 30.8	16 87	76.8	49 35.5	15 86	76.1	49 43.9	13 86	74.5	49 56.9	09 84	71.4	50 05.1	05 83	68.3	50 06.4	04 82	67.6	50 07.9	02 81	66.0	6
7	48 33.7	17 87	77.4	48 38.8	17 87	76.6	48 43.6	16 86	75.9	48 52.4	14 86	74.4	49 06.3	10 84	71.3	49 15.4	06 83	68.3	49 17.0	05 82	67.5	49 19.1	03 81	66.0	7
8	47 41.6	18 87	77.1	47 46.8	17 86	76.4	47 51.8	16 86	75.6	48 00.9	14 86	74.2	48 15.7	10 84	71.2	48 25.8	06 83	68.2	48 27.6	05 82	67.4	48 30.3	04 81	65.9	8
9	46 49.5	18 87	76.9	46 54.9	18 86	76.2	47 00.0	17 86	75.4	47 09.5	15 86	74.0	47 25.1	11 84	71.1	47 36.1	07 83	68.1	47 38.2	06 82	67.4	47 41.5	04 81	65.9	9
50	45 57.4	19 87	76.6	46 03.0	18 86	75.9	46 08.3	17 86	75.2	46 18.1	15 86	73.8	46 34.5	12 84	70.9	46 46.6	08 83	68.0	46 48.9	07 82	67.3	46 52.7	05 81	65.8	50
1	45 05.5	19 86	76.4	45 11.2	19 86	75.7	45 16.6	18 86	75.0	45 26.8	16 86	73.6	45 44.0	13 84	70.8	45 57.0	09 82	67.9	45 59.6	08 82	67.2	46 03.9	06 81	65.8	1
2	44 13.5	20 86	76.2	44 19.4	19 86	75.5	44 25.0	18 86	74.8	44 35.6	17 85	73.4	44 53.6	13 84	70.6	45 07.5	10 82	67.8	45 10.3	09 82	67.1	45 15.2	07 81	65.7	2
3	43 21.6	21 86	75.9	43 27.7	20 86	75.2	43 33.5	19 86	74.6	43 44.3	17 85	73.2	44 03.2	14 84	70.5	44 18.0	11 82	67.7	44 21.1	10 82	67.0	44 26.5	08 81	65.6	3
4	42 29.8	21 86	75.7	42 36.0	20 86	75.0	42 42.0	19 86	74.3	42 53.2	18 85	73.0	43 12.8	15 84	70.3	43 28.6	12 82	67.6	43 31.9	11 82	66.9	43 37.8	09 81	65.5	4
55	41 38.1	22 86	75.4	41 44.4	21 86	74.7	41 50.5	20 86	74.1	42 02.1	19 85	72.8	42 22.5	15 84	70.1	42 39.2	12 82	67.4	42 42.8	12 82	66.7	42 49.2	10 81	65.4	55
6	40 46.4	22 86	75.1	40 52.9	21 86	74.5	40 59.2	21 86	73.9	41 11.1	19 85	72.6	41 32.3	16 84	69.9	41 49.8	13 82	67.3	41 53.7	12 82	66.6	42 00.6	11 81	65.3	6
7	39 54.7	23 86	74.9	40 01.4	22 86	74.3	40 07.8	21 85	73.6	40 20.1	20 85	72.3	40 42.1	17 84	69.7	41 00.6	14 82	67.1	41 04.6	13 82	66.5	41 12.1	12 81	65.2	7
8	39 03.1	23 86	74.6	39 10.0	22 86	74.0	39 16.6	22 85	73.4	39 29.2	20 85	72.1	39 52.0	18 84	69.6	40 11.3	15 82	67.0	40 15.6	14 82	66.3	40 23.6	13 81	65.0	8
9	38 11.6	24 86	74.4	38 18.6	23 86	73.7	38 25.4	22 85	73.1	38 38.4	21 85	71.9	39 01.9	18 83	69.4	39 22.2	16 82	66.8	39 26.7	15 82	66.2	39 35.1	13 81	64.9	9
60	37 20.2	24 86	74.1	37 27.3	23 85	73.5	37 34.3	23 85	72.9	37 47.6	22 84	71.6	38 11.9	19 83	69.2	38 33.0	16 82	66.6	38 37.8	16 81	66.0	38 46.8	14 81	64.7	60
1	36 28.8	25 86	73.8	36 36.1	24 85	73.2	36 43.2	23 85	72.6	36 56.9	22 84	71.4	37 22.0	20 83	68.9	37 44.0	17 82	66.5	37 49.0	16 81	65.8	37 58.4	15 80	64.6	1
2	35 37.5	25 85	73.6	35 44.9	25 85	73.0	35 52.2	24 85	72.4	36 06.3	23 84	71.2	36 32.1	20 83	68.7	36 55.0	18 82	66.3	37 00.3	17 81	65.7	37 10.2	16 80	64.4	2
3	34 46.2	26 85	73.3	34 53.9	25 85	72.7	35 01.3	25 85	72.1	35 15.7	23 84	70.9	35 42.3	21 83	68.5	36 06.1	19 81	66.1	36 11.6	18 81	65.5	36 22.0	17 80	64.3	3
4	33 55.1	26 85	73.0	34 02.9	26 85	72.4	34 10.5	25 85	71.8	34 25.2	24 84	70.7	34 52.6	22 83	68.3	35 17.3	19 81	65.9	35 23.0	19 81	65.3	35 33.9	18 80	64.1	4
65	33 04.0	27 85	72.7	33 11.9	26 85	72.1	33 19.7	26 84	71.6	33 34.8	25 84	70.4	34 03.0	22 82	68.1	34 28.5	20 81	65.7	34 34.4	20 81	65.1	34 45.8	18 80	63.9	65
6	32 13.0	27 85	72.4	32 21.1	27 85	71.9	32 29.0	26 84	71.3	32 44.5	25 84	70.2	33 13.4	23 82	67.8	33 39.8	21 81	65.5	33 46.0	20 81	64.9	33 57.8	19 80	63.7	6
7	31 22.1	28 85	72.2	31 30.3	27 84	71.6	31 38.4	27 84	71.0	31 54.2	26 84	69.9	32 24.0	24 82	67.6	32 51.2	22 81	65.3	32 57.6	21 80	64.7	33 09.9	20 80	63.5	7
8	30 31.2	28 85	71.9	30 39.6	28 84	71.3	30 47.9	27 84	70.7	31 04.1	26 84	69.6	31 34.6	24 82	67.4	32 02.7	22 81	65.1	32 09.3	22 80	64.5	32 22.1	21 80	63.3	8
9	29 40.5	29 84	71.6	29 49.1	28 84	71.0	29 57.5	28 84	70.5	30 14.0	27 83	69.4	30 45.3	25 82	67.1	31 14.3	23 81	64.9	31 21.1	23 80	64.3	31 34.4	22 80	63.1	9
70	28 49.8	29 84	71.3	28 58.5	29 84	70.7	29 07.2	29 84	70.2	29 24.0	28 83	69.1	29 56.1	26 82	66.9	30 25.9	24 80	64.6	30 33.0	23 80	64.1	30 46.7	22 79	62.9	70
1	27 59.2	30 84	71.0	28 08.1	30 84	70.4	28 16.9	29 84	69.9	28 34.1	28 83	68.8	29 07.0	26 82	66.6	29 37.6	25 80	64.4	29 45.0	24 80	63.8	29 59.2	23 79	62.7	1
2	27 08.7	31 84	70.7	27 17.8	30 84	70.1	27 26.8	30 84	69.6	27 44.3	29 83	68.5	28 18.0	27 82	66.4	28 49.5	25 80	64.2	28 57.0	25 80	63.6	29 11.7	24 79	62.5	2
3	26 18.3	31 84	70.4	26 27.6	31 84	69.8	26 36.7	30 83	69.3	26 54.6	29 83	68.2	27 29.0	28 81	66.1	28 01.4	26 80	63.9	28 09.2	26 80	63.4	28 24.4	25 79	62.3	3
4	25 28.0	32 84	70.1	25 37.4	31 83	69.5	25 46.7	31 83	69.0	26 05.0	30 82	68.0	26 40.2	29 81	65.8	27 13.5	27 80	63.7	27 21.5	26 80	63.1	27 37.1	26 79	62.0	4
75	24 37.8	32 84	69.8	24 47.4	32 83	69.2	24 56.9	31 83	68.7	25 15.5	31 82	67.7	25 51.5	29 81	65.5	26 25.6	28 80	63.4	26 33.8	27 79	62.9	26 49.9	26 78	61.8	75
6	23 47.7	33 83	69.4	23 57.4	32 83	68.9	24 07.1	32 83	68.4	24 26.1	31 82	67.4	25 02.9	30 81	65.3	25 37.8	28 79	63.2	25 46.3	28 79	62.6	26 02.9	27 78	61.6	6
7	22 57.7	33 83	69.1	23 07.6	33 83	68.6	23 17.5	33 83	68.1	23 36.8	32 82	67.1	24 14.4	31 81	65.0	24 50.2	29 79	62.9	24 58.9	29 79	62.4	25 15.9	28 78	61.3	7
8	22 07.8	34 83	68.8	22 17.9	34 83	68.3	22 27.9	33 82	67.8	22 47.7	33 82	66.8	23 26.0	31 80	64.7	24 02.7	30 79	62.6	24 11.6	30 79	62.1	24 29.1	29 78	61.0	8
9	21 18.0	34 83	68.5	21 28.3	34 82	68.0	21 38.5	34 82	67.5	21 58.6	33 82	66.5	22 37.7	32 80	64.4	23 15.3	31 79	62.3	23 24.4	30 78	61.8	23 42.4	30 78	60.8	9
80	20 28.3	35 83	68.1	20 38.8	35 82	67.6	20 49.2	34 82	67.1	21 09.7	34 81	66.1	21 49.6	33 80	64.1	22 28.0	31 79	62.1	22 37.3	31 78	61.6	22 55.8	30 78	60.5	80
1	19 38.7	36 82	67.8	19 49.4	35 82	67.3	20 00.0	35 82	66.8	20 20.8	35 81	65.8	21 01.5	33 80	63.8	21 40.8	32 78	61.8	21 50.4	32 78	61.3	22 09.3	31 77	60.2	1
2	18 49.3	36 82	67.5	19 00.1	36 82	67.0	19 10.9	36 82	66.5	19 32.1	35 81	65.5	20 13.6	34 80	63.5	20 53.8	33 78	61.5	21 03.6	33 78	61.0	21 22.9	32 77	60.0	2
3	18 00.0	37 82	67.1	18 11.0	37 82	66.7	18 21.9	36 81	66.2	18 43.5	36 81	65.2	19 25.8	35 79	63.2	20 06.8	34 78	61.2	20 16.9	33 78	60.7	20 36.7	33 77	59.7	2
4	17 10.8	37 82	66.8	17 22.0	37 82	66.3	17 33.1	37 81	65.8	17 55.1	36 80	64.8	18 38.2	35 79	62.9	19 20.1	34 78	60.9	19 30.3	34 77	60.4	19 50.6	34 76	59.4	4
85	16 21.7	38 82	66.5	16 33.1	38 81	66.0	16 44.4	38 81	65.5	17 06.7	37 80	64.5	17 50.7	36 79	62.6	18 33.4	35 78	60.6	18 43.9	35 77	60.1	19 04.7	34 76	59.1	85
6	15 32.8	39 81	66.1	15 44.3	38 81	65.6	15 55.8	38 81	65.1	16 18.6	38 80	64.2	17 03.3	37 79	62.2	17 46.9	36 77	60.3	17 57.6	36 77	59.8	18 18.9	35 76	58.8	6
7	14 44.0	39 81	65.7	14 55.7	39 81	65.3	15 07.4	39 80	64.8	15 30.5	38 80	63.8	16 16.1	38 78	61.9	17 00.6	37 77	60.0	17 11.5	36 77	59.5	17 33.2	36 76	58.5	7
8	13 55.3	40 81	65.4	14 07.2	40 80	64.9	14 19.1	39 80	64.4	14 42.6	39 80	63.5	15 29.0	38 78	61.6	16 14.4	37 77	59.7	16 25.5	37 76	59.2	16 47.7	37 76	58.2	8
9	13 06.8	40 81	65.0	13 18.9	40 80	64.5	13 30.9	40 80	64.1	13 54.8	40 79	63.1	14 42.0	39 78	61.2	15 28.3	38 76	59.3	15 39.7	38 76	58.8	16 02.3	38 75	57.9	9
90	12 18.4	41 80	64.7	12 30.7	41 80	64.2	12 42.9	41 80	63.7	13 07.2	40 79	62.8	13 55.2	40 78	60.9	14 42.4	39 76	59.0	14 54.0	39 76	58.5	15 17.1	38 75	57.6	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	34 00.0	1.0 01	180.0	33 00.0	1.0 01	180.0	31 00.0	1.0 01	180.0	29 00.0	1.0 01	180.0	28 30.0	1.0 01	180.0	27 30.0	1.0 01	180.0	00
1	34 59.5	1.0 02	178.9	34 29.5	1.0 02	178.9	33 59.5	1.0 02	178.9	32 59.5	1.0 02	179.0	30 59.5	1.0 02	179.0	28 59.6	1.0 02	179.1	28 29.6	1.0 02	179.1	27 29.6	1.0 02	179.1	1
2	34 58.0	1.0 04	177.8	34 28.0	1.0 04	177.9	33 58.0	1.0 04	177.9	32 58.1	1.0 04	177.9	30 58.2	1.0 04	178.0	28 58.2	1.0 04	178.1	28 28.3	1.0 04	178.1	27 28.3	1.0 04	178.2	2
3	34 55.5	1.0 06	176.8	34 25.5	1.0 06	176.8	33 55.6	1.0 06	176.8	32 55.7	1.0 06	176.9	30 55.8	1.0 05	177.0	28 56.0	1.0 05	177.2	28 26.1	1.0 05	177.2	27 26.1	1.0 05	177.2	3
4	34 52.0	1.0 08	175.7	34 22.0	1.0 07	175.7	33 52.1	1.0 07	175.8	32 52.3	1.0 07	175.9	30 52.6	1.0 07	176.0	28 52.9	1.0 07	176.2	28 23.0	1.0 06	176.3	27 23.2	1.0 06	176.3	4
05	34 47.5	1.0 09	174.6	34 17.6	1.0 09	174.7	33 47.7	1.0 09	174.7	32 48.0	1.0 09	174.8	30 48.5	1.0 08	175.1	28 49.0	1.0 08	175.3	28 19.1	1.0 08	175.3	27 19.3	1.0 08	175.4	05
6	34 41.9	99 11	173.6	34 12.1	99 11	173.6	33 42.3	99 11	173.7	32 42.7	99 10	173.8	30 43.4	99 10	174.1	28 44.1	99 10	174.3	28 14.3	99 10	174.4	27 14.6	99 09	174.5	6
7	34 35.5	99 12	172.5	34 05.7	99 12	172.6	33 36.0	99 12	172.6	32 36.5	99 12	172.8	30 37.5	99 12	173.1	28 38.4	99 11	173.4	28 08.6	99 11	173.5	27 09.1	99 11	173.6	7
8	34 28.0	99 14	171.4	33 58.3	99 14	171.5	33 28.6	99 14	171.6	32 29.3	99 14	171.8	30 30.6	99 13	172.1	28 31.8	99 12	172.5	28 02.1	99 12	172.5	27 02.7	99 12	172.7	8
9	34 19.5	99 16	170.4	33 49.9	99 16	170.5	33 20.4	99 15	170.6	32 21.2	99 15	170.8	30 22.8	99 14	171.2	28 24.4	99 14	171.5	27 54.7	99 14	171.6	26 55.5	99 14	171.8	9
10	34 10.1	98 17	169.3	33 40.6	98 17	169.4	33 11.1	98 17	169.5	32 12.2	98 17	169.8	30 14.1	98 16	170.2	28 16.0	98 15	170.6	27 46.5	98 15	170.7	26 47.4	98 15	170.9	10
1	33 59.7	98 19	168.3	33 30.3	98 19	168.4	33 01.0	98 18	168.5	32 02.2	98 18	168.8	30 04.6	98 17	169.2	28 06.9	98 17	169.7	27 37.4	98 16	169.8	26 38.5	98 16	170.0	1
2	33 48.4	97 20	167.2	33 19.1	98 20	167.4	32 49.9	98 20	167.5	31 51.3	98 20	167.8	29 54.2	98 19	168.3	27 56.9	98 18	168.7	27 27.5	98 18	168.9	26 28.8	98 18	169.1	2
3	33 36.1	97 22	166.2	33 07.0	97 22	166.3	32 37.8	97 22	166.5	31 39.5	97 21	166.8	29 42.8	97 20	167.3	27 46.0	97 20	167.8	27 16.8	97 19	168.0	26 18.3	97 19	168.2	3
4	33 22.9	97 24	165.2	32 53.9	97 23	165.3	32 24.9	97 23	165.5	31 26.9	97 23	165.8	29 30.7	97 22	166.4	27 34.3	97 21	166.9	27 05.2	97 20	167.1	26 07.0	97 20	167.3	4
15	33 08.7	96 25	164.2	32 39.9	96 25	164.3	32 11.0	96 24	164.5	31 13.3	96 24	164.8	29 17.6	96 23	165.4	27 21.8	97 22	166.0	26 52.9	97 22	166.2	25 54.9	97 22	166.5	15
6	32 53.7	96 26	163.2	32 25.0	96 26	163.3	31 56.3	96 26	163.5	30 58.8	96 26	163.8	29 03.8	96 24	164.5	27 08.5	96 24	165.1	26 39.7	96 23	165.3	25 42.0	96 23	165.6	6
7	32 37.8	95 28	162.2	32 09.2	95 28	162.3	31 40.7	95 28	162.5	30 43.5	95 27	162.9	28 49.0	95 26	163.6	26 54.4	96 25	164.2	26 25.7	96 25	164.4	25 28.3	96 24	164.7	7
8	32 20.9	95 30	161.2	31 52.6	95 29	161.3	31 24.2	95 29	161.5	30 27.3	95 28	161.9	28 33.5	95 27	162.6	26 39.5	95 26	163.3	26 10.9	95 26	163.5	25 13.8	95 26	163.9	8
9	32 03.2	94 31	160.2	31 35.0	94 31	160.4	31 06.8	94 30	160.6	30 10.3	94 30	161.0	28 17.2	94 29	161.7	26 23.7	95 28	162.5	25 55.3	95 27	162.6	24 58.5	95 27	163.0	9
20	31 44.7	93 32	159.2	31 16.6	93 32	159.4	30 48.6	93 32	159.6	29 52.5	94 31	160.0	28 00.0	94 30	160.8	26 07.2	94 29	161.6	25 39.0	94 28	161.8	24 42.5	94 28	162.2	20
1	31 25.3	93 34	158.2	30 57.4	93 33	158.5	30 29.6	93 33	158.7	29 33.8	93 32	159.1	27 42.0	93 31	159.9	25 50.0	93 30	160.7	25 21.9	94 30	160.9	24 25.8	94 29	161.3	1
2	31 05.0	92 35	157.3	30 37.4	92 35	157.5	30 09.7	92 34	157.7	29 14.3	92 34	158.2	27 23.3	93 32	159.6	25 31.9	93 31	159.9	25 04.1	93 31	160.1	24 08.3	93 30	160.5	2
3	30 44.0	91 36	156.3	30 16.5	92 36	156.6	29 49.1	92 36	156.8	28 54.1	92 35	157.3	27 03.8	92 34	158.2	25 13.2	92 32	159.0	24 45.5	92 32	159.2	23 50.0	92 32	159.7	3
4	30 22.1	91 38	155.4	29 54.9	91 38	155.6	29 27.6	91 37	155.9	28 33.0	91 36	156.4	26 43.5	91 35	157.3	24 53.7	92 34	158.2	24 26.2	92 34	158.4	23 31.1	92 33	158.8	4
25	29 59.5	90 39	154.5	29 32.4	90 39	154.7	29 05.4	90 38	155.0	28 11.2	90 38	155.5	26 22.5	91 36	156.4	24 33.4	91 35	157.3	24 06.1	91 34	157.6	23 11.4	91 34	158.0	25
6	29 36.1	89 40	153.6	29 09.2	89 40	153.8	28 42.4	90 40	154.1	27 48.6	90 39	154.6	26 00.7	90 38	155.6	24 12.5	90 36	156.5	23 45.4	90 36	156.8	22 51.1	91 35	157.2	6
7	29 11.9	89 42	152.7	28 45.3	89 41	152.9	28 18.7	89 41	153.2	27 25.3	89 40	153.7	25 38.3	89 39	154.7	23 50.8	90 37	155.7	23 23.9	90 37	155.9	22 30.0	90 36	156.4	7
8	28 47.0	88 43	151.8	28 20.6	88 42	152.0	27 54.2	88 42	152.3	27 01.3	88 41	152.8	25 15.1	89 40	153.9	23 28.5	89 38	154.9	23 01.8	89 38	155.1	22 08.3	89 37	155.6	8
9	28 21.3	87 44	150.9	27 55.2	87 44	151.2	27 29.0	87 43	151.4	26 36.5	88 42	152.0	24 51.2	88 41	153.1	23 05.5	88 40	154.1	22 39.0	88 39	154.3	21 45.9	89 38	154.9	9
30	27 55.0	86 45	150.0	27 29.0	86 45	150.3	27 03.1	87 44	150.6	26 11.1	87 44	151.2	24 26.6	87 42	152.2	22 41.8	88 40	153.3	22 15.5	88 40	153.6	21 22.9	88 40	154.1	30
1	27 27.9	86 46	149.2	27 02.2	86 46	149.5	26 36.5	86 46	149.7	25 44.9	86 45	150.3	24 01.4	86 43	151.4	22 17.4	87 42	152.5	21 51.4	87 41	152.8	20 59.2	87 41	153.3	1
2	27 00.2	85 47	148.3	26 34.7	85 47	148.6	26 09.2	85 46	148.9	25 18.1	85 46	149.5	23 35.5	86 44	150.6	21 52.4	86 43	151.7	21 26.6	86 42	152.0	20 34.8	86 42	152.6	2
3	26 31.8	84 48	147.5	26 06.5	84 48	147.8	25 41.3	84 48	148.1	24 50.6	85 47	148.7	23 09.0	85 45	149.8	21 26.8	85 44	151.0	21 01.2	85 43	151.3	20 09.9	86 43	151.8	3
4	26 02.7	83 50	146.7	25 37.7	83 49	147.0	25 12.7	83 49	147.3	24 22.5	84 48	147.9	22 41.8	84 46	149.1	21 00.6	85 45	150.2	20 35.2	85 44	150.5	19 44.3	85 44	151.1	4
35	25 33.0	82 50	145.9	25 08.3	83 50	146.2	24 43.5	83 50	146.5	23 53.8	83 49	147.1	22 14.0	83 47	148.3	20 33.7	84 46	149.5	20 08.6	84 45	149.8	19 18.2	84 45	150.3	35
6	25 02.7	82 52	145.1	24 38.2	82 51	145.4	24 13.7	82 51	145.7	23 24.5	82 50	146.3	21 45.6	83 48	147.5	20 06.3	83 47	148.7	19 41.4	83 46	149.0	18 51.4	83 46	149.6	6
7	24 31.8	81 52	144.3	24 07.5	81 52	144.6	23 43.2	81 52	144.9	22 54.5	81 51	145.5	21 16.6	82 49	146.8	19 38.2	82 48	148.0	19 13.6	82 47	148.3	18 24.1	82 46	148.9	7
8	24 00.2	80 54	143.5	23 36.2	80 53	143.8	23 12.2	80 53	144.1	22 24.0	81 52	144.8	20 47.1	81 50	146.1	19 09.6	81 49	147.3	18 45.2	82 48	147.6	17 56.2	82 47	148.2	8
9	23 28.1	79 54	142.7	23 04.4	79 54	143.0	22 40.6	79 54	143.4	21 52.8	80 53	144.0	20 16.9	80 51	145.3	18 40.5	81 50	146.6	18 16.3	81 49	146.9	17 27.8	81 48	147.5	9
40	22 55.5	78 55	142.0	22 32.0	78 55	142.3	22 08.4	79 54	142.6	21 21.2	79 54	143.3	19 46.2	79 52	144.6	18 10.8	80 50	145.9	17 46.8	80 50	146.2	16 58.8	80 49	146.8	40
1	22 22.3	77 56	141.2	21 59.0	78 56	141.6	21 35.7	78 55	141.9	20 48.9	78 55	142.6	19 15.0	79 53	143.9	17 40.5	79 51	145.2	17 16.8	79 51	145.5	16 29.3	79 50	146.2	1
2	21 48.5	77 57	140.5	21 25.5	77 57	140.8	21 02.4	77 56	141.2	20 16.2	77 56	141.8	18 43.2	78 54	143.2	17 09.7	78 52	144.5	16 46.3	78 52	144.8	15 59.3	78 51	145.5	2
3	21 14.2	76 58	139.8	20 51.5	76 58	140.1	20 28.6	76 57	140.5	19 42.9	76 56	141.1	18 10.9	77 55	142.5	16 38.4	77 53	143.8	16 15.2	77 52	144.2	15 28.7	78 52	144.8	3
4	20 39.4	75 59	139.0	20 16.9	75 58	139.4	19 54.4	75 58	139.7	19 09.1	76 57	140.4	17 38.2	76 56	141.8	16 06.6	76 54	143.2	15 43.7	77 54	143.5	14 57.7	77 53	144.2	4
45	20 04.1	74 60	138.3	19 41.9	74 59	138.7	19 19.6	74 59	139.1	18 34.8	75 58	139.8	17 04.9	75 56	141.1	15 34.3	76 55	142.5	15 11.6	76 54	142.9	14 26.1	76 53	143.5	45
6	19 28.4	73 60	137.6	19 06.4	73 60	138.0	18 44.3	74 60	138.4	18 00.0	74 59	139.1	16 31.1	74 57	140.5	15 01.6	75 55	141.9	14 39.1	75 55	142.2	13 54.1	75 54	142.9	6
7	18 52.1	72 61	137.0	18 30.3	73 61	137.3	18 08.5	73 60	137.7	17 24.8	73 60	138.4	15 56.8	74 58	139.8	14 28.3	74 56	141.2	14 06.1	74 56	141.6	13 21.6	74 55	142.3	7
8	18 15.4	72 62	136.3	17 53.9	72 62	136.7	17 32.3	72 61	137.0	16 49.1	72 60	137.8	15 22.1	73 59	139.2	13 54.6	73 57	140.6	13 32.7	73 56	141.0	12 48.7	73 56	141.7	8
9	17 38.3	71 63	135.6	17 17.0	71 62	136.0	16 55.7	71 62	136.4	16 12.9	71 61	137.1	14 47.0	72 59	138.6	13 20.5	72 58	140.0	12 58.8	72 57	140.3	12 15.3	73 56	141.0	9
50	17 00.7	70 63	135.0	16 39.6	70 63	135.4	16 18.5	70 62	135.7	15 36.3	70 62	136.5	14 11.3	71 60	137.9	12 45.9	71 58	139.4	12 24.4	72 58	139.7	11 41.5	72 57	140.4	50
1	16 22.6	69 64	134.3	16 01.8	69 64	134.7	15 41.0	69 63	135.1	14 59.3	70 62	135.8	13 35.3	70 61	137.3	12 10.8	71 59	138.8	11 49.7	71 59	139.1	11 07.2	71 58	139.9	1
2	15 44.2	68 65	133.7	15 23.6	69 64	134.1	15 03.1	69 64	134.5	14 21.8	69 63	135.2	12 58.9	69 62	136.7	11 35.4	70 60	138.2	11 14.5	70 59	138.5	10 32.5	70 58	139.3	2
3	15 05.3	68 65	133.1	14 45.0	68 65	133.5	14 24.7	68 64	133.8	13 43.9	68 64	134.6	12 22.0	68 62	136.1	10 59.5	69 60	137.6	10 38.9	69 60	138.0	9 57.4	69 59	138.7	3
4	14 26.1	67 66	132.5	14 06.0	67 66	132.9	13 46.0	67 65	133.2	13 05.7	67 64	134.0	11 44.7	68 63	135.5	10 23.3	68 61	137.0	10 02.9	68 61	137.4	9 21.9	68 60	138.1	4
55	13 46.5	66 67	131.9	13 26.7	66 66	132.3	13 06.8	66 66	132.6	12 27.0	66 65	133.4	11 07.1	67 63	134.9	9 46.6	67 62	136.4	9 26.5	67 61	136.8	8 46.1	67 60	137.6	55
6	13 06.5	65 67	131.3	12 46.9	65 67	131.7	12 27.3	65 66	132.1	11 48.0	66 66	132.8	10 29.0	66 64	134.4	9 09.6	66 62	135.9	8 49.7	66 62	136.3	8 09.8	67 61	137.0	6
7	12 26.1	64 68	130.7	12 06.8	64 68	131.1	11 47.4	65 67	131.5	11 08.6	65 66	132.2	9 50.6	65 65	133.8	8 32.2	65 63	135.3	8 12.5	66 62	135.7	7 33.2	66 62	136.5	7
8	11 45.4	64 68	130.1	11 26.3	64 68	130.5	11 07.2	64 68	130.9	10 28.9	64 67	131.7	9 11.8	64 65	133.2	7 54.4	65 64	134.8	7 35.0	65 63	135.2	6 56.2	65 62	135.9	8
9	11 04.4	63 69	129.5	10 45.5	63 69	129.9	10 26.6	63 68	130.3	9 48.8	63 67	131.1	8 32.7	64 66	132.7	7 16.3	64 64	134.2	6 57.2	64 64	134.6	6 18.8	64 63	135.4	9
60	10 23.0	62 70	129.0	10 04.3	62 69	129.4	9 45.7	62 69	129.8	9 08.3	62 68	130.6	7 53.3	63 66	132.1	6 37.8	63 65	133.7	6 18.9	63 64	134.1	5 41.1	63 64	134.9	60
1	9 41.2	61 70	128.4	9 22.8	61 70	128.8	9 04.4	61 69	129.2	8 27.5	61 68	130.0	7 13.5	62 67	131.6	5 59.0	62 65	133.2	5 40.4	62 65	133.6	5 03.0	62 64	134.4	1
2	8 59.2	60 71	127.9	8 41.0	61 70	128.3	8 22.9	61 70	128.7	7 46.4	61 69	129.5	6 33.3	61 67	131.1	5 19.9	61 66	132.7	5 01.5	61 65	133.1				2
3	8 16.8	60 71	127.3	7 58.9	60 71	127.8	7 41.0	60 70	128.2	7 05.0	60 70	129.0	5 52.9	60 68	130.6	5 12.1	59 68	130.1							3
4	7 34.2	59 72	126.8	7 16.5	59 71	127.2	6 58.8	59 71	127.6	6 23.3	59 70	128.4													4
65	6 51.3	58 72	126.3	6 33.8	58 72	126.7	6 16.3	58 71	127.1	5 41.3	58 70	127.9													65
6	6 08.0	57 72	125.8	5 50.8	57 72	126.2	5 33.5	58 72	126.6																6
7	5 24.5	57 73	125.3	5 07.5	57 73	125.7																			7

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	11 30.1	42 80	64.3	11 42.6	41 80	63.8	11 55.0	41 80	63.3	12 19.8	41 79	62.4	13 06.6	40 78	60.5	13 56.7	40 76	58.7	14 08.5	39 76	58.2	14 32.1	39 75	57.2	91
2	10 42.0	42 80	63.9	10 54.7	42 80	63.4	11 07.3	42 79	63.0	11 32.4	42 78	62.1	12 22.1	41 77	60.2	13 11.1	40 76	58.3	13 23.2	40 75	57.8	13 47.2	40 74	56.9	2
3	9 54.1	43 80	63.5	10 07.0	43 79	63.1	10 19.8	43 79	62.6	10 45.3	42 78	61.7	11 35.8	42 77	59.8	12 25.7	41 75	58.0	12 38.0	41 75	57.5	13 02.5	41 74	56.6	3
4	9 06.3	44 79	63.1	9 19.4	43 79	62.7	9 32.4	43 79	62.2	9 58.3	43 78	61.3	10 49.7	43 77	59.5	11 40.4	42 75	57.6	11 53.0	42 75	57.2	12 18.0	42 74	56.2	4
95	8 18.7	44 79	62.7	8 32.0	44 79	62.3	8 45.2	44 78	61.8	9 11.5	44 78	60.9	10 03.7	43 76	59.1	10 55.4	43 75	57.3	11 08.2	43 74	56.8	11 33.7	42 74	55.9	95
6	7 31.3	45 79	62.3	7 44.7	45 78	61.9	7 58.2	45 78	61.4	8 24.9	44 78	60.5	9 18.0	44 76	58.7	10 10.5	44 74	56.9	10 23.5	43 74	56.4	10 49.5	43 73	55.5	6
7	6 44.0	46 78	61.9	6 57.7	45 78	61.5	7 11.3	45 78	61.0	7 38.4	45 77	60.1	8 32.4	45 76	58.3	9 25.8	44 74	56.5	9 39.1	44 74	56.1	10 05.5	44 73	55.2	7
8	5 57.0	46 78	61.5	6 10.8	46 78	61.1	6 24.6	46 78	60.6	6 52.2	46 77	59.7	7 47.0	46 75	58.0	8 41.3	45 74	56.1	8 54.8	45 73	55.7	9 21.7	45 72	54.8	8
9	5 10.0	47 78	61.1	5 24.1	47 78	60.7	5 38.1	47 77	60.2	6 06.1	47 76	59.3	7 01.7	46 75	57.6	7 57.0	46 74	55.8	8 10.8	46 73	55.3	8 38.2	46 72	54.4	9
100										5 20.2	47 76	58.9	6 16.7	47 75	57.2	7 12.9	47 73	55.4	7 26.9	47 73	54.9	7 54.8	46 72	54.0	100
1													5 31.9	48 74	56.8	6 29.0	47 73	55.0	6 43.2	47 72	54.5	7 11.6	47 72	53.7	1
2																5 45.3	48 72	54.6	5 59.8	48 72	54.2	6 28.7	48 71	53.3	2
3																5 01.9	49 72	54.2	5 16.6	49 72	53.7	5 45.9	49 71	52.9	3
4																						5 03.4	50 71	52.5	4

Lat. 27°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′		
°	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °
00	81 00.0	1.0 04	00.0	80 00.0	1.0 04	00.0	78 30.0	1.0 03	00.0	77 00.0	1.0 03	00.0
1	80 57.6	1.0 12	05.2	79 57.9	1.0 11	04.6	78 28.2	1.0 09	03.9	76 58.4	1.0 08	03.4
2	80 50.4	98 20	10.2	79 51.5	98 18	09.1	78 22.7	99 15	07.8	76 53.7	99 13	06.8
3	80 38.7	96 27	15.1	79 41.0	97 24	13.5	78 13.7	97 21	11.6	76 45.8	98 18	10.1
4	80 22.7	93 33	19.7	79 26.6	94 30	17.7	78 01.3	95 26	15.3	76 35.0	96 23	13.3
05	80 02.7	89 39	24.1	79 08.6	91 36	21.7	77 45.7	93 31	18.8	76 21.3	94 28	16.4
6	79 39.2	86 44	28.1	78 47.2	88 41	25.4	77 27.0	90 36	22.1	76 04.8	92 32	19.4
7	79 12.5	81 49	31.8	78 22.8	84 45	28.9	77 05.5	87 40	25.3	75 45.7	90 36	22.3
8	78 43.0	77 53	35.1	77 55.6	81 49	32.1	76 41.4	84 44	28.2	75 24.2	87 40	25.0
9	78 11.1	73 57	38.2	77 26.1	77 53	35.0	76 15.0	81 47	31.0	75 00.5	84 43	27.6
10	77 37.0	69 60	40.9	76 54.3	73 56	37.7	75 46.4	78 51	33.6	74 34.8	81 46	30.0
1	77 01.1	65 62	43.4	76 20.7	69 59	40.2	75 15.9	74 54	36.0	74 07.1	78 49	32.3
2	76 23.6	62 65	45.6	75 45.4	66 61	42.4	74 43.7	71 56	38.2	73 37.7	75 52	34.4
3	75 44.8	58 67	47.7	75 08.6	62 64	44.5	74 09.9	68 58	40.2	73 06.7	72 54	36.4
4	75 04.7	55 68	49.5	74 30.5	59 65	46.3	73 34.8	65 61	42.0	72 34.3	69 56	38.2
15	74 23.5	52 70	51.1	73 51.3	56 67	48.0	72 58.4	62 63	43.8	72 00.6	67 58	39.9
6	73 41.5	48 71	52.6	73 11.1	53 68	49.5	72 20.8	59 64	45.3	71 25.7	64 60	41.5
7	72 58.7	46 72	53.9	72 30.0	50 70	50.9	71 42.3	56 66	46.8	70 49.8	61 62	43.0
8	72 15.1	43 74	55.1	71 48.1	47 71	52.2	71 02.9	53 67	48.1	70 12.8	58 63	44.4
9	71 31.0	40 74	56.2	71 05.5	45 72	53.4	70 22.7	50 68	49.4	69 35.0	56 64	45.6
20	70 46.3	38 75	57.2	70 22.3	42 73	54.4	69 41.8	48 69	50.5	68 56.4	53 66	46.8
1	70 01.2	36 76	58.0	69 38.6	40 74	55.4	69 00.3	45 70	51.5	68 17.1	51 67	47.9
2	69 15.6	33 76	58.8	68 54.4	37 74	56.2	68 18.2	43 71	52.5	67 37.1	48 68	48.9
3	68 29.7	31 77	59.6	68 09.7	35 75	57.0	67 35.5	41 72	53.3	66 56.5	46 68	49.8
4	67 43.4	29 78	60.2	67 24.7	33 76	57.7	66 52.4	39 72	54.1	66 15.4	44 69	50.7
25	66 56.9	27 78	60.8	66 39.3	31 76	58.4	66 08.9	36 73	54.9	65 33.8	41 70	51.5
6	66 10.1	26 78	61.4	65 53.6	29 77	59.0	65 25.0	34 74	55.6	64 51.8	39 71	52.2
7	65 23.1	24 79	61.9	65 07.7	27 77	59.5	64 40.7	32 74	56.2	64 09.3	37 71	52.9
8	64 35.8	22 79	62.3	64 21.5	26 77	60.0	63 56.2	31 75	56.7	63 26.5	35 72	53.5
9	63 48.4	21 79	62.7	63 35.0	24 78	60.5	63 11.3	29 75	57.3	62 43.3	33 72	54.1
30	63 00.8	19 80	63.1	62 48.4	22 78	60.9	62 26.2	27 76	57.7	61 59.8	32 73	54.7
1	62 13.1	18 80	63.4	62 01.6	21 78	61.3	61 40.9	25 76	58.2	61 16.1	30 73	55.2
2	61 25.2	16 80	63.7	61 14.7	19 78	61.6	60 55.4	24 76	58.6	60 32.1	28 74	55.6
3	60 37.3	15 80	63.9	60 27.6	18 79	61.9	60 09.7	22 76	58.9	59 47.9	26 74	56.0
4	59 49.2	13 80	64.1	59 40.3	16 79	62.2	59 23.8	21 77	59.3	59 03.4	25 74	56.4
35	59 01.1	12 80	64.3	58 53.0	15 79	62.4	58 37.8	19 77	59.6	58 18.8	23 75	56.8
6	58 12.8	11 80	64.5	58 05.6	13 79	62.6	57 51.6	18 77	59.8	57 34.0	22 75	57.1
7	57 24.5	09 80	64.7	57 18.1	12 79	62.8	57 05.3	16 77	60.1	56 49.0	20 75	57.4
8	56 36.2	08 81	64.8	56 30.5	11 80	63.0	56 18.9	15 78	60.3	56 03.9	19 75	57.7
9	55 47.8	07 81	64.9	55 42.8	10 80	63.1	55 32.4	13 78	60.5	55 18.7	17 76	57.9
40	54 59.4	06 81	65.0	54 55.1	08 80	63.3	54 45.9	12 78	60.7	54 33.4	16 76	58.1
1	54 10.9	05 81	65.1	54 07.3	07 80	63.4	53 59.2	11 78	60.8	53 47.9	14 76	58.3
2	53 22.4	04 81	65.1	53 19.5	06 80	63.5	53 12.5	09 78	61.0	53 02.4	13 76	58.5
3	52 33.9	03 81	65.2	52 31.6	05 80	63.5	52 25.7	08 78	61.1	52 16.8	12 76	58.6
4	51 45.3	02 81	65.2	51 43.8	04 80	63.6	51 38.9	07 78	61.2	51 31.1	10 76	58.8
45	50 56.8	00 81	65.2	50 55.9	03 80	63.6	50 52.0	06 78	61.3	50 45.3	09 76	58.9
6	50 08.3	01 81	65.2	50 08.0	02 80	63.7	50 05.2	05 78	61.3	49 59.5	08 76	59.0
7	49 19.7	02 81	65.2	49 20.0	00 80	63.7	49 18.2	04 78	61.4	49 13.7	07 76	59.1
8	48 31.2	03 81	65.2	48 32.1	01 80	63.7	48 31.3	02 78	61.4	48 27.8	05 76	59.2
9	47 42.7	04 81	65.2	47 44.2	02 80	63.7	47 44.4	01 78	61.4	47 41.9	04 76	59.2
50	46 54.2	04 81	65.1	46 56.3	03 80	63.6	46 57.4	00 78	61.4	46 56.0	03 77	59.2
1	46 05.7	05 81	65.0	46 08.4	04 80	63.6	46 10.4	01 78	61.4	46 10.0	02 77	59.3
2	45 17.2	06 81	65.0	45 20.5	05 80	63.6	45 23.5	02 78	61.4	45 24.1	01 77	59.3
3	44 28.8	07 81	64.9	44 32.7	06 80	63.5	44 36.5	03 78	61.4	44 38.1	00 77	59.3
4	43 40.4	08 81	64.8	43 44.8	07 80	63.4	43 49.6	04 78	61.4	43 52.1	02 77	59.3
55	42 52.1	09 80	64.7	42 57.0	08 80	63.4	43 02.7	05 78	61.3	43 06.2	03 77	59.3
6	42 03.7	10 80	64.6	42 09.3	08 80	63.3	42 15.8	06 78	61.2	42 20.3	04 76	59.2
7	41 15.5	11 80	64.5	41 21.6	09 80	63.2	41 29.0	07 78	61.2	41 34.3	05 76	59.2
8	40 27.2	12 80	64.4	40 33.9	10 79	63.1	40 42.2	08 78	61.1	40 48.4	06 76	59.1
9	39 39.1	13 80	64.2	39 46.2	11 79	63.0	39 55.4	09 78	61.0	40 02.6	07 76	59.1
60	38 50.9	14 80	64.1	38 58.6	12 79	62.8	39 08.6	10 78	60.9	39 16.7	08 76	59.0
1	38 02.9	14 80	64.0	38 11.1	13 79	62.7	38 21.9	11 78	60.8	38 30.9	09 76	58.9
2	37 14.9	15 80	63.8	37 23.6	14 79	62.6	37 35.3	12 78	60.7	37 45.2	10 76	58.8
3	36 26.9	16 80	63.7	36 36.2	15 79	62.4	36 48.7	13 78	60.6	36 59.5	11 76	58.7
4	35 39.0	17 80	63.5	35 48.9	16 79	62.3	36 02.2	14 78	60.4	36 13.8	12 76	58.6
65	34 51.2	18 80	63.3	35 01.6	17 79	62.1	35 15.7	15 77	60.3	35 28.2	13 76	58.5
6	34 03.5	19 79	63.1	34 14.3	17 78	62.0	34 29.3	16 77	60.2	34 42.7	14 76	58.4
7	33 15.9	19 79	63.0	33 27.2	18 78	61.8	33 43.0	17 77	60.0	33 57.2	15 76	58.2
8	32 28.3	20 79	62.8	32 40.1	19 78	61.6	32 56.7	18 77	59.8	33 11.8	16 76	58.1
9	31 40.8	21 79	62.6	31 53.2	20 78	61.4	32 10.5	18 77	59.7	32 26.4	17 76	57.9
70	30 53.4	22 79	62.4	31 06.3	21 78	61.2	31 24.4	19 77	59.5	31 41.2	18 75	57.8
1	30 06.1	23 79	62.2	30 19.4	22 78	61.0	30 38.4	20 77	59.3	30 56.0	19 75	57.6
2	29 18.9	24 78	61.9	29 32.7	23 78	60.8	29 52.4	21 76	59.1	30 10.9	20 75	57.4
3	28 31.7	24 78	61.7	28 46.1	23 78	60.6	29 06.6	22 76	58.9	29 25.9	21 75	57.3
4	27 44.7	25 78	61.5	27 59.6	24 77	60.4	28 20.9	23 76	58.7	28 41.0	22 75	57.1
75	26 57.8	26 78	61.3	27 13.1	25 77	60.2	27 35.2	24 76	58.5	27 56.1	23 74	56.9
6	26 11.0	27 78	61.0	26 26.8	26 77	59.9	26 49.7	25 76	58.3	27 11.4	24 74	56.7
7	25 24.3	28 78	60.8	25 40.6	27 77	59.7	26 04.2	26 76	58.1	26 26.8	24 74	56.5
8	24 37.7	28 78	60.5	24 54.5	28 77	59.5	25 18.9	27 75	57.9	25 42.3	25 74	56.3
9	23 51.2	29 77	60.3	24 08.5	29 76	59.2	24 33.7	27 75	57.6	24 57.9	26 74	56.0
80	23 04.8	30 77	60.0	23 22.6	29 76	59.0	23 48.6	28 75	57.4	24 13.6	27 74	55.8
1	22 18.6	31 77	59.7	22 36.9	30 76	58.7	23 03.6	29 75	57.2	23 29.4	28 73	55.6
2	21 32.5	32 77	59.5	21 51.3	31 76	58.4	22 18.8	30 75	56.9	22 45.4	29 73	55.3
3	20 46.5	32 76	59.2	21 05.8	32 76	58.2	21 34.0	31 74	56.6	22 01.5	30 73	55.1
4	20 00.6	33 76	58.9	20 20.4	33 75	57.9	20 49.5	32 74	56.4	21 17.7	31 73	54.9
85	19 14.9	34 76	58.6	19 35.2	34 75	57.6	20 05.0	33 74	56.1	20 34.0	32 72	54.6
6	18 29.4	35 76	58.3	18 50.1	34 75	57.3	19 20.7	34 74	55.8	19 50.5	33 72	54.3
7	17 44.0	36 76	58.0	18 05.2	35 75	57.0	18 36.5	34 73	55.6	19 07.2	34 72	54.1
8	16 58.7	36 75	57.7	17 20.4	36 74	56.7	17 52.5	35 73	55.3	18 24.0	35 72	53.8
9	16 13.6	37 75	57.4	16 35.8	37 74	56.4	17 08.7	36 73	55.0	17 40.9	35 72	53.5
90	15 28.6	38 75	57.1	15 51.4	38 74	56.1	16 25.0	37 73	54.7	16 58.0	36 71	53.2

42° 00′			42° 30′			43° 00′			45° 00′			H.A.
Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	Alt. ° ′	Δd Δt	Az. °	°
75 00.0	1.0 02	00.0	74 30.0	1.0 02	00.0	74 00.0	1.0 02	00.0	72 00.0	1.0 02	00.0	00
74 58.7	1.0 07	02.9	74 28.7	1.0 06	02.8	73 58.8	1.0 06	02.7	71 58.9	1.0 05	02.3	1
74 54.7	99 11	05.7	74 24.9	99 11	05.5	73 55.1	99 10	05.3	71 55.7	99 09	04.6	2
74 48.0	98 15	08.5	74 18.5	99 15	08.2	73 48.9	99 14	07.9	71 50.4	99 12	06.8	3
74 38.8	97 20	11.3	74 09.6	97 19	10.9	73 40.4	98 18	10.5	71 43.1	98 16	09.0	4
74 27.1	96 24	14.0	73 58.4	96 23	13.5	73 29.5	96 22	13.0	71 33.6	97 19	11.2	05
74 13.0	94 27	16.6	73 44.8	94 26	16.0	73 16.4	95 26	15.4	71 22.2	96 22	13.4	6
73 56.6	92 31	19.1	73 29.0	92 30	18.4	73 01.2	93 29	17.8	71 08.9	94 25	15.5	7
73 38.0	90 34	21.5	73 11.0	90 33	20.8	72 43.8	91 32	20.1	70 53.8	93 28	17.5	8
73 17.4	87 38	23.8	72 51.1	88 36	23.0	72 24.5	89 35	22.2	70 36.8	91 31	19.5	9
72 54.9	85 41	26.1	72 29.2	86 39	25.2	72 03.4	86 38	24.3	70 18.1	89 34	21.4	10
72 30.5	82 44	28.1	72 05.6	83 42	27.2	71 40.5	84 41	26.3	69 57.9	87 36	23.2	1
72 04.5	80 46	30.1	71 40.4	81 45	29.2	71 16.0	82 44	28.3	69 36.1	85 39	24.9	2
71 36.9	77 48	32.0	71 13.5	78 47	31.0	70 49.9	79 46	30.1	69 12.8	83 41	26.6	3
71 07.8	75 51	33.8	70 45.3	76 49	32.8	70 22.4	77 48	31.8	68 48.2	80 43	28.2	4
70 37.5	72 53	35.4	70 15.7	73 51	34.4	69 53.6	74 50	33.4	68 22.2	78 45	29.8	15
70 05.9	69 54	37.0	69 44.9	70 53	36.0	69 23.6	72 52	34.9	67 55.1	76 47	31.2	6
69 33.2	67 56	38.5	69 13.0	68 55	37.4	68 52.4	69 54	36.4	67 26.8	73 49	32.6	7
68 59.4	64 58	39.8	68 40.0	65 57	38.8	68 20.2	67 55	37.7	66 57.5	71 50	33.9	8
68 24.7	62 59	41.1	68 06.0	63 58	40.1	67 47.0	64 57	39.0	66 27.2	69 52	35.2	9
67 49.1	59 61	42.3	67 31.2	60 60	41.3	67 12.9	62 58	40.2	65 55.9	66 54	36.4	20
67 12.7	57 62	43.4	66 55.5	58 61	42.4	66 38.0	59 60	41.4	65 23.8	64 55	37.5	1
66 35.6	54 63	44.5	66 19.1	55 62	43.4	66 02.3	57 61	42.4	64 50.8	62 56	38.6	2
65 57.8	52 64	45.5	65 42.0	53 63	44.4	65 25.8	55 62	43.4	64 17.2	60 57	39.6	3
65 19.4	50 65	46.4	65 04.3	51 64	45.4	64 48.8	52 63	44.3	63 42.8	58 58	40.5	4
64 40.4	47 66	47.2	64 26.0	49 65	46.2	64 11.1	50 64	45.2	63 07.7	55 59	41.4	25
64 00.9	45 67	48.0	63 47.1	47 66	47.0	63 32.9	48 64	46.0	62 32.1	53 60	42.2	6
63 20.9	43 67	48.8	63 07.8	45 66	47.8	62 54.2	46 65	46.8	61 55.9	51 61	43.0	7
62 40.5	41 68	49.5	62 28.0	43 67	48.5	62 15.0	44 66	47.5	61 19.2	49 62	43.8	8
61 59.7	39 69	50.1	61 47.7	41 68	49.1	61 35.4	42 67	48.2	60 42.0	47 63	44.5	9
61 18.5	37 69	50.7	61 07.1	39 68	49.8	60 55.3	40 67	48.8	60 04.3	45 64	45.1	30
60 37.0	35 70	51.3	60 26.1	37 69	50.3	60 14.9	38 68	49.4	59 26.2	43 64	45.7	1
59 55.1	34 70	51.8	59 44.8	35 69	50.8	59 34.2	36 68	49.9	58 47.7	41 65	46.3	2
59 13.0	32 71	52.3	59 03.2	33 70	51.3	58 53.1	34 69	50.4	58 08.9	39 65	46.9	3
58 30.5	30 71	52.7	58 21.3	31 70	51.8	58 11.8	33 69	50.9	57 29.7	37 66	47.4	4
57 47.9	28 72	53.1	57 39.2	30 71	52.2	57 30.1	31 70	51.3	56 50.2	36 66	47.9	35
57 05.0	27 72	53.5	56 56.8	28 71	52.6	56 48.3	29 70	51.7	56 10.4	34 67	48.3	6
56 22.0	25 72	53.8	56 14.3	26 71	53.0	56 06.2	27 70	52.1	55 30.4	32 67	48.7	7
55 38.7	23 72	54.2	55 31.5	25 72	53.3	55 23.9	26 71	52.5	54 50.1	30 68	49.1	8
54 55.3	22 73	54.5	54 48.5	23 72	53.6	54 41.4	24 71	52.8	54 09.6	29 68	49.5	9
54 11.7	20 73	54.7	54 05.4	22 72	53.9	53 58.8	23 71	53.1	53 28.8	27 68	49.8	40
53 28.0	19 73	55.0	53 22.1	20 72	54.2	53 16.0	21 72	53.3	52 47.9	26 68	50.1	1
52 44.1	17 73	55.2	52 38.7	19 72	54.4	52 33.0	20 72	53.6	52 06.8	24 69	50.4	2
52 00.2	16 74	55.4	51 55.2	17 73	54.6	51 49.9	18 72	53.8	51 25.5	22 69	50.7	3
51 16.1	15 74	55.6	51 11.6	16 73	54.8	51 06.7	17 72	54.0	50 44.1	21 69	50.9	4
50 32.0	13 74	55.8	50 27.8	14 73	55.0	50 23.4	15 72	54.2	50 02.6	19 70	51.1	45
49 47.7	12 74	55.9	49 44.0	13 73	55.1	49 40.0	14 72	54.4	49 20.9	18 70	51.3	6
49 03.4	11 74	56.0	49 00.1	12 73	55.3	48 56.5	13 73	54.5	48 39.1	16 70	51.5	7
48 19.1	09 74	56.1	48 16.1	10 73	55.4	48 12.9	11 73	54.7	47 57.2	15 70	51.7	8
47 34.6	08 74	56.2	47 32.1	09 74	55.5	47 29.3	10 73	54.8	47 15.2	14 70	51.8	9
46 50.2	07 74	56.3	46 48.0	08 74	55.6	46 45.6	09 73	54.9	46 33.1	12 70	52.0	50
46 05.7	05 74	56.4	46 03.9	06 74	55.7	46 01.8	07 73	54.9	45 51.0	11 70	52.1	1
45 21.1	04 74	56.4	45 19.7	05 74	55.7	45 18.1	06 73	55.0	45 08.8	09 70	52.2	2
44 36.6	03 74	56.5	44 35.5	04 74	55.8	44 34.2	05 73	55.1	44 26.5	08 70	52.3	3
43 52.0	02 74	56.5	43 51.3	03 74	55.8	43 50.4	03 73	55.1	43 44.2	07 70	52.4	4
43 07.4	01 74	56.5	43 07.1	01 74	55.8	43 06.5	02 73	55.1	43 01.9	06 71	52.4	55
42 22.8	01 74	56.5	42 22.9	00 74	55.8	42 22.7	01 73	55.2	42 19.5	04 71	52.5	6
41 38.2	02 74	56.5	41 38.6	01 74	55.8	41 38.8	00 73	55.2	41 37.1	03 71	52.5	7
40 53.6	03 74	56.5	40 54.4	02 74	55.8	40 54.9	01 73	55.2	40 54.7	02 71	52.5	8
40 09.1	04 74	56.4	40 10.2	03 74	55.8	40 11.0	03 73	55.1	40 12.2	00 71	52.5	9
39 24.5	05 74	56.4	39 26.0	04 74	55.8	39 27.2	04 73	55.1	39 29.8	01 71	52.5	60
38 40.0	06 74	56.4	38 41.8	05 74	55.7	38 43.3	05 73	55.1	38 47.4	02 71	52.5	1
37 55.5	07 74	56.3	37 57.6	07 74	55.7	37 59.5	06 73	55.0	38 05.0	03 71	52.5	2
37 11.1	08 74	56.2	37 13.5	08 74	55.6	37 15.7	07 73	55.0	37 22.6	04 71	52.5	3
36 26.7	09 74	56.1	36 29.4	09 73	55.5	36 32.0	08 73	54.9	36 40.2	06 71	52.4	4
35 42.3	11 74	56.1	35 45.4	10 73	55.4	35 48.2	09 73	54.8	35 57.9	07 70	52.4	65
34 58.0	12 74	55.9	35 01.4	11 73	55.3	35 04.6	10 73	54.7	35 15.6	08 70	52.3	6
34 13.7	13 74	55.8	34 17.4	12 73	55.2	34 21.0	11 73	54.6	34 33.3	09 70	52.2	7
33 29.5	14 74	55.7	33 33.5	13 73	55.1	33 37.3	13 72	54.5	33 51.1	10 70	52.1	8
32 45.4	15 74	55.6	32 49.7	14 73	55.0	32 53.9	14 72	54.4	33 08.9	11 70	52.0	9
32 01.3	16 73	55.5	32 06.0	15 73	54.9	32 10.5	15 72	54.3	32 26.8	13 70	51.9	70
31 17.3	17 73	55.3	31 22.3	16 73	54.7	31 27.1	16 72	54.2	31 44.7	14 70	51.8	1
30 33.4	18 73	55.2	30 38.7	17 73	54.6	30 43.8	17 72	54.0	31 02.7	15 70	51.7	2
29 49.6	19 73	55.0	29 55.1	18 72	54.4	30 00.6	18 72	53.9	30 20.8	16 70	51.6	3
29 05.8	20 73	54.8	29 11.7	19 72	54.3	29 17.4	19 72	53.7	29 38.9	17 70	51.5	4
28 22.2	21 73	54.7	28 28.3	20 72	54.1	28 34.4	20 72	53.6	28 57.2	18 70	51.3	75
27 38.6	22 72	54.5	27 45.1	21 72	53.9	27 51.4	21 72	53.4	28 15.5	19 69	51.2	6
26 55.1	23 72	54.3	27 01.9	22 73	53.8	27 08.6	22 71	53.2	27 33.9	20 69	51.0	7
26 11.8	24 72	54.1	26 18.8	23 72	53.6	26 25.8	23 71	53.0	26 52.4	21 69	50.8	8
25 28.5	25 72	53.9	25 35.9	24 72	53.4	25 43.1	24 71	52.8	26 11.0	22 69	50.7	9
24 45.4	26 72	53.7	24 53.0	25 71	53.2	25 00.6	25 71	52.6	25 29.7	24 69	50.5	80
24 02.4	27 72	53.5	24 10.3	26 71	53.0	24 18.2	26 70	52.4	24 48.5	25 68	50.3	1
23 19.4	28 71	53.3	23 27.7	27 71	52.7	23 35.9	27 70	52.2	24 07.4	26 68	50.1	2
22 36.7	29 71	53.0	22 45.2	28 70	52.5	22 53.7	28 70	52.0	23 26.5	27 68	49.9	3
21 54.0	30 71	52.8	22 02.9	29 70	52.3	22 11.6	29 70	51.8	22 45.6	28 68	49.7	4
21 11.5	31 71	52.6	21 20.6	30 70	52.1	21 29.7	30 70	51.5	22 04.9	29 68	49.5	85
20 29.1	32 70	52.3	20 38.6	31 70	51.8	20 47.9	31 70	51.3	21 24.3	30 67	49.3	6
19 46.9	33 70	52.1	19 56.6	32 70	51.6	20 06.2	32 69	51.1	20 43.9	31 67	49.0	7
19 04.8	33 70	51.8	19 14.8	33 69	51.3	19 24.7	33 69	50.8	20 03.6	32 67	48.8	8
18 22.9	34 70	51.5	18 33.2	34 69	51.0	18 43.4	34 69	50.5	19 23.5	33 67	48.5	9
17 41.1	35 69	51.3	17 51.7	35 69	50.8	18 02.2	35 68	50.3	18 43.5	34 66	48.3	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	27 00.0	1.0 01	180.0	26 00.0	1.0 01	180.0	24 30.0	1.0 01	180.0	23 00.0	1.0 01	180.0	21 00.0	1.0 01	180.0	20 30.0	1.0 01	180.0	20 00.0	1.0 01	180.0	18 00.0	1.0 00	180.0	00
1	26 59.6	1.0 02	179.1	25 59.6	1.0 02	179.1	24 29.6	1.0 02	179.1	22 59.6	1.0 02	179.2	20 59.6	1.0 02	179.2	20 29.6	1.0 02	179.2	19 59.6	1.0 02	179.2	17 59.7	1.0 02	179.3	1
2	26 58.3	1.0 04	178.2	25 58.3	1.0 04	178.2	24 28.4	1.0 03	178.3	22 58.4	1.0 03	178.3	20 58.5	1.0 03	178.4	20 28.5	1.0 03	178.4	19 58.5	1.0 03	178.4	17 58.6	1.0 03	178.5	2
3	26 56.2	1.0 05	177.3	25 56.3	1.0 05	177.3	24 26.4	1.0 05	177.4	22 56 5	1.0 04	177.5	20 56.7	1.0 04	177.6	20 26.7	1.0 04	177.6	19 56.7	1.0 04	177.7	17 56.9	1.0 04	177.8	3
4	26 53.2	1.0 06	176.4	25 53.4	1.0 06	176.4	24 23.6	1.0 06	176.6	22 53.8	1.0 06	176.7	20 54.1	1.0 06	176.8	20 24.1	1.0 06	176.9	19 54.2	1.0 06	176.9	17 54.5	1.0 05	177.0	4
05	26 49.4	1.0 08	175.5	25 49.6	1.0 08	175.6	24 20.0	1.0 07	175.7	22 50.3	1.0 07	175.8	20 50.7	1.0 07	176.0	20 20.8	1.0 07	176.1	19 50.9	1.0 07	176.1	17 51.3	1.0 06	176.3	05
6	26 44.8	99 09	174.6	25 45.1	99 09	174.7	24 15.6	99 09	174.9	22 46.0	99 08	175.0	20 46.7	1.0 08	175.2	20 16.8	1.0 08	175.3	19 46.9	1.0 08	175.3	17 47.5	1.0 08	175.5	6
7	26 39.3	99 10	173.7	25 39.7	99 10	173.8	24 10.4	99 10	174.0	22 41.0	99 10	174.2	20 41.8	99 09	174.4	20 12.0	99 09	174.5	19 42.2	99 09	174.6	17 43.0	99 09	174.8	7
8	26 33.0	99 12	172.8	25 33.6	99 12	172.9	24 04.4	99 11	173.1	22 35.2	99 11	173.4	20 36.3	99 10	173.7	20 06.6	99 10	173.7	19 36.8	99 10	173.8	17 37.9	99 10	174.1	8
9	26 25.8	99 13	171.9	25 26.6	99 13	172.0	23 57.6	99 12	172.3	22 28.7	99 12	172.5	20 30.0	99 12	172.9	20 00.4	99 12	172.9	19 30.7	99 11	173.0	17 32.0	99 11	173.3	9
10	26 17.9	99 15	171.0	25 18.8	99 14	171.2	23 50.1	99 14	171.5	22 21.4	99 14	171.7	20 23.0	99 13	172.1	19 53.4	99 13	172.2	19 23.9	99 12	172.3	17 25.5	99 12	172.6	10
1	26 09.1	98 16	170.1	25 10.2	98 16	170.3	23 41.8	98 15	170.6	22 13.3	98 15	170.9	20 15.3	98 14	171.3	19 45.8	98 14	171.4	19 16.3	98 14	171.5	17 18.2	98 13	171.9	1
2	25 59.5	98 17	169.2	25 00.8	98 17	169.4	23 32.6	98 16	169.8	22 04.5	98 16	170.1	20 06.9	98 15	170.5	19 37.5	98 15	170.6	19 08.0	98 15	170.7	17 10.3	98 14	171.1	2
3	25 49.1	97 19	168.3	24 50.6	98 18	168.6	23 22.8	98 18	168.9	21 54.9	98 17	169.3	19 57.7	98 16	169.8	19 28.4	98 16	169.9	18 59.1	98 16	170.0	17 01.8	98 15	170.4	3
4	25 37.9	97 20	167.5	24 39.6	97 20	167.7	23 12.1	97 19	168.1	21 44.6	97 18	168.5	19 47.9	97 18	169.0	19 18.7	97 18	169.1	18 49.4	97 17	169.2	16 52.6	97 16	169.7	4
15	25 25.9	97 21	166.6	24 27.9	97 21	166.9	23 00.8	97 20	167.3	21 33.6	97 20	167.7	19 37.3	97 19	168.2	19 08.2	97 18	168.3	18 39.1	97 18	168.5	16 42.7	97 18	169.0	15
6	25 13.1	96 23	165.7	24 15.3	96 22	166.0	22 48.6	96 22	166.5	21 21.8	96 21	166.9	19 26.0	97 20	167.5	18 57.1	97 20	167.6	18 28.1	97 20	167.7	16 32.1	97 19	168.3	6
7	24 59.5	96 24	164.9	24 02.0	96 23	165.2	22 35.7	96 23	165.7	21 09.4	96 22	166.1	19 14.1	96 21	166.7	18 45.2	96 21	166.8	18 16.4	96 21	167.0	16 20.9	96 20	167.6	7
8	24 45.2	95 25	164.0	23 48.0	95 25	164.4	22 22.1	95 24	164.8	20 56.2	96 23	165.3	19 01.4	96 22	165.9	18 32.7	96 22	166.1	18 04.0	96 22	166.2	16 09.1	96 21	166.9	8
9	24 30.1	95 26	163.2	23 33.2	95 26	163.5	22 07.8	95 25	164.0	20 42.3	95 24	164.5	18 48.1	95 23	165.2	18 19.5	95 23	165.4	17 51.0	95 23	165.5	15 56.6	95 22	166.1	9
20	24 14.2	94 28	162.3	23 17.7	94 27	162.7	21 52.7	94 26	163.2	20 27.7	95 26	163.8	18 34.1	95 24	164.4	18 05.7	95 24	164.6	17 37.3	95 24	164.8	15 43.5	95 23	165.4	20
1	23 57.7	94 29	161.5	23 01.4	94 28	161.9	21 36.9	94 27	162.4	20 12.4	94 27	163.0	18 19.4	94 26	163.7	17 51.2	94 25	163.9	17 22.9	94 25	164.1	15 29.8	94 24	164.8	1
2	23 40.3	93 30	160.7	22 44.4	93 30	161.1	21 20.5	93 29	161.7	19 56.4	93 28	162.2	18 04.1	94 27	163.0	17 36.0	94 26	163.2	17 07.9	94 26	163.3	15 15.4	94 25	164.1	2
3	23 22.3	93 31	159.9	22 26.7	93 31	160.3	21 03.3	93 30	160.9	19 39.7	93 29	161.5	17 48.1	93 28	162.2	17 20.2	93 28	162.4	16 52.3	93 27	162.6	15 00.4	93 26	163.4	3
4	23 03.5	92 32	159.0	22 08.3	92 32	159.5	20 45.4	92 31	160.1	19 22.4	92 30	160.7	17 31.5	92 29	161.5	17 03.7	93 28	161.7	16 36.0	93 28	161.9	14 44.8	93 27	162.7	4
25	22 44.0	91 34	158.2	21 49.2	91 33	158.7	20 26.9	92 32	159.3	19 04.4	92 31	160.0	17 14.2	92 30	160.8	16 46.7	92 30	161.0	16 19.1	92 29	161.2	14 28.6	92 28	162.0	25
6	22 23.9	91 35	157.4	21 29.5	91 34	157.9	20 07.7	91 33	158.6	18 45.8	91 32	159.2	16 56.3	91 31	160.1	16 29.0	91 31	160.3	16 01.5	91 30	160.5	14 11.8	92 29	161.4	6
7	22 03.0	90 36	156.7	21 09.0	90 35	157.1	19 47.8	90 34	157.8	18 26.5	90 33	158.5	16 37.8	91 32	159.4	16 10.6	91 32	159.6	15 43.4	91 31	159.8	13 54.4	91 30	160.7	7
8	21 41.5	89 37	155.9	20 47.9	89 36	156.4	19 27.3	90 35	157.1	18 06.6	90 34	157.8	16 18.7	90 33	158.7	15 51.7	90 32	158.9	15 24.7	90 32	159.1	13 36.5	90 31	160.0	8
9	21 19.3	89 38	155.1	20 26.1	89 37	155.6	19 06.2	89 36	156.3	17 46.0	89 35	157.0	15 59.0	89 34	158.0	15 32.2	89 34	158.2	15 05.3	89 33	158.5	13 17.9	90 32	159.4	9
30	20 56.5	88 39	154.3	20 03.7	88 38	154.8	18 44.4	88 37	155.6	17 24.9	88 36	156.3	15 38.6	89 35	157.3	15 12.0	89 34	157.5	14 45.4	89 34	157.8	12 58.8	89 33	158.7	30
1	20 33.0	87 40	153.6	19 40.7	87 40	154.1	18 22.0	88 38	154.9	17 03.1	88 37	155.6	15 17.7	88 36	156.6	14 51.3	88 36	156.9	14 24.9	88 35	157.1	12 39.1	88 34	158.1	1
2	20 08.9	86 41	152.8	19 17.0	87 40	153.4	17 59.0	87 39	154.1	16 40.8	87 38	154.9	14 56.2	87 37	155.9	14 30.0	87 36	156.2	14 03.8	87 36	156.5	12 18.9	88 35	157.4	2
3	19 44.2	86 42	152.1	18 52.7	86 42	152.6	17 35.4	86 40	153.4	16 17.8	86 39	154.2	14 34.1	87 38	155.3	14 08.2	87 37	155.5	13 42.2	87 37	155.8	11 58.1	87 36	156.8	3
4	19 18.9	85 43	151.4	18 27.9	85 42	151.9	17 11.2	85 41	152.7	15 54.3	86 40	153.6	14 11.5	86 39	154.6	13 45.8	86 38	154.9	13 20.0	86 38	155.1	11 36.8	86 36	156.2	4
35	18 52.9	84 44	150.6	18 02.4	84 43	151.2	16 46.4	85 42	152.0	15 30.2	85 41	152.9	13 48.3	85 40	154.0	13 22.8	85 39	154.2	12 57.3	85 39	154.5	11 15.0	85 37	155.6	35
6	18 26.4	83 45	149.9	17 36.4	84 44	150.5	16 21.1	84 43	151.4	15 05.5	84 42	152.2	13 24.6	84 40	153.3	12 59.3	84 40	153.6	12 34.0	84 40	153.9	10 52.6	85 38	155.0	6
7	17 59.4	83 46	149.2	17 09.7	83 45	149.8	15 55.1	83 44	150.7	14 40.3	83 43	151.5	13 00.3	84 41	152.7	12 35.2	84 41	153.0	12 10.2	84 40	153.2	10 29.7	84 39	154.4	7
8	17 31.7	82 47	148.5	16 42.6	82 46	149.1	15 28.7	82 45	150.0	14 14.6	82 44	150.9	12 35.5	83 42	152.0	12 10.7	83 42	152.3	11 45.8	83 41	152.6	10 06.3	83 40	153.8	8
9	17 03.5	81 48	147.8	16 14.9	81 47	148.4	15 01.7	81 46	149.3	13 48.3	82 45	150.2	12 10.2	82 43	151.4	11 45.6	82 43	151.7	11 21.0	82 42	152.0	9 42.4	82 41	153.2	9
40	16 34.8	80 49	147.1	15 46.6	80 48	147.8	14 34.2	81 47	148.7	13 21.5	81 46	149.6	11 44.3	81 44	150.8	11 20.0	81 44	151.1	10 55.6	81 43	151.4	9 18.0	81 42	152.6	40
1	16 05.5	79 50	146.5	15 17.8	80 49	147.1	14 06.1	80 48	148.0	12 54.2	80 46	149.0	11 18.0	80 45	150.2	10 53.9	80 44	150.5	10 29.8	80 44	150.8	8 53.2	81 42	152.0	1
2	15 35.7	79 50	145.8	14 48.5	79 50	146.4	13 37.6	79 48	147.4	12 26.4	79 47	148.3	10 51.2	79 46	149.6	10 27.3	80 45	149.9	10 03.5	80 45	150.2	8 27.8	80 43	151.4	2
3	15 05.4	78 51	145.1	14 18.7	78 50	145.8	13 08.5	78 49	146.8	11 58.1	78 48	147.7	10 23.9	79 46	149.0	10 00.3	79 46	149.3	9 36.7	79 46	149.6	8 02.0	79 44	150.9	3
4	14 34.6	77 52	144.5	13 48.4	77 51	145.2	12 39.0	77 50	146.1	11 29.3	78 49	147.1	9 56.1	78 47	148.4	9 32.8	78 47	148.7	9 09.4	78 46	149.0	7 35.8	78 44	150.3	4
45	14 03.3	76 53	143.9	13 17.7	76 52	144.5	12 08.9	76 51	145.5	11 00.0	77 50	146.5	9 27.8	77 48	147.8	9 04.8	77 48	148.1	8 41.6	77 47	148.5	7 09.1	77 45	149.7	45
6	13 31.6	75 54	143.2	12 46.4	75 53	143.9	11 38.4	76 52	144.9	10 30.3	76 50	145.9	8 59.1	76 48	147.2	8 36.3	76 48	147.6	8 13.5	76 48	147.9	6 41.9	76 46	149.2	6
7	12 59.3	74 54	142.6	12 14.7	75 54	143.3	11 07.5	75 52	144.3	10 00.1	75 51	145.3	8 30.0	75 49	146.7	8 07.4	75 49	147.0	7 44.8	75 48	147.3	6 14.3	76 47	148.7	7
8	12 26.6	73 55	142.0	11 42.5	74 54	142.7	10 36.1	74 53	143.7	9 29.5	74 52	144.7	8 00.4	74 50	146.1	7 38.1	74 50	146.4	7 15.7	74 49	146.8	5 46.3	75 47	148.1	8
9	11 53.5	73 56	141.4	11 09.9	73 55	142.1	10 04.2	73 54	143.1	8 58.4	73 52	144.2	7 30.4	73 51	145.5	7 08.3	74 50	145.9	6 46.2	74 50	146.2	5 17.8	74 48	147.6	9
50	11 19.9	72 57	140.8	10 36.8	72 56	141.5	9 31.9	72 54	142.6	8 26.9	72 53	143.6	6 59.9	73 52	145.0	6 38.1	73 51	145.3	6 16.3	73 50	145.7				50
1	10 45.9	71 57	140.2	10 03.3	71 56	140.9	8 59.2	71 55	142.0	7 55.0	72 54	143.1	6 29.0	72 52	144.5	6 07.5	72 52	144.8	5 46.0	72 51	145.2				1
2	10 11.5	70 58	139.6	9 29.4	70 57	140.4	8 26.1	70 56	141.4	7 22.6	71 54	142.5	5 57.8	71 53	143.9	5 36.5	71 52	144.3	5 15.2	71 52	144.6				2
3	9 36.7	69 59	139.1	8 55.1	69 58	139.8	7 52.6	70 56	140.9	6 49.9	70 55	142.0	5 26.1	70 54	143.4	5 05.1	70 53	143.8							3
4	9 01.4	68 59	138.5	8 20.4	68 58	139.2	7 18.7	69 57	140.3	6 16.8	69 56	141.4													4
55	8 25.8	67 60	137.9	7 45.3	68 59	138.7	6 44.3	68 58	139.8	5 43.2	68 56	140.9													55
6	7 49.8	67 61	137.4	7 09.8	67 60	138.1	6 09.6	67 58	139.3	5 09.3	67 57	140.4													6
7	7 13.4	66 61	136.8	6 33.9	66 60	137.6	5 34.6	66 59	138.7																7
8	6 36.7	65 62	136.3	5 57.7	65 61	137.1																			8
9	5 59.6	64 62	135.8	5 21.1	64 61	136.6																			9
60	5 22.1	63 63	135.3																						60

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	14 43.8	39 74	56.8	15 07.0	39 74	55.8	15 41.4	38 72	54.4	16 15.3	37 71	52.9	16 59.5	36 69	51.0	17 10.3	36 68	50.5	17 21.1	36 68	50.0	18 03.6	35 66	48.0	91
2	13 59.2	40 74	56.4	14 22.9	39 73	55.5	14 58.1	39 72	54.1	15 32.7	38 71	52.6	16 18.0	37 69	50.7	16 29.2	37 68	50.2	16 40.3	37 68	49.7	17 24.0	36 66	47.8	2
3	13 14.7	41 74	56.1	13 39.0	40 73	55.2	14 14.9	40 72	53.7	14 50.3	39 70	52.3	15 36.7	38 68	50.4	15 48.2	38 68	49.9	15 59.6	38 68	49.4	16 44.5	37 66	47.5	3
4	12 30.4	41 74	55.8	12 55.2	41 73	54.8	13 31.9	41 72	53.4	14 08.1	40 70	52.0	14 55.6	39 68	50.1	15 07.4	39 68	49.6	15 19.0	39 67	49.2	16 05.1	38 65	47.2	4
95	11 46.3	42 73	55.4	12 11.6	42 72	54.5	12 49.0	41 71	53.1	13 26.1	41 70	51.7	14 14.7	40 68	49.8	14 26.7	40 67	49.3	14 38.7	40 67	48.9	15 26.0	39 65	46.9	95
6	11 02.4	43 73	55.1	11 28.1	43 72	54.1	12 06.4	42 71	52.8	12 44.2	42 70	51.4	13 34.0	41 68	49.5	13 46.3	41 67	49.0	13 58.5	41 67	48.6	14 47.0	40 65	46.7	6
7	10 18.7	44 72	54.7	10 44.9	44 72	53.8	11 23.9	43 70	52.4	12 02.6	43 69	51.0	12 53.4	42 67	49.2	13 06.0	42 67	48.7	13 18.6	42 66	48.2	14 08.2	41 64	46.4	7
8	9 35.2	45 72	54.3	10 01.9	44 71	53.4	10 41.7	44 70	52.1	11 21.1	44 69	50.7	12 13.1	43 67	48.8	12 25.9	43 66	48.4	12 38.8	43 66	47.9	13 29.6	42 64	46.1	8
9	8 51.8	45 72	54.0	9 19.0	45 71	53.1	9 59.6	45 70	51.7	10 39.8	45 68	50.3	11 32.9	44 66	48.5	11 46.1	44 66	48.1	11 59.2	44 66	47.6	12 51.2	43 64	45.8	9
100	8 08.7	46 72	53.6	8 36.4	46 71	52.7	9 17.7	46 69	51.4	9 58.8	45 68	50.0	10 53.0	45 66	48.2	11 06.4	45 66	47.7	11 19.8	45 65	47.3	12 13.0	44 63	45.4	100
1	7 25.8	47 71	53.2	7 54.0	47 70	52.3	8 36.1	47 69	51.0	9 17.9	46 68	49.6	10 13.2	46 66	47.8	10 27.0	46 66	47.4	10 40.7	46 65	46.9	11 35.0	45 63	45.1	1
2	6 43.1	48 71	52.8	7 11.8	48 70	51.9	7 54.7	48 69	50.6	8 37.3	47 67	49.3	9 33.7	47 66	47.5	9 47.7	47 65	47.0	10 01.7	47 64	46.6	10 57.3	46 63	44.8	2
3	6 00.6	49 70	52.4	6 29.8	49 70	51.6	7 13.5	48 68	50.2	7 56.9	48 67	48.9	8 54.4	48 65	47.1	9 08.7	48 65	46.7	9 23.0	48 64	46.2	10 19.7	47 62	44.5	3
4	5 18.3	50 70	52.0	5 48.0	49 69	51.2	6 32.5	49 68	49.8	7 16.7	49 66	48.5	8 15.3	49 65	46.8	8 29.9	49 64	46.3	8 44.5	48 64	45.9	9 42.4	48 62	44.1	4
105				5 06.5	50 69	50.8	5 51.7	50 68	49.5	6 36.8	50 66	48.2	7 36.5	50 64	46.4	7 51.4	50 64	46.0	8 06.2	49 63	45.5	9 05.3	49 62	43.8	105
6							5 11.2	51 67	49.1	5 57.1	51 66	47.8	6 57.9	51 64	46.0	7 13.1	50 64	45.6	7 28.2	50 63	45.2	8 28.4	50 61	43.4	6
7										5 17.6	52 66	47.4	6 19.6	51 64	45.6	6 35.0	51 63	45.2	6 50.4	51 62	44.8	7 51.8	51 61	43.0	7
8													5 41.5	52 63	45.3	5 57.2	52 63	44.8	6 12.9	52 62	44.4	7 15.4	52 60	42.7	8
9													5 03.6	53 63	44.9	5 19.6	53 62	44.4	5 35.6	53 62	44.0	6 39.3	53 60	42.3	9
110																						6 03.5	54 59	41.9	110
1																						5 27.9	55 59	41.5	1

Lat. 27°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	71 60.0	1.0 02	00.0	70 00.0	1.0 02	00.0	68 30.0	1.0 01	00.0	67 30.0	1.0 01	00.0
1	70 59.0	1.0 05	02.1	69 59.1	1.0 05	02.0	68 29.2	1.0 04	01.8	67 29.2	1.0 04	01.7
2	70 56.0	1.0 08	04.3	69 56.3	1.0 08	04.0	68 26.6	1.0 07	03.6	67 26.8	1.0 06	03.4
3	70 51.1	99 12	06.4	69 51.7	99 11	06.0	68 22.4	99 10	05.4	67 22.9	99 09	05.1
4	70 44.2	98 15	08.4	69 45.2	98 14	07.9	68 16.6	99 12	07.2	67 17.4	99 12	06.7
05	70 35.4	97 18	10.5	69 37.0	97 17	09.8	68 09.1	98 15	08.9	67 10.4	98 14	08.4
6	70 24.7	96 21	12.5	69 27.0	96 20	11.7	68 00.0	97 18	10.7	67 01.8	97 17	10.0
7	70 12.2	95 24	14.5	69 15.3	95 22	13.6	67 49.3	96 20	12.4	66 51.8	96 19	11.6
8	69 58.0	93 26	16.4	69 01.9	94 25	15.4	67 37.1	95 23	14.0	66 40.3	95 22	13.2
9	69 42.1	92 29	18.3	68 46.9	92 28	17.1	67 23.4	93 25	15.6	66 27.4	94 24	14.7
10	69 24.5	90 32	20.1	68 30.4	91 30	18.9	67 08.3	92 28	17.2	66 13.1	92 26	16.2
1	69 05.4	88 34	21.8	68 12.4	89 32	20.5	66 51.8	90 30	18.8	65 57.5	91 28	17.7
2	68 44.9	86 37	23.5	67 52.9	87 35	22.1	66 33.9	88 32	20.3	65 40.6	89 30	19.1
3	68 22.9	84 39	25.1	67 32.1	85 37	23.7	66 14.8	87 34	21.7	65 22.4	88 32	20.5
4	67 59.5	82 41	26.6	67 10.0	83 39	25.2	65 54.4	85 36	23.1	65 03.1	86 34	21.9
15	67 34.9	80 43	28.1	66 46.7	81 41	26.6	65 32.8	83 38	24.5	64 42.6	84 36	23.2
6	67 09.2	77 45	29.5	66 22.2	79 43	28.0	65 10.1	81 40	25.8	64 21.1	82 38	24.4
7	66 42.2	75 47	30.9	65 56.6	77 44	29.3	64 46.3	79 41	27.0	63 58.4	80 39	25.6
8	66 14.3	73 48	32.2	65 29.9	75 46	30.5	64 21.5	77 43	28.2	63 34.8	79 41	26.8
9	65 45.3	71 50	33.4	65 02.3	73 48	31.7	63 55.8	75 44	29.4	63 10.2	77 42	27.9
20	65 15.4	69 51	34.6	64 33.7	70 49	32.9	63 29.1	73 46	30.5	62 44.7	75 44	29.0
1	64 44.6	66 53	35.7	64 04.2	68 50	34.0	63 01.5	71 47	31.6	62 18.4	73 45	30.1
2	64 13.0	64 54	36.7	63 33.9	66 52	35.0	62 33.1	69 49	32.6	61 51.2	71 46	31.0
3	63 40.7	62 55	37.7	63 02.9	64 53	36.0	62 03.9	67 50	33.6	61 23.3	69 48	32.0
4	63 07.6	60 56	38.7	62 31.1	62 54	36.9	61 34.0	65 51	34.5	60 54.6	67 49	32.9
25	62 33.9	58 57	39.6	61 58.6	60 55	37.8	61 03.4	63 52	35.4	60 25.2	65 50	33.8
6	61 59.5	56 58	40.4	61 25.5	58 56	38.7	60 32.2	61 53	36.2	59 55.1	63 51	34.6
7	61 24.5	53 59	41.2	60 51.8	56 57	39.5	60 00.3	59 54	37.0	59 24.5	61 52	35.4
8	60 49.0	51 60	42.0	60 17.5	54 58	40.2	59 27.8	57 55	37.8	58 53.2	59 53	36.2
9	60 13.0	49 61	42.7	59 42.7	52 59	41.0	58 54.8	55 56	38.5	58 21.4	57 54	36.9
30	59 36.6	47 62	43.4	59 07.4	50 60	41.6	58 21.3	53 57	39.2	57 49.0	55 55	37.6
1	58 59.6	45 62	44.0	58 31.7	48 60	42.3	57 47.3	51 57	39.8	57 16.2	53 56	38.2
2	58 22.3	43 63	44.6	57 55.5	46 61	42.9	57 12.9	49 58	40.4	56 42.9	51 56	38.8
3	57 44.6	42 64	45.1	57 18.9	44 62	43.5	56 38.0	47 59	41.0	56 09.2	49 57	39.4
4	57 06.5	40 64	45.7	56 42.0	42 62	44.0	56 02.7	45 59	41.6	55 35.0	47 58	40.0
35	56 28.1	38 64	46.2	56 04.7	40 63	44.5	55 27.1	43 60	42.1	55 00.5	45 58	40.5
6	55 49.4	36 65	46.6	55 27.0	38 63	45.0	54 51.1	42 60	42.6	54 25.6	44 59	41.0
7	55 10.4	34 66	47.1	54 49.1	37 64	45.4	54 14.8	40 61	43.0	53 50.3	42 59	41.5
8	54 31.1	33 66	47.5	54 10.9	35 64	45.8	53 38.1	38 62	43.5	53 14.7	40 60	41.9
9	53 51.6	31 66	47.8	53 32.4	33 64	46.2	53 01.2	36 62	43.9	52 38.9	38 60	42.3
40	53 11.9	29 66	48.2	52 53.7	31 65	46.6	52 24.0	34 62	44.3	52 02.7	36 61	42.7
1	52 31.9	28 67	48.5	52 14.7	30 65	46.9	51 46.6	33 63	44.6	51 26.3	35 61	43.1
2	51 51.8	26 67	48.8	51 35.5	28 66	47.3	51 08.9	31 63	45.0	50 49.6	33 61	43.5
3	51 11.5	24 68	49.1	50 56.2	26 66	47.6	50 31.0	29 64	45.3	50 12.8	31 62	43.8
4	50 31.0	23 68	49.4	50 16.6	25 66	47.8	49 52.9	28 64	45.6	49 35.6	30 62	44.1
45	49 50.3	21 68	49.6	49 36.9	23 66	48.1	49 14.6	26 64	45.9	48 58.3	28 62	44.4
6	49 09.5	20 68	49.8	48 57.1	22 67	48.3	48 36.2	25 64	46.1	48 20.9	26 63	44.7
7	48 28.6	18 68	50.0	48 17.0	20 67	48.6	47 57.6	23 65	46.4	47 43.2	25 63	44.9
8	47 47.6	17 68	50.2	47 36.9	19 67	48.8	47 18.8	22 65	46.6	47 05.4	23 63	45.1
9	47 06.5	15 69	50.4	46 56.7	17 67	48.9	46 39.9	20 65	46.8	46 27.4	22 64	45.4
50	46 25.3	14 69	50.5	46 16.3	16 68	49.1	46 00.9	18 65	47.0	45 49.3	20 64	45.6
1	45 43.9	13 69	50.7	45 35.9	14 68	49.2	45 21.8	17 66	47.1	45 11.1	19 64	45.7
2	45 02.6	11 69	50.8	44 55.3	13 68	49.4	44 42.5	16 66	47.3	44 32.7	17 64	45.9
3	44 21.1	10 69	50.9	44 14.7	12 68	49.5	44 03.2	14 66	47.4	43 54.3	16 64	46.0
4	43 39.6	08 69	51.0	43 34.0	10 68	49.6	43 23.8	13 66	47.5	43 15.8	14 64	46.2
55	42 58.1	07 69	51.0	42 53.3	09 68	49.7	42 44.3	11 66	47.6	42 37.2	13 64	46.3
6	42 16.5	06 69	51.1	42 12.5	07 68	49.8	42 04.8	10 66	47.7	41 58.5	11 65	46.4
7	41 34.8	05 69	51.2	41 31.7	06 68	49.8	41 25.2	08 66	47.8	41 19.7	10 65	46.5
8	40 53.2	03 70	51.2	40 50.8	05 68	49.9	40 45.6	07 66	47.9	40 40.9	08 65	46.6
9	40 11.5	02 70	51.2	40 09.9	03 68	49.9	40 05.9	06 66	47.9	40 02.1	07 65	46.6
60	39 29.9	01 70	51.2	39 29.0	02 68	49.9	39 26.2	04 66	48.0	39 23.2	06 65	46.7
1	38 48.2	01 70	51.2	38 48.1	01 68	49.9	38 46.4	03 66	48.0	38 44.3	04 65	46.7
2	38 06.5	02 70	51.2	38 07.2	00 68	49.9	38 06.7	02 66	48.0	38 05.3	03 65	46.8
3	37 24.8	03 69	51.2	37 26.3	02 68	49.9	37 26.9	00 66	48.0	37 26.4	02 65	46.8
4	36 43.2	04 69	51.2	36 45.4	03 68	49.9	36 47.2	01 66	48.0	36 47.4	00 65	46.8
65	36 01.6	06 69	51.1	36 04.5	04 68	49.9	36 07.4	02 66	48.0	36 08.4	01 65	46.8
6	35 20.0	07 69	51.1	35 23.6	05 68	49.8	35 27.7	04 66	48.0	35 29.5	02 65	46.8
7	34 38.4	08 69	51.0	34 42.8	07 68	49.8	34 48.0	05 66	48.0	34 50.5	04 65	46.8
8	33 56.9	09 69	50.9	34 01.9	08 68	49.7	34 08.3	06 66	47.9	34 11.6	05 65	46.7
9	33 15.4	10 69	50.9	33 21.2	09 68	49.7	33 28.6	07 66	47.9	33 32.7	06 65	46.7
70	32 33.9	11 69	50.8	32 40.5	10 68	49.6	32 49.0	09 66	47.8	32 53.8	08 65	46.6
1	31 52.6	13 69	50.7	31 59.8	11 68	49.5	32 09.4	10 66	47.7	32 15.0	09 65	46.6
2	31 11.2	14 69	50.6	31 19.2	13 68	49.4	31 29.9	11 66	47.7	31 36.2	10 65	46.5
3	30 30.0	15 69	50.4	30 38.6	14 68	49.3	30 50.4	12 66	47.6	30 57.4	11 64	46.4
4	29 48.8	16 68	50.3	29 58.1	15 67	49.2	30 10.9	14 66	47.5	30 18.8	13 64	46.3
75	29 07.7	17 68	50.2	29 17.7	16 67	49.1	29 31.6	15 66	47.4	29 40.1	14 64	46.2
6	28 26.7	18 68	50.0	28 37.3	17 67	48.9	28 52.3	16 65	47.2	29 01.6	15 64	46.1
7	27 45.7	19 68	49.9	27 57.1	18 67	48.8	28 13.1	17 65	47.1	28 23.1	16 64	46.0
8	27 04.9	20 68	49.7	27 16.9	20 67	48.6	27 34.0	18 65	47.0	27 44.7	17 64	45.9
9	26 24.1	22 68	49.6	26 36.8	21 67	48.5	26 54.9	19 65	46.8	27 06.3	19 64	45.7
80	25 43.5	23 68	49.4	25 56.9	22 66	48.3	26 16.0	21 65	46.7	26 28.1	20 64	45.6
1	25 03.0	24 67	49.2	25 17.0	23 66	48.2	25 37.1	22 64	46.5	25 49.9	21 63	45.5
2	24 22.5	25 67	49.0	24 37.2	24 66	48.0	24 58.4	23 64	46.4	25 11.9	22 63	45.3
3	23 42.2	26 67	48.9	23 57.5	25 66	47.8	24 19.7	24 64	46.2	24 33.9	23 63	45.1
4	23 02.0	27 67	48.7	23 18.0	26 66	47.6	23 41.2	25 64	46.0	23 56.1	25 63	45.0
85	22 21.9	28 67	48.4	22 38.6	27 66	47.4	23 02.8	26 64	45.8	23 18.4	26 63	44.8
6	21 42.0	29 66	48.2	21 59.3	29 65	47.2	22 24.5	28 64	45.6	22 40.8	27 62	44.6
7	21 02.2	30 66	48.0	21 20.1	30 65	47.0	21 46.3	29 63	45.4	22 03.3	28 62	44.4
8	20 22.5	31 66	47.8	20 41.1	31 65	46.8	21 08.3	30 63	45.2	21 26.0	29 62	44.2
9	19 43.0	32 66	47.5	20 02.2	32 64	46.5	20 30.4	31 63	45.0	20 48.8	30 62	44.0
90	19 03.7	33 65	47.3	19 23.5	33 64	46.3	19 52.7	32 63	44.8	20 11.7	31 62	43.8

H.A.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	66 30.0	1.0 01	00.0	65 30.0	1.0 01	00.0	64 30.0	1.0 01	00.0	63 00.0	1.0 01	00.0
1	66 29.3	1.0 04	01.6	65 29.3	1.0 04	01.5	64 29.3	1.0 03	01.4	62 59.4	1.0 03	01.3
2	66 27.0	1.0 06	03.2	65 27.2	1.0 06	03.0	64 27.4	1.0 06	02.8	62 57.6	1.0 05	02.6
3	66 23.3	99 09	04.8	65 23.7	99 08	04.5	64 24.1	99 08	04.2	62 54.6	99 07	03.9
4	66 18.1	99 11	06.3	65 18.8	99 10	06.0	64 19.5	99 10	05.6	62 50.4	99 09	05.2
05	66 11.5	98 13	07.9	65 12.6	98 13	07.4	64 13.6	98 12	07.0	62 45.0	99 11	06.4
6	66 03.5	97 16	09.4	65 05.0	98 15	08.9	64 06.4	98 14	08.4	62 38.4	98 13	07.7
7	65 54.0	96 18	10.9	64 56.1	97 17	10.3	63 58.0	97 16	09.7	62 30.7	97 15	08.9
8	65 43.2	95 20	12.4	64 45.9	96 19	11.7	63 48.4	96 18	11.1	62 21.8	96 17	10.2
9	65 31.0	94 22	13.9	64 34.4	95 21	13.1	63 37.5	95 20	12.4	62 11.8	95 18	11.4
10	65 17.5	93 24	15.3	64 21.6	93 23	14.5	63 25.5	94 22	13.7	62 00.7	94 20	12.6
1	65 02.8	92 27	16.7	64 07.7	92 25	15.8	63 12.3	93 24	14.9	61 48.6	93 22	13.7
2	64 46.8	90 29	18.1	63 52.5	91 27	17.1	62 57.9	91 26	16.2	61 35.4	92 24	14.9
3	64 29.6	88 30	19.4	63 36.3	89 29	18.4	62 42.5	90 28	17.4	61 21.1	91 25	16.0
4	64 11.3	87 32	20.7	63 18.9	88 31	19.6	62 26.0	88 29	18.6	61 05.9	90 27	17.1
15	63 51.8	85 34	21.9	63 00.4	86 32	20.8	62 08.5	87 31	19.7	60 49.7	88 29	18.2
6	63 31.3	83 36	23.2	62 40.9	84 34	22.0	61 50.0	85 32	20.8	60 32.5	87 30	19.2
7	63 09.8	82 38	24.3	62 20.5	83 36	23.1	61 30.5	84 34	21.9	60 14.5	85 32	20.3
8	62 47.3	80 39	25.5	61 59.0	81 37	24.2	61 10.1	82 36	23.0	59 55.5	84 33	21.3
9	62 23.8	78 40	26.5	61 36.7	79 39	25.2	60 48.8	80 37	24.0	59 35.7	82 34	22.2
20	61 59.5	76 42	27.6	61 13.5	77 40	26.3	60 26.6	79 38	25.0	59 15.1	80 36	23.2
1	61 34.3	74 43	28.6	60 49.4	76 42	27.2	60 03.7	77 40	25.9	58 53.7	79 37	24.1
2	61 08.3	72 44	29.6	60 24.5	74 43	28.2	59 39.9	75 41	26.8	58 31.5	77 38	24.9
3	60 41.6	70 46	30.5	59 58.9	72 44	29.1	59 15.4	73 42	27.7	58 08.6	75 39	25.8
4	60 14.1	68 47	31.4	59 32.6	70 45	30.0	58 50.2	71 43	28.6	57 45.0	73 40	26.6
25	59 45.9	66 48	32.3	59 05.5	68 46	30.8	58 24.3	70 44	29.4	57 20.7	72 42	27.4
6	59 17.0	64 49	33.1	58 37.8	66 47	31.6	57 57.7	68 45	30.2	56 55.8	70 42	28.2
7	58 47.5	62 50	33.9	58 09.5	64 48	32.4	57 30.5	66 46	31.0	56 30.2	68 44	28.9
8	58 17.4	61 51	34.6	57 40.6	62 49	33.1	57 02.7	64 47	31.7	56 04.1	66 44	29.6
9	57 46.8	59 52	35.3	57 11.1	60 50	33.8	56 34.3	62 48	32.4	55 37.4	64 46	30.3
30	57 15.6	57 53	36.0	56 41.0	58 51	34.5	56 05.4	60 49	33.1	55 10.1	63 46	31.0
1	56 43.9	55 54	36.7	56 10.5	57 52	35.2	55 36.0	58 50	33.7	54 42.4	61 47	31.6
2	56 11.7	53 54	37.3	55 39.4	55 52	35.8	55 06.1	56 51	34.3	54 14.1	59 48	32.2
3	55 39.1	51 55	37.9	55 08.0	53 53	36.4	54 35.7	55 51	34.9	53 45.4	57 49	32.8
4	55 06.1	49 56	38.4	54 36.0	51 54	36.9	54 04.9	53 52	35.5	53 16.2	55 49	33.3
35	54 32.7	47 56	39.0	54 03.7	49 54	37.5	53 33.7	51 53	36.0	52 46.7	53 50	33.9
6	53 58.9	45 57	39.5	53 31.0	47 55	38.0	53 02.0	49 53	36.5	52 16.7	52 51	34.4
7	53 24.7	44 58	40.0	52 57.9	46 56	38.5	52 30.1	47 54	37.0	51 46.3	50 51	34.9
8	52 50.2	42 58	40.4	52 24.5	44 56	38.9	51 57.7	46 54	37.5	51 15.5	48 52	35.3
9	52 15.4	40 58	40.8	51 50.8	42 57	39.4	51 25.0	44 55	37.9	50 44.5	46 52	35.8
40	51 40.3	38 59	41.2	51 16.7	40 57	39.8	50 52.0	42 56	38.3	50 13.1	45 53	36.2
1	51 04.9	37 59	41.6	50 42.4	38 58	40.2	50 18.7	40 56	38.7	49 41.3	43 53	36.6
2	50 29.3	35 60	42.0	50 07.8	37 58	40.5	49 45.2	39 56	39.1	49 09.3	41 54	37.0
3	49 53.4	33 60	42.3	49 32.9	35 58	40.9	49 11.3	37 57	39.4	48 37.0	39 54	37.3
4	49 17.3	32 60	42.6	48 57.8	33 59	41.2	48 37.3	35 57	39.8	48 04.5	38 55	37.7
45	48 41.0	30 61	42.9	48 22.5	32 59	41.5	48 02.9	33 58	40.1	47 31.7	36 55	38.0
6	48 04.4	28 61	43.2	47 46.9	30 60	41.8	47 28.4	32 58	40.4	46 58.7	34 55	38.3
7	47 27.7	27 61	43.5	47 11.2	28 60	42.1	46 53.7	30 58	40.7	46 25.4	33 56	38.6
8	46 50.9	25 62	43.7	46 35.3	27 60	42.3	46 18.8	28 58	40.9	45 52.0	31 56	38.9
9	46 13.8	23 62	43.9	45 59.3	25 60	42.5	45 43.7	27 59	41.2	45 18.4	29 56	39.1
50	45 36.7	22 62	44.2	45 23.0	24 60	42.8	45 08.4	25 59	41.4	44 44.6	28 57	39.3
1	44 59.4	20 62	44.3	44 46.7	22 61	43.0	44 33.0	24 59	41.6	44 10.6	26 57	39.6
2	44 21.9	19 62	44.5	44 10.2	20 61	43.1	43 57.4	22 60	41.8	43 36.5	24 57	39.8
3	43 44.4	17 63	44.7	43 33.5	19 61	43.3	43 21.7	21 60	42.0	43 02.2	23 57	40.0
4	43 06.8	16 63	44.8	42 56.8	17 61	43.5	42 45.9	19 60	42.1	42 27.8	21 58	40.1
55	42 29.0	14 63	44.9	42 20.0	16 62	43.6	42 10.0	17 60	42.3	41 53.3	20 58	40.3
6	41 51.2	13 63	45.1	41 43.1	14 62	43.7	41 34.0	16 60	42.4	41 18.7	18 58	40.4
7	41 13.3	11 63	45.2	41 06.1	13 62	43.9	40 57.9	14 60	42.5	40 43.9	17 58	40.6
8	40 35.4	10 63	45.3	40 29.0	11 62	44.0	40 21.7	13 60	42.7	40 09.1	15 58	40.7
9	39 57.4	09 63	45.3	39 51.9	10 62	44.0	39 45.4	11 60	42.7	39 34.2	14 58	40.8
60	39 19.4	07 64	45.4	39 14.7	09 62	44.1	39 09.1	10 61	42.8	38 59.2	12 58	40.9
1	38 41.3	06 64	45.5	38 37.4	07 62	44.2	38 32.7	08 61	42.9	38 24.2	11 58	41.0
2	38 03.1	04 64	45.5	38 00.2	06 62	44.2	37 56.3	07 61	43.0	37 49.1	09 59	41.1
3	37 25.0	03 64	45.5	37 22.8	04 62	44.3	37 19.9	06 61	43.0	37 13.9	08 59	41.1
4	36 46.9	02 64	45.5	36 45.5	03 62	44.3	36 43.4	04 61	43.0	36 38.8	06 59	41.2
65	36 08.7	00 64	45.6	36 08.2	01 62	44.3	36 06.9	03 61	43.1	36 03.5	05 59	41.2
6	35 30.5	01 64	45.5	35 30.8	00 62	44.3	35 30.4	01 61	43.1	35 28.3	03 59	41.2
7	34 52.4	02 64	45.5	34 53.5	01 62	44.3	34 53.9	00 61	43.1	34 53.1	02 59	41.3
8	34 14.2	04 64	45.5	34 16.1	03 62	44.3	34 17.3	01 61	43.1	34 17.8	00 59	41.3
9	33 36.1	05 64	45.5	33 38.8	04 62	44.3	33 40.8	03 61	43.1	33 42.5	01 59	41.3
70	32 58.0	06 64	45.4	33 01.5	05 62	44.2	33 04.3	04 61	43.1	33 07.3	02 59	41.3
1	32 19.9	08 63	45.4	32 24.2	07 62	44.2	32 27.8	05 61	43.0	32 32.8	04 59	41.2
2	31 41.9	09 63	45.3	31 47.0	08 62	44.2	31 51.4	07 61	43.0	31 56.8	05 59	41.2
3	31 03.9	10 63	45.2	31 09.7	09 62	44.1	31 14.9	08 61	42.9	31 21.6	07 59	41.2
4	30 26.0	11 63	45.2	30 32.6	11 62	44.0	30 38.6	09 61	42.9	30 46.4	08 58	41.1
75	29 48.1	13 63	45.1	29 55.5	12 62	43.9	30 02.2	11 60	42.8	30 11.3	09 58	41.1
6	29 10.3	14 63	45.0	29 18.4	13 62	43.8	29 25.9	12 60	42.7	29 36.2	11 58	41.0
7	28 32.5	15 63	44.9	28 41.4	14 62	43.7	28 49.7	13 60	42.6	29 01.1	12 58	40.9
8	27 54.8	17 63	44.8	28 04.5	16 62	43.6	28 13.6	15 60	42.5	28 26.1	13 58	40.8
9	27 17.2	18 62	44.6	27 27.6	17 61	43.5	27 37.5	16 60	42.4	27 51.2	15 58	40.7
80	26 39.7	19 62	44.5	26 50.8	18 61	43.4	27 01.4	17 60	42.3	27 16.4	16 58	40.6
1	26 02.3	20 62	44.4	26 14.1	19 61	43.3	26 25.5	19 60	42.2	26 41.6	17 58	40.5
2	25 25.0	21 62	44.2	25 37.5	21 61	43.1	25 49.7	20 60	42.0	26 06.9	19 58	40.4
3	24 47.7	23 62	44.1	25 01.0	22 61	43.0	25 13.9	21 60	41.9	25 32.3	20 58	40.3
4	24 10.6	24 62	43.9	24 24.6	23 60	42.8	24 38.2	22 59	41.8	24 57.8	21 57	40.2
85	23 33.6	25 62	43.7	23 48.4	24 60	42.7	24 02.7	24 59	41.6	24 23.3	22 57	40.0
6	22 56.7	26 61	43.6	23 12.2	25 60	42.5	23 27.2	25 59	41.4	23 49.0	24 57	39.9
7	22 19.9	27 61	43.4	22 36.1	27 60	42.3	22 51.9	26 59	41.3	23 14.8	25 57	39.7
8	21 43.3	28 61	43.2	22 00.2	28 60	42.1	22 16.7	27 58	41.1	22 40.7	26 57	39.5
9	21 06.8	30 61	43.0	21 24.4	29 60	42.0	21 41.6	28 58	40.9	22 06.7	27 56	39.4
90	20 30.4	31 60	42.8	20 48.7	30 59	41.8	21 06.7	30 58	40.7	21 32.9	29 56	39.2

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	17 00.0	1.0 00	180.0	16 00.0	1.0 00	180.0	14 30.0	1.0 00	180.0	13 30.0	1.0 00	180.0	12 30.0	1.0 00	180.0	11 30.0	1.0 00	180.0	10 30.0	1.0 00	180.0	9 00.0	1.0 00	180.0	00
1	16 59.7	1.0 02	179.3	15 59.7	1.0 02	179.3	14 29.7	1.0 02	179.3	13 29.7	1.0 02	179.3	12 29.7	1.0 02	179.3	11 29.7	1.0 02	179.4	10 29.7	1.0 02	179.4	8 59.7	1.0 01	179.4	1
2	16 58.6	1.0 03	178.5	15 58.7	1.0 03	178.6	14 28.7	1.0 03	178.6	13 28.8	1.0 03	178.7	12 28.8	1.0 02	178.7	11 28.8	1.0 02	178.7	10 28.8	1.0 02	178.8	8 58.9	1.0 02	178.8	2
3	16 57.0	1.0 04	177.8	15 57.0	1.0 04	177.9	14 27.1	1.0 04	177.9	13 27.2	1.0 04	178.0	12 27.3	1.0 04	178.0	11 27.3	1.0 03	178.1	10 27.4	1.0 03	178.1	8 57.5	1.0 03	178.2	3
4	16 54.6	1.0 05	177.1	15 54.7	1.0 05	177.2	14 24.9	1.0 05	177.3	13 25.0	1.0 05	177.3	12 25.1	1.0 04	177.4	11 25.3	1.0 04	177.5	10 25.4	1.0 04	177.5	8 55.6	1.0 04	177.6	4
05	16 51.5	1.0 06	176.4	15 51.7	1.0 06	176.5	14 22.0	1.0 06	176.6	13 22.2	1.0 06	176.7	12 22.4	1.0 06	176.7	11 22.6	1.0 06	176.8	10 22.8	1.0 05	176.9	8 53.1	1.0 05	177.0	05
6	16 47.8	1.0 07	175.6	15 48.1	1.0 07	175.8	14 18.5	1.0 07	175.9	13 18.8	1.0 07	176.0	12 19.1	1.0 07	176.1	11 19.3	1.0 06	176.2	10 19.6	1.0 06	176.3	8 50.0	1.0 06	176.4	6
7	16 43.4	99 08	174.9	15 43.8	99 08	175.0	14 14.4	99 08	175.2	13 14.8	99 08	175.3	12 15.1	99 08	175.5	11 15.5	99 07	175.6	10 15.9	99 07	175.7	8 46.4	99 07	175.8	7
8	16 38.4	99 10	174.2	15 38.9	99 09	174.3	14 09.6	99 09	174.5	13 10.1	99 09	174.7	12 10.6	99 09	174.8	11 11.1	99 08	174.9	10 11.6	99 08	175.1	8 42.3	99 08	175.3	8
9	16 32.6	99 11	173.5	15 33.3	99 10	173.6	14 04.2	99 10	173.9	13 04.8	99 10	174.0	12 05.4	99 10	174.2	11 06.1	99 09	174.3	10 06.7	99 09	174.4	8 37.6	99 09	174.7	9
10	16 26.2	99 12	172.8	15 27.0	99 12	172.9	13 58.2	99 11	173.2	12 59.0	99 11	173.4	11 59.7	99 10	173.5	11 00.5	99 10	173.7	10 01.2	99 10	173.8	8 32.3	99 10	174.1	10
1	16 19.2	98 13	172.1	15 20.1	98 12	172.2	13 51.5	98 12	172.5	12 52.5	98 12	172.7	11 53.4	98 12	172.9	10 54.3	98 11	173.1	9 55.2	99 11	173.2	8 26.5	99 10	173.5	1
2	16 11.5	98 14	171.4	15 12.6	98 14	171.6	13 44.3	98 13	171.8	12 45.4	98 13	172.0	11 46.5	98 13	172.2	10 47.5	98 12	172.4	9 48.6	98 12	172.6	8 20.2	98 12	172.9	2
3	16 03.1	98 15	170.6	15 04.4	98 15	170.9	13 36.4	98 14	171.2	12 37.7	98 14	171.4	11 38.9	98 14	171.6	10 40.2	98 13	171.8	9 41.5	98 13	172.0	8 13.3	98 12	172.3	3
4	15 54.1	97 16	169.9	14 55.6	97 16	170.2	13 27.9	98 15	170.5	12 29.4	98 15	170.7	11 30.8	98 14	171.0	10 32.3	98 14	171.2	9 33.8	98 14	171.4	8 05.9	98 13	171.7	4
15	15 44.4	97 17	169.2	14 46.2	97 17	169.5	13 18.8	97 16	169.8	12 20.5	97 16	170.1	11 22.1	97 15	170.3	10 23.8	97 15	170.6	9 25.5	97 15	170.8	7 58.0	97 14	171.2	15
6	15 34.1	97 18	168.5	14 36.1	97 18	168.8	13 09.0	97 17	169.2	12 11.0	97 17	169.4	11 12.9	97 16	169.7	10 14.8	97 16	170.0	9 16.7	97 16	170.2	7 49.5	97 15	170.6	6
7	15 23.2	96 19	167.8	14 25.4	96 19	168.1	12 58.7	96 18	168.5	12 00.9	96 18	168.8	11 03.0	96 17	169.1	10 05.2	96 17	169.3	9 07.3	96 16	169.6	7 40.5	96 16	170.0	7
8	15 11.6	96 20	167.1	14 14.1	96 20	167.4	12 47.8	96 19	167.9	11 50.2	96 19	168.2	10 52.6	96 18	168.5	9 55.0	96 18	168.7	8 57.4	96 17	169.0	7 31.0	96 17	169.4	8
9	14 59.4	95 21	166.5	14 02.2	95 21	166.8	12 36.2	95 20	167.2	11 39.0	96 20	167.5	10 41.6	96 19	167.8	9 44.3	96 19	168.1	8 47.0	96 18	168.4	7 20.9	96 18	168.9	9
20	14 46.6	95 22	165.8	13 49.6	95 22	166.1	12 24.1	95 21	166.6	11 27.1	95 21	166.9	10 30.1	95 20	167.2	9 33.0	95 20	167.5	8 36.0	95 19	167.8	7 10.3	95 18	168.3	20
1	14 33.1	94 23	165.1	13 36.5	94 23	165.4	12 11.4	95 22	165.9	11 14.7	95 22	166.3	10 18.0	95 21	166.6	9 21.2	95 20	166.9	8 24.4	95 20	167.3	6 59.2	95 19	167.7	1
2	14 19.1	94 24	164.4	13 22.7	94 24	164.8	11 58.2	94 23	165.3	11 01.8	94 23	165.6	10 05.3	94 22	166.0	9 08.9	94 22	166.3	8 12.4	94 21	166.7	6 47.6	94 20	167.2	2
3	14 04.4	93 26	163.8	13 08.4	93 25	164.1	11 44.3	93 24	164.7	10 48.2	94 24	165.0	9 52.1	94 23	165.4	8 56.0	94 22	165.7	7 59.8	94 22	166.1	6 35.5	94 21	166.6	3
4	13 49.2	93 26	163.1	12 53.5	93 26	163.5	11 29.9	93 25	164.0	10 34.1	93 24	164.4	9 38.3	93 24	164.8	8 42.5	93 23	165.2	7 46.7	93 23	165.5	6 22.9	93 22	166.1	4
25	13 33.3	92 27	162.4	12 38.0	92 27	162.8	11 14.9	92 26	163.4	10 19.5	92 25	163.8	9 24.0	92 25	164.2	8 28.6	92 24	164.6	7 33.1	93 24	165.0	6 09.8	93 23	165.5	25
6	13 16.9	92 28	161.8	12 21.9	92 28	162.2	10 59.4	92 27	162.8	10 04.3	92 26	163.2	9 09.2	92 26	163.6	8 14.1	92 25	164.0	7 19.0	92 24	164.4	5 56.2	92 24	165.0	6
7	12 59.9	91 29	161.1	12 05.3	91 29	161.5	10 43.3	91 28	162.2	9 48.6	91 27	162.6	8 53.9	91 26	163.0	7 59.1	91 26	163 4	7 04.3	91 25	163.8	5 42.1	91 24	164.4	7
8	12 42.3	90 30	160.5	11 48.0	90 30	160.9	10 26.6	91 28	161.6	9 32.3	91 28	162.0	8 38.0	91 27	162.4	7 43.6	91 27	162.8	6 49.2	91 26	163.3	5 27.5	91 25	163.9	8
9	12 24.1	90 31	159.8	11 30.3	90 30	160.3	10 09.5	90 30	161.0	9 15.5	90 29	161.4	8 21.6	90 28	161.8	7 27.6	90 28	162.3	6 33.5	90 27	162.7	5 12.5	90 26	163.4	9
30	12 05.4	89 32	159.2	11 12.0	89 31	159.7	9 51.7	89 30	160.4	8 58.2	89 30	160.8	8 04.6	89 29	161.3	7 11.0	89 28	161.7	6 17.4	89 28	162.2				30
1	11 46.1	88 33	158.6	10 53.1	88 32	159.0	9 33.5	89 31	159.8	8 40.4	89 31	160.2	7 47.2	89 30	160.7	6 54.0	89 29	161.2	6 00.8	89 28	161.6				1
2	11 26.3	88 34	157.9	10 33.7	88 33	158.4	9 14.7	88 32	159.2	8 22.0	88 31	159.6	7 29.3	88 31	160.1	6 36.5	88 30	160.6	5 43.7	88 29	161.1				2
3	11 06.0	87 35	157.3	10 13.8	87 34	157.8	8 55.5	87 33	158.6	8 03.2	87 32	159.1	7 10.9	87 32	159.6	6 18.5	87 31	160.1	5 26.1	87 30	160.5				3
4	10 45.1	86 36	156.7	9 53.4	86 35	157.2	8 35.7	86 34	158.0	7 43.8	86 33	158.5	6 52.0	87 32	159.0	6 00.0	87 32	159.5	5 08.1	87 31	160.0				4
35	10 23.7	85 36	156.1	9 32.4	86 36	156.6	8 15.4	86 35	157.4	7 24.0	86 34	157.9	6 32.6	86 33	158.5	5 41.1	86 32	159.0							35
6	10 01.8	85 37	155.5	9 11.0	85 37	156.0	7 54.6	85 35	156.8	7 03.7	85 35	157.4	6 12.7	85 34	157.9	5 21.7	85 33	158.4							6
7	9 39.4	84 38	154.9	8 49.0	84 37	155.5	7 33.4	84 36	156.3	6 42.9	84 36	156.8	5 52.4	84 35	157.4	5 01.8	84 34	157.9							7
8	9 16.5	83 39	154.3	8 26.6	83 38	154.9	7 11.6	83 37	155.7	6 21.6	83 36	156.3	5 31.6	83 36	156.8										8
9	8 53.0	82 40	153.7	8 03.6	82 39	154.3	6 49.4	83 38	155.2	5 59.9	83 37	155.7	5 10.3	83 36	156.3										9
40	8 29.2	82 41	153.2	7 40.2	82 40	153.7	6 26.7	82 38	154.6	5 37.7	82 38	155.2													40
1	8 04.8	81 42	152.6	7 16.3	81 41	153.2	6 03.6	81 39	154.1	5 15.0	81 38	154.7													1
2	7 39.9	80 42	152.0	6 52.0	80 41	152.6	5 40.0	80 40	153.5																2
3	7 14.6	79 43	151.5	6 27.2	79 42	152.1	5 15.9	79 41	153.0																3
4	6 48.9	78 44	150.9	6 01.9	78 43	151.6																			4
45	6 22.7	77 44	150.4	5 36.3	77 44	151.0																			45
6	5 56.0	76 45	149.8	5 10.1	77 44	150.5																			6
7	5 29.0	76 46	149.3																						7
8	5 01.5	75 47	148.8																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	18 24.4	34 65	47.1	18 44.9	34 64	46.1	19 15.1	33 62	44.6	19 34.8	33 61	43.6	19 54.1	32 60	42.6	20 13.2	31 59	41.6	20 31.8	31 58	40.5	20 59.2	30 56	39.0	91
2	17 45.4	35 65	46.8	18 06.5	35 64	45.8	18 37.7	34 62	44.3	18 58.0	34 61	43.3	19 18.1	33 60	42.3	19 37.8	33 59	41.3	19 57.2	32 58	40.3	20 25.6	31 56	38.8	2
3	17 06.5	37 64	46.5	17 28.3	36 64	45.6	18 00.4	35 62	44.1	18 21.4	35 61	43.1	18 42.1	34 60	42.2	19 02.5	34 58	41.1	19 22.6	33 57	40.1	19 52.2	32 56	38.6	3
4	16 27.8	38 64	46.3	16 50.2	37 63	45.3	17 23.3	36 62	43.8	17 45.0	36 60	42.9	18 06.4	35 59	41.9	18 27.5	35 58	40.9	18 48.3	34 57	39.9	19 18.9	34 55	38.4	4
95	15 49.2	39 64	46.0	16 12.3	38 63	45.0	16 46.3	37 61	43.6	17 08.7	37 60	42.6	17 30.8	37 59	41.6	17 52.5	36 58	40.7	18 14.0	36 57	39.7	18 45.7	35 55	38.2	95
6	15 10.9	40 64	45.7	15 34.5	39 63	44.8	16 09.5	39 61	43.3	16 32.6	38 60	42.4	16 55.3	38 59	41.4	17 17.8	37 58	40.4	17 40.0	37 56	39.4	18 12.8	36 55	38.0	6
7	14 32.7	41 63	45.4	14 57.0	40 62	44.5	15 33.0	40 61	43.1	15 56.6	39 60	42.1	16 20.1	39 58	41.1	16 43.2	38 57	40.2	17 06.1	38 56	39.2	17 39.9	37 54	37.8	7
8	13 54.7	42 63	45.1	14 19.6	41 62	44.2	14 56.6	41 60	42.8	15 20.9	40 59	41.8	15 45.0	40 58	40.9	16 08.8	40 57	39.9	16 32.4	39 56	39.0	17 07.3	38 54	37.5	8
9	13 16.9	43 63	44.8	13 42.5	42 62	43.9	14 20.3	42 60	42.5	14 45.3	41 59	41.6	15 10.1	41 58	40.6	15 34.6	41 57	39.7	15 58.9	40 56	38.7	16 34.8	40 54	37.3	9
100	12 39.4	44 62	44.5	13 05.5	43 61	43.6	13 44.3	43 60	42.2	14 10.0	43 59	41.3	14 35.4	42 58	40.3	15 00.6	42 56	39.4	15 25.5	41 55	38.5	16 02.5	41 54	37.0	100
1	12 02.0	45 62	44.2	12 28.7	44 61	43.3	13 08.5	44 59	41.9	13 34.8	44 58	41.0	14 00.9	43 57	40.1	14 26.7	43 56	39.1	14 52.4	43 55	38.2	15 30.4	42 53	36.8	1
2	11 24.8	46 62	43.9	11 52.2	45 60	43.0	12 32.9	45 59	41.6	12 59.8	45 58	40.7	13 26.6	44 57	39.8	13 53.1	44 56	38.8	14 19.4	44 54	37.9	14 58.5	43 53	36.5	2
3	10 47.9	47 61	43.6	11 15.9	47 60	42.7	11 57.5	46 58	41.3	12 25.1	46 58	40.4	12 52.5	45 56	39.5	13 19.7	45 55	38.6	13 46.7	45 54	37.6	14 26.8	44 52	36.3	3
4	10 11.1	48 61	43.2	10 39.7	48 60	42.3	11 22.4	47 58	41.0	11 50.6	47 57	40.1	12 18.6	47 56	39.2	12 46.5	46 55	38.3	13 14.1	46 54	37.4	13 55.3	45 52	36.0	4
105	9 34.6	49 60	42.9	10 03.9	49 60	42.0	10 47.4	48 58	40.7	11 16.3	48 57	39.8	11 44.9	48 56	38.9	12 13.5	47 55	38.0	12 41.8	47 54	37.1	13 24.0	47 52	35.7	105
6	8 58.4	50 60	42.5	9 28.2	50 59	41.7	10 12.7	49 58	40.3	10 42.2	49 56	39.4	11 11.5	49 55	38.6	11 40.7	48 54	37.7	12 09.7	48 53	36.8	12 52.9	48 52	35.4	6
7	8 22.4	51 60	42.2	8 52.8	51 59	41.3	9 38.2	50 57	40.0	10 08.3	50 56	39.1	10 38.3	50 55	38.2	11 08.1	50 54	37.4	11 37.8	49 53	36.5	12 22.0	49 51	35.1	7
8	7 46.6	52 59	41.8	8 17.6	52 58	41.0	9 04.0	51 57	39.7	9 34.7	51 56	38.8	10 05.3	51 54	37.9	10 35.8	51 54	37.0	11 06.1	50 52	36.2	11 51.3	50 51	34.8	8
9	7 11.1	53 59	41.5	7 42.7	53 58	40.6	8 30.0	52 56	39.3	9 01.4	52 55	38.4	9 32.6	52 54	37.6	10 03.7	52 53	36.7	10 34.7	52 52	35.8	11 20.9	51 50	34.5	9
110	6 35.8	54 58	41.1	7 08.1	54 57	40.2	7 56.2	53 56	39.0	8 28.2	53 55	38.1	9 00.1	53 54	37.2	9 31.9	53 53	36.4	10 03.5	53 52	35.5	10 50.7	52 50	34.2	110
1	6 00.8	55 58	40.7	6 33.7	55 57	39.9	7 22.8	54 56	38.6	7 55.4	54 54	37.7	8 27.9	54 53	36.9	9 00.3	54 52	36.0	9 32.6	54 51	35.2	10 20.8	53 50	33.9	1
2	5 26.1	56 58	40.3	5 59.5	56 56	39.5	6 49.5	55 55	38.2	7 22.8	55 54	37.4	7 55.9	55 53	36.5	8 29.0	55 52	35.7	9 01.9	55 51	34.9	9 51.1	54 49	33.6	2
3				5 25.7	57 56	39.1	6 16.6	56 54	37.9	6 50.5	56 54	37.0	7 24.2	56 52	36.2	7 57.9	56 51	35.4	8 31.5	56 50	34.5	9 21.7	56 49	33.3	3
4							5 43.9	58 54	37.5	6 18.4	57 53	36.6	6 52.8	57 52	35.8	7 27.1	57 51	35.0	8 01.3	57 50	34.2	8 52.5	57 48	32.9	4
115							5 11.6	59 54	37.1	5 46.6	58 52	36.3	6 21.7	58 52	35.5	6 56.6	58 50	34.6	7 31.4	58 49	33.8	8 23.5	58 48	32.6	115
6										5 15.2	59 52	35.9	5 50.8	59 51	35.1	6 26.3	59 50	34.3	7 01.8	59 49	33.5	7 54.9	59 47	32.2	6
7													5 20.2	60 50	34.7	5 56.4	60 50	33.9	6 32.5	60 48	33.1	7 26.5	60 47	31.9	7
8																5 26.7	61 49	33.5	6 03.5	61 48	32.7	6 58.4	61 46	31.5	8
9																			5 34.7	62 47	32.3	6 30.6	62 46	31.2	9
120																			5 06.3	63 47	32.0	6 03.1	63 45	30.8	120
1																						5 35.9	64 45	30.4	1
2																						5 09.0	65 44	30.0	2

Lat. 27°

H.A.	54° 30′ Alt.		Az.	55° 00′ Alt.		Az.	56° 00′ Alt.		Az.	56° 30′ Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
00	62 30.0	1.0 01	00.0	62 00.0	1.0 01	00.0	61 00.0	1.0 01	00.0	60 30.0	1.0 01	00.0
1	62 29.4	1.0 03	01.3	61 59.4	1.0 03	01.2	60 59.5	1.0 03	01.2	60 29.5	1.0 03	01.1
2	62 27.7	1.0 05	02.5	61 57.7	1.0 05	02.4	60 57.8	1.0 04	02.3	60 27.9	1.0 04	02.2
3	62 24.7	99 07	03.8	61 54.9	1.0 07	03.7	60 55.2	1.0 06	03.5	60 25.3	1.0 06	03.4
4	62 20.6	99 09	05.0	61 50.9	99 08	04.9	60 51.4	99 08	04.6	60 21.7	99 08	04.5
05	62 15.4	99 11	06.2	61 45.8	99 10	06.1	60 46.6	99 10	05.7	60 17.0	99 10	05.6
6	62 09.0	98 12	07.5	61 39.6	98 12	07.3	60 40.7	98 12	06.9	60 11.3	98 11	06.7
7	62 01.5	97 14	08.7	61 32.3	97 14	08.4	60 33.8	98 13	08.0	60 04.6	98 13	07.7
8	61 52.9	96 16	09.9	61 23.9	97 16	09.6	60 25.9	97 15	09.1	59 56.9	97 14	08.8
9	61 43.2	96 18	11.1	61 14.5	96 18	10.7	60 17.0	96 16	10.2	59 48.2	96 16	09.9
10	61 32.4	95 20	12.2	61 04.0	95 19	11.9	60 07.1	95 18	11.2	59 38.5	95 18	10.9
1	61 20.6	94 22	13.4	60 52.5	94 21	13.0	59 56.2	94 20	12.3	59 27.9	94 19	12.0
2	61 07.7	92 23	14.5	60 40.0	93 22	14.1	59 44.3	93 21	13.3	59 16.4	93 21	13.0
3	60 53.8	91 25	15.6	60 26.5	91 24	15.2	59 31.5	92 23	14.4	59 03.9	92 22	14.0
4	60 39.0	90 26	16.7	60 12.0	90 26	16.2	59 17.8	91 24	15.4	58 50.5	91 24	15.0
15	60 23.2	88 28	17.7	59 56.6	89 27	17.2	59 03.2	89 26	16.3	58 36.3	90 25	15.9
6	60 06.5	87 29	18.7	59 40.3	87 29	18.2	58 47.7	88 27	17.3	58 21.2	88 26	16.9
7	59 48.9	86 31	19.7	59 23.2	86 30	19.2	58 31.4	87 28	18.2	58 05.3	87 28	17.8
8	59 30.4	84 32	20.7	59 05.1	84 31	20.2	58 14.2	86 30	19.2	57 48.6	86 29	18.7
9	59 11.1	82 34	21.7	58 46.3	83 33	21.1	57 56.3	84 31	20.1	57 31.1	84 30	19.5
20	58 50.9	81 35	22.6	58 26.6	81 34	22.0	57 37.6	82 32	20.9	57 12.8	83 32	20.4
1	58 30.0	79 36	23.5	58 06.2	80 35	22.9	57 18.1	81 34	21.8	56 53.8	81 33	21.2
2	58 08.4	77 37	24.4	57 45.0	78 36	23.7	56 57.9	79 35	22.6	56 34.1	80 34	22.0
3	57 46.0	76 38	25.2	57 23.2	76 38	24.6	56 37.0	77 36	23.4	56 13.7	78 35	22.8
4	57 22.9	74 40	26.0	57 00.6	75 39	25.4	56 15.5	76 37	24.2	55 52.6	76 36	23.6
25	56 59.1	72 41	26.8	56 37.4	73 40	26.1	55 53.3	74 38	24.9	55 30.9	75 37	24.3
6	56 34.7	71 42	27.5	56 13.5	71 41	26.9	55 30.4	72 39	25.6	55 08.6	73 38	25.0
7	56 09.7	69 43	28.3	55 49.0	69 42	27.6	55 07.0	71 40	26.4	54 45.7	71 39	25.7
8	55 44.1	67 44	29.0	55 23.9	68 43	28.3	54 43.0	69 41	27.0	54 22.2	70 40	26.4
9	55 18.0	65 44	29.6	54 58.3	66 44	29.0	54 18.4	67 42	27.7	53 58.1	68 41	27.1
30	54 51.3	63 46	30.3	54 32.2	64 44	29.6	53 53.3	65 43	28.3	53 33.5	66 42	27.7
1	54 24.0	62 46	30.9	54 05.5	62 45	30.2	53 27.7	64 44	28.9	53 08.5	64 43	28.3
2	53 56.3	60 47	31.5	53 38.3	60 46	30.8	53 01.6	62 44	29.5	52 42.9	63 44	28.9
3	53 28.2	58 48	32.1	53 10.7	59 47	31.4	52 35.0	60 45	30.1	52 16.8	61 44	29.4
4	52 59.5	56 48	32.6	52 42.6	57 48	32.0	52 08.0	58 46	30.6	51 50.4	59 45	30.0
35	52 30.5	54 49	33.2	52 14.1	55 48	32.5	51 40.5	57 46	31.1	51 23.4	57 46	30.5
6	52 01.0	53 50	33.7	51 45.1	53 49	33.0	51 12.7	55 47	31.6	50 56.1	56 46	31.0
7	51 31.2	51 50	34.2	51 15.8	52 50	33.5	50 44.4	53 48	32.1	50 28.4	54 47	31.5
8	51 01.0	49 51	34.6	50 46.2	50 50	33.9	50 15.8	51 48	32.6	50 00.3	52 47	31.9
9	50 30.4	47 52	35.1	50 16.2	48 50	34.4	49 46.9	50 49	33.0	49 31.9	50 48	32.4
40	49 59.5	45 52	35.5	49 45.8	46 51	34.8	49 17.6	48 49	33.4	49 03.1	49 48	32.8
1	49 28.4	44 52	35.9	49 15.1	44 52	35.2	48 47.9	46 50	33.8	48 34.0	47 49	33.2
2	48 56.9	42 53	36.3	48 44.2	43 52	35.6	48 18.0	44 50	34.2	48 04.6	45 50	33.6
3	48 25.1	40 53	36.6	48 12.9	41 52	35.9	47 47.8	43 51	34.6	47 34.9	43 50	33.9
4	47 53.1	39 54	37.0	47 41.4	39 53	36.3	47 17.3	41 51	34.9	47 04.9	42 50	34.3
45	47 20.8	37 54	37.3	47 09.6	38 53	36.6	46 46.6	39 52	35.3	46 34.7	40 51	34.6
6	46 48.3	35 55	37.6	46 37.6	36 54	36.9	46 15.6	37 52	35.6	46 04.2	38 51	34.9
7	46 15.5	33 55	37.9	46 05.4	34 54	37.2	45 44.4	36 52	35.9	45 33.5	37 52	35.2
8	45 42.6	32 55	38.2	45 33.0	33 54	37.5	45 13.0	34 53	36.2	45 02.6	35 52	35.5
9	45 09.5	30 56	38.4	45 00.3	31 55	37.8	44 41.3	32 53	36.4	44 31.5	33 52	35.8
50	44 36.2	28 56	38.7	44 27.5	29 55	38.0	44 09.5	31 53	36.7	44 00.1	32 52	36.0
1	44 02.7	27 56	38.9	43 54.5	28 55	38.2	43 37.5	29 54	36.9	43 28.6	30 53	36.2
2	43 29.0	25 56	39.1	43 21.4	26 56	38.4	43 05.3	28 54	37.1	42 56.9	28 53	36.5
3	42 55.2	24 56	39.3	42 48.0	24 56	38.6	42 33.0	26 54	37.3	42 25.1	27 53	36.7
4	42 21.3	22 57	39.5	42 14.6	23 56	38.8	42 00.5	24 54	37.5	41 53.1	25 54	36.9
55	41 47.3	20 57	39.6	41 41.0	21 56	39.0	41 27.9	23 54	37.7	41 21.0	23 54	37.0
6	41 13.1	19 57	39.8	41 07.3	20 56	39.1	40 55.1	21 55	37.8	40 48.7	22 54	37.2
7	40 38.8	17 57	39.9	40 33.5	18 56	39.3	40 22.3	20 55	38.0	40 16.3	20 54	37.4
8	40 04.5	16 58	40.1	39 59.6	16 57	39.4	39 49.3	18 55	38.1	39 43.8	19 54	37.5
9	39 30.0	14 58	40.2	39 25.7	15 57	39.5	39 16.3	16 55	38.3	39 11.3	17 54	37.6
60	38 55.5	13 58	40.3	38 51.6	13 57	39.6	38 43.1	15 55	38.4	38 38.6	15 55	37.7
1	38 20.9	11 58	40.4	38 17.5	12 57	39.7	38 09.9	13 56	38.5	38 05.8	14 55	37.8
2	37 46.3	10 58	40.4	37 43.3	10 57	39.8	37 36.6	12 56	38.6	37 33.0	12 55	37.9
3	37 11.6	08 58	40.5	37 09.0	09 57	39.9	37 03.3	10 56	38.6	37 00.1	11 55	38.0
4	36 36.8	07 58	40.6	36 34.7	07 57	39.9	36 29.9	09 56	38.7	36 27.2	09 55	38.1
65	36 02.1	05 58	40.6	36 00.4	06 57	40.0	35 56.4	07 56	38.8	35 54.2	08 55	38.2
6	35 27.2	04 58	40.6	35 26.0	04 57	40.0	35 22.9	06 56	38.8	35 21.1	06 55	38.2
7	34 52.4	02 58	40.7	34 51.6	03 57	40.0	34 49.4	04 56	38.8	34 48.1	05 55	38.2
8	34 17.6	01 58	40.7	34 17.2	02 57	40.1	34 15.9	03 56	38.9	34 15.0	03 55	38.3
9	33 42.7	00 58	40.7	33 42.8	00 57	40.1	33 42.4	01 56	38.9	33 41.9	02 55	38.3
70	33 07.9	02 58	40.7	33 08.4	01 57	40.1	33 08.8	00 56	38.9	33 08.8	00 55	38.3
1	32 33.1	03 58	40.6	32 34.0	03 57	40.1	32 35.3	02 56	38.9	32 35.7	01 55	38.3
2	31 58.3	05 58	40.6	31 59.6	04 57	40.0	32 01.7	03 56	38.9	32 02.5	02 55	38.3
3	31 23.5	06 58	40.6	31 25.2	06 57	40.0	31 28.2	04 56	38.8	31 29.4	04 55	38.2
4	30 48.7	07 58	40.5	30 50.8	07 57	40.0	30 54.7	06 56	38.8	30 56.4	05 55	38.2
75	30 14.0	09 58	40.5	30 16.5	08 57	39.9	30 21.2	07 56	38.8	30 23.3	07 55	38.2
6	29 39.3	10 58	40.4	29 42.3	10 57	39.8	29 47.8	09 56	38.7	29 50.3	08 55	38.1
7	29 04.7	11 58	40.3	29 08.0	11 57	39.8	29 14.3	10 56	38.6	29 17.3	10 55	38.1
8	28 30.1	13 58	40.3	28 33.8	12 57	39.7	28 41.0	11 56	38.6	28 44.4	11 55	38.0
9	27 55.5	14 57	40.2	27 59.7	14 57	39.6	28 07.7	13 55	38.5	28 11.5	12 55	37.9
80	27 21.1	16 57	40.1	27 25.7	15 57	39.5	27 34.4	14 55	38.4	27 38.6	14 54	37.8
1	26 46.7	17 57	40.0	26 51.7	16 56	39.4	27 01.3	16 55	38.3	27 05.9	15 54	37.8
2	26 12.4	18 57	39.9	26 17.8	18 56	39.3	26 28.2	17 55	38.2	26 33.2	16 54	37.7
3	25 38.2	19 57	39.7	25 43.9	19 56	39.2	25 55.1	18 55	38.1	26 00.5	18 54	37.6
4	25 04.0	21 57	39.6	25 10.2	20 56	39.1	25 22.2	20 55	38.0	25 28.0	19 54	37.4
85	24 30.0	22 56	39.5	24 36.6	22 56	38.9	24 49.3	21 55	37.9	24 55.5	20 54	37.3
6	23 56.1	23 56	39.3	24 03.0	23 56	38.8	24 16.6	22 54	37.7	24 23.2	22 54	37.2
7	23 22.2	25 56	39.2	23 29.6	24 56	38.7	23 43.9	24 54	37.6	23 50.9	23 54	37.1
8	22 48.5	26 56	39.0	22 56.2	26 55	38.5	23 11.3	25 54	37.4	23 18.7	24 53	36.9
9	22 14.9	27 56	38.9	22 23.0	27 55	38.3	22 38.9	26 54	37.3	22 46.7	26 53	36.8
90	21 41.5	28 56	38.7	21 49.9	28 55	38.2	22 06.6	27 54	37.1	22 14.7	27 53	36.6

57° 00′ Alt.		Az.	57° 30′ Alt.		Az.	59° 00′ Alt.		Az.	59° 30′ Alt.		Az.	H.A.
° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
60 00.0	1.0 01	00.0	59 30.0	1.0 01	00.0	58 00.0	1.0 01	00.0	57 30.0	1.0 01	00.0	00
59 59.5	1.0 02	01.1	59 29.5	1.0 02	01.1	57 59.5	1.0 02	01.0	57 29.6	1.0 02	00.9	1
59 58.0	1.0 04	02.2	59 28.0	1.0 04	02.1	57 58.2	1.0 04	01.9	57 28.2	1.0 04	01.9	2
59 55.4	1.0 06	03.3	59 25.6	1.0 06	03.2	57 55.9	1.0 05	02.9	57 26.0	1.0 05	02.8	3
59 51.9	99 08	04.3	59 22.1	99 07	04.2	57 52.8	99 07	03.9	57 23.0	99 07	03.8	4
59 47.3	99 09	05.4	59 17.7	99 09	05.3	57 48.7	99 08	04.8	57 19.0	99 08	04.7	05
59 41.8	98 11	06.5	59 12.3	98 10	06.3	57 43.8	98 10	05.8	57 14.2	99 10	05.6	6
59 35.3	98 12	07.5	59 06.0	98 12	07.3	57 37.9	98 11	06.7	57 08.5	98 11	06.5	7
59 27.8	97 14	08.6	58 58.7	97 14	08.3	57 31.2	97 13	07.7	57 02.0	97 12	07.5	8
59 19.3	96 16	09.6	58 50.5	96 15	09.3	57 23.7	97 14	08.6	56 54.7	07 14	08.4	9
59 09.9	95 17	10.6	58 41.3	95 17	10.3	57 15.2	96 16	09.5	56 46.5	96 15	09.3	10
58 59.6	94 19	11.6	58 31.3	95 18	11.3	57 06.0	95 17	10.4	56 37.5	95 16	10.1	1
58 48.4	93 20	12.6	58 20.3	94 20	12.3	56 55.9	94 18	11.3	56 27.7	94 18	11.0	2
58 36.2	92 22	13.6	58 08.5	93 21	13.2	56 45.0	93 20	12.2	56 17.1	93 19	11.9	3
58 23.2	91 23	14.6	57 55.9	91 22	14.2	56 33.3	92 21	13.1	56 05.7	92 20	12.7	4
58 09.4	90 24	15.5	57 42.4	90 24	15.1	56 20.8	91 22	13.9	55 53.5	91 22	13.5	15
57 54.7	89 26	16.4	57 28.0	89 25	16.0	56 07.6	90 23	14.8	55 40.6	90 23	14.4	6
57 39.2	87 27	17.3	57 12.9	88 26	16.9	55 53.6	89 24	15.6	55 27.0	89 24	15.2	7
57 22.9	86 28	18.2	56 57.0	86 28	17.7	55 38.9	87 26	16.4	55 12.7	88 25	16.0	8
57 05.8	85 30	19.1	56 40.4	85 29	18.6	55 23.5	86 27	17.2	54 57.6	86 26	16.7	9
56 48.0	83 31	19.9	56 23.0	83 30	19.4	55 07.3	85 28	17.9	54 41.9	85 27	17.5	20
56 29.4	82 32	20.7	56 04.9	82 31	20.2	54 50.5	83 29	18.7	54 25.5	84 28	18.2	1
56 10.2	80 33	21.5	55 46.1	80 32	21.0	54 33.1	82 30	19.4	54 08.5	82 30	18.9	2
55 50.2	78 34	22.3	55 26.6	79 34	21.7	54 15.0	80 31	20.2	53 50.8	81 30	19.6	3
55 29.7	77 35	23.0	55 06.5	77 34	22.5	53 56.2	79 32	20.8	53 32.5	79 31	20.3	4
55 08.4	75 36	23.7	54 45.8	76 36	23.2	53 36.9	77 33	21.5	53 13.7	78 32	21.0	25
54 46.6	74 37	24.5	54 24.5	74 37	23.9	53 17.0	76 34	22.2	52 54.2	76 33	21.6	6
54 24.2	72 38	25.1	54 02.5	72 38	24.5	52 56.5	74 35	22.8	52 34.2	75 34	22.3	7
54 01.2	70 39	25.8	53 40.0	71 38	25.2	52 35.5	73 36	23.5	52 13.7	73 35	22.9	8
53 37.7	69 40	26.4	53 17.0	69 39	25.8	52 14.0	71 37	24.1	51 52.6	71 36	23.5	9
53 13.6	67 41	27.1	52 53.5	67 40	26.4	51 51.9	69 38	24.6	51 31.1	70 37	24.1	30
52 49.0	65 42	27.7	52 29.4	66 41	27.0	51 29.4	68 38	25.2	51 09.0	68 38	24.6	1
52 24.0	63 42	28.2	52 04.9	64 42	27.6	51 06.4	66 39	25.8	50 46.5	67 38	25.2	2
51 58.5	62 43	28.8	51 39.9	62 42	28.2	50 42.9	64 40	26.3	50 23.6	65 39	25.7	3
51 32.5	60 44	29.3	51 14.4	61 43	28.7	50 19.0	63 40	26.8	50 00.2	63 40	26.2	4
51 06.1	58 45	29.8	50 48.6	59 44	29.2	49 54.7	61 41	27.3	49 36.4	61 40	26.7	35
50 39.3	56 45	30.3	50 22.3	57 44	29.7	49 30.0	59 42	27.8	49 12.2	60 41	27.2	6
50 12.1	55 46	30.8	49 55.6	55 45	30.2	49 04.9	57 42	28.2	48 47.6	58 42	27.6	7
49 44.6	53 46	31.3	49 28.6	54 46	30.6	48 39.4	56 43	28.7	48 22.6	56 42	28.1	8
49 16.7	51 47	31.7	49 01.2	52 46	31.0	48 13.6	54 44	29.1	47 57.3	55 43	28.5	9
48 48.4	49 48	32.1	48 33.5	50 47	31.5	47 47.4	52 44	29.5	47 31.6	53 43	28.9	40
48 19.8	48 48	32.5	48 05.4	48 47	31.9	47 20.9	51 45	29.9	47 05.6	51 44	29.3	1
47 50.9	46 49	32.9	47 37.1	47 48	32.2	46 54.1	49 45	30.3	46 39.3	50 44	29.7	2
47 21.8	44 49	33.3	47 08.4	45 48	32.6	46 27.0	47 46	30.7	46 12.7	48 45	30.0	3
46 52.3	42 50	33.6	46 39.5	43 49	32.9	45 59.6	45 46	31.0	45 45.8	46 45	30.4	4
46 22.6	41 50	33.9	46 10.3	41 49	33.2	45 31.9	44 46	31.3	45 18.7	44 46	30.7	45
45 52.6	39 50	34.2	45 40.8	40 50	33.6	45 04.0	42 47	31.6	44 51.3	43 46	31.0	6
45 22.4	37 51	34.5	45 11.1	38 50	33.9	44 35.8	40 47	31.9	44 23.6	41 46	31.3	7
44 52.0	36 51	34.8	44 41.2	36 50	34.2	44 07.4	39 48	32.2	43 55.7	39 47	31.6	8
44 21.4	34 51	35.1	44 11.1	35 51	34.4	43 38.8	37 48	32.5	43 27.6	38 47	31.9	9
43 50.5	32 52	35.3	43 40.7	33 51	34.7	43 10.0	35 48	32.7	42 59.3	36 48	32.1	50
43 19.5	31 52	35.6	43 10.2	31 51	34.9	42 41.0	34 49	33.0	42 30.8	34 48	32.3	1
42 48.3	29 52	35.8	42 39.5	30 51	35.2	42 11.8	32 49	33.2	42 02.1	33 48	32.6	2
42 17.0	27 52	36.0	42 08.7	28 52	35.4	41 42.4	30 49	33.4	41 33.2	31 48	32.8	3
41 45.5	26 53	36.2	41 37.7	26 52	35.6	41 12.9	29 50	33.6	41 04.2	29 49	33.0	4
41 13.8	24 53	36.4	41 06.5	25 52	35.7	40 43.2	27 50	33.8	40 35.0	28 49	33.2	55
40 42.1	23 53	36.6	40 35.2	23 52	35.9	40 13.4	25 50	34.0	40 05.7	26 49	33.4	6
40 10.2	21 53	36.7	40 03.8	22 52	36.1	39 43.4	24 50	34.2	39 36.2	24 49	33.5	7
39 38.2	19 54	36.9	39 32.3	20 53	36.2	39 13.3	22 50	34.3	39 06.6	23 50	33.7	8
39 06.0	18 54	37.0	39 00.6	18 53	36.3	38 43.1	20 50	34.5	38 36.9	21 50	33.8	9
38 33.8	16 54	37.1	38 28.9	17 53	36.5	38 12.8	19 51	34.6	38 07.1	19 50	34.0	60
38 01.5	15 54	37.2	37 57.1	15 53	36.6	37 42.4	17 51	34.7	37 37.2	18 50	34.1	1
37 29.2	13 54	37.3	37 25.2	14 53	36.7	37 12.0	16 51	34.8	37 07.2	16 50	34.2	2
36 56.7	12 54	37.4	36 53.2	12 53	36.8	36 41.4	14 51	34.9	36 37.1	15 50	34.3	3
36 24.3	10 54	37.5	36 21.2	11 54	36.8	36 10.8	13 51	35.0	36 06.9	13 50	34.4	4
35 51.7	08 54	37.5	35 49.1	09 54	36.9	35 40.1	11 51	35.1	35 36.7	12 50	34.5	65
35 19.1	07 54	37.6	35 17.0	08 54	37.0	35 09.3	09 51	35.1	35 06.4	10 50	34.5	6
34 46.5	05 54	37.6	34 44.8	06 54	37.0	34 38.5	08 51	35.2	34 36.1	08 51	34.6	7
34 13.9	04 54	37.6	34 12.6	05 54	37.0	34 07.7	06 52	35.2	34 05.7	07 51	34.6	8
33 41.2	02 54	37.7	33 40.4	03 54	37.1	33 36.9	05 52	35.3	33 35.3	05 51	34.7	9
33 08.5	01 54	37.7	33 08.2	02 54	37.1	33 06.0	03 52	35.3	33 04.9	04 51	34.7	70
32 35.9	00 54	37.7	32 35.9	00 54	37.1	32 35.1	02 52	35.3	32 34.5	02 51	34.7	1
32 03.2	02 54	37.7	32 03.7	01 54	37.1	32 04.2	00 52	35.3	32 04.0	01 51	34.7	2
31 30.5	03 54	37.7	31 31.5	03 54	37.1	31 33.3	01 52	35.3	31 33.6	01 51	34.7	3
30 57.9	05 54	37.6	30 59.2	04 54	37.0	31 02.4	03 52	35.3	31 03.1	02 51	34.7	4
30 25.3	06 54	37.6	30 27.0	06 54	37.0	30 31.5	04 52	35.3	30 32.7	04 51	34.7	75
29 52.7	08 54	37.6	29 54.9	07 54	37.0	30 00.7	06 51	35.2	30 02.3	05 51	34.7	6
29 20.1	09 54	37.5	29 22.7	09 54	36.9	29 29.8	07 51	35.2	29 31.9	07 51	34.6	7
28 47.6	10 54	37.4	28 50.6	10 53	36.9	28 59.0	09 51	35.2	29 01.5	08 50	34.6	8
28 15.1	12 54	37.4	28 18.6	11 53	36.8	28 28.2	10 51	35.1	28 31.2	10 50	34.5	9
27 42.7	13 54	37.3	27 46.6	13 53	36.7	27 57.5	11 51	35.0	28 00.9	11 50	34.5	80
27 10.3	15 54	37.2	27 14.6	14 53	36.6	27 26.8	13 51	35.0	27 30.6	12 50	34.4	1
26 38.0	16 54	37.1	26 42.8	16 53	36.6	26 56.2	14 51	34.9	27 00.5	14 50	34.3	2
26 05.8	17 54	37.0	26 11.0	17 53	36.5	26 25.7	16 51	34.8	26 30.3	15 50	34.3	3
25 33.7	19 53	36.9	25 39.2	18 53	36.4	25 55.2	17 51	34.7	26 00.3	17 50	34.2	4
25 01.6	20 53	36.8	25 07.6	20 53	36.2	25 24.8	19 50	34.6	25 30.3	18 50	34.1	85
24 29.6	21 53	36.7	24 36.0	21 52	36.1	24 54.5	20 50	34.5	25 00.4	20 50	34.0	6
23 57.8	23 53	36.5	24 04.6	22 52	36.0	24 24.2	21 50	34.4	24 30.6	21 50	33.8	7
23 26.0	24 53	36.4	23 33.2	24 52	35.9	23 54.1	23 50	34.3	24 00.8	22 49	33.7	8
22 54.4	25 53	36.2	23 01.9	25 52	35.7	23 24.0	24 50	34.1	23 31.2	24 49	33.6	9
22 22.8	27 52	36.1	22 30.8	26 52	35.6	22 54.1	25 50	34.0	23 01.6	25 49	33.5	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	8 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	7 00.0	1.0 00	180.0	6 30.0	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0							00
1	8 29.7	1.0 01	179.4	7 59.7	1.0 01	179.4	6 59.7	1.0 01	179.4	6 29.7	1.0 01	179.4	5 59.7	1.0 01	179.5	5 29.7	1.0 01	179.5							1
2	8 28.9	1.0 02	178.8	7 58.9	1.0 02	178.8	6 58.9	1.0 02	178.9	6 29.0	1.0 02	178.9	5 59.0	1.0 02	178.9	5 29.0	1.0 02	178.9							2
3	8 27.5	1.0 03	178.2	7 57.6	1.0 03	178.3	6 57.6	1.0 03	178.3	6 27.7	1.0 03	178.3	5 57.7	1.0 03	178.4	5 27.7	1.0 03	178.4							3
4	8 25.6	1.0 04	177.7	7 55.7	1.0 04	177.7	6 55.8	1.0 04	177.7	6 25.9	1.0 04	177.8	5 55.9	1.0 04	177.8	5 26.0	1.0 04	177.8							4
05	8 23.2	1.0 05	177.1	7 53.2	1.0 05	177.1	6 53.4	1.0 05	177.2	6 23.5	1.0 05	177.2	5 53.6	1.0 05	177.3	5 23.7	1.0 05	177.3							05
6	8 20.2	1.0 06	176.5	7 50.3	1.0 06	176.5	6 50.5	1.0 06	176.6	6 20.7	1.0 06	176.7	5 50.8	1.0 06	176.7	5 20.9	1.0 05	176.8							6
7	8 16.6	99 07	175.9	7 46.8	99 07	176.0	6 47.1	99 06	176.1	6 17.3	99 06	176.1	5 47.5	99 06	176.2	5 17.7	99 06	176.2							7
8	8 12.5	99 08	175.3	7 42.7	99 08	175.4	6 43.2	99 07	175.5	6 13.4	99 07	175.6	5 43.7	99 07	175.6	5 13.9	99 07	175.7							8
9	8 07.9	99 09	174.7	7 38.2	99 08	174.8	6 38.8	99 08	174.9	6 09.1	99 08	175.0	5 39.4	99 08	175.1	5 09.6	99 08	175.2							9
10	8 02.7	99 10	174.2	7 33.1	99 09	174.2	6 33.8	99 09	174.4	6 04.2	99 09	174.5	5 34.5	99 09	174.5	5 04.9	99 08	174.6							10
1	7 57.0	99 10	173.6	7 27.4	99 10	173.7	6 28.3	99 10	173.8	5 58.8	99 10	173.9	5 29.2	99 10	174.0										1
2	7 50.7	98 11	173.0	7 21.3	98 11	173.1	6 22.3	98 11	173.3	5 52.8	98 11	173.4	5 23.4	98 10	173.5										2
3	7 43.9	98 12	172.4	7 14.6	98 12	172.5	6 15.8	98 12	172.7	5 46.4	98 12	172.8	5 17.0	98 11	172.9										3
4	7 36.6	98 13	171.9	7 07.4	98 13	172.0	6 08.8	98 12	172.2	5 39.5	98 12	172.3	5 10.2	98 12	172.4										4
15	7 28.8	97 14	171.3	6 59.6	97 14	171.4	6 01.3	97 13	171.6	5 32.1	97 13	171.7	5 02.9	97 13	171.9										15
6	7 20.4	97 15	170.7	6 51.4	97 15	170.8	5 53.2	97 14	171.1	5 24.2	97 14	171.2													6
7	7 11.5	96 16	170.1	6 42.6	96 16	170.3	5 44.7	97 15	170.5	5 15.7	97 15	170.7													7
8	7 02.1	96 16	169.6	6 33.3	96 16	169.7	5 35.7	96 16	170.0	5 06.8	96 15	170.1													8
9	6 52.2	96 17	169.0	6 23.5	96 17	169.2	5 26.1	96 17	169.5																9
20	6 41.8	95 18	168.5	6 13.2	95 18	168.6	5 16.1	95 18	168.9																20
1	6 30.8	95 19	167.9	6 02.4	95 19	168.1	5 05.6	95 18	168.4																1
2	6 19.4	94 20	167.4	5 51.1	94 20	167.5																			2
3	6 07.4	94 21	166.8	5 39.3	94 20	167.0																			3
4	5 55.0	93 22	166.3	5 27.0	93 21	166.4																			4
25	5 42.0	93 22	165.7	5 14.3	93 22	165.9																			25
6	5 28.6	92 23	165.2	5 01.0	92 23	165.4																			6
7	5 14.7	91 24	164.6																						7
8	5 00.3	91 25	164.1																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	21 08.1	30 55	38.5	21 17.0	29 55	38.0	21 34.4	29 54	37.0	21 42.9	28 53	36.4	21 51.4	28 52	35.9	21 59.7	28 52	35.4	22 24.2	27 50	33.8	22 32.2	26 49	33.3	91
2	20 34.9	31 55	38.3	20 44.1	31 54	37.8	21 02.3	30 53	36.8	21 11.2	30 52	36.3	21 20.1	29 52	35.8	21 28.8	29 51	35.2	21 54.5	28 49	33.7	22 02.9	28 49	33.2	2
3	20 01.8	32 55	38.1	20 11.4	32 54	37.6	20 30.3	31 53	36.6	20 39.7	31 52	36.1	20 48.9	31 52	35.6	20 58.0	30 51	35.1	21 24.9	29 49	33.5	21 33.7	29 48	33.0	3
4	19 28.9	33 55	37.9	19 38.9	33 54	37.4	19 58.5	33 53	36.4	20 08.2	32 52	35.9	20 17.9	32 52	35.4	20 27.4	32 51	34.9	20 55.5	31 49	33.4	21 04.6	30 48	32.9	4
95	18 56.1	35 54	37.7	19 06.5	34 54	37.2	19 26.9	34 52	36.2	19 37.0	33 52	35.7	19 47.0	33 51	35.2	19 56.9	33 51	34.7	20 26.1	32 49	33.2	20 35.7	32 48	32.7	95
6	18 23.5	36 54	37.5	18 34.2	36 54	37.0	18 55.4	35 52	36.0	19 05.8	35 52	35.5	19 16.2	34 51	35.0	19 26.5	34 50	34.5	19 56.9	33 48	33.0	20 06.9	33 48	32.5	6
7	17 51.1	37 54	37.3	18 02.1	37 53	36.8	18 24.0	36 52	35.8	18 34.9	36 52	35.3	18 45.6	36 51	34.8	18 56.3	35 50	34.3	19 27.9	35 48	32.8	19 38.2	34 48	32.3	7
8	17 18.8	38 54	37.0	17 30.2	38 53	36.6	17 52.8	37 52	35.6	18 04.0	37 51	35.1	18 15.2	37 50	34.6	18 26.2	37 50	34.1	18 58.9	36 48	32.6	19 09.7	36 47	32.1	8
9	16 46.7	39 53	36.8	16 58.4	39 53	36.3	17 21.8	39 52	35.4	17 33.4	38 51	34.9	17 44.9	38 50	34.4	17 56.3	38 50	33.9	18 30.2	37 48	32.4	18 41.3	37 47	32.0	9
100	16 14.7	41 53	36.6	16 26.9	40 52	36.1	16 51.0	40 51	35.1	17 02.9	40 50	34.6	17 14.8	40 50	34.2	17 26.6	39 49	33.7	18 01.6	39 47	32.2	18 13.1	38 47	31.7	100
1	15 43.0	42 53	36.3	15 55.5	42 52	35.8	16 20.3	41 51	34.9	16 32.6	41 50	34.4	16 44.8	41 50	33.9	16 57.0	41 49	33.5	17 33.2	40 47	32.0	17 45.1	40 46	31.5	1
2	15 11.4	43 52	36.1	15 24.3	43 52	35.6	15 49.8	42 50	34.6	16 02.5	42 50	34.2	16 15.1	42 49	33.7	16 27.6	42 49	33.2	17 04.9	41 47	31.8	17 17.2	41 46	31.3	2
3	14 40.0	44 52	35.8	14 53.3	44 51	35.3	15 19.5	44 50	34.4	15 32.5	43 50	33.9	15 45.5	43 49	33.5	15 58.4	43 48	33.0	16 36.8	42 46	31.6	16 49.5	42 46	31.1	3
4	14 08.9	45 52	35.5	14 22.4	45 51	35.1	14 49.4	45 50	34.1	15 02.8	45 49	33.7	15 16.1	44 49	33.2	15 29.4	44 48	32.8	16 08.9	44 46	31.4	16 22.0	43 46	30.9	4
105	13 37.9	46 51	35.3	13 51.8	46 51	34.8	14 19.5	46 50	33.9	14 33.2	46 49	33.4	14 46.9	46 48	32.9	15 00.6	45 48	32.5	15 41.2	45 46	31.1	15 54.6	45 45	30.6	105
6	13 07.2	48 51	35.0	13 21.4	47 50	34.5	13 49.8	47 49	33.6	14 03.9	47 48	33.2	14 18.0	47 48	32.7	14 32.0	47 48	32.2	15 13.7	46 46	30.9	15 27.4	46 45	30.4	6
7	12 36.6	49 50	34.7	12 51.2	49 50	34.2	13 20.3	48 49	33.3	13 34.8	48 48	32.9	13 49.2	48 48	32.4	14 03.5	48 47	32.0	14 46.3	47 45	30.6	15 00.5	47 45	30.2	7
8	12 06.3	50 50	34.4	12 21.3	50 50	33.9	12 51.0	49 48	33.1	13 05.8	49 48	32.6	13 20.6	49 47	32.2	13 35.3	49 47	31.7	14 19.2	48 45	30.4	14 33.7	48 44	29.9	8
9	11 36.2	51 50	34.1	11 51.5	51 49	33.7	12 22.0	51 48	32.8	12 37.1	50 47	32.3	12 52.3	50 47	31.9	13 07.3	50 46	31.4	13 52.3	50 44	30.1	14 07.2	50 44	29.7	9
110	11 06.4	52 49	33.8	11 22.0	52 49	33.4	11 53.2	52 48	32.5	12 08.7	52 47	32.0	12 24.1	51 46	31.6	12 39.6	51 46	31.2	13 25.6	51 44	29.8	13 40.8	51 44	29.4	110
1	10 36.8	53 49	33.5	10 52.8	53 48	33.0	11 24.6	53 47	32.2	11 40.4	53 47	31.7	11 56.2	53 46	31.3	12 12.0	53 46	30.9	12 59.1	52 44	29.6	13 14.7	52 43	29.1	1
2	10 07.4	54 48	33.2	10 23.7	54 48	32.7	10 56.2	54 47	31.9	11 12.4	54 46	31.4	11 28.6	54 46	31.0	11 44.7	54 45	30.6	12 32.8	53 44	29.3	12 48.8	53 43	28.9	2
3	9 38.3	55 48	32.8	9 54.9	55 48	32.4	10 28.1	55 46	31.6	10 44.6	55 46	31.1	11 01.1	55 45	30.7	11 17.6	55 45	30.3	12 06.8	54 43	29.0	12 23.1	54 42	28.6	3
4	9 09.5	57 48	32.5	9 26.4	57 47	32.1	10 00.3	56 46	31.2	10 17.1	56 45	30.8	10 34.0	56 45	30.4	10 50.8	56 44	30.0	11 41.0	56 43	28.7	11 57.6	55 42	28.3	4
115	8 40.9	58 47	32.2	8 58.2	58 47	31.8	9 32.7	57 46	30.9	9 49.9	57 45	30.5	10 07.0	57 44	30.1	10 24.2	57 44	29.7	11 15.4	57 42	28.4	11 32.4	57 42	28.0	115
6	8 12.5	59 47	31.8	8 30.2	59 46	31.4	9 05.3	58 45	30.6	9 22.8	58 44	30.2	9 40.4	58 44	29.8	9 57.8	58 44	29.4	10 50.1	58 42	28.1	11 07.4	58 41	27.7	6
7	7 44.5	60 46	31.5	8 02.4	60 46	31.1	8 38.2	60 45	30.3	8 56.1	60 44	29.9	9 13.9	59 44	29.4	9 31.7	59 43	29.0	10 25.0	59 41	27.8	10 42.7	59 41	27.4	7
8	7 16.7	61 46	31.1	7 35.0	61 45	30.7	8 11.4	61 44	29.9	8 29.6	61 44	29.5	8 47.8	61 43	29.1	9 05.9	60 42	28.7	10 00.2	60 41	27.5	10 18.2	60 40	27.1	8
9	6 49.2	62 45	30.8	7 07.8	62 45	30.4	7 44.9	62 44	29.6	8 03.4	62 43	29.2	8 21.9	62 43	28.8	8 40.4	62 42	28.4	9 35.6	61 40	27.2	9 54.0	61 40	26.8	9
120	6 22.0	63 45	30.4	6 40.9	63 44	30.0	7 18.7	63 43	29.2	7 37.5	63 43	28.8	7 56.3	63 42	28.4	8 15.1	63 42	28.0	9 11.4	62 40	26.9	9 30.0	62 39	26.5	120
1	5 55.1	64 44	30.0	6 14.3	64 44	29.6	6 52.7	64 43	28.9	7 11.9	64 42	28.5	7 31.0	64 42	28.1	7 50.1	64 41	27.7	8 47.3	63 40	26.5	9 06.4	63 39	26.1	1
2	5 28.5	65 44	29.7	5 48.0	65 43	29.3	6 27.0	65 42	28.5	6 46.5	65 42	28.1	7 06.0	65 41	27.7	7 25.4	65 41	27.4	8 23.6	65 39	26.2	8 42.9	64 38	25.8	2
3	5 02.2	66 43	29.3	5 22.1	66 43	28.9	6 01.7	66 42	28.1	6 21.5	66 41	27.8	6 41.2	66 41	27.4	7 01.0	66 40	27.0	8 00.1	66 39	25.9	8 19.8	66 38	25.5	3
4							5 36.6	67 41	27.8	5 56.7	67 41	27.4	6 16.8	67 40	27.0	6 36.9	67 40	26.6	7 37.0	67 38	25.5	7 56.9	67 38	25.1	4
125							5 11.9	68 41	27.4	5 32.3	68 40	27.0	5 52.7	68 40	26.6	6 13.0	68 39	26.3	7 14.1	68 38	25.2	7 34.4	68 37	24.8	125
6										5 08.1	69 40	26.6	5 28.8	69 39	26.3	5 49.5	69 39	25.9	6 51.5	69 37	24.8	7 12.1	69 37	24.4	6
7													5 05.3	70 39	25.9	5 26.3	70 38	25.5	6 29.2	70 37	24.5	6 50.1	70 36	24.1	7
8																5 03.4	71 38	25.2	6 07.2	71 36	24.1	6 28.5	71 36	23.7	8
9																			5 45.6	72 36	23.7	6 07.1	72 35	23.4	9
130																			5 24.2	73 35	23.3	5 46.0	73 34	23.0	130
1																			5 03.2	74 35	23.0	5 25.3	74 34	22.6	1
2																						5 04.9	75 34	22.3	2

Lat. 27°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	57 00.0	1.0 01	00.0	56 30.0	1.0 01	00.0	55 00.0	1.0 01	00.0	54 30.0	1.0 01	00.0
1	56 59.6	1.0 02	00.9	56 29.6	1.0 02	00.9	54 59.6	1.0 02	00.8	54 29.6	1.0 02	00.8
2	56 58.3	1.0 04	01.8	56 28.3	1.0 03	01.8	54 58.5	1.0 03	01.6	54 28.5	1.0 03	01.6
3	56 56.2	1.0 05	02.7	56 26.3	1.0 05	02.7	54 56.6	1.0 04	02.5	54 26.7	1.0 04	02.4
4	56 53.2	99 06	03.7	56 23.4	99 06	03.6	54 53.9	99 06	03.3	54 24.1	99 06	03.2
05	56 49.3	99 08	04.6	56 19.6	99 08	04.4	54 50.5	99 07	04.1	54 20.7	99 07	04.0
6	56 44.6	99 09	05.5	56 15.1	99 09	05.3	54 46.3	99 08	04.9	54 16.7	99 08	04.7
7	56 39.1	98 10	06.4	56 09.7	98 10	06.2	54 41.4	98 10	05.7	54 11.9	98 09	05.5
8	56 32.8	97 12	07.3	56 03.6	98 12	07.1	54 35.7	98 11	06.5	54 06.4	98 10	06.3
9	56 25.6	97 13	08.1	55 56.6	97 13	07.9	54 29.3	97 12	07.3	54 00.2	97 12	07.1
10	56 17.7	96 15	09.0	55 48.9	96 14	08.8	54 22.2	96 13	08.0	53 53.3	96 13	07.8
1	56 08.9	95 16	09.9	55 40.3	95 16	09.6	54 14.4	96 14	08.8	53 45.7	96 14	08.6
2	55 59.4	94 17	10.7	55 31.0	94 17	10.4	54 05.8	95 15	09.6	53 37.3	95 15	09.3
3	55 49.1	93 18	11.5	55 21.0	94 18	11.2	53 56.6	94 17	10.3	53 28.3	94 16	10.1
4	55 38.0	92 20	12.4	55 10.2	93 19	12.0	53 46.6	93 18	11.1	53 18.7	93 17	10.8
15	55 26.1	91 21	13.2	54 58.7	92 20	12.8	53 36.0	92 19	11.8	53 08.4	92 18	11.5
6	55 13.6	90 22	14.0	54 46.5	90 22	13.6	53 24.7	91 20	12.5	52 57.4	91 19	12.2
7	55 00.3	89 23	14.8	54 33.5	89 23	14.4	53 12.8	90 21	13.3	52 45.8	90 20	12.9
8	54 46.3	88 24	15.5	54 19.9	88 24	15.1	53 00.2	89 22	14.0	52 33.5	89 21	13.6
9	54 31.7	87 26	16.3	54 05.7	87 25	15.9	52 47.0	88 23	14.6	52 20.7	88 22	14.2
20	54 16.4	85 27	17.0	53 50.7	86 26	16.6	52 33.2	87 24	15.3	52 07.2	87 23	14.9
1	54 00.4	84 28	17.8	53 35.1	84 27	17.3	52 18.8	85 25	16.0	51 53.2	86 24	15.6
2	53 43.8	83 29	18.5	53 18.9	83 28	18.0	52 03.8	84 26	16.6	51 38.6	84 25	16.2
3	53 26.5	81 30	19.1	53 02.1	82 29	18.7	51 48.2	83 27	17.3	51 23.4	83 26	16.8
4	53 08.7	80 31	19.8	52 44.7	80 30	19.3	51 32.1	81 28	17.9	51 07.7	82 27	17.4
25	52 50.3	78 32	20.5	52 26.8	79 31	20.0	51 15.4	80 29	18.5	50 51.4	80 28	18.0
6	52 31.3	77 32	21.1	52 08.2	77 32	20.6	50 58.2	78 30	19.1	50 34.6	79 29	18.6
7	52 11.8	75 34	21.7	51 49.2	76 33	21.2	50 40.5	77 30	19.7	50 17.3	77 30	19.2
8	51 51.7	74 34	22.3	51 29.6	74 34	21.8	50 22.3	75 31	20.2	49 59.5	76 30	19.7
9	51 31.1	72 35	22.9	51 09.5	72 34	22.4	50 03.5	74 32	20.8	49 41.3	74 31	20.2
30	51 10.1	70 36	23.5	50 48.9	71 35	22.9	49 44.3	72 33	21.3	49 22.5	73 32	20.8
1	50 48.5	69 37	24.0	50 27.8	69 36	23.5	49 24.7	71 34	21.8	49 03.4	71 33	21.3
2	50 26.5	67 38	24.6	50 06.3	68 37	24.0	49 04.6	69 34	22.3	48 43.7	70 33	21.8
3	50 04.0	65 38	25.1	49 44.3	66 37	24.5	48 44.1	68 35	22.8	48 23.7	68 34	22.3
4	49 41.1	64 39	25.6	49 21.9	64 38	25.0	48 23.2	66 36	23.3	48 03.3	67 35	22.7
35	49 17.8	62 40	26.1	48 59.1	63 39	25.5	48 01.8	65 36	23.7	47 42.4	65 35	23.2
6	48 54.1	60 40	26.6	48 35.9	61 39	26.0	47 40.1	63 37	24.2	47 21.2	63 36	23.6
7	48 30.0	59 41	27.0	48 12.3	59 40	26.4	47 18.0	61 37	24.6	46 59.6	62 37	24.0
8	48 05.6	57 41	27.4	47 48.4	58 40	26.8	46 55.6	60 38	25.0	46 37.6	60 37	24.5
9	47 40.8	55 42	27.9	47 24.1	56 41	27.2	46 32.8	58 38	25.4	46 15.3	59 38	24.9
40	47 15.6	54 42	28.3	46 59.4	54 42	27.6	46 09.7	56 39	25.8	45 52.7	57 38	25.2
1	46 50.1	52 43	28.7	46 34.4	53 42	28.0	45 46.2	55 40	26.2	45 29.7	55 39	25.6
2	46 24.3	50 44	29.0	46 09.2	51 43	28.4	45 22.4	53 40	26.6	45 06.5	54 39	26.0
3	45 58.3	49 44	29.4	45 43.6	49 43	28.8	44 58.4	51 40	26.9	44 42.9	52 40	26.3
4	45 31.9	47 44	29.7	45 17.7	48 44	29.1	44 34.1	50 41	27.2	44 19.1	50 40	26.6
45	45 05.2	45 45	30.1	44 51.6	46 44	29.4	44 09.5	48 42	27.6	43 55.0	48 41	27.0
6	44 38.4	43 45	30.4	44 25.2	44 44	29.7	43 44.6	46 42	27.9	43 30.6	47 41	27.3
7	44 11.2	42 46	30.7	43 58.6	42 45	30.0	43 19.5	44 42	28.2	43 06.0	45 41	27.5
8	43 43.8	40 46	30.9	43 31.7	41 45	30.3	42 54.1	43 42	28.4	42 41.2	43 42	27.8
9	43 16.2	38 46	31.2	43 04.6	39 46	30.6	42 28.6	41 43	28.7	42 16.1	42 42	28.1
50	42 48.4	37 47	31.5	42 37.3	37 46	30.8	42 02.8	39 43	29.0	41 50.9	40 42	28.3
1	42 20.4	35 47	31.7	42 09.8	36 46	31.1	41 36.8	38 44	29.2	41 25.4	38 43	28.6
2	41 52.2	33 47	31.9	41 42.1	34 46	31.3	41 10.6	36 44	29.4	40 59.7	37 43	28.8
3	41 23.8	32 48	32.2	41 14.2	32 47	31.5	40 44.2	34 44	29.7	40 33.8	35 43	29.0
4	40 55.3	30 48	32.4	40 46.2	31 47	31.7	40 17.7	33 44	29.9	40 07.8	33 44	29.2
55	40 26.6	28 48	32.6	40 18.0	29 47	31.9	39 51.0	31 45	30.1	39 41.6	32 44	29.4
6	39 57.8	27 48	32.7	39 49.7	27 48	32.1	39 24.1	29 45	30.2	39 15.2	30 44	29.6
7	39 28.8	25 48	32.9	39 21.2	26 48	32.3	38 57.1	28 45	30.4	38 48.7	28 44	29.8
8	38 59.7	23 49	33.1	38 52.6	24 48	32.4	38 30.0	26 46	30.6	38 22.1	27 45	30.0
9	38 30.5	22 49	33.2	38 23.8	22 48	32.6	38 02.7	24 46	30.7	37 55.3	25 45	30.1
60	38 01.1	20 49	33.3	37 55.0	21 48	32.7	37 35.4	23 46	30.9	37 28.5	23 45	30.3
1	37 31.7	19 49	33.5	37 26.0	19 48	32.8	37 07.9	21 46	31.0	37 01.5	22 45	30.4
2	37 02.2	17 49	33.6	36 57.0	18 48	33.0	36 40.3	19 46	31.1	36 34.4	20 45	30.5
3	36 32.6	15 50	33.7	36 27.9	16 49	33.1	36 12.6	18 46	31.2	36 07.2	18 46	30.6
4	36 02.9	14 50	33.8	35 58.7	14 49	33.2	35 44.9	16 46	31.3	35 39.9	17 46	30.7
65	35 33.1	12 50	33.8	35 29.4	13 49	33.2	35 17.1	15 46	31.4	35 12.6	15 46	30.8
6	35 03.3	11 50	33.9	35 00.1	11 49	33.3	34 49.2	13 47	31.5	34 45.2	14 46	30.9
7	34 33.5	09 50	34.0	34 30.7	10 49	33.4	34 21.2	11 47	31.6	34 17.7	12 46	31.0
8	34 03.6	07 50	34.0	34 01.2	08 49	33.4	33 53.2	10 47	31.6	33 50.2	10 46	31.0
9	33 33.6	06 50	34.1	33 31.8	07 49	33.5	33 25.1	08 47	31.7	33 22.6	09 46	31.1
70	33 03.7	04 50	34.1	33 02.3	05 49	33.5	32 57.0	07 47	31.7	32 55.0	07 46	31.1
1	32 33.7	03 50	34.1	32 32.8	03 49	33.5	32 28.9	05 47	31.8	32 27.3	06 46	31.2
2	32 03.7	01 50	34.1	32 03.2	02 49	33.5	32 00.8	04 47	31.8	31 59.6	04 46	31.2
3	31 33.7	00 50	34.1	31 33.7	00 49	33.5	31 32.6	02 47	31.8	31 32.0	03 46	31.2
4	31 03.7	02 50	34.1	31 04.1	01 49	33.5	31 04.5	00 47	31.8	31 04.3	01 46	31.2
75	30 33.7	03 50	34.1	30 34.6	03 49	33.5	30 36.3	01 47	31.8	30 36.5	01 46	31.2
6	30 03.7	05 50	34.1	30 05.1	04 49	33.5	30 08.1	03 47	31.8	30 08.8	02 46	31.2
7	29 33.8	06 50	34.1	29 35.6	06 49	33.5	29 40.0	04 47	31.8	29 41.2	04 46	31.2
8	29 03.9	08 50	34.0	29 06.1	07 49	33.5	29 11.8	06 47	31.7	29 13.5	05 46	31.2
9	28 34.0	09 50	34.0	28 36.6	09 49	33.4	28 43.7	07 47	31.7	28 45.8	07 46	31.1
80	28 04.1	11 50	33.9	28 07.2	10 49	33.4	28 15.7	09 47	31.7	28 18.2	08 46	31.1
1	27 34.3	12 50	33.9	27 37.8	12 49	33.3	27 47.6	10 47	31.6	27 50.6	10 46	31.1
2	27 04.5	13 50	33.8	27 08.5	13 49	33.2	27 19.6	12 46	31.6	27 23.0	11 46	31.0
3	26 34.9	15 49	33.7	26 39.2	14 49	33.2	26 51.7	13 46	31.5	26 55.5	13 46	30.9
4	26 05.2	16 49	33.6	26 10.0	16 48	33.1	26 23.8	15 46	31.4	26 28.1	14 46	30.9
85	25 35.7	18 49	33.5	25 40.9	17 48	33.0	25 55.9	16 46	31.3	26 00.7	16 46	30.8
6	25 06.2	19 49	33.4	25 11.8	19 48	32.9	25 28.2	18 46	31.2	25 33.4	17 46	30.7
7	24 36.8	21 49	33.3	24 42.9	20 48	32.8	25 00.5	19 46	31.2	25 06.1	19 45	30.6
8	24 07.4	22 49	33.2	24 14.0	22 48	32.7	24 32.9	20 46	31.1	24 38.9	20 45	30.5
9	23 38.2	23 48	33.1	23 45.2	23 48	32.5	24 05.3	22 46	30.9	24 11.8	21 45	30.4
90	23 09.1	25 48	32.9	23 16.5	24 48	32.4	23 37.9	23 46	30.8	23 44.8	23 45	30.3

H.A.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	54 00.0	1.0 01	00.0	48 00.0	1.0 00	00.0	47 30.0	1.0 00	00.0	42 30.0	1.0 00	00.0
1	53 59.6	1.0 02	00.8	47 59.8	1.0 01	00.5	47 29.8	1.0 01	00.5	42 29.8	1.0 01	00.4
2	53 58.6	1.0 03	01.5	47 59.0	1.0 02	01.1	47 29.0	1.0 02	01.0	42 29.3	1.0 01	00.7
3	53 56.8	1.0 04	02.3	47 57.8	1.0 03	01.6	47 27.8	1.0 03	01.6	42 28.5	1.0 02	01.1
4	53 54.2	99 05	03.1	47 56.0	1.0 04	02.1	47 26.1	1.0 04	02.1	42 27.3	1.0 02	01.4
05	53 51.0	99 06	03.8	47 53.8	99 05	02.7	47 24.0	99 04	02.6	42 25.8	99 03	01.8
6	53 47.1	99 08	04.6	47 51.0	99 05	03.2	47 21.3	99 05	03.1	42 23.9	99 04	02.2
7	53 42.4	98 09	05.4	47 47.8	99 06	03.7	47 18.2	99 06	03.6	42 21.7	99 04	02.5
8	53 37.1	98 10	06.1	47 44.1	98 07	04.3	47 14.6	98 07	04.1	42 19.2	99 05	02.9
9	53 31.0	97 11	06.9	47 39.9	98 08	04.8	47 10.5	98 08	04.6	42 16.4	98 05	03.2
10	53 24.3	97 12	07.6	47 35.2	97 09	05.3	47 06.0	97 08	05.1	42 13.2	98 06	03.6
1	53 16.9	96 14	08.3	47 30.0	97 09	05.8	47 01.0	97 09	05.6	42 09.7	97 06	03.9
2	53 08.8	95 14	09.1	47 24.4	96 10	06.3	46 55.5	96 10	06.1	42 05.8	97 07	04.3
3	53 00.1	94 16	09.8	47 18.2	96 11	06.8	46 49.6	96 11	06.6	42 01.7	96 07	04.6
4	52 50.7	93 17	10.5	47 11.6	95 12	07.3	46 43.2	95 11	07.1	41 57.2	96 08	05.0
15	52 40.6	92 18	11.2	47 04.6	94 12	07.8	46 36.4	94 12	07.6	41 52.4	95 09	05.3
6	52 30.0	91 19	11.9	46 57.1	93 13	08.3	46 29.1	93 13	08.1	41 47.2	94 09	05.7
7	52 18.7	90 20	12.5	46 49.1	92 14	08.8	46 21.4	93 14	08.5	41 41.8	94 10	06.0
8	52 06.8	89 21	13.2	46 40.7	92 15	09.3	46 13.2	92 14	09.0	41 36.0	93 10	06.3
9	51 54.2	88 22	13.9	46 31.9	91 16	09.8	46 04.6	91 15	09.5	41 30.0	92 11	06.7
20	51 41.1	87 23	14.5	46 22.6	90 16	10.2	45 55.6	90 16	09.9	41 23.6	91 11	07.0
1	51 27.5	86 24	15.1	46 12.9	89 17	10.7	45 46.2	89 16	10.4	41 17.0	91 12	07.3
2	51 13.2	85 25	15.8	46 02.7	88 18	11.2	45 36.4	88 17	10.8	41 10.0	90 12	07.6
3	50 58.4	83 26	16.4	45 52.2	87 18	11.6	45 26.2	87 18	11.2	41 02.7	89 12	08.0
4	50 43.1	82 26	17.0	45 41.2	85 19	12.0	45 15.6	86 18	11.7	40 55.2	88 13	08.3
25	50 27.3	81 27	17.5	45 29.9	84 20	12.5	45 04.6	85 19	12.1	40 47.4	87 14	08.6
6	50 10.9	79 28	18.1	45 18.1	83 20	12.9	44 53.2	83 20	12.5	40 39.3	86 14	08.9
7	49 54.0	78 29	18.7	45 06.0	82 21	13.3	44 41.4	82 20	12.9	40 30.9	85 14	09.2
8	49 36.7	76 30	19.2	44 53.5	81 22	13.7	44 29.2	81 21	13.3	40 22.2	84 15	09.5
9	49 18.9	75 30	19.7	44 40.6	79 22	14.1	44 16.7	80 21	13.7	40 13.3	82 16	09.8
30	49 00.6	73 31	20.2	44 27.4	78 23	14.5	44 03.9	78 22	14.1	40 04.0	81 16	10.1
1	48 41.9	72 32	20.7	44 13.8	77 23	14.9	43 50.7	77 22	14.5	39 54.6	80 16	10.3
2	48 22.7	70 32	21.2	43 59.8	75 24	15.3	43 37.2	76 23	14.9	39 44.9	79 17	10.6
3	48 03.2	69 33	21.7	43 45.6	74 24	15.7	43 23.3	74 24	15.2	39 34.9	78 17	10.9
4	47 43.2	67 34	22.2	43 31.0	73 25	16.0	43 09.1	73 24	15.6	39 24.7	76 18	11.2
35	47 22.8	66 34	22.6	43 16.0	71 25	16.4	42 54.6	72 25	15.9	39 14.2	75 18	11.4
6	47 02.1	64 35	23.0	43 00.8	70 26	16.7	42 39.8	70 25	16.3	39 03.5	74 18	11.7
7	46 41.0	62 36	23.5	42 45.2	68 26	17.1	42 24.7	69 26	16.6	38 52.6	72 19	11.9
8	46 19.5	61 36	23.9	42 29.4	67 27	17.4	42 09.3	67 26	16.9	38 41.4	71 19	12.2
9	45 57.7	59 37	24.3	42 13.2	65 27	17.7	41 53.6	66 27	17.2	38 30.1	70 19	12.4
40	45 35.5	57 37	24.6	41 56.8	64 28	18.0	41 37.6	64 27	17.5	38 18.5	68 20	12.6
1	45 13.1	56 38	25.0	41 40.1	62 28	18.3	41 21.4	63 28	17.8	38 06.6	67 20	12.9
2	44 50.3	54 38	25.4	41 23.2	61 29	18.6	41 04.9	61 28	18.1	37 54.6	65 20	13.1
3	44 27.3	52 39	25.7	41 05.9	59 29	18.9	40 48.1	60 28	18.4	37 42.4	64 21	13.3
4	44 04.0	51 39	26.0	40 48.5	58 30	19.2	40 31.1	58 29	18.7	37 30.0	63 21	13.5
45	43 40.4	49 40	26.3	40 30.8	56 30	19.5	40 13.9	56 29	18.9	37 17.4	61 21	13.7
6	43 16.5	47 40	26.7	40 12.9	54 30	19.7	39 56.5	55 30	19.2	37 04.6	60 22	13.9
7	42 52.4	46 40	26.9	39 54.7	53 31	20.0	39 38.8	53 30	19.4	36 51.6	58 22	14.1
8	42 28.1	44 41	27.2	39 36.3	51 31	20.2	39 20.9	52 30	19.7	36 38.5	56 22	14.3
9	42 03.5	42 41	27.5	39 17.7	49 31	20.5	39 02.8	50 30	19.9	36 25.2	55 22	14.5
50	41 38.7	41 42	27.7	38 59.0	48 32	20.7	38 44.5	48 31	20.1	36 11.7	53 23	14.7
1	41 13.8	39 42	28.0	38 40.0	46 32	20.9	38 26.0	47 31	20.3	35 58.1	52 23	14.9
2	40 48.6	37 42	28.2	38 20.8	45 32	21.1	38 07.4	45 32	20.5	35 44.3	50 23	15.0
3	40 23.2	36 42	28.4	38 01.5	43 32	21.3	37 48.5	43 32	20.7	35 30.3	49 24	15.2
4	39 57.7	34 43	28.6	37 42.0	41 33	21.5	37 29.5	42 32	20.9	35 16.2	47 24	15.4
55	39 32.0	32 43	28.8	37 22.3	40 33	21.7	37 10.4	40 32	21.1	35 02.0	45 24	15.5
6	39 06.1	31 43	29.0	37 02.5	38 33	21.9	36 51.0	38 32	21.3	34 47.6	44 24	15.7
7	38 40.1	29 44	29.2	36 42.5	36 34	22.0	36 31.6	37 33	21.4	34 33.2	42 24	15.8
8	38 14.0	27 44	29.3	36 22.4	35 34	22.2	36 12.0	35 33	21.6	34 18.6	40 25	15.9
9	37 47.7	26 44	29.5	36 02.2	33 34	22.3	35 52.2	33 33	21.7	34 03.8	39 25	16.1
60	37 21.3	24 44	29.6	35 41.8	31 34	22.5	35 32.3	32 33	21.9	33 49.0	37 25	16.2
1	36 54.9	22 44	29.8	35 21.3	29 34	22.6	35 12.4	30 34	22.0	33 34.0	35 25	16.3
2	36 28.3	21 44	29.9	35 00.7	28 34	22.7	34 52.3	28 34	22.1	33 19.0	34 25	16.4
3	36 01.6	19 45	30.0	34 40.0	26 35	22.8	34 32.1	27 34	22.3	33 03.9	32 26	16.5
4	35 34.8	17 45	30.1	34 19.2	24 35	23.0	34 11.8	25 34	22.4	32 48.6	30 26	16.6
65	35 07.9	16 45	30.2	33 58.3	23 35	23.1	33 51.4	23 34	22.5	32 33.3	29 26	16.7
6	34 41.0	14 45	30.3	33 37.3	21 35	23.2	33 30.9	22 34	22.6	32 17.9	27 26	16.8
7	34 14.0	13 45	30.4	33 16.3	19 35	23.2	33 10.4	20 34	22.7	32 02.4	25 26	16.9
8	33 46.9	11 45	30.4	32 55.1	18 35	23.3	32 49.7	18 34	22.7	31 46.9	24 26	16.9
9	33 19.8	09 45	30.5	32 33.9	16 35	23.4	32 29.0	17 34	22.8	31 31.3	22 26	17.0
70	32 52.7	08 45	30.5	32 12.7	14 36	23.5	32 08.3	15 35	22.9	31 15.6	20 26	17.1
1	32 25.5	06 45	30.6	31 51.4	13 36	23.5	31 47.5	13 35	22.9	30 59.8	18 26	17.1
2	31 58.3	05 45	30.6	31 30.0	11 36	23.6	31 26.6	12 35	23.0	30 44.1	17 26	17.2
3	31 31.1	03 45	30.6	31 08.7	09 36	23.6	31 05.8	10 35	23.0	30 28.2	15 26	17.2
4	31 03.9	01 45	30.6	30 47.2	08 36	23.6	30 44.8	08 35	23.1	30 12.4	13 26	17.3
75	30 36.6	00 45	30.6	30 25.8	06 36	23.7	30 23.9	07 35	23.1	29 56.5	12 27	17.3
6	30 09.4	02 45	30.6	30 04.3	04 36	23.7	30 02.9	05 35	23.1	29 40.5	10 27	17.4
7	29 42.2	03 45	30.6	29 42.8	03 36	23.7	29 41.9	03 35	23.1	29 24.5	08 27	17.4
8	29 15.0	05 45	30.6	29 21.3	01 36	23.7	29 20.9	02 35	23.1	29 08.6	07 27	17.4
9	28 47.8	06 45	30.6	28 59.8	00 36	23.7	28 59.9	00 35	23.1	28 52.5	05 27	17.4
80	28 20.6	08 45	30.5	28 38.3	02 36	23.7	28 38.9	02 35	23.1	28 36.5	03 27	17.4
1	27 53.4	09 45	30.5	28 16.8	04 36	23.7	28 17.9	03 35	23.1	28 20.5	01 27	17.5
2	27 26.3	11 45	30.4	27 55.3	05 36	23.7	27 56.9	05 35	23.1	28 04.5	00 27	17.5
3	26 59.3	12 45	30.4	27 33.9	07 36	23.7	27 35.9	06 35	23.1	27 48.4	02 27	17.5
4	26 32.3	14 45	30.3	27 12.4	09 36	23.6	27 14.9	08 35	23.1	27 32.4	04 27	17.4
85	26 05.3	15 45	20.2	26 51.0	10 36	23.6	26 54.0	10 35	23.0	27 16.4	05 27	17.4
6	25 38.4	17 45	30.2	26 29.7	12 36	23.5	26 33.1	11 35	23.0	27 00.4	07 27	17.4
7	25 11.6	18 44	30.1	26 08.3	13 36	23.5	26 12.2	13 35	22.9	26 44.4	09 27	17.4
8	24 44.9	20 44	30.0	25 47.0	15 36	23.4	25 51.4	14 35	22.9	26 28.4	10 26	17.4
9	24 18.2	21 44	29.9	25 25.8	16 35	23.4	25 30.7	16 35	22.8	26 12.5	12 26	17.3
90	23 51.6	23 44	29.8	25 04.6	18 35	23.3	25 10.0	18 34	22.8	25 56.6	13 26	17.3

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	22 40.1	26 48	32.8	22 47.9	26 48	32.3	23 10.5	25 45	30.7	23 17.9	24 45	30.2	23 25.1	24 44	29.6	24 43.5	20 35	23.2	24 49.3	19 34	22.7	25 40.7	15 26	17.2	91
2	22 11.2	27 48	32.7	22 19.4	27 47	32.1	22 43.3	26 45	30.6	22 51.1	26 45	30.1	22 58.7	25 44	29.5	24 22.4	21 35	23.2	24 28.7	21 34	22.6	25 24.9	17 26	17.2	2
3	21 42.4	29 48	32.5	21 51.0	28 47	32.0	22 16.1	27 45	30.4	22 24.3	27 44	29.9	22 32.4	27 44	29.4	24 01.5	23 35	23.1	24 08.2	22 34	22.5	25 09.1	18 26	17.1	3
4	21 13.7	30 48	32.4	21 22.7	30 47	31.8	21 49.1	29 45	30.3	21 57.7	29 44	29.8	22 06.2	28 43	29.3	23 40.6	24 35	23.0	23 47.7	24 34	22.4	24 53.4	20 26	17.1	4
95	20 45.2	31 47	32.2	20 54.6	31 47	31.7	21 22.2	30 45	30.1	21 31.2	30 44	29.6	21 40.2	30 43	29.1	23 19.7	26 34	22.9	23 27.4	25 34	22.4	24 37.7	22 26	17.0	95
6	20 16.8	33 47	32.0	20 26.6	33 46	31.5	20 55.4	32 44	30.0	21 04.9	31 44	29.5	21 14.2	31 43	29.0	22 59.0	27 34	22.8	23 07.1	27 34	22.3	24 22.1	23 26	17.0	6
7	19 48.5	34 47	31.8	19 58.7	34 46	31.3	20 28.8	33 44	29.8	20 38.6	33 44	29.3	20 48.4	32 43	28.8	22 38.3	29 34	22.7	22 46.9	28 34	22.1	24 06.5	25 26	16.9	7
8	19 20.4	35 47	31.7	19 31.0	35 46	31.2	20 02.2	34 44	29.7	20 12.5	34 43	29.2	20 22.7	34 43	28.7	22 17.8	30 34	22.6	22 26.8	30 33	22.0	23 51.0	26 26	16.8	8
9	18 52.4	37 46	31.5	19 03.4	36 46	31.0	19 35.9	36 44	29.5	19 46.5	35 43	29.0	19 57.1	35 42	28.5	21 57.3	32 34	22.4	22 06.8	31 33	21.9	23 35.6	28 26	16.7	9
100	18 24.6	38 46	31.3	18 35.9	38 45	30.8	19 09.6	37 44	29.3	19 20.7	37 43	28.8	19 31.7	37 42	28.3	21 37.0	33 34	22.3	21 46.8	33 33	21.8	23 20.2	29 26	16.7	100
1	17 56.9	39 46	31.1	18 08.7	39 45	30.6	18 43.5	38 43	29.1	18 55.0	38 42	28.6	19 06.4	38 42	28.1	21 16.7	35 34	22.2	21 27.0	34 33	21.7	23 04.9	31 25	16.6	1
2	17 29.4	41 46	30.8	17 41.6	40 45	30.4	18 17.6	40 43	28.9	18 29.5	39 42	28.4	18 41.3	39 42	28.0	20 56.6	36 33	22.0	21 07.4	36 33	21.5	22 49.7	33 25	16.5	2
3	17 02.1	42 45	30.6	17 14.6	42 45	30.2	17 51.8	41 43	28.7	18 04.1	41 42	28.2	18 16.3	41 42	27.8	20 36.6	37 33	21.9	20 47.8	37 32	21.4	22 34.6	34 25	16.4	3
4	16 34.9	43 45	30.4	16 47.8	43 44	29.9	17 26.2	42 42	28.5	17 38.9	42 42	28.0	17 51.4	42 41	27.6	20 16.7	39 33	21.8	20 28.3	39 32	21.3	22 19.6	36 25	16.3	4
105	16 08.0	44 45	30.2	16 21.3	44 44	29.7	17 00.8	44 42	28.3	17 13.8	43 42	27.8	17 26.8	43 41	27.4	19 57.0	40 33	21.6	20 09.0	40 32	21.1	22 04.6	37 25	16.2	105
6	15 41.2	46 44	29.9	15 54.8	45 44	29.5	16 35.5	45 42	28.1	16 48.9	45 41	27.6	17 02.3	44 40	27.2	19 37.4	42 32	21.5	19 49.8	41 32	21.0	21 49.8	39 25	16.1	6
7	15 14.6	47 44	29.7	15 28.6	47 43	29.3	16 10.4	46 42	27.9	16 24.2	46 41	27.4	16 38.0	46 40	26.9	19 17.9	43 32	21.3	19 30.7	43 32	20.8	21 35.0	40 24	16.0	7
8	14 48.2	48 44	29.5	15 02.6	48 43	29.0	15 45.5	47 41	27.6	15 59.7	47 40	27.2	16 13.9	47 40	26.7	18 58.5	44 32	21.1	19 11.8	44 31	20.7	21 20.4	42 24	15.8	8
9	14 22.0	49 43	29.2	14 36.8	49 43	28.8	15 20.8	49 41	27.4	15 35.4	48 40	27.0	15 49.9	48 40	26.5	18 39.3	46 32	21.0	18 53.0	46 31	20.5	21 05.9	43 24	15.7	9
110	13 56.0	51 43	29.0	14 11.2	50 42	28.5	14 56.3	50 40	27.2	15 11.3	50 40	26.7	15 26.1	50 39	26.3	18 20.3	47 32	20.8	18 34.4	47 31	20.3	20 51.4	44 24	15.6	110
1	13 30.2	52 43	28.7	13 45.8	52 42	28.2	14 32.0	51 40	26.9	14 47.3	51 40	26.5	15 02.6	51 39	26.0	18 01.4	48 31	20.6	18 15.9	48 30	20.1	20 37.1	46 24	15.5	1
2	13 04.7	53 42	28.4	13 20.6	53 42	28.0	14 07.9	52 40	26.7	14 23.6	52 39	26.2	14 39.2	52 38	25.8	17 42.7	50 31	20.4	17 57.6	50 30	20.0	20 22.9	47 23	15.3	2
3	12 39.4	54 42	28.1	12 55.6	54 41	27.7	13 44.0	54 40	26.4	14 00.1	53 39	26.0	14 16.1	53 38	25.5	17 24.1	51 31	20.2	17 39.4	51 30	19.8	20 08.9	49 23	15.2	3
4	12 14.3	55 42	27.9	12 30.8	55 41	27.4	13 20.3	55 39	26.2	13 36.8	55 38	25.7	13 53.1	54 38	25.3	17 05.7	52 30	20.0	17 21.4	52 30	19.6	19 54.9	50 23	15.1	4
115	11 49.4	57 41	27.6	12 06.3	56 40	27.2	12 56.9	56 39	25.9	13 13.7	56 38	25.5	13 30.4	56 38	25.0	16 47.5	54 30	19.8	17 03.6	54 30	19.4	19 41.1	51 23	14.9	115
6	11 24.8	58 41	27.3	11 42.0	58 40	26.9	12 33.7	57 38	25.6	12 50.8	57 38	25.2	13 07.9	57 37	24.8	16 29.4	55 30	19.6	16 45.9	55 29	19.2	19 27.4	53 22	14.8	6
7	11 00.4	59 40	27.0	11 18.0	59 40	26.6	12 10.7	58 38	25.3	12 28.1	58 37	24.9	12 45.6	58 37	24.5	16 11.6	56 30	19.4	16 28.4	56 29	19.0	19 13.9	54 22	14.6	7
8	10 36.2	60 40	26.7	10 54.2	60 39	26.3	11 47.9	60 38	25.1	12 05.7	59 37	24.6	12 23.5	59 36	24.2	15 53.9	58 29	19.2	16 11.1	57 28	18.8	19 00.5	55 22	14.5	8
9	10 12.3	61 39	26.4	10 30.7	61 39	26.0	11 25.4	61 37	24.8	11 43.6	61 37	24.4	12 01.7	60 36	24.0	15 36.4	59 29	19.0	15 54.0	59 28	18.6	18 47.2	57 22	14.3	9
120	9 48.7	62 39	26.1	10 07.4	62 38	25.7	11 03.1	62 37	24.5	11 21.6	62 36	24.1	11 40.1	62 36	23.7	15 19.1	60 28	18.8	15 37.1	60 28	18.4	18 34.1	58 22	14.1	120
1	9 25.4	63 38	25.8	9 44.3	63 38	25.4	10 41.1	63 36	24.2	11 00.0	63 36	23.8	11 18.8	63 35	23.4	15 02.0	61 28	18.5	15 20.3	61 28	18.1	18 21.1	59 21	14.0	1
2	9 02.3	64 38	25.4	9 21.6	64 38	25.0	10 19.3	64 36	23.9	10 38.5	64 35	23.5	10 57.7	64 35	23.1	14 45.1	62 28	18.3	15 03.8	62 27	17.9	18 08.3	61 21	13.8	2
3	8 39.5	65 38	25.1	8 59.1	65 37	24.7	9 57.8	65 35	23.6	10 17.4	65 35	23.2	10 36.9	65 34	22.8	14 28.4	64 28	18.1	14 47.5	63 27	17.7	17 55.6	62 21	13.6	3
4	8 16.9	67 37	24.8	8 36.9	66 37	24.4	9 36.6	66 35	23.3	9 56.4	66 34	22.9	10 16.3	66 34	22.5	14 11.9	65 27	17.8	14 31.3	65 26	17.5	17 43.1	63 21	13.4	4
125	7 54.7	68 37	24.4	8 14.9	68 36	24.1	9 15.6	67 34	22.9	9 35.8	67 34	22.6	9 56.0	67 34	22.2	13 55.6	66 27	17.6	14 15.4	66 26	17.2	17 30.7	64 20	13.3	125
6	7 32.7	69 36	24.1	7 53.3	69 36	23.7	8 54.9	68 34	22.6	9 15.4	68 34	22.2	9 35.9	68 33	21.9	13 39.6	67 26	17.4	13 59.7	67 26	17.0	17 18.5	66 20	13.1	6
7	7 11.0	70 36	23.7	7 31.9	70 35	23.4	8 34.5	69 34	22.3	8 55.3	69 33	21.9	9 16.1	69 32	21.6	13 23.7	68 26	17.1	13 44.2	68 26	16.7	17 06.5	67 20	12.9	7
8	6 49.7	71 35	23.4	7 10.9	71 35	23.0	8 14.4	70 33	22.0	8 35.5	70 32	21.6	8 56.6	70 32	21.2	13 08.1	69 26	16.9	13 28.9	69 25	16.5	16 54.7	68 20	12.7	8
9	6 28.6	72 35	23.0	6 50.1	72 34	22.7	7 54.6	72 33	21.6	8 16.0	71 32	21.3	8 37.4	71 32	20.9	12 52.7	70 25	16.6	13 13.8	70 25	16.2	16 43.0	69 19	12.5	9
130	6 07.9	73 34	22.7	6 29.7	73 34	22.3	7 35.0	73 32	21.3	7 56.8	72 32	20.9	8 18.5	72 31	20.6	12 37.6	71 25	16.3	12 59.0	71 24	16.0	16 31.5	70 19	12.3	130
1	5 47.4	74 34	22.3	6 09.5	74 33	21.9	7 15.8	74 32	20.9	7 37.8	73 31	20.6	7 59.8	73 30	20.2	12 22.7	73 24	16.1	12 44.4	72 24	15.7	16 20.1	71 18	12.1	1
2	5 27.3	75 33	21.9	5 49.7	75 32	21.6	6 56.8	75 31	20.6	7 19.2	74 31	20.2	7 41.5	74 30	19.9	12 08.0	74 24	15.8	12 30.0	73 24	15.5	16 09.0	72 18	11.9	2
3	5 07.5	76 33	21.5	5 30.2	76 32	21.2	6 38.2	75 30	20.2	7 00.8	75 30	19.9	7 23.4	75 30	19.6	11 53.5	75 24	15.5	12 15.9	75 23	15.2	15 58.0	74 18	11.7	3
4				5 11.0	77 32	20.8	6 19.9	76 30	19.9	6 42.8	76 30	19.5	7 05.7	76 29	19.2	11 39.3	76 23	15.3	12 02.0	76 23	14.9	15 47.3	75 18	11.5	4
135							6 01.9	77 30	19.5	6 25.1	77 29	19.2	6 48.3	77 29	18.9	11 25.4	77 23	15.0	11 48.4	77 22	14.7	15 36.7	76 17	11.3	135
6							5 44.2	78 29	19.1	6 07.7	78 28	18.8	6 31.1	78 28	18.5	11 11.7	78 22	14.7	11 35.0	78 22	14.4	15 26.3	77 17	11.1	6
7							5 26.8	79 28	18.8	5 50.6	79 28	18.5	6 14.3	79 28	18.1	10 58.3	79 22	14.4	11 21.8	78 22	14.1	15 16.1	78 17	10.9	7
8							5 09.8	80 28	18.4	5 33.8	80 27	18.1	5 57.8	80 27	17.8	10 45.1	79 22	14.1	11 08.9	79 21	13.8	15 06.1	79 16	10.7	8
9										5 17.4	81 27	17.7	5 41.7	81 26	17.4	10 32.2	80 21	13.8	10 56.3	80 21	13.5	14 56.3	80 16	10.5	9
140										5 01.3	82 26	17.3	5 25.8	82 26	17.0	10 19.5	81 21	13.5	10 43.9	81 20	13.2	14 46.7	81 16	10.2	140
1													5 10.3	83 25	16.7	10 07.1	82 20	13.2	10 31.8	82 20	13.0	14 37.3	81 15	10.0	1
2																9 55.0	83 20	12.9	10 19.9	83 19	12.7	14 28.1	82 15	09.8	2
3																9 43.2	84 19	12.6	10 08.3	84 19	12.4	14 19.1	83 14	09.6	3
4																9 31.6	85 19	12.3	9 57.0	85 18	12.1	14 10.4	84 14	09.3	4
145																9 20.3	86 18	12.0	9 46.0	86 18	11.8	14 01.8	85 14	09.1	145
6																9 09.3	86 18	11.7	9 35.2	86 17	11.5	13 53.5	86 14	08.9	6
7																8 58.6	87 17	11.4	9 24.8	87 17	11.1	13 45.3	87 13	08.6	7
8																8 48.2	88 17	11.1	9 14.6	88 16	10.8	13 37.4	87 13	08.4	8
9																8 38.1	89 16	10.8	9 04.7	89 16	10.5	13 29.8	88 12	08.1	9
150																8 28.3	89 16	10.4	8 55.0	89 16	10.2	13 22.3	89 12	07.9	150
1																8 18.7	90 15	10.1	8 45.7	90 15	09.9	13 15.1	90 12	07.6	1
2																8 09.5	91 15	09.8	8 36.7	91 15	09.6	13 08.1	90 11	07.4	2
3																8 00.5	91 14	09.5	8 27.9	91 14	09.3	13 01.3	91 11	07.2	3
4																7 51.9	92 14	09.1	8 19.5	92 14	08.9	12 54.8	92 10	06.9	4
155																7 43.6	92 13	08.8	8 11.3	92 13	08.6	12 48.5	92 10	06.7	155
6																7 35.6	93 13	08.5	8 03.5	93 12	08.3	12 42.4	93 10	06.4	6
7																7 27.9	94 12	08.1	7 56.0	94 12	07.9	12 36.5	93 09	06.1	7
8																7 20.5	94 12	07.8	7 48.7	94 12	07.6	12 30.9	94 09	05.9	8
9																7 13.4	95 11	07.4	7 41.8	95 11	07.3	12 25.6	95 08	05.6	9
160																7 06.6	95 11	07.1	7 35.2	95 10	06.9	12 20.5	95 08	05.4	160
1																7 00.2	96 10	06.8	7 28.9	96 10	06.6	12 15.6	95 08	05.1	1
2																6 54.1	96 10	06.4	7 22.9	96 10	06.3	12 10.9	96 07	04.8	2
3																6 48.3	96 09	06.1	7 17.2	96 09	05.9	12 06.5	96 07	04.6	3
4																6 42.8	97 09	05.7	7 11.9	97 08	05.6	12 02.4	97 06	04.3	4
165																6 37.6	97 08	05.4	7 06.8	97 08	05.2	11 58.5	97 06	04.1	165
6																6 32.8	98 08	05.0	7 02.1	98 07	04.9	11 54.8	98 06	03.8	6
7																6 28.3	98 07	04.7	6 57.7	98 07	04.6	11 51.4	98 05	03.5	7
8																6 24.1	98 06	04.3	6 53.6	98 06	04.2	11 48.3	98 05	03.3	8
9																6 20.3	99 06	03.9	6 49.8	99 06	03.9	11 45.4	98 04	03.0	9
170																6 16.8	99 05	03.6	6 46.4	99 05	03.5	11 42.7	99 04	02.7	170
1																6 13.6	99 05	03.2	6 43.3	99 05	03.2	11 40.3	99 04	02.4	1
2																6 10.7	99 04	02.9	6 40.5	99 04	02.8	11 38.1	99 03	02.2	2
3																6 08.2	99 04	02.5	6 38.0	99 04	02.5	11 36.2	99 03	01.9	3
4																6 06.0	1.0 03	02.2	6 35.9	1.0 03	02.1	11 34.6	1.0 02	01.6	4
175																6 04.2	1.0 02	01.8	6 34.1	1.0 02	01.8	11 33.2	1.0 02	01.4	175
6																6 02.7	1.0 02	01.4	6 32.6	1.0 02	01.4	11 32.0	1.0 02	01.1	6
7																6 01.5	1.0 01	01.1	6 31.5	1.0 01	01.1	11 31.1	1.0 01	00.8	7
8																6 00.7	1.0 01	00.7	6 30.7	1.0 01	00.7	11 30.5	1.0 01	00.5	8
9																6 00.2	1.0 00	00.4	6 30.2	1.0 00	00.4	11 30.1	1.0 00	00.3	9
180																6 00.0	1.0 00	00.0	6 30.0	1.0 00	00.0	11 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 27°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	67	180	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	77	00	73	00	00
4	67	170	71	168	75	165	78	161	82	152	85	129	86	73	84	34	80	20	77	13	73	10	4
8	66	160	70	157	73	152	77	144	80	132	82	111	83	80	81	52	79	35	75	25	72	19	8
12	64	151	68	147	71	141	74	132	77	120	79	103	79	82	78	62	76	46	74	34	70	27	12
16	62	144	66	138	69	132	72	123	74	112	75	98	76	82	75	66	74	53	71	42	69	33	16
20	60	137	63	131	66	125	68	117	70	107	72	95	72	82	72	69	71	57	69	47	67	38	20
24	58	131	60	125	63	119	65	111	67	103	68	93	69	82	69	71	68	60	66	51	64	42	24
28	55	126	57	120	60	114	62	107	63	99	65	91	65	81	65	72	65	62	63	54	62	46	28
32	52	121	54	116	56	110	58	104	60	97	61	89	62	80	62	72	61	64	61	56	59	48	32
36	49	117	51	112	53	107	55	101	56	94	57	87	58	80	58	72	58	65	58	57	56	50	36
40	45	114	48	109	50	104	51	98	53	92	54	86	55	79	55	72	55	65	55	58	54	51	40
44	42	111	44	106	46	101	48	96	49	90	50	84	51	78	52	72	52	65	52	59	51	52	44
48	39	108	41	104	43	99	44	94	46	88	47	83	48	77	48	71	49	65	48	59	48	53	48
52	35	105	37	101	39	97	41	92	42	87	43	82	44	76	45	71	45	65	45	59	45	54	52
56	32	103	34	99	36	94	37	90	39	85	40	80	41	75	42	70	42	65	42	59	42	54	56
60	28	101	30	97	32	92	34	88	35	84	36	79	37	74	38	69	39	64	39	59	39	54	60
64	25	99	27	95	28	91	30	86	31	82	33	78	34	73	35	68	36	63	36	59	37	54	64
68	21	97	23	93	25	89	26	85	28	81	29	76	31	72	32	67	32	63	33	58	34	53	68
72	18	95	20	91	21	87	23	83	24	79	26	75	27	71	28	66	29	62	30	57	31	53	72
76	14	93	16	89	18	85	19	81	21	78	22	74	24	69	25	65	26	61	27	57	28	52	76
80	11	91	12	87	14	84	16	80	17	76	19	72	20	68	22	64	23	60	24	56	25	52	80
84	07	89	09	86	11	82	12	78	14	74	16	71	17	67	19	63	20	59	21	55	22	51	84
88	04	87	05	84	07	80	09	77	11	73	12	69	14	65	15	62	17	58	18	54	20	50	88
92	00	86	02	82	04	78	05	75	07	71	09	68	11	64	12	60	14	56	16	53	17	49	92
96	04	84	02	80	00	77	02	73	04	70	06	66	08	62	09	59	11	55	13	51	14	48	96
100	07	82	05	78	03	75	01	71	01	68	02	64	04	61	06	57	08	54	10	50	12	46	100
104	11	80	09	76	07	73	05	69	03	66	01	62	01	59	03	56	05	52	07	49	09	45	104
108	14	78	12	74	10	71	08	67	06	64	04	61	02	57	00	54	03	50	05	47	07	44	108
112	18	76	16	72	13	69	11	65	09	62	07	59	05	55	02	52	00	49	02	45	04	42	112
116	21	74	19	70	17	67	14	63	12	60	10	56	08	53	05	50	03	47	00	44	02	40	116
120	24	72	22	68	20	64	18	61	15	58	13	54	10	51	08	48	05	45	03	42	00	39	120
124	28	69	25	65	23	62	21	58	18	55	16	52	13	49	10	46	08	43	05	40	02	37	124
128	31	67	29	63	26	59	24	56	21	53	18	50	16	46	13	43	10	40	07	38	05	35	128
132	34	64	32	60	29	56	27	53	24	50	21	47	18	44	15	41	12	38	09	35	07	33	132
136	37	61	35	57	32	53	29	50	27	47	24	44	21	41	18	38	15	35	11	33	08	30	136
140	40	57	38	54	35	50	32	47	29	44	26	41	23	38	20	35	17	33	13	30	10	28	140
144	43	54	41	50	38	47	35	43	31	40	28	38	25	35	22	32	18	30	15	28	12	26	144
148	46	50	43	46	40	43	37	40	34	37	30	34	27	32	24	29	20	27	17	25	13	23	148
152	49	45	46	42	42	38	39	36	36	33	32	31	29	28	25	26	22	24	18	22	15	20	152
156	51	40	48	37	45	34	41	31	38	29	34	27	30	25	27	23	23	21	19	19	16	18	156
160	53	35	50	32	46	29	43	27	39	24	35	23	32	21	28	19	24	18	20	16	17	15	160
164	55	29	52	26	48	24	44	22	41	20	37	18	33	17	29	16	25	14	21	13	18	12	164
168	57	22	53	20	49	18	45	17	42	15	38	14	34	13	30	12	26	11	22	10	18	09	168
172	58	15	54	14	50	12	46	11	42	10	38	09	34	09	31	08	27	07	23	07	19	06	172
176	59	08	55	07	51	06	47	06	43	05	39	05	35	04	31	04	27	04	23	03	19	03	176
180	59	00	55	00	51	00	47	00	43	00	39	00	35	00	31	00	27	00	23	00	19	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	69	00	65	00	61	00	57	00	53	00	49	00	45	00	41	00	37	00	33	00	29	00	00
4	69	07	65	06	61	05	57	04	53	03	49	02	45	02	41	01	37	01	33	00	29	00	4
8	68	14	64	11	60	09	57	07	53	06	49	05	45	03	41	03	37	02	33	01	29	00	8
12	67	21	63	17	60	13	56	11	52	09	48	07	45	05	41	04	37	03	33	01	29	00	12
16	66	26	62	21	59	17	55	14	52	11	48	09	44	07	40	05	37	03	33	02	29	01	16
20	64	31	61	26	58	21	54	17	51	14	47	11	44	08	40	06	36	04	33	02	29	01	20
24	62	35	59	29	56	24	53	20	50	16	47	13	43	10	40	07	36	05	32	03	29	01	24
28	60	39	57	32	55	27	52	22	49	18	46	15	42	11	39	08	36	06	32	03	29	01	28
32	57	41	55	35	53	30	50	25	48	20	45	16	42	13	39	09	35	06	32	04	29	01	32
36	55	43	53	37	51	32	49	27	46	22	44	18	41	14	38	10	35	07	32	04	29	01	36
40	53	45	51	39	49	33	47	28	45	23	43	19	40	15	37	11	34	08	32	05	29	01	40
44	50	46	49	40	47	35	46	30	44	25	41	20	39	16	37	12	34	08	31	05	28	02	44
48	47	47	46	42	45	36	44	31	42	26	40	21	38	17	36	13	33	09	31	05	28	02	48
52	45	48	44	42	43	37	42	32	40	27	39	22	37	18	35	13	33	09	31	05	28	02	52
56	42	48	42	43	41	38	40	33	39	28	37	23	36	18	34	14	32	10	30	06	28	02	56
60	39	49	39	43	39	38	38	33	37	28	36	24	35	19	33	15	32	10	30	06	28	02	60
64	37	49	37	44	36	39	36	34	35	29	35	24	34	19	32	15	31	10	29	06	28	02	64
68	34	49	34	44	34	39	34	34	34	29	33	24	32	20	31	15	30	11	29	06	28	02	68
72	31	48	32	44	32	39	32	34	32	29	32	25	31	20	30	15	30	11	29	07	28	02	72
76	29	48	29	43	30	39	30	34	30	29	30	25	30	20	30	16	29	11	28	07	27	02	76
80	26	47	27	43	28	38	28	34	28	29	29	25	29	20	29	16	28	11	28	07	27	02	80
84	24	47	25	42	25	38	26	34	27	29	27	25	27	20	28	16	28	11	27	07	27	02	84
88	21	46	22	42	23	37	24	33	25	29	26	25	26	20	27	16	27	11	27	07	27	02	88
92	18	45	20	41	21	37	22	33	23	28	24	24	25	20	26	16	26	11	27	07	27	02	92
96	16	44	17	40	19	36	20	32	22	28	23	24	24	20	25	15	26	11	26	07	27	02	96
100	14	43	15	39	17	35	18	31	20	27	21	23	23	19	24	15	25	11	26	07	27	02	100
104	11	41	13	38	15	34	17	30	18	27	20	23	21	19	23	15	24	11	25	06	26	02	104
108	09	40	11	37	13	33	15	29	17	26	19	22	20	18	22	14	24	10	25	06	26	02	108
112	07	39	09	35	11	32	13	28	15	25	17	21	19	18	21	14	23	10	25	06	26	02	112
116	04	37	07	34	09	31	11	27	14	24	16	20	18	17	20	13	22	10	24	06	26	02	116
120	02	35	05	32	07	29	10	26	12	23	15	20	17	16	19	13	22	09	24	06	26	02	120
124	00	34	03	31	06	28	08	25	11	22	14	19	16	15	19	12	21	09	24	05	26	02	124
128	*02*	32	01	29	04	26	07	23	10	21	12	18	15	15	18	12	21	08	23	05	26	02	128
132	*04*	30	*01*	27	02	25	05	22	08	19	11	16	14	14	17	11	20	08	23	05	26	02	132
136	*05*	28	*02*	25	01	23	04	20	07	18	10	15	14	13	17	10	20	07	23	05	26	02	136
140	*07*	26	*04*	23	*00*	21	03	19	06	16	10	14	13	12	16	09	19	07	22	04	25	01	140
144	*08*	23	*05*	21	*02*	19	02	17	05	15	09	13	12	11	15	08	19	06	22	04	25	01	144
148	*10*	21	*06*	19	*03*	17	01	15	04	13	08	12	11	10	15	08	18	06	22	03	25	01	148
152	*11*	19	*07*	17	*04*	15	*00*	14	04	12	07	10	11	08	14	07	18	05	22	03	25	01	152
156	*12*	16	*08*	15	*05*	13	*01*	12	03	10	07	09	10	07	14	06	18	04	21	03	25	01	156
160	*13*	14	*09*	12	*05*	11	*01*	10	02	09	06	07	10	06	14	05	18	04	21	02	25	01	160
164	*14*	11	*10*	10	*06*	09	*02*	08	02	07	06	06	10	05	13	04	17	03	21	02	25	01	164
168	*14*	08	*10*	07	*06*	07	*02*	06	01	05	05	04	09	04	13	03	17	02	21	01	25	00	168
172	*15*	06	*11*	05	*07*	04	*03*	04	01	03	05	03	09	02	13	02	17	01	21	01	25	00	172
176	*15*	03	*11*	03	*07*	02	*03*	02	01	02	05	02	09	01	13	01	17	01	21	00	25	00	176
180	*15*	00	*11*	00	*07*	00	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	25	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 28°

H.A.	0° 00′ Alt.	Δd Δt	Az.	0° 30′ Alt.	Δd Δt	Az.	1° 00′ Alt.	Δd Δt	Az.	1° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	62 00.0	1.0 02	180.0	62 30.0	1.0 02	180.0	63 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0
1	61 59.0	1.0 05	177.9	62 29.0	1.0 05	177.8	62 59.0	1.0 05	177.8	63 29.0	1.0 05	177.8
2	61 56.1	1.0 08	175.7	62 26.0	1.0 08	175.7	62 55.9	1.0 08	175.6	63 25.9	1.0 09	175.5
3	61 51.2	1.0 11	173.6	62 21.0	1.0 12	173.5	62 50.9	99 12	173.4	63 20.7	99 12	173.3
4	61 44.3	99 14	171.5	62 14.1	99 15	171.4	62 43.8	99 15	171.2	63 13.5	99 15	171.1
05	61 35.6	99 18	169.4	62 05.2	99 18	169.3	62 34.7	99 18	169.1	63 04.3	99 19	168.9
6	61 24.9	98 21	167.4	61 54.3	98 21	167.2	62 23.8	98 22	167.0	62 53.1	98 22	166.7
7	61 12.4	97 24	165.3	61 41.7	97 24	165.1	62 10.9	97 25	164.9	62 40.0	97 25	164.6
8	60 58.1	97 27	163.3	61 27.1	97 27	163.1	61 56.1	97 28	162.8	62 25.0	96 28	162.5
9	60 42.1	96 30	161.4	61 10.8	96 30	161.1	61 39.5	96 30	160.8	62 08.2	96 31	160.5
10	60 24.3	95 32	159.4	60 52.8	95 33	159.1	61 21.2	95 33	158.8	61 49.6	95 34	158.4
1	60 04.8	94 35	157.5	60 33.0	94 36	157.2	61 01.2	94 36	156.8	61 29.3	94 37	156.4
2	59 43.8	93 38	155.6	60 11.7	93 38	155.3	60 39.5	93 39	154.9	61 07.3	92 39	154.5
3	59 21.1	92 40	153.8	59 48.7	92 41	153.4	60 16.3	92 41	153.0	60 43.7	91 42	152.6
4	58 57.0	91 43	152.0	59 24.3	91 43	151.6	59 51.5	91 44	151.2	60 18.6	90 44	150.8
15	58 31.5	90 45	150.3	58 58.4	90 46	149.9	59 25.2	89 46	149.4	59 52.0	89 47	149.0
6	58 04.5	89 47	148.6	58 31.1	88 48	148.1	58 57.6	88 48	147.7	59 24.0	88 49	147.2
7	57 36.2	88 49	146.9	58 02.5	87 50	146.5	58 28.6	87 50	146.0	58 54.7	87 51	145.5
8	57 06.7	86 51	145.3	57 32.6	86 52	144.8	57 58.4	86 52	144.4	58 24.1	85 53	143.9
9	56 36.0	85 53	143.7	57 01.5	85 54	143.3	57 26.9	85 54	142.8	57 52.2	84 55	142.3
20	56 04.1	84 55	142.2	56 29.2	84 56	141.7	56 54.3	83 56	141.2	57 19.2	83 57	140.7
1	55 31.1	83 57	140.7	55 55.9	83 57	140.2	56 20.6	82 58	139.7	56 45.1	82 58	139.2
2	54 57.0	82 58	139.3	55 21.5	81 59	138.8	55 45.8	81 60	138.3	56 10.0	80 60	137.7
3	54 22.0	81 60	137.9	54 46.1	80 61	137.4	55 10.1	80 61	136.8	55 33.9	79 62	136.3
4	53 46.0	79 62	136.5	54 09.7	79 62	136.0	54 33.4	79 63	135.5	54 56.8	78 63	134.9
25	53 09.1	78 63	135.2	53 32.5	78 64	134.7	53 55.8	77 64	134.1	54 18.9	77 65	133.6
6	52 31.3	77 64	133.9	52 54.4	77 65	133.4	53 17.3	76 65	132.8	53 40.1	76 66	132.3
7	51 52.8	76 66	132.7	52 15.5	76 66	132.1	52 38.1	75 67	131.6	53 00.6	75 67	131.0
8	51 13.4	75 67	131.4	51 35.8	74 67	130.9	51 58.1	74 68	130.4	52 20.2	73 68	129.8
9	50 33.3	74 68	130.3	50 55.4	73 68	129.7	51 17.4	73 69	129.2	51 39.2	72 70	128.6
30	49 52.6	73 69	129.1	50 14.4	72 70	128.6	50 36.0	72 70	128.0	50 57.5	71 71	127.5
1	49 11.2	72 70	128.0	49 32.6	71 70	127.5	49 54.0	71 71	126.9	50 15.1	70 72	126.4
2	48 29.1	71 71	126.9	48 50.3	70 72	126.4	49 11.3	70 72	125.8	49 32.2	69 73	125.3
3	47 46.5	70 72	125.9	48 07.3	69 72	125.3	48 28.1	69 73	124.8	48 48.6	68 73	124.2
4	47 03.2	69 73	124.8	47 23.8	68 73	124.3	47 44.3	68 74	123.8	48 04.6	67 74	123.2
35	46 19.5	68 74	123.8	46 39.8	67 74	123.3	47 00.0	67 75	122.8	47 20.0	66 75	122.2
6	45 35.2	67 74	122.9	45 55.3	67 75	122.3	46 15.2	66 76	121.8	46 34.9	66 76	121.3
7	44 50.5	66 75	121.9	45 10.3	66 76	121.4	45 29.9	65 76	120.9	45 49.4	65 76	120.3
8	44 05.3	65 76	121.0	44 24.9	65 76	120.5	44 44.2	64 77	119.9	45 03.5	64 77	119.4
9	43 19.7	65 77	120.1	43 39.0	64 77	119.6	43 58.1	64 78	119.0	44 17.1	63 78	118.5
40	42 33.7	64 77	119.2	42 52.7	63 78	118.7	43 11.6	63 78	118.2	43 30.4	62 78	117.6
1	41 47.2	63 78	118.4	42 06.1	62 78	117.8	42 24.7	62 79	117.3	42 43.3	61 79	116.8
2	41 00.5	62 79	117.5	41 19.0	62 79	117.0	41 37.5	61 79	116.5	41 55.8	61 80	116.0
3	40 13.3	61 79	116.7	40 31.7	61 80	116.2	40 49.9	61 80	115.7	41 08.0	60 80	115.2
4	39 25.8	61 80	115.9	39 44.0	60 80	115.4	40 02.0	60 80	114.9	40 19.9	59 81	114.4
45	38 38.0	60 80	115.1	38 56.0	60 80	114.6	39 13.8	59 81	114.1	39 31.5	59 81	113.6
6	37 49.9	59 81	114.4	38 07.7	59 81	113.9	38 25.3	59 81	113.4	38 42.8	58 82	112.8
7	37 01.5	59 81	113.6	37 19.1	58 81	113.1	37 36.5	58 82	112.6	37 53.9	57 82	112.1
8	36 12.9	58 82	112.9	36 30.3	58 82	112.4	36 47.5	57 82	111.9	37 04.6	57 82	111.4
9	35 23.9	58 82	112.2	35 41.2	57 82	111.7	35 58.2	57 82	111.2	36 15.2	56 83	110.7
50	34 34.8	57 82	111.5	34 51.8	57 83	111.0	35 08.7	56 83	110.5	35 25.5	56 83	110.0
1	33 45.4	56 83	110.8	34 02.2	56 83	110.3	34 19.0	56 83	109.8	34 35.6	55 84	109.3
2	32 55.7	56 83	110.1	33 12.5	56 83	109.6	33 29.1	55 84	109.1	33 45.5	55 84	108.6
3	32 05.9	55 83	109.5	32 22.5	55 84	109.0	32 38.9	55 84	108.5	32 55.2	54 84	108.0
4	31 15.8	55 84	108.8	31 32.3	55 84	108.3	31 48.6	54 84	107.9	32 04.8	54 84	107.4
55	30 25.6	54 84	108.2	30 41.9	54 84	107.7	30 58.1	54 84	107.2	31 14.1	53 85	106.7
6	29 35.2	54 84	107.6	29 51.3	54 84	107.1	30 07.4	53 85	106.6	30 23.3	53 85	106.1
7	28 44.6	54 85	107.0	29 00.6	53 85	106.5	29 16.5	53 85	106.0	29 32.3	52 85	105.5
8	27 53.8	53 85	106.3	28 09.7	53 85	105.9	28 25.5	52 85	105.4	28 41.2	52 86	104.9
9	27 02.9	53 85	105.8	27 18.7	52 85	105.3	27 34.4	52 86	104.8	27 49.9	52 86	104.3
60	26 11.9	52 85	105.2	26 27.5	52 86	104.7	26 43.1	52 86	104.2	26 58.5	51 86	103.7
1	25 20.7	52 86	104.6	25 36.2	52 86	104.1	25 51.7	51 86	103.6	26 07.0	51 86	103.2
2	24 29.3	52 86	104.0	24 44.8	51 86	103.5	25 00.1	51 86	103.1	25 15.4	51 86	102.6
3	23 37.9	51 86	103.5	23 53.2	51 86	103.0	24 08.5	51 86	102.5	24 23.6	50 86	102.0
4	22 46.3	51 86	102.9	23 01.5	51 86	102.4	23 16.7	50 86	102.0	23 31.7	50 86	101.5
65	21 54.6	51 86	102.3	22 09.7	50 86	101.9	22 24.8	50 87	101.4	22 39.8	50 87	100.9
6	21 02.8	50 86	101.8	21 17.8	50 86	101.3	21 32.8	50 87	100.9	21 47.7	50 87	100.4
7	20 10.9	50 87	101.3	20 25.9	50 87	100.8	20 40.8	50 87	100.3	20 55.6	49 87	99.9
8	19 18.9	50 87	100.7	19 33.8	50 87	100.3	19 48.6	49 87	99.8	20 03.3	49 87	99.4
9	18 26.8	49 87	100.2	18 41.6	49 87	99.8	18 56.4	49 87	99.3	19 11.0	49 87	98.8
70	17 34.6	49 87	99.7	17 49.4	49 87	99.2	18 04.0	49 87	98.8	18 18.6	49 87	98.3
1	16 42.4	49 87	99.2	16 57.0	49 87	98.7	17 11.6	49 88	98.3	17 26.2	48 88	97.8
2	15 50.0	49 87	98.7	16 04.6	49 87	98.2	16 19.2	48 88	97.8	16 33.7	48 88	97.3
3	14 57.6	49 88	98.2	15 12.2	48 88	97.7	15 26.7	48 88	97.3	15 41.1	48 88	96.8
4	14 05.1	48 88	97.7	14 19.6	48 88	97.2	14 34.1	48 88	96.8	14 48.5	48 88	96.3
75	13 12.6	48 88	97.2	13 27.1	48 88	96.7	13 41.4	48 88	96.3	13 55.8	48 88	95.8
6	12 20.0	48 88	96.7	12 34.4	48 88	96.2	12 48.8	48 88	95.8	13 03.1	48 88	95.3
7	11 27.4	48 88	96.2	11 41.7	48 88	95.7	11 56.0	48 88	95.3	12 10.3	47 88	94.8
8	10 34.7	48 88	95.7	10 49.0	48 88	95.3	11 03.3	48 88	94.8	11 17.5	47 88	94.4
9	9 41.9	48 88	95.2	9 56.2	48 88	94.8	10 10.5	47 88	94.3	10 24.7	47 88	93.9
80	8 49.2	48 88	94.7	9 03.4	47 88	94.3	9 17.6	47 88	93.8	9 31.8	47 88	93.4
1	7 56.4	47 88	94.3	8 10.6	47 88	93.8	8 24.7	47 88	93.4	8 38.9	47 88	92.9
2	7 03.5	47 88	93.8	7 17.7	47 88	93.3	7 31.8	47 88	92.9	7 46.0	47 88	92.4
3	6 10.6	47 88	93.3	6 24.8	47 88	92.9	6 38.9	47 88	92.4	6 53.0	47 88	92.0
4	5 17.7	47 88	92.8	5 31.9	47 88	92.4	5 46.0	47 88	91.9	6 00.1	47 88	91.5
85										5 07.1	47 88	91.0
6												

H.A.	2° 00′ Alt.	Δd Δt	Az.	2° 30′ Alt.	Δd Δt	Az.	3° 00′ Alt.	Δd Δt	Az.	3° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	64 00.0	1.0 02	180.0	64 30.0	1.0 02	180.0	65 00.0	1.0 02	180.0	65 30.0	1.0 02	180.0
1	63 58.9	1.0 05	177.7	64 28.9	1.0 05	177.7	64 58.9	1.0 06	177.6	65 28.9	1.0 06	177.6
2	63 55.8	1.0 09	175.4	64 25.7	1.0 09	175.4	64 55.6	1.0 09	175.3	65 25.6	1.0 09	175.2
3	63 50.5	99 12	173.2	64 20.4	99 12	173.1	64 50.2	99 13	172.9	65 20.0	99 13	172.8
4	63 43.2	99 16	170.9	64 12.9	99 16	170.8	64 42.6	99 16	170.6	65 12.3	99 16	170.4
05	63 33.9	98 19	168.7	64 03.4	98 19	168.5	64 32.9	98 20	168.3	65 02.4	98 20	168.1
6	63 22.5	98 22	166.5	63 51.9	98 23	166.3	64 21.2	98 23	166.0	64 50.5	98 23	165.8
7	63 09.2	97 25	164.4	63 38.3	97 26	164.1	64 07.4	97 26	163.8	64 36.5	97 27	163.5
8	62 54.0	96 28	162.2	63 22.8	96 29	161.9	63 51.7	96 30	161.6	64 20.4	96 30	161.3
9	62 36.9	95 32	160.1	63 05.4	95 32	159.8	63 34.0	95 32	159.5	64 02.5	95 33	159.1
10	62 18.0	94 34	158.1	62 46.3	94 35	157.7	63 14.5	94 36	157.3	63 42.7	94 36	157.0
1	61 57.3	93 37	156.1	62 25.3	93 38	155.7	62 53.2	93 38	155.3	63 21.0	93 39	154.9
2	61 35.0	92 40	154.1	62 02.6	92 40	153.7	62 30.2	92 41	153.3	62 57.7	91 42	152.8
3	61 11.1	91 42	152.2	61 38.4	91 43	151.8	62 05.6	91 44	151.3	62 32.7	90 44	150.9
4	60 45.6	90 45	150.3	61 12.5	90 46	149.9	61 39.4	89 46	149.4	62 06.1	89 47	148.9
15	60 18.7	89 47	148.5	60 45.2	88 48	148.0	61 11.7	88 48	147.6	61 38.0	88 49	147.1
6	59 50.3	87 50	146.8	60 16.5	87 50	146.3	60 42.6	87 51	145.8	61 08.5	86 51	145.2
7	59 20.6	86 52	145.0	59 46.4	86 52	144.5	60 12.1	85 53	144.0	60 37.7	85 54	143.5
8	58 49.6	85 54	143.4	59 15.0	85 54	142.9	59 40.3	84 55	142.3	60 05.5	84 56	141.8
9	58 17.4	84 56	141.8	58 42.4	83 56	141.2	59 07.4	83 57	140.7	59 32.2	82 58	140.1
20	57 44.0	82 58	140.2	58 08.7	82 58	139.7	58 33.2	82 59	139.1	58 57.6	81 59	138.5
1	57 09.6	81 59	138.7	57 33.9	81 60	138.1	57 58.0	80 60	137.6	58 22.0	80 61	137.0
2	56 34.1	80 61	137.2	56 58.0	79 62	136.6	57 21.8	79 62	136.1	57 45.4	78 63	135.5
3	55 57.6	79 62	135.8	56 21.1	78 63	135.2	56 44.5	78 64	134.6	57 07.8	77 64	134.1
4	55 20.2	78 64	134.4	55 43.4	77 64	133.8	56 06.4	77 65	133.3	56 29.3	76 66	132.7
25	54 41.9	76 65	133.0	55 04.7	76 66	132.5	55 27.4	75 66	131.9	55 49.9	75 67	131.3
6	54 02.8	75 66	131.7	54 25.2	75 67	131.2	54 47.6	74 68	130.6	55 09.7	74 68	130.0
7	53 22.8	74 68	130.5	53 45.0	74 68	129.9	54 07.0	73 69	129.3	54 28.8	72 70	128.7
8	52 42.2	73 69	129.3	53 04.0	72 70	128.7	53 25.6	72 70	128.1	53 47.1	71 71	127.5
9	52 00.8	72 70	128.1	52 22.3	71 71	127.5	52 43.6	71 71	126.9	53 04.7	70 72	126.3
30	51 18.8	71 71	126.9	51 39.9	70 72	126.4	52 00.9	70 72	125.8	52 21.7	69 72	125.2
1	50 36.1	70 72	125.8	50 57.0	69 73	125.2	51 17.6	69 73	124.7	51 38.2	68 74	124.1
2	49 52.9	69 73	124.7	50 13.4	68 74	124.2	50 33.8	68 74	123.6	50 54.0	67 74	123.0
3	49 09.1	68 74	123.7	49 29.3	67 74	123.1	49 49.4	67 75	122.5	50 09.3	66 75	122.0
4	48 24.7	67 75	122.7	48 44.7	66 75	122.1	49 04.5	66 76	121.5	49 24.1	65 76	120.9
35	47 39.9	66 76	121.7	47 59.6	65 76	121.1	48 19.1	65 76	120.5	48 38.4	64 77	120.0
6	46 54.5	65 76	120.7	47 14.0	64 77	120.1	47 33.2	64 77	119.6	47 52.3	63 78	119.0
7	46 08.8	64 77	119.8	46 27.9	64 77	119.2	46 46.9	63 78	118.6	47 05.8	63 78	118.1
8	45 22.6	63 78	118.8	45 41.5	63 78	118.3	46 00.2	62 78	117.7	46 18.8	62 79	117.2
9	44 36.0	63 78	118.0	44 54.6	62 79	117.4	45 13.2	61 79	116.8	45 31.5	61 80	116.3
40	43 49.0	62 79	117.1	44 07.4	61 79	116.5	44 25.7	61 80	116.0	44 43.8	60 80	115.4
1	43 01.6	61 80	116.2	43 19.9	60 80	115.7	43 37.9	60 80	115.2	43 55.8	59 80	114.6
2	42 14.0	60 80	115.4	42 32.0	60 80	114.9	42 49.8	59 81	114.3	43 07.5	59 81	113.8
3	41 26.0	60 80	114.6	41 43.8	59 81	114.1	42 01.4	59 81	113.5	42 18.9	58 82	113.0
4	40 37.6	59 81	113.8	40 55.2	58 81	113.3	41 12.7	58 82	112.8	41 30.0	57 82	112.2
45	39 49.0	58 82	113.1	40 06.4	58 82	112.5	40 23.7	57 82	112.0	40 40.8	57 82	111.5
6	39 00.2	58 82	112.3	39 17.4	57 82	111.8	39 34.4	57 82	111.3	39 51.4	56 83	110.7
7	38 11.0	57 82	111.6	38 28.1	57 83	111.1	38 45.0	56 83	110.5	39 01.7	56 83	110.0
8	37 21.6	56 83	110.9	37 38.5	56 83	110.3	37 55.2	56 83	109.8	38 11.8	55 84	109.3
9	36 32.0	56 83	110.2	36 48.7	55 83	109.6	37 05.3	55 84	109.1	37 21.7	55 84	108.6
50	35 42.2	55 83	109.5	35 58.7	55 84	109.0	36 15.1	54 84	108.4	36 31.4	54 84	107.9
1	34 52.1	55 84	108.8	35 08.5	54 84	108.3	35 24.8	54 84	107.8	35 40.9	54 84	107.3
2	34 01.9	54 84	108.1	34 18.1	54 84	107.6	34 34.2	53 84	107.1	34 50.2	53 85	106.6
3	33 11.5	54 84	107.5	33 27.6	53 85	107.0	33 43.5	53 85	106.5	33 59.4	53 85	106.0
4	32 20.8	53 85	106.9	32 36.8	53 85	106.4	32 52.6	53 85	105.8	33 08.4	52 85	105.3
55	31 30.1	53 85	106.2	31 45.9	53 85	105.7	32 01.6	52 85	105.2	32 17.2	52 86	104.7
6	30 39.1	53 85	105.6	30 54.8	52 85	105.1	31 10.4	52 86	104.6	31 25.9	51 86	104.1
7	29 48.0	52 85	105.0	30 03.6	52 86	104.5	30 19.1	51 86	104.0	30 34.4	51 86	103.5
8	28 56.8	52 86	104.4	29 12.3	51 86	103.9	29 27.6	51 86	103.4	29 42.9	51 86	102.9
9	28 05.4	51 86	103.8	28 20.8	51 86	103.3	28 36.0	51 86	102.8	28 51.2	50 86	102.4
60	27 13.9	51 86	103.2	27 29.2	51 86	102.8	27 44.3	50 86	102.3	27 59.4	50 86	101.8
1	26 22.3	51 86	102.7	26 37.4	50 86	102.2	26 52.5	50 86	101.7	27 07.5	50 87	101.2
2	25 30.5	50 86	102.1	25 45.6	50 86	101.6	26 00.6	50 87	101.2	26 15.5	49 87	100.7
3	24 38.7	50 86	101.6	24 53.7	50 87	101.1	25 08.5	49 87	100.6	25 23.3	49 87	100.1
4	23 46.7	50 87	101.0	24 01.6	49 87	100.5	24 16.4	49 87	100.1	24 31.1	49 87	99.6
65	22 54.7	50 87	100.5	23 09.5	49 87	100.0	23 24.2	49 87	99.5	23 38.9	49 87	99.1
6	22 02.5	49 87	99.9	22 17.3	49 87	99.5	22 31.9	49 87	99.0	22 46.5	48 87	98.5
7	21 10.3	49 87	99.4	21 25.0	49 87	98.9	21 39.6	49 87	98.5	21 54.1	48 88	98.0
8	20 18.0	49 87	98.9	20 32.6	49 87	98.4	20 47.1	48 88	98.0	21 01.6	48 88	97.5
9	19 25.6	49 88	98.4	19 40.2	48 88	97.9	19 54.6	48 88	97.4	20 09.0	48 88	97.0
70	18 33.2	48 88	97.9	18 47.7	48 88	97.4	19 02.1	48 88	96.9	19 16.4	48 88	96.5
1	17 40.7	48 88	97.4	17 55.1	48 88	96.9	18 09.5	48 88	96.4	18 23.8	48 88	96.0
2	16 48.1	48 88	96.8	17 02.5	48 88	96.4	17 16.8	48 88	95.9	17 31.1	47 88	95.5
3	15 55.5	48 88	96.4	16 09.8	48 88	95.9	16 24.1	47 88	95.4	16 38.3	47 88	95.0
4	15 02.8	48 88	95.9	15 17.1	48 88	95.4	15 31.3	47 88	94.9	15 45.5	47 88	94.5
75	14 10.1	48 88	95.4	14 24.3	47 88	94.9	14 38.5	47 88	94.5	14 52.7	47 88	94.0
6	13 17.3	47 88	94.9	13 31.5	47 88	94.4	13 45.7	47 88	94.0	13 59.8	47 88	93.5
7	12 24.5	47 88	94.4	12 38.7	47 88	93.9	12 52.8	47 88	93.5	13 06.9	47 88	93.0
8	11 31.7	47 88	93.9	11 45.8	47 88	93.5	11 59.9	47 88	93.0	12 14.0	47 88	92.6
9	10 38.8	47 88	93.4	10 52.9	47 88	93.0	11 07.0	47 88	92.5	11 21.1	47 88	92.1
80	9 45.9	47 88	92.9	10 00.0	47 88	92.5	10 14.1	47 88	92.0	10 28.1	47 88	91.6
1	8 53.0	47 88	92.5	9 07.1	47 88	92.0	9 21.1	47 88	91.6	9 35.2	47 88	91.1
2	8 00.1	47 88	92.0	8 14.1	47 88	91.6	8 28.2	47 88	91.1	8 42.2	47 88	90.7
3	7 07.1	47 88	91.5	7 21.2	47 88	91.1	7 35.2	47 88	90.6	7 49.2	47 88	90.2
4	6 14.2	47 88	91.1	6 28.2	47 88	90.6	6 42.2	47 88	90.2	6 56.2	47 88	89.7
85	5 21.2	47 88	90.6	5 35.2	47 88	90.1	5 49.3	47 88	89.7	6 03.3	47 88	89.2
6										5 10.3	47 88	88.8

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	62 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	59 00.0	1.0 02	180.0	58 30.0	1.0 02	180.0	00
1	61 59.0	1.0 05	177.9	61 29.0	1.0 05	177.9	60 59.0	1.0 05	177.9	60 29.1	1.0 05	178.0	59 59.1	1.0 05	178.0	59 29.1	1.0 04	178.0	58 59.1	1.0 04	178.1	58 29.1	1.0 04	178.1	1
2	61 56.1	1.0 08	175.7	61 26.1	1.0 08	175.8	60 56.2	1.0 08	175.9	60 26.2	1.0 08	175.9	59 56.3	1.0 08	176.0	59 26.4	1.0 08	176.1	58 56.4	1.0 08	176.1	58 26.5	1.0 07	176.2	2
3	61 51.2	1.0 11	173.6	61 21.3	1.0 11	173.7	60 51.4	1.0 11	173.8	60 21.6	1.0 11	173.9	59 51.7	1.0 11	174.0	59 21.8	1.0 10	174.1	58 52.0	1.0 10	174.2	58 22.1	1.0 10	174.3	3
4	61 44.3	99 14	171.5	61 14.6	99 14	171.7	60 44.8	99 14	171.8	60 15.0	99 14	171.9	59 45.3	99 14	172.0	59 15.5	99 14	172.2	58 45.7	99 13	172.3	58 15.9	99 13	172.4	4
05	61 35.6	99 18	169.4	61 05.9	99 17	169.6	60 36.3	99 17	169.8	60 06.7	99 17	169.9	59 37.0	99 17	170.1	59 07.4	99 16	170.2	58 37.7	99 16	170.4	58 08.0	99 16	170.5	05
6	61 24.9	98 21	167.4	60 55.5	98 20	167.6	60 26.0	98 20	167.8	59 56.5	98 20	168.0	59 27.0	98 20	168.1	58 57.5	98 19	168.3	58 28.0	98 19	168.5	57 58.5	98 19	168.7	6
7	61 12.4	97 24	165.3	60 43.2	98 24	165.6	60 13.9	98 23	165.8	59 44.6	98 23	166.0	59 15.3	98 22	166.2	58 45.9	98 22	166.4	58 16.6	98 22	166.6	57 47.2	98 22	166.8	7
8	60 58.1	97 27	163.3	60 29.1	97 26	163.6	60 00.0	97 26	163.8	59 30.9	97 26	164.1	59 01.8	97 25	164.3	58 32.7	97 25	164.5	58 03.5	97 24	164.8	57 34.3	97 24	165.0	8
9	60 42.1	96 30	161.4	60 13.3	96 29	161.6	59 44.4	96 29	161.9	59 15.6	96 28	162.2	58 46.7	96 28	162.4	58 17.7	96 28	162.7	57 48.8	97 27	162.9	57 19.8	97 27	163.2	9
10	60 24.3	95 32	159.4	59 55.7	95 32	159.7	59 27.1	95 32	160.0	58 58.5	95 31	160.3	58 29.9	96 31	160.6	58 01.2	96 30	160.9	57 32.4	96 30	161.1	57 03.7	96 30	161.4	10
1	60 04.8	94 35	157.5	59 36.6	94 35	157.8	59 08.2	94 34	158.2	58 39.9	95 34	158.5	58 11.5	95 33	158.8	57 43.0	95 33	159.1	57 14.5	95 32	159.4	56 46.0	95 32	159.7	1
2	59 43.8	93 38	155.6	59 15.8	93 37	156.0	58 47.8	94 37	156.3	58 19.7	94 36	156.7	57 51.5	94 36	157.0	57 23.4	94 35	157.3	56 55.1	94 35	157.6	56 26.9	94 34	157.9	2
3	59 21.1	92 40	153.8	58 53.5	92 40	154.2	58 25.7	93 39	154.6	57 58.0	93 39	154.9	57 30.1	93 38	155.3	57 02.2	93 38	155.6	56 34.3	93 37	155.9	56 06.2	93 37	156.3	3
4	58 57.0	91 43	152.0	58 29.7	91 42	152.4	58 02.3	91 42	152.8	57 34.8	92 41	153.2	57 07.2	92 40	153.6	56 39.6	92 40	153.9	56 11.9	92 40	154.3	55 44.2	93 39	154.6	4
15	58 31.5	90 45	150.3	58 04.4	90 44	150.7	57 37.4	90 44	151.1	57 10.2	91 43	151.5	56 42.9	91 43	151.9	56 15.6	91 42	152.3	55 48.3	91 42	152.6	55 20.8	92 41	153.0	15
6	58 04.5	89 47	148.6	57 37.8	89 46	149.0	57 11.1	89 46	149.4	56 44.2	90 45	149.8	56 17.3	90 45	150.2	55 50.3	90 44	150.6	55 23.2	90 44	151.0	54 56.1	91 43	151.4	6
7	57 36.2	88 49	146.9	57 09.9	88 49	147.4	56 43.5	88 48	147.8	56 17.0	89 48	148.2	55 50.4	89 47	148.6	55 23.7	89 46	149.0	54 56.9	89 46	149.4	54 30.1	90 45	149.8	7
8	57 06.7	86 51	145.3	56 40.7	87 51	145.8	56 14.6	87 50	146.2	55 48.5	87 50	146.7	55 22.2	88 49	147.1	54 55.8	88 48	147.5	54 29.4	88 48	147.9	54 02.9	89 48	148.3	8
9	56 36.0	85 53	143.7	56 10.3	86 52	144.2	55 44.6	86 52	144.7	55 18.7	86 51	145.1	54 52.8	87 51	145.6	54 26.8	87 50	146.0	54 00.7	87 50	146.4	53 34.4	88 49	146.8	9
20	56 04.1	84 55	142.2	55 38.8	84 54	142.7	55 13.4	85 54	143.2	54 47.9	85 53	143.6	54 22.3	86 53	144.1	53 56.6	86 52	144.5	53 30.8	86 52	144.9	53 04.9	86 51	145.4	20
1	55 31.1	83 57	140.7	55 06.1	83 56	141.2	54 41.1	84 56	141.7	54 15.9	84 55	142.2	53 50.7	84 54	142.6	53 25.3	85 54	143.1	52 59.8	85 53	143.5	52 34.2	85 53	143.9	1
2	54 57.0	82 58	139.3	54 32.4	82 58	139.8	54 07.7	83 57	140.3	53 42.9	83 57	140.7	53 18.0	83 56	141.2	52 52.9	84 56	141.7	52 27.8	84 55	142.1	52 02.6	84 54	142.6	2
3	54 22.0	81 60	137.9	53 57.7	81 59	138.4	53 33.4	81 59	138.9	53 08.9	82 58	139.4	52 44.3	82 58	139.8	52 19.6	83 57	140.3	51 54.8	83 57	140.8	51 29.8	83 56	141.2	3
4	53 46.0	79 62	136.5	53 22.1	80 61	137.0	52 58.1	80 60	137.5	52 33.9	81 60	138.0	52 09.7	81 59	138.5	51 45.3	81 59	139.0	51 20.8	82 58	139.4	50 56.2	82 58	139.9	4
25	53 09.1	78 63	135.2	52 45.5	79 62	135.7	52 21.8	79 62	136.2	51 58.0	80 61	136.7	51 34.1	80 61	137.2	51 10.1	80 60	137.7	50 45.9	81 60	138.1	50 21.6	81 59	138.6	25
6	52 31.3	77 64	133.9	52 08.1	78 64	134.4	51 44.8	78 63	134.9	51 21.3	78 63	135.4	50 57.7	79 62	135.9	50 33.9	79 62	136.4	50 10.1	80 61	136.9	49 46.1	80 60	137.4	6
7	51 52.8	76 66	132.7	51 29.9	77 65	133.2	51 06.9	77 64	133.7	50 43.7	77 64	134.2	50 20.4	78 64	134.7	49 57.0	78 63	135.2	49 33.5	79 62	135.7	49 09.8	79 62	136.1	7
8	51 13.4	75 67	131.4	50 50.9	75 66	132.0	50 28.2	76 66	132.5	50 05.3	76 65	133.0	49 42.4	77 65	133.5	49 19.3	77 64	134.0	48 56.1	78 64	134.5	48 32.7	78 63	134.9	8
9	50 33.3	74 68	130.3	50 11.1	74 67	130.8	49 48.7	75 67	131.3	49 26.2	75 66	131.8	49 03.6	76 66	132.3	48 40.8	76 65	132.8	48 17.9	77 65	133.3	47 54.9	77 64	133.8	9
30	49 52.6	73 69	129.1	49 30.7	73 69	129.6	49 08.6	74 68	130.2	48 46.4	74 68	130.7	48 24.0	75 67	131.2	48 01.6	75 66	131.7	47 39.0	76 66	132.2	47 16.2	76 66	132.6	30
1	49 11.2	72 70	128.0	48 49.5	72 70	128.5	48 27.8	73 69	129.1	48 05.9	73 69	129.6	47 43.8	74 68	130.1	47 21.7	74 68	130.6	46 59.4	75 67	131.1	46 36.9	75 66	131.5	1
2	48 29.1	71 71	126.9	48 07.8	71 71	127.4	47 46.3	72 70	128.0	47 24.7	72 70	128.5	47 03.0	73 69	129.0	46 41.1	73 69	129.5	46 19.1	74 68	130.0	45 57.0	74 68	130.5	2
3	47 46.5	70 72	125.9	47 25.4	70 72	126.4	47 04.2	71 71	126.9	46 42.9	71 70	127.4	46 21.5	72 70	127.9	45 59.9	72 70	128.4	45 38.2	73 69	128.9	45 16.3	73 69	129.4	3
4	47 03.2	69 73	124.8	46 42.5	69 72	125.4	46 21.6	70 72	125.9	46 00.6	70 72	126.4	45 39.4	71 71	126.9	45 18.1	71 70	127.4	44 56.7	72 70	127.9	44 35.1	72 70	128.4	4
35	46 19.5	68 74	123.8	45 59.0	68 73	124.4	45 38.4	69 73	124.9	45 17.7	69 72	125.4	44 56.8	70 72	125.9	44 35.8	70 72	126.4	44 14.6	71 71	126.9	43 53.3	71 70	127.4	35
6	45 35.2	67 74	122.9	45 15.0	68 74	123.4	44 54.7	68 74	123.9	44 34.2	68 73	124.4	44 13.6	69 73	124.9	43 52.9	69 72	125.4	43 32.0	70 72	125.9	43 11.0	70 72	126.4	6
7	44 50.5	66 75	121.9	44 30.6	67 75	122.4	44 10.5	67 74	123.0	43 50.3	68 74	123.5	43 29.9	68 74	124.0	43 09.4	69 73	124.5	42 48.8	69 73	125.0	42 28.1	69 72	125.5	7
8	44 05.3	65 76	121.0	43 45.6	66 76	121.5	43 25.8	66 75	122.0	43 05.9	67 75	122.6	42 45.8	67 74	123.1	42 25.5	68 74	123.6	42 05.2	68 74	124.1	41 44.7	68 73	124.6	8
9	43 19.7	65 77	120.1	43 00.3	65 76	120.6	42 40.7	65 76	121.1	42 21.0	66 76	121.7	42 01.1	66 75	122.2	41 41.2	67 75	122.7	41 21.1	67 74	123.2	41 00.8	68 74	123.6	9
40	42 33.7	64 77	119.2	42 14.5	64 77	119.7	41 55.1	65 77	120.3	41 35.7	65 76	120.8	41 16.1	66 76	121.3	40 56.3	66 75	121.8	40 36.5	66 75	122.3	40 16.5	67 75	122.8	40
1	41 47.2	63 78	118.4	41 28.3	63 78	118.9	41 09.2	64 77	119.4	40 50.0	64 77	119.9	40 30.6	65 76	120.4	40 11.1	65 76	120.9	39 51.5	66 76	121.4	39 31.7	66 75	121.9	1
2	41 00.5	62 79	117.5	40 41.7	63 78	118.1	40 22.8	63 78	118.6	40 03.8	64 77	119.1	39 44.7	64 77	119.6	39 25.4	64 77	120.1	39 06.1	65 76	120.6	38 46.5	65 76	121.1	2
3	40 13.3	61 79	116.7	39 54.8	62 79	117.2	39 36.1	62 78	117.7	39 17.4	63 78	118.3	38 58.4	63 78	118.8	38 39.4	64 77	119.2	38 20.2	64 77	119.7	38 01.0	64 77	120.2	3
4	39 25.8	61 80	115.9	39 07.5	61 79	116.4	38 49.1	62 79	116.9	38 30.5	62 79	117.4	38 11.8	63 78	117.9	37 53.0	63 78	118.4	37 34.1	63 78	118.9	37 15.0	64 77	119.4	4
45	38 38.0	60 80	115.1	38 19.9	61 80	115.7	38 01.7	61 80	116.2	37 43.3	61 79	116.7	37 24.9	62 79	117.2	37 06.3	62 78	117.7	36 47.5	63 78	118.1	36 28.7	63 78	118.6	45
6	37 49.9	59 81	114.4	37 32.0	60 80	114.9	37 14.0	60 80	115.4	36 55.8	61 80	115.9	36 37.6	61 79	116.4	36 19.2	62 79	116.9	36 00.6	62 79	117.4	35 42.0	62 78	117.9	6
7	37 01.5	59 81	113.6	36 43.8	59 81	114.1	36 26.0	60 80	114.6	36 08.0	60 80	115.1	35 49.9	60 80	115.6	35 31.8	61 80	116.1	35 13.4	61 79	116.6	34 55.0	62 79	117.1	7
8	36 12.9	58 82	112.9	35 55.3	59 81	113.4	35 37.7	59 81	113.9	35 19.9	59 80	114.4	35 02.0	60 80	114.9	34 44.0	60 80	115.4	34 25.9	61 80	115.9	34 07.7	61 79	116.4	8
9	35 23.9	58 82	112.2	35 06.6	58 82	112.7	34 49.1	58 81	113.2	34 31.6	59 81	113.7	34 13.9	59 81	114.2	33 56.0	60 80	114.7	33 38.1	60 80	115.1	33 20.1	60 80	115.6	9
50	34 34.8	57 82	111.5	34 17.6	57 82	112.0	34 00.3	58 82	112.5	33 42.9	58 82	113.0	33 25.4	59 81	113.5	33 07.8	59 81	114.0	32 50.0	59 81	114.4	32 32.2	60 80	114.9	50
1	33 45.4	56 83	110.8	33 28.4	57 82	111.3	33 11.2	57 82	111.8	32 54.0	58 82	112.3	32 36.7	58 82	112.8	32 19.2	58 81	113.3	32 01.6	59 81	113.7	31 44.0	59 81	114.2	1
2	32 55.7	56 83	110.1	32 38.9	56 83	110.6	32 21.9	57 82	111.1	32 04.9	57 82	111.6	31 47.7	57 82	112.1	31 30.4	58 82	112.6	31 13.0	58 82	113.1	30 55.5	58 81	113.5	2
3	32 05.9	55 83	109.5	31 49.2	56 83	110.0	31 32.4	56 83	110.5	31 15.5	57 83	110.9	30 58.5	57 82	111.4	30 41.4	57 82	111.9	30 24.2	58 82	112.4	30 06.8	58 82	112.8	3
4	31 15.8	55 84	108.8	30 59.3	55 84	109.3	30 42.7	56 83	109.8	30 25.9	56 83	110.3	30 09.1	56 83	110.8	29 52.1	57 82	111.2	29 35.1	57 82	111.7	29 17.9	57 82	112.2	4
55	30 25.6	54 84	108.2	30 09.2	55 84	108.7	29 52.7	55 84	109.2	29 36.1	56 83	109.6	29 19.4	56 83	110.1	29 02.6	56 83	110.6	28 45.7	56 82	111.1	28 28.7	57 82	111.5	55
6	29 35.2	54 84	107.6	29 18.9	54 84	108.1	29 02.6	55 84	108.5	28 46.1	55 84	109.0	28 29.6	55 83	109.5	28 12.9	56 83	110.0	27 56.2	56 83	110.4	27 39.3	56 83	110.9	6
7	28 44.6	54 85	107.0	28 28.5	54 84	107.4	28 12.3	54 84	107.9	27 56.0	55 84	108.4	27 39.5	55 84	108.9	27 23.0	55 83	109.3	27 06.4	56 83	109.8	26 49.7	56 83	110.3	7
8	27 53.8	53 85	106.3	27 37.9	53 85	106.8	27 21.8	54 84	107.3	27 05.6	54 84	107.8	26 49.3	54 84	108.2	26 33.0	55 84	108.7	26 16.5	55 84	109.2	25 59.9	55 83	109.6	8
9	27 02.9	53 85	105.8	26 47.1	53 85	106.2	26 31.1	53 85	106.7	26 15.1	54 84	107.2	25 58.9	54 84	107.6	25 42.7	54 84	108.1	25 26.4	55 84	108.6	25 10.0	55 84	109.0	9
60	26 11.9	52 85	105.2	25 56.1	53 85	105.6	25 40.3	53 85	106.1	25 24.4	53 85	106.6	25 08.4	54 84	107.0	24 52.3	54 84	107.5	24 36.1	54 84	108.0	24 19.8	54 84	108.4	60
1	25 20.7	52 86	104.6	25 05.0	52 85	105.1	24 49.3	53 85	105.5	24 33.5	53 85	106.0	24 17.6	53 85	106.5	24 01.7	53 85	106.9	23 45.6	54 84	107.4	23 29.5	54 84	107.8	1
2	24 29.3	52 86	104.0	24 13.8	52 86	104.5	23 58.2	52 85	105.0	23 42.5	52 85	105.4	23 26.8	53 85	105.9	23 10.9	53 85	106.3	22 55.0	53 85	106.8	22 38.9	54 84	107.3	2
3	23 37.9	51 86	103.5	23 22.5	52 86	103.9	23 07.0	52 86	104.4	22 51.4	52 86	104.9	22 35.7	52 85	105.3	22 20.0	53 85	105.8	22 04.2	53 85	106.2	21 48.3	53 85	106.7	3
4	22 46.3	51 86	102.9	22 31.0	51 86	103.4	22 15.6	51 86	103.8	22 00.1	52 86	104.3	21 44.6	52 86	104.8	21 28.9	52 85	105.2	21 13.2	52 85	105.7	20 57.5	53 85	106.1	4
65	21 54.6	51 86	102.3	21 39.4	51 86	102.8	21 24.1	51 86	103.3	21 08.7	51 86	103.7	20 53.3	52 86	104.2	20 37.7	52 86	104.7	20 22.2	52 85	105.1	20 06.5	52 85	105.6	65
6	21 02.8	50 86	101.8	20 47.7	51 86	102.3	20 32.5	51 86	102.7	20 17.2	51 86	103.2	20 01.8	51 86	103.6	19 46.4	52 86	104.1	19 30.9	52 86	104.6	19 15.4	52 85	105.0	6
7	20 10.9	50 87	101.3	19 55.8	50 86	101.7	19 40.7	51 86	102.2	19 25.6	51 86	102.6	19 10.3	51 86	103.1	18 55.0	51 86	103.6	18 39.6	51 86	104.0	18 24.2	52 86	104.5	7
8	19 18.9	50 87	100.7	19 03.9	50 87	101.2	18 48.9	50 86	101.7	18 33.8	50 86	102.1	18 18.7	51 86	102.6	18 03.4	51 86	103.0	17 48.1	51 86	103.5	17 32.8	51 86	103.9	8
9	18 26.8	49 87	100.2	18 11.9	50 87	100.7	17 57.0	50 87	101.1	17 42.0	50 87	101.6	17 26.9	50 86	102.0	17 11.8	51 86	102.5	16 56.6	51 86	102.9	16 41.3	51 86	103.4	9
70	17 34.6	49 87	99.7	17 19.8	49 87	100.2	17 04.9	50 87	100.6	16 50.0	50 87	101.1	16 35.0	50 87	101.5	16 20.0	50 86	102.0	16 04.9	50 86	102.4	15 49.7	51 86	102.9	70
1	16 42.4	49 87	99.2	16 27.6	49 87	99.6	16 12.8	49 87	100.1	15 58.0	50 87	100.5	15 43.1	50 87	101.0	15 28.1	50 87	101.4	15 13.1	50 86	101.9	14 58.0	50 86	102.3	1
2	15 50.0	49 87	98.7	15 35.4	49 87	99.1	15 20.6	49 87	99.6	15 05.9	49 87	100.0	14 51.0	50 87	100.5	14 36.1	50 87	100.9	14 21.2	50 87	101.4	14 06.2	50 86	101.8	2
3	14 57.6	49 88	98.2	14 43.0	49 87	98.6	14 28.4	49 87	99.1	14 13.6	49 87	99.5	13 58.9	49 87	100.0	13 44.1	49 87	100.4	13 29.2	50 87	100.9	13 14.3	50 87	101.3	3
4	14 05.1	48 88	97.7	13 50.6	49 88	98.1	13 36.0	49 87	98.6	13 21.4	49 87	99.0	13 06.7	49 87	99.5	12 51.9	49 87	99.9	12 37.2	49 87	100.4	12 22.3	49 87	100.8	4
75	13 12.6	48 88	97.2	12 58.1	48 88	97.6	12 43.6	49 88	98.1	12 29.0	49 87	98.5	12 14.4	49 87	99.0	11 59.7	49 87	99.4	11 45.0	49 87	99.9	11 30.2	49 87	100.3	75
6	12 20.0	48 88	96.7	12 05.6	48 88	97.1	11 51.1	48 88	97.6	11 36.6	48 88	98.0	11 22.0	49 87	98.5	11 07.4	49 87	98.9	10 52.8	49 87	99.4	10 38.1	49 87	99.8	6
7	11 27.4	48 88	96.2	11 13.0	48 88	96.6	10 58.6	48 88	97.1	10 44.1	48 88	97.5	10 29.6	48 88	98.0	10 15.0	49 87	98.4	10 00.5	49 87	98.9	9 45.8	49 87	99.3	7
8	10 34.7	48 88	95.7	10 20.3	48 88	96.1	10 06.0	48 88	96.6	9 51.5	48 88	97.0	9 37.1	48 88	97.5	9 22.6	48 88	97.9	9 08.1	48 87	98.4	8 53.5	49 87	98.8	8
9	9 41.9	48 88	95.2	9 27.6	48 88	95.7	9 13.3	48 88	96.1	8 58.9	48 88	96.6	8 44.5	48 88	97.0	8 30.1	48 88	97.4	8 15.6	48 88	97.9	8 01.1	48 87	98.3	9
80	8 49.2	48 88	94.7	8 34.9	48 88	95.2	8 20.6	48 88	95.6	8 06.3	48 88	96.1	7 51.9	48 88	96.5	7 37.5	48 88	97.0	7 23.1	48 88	97.4	7 08.7	48 88	97.8	80
1	7 56.4	47 88	94.3	7 42.1	47 88	94.7	7 27.9	48 88	95.1	7 13.6	48 88	95.6	6 59.3	48 88	96.0	6 44.9	48 88	96.5	6 30.6	48 88	96.9	6 16.2	48 88	97.4	1
2	7 03.5	47 88	93.8	6 49.3	47 88	94.2	6 35.1	47 88	94.7	6 20.8	48 88	95.1	6 06.6	48 88	95.5	5 52.3	48 88	96.0	5 37.9	48 88	96.4	5 23.6	48 88	96.9	2
3	6 10.6	47 88	93.3	5 56.5	47 88	93.7	5 42.3	47 88	94.2	5 28.0	47 88	94.6	5 13.8	47 88	95.1										3
4	5 17.7	47 88	92.8	5 03.6	47 88	93.3																			4

Lat. 28°

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	66 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	67 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0
1	65 58.9	1.0 06	177.5	66 28.8	1.0 06	177.5	66 58.8	1.0 06	177.5	67 28.8	1.0 06	177.4
2	65 55.5	1.0 10	175.1	66 25.4	1.0 10	175.0	66 55.3	1.0 10	174.9	67 25.2	1.0 10	174.8
3	65 49.8	99 13	172.7	66 19.6	99 13	172.5	66 49.4	99 14	172.4	67 19.2	99 14	172.2
4	65 42.0	99 17	170.3	66 11.6	99 17	170.1	66 41.3	99 17	169.9	67 10.9	99 18	169.7
05	65 31.9	98 20	167.9	66 01.4	98 21	167.7	66 30.8	98 21	167.4	67 00.3	98 22	167.2
6	65 19.7	98 24	165.5	65 49.0	97 24	165.3	66 18.2	97 25	165.0	66 47.4	97 25	164.7
7	65 05.5	97 27	163.2	65 34.5	97 28	162.9	66 03.4	96 28	162.6	66 32.3	96 29	162.3
8	64 49.2	96 30	161.0	65 17.9	96 31	160.6	65 46.5	95 32	160.3	66 15.1	95 32	159.9
9	64 30.9	95 34	158.7	64 59.3	95 34	158.4	65 27.6	94 35	158.0	65 55.9	94 35	157.6
10	64 10.8	94 37	156.6	64 38.8	93 37	156.2	65 06.8	93 38	155.7	65 34.7	93 38	155.3
1	63 48.8	92 40	154.4	64 16.5	92 40	154.0	64 44.1	92 41	153.6	65 11.6	92 41	153.1
2	63 25.1	91 42	152.4	63 52.4	91 43	151.9	64 19.6	91 44	151.4	64 46.8	90 44	150.9
3	62 59.7	90 45	150.4	63 26.7	90 46	149.9	63 53.5	89 46	149.4	64 20.2	89 47	148.9
4	62 32.8	89 48	148.4	62 59.3	88 48	147.9	63 25.7	88 49	147.4	63 52.0	87 50	146.9
15	62 04.3	87 50	146.5	62 30.4	87 50	146.0	62 56.4	86 51	145.5	63 22.3	86 52	144.9
6	61 34.4	86 52	144.7	62 00.1	86 53	144.2	62 25.7	85 54	143.6	62 51.1	85 54	143.0
7	61 03.1	85 54	142.9	61 28.4	84 55	142.4	61 53.6	84 56	141.8	62 18.6	83 56	141.2
8	60 30.6	83 56	141.2	60 55.5	83 57	140.7	61 20.2	82 58	140.1	61 44.8	82 58	139.5
9	59 56.8	82 58	139.6	60 21.3	81 59	139.0	60 45.6	81 60	138.4	61 09.8	80 60	137.8
20	59 21.9	81 60	138.0	59 46.0	80 61	137.4	60 09.9	79 61	136.8	60 33.6	79 62	136.2
1	58 45.9	79 62	136.4	59 09.6	79 62	135.8	59 33.1	78 63	135.2	59 56.4	78 64	134.6
2	58 08.8	78 63	134.9	58 32.1	77 64	134.3	58 55.3	77 65	133.7	59 18.2	76 65	133.1
3	57 30.9	77 65	133.5	57 53.8	76 66	132.9	58 16.5	75 66	132.2	58 39.0	75 67	131.6
4	56 52.0	75 66	132.1	57 14.5	75 67	131.5	57 36.9	74 68	130.8	57 59.0	74 68	130.2
25	56 12.2	74 68	130.7	56 34.4	74 68	130.1	56 56.4	73 69	129.5	57 18.2	72 70	128.9
6	55 31.7	73 69	129.4	55 53.5	72 70	128.8	56 15.1	72 70	128.2	56 36.5	71 70	127.5
7	54 50.4	72 70	128.1	55 11.8	71 70	127.5	55 33.1	71 71	126.9	55 54.2	70 72	126.3
8	54 08.4	71 71	126.9	54 29.5	70 72	126.3	54 50.4	69 72	125.7	55 11.1	69 73	125.1
9	53 25.7	70 72	125.7	53 46.5	69 73	125.1	54 07.1	68 73	124.5	54 27.5	68 74	123.9
30	52 42.4	68 73	124.6	53 02.8	68 74	124.0	53 23.1	67 74	123.4	53 43.2	67 75	122.7
1	51 58.5	67 74	123.5	52 18.6	67 74	122.9	52 38.6	66 75	122.3	52 58.3	66 76	121.6
2	51 14.0	66 75	122.4	51 33.9	66 76	121.8	51 53.5	65 76	121.2	52 13.0	65 76	120.6
3	50 29.0	65 76	121.4	50 48.6	65 76	120.8	51 08.0	64 77	120.2	51 27.1	64 77	119.5
4	49 43.6	65 77	120.4	50 02.8	64 77	119.8	50 21.9	63 78	119.2	50 40.8	63 78	118.5
35	48 57.6	64 77	119.4	49 16.6	63 78	118.8	49 35.4	62 78	118.2	49 54.1	62 79	117.6
6	48 11.2	63 78	118.4	48 30.0	62 78	117.8	48 48.5	62 79	117.2	49 06.9	61 79	116.6
7	47 24.4	62 79	117.5	47 42.9	61 79	116.9	48 01.2	61 80	116.3	48 19.4	60 80	115.7
8	46 37.3	61 79	116.6	46 55.5	61 80	116.0	47 13.6	60 80	115.4	47 31.5	59 80	114.8
9	45 49.7	60 80	115.7	46 07.7	60 80	115.1	46 25.6	59 80	114.6	46 43.2	59 81	114.0
40	45 01.8	60 80	114.9	45 19.6	59 81	114.3	45 37.2	58 81	113.7	45 54.7	58 82	113.1
1	44 13.6	59 81	114.0	44 31.2	58 81	113.5	44 48.6	58 82	112.9	45 05.8	57 82	112.3
2	43 25.0	58 81	113.2	43 42.4	58 82	112.7	43 59.6	57 82	112.1	44 16.6	56 82	111.5
3	42 36.2	58 82	112.4	42 53.4	57 82	111.9	43 10.4	56 82	111.3	43 27.2	56 83	110.7
4	41 47.1	57 82	111.7	42 04.1	56 82	111.1	42 20.9	56 83	110.6	42 37.6	55 83	110.0
45	40 57.8	56 83	110.9	41 14.6	56 83	110.4	41 31.2	55 83	109.8	41 47.7	55 84	109.3
6	40 08.1	56 83	110.2	40 24.8	55 83	109.6	40 41.2	55 84	109.1	40 57.5	54 84	108.5
7	39 18.3	55 84	109.5	39 34.8	55 84	108.9	39 51.1	54 84	108.4	40 07.2	54 84	107.8
8	38 28.3	55 84	108.8	38 44.5	54 84	108.2	39 00.7	54 84	107.7	39 16.7	53 84	107.1
9	37 38.0	54 84	108.1	37 54.1	54 84	107.5	38 10.1	53 85	107.0	38 26.0	53 85	106.5
50	36 47.5	54 84	107.4	37 03.5	53 85	106.9	37 19.4	53 85	106.3	37 35.1	52 85	105.8
1	35 56.9	53 85	106.7	36 12.7	53 85	106.2	36 28.4	52 85	105.7	36 44.0	52 85	105.2
2	35 06.1	53 85	106.1	35 21.8	52 85	105.6	35 37.4	52 85	105.0	35 52.8	51 86	104.5
3	34 15.1	52 85	105.5	34 30.7	52 86	104.9	34 46.1	51 86	104.4	35 01.4	51 86	103.9
4	33 23.9	52 86	104.8	33 39.4	51 86	104.3	33 54.7	51 86	103.8	34 10.0	50 86	103.3
55	32 32.7	51 86	104.2	32 48.0	51 86	103.7	33 03.2	51 86	103.2	33 18.3	50 86	102.7
6	31 41.2	51 86	103.6	31 56.5	51 86	103.1	32 11.6	50 86	102.6	32 26.6	50 86	102.1
7	30 49.7	51 86	103.0	31 04.8	50 86	102.5	31 19.8	50 86	102.0	31 34.7	49 86	101.5
8	29 58.0	50 86	102.4	30 13.0	50 86	101.9	30 28.0	50 87	101.4	30 42.8	49 87	100.9
9	29 06.2	50 86	101.9	29 21.2	50 87	101.4	29 36.0	49 87	100.9	29 50.7	49 87	100.4
60	28 14.3	50 87	101.3	28 29.2	40 87	100.8	28 43.9	49 87	100.3	28 58.5	49 87	99.8
1	27 22.3	49 87	100.7	27 37.1	49 87	100.2	27 51.7	49 87	99.8	28 06.3	48 87	99.3
2	26 30.2	49 87	100.2	26 44.9	49 87	99.7	26 59.5	48 87	99.2	27 14.0	48 87	98.7
3	25 38.0	49 87	99.6	25 52.6	49 87	99.2	26 07.2	48 87	98.7	26 21.6	48 88	98.2
4	24 45.8	49 87	99.1	25 00.3	48 87	98.6	25 14.8	48 88	98.1	25 29.1	48 88	97.7
65	23 53.4	48 87	98.6	24 07.9	48 88	98.1	24 22.3	48 88	97.6	24 36.6	47 88	97.1
6	23 01.0	48 88	98.1	23 15.4	48 88	97.6	23 29.7	48 88	97.1	23 44.0	47 88	96.6
7	22 08.5	48 88	97.5	22 22.9	48 88	97.1	22 37.1	47 88	96.6	22 51.3	47 88	96.1
8	21 16.0	48 88	97.0	21 30.3	48 88	96.5	21 44.5	47 88	96.1	21 58.6	47 88	95.6
9	20 23.4	48 88	96.5	20 37.6	47 88	96.0	20 51.8	47 88	95.6	21 05.9	47 88	95.1
70	19 30.7	47 88	96.0	19 44.9	47 88	95.5	19 59.0	47 88	95.1	20 13.1	47 88	94.6
1	18 38.0	47 88	95.5	18 52.1	47 88	95.0	19 06.2	47 88	94.6	19 20.3	47 88	94.1
2	17 45.2	47 88	95.0	17 59.4	47 88	94.5	18 13.4	47 88	94.1	18 27.4	47 88	93.6
3	16 52.4	47 88	94.5	17 06.5	47 88	94.1	17 20.6	47 88	93.6	17 34.5	46 88	93.1
4	15 59.6	47 88	94.0	16 13.7	47 88	93.6	16 27.7	47 88	93.1	16 41.6	46 88	92.6
75	15 06.8	47 88	93.5	15 20.8	47 88	93.1	15 34.8	46 88	92.6	15 48.7	46 88	92.2
6	14 13.9	47 88	93.1	14 27.9	47 88	92.6	14 41.8	46 88	92.1	14 55.7	46 88	91.7
7	13 21.0	47 88	92.6	13 34.9	47 88	92.1	13 48.9	46 88	91.7	14 02.8	46 88	91.2
8	12 28.0	47 88	92.1	12 42.0	47 88	91.6	12 55.9	46 88	91.2	13 09.8	46 88	90.7
9	11 35.1	47 88	91.6	11 49.0	46 88	91.2	12 02.9	46 88	90.7	12 16.8	46 88	90.3
80	10 42.1	47 88	91.2	10 56.1	46 88	90.7	11 10.0	46 88	90.2	11 23.8	46 88	89.8
1	9 49.1	47 88	90.7	10 03.1	46 88	90.2	10 17.0	46 88	89.8	10 30.9	46 88	89.3
2	8 56.2	47 88	90.2	9 10.1	46 88	89.8	9 24.0	46 88	89.3	9 37.9	46 88	88.9
3	8 03.2	47 88	89.7	8 17.1	46 88	89.3	8 31.1	46 88	88.8	8 44.9	46 88	88.4
4	7 10.2	47 88	89.3	7 24.2	46 88	88.8	7 38.1	46 88	88.4	7 52.0	46 88	87.9
85	6 17.2	47 88	88.8	6 31.2	47 88	88.4	6 45.1	46 88	87.9	6 59.1	46 88	87.5
6	5 24.3	47 88	88.3	5 38.3	47 88	87.9	5 52.2	46 88	87.4	6 06.1	46 88	87.0
7										5 13.2	46 88	86.5
8												

H.A.	6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	68 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0
1	67 58.8	1.0 06	177.3	68 28.7	1.0 06	177.3	68 58.7	1.0 06	177.2	69 28.7	1.0 06	177.2
2	67 55.1	1.0 10	174.7	68 25.0	1.0 10	174.6	68 54.9	1.0 11	174.5	69 24.8	1.0 11	174.4
3	67 49.0	99 14	172.1	68 18.8	99 14	171.9	68 48.5	99 15	171.7	69 18.3	99 15	171.6
4	67 40.5	99 18	169.5	68 10.1	99 18	169.3	68 39.7	99 19	169.0	69 09.2	98 19	168.8
05	67 29.7	98 22	166.9	67 59.0	98 22	166.6	68 28.4	98 23	166.4	68 57.7	98 23	166.1
6	67 16.5	97 26	164.4	67 45.6	97 26	164.1	68 14.7	97 27	163.7	68 43.8	97 27	163.4
7	67 01.2	96 29	161.9	67 30.0	96 30	161.6	67 58.8	96 30	161.2	68 27.5	96 31	160.8
8	66 43.7	95 33	159.5	67 12.2	95 33	159.1	67 40.6	95 34	158.7	68 08.9	94 34	158.2
9	66 24.1	94 36	157.1	66 52.2	94 36	156.7	67 20.3	93 37	156.2	67 48.2	93 38	155.8
10	66 02.5	93 39	154.8	66 30.3	92 40	154.4	66 57.9	92 40	153.9	67 25.5	92 41	153.4
1	65 39.1	91 42	152.6	66 06.4	91 43	152.1	66 33.6	91 44	151.6	67 00.7	90 44	151.0
2	65 13.8	90 45	150.4	65 40.7	90 46	149.9	66 07.5	89 46	149.3	66 34.2	89 47	148.8
3	64 46.8	88 48	148.3	65 13.3	88 48	147.8	65 39.6	88 49	147.2	66 05.8	87 50	146.6
4	64 18.2	87 50	146.3	64 44.2	87 51	145.7	65 10.1	86 52	145.1	65 35.9	86 52	144.5
15	63 48.0	86 53	144.3	64 13.6	85 53	143.7	64 39.1	85 54	143.1	65 04.4	84 55	142.5
6	63 16.4	84 55	142.4	63 41.6	84 56	141.8	64 06.6	83 56	141.2	64 31.4	82 57	140.6
7	62 43.5	83 57	140.6	63 08.2	82 58	140.0	63 32.7	81 58	139.4	63 57.1	81 59	138.7
8	62 09.2	81 59	138.9	62 33.5	81 60	138.2	62 57.6	80 60	137.6	63 21.5	79 61	136.9
9	61 33.8	80 61	137.2	61 57.6	79 62	136.5	62 21.3	78 62	135.9	62 44.7	78 63	135.2
20	60 57.2	78 63	135.5	61 20.6	78 63	134.9	61 43.8	77 64	134.2	62 06.8	76 65	133.5
1	60 19.6	77 64	134.0	60 42.6	76 65	133.3	61 05.3	76 66	132.6	61 27.9	75 66	131.9
2	59 41.0	76 66	132.4	60 03.5	75 66	131.8	60 25.9	74 67	131.1	60 48.1	74 68	130.4
3	59 01.4	74 67	131.0	59 23.6	74 68	130.3	59 45.5	73 69	129.6	60 07.3	72 69	129.0
4	58 21.0	73 69	129.6	58 42.8	72 70	128.9	59 04.3	72 70	128.2	59 25.7	71 71	127.5
25	57 39.8	72 70	128.2	58 01.1	71 70	127.6	58 22.3	70 71	126.9	58 43.3	70 72	126.2
6	56 57.8	70 71	126.9	57 18.8	70 72	126.2	57 39.6	69 72	125.6	58 00.2	68 73	124.9
7	56 15.0	69 72	125.6	56 35.7	69 73	125.0	56 56.2	68 74	124.3	57 16.4	67 74	123.6
8	55 31.7	68 73	124.4	55 52.0	67 74	123.8	56 12.1	67 74	123.1	56 32.0	66 75	122.4
9	54 47.6	67 74	123.2	55 07.6	66 75	122.6	55 27.4	66 75	121.9	55 47.0	65 76	121.3
30	54 03.1	66 75	122.1	54 22.7	65 76	121.5	54 42.2	65 76	120.8	55 01.4	64 77	120.1
1	53 17.9	65 76	121.0	53 37.3	64 77	120.4	53 56.4	63 77	119.7	54 15.4	63 78	119.1
2	52 32.3	64 77	119.9	52 51.3	63 77	119.3	53 10.2	63 78	118.7	53 28.8	62 78	118.0
3	51 46.1	63 78	118.9	52 04.9	62 78	118.3	52 23.5	62 79	117.6	52 41.8	61 79	117.0
4	50 59.5	62 78	117.9	51 18.0	61 79	117.3	51 36.3	61 79	116.7	51 54.4	60 80	116.0
35	50 12.5	61 79	117.0	50 30.8	60 80	116.3	50 48.8	60 80	115.7	51 06.6	59 80	115.1
6	49 25.1	60 80	116.0	49 43.1	60 80	115.4	50 00.9	59 80	114.8	50 18.5	58 81	114.2
7	48 37.3	59 80	115.1	48 55.1	59 81	114.5	49 12.6	58 81	113.9	49 30.0	58 82	113.3
8	47 49.2	59 81	114.2	48 06.7	58 81	113.6	48 24.0	57 82	113.0	48 41.1	57 82	112.4
9	47 00.7	58 81	113.4	47 18.0	57 82	112.8	47 35.1	57 82	112.2	47 52.0	56 82	111.6
40	46 11.9	57 82	112.5	46 29.0	57 82	111.9	46 45.9	56 82	111.3	47 02.6	55 83	110.7
1	45 22.9	57 82	111.7	45 39.7	56 82	111.1	45 56.4	55 83	110.5	46 12.9	55 83	109.9
2	44 33.5	56 83	110.9	44 50.2	55 83	110.4	45 06.7	55 83	109.8	45 23.0	54 84	109.2
3	43 43.9	55 83	110.2	44 00.4	55 83	109.6	44 16.7	54 84	109.0	44 32.9	54 84	108.4
4	42 54.1	55 84	109.4	43 10.4	54 84	108.8	43 26.5	54 84	108.3	43 42.5	53 84	107.7
45	42 04.0	54 84	108.7	42 20.1	54 84	108.1	42 36.1	53 84	107.5	42 51.9	52 85	107.0
6	41 13.7	54 84	108.0	41 29.7	53 84	107.4	41 45.5	52 85	106.8	42 01.1	52 85	106.3
7	40 23.2	53 84	107.3	40 39.0	52 85	106.7	40 54.7	52 85	106.1	41 10.2	51 85	105.6
8	39 32.5	53 85	106.6	39 48.2	52 85	106.0	40 03.7	51 85	105.5	40 19.1	51 86	104.9
9	38 41.7	52 85	105.9	38 57.2	52 85	105.4	39 12.6	51 86	104.8	39 27.8	51 86	104.3
50	37 50.6	52 85	105.3	38 06.0	51 86	104.7	38 21.3	51 86	104.2	38 36.4	50 86	103.6
1	36 59.4	51 86	104.6	37 14.7	51 86	104.1	37 29.9	50 86	103.5	37 44.8	50 86	103.0
2	36 08.1	51 86	104.0	36 23.3	50 86	103.4	36 38.3	50 86	102.9	36 53.2	49 86	102.4
3	35 16.6	50 86	103.4	35 31.7	50 86	102.8	35 46.6	49 86	102.3	36 01.4	49 97	101.8
4	34 25.0	50 86	102.8	34 40.0	50 86	102.2	34 54.8	49 87	101.7	35 09.4	49 87	101.2
55	33 33.3	50 86	102.2	33 48.1	49 86	101.6	34 02.8	49 87	101.1	34 17.4	48 87	100.6
6	32 41.5	49 87	101.6	32 56.2	49 87	101.1	33 10.8	48 87	100.5	33 25.3	48 87	100.0
7	31 49.5	49 87	101.0	32 04.1	49 87	100.5	32 18.7	48 87	100.0	32 33.1	48 87	99.4
8	30 57.4	49 87	100.4	31 12.0	48 87	99.9	31 26.4	48 87	99.4	31 40.8	48 87	98.9
9	30 05.3	48 87	99.9	30 19.8	48 87	99.4	30 34.1	48 87	98.8	30 48.4	47 88	98.3
60	29 13.1	48 87	99.3	29 27.5	48 87	98.8	29 41.8	47 88	98.3	29 55.9	47 88	97.8
1	28 20.7	48 87	98.8	28 35.1	48 88	98.3	28 49.3	47 88	97.8	29 03.4	47 88	97.3
2	27 28.3	48 88	98.2	27 42.6	47 88	97.7	27 56.8	47 88	97.2	28 10.8	47 88	96.7
3	26 35.9	48 88	97.7	26 50.1	47 88	97.2	27 04.2	47 88	96.7	27 18.2	46 88	96.2
4	25 43.3	47 88	97.2	25 57.5	47 88	96.7	26 11.5	47 88	96.2	26 25.5	46 88	95.7
65	24 50.8	47 88	96.6	25 04.9	47 88	96.2	25 18.9	47 88	95.7	25 32.8	46 88	95.2
6	23 58.1	47 88	96.1	24 12.2	47 88	95.6	24 26.1	46 88	95.2	24 40.0	46 88	94.7
7	23 05.4	47 88	95.6	23 19.4	47 88	95.1	23 33.3	46 88	94.7	23 47.2	46 88	94.2
8	22 12.7	47 88	95.1	22 26.6	46 88	94.6	22 40.5	46 88	94.2	22 54.3	46 88	93.7
9	21 19.9	47 88	94.6	21 33.8	46 88	94.1	21 47.7	46 88	93.7	22 01.4	46 88	93.2
70	20 27.1	46 88	94.1	20 41.0	46 88	93.7	20 54.8	46 88	93.2	21 08.5	46 88	92.7
1	19 34.2	46 88	93.6	19 48.1	46 88	93.2	20 01.9	46 88	92.7	20 15.6	46 88	92.2
2	18 41.3	46 88	93.1	18 55.2	46 88	92.7	19 08.9	46 88	92.2	19 22.6	46 88	91.7
3	17 48.4	46 88	92.7	18 02.2	46 88	92.2	18 16.0	46 88	91.7	18 29.7	46 88	91.3
4	16 55.5	46 88	92.2	17 09.3	46 88	91.7	17 23.0	46 88	91.3	17 36.7	46 88	90.8
75	16 02.5	46 88	91.7	16 16.3	46 88	91.2	16 30.1	46 88	90.8	16 43.7	45 88	90.3
6	15 09.6	46 88	91.2	15 23.4	46 88	90.8	15 37.1	46 88	90.3	15 50.8	45 88	89.8
7	14 16.6	46 88	90.8	14 30.4	46 88	90.3	14 44.1	46 88	89.8	14 57.8	46 88	89.4
8	13 23.6	46 88	90.3	13 37.4	46 88	89.8	13 51.1	46 88	89.4	14 04.8	46 88	88.9
9	12 30.7	46 88	89.8	12 44.4	46 88	89.4	12 58.2	46 88	88.9	13 11.9	46 88	88.4
80	11 37.7	46 88	89.3	11 51.5	46 88	88.9	12 05.2	46 88	88.4	12 18.9	46 88	88.0
1	10 44.7	46 88	88.9	10 58.5	46 88	88.4	11 12.3	46 88	88.0	11 26.0	46 88	87.5
2	9 51.7	46 88	88.4	10 05.6	46 88	88.0	10 19.3	46 88	87.5	10 33.1	46 88	87.1
3	8 58.8	46 88	87.9	9 12.6	46 88	87.5	9 26.4	46 88	87.0	9 40.2	46 88	86.6
4	8 05.9	46 88	87.5	8 19.7	46 88	87.0	8 33.5	46 88	86.6	8 47.3	46 88	86.1
85	7 12.9	46 88	87.0	7 26.8	46 88	86.6	7 40.6	46 88	86.1	7 54.4	46 88	85.7
6	6 20.0	46 88	86.6	6 33.9	46 88	86.1	6 47.8	46 88	85.7	7 01.6	46 88	85.2
7	5 27.2	46 88	86.1	5 41.1	46 88	85.6	5 55.0	46 88	85.2	6 08.9	46 88	84.8
8							5 02.2	46 88	84.7	5 16.1	46 88	84.3

H.A.	4° 00′ Alt.	Az.	Δd	Δt	4° 30′ Alt.	Az.	Δd	Δt	5° 00′ Alt.	Az.	Δd	Δt	5° 30′ Alt.	Az.	Δd	Δt	6° 00′ Alt.	Az.	Δd	Δt	6° 30′ Alt.	Az.	Δd	Δt	7° 00′ Alt.	Az.	Δd	Δt	7° 30′ Alt.	Az.	Δd	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
00	58 00.0	180.0	1.0	02	57 30.0	180.0	1.0	02	57 00.0	180.0	1.0	01	56 30.0	180.0	1.0	01	56 00.0	180.0	1.0	01	55 30.0	180.0	1.0	01	55 00.0	180.0	1.0	01	54 30.0	180.0	1.0	01	00
1	57 59.1	178.1	1.0	04	57 29.1	178.1	1.0	04	56 59.2	178.2	1.0	04	56 29.2	178.2	1.0	04	55 59.2	178.2	1.0	04	55 29.2	178.2	1.0	04	54 59.2	178.3	1.0	04	54 29.2	178.3	1.0	04	1
2	57 56.5	176.2	1.0	07	57 26.6	176.3	1.0	07	56 56.6	176.3	1.0	07	56 26.7	176.4	1.0	07	55 56.7	176.4	1.0	07	55 26.8	176.5	1.0	07	54 56.8	176.5	1.0	07	54 26.8	176.6	1.0	06	2
3	57 52.2	174.4	1.0	10	57 22.3	174.4	1.0	10	56 52.4	174.5	1.0	10	56 22.5	174.6	1.0	10	55 52.6	174.7	1.0	10	55 22.7	174.7	1.0	09	54 52.8	174.8	1.0	09	54 22.9	174.9	1.0	09	3
4	57 46.1	172.5	99	13	57 16.5	172.6	99	13	56 46.5	172.7	99	13	56 16.7	172.8	99	12	55 46.9	172.9	99	12	55 17.1	173.0	99	12	54 47.2	173.1	99	12	54 17.4	173.2	99	12	4
05	57 38.4	170.7	99	16	57 08.7	170.8	99	16	56 39.0	170.9	99	15	56 09.3	171.0	99	15	55 39.5	171.2	99	15	55 09.8	171.3	99	15	54 40.1	171.4	99	14	54 10.4	171.5	99	14	05
6	57 28.9	168.8	99	18	56 59.4	169.0	99	18	56 29.8	169.1	99	18	56 00.2	169.3	99	18	55 30.6	169.4	99	18	55 01.0	169.6	99	17	54 31.4	169.7	99	17	54 01.8	169.8	99	17	6
7	57 17.8	167.0	98	21	56 48.4	167.2	98	21	56 19.0	167.4	98	21	55 49.6	167.5	98	20	55 20.1	167.7	98	20	54 50.6	167.9	98	20	54 21.2	168.0	98	20	53 51.7	168.2	98	19	7
8	57 05.1	165.2	97	24	56 35.9	165.4	97	24	56 06.6	165.6	98	23	55 37.3	165.8	98	23	55 08.0	166.0	98	23	54 38.7	166.2	98	22	54 09.4	166.4	98	22	53 40.1	166.5	98	22	8
9	56 50.8	163.4	97	26	56 21.7	163.6	97	26	55 52.7	163.9	97	26	55 23.6	164.1	97	25	54 54.5	164.3	97	25	54 25.3	164.5	97	25	53 56.2	164.7	97	24	53 27.0	164.9	97	24	9
10	56 34.9	161.7	96	29	56 06.0	161.9	96	29	55 37.2	162.2	96	28	55 08.3	162.4	96	28	54 39.4	162.6	96	28	54 10.4	162.9	97	27	53 41.5	163.1	97	27	53 12.5	163.3	97	26	10
1	56 17.4	159.9	95	32	55 48.8	160.2	95	31	55 20.2	160.5	96	31	54 51.5	160.7	96	30	54 22.8	161.0	96	30	53 54.1	161.2	96	30	53 25.3	161.5	96	29	52 56.6	161.7	96	29	1
2	55 58.5	158.2	94	34	55 30.2	158.5	95	34	55 01.8	158.8	95	33	54 33.3	159.1	95	33	54 04.9	159.4	95	32	53 36.4	159.6	95	32	53 07.8	159.9	95	32	52 39.2	160.1	95	31	2
3	55 38.2	156.6	94	36	55 10.1	156.9	94	36	54 41.9	157.2	94	35	54 13.7	157.5	94	35	53 45.5	157.8	94	34	53 17.2	158.0	94	34	52 48 9	158.3	94	34	52 20.6	158.6	95	33	3
4	55 16.4	154.9	93	38	54 48.6	155.3	93	38	54 20.7	155.6	93	38	53 52.8	155.9	93	37	53 24.8	156.2	93	37	52 56.8	156.5	94	36	52 28.7	156.8	94	36	52 00.6	157.1	94	36	4
15	54 53.3	153.3	92	41	54 25.8	153.7	92	40	53 58.1	154.0	92	40	53 30.5	154.3	92	39	53 02.7	154.6	92	39	52 35.0	155.0	93	38	52 07.2	155.3	93	38	51 39.3	155.6	93	38	15
6	54 28.9	151.8	91	43	54 01.6	152.1	91	42	53 34.3	152.5	91	42	53 06.9	152.8	91	41	52 39.4	153.1	92	41	52 11.9	153.5	92	40	51 44.4	153.8	92	40	51 16.8	154.1	92	40	6
7	54 03.2	150.2	90	45	53 36.2	150.6	90	44	53 09.2	150.9	90	44	52 42.1	151.3	90	44	52 14.9	151.6	91	43	51 47.6	152.0	91	42	51 20.4	152.3	91	42	50 53.0	152.6	91	42	7
8	53 36.3	148.7	89	47	53 09.6	149.1	89	46	52 42.8	149.5	89	46	52 16.0	149.8	90	45	51 49.1	150.2	90	45	51 22.2	150.5	90	44	50 55.2	150.9	90	44	50 28.1	151.2	90	44	8
9	53 08.2	147.2	88	49	52 41.8	147.6	88	48	52 15.3	148.0	88	48	51 48.8	148.4	89	47	51 22.2	148.8	89	47	50 55.6	149.1	89	46	50 28.8	149.5	89	46	50 02.0	149.8	89	45	9
20	52 38.9	145.8	87	50	52 12.9	146.2	87	50	51 46.7	146.6	87	50	51 20.5	147.0	88	49	50 54.2	147.4	88	48	50 27.8	147.7	88	48	50 01.4	148.1	88	48	49 34.9	148.5	88	47	20
1	52 08.6	144.4	86	52	51 42.8	144.8	86	52	51 17.0	145.2	86	51	50 51.1	145.6	87	51	50 25.1	146.0	87	50	49 59.0	146.4	87	50	49 32.8	146.8	87	49	49 06.6	147.1	88	49	1
2	51 37.2	143.0	85	54	51 11.8	143.4	85	53	50 46.2	143.8	85	53	50 20.6	144.2	86	52	49 54.9	144.7	86	52	49 29.2	145.0	86	52	49 03.3	145.4	86	51	48 37.4	145.8	87	50	2
3	51 04.8	141.7	84	56	50 39.7	142.1	84	55	50 14.5	142.5	84	54	49 49.2	142.9	85	54	49 23.8	143.3	85	54	48 58.3	143.7	85	53	48 32.7	144.1	85	52	48 07.1	144.5	86	52	3
4	50 31.5	140.3	83	57	50 06.7	140.8	83	57	49 41.8	141.2	83	56	49 16.8	141.6	84	55	48 51.7	142.1	84	55	48 26.5	142.5	84	54	48 01.2	142.9	84	54	47 35.9	143.3	85	54	4
25	49 57.2	139.1	81	59	49 32.7	139.5	82	58	49 08.1	139.9	82	58	48 43.4	140.4	82	57	48 18.7	140.8	83	56	47 53.8	141.2	83	56	47 28.8	141.6	83	56	47 03.8	142.0	84	55	25
6	49 22.1	137.8	80	60	48 57.9	138.3	81	60	48 33.6	138.7	81	59	48 09.2	139.2	81	58	47 44.7	139.6	82	58	47 20.2	140.0	82	58	46 55.5	140.4	82	57	46 30.7	140.8	83	56	6
7	48 46.1	136.6	79	61	48 22.2	137.1	80	61	47 58.2	137.5	80	60	47 34.2	138.0	80	60	47 10.0	138.4	81	59	46 45.7	138.8	81	59	46 21.3	139.2	81	58	45 56.9	139.7	82	58	7
8	48 09.3	135.4	78	63	47 45.7	135.9	79	62	47 22.0	136.3	79	62	46 58.3	136.8	79	61	46 34.4	137.2	80	61	46 10.4	137.7	80	60	45 46.3	138.1	80	60	45 22.2	138.5	81	59	8
9	47 31.7	134.3	77	64	47 08.5	134.7	78	64	46 45.1	135.2	78	63	46 21.6	135.6	78	62	45 58.0	136.1	79	62	45 34.3	136.5	79	61	45 10.5	137.0	79	61	44 46.7	137.4	80	60	9
30	46 53.4	133.1	76	65	46 30.4	133.6	77	64	46 07.4	134.1	77	64	45 44.2	134.5	77	64	45 20.9	135.0	78	63	44 57.5	135.4	78	62	44 34.0	135.8	78	62	44 10.4	136.3	79	62	30
1	46 14.4	132.0	75	66	45 51.7	132.5	76	66	45 29.0	133.0	76	65	45 06.1	133.4	76	65	44 43.1	133.9	77	64	44 20.0	134.3	77	64	43 56.8	134.8	78	63	43 33.4	135.2	78	63	1
2	45 34.7	131.0	74	67	45 12.3	131.4	75	67	44 49.8	131.9	75	66	44 27.2	132.4	76	66	44 04.5	132.8	76	65	43 41.7	133.3	76	65	43 18.8	133.7	77	64	42 55.8	134.1	77	64	2
3	44 54.4	129.9	73	68	44 32.3	130.4	74	68	44 10.1	130.9	74	67	43 47.8	131.3	75	67	43 25.3	131.8	75	66	43 02.8	132.2	75	66	42 40.2	132.7	76	66	42 17.4	133.1	76	65	3
4	44 13.4	128.9	72	69	43 51.6	129.4	73	69	43 29.7	129.8	73	68	43 07.7	130.3	74	68	42 45.5	130.8	74	67	42 23.3	131.2	74	67	42 00.9	131.7	75	66	41 38.4	132.1	75	66	4
35	43 31.9	127.9	72	70	43 10.4	128.4	72	70	42 48.7	128.8	72	69	42 27.0	129.3	73	69	42 05.1	129.8	73	68	41 43.1	130.2	73	68	41 21.0	130.7	74	68	40 58.8	131.1	74	67	35
6	42 49.8	126.9	71	71	42 28.6	127.4	71	71	42 07.2	127.9	71	70	41 45.7	128.3	72	70	41 24.1	128.8	72	69	41 02.4	129.3	73	69	40 40.6	129.7	73	68	40 18.6	130.2	73	68	6
7	42 07.2	126.0	70	72	41 46.2	126.4	70	72	41 25.1	126.9	71	71	41 03.9	127.4	71	71	40 42.5	127.9	71	70	40 21.1	128.3	72	70	39 59.5	128.8	72	69	39 37.9	129.2	72	69	7
8	41 24.1	125.0	69	73	41 03.3	125.5	69	72	40 42.5	126.0	70	72	40 21.5	126.5	70	71	40 00.4	126.9	70	71	39 39.3	127.4	71	71	39 18.0	127.8	71	70	38 56.6	128.3	72	70	8
9	40 40.5	124.1	68	74	40 20.0	124.6	68	73	39 59.4	125.1	69	73	39 38.7	125.6	69	72	39 17.8	126.0	70	72	38 56.9	126.5	70	71	38 35.9	126.9	70	71	38 14.7	127.4	71	70	9
40	39 56.4	123.2	67	74	39 36.2	123.7	68	74	39 15.8	124.2	68	73	38 55.3	124.7	68	73	38 34.8	125.1	69	73	38 14.1	125.6	69	72	37 53.3	126.1	69	72	37 32.4	126.5	70	71	40
1	39 11.9	122.4	66	75	38 51.9	122.9	67	74	38 31.8	123.3	67	74	38 11.5	123.8	68	74	37 51.2	124.3	68	73	37 30.8	124.7	68	73	37 10.2	125.2	69	72	36 49.6	125.6	69	72	1
2	38 26.9	121.5	66	76	38 07.2	122.0	66	75	37 47.3	122.5	66	75	37 27.3	123.0	67	74	37 07.2	123.4	67	74	36 47.0	123.9	68	74	36 26.7	124.3	68	73	36 06.3	124.8	68	73	2
3	37 41.6	120.7	65	76	37 22.0	121.2	66	76	37 02.4	121.7	66	76	36 42.7	122.1	66	75	36 22.8	122.6	66	75	36 02.8	123.1	67	74	35 42.8	123.5	67	74	35 22.6	124.0	67	74	3
4	36 55.8	119.9	64	77	36 36.5	120.4	65	76	36 17.1	120.9	65	76	35 57.6	121.3	65	76	35 38.0	121.8	66	75	35 18.2	122.3	66	75	34 58.4	122.7	66	75	34 38.4	123.2	67	74	4
45	36 09.7	119.1	63	78	35 50.6	119.6	64	77	35 31.4	120.1	64	77	35 12.1	120.5	65	76	34 52.7	121.0	65	76	34 33.2	121.5	65	76	34 13.6	121.9	66	75	33 53.9	122.4	66	75	45
6	35 23.3	118.3	63	78	35 04.4	118.8	63	77	34 45.4	119.3	63	77	34 26.3	119.8	64	77	34 07.1	120.2	64	77	33 47.8	120.7	64	76	33 28.4	121.1	65	76	33 09.0	121.6	65	76	6
7	34 36.5	117.6	62	78	34 17.8	118.0	62	78	33 59.0	118.5	63	78	33 40.2	119.0	63	78	33 21.2	119.4	63	77	33 02.1	119.9	64	77	32 42.9	120.4	64	76	32 23.6	120.8	64	76	7
8	33 49.3	116.8	61	79	33 30.9	117.3	62	79	33 12.3	117.8	62	78	32 53.7	118.2	62	78	32 34.9	118.7	63	78	32 16.0	119.2	63	77	31 57.0	119.6	63	77	31 38.0	120.1	64	77	8
9	33 01.9	116.1	61	80	32 43.7	116.6	61	79	32 25.3	117.0	61	79	32 06.8	117.5	62	78	31 48.3	118.0	62	78	31 29.6	118.4	62	78	31 10.8	118.9	63	78	30 52.0	119.3	63	77	9
50	32 14.2	115.4	60	80	31 56.1	115.9	60	80	31 38.0	116.3	61	79	31 19.7	116.8	61	79	31 01.3	117.3	61	79	30 42.8	117.7	62	78	30 24.3	118.2	62	78	30 05.6	118.6	62	78	50
1	31 26.2	114.7	59	80	31 08.3	115.2	60	80	30 50.3	115.6	60	80	30 32.2	116.1	60	80	30 14.1	116.5	61	79	29 55.8	117.0	61	79	29 37.4	117.5	61	79	29 19.0	117.9	62	78	1
2	30 37.9	114.0	59	81	30 20.2	114.5	59	80	30 02.4	114.9	60	80	29 44.5	115.4	60	80	29 26.5	115.9	60	80	29 08.4	116.3	60	79	28 50.3	116.8	61	79	28 32.0	117.2	61	79	2
3	29 49.4	113.3	58	81	29 31.9	113.8	59	81	29 14.3	114.2	59	81	28 56.5	114.7	59	80	28 38.7	115.2	60	80	28 20.8	115.6	60	80	28 02.8	116.1	60	80	27 44.7	116.5	60	79	3
4	29 00.6	112.7	58	82	28 43.3	113.1	58	81	28 25.8	113.6	58	81	28 08.3	114.0	59	81	27 50.6	114.5	59	80	27 32.9	115.0	59	80	27 15.1	115.4	60	80	26 57.2	115.9	60	80	4
55	28 11.6	112.0	57	82	27 54.4	112.5	57	82	27 37.2	112.9	58	82	27 19.8	113.4	58	81	27 02.3	113.8	58	81	26 44.8	114.3	59	81	26 27.1	114.8	59	80	26 09.4	115.2	59	80	55
6	27 22.4	111.4	57	82	27 05.4	111.8	57	82	26 48.2	112.3	57	82	26 31.0	112.7	58	82	26 13.7	113.2	58	81	25 56.4	113.7	58	81	25 38.9	114.1	58	81	25 21.3	114.6	59	80	6
7	26 33.0	110.7	56	83	26 16.1	111.2	56	82	25 59.1	111.7	57	82	25 42.1	112.1	57	82	25 24.9	112.6	57	82	25 07.7	113.0	58	82	24 50.4	113.5	58	81	24 33.0	113.9	58	81	7
8	25 43.3	110.1	56	83	25 26.6	110.6	56	83	25 09.8	111.0	56	82	24 52.9	111.5	56	82	24 35.9	111.9	57	82	24 18.8	112.4	57	82	24 01.7	112.8	57	82	23 44.5	113.3	58	81	8
9	24 53.5	109.5	55	83	24 36.9	110.0	55	83	24 20.2	110.4	56	83	24 03.5	110.9	56	83	23 46.7	111.3	56	82	23 29.8	111.8	57	82	23 12.8	112.2	57	82	22 55.7	112.7	57	82	9
60	24 03.4	108.9	55	84	23 47.0	109.4	55	84	23 30.5	109.8	55	83	23 13.9	110.3	55	83	22 57.2	110.7	56	83	22 40.5	111.2	56	82	22 23.6	111.6	56	82	22 06.7	112.1	56	82	60
1	23 13.2	108.3	54	84	22 56.9	108.8	54	84	22 40.5	109.2	55	84	22 24.1	109.7	55	83	22 07.6	110.1	55	83	21 50.9	110.6	55	83	21 34.3	111.0	56	83	21 17.5	111.5	56	82	1
2	22 22.8	107.7	54	84	22 06.7	108.2	54	84	21 50.4	108.6	54	84	21 34.1	109.1	55	84	21 17.7	109.5	55	83	21 01.3	110.0	55	83	20 44.7	110.4	55	83	20 28.1	110.9	55	83	2
3	21 32.3	107.1	53	84	21 16.3	107.6	54	84	21 00.1	108.1	54	84	20 44.0	108.5	54	84	20 27.7	108.9	54	84	20 11.4	109.4	55	84	19 55.0	109.8	55	83	19 38.5	110.3	55	83	3
4	20 41.6	106.6	53	85	20 25.7	107.0	53	84	20 09.7	107.5	53	84	19 53.6	107.9	54	84	19 37.5	108.4	54	84	19 21.3	108.8	54	84	19 05.1	109.3	54	84	18 48.7	109.7	55	83	4
65	19 50.8	106.0	53	85	19 35.0	106.5	53	85	19 19.1	106.9	53	85	19 03.2	107.4	53	84	18 47.2	107.8	53	84	18 31.1	108.3	54	84	18 15.0	108.7	54	84	17 58.8	109.1	54	84	65
6	18 59.8	105.5	52	85	18 44.1	105.9	52	85	18 28.3	106.4	53	85	18 12.5	106.8	53	85	17 56.6	107.3	53	84	17 40.7	107.7	53	84	17 24.7	108.1	53	84	17 08.6	108.6	54	84	6
7	18 08.6	104.9	52	85	17 53.1	105.4	52	85	17 37.4	105.8	52	85	17 21.7	106.3	53	85	17 06.0	106.7	53	85	16 50.2	107.1	53	84	16 34.3	107.6	53	84	16 18.4	108.0	53	84	7
8	17 17.4	104.4	51	86	17 01.9	104.8	52	86	16 46.4	105.3	52	85	16 30.8	105.7	52	85	16 15.2	106.2	52	85	15 59.5	106.6	52	85	15 43.7	107.0	53	84	15 27.9	107.5	53	84	8
9	16 26.0	103.8	51	86	16 10.6	104.3	51	86	15 55.2	104.7	52	86	15 39.7	105.2	52	85	15 24.2	105.6	52	85	15 08.6	106.1	52	85	14 53.0	106.5	52	85	14 37.3	106.9	52	84	9
70	15 34.5	103.3	51	86	15 19.2	103.8	51	86	15 03.9	104.2	51	86	14 48.5	104.6	51	86	14 33.1	105.1	52	85	14 17.6	105.5	52	85	14 02.1	106.0	52	85	13 46.6	106.4	52	85	70
1	14 42.9	102.8	51	86	14 27.7	103.2	51	86	14 12.5	103.7	51	86	13 57.2	104.1	51	86	13 41.9	104.6	51	86	13 26.5	105.0	51	85	13 11.1	105.4	51	85	12 55.7	105.9	52	85	1
2	13 51.2	102.3	50	86	13 36.1	102.7	50	86	13 21.0	103.2	51	86	13 05.8	103.6	51	86	12 50.6	104.0	51	86	12 35.3	104.5	51	86	12 20.0	104.9	51	85	12 04.6	105.4	51	85	2
3	12 59.4	101.8	50	86	12 44.4	102.2	50	86	12 29.3	102.6	50	86	12 14.2	103.1	50	86	11 59.1	103.5	50	86	11 44.0	104.0	51	86	11 28.7	104.4	51	86	11 13.5	104.8	51	86	3
4	12 07.5	101.2	50	87	11 52.5	101.7	50	86	11 37.6	102.1	50	86	11 22.6	102.6	50	86	11 07.6	103.0	50	86	10 52.5	103.5	50	86	10 37.4	103.9	50	86	10 22.2	104.3	51	86	4
75	11 15.4	100.7	49	87	11 00.6	101.2	50	87	10 45.7	101.6	50	86	10 30.8	102.1	50	86	10 15.9	102.5	50	86	10 00.9	102.9	50	86	9 45.9	103.4	50	86	9 30.8	103.8	50	86	75
6	10 23.4	100.2	49	87	10 08.6	100.7	49	87	9 53.8	101.1	49	87	9 39.0	101.6	49	87	9 24.1	102.0	50	86	9 09.2	102.4	50	86	8 54.3	102.9	50	86	8 39.3	103.3	50	86	6
7	9 31.2	99.7	49	87	9 16.5	100.2	49	87	9 01.8	100.6	49	87	8 47.0	101.1	49	87	8 32.3	101.5	49	87	8 17.4	101.9	49	86	8 02.6	102.4	50	86	7 47.7	102.8	50	86	7
8	8 38.9	99.3	49	87	8 24.3	99.7	49	87	8 09.7	100.1	49	87	7 55.0	100.6	49	87	7 40.3	101.0	49	87	7 25.6	101.5	49	87	7 10.8	101.9	49	86	6 56.0	102.3	49	86	8
9	7 46.6	98.8	48	87	7 32.1	99.2	49	87	7 17.5	99.6	49	87	7 02.9	100.1	49	87	6 48.3	100.5	49	87	6 33.6	101.0	49	87	6 18.9	101.4	49	86	6 04.2	101.8	49	86	9
80	6 54.2	98.3	48	87	6 39.7	98.7	48	87	6 25.2	99.2	48	87	6 10.7	99.6	48	87	5 56.1	100.0	49	87	5 41.6	100.5	49	87	5 27.0	100.9	49	87	5 12.3	101.4	49	86	80
1	6 01.8	97.8	48	88	5 47.3	98.2	48	87	5 32.9	98.7	48	87	5 18.4	99.1	48	87	5 03.9	99.6	48	87													1
2	5 09.2	97.3	48	88																													2

Lat. 28°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	72 00.0	1.0 02	180.0	72 30.0	1.0 02	180.0	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	00
1	69 58.7	1.0 07	177.1	70 28.6	1.0 07	177.0	70 58.6	1.0 07	177.0	71 28.6	1.0 07	176.9	71 58.5	1.0 07	176.8	72 28.5	1.0 08	176.7	72 58.4	1.0 08	176.6	73 28.4	1.0 08	176.6	1
2	69 54.7	1.0 11	174.2	70 24.5	1.0 11	174.1	70 54.4	1.0 12	174.0	71 24.3	1.0 12	173.8	71 54.1	1.0 12	173.6	72 24.0	99 12	173.5	72 53.8	99 13	173.3	73 23.6	99 13	173.1	2
3	69 48.0	99 15	171.4	70 17.7	99 16	171.2	70 47.4	99 16	171.0	71 17.1	99 16	170.7	71 46.8	99 17	170.5	72 16.5	99 17	170.3	72 46.1	99 18	170.0	73 15.7	99 18	169.7	3
4	69 38.8	98 20	168.5	70 08.3	98 20	168.3	70 37.8	98 20	168.0	71 07.2	98 21	167.7	71 36.7	98 22	167.4	72 06.1	98 22	167.1	72 35.5	98 22	166.8	73 04.8	98 23	166.4	4
05	69 27.0	98 24	165.8	69 56.2	97 24	165.4	70 25.5	97 25	165.1	70 54.6	97 25	164.8	71 23.8	97 26	164.4	71 52.9	97 27	164.0	72 21.9	97 27	163.6	72 50.9	97 28	163.2	05
6	69 12.7	97 28	163.0	69 41.7	96 28	162.7	70 10.6	96 29	162.3	70 39.4	96 30	161.9	71 08.2	96 30	161.4	71 36.9	96 31	161.0	72 05.6	95 32	160.5	72 34.2	95 32	160.0	6
7	68 56.1	95 32	160.4	69 24.7	95 32	160.0	69 53.2	95 33	159.5	70 21.7	95 34	159.0	70 50.1	94 34	158.6	71 18.4	94 35	158.0	71 46.6	94 36	157.5	72 14.7	94 37	156.9	7
8	68 37.2	94 35	157.8	69 05.4	94 36	157.3	69 33.5	94 37	156.8	70 01.6	93 37	156.3	70 29.5	93 38	155.8	70 57.4	93 39	155.2	71 25.1	92 40	154.6	71 52.7	92 41	154.0	8
9	68 16.1	93 39	155.3	68 43.9	92 39	154.8	69 11.6	92 40	154.2	69 39.2	92 41	153.7	70 06.6	91 42	153.1	70 34.0	91 43	152.5	71 01.2	91 44	151.8	71 28.3	90 44	151.2	9
10	67 52.9	91 42	152.8	68 20.3	91 43	152.3	68 47.5	91 44	151.7	69 14.6	90 44	151.1	69 41.6	90 45	150.5	70 08.4	89 46	149.8	70 35.1	89 47	149.1	71 01.7	88 48	148.4	10
1	67 27.7	90 45	150.5	67 54.6	89 46	149.9	68 21.4	89 47	149.3	68 48.0	88 48	148.6	69 14.5	88 48	148.0	69 40.8	87 49	147.3	70 06.9	87 50	146.6	70 32.9	86 51	145.8	1
2	67 00.7	88 48	148.2	67 27.1	88 49	147.6	67 53.4	87 50	146.9	68 19.5	87 50	146.3	68 45.4	86 51	145.6	69 11.2	86 52	144.9	69 36.8	85 53	144.1	70 02.2	84 54	143.4	2
3	66 31.9	87 51	146.0	66 57.8	86 52	145.4	67 23.6	86 52	144.7	67 49.2	85 53	144.0	68 14.6	84 54	143.3	68 39.9	84 55	142.6	69 04.9	83 56	141.8	69 29.7	82 57	141.0	3
4	66 01.5	85 53	143.9	66 26.9	85 54	143.2	66 52.2	84 55	142.5	67 17.3	83 56	141.8	67 42.2	83 57	141.1	68 06.9	82 58	140.3	68 31.3	81 58	139.6	68 55.6	80 60	138.8	4
15	65 29.5	83 56	141.8	65 54.4	83 56	141.2	66 19.2	82 57	140.5	66 43.8	82 58	139.7	67 08.1	81 59	139.0	67 32.3	80 60	138.2	67 56.2	79 61	137.4	68 19.9	78 62	136.6	15
6	64 56.0	82 58	139.9	65 20.5	81 59	139.2	65 44.8	81 60	138.5	66 08.8	80 60	137.8	66 32.7	79 61	137.0	66 56.3	78 62	136.2	67 19.7	78 63	135.4	67 42.8	77 64	134.6	6
7	64 21.3	80 60	138.0	64 45.2	80 61	137.3	65 09.0	79 62	136.6	65 32.6	78 62	135.9	65 55.9	77 63	135.1	66 19.0	77 64	134.3	66 41.9	76 65	133.5	67 04.5	75 66	132.6	7
8	63 45.2	79 62	136.2	64 08.7	78 63	135.5	64 32.0	77 64	134.8	64 55.1	77 64	134.0	65 17.9	76 65	133.3	65 40.5	75 66	132.5	66 02.9	74 67	131.7	66 24.9	73 68	130.8	8
9	63 08.0	77 64	134.5	63 31.0	76 65	133.8	63 53.8	76 65	133.0	64 16.4	75 66	132.3	64 38.8	74 67	131.5	65 00.9	73 68	130.7	65 22.8	72 68	129.9	65 44.3	71 69	129.1	9
20	62 29.6	76 66	132.8	62 52.2	75 66	132.1	63 14.6	74 67	131.4	63 36.7	73 68	130.6	63 58.6	73 68	129.9	64 20.2	72 69	129.1	64 41.6	71 70	128.2	65 02.7	70 71	127.4	20
1	61 50.3	74 67	131.2	62 12.4	73 68	130.5	62 34.4	73 69	129.8	62 56.0	72 69	129.0	63 17.5	71 70	128.3	63 38.6	70 71	127.5	63 59.6	69 72	126.7	64 20.2	68 72	125.8	1
2	61 10.0	73 69	129.7	61 31.7	72 69	129.0	61 53.2	71 70	128.3	62 14.4	70 71	127.5	62 35.4	70 71	126.7	62 56.2	69 72	125.9	63 16.6	68 73	125.1	63 36.8	67 74	124.3	2
3	60 28.8	71 70	128.3	60 50.1	71 71	127.5	61 11.2	70 71	126.8	61 32.0	69 72	126.0	61 52.6	68 73	125.3	62 12.9	67 73	124.5	62 32.9	66 74	123.7	62 52.7	65 75	122.9	3
4	59 46.8	70 71	126.8	60 07.7	69 72	126.1	60 28.4	68 72	125.4	60 48.8	68 73	124.7	61 09.0	67 74	123.9	61 28.9	66 74	123.1	61 48.5	65 75	122.3	62 07.9	64 76	121.5	4
25	59 04.0	69 72	125.5	59 24.6	68 73	124.8	59 44.8	67 74	124.1	60 04.9	66 74	123.3	60 24.6	65 75	122.6	60 44.2	65 76	121.8	61 03.4	64 76	121.0	61 22.4	63 77	120.2	25
6	58 20.6	68 74	124.2	58 40.7	67 74	123.5	59 00.6	66 75	122.8	59 20.3	65 75	122.0	59 39.7	64 76	121.3	59 58.8	63 77	120.5	60 17.7	62 77	119.7	60 36.3	61 78	118.9	6
7	57 36.4	66 75	122.9	57 56.2	66 75	122.2	58 15.8	65 76	121.5	58 35.1	64 76	120.8	58 54.1	63 77	120.0	59 12.9	62 78	119.3	59 31.4	61 78	118.5	59 49.7	60 79	117.7	7
8	56 51.7	65 76	121.7	57 11.1	64 76	121.0	57 30.3	64 77	120.3	57 49.3	63 77	119.6	58 08.0	62 78	118.9	58 26.4	61 78	118.1	58 44.6	60 79	117.4	59 02.5	59 79	116.6	8
9	56 06.3	64 76	120.6	56 25.4	63 77	119.9	56 44.3	63 78	119.2	57 03.0	62 78	118.5	57 21.3	61 78	117.7	57 39.5	60 79	117.0	57 57.3	59 80	116.2	58 14.9	58 80	115.5	9
30	55 20.5	63 77	119.5	55 39.3	62 78	118.8	55 57.8	61 78	118.1	56 16.1	61 79	117.4	56 34.2	60 79	116.6	56 52.0	59 80	115.9	57 09.6	58 80	115.2	57 26.9	57 81	114.4	30
1	54 34.1	62 78	118.4	54 52.6	61 78	117.7	55 10.8	60 79	117.0	55 28.9	60 80	116.3	55 46.6	59 80	115.6	56 04.2	58 80	114.9	56 21.4	57 81	114.1	56 38.4	56 81	113.4	1
2	53 47.3	61 79	117.3	54 05.5	60 79	116.7	54 23.4	60 80	116.0	54 41.2	59 80	115.3	54 58.7	58 81	114.6	55 15.9	57 81	113.9	55 32.9	56 82	113.1	55 49.6	55 82	112.4	2
3	53 00.0	60 80	116.3	53 17.9	59 80	115.7	53 35.6	59 80	115.0	53 53.1	58 81	114.3	54 10.3	57 81	113.6	54 27.3	56 82	112.9	54 44.0	55 82	112.2	55 00.5	54 82	111.5	3
4	52 12.3	59 80	115.4	52 30.0	58 80	114.7	52 47.4	58 81	114.0	53 04.6	57 81	113.4	53 21.6	56 82	112.7	53 38.3	55 82	112.0	53 54.8	55 82	111.3	54 11.0	54 83	110.5	4
35	51 24.3	58 81	114.4	51 41.7	58 81	113.8	51 58.9	57 82	113.1	52 15.8	56 82	112.4	52 32.5	55 82	111.8	52 49.0	55 82	111.1	53 05.3	54 83	110.4	53 21.3	53 83	109.7	35
6	50 35.8	58 81	113.5	50 53.0	57 82	112.9	51 10.0	56 82	112.2	51 26.7	55 82	111.5	51 43.2	55 83	110.9	51 59.5	54 83	110.2	52 15.5	53 84	109.5	52 31.3	52 84	108.8	6
7	49 47.1	57 82	112.6	50 04.0	56 82	112.0	50 20.8	55 82	111.3	50 37.3	55 83	110.7	50 53.5	54 83	110.0	51 09.6	53 84	109.3	51 25.4	52 84	108.7	51 41.0	52 84	108.0	7
8	48 58.1	56 82	111.8	49 14.8	55 83	111.1	49 31.3	55 83	110.5	49 47.6	54 83	109.8	50 03.6	53 84	109.2	50 19.5	52 84	108.5	50 35.1	52 84	107.9	50 50.5	51 84	107.2	8
9	48 08.7	55 83	110.9	48 25.2	55 83	110.3	48 41.5	54 83	109.7	48 57.6	53 84	109.0	49 13.5	53 84	108.4	49 29.1	52 84	107.7	49 44.6	51 84	107.1	49 59.8	50 85	106.4	9
40	47 19.1	55 83	110.1	47 35.4	54 83	109.5	47 51.5	53 84	108.9	48 07.4	53 84	108.2	48 23.1	52 84	107.6	48 38.6	51 85	107.0	48 53.8	50 85	106.3	49 08.9	50 85	105.6	40
1	46 29.2	54 84	109.3	46 45.4	53 84	108.7	47 01.3	53 84	108.1	47 17.0	52 84	107.5	47 32.5	51 85	106.8	47 47.8	51 85	106.2	48 02.9	50 85	105.6	48 17.7	49 85	104.9	1
2	45 39.1	53 84	108.6	45 55.1	53 84	108.0	46 10.8	52 84	107.4	46 26.4	51 85	106.7	46 41.7	51 85	106.1	46 56.8	50 85	105.5	47 11.8	49 86	104.8	47 26.5	49 86	104.2	2
3	44 48.8	53 84	107.8	45 04.6	52 84	107.2	45 20.1	52 85	106.6	45 35.5	51 85	106.0	45 50.7	50 85	105.4	46 05.7	50 86	104.8	46 20.5	49 86	104.1	46 35.0	48 86	103.5	3
4	43 58.3	52 84	107.1	44 13.9	52 85	106.5	44 29.3	51 85	105.9	44 44.5	50 85	105.3	44 59.5	50 86	104.7	45 14.4	49 86	104.1	45 29.0	48 86	103.4	45 43.4	48 86	102.8	4
45	43 07.5	52 85	106.4	43 23.0	51 85	105.8	43 38.2	51 85	105.2	43 53.3	50 86	104.6	44 08.2	49 86	104.0	44 22.9	49 86	103.4	44 37.4	48 86	102.8	44 51.7	47 86	102.2	45
6	42 16.6	51 85	105.7	42 31.9	51 85	105.1	42 47.0	50 86	104.5	43 02.0	49 86	103.9	43 16.7	49 86	103.3	43 31.3	48 86	102.7	43 45.7	48 86	102.1	43 59.9	47 87	101.5	6
7	41 25.5	51 86	105.0	41 40.7	50 86	104.4	41 55.7	50 86	103.9	42 10.5	49 86	103.3	42 25.1	48 86	102.7	42 39.6	48 86	102.1	42 53.8	47 87	101.5	43 07.9	47 87	100.9	7
8	40 34.3	50 86	104.3	40 49.3	50 86	103.8	41 04.2	49 86	103.2	41 18.9	49 86	102.6	41 33.4	48 86	102.0	41 47.7	47 87	101.4	42 01.9	47 87	100.9	42 15.8	46 87	100.3	8
9	39 42.9	50 86	103.7	39 57.8	49 86	103.1	40 12.5	49 86	102.6	40 27.1	48 86	102.0	40 41.5	48 87	101.4	40 55.7	47 87	100.8	41 09.8	47 87	100.2	41 23.6	46 87	99.7	9
50	38 51.3	50 86	103.1	39 06.1	49 86	102.5	39 20.8	48 86	101.9	39 35.2	48 87	101.4	39 49.5	47 87	100.8	40 03.6	47 87	100.2	40 17.6	46 87	99.6	40 31.4	46 87	99.1	50
1	37 59.7	49 86	102.4	38 14.4	49 86	101.9	38 28.9	48 87	101.3	38 43.2	48 87	100.8	38 57.4	47 87	100.2	39 11.5	46 87	99.6	39 25.3	46 87	99.1	39 39.0	45 87	98.5	1
2	37 07.9	49 86	101.8	37 22.5	48 87	101.3	37 36.9	48 87	100.7	37 51.1	47 87	100.2	38 05.2	47 87	99.6	38 19.2	46 87	99.0	38 33.0	46 87	98.5	38 46.6	45 88	97.9	2
3	36 16.0	49 87	101.2	36 30.4	48 87	100.7	36 44.8	48 87	100.1	36 58.9	47 87	99.6	37 13.0	46 87	99.0	37 26.8	46 87	98.5	37 40.5	45 88	97.9	37 54.1	45 88	97.3	3
4	35 24.0	48 87	100.6	35 38.3	48 87	100.1	35 52.6	47 87	99.5	36 06.7	47 87	99.0	36 20.6	46 87	98.5	36 34.4	46 88	97.9	36 48.0	45 88	97.3	37 01.5	45 88	96.8	4
55	34 31.8	48 87	100.1	34 46.1	47 87	99.5	35 00.3	47 87	99.0	35 14.3	46 87	98.4	35 28.2	46 88	97.9	35 41.9	45 88	97.3	35 55.4	45 88	96.8	36 08.9	44 88	96.2	55
6	33 39.6	48 87	99.5	33 53.8	47 87	99.0	34 07.9	47 87	98.4	34 21.9	46 88	97.9	34 35.7	46 88	97.3	34 49.3	45 88	96.8	35 02.8	45 88	96.3	35 16.2	44 88	95.7	6
7	32 47.3	47 87	98.9	33 01.5	47 88	98.4	33 15.5	46 88	97.9	33 29.3	46 88	97.3	33 43.1	46 88	96.8	33 56.7	45 88	96.3	34 10.1	45 88	95.7	34 23.4	44 88	95.2	7
8	31 55.0	47 88	98.4	32 09.0	47 88	97.8	32 23.0	46 88	97.3	32 36.8	46 88	96.8	32 50.4	45 88	96.3	33 04.0	45 88	95.7	33 17.4	44 88	95.2	33 30.7	44 88	94.7	8
9	31 02.5	47 88	97.8	31 16.5	46 88	97.3	31 30.4	46 88	96.8	31 44.1	46 88	96.3	31 57.8	45 88	95.7	32 11.2	45 88	95.2	32 24.6	44 88	94.7	32 37.8	44 88	94.1	9
60	30 10.0	47 88	97.3	30 23.9	46 88	96.8	30 37.8	46 88	96.3	30 51.4	45 88	95.7	31 05.0	45 88	95.2	31 18.5	45 88	94.7	31 31.8	44 88	94.2	31 45.0	44 88	93.6	60
1	29 17.4	46 88	96.7	29 31.3	46 88	96.2	29 45.1	46 88	95.7	29 58.7	45 88	95.2	30 12.2	45 88	94.7	30 25.7	44 88	94.2	30 38.9	44 88	93.7	30 52.1	44 88	93.1	1
2	28 24.8	46 88	96.2	28 38.6	46 88	95.7	28 52.3	46 88	95.2	29 05.9	45 88	94.7	29 19.4	45 88	94.2	29 32.8	44 88	93.7	29 46.1	44 88	93.2	29 59.2	44 88	92.6	2
3	27 32.1	46 88	95.7	27 45.9	46 88	95.2	27 59.6	45 88	94.7	28 13.1	45 88	94.2	28 26.6	45 88	93.7	28 39.9	44 88	93.2	28 53.1	44 88	92.7	29 06.3	43 88	92.2	3
4	26 39.3	46 88	95.2	26 53.1	46 88	94.7	27 06.7	45 88	94.2	27 20.3	45 88	93.7	27 33.7	45 88	93.2	27 47.0	44 88	92.7	28 00.2	44 88	92.2	28 13.3	43 88	91.7	4
65	25 46.6	46 88	94.7	26 00.3	46 88	94.2	26 13.9	45 88	93.7	26 27.4	45 88	93.2	26 40.8	44 88	92.7	26 54.1	44 88	92.2	27 07.3	44 88	91.7	27 20.3	43 88	91.2	65
6	24 53.8	46 88	94.2	25 07.4	45 88	93.7	25 21.0	45 88	93.2	25 34.5	45 88	92.7	25 47.9	44 88	92.2	26 01.1	44 88	91.7	26 14.3	44 88	91.2	26 27.4	43 88	90.7	6
7	24 00.9	46 88	93.7	24 14.5	45 88	93.2	24 28.1	45 88	92.7	24 41.6	45 88	92.2	24 54.9	44 88	91.7	25 08.2	44 88	91.2	25 21.3	44 88	90.7	25 34.4	43 88	90.2	7
8	23 08.0	46 88	93.2	23 21.6	45 88	92.7	23 35.2	45 88	92.2	23 48.6	45 88	91.7	24 02.0	44 88	91.2	24 15.2	44 88	90.8	24 28.4	44 88	90.3	24 41.4	43 88	89.8	8
9	22 15.1	45 88	92.7	22 28.7	45 88	92.2	22 42.2	45 88	91.7	22 55.6	45 88	91.3	23 09.0	44 88	90.8	23 22.2	44 88	90.3	23 35.4	44 88	89.8	23 48.5	43 88	89.3	9
70	21 22.2	45 88	92.2	21 35.8	45 88	91.7	21 49.3	45 88	91.3	22 02.7	45 88	90.8	22 16.0	44 88	90.3	22 29.3	44 88	89.8	22 42.4	44 88	89.3	22 55.5	43 88	88.8	70
1	20 29.2	45 88	91.7	20 42.8	45 88	91.3	20 56.3	45 88	90.8	21 09.7	45 88	90.3	21 23.0	44 88	89.8	21 36.3	44 88	89.3	21 49.4	44 88	88.9	22 02.5	43 88	88.4	1
2	19 36.3	45 88	91.3	19 49.8	45 88	90.8	20 03.3	45 88	90.3	20 16.7	45 88	89.8	20 30.1	44 88	89.4	20 43.3	44 88	88.9	20 56.5	44 88	88.4	21 09.6	43 88	87.9	2
3	18 43.3	45 88	90.8	18 56.9	45 88	90.3	19 10.3	45 88	89.8	19 23.8	45 88	89.4	19 37.1	44 88	88.9	19 50.3	44 88	88.4	20 03.5	44 88	87.9	20 16.6	44 88	87.5	3
4	17 50.3	45 88	90.3	18 03.9	45 88	89.8	18 17.4	45 88	89.4	18 30.8	45 88	88.9	18 44.1	44 88	88.4	18 57.4	44 88	88.0	19 10.6	44 88	87.5	19 23.7	44 88	87.0	4
75	16 57.4	45 88	89.8	17 10.9	45 88	89.4	17 24.4	45 88	88.9	17 37.8	45 88	88.4	17 51.2	44 88	88.0	18 04.5	44 88	87.5	18 17.7	44 88	87.0	18 30.8	44 88	86.6	75
6	16 04.4	45 88	89.4	16 17.9	45 88	88.9	16 31.4	45 88	88.4	16 44.9	45 88	88.0	16 58.2	44 88	87.5	17 11.5	44 88	87.0	17 24.8	44 88	86.6	17 38.0	44 88	86.1	6
7	15 11.4	45 88	88.9	15 25.0	45 88	88.5	15 38.5	45 88	88.0	15 51.9	45 88	87.5	16 05.3	45 88	87.1	16 18.7	44 88	86.6	16 31.9	44 88	86.1	16 45.1	44 88	85.7	7
8	14 18.5	45 88	88.4	14 32.0	45 88	88.0	14 45.6	45 88	87.5	14 59.0	45 88	87.1	15 12.4	45 88	86.6	15 25.8	44 88	86.1	15 39.1	44 88	85.7	15 52.3	44 88	85.2	8
9	13 25.5	45 88	88.0	13 39.1	45 88	87.5	13 52.6	45 88	87.1	14 06.1	45 88	86.6	14 19.6	45 88	86.1	14 32.9	45 88	85.7	14 46.3	44 88	85.2	14 59.5	44 88	84.8	9
80	12 32.6	45 88	87.5	12 46.2	45 88	87.1	12 59.7	45 88	86.6	13 13.2	45 88	86.2	13 26.7	45 88	85.7	13 40.1	45 88	85.2	13 53.5	44 88	84.8	14 06.8	44 88	84.3	80
1	11 39.6	46 88	87.1	11 53.3	45 88	86.6	12 06.9	45 88	86.2	12 20.4	45 88	85.7	12 33.9	45 88	85.2	12 47.4	45 88	84.8	13 00.8	45 88	84.3	13 14.1	44 88	83.9	1
2	10 46.8	46 88	86.6	11 00.4	45 88	86.2	11 14.0	45 88	85.7	11 27.6	45 88	85.2	11 41.1	45 88	84.8	11 54.6	45 88	84.3	12 08.1	45 88	83.9	12 21.5	45 88	83.4	2
3	9 53.9	46 88	86.1	10 07.6	46 88	85.7	10 21.2	45 88	85.2	10 34.8	45 88	84.8	10 48.4	45 88	84.3	11 01.9	45 88	83.9	11 15.4	45 88	83.4	11 28.9	45 88	83.0	3
4	9 01.0	46 88	85.7	9 14.8	46 88	85.2	9 28.4	46 88	84.8	9 42.1	45 88	84.3	9 55.7	45 88	83.9	10 09.3	45 88	83.4	10 22.8	45 88	83.0	10 36.3	45 88	82.5	4
85	8 08.2	46 88	85.2	8 22.0	46 88	84.8	8 35.7	46 88	84.3	8 49.4	46 88	83.9	9 03.0	45 88	83.4	9 16.7	45 88	83.0	9 30.3	45 88	82.5	9 43.8	45 87	82.1	85
6	7 15.5	46 88	84.8	7 29.2	46 88	84.3	7 43.0	46 88	83.9	7 56.7	46 88	83.4	8 10.4	46 88	83.0	8 24.1	46 88	82.5	8 37.8	45 87	82.1	8 51.4	45 87	81.6	6
7	6 22.7	46 88	84.3	6 36.5	46 88	83.9	6 50.3	46 88	83.4	7 04.1	46 88	83.0	7 17.9	46 88	82.5	7 31.6	46 87	82.1	7 45.3	46 87	81.6	7 59.0	46 87	81.2	7
8	5 30.0	46 88	83.8	5 43.9	46 88	83.4	5 57.7	46 88	83.0	6 11.6	46 88	82.5	6 25.4	46 87	82.1	6 39.2	46 87	81.6	6 52.9	46 87	81.2	7 06.7	46 87	80.7	8
9							5 05.2	46 88	82.5	5 19.1	46 88	82.1	5 32.9	46 87	81.6	5 46.8	46 87	81.2	6 00.6	46 87	80.7	6 14.4	46 87	80.3	9
90																			5 06.4	46 87	80.3	5 22.2	46 87	79.8	90

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		
00	54 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	00
1	53 59.2	1.0 04	178.3	53 29.2	1.0 04	178.3	52 59.2	1.0 04	178.4	52 29.3	1.0 04	178.4	51 59.3	1.0 04	178.4	51 29.3	1.0 04	178.4	50 59.3	1.0 04	178.4	50 29.3	1.0 04	178.5	1
2	53 56.9	1.0 06	176.6	53 26.9	1.0 06	176.7	52 57.0	1.0 06	176.7	52 27.0	1.0 06	176.8	51 57.0	1.0 06	176.8	51 27.1	1.0 06	176.8	50 57.1	1.0 06	176.9	50 27.2	1.0 06	176.9	2
3	53 53.0	1.0 09	175.0	53 23.1	1.0 09	175.0	52 53.2	1.0 09	175.1	52 23.3	1.0 09	175.1	51 53.4	1.0 09	175.2	51 23.4	1.0 08	175.3	50 53.5	1.0 08	175.3	50 23.6	1.0 08	175.4	3
4	53 47.6	99 12	173.3	53 17.7	99 11	173.4	52 47.9	99 11	173.5	52 18.0	99 11	173.5	51 48.2	1.0 11	173.6	51 18.3	1.0 11	173.7	50 48.5	1.0 11	173.8	50 18.6	1.0 10	173.9	4
05	53 40.6	99 14	171.6	53 10.9	99 14	171.7	52 41.1	99 14	171.8	52 11.4	99 14	171.9	51 41.6	99 14	172.0	51 11.8	99 13	172.1	50 42.0	99 13	172.2	50 12.3	99 13	172.3	05
6	53 32.1	99 17	170.0	53 02.5	99 16	170.1	52 32.9	99 16	170.2	52 03.2	99 16	170.3	51 33.5	99 16	170.5	51 03.9	99 16	170.6	50 34.2	99 15	170.7	50 04.5	99 15	170.8	6
7	53 22.2	98 19	168.3	52 52.7	98 19	168.5	52 23.1	98 19	168.6	51 53.6	98 18	168.8	51 24.0	99 18	168.9	50 54.5	99 18	169.0	50 24.9	99 18	169.2	49 55.4	99 18	169.3	7
8	53 10.7	98 22	166.7	52 41.3	98 21	166.9	52 12.0	98 21	167.0	51 42.6	98 21	167.2	51 13.2	98 20	167.4	50 43.7	98 20	167.5	50 14.3	98 20	167.7	49 44 8	98 20	167.8	8
9	52 57.8	97 24	165.1	52 28.6	97 24	165.3	51 59.4	97 23	165.5	51 30.1	98 23	165.6	51 00.9	98 23	165.8	50 31.6	98 22	166.0	50 02.3	98 22	166.2	49 33.0	98 22	166.3	9
10	52 43.5	97 26	163.5	52 14.4	97 26	163.7	51 45.4	97 26	163.9	51 16.3	97 25	164.1	50 47.2	97 25	164.3	50 18.1	97 25	164.5	49 49.0	97 24	164.7	49 19.8	97 24	164.9	10
1	52 27.7	96 28	161.9	51 58.9	96 28	162.2	51 30.0	96 28	162.4	51 01.1	96 28	162.6	50 32.2	96 27	162.8	50 03.3	96 27	163.0	49 34.3	97 26	163.2	49 05.3	97 26	163.4	1
2	52 10.6	95 31	160.4	51 42.0	96 30	160.6	51 13.3	96 30	160.9	50 44.6	96 30	161.1	50 15.9	96 29	161.3	49 47.2	96 29	161.5	49 18.4	96 29	161.8	48 49.6	96 28	162.0	2
3	51 52.2	95 33	158.9	51 23.8	95 33	159.1	50 55.3	95 32	159.4	50 26.8	95 32	159.6	49 58.3	95 32	159.9	49 29.7	95 31	160.1	49 01.2	95 31	160.3	48 32.6	95 30	160.6	3
4	51 32.4	94 35	157.3	51 04.2	94 35	157.6	50 36.0	94 34	157.9	50 07.7	94 34	158.1	49 39.4	94 34	158.4	49 11.1	95 33	158.7	48 42.7	95 33	158.9	48 14.3	95 32	159.1	4
15	51 11.4	93 37	155.9	50 43.4	93 37	156.1	50 15.4	93 36	156.4	49 47.4	94 36	156.7	49 19.3	94 36	157.0	48 51.2	94 35	157.2	48 23.0	94 35	157.5	47 54.9	94 34	157.8	15
6	50 49.1	92 39	154.4	50 21.4	92 39	154.7	49 53.6	93 38	155.0	49 25.8	93 38	155.3	48 58.0	93 38	155.6	48 30.1	93 37	155.9	48 02.2	93 37	156.1	47 34.2	93 36	156.4	6
7	50 25.6	91 41	153.0	49 58.2	92 41	153.3	49 30.7	92 40	153.6	49 03.1	92 40	153.9	48 35.5	92 39	154.2	48 07.9	92 39	154.5	47 40.2	92 38	154.8	47 12.4	92 38	155.1	7
8	50 01.0	91 43	151.6	49 33.8	91 43	151.9	49 06.5	91 42	152.2	48 39.2	91 42	152.5	48 11.9	91 41	152.8	47 44.5	91 41	153.1	47 17.0	92 40	153.4	46 49.6	92 40	153.7	8
9	49 35.2	90 45	150.2	49 08.2	90 44	150.5	48 41.3	90 44	150.9	48 14.2	90 43	151.2	47 47.1	90 43	151.5	47 20.0	91 43	151.8	46 52.8	91 42	152.1	46 25.6	91 42	152.4	9
20	49 08.3	89 47	148.8	48 41.6	89 46	149.2	48 14.9	89 46	149.5	47 48.2	89 45	149.9	47 21.3	90 45	150.2	46 54.4	90 44	150.5	46 27.5	90 44	150.8	46 00.5	90 44	151.1	20
1	48 40.3	88 48	147.5	48 14.0	88 48	147.9	47 47.5	88 47	148.2	47 21.0	88 47	148.6	46 54.5	89 46	148.9	46 27.9	89 46	149.2	46 01.2	89 46	149.6	45 34.4	89 45	149.9	1
2	48 11.3	87 50	146.2	47 45.3	87 50	146.6	47 19.1	87 49	146.9	46 52.9	88 48	147.3	46 26.6	88 48	147.6	46 00.3	88 48	148.0	45 33.8	88 47	148.3	45 07.4	88 47	148.7	2
3	47 41.4	86 52	144.9	47 15.6	86 51	145.3	46 49.7	86 51	145.7	46 23.8	87 50	146.0	45 57.8	87 50	146.4	45 31.7	87 49	146.7	45 05.5	87 49	147.1	44 39.3	87 48	147.4	3
4	47 10.5	85 53	143.7	46 44.9	85 52	144.1	46 19.4	85 52	144.4	45 53.7	86 52	144.8	45 28.0	86 51	145.2	45 02.2	86 51	145.5	44 36.3	86 50	145.9	44 10.4	87 50	146.2	4
25	46 38.6	84 54	142.4	46 13.4	84 54	142.8	45 48.1	84 54	143.2	45 22.7	85 53	143.6	44 57.3	85 52	144.0	44 31.7	85 52	144.3	44 06.1	85 52	144.7	43 40.5	86 51	145.1	25
6	46 05.9	83 56	141.2	45 40.9	83 56	141.6	45 15.9	84 55	142.0	44 50.8	84 54	142.4	44 25.7	84 54	142.8	44 00.4	84 54	143.2	43 35.1	85 53	143.6	43 09.7	85 53	143.9	6
7	45 32.3	82 57	140.1	45 07.6	82 57	140.5	44 42.9	83 56	140.9	44 18.1	83 56	141.3	43 53.2	83 56	141.7	43 28.2	83 55	142.0	43 03.2	84 54	142.4	42 38.1	84 54	142.8	7
8	44 57.9	81 59	138.9	44 33.5	81 58	139.3	44 09.1	82 58	139.7	43 44.6	82 57	140.1	43 19.9	82 57	140.5	42 55.3	82 56	140.9	42 30.5	83 56	141.3	42 05.6	83 55	141.7	8
9	44 22.7	80 60	137.8	43 58.6	80 60	138.2	43 34.5	81 59	138.6	43 10.2	81 58	139.0	42 45.9	81 58	139.4	42 21.5	82 58	139.8	41 57.0	82 57	140.2	41 32.4	82 57	140.6	9
30	43 46.7	79 61	136.7	43 22.9	79 61	137.1	42 59.1	80 60	137.5	42 35.1	80 60	137.9	42 11.0	80 59	138.4	41 46.9	81 59	138.8	41 22.7	81 58	139.1	40 58.4	81 58	139.5	30
1	43 10.0	78 62	135.6	42 46.5	78 62	136.1	42 22.9	79 61	136.5	41 59.3	79 61	136.9	41 35.5	79 60	137.3	41 11.6	80 60	137.7	40 47.7	80 60	138.1	40 23.7	80 59	138.5	1
2	42 32.6	77 64	134.6	42 09.4	78 63	135.0	41 46.1	78 62	135.4	41 22.7	78 62	135.8	40 59.2	78 62	136.3	40 35.6	79 61	136.7	40 11.9	79 61	137.1	39 48.2	79 60	137.5	2
3	41 54.6	76 64	133.6	41 31.6	77 64	134.0	41 08.6	77 64	134.4	40 45.5	77 63	134.8	40 22.2	78 63	135.3	39 58.9	78 62	135.7	39 35.5	78 62	136.1	39 12.0	78 61	136.5	3
4	41 15.9	75 66	132.5	40 53.2	76 65	133.0	40 30.4	76 65	133.4	40 07.6	76 64	133.8	39 44.6	77 64	134.3	39 21.6	77 63	134.7	38 58.4	77 63	135.1	38 35.2	78 62	135.5	4
35	40 36.5	74 66	131.6	40 14.1	75 66	132.0	39 51.6	75 66	132.4	39 29.0	75 65	132.9	39 06.4	76 65	133.3	38 43.6	76 64	133.7	38 20.7	76 64	134.1	37 57.8	77 63	134.5	35
6	39 56.6	74 68	130.6	39 34.5	74 67	131.0	39 12.2	74 67	131.5	38 49.9	75 66	131.9	38 27.5	75 66	132.3	38 05.0	75 65	132.8	37 42.4	75 65	133.2	37 19.7	76 64	133.6	6
7	39 16.1	73 68	129.7	38 54.2	73 68	130.1	38 32.3	73 68	130.5	38 10.2	74 67	131.0	37 48.0	74 67	131.4	37 25.8	74 66	131.8	37 03.5	75 66	132.2	36 41.0	75 65	132.7	7
8	38 35.0	72 69	128.7	38 13.4	72 69	129.2	37 51.7	73 68	129.6	37 29.9	73 68	130.1	37 08.0	73 68	130.5	36 46.0	73 67	130.9	36 24.0	74 67	131.3	36 01.8	74 66	131.8	8
9	37 53.5	71 70	127.8	37 32.1	71 70	128.3	37 10.7	72 69	128.7	36 49.1	72 69	129.2	36 27.5	72 68	129.6	36 05.7	73 68	130.0	35 43.9	73 68	130.4	35 22.0	73 67	130.9	9
40	37 11.4	70 71	127.0	36 50.3	71 70	127.4	36 29.1	71 70	127.8	36 07.8	71 70	128.3	35 46.4	71 69	128.7	35 24.9	72 69	129.1	35 03.3	72 68	129.6	34 41.7	72 68	130.0	40
1	36 28.8	69 72	126.1	36 08.0	70 71	126.5	35 47.0	70 71	127.0	35 26.0	70 70	127.4	35 04.8	71 70	127.9	34 43.6	71 70	128.3	34 22.2	71 69	128.7	34 00.8	72 69	129.1	1
2	35 45.8	69 72	125.3	35 25.2	69 72	125.7	35 04.5	69 72	126.1	34 43.7	70 71	126.6	34 22.7	70 71	127.0	34 01.8	70 70	127.5	33 40.7	70 70	127.9	33 19.5	71 70	128.3	2
3	35 02.3	68 73	124.4	34 41.9	68 73	124.9	34 21.5	68 72	125.3	34 00.9	69 72	125.8	33 40.2	69 72	126.2	33 19.5	69 71	126.6	32 58.6	70 71	127.1	32 37.7	70 70	127.5	3
4	34 18.4	67 74	123.6	33 58.2	67 73	124.1	33 38.0	68 73	124.5	33 17.7	68 73	124.9	32 57.2	68 72	125.4	32 36.7	69 72	125.8	32 16.1	69 72	126.3	31 55.4	69 71	126.7	4
45	33 34.1	66 74	122.8	33 14.2	67 74	123.3	32 54.1	67 74	123.7	32 34.0	67 73	124.2	32 13.8	67 73	124.6	31 53.6	68 73	125.0	31 33.2	68 72	125.5	31 12.7	68 72	125.9	45
6	32 49.4	65 75	122.0	32 29.7	66 75	122.5	32 09.9	66 74	122.9	31 50.0	66 74	123.4	31 30.0	67 74	123.8	31 10.0	67 73	124.2	30 49.8	67 73	124.7	30 29.6	68 72	125.1	6
7	32 04.3	65 76	121.3	31 44.8	65 76	121.7	31 25.2	65 75	122.2	31 05.6	66 75	122.6	30 45.8	66 74	123.1	30 26.0	66 74	123.5	30 06.1	67 74	123.9	29 46.1	67 73	124.3	7
8	31 18.8	64 76	120.5	30 59.5	64 76	121.0	30 40.2	65 76	121.4	30 20.8	65 75	121.9	30 01.2	65 75	122.3	29 41.6	66 74	122.7	29 21.9	66 74	123.2	29 02.1	66 74	123.6	8
9	30 33.0	63 77	119.8	30 14.0	64 77	120.2	29 54.8	64 76	120.7	29 35.6	64 76	121.1	29 16.3	65 76	121.6	28 56.9	65 75	122.0	28 37.4	65 75	122.4	28 17.8	65 74	122.9	9
50	29 46.9	63 78	119.1	29 28.0	63 77	119.5	29 09.1	63 77	120.0	28 50.1	64 76	120.4	28 31.0	64 76	120.8	28 11.8	64 76	121.3	27 52.5	64 75	121.7	27 33.1	65 75	122.1	50
1	29 00.4	62 78	118.4	28 41.8	62 78	118.8	28 23.0	63 77	119.3	28 04.2	63 77	119.7	27 45.3	63 77	120.1	27 26.3	63 76	120.6	27 07.3	64 76	121.0	26 48.1	64 76	121.4	1
2	28 13.6	61 78	117.7	27 55.2	62 78	118.1	27 36.6	62 78	118.6	27 18.0	62 78	119.0	26 59.3	62 77	119.4	26 40.5	63 77	119.9	26 21.7	63 76	120.3	26 02.7	63 76	120.7	2
3	27 26.6	61 79	117.0	27 08.3	61 79	117.4	26 50.0	61 78	117.9	26 31.5	62 78	118.3	26 13.0	62 78	118.8	25 54.4	62 77	119.2	25 35.8	62 77	119.6	25 17.0	63 77	120.1	3
4	26 39.2	60 79	116.3	26 21.1	60 79	116.8	26 03.0	61 79	117.2	25 44.8	61 78	117.6	25 26.4	61 78	118.1	25 08.0	61 78	118.5	24 49.6	62 78	119.0	24 31.0	62 77	119.4	4
55	25 51.6	60 80	115.7	25 33.7	60 80	116.1	25 15.7	60 79	116.5	24 57.7	60 79	117.0	24 39.6	61 79	117.4	24 21.4	61 78	117.9	24 03.1	61 78	118.3	23 44.7	61 78	118.7	55
6	25 03.7	59 80	115.0	24 46.0	59 80	115.4	24 28.2	59 80	115.9	24 10.3	60 79	116.3	23 52.4	60 79	116.8	23 34.4	60 79	117.2	23 16.3	60 78	117.6	22 58.1	61 78	118.1	6
7	24 15.6	58 81	114.4	23 58.0	59 80	114.8	23 40.4	59 80	115.3	23 22.7	59 80	115.7	23 05.0	59 80	116.1	22 47.1	60 79	116.6	22 29.2	60 79	117.0	22 11.2	60 78	117.4	7
8	23 27.2	58 81	113.7	23 09.8	58 81	114.2	22 52.4	58 80	114.6	22 34.9	59 80	115.1	22 17.3	59 80	115.5	21 59.6	59 80	115.9	21 41.9	59 79	116.4	21 24.1	59 79	116.8	8
9	22 38.6	57 81	113.1	22 21.4	57 81	113.6	22 04.1	58 81	114.0	21 46.7	58 80	114.4	21 29.3	58 80	114.9	21 11.8	58 80	115.3	20 54.3	59 80	115.8	20 36.7	59 80	116.2	9
60	21 49.7	57 82	112.5	21 32.7	57 82	112.9	21 15.6	57 81	113.4	20 58.4	57 81	113.8	20 41.2	58 81	114.3	20 23.8	58 80	114.7	20 06.5	58 80	115.1	19 49.0	58 80	115.6	60
1	21 00.7	56 82	111.9	20 43.8	56 82	112.3	20 26.9	57 82	112.8	20 09.8	57 81	113.2	19 52.7	57 81	113.7	19 35.6	57 81	114.1	19 18.4	57 80	114.5	19 01.1	58 80	115.0	1
2	20 11.4	56 82	111.3	19 54.7	56 82	111.8	19 37.9	56 82	112.2	19 21.0	56 82	112.6	19 04.1	57 81	113.1	18 47.1	57 81	113.5	18 30.1	57 81	113.9	18 13.0	57 81	114.4	2
3	19 22.0	55 83	110.7	19 05.4	55 82	111.2	18 48.8	56 82	111.6	18 32.0	56 82	112.0	18 15.3	56 82	112.5	17 58.4	56 82	112.9	17 41.5	56 81	113.4	17 24.6	57 81	113.8	3
4	18 32.4	55 83	110.2	18 15.9	55 83	110.6	17 59.4	55 82	111.0	17 42.8	55 82	111.5	17 26.2	56 82	111.9	17 09.5	56 82	112.3	16 52.8	56 82	112.8	16 36.0	56 81	113.2	4
65	17 42.5	54 83	109.6	17 26.2	54 83	110.0	17 09.9	55 83	110.5	16 53.4	55 82	110.9	16 37.0	55 82	111.3	16 20.4	55 82	111.8	16 03.9	55 82	112.2	15 47.2	56 82	112.6	65
6	16 52.5	54 84	109.0	16 36.4	54 84	109.5	16 20.1	54 83	109.9	16 03.9	54 83	110.3	15 47.5	55 83	110.8	15 31.1	55 82	111.2	15 14.7	55 82	111.6	14 58.2	55 82	112.1	6
7	16 02.4	53 84	108.5	15 46.3	54 84	108.9	15 30.2	54 84	109.4	15 14.1	54 83	109.8	14 57.9	54 83	110.2	14 41.7	54 83	110.7	14 25.4	54 82	111.1	14 09.0	55 82	111.5	7
8	15 12.0	53 84	107.9	14 56.1	53 84	108.4	14 40.2	53 84	108.8	14 24.2	53 84	109.2	14 08.1	54 83	109.7	13 52.0	54 83	110.1	13 35.9	54 83	110.5	13 19.7	54 83	111.0	8
9	14 21.6	53 84	107.4	14 05.8	53 84	107.8	13 49.9	53 84	108.3	13 34.1	53 84	108.7	13 18.1	53 84	109.1	13 02.2	53 83	109.6	12 46.2	53 83	110.0	12 30.1	54 83	110.4	9
70	13 30.9	52 85	106.9	13 15.3	52 84	107.3	12 59.6	52 84	107.7	12 43.8	53 84	108.2	12 28.0	53 84	108.6	12 12.2	53 84	109.0	11 56.3	53 83	109.5	11 40.4	53 83	109.9	70
1	12 40.2	52 85	106.3	12 24.6	52 85	106.8	12 09.0	52 84	107.2	11 53.4	52 84	107.6	11 37.7	52 84	108.1	11 22.0	52 84	108.5	11 06.3	53 84	108.9	10 50.5	53 84	109.4	1
2	11 49.3	51 85	105.8	11 33.8	52 85	106.2	11 18.3	52 85	106.7	11 02.8	52 84	107.1	10 47.3	52 84	107.5	10 31.7	52 84	108.0	10 16.1	52 84	108.4	10 00.4	52 84	108.9	2
3	10 58.2	51 85	105.3	10 42.9	51 85	105.7	10 27.5	51 85	106.2	10 12.1	51 85	106.6	9 56.7	51 84	107.0	9 41.2	52 84	107.5	9 25.7	52 84	107.9	9 10.2	52 84	108.3	3
4	10 07.0	51 86	104.8	9 51.8	51 85	105.2	9 36.6	51 85	105.6	9 21.3	51 85	106.1	9 06.0	51 85	106.5	8 50.6	51 84	107.0	8 35.3	51 84	107.4	8 19.9	51 84	107.8	4
75	9 15.8	50 86	104.3	9 00.6	50 86	104.7	8 45.5	51 85	105.1	8 30.3	51 85	105.6	8 15.1	51 85	106.0	7 59.9	51 85	106.4	7 44.6	51 85	106.9	7 29.4	51 84	107.3	75
6	8 24.4	50 86	103.8	8 09.3	50 86	104.2	7 54.3	50 86	104.6	7 39.2	50 85	105.1	7 24.1	50 85	105.5	7 09.0	50 85	105.9	6 53.9	51 85	106.4	6 38.7	51 85	106.8	6
7	7 32.9	50 86	103.3	7 17.9	50 86	103.7	7 03.0	50 86	104.1	6 48.0	50 86	104.6	6 33.0	50 85	105.0	6 18.0	50 85	105.4	6 03.0	50 85	105.9	5 47.9	50 85	106.3	7
8	6 41.2	49 86	102.8	6 26.4	49 86	103.2	6 11.6	50 86	103.6	5 56.7	50 86	104.1	5 41.8	50 86	104.5	5 26.9	50 85	105.0	5 12.0	50 85	105.4				8
9	5 49.5	49 86	102.3	5 34.8	49 86	102.7	5 20.0	49 86	103.2	5 05.3	49 86	103.6													9

Lat. 28°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	77 00.0	1.0 03	180.0	77 30.0	1.0 04	180.0	00
1	73 58.4	1.0 08	176.5	74 28.3	1.0 08	176.4	74 58.3	1.0 09	176.2	75 28.2	1.0 09	176.1	75 58.1	1.0 09	176.0	76 28.1	1.0 10	175.9	76 58.0	1.0 10	175.7	77 27.9	1.0 10	175.6	1
2	73 53.5	99 14	172.9	74 23.3	99 14	172.7	74 53.1	99 14	172.5	75 22.8	99 15	172.3	75 52.6	99 15	172.0	76 22.4	99 16	171.8	76 52.1	99 16	171.5	77 21.8	99 17	171.2	2
3	73 45.3	99 19	169.5	74 14.9	99 19	169.2	74 44.5	98 20	168.8	75 14.0	98 20	168.5	75 43.5	98 21	168.1	76 12.9	98 22	167.7	76 42.3	98 22	167.3	77 11.7	98 23	166.8	3
4	73 34.1	98 24	166.0	74 03.4	97 24	165.6	74 32.6	97 25	165.2	75 01.7	97 26	164.8	75 30.8	97 27	164.3	75 59.9	97 28	163.8	76 28.9	96 28	163.2	76 57.8	96 29	162.7	4
05	73 19.8	96 29	162.7	73 48.7	96 29	162.2	74 17.5	96 30	161.7	74 46.2	96 31	161.2	75 14.9	95 32	160.6	75 43.4	95 33	160.0	76 11.9	95 34	159.3	76 40.2	94 35	158.6	05
6	73 02.7	95 33	159.5	73 31.1	95 34	158.9	73 59.4	94 35	158.3	74 27.6	94 36	157.7	74 55.7	93 37	157.0	75 23.7	93 38	156.3	75 51.5	93 39	155.6	76 19.2	92 40	154.8	6
7	72 42.7	93 38	156.4	73 10.6	93 38	155.7	73 38.4	92 39	155.1	74 06.1	92 40	154.4	74 33.6	91 42	153.6	75 01.0	91 43	152.8	75 28.2	90 44	152.0	75 55.2	90 45	151.1	7
8	72 20.2	91 42	153.3	72 47.6	91 43	152.7	73 14.8	90 44	151.9	73 41.8	90 44	151.2	74 08.7	89 46	150.4	74 35.4	89 47	149.5	75 01.9	88 48	148.6	75 28.2	87 49	147.7	8
9	71 55.2	90 45	150.5	72 22.0	89 46	149.7	72 48.6	88 47	149.0	73 15.1	88 48	148.1	73 41.3	87 50	147.3	74 07.3	86 51	146.4	74 33.1	86 52	145.4	74 58.6	85 53	144.4	9
10	71 28.0	88 49	147.7	71 54.2	87 50	146.9	72 20.2	86 51	146.1	72 46.0	86 52	145.3	73 11.5	85 53	144.4	73 36.8	84 54	143.4	74 01.9	83 56	142.4	74 26.7	82 57	141.4	10
1	70 58.7	86 52	145.1	71 24.3	85 53	144.3	71 49.6	84 54	143.4	72 14.8	83 55	142.5	72 39.6	82 56	141.6	73 04.2	82 58	140.6	73 28.6	81 59	139.6	73 52.6	79 60	138.5	1
2	70 27.4	84 55	142.6	70 52.4	83 56	141.7	71 17.1	82 57	140.8	71 41.6	81 58	139.9	72 05.8	80 59	139.0	72 29.7	79 60	138.0	72 53.3	78 62	137.0	73 16.6	77 63	135.9	2
3	69 54.3	82 58	140.2	70 18.7	81 59	139.3	70 42.8	80 60	138.4	71 06.6	79 61	137.5	71 30.2	78 62	136.5	71 53.4	77 63	135.5	72 16.3	76 64	134.5	72 38.9	75 66	133.4	3
4	69 19.6	80 60	137.9	69 43.3	79 61	137.0	70 06.8	78 62	136.1	70 30.0	77 63	135.2	70 52.9	76 64	134.2	71 15.5	75 66	133.2	71 37.8	74 67	132.1	71 59.6	72 68	131.0	4
15	68 43.3	78 63	135.8	69 06.5	77 64	134.9	69 29.4	76 65	134.0	69 52.0	75 66	133.0	70 14.3	74 67	132.0	70 36.2	73 68	131.0	70 57.8	71 69	130.0	71 19.0	70 70	128.9	15
6	68 05.7	76 65	133.7	68 28.3	75 66	132.8	68 50.6	74 67	131.9	69 12.6	73 68	131.0	69 34.3	72 69	130.0	69 55.6	71 70	129.0	70 16.6	69 70	127.9	70 37.2	68 72	126.8	6
7	67 26.8	74 67	131.8	67 48.9	73 68	130.9	68 10.6	72 68	130.0	68 32.0	71 70	129.0	68 53.1	70 70	128.0	69 13.9	69 71	127.0	69 34.2	67 72	126.0	69 54.2	66 73	124.9	7
8	66 46.7	72 68	129.9	67 08.3	71 70	129.1	67 29.5	70 70	128.1	67 50.3	69 71	127.2	68 10.9	68 72	126.2	68 31.1	67 73	125.2	68 50.9	65 74	124.2	69 10.3	64 75	123.1	8
9	66 05.6	70 70	128.2	66 26.6	69 71	127.3	66 47.3	68 72	126.4	67 07.7	67 73	125.5	67 27.7	66 74	124.5	67 47.3	65 74	123.5	68 06.6	64 75	122.5	68 25.5	62 76	121.4	9
20	65 23.5	69 72	126.5	65 44.0	68 72	125.7	66 04.2	67 73	124.8	66 24.1	66 74	123.8	66 43.6	65 75	122.9	67 02.8	63 76	121.9	67 21.6	62 76	120.9	67 40.0	61 77	119.9	20
1	64 40.5	67 73	125.0	65 00.6	66 74	124.1	65 20.3	65 74	123.2	65 39.7	64 75	122.3	65 58.7	63 76	121.3	66 17.4	62 77	120.4	66 35.7	60 78	119.4	66 53.7	59 78	118.4	1
2	63 56.7	66 74	123.5	64 16.3	65 75	122.6	64 35.6	64 76	121.7	64 54.5	63 76	120.8	65 13.1	61 77	119.9	65 31.4	60 78	118.9	65 49.2	59 78	117.9	66 06.7	58 79	116.9	2
3	63 12.1	64 75	122.0	63 31.3	63 76	121.2	63 50.2	62 77	120.3	64 08.7	61 78	119.4	64 26.9	60 78	118.5	64 44.7	59 79	117.5	65 02.1	58 79	116.6	65 19.2	56 80	115.6	3
4	62 26.9	63 76	120.7	62 45.7	62 77	119.8	63 04.1	61 78	119.0	63 22.2	60 78	118.1	63 40.0	59 79	117.2	63 57.4	58 80	116.2	64 14.5	56 80	115.3	64 31.2	55 81	114.3	4
25	61 41.0	62 78	119.4	61 59.4	61 78	118.5	62 17.5	60 79	117.7	62 35.2	59 79	116.8	62 52.6	57 80	115.9	63 09.7	56 80	115.0	63 26.4	55 81	114.1	63 42.7	54 82	113.1	25
6	60 54.6	61 78	118.1	61 12.6	60 79	117.3	61 30.3	58 80	116.5	61 47.7	57 80	115.6	62 04.7	56 81	114.7	62 21.4	55 81	113.8	62 37.8	54 82	112.9	62 53.8	53 82	112.0	6
7	60 07.6	59 79	116.9	60 25.3	58 80	116.1	60 42.6	57 80	115.3	60 59.7	56 81	114.4	61 16.4	55 81	113.6	61 32.8	54 82	112.7	61 48.8	53 82	111.8	62 04.5	52 83	110.9	7
8	59 20.1	58 80	115.8	59 37.5	57 80	115.0	59 54.5	56 81	114.2	60 11.2	55 81	113.3	60 27.6	54 82	112.5	60 43.7	53 82	111.6	60 59.4	52 83	110.8	61 14.8	51 83	109.9	8
9	58 32.2	57 80	114.7	58 49.2	56 81	113.9	59 06.0	55 82	113.1	59 22.4	54 82	112.3	59 38.5	53 82	111.4	59 54.3	52 83	110.6	60 09.7	51 83	109.7	60 24.9	50 84	108.9	9
30	57 43.9	56 81	113.6	58 00.6	55 82	112.9	58 17.0	54 82	112.1	58 33.2	53 82	111.3	58 49.0	52 83	110.4	59 04.5	51 83	109.6	59 19.7	50 84	108.8	59 34.6	49 84	107.9	30
1	56 55.2	55 82	112.6	57 11.6	54 82	111.9	57 27.8	53 83	111.1	57 43.7	52 83	110.3	57 59.2	51 84	109.5	58 14.5	50 84	108.7	58 29.4	49 84	107.8	58 44.1	48 85	107.0	1
2	56 06.1	54 82	111.7	56 22.3	53 83	110.9	56 38.2	53 83	110.1	56 53.8	52 84	109.4	57 09.1	51 84	108.6	57 24.2	50 84	107.8	57 38.9	49 85	107.0	57 53.3	47 85	106.1	2
3	55 16.7	54 83	110.7	55 32.6	53 83	110.0	55 48.3	52 84	109.2	56 03.7	51 84	108.5	56 18.8	50 84	107.7	56 33.6	49 85	106.9	56 48.1	48 85	106.1	57 02.3	47 85	105.3	3
4	54 27.0	53 83	109.8	54 42.7	52 84	109.1	54 58.2	51 84	108.3	55 13.3	50 84	107.6	55 28.2	49 85	106.8	55 42.8	48 85	106.0	55 57.1	47 85	105.3	56 11.1	46 86	104.5	4
35	53 37.0	52 84	108.9	53 52.5	51 84	108.2	54 07.7	50 84	107.5	54 22.7	49 85	106.7	54 37.4	48 85	106.0	54 51.8	48 85	105.2	55 05.9	47 86	104.5	55 19.7	46 86	103.7	35
6	52 46.8	51 84	108.1	53 02.1	51 84	107.4	53 17.1	50 85	106.7	53 31.9	49 85	105.9	53 46.4	48 85	105.2	54 00.6	47 86	104.5	54 14.5	46 86	103.7	54 28.1	45 86	102.9	6
7	51 56.3	51 84	107.3	52 11.4	50 85	106.6	52 26.2	49 85	105.9	52 40.8	48 85	105.2	52 55.1	47 86	104.4	53 09.2	46 86	103.7	53 22.9	45 86	102.9	53 36.4	44 86	102.2	7
8	51 05.6	50 85	106.5	51 20.5	49 85	105.8	51 35.2	48 85	105.1	51 49.6	48 86	104.4	52 03.7	47 86	103.7	52 17.6	46 86	103.0	52 31.2	45 86	102.2	52 44.6	44 87	101.5	8
9	50 14.7	49 85	105.7	50 29.5	49 86	105.0	50 44.0	48 86	104.4	50 58.2	47 86	103.7	51 12.2	46 86	102.9	51 25.9	45 86	102.2	51 39.4	44 87	101.5	51 52.6	44 87	100.8	9
40	49 23.6	49 86	105.0	49 38.2	48 86	104.3	49 52.6	47 86	103.6	50 06.6	47 86	102.9	50 20.5	46 86	102.2	50 34.1	45 87	101.5	50 47.4	44 87	100.8	51 00.5	43 87	100.1	40
1	48 32.4	48 86	104.3	48 46.8	48 86	103.6	49 01.0	47 86	102.9	49 14.9	46 86	102.2	49 28.6	45 87	101.6	49 42.1	44 87	100.9	49 55.3	44 87	100.2	50 08.3	43 87	99.5	1
2	47 41.0	48 86	103.5	47 55.2	47 86	102.9	48 09.3	46 86	102.2	48 23.1	46 87	101.6	48 36.7	45 87	100.9	48 50.0	44 87	100.2	49 03.1	43 87	99.5	49 16.0	42 87	98.8	2
3	46 49.4	47 86	102.9	47 03.5	47 86	102.2	47 17.4	46 87	101.6	47 31.1	45 87	100.9	47 44.6	45 87	100.2	47 57.8	44 87	99.6	48 10.8	43 87	98.9	48 23.6	42 88	98.2	3
4	45 57.7	47 86	102.2	46 11.7	46 87	101.6	46 25.5	46 87	100.9	46 39.1	45 87	100.3	46 52.4	44 87	99.6	47 05.6	43 87	98.9	47 18.5	43 88	98.3	47 31.1	42 88	97.6	4
45	45 05.8	47 87	101.5	45 19.7	46 87	100.9	45 33.4	45 87	100.3	45 46.9	45 87	99.6	46 00.1	44 87	99.0	46 13.2	43 88	98.3	46 26.0	42 88	97.7	46 38.6	42 88	97.0	45
6	44 13.9	46 87	100.9	44 27.6	46 87	100.3	44 41.2	45 87	99.6	44 54.6	44 87	99.0	45 07.8	44 88	98.4	45 20.7	43 88	97.7	45 33.5	42 88	97.1	45 46.0	41 88	96.4	6
7	43 21.8	46 87	100.3	43 35.5	45 87	99.7	43 49.0	45 87	99.0	44 02.2	44 87	98.4	44 15.3	43 88	97.8	44 28.2	43 88	97.2	44 40.9	42 88	96.5	44 53.3	41 88	95.9	7
8	42 29.6	46 87	99.7	42 43.2	45 87	99.1	42 56.6	44 87	98.4	43 09.8	44 88	97.8	43 22.8	43 88	97.2	43 35.6	42 88	96.6	43 48.2	42 88	96.0	44 00.6	41 88	95.3	8
9	41 37.3	45 87	99.1	41 50.8	45 87	98.5	42 04.2	44 88	97.9	42 17.3	43 88	97.3	42 30.2	43 88	96.6	42 42.9	42 88	96.0	42 55.5	41 88	95.4	43 07.8	41 88	94.8	9
50	40 45.0	45 87	98.5	40 58.4	44 88	97.9	41 11.6	44 88	97.3	41 24.7	43 88	96.7	41 37.6	43 88	96.1	41 50.2	42 88	95.5	42 02.7	41 88	94.9	42 15.0	41 88	94.2	50
1	39 52.5	45 88	97.9	40 05.9	44 88	97.3	40 19.1	44 88	96.7	40 32.0	43 88	96.1	40 44.9	42 88	95.5	40 57.5	42 88	94.9	41 09.9	41 88	94.3	41 22.2	40 88	93.7	1
2	39 00.0	45 88	97.3	39 13.3	44 88	96.8	39 26.4	43 88	96.2	39 39.3	43 88	95.6	39 52.1	42 88	95.0	40 04.7	42 88	94.4	40 17.1	41 88	93.8	40 29.3	40 88	93.2	2
3	38 07.5	44 88	96.8	38 20.7	44 88	96.2	38 33.7	43 88	95.6	38 46.6	43 88	95.0	38 59.3	42 88	94.5	39 11.8	41 88	93.9	39 24.2	41 88	93.3	39 36.4	40 88	92.7	3
4	37 14.8	44 88	96.2	37 28.0	44 88	95.7	37 41.0	43 88	95.1	37 53.8	42 88	94.5	38 06.5	42 88	93.9	38 19.0	41 88	93.4	38 31.3	41 88	92.8	38 43.4	40 88	92.2	4
55	36 22.1	44 88	95.7	36 35.2	43 88	95.1	36 48.2	43 88	94.6	37 01.0	42 88	94.0	37 13.6	42 88	93.4	37 26.1	41 88	92.9	37 38.4	41 88	92.3	37 50.5	40 88	91.7	55
6	35 29.4	44 88	95.2	35 42.4	43 88	94.6	35 55.4	43 88	94.0	36 08.1	42 88	93.5	36 20.7	42 88	92.9	36 33.1	41 88	92.4	36 45.4	41 88	91.8	36 57.5	40 88	91.2	6
7	34 36.6	44 88	94.6	34 49.6	43 88	94.1	35 02.5	43 88	93.5	35 15.2	42 88	93.0	35 27.8	42 88	92.4	35 40.2	41 88	91.9	35 52.5	41 88	91.3	36 04.6	40 88	90.7	7
8	33 43.8	44 88	94.1	33 56.8	43 88	93.6	34 09.6	43 88	93.0	34 22.3	42 88	92.5	34 34.8	42 88	91.9	34 47.2	41 88	91.4	34 59.5	41 88	90.8	35 11.6	40 88	90.3	8
9	32 50.9	43 88	93.6	33 03.9	43 88	93.1	33 16.7	42 88	92.5	33 29.4	42 88	92.0	33 41.9	42 88	91.4	33 54.3	41 88	90.9	34 06.5	41 88	90.3	34 18.6	40 88	89.8	9
60	31 58.0	43 88	93.1	32 11.0	43 88	92.6	32 23.8	42 88	92.0	32 36.4	42 88	91.5	32 48.9	41 88	91.0	33 01.3	41 88	90.4	33 13.5	41 88	89.9	33 25.6	40 88	89.3	60
1	31 05.1	43 88	92.6	31 18.0	43 88	92.1	31 30.8	42 88	91.6	31 43.4	42 88	91.0	31 56.0	41 88	90.5	32 08.3	41 88	90.0	32 20.6	41 88	89.4	32 32.7	40 88	88.9	1
2	30 12.2	43 88	92.1	30 25.1	43 88	91.6	30 37.8	42 88	91.1	30 50.5	42 88	90.5	31 03.0	41 88	90.0	31 15.4	41 88	89.5	31 27.6	41 88	89.0	31 39.7	40 88	88.4	2
3	29 19.2	43 88	91.6	29 32.1	43 88	91.1	29 44.9	42 88	90.6	29 57.5	42 88	90.1	30 10.0	41 88	89.5	30 22.4	41 88	89.0	30 34.6	41 88	88.5	30 46.8	40 88	88.0	3
4	28 26.3	43 88	91.2	28 39.2	43 88	90.6	28 51.9	42 88	90.1	29 04.5	42 88	89.6	29 17.0	41 88	89.1	29 29.4	41 88	88.6	29 41.7	41 88	88.0	29 53.8	40 88	87.5	4
65	27 33.3	43 88	90.7	27 46.2	43 88	90.2	27 58.9	42 88	89.7	28 11.6	42 88	89.1	28 24.1	42 88	88.6	28 36.5	41 88	88.1	28 48.7	41 88	87.6	29 00.9	40 88	87.1	65
6	26 40.3	43 88	90.2	26 53.2	43 88	89.7	27 05.9	42 88	89.2	27 18.6	42 88	88.7	27 31.1	42 88	88.2	27 43.5	41 88	87.7	27 55.8	41 88	87.1	28 08.0	40 88	86.6	6
7	25 47.4	43 88	89.7	26 00.2	43 88	89.2	26 13.0	42 88	88.7	26 25.6	42 88	88.2	26 38.2	42 88	87.7	26 50.6	41 88	87.2	27 02.9	41 88	86.7	27 15.1	41 88	86.2	7
8	24 54.4	43 88	89.3	25 07.3	43 88	88.8	25 20.0	42 88	88.3	25 32.7	42 88	87.8	25 45.2	42 88	87.3	25 57.7	41 88	86.8	26 10.0	41 88	86.3	26 22.3	41 88	85.7	8
9	24 01.4	43 88	88.8	24 14.3	43 88	88.3	24 27.1	42 88	87.8	24 39.8	42 88	87.3	24 52.3	42 88	86.8	25 04.8	41 88	86.3	25 17.2	41 88	85.8	25 29.5	41 88	85.3	9
70	23 08.5	43 88	88.3	23 21.3	43 88	87.9	23 34.1	42 88	87.4	23 46.8	42 88	86.9	23 59.5	42 88	86.4	24 12.0	42 88	85.9	24 24.4	41 88	85.4	24 36.7	41 88	84.9	70
1	22 15.5	43 88	87.9	22 28.4	43 88	87.4	22 41.2	43 88	86.9	22 54.0	42 88	86.4	23 06.6	42 88	85.9	23 19.1	42 88	85.4	23 31.6	41 88	84.9	23 43.9	41 88	84.4	1
2	21 22.6	43 88	87.4	21 35.5	43 88	87.0	21 48.3	43 88	86.5	22 01.1	42 88	86.0	22 13.8	42 88	85.5	22 26.3	42 88	85.0	22 38.8	41 88	84.5	22 51.2	41 88	84.0	2
3	20 29.7	43 88	87.0	20 42.6	43 88	86.5	20 55.5	43 88	86.0	21 08.3	42 88	85.5	21 21.0	42 88	85.0	21 33.6	42 88	84.6	21 46.1	42 88	84.1	21 58.6	41 88	83.6	3
4	19 36.8	43 88	86.5	19 49.7	43 88	86.1	20 02.6	43 88	85.6	20 15.5	43 88	85.1	20 28.2	42 88	84.6	20 40.9	42 88	84.1	20 53.5	42 88	83.6	21 05.9	42 88	83.2	4
75	18 43.9	43 88	86.1	18 56.9	43 88	85.6	19 09.8	43 88	85.1	19 22.7	43 88	84.6	19 35.5	42 88	84.2	19 48.2	42 88	83.7	20 00.8	42 88	83.2	20 13.4	42 88	82.7	75
6	17 51.1	44 88	85.6	18 04.1	43 88	85.2	18 17.1	43 88	84.7	18 30.0	43 88	84.2	18 42.8	43 88	83.7	18 55.6	42 88	83.3	19 08.2	42 88	82.8	19 20.8	42 87	82.3	6
7	16 58.3	44 88	85.2	17 11.3	43 88	84.7	17 24.3	43 88	84.2	17 37.3	43 88	83.8	17 50.2	43 88	83.3	18 03.0	43 88	82.8	18 15.7	42 88	82.3	18 28.4	42 87	81.9	7
8	16 05.5	44 88	84.7	16 18.6	44 88	84.3	16 31.7	43 88	83.8	16 44.7	43 88	83.3	16 57.6	43 88	82.9	17 10.4	43 88	82.4	17 23.2	43 87	81.9	17 36.0	42 87	81.4	8
9	15 12.8	44 88	84.3	15 25.9	44 88	83.8	15 39.0	44 88	83.4	15 52.1	43 88	82.9	16 05.0	43 88	82.4	16 18.0	43 87	82.0	16 30.8	43 87	81.5	16 43.6	43 87	81.0	9
80	14 20.1	44 88	83.8	14 33.3	44 88	83.4	14 46.4	44 88	82.9	14 59.5	44 88	82.5	15 12.5	43 87	82.0	15 25.5	43 87	81.5	15 38.4	43 87	81.1	15 51.3	43 87	80.6	80
1	13 27.4	44 88	83.4	13 40.7	44 88	82.9	13 53.9	44 88	82.5	14 07.0	44 87	82.0	14 20.1	44 87	81.6	14 33.2	43 87	81.1	14 46.1	43 87	80.6	14 59.1	43 87	80.2	1
2	12 34.8	44 88	83.0	12 48.1	44 88	82.5	13 01.4	44 87	82.0	13 14.6	44 87	81.6	13 27.7	44 87	81.1	13 40.9	44 87	80.7	13 53.9	43 87	80.2	14 06.9	43 87	79.7	2
3	11 42.3	45 88	82.5	11 55.6	44 87	82.1	12 08.9	44 87	81.6	12 22.2	44 87	81.1	12 35.4	44 87	80.7	12 48.6	44 87	80.2	13 01.7	44 87	79.8	13 14.8	44 87	79.3	3
4	10 49.8	45 87	82.1	11 03.2	45 87	81.6	11 16.6	45 87	81.2	11 29.9	44 87	80.7	11 43.2	44 87	80.2	11 56.4	44 87	79.8	12 09.6	44 87	79.3	12 22.8	44 86	78.9	4
85	9 57.3	45 87	81.6	10 10.8	45 87	81.2	10 24.2	45 87	80.7	10 37.7	45 87	80.3	10 51.0	44 87	79.8	11 04.3	44 87	79.3	11 17.6	44 87	78.9	11 30.9	44 86	78.4	85
6	9 04.9	45 87	81.2	9 18.5	45 87	80.7	9 32.0	45 87	80.3	9 45.5	45 87	79.8	9 58.9	45 87	79.4	10 12.3	45 86	78.9	10 25.7	44 86	78.5	10 39.0	44 86	78.0	6
7	8 12.6	45 87	80.7	8 26.2	45 87	80.3	8 39.8	45 87	79.8	8 53.4	45 87	79.4	9 06.9	45 87	78.9	9 20.4	45 86	78.5	9 33.8	45 86	78.0	9 47.2	45 86	77.6	7
8	7 20.4	46 87	80.3	7 34.1	46 87	79.8	7 47.7	45 87	79.4	8 01.3	45 86	78.9	8 14.9	45 86	78.5	8 28.5	45 86	78.0	8 42.0	45 86	77.6	8 55.5	45 86	77.1	8
9	6 28.2	46 87	79.8	6 42.0	46 87	79.4	6 55.7	46 87	78.9	7 09.4	46 86	78.5	7 23.1	46 86	78.0	7 36.7	45 86	77.6	7 50.3	45 86	77.1	8 03.9	45 86	76.7	9
90	5 36.1	46 87	79.4	5 49.9	46 86	78.9	6 03.7	46 86	78.5	6 17.5	46 86	78.0	6 31.3	46 86	77.6	6 45.0	46 86	77.1	6 58.7	46 86	76.7	7 12.4	46 86	76.2	90

H.A.	12° 00′ Alt.	Az.	Δd	Δt	12° 30′ Alt.	Az.	Δd	Δt	13° 00′ Alt.	Az.	Δd	Δt	13° 30′ Alt.	Az.	Δd	Δt	14° 00′ Alt.	Az.	Δd	Δt	14° 30′ Alt.	Az.	Δd	Δt	15° 00′ Alt.	Az.	Δd	Δt	15° 30′ Alt.	Az.	Δd	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
00	50 00.0	180.0	1.0	01	49 30.0	180.0	1.0	01	49 00.0	180.0	1.0	01	48 30.0	180.0	1.0	01	48 00.0	180.0	1.0	01	47 30.0	180.0	1.0	01	47 00.0	180.0	1.0	01	46 30.0	180.0	1.0	01	00
1	49 59.3	178.5	1.0	04	49 29.3	178.5	1.0	04	48 59.3	178.5	1.0	03	48 29.3	178.5	1.0	03	47 59.3	178.5	1.0	03	47 29.3	178.6	1.0	03	46 59.3	178.6	1.0	03	46 29.4	178.6	1.0	03	1
2	49 57.2	177.0	1.0	06	49 27.2	177.0	1.0	06	48 57.3	177.0	1.0	06	48 27.3	177.1	1.0	06	47 57.3	177.1	1.0	06	47 27.4	177.1	1.0	06	46 57.4	177.2	1.0	06	46 27.4	177.2	1.0	05	2
3	49 53.7	175.4	1.0	08	49 23.8	175.5	1.0	08	48 53.8	175.6	1.0	08	48 23.9	175.6	1.0	08	47 54.0	175.7	1.0	08	47 24.0	175.7	1.0	08	46 54.1	175.8	1.0	08	46 24.2	175.8	1.0	08	3
4	49 48.8	173.9	1.0	10	49 18.9	174.0	1.0	10	48 49.0	174.1	1.0	10	48 19.2	174.1	1.0	10	47 49.3	174.2	1.0	10	47 19.4	174.3	1.0	10	46 49.5	174.3	1.0	10	46 19.7	174.4	1.0	10	4
05	49 42.5	172.4	99	13	49 12.7	172.5	99	13	48 42.9	172.6	99	12	48 13.1	172.7	99	12	47 43.3	172.8	99	12	47 13.5	172.9	99	12	46 43.7	173.0	99	12	46 13.9	173.0	99	12	05
6	49 34.8	170.9	99	15	49 05.1	171.0	99	15	48 35.4	171.1	99	14	48 05.7	171.2	99	14	47 36.0	171.3	99	14	47 06.3	171.4	99	14	46 36.5	171.5	99	14	46 06.8	171.6	99	14	6
7	49 25.8	169.4	99	17	48 56.2	169.6	99	17	48 26.6	169.7	99	17	47 57.0	169.8	99	17	47 27.4	169.9	99	16	46 57.7	170.0	99	16	46 28.1	170.2	99	16	45 58.5	170.3	99	16	7
8	49 15.4	168.0	98	20	48 45.9	168.1	98	19	48 16.4	168.2	98	19	47 47.0	168.4	98	19	47 17.5	168.5	98	19	46 47.9	168.6	98	18	46 18.4	168.8	98	18	45 48.9	168.9	98	18	8
9	49 03.7	166.5	98	22	48 34.3	166.7	98	21	48 05.0	166.8	98	21	47 35.6	167.0	98	21	47 06.3	167.1	98	21	46 36.9	167.3	98	20	46 07.5	167.4	98	20	45 38.1	167.5	98	20	9
10	48 50.7	165.0	97	24	48 21.5	165.2	97	24	47 52.3	165.4	97	23	47 23.1	165.6	97	23	46 53.8	165.7	97	23	46 24.6	165.9	97	22	45 55.3	166.0	98	22	45 26.1	166.2	98	22	10
1	48 36.3	163.6	97	26	48 07.3	163.8	97	25	47 38.3	164.0	97	25	47 09.2	164.2	97	25	46 40.2	164.3	97	25	46 11.1	164.5	97	25	45 42.0	164.7	97	24	45 12.8	164.9	97	24	1
2	48 29.8	162.2	96	28	47 51.9	162.4	96	27	47 23.0	162.6	96	27	46 54.2	162.8	96	27	46 25.3	163.0	96	27	45 56.3	163.2	96	26	45 27.4	163.4	97	26	44 58.4	163.5	97	26	2
3	48 03.9	160.8	95	30	47 35.3	161.0	96	30	47 06.6	161.2	96	30	46 37.9	161.4	96	29	46 09.2	161.6	96	29	45 40.4	161.8	96	28	45 11.6	162.0	96	28	44 42.8	162.2	96	28	3
4	47 45.9	159.4	95	32	47 17.4	159.6	95	31	46 48.9	159.9	95	31	46 20.4	160.1	95	31	45 51.9	160.3	95	31	45 23.3	160.5	95	30	44 54.7	160.7	95	30	44 26.1	160.9	95	30	4
15	47 26.6	158.0	94	34	46 58.4	158.3	94	33	46 30.1	158.5	94	33	46 01.8	158.7	94	33	45 33.4	159.0	95	33	45 05.1	159.2	95	32	44 36.7	159.4	95	32	44 08.3	159.7	95	32	15
6	47 06.2	156.7	93	36	46 38.2	156.9	94	36	46 10.1	157.2	94	35	45 42.0	157.4	94	35	45 13.9	157.7	94	34	44 45.7	157.9	94	34	44 17.5	158.2	94	34	43 49.3	158.4	94	33	6
7	46 44.7	155.3	93	38	46 16.9	155.6	93	38	45 49.0	155.9	93	37	45 21.1	156.1	93	36	44 53.2	156.4	93	36	44 25.3	156.7	93	36	43 57.3	156.9	93	36	43 29.3	157.2	93	35	7
8	46 22.0	154.0	92	40	45 54.4	154.3	92	39	45 26.8	154.6	92	39	44 59.2	154.9	92	38	44 31.5	155.1	92	38	44 03.7	155.4	93	38	43 36.0	155.7	93	37	43 08.2	155.9	93	37	8
9	45 58.3	152.7	91	41	45 30.9	153.0	91	40	45 03.6	153.3	91	40	44 36.1	153.6	91	40	44 08.7	153.9	92	40	43 41.2	154.2	92	39	43 13.6	154.4	92	39	42 46.0	154.7	92	38	9
20	45 33.5	151.5	90	43	45 06.4	151.8	90	43	44 39.3	152.1	91	42	44 12.1	152.4	91	42	43 44.8	152.7	91	41	43 17.6	152.9	91	41	42 50.2	153.2	91	41	42 22.9	153.5	91	40	20
1	45 07.7	150.2	89	45	44 40.8	150.5	90	44	44 13.9	150.8	90	44	43 47.0	151.1	90	44	43 20.0	151.4	90	43	42 53.0	151.7	90	43	42 25.9	152.0	90	42	41 58.8	152.3	90	42	1
2	44 40.8	149.0	89	46	44 14.3	149.3	89	46	43 47.6	149.6	89	46	43 20.9	149.9	89	45	42 54.2	150.3	89	45	42 27.4	150.6	89	44	42 00.6	150.9	90	44	41 33.7	151.2	90	44	2
3	44 13.1	147.8	88	48	43 46.7	148.1	88	47	43 20.4	148.4	88	47	42 53.9	148.8	88	46	42 27.4	149.1	88	46	42 00.9	149.4	89	46	41 34.3	149.7	89	45	41 07.6	150.0	89	45	3
4	43 44.4	146.6	87	49	43 18.3	146.9	87	49	42 52.2	147.3	87	48	42 26.0	147.6	87	48	41 59.8	147.9	88	48	41 33.5	148.2	88	47	41 07.1	148.6	88	47	40 40.7	148.9	88	46	4
25	43 14.7	145.4	86	51	42 48.9	145.8	86	50	42 23.1	146.1	86	50	41 57.2	146.5	87	50	41 31.2	146.8	87	49	41 05.1	147.1	87	48	40 39.0	147.4	87	48	40 12.9	147.8	87	48	25
6	42 44.2	144.3	85	52	42 18.7	144.6	85	51	41 53.1	145.0	85	51	41 27.5	145.3	86	51	41 01.7	145.7	86	50	40 36.0	146.0	86	50	40 10.1	146.4	86	50	39 44.2	146.7	86	49	6
7	42 12.9	143.2	84	54	41 47.6	143.5	84	53	41 22.3	143.9	85	53	40 56.9	144.2	85	52	40 31.4	144.6	85	52	40 05.9	144.9	85	51	39 40.3	145.3	85	51	39 14.7	145.6	86	50	7
8	41 40.7	142.1	83	55	41 15.7	142.4	83	54	40 50.7	142.8	84	54	40 25.5	143.2	84	54	40 00.3	143.5	84	53	39 35.1	143.9	84	53	39 09.8	144.2	85	52	38 44.4	144.6	85	52	8
9	41 07.8	141.0	82	56	40 43.0	141.4	83	56	40 18.2	141.7	83	55	39 53.4	142.1	83	55	39 28.4	142.5	83	54	39 03.4	142.8	83	54	38 38.4	143.2	84	54	38 13.3	143.5	84	53	9
30	40 34.0	139.9	81	58	40 09.6	140.3	82	57	39 45.0	140.7	82	56	39 20.4	141.1	82	56	38 55.8	141.4	82	56	38 31.0	141.8	83	55	38 06.2	142.1	83	55	37 41.4	142.5	83	54	30
1	39 59.5	138.9	80	59	39 35.4	139.3	81	58	39 11.1	139.7	81	58	38 46.8	140.0	81	57	38 22.4	140.4	81	57	37 57.9	140.8	82	56	37 33.4	141.1	82	56	37 08.8	141.5	82	56	1
2	39 24.4	137.9	80	60	39 00.4	138.3	80	59	38 36.5	138.6	80	59	38 12.4	139.0	80	58	37 48.2	139.4	81	58	37 24.0	139.8	81	58	36 59.8	140.1	81	57	36 35.4	140.5	82	57	2
3	38 48.5	136.9	79	61	38 24.8	137.3	79	60	38 01.1	137.7	79	60	37 37.3	138.0	79	60	37 13.4	138.4	80	59	36 49.5	138.8	80	59	36 25.5	139.2	80	58	36 01.4	139.5	80	58	3
4	38 11.9	135.9	78	62	37 48.5	136.3	78	61	37 25.1	136.7	78	61	37 01.6	137.1	79	61	36 37.9	137.5	79	60	36 14.3	137.8	79	60	35 50.5	138.2	79	59	35 26.7	138.6	80	59	4
35	37 34.7	134.9	77	63	37 11.6	135.3	77	62	36 48.4	135.7	77	62	36 25.2	136.1	78	62	36 01.8	136.5	78	61	35 38.4	136.9	78	61	35 14.9	137.3	78	60	34 51.3	137.7	79	60	35
6	36 56.9	134.0	76	64	36 34.1	134.4	76	64	36 11.1	134.8	77	63	35 48.1	135.2	77	63	35 25.0	135.6	77	62	35 01.9	136.0	77	62	34 38.6	136.4	78	61	34 15.3	136.7	78	61	6
7	36 18.5	133.1	75	65	35 55.9	133.5	75	64	35 33.2	133.9	76	64	35 10.5	134.3	76	64	34 47.7	134.7	76	63	34 24.7	135.1	76	63	34 01.8	135.5	77	62	33 38.7	135.8	77	62	7
8	35 39.5	132.2	74	66	35 17.2	132.6	75	66	34 54.8	133.0	75	65	34 32.3	133.4	75	65	34 09.7	133.8	75	64	33 47.0	134.2	76	64	33 24.3	134.6	76	63	33 01.5	135.0	76	63	8
9	35 00.0	131.3	73	67	34 37.9	131.7	74	66	34 15.7	132.1	74	66	33 53.5	132.5	74	66	33 31.2	132.9	75	65	33 08.8	133.3	75	65	32 46.3	133.7	75	64	32 23.7	134.1	75	64	9
40	34 19.9	130.4	73	68	33 58.1	130.8	73	67	33 36.2	131.2	73	67	33 14.2	131.6	73	66	32 52.1	132.0	74	66	32 29.9	132.4	74	66	32 07.7	132.8	74	65	31 45.4	133.2	74	65	40
1	33 39.3	129.6	72	68	33 17.7	130.0	72	68	32 56.1	130.4	72	68	32 34.3	130.8	73	67	32 12.5	131.2	73	67	31 50.6	131.6	73	66	31 28.6	132.0	73	66	31 06.6	132.4	74	66	1
2	32 58.2	128.7	71	69	32 36.9	129.1	71	69	32 15.5	129.6	72	68	31 54.0	130.0	72	68	31 32.4	130.4	72	68	31 10.7	130.8	72	67	30 49.0	131.2	73	67	30 27.2	131.6	73	66	2
3	32 16.7	127.9	70	70	31 55.6	128.3	70	70	31 34.4	128.7	71	69	31 13.1	129.2	71	69	30 51.8	129.6	71	68	30 30.4	130.0	72	68	30 08.9	130.4	72	68	29 47.3	130.8	72	67	3
4	31 34.6	127.1	69	71	31 13.8	127.5	70	70	30 52.8	127.9	70	70	30 31.8	128.4	70	70	30 10.7	128.8	71	69	29 49.5	129.2	71	69	29 28.3	129.6	71	68	29 07.0	130.0	71	68	4
45	30 52.2	126.3	69	72	30 31.6	126.7	69	71	30 10.8	127.2	69	71	29 50.1	127.6	69	70	29 29.2	128.0	70	70	29 08.2	128.4	70	70	28 47.2	128.8	70	69	28 26.1	129.2	70	69	45
6	30 09.3	125.5	68	72	29 48.9	126.0	68	72	29 28.4	126.4	68	71	29 07.8	126.8	69	71	28 47.2	127.2	69	71	28 26.5	127.6	69	70	28 05.7	128.0	69	70	27 44.9	128.4	70	70	6
7	29 26.0	124.8	67	73	29 05.8	125.2	67	72	28 45.5	125.6	68	72	28 25.2	126.0	68	72	28 04.8	126.5	68	71	27 44.3	126.9	68	71	27 23.8	127.3	69	71	27 03.2	127.7	69	70	7
8	28 42.3	124.0	66	74	28 22.3	124.5	67	73	28 02.3	124.9	67	73	27 42.2	125.3	67	72	27 22.0	125.7	67	72	27 01.7	126.1	68	72	26 41.4	126.5	68	71	26 21.0	127.0	68	71	8
9	27 58.2	123.3	66	74	27 38.4	123.7	66	73	27 18.6	124.1	66	73	26 58.7	124.6	67	73	26 38.8	125.0	67	72	26 18.8	125.4	67	72	25 58.7	125.8	67	72	25 38.5	126.2	67	72	9
50	27 13.7	122.6	65	75	26 54.2	123.0	65	74	26 34.6	123.4	65	74	26 14.9	123.8	66	74	25 55.2	124.3	66	73	25 35.4	124.7	66	73	25 15.5	125.1	66	72	24 55.6	125.5	67	72	50
1	26 28.9	121.9	64	75	26 09.6	122.3	64	75	25 50.2	122.7	65	75	25 30.8	123.1	65	74	25 11.2	123.6	65	74	24 51.6	124.0	65	74	24 32.0	124.4	66	73	24 12.2	124.8	66	73	1
2	25 43.7	121.2	64	76	25 24.6	121.6	64	76	25 05.5	122.0	64	75	24 46.2	122.4	64	75	24 26.9	122.9	64	74	24 07.5	123.3	65	74	23 48.1	123.7	65	74	23 28.6	124.1	65	74	2
3	24 58.2	120.5	63	76	24 39.3	120.9	63	76	24 20.4	121.3	63	76	24 01.3	121.8	64	75	23 42.2	122.2	64	75	23 23.1	122.6	64	75	23 03.8	123.0	64	74	22 44.5	123.4	64	74	3
4	24 12.4	119.8	62	77	23 53.7	120.2	62	76	23 35.0	120.7	63	76	23 16.1	121.1	63	76	22 57.2	121.5	63	76	22 38.3	121.9	63	75	22 19.2	122.4	64	75	22 00.2	122.8	64	75	4
55	23 26.3	119.2	62	77	23 07.8	119.6	62	77	22 49.2	120.0	62	77	22 30.6	120.4	62	76	22 11.9	120.9	62	76	21 53.2	121.3	63	76	21 34.3	121.7	63	75	21 15.4	122.1	63	75	55
6	22 39.9	118.5	61	78	22 21.6	118.9	61	78	22 03.2	119.4	61	77	21 44.8	119.8	62	77	21 26.3	120.2	62	76	21 07.7	120.6	62	76	20 49.1	121.0	62	76	20 30.4	121.5	62	76	6
7	21 53.2	117.9	60	78	21 35.1	118.3	60	78	21 16.9	118.7	61	78	20 58.7	119.1	61	77	20 40.4	119.6	61	77	20 22.0	120.0	61	77	20 03.6	120.4	62	76	19 45.1	120.8	62	76	7
8	21 06.2	117.2	60	79	20 48.3	117.7	60	78	20 30.3	118.1	60	78	20 12.3	118.5	60	78	19 54.1	118.9	60	78	19 36.0	119.4	61	77	19 17.7	119.8	61	77	18 59.4	120.2	61	76	8
9	20 19.0	116.6	59	79	20 01.2	117.0	59	79	19 43.4	117.5	59	78	19 25.6	117.9	60	78	19 07.6	118.3	60	78	18 49.7	118.7	60	78	18 31.6	119.2	60	77	18 13.5	119.6	60	77	9
60	19 31.5	116.0	58	80	19 13.9	116.4	59	79	18 56.3	116.9	59	79	18 38.6	117.3	59	79	18 20.9	117.7	59	78	18 03.1	118.1	59	78	17 45.2	118.6	60	78	17 27.3	119.0	60	78	60
1	18 43.8	115.4	58	80	18 26.4	115.8	58	80	18 08.9	116.3	58	79	17 51.4	116.7	58	79	17 33.8	117.1	59	79	17 16.2	117.5	59	78	16 58.5	118.0	59	78	16 40.8	118.4	59	78	1
2	17 55.8	114.8	57	80	17 38.6	115.2	58	80	17 21.3	115.7	58	80	17 03.9	116.1	58	79	16 46.6	116.5	58	79	16 29.1	116.9	58	79	16 11.6	117.4	58	79	15 54.1	117.8	59	78	2
3	17 07.6	114.2	57	81	16 50.5	114.7	57	80	16 33.4	115.1	57	80	16 16.3	115.5	57	80	15 59.0	115.9	57	80	15 41.8	116.4	58	79	15 24.5	116.8	58	79	15 07.1	117.2	58	79	3
4	16 19.2	113.6	56	81	16 02.3	114.1	56	81	15 45.3	114.5	57	80	15 28.3	114.9	57	80	15 11.3	115.4	57	80	14 54.2	115.8	57	80	14 37.0	116.2	57	79	14 19.9	116.6	57	79	4
65	15 30.5	113.1	56	81	15 13.8	113.5	56	81	14 57.0	113.9	56	81	14 40.2	114.4	56	81	14 23.3	114.8	56	80	14 06.4	115.2	56	80	13 49.4	115.6	57	80	13 32.4	116.1	57	80	65
6	14 41.7	112.5	55	82	14 25.1	112.9	55	82	14 08.5	113.4	56	81	13 51.8	113.8	56	81	13 35.1	114.2	56	81	13 18.3	114.7	56	80	13 01.5	115.1	56	80	12 44.7	115.5	56	80	6
7	13 52.7	112.0	55	82	13 36.2	112.4	55	82	13 19.7	112.8	55	82	13 03.2	113.2	55	81	12 46.7	113.7	55	81	12 30.1	114.1	55	81	12 13.4	114.5	56	80	11 56.8	115.0	56	80	7
8	13 03.4	111.4	54	82	12 47.1	111.8	54	82	12 30.8	112.3	54	82	12 14.5	112.7	55	82	11 58.1	113.1	55	81	11 41.6	113.6	55	81	11 25.1	114.0	55	81	11 08.6	114.4	55	80	8
9	12 14.0	110.9	54	83	11 57.9	111.3	54	82	11 41.7	111.7	54	82	11 25.5	112.2	54	82	11 09.2	112.6	54	82	10 52.9	113.0	54	81	10 36.6	113.4	54	81	10 20.3	113.9	55	81	9
70	11 24.4	110.3	53	83	11 08.4	110.8	53	83	10 52.4	111.2	54	82	10 36.3	111.6	54	82	10 20.2	112.1	54	82	10 04.1	112.5	54	82	9 47.9	112.9	54	82	9 31.7	113.3	54	81	70
1	10 34.7	109.8	53	83	10 18.8	110.2	53	83	10 02.9	110.7	53	83	9 47.0	111.1	53	82	9 31.0	111.5	53	82	9 15.1	112.0	53	82	8 59.0	112.4	53	82	8 43.0	112.8	54	82	1
2	9 44.7	109.3	52	84	9 29.0	109.7	52	83	9 13.3	110.1	53	83	8 57.5	110.6	53	83	8 41.7	111.0	53	82	8 25.8	111.4	53	82	8 10.0	111.9	53	82	7 54.1	112.3	53	82	2
3	8 54.7	108.8	52	84	8 39.1	109.2	52	84	8 23.4	109.6	52	83	8 07.8	110.1	52	83	7 52.1	110.5	52	83	7 36.4	110.9	52	82	7 20.7	111.4	52	82	7 05.0	111.8	53	82	3
4	8 04.4	108.3	51	84	7 49.0	108.7	52	84	7 33.5	109.1	52	84	7 18.0	109.6	52	83	7 02.4	110.0	52	83	6 46.9	110.4	52	83	6 31.3	110.8	52	83	6 15.7	111.3	52	82	4
75	7 14.0	107.7	51	84	6 58.7	108.2	51	84	6 43.3	108.6	51	84	6 28.0	109.0	51	84	6 12.6	109.5	51	83	5 57.1	109.9	51	83	5 41.7	110.3	52	83	5 26.2	110.8	52	82	75
6	6 23.5	107.2	51	84	6 08.3	107.7	51	84	5 53.1	108.1	51	84	5 37.8	108.5	51	84	5 22.5	109.0	51	84	5 07.2	109.4	51	83									6
7	5 32.9	106.8	50	85	5 17.7	107.2	50	84	5 02.6	107.6	50	84																					7

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt.	Az.	Δd	Δt	12° 30′ Alt.	Az.	Δd	Δt	13° 00′ Alt.	Az.	Δd	Δt	13° 30′ Alt.	Az.	Δd	Δt	14° 00′ Alt.	Az.	Δd	Δt	14° 30′ Alt.	Az.	Δd	Δt	15° 00′ Alt.	Az.	Δd	Δt	15° 30′ Alt.	Az.	Δd	Δt	H.A.
°	° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			° ′	°			°
91									5 11.9	78.0	46	86	5 25.7	77.6	46	86	5 39.6	77.1	46	86	5 53.4	76.7	46	86	6 07.2	76.2	46	86	6 21.0	75.8	46	86	91
2																					5 01.9	76.2	46	86	5 15.8	75.8	46	86	5 29.7	75.4	46	85	2

Lat. 28°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	78 00.0	1.0 04	180.0	78 30.0	1.0 04	180.0	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	80 00.0	1.0 04	180.0	80 30.0	1.0 04	180.0	81 00.0	1.0 05	180.0	81 30.0	1.0 05	180.0	00
1	77 57.9	1.0 11	175.4	78 27.8	1.0 11	175.2	78 57.7	1.0 12	175.0	79 27.6	1.0 12	174.8	79 57.5	1.0 12	174.5	80 27.4	1.0 13	174.3	80 57.2	1.0 14	174.0	81 27.1	99 15	173.6	1
2	77 51.5	99 18	170.8	78 21.2	99 18	170.5	78 50.8	99 19	170.0	79 20.4	99 20	169.6	79 50.0	98 20	169.2	80 19.5	98 22	168.6	80 48.9	98 22	168.1	81 18.3	98 24	167.4	2
3	77 41.0	98 24	166.4	78 10.3	97 25	165.8	78 39.5	97 26	165.3	79 08.6	97 27	164.6	79 37.6	97 28	164.0	80 06.6	96 29	163.2	80 35.4	96 31	162.4	81 04.1	95 32	161.5	3
4	77 26.6	96 30	162.0	77 55.3	96 31	161.4	78 23.9	95 32	160.6	78 52.4	95 34	159.8	79 20.8	94 35	159.0	79 49.0	94 36	158.0	80 17.0	93 38	157.0	80 44.8	92 40	155.9	4
05	77 08.4	94 36	157.9	77 36.5	93 37	157.1	78 04.4	93 38	156.2	78 32.2	92 40	155.3	78 59.7	92 41	154.3	79 27.1	91 43	153.2	79 54.2	90 45	152.0	80 21.0	89 46	150.7	05
6	76 46.8	91 41	153.9	77 14.1	91 43	153.0	77 41.3	90 44	152.0	78 08.2	89 46	151.0	78 34.9	88 47	149.9	79 01.3	87 49	148.6	79 27.4	86 50	147.3	79 53.1	85 52	145.9	6
7	76 22.0	89 46	150.2	76 48.5	88 48	149.2	77 14.9	87 49	148.1	77 40.9	86 50	147.0	78 06.7	85 52	145.8	78 32.1	84 54	144.5	78 57.1	83 56	143.0	79 21.7	81 57	141.5	7
8	75 54.2	86 51	146.7	76 20.0	85 52	145.6	76 45.5	84 53	144.5	77 10.6	83 55	143.3	77 35.4	82 56	142.0	77 59.8	81 58	140.6	78 23.8	79 60	139.1	78 47.3	77 62	137.6	8
9	75 23.8	84 54	143.4	75 48.8	83 56	142.3	76 13.4	81 57	141.1	76 37.7	80 59	139.8	77 01.5	79 60	138.5	77 24.9	77 62	137.1	77 47.9	76 64	135.6	78 10.3	74 65	134.0	9
10	74 51.1	81 58	140.3	75 15.2	80 59	139.1	75 39.0	79 61	137.9	76 02.4	77 62	136.6	76 25.3	76 64	135.3	76 47.8	74 65	133.9	77 09.8	72 67	132.4	77 31.2	70 68	130.8	10
1	74 16.2	78 61	137.4	74 39.6	77 63	136.2	75 02.5	76 64	135.0	75 25.0	74 65	133.7	75 47.1	73 67	132.4	76 08.7	71 68	130.9	76 29.7	69 70	129.4	76 50.2	67 71	127.8	1
2	73 39.5	76 64	134.7	74 02.0	74 65	133.6	74 24.2	73 67	132.3	74 45.9	72 68	131.0	75 07.1	70 69	129.7	75 27.8	68 70	128.2	75 48.0	66 72	126.7	76 07.6	64 73	125.2	2
3	73 01.1	73 66	132.2	73 22.8	72 68	131.1	73 44.2	71 69	129.8	74 05.1	69 70	128.5	74 25.6	67 71	127.2	74 45.5	66 73	125.8	75 04.9	64 74	124.3	75 23.7	62 75	122.8	3
4	72 21.1	71 69	129.9	72 42.2	70 70	128.7	73 02.8	68 71	127.5	73 23.0	66 72	126.2	73 42.7	65 73	124.9	74 01.9	63 74	123.5	74 20.5	61 76	122.1	74 38.6	59 77	120.6	4
15	71 39.8	69 71	127.7	72 00.2	67 72	126.6	72 20.2	66 73	125.3	72 39.7	64 74	124.1	72 58.7	62 75	122.8	73 17.2	61 76	121.4	73 35.1	59 77	120.0	73 52.5	57 78	118.5	15
6	70 57.4	67 72	125.7	71 17.1	65 74	124.5	71 36.5	64 74	123.3	71 55.3	62 76	122.1	72 13.7	60 76	120.8	72 31.5	59 78	119.5	72 48.8	57 78	118.1	73 05.5	55 80	116.7	6
7	70 13.8	65 74	123.8	70 33.0	63 75	122.7	70 51.7	62 76	121.5	71 10.0	60 77	120.3	71 27.7	58 78	119.0	71 45.0	57 79	117.7	72 01.7	55 80	116.4	72 17.8	53 80	115.0	7
8	69 29.4	63 76	122.0	69 48.0	61 76	120.9	70 06.1	60 77	119.7	70 23.8	58 78	118.5	70 41.0	57 79	117.3	70 57.7	55 80	116.1	71 13.9	53 81	114.8	71 29.5	51 82	113.4	8
9	68 44.0	61 77	120.4	69 02.1	60 78	119.3	69 19.8	58 78	118.1	69 36.9	56 79	116.9	69 53.6	55 80	115.7	70 09.8	53 81	114.5	70 25.5	51 82	113.2	70 40.6	50 82	112.0	9
20	67 58.0	59 78	118.8	68 15.6	58 79	117.7	68 32.7	56 80	116.6	68 49.4	55 80	115.4	69 05.6	53 81	114.3	69 21.4	52 82	113.1	69 36.6	50 82	111.8	69 51.3	48 83	110.6	20
1	67 11.2	58 79	117.3	67 28.3	56 80	116.3	67 45.0	55 80	115.2	68 01.3	53 81	114.0	68 17.1	52 82	112.9	68 32.4	50 82	111.7	68 47.2	49 83	110.5	69 01.5	47 84	109.3	1
2	66 23.9	56 80	115.9	66 40.6	55 81	114.9	66 56.8	54 81	113.8	67 12.7	52 82	112.7	67 28.0	51 82	111.6	67 43.0	49 83	110.5	67 57.4	47 84	109.3	68 11.3	46 84	108.1	2
3	65 35.9	55 81	114.6	65 52.2	54 81	113.6	66 08.1	52 82	112.5	66 23.6	51 82	111.5	66 38.6	49 83	110.4	66 53.1	48 84	109.3	67 07.2	46 84	108.2	67 20.8	44 85	107.0	3
4	64 47.5	54 81	113.4	65 03.5	52 82	112.4	65 19.0	51 82	111.3	65 34.1	50 83	110.3	65 48.7	48 84	109.2	66 03.0	47 84	108.2	66 16.7	45 85	107.1	66 30.0	43 85	105.9	4
25	63 58.7	53 82	112.2	64 14.3	51 83	111.2	64 29.5	50 83	110.2	64 44.2	49 84	109.2	64 58.6	47 84	108.2	65 12.5	46 85	107.1	65 25.9	44 85	106.0	65 38.9	43 86	104.9	25
6	63 09.4	52 83	111.1	63 24.7	50 83	110.1	63 39.6	49 84	109.1	63 54.0	48 84	108.1	64 08.1	46 85	107.1	64 21.7	45 85	106.1	64 34.9	43 86	105.1	64 47.6	42 86	104.0	6
7	62 19.8	50 83	110.0	62 34.8	49 84	109.1	62 49.4	48 84	108.1	63 03.5	47 84	107.1	63 17.3	45 85	106.1	63 30.7	44 86	105.1	63 43.6	42 86	104.1	63 56.1	41 86	103.1	7
8	61 29.9	50 84	109.0	61 44.6	48 84	108.0	61 58.9	47 85	107.1	62 12.8	46 85	106.2	62 26.3	44 85	105.2	62 39.4	43 86	104.2	62 52.2	42 86	103.2	63 04.4	40 86	102.2	8
9	60 39.6	49 84	108.0	60 54.1	47 85	107.1	61 08.1	46 85	106.2	61 21.8	45 85	105.3	61 35.1	44 86	104.3	61 48.0	42 86	103.4	62 00.5	41 86	102.4	62 12.6	40 87	101.4	9
30	59 49.1	48 85	107.1	60 03.3	47 85	106.2	60 17.1	45 85	105.3	60 30.6	44 86	104.4	60 43.7	43 86	103.5	60 56.4	42 86	102.5	61 08.7	40 87	101.6	61 20.6	39 87	100.6	30
1	58 58.3	47 85	106.2	59 12.3	46 85	105.3	59 25.9	45 86	104.4	59 39.2	44 86	103.5	59 52.0	42 86	102.6	60 04.6	41 87	101.7	60 16.7	40 87	100.8	60 28.5	39 87	99.9	1
2	58 07.4	46 85	105.3	58 21.1	45 86	104.5	58 34.5	44 86	103.6	58 47.6	43 86	102.7	59 00.3	42 86	101.9	59 12.6	41 87	101.0	59 24.6	39 87	100.1	59 36.2	38 87	99.2	2
3	57 16.2	45 86	104.5	57 29.7	45 86	103.6	57 42.9	44 86	102.8	57 55.8	42 86	102.0	58 08.4	41 87	101.1	58 20.6	40 87	100.2	58 32.4	39 87	99.4	58 43.9	38 88	98.5	3
4	56 24.8	45 86	103.7	56 38.1	44 86	102.9	56 51.2	43 86	102.0	57 03.9	42 87	101.2	57 16.3	41 87	100.4	57 28.4	40 87	99.5	57 40.1	38 87	98.7	57 51.4	37 88	97.8	4
35	55 33.2	45 86	102.9	55 46.4	43 86	102.1	55 59.3	42 87	101.3	56 11.9	41 87	100.5	56 24.1	40 87	99.7	56 36.1	39 87	98.8	56 47.6	38 88	98.0	56 58.9	37 88	97.1	35
6	54 41.5	44 86	102.2	54 54.5	43 87	101.4	55 07.3	42 87	100.6	55 19.7	41 87	99.8	55 31.9	40 87	99.0	55 43.7	39 88	98.2	55 55.1	38 88	97.3	56 06.3	37 88	96.5	6
7	53 49.6	44 87	101.4	54 02.5	43 87	100.7	54 15.2	42 87	99.9	54 27.5	41 87	99.1	54 39.5	40 88	98.3	54 51.2	38 88	97.5	55 02.6	37 88	96.7	55 13.6	36 88	95.9	7
8	52 57.6	43 87	100.7	53 10.4	42 87	100.0	53 22.9	41 87	99.2	53 35.1	40 87	98.5	53 47.0	39 88	97.7	53 58.6	38 88	96.9	54 09.9	37 88	96.1	54 20.9	36 88	95.3	8
9	52 05.5	43 87	100.1	52 18.2	42 87	99.3	52 30.6	41 87	98.6	52 42.7	40 88	97.8	52 54.5	39 88	97.1	53 06.0	38 88	96.3	53 17.2	37 88	95.5	53 28.1	36 88	94.7	9
40	51 13.3	42 87	99.4	51 25.9	41 87	98.7	51 38.2	40 88	97.9	51 50.2	40 88	97.2	52 01.9	39 88	96.5	52 13.3	38 88	95.7	52 24.5	37 88	94.9	52 35.3	36 88	94.2	40
1	50 21.0	42 87	98.8	50 33.5	41 88	98.0	50 45.6	40 88	97.3	50 57.6	39 88	96.6	51 09.2	38 88	95.9	51 20.6	37 88	95.1	51 31.7	36 88	94.4	51 42.5	36 88	93.6	1
2	49 28.6	42 88	98.1	49 41.0	41 88	97.4	49 53.1	40 88	96.7	50 04.9	39 88	96.0	50 16.5	38 88	95.3	50 27.8	37 88	94.6	50 38.8	36 88	93.8	50 49.6	35 88	93.1	2
3	48 36.1	41 88	97.5	48 48.4	40 88	96.8	49 00.4	40 88	96.1	49 12.2	39 88	95.4	49 23.7	38 88	94.7	49 35.0	37 88	94.0	49 45.9	36 88	93.3	49 56.7	35 88	92.6	3
4	47 43.6	41 88	96.9	47 55.8	40 88	96.3	48 07.7	39 88	95.6	48 19.4	39 88	94.9	48 30.9	38 88	94.2	48 42.1	37 88	93.5	48 53.0	36 88	92.8	49 03.7	35 88	92.1	4
45	46 51.0	41 88	96.4	47 03.1	40 88	95.7	47 15.0	39 88	95.0	47 26.6	38 88	94.3	47 38.0	38 88	93.6	47 49.2	37 88	93.0	48 00.1	36 88	92.3	48 10.8	35 88	91.6	45
6	45 58.3	41 88	95.8	46 10.3	40 88	95.1	46 22.2	39 88	94.5	46 33.8	38 88	93.8	46 45.2	37 88	93.1	46 56.3	37 88	92.4	47 07.2	36 88	91.8	47 17.8	35 88	91.1	6
7	45 05.5	40 88	95.2	45 17.6	40 88	94.6	45 29.3	39 88	93.9	45 40.9	38 88	93.3	45 52.2	37 88	92.6	46 03.4	37 88	91.9	46 14.2	36 88	91.3	46 24.8	35 88	90.6	7
8	44 12.8	40 88	94.7	44 24.7	40 88	94.0	44 36.5	39 88	93.4	44 48.0	38 88	92.8	44 59.3	37 88	92.1	45 10.4	37 88	91.4	45 21.3	36 88	90.8	45 31.9	35 88	90.1	8
9	43 19.9	40 88	94.2	43 31.9	39 88	93.5	43 43.6	39 88	92.9	43 55.1	38 88	92.2	44 06.4	37 88	91.6	44 17.4	37 88	91.0	44 28.3	36 88	90.3	44 38.9	35 88	89.6	9
50	42 27.1	40 88	93.6	42 39.0	39 88	93.0	42 50.7	39 88	92.4	43 02.1	38 88	91.7	43 13.4	37 88	91.1	43 24.5	36 88	90.5	43 35.3	36 88	89.8	43 45.9	35 88	89.2	50
1	41 34.2	40 88	93.1	41 46.1	39 88	92.5	41 57.7	39 88	91.9	42 09.2	38 88	91.3	42 20.4	37 88	90.6	42 31.5	36 88	90.0	42 42.3	36 88	89.4	42 53.0	35 88	88.7	1
2	40 41.3	40 88	92.6	40 53.1	39 88	92.0	41 04.8	38 88	91.4	41 16.2	38 88	90.8	41 27.5	37 88	90.2	41 38.5	36 88	89.5	41 49.4	36 88	88.9	42 00.0	35 88	88.3	2
3	39 48.4	40 88	92.1	40 00.2	39 88	91.5	40 11.8	38 88	90.9	40 23.2	38 88	90.3	40 34.5	37 88	89.7	40 45.5	36 88	89.1	40 56.4	36 88	88.5	41 07.0	35 88	87.8	3
4	38 55.4	40 88	91.6	39 07.2	39 88	91.0	39 18.8	38 88	90.4	39 30.3	38 88	89.8	39 41.5	37 88	89.2	39 52.6	37 88	88.6	40 03.4	36 88	88.0	40 14.1	35 88	87.4	4
55	38 02.5	40 88	91.1	38 14.2	39 88	90.5	38 25.8	38 88	90.0	38 37.3	38 88	89.4	38 48.5	37 88	88.8	38 59.6	37 88	88.2	39 10.5	36 88	87.6	39 21.2	35 88	87.0	55
6	37 09.5	40 88	90.6	37 21.3	39 88	90.1	37 32.9	38 88	89.5	37 44.3	38 88	88.9	37 55.6	37 88	88.3	38 06.7	37 88	87.7	38 17.6	36 88	87.1	38 28.3	35 88	86.5	6
7	36 16.5	40 88	90.2	36 28.3	39 88	89.6	36 39.9	38 88	89.0	36 51.3	38 88	88.4	37 02.6	37 88	87.9	37 13.7	37 88	87.3	37 24.7	36 88	86.7	37 35.4	36 88	86.1	7
8	35 23.5	40 88	89.7	35 35.3	39 88	89.1	35 46.9	38 88	88.6	35 58.4	38 88	88.0	36 09.7	37 88	87.4	36 20.8	37 88	86.9	36 31.8	36 88	86.3	36 42.6	36 88	85.7	8
9	34 30.6	40 88	89.2	34 42.3	39 88	88.7	34 54.0	39 88	88.1	35 05.5	38 88	87.6	35 16.8	37 88	87.0	35 27.9	37 88	86.4	35 39.0	36 88	85.8	35 49.8	36 88	85.3	9
60	33 37.6	40 88	88.8	33 49.4	39 88	88.2	34 01.0	39 88	87.7	34 12.5	38 88	87.1	34 23.9	38 88	86.6	34 35.1	37 88	86.0	34 46.1	37 88	85.4	34 57.0	36 88	84.9	60
1	32 44.6	40 88	88.3	32 56.4	39 88	87.8	33 08.1	39 88	87.2	33 19.6	38 88	86.7	33 31.0	38 88	86.1	33 42.3	37 88	85.6	33 53.3	37 88	85.0	34 04.3	36 88	84.4	1
2	31 51.7	40 88	87.9	32 03.5	39 88	87.3	32 15.2	39 88	86.8	32 26.8	38 88	86.2	32 38.2	38 88	85.7	32 49.5	37 88	85.1	33 00.6	37 88	84.6	33 11.6	36 88	84.0	2
3	30 58.7	40 88	87.4	31 10.6	39 88	86.9	31 22.3	39 88	86.4	31 33.9	38 88	85.8	31 45.4	38 88	85.3	31 56.7	37 88	84.7	32 07.9	37 88	84.2	32 18.9	37 88	83.6	3
4	30 05.8	40 88	87.0	30 17.7	39 88	86.5	30 29.5	39 88	85.9	30 41.1	39 88	85.4	30 52.6	38 88	84.8	31 03.9	38 88	84.3	31 15.2	37 88	83.8	31 26.3	37 88	83.2	4
65	29 12.9	40 88	86.5	29 24.9	40 88	86.0	29 36.6	39 88	85.5	29 48.3	39 88	85.0	29 59.8	38 88	84.4	30 11.3	38 88	83.9	30 22.5	37 88	83.4	30 33.7	37 88	82.8	65
6	28 20.1	40 88	86.1	28 32.0	40 88	85.6	28 43.8	39 88	85.1	28 55.6	39 88	84.5	29 07.1	38 88	84.0	29 18.6	38 88	83.5	29 29.9	38 88	82.9	29 41.1	37 87	82.4	6
7	27 27.2	40 88	85.7	27 39.2	40 88	85.2	27 51.1	39 88	84.6	28 02.8	39 88	84.1	28 14.5	39 88	83.6	28 26.0	38 88	83.1	28 37.4	38 88	82.5	28 48.7	37 87	82.0	7
8	26 34.4	40 88	85.2	26 46.4	40 88	84.7	26 58.4	40 88	84.2	27 10.2	39 88	83.7	27 21.8	39 88	83.2	27 33.4	38 88	82.7	27 44.9	38 88	82.1	27 56.2	38 87	81.6	8
9	25 41.6	40 88	84.8	25 53.7	40 88	84.3	26 05.7	40 88	83.8	26 17.5	39 88	83.3	26 29.3	39 88	82.8	26 40.9	39 88	82.2	26 52.4	38 87	81.7	27 03.8	38 87	81.2	9
70	24 48.9	41 88	84.4	25 01.0	40 88	83.9	25 13.0	40 88	83.4	25 24.9	40 88	82.9	25 36.7	39 88	82.3	25 48.4	39 87	81.8	26 00.0	38 87	81.3	26 11.5	38 87	80.8	70
1	23 56.2	41 88	83.9	24 08.4	40 88	83.4	24 20.4	40 88	82.9	24 32.4	40 88	82.4	24 44.3	39 87	81.9	24 56.0	39 87	81.4	25 07.7	39 87	80.9	25 19.2	38 87	80.4	1
2	23 03.5	41 88	83.5	23 15.8	41 88	83.0	23 27.9	40 88	82.5	23 39.9	40 87	82.0	23 51.8	40 87	81.5	24 03.7	39 87	81.0	24 15.4	39 87	80.5	24 27.0	39 87	80.0	2
3	22 10.9	41 88	83.1	22 23.2	41 88	82.6	22 35.4	40 87	82.1	22 47.5	40 87	81.6	22 59.5	40 87	81.1	23 11.4	40 87	80.6	23 23.2	39 87	80.1	23 34.9	39 87	79.6	3
4	21 18.4	41 88	82.7	21 30.7	41 88	82.2	21 42.9	41 87	81.7	21 55.1	40 87	81.2	22 07.2	40 87	80.7	22 19.1	40 87	80.2	22 31.0	39 87	79.7	22 42.8	39 87	79.2	4
75	20 25.8	41 88	82.2	20 38.2	41 87	81.8	20 50.5	41 87	81.3	21 02.8	41 87	80.8	21 14.9	40 87	80.3	21 27.0	40 87	79.8	21 38.9	40 87	79.3	21 50.8	39 86	78.8	75
6	19 33.4	42 87	81.8	19 45.8	41 87	81.3	19 58.2	41 87	80.8	20 10.5	41 87	80.4	20 22.7	41 87	79.9	20 34.9	40 87	79.4	20 46.9	40 86	78.9	20 58.9	40 86	78.4	6
7	18 41.0	42 87	81.4	18 53.5	42 87	80.9	19 05.9	41 87	80.4	19 18.3	41 87	79.9	19 30.6	41 87	79.5	19 42.8	41 86	79.0	19 55.0	40 86	78.5	20 07.0	40 86	78.0	7
8	17 48.6	42 87	81.0	18 01.2	42 87	80.5	18 13.7	42 87	80.0	18 26.2	41 87	79.5	18 38.6	41 87	79.0	18 50.9	41 86	78.6	19 03.1	41 86	78.1	19 15.2	40 86	77.6	8
9	16 56.3	42 87	80.5	17 09.0	42 87	80.1	17 21.6	42 87	79.6	17 34.1	42 87	79.1	17 46.6	41 86	78.6	17 59.0	41 86	78.2	18 11.3	41 86	77.7	18 23.5	41 86	77.2	9
80	16 04.1	43 87	80.1	16 16.8	42 87	79.6	16 29.5	42 87	79.2	16 42.1	42 86	78.7	16 54.7	42 86	78.2	17 07.2	41 86	77.7	17 19.6	41 86	77.3	17 31.9	41 86	76.8	80
1	15 12.0	43 87	79.7	15 24.8	43 87	79.2	15 37.5	42 86	78.7	15 50.2	42 86	78.3	16 02.9	42 86	77.8	16 15.4	42 86	77.3	16 27.9	42 86	76.9	16 40.4	41 86	76.4	1
2	14 19.9	43 87	79.3	14 32.8	43 87	78.8	14 45.6	43 86	78.3	14 58.4	43 86	77.9	15 11.1	42 86	77.4	15 23.8	42 86	76.9	15 36.4	42 86	76.4	15 49.0	42 86	76.0	2
3	13 27.9	43 87	78.8	13 40.8	43 86	78.4	13 53.8	43 86	77.9	14 06.6	43 86	77.4	14 19.5	43 86	77.0	14 32.2	42 86	76.5	14 44.9	42 86	76.0	14 57.6	42 86	75.6	3
4	12 35.9	44 86	78.4	12 49.0	43 86	77.9	13 02.0	43 86	77.5	13 15.0	43 86	77.0	13 27.9	43 86	76.6	13 40.8	43 86	76.1	13 53.6	43 86	75.6	14 06.3	42 85	75.2	4
85	11 44.1	44 86	78.0	11 57.2	44 86	77.5	12 10.3	44 86	77.1	12 23.4	43 86	76.6	12 36.4	43 86	76.1	12 49.4	43 86	75.7	13 02.3	43 85	75.2	13 15.2	43 85	74.7	85
6	10 52.3	44 86	77.5	11 05.5	44 86	77.1	11 18.8	44 86	76.6	11 31.9	44 86	76.2	11 45.0	44 86	75.7	11 58.1	43 85	75.2	12 11.1	43 85	74.8	12 24.1	43 85	74.3	6
7	10 00.6	45 86	77.1	10 14.0	44 86	76.7	10 27.3	44 86	76.2	10 40.5	44 86	75.7	10 53.7	44 85	75.3	11 06.9	44 85	74.8	11 20.1	44 85	74.4	11 33.2	44 85	73.9	7
8	9 09.0	45 86	76.7	9 22.5	45 86	76.2	9 35.9	45 86	75.8	9 49.2	44 85	75.3	10 02.6	44 85	74.9	10 15.9	44 85	74.4	10 29.1	44 85	73.9	10 42.3	44 84	73.5	8
9	8 17.5	45 86	76.2	8 31.1	45 86	75.8	8 44.6	45 85	75.3	8 58.0	45 85	74.9	9 11.5	45 85	74.4	9 24.9	45 85	74.0	9 38.3	45 84	73.5	9 51.6	44 84	73.1	9
90	7 26.1	46 86	75.8	7 39.7	45 85	75.3	7 53.4	45 85	74.9	8 06.9	45 85	74.4	8 20.5	45 85	74.0	8 34.0	45 84	73.5	8 47.5	45 84	73.1	9 01.0	45 84	72.6	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	46 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	45 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	00
1	45 59.4	1.0 03	178.6	45 29.4	1.0 03	178.6	44 59.4	1.0 03	178.6	44 29.4	1.0 03	178.7	43 59.4	1.0 03	178.7	43 29.4	1.0 03	178.7	42 59.4	1.0 03	178.7	42 29.4	1.0 03	178.7	1
2	45 57.4	1.0 05	177.2	45 27.5	1.0 05	177.3	44 57.5	1.0 05	177.3	44 27.5	1.0 05	177.3	43 57.6	1.0 05	177.4	43 27.6	1.0 05	177.4	42 57.6	1.0 05	177.4	42 27.6	1.0 05	177.4	2
3	45 54.2	1.0 08	175.9	45 24.3	1.0 07	175.9	44 54.4	1.0 07	175.9	44 24.4	1.0 07	176.0	43 54.5	1.0 07	176.0	43 24.6	1.0 07	176.1	42 54.6	1.0 07	176.1	42 24.7	1.0 07	176.2	3
4	45 49.8	1.0 10	174.5	45 19.9	1.0 10	174.5	44 50.0	1.0 09	174.6	44 20.1	1.0 09	174.7	43 50.2	1.0 09	174.7	43 20.3	1.0 09	174.8	42 50.5	1.0 09	174.8	42 20.6	1.0 09	174.9	4
05	45 44.1	99 12	173.1	45 14.2	99 12	173.2	44 44.4	99 11	173.3	44 14.6	99 11	173.3	43 44.8	99 11	173.4	43 14.9	99 11	173.5	42 45.1	99 11	173.6	42 15.3	99 11	173.6	05
6	45 37.1	99 14	171.7	45 07.3	99 14	171.8	44 37.6	99 13	171.9	44 07.8	99 13	172.0	43 38.1	99 13	172.1	43 08.3	99 13	172.2	42 38.6	99 13	172.3	42 08.8	99 13	172.4	6
7	45 28.8	99 16	170.4	44 59.2	99 16	170.5	44 29.5	99 15	170.6	43 59.9	99 15	170.7	43 30.2	99 15	170.8	43 00.5	99 15	170.9	42 30.9	99 15	171.0	42 01.2	99 15	171.1	7
8	45 19.4	98 18	169.0	44 49.8	98 18	169.2	44 20.3	99 18	169.3	43 50.7	99 17	169.4	43 21.2	99 17	169.5	42 51.6	99 17	169.6	42 22.0	99 17	169.7	41 52.4	99 16	169.9	8
9	45 08.7	98 20	167.7	44 39.3	98 20	167.8	44 09.8	98 19	168.0	43 40.4	98 19	168.1	43 10.9	98 19	168.2	42 41.5	98 19	168.4	42 12.0	98 19	168.5	41 42.5	98 18	168.6	9
10	44 56.8	98 22	166.4	44 27.5	98 22	166.5	43 58.2	98 21	166.7	43 28.9	98 21	166.8	42 59.5	98 21	167.0	42 30.2	98 21	167.1	42 00.9	98 20	167.2	41 31.5	98 20	167.4	10
1	44 43.7	97 24	165.0	44 14.5	97 24	165.2	43 45.4	97 23	165.4	43 16.2	97 23	165.5	42 47.0	97 23	165.7	42 17.8	97 22	165.8	41 48.6	97 22	166.0	41 19.4	97 22	166.1	1
2	44 29.4	97 26	163.7	44 00.4	97 25	163.9	43 31.4	97 25	164.1	43 02.4	97 25	164.3	42 33.4	97 25	164.4	42 04.3	97 24	164.6	41 35.2	97 24	164.8	41 06.1	97 24	164.9	2
3	44 14.0	96 28	162.4	43 45.2	96 27	162.6	43 16.3	96 27	162.8	42 47.5	96 27	163.0	42 18.6	96 26	163.2	41 49.7	96 26	163.4	41 20.7	96 26	163.5	40 51.8	96 26	163.7	3
4	43 57.5	95 30	161.2	43 28.8	96 29	161.4	43 00.1	96 29	161.6	42 31.4	96 28	161.8	42 02.7	96 28	162.0	41 34.0	96 28	162.1	41 05.2	96 28	162.3	40 36.4	96 27	162.5	4
15	43 39.8	95 31	159.9	43 11.3	95 31	160.1	42 42.8	95 31	160.3	42 14.3	95 30	160.5	41 45.8	95 30	160.7	41 17.2	95 30	160.9	40 48.6	95 29	161.1	40 20.0	95 29	161.3	15
6	43 21.0	94 33	158.6	42 52.8	94 33	158.9	42 24.4	94 32	159.1	41 56.1	94 32	159.3	41 27.7	95 32	159.5	40 59.4	95 32	159.7	40 30.9	95 31	160.0	40 02.5	95 31	160.2	6
7	43 01.2	94 35	157.4	42 33.1	94 34	157.6	42 05.0	94 34	157.9	41 36.9	94 34	158.1	41 08.7	94 34	158.3	40 40.5	94 33	158.6	40 12.3	94 33	158.8	39 44.0	94 32	159.0	7
8	42 40.3	93 36	156.2	42 12.4	93 36	156.4	41 44.5	93 36	156.7	41 16.6	93 36	156.9	40 48.6	93 35	157.2	40 20.6	93 35	157.4	39 52.6	93 34	157.6	39 24.6	94 34	157.9	8
9	42 18.4	92 38	155.0	41 50.7	92 38	155.2	41 23.1	92 38	155.5	40 55.3	92 37	155.7	40 27.6	93 37	156.0	39 59.8	93 36	156.2	39 31.9	93 36	156.5	39 04.1	93 36	156.7	9
20	41 55.5	91 40	153.8	41 28.0	92 39	154.0	41 00.6	92 39	154.3	40 33.1	92 39	154.6	40 05.5	92 38	154.8	39 37.9	92 38	155.1	39 10.3	92 38	155.3	38 42.7	92 37	155.6	20
1	41 31.6	91 42	152.6	41 04.4	91 41	152.9	40 37.1	91 41	153.2	40 09.8	91 40	153.4	39 42.5	91 40	153.7	39 15.2	91 40	154.0	38 47.8	91 39	154.2	38 20.3	92 39	154.5	1
2	41 06.7	90 43	151.4	40 39.8	90 43	151.7	40 12.7	90 42	152.0	39 45.7	90 42	152.3	39 18.6	90 41	152.6	38 51.4	91 41	152.9	38 24.3	91 41	153.1	37 57.0	91 40	153.4	2
3	40 41.0	89 44	150.3	40 14.2	89 44	150.6	39 47.4	89 44	150.9	39 20.6	89 43	151.2	38 53.7	90 43	151.5	38 26.8	90 42	151.8	37 59.9	90 42	152.0	37 32.9	90 42	152.3	3
4	40 14.3	88 46	149.2	39 47.8	88 46	149.5	39 21.2	89 45	149.8	38 54.6	89 45	150.1	38 28.0	89 44	150.4	38 01.3	89 44	150.7	37 34.6	89 44	151.0	37 07.8	89 43	151.3	4
25	39 46.7	87 47	148.1	39 20.4	88 47	148.4	38 54.1	88 46	148.7	38 27.8	88 46	149.0	38 01.4	88 46	149.3	37 35.0	88 46	149.6	37 08.5	88 45	149.9	36 41.9	89 44	150.2	25
6	39 18.3	87 49	147.0	38 52.3	87 48	147.3	38 26.2	87 48	147.6	38 00.1	87 48	148.0	37 33.9	87 47	148.3	37 07.7	87 47	148.6	36 41.5	88 46	148.9	36 15.2	88 46	149.2	6
7	38 49.0	86 50	145.9	38 23.3	86 50	146.3	37 57.4	86 49	146.6	37 31.6	86 49	146.9	37 05.7	86 48	147.2	36 39.7	87 48	147.5	36 13.7	87 48	147.9	35 47.6	87 47	148.2	7
8	38 18.9	85 52	144.9	37 53.4	85 51	145.2	37 27.9	85 51	145.6	37 02.3	85 50	145.9	36 36.6	86 50	146.2	36 10.9	86 49	146.5	35 45.1	86 49	146.8	35 19.3	86 48	147.2	8
9	37 48.1	84 53	143.9	37 22.8	84 52	144.2	36 57.5	84 52	144.5	36 32.2	85 52	144.9	36 06.8	85 51	145.2	35 41.3	85 51	145.5	35 15.8	85 50	145.8	34 50.2	85 50	146.2	9
30	37 16.5	83 54	142.8	36 51.5	83 54	143.2	36 26.4	84 53	143.5	36 01.3	84 53	143.9	35 36.1	84 52	144.2	35 10.9	84 52	144.5	34 45.6	84 51	144.9	34 20.3	85 51	145.2	30
1	36 44.1	82 55	141.8	36 19.4	83 55	142.2	35 54.6	83 54	142.5	35 29.7	83 54	142.9	35 04.8	83 54	143.2	34 39.8	83 53	143.6	34 14.8	84 53	143.9	33 49.7	84 52	144.2	1
2	36 11.0	81 56	140.9	35 46.5	82 56	141.2	35 22.0	82 56	141.6	34 57.4	82 55	141.9	34 32.7	82 55	142.3	34 08.0	82 54	142.6	33 43.2	83 54	143.0	33 18.4	83 53	143.3	2
3	35 37.2	81 58	139.9	35 13.0	81 57	140.3	34 48.7	81 56	140.6	34 24.4	81 56	141.0	34 00.0	81 56	141.3	33 35.5	82 55	141.7	33 11.0	82 55	142.0	32 46.4	82 54	142.4	3
4	35 02.8	80 58	139.0	34 38.8	80 58	139.3	34 14.8	80 58	139.7	33 50.7	80 57	140.1	33 26.5	81 57	140.4	33 02.3	81 56	140.8	32 38.0	81 56	141.1	32 13.7	81 56	141.5	4
35	34 27.7	79 60	138.0	34 04.0	79 59	138.4	33 40.2	79 59	138.8	33 16.3	80 58	139.1	32 52.4	80 58	139.5	32 28.5	80 58	139.9	32 04.5	80 57	140.2	31 40.4	80 57	140.6	35
6	33 51.9	78 61	137.1	33 28.5	78 60	137.5	33 05.0	79 60	137.9	32 41.4	79 59	138.2	32 17.7	79 59	138.6	31 54.0	79 58	139.0	31 30.2	79 58	139.3	31 06.4	80 58	139.7	6
7	33 15.6	77 62	136.2	32 52.4	77 61	136.6	32 29.1	78 61	137.0	32 05.8	78 60	137.4	31 42.4	78 60	137.7	31 18.9	78 60	138.1	30 55.4	79 59	138.4	30 31.8	79 59	138.8	7
8	32 38.6	76 62	135.3	32 15.7	77 62	135.7	31 52.7	77 62	136.1	31 29.6	77 61	136.5	31 06.4	77 61	136.9	30 43.2	77 60	137.2	30 20.0	78 60	137.6	29 56.6	78 60	138.0	8
9	32 01.1	76 64	134.5	31 38.4	76 63	134.9	31 15.7	76 63	135.2	30 52.8	76 62	135.6	30 29.9	76 62	136.0	30 07.0	77 62	136.4	29 43.9	77 61	136.7	29 20.9	77 61	137.1	9
40	31 23.0	75 64	133.6	31 00.6	75 64	134.0	30 38.1	75 64	134.4	30 15.5	75 63	134.8	29 52.9	76 63	135.2	29 30.1	76 62	135.5	29 07.4	76 62	135.9	28 44.5	76 62	136.3	40
1	30 44.4	74 65	132.8	30 22.2	74 65	133.2	30 00.0	74 64	133.6	29 37.6	75 64	134.0	29 15.2	75 64	134.3	28 52.8	75 63	134.7	28 30.2	75 63	135.1	28 07.6	75 62	135.5	1
2	30 05.3	73 66	132.0	29 43.4	73 66	132.4	29 21.3	74 65	132.8	28 59.2	74 65	133.2	28 37.1	74 64	133.5	28 14.9	74 64	133.9	27 52.6	74 64	134.3	27 30.2	75 63	134.7	2
3	29 25.7	72 67	131.2	29 04.0	72 66	131.6	28 42.2	73 66	132.0	28 20.3	73 66	132.4	27 58.4	73 65	132.7	27 36.4	73 65	133.1	27 14.4	74 64	133.5	26 52.3	74 64	133.9	3
4	28 45.6	71 68	130.4	28 24.1	72 67	130.8	28 02.6	72 67	131.2	27 40.9	72 66	131.6	27 19.3	72 66	132.0	26 57.5	73 66	132.3	26 35.7	73 65	132.7	26 13.9	73 65	133.1	4
45	28 05.0	71 68	129.6	27 43.7	71 68	130.0	27 22.4	71 68	130.4	27 01.1	71 67	130.8	26 39.6	72 67	131.2	26 18.1	72 66	131.6	25 56.6	72 66	132.0	25 35.0	72 66	132.4	45
6	27 23.9	70 69	128.8	27 02.9	70 69	129.2	26 41.9	70 68	129.6	26 20.7	71 68	130.0	25 59.5	71 68	130.4	25 38.3	71 67	130.8	25 17.0	71 67	131.2	24 55.6	71 66	131.6	6
7	26 42.5	69 70	128.1	26 21.7	69 70	128.5	26 00.9	70 69	128.9	25 40.0	70 69	129.3	25 19.0	70 68	129.7	24 58.0	70 68	130.1	24 36.9	70 68	130.5	24 15.7	71 67	130.9	7
8	26 00.6	68 70	127.4	25 40.0	69 70	127.8	25 19.4	69 70	128.2	24 58.8	69 70	128.6	24 38.0	69 69	129.0	24 17.2	69 68	129.4	23 56.4	70 68	129.8	23 35.5	70 68	130.1	8
9	25 18.2	68 71	126.6	24 57.9	68 71	127.0	24 37.6	68 70	127.4	24 17.1	68 70	127.8	23 56.6	68 70	128.2	23 36.1	69 69	128.6	23 15.4	69 69	129.0	22 54.8	69 69	129.4	9
50	24 35.5	67 72	125.9	24 15.5	67 72	126.3	23 55.3	67 71	126.7	23 35.1	67 71	127.1	23 14.8	68 70	127.5	22 54.5	68 70	127.9	22 34.1	68 70	128.3	22 13.6	68 69	128.7	50
1	23 52.4	66 72	125.2	23 32.6	66 72	125.6	23 12.7	67 72	126.0	22 52.7	67 71	126.4	22 32.6	67 71	126.8	22 12.5	67 71	127.2	21 52.3	67 70	127.6	21 32.1	68 70	128.0	1
2	23 09.0	65 73	124.5	22 49.3	66 73	124.9	22 29.6	66 72	125.4	22 09.9	66 72	125.8	21 50.0	66 72	126.2	21 30.1	66 71	126.6	21 10.2	67 71	127.0	20 50.2	67 70	127.4	2
3	22 25.2	65 74	123.9	22 05.7	65 73	124.3	21 46.2	65 73	124.7	21 26.7	65 72	125.1	21 07.1	65 72	125.5	20 47.4	66 72	125.9	20 27.7	66 72	126.3	20 07.9	66 71	126.7	3
4	21 41.0	64 74	123.2	21 21.8	64 74	123.6	21 02.5	64 74	124.0	20 43.2	65 73	124.4	20 23.8	65 73	124.8	20 04.3	65 72	125.2	19 44.8	65 72	125.6	19 25.2	65 72	126.0	4
55	20 56.5	63 75	122.5	20 37.5	63 74	122.9	20 18.4	64 74	123.4	19 59.3	64 74	123.8	19 40.1	64 73	124.2	19 20.9	64 73	124.6	19 01.6	64 73	125.0	18 42.2	65 72	125.4	55
6	20 11.7	63 75	121.9	19 52.9	63 75	122.3	19 34.0	63 75	122.7	19 15.1	63 74	123.1	18 56.1	63 74	123.5	18 37.1	64 74	123.9	18 18.0	64 73	124.3	17 58.9	64 73	124.8	6
7	19 26.5	62 76	121.2	19 07.9	62 75	121.7	18 49.3	62 75	122.1	18 30.6	62 75	122.5	18 11.8	63 74	122.9	17 53.0	63 74	123.3	17 34.1	63 74	123.7	17 15.2	63 73	124.1	7
8	18 41.1	61 76	120.6	18 22.7	61 76	121.0	18 04.2	62 76	121.5	17 45.7	62 75	121.9	17 27.2	62 75	122.3	17 08.5	62 74	122.7	16 49.9	62 74	123.1	16 31.2	62 74	123.5	8
9	17 55.4	61 77	120.0	17 37.1	61 76	120.4	17 18.9	61 76	120.8	17 00.6	61 76	121.3	16 42.2	61 75	121.7	16 23.8	61 75	122.1	16 05.3	62 75	122.5	15 46.8	62 74	122.9	9
60	17 09.3	60 77	119.4	16 51.3	60 77	119.8	16 33.3	60 76	120.2	16 15.1	60 76	120.6	15 57.0	61 76	121.1	15 38.8	61 76	121.5	15 20.5	61 75	121.9	15 02.2	61 75	122.3	60
1	16 23.0	59 78	118.8	16 05.2	60 77	119.2	15 47.4	60 77	119.6	15 29.4	60 77	120.1	15 11.5	60 76	120.5	14 53.4	60 76	120.9	14 35.4	60 76	121.3	14 17.3	60 75	121.7	1
2	15 36.5	59 78	118.2	15 18.8	59 78	118.6	15 01.2	59 77	119.0	14 43.4	59 77	119.5	14 25.7	59 77	119.9	14 07.8	59 76	120.3	13 50.0	60 76	120.7	13 32.1	60 76	121.1	2
3	14 49.7	58 78	117.6	14 32.2	58 78	118.0	14 14.7	58 78	118.5	13 57.2	59 78	118.9	13 39.6	59 77	119.3	13 22.0	59 77	119.7	13 04.3	59 77	120.1	12 46.6	59 76	120.5	3
4	14 02.6	58 79	117.1	13 45.3	58 78	117.5	13 28.0	58 78	117.9	13 10.7	58 78	118.3	12 53.3	58 78	118.7	12 35.8	58 77	119.1	12 18.3	58 77	119.6	12 00.8	58 77	120.0	4
65	13 15.3	57 79	116.5	12 58.2	57 79	116.9	12 41.1	57 79	117.3	12 23.9	57 78	117.7	12 06.7	57 78	118.2	11 49.4	58 78	118.6	11 32.1	58 78	119.0	11 14.8	58 77	119.4	65
6	12 27.8	56 80	115.9	12 10.9	56 79	116.4	11 53.9	57 79	116.8	11 36.9	57 79	117.2	11 19.9	57 78	117.6	11 02.8	57 78	118.0	10 45.7	57 78	118.4	10 28.5	57 78	118.9	6
7	11 40.0	56 80	115.4	11 23.3	56 80	115.8	11 06.5	56 79	116.2	10 49.7	56 79	116.6	10 32.8	56 79	117.1	10 15.9	56 78	117.5	9 59.0	56 78	117.9	9 42.0	57 78	118.3	7
8	10 52.1	55 80	114.8	10 35.5	55 80	115.3	10 18.8	55 80	115.7	10 02.2	56 80	116.1	9 45.5	56 79	116.5	9 28.8	56 79	116.9	9 12.0	56 79	117.4	8 55.3	56 78	117.8	8
9	10 03.9	55 81	114.3	9 47.5	55 80	114.7	9 31.0	55 80	115.1	9 14.5	55 80	115.6	8 58.0	55 80	116.0	8 41.5	55 79	116.4	8 24.9	55 79	116.8	8 08.3	55 79	117.3	9
70	9 15.5	54 81	113.8	8 59.2	54 81	114.2	8 42.9	54 80	114.6	8 26.6	54 80	115.0	8 10.3	55 80	115.5	7 53.9	55 80	115.9	7 37.5	55 79	116.3	7 21.1	55 79	116.7	70
1	8 26.9	54 81	113.2	8 10.8	54 81	113.7	7 54.7	54 81	114.1	7 38.5	54 80	114.5	7 22.3	54 80	114.9	7 06.1	54 80	115.4	6 49.9	54 80	115.8	6 33.7	54 80	116.2	1
2	7 38.1	53 82	112.7	7 22.2	53 81	113.1	7 06.2	53 81	113.6	6 50.2	53 81	114.0	6 34.2	53 80	114.4	6 18.2	54 80	114.9	6 02.1	54 80	115.3	5 46.0	54 80	115.7	2
3	6 49.2	53 82	112.2	6 33.4	53 82	112.6	6 17.6	53 81	113.1	6 01.7	53 81	113.5	5 45.9	53 81	113.9	5 30.0	53 81	114.3	5 14.1	53 80	114.8				3
4	6 00.0	52 82	111.7	5 44.4	52 82	112.1	5 28.7	52 82	112.6	5 13.0	52 81	113.0													4
75	5 10.7	52 82	111.2																						75

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	6 34.8	46 85	75.3	6 48.5	46 85	74.9	7 02.3	46 85	74.5	7 16.0	46 85	74.0	7 29.6	46 85	73.6	7 43.3	45 84	73.1	7 56.9	45 84	72.7	8 10.5	45 84	72.2	91
2	5 43.6	46 85	74.9	5 57.5	46 85	74.5	6 11.3	46 85	74.0	6 25.1	46 85	73.6	6 38.9	46 84	73.1	6 52.6	46 84	72.7	7 06.4	46 84	72.2	7 20.1	46 84	71.8	2
3				5 06.5	47 85	74.0	5 20.4	46 85	73.6	5 34.3	46 84	73.1	5 48.2	46 84	72.7	6 02.1	46 84	72.2	6 16.0	46 84	71.8	6 29.8	46 84	71.3	3
4																5 11.7	47 84	71.8	5 25.7	47 84	71.3	5 39.7	47 83	70.9	4

Lat. 28°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	82 00.9	1.0 00	180.0	82 30.0	1.0 00	180.0	83 00.0	1.0 00	180.0	83 30.0	1.0 00	180.0	84 00.0	1.0 00	180.0	84 30.0	1.0 00	180.0	85 00.0	1.0 00	180.0	85 30.0	1.0 00	180.0	00
1	81 56.9	99 15	173.3	82 26.7	99 16	172.9	82 56.5	99 17	172.4	83 26.2	99 18	171.8	83 55.9	99 20	171.2	84 25.6	99 22	170.4	84 55.2	98 24	169.5	85 24.7	98 26	168.5	1
2	81 47.7	98 25	166.7	82 16.9	97 26	165.9	82 46.1	97 28	165.0	83 15.1	97 30	164.0	83 44.0	96 32	162.8	84 12.6	96 34	161.4	84 41.1	94 37	159.7	85 09.2	93 40	157.7	2
3	81 32.7	95 34	160.5	82 01.1	94 36	159.3	82 29.2	94 38	158.1	82 57.2	93 40	156.6	83 24.8	92 42	155.0	83 52.1	90 45	153.1	84 18.9	88 48	150.9	84 45.1	86 52	148.4	3
4	81 12.4	92 42	154.6	81 39.7	91 44	153.2	82 06.7	89 46	151.7	82 33.3	88 48	149.9	82 59.5	86 51	148.0	83 25.1	84 54	145.8	83 50.0	82 57	143.3	84 14.2	79 60	140.4	4
05	80 47.5	88 48	149.2	81 13.6	86 51	147.6	81 39.2	85 53	145.9	82 04.4	83 55	144.0	82 29.0	81 58	141.8	82 52.9	78 60	139.5	83 16.0	75 64	136.8	83 38.1	72 66	133.9	05
6	80 18.4	84 54	144.3	80 43.2	82 56	142.6	81 07.6	80 59	140.8	81 31.3	78 61	138.7	81 54.3	76 63	136.5	82 16.6	73 66	134.1	82 37.9	69 69	131.4	82 58.2	66 71	128.4	6
7	79 45.8	80 59	139.9	80 09.4	78 61	138.1	80 32.4	76 63	136.2	80 54.8	73 66	134.1	81 16.3	71 68	131.9	81 37.0	67 70	129.4	81 56.8	64 72	126.8	82 15.4	60 75	124.0	7
8	79 10.3	76 64	135.9	79 32.7	74 65	134.1	79 54.4	71 67	132.2	80 15.4	69 69	130.1	80 35.6	66 71	127.9	80 54.9	63 73	125.5	81 13.3	59 76	122.9	81 30.5	55 78	120.2	8
9	78 32.2	72 67	132.3	78 53.5	70 69	130.5	79 14.0	67 70	128.6	79 33.8	65 72	126.5	79 52.8	62 74	124.4	80 10.9	59 76	122.1	80 28.0	55 78	119.6	80 44.0	51 80	117.0	9
10	77 52.0	68 70	129.1	78 12.2	66 72	127.3	78 31.7	64 73	125.4	78 50.4	61 75	123.4	79 08.3	58 76	121.3	79 25.3	55 78	119.1	79 41.3	52 80	116.8	79 56.2	48 81	114.3	10
1	77 10.1	65 72	126.2	77 29.3	63 74	124.4	77 47.8	60 76	122.6	78 05.5	58 77	120.6	78 22.4	55 78	118.6	78 38.4	52 80	116.5	78 53.5	49 81	114.3	79 07.5	45 82	112.0	1
2	76 26.6	62 75	123.5	76 44.9	60 76	121.8	77 02.5	57 77	120.1	77 19.3	55 78	118.2	77 35.4	52 80	116.2	77 50.5	49 81	114.2	78 04.8	46 82	112.2	78 18.0	42 84	109.9	2
3	75 41.8	59 76	121.2	75 59.3	57 78	119.5	76 16.1	55 79	117.8	76 32.2	52 80	116.0	76 47.4	49 81	114.1	77 01.8	47 82	112.2	77 15.3	44 83	110.2	77 27.9	40 84	108.1	3
4	74 56.0	57 78	119.0	75 12.7	55 79	117.4	75 28.8	52 80	115.7	75 44.1	50 81	114.0	75 58.7	47 82	112.2	76 12.4	44 83	110.4	76 25.3	41 84	108.5	76 37.3	38 85	106.5	4
15	74 09.2	55 79	117.0	74 25.3	53 80	115.5	74 40.7	50 81	113.9	74 55.4	48 82	112.2	75 09.4	45 83	110.5	75 22.5	43 84	108.7	75 34.9	40 85	106.9	75 46.3	37 86	105.0	15
6	73 21.6	53 80	115.2	73 37.1	51 81	113.7	73 52.0	48 82	112.2	74 06.1	46 83	110.6	74 19.5	43 84	108.9	74 32.1	41 84	107.2	74 44.0	38 85	105.5	74 55.0	35 86	103.7	6
7	72 33.4	51 81	113.6	72 48.3	49 82	112.1	73 02.6	47 83	110.6	73 16.3	44 84	109.1	73 29.2	42 84	107.5	73 41.4	39 85	105.9	73 52.8	37 86	104.2	74 03.4	34 86	102.5	7
8	71 44.6	49 82	112.0	71 59.0	47 83	110.6	72 12.8	45 84	109.2	72 26.0	43 84	107.7	72 38.5	40 85	106.2	72 50.2	38 86	104.6	73 01.3	36 86	103.1	73 11.6	33 87	101.4	8
9	70 55.2	48 83	110.6	71 09.2	46 84	109.3	71 22.6	44 84	107.9	71 35.3	41 85	106.4	71 47.4	39 86	105.0	71 58.9	37 86	103.5	72 09.6	35 86	102.0	72 19.6	32 87	100.4	9
20	70 05.4	46 84	109.3	70 19.0	44 84	108.0	70 32.0	42 85	106.6	70 44.4	40 86	105.3	70 56.1	38 86	103.9	71 07.2	36 86	102.4	71 17.7	34 87	101.0	71 27.4	31 87	99.5	20
1	69 15.2	45 84	108.1	69 28.4	43 85	106.8	69 41.1	41 85	105.5	69 53.1	39 86	104.2	70 04.6	37 86	102.8	70 15.4	35 87	101.4	70 25.6	33 87	100.0	70 35.1	31 87	98.6	1
2	68 24.7	44 85	106.9	68 37.6	42 85	105.7	68 49.9	40 86	104.4	69 01.7	38 86	103.1	69 12.8	36 86	101.8	69 23.4	34 87	100.5	69 33.4	32 87	99.2	69 42.7	30 88	97.8	2
3	67 33.9	43 85	105.8	67 46.4	41 86	104.6	67 58.5	39 86	103.4	68 10.0	37 86	102.2	68 20.9	35 87	100.9	68 31.2	34 87	99.6	68 41.0	32 88	98.4	68 50.1	29 88	97.0	3
4	66 42.8	42 86	104.8	66 55.1	40 86	103.6	67 06.8	38 86	102.5	67 18.1	37 87	101.3	67 28.8	35 87	100.1	67 38.9	33 87	98.8	67 48.5	31 88	97.6	67 57.5	29 88	96.3	4
25	65 51.5	41 86	103.8	66 03.5	39 86	102.7	66 15.0	38 87	101.6	66 26.1	36 87	100.4	66 36.6	34 87	99.2	66 46.5	32 88	98.0	66 56.0	30 88	96.8	67 04.8	29 88	95.6	25
6	64 59.9	40 86	102.9	65 11.7	39 86	101.8	65 23.1	37 87	100.7	65 33.9	35 87	99.6	65 44.2	34 87	98.5	65 54.0	32 88	97.3	66 03.3	30 88	96.1	66 12.1	28 88	95.0	6
7	64 08.2	39 86	102.1	64 19.8	38 87	101.0	64 30.9	36 87	99.9	64 41.6	35 87	98.8	64 51.8	33 88	97.7	65 01.5	31 88	96.6	65 10.6	30 88	95.5	65 19.3	28 88	94.3	7
8	63 16.3	39 87	101.2	63 27.7	37 87	100.2	63 38.7	36 87	99.1	63 49.2	34 88	98.1	63 59.2	33 88	97.0	64 08.8	31 88	95.9	64 17.9	29 88	94.8	64 26.4	28 88	93.7	8
9	62 24.3	38 87	100.4	62 35.5	37 87	99.4	62 46.3	35 87	98.4	62 56.7	34 88	97.4	63 06.6	32 88	96.3	63 16.1	31 88	95.3	63 25.0	29 88	94.2	63 33.6	28 88	93.2	9
30	61 32.1	38 87	99.7	61 43.2	36 87	98.7	61 53.9	35 88	97.7	62 04.1	33 88	96.7	62 13.9	32 88	95.7	62 23.3	30 88	94.7	62 32.2	29 88	93.6	62 40.6	27 88	92.6	30
1	60 39.8	37 87	98.9	60 50.8	36 88	98.0	61 01.3	34 88	97.0	61 11.5	33 88	96.1	61 21.2	32 88	95.1	61 30.5	30 88	94.1	61 39.3	29 88	93.1	61 47.7	27 88	92.1	1
2	59 47.4	37 87	98.2	59 58.3	35 88	97.3	60 08.7	34 88	96.4	60 18.8	33 88	95.4	60 28.4	31 88	94.5	60 37.6	30 88	93.5	60 46.4	29 88	92.5	60 54.8	27 88	91.5	2
3	58 55.0	36 88	97.6	59 05.7	35 88	96.7	59 16.0	34 88	95.7	59 26.0	33 88	94.8	59 35.6	31 88	93.9	59 44.7	30 88	92.9	59 53.5	28 88	92.0	60 01.8	27 88	91.0	3
4	58 02.4	36 88	96.9	58 13.0	35 88	96.0	58 23.3	34 88	95.1	58 33.2	32 88	94.2	58 42.7	31 88	93.3	58 51.8	30 88	92.4	59 00.5	28 88	91.5	59 08.8	27 88	90.5	4
35	57 09.8	36 88	96.3	57 20.3	35 88	95.4	57 30.5	33 88	94.6	57 40.3	32 88	93.7	57 49.8	31 88	92.8	57 58.9	30 88	91.9	58 07.5	28 88	91.0	58 15.8	27 88	90.1	35
6	56 17.1	35 88	95.7	56 27.6	34 88	94.8	56 37.7	33 88	94.0	56 47.5	32 88	93.1	56 56.9	31 88	92.2	57 05.9	30 88	91.4	57 14.6	28 88	90.5	57 22.9	27 88	89.6	6
7	55 24.4	35 88	95.1	55 34.8	34 88	94.3	55 44.8	33 88	93.4	55 54.5	32 88	92.6	56 03.9	31 88	91.7	56 12.9	29 88	90.9	56 21.6	28 88	90.0	56 29.9	27 88	89.1	7
8	54 31.6	35 88	94.5	54 41.9	34 88	93.7	54 51.9	33 88	92.9	55 01.6	32 88	92.1	55 11.0	31 88	91.2	55 20.0	29 88	90.4	55 28.6	28 88	89.5	55 36.9	27 88	88.7	8
9	53 38.7	35 88	94.0	53 49.0	34 88	93.2	53 59.0	33 88	92.4	54 08.7	32 88	91.6	54 18.0	31 88	90.7	54 27.0	29 88	89.9	54 35.6	28 88	89.1	54 44.0	27 88	88.3	9
40	52 45.9	35 88	93.4	52 56.1	34 88	92.6	53 06.1	33 88	91.8	53 15.7	32 88	91.1	53 25.0	31 88	90.3	53 34.0	29 88	89.5	53 42.7	28 88	88.6	53 51.0	27 88	87.8	40
1	51 53.0	35 88	92.9	52 03.2	34 88	92.1	52 13.1	33 88	91.3	52 22.7	32 88	90.6	52 32.0	31 88	89.8	52 41.0	29 88	89.0	52 49.7	28 88	88.2	52 58.1	27 88	87.4	1
2	51 00.1	34 88	92.4	51 10.2	33 88	91.6	51 20.1	33 88	90.9	51 29.8	32 88	90.1	51 39.1	31 88	89.3	51 48.1	30 88	88.6	51 56.8	29 88	87.8	52 05.2	27 88	87.0	2
3	50 07.1	34 88	91.8	50 17.3	33 88	91.1	50 27.2	33 88	90.4	50 36.8	32 88	89.6	50 46.1	31 88	88.9	50 55.1	30 88	88.1	51 03.9	29 88	87.4	51 12.3	28 88	86.6	3
4	49 14.2	34 88	91.3	49 24.3	33 88	90.6	49 34.2	33 88	89.9	49 43.8	32 88	89.2	49 53.1	31 88	88.4	50 02.2	30 88	87.7	50 10.9	29 88	86.9	50 19.4	28 88	86.2	4
45	48 21.2	34 88	90.9	48 31.3	33 88	90.1	48 41.2	33 88	89.4	48 50.8	32 88	88.7	49 00.2	31 88	88.0	49 09.3	30 88	87.3	49 18.0	29 88	86.5	49 26.6	28 88	85.8	45
6	47 28.2	34 88	90.4	47 38.4	33 88	89.7	47 48.2	33 88	89.0	47 57.9	32 88	88.3	48 07.2	31 88	87.6	48 16.3	30 88	86.8	48 25.2	29 88	86.1	48 33.7	28 88	85.4	6
7	46 35.2	34 88	89.9	46 45.4	33 88	89.2	46 55.3	33 88	88.5	47 04.9	32 88	87.8	47 14.3	31 88	87.1	47 23.5	30 88	86.4	47 32.3	29 88	85.7	47 41.0	28 88	85.0	7
8	45 42.3	34 88	89.4	45 52.4	33 88	88.8	46 02.3	33 88	88.1	46 12.0	32 88	87.4	46 21.4	31 88	86.7	46 30.6	30 88	86.0	46 39.5	29 88	85.3	46 48.2	28 88	84.6	8
9	44 49.3	34 88	89.0	44 59.5	33 88	88.3	45 09.4	33 88	87.7	45 19.1	32 88	87.0	45 28.5	31 88	86.3	45 37.8	30 88	85.6	45 46.7	30 88	84.9	45 55.5	29 88	84.3	9
50	43 56.3	34 88	88.5	44 06.5	34 88	87.9	44 16.5	33 88	87.2	44 26.2	32 88	86.6	44 35.7	31 88	85.9	44 45.0	30 88	85.2	44 54.0	30 88	84.6	45 02.8	29 88	83.9	50
1	43 03.4	34 88	88.1	43 13.6	34 88	87.4	43 23.6	33 88	86.8	43 33.3	32 88	86.1	43 42.9	31 88	85.5	43 52.2	31 88	84.8	44 01.3	30 88	84.2	44 10.1	29 88	83.5	1
2	42 10.4	34 88	87.7	42 20.7	34 88	87.0	42 30.7	33 88	86.4	42 40.5	32 88	85.7	42 50.1	32 88	85.1	42 59.4	31 88	84.4	43 08.6	30 88	83.8	43 17.5	29 88	83.1	2
3	41 17.5	35 88	87.2	41 27.8	34 88	86.6	41 37.8	33 88	86.0	41 47.7	32 88	85.3	41 57.3	32 88	84.7	42 06.7	31 88	84.1	42 15.9	30 88	83.4	42 24.9	30 88	82.8	3
4	40 24.6	35 88	86.8	40 34.9	34 88	86.2	40 45.0	33 88	85.5	40 54.9	33 88	84.9	41 04.6	32 88	84.3	41 14.0	31 88	83.7	41 23.3	31 88	83.0	41 32.4	30 88	82.4	4
55	39 31.7	35 88	86.4	39 42.0	34 88	85.8	39 52.2	33 88	85.1	40 02.1	33 88	84.5	40 11.9	32 88	83.9	40 21.4	31 88	83.3	40 30.8	31 88	82.7	40 39.9	30 87	82.0	55
6	38 38.9	35 88	85.9	38 49.2	34 88	85.3	38 59.4	34 88	84.7	39 09.4	33 88	84.1	39 19.2	32 88	83.5	39 28.8	32 88	82.9	39 38.2	31 88	82.3	39 47.5	30 87	81.7	6
7	37 46.0	35 88	85.5	37 56.4	34 88	84.9	38 06.7	34 88	84.3	38 16.7	33 88	83.7	38 26.6	33 88	83.1	38 36.3	32 88	82.5	38 45.8	31 87	81.9	38 55.1	31 87	81.3	7
8	36 53.2	35 88	85.1	37 03.7	35 88	84.5	37 14.0	34 88	83.9	37 24.1	33 88	83.3	37 34.0	33 88	82.7	37 43.8	32 88	82.1	37 53.3	32 87	81.5	38 02.7	31 87	80.9	8
9	36 00.5	35 88	84.7	36 11.0	35 88	84.1	36 21.3	34 88	83.5	36 31.5	34 88	83.0	36 41.5	33 88	82.4	36 51.3	32 87	81.8	37 01.0	32 87	81.2	37 10.4	31 87	80.6	9
60	35 07.7	35 88	84.3	35 18.3	35 88	83.7	35 28.7	34 88	83.1	35 38.9	34 88	82.6	35 49.0	33 87	82.0	35 58.9	33 87	81.4	36 08.6	32 87	80.8	36 18.2	32 87	80.2	60
1	34 15.0	36 88	83.9	34 25.7	35 88	83.3	34 36.1	35 88	82.7	34 46.4	34 87	82.2	34 56.6	34 87	81.6	35 06.6	33 87	81.0	35 16.4	32 87	80.4	35 26.0	32 87	79.9	1
2	33 22.4	36 88	83.5	33 33.1	35 88	82.9	33 43.6	35 88	82.4	33 54.0	34 87	81.8	34 04.2	34 87	81.2	34 14.2	33 87	80.7	34 24.2	33 87	80.1	34 33.9	32 87	79.5	2
3	32 29.8	36 88	83.1	32 40.5	36 88	82.5	32 51.1	35 87	82.0	33 01.6	35 87	81.4	33 11.9	34 87	80.8	33 22.0	34 87	80.3	33 32.0	33 87	79.7	33 41.8	33 87	79.1	3
4	31 37.2	36 88	82.7	31 48.0	36 87	82.1	31 58.7	35 87	81.6	32 09.2	35 87	81.0	32 19.6	34 87	80.5	32 29.8	34 87	79.9	32 39.9	33 87	79.4	32 49.8	33 86	78.8	4
65	30 44.7	36 88	82.3	30 55.6	36 87	81.7	31 06.3	36 87	81.2	31 16.9	35 87	80.6	31 27.4	35 87	80.1	31 37.7	34 87	79.5	31 47.9	34 87	79.0	31 57.9	33 86	78.4	65
6	29 52.2	37 87	81.9	30 03.2	36 87	81.3	30 14.0	36 87	80.8	30 24.7	35 87	80.3	30 35.2	35 87	79.7	30 45.6	34 87	79.2	30 55.9	34 86	78.6	31 06.0	34 86	78.1	6
7	28 59.8	37 87	81.5	29 10.8	37 87	80.9	29 21.7	36 87	80.4	29 32.5	36 87	79.9	29 43.1	35 87	79.3	29 53.6	35 86	78.8	30 04.0	34 86	78.3	30 14.2	34 86	77.7	7
8	28 07.4	37 87	81.1	28 18.5	37 87	80.6	28 29.5	36 87	80.0	28 40.4	36 87	79.5	28 51.1	36 87	79.0	29 01.7	35 86	78.4	29 12.2	35 86	77.9	29 22.5	34 86	77.4	8
9	27 15.1	37 87	80.7	27 26.3	37 87	80.2	27 37.4	37 87	79.6	27 48.3	36 87	79.1	27 59.1	36 86	78.6	28 09.8	35 86	78.1	28 20.4	35 86	77.5	28 30.9	35 86	77.0	9
70	26 22.9	38 87	80.3	26 34.1	37 87	79.8	26 45.3	37 87	79.3	26 56.3	37 86	78.7	27 07.2	36 86	78.2	27 18.0	36 86	77.7	27 28.7	35 86	77.2	27 39.3	35 86	76.6	70
1	25 30.7	38 87	79.9	25 42.0	38 87	79.4	25 53.3	37 87	78.9	26 04.4	37 86	78.3	26 15.4	37 86	77.8	26 26.3	36 86	77.3	26 37.1	36 86	76.8	26 47.8	35 86	76.3	1
2	24 38.6	38 87	79.5	24 50.0	38 87	79.0	25 01.3	38 86	78.5	25 12.5	37 86	78.0	25 23.7	37 86	77.5	25 34.7	37 86	76.9	25 45.6	36 86	76.4	25 56.4	36 86	75.9	2
3	23 46.5	39 87	79.1	23 58.0	38 86	78.6	24 09.4	38 86	78.1	24 20.8	38 86	77.6	24 32.0	37 86	77.1	24 43.1	37 86	76.6	24 54.1	37 86	76.1	25 05.0	36 85	75.5	3
4	22 54.5	39 86	78.7	23 06.1	39 86	78.2	23 17.7	38 86	77.7	23 29.1	38 86	77.2	23 40.4	38 86	76.7	23 51.6	37 86	76.2	24 02.7	37 86	75.7	24 13.8	37 85	75.2	4
75	22 02.6	39 86	78.3	22 14.3	39 86	77.8	22 25.9	39 86	77.3	22 37.4	38 86	76.8	22 48.9	38 86	76.3	23 00.2	38 86	75.8	23 11.4	37 85	75.3	23 22.6	37 85	74.8	75
6	21 10.8	39 86	77.9	21 22.6	39 86	77.4	21 34.3	39 86	76.9	21 45.9	39 86	76.4	21 57.4	38 86	75.9	22 08.9	38 85	75.4	22 20.2	38 85	74.9	22 31.5	37 85	74.4	6
7	20 19.0	40 86	77.5	20 30.9	40 86	77.0	20 42.7	39 86	76.5	20 54.5	39 86	76.0	21 06.1	39 85	75.5	21 17.7	38 85	75.1	21 29.1	38 85	74.6	21 40.5	38 85	74.1	7
8	19 27.3	40 86	77.1	19 39.3	40 86	76.6	19 51.2	40 86	76.1	20 03.1	39 86	75.7	20 14.8	39 85	75.2	20 26.5	39 85	74.7	20 38.1	39 85	74.2	20 49.6	38 85	73.7	8
9	18 35.7	40 86	76.7	18 47.8	40 86	76.2	18 59.9	40 86	75.7	19 11.8	40 85	75.3	19 23.7	39 85	74.8	19 35.5	39 85	74.3	19 47.2	39 85	73.8	19 58.8	39 84	73.3	9
80	17 44.2	41 86	76.3	17 56.4	41 86	75.8	18 08.6	40 85	75.4	18 20.6	40 85	74.9	18 32.6	40 85	74.4	18 44.5	40 85	73.9	18 56.4	39 84	73.4	19 08.1	39 84	72.9	80
1	16 52.8	41 86	75.9	17 05.1	41 85	75.4	17 17.3	41 85	75.0	17 29.5	40 85	74.5	17 41.6	40 85	74.0	17 53.7	40 85	73.5	18 05.7	40 84	73.0	18 17.6	40 84	72.5	1
2	16 01.4	42 85	75.5	16 13.9	41 85	75.0	16 26.2	41 85	74.6	16 38.5	41 85	74.1	16 50.8	41 85	73.6	17 02.9	40 84	73.1	17 15.0	40 84	72.6	17 27.1	40 84	72.2	2
3	15 10.2	42 85	75.1	15 22.7	42 85	74.6	15 35.2	41 85	74.2	15 47.6	41 85	73.7	16 00.0	41 84	73.2	16 12.3	41 84	72.7	16 24.5	41 84	72.3	16 36.7	40 84	71.8	3
4	14 19.1	42 85	74.7	14 31.7	42 85	74.2	14 44.3	42 85	73.8	14 56.8	42 84	73.3	15 09.3	42 84	72.8	15 21.8	41 84	72.3	15 34.1	41 84	71.9	15 46.4	41 84	71.4	4
85	13 28.0	43 85	74.3	13 40.8	42 85	73.8	13 53.5	42 84	73.3	14 06.2	42 84	72.9	14 18.8	42 84	72.4	14 31.3	42 84	71.9	14 43.8	42 84	71.5	14 56.3	41 84	71.0	85
6	12 37.1	43 85	73.9	12 50.0	43 85	73.4	13 02.8	43 84	72.9	13 15.6	43 84	72.5	13 28.3	42 84	72.0	13 41.0	42 84	71.5	13 53.7	42 84	71.1	14 06.2	42 83	70.6	6
7	11 46.2	43 84	73.4	11 59.2	43 84	73.0	12 12.2	43 84	72.5	12 25.1	43 84	72.1	12 38.0	43 84	71.6	12 50.8	43 83	71.1	13 03.6	42 83	70.7	13 16.3	42 83	70.2	7
8	10 55.5	44 84	73.0	11 08.6	44 84	72.6	11 21.7	44 84	72.1	11 34.8	43 84	71.7	11 47.8	43 84	71.2	12 00.8	43 83	70.7	12 13.7	43 83	70.3	12 26.6	43 83	69.8	8
9	10 04.9	44 84	72.6	10 18.2	44 84	72.2	10 31.4	44 84	71.7	10 44.6	44 84	71.2	10 57.7	44 83	70.8	11 10.8	44 83	70.3	11 23.9	43 83	69.9	11 36.9	43 82	69.4	9
90	9 14.4	45 84	72.2	9 27.8	45 84	71.7	9 41.1	44 84	71.3	9 54.5	44 83	70.8	10 07.7	44 83	70.4	10 21.0	44 83	69.9	10 34.2	44 82	69.5	10 47.4	44 82	69.0	

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	42 00.0	1.0	01	180.0	41 30.0	1.0	01	180.0	41 00.0	1.0	01	180.0	40 30.0	1.0	01	180.0	40 00.0	1.0	01	180.0	39 30.0	1.0	01	180.0	39 00.0	1.0	01	180.0	38 30.0	1.0	01	180.0	00
1	41 59.4	1.0	03	178.7	41 29.4	1.0	03	178.7	40 59.4	1.0	03	178.8	40 29.4	1.0	03	178.8	39 59.4	1.0	03	178.8	39 29.4	1.0	03	178.8	38 59.5	1.0	03	178.8	38 29.5	1.0	03	178.8	1
2	41 57.7	1.0	05	177.5	41 27.7	1.0	05	177.5	40 57.7	1.0	05	177.5	40 27.7	1.0	05	177.6	39 57.8	1.0	05	177.6	39 27.8	1.0	05	177.6	38 57.8	1.0	04	177.6	38 27.8	1.0	04	177.7	2
3	41 54.7	1.0	07	176.2	41 24.8	1.0	07	176.3	40 54.9	1.0	07	176.3	40 24.9	1.0	06	176.3	39 55.0	1.0	06	176.4	39 25.0	1.0	06	176.4	38 55.1	1.0	06	176.4	38 25.1	1.0	06	176.5	3
4	41 50.7	1.0	09	175.0	41 20.8	1.0	09	175.0	40 50.9	1.0	09	175.1	40 21.0	1.0	08	175.1	39 51.1	1.0	08	175.2	39 21.2	1.0	08	175.2	38 51.3	1.0	08	175.3	38 21.3	1.0	08	175.3	4
05	41 45.4	99	11	173.7	41 15.6	99	10	173.8	40 45.7	99	10	173.8	40 15.9	99	10	173.9	39 46.0	99	10	174.0	39 16.2	1.0	10	174.0	38 46.3	1.0	10	174.1	38 16.5	1.0	10	174.2	05
6	41 39.0	99	13	172.4	41 09.3	99	12	172.5	40 39.5	99	12	172.6	40 09.7	99	12	172.7	39 39.9	99	12	172.8	39 10.1	99	12	172.8	38 40.3	99	12	172.9	38 10.6	99	12	173.0	6
7	41 31.5	99	14	171.2	41 01.8	99	14	171.3	40 32.1	99	14	171.4	40 02.4	99	14	171.5	39 32.7	99	14	171.6	39 03.0	99	14	171.7	38 33.3	99	14	171.8	38 03.6	99	14	171.8	7
8	41 22.8	99	16	170.0	40 53.2	99	16	170.1	40 23.6	99	16	170.2	39 54.0	99	16	170.3	39 24.4	99	16	170.4	38 54.8	99	16	170.5	38 25.2	99	15	170.6	37 55.5	99	15	170.7	8
9	41 13.0	98	18	168.7	40 43.5	98	18	168.9	40 14.0	98	18	169.0	39 44.5	98	18	169.1	39 15.0	98	18	169.2	38 45.5	98	17	169.3	38 16.0	98	17	169.4	37 46.4	98	17	169.5	9
10	41 02.1	98	20	167.5	40 32.7	98	20	167.6	40 03.4	98	20	167.8	39 34.0	98	20	167.9	39 04.6	98	19	168.0	38 35.1	98	19	168.2	38 05.7	98	19	168.3	37 36.3	98	19	168.4	10
1	40 50.1	97	22	166.3	40 20.9	98	22	166.4	39 51.6	98	21	166.6	39 22.3	98	21	166.7	38 53.0	98	21	166.9	38 23.8	98	21	167.0	37 54.4	98	20	167.1	37 25.1	98	20	167.3	1
2	40 37.0	97	24	165.1	40 07.9	97	23	165.2	39 38.8	97	23	165.4	39 09.6	97	23	165.6	38 40.5	97	23	165.7	38 11.3	97	22	165.9	37 42.1	97	22	166.0	37 13.0	97	22	166.1	2
3	40 22.9	97	25	163.9	39 53.9	97	25	164.1	39 24.9	97	25	164.2	38 55.9	97	25	164.4	38 26.9	97	24	164.6	37 57.9	97	24	164.7	37 28.8	97	24	164.9	36 59.8	97	24	165.0	3
4	40 07.6	96	27	162.7	39 38.8	96	27	162.9	39 10.0	96	27	163.1	38 41.1	96	26	163.2	38 12.3	96	26	163.4	37 43.4	96	26	163.6	37 14.5	96	26	163.8	36 45.6	96	25	163.9	4
15	39 51.4	95	29	161.5	39 22.7	96	28	161.7	38 54.0	96	28	161.9	38 25.4	96	28	162.1	37 56.6	96	28	162.3	37 27.9	96	27	162.5	36 59.2	96	27	162.6	36 30.4	96	27	162.8	15
6	39 34.1	95	30	160.4	39 05.6	95	30	160.6	38 37.1	95	30	160.8	38 08.6	95	30	161.0	37 40.0	95	29	161.2	37 11.5	95	29	161.4	36 42.9	95	29	161.5	36 14.3	95	28	161.7	6
7	39 15.8	94	32	159.2	38 47.5	94	32	159.4	38 19.1	94	32	159.6	37 50.8	95	31	159.8	37 22.4	95	31	160.1	36 54.1	95	31	160.3	36 25.7	95	30	160.5	35 57.2	95	30	160.7	7
8	38 56.5	94	34	158.1	38 28.4	94	34	158.3	38 00.2	94	33	158.5	37 32.1	94	33	158.7	37 03.9	94	32	159.0	36 35.7	94	32	159.2	36 07.5	94	32	159.4	35 39.2	94	32	159.6	8
9	38 36.2	93	35	157.0	38 08.3	93	35	157.2	37 40.4	93	35	157.4	37 12.4	93	34	157.6	36 44.4	93	34	157.9	36 16.4	93	34	158.1	35 48.4	94	33	158.3	35 20.3	94	33	158.5	9
20	38 15.0	92	37	155.8	37 47.3	92	36	156.1	37 19.6	93	36	156.3	36 51.8	93	36	156.6	36 24.0	93	36	156.8	35 56.2	93	35	157.0	35 28.3	93	35	157.3	35 00.4	93	34	157.5	20
1	37 52.9	92	38	154.7	37 25.4	92	38	155.0	36 57.8	92	38	155.2	36 30.3	92	38	155.5	36 02.7	92	37	155.7	35 35.0	92	37	156.0	35 07.4	92	36	156.2	34 39.7	92	36	156.4	1
2	37 29.8	91	40	153.7	37 02.5	91	40	153.9	36 35.2	91	39	154.2	36 07.8	91	39	154.4	35 40.5	91	38	154.7	35 13.0	91	38	154.9	34 45.6	92	38	155.2	34 18.1	92	37	155.4	2
3	37 06.9	90	41	152.6	36 38.8	90	41	152.9	36 11.7	90	41	153.1	35 44.5	91	40	153.4	35 17.4	91	40	153.7	34 50.2	91	40	153.9	34 22.9	91	39	154.2	33 55.7	91	39	154.4	3
4	36 41.0	89	43	151.5	36 14.2	90	42	151.8	35 47.3	90	42	152.1	35 20.4	90	42	152.4	34 53.4	90	41	152.6	34 26.4	90	41	152.9	33 59.4	90	40	153.2	33 32.4	90	40	153.4	4
25	36 15.4	89	44	150.5	35 48.7	89	44	150.8	35 22.1	89	43	151.1	34 55.4	89	43	151.3	34 28.7	89	43	151.6	34 01.9	89	42	151.9	33 35.1	89	42	152.2	33 08.3	90	42	152.4	25
6	35 48.9	88	46	149.5	35 22.5	88	45	149.8	34 56.0	88	45	150.1	34 29.6	88	44	150.3	34 03.1	88	44	150.6	33 36.5	89	44	150.9	33 10.0	89	43	151.2	32 43.3	89	43	151.5	6
7	35 21.5	87	47	148.5	34 55.4	87	46	148.8	34 29.2	87	46	149.1	34 03.0	88	46	149.3	33 36.7	88	45	149.6	33 10.4	88	45	149.9	32 44.0	88	44	150.2	32 17.6	88	44	150.5	7
8	34 53.4	86	48	147.5	34 27.5	86	48	147.8	34 01.6	87	47	148.1	33 35.6	87	47	148.4	33 09.5	87	46	148.7	32 43.4	87	46	149.0	32 17.3	87	46	149.3	31 51.2	87	46	149.5	8
9	34 24.6	85	49	146.5	33 58.9	86	49	146.8	33 33.2	86	49	147.1	33 07.4	86	48	147.4	32 41.6	86	48	147.7	32 15.8	86	48	148.0	31 49.9	86	47	148.3	31 23.9	87	46	148.6	9
30	33 54.9	85	51	145.5	33 29.5	85	50	145.8	33 04.0	85	50	146.2	32 38.5	85	49	146.5	32 12.9	85	49	146.8	31 47.3	85	48	147.1	31 21.7	86	48	147.4	30 56.0	86	48	147.7	30
1	33 24.6	84	52	144.6	32 59.4	84	51	144.9	32 34.2	84	51	145.2	32 08.9	84	50	145.5	31 43.6	85	50	145.8	31 18.2	85	50	146.2	30 52.8	85	49	146.5	30 27.3	85	49	146.8	1
2	32 53.5	83	53	143.6	32 28.6	83	52	144.0	32 03.6	83	52	144.3	31 38.6	84	52	144.6	31 13.5	84	51	144.9	30 48.3	84	51	145.2	30 23.1	84	50	145.6	29 57.9	84	50	145.9	2
3	32 21.8	82	54	142.7	31 57.1	82	54	143.0	31 32.3	83	53	143.4	31 07.5	83	53	143.7	30 42.7	83	52	144.0	30 17.8	83	52	144.4	29 52.9	83	52	144.7	29 27.9	83	51	145.0	3
4	31 49.3	81	55	141.8	31 24.9	82	55	142.1	31 00.4	82	54	142.5	30 35.8	82	54	142.8	30 11.2	82	53	143.1	29 46.6	82	53	143.5	29 21.9	82	53	143.8	28 57.1	83	52	144.1	4
35	31 16.2	81	56	140.9	30 52.0	81	56	141.3	30 27.8	81	55	141.6	30 03.5	81	55	141.9	29 39.1	81	54	142.3	29 14.7	81	54	142.6	28 50.3	82	54	142.9	28 25.8	82	53	143.3	35
6	30 42.5	80	57	140.0	30 18.6	80	57	140.4	29 54.6	80	56	140.7	29 30.5	80	56	141.1	29 06.4	80	56	141.4	28 42.2	81	55	141.7	28 18.0	81	55	142.1	27 53.8	81	54	142.4	6
7	30 08.2	79	58	139.2	29 44.5	79	58	139.5	29 20.7	79	57	139.9	28 56.9	79	57	140.2	28 33.1	80	56	140.6	28 09.1	80	56	140.9	27 45.2	80	56	141.2	27 21.2	80	56	141.6	7
8	29 33.2	78	59	138.3	29 09.8	78	59	138.7	28 46.3	78	58	139.0	28 22.7	79	58	139.4	27 59.1	79	58	139.7	27 35.4	79	57	140.1	27 11.7	79	57	140.4	26 47.9	79	56	140.8	8
9	28 57.7	77	60	137.5	28 34.5	77	60	137.8	28 11.3	78	59	138.2	27 47.9	78	59	138.6	27 24.6	78	58	138.9	27 01.1	78	58	139.3	26 37.7	78	58	139.6	26 14.1	78	57	140.0	9
40	28 21.6	76	61	136.7	27 58.7	77	61	137.0	27 35.7	77	60	137.4	27 12.6	77	60	137.7	26 49.5	77	59	138.1	26 26.3	77	59	138.5	26 03.1	78	59	138.8	25 39.8	78	58	139.2	40
1	27 45.0	76	62	135.8	27 22.3	76	62	136.2	26 59.5	76	61	136.6	26 36.7	76	61	136.9	26 13.8	76	60	137.3	25 50.9	77	60	137.7	25 27.9	77	60	138.0	25 04.9	77	59	138.4	1
2	27 07.8	75	63	135.0	26 45.4	75	62	135.4	26 22.8	75	62	135.8	26 00.3	75	62	136.2	25 37.6	76	61	136.5	25 14.9	76	61	136.9	24 52.2	76	60	137.2	24 29.4	76	60	137.6	2
3	26 30.1	74	64	134.3	26 07.9	74	63	134.6	25 45.6	74	63	135.0	25 23.3	75	62	135.4	25 00.9	75	62	135.8	24 38.5	75	62	136.1	24 16.0	75	61	136.5	23 53.4	75	61	136.8	3
4	25 52.0	73	64	133.5	25 30.0	73	64	133.9	25 07.9	74	64	134.2	24 45.8	74	63	134.6	24 23.7	74	63	135.0	24 01.5	74	62	135.4	23 39.2	74	62	135.7	23 16.9	74	62	136.1	4
45	25 13.3	72	65	132.7	24 51.5	73	65	133.1	24 29.7	73	64	133.5	24 07.9	73	64	133.9	23 46.0	73	64	134.2	23 24.0	73	63	134.6	23 02.0	73	63	135.0	22 39.9	74	62	135.4	45
6	24 34.1	72	66	132.0	24 12.6	72	66	132.4	23 51.1	72	65	132.8	23 29.5	72	65	133.1	23 07.8	72	64	133.5	22 46.1	72	64	133.9	22 24.3	73	64	134.3	22 02.5	73	63	134.6	6
7	23 54.5	71	67	131.3	23 33.3	71	66	131.6	23 12.0	71	66	132.0	22 50.6	71	66	132.4	22 29.1	72	65	132.8	22 07.7	72	65	133.2	21 46.1	72	64	133.5	21 24.5	72	64	133.9	7
8	23 14.5	70	67	130.5	22 53.5	70	67	130.9	22 32.4	70	67	131.3	22 11.2	71	66	131.7	21 50.0	71	66	132.1	21 28.8	71	66	132.5	21 07.5	71	65	132.8	20 46.2	71	65	133.2	8
9	22 34.0	69	68	129.8	22 13.2	69	68	130.2	21 52.4	70	67	130.6	21 31.5	70	67	131.0	21 10.5	70	67	131.4	20 49.5	70	66	131.8	20 28.4	70	66	132.1	20 07.3	70	65	132.5	9
50	21 53.1	68	69	129.1	21 32.6	69	68	129.5	21 11.9	69	68	129.9	20 51.3	69	68	130.3	20 30.5	69	67	130.7	20 09.8	69	67	131.1	19 48.9	70	66	131.5	19 28.1	70	66	131.8	50
1	21 11.8	68	70	128.4	20 51.5	68	69	128.8	20 31.1	68	69	129.2	20 10.7	68	68	129.6	19 50.2	68	68	130.0	19 29.6	69	68	130.4	19 09.0	69	67	130.8	18 48.4	69	67	131.2	1
2	20 30.1	67	70	127.8	20 10.0	67	70	128.2	19 49.9	67	69	128.6	19 29.7	67	69	128.9	19 09.4	68	69	129.3	18 49.1	68	68	129.7	18 28.7	68	68	130.1	18 08.3	68	68	130.5	2
3	19 48.1	66	71	127.1	19 28.2	66	70	127.5	19 08.2	67	70	127.9	18 48.3	67	70	128.3	18 28.2	67	69	128.7	18 08.1	67	69	129.1	17 48.0	67	68	129.5	17 27.8	67	68	129.8	3
4	19 05.6	65	71	126.4	18 46.0	66	71	126.8	18 26.2	66	71	127.2	18 06.5	66	70	127.6	17 46.7	66	70	128.0	17 26.8	66	70	128.4	17 06.9	66	69	128.8	16 46.9	67	69	129.2	4
55	18 22.8	65	72	125.8	18 03.4	65	72	126.2	17 43.9	65	71	126.6	17 24.3	65	71	127.0	17 04.8	65	70	127.4	16 45.1	66	70	127.8	16 25.4	66	70	128.2	16 05.7	66	69	128.6	55
6	17 39.7	64	72	125.2	17 20.5	64	72	125.6	17 01.2	64	72	126.0	16 41.9	65	72	126.4	16 22.5	65	71	126.8	16 03.1	65	71	127.2	15 43.6	65	70	127.6	15 24.1	65	70	127.9	6
7	16 56.2	63	73	124.5	16 37.2	63	73	124.9	16 18.1	64	72	125.3	15 59.0	64	72	125.7	15 39.9	64	72	126.1	15 20.7	64	71	126.5	15 01.4	64	71	126.9	14 42.2	64	70	127.3	7
8	16 12.4	63	74	123.9	15 53.6	63	73	124.3	15 34.8	63	73	124.7	15 15.9	63	72	125.1	14 56.9	63	72	125.5	14 37.9	63	72	125.9	14 18.9	63	71	126.3	13 59.9	64	71	126.7	8
9	15 28.3	62	74	123.3	15 09.7	62	74	123.7	14 51.1	62	73	124.1	14 32.4	62	73	124.5	14 13.6	62	73	124.9	13 54.9	63	72	125.3	13 36.1	63	72	125.7	13 17.2	63	72	126.1	9
60	14 43.9	61	74	122.7	14 25.5	61	74	123.1	14 07.0	61	74	123.5	13 48.6	62	74	123.9	13 30.1	62	73	124.3	13 11.5	62	73	124.7	12 52.9	62	72	125.1	12 34.3	62	72	125.5	60
1	13 59.1	61	75	122.1	13 40.9	61	75	122.5	13 22.7	61	74	122.9	13 04.5	61	74	123.3	12 46.2	61	74	123.7	12 27.8	61	73	124.2	12 09.4	61	73	124.6	11 51.0	61	72	125.0	1
2	13 14.1	60	75	121.5	12 56.1	60	75	121.9	12 38.1	60	75	122.4	12 20.1	60	74	122.8	12 02.0	60	74	123.2	11 43.8	61	74	123.6	11 25.7	61	74	124.0	11 07.5	61	73	124.4	2
3	12 28.8	59	76	121.0	12 11.0	59	76	121.4	11 53.2	59	75	121.8	11 35.4	60	75	122.2	11 17.5	60	75	122.6	10 59.5	60	74	123.0	10 41.6	60	74	123.4	10 23.6	60	74	123.8	3
4	11 43.3	59	76	120.4	11 25.7	59	76	120.8	11 08.0	59	76	121.2	10 50.4	59	76	121.6	10 32.7	59	75	122.0	10 15.0	59	75	122.5	9 57.2	59	74	122.9	9 39.4	59	74	123.3	4
65	10 57.4	58	77	119.8	10 40.0	58	76	120.2	10 22.6	58	76	120.7	10 05.1	58	76	121.1	9 47.7	58	76	121.5	9 30.1	58	75	121.9	9 12.6	59	75	122.3	8 55.0	59	74	122.7	65
6	10 11.4	57	77	119.3	9 54.1	57	77	119.7	9 36.9	58	76	120.1	9 19.6	58	76	120.5	9 02.3	58	76	120.9	8 45.0	58	76	121.4	8 27.7	58	75	121.8	8 10.3	58	75	122.2	6
7	9 25.0	57	78	118.7	9 08.0	57	77	119.2	8 51.0	57	77	119.6	8 33.9	57	77	120.0	8 16.8	57	76	120.4	7 59.7	57	76	120.8	7 42.5	57	76	121.2	7 25.3	57	75	121.6	7
8	8 38.5	56	78	118.2	8 21.6	56	78	118.6	8 04.8	56	77	119.0	7 47.9	56	77	119.5	7 31.0	56	77	119.9	7 14.0	56	76	120.3	6 57.1	57	76	120.7	6 40.1	57	76	121.1	8
9	7 51.7	55	78	117.7	7 35.0	56	78	118.1	7 18.3	56	78	118.5	7 01.6	56	77	118.9	6 44.9	56	77	119.4	6 28.2	56	77	119.8	6 11.4	56	76	120.2	5 54.6	56	76	120.6	9
70	7 04.6	55	79	117.2	6 48.2	55	78	117.6	6 31.7	55	78	118.0	6 15.2	55	78	118.4	5 58.6	55	78	118.8	5 42.1	55	77	119.3	5 25.5	55	77	119.7	5 08.9	55	76	120.1	70
1	6 17.4	54	79	116.6	6 01.1	54	79	117.1	5 44.8	54	78	117.5	5 28.4	54	78	117.9	5 12.1	55	78	118.3													1
2	5 29.9	54	80	116.1	5 13.8	54	79	116.5																									2

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	8 24.0	45	84	71.8	8 37.5	45	84	71.3	8 51.0	45	83	70.9	9 04.5	45	83	70.4	9 17.9	45	83	69.9	9 31.3	45	82	69.5	9 44.7	44	82	69.0	9 58.0	44	82	68.6	91
2	7 33.8	46	84	71.3	7 47.4	45	83	70.9	8 01.1	45	83	70.4	8 14.6	45	83	70.0	8 28.2	45	83	69.5	8 41.8	45	82	69.1	8 55.3	45	82	68.6	9 08.7	45	82	68.2	2
3	6 43.6	46	83	70.9	6 57.4	46	83	70.4	7 11.2	46	83	70.0	7 24.9	46	82	69.6	7 38.7	46	82	69.1	7 52.3	46	82	68.7	8 06.0	45	82	68.2	8 19.6	45	82	67.8	3
4	5 53.7	46	83	70.5	6 07.6	46	83	70.0	6 21.5	46	83	69.6	6 35.4	46	82	69.1	6 49.2	46	82	68.7	7 03.1	46	82	68.2	7 16.9	46	82	67.8	7 30.7	46	81	67.3	4
95	5 03.8	47	83	70.0	5 17.9	47	83	69.6	5 31.9	47	83	69.1	5 45.9	47	82	68.7	6 00.0	47	82	68.2	6 13.9	47	82	67.8	6 27.9	47	81	67.4	6 41.9	46	81	66.9	95
6																	5 10.8	47	82	67.8	5 25.0	47	82	67.4	5 39.1	47	81	66.9	5 53.2	47	81	66.5	6
7																													5 04.7	48	81	66.0	7

Lat. 28°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		° ′	Δt °		°
00	86 00.0	1.0 10	180.0	86 30.0	1.0 11	180.0	87 00.0	1.0 13	180.0	87 30.0	1.0 16	180.0	88 00.0	1.0 19	180.0	88 30.0	1.0 24	180.0	89 00.0	1.0 34	180.0	89 30.0	1.0 52	180.0	00
1	85 54.0	98 28	167.1	86 23.2	97 32	165.4	86 52.2	96 36	163.2	87 20.7	94 42	160.1	87 48.6	92 49	155.8	88 15.4	86 58	149.1	88 39.8	75 70	138.2	88 59.0	50 82	119.2	1
2	85 36.9	92 44	155.4	86 04.0	89 48	152.4	86 30.4	86 53	148.7	86 55.7	82 59	144.0	87 19.3	75 66	137.8	87 40.4	65 73	129.7	87 57.8	50 81	118.9	88 09.6	28 86	105.3	2
3	85 10.6	84 55	145.3	85 35.1	80 60	141.8	85 58.5	75 64	137.5	86 20.2	69 70	132.3	86 39.7	61 75	126.1	86 56.4	50 80	118.7	87 09.4	36 84	109.9	87 17.9	20 87	100.0	3
4	84 37.4	75 64	137.2	84 59.3	71 68	133.4	85 19.8	65 72	129.1	85 38.4	59 76	124.1	85 54.8	50 80	118.4	86 08.5	40 83	111.9	86 18.8	29 86	104.8	86 25.5	16 88	97.1	4
05	83 59.1	68 70	130.6	84 18.8	63 73	126.8	84 36.8	57 76	122.7	84 53.0	51 80	118.1	85 07.0	43 82	113.0	85 18.5	34 85	107.5	85 27.2	24 87	101.5	85 32.8	13 88	95.3	05
6	83 17.3	61 74	125.2	83 34.9	56 77	121.7	83 51.0	51 80	117.8	84 05.3	44 82	113.6	84 17.6	37 84	109.1	84 27.6	29 86	104.3	84 35.1	21 87	99.2	84 40.0	12 88	94.0	6
7	82 32.8	56 77	120.9	82 48.9	51 80	117.6	83 03.4	46 82	114.0	83 16.2	40 84	110.2	83 27.1	33 85	106.2	83 36.0	26 87	101.9	83 42.7	19 88	97.5	83 47.2	11 88	93.0	7
8	81 46.5	51 80	117.3	82 01.2	47 82	114.2	82 14.4	41 83	110.9	82 26.0	36 85	107.5	82 35.9	30 86	103.8	82 44.0	24 87	100.1	82 50.1	17 88	96.2	82 54.2	10 88	92.2	8
9	80 58.8	47 81	114.3	81 12.3	43 83	111.4	81 24.5	38 84	108.4	81 35.2	33 86	105.2	81 44.3	28 87	101.9	81 51.7	22 88	98.5	81 57.4	16 88	95.0	82 01.3	10 88	91.5	9
10	80 10.0	44 83	111.7	80 22.6	40 84	109.0	80 33.9	35 85	106.3	80 43.8	31 86	103.3	80 52.3	26 87	100.3	80 59.2	21 88	97.3	81 04.6	15 88	94.1	81 08.3	10 88	90.9	10
1	79 20.4	41 84	109.5	79 32.2	37 85	107.0	79 42.8	33 86	104.4	79 52.1	29 87	101.8	80 00.1	24 87	99.0	80 06.6	19 88	96.2	80 11.7	15 88	93.3	80 15.3	10 88	90.4	1
2	78 30.2	39 84	107.6	78 41.4	35 86	105.3	78 51.3	31 86	102.9	79 00.1	27 87	100.4	79 07.6	23 88	97.8	79 13.9	19 88	95.2	79 18.8	14 88	92.6	79 22.4	10 88	89.9	2
3	77 39.5	37 85	106.0	77 50.1	33 86	103.8	77 59.5	30 87	101.5	78 07.9	26 87	99.2	78 15.1	22 88	96.8	78 21.1	18 88	94.4	78 25.9	14 88	91.9	78 29.4	10 88	89.4	3
4	76 48.4	35 86	104.5	76 58.5	32 86	102.4	77 07.5	28 87	100.3	77 15.5	25 88	98.1	77 22.4	21 88	95.9	77 28.3	17 88	93.6	77 32.9	14 88	91.3	77 36.4	10 88	89.0	4
15	75 56.9	34 86	103.1	76 06.6	31 87	101.2	76 15.3	27 87	99.2	76 23.0	24 88	97.1	76 29.7	21 88	95.0	76 35.4	17 88	92.9	76 39.9	13 88	90.8	76 43.4	10 88	88.6	15
6	75 05.2	33 86	101.9	75 14.5	30 87	100.1	75 22.9	26 88	98.2	75 30.4	23 88	96.2	75 36.9	20 88	94.3	75 42.4	17 88	92.3	75 47.0	13 88	90.3	75 50.5	10 88	88.3	6
7	74 13.3	31 87	100.8	74 22.3	29 87	99.1	74 30.4	26 88	97.3	74 37.7	23 88	95.4	74 44.1	20 88	93.6	74 49.5	17 88	91.7	74 54.0	13 88	89.8	74 57.5	10 88	87.9	7
8	73 21.2	30 87	99.8	73 29.9	28 88	98.1	73 37.8	25 88	96.4	73 44.9	22 88	94.7	73 51.2	19 88	92.9	73 56.5	16 88	91.2	74 01.0	13 88	89.4	74 04.6	10 88	87.6	8
9	72 28.9	30 87	98.9	72 37.4	27 88	97.3	72 45.1	25 88	95.6	72 52.1	22 88	94.0	72 58.2	19 88	92.3	73 03.6	16 88	90.6	73 08.0	14 88	88.9	73 11.7	11 88	87.2	9
20	71 36.5	29 88	98.0	71 44.8	27 88	96.5	71 52.4	24 88	94.9	71 59.2	22 88	93.3	72 05.3	19 88	91.8	72 10.6	16 88	90.2	72 15.1	14 88	88.5	72 18.8	11 88	86.9	20
1	70 44.0	28 88	97.2	70 52.1	26 88	95.7	70 59.6	24 88	94.2	71 06.3	21 88	92.7	71 12.3	19 88	91.2	71 17.6	16 88	89.7	71 22.1	14 88	88.1	71 25.9	11 88	86.6	1
2	69 51.4	28 88	96.4	69 59.4	26 88	95.0	70 06.7	23 88	93.6	70 13.4	21 88	92.2	70 19.4	19 88	90.7	70 24.6	16 88	89.2	70 29.2	14 88	87.8	70 33.0	12 88	86.3	2
3	68 58.7	27 88	95.7	69 06.6	25 88	94.4	69 13.8	23 88	93.0	69 20.4	21 88	91.6	69 26.4	19 88	90.2	69 31.7	16 88	88.8	69 36.3	14 88	87.4	69 40.2	12 88	86.0	3
4	68 05.9	27 88	95.0	68 13.7	25 88	93.7	68 20.9	23 88	92.4	68 27.5	21 88	91.1	68 33.4	19 88	89.8	68 38.7	17 88	88.4	68 43.3	14 88	87.0	68 47.3	12 88	85.7	4
25	67 13.1	27 88	94.4	67 20.9	25 88	93.1	67 28.0	23 88	91.9	67 34.5	21 88	90.6	67 40.4	19 88	89.3	67 45.8	17 88	88.0	67 50.4	15 88	86.7	67 54.5	12 88	85.4	25
6	66 20.3	26 88	93.8	66 27.9	25 88	92.6	66 35.0	23 88	91.3	66 41.5	21 88	90.1	66 47.5	19 88	88.9	66 52.8	17 88	87.6	66 57.6	15 88	86.4	67 01.7	13 88	85.1	6
7	65 27.4	26 88	93.2	65 35.0	24 88	92.0	65 42.1	23 88	90.8	65 48.6	21 88	89.6	65 54.5	19 88	88.4	65 59.9	17 88	87.2	66 04.7	15 88	86.0	66 08.9	13 88	84.8	7
8	64 34.5	26 88	92.6	64 42.1	24 88	91.5	64 49.1	23 88	90.3	64 55.6	21 88	89.2	65 01.6	19 88	88.0	65 07.0	17 88	86.9	65 11.9	15 88	85.7	65 16.2	13 88	84.5	8
9	63 41.6	26 88	92.1	63 49.1	24 88	91.0	63 56.1	23 88	89.9	64 02.6	21 88	88.8	64 08.6	19 88	87.6	64 14.1	17 88	86.5	64 19.1	16 88	85.4	64 23.5	14 88	84.2	9
30	62 48.6	26 88	91.5	62 56.1	24 88	90.5	63 03.1	23 88	89.4	63 09.7	21 88	88.3	63 15.7	19 88	87.2	63 21.2	18 88	86.1	63 26.3	16 88	85.1	63 30.8	14 88	83.9	30
1	61 55.7	26 88	91.0	62 03.1	24 88	90.0	62 10.2	23 88	89.0	62 16.7	21 88	87.9	62 22.8	19 88	86.9	62 28.4	18 88	85.8	62 33.5	16 88	84.7	62 38.1	15 88	83.7	1
2	61 02.7	26 88	90.5	61 10.2	24 88	89.5	61 17.2	23 88	88.5	61 23.8	21 88	87.5	61 29.9	20 88	86.5	61 35.6	18 88	85.5	61 40.8	17 88	84.4	61 45.5	15 88	83.4	2
3	60 09.7	26 88	90.1	60 17.2	24 88	89.1	60 24.2	23 88	88.1	60 30.9	21 88	87.1	60 37.0	20 88	86.1	60 42.8	18 88	85.1	60 48.0	17 88	84.1	60 52.9	15 88	83.1	3
4	59 16.7	26 88	89.6	59 24.2	24 88	88.7	59 31.3	23 88	87.7	59 38.0	21 88	86.7	59 44.2	20 88	85.8	59 50.0	19 88	84.8	59 55.4	17 88	83.8	60 00.3	16 88	82.8	4
35	58 23.8	26 88	89.1	58 31.3	24 88	88.2	58 38.4	23 88	87.3	58 45.1	22 88	86.4	58 51.4	20 88	85.4	58 57.2	19 88	84.5	59 02.7	17 88	83.5	59 07.7	16 88	82.5	35
6	57 30.8	26 88	88.7	57 38.3	24 88	87.8	57 45.5	23 88	86.9	57 52.2	22 88	86.0	57 58.6	21 88	85.1	58 04.5	19 88	84.1	58 10.1	18 88	83.2	58 15.2	16 88	82.3	6
7	56 37.8	26 88	88.3	56 45.4	25 88	87.4	56 52.6	23 88	86.5	56 59.4	22 88	85.6	57 05.8	21 88	84.7	57 11.9	19 88	83.8	57 17.5	18 88	82.9	57 22.8	17 88	82.0	7
8	55 44.9	26 88	87.8	55 52.5	25 88	87.0	55 59.7	24 88	86.1	56 06.6	22 88	85.2	56 13.1	21 88	84.4	56 19.2	20 88	83.5	56 24.9	19 88	82.6	56 30.3	17 87	81.7	8
9	54 52.0	26 88	87.4	54 59.6	25 88	86.6	55 06.9	24 88	85.7	55 13.8	22 88	84.9	55 20.4	21 88	84.0	55 26.6	20 88	83.2	55 32.4	19 88	82.3	55 37.9	18 87	81.4	9
40	53 59.0	26 88	87.0	54 06.7	25 88	86.2	54 14.1	24 88	85.4	54 21.0	23 88	84.5	54 27.7	22 88	83.7	54 34.0	20 88	82.9	54 39.9	19 87	82.0	54 45.5	18 87	81.2	40
1	53 06.1	26 88	86.6	53 13.9	25 88	85.8	53 21.3	24 88	85.0	53 28.3	23 88	84.2	53 35.1	22 88	83.4	53 41.5	21 88	82.5	53 47.5	20 87	81.7	53 53.2	18 87	80.9	1
2	52 13.3	26 88	86.2	52 21.0	25 88	85.4	52 28.5	24 88	84.6	52 35.6	23 88	83.8	52 42.5	22 88	83.0	52 48.9	21 88	82.2	52 55.1	20 87	81.4	53 00.9	19 87	80.6	2
3	51 20.4	27 88	85.8	51 28.3	26 88	85.1	51 35.8	25 88	84.3	51 43.0	24 88	83.5	51 49.9	22 88	82.7	51 56.5	21 88	81.9	52 02.7	20 87	81.1	52 08.7	19 87	80.3	3
4	50 27.6	27 88	85.4	50 35.5	26 88	84.7	50 43.1	25 88	83.9	50 50.4	24 88	83.1	50 57.4	23 88	82.4	51 04.0	22 87	81.6	51 10.4	21 87	80.8	51 16.5	20 87	80.0	4
45	49 34.8	27 88	85.1	49 42.8	26 88	84.3	49 50.4	25 88	83.6	49 57.8	24 88	82.8	50 04.9	23 87	82.1	50 11.7	22 87	81.3	50 18.1	21 87	80.5	50 24.3	20 87	79.8	45
6	48 42.0	27 88	84.7	48 50.1	26 88	83.9	48 57.8	25 88	83.2	49 05.2	24 88	82.5	49 12.4	23 87	81.7	49 19.3	22 87	81.0	49 25.9	22 87	80.2	49 32.2	21 87	79.5	6
7	47 49.3	27 88	84.3	47 57.4	26 88	83.6	48 05.2	26 88	82.9	48 12.7	25 87	82.1	48 20.0	24 87	81.4	48 27.0	23 87	80.7	48 33.7	22 87	79.9	48 40.1	21 87	79.2	7
8	46 56.6	28 88	83.9	47 04.8	27 88	83.2	47 12.7	26 88	82.5	47 20.3	25 87	81.8	47 27.7	24 87	81.1	47 34.8	23 87	80.4	47 41.6	22 87	79.6	47 48.1	21 86	78.9	8
9	46 03.9	28 88	83.6	46 12.2	27 88	82.9	46 20.2	26 87	82.2	46 27.9	25 87	81.5	46 35.3	24 87	80.8	46 42.5	24 87	80.1	46 49.5	23 87	79.4	46 56.2	22 86	78.6	9
50	45 11.3	28 88	83.2	45 19.6	27 88	82.5	45 27.7	26 87	81.8	45 35.5	26 87	81.1	45 43.1	25 87	80.4	45 50.4	24 87	79.8	45 57.4	23 87	79.1	46 04.3	22 86	78.4	50
1	44 18.7	28 88	82.8	44 27.1	28 87	82.2	44 35.3	27 87	81.5	44 43.2	26 87	80.8	44 50.9	25 87	80.1	44 58.3	24 87	79.4	45 05.5	24 86	78.8	45 12.4	23 86	78.1	1
2	43 26.2	29 88	82.5	43 34.7	28 87	81.8	43 42.9	27 87	81.2	43 50.9	26 87	80.5	43 58.7	26 87	79.8	44 06.2	25 87	79.1	44 13.5	24 86	78.5	44 20.6	23 86	77.8	2
3	42 33.7	29 87	82.1	42 42.3	28 87	81.5	42 50.6	27 87	80.8	42 58.7	27 87	80.2	43 06.6	26 87	79.5	43 14.2	25 86	78.8	43 21.6	24 86	78.2	43 28.8	24 86	77.5	3
4	41 41.2	29 87	81.8	41 49.9	28 87	81.1	41 58.3	28 87	80.5	42 06.5	27 87	79.8	42 14.5	26 87	79.2	42 22.3	26 86	78.5	42 29.8	25 86	77.9	42 37.1	24 86	77.2	4
55	40 48.8	29 87	81.4	40 57.6	29 87	80.8	41 06.1	28 87	80.1	41 14.4	27 87	79.5	41 22.5	27 86	78.9	41 30.4	26 86	78.2	41 38.1	25 86	77.6	41 45.5	24 86	76.9	55
6	39 56.5	30 87	81.0	40 05.3	29 87	80.4	40 13.9	28 87	79.8	40 22.3	28 87	79.2	40 30.6	27 86	78.5	40 38.6	26 86	77.9	40 46.4	26 86	77.3	40 53.9	25 86	76.6	6
7	39 04.2	30 87	80.7	39 13.1	29 87	80.1	39 21.8	29 87	79.5	39 30.3	28 86	78.8	39 38.7	27 86	78.2	39 46.8	27 86	77.6	39 54.7	26 86	77.0	40 02.4	25 86	76.3	7
8	38 11.9	30 87	80.3	38 20.9	30 87	79.7	38 29.8	29 87	79.1	38 38.4	28 86	78.5	38 46.8	28 86	77.9	38 55.1	27 86	77.3	39 03.1	26 86	76.7	39 11.0	26 86	76.0	8
9	37 19.7	31 87	80.0	37 28.8	30 87	79.4	37 37.8	29 86	78.8	37 46.5	29 86	78.2	37 55.1	28 86	77.6	38 03.4	28 86	77.0	38 11.6	27 86	76.4	38 19.6	26 86	75.7	9
60	36 27.6	31 87	79.6	36 36.8	30 87	79.0	36 45.8	30 86	78.4	36 54.7	29 86	77.9	37 03.4	29 86	77.3	37 11.9	28 86	76.7	37 20.2	27 86	76.0	37 28.3	27 85	75.4	60
1	35 35.5	31 87	79.3	35 44.8	31 86	78.7	35 54.0	30 86	78.1	36 02.9	29 86	77.5	36 11.7	29 86	76.9	36 20.4	28 86	76.3	36 28.8	28 86	75.7	36 37.1	27 85	75.1	1
2	34 43.5	32 87	78.9	34 52.9	31 86	78.4	35 02.2	31 86	77.8	35 11.2	30 86	77.2	35 20.2	29 86	76.6	35 28.9	29 86	76.0	35 37.5	28 85	75.4	35 45.9	28 85	74.8	2
3	33 51.5	32 86	78.6	34 01.0	31 86	78.0	34 10.4	31 86	77.4	34 19.6	30 86	76.9	34 28.7	30 86	76.3	34 37.5	29 86	75.7	34 46.2	29 85	75.1	34 54.8	28 85	74.5	3
4	32 59.6	32 86	78.2	33 09.3	32 86	77.7	33 18.7	31 86	77.1	33 28.1	31 86	76.5	33 37.2	30 86	76.0	33 46.2	30 85	75.4	33 55.1	29 85	74.8	34 03.8	29 85	74.2	4
65	32 07.8	33 86	77.9	32 17.5	32 86	77.3	32 27.1	32 86	76.8	32 36.6	31 86	76.2	32 45.9	31 86	75.6	32 55.0	30 85	75.1	33 04.0	30 85	74.5	33 12.8	29 85	73.9	65
6	31 16.0	33 86	77.5	31 25.9	33 86	77.0	31 35.6	32 86	76.4	31 45.2	32 86	75.9	31 54.6	31 85	75.3	32 03.9	31 85	74.7	32 13.0	30 85	74.2	32 22.0	30 85	73.6	6
7	30 24.3	33 86	77.2	30 34.3	33 86	76.6	30 44.1	33 86	76.1	30 53.8	32 85	75.5	31 03.4	32 85	75.0	31 12.8	31 85	74.4	31 22.1	31 85	73.9	31 31.2	30 84	73.3	7
8	29 32.7	34 86	76.8	29 42.8	33 86	76.3	29 52.8	33 86	75.7	30 02.6	33 85	75.2	30 12.3	32 85	74.6	30 21.8	32 85	74.1	30 31.2	31 85	73.5	30 40.5	31 84	73.0	8
9	28 41.2	34 86	76.5	28 51.4	34 86	75.9	29 01.5	33 85	75.4	29 11.4	33 85	74.8	29 21.2	33 85	74.3	29 30.9	32 85	73.8	29 40.5	32 84	73.2	29 49.9	31 84	72.7	9
70	27 49.7	35 86	76.1	28 00.0	34 85	75.6	28 10.2	34 85	75.0	28 20.3	33 85	74.5	28 30.3	33 85	74.0	28 40.1	33 84	73.4	28 49.8	32 84	72.9	28 59.3	32 84	72.3	70
1	26 58.3	35 86	75.7	27 08.8	35 85	75.2	27 19.1	34 85	74.7	27 29.3	34 85	74.2	27 39.4	33 85	73.6	27 49.4	33 84	73.1	27 59.2	33 84	72.6	28 08.9	32 84	72.0	1
2	26 07.0	35 85	75.4	26 17.6	35 85	74.9	26 28.0	35 85	74.3	26 38.4	34 85	73.8	26 48.6	34 84	73.3	26 58.7	33 84	72.8	27 08.7	33 84	72.2	27 18.6	33 84	71.7	2
3	25 15.8	36 85	75.0	25 26.5	35 85	74.5	25 37.1	35 85	74.0	25 47.6	35 85	73.5	25 57.9	34 84	72.9	26 08.2	34 84	72.4	26 18.3	34 84	71.9	26 28.3	33 84	71.4	3
4	24 24.7	36 85	74.7	24 35.5	36 85	74.1	24 46.2	36 85	73.6	24 56.8	35 84	73.1	25 07.3	35 84	72.6	25 17.7	34 84	72.1	25 28.0	34 84	71.6	25 38.2	34 84	71.0	4
75	23 33.6	37 85	74.3	23 44.6	36 85	73.8	23 55.4	36 84	73.3	24 06.2	36 84	72.8	24 16.8	35 84	72.3	24 27.3	35 84	71.7	24 37.8	35 84	71.2	24 48.1	34 83	70.7	75
6	22 42.7	37 85	73.9	22 53.8	37 85	73.4	23 04.7	36 84	72.9	23 15.6	36 84	72.4	23 26.4	36 84	71.9	23 37.1	35 84	71.4	23 47.7	35 83	70.9	23 58.2	35 83	70.4	6
7	21 51.8	37 85	73.6	22 03.0	37 84	73.1	22 14.1	37 84	72.6	22 25.2	37 84	72.1	22 36.1	36 84	71.6	22 46.9	36 83	71.0	22 57.7	36 83	70.5	23 08.3	35 83	70.0	7
8	21 01.1	38 84	73.2	21 12.4	38 84	72.7	21 23.7	37 84	72.2	21 34.8	37 84	71.7	21 45.9	37 84	71.2	21 56.9	36 83	70.7	22 07.8	36 83	70.2	22 18.6	36 83	69.7	8
9	20 10.4	38 84	72.8	20 21.9	38 84	72.3	20 33.3	38 84	71.8	20 44.6	38 84	71.3	20 55.8	37 83	70.8	21 06.9	37 83	70.3	21 18.0	37 83	69.8	21 28.9	36 82	69.3	9
80	19 19.8	39 84	72.4	19 31.4	39 84	72.0	19 43.0	38 84	71.5	19 54.4	38 83	71.0	20 05.8	38 83	70.5	20 17.1	37 83	70.0	20 28.3	37 83	69.5	20 39.4	37 82	69.0	80
1	18 29.4	39 84	72.1	18 41.1	39 84	71.6	18 52.8	39 84	71.1	19 04.4	39 83	70.6	19 15.9	38 83	70.1	19 27.4	38 83	69.6	19 38.7	38 82	69.1	19 50.0	37 82	68.6	1
2	17 39.0	40 84	71.7	17 50.9	40 83	71.2	18 02.7	39 83	70.7	18 14.5	39 83	70.2	18 26.2	39 83	69.8	18 37.8	39 82	69.3	18 49.3	38 82	68.8	19 00.8	38 82	68.3	2
3	16 48.8	40 84	71.3	17 00.8	40 83	70.8	17 12.8	40 83	70.3	17 24.7	40 83	69.9	17 36.5	39 82	69.4	17 48.3	39 82	68.9	18 00.0	39 82	68.4	18 11.6	39 82	67.9	3
4	15 58.7	41 83	70.9	16 10.8	40 83	70.4	16 23.0	40 83	70.0	16 35.0	40 82	69.5	16 47.0	40 82	69.0	16 58.9	40 82	68.5	17 10.8	39 82	68.0	17 22.6	39 82	67.6	4
85	15 08.7	41 83	70.5	15 21.0	41 83	70.1	15 33.3	41 83	69.6	15 45.5	41 82	69.1	15 57.6	40 82	68.6	16 09.7	40 82	68.2	16 21.7	40 82	67.7	16 33.7	40 81	67.2	85
6	14 18.8	42 83	70.1	14 31.3	41 83	69.7	14 43.7	41 82	69.2	14 56.0	41 82	68.7	15 08.3	41 82	68.3	15 20.6	41 82	67.8	15 32.8	41 81	67.3	15 44.9	40 81	66.8	6
7	13 29.0	42 83	69.7	13 41.6	42 82	69.3	13 54.2	42 82	68.8	14 06.7	42 82	68.3	14 19.2	41 82	67.9	14 31.6	41 81	67.4	14 44.0	41 81	66.9	14 56.3	41 81	66.5	7
8	12 39.4	43 82	69.3	12 52.2	42 82	68.9	13 04.9	42 82	68.4	13 17.6	42 82	67.9	13 30.2	42 82	67.5	13 42.8	42 81	67.0	13 55.3	42 81	66.6	14 07.8	41 81	66.1	8
9	11 49.9	43 82	68.9	12 02.8	43 82	68.5	12 15.7	43 82	68.0	12 28.5	43 82	67.6	12 41.3	43 81	67.1	12 54.1	42 81	66.6	13 06.8	42 81	66.2	13 19.4	42 80	65.7	9
90	11 00.5	44 82	68.5	11 13.6	44 82	68.1	11 26.6	43 82	67.6	11 39.6	43 81	67.2	11 52.6	43 81	66.7	12 05.5	43 81	66.2	12 18.4	43 80	65.8	12 31.2	43 80	65.3	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	38 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	00
1	37 59.5	1.0 03	178.8	37 29.5	1.0 03	178.9	36 59.5	1.0 03	178.9	36 29.5	1.0 03	178.9	35 59.5	1.0 03	178.9	35 29.5	1.0 02	178.9	34 59.5	1.0 02	178.9	34 29.5	1.0 02	178.9	1
2	37 57.9	1.0 04	177.7	37 27.9	1.0 04	177.7	36 57.9	1.0 04	177.7	36 27.9	1.0 04	177.8	35 57.9	1.0 04	177.8	35 28.0	1.0 04	177.8	34 58.0	1.0 04	177.8	34 28.0	1.0 04	177.8	2
3	37 55.2	1.0 06	176.5	37 25.2	1.0 06	176.6	36 55.3	1.0 06	176.6	36 25.3	1.0 06	176.6	35 55.4	1.0 06	176.7	35 25.4	1.0 06	176.7	34 55.5	1.0 06	176.7	34 25.5	1.0 06	176.8	3
4	37 51.4	1.0 08	175.4	37 21.5	1.0 08	175.4	36 51.6	1.0 08	175.5	36 21.7	1.0 08	175.5	35 51.8	1.0 08	175.6	35 21.9	1.0 08	175.6	34 52.0	1.0 08	175.7	34 22.0	1.0 07	175.7	4
05	37 46.6	1.0 10	174.2	37 16.8	1.0 10	174.3	36 46.9	1.0 10	174.3	36 17.0	1.0 09	174.4	35 47.2	1.0 09	174.5	35 17.3	1.0 09	174.5	34 47.5	1.0 09	174.6	34 17.6	1.0 09	174.6	05
6	37 40.8	99 12	173.1	37 11.0	99 12	173.1	36 41.2	99 11	173.2	36 11.4	99 11	173.3	35 41.6	99 11	173.4	35 11.8	99 11	173.4	34 41.9	99 11	173.5	34 12.1	99 11	173.6	6
7	37 33.8	99 13	171.9	37 04.1	99 13	172.0	36 34.4	99 13	172.1	36 04.7	99 13	172.2	35 34.9	99 13	172.3	35 05.2	99 13	172.3	34 35.5	99 12	172.4	34 05.7	99 12	172.5	7
8	37 25.9	99 15	170.8	36 56.2	99 15	170.9	36 26.6	99 15	171.0	35 56.9	99 14	171.1	35 27.3	99 14	171.2	34 57.6	99 14	171.3	34 28.0	99 14	171.3	33 58.3	99 14	171.4	8
9	37 16.9	98 17	169.7	36 47.3	99 16	169.8	36 17.8	99 16	169.9	35 48.2	99 16	170.0	35 18.7	99 16	170.1	34 49.1	99 16	170.2	34 19.5	99 16	170.3	33 49.9	99 16	170.4	9
10	37 06.9	98 18	168.5	36 37.4	98 18	168.6	36 08.0	98 18	168.8	35 38.5	98 18	168.9	35 09.0	98 18	169.0	34 39.6	98 18	169.1	34 10.1	98 17	169.2	33 40.6	98 17	169.3	10
1	36 55.8	98 20	167.4	36 26.5	98 20	167.5	35 57.1	98 20	167.7	35 27.8	98 20	167.8	34 58.4	98 19	167.9	34 29.1	98 19	168.0	33 59.7	98 19	168.2	33 30.3	98 19	168.3	1
2	36 43.8	97 22	166.3	36 14.6	97 22	166.4	35 45.3	97 21	166.6	35 16.1	97 21	166.7	34 46.9	97 21	166.8	34 17.6	98 21	167.0	33 48.4	98 20	167.1	33 19.1	98 20	167.3	2
3	36 30.7	97 23	165.2	36 01.6	97 23	165.3	35 32.5	97 23	165.5	35 03.4	97 23	165.6	34 34.3	97 22	165.8	34 05.2	97 22	165.9	33 36.1	97 22	166.1	33 06.9	97 22	166.2	3
4	36 16.7	96 25	164.1	35 47.7	96 25	164.3	35 18.8	97 24	164.4	34 49.8	97 24	164.6	34 20.9	97 24	164.7	33 51.9	97 24	164.9	33 22.9	97 24	165.0	32 53.9	97 23	165.2	4
15	36 01.7	96 27	163.0	35 32.9	96 26	163.2	35 04.1	96 26	163.3	34 35.3	96 26	163.5	34 06.4	96 26	163.7	33 37.6	96 25	163.8	33 08.7	96 25	164.0	32 39.9	96 25	164.2	15
6	35 45.7	95 28	161.9	35 17.1	95 28	162.1	34 48.4	96 28	162.3	34 19.8	96 28	162.5	33 51.1	96 27	162.6	33 22.4	96 27	162.8	32 53.7	96 26	163.0	32 25.0	96 26	163.2	6
7	35 28.8	95 30	160.9	35 00.3	95 29	161.0	34 31.8	95 29	161.2	34 03.3	95 29	161.4	33 34.8	95 29	161.6	33 06.3	95 28	161.8	32 37.8	95 28	162.0	32 09.2	95 28	162.2	7
8	35 11.0	94 31	159.8	34 42.7	94 31	160.0	34 14.4	94 31	160.2	33 46.0	94 30	160.4	33 17.7	95 30	160.6	32 49.3	95 30	160.8	32 20.9	95 30	161.0	31 52.5	95 29	161.2	8
9	34 52.2	94 33	158.7	34 24.1	94 32	159.0	33 56.0	94 32	159.2	33 27.8	94 32	159.4	32 59.6	94 32	159.6	32 31.4	94 31	159.8	32 03.2	94 31	160.0	31 35.0	94 31	160.2	9
20	34 32.5	93 34	157.7	34 04.6	93 34	157.9	33 36.7	93 34	158.1	33 08.7	93 33	158.4	32 40.7	93 33	158.6	32 12.7	93 33	158.8	31 44.7	93 32	159.0	31 16.6	94 32	159.2	20
1	34 12.0	92 36	156.7	33 44.3	92 35	156.9	33 16.5	93 35	157.1	32 48.7	93 35	157.4	32 20.9	93 34	157.6	31 53.1	93 34	157.8	31 25.3	93 34	158.0	30 57.4	93 34	158.2	1
2	33 50.6	92 37	155.7	33 23.1	92 37	155.9	32 55.5	92 36	156.1	32 27.9	92 36	156.4	32 00.3	92 36	156.6	31 32.7	92 36	156.8	31 05.0	92 35	157.1	30 37.3	92 35	157.3	2
3	33 28.4	91 38	154.7	33 01.0	91 38	154.9	32 33.7	91 38	155.2	32 06.3	91 38	155.4	31 38.9	91 37	155.6	31 11.4	92 37	155.9	30 44.0	92 36	156.1	30 16.5	92 36	156.3	3
4	33 05.3	90 40	153.7	32 38.2	90 40	153.9	32 11.0	91 39	154.2	31 43.8	91 39	154.4	31 16.6	91 38	154.7	30 49.4	91 38	154.9	30 22.1	91 38	155.2	29 54.8	91 37	155.4	4
25	32 41.4	90 41	152.7	32 14.5	90 41	153.0	31 47.5	90 40	153.2	31 20.5	90 40	153.5	30 53.6	90 40	153.7	30 26.5	90 39	154.0	29 59.5	90 39	154.2	29 32.4	90 39	154.5	25
6	32 16.7	89 42	151.7	31 50.0	89 42	152.0	31 23.3	89 42	152.3	30 56.5	89 41	152.5	30 29.7	89 41	152.8	30 02.9	89 41	153.0	29 36.1	90 40	153.3	29 09.2	90 40	153.6	6
7	31 51.2	88 44	150.8	31 24.7	88 43	151.0	30 58.2	88 43	151.3	30 31.7	89 43	151.6	30 05.1	89 42	151.9	29 38.5	89 42	152.1	29 11.9	89 42	152.4	28 45.2	89 41	152.7	7
8	31 25.0	87 45	149.8	30 58.7	88 45	150.1	30 32.4	88 44	150.4	30 06.1	88 44	150.7	29 39.8	88 44	150.9	29 13.4	88 43	151.2	28 47.0	88 43	151.5	28 20.5	88 42	151.8	8
9	30 58.0	87 46	148.9	30 31.9	87 46	149.2	30 05.9	87 46	149.5	29 39.8	87 45	149.8	29 13.7	87 45	150.0	28 47.5	87 44	150.3	28 21.3	87 44	150.6	27 55.1	87 44	150.9	9
30	30 30.2	86 47	148.0	30 04.4	86 47	148.3	29 38.6	86 47	148.6	29 12.8	86 46	148.9	28 46.9	86 46	149.2	28 20.9	87 46	149.4	27 55.0	87 45	149.7	27 29.0	87 45	150.0	30
1	30 01.8	85 48	147.1	29 36.2	85 48	147.4	29 10.7	85 48	147.7	28 45.0	85 47	148.0	28 19.4	86 47	148.3	27 53.6	86 46	148.6	27 27.9	86 46	148.9	27 02.1	86 46	149.1	1
2	29 32.7	84 50	146.2	29 07.3	84 49	146.5	28 42.0	85 49	146.8	28 16.6	85 48	147.1	27 51.2	85 48	147.4	27 25.7	85 48	147.7	27 00.2	85 47	148.0	26 34.6	85 47	148.3	2
3	29 02.8	84 51	145.3	28 37.8	84 50	145.6	28 12.6	84 50	145.9	27 47.5	84 50	146.2	27 22.3	84 49	146.5	26 57.0	84 49	146.9	26 31.8	84 48	147.2	26 06.4	84 48	147.5	3
4	28 32.4	83 52	144.4	28 07.5	83 52	144.8	27 42.6	83 51	145.1	27 17.7	83 51	145.4	26 52.8	83 50	145.7	26 27.7	83 50	146.0	26 02.7	84 50	146.3	25 37.6	84 49	146.6	4
35	28 01.2	82 53	143.6	27 36.6	82 52	143.9	27 12.0	82 52	144.2	26 47.3	82 52	144.6	26 22.6	82 51	144.9	25 57.8	83 51	145.2	25 33.0	83 50	145.5	25 08.2	83 50	145.8	35
6	27 29.5	81 54	142.7	27 05.1	81 54	143.1	26 40.7	81 53	143.4	26 16.3	82 53	143.7	25 51.8	82 52	144.0	25 27.3	82 52	144.4	25 02.7	82 52	144.7	24 38.1	82 51	145.0	6
7	26 57.1	80 55	141.9	26 33.0	80 54	142.3	26 08.8	81 54	142.6	25 44.6	81 54	142.9	25 20.4	81 53	143.2	24 56.1	81 53	143.6	24 31.8	81 52	143.9	24 07.4	81 52	144.2	7
8	26 24.1	79 56	141.1	26 00.3	80 56	141.4	25 36.3	80 55	141.8	25 12.4	80 55	142.1	24 48.4	80 54	142.4	24 24.3	80 54	142.8	24 00.2	80 54	143.1	23 36.1	81 53	143.4	8
9	25 50.6	79 57	140.3	25 26.9	79 56	140.6	25 03.3	79 56	141.0	24 39.6	79 56	141.3	24 15.8	79 55	141.7	23 52.0	79 55	142.0	23 28.1	80 54	142.3	23 04.3	80 54	142.6	9
40	25 16.4	78 58	139.5	24 53.1	78 58	139.9	24 29.6	78 57	140.2	24 06.2	78 57	140.5	23 42.7	78 56	140.9	23 19.1	79 56	141.2	22 55.5	79 55	141.5	22 31.8	79 55	141.9	40
1	24 41.8	77 59	138.7	24 18.6	77 58	139.1	23 55.5	77 58	139.4	23 32.2	78 58	139.8	23 08.9	78 57	140.1	22 45.6	78 57	140.5	22 22.3	78 56	140.8	21 58.9	78 56	141.1	1
2	24 06.6	76 60	138.0	23 43.7	76 59	138.3	23 20.7	77 59	138.7	22 57.7	77 58	139.0	22 34.7	77 58	139.4	22 11.6	77 58	139.7	21 48.5	77 57	140.0	21 25.3	77 57	140.4	2
3	23 30.8	75 60	137.2	23 08.2	76 60	137.6	22 45.5	76 60	137.9	22 22.7	76 59	138.3	21 59.9	76 59	138.5	21 37.1	76 58	139.0	21 14.2	76 58	139.3	20 51.3	76 58	139.7	3
4	22 54.6	75 61	136.5	22 32.2	75 61	136.8	22 09.7	75 60	137.2	21 47.2	75 60	137.5	21 24.7	75 60	137.9	21 02.1	75 59	138.2	20 39.4	76 59	138.6	20 16.8	76 58	138.9	4
45	22 17.8	74 62	135.7	21 55.7	74 62	136.1	21 33.5	74 61	136.4	21 11.2	74 61	136.8	20 48.9	74 60	137.2	20 26.5	75 60	137.5	20 04.1	75 60	137.9	19 41.7	75 59	138.2	45
6	21 40.6	73 63	135.0	21 18.7	73 62	135.4	20 56.7	73 62	135.7	20 34.7	73 62	136.1	20 12.6	74 61	136.5	19 50.5	74 61	136.8	19 28.4	74 60	137.2	19 06.2	74 60	137.5	6
7	21 02.9	72 64	134.3	20 41.2	72 63	134.7	20 19.5	73 63	135.0	19 57.7	73 62	135.4	19 35.9	73 62	135.8	19 14.0	73 62	136.1	18 52.1	73 61	136.5	18 30.2	73 61	136.8	7
8	20 24.8	71 64	133.6	20 03.3	72 64	134.0	19 41.8	72 64	134.3	19 20.3	72 63	134.7	18 58.7	72 63	135.1	18 37.1	72 62	135.4	18 15.4	72 62	135.8	17 53.7	72 62	136.2	8
9	19 46.2	71 65	132.9	19 25.0	71 65	133.3	19 03.7	71 64	133.6	18 42.4	71 64	134.0	18 21.1	71 64	134.4	17 59.7	71 63	134.8	17 38.3	71 63	135.1	17 16.8	72 62	135.5	9
50	19 07.1	70 66	132.2	18 46.2	70 65	132.6	18 25.1	70 65	133.0	18 04.1	70 65	133.3	17 43.0	70 64	133.7	17 21.8	71 64	134.1	17 00.7	71 63	134.5	16 39.4	71 63	134.8	50
1	18 27.7	69 66	131.5	18 07.0	69 66	131.9	17 46.2	69 66	132.3	17 25.3	69 65	132.7	17 04.5	70 65	133.1	16 43.6	70 64	133.4	16 22.6	70 64	133.8	16 01.6	70 64	134.2	1
2	17 47.8	68 67	130.9	17 27.3	68 67	131.3	17 06.8	69 66	131.6	16 46.2	69 66	132.0	16 25.6	69 66	132.4	16 04.9	69 65	132.8	15 44.2	69 65	133.2	15 23.4	69 64	133.5	2
3	17 07.6	67 68	130.2	16 47.3	68 67	130.6	16 27.0	68 67	131.0	16 06.6	68 66	131.4	15 46.2	68 66	131.8	15 25.8	68 66	132.1	15 05.3	68 65	132.5	14 44.8	68 65	132.9	3
4	16 26.9	67 68	129.6	16 06.9	67 68	130.0	15 46.8	67 68	130.4	15 26.7	67 67	130.8	15 06.5	67 67	131.1	14 46.3	67 66	131.5	14 26.1	68 66	131.9	14 05.8	68 66	132.3	4
55	15 45.9	66 69	129.0	15 26.1	66 68	129.3	15 06.3	66 68	129.7	14 46.4	66 68	130.1	14 26.5	67 68	130.5	14 06.5	67 67	130.9	13 46.5	67 67	131.3	13 26.4	67 66	131.7	55
6	15 04.6	65 70	128.3	14 45.0	65 69	128.7	14 25.4	65 69	129.1	14 05.7	66 68	129.5	13 46.0	66 68	129.9	13 26.3	66 68	130.3	13 06.5	66 67	130.7	12 46.7	66 67	131.1	6
7	14 22.8	64 70	127.7	14 03.5	65 70	128.1	13 44.1	65 69	128.5	13 24.6	65 69	128.9	13 05.2	65 69	129.3	12 45.7	65 68	129.7	12 26.1	65 68	130.1	12 06.5	65 67	130.5	7
8	13 40.8	64 71	127.1	13 21.6	64 70	127.5	13 02.5	64 70	127.9	12 43.2	64 70	128.3	12 24.0	64 69	128.7	12 04.7	64 69	129.1	11 45.4	64 68	129.5	11 26.1	65 68	129.9	8
9	12 58.4	63 71	126.5	12 39.4	63 71	126.9	12 20.5	63 70	127.3	12 01.5	63 70	127.7	11 42.5	63 70	128.1	11 23.4	64 69	128.5	11 04.4	64 69	128.9	10 45.2	64 68	129.3	9
60	12 15.6	62 72	125.9	11 56.9	62 71	126.3	11 38.2	62 71	126.7	11 19.4	63 71	127.1	11 00.6	63 70	127.5	10 41.8	63 70	127.9	10 23.0	63 70	128.3	10 04.1	63 69	128.7	60
1	11 32.6	62 72	125.4	11 14.1	62 72	125.8	10 55.6	62 72	126.2	10 37.0	62 71	126.6	10 18.5	62 71	127.0	9 59.9	62 70	127.4	9 41.2	62 70	127.8	9 22.6	62 70	128.2	1
2	10 49.2	61 73	124.8	10 31.0	61 72	125.2	10 12.7	61 72	125.6	9 54.3	61 72	126.0	9 36.0	61 71	126.4	9 17.6	61 71	126.8	8 59.2	61 71	127.2	8 40.8	61 70	127.6	2
3	10 05.6	60 73	124.2	9 47.5	60 73	124.6	9 29.4	60 72	125.0	9 11.3	60 72	125.4	8 53.2	60 72	125.8	8 35.0	61 71	126.3	8 16.8	61 71	126.7	7 58.6	61 71	127.1	3
4	9 21.6	59 74	123.7	9 03.8	60 73	124.1	8 45.9	60 73	124.5	8 28.0	60 73	124.9	8 10.1	60 72	125.3	7 52.2	60 72	125.7	7 34.2	60 72	126.1	7 16.2	60 71	126.5	4
65	8 37.4	59 74	123.1	8 19.8	59 74	123.5	8 02.1	59 74	123.9	7 44.4	59 73	124.4	7 26.7	59 73	124.8	7 09.0	59 72	125.2	6 51.3	59 72	125.6	6 33.5	59 72	126.0	65
6	7 52.9	58 75	122.6	7 35.5	58 74	123.0	7 18.0	58 74	123.4	7 00.6	58 74	123.8	6 43.1	58 73	124.2	6 25.6	58 73	124.6	6 08.0	58 72	125.0	5 50.5	59 72	125.5	6
7	7 08.1	57 75	122.1	6 50.9	57 75	122.5	6 33.7	58 74	122.9	6 16.4	58 74	123.3	5 59.1	58 74	123.7	5 41.8	58 73	124.1	5 24.5	58 73	124.5	5 07.2	58 73	124.9	7
8	6 23.1	57 76	121.5	6 06.1	57 75	122.0	5 49.1	57 75	122.4	5 32.0	57 74	122.8	5 14.9	57 74	123.2										8
9	5 37.8	56 76	121.0	5 21.0	56 76	121.4	5 04.2	56 75	121.9																9

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	10 11.3	44 82	68.1	10 24.5	44 82	67.7	10 37.7	44 81	67.2	10 50.9	44 81	66.8	11 04.0	44 81	66.3	11 17.1	44 80	65.8	11 30.1	43 80	65.4	11 43.1	43 80	64.9	91
2	9 22.2	45 82	67.7	9 35.6	45 81	67.3	9 48.9	45 81	66.8	10 02.3	44 81	66.4	10 15.6	44 80	65.9	10 28.8	44 80	65.4	10 42.0	44 80	65.0	10 55.2	44 80	64.5	2
3	8 33.2	45 81	67.3	8 46.2	45 81	66.9	9 00.3	45 81	66.4	9 13.8	45 80	65.9	9 27.3	45 80	65.5	9 40.7	45 80	65.0	9 54.1	45 80	64.6	10 07.5	44 79	64.1	3
4	7 44.4	46 81	66.9	7 58.2	46 81	66.4	8 11.9	46 80	66.0	8 25.5	46 80	65.5	8 39.2	45 80	65.1	8 52.8	45 80	64.6	9 06.3	45 79	64.2	9 19.9	45 79	63.7	4
95	6 55.8	46 81	66.5	7 09.7	46 80	66.0	7 23.5	46 80	65.6	7 37.4	46 80	65.1	7 51.2	46 80	64.7	8 05.0	46 79	64.2	8 18.7	46 79	63.8	8 32.5	46 79	63.3	95
6	6 07.3	47 80	66.0	6 21.4	47 80	65.6	6 35.4	47 80	65.1	6 49.4	47 80	64.7	7 03.4	47 79	64.2	7 17.4	47 79	63.8	7 31.3	46 79	63.4	7 45.2	46 78	62.9	6
7	5 19.0	47 80	65.6	5 33.2	47 80	65.2	5 47.4	47 80	64.7	6 01.6	47 79	64.3	6 15.8	47 79	63.8	6 29.9	47 79	63.4	6 44.0	47 78	62.9	6 58.1	47 78	62.5	7
8										5 14.0	48 79	63.8	5 28.3	48 79	63.4	5 42.6	48 78	63.0	5 57.0	48 78	62.5	6 11.2	48 78	62.1	8
9																			5 10.0	48 78	62.1	5 24.5	48 78	61.6	9

Lat. 28°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	90 00.0	.. 88	....	89 30.0	1.0 51	00.0	89 00.0	1.0 33	00.0	88 00.0	1.0 18	00.0	86 00.0	1.0 09	00.0	84 00.0	1.0 06	00.0	83 30.0	1.0 06	00.0	82 30.0	1.0 05	00.0	00
1	89 07.9	00 88	89.8	88 59.2	49 82	60.2	88 40.1	75 69	41.1	87 49.0	91 47	23.4	85 54.4	98 27	12.0	83 56.4	99 18	07.9	83 26.6	99 16	07.2	82 27.1	99 14	06.2	1
2	88 14.0	01 88	89.5	88 10.1	26 86	73.7	87 58.7	49 80	59.9	87 20.6	75 64	40.7	85 38.5	91 41	22.9	83 45.6	96 29	15.4	83 16.8	96 27	14.2	82 18.6	97 23	12.3	2
3	87 21.1	01 88	89.3	87 18.6	17 87	78.6	87 10.8	34 84	68.5	86 42.1	60 73	52.0	85 13.8	83 52	32.3	83 28.4	91 38	22.4	83 00.8	92 36	20.8	82 04.8	94 31	18.0	3
4	86 28.1	02 88	89.1	86 26.5	12 88	81.0	86 20.7	26 85	73.2	85 58.2	48 78	59.3	84 42.6	74 60	39.9	83 05.5	86 46	28.7	82 39.4	88 43	26.7	81 46.0	90 38	23.4	4
05	85 35.1	02 88	88.8	85 34.1	09 88	82.3	85 29.6	20 86	76.0	85 11.5	40 81	64.2	84 06.4	66 66	46.0	82 37.7	80 53	34.3	82 13.4	82 50	32.1	81 22.9	86 45	28.3	05
6	84 42.2	02 88	88.6	84 41.5	07 88	83.2	84 38.0	16 86	77.8	84 23.1	33 82	67.7	83 26.7	59 70	50.9	82 06.1	74 58	39.1	81 43.4	77 55	36.8	80 56.9	81 50	32.7	6
7	83 49.2	03 88	88.4	83 48.9	05 88	83.7	83 46.1	13 87	79.1	83 33.6	28 84	70.2	82 44.4	52 74	54.9	81 31.2	68 62	43.2	81 10.2	71 60	40.9	80 25.9	76 55	36.6	7
8	82 56.3	03 88	88.1	82 56.2	04 88	84.1	82 54.0	11 87	80.0	82 43.5	24 84	72.1	82 00.2	47 76	58.0	80 53.7	63 66	46.8	80 34.3	66 64	44.4	79 53.0	71 59	40.2	8
9	82 03.3	04 88	87.9	82 03.5	03 88	84.3	82 01.8	09 87	80.7	81 52.8	21 85	73.6	81 14.6	42 78	60.6	80 14.1	58 69	49.9	79 56.2	61 67	47.5	79 17.7	67 62	43.3	9
10	81 10.4	04 88	87.6	81 10.8	02 88	84.4	81 09.5	07 87	81.1	81 01.9	18 85	74.7	80 28.0	38 79	62.8	79 32.8	53 71	52.5	79 16.2	57 69	50.2	78 40.4	63 65	46.0	10
1	80 17.4	05 88	87.4	80 18.0	01 88	84.4	80 17.1	06 87	81.5	80 10.7	16 86	75.6	79 40.5	34 80	64.5	78 50.1	49 73	54.8	78 34.8	53 71	52.6	78 01.5	58 67	48.5	1
2	79 24.5	05 88	87.2	79 25.3	00 88	84.5	79 24.7	04 87	81.7	79 19.3	14 86	76.3	78 52.4	31 81	66.0	78 06.3	45 74	56.7	77 52.2	49 73	54.6	77 21.2	54 69	50.6	2
3	78 31.6	05 88	86.9	78 32.6	01 88	84.4	78 32.3	03 87	81.9	78 27.7	12 86	76.9	78 03.7	28 82	67.3	77 21.5	42 76	58.5	77 08.5	45 74	56.4	76 39.7	51 71	52.5	3
4	77 38.7	06 88	86.7	77 39.9	02 88	84.4	77 39.8	02 87	82.0	77 36.1	10 86	77.4	77 14.7	25 82	68.3	76 36.0	39 77	59.9	76 23.9	42 75	58.0	75 57.1	48 72	54.2	4
15	76 45.8	06 88	86.5	76 47.1	02 88	84.3	76 47.3	01 87	82.1	76 44.4	09 86	77.7	76 25.3	23 83	69.2	75 49.9	36 78	61.2	75 38.7	39 76	59.4	75 13.7	44 74	55.7	15
6	75 53.0	07 88	86.2	75 54.4	03 88	84.2	75 54.8	00 87	82.1	75 52.6	07 86	78.0	75 35.6	21 83	70.0	75 03.2	33 78	62.4	74 52.8	36 77	60.6	74 29.6	41 75	57.1	6
7	75 00.1	07 88	86.0	75 01.7	04 88	84.1	75 02.4	00 87	82.1	75 00.7	06 86	78.3	74 45.8	19 84	70.6	74 16.0	31 79	63.4	74 06.4	33 78	61.6	73 44.8	39 76	58.3	7
8	74 07.3	07 88	85.7	74 09.1	04 88	83.9	74 09.9	01 87	82.1	74 08.8	05 86	78.4	73 55.7	17 84	71.2	73 28.5	28 80	64.2	73 19.6	31 79	62.6	72 59.5	36 76	59.3	8
9	73 14.5	08 88	85.5	73 16.4	05 88	83.8	73 17.4	02 87	82.0	73 16.9	04 86	78.6	73 05.5	15 84	71.7	72 40.6	26 80	65.0	72 32.4	29 79	63.4	72 13.7	34 77	60.3	9
20	72 21.7	08 88	85.3	72 23.7	06 88	83.6	72 25.0	03 87	82.0	72 25.0	03 87	78.7	72 15.1	14 84	72.1	71 52.5	24 81	65.7	71 44.9	26 80	64.2	71 27.5	31 78	61.1	20
1	71 28.9	09 88	85.0	71 31.1	06 88	83.5	71 32.5	03 87	81.9	71 33.0	02 87	78.7	71 24.7	12 84	72.4	71 04.1	22 81	66.3	70 57.1	25 80	64.8	70 41.0	29 78	61.9	1
2	70 36.1	09 88	84.8	70 38.5	07 88	83.3	70 40.1	04 87	81.8	70 41.1	01 87	78.8	70 34.1	11 84	72.7	70 15.5	20 81	66.8	70 09.0	23 80	65.4	69 54.1	27 79	62.6	2
3	69 43.4	10 88	84.5	69 45.9	07 88	83.1	69 47.7	05 87	81.7	69 49.1	00 87	78.8	69 43.5	09 84	73.0	69 26.7	19 82	67.3	69 20.7	21 81	65.9	69 06.9	25 79	63.2	3
4	68 50.6	10 88	84.3	68 53.3	08 88	82.9	68 55.2	05 87	81.5	68 57.1	01 87	78.8	68 52.8	08 84	73.2	68 37.7	17 82	67.7	68 32.3	19 81	66.4	68 19.6	23 79	63.7	4
25	67 57.9	10 88	84.1	68 00.7	08 88	82.7	68 02.9	06 87	81.4	68 05.2	02 87	78.7	68 02.1	07 85	73.4	67 48.6	15 82	68.1	67 43.7	18 81	66.8	67 32.0	22 80	64.2	25
6	67 05.2	11 88	83.8	67 08.2	09 88	82.5	67 10.5	07 87	81.3	67 13.2	03 87	78.7	67 11.3	06 85	73.5	66 59.4	14 82	68.4	66 54.9	16 81	67.1	66 44.2	20 80	64.6	6
7	66 12.6	11 88	83.6	66 15.7	09 88	82.3	66 18.1	07 87	81.1	66 21.3	03 86	78.6	66 20.5	05 85	73.6	66 10.1	13 82	68.7	66 06.1	14 82	67.4	65 56.2	18 80	65.0	7
8	65 20.0	12 88	83.3	65 23.2	10 88	82.1	65 25.8	08 87	80.9	65 29.4	04 86	78.5	65 29.6	04 85	73.7	65 20.7	11 82	68.9	65 17.1	13 82	67.7	65 08.1	17 80	65.4	8
9	64 27.4	12 88	83.1	64 30.7	10 87	81.9	64 33.5	08 87	80.8	64 37.5	05 86	78.4	64 38.8	03 85	73.8	64 31.3	10 82	69.1	64 28.0	12 82	68.0	64 19.9	15 80	65.7	9
30	63 34.8	13 88	82.8	63 38.3	11 87	81.7	63 41.2	09 87	80.6	63 45.6	05 86	78.3	63 47.9	02 85	73.8	63 41.7	09 83	69.3	63 38.9	10 82	68.2	63 31.6	14 81	65.9	30
1	62 42.2	13 88	82.6	62 45.9	11 87	81.5	62 49.0	10 87	80.4	62 53.7	06 86	78.2	62 57.0	01 85	73.8	62 52.2	07 83	69.4	62 49.7	09 82	68.4	62 43.2	13 81	66.2	1
2	61 49.7	13 88	82.3	61 53.5	12 87	81.3	61 56.8	10 87	80.2	62 01.8	07 86	78.1	62 06.1	00 85	73.8	62 02.5	06 83	69.6	62 00.4	08 82	68.5	61 54.7	11 81	66.4	2
3	60 57.2	14 88	82.1	61 01.1	12 87	81.1	61 04.6	11 87	80.0	61 10.0	08 86	78.0	61 15.3	01 85	73.8	61 12.9	06 83	69.7	61 11.1	07 82	68.6	61 06.1	10 81	66.6	3
4	60 04.8	14 87	81.8	60 08.8	13 87	80.8	60 12.4	11 87	79.8	60 18.2	08 86	77.8	60 24.4	02 85	73.8	60 23.2	04 83	69.7	60 21.7	06 82	68.7	60 17.5	09 81	66.7	4
35	59 12.3	15 87	81.6	59 16.5	13 87	80.6	59 20.3	12 87	79.6	59 26.4	09 86	77.7	59 33.5	03 85	73.8	59 33.5	03 83	69.8	59 32.4	04 82	68.8	59 28.8	07 81	66.9	35
6	58 20.9	15 87	81.3	58 24.3	14 87	80.4	58 28.2	12 87	79.4	58 34.7	09 86	77.5	58 42.7	04 85	73.7	58 43.7	02 83	69.8	58 42.9	03 82	68.9	58 40.0	06 81	67.0	6
7	57 27.6	16 87	81.1	57 32.1	14 87	80.2	57 36.1	13 87	79.2	57 43.0	10 86	77.4	57 51.8	05 85	73.6	57 54.0	01 83	69.9	57 53.5	02 82	68.9	57 51.3	05 81	67.0	7
8	56 35.3	16 87	80.8	56 39.9	15 87	79.9	56 44.1	13 87	79.0	56 51.3	11 86	77.2	57 01.0	05 85	73.5	57 04.3	00 83	69.9	57 04.1	01 82	69.0	57 02.5	04 81	67.1	8
9	55 43.0	16 87	80.6	55 47.7	15 87	79.7	55 52.1	14 87	78.8	55 59.7	11 86	77.0	56 10.2	06 85	73.5	56 14.5	01 83	69.9	56 14.6	00 82	69.0	56 13.7	03 81	67.2	9
40	54 50.8	17 87	80.3	54 55.6	16 87	79.4	55 00.2	14 86	78.6	55 08.1	12 86	76.9	55 19.4	07 84	73.4	55 24.8	02 83	69.8	55 25.2	01 82	69.0	55 24.8	02 81	67.2	40
1	53 58.6	17 87	80.0	54 03.6	16 87	79.2	54 08.2	15 86	78.4	54 16.5	13 86	76.7	54 28.7	08 84	73.3	54 35.1	03 83	69.8	54 35.7	02 82	68.9	54 36.0	01 81	67.2	1
2	53 06.4	18 87	79.8	53 11.6	17 87	79.0	53 16.4	15 86	78.1	53 25.0	13 86	76.5	53 38.0	08 84	73.1	53 45.4	04 83	69.8	53 46.3	03 82	68.9	53 47.1	00 81	67.2	2
3	52 14.3	18 87	79.5	52 19.6	17 86	78.7	52 24.6	16 86	77.9	52 33.5	14 86	76.3	52 47.3	09 84	73.0	52 55.7	05 83	69.7	52 56.9	04 82	68.9	52 58.3	01 81	67.2	3
4	51 22.2	19 87	79.3	51 27.7	18 86	78.5	51 32.8	17 86	77.7	51 42.0	14 86	76.1	51 56.7	10 84	72.9	52 06.0	06 83	69.6	52 07.5	04 82	68.8	52 09.5	02 81	67.2	4
45	50 30.2	19 87	79.0	50 35.8	18 86	78.2	50 41.0	17 86	77.4	50 50.6	15 86	75.9	51 06.0	11 84	72.7	51 16.3	06 83	69.6	51 18.1	05 82	68.8	51 20.6	03 81	67.2	45
6	49 38.2	20 86	78.7	49 43.9	19 86	78.0	49 49.4	18 86	77.2	49 59.3	16 86	75.7	50 15.5	11 84	72.6	50 26.7	07 83	69.5	50 28.7	06 82	68.7	50 31.8	04 81	67.1	6
7	48 46.3	20 86	78.5	48 52.1	19 86	77.7	48 57.7	18 86	77.0	49 08.0	16 86	75.5	49 24.9	12 84	72.4	49 37.1	08 83	69.4	49 39.4	07 82	68.6	49 43.0	05 81	67.1	7
8	47 54.4	20 86	78.2	48 00.4	20 86	77.5	48 06.1	19 86	76.7	48 16.7	17 85	75.3	48 34.5	13 84	72.3	48 47.5	09 82	69.3	48 50.1	08 82	68.5	48 54.2	06 81	67.0	8
9	47 02.6	21 86	77.9	47 08.7	20 86	77.2	47 14.6	19 86	76.5	47 25.5	17 85	75.0	47 44.0	14 84	72.1	47 58.0	10 82	69.1	48 00.8	09 82	68.4	48 05.5	07 81	66.9	9
50	46 10.8	21 86	77.7	46 17.1	21 86	76.9	46 23.1	20 86	76.2	46 34.4	18 85	74.8	46 53.6	14 84	71.9	47 08.5	11 82	69.0	47 11.6	10 82	68.3	47 16.8	08 81	66.8	50
1	45 19.1	22 86	77.4	45 25.5	21 86	76.7	45 31.7	20 86	76.0	45 43.3	18 85	74.6	46 03.3	15 84	71.7	46 19.1	11 82	68.9	46 22.4	10 82	68.2	46 28.1	09 81	66.7	1
2	44 27.4	22 86	77.1	44 34.0	22 86	76.4	44 40.3	21 86	75.7	44 52.2	19 85	74.4	45 13.0	16 84	71.6	45 29.7	12 82	68.7	45 33.2	11 82	68.0	45 39.4	10 81	66.6	2
3	43 35.8	23 86	76.8	43 42.5	22 86	76.2	43 49.0	21 86	75.5	44 01.2	20 85	74.1	44 22.8	16 84	71.4	44 40.3	13 82	68.6	44 44.1	12 82	67.9	44 50.8	10 81	66.5	3
4	42 44.2	23 86	76.5	42 51.1	23 86	75.9	42 57.7	22 85	75.2	43 10.3	20 85	73.9	43 32.6	17 84	71.2	43 51.0	14 82	68.4	43 55.0	13 82	67.8	44 02.3	11 81	66.4	4
55	41 52.8	24 86	76.3	41 59.8	23 86	75.6	42 06.5	22 85	75.0	42 19.4	21 85	73.6	42 42.5	18 84	71.0	43 01.8	15 82	68.3	43 06.0	14 82	67.6	43 13.8	12 81	66.2	55
6	41 01.3	24 86	76.0	41 08.5	24 85	75.3	41 15.4	23 85	74.7	41 28.6	21 84	73.4	41 52.4	18 83	70.8	42 12.6	15 82	68.1	42 17.1	14 82	67.4	42 25.3	13 81	66.1	6
7	40 10.0	25 86	75.7	40 17.3	24 85	75.1	40 24.4	23 85	74.4	40 37.9	22 84	73.1	41 02.5	19 83	70.6	41 23.5	16 82	67.9	41 28.2	15 82	67.3	41 36.9	14 81	66.0	7
8	39 18.6	25 85	75.4	39 26.1	25 85	74.8	39 33.4	24 85	74.2	39 47.2	22 84	72.9	40 12.5	20 83	70.3	40 34.4	17 82	67.8	40 39.3	16 81	67.1	40 48.5	15 80	65.8	8
9	38 27.4	26 85	75.1	38 35.0	25 85	74.5	38 42.4	24 85	73.9	38 56.6	23 84	72.6	39 22.7	20 83	70.1	39 45.4	18 82	67.6	39 50.6	17 81	66.9	40 00.3	15 80	65.6	9
60	37 36.2	26 85	74.8	37 44.0	26 85	74.2	37 51.6	25 85	73.6	38 06.1	24 84	72.4	38 32.9	21 83	69.9	38 56.5	18 82	67.4	39 01.9	18 81	66.7	39 12.0	16 80	65.5	60
1	36 45.1	27 85	74.5	36 53.1	26 85	73.9	37 00.8	25 84	73.3	37 15.7	24 84	72.1	37 43.2	22 83	69.7	38 07.6	19 81	67.2	38 13.2	18 81	66.6	38 23.9	17 80	65.3	1
2	35 54.1	27 85	74.2	36 02.2	27 85	73.7	36 10.1	26 84	73.1	36 25.3	25 84	71.9	36 53.5	22 83	69.4	37 18.8	20 81	67.0	37 24.7	19 81	66.4	37 35.8	18 80	65.1	2
3	35 03.2	28 85	74.0	35 11.4	27 84	73.4	35 19.4	26 84	72.8	35 35.0	25 84	71.6	36 04.0	23 82	69.2	36 30.1	21 81	66.8	36 36.2	20 81	66.2	36 47.7	19 80	64.9	3
4	34 12.3	28 85	73.7	34 20.7	28 84	73.1	34 28.9	27 84	72.5	34 44.8	26 84	71.3	35 14.5	24 82	69.0	35 41.5	21 81	66.6	35 47.7	21 80	66.0	35 59.8	19 80	64.7	4
65	33 21.5	29 84	73.3	33 30.0	28 84	72.8	33 38.4	28 84	72.2	33 54.6	26 84	71.0	34 25.1	24 82	68.7	34 52.9	22 81	66.3	34 59.4	21 80	65.7	35 11.9	20 80	64.5	65
6	32 30.8	29 84	73.0	32 39.5	29 84	72.5	32 48.0	28 84	71.9	33 04.6	27 83	70.8	33 35.8	25 82	68.5	34 04.4	23 81	66.1	34 11.1	22 80	65.5	34 24.1	21 80	64.3	6
7	31 40.2	30 84	72.7	31 49.0	29 84	72.2	31 57.7	29 84	71.6	32 14.6	28 83	70.5	32 46.6	26 82	68.2	33 16.0	23 80	65.9	33 23.0	23 80	65.3	33 36.4	22 79	64.1	7
8	30 49.6	30 84	72.4	30 58.6	30 84	71.9	31 07.4	29 84	71.3	31 24.7	28 83	70.2	31 57.4	26 82	67.9	32 27.7	24 80	65.6	32 34.9	24 80	65.1	32 48.8	23 79	63.9	8
9	29 59.2	31 84	72.1	30 08.3	30 84	71.6	30 17.3	30 83	71.0	30 34.9	29 83	69.9	31 08.4	27 82	67.7	31 39.5	25 80	65.4	31 46.9	24 80	64.8	32 01.2	23 79	63.7	9
70	29 08.8	31 84	71.8	29 18.1	31 84	71.3	29 27.2	30 83	70.7	29 45.2	29 83	69.6	30 19.4	28 82	67.4	30 51.4	26 80	65.2	30 59.0	25 80	64.6	31 13.8	24 79	63.5	70
1	28 18.5	32 84	71.5	28 28.0	31 84	70.9	28 37.3	31 83	70.4	28 55.6	30 82	69.3	29 30.5	28 81	67.1	30 03.3	26 80	64.9	30 11.2	26 80	64.4	30 26.5	25 79	63.2	1
2	27 28.3	32 84	71.2	27 37.9	32 83	70.6	27 47.4	31 83	70.1	28 06.1	31 82	69.0	28 41.8	29 81	66.9	29 15.4	27 80	64.7	29 23.5	27 79	64.1	29 39.2	26 78	63.0	2
3	26 38.2	33 83	70.8	26 48.0	32 83	70.3	26 57.7	32 83	69.8	27 16.6	31 82	68.7	27 53.1	30 81	66.6	28 27.6	28 80	64.4	28 35.9	27 79	63.8	28 52.1	27 78	62.7	3
4	25 48.2	33 83	70.5	25 58.2	33 83	70.0	26 08.0	33 83	69.5	26 27.3	32 82	68.4	27 04.6	30 81	66.3	27 39.9	29 79	64.1	27 48.4	28 79	63.6	28 05.0	27 78	62.5	4
75	24 58.3	34 83	70.2	25 08.4	34 83	69.7	25 18.4	33 82	69.1	25 38.1	32 82	68.1	26 16.1	31 80	66.0	26 52.2	29 79	63.9	27 01.0	29 79	63.3	27 18.1	28 78	62.2	75
6	24 08.5	34 83	69.9	24 18.8	34 82	69.3	24 29.0	34 82	68.8	24 49.0	33 82	67.8	25 27.8	32 80	65.7	26 04.7	30 79	63.6	26 13.7	30 79	63.1	26 31.2	29 78	62.0	6
7	23 18.9	35 83	69.5	23 29.3	35 82	69.0	23 39.6	34 82	68.5	24 00.0	34 82	67.5	24 39.6	32 80	65.4	25 17.4	31 79	63.3	25 26.5	30 78	62.8	25 44.5	30 78	61.7	7
8	22 29.3	36 82	69.2	22 39.9	35 82	68.7	22 50.4	35 82	68.2	23 11.2	34 81	67.2	23 51.4	33 80	65.1	24 30.1	31 79	63.0	24 39.5	31 78	62.5	24 57.9	30 77	61.5	8
9	21 39.8	36 82	68.8	21 50.6	36 82	68.3	22 01.3	35 82	67.8	22 22.4	35 81	66.8	23 03.5	34 80	64.8	23 42.9	32 78	62.7	23 52.5	32 78	62.2	24 11.5	31 77	61.2	9
80	20 50.5	37 82	68.5	21 01.4	36 82	68.0	21 12.3	36 82	67.5	21 33.8	35 81	66.5	22 15.6	34 80	64.5	22 55.9	33 78	62.4	23 05.7	33 78	61.9	23 25.1	32 77	60.9	80
1	20 01.2	37 82	68.2	20 12.4	37 82	67.7	20 23.4	37 81	67.2	20 45.2	36 81	66.2	21 27.8	35 79	64.2	22 09.0	34 78	62.1	22 19.1	33 78	61.6	22 38.9	33 77	60.6	1
2	19 12.1	38 82	67.8	19 23.4	38 81	67.3	19 34.6	37 81	66.8	19 56.8	37 80	65.8	20 40.2	36 79	63.8	21 22.2	34 78	61.8	21 32.5	34 77	61.3	21 52.8	33 77	60.3	2
3	18 23.1	38 82	67.4	18 34.6	38 81	67.0	18 46.0	38 81	66.5	19 08.6	37 80	65.5	19 52.7	36 79	63.5	20 35.6	35 78	61.5	20 46.1	35 77	61.0	21 06.8	34 76	60.0	3
4	17 34.3	39 81	67.1	17 45.9	39 81	66.6	17 57.5	38 81	66.1	18 20.4	38 80	65.1	19 05.4	37 79	63.2	19 49.1	36 77	61.2	19 59.8	36 77	60.7	20 21.0	35 76	59.7	4
85	16 45.6	40 81	66.7	16 57.4	39 81	66.2	17 09.1	39 80	65.8	17 32.4	39 80	64.8	18 18.2	38 78	62.9	19 02.7	37 77	60.9	19 13.7	36 77	60.4	19 35.3	36 76	59.4	85
6	15 57.0	40 81	66.4	16 09.0	40 80	65.9	16 20.9	40 80	65.4	16 44.6	39 80	64.4	17 31.1	38 78	62.5	18 16.5	37 77	60.6	18 27.7	37 76	60.1	18 49.8	37 76	59.1	6
7	15 08.5	41 80	66.0	15 20.7	40 80	65.5	15 32.8	40 80	65.0	15 56.8	40 79	64.1	16 44.2	39 78	62.2	17 30.5	38 76	60.2	17 41.9	38 76	59.8	18 04.4	37 75	58.8	7
8	14 20.2	41 80	65.6	14 32.5	41 80	65.1	14 44.8	41 80	64.7	15 09.3	40 79	63.7	15 57.4	40 78	61.8	16 44.6	39 76	59.9	16 56.2	39 76	59.4	17 19.2	38 75	58.5	8
9	13 32.0	42 80	65.2	13 44.5	42 80	64.8	13 57.0	42 80	64.3	14 21.8	41 79	63.4	15 10.8	40 78	61.5	15 58.8	40 76	59.6	16 10.6	39 76	59.1	16 34.1	39 75	58.1	9
90	12 44.0	42 80	64.9	12 56.7	42 80	64.4	13 09.4	42 79	63.9	13 34.6	42 78	63.0	14 24.3	41 77	61.1	15 13.2	40 76	59.2	15 25.3	40 75	58.7	15 49.2	40 74	57.8	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	34 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	33 00.0	1.0 01	180.0	32 00.0	1.0 01	180.0	30 00.0	1.0 01	180.0	28 00.0	1.0 01	180.0	27 30.0	1.0 01	180.0	26 30.0	1.0 01	180.0	00
1	33 59.5	1.0 02	178.9	33 29.5	1.0 02	178.9	32 59.5	1.0 02	179.0	31 59.5	1.0 02	179.0	29 59.5	1.0 02	179.0	27 59.6	1.0 02	179.1	27 29.6	1.0 02	179.1	26 29.6	1.0 02	179.1	1
2	33 58.0	1.0 04	177.9	33 28.1	1.0 04	177.9	32 58.1	1.0 04	177.9	31 58.1	1.0 04	178.0	29 58.2	1.0 04	178.0	27 58.3	1.0 04	178.1	27 28.3	1.0 04	178.1	26 28.3	1.0 03	178.2	2
3	33 55.6	1.0 06	176.8	33 25.6	1.0 06	176.8	32 55.7	1.0 06	176.9	31 55.8	1.0 06	176.9	29 55.9	1.0 05	177.1	27 56.1	1.0 05	177.2	27 26.1	1.0 05	177.2	26 26.3	1.0 05	177.3	3
4	33 52.1	1.0 07	175.7	33 22.2	1.0 07	175.8	32 52.3	1.0 07	175.8	31 52.5	1.0 07	175.9	29 52.8	1.0 07	176.1	27 53.1	1.0 06	176.2	27 23.1	1.0 06	176.3	26 23.3	1.0 06	176.4	4
05	33 47.7	1.0 09	174.7	33 17.8	1.0 09	174.7	32 48.0	1.0 09	174.8	31 48.2	1.0 09	174.9	29 48.7	1.0 08	175.1	27 49.2	1.0 08	175.3	27 19.3	1.0 08	175.4	26 19.5	1.0 08	175.5	05
6	33 42.3	99 11	173.6	33 12.5	99 10	173.7	32 42.7	99 10	173.8	31 43.0	99 10	173.9	29 43.7	99 10	174.1	27 44.4	99 09	174.4	27 14.6	99 09	174.4	26 14 9	99 09	174.6	6
7	33 36.0	99 12	172.6	33 06.2	99 12	172.7	32 36.5	99 12	172.7	31 36.9	99 12	172.9	29 37.9	99 11	173.2	27 38.8	99 11	173.5	27 09.0	99 11	173.5	26 09.4	99 10	173.7	7
8	33 28.6	99 14	171.5	32 59.0	99 14	171.6	32 29.3	99 14	171.7	31 29.9	99 13	171.9	29 31.1	99 13	172.2	27 32.3	99 12	172.5	27 02.6	99 12	172.6	26 03.2	99 12	172.8	8
9	33 20.4	99 15	170.5	32 50.8	99 15	170.6	32 21.2	99 15	170.7	31 22.0	99 15	170.9	29 23.5	99 14	171.2	27 25.0	99 14	171.6	26 55.4	99 14	171.7	25 56.1	99 13	171.9	9
10	33 11.1	98 17	169.4	32 41.6	98 17	169.6	32 12.1	98 17	169.7	31 13.1	98 16	169.9	29 15.0	98 16	170.3	27 16.8	99 15	170.7	26 47.3	99 15	170.8	25 48.2	99 14	171.0	10
1	33 00.9	98 18	168.4	32 31.6	98 18	168.5	32 02.2	98 18	168.6	31 03.3	98 18	168.9	29 05.6	98 17	169.3	27 07.8	98 16	169.8	26 38.4	98 16	169.9	25 39.5	98 16	170.1	1
2	32 49.8	98 20	167.4	32 20.6	98 20	167.5	31 51.3	98 20	167.6	30 52.7	98 19	167.9	28 55.4	98 18	168.4	26 58.0	98 18	168.8	26 28.7	98 18	169.0	25 29.9	98 17	169.2	2
3	32 37.8	97 22	166.4	32 08.7	97 22	166.5	31 39.5	97 21	166.6	30 41.1	97 21	166.9	28 44.3	97 20	167.4	26 47.4	97 19	167.9	26 18.1	98 19	168.1	25 19.6	98 18	168.3	3
4	32 24.8	97 23	165.3	31 55.8	97 23	165.5	31 26.8	97 23	165.6	30 28.7	97 22	165.9	28 32.3	97 21	166.5	26 35.9	97 20	167.0	26 06.7	97 20	167.2	25 08.5	97 20	167.4	4
15	32 11.0	96 24	164.3	31 42.1	96 24	164.5	31 13.2	96 24	164.7	30 15.4	96 24	165.0	28 19.6	97 23	165.6	26 23.6	97 22	166.1	25 54.6	97 22	166.3	24 56.5	97 21	166.6	15
6	31 56.2	96 26	163.3	31 27.5	96 26	163.5	30 58.7	96 26	163.7	30 01.2	96 25	164.0	28 05.9	96 24	164.6	26 10.5	96 23	165.2	25 41.6	96 23	165.4	24 43.8	96 22	165.7	6
7	31 40.6	95 28	162.3	31 12.0	95 27	162.5	30 43.4	95 27	162.7	29 46.2	95 26	163.0	27 51.5	96 26	163.7	25 56.6	96 24	164.4	25 27.9	96 24	164.5	24 30.4	96 24	164.8	7
8	31 24.1	95 29	161.4	30 55.7	95 29	161.5	30 27.2	95 28	161.7	29 30.3	95 28	162.1	27 36.2	95 27	162.8	25 41.9	95 26	163.5	25 13.3	95 25	163.7	24 16.1	95 25	164.0	8
9	31 06.7	94 30	160.4	30 38.5	94 30	160.6	30 10.2	94 30	160.8	29 13.6	94 29	161.2	27 20.2	95 28	161.9	25 26.5	95 27	162.6	24 58.1	95 27	162.8	24 01.1	95 26	163.1	9
20	30 48.5	94 32	159.4	30 20.4	94 31	159.6	29 52.3	94 31	159.8	28 56.1	94 30	160.2	27 03.3	94 29	161.0	25 10.3	94 28	161.7	24 42.0	94 28	161.9	23 45.4	94 28	162.3	20
1	30 29.5	93 33	158.5	30 01.6	93 33	158.7	29 33.6	93 32	158.9	28 37.7	93 32	159.3	26 45.6	94 31	160.1	24 53.3	94 30	160.9	24 25.2	94 29	161.1	23 28.9	94 29	161.5	1
2	30 09.6	92 34	157.5	29 41.9	92 34	157.7	29 14.2	93 34	157.9	28 18.6	93 33	158.4	26 27.2	93 32	159.2	24 35.6	93 31	160.0	24 07.6	93 30	160.2	23 11.7	93 30	160.6	2
3	29 49.0	92 36	156.6	29 21.4	92 35	156.8	28 53.9	92 35	157.0	27 58.7	92 34	157.5	26 08.1	92 33	158.3	24 17.1	93 32	159.2	23 49.3	93 32	159.4	22 53.7	93 31	159.8	3
4	29 27.5	91 37	155.6	29 00.2	91 37	155.9	28 32.8	91 36	156.1	27 38.0	91 36	156.6	25 48.1	92 34	157.5	23 57.9	92 33	158.3	23 30.3	92 33	158.6	22 35.1	92 32	159.0	4
25	29 05.3	90 38	154.7	28 38.1	91 38	155.0	28 11.0	91 38	155.2	27 16.6	91 37	155.7	25 27.5	91 36	156.6	23 38.0	91 34	157.5	23 10.6	91 34	157.7	22 15.7	92 33	158.2	25
6	28 42.3	90 40	153.8	28 15.3	90 39	154.1	27 48.4	90 39	154.3	26 54.4	90 38	154.8	25 06.1	90 37	155.8	23 17.4	91 36	156.7	22 50.2	91 35	156.9	21 55.7	91 34	157.4	6
7	28 18.5	89 41	152.9	27 51.8	89 40	153.2	27 25.0	89 40	153.4	26 31.5	89 39	153.9	24 44.0	90 38	154.9	22 56.1	90 37	155.9	22 29.1	90 36	156.1	21 35.0	90 36	156.6	7
8	27 54.0	88 42	152.0	27 27.5	88 42	152.3	27 01.0	89 41	152.6	26 07.8	89 40	153.1	24 21.2	89 39	154.1	22 34.1	89 38	155.1	22 07.3	89 38	155.3	21 13.6	90 37	155.8	8
9	27 28.8	88 43	151.2	27 02.5	88 43	151.4	26 36.2	88 42	151.7	25 43.5	88 42	152.2	23 57.7	88 40	153.3	22 11.5	89 39	154.3	21 44.8	89 38	154.5	20 51.5	89 38	155.0	9
30	27 02.9	87 44	150.3	26 36.8	87 44	150.6	26 10.7	87 44	150.8	25 18.4	87 43	151.4	23 33.5	88 41	152.4	21 48.1	88 40	153.5	21 21.7	88 40	153.7	20 28.9	88 39	154.2	30
1	26 36.3	86 46	149.4	26 10.5	86 45	149.7	25 44.6	86 45	150.0	24 52.7	87 44	150.6	23 08.7	87 42	151.6	21 24.2	87 41	152.7	20 58.0	87 41	153.0	20 05.5	88 40	153.5	1
2	26 09.0	85 47	148.6	25 43.4	85 46	148.9	25 17.8	86 46	149.2	24 26.4	86 45	149.7	22 43.2	86 44	150.8	20 59.5	87 42	151.9	20 33.6	87 42	152.2	19 41.5	87 41	152.7	2
3	25 41.1	85 48	147.8	25 15.7	85 47	148.0	24 50.3	85 47	148.3	23 59.3	85 46	148.9	22 17.0	85 45	150.1	20 34.3	86 43	151.2	20 08.5	86 43	151.4	19 17.0	86 42	152.0	3
4	25 12.5	84 49	146.9	24 47.3	84 48	147.2	24 22.2	84 48	147.5	23 31.7	84 47	148.1	21 50.3	85 46	149.3	20 08.4	85 44	150.4	19 42.9	85 44	150.7	18 51.8	85 43	151.2	4
35	24 43.3	83 50	146.1	24 18.4	83 50	146.4	23 53.4	83 49	146.7	23 03.4	83 48	147.3	21 22.9	84 47	148.5	19 42.0	84 45	149.7	19 16.7	84 45	149.9	18 26.0	85 44	150.5	35
6	24 13.4	82 51	145.3	23 48.7	82 50	145.6	23 24.0	82 50	145.9	22 34.5	83 49	146.5	20 54.9	83 48	147.7	19 14.9	84 46	148.9	18 49.9	84 46	149.2	17 59.6	84 45	149.8	6
7	23 43.0	81 52	144.5	23 18.5	82 51	144.8	22 54.0	82 51	145.2	22 05.0	82 50	145.8	20 26.4	82 48	147.0	18 47.3	83 47	148.2	18 22.5	83 47	148.5	17 32.7	83 46	149.1	7
8	23 11.9	81 53	143.7	22 47.7	81 52	144.1	22 23.5	81 52	144.4	21 34.9	81 51	145.0	19 57.2	82 50	146.3	18 19.1	82 48	147.5	17 54.5	82 48	147.8	17 05.2	82 47	148.4	8
9	22 40.3	80 54	143.0	22 16.4	80 53	143.3	21 52.3	80 53	143.6	21 04.2	80 52	144.3	19 27.5	81 50	145.5	17 50.3	81 49	146.8	17 26.0	81 48	147.1	16 37.1	82 48	147.7	9
40	22 08.1	79 54	142.2	21 44.4	79 54	142.5	21 20.6	79 54	142.9	20 33.0	80 53	143.5	18 57.3	80 51	144.8	17 21.0	80 50	146.1	16 56.9	80 49	146.4	16 08.5	81 48	147.0	40
1	21 35.4	78 56	141.5	21 11.9	78 55	141.8	20 48.4	78 55	142.1	20 01.2	79 54	142.8	18 26.5	79 52	144.1	16 51.2	80 51	145.4	16 27.3	80 50	145.7	15 39.4	80 49	146.3	1
2	21 02.1	77 56	140.7	20 38.9	78 56	141.1	20 15.6	78 56	141.4	19 28.9	78 55	142.1	17 55.1	78 53	143.4	16 20.8	79 52	144.7	15 57.2	79 51	145.0	15 09.8	79 50	145.6	2
3	20 28.3	77 57	140.0	20 05.3	77 57	140.3	19 42.3	77 56	140.7	18 56.1	77 56	141.4	17 23.3	78 54	142.7	15 49.9	78 52	144.0	15 26.5	78 52	144.3	14 39.6	78 51	145.0	3
4	19 54.0	76 58	139.3	19 31.3	76 58	139.6	19 08.5	76 57	140.0	18 22.8	76 56	140.7	16 50.9	77 55	142.0	15 18.6	77 53	143.3	14 55.4	77 53	143.7	14 09.0	77 52	144.3	4
45	19 19.2	75 59	138.6	18 56.7	75 58	138.9	18 34.2	75 58	139.3	17 48.9	75 57	140.0	16 18.1	76 56	141.3	14 46.7	76 54	142.7	14 23.8	76 54	143.0	13 37.8	77 53	143.7	45
6	18 43.9	74 60	137.9	18 21.7	74 59	138.2	17 59.4	74 59	138.6	17 14.6	75 58	139.3	15 44.7	75 56	140.7	14 14.3	76 55	142.0	13 51.6	76 54	142.4	13 06.2	76 54	143.0	6
7	18 08.2	73 60	137.2	17 46.2	73 60	137.6	17 24.1	74 60	137.9	16 39.8	74 59	138.6	15 10.9	74 57	140.0	13 41.5	75 56	141.4	13 19.1	75 55	141.7	12 34.1	75 54	142.4	7
8	17 32.0	73 61	136.5	17 10.2	73 61	136.9	16 48.3	73 60	137.2	16 04.6	73 60	138.0	14 36.6	73 58	139.4	13 08.2	74 56	140.8	12 46.0	74 56	141.1	12 01.6	74 55	141.8	8
9	16 55.3	72 62	135.9	16 33.7	72 61	136.2	16 12.1	72 61	136.6	15 28.9	72 60	137.3	14 01.9	73 59	138.7	12 34.5	73 57	140.1	12 12.5	73 56	140.5	11 28.6	73 56	141.2	9
50	16 18.2	71 63	135.2	15 56.9	71 62	135.6	15 35.5	71 62	135.9	14 52.7	71 61	136.7	13 26.7	72 59	138.1	12 00.3	72 58	139.5	11 38.6	72 57	139.9	10 55.2	72 56	140.6	50
1	15 40.6	70 63	134.5	15 19.6	70 63	134.9	14 58.5	70 62	135.3	14 16.1	71 62	136.0	12 51.2	71 60	137.5	11 25.7	71 58	138.9	11 04.2	71 58	139.3	10 21.3	72 57	140.0	1
2	15 02.7	69 64	133.9	14 41.8	69 64	134.3	14 21.0	70 63	134.7	13 39.2	70 62	135.4	12 15.1	70 61	136.9	10 50.6	71 59	138.3	10 29.5	71 59	138.7	9 47.0	71 58	139.4	2
3	14 24.3	69 65	133.3	14 03.7	69 64	133.7	13 43.1	69 64	134.0	13 01.7	69 63	134.8	11 38.7	69 61	136.2	10 15.2	70 60	137.7	9 54.3	70 59	138.1	9 12.3	70 58	138.8	3
4	13 45.5	68 65	132.7	13 25.2	68 65	133.0	13 04.8	68 64	133.4	12 23.9	68 64	134.2	11 01.9	69 62	135.7	9 39.4	69 60	137.1	9 18.7	69 60	137.5	8 37.2	69 59	138.2	4
55	13 06.4	67 66	132.0	12 46.3	67 66	132.4	12 26.1	67 65	132.8	11 45.7	67 64	133.6	10 24.6	68 63	135.1	9 03.1	68 61	136.6	8 42.7	68 61	136.9	8 01.7	68 60	137.7	55
6	12 26.8	66 66	131.4	12 07.0	66 66	131.8	11 47.1	66 66	132.2	11 07.2	67 65	133.0	9 47.0	67 63	134.5	8 26.5	67 62	136.0	8 06.3	67 61	136.4	7 25.9	67 60	137.1	6
7	11 46.9	65 67	130.8	11 27.3	66 67	131.2	11 07.6	66 66	131.6	10 28.2	66 66	132.4	9 09.0	66 64	133.9	7 49.5	66 62	135.4	7 29.6	67 62	135.8	6 49.6	67 61	136.6	7
8	11 06.7	65 68	130.3	10 47.3	65 67	130.7	10 27.9	65 67	131.0	9 48.9	65 66	131.8	8 30.7	65 64	133.3	7 12.1	66 63	134.9	6 52.5	66 62	135.3	6 13.0	66 62	136.0	8
9	10 26.1	64 68	129.7	10 06.9	64 68	130.1	9 47.7	64 68	130.5	9 09.2	64 67	131.2	7 52.0	65 65	132.8	6 34.4	65 64	134.3	6 15.0	65 63	134.7	5 36.0	65 62	135.5	9
60	9 45.2	63 69	129.1	9 26.2	63 68	129.5	9 07.3	63 68	129.9	8 29.2	63 67	130.7	7 13.0	64 66	132.2	5 56.4	64 64	133.8	5 37.2	64 64	134.2				60
1	9 03.9	62 69	128.6	8 45.2	62 69	128.9	8 26.4	63 68	129.3	7 48.9	63 68	130.1	6 33.6	63 66	131.7	5 17.9	63 65	133.3							1
2	8 22.3	62 70	128.0	8 03.8	62 70	128.4	7 45.3	62 69	128.8	7 08.2	62 68	129.6	5 53.9	62 67	131.2										2
3	7 40.4	61 70	127.5	7 22.1	61 70	127.9	7 03.9	61 70	128.3	6 27.3	61 69	129.1	5 13.8	61 67	130.6										3
4	6 58.2	60 71	126.9	6 40.2	60 70	127.3	6 22.1	60 70	127.7	5 46.0	60 69	128.5													4
65	6 15.7	59 71	126.4	5 57.9	59 71	126.8	5 40.1	59 70	127.2	5 04.4	60 70	128.0													65
6	5 32.9	59 72	125.9	5 15.3	59 71	126.3																			6

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
91	11 56.1	43 80	64.5	12 09.0	43 79	64.0	12 21.9	43 79	63.5	12 47.4	42 78	62.6	13 38.0	42 77	60.8	14 27.8	41 76	58.9	14 40.1	41 75	58.4	15 04.5	41 74	57.5	91
2	11 08.4	44 79	64.1	11 21.5	44 79	63.6	11 34.5	43 79	63.2	12 00.5	43 78	62.2	12 51.9	43 77	60.4	13 42.5	42 76	58.5	13 55.0	42 75	58.1	14 19.9	41 74	57.1	2
3	10 20.8	44 79	63.7	10 34.1	44 79	63.2	10 47.3	44 78	62.8	11 13.7	44 78	61.8	12 05.9	43 76	60.0	12 57.4	43 75	58.2	13 10.2	42 74	57.7	13 35.5	42 74	56.8	3
4	9 33.4	45 79	63.3	9 46.9	45 78	62.8	10 00.3	45 78	62.4	10 27.1	44 77	61.5	11 20.1	44 76	59.6	12 12.5	43 74	57.8	12 25.5	43 74	57.3	12 51.3	43 73	56.4	4
95	8 46.2	46 78	62.9	8 59.8	46 78	62.4	9 13.5	45 78	62.0	9 40.6	45 77	61.1	10 34.5	45 76	59.3	11 27.8	44 74	57.4	11 41.0	44 74	57.0	12 07.3	44 73	56.0	95
6	7 59.1	46 78	62.5	8 13.0	46 78	62.0	8 26.8	46 78	61.6	8 54.3	46 77	60.7	9 49.1	45 76	58.9	10 43.2	45 74	57.0	10 56.6	45 74	56.6	11 23.4	44 73	55.7	6
7	7 12.2	47 78	62.0	7 26.3	47 78	61.6	7 40.3	47 77	61.2	8 08.2	47 76	60.3	9 03.8	46 75	58.5	9 58.8	46 74	56.7	10 12.5	46 73	56.2	10 39.7	45 72	55.3	7
8	6 25.5	48 78	61.6	6 39.8	47 77	61.2	6 54.0	47 77	60.7	7 22.3	47 76	59.9	8 18.7	47 75	58.1	9 14.7	46 73	56.3	9 28.6	46 73	55.8	9 56.3	46 72	54.9	8
9	5 39.0	48 77	61.2	5 53.4	48 77	60.8	6 07.8	48 76	60.3	6 36.6	48 76	59.4	7 33.9	48 74	57.7	8 30.7	47 73	55.9	8 44.9	47 73	55.4	9 13.0	47 72	54.5	9
100				5 07.3	49 77	60.3	5 21.9	49 76	59.9	5 51.1	49 76	59.0	6 49.2	48 74	57.3	7 47.0	48 72	55.5	8 01.3	48 72	55.0	8 30.0	48 72	54.2	100
1										5 05.8	49 75	58.6	6 04.8	49 74	56.8	7 03.4	49 72	55.1	7 18.0	49 72	54.6	7 47.1	48 71	53.8	1
2													5 20.5	50 74	56.4	6 20.1	49 72	54.7	6 34.9	49 72	54.2	7 04.5	49 71	53.4	2
3																5 37.0	50 72	54.3	5 52.0	50 71	53.8	6 22.1	50 70	53.0	3
4																			5 09.4	51 71	53.4	5 39.9	51 70	52.5	4
105																									105

Lat. 28°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	
00	82 00.0	1.0 04	00.0	81 00.0	1.0 04	00.0	79 30.0	1.0 03	00.0	78 00.0	1.0 03	00.0	76 00.0	1.0 02	00.0	75 30.0	1.0 02	00.0	75 00.0	1.0 02	00.0	73 00.0	1.0 02	00.0	00
1	81 57.3	99 13	05.8	80 57.6	1.0 12	05.1	79 28.0	1.0 10	04.3	77 58.3	1.0 08	03.7	75 58.6	1.0 07	03.1	75 28.6	1.0 07	02.9	74 58.7	1.0 06	02.8	72 58.9	1.0 06	02.4	1
2	81 49.4	98 22	11.5	80 50.6	98 19	10.1	79 22.1	99 16	08.5	77 53.2	99 14	07.3	75 54.3	99 12	06.1	75 24.6	99 11	05.9	74 54.8	99 11	05.6	72 55.5	99 09	04.8	2
3	81 36.4	96 29	16.9	80 39.2	96 26	14.9	79 12.4	97 22	12.6	77 44.8	98 19	10.9	75 47.3	98 16	09.1	75 17.8	98 16	08.7	74 48.3	98 15	08.4	72 50.0	99 13	07.2	3
4	81 18.8	91 36	21.9	80 23.5	93 33	19.5	78 59.0	95 28	16.6	77 33.2	96 24	14.4	75 37.6	97 21	12.1	75 08.5	97 20	11.6	74 39.3	97 19	11.1	72 42.3	98 16	09.6	4
05	80 57.0	87 42	26.6	80 03.9	89 38	23.8	78 42.2	92 33	20.4	77 18.6	94 29	17.7	75 25.2	95 25	14.9	74 56.6	96 24	14.3	74 27.9	96 23	13.8	72 32.4	97 20	11.9	05
6	80 31.4	83 48	30.9	79 40.9	86 44	27.8	78 22.2	89 38	23.9	77 01.1	91 34	20.9	75 10.4	93 29	17.7	74 42.3	94 28	17.0	74 14.2	94 27	16.3	72 20.5	95 23	14.1	6
7	80 02.7	78 52	34.8	79 14.7	82 48	31.4	77 59.3	86 43	27.3	76 40.9	88 38	23.9	74 53.1	91 32	20.3	74 25.7	92 31	19.6	73 58.1	92 30	18.8	72 06.6	94 26	16.3	7
8	79 31.2	74 56	38.2	78 45.7	78 52	34.8	77 33.7	82 46	30.4	76 18.2	85 42	26.8	74 33.6	89 36	22.9	74 06.9	89 35	22.0	73 40.0	90 34	21.2	71 50.8	92 29	18.4	8
9	78 57.2	69 60	41.3	78 14.3	74 56	37.8	77 05.8	79 50	33.2	75 53.3	82 45	29.4	74 12.0	86 39	25.3	73 46.0	87 38	24.4	73 19.8	88 37	23.5	71 33.2	90 32	20.5	9
10	78 21.3	65 63	44.1	77 40.9	70 59	40.5	76 35.7	75 53	35.9	75 26.2	79 48	31.9	73 48.4	84 42	27.6	73 23.2	84 41	26.6	72 57.8	85 40	25.7	71 13.8	88 35	22.4	10
1	77 43.6	61 65	46.6	77 05.6	66 62	43.0	76 03.8	71 56	38.3	74 57.3	76 51	34.3	73 23.0	81 45	29.7	72 58.6	82 44	28.7	72 33.9	83 42	27.8	70 52.8	86 38	24.3	1
2	77 04.4	57 67	48.8	76 28.7	62 64	45.2	75 30.1	68 58	40.5	74 26.6	73 54	36.4	72 55.9	78 48	31.8	72 32.3	79 46	30.7	72 08.5	80 45	29.7	70 30.2	84 40	26.1	2
3	76 24.0	54 69	50.7	75 50.4	58 66	47.3	74 55.0	65 61	42.6	73 54.4	70 56	38.4	72 27.3	75 50	33.7	72 04.5	76 49	32.6	71 41.5	77 47	31.6	70 06.2	81 42	27.9	3
4	75 42.5	50 71	52.5	75 10.9	55 68	49.1	74 18.5	61 63	44.4	73 20.8	67 58	40.3	71 57.2	72 52	35.5	71 35.3	74 51	34.4	71 13.0	75 50	33.3	69 40.7	79 44	29.5	4
15	75 00.0	47 72	54.0	74 30.4	52 69	50.7	73 40.8	58 64	46.1	72 45.9	64 60	42.0	71 25.8	70 54	37.2	71 04.7	71 53	36.0	70 43.3	72 52	35.0	69 14.0	76 46	31.1	15
6	74 16.8	44 73	55.4	73 49.0	49 70	52.2	73 02.1	55 66	47.7	72 09.9	61 62	43.6	70 53.2	67 56	38.7	70 33.0	68 55	37.6	70 12.3	70 54	36.5	68 46.1	74 48	32.6	6
7	73 32.9	41 74	56.6	73 06.7	46 71	53.5	72 22.5	52 67	49.1	71 32.9	58 63	45.0	70 19.6	64 58	40.2	70 00.1	66 56	39.1	69 40.2	67 55	38.0	68 17.0	72 50	34.0	7
8	72 48.3	38 75	57.7	72 23.8	43 72	54.7	71 42.1	49 69	50.4	70 55.0	55 65	46.4	69 44.9	62 59	41.6	69 26.2	63 58	40.4	69 07.1	64 57	39.4	67 46.9	69 52	35.3	8
9	72 03.3	36 76	58.7	71 40.3	41 73	55.8	71 00.9	47 70	51.6	70 16.2	52 66	47.6	69 09.3	59 61	42.8	68 51.4	60 60	41.7	68 33.1	62 58	40.6	67 15.8	67 53	36.6	9
20	71 17.8	34 76	59.6	70 56.2	38 74	56.8	70 19.1	44 70	52.6	69 36.7	50 67	48.8	68 32.9	56 62	44.0	68 15.7	58 61	42.9	67 58.2	59 60	41.8	66 43.8	64 55	37.7	20
1	70 31.9	31 77	60.4	70 11.7	36 75	57.6	69 36.8	42 72	53.6	68 56.6	47 68	49.8	67 55.7	54 63	45.1	67 39.3	55 62	44.0	67 22.4	57 61	42.9	66 11.0	62 56	38.9	1
2	69 45.6	29 78	61.2	69 26.8	34 76	58.4	68 53.9	40 72	54.5	68 15.8	45 69	50.8	67 17.8	52 64	46.2	67 02.1	53 63	45.1	66 46.0	54 62	44.0	65 37.3	60 57	39.9	2
3	68 59.1	27 78	61.8	68 41.4	31 76	59.2	68 10.5	37 73	55.3	67 34.5	43 70	51.7	66 39.3	49 65	47.1	66 24.3	51 64	46.0	66 08.9	52 63	45.0	65 03.0	58 58	40.9	3
4	68 12.2	25 78	62.4	67 55.8	29 76	59.8	67 26.7	35 74	56.1	66 52.7	40 70	52.5	66 00.2	47 66	48.0	65 45.9	48 65	46.9	65 31.1	50 64	45.9	64 27.9	55 59	41.9	4
25	67 25.2	24 79	62.9	67 09.9	27 77	60.4	66 42.6	33 74	56.8	66 10.4	38 71	53.3	65 20.6	45 67	48.8	65 06.9	46 66	47.8	64 52.8	48 65	46.7	63 52.3	53 60	42.7	25
6	66 37.9	22 79	63.4	66 23.7	26 77	61.0	65 58.1	31 75	57.4	65 27.8	36 72	54.0	64 40.4	43 68	49.6	64 27.4	44 66	48.6	64 14.0	46 66	47.5	63 16.1	51 61	43.6	6
7	65 50.4	20 79	63.8	65 37.2	24 78	61.4	65 13.3	29 75	58.0	64 44.8	34 72	54.6	63 59.9	40 68	50.3	63 47.5	42 67	49.3	63 34.7	43 66	48.3	62 39.3	49 62	44.3	7
8	65 02.8	19 80	64.2	64 50.6	22 78	61.9	64 28.3	27 76	58.5	64 01.4	32 73	55.2	63 18.9	38 69	51.0	63 07.2	40 68	50.0	62 55.0	41 67	48.9	62 02.0	47 63	45.1	8
9	64 15.1	17 80	64.5	64 03.8	21 78	62.3	63 43.0	26 76	59.0	63 17.8	30 73	55.7	62 37.6	37 70	51.6	62 26.4	38 68	50.6	62 14.8	39 68	49.6	61 24.3	45 64	45.7	9
30	63 27.2	16 80	64.8	63 16.8	19 78	62.6	62 57.5	24 76	59.4	62 33.9	29 74	56.2	61 55.9	35 70	52.2	61 45.3	36 69	51.2	61 34.3	37 68	50.2	60 46.2	43 64	46.4	30
1	62 39.2	14 80	65.1	62 29.7	17 79	63.0	62 11.8	22 76	59.8	61 49.7	27 74	56.7	61 13.9	33 70	52.7	61 03.9	34 70	51.7	60 53.4	36 69	50.7	60 07.6	41 65	47.0	1
2	61 51.1	13 80	65.3	61 42.4	16 79	63.2	61 26.0	21 77	60.1	61 05.3	25 74	57.1	60 31.6	31 71	53.2	60 22.2	32 70	52.2	60 12.3	34 69	51.3	59 28.7	39 66	47.5	2
3	61 02.9	11 80	65.5	60 55.1	15 79	63.5	60 40.0	19 77	60.5	60 20.8	24 75	57.5	59 49.1	29 71	53.6	59 40.2	31 70	52.7	59 30.8	32 70	51.7	58 49.4	37 66	48.1	3
4	60 14.6	10 80	65.7	60 07.6	13 79	63.7	59 53.8	18 77	60.8	59 36.0	22 75	57.8	59 06.4	27 72	54.0	58 57.9	29 71	53.1	58 49.1	30 70	52.2	58 09.9	35 66	48.6	4
35	59 26.3	09 81	65.9	59 20.1	12 79	63.9	59 07.5	16 77	61.0	58 51.1	20 75	58.2	58 23.4	26 72	54.4	58 15.4	27 71	53.5	58 07.1	28 70	52.6	57 30.0	33 67	49.0	35
6	58 37.9	08 81	66.0	58 32.5	11 80	64.1	58 21.1	15 78	61.2	58 06.0	19 75	58.4	57 40.2	24 72	54.8	57 32.8	25 72	53.9	57 24.9	27 71	53.0	56 49.9	32 67	49.4	6
7	57 49.5	07 81	66.1	57 44.8	09 80	64.2	57 34.6	13 78	61.5	57 20.8	17 76	58.7	56 56.8	23 72	55.1	56 49.9	24 72	54.2	56 42.6	25 71	53.3	56 09.5	30 68	49.8	7
8	57 01.1	05 81	66.2	56 57.1	08 80	64.4	56 48.0	12 78	61.6	56 35.5	16 76	58.9	56 13.3	21 73	55.4	56 06.8	22 72	54.5	56 00.0	23 71	53.6	55 28.9	28 68	50.2	8
9	56 12.6	04 81	66.3	56 09.3	07 80	64.5	56 01.4	11 78	61.8	55 50.0	14 76	59.1	55 29.6	19 73	55.6	55 23.6	21 72	54.8	55 17.2	22 72	53.9	54 48.1	27 68	50.5	9
40	55 24.1	03 81	66.3	55 21.4	06 80	64.6	55 14.7	09 78	61.9	55 04.5	13 76	59.3	54 45.8	18 73	55.9	54 40.3	19 72	55.0	54 34.4	20 72	54.2	54 07.1	25 69	50.8	40
1	54 35.6	02 81	66.4	54 33.6	04 80	64.6	54 27.9	08 78	62.1	54 18.9	12 76	59.5	54 01.9	17 73	56.1	53 56.8	18 73	55.3	53 51.3	19 72	54.4	53 26.0	23 69	51.1	1
2	53 47.0	01 81	66.4	53 45.7	03 80	64.7	53 41.1	07 78	62.2	53 33.2	10 76	59.6	53 17.9	15 74	56.3	53 13.2	16 73	55.5	53 08.2	17 72	54.7	52 44.6	22 69	51.4	2
3	52 58.5	00 81	66.4	52 57.8	02 80	64.7	52 54.2	06 78	62.2	52 47.5	09 76	59.8	52 33.8	14 74	56.5	52 29.5	15 73	55.7	52 24.9	16 72	54.9	52 03.2	20 69	51.6	3
4	52 09.9	01 81	66.4	52 09.9	01 80	64.7	52 07.3	05 78	62.3	52 01.7	08 76	59.9	51 49.6	12 74	56.6	51 45.7	13 73	55.8	51 41.5	14 72	55.0	51 21.6	19 70	51.9	4
45	51 21.4	02 81	66.4	51 22.0	00 80	64.8	51 20.4	03 78	62.4	51 15.9	07 76	60.0	51 05.3	11 74	56.8	51 01.8	12 73	56.0	50 58.1	13 73	55.2	50 39.8	17 70	52.1	45
6	50 32.9	03 81	66.3	50 34.1	01 80	64.8	50 33.5	02 78	62.4	50 30.0	05 76	60.0	50 20.9	10 74	56.9	50 17.9	11 73	56.1	50 14.5	12 73	55.3	49 58.0	16 70	52.3	6
7	49 44.4	04 81	66.3	49 46.1	02 80	64.7	49 46.5	01 78	62.4	49 44.1	04 76	60.1	49 36.5	08 74	57.0	49 33.9	09 74	56.2	49 30.9	10 73	55.5	49 16.0	14 70	52.4	7
8	48 55.9	05 81	66.2	48 58.2	03 80	64.7	48 59.5	00 78	62.4	48 58.1	03 76	60.1	48 52.1	07 74	57.1	48 49.8	08 74	56.3	48 47.2	09 73	55.6	48 34.0	13 70	52.6	8
9	48 07.4	06 81	66.2	48 10.4	04 80	64.7	48 12.6	01 78	62.4	48 12.2	02 77	60.2	48 07.6	06 74	57.2	48 05.7	07 74	56.4	48 03.5	08 73	55.7	47 51.9	12 70	52.7	9
50	47 19.0	07 81	66.1	47 22.5	05 80	64.6	47 25.6	02 78	62.4	47 26.2	01 77	60.2	47 23.0	05 74	57.2	47 21.5	05 74	56.5	47 19.7	06 73	55.8	47 09.7	10 70	52.8	50
1	46 30.6	08 81	66.0	46 34.6	06 80	64.5	46 38.7	03 78	62.4	46 40.3	00 77	60.2	46 38.5	03 74	57.3	46 37.3	04 74	56.5	46 35.9	05 73	55.8	46 27.5	09 70	52.9	1
2	45 42.2	09 80	65.9	45 46.8	07 80	64.5	45 51.8	04 78	62.3	45 54.3	01 77	60.2	45 53.9	02 74	57.3	45 53.1	03 74	56.6	45 52.1	04 73	55.9	45 45.2	07 70	53.0	2
3	44 53.8	10 80	65.8	44 59.0	08 80	64.4	45 04.9	05 78	62.3	45 08.4	03 77	60.1	45 09.3	01 74	57.3	45 08.9	02 74	56.6	45 08.2	03 73	55.9	45 02.9	06 71	53.1	3
4	44 05.5	10 80	65.7	44 11.3	09 80	64.3	44 18.0	06 78	62.2	44 22.4	04 76	60.1	44 24.7	00 74	57.3	44 24.7	01 74	56.6	44 24.4	01 73	55.9	44 20.5	06 71	53.1	4
55	43 17.3	11 80	65.6	43 23.6	10 79	64.2	43 31.1	07 78	62.1	43 36.5	05 76	60.1	43 40.2	01 74	57.3	43 40.4	01 74	56.6	43 40.5	00 73	55.9	43 38.2	04 71	53.2	55
6	42 29.1	12 80	65.4	42 35.9	11 79	64.1	42 44.3	08 78	62.1	42 50.6	06 76	60.0	42 55.6	03 74	57.3	42 56.2	02 74	56.6	42 56.6	01 73	55.9	42 55.7	02 71	53.2	6
7	41 40.9	13 80	65.3	41 48.3	11 79	64.0	41 57.5	09 78	62.0	42 04.7	07 76	59.9	42 11.0	04 74	57.3	42 12.0	03 74	56.6	42 12.7	02 73	55.9	42 13.3	01 71	53.2	7
8	40 52.8	14 80	65.2	41 00.7	12 79	63.8	41 10.8	10 78	61.9	41 18.9	08 76	59.9	41 26.5	05 74	57.2	41 27.8	04 74	56.5	41 28.9	03 73	55.9	41 30.9	00 71	53.2	8
9	40 04.8	15 80	65.0	40 13.2	13 79	63.7	40 24.1	11 78	61.8	40 33.1	09 76	59.8	40 41.9	06 74	57.2	40 43.6	05 74	56.5	40 45.0	04 73	55.8	40 48.5	01 71	53.2	9
60	39 16.8	16 80	64.8	39 25.7	14 79	63.6	39 37.5	12 78	61.6	39 47.3	10 76	59.7	39 57.4	07 74	57.1	39 59.4	06 74	56.4	40 01.2	06 73	55.8	40 06.1	03 71	53.2	60
1	38 28.9	16 80	64.7	38 38.3	15 79	63.4	38 50.9	13 78	61.5	39 01.6	11 76	59.6	39 13.0	08 74	57.0	39 15.3	07 74	56.4	39 17.4	07 73	55.7	39 23.6	04 71	53.2	1
2	37 41.0	17 80	64.5	37 50.9	16 79	63.3	38 04.4	14 78	61.4	38 15.9	12 76	59.5	38 28.6	09 74	56.9	38 31.2	08 74	56.3	38 33.6	08 73	55.7	38 41.3	06 71	53.1	2
3	36 53.2	18 80	64.3	37 03.7	17 79	63.1	37 17.9	15 77	61.2	37 30.3	13 76	59.4	37 44.2	10 74	56.9	37 47.1	10 73	56.2	37 49.9	09 73	55.6	37 58.9	08 70	53.1	3
4	36 05.5	19 79	64.1	36 16.5	18 78	62.9	36 31.5	16 77	61.1	36 44.8	14 76	59.2	36 59.8	11 74	56.8	37 03.1	11 73	56.1	37 06.2	10 73	55.5	37 16.6	07 70	53.0	4
65	35 17.9	20 79	63.9	35 29.3	18 78	62.7	35 45.1	17 77	60.9	35 59.3	15 76	59.1	36 15.6	12 74	56.6	36 19.2	12 73	56.0	36 22.6	11 73	55.4	36 34.3	08 70	52.9	65
6	34 30.3	20 79	63.7	34 42.3	19 78	62.6	34 58.9	18 77	60.8	35 13.9	16 76	59.0	35 31.3	13 74	56.5	35 35.3	13 73	55.9	35 39.0	12 72	55.3	35 52.0	10 70	52.9	6
7	33 42.9	21 79	63.5	33 55.3	20 78	62.4	34 12.7	18 77	60.6	34 28.5	17 76	58.8	34 47.2	14 74	56.4	34 51.4	14 73	55.8	34 55.5	13 72	55.2	35 00.8	11 70	52.8	7
8	32 55.5	22 79	63.3	33 08.4	21 78	62.2	33 26.6	19 77	60.4	33 43.2	18 75	58.6	34 03.1	15 73	56.3	34 07.6	15 73	55.7	34 12.0	14 72	55.1	34 27.7	12 70	52.7	8
9	32 08.2	23 79	63.1	32 21.6	22 78	62.0	32 40.6	20 77	60.2	32 58.0	19 75	58.5	33 19.1	16 73	56.1	33 23.9	16 73	55.5	33 28.6	15 72	54.9	33 45.6	13 70	52.6	9
70	31 21.0	24 78	62.9	31 34.9	23 78	61.8	31 54.6	21 76	60.0	32 12.9	20 75	58.3	32 35.1	17 73	56.0	32 40.3	17 73	55.4	32 45.3	16 72	54.8	33 03.5	14 70	52.4	70
1	30 33.9	24 78	62.7	30 48.3	24 78	61.5	31 08.8	22 76	59.8	31 27.9	21 75	58.1	31 51.3	18 73	55.8	31 56.7	18 72	55.2	32 02.0	17 72	54.7	32 21.6	15 70	52.3	1
2	29 46.9	25 78	62.4	30 01.7	24 77	61.3	30 23.0	23 76	59.6	30 43.0	21 75	57.9	31 07.5	19 73	55.7	31 13.2	19 72	55.1	31 18.8	18 72	54.5	31 39.7	16 70	52.2	2
3	28 59.9	26 78	62.2	29 15.3	25 77	61.1	29 37.3	24 76	59.4	29 58.1	22 75	57.7	30 23.8	20 73	55.5	30 29.8	20 72	54.9	30 35.7	19 72	54.3	30 57.9	17 70	52.1	3
4	28 13.1	27 78	62.0	28 29.0	26 77	60.9	28 51.8	25 76	59.2	29 13.4	23 74	57.5	29 40.2	21 72	55.3	29 46.5	21 72	54.7	29 52.7	20 72	54.2	30 16.1	19 69	51.9	4
75	27 26.4	28 78	61.7	27 42.8	27 77	60.6	28 06.3	26 76	59.0	28 28.7	24 74	57.3	28 56.7	22 72	55.1	29 03.3	22 72	54.6	29 09.8	21 71	54.0	29 34.5	20 69	51.8	75
6	26 39.8	28 78	61.4	26 56.7	28 77	60.4	27 21.0	26 75	58.8	27 44.2	25 74	57.1	28 13.3	23 72	54.9	28 20.2	23 72	54.4	28 27.0	22 71	53.8	28 52.9	21 69	51.6	6
7	25 53.4	29 77	61.2	26 10.7	28 76	60.1	26 35.8	27 75	58.5	26 59.7	26 74	56.9	27 30.0	24 72	54.7	27 37.2	24 72	54.2	27 44.3	23 71	53.6	28 11.5	22 69	51.4	7
8	25 07.0	30 77	60.9	25 24.8	29 76	59.9	25 50.6	28 75	58.3	26 15.4	27 74	56.7	26 46.8	25 72	54.5	26 54.3	25 71	54.0	27 01.7	24 71	53.4	27 30.1	23 69	51.2	8
9	24 20.8	31 77	60.7	24 39.0	30 76	59.6	25 05.6	29 75	58.0	25 31.2	28 74	56.4	26 03.7	26 72	54.3	26 11.5	26 71	53.8	26 19.2	25 71	53.2	26 48.8	24 68	51.1	9
80	23 34.6	32 77	60.4	23 53.4	31 76	59.3	24 20.8	30 75	57.8	24 47.1	29 73	56.2	25 20.7	27 71	54.1	25 28.9	27 71	53.5	25 36.9	26 70	53.0	26 07.7	25 68	50.9	80
1	22 48.7	32 76	60.1	23 07.9	32 76	59.1	23 36.0	31 74	57.5	24 03.2	30 73	56.0	24 37.9	28 71	53.9	24 46.3	28 71	53.3	24 54.6	27 70	52.8	25 26.7	26 68	50.7	1
2	22 02.8	33 76	59.8	22 22.5	33 75	58.8	22 51.4	32 74	57.2	23 19.3	31 73	55.7	23 55.2	29 71	53.6	24 03.9	29 70	53.1	24 12.5	28 70	52.6	24 45.7	27 68	50.5	2
3	21 17.1	34 76	59.5	21 37.3	33 75	58.5	22 06.9	32 74	57.0	22 35.6	31 73	55.4	23 12.6	30 71	53.4	23 21.6	30 70	52.9	23 30.5	29 70	52.3	24 05.0	28 68	50.2	3
4	20 31.5	35 76	59.2	20 52.2	34 75	58.2	21 22.5	33 74	56.7	21 52.1	32 72	55.2	22 30.2	31 70	53.1	22 39.4	31 70	52.6	22 48.6	30 70	52.1	23 24.3	29 68	50.0	4
85	19 46.1	36 76	58.9	20 07.2	35 75	57.9	20 38.3	34 73	56.4	21 08.7	33 72	54.9	21 47.8	32 70	52.9	21 57.4	32 70	52.4	22 06.9	31 69	51.9	22 43.8	30 67	49.8	85
6	19 00.8	36 75	58.6	19 22.4	36 74	57.6	19 54.3	35 73	56.1	20 25.4	34 72	54.6	21 05.7	33 70	52.6	21 15.5	33 70	52.1	21 25.3	32 69	51.6	22 03.4	31 67	49.6	6
7	18 15.6	37 75	58.3	18 37.7	37 74	57.3	19 10.4	36 73	55.8	19 42.3	35 72	54.3	20 23.7	34 70	52.4	20 33.8	34 69	51.8	20 43.8	33 69	51.3	21 23.1	32 67	49.3	7
8	17 30.6	38 75	58.0	17 53.2	37 74	57.0	18 26.6	37 73	55.5	18 59.3	36 71	54.1	19 41.8	35 70	52.1	19 52.2	35 69	51.6	20 02.5	34 69	51.1	20 43.0	33 67	49.1	8
9	16 45.8	39 74	57.6	17 08.9	38 74	56.7	17 43.0	38 72	55.2	18 16.5	37 71	53.8	19 00.1	36 69	51.8	19 10.8	36 69	51.3	19 21.4	35 68	50.8	20 03.1	34 66	48.8	9
90	16 01.1	40 74	57.3	16 24.7	39 73	56.4	16 59.6	38 72	54.9	17 33.8	38 71	53.5	18 18.5	37 69	51.5	18 29.5	36 68	51.0	18 40.4	36 68	50.5	19 23.3	35 66	48.6	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	36° 00′ Alt.	Δd	Δt	Az.	37° 00′ Alt.	Δd	Δt	Az.	38° 30′ Alt.	Δd	Δt	Az.	40° 00′ Alt.	Δd	Δt	Az.	42° 00′ Alt.	Δd	Δt	Az.	42° 30′ Alt.	Δd	Δt	Az.	43° 00′ Alt.	Δd	Δt	Az.	45° 00′ Alt.	Δd	Δt	Az.	H.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	
00	26 00.0	1.0	01	180.0	25 00.0	1.0	01	180.0	23 30.0	1.0	01	180.0	22 00.0	1.0	01	180.0	20 00.0	1.0	01	180.0	19 30.0	1.0	01	180.0	19 00.0	1.0	01	180.0	17 00.0	1.0	00	180.0	00
1	25 59.6	1.0	02	179.1	24 59.6	1.0	02	179.1	23 29.6	1.0	02	179.1	21 59.6	1.0	02	179.2	19 59.6	1.0	02	179.2	19 29.6	1.0	02	179.2	18 59.6	1.0	02	179.2	16 59.7	1.0	02	179.3	
2	25 58.3	1.0	04	178.2	24 58.4	1.0	03	178.2	23 28.4	1.0	03	178.3	21 58.5	1.0	03	178.3	19 58.5	1.0	03	178.4	19 28.6	1.0	03	178.4	18 58.6	1.0	03	178.5	16 58.6	1.0	03	178.5	2
3	25 56.3	1.0	05	177.3	24 56.3	1.0	05	177.4	23 26.5	1.0	05	177.4	21 56.6	1.0	04	177.5	19 56.7	1.0	04	177.6	19 26.7	1.0	04	177.7	18 56.8	1.0	04	177.7	16 56.9	1.0	04	177.8	3
4	25 53.3	1.0	06	176.4	24 53.5	1.0	06	176.5	23 23.7	1.0	06	176.6	21 53.9	1.0	06	176.7	19 54.2	1.0	06	176.8	19 24.2	1.0	05	176.9	18 54.3	1.0	05	176.9	16 54.5	1.0	05	177.0	4
05	25 49.6	1.0	08	175.5	24 49.8	1.0	08	175.6	23 20.1	1.0	07	175.7	21 50.5	1.0	07	175.9	19 50.9	1.0	07	176.1	19 21.0	1.0	07	176.1	18 51.1	1.0	06	176.1	16 51.5	1.0	06	176.3	05
6	25 45.0	99	09	174.6	24 45.4	99	09	174.7	23 15.8	99	08	174.9	21 46.3	1.0	08	175.1	19 46.9	1.0	08	175.3	19 17.0	1.0	08	175.3	18 47.1	1.0	08	175.4	16 47.7	1.0	07	175.6	6
7	25 39.7	99	10	173.7	24 40.1	99	10	173.9	23 10.7	99	10	174.0	21 41.3	99	10	174.2	19 42.1	99	09	174.5	19 12.3	99	09	174.5	18 42.5	99	09	174.6	16 43.3	99	08	174.8	7
8	25 33.5	99	12	172.8	24 34.0	99	12	173.0	23 04.8	99	11	173.2	21 35.6	99	11	173.4	19 36.7	99	10	173.7	19 06.9	99	10	173.8	18 37.2	99	10	173.8	16 38.2	99	10	174.1	8
9	25 26.4	99	13	171.9	24 27.1	99	13	172.1	22 58.2	99	12	172.4	21 29.2	99	12	172.6	19 30.5	99	12	172.9	19 00.8	99	11	173.0	18 31.1	99	11	173.1	16 32.4	99	11	173.4	9
10	25 18.6	99	14	171.1	24 19.5	99	14	171.2	22 50.7	99	14	171.5	21 22.0	99	13	171.8	19 23.6	99	13	172.1	18 54.0	99	12	172.2	18 24.4	99	12	172.3	16 26.0	99	12	172.6	10
1	25 10.0	98	16	170.2	24 11.0	98	15	170.4	22 42.5	98	15	170.7	21 14.0	98	14	171.0	19 16.0	98	14	171.4	18 46.5	98	14	171.5	18 17.0	98	14	171.5	16 18.8	98	13	171.9	1
2	25 00.5	98	17	169.3	24 01.8	98	17	169.5	22 33.6	98	16	169.9	21 05.4	98	16	170.2	19 07.7	98	15	170.6	18 38.3	98	15	170.7	18 08.8	98	15	170.8	16 11.1	98	14	171.2	2
3	24 50.3	98	18	168.4	23 51.8	98	18	168.7	22 23.9	98	18	169.0	20 56.0	98	17	169.4	18 58.7	98	16	169.8	18 29.3	98	16	169.9	18 00.0	98	16	170.0	16 02.6	98	15	170.5	3
4	24 39.3	97	20	167.6	23 41.0	97	19	167.8	22 13.4	97	19	168.2	20 45.8	97	18	168.6	18 49.0	97	17	169.1	18 19.7	97	17	169.2	17 50.5	97	17	169.3	15 53.5	98	16	169.8	4
15	24 27.5	97	21	166.7	23 29.4	97	20	167.0	22 02.2	97	20	167.4	20 35.0	97	19	167.8	18 38.5	97	18	168.3	18 09.4	97	18	168.4	17 40.3	97	18	168.5	15 43.8	97	17	169.0	15
6	24 14.9	96	22	165.8	23 17.1	96	22	166.1	21 50.3	97	21	166.6	20 23.4	97	20	167.0	18 27.5	97	20	167.5	17 58.5	97	20	167.7	17 29.4	97	19	167.8	15 33.4	97	18	168.3	6
7	24 01.6	96	24	165.0	23 04.0	96	23	165.3	21 37.6	96	22	165.8	20 11.1	96	22	166.2	18 15.7	96	21	166.8	17 46.8	96	20	166.9	17 17.9	96	20	167.1	15 22.3	96	20	167.6	7
8	23 47.5	96	25	164.1	22 50.2	96	24	164.5	21 24.2	96	24	164.9	19 58.1	96	23	165.4	18 03.2	96	22	166.0	17 34.5	96	22	166.2	17 05.7	96	22	166.3	15 10.7	96	20	166.9	8
9	23 32.6	95	26	163.3	22 35.6	95	26	163.6	21 10.1	95	25	164.1	19 44.4	95	24	164.6	17 50.1	95	23	165.3	17 21.5	95	23	165.4	16 52.9	95	22	165.6	14 58.4	95	22	166.2	9
20	23 17.1	94	27	162.5	22 20.4	95	27	162.8	20 55.2	96	26	163.3	19 30.0	95	25	163.9	17 36.3	95	24	164.5	17 07.8	95	24	164.7	16 39.4	95	24	164.9	14 45.4	95	23	165.5	20
1	23 00.7	94	28	161.6	22 04.4	94	28	162.0	20 39.7	94	27	162.6	19 15.0	94	26	163.1	17 21.8	94	25	163.8	16 53.5	94	25	164.0	16 25.2	94	25	164.1	14 31.9	95	24	164.8	1
2	22 43.7	93	30	160.8	21 47.6	93	29	161.2	20 23.5	94	28	161.8	18 59.2	94	27	162.3	17 06.7	94	26	163.1	16 38.6	94	26	163.2	16 10.4	94	26	163.4	14 17.7	94	25	164.1	2
3	22 25.9	93	31	160.0	21 30.2	93	30	160.4	20 06.6	93	29	161.0	18 42.8	93	28	161.6	16 51.0	93	27	162.3	16 23.0	93	27	162.5	15 55.0	93	27	162.7	14 02.9	93	26	163.5	3
4	22 07.5	92	32	159.2	21 12.1	92	31	159.6	19 49.0	92	30	160.2	18 25.7	93	30	160.8	16 34.6	93	28	161.6	16 06.8	93	28	161.8	15 38.9	93	28	162.0	13 47.5	93	27	162.8	4
25	21 48.3	92	33	158.4	20 53.3	92	32	158.8	19 30.7	92	32	159.5	18 08.0	92	31	160.1	16 17.6	92	29	160.9	15 49.9	92	29	161.1	15 22.3	92	29	161.3	13 31.5	92	28	162.1	25
6	21 28.4	91	34	157.6	20 33.8	91	34	158.0	19 11.8	91	33	158.7	17 49.7	91	32	159.3	15 59.9	92	30	160.2	15 32.4	92	30	160.4	15 05.0	92	30	160.6	13 14.9	92	29	161.4	6
7	21 07.9	90	35	156.8	20 13.7	90	35	157.3	18 52.2	91	34	157.9	17 30.6	91	33	158.6	15 41.7	91	32	159.5	15 14.4	91	31	159.7	14 47.1	91	31	159.9	12 57.8	91	30	160.8	7
8	20 46.7	90	36	156.0	19 52.9	90	36	156.5	18 32.0	90	35	157.2	17 11.0	90	34	157.9	15 22.8	90	32	158.8	14 55.7	90	32	159.0	14 28.6	90	32	159.2	12 40.0	91	30	160.1	8
9	20 24.9	89	38	155.3	19 31.5	89	37	155.7	18 11.2	89	36	156.5	16 50.8	89	35	157.2	15 03.3	90	33	158.1	14 36.4	90	33	158.3	14 09.5	90	33	158.6	12 21.7	90	32	159.5	9
30	20 02.4	88	38	154.5	19 09.4	88	38	155.0	17 49.7	89	37	155.7	16 29.9	89	36	156.5	14 43.3	89	34	157.4	14 16.6	89	34	157.6	13 49.8	89	34	157.9	12 02.9	89	32	158.8	30
1	19 39.3	88	40	153.7	18 46.7	88	39	154.2	17 27.6	88	38	155.0	16 08.4	88	37	155.8	14 22.6	88	35	156.7	13 56.1	88	35	157.0	13 29.6	88	35	157.2	11 43.4	89	33	158.2	1
2	19 15.5	87	41	153.0	18 23.3	87	40	153.5	17 05.0	87	39	154.3	15 46.4	87	38	155.1	14 01.4	88	36	156.1	13 35.1	88	36	156.3	13 08.8	88	36	156.5	11 23.5	88	34	157.5	2
3	18 51.1	86	42	152.3	17 59.4	86	41	152.8	16 41.7	86	40	153.6	15 23.8	87	39	154.4	13 39.6	87	37	155.4	13 13.5	87	37	155.6	12 47.4	87	36	155.9	11 02.9	87	35	156.9	3
4	18 26.2	85	43	151.5	17 34.9	86	42	152.1	16 17.8	86	41	152.9	15 00.5	86	40	153.7	13 17.3	86	38	154.7	12 51.4	86	38	155.0	12 25.5	86	38	155.2	10 41.9	86	36	156.3	4
35	18 00.6	85	44	150.8	17 09.8	85	43	151.4	15 53.4	85	42	152.2	14 36.8	85	40	153.0	12 54.4	85	39	154.1	12 28.7	86	39	154.3	12 03.1	86	38	154.6	10 20.3	86	37	155.7	35
6	17 34.5	84	44	150.1	16 44.1	84	44	150.6	15 28.4	84	43	151.5	14 12.4	84	42	152.3	12 30.9	85	40	153.4	12 05.5	85	40	153.7	11 40.1	85	39	154.0	9 58.2	85	38	155.0	6
7	17 07.8	83	46	149.4	16 17.9	83	45	149.9	15 02.8	84	44	150.8	13 47.6	84	42	151.7	12 07.0	84	41	152.8	11 41.8	84	40	153.1	11 16.6	84	40	153.3	9 35.6	84	38	154.4	7
8	16 40.5	82	46	148.7	15 51.0	83	46	149.3	14 36.7	83	44	150.1	13 22.1	83	43	151.0	11 42.5	83	42	152.1	11 17.5	83	41	152.4	10 52.5	83	41	152.7	9 12.5	83	39	153.8	8
9	16 12.7	82	47	148.0	15 23.7	82	46	148.6	14 10.0	82	45	149.5	12 56.2	82	44	150.4	11 17.5	82	42	151.5	10 52.7	82	42	151.8	10 28.0	83	42	152.1	8 48.9	83	40	153.2	9
40	15 44.3	81	48	147.3	14 55.8	81	47	147.9	13 42.9	81	46	148.8	12 29.7	81	45	149.7	10 51.9	82	43	150.9	10 27.5	82	43	151.2	10 02.9	82	42	151.5	8 24.8	82	41	152.6	40
1	15 15.4	80	49	146.6	14 27.4	80	48	147.2	13 15.2	80	47	148.2	12 02.8	81	46	149.1	10 25.9	81	44	150.3	10 01.7	81	44	150.6	9 37.4	81	43	150.9	8 00.2	81	42	152.1	1
2	14 46.0	79	50	146.0	13 58.5	79	49	146.6	12 47.0	80	48	147.5	11 35.3	80	47	148.4	9 59.4	80	45	149.7	9 35.4	80	44	150.0	9 11.4	80	44	150.3	7 35.1	80	42	151.5	2
3	14 16.1	78	51	145.3	13 29.1	79	50	145.9	12 18.3	79	49	146.9	11 07.3	79	47	147.8	9 32.4	79	46	149.1	9 08.7	79	45	149.4	8 44.9	79	45	149.7	7 09.6	79	43	150.9	3
4	13 45.7	78	52	144.6	12 59.1	78	51	145.3	11 49.1	78	50	146.3	10 38.9	78	48	147.2	9 05.0	78	46	148.5	8 41.5	78	46	148.8	8 17.9	78	46	149.1	6 43.6	79	44	150.4	4
45	13 14.8	77	52	144.0	12 28.7	77	52	144.7	11 19.4	77	50	145.6	10 10.0	77	49	146.6	8 37.0	78	47	147.9	8 13.8	78	47	148.2	7 50.5	78	46	148.5	6 17.2	78	45	149.8	45
6	12 43.5	76	53	143.4	11 57.9	76	52	144.0	10 49.3	76	51	145.0	9 40.6	76	50	146.0	8 08.7	77	48	147.3	7 45.6	77	48	147.6	7 22.6	77	47	148.0	5 50.3	77	46	149.3	6
7	12 11.6	75	54	142.7	11 26.5	75	53	143.4	10 18.7	75	52	144.4	9 10.7	76	50	145.4	7 39.8	76	49	146.7	7 17.1	76	48	147.1	6 54.3	76	48	147.4	5 23.0	76	46	148.7	7
8	11 39.3	74	54	142.1	10 54.7	74	54	142.8	9 47.7	75	52	143.8	8 40.4	75	51	144.8	7 10.6	75	50	146.2	6 48.1	75	49	146.5	6 25.5	75	49	146.8					8
9	11 06.6	73	55	141.5	10 22.5	74	54	142.2	9 16.2	74	53	143.2	8 09.7	74	52	144.3	6 40.9	74	50	145.6	6 18.6	74	50	146.0	5 56.3	74	49	146.3					9
50	10 33.4	73	56	140.9	9 49.8	73	55	141.6	8 44.3	73	54	142.7	7 38.6	73	53	143.7	6 10.7	73	51	145.1	5 48.7	73	50	145.4	5 26.7	73	50	145.8					50
1	9 59.8	72	57	140.3	9 16.7	72	56	141.0	8 11.9	72	54	142.1	7 07.0	72	53	143.1	5 40.2	72	52	144.5	5 18.5	72	51	144.9									1
2	9 25.8	71	57	139.7	8 43.2	71	56	140.5	7 39.2	71	55	141.5	6 35.0	71	54	142.6	5 09.2	72	52	144.0													2
3	8 51.3	70	58	139.2	8 08.2	70	57	139.9	7 06.0	70	56	141.0	6 02.6	71	55	142.0																	3
4	8 16.5	69	59	138.6	7 34.9	69	58	139.3	6 32.4	70	56	140.4	5 29.8	70	55	141.5																	4
55	7 41.2	68	59	138.0	7 00.2	68	58	138.8	5 58.5	69	57	139.9																					55
6	7 05.6	68	60	137.5	6 25.1	68	59	138.2	5 24.1	68	58	139.3																					6
7	6 29.6	67	61	136.9	5 49.6	67	60	137.7																									7
8	5 53.3	66	61	136.4	5 13.7	66	60	137.1																									8
9	5 16.6	66	62	135.9																													9

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′ Alt.	Δd	Δt	Az.	37° 00′ Alt.	Δd	Δt	Az.	38° 30′ Alt.	Δd	Δt	Az.	40° 00′ Alt.	Δd	Δt	Az.	42° 00′ Alt.	Δd	Δt	Az.	42° 30′ Alt.	Δd	Δt	Az.	43° 00′ Alt.	Δd	Δt	Az.	45° 00′ Alt.	Δd	Δt	Az.	H.A.
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	
91	15 16.6	40	74	57.0	15 40.7	40	73	56.0	16 16.3	39	72	54.6	16 51.4	39	70	53.2	17 37.1	38	69	51.2	17 48.4	37	68	50.7	17 59.6	37	68	50.3	18 43.7	36	66	48.3	91
2	14 32.3	41	74	56.6	14 56.8	41	73	55.7	15 33.2	40	72	54.3	16 09.0	40	70	52.8	16 55.9	39	68	50.9	17 07.5	38	68	50.4	17 19.0	38	68	50.0	18 04.2	37	66	48.0	2
3	13 48.1	42	73	56.3	14 13.1	42	72	55.4	14 50.3	41	71	54.0	15 26.9	40	70	52.5	16 14.9	40	68	50.6	16 26.7	39	68	50.1	16 38.5	39	67	49.7	17 24.9	38	65	47.7	3
4	13 04.1	43	73	55.9	13 29.6	42	72	55.0	14 07.5	42	71	53.6	14 45.0	41	70	52.2	15 34.0	41	68	50.3	15 46.1	40	67	49.8	15 58.2	40	67	49.4	16 45.8	39	65	47.5	4
95	12 29.3	43	73	55.6	12 46.3	43	72	54.7	13 25.0	43	71	53.3	14 03.2	42	69	51.9	14 53.3	41	68	50.0	15 05.7	41	67	49.5	15 18.1	41	66	49.1	16 06.8	40	64	47.2	95
6	11 36.7	44	72	55.2	12 03.2	44	72	54.3	12 42.6	44	70	52.9	13 21.6	43	69	51.5	14 12.9	42	67	49.7	14 25.5	42	67	49.2	14 38.2	42	66	48.7	15 28.1	41	64	46.9	6
7	10 53.3	45	72	54.9	11 20.3	45	71	53.9	12 00.5	44	70	52.6	12 40.2	44	69	51.2	13 32.6	43	67	49.4	13 45.5	43	66	48.9	13 58.4	43	66	48.4	14 49.5	42	64	46.6	7
8	10 10.1	46	72	54.5	10 37.6	46	71	53.6	11 18.5	45	70	52.2	11 59.0	45	68	50.8	12 52.5	44	66	49.0	13 05.7	44	66	48.6	13 18.9	44	66	48.1	14 11.2	43	64	46.2	8
9	9 27.1	47	71	54.1	9 55.0	46	70	53.2	10 36.7	46	69	51.9	11 18.1	46	68	50.5	12 12.6	45	66	48.7	12 26.1	45	66	48.2	12 39.6	45	65	47.8	13 33.0	44	63	45.9	9
100	8 44.3	48	71	53.7	9 12.7	47	70	52.8	9 55.2	47	69	51.5	10 37.3	47	68	50.1	11 32.9	46	66	48.3	11 46.7	46	65	47.9	12 00.5	46	65	47.4	12 55.1	45	63	45.6	100
1	8 01.7	48	71	53.3	8 30.6	48	70	52.4	9 13.8	48	68	51.1	9 56.7	48	67	49.8	10 53.4	47	65	48.0	11 07.5	47	65	47.5	11 21.6	47	64	47.1	12 17.3	46	62	45.3	1
2	7 19.3	49	70	52.9	7 48.7	49	69	52.0	8 32.7	49	68	50.7	9 16.4	48	67	49.4	10 14.2	48	65	47.6	10 28.6	48	65	47.2	10 42.9	48	64	46.7	11 39.8	47	62	44.9	2
3	6 37.1	50	70	52.5	7 07.1	50	69	51.6	7 51.8	50	68	50.3	8 36.3	49	66	49.0	9 35.2	49	65	47.3	9 49.8	49	64	46.8	10 04.4	49	64	46.4	11 02.5	48	62	44.6	3
4	5 55.2	51	70	52.1	6 25.6	51	69	51.2	7 11.1	50	67	49.9	7 56.4	50	66	48.6	8 56.4	50	64	46.9	9 11.3	50	64	46.4	9 26.2	50	63	46.0	10 25.4	49	61	44.2	4
105	5 13.5	52	69	51.7	5 44.4	52	68	50.8	6 30.7	51	67	49.5	7 16.8	51	66	48.2	8 17.8	51	64	46.5	8 33.0	51	63	46.1	8 48.2	51	63	45.6	9 48.6	50	61	43.9	105
6					5 03.5	52	68	50.4	5 50.5	52	66	49.1	6 37.4	52	65	47.8	7 39.5	52	63	46.1	7 55.0	52	63	45.7	8 10.5	51	62	45.3	9 12.0	51	61	43.5	6
7									5 10.6	53	66	48.7	5 58.2	53	65	47.4	7 01.5	53	63	45.7	7 17.2	52	62	45.3	7 33.0	52	62	44.9	8 35.6	52	60	43.1	7
8													5 19.3	54	64	47.0	6 23.7	54	63	45.3	6 39.7	53	62	44.9	6 55.7	53	62	44.5	7 59.5	53	60	42.8	8
9																	5 46.1	54	62	44.9	6 02.4	54	62	44.5	6 18.7	54	61	44.1	7 23.7	54	59	42.4	9
110																	5 08.8	55	62	44.5	5 25.4	55	61	44.1	5 42.0	55	61	43.7	6 48.1	55	59	42.0	110
1																									5 05.5	56	60	43.3	6 12.8	56	58	41.6	1
2																													5 37.7	57	58	41.2	2
3																													5 03.0	58	57	40.8	3

Lat. 28°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	72 00.0	1.0 02	00.0	71 00.0	1.0 02	00.0	69 30.0	1.0 02	00.0	68 30.0	1.0 01	00.0	67 30.0	1.0 01	00.0	66 30.0	1.0 01	00.0	65 30.0	1.0 01	00.0	64 00.0	1.0 01	00.0	00
1	71 59.0	1.0 05	02.2	70 59.0	1.0 05	02.1	69 29.1	1.0 04	01.9	68 29.2	1.0 04	01.8	67 29.2	1.0 04	01.7	66 29.3	1.0 04	01.6	65 29.3	1.0 03	01.5	63 59.4	1.0 03	01.3	1
2	71 55.9	1.0 09	04.5	70 56.1	1.0 08	04.2	69 26.5	1.0 07	03.8	68 26.7	1.0 07	03.5	67 26.9	1.0 06	03.3	66 27.1	1.0 06	03.1	65 27.3	1.0 06	02.9	63 57.5	1.0 05	02.7	2
3	71 50.7	99 12	06.7	70 51.3	99 11	06.2	69 22.2	99 10	05.6	68 22.6	99 09	05.3	67 23.1	99 09	05.0	66 23.5	99 08	04.7	65 23.9	99 08	04.4	63 54.4	99 07	04.0	3
4	71 43.5	98 15	08.9	70 44.6	98 14	08.3	69 16.1	98 13	07.5	68 17.0	99 12	07.0	67 17.8	99 12	06.6	66 18.5	99 11	06.2	65 19.2	99 10	05.8	63 50.1	99 09	05.3	4
05	71 34.3	97 18	11.0	70 36.0	97 17	10.3	69 08.3	98 16	09.3	68 09.7	98 15	08.8	67 10.9	98 14	08.2	66 12.1	98 13	07.7	65 13.1	98 12	07.3	63 44.6	98 11	06.6	05
6	71 23.2	96 22	13.2	70 25.7	96 20	12.3	68 58.9	97 18	11.1	68 00.8	97 17	10.4	67 02.6	97 16	09.8	66 04.3	97 15	09.2	65 05.8	98 14	08.7	63 37.9	98 13	08.0	6
7	71 10.2	94 25	15.2	70 13.5	95 23	14.2	68 47.9	95 21	12.9	67 50.5	96 20	12.1	66 52.9	96 19	11.4	65 55.1	96 18	10.7	64 57.1	97 16	10.1	63 29.9	97 15	09.2	7
8	70 55.5	93 28	17.2	69 59.7	93 26	16.1	68 35.3	94 24	14.6	67 38.6	95 22	13.7	66 41.7	95 21	12.9	65 44.6	95 20	12.2	64 47.2	96 18	11.5	63 20.8	96 17	10.5	8
9	70 38.9	91 30	19.1	69 44.1	92 28	17.9	68 21.1	93 26	16.3	67 25.3	93 24	15.3	66 29.2	94 23	14.4	65 32.8	94 22	13.6	64 36.1	95 21	12.8	63 10.6	95 19	11.8	9
10	70 20.7	89 33	21.0	69 27.0	90 31	19.7	68 05.5	91 28	18.0	67 10.6	92 27	16.9	66 15.3	92 25	15.9	65 19.7	93 24	15.0	64 23.7	93 22	14.2	62 59.3	94 21	13.0	10
1	70 01.0	87 36	22.8	69 08.4	88 34	21.4	67 48.5	90 31	19.6	66 54.5	90 29	18.4	66 00.1	91 27	17.4	65 05.3	92 26	16.4	64 10.2	92 24	15.5	62 46.8	93 22	14.2	1
2	69 39.7	85 38	24.6	68 48.3	86 36	23.1	67 30.1	88 33	21.1	66 37.1	89 31	19.9	65 43.7	89 29	18.8	64 49.8	90 28	17.7	63 55.5	91 26	16.7	62 33.3	92 24	15.4	2
3	69 17.0	83 40	26.2	68 26.9	84 38	24.7	67 10.4	86 35	22.6	66 18.5	87 33	21.3	65 26.1	88 31	20.1	64 33.1	89 30	19.0	63 39.7	89 28	18.0	62 18.7	90 26	16.5	3
4	68 52.9	81 42	27.8	68 04.1	82 40	26.2	66 49.4	84 37	24.0	65 58.6	85 35	22.7	65 07.3	86 33	21.5	64 15.3	87 32	20.3	63 22.8	88 30	19.2	62 03.2	89 28	17.7	4
15	68 27.6	78 44	29.3	67 40.1	80 42	27.7	66 27.2	82 39	25.4	65 37.6	83 37	24.0	64 47.3	84 35	22.7	63 56.4	85 33	21.5	63 04.9	86 32	20.4	61 46.6	88 29	18.8	15
6	68 01.0	76 46	30.8	67 14.9	78 44	29.1	66 03.9	80 41	26.8	65 15.5	81 39	25.3	64 26.3	83 37	24.0	63 36.4	84 35	22.7	62 45.9	85 33	21.5	61 29.1	86 31	19.8	6
7	67 33.4	74 48	32.1	66 48.6	76 46	30.4	65 39.5	78 42	28.0	64 52.3	79 40	26.6	64 04.3	81 38	25.2	63 15.5	82 36	23.9	62 26.0	83 35	22.6	61 10.6	84 32	20.9	7
8	67 04.7	71 50	33.4	66 21.3	73 47	31.7	65 14.1	76 44	29.3	64 28.1	77 42	27.8	63 41.3	79 40	26.3	62 53.6	80 38	25.0	62 05.2	81 36	23.7	60 51.3	83 34	21.9	8
9	66 35.0	69 51	34.7	65 53.0	71 49	32.9	64 47.8	74 46	30.4	64 03.0	75 43	28.9	63 17.3	77 41	27.4	62 30.8	78 40	26.0	61 43.4	79 38	24.7	60 31.1	81 35	22.9	9
20	66 04.4	67 52	35.9	65 23.7	69 50	34.1	64 20.5	72 47	31.6	63 37.0	73 45	30.0	62 52.5	75 43	28.5	62 07.1	76 41	27.1	61 20.9	78 39	25.7	60 10.1	79 36	23.8	20
1	65 33.0	64 54	37.0	64 53.6	67 52	35.2	63 52.3	70 48	32.6	63 10.1	71 46	31.0	62 26.8	73 44	29.5	61 42.5	74 42	28.1	60 57.5	76 40	26.7	59 48.3	78 38	24.8	1
2	65 00.7	62 55	38.0	64 22.7	64 53	36.2	63 23.4	67 50	33.7	62 42.3	69 47	32.0	62 00.3	71 46	30.5	61 17.2	73 44	29.0	60 33.3	74 42	27.6	59 25.8	76 39	25.7	2
3	64 27.7	60 56	39.0	63 51.0	62 54	37.2	62 53.6	65 51	34.6	62 13.9	67 49	33.0	61 33.0	69 47	31.4	60 51.1	71 45	30.0	60 08.3	72 43	28.5	59 02.5	74 40	26.5	3
4	63 54.0	58 57	40.0	63 18.7	60 55	38.1	62 23.2	63 52	35.6	61 44.6	65 50	33.9	61 05.0	67 48	32.3	60 24.3	69 46	30.8	59 42.7	70 44	29.4	58 38.5	72 41	27.3	4
25	63 19.7	56 58	40.8	62 45.6	58 56	39.0	61 52.0	61 53	36.4	61 14.8	63 51	34.8	60 36.3	65 49	33.2	59 56.8	67 47	31.7	59 16.3	68 45	30.2	58 13.8	71 42	28.2	25
6	62 44.7	53 59	41.7	62 12.0	56 57	39.9	61 20.3	59 54	37.3	60 44.2	61 52	35.6	60 07.0	63 50	34.0	59 28.7	65 48	32.5	58 49.3	66 46	31.0	57 48.5	69 43	28.9	6
7	62 09.2	51 60	42.5	61 37.7	54 58	40.7	60 47.9	57 55	38.1	60 13.1	59 53	36.4	59 37.0	61 51	34.8	58 59.9	63 49	33.3	58 21.7	65 47	31.8	57 22.6	67 44	29.7	7
8	61 33.2	49 61	43.2	61 02.9	52 59	41.4	60 14.9	55 56	38.8	59 41.3	57 54	37.2	59 06.5	59 52	35.6	58 30.5	61 50	34.0	57 53.5	63 48	32.5	56 56.1	65 45	30.4	8
9	60 56.7	47 62	43.9	60 27.6	50 60	42.1	59 41.5	53 57	39.5	59 09.1	55 55	37.9	58 35.4	57 53	36.3	58 00.6	59 51	34.7	57 24.7	61 49	33.2	56 29.0	63 46	31.1	9
30	60 19.8	45 62	44.6	59 51.9	48 60	42.8	59 07.5	51 57	40.2	58 36.3	53 56	38.6	58 03.8	55 54	37.0	57 30.2	57 52	35.4	56 55.5	59 50	33.9	56 01.4	61 47	31.7	30
1	59 42.4	43 63	45.2	59 15.7	46 61	43.4	58 33.1	49 58	40.9	58 03.0	51 56	39.2	57 31.7	53 54	37.6	56 59.3	55 52	36.0	56 25.7	57 50	34.5	55 33.3	59 48	32.4	1
2	59 04.6	41 64	45.8	58 39.1	44 62	44.0	57 58.2	47 59	41.5	57 29.3	49 57	39.8	56 59.2	51 55	38.2	56 27.8	53 53	36.7	55 55.4	55 51	35.2	55 04.7	58 48	33.0	2
3	58 26.5	39 64	46.3	58 02.1	42 62	44.6	57 22.9	45 59	42.0	56 55.2	47 58	40.4	56 26.2	49 56	38.8	55 56.0	51 54	37.2	55 24.7	53 52	35.7	54 35.6	56 49	33.5	3
4	57 48.0	38 65	46.8	57 24.8	40 63	45.1	56 47.3	43 60	42.6	56 20.7	45 58	40.9	55 52.8	47 56	39.4	55 23.7	49 54	37.8	54 53.5	51 53	36.3	54 06.2	54 50	34.1	4
35	57 09.3	36 65	47.3	56 47.1	38 63	45.6	56 11.3	41 61	43.1	55 45.8	44 59	41.5	55 19.0	46 57	39.9	54 51.1	48 55	38.3	54 22.0	49 53	36.8	53 36.2	52 50	34.6	35
6	56 30.2	34 66	47.7	56 09.1	36 64	46.0	55 34.9	40 61	43.6	55 10.5	42 59	41.9	54 44.9	44 58	40.4	54 18.0	46 56	38.8	53 50.0	48 54	37.3	53 06.0	50 51	35.1	6
7	55 50.9	32 66	48.1	55 30.8	35 64	46.5	54 58.3	38 62	44.0	54 34.9	40 60	42.4	54 10.4	42 58	40.8	53 44.6	44 56	39.3	53 17.7	46 54	37.8	52 35.3	48 52	35.6	7
8	55 11.3	31 66	48.5	54 52.3	33 65	46.9	54 21.3	36 62	44.4	53 59.1	38 60	42.8	53 35.6	40 58	41.3	53 10.9	42 57	39.8	52 45.1	44 55	38.3	52 04.3	47 52	36.1	8
9	54 31.5	29 67	48.9	54 13.5	31 65	47.2	53 44.1	34 62	44.8	53 22.9	36 61	43.3	53 00.5	38 59	41.7	52 36.9	40 57	40.2	52 12.1	42 55	38.7	51 32.9	45 53	36.5	9
40	53 51.5	27 67	49.2	53 34.5	29 65	47.6	53 06.6	33 63	45.2	52 46.5	35 61	43.6	52 25.1	37 59	42.1	52 02.5	39 58	40.6	51 38.9	40 56	39.1	51 01.3	43 53	36.9	40
1	53 11.3	26 67	49.5	52 55.3	28 66	47.9	52 28.9	31 63	45.5	52 09.8	33 62	44.0	51 49.5	35 60	42.5	51 28.0	37 58	41.0	51 05.3	39 56	39.5	50 29.3	41 54	37.3	1
2	52 30.9	24 68	49.8	52 15.9	26 66	48.2	51 51.0	29 64	45.9	51 32.9	31 62	44.3	51 13.6	33 60	42.8	50 53.1	35 58	41.3	50 31.5	37 57	39.8	49 57.0	40 54	37.7	2
3	51 50.4	22 68	50.1	51 36.3	24 66	48.5	51 12.9	28 64	46.2	50 55.8	30 62	44.6	50 37.5	31 61	43.1	50 18.0	33 59	41.7	49 57.4	35 57	40.2	49 24.5	38 55	38.0	3
4	51 09.7	21 68	50.3	50 56.5	23 66	48.8	50 34.6	26 64	46.5	50 18.4	28 62	44.9	50 01.1	30 61	43.4	49 42.7	32 59	42.0	49 23.1	34 58	40.5	48 51.8	36 55	38.4	4
45	50 28.8	19 68	50.5	50 16.6	21 67	49.0	49 56.1	24 64	46.7	49 40.9	26 63	45.2	49 24.6	28 61	43.7	49 07.1	30 60	42.3	48 48.6	32 58	40.8	48 18.8	34 55	38.7	45
6	49 47.9	18 68	50.7	49 36.6	20 67	49.2	49 17.4	23 64	47.0	49 03.2	25 63	45.5	48 47.9	26 62	44.0	48 31.4	28 60	42.5	48 13.9	30 58	41.1	47 45.6	33 56	39.0	6
7	49 06.8	16 69	50.9	48 56.4	18 67	49.4	48 38.7	21 65	47.2	48 25.4	23 63	45.7	48 11.0	25 62	44.2	47 55.5	27 60	42.8	47 39.0	29 58	41.4	47 12.1	31 56	39.3	7
8	48 25.7	15 69	51.1	48 16.1	17 67	49.6	47 59.7	20 65	47.4	47 47.4	21 64	45.9	47 34.0	23 62	44.5	47 19.4	25 60	43.0	47 03.9	27 59	41.6	46 38.5	29 56	39.5	8
9	47 44.4	13 69	51.2	47 35.8	15 68	49.8	47 20.7	18 65	47.6	47 09.3	20 64	46.1	46 56.8	22 62	44.7	46 43.2	23 61	43.3	46 28.6	25 59	41.8	46 04.7	28 57	39.8	9
50	47 03.1	12 69	51.4	46 55.3	14 68	49.9	46 41.5	17 65	47.7	46 31.0	18 64	46.3	46 19.5	20 62	44.9	46 06.8	22 61	43.5	45 53.2	24 59	42.1	45 30.8	26 57	40.0	50
1	46 21.7	11 69	51.5	46 14.7	12 68	50.0	46 02.3	15 66	47.9	45 52.7	17 64	46.5	45 42.0	19 62	45.1	45 30.3	20 61	43.7	45 17.6	22 60	42.3	44 56.6	25 57	40.2	1
2	45 40.2	09 69	51.6	45 34.1	11 68	50.1	45 23.0	14 66	48.0	45 14.2	15 64	46.6	45 04.5	17 63	45.2	44 53.7	19 61	43.8	44 41.9	20 60	42.4	44 22.4	23 57	40.4	2
3	44 58.7	08 69	51.7	44 53.4	10 68	50.2	44 43.5	12 66	48.1	44 35.7	14 64	46.8	44 26.8	16 63	45.4	44 17.0	17 62	44.0	44 06.1	19 60	42.6	43 48.0	21 58	40.6	3
4	44 17.1	07 69	51.7	44 12.6	08 68	50.3	44 04.0	11 66	48.3	43 57.1	12 64	46.9	43 49.1	14 63	45.5	43 40.1	16 62	44.1	43 30.2	17 60	42.8	43 13.5	20 58	40.7	4
55	43 35.5	05 69	51.8	43 31.8	07 68	50.4	43 24.5	09 66	48.3	43 18.4	11 65	47.0	43 11.3	13 63	45.6	43 03.2	14 62	44.3	42 54.2	16 60	42.9	42 38.9	18 58	40.9	55
6	42 53.8	04 69	51.8	42 51.0	06 68	50.5	42 44.9	08 66	48.4	42 39.6	10 65	47.1	42 33.4	11 63	45.7	42 26.2	13 62	44.4	42 18.1	14 60	43.0	42 04.1	17 58	41.0	6
7	42 12.2	03 70	51.9	42 10.1	04 68	50.5	42 05.2	07 66	48.5	42 00.8	08 65	47.1	41 55.4	10 63	45.8	41 49.1	11 62	44.5	41 41.9	13 60	43.1	41 29.3	15 58	41.2	7
8	41 30.5	01 70	51.9	41 29.2	03 68	50.5	41 25.5	05 66	48.5	41 21.9	07 65	47.2	41 17.4	08 64	45.9	41 12.0	10 62	44.6	41 05.6	11 60	43.2	40 54.4	14 58	41.3	8
9	40 48.8	00 70	51.9	40 48.3	02 68	50.6	40 45.8	04 66	48.6	40 43.0	05 65	47.3	40 39.3	07 64	45.9	40 34.8	08 62	44.6	40 29.3	10 61	43.3	40 19.4	12 58	41.4	9
60	40 07.2	01 70	51.9	40 07.4	00 68	50.6	40 06.1	03 66	48.6	40 04.1	04 65	47.3	40 01.3	05 64	46.0	39 57.5	07 62	44.7	39 52.9	08 61	43.4	39 44.4	11 58	41.5	60
1	39 25.5	02 70	51.9	39 26.5	01 68	50.6	39 26.3	02 66	48.6	39 25.2	03 65	47.3	39 23.1	04 64	46.0	39 20.2	06 62	44.7	39 16.5	07 61	43.5	39 09.3	09 59	41.5	1
2	38 43.8	04 70	51.8	38 45.6	02 68	50.6	38 46.6	00 66	48.6	38 46.2	01 65	47.3	38 45.0	03 64	46.1	38 42.9	04 62	44.8	38 40.1	06 61	43.5	38 34.1	08 59	41.6	2
3	38 02.2	05 69	51.8	38 04.7	03 68	50.5	38 06.8	01 66	48.6	38 07.2	00 65	47.4	38 06.8	01 64	46.1	38 05.6	03 62	44.8	38 03.6	04 61	43.5	37 59.0	06 59	41.6	3
4	37 20.6	06 69	51.8	37 23.8	05 68	50.5	37 27.1	03 66	48.6	37 28.3	01 65	47.3	37 28.7	00 64	46.1	37 28.3	01 62	44.8	37 27.1	03 61	43.6	37 23.7	05 59	41.7	4
65	36 39.0	07 69	51.7	36 42.9	06 68	50.4	36 47.3	04 66	48.6	36 49.3	03 65	47.3	36 50.5	01 64	46.1	36 50.9	00 62	44.8	36 50.5	01 61	43.6	36 48.5	03 59	41.7	65
6	35 57.4	08 69	51.6	36 02.1	07 68	50.4	36 07.6	05 66	48.5	36 10.4	04 65	47.3	36 12.4	03 64	46.1	36 13.6	01 62	44.8	36 14.0	00 61	43.6	36 13.3	02 59	41.7	6
7	35 15.9	10 69	51.6	35 21.3	08 68	50.3	35 27.9	06 66	48.5	35 31.4	05 65	47.3	35 34.2	04 64	46.0	35 36.2	03 62	44.8	35 37.5	01 61	43.6	35 38.0	00 59	41.7	7
8	34 34.5	11 69	51.5	34 40.5	10 68	50.3	34 48.3	08 66	48.4	34 52.5	07 65	47.2	34 56.1	05 64	46.0	34 58.9	04 62	44.8	35 01.0	03 61	43.6	35 02.7	01 59	41.7	8
9	33 53.0	12 69	51.4	33 59.8	11 68	50.2	34 08.7	09 66	48.4	34 13.7	08 65	47.2	34 18.0	07 64	46.0	34 21.6	05 62	44.8	34 24.5	04 61	43.5	34 27.5	02 59	41.7	9
70	33 11.7	13 69	51.3	33 19.2	12 68	50.1	33 29.1	10 66	48.3	33 34.9	09 65	47.1	33 39.9	08 63	45.9	33 44.3	07 62	44.7	33 48.0	06 61	43.5	33 52.2	04 59	41.7	70
1	32 30.4	14 69	51.2	32 38.6	13 68	50.0	32 49.6	11 66	48.2	32 56.1	10 65	47.0	33 01.9	09 63	45.8	33 07.1	08 62	44.6	33 11.5	07 61	43.5	33 17.0	05 59	41.7	1
2	31 49.2	15 68	51.0	31 58.0	14 68	49.9	32 10.1	12 66	48.1	32 17.3	12 64	46.9	32 23.9	10 63	45.8	32 29.8	09 62	44.6	32 35.1	08 61	43.4	32 41.8	07 59	41.6	2
3	31 08.0	16 68	50.9	31 17.5	15 67	49.7	31 30.7	14 66	48.0	31 38.7	13 64	46.8	31 46.0	12 63	45.7	31 52.7	11 62	44.5	31 58.7	10 60	43.3	32 06.6	08 58	41.6	3
4	30 26.9	18 68	50.8	30 37.2	17 67	49.6	30 51.3	15 65	47.9	31 00.0	14 64	46.7	31 08.1	13 63	45.6	31 15.6	12 62	44.4	31 22.4	11 60	43.3	31 31.5	09 58	41.5	4
75	29 45.9	19 68	50.6	29 56.8	18 67	49.5	30 12.1	16 65	47.8	30 21.5	15 64	46.6	30 30.3	14 63	45.5	30 38.5	13 62	44.3	30 46.1	12 60	43.2	30 56.4	11 58	41.4	75
6	29 05.0	20 68	50.5	29 16.6	19 67	49.3	29 32.9	17 65	47.7	29 43.0	16 64	46.5	29 52.6	15 63	45.4	30 01.5	14 62	44.2	30 09.9	13 60	43.1	30 21.3	12 58	41.4	6
7	28 24.2	21 68	50.3	28 36.5	20 67	49.2	28 53.8	19 65	47.5	29 04.6	18 64	46.4	29 14.9	17 63	45.3	29 24.6	16 61	44.1	29 33.7	15 60	43.0	29 46.3	13 58	41.3	7
8	27 43.5	22 68	50.1	27 56.4	21 67	49.0	28 14.7	20 65	47.4	28 26.3	19 64	46.3	28 37.3	18 62	45.1	28 47.8	17 61	44.0	28 57.6	16 60	42.9	29 11.4	15 58	41.2	8
9	27 02.9	23 68	50.0	27 16.5	22 66	48.9	27 35.8	21 65	47.2	27 48.1	20 64	46.1	27 59.8	19 62	45.0	28 11.0	18 61	43.9	28 21.6	17 60	42.8	28 36.6	16 58	41.1	9
80	26 22.4	24 67	49.8	26 36.6	23 66	48.7	26 57.0	22 64	47.1	27 09.9	21 63	46.0	27 22.4	20 62	44.9	27 34.3	19 61	43.8	27 45.7	19 60	42.7	28 01.8	17 58	41.0	80
1	25 42.0	25 67	49.6	25 56.9	24 66	48.5	26 18.3	23 64	46.9	26 31.9	22 63	45.8	26 45.1	22 62	44.7	26 57.7	21 61	43.6	27 09.8	20 60	42.5	27 27.1	19 58	40.9	1
2	25 01.7	26 67	49.4	25 17.2	25 66	48.3	25 39.6	24 64	46.7	25 54.0	24 63	45.6	26 07.8	23 62	44.6	26 21.2	22 61	43.5	26 34.1	21 60	42.4	26 52.5	20 58	40.7	2
3	24 21.6	27 67	49.2	24 37.7	27 66	48.1	25 01.1	25 64	46.5	25 16.2	25 63	45.5	25 30.7	24 62	44.4	25 44.8	23 60	43.3	25 58.4	22 59	42.2	26 18.0	21 57	40.6	3
4	23 41.5	28 66	49.0	23 58.3	28 66	47.9	24 22.7	27 64	46.3	24 38.5	26 63	45.3	24 53.7	25 62	44.2	25 08.5	24 60	43.1	25 22.9	24 59	42.1	25 43.5	22 57	40.5	4
85	23 01.6	29 66	48.8	23 19.1	29 65	47.7	23 44.5	28 64	46.1	24 00.9	27 62	45.1	24 16.8	26 61	44.0	24 32.4	26 60	43.0	24 47.4	25 59	41.9	25 09.2	24 57	40.3	85
6	22 21.9	31 66	48.5	22 39.9	30 65	47.5	23 06.3	29 63	45.9	23 23.4	28 62	44.9	23 40.1	27 61	43.9	23 56.3	27 60	42.8	24 12.1	26 59	41.7	24 35.0	25 57	40.2	6
7	21 42.2	32 66	48.3	22 01.0	31 65	47.3	22 28.3	30 63	45.7	22 46.1	29 62	44.7	23 03.4	28 61	43.7	23 20.4	28 60	42.6	23 36.9	27 58	41.6	24 00.9	26 57	40.0	7
8	21 02.8	33 66	48.1	21 22.1	32 64	47.0	21 50.5	31 63	45.5	22 08.9	30 62	44.5	22 26.9	30 60	43.5	22 44.6	29 60	42.4	23 01.8	28 58	41.4	23 26.9	27 56	39.8	8
9	20 23.4	34 65	47.8	20 43.4	33 64	46.8	21 12.7	32 62	45.3	21 31.8	32 62	44.3	21 50.6	31 60	43.2	22 08.9	30 59	42.2	22 26.9	30 58	41.2	22 53.0	29 56	39.6	9
90	19 44.2	35 65	47.6	20 04.9	34 64	46.6	20 35.2	33 62	45.1	20 54.9	33 61	44.0	21 14.3	32 60	43.0	21 33.4	31 59	42.0	21 52.0	31 58	41.0	22 19.3	30 56	39.4	90

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	16 00.0	1.0 00	180.0	15 00.0	1.0 00	180.0	13 30.0	1.0 00	180.0	12 30.0	1.0 00	180.0	11 30.0	1.0 00	180.0	10 30.0	1.0 00	180.0	9 30.0	1.0 00	180.0	8 00.0	1.0 00	180.0	00
1	15 59.7	1.0 02	179.3	14 59.7	1.0 02	179.3	13 29.7	1.0 02	179.3	12 29.7	1.0 02	179.3	11 29.7	1.0 02	179.4	10 29.7	1.0 02	179.4	9 29.7	1.0 01	179.4	7 59.7	1.0 01	179.4	1
2	15 58.7	1.0 03	178.6	14 58.7	1.0 03	178.6	13 28.8	1.0 03	178.6	12 28.8	1.0 03	178.7	11 28.8	1.0 02	178.7	10 28.8	1.0 02	178.7	9 28.9	1.0 02	178.8	7 58.9	1.0 02	178.8	2
3	15 57.0	1.0 04	177.8	14 57.1	1.0 04	177.9	13 27.2	1.0 04	178.0	12 27.2	1.0 04	178.0	11 27.3	1.0 04	178.1	10 27.4	1.0 04	178.1	9 27.4	1.0 03	178.1	7 57.5	1.0 03	178.2	3
4	15 54.7	1.0 05	177.1	14 54.8	1.0 05	177.2	13 25.0	1.0 05	177.3	12 25.1	1.0 05	177.3	11 25.2	1.0 04	177.4	10 25.3	1.0 04	177.5	9 25.4	1.0 04	177.5	7 55.6	1.0 04	177.6	4
05	15 51.7	1.0 06	176.4	14 51.8	1.0 06	176.5	13 22.1	1.0 06	176.6	12 22.3	1.0 06	176.7	11 22.5	1.0 06	176.8	10 22.7	1.0 05	176.8	9 22.9	1.0 05	176.9	7 53.1	1.0 05	177.0	05
6	15 48.0	1.0 07	175.7	14 48.3	1.0 07	175.8	13 18.7	1.0 07	175.9	12 18.9	1.0 06	176.0	11 19.2	1.0 06	176.1	10 19.5	1.0 06	176.2	9 19.7	1.0 06	176.3	7 50.1	1.0 06	176.4	6
7	15 43.7	99 08	175.0	14 44.0	99 08	175.1	13 14.6	99 08	175.2	12 15.0	99 08	175.4	11 15.3	99 08	175.5	10 15.7	99 07	175.6	9 16.0	99 07	175.7	7 46.6	99 07	175.9	7
8	15 38.7	99 10	174.2	14 39.2	99 09	174.4	13 09.9	99 09	174.6	12 10.4	99 09	174.7	11 10.8	99 08	174.8	10 11.3	99 08	175.0	9 11.8	99 08	175.1	7 42.5	99 08	175.3	8
9	15 33.0	99 10	173.5	14 33.6	99 10	173.7	13 04.6	99 10	173.9	12 05.2	99 10	174.0	11 05.8	99 10	174.2	10 06.4	99 09	174.3	9 06.9	99 09	174.5	7 37.8	99 09	174.7	9
10	15 26.7	99 12	172.8	14 27.5	99 11	173.0	12 58.6	99 11	173.2	11 59.4	99 11	173.4	11 00.1	99 10	173.5	10 00.8	99 10	173.7	9 01.6	99 10	173.9	7 32.6	99 10	174.1	10
1	15 19.8	98 13	172.1	14 20.7	98 12	172.3	12 52.0	98 12	172.5	11 52.9	98 12	172.7	10 53.8	99 11	172.9	9 54.7	99 11	173.1	8 55.6	99 11	173.2	7 26.9	99 10	173.5	1
2	15 12.2	98 14	171.4	14 13.3	98 14	171.6	12 44.9	98 13	171.9	11 45.9	98 13	172.1	10 47.0	98 12	172.3	9 48.1	98 12	172.5	8 49.1	98 12	172.6	7 20.7	98 11	172.9	2
3	15 03.9	98 15	170.7	14 05.2	98 14	170.9	12 37.1	98 14	171.2	11 38.3	98 14	171.4	10 39.6	98 13	171.6	9 40.8	98 13	171.8	8 42.0	98 13	172.0	7 13.9	98 12	172.3	3
4	14 55.0	98 16	170.0	13 56.5	98 16	170.2	12 28.7	98 15	170.6	11 30.1	98 15	170.8	10 31.6	98 14	171.0	9 33.0	98 14	171.2	8 34.4	98 14	171.4	7 06.5	98 13	171.8	4
15	14 45.5	97 17	169.3	13 47.2	97 16	169.5	12 19.7	97 16	169.9	11 21.3	97 16	170.1	10 23.0	97 15	170.4	9 24.6	97 15	170.6	8 26.3	97 15	170.8	6 58.7	97 14	171.2	15
6	14 35.3	97 18	168.6	13 37.2	97 18	168.8	12 10.1	97 17	169.2	11 12.0	97 17	169.5	10 13.8	97 16	169.7	9 15.7	97 16	170.0	8 17.5	97 15	170.2	6 50.3	97 15	170.6	6
7	14 24.5	96 19	167.9	13 26.7	96 19	168.2	11 59.9	96 18	168.6	11 02.0	96 18	168.8	10 04.1	97 17	169.1	9 06.2	97 17	169.4	8 08.3	97 16	169.6	6 41.4	97 16	170.0	7
8	14 13.1	96 20	167.2	13 15.5	96 20	167.5	11 49.1	96 19	167.9	10 51.5	96 18	168.2	9 53.8	96 18	168.5	8 56.2	96 18	168.8	7 58.5	96 17	169.0	6 32.0	96 17	169.5	8
9	14 01.1	96 21	166.5	13 03.7	96 21	166.8	11 37.7	96 20	167.3	10 40.4	96 20	167.6	9 43.0	96 19	167.9	8 45.6	96 19	168.2	7 48.2	96 18	168.5	6 22.0	96 18	168.9	9
20	13 48.4	95 22	165.8	12 51.4	95 22	166.2	11 25.8	95 21	166.6	10 28.7	95 20	166.9	9 31.6	95 20	167.3	8 34.4	95 19	167.6	7 37.3	95 19	167.9	6 11.6	95 18	168.3	20
1	13 35.1	95 23	165.2	12 38.4	95 23	165.5	11 13.2	95 22	166.0	10 16.4	95 21	166.3	9 19.6	95 21	166.6	8 22.8	95 20	167.0	7 25.9	95 20	167.3	6 00.6	95 19	167.8	1
2	13 21.3	94 24	164.5	12 24.8	94 24	164.8	11 00.1	94 23	165.4	10 03.6	94 22	165.7	9 07.1	94 22	166.0	8 10.6	94 21	166.4	7 14.0	94 21	166.7	5 49.1	94 20	167.2	2
3	13 06.8	94 25	163.8	12 10.7	94 24	164.2	10 46.4	94 24	164.7	9 50.3	94 23	165.1	8 54.0	94 23	165.4	7 57.8	94 22	165.8	7 01.6	94 22	166.1	5 37.2	94 21	166.7	3
4	12 51.7	93 26	163.2	11 55.9	93 26	163.5	10 32.2	93 25	164.1	9 36.3	93 24	164.5	8 40.4	93 24	164.8	7 44.5	93 23	165.2	6 48.6	93 22	165.6	5 24.7	93 22	166.1	4
25	12 36.1	92 27	162.5	11 40.6	92 26	162.9	10 17.4	93 26	163.5	9 21.9	93 25	163.8	8 26.3	93 24	164.2	7 30.7	93 24	164.6	6 35.1	93 23	165.0	5 11.7	93 23	165.6	25
6	12 19.9	92 28	161.8	11 24.8	92 27	162.2	10 02.0	92 26	162.8	9 06.9	92 26	163.2	8 11.7	92 25	163.6	7 16.4	92 25	164.0	6 21.2	92 24	164.4				6
7	12 03.1	91 29	161.2	11 08.3	91 28	161.6	9 46.1	91 27	162.2	8 51.3	91 27	162.6	7 56.5	91 26	163.0	7 01.6	91 26	163.5	6 06.7	92 25	163.9				7
8	11 45.7	91 30	160.5	10 51.3	91 29	161.0	9 29.7	91 28	161.6	8 35.2	91 28	162.0	7 40.8	91 27	162.5	6 46.2	91 26	162.9	5 51.7	91 26	163.3				8
9	11 27.8	90 31	159.9	10 33.8	90 30	160.3	9 12.7	90 29	161.0	8 18.6	90 28	161.4	7 24.5	90 28	161.9	6 30.4	90 27	162.3	5 36.2	90 26	162.7				9
30	11 09.3	89 32	159.3	10 15.7	89 31	159.7	8 55.2	89 30	160.4	8 01.5	90 29	160.9	7 07.8	90 29	161.3	6 14.1	90 28	161.8	5 20.3	90 27	162.2				30
1	10 50.3	89 33	158.6	9 57.1	89 32	159.1	8 37.2	89 31	159.8	7 43.9	89 30	160.3	6 50.6	89 30	160.7	5 57.2	89 29	161.2	5 03.9	89 28	161.7				1
2	10 30.7	88 34	158.0	9 37.9	88 33	158.5	8 18.7	88 32	159.2	7 25.8	88 31	159.7	6 32.9	88 30	160.2	5 39.9	88 30	160.6							2
3	10 10.6	87 34	157.4	9 18.2	87 34	157.9	7 59.6	87 33	158.6	7 07.1	87 32	159.1	6 14.6	88 31	159.6	5 22.1	88 30	160.1							3
4	9 50.0	87 35	156.8	8 58.0	87 34	157.3	7 40.0	87 33	158.0	6 48.0	87 33	158.5	5 55.9	87 32	159.0	5 03.8	87 31	159.5							4
35	9 28.8	86 36	156.2	8 37.3	86 35	156.7	7 20.0	86 34	157.5	6 28.4	86 34	158.0	5 36.7	86 33	158.5										35
6	9 07.2	85 37	155.6	8 16.1	85 36	156.1	6 59.4	85 35	156.9	6 08.3	85 34	157.4	5 17.1	85 34	157.9										6
7	8 45.0	84 38	155.0	7 54.4	84 37	155.5	6 38.4	84 36	156.3	5 47.7	85 35	156.9													7
8	8 22.4	84 38	154.4	7 32.2	84 38	154.9	6 16.9	84 37	155.8	5 26.7	84 36	156.3													8
9	7 59.2	83 39	153.8	7 09.5	83 39	154.4	5 54.9	83 37	155.2	5 05.2	83 36	155.8													9
40	7 35.6	82 40	153.2	6 46.4	82 39	153.8	5 32.5	82 38	154.7																40
1	7 11.5	81 41	152.7	6 22.8	81 40	153.2	5 09.6	81 39	154.1																1
2	6 46.9	80 42	152.1	5 58.7	80 41	152.7																			2
3	6 21.9	80 42	151.5	5 34.2	80 42	152.1																			3
4	5 56.4	79 43	151.0	5 09.2	79 42	151.6																			4
45	5 30.5	78 44	150.4																						45
6	5 04.1	77 45	149.9																						6

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	19 05.2	36 65	47.3	19 26.5	35 64	46.3	19 57.7	34 62	44.8	20 18.2	34 61	43.8	20 38.2	33 60	42.8	20 58.0	33 59	41.8	21 17.4	32 58	40.8	21 45.7	31 56	39.3	91
2	18 26.4	37 64	47.0	18 48.2	36 64	46.1	19 20.5	35 62	44.6	19 41.6	35 61	43.6	20 02.3	34 60	42.6	20 22.7	34 58	41.6	20 42.8	33 57	40.6	21 12.3	32 56	39.1	2
3	17 47.7	38 64	46.8	18 10.2	37 63	45.8	18 43.4	37 62	44.3	19 05.1	36 60	43.3	19 26.6	35 59	42.3	19 47.7	35 58	41.4	20 08.4	34 57	40.4	20 39.0	34 55	38.8	3
4	17 09.2	39 64	46.5	17 32.3	38 63	45.5	18 06.5	38 61	44.1	18 28.9	37 60	43.1	18 51.0	37 59	42.1	19 12.7	36 58	41.1	19 34.2	36 57	40.1	20 05.8	35 55	38.6	4
95	16 30.9	40 64	46.2	16 54.6	39 62	45.2	17 29.7	39 61	43.8	17 52.8	38 60	42.8	18 15.5	38 59	41.9	18 38.0	37 58	40.9	19 00.2	37 56	39.9	19 32.8	36 55	38.4	95
6	15 52.7	41 63	45.9	16 17.1	40 62	45.0	16 53.1	40 61	43.5	17 16.8	39 60	42.6	17 40.3	39 58	41.6	18 03.4	38 57	40.6	18 26.3	38 56	39.7	19 00.0	37 54	38.2	6
7	15 14.8	42 63	45.6	15 39.7	41 62	44.7	16 16.7	41 60	43.2	16 41.1	40 59	42.3	17 05.2	40 58	41.3	17 29.0	39 57	40.4	17 52.5	39 56	39.4	18 27.3	38 54	38.0	7
8	14 37.0	43 63	45.3	15 02.6	42 62	44.4	15 40.5	42 60	43.0	16 05.5	41 59	42.0	16 30.3	41 58	41.1	16 54.8	41 57	40.1	17 19.0	40 56	39.2	17 54.8	39 54	37.7	8
9	13 59.4	44 62	45.0	14 25.6	43 61	44.1	15 04.5	43 60	42.7	15 30.2	43 59	41.7	15 55.6	42 58	40.8	16 20.7	42 56	39.8	16 45.6	41 55	38.9	17 22.5	41 54	37.5	9
100	13 22.1	45 62	44.7	13 48.9	45 61	43.8	14 28.7	44 59	42.4	14 55.0	44 58	41.4	15 21.1	43 57	40.5	15 46.9	43 56	39.6	16 12.5	42 55	38.6	16 50.4	42 53	37.2	100
1	12 44.9	46 62	44.4	13 12.4	46 60	43.4	13 53.1	45 59	42.1	14 20.0	45 58	41.1	14 46.7	44 57	40.2	15 13.2	44 56	39.3	15 39.5	44 55	38.4	16 18.4	43 53	37.0	1
2	12 08.0	47 61	44.0	12 36.0	47 60	43.1	13 17.7	46 58	41.8	13 45.3	46 58	40.8	14 12.6	45 56	39.9	14 39.8	45 56	39.0	15 06.7	45 54	38.1	15 46.7	44 53	36.7	2
3	11 31.3	48 61	43.7	11 59.9	48 60	42.8	12 42.6	47 58	41.4	13 10.7	47 57	40.5	13 38.7	47 56	39.6	14 06.5	46 55	38.7	14 34.1	46 54	37.8	15 15.1	45 52	36.4	3
4	10 54.8	49 60	43.3	11 24.1	49 60	42.5	12 07.6	48 58	41.1	12 36.4	48 57	40.2	13 05.1	48 56	39.3	13 33.5	47 55	38.4	14 01.8	47 54	37.5	14 43.8	46 52	36.1	4
105	10 18.6	50 60	43.0	10 48.4	50 59	42.1	11 32.9	49 58	40.8	12 02.3	49 56	39.9	12 31.6	49 55	39.0	13 00.7	48 54	38.1	13 29.6	48 53	37.2	14 12.6	48 52	35.9	105
6	9 42.6	51 60	42.6	10 13.0	51 59	41.8	10 58.4	50 57	40.5	11 28.5	50 56	39.6	11 58.4	50 55	38.7	12 28.1	49 54	37.8	12 57.7	49 53	36.9	13 41.7	49 51	35.6	6
7	9 06.8	52 59	42.3	9 37.8	52 58	41.4	10 24.1	51 57	40.1	10 54.8	51 56	39.2	11 25.4	51 55	38.4	11 55.8	51 54	37.5	12 26.0	50 52	36.6	13 11.0	50 51	35.3	7
8	8 31.3	53 59	41.9	9 02.9	53 58	41.1	9 50.1	52 56	39.8	10 21.5	52 55	38.9	10 52.6	52 54	38.0	11 23.7	52 53	37.2	11 54.5	51 52	36.3	12 40.6	51 50	35.0	8
9	7 56.0	54 58	41.5	8 28.2	54 57	40.7	9 16.4	53 56	39.4	9 48.3	53 55	38.5	10 20.1	53 54	37.7	10 51.8	53 53	36.8	11 23.3	52 52	36.0	12 10.3	52 50	34.6	9
110	7 21.0	55 58	41.2	7 53.8	55 57	40.3	8 42.9	54 56	39.0	9 15.4	54 54	38.2	9 47.9	54 53	37.3	10 20.2	54 52	36.5	10 52.3	53 51	35.6	11 40.3	53 50	34.3	110
1	6 46.3	56 58	40.8	7 19.7	56 56	39.9	8 09.6	55 55	38.7	8 42.8	55 54	37.8	9 15.9	55 53	37.0	9 48.8	55 52	36.1	10 21.6	55 51	35.3	11 10.6	54 49	34.0	1
2	6 11.8	57 57	40.4	6 45.8	57 56	39.6	7 36.6	56 54	38.3	8 10.4	56 54	37.5	8 44.1	56 52	36.6	9 17.7	56 52	35.8	9 51.1	56 50	35.0	10 41.1	55 49	33.7	2
3	5 37.6	58 56	40.0	6 12.2	58 56	39.2	7 04.0	57 54	37.9	7 38.3	57 53	37.1	8 12.6	57 52	36.3	8 46.8	57 51	35.4	9 20.9	57 50	34.6	10 11.8	56 48	33.4	3
4	5 03.7	59 56	39.6	5 38.9	59 55	38.8	6 31.5	58 54	37.5	7 06.5	58 52	36.7	7 41.4	58 52	35.9	8 16.2	58 50	35.1	8 51.0	58 50	34.3	9 42.8	57 48	33.0	4
115				5 05.9	60 55	38.4	5 59.4	59 53	37.1	6 35.0	59 52	36.3	7 10.5	59 51	35.5	7 45.9	59 50	34.7	8 21.3	59 49	33.9	9 14.1	59 47	32.7	115
6							5 27.6	60 52	36.7	6 03.8	60 52	35.9	6 39.9	60 51	35.1	7 15.9	60 50	34.3	7 51.9	60 48	33.5	8 45.6	60 47	32.3	6
7										5 32.8	61 51	35.5	6 09.5	61 50	34.8	6 46.2	61 49	34.0	7 22.8	61 48	33.2	8 17.4	61 46	32.0	7
8										5 02.2	62 51	35.1	5 39.5	62 50	34.4	6 16.7	62 48	33.6	6 53.9	62 48	32.8	7 49.6	62 46	31.6	8
9													5 09.7	63 49	34.0	5 47.6	63 48	33.2	6 25.4	63 47	32.4	7 21.9	63 46	31.2	3
120																5 18.8	64 48	32.8	5 57.2	64 47	32.0	6 54.6	64 45	30.8	120
1																			5 29.2	65 46	31.6	6 27.6	65 44	30.5	1
2																			5 01.6	66 46	31.2	6 00.9	66 44	30.1	2
3																						5 34.5	67 44	29.7	3
4																						5 08.4	68 43	29.3	4

Lat. 28°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	63 30.0	1.0 01	00.0	63 00.0	1.0 01	00.0	62 00.0	1.0 01	00.0	61 30.0	1.0 01	00.0	61 00.0	1.0 01	00.0	60 30.0	1.0 01	00.0	59 00.0	1.0 01	00.0	58 30.0	1.0 01	00.0	00
1	63 29.4	1.0 03	01.3	62 59.4	1.0 03	01.3	61 59.4	1.0 03	01.2	61 29.5	1.0 03	01.2	60 59.5	1.0 03	01.1	60 29.5	1.0 02	01.1	58 59.5	1.0 02	01.0	58 29.6	1.0 02	01.0	1
2	63 27.6	1.0 05	02.6	62 57.7	1.0 05	02.5	61 57.8	1.0 04	02.4	61 27.9	1.0 04	02.3	60 57.9	1.0 04	02.2	60 28.0	1.0 04	02.2	58 58.2	1.0 04	02.0	58 28.2	1.0 04	01.9	2
3	63 24.6	99 07	03.9	62 54.8	99 07	03.8	61 55.0	1.0 06	03.6	61 25.2	1.0 06	03.5	60 55.3	1.0 06	03.4	60 25.5	1.0 06	03.3	58 55.8	1.0 05	03.0	58 26.0	1.0 05	02.9	3
4	63 20.4	99 09	05.2	62 50.7	99 09	05.0	61 51.2	99 08	04.7	61 21.5	99 08	04.6	60 51.7	99 08	04.5	60 21.9	99 08	04.3	58 52.6	99 07	04.0	58 22.8	99 07	03.9	4
05	63 15.0	98 11	06.5	62 45.5	99 10	06.3	61 46.3	99 10	05.9	61 16.7	99 10	05.7	60 47.1	99 09	05.6	60 17.4	99 09	05.4	58 48.5	99 08	05.0	58 18.8	99 08	04.8	05
6	63 08.5	98 13	07.7	62 39.1	98 12	07.5	61 40.3	98 12	07.1	61 10.9	98 12	06.9	60 41.4	98 11	06.7	60 11.9	98 11	06.5	58 43.4	98 10	06.0	58 13.9	98 10	05.8	6
7	63 00.8	97 15	09.0	62 31.6	97 14	08.7	61 33.2	97 14	08.2	61 04.0	97 13	08.0	60 34.8	98 13	07.8	60 05.5	98 12	07.5	58 37.5	98 11	06.9	58 08.1	98 11	06.7	7
8	62 52.0	96 17	10.2	62 23.1	96 16	09.9	61 25.1	97 15	09.4	60 56.1	97 15	09.1	60 27.1	97 14	08.8	59 58.0	97 14	08.6	58 30.7	97 13	07.9	58 01.5	97 12	07.7	8
9	62 42.0	96 18	11.4	62 13.4	96 18	11.1	61 16.0	96 17	10.5	60 47.3	96 16	10.2	60 18.5	96 16	09.9	59 49.6	96 16	09.6	58 23.0	96 14	08.8	57 54.0	97 14	08.6	9
10	62 31.0	94 20	12.6	62 02.7	95 20	12.3	61 05.9	95 18	11.6	60 37.4	95 18	11.3	60 08.9	95 18	11.0	59 40.3	95 17	10.6	58 14.4	96 16	09.8	57 45.7	96 15	09.5	10
1	62 18.9	93 22	13.8	61 50.9	93 21	13.4	60 54.7	94 20	12.7	60 26.6	94 20	12.3	59 58.3	94 19	12.0	59 30.1	94 19	11.7	58 05.0	96 17	10.7	57 36.5	96 17	10.4	1
2	62 05.7	92 24	15.0	61 38.1	92 23	14.5	60 42.6	93 22	13.7	60 14.8	93 21	13.4	59 46.9	93 21	13.0	59 18.9	93 20	12.6	57 54.7	94 18	11.6	57 26.5	94 18	11.3	2
3	61 51.6	91 25	16.1	61 24.3	91 25	15.6	60 29.6	92 23	14.8	60 02.1	92 23	14.4	59 34.5	92 22	14.0	59 06.9	92 22	13.6	57 43.6	93 20	12.5	57 15.7	93 19	12.2	3
4	61 36.4	89 27	17.2	61 09.6	90 26	16.7	60 15.6	90 25	15.8	59 48.5	91 24	15.4	59 21.3	91 24	15.0	58 54.0	91 23	14.6	57 31.7	92 21	13.4	57 04.2	92 21	13.1	4
15	61 20.3	88 28	18.3	60 53.8	88 28	17.8	60 00.7	89 26	16.8	59 34.0	89 26	16.4	59 07.1	90 25	15.9	58 40.2	90 24	15.5	57 19.0	91 22	14.3	56 51.8	91 22	13.9	15
6	61 03.2	86 30	19.3	60 37.2	87 29	18.8	59 44.9	88 28	17.8	59 18.6	88 27	17.3	58 52.2	88 26	16.9	58 25.6	89 26	16.4	57 05.6	89 24	15.1	56 38.7	90 23	14.7	6
7	60 45.2	85 31	20.3	60 19.7	85 31	19.8	59 28.3	86 29	18.8	59 02.4	87 28	18.3	58 36.4	87 28	17.8	58 10.3	87 27	17.3	56 51.3	88 25	16.0	56 24.9	88 24	15.6	7
8	60 26.4	83 33	21.3	60 01.3	84 32	20.8	59 10.8	85 30	19.7	58 45.4	85 30	19.2	58 19.8	85 29	18.7	57 54.1	86 28	18.2	56 36.4	87 26	16.8	56 10.3	87 26	16.4	8
9	60 06.7	82 34	22.3	59 42.1	82 33	21.7	58 52.5	83 32	20.6	58 27.5	84 31	20.1	58 02.4	84 30	19.6	57 37.2	84 30	19.1	56 20.7	86 27	17.6	55 55.0	86 26	17.1	9
20	59 46.2	80 36	23.2	59 22.1	81 35	22.6	58 33.5	82 33	21.5	58 09.0	82 32	21.0	57 44.3	82 31	20.4	57 19.5	83 31	19.9	56 04.3	84 28	18.4	55 39.1	84 28	17.9	20
1	59 24.9	78 37	24.1	59 01.3	79 36	23.5	58 13.7	80 34	22.4	57 49.6	80 33	21.8	57 25.4	81 32	21.3	57 01.1	81 32	20.7	55 47.3	83 30	19.2	55 22.4	83 29	18.7	1
2	59 02.9	77 38	25.0	58 39.8	77 37	24.4	57 53.2	78 35	23.2	57 29.6	79 34	22.6	57 05.9	79 34	22.1	56 42.0	80 33	21.5	55 29.6	81 31	19.9	55 05.1	82 30	19.4	2
3	58 40.1	75 39	25.9	58 17.6	75 38	25.2	57 32.0	77 36	24.0	57 08.9	77 36	23.4	56 45.7	78 35	22.8	56 22.3	78 34	22.3	55 11.2	80 32	20.6	54 47.2	80 31	20.1	3
4	58 16.7	73 40	26.7	57 54.7	74 39	26.1	57 10.1	75 38	24.8	56 47.5	76 37	24.2	56 24.8	76 36	23.6	56 01.9	77 35	23.0	54 52.2	78 33	21.3	54 28.7	79 32	20.8	4
25	57 52.5	71 41	27.5	57 31.1	72 40	26.8	56 47.5	73 39	25.6	56 25.5	74 38	24.9	56 03.2	74 37	24.3	55 40.8	75 36	23.8	54 32.6	77 34	22.0	54 09.6	77 33	21.5	25
6	57 27.8	69 42	28.2	57 06.8	70 41	27.6	56 24.4	71 40	26.3	56 02.8	72 39	25.7	55 41.1	73 38	25.1	55 19.2	73 37	24.5	54 12.5	75 34	22.7	53 49.9	75 34	22.1	6
7	57 02.4	68 43	29.0	56 42.0	68 42	28.3	56 00.6	70 40	27.0	55 39.6	70 40	26.4	55 18.4	71 39	25.7	54 57.0	72 38	25.1	53 51.7	73 36	23.4	53 29.7	74 35	22.8	7
8	56 36.4	66 44	29.7	56 16.6	67 43	29.0	55 36.2	68 42	27.7	55 15.8	69 41	27.0	54 55.1	69 40	26.4	54 34.2	70 39	25.8	53 30.5	72 36	24.0	53 08.9	72 36	23.4	8
9	56 09.9	64 45	30.4	55 50.6	65 44	29.7	55 11.4	66 42	28.4	54 51.4	67 42	27.7	54 31.2	68 41	27.1	54 10.9	68 40	26.4	53 08.7	70 37	24.6	52 47.6	71 36	24.0	9
30	55 42.9	62 46	31.0	55 24.1	63 45	30.3	54 45.9	64 43	29.0	54 26.5	65 42	28.3	54 06.9	66 42	27.7	53 47.1	66 41	27.0	52 46.4	68 38	25.2	52 25.8	69 37	24.6	30
1	55 15.3	60 47	31.7	54 57.1	61 46	31.0	54 20.0	63 44	29.6	54 01.1	63 43	28.9	53 42.0	64 42	28.3	53 22.7	65 41	27.6	52 23.6	67 39	25.8	52 03.5	67 38	25.2	1
2	54 47.3	58 48	32.3	54 29.6	59 47	31.6	53 53.6	61 45	30.2	53 35.3	62 44	29.5	53 16.7	62 43	28.9	52 57.9	63 42	28.2	52 00.3	65 40	26.3	51 40.7	66 39	25.7	2
3	54 18.8	57 48	32.8	54 01.7	57 47	32.1	53 26.7	59 46	30.8	53 08.9	60 44	30.1	52 50.9	61 44	29.4	52 32.6	61 43	28.8	51 36.6	63 40	26.9	51 17.5	64 39	26.2	3
4	53 49.8	55 49	33.4	53 33.3	56 48	32.7	52 59.4	57 46	31.3	52 42.2	58 45	30.6	52 24.7	59 44	30.0	52 06.9	59 44	29.3	51 12.5	62 41	27.4	50 53.9	62 40	26.7	4
35	53 20.5	53 50	33.9	53 04.5	54 49	33.2	52 31.7	55 47	31.8	52 15.0	56 46	31.1	51 58.0	57 45	30.5	51 40.8	58 44	29.8	50 47.9	60 42	27.9	50 29.8	61 41	27.2	35
6	52 50.7	51 50	34.4	52 35.3	52 49	33.7	52 03.6	54 48	32.3	51 47.4	54 47	31.6	51 30.9	55 46	31.0	51 14.3	56 45	30.3	50 22.9	58 42	28.3	50 05.4	59 41	27.7	6
7	52 20.6	49 51	34.9	52 05.7	50 50	34.2	51 35.1	52 48	32.8	51 19.4	53 47	32.1	51 03.5	53 46	31.4	50 47.4	54 46	30.8	49 57.6	56 43	28.8	49 40.6	57 42	28.2	7
8	51 50.1	48 51	35.4	51 35.7	48 50	34.6	51 06.2	50 49	33.2	50 51.1	51 48	32.6	50 35.7	52 47	31.9	50 20.1	52 46	31.2	49 31.9	55 43	29.2	49 15.4	55 42	28.6	8
9	51 19.3	46 52	35.8	51 05.5	47 51	35.1	50 37.0	48 49	33.7	50 22.4	49 48	33.0	50 07.5	50 48	32.3	49 52.5	51 47	31.6	49 05.8	53 44	29.7	48 49.9	54 43	29.0	9
40	50 48.2	44 52	36.2	50 34.9	45 52	35.5	50 07.4	47 50	34.1	49 53.4	47 49	33.4	49 39.1	48 48	32.7	49 24.5	49 47	32.1	48 39.5	51 44	30.1	48 24.0	52 44	29.4	40
1	50 16.7	42 53	36.6	50 03.9	43 52	35.9	49 37.6	45 50	34.5	49 24.0	46 49	33.8	49 10.3	46 48	33.1	48 56.2	47 48	32.5	48 12.7	49 45	30.5	47 57.8	50 44	29.8	1
2	49 45.0	40 53	37.0	49 32.8	41 52	36.3	49 07.4	43 51	34.9	48 54.4	44 50	34.2	48 41.2	45 49	33.5	48 27.6	45 48	32.8	47 45.7	48 46	30.8	47 31.3	48 45	30.2	2
3	49 13.8	39 54	37.3	49 01.3	40 53	36.6	48 37.0	41 51	35.2	48 24.5	42 50	34.5	48 11.8	43 50	33.9	47 58.8	44 49	33.2	47 18.4	46 46	31.2	47 04.5	47 45	30.5	3
4	48 40.8	37 54	37.7	48 29.6	38 53	37.0	48 06.3	40 52	35.6	47 54.3	40 51	34.9	47 42.1	41 50	34.2	47 29.6	42 49	33.5	46 50.9	44 46	31.5	46 37.5	45 46	30.9	4
45	48 08.3	35 54	38.0	47 57.6	36 54	37.3	47 35.4	38 52	35.9	47 23.9	39 51	35.2	47 12.2	39 50	34.5	47 00.3	40 50	33.9	46 23.0	43 47	31.9	46 10.1	43 46	31.2	45
6	47 35.6	34 55	38.3	47 25.4	34 54	37.6	47 04.2	36 52	36.2	46 53.3	37 52	35.5	46 42.1	38 51	34.8	46 30.6	39 50	34.2	45 54.9	41 47	32.2	45 42.6	42 46	31.5	6
7	47 02.7	32 55	38.6	46 53.0	33 54	37.9	46 32.8	34 53	36.5	46 22.4	35 52	35.8	46 11.7	36 51	35.1	46 00.8	37 50	34.5	45 26.6	39 48	32.5	45 14.8	40 47	31.8	7
8	46 29.6	30 56	38.8	46 20.4	31 55	38.1	46 01.2	33 53	36.8	45 51.3	34 52	36.1	45 41.1	34 51	35.4	45 30.7	35 50	34.7	44 58.0	37 48	32.8	44 46.7	38 47	32.1	8
9	45 56.3	29 56	39.1	45 47.6	29 55	38.4	45 29.4	31 53	37.0	45 20.0	32 52	36.3	45 10.3	33 52	35.7	45 00.4	33 51	35.0	44 29.3	36 48	33.0	44 18.5	36 48	32.4	9
50	45 22.8	27 56	39.3	45 14.6	28 55	38.6	44 57.4	29 54	37.3	44 48.5	30 53	36.6	44 39.3	31 52	35.9	44 29.9	32 51	35.2	44 00.3	34 49	33.3	43 50.0	35 48	32.6	50
1	44 49.2	25 56	39.5	44 41.4	26 56	38.8	44 25.3	28 54	37.5	44 16.8	29 53	36.8	44 08.2	29 52	36.1	43 59.3	30 52	35.5	43 31.2	32 49	33.5	43 21.4	33 48	32.9	1
2	44 15.4	24 56	39.7	44 08.2	25 56	39.0	43 53.0	26 54	37.7	43 45.0	27 53	37.0	43 36.8	28 52	36.4	43 28.4	28 52	35.7	43 01.8	31 49	33.7	42 52.5	31 48	33.1	2
3	43 41.5	22 57	39.9	43 34.7	23 56	39.2	43 20.5	24 54	37.9	43 13.0	25 54	37.2	43 05.4	26 53	36.6	42 57.4	27 52	35.9	42 32.3	29 50	33.9	42 23.5	30 48	33.3	3
4	43 07.4	21 57	40.1	43 01.2	21 56	39.4	42 47.9	23 54	38.1	42 40.9	24 54	37.4	42 33.7	24 53	36.7	42 26.3	25 52	36.1	42 02.7	27 50	34.1	41 54.4	28 49	33.5	4
55	42 33.3	19 57	40.2	42 27.5	20 56	39.6	42 15.2	21 55	38.2	42 08.7	22 54	37.6	42 02.0	23 53	36.9	41 55.0	24 52	36.3	41 32.9	26 50	34.3	41 25.1	26 49	33.7	55
6	41 59.0	17 57	40.4	41 53.7	18 56	39.7	41 42.3	20 55	38.4	41 36.3	20 54	37.7	41 30.1	21 53	37.1	41 23.6	22 52	36.4	41 03.0	24 50	34.5	40 55.6	25 49	33.8	6
7	41 24.7	16 58	40.5	41 19.8	17 57	39.8	41 09.4	18 55	38.5	41 03.9	19 54	37.9	40 58.1	20 54	37.2	40 52.1	20 53	36.6	40 32.9	22 50	34.6	40 26.1	23 50	34.0	7
8	40 50.2	14 58	40.6	40 45.8	15 57	40.0	40 36.3	17 55	38.7	40 31.3	17 54	38.0	40 26.0	18 54	37.4	40 20.5	19 53	36.7	40 02.7	21 50	34.8	39 56.4	22 50	34.2	8
9	40 15.7	13 58	40.7	40 11.8	14 57	40.1	40 03.2	15 55	38.8	39 58.6	16 54	38.1	39 53.8	16 54	37.5	39 48.8	17 53	36.8	39 32.5	19 51	34.9	39 26.6	20 50	34.3	9
60	39 41.1	11 58	40.8	39 37.6	12 57	40.2	39 30.0	13 56	38.9	39 25.9	14 55	38.2	39 21.5	15 54	37.6	39 17.0	16 53	37.0	39 02.1	18 51	35.0	38 56.7	18 50	34.4	60
1	39 06.5	10 58	40.9	39 03.4	10 57	40.2	38 56.7	12 56	39.0	38 53.1	13 55	38.3	38 49.2	13 54	37.7	38 45.1	14 53	37.1	38 31.6	16 51	35.2	38 26.7	17 50	34.5	1
2	38 31.8	08 58	41.0	38 29.2	09 57	40.3	38 23.4	10 56	39.0	38 20.2	11 55	38.4	38 16.8	12 54	37.8	38 13.1	12 53	37.1	38 01.1	14 51	35.3	37 56.7	15 50	34.6	2
3	37 57.0	07 58	41.0	37 54.9	07 57	40.4	37 50.0	09 56	39.1	37 47.2	09 55	38.5	37 44.3	10 54	37.9	37 41.1	11 54	37.2	37 30.5	13 51	35.3	37 26.5	13 50	34.7	3
4	37 22.2	05 58	41.1	37 20.5	06 57	40.4	37 16.5	07 56	39.2	37 14.2	08 55	38.5	37 11.7	09 54	37.9	37 09.0	09 54	37.3	36 59.8	11 51	35.4	36 56.3	12 50	34.8	4
65	36 47.4	04 58	41.1	36 46.2	05 57	40.5	36 43.1	06 56	39.2	36 41.2	06 55	38.6	36 39.2	07 54	38.0	36 36.9	08 54	37.4	36 29.1	10 51	35.5	36 26.0	10 50	34.9	65
6	36 12.6	02 58	41.1	36 11.8	03 57	40.5	36 09.6	04 56	39.3	36 08.1	05 55	38.6	36 06.6	06 54	38.0	36 04.8	06 54	37.4	35 58.3	08 51	35.5	35 55.7	09 50	34.9	6
7	35 37.8	01 58	41.1	35 37.4	02 57	40.5	35 36.0	03 56	39.3	35 35.1	04 55	38.7	35 33.9	04 54	38.0	35 32.6	05 54	37.4	35 27.5	07 51	35.6	35 25.4	07 51	35.0	7
8	35 02.9	00 58	41.1	35 03.0	00 57	40.5	35 02.5	01 56	39.3	35 02.0	02 55	38.7	35 01.3	03 54	38.1	35 00.4	03 54	37.5	34 56.6	05 52	35.6	34 55.0	06 51	35.0	8
9	34 28.1	02 58	41.1	34 28.6	01 57	40.5	34 28.9	00 56	39.3	34 28.8	01 55	38.7	34 28.6	01 54	38.1	34 28.1	02 54	37.5	34 25.7	04 52	35.7	34 24.6	04 51	35.1	9
70	33 53.3	03 58	41.1	33 54.1	03 57	40.5	33 55.4	01 56	39.3	33 55.7	01 55	38.7	33 55.9	00 54	38.1	33 55.9	00 54	37.5	33 54.8	02 52	35.7	33 54.1	03 51	35.1	70
1	33 18.5	05 58	41.1	33 19.8	04 57	40.5	33 21.8	03 56	39.3	33 22.6	02 55	38.7	33 23.2	02 54	38.1	33 23.7	01 54	37.5	33 23.9	01 52	35.7	33 23.7	01 51	35.1	1
2	32 43.7	06 58	41.0	32 45.4	05 57	40.4	32 48.3	04 56	39.3	32 49.5	04 55	38.7	32 50.6	03 54	38.1	32 51.4	03 54	37.5	32 53.0	01 52	35.7	32 53.2	00 51	35.1	2
3	32 06.9	07 58	41.0	32 11.0	07 57	40.4	32 14.8	06 56	39.2	32 16.4	05 55	38.6	32 17.9	05 54	38.0	32 19.2	04 54	37.4	32 22.1	02 52	35.7	32 22.8	02 51	35.1	3
4	31 34.2	09 58	40.9	31 36.7	08 57	40.3	31 41.3	07 56	39.2	31 43.4	07 55	38.6	31 45.3	06 54	38.0	31 47.0	06 54	37.4	31 51.3	04 52	35.7	31 52.4	03 51	35.1	4
75	30 59.5	10 58	40.9	31 02.4	10 57	40.3	31 07.9	09 56	39.1	31 10.4	08 55	38.5	31 12.7	07 54	38.0	31 14.8	07 54	37.4	31 20.4	05 52	35.6	31 21.9	05 51	35.0	75
6	30 24.8	11 58	40.8	30 28.2	11 57	40.2	30 34.5	10 56	39.1	30 37.4	09 55	38.5	30 40.1	09 54	37.9	30 42.7	08 54	37.3	30 49.6	07 51	35.6	30 51.5	06 51	35.0	6
7	29 50.3	13 58	40.7	29 54.0	12 57	40.1	30 01.1	11 56	39.0	30 04.4	11 55	38.4	30 07.6	10 54	37.8	30 10.6	10 54	37.3	30 18.7	08 51	35.5	30 21.1	08 50	35.0	7
8	29 15.7	14 57	40.6	29 19.9	14 57	40.1	29 27.8	13 56	38.9	29 31.5	12 55	38.3	29 35.1	12 54	37.8	29 38.5	11 53	37.2	29 48.0	10 51	35.5	29 50.8	09 50	34.9	8
9	28 41.3	15 57	40.5	28 45.8	15 57	40.0	28 54.5	14 55	38.8	28 58.7	14 55	38.3	29 02.7	13 54	37.7	29 06.5	13 53	37.1	29 17.2	11 51	35.4	29 20.5	11 50	34.9	9
80	28 06.9	17 57	40.4	28 11.8	16 56	39.9	28 21.4	15 55	38.7	28 25.9	15 54	38.2	28 30.3	14 54	37.6	28 34.6	14 53	37.1	28 46.5	13 51	35.4	28 50.3	12 50	34.8	80
1	27 32.6	18 57	40.3	27 37.9	18 56	39.8	27 48.2	17 55	38.6	27 53.2	16 54	38.1	27 58.0	16 54	37.5	28 02.7	15 53	37.0	28 15.9	14 51	35.3	28 20.1	14 50	34.7	1
2	26 58.3	19 57	40.2	27 04.1	19 56	39.6	27 15.2	18 55	38.5	27 20.6	18 54	38.0	27 25.8	17 54	37.4	27 30.9	17 53	36.9	27 45.4	15 51	35.2	27 49.9	15 50	34.6	2
3	26 24.2	21 57	40.1	26 30.3	20 56	39.5	26 42.2	19 55	38.4	26 48.0	19 54	37.9	26 53.6	19 54	37.3	26 59.1	18 53	36.8	27 14.9	17 51	35.1	27 19.8	16 50	34.5	3
4	25 50.2	22 57	39.9	25 56.7	22 56	39.4	26 09.4	21 55	38.3	26 15.5	20 54	37.7	26 21.6	20 53	37.2	26 27.5	19 53	36.6	26 44.4	18 51	35.0	26 49.8	18 50	34.4	4
85	25 16.2	23 56	39.8	25 23.1	23 56	39.2	25 36.6	22 54	38.2	25 43.1	22 54	37.6	25 49.6	21 53	37.1	25 55.9	21 52	36.5	26 14.1	20 50	34.9	26 19.9	19 50	34.3	85
6	24 42.4	25 56	39.6	24 49.7	24 56	39.1	25 03.9	23 54	38.0	25 10.9	23 54	37.5	25 17.7	23 53	36.9	25 24.4	22 52	36.4	25 43.8	21 50	34.8	25 50.1	21 50	34.2	6
7	24 06.7	26 56	39.5	24 16.3	25 55	38.9	24 31.3	25 54	37.9	24 38.7	24 54	37.3	24 45.9	24 53	36.8	24 53.0	24 52	36.3	25 13.7	22 50	34.7	25 20.3	22 50	34.1	7
8	23 35.1	27 56	39.3	23 43.1	27 55	38.8	23 58.9	26 54	37.7	24 06.6	26 53	37.2	24 14.2	26 53	36.6	24 21.7	25 52	36.1	24 43.6	24 50	34.5	24 50.6	23 49	34.0	8
9	23 01.6	28 56	39.1	23 10.0	28 55	38.6	23 26.5	27 54	37.5	23 34.7	27 53	37.0	23 42.7	27 52	36.5	23 50.6	26 52	36.0	24 13.6	26 50	34.4	24 21.1	25 49	33.9	9
90	22 28.2	30 55	38.9	22 37.0	29 55	38.4	22 54.3	28 54	37.4	23 02.8	28 53	36.9	23 11.2	28 52	36.3	23 19.5	27 52	35.8	23 43.8	26 50	34.2	23 51.6	26 49	33.7	90

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	7 30.0	1.0 00	180.0	7 00.8	1.0 00	180.0	6 00.0	1.0 00	180.0	5 30.0	1.0 00	180.0	5 00.0	1.0 00	180.0										00
1	7 29.7	1.0 01	179.4	6 59.7	1.0 01	179.4	5 59.7	1.0 01	179.4	5 29.7	1.0 01	179.4													1
2	7 28.9	1.0 02	178.8	6 58.9	1.0 02	178.8	5 59.0	1.0 02	178.9	5 29.0	1.0 02	178.9													2
3	7 27.6	1.0 03	178.2	6 57.6	1.0 03	178.3	5 57.7	1.0 03	178.3	5 27.7	1.0 03	178.3													3
4	7 25.7	1.0 04	177.7	6 55.7	1.0 04	177.7	5 55.8	1.0 04	177.8	5 25.9	1.0 04	177.8													4
05	7 23.2	1.0 05	177.1	6 53.3	1.0 05	177.1	5 53.5	1.0 05	177.2	5 23.6	1.0 05	177.2													05
6	7 20.3	1.0 06	176.5	6 50.4	1.0 06	176.5	5 50.7	1.0 06	176.6	5 20.8	1.0 06	176.7													6
7	7 16.8	99 07	175.9	6 46.9	99 07	176.0	5 47.3	99 06	176.1	5 17.5	99 06	176.1													7
8	7 12.7	99 08	175.3	6 42.9	99 08	175.4	5 43.4	99 07	175.5	5 13.6	99 07	175.6													8
9	7 08.1	99 08	174.7	6 38.4	99 08	174.8	5 39.0	99 08	175.0	5 09.3	99 08	175.0													9
10	7 03.0	99 09	174.2	6 33.4	99 09	174.2	5 34.1	99 09	174.4	5 04.4	99 09	174.5													10
1	6 57.4	99 10	173.6	6 27.8	99 10	173.7	5 28.7	99 10	173.8																1
2	6 51.2	98 11	173.0	6 21.7	98 11	173.1	5 22.7	98 11	173.3																2
3	6 44.5	98 12	172.4	6 15.1	98 12	172.5	5 16.3	98 12	172.7																3
4	6 37.2	98 13	171.9	6 07.9	98 13	172.0	5 09.3	98 12	172.2																4
15	6 29.5	97 14	171.3	6 00.3	97 14	171.4	5 01.9	97 13	171.6																15
6	6 21.2	97 15	170.7	5 52.1	97 14	170.9																			6
7	6 12.4	97 16	170.2	5 43.5	97 15	170.3																			7
8	6 03.1	96 16	169.6	5 34.3	96 16	169.7																			8
9	5 53.3	96 17	169.0	5 24.6	96 17	169.2																			9
20	5 43.0	95 18	168.5	5 14.4	95 18	168.6																			20
1	5 32.2	95 19	167.9	5 03.7	95 19	168.1																			1
2	5 20.8	94 20	167.4																						2
3	5 09.0	94 20	166.8																						3

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	21 55.0	31 55	38.7	22 04.2	30 54	38.2	22 22.2	30 53	37.2	22 31.1	29 53	36.7	22 39.9	29 52	36.2	22 48.6	29 51	35.6	23 14.0	28 49	34.1	23 22.3	27 49	33.6	91
2	21 21.9	32 55	38.5	21 31.5	32 54	38.0	21 50.3	31 53	37.0	21 59.5	31 52	36.5	22 08.7	30 52	36.0	22 17.8	30 51	35.5	22 44.4	29 49	33.9	22 53.1	29 48	33.4	2
3	20 49.0	33 55	38.3	20 58.9	33 54	37.8	21 18.4	32 53	36.8	21 28.1	32 52	36.3	21 37.6	32 52	35.8	21 47.1	31 51	35.3	22 14.9	30 49	33.8	22 24.0	30 48	33.2	3
4	20 16.2	34 54	38.1	20 26.5	34 54	37.6	20 46.8	34 52	36.6	20 56.8	33 52	36.1	21 06.7	33 51	35.6	21 16.5	33 51	35.1	21 45.5	32 49	33.6	21 55.0	31 48	33.1	4
95	19 43.5	36 54	37.9	19 54.2	35 54	37.4	20 15.2	35 52	36.4	20 25.6	35 52	35.9	20 35.9	34 51	35.4	20 46.1	34 50	34.9	21 16.3	33 48	33.4	21 26.1	33 48	32.9	95
6	19 11.1	37 54	37.7	19 22.1	37 53	37.2	19 43.8	36 52	36.2	19 54.6	36 51	35.7	20 05.3	35 51	35.2	20 15.9	35 50	34.7	20 47.2	34 48	33.2	20 57.4	34 48	32.7	6
7	18 38.8	38 54	37.5	18 50.1	38 53	37.0	19 12.6	37 52	36.0	19 23.8	37 51	35.5	19 34.8	37 50	35.0	19 45.8	36 50	34.5	20 18.2	36 48	33.0	20 28.9	35 48	32.5	7
8	18 06.6	39 53	37.2	18 18.3	39 53	36.7	18 41.6	38 52	35.8	18 53.1	38 51	35.3	19 04.5	38 50	34.8	19 15.8	38 50	34.3	19 49.4	37 48	32.8	20 00.4	37 47	32.3	8
9	17 34.6	40 53	37.0	17 46.7	40 52	36.5	18 10.7	40 51	35.5	18 22.6	39 51	35.1	18 34.4	39 50	34.6	18 46.1	39 49	34.1	19 20.8	38 48	32.6	19 32.2	38 47	32.1	9
100	17 02.9	42 53	36.7	17 15.3	41 52	36.3	17 40.0	41 51	35.3	17 52.2	41 50	34.8	18 04.4	40 50	34.3	18 16.5	40 49	33.9	18 52.3	39 47	32.4	19 04.1	39 46	31.9	100
1	16 31.3	43 52	36.5	16 44.1	43 52	36.0	17 09.5	42 50	35.1	17 22.0	42 50	34.6	17 34.6	42 49	34.1	17 47.0	41 49	33.6	18 24.0	41 47	32.2	18 36.2	40 46	31.7	1
2	15 59.9	44 52	36.2	16 13.0	44 51	35.8	16 39.1	43 50	34.8	16 52.1	43 50	34.3	17 05.0	43 49	33.9	17 17.8	43 48	33.4	17 55.8	42 47	32.0	18 08.4	42 46	31.5	2
3	15 28.7	45 52	36.0	15 42.2	45 51	35.5	16 09.0	44 50	34.6	16 22.3	44 49	34.1	16 35.5	44 49	33.6	16 48.7	44 48	33.2	17 27.9	43 46	31.7	17 40.8	43 46	31.3	3
4	14 57.7	46 51	35.7	15 11.5	46 51	35.2	15 39.0	46 50	34.3	15 52.7	45 49	33.8	16 06.3	45 48	33.4	16 19.8	45 48	32.9	17 00.1	44 46	31.5	17 13.4	44 45	31.0	4
105	14 26.9	47 51	35.4	14 41.1	47 50	34.9	15 09.3	47 49	34.0	15 23.3	47 49	33.6	15 37.2	46 48	33.1	15 51.2	46 48	32.7	16 32.5	46 46	31.3	16 46.2	45 45	30.8	105
6	13 56.3	49 51	35.1	14 10.8	48 50	34.7	14 39.7	48 49	33.8	14 54.1	48 48	33.3	15 08.4	48 48	32.8	15 22.7	47 47	32.4	16 05.1	47 45	31.0	16 19.2	47 45	30.6	6
7	13 25.9	50 50	34.8	13 40.8	49 50	34.4	14 10.4	49 48	33.5	14 25.1	49 48	33.0	14 39.8	49 47	32.6	14 54.4	49 47	32.1	15 37.9	48 45	30.8	15 52.3	48 44	30.3	7
8	12 55.8	51 50	34.5	13 11.0	51 49	34.1	13 41.3	50 48	33.2	13 56.4	50 48	32.7	14 11.4	50 47	32.3	14 26.3	50 46	31.8	15 10.9	49 45	30.5	15 25.7	49 44	30.0	8
9	12 25.9	52 50	34.2	12 41.4	52 49	33.8	13 12.4	51 48	32.9	13 27.8	51 47	32.5	13 43.2	51 47	32.0	13 58.5	51 46	31.6	14 44.2	50 44	30.2	14 59.3	50 44	29.8	9
110	11 56.2	53 49	33.9	12 12.1	53 48	33.5	12 43.7	53 47	32.6	12 59.5	52 47	32.2	13 15.2	52 46	31.7	13 30.9	52 46	31.3	14 17.6	52 44	30.0	14 33.1	52 43	29.5	110
1	11 26.8	54 49	33.6	11 43.0	54 48	33.2	12 15.3	54 47	32.3	12 31.4	54 46	31.9	12 47.5	53 46	31.4	13 03.5	53 45	31.0	13 51.2	53 44	29.7	14 07.1	53 43	29.2	1
2	10 57.6	55 48	33.3	11 14.2	55 48	32.8	11 47.1	55 47	32.0	12 03.6	55 46	31.6	12 20.0	55 46	31.1	12 36.3	54 45	30.7	13 25.1	54 43	29.4	13 41.3	54 43	29.0	2
3	10 28.7	56 48	32.9	10 45.6	56 47	32.5	11 19.2	56 46	31.7	11 36.0	56 46	31.2	11 52.7	56 45	30.8	12 09.4	56 44	30.4	12 59.2	55 43	29.1	13 15.7	55 42	28.7	3
4	10 00.9	57 47	32.6	10 17.2	57 47	32.2	10 51.5	57 46	31.3	11 08.6	57 45	30.9	11 25.7	57 45	30.5	11 42.7	57 44	30.1	12 33.6	56 42	28.8	12 50.4	56 42	28.4	4
115	9 31.6	58 47	32.3	9 49.1	58 46	31.8	10 24.1	58 45	31.0	10 41.5	58 45	30.6	10 58.9	58 44	30.2	11 16.3	58 44	29.8	12 08.1	57 42	28.5	12 25.4	57 42	28.1	115
6	9 03.5	60 46	31.9	9 21.3	59 46	31.5	9 56.9	59 45	30.7	10 14.7	59 44	30.3	10 32.4	59 44	29.9	10 50.1	59 43	29.5	11 43.0	59 42	28.2	12 00.5	58 41	27.8	6
7	8 35.6	61 46	31.6	8 53.8	60 46	31.2	9 30.0	60 44	30.3	9 48.1	60 44	29.9	10 06.2	60 43	29.5	10 24.2	60 43	29.1	11 18.1	60 41	27.9	11 36.0	60 41	27.5	7
8	8 08.1	62 46	31.2	8 26.5	62 45	30.8	9 03.4	61 44	30.0	9 21.8	61 43	29.6	9 40.2	61 43	29.2	9 58.5	61 42	28.8	10 53.4	61 41	27.6	11 11.6	61 40	27.2	8
9	7 40.8	63 45	30.8	7 59.5	63 44	30.4	8 37.1	62 44	29.6	8 55.8	62 43	29.3	9 14.5	62 42	28.9	9 33.1	62 42	28.5	10 29.0	62 40	27.3	10 47.6	62 40	26.9	9
120	7 13.8	64 45	30.5	7 32.9	64 44	30.1	8 11.0	63 43	29.3	8 30.0	63 42	28.9	8 49.1	63 42	28.5	9 08.0	63 41	28.1	10 04.9	63 40	26.9	10 23.7	63 39	26.5	120
1	6 47.0	65 44	30.1	7 06.5	65 44	29.7	7 45.2	65 42	28.9	8 04.6	64 42	28.5	8 23.9	64 41	28.2	8 43.2	64 41	27.8	9 41.0	64 39	26.6	10 00.2	64 39	26.2	1
2	6 20.6	66 44	29.7	6 40.4	66 43	29.3	7 19.7	66 42	28.6	7 39.4	65 42	28.2	7 59.1	65 41	27.8	8 18.7	65 40	27.4	9 17.4	65 39	26.3	9 36.9	65 38	25.9	2
3	5 54.5	67 43	29.3	6 14.6	67 42	28.9	6 54.6	67 42	28.2	7 14.5	67 41	27.8	7 34.5	66 40	27.4	7 54.4	66 40	27.1	8 54.1	66 38	25.9	9 14.0	66 38	25.5	3
4	5 28.8	68 42	28.9	5 49.1	68 42	28.6	6 29.7	68 41	27.8	6 50.0	68 40	27.4	7 10.2	68 40	27.1	7 30.5	67 40	26.7	8 31.1	67 38	25.6	8 51.2	67 37	25.2	4
125	5 03.3	69 42	28.5	5 23.9	69 42	28.2	6 05.1	69 40	27.4	6 25.7	69 40	27.1	6 46.3	69 40	26.7	7 06.8	68 39	26.3	8 08.4	68 37	25.2	8 28.8	68 37	24.9	125
6							5 40.9	70 40	27.0	6 01.8	70 40	26.7	6 22.6	70 39	26.3	6 43.5	69 38	26.0	7 45.9	69 37	24.9	8 06.7	69 36	24.5	6
7							5 17.9	71 39	26.6	5 38.1	71 39	26.3	5 59.3	71 38	25.9	6 20.5	70 38	25.6	7 23.8	70 36	24.5	7 44.9	70 36	24.1	7
8										5 14.8	72 38	25.9	5 36.3	72 38	25.5	5 57.7	71 37	25.2	7 02.0	71 35	24.1	7 23.4	71 35	23.8	8
9													5 13.6	72 37	25.2	5 35.3	72 37	24.8	6 40.5	72 35	23.8	7 02.2	72 35	23.4	9
130																5 13.3	73 36	24.4	6 19.3	73 35	23.4	6 41.3	73 34	23.0	130
1																			5 58.4	74 34	23.0	6 20.7	74 34	22.7	1
2																			5 37.9	75 34	22.6	6 00.4	75 33	22.3	2
3																			5 17.7	76 33	22.2	5 40.5	76 33	21.9	3
4																						5 20.9	77 32	21.5	4
135																						5 01.7	78 32	21.1	135

Lat. 28°

H.A.	60° 00′ Alt.	Δd	Δt	Az.	60° 30′ Alt.	Δd	Δt	Az.	62° 00′ Alt.	Δd	Δt	Az.	62° 30′ Alt.	Δd	Δt	Az.
°	° ′			°	° ′			°	° ′			°	° ′			°
00	58 00.0	1.0	01	00.0	57 30.0	1.0	01	00.0	56 00.0	1.0	01	00.0	55 30.0	1.0	01	00.0
1	57 59.6	1.0	02	00.9	57 29.6	1.0	02	00.9	55 59.6	1.0	02	00.8	55 29.6	1.0	02	00.8
2	57 58.3	1.0	04	01.9	57 28.3	1.0	04	01.8	55 58.4	1.0	03	01.7	55 28.5	1.0	03	01.6
3	57 56.1	1.0	05	02.8	57 26.2	1.0	05	02.7	55 56.5	1.0	04	02.5	55 26.6	1.0	04	02.4
4	57 53.0	99	06	03.8	57 23.2	99	06	03.7	55 53.8	99	06	03.3	55 24.0	99	06	03.3
05	57 49.1	99	08	04.7	57 19.4	99	08	04.6	55 50.3	99	07	04.2	55 20.6	99	07	04.1
6	57 44.4	98	09	05.6	57 14.8	99	09	05.5	55 46.1	99	08	05.0	55 16.5	99	08	04.9
7	57 38.8	98	11	06.5	57 09.4	98	10	06.4	55 41.1	98	10	05.8	55 11.6	98	09	05.7
8	57 32.3	97	12	07.4	57 03.1	97	12	07.2	55 35.3	98	11	06.6	55 06.0	98	10	06.4
9	57 25.0	97	14	08.4	56 56.0	97	13	08.1	55 28.8	97	12	07.4	54 59.7	97	12	07.2
10	57 16.9	96	15	09.2	56 48.1	96	14	09.0	55 21.6	96	13	08.2	54 52.7	96	13	08.0
1	57 08.0	95	16	10.1	56 39.5	95	16	09.8	55 13.6	96	14	09.0	54 45.0	96	14	08.8
2	56 58.3	94	18	11.0	56 30.0	94	17	10.7	55 05.0	95	16	09.8	54 36.5	95	15	09.5
3	56 47.8	93	19	11.9	56 19.8	93	18	11.5	54 55.6	94	17	10.6	54 27.4	94	16	10.3
4	56 36.5	92	20	12.7	56 08.9	92	20	12.3	54 45.5	93	18	11.4	54 17.6	93	18	11.0
15	56 24.5	91	21	13.5	55 57.2	91	21	13.2	54 34.7	92	19	12.1	54 07.1	92	18	11.8
6	56 11.8	90	22	14.3	55 44.7	90	22	14.0	54 23.3	91	20	12.8	53 56.0	91	20	12.5
7	55 58.3	89	24	15.1	55 31.6	89	23	14.7	54 11.2	90	21	13.6	53 44.2	90	21	13.2
8	55 44.1	87	25	15.9	55 17.8	88	24	15.5	53 58.4	89	22	14.3	53 31.8	89	22	13.9
9	55 29.2	86	26	16.7	55 03.3	87	25	16.3	53 45.1	87	23	15.0	53 18.8	88	23	14.6
20	55 13.7	85	27	17.4	54 48.2	85	26	17.0	53 31.1	86	24	15.7	53 05.2	86	24	15.2
1	54 57.4	83	28	18.2	54 32.4	84	28	17.7	53 16.4	85	25	16.3	52 50.9	85	25	15.9
2	54 40.6	82	29	18.9	54 15.9	82	28	18.4	53 01.2	84	26	17.0	52 36.1	84	26	16.5
3	54 23.1	81	30	19.6	53 58.9	81	29	19.1	52 45.5	82	27	17.6	52 20.8	83	26	17.2
4	54 05.1	79	31	20.3	53 41.3	80	30	19.8	52 29.1	81	28	18.3	52 04.9	81	28	17.8
25	53 46.4	78	32	21.0	53 23.1	78	31	20.4	52 12.3	79	29	18.9	51 48.4	80	28	18.4
6	53 27.2	76	33	21.6	53 04.3	76	32	21.1	51 54.8	78	30	19.5	51 31.4	78	29	19.0
7	53 07.4	74	34	22.2	52 45.0	75	33	21.7	51 36.9	76	31	20.1	51 13.9	77	30	19.6
8	52 47.1	73	35	22.8	52 25.2	73	34	22.3	51 18.5	75	32	20.6	50 55.9	75	31	20.1
9	52 26.3	71	36	23.4	52 04.8	72	35	22.9	50 59.6	73	32	21.2	50 37.5	74	32	20.7
30	52 05.0	70	36	24.0	51 44.0	70	36	23.4	50 40.2	72	33	21.7	50 18.6	72	32	21.2
1	51 43.2	68	37	24.6	51 22.7	68	36	24.0	50 20.3	70	34	22.3	49 59.2	71	33	21.7
2	51 20.9	66	38	25.1	51 01.0	67	37	24.5	50 00.0	69	34	22.8	49 39.4	69	34	22.2
3	50 58.2	65	38	25.6	50 38.8	65	38	25.0	49 39.3	67	35	23.3	49 19.1	68	34	22.7
4	50 35.1	63	39	26.1	50 16.2	63	38	25.5	49 18.2	65	36	23.7	48 58.5	66	35	23.2
35	50 11.6	61	40	26.6	49 53.1	62	39	26.0	48 56.7	64	36	24.2	48 37.5	64	36	23.6
6	49 47.7	59	40	27.1	49 29.7	60	40	26.5	48 34.8	62	37	24.7	48 16.1	63	36	24.1
7	49 23.4	58	41	27.5	49 05.9	58	40	26.9	48 12.5	60	38	25.1	47 54.3	61	37	24.5
8	48 58.7	56	42	28.0	48 41.8	57	41	27.3	47 49.8	59	38	25.5	47 32.1	59	37	24.9
9	48 33.7	54	42	28.4	48 17.3	55	42	27.8	47 26.9	57	39	25.9	47 09.7	58	38	25.3
40	48 08.3	53	43	28.8	47 52.4	53	42	28.2	47 03.6	55	40	26.3	46 46.9	56	39	25.7
1	47 42.7	51	43	29.2	47 27.3	52	42	28.5	46 39.9	54	40	26.7	46 23.7	54	39	26.1
2	47 16.7	49	44	29.5	47 01.8	50	43	28.9	46 16.0	52	40	27.0	46 00.3	53	40	26.4
3	46 50.4	47	44	29.9	46 36.0	48	43	29.3	45 51.8	50	41	27.4	45 36.6	51	40	26.8
4	46 23.9	46	45	30.2	46 10.0	46	44	29.6	45 27.3	49	41	27.7	45 12.6	49	40	27.1
45	45 57.0	44	45	30.6	45 43.7	45	44	29.9	45 02.5	47	42	28.0	44 48.4	48	41	27.4
6	45 30.0	42	46	30.9	45 17.2	43	45	30.2	44 37.5	45	42	28.3	44 23.9	46	41	27.7
7	45 02.7	41	46	31.2	44 50.4	41	45	30.5	44 12.3	43	42	28.6	43 59.1	44	42	28.0
8	44 35.2	39	46	31.4	44 23.4	40	46	30.8	43 46.8	42	43	28.9	43 34.2	42	42	28.3
9	44 07.4	37	46	31.7	43 56.1	38	46	31.1	43 21.1	40	43	29.2	43 09.0	41	42	28.5
50	43 39.5	36	47	32.0	43 28.7	36	46	31.3	42 55.2	38	44	29.4	42 43.5	39	43	28.8
1	43 11.3	34	47	32.2	43 01.1	35	46	31.6	42 29.0	37	44	29.7	42 17.9	37	43	29.0
2	42 43.0	32	48	32.4	42 33.3	33	47	31.8	42 02.7	35	44	29.9	41 52.1	36	43	29.2
3	42 14.5	30	48	32.6	42 05.3	31	47	32.0	41 36.3	33	44	30.1	41 26.2	34	44	29.5
4	41 45.9	29	48	32.8	41 37.1	29	47	32.2	41 09.6	32	45	30.3	41 00.0	32	44	29.7
55	41 17.0	27	48	33.0	41 08.8	28	47	32.4	40 42.8	30	45	30.5	40 33.7	31	44	29.9
6	40 48.1	25	48	33.2	40 40.4	26	48	32.6	40 15.9	28	45	30.7	40 07.3	29	44	30.0
7	40 19.0	24	49	33.4	40 11.8	25	48	32.7	39 48.8	27	45	30.8	39 40.7	27	44	30.2
8	39 49.8	22	49	33.5	39 43.1	23	48	32.9	39 21.6	25	46	31.0	39 14.0	26	45	30.4
9	39 20.5	21	49	33.7	39 14.3	21	48	33.0	38 54.2	23	46	31.1	38 47.1	24	45	30.5
60	38 51.1	19	49	33.8	38 45.3	20	48	33.2	38 26.8	22	46	31.3	38 20.2	22	45	30.7
1	38 21.6	17	49	33.9	38 16.3	18	48	33.3	37 59.2	20	46	31.4	37 53.1	21	45	30.8
2	37 52.0	16	50	34.0	37 47.2	16	49	33.4	37 31.6	18	46	31.5	37 26.0	19	46	30.9
3	37 22.4	14	50	34.1	37 18.0	15	49	33.5	37 03.8	17	46	31.6	36 58.7	17	46	31.0
4	36 52.6	13	50	34.2	36 48.8	13	49	33.6	36 36.0	15	46	31.7	36 31.4	16	46	31.1
65	36 22.8	11	50	34.3	36 19.5	12	49	33.6	36 08.2	13	47	31.8	36 04.0	14	46	31.2
6	35 53.0	09	50	34.3	35 50.1	10	49	33.7	35 40.2	12	47	31.9	35 36.5	13	46	31.3
7	35 23.1	08	50	34.4	35 20.7	08	49	33.8	35 12.2	10	47	31.9	35 09.0	11	46	31.3
8	34 53.2	06	50	34.4	34 51.2	07	49	33.8	34 44.2	09	47	32.0	34 41.5	09	46	31.4
9	34 23.2	05	50	34.4	34 21.7	05	49	33.8	34 16.1	07	47	32.0	34 13.9	08	46	31.4
70	33 53.3	03	50	34.5	33 52.2	04	49	33.9	33 48.0	06	47	32.1	33 46.2	06	46	31.5
1	33 23.3	02	50	34.5	33 22.7	02	49	33.9	33 19.9	04	47	32.1	33 18.6	05	46	31.5
2	32 53.3	00	50	34.5	32 53.1	01	49	33.9	32 51.7	02	47	32.1	32 50.9	03	46	31.5
3	32 23.3	01	50	34.5	32 23.6	01	49	33.9	32 23.5	01	47	32.1	32 23.2	01	46	31.5
4	31 53.3	03	50	34.5	31 54.0	02	49	33.9	31 55.4	01	47	32.1	31 55.5	00	46	31.5
75	31 23.3	04	50	34.5	31 24.5	04	49	33.9	31 27.2	02	47	32.1	31 27.8	02	46	31.5
6	30 53.3	06	50	34.4	30 55.0	05	49	33.8	30 59.0	04	47	32.1	31 00.1	03	46	31.5
7	30 23.4	07	50	34.4	30 25.5	07	49	33.8	30 30.9	05	47	32.1	30 32.4	05	46	31.5
8	29 53.5	09	50	34.3	29 56.0	08	49	33.8	30 02.8	07	47	32.0	30 04.7	06	46	31.5
9	29 23.6	10	50	34.3	29 26.6	10	49	33.7	29 34.7	08	47	32.0	29 37.1	08	46	31.4
80	28 53.8	12	50	34.2	28 57.2	11	49	33.7	29 06.6	10	47	32.0	29 09.5	09	46	31.4
1	28 24.0	13	50	34.2	28 27.9	13	49	33.6	28 38.6	11	46	31.9	28 41.9	11	46	31.3
2	27 54.3	15	49	34.1	27 58.6	14	49	33.5	28 10.7	13	46	31.8	28 14.4	12	46	31.3
3	27 24.7	16	49	34.0	27 29.4	16	49	33.4	27 42.8	14	46	31.8	27 46.9	14	46	31.2
4	26 55.1	17	49	33.9	27 00.2	17	48	33.3	27 14.9	16	46	31.7	27 19.5	15	46	31.1
85	26 25.6	19	49	33.8	26 31.2	18	48	33.2	26 47.1	17	46	31.6	26 52.2	17	46	31.0
6	25 56.2	20	49	33.7	26 02.2	20	48	33.1	26 19.4	19	46	31.5	26 24.9	18	45	31.0
7	25 26.8	22	49	33.6	25 33.2	21	48	33.0	25 51.8	20	46	31.4	25 57.7	20	45	30.9
8	24 57.6	23	49	33.4	25 04.4	23	48	32.9	25 24.2	21	46	31.3	25 30.5	21	45	30.8
9	24 28.4	24	48	33.3	24 35.7	24	48	32.8	24 56.7	23	46	31.2	25 03.5	22	45	30.6
90	23 59.4	26	48	33.2	24 07.0	25	48	32.7	24 29.3	24	45	31.1	24 36.6	24	45	30.5

63° 00′ Alt.	Δd	Δt	Az.	69° 00′ Alt.	Δd	Δt	Az.	69° 30′ Alt.	Δd	Δt	Az.	74° 30′ Alt.	Δd	Δt	Az.	H.A.
° ′			°	° ′			°	° ′			°	° ′			°	°
55 00.0	1.0	01	00.0	49 00.0	1.0	00	00.0	48 30.0	1.0	00	00.0	43 30.0	1.0	00	00.0	00
54 59.6	1.0	02	00.8	48 59.7	1.0	01	00.5	48 29.8	1.0	01	00.5	43 29.8	1.0	01	00.4	1
54 58.5	1.0	03	01.6	48 59.0	1.0	02	01.1	48 29.0	1.0	02	01.1	43 29.3	1.0	01	00.7	2
54 56.7	1.0	04	02.4	48 57.7	1.0	03	01.6	48 27.8	1.0	03	01.6	43 28.5	1.0	02	01.1	3
54 54.2	99	06	03.2	48 56.0	1.0	04	02.2	48 26.1	1.0	04	02.1	43 27.3	1.0	03	01.5	4
54 50.9	99	07	03.9	48 53.7	99	05	02.7	48 23.9	99	04	02.6	43 25.7	99	03	01.8	05
54 46.9	99	08	04.7	48 50.9	99	05	03.3	48 21.2	99	05	03.2	43 23.9	99	04	02.2	6
54 42.2	98	09	05.5	48 47.7	99	06	03.8	48 18.1	99	06	03.7	43 21.7	99	04	02.6	7
54 36.7	98	10	06.3	48 43.9	98	07	04.3	48 14.4	98	07	04.2	43 19.1	99	05	02.9	8
54 30.6	97	11	07.0	48 39.7	98	08	04.9	48 10.3	98	08	04.7	43 16.3	98	05	03.3	9
54 23.8	96	12	07.8	48 34.9	97	09	05.4	48 05.7	97	08	05.2	43 13.1	98	06	03.7	10
54 16.3	96	14	08.5	48 29.7	97	10	05.9	48 00.7	97	09	05.7	43 09.5	97	06	04.0	1
54 08.1	95	15	09.3	48 24.0	96	10	06.4	47 55.1	96	10	06.2	43 05.6	97	07	04.4	2
53 59.2	94	16	10.0	48 17.8	95	11	07.0	47 49.2	96	11	06.7	43 01.5	96	08	04.7	3
53 49.7	93	17	10.7	48 11.1	95	12	07.5	47 42.7	95	12	07.2	42 56.9	96	08	05.1	4
53 39.5	92	18	11.4	48 04.0	94	13	08.0	47 35.8	94	12	07.7	42 52.1	95	09	05.4	15
53 28.7	91	19	12.1	47 56.4	93	13	08.5	47 28.5	93	13	08.2	42 46.9	94	09	05.8	6
53 17.2	90	20	12.8	47 48.4	92	14	09.0	47 20.7	92	14	08.7	42 41.5	94	10	06.1	7
53 05.1	89	21	13.5	47 39.9	91	15	09.5	47 12.5	92	14	09.2	42 35.7	93	10	06.4	8
52 52.5	88	22	14.2	47 31.0	90	16	09.9	47 03.8	91	15	09.6	42 29.6	92	11	06.8	9
52 39.2	87	23	14.8	47 21.6	90	16	10.4	46 54.7	90	16	10.1	42 23.2	91	11	07.1	20
52 25.3	85	24	15.5	47 11.8	88	17	10.9	46 45.2	89	16	10.6	42 16.5	90	12	07.4	1
52 10.9	84	25	16.1	47 01.6	87	18	11.4	46 35.3	88	17	11.0	42 09.5	89	12	07.8	2
51 56.0	83	26	16.7	46 51.0	86	18	11.8	46 25.0	87	18	11.4	42 02.2	89	13	08.1	3
51 40.4	82	27	17.3	46 39.9	85	19	12.3	46 14.3	85	18	11.9	41 54.6	88	13	08.4	4
51 24.4	80	28	17.9	46 28.4	84	20	12.7	46 03.2	84	19	12.3	41 46.7	87	14	08.7	25
51 07.9	79	28	18.5	46 16.6	83	20	13.1	45 51.7	83	20	12.7	41 38.5	86	14	09.0	6
50 50.8	77	29	19.1	46 04.4	82	21	13.6	45 39.8	82	20	13.1	41 30.1	84	14	09.3	7
50 33.3	76	30	19.6	45 51.8	80	22	14.0	45 27.6	81	21	13.6	41 21.4	83	15	09.6	8
50 15.3	74	31	20.1	45 38.8	79	22	14.4	45 15.0	79	22	14.0	41 12.4	82	16	09.9	9
49 56.8	73	32	20.7	45 25.4	78	23	14.8	45 02.1	78	22	14.3	41 03.1	81	16	10.2	30
49 37.9	71	32	21.2	45 11.7	76	23	15.2	44 48.8	77	23	14.7	40 53.6	80	16	10.5	1
49 18.6	70	33	21.7	44 57.7	75	24	15.6	44 35.1	75	23	15.1	40 43.8	79	17	10.8	2
48 58.8	68	34	22.1	44 43.3	74	24	15.9	44 21.1	74	24	15.5	40 33.8	77	17	11.0	3
48 38.7	66	34	22.6	44 28.6	72	25	16.3	44 06.9	73	24	15.8	40 23.5	76	18	11.3	4
48 18.1	65	35	23.0	44 13.5	71	26	16.7	43 52.3	71	25	16.2	40 13.0	75	18	11.6	35
47 57.2	63	36	23.5	43 58.2	69	26	17.0	43 37.3	70	25	16.5	40 02.3	74	18	11.8	6
47 35.9	62	36	23.9	43 42.5	68	26	17.4	43 22.1	68	26	16.9	39 51.3	72	19	12.1	7
47 14.3	60	37	24.3	43 26.6	66	27	17.7	43 06.6	67	26	17.2	39 40.1	71	19	12.3	8
46 52.3	58	37	24.7	43 10.3	65	28	18.0	42 50.8	65	27	17.5	39 28.6	69	19	12.6	9
46 30.0	57	38	25.1	42 53.8	63	28	18.3	42 34.8	64	27	17.8	39 17.0	68	20	12.8	40
46 07.4	55	38	25.5	42 37.0	62	28	18.6	42 18.4	62	28	18.1	39 05.1	67	20	13.1	1
45 44.5	53	39	25.8	42 20.0	60	29	18.9	42 01.9	61	28	18.4	38 53.0	65	20	13.3	2
45 21.3	52	39	26.1	42 02.7	59	29	19.2	41 45.0	59	28	18.7	38 40.8	64	21	13.5	3
44 57.8	50	40	26.5	41 45.1	57	30	19.5	41 27.9	57	29	18.9	38 28.3	62	21	13.7	4
44 34.0	48	40	26.8	41 27.3	55	30	19.8	41 10.6	56	29	19.2	38 15.7	61	22	13.9	45
44 10.0	46	40	27.1	41 09.3	54	30	20.0	40 53.1	54	30	19.5	38 02.8	59	22	14.1	6
43 45.8	45	41	27.4	40 51.0	52	31	20.3	40 35.3	53	30	19.7	37 49.8	58	22	14.3	7
43 21.3	43	41	27.6	40 32.6	50	31	20.5	40 17.4	51	30	19.9	37 36.6	56	22	14.5	8
42 56.6	41	42	27.9	40 13.9	49	32	20.7	39 59.2	49	31	20.2	37 23.2	54	22	14.7	9
42 31.7	40	42	28.2	39 55.0	47	32	21.0	39 40.8	48	31	20.4	37 09.7	53	23	14.9	50
42 06.6	38	42	28.4	39 36.0	45	32	21.2	39 22.2	46	31	20.6	36 56.0	51	23	15.1	1
41 41.4	36	42	28.6	39 16.7	44	32	21.4	39 03.5	44	32	20.8	36 42.2	50	23	15.2	2
41 15.9	35	43	28.8	38 57.3	42	33	21.6	38 44.6	43	32	21.0	36 28.2	48	24	15.4	3
40 50.2	33	43	29.0	38 37.7	40	33	21.8	38 25.5	41	32	21.2	36 14.1	46	24	15.5	4
40 24.5	31	43	29.2	38 18.0	39	33	22.0	38 06.3	39	32	21.4	35 59.8	45	24	15.7	55
39 58.5	30	44	29.4	37 58.1	37	33	22.1	37 46.9	38	32	21.6	35 45.4	43	24	15.8	6
39 32.4	28	44	29.6	37 38.1	35	34	22.3	37 27.4	36	33	21.7	35 30.9	42	24	16.0	7
39 06.2	26	44	29.7	37 17.9	34	34	22.5	37 07.7	34	33	21.9	35 16.2	40	24	16.1	8
38 39.9	25	44	29.9	36 57.6	32	34	22.6	36 47.9	33	33	22.0	35 01.5	38	25	16.2	9
38 13.4	23	44	30.0	36 37.2	30	34	22.7	36 28.0	31	34	22.2	34 46.6	36	25	16.4	60
37 46.8	21	44	30.2	36 16.6	29	34	22.9	36 07.9	29	34	22.3	34 31.6	35	25	16.5	1
37 20.2	20	45	30.3	35 56.0	27	35	23.0	35 47.8	28	34	22.4	34 16.5	33	25	16.6	2
36 53.4	18	45	30.4	35 35.2	25	35	23.1	35 27.5	26	34	22.5	34 01.4	31	26	16.7	3
36 26.6	16	45	30.5	35 14.4	24	35	23.2	35 07.2	24	34	22.6	33 46.1	30	26	16.8	4
35 59.7	15	45	30.6	34 53.4	22	35	23.3	34 46.8	23	34	22.7	33 30.7	28	26	16.9	65
35 32.7	13	45	30.6	34 32.4	20	35	23.4	34 26.3	21	34	22.8	33 15.3	26	26	17.0	6
35 05.7	12	45	30.7	34 11.3	19	35	23.5	34 05.7	19	34	22.9	32 59.8	25	26	17.1	7
34 38.6	10	45	30.8	33 50.2	17	35	23.6	33 45.0	17	34	23.0	32 44.2	23	26	17.1	8
34 11.5	08	45	30.8	33 29.0	15	36	23.7	33 24.3	16	35	23.1	32 28.6	21	26	17.2	9
33 44.3	07	45	30.9	33 07.7	14	36	23.7	33 03.5	14	35	23.1	32 12.9	20	26	17.3	70
33 17.1	05	45	30.9	32 46.4	12	36	23.8	32 42.7	12	35	23.2	31 57.2	18	26	17.3	1
32 49.9	04	45	30.9	32 25.0	10	36	23.8	32 21.8	11	35	23.2	31 41.4	16	26	17.4	2
32 22.7	02	45	30.9	32 03.6	09	36	23.9	32 00.9	09	35	23.3	31 25.5	14	26	17.4	3
31 55.4	00	45	30.9	31 42.1	07	36	23.9	31 40.0	07	35	23.3	31 09.6	13	26	17.5	4
31 28.2	01	45	30.9	31 20.7	05	36	23.9	31 19.0	06	35	23.3	30 53.7	11	26	17.5	75
31 01.0	03	45	30.9	30 59.2	04	36	23.9	30 58.0	04	35	23.3	30 37.8	09	27	17.5	6
30 33.7	04	45	30.9	30 37.7	02	36	23.9	30 37.0	03	35	23.4	30 21.8	08	27	17.6	7
30 06.5	06	45	30.9	30 16.2	00	36	23.9	30 16.0	01	35	23.4	30 05.8	06	27	17.6	8
29 39.3	07	45	30.9	29 54.7	01	36	23.9	29 55.0	01	35	23.4	29 49.8	04	27	17.6	9
29 12.2	09	45	30.8	29 33.2	03	36	23.9	29 34.0	02	35	23.4	29 33.7	03	27	17.6	80
28 45.1	10	45	30.8	29 11.7	05	36	23.9	29 13.0	04	35	23.3	29 17.7	01	27	17.6	1
28 18.0	12	45	30.7	28 50.2	06	36	23.9	28 52.0	06	35	23.3	29 01.7	01	27	17.6	2
27 51.0	13	45	30.6	28 28.8	08	36	23.9	28 31.0	07	35	23.3	28 45.6	02	27	17.6	3
27 24.0	15	45	30.6	28 07.4	09	36	23.8	28 10.1	09	35	23.3	28 29.6	04	27	17.6	4
26 57.1	16	45	30.5	27 46.0	11	36	23.8	27 49.2	10	35	23.2	28 13.6	06	27	17.6	85
26 30.3	18	45	30.4	27 24.6	12	36	23.7	27 28.3	12	35	23.2	27 57.6	07	27	17.6	6
26 03.5	19	44	30.3	27 03.3	14	36	23.7	27 07.5	14	35	23.1	27 41.6	09	27	17.5	7
25 36.8	21	44	30.2	26 42.1	16	36	23.6	26 46.7	15	35	23.1	27 25.7	11	27	17.5	8
25 10.2	22	44	30.1	26 20.8	17	35	23.6	26 25.9	17	34	23.0	27 09.7	12	26	17.5	9
24 43.6	23	44	30.0	25 59.7	19	35	23.5	26 05.2	18	34	23.0	26 53.9	14	26	17.4	90

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	23 30.5	27 48	33.0	23 38.5	27 47	32.5	24 02.1	26 45	30.9	24 09.7	25 45	30.4	24 17.2	25 44	29.9	25 38.6	20 35	23.4	25 44.6	20 34	22.9	26 38.0	16 26	17.4	91
2	23 01.6	28 48	32.9	23 10.1	28 47	32.4	23 34.9	27 45	30.8	23 42.9	27 44	30.3	23 50.9	26 44	29.7	25 17.6	22 35	23.3	25 24.1	21 34	22.8	26 22.2	17 26	17.3	2
3	22 32.9	30 48	32.7	22 41.8	29 47	32.2	23 07.8	28 45	30.7	23 16.3	28 44	30.1	23 24.7	28 44	29.6	24 56.6	23 35	23.2	25 03.6	23 34	22.7	26 06.4	19 26	17.3	3
4	22 04.3	31 47	32.6	22 13.6	31 47	32.0	22 40.9	30 45	30.5	22 49.8	29 44	30.0	22 58.5	29 43	29.5	24 35.8	25 35	23.2	24 43.2	24 34	22.6	25 50.7	21 26	17.2	4
95	21 35.9	32 47	32.4	21 45.6	32 46	31.9	22 14.0	31 44	30.3	22 23.3	31 44	29.8	22 32.5	31 43	29.3	24 15.0	26 34	23.1	24 22.8	26 34	22.5	25 35.0	22 26	17.2	95
6	21 07.6	34 47	32.2	21 17.7	33 46	31.7	21 47.3	33 44	30.2	21 57.0	32 44	29.7	22 06.7	32 43	29.2	23 54.3	28 34	22.9	24 02.6	27 34	22.4	25 19.4	24 26	17.1	6
7	20 39.4	35 47	32.0	20 49.9	35 46	31.5	21 20.8	34 44	30.0	21 30.9	34 43	29.5	21 40.9	33 43	29.0	23 33.7	29 34	22.8	23 42.4	29 34	22.3	25 03.9	25 26	17.0	7
8	20 11.4	36 46	31.8	20 22.3	36 46	31.3	20 54.3	35 44	29.8	21 04.9	35 43	29.3	21 15.3	35 42	28.8	23 13.2	31 34	22.7	23 22.3	30 33	22.2	24 48.4	27 26	17.0	8
9	19 43.5	38 46	31.6	19 54.8	37 46	31.2	20 28.0	37 44	29.7	20 39.0	36 43	29.2	20 49.8	36 42	28.7	22 52.8	32 34	22.6	23 02.4	32 33	22.1	24 33.0	28 26	16.9	9
100	19 15.8	39 46	31.4	19 27.5	39 45	31.0	20 01.9	38 43	29.5	20 13.2	38 43	29.0	20 24.5	37 42	28.5	22 32.5	34 34	22.5	22 42.5	33 33	22.0	24 17.7	30 26	16.8	100
1	18 48.3	40 46	31.2	19 00.3	40 45	30.7	19 35.9	39 43	29.3	19 47.6	39 42	28.8	19 59.3	39 42	28.3	22 12.3	35 34	22.3	22 22.8	35 33	21.8	24 02.4	32 25	16.7	1
2	18 20.9	41 45	31.0	18 33.3	41 45	30.5	19 10.1	41 43	29.1	19 22.2	40 42	28.6	19 34.2	40 42	28.1	21 52.2	37 33	22.2	22 03.1	36 32	21.7	23 47.2	33 25	16.6	2
3	17 53.7	43 45	30.8	18 06.5	43 44	30.3	18 44.4	42 42	28.9	18 56.9	42 42	28.4	19 09.3	41 41	27.9	21 32.3	38 33	22.0	21 43.6	38 32	21.6	23 32.1	35 25	16.5	3
4	17 26.6	44 45	30.6	17 39.8	44 44	30.1	18 18.9	43 42	28.7	18 31.8	43 42	28.2	18 44.6	43 41	27.7	21 12.4	39 33	21.9	21 24.2	39 32	21.4	23 17.1	36 25	16.4	4
105	16 59.8	45 44	30.3	17 13.3	45 44	29.9	17 53.6	44 42	28.5	18 06.8	44 41	28.0	18 20.0	44 41	27.5	20 52.7	41 32	21.7	21 04.9	41 32	21.3	23 02.2	38 25	16.3	105
6	16 33.1	46 44	30.1	16 47.0	46 44	29.6	17 28.4	46 42	28.2	17 42.1	45 41	27.8	17 55.6	45 40	27.3	20 33.2	42 32	21.6	20 45.8	42 32	21.1	22 47.4	39 24	16.2	6
7	16 06.7	48 44	29.8	16 20.9	48 43	29.4	17 03.4	47 41	28.0	17 17.5	47 41	27.5	17 31.4	47 40	27.1	20 13.8	44 32	21.4	20 26.8	43 32	20.9	22 32.7	41 24	16.1	7
8	15 40.4	49 44	29.6	15 55.0	49 43	29.1	16 38.6	48 41	27.8	16 53.1	48 40	27.3	17 07.4	48 40	26.9	19 54.5	45 32	21.3	20 07.9	45 31	20.8	22 18.1	42 24	15.9	8
9	15 14.3	50 43	29.3	15 29.3	50 42	28.9	16 14.1	49 41	27.5	16 28.8	49 40	27.1	16 43.6	49 40	26.6	19 35.3	46 32	21.1	19 49.2	46 31	20.6	22 03.6	43 24	15.8	9
110	14 48.5	51 43	29.1	15 03.9	51 42	28.6	15 49.7	51 40	27.3	16 04.8	50 40	26.8	16 19.9	50 39	26.4	19 16.4	48 31	20.9	19 30.6	47 31	20.4	21 49.2	45 24	15.7	110
1	14 22.8	53 42	28.8	14 38.6	52 42	28.4	15 25.5	52 40	27.0	15 41.0	52 39	26.6	15 56.5	52 39	26.2	18 57.6	49 31	20.7	19 12.2	49 30	20.3	21 34.9	46 24	15.6	1
2	13 57.4	54 42	28.5	14 13.5	54 41	28.1	15 01.5	53 40	26.8	15 17.4	53 39	26.3	15 33.2	53 38	25.9	18 38.9	50 31	20.5	18 54.0	50 30	20.1	21 20.8	48 23	15.4	2
3	13 32.2	55 42	28.3	13 48.7	55 41	27.8	14 37.7	54 39	26.5	14 54.0	54 39	26.1	15 10.2	54 38	25.7	18 20.4	52 30	20.3	18 35.9	51 30	19.9	21 06.8	49 23	15.3	3
4	13 07.3	56 41	28.0	13 24.1	56 41	27.5	14 14.2	55 39	26.3	14 30.8	55 38	25.8	14 47.3	55 38	25.4	18 02.1	53 30	20.1	18 17.9	53 30	19.7	20 52.8	50 23	15.1	4
115	12 42.5	57 41	27.7	12 59.7	57 40	27.3	13 50.8	57 38	26.0	14 07.8	56 38	25.6	14 24.7	56 37	25.1	17 43.9	54 30	19.9	18 00.2	54 29	19.5	20 39.1	52 23	15.0	115
6	12 18.1	58 40	27.4	12 35.5	58 40	27.0	13 27.7	58 38	25.7	13 45.1	58 38	25.3	14 02.3	58 37	24.9	17 25.9	56 30	19.7	17 42.6	55 29	19.3	20 25.4	53 22	14.9	6
7	11 53.8	59 40	27.1	12 11.6	59 39	26.7	13 04.9	59 38	25.4	13 22.5	59 37	25.0	13 40.2	59 37	24.6	17 08.1	57 29	19.5	17 25.2	57 29	19.1	20 11.9	55 22	14.7	7
8	11 29.8	61 40	26.8	11 48.0	60 39	26.4	12 42.2	60 37	25.1	13 00.3	60 37	24.7	13 18.2	60 36	24.3	16 50.5	58 29	19.3	17 07.9	58 28	18.9	19 58.5	56 22	14.5	8
9	11 06.1	62 39	26.5	11 24.6	62 39	26.1	12 19.9	61 37	24.9	12 38.2	61 36	24.4	12 56.5	61 36	24.0	16 33.1	59 29	19.1	16 50.9	59 28	18.7	19 45.3	57 22	14.4	9
120	10 42.6	63 39	26.1	11 01.4	63 38	25.8	11 57.7	62 36	24.6	12 16.4	62 36	24.2	12 35.1	62 36	23.8	16 15.9	60 28	18.9	16 34.0	60 28	18.4	19 32.2	58 22	14.2	120
1	10 19.4	64 38	25.8	10 38.5	64 38	25.4	11 35.8	63 36	24.3	11 54.8	63 36	23.9	12 13.8	63 35	23.5	15 58.9	62 28	18.6	16 17.3	61 27	18.2	19 19.3	60 21	14.0	1
2	9 56.4	65 38	25.5	10 15.9	65 37	25.1	11 14.2	65 36	23.9	11 33.5	64 35	23.6	11 52.9	64 34	23.2	15 42.0	63 28	18.4	16 00.9	63 27	18.0	19 06.5	61 21	13.9	2
3	9 33.8	66 37	25.2	9 53.6	66 37	24.8	10 52.8	66 35	23.6	11 12.5	66 35	23.3	11 32.2	66 34	22.9	15 25.4	64 27	18.2	15 44.6	64 27	17.8	18 53.9	62 21	13.7	3
4	9 11.4	67 37	24.8	9 31.5	67 36	24.5	10 31.7	67 35	23.3	10 51.7	67 34	22.9	11 11.7	67 34	22.6	15 09.0	65 27	17.9	15 28.5	65 26	17.5	18 41.4	63 20	13.5	4
125	8 49.3	68 36	24.5	9 09.7	68 36	24.1	10 10.9	68 34	23.0	10 31.2	68 34	22.6	10 51.5	68 33	22.3	14 52.8	66 27	17.7	15 12.7	66 26	17.3	18 29.1	65 20	13.3	125
6	8 27.5	69 36	24.1	8 48.2	69 35	23.8	9 50.3	69 34	22.7	10 11.0	69 33	22.3	10 31.6	69 33	21.9	14 36.8	67 26	17.4	14 57.0	67 26	17.1	18 17.0	66 20	13.2	6
7	8 06.0	70 35	23.8	8 27.0	70 35	23.4	9 30.0	70 33	22.3	9 51.0	70 33	22.0	10 11.9	70 32	21.6	14 21.1	69 26	17.2	14 41.6	68 25	16.8	18 05.0	67 20	13.0	7
8	7 44.7	71 35	23.4	8 06.1	71 34	23.1	9 10.0	71 33	22.0	9 31.3	71 32	21.7	9 52.6	71 32	21.3	14 05.5	70 26	16.9	14 26.4	70 25	16.6	17 53.2	68 20	12.8	8
9	7 23.8	72 34	23.1	7 45.5	72 34	22.7	8 50.3	72 32	21.7	9 11.9	72 32	21.3	9 33.5	72 32	21.0	13 50.2	71 25	16.7	14 11.4	71 24	16.3	17 41.5	69 19	12.6	9
130	7 03.2	73 34	22.7	7 25.2	73 33	22.4	8 30.9	73 32	21.3	8 52.8	73 31	21.0	9 14.6	73 31	20.6	13 35.1	72 25	16.4	13 56.7	72 24	16.0	17 30.1	71 19	12.4	130
1	6 42.9	74 33	22.3	7 05.2	74 33	22.0	8 11.8	74 31	21.0	8 34.0	74 31	20.6	8 56.1	74 30	20.3	13 20.3	73 24	16.1	13 42.1	73 24	15.8	17 18.8	72 18	12.2	1
2	6 23.0	75 33	22.0	6 45.5	75 32	21.6	7 53.0	75 31	20.6	8 15.4	75 30	20.3	8 37.9	75 30	20.0	13 05.7	74 24	15.9	13 27.8	74 23	15.5	17 07.7	73 18	12.0	2
3	6 03.3	76 32	21.6	6 26.1	76 32	21.2	7 34.5	76 30	20.3	7 57.2	76 30	19.9	8 20.0	76 30	19.6	12 51.3	75 24	15.6	13 13.8	75 23	15.3	16 56.8	74 18	11.8	3
4	5 44.0	77 32	21.2	6 07.1	77 31	20.9	7 16.3	77 30	19.9	7 39.3	77 29	19.6	8 02.3	77 29	19.3	12 37.2	76 23	15.3	13 00.0	76 23	15.0	16 46.0	75 18	11.6	4
135	5 25.0	78 31	20.8	5 48.4	78 31	20.5	6 58.4	78 29	19.5	7 21.7	78 29	19.2	7 45.0	78 28	18.9	12 23.3	77 23	15.0	12 46.4	77 22	14.7	16 35.5	76 17	11.4	135
6	5 06.4	79 31	20.4	5 30.0	79 30	20.1	6 40.9	79 29	19.2	7 04.4	79 28	18.9	7 28.0	79 28	18.5	12 09.7	78 22	14.8	12 33.1	78 22	14.4	16 25.2	77 17	11.2	6
7				5 12.0	80 30	19.7	6 23.6	80 28	18.8	6 47.5	80 28	18.5	7 11.3	79 27	18.2	11 56.4	79 22	14.5	12 20.0	79 21	14.2	16 15.0	78 17	10.9	7
8							6 06.7	80 28	18.4	6 30.8	80 27	18.1	6 55.0	80 27	17.8	11 43.3	80 22	14.2	12 07.2	80 21	13.9	16 05.0	79 16	10.7	8
9							5 50.1	81 27	18.0	6 14.5	81 26	17.7	6 38.9	81 26	17.4	11 30.4	81 21	13.9	11 54.6	81 20	13.6	15 55.3	80 16	10.5	9
140							5 33.9	82 26	17.7	5 58.6	82 26	17.4	6 23.2	82 26	17.1	11 17.8	82 20	13.6	11 42.3	81 20	13.3	15 45.7	81 16	10.3	140
1							5 18.0	83 26	17.3	5 42.9	83 26	17.0	6 07.8	83 25	16.7	11 05.5	82 20	13.3	11 30.2	82 20	13.0	15 36.4	82 15	10.1	1
2							5 02.5	84 25	16.9	5 27.6	84 25	16.6	5 52.7	84 24	16.3	10 53.5	83 20	13.0	11 18.5	83 19	12.7	15 27.2	83 15	09.8	2
3										5 12.7	85 24	16.2	5 38.0	85 24	15.9	10 41.7	84 19	12.7	11 06.9	84 19	12.4	15 18.3	83 14	09.6	3
4													5 23.7	85 24	15.5	10 30.2	85 19	12.4	10 55.7	85 18	12.1	15 09.6	84 14	09.4	4
145													5 09.6	86 23	15.2	10 19.0	86 18	12.1	10 44.7	86 18	11.8	15 01.0	85 14	09.1	145
6																10 08.1	87 18	11.7	10 34.0	86 17	11.5	14 52.7	86 13	08.9	6
7																9 57.4	87 17	11.4	10 23.6	87 17	11.2	14 44.7	87 13	08.7	7
8																9 47.1	88 17	11.1	10 13.5	88 16	10.9	14 36.8	88 13	08.4	8
9																9 37.0	89 16	10.8	10 03.6	89 16	10.6	14 29.2	88 12	08.2	9
150																9 27.3	89 16	10.5	9 54.1	89 16	10.2	14 21.7	89 12	07.9	150
1																9 17.8	90 15	10.1	9 44.8	90 15	09.9	14 14.5	90 12	07.7	1
2																9 08.6	91 15	09.8	9 35.8	91 14	09.6	14 07.6	90 11	07.4	2
3																8 59.7	91 14	09.5	9 27.1	91 14	09.3	14 00.8	91 11	07.2	3
4																8 51.2	92 14	09.1	9 18.8	92 14	08.9	13 54.3	92 10	06.9	4
155																8 42.9	93 13	08.8	9 10.7	93 13	08.6	13 48.0	92 10	06.7	155
6																8 34.9	93 13	08.5	9 02.9	93 12	08.3	13 42.0	93 10	06.4	6
7																8 27.3	94 12	08.1	8 55.4	94 12	08.0	13 36.2	93 09	06.2	7
8																8 19.9	94 12	07.8	8 48.2	94 12	07.6	13 30.6	94 09	05.9	8
9																8 12.9	95 11	07.5	8 41.3	95 11	07.3	13 25.3	95 08	05.7	9
160																8 06.2	95 11	07.1	8 34.7	95 10	07.0	13 20.2	95 08	05.4	160
1																7 59.8	96 10	06.8	8 28.5	96 10	06.6	13 15.3	96 08	05.1	1
2																7 53.7	96 10	06.4	8 22.5	96 09	06.3	13 10.7	96 07	04.9	2
3																7 47.9	97 09	06.1	8 16.9	97 09	05.9	13 06.3	96 07	04.6	3
4																7 42.5	97 08	05.7	8 11.6	97 08	05.6	13 02.2	97 06	04.3	4
165																7 37.4	97 08	05.4	8 06.6	97 08	05.3	12 58.3	97 06	04.1	165
6																7 32.6	98 08	05.0	8 01.9	98 07	04.9	12 54.7	98 06	03.8	6
7																7 28.1	98 07	04.7	7 57.5	98 07	04.6	12 51.3	98 05	03.5	7
8																7 24.0	98 06	04.3	7 53.4	98 06	04.2	12 48.2	98 05	03.3	8
9																7 20.1	99 06	04.0	7 49.7	99 06	03.9	12 45.3	98 04	03.0	9
170																7 16.7	99 05	03.6	7 46.3	99 06	03.5	12 42.6	99 04	02.7	170
1																7 13.5	99 05	03.2	7 43.2	99 05	03.2	12 40.2	99 04	02.5	1
2																7 10.7	99 04	02.9	7 40.4	99 04	02.8	12 38.1	99 03	02.2	2
3																7 08.2	99 04	02.5	7 38.0	99 04	02.5	12 36.2	99 03	01.9	3
4																7 06.0	1.0 03	02.2	7 35.9	1.0 03	02.1	12 34.6	1.0 02	01.6	4
175																7 04.2	1.0 02	01.8	7 34.1	1.0 02	01.8	12 33.2	1.0 02	01.4	175
6																7 02.7	1.0 02	01.4	7 32.6	1.0 02	01.4	12 32.0	1.0 02	01.1	6
7																7 01.5	1.0 01	01.1	7 31.5	1.0 01	01.1	12 31.1	1.0 01	00.8	7
8																7 00.7	1.0 01	00.7	7 30.7	1.0 01	00.7	12 30.5	1.0 01	00.5	8
9																7 00.2	1.0 00	00.4	7 30.2	1.0 00	00.4	12 30.1	1.0 00	00.3	9
180																7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	12 30.0	1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 28°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	66	180	70	180	74	180	78	180	82	180	86	180	90	...	86	00	82	00	78	00	74	00	00
4	66	170	70	169	74	166	77	162	81	155	85	137	86	89	85	40	81	22	78	14	74	10	4
8	65	161	69	158	72	153	76	147	79	136	82	117	83	88	82	58	80	38	76	27	73	20	8
12	63	152	67	148	70	143	74	135	76	124	79	108	79	87	79	66	77	49	74	36	71	28	12
16	62	145	65	140	68	134	71	126	73	115	75	102	76	86	76	70	74	55	72	44	69	34	16
20	59	138	62	133	65	127	68	119	70	109	72	98	72	85	72	72	71	60	70	49	67	40	20
24	57	132	60	127	62	121	65	113	67	105	68	95	69	84	69	73	68	62	67	53	65	44	24
28	54	127	57	122	59	116	61	109	63	101	65	93	65	83	65	74	65	64	64	55	62	47	28
32	51	122	54	117	56	112	58	105	60	98	61	91	62	82	62	74	62	65	61	57	60	49	32
36	48	118	51	114	53	108	55	102	56	96	58	89	58	81	59	74	59	66	58	58	57	51	36
40	45	115	47	110	49	105	51	99	53	93	54	87	55	80	55	73	55	66	55	59	54	53	40
44	42	112	44	107	46	102	48	97	49	91	51	85	51	79	52	73	52	66	52	60	52	53	44
48	38	109	41	104	42	100	44	95	46	89	47	84	48	78	49	72	49	66	49	60	49	54	48
52	35	106	37	102	39	97	41	93	42	88	43	82	44	77	45	72	46	66	46	60	46	54	52
56	32	104	34	99	35	95	37	91	39	86	40	81	41	76	42	71	42	65	43	60	43	55	56
60	28	101	30	97	32	93	34	89	35	84	36	80	38	75	39	70	39	65	40	60	40	54	60
64	25	99	27	95	28	91	30	87	32	83	33	78	34	74	35	69	36	64	37	59	37	54	64
68	21	97	23	93	25	89	27	85	28	81	30	77	31	72	32	68	33	63	34	59	34	54	68
72	18	95	20	91	21	87	23	84	25	79	26	75	27	71	29	67	30	62	31	58	31	53	72
76	14	93	16	89	18	86	20	82	21	78	23	74	24	70	25	66	27	61	28	57	29	53	76
80	11	91	13	88	14	84	16	80	18	76	19	72	21	68	22	64	24	60	25	56	26	52	80
84	07	89	09	86	11	82	13	78	14	75	16	71	18	67	19	63	21	59	22	55	23	51	84
88	04	87	06	84	07	80	09	77	11	73	13	69	14	66	16	62	18	58	19	54	20	50	88
92	00	86	02	82	04	78	06	75	08	71	09	68	11	64	13	60	15	57	16	53	18	49	92
96	*03*	84	*01*	80	00	77	02	73	04	70	06	66	08	62	10	59	12	55	13	52	15	48	96
100	*07*	82	*05*	78	*03*	75	*01*	71	01	68	03	64	05	61	07	57	09	54	11	50	12	47	100
104	*10*	80	*08*	76	*06*	73	*04*	69	*02*	66	*00*	62	02	59	04	56	06	52	08	49	10	45	104
108	*14*	78	*12*	74	*10*	71	*08*	67	*05*	64	*03*	60	*01*	57	01	54	03	50	05	47	07	44	108
112	*17*	76	*15*	72	*13*	69	*11*	65	*09*	62	*06*	58	*04*	55	*02*	52	00	49	03	45	05	42	112
116	*21*	73	*19*	70	*16*	66	*14*	63	*12*	60	*09*	56	*07*	53	*05*	50	*02*	47	00	44	03	40	116
120	*24*	71	*22*	67	*20*	64	*17*	61	*15*	57	*12*	54	*10*	51	*07*	48	*05*	45	*02*	42	00	39	120
124	*27*	69	*25*	65	*23*	61	*20*	58	*18*	55	*15*	52	*12*	49	*10*	46	*07*	43	*04*	40	*02*	37	124
128	*31*	66	*28*	62	*26*	59	*23*	55	*21*	52	*18*	49	*15*	46	*12*	43	*09*	40	*07*	37	*04*	35	128
132	*34*	63	*31*	59	*29*	56	*26*	53	*23*	49	*20*	46	*18*	43	*15*	41	*12*	38	*09*	35	*06*	32	132
136	*37*	60	*34*	56	*32*	53	*29*	50	*26*	47	*23*	44	*20*	41	*17*	38	*14*	35	*11*	33	*08*	30	136
140	*40*	57	*37*	53	*34*	50	*31*	46	*28*	43	*25*	40	*22*	38	*19*	35	*16*	33	*12*	30	*09*	28	140
144	*43*	53	*40*	50	*37*	46	*34*	43	*31*	40	*27*	37	*24*	35	*21*	32	*18*	30	*14*	28	*11*	25	144
148	*46*	49	*43*	45	*39*	42	*36*	39	*33*	36	*30*	34	*26*	31	*23*	29	*19*	27	*16*	25	*12*	23	148
152	*48*	45	*45*	41	*42*	38	*38*	35	*35*	33	*31*	30	*28*	28	*24*	26	*21*	24	*17*	22	*14*	20	152
156	*51*	40	*47*	36	*44*	33	*40*	31	*37*	28	*33*	26	*29*	24	*26*	23	*22*	21	*18*	19	*15*	18	156
160	*53*	34	*49*	31	*46*	29	*42*	26	*38*	24	*35*	22	*31*	21	*27*	19	*23*	18	*20*	16	*16*	15	160
164	*54*	28	*51*	26	*47*	23	*43*	21	*40*	20	*36*	18	*32*	17	*28*	15	*24*	14	*20*	13	*17*	12	164
168	*56*	22	*52*	20	*48*	18	*44*	16	*41*	15	*37*	14	*33*	13	*29*	12	*25*	11	*21*	10	*17*	09	168
172	*57*	15	*53*	13	*49*	12	*45*	11	*41*	10	*37*	09	*33*	08	*30*	08	*26*	07	*22*	07	*18*	06	172
176	*58*	07	*54*	07	*50*	06	*46*	06	*42*	05	*38*	05	*34*	04	*30*	04	*26*	04	*22*	03	*18*	03	176
180	*58*	00	*54*	00	*50*	00	*46*	00	*42*	00	*38*	00	*34*	00	*30*	00	*26*	00	*22*	00	*18*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	70	00	66	00	62	00	58	00	54	00	50	00	46	00	42	00	38	00	34	00	30	00	00
4	70	08	66	06	62	05	58	04	54	03	50	02	46	02	42	01	38	01	34	01	30	00	4
8	69	15	65	12	61	09	58	07	54	06	50	05	46	04	42	03	38	02	34	01	30	00	8
12	68	22	64	17	61	14	57	11	53	09	49	07	46	05	42	04	38	03	34	01	30	00	12
16	66	28	63	22	60	18	56	14	53	11	49	09	45	07	41	05	38	03	34	02	30	01	16
20	65	32	62	26	59	22	55	17	52	14	48	11	45	09	41	06	37	04	34	02	30	01	20
24	63	36	60	30	57	25	54	20	51	16	48	13	44	10	41	07	37	05	33	03	30	01	24
28	61	40	58	33	56	28	53	23	50	19	47	15	43	12	40	09	37	06	33	03	30	01	28
32	58	42	56	36	54	30	51	25	49	21	46	17	43	13	40	10	36	07	33	04	30	01	32
36	56	44	54	38	52	32	50	27	47	22	45	18	42	14	39	11	36	07	33	04	30	01	36
40	53	46	52	40	50	34	48	29	46	24	44	19	41	15	38	11	35	08	33	05	30	01	40
44	51	47	50	41	48	36	46	30	44	25	42	21	40	16	38	12	35	08	32	05	29	02	44
48	48	48	47	42	46	37	45	31	43	26	41	22	39	17	37	13	34	09	32	05	29	02	48
52	45	49	45	43	44	38	43	32	41	27	40	23	38	18	36	14	34	09	32	06	29	02	52
56	43	49	42	44	42	38	41	33	40	28	38	23	37	19	35	14	33	10	31	06	29	02	56
60	40	49	40	44	40	39	39	34	38	29	37	24	36	19	34	15	33	10	31	06	29	02	60
64	37	49	37	44	37	39	37	34	36	29	35	24	34	20	33	15	32	11	30	06	29	02	64
68	35	49	35	44	35	39	35	34	35	30	34	25	33	20	32	15	31	11	30	06	29	02	68
72	32	49	33	44	33	39	33	34	33	30	33	25	32	20	31	16	31	11	30	07	29	02	72
76	29	48	30	44	31	39	31	34	31	30	31	25	31	20	30	16	30	11	29	07	28	02	76
80	27	48	28	43	28	39	29	34	29	30	30	25	30	20	30	16	29	11	29	07	28	02	80
84	24	47	25	43	26	38	27	34	28	29	28	25	28	20	29	16	29	11	28	07	28	02	84
88	22	46	23	42	24	38	25	33	26	29	27	25	27	20	28	16	28	11	28	07	28	02	88
92	19	45	21	41	22	37	23	33	24	29	25	24	26	20	27	16	27	11	28	07	28	02	92
96	17	44	18	40	20	36	21	32	22	28	24	24	25	20	26	15	27	11	27	07	28	02	96
100	14	43	16	39	18	35	19	31	21	27	22	23	24	19	25	15	26	11	27	07	28	02	100
104	12	42	14	38	16	34	17	31	19	27	21	23	22	19	24	15	25	11	26	07	27	02	104
108	10	40	12	37	14	33	16	30	18	26	19	22	21	18	23	14	25	10	26	06	27	02	108
112	07	39	10	35	12	32	14	29	16	25	18	21	20	18	22	14	24	10	26	06	27	02	112
116	05	37	08	34	10	31	12	27	15	24	17	21	19	17	21	13	23	10	25	06	27	02	116
120	03	35	06	32	08	29	11	26	13	23	16	20	18	16	20	13	23	09	25	06	27	02	120
124	01	34	04	31	06	28	09	25	12	22	14	19	17	16	20	12	22	09	25	05	27	02	124
128	*01*	32	02	29	05	26	08	23	11	21	13	18	16	15	19	12	22	08	24	05	27	02	128
132	*03*	30	00	27	03	25	06	22	09	19	12	17	15	14	18	11	21	08	24	05	27	02	132
136	*04*	28	*01*	25	02	23	05	20	08	18	11	15	14	13	18	10	21	07	24	05	27	02	136
140	*06*	26	*03*	23	01	21	04	19	07	17	10	14	14	12	17	09	20	07	23	04	26	01	140
144	*07*	23	*04*	21	*01*	19	03	17	06	15	10	13	13	11	16	09	20	06	23	04	26	01	144
148	*09*	21	*05*	19	*02*	17	02	15	05	13	09	12	12	10	16	08	19	06	23	03	26	01	148
152	*10*	19	*06*	17	*03*	15	01	14	05	12	08	10	12	09	15	07	19	05	23	03	26	01	152
156	*11*	16	*07*	15	*04*	13	00	12	04	10	08	09	11	07	15	06	19	04	22	03	26	01	156
160	*12*	14	*08*	12	*04*	11	*00*	10	03	09	07	07	11	06	15	05	19	04	22	02	26	01	160
164	*13*	11	*09*	10	*05*	09	*01*	08	03	07	07	06	11	05	14	04	18	03	22	02	26	01	164
168	*13*	08	*09*	07	*05*	07	*01*	06	02	05	06	04	10	04	14	03	18	02	22	01	26	00	168
172	*14*	05	*10*	05	*06*	04	*02*	04	02	04	06	03	10	03	14	02	18	01	22	01	26	00	172
176	*14*	03	*10*	02	*06*	02	*02*	02	02	02	06	02	10	01	14	01	18	01	22	00	26	00	176
180	*14*	00	*10*	00	*06*	00	*02*	00	02	00	06	00	10	00	14	00	18	00	22	00	26	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

Lat. 29°

H.A.	0° 00′ Alt.	Az.	0° 30′ Alt.	Az.	1° 00′ Alt.	Az.	1° 30′ Alt.	Az.	2° 00′ Alt.	Az.	2° 30′ Alt.	Az.	3° 00′ Alt.	Az.	3° 30′ Alt.	Az.	H.A.
°	′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		′ Δd Δt °		°
00	61 00.0 1.0 02	180.0	61 30.0 1.0 02	180.0	62 00.0 1.0 02	180.0	62 30.0 1.0 02	180.0	63 00.0 1.0 02	180.0	63 30.0 1.0 02	180.0	64 00.0 1.0 02	180.0	64 30.0 1.0 02	180.0	00
1	60 59.1 1.0 05	177.9	61 29.0 1.0 05	177.9	61 59.0 1.0 05	177.9	62 29.0 1.0 05	177.8	62 59.0 1.0 05	177.8	63 29.0 1.0 05	177.8	63 59.0 1.0 05	177.7	64 28.9 1.0 05	177.7	1
2	60 56.2 1.0 08	175.9	61 26.2 1.0 08	175.8	61 56.1 1.0 08	175.7	62 26.0 1.0 08	175.7	62 56.0 1.0 08	175.6	63 25.9 1.0 08	175.5	63 55.8 1.0 09	175.5	64 25.8 1.0 09	175.4	2
3	60 51.5 1.0 11	173.8	61 21.4 1.0 11	173.7	61 51.2 1.0 11	173.6	62 21.1 1.0 12	173.5	62 51.0 99 12	173.4	63 20.8 99 12	173.3	63 50.6 99 12	173.2	64 20.5 99 12	173.1	3
4	60 45.0 99 14	171.8	61 14.7 99 14	171.7	61 44.5 99 14	171.5	62 14.2 99 15	171.4	62 44.0 99 15	171.2	63 13.7 99 15	171.1	63 43.4 99 16	170.9	64 13.1 99 16	170.8	4
05	60 36.5 99 17	169.8	61 06.2 99 17	169.6	61 35.8 99 18	169.4	62 05.4 99 18	169.3	62 35.0 99 18	169.1	63 04.6 99 18	168.9	63 34.1 99 19	168.7	64 03.7 98 19	168.5	05
6	60 26.3 98 20	167.8	60 55.8 98 20	167.6	61 25.2 98 21	167.4	61 54.7 98 21	167.2	62 24.1 98 21	167.0	62 53.5 98 22	166.8	63 22.9 98 22	166.5	63 52.2 98 22	166.3	6
7	60 14.3 98 23	165.8	60 43.6 98 23	165.6	61 12.9 98 24	165.3	61 42.1 97 24	165.1	62 11.3 97 24	164.9	62 40.5 97 25	164.6	63 09.7 97 26	164.4	63 38.8 97 26	164.1	7
8	60 00.6 97 26	163.8	60 29.7 97 26	163.6	60 58.7 97 26	163.3	61 27.7 97 27	163.1	61 56.7 97 27	162.8	62 25.7 96 28	162.5	62 54.6 96 28	162.2	63 23.5 96 29	161.9	8
9	59 45.1 96 28	161.9	60 14.0 96 29	161.6	60 42.8 96 29	161.4	61 11.6 96 30	161.1	61 40.3 96 30	160.8	62 09.0 96 31	160.5	62 37.7 95 31	160.1	63 06.3 95 32	159.8	9
10	59 28.0 95 31	160.0	59 56.6 95 32	159.7	60 25.2 95 32	159.4	60 53.7 95 33	159.1	61 22.2 95 33	158.8	61 50.6 95 34	158.4	62 19.0 95 34	158.1	62 47.3 94 35	157.7	10
1	59 09.3 95 34	158.2	59 37.6 94 34	157.8	60 05.9 94 35	157.5	60 34.1 94 35	157.2	61 02.3 94 36	156.8	61 30.5 94 36	156.4	61 58.5 93 37	156.1	62 26.5 93 37	155.7	1
2	58 48.9 94 36	156.3	59 17.0 93 37	156.0	59 45.0 93 37	155.6	60 13.0 93 38	155.3	60 40.9 93 38	154.9	61 08.7 93 39	154.5	61 36.4 92 40	154.1	62 04.1 92 40	153.7	2
3	58 27.1 93 39	154.5	58 54.9 92 39	154.2	59 22.6 92 40	153.8	59 50.2 92 40	153.4	60 17.8 92 41	153.0	60 45.3 92 42	152.6	61 12.7 91 42	152.2	61 40.1 91 43	151.8	3
4	58 03.8 92 41	152.8	58 31.3 91 42	152.4	58 58.7 91 42	152.0	59 26.0 91 43	151.6	59 53.3 91 43	151.2	60 20.4 90 44	150.8	60 47.5 90 44	150.3	61 14.5 90 45	149.9	4
15	57 39.1 91 44	151.1	58 06.3 90 44	150.7	58 33.4 90 44	150.3	59 00.3 90 45	149.8	59 27.2 90 46	149.4	59 54.1 89 46	149.0	60 20.8 89 47	148.5	60 47.4 89 48	148.0	15
6	57 13.1 90 46	149.4	57 39.9 89 46	149.0	58 06.6 89 47	148.6	58 33.3 89 47	148.1	58 59.9 88 48	147.7	59 26.3 88 48	147.2	59 52.7 88 49	146.7	60 18.9 87 50	146.3	6
7	56 45.7 88 48	147.8	57 12.2 88 48	147.3	57 38.6 88 49	146.9	58 04.9 88 49	146.4	58 31.1 87 50	146.0	58 57.2 87 50	145.5	59 23.2 86 51	145.0	59 49.1 86 52	144.5	7
8	56 17.1 87 50	146.2	56 43.3 87 50	145.7	57 09.3 87 51	145.3	57 35.3 86 51	144.8	58 01.2 86 52	144.3	58 26.9 86 53	143.8	58 52.5 85 53	143.3	59 18.0 85 54	142.8	8
9	55 47.3 86 52	144.6	56 13.1 86 52	144.2	56 38.9 86 53	143.7	57 04.5 85 53	143.2	57 30.0 85 54	142.7	57 55.3 84 54	142.2	58 20.6 84 55	141.7	58 45.7 84 56	141.2	9
20	55 16.4 85 53	143.1	55 41.8 85 54	142.6	56 07.2 84 54	142.2	56 32.5 84 55	141.7	56 57.6 84 56	141.2	57 22.6 83 56	140.7	57 47.5 83 57	140.1	58 12.3 82 58	139.6	20
1	54 44.3 84 55	141.6	55 09.5 84 56	141.2	55 34.5 83 56	140.7	55 59.4 83 57	140.2	56 24.2 82 58	139.7	56 48.8 82 58	139.1	57 13.4 82 59	138.6	57 37.8 81 59	138.1	1
2	54 11.2 83 57	140.2	54 36.0 82 57	139.7	55 00.7 82 58	139.2	55 25.3 82 58	138.7	55 49.7 81 59	138.2	56 14.0 81 60	137.7	56 38.2 80 60	137.1	57 02.2 80 61	136.6	2
3	53 37.1 82 58	138.8	54 01.6 81 59	138.3	54 25.9 81 60	137.8	54 50.2 80 60	137.3	55 14.2 80 61	136.8	55 38.2 80 61	136.2	56 02.0 79 62	135.7	56 25.6 79 62	135.2	3
4	53 02.1 81 60	137.4	53 26.2 80 60	136.9	53 50.2 80 61	136.4	54 14.1 79 62	135.9	54 37.8 79 62	135.4	55 01.4 78 63	134.9	55 24.9 78 63	134.3	55 48.2 77 64	133.8	4
25	52 26.2 80 61	136.1	52 50.0 79 62	135.6	53 13.6 79 62	135.1	53 37.2 78 63	134.6	54 00.6 78 64	134.1	54 23.8 77 64	133.5	54 46.9 77 65	133.0	55 09.9 76 65	132.4	25
6	51 49.4 78 63	134.8	52 12.8 78 63	134.3	52 36.2 78 64	133.8	52 59.4 77 64	133.3	53 22.4 77 65	132.7	53 45.3 76 65	132.2	54 08.1 76 66	131.7	54 30.7 75 66	131.1	6
7	51 11.7 77 64	133.6	51 34.9 77 64	133.1	51 57.9 76 65	132.5	52 20.8 76 66	132.0	52 43.5 76 66	131.5	53 06.1 75 67	130.9	53 28.5 74 67	130.4	53 50.8 74 68	129.8	7
8	50 33.3 76 65	132.3	50 56.2 76 66	131.8	51 18.9 75 66	131.3	51 41.4 75 67	130.8	52 03.8 74 67	130.3	52 26.1 74 68	129.7	52 48.2 73 68	129.2	53 10.1 73 69	128.6	8
9	49 54.2 75 66	131.2	50 16.7 75 67	130.7	50 39.1 74 68	130.1	51 01.3 74 68	129.6	51 23.4 73 68	129.1	51 45.3 73 69	128.5	52 07.1 72 70	128.0	52 28.7 72 70	127.4	9
30	49 14.4 74 68	130.0	49 36.6 74 68	129.5	49 58.6 73 68	129.0	50 20.6 73 69	128.4	50 42.3 72 70	127.9	51 04.0 72 70	127.4	51 25.4 71 70	126.8	51 46.7 71 71	126.2	30
1	48 33.8 73 68	128.9	48 55.7 73 69	128.4	49 17.5 72 70	127.9	49 39.1 72 70	127.3	50 00.6 71 70	126.8	50 21.9 71 71	126.2	50 43.1 70 72	125.7	51 04.1 70 72	125.1	1
2	47 52.7 72 70	127.8	48 14.3 72 70	127.3	48 35.8 71 70	126.8	48 57.1 71 71	126.2	49 18.3 70 72	125.7	49 39.3 70 72	125.1	50 00.2 69 72	124.6	50 20.9 69 73	124.0	2
3	47 10.9 71 70	126.7	47 32.3 71 71	126.2	47 53.4 70 72	125.7	48 14.5 70 72	125.2	48 35.4 69 72	124.6	48 56.1 69 73	124.1	49 16.7 68 73	123.5	49 37.1 68 74	123.0	3
4	46 28.6 70 72	125.7	46 49.6 70 72	125.2	47 10.5 69 72	124.7	47 31.3 69 73	124.1	47 51.9 68 73	123.6	48 12.4 68 74	123.0	48 32.7 67 74	122.5	48 52.8 67 75	121.9	4
35	45 45.7 69 72	124.7	46 06.5 69 73	124.2	46 27.1 69 73	123.7	46 47.6 68 74	123.1	47 08.0 68 74	122.6	47 28.1 67 74	122.0	47 48.2 67 75	121.5	48 08.0 66 75	120.9	35
6	45 02.3 69 73	123.7	45 22.8 68 74	123.2	45 43.2 68 74	122.7	46 03.4 67 74	122.1	46 23.5 67 75	121.6	46 43.4 66 75	121.1	47 03.2 66 76	120.5	47 22.8 65 76	120.0	6
7	44 18.4 68 74	122.8	44 38.7 67 74	122.2	44 58.8 67 75	121.7	45 18.8 66 75	121.2	45 38.6 66 76	120.7	45 58.2 65 76	120.1	46 17.8 65 76	119.6	46 37.1 64 77	119.0	7
8	43 34.1 67 75	121.8	43 54.1 66 75	121.3	44 13.9 66 76	120.8	44 33.6 65 76	120.3	44 53.2 65 76	119.7	45 12.6 64 77	119.2	45 31.9 64 77	118.6	45 51.0 63 78	118.1	8
9	42 49.2 66 75	120.9	43 09.0 66 76	120.4	43 28.6 65 76	119.9	43 48.1 65 76	119.3	44 07.4 64 77	118.8	44 26.6 64 77	118.3	44 45.6 63 78	117.7	45 04.5 63 78	117.2	9
40	42 04.0 65 76	120.0	42 23.5 65 76	119.5	42 42.9 64 77	119.0	43 02.2 64 77	118.5	43 21.3 63 78	117.9	43 40.2 63 78	117.4	43 59.0 62 78	116.9	44 17.7 62 79	116.3	40
1	41 18.4 65 77	119.1	41 37.7 64 77	118.6	41 56.8 64 78	118.1	42 15.8 63 78	117.6	42 34.7 63 78	117.1	42 53.4 62 78	116.5	43 12.0 62 79	116.0	43 30.5 61 79	115.5	1
2	40 32.4 64 77	118.3	40 51.4 63 78	117.8	41 10.4 63 78	117.3	41 29.2 62 78	116.8	41 47.8 62 79	116.2	42 06.3 61 79	115.7	42 24.7 61 80	115.2	42 42.9 60 80	114.6	2
3	39 46.0 63 78	117.5	40 04.8 63 78	117.0	40 23.5 62 78	116.5	40 42.1 62 79	115.9	41 00.6 61 79	115.4	41 18.9 61 80	114.9	41 37.0 60 80	114.4	41 55.1 60 80	113.8	3
4	38 59.2 62 78	116.7	39 17.9 62 79	116.2	39 36.4 61 79	115.6	39 54.8 61 80	115.1	40 13.0 61 80	114.6	40 31.1 60 80	114.1	40 49.1 60 80	113.6	41 06.9 59 81	113.0	4
45	38 12.2 62 79	115.9	38 30.6 61 79	115.4	38 48.9 61 80	114.9	39 07.1 60 80	114.3	39 25.2 60 80	113.8	39 43.1 59 81	113.3	40 00.8 59 81	112.8	40 18.5 58 81	112.3	45
6	37 24.8 61 80	115.1	37 43.1 61 80	114.6	38 01.2 60 80	114.1	38 19.2 60 80	113.6	38 37.0 59 81	113.1	38 54.7 59 81	112.5	39 12.3 58 81	112.0	39 29.8 58 82	111.5	6
7	36 37.1 60 80	114.3	36 55.2 60 80	113.8	37 13.1 60 80	113.3	37 30.9 59 81	112.8	37 48.6 59 81	112.3	38 06.1 58 81	111.8	38 23.5 58 82	111.3	38 40.8 57 82	110.8	7
8	35 49.2 60 80	113.6	36 07.1 59 81	113.1	36 24.8 59 81	112.6	36 42.4 59 81	112.1	36 59.9 58 82	111.6	37 17.3 58 82	111.1	37 34.5 57 82	110.5	37 51.6 57 82	110.0	8
9	35 00.9 59 81	112.9	35 18.6 59 81	112.4	35 36.2 58 81	111.9	35 53.7 58 82	111.4	36 11.0 58 82	110.9	36 28.2 57 82	110.3	36 45.3 57 82	109.8	37 02.2 56 83	109.3	9
50	34 12.5 59 81	112.1	34 30.0 58 82	111.6	34 47.4 58 82	111.2	35 04.7 57 82	110.7	35 21.9 57 82	110.2	35 38.9 57 82	109.6	35 55.8 56 83	109.1	36 12.6 56 83	108.6	50
1	33 23.7 58 82	111.4	33 41.1 58 82	110.9	33 58.3 57 82	110.5	34 15.5 57 82	110.0	34 32.5 56 83	109.5	34 49.4 56 83	109.0	35 06.1 56 83	108.4	35 22.8 55 84	107.9	1
2	32 34.8 58 82	110.7	32 52.0 57 82	110.3	33 09.1 57 82	109.8	33 26.0 56 83	109.3	33 42.9 56 83	108.8	33 59.6 56 83	108.3	34 16.2 55 84	107.8	34 32.7 55 84	107.3	2
3	31 45.6 57 82	110.1	32 02.6 57 82	109.6	32 19.6 56 83	109.1	32 36.4 56 83	108.6	32 53.1 56 83	108.1	33 09.7 55 84	107.6	33 26.2 55 84	107.1	33 42.5 54 84	106.6	3
4	30 56.2 57 83	109.4	31 13.1 56 83	108.9	31 29.9 56 83	108.4	31 46.6 55 83	107.9	32 03.1 55 84	107.5	32 19.6 55 84	107.0	32 35.9 54 84	106.5	32 52.2 54 84	106.0	4
55	30 06.6 56 83	108.8	30 23.4 56 83	108.3	30 40.0 55 84	107.8	30 56.6 55 84	107.3	31 13.0 55 84	106.8	31 29.3 54 84	106.3	31 45.5 54 84	105.8	32 01.6 53 84	105.3	55
6	29 16.8 56 83	108.1	29 33.4 55 84	107.6	29 50.0 55 84	107.2	30 06.4 55 84	106.7	30 22.7 54 84	106.2	30 38.9 54 84	105.7	30 55.0 53 84	105.2	31 10.9 53 85	104.7	6
7	28 26.8 55 84	107.5	28 43.3 55 84	107.0	28 59.7 54 84	106.5	29 16.0 54 84	106.0	29 32.2 54 84	105.6	29 48.3 53 85	105.1	30 04.3 53 85	104.6	30 20.1 53 85	104.1	7
8	27 36.7 55 84	106.9	27 53.1 54 84	106.4	28 09.3 54 84	105.9	28 25.5 54 84	105.4	28 41.6 53 85	104.9	28 57.5 53 85	104.5	29 13.4 53 85	104.0	29 29.2 52 85	103.5	8
9	26 46.4 54 84	106.2	27 02.6 54 84	105.8	27 18.8 54 84	105.3	27 34.8 53 85	104.8	27 50.8 53 85	104.3	28 06.7 53 85	103.9	28 22.4 52 85	103.4	28 38.1 52 85	102.9	9
60	25 55.9 54 84	105.6	26 12.1 54 84	105.2	26 28.1 53 85	104.7	26 44.0 53 85	104.2	26 59.9 53 85	103.7	27 15.6 52 85	103.3	27 31.3 52 85	102.8	27 46.9 52 86	102.3	60
1	25 05.3 54 84	105.0	25 21.4 53 85	104.6	25 37.3 53 85	104.1	25 53.1 53 85	103.6	26 08.9 52 85	103.2	26 24.5 52 85	102.7	26 40.1 52 86	102.2	26 55.5 51 86	101.7	1
2	24 14.6 53 85	104.5	24 30.5 53 85	104.0	24 46.3 53 85	103.5	25 02.1 52 85	103.1	25 17.7 52 86	102.6	25 33.3 52 86	102.1	25 48.7 51 86	101.6	26 04.1 51 86	101.2	2
3	23 23.7 53 85	103.9	23 39.5 53 85	103.4	23 55.2 52 85	102.9	24 10.9 52 86	102.5	24 26.4 52 86	102.0	24 41.9 51 86	101.5	24 57.3 51 86	101.1	25 12.6 51 86	100.6	3
4	22 32.7 52 85	103.3	22 48.4 52 85	102.8	23 04.0 52 86	102.4	23 19.6 52 86	101.9	23 35.0 51 86	101.4	23 50.4 51 86	101.0	24 05.7 51 86	100.5	24 20.9 51 86	100.0	4
65	21 41.6 52 85	102.7	21 57.2 52 86	102.3	22 12.7 52 86	101.8	22 28.2 51 86	101.4	22 43.6 51 86	100.9	22 58.9 51 86	100.4	23 14.1 51 86	100.0	23 29.2 50 86	99.5	65
6	20 50.3 52 86	102.2	21 05.9 52 86	101.7	21 21.3 51 86	101.3	21 36.7 51 86	100.8	21 52.0 51 86	100.3	22 07.2 51 86	99.9	22 22.3 50 86	99.4	22 37.4 50 86	98.9	6
7	19 59.0 52 86	101.6	20 14.4 51 86	101.2	20 29.8 51 86	100.7	20 45.1 51 86	100.3	21 00.3 51 86	99.8	21 15.5 50 86	99.3	21 30.5 50 86	98.9	21 45.5 50 86	98.4	7
8	19 07.5 51 86	101.1	19 22.9 51 86	100.6	19 38.2 51 86	100.2	19 53.4 51 86	99.7	20 08.6 50 86	99.3	20 23.6 50 86	98.8	20 38.6 50 87	98.3	20 53.6 50 87	97.9	8
9	18 16.0 51 86	100.5	18 31.3 51 86	100.1	18 46.5 51 86	99.6	19 01.6 50 86	99.2	19 16.7 50 86	98.7	19 31.7 50 87	98.3	19 46.7 50 87	97.8	20 01.6 49 87	97.3	9
70	17 24.3 51 86	100.0	17 39.6 51 86	99.6	17 54.7 50 86	99.1	18 09.8 50 86	98.6	18 24.8 50 87	98.2	18 39.8 50 87	97.7	18 54.7 50 87	97.3	19 09.5 49 87	96.8	70
1	16 32.6 51 86	99.5	16 47.8 50 86	99.0	17 02.9 50 86	98.6	17 17.9 50 87	98.1	17 32.8 50 87	97.7	17 47.7 50 87	97.2	18 02.6 49 87	96.8	18 17.4 49 87	96.3	1
2	15 40.8 50 86	99.0	15 55.9 50 86	98.5	16 10.9 50 87	98.1	16 25.9 50 87	97.6	16 40.8 50 87	97.1	16 55.7 49 87	96.7	17 10.4 49 87	96.2	17 25.2 49 87	95.8	2
3	14 49.0 50 86	98.4	15 04.0 50 87	98.0	15 18.9 50 87	97.5	15 33.8 50 87	97.1	15 48.7 49 87	96.6	16 03.5 49 87	96.2	16 18.3 49 87	95.7	16 32.9 49 87	95.3	3
4	13 57.0 50 87	97.9	14 12.0 50 87	97.5	14 26.9 50 87	97.0	14 41.7 49 87	96.6	14 56.6 49 87	96.1	15 11.3 49 87	95.7	15 26.0 49 87	95.2	15 40.7 49 87	94.8	4
75	13 05.0 50 87	97.4	13 19.9 50 87	97.0	13 34.8 49 87	96.5	13 49.6 49 87	96.1	14 04.4 49 87	95.6	14 19.1 49 87	95.2	14 33.7 49 87	94.7	14 48.3 49 87	94.3	75
6	12 12.9 50 87	96.9	12 27.8 49 87	96.4	12 42.6 49 87	96.0	12 57.4 49 87	95.6	13 12.1 49 87	95.1	13 26.8 49 87	94.7	13 41.4 49 87	94.2	13 56.0 49 87	93.8	6
7	11 20.8 49 87	96.4	11 35.6 49 87	95.9	11 50.4 49 87	95.5	12 05.1 49 87	95.1	12 19.8 49 87	94.6	12 34.5 49 87	94.2	12 49.1 49 87	93.7	13 03.6 48 87	93.3	7
8	10 28.6 49 87	95.9	10 43.4 49 87	95.4	10 58.1 49 87	95.0	11 12.8 49 87	94.6	11 27.5 49 87	94.1	11 42.1 49 87	93.7	11 56.7 49 87	93.2	12 11.2 48 87	92.8	8
9	9 36.4 49 87	95.4	9 51.1 49 87	94.9	10 05.8 49 87	94.5	10 20.5 49 87	94.1	10 35.1 49 87	93.6	10 49.7 49 87	93.2	11 04.3 48 87	92.7	11 18.8 48 88	92.3	9
80	8 44.1 49 87	94.9	8 58.8 49 87	94.4	9 13.5 49 87	94.0	9 28.1 49 87	93.6	9 42.7 49 87	93.1	9 57.3 49 87	92.7	10 11.8 48 87	92.2	10 26.3 48 88	91.8	80
1	7 51.8 49 87	94.4	8 06.5 49 87	94.0	8 21.1 49 87	93.5	8 35.8 49 87	93.1	8 50.3 49 87	92.6	9 04.9 48 87	92.2	9 19.4 48 87	91.7	9 33.9 48 88	91.3	1
2	6 59.5 49 87	93.9	7 14.1 49 87	93.5	7 28.8 49 87	93.0	7 43.3 49 87	92.6	7 57.9 49 87	92.1	8 12.4 48 88	91.7	8 26.9 48 88	91.3	8 41.4 48 88	90.8	2
3	6 07.1 49 87	93.4	6 21.7 49 87	93.0	6 36.3 49 87	92.5	6 50.9 49 87	92.1	7 05.5 48 88	91.6	7 20.0 48 88	91.2	7 34.5 48 88	90.8	7 48.9 48 88	90.3	3
4	5 14.7 49 87	92.9	5 29.3 49 87	92.5	5 43.9 49 88	92.0	5 58.5 48 88	91.6	6 13.0 48 88	91.2	6 27.5 48 88	90.7	6 42.0 48 88	90.3	6 56.5 48 88	89.8	4
85							5 06.0 48 88	91.1	5 20.5 48 88	90.7	5 35.0 48 88	90.2	5 49.5 48 88	89.8	6 04.0 48 88	89.4	85
6															5 11.5 48 88	88.9	6

Lat. 29°

H.A.	0° 00′			0° 30′			1° 00′			1° 30′			2° 00′			2° 30′			3° 00′			3° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	61 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	59 00.0	1.0 02	180.0	58 30.0	1.0 02	180.0	58 00.0	1.0 02	180.0	57 30.0	1.0 01	180.0	00
1	60 59.1	1.0 05	177.9	60 29.1	1.0 05	178.0	59 59.1	1.0 05	178.0	59 29.1	1.0 04	178.0	58 59.1	1.0 04	178.1	58 29.1	1.0 04	178.1	57 59.1	1.0 04	178.1	57 29.2	1.0 04	178.1	1
2	60 56.2	1.0 08	175.9	60 26.3	1.0 08	175.9	59 56.3	1.0 08	176.0	59 26.4	1.0 08	176.1	58 56.4	1.0 07	176.1	58 26.5	1.0 07	176.2	57 56.6	1.0 07	176.2	57 26.6	1.0 07	176.3	2
3	60 51.5	1.0 11	173.8	60 21.6	1.0 11	173.9	59 51.8	1.0 11	174.0	59 21.9	1.0 10	174.1	58 52.0	1.0 10	174.2	58 22.1	1.0 10	174.3	57 52.2	1.0 10	174.4	57 22.4	1.0 10	174.4	3
4	60 45.0	99 14	171.8	60 15.2	99 14	171.9	59 45.4	99 14	172.0	59 15.6	99 13	172.2	58 45.8	99 13	172.3	58 16.0	99 13	172.4	57 46.2	99 13	172.5	57 16.4	99 13	172.6	4
05	60 36.5	99 17	169.8	60 06.9	99 17	169.9	59 37.2	99 16	170.1	59 07.6	99 16	170.2	58 37.9	99 16	170.4	58 08.2	99 16	170.5	57 38.5	99 16	170.6	57 08.8	99 15	170.8	05
6	60 26.3	98 20	167.8	59 56.8	98 20	168.0	59 27.3	98 20	168.1	58 57.8	98 19	168.3	58 28.3	98 19	168.5	57 58.7	99 18	168.6	57 29.2	99 18	168.8	56 59.6	99 18	169.0	6
7	60 14.3	98 23	165.8	59 45.0	98 22	166.0	59 15.7	98 22	166.2	58 46.3	98 22	166.4	58 17.0	98 22	166.6	57 47.6	98 21	166.8	57 18.2	98 21	167.0	56 48.8	98 21	167.2	7
8	60 00.6	97 26	163.8	59 31.5	97 26	164.1	59 02.3	97 25	164.3	58 33.2	97 25	164.5	58 04.0	97 24	164.8	57 34.8	97 24	165.0	57 05.5	97 24	165.2	56 36.3	98 23	165.4	8
9	59 45.1	96 28	161.9	59 16.2	96 28	162.2	58 47.3	96 28	162.4	58 18.4	97 28	162.7	57 49.4	97 27	162.9	57 20.4	97 27	163.2	56 51.3	97 26	163.4	56 22.3	97 26	163.6	9
10	59 28.0	95 31	160.0	58 59.3	96 31	160.3	58 30.7	96 30	160.6	58 01.9	96 30	160.9	57 33.2	96 30	161.1	57 04.4	96 29	161.4	56 35.6	96 29	161.6	56 06.7	96 28	161.9	10
1	59 09.3	95 34	158.2	58 40.9	95 34	158.5	58 12.4	95 33	158.8	57 44.0	95 32	159.1	57 15.4	95 32	159.4	56 46.9	95 32	159.6	56 18.3	95 31	159.9	55 49.7	95 31	160.2	1
2	58 48.9	94 36	156.3	58 20.8	94 36	156.7	57 52.7	94 36	157.0	57 24.5	94 35	157.3	56 56.2	94 34	157.6	56 27.9	94 34	157.9	55 59.5	95 34	158.2	55 31.1	95 33	158.5	2
3	58 27.1	93 39	154.5	57 59.3	93 38	154.9	57 31.4	93 38	155.2	57 03.5	93 37	155.6	56 35.5	93 37	155.9	56 07.4	94 36	156.2	55 39.3	94 36	156.5	55 11.2	94 36	156.8	3
4	58 03.8	92 41	152.8	57 36.3	92 41	153.2	57 08.7	92 40	153.5	56 41.1	92 40	153.9	56 13.4	92 39	154.2	55 45.6	93 39	154.6	55 17.8	93 38	154.9	54 49.9	93 38	155.2	4
15	57 39.1	91 44	151.1	57 11.9	91 43	151.5	56 44.6	91 42	151.8	56 17.3	91 42	152.2	55 49.9	92 41	152.6	55 22.4	92 41	152.9	54 54.8	92 40	153.3	54 27.2	92 40	153.6	15
6	57 13.1	90 46	149.4	56 46.2	90 45	149.8	56 19.2	90 44	150.2	55 52.2	90 44	150.6	55 25.0	91 44	151.0	54 57.8	91 43	151.3	54 30.6	91 42	151.7	54 03.3	91 42	152.1	6
7	56 45.7	88 48	147.8	56 19.2	89 47	148.2	55 52.5	89 47	148.6	55 25.8	89 46	149.0	54 58.9	90 46	149.4	54 32.0	90 45	149.8	54 05.1	90 44	150.1	53 38.0	90 44	150.5	7
8	56 17.1	87 50	146.2	55 50.9	88 49	146.6	55 24.5	88 49	147.0	54 58.1	88 48	147.4	54 31.6	88 48	147.8	54 05.0	89 47	148.2	53 38.4	89 46	148.6	53 11.6	89 46	149.0	8
9	55 47.3	86 52	144.6	55 21.4	87 51	145.1	54 55.4	87 50	145.5	54 29.3	87 50	145.9	54 03.1	87 49	146.3	53 36.8	88 49	146.8	53 10.5	88 48	147.2	52 44.0	88 48	147.5	9
20	55 16.4	85 53	143.1	54 50.8	85 53	143.6	54 25.1	86 52	144.0	53 59.3	86 52	144.4	53 33.5	86 51	144.9	53 07.5	87 51	145.3	52 41.4	87 50	145.7	52 15.3	87 50	146.1	20
1	54 44.3	84 55	141.6	54 19.1	84 55	142.1	53 53.7	85 54	142.6	53 28.3	85 54	143.0	53 02.7	85 53	143.4	52 37.1	86 52	143.9	52 11.3	86 52	144.3	51 45.5	86 51	144.7	1
2	54 11.2	83 57	140.2	53 46.3	83 56	140.7	53 21.3	84 56	141.1	52 56.2	84 55	141.6	52 30.9	84 55	142.0	52 05.6	85 54	142.5	51 40.2	85 54	142.9	51 14.7	85 53	143.3	2
3	53 37.1	82 58	138.8	53 12.6	82 58	139.3	52 47.9	82 57	139.7	52 23.1	83 57	140.2	51 58.2	83 56	140.7	51 33.2	84 56	141.1	51 08.0	84 55	141.6	50 42.8	84 55	142.0	3
4	53 02.1	81 60	137.4	52 37.9	81 59	137.9	52 13.5	81 59	138.4	51 49.0	82 58	138.9	51 24.4	82 58	139.3	50 59.7	82 57	139.8	50 34.9	83 57	140.2	50 10.0	83 56	140.7	4
25	52 26.2	80 61	136.1	52 02.3	80 61	136.6	51 38.2	80 60	137.1	51 14.1	81 60	137.6	50 49.8	81 59	138.0	50 25.4	81 59	138.5	50 00.9	82 58	138.9	49 36.3	82 58	139.4	25
6	51 49.4	78 63	134.8	51 25.8	79 62	135.3	51 02.1	79 62	135.8	50 38.2	80 61	136.3	50 14.3	80 61	136.8	49 50.2	80 60	137.2	49 26.0	81 60	137.7	49 01.7	81 59	138.1	6
7	51 11.7	77 64	133.6	50 48.5	78 64	134.1	50 25.1	78 63	134.6	50 01.5	79 62	135.1	49 37.9	79 62	135.5	49 14.1	79 61	136.0	48 50.3	80 61	136.5	48 26.3	80 60	136.9	7
8	50 33.3	76 65	132.3	50 10.4	77 65	132.9	49 47.3	77 64	133.4	49 24.1	78 64	133.8	49 00.8	78 63	134.3	48 37.3	78 63	134.8	48 13.7	79 62	135.3	47 50.1	79 62	135.7	8
9	49 54.2	75 66	131.2	49 31.6	76 66	131.7	49 08.8	76 65	132.2	48 45.9	77 65	132.7	48 22.8	77 64	133.2	47 59.7	77 64	133.6	47 36.4	78 63	134.1	47 13.0	78 63	134.6	9
30	49 14.4	74 68	130.0	48 52.0	75 67	130.5	48 29.5	75 66	131.0	48 06.9	76 66	131.5	47 44.2	76 66	132.0	47 21.3	76 65	132.5	46 58.4	77 64	133.0	46 35.3	77 64	133.4	30
1	48 33.8	73 68	128.9	48 11.8	74 68	129.4	47 49.6	74 68	129.9	47 27.3	75 67	130.4	47 04.9	75 67	130.9	46 42.3	75 66	131.4	46 19.6	76 66	131.9	45 56.8	76 65	132.3	1
2	47 52.7	72 70	127.8	47 30.9	73 69	128.3	47 09.0	73 69	128.8	46 47.0	74 68	129.3	46 24.9	74 68	129.8	46 02.6	74 67	130.3	45 40.2	75 67	130.8	45 17.7	75 66	131.2	2
3	47 10.9	71 70	126.7	46 49.5	72 70	127.3	46 27.9	72 70	127.8	46 06.1	73 69	128.3	45 44.3	73 69	128.8	45 22.3	73 68	129.2	45 00.2	74 68	129.7	44 37.9	74 67	130.2	3
4	46 28.6	70 72	125.7	46 07.4	71 71	126.2	45 46.1	71 70	126.7	45 24.6	72 70	127.2	45 03.0	72 70	127.7	44 41.3	73 69	128.2	44 19.5	73 69	128.7	43 57.5	73 68	129.2	4
35	45 45.7	69 72	124.7	45 24.8	70 72	125.2	45 03.7	70 72	125.7	44 42.6	71 71	126.2	44 21.2	71 71	126.7	43 59.8	72 70	127.2	43 38.2	72 70	127.7	43 16.6	72 69	128.2	35
6	45 02.3	69 73	123.7	44 41.7	69 73	124.2	44 20.9	70 72	124.7	44 00.0	70 72	125.2	43 38.9	70 72	125.7	43 17.7	71 71	126.2	42 56.4	71 70	126.7	42 35.0	72 70	127.2	6
7	44 18.4	68 74	122.8	43 58.0	68 74	123.3	43 37.5	69 73	123.8	43 16.8	69 73	124.3	42 56.0	70 72	124.8	42 35.1	70 72	125.3	42 14.1	70 71	125.7	41 52.9	71 71	126.2	7
8	43 34.1	67 75	121.8	43 13.9	67 74	122.3	42 53.6	68 74	122.8	42 33.2	68 73	123.3	42 12.7	69 73	123.8	41 52.0	69 72	124.3	41 31.2	69 72	124.8	41 10.3	70 72	125.3	8
9	42 49.2	66 75	120.9	42 29.3	67 75	121.4	42 09.3	67 74	121.9	41 49.2	67 74	122.4	41 28.9	68 74	122.9	41 08.5	68 74	123.4	40 47.9	69 73	123.9	40 27.3	69 73	124.4	9
40	42 04.0	65 76	120.0	41 44.4	66 76	120.5	41 24.6	66 75	121.0	41 04.6	67 75	121.5	40 44.6	67 74	122.0	40 24.4	67 74	122.5	40 04.1	68 74	123.0	39 43.7	68 73	123.5	40
1	41 18.4	65 77	119.1	40 58.9	65 76	119.7	40 39.4	65 76	120.2	40 19.7	66 76	120.7	39 59.9	66 75	121.1	39 39.9	67 75	121.6	39 19.9	67 74	122.1	38 59.7	67 74	122.6	1
2	40 32.4	64 77	118.3	40 13.1	64 77	118.8	39 53.8	65 77	119.3	39 34.4	65 76	119.8	39 14.8	65 76	120.3	38 55.1	66 76	120.8	38 35.2	66 75	121.3	38 15.3	67 75	121.7	2
3	39 46.0	63 78	117.5	39 27.0	63 78	118.0	39 07.9	64 77	118.5	38 48.6	64 77	119.0	38 29.3	65 76	119.5	38 09.8	65 76	119.9	37 50.2	66 76	120.4	37 30.5	66 76	120.9	3
4	38 59.2	62 78	116.7	38 40.5	63 78	117.2	38 21.6	63 78	117.7	38 02.5	64 77	118.1	37 43.4	64 77	118.6	37 24.1	64 77	119.1	37 04.7	65 76	119.6	36 45.2	65 76	120.1	4
45	38 12.2	62 79	115.9	37 53.6	62 79	116.4	37 34.9	63 78	116.9	37 16.1	63 78	117.3	36 57.2	63 78	117.8	36 38.1	64 77	118.3	36 18.9	64 77	118.8	35 59.6	64 76	119.3	45
6	37 24.8	61 80	115.1	37 06.4	61 79	115.6	36 47.9	62 79	116.1	36 29.3	62 78	116.6	36 10.6	63 78	117.0	35 51.7	63 78	117.5	35 32.8	63 78	118.0	35 13.7	64 77	118.5	6
7	36 37.1	60 80	114.3	36 18.9	61 80	114.8	36 00.6	61 79	115.3	35 42.2	62 79	115.8	35 23.7	62 79	116.3	35 05.0	62 78	116.8	34 46.3	63 78	117.2	34 27.4	63 78	117.7	7
8	35 49.2	60 80	113.6	35 31.2	60 80	114.1	35 13.1	61 80	114.6	34 54.8	61 80	115.0	34 36.5	61 79	115.5	34 18.0	62 79	116.0	33 59.4	62 78	116.5	33 40.8	62 78	117.0	8
9	35 00.9	59 81	112.9	34 43.1	60 80	113.3	34 25.2	60 80	113.8	34 07.1	60 80	114.3	33 49.0	61 80	114.8	33 30.7	61 79	115.3	33 12.3	61 79	115.7	32 53.8	62 79	116.2	9
50	34 12.5	59 81	112.1	33 54.8	59 81	112.6	33 37.1	59 81	113.1	33 19.2	60 80	113.6	33 01.2	60 80	114.1	32 43.1	60 80	114.5	32 24.9	61 80	115.0	32 06.6	61 79	115.5	50
1	33 23.7	58 82	111.4	33 06.3	58 81	111.9	32 48.7	59 81	112.4	32 31.0	59 81	112.9	32 13.2	60 80	113.4	31 55.2	60 80	113.8	31 37.2	60 80	114.3	31 19.1	61 80	114.8	1
2	32 34.8	58 82	110.7	32 17.5	58 82	111.2	32 00.0	58 82	111.7	31 42.5	59 81	112.2	31 24.9	59 81	112.7	31 07.1	59 81	113.1	30 49.3	60 80	113.6	30 31.3	60 80	114.1	2
3	31 45.6	57 82	110.1	31 28.4	57 82	110.5	31 11.2	58 82	111.0	30 53.8	58 82	111.5	30 36.3	58 81	112.0	30 18.7	59 81	112.4	30 01.1	59 81	112.9	29 43.3	59 80	113.4	3
4	30 56.2	57 83	109.4	30 39.2	57 82	109.9	30 22.1	57 82	110.4	30 04.9	58 82	110.8	29 47.5	58 82	111.3	29 30.1	58 81	111.8	29 12.6	59 81	112.2	28 55.0	59 81	112.7	4
55	30 06.6	56 83	108.8	29 49.7	56 83	109.2	29 32.8	57 82	109.7	29 15.7	57 82	110.2	28 58.5	57 82	110.6	28 41.3	58 82	111.1	28 23.9	58 82	111.6	28 06.5	58 81	112.0	55
6	29 16.8	56 83	108.1	29 00.1	56 83	108.6	28 43.3	56 83	109.1	28 26.3	57 82	109.5	28 09.3	57 82	110.0	27 52.2	57 82	110.5	27 35.0	58 82	110.9	27 17.7	58 82	111.4	6
7	28 26.8	55 84	107.5	28 10.3	55 84	107.9	27 53.6	56 83	108.4	27 36.8	56 83	108.9	27 19.9	56 83	109.4	27 02.9	57 82	109.8	26 45.9	57 82	110.3	26 28.7	57 82	110.7	7
8	27 36.7	55 84	106.9	27 20.2	55 84	107.3	27 03.7	55 83	107.8	26 47.0	56 83	108.3	26 30.3	56 83	108.7	26 13.5	56 83	109.2	25 56.6	57 82	109.6	25 39.5	57 82	110.1	8
9	26 46.4	54 84	106.2	26 30.1	55 84	106.7	26 13.6	55 84	107.2	25 57.1	55 84	107.6	25 40.5	56 83	108.1	25 23.8	56 83	108.6	25 07.0	56 83	109.0	24 50.2	56 83	109.5	9
60	25 55.9	54 84	105.6	25 39.7	54 84	106.1	25 23.4	55 84	106.6	25 07.0	55 84	107.0	24 50.5	55 84	107.5	24 34.0	55 83	108.0	24 17.3	56 83	108.4	24 00.6	56 83	108.9	60
1	25 05.3	54 84	105.0	24 49.2	54 84	105.5	24 33.0	54 84	106.0	24 16.8	54 84	106.4	24 00.4	55 84	106.9	23 44.0	55 84	107.3	23 27.5	55 83	107.8	23 10.9	55 83	108.3	1
2	24 14.6	53 85	104.5	23 58.6	53 85	104.9	23 42.5	54 84	105.4	23 26.4	54 84	105.8	23 10.1	54 84	106.3	22 53.8	55 84	106.8	22 37.4	55 84	107.2	22 20.9	55 84	107.7	2
3	23 23.7	53 85	103.9	23 07.8	53 85	104.3	22 51.8	53 85	104.8	22 35.8	54 84	105.3	22 19.7	54 84	105.7	22 03.5	54 84	106.2	21 47.2	54 84	106.6	21 30.8	55 84	107.1	3
4	22 32.7	52 85	103.3	22 16.9	53 85	103.8	22 01.0	53 85	104.2	21 45.1	53 85	104.7	21 29.1	54 84	105.1	21 13.0	54 84	105.6	20 56.8	54 84	106.0	20 40.6	54 84	106.5	4
65	21 41.6	52 85	102.7	21 25.9	52 85	103.2	21 10.1	53 85	103.7	20 54.3	53 85	104.1	20 38.4	53 85	104.6	20 22.4	53 85	105.0	20 06.3	54 84	105.5	19 50.2	54 84	105.9	65
6	20 50.3	52 86	102.2	20 34.7	52 85	102.6	20 19.1	52 85	103.1	20 03.3	53 85	103.5	19 47.5	53 85	104.0	19 31.6	53 85	104.4	19 15.7	53 85	104.9	18 59.7	53 84	105.3	6
7	19 59.0	52 86	101.6	19 43.5	52 86	102.1	19 27.9	52 86	102.5	19 12.2	52 85	103.0	18 56.5	52 85	103.4	18 40.8	53 85	103.9	18 24.9	53 85	104.3	18 09.0	53 85	104.8	7
8	19 07.5	51 86	101.1	18 52.1	52 86	101.5	18 36.6	52 86	102.0	18 21.1	52 86	102.4	18 05.4	52 85	102.9	17 49.7	52 85	103.3	17 34.0	53 85	103.8	17 18.2	53 85	104.2	8
9	18 16.0	51 86	100.5	18 00.6	51 86	101.0	17 45.2	51 86	101.4	17 29.8	52 86	101.9	17 14.2	52 86	102.3	16 58.6	52 85	102.8	16 43.0	52 85	103.2	16 27.3	52 85	103.7	9
70	17 24.3	51 86	100.0	17 09.1	51 86	100.5	16 53.7	51 86	100.9	16 38.4	51 86	101.4	16 22.9	52 86	101.8	16 07.4	52 86	102.2	15 51.8	52 85	102.7	15 36.2	52 85	103.1	70
1	16 32.6	51 86	99.5	16 17.4	51 86	99.9	16 02.2	51 86	100.4	15 46.9	51 86	100.8	15 31.5	51 86	101.3	15 16.1	52 86	101.7	15 00.6	52 86	102.2	14 45.1	52 86	102.6	1
2	15 40.8	50 86	99.0	15 25.7	51 86	99.4	15 10.5	51 86	99.8	14 55.3	51 86	100.3	14 40.0	51 86	100.7	14 24.6	51 86	101.2	14 09.2	51 86	101.6	13 53.8	52 86	102.1	2
3	14 49.0	50 86	98.4	14 33.9	50 86	98.9	14 18.8	50 86	99.3	14 03.6	51 86	99.8	13 48.4	51 86	100.2	13 33.1	51 86	100.7	13 17.8	51 86	101.1	13 02.4	51 86	101.5	3
4	13 57.0	50 87	97.9	13 42.0	50 87	98.4	13 26.9	50 86	98.8	13 11.8	50 86	99.2	12 56.7	51 86	99.7	12 41.5	51 86	100.1	12 26.2	51 86	100.6	12 11.0	51 86	101.0	4
75	13 05.0	50 87	97.4	12 50.0	50 87	97.8	12 35.0	50 87	98.3	12 20.0	50 86	98.7	12 04.9	50 86	99.2	11 49.8	51 86	99.6	11 34.6	51 86	100.1	11 19.4	51 86	100.5	75
6	12 12.9	50 87	96.9	11 58.0	50 87	97.3	11 43.1	50 87	97.8	11 28.1	50 87	98.2	11 13.1	50 86	98.7	10 58.0	50 86	99.1	10 42.9	50 86	99.5	10 27.8	51 86	100.0	6
7	11 20.8	49 87	96.4	11 06.0	50 87	96.8	10 51.1	50 87	97.3	10 36.1	50 87	97.7	10 21.2	50 87	98.2	10 06.2	50 87	98.6	9 51.1	50 86	99.0	9 36.0	50 86	99.5	7
8	10 28.6	49 87	95.9	10 13.8	49 87	96.3	9 59.0	50 87	96.8	9 44.1	50 87	97.2	9 29.2	50 87	97.6	9 14.2	50 87	98.1	8 59.3	50 86	98.5	8 44.2	50 86	99.0	8
9	9 36.4	49 87	95.4	9 21.6	49 87	95.8	9 06.8	49 87	96.3	8 52.0	49 87	96.7	8 37.1	50 87	97.1	8 22.3	50 87	97.6	8 07.3	50 87	98.0	7 52.4	50 87	98.5	9
80	8 44.1	49 87	94.9	8 29.4	49 87	95.3	8 14.6	49 87	95.8	7 59.9	49 87	96.2	7 45.0	49 87	96.6	7 30.2	50 87	97.1	7 15.3	50 87	97.5	7 00.4	50 87	98.0	80
1	7 51.8	49 87	94.4	7 37.1	49 87	94.8	7 22.4	49 87	95.3	7 07.7	49 87	95.7	6 52.9	49 87	96.1	6 38.1	49 87	96.6	6 23.3	49 87	97.0	6 08.4	50 87	97.5	1
2	6 59.5	49 87	93.9	6 44.8	49 87	94.3	6 30.1	49 87	94.8	6 15.4	49 87	95.2	6 00.7	49 87	95.7	5 45.9	49 87	96.1	5 31.2	49 87	96.5	5 16.4	49 87	97.0	2
3	6 07.1	49 87	93.4	5 52.5	49 87	93.8	5 37.8	49 87	94.3	5 23.1	49 87	94.7	5 08.5	49 87	95.2										3
4	5 14.7	49 87	92.9	5 00.1	49 87	93.4																			4

Lat. 29°

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	′	Δt °	°	
00	65 00.0	1.0 02	180.0	65 30.0	1.0 02	180.0	66 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	67 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0	68 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	00
1	64 58.9	1.0 05	177.6	65 28.9	1.0 06	177.6	65 58.9	1.0 06	177.6	66 28.9	1.0 06	177.5	66 58.8	1.0 06	177.5	67 28.8	1.0 06	177.4	67 58.8	1.0 06	177.4	68 28.8	1.0 06	177.3	1
2	64 55.7	1.0 09	175.3	65 25.6	1.0 09	175.2	65 55.5	1.0 09	175.1	66 25.4	1.0 10	175.0	66 55.4	1.0 10	174.9	67 25.3	1.0 10	174.8	67 55.2	1.0 10	174.7	68 25.1	1.0 10	174.6	2
3	64 50.3	99 12	172.9	65 20.1	99 13	172.8	65 49.9	99 13	172.7	66 19.7	99 13	172.5	66 49.5	99 14	172.4	67 19.3	99 14	172.2	67 49.1	99 14	172.1	68 18.9	99 14	171.9	3
4	64 42.8	99 16	170.6	65 12.5	99 16	170.5	65 42.2	99 16	170.3	66 11.8	99 17	170.1	66 41.5	99 17	169.9	67 11.1	99 18	169.7	67 40.7	99 18	169.5	68 10.3	99 18	169.3	4
05	64 33.2	98 19	168.3	65 02.7	98 20	168.1	65 32.2	98 20	167.9	66 01.7	98 20	167.7	66 31.2	98 21	167.4	67 00.6	98 21	167.2	67 30.0	98 22	166.9	67 59.4	98 22	166.7	05
6	64 21.6	98 23	166.1	64 50.9	98 23	165.8	65 20.2	98 24	165.5	65 49.4	97 24	165.3	66 18.7	97 24	165.0	66 47.9	97 25	164.7	67 17.0	97 25	164.4	67 46.2	97 26	164.1	6
7	64 07.9	97 26	163.8	64 37.0	97 26	163.5	65 06.1	97 27	163.2	65 35.1	97 27	162.9	66 04.0	96 28	162.6	66 33.0	96 28	162.3	67 01.8	96 29	161.9	67 30.7	96 30	161.6	7
8	63 52.4	96 29	161.6	64 21.2	96 30	161.3	64 49.9	96 30	161.0	65 18.7	96 31	160.6	65 47.3	95 31	160.3	66 15.9	95 32	159.9	66 44.5	95 32	159.5	67 13.0	95 33	159.1	8
9	63 34.9	95 32	159.5	64 03.4	95 33	159.1	64 31.9	95 33	158.8	65 00.3	95 34	158.4	65 28.6	94 34	158.0	65 56.9	94 35	157.6	66 25.1	94 36	157.2	66 53.3	94 36	156.7	9
10	63 15.6	94 35	157.4	63 43.8	94 36	157.0	64 11.9	94 36	156.6	64 40.0	93 37	156.2	65 08.0	93 38	155.8	65 35.9	93 38	155.3	66 03.8	93 39	154.9	66 31.6	92 39	154.4	10
1	62 54.5	93 38	155.3	63 22.4	93 38	154.9	63 50.2	93 39	154.5	64 17.9	92 40	154.0	64 45.6	92 40	153.6	65 13.1	92 41	153.1	65 40.6	91 42	152.6	66 08.0	91 42	152.1	1
2	62 31.7	92 41	153.3	62 59.3	92 41	152.8	63 26.7	91 42	152.4	63 54.1	91 42	151.9	64 21.3	91 43	151.5	64 48.5	90 44	151.0	65 15.6	90 44	150.5	65 42.5	90 45	149.9	2
3	62 07.3	91 43	151.3	62 34.5	90 44	150.9	63 01.6	90 44	150.4	63 28.6	90 45	149.9	63 55.4	89 46	149.4	64 22.2	89 46	148.9	64 48.9	89 47	148.4	65 15.4	88 48	147.8	3
4	61 41.4	89 46	149.4	62 08.2	89 46	148.9	62 34.9	89 47	148.4	63 01.5	88 48	147.9	63 27.9	88 48	147.4	63 54.3	88 49	146.9	64 20.5	87 50	146.3	64 46.7	87 50	145.7	4
15	61 13.9	88 48	147.6	61 40.4	88 49	147.1	62 06.7	88 49	146.5	62 32.9	87 50	146.0	62 58.9	87 51	145.5	63 24.9	86 52	144.9	63 50.7	86 52	144.4	64 16.4	85 53	143.8	15
6	60 45.1	87 50	145.8	61 11.1	87 51	145.2	61 37.0	86 52	144.7	62 02.8	86 52	144.2	62 28.5	85 53	143.6	62 54.0	85 54	143.0	63 19.4	84 54	142.5	63 44.6	84 55	141.8	6
7	60 14.9	86 52	144.0	60 40.5	85 53	143.5	61 06.1	85 54	142.9	61 31.5	84 54	142.4	61 56.7	84 55	141.8	62 21.8	83 56	141.2	62 46.8	83 56	140.6	63 11.6	82 57	140.0	7
8	59 43.4	84 54	142.3	60 08.7	84 55	141.8	60 33.8	84 56	141.2	60 58.8	83 56	140.6	61 23.6	83 57	140.1	61 48.3	82 58	139.5	62 12.8	81 58	138.9	62 37.2	81 59	138.2	8
9	59 10.7	83 56	140.7	59 35.6	83 57	140.1	60 00.3	82 58	139.6	60 24.9	82 58	139.0	60 49.4	81 59	138.4	61 13.6	81 60	137.8	61 37.7	80 60	137.2	62 01.7	79 61	136.5	9
20	58 36.9	82 58	139.1	59 01.4	81 59	138.5	59 25.7	81 60	137.9	59 49.9	80 60	137.4	60 14.0	80 61	136.8	60 37.8	79 62	136.1	61 01.5	79 62	135.5	61 25.0	78 63	134.9	20
1	58 02.0	81 60	137.5	58 26.1	80 60	137.0	58 50.1	80 61	136.4	59 13.9	79 62	135.8	59 37.5	78 62	135.2	60 00.9	78 63	134.6	60 24.2	77 64	133.9	60 47.3	77 64	133.3	1
2	57 26.1	79 62	136.0	57 49.8	79 62	135.5	58 13.4	78 63	134.9	58 36.8	78 64	134.3	59 00.0	77 64	133.7	59 23.1	77 65	133.0	59 45.9	76 65	132.4	60 08.6	75 66	131.8	2
3	56 49.2	78 63	134.6	57 12.5	78 64	134.0	57 35.7	77 64	133.4	57 58.7	76 65	132.8	58 21.6	76 66	132.2	58 44.2	75 66	131.6	59 06.7	75 67	130.9	59 29.0	74 67	130.3	3
4	56 11.3	77 64	133.2	56 34.3	76 65	132.6	56 57.1	76 66	132.0	57 19.8	75 66	131.4	57 42.3	75 67	130.8	58 04.6	74 68	130.2	58 26.7	73 68	129.5	58 48.6	73 69	128.9	4
25	55 32.6	76 66	131.8	55 55.3	75 66	131.2	56 17.7	75 67	130.6	56 40.0	74 68	130.0	57 02.1	73 68	129.4	57 24.1	73 69	128.8	57 45.8	72 69	128.2	58 07.3	71 70	127.5	25
6	54 53.1	75 67	130.5	55 15.4	74 68	129.9	55 37.5	73 68	129.3	55 59.5	73 69	128.7	56 21.2	72 69	128.1	56 42.8	72 70	127.5	57 04.1	71 70	126.8	57 25.3	70 71	126.2	6
7	54 12.9	73 68	129.2	54 34.8	73 69	128.7	54 56.6	72 70	128.1	55 18.2	72 70	127.5	55 39.6	71 70	126.8	56 00.8	70 71	126.2	56 21.8	70 72	125.6	56 42.6	69 72	124.9	7
8	53 31.9	72 70	128.0	53 53.5	72 70	127.4	54 14.9	71 70	126.8	54 36.2	71 71	126.2	54 57.2	70 72	125.6	55 18.1	69 72	125.0	55 38.8	69 73	124.3	55 59.3	68 73	123.7	8
9	52 50.2	71 70	126.8	53 11.5	71 71	126.2	53 32.6	70 72	125.6	53 53.5	69 72	125.0	54 14.2	69 73	124.4	54 34.8	68 73	123.8	54 55.1	67 74	123.1	55 15.3	67 74	122.5	9
30	52 07.9	70 72	125.7	52 28.8	70 72	125.1	52 49.6	69 73	124.5	53 10.2	68 73	123.9	53 30.7	68 74	123.3	53 50.9	67 74	122.6	54 10.9	66 75	122.0	54 30.8	66 75	121.4	30
1	51 24.9	69 72	124.5	51 45.6	69 73	123.9	52 06.1	68 74	123.4	52 26.4	67 74	122.8	52 46.5	67 74	122.1	53 06.4	66 75	121.5	53 26.2	65 76	120.9	53 45.7	65 76	120.3	1
2	50 41.4	68 74	123.4	51 01.8	68 74	122.9	51 22.0	67 74	122.3	51 42.0	66 75	121.7	52 01.8	66 75	121.1	52 21.4	65 76	120.4	52 40.9	64 76	119.8	53 00.1	64 77	119.2	2
3	49 57.4	67 74	122.4	50 17.4	67 75	121.8	50 37.3	66 75	121.2	50 57.1	65 76	120.6	51 16.6	65 76	120.0	51 36.0	64 77	119.4	51 55.1	64 77	118.8	52 14.1	63 78	118.2	3
4	49 12.8	66 75	121.4	49 32.6	66 76	120.8	49 52.2	65 76	120.2	50 11.7	65 76	119.6	50 30.9	64 77	119.0	50 50.0	63 77	118.4	51 08.9	63 78	117.8	51 27.6	62 78	117.2	4
35	48 27.7	65 76	120.4	48 47.3	65 76	119.8	49 06.6	64 77	119.2	49 25.8	64 77	118.6	49 44.8	63 78	118.0	50 03.6	62 78	117.4	50 22.3	62 78	116.8	50 40.7	61 79	116.2	35
6	47 42.2	65 76	119.4	48 01.5	64 77	118.8	48 20.6	63 77	118.2	48 39.5	63 78	117.7	48 58.3	62 78	117.1	49 16.8	62 78	116.5	49 35.2	61 79	115.9	49 53.4	60 79	115.2	6
7	46 56.3	64 77	118.4	47 15.3	63 78	117.9	47 34.2	63 78	117.3	47 52.9	62 78	116.7	48 11.4	61 79	116.1	48 29.7	61 79	115.5	48 47.8	60 80	114.9	49 05.8	59 80	114.3	7
8	46 10.0	63 78	117.5	46 28.7	62 78	117.0	46 47.4	62 79	116.4	47 05.8	61 79	115.8	47 24.1	61 79	115.2	47 42.2	60 80	114.6	48 00.1	59 80	114.0	48 17.8	59 80	113.4	8
9	45 23.2	62 78	116.6	45 41.8	62 79	116.1	46 00.2	61 79	115.5	46 18.4	60 80	114.9	46 36.4	60 80	114.4	46 54.3	59 80	113.8	47 12.0	59 81	113.2	47 29.5	58 81	112.6	9
40	44 36.2	61 79	115.8	44 54.5	61 80	115.2	45 12.6	60 80	114.6	45 30.6	60 80	114.1	45 48.5	59 80	113.5	46 06.1	59 81	112.9	46 23.6	58 81	112.3	46 40.9	57 82	111.7	40
1	43 48.7	61 80	114.9	44 06.8	60 80	114.4	44 24.8	60 80	113.8	44 42.6	59 81	113.2	45 00.2	58 81	112.7	45 17.6	58 81	112.1	45 34.9	57 82	111.5	45 52.0	57 82	110.9	1
2	43 01.0	60 80	114.1	43 18.9	59 80	113.5	43 36.6	59 81	113.0	43 54.2	58 81	112.4	44 11.6	58 81	111.9	44 28.9	57 82	111.3	44 45.9	57 82	110.7	45 02.8	56 82	110.1	2
3	42 12.9	59 80	113.3	42 30.6	59 81	112.7	42 48.2	58 81	112.2	43 05.6	58 82	111.6	43 22.8	57 82	111.1	43 39.8	57 82	110.5	43 56.7	56 82	109.9	44 13.4	55 83	109.3	3
4	41 24.6	59 81	112.5	41 42.1	58 81	111.9	41 59.4	58 82	111.4	42 16.6	57 82	110.8	42 33.7	57 82	110.3	42 50.6	56 83	109.7	43 07.3	55 83	109.2	43 23.8	55 83	108.6	4
45	40 35.9	58 82	111.7	40 53.3	58 82	111.2	41 10.4	57 82	110.6	41 27.5	56 82	110.1	41 44.3	56 83	109.5	42 01.0	55 83	109.0	42 17.6	55 83	108.4	42 34.0	54 84	107.8	45
6	39 47.1	57 82	111.0	40 04.2	57 82	110.4	40 21.2	56 82	109.9	40 38.1	56 83	109.3	40 54.8	55 83	108.8	41 11.3	55 83	108.2	41 27.7	54 84	107.7	41 43.9	54 84	107.1	6
7	38 57.9	57 82	110.2	39 14.9	56 82	109.7	39 31.8	56 83	109.2	39 48.4	55 83	108.6	40 05.0	55 83	108.1	40 21.4	54 84	107.5	40 37.6	54 84	107.0	40 53.7	53 84	106.4	7
8	38 08.6	56 83	109.5	38 25.4	56 83	109.0	38 42.1	55 83	108.4	38 58.6	55 83	107.9	39 15.0	54 84	107.4	39 31.2	54 84	106.8	39 47.3	53 84	106.3	40 03.2	53 84	105.7	8
9	37 19.0	56 83	108.8	37 35.7	55 83	108.3	37 52.2	55 84	107.7	38 08.6	54 84	107.2	38 24.8	54 84	106.7	38 40.9	53 84	106.1	38 56.9	53 84	105.6	39 12.6	52 84	105.0	9
50	36 29.2	55 83	108.1	36 45.8	55 84	107.6	37 02.1	54 84	107.1	37 18.4	54 84	106.5	37 34.5	53 84	106.0	37 50.4	53 84	105.5	38 06.2	52 85	104.9	38 21.9	52 85	104.4	50
1	35 39.3	55 84	107.4	35 55.6	54 84	106.9	36 11.9	54 84	106.4	36 28.0	53 84	105.9	36 43.9	53 84	105.3	36 59.8	53 85	104.8	37 15.4	52 85	104.3	37 31.0	52 85	103.7	1
2	34 49.1	54 84	106.8	35 05.3	54 84	106.2	35 21.4	53 84	105.7	35 37.4	53 84	105.2	35 53.3	53 85	104.7	36 09.0	52 85	104.2	36 24.5	52 85	103.6	36 39.9	51 85	103.1	2
3	33 58.8	54 84	106.1	34 14.9	53 84	105.6	34 30.9	53 85	105.1	34 46.7	53 85	104.6	35 02.4	52 85	104.0	35 18.0	52 85	103.5	35 33.4	51 85	103.0	35 48.8	51 86	102.5	3
4	33 08.3	53 84	105.5	33 24.3	53 85	105.0	33 40.1	53 85	104.4	33 55.8	52 85	103.9	34 11.4	52 85	103.4	34 26.9	51 85	102.9	34 42.3	51 86	102.4	34 57.5	50 86	101.9	4
55	32 17.6	53 85	104.8	32 33.5	53 85	104.3	32 49.2	52 85	103.8	33 04.8	52 85	103.3	33 20.3	51 85	102.8	33 35.7	51 86	102.3	33 50.9	51 86	101.8	34 06.0	50 86	101.2	55
6	31 26.8	53 85	104.2	31 42.6	52 85	103.7	31 58.2	52 85	103.2	32 13.7	52 85	102.7	32 29.1	51 86	102.2	32 44.4	51 86	101.7	32 59.5	50 86	101.2	33 14.5	50 86	100.7	6
7	30 35.9	52 85	103.6	30 51.5	52 85	103.1	31 07.0	52 86	102.6	31 22.5	51 86	102.1	31 37.7	51 86	101.6	31 52.9	50 86	101.1	32 08.0	50 86	100.6	32 22.9	50 86	100.1	7
8	29 44.8	52 85	103.0	30 00.3	52 86	102.5	30 15.8	51 86	102.0	30 31.1	51 86	101.5	30 46.3	50 86	101.0	31 01.4	50 86	100.5	31 16.3	50 86	100.0	31 31.2	49 86	99.5	8
9	28 53.6	52 86	102.4	29 09.1	51 86	101.9	29 24.4	51 86	101.4	29 39.6	51 86	100.9	29 54.7	50 86	100.4	30 09.7	50 86	99.9	30 24.6	49 86	99.4	30 39.4	49 86	98.9	9
60	28 02.3	51 86	101.8	28 17.7	51 86	101.3	28 32.9	51 86	100.8	28 48.0	50 86	100.4	29 03.1	50 86	99.9	29 18.0	50 86	99.4	29 32.8	49 86	98.9	29 47.5	49 87	98.4	60
1	27 10.9	51 86	101.2	27 26.1	51 86	100.8	27 41.3	50 86	100.3	27 56.4	50 86	99.8	28 11.3	50 86	99.3	28 26.2	49 86	98.8	28 40.9	49 87	98.3	28 55.5	49 87	97.8	1
2	26 19.4	51 86	100.7	26 34.5	50 86	100.2	26 49.6	50 86	99.7	27 04.6	50 86	99.2	27 19.5	49 86	98.7	27 34.3	49 87	98.2	27 49.0	49 87	97.8	28 03.5	48 87	97.3	2
3	25 27.7	51 86	100.1	25 42.9	50 86	99.6	25 57.9	50 86	99.2	26 12.8	50 86	98.7	26 27.6	49 87	98.2	26 42.3	49 87	97.7	26 56.9	49 87	97.2	27 11.4	48 87	96.7	3
4	24 36.0	50 86	99.6	24 51.1	50 86	99.1	25 06.0	50 86	98.6	25 20.9	49 87	98.1	25 35.6	49 87	97.6	25 50.3	49 87	97.2	26 04.8	48 87	96.7	26 19.3	48 87	96.2	4
65	23 44.3	50 86	99.0	23 59.2	50 86	98.5	24 14.1	49 87	98.1	24 28.9	49 87	97.6	24 43.6	49 87	97.1	24 58.2	49 87	96.6	25 12.7	48 87	96.1	25 27.1	48 87	95.7	65
6	22 52.4	50 86	98.5	23 07.3	50 87	98.0	23 22.1	49 87	97.5	23 36.8	49 87	97.0	23 51.5	49 87	96.6	24 06.0	48 87	96.1	24 20.5	48 87	95.6	24 34.9	48 87	95.1	6
7	22 00.4	50 87	97.9	22 15.3	49 87	97.5	22 30.0	49 87	97.0	22 44.7	49 87	96.5	22 59.3	49 87	96.0	23 13.8	48 87	95.6	23 28.2	48 87	95.1	23 42.6	48 87	94.6	7
8	21 08.4	49 87	97.4	21 23.2	49 87	96.9	21 37.9	49 87	96.5	21 52.6	49 87	96.0	22 07.1	48 87	95.5	22 21.6	48 87	95.1	22 35.9	48 87	94.6	22 50.2	48 87	94.1	8
9	20 16.4	49 87	96.9	20 31.1	49 87	96.4	20 45.8	49 87	95.9	21 00.3	48 87	95.5	21 14.8	48 87	95.0	21 29.3	48 87	94.5	21 43.6	48 87	94.1	21 57.9	47 87	93.6	9
70	19 24.2	49 87	96.4	19 38.9	49 87	95.9	19 53.5	49 87	95.4	20 08.1	48 87	95.0	20 22.5	48 87	94.5	20 36.9	48 87	94.0	20 51.3	48 87	93.6	21 05.5	47 87	93.1	70
1	18 32.1	49 87	95.8	18 46.7	49 87	95.4	19 01.3	48 87	94.9	19 15.8	48 87	94.5	19 30.2	48 87	94.0	19 44.6	48 87	93.5	19 58.9	48 87	93.1	20 13.1	47 87	92.6	1
2	17 39.8	49 87	95.3	17 54.4	49 87	94.9	18 09.0	48 87	94.4	18 23.4	48 87	93.9	18 37.8	48 87	93.5	18 52.2	48 87	93.0	19 06.4	47 87	92.6	19 20.6	47 87	92.1	2
3	16 47.6	49 87	94.8	17 02.1	48 87	94.4	17 16.6	48 87	93.9	17 31.1	48 87	93.4	17 45.5	48 87	93.0	17 59.8	48 87	92.5	18 14.0	47 87	92.1	18 28.2	47 87	91.6	3
4	15 55.3	49 87	94.3	16 09.8	48 87	93.9	16 24.3	48 87	93.4	16 38.7	48 87	92.9	16 53.0	48 87	92.5	17 07.3	48 87	92.0	17 21.6	47 87	91.6	17 35.7	47 87	91.1	4
75	15 02.9	48 87	93.8	15 17.4	48 87	93.4	15 31.9	48 87	92.9	15 46.3	48 87	92.4	16 00.6	48 87	92.0	16 14.9	48 87	91.5	16 29.1	47 87	91.1	16 43.3	47 87	90.6	75
6	14 10.5	48 87	93.3	14 25.0	48 87	92.9	14 39.4	48 87	92.4	14 53.8	48 87	92.0	15 08.1	48 87	91.5	15 22.4	47 87	91.0	15 36.6	47 87	90.6	15 50.8	47 87	90.1	6
7	13 18.1	48 87	92.8	13 32.6	48 87	92.4	13 47.0	48 87	91.9	14 01.4	48 87	91.5	14 15.7	48 87	91.0	14 29.9	47 87	90.6	14 44.2	47 87	90.1	14 58.3	47 87	89.6	7
8	12 25.7	48 87	92.3	12 40.1	48 87	91.9	12 54.5	48 87	91.4	13 08.9	48 87	91.0	13 23.2	48 87	90.5	13 37.5	47 87	90.1	13 51.7	47 87	89.6	14 05.8	47 87	89.2	8
9	11 33.3	48 87	91.8	11 47.7	48 87	91.4	12 02.1	48 87	90.9	12 16.4	48 87	90.5	12 30.7	48 87	90.0	12 45.0	47 87	89.6	12 59.2	47 87	89.1	13 13.4	47 87	88.7	9
80	10 40.8	48 87	91.3	10 55.2	48 87	90.9	11 09.6	48 87	90.4	11 24.0	48 87	90.0	11 38.3	48 87	89.5	11 52.5	47 87	89.1	12 06.7	47 87	88.7	12 20.9	47 87	88.2	80
1	9 48.3	48 87	90.9	10 02.8	48 87	90.4	10 17.1	48 87	90.0	10 31.5	48 87	89.5	10 45.8	48 87	89.1	11 00.0	47 87	88.6	11 14.3	47 87	88.2	11 28.5	47 87	87.7	1
2	8 55.9	48 87	90.4	9 10.3	48 87	89.9	9 24.7	48 87	89.5	9 39.0	48 87	89.0	9 53.3	48 87	88.6	10 07.6	48 87	88.1	10 21.8	47 87	87.7	10 36.0	47 87	87.2	2
3	8 03.4	48 87	89.9	8 17.8	48 87	89.4	8 32.2	48 87	89.0	8 46.5	48 87	88.5	9 00.9	48 87	88.1	9 15.2	48 87	87.7	9 29.4	47 87	87.2	9 43.6	47 87	86.8	3
4	7 10.9	48 87	89.4	7 25.3	48 87	89.0	7 39.7	48 87	88.5	7 54.1	48 87	88.1	8 08.4	48 87	87.6	8 22.7	48 87	87.2	8 37.0	48 87	86.7	8 51.3	47 87	86.3	4
85	6 18.4	48 87	88.9	6 32.9	48 87	88.5	6 47.3	48 87	88.0	7 01.6	48 87	87.6	7 16.0	48 87	87.1	7 30.3	48 87	86.7	7 44.6	48 87	86.3	7 58.9	48 87	85.8	85
6	5 26.0	48 87	88.4	5 40.4	48 87	88.0	5 54.8	48 87	87.6	6 09.2	48 87	87.1	6 23.6	48 87	86.7	6 37.9	48 87	86.2	6 52.3	48 87	85.8	7 06.6	48 87	85.3	6
7							5 02.4	48 87	87.1	5 16.8	48 87	86.6	5 31.2	48 87	86.2	5 45.6	48 87	85.7	6 00.0	48 87	85.3	6 14.3	48 87	84.9	7
8																			5 07.7	48 87	84.8	5 22.0	48 87	84.4	8

H.A.	4° 00′			4° 30′			5° 00′			5° 30′			6° 00′			6° 30′			7° 00′			7° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	57 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	56 00.0	1.0 01	180.0	55 30.0	1.0 01	180.0	55 00.0	1.0 01	180.0	54 30.0	1.0 01	180.0	54 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	00
1	56 59.2	1.0 04	178.2	56 29.2	1.0 04	178.2	55 59.2	1.0 04	178.2	55 29.2	1.0 04	178.2	54 59.2	1.0 04	178.3	54 29.2	1.0 04	178.3	53 59.2	1.0 04	178.3	53 29.2	1.0 04	178.3	1
2	56 56.6	1.0 07	176.3	56 26.7	1.0 07	176.4	55 56.7	1.0 07	176.4	55 26.8	1.0 07	176.5	54 56.8	1.0 07	176.5	54 26.9	1.0 06	176.6	53 56.9	1.0 06	176.6	53 26.9	1.0 06	176.7	2
3	56 52.5	1.0 10	174.5	56 22.6	1.0 10	174.6	55 52.7	1.0 10	174.7	55 22.8	1.0 09	174.7	54 52.9	1.0 09	174.8	54 23.0	1.0 09	174.9	53 53.1	1.0 09	174.9	53 23.1	1.0 09	175.0	3
4	56 45.6	99 12	172.7	56 16.8	99 12	172.8	55 47.0	99 12	172.9	55 17.2	99 12	173.0	54 47.3	99 12	173.1	54 17.5	99 12	173.2	53 47.7	99 12	173.3	53 17.8	99 11	173.4	4
05	56 39.1	99 15	170.9	56 09.4	99 15	171.0	55 39.7	99 15	171.1	55 10.0	99 15	171.3	54 40.2	99 14	171.4	54 10.5	99 14	171.5	53 40.8	99 14	171.6	53 11.0	99 14	171.7	05
6	56 30.0	99 18	169.1	56 00.4	99 18	169.3	55 30.8	99 17	169.4	55 01.2	99 17	169.5	54 31.6	99 17	169.7	54 02.0	99 17	169.8	53 32.3	99 16	169.9	53 02.7	99 16	170.1	6
7	56 19.3	98 20	167.3	55 49.9	98 20	167.5	55 20.4	98 20	167.7	54 50.9	98 20	167.8	54 21.4	98 20	168.0	53 51.9	98 19	168.2	53 22.4	98 19	168.3	52 52.9	98 19	168.4	7
8	56 07.0	98 23	165.6	55 37.7	98 23	165.8	55 08.4	98 22	166.0	54 39.1	98 22	166.1	54 09.8	98 22	166.3	53 40.4	98 22	166.5	53 11.1	98 21	166.7	52 41.7	98 21	166.8	8
9	55 53.2	97 26	163.8	55 24.1	97 25	164.1	54 55.0	97 25	164.3	54 25.8	97 25	164.5	53 56.6	97 24	164.7	53 27.5	97 24	164.9	52 58.3	97 24	165.1	52 29.0	97 23	165.2	9
10	55 37.8	96 28	162.1	55 08.9	96 28	162.4	54 40.0	96 27	162.6	54 11.0	97 27	162.8	53 42.1	97 27	163.0	53 13.0	97 26	163.3	52 44.0	97 26	163.5	52 15.0	97 26	163.7	10
1	55 21.0	96 30	160.4	54 52.3	96 30	160.7	54 23.6	96 30	160.9	53 54.8	96 29	161.2	53 26.0	96 29	161.4	52 57.2	96 29	161.7	52 28.4	96 28	161.9	51 59.5	96 28	162.1	1
2	55 02.7	95 33	158.8	54 34.2	95 32	159.0	54 05.7	95 32	159.3	53 37.2	95 32	159.6	53 08.6	95 31	159.8	52 40.0	95 31	160.1	52 11.4	96 30	160.3	51 42.7	96 30	160.6	2
3	54 43.0	94 35	157.1	54 14.8	94 35	157.4	53 46.5	94 34	157.7	53 18.2	94 34	158.0	52 49.9	95 34	158.3	52 21.5	95 33	158.5	51 53.1	95 33	158.8	51 24.6	95 32	159.0	3
4	54 22.0	93 37	155.5	53 54.0	93 37	155.8	53 26.0	93 36	156.1	52 57.9	94 36	156.4	52 29.8	94 36	156.7	52 01.6	94 35	157.0	51 33.4	94 35	157.3	51 05.2	94 34	157.6	4
15	53 59.6	92 40	153.9	53 31.8	92 39	154.3	53 04.1	93 39	154.6	52 36.3	93 38	154.9	52 08.4	93 38	155.2	51 40.5	93 37	155.5	51 12.5	93 37	155.8	50 44.6	93 36	156.1	15
6	53 35.9	91 42	152.4	53 08.4	92 41	152.7	52 40.9	92 41	153.1	52 13.4	92 40	153.4	51 45.8	92 40	153.7	51 18.1	92 39	154.0	50 50.4	92 39	154.3	50 22.7	93 38	154.6	6
7	53 10.9	90 44	150.9	52 43.8	91 43	151.2	52 16.6	91 43	151.6	51 49.3	91 42	151.9	51 21.9	91 42	152.2	50 54.5	91 41	152.6	50 27.1	92 41	152.9	49 59.6	92 40	153.2	7
8	52 44.8	89 46	149.4	52 17.9	90 45	149.8	51 51.0	90 44	150.1	51 24.0	90 44	150.5	50 56.9	90 44	150.8	50 29.8	91 43	151.1	50 02.6	91 43	151.5	49 35.4	91 42	151.8	8
9	52 17.5	88 47	147.9	51 50.9	89 47	148.3	51 24.3	89 46	148.7	50 57.5	89 46	149.0	50 30.7	89 46	149.4	50 03.9	90 45	149.7	49 37.0	90 44	150.1	49 10.0	90 44	150.4	9
20	51 49.1	88 49	146.5	51 22.8	88 49	146.9	50 56.4	88 48	147.3	50 30.0	88 48	147.6	50 03.5	88 47	148.0	49 36.9	89 47	148.4	49 10.3	89 46	148.7	48 43.6	89 46	149.1	20
1	51 19.6	87 51	145.1	50 53.6	87 50	145.5	50 27.5	87 50	145.9	50 01.4	87 50	146.3	49 35.2	88 49	146.6	49 08.9	88 48	147.0	48 42.5	88 48	147.4	48 16.1	88 48	147.7	1
2	50 49.1	86 52	143.7	50 23.4	86 52	144.1	49 57.6	86 52	144.5	49 31.7	86 51	144.9	49 05.8	87 51	145.3	48 39.8	87 50	145.7	48 13.7	87 50	146.1	47 47.5	87 49	146.4	2
3	50 17.5	84 54	142.4	49 52.1	85 54	142.8	49 26.7	85 53	143.2	49 01.1	85 53	143.6	48 35.4	86 52	144.0	48 09.7	86 52	144.4	47 43.9	86 51	144.8	47 18.0	86 51	145.2	3
4	49 45.0	83 56	141.1	49 19.9	84 55	141.5	48 54.8	84 55	141.9	48 29.5	84 54	142.3	48 04.1	85 54	142.7	47 38.7	85 53	143.1	47 13.2	85 53	143.5	46 47.6	85 52	143.9	4
25	49 11.6	82 57	139.8	48 46.8	83 56	140.3	48 22.0	83 56	140.7	47 57.0	83 56	141.1	47 31.9	84 55	141.5	47 06.8	84 55	141.9	46 41.5	84 54	142.3	46 16.2	84 54	142.7	25
6	48 37.3	81 58	138.6	48 12.9	82 58	139.0	47 48.3	82 58	139.4	47 23.6	82 57	139.9	46 58.8	83 57	140.3	46 34.0	83 56	140.7	46 09.0	83 56	141.1	45 44.0	84 55	141.5	6
7	48 02.2	80 60	137.4	47 38.0	81 59	137.8	47 13.7	81 59	138.2	46 49.3	81 58	138.7	46 24.9	82 58	139.1	46 00.3	82 58	139.5	45 35.6	82 57	139.9	45 10.9	83 56	140.3	7
8	47 26.3	79 61	136.2	47 02.4	80 61	136.6	46 38.4	80 60	137.1	46 14.3	80 60	137.5	45 50.1	81 59	137.9	45 25.8	81 59	138.3	45 01.4	81 58	138.8	44 37.0	82 58	139.2	8
9	46 49.6	78 62	135.0	46 26.0	79 62	135.5	46 02.3	79 61	135.9	45 38.4	80 61	136.4	45 14.5	80 60	136.8	44 50.5	80 60	137.2	44 26.5	80 60	137.6	44 02.3	81 59	138.0	9
30	46 12.1	78 64	133.9	45 48.8	78 63	134.3	45 25.4	78 63	134.8	45 01.9	79 62	135.2	44 38.2	79 62	135.7	44 14.5	79 61	136.1	43 50.7	80 61	136.5	43 26.8	80 60	136.9	30
1	45 33.9	77 65	132.8	45 10.9	77 64	133.2	44 47.8	77 64	133.7	44 24.5	78 63	134.1	44 01.2	78 63	134.6	43 37.8	78 62	135.0	43 14.2	79 62	135.4	42 50.6	79 62	135.9	1
2	44 55.1	76 66	131.7	44 32.3	76 65	132.2	44 09.5	76 65	132.6	43 46.5	77 64	133.1	43 23.5	77 64	133.5	43 00.3	77 64	133.9	42 37.1	78 63	134.4	42 13.7	78 62	134.8	2
3	44 15.6	75 67	130.7	43 53.1	75 66	131.1	43 30.6	75 66	131.6	43 07.9	76 66	132.0	42 45.1	76 65	132.5	42 22.2	76 64	132.9	41 59.2	77 64	133.3	41 36.2	77 64	133.8	3
4	43 35.5	74 68	129.6	43 13.3	74 68	130.1	42 51.0	74 67	130.6	42 28.6	75 66	131.0	42 06.1	75 66	131.4	41 43.5	76 66	131.9	41 20.8	76 65	132.3	40 58.0	76 65	132.8	4
35	42 54.8	73 69	128.6	42 32.8	73 68	129.1	42 10.8	74 68	129.6	41 48.7	74 68	130.0	41 26.4	74 67	130.5	41 04.1	75 67	130.9	40 41.7	75 66	131.3	40 19.1	75 66	131.8	35
6	42 13.5	72 70	127.6	41 51.8	72 69	128.1	41 30.1	73 69	128.6	41 08.2	73 68	129.0	40 46.2	73 68	129.5	40 24.1	74 68	129.9	40 02.0	74 67	130.4	39 39.7	74 67	130.8	6
7	41 31.7	71 71	126.7	41 10.3	71 70	127.2	40 48.8	72 70	127.6	40 27.2	72 69	128.1	40 05.4	73 69	128.5	39 43.6	73 68	129.0	39 21.7	73 68	129.4	38 59.7	74 68	129.9	7
8	40 49.3	70 71	125.7	40 28.2	71 71	126.2	40 06.9	71 70	126.7	39 45.6	71 70	127.1	39 24.1	72 70	127.6	39 02.6	72 69	128.0	38 40.9	72 69	128.5	38 19.1	73 68	128.9	8
9	40 06.5	69 72	124.8	39 45.6	70 72	125.3	39 24.6	70 71	125.8	39 03.5	71 71	126.2	38 42.3	71 70	126.7	38 21.0	71 70	127.1	37 59.5	72 70	127.6	37 38.0	72 69	128.0	9
40	39 23.2	69 73	123.9	39 02.5	69 72	124.4	38 41.8	69 72	124.9	38 20.9	70 72	125.3	38 00.0	70 71	125.8	37 38.9	70 71	126.2	37 17.7	71 70	126.7	36 56.4	71 70	127.1	40
1	38 39.4	68 74	123.1	38 19.0	68 73	123.5	37 58.5	69 73	124.0	37 37.9	69 72	124.5	37 17.1	69 72	124.9	36 56.3	70 72	125.4	36 35.4	70 71	125.8	36 14.3	70 71	126.2	1
2	37 55.2	67 74	122.2	37 35.1	67 74	122.7	37 14.8	68 74	123.1	36 54.4	68 73	123.6	36 33.9	68 73	124.1	36 13.3	69 72	124.5	35 52.6	69 72	125.0	35 31.8	69 72	125.4	2
3	37 10.6	66 75	121.4	36 50.7	67 75	121.8	36 30.6	67 74	122.3	36 10.5	67 74	122.8	35 50.2	68 74	123.2	35 29.8	68 73	123.7	35 09.4	68 73	124.1	34 48.8	69 72	124.6	3
4	36 25.6	66 76	120.5	36 05.9	66 75	121.0	35 46.1	66 75	121.5	35 26.1	67 74	121.9	35 06.1	67 74	122.4	34 45.9	67 74	122.8	34 25.7	68 74	123.3	34 05.4	68 73	123.7	4
45	35 40.2	65 76	119.7	35 20.7	65 76	120.2	35 01.1	66 76	120.7	34 41.4	66 75	121.1	34 21.6	66 75	121.6	34 01.7	67 74	122.0	33 41.6	67 74	122.5	33 21.5	67 74	122.9	45
6	34 54.5	64 77	119.0	34 35.2	65 76	119.4	34 15.8	65 76	119.9	33 56.3	65 76	120.3	33 36.7	66 76	120.8	33 17.0	66 75	121.2	32 57.2	66 75	121.7	32 37.3	66 74	122.1	6
7	34 08.4	63 77	118.2	33 49.3	64 77	118.6	33 30.1	64 77	119.1	33 10.8	65 76	119.6	32 51.4	65 76	120.0	32 31.9	65 76	120.5	32 12.3	65 75	120.9	31 52.7	66 75	121.4	7
8	33 22.0	63 78	117.4	33 03.1	63 78	117.9	32 44.1	63 77	118.3	32 25.0	64 77	118.8	32 05.8	64 77	119.3	31 46.5	64 76	119.7	31 27.1	65 76	120.2	31 07.7	65 76	120.6	8
9	32 35.2	62 78	116.7	32 16.5	62 78	117.1	31 57.8	63 78	117.6	31 38.9	63 78	118.1	31 19.9	63 77	118.5	31 00.8	64 77	119.0	30 41.6	64 76	119.4	30 22.3	64 76	119.9	9
50	31 48.2	62 79	116.0	31 29.7	62 78	116.4	31 11.1	62 78	116.9	30 52.4	63 78	117.3	30 33.6	63 78	117.8	30 14.7	63 77	118.2	29 55.7	63 77	118.7	29 36.6	64 77	119.1	50
1	31 00.9	61 79	115.2	30 42.6	61 79	115.7	30 24.1	62 79	116.2	30 05.6	62 78	116.6	29 47.0	62 78	117.1	29 28.3	62 78	117.5	29 09.5	63 78	118.0	28 50.6	63 77	118.4	1
2	30 13.3	60 80	114.5	29 55.1	61 80	115.0	29 36.9	61 79	115.5	29 18.6	61 79	115.9	29 00.1	62 79	116.4	28 41.6	62 78	116.8	28 23.0	62 78	117.3	28 04.3	62 78	117.7	2
3	29 25.4	60 80	113.8	29 07.4	60 80	114.3	28 49.4	60 80	114.8	28 31.2	61 79	115.2	28 13.0	61 79	115.7	27 54.6	61 79	116.1	27 36.2	62 78	116.6	27 17.7	62 78	117.0	3
4	28 37.3	59 81	113.2	28 19.5	59 80	113.6	28 01.6	60 80	114.1	27 43.6	60 80	114.5	27 25.5	60 80	115.0	27 07.4	61 79	115.4	26 49.1	61 79	115.9	26 30.8	61 79	116.3	4
55	27 48.9	59 81	112.5	27 31.3	59 81	113.0	27 13.5	59 80	113.4	26 55.7	60 80	113.9	26 37.8	60 80	114.3	26 19.9	60 80	114.8	26 01.8	60 79	115.2	25 43.6	61 79	115.6	55
6	27 00.3	58 81	111.8	26 42.8	58 81	112.3	26 25.3	59 81	112.7	26 07.6	59 80	113.2	25 49.9	59 80	113.6	25 32.1	60 80	114.1	25 14.2	60 80	114.5	24 56.2	60 80	115.0	6
7	26 11.5	58 82	111.2	25 54.2	58 82	111.6	25 36.8	58 81	112.1	25 19.3	58 81	112.6	25 01.7	59 81	113.0	24 44.0	59 80	113.4	24 26.3	59 80	113.9	24 08.5	59 80	114.3	7
8	25 22.5	57 82	110.6	25 05.3	57 82	111.0	24 48.0	58 82	111.5	24 30.7	58 81	111.9	24 13.3	58 81	112.4	23 55.8	58 81	112.8	23 38.2	59 80	113.2	23 20.6	59 80	113.7	8
9	24 33.2	57 82	109.9	24 16.2	57 82	110.4	23 59.1	57 82	110.8	23 41.9	57 82	111.3	23 24.6	58 81	111.7	23 07.3	58 81	112.2	22 49.9	58 81	112.6	22 32.4	58 81	113.1	9
60	23 43.8	56 83	109.3	23 26.9	56 82	109.8	23 09.9	57 82	110.2	22 52.9	57 82	110.7	22 35.8	57 82	111.1	22 18.6	57 82	111.6	22 01.3	58 81	112.0	21 44.0	58 81	112.4	60
1	22 54.2	56 83	108.7	22 37.4	56 83	109.2	22 20.6	56 82	109.6	22 03.7	56 82	110.1	21 46.7	57 82	110.5	21 29.7	57 82	110.9	21 12.6	57 82	111.4	20 55.4	57 81	111.8	1
2	22 04.4	55 83	108.1	21 47.8	56 83	108.6	21 31.1	56 83	109.0	21 14.3	56 83	109.5	20 57.5	56 82	109.9	20 40.6	56 82	110.3	20 23.6	57 82	110.8	20 06.6	57 82	111.2	2
3	21 14.4	55 84	107.5	20 57.9	55 83	108.0	20 41.4	55 83	108.4	20 24.7	56 83	108.9	20 08.0	56 83	109.3	19 51.3	56 82	109.7	19 34.4	56 82	110.2	19 17.6	56 82	110.6	3
4	20 24.3	54 84	106.9	20 07.9	55 84	107.4	19 51.5	55 83	107.8	19 35.0	55 83	108.3	19 18.4	55 83	108.7	19 01.8	56 83	109.2	18 45.1	56 82	109.6	18 28.3	56 82	110.0	4
65	19 34.0	54 84	106.4	19 17.8	54 84	106.8	19 01.5	54 84	107.2	18 45.1	55 84	107.7	18 28.6	55 83	108.1	18 12.1	55 83	108.6	17 55.6	55 83	109.0	17 38.9	56 82	109.4	65
6	18 43.6	54 84	105.8	18 27.5	54 84	106.2	18 11.3	54 84	106.7	17 55.0	54 84	107.1	17 38.7	54 84	107.6	17 22.3	55 83	108.0	17 05.9	55 83	108.4	16 49.4	55 83	108.9	6
7	17 53.0	53 84	105.2	17 37.0	54 84	105.7	17 20.9	54 84	106.1	17 04.8	54 84	106.6	16 48.6	54 84	107.0	16 32.3	54 84	107.4	16 16.0	54 83	107.9	15 59.6	55 83	108.3	7
8	17 02.3	53 85	104.7	16 46.4	53 84	105.1	16 30.4	53 84	105.6	16 14.4	54 84	106.0	15 58.3	54 84	106.4	15 42.2	54 84	106.9	15 26.0	54 84	107.3	15 09.7	54 83	107.7	8
9	16 11.5	53 85	104.1	15 55.7	53 85	104.6	15 39.8	53 85	105.0	15 23.9	53 84	105.4	15 07.9	53 84	105.9	14 51.9	54 84	106.3	14 35.8	54 84	106.8	14 19.7	54 84	107.2	9
70	15 20.6	52 85	103.6	15 04.8	52 85	104.0	14 49.1	53 85	104.5	14 33.2	53 85	104.9	14 17.4	53 84	105.3	14 01.5	53 84	105.8	13 45.5	53 84	106.2	13 29.5	53 84	106.6	70
1	14 29.5	52 85	103.0	14 13.9	52 85	103.5	13 58.2	52 85	103.9	13 42.5	52 85	104.4	13 26.7	53 85	104.8	13 10.9	53 84	105.2	12 55.0	53 84	105.7	12 39.1	53 84	106.1	1
2	13 38.3	52 86	102.5	13 22.8	52 85	102.9	13 07.2	52 85	103.4	12 51.6	52 85	103.8	12 35.9	52 85	104.3	12 20.2	52 85	104.7	12 04.4	53 84	105.1	11 48.6	53 84	105.6	2
3	12 47.0	51 86	102.0	12 31.6	52 86	102.4	12 16.1	52 85	102.9	12 00.6	52 85	103.3	11 45.0	52 85	103.7	11 29.4	52 85	104.2	11 13.7	52 85	104.6	10 58.0	52 84	105.0	3
4	11 55.6	51 86	101.5	11 40.3	51 86	101.9	11 24.9	51 86	102.3	11 09.4	52 85	102.8	10 53.9	52 85	103.2	10 38.4	52 85	103.6	10 22.9	52 85	104.1	10 07.3	52 85	104.5	4
75	11 04.2	51 86	100.9	10 48.9	51 86	101.4	10 33.6	51 86	101.8	10 18.2	51 86	102.2	10 02.8	51 85	102.7	9 47.4	51 85	103.1	9 31.9	52 85	103.6	9 16.4	52 85	104.0	75
6	10 12.6	51 86	100.4	9 57.4	51 86	100.9	9 42.1	51 86	101.3	9 26.9	51 86	101.7	9 11.6	51 86	102.2	8 56.2	51 85	102.6	8 40.8	51 85	103.0	8 25.4	51 85	103.5	6
7	9 20.9	50 86	99.9	9 05.8	51 86	100.3	8 50.6	51 86	100.8	8 35.4	51 86	101.2	8 20.2	51 86	101.7	8 05.0	51 86	102.1	7 49.7	51 86	102.5	7 34.4	51 85	103.0	7
8	8 29.2	50 86	99.4	8 14.1	50 86	99.8	7 59.0	50 86	100.3	7 43.9	50 86	100.7	7 28.8	51 86	101.1	7 13.6	51 86	101.6	6 58.4	51 86	102.0	6 43.2	51 86	102.4	8
9	7 37.4	50 86	98.9	7 22.4	50 86	99.3	7 07.4	50 86	99.8	6 52.3	50 86	100.2	6 37.2	50 86	100.6	6 22.1	50 86	101.1	6 07.0	50 86	101.5	5 51.9	51 86	101.9	9
80	6 45.5	50 87	98.4	6 30.6	50 86	98.8	6 15.6	50 86	99.3	6 00.6	50 86	99.7	5 45.6	50 86	100.1	5 30.6	50 86	100.6	5 15.5	50 86	101.0	5 00.5	50 86	101.4	80
1	5 53.6	50 87	97.9	5 38.7	50 87	98.3	5 23.8	50 86	98.8	5 08.9	50 86	99.2													1
2	5 01.6	49 87	97.4																						2

Lat. 29°

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	Alt.	d	Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	72 00.0	1.0 02	180.0	72 30.0	1.0 02	180.0	00
1	68 58.7	1.0 06	177.2	69 28.7	1.0 06	177.2	69 58.7	1.0 07	177.1	70 28.6	1.0 07	177.0	70 58.6	1.0 07	177.0	71 28.6	1.0 07	176.9	71 58.5	1.0 07	176.8	72 28.5	1.0 08	176.7	1
2	68 55.0	1.0 10	174.5	69 24.8	1.0 11	174.4	69 54.7	1.0 11	174.2	70 24.6	1.0 11	174.1	70 54.5	1.0 12	174.0	71 24.3	1.0 12	173.8	71 54.2	1.0 12	173.7	72 24.0	99 12	173.5	2
3	68 48.7	99 15	171.8	69 18.4	99 15	171.6	69 48.2	99 16	171.4	70 17.9	99 16	171.2	70 47.6	99 16	171.0	71 17.3	99 16	170.8	71 47.0	99 17	170.5	72 16.7	99 17	170.3	3
4	68 39.9	99 19	169.1	69 09.5	99 19	168.8	69 39.0	98 19	168.6	70 08.6	98 20	168.3	70 38.0	98 20	168.0	71 07.5	98 21	167.8	71 37.0	98 21	167.5	72 06.4	98 22	167.1	4
05	68 28.8	98 22	166.4	68 58.1	98 23	166.1	69 27.4	98 24	165.8	69 56.6	97 24	165.5	70 25.9	97 24	165.2	70 55.1	97 25	164.8	71 24.2	97 26	164.4	71 53.3	97 26	164.1	05
6	68 15.2	97 26	163.8	68 44.3	97 27	163.4	69 13.3	97 27	163.1	69 42.3	96 28	162.7	70 11.2	96 29	162.3	70 40.0	96 29	161.9	71 08.8	96 30	161.5	71 37.6	96 30	161.0	6
7	67 59.5	96 30	161.2	68 28.2	96 30	160.8	68 56.9	95 31	160.4	69 25.5	95 32	160.0	69 54.0	95 32	159.6	70 22.5	95 33	159.1	70 50.9	95 34	158.6	71 19.3	94 35	158.1	7
8	67 41.5	95 34	158.7	68 09.9	94 34	158.3	68 38.2	94 35	157.8	69 06.4	94 36	157.4	69 34.6	94 36	156.9	70 02.6	93 37	156.4	70 30.6	93 38	155.8	70 58.5	93 38	155.3	8
9	67 21.4	93 37	156.3	67 49.4	93 38	155.8	68 17.3	93 38	155.3	68 45.1	93 39	154.8	69 12.9	92 40	154.3	69 40.5	92 40	153.7	70 08.0	92 41	153.1	70 35.4	91 42	152.5	9
10	66 59.3	92 40	153.9	67 26.9	92 41	153.4	67 54.4	91 42	152.9	68 21.8	91 42	152.3	68 49.0	91 43	151.8	69 16.2	90 44	151.2	69 43.2	90 45	150.5	70 10.1	89 46	149.9	10
1	66 35.2	91 43	151.6	67 02.4	90 44	151.1	67 29.5	90 45	150.5	67 56.4	90 45	149.9	68 23.2	89 46	149.3	68 49.9	89 47	148.7	69 16.4	88 48	148.0	69 42.8	88 49	147.4	1
2	66 09.4	89 46	149.4	66 36.1	89 47	148.8	67 02.7	88 48	148.2	67 29.2	88 48	147.6	67 55.5	88 49	147.0	68 21.7	87 50	146.3	68 47.7	86 51	145.6	69 13.6	86 52	144.9	2
3	65 41.8	88 49	147.2	66 08.1	87 50	146.6	66 34.2	87 50	146.0	67 00.2	86 51	145.4	67 26.1	86 52	144.7	67 51.8	85 53	144.1	68 17.2	85 54	143.4	68 42.6	84 54	142.6	3
4	65 12.6	86 51	145.2	65 38.4	86 52	144.5	66 04.1	85 53	143.9	66 29.6	85 54	143.3	66 55.0	84 54	142.6	67 20.1	84 55	141.9	67 45.1	83 56	141.2	68 09.9	82 57	140.4	4
15	64 41.9	85 54	143.2	65 07.3	84 54	142.5	65 32.5	84 55	141.9	65 57.5	83 56	141.2	66 22.3	83 57	140.5	66 47.0	82 58	139.8	67 11.5	81 58	139.1	67 35.7	80 59	138.3	15
6	64 09.7	83 56	141.2	64 34.6	83 57	140.6	64 59.4	82 57	139.9	65 23.9	82 58	139.2	65 48.3	81 59	138.5	66 12.4	80 60	137.8	66 36.4	79 61	137.0	67 00.1	79 62	136.3	6
7	63 36.2	82 58	139.4	64 00.6	81 59	138.7	64 24.9	81 60	138.0	64 49.0	80 60	137.3	65 12.9	79 61	136.6	65 36.5	79 62	135.9	66 00.0	78 63	135.1	66 23.2	77 64	134.3	7
8	63 01.4	80 60	137.6	63 25.4	80 61	136.9	63 49.2	79 62	136.2	64 12.8	78 62	135.5	64 36.2	78 63	134.8	64 59.4	77 64	134.1	65 22.3	76 64	133.3	65 45.1	75 66	132.5	8
9	62 25.4	79 62	135.9	62 49.0	78 63	135.2	63 12.3	78 63	134.5	63 35.5	77 64	133.8	63 58.4	76 65	133.1	64 21.1	75 66	132.3	64 43.6	75 66	131.5	65 05.8	74 67	130.7	9
20	61 48.3	78 64	134.2	62 11.4	77 64	133.5	62 34.4	76 65	132.8	62 57.1	75 66	132.1	63 19.6	75 66	131.4	63 41.8	74 67	130.6	64 03.8	73 68	129.9	64 25.6	72 69	129.1	20
1	61 10.2	76 65	132.6	61 32.9	75 66	131.9	61 55.4	75 66	131.2	62 17.7	74 67	130.5	62 39.7	73 68	129.8	63 01.5	72 69	129.0	63 23.1	71 70	128.3	63 44.4	71 70	127.5	1
2	60 31.1	75 67	131.1	60 53.4	74 67	130.4	61 15.5	73 68	129.7	61 37.3	72 69	129.0	61 58.9	72 69	128.2	62 20.3	71 70	127.5	62 41.4	70 71	126.7	63 02.3	69 72	125.9	2
3	59 51.1	73 68	129.6	60 13.0	73 69	128.9	60 34.6	72 69	128.2	60 56.1	71 70	127.5	61 17.3	70 71	126.8	61 38.2	69 71	126.0	61 59.0	69 72	125.3	62 19.4	68 73	124.5	3
4	59 10.3	72 69	128.2	59 31.8	71 70	127.5	59 53.0	71 71	126.8	60 14.1	70 71	126.1	60 34.9	69 72	125.4	60 55.4	68 72	124.6	61 15.7	67 73	123.9	61 35.8	66 74	123.1	4
25	58 28.6	71 71	126.8	58 49.7	70 71	126.1	59 10.6	69 72	125.4	59 31.3	68 72	124.7	59 51.7	68 73	124.0	60 11.9	67 74	123.3	60 31.8	66 74	122.5	60 51.5	65 75	121.7	25
6	57 46.3	70 72	125.5	58 07.0	69 72	124.8	58 27.5	68 73	124.1	58 47.8	67 74	123.4	59 07.9	66 74	122.7	59 27.7	66 75	122.0	59 47.3	65 75	121.2	60 06.6	64 76	120.5	6
7	57 03.2	68 73	124.2	57 23.6	68 73	123.6	57 43.8	67 74	122.9	58 03.7	66 74	122.2	58 23.4	65 75	121.5	58 42.9	64 76	120.7	59 02.1	64 76	120.0	59 21.0	63 77	119.2	7
8	56 19.5	67 74	123.0	56 39.6	66 74	122.3	56 59.4	66 75	121.7	57 19.0	65 76	121.0	57 38.4	64 76	120.3	57 57.5	63 76	119.5	58 16.4	62 77	118.8	58 35.0	62 78	118.0	8
9	55 35.2	66 75	121.8	55 55.0	65 75	121.2	56 14.5	65 76	120.5	56 33.7	64 76	119.8	56 52.8	63 77	119.1	57 11.6	62 77	118.4	57 30.1	61 78	117.7	57 48.4	61 78	116.9	9
30	54 50.4	65 76	120.7	55 09.8	64 76	120.0	55 29.0	64 77	119.4	55 47.9	63 77	118.7	56 06.7	62 78	118.0	56 25.2	61 78	117.3	56 43.4	60 79	116.6	57 01.4	60 79	115.8	30
1	54 05.0	64 76	119.6	54 24.1	63 77	118.9	54 43.0	63 77	118.3	55 01.7	62 78	117.6	55 20.1	61 78	116.9	55 38.3	60 79	116.2	55 56.3	59 79	115.5	56 14.0	59 80	114.8	1
2	53 19.1	63 77	118.5	53 38.0	62 78	117.9	53 56.6	62 78	117.2	54 14.9	61 78	116.5	54 33.1	60 79	115.9	54 51.0	59 80	115.2	55 08.7	58 80	114.5	55 26.1	58 80	113.8	2
3	52 32.8	62 78	117.5	52 51.4	61 78	116.9	53 09.7	61 79	116.2	53 27.8	60 79	115.5	53 45.7	59 80	114.9	54 03.3	58 80	114.2	54 20.7	58 80	113.5	54 37.9	57 81	112.8	3
4	51 46.1	61 78	116.5	52 04.3	61 79	115.9	52 22.4	60 80	115.2	52 40.2	59 80	114.6	52 57.9	58 80	113.9	53 15.3	58 81	113.2	53 32.4	57 81	112.5	53 49.3	56 81	111.8	4
35	50 58.9	60 79	115.6	51 16.9	60 80	114.9	51 34.7	59 80	114.3	51 52.3	58 80	113.6	52 09.7	58 81	113.0	52 26.9	57 81	112.3	52 43.8	56 82	111.6	53 00.5	55 82	110.9	35
6	50 11.4	60 80	114.6	50 29.2	59 80	114.0	50 46.7	58 80	113.3	51 04.1	58 81	112.7	51 21.2	57 81	112.0	51 38.2	56 82	111.4	51 54.9	55 82	110.7	52 11.3	54 82	110.0	6
7	49 23.5	59 80	113.7	49 41.0	58 81	113.1	49 58.4	57 81	112.4	50 15.5	57 81	111.8	50 32.4	56 82	111.2	50 49.2	55 82	110.5	51 05.6	55 82	109.8	51 21.9	54 83	109.2	7
8	48 35.3	58 81	112.8	48 52.6	57 81	112.2	49 09.7	57 82	111.6	49 26.7	56 82	110.9	49 43.4	55 82	110.3	49 59.9	55 83	109.7	50 16.1	54 83	109.0	50 32.2	53 83	108.3	8
9	47 46.8	57 81	112.0	48 03.9	57 82	111.4	48 20.8	56 82	110.7	48 37.5	55 82	110.1	48 54.0	55 83	109.5	49 10.3	54 83	108.8	49 26.4	53 83	108.2	49 42.3	52 84	107.5	9
40	46 58.0	57 82	111.1	47 14.9	56 82	110.5	47 31.6	55 82	109.9	47 48.1	55 83	109.3	48 04.4	54 83	108.7	48 20.5	53 83	108.0	48 36.4	53 84	107.4	48 52.1	52 84	106.7	40
1	46 08.9	56 82	110.3	46 25.6	55 82	109.7	46 42.1	55 83	109.1	46 58.5	54 83	108.5	47 14.6	53 83	107.9	47 30.5	53 84	107.3	47 46.2	52 84	106.6	48 01.8	51 84	106.0	1
2	45 19.5	55 83	109.5	45 36.1	55 83	108.9	45 52.4	54 83	108.3	46 08.6	54 84	107.7	46 24.5	53 84	107.1	46 40.3	52 84	106.5	46 55.9	52 84	105.9	47 11.2	51 84	105.2	2
3	44 30.0	55 83	108.8	44 46.3	54 83	108.2	45 02.5	54 84	107.6	45 18.5	53 84	107.0	45 34.3	52 84	106.4	45 49.9	52 84	105.8	46 05.3	51 84	105.1	46 20.5	50 85	104.5	3
4	43 40.2	54 83	108.0	43 56.4	54 84	107.4	44 12.4	53 84	106.8	44 28.2	52 84	106.2	44 43.8	52 84	105.6	44 59.3	51 85	105.0	45 14.6	51 85	104.4	45 29.6	50 85	103.8	4
45	42 50.2	54 84	107.3	43 06.2	53 84	106.7	43 22.1	53 84	106.1	43 37.7	52 84	105.5	43 53.2	51 85	104.9	44 08.5	51 85	104.3	44 23.7	50 85	103.7	44 38.6	49 85	103.1	45
6	42 00.0	53 84	106.6	42 15.8	53 84	106.0	42 31.6	52 84	105.4	42 47.1	51 85	104.8	43 02.4	51 85	104.2	43 17.6	50 85	103.6	43 32.6	50 85	103.1	43 47.4	49 86	102.5	6
7	41 09.6	53 84	105.9	41 25.3	52 84	105.3	41 40.9	52 85	104.7	41 56.3	51 85	104.1	42 11.5	50 85	103.6	42 26.6	50 86	103.0	42 41.4	49 86	102.4	42 56.1	49 86	101.8	7
8	40 19.0	52 84	105.2	40 34.6	52 85	104.6	40 50.0	51 85	104.0	41 05.3	51 85	103.5	41 20.4	50 85	102.9	41 35.3	49 86	102.3	41 50.1	49 86	101.7	42 04.7	48 86	101.1	8
9	39 28.3	52 85	104.5	39 43.7	51 85	103.9	39 59.1	51 85	103.4	40 14.2	50 85	102.8	40 29.2	50 86	102.2	40 44.0	49 86	101.7	40 58.7	49 86	101.1	41 13.1	48 86	100.5	9
50	38 37.4	51 85	103.8	38 52.7	51 85	103.3	39 07.9	50 85	102.7	39 23.0	50 86	102.2	39 37.9	49 86	101.6	39 52.6	49 86	101.0	40 07.1	48 86	100.5	40 21.5	48 86	99.9	50
1	37 46.4	51 85	103.2	38 01.6	51 86	102.6	38 16.7	50 86	102.1	38 31.6	50 86	101.5	38 46.4	49 86	101.0	39 01.0	48 86	100.4	39 15.5	48 86	99.9	39 29.7	47 86	99.3	1
2	36 55.2	51 86	102.6	37 10.3	50 86	102.0	37 25.3	50 86	101.5	37 40.2	49 86	100.9	37 54.8	49 86	100.4	38 09.4	48 86	99.8	38 23.7	48 86	99.3	38 37.9	47 86	98.7	2
3	36 03.9	50 86	101.9	36 19.0	50 86	101.4	36 33.8	49 86	100.9	36 48.6	49 86	100.3	37 03.2	48 86	99.8	37 17.6	48 86	99.2	37 31.9	47 86	98.7	37 46.0	47 87	98.1	3
4	35 12.5	50 86	101.3	35 27.5	50 86	100.8	35 42.2	49 86	100.3	35 56.9	49 86	99.7	36 11.4	48 86	99.2	36 25.8	48 87	98.6	36 40.0	47 87	98.1	36 54.0	47 87	97.5	4
55	34 21.0	50 86	100.7	34 35.9	49 86	100.2	34 50.6	49 86	99.7	35 05.1	48 86	99.1	35 19.6	48 87	98.6	35 33.8	47 87	98.1	35 48.0	47 87	97.5	36 02.0	46 87	97.0	55
6	33 29.4	49 86	100.1	33 44.2	49 86	99.6	33 58.8	49 86	99.1	34 13.3	48 87	98.6	34 27.6	48 87	98.0	34 41.8	47 87	97.5	34 55.9	47 87	97.0	35 09.8	46 87	96.4	6
7	32 37.7	49 86	99.6	32 52.4	49 86	99.0	33 06.9	48 86	98.5	33 21.3	48 87	98.0	33 35.6	47 87	97.5	33 49.8	47 87	96.9	34 03.8	46 87	96.4	34 17.7	46 87	95.9	7
8	31 45.9	49 86	99.0	32 00.5	48 86	98.5	32 15.0	48 87	97.9	32 29.3	48 87	97.4	32 43.6	47 87	96.9	32 57.7	47 87	96.4	33 11.6	46 87	95.9	33 25.4	46 87	95.3	8
9	30 54.0	49 87	98.4	31 08.6	48 87	97.9	31 23.0	48 87	97.4	31 37.3	47 87	96.9	31 51.4	47 87	96.4	32 05.5	47 87	95.8	32 19.4	46 87	95.3	32 33.2	46 87	94.8	9
60	30 02.1	48 87	97.9	30 16.6	48 87	97.3	30 30.9	48 87	96.8	30 45.1	47 87	96.3	30 59.3	47 87	95.8	31 13.2	46 87	95.3	31 27.1	46 87	94.8	31 40.8	46 87	94.3	60
1	29 10.1	48 87	97.3	29 24.5	48 87	96.8	29 38.8	47 87	96.3	29 53.0	47 87	95.8	30 07.0	47 87	95.3	30 21.0	46 87	94.8	30 34.8	46 87	94.3	30 48.5	45 87	93.7	1
2	28 18.0	48 87	96.8	28 32.3	48 87	96.3	28 46.6	47 87	95.8	29 00.7	47 87	95.3	29 14.7	47 87	94.8	29 28.7	46 87	94.2	29 42.4	46 87	93.7	29 56.1	45 87	93.2	2
3	27 25.8	48 87	96.2	27 40.2	48 87	95.7	27 54.4	47 87	95.2	28 08.4	47 87	94.7	28 22.4	46 87	94.2	28 36.3	46 87	93.7	28 50.1	46 87	93.2	29 03.7	45 87	92.7	3
4	26 33.7	48 87	95.7	26 47.9	47 87	95.2	27 02.1	47 87	94.7	27 16.1	47 87	94.2	27 30.1	46 87	93.7	27 43.9	46 87	93.2	27 57.7	46 87	92.7	28 11.3	45 87	92.2	4
65	25 41.4	48 87	95.2	25 55.6	47 87	94.7	26 09.8	47 87	94.2	26 23.8	47 87	93.7	26 37.7	46 87	93.2	26 51.5	46 87	92.7	27 05.2	46 87	92.2	27 18.8	45 87	91.7	65
6	24 49.1	47 87	94.6	25 03.3	47 87	94.2	25 17.4	47 87	93.7	25 31.4	46 87	93.2	25 45.3	46 87	92.7	25 59.1	46 87	92.2	26 12.8	45 87	91.7	26 26.4	45 87	91.2	6
7	23 56.8	47 87	94.1	24 11.0	47 87	93.6	24 25.0	47 87	93.2	24 39.0	46 87	92.7	24 52.9	46 87	92.2	25 06.6	46 87	91.7	25 20.3	45 87	91.2	25 33.9	45 87	90.7	7
8	23 04.4	47 87	93.6	23 18.6	47 87	93.1	23 32.6	47 87	92.7	23 46.6	46 87	92.2	24 00.4	46 87	91.7	24 14.2	46 87	91.2	24 27.9	45 87	90.7	24 41.4	45 87	90.2	8
9	22 12.1	47 87	93.1	22 26.2	47 87	92.6	22 40.2	47 87	92.2	22 54.1	46 87	91.7	23 08.0	46 87	91.2	23 21.7	46 87	90.7	23 35.4	45 87	90.2	23 49.0	45 87	89.7	9
70	21 19.7	47 87	92.6	21 33.7	47 87	92.1	21 47.7	47 87	91.7	22 01.7	46 87	91.2	22 15.5	46 87	90.7	22 29.2	46 87	90.2	22 42.9	45 87	89.7	22 56.5	45 87	89.3	70
1	20 27.2	47 87	92.1	20 41.3	47 87	91.6	20 55.3	46 87	91.2	21 09.2	46 87	90.7	21 23.0	46 87	90.2	21 36.8	46 87	89.7	21 50.4	45 87	89.3	22 04.0	45 87	88.8	1
2	19 34.8	47 87	91.6	19 48.8	47 87	91.2	20 02.8	46 87	90.7	20 16.7	46 87	90.2	20 30.5	46 87	89.7	20 44.3	46 87	89.3	20 58.0	45 87	88.8	21 11.5	45 87	88.3	2
3	18 42.3	47 87	91.1	18 56.4	47 87	90.7	19 10.3	46 87	90.2	19 24.2	46 87	89.7	19 38.1	46 87	89.3	19 51.8	46 87	88.8	20 05.5	45 87	88.3	20 19.1	45 87	87.8	3
4	17 49.8	47 87	90.6	18 03.9	47 87	90.2	18 17.8	46 87	89.7	18 31.8	46 87	89.2	18 45.6	46 87	88.8	18 59.4	46 87	88.3	19 13.0	46 87	87.8	19 26.7	45 87	87.4	4
75	16 57.4	47 87	90.2	17 11.4	47 87	89.7	17 25.4	46 87	89.2	17 39.3	46 87	88.8	17 53.1	46 87	88.3	18 06.9	46 87	87.8	18 20.6	46 87	87.4	18 34.3	45 87	86.9	75
6	16 04.9	47 87	89.7	16 18.9	47 87	89.2	16 32.9	47 87	88.7	16 46.8	46 87	88.3	17 00.7	46 87	87.8	17 14.5	46 87	87.4	17 28.2	46 87	86.9	17 41.9	45 87	86.4	6
7	15 12.4	47 87	89.2	15 26.5	47 87	88.7	15 40.4	47 87	88.3	15 54.4	46 87	87.8	16 08.3	46 87	87.3	16 22.1	46 87	86.9	16 35.8	46 87	86.4	16 49.5	46 87	86.0	7
8	14 19.9	47 87	88.7	14 34.0	47 87	88.2	14 48.0	47 87	87.8	15 01.9	46 87	87.3	15 15.8	46 87	86.9	15 29.7	46 87	86.4	15 43.5	46 87	86.0	15 57.2	46 87	85.5	8
9	13 27.5	47 87	88.2	13 41.6	47 87	87.8	13 55.6	47 87	87.3	14 09.5	46 87	86.9	14 23.5	46 87	86.4	14 37.3	46 87	85.9	14 51.1	46 87	85.5	15 04.9	46 87	85.0	9
80	12 35.0	47 87	87.7	12 49.1	47 87	87.3	13 03.2	47 87	86.8	13 17.2	47 87	86.4	13 31.1	46 87	85.9	13 45.0	46 87	85.5	13 58.8	46 87	85.0	14 12.6	46 87	84.6	80
1	11 42.6	47 87	87.3	11 56.7	47 87	86.8	12 10.8	47 87	86.4	12 24.8	47 87	85.9	12 38.8	46 87	85.5	12 52.7	46 87	85.0	13 06.6	46 87	84.6	13 20.4	46 87	84.1	1
2	10 50.2	47 87	86.8	11 04.3	47 87	86.3	11 18.4	47 87	85.9	11 32.5	47 87	85.4	11 46.5	47 87	85.0	12 00.4	46 87	84.5	12 14.4	46 87	84.1	12 28.2	46 87	83.6	2
3	9 57.8	47 87	86.3	10 12.0	47 87	85.9	10 26.1	47 87	85.4	10 40.2	47 87	85.0	10 54.2	47 87	84.5	11 08.2	47 87	84.1	11 22.2	46 87	83.6	11 36.1	46 87	83.2	3
4	9 05.5	47 87	85.8	9 19.7	47 87	85.4	9 33.8	47 87	85.0	9 47.9	47 87	84.5	10 02.0	47 87	84.1	10 16.0	47 87	83.6	10 30.0	47 87	83.2	10 44.0	47 87	82.7	4
85	8 13.1	47 87	85.4	8 27.4	47 87	84.9	8 41.5	47 87	84.5	8 55.7	47 87	84.0	9 09.8	47 87	83.6	9 23.9	47 87	83.1	9 38.0	47 87	82.7	9 52.0	47 87	82.2	85
6	7 20.9	48 87	84.9	7 35.1	47 87	84.5	7 49.3	47 87	84.0	8 03.5	47 87	83.6	8 17.7	47 87	83.1	8 31.8	47 87	82.7	8 45.9	47 87	82.2	9 00.0	47 86	81.8	6
7	6 28.6	48 87	84.4	6 42.9	48 87	84.0	6 57.2	48 87	83.5	7 11.4	47 87	83.1	7 25.6	47 87	82.6	7 39.8	47 86	82.2	7 54.0	47 86	81.8	8 08.1	47 86	81.3	7
8	5 36.4	48 87	83.9	5 50.7	48 87	83.5	6 05.0	48 87	83.1	6 19.3	48 87	82.6	6 33.6	48 87	82.2	6 47.9	47 86	81.7	7 02.1	47 86	81.3	7 16.3	47 86	80.8	8
9							5 13.0	48 87	82.6	5 27.3	48 87	82.1	5 41.7	48 86	81.7	5 56.0	48 86	81.3	6 10.2	48 86	80.8	6 24.5	48 86	80.4	9
90																5 04.1	48 86	80.8	5 18.5	48 86	80.4	5 32.8	48 86	79.9	90

H.A.	8° 00′			8° 30′			9° 00′			9° 30′			10° 00′			10° 30′			11° 00′			11° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	53 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	50 00.0	1.0 01	180.0	49 30.0	1.0 01	180.0	00
1	52 59.2	1.0 04	178.4	52 29.3	1.0 04	178.4	51 59.3	1.0 04	178.4	51 29.3	1.0 04	178.4	50 59.3	1.0 04	178.4	50 29.3	1.0 04	178.5	49 59.3	1.0 04	178.5	49 29.3	1.0 04	178.5	1
2	52 57.0	1.0 06	176.7	52 27.0	1.0 06	176.8	51 57.1	1.0 06	176.8	51 27.1	1.0 06	176.8	50 57.1	1.0 06	176.9	50 27.2	1.0 06	176.9	49 57.2	1.0 06	176.9	49 27.2	1.0 06	177.0	2
3	52 53.2	1.0 09	175.1	52 23.3	1.0 09	175.1	51 53.4	1.0 08	175.2	51 23.5	1.0 08	175.3	50 53.6	1.0 08	175.3	50 23.6	1.0 08	175.4	49 53.7	1.0 08	175.4	49 23.8	1.0 08	175.5	3
4	52 48.0	99 11	173.4	52 18.1	1.0 11	173.5	51 48.3	1.0 11	173.6	51 18.4	1.0 11	173.7	50 48.6	1.0 11	173.8	50 18.7	1.0 10	173.8	49 48.8	1.0 10	173.9	49 19.0	1.0 10	174.0	4
05	52 41.2	99 14	171.8	52 11.5	99 14	171.9	51 41.7	99 13	172.0	51 11.9	99 13	172.1	50 42.2	99 13	172.2	50 12.4	99 13	172.3	49 42.6	99 13	172.4	49 12.8	99 12	172.5	05
6	52 33.0	99 16	170.2	52 03.4	99 16	170.3	51 33.7	99 16	170.4	51 04.0	99 16	170.6	50 34.3	99 15	170.7	50 04.7	99 15	170.8	49 35.0	99 15	170.9	49 05.3	99 15	171.0	6
7	52 23.4	98 18	168.6	51 53.8	98 18	168.7	51 24.3	99 18	168.9	50 54.7	99 18	169.0	50 25.1	99 18	169.1	49 55.6	99 18	169.3	49 26.0	99 17	169.4	48 56.4	99 17	169.5	7
8	52 12.3	98 21	167.0	51 42.9	98 21	167.2	51 13.5	98 20	167.3	50 44.0	98 20	167.5	50 14.6	98 20	167.6	49 45.1	98 20	167.8	49 15.7	98 19	167.9	48 46.2	98 19	168.1	8
9	51 59.8	98 23	165.4	51 30.5	98 23	165.6	51 01.3	98 23	165.8	50 32.0	98 22	166.0	50 02.7	98 22	166.1	49 33.3	98 22	166.3	49 04.0	98 22	166.4	48 34.7	98 21	166.6	9
10	51 45.9	97 25	163.9	51 16.8	97 25	164.1	50 47.7	97 25	164.3	50 18.6	97 25	164.4	49 49.4	97 24	164.6	49 20.2	97 24	164.8	48 51.1	97 24	165.0	48 21.9	97 24	165.2	10
1	51 30.6	96 28	162.3	51 01.7	96 27	162.5	50 32.8	96 27	162.7	50 03.8	97 27	163.0	49 34.8	97 26	163.2	49 05.8	97 26	163.3	48 36.8	97 26	163.5	48 07.8	97 26	163.7	1
2	51 14.0	96 30	160.8	50 45.3	96 30	161.0	50 16.6	96 29	161.3	49 47.8	96 29	161.5	49 19.0	96 28	161.7	48 50.2	96 28	161.9	48 21.3	96 28	162.1	47 52.5	96 28	162.3	2
3	50 56.1	95 32	159.3	50 27.6	95 32	159.5	49 59.1	95 31	159.8	49 30.5	95 31	160.0	49 01.9	95 30	160.3	48 33.3	95 30	160.5	48 04.6	96 30	160.7	47 35.9	96 30	160.9	3
4	50 36.9	94 34	157.8	50 08.6	94 34	158.1	49 40.3	95 33	158.3	49 11.9	95 33	158.6	48 43.5	95 32	158.8	48 15.1	95 32	159.1	47 46.7	95 32	159.3	47 18.2	95 32	159.5	4
15	50 16.5	94 36	156.4	49 48.4	94 36	156.6	49 20.3	94 35	156.9	48 52.2	94 35	157.2	48 24.0	94 34	157.4	47 55.8	94 34	157.7	47 27.5	94 34	157.9	46 59.2	94 33	158.2	15
6	49 54.9	93 38	154.9	49 27.0	93 38	155.2	48 59.1	93 37	155.5	48 31.2	93 37	155.8	48 03.3	93 36	156.0	47 35.3	93 36	156.3	47 07.2	94 36	156.6	46 39.2	94 36	156.8	6
7	49 32.0	92 40	153.5	49 04.4	92 40	153.8	48 36.8	92 39	154.1	48 09.1	92 39	154.4	47 41.4	92 38	154.7	47 13.6	93 38	155.0	46 45.8	93 38	155.2	46 17.9	93 37	155.5	7
8	49 08.1	91 42	152.1	48 40.7	91 41	152.4	48 13.3	91 41	152.7	47 45.9	92 41	153.0	47 18.4	92 40	153.3	46 50.8	92 40	153.6	46 23.3	92 39	153.9	45 55.6	92 39	154.2	8
9	48 43.0	90 44	150.7	48 15.9	90 43	151.1	47 48.7	91 43	151.4	47 21.5	91 42	151.7	46 54.3	91 42	152.0	46 27.0	91 42	152.3	45 59.7	91 41	152.6	45 32.3	91 41	152.9	9
20	48 16.8	89 45	149.4	47 50.0	90 45	149.7	47 23.1	90 44	150.1	46 56.1	90 44	150.4	46 29.1	90 44	150.7	46 02.1	90 43	151.0	45 35.0	90 43	151.3	45 07.8	91 42	151.6	20
1	47 49.6	88 47	148.1	47 23.0	89 47	148.4	46 56.4	89 46	148.8	46 29.7	89 46	149.1	46 03.0	89 45	149.4	45 36.2	89 45	149.8	45 09.3	90 44	150.1	44 42.4	90 44	150.4	1
2	47 21.3	88 49	146.8	46 55.0	88 48	147.2	46 28.7	88 48	147.5	46 02.3	88 48	147.8	45 35.8	88 47	148.2	45 09.2	89 46	148.5	44 42.6	89 46	148.8	44 16.0	89 46	149.2	2
3	46 52.1	87 50	145.5	46 26.1	87 50	145.9	46 00.0	87 49	146.3	45 33.8	87 49	146.6	45 07.6	87 48	146.9	44 41.4	88 48	147.3	44 15.0	88 48	147.6	43 48.6	88 47	148.0	3
4	46 21.9	86 52	144.3	45 56.2	86 51	144.7	45 30.4	86 51	145.0	45 04.5	86 50	145.4	44 38.5	87 50	145.7	44 12.5	87 50	146.1	43 46.5	87 49	146.4	43 20.3	87 49	146.8	4
25	45 50.8	85 53	143.1	45 25.4	85 53	143.4	44 59.8	85 52	143.8	44 34.2	85 52	144.2	44 08.6	86 52	144.6	43 42.8	86 51	144.9	43 17.0	86 51	145.3	42 51.1	86 50	145.6	25
6	45 18.9	84 55	141.9	44 53.7	84 54	142.3	44 28.4	84 54	142.6	44 03.1	85 53	143.0	43 37.7	85 53	143.4	43 12.2	85 52	143.7	42 46.7	85 52	144.1	42 21.0	85 52	144.5	6
7	44 46.1	83 56	140.7	44 21.2	83 56	141.1	43 56.2	83 55	141.5	43 31.1	84 55	141.9	43 06.0	84 54	142.2	42 40.8	84 54	142.6	42 15.5	84 53	143.0	41 50.1	85 53	143.3	7
8	44 12.4	82 57	139.6	43 47.8	82 57	140.0	43 23.1	83 56	140.4	42 58.3	83 56	140.7	42 33.4	83 56	141.1	42 08.5	83 55	141.5	41 43.5	84 55	141.9	41 18.4	84 54	142.2	8
9	43 38.0	81 59	138.4	43 13.7	81 58	138.8	42 49.2	82 58	139.2	42 24.7	82 57	139.6	42 00.1	82 57	140.0	41 35.4	82 56	140.4	41 10.7	83 56	140.8	40 45.9	83 56	141.2	9
30	43 02.8	80 60	137.3	42 38.7	80 59	137.8	42 14.6	81 59	138.2	41 50.3	81 58	138.6	41 26.0	81 58	138.9	41 01.6	81 58	139.3	40 37.1	82 57	139.7	40 12.6	82 57	140.1	30
1	42 26.9	79 61	136.3	42 03.1	79 60	136.7	41 39.2	80 60	137.1	41 15.2	80 60	137.5	40 51.2	80 59	137.9	40 27.0	81 59	138.3	40 02.8	81 58	138.7	39 38.5	81 58	139.0	1
2	41 50.3	78 62	135.2	41 26.8	79 62	135.6	41 03.1	79 61	136.0	40 39.4	79 61	136.5	40 15.6	79 60	136.9	39 51.8	80 60	137.2	39 27.8	80 60	137.6	39 03.8	80 59	138.0	2
3	41 13.0	77 63	134.2	40 49.7	78 63	134.6	40 26.4	78 62	135.0	40 02.9	78 62	135.4	39 39.4	79 62	135.8	39 15.8	79 61	136.2	38 52.1	79 61	136.6	38 28.3	79 60	137.0	3
4	40 35.0	77 64	133.2	40 12.0	77 64	133.6	39 49.0	77 63	134.0	39 25.8	77 63	134.4	39 02.5	78 62	134.8	38 39.2	78 62	135.2	38 15.7	78 62	135.6	37 52.2	78 61	136.0	4
35	39 56.5	76 65	132.2	39 33.7	76 65	132.6	39 10.9	76 64	133.0	38 48.0	77 64	133.5	38 25.0	77 64	133.9	38 01.9	77 63	134.3	37 38.7	77 63	134.7	37 15.5	78 62	135.1	35
6	39 17.3	75 66	131.2	38 54.8	75 66	131.7	38 32.3	75 65	132.1	38 09.6	76 65	132.5	37 46.9	76 64	132.9	37 24.0	76 64	133.3	37 01.1	77 64	133.7	36 38.1	77 63	134.1	6
7	38 37.6	74 67	130.3	38 15.3	74 67	130.7	37 53.0	75 66	131.1	37 30.6	75 66	131.6	37 08.1	75 66	132.0	36 45.6	75 65	132.4	36 22.9	76 65	132.8	36 00.2	76 64	133.2	7
8	37 57.2	73 68	129.4	37 35.3	73 68	129.8	37 13.2	74 67	130.2	36 51.1	74 67	130.6	36 28.8	74 66	131.1	36 06.5	75 66	131.5	35 44.1	75 66	131.9	35 21.6	75 65	132.3	8
9	37 16.4	72 69	128.4	36 54.7	73 68	128.9	36 32.9	73 68	129.3	36 11.0	73 68	129.7	35 49.0	73 67	130.2	35 26.9	74 67	130.6	35 04.8	74 66	131.0	34 42.5	74 66	131.4	9
40	36 35.1	71 70	127.6	36 13.6	72 69	128.0	35 52.0	72 69	128.4	35 30.4	72 68	128.9	35 08.6	73 68	129.3	34 46.8	73 68	129.7	34 24.9	73 67	130.1	34 02.9	73 67	130.5	40
1	35 53.2	71 70	126.7	35 32.0	71 70	127.1	35 10.7	71 70	127.6	34 49.3	72 69	128.0	34 27.8	72 69	128.4	34 06.2	72 68	128.8	33 44.5	72 68	129.2	33 22.7	73 68	129.7	1
2	35 10.9	70 71	125.8	34 49.9	70 71	126.3	34 28.8	70 70	126.7	34 07.7	71 70	127.1	33 46.4	71 70	127.6	33 25.1	71 69	128.0	33 03.6	72 69	128.4	32 42.1	72 68	128.8	2
3	34 28.1	69 72	125.0	34 07.4	69 72	125.4	33 46.5	70 71	125.9	33 25.6	70 71	126.3	33 04.6	70 70	126.7	32 43.5	71 70	127.1	32 22.3	71 70	127.6	32 01.0	71 69	128.0	3
4	33 44.9	68 73	124.2	33 24.4	69 72	124.6	33 03.8	69 72	125.0	32 43.1	69 72	125.5	32 22.3	69 71	125.9	32 01.4	70 71	126.3	31 40.4	70 70	126.8	31 19.4	70 70	127.2	4
45	33 01.3	68 73	123.4	32 41.0	68 73	123.8	32 20.6	68 73	124.2	32 00.1	68 72	124.7	31 39.6	69 72	125.1	31 18.9	69 72	125.5	30 58.2	69 71	126.0	30 37.3	70 71	126.4	45
6	32 17.3	67 74	122.6	31 57.2	67 74	123.0	31 37.0	67 73	123.5	31 16.8	68 73	123.9	30 56.4	68 72	124.3	30 36.0	68 72	124.7	30 15.5	69 72	125.2	29 54.9	69 72	125.6	6
7	31 32.9	66 75	121.8	31 13.0	66 74	122.2	30 53.1	67 74	122.7	30 33.0	67 74	123.1	30 12.9	67 73	123.5	29 52.7	68 73	124.0	29 32.4	68 72	124.4	29 12.0	68 72	124.8	7
8	30 48.1	65 75	121.0	30 28.4	66 75	121.5	30 08.7	66 74	121.9	29 48.9	66 74	122.4	29 28.9	67 74	122.8	29 09.0	67 74	123.2	28 48.9	67 73	123.6	28 28.7	67 73	124.1	8
9	30 03.0	65 76	120.3	29 43.5	65 76	120.7	29 24.0	65 75	121.2	29 04.4	66 75	121.6	28 44.6	66 74	122.0	28 24.9	66 74	122.5	28 05.0	66 74	122.9	27 45.0	67 73	123.3	9
50	29 17.5	64 76	119.6	28 58.2	64 76	120.0	28 38.9	65 76	120.4	28 19.5	65 75	120.9	28 00.0	65 75	121.3	27 40.4	65 75	121.7	27 20.7	66 74	122.2	27 01.0	66 74	122.6	50
1	28 31.7	63 77	118.8	28 12.6	64 76	119.3	27 53.5	64 76	119.7	27 34.3	64 76	120.2	27 15.0	64 76	120.6	26 55.6	65 75	121.0	26 36.1	65 75	121.4	26 16.6	65 74	121.9	1
2	27 45.6	63 77	118.1	27 26.7	63 77	118.6	27 07.8	63 77	119.0	26 48.7	64 76	119.4	26 29.6	64 76	119.9	26 10.5	64 76	120.3	25 51.2	64 76	120.7	25 31.9	65 75	121.2	2
3	26 59.1	62 78	117.4	26 40.5	62 78	117.9	26 21.7	63 77	118.3	26 02.9	63 77	118.7	25 44.0	63 77	119.2	25 25.0	63 76	119.6	25 05.9	64 76	120.0	24 46.8	64 76	120.5	3
4	26 12.4	61 78	116.8	25 53.9	62 78	117.2	25 35.4	62 78	117.6	25 16.7	62 77	118.1	24 58.0	63 77	118.5	24 39.2	63 77	118.9	24 20.3	63 76	119.4	24 01.4	63 76	119.8	4
55	25 25.4	61 79	116.1	25 07.1	61 78	116.5	24 48.7	61 78	117.0	24 30.3	62 78	117.4	24 11.7	62 78	117.8	23 53.1	62 77	118.3	23 34.5	62 77	118.7	23 15.7	63 77	119.1	55
6	24 38.1	60 79	115.4	24 20.0	61 79	115.9	24 01.8	61 79	116.3	23 43.5	61 78	116.7	23 25.2	61 78	117.2	23 06.8	62 78	117.6	22 48.3	62 77	118.0	22 29.7	62 77	118.4	6
7	23 50.6	60 80	114.8	23 32.7	60 79	115.2	23 14.6	60 79	115.6	22 56.5	60 79	116.1	22 38.4	61 78	116.5	22 20.1	61 78	116.9	22 01.8	61 78	117.4	21 43.4	61 78	117.8	7
8	23 02.9	59 80	114.1	22 45.1	59 80	114.6	22 27.2	60 80	115.0	22 09.3	60 79	115.4	21 51.3	60 79	115.9	21 33.2	60 79	116.3	21 15.1	61 78	116.7	20 56.9	61 78	117.1	8
9	22 14.8	59 80	113.5	21 57.2	59 80	113.9	21 39.5	59 80	114.4	21 21.8	59 80	114.8	21 03.9	60 79	115.2	20 46.0	60 79	115.7	20 28.1	60 79	116.1	20 10.0	60 78	116.5	9
60	21 26.6	58 81	112.9	21 09.1	58 80	113.3	20 51.6	59 80	113.7	20 34.0	59 80	114.2	20 16.3	59 80	114.6	19 58.6	59 80	115.0	19 40.8	59 79	115.5	19 23.0	60 79	115.9	60
1	20 38.1	58 81	112.3	20 20.8	58 81	112.7	20 03.4	58 81	113.1	19 46.0	58 80	113.6	19 28.5	55 80	114.0	19 10.9	59 80	114.4	18 53.3	59 80	114.8	18 35.6	59 79	115.3	1
2	19 49.5	57 82	111.7	19 32.3	57 81	112.1	19 15.1	58 81	112.5	18 57.8	58 81	113.0	18 40.4	58 80	113.4	18 23.0	58 80	113.8	18 05.6	58 80	114.2	17 48.1	58 80	114.7	2
3	19 00.6	57 82	111.1	18 43.6	57 82	111.5	18 26.5	57 81	111.9	18 09.4	57 81	112.4	17 52.2	57 81	112.8	17 34.9	58 80	113.2	17 17.6	58 80	113.6	17 00.3	58 80	114.1	3
4	18 11.5	56 82	110.5	17 54.7	56 82	110.9	17 37.7	57 82	111.3	17 20.7	57 81	111.8	17 03.7	57 81	112.2	16 46.6	57 81	112.6	16 29.4	57 81	113.1	16 12.2	57 80	113.5	4
65	17 22.3	56 82	109.9	17 05.5	56 82	110.3	16 48.7	56 82	110.8	16 31.9	56 82	111.2	16 15.0	56 82	111.6	15 58.0	57 81	112.0	15 41.0	57 81	112.5	15 24.0	57 81	112.9	65
6	16 32.8	55 83	109.3	16 16.2	55 82	109.7	15 59.6	56 82	110.2	15 42.9	56 82	110.6	15 26.1	56 82	111.0	15 09.3	56 82	111.5	14 52.5	56 81	111.9	14 35.6	56 81	112.3	6
7	15 43.2	55 83	108.7	15 26.8	55 83	109.2	15 10.2	55 82	109.6	14 53.7	55 82	110.0	14 37.0	55 82	110.5	14 20.4	56 82	110.9	14 03.7	56 82	111.3	13 46.9	56 81	111.8	7
8	14 53.4	54 83	108.2	14 37.1	55 83	108.6	14 20.7	55 83	109.0	14 04.3	55 83	109.5	13 47.8	55 82	109.9	13 31.3	55 82	110.3	13 14.7	55 82	110.8	12 58.1	55 82	111.2	8
9	14 03.5	54 84	107.6	13 47.3	54 83	108.1	13 31.0	54 83	108.5	13 14.7	54 83	108.9	12 58.4	55 83	109.4	12 42.0	55 82	109.8	12 25.5	55 82	110.2	12 09.1	55 82	110.6	9
70	13 13.4	54 84	107.1	12 57.3	54 84	107.5	12 41.2	54 83	107.9	12 25.0	54 83	108.4	12 08.8	54 83	108.8	11 52.5	54 83	109.2	11 36.2	54 82	109.7	11 19.9	55 82	110.1	70
1	12 23.2	53 84	106.5	12 07.2	53 84	107.0	11 51.2	53 84	107.4	11 35.1	54 83	107.8	11 19.0	54 83	108.3	11 02.9	54 83	108.7	10 46.7	54 83	109.1	10 30.5	54 82	109.6	1
2	11 32.8	53 84	106.0	11 16.9	53 84	106.4	11 01.0	53 84	106.9	10 45.1	53 84	107.3	10 29.1	53 83	107.7	10 13.1	53 83	108.2	9 57.0	54 83	108.6	9 41.0	54 83	109.0	2
3	10 42.3	52 84	105.5	10 26.5	53 84	105.9	10 10.7	53 84	106.3	9 54.9	53 84	106.8	9 39.0	53 84	107.2	9 23.2	53 84	107.6	9 07.2	53 83	108.1	8 51.3	53 83	108.5	3
4	9 51.7	52 85	104.9	9 36.0	52 84	105.4	9 20.3	52 84	105.8	9 04.6	52 84	106.2	8 48.8	53 84	106.7	8 33.1	53 84	107.1	8 17.3	53 84	107.5	8 01.4	53 83	108.0	4
75	9 00.9	52 85	104.4	8 45.3	52 84	104.9	8 29.8	52 84	105.3	8 14.1	52 84	105.7	7 58.5	52 84	106.1	7 42.8	52 84	106.6	7 27.1	52 84	107.0	7 11.4	52 84	107.4	75
6	8 10.0	51 85	103.9	7 54.6	52 85	104.3	7 39.1	52 85	104.8	7 23.6	52 84	105.2	7 08.0	52 84	105.6	6 52.5	52 84	106.1	6 36.9	52 84	106.5	6 21.3	52 84	106.9	6
7	7 19.0	51 85	103.4	7 03.7	51 85	103.8	6 48.3	51 85	104.3	6 32.9	51 85	104.7	6 17.4	51 84	105.1	6 02.0	52 84	105.6	5 46.5	52 84	106.0	5 31.0	52 84	106.4	7
8	6 27.9	51 85	102.9	6 12.6	51 85	103.3	5 57.4	51 85	103.7	5 42.0	51 85	104.2	5 26.7	51 85	104.6	5 11.4	51 84	105.0							8
9	5 36.7	51 86	102.4	5 21.5	51 85	102.8	5 06.3	51 85	103.2																9

Lat. 29°

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	° ′	Δt °	°	
00	73 00.0	1.0 02	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	00
1	72 58.5	1.0 08	176.7	73 28.4	1.0 08	176.6	73 58.4	1.0 08	176.5	74 28.3	1.0 08	176.4	74 58.3	1.0 08	176.3	75 28.2	1.0 09	176.1	75 58.2	1.0 09	176.0	76 28.1	1.0 09	175.9	1
2	72 53.9	99 13	173.3	73 23.7	99 13	173.2	73 53.5	99 13	173.0	74 23.4	99 14	172.8	74 53.2	99 14	172.5	75 22.9	99 14	172.3	75 52.7	99 15	172.1	76 22.5	99 16	171.8	2
3	72 46.3	99 18	170.0	73 15.9	99 18	169.8	73 45.5	99 18	169.5	74 15.1	99 19	169.2	74 44.7	98 20	168.9	75 14.2	98 20	168.5	75 43.7	98 21	168.2	76 13.2	98 22	167.8	3
4	72 35.8	98 22	166.8	73 05.1	98 23	166.5	73 34.4	98 24	166.1	74 03.7	98 24	165.7	74 32.9	97 25	165.3	75 02.1	97 26	164.8	75 31.2	97 26	164.4	76 00.3	97 27	163.9	4
05	72 22.4	97 27	163.6	72 51.4	97 28	163.2	73 20.4	96 28	162.8	73 49.2	96 29	162.3	74 18.1	96 30	161.8	74 46.8	96 31	161.3	75 15.5	95 32	160.7	75 44.0	95 32	160.1	05
6	72 06.3	95 31	160.6	72 34.9	95 32	160.1	73 03.4	95 33	159.5	73 31.8	95 34	159.0	74 00.2	94 34	158.4	74 28.4	94 35	157.8	74 56.6	94 36	157.1	75 24.6	93 37	156.4	6
7	71 47.5	94 35	157.6	72 15.7	94 36	157.0	72 43.7	93 37	156.4	73 11.7	93 38	155.8	73 39.5	93 39	155.1	74 07.2	92 40	154.5	74 34.7	92 41	153.7	75 02.2	91 42	152.9	7
8	71 26.3	92 39	154.7	71 53.9	92 40	154.1	72 21.5	92 41	153.4	72 48.9	91 42	152.7	73 16.1	91 43	152.0	73 43.2	90 44	151.3	74 10.2	89 45	150.5	74 36.9	89 46	149.6	8
9	71 02.7	91 43	151.9	71 29.8	90 44	151.2	71 56.8	90 45	150.5	72 23.7	89 46	149.8	72 50.3	89 47	149.0	73 16.8	88 48	148.2	73 43.1	87 49	147.4	74 09.2	87 50	146.5	9
10	70 36.9	89 46	149.2	71 03.5	88 47	148.5	71 29.9	88 48	147.8	71 56.2	87 49	147.0	72 22.2	87 50	146.2	72 48.1	86 52	145.4	73 13.7	85 52	144.5	73 39.1	84 54	143.5	10
1	70 09.0	87 50	146.7	70 35.1	86 51	145.9	71 00.9	86 52	145.1	71 26.6	85 53	144.3	71 52.0	84 54	143.5	72 17.2	84 55	142.6	72 42.2	83 56	141.7	73 06.8	82 57	140.7	1
2	69 39.2	85 53	144.2	70 04.7	85 54	143.4	70 30.0	84 54	142.6	70 55.0	83 56	141.8	71 19.8	82 56	140.9	71 44.4	81 58	140.0	72 08.7	81 59	139.1	72 32.7	80 60	138.1	2
3	69 07.7	83 55	141.9	69 32.6	83 56	141.1	69 57.3	82 57	140.2	70 21.7	81 58	139.4	70 45.9	80 59	138.5	71 09.8	79 60	137.6	71 33.5	78 61	136.6	71 56.8	77 62	135.6	3
4	68 34.5	82 58	139.6	68 58.8	81 59	138.8	69 22.9	80 60	138.0	69 46.8	79 61	137.1	70 10.3	78 62	136.2	70 33.6	77 63	135.3	70 56.7	76 64	134.3	71 19.3	75 65	133.3	4
15	67 59.7	80 60	137.5	68 23.5	79 61	136.7	68 47.0	78 62	135.8	69 10.3	77 63	134.9	69 33.3	76 64	134.0	69 56.0	75 65	133.1	70 18.4	74 66	132.1	70 40.5	73 67	131.1	15
6	67 23.6	78 62	135.5	67 46.8	77 63	134.6	68 09.8	76 64	133.8	68 32.5	75 65	132.9	68 54.9	74 66	132.0	69 17.0	73 67	131.0	69 38.8	72 68	130.0	70 00.3	71 69	129.0	6
7	66 46.2	76 64	133.5	67 08.9	75 65	132.7	67 31.3	74 66	131.8	67 53.5	73 67	130.9	68 15.3	72 68	130.0	68 36.9	71 69	129.1	68 58.1	70 70	128.1	69 19.0	69 71	127.1	7
8	66 07.5	74 66	131.7	66 29.7	74 67	130.8	66 51.6	73 67	130.0	67 13.3	72 69	129.1	67 34.6	71 70	128.2	67 55.6	69 70	127.2	68 16.3	68 71	126.3	68 36.6	67 72	125.3	8
9	65 27.8	73 68	129.9	65 49.5	72 69	129.1	66 10.9	71 70	128.2	66 32.0	70 70	127.3	66 52.8	69 71	126.4	67 13.3	68 72	125.5	67 33.5	67 73	124.5	67 53.3	65 74	123.5	9
20	64 47.1	71 70	128.3	65 08.3	70 70	127.4	65 29.2	69 71	126.6	65 49.9	68 72	125.7	66 10.2	67 72	124.8	66 30.2	66 73	123.8	66 49.8	65 74	122.9	67 09.2	64 75	121.9	20
1	64 05.4	70 71	126.7	64 26.2	69 72	125.8	64 46.6	68 72	125.0	65 06.8	67 73	124.1	65 26.7	66 74	123.2	65 46.2	65 74	122.3	66 05.4	63 75	121.3	66 24.2	62 76	120.4	1
2	63 22.9	68 72	125.1	63 43.2	67 73	124.3	64 03.2	66 74	123.5	64 23.0	65 74	122.6	64 42.4	64 75	121.7	65 01.5	63 76	120.8	65 20.2	62 76	119.9	65 38.6	61 77	118.9	2
3	62 39.6	67 73	123.7	62 59.5	66 74	122.9	63 19.1	65 75	122.0	63 38.4	64 75	121.2	63 57.4	63 76	120.3	64 16.1	62 77	119.4	64 34.4	61 77	118.5	64 52.4	59 78	117.5	3
4	61 55.6	65 74	122.3	62 15.1	65 75	121.5	62 34.3	64 76	120.6	62 53.2	63 76	119.8	63 11.8	61 77	118.9	63 30.1	60 78	118.0	63 48.0	59 78	117.1	64 05.6	58 79	116.2	4
25	61 10.9	64 76	121.0	61 30.0	63 76	120.2	61 48.8	62 77	119.3	62 07.4	61 77	118.5	62 25.6	60 78	117.6	62 43.5	59 78	116.8	63 01.0	58 79	115.9	63 18.3	57 80	115.0	25
6	60 25.6	63 76	119.7	60 44.3	62 77	118.9	61 02.8	61 78	118.1	61 21.0	60 78	117.2	61 38.8	59 79	116.4	61 56.4	58 79	115.5	62 13.6	57 80	114.7	62 30.5	56 80	113.8	6
7	59 39.7	62 77	118.5	59 58.1	61 78	117.7	60 16.2	60 78	116.9	60 34.1	59 79	116.1	60 51.6	58 80	115.2	61 08.8	57 80	114.4	61 25.7	56 80	113.5	61 42.2	55 81	112.6	7
8	58 53.3	61 78	117.3	59 11.4	60 79	116.5	59 29.2	59 79	115.7	59 46.7	58 80	114.9	60 03.9	57 80	114.1	60 20.8	56 81	113.3	60 37.4	55 81	112.4	60 53.6	54 82	111.6	8
9	58 06.5	60 79	116.2	58 24.2	59 79	115.4	58 41.7	58 80	114.6	58 58.9	57 80	113.8	59 15.8	56 81	113.0	59 32.4	55 81	112.2	59 48.7	54 82	111.4	60 04.6	53 82	110.5	9
30	57 19.1	59 80	115.1	57 36.6	58 80	114.3	57 53.8	57 80	113.6	58 10.7	56 81	112.8	58 27.3	55 81	112.0	58 43.6	54 82	111.2	58 59.6	53 82	110.4	59 15.3	52 83	109.5	30
1	56 31.4	58 80	114.0	56 48.6	57 81	113.3	57 05.5	56 81	112.5	57 22.1	55 82	111.8	57 38.5	54 82	111.0	57 54.5	53 82	110.2	58 10.3	52 83	109.4	58 25.7	51 83	108.6	1
2	55 43.3	57 81	113.0	56 00.2	56 81	112.3	56 16.8	55 82	111.5	56 33.2	54 82	110.8	56 49.3	53 82	110.0	57 05.1	52 83	109.2	57 20.6	51 83	108.4	57 35.8	50 84	107.6	2
3	54 54.8	56 81	112.1	55 11.5	55 82	111.3	55 27.9	54 82	110.6	55 44.0	53 82	109.9	55 59.9	52 83	109.1	56 15.4	51 83	108.3	56 30.7	50 84	107.5	56 45.7	49 84	106.8	3
4	54 06.0	55 82	111.1	54 22.4	54 82	110.4	54 38.6	53 82	109.7	54 54.5	53 83	108.9	55 10.1	52 83	108.2	55 25.5	51 84	107.4	55 40.6	50 84	106.7	55 55.4	49 84	105.9	4
35	53 16.9	54 82	110.2	53 33.1	54 83	109.5	53 49.1	53 83	108.8	54 04.7	52 83	108.1	54 20.2	51 84	107.3	54 35.3	50 84	106.6	54 50.2	49 84	105.8	55 04.8	48 85	105.1	35
6	52 27.5	54 83	109.3	52 43.5	53 83	108.6	52 59.3	52 83	107.9	53 14.7	51 84	107.2	53 30.0	50 84	106.5	53 44.9	49 84	105.8	53 59.6	49 85	105.0	54 14.0	48 85	104.3	6
7	51 37.9	53 83	108.5	51 53.7	52 84	107.8	52 09.2	51 84	107.1	52 24.5	51 84	106.4	52 39.5	50 84	105.7	52 54.3	49 85	105.0	53 08.8	48 85	104.2	53 23.1	47 85	103.5	7
8	50 48.0	52 84	107.7	51 03.6	52 84	107.0	51 19.0	51 84	106.3	51 34.1	50 84	105.6	51 48.9	49 85	104.9	52 03.5	48 85	104.2	52 17.9	47 85	103.5	52 32.0	47 86	102.8	8
9	49 57.9	52 84	106.9	50 13.3	51 84	106.2	50 28.5	50 84	105.5	50 43.4	49 85	104.8	50 58.1	49 85	104.2	51 12.6	48 85	103.5	51 26.8	47 86	102.8	51 40.7	46 86	102.0	9
40	49 07.6	51 84	106.1	49 22.8	50 84	105.4	49 37.8	50 85	104.8	49 52.6	49 85	104.1	50 07.2	48 85	103.4	50 21.5	47 86	102.7	50 35.5	46 86	102.0	50 49.3	46 86	101.3	40
1	48 17.1	51 84	105.3	48 32.1	50 85	104.7	48 47.0	49 85	104.0	49 01.6	48 85	103.4	49 16.0	48 85	102.7	49 30.2	47 86	102.0	49 44.1	46 86	101.3	49 57.8	45 86	100.6	1
2	47 26.4	50 85	104.6	47 41.3	49 85	104.0	47 56.0	49 85	103.3	48 10.5	48 86	102.7	48 24.8	47 86	102.0	48 38.8	46 86	101.3	48 52.6	46 86	100.7	49 06.2	45 86	100.0	2
3	46 35.5	50 85	103.9	46 50.3	49 85	103.3	47 04.9	48 86	102.6	47 19.2	48 86	102.0	47 33.4	47 86	101.3	47 47.3	46 86	100.7	48 01.0	45 86	100.0	48 14.5	44 86	99.3	3
4	45 44.5	49 85	103.2	45 59.1	49 85	102.6	46 13.6	48 86	101.9	46 27.8	47 86	101.3	46 41.9	46 86	100.7	46 55.7	46 86	100.0	47 09.3	45 86	99.4	47 22.6	44 86	98.7	4
45	44 53.3	49 86	102.5	45 07.9	48 86	101.9	45 22.2	47 86	101.3	45 36.3	47 86	100.6	45 50.2	46 86	100.0	46 03.9	45 86	99.4	46 17.4	45 86	98.7	46 30.7	44 87	98.1	45
6	44 02.0	48 86	101.8	44 16.4	48 86	101.2	44 30.7	47 86	100.6	44 44.7	46 86	100.0	44 58.5	46 86	99.4	45 12.1	45 86	98.7	45 25.5	44 87	98.1	45 38.7	44 87	97.5	6
7	43 10.6	48 86	101.2	43 24.9	47 86	100.6	43 39.0	47 86	100.0	43 53.0	46 86	99.4	44 06.7	45 86	98.8	44 20.2	45 87	98.1	44 33.5	44 87	97.5	44 46.6	43 87	96.9	7
8	42 19.1	48 86	100.6	42 33.3	47 86	100.0	42 47.3	46 86	99.4	43 01.1	46 86	98.8	43 14.8	45 87	98.1	43 28.2	44 87	97.5	43 41.5	44 87	96.9	43 54.5	43 87	96.3	8
9	41 27.4	47 86	99.9	41 41.6	47 86	99.3	41 55.5	46 86	98.7	42 09.2	46 87	98.2	42 22.8	45 87	97.5	42 36.2	44 87	96.9	42 49.3	44 87	96.3	43 02.3	43 87	95.7	9
50	40 35.7	47 86	99.3	40 49.7	46 86	98.7	41 03.6	46 87	98.2	41 17.2	45 87	97.6	41 30.7	45 87	97.0	41 44.0	44 87	96.4	41 57.2	43 87	95.8	42 10.1	43 87	95.2	50
1	39 43.9	47 86	98.7	39 57.8	46 87	98.1	40 11.6	46 87	97.6	40 25.2	45 87	97.0	40 38.6	44 87	96.4	40 51.9	44 87	95.8	41 04.9	43 87	95.2	41 17.8	43 87	94.6	1
2	38 52.0	47 87	98.1	39 05.8	46 87	97.6	39 19.5	45 87	97.0	39 33.1	45 87	96.4	39 46.4	44 87	95.8	39 59.6	44 87	95.2	40 12.6	43 87	94.7	40 25.5	42 87	94.1	2
3	38 00.0	46 87	97.6	38 13.8	46 87	97.0	38 27.4	45 87	96.4	38 40.9	45 87	95.8	38 54.2	44 87	95.3	39 07.3	44 87	94.7	39 20.3	43 87	94.1	39 33.1	42 87	93.5	3
4	37 07.9	46 87	97.0	37 21.7	46 87	96.4	37 35.2	45 87	95.9	37 48.7	44 87	95.3	38 01.9	44 87	94.7	38 15.0	43 87	94.2	38 28.0	43 87	93.6	38 40.7	42 87	93.0	4
55	36 15.8	46 87	96.4	36 29.5	45 87	95.9	36 43.0	45 87	95.3	36 56.4	44 87	94.8	37 09.6	44 87	94.2	37 22.7	43 87	93.6	37 35.6	43 87	93.1	37 48.3	42 87	92.5	55
6	35 23.6	46 87	95.9	35 37.3	45 87	95.3	35 50.7	45 87	94.8	36 04.1	44 87	94.2	36 17.3	44 87	93.7	36 30.3	43 87	93.1	36 43.2	43 87	92.5	36 55.9	42 87	92.0	6
7	34 31.4	46 87	95.3	34 45.0	45 87	94.8	34 58.4	45 87	94.2	35 11.7	44 87	93.7	35 24.9	44 87	93.1	35 37.9	43 87	92.6	35 50.7	43 87	92.0	36 03.4	42 87	91.5	7
8	33 39.1	45 87	94.8	33 52.7	45 87	94.2	34 06.1	44 87	93.7	34 19.3	44 87	93.2	34 32.5	43 87	92.6	34 45.4	43 87	92.1	34 58.3	42 87	91.5	35 10.9	42 87	91.0	8
9	32 46.8	45 87	94.3	33 00.3	45 87	93.7	33 13.7	44 87	93.2	33 26.9	44 87	92.7	33 40.0	43 87	92.1	33 53.0	43 87	91.6	34 05.8	42 87	91.0	34 18.5	42 87	90.5	9
60	31 54.5	45 87	93.7	32 07.9	45 87	93.2	32 21.3	44 87	92.7	32 34.5	44 87	92.1	32 47.6	43 87	91.6	33 00.5	43 87	91.1	33 13.3	42 87	90.5	33 26.0	42 87	90.0	60
1	31 02.1	45 87	93.2	31 15.5	45 87	92.7	31 28.9	44 87	92.2	31 42.1	44 87	91.6	31 55.1	43 87	91.1	32 08.1	43 87	90.6	32 20.9	42 87	90.0	32 33.5	42 87	89.5	1
2	30 09.7	45 87	92.7	30 23.1	45 87	92.2	30 36.4	44 87	91.7	30 49.6	44 87	91.1	31 02.6	43 87	90.6	31 15.6	43 87	90.1	31 28.4	42 87	89.6	31 41.0	42 87	89.0	2
3	29 17.2	45 87	92.2	29 30.7	45 87	91.7	29 43.9	44 87	91.2	29 57.1	44 87	90.7	30 10.2	43 87	90.1	30 23.1	43 87	89.6	30 35.9	42 87	89.1	30 48.6	42 87	88.6	3
4	28 24.8	45 87	91.7	28 38.2	44 87	91.2	28 51.5	44 87	90.7	29 04.6	44 87	90.2	29 17.7	43 87	89.6	29 30.6	43 87	89.1	29 43.4	42 87	88.6	29 56.1	42 87	88.1	4
65	27 32.3	45 87	91.2	27 45.7	44 87	90.7	27 59.0	44 87	90.2	28 12.2	44 87	89.7	28 25.2	43 87	89.2	28 38.2	43 87	88.7	28 51.0	43 87	88.1	29 03.7	42 87	87.6	65
6	26 39.9	45 87	90.7	26 53.2	44 87	90.2	27 06.5	44 87	89.7	27 19.7	44 87	89.2	27 32.8	43 87	88.7	27 45.7	43 87	88.2	27 58.5	43 87	87.7	28 11.3	42 87	87.2	6
7	25 47.4	45 87	90.2	26 00.8	44 87	89.7	26 14.0	44 87	89.2	26 27.2	44 87	88.7	26 40.3	43 87	88.2	26 53.3	43 87	87.7	27 06.1	43 87	87.2	27 18.9	42 87	86.7	7
8	24 54.9	45 87	89.7	25 08.3	44 87	89.2	25 21.6	44 87	88.7	25 34.8	44 87	88.2	25 47.9	43 87	87.7	26 00.8	43 87	87.2	26 13.7	43 87	86.7	26 26.5	42 87	86.2	8
9	24 02.4	45 87	89.3	24 15.8	44 87	88.8	24 29.1	44 87	88.3	24 42.3	44 87	87.8	24 55.4	43 87	87.3	25 08.4	43 87	86.8	25 21.3	43 87	86.3	25 34.1	42 87	85.8	9
70	23 10.0	45 87	88.8	23 23.4	45 87	88.3	23 36.7	44 87	87.8	23 49.9	44 87	87.3	24 03.0	44 87	86.8	24 16.0	43 87	86.3	24 29.0	43 87	85.8	24 41.8	43 87	85.3	70
1	22 17.5	45 87	88.3	22 30.9	45 87	87.8	22 44.2	44 87	87.3	22 57.5	44 87	86.8	23 10.6	44 87	86.4	23 23.7	43 87	85.9	23 36.7	43 87	85.4	23 49.5	43 87	84.9	1
2	21 25.1	45 87	87.8	21 38.5	45 87	87.3	21 51.8	44 87	86.9	22 05.1	44 87	86.4	22 18.3	44 87	85.9	22 31.4	43 87	85.4	22 44.4	43 87	84.9	22 57.3	43 87	84.4	2
3	20 32.6	45 87	87.4	20 46.1	45 87	86.9	20 59.4	44 87	86.4	21 12.7	44 87	85.9	21 25.9	44 87	85.4	21 39.1	44 87	85.0	21 52.1	43 87	84.5	22 05.1	43 87	84.0	3
4	19 40.2	45 87	86.9	19 53.7	45 87	86.4	20 07.1	45 87	85.9	20 20.4	44 87	85.5	20 33.7	44 87	85.0	20 46.8	44 87	84.5	20 59.9	43 87	84.0	21 12.9	43 87	83.5	4
75	18 47.8	45 87	86.4	19 01.3	45 87	85.9	19 14.8	45 87	85.5	19 28.1	44 87	85.0	19 41.4	44 87	84.5	19 54.6	44 87	84.0	20 07.7	44 87	83.6	20 20.8	43 87	83.1	75
6	17 55.5	45 87	86.0	18 09.0	45 87	85.5	18 22.5	45 87	85.0	18 35.9	45 87	84.5	18 49.2	44 87	84.1	19 02.4	44 87	83.6	19 15.6	44 87	83.1	19 28.7	44 87	82.6	6
7	17 03.1	45 87	85.5	17 16.7	45 87	85.0	17 30.2	45 87	84.6	17 43.6	45 87	84.1	17 57.0	44 87	83.6	18 10.3	44 87	83.1	18 23.5	44 87	82.7	18 36.7	44 87	82.2	7
8	16 10.8	45 87	85.0	16 24.4	45 87	84.6	16 38.0	45 87	84.1	16 51.5	45 87	83.6	17 04.9	45 87	83.2	17 18.2	44 87	82.7	17 31.5	44 87	82.2	17 44.7	44 86	81.8	8
9	15 18.6	46 87	84.6	15 32.2	45 87	84.1	15 45.8	45 87	83.6	15 59.3	45 87	83.2	16 12.8	45 87	82.7	16 26.2	45 87	82.2	16 39.5	44 86	81.8	16 52.8	44 86	81.3	9
80	14 26.4	46 87	84.1	14 40.0	46 87	83.6	14 53.7	45 87	83.2	15 07.3	45 87	82.7	15 20.8	45 87	82.3	15 34.2	45 86	81.8	15 47.6	45 86	81.3	16 01.0	44 86	80.9	80
1	13 34.2	46 87	83.6	13 47.9	46 87	83.2	14 01.6	46 87	82.7	14 15.2	45 87	82.3	14 28.8	45 86	81.8	14 42.3	45 86	81.3	14 55.8	45 86	80.9	15 09.2	45 86	80.4	1
2	12 42.1	46 87	83.2	12 55.8	46 87	82.7	13 09.6	46 87	82.3	13 23.3	46 87	81.8	13 36.9	45 86	81.4	13 50.5	45 86	80.9	14 04.0	45 86	80.4	14 17.5	45 86	80.0	2
3	11 50.0	46 87	82.7	12 03.8	46 87	82.3	12 17.6	46 86	81.8	12 31.3	46 86	81.4	12 45.0	46 86	80.9	12 58.7	45 86	80.4	13 12.3	45 86	80.0	13 25.9	45 86	79.5	3
4	10 57.9	46 87	82.3	11 11.8	46 86	81.8	11 25.7	46 86	81.4	11 39.5	46 86	80.9	11 53.3	46 86	80.4	12 07.0	46 86	80.0	12 20.7	46 86	79.5	12 34.3	45 86	79.1	4
85	10 06.0	47 86	81.8	10 19.9	46 86	81.3	10 33.8	46 86	80.9	10 47.7	46 86	80.4	11 01.5	46 86	80.0	11 15.3	46 86	79.5	11 29.1	46 86	79.1	11 42.8	46 86	78.6	85
6	9 14.1	47 86	81.3	9 28.1	47 86	80.9	9 42.1	47 86	80.4	9 56.0	46 86	80.0	10 09.9	46 86	79.5	10 23.8	46 86	79.1	10 37.6	46 86	78.6	10 51.4	46 86	78.2	6
7	8 22.2	47 86	80.9	8 36.3	47 86	80.4	8 50.3	47 86	80.0	9 04.4	47 86	79.5	9 18.3	47 86	79.1	9 32.3	46 86	78.6	9 46.2	46 86	78.2	10 00.1	46 86	77.7	7
8	7 30.4	47 86	80.4	7 44.6	47 86	80.0	7 58.7	47 86	79.5	8 12.8	47 86	79.1	8 26.9	47 86	78.6	8 40.9	47 86	78.2	8 54.9	47 85	77.7	9 08.8	46 86	77.3	8
9	6 38.7	47 86	79.9	6 53.0	47 86	79.5	7 07.1	47 86	79.0	7 21.3	47 86	78.6	7 35.4	47 86	78.2	7 49.6	47 86	77.7	8 03.6	47 85	77.3	8 17.7	47 85	76.8	9
90	5 47.1	48 86	79.5	6 01.4	48 86	79.0	6 15.7	48 86	78.6	6 29.9	47 86	78.1	6 44.1	47 85	77.7	6 58.3	47 85	77.3	7 12.5	47 85	76.8	7 26.6	47 85	76.4	90

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	49 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	48 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	47 00.0	1.0 01	180.0	46 30.0	1.0 01	180.0	46 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	00
1	48 59.3	1.0 03	178.5	48 29.3	1.0 03	178.5	47 59.3	1.0 03	178.5	47 29.3	1.0 03	178.6	46 59.3	1.0 03	178.6	46 29.4	1.0 03	178.6	45 59.4	1.0 03	178.6	45 29.4	1.0 03	178.6	1
2	48 57.3	1.0 06	177.0	48 27.3	1.0 06	177.1	47 57.3	1.0 06	177.1	47 27.4	1.0 06	177.1	46 57.4	1.0 05	177.2	46 27.4	1.0 05	177.2	45 57.5	1.0 05	177.2	45 27.5	1.0 05	177.3	2
3	48 53.9	1.0 08	175.5	48 23.9	1.0 08	175.6	47 54.0	1.0 08	175.6	47 24.1	1.0 08	175.7	46 54.1	1.0 08	175.7	46 24.2	1.0 08	175.8	45 54.3	1.0 07	175.8	45 24.3	1.0 07	175.9	3
4	48 49.1	1.0 10	174.1	48 19.2	1.0 10	174.1	47 49.4	1.0 10	174.2	47 19.5	1.0 10	174.3	46 49.6	1.0 10	174.3	46 19.7	1.0 10	174.4	45 49.8	1.0 10	174.5	45 19.9	1.0 09	174.5	4
05	48 43.0	99 12	172.6	48 13.2	99 12	172.7	47 43.4	99 12	172.7	47 13.6	99 12	172.8	46 43.8	99 12	172.9	46 13.9	99 12	173.0	45 44.1	99 12	173.1	45 14.3	99 12	173.2	05
6	48 35.5	99 15	171.1	48 05.8	99 14	171.2	47 36.1	99 14	171.3	47 06.4	99 14	171.4	46 36.6	99 14	171.5	46 06.9	99 14	171.6	45 37.2	99 14	171.7	45 07.4	99 14	171.8	6
7	48 26.8	99 17	169.6	47 57.2	99 17	169.8	47 27.5	99 16	169.9	46 57.9	99 16	170.0	46 28.3	99 16	170.1	45 58.6	99 16	170.2	45 29.0	99 16	170.3	44 59.3	99 16	170.4	7
8	48 16.7	98 19	168.2	47 47.2	98 19	168.3	47 17.7	98 18	168.5	46 48.2	98 18	168.6	46 18.6	98 18	168.7	45 49.1	98 18	168.9	45 19.6	98 18	169.0	44 50.0	99 18	169.1	8
9	48 05.3	98 21	166.8	47 35.9	98 21	166.9	47 06.6	98 21	167.1	46 37.2	98 20	167.2	46 07.8	98 20	167.3	45 38.3	98 20	167.5	45 08.9	98 20	167.6	44 39.5	98 20	167.8	9
10	47 52.6	97 23	165.3	47 23.4	97 23	165.5	46 54.2	97 23	165.7	46 24.9	98 22	165.8	45 55.7	98 22	166.0	45 26.4	98 22	166.1	44 57.1	98 22	166.3	44 27.8	98 22	166.4	10
1	47 38.7	97 25	163.9	47 09.7	97 25	164.1	46 40.6	97 25	164.3	46 11.5	97 24	164.5	45 42.3	97 24	164.6	45 13.2	97 24	164.8	44 44.0	97 24	165.0	44 14.9	97 24	165.1	1
2	47 23.6	96 27	162.5	46 54.7	96 27	162.7	46 25.7	96 27	162.9	45 56.8	97 26	163.1	45 27.8	97 26	163.3	44 58.9	97 26	163.5	44 29.9	97 26	163.6	44 00.8	97 25	163.8	2
3	47 07.2	96 29	161.1	46 38.5	96 29	161.3	46 09.7	96 29	161.6	45 41.0	96 28	161.8	45 12.2	96 28	162.0	44 43.3	96 28	162.2	44 14.5	96 28	162.3	43 45.6	96 27	162.5	3
4	46 49.7	95 31	159.8	46 21.1	96 31	160.0	45 52.5	96 30	160.2	45 23.9	96 30	160.4	44 55.3	96 30	160.6	44 26.7	96 30	160.8	43 58.0	96 29	161.1	43 29.3	96 29	161.3	4
15	46 30.9	94 33	158.4	46 02.6	95 33	158.7	45 34.2	95 32	158.9	45 05.8	95 32	159.1	44 37.4	95 32	159.3	44 08.9	95 32	159.6	43 40.4	95 31	159.8	43 11.9	95 31	160.0	15
6	46 11.0	94 35	157.1	45 42.9	94 35	157.3	45 14.7	94 34	157.6	44 46.5	94 34	157.8	44 18.3	94 34	158.1	43 50.0	94 33	158.3	43 21.8	94 33	158.5	42 53.4	94 32	158.7	6
7	45 50.1	93 37	155.8	45 22.1	93 36	156.0	44 54.2	93 36	156.3	44 26.2	93 36	156.5	43 58.2	93 35	156.8	43 30.1	94 35	157.0	43 02.0	94 35	157.3	42 33.9	94 34	157.5	7
8	45 28.9	92 39	154.5	45 00.3	92 38	154.7	44 32.5	93 38	155.0	44 04.8	93 38	155.3	43 36.9	93 37	155.5	43 09.1	93 37	155.8	42 41.2	93 36	156.0	42 13.3	93 36	156.3	8
9	45 04.8	92 40	153.2	44 37.4	92 40	153.5	44 09.8	92 40	153.8	43 42.3	92 39	154.0	43 14.7	92 39	154.3	42 47.1	92 38	154.6	42 19.4	92 38	154.8	41 51.7	92 38	155.1	9
20	44 40.7	91 42	151.9	44 13.4	91 42	152.2	43 46.1	91 41	152.5	43 18.8	91 41	152.8	42 51.4	91 40	153.1	42 24.0	91 40	153.4	41 56.6	92 40	153.6	41 29.1	92 39	153.9	20
1	44 15.5	90 44	150.7	43 48.5	90 43	151.0	43 21.4	90 43	151.3	42 54.3	90 42	151.6	42 27.2	91 42	151.9	42 00.0	91 42	152.2	41 32.8	91 41	152.5	41 05.5	91 41	152.7	1
2	43 49.3	89 45	149.5	43 22.5	89 45	149.8	42 55.7	89 44	150.1	42 28.9	90 44	150.4	42 02.0	90 44	150.7	41 35.0	90 43	151.0	41 08.0	90 43	151.3	40 41.0	90 42	151.6	2
3	43 22.2	88 47	148.3	42 55.7	88 46	148.6	42 29.1	89 46	148.9	42 02.5	89 46	149.2	41 35.8	89 45	149.5	41 09.1	89 45	149.8	40 42.4	89 44	150.1	40 15.6	89 44	150.4	3
4	42 54.1	87 48	147.1	42 27.9	88 48	147.4	42 01.6	88 47	147.8	41 35.2	88 47	148.1	41 08.8	88 47	148.4	40 42.3	88 46	148.7	40 15.8	88 46	149.0	39 49.2	89 45	149.3	4
25	42 25.2	87 50	145.9	41 59.2	87 49	146.3	41 33.1	87 49	146.6	41 07.0	87 48	146.9	40 40.8	87 48	147.3	40 14.6	87 48	147.6	39 48.3	88 47	147.9	39 22.0	88 47	148.2	25
6	41 55.4	86 51	144.8	41 29.6	86 51	145.2	41 03.8	86 50	145.5	40 38.0	86 50	145.8	40 12.0	86 49	146.2	39 46.1	87 49	146.5	39 20.0	87 48	146.8	38 54.0	87 48	147.1	6
7	41 24.7	85 52	143.7	40 59.2	85 52	144.0	40 33.7	85 52	144.4	40 08.1	85 51	144.7	39 42.4	86 51	145.1	39 16.7	86 50	145.4	38 50.9	86 50	145.7	38 25.1	86 50	146.1	7
8	40 53.2	84 54	142.6	40 28.0	84 53	143.0	40 02.7	84 53	143.3	39 37.4	85 52	143.7	39 12.0	85 52	144.0	38 46.5	85 52	144.3	38 20.9	85 51	144.7	37 55.4	85 51	145.0	8
9	40 21.0	83 55	141.5	39 56.0	83 55	141.9	39 31.0	84 54	142.2	39 05.9	84 54	142.6	38 40.7	84 53	142.9	38 15.5	84 53	143.3	37 50.2	84 52	143.6	37 24.9	85 52	144.0	9
30	39 47.9	82 56	140.5	39 23.2	82 56	140.8	38 58.5	83 55	141.2	38 33.6	83 55	141.6	38 08.7	83 54	141.9	37 43.8	83 54	142.3	37 18.7	84 54	142.6	36 53.6	84 53	143.0	30
1	39 14.2	81 58	139.4	38 49.7	82 57	139.8	38 25.2	82 57	140.2	38 00.6	82 56	140.5	37 36.0	82 56	140.9	37 11.3	82 55	141.3	36 46.5	83 55	141.6	36 21.7	83 54	142.0	1
2	38 39.7	80 59	138.4	38 15.5	81 58	138.8	37 51.2	81 58	139.2	37 26.9	81 57	139.5	37 02.5	81 57	139.9	36 38.1	82 56	140.3	36 13.5	82 56	140.6	35 49.0	82 56	141.0	2
3	38 04.5	80 60	137.4	37 40.6	80 59	137.8	37 16.6	80 59	138.2	36 52.5	80 58	138.5	36 28.4	81 58	138.9	36 04.2	81 58	139.3	35 39.9	81 57	139.6	35 15.6	81 57	140.0	3
4	37 28.6	79 61	136.4	37 05.0	79 60	136.8	36 41.2	79 60	137.2	36 17.4	79 60	137.6	35 53.6	80 59	138.0	35 29.6	80 59	138.3	35 05.6	80 58	138.7	34 41.5	80 58	139.1	4
35	36 52.2	78 62	135.5	36 28.8	78 62	135.9	36 05.3	78 61	136.2	35 41.7	79 60	136.6	35 18.1	79 60	137.0	34 54.4	79 60	137.4	34 30.6	79 59	137.8	34 06.8	80 59	138.1	35
6	36 15.1	77 63	134.5	35 51.9	77 62	134.9	35 28.7	78 62	135.3	35 05.4	78 62	135.7	34 42.0	78 61	136.1	34 18.5	78 61	136.5	33 55.0	78 60	136.8	33 31.4	79 60	137.2	6
7	35 37.3	76 64	133.6	35 14.4	76 63	134.0	34 51.5	77 63	134.4	34 28.4	77 62	134.8	34 05.3	77 62	135.2	33 42.1	77 62	135.5	33 18.8	78 61	135.9	32 55.5	78 61	136.3	7
8	34 59.1	75 65	132.7	34 36.4	76 64	133.1	34 13.7	76 64	133.5	33 50.9	76 64	133.9	33 28.0	76 63	134.3	33 05.0	77 63	134.7	32 42.0	77 62	135.0	32 18.9	77 62	135.4	8
9	34 20.2	75 66	131.8	33 57.8	75 65	132.2	33 35.3	75 65	132.6	33 12.8	75 64	133.0	32 50.1	76 64	133.4	32 27.4	76 64	133.8	32 04.7	76 63	134.2	31 41.8	76 63	134.5	9
40	33 40.8	74 66	130.9	33 18.7	74 66	131.3	32 56.4	74 66	131.7	32 34.1	74 65	132.1	32 11.7	75 65	132.5	31 49.3	75 64	132.9	31 26.7	75 64	133.3	31 04.1	75 64	133.7	40
1	33 00.9	73 67	130.1	32 39.0	73 67	130.5	32 17.0	73 66	130.9	31 54.9	74 66	131.3	31 32.8	74 66	131.7	31 10.6	74 65	132.1	30 48.3	74 65	132.5	30 25.9	75 64	132.8	1
2	32 20.5	72 68	129.2	31 58.8	72 68	129.6	31 37.1	73 67	130.0	31 15.2	73 67	130.4	30 53.3	73 66	130.8	30 31.4	73 66	131.2	30 09.3	74 66	131.6	29 47.2	74 65	132.0	2
3	31 39.6	71 69	128.4	31 18.2	72 69	128.8	30 56.7	72 68	129.2	30 35.1	72 68	129.6	30 13.4	72 67	130.0	29 51.7	73 67	130.4	29 29.8	73 67	130.8	29 08.0	73 66	131.2	3
4	30 58.3	71 70	127.6	30 37.0	71 69	128.0	30 15.8	71 69	128.4	29 54.4	71 68	128.8	29 33.0	72 68	129.2	29 11.5	72 68	129.6	28 49.9	72 67	130.0	28 28.2	72 67	130.4	4
45	30 16.4	70 70	126.8	29 55.5	70 70	127.2	29 34.4	70 70	127.6	29 13.3	71 69	128.0	28 52.1	71 69	128.4	28 30.8	71 68	128.8	28 09.5	71 68	129.2	27 48.0	72 68	129.6	45
6	29 34.2	69 71	126.0	29 13.5	69 71	126.4	28 52.6	70 70	126.8	28 31.7	70 70	127.2	28 10.7	70 70	127.6	27 49.7	70 69	128.0	27 28.6	71 69	128.4	27 07.4	71 68	128.8	6
7	28 51.5	68 72	125.2	28 31.0	69 71	125.6	28 10.4	69 71	126.1	27 49.7	69 71	126.5	27 29.0	69 70	126.9	27 08.2	70 70	127.3	26 47.3	70 70	127.7	26 26.3	70 69	128.1	7
8	28 08.5	68 72	124.5	27 48.2	68 72	124.9	27 27.8	68 72	125.3	27 07.3	68 71	125.7	26 46.8	69 71	126.1	26 26.2	69 71	126.5	26 05.5	69 70	126.9	25 44.8	69 70	127.3	8
9	27 25.0	67 73	123.7	27 04.9	67 73	124.2	26 44.8	67 72	124.6	26 24.5	68 72	125.0	26 04.2	68 72	125.4	25 43.8	68 71	125.8	25 23.4	68 71	126.2	25 02.9	68 71	126.6	9
50	26 41.2	66 74	123.0	26 21.3	66 73	123.4	26 01.4	67 73	123.8	25 41.3	67 72	124.3	25 21.2	67 72	124.7	25 01.1	67 72	125.1	24 40.8	68 72	125.5	24 20.5	68 71	125.9	50
1	25 57.0	65 74	122.3	25 37.3	66 74	122.7	25 17.6	66 74	123.1	24 57.8	66 73	123.5	24 37.9	66 73	123.9	24 17.9	67 72	124.4	23 57.9	67 72	124.8	23 37.8	67 72	125.2	1
2	25 12.5	65 75	121.6	24 53.0	65 74	122.0	24 33.5	65 74	122.4	24 13.9	65 74	122.8	23 54.2	66 74	123.2	23 34.4	66 73	123.7	23 14.6	66 73	124.1	22 54.8	66 72	124.5	2
3	24 27.6	64 75	120.9	24 08.3	64 75	121.3	23 49.0	65 75	121.7	23 29.6	65 74	122.1	23 10.1	65 74	122.6	22 50.6	65 74	123.0	22 31.0	65 73	123.4	22 11.3	66 73	123.8	3
4	23 42.4	63 76	120.2	23 23.3	64 76	120.6	23 04.2	64 75	121.0	22 45.0	64 75	121.5	22 25.7	64 74	121.9	22 06.4	65 74	122.3	21 47.0	65 74	122.7	21 27.5	65 74	123.1	4
55	22 56.9	63 76	119.5	22 38.0	63 76	119.9	22 19.1	63 76	120.4	22 00.1	63 76	120.8	21 41.0	64 75	121.2	21 21.9	64 75	121.6	21 02.7	64 74	122.0	20 43.4	64 74	122.4	55
6	22 11.1	62 77	118.9	21 52.4	62 76	119.3	21 33.6	63 76	119.7	21 14.8	63 76	120.1	20 55.9	63 76	120.5	20 37.0	63 75	121.0	20 18.0	63 75	121.4	19 59.0	64 75	121.8	6
7	21 25.0	62 77	118.2	21 06.5	62 77	118.6	20 47.9	62 77	119.1	20 29.3	62 76	119.5	20 10.6	62 76	119.9	19 51.9	63 76	120.3	19 33.0	63 76	120.7	19 14.2	63 75	121.1	7
8	20 38.6	61 78	117.6	20 20.3	61 78	118.0	20 01.9	61 77	118.4	19 43.5	62 77	118.8	19 25.0	62 76	119.3	19 06.4	62 76	119.7	18 47.8	62 76	120.1	18 29.1	62 76	120.5	8
9	19 52.0	60 78	116.9	19 33.8	61 78	117.4	19 15.6	61 78	117.8	18 57.4	61 77	118.2	18 39.0	61 77	118.6	18 20.7	61 77	119.0	18 02.2	61 76	119.5	17 43.8	62 76	119.9	9
60	19 05.0	60 79	116.3	18 47.1	60 78	116.7	18 29.1	60 78	117.2	18 11.0	60 78	117.6	17 52.8	61 78	118.0	17 34.6	61 77	118.4	17 16.4	61 77	118.8	16 58.1	61 76	119.2	60
1	18 17.9	59 79	115.7	18 00.1	59 79	116.1	17 42.2	60 78	116.5	17 24.3	60 78	117.0	17 06.4	60 78	117.4	16 48.4	60 78	117.8	16 30.3	60 77	118.2	16 12.2	60 77	118.6	1
2	17 30.5	59 79	115.1	17 12.8	59 79	115.5	16 55.2	59 79	115.9	16 37.4	59 78	116.4	16 19.6	59 78	116.8	16 01.8	60 78	117.2	15 43.9	60 78	117.6	15 26.0	60 78	118.0	2
3	16 42.8	58 80	114.5	16 25.4	58 80	114.9	16 07.9	58 79	115.3	15 50.3	59 79	115.8	15 32.7	59 79	116.2	15 15.0	59 78	116.6	14 57.3	59 78	117.0	14 39.5	59 78	117.4	3
4	15 55.0	58 80	113.9	15 37.7	58 80	114.3	15 20.3	58 80	114.8	15 02.9	58 79	115.2	14 45.5	58 79	115.6	14 28.0	58 79	116.0	14 10.4	59 78	116.4	13 52.9	59 78	116.9	4
65	15 06.9	57 80	113.3	14 49.7	57 80	113.8	14 32.6	57 80	114.2	14 15.3	58 80	114.6	13 58.0	58 80	115.0	13 40.7	58 79	115.4	13 23.3	58 79	115.9	13 05.9	58 79	116.3	65
6	14 18.6	57 81	112.8	14 01.6	57 80	113.2	13 44.6	57 80	113.6	13 27.5	57 80	114.0	13 10.4	57 80	114.4	12 53.2	57 80	114.9	12 36.0	57 79	115.3	12 18.7	58 79	115.7	6
7	13 30.1	56 81	112.2	13 13.3	56 81	112.6	12 56.4	56 81	113.0	12 39.4	56 80	113.5	12 22.5	57 80	113.9	12 05.5	57 80	114.3	11 48.4	57 80	114.7	11 31.3	57 79	115.1	7
8	12 41.4	56 82	111.6	12 24.7	56 81	112.0	12 08.0	56 81	112.5	11 51.2	56 81	112.9	11 34.4	56 80	113.3	11 17.5	56 80	113.7	11 00.7	56 80	114.2	10 43.7	56 80	114.6	8
9	11 52.5	55 82	111.1	11 36.0	55 82	111.5	11 19.4	55 81	111.9	11 02.8	55 81	112.3	10 46.1	56 81	112.8	10 29.4	56 80	113.2	10 12.7	56 80	113.6	9 55.9	56 80	114.0	9
70	11 03.5	55 82	110.5	10 47.1	55 82	110.9	10 30.6	55 82	111.4	10 14.1	55 81	111.8	9 57.6	55 81	112.2	9 41.1	55 81	112.6	9 24.5	55 81	113.1	9 07.9	55 80	113.5	70
1	10 14.2	54 82	110.0	9 58.0	54 82	110.4	9 41.7	54 82	110.8	9 25.3	55 82	111.3	9 08.9	55 81	111.7	8 52.5	55 81	112.1	8 36.1	55 81	112.5	8 19.7	55 81	113.0	1
2	9 24.8	54 83	109.4	9 08.7	54 82	109.9	8 52.5	54 82	110.3	8 36.3	54 82	110.7	8 20.1	54 82	111.1	8 03.8	54 82	111.6	7 47.5	54 81	112.0	7 31.2	54 81	112.4	2
3	8 35.3	53 83	108.9	8 19.3	53 83	109.3	8 03.2	54 82	109.8	7 47.2	54 82	110.2	7 31.1	54 82	110.6	7 14.9	54 82	111.0	6 58.8	54 82	111.5	6 42.6	54 81	111.9	3
4	7 45.6	53 83	108.4	7 29.7	53 83	108.8	7 13.8	53 83	109.2	6 57.8	53 82	109.7	6 41.9	53 82	110.1	6 25.9	53 82	110.5	6 09.9	53 82	110.9	5 53.9	53 82	111.4	4
75	6 55.7	52 83	107.9	6 39.9	53 83	108.3	6 24.1	53 83	108.7	6 08.3	53 83	109.2	5 52.5	53 82	109.6	5 36.7	53 82	110.0	5 20.8	53 82	110.4	5 04.9	53 82	110.9	75
6	6 05.7	52 84	107.4	5 50.0	52 83	107.8	5 34.4	52 83	108.2	5 18.7	52 83	108.6	5 03.0	52 83	109.1										6
7	5 15.5	52 84	106.8	5 00.0	52 83	107.3																			7

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′			12° 30′			13° 00′			13° 30′			14° 00′			14° 30′			15° 00′			15° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91																									91
2				5 09.9	48 86	78.6	5 24.3	48 86	78.1	5 38.6	48 86	77.7	5 52.9	48 85	77.2	6 07.2	48 85	76.8	6 21.5	48 85	76.3	6 35.7	47 85	75.9	2
3													5 01.8	48 85	76.8	5 16.2	48 85	76.3	5 30.5	48 85	75.9	5 44.9	48 85	75.4	3

Lat. 29°

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	77 00.0	1.0 03	180.0	77 30.0	1.0 03	180.0	78 00.0	1.0 04	180.0	78 30.0	1.0 04	180.0	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	80 00.0	1.0 04	180.0	80 30.0	1.0 04	180.0	00
1	76 58.0	1.0 10	175.7	77 28.0	1.0 10	175.6	77 57.9	1.0 10	175.4	78 27.8	1.0 11	175.2	78 57.7	1.0 11	175.0	79 27.6	1.0 12	174.8	79 57.5	1.0 12	174.6	80 27.4	1.0 13	174.3	1
2	76 52.2	99 16	171.5	77 21.9	99 16	171.2	77 51.6	99 17	170.9	78 21.3	99 18	170.5	78 50.9	99 19	170.1	79 20.5	99 19	169.7	79 50.1	98 20	169.2	80 19.6	98 21	168.7	2
3	76 42.6	98 22	167.4	77 12.0	98 23	166.9	77 41.3	98 24	166.4	78 10.6	97 25	165.9	78 39.8	97 26	165.3	79 08.9	97 26	164.7	79 38.0	97 28	164.0	80 06.9	96 29	163.3	3
4	76 29.3	97 28	163.3	76 58.2	96 29	162.7	77 27.1	96 30	162.1	77 55.8	96 31	161.4	78 24.4	95 32	160.7	78 53.0	95 33	159.9	79 21.4	94 35	159.1	79 49.6	94 36	158.1	4
05	76 12.5	95 34	159.4	76 40.9	94 34	158.7	77 09.1	94 36	158.0	77 37.2	93 37	157.2	78 05.2	93 38	156.3	78 33.0	92 39	155.4	79 00.6	92 41	154.4	79 28.0	91 42	153.3	05
6	75 52.5	93 38	155.7	76 20.2	92 40	154.9	76 47.8	92 41	154.0	77 15.2	91 42	153.1	77 42.4	90 44	152.2	78 09.4	90 45	151.1	78 36.1	89 46	150.0	79 02.6	88 48	148.8	6
7	75 29.4	90 43	152.1	75 56.4	90 44	151.2	76 23.3	89 46	150.3	76 49.9	88 47	149.3	77 16.3	88 48	148.3	77 42.4	87 50	147.1	78 08.2	86 52	145.9	78 33.7	84 53	144.6	7
8	75 03.5	88 48	148.7	75 29.8	87 49	147.8	75 55.9	87 50	146.8	76 21.8	86 52	145.7	76 47.3	85 53	144.6	77 12.5	84 54	143.4	77 37.4	82 56	142.1	78 01.9	81 58	140.8	8
9	74 35.0	86 51	145.6	75 00.6	85 53	144.6	75 25.9	84 54	143.5	75 50.9	83 55	142.4	76 15.6	82 57	141.2	76 40.0	81 58	140.0	77 03.9	79 60	138.6	77 27.4	78 61	137.2	9
10	74 04.2	83 55	142.5	74 29.0	82 56	141.5	74 53.6	81 57	140.4	75 17.8	80 59	139.3	75 41.6	79 60	138.1	76 05.1	78 62	136.8	76 28.2	76 63	135.4	76 50.7	74 64	134.0	10
1	73 31.3	81 58	139.7	73 55.4	80 59	138.7	74 19.1	79 60	137.5	74 42.5	77 62	136.4	75 05.6	76 63	135.1	75 28.2	75 64	133.8	75 50.4	73 66	132.5	76 12.1	71 67	131.1	1
2	72 56.4	78 61	137.1	73 19.8	77 62	136.0	73 42.8	76 63	134.9	74 05.4	75 64	133.7	74 27.7	73 66	132.4	74 49.5	72 67	131.1	75 10.8	70 68	129.8	75 31.7	69 70	128.4	2
3	72 19.8	76 64	134.6	72 42.5	75 65	133.5	73 04.8	74 66	132.3	73 26.7	72 67	131.2	73 48.2	71 68	129.9	74 09.2	69 69	128.6	74 29.8	68 71	127.3	74 49.8	66 72	125.9	3
4	71 41.7	74 66	132.2	72 03.7	73 67	131.1	72 25.3	71 68	130.0	72 46.5	70 69	128.8	73 07.2	68 70	127.6	73 27.6	67 72	126.3	73 47.4	65 73	125.0	74 06.7	63 74	123.6	4
15	71 02.2	72 68	130.0	71 23.5	70 69	129.0	71 44.4	69 70	127.8	72 05.0	68 71	126.6	72 25.1	66 72	125.4	72 44.7	65 73	124.2	73 03.8	63 74	122.9	73 22.4	61 75	121.5	15
6	70 21.4	70 70	128.0	70 42.1	68 71	126.9	71 02.4	67 72	125.8	71 22.3	66 73	124.6	71 41.8	64 74	123.4	72 00.8	63 75	122.2	72 19.3	61 76	120.9	72 37.2	59 77	119.6	6
7	69 39.5	68 72	126.1	69 59.6	66 72	125.0	70 19.3	65 73	123.9	70 38.6	64 74	122.7	70 57.5	62 75	121.5	71 15.9	61 76	120.3	71 33.8	59 77	119.1	71 51.2	57 78	117.8	7
8	68 56.6	66 73	124.2	69 16.1	65 74	123.2	69 35.3	63 75	122.1	69 54.0	62 76	121.0	70 12.4	60 76	119.8	70 30.2	59 77	118.6	70 47.5	57 78	117.4	71 04.4	55 79	116.1	8
9	68 12.7	64 74	122.5	68 31.8	63 75	121.5	68 50.4	61 76	120.4	69 08.7	60 77	119.3	69 26.4	59 78	118.2	69 43.8	57 78	117.0	70 00.6	55 79	115.8	70 17.0	54 80	114.5	9
20	67 28.1	63 76	120.9	67 46.7	61 76	119.9	68 04.8	60 77	118.8	68 22.5	58 78	117.7	68 39.8	57 79	116.6	68 56.7	55 80	115.5	69 13.1	54 80	114.3	69 28.9	52 81	113.1	20
1	66 42.7	61 77	119.4	67 00.8	60 78	118.4	67 18.5	58 78	117.3	67 35.8	57 79	116.3	67 52.6	55 80	115.2	68 09.0	54 80	114.1	68 25.0	52 81	112.9	68 40.4	51 82	111.7	1
2	65 56.7	59 78	117.9	66 14.3	58 78	116.9	66 31.6	57 79	115.9	66 48.4	56 80	114.9	67 04.9	54 80	113.8	67 20.9	53 81	112.7	67 36.4	51 82	111.6	67 51.5	49 82	110.5	2
3	65 10.0	58 79	116.6	65 27.3	57 79	115.6	65 44.1	56 80	114.6	66 00.6	54 80	113.6	66 16.6	53 81	112.5	66 32.2	51 82	111.5	66 47.4	50 82	110.4	67 02.1	48 83	109.3	3
4	64 22.8	57 80	115.3	64 39.7	56 80	114.3	64 56.2	54 81	113.3	65 12.3	53 81	112.3	65 27.9	52 82	111.3	65 43.2	50 82	110.3	65 58.0	49 83	109.2	66 12.4	47 83	108.1	4
25	63 35.1	56 80	114.0	63 51.6	54 81	113.1	64 07.8	53 81	112.1	64 23.5	52 82	111.2	64 38.9	50 82	110.2	64 53.8	49 83	109.1	65 08.3	48 83	108.1	65 22.4	46 84	107.1	25
6	62 47.0	55 81	112.9	63 03.2	53 82	112.0	63 19.0	52 82	111.0	63 34.4	51 82	110.0	63 49.4	49 83	109.1	64 04.1	48 84	108.1	64 18.3	47 84	107.1	64 32.1	45 84	106.0	6
7	61 58.4	53 82	111.8	62 14.3	52 82	110.8	62 29.8	51 82	109.9	62 44.9	50 83	109.0	62 59.7	49 83	108.0	63 14.0	47 84	107.1	63 28.0	46 84	106.1	63 41.5	44 85	105.1	7
8	61 00.5	52 82	110.7	61 25.1	51 82	109.8	61 40.3	50 83	108.9	61 55.2	49 84	108.0	62 09.6	48 84	107.0	62 23.7	46 84	106.1	62 37.4	45 85	105.1	62 50.7	44 85	104.1	8
9	60 20.3	52 83	109.7	60 35.6	50 83	108.8	60 50.5	49 84	107.9	61 05.1	48 84	107.0	61 19.3	47 84	106.1	61 33.2	46 85	105.2	61 46.7	44 85	104.2	61 59.8	43 85	103.3	9
30	59 39.7	51 83	108.7	59 45.7	50 83	107.8	60 00.5	48 84	107.0	60 14.8	47 84	106.1	60 28.8	46 84	105.2	60 42.4	45 85	104.3	60 55.7	44 85	103.4	61 08.6	42 86	102.4	30
1	58 40.8	50 84	107.7	58 55.7	49 84	106.9	59 10.1	48 84	106.0	59 24.3	47 85	105.2	59 38.1	45 85	104.3	59 51.5	44 85	103.4	60 04.6	43 86	102.5	60 17.3	42 86	101.6	1
2	57 50.7	49 84	106.8	58 05.3	48 84	106.0	58 19.6	47 84	105.2	58 33.5	46 85	104.3	58 47.1	45 85	103.5	59 00.4	44 86	102.6	59 13.3	42 86	101.7	59 25.8	41 86	100.8	2
3	57 00.4	48 84	106.0	57 14.8	47 85	105.2	57 28.8	46 85	104.3	57 42.6	45 85	103.5	57 56.0	44 86	102.7	58 09.1	43 86	101.8	58 21.8	42 86	101.0	58 34.2	41 86	100.1	3
4	56 09.8	48 85	105.1	56 24.0	47 85	104.3	56 37.9	46 85	103.5	56 51.5	45 86	102.7	57 04.7	44 86	101.9	57 17.7	42 86	101.1	57 30.2	41 86	100.2	57 42.5	40 86	99.4	4
35	55 19.1	47 85	104.3	55 33.1	46 85	103.5	55 46.8	45 86	102.7	56 00.2	44 86	101.9	56 13.3	43 86	101.1	56 26.1	42 86	100.3	56 38.5	41 86	99.5	56 50.6	40 86	98.7	35
6	54 28.2	47 85	103.5	54 42.0	46 86	102.8	54 55.6	45 86	102.0	55 08.8	44 86	101.2	55 21.8	43 86	100.4	55 34.4	42 86	99.6	55 46.7	41 86	98.8	55 58.7	39 87	98.0	6
7	53 37.1	46 86	102.8	53 50.7	45 86	102.0	54 04.1	44 86	101.3	54 17.3	43 86	100.5	54 30.1	42 86	99.7	54 42.6	41 86	98.9	54 54.8	40 87	98.1	55 06.7	39 87	97.3	7
8	52 45.8	46 86	102.0	52 59.3	45 86	101.3	53 12.6	44 86	100.5	53 25.6	43 86	99.8	53 38.3	42 86	99.0	53 50.7	41 87	98.3	54 02.8	40 87	97.5	54 14.6	39 87	96.7	8
9	51 54.4	45 86	101.3	52 07.8	44 86	100.6	52 21.0	43 86	99.9	52 33.8	42 86	99.1	52 46.4	41 87	98.4	52 58.7	41 87	97.6	53 10.8	40 87	96.9	53 22.5	39 87	96.1	9
40	51 02.9	45 86	100.6	51 16.2	44 86	99.9	51 29.2	43 86	99.2	51 42.0	42 87	98.5	51 54.5	41 87	97.7	52 06.7	40 87	97.0	52 18.6	39 87	96.2	52 30.3	38 87	95.5	40
1	50 11.3	44 86	100.0	50 24.4	44 86	99.2	50 37.4	43 86	98.5	50 50.0	42 87	97.8	51 02.4	41 87	97.1	51 14.6	40 87	96.4	51 26.4	39 87	95.6	51 38.0	38 87	94.9	1
2	49 19.5	44 86	99.3	49 32.6	43 86	98.6	49 45.4	42 87	97.9	49 58.0	41 87	97.2	50 10.3	41 87	96.5	50 22.4	40 87	95.8	50 34.2	39 87	95.0	50 45.7	38 87	94.3	2
3	48 27.7	44 86	98.7	48 40.7	43 87	98.0	48 53.4	42 87	97.3	49 05.9	41 87	96.6	49 18.2	40 87	95.9	49 30.1	40 87	95.2	49 41.9	39 87	94.5	49 53.3	38 87	93.8	3
4	47 35.8	43 87	98.0	47 48.7	43 87	97.4	48 01.3	42 87	96.7	48 13.7	41 87	96.0	48 25.9	40 87	95.3	48 37.9	39 87	94.6	48 49.5	39 87	93.9	49 01.0	38 87	93.2	4
45	46 43.8	43 87	97.4	46 56.6	42 87	96.8	47 09.2	42 87	96.1	47 21.5	41 87	95.4	47 33.7	40 87	94.7	47 45.5	39 87	94.1	47 57.2	38 87	93.4	48 08.6	38 87	92.7	45
6	45 51.7	43 87	96.8	46 04.4	42 87	96.2	46 17.0	41 87	95.5	46 29.3	41 87	94.8	46 41.3	40 87	94.2	46 53.2	39 87	93.5	47 04.8	38 87	92.8	47 16.1	37 87	92.2	6
7	44 59.5	43 87	96.2	45 12.2	42 87	95.6	45 24.7	41 87	94.9	45 37.0	40 87	94.3	45 49.0	40 87	93.6	46 00.8	39 87	93.0	46 12.3	38 87	92.3	46 23.7	37 87	91.6	7
8	44 07.4	42 87	95.7	44 20.0	42 87	95.0	44 32.4	41 87	94.4	44 44.6	40 87	93.7	44 56.6	40 87	93.1	45 08.4	39 87	92.4	45 19.9	38 87	91.8	45 31.2	37 87	91.1	8
9	43 15.1	42 87	95.1	43 27.7	42 87	94.5	43 40.1	41 87	93.8	43 52.2	40 87	93.2	44 04.2	40 87	92.6	44 15.9	39 87	91.9	44 27.4	38 87	91.3	44 38.8	37 87	90.6	9
50	42 22.8	42 87	94.5	42 35.4	41 87	93.9	42 47.7	41 87	93.3	42 59.8	40 87	92.7	43 11.7	39 87	92.1	43 23.5	39 87	91.4	43 35.0	38 87	90.8	43 46.3	37 87	90.1	50
1	41 30.5	42 87	94.0	41 43.0	41 87	93.4	41 55.3	41 87	92.8	42 07.4	40 87	92.2	42 19.3	39 87	91.5	42 31.0	39 87	90.9	42 42.5	38 87	90.3	42 53.8	37 87	89.7	1
2	40 38.1	42 87	93.5	40 50.6	41 87	92.9	41 02.9	41 87	92.3	41 14.9	40 87	91.7	41 26.8	39 87	91.0	41 38.5	39 87	90.4	41 50.0	38 87	89.8	42 01.3	37 87	89.2	2
3	39 45.7	42 87	92.9	39 58.2	41 87	92.3	40 10.4	41 87	91.7	40 22.5	40 87	91.1	40 34.4	39 87	90.5	40 46.1	39 87	89.9	40 57.6	38 87	89.3	41 08.9	37 87	88.7	3
4	38 53.3	42 87	92.4	39 05.7	41 87	91.8	39 18.0	40 87	91.2	39 30.0	40 87	90.7	39 41.9	39 87	90.1	39 53.6	39 87	89.5	40 05.1	38 87	88.9	40 16.4	37 87	88.2	4
55	38 00.9	42 87	91.9	38 13.3	41 87	91.3	38 25.5	40 87	90.7	38 37.5	40 87	90.2	38 49.4	39 87	89.6	39 01.1	39 87	89.0	39 12.6	38 87	88.4	39 24.0	37 87	87.8	55
6	37 08.4	42 87	91.4	37 20.8	41 87	90.8	37 33.0	40 87	90.3	37 45.1	40 87	89.7	37 56.9	39 87	89.1	38 08.6	39 87	88.5	38 20.2	38 87	87.9	38 31.5	38 87	87.3	6
7	36 15.9	42 87	90.9	36 28.3	41 87	90.3	36 40.5	40 87	89.8	36 52.6	40 87	89.2	37 04.5	39 87	88.6	37 16.2	39 87	88.0	37 27.7	38 87	87.5	37 39.1	38 87	86.9	7
8	35 23.5	41 87	90.4	35 35.8	41 87	89.9	35 48.1	40 87	89.3	36 00.1	40 87	88.7	36 12.0	39 87	88.2	36 23.7	39 87	87.6	36 35.3	38 87	87.0	36 46.7	38 87	86.4	8
9	34 31.0	41 87	89.9	34 43.4	41 87	89.4	34 55.6	40 87	88.8	35 07.7	40 87	88.3	35 19.6	39 87	87.7	35 31.3	39 87	87.1	35 42.9	38 87	86.6	35 54.4	38 87	86.0	9
60	33 38.5	41 87	89.4	33 50.9	41 87	88.9	34 03.1	41 87	88.3	34 15.2	40 87	87.8	34 27.1	40 87	87.2	34 38.9	39 87	86.7	34 50.6	39 87	86.1	35 02.0	38 87	85.6	60
1	32 46.0	42 87	89.0	32 58.4	41 87	88.4	33 10.7	41 87	87.9	33 22.8	40 87	87.3	33 34.7	40 87	86.8	33 46.5	39 87	86.2	33 58.2	39 87	85.7	34 09.7	38 87	85.1	1
2	31 53.6	42 87	88.5	32 06.0	41 87	88.0	32 18.2	41 87	87.4	32 30.4	40 87	86.9	32 42.4	40 87	86.3	32 54.2	39 87	85.8	33 05.9	39 87	85.2	33 17.5	38 87	84.7	2
3	31 01.1	42 87	88.0	31 13.5	41 87	87.5	31 25.8	41 87	87.0	31 38.0	40 87	86.4	31 50.0	40 87	85.9	32 01.9	39 87	85.3	32 13.6	39 87	84.8	32 25.2	38 87	84.3	3
4	30 08.7	42 87	87.6	30 21.1	41 87	87.0	30 33.4	41 87	86.5	30 45.6	40 87	86.0	30 57.7	40 87	85.4	31 09.6	40 87	84.9	31 21.4	39 87	84.4	31 33.0	39 87	83.8	4
65	29 16.3	42 87	87.1	29 28.7	41 87	86.6	29 41.1	41 87	86.1	29 53.3	41 87	85.5	30 05.4	40 87	85.0	30 17.3	40 87	84.5	30 29.2	39 87	83.9	30 40.9	39 87	83.4	65
6	28 23.9	42 87	86.6	28 36.4	41 87	86.1	28 48.7	41 87	85.6	29 01.0	41 87	85.1	29 13.1	40 87	84.6	29 25.1	40 87	84.0	29 37.0	39 87	83.5	29 48.8	39 87	83.0	6
7	27 31.5	42 87	86.2	27 44.0	42 87	85.7	27 56.4	41 87	85.2	28 08.7	41 87	84.6	28 20.9	40 87	84.1	28 33.0	40 87	83.6	28 44.9	40 87	83.1	28 56.7	39 87	82.6	7
8	26 39.1	42 87	85.7	26 51.7	42 87	85.2	27 04.2	41 87	84.7	27 16.5	41 87	84.2	27 28.7	41 87	83.7	27 40.8	40 87	83.2	27 52.8	40 87	82.7	28 04.7	39 87	82.1	8
9	25 46.8	42 87	85.3	25 59.4	42 87	84.8	26 11.9	41 87	84.3	26 24.3	41 87	83.8	26 36.6	41 87	83.3	26 48.7	40 87	82.7	27 00.8	40 87	82.2	27 12.7	40 86	81.7	9
70	24 54.6	42 87	84.8	25 07.2	42 87	84.3	25 19.7	42 87	83.8	25 32.2	41 87	83.3	25 44.5	41 87	82.8	25 56.7	41 87	82.3	26 08.8	40 86	81.8	26 20.8	40 86	81.3	70
1	24 02.3	42 87	84.4	24 15.0	42 87	83.9	24 27.6	42 87	83.4	24 40.1	41 87	82.9	24 52.4	41 87	82.4	25 04.7	41 86	81.9	25 16.9	40 86	81.4	25 29.0	40 86	80.9	1
2	23 10.1	43 87	83.9	23 22.8	42 87	83.4	23 35.5	42 87	83.0	23 48.0	42 87	82.5	24 00.5	41 86	82.0	24 12.8	41 86	81.5	24 25.1	41 86	81.0	24 37.2	40 86	80.5	2
3	22 17.9	43 87	83.5	22 30.7	42 87	83.0	22 43.4	42 87	82.5	22 56.0	42 86	82.0	23 08.5	42 86	81.5	23 20.9	41 86	81.0	23 33.3	41 86	80.5	23 45.5	41 86	80.0	3
4	21 25.8	43 87	83.1	21 38.7	43 87	82.6	21 51.4	42 87	82.1	22 04.1	42 86	81.6	22 16.7	42 86	81.1	22 29.1	41 86	80.6	22 41.5	41 86	80.1	22 53.8	41 86	79.6	4
75	20 33.8	43 87	82.6	20 46.6	43 86	82.1	20 59.5	43 86	81.6	21 12.2	42 86	81.2	21 24.8	42 86	80.7	21 37.4	42 86	80.2	21 49.9	41 86	79.7	22 02.3	41 86	79.2	75
6	19 41.7	43 87	82.2	19 54.7	43 86	81.7	20 07.6	43 86	81.2	20 20.4	43 86	80.7	20 33.1	42 86	80.2	20 45.7	42 86	79.8	20 58.3	42 86	79.3	21 10.8	41 86	78.8	6
7	18 49.8	43 86	81.7	19 02.8	43 86	81.2	19 15.7	43 86	80.8	19 28.6	43 86	80.3	19 41.4	43 86	79.8	19 54.1	42 86	79.3	20 06.8	42 86	78.8	20 19.3	42 86	78.4	7
8	17 57.9	44 86	81.3	18 11.0	43 86	80.8	18 24.0	43 86	80.3	18 36.9	43 86	79.9	18 49.8	43 86	79.4	19 02.6	43 86	78.9	19 15.3	42 86	78.4	19 28.0	42 86	77.9	8
9	17 06.0	44 86	80.8	17 19.2	44 86	80.4	17 32.3	43 86	79.9	17 45.3	43 86	79.4	17 58.2	43 86	79.0	18 11.1	43 86	78.5	18 23.9	43 86	78.0	18 36.7	42 85	77.5	9
80	16 14.3	44 86	80.4	16 27.5	44 86	79.9	16 40.7	44 86	79.5	16 53.7	44 86	79.0	17 06.8	43 86	78.5	17 19.7	43 86	78.0	17 32.6	43 85	77.6	17 45.5	43 85	77.1	80
1	15 22.6	44 86	80.0	15 35.9	44 86	79.5	15 49.1	44 86	79.0	16 02.3	44 86	78.6	16 15.4	44 86	78.1	16 28.4	43 85	77.6	16 41.4	43 85	77.1	16 54.4	43 85	76.7	1
2	14 30.9	45 86	79.5	14 44.3	44 86	79.0	14 57.6	44 86	78.6	15 10.9	44 86	78.1	15 24.1	44 85	77.7	15 37.2	44 85	77.2	15 50.3	44 85	76.7	16 03.4	43 85	76.3	2
3	13 39.4	45 86	79.1	13 52.8	45 86	78.6	14 06.2	45 86	78.1	14 19.6	44 86	77.7	14 32.9	44 85	77.2	14 46.1	44 85	76.8	14 59.3	44 85	76.3	15 12.4	44 85	75.8	3
4	12 47.9	45 86	78.6	13 01.4	45 86	78.2	13 14.9	45 85	77.7	13 28.3	45 85	77.2	13 41.7	45 85	76.8	13 55.1	44 85	76.3	14 08.4	44 85	75.9	14 21.6	44 84	75.4	4
85	11 56.5	45 86	78.2	12 10.1	45 85	77.7	12 23.7	45 85	77.3	12 37.2	45 85	76.8	12 50.7	45 85	76.4	13 04.1	45 85	75.9	13 17.5	45 84	75.4	13 30.9	44 84	75.0	85
6	11 05.1	46 85	77.7	11 18.9	46 85	77.3	11 32.5	45 85	76.8	11 46.2	45 85	76.4	11 59.7	45 85	75.9	12 13.3	45 85	75.5	12 26.8	45 84	75.0	12 40.2	45 84	74.5	6
7	10 13.9	46 85	77.3	10 27.7	46 85	76.8	10 41.5	46 85	76.4	10 55.2	46 85	75.9	11 08.9	46 84	75.5	11 22.5	45 84	75.0	11 36.1	45 84	74.6	11 49.7	45 84	74.1	7
8	9 22.8	46 85	76.8	9 36.7	46 85	76.4	9 50.5	46 85	75.9	10 04.4	46 85	75.5	10 18.1	46 84	75.0	10 31.9	46 84	74.6	10 45.6	46 84	74.1	10 59.3	46 84	73.7	8
9	8 31.7	47 85	76.4	8 45.7	47 85	75.9	8 59.7	46 85	75.5	9 13.6	46 84	75.0	9 27.5	46 84	74.6	9 41.4	46 84	74.1	9 55.2	46 84	73.7	10 09.0	46 84	73.2	9
90	7 40.8	47 85	75.9	7 54.9	47 85	75.5	8 08.9	47 84	75.0	8 23.0	47 84	74.6	8 37.0	47 84	74.1	8 50.9	47 84	73.7	9 04.9	46 84	73.2	9 18.8	46 84	72.8	90

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	45 00.0	1.0 01	180.0	44 30.0	1.0 01	180.0	44 00.0	1.0 01	180.0	43 30.0	1.0 01	180.0	43 00.0	1.0 01	180.0	42 30.0	1.0 01	180.0	42 00.0	1.0 01	180.0	41 30.0	1.0 01	180.0	00
1	44 59.4	1.0 03	178.6	44 29.4	1.0 03	178.7	43 59.4	1.0 03	178.7	43 29.4	1.0 03	178.7	42 59.4	1.0 03	178.7	42 29.4	1.0 03	178.7	41 59.4	1.0 03	178.7	41 29.4	1.0 03	178.7	1
2	44 57.5	1.0 05	177.3	44 27.5	1.0 05	177.3	43 57.6	1.0 05	177.3	43 27.6	1.0 05	177.4	42 57.6	1.0 06	177.4	42 27.6	1.0 06	177.4	41 57.7	1.0 05	177.5	41 27.7	1.0 05	177.5	2
3	44 54.4	1.0 07	175.9	44 24.5	1.0 07	176.0	43 54.5	1.0 07	176.0	43 24.6	1.0 07	176.1	42 54.6	1.0 07	176.1	42 24.7	1.0 07	176.1	41 54.8	1.0 07	176.2	41 24.8	1.0 07	176.2	3
4	44 50.1	1.0 09	174.6	44 20.2	1.0 09	174.6	43 50.3	1.0 09	174.7	43 20.4	1.0 09	174.8	42 50.5	1.0 09	174.8	42 20.6	1.0 09	174.9	41 50.7	1.0 09	174.9	41 20.8	1.0 09	175.0	4
05	44 44.5	99 11	173.2	44 14.7	99 11	173.3	43 44.8	99 11	173.4	43 15.0	99 11	173.4	42 45.2	99 11	173.5	42 15.3	99 11	173.6	41 45.5	99 11	173.7	41 15.6	99 10	173.7	05
6	44 37.7	99 13	171.9	44 07.9	99 13	172.0	43 38.2	99 13	172.1	43 08.4	99 13	172.1	42 38.6	99 13	172.2	42 08.9	99 13	172.3	41 39.1	99 12	172.4	41 09.3	99 12	172.5	6
7	44 29.7	99 15	170.5	44 00.0	99 15	170.7	43 30.3	99 15	170.8	43 00.7	99 15	170.9	42 31.0	99 15	171.0	42 01.3	99 15	171.1	41 31.6	99 14	171.1	41 01.9	99 14	171.2	7
8	44 20.4	99 17	169.2	43 50.9	99 17	169.3	43 21.3	99 17	169.5	42 51.7	99 17	169.6	42 22.1	99 17	169.7	41 52.5	99 16	169.8	41 22.9	99 16	169.9	40 53.3	99 16	170.0	8
9	44 10.0	98 19	167.9	43 40.6	98 19	168.0	43 11.1	98 19	168.2	42 41.7	98 19	168.3	42 12.2	98 18	168.4	41 42.7	98 18	168.5	41 13.2	98 18	168.7	40 43.7	98 18	168.8	9
10	43 58.5	98 21	166.6	43 29.1	98 21	166.7	42 59.8	98 21	166.9	42 30.4	98 20	167.0	42 01.1	98 20	167.2	41 31.7	98 20	167.3	41 02.3	98 20	167.4	40 32.9	98 20	167.6	10
1	43 45.7	97 23	165.3	43 16.5	97 23	165.4	42 47.3	97 23	165.6	42 18.1	97 22	165.8	41 48.8	97 22	165.9	41 19.6	98 22	166.1	40 50.3	98 22	166.2	40 21.1	98 22	166.3	1
2	43 31.8	97 25	164.0	43 02.8	97 25	164.2	42 33.7	97 24	164.3	42 04.6	97 24	164.5	41 35.5	97 24	164.7	41 06.4	97 24	164.8	40 37.3	97 24	165.0	40 08.2	97 23	165.1	2
3	43 16.8	96 27	162.7	42 47.9	96 27	162.9	42 19.0	96 26	163.1	41 50.0	96 26	163.3	41 21.1	97 26	163.4	40 52.1	97 26	163.6	40 23.2	97 25	163.8	39 54.2	97 25	164.0	3
4	43 00.6	96 29	161.5	42 31.9	96 28	161.7	42 03.2	96 28	161.8	41 34.4	96 28	162.0	41 05.6	96 28	162.2	40 36.8	96 27	162.4	40 08.0	96 27	162.6	39 39.2	96 27	162.8	4
15	42 43.4	95 30	160.2	42 14.8	95 30	160.4	41 46.3	95 30	160.6	41 17.7	95 30	160.8	40 49.1	95 29	161.0	40 20.4	95 29	161.2	39 51.8	96 29	161.4	39 23.1	96 28	161.6	15
6	42 25.1	95 32	159.0	41 56.7	95 32	159.2	41 28.3	95 32	159.4	40 59.9	95 31	159.6	40 31.5	95 31	159.8	40 03.0	95 31	160.0	39 34.5	95 30	160.2	39 06.0	95 30	160.4	6
7	42 05.7	94 34	157.7	41 37.6	94 34	158.0	41 09.4	94 33	158.2	40 41.1	94 33	158.4	40 12.9	94 33	158.6	39 44.6	94 32	158.9	39 16.3	94 32	159.1	38 48.0	94 32	159.3	7
8	41 45.4	93 36	156.5	41 17.4	93 35	156.8	40 49.4	93 35	157.0	40 21.3	94 35	157.2	39 53.3	94 34	157.5	39 25.2	94 34	157.7	38 57.1	94 34	157.9	38 28.9	94 33	158.2	8
9	41 24.0	93 37	155.3	40 56.2	93 37	155.6	40 28.4	93 37	155.8	40 00.5	93 36	156.1	39 32.7	93 36	156.3	39 04.8	93 36	156.6	38 36.9	93 35	156.8	38 08.9	93 35	157.0	9
20	41 01.6	92 39	154.2	40 34.0	92 38	154.4	40 06.4	92 38	154.7	39 38.8	92 38	154.9	39 11.1	92 38	155.2	38 43.4	92 37	155.4	38 15.7	92 37	155.7	37 48.0	93 36	155.9	20
1	40 38.2	91 40	153.0	40 10.9	91 40	153.3	39 43.5	91 40	153.5	39 16.1	91 39	153.8	38 48.6	92 39	154.1	38 21.2	92 39	154.3	37 53.6	92 38	154.6	37 26.1	92 38	154.8	1
2	40 13.9	90 42	151.9	39 46.8	90 42	152.1	39 19.7	91 41	152.4	38 52.5	91 41	152.7	38 25.2	91 40	153.0	37 58.0	91 40	153.2	37 30.7	91 40	153.5	37 03.3	91 39	153.7	2
3	39 48.7	90 44	150.7	39 21.8	90 43	151.0	38 54.9	90 43	151.3	38 27.9	90 42	151.6	38 00.9	90 42	151.9	37 33.9	90 42	152.1	37 06.8	90 41	152.4	36 39.7	90 41	152.7	3
4	39 22.6	89 45	149.6	38 56.0	89 45	149.9	38 29.3	89 44	150.2	38 02.5	89 44	150.5	37 35.7	89 44	150.8	37 08.9	89 43	151.1	36 42.0	90 43	151.3	36 15.1	90 42	151.6	4
25	38 55.6	88 46	148.5	38 29.2	88 46	148.8	38 02.8	88 46	149.1	37 36.2	88 45	149.4	37 09.7	89 45	149.7	36 43.1	89 44	150.0	36 16.5	89 44	150.3	35 49.8	89 44	150.6	25
6	38 27.8	87 48	147.4	38 01.6	87 47	147.8	37 35.4	88 47	148.1	37 09.1	88 46	148.4	36 42.8	88 46	148.7	36 16.4	88 46	149.0	35 50.0	88 45	149.3	35 23.6	88 45	149.5	6
7	37 59.2	86 49	146.4	37 33.2	87 49	146.7	37 07.2	87 48	147.0	36 41.2	87 48	147.3	36 15.1	87 48	147.6	35 49.0	87 47	147.9	35 22.8	87 47	148.2	34 56.6	87 46	148.5	7
8	37 29.7	86 50	145.3	37 04.0	86 50	145.7	36 38.3	86 50	146.0	36 12.5	86 49	146.3	35 46.6	86 49	146.6	35 20.7	86 48	146.9	34 54.8	87 48	147.2	34 28.8	87 48	147.5	8
9	36 59.5	85 52	144.3	36 34.0	85 51	144.6	36 08.5	85 51	145.0	35 43.0	85 50	145.3	35 17.4	85 50	145.6	34 51.7	86 50	145.9	34 26.0	86 49	146.2	34 00.2	86 49	146.5	9
30	36 28.5	84 53	143.3	36 03.3	84 52	143.6	35 38.0	84 52	144.0	35 12.7	84 52	144.3	34 47.3	85 51	144.6	34 21.9	85 51	144.9	33 56.5	85 50	145.3	33 30.9	85 50	145.6	30
1	35 56.8	83 54	142.3	35 31.8	83 54	142.6	35 06.8	83 53	143.0	34 41.7	84 53	143.3	34 16.6	84 52	143.6	33 51.4	84 52	144.0	33 26.2	84 52	144.3	33 00.9	84 51	144.6	1
2	35 24.3	82 55	141.3	34 59.6	82 55	141.7	34 34.8	83 54	142.0	34 10.0	83 54	142.4	33 45.1	83 54	142.7	33 20.2	83 53	143.0	32 55.2	83 53	143.4	32 30.2	84 52	143.7	2
3	34 51.2	81 56	140.4	34 26.7	82 56	140.7	34 02.2	82 56	141.1	33 37.6	82 55	141.4	33 13.0	82 55	141.7	32 48.3	82 54	142.1	32 23.5	83 54	142.4	31 58.8	83 54	142.8	3
4	34 17.4	81 58	139.4	33 53.1	81 57	139.8	33 28.9	81 57	140.1	33 04.5	81 56	140.5	32 40.2	81 56	140.8	32 15.7	82 55	141.2	31 51.2	82 55	141.5	31 26.7	82 55	141.8	4
35	33 42.9	80 58	138.5	33 18.9	80 58	138.8	32 54.9	80 58	139.2	32 30.8	80 57	139.6	32 06.7	81 57	139.9	31 42.5	81 56	140.3	31 18.2	81 56	140.6	30 53.9	81 56	140.9	35
6	33 07.8	79 60	137.6	32 44.1	79 59	137.9	32 20.3	79 59	138.3	31 56.5	80 58	138.7	31 32.6	80 58	139.0	31 08.6	80 58	139.4	30 44.6	80 57	139.7	30 20.5	80 57	140.1	6
7	32 32.1	78 60	136.7	32 08.6	78 60	137.0	31 45.1	79 60	137.4	31 21.5	79 59	137.8	30 57.8	79 59	138.1	30 34.1	79 58	138.5	30 10.4	79 58	138.8	29 46.5	80 58	139.2	7
8	31 55.8	77 62	135.8	31 32.6	78 61	136.2	31 09.3	78 61	136.5	30 45.9	78 60	136.9	30 22.5	78 60	137.3	29 59.1	78 60	137.6	29 35.5	79 59	138.0	29 11.9	79 58	138.3	8
9	31 18.9	76 62	134.9	30 55.9	77 62	135.3	30 32.9	77 62	135.7	30 09.8	77 61	136.0	29 46.6	77 61	136.4	29 23.4	78 60	136.8	29 00.1	78 60	137.1	28 36.8	78 60	137.5	9
40	30 41.5	76 63	134.1	30 18.7	76 63	134.4	29 55.9	76 62	134.8	29 33.1	76 62	135.2	29 10.2	77 62	135.6	28 47.2	77 61	135.9	28 24.1	77 61	136.3	28 01.0	77 60	136.7	40
1	30 03.5	75 64	133.2	29 41.0	75 64	133.6	29 18.4	75 63	134.0	28 55.8	76 63	134.4	28 33.1	76 62	134.7	28 10.4	76 62	135.1	27 47.6	76 62	135.5	27 24.7	76 61	135.8	1
2	29 25.0	74 65	132.4	29 02.8	74 65	132.8	28 40.4	75 64	133.2	28 18.1	75 64	133.5	27 55.6	75 63	133.9	27 33.1	75 63	134.3	27 10.5	75 63	134.7	26 47.9	76 62	135.0	2
3	28 46.0	73 66	131.6	28 24.0	73 66	132.0	28 01.9	74 65	132.4	27 39.8	74 65	132.7	27 17.6	74 64	133.1	26 55.3	74 64	133.5	26 33.0	75 64	133.9	26 10.6	75 63	134.2	3
4	28 06.5	72 67	130.8	27 44.7	73 66	131.2	27 22.9	73 66	131.6	27 01.0	73 66	132.0	26 39.0	73 65	132.3	26 17.0	74 65	132.7	25 54.9	74 64	133.1	25 32.7	74 64	133.5	4
45	27 26.6	72 67	130.0	27 05.0	72 67	130.4	26 43.4	72 67	130.8	26 21.7	72 66	131.2	26 00.0	73 66	131.6	25 38.2	73 66	131.9	25 16.3	73 65	132.3	24 54.4	73 65	132.7	45
6	26 46.1	71 68	129.2	26 24.8	71 68	129.6	26 03.4	71 67	130.0	25 42.0	72 67	130.4	25 20.5	72 67	130.8	24 58.9	72 66	131.2	24 37.3	72 66	131.6	24 15.6	72 65	131.9	6
7	26 05.3	70 69	128.5	25 44.2	70 68	128.9	25 23.0	71 68	129.3	25 01.8	71 68	129.7	24 40.5	71 67	130.1	24 19.2	71 67	130.4	23 57.8	71 66	130.8	23 36.4	72 66	131.2	7
8	25 24.0	69 70	127.7	25 03.1	70 69	128.1	24 42.2	70 69	128.5	24 21.2	70 68	128.9	24 00.2	70 68	129.3	23 39.0	70 68	129.7	23 17.9	71 67	130.1	22 56.7	71 67	130.5	8
9	24 42.3	69 70	127.0	24 21.6	69 70	127.4	24 00.9	69 70	127.8	23 40.2	69 69	128.2	23 19.3	70 69	128.6	22 58.5	70 68	129.0	22 37.5	70 68	129.4	22 16.5	70 68	129.8	9
50	24 00.2	68 71	126.3	23 39.8	68 70	126.7	23 19.3	68 70	127.1	22 58.7	69 70	127.5	22 38.1	69 69	127.9	22 17.5	69 69	128.3	21 56.7	69 69	128.7	21 36.0	69 68	129.0	50
1	23 17.7	67 72	125.6	22 57.5	67 71	126.0	22 37.2	68 71	126.4	22 16.9	68 70	126.8	21 56.5	68 70	127.2	21 36.1	68 70	127.6	21 15.6	68 69	128.0	20 55.0	69 69	128.3	1
2	22 34.8	67 72	124.9	22 14.8	67 72	125.3	21 54.8	67 71	125.7	21 34.7	67 71	126.1	21 14.5	67 71	126.5	20 54.3	67 70	126.9	20 34.0	68 70	127.3	20 13.7	68 70	127.7	2
3	21 51.6	66 73	124.2	21 31.8	66 72	124.6	21 12.0	66 72	125.0	20 52.1	66 72	125.4	20 32.1	67 71	125.8	20 12.1	67 71	126.2	19 52.0	67 70	126.6	19 31.9	67 70	127.0	3
4	21 08.0	65 73	123.5	20 48.4	65 73	123.9	20 28.8	66 72	124.3	20 09.1	66 72	124.7	19 49.4	66 72	125.1	19 29.6	66 72	125.5	19 09.7	66 71	125.9	18 49.8	66 71	126.3	4
55	20 24.1	64 74	122.8	20 04.7	65 73	123.3	19 45.3	65 73	123.7	19 25.8	65 73	124.1	19 06.3	65 72	124.5	18 46.7	65 72	124.9	18 27.1	66 72	125.3	18 07.4	66 71	125.7	55
6	19 39.8	64 74	122.2	19 20.7	64 74	122.6	19 01.4	64 74	123.0	18 42.2	64 73	123.4	18 22.8	65 73	123.8	18 03.5	65 73	124.2	17 44.0	65 72	124.6	17 24.6	65 72	125.0	6
7	18 55.3	63 75	121.5	18 36.3	63 74	122.0	18 17.3	63 74	122.4	17 58.2	64 74	122.8	17 39.1	64 74	123.2	17 19.9	64 73	123.6	17 00.7	64 73	124.0	16 41.4	64 72	124.4	7
8	18 10.4	63 75	120.9	17 51.6	63 75	121.3	17 32.8	63 75	121.7	17 13.9	63 74	122.1	16 55.0	63 74	122.5	16 36.0	63 74	122.9	16 17.0	63 73	123.3	15 57.9	64 73	123.7	8
9	17 25.2	62 76	120.3	17 06.6	62 75	120.7	16 48.0	62 75	121.1	16 29.3	62 75	121.5	16 10.6	63 74	121.9	15 51.8	63 74	122.3	15 33.0	63 74	122.7	15 14.1	63 74	123.1	9
60	16 39.8	61 76	119.7	16 21.4	61 76	120.1	16 02.9	62 76	120.5	15 44.4	62 75	120.9	15 25.9	62 75	121.3	15 07.3	62 75	121.7	14 48.7	62 74	122.1	14 30.0	62 74	122.5	60
1	15 54.0	61 77	119.1	15 35.8	61 76	119.5	15 17.6	61 76	119.9	14 59.3	61 76	120.3	14 40.9	61 76	120.7	14 22.5	61 75	121.1	14 04.1	61 75	121.5	13 45.7	62 74	121.9	1
2	15 08.0	60 77	118.5	14 50.0	60 77	118.9	14 31.9	60 76	119.3	14 13.8	60 76	119.7	13 55.7	61 76	120.1	13 37.5	61 76	120.5	13 19.2	61 75	120.9	13 01.0	61 75	121.3	2
3	14 21.7	59 78	117.9	14 03.9	60 77	118.3	13 46.0	60 77	118.7	13 28.1	60 77	119.1	13 10.1	60 76	119.5	12 52.1	60 76	119.9	12 34.1	60 76	120.3	12 16.0	60 75	120.7	3
4	13 35.2	59 78	117.3	13 17.6	59 78	117.7	12 59.9	59 77	118.1	12 42.1	59 77	118.5	12 24.3	59 77	118.9	12 06.5	59 76	119.3	11 48.6	60 76	119.7	11 30.8	60 76	120.2	4
65	12 48.5	58 78	116.7	12 31.0	58 78	117.1	12 13.4	58 78	117.5	11 55.9	59 78	117.9	11 38.3	59 77	118.4	11 20.6	59 77	118.8	11 03.0	59 77	119.2	10 45.3	59 76	119.6	65
6	12 01.5	58 79	116.1	11 44.1	58 78	116.5	11 26.8	58 78	117.0	11 09.4	58 78	117.4	10 52.0	58 78	117.8	10 34.5	58 77	118.2	10 17.0	58 77	118.6	9 59.5	58 77	119.0	6
7	11 14.2	57 79	115.6	10 57.1	57 79	116.0	10 39.9	57 78	116.4	10 22.7	57 78	116.8	10 05.4	58 78	117.2	9 48.1	58 78	117.6	9 30.8	58 77	118.1	9 13.5	58 77	118.5	7
8	10 26.8	57 80	115.0	10 09.8	57 79	115.4	9 52.8	57 79	115.8	9 35.7	57 79	116.3	9 18.6	57 78	116.7	9 01.5	57 78	117.1	8 44.4	57 78	117.5	8 27.2	57 78	117.9	8
9	9 39.1	56 80	114.5	9 22.3	56 80	114.9	9 05.4	56 79	115.3	8 48.5	56 79	115.7	8 31.6	56 79	116.1	8 14.7	56 78	116.5	7 57.7	57 78	117.0	7 40.7	57 78	117.4	9
70	8 51.2	56 80	113.9	8 34.6	56 80	114.3	8 17.9	56 80	114.8	8 01.2	56 79	115.2	7 44.4	56 79	115.6	7 27.6	56 79	116.0	7 10.9	56 78	116.4	6 54.0	56 78	116.8	70
1	8 03.2	55 80	113.4	7 46.7	55 80	113.8	7 30.1	55 80	114.2	7 13.6	55 80	114.6	6 57.0	55 79	115.1	6 40.4	55 79	115.5	6 23.7	55 79	115.9	6 07.1	56 78	116.3	1
2	7 14.9	54 81	112.8	6 58.5	55 80	113.3	6 42.2	55 80	113.7	6 25.8	55 80	114.1	6 09.3	55 80	114.5	5 52.9	55 80	114.9	5 36.4	55 79	115.4	5 20.0	55 78	115.8	2
3	6 26.4	54 81	112.3	6 10.2	54 81	112.7	5 54.0	54 81	113.2	5 37.8	54 80	113.6	5 21.5	54 80	114.0	5 05.2	54 80	114.4							3
4	5 37.8	54 81	111.8	5 21.8	54 81	112.2	5 05.7	54 81	112.6																74

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′			16° 30′			17° 00′			17° 30′			18° 00′			18° 30′			19° 00′			19° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
91	6 49.9	47 84	75.5	7 04.1	47 84	75.0	7 18.3	47 84	74.6	7 32.4	47 84	74.1	7 46.5	47 84	73.7	8 00.6	47 84	73.2	8 14.7	47 84	72.8	8 28.7	47 83	72.3	91
2	5 59.2	48 84	75.0	6 13.5	48 84	74.6	6 27.8	48 84	74.1	6 42.0	47 84	73.7	6 56.2	47 84	73.2	7 10.4	47 83	72.8	7 24.6	47 83	72.3	7 38.8	47 83	71.9	2
3	5 08.5	48 84	74.5	5 22.9	48 84	74.1	5 37.3	48 84	73.7	5 51.7	48 84	73.2	6 06.1	48 84	72.8	6 20.4	48 83	72.3	6 34.7	48 83	71.9	6 49.0	48 83	71.5	3
4										5 01.5	48 84	72.8	5 16.0	48 83	72.3	5 30.4	48 83	71.9	5 44.9	48 83	71.4	5 59.3	48 83	71.0	4
95																						5 09.7	48 83	70.5	95

Lat. 29°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	81 00.0	1.0 04	180.0	81 30.0	1.0 05	180.0	82 00.0	1.0 05	180.0	82 30.0	1.0 05	180.0	83 00.0	1.0 06	180.0	83 30.0	1.0 06	180.0	84 00.0	1.0 07	180.0	84 30.0	1.0 07	180.0	00
1	80 57.3	1.0 14	174.0	81 27.1	99 14	173.7	81 56.9	99 15	173.3	82 26.8	99 16	172.9	82 56.5	99 17	172.4	83 26.3	99 18	171.9	83 56.0	99 20	171.3	84 25.6	99 21	170.5	1
2	80 49.1	98 22	168.1	81 18.5	98 23	167.5	81 47.9	98 25	166.8	82 17.1	97 26	166.0	82 46.3	97 28	165.1	83 15.3	97 29	164.1	83 44.2	96 31	162.9	84 12.9	96 34	161.5	2
3	80 35.8	96 30	162.5	81 04.5	96 32	161.6	81 33.1	95 33	160.6	82 01.5	94 35	159.5	82 29.7	94 37	158.2	82 57.7	93 39	156.8	83 25.4	92 42	155.1	83 52.7	90 44	153.3	3
4	80 17.6	93 38	157.1	80 45.5	92 39	156.0	81 13.1	91 41	154.7	81 40.5	91 43	153.4	82 07.5	90 45	151.8	82 34.2	88 48	150.1	83 00.4	87 50	148.2	83 26.1	85 53	146.0	4
05	79 55.1	90 44	152.1	80 22.0	89 46	150.8	80 48.5	88 48	149.4	81 14.7	87 50	147.8	81 40.4	85 52	146.1	82 05.7	83 54	144.2	82 30.4	81 57	142.0	82 54.3	79 60	139.7	05
6	79 28.7	87 50	147.5	79 54.5	85 52	146.0	80 19.9	84 54	144.5	80 44.8	82 56	142.8	81 09.2	80 58	140.9	81 33.0	78 60	138.9	81 56.2	76 62	136.7	82 18.5	73 65	134.3	6
7	78 58.8	83 55	143.2	79 23.5	82 56	141.7	79 47.7	80 58	140.0	80 11.4	78 60	138.3	80 34.5	76 63	136.4	80 56.9	74 65	134.3	81 18.6	71 67	132.1	81 39.4	68 69	129.6	7
8	78 26.0	79 59	139.3	78 49.6	78 61	137.7	79 12.6	76 63	136.0	79 35.1	74 64	134.2	79 57.0	72 66	132.3	80 18.1	69 68	130.2	80 38.4	66 70	128.0	80 57.9	63 73	125.6	8
9	77 50.5	76 63	135.7	78 13.0	74 64	134.1	78 35.0	72 66	132.5	78 56.4	70 68	130.7	79 17.1	68 70	128.7	79 37.0	65 72	126.7	79 56.1	62 73	124.5	80 14.3	59 75	122.2	9
10	77 12.8	73 66	132.5	77 34.4	71 68	130.9	77 55.3	69 69	129.2	78 15.6	67 71	127.4	78 35.2	64 72	125.5	78 54.1	61 74	123.6	79 12.1	59 76	121.4	79 29.2	55 77	119.2	10
1	76 33.2	70 69	129.5	76 53.8	68 70	128.0	77 13.8	66 72	126.3	77 33.1	63 73	124.5	77 51.8	61 75	122.7	78 09.6	58 76	120.8	78 26.7	55 78	118.7	78 42.8	52 79	116.6	1
2	75 52.0	67 71	126.9	76 11.7	65 72	125.3	76 30.8	63 74	123.7	76 49.3	60 75	122.0	77 07.0	58 76	120.2	77 24.0	55 78	118.3	77 40.1	52 79	116.3	77 55.4	49 80	114.3	2
3	75 09.3	64 73	124.4	75 28.2	62 74	122.9	75 46.5	60 76	121.3	76 04.2	58 77	119.6	76 21.1	55 78	117.9	76 37.3	53 79	116.1	76 52.7	50 80	114.2	77 07.2	47 82	112.3	3
4	74 25.4	62 75	122.2	74 43.6	60 76	120.7	75 01.2	57 77	119.1	75 18.1	55 78	117.5	75 34.3	53 79	115.8	75 49.7	50 80	114.1	76 04.4	48 81	112.3	76 18.3	45 82	110.4	4
15	73 40.5	59 76	120.1	73 58.0	57 78	118.6	74 14.9	55 78	117.1	74 31.1	53 80	115.6	74 46.7	51 80	113.9	75 01.5	48 82	112.3	75 15.6	46 82	110.6	75 28.9	43 83	108.8	15
6	72 54.7	57 78	118.2	73 11.5	55 79	116.8	73 27.8	53 80	115.3	73 43.4	51 80	113.8	73 58.4	49 81	112.2	74 12.6	46 82	110.6	74 26.2	44 83	109.0	74 39.0	41 84	107.3	6
7	72 08.0	55 79	116.4	72 24.3	53 80	115.0	72 40.0	51 81	113.6	72 55.1	49 82	112.2	73 09.5	47 82	110.7	73 23.3	45 83	109.1	73 36.4	42 84	107.5	73 48.7	40 84	105.9	7
8	71 20.7	53 80	114.8	71 36.5	52 81	113.5	71 51.7	50 82	112.1	72 06.2	48 82	110.7	72 20.2	45 83	109.2	72 33.5	43 84	107.7	72 46.1	41 84	106.2	72 58.1	39 85	104.7	8
9	70 32.8	52 81	113.3	70 48.1	50 82	112.0	71 02.8	48 82	110.6	71 16.9	46 83	109.3	71 30.5	44 84	107.9	71 43.3	42 84	106.4	71 55.6	40 85	105.0	72 07.2	37 85	103.5	9
20	69 44.3	50 82	111.9	69 59.2	49 82	110.6	70 13.5	47 83	109.3	70 27.2	45 84	108.0	70 40.3	43 84	106.6	70 52.9	41 85	105.3	71 04.8	39 85	103.8	71 16.0	36 86	102.4	20
1	68 55.4	49 82	110.5	69 09.8	47 83	109.3	69 23.8	45 84	108.1	69 37.1	44 84	106.8	69 49.9	42 84	105.5	70 02.1	40 85	104.1	70 13.7	38 86	102.8	70 24.7	35 86	101.4	1
2	68 06.1	48 83	109.3	68 20.1	46 83	108.1	68 33.7	44 84	106.9	68 46.7	42 84	105.7	68 59.2	41 85	104.4	69 11.1	39 85	103.1	69 22.4	37 86	101.8	69 33.1	35 86	100.5	2
3	67 16.4	47 83	108.1	67 30.1	45 84	107.0	67 43.3	43 84	105.8	67 56.1	42 85	104.6	68 08.3	40 85	103.4	68 19.9	38 86	102.1	68 31.0	36 86	100.9	68 41.5	34 86	99.6	3
4	66 26.3	46 84	107.0	66 39.8	44 84	105.9	66 52.7	42 85	104.8	67 05.2	41 85	103.6	67 17.1	39 86	102.4	67 28.5	37 86	101.2	67 39.4	35 86	100.0	67 49.7	33 87	98.8	4
25	65 36.0	45 84	106.0	65 49.2	43 85	104.9	66 01.9	41 85	103.8	66 14.1	40 86	102.7	66 25.8	38 86	101.5	66 37.0	36 86	100.3	66 47.6	35 86	99.2	66 57.7	33 87	98.0	25
6	64 45.4	44 85	105.0	64 58.3	42 85	103.9	65 10.8	41 86	102.9	65 22.8	39 86	101.8	65 34.3	37 86	100.6	65 45.3	36 86	99.5	65 55.8	34 87	98.4	66 05.7	32 87	97.2	6
7	63 54.6	43 85	104.1	64 07.3	41 85	103.0	64 19.5	40 86	102.0	64 31.3	38 86	100.9	64 42.6	37 86	99.8	64 53.4	35 86	98.7	65 03.8	34 87	97.6	65 13.6	32 87	96.5	7
8	63 03.6	42 85	103.2	63 16.1	41 86	102.1	63 28.1	39 86	101.1	63 39.7	38 86	100.1	63 50.9	36 86	99.0	64 01.5	35 87	98.0	64 11.7	33 87	96.9	64 21.4	32 87	95.8	8
9	62 12.4	42 86	102.3	62 24.7	40 86	101.3	62 36.6	39 86	100.3	62 48.0	37 86	99.3	62 59.0	36 87	98.3	63 09.5	34 87	97.3	63 19.6	33 87	96.2	63 29.2	31 87	95.2	9
30	61 21.1	41 86	101.5	61 33.2	40 86	100.5	61 44.9	38 86	99.6	61 56.2	37 87	98.6	62 07.0	35 87	97.6	62 17.4	34 87	96.6	62 27.4	33 87	95.6	62 36.9	31 87	94.5	30
1	60 29.6	40 86	100.7	60 41.5	39 86	99.8	60 53.1	38 86	98.8	61 04.2	36 87	97.9	61 14.9	35 87	96.9	61 25.2	34 87	95.9	61 35.1	32 87	94.9	61 44.6	31 87	93.9	1
2	59 38.0	40 86	99.9	59 49.8	39 86	99.0	60 01.2	37 87	98.1	60 12.2	36 87	97.2	60 22.8	35 87	96.2	60 33.0	33 87	95.3	60 42.8	32 87	94.3	60 52.2	31 87	93.3	2
3	58 46.2	39 86	99.2	58 57.9	38 87	98.3	59 09.2	37 87	97.4	59 20.1	36 87	96.5	59 30.6	34 87	95.6	59 40.7	33 87	94.7	59 50.5	32 87	93.7	59 59.8	30 87	92.8	3
4	57 54.4	39 87	98.5	58 05.9	38 87	97.6	58 17.1	37 87	96.8	58 27.9	35 87	95.9	58 38.4	34 87	95.0	58 48.4	33 87	94.1	58 58.1	32 87	93.1	59 07.4	30 87	92.2	4
35	57 02.4	39 87	97.8	57 13.9	38 87	97.0	57 24.9	36 87	96.1	57 35.7	35 87	95.2	57 46.0	34 87	94.4	57 56.1	33 87	93.5	58 05.7	31 87	92.6	58 14.9	30 87	91.7	35
6	56 10.4	38 87	97.2	56 21.7	37 87	96.3	56 32.7	36 87	95.5	56 43.4	35 87	94.6	56 53.7	34 87	93.8	57 03.7	33 87	92.9	57 13.2	31 87	92.0	57 22.5	30 87	91.2	6
7	55 18.3	38 87	96.5	55 29.5	37 87	95.7	55 40.5	36 87	94.9	55 51.1	35 87	94.1	56 01.3	34 87	93.2	56 11.2	32 87	92.4	56 20.8	31 87	91.5	56 30.0	30 87	90.7	7
8	54 26.1	38 87	95.9	54 37.3	37 87	95.1	54 48.2	36 87	94.3	54 58.7	35 87	93.5	55 08.9	33 87	92.7	55 18.8	32 87	91.8	55 28.3	31 87	91.0	55 37.5	30 87	90.2	8
9	53 33.9	38 87	95.3	53 45.0	37 87	94.5	53 55.8	36 87	93.7	54 06.3	34 87	92.9	54 16.5	33 87	92.1	54 26.3	32 87	91.3	54 35.9	31 87	90.5	54 45.0	30 87	89.7	9
40	52 41.6	37 87	94.7	52 52.7	36 87	93.9	53 03.4	35 87	93.2	53 13.9	34 87	92.4	53 24.0	33 87	91.6	53 33.9	32 87	90.8	53 43.4	31 87	90.0	53 52.6	30 87	89.2	40
1	51 49.3	37 87	94.1	52 00.3	36 87	93.4	52 11.0	35 87	92.6	52 21.4	34 87	91.9	52 31.6	33 87	91.1	52 41.4	32 87	90.3	52 50.9	31 87	89.5	53 00.1	30 87	88.7	1
2	50 56.9	37 87	93.6	51 07.9	36 87	92.8	51 18.6	35 87	92.1	51 29.0	34 87	91.3	51 39.1	33 87	90.6	51 48.9	32 87	89.8	51 58.4	31 87	89.1	52 07.6	30 87	88.3	2
3	50 04.6	37 87	93.0	50 15.5	36 87	92.3	50 26.1	35 87	91.6	50 36.5	34 87	90.8	50 46.6	33 87	90.1	50 56.4	32 87	89.4	51 06.0	31 87	88.6	51 15.2	30 87	87.8	3
4	49 12.1	37 87	92.5	49 23.0	36 87	91.8	49 33.7	35 87	91.1	49 44.1	34 87	90.3	49 54.1	33 87	89.6	50 04.0	32 87	88.9	50 13.5	31 87	88.1	50 22.8	30 87	87.4	4
45	48 19.7	37 87	92.0	48 30.6	36 87	91.3	48 41.2	35 87	90.6	48 51.6	34 87	89.9	49 01.7	33 87	89.1	49 11.5	32 87	88.4	49 21.1	31 87	87.7	49 30.4	30 87	87.0	45
6	47 27.2	37 87	91.5	47 38.1	36 87	90.8	47 48.7	35 87	90.1	47 59.1	34 87	89.4	48 09.2	33 87	88.7	48 19.1	32 87	88.0	48 28.6	32 87	87.3	48 38.0	31 87	86.5	6
7	46 34.8	37 87	91.0	46 45.6	36 87	90.3	46 56.3	35 87	89.6	47 06.6	34 87	88.9	47 16.8	33 87	88.2	47 26.6	32 87	87.5	47 36.2	32 87	86.8	47 45.6	31 87	86.1	7
8	45 42.3	37 87	90.5	45 53.2	36 87	89.8	46 03.8	35 87	89.1	46 14.2	34 87	88.4	46 24.3	33 87	87.8	46 34.2	33 87	87.1	46 43.8	32 87	86.4	46 53.2	31 87	85.7	8
9	44 49.8	37 87	90.0	45 00.7	36 87	89.3	45 11.3	35 87	88.7	45 21.7	34 87	88.0	45 31.9	33 87	87.3	45 41.8	33 87	86.6	45 51.5	32 87	86.0	46 00.9	31 87	85.3	9
50	43 57.4	37 87	89.5	44 08.2	36 87	88.9	44 18.9	35 87	88.2	44 29.3	34 87	87.5	44 39.5	34 87	86.9	44 49.4	33 87	86.2	44 59.2	32 87	85.5	45 08.6	31 87	84.9	50
1	43 04.9	37 87	89.0	43 15.8	36 87	88.4	43 26.4	35 87	87.7	43 36.9	34 87	87.1	43 47.1	34 87	86.4	43 57.1	33 87	85.8	44 06.9	32 87	85.1	44 16.4	31 87	84.5	1
2	42 12.4	37 87	88.6	42 23.3	36 87	87.9	42 34.0	35 87	87.3	42 44.5	35 87	86.7	42 54.7	34 87	86.0	43 04.8	33 87	85.4	43 14.6	32 87	84.7	43 24.2	32 87	84.1	2
3	41 20.0	37 87	88.1	41 30.9	36 87	87.5	41 41.6	35 87	86.8	41 52.1	35 87	86.2	42 02.4	34 87	85.6	42 12.5	33 87	85.0	42 22.3	33 87	84.3	42 32.0	32 87	83.7	3
4	40 27.5	37 87	87.6	40 38.5	36 87	87.0	40 49.2	35 87	86.4	40 59.7	35 87	85.8	41 10.1	34 87	85.2	41 20.2	33 87	84.5	41 30.1	33 87	83.9	41 39.9	32 87	83.3	4
55	39 35.1	37 87	87.2	39 46.1	36 87	86.6	39 56.8	36 87	86.0	40 07.4	35 87	85.4	40 17.8	34 87	84.7	40 28.0	34 87	84.1	40 38.0	33 87	83.5	40 47.8	32 87	82.9	55
6	38 42.7	37 87	86.7	38 53.7	36 87	86.1	39 04.5	36 87	85.5	39 15.1	35 87	84.9	39 25.6	34 87	84.3	39 35.8	34 87	83.7	39 45.9	33 87	83.1	39 55.7	33 87	82.5	6
7	37 50.3	37 87	86.3	38 01.3	36 87	85.7	38 12.2	36 87	85.1	38 22.9	35 87	84.5	38 33.4	35 87	83.9	38 43.7	34 87	83.3	38 53.8	33 87	82.7	39 03.7	33 86	82.1	7
8	36 58.0	37 87	85.9	37 09.0	37 87	85.3	37 19.9	36 87	84.7	37 30.6	35 87	84.1	37 41.2	35 87	83.5	37 51.6	34 87	82.9	38 01.8	34 87	82.3	38 11.8	33 86	81.7	8
9	36 05.6	37 87	85.4	36 16.7	37 87	84.8	36 27.7	36 87	84.3	36 38.5	36 87	83.7	36 49.1	35 87	83.1	36 59.5	35 87	82.5	37 09.8	34 86	81.9	37 19.9	33 86	81.3	9
60	35 13.3	37 87	85.0	35 24.5	37 87	84.4	35 35.5	36 87	83.8	35 46.3	36 87	83.3	35 57.0	35 87	82.7	36 07.5	35 87	82.1	36 17.8	34 86	81.5	36 28.0	34 86	81.0	60
1	34 21.1	38 87	84.6	34 32.3	37 87	84.0	34 43.3	37 87	83.4	34 54.2	36 87	82.9	35 05.0	36 87	82.3	35 15.5	35 86	81.7	35 26.0	34 86	81.1	35 36.2	34 86	80.6	1
2	33 28.9	38 87	84.1	33 40.1	37 87	83.6	33 51.2	37 87	83.0	34 02.2	36 87	82.5	34 13.0	36 86	81.9	34 23.6	35 86	81.3	34 34.1	35 86	80.8	34 44.5	34 86	80.2	2
3	32 36.7	38 87	83.7	32 48.0	37 87	83.2	32 59.2	37 87	82.6	33 10.2	37 87	82.0	33 21.1	36 86	81.5	33 31.8	36 86	80.9	33 42.4	35 86	80.4	33 52.8	34 86	79.8	3
4	31 44.5	38 87	83.3	31 55.9	38 87	82.7	32 07.2	37 87	82.2	32 18.2	37 86	81.6	32 29.2	36 86	81.1	32 40.0	36 86	80.5	32 50.7	35 86	80.0	33 01.2	35 86	79.4	4
65	30 52.4	38 87	82.9	31 03.9	38 87	82.3	31 15.2	37 86	81.8	31 26.4	37 86	81.2	31 37.4	37 86	80.7	31 48.3	36 86	80.1	31 59.0	36 86	79.6	32 09.6	35 86	79.0	65
6	30 00.4	39 87	82.4	30 11.9	38 86	81.9	30 23.3	38 86	81.4	30 34.5	37 86	80.8	30 45.6	37 86	80.3	30 56.6	36 86	79.8	31 07.4	36 86	79.2	31 18.1	35 86	78.7	6
7	29 08.4	39 87	82.0	29 20.0	38 86	81.5	29 31.4	38 86	81.0	29 42.7	38 86	80.4	29 53.9	37 86	79.9	30 05.0	37 86	79.4	30 15.9	36 86	78.8	30 26.7	36 86	78.3	7
8	28 16.5	39 86	81.6	28 28.1	39 86	81.1	28 39.6	38 86	80.6	28 51.0	38 86	80.0	29 02.3	37 86	79.5	29 13.4	37 86	79.0	29 24.5	37 86	78.4	29 35.4	36 86	77.9	8
9	27 24.6	39 86	81.2	27 36.3	39 86	80.7	27 47.9	38 86	80.2	27 59.4	38 86	79.6	28 10.7	38 86	79.1	28 22.0	37 86	78.6	28 33.1	37 86	78.1	28 44.1	36 85	77.5	9
70	26 32.7	40 86	80.8	26 44.5	39 86	80.3	26 56.2	39 86	79.8	27 07.8	38 86	79.2	27 19.2	38 86	78.7	27 30.6	38 86	78.2	27 41.8	37 85	77.7	27 52.9	37 85	77.1	70
1	25 41.0	40 86	80.4	25 52.8	39 86	79.9	26 04.6	39 86	79.3	26 16.3	39 86	78.8	26 27.8	38 86	78.3	26 39.2	38 85	77.8	26 50.6	38 85	77.3	27 01.8	37 85	76.8	1
2	24 49.3	40 86	80.0	25 01.2	40 86	79.4	25 13.1	39 86	78.9	25 24.8	39 86	78.4	25 36.5	39 86	77.9	25 48.0	38 85	77.4	25 59.4	38 85	76.9	26 10.7	38 85	76.4	2
3	23 57.6	40 86	79.5	24 09.7	40 86	79.0	24 21.6	40 86	78.5	24 33.4	39 86	78.0	24 45.2	39 85	77.5	24 56.8	39 85	77.0	25 08.3	38 85	76.5	25 19.8	38 85	76.0	3
4	23 06.1	41 86	79.1	23 18.2	40 86	78.6	23 30.2	40 86	78.1	23 42.1	40 85	77.6	23 54.0	39 85	77.1	24 05.7	39 85	76.6	24 17.4	39 85	76.1	24 28.9	38 85	75.6	4
75	22 14.6	41 86	78.7	22 26.8	41 86	78.2	22 38.9	40 85	77.7	22 50.9	40 85	77.2	23 02.9	40 85	76.7	23 14.7	39 85	76.2	23 26.5	39 85	75.7	23 38.1	39 84	75.2	75
6	21 23.1	41 86	78.3	21 35.4	41 85	77.8	21 47.7	41 85	77.3	21 59.8	40 85	76.8	22 11.8	40 85	76.3	22 23.8	40 85	75.8	22 35.6	39 84	75.3	22 47.4	39 84	74.8	6
7	20 31.8	41 85	77.9	20 44.2	41 85	77.4	20 56.5	41 85	76.9	21 08.7	41 85	76.4	21 20.9	40 85	75.9	21 32.9	40 84	75.4	21 44.9	40 84	74.9	21 56.8	39 84	74.4	7
8	19 48.5	42 85	77.5	19 53.0	42 85	77.0	20 05.4	41 85	76.5	20 17.8	41 85	76.0	20 30.0	41 85	75.5	20 42.2	40 84	75.0	20 54.3	40 84	74.5	21 06.3	40 84	74.1	8
9	18 49.3	42 85	77.0	19 01.9	42 85	76.6	19 14.5	42 85	76.1	19 26.9	41 85	75.6	19 39.3	41 84	75.1	19 51.6	41 84	74.6	20 03.8	41 84	74.1	20 15.9	40 84	73.7	9
80	17 58.2	42 85	76.6	18 10.9	42 85	76.1	18 23.6	42 85	75.7	18 36.1	42 84	75.2	18 48.6	41 84	74.7	19 01.0	41 84	74.2	19 13.3	41 84	73.7	19 25.6	41 84	73.3	80
1	17 07.2	43 85	76.2	17 20.0	43 85	75.7	17 32.8	42 84	75.3	17 45.4	42 84	74.8	17 58.0	42 84	74.3	18 10.6	42 84	73.8	18 23.0	41 84	73.3	18 35.4	41 84	72.9	1
2	16 16.3	43 85	75.8	16 29.2	43 84	75.3	16 42.1	43 84	74.8	16 54.8	42 84	74.4	17 07.6	42 84	73.9	17 20.2	42 84	73.4	17 32.8	42 84	72.9	17 45.3	42 83	72.5	2
3	15 25.5	43 85	75.4	15 38.5	43 84	74.9	15 51.5	43 84	74.4	16 04.4	43 84	74.0	16 17.2	43 84	73.5	16 30.0	42 84	73.0	16 42.7	42 83	72.5	16 55.3	42 83	72.1	3
4	14 34.8	44 84	74.9	14 47.9	44 84	74.5	15 01.0	43 84	74.0	15 14.0	43 84	73.5	15 26.9	43 84	73.1	15 39.8	43 83	72.6	15 52.7	43 83	72.1	16 05.4	42 83	71.7	4
85	13 44.1	44 84	74.5	13 57.4	44 84	74.0	14 10.6	44 84	73.6	14 23.7	44 84	73.1	14 36.8	43 83	72.7	14 49.8	43 83	72.2	15 02.8	43 83	71.7	15 15.7	43 83	71.3	85
6	12 53.6	45 84	74.1	13 07.0	44 84	73.6	13 20.3	44 84	73.2	13 33.5	44 83	72.7	13 46.8	44 83	72.2	13 59.9	44 83	71.8	14 13.0	44 83	71.3	14 26.0	43 83	70.8	6
7	12 03.2	45 84	73.7	12 16.7	45 84	73.2	12 30.1	45 83	72.7	12 43.5	45 83	72.3	12 56.8	44 83	71.8	13 10.1	44 83	71.4	13 23.4	44 83	70.9	13 36.5	44 83	70.4	7
8	11 12.9	45 84	73.2	11 26.5	45 83	72.8	11 40.1	45 83	72.3	11 53.6	45 83	71.9	12 07.0	45 83	71.4	12 20.5	45 83	70.9	12 33.8	44 83	70.5	12 47.2	44 83	70.0	8
9	10 22.7	46 83	72.8	10 36.5	46 83	72.3	10 50.1	46 83	71.9	11 03.8	45 83	71.4	11 17.4	45 83	71.0	11 30.9	45 82	70.5	11 44.4	45 82	70.1	11 57.9	45 83	69.6	9
90	9 32.7	46 83	72.3	9 46.5	46 83	71.9	10 00.3	46 83	71.4	10 14.1	46 83	71.0	10 27.8	46 82	70.5	10 41.5	46 82	70.1	10 55.2	45 83	69.6	11 08.8	45 83	69.2	90

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	41 00.0	1.0 01	180.0	40 30.0	1.0 01	180.0	40 00.0	1.0 01	180.0	39 30.0	1.0 01	180.0	39 00.0	1.0 01	180.0	38 30.0	1.0 01	180.0	38 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	00
1	40 59.4	1.0 03	178.8	40 29.4	1.0 03	178.8	39 59.4	1.0 03	178.8	39 29.4	1.0 03	178.8	38 59.5	1.0 03	178.8	38 29.5	1.0 03	178.8	37 59.5	1.0 03	178.8	37 29.5	1.0 03	178.8	1
2	40 57.7	1.0 05	177.5	40 27.7	1.0 05	177.5	39 57.8	1.0 05	177.6	39 27.8	1.0 05	177.6	38 57.8	1.0 04	177.6	38 27.8	1.0 04	177.6	37 57.9	1.0 04	177.7	37 27.9	1.0 04	177.7	2
3	40 54.9	1.0 07	176.3	40 24.9	1.0 06	176.3	39 55.0	1.0 06	176.3	39 25.0	1.0 06	176.4	38 55.1	1.0 06	176.4	38 25.1	1.0 06	176.5	37 55.2	1.0 06	176.5	37 25.2	1.0 06	176.5	3
4	40 50.9	1.0 08	175.0	40 21.0	1.0 08	175.1	39 51.1	1.0 08	175.1	39 21.2	1.0 08	175.2	38 51.3	1.0 08	175.2	38 21.4	1.0 08	175.3	37 51.5	1.0 08	175.3	37 21.5	1.0 08	175.4	4
05	40 45.8	99 10	173.8	40 15.9	1.0 10	173.9	39 46.1	1.0 10	173.9	39 16.2	1.0 10	174.0	38 46.4	1.0 10	174.1	38 16.5	1.0 10	174.1	37 46.7	1.0 10	174.2	37 16.8	1.0 10	174.2	05
6	40 39.5	99 12	172.6	40 09.8	99 12	172.6	39 40.0	99 12	172.7	39 10.2	99 12	172.8	38 40.4	99 12	172.9	38 10.6	99 12	172.9	37 40.8	99 12	173.0	37 11.0	99 11	173.1	6
7	40 32.2	99 14	171.3	40 02.5	99 14	171.4	39 32.8	99 14	171.5	39 03.1	99 14	171.6	38 33.3	99 14	171.7	38 03.6	99 13	171.8	37 33.9	99 13	171.9	37 04.2	99 13	171.9	7
8	40 23.7	99 16	170.1	39 54.1	99 16	170.2	39 24.5	99 16	170.3	38 54.9	99 16	170.4	38 25.2	99 15	170.5	37 55.6	99 15	170.6	37 26.0	99 15	170.7	36 56.3	99 15	170.8	8
9	40 14.2	98 18	168.9	39 44.7	98 18	169.0	39 15.1	98 17	169.1	38 45.6	98 17	169.2	38 16.1	98 17	169.4	37 46.5	98 17	169.5	37 17.0	99 17	169.6	36 47.4	99 16	169.7	9
10	40 03.5	98 20	167.7	39 34.1	98 19	167.8	39 04.7	98 19	167.9	38 35.3	98 19	168.1	38 05.8	98 19	168.2	37 36.4	98 18	168.3	37 07.0	98 18	168.4	36 37.5	98 18	168.6	10
1	39 51.8	98 21	166.5	39 22.5	98 21	166.6	38 53.2	98 21	166.8	38 23.9	98 21	166.9	37 54.6	98 20	167.0	37 25.3	98 20	167.2	36 55.9	98 20	167.3	36 26.6	98 20	167.4	1
2	39 39.0	97 23	165.3	39 09.9	97 23	165.5	38 40.7	97 23	165.6	38 11.5	97 22	165.8	37 42.3	97 22	165.9	37 13.1	97 22	166.0	36 43.9	97 22	166.2	36 14.7	97 22	166.3	2
3	39 25.2	97 25	164.1	38 56.2	97 25	164.3	38 27.1	97 24	164.4	37 58.1	97 24	164.6	37 29.0	97 24	164.8	37 00.0	97 24	164.9	36 30.9	97 23	165.1	36 01.8	97 23	165.2	3
4	39 10.3	96 26	162.9	38 41.4	96 26	163.1	38 12.5	96 26	163.3	37 43.6	96 26	163.5	37 14.7	96 26	163.6	36 45.8	96 25	163.8	36 16.9	96 25	164.0	35 47.9	97 25	164.1	4
15	38 54.4	96 28	161.8	38 25.7	96 28	162.0	37 57.0	96 28	162.2	37 28.2	96 27	162.3	36 59.5	96 27	162.5	36 30.7	96 27	162.7	36 01.9	96 26	162.9	35 33.1	96 26	163.0	15
6	38 37.5	95 30	160.6	38 09.0	95 30	160.8	37 40.4	95 29	161.0	37 11.8	95 29	161.2	36 43.2	95 29	161.4	36 14.6	95 28	161.6	35 45.9	95 28	161.8	35 17.3	96 28	162.0	6
7	38 19.6	95 31	159.5	37 51.2	95 31	159.7	37 22.8	95 31	159.9	36 54.4	95 30	160.1	36 26.0	95 30	160.3	35 57.5	95 30	160.5	35 29.1	95 30	160.7	35 00.6	95 30	160.9	7
8	38 00.8	94 33	158.4	37 32.6	94 33	158.6	37 04.3	94 32	158.8	36 36.1	94 32	159.0	36 07.8	94 32	159.2	35 39.6	94 32	159.4	35 11.3	94 31	159.6	34 42.9	94 31	159.8	8
9	37 40.9	93 35	157.3	37 12.9	93 34	157.5	36 44.9	93 34	157.7	36 16.8	94 31	157.9	35 48.8	94 33	158.1	35 20.7	94 33	158.4	34 52.5	94 33	158.6	34 24.4	94 32	158.8	9
20	37 20.2	93 36	156.2	36 52.4	93 36	156.4	36 24.5	93 36	156.6	35 56.7	93 35	156.9	35 28.8	93 35	157.1	35 00.9	93 34	157.3	34 32.9	93 34	157.5	34 05.0	93 34	157.7	20
1	36 58.5	92 38	155.1	36 30.9	92 37	155.3	36 03.3	92 37	155.6	35 35.6	92 37	155.8	35 07.9	92 36	156.0	34 40.2	92 36	156.3	34 12.4	93 36	156.5	33 44.7	93 35	156.7	1
2	36 36.0	91 39	154.0	36 08.5	91 39	154.2	35 41.1	92 38	154.5	35 13.6	92 38	154.7	34 46.1	92 38	155.0	34 18.6	92 37	155.2	33 51.1	92 37	155.5	33 23.5	92 37	155.7	2
3	36 12.5	91 40	152.9	35 45.3	91 40	153.2	35 18.1	91 40	153.5	34 50.8	91 39	153.7	34 23.5	91 39	154.0	33 56.2	91 39	154.2	33 28.9	91 38	154.5	33 01.5	91 38	154.7	3
4	35 48.2	90 42	151.9	35 21.2	90 42	152.2	34 54.2	90 41	152.4	34 27.2	90 41	152.7	34 00.1	90 40	152.9	33 33.0	90 40	153.2	33 05.8	91 40	153.5	32 38.6	91 40	153.7	4
25	35 23.0	89 43	150.8	34 56.3	89 43	151.1	34 29.5	89 42	151.4	34 02.7	89 42	151.7	33 35.8	90 42	151.9	33 08.9	90 42	152.2	32 42.0	90 41	152.5	32 15.0	90 41	152.7	25
6	34 57.1	88 45	149.8	34 30.5	89 44	150.1	34 04.0	89 44	150.4	33 37.4	89 44	150.7	33 10.7	89 43	150.9	32 44.0	89 43	151.2	32 17.3	89 42	151.5	31 50.6	89 42	151.8	6
7	34 30.3	88 46	148.8	34 04.0	88 46	149.1	33 37.7	88 45	149.4	33 11.3	88 45	149.7	32 44.8	88 44	150.0	32 18.4	88 44	150.2	31 51.9	88 44	150.5	31 25.3	89 43	150.8	7
8	34 02.8	87 47	147.8	33 36.7	87 47	148.1	33 10.6	87 46	148.4	32 44.4	87 46	148.7	32 18.2	87 46	149.0	31 51.9	88 45	149.3	31 25.7	88 45	149.6	30 59.4	88 45	149.9	8
9	33 34.4	86 48	146.9	33 08.6	86 48	147.2	32 42.7	86 48	147.5	32 16.8	87 47	147.8	31 50.8	87 47	148.0	31 24.8	87 46	148.3	30 58.7	87 46	148.6	30 32.6	87 46	148.9	9
30	33 05.4	85 50	145.9	32 39.8	85 49	146.2	32 14.1	86 49	146.5	31 48.4	86 48	146.8	31 22.7	86 48	147.1	30 56.9	86 48	147.4	30 31.0	86 47	147.7	30 05.2	86 47	148.0	30
1	32 35.6	85 51	144.9	32 10.2	85 50	145.3	31 44.8	85 50	145.6	31 19.3	85 50	145.9	30 53.8	85 49	146.2	30 28.3	85 49	146.5	30 02.7	85 48	146.8	29 37.0	86 48	147.1	1
2	32 05.1	84 52	144.0	31 39.9	84 52	144.3	31 14.8	84 51	144.6	30 49.5	84 51	145.0	30 24.3	84 50	145.3	29 58.9	84 50	145.6	29 33.6	85 50	145.9	29 08.2	85 49	146.2	2
3	31 33.9	83 53	143.1	31 09.0	83 53	143.4	30 44.1	83 52	143.7	30 19.1	83 52	144.1	29 54.0	84 52	144.4	29 28.9	84 51	144.7	29 03.8	84 51	145.0	28 38.6	84 50	145.3	3
4	31 02.1	82 54	142.2	30 37.4	82 54	142.5	30 12.7	82 53	142.8	29 47.9	83 53	143.2	29 23.1	83 52	143.5	28 58.3	83 52	143.8	28 33.4	83 52	144.1	28 08.4	83 51	144.4	4
35	30 29.5	81 55	141.3	30 05.1	81 55	141.6	29 40.7	82 54	142.0	29 16.1	82 54	142.3	28 51.6	82 54	142.6	28 27.0	82 53	142.9	28 02.3	82 53	143.3	27 37.6	82 52	143.6	35
6	29 56.4	81 56	140.4	29 32.2	81 56	140.7	29 08.0	81 56	141.1	28 43.7	81 55	141.4	28 19.4	81 55	141.7	27 55.0	81 54	142.1	27 30.6	81 54	142.4	27 06.1	82 54	142.7	6
7	29 22.7	80 57	139.5	28 58.7	80 57	139.9	28 34.7	80 56	140.2	28 10.7	80 56	140.6	27 46.6	80 56	140.9	27 22.5	81 55	141.2	26 58.3	81 55	141.6	26 34.0	81 54	141.9	7
8	28 48.3	79 58	138.7	28 24.6	79 58	139.0	28 00.9	79 58	139.4	27 37.1	79 57	139.7	27 13.2	80 57	140.1	26 49.3	80 56	140.4	26 25.4	80 56	140.7	26 01.4	80 56	141.1	8
9	28 13.4	78 59	137.8	27 49.9	78 59	138.2	27 26.4	78 58	138.5	27 02.8	79 58	138.9	26 39.2	79 58	139.2	26 15.6	79 57	139.6	25 51.9	79 57	139.9	25 28.1	79 56	140.3	9
40	27 37.9	77 60	137.0	27 14.7	77 60	137.4	26 51.4	78 59	137.7	26 28.1	78 59	138.1	26 04.7	78 58	138.4	25 41.3	78 58	138.8	25 17.8	78 58	139.1	24 54.3	78 57	139.5	40
1	27 01.8	76 61	136.2	26 38.8	77 60	136.6	26 15.8	77 60	136.9	25 52.7	77 60	137.3	25 29.6	77 59	137.6	25 06.4	77 59	138.0	24 43.2	78 59	138.3	24 19.9	78 58	138.7	1
2	26 25.2	76 62	135.4	26 02.5	76 62	135.8	25 39.7	76 61	136.1	25 16.9	76 61	136.5	24 54.0	76 60	136.8	24 31.0	77 60	137.2	24 08.0	77 60	137.6	23 45.0	77 59	137.9	2
3	25 48.1	75 63	134.6	25 25.6	75 62	135.0	25 03.1	75 62	135.3	24 40.5	75 62	135.7	24 17.8	76 61	136.1	23 55.1	76 61	136.4	23 32.4	76 60	136.8	23 09.5	76 60	137.1	3
4	25 10.5	74 64	133.8	24 48.3	74 63	134.2	24 25.9	74 63	134.6	24 03.6	75 62	134.9	23 41.2	75 62	135.3	23 18.7	75 62	135.7	22 56.2	75 61	136.0	22 33.6	75 61	136.4	4
45	24 32.4	73 64	133.1	24 10.4	74 64	133.4	23 48.3	74 64	133.8	23 26.2	74 63	134.2	23 04.0	74 63	134.6	22 41.8	74 62	134.9	22 19.5	74 62	135.3	21 57.2	75 62	135.6	45
6	23 53.9	73 65	132.3	23 32.1	73 65	132.7	23 10.2	73 64	133.1	22 48.3	73 64	133.4	22 26.4	73 64	133.8	22 04.4	73 63	134.2	21 42.3	74 63	134.5	21 20.2	74 62	134.9	6
7	23 14.8	72 66	131.6	22 53.3	72 66	132.0	22 31.7	72 65	132.3	22 10.0	72 65	132.7	21 48.3	72 64	133.1	21 26.5	73 64	133.5	21 04.7	73 64	133.8	20 42.8	73 63	134.2	7
8	22 35.4	71 66	130.9	22 14.0	71 66	131.2	21 52.7	71 66	131.6	21 31.2	72 65	132.0	21 09.7	72 65	132.4	20 48.2	72 65	132.7	20 26.6	72 64	133.1	20 05.0	72 64	133.5	8
9	21 55.5	70 67	130.1	21 34.4	70 67	130.5	21 13.2	71 66	130.9	20 52.0	71 66	131.3	20 30.7	71 66	131.7	20 09.4	71 65	132.0	19 48.1	71 65	132.4	19 26.7	71 65	132.8	9
50	21 15.1	70 68	129.4	20 54.3	70 68	129.8	20 33.3	70 67	130.2	20 12.3	70 67	130.6	19 51.3	70 66	131.0	19 30.2	70 66	131.3	19 09.1	71 66	131.7	18 47.9	71 65	132.1	50
1	20 34.4	69 69	128.7	20 13.7	69 68	129.1	19 53.0	69 68	129.5	19 32.3	69 68	129.9	19 11.5	69 67	130.3	18 50.6	70 67	130.7	18 29.7	70 66	131.0	18 08.8	70 66	131.4	1
2	19 53.3	68 69	128.1	19 32.8	68 69	128.4	19 12.4	68 68	128.8	18 51.8	69 68	129.2	18 31.2	69 68	129.6	18 10.6	69 67	130.0	17 49.9	69 67	130.4	17 29.2	69 66	130.7	2
3	19 11.8	67 70	127.4	18 51.5	67 69	127.8	18 31.3	68 69	128.2	18 11.0	68 69	128.5	17 50.6	68 68	128.9	17 30.2	68 68	129.3	17 09.8	68 68	129.7	16 49.3	68 67	130.1	3
4	18 29.9	67 70	126.7	18 09.9	67 70	127.1	17 49.8	67 70	127.5	17 29.7	67 69	127.9	17 09.6	67 69	128.3	16 49.4	67 68	128.7	16 29.2	67 68	129.0	16 08.9	68 68	129.4	4
55	17 47.6	66 71	126.1	17 27.8	66 70	126.5	17 08.0	66 70	126.8	16 48.1	66 70	127.2	16 28.2	66 70	127.6	16 08.3	67 69	128.0	15 48.3	67 69	128.4	15 28.2	67 68	128.8	55
6	17 05.0	65 72	125.4	16 45.5	65 71	125.8	16 25.8	65 71	126.2	16 06.2	66 70	126.6	15 46.5	66 70	127.0	15 26.7	66 70	127.4	15 06.9	66 69	127.8	14 47.1	66 69	128.2	6
7	16 22.1	64 72	124.8	16 02.7	65 72	125.2	15 43.3	65 71	125.6	15 23.9	65 71	126.0	15 04.4	65 71	126.4	14 44.9	65 70	126.8	14 25.3	65 70	127.1	14 05.7	65 70	127.5	7
8	15 38.8	64 73	124.2	15 19.7	64 72	124.5	15 00.5	64 72	124.9	14 41.2	64 72	125.3	14 22.0	64 71	125.7	14 02.6	64 71	126.1	13 43.3	65 70	126.5	13 23.9	65 70	126.9	8
9	14 55.2	63 73	123.5	14 36.3	63 73	123.9	14 17.3	63 72	124.3	13 58.3	63 72	124.7	13 39.2	64 72	125.1	13 20.1	64 72	125.5	13 01.0	64 71	125.9	12 41.8	64 71	126.3	9
60	14 11.3	62 74	122.9	13 52.6	63 73	123.3	13 33.8	63 73	123.7	13 15.0	63 73	124.1	12 56.1	63 72	124.5	12 37.2	63 72	124.9	12 18.3	63 72	125.3	11 59.3	63 71	125.7	60
1	13 27.1	62 74	122.3	13 08.6	62 74	122.7	12 50.0	62 74	123.1	12 31.4	62 73	123.5	12 12.7	62 73	123.9	11 54.1	62 72	124.3	11 35.3	62 72	124.7	11 16.6	63 72	125.1	1
2	12 42.7	61 75	121.7	12 24.3	61 74	122.1	12 05.9	61 74	122.5	11 47.5	61 74	122.9	11 29.1	62 73	123.3	11 10.6	62 73	123.7	10 52.0	62 73	124.1	10 33.5	62 72	124.5	2
3	11 57.9	60 75	121.1	11 39.7	61 75	121.6	11 21.5	61 74	122.0	11 03.3	61 74	122.4	10 45.1	61 74	122.8	10 26.8	61 74	123.2	10 08.5	61 73	123.6	9 50.1	61 73	124.0	3
4	11 12.8	60 76	120.6	10 54.9	60 75	121.0	10 36.9	60 75	121.4	10 18.9	60 75	121.8	10 00.8	60 74	122.2	9 42.7	60 74	122.6	9 24.6	60 74	123.0	9 06.5	61 73	123.4	4
65	10 27.5	59 76	120.0	10 09.7	59 76	120.4	9 51.9	59 75	120.8	9 34.1	59 75	121.2	9 16.3	60 75	121.6	8 58 4	60 74	122.0	8 40.5	60 74	122.4	8 22.5	60 74	122.8	65
6	9 41.9	59 76	119.4	9 24.4	59 76	119.8	9 06.7	59 76	120.3	8 49.1	59 76	120.7	8 31.4	59 75	121.1	8 13.7	59 75	121.5	7 56.0	59 74	121.9	7 38.3	59 74	122.3	6
7	8 56.1	58 77	118.9	8 38.7	58 76	119.3	8 21.3	58 76	119.7	8 03.8	58 76	120.1	7 46.4	58 76	120.5	7 28.9	58 75	120.9	7 11.3	58 75	121.3	6 53.8	59 74	121.8	7
8	8 10.0	57 77	118.3	7 52.8	57 77	118.7	7 35.6	58 77	119.2	7 18.3	58 76	119.6	7 01.0	58 76	120.0	6 43.7	58 76	120.4	6 26.4	58 75	120.8	6 09.1	58 75	121.2	8
9	7 23.7	57 78	117.8	7 06.7	57 77	118.2	6 49.6	57 77	118.6	6 32.6	57 77	119.0	6 15.5	57 76	119.4	5 58.3	57 76	119.9	5 41.2	57 76	120.3	5 24.0	57 75	120.7	9
70	6 37.2	56 78	117.3	6 20.3	56 78	117.7	6 03.5	56 77	118.1	5 46.6	56 77	118.5	5 29.6	56 77	118.9	5 12.7	56 76	119.3							70
1	5 50.4	56 78	116.7	5 33.8	56 78	117.1	5 17.0	56 78	117.6	5 00.3	56 77	118.0													1
2	5 03.5	55 79	116.2																						2

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	8 42.7	47 83	71.9	8 56.7	47 83	71.5	9 10.6	46 82	71.0	9 24.5	46 82	70.6	9 38.4	46 82	70.1	9 52.2	46 82	69.7	10 06.0	46 82	69.2	10 19.8	46 81	68.8	91
2	7 52.9	47 83	71.5	8 07.0	47 82	71.0	8 21.1	47 82	70.6	8 35.1	47 82	70.1	8 49.1	47 82	69.7	9 03.1	47 82	69.2	9 17.1	46 81	68.8	9 31.0	46 81	68.3	2
3	7 03.2	47 83	71.0	7 17.5	47 82	70.6	7 31.7	47 82	70.1	7 45.8	47 82	69.7	8 00.0	47 82	69.2	8 14.1	47 81	68.8	8 28.2	47 81	68.3	8 42.3	47 81	67.9	3
4	6 13.7	48 82	70.6	6 28.0	48 82	70.1	6 42.4	48 82	69.7	6 56.7	48 82	69.2	7 11.0	48 81	68.8	7 25.3	48 81	68.3	7 39.5	47 81	67.9	7 53.7	47 81	67.5	4
95	5 24.3	48 82	70.1	5 38.8	48 82	69.7	5 53.2	48 82	69.2	6 07.7	48 81	68.8	6 22.2	48 81	68.3	6 36.6	48 81	67.9	6 51.0	48 81	67.5	7 05.3	48 80	67.0	95
6							5 04.3	49 81	68.8	5 18.9	49 81	68.3	5 33.5	49 81	67.9	5 48.0	49 81	67.4	6 02.6	48 80	67.0	6 17.1	48 80	66.6	6
7																			5 14.4	49 80	66.6	5 29.0	49 80	66.1	7

Lat. 29°

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	85 09.0	1.0 08	180.0	85 30.0	1.0 09	180.0	86 00.0	1.0 10	180.0	86 30.0	1.0 11	180.0	87 00.0	1.0 13	180.0	87 30.0	1.0 15	180.0	88 00.0	1.0 19	180.0	88 30.0	1.0 24	180.0	00
1	84 55.2	99 23	169.6	85 24.7	98 25	168.5	85 54.1	98 28	167.2	86 23.3	97 31	165.5	86 52.3	96 36	163.3	87 20.9	94 41	160.3	87 48.8	92 48	155.9	88 15.6	86 57	149.3	1
2	84 41.4	94 36	159.8	85 09.5	93 40	157.9	85 37.3	92 43	155.5	86 04.5	90 48	152.6	86 30.9	86 52	148.9	86 56.2	82 58	144.2	87 19.9	75 65	138.1	87 41.2	65 72	129.9	2
3	84 19.5	89 47	151.1	84 45.8	87 51	148.5	85 11.4	84 55	145.6	85 36.0	80 59	142.0	85 59.4	76 04	137.7	86 21.2	69 69	132.6	86 40.9	61 74	126.3	86 57.7	50 79	118.9	3
4	83 51.1	82 56	143.5	84 15.3	79 59	140.6	84 38.6	76 63	137.4	85 00.7	71 67	133.6	85 21.3	66 71	129.3	85 40.0	59 75	124.3	85 56.5	51 79	118.6	86 10.2	41 82	112.1	4
05	83 17.5	76 63	137.0	83 39.7	72 66	134.1	84 00.8	68 69	130.8	84 20.6	63 72	127.0	84 38.8	58 76	122.9	84 55.1	51 79	118.3	85 09.2	43 82	113.2	85 20.9	34 84	107.6	05
6	82 39.9	70 68	131.6	83 00.3	66 70	128.6	83 19.5	62 73	125.4	83 37.3	57 76	121.9	83 53.5	51 79	118.0	84 07.9	45 81	113.8	84 20.3	38 83	109.3	84 30.4	30 85	104.4	6
7	81 59.3	64 72	127.0	82 18.1	61 74	124.1	82 35.6	56 76	121.0	82 51.7	51 78	117.7	83 06.4	46 81	114.1	83 19.3	40 83	110.3	83 30.3	33 84	106.3	83 39.3	26 86	102.0	7
8	81 16.3	60 75	123.1	81 33.6	56 77	120.4	81 49.8	52 79	117.4	82 04.6	47 81	114.3	82 17.9	42 82	111.0	82 29.6	36 84	107.6	82 39.6	30 85	103.9	82 47.8	24 86	100.1	8
9	80 31.5	56 77	119.8	80 47.6	52 79	117.2	81 02.6	48 80	114.4	81 16.2	43 82	111.5	81 28.5	38 84	108.5	81 39.3	33 85	105.3	81 48.5	28 86	102.0	81 56.0	22 87	98.6	9
10	79 45.3	52 79	116.9	80 00.4	48 80	114.4	80 14.3	44 82	111.8	80 27.0	40 83	109.1	80 38.4	36 84	106.3	80 48.4	31 85	103.4	80 57.0	26 86	100.4	81 04.0	21 87	97.3	10
1	78 58.0	49 80	114.4	79 12.1	45 82	112.1	79 25.2	42 83	109.6	79 37.1	38 84	107.1	79 47.8	34 85	104.5	79 57.2	29 86	101.8	80 05.3	25 86	99.0	80 11.9	20 87	96.2	1
2	78 00.8	46 82	112.2	78 23.2	43 83	110.0	78 35.5	39 84	107.7	78 46.7	36 85	105.3	78 56.8	32 86	102.9	79 05.7	28 86	100.4	79 13.4	23 87	97.8	79 19.7	19 87	95.2	2
3	77 20.8	44 82	110.2	77 33.6	41 84	108.2	77 45.3	37 84	106.0	77 55.9	34 85	103.8	78 05.5	30 86	101.5	78 14.0	26 86	99.2	78 21.3	22 87	96.8	78 27.4	18 87	94.3	3
4	76 31.3	42 83	108.5	76 43.5	39 84	106.5	76 54.6	36 85	104.5	77 04.8	32 86	102.4	77 14.0	29 86	100.3	77 22.1	25 87	98.1	77 29.2	22 87	95.8	77 35.1	18 87	93.6	4
15	75 41.4	40 84	107.0	75 53.0	37 85	105.1	76 03.7	34 85	103.1	76 13.5	31 86	101.2	76 22.3	28 86	99.2	76 30.1	24 87	97.1	76 36.9	21 87	95.0	76 42.7	17 87	92.9	15
6	74 51.0	39 84	105.5	75 02.1	36 85	103.7	75 12.5	33 86	101.9	75 21.9	30 86	100.1	75 30.4	27 87	98.1	75 38.0	24 87	96.2	75 44.6	20 87	94.2	75 50.2	17 87	92.2	6
7	74 00.3	37 85	104.2	74 11.0	35 86	102.5	74 21.0	32 86	100.8	74 30.1	29 86	99.0	74 38.4	26 87	97.2	74 45.8	23 87	95.4	74 52.2	20 87	93.5	74 57.8	17 87	91.6	7
8	73 09.3	36 85	103.1	73 19.7	34 86	101.4	73 29.4	31 86	99.8	73 38.2	28 87	98.1	73 46.3	25 87	96.4	73 53.5	23 87	94.6	73 59.8	20 87	92.9	74 05.3	17 87	91.1	8
9	72 18.0	35 86	102.0	72 28.2	33 86	100.4	72 37.6	30 86	98.8	72 46.2	28 87	97.2	72 54.1	25 87	95.6	73 01.2	22 87	93.9	73 07.4	19 87	92.2	73 12.8	17 87	90.5	9
20	71 26.6	34 86	100.9	71 36.5	32 86	99.5	71 45.7	29 87	97.9	71 54.1	27 87	96.4	72 01.8	24 87	94.8	72 08.8	22 87	93.3	72 15.0	19 87	91.7	72 20.4	17 87	90.0	20
1	70 35.0	33 86	100.0	70 44.7	31 87	98.6	70 53.6	29 87	97.1	71 01.9	26 87	95.6	71 09.5	24 87	94.2	71 16.4	22 87	92.6	71 22.5	19 87	91.1	71 27.9	17 87	89.6	1
2	69 43.2	33 86	99.1	69 52.7	30 87	97.7	70 01.5	28 87	96.3	70 09.7	26 87	94.9	70 17.2	24 87	93.5	70 24.0	21 87	92.1	70 30.0	19 87	90.6	70 35.4	17 87	89.1	2
3	68 51.4	32 87	98.2	69 00.7	30 87	97.0	69 09.3	28 87	95.6	69 17.4	26 87	94.3	69 24.8	24 87	92.9	69 31.5	21 87	91.5	69 37.6	19 87	90.1	69 43.0	17 87	88.7	3
4	67 59.4	31 87	97.5	68 08.5	29 87	96.2	68 17.1	27 87	94.9	68 25.0	25 87	93.6	68 32.3	23 87	92.3	68 39.0	21 87	91.0	68 45.1	19 87	89.6	68 50.5	17 87	88.3	4
25	67 07.3	31 87	96.7	67 16.3	29 87	95.5	67 24.8	27 87	94.3	67 32.6	25 87	93.0	67 39.9	23 87	91.7	67 46.6	21 87	90.5	67 52.6	19 87	89.2	67 58.1	17 87	87.8	25
6	66 15.2	31 87	96.0	66 24.1	29 87	94.8	66 32.4	27 87	93.6	66 40.2	25 87	92.4	66 47.4	23 87	91.2	66 54.1	21 87	90.0	67 00.2	19 87	88.7	67 05.6	17 87	87.4	6
7	65 22.9	30 87	95.4	65 31.8	28 87	94.2	65 40.0	27 87	93.0	65 47.8	25 87	91.9	65 55.0	23 87	90.7	66 01.6	21 87	89.5	66 07.7	19 87	88.3	66 13.2	17 87	87.1	7
8	64 30.7	30 87	94.7	64 39.4	28 87	93.6	64 47.6	27 87	92.5	64 55.3	25 87	91.3	65 02.5	23 87	90.2	65 09.1	21 87	89.0	65 15.2	19 87	87.9	65 20.8	18 87	86.7	8
9	63 38.3	30 87	94.1	63 47.0	28 87	93.0	63 55.2	26 87	91.9	64 02.8	25 87	90.8	64 10.0	23 87	89.7	64 16.7	21 87	88.6	64 22.8	20 87	87.4	64 28.4	18 87	86.3	9
30	62 46.0	29 87	93.5	62 54.6	28 87	92.4	63 02.7	26 87	91.4	63 10.4	25 87	90.3	63 17.5	23 87	89.2	63 24.2	21 87	88.1	63 30.4	20 87	87.0	63 36.1	18 87	85.9	30
1	61 53.6	29 87	92.9	62 02.2	28 87	91.9	62 10.3	26 87	90.9	62 17.9	25 87	89.8	62 25.1	23 87	88.8	62 31.8	22 87	87.7	62 38.0	20 87	86.7	62 43.7	18 87	85.6	1
2	61 01.2	29 87	92.3	61 09.7	28 87	91.4	61 17.8	26 87	90.4	61 25.4	25 87	89.3	61 32.6	23 87	88.3	61 39.3	22 87	87.3	61 45.6	20 87	86.3	61 51.4	19 87	85.2	2
3	60 08.7	29 87	91.8	60 17.2	28 87	90.8	60 25.3	26 87	89.9	60 33.0	25 87	88.9	60 40.2	23 87	87.9	60 46.9	22 87	86.9	60 53.3	20 87	85.9	60 59.1	19 87	84.9	3
4	59 16.3	29 87	91.3	59 24.8	28 87	90.3	59 32.8	26 87	89.4	59 40.5	25 87	88.4	59 47.7	23 87	87.5	59 54.5	22 87	86.5	60 00.9	21 87	85.5	60 06.9	19 87	84.5	4
35	58 23.8	29 87	90.8	58 32.3	28 87	89.9	58 40.4	26 87	88.9	58 48.0	25 87	88.0	58 55.3	24 87	87.1	59 02.2	22 87	86.1	59 08.6	21 87	85.2	59 14.7	19 87	84.2	35
6	57 31.3	29 87	90.3	57 39.8	28 87	89.4	57 47.9	26 87	88.5	57 55.6	25 87	87.6	58 02.9	24 87	86.7	58 09.8	22 87	85.7	58 16.4	21 87	84.8	58 22.5	20 87	83.9	6
7	56 38.8	29 87	89.8	56 47.3	28 87	88.9	56 55.4	26 87	88.0	57 03.2	25 87	87.1	57 10.5	24 87	86.3	57 17.5	23 87	85.4	57 24.1	21 87	84.5	57 30.3	20 87	83.5	7
8	55 46.4	29 87	89.3	55 54.9	28 87	88.5	56 03.0	26 87	87.6	56 10.8	25 87	86.7	56 18.2	24 87	85.9	56 25.2	23 87	85.0	56 31.9	22 87	84.1	56 38.2	20 87	83.2	8
9	54 53.9	29 87	88.8	55 02.4	28 87	88.0	55 10.6	27 87	87.2	55 18.4	25 87	86.3	55 25.9	24 87	85.5	55 33.0	23 87	84.6	55 39.7	22 87	83.8	55 46.1	21 87	82.9	9
40	54 01.4	29 87	88.4	54 10.0	28 87	87.6	54 18.2	27 87	86.8	54 26.0	26 87	85.9	54 33.6	25 87	85.1	54 40.7	23 87	84.3	54 47.6	22 87	83.4	54 54.0	21 87	82.6	40
1	53 09.0	29 87	87.9	53 17.6	28 87	87.1	53 25.8	27 87	86.3	53 33.7	26 87	85.5	53 41.3	25 87	84.7	53 48.5	24 87	83.9	53 55.4	22 87	83.1	54 02.0	21 87	82.2	1
2	52 16.6	29 87	87.5	52 25.2	28 87	86.7	52 33.4	27 87	85.9	52 41.4	26 87	85.1	52 49.1	25 87	84.3	52 56.4	24 87	83.5	53 03.4	23 87	82.7	53 10.0	22 86	81.9	2
3	51 24.1	29 87	87.1	51 32.8	28 87	86.3	51 41.1	27 87	85.5	51 49.1	26 87	84.8	51 56.8	25 87	84.0	52 04.3	24 87	83.2	52 11.3	23 87	82.4	52 18.1	22 86	81.6	3
4	50 31.7	29 87	86.6	50 40.4	28 87	85.9	50 48.8	27 87	85.1	50 56.9	26 87	84.4	51 04.7	25 87	83.6	51 12.2	24 87	82.8	51 19.3	23 87	82.1	51 26.2	22 86	81.3	4
45	49 39.4	30 87	86.2	49 48.1	29 87	85.5	49 56.5	28 87	84.7	50 04.7	27 87	84.0	50 12.5	26 87	83.2	50 20.1	25 87	82.5	50 27.4	24 86	81.7	50 34.4	23 86	81.0	45
6	48 47.0	30 87	85.8	48 55.8	29 87	85.1	49 04.3	28 87	84.4	49 12.5	27 87	83.6	49 20.5	26 87	82.9	49 28.1	25 87	82.1	49 35.5	24 86	81.4	49 42.6	23 86	80.6	6
7	47 54.7	30 87	85.4	48 03.5	29 87	84.7	48 12.1	28 87	84.0	48 20.4	27 87	83.3	48 28.4	26 87	82.5	48 36.1	25 86	81.8	48 43.6	24 86	81.1	48 50.8	23 86	80.3	7
8	47 02.4	30 87	85.0	47 11.3	29 87	84.3	47 19.9	28 87	83.6	47 28.3	27 87	82.9	47 36.4	27 87	82.2	47 44.2	26 86	81.5	47 51.8	25 86	80.7	47 59.1	24 86	80.0	8
9	46 10.1	30 87	84.6	46 19.1	29 87	83.9	46 27.8	29 87	83.2	46 36.2	28 87	82.5	46 44.4	27 86	81.8	46 52.4	26 86	81.1	47 00.0	25 86	80.4	47 07.4	24 86	79.7	9
50	45 17.9	30 87	84.2	45 26.9	30 87	83.5	45 35.7	29 87	82.8	45 44.2	28 87	82.2	45 52.5	27 86	81.5	46 00.5	26 86	80.8	46 08.3	26 86	80.1	46 15.8	25 86	79.4	50
1	44 25.7	31 87	83.8	44 34.8	30 87	83.1	44 43.6	29 87	82.5	44 52.3	28 87	81.8	45 00.6	28 86	81.1	45 08.8	27 86	80.4	45 16.6	26 86	79.7	45 24.3	25 86	79.1	1
2	43 33.6	31 87	83.4	43 42.7	30 87	82.8	43 51.6	29 86	82.1	44 00.3	29 86	81.4	44 08.8	28 86	80.8	44 17.0	27 86	80.1	44 25.0	26 86	79.4	44 32.8	25 86	78.7	2
3	42 41.5	31 87	83.0	42 50.7	30 87	82.4	42 59.7	30 86	81.7	43 08.5	29 86	81.1	43 17.0	28 86	80.4	43 25.4	27 86	79.8	43 33.5	27 86	79.1	43 41.4	26 86	78.4	3
4	41 49.4	31 87	82.6	41 58.7	31 86	82.0	42 07.8	30 86	81.4	42 16.7	29 86	80.7	42 25.3	29 86	80.1	42 33.8	28 86	79.4	42 42.0	27 86	78.8	42 50.0	26 86	78.1	4
55	40 57.4	32 87	82.3	41 06.8	31 86	81.6	41 15.9	30 86	81.0	41 24.9	30 86	80.4	41 33.7	29 86	79.7	41 42.2	28 86	79.1	41 50.5	27 86	78.4	41 58.7	27 86	77.8	55
6	40 05.4	32 86	81.9	40 14.9	31 86	81.3	40 24.1	31 86	80.6	40 33.2	30 86	80.0	40 42.1	29 86	79.4	40 50.7	28 86	78.7	40 59.2	28 86	78.1	41 07.4	27 85	77.5	6
7	39 13.5	32 86	81.5	39 23.0	32 86	80.9	39 32.4	31 86	80.3	39 41.5	30 86	79.7	39 50.5	30 86	79.0	39 59.3	29 86	78.4	40 07.8	28 85	77.8	40 16.2	28 85	77.2	7
8	38 21.6	32 86	81.1	38 31.2	32 86	80.5	38 40.7	31 86	79.9	38 49.9	31 86	79.3	38 59.0	30 86	78.7	39 07.9	29 86	78.1	39 16.6	29 85	77.5	39 25.1	28 85	76.8	8
9	37 29.8	33 86	80.7	37 39.5	32 86	80.1	37 49.0	32 86	79.5	37 58.4	31 86	78.9	38 07.6	30 86	78.3	38 16.6	30 86	77.7	38 25.4	29 85	77.1	38 34.0	28 85	76.5	9
60	36 38.0	33 86	80.4	36 47.8	32 86	79.8	36 57.5	32 86	79.2	37 06.9	31 86	78.6	37 16.2	31 86	78.0	37 25.3	30 85	77.4	37 34.3	29 85	76.8	37 43.0	29 85	76.2	60
1	35 46.3	33 86	80.0	35 56.2	33 86	79.4	36 06.0	32 86	78.8	36 15.5	32 86	78.2	36 24.9	31 85	77.6	36 34.2	30 85	77.1	36 43.2	30 85	76.5	36 52.1	29 85	75.9	1
2	34 54.6	34 86	79.6	35 04.7	33 86	79.0	35 14.5	33 86	78.5	35 24.2	32 86	77.9	35 33.7	31 85	77.3	35 43.0	31 85	76.7	35 52.2	30 85	76.1	36 01.2	30 84	75.5	2
3	34 03.1	34 86	79.2	34 13.2	33 86	78.7	34 23.1	33 86	78.1	34 32.9	32 85	77.5	34 42.5	32 85	77.0	34 52.0	31 85	76.4	35 01.3	31 85	75.8	35 10.5	30 84	75.2	3
4	33 11.5	34 86	78.9	33 21.7	34 86	78.3	33 31.8	33 85	77.7	33 41.7	33 85	77.2	33 51.5	32 85	76.6	34 01.0	32 85	76.0	34 10.5	31 85	75.5	34 19.8	31 84	74.9	4
65	32 20.1	35 86	78.5	32 30.4	34 86	77.9	32 40.6	34 85	77.4	32 50.6	33 85	76.8	33 00.4	33 85	76.3	33 10.2	32 85	75.7	33 19.7	32 84	75.1	33 29.1	31 84	74.6	65
6	31 28.7	35 86	78.1	31 39.1	35 85	77.6	31 49.4	34 85	77.0	31 59.5	34 85	76.5	32 09.5	33 85	75.9	32 19.4	33 85	75.3	32 29.0	32 84	74.8	32 38.6	32 84	74.2	6
7	30 37.4	35 86	77.7	30 47.9	35 85	77.2	30 58.3	34 85	76.7	31 08.5	34 85	76.1	31 18.7	33 85	75.6	31 28.6	33 84	75.0	31 38.4	33 84	74.4	31 48.1	32 84	73.9	7
8	29 46.1	36 85	77.4	29 56.8	35 85	76.8	30 07.3	35 85	76.3	30 17.6	34 85	75.7	30 27.9	34 84	75.2	30 38.0	33 84	74.7	30 47.9	33 84	74.1	30 57.8	33 84	73.6	8
9	28 55.0	36 85	77.0	29 05.7	36 85	76.5	29 16.3	35 85	75.9	29 26.8	35 84	75.4	29 37.2	34 84	74.8	29 47.4	34 84	74.3	29 57.5	33 84	73.8	30 07.5	33 84	73.2	9
70	28 03.9	36 85	76.6	28 14.7	36 85	76.1	28 25.5	36 85	75.6	28 36.1	35 84	75.0	28 46.6	35 84	74.5	28 56.9	34 84	74.0	29 07.2	34 84	73.4	29 17.3	33 84	72.9	70
1	27 12.9	37 85	76.2	27 23.8	36 85	75.7	27 34.7	36 84	75.2	27 45.4	36 84	74.7	27 56.0	35 84	74.1	28 06.5	35 84	73.6	28 16.9	34 84	73.1	28 27.2	34 83	72.5	1
2	26 21.9	37 85	75.9	26 33.0	37 84	75.3	26 44.0	36 84	74.8	26 54.9	36 84	74.3	27 05.6	36 84	73.8	27 16.2	35 84	73.2	27 26.8	35 84	72.7	27 37.2	34 83	72.2	2
3	25 31.1	38 85	75.5	25 42.3	37 84	75.0	25 53.4	37 84	74.5	26 04.4	36 84	73.9	26 15.3	36 84	73.4	26 26.0	36 84	72.9	26 36.7	35 83	72.4	26 47.2	35 83	71.8	3
4	24 40.3	38 84	75.1	24 51.7	38 84	74.6	25 02.9	37 84	74.1	25 14.0	37 84	73.6	25 25.0	37 84	73.1	25 35.9	36 83	72.5	25 46.7	36 83	72.0	25 57.4	35 83	71.5	4
75	23 49.7	38 84	74.7	24 01.1	38 84	74.2	24 12.5	38 84	73.7	24 23.7	37 84	73.2	24 34.9	37 83	72.7	24 45.9	37 83	72.2	24 56.9	36 83	71.7	25 07.7	36 83	71.1	75
6	22 59.1	39 84	74.3	23 10.7	38 84	73.8	23 22.2	38 84	73.3	23 33.5	38 83	72.8	23 44.8	37 83	72.3	23 56.0	37 83	71.8	24 07.1	37 83	71.3	24 18.1	36 82	70.8	6
7	22 08.6	39 84	73.9	22 20.3	39 84	73.5	22 31.9	39 84	73.0	22 43.5	38 83	72.5	22 54.9	38 83	72.0	23 06.2	38 83	71.4	23 17.5	37 83	70.9	23 28.6	37 82	70.4	7
8	21 18.2	40 84	73.6	21 30.1	39 84	73.1	21 41.8	39 83	72.6	21 53.5	39 83	72.1	22 05.0	38 83	71.6	22 16.5	38 83	71.1	22 27.9	38 82	70.6	22 39.2	37 82	70.1	8
9	20 27.9	40 84	73.2	20 39.9	40 83	72.7	20 51.8	39 83	72.2	21 03.6	39 83	71.7	21 15.3	39 83	71.2	21 26.9	39 82	70.7	21 38.5	38 82	70.2	21 49.9	38 82	69.7	9
80	19 37.8	40 84	72.8	19 49.9	40 83	72.3	20 01.9	40 83	71.8	20 13.8	40 83	71.3	20 25.7	39 82	70.8	20 37.5	39 82	70.3	20 49.2	39 82	69.8	21 00.8	39 82	69.4	80
1	18 47.7	41 83	72.4	18 59.9	41 83	71.9	19 12.1	40 83	71.4	19 24.2	40 83	70.9	19 36.2	40 82	70.4	19 48.1	40 82	70.0	20 00.0	39 82	69.5	20 11.7	39 82	69.0	1
2	17 57.7	41 83	72.0	18 10.1	41 83	71.5	18 22.4	41 83	71.0	18 34.6	41 82	70.6	18 46.8	40 82	70.1	18 58.9	40 82	69.6	19 10.9	40 82	69.1	19 22.8	40 81	68.6	2
3	17 07.9	42 83	71.6	17 20.4	42 83	71.1	17 32.8	41 82	70.6	17 45.2	41 82	70.2	17 57.5	41 82	69.7	18 09.7	41 82	69.2	18 21.9	40 81	68.7	18 34.0	40 81	68.2	3
4	16 18.2	42 83	71.2	16 30.8	42 82	70.7	16 43.4	42 82	70.2	16 55.9	42 82	69.8	17 08.4	41 82	69.3	17 20.7	41 81	68.8	17 33.1	41 81	68.3	17 45.3	41 81	67.9	4
85	15 28.5	43 82	70.8	15 41.3	43 82	70.3	15 54.1	42 82	69.8	16 06.7	42 82	69.4	16 19.3	42 82	68.9	16 31.9	42 81	68.4	16 44.4	41 81	68.0	16 56.8	41 81	67.5	85
6	14 39.0	43 82	70.4	14 52.0	43 82	69.9	15 04.9	43 82	69.4	15 17.7	43 82	69.0	15 30.4	42 81	68.5	15 43.1	42 81	68.0	15 55.8	42 81	67.6	16 08.4	42 80	67.1	6
7	13 49.7	44 82	70.0	14 02.8	44 82	69.5	14 15.8	43 82	69.0	14 28.8	43 81	68.6	14 41.7	43 81	68.1	14 54.5	43 81	67.6	15 07.4	43 80	67.2	15 20.1	42 80	66.7	7
8	13 00.4	44 82	69.6	13 13.7	44 82	69.1	13 26.8	44 81	68.6	13 40.0	44 81	68.2	13 53.1	43 81	67.7	14 06.1	43 80	67.2	14 19.1	43 80	66.8	14 32.0	43 80	66.3	8
9	12 11.3	45 82	69.1	12 24.7	45 81	68.7	12 38.0	44 81	68.2	12 51.3	44 81	67.8	13 04.6	44 80	67.3	13 17.8	44 80	66.8	13 30.9	44 80	66.4	13 44.0	44 80	65.9	9
90	11 22.4	45 81	68.7	11 35.9	45 81	68.3	11 49.4	45 81	67.8	12 02.8	45 80	67.4	12 16.2	45 80	66.9	12 29.6	44 80	66.4	12 42.9	44 80	66.0	12 56.2	44 80	65.5	90

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	34 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	00
1	36 59.5	1.0 03	178.9	36 29.5	1.0 03	178.9	35 59.5	1.0 02	178.9	35 29.5	1.0 02	178.9	34 59.5	1.0 02	178.9	34 29.5	1.0 02	178.9	33 59.5	1.0 02	178.9	33 29.5	1.0 02	178.9	1
2	36 57.9	1.0 04	177.7	36 27.9	1.0 04	177.7	35 57.9	1.0 04	177.8	35 28.0	1.0 04	177.8	34 58.0	1.0 04	177.8	34 28.0	1.0 04	177.8	33 58.0	1.0 04	177.9	33 28.1	1.0 04	177.9	2
3	36 55.3	1.0 06	176.6	36 25.3	1.0 06	176.6	35 55.4	1.0 06	176.6	35 25.4	1.0 06	176.7	34 55.5	1.0 06	176.7	34 25.5	1.0 06	176.7	33 55.6	1.0 06	176.8	33 25.6	1.0 06	176.8	3
4	36 51.6	1.0 08	175.4	36 21.7	1.0 08	175.5	35 51.8	1.0 08	175.5	35 21.9	1.0 08	175.6	34 52.0	1.0 08	175.6	34 22.1	1.0 08	175.7	33 52.1	1.0 07	175.7	33 22.2	1.0 07	175.8	4
05	36 46.9	1.0 10	174.3	36 17.1	1.0 10	174.4	35 47.2	1.0 09	174.4	35 17.3	1.0 09	174.5	34 47.5	1.0 09	174.5	34 17.6	1.0 09	174.6	33 47.7	1.0 09	174.6	33 17.8	1.0 09	174.7	05
6	36 41.2	99 11	173.2	36 11.4	99 11	173.2	35 41.6	99 11	173.3	35 11.8	99 11	173.4	34 42.0	99 11	173.4	34 12.1	99 11	173.5	33 42.3	99 11	173.6	33 12.5	99 10	173.6	6
7	36 34.4	99 13	172.0	36 04.7	99 13	172.1	35 35.0	99 13	172.2	35 05.2	99 12	172.3	34 35.5	99 12	172.4	34 05.7	99 12	172.4	33 36.0	99 12	172.5	33 06.2	99 12	172.6	7
8	36 26.6	99 15	170.9	35 57.0	99 14	171.0	35 27.3	99 14	171.1	34 57.7	99 14	171.2	34 28.0	99 14	171.3	33 58.3	99 14	171.4	33 28.6	99 14	171.5	32 59.0	99 14	171.5	8
9	36 17.8	99 16	169.8	35 48.3	99 16	169.9	35 18.7	99 16	170.0	34 49.1	99 16	170.1	34 19.5	99 16	170.2	33 50.0	99 16	170.3	33 20.4	99 15	170.4	32 50.8	99 15	170.5	9
10	36 08.0	98 18	168.7	35 38.6	98 18	168.8	35 09.1	98 18	168.9	34 39.6	98 18	169.0	34 10.1	98 17	169.1	33 40.6	98 17	169.2	33 11.1	98 17	169.3	32 41.6	98 17	169.5	10
1	35 57.2	98 20	167.6	35 27.9	98 20	167.7	34 58.5	98 19	167.8	34 29.1	98 19	167.9	33 59.8	98 19	168.1	33 30.4	98 19	168.2	33 01.0	98 18	168.3	32 31.6	98 18	168.4	1
2	35 45.4	97 21	166.5	35 16.2	97 21	166.6	34 47.0	98 21	166.7	34 17.7	98 21	166.9	33 48.4	98 20	167.0	33 19.1	98 20	167.1	32 49.9	98 20	167.3	32 20.6	98 20	167.4	2
3	35 32.7	97 23	165.4	35 03.6	97 23	165.5	34 34.4	97 22	165.7	34 05.3	97 22	165.8	33 36.2	97 22	166.0	33 07.0	97 22	166.1	32 37.8	97 22	166.2	32 08.7	97 22	166.4	3
4	35 18.9	97 24	164.3	34 50.0	97 24	164.4	34 21.0	97 24	164.6	33 52.0	97 24	164.8	33 23.0	97 24	164.9	32 53.9	97 23	165.1	32 24.9	97 23	165.2	31 55.8	97 23	165.4	4
15	35 04.3	96 26	163.2	34 35.4	96 26	163.4	34 06.6	96 26	163.5	33 37.7	96 25	163.7	33 08.8	96 25	163.9	32 39.9	96 25	164.0	32 11.0	96 24	164.2	31 42.1	96 24	164.3	15
6	34 48.6	96 28	162.1	34 19.9	96 27	162.3	33 51.2	96 27	162.5	33 22.5	96 27	162.7	32 53.8	96 26	162.8	32 25.0	96 26	163.0	31 56.3	96 26	163.2	31 27.5	96 26	163.3	6
7	34 32.1	96 29	161.1	34 03.5	96 29	161.3	33 35.0	96 28	161.5	33 06.4	96 28	161.6	32 37.9	96 28	161.8	32 09.3	96 28	162.0	31 40.7	96 28	162.2	31 12.0	96 27	162.4	7
8	34 14.6	96 31	160.0	33 46.2	96 30	160.2	33 17.9	96 30	160.4	32 49.5	96 30	160.6	32 21.0	96 30	160.8	31 52.6	96 29	161.0	31 24.2	96 29	161.2	30 55.7	96 29	161.4	8
9	33 56.2	94 32	159.0	33 28.0	94 32	159.2	32 59.8	94 32	159.4	32 31.6	94 31	159.6	32 03.4	94 31	159.8	31 35.1	94 31	160.0	31 06.8	94 30	160.2	30 38.5	94 30	160.4	9
20	33 37.0	93 34	158.0	33 09.0	93 33	158.2	32 40.9	93 33	158.4	32 12.9	94 33	158.6	31 44.8	94 32	158.8	31 16.7	94 32	159.0	30 48.6	94 32	159.2	30 20.5	94 32	159.4	20
1	33 16.9	93 35	156.9	32 49.0	93 34	157.2	32 21.2	93 34	157.4	31 53.3	93 34	157.6	31 25.4	93 34	157.8	30 57.5	93 33	158.0	30 29.6	93 33	158.2	30 01.6	93 33	158.5	1
2	32 55.9	92 36	155.9	32 28.3	92 36	156.2	32 00.6	92 36	156.4	31 32.9	92 35	156.6	31 05.2	92 35	156.8	30 37.5	92 35	157.1	30 09.7	93 34	157.3	29 42.0	93 34	157.5	2
3	32 34.1	91 38	154.9	32 06.6	91 37	155.2	31 39.2	92 37	155.4	31 11.7	92 37	155.7	30 44.2	92 36	155.9	30 16.6	92 36	156.1	29 49.1	92 36	156.3	29 21.5	92 36	156.6	3
4	32 11.4	91 39	154.0	31 44.2	91 39	154.2	31 16.9	91 38	154.4	30 49.6	91 38	154.7	30 22.3	91 38	154.9	29 55.0	91 37	155.2	29 27.6	91 37	155.4	29 00.2	91 37	155.6	4
25	31 48.0	90 40	153.0	31 21.0	90 40	153.2	30 53.9	90 40	153.5	30 26.8	90 39	153.7	29 59.7	90 39	154.0	29 32.6	91 39	154.2	29 05.4	91 38	154.5	28 38.2	91 38	154.7	25
6	31 23.8	89 42	152.0	30 56.9	89 41	152.3	30 30.1	90 41	152.5	30 03.2	90 41	152.8	29 36.3	90 40	153.1	29 09.4	90 40	153.3	28 42.4	90 40	153.6	28 15.4	90 39	153.8	6
7	30 58.8	89 43	151.1	30 32.2	89 43	151.3	30 05.5	89 42	151.6	29 38.8	89 42	151.9	29 12.1	89 42	152.1	28 45.4	89 41	152.4	28 18.7	89 41	152.6	27 51.9	89 40	152.9	7
8	30 33.0	88 44	150.1	30 06.6	88 44	150.4	29 40.2	88 44	150.7	29 13.7	88 43	151.0	28 47.2	88 43	151.2	28 20.7	88 42	151.5	27 54.2	89 42	151.7	27 27.6	89 42	152.0	8
9	30 06.5	87 45	149.2	29 40.3	87 45	149.5	29 14.1	87 45	149.8	28 47.9	88 44	150.0	28 21.6	88 44	150.3	27 55.3	88 44	150.6	27 29.0	88 43	150.9	27 02.6	88 43	151.1	9
30	29 39.3	86 46	148.3	29 13.3	87 46	148.6	28 47.3	87 46	148.9	28 21.3	87 45	149.1	27 55.3	87 45	149.4	27 29.2	87 45	149.7	27 03.1	87 44	150.0	26 36.9	87 44	150.3	30
1	29 11.3	86 48	147.4	28 45.6	86 47	147.7	28 19.9	86 47	148.0	27 54.1	86 47	148.3	27 28.2	86 46	148.6	27 02.4	86 46	148.8	26 36.5	86 46	149.1	26 10.6	86 45	149.4	1
2	28 42.7	85 49	146.5	28 17.2	85 48	146.8	27 51.7	85 48	147.1	27 26.1	85 48	147.4	27 00.5	85 47	147.7	26 34.9	86 47	148.0	26 09.2	86 46	148.3	25 43.5	86 46	148.5	2
3	28 13.4	84 50	145.6	27 48.2	84 50	145.9	27 22.9	84 49	146.2	26 57.5	85 49	146.5	26 32.1	85 48	146.8	26 06.7	85 48	147.1	25 41.3	85 48	147.4	25 15.8	85 47	147.7	3
4	27 43.4	83 51	144.8	27 18.4	83 50	145.1	26 53.4	84 50	145.4	26 28.2	84 50	145.7	26 03.1	84 50	146.0	25 37.9	84 49	146.3	25 12.7	84 49	146.6	24 47.4	84 48	146.9	4
35	27 12.8	83 52	143.9	26 48.1	83 52	144.2	26 23.2	83 51	144.5	25 58.3	83 51	144.8	25 33.4	83 50	145.1	25 08.5	83 50	145.5	24 43.5	83 50	145.8	24 18.5	83 49	146.1	35
6	26 41.6	82 53	143.1	26 17.1	82 53	143.4	25 52.5	82 52	143.7	25 27.8	82 52	144.0	25 03.1	82 52	144.3	24 38.4	82 51	144.6	24 13.7	83 51	144.9	23 48.9	83 50	145.3	6
7	26 09.8	81 54	142.2	25 45.4	81 54	142.6	25 21.1	81 53	142.9	24 56.7	81 53	143.2	24 32.2	82 52	143.5	24 07.7	82 52	143.8	23 43.2	82 52	144.1	23 18.6	82 51	144.5	7
8	25 37.3	80 55	141.4	25 13.2	80 54	141.7	24 49.1	81 54	142.1	24 24.9	81 54	142.4	24 00.7	81 54	142.7	23 36.5	81 53	143.0	23 12.2	81 53	143.4	22 47.9	81 52	143.7	8
9	25 04.3	79 56	140.6	24 40.5	80 56	140.9	24 16.6	80 55	141.3	23 52.6	80 55	141.6	23 28.7	80 54	141.9	23 04.6	80 54	142.3	22 40.6	80 54	142.6	22 16.5	80 53	142.9	9
40	24 30.7	79 57	139.8	24 07.1	79 56	140.1	23 43.5	79 56	140.5	23 19.8	79 56	140.8	22 56.0	79 55	141.1	22 32.2	79 55	141.5	22 08.4	79 54	141.8	21 44.5	80 54	142.1	40
1	23 56.6	78 58	139.0	23 33.2	78 57	139.4	23 09.8	78 57	139.7	22 46.3	78 56	140.0	22 22.8	78 56	140.4	21 59.3	79 56	140.7	21 35.7	79 55	141.1	21 12.1	79 55	141.4	1
2	23 21.9	77 59	138.2	22 58.8	77 58	138.6	22 35.6	77 58	138.9	22 12.4	77 58	139.3	21 49.1	78 57	139.6	21 25.8	78 57	140.0	21 02.4	78 56	140.3	20 39.0	78 56	140.6	2
3	22 46.7	76 60	137.5	22 23.8	76 59	137.8	22 00.9	77 59	138.2	21 37.9	77 58	138.5	21 14.8	77 58	138.9	20 51.8	77 58	139.2	20 28.6	77 57	139.6	20 05.5	77 57	139.9	3
4	22 11.0	75 60	136.7	21 48.3	76 60	137.1	21 25.6	76 60	137.4	21 02.9	76 59	137.8	20 40.1	76 59	138.1	20 17.2	76 58	138.5	19 54.4	76 58	138.8	19 31.4	76 58	139.2	4
45	21 34.8	75 61	136.0	21 12.3	75 61	136.4	20 49.9	75 60	136.7	20 27.4	75 60	137.1	20 04.8	75 60	137.4	19 42.2	75 59	137.8	19 19.6	76 59	138.1	18 56.9	76 58	138.5	45
6	20 58.1	74 62	135.3	20 35.9	74 62	135.6	20 13.7	74 61	136.0	19 51.4	74 61	136.3	19 29.0	74 60	136.7	19 06.7	75 60	137.1	18 44.3	75 60	137.4	18 21.8	75 59	137.8	6
7	20 20.9	73 63	134.6	19 59.0	73 62	134.9	19 37.0	73 62	135.3	19 14.9	74 62	135.6	18 52.8	74 61	136.0	18 30.7	74 61	136.4	18 08.5	74 60	136.7	17 46.3	74 60	137.1	7
8	19 43.3	72 64	133.8	19 21.6	72 63	134.2	18 59.8	73 63	134.6	18 38.0	73 62	134.9	18 16.1	73 62	135.3	17 54.2	73 62	135.7	17 32.3	73 61	136.0	17 10.3	73 61	136.4	8
9	19 05.2	72 64	133.1	18 43.7	72 64	133.5	18 22.2	72 63	133.9	18 00.6	72 63	134.3	17 39.0	72 63	134.6	17 17.3	72 62	135.0	16 55.7	72 62	135.3	16 33.9	72 61	135.7	9
50	18 26.7	71 65	132.5	18 05.5	71 64	132.8	17 44.2	71 64	133.2	17 22.8	71 64	133.6	17 01.4	71 63	133.9	16 40.0	71 63	134.3	16 18.5	72 62	134.7	15 57.1	72 62	135.0	50
1	17 47.8	70 66	131.8	17 26.8	70 65	132.2	17 05.7	70 65	132.5	16 44.6	70 64	132.9	16 23.4	71 64	133.3	16 02.2	71 64	133.6	15 41.0	71 63	134.0	15 19.8	71 63	134.4	1
2	17 08.5	69 66	131.1	16 47.7	69 66	131.5	16 26.8	70 66	131.9	16 05.9	70 65	132.2	15 45.0	70 65	132.6	15 24.1	70 64	133.0	15 03.1	70 64	133.4	14 42.0	70 64	133.7	2
3	16 28.7	69 67	130.5	16 08.2	69 66	130.8	15 47.5	69 66	131.2	15 26.9	69 66	131.6	15 06.2	69 65	132.0	14 45.5	69 65	132.3	14 24.7	69 64	132.7	14 03.9	69 64	133.1	3
4	15 48.6	68 68	129.8	15 28.3	68 67	130.2	15 07.9	68 67	130.6	14 47.5	68 66	131.0	14 27.0	68 66	131.3	14 06.5	68 66	131.7	13 46.0	68 65	132.1	13 25.4	69 65	132.5	4
55	15 08.1	67 68	129.2	14 48.0	67 68	129.6	14 27.8	67 67	129.9	14 07.6	67 67	130.3	13 47.4	68 67	130.7	13 27.1	68 66	131.1	13 06.8	68 66	131.5	12 46.5	68 66	131.8	55
6	14 27.3	66 69	128.5	14 07.4	66 68	128.9	13 47.4	67 68	129.3	13 27.4	67 68	129.7	13 07.4	67 67	130.1	12 47.4	67 67	130.5	12 27.3	67 66	130.8	12 07.2	67 66	131.2	6
7	13 46.0	66 69	127.9	13 26.4	66 69	128.3	13 06.6	66 68	128.7	12 46.9	66 68	129.1	12 27.1	66 68	129.5	12 07.3	66 68	129.9	11 47.4	66 67	130.2	11 27.5	66 67	130.6	7
8	13 04.5	65 70	127.3	12 45.0	65 70	127.7	12 25.5	65 69	128.1	12 06.0	65 69	128.5	11 46.4	65 68	128.9	11 26.8	65 68	129.3	11 07.2	65 68	129.6	10 47.5	66 67	130.0	8
9	12 22.6	64 70	126.7	12 03.3	64 70	127.1	11 44.0	64 70	127.5	11 24.7	64 69	127.9	11 05.4	65 69	128.3	10 46.0	65 68	128.7	10 26.6	65 68	129.0	10 07.2	65 68	129.4	9
60	11 40.3	63 71	126.1	11 21.3	63 70	126.5	11 02.2	64 70	126.9	10 43.1	64 70	127.3	10 24.0	64 70	127.7	10 04.9	64 69	128.1	9 45.7	64 69	128.5	9 26.5	64 68	128.9	60
1	10 57.8	63 72	125.5	10 39.0	63 71	125.9	10 20.1	63 71	126.3	10 01.2	63 70	126.7	9 42.3	63 70	127.1	9 23.4	63 70	127.5	9 04.4	63 69	127.9	8 45.5	63 69	128.3	1
2	10 14.9	62 72	124.9	9 56.3	62 72	125.3	9 37.7	62 71	125.7	9 19.0	62 71	126.1	9 00.3	62 70	126.5	8 41.6	62 70	126.9	8 22.9	63 70	127.3	8 04.1	63 70	127.7	2
3	9 31.8	61 72	124.4	9 13.4	61 72	124.8	8 54.9	61 72	125.2	8 36.5	62 72	125.6	8 18.0	62 71	126.0	7 59.5	62 71	126.4	7 41.0	62 70	126.8	7 22.4	62 70	127.2	3
4	8 48.3	61 73	123.8	8 30.1	61 72	124.2	8 11.9	61 72	124.6	7 53.6	61 72	125.0	7 35.4	61 72	125.4	7 17.1	61 71	125.8	6 58.8	61 71	126.2	6 40.5	61 70	126.6	4
65	8 04.6	60 73	123.3	7 46.6	60 73	123.7	7 28.6	60 73	124.1	7 10.5	60 72	124.5	6 52.5	60 72	124.9	6 34.4	60 72	125.3	6 16.3	60 71	125.7	5 58.2	60 71	126.1	65
6	7 20.5	59 74	122.7	7 02.7	59 73	123.1	6 44.9	59 73	123.5	6 27.1	59 73	123.9	6 09.3	60 72	124.3	5 51.4	60 72	124.7	5 33.5	60 72	125.1	5 15.6	60 71	125.5	6
7	6 36.2	59 74	122.2	6 18.7	59 74	122.6	6 01.1	59 74	123.0	5 43.4	59 73	123.4	5 25.8	59 73	123.8										7
8	5 51.7	58 75	121.6	5 34.3	58 74	122.0	5 16.9	58 74	122.4																8
9	5 06.9	57 75	121.1																						9

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′			24° 30′			25° 00′			25° 30′			26° 00′			26° 30′			27° 00′			27° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	10 33.5	46 81	68.3	10 47.2	46 81	67.8	11 00.9	45 81	67.4	11 14.5	45 80	66.9	11 28.0	45 80	66.5	11 41.6	45 80	66.0	11 55.0	45 80	65.6	12 08.5	45 79	65.1	91
2	9 44.8	46 81	67.9	9 58.7	46 81	67.4	10 12.5	46 80	67.0	10 26.3	46 80	66.5	10 40.0	46 80	66.1	10 53.7	46 80	65.6	11 07.3	45 79	65.2	11 20.9	45 79	64.7	2
3	8 56.3	47 81	67.4	9 10.3	47 80	67.0	9 24.3	47 80	66.5	9 38.2	46 80	66.1	9 52.1	46 80	65.6	10 06.0	46 79	65.2	10 19.8	46 79	64.7	10 33.6	46 79	64.3	3
4	8 07.9	47 80	67.0	8 22.1	47 80	66.6	8 36.2	47 80	66.1	8 50.3	47 80	65.7	9 04.4	47 79	65.2	9 18.4	47 79	64.8	9 32.4	47 79	64.3	9 46.4	47 78	63.9	4
95	7 19.7	48 80	66.6	7 34.0	48 80	66.1	7 48.3	48 80	65.7	8 02.6	48 79	65.2	8 16.8	47 79	64.8	8 31.0	47 79	64.4	8 45.2	47 78	63.9	8 59.3	47 78	63.5	95
6	6 31.6	48 80	66.1	6 46.1	48 80	65.7	7 00.6	48 79	65.2	7 15.0	48 79	64.8	7 29.4	48 79	64.4	7 43.8	48 78	63.9	7 58.2	48 78	63.5	8 12.5	48 78	63.0	6
7	5 43.7	49 80	65.7	5 58.4	49 79	65.2	6 13.0	49 79	64.8	6 27.6	49 79	64.4	6 42.2	49 78	63.9	6 56.7	49 78	63.5	7 11.3	48 78	63.0	7 25.8	48 78	62.6	7
8				5 10.8	49 79	64.8	5 25.6	49 79	64.4	5 40.4	49 78	63.9	5 55.1	49 78	63.5	6 09.9	49 78	63.0	6 24.6	49 78	62.6	6 39.3	49 77	62.2	8
9													5 08.3	50 78	63.0	5 23.2	50 78	62.6	5 38.1	50 77	62.2	5 53.0	50 77	61.7	9
100																						5 06.9	50 77	61.3	100

Lat. 29°

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	′	Δd Δt	°	°
00	89 00.0	1.0 33	180.0	89 30.0	1.0 51	180.0	90 00.0	.. 87	....	89 00.0	1.0 32	00.0	87 00.0	1.0 12	00.0	85 00.0	1.0 07	00.0	84 30.0	1.0 06	00.0	83 30.0	1.0 06	00.0	00
1	88 40.1	75 69	138.5	88 59.4	50 81	119.5	89 07.5	00 87	89.8	88 40.4	75 68	40.8	86 52.7	96 34	15.8	84 55.7	98 21	09.4	84 26.1	99 19	08.5	83 26.7	99 16	07.2	1
2	87 58.7	50 80	119.2	88 10.6	28 85	105.4	88 15.0	01 87	89.5	87 59.6	49 79	59.6	86 32.4	86 50	29.4	84 43.1	94 33	18.3	84 14.6	95 30	16.7	83 17.0	97 26	14.1	2
3	87 10.8	37 84	110.1	87 19.4	20 86	100.0	87 22.6	01 87	89.3	87 12.2	35 83	68.3	86 02.4	75 61	40.0	84 23.1	88 44	26.3	83 56.3	90 40	24.1	83 01.4	93 35	20.5	3
4	86 20.7	29 85	104.9	86 27.5	16 87	97.1	86 30.1	02 87	89.0	86 22.7	26 84	73.0	85 25.9	64 68	48.0	83 56.9	82 52	33.3	83 32.1	84 48	30.7	82 40.5	88 43	26.4	4
05	85 29.6	24 86	101.6	85 35.3	13 87	95.3	85 37.6	02 87	88.8	85 32.1	20 85	75.8	84 45.1	55 73	53.9	83 25.9	75 58	39.2	83 03.0	78 55	36.4	82 14.9	82 49	31.7	05
6	84 38.0	21 86	99.3	84 43.0	12 87	94.0	84 45.2	03 87	88.5	84 41.0	16 86	77.7	84 01.5	49 76	58.4	82 51.0	68 63	44.1	82 30.1	71 60	41.3	81 45.5	77 54	36.4	6
7	83 46.1	19 87	97.6	83 50.6	11 87	93.0	83 52.7	03 87	88.3	83 49.6	13 86	79.0	83 16.0	42 78	61.8	82 13.1	62 67	48.3	81 54.0	65 64	45.5	81 12.8	72 59	40.5	7
8	82 54.0	17 87	96.2	82 58.2	10 87	92.1	83 00.3	03 87	88.1	82 58.0	11 86	79.9	82 29.1	37 80	64.5	81 32.9	56 70	51.7	81 15.4	60 68	49.0	80 37.5	66 62	44.1	8
9	82 01.8	16 87	95.0	82 05.7	10 87	91.5	82 07.8	04 87	87.8	82 06.3	09 86	80.5	81 41.3	32 81	66.6	80 50.8	51 72	54.6	80 34.9	55 70	52.0	80 00.0	62 66	47.2	9
10	81 09.5	15 87	94.1	81 13.3	10 87	90.8	81 15.4	04 87	87.6	81 14.5	07 86	81.0	80 52.9	29 82	68.3	80 07.4	46 74	57.1	79 52.9	50 72	54.5	79 20.6	57 68	49.9	10
1	80 17.1	15 87	93.3	80 20.8	10 87	90.3	80 23.0	05 87	87.3	80 22.7	06 86	81.3	80 03.9	25 82	69.7	79 22.8	42 76	59.1	79 09.5	46 74	56.7	78 39.8	53 70	52.2	1
2	79 24.7	14 87	92.5	79 28.3	10 87	89.8	79 30.5	05 87	87.1	79 30.8	04 86	81.6	79 14.5	23 83	70.8	78 37.4	39 77	60.9	78 25.2	42 75	58.6	77 57.8	49 72	54.3	2
3	78 32.3	14 87	91.9	78 35.8	10 87	89.4	78 38.1	06 87	86.8	78 38.8	03 86	81.8	78 24.8	20 83	71.8	77 51.2	35 78	62.4	77 40.0	39 76	60.2	77 14.7	45 73	56.0	3
4	77 39.8	14 87	91.3	77 43.4	10 87	88.9	77 45.8	06 87	86.6	77 46.9	02 87	81.9	77 34.8	18 84	72.5	77 04.4	32 79	63.7	76 54.1	36 77	61.6	76 30.8	42 74	57.6	4
15	76 47.3	14 87	90.7	76 50.9	10 87	88.5	76 53.4	06 87	86.3	76 54.9	01 87	81.9	76 44.7	16 84	73.2	76 17.1	30 80	64.8	76 07.7	33 78	62.8	75 46.1	39 76	59.0	15
6	75 54.8	14 87	90.2	75 58.4	10 87	88.2	76 01.0	07 87	86.1	76 03.0	00 87	82.0	75 54.3	14 84	73.7	75 29.4	27 80	65.8	75 20.8	30 79	63.9	75 00.8	36 76	60.2	6
7	75 02.4	14 87	89.7	75 06.0	10 87	87.8	75 08.7	07 87	85.9	75 11.0	01 87	82.0	75 03.9	12 84	74.2	74 41.4	25 80	66.6	74 33.5	28 80	64.8	74 15.0	34 77	61.3	7
8	74 09.9	14 87	89.3	74 13.6	11 87	87.4	74 16.3	08 87	85.6	74 19.1	01 87	81.9	74 13.4	11 84	74.5	73 53.1	23 81	67.4	73 45.8	26 80	65.6	73 28.8	31 78	62.2	8
9	73 17.4	14 87	88.8	73 21.2	11 87	87.1	73 24.0	08 87	85.4	73 27.1	02 86	81.9	73 22.8	09 84	74.9	73 04.5	21 81	68.0	72 57.9	24 80	66.3	72 42.2	29 78	63.1	9
20	72 25.0	14 87	88.4	72 28.8	11 87	86.8	72 31.7	09 87	85.1	72 35.2	03 86	81.8	72 32.1	08 85	75.1	72 15.8	19 82	68.6	72 09.7	22 81	66.9	71 55.3	27 79	63.8	20
1	71 32.5	14 87	88.0	71 36.4	12 87	86.4	71 39.4	09 87	84.9	71 43.2	04 86	81.7	71 41.3	07 85	75.3	71 26.9	17 82	69.0	71 21.3	20 81	67.5	71 08.1	25 79	64.5	1
2	70 40.1	14 87	87.6	70 44.0	12 87	86.1	70 47.2	09 87	84.6	70 51.3	04 86	81.6	70 50.6	06 85	75.5	70 37.8	16 82	69.4	70 32.8	18 81	68.0	70 20.6	23 80	65.0	2
3	69 47.7	13 87	87.2	69 51.7	12 87	85.8	69 55.0	10 87	84.4	69 59.4	05 86	81.5	69 59.7	05 85	75.6	69 48.6	14 82	69.8	69 44.1	16 82	68.4	69 32.9	21 80	65.6	3
4	68 55.2	13 87	86.9	68 59.3	12 87	85.5	69 02.7	10 87	84.1	69 07.5	06 86	81.3	69 08.9	03 85	75.7	68 59.3	13 82	70.1	68 55.2	15 82	68.7	68 45.0	19 80	66.0	4
25	68 02.9	13 87	86.5	68 07.0	13 87	85.2	68 10.6	11 87	83.9	68 15.7	06 86	81.2	68 18.0	02 85	75.8	68 09.9	11 82	70.4	68 06.2	13 82	69.1	67 57.0	17 80	66.4	25
6	67 10.5	13 87	86.2	67 14.7	13 87	84.9	67 18.4	11 87	83.6	67 23.8	07 86	81.0	67 27.2	01 85	75.8	67 20.4	10 82	70.6	67 17.2	12 82	69.3	67 08.9	16 80	66.8	6
7	66 18.1	13 87	85.8	66 22.5	14 87	84.6	66 26.2	12 87	83.4	66 32.0	08 86	80.9	66 36.3	00 85	75.8	66 30.9	09 83	70.8	66 28.1	11 82	69.6	66 20.6	14 81	67.1	7
8	65 25.8	13 87	85.5	65 30.3	14 87	84.3	65 34.1	12 87	83.1	65 40.2	08 86	80.7	65 45.4	00 85	75.8	65 41.3	08 83	71.0	65 38.8	09 82	69.8	65 32.2	13 81	67.4	8
9	64 33.5	13 87	85.2	64 38.1	14 87	84.0	64 42.1	12 87	82.9	64 48.4	09 86	80.5	64 54.5	01 85	75.8	64 51.7	08 83	71.1	64 49.6	08 82	69.9	64 43.7	12 81	67.6	9
30	63 41.2	13 87	84.8	63 45.9	15 87	83.7	63 50.0	13 87	82.6	63 56.7	09 86	80.3	64 03.6	02 85	75.8	64 02.0	06 83	71.2	64 00.3	07 82	70.1	63 55.2	10 81	67.8	30
1	62 49.0	13 87	84.5	62 53.7	15 87	83.4	62 58.0	13 87	82.3	63 05.0	10 86	80.2	63 12.8	03 85	75.7	63 12.3	04 83	71.3	63 10.9	06 82	70.2	63 06.5	09 81	68.0	1
2	61 56.8	13 87	84.2	62 01.6	15 87	83.1	62 06.0	14 87	82.1	62 13.3	11 86	80.0	62 21.9	04 85	75.7	62 22.6	03 83	71.4	62 21.5	04 82	70.3	62 17.9	08 81	68.1	2
3	61 04.6	13 87	83.9	61 09.5	16 87	82.9	61 14.0	14 86	81.8	61 21.6	11 86	79.8	61 31.1	05 85	75.6	61 32.9	02 83	71.4	61 32.1	03 82	70.3	61 29.1	07 81	68.3	3
4	60 12.4	13 87	83.6	60 17.5	16 87	82.6	60 22.1	15 86	81.6	60 30.0	12 86	79.6	60 40.3	05 85	75.5	60 43.1	01 83	71.4	60 42.7	02 82	70.4	60 40.4	05 81	68.4	4
35	59 20.3	13 87	83.2	59 25.5	17 87	82.3	59 30.2	15 86	81.3	59 38.4	12 86	79.4	59 49.5	06 85	75.4	59 53.4	00 83	71.4	59 53.2	01 82	70.4	59 51.6	04 81	68.4	35
6	58 28.2	13 87	82.9	58 33.5	17 87	82.0	58 38.3	16 86	81.0	58 46.8	13 86	79.1	58 58.7	07 84	75.3	59 03.7	01 83	71.4	59 03.8	00 82	70.4	59 02.8	03 81	68.5	6
7	57 36.1	13 87	82.6	57 41.5	17 86	81.7	57 46.5	16 86	80.8	57 55.3	13 86	78.9	58 08.0	08 84	75.2	58 13.9	02 83	71.4	58 14.4	01 82	70.4	58 14.0	02 81	68.5	7
8	56 44.1	13 87	82.3	56 49.6	18 86	81.4	56 54.7	16 86	80.5	57 03.8	14 86	78.7	57 17.3	08 84	75.0	57 24.2	03 83	71.3	57 24.9	02 82	70.4	57 25.1	01 81	68.6	8
9	55 52.1	13 87	82.0	55 57.7	18 86	81.1	56 03.0	17 86	80.3	56 12.4	14 86	78.5	56 26.6	09 84	74.9	56 34.5	04 83	71.3	56 35.5	03 82	70.4	56 36.3	00 81	68.6	9
40	55 00.2	20 87	81.7	55 05.9	19 86	80.9	55 11.3	17 86	80.0	55 21.0	15 86	78.3	55 35.9	10 84	74.8	55 44.8	05 83	71.2	55 46.1	04 82	70.3	55 47.4	01 81	68.6	40
1	54 08.2	20 86	81.4	54 14.1	19 86	80.6	54 19.6	18 86	79.7	54 29.6	15 86	78.0	54 45.3	11 84	74.6	54 55.1	06 83	71.1	54 56.6	04 82	70.3	54 58.6	02 81	68.5	1
2	53 16.4	21 86	81.1	53 22.4	19 86	80.3	53 28.0	18 86	79.5	53 38.3	16 86	77.8	53 54.7	11 84	74.4	54 05.5	07 83	71.1	54 07.3	05 82	70.2	54 09.7	03 81	68.5	2
3	52 24.6	21 86	80.8	52 30.7	20 86	80.0	52 36.5	19 86	79.2	52 47.1	17 85	77.6	53 04.2	12 84	74.3	53 15.8	07 83	71.0	53 17.9	06 82	70.1	53 20.9	04 81	68.5	3
4	51 32.8	21 86	80.5	51 39.0	20 86	79.7	51 44.9	19 86	78.9	51 55.8	17 85	77.3	52 13.7	13 84	74.1	52 26.3	08 83	70.9	52 28.6	07 82	70.0	52 32.1	05 81	68.4	4
45	50 41.0	22 86	80.2	50 47.4	21 86	79.4	50 53.5	20 86	78.6	51 04.7	18 85	77.1	51 23.3	13 84	73.9	51 36.7	09 82	70.7	51 39.2	08 82	69.9	51 43.3	06 81	68.3	45
6	49 49.4	22 86	79.9	49 55.8	21 86	79.1	50 02.0	20 86	78.4	50 13.5	18 85	76.8	50 32.8	14 84	73.7	50 47.2	10 82	70.6	50 50.0	09 82	69.8	50 54.6	07 81	68.2	6
7	48 57.7	23 86	79.6	49 04.3	22 86	78.8	49 10.7	21 86	78.1	49 22.5	19 85	76.6	49 42.5	15 84	73.6	49 57.7	11 82	70.5	50 00.7	10 82	69.7	50 05.9	08 81	68.2	7
8	48 06.1	23 86	79.3	48 12.9	22 86	78.6	48 19.3	21 86	77.8	48 31.4	19 85	76.3	48 52.2	15 84	73.4	49 08.3	11 82	70.3	49 11.5	10 82	69.6	49 17.2	08 81	68.1	8
9	47 14.6	23 86	79.0	47 21.5	22 86	78.3	47 28.1	22 85	77.5	47 40.5	20 85	76.1	48 01.9	16 84	73.2	48 18.9	12 82	70.2	48 22.4	11 82	69.4	48 28.5	09 81	67.9	9
50	46 23.1	24 86	78.7	46 30.1	23 86	78.0	46 36.9	22 85	77.3	46 49.6	20 85	75.8	47 11.7	17 84	73.0	47 29.5	13 82	70.0	47 33.3	12 82	69.3	47 39.9	10 81	67.8	50
1	45 31.7	24 86	78.4	45 38.8	23 85	77.7	45 45.7	23 85	77.0	45 58.7	21 85	75.6	46 21.6	17 84	72.7	46 40.2	14 82	69.9	46 44.2	13 82	69.1	46 51.3	11 81	67.7	1
2	44 40.3	25 86	78.1	44 47.6	24 85	77.4	44 54.6	23 85	76.7	45 07.9	21 84	75.3	45 31.5	18 83	72.5	45 51.0	14 82	69.7	45 55.2	14 82	69.0	46 02.8	12 81	67.6	2
3	43 49.0	25 86	77.8	43 56.4	24 85	77.1	44 03.6	24 85	76.4	44 17.2	22 84	75.1	44 41.5	19 83	72.3	45 01.8	15 82	69.5	45 06.2	14 82	68.8	45 14.3	13 81	67.4	3
4	42 57.7	26 85	77.5	43 05.3	25 85	76.8	43 12.6	24 85	76.1	43 26.5	22 84	74.8	43 51.5	19 83	72.1	44 12.6	16 82	69.3	44 17.3	15 81	68.7	44 25.9	13 81	67.3	4
55	42 06.5	26 85	77.1	42 14.2	25 85	76.5	42 21.7	24 85	75.8	42 35.9	23 84	74.5	43 01.6	20 83	71.9	43 23.6	17 82	69.2	43 28.5	16 81	68.5	43 37.5	14 80	67.1	55
6	41 15.4	26 85	76.8	41 23.2	26 85	76.2	41 30.8	25 85	75.5	41 45.4	23 84	74.2	42 11.8	21 83	71.6	42 34.6	17 82	69.0	42 39.7	17 81	68.3	42 49.2	15 80	67.0	6
7	40 24.4	27 85	76.5	40 32.3	26 85	75.9	40 40.0	25 34	75.3	40 54.9	24 84	74.0	41 22.0	21 83	71.4	41 45.6	18 82	68.8	41 51.0	17 81	68.1	42 01.0	16 80	66.8	7
8	39 33.4	27 85	76.2	39 41.4	27 85	75.6	39 49.3	26 84	75.0	40 04.5	25 84	73.7	40 32.3	22 83	71.1	40 56.7	19 81	68.6	41 02.3	18 81	67.9	41 12.8	17 80	66.6	8
9	38 42.4	28 85	75.9	38 50.7	27 85	75.3	38 58.7	26 84	74.7	39 14.2	25 84	73.4	39 42.7	22 83	70.9	40 07.9	20 81	68.4	40 13.7	19 81	67.7	40 24.6	17 80	66.4	9
60	37 51.6	28 85	75.6	37 59.9	28 84	75.0	38 08.1	27 84	74.4	38 23.9	26 84	73.1	38 53.1	23 82	70.7	39 19.2	20 81	68.1	39 25.2	20 81	67.5	39 36.6	18 80	66.2	60
1	37 00.8	29 84	75.3	37 09.3	28 84	74.7	37 17.6	27 84	74.1	37 33.7	26 84	72.8	38 03.7	24 82	70.4	38 30.5	21 81	67.9	38 36.7	20 80	67.3	38 48.6	19 80	66.0	1
2	36 10.1	29 84	74.9	36 18.7	29 84	74.4	36 27.2	28 84	73.8	36 43.6	27 83	72.6	37 14.3	24 82	70.1	37 41.9	22 81	67.7	37 48.4	21 80	67.1	38 00.7	20 80	65.8	2
3	35 19.4	30 84	74.6	35 28.2	29 84	74.0	35 36.9	28 84	73.5	35 53.6	27 83	72.3	36 25.0	25 82	69.9	36 53.4	22 81	67.5	37 00.1	22 80	66.8	37 12.8	21 80	65.6	3
4	34 28.9	30 84	74.3	34 37.8	30 84	73.7	34 46.6	29 84	73.1	35 03.6	28 83	72.0	35 35.7	26 82	69.6	36 05.0	23 80	67.2	36 11.9	23 80	66.6	36 25.1	21 80	65.4	4
65	33 38.4	31 84	74.0	33 47.5	30 84	73.4	33 56.4	30 83	72.8	34 13.8	28 83	71.7	34 46.6	26 82	69.4	35 16.7	24 80	67.0	35 23.7	23 80	66.4	35 37.4	22 79	65.2	65
6	32 48.0	31 84	73.7	32 57.2	31 84	73.1	33 06.3	30 83	72.5	33 24.0	29 83	71.4	33 57.5	27 82	69.1	34 28.4	25 80	66.7	34 35.7	24 80	66.1	34 49.8	23 79	65.0	6
7	31 57.7	32 84	73.3	32 07.1	31 84	72.8	32 16.3	31 83	72.2	32 34.3	30 83	71.1	33 08.5	27 82	68.8	33 40.2	25 80	66.5	33 47.8	25 80	65.9	34 02.3	24 79	64.7	7
8	31 07.4	32 84	73.0	31 17.0	32 83	72.4	31 26.4	31 83	71.9	31 44.7	30 82	70.8	32 19.7	28 81	68.5	32 52.2	26 80	66.2	32 59.9	26 80	65.7	33 14.9	24 79	64.5	8
9	30 17.3	33 83	72.7	30 27.0	32 83	72.1	30 36.5	32 83	71.6	30 55.2	31 82	70.5	31 30.9	29 81	68.2	32 04.2	27 80	66.0	32 12.1	26 79	65.4	32 27.6	25 79	64.3	9
70	29 27.2	33 83	72.3	29 37.1	33 83	71.8	29 46.8	32 83	71.2	30 05.8	31 82	70.2	30 42.2	29 81	67.9	31 16.3	27 80	65.7	31 24.5	27 79	65.1	31 40.3	26 78	64.0	70
1	28 37.3	34 83	72.0	28 47.3	33 83	71.5	28 57.2	33 82	70.9	29 16.5	32 82	69.8	29 53.6	30 81	67.7	30 28.5	28 80	65.4	30 36.9	28 79	64.9	30 53.2	27 78	63.8	1
2	27 47.4	34 83	71.7	27 57.6	34 83	71.1	28 07.6	33 82	70.6	28 27.3	32 82	69.5	29 05.1	31 81	67.4	29 40.8	29 79	65.2	29 49.4	28 79	64.6	30 06.2	27 78	63.5	2
3	26 57.7	35 83	71.3	27 08.0	34 82	70.8	27 18.2	34 82	70.3	27 38.2	33 82	69.2	28 16.7	31 80	67.1	28 53.3	30 79	64.9	29 02.1	29 79	64.3	29 19.3	28 78	63.2	3
4	26 08.0	35 83	71.0	26 18.5	35 82	70.5	26 28.8	34 82	69.9	26 49.2	34 82	68.9	27 28.5	32 80	66.8	28 05.8	30 79	64.6	28 14.8	30 78	64.1	28 32.5	29 78	63.0	4
75	25 18.4	36 82	70.6	25 29.1	35 82	70.1	25 39.6	35 82	69.6	26 00.3	34 81	68.6	26 40.3	33 80	66.4	27 18.5	31 79	64.3	27 27.7	31 78	63.8	27 45.8	30 78	62.7	75
6	24 29.0	36 82	70.3	24 39.8	36 82	69.8	24 50.5	35 82	69.3	25 11.5	35 81	68.2	25 52.3	33 80	66.1	26 31.2	32 78	64.0	26 40.7	31 78	63.5	26 59.2	31 77	62.4	6
7	23 39.6	37 82	69.9	23 50.6	36 82	69.4	24 01.4	36 82	68.9	24 22.8	35 81	67.9	25 04.3	34 80	65.8	25 44.1	32 78	63.7	25 53.8	32 78	63.2	26 12.8	31 77	62.2	7
8	22 50.4	37 82	69.6	23 01.5	37 82	69.1	23 12.5	37 81	68.6	23 34.3	36 81	67.6	24 16.5	35 80	65.5	24 57.1	33 78	63.4	25 07.0	33 78	62.9	25 26.4	32 77	61.9	8
9	22 01.3	38 82	69.2	22 12.6	37 82	68.7	22 23.7	37 81	68.2	22 45.8	36 80	67.2	23 28.8	35 79	65.2	24 10.2	34 78	63.1	24 20.3	33 78	62.6	24 40.2	33 77	61.6	9
80	21 12.3	38 82	68.9	21 23.7	38 81	68.4	21 35.1	38 81	67.9	21 57.5	37 80	66.9	22 41.3	36 79	64.9	23 23.5	35 78	62.8	23 33.8	34 77	62.3	23 54.1	34 76	61.3	80
1	20 23.4	39 81	68.5	20 35.0	39 81	68.0	20 46.5	38 81	67.5	21 09.3	38 80	66.5	21 53.8	37 79	64.5	22 36.9	35 78	62.5	22 47.4	35 77	62.0	23 08.2	34 76	61.0	1
2	19 34.6	39 81	68.1	19 46.4	39 81	67.6	19 58.1	39 80	67.1	20 21.2	38 80	66.2	21 06.5	37 79	64.2	21 50.4	36 77	62.2	22 01.1	36 77	61.7	22 22.4	35 76	60.7	2
3	18 46.0	40 81	67.8	18 57.9	40 80	67.3	19 09.8	39 80	66.8	19 33.3	39 80	65.8	20 19.3	38 78	63.8	21 04.1	37 77	61.9	21 15.0	36 77	61.4	21 36.7	36 76	60.4	3
4	17 57.5	40 81	67.4	18 09.6	40 80	66.9	18 21.7	40 80	66.4	18 45.5	40 79	65.4	19 32.3	38 78	63.5	20 17.9	37 77	61.5	20 29.0	37 76	61.0	20 51.1	37 76	60.0	4
85	17 09.1	41 80	67.0	17 21.4	41 80	66.5	17 33.6	41 80	66.0	17 57.8	40 79	65.1	18 45.4	39 78	63.2	19 31.8	38 76	61.2	19 43.2	38 76	60.7	20 05.7	37 75	59.7	85
6	16 20.9	42 80	66.6	16 33.3	41 80	66.1	16 45.7	41 80	65.7	17 10.3	41 79	64.7	17 58.7	40 78	62.8	18 45.9	39 76	60.9	18 57.5	39 76	60.4	19 20.5	38 75	59.4	6
7	15 32.8	42 80	66.2	15 45.4	42 80	65.8	15 58.0	42 79	65.3	16 22.9	41 79	64.3	17 12.1	41 77	62.4	18 00.1	40 76	60.5	18 12.0	39 76	60.0	18 35.4	39 75	59.1	7
8	14 44.8	43 80	65.8	14 57.6	43 79	65.4	15 10.4	42 79	64.9	15 35.7	42 78	64.0	16 25.6	41 77	62.1	17 14.5	40 76	60.2	17 26.6	40 76	59.7	17 50.5	40 75	58.7	8
9	13 57.0	43 80	65.5	14 10.0	43 79	65.0	14 22.9	43 79	64.5	14 48.6	43 78	63.6	15 39.3	42 77	61.7	16 29.1	41 76	59.8	16 41.3	41 75	59.3	17 05.7	40 74	58.4	9
90	13 09.4	44 79	65.1	13 22.5	44 79	64.6	13 35.6	44 78	64.1	14 01.7	43 78	63.2	14 53.2	43 77	61.3	15 43.8	42 75	59.5	15 56.3	42 75	59.0	16 21.1	41 74	58.0	90

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
00	33 00.0	1.0 01	180.0	32 30.0	1.0 01	180.0	32 00.0	1.0 01	180.0	31 00.0	1.0 01	180.0	29 00.0	1.0 01	180.0	27 00.0	1.0 01	180.0	26 30.0	1.0 01	180.0	25 30.0	1.0 01	180.0	00
1	32 59.5	1.0 02	178.9	32 29.5	1.0 02	179.0	31 59.5	1.0 02	179.0	30 59.5	1.0 02	179.0	28 59.6	1.0 02	179.0	26 59.6	1.0 02	179.1	26 29.6	1.0 02	179.1	25 29.6	1.0 02	179.1	1
2	32 58.1	1.0 04	177.9	32 28.1	1.0 04	177.9	31 58.1	1.0 04	177.9	30 58.2	1.0 04	178.0	28 58.2	1.0 04	178.1	26 58.3	1.0 04	178.1	26 28.3	1.0 04	178.2	25 28.3	1.0 03	178.2	2
3	32 55.7	1.0 06	176.8	32 25.7	1.0 06	176.9	31 55.8	1.0 06	176.9	30 55.8	1.0 05	177.0	28 56.0	1.0 05	177.1	26 56.2	1.0 05	177.2	26 26.2	1.0 05	177.2	25 26.3	1.0 05	177.3	3
4	32 52.3	1.0 07	175.8	32 22.4	1.0 07	175.8	31 52.5	1.0 07	175.9	30 52.6	1.0 07	176.0	28 52.9	1.0 07	176.1	26 53.2	1.0 06	176.3	26 23.3	1.0 06	176.3	25 23.4	1.0 06	176.4	4
05	32 48.0	1.0 09	174.7	32 18.1	1.0 09	174.8	31 48.2	1.0 09	174.9	30 48.5	1.0 08	175.0	28 48.9	1.0 08	175.2	26 49.4	1.0 08	175.4	26 19.5	1.0 08	175.4	25 19.7	1.0 08	175.5	05
6	32 42.7	99 10	173.7	32 12.9	99 10	173.8	31 43.0	99 10	173.8	30 43.4	99 10	174.0	28 44.0	99 10	174.2	26 44.7	99 09	174.4	26 14.8	99 09	174.5	25 15.2	99 09	174.6	6
7	32 36.5	99 12	172.7	32 06.7	99 12	172.7	31 36.9	99 12	172.8	30 37.4	99 12	173.0	28 38.3	99 11	173.2	26 39.2	99 11	173.5	26 09.4	99 10	173.6	25 09.8	99 10	173.7	7
8	32 29.3	99 14	171.6	31 59.6	99 13	171.7	31 29.9	99 13	171.8	30 30.5	99 13	172.0	28 31.7	99 12	172.3	26 32.8	99 12	172.6	26 03.1	99 12	172.7	25 03.7	99 12	172.8	8
9	32 21.2	99 15	170.6	31 51.6	99 15	170.7	31 22.0	99 15	170.8	30 22.7	99 14	171.0	28 24.2	99 14	171.3	26 25.6	99 13	171.7	25 56.0	99 13	171.8	24 56.7	99 13	171.9	9
10	32 12.1	98 17	169.6	31 42.6	98 16	169.7	31 13.1	98 16	169.8	30 14.0	98 16	170.0	28 15.9	99 15	170.4	26 17.6	99 15	170.8	25 48.1	99 15	170.9	24 48.9	99 14	171.0	10
1	32 02.2	98 18	168.5	31 32.7	98 18	168.7	31 03.3	98 18	168.8	30 04.5	98 17	169.0	28 06.7	98 17	169.4	26 08.8	98 16	169.9	25 39.3	98 16	170.0	24 40.3	98 16	170.2	1
2	31 51.3	98 20	167.5	31 22.0	98 20	167.6	30 52.6	98 19	167.8	29 54.0	98 19	168.0	27 56.6	98 18	168.5	25 59.1	98 18	168.9	25 29.8	98 17	169.1	24 31.0	98 17	169.3	2
3	31 39.5	97 21	166.5	31 10.3	97 21	166.6	30 41.1	97 21	166.8	29 42.7	97 20	167.0	27 45.7	97 20	167.6	25 48.7	98 19	168.0	25 19.4	98 19	168.2	24 20.8	98 18	168.4	3
4	31 26.8	97 23	165.5	30 57.7	97 22	165.6	30 28.6	97 22	165.8	29 30.5	97 22	166.1	27 34.0	97 21	166.6	25 37.4	97 20	167.1	25 08.2	97 20	167.3	24 09.9	97 20	167.5	4
15	31 13.2	96 24	164.5	30 44.3	96 24	164.7	30 15.3	97 24	164.8	29 17.4	97 23	165.1	27 21.4	97 22	165.7	25 25.3	97 22	166.3	24 56.3	97 21	166.4	23 58.2	97 21	166.7	15
6	30 58.7	96 26	163.5	30 29.9	96 25	163.7	30 01.1	96 25	163.8	29 03.5	96 25	164.2	27 08.1	96 24	164.8	25 12.5	96 23	165.4	24 43.5	96 22	165.5	23 45.7	96 22	165.8	6
7	30 43.4	95 27	162.5	30 14.8	96 27	162.7	29 46.1	96 26	162.9	28 48.7	96 26	163.2	26 53.9	96 25	163.9	24 58.8	96 24	164.5	24 30.0	96 24	164.6	23 32.4	96 23	165.0	7
8	30 27.2	95 28	161.5	29 58.7	95 28	161.7	29 30.2	95 28	161.9	28 33.2	95 27	162.3	26 38.9	95 26	163.0	24 44.4	95 25	163.6	24 15.8	96 25	163.8	23 18.4	96 24	164.1	8
9	30 10.2	94 30	160.6	29 41.9	94 30	160.8	29 13.5	95 29	161.0	28 16.8	95 29	161.3	26 23.1	95 28	162.0	24 29.2	95 26	162.7	24 00.7	95 26	162.9	23 03.7	95 26	163.3	9
20	29 52.3	94 31	159.6	29 24.2	94 31	159.8	28 56.0	94 30	160.0	27 59.6	94 30	160.4	26 06.5	94 29	161.2	24 13.3	94 28	161.9	23 44.9	95 28	162.1	22 48.2	95 27	162.4	20
1	29 33.6	93 32	158.7	29 05.7	93 32	158.9	28 37.6	93 32	159.1	27 41.6	94 31	159.5	25 49.2	94 30	160.3	23 56.6	94 29	161.0	23 28.4	94 29	161.2	22 32.0	94 28	161.6	1
2	29 14.2	93 34	157.7	28 46.3	93 34	157.9	28 18.5	93 33	158.2	27 22.8	93 33	158.6	25 31.1	93 31	159.4	23 39.2	93 30	160.2	23 11.1	93 30	160.4	22 15.1	94 30	160.8	2
3	28 53.9	92 35	156.8	28 26.2	92 35	157.0	27 58.6	92 34	157.2	27 03.2	92 34	157.7	25 12.3	93 33	158.5	23 21.0	93 32	159.3	22 53.2	93 31	159.5	21 57.4	93 30	159.9	3
4	28 32.8	91 36	155.9	28 05.4	92 36	156.1	27 37.9	92 36	156.3	26 42.9	92 35	156.8	24 52.7	92 34	157.7	23 02.1	92 33	158.5	22 34.5	92 32	158.7	21 39.1	92 32	159.1	4
25	28 11.0	91 38	155.0	27 43.7	91 37	155.2	27 16.4	91 37	155.4	26 21.8	91 36	155.9	24 32.4	91 35	156.8	22 42.6	92 34	157.7	22 15.1	92 34	157.9	21 20.0	92 33	158.3	25
6	27 48.4	90 39	154.1	27 21.3	90 38	154.3	26 54.3	90 38	154.5	26 00.0	90 38	155.0	24 11.3	91 36	155.9	22 22.3	91 35	156.9	21 55.0	91 35	157.1	21 00.3	91 34	157.5	6
7	27 25.0	89 40	153.2	26 58.2	90 40	153.4	26 31.3	90 39	153.7	25 37.5	90 39	154.1	23 49.6	90 37	155.1	22 01.3	90 36	156.0	21 34.2	90 36	156.3	20 39.9	91 35	156.7	7
8	27 01.0	89 41	152.3	26 34.3	89 41	152.5	26 07.7	89 40	152.8	25 14.3	89 40	153.3	23 27.2	89 38	154.3	21 39.7	90 37	155.2	21 12.7	90 37	155.5	20 18.8	90 36	155.9	8
9	26 36.2	88 42	151.4	26 09.8	88 42	151.7	25 43.3	88 42	151.9	24 50.3	88 41	152.4	23 04.0	89 40	153.5	21 17.4	89 38	154.4	20 50.6	89 38	154.7	19 57.1	89 37	155.2	9
30	26 10.7	87 44	150.5	25 44.5	87 43	150.8	25 18.3	88 43	151.1	24 25.7	88 42	151.6	22 40.3	88 41	152.6	20 54.4	88 39	153.7	20 27.9	88 39	153.9	19 34.8	89 38	154.4	30
1	25 44.6	87 45	149.7	25 18.6	87 44	150.0	24 52.6	87 44	150.2	24 00.4	87 43	150.8	22 15.8	87 42	151.8	20 30.8	88 40	152.9	20 04.5	88 40	153.1	19 11.8	88 39	153.6	1
2	25 17.8	86 46	148.8	24 52.0	86 46	149.1	24 26.2	86 45	149.4	23 34.5	86 44	150.0	21 50.7	87 43	151.0	20 06.6	87 41	152.1	19 40.5	87 41	152.4	18 48.2	87 40	152.9	2
3	24 50.3	85 47	148.0	24 24.7	85 46	148.3	23 59.1	85 46	148.6	23 07.9	86 45	149.1	21 25.0	86 44	150.3	19 41.7	86 42	151.3	19 15.8	86 42	151.6	18 24.0	86 42	152.1	3
4	24 22.2	84 48	147.2	23 56.8	84 48	147.5	23 31.5	85 47	147.8	22 40.6	85 46	148.3	20 58.7	85 45	149.5	19 16.2	86 44	150.6	18 50.6	86 43	150.9	17 59.1	86 42	151.4	4
35	23 53.4	84 49	146.4	23 28.3	84 48	146.7	23 03.2	84 48	147.0	22 12.8	84 48	147.6	20 31.7	84 46	148.7	18 50.2	85 44	149.8	18 24.7	85 44	150.1	17 33.7	85 43	150.7	35
6	23 24.0	83 50	145.6	22 59.2	83 50	145.9	22 34.2	83 49	146.2	21 44.3	83 48	146.8	20 04.1	84 47	147.9	18 23.5	84 45	149.1	17 58.3	84 45	149.4	17 07.7	84 44	150.0	6
7	22 54.0	82 51	144.8	22 29.4	82 50	145.1	22 04.7	82 50	145.4	21 15.3	83 49	146.0	19 36.0	83 48	147.2	17 56.3	83 46	148.4	17 31.3	83 46	148.7	16 41.2	84 45	149.2	7
8	22 23.5	81 52	144.0	21 59.1	81 52	144.3	21 34.6	82 51	144.6	20 45.7	82 50	145.2	19 07.3	82 49	146.5	17 28.5	83 47	147.6	17 03.7	83 47	147.9	16 14.1	83 46	148.5	5
9	21 52.3	81 53	143.2	21 28.2	81 52	143.5	21 04.0	81 52	143.9	20 15.4	81 51	144.5	18 38.0	81 50	145.7	17 00.1	82 48	146.9	16 35.6	82 48	147.2	15 46.4	82 47	147.8	9
40	21 20.6	80 54	142.5	20 56.7	80 53	142.8	20 32.7	80 53	143.1	19 44.7	80 52	143.7	18 08.2	81 51	145.0	16 31.2	81 49	146.2	16 06.9	81 49	146.5	15 18.2	81 48	147.1	40
1	20 48.4	79 55	141.7	20 24.7	79 54	142.0	20 01.0	79 54	142.4	19 13.4	79 53	143.0	17 37.8	80 52	144.3	16 01.8	80 50	145.5	15 37.7	80 50	145.8	14 49.5	80 49	146.5	1
2	20 15.6	78 56	141.0	19 52.1	78 55	141.3	19 28.6	78 55	141.6	18 41.5	79 54	142.3	17 06.9	79 52	143.6	15 31.8	79 51	144.8	15 08.0	80 50	145.2	14 20.2	80 50	145.8	2
3	19 42.3	77 56	140.2	19 19.1	77 56	140.6	18 55.8	78 56	140.9	18 09.2	78 55	141.6	16 35.5	78 53	142.9	15 01.3	79 52	144.2	14 37.7	79 51	144.5	13 50.4	79 50	145.1	3
4	19 08.5	77 57	139.5	18 45.5	77 57	139.9	18 22.5	77 56	140.2	17 36.3	77 56	140.9	16 03.6	77 54	142.2	14 30.4	78 52	143.5	14 07.0	78 52	143.8	13 20.2	78 51	144.5	4
45	18 34.2	76 58	138.8	18 11.4	76 58	139.1	17 48.6	76 57	139.5	17 02.9	76 56	140.2	15 31.2	77 55	141.5	13 58.9	77 53	142.8	13 35.8	77 53	143.2	12 49.4	77 52	143.8	45
6	17 59.4	75 59	138.1	17 36.8	75 58	138.5	17 14.3	75 58	138.8	16 29.1	75 57	139.5	14 58.3	76 56	140.8	13 27.0	76 54	142.2	13 04.1	76 54	142.5	12 18.2	77 53	143.2	6
7	17 24.1	74 60	137.4	17 01.8	74 59	137.8	16 39.5	74 59	138.1	15 54.8	75 58	138.8	14 24.9	75 56	140.2	12 54.6	75 55	141.5	12 31.9	76 54	141.9	11 46.5	76 54	142.5	7
8	16 48.3	73 60	136.7	16 26.3	74 60	137.1	16 04.2	74 60	137.4	15 20.0	74 59	138.1	13 51.1	74 57	139.5	12 21.7	75 56	140.9	11 59.3	75 55	141.2	11 14.4	75 54	141.9	8
9	16 12.1	73 61	136.1	15 50.3	73 61	136.4	15 28.5	73 60	136.8	14 44.7	73 60	137.5	13 16.8	73 58	138.9	11 48.4	74 56	140.3	11 26.2	74 56	140.6	10 41.8	74 55	141.3	9
50	15 35.5	72 62	135.4	15 13.9	72 61	135.8	14 52.3	72 61	136.1	14 09.0	72 60	136.8	12 42.0	73 59	138.2	11 14.6	73 57	139.6	10 52.7	73 57	140.0	10 08.8	73 56	140.7	50
1	14 58.5	71 62	134.7	14 37.1	71 62	135.1	14 15.7	71 62	135.5	13 32.9	72 61	136.2	12 06.9	72 59	137.6	10 40.4	72 58	139.0	10 18.7	72 57	139.4	9 35.3	72 56	140.1	1
2	14 21.0	70 63	134.1	13 59.9	70 63	134.5	13 38.7	71 62	134.8	12 56.4	71 62	135.6	11 31.3	71 60	137.0	10 05.8	71 58	138.4	9 44.4	71 58	138.8	9 01.4	72 57	139.5	2
3	13 43.1	70 64	133.5	13 22.2	70 63	133.8	13 01.3	70 63	134.2	12 19.4	70 62	134.9	10 55.3	70 61	136.4	9 30.8	71 59	137.8	9 09.6	71 59	138.2	8 27.1	71 58	138.9	3
4	13 04.8	69 64	132.8	12 44.2	69 64	133.2	12 23.5	69 64	133.6	11 42.1	69 63	134.3	10 18.9	69 61	135.8	8 55.3	70 60	137.2	8 34.4	70 59	137.6	7 52.4	70 58	138.3	4
55	12 26.1	68 65	132.2	12 05.7	68 65	132.6	11 45.3	68 64	133.0	11 04.3	68 64	133.7	9 42.1	69 62	135.2	8 19.5	69 60	136.7	7 58.8	69 60	137.0	7 17.4	69 59	137.8	55
6	11 47.1	67 66	131.6	11 26.9	67 65	132.0	11 06.7	67 65	132.4	10 26.2	68 64	133.1	9 04.9	68 63	134.6	7 43.3	68 61	136.1	7 22.9	68 61	136.5	6 41.9	68 60	137.2	6
7	11 07.6	66 66	131.0	10 47.7	67 66	131.4	10 27.7	67 66	131.8	9 47.7	67 65	132.5	8 27.4	67 63	134.0	7 06.7	67 62	135.5	6 46.5	67 61	135.9	6 06.0	68 60	136.6	7
8	10 27.9	66 67	130.4	10 08.1	66 66	130.8	9 48.4	66 66	131.2	9 08.9	66 65	131.9	7 49.5	66 64	133.5	6 29.8	67 62	135.0	6 09.8	67 62	135.3	5 29.8	67 61	136.1	8
9	9 47.7	65 68	129.8	9 28.2	65 67	130.2	9 08.7	65 67	130.6	8 29.6	65 66	131.4	7 11.2	65 64	132.9	5 52.5	66 63	134.4	5 32.7	66 62	134.8				9
60	9 07.3	64 68	129.2	8 48.0	64 68	129.6	8 28.7	64 67	130.0	7 50.1	64 66	130.8	6 32.6	65 65	132.3	5 14.8	65 64	133.9							60
1	8 26.4	63 68	128.7	8 07.4	63 68	129.1	7 48.4	64 68	129.5	7 10.2	64 67	130.2	5 53.6	64 66	131.8										1
2	7 45.3	63 69	128.1	7 26.5	63 69	128.5	7 07.7	63 68	128.9	6 30.0	63 68	129.7	5 14.3	63 66	131.2										2
3	7 03.9	62 70	127.6	6 45.3	62 69	128.0	6 26.7	62 69	128.3	5 49.4	62 68	129.1													3
4	6 22.1	61 70	127.0	6 03.8	61 70	127.4	5 45.4	61 69	127.8	5 08.6	61 69	128.6													4
65	5 40.1	60 70	126.5	5 21.9	61 70	126.9	5 03.8	61 70	127.3																65

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′			28° 30′			29° 00′			30° 00′			32° 00′			34° 00′			34° 30′			35° 30′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	°
91	12 21.9	45 79	64.7	12 35.2	44 79	64.2	12 48.5	44 78	63.7	13 14.9	44 78	62.8	14 07.2	43 76	61.0	14 58.7	42 75	59.1	15 11.4	42 74	58.6	15 36.7	42 74	57.7	91
2	11 34.5	45 79	64.3	11 48.0	45 78	63.8	12 01.5	45 78	63.3	12 28.3	45 77	62.4	13 21.4	44 76	60.6	14 13.7	43 75	58.7	14 26.7	43 74	58.3	14 52.4	43 74	57.3	2
3	10 47.3	46 78	63.8	11 01.0	46 78	63.4	11 14.7	46 78	62.9	11 41.9	45 77	62.0	12 35.8	45 76	60.2	13 29.0	44 74	58.4	13 42.1	44 74	57.9	14 08.3	43 73	57.0	3
4	10 00.3	46 78	63.4	10 14.2	46 78	63.0	10 28.1	46 78	62.5	10 55.7	46 77	61.6	11 50.4	45 76	59.8	12 44.4	45 74	58.0	12 57.8	45 74	57.5	13 24.4	44 73	56.6	4
95	9 13.5	47 78	63.0	9 27.5	47 78	62.6	9 41.6	47 77	62.1	10 09.6	47 76	61.2	11 05.1	46 75	59.4	12 00.0	45 74	57.6	12 13.6	45 73	57.1	12 40.7	45 72	56.2	95
6	8 26.8	48 78	62.6	8 41.0	48 77	62.1	8 55.3	47 77	61.7	9 23.7	47 76	60.8	10 20.0	47 75	59.0	11 15.8	46 73	57.2	11 29.6	46 73	56.8	11 57.2	46 72	55.9	6
7	7 40.3	48 77	62.2	7 54.7	48 77	61.7	8 09.2	48 76	61.3	8 37.9	48 76	60.4	9 35.1	47 74	58.6	10 31.7	47 73	56.8	10 45.8	47 73	56.4	11 13.8	47 72	55.5	7
8	6 54.0	49 77	61.7	7 08.6	49 76	61.3	7 23.2	49 76	60.9	7 52.4	49 76	60.0	8 50.4	48 74	58.2	9 47.9	48 73	56.4	10 02.2	48 72	56.0	10 30.7	47 72	55.1	8
9	6 07.8	50 76	61.3	6 22.7	49 76	60.9	6 37.5	49 76	60.4	7 07.1	49 75	59.5	8 05.9	49 74	57.8	9 04.3	48 72	56.0	9 18.8	48 72	55.6	9 47.8	48 71	54.7	9
100	5 21.9	50 76	60.9	5 37.0	50 76	60.4	5 52.0	50 76	60.0	6 21.9	50 75	59.1	7 21.6	50 74	57.4	8 20.9	49 72	55.6	8 35.6	49 72	55.2	9 05.1	49 71	54.3	100
1							5 06.6	51 75	59.5	5 37.0	51 74	58.7	6 37.5	50 73	56.9	7 37.7	50 72	55.2	7 52.7	50 71	54.8	8 22.6	50 70	53.9	1
2													5 53.7	51 73	56.5	6 54.7	51 71	54.8	7 09.9	51 71	54.3	7 40.3	51 70	53.5	2
3													5 10.0	52 72	56.1	6 12.0	52 71	54.3	6 27.4	51 70	53.9	6 58.2	51 70	53.0	3
4																5 29.4	52 70	53.9	5 45.1	52 70	53.5	6 16.4	52 69	52.6	4
105																			5 03.1	53 70	53.0	5 34.8	53 69	52.2	105

Lat. 29°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	83 00.0	1.0 05	00.0	82 00.0	1.0 04	00.0	80 30.0	1.0 04	00.0	79 00.0	1.0 03	00.0	77 00.0	1.0 02	00.0	76 30.0	1.0 02	00.0	76 00.0	1.0 02	00.0	74 00.0	1.0 02	00.0	00
1	82 57.0	99 15	06.6	81 57.4	99 13	05.7	80 27.8	1.0 11	04.7	78 58.2	1.0 09	04.0	76 58.5	1.0 08	03.3	76 28.6	1.0 07	03.2	75 58.6	1.0 07	03.0	73 58.8	1.0 06	02.6	1
2	82 48.0	97 24	13.0	81 49.6	98 21	11.3	80 21.4	98 18	09.4	78 52.7	99 15	08.0	76 54.0	99 12	06.6	76 24.2	99 12	06.3	75 54.5	99 11	06.0	73 55.3	99 10	05.1	2
3	82 33.5	94 33	19.1	81 36.9	96 29	16.7	80 10.8	96 24	13.9	78 43.7	97 21	11.8	76 46.5	98 17	09.8	76 17.1	98 16	09.4	75 47.6	98 16	09.0	73 49.5	99 14	07.6	3
4	82 13.9	89 40	24.7	81 19.7	91 36	21.7	79 56.3	94 30	18.2	78 31.2	95 26	15.6	76 36.2	96 22	12.9	76 07.2	97 21	12.4	75 38.1	97 20	11.9	73 41.4	98 17	10.1	4
05	81 49.9	84 46	29.8	80 58.3	87 42	26.3	79 38.1	91 36	22.3	78 15.5	93 31	19.2	76 23.1	95 26	16.0	75 54.6	95 25	15.3	75 26.1	95 24	14.7	73 31.1	96 21	12.5	05
6	81 22.0	79 52	34.3	80 33.3	83 47	30.6	79 16.6	87 41	26.1	77 56.9	90 36	22.6	76 07.3	92 30	18.9	75 39.5	93 29	18.1	75 11.6	93 28	17.4	73 18.6	95 24	14.9	6
7	80 50.9	74 56	38.3	80 05.0	79 52	34.4	78 52.1	83 46	29.6	77 35.4	87 40	25.7	75 49.1	90 34	21.7	75 22.0	91 33	20.8	74 54.7	91 32	20.0	73 04.1	93 28	17.2	7
8	80 17.1	69 60	41.9	79 34.1	74 56	37.9	78 24.8	80 49	32.8	77 11.3	84 44	28.7	75 28.6	87 38	24.4	75 02.2	88 36	23.4	74 35.7	89 35	22.5	72 47.6	91 31	19.4	8
9	79 41.0	65 63	45.0	79 00.7	70 59	41.0	77 55.2	76 53	35.8	76 45.0	80 47	31.5	75 05.9	85 41	26.9	74 40.4	86 40	25.9	74 14.6	86 38	24.9	72 29.2	89 34	21.6	9
10	79 03.1	60 66	47.7	78 25.4	65 62	43.7	77 23.5	72 56	38.5	76 16.5	77 50	34.1	74 41.2	82 44	29.2	74 16.5	83 43	28.2	73 51.5	84 41	27.2	72 09.0	87 36	23.6	10
1	78 23.5	56 68	50.1	77 48.3	61 64	46.2	76 50.0	68 59	41.0	75 46.2	73 53	36.5	74 14.7	79 47	31.5	73 50.8	80 46	30.4	73 26.7	81 44	29.3	71 47.2	85 39	25.6	1
2	77 42.6	52 70	52.2	77 09.8	57 66	48.4	76 14.8	64 61	43.2	75 14.2	70 56	38.7	73 46.4	76 50	33.6	73 23.5	77 48	32.4	73 00.2	78 47	31.3	71 23.8	82 42	27.4	2
3	77 00.6	48 72	54.1	76 29.9	54 68	50.3	75 38.2	61 63	45.2	74 40.7	67 58	40.7	73 16.7	73 52	35.5	72 54.6	74 50	34.4	72 32.1	76 49	33.2	70 58.9	80 44	29.2	3
4	76 17.7	45 73	55.7	75 49.0	50 70	52.1	75 00.4	58 65	47.0	74 05.8	64 60	42.6	72 45.5	70 54	37.3	72 24.3	71 53	36.2	72 02.7	73 51	35.0	70 32.6	77 46	30.9	4
15	75 34.0	42 74	57.1	75 07.2	47 71	53.6	74 21.4	54 66	48.7	73 29.7	60 62	44.3	72 13.1	67 56	39.0	71 52.7	69 55	37.8	71 31.9	70 53	36.7	70 05.0	75 48	32.5	15
6	74 49.6	39 75	58.4	74 24.6	44 72	55.0	73 41.6	51 68	50.2	72 52.6	57 64	45.8	71 39.4	64 58	40.6	71 19.9	66 56	39.4	71 00.0	67 55	38.3	69 36.2	72 50	34.0	6
7	74 04.6	36 76	59.6	73 41.3	41 73	56.2	73 00.9	48 69	51.6	72 14.5	54 65	47.3	71 04.8	61 59	42.1	70 46.1	63 58	40.9	70 27.0	65 57	39.7	69 06.3	70 52	35.4	7
8	73 19.1	34 76	60.6	72 57.4	39 74	57.4	72 19.4	46 70	52.8	71 35.6	52 66	48.6	70 29.1	59 61	43.4	70 11.3	60 60	42.2	69 52.9	62 58	41.1	68 35.4	67 53	36.8	8
9	72 33.2	31 77	61.5	72 12.9	36 75	58.4	71 37.3	43 71	53.9	70 55.8	49 67	49.8	69 52.6	56 62	44.7	69 35.6	58 61	43.5	69 18.0	59 60	42.3	68 03.5	65 55	38.0	9
20	71 46.9	29 78	62.3	71 28.0	34 76	59.2	70 54.6	40 72	54.9	70 15.5	46 68	50.9	69 15.4	54 63	45.9	68 59.1	55 62	44.7	68 42.3	57 61	43.5	67 30.8	62 56	39.2	20
1	71 00.3	27 78	63.0	70 42.8	32 76	60.1	70 11.4	38 73	55.8	69 34.5	44 69	51.9	68 37.4	51 64	46.9	68 21.8	53 63	45.8	68 05.8	54 62	44.6	66 57.2	60 57	40.3	1
2	70 13.4	25 78	63.6	69 57.1	29 76	60.8	69 27.8	36 74	56.7	68 52.9	42 70	52.8	67 58.7	49 65	47.9	67 43.9	50 64	46.8	67 28.6	52 63	45.7	66 22.8	58 58	41.4	2
3	69 26.3	23 79	64.2	69 11.2	27 77	61.4	68 43.7	34 74	57.4	68 10.9	39 71	53.6	67 19.4	46 66	48.9	67 05.3	48 65	47.7	66 50.7	49 64	46.6	65 47.8	55 59	42.4	3
4	68 39.0	21 79	64.7	68 25.0	25 78	62.0	67 59.3	31 74	58.1	67 28.4	37 72	54.4	66 39.7	44 67	49.7	66 26.2	46 66	48.6	66 12.3	47 65	47.5	65 12.1	53 60	43.3	4
25	67 51.5	20 80	65.1	67 38.5	24 78	62.5	67 14.6	29 75	58.8	66 45.5	35 72	55.1	65 59.4	42 68	50.5	65 46.6	43 67	49.4	65 33.4	45 66	48.3	64 35.9	51 61	44.2	25
6	67 03.8	18 80	65.5	66 51.8	22 78	63.0	66 29.6	28 76	59.3	66 02.3	33 72	55.8	65 18.7	40 68	51.3	65 06.5	41 68	50.2	64 53.9	43 66	49.1	63 59.0	49 62	45.0	6
7	66 16.0	16 80	65.9	66 05.0	20 78	63.4	65 44.3	26 76	59.8	65 18.8	31 73	56.4	64 37.5	38 69	51.9	64 26.0	39 68	50.9	64 14.0	41 67	49.8	63 21.7	46 63	45.7	7
8	65 28.0	15 80	66.2	65 18.0	19 79	63.8	64 58.8	24 76	60.3	64 34.9	29 74	56.9	63 56.0	36 70	52.6	63 45.1	37 69	51.5	63 33.8	39 68	50.5	62 43.9	44 64	46.4	8
9	64 40.0	13 80	66.4	64 30.8	17 79	64.1	64 13.2	22 76	60.7	63 50.8	27 74	57.4	63 14.2	34 70	53.1	63 03.9	35 69	52.1	62 53.1	37 68	51.1	62 05.7	42 64	47.1	9
30	63 51.8	12 80	66.7	63 43.6	16 79	64.4	63 27.3	21 77	61.1	63 06.5	26 74	57.9	62 32.1	32 71	53.7	62 22.3	33 70	52.7	62 12.1	35 69	51.6	61 27.0	40 65	47.7	30
1	63 03.6	11 80	66.9	62 56.2	14 79	64.7	62 41.3	19 77	61.5	62 22.0	24 74	58.3	61 49.7	30 71	54.2	61 40.5	31 70	53.2	61 30.8	33 69	52.2	60 48.0	38 66	48.3	1
2	62 15.3	09 81	67.1	62 08.7	13 79	64.9	61 55.1	17 77	61.8	61 37.2	22 75	58.7	61 07.0	28 72	54.6	60 58.3	30 70	53.6	60 49.2	31 70	52.6	60 08.7	36 66	48.8	2
3	61 26.9	08 81	67.2	61 21.1	11 79	65.1	61 08.8	16 77	62.0	60 52.3	21 75	59.0	60 24.1	26 72	55.0	60 16.0	28 71	54.1	60 07.4	29 70	53.1	59 29.0	35 66	49.3	3
4	60 38.5	07 81	67.3	60 33.5	10 80	65.3	60 22.4	15 78	62.3	60 07.3	19 75	59.3	59 41.0	25 72	55.4	59 33.4	26 71	54.5	59 25.3	28 70	53.5	58 49.1	33 67	49.8	4
35	59 50.1	06 81	67.4	59 45.7	09 80	65.5	59 35.9	13 78	62.5	59 22.1	18 76	59.6	58 57.7	23 72	55.8	58 50.6	24 72	54.8	58 43.0	26 71	53.9	58 08.9	31 67	50.2	35
6	59 01.6	05 81	67.5	58 58.0	08 80	65.6	58 49.3	12 78	62.7	58 36.8	16 76	59.8	58 14.2	22 73	56.1	58 07.6	23 72	55.2	58 00.5	24 71	54.2	57 28.4	29 68	50.6	6
7	58 13.1	03 81	67.6	58 10.2	06 80	65.7	58 02.6	10 78	62.9	57 51.4	15 76	60.1	57 30.6	20 73	56.4	57 24.4	21 72	55.5	57 17.9	23 71	54.6	56 47.8	28 68	51.0	7
8	57 24.6	02 81	67.6	57 22.3	05 80	65.8	57 15.9	09 78	63.0	57 05.8	13 76	60.3	56 46.9	18 73	56.6	56 41.1	20 72	55.7	56 35.0	21 72	54.8	56 06.9	26 68	51.3	8
9	56 36.1	01 81	67.7	56 34.5	04 80	65.8	56 29.1	08 78	63.1	56 20.2	12 76	60.4	56 03.0	17 73	56.9	55 57.7	18 72	56.0	55 52.1	19 72	55.1	55 25.8	24 69	51.6	9
40	55 47.5	00 81	67.7	55 46.6	03 80	65.9	55 42.3	07 78	63.2	55 34.6	10 76	60.6	55 19.0	15 74	57.1	55 14.2	17 73	56.2	55 09.0	18 72	55.4	54 44.6	23 69	51.9	40
1	54 59.0	01 81	67.7	54 58.7	02 80	65.9	54 55.4	05 78	63.3	54 48.8	09 76	60.7	54 34.9	14 74	57.3	54 30.5	15 73	56.4	54 25.7	16 72	55.6	54 03.2	21 69	52.2	1
2	54 10.4	02 81	67.6	54 10.8	01 80	65.9	54 08.5	04 78	63.4	54 03.0	08 76	60.8	53 50.7	13 74	57.4	53 46.7	14 73	56.6	53 42.4	15 72	55.8	53 21.6	20 70	52.5	2
3	53 21.9	03 81	67.6	53 22.8	00 80	65.9	53 21.6	03 78	63.4	53 17.2	07 76	60.9	53 06.4	11 74	57.6	53 02.9	12 73	56.8	52 59.0	14 72	55.9	52 40.0	18 70	52.7	3
4	52 33.4	04 81	67.6	52 34.9	01 80	65.9	52 34.7	02 78	63.5	52 31.3	05 76	61.0	52 22.1	10 74	57.7	52 18.9	11 73	56.9	52 15.4	12 73	56.1	51 58.2	17 70	52.9	4
45	51 44.9	05 81	67.5	51 47.0	02 80	65.9	51 47.7	01 78	63.5	51 45.4	04 76	61.1	51 37.7	09 74	57.8	51 34.9	10 73	57.0	51 31.9	11 73	56.2	51 16.3	15 70	53.1	45
6	50 56.4	06 81	67.5	50 59.1	03 80	65.9	51 00.8	00 78	63.5	50 59.5	03 77	61.1	50 53.2	07 74	57.9	50 50.9	08 74	57.1	50 48.2	09 73	56.4	50 34.3	14 70	53.2	6
7	50 08.0	06 81	67.4	50 11.2	04 80	65.8	50 13.8	01 78	63.5	50 13.5	02 77	61.1	50 08.8	06 74	58.0	50 06.8	07 74	57.2	50 04.5	08 73	56.5	49 52.3	12 70	53.4	7
8	49 19.6	07 81	67.3	49 23.4	05 80	65.8	49 26.9	02 78	63.5	49 27.6	01 77	61.1	49 24.2	05 74	58.1	49 22.6	06 74	57.3	49 20.7	07 73	56.5	49 10.1	11 70	53.5	8
9	48 31.2	08 81	67.2	48 35.6	06 80	65.7	48 39.9	03 78	63.4	48 41.6	00 77	61.1	48 39.7	04 74	58.1	48 38.5	05 74	57.4	48 36.9	06 73	56.6	48 27.9	09 70	53.6	9
50	47 42.8	09 80	67.1	47 47.7	07 80	65.6	47 53.0	04 78	63.4	47 55.6	02 77	61.1	47 55.1	02 74	58.2	47 54.3	03 74	57.4	47 53.1	04 73	56.7	47 45.6	08 70	53.7	50
1	46 54.5	10 80	67.0	47 00.0	08 80	65.5	47 06.1	05 78	63.3	47 09.7	03 76	61.1	47 10.5	01 74	58.2	47 10.0	02 74	57.4	47 09.3	03 73	56.7	47 03.3	07 70	53.8	1
2	46 06.2	11 80	66.8	46 12.2	09 80	65.4	46 19.2	06 78	63.2	46 23.7	04 76	61.1	46 25.9	00 74	58.2	46 25.8	01 74	57.5	46 25.4	02 73	56.7	46 21.0	05 71	53.8	2
3	45 18.0	12 80	66.7	45 24.5	10 79	65.3	45 32.4	07 78	63.2	45 37.8	05 76	61.0	45 41.4	01 74	58.2	45 41.6	00 74	57.5	45 41.5	01 73	56.7	45 38.6	04 71	53.9	3
4	44 29.8	13 80	66.6	44 36.9	11 79	65.2	44 45.6	08 78	63.1	44 51.9	06 76	61.0	44 56.8	02 74	58.2	44 57.3	01 74	57.4	44 57.6	01 73	56.7	44 56.2	03 71	53.9	4
55	43 41.7	13 80	66.4	43 49.3	12 79	65.1	43 58.8	09 78	63.0	44 06.1	07 76	60.9	44 12.2	03 74	58.1	44 13.1	03 74	57.4	44 13.8	02 73	56.7	44 13.8	02 71	53.9	55
6	42 53.6	14 80	66.3	43 01.7	13 79	64.9	43 12.1	10 78	62.9	43 20.2	08 76	60.8	43 27.7	05 74	58.1	43 28.9	04 74	57.4	43 29.9	03 73	56.7	43 31.4	00 71	53.9	6
7	42 05.6	15 80	66.1	42 14.2	14 79	64.8	42 25.4	11 78	62.8	42 34.4	09 76	60 7	42 43.1	06 74	58.0	42 44.7	05 74	57.3	42 46.0	04 73	56.7	42 49.0	01 71	53.9	7
8	41 17.6	16 80	65.9	41 26.8	14 79	64.6	41 38.7	12 78	62.6	41 48.7	10 76	60 6	41 58.6	07 74	58.0	42 00.5	06 74	57.3	42 02.2	05 73	56.6	42 06.5	02 71	53.9	8
9	40 29.8	17 80	65.8	40 39.4	15 79	64.5	40 52.2	13 78	62.5	41 02.9	11 76	60.5	41 14.1	08 74	57.9	41 16.4	07 74	57.2	41 18.4	06 73	56.6	41 24.1	03 71	53.9	9
60	39 41.9	18 80	65.6	39 52.1	16 79	64.3	40 05.6	14 77	62.4	40 17.3	12 76	60.4	40 29.7	09 74	57.8	40 32.3	08 74	57.2	40 34.6	07 73	56.5	40 41.7	04 71	53.9	60
1	38 54.2	18 80	65.4	39 04.8	17 79	64.1	39 19.2	15 77	62.2	39 31.7	13 76	60.3	39 45.3	10 74	57.7	39 48.2	09 73	57.1	39 50.9	09 73	56.4	39 59.3	06 70	53.8	1
2	38 06.5	19 79	65.2	38 17.6	18 78	64.0	38 32.8	16 77	62.1	38 46.1	14 76	60.2	39 01.0	11 74	57.6	39 04.2	10 73	57.0	39 07.2	10 73	56.3	39 17.0	07 70	53.8	2
3	37 18.9	20 79	65.0	37 30.5	19 78	63.8	37 46.4	17 77	61.9	38 00.6	15 76	60.0	38 16.7	12 74	57.5	38 20.2	11 73	56.9	38 23.5	11 73	56.2	38 34.7	08 70	53.7	3
4	36 31.4	21 79	64.8	36 43.5	20 78	63.6	37 00.2	18 77	61.7	37 15.2	16 76	59.9	37 32.5	13 74	57.4	37 36.3	12 73	56.8	37 39.9	12 73	56.1	37 52.4	09 70	53.6	4
65	35 43.9	22 79	64.6	35 56.5	20 78	63.4	36 14.0	19 77	61.6	36 29.8	17 76	59.7	36 48.3	14 74	57.3	36 52.4	13 73	56.6	36 56.4	13 72	56.0	37 10.2	10 70	53.5	65
6	34 56.6	22 79	64.4	35 09.6	21 78	63.2	35 27.9	19 77	61.4	35 44.5	18 75	59.6	36 04.2	15 73	57.1	36 08.6	15 73	56.5	36 12.9	14 72	55.9	36 28.0	11 70	53.4	6
7	34 09.3	23 79	64.1	34 22.9	22 78	63.0	34 41.9	20 77	61.2	34 59.3	19 75	59.4	35 20.1	16 73	57.0	35 24.9	16 73	56.4	35 29.5	15 72	55.8	35 45.9	12 70	53.3	7
8	33 22.1	24 78	63.9	33 36.2	23 78	62.8	33 55.9	21 76	61.0	34 14.2	19 75	59.2	34 36.2	17 73	56.8	34 41.2	17 73	56.2	34 46.1	16 72	55.6	35 03.8	14 70	53.2	8
9	32 35.1	25 78	63.7	32 49.5	24 78	62.5	33 10.1	22 76	60.8	33 29.2	20 75	59.0	33 52.3	18 73	56.7	33 57.6	18 72	56.1	34 02.8	17 72	55.5	34 21.8	15 70	53.1	9
70	31 48.1	25 78	63.4	32 03.0	24 77	62.3	32 24.3	23 76	60.6	32 44.2	21 75	58.8	33 08.5	19 73	56.5	33 14.1	19 72	55.9	33 19.6	18 72	55.3	33 39.9	16 70	53.0	70
1	31 01.2	26 78	63.2	31 16.6	25 77	62.1	31 38.7	24 76	60.4	31 59.4	22 75	58.6	32 24.7	20 73	56.3	32 30.7	20 72	55.8	32 36.5	19 72	55.2	32 58.0	17 70	52.8	1
2	30 14.4	27 78	63.0	30 30.3	26 77	61.8	30 53.1	25 76	60.1	31 14.6	23 74	58.4	31 41.1	21 72	56.2	31 47.4	21 72	55.6	31 53.5	20 72	55.0	32 16.3	18 70	52.7	2
3	29 27.7	28 78	62.7	29 44.1	27 77	61.6	30 07.6	26 76	59.9	30 29.9	24 74	58.2	30 57.6	22 72	56.0	31 04.1	22 72	55.4	31 10.5	21 71	54.8	31 34.6	19 69	52.5	3
4	28 41.1	29 78	62.4	28 58.0	28 77	61.3	29 22.3	26 76	59.7	29 45.4	25 74	58.0	30 14.1	23 72	55.8	30 21.0	23 72	55.2	30 27.7	22 71	54.6	30 53.0	20 69	52.4	4
75	27 54.7	29 77	62.2	28 12.0	28 76	61.1	28 37.0	27 75	59.4	29 00.9	26 74	57.8	29 30.8	24 72	55.6	29 37.9	24 72	55.0	29 44.9	23 71	54.5	30 11.4	21 69	52.2	75
6	27 08.3	30 77	61.9	27 26.1	29 76	60.8	27 51.9	28 75	59.2	28 16.5	27 74	57.6	28 47.6	25 72	55.4	28 55.0	25 71	54.8	29 02.3	24 71	54.3	29 30.0	22 69	52.0	6
7	26 22.1	31 77	61.6	26 40.4	30 76	60.6	27 06.9	29 75	58.9	27 32.3	28 74	57.3	28 04.4	26 72	55.2	28 12.2	25 71	54.6	28 19.7	25 71	54.1	28 48.7	23 69	51.8	7
8	25 36.0	32 77	61.3	25 54.7	31 76	60.3	26 22.0	30 75	58.7	26 48.2	29 73	57.1	27 21.4	27 72	54.9	27 29.4	26 71	54.4	27 37.3	26 70	53.8	28 07.5	24 68	51.7	8
9	24 50.0	32 76	61.1	25 09.2	32 76	60.0	25 37.2	31 74	58.4	26 04.2	29 73	56.8	26 38.5	28 71	54.7	26 46.8	27 71	54.2	26 55.0	27 70	53.6	27 26.4	25 68	51.5	9
80	24 04.1	33 76	60.8	24 23.8	32 75	59.7	24 52.6	31 74	58.2	25 20.3	30 73	56.6	25 55.8	29 71	54.5	26 04.3	28 70	53.9	26 12.8	28 70	53.4	26 45.4	26 68	51.2	80
1	23 18.4	34 76	60.5	23 38.6	33 75	59.4	24 08.1	32 74	57.9	24 36.6	31 73	56.3	25 13.1	30 71	54.2	25 22.0	29 70	53.7	25 30.7	29 70	53.2	26 04.5	27 68	51.0	1
2	22 32.8	35 76	60.2	22 53.5	34 75	59.1	23 23.7	33 74	57.6	23 53.0	32 72	56.1	24 30.6	31 71	54.0	24 39.8	30 70	53.5	24 48.8	30 70	52.9	25 23.8	28 68	50.8	2
3	21 47.4	35 76	59.9	22 08.5	35 75	58.8	22 39.4	34 74	57.3	23 09.5	33 72	55.8	23 48.3	32 70	53.7	23 57.7	31 70	53.2	24 07.0	31 70	52.7	24 43.2	29 68	50.6	3
4	21 02.1	36 75	59.5	21 23.6	36 74	58.5	21 55.3	35 73	57.0	22 26.2	34 72	55.5	23 06.0	33 70	53.5	23 15.7	32 70	53.0	23 25.3	32 69	52.4	24 02.7	30 67	50.4	4
85	20 16.9	37 75	59.2	20 38.9	36 74	58.2	21 11.4	36 73	56.7	21 43.0	35 72	55.2	22 23.9	33 70	53.2	22 33.9	33 70	52.7	22 43.8	33 69	52.2	23 22.4	31 67	50.1	85
6	19 31.9	38 75	58.9	19 54.4	37 74	57.9	20 27.6	36 73	56.4	21 00.0	36 72	54.9	21 42.0	34 70	52.9	21 52.2	34 69	52.4	22 02.4	34 69	51.9	22 42.2	32 67	49.9	6
7	18 47.0	39 74	58.6	19 10.0	38 74	57.6	19 43.9	37 72	56.1	20 17.1	36 71	54.6	21 00.2	35 69	52.6	21 10.7	35 69	52.1	21 21.2	35 68	51.6	22 02.1	33 66	49.6	7
8	18 02.3	39 74	58.2	18 25.8	39 74	57.3	19 00.4	38 72	55.8	19 34.4	37 71	54.3	20 18.5	36 69	52.4	20 29.4	36 69	51.9	20 40.1	36 68	51.4	21 22.2	35 66	49.4	8
9	17 17.8	40 74	57.9	17 41.7	40 73	56.9	18 17.1	39 72	55.5	18 51.8	38 71	54.0	19 37.1	37 69	52.1	19 48.2	37 68	51.6	19 59.2	37 68	51.1	20 42.5	35 66	49.1	9
90	16 33.4	41 74	57.6	16 57.8	40 73	56.6	17 33.9	40 72	55.2	18 09.4	39 70	53.7	18 55.8	38 68	51.8	19 07.1	38 68	51.3	19 18.5	38 68	50.8	20 02.9	36 66	48.8	90

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
00	25 00.0	1.0 01	180.0	24 00.0	1.0 01	180.0	22 30.0	1.0 01	180.0	21 00.0	1.0 01	180.0	19 00.0	1.0 01	180.0	18 30.0	1.0 01	180.0	18 00.0	1.0 01	180.0	16 00.0	1.0 01	180.0	00
1	24 59.6	1.0 02	179.1	23 59.6	1.0 02	179.1	22 29.6	1.0 02	179.2	20 59.6	1.0 02	179.2	18 59.6	1.0 02	179.2	18 29.6	1.0 02	179.2	17 59.6	1.0 02	179.2	15 59.7	1.0 02	179.3	1
2	24 58.4	1.0 03	178.2	23 58.4	1.0 03	178.3	22 28.4	1.0 03	178.3	20 58.5	1.0 03	178.4	18 58.6	1.0 03	178.4	18 28.6	1.0 03	178.4	17 58.6	1.0 03	178.5	15 58.7	1.0 03	178.5	2
3	24 56.3	1.0 05	177.3	23 56.4	1.0 05	177.4	22 26.5	1.0 04	177.5	20 56.6	1.0 04	177.5	18 56.8	1.0 04	177.6	18 26.8	1.0 04	177.7	17 56.8	1.0 04	177.7	15 57.0	1.0 04	177.8	3
4	24 53.5	1.0 06	176.4	23 53.6	1.0 06	176.5	22 23.8	1.0 06	176.6	20 54.0	1.0 06	176.7	18 54.2	1.0 05	176.9	18 24.3	1.0 05	176.9	17 54.4	1.0 05	176.9	15 54.6	1.0 05	177.1	4
05	24 49.8	1.0 08	175.5	23 50.0	1.0 07	175.6	22 20.3	1.0 07	175.8	20 50.6	1.0 07	175.9	18 51.0	1.0 06	176.1	18 21.1	1.0 06	176.1	17 51.2	1.0 06	176.2	15 51.6	1.0 06	176.3	05
6	24 45.3	99 09	174.7	23 45.6	1.0 09	174.8	22 16.1	1.0 08	174.9	20 46.5	1.0 08	175.1	18 47.1	1.0 08	175.3	18 17.2	1.0 08	175.3	17 47.3	1.0 08	175.4	15 47.9	1.0 07	175.6	6
7	24 40.0	99 10	173.8	23 40.4	99 10	173.9	22 11.0	99 10	174.1	20 41.6	99 09	174.3	18 42.4	99 09	174.5	18 12.6	99 09	174.6	17 42.8	99 09	174.6	15 43.5	99 08	174.9	7
8	24 33.9	99 12	172.9	23 34.5	99 11	173.0	22 05.2	99 11	173.2	20 36.0	99 10	173.5	18 37.0	99 10	173.7	18 07.3	99 10	173.8	17 37.5	99 10	173.9	15 38.5	99 10	174.1	8
9	24 27.0	99 13	172.0	23 27.7	99 12	172.2	21 58.7	99 12	172.4	20 29.7	99 12	172.6	18 30.9	99 11	173.0	18 01.3	99 11	173.0	17 31.6	99 11	173.1	15 32.8	99 11	173.4	9
10	24 19.3	99 14	171.1	23 20.2	99 14	171.3	21 51.4	99 14	171.6	20 22.6	99 13	171.8	18 24.2	99 12	172.2	17 54.5	99 12	172.3	17 24.9	99 12	172.4	15 26.4	99 12	172.7	10
1	24 10.8	98 15	170.3	23 11.9	98 15	170.5	21 43.3	98 15	170.8	20 14.8	98 14	171.0	18 16.7	98 14	171.4	17 47.1	98 13	171.5	17 17.6	98 13	171.6	15 19.4	98 13	172.0	1
2	24 01.6	98 17	169.4	23 02.8	98 16	169.6	21 34.5	98 16	169.9	20 06.2	98 16	170.2	18 08.5	98 15	170.6	17 39.0	98 14	170.7	17 09.6	98 14	170.8	15 11.8	98 14	171.2	2
3	23 51.5	98 18	168.5	22 52.9	98 18	168.8	21 25.0	98 17	169.1	19 57.0	98 17	169.4	17 59.6	98 16	169.9	17 30.3	98 16	170.0	17 00.9	98 16	170.1	15 03.4	98 15	170.5	3
4	23 40.7	97 19	167.7	22 42.3	97 19	167.9	21 14.7	97 18	168.3	19 47.0	97 18	168.6	17 50.0	97 17	169.1	17 20.8	98 17	169.2	16 51.5	98 17	169.3	14 54.5	98 16	169.8	4
15	23 29.1	97 21	166.8	22 30.9	97 20	167.1	21 03.7	97 20	167.5	19 36.3	97 19	167.9	17 39.8	97 18	168.4	17 10.6	97 18	168.5	16 41.5	97 18	168.6	14 44.9	97 17	169.1	15
6	23 16.7	96 22	166.0	22 18.8	97 21	166.2	20 51.9	97 21	166.7	19 24.9	97 20	167.1	17 28.9	97 19	167.6	16 59.8	97 19	167.7	16 30.8	97 19	167.9	14 34.6	97 18	168.4	6
7	23 03.6	96 23	165.1	22 06.0	96 23	165.4	20 39.4	96 22	165.8	19 12.8	96 21	166.3	17 17.3	96 20	166.8	16 48.3	96 20	167.0	16 19.4	96 20	167.1	14 23.7	96 19	167.7	7
8	22 49.8	96 24	164.3	21 52.4	96 24	164.6	20 26.2	96 23	165.0	19 00.0	96 22	165.5	17 05.0	96 22	166.1	16 36.2	96 21	166.3	16 07.4	96 21	166.4	14 12.2	96 20	167.0	8
9	22 35.2	95 26	163.4	21 38.1	95 25	163.8	20 12.3	95 24	164.2	18 46.5	95 24	164.7	16 52.0	95 23	165.4	16 23.4	95 22	165.5	15 54.7	96 22	165.7	14 00.1	96 21	166.3	9
20	22 19.8	95 27	162.6	21 23.0	95 26	162.9	19 57.7	95 25	163.5	18 32.4	95 25	164.0	16 38.4	95 24	164.6	16 09.9	95 24	164.8	15 41.4	95 23	164.9	13 47.3	95 22	165.6	20
1	22 03.8	94 28	161.8	21 07.3	94 27	162.1	19 42.5	94 27	162.7	18 17.5	94 26	163.2	16 24.2	95 25	163.9	15 55.8	95 24	164.1	15 27.5	95 24	164.2	13 33.9	95 23	164.9	1
2	21 47.0	94 29	161.0	20 50.8	94 28	161.3	19 26.5	94 28	161.9	18 02.0	94 27	162.4	16 09.3	94 26	163.2	15 41.1	94 26	163.3	15 12.9	94 25	163.5	13 20.0	94 24	164.2	2
3	21 29.5	93 30	160.1	20 33.7	93 30	160.5	19 09.8	93 29	161.1	17 45.9	93 28	161.7	15 53.8	93 27	162.4	15 25.7	94 27	162.6	14 57.7	94 26	162.8	13 05.4	94 25	163.5	3
4	21 11.3	92 31	159.3	20 15.8	93 31	159.7	18 52.5	93 30	160.3	17 29.1	93 29	160.9	15 37.6	93 28	161.7	15 09.7	93 28	161.9	14 41.9	93 27	162.1	12 50.2	93 26	162.8	4
25	20 52.5	92 32	158.5	19 57.3	92 32	159.0	18 34.5	92 31	159.6	17 11.6	92 30	160.2	15 20.8	92 29	161.0	14 53.1	92 29	161.2	14 25.4	92 28	161.4	12 34.4	93 27	162.2	25
6	20 32.9	91 34	157.7	19 38.2	91 33	158.2	18 15.9	91 32	158.8	16 53.5	92 31	159.5	15 03.4	92 30	160.3	14 35.9	92 30	160.5	14 08.4	92 29	160.7	12 18.1	92 28	161.5	6
7	20 12.7	91 35	157.0	19 18.3	91 34	157.4	17 56.6	91 33	158.1	16 34.8	91 32	158.7	14 45.4	91 31	159.6	14 18.1	91 31	159.8	13 50.7	91 30	160.0	12 01.1	91 29	160.8	7
8	19 51.9	90 36	156.2	18 57.8	90 35	156.6	17 36.7	90 34	157.3	16 15.4	90 33	158.0	14 26.8	91 32	158.9	13 59.7	91 32	159.1	13 32.5	91 31	159.3	11 43.6	91 30	160.2	8
9	19 30.3	89 37	155.4	18 36.7	89 36	155.9	17 16.2	90 35	156.6	15 55.4	90 34	157.3	14 07.6	90 33	158.2	13 40.7	90 33	158.4	13 13.6	90 32	158.6	11 25.5	90 31	159.5	9
30	19 08.2	89 38	154.6	18 15.0	89 37	155.1	16 55.0	89 36	155.9	15 34.9	89 35	156.6	13 47.8	89 34	157.5	13 21.0	89 34	157.7	12 54.2	89 33	158.0	11 06.9	90 32	158.9	30
1	18 45.4	88 39	153.9	17 52.6	88 38	154.4	16 33.2	88 37	155.1	15 13.7	88 36	155.9	13 27.5	89 35	156.8	13 00.9	89 35	157.1	12 34.3	89 34	157.3	10 47.7	89 33	158.2	1
2	18 22.0	87 40	153.1	17 29.6	87 39	153.7	16 10.9	88 38	154.4	14 52.0	88 37	155.2	13 06.5	88 36	156.2	12 40.1	88 35	156.4	12 13.7	88 35	156.6	10 28.0	88 34	157.6	2
3	17 58.0	87 41	152.4	17 06.0	87 40	152.9	15 47.9	87 39	153.7	14 29.6	87 38	154.5	12 45.0	87 37	155.5	12 18.9	87 36	155.7	11 52.7	87 36	156.0	10 07.7	88 35	157.0	3
4	17 33.4	86 42	151.7	16 41.9	86 41	152.2	15 24.4	86 40	153.0	14 06.7	86 39	153.8	12 23.0	87 38	154.8	11 57.0	87 37	155.1	11 31.0	87 37	155.3	9 46.9	87 36	156.3	4
35	17 08.2	85 43	150.9	16 17.1	85 42	151.5	15 00.3	85 41	152.3	13 43.3	86 40	153.1	12 00.4	86 39	154.2	11 34.6	86 38	154.4	11 08.9	86 38	154.7	9 25.6	86 36	155.7	35
6	16 42.4	84 44	150.2	15 51.8	85 43	150.8	14 35.6	85 42	151.6	13 19.3	85 41	152.4	11 37.3	85 39	153.5	11 11.7	85 39	153.8	10 46.2	85 39	154.1	9 03.8	85 37	155.1	6
7	16 16.1	84 45	149.5	15 25.9	84 44	150.1	14 10.4	84 43	150.9	12 54.7	84 42	151.8	11 13.6	84 40	152.9	10 48.3	84 40	153.1	10 22.9	84 40	158.4	8 41.5	85 38	154.5	7
8	15 49.2	83 46	148.8	14 59.4	83 45	149.4	13 44.6	83 44	150.3	12 29.6	83 43	151.1	10 49.4	84 41	152.2	10 24.3	84 41	152.5	9 59.2	84 40	152.8	8 18.6	84 39	153.9	8
9	15 21.8	82 47	148.1	14 32.5	82 46	148.7	13 18.3	82 45	149.6	12 04.0	83 44	150.5	10 24.7	83 42	151.6	9 59.8	83 42	151.9	9 34.9	83 41	152.2	7 55.3	83 40	153.3	9
40	14 53.8	81 48	147.4	14 04.9	81 47	148.0	12 51.5	82 46	148.9	11 37.9	82 44	149.8	9 59.5	82 43	151.0	9 34.9	82 42	151.3	9 10.2	82 42	151.6	7 31.5	82 40	152.7	40
1	14 25.3	81 48	146.8	13 36.9	81 48	147.4	12 24.2	81 46	148.3	11 11.3	81 45	149.2	9 33.8	81 44	150.4	9 09.4	81 43	150.7	8 45.0	81 43	151.0	7 07.2	82 41	152.1	1
2	13 56.3	80 49	146.1	13 08.4	80 48	146.7	11 56.3	80 47	147.6	10 44.1	80 46	148.6	9 07.6	81 44	149.8	8 43.4	81 44	150.1	8 19.3	81 44	150.4	6 42.4	81 42	151.5	2
3	13 26.8	79 50	145.4	12 39.3	79 49	146.1	11 28.0	79 48	147.0	10 16.5	80 47	147.9	8 40.9	80 45	149.2	8 17.0	80 45	149.5	7 53.1	80 44	149.8	6 17.2	80 43	151.0	3
4	12 56.7	78 51	144.8	12 09.8	78 50	145.4	10 59.2	79 49	146.4	9 48.4	79 48	147.3	8 13.8	79 46	148.6	7 50.1	79 46	148.9	7 26.4	79 45	149.2	5 51.5	79 44	150.4	4
45	12 26.2	77 52	144.1	11 39.8	78 51	144.8	10 29.9	78 50	145.8	9 19.8	78 48	146.7	7 46.2	78 47	148.0	7 22.8	78 46	148.3	6 59.3	78 46	148.6	5 25.3	78 44	149.9	45
6	11 55.3	77 52	143.5	11 09.3	77 52	144.2	10 00.1	77 50	145.1	8 50.8	77 49	146.1	7 18.1	77 48	147.4	6 54.9	77 47	147.7	6 31.7	77 47	148.0				6
7	11 23.8	76 53	142.9	10 38.3	76 52	143.5	9 29.9	76 51	144.5	8 21.3	76 50	145.5	6 49.6	76 48	146.8	6 26.7	77 48	147.1	6 03.7	77 47	147.5				7
8	10 51.9	75 54	142.3	10 06.9	75 53	142.9	8 59.2	75 52	143.9	7 51.4	75 51	144.9	6 20.7	76 49	146.2	5 58.0	76 48	146.6	5 35.3	76 48	146.9				8
9	10 19.6	74 55	141.6	9 35.0	74 54	142.3	8 28.1	74 53	143.3	7 21.0	75 51	144.3	5 51.3	75 50	145.7	5 28.9	75 49	146.0	5 06.4	75 49	146.3				9
50	9 46.8	73 55	141.0	9 02.7	73 54	141.7	7 56.5	74 53	142.7	6 50.2	74 52	143.8	5 21.5	74 50	145.1										50
1	9 13.6	73 56	140.4	8 30.0	73 55	141.1	7 24.6	73 54	142.2	6 19.0	73 53	143.2													1
2	8 39.9	72 57	139.8	7 56.9	72 56	140.5	6 52.2	72 55	141.6	5 47.3	72 53	142.6													2
3	8 05.9	71 57	139.3	7 23.3	71 57	140.0	6 19.4	71 55	141.0	5 15.3	71 54	142.1													3
4	7 31.4	70 58	138.7	6 49.4	70 57	139.4	5 46.2	70 56	140.5																4
55	6 56.6	69 59	138.1	6 15.0	69 58	138.8	5 12.6	69 56	139.9																55
6	6 21.4	68 59	137.6	5 40.3	68 58	138.3																			6
7	5 45.8	68 60	137.0	5 05.2	68 59	137.7																			7
8	5 09.8	67 61	136.5																						8

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	° ′	Δt	°	
91	15 49.2	42 73	57.2	16 14.1	41 73	56.3	16 51.0	41 72	54.8	17 27.2	40 70	53.4	18 14.6	39 68	51.5	18 28.3	39 68	51.0	18 37.9	39 67	50.5	19 23.5	37 65	48.5	91
2	15 05.2	42 73	56.9	15 30.5	42 72	55.9	16 08.1	41 71	54.5	16 45.2	41 70	53.1	17 33.6	40 68	51.2	17 45.6	40 68	50.7	17 57.5	39 67	50.2	18 44.2	38 65	48.3	2
3	14 21.3	43 73	56.5	14 47.2	43 72	55.6	15 25.5	42 71	54.2	16 03.3	42 70	52.8	16 52.9	41 68	50.9	17 05.1	41 67	50.4	17 17.2	40 67	49.9	18 05.2	39 65	48.0	3
4	13 37.6	44 72	56.1	14 04.0	44 72	55.2	14 43.1	43 70	53.8	15 21.6	43 69	52.4	16 12.3	42 67	50.5	16 24.8	42 67	50.1	16 37.2	41 66	49.6	17 26.3	40 64	47.7	4
95	12 54.2	45 72	55.8	13 21.0	44 71	54.9	14 00.8	44 70	53.5	14 40.1	43 69	52.1	15 31.8	43 67	50.2	15 44.6	42 66	49.7	15 57.3	42 66	49.3	16 47.6	41 64	47.4	95
6	12 10.9	46 72	55.4	12 38.1	45 71	54.5	13 18.7	45 70	53.1	13 58.8	44 68	51.7	14 51.6	44 67	49.9	15 04.7	43 66	49.4	15 17.7	43 66	48.9	16 09.0	42 64	47.1	6
7	11 27.8	46 72	55.0	11 55.5	46 71	54.1	12 36.8	46 69	52.7	13 17.7	45 68	51.4	14 11.6	45 66	49.5	14 24.9	44 66	49.1	14 38.2	44 66	48.6	15 30.7	43 64	46.7	7
8	10 44.9	47 71	54.6	11 13.1	47 70	53.7	11 55.2	47 69	52.4	12 36.8	46 68	51.0	13 31.8	45 66	49.2	13 45.4	45 66	48.7	13 58.9	45 65	48.3	14 52.6	44 63	46.4	8
9	10 02.2	48 71	54.2	10 30.9	48 70	53.3	11 13.7	47 69	52.0	11 56.2	47 68	50.7	12 52.1	46 66	48.8	13 06.0	46 65	48.4	13 19.9	46 65	47.9	14 14.7	45 63	46.1	9
100	9 19.7	49 70	53.8	9 48.9	49 70	53.0	10 32.5	48 68	51.6	11 15.7	48 67	50.3	12 12.7	47 65	48.5	12 26.9	47 65	48.0	12 41.0	47 64	47.6	13 37.0	46 62	45.8	100
1	8 37.4	50 70	53.4	9 07.1	49 69	52.6	9 51.4	49 68	51.2	10 35.4	49 67	49.9	11 33.6	48 65	48.1	11 48.0	48 64	47.7	12 02.4	48 64	47.2	12 59.5	47 62	45.4	1
2	7 55.4	50 70	53.0	8 25.6	50 69	52.2	9 10.6	50 68	50.8	9 55.4	50 66	49.5	10 54.6	49 64	47.8	11 09.3	49 64	47.3	11 24.0	49 64	46.9	12 22.2	48 62	45.1	2
3	7 13.6	51 69	52.6	7 44.3	51 68	51.8	8 30.1	51 67	50.4	9 15.6	50 66	49.1	10 15.9	50 64	47.4	10 30.8	50 64	46.9	10 45.8	50 63	46.5	11 45.2	49 61	44.7	3
4	6 32.0	52 69	52.2	7 03.2	52 68	51.3	7 49.7	52 67	50.0	8 36.0	51 66	48.7	9 37.4	51 64	47.0	9 52.6	51 63	46.6	10 07.8	51 63	46.1	11 08.4	50 61	44.4	4
105	5 50.7	53 68	51.8	6 22.3	53 68	50.9	7 09.6	52 66	49.6	7 56.7	52 65	48.3	8 59.1	52 63	46.6	9 14.6	52 63	46.2	9 30.1	52 62	45.7	10 31.8	51 60	44.0	105
6	5 08.6	54 68	51.3	5 41.7	53 67	50.5	6 29.8	53 66	49.2	7 17.6	53 65	47.9	8 21.1	53 63	46.2	8 36.9	53 62	45.8	8 52.7	53 62	45.4	9 55.4	52 60	43.6	6
7				5 01.3	54 67	50.1	5 50.1	54 66	48.8	6 38.8	54 64	47.5	7 43.3	54 62	45.8	7 59.4	54 62	45.4	8 15.4	53 62	45.0	9 19.4	53 60	43.3	7
8							5 10.8	55 66	48.4	6 00.2	55 64	47.1	7 05.8	55 62	45.4	7 22.2	54 62	45.0	7 38.5	54 61	44.6	8 43.5	54 59	42.9	8
9										5 21.9	56 64	46.7	6 28.6	55 62	45.0	6 45.2	55 61	44.6	7 01.8	55 61	44.2	8 08.0	55 59	42.5	9
110													5 51.6	56 61	44.6	6 08.5	56 61	44.2	6 25.4	56 60	43.8	7 32.6	56 58	42.1	110
1													5 14.9	57 61	44.2	5 32.1	57 60	43.8	5 49.2	57 60	43.3	6 57.6	57 58	41.7	1
2																			5 13.3	58 60	42.9	6 22.9	58 58	41.3	2
3																						5 48.4	59 57	40.9	3
4																						5 14.2	60 57	40.4	4

Lat. 29°

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	Alt.	Δd	Az.	
°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	′	Δt	°	
00	73 00.0	1.0 02	00.0	72 00.0	1.0 02	00.0	70 30.0	1.0 02	00.0	69 30.0	1.0 01	00.0	68 30.0	1.0 01	00.0	67 30.0	1.0 01	00.0	66 30.0	1.0 01	00.0	65 00.0	1.0 01	00.0	00
1	72 58.9	1.0 06	02.4	71 59.0	1.0 05	02.2	70 29.1	1.0 04	02.0	69 29.2	1.0 04	01.9	68 29.2	1.0 04	01.7	67 29.3	1.0 04	01.6	66 29.3	1.0 04	01.5	64 59.4	1.0 03	01.4	1
2	72 55.7	99 09	04.7	71 56.0	1.0 08	04.4	70 26.4	1.0 08	04.0	69 26.6	1.0 07	03.7	68 26.8	1.0 06	03.5	67 27.0	1.0 06	03.2	66 27.2	1.0 06	03.0	64 57.5	1.0 05	02.8	2
3	72 50.3	99 12	07.1	71 50.9	99 12	06.6	70 21.8	99 10	05.9	69 22.4	99 10	05.5	68 22.9	99 09	05.2	67 23.3	99 09	04.9	66 23.7	99 08	04.6	64 54.3	99 07	04.2	3
4	72 42.7	98 16	09.4	71 44.0	98 15	08.7	70 15.5	98 13	07.9	69 16.5	99 12	07.4	68 17.3	99 12	06.9	67 18.1	99 11	06.5	66 18.9	99 10	06.1	64 49.8	99 10	05.5	4
05	72 33.2	97 19	11.7	71 35.0	97 18	10.8	70 07.5	97 16	09.8	69 09.0	98 15	09.2	68 10.3	98 14	08.6	67 11.5	98 13	08.0	66 12.6	98 12	07.6	64 44.2	98 12	06.9	05
6	72 21.6	96 22	13.9	71 24.2	96 21	12.9	69 57.7	96 19	11.7	68 59.8	97 18	10.9	68 01.7	97 17	10.2	67 03.5	97 16	09.6	66 05.1	97 15	09.0	64 37.3	98 14	08.2	6
7	72 08.0	94 26	16.0	71 11.6	94 24	14.9	69 46.3	95 22	13.5	68 49.1	96 20	12.7	67 51.6	96 19	11.9	66 54.0	96 18	11.1	65 56.2	97 17	10.5	64 29.1	97 16	09.6	7
8	71 52.6	92 29	18.1	70 57.2	93 27	16.9	69 33.2	94 24	15.3	68 36.8	94 23	14.4	67 40.1	95 22	13.5	66 43.2	95 20	12.7	65 46.0	96 19	11.9	64 19.8	96 18	10.9	8
9	71 35.4	90 32	20.1	70 41.1	91 30	18.8	69 18.6	92 27	17.1	68 23.1	93 25	16.0	67 27.2	93 24	15.0	66 31.0	94 22	14.1	65 34.5	94 21	13.3	64 09.3	95 19	12.2	9
10	71 16.5	88 34	22.1	70 23.4	89 32	20.7	69 02.5	91 29	18.8	68 07.9	91 28	17.6	67 12.9	92 26	16.6	66 17.5	93 24	15.6	65 21.8	93 23	14.7	63 57.7	94 21	13.4	10
1	70 56.0	86 37	23.9	70 04.1	87 35	22.4	68 44.9	89 32	20.4	67 51.3	90 30	19.2	66 57.3	90 28	18.1	66 02.8	91 27	17.0	65 07.9	92 25	16.0	63 44.9	93 23	14.7	1
2	70 34.0	84 39	25.7	69 43.3	85 37	24.2	68 25.9	87 34	22.0	67 33.4	88 32	20.7	66 40.4	89 30	19.5	65 46.8	90 28	18.4	64 52.8	90 27	17.3	63 31.1	91 25	15.9	2
3	70 10.5	81 41	27.4	69 21.2	83 39	25.8	68 05.6	85 36	23.5	67 14.2	86 34	22.2	66 22.2	87 32	20.9	65 29.7	88 30	19.7	64 36.6	89 29	18.6	63 16.2	90 26	17.1	3
4	69 45.7	79 44	29.1	68 57.7	81 41	27.4	67 44.0	83 38	25.0	66 53.8	84 36	23.6	66 02.9	85 34	22.3	65 11.4	86 32	21.0	64 19.3	87 30	19.9	63 00.2	88 28	18.3	4
15	69 19.5	77 46	30.6	68 33.0	79 43	28.9	67 21.2	81 40	26.4	66 32.2	82 38	25.0	65 42.5	84 36	23.6	64 52.0	85 34	22.3	64 01.0	86 32	21.1	62 43.3	87 30	19.4	15
6	68 52.2	74 47	32.1	68 07.0	76 45	30.3	66 57.2	79 42	27.8	66 09.5	80 40	26.3	65 21.0	82 38	24.9	64 31.6	83 36	23.5	63 41.6	84 34	22.2	62 25.4	85 31	20.5	6
7	68 23.8	72 49	33.5	67 40.0	74 47	31.7	66 32.2	77 43	29.1	65 45.8	78 41	27.6	64 58.4	80 39	26.1	64 10.2	81 37	24.7	63 21.2	82 35	23.4	62 06.6	84 33	21.6	7
8	67 54.4	70 51	34.8	67 12.0	72 48	32.9	66 06.2	74 45	30.4	65 21.0	76 43	28.8	64 34.8	78 41	27.3	63 47.8	79 39	25.8	63 00.0	80 37	24.5	61 46.9	82 34	22.6	8
9	67 23.9	67 52	36.0	66 43.0	69 50	34.2	65 39.2	72 46	31.6	64 55.3	74 44	29.9	64 10.3	76 42	28.4	63 24.5	77 40	26.9	62 37.8	79 38	25.5	61 26.3	80 36	23.6	9
20	66 52.6	65 54	37.2	66 13.1	67 51	35.3	65 11.3	70 48	32.7	64 28.7	72 46	31.0	63 45.0	74 44	29.5	63 00.3	75 42	28.0	62 14.7	77 40	26.6	61 04.9	79 37	24.6	20
1	66 20.5	62 55	38.3	65 42.3	65 53	36.4	64 42.5	68 49	33.8	64 01.2	70 47	32.1	63 18.7	72 45	30.5	62 35.3	73 43	29.0	61 50.9	75 41	27.5	60 42.7	77 38	25.5	1
2	65 47.5	60 56	39.4	65 10.7	63 54	37.5	64 13.0	66 50	34.8	63 32.9	68 48	33.1	62 51.7	70 46	31.5	62 09.4	71 44	30.0	61 26.2	73 42	28.5	60 19.7	75 40	26.4	2
3	65 13.9	58 57	40.4	64 38.4	60 55	38.5	63 42.7	64 52	35.8	63 03.9	66 50	34.1	62 23.9	68 48	32.4	61 42.9	69 46	30.9	61 00.8	71 44	29.4	59 56.0	73 41	27.3	3
4	64 39.6	56 58	41.3	64 05.4	58 56	39.4	63 11.6	61 53	36.7	62 34.1	64 51	35.0	61 55.4	65 49	33.3	61 15.6	67 47	31.8	60 34.7	69 45	30.3	59 31.6	71 42	28.1	4
25	64 04.6	53 59	42.2	63 31.8	56 57	40.3	62 39.9	59 54	37.6	62 03.7	61 52	35.9	61 26.2	63 50	34.2	60 47.6	65 48	32.6	60 07.9	67 46	31.1	59 06.5	69 43	28.9	25
6	63 29.1	51 60	43.0	62 57.6	54 58	41.1	62 07.6	57 55	38.4	61 32.7	59 53	36.7	60 56.4	61 51	35.0	60 19.0	63 49	33.4	59 40.5	65 47	31.9	58 40.8	68 44	29.7	6
7	62 53.0	49 61	43.8	62 22.8	52 59	41.9	61 34.7	55 56	39.2	61 01.0	57 54	37.5	60 26.0	59 52	35.8	59 49.8	61 50	34.2	59 12.5	63 48	32.7	58 14.5	66 45	30.5	7
8	62 16.5	47 62	44.5	61 47.5	50 60	42.6	61 01.3	53 56	39.9	60 28.8	55 54	38.2	59 55.0	57 52	36.6	59 20.0	59 50	35.0	58 43.9	61 49	33.4	57 47.6	64 46	31.2	8
9	61 39.5	45 62	45.2	61 11.7	47 60	43.3	60 27.4	51 58	40.7	59 56.1	53 55	38.9	59 23.5	55 53	37.3	58 49.7	57 52	35.7	58 14.7	59 50	34.1	57 20.2	62 47	31.9	9
30	61 02.0	43 63	45.8	60 35.5	45 61	44.0	59 52.9	49 58	41.3	59 22.9	51 56	39.6	58 51.5	53 54	37.9	58 18.8	55 52	36.3	57 45.0	57 50	34.8	56 52.2	60 48	32.5	30
1	60 24.2	41 64	46.4	59 58.9	43 62	44.6	59 18.1	47 59	41.9	58 49.2	49 57	40.2	58 18.9	51 55	38.6	57 47.5	53 53	37.0	57 14.8	55 51	35.4	56 23.7	58 48	33.2	1
2	59 46.0	39 64	47.0	59 21.8	42 62	45.2	58 42.8	45 60	42.5	58 15.1	47 58	40.8	57 46.0	49 56	39.2	57 15.7	52 54	37.6	56 44.2	53 52	36.0	55 54.8	56 49	33.8	2
3	59 07.5	37 65	47.5	58 44.4	40 63	45.7	58 07.1	43 60	43.1	57 40.5	45 58	41.4	57 12.6	48 56	39.8	56 43.5	50 54	38.2	56 13.1	52 52	36.6	55 25.4	54 50	34.3	3
4	58 28.6	35 65	48.0	58 06.7	38 63	46.2	57 31.1	41 61	43.6	57 05.6	44 59	42.0	56 38.9	46 57	40.3	56 10.8	48 55	38.7	55 41.6	50 53	37.2	54 55.6	52 50	34.9	4
35	57 49.5	34 66	48.4	57 28.7	36 64	46.7	56 54.7	39 61	44.1	56 30.4	42 59	42.5	56 04.7	44 57	40.8	55 37.8	46 56	39.2	55 09.7	48 54	37.7	54 25.4	51 51	35.4	35
6	57 10.1	32 66	48.9	56 50.3	34 64	47.1	56 18.0	38 62	44.6	55 54.8	40 60	42.9	55 30.3	42 58	41.3	55 04.5	44 56	39.7	54 37.5	46 54	38.2	53 54.8	49 52	35.9	6
7	56 30.5	30 66	49.3	56 11.8	32 65	47.5	55 41.0	36 62	45.0	55 18.9	38 60	43.4	54 55.5	40 58	41.8	54 30.8	42 57	40.2	54 04.9	44 55	38.6	53 23.8	47 52	36.4	7
8	55 50.6	28 67	49.6	55 32.9	31 65	47.9	55 03.8	34 62	45.4	54 42.7	36 61	43.8	54 20.4	38 59	42.2	53 56.7	40 57	40.6	53 31.9	42 55	39.1	52 52.5	45 53	36.8	8
9	55 10.5	27 67	50.0	54 53.9	29 66	48.3	54 26.3	32 63	45.8	54 06.3	34 61	44.2	53 45.0	37 60	42.6	53 22.4	39 58	41.0	52 58.7	41 56	39.5	52 29.9	43 53	37.3	9
40	54 30.3	25 67	50.3	54 14.6	27 66	48.6	53 48.5	31 63	46.2	53 29.6	33 62	44.6	53 09.3	35 60	43.0	52 47.8	37 58	41.4	52 25.2	39 56	39.9	51 49.0	42 54	37.7	40
1	53 49.8	23 68	50.6	53 35.1	26 66	48.9	53 10.6	29 64	46.5	52 52.6	31 62	44.9	52 33.4	33 60	43.3	52 13.0	35 58	41.8	51 51.3	37 57	40.3	51 16.8	40 54	38.1	1
2	53 09.2	22 68	50.8	52 55.5	24 66	49.2	52 32.4	27 64	46.8	52 15.5	29 62	45.2	51 57.3	31 61	43.7	51 37.9	33 59	42.1	51 17.3	35 57	40.6	50 44.3	38 54	38.4	2
3	52 28.5	20 68	51.1	52 15.7	22 67	49.5	51 54.1	26 64	47.1	51 38.1	28 62	45.5	51 20.9	30 61	44.0	51 02.5	32 59	42.5	50 43.0	34 58	41.0	50 11.6	36 55	38.8	3
4	51 47.6	19 68	51.3	51 35.7	21 67	49.7	51 15.6	24 64	47.4	51 00.6	26 63	45.8	50 44.4	28 61	44.3	50 27.0	30 60	42.8	50 08.5	32 58	41.3	49 38.6	35 55	39.1	4
45	51 06.6	17 68	51.5	50 55.6	19 67	49.9	50 36.9	22 65	47.6	50 22.9	24 63	46.1	50 07.7	26 62	44.6	49 51.3	28 60	43.1	49 33.7	30 58	41.6	49 05.4	33 56	39.4	45
6	50 25.5	16 69	51.7	50 15.4	18 67	50.1	49 58.1	21 65	47.8	49 45.0	23 63	46.3	49 30.8	25 62	44.8	49 15.4	27 60	43.3	48 58.8	28 58	41.9	48 32.0	31 56	39.7	6
7	49 44.3	14 69	51.8	49 35.1	16 67	50.3	49 19.1	19 65	48.0	49 07.0	21 64	46.5	48 53.7	23 62	45.0	48 39.3	25 60	43.6	48 23.7	27 59	42.1	47 58.4	30 56	39.9	7
8	49 03.0	13 69	52.0	48 54.7	15 68	50.5	48 40.0	18 65	48.2	48 28.8	20 64	46.7	48 16.5	22 62	45.3	48 03.0	23 61	43.8	47 48.5	25 59	42.3	47 24.6	28 57	40.2	8
9	48 21.6	11 69	52.1	48 14.2	13 68	50.6	48 00.9	16 66	48.4	47 50.6	18 64	46.9	47 39.6	20 62	45.5	47 26.6	22 61	44.0	47 13.0	24 59	42.6	46 50.6	26 57	40.4	9
50	47 40.2	10 69	52.2	47 33.6	12 68	50.7	47 21.6	15 66	48.5	47 12.2	17 64	47.1	47 01.7	18 63	45.6	46 50.1	20 61	44.2	46 37.5	22 60	42.8	46 16.5	25 57	40.7	50
1	46 58.7	09 69	52.3	46 52.9	11 68	50.8	46 42.2	13 66	48.7	46 33.7	15 64	47.2	46 24.1	17 63	45.8	46 13.5	19 61	44.4	46 01.8	20 60	43.0	45 42.3	23 57	40.9	1
2	46 17.1	07 69	52.4	46 12.2	09 68	50.9	46 02.8	12 66	48.8	45 55.2	14 64	47.4	45 46.5	15 63	45.9	45 36.7	17 61	44.5	45 26.0	19 60	43.1	45 07.9	21 58	41.0	2
3	45 35.6	06 69	52.5	45 31.4	08 68	51.0	45 23.3	10 66	48.9	45 16.5	12 64	47.5	45 08.7	14 63	46.1	44 59.9	16 62	44.7	44 50.0	17 60	43.3	44 33.4	20 58	41.2	3
4	44 53.9	05 69	52.5	44 50.6	06 68	51.1	44 43.7	09 66	49.0	44 37.8	11 65	47.6	44 30.9	12 63	46.2	44 22.9	14 62	44.8	44 14.0	16 60	43.4	43 58.7	18 58	41.4	4
55	44 12.3	03 70	52.5	44 09.8	05 68	51.1	44 04.1	08 66	49.1	43 59.0	09 65	47.7	43 53.0	11 63	46.3	43 45.9	13 62	44.9	43 37.9	14 60	43.5	43 24.0	17 58	41.5	55
6	43 30.6	02 70	52.6	43 28.9	04 68	51.2	43 24.4	06 66	49.1	43 20.2	08 65	47.8	43 15.0	09 63	46.4	43 08.8	11 62	45.0	43 01.7	13 60	43.7	42 49.2	15 58	41.6	6
7	42 49.0	01 70	52.6	42 48.0	02 68	51.2	42 44.7	05 66	49.2	42 41.3	06 65	47.8	42 37.0	08 64	46.5	42 31.7	10 62	45.1	42 25.4	11 60	43.8	42 14.3	14 58	41.7	7
8	42 07.3	00 70	52.6	42 07.1	01 68	51.2	42 05.0	03 66	49.2	42 02.4	05 65	47.9	41 58.9	07 64	46.5	41 54.5	08 62	45.2	41 49.1	10 61	43.8	41 39.3	12 58	41.8	8
9	41 25.6	02 70	52.6	41 26.2	00 68	51.2	41 25.3	02 66	49.2	41 23.5	04 65	47.9	41 20.8	05 64	46.6	41 17.2	07 62	45.2	41 12.7	08 61	43.9	41 04.3	11 58	41.9	9
60	40 43.9	03 69	52.6	40 45.2	01 68	51.2	40 45.5	01 66	49.3	40 44.6	02 65	47.9	40 42.7	04 64	46.6	40 40.0	05 62	45.3	40 36.3	07 61	44.0	40 29.2	09 59	42.0	60
1	40 02.3	04 69	52.5	40 04.3	03 68	51.2	40 05.7	00 66	49.3	40 05.6	01 65	47.9	40 04.6	02 64	46.6	40 02.6	04 62	45.3	39 59.9	05 61	44.0	39 54.0	08 59	42.1	1
2	39 20.6	05 69	52.5	39 23.4	04 68	51.2	39 26.0	02 66	49.2	39 26.6	00 65	47.9	39 26.4	01 64	46.7	39 25.3	03 62	45.4	39 23.4	04 61	44.1	39 18.8	06 59	42.1	2
3	38 39.0	07 69	52.4	38 42.6	05 68	51.1	38 46.2	03 66	49.2	38 47.7	02 65	47.9	38 48.2	00 64	46.7	38 48.0	01 62	45.4	38 46.9	03 61	44.1	38 43.6	05 59	42.2	3
4	37 57.5	08 69	52.4	38 01.7	06 68	51.1	38 06.5	04 66	49.2	38 08.7	03 65	47.9	38 10.1	02 64	46.6	38 10.6	00 62	45.4	38 10.3	01 61	44.1	38 08.4	03 59	42.2	4
65	37 15.9	09 69	52.3	37 20.9	08 68	51.0	37 26.8	06 66	49.2	37 29.8	04 65	47.9	37 31.9	03 64	46.6	37 33.3	02 62	45.4	37 33.8	00 61	44.1	37 33.1	02 59	42.2	65
6	36 34.4	10 69	52.2	36 40.1	09 68	51.0	36 47.1	07 66	49.1	36 50.8	06 65	47.9	36 53.8	04 64	46.6	36 55.9	03 62	45.4	36 57.3	02 61	44.1	36 57.9	00 59	42.2	6
7	35 53.0	11 69	52.1	35 59.4	10 68	50.9	36 07.5	08 66	49.0	36 12.0	07 65	47.8	36 15.7	06 64	46.6	36 18.6	04 62	45.3	36 20.8	03 61	44.1	36 22.6	01 59	42.2	7
8	35 11.6	12 69	52.0	35 18.7	11 68	50.8	35 27.9	09 66	49.0	35 33.1	08 65	47.7	35 37.6	07 64	46.5	35 41.3	06 62	45.3	35 44.3	04 61	44.1	35 47.3	02 59	42.2	8
9	34 30.3	14 69	51.9	34 38.0	12 68	50.7	34 48.3	11 66	48.9	34 54.3	09 65	47.7	34 59.5	08 63	46.5	35 04.0	07 62	45.2	35 07.8	06 61	44.0	35 12.1	04 59	42.2	9
70	33 49.0	15 69	51.8	33 57.5	13 68	50.6	34 08.8	12 66	48.8	34 15.5	11 64	47.6	34 21.5	09 63	46.4	34 26.8	08 62	45.2	34 31.3	07 61	44.0	34 36.9	05 59	42.2	70
1	33 07.8	16 68	51.7	33 16.9	15 67	50.5	33 29.4	13 66	48.7	33 36.8	12 64	47.5	33 43.5	11 63	46.3	33 49.6	09 62	45.1	33 54.9	08 61	43.9	34 01.6	07 59	42.1	1
2	32 26.7	17 68	51.5	32 36.5	16 67	50.4	32 50.0	14 66	48.6	32 58.1	13 64	47.4	33 05.6	12 63	46.2	33 12.4	11 62	45.0	33 18.6	10 61	43.8	33 26.5	08 58	42.1	2
3	31 45.7	18 68	51.4	31 56.1	17 67	50.2	32 10.6	15 65	48.5	32 19.5	14 64	47.3	32 27.7	13 63	46.1	32 35.3	12 62	45.0	32 42.2	11 60	43.8	32 51.3	09 58	42.0	3
4	31 04.7	19 68	51.2	31 15.8	18 67	50.1	31 31.4	16 65	48.4	31 41.0	15 64	47.2	31 49.9	14 63	46.0	31 58.3	13 62	44.9	32 05.9	12 60	43.7	32 16.2	11 58	41.9	4
75	30 23.8	20 68	51.1	30 35.6	19 67	49.9	30 52.2	18 65	48.2	31 02.5	17 64	47.1	31 12.2	16 63	45.9	31 21.3	15 62	44.8	31 29.7	14 60	43.6	31 41.2	12 58	41.9	75
6	29 43.1	21 68	50.9	29 55.5	20 67	49.8	30 13.1	19 65	48.1	30 24.1	18 64	46.9	30 34.6	17 63	45.8	30 44.4	16 62	44.6	30 53.6	15 60	43.5	31 06.2	13 58	41.8	6
7	29 02.4	22 68	50.7	29 15.5	21 66	49.6	29 34.1	20 65	47.9	29 45.8	19 64	46.8	29 57.0	18 62	45.7	30 07.5	17 61	44.5	30 17.5	16 60	43.4	30 31.3	15 58	41.7	7
8	28 21.8	23 68	50.6	28 35.6	23 66	49.4	28 55.2	21 65	47.8	29 07.6	20 64	46.7	29 19.5	19 62	45.5	29 30.8	19 61	44.4	29 41.5	17 60	43.3	29 56.4	16 58	41.6	8
9	27 41.3	24 67	50.4	27 55.8	24 66	49.3	28 16.4	22 64	47.6	28 29.5	21 63	46.5	28 42.1	20 62	45.4	28 54.1	20 61	44.3	29 05.5	19 60	43.1	29 21.7	17 58	41.5	9
80	27 01.0	26 67	50.2	27 16.1	25 66	49.1	27 37.7	23 64	47.4	27 51.5	23 63	46.3	28 04.8	22 62	45.2	28 17.5	21 61	44.1	28 29.7	20 60	43.0	28 47.0	18 58	41.3	80
1	26 20.7	27 67	50.0	26 36.5	26 66	48.9	26 59.1	25 64	47.3	27 13.6	24 63	46.2	27 27.6	23 62	45.1	27 41.0	22 61	44.0	27 53.9	21 59	42.9	28 12.3	20 58	41.2	1
2	25 40.6	28 67	49.8	25 57.0	27 66	48.7	26 20.6	26 64	47.1	26 35.8	25 63	46.0	26 50.5	24 62	44.9	27 04.6	23 60	43.8	27 18.3	22 59	42.7	27 37.8	21 57	41.1	2
3	25 00.6	29 66	49.5	25 17.6	28 65	48.5	25 42.3	27 64	46.9	25 58.1	26 63	45.8	26 13.5	25 62	44.7	26 28.4	24 60	43.6	26 42.7	24 59	42.6	27 03.4	22 57	40.9	3
4	24 20.8	30 66	49.3	24 38.4	29 65	48.3	25 04.0	28 64	46.7	25 20.5	27 62	45.6	25 36.6	26 61	44.5	25 52.2	26 60	43.5	26 07.3	25 59	42.4	26 29.1	24 57	40.8	4
85	23 41.1	31 66	49.1	23 59.3	30 65	48.0	24 25.9	29 63	46.5	24 43.1	28 62	45.4	24 59.8	28 61	44.4	25 16.1	27 60	43.3	25 32.0	26 59	42.2	25 54.9	25 57	40.6	85
6	23 01.5	32 66	48.8	23 20.4	31 65	47.8	23 47.9	30 63	46.3	24 05.8	29 62	45.2	24 23.2	29 61	44.2	24 40.2	28 60	43.1	24 56.8	27 58	42.0	25 20.7	26 57	40.5	6
7	22 22.0	33 66	48.6	22 41.5	32 64	47.6	23 10.1	31 63	46.0	23 28.6	31 62	45.0	23 46.7	30 60	44.0	24 04.4	29 59	42.9	24 21.7	28 58	41.9	24 46.8	27 56	40.3	7
8	21 42.7	34 65	48.4	22 02.9	33 64	47.3	22 32.4	32 63	45.8	22 51.6	32 62	44.8	23 10.4	31 60	43.7	23 28.8	30 59	42.7	23 46.7	30 58	41.7	24 12.9	29 56	40.1	8
9	21 03.6	35 65	48.1	21 24.4	34 64	47.1	21 54.8	33 62	45.6	22 14.7	33 61	44.6	22 34.2	32 60	43.5	22 53.2	31 59	42.5	23 11.9	31 58	41.5	23 39.2	30 56	39.9	9
90	20 24.6	36 65	47.8	20 46.0	35 64	46.8	21 17.4	34 62	45.3	21 38.0	34 61	44.3	21 58.1	33 60	43.3	22 17.9	33 59	42.3	22 37.2	32 58	41.3	23 05.6	31 56	39.7	90

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	15 00.0	1.0 00	180.0	14 00.0	1.0 00	180.0	12 30.0	1.0 00	180.0	11 30.0	1.0 00	180.0	10 30.0	1.0 00	180.0	9 30.0	1.0 00	180.0	8 30.0	1.0 00	180.0	7 00.0	1.0 00	180.0	00
1	14 59.7	1.0 02	179.3	13 59.7	1.0 02	179.3	12 29.7	1.0 02	179.3	11 29.7	1.0 02	179.3	10 29.7	1.0 02	179.4	9 29.7	1.0 02	179.4	8 29.7	1.0 01	179.4	6 59.7	1.0 01	179.4	1
2	14 58.7	1.0 03	178.6	13 58.7	1.0 03	178.6	12 28.8	1.0 03	178.6	11 28.8	1.0 02	178.7	10 28.8	1.0 02	178.7	9 28.8	1.0 02	178.7	8 28.9	1.0 02	178.8	6 58.9	1.0 02	178.8	2
3	14 57.0	1.0 04	177.8	13 57.1	1.0 04	177.9	12 27.2	1.0 04	178.0	11 27.3	1.0 04	178.0	10 27.3	1.0 03	178.1	9 27.4	1.0 03	178.1	8 27.5	1.0 03	178.2	6 57.6	1.0 03	178.2	3
4	14 54.7	1.0 05	177.1	13 54.9	1.0 05	177.2	12 25.0	1.0 05	177.3	11 25.1	1.0 04	177.4	10 25.3	1.0 04	177.4	9 25.4	1.0 04	177.5	8 25.5	1.0 04	177.5	6 55.7	1.0 04	177.6	4
05	14 51.8	1.0 06	176.4	13 52.0	1.0 06	176.5	12 22.2	1.0 06	176.6	11 22.4	1.0 06	176.7	10 22.6	1.0 06	176.8	9 22.8	1.0 05	176.8	8 23.0	1.0 05	176.9	6 53.2	1.0 05	177.0	05
6	14 48.2	1.0 07	175.7	13 48.4	1.0 07	175.8	12 18.8	1.0 07	175.9	11 19.1	1.0 06	176.0	10 19.3	1.0 06	176.1	9 19.6	1.0 06	176.2	8 19.9	1.0 06	176.3	6 50.2	1.0 06	176.5	6
7	14 43.9	99 08	175.0	13 44.3	99 08	175.1	12 14.8	99 08	175.3	11 15.2	99 08	175.4	10 15.5	99 07	175.5	9 15.9	99 07	175.6	8 16.2	99 07	175.7	6 46.7	99 07	175.9	7
8	14 39.0	99 09	174.3	13 39.4	99 09	174.4	12 10.2	99 09	174.6	11 10.6	99 08	174.7	10 11.1	99 08	174.8	9 11.5	99 08	175.0	8 12.0	99 08	175.1	6 42.7	99 08	175.3	8
9	14 33.4	99 10	173.6	13 34.0	99 10	173.7	12 04.9	99 10	173.9	11 05.5	99 10	174.1	10 06.1	99 09	174.2	9 06.6	99 09	174.3	8 07.2	99 09	174.5	6 38.1	99 08	174.7	9
10	14 27.2	99 11	172.8	13 27.9	99 11	173.0	11 59.0	99 11	173.2	10 59.8	99 11	173.4	10 00.5	99 10	173.6	9 01.2	99 10	173.7	8 01.9	99 10	173.9	6 33.0	99 09	174.1	10
1	14 20.3	99 12	172.1	13 21.2	99 12	172.3	11 52.6	99 12	172.6	10 53.4	99 12	172.8	9 54.3	99 11	172.9	8 55.2	99 11	173.1	7 56.0	99 11	173.3	6 27.3	99 10	173.5	1
2	14 12.8	98 14	171.4	13 13.9	98 13	171.6	11 45.5	98 13	171.9	10 46.5	98 12	172.1	9 47.5	98 12	172.3	8 48.6	98 12	172.5	7 49.6	98 12	172.7	6 21.1	98 11	172.9	2
3	14 04.7	98 15	170.7	13 05.9	98 14	170.9	11 37.8	98 14	171.2	10 39.0	98 14	171.5	9 40.2	98 13	171.7	8 41.4	98 13	171.9	7 42.6	98 12	172.1	6 14.4	98 12	172.4	3
4	13 55.9	98 16	170.0	12 57.4	98 15	170.3	11 29.5	98 15	170.6	10 30.9	98 14	170.8	9 32.3	98 14	171.0	8 33.7	98 14	171.2	7 35.1	98 14	171.5	6 07.2	98 13	171.8	4
15	13 46.5	97 17	169.3	12 48.2	97 16	169.6	11 20.6	97 16	169.9	10 22.2	97 15	170.2	9 23.8	97 15	170.4	8 25.4	97 15	170.6	7 27.0	97 14	170.9	5 59.4	97 14	171.2	15
6	13 36.5	97 18	168.6	12 38.4	97 17	168.9	11 11.1	97 17	169.3	10 13.0	97 16	169.5	9 14.8	97 16	169.8	8 16.6	97 16	170.0	7 18.4	97 15	170.3	5 51.1	97 15	170.6	6
7	13 25.9	96 19	167.9	12 28.0	97 18	168.2	11 01.1	97 18	168.6	10 03.1	97 17	168.9	9 05.2	97 17	169.1	8 07.2	97 16	169.4	7 09.3	97 16	169.7	5 42.3	97 16	170.1	7
8	13 14.6	96 20	167.3	12 16.9	96 19	167.5	10 50.4	96 19	168.0	9 52.7	96 18	168.2	8 55.0	96 18	168.5	7 57.3	96 17	168.8	6 59.6	96 17	169.1	5 33.0	96 16	169.5	8
9	13 02.7	96 21	166.6	12 05.3	96 20	166.9	10 39.2	96 20	167.3	9 41.8	96 19	167.6	8 44.3	96 19	167.9	7 46.9	96 18	168.2	6 49.4	96 18	168.5	5 23.1	96 17	168.9	9
20	12 50.2	95 22	165.9	11 53.1	95 21	166.2	10 27.4	95 21	166.7	9 30.2	95 20	167.0	8 33.0	95 20	167.3	7 35.8	95 19	167.6	6 38.6	95 19	167.9	5 12.8	96 18	168.4	20
1	12 37.1	95 23	165.2	11 40.3	95 22	165.5	10 15.0	95 22	166.0	9 18.1	95 21	166.4	8 21.2	95 20	166.7	7 24.3	95 20	167.0	6 27.4	95 20	167.3	5 02.0	96 19	167.8	1
2	12 23.4	94 24	164.5	11 26.9	94 23	164.9	10 02.1	94 22	165.4	9 05.5	94 22	165.7	8 08.9	94 22	166.1	7 12.2	94 21	166.4	6 15.6	94 20	166.7				2
3	12 09.2	94 25	163.9	11 12.9	94 24	164.2	9 48.6	94 24	164.8	8 52.3	94 23	165.1	7 56.0	94 22	165.5	6 59.6	94 22	165.8	6 03.3	94 21	166.2				3
4	11 54.3	93 26	163.2	10 58.4	93 25	163.6	9 34.5	93 24	164.1	8 38.5	93 24	164.5	7 42.5	93 23	164.9	6 46.5	93 23	165.2	5 50.5	93 22	165.6				4
25	11 38.9	93 27	162.6	10 43.3	93 26	162.9	9 19.9	93 25	163.5	8 24.2	93 25	163.9	7 28.6	93 24	164.3	6 32.9	93 24	164.6	5 37.2	93 23	165.0				25
6	11 22.9	92 28	161.9	10 27.6	92 27	162.3	9 04.7	92 26	162.9	8 09.4	92 26	163.3	7 14.1	92 25	163.7	6 18.7	92 24	164.1	5 23.4	92 24	164.5				6
7	11 06.3	91 29	161.3	10 11.4	91 28	161.7	8 49.0	92 27	162.3	7 54.0	92 26	162.7	6 59.1	92 26	163.1	6 04.1	92 25	163.5	5 09.0	92 24	163.9				7
8	10 49.1	91 30	160.6	9 54.6	91 29	161.0	8 32.8	91 28	161.7	7 38.2	91 27	162.1	6 43.5	91 27	162.5	5 48.9	91 26	162.9							8
9	10 31.4	90 30	160.0	9 37.3	90 30	160.4	8 16.0	90 29	161.1	7 21.8	90 28	161.5	6 27.5	90 28	161.9	5 33.2	90 27	162.3							9
30	10 13.2	90 31	159.3	9 19.4	90 31	159.8	7 58.7	90 30	160.5	7 04.8	90 29	160.9	6 11.0	90 28	161.3	5 17.1	90 28	161.8							30
1	9 54.4	89 32	158.7	9 01.0	89 32	159.2	7 40.9	89 30	159.9	6 47.4	89 30	160.3	5 53.9	89 29	160.8	5 00.4	89 28	161.2							1
2	9 35.1	88 33	158.1	8 42.1	88 32	158.6	7 22.6	88 32	159.3	6 29.5	88 31	159.7	5 36.4	88 30	160.2										2
3	9 15.2	88 34	157.5	8 22.6	88 33	157.9	7 03.7	88 32	158.7	6 11.1	88 32	159.2	5 18.4	88 31	159.6										3
4	8 54.8	87 35	156.8	8 02.7	87 34	157.3	6 44.4	87 33	158.1	5 52.2	87 32	158.6													4
35	8 33.9	86 36	156.2	7 42.2	86 35	156.8	6 24.6	86 34	157.5	5 32.8	86 33	158.0													35
6	8 12.5	85 36	155.6	7 21.3	86 36	156.2	6 04.2	86 34	156.9	5 12.9	86 34	157.5													6
7	7 50.6	85 37	155.0	6 59.8	85 37	155.6	5 43.5	85 36	156.4																7
8	7 28.3	84 38	154.4	6 37.9	84 37	155.0	5 22.2	84 36	155.8																8
9	7 05.4	83 39	153.9	6 15.4	83 38	154.4	5 00.5	83 37	155.3																9
40	6 42.0	82 40	153.3	5 52.5	82 39	153.9																			40
1	6 18.2	82 40	152.7	5 29.2	82 40	153.3																			1
2	5 53.9	81 41	152.1	5 05.4	81 40	152.7																			2
3	5 29.2	80 42	151.6																						3
4	5 04.0	79 43	151.0																						4

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′			47° 00′			48° 30′			49° 30′			50° 30′			51° 30′			52° 30′			54° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
91	19 45.8	37 64	47.6	20 07.8	36 63	46.6	20 40.2	36 62	45.1	21 01.4	35 61	44.1	21 22.2	34 60	43.1	21 42.6	34 58	42.1	22 02.7	33 57	41.1	22 32.1	32 56	39.5	91
2	19 07.2	38 64	47.3	19 29.8	37 63	46.3	20 03.1	37 62	44.8	20 24.9	36 60	43.8	20 46.4	36 59	42.8	21 07.5	35 58	41.8	21 28.3	34 57	40.8	21 58.8	33 55	39.3	2
3	18 28.7	39 64	47.0	18 51.9	38 63	46.0	19 26.2	38 61	44.6	19 48.7	37 60	43.6	20 10.8	37 59	42.6	20 32.6	36 58	41.6	20 54.1	35 57	40.6	21 25.6	35 55	39.1	3
4	17 50.4	40 64	46.7	18 14.3	40 62	45.8	18 49.5	39 61	44.3	19 12.6	38 60	43.3	19 35.4	38 59	42.3	19 57.9	37 58	41.4	20 20.0	37 56	40.4	20 52.6	36 55	38.9	4
95	17 12.3	41 63	46.4	17 36.8	41 62	45.5	18 12.9	40 60	44.0	18 36.7	39 60	43.1	19 00.1	39 58	42.1	19 23.3	38 57	41.1	19 46.1	38 56	40.1	20 19.8	37 54	38.6	95
6	16 34.4	42 63	46.1	16 59.4	42 62	45.2	17 36.6	41 60	43.7	18 00.9	40 59	42.8	18 25.1	40 58	41.8	18 48.9	39 57	40.8	19 12.4	39 56	39.9	19 47.1	38 54	38.4	6
7	15 56.6	43 62	45.8	16 22.3	43 62	44.9	17 00.4	42 60	43.5	17 25.4	41 59	42.5	17 50.2	41 58	41.5	18 14.6	41 57	40.6	18 38.8	40 56	39.6	19 14.6	39 54	38.2	7
8	15 19.1	44 62	45.5	15 45.4	44 61	44.6	16 24.4	43 60	43.2	16 50.0	43 58	42.2	17 15.4	42 58	41.3	17 40.6	42 56	40.3	18 05.5	41 55	39.4	18 42.2	40 54	37.9	8
9	14 41.8	45 62	45.2	15 08.7	45 61	44.3	15 48.6	44 59	42.9	16 14.9	44 58	41.9	16 40.9	43 57	41.0	17 06.7	43 56	40.0	17 32.3	42 55	39.1	18 10.1	42 53	37.7	9
100	14 04.7	46 62	44.9	14 32.2	46 60	43.9	15 13.0	45 59	42.6	15 39.9	45 58	41.6	16 06.6	44 57	40.7	16 33.1	44 56	39.8	16 59.3	43 55	38.8	17 38.1	43 53	37.4	100
1	13 27.8	47 61	44.5	13 55.9	47 60	43.6	14 37.6	46 59	42.2	15 05.2	46 58	41.3	15 32.5	45 56	40.4	15 59.6	45 55	39.5	16 26.5	45 54	38.5	17 06.3	44 53	37.1	1
2	12 51.1	48 61	44.2	13 19.8	48 60	43.3	14 02.4	47 58	41.9	14 30.6	47 57	41.0	14 58.6	46 56	40.1	15 26.4	46 55	39.2	15 53.9	46 54	38.3	16 34.7	45 52	36.9	2
3	12 14.6	49 60	43.8	12 43.9	49 59	42.9	13 27.5	48 58	41.6	13 56.3	48 57	40.7	14 24.9	48 56	39.8	14 53.3	47 55	38.9	15 21.5	47 54	38.0	16 03.4	46 52	36.6	3
4	11 38.4	50 60	43.5	12 08.3	50 59	42.6	12 52.8	49 58	41.3	13 22.2	49 56	40.4	13 51.4	49 55	39.5	14 20.5	48 54	38.6	14 49.3	48 53	37.7	15 32.2	47 52	36.3	4
105	11 02.4	51 60	43.1	11 32.9	51 59	42.3	12 18.3	50 57	40.9	12 48.3	50 56	40.0	13 18.2	50 55	39.1	13 47.9	49 54	38.3	14 17.4	49 53	37.4	15 01.2	48 51	36.0	105
6	10 26.6	52 59	42.8	10 57.7	52 58	41.9	11 44.0	51 57	40.6	12 14.7	51 56	39.7	12 45.2	51 55	38.8	13 15.5	50 54	37.9	13 45.6	50 52	37.0	14 30.5	50 51	35.7	6
7	9 51.1	53 59	42.4	10 22.8	53 58	41.5	11 10.0	52 56	40.2	11 41.3	52 55	39.4	12 12.4	52 54	38.5	12 43.4	51 53	37.6	13 14.1	51 52	36.7	14 00.0	51 50	35.4	7
8	9 15.9	54 58	42.0	9 48.1	54 57	41.2	10 36.2	53 56	39.9	11 08.1	53 55	39.0	11 39.9	53 54	38.1	12 11.4	53 53	37.3	12 42.9	52 52	36.4	13 29.7	52 50	35.1	8
9	8 40.9	55 58	41.6	9 13.7	55 57	40.8	10 02.7	54 56	39.5	10 35.2	54 54	38.7	11 07.6	54 54	37.8	11 39.8	54 52	36.9	12 11.8	53 51	36.1	12 59.6	53 50	34.8	9
110	8 06.2	56 58	41.2	8 39.5	56 56	40.4	9 29.4	55 55	39.1	10 02.5	55 54	38.3	10 35.5	55 53	37.5	11 08.4	55 52	36.6	11 41.1	54 51	35.7	12 29.8	54 49	34.5	110
1	7 31.7	57 57	40.9	8 05.7	57 56	40.0	8 56.4	56 54	38.8	9 30.2	56 54	37.9	10 03.7	56 52	37.1	10 37.2	56 52	36.2	11 10.5	55 50	35.4	12 00.3	55 49	34.1	1
2	6 57.5	58 56	40.5	7 32.1	58 56	39.6	8 23.7	57 54	38.4	8 58.0	57 53	37.6	9 32.2	57 52	36.7	10 06.3	57 51	35.9	10 40.3	56 50	35.1	11 30.9	56 48	33.8	2
3	6 23.6	59 56	40.0	6 58.7	58 55	39.2	7 51.3	58 54	38.0	8 26.2	58 53	37.2	9 01.0	58 52	36.4	9 35.7	58 51	35.5	10 10.3	58 50	34.7	11 01.9	57 48	33.5	3
4	5 50.0	60 56	39.6	6 25.7	59 55	38.8	7 19.1	59 53	37.6	7 54.6	59 52	36.8	8 30.0	59 51	36.0	9 05.3	59 50	35.2	9 40.5	59 49	34.3	10 33.1	58 48	33.1	4
115	5 16.6	61 55	39.2	5 52.9	60 54	38.4	6 47.2	60 53	37.2	7 23.3	60 53	36.4	7 59.3	60 51	35.6	8 35.2	60 50	34.8	9 11.1	60 49	34.0	10 04.6	59 47	32.8	115
6				5 20.5	61 54	38.0	6 15.6	61 52	36.8	6 52.3	61 51	36.0	7 28.9	61 50	35.2	8 05.4	61 49	34.4	8 41.9	61 48	33.6	9 36.3	60 47	32.4	6
7							5 44.3	62 52	36.4	6 21.6	62 51	35.6	6 58.8	62 50	34.8	7 35.9	62 49	34.0	8 13.0	62 48	33.2	9 08.3	61 46	32.0	7
8							5 13.3	63 52	36.0	5 51.2	63 50	35.2	6 29.0	63 49	34.4	7 06.7	63 48	33.6	7 44.3	63 47	32.9	8 40.6	62 46	31.7	8
9										5 21.1	64 50	34.8	5 59.5	64 49	34.0	6 37.8	64 48	33.2	7 16.0	64 47	32.5	8 13.2	63 45	31.3	9
120													5 30.3	65 48	33.6	6 09.2	65 47	32.8	6 48.0	65 46	32.1	7 46.1	64 45	30.9	120
1													5 01.4	66 48	33.2	5 40.9	66 47	32.4	6 20.3	66 46	31.7	7 19.3	65 44	30.5	1
2																5 12.9	67 46	32.0	5 52.9	67 45	31.3	6 52.8	66 44	30.1	2
3																			5 25.8	68 45	30.9	6 26.6	67 43	29.7	3
4																						6 00.7	68 42	29.3	4
125																						5 35.2	69 42	28.9	125
6																						5 10.0	70 42	28.5	6

Lat. 29°

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	64 30.0	1.0 01	00.0	64 00.0	1.0 01	00.0	63 00.0	1.0 01	00.0	62 30.0	1.0 01	00.0	62 00.0	1.0 01	00.0	61 30.0	1.0 01	00.0	60 00.0	1.0 01	00.0	59 30.0	1.0 01	00.0	00
1	64 29.4	1.0 03	01.3	63 59.4	1.0 03	01.3	62 59.4	1.0 03	01.2	62 29.5	1.0 03	01.2	61 59.5	1.0 03	01.2	61 29.5	1.0 03	01.1	59 59.5	1.0 02	01.0	59 29.5	1.0 02	01.0	1
2	64 27.5	1.0 05	02.7	63 57.6	1.0 05	02.6	62 57.7	1.0 05	02.5	62 27.8	1.0 04	02.4	61 57.9	1.0 04	02.3	61 27.9	1.0 04	02.2	59 58.1	1.0 04	02.1	59 28.2	1.0 04	02.0	2
3	64 24.5	99 07	04.0	63 54.6	99 07	03.9	62 54.9	99 06	03.7	62 25.1	1.0 06	03.6	61 55.2	1.0 06	03.5	61 25.4	1.0 06	03.4	59 55.8	1.0 06	03.1	59 25.9	1.0 05	03.0	3
4	64 20.2	99 09	05.4	63 50.4	99 09	05.2	62 51.0	99 08	04.9	62 21.3	99 08	04.8	61 51.5	99 08	04.6	61 21.8	99 08	04.5	59 52.5	99 07	04.1	59 22.7	99 07	04.0	4
05	64 14.6	98 11	06.7	63 45.1	99 11	06.5	62 46.0	99 10	06.1	62 16.4	99 10	05.9	61 46.8	99 10	05.8	61 17.2	99 10	05.6	59 48.2	99 08	05.1	59 18.6	99 08	05.0	05
6	64 07.9	98 13	08.0	63 38.6	98 13	07.8	62 39.8	98 12	07.3	62 10.4	98 12	07.1	61 41.0	98 11	06.9	61 11.5	98 11	06.7	59 43.1	98 10	06.1	59 13.6	98 10	06.0	6
7	64 00.0	97 15	09.3	63 30.9	97 15	09.0	62 32.6	97 14	08.5	62 03.4	97 13	08.3	61 34.2	97 13	08.0	61 04.9	98 13	07.8	59 37.0	98 12	07.1	59 07.7	98 11	06.9	7
8	63 51.0	96 17	10.6	63 22.1	96 16	10.3	62 24.3	96 16	09.7	61 55.4	97 15	09.4	61 26.4	97 15	09.1	60 57.3	97 14	08.9	59 30.1	97 13	08.1	59 00.9	97 13	07.9	8
9	63 40.8	95 19	11.8	63 12.2	95 18	11.5	62 15.0	96 17	10.8	61 46.3	96 17	10.5	61 17.5	96 16	10.2	60 48.8	96 16	09.9	59 22.2	96 15	09.1	58 53.3	96 14	08.8	9
10	63 29.5	94 21	13.1	63 01.3	94 20	12.7	62 04.6	95 19	12.0	61 36.2	95 18	11.6	61 07.8	95 18	11.3	60 39.3	95 18	11.0	59 13.5	95 16	10.1	58 44.8	96 16	09.8	10
1	63 17.1	93 22	14.3	62 49.2	93 22	13.9	61 53.2	94 21	13.1	61 25.1	94 20	12.7	60 57.0	94 20	12.4	60 28.8	94 19	12.0	59 03.9	95 17	11.0	58 35.5	96 17	10.7	1
2	63 03.6	92 24	15.5	62 36.1	92 24	15.0	61 40.9	92 22	14.2	61 13.1	93 22	13.8	60 45.3	93 21	13.4	60 17.4	93 20	13.0	58 53.4	94 19	12.0	58 25.3	94 18	11.6	2
3	62 49.1	90 26	16.6	62 22.0	91 25	16.2	61 27.5	91 24	15.3	61 00.1	91 23	14.8	60 32.7	92 22	14.4	60 05.1	92 22	14.0	58 42.1	93 20	12.9	58 14.3	93 20	12.5	3
4	62 33.6	89 27	17.7	62 06.9	89 27	17.3	61 13.2	90 25	16.3	60 46.2	90 25	15.9	60 19.2	90 24	15.4	59 52.0	91 23	15.0	58 30.0	91 22	13.8	58 02.6	92 21	13.4	4
15	62 17.2	87 29	18.9	61 50.9	88 28	18.3	60 58.0	88 27	17.4	60 31.4	89 26	16.9	60 04.8	89 26	16.4	59 38.0	89 25	16.0	58 17.1	90 23	14.7	57 50.0	91 22	14.3	15
6	61 59.7	86 30	19.9	61 33.9	86 30	19.4	60 41.9	87 28	18.4	60 15.8	87 28	17.9	59 49.5	88 27	17.4	59 23.1	88 26	16.9	58 03.4	89 24	15.6	57 36.7	89 24	15.1	6
7	61 41.4	84 32	21.0	61 16.1	85 31	20.4	60 25.0	86 30	19.3	59 59.3	86 29	18.8	59 33.4	86 28	18.3	59 07.5	87 28	17.8	57 49.0	88 25	16.4	57 22.6	88 25	16.0	7
8	61 22.2	83 34	22.0	60 57.3	83 33	21.4	60 07.2	84 31	20.3	59 41.9	84 30	19.8	59 16.5	85 30	19.2	58 51.0	85 29	18.7	57 33.8	86 26	17.3	57 07.8	87 26	16.8	8
9	61 02.1	81 35	23.0	60 37.7	81 34	22.4	59 48.6	82 32	21.2	59 23.8	83 32	20.7	58 58.9	83 31	20.1	58 33.8	84 30	19.6	57 17.8	85 28	18.1	56 52.3	85 27	17.6	9
20	60 41.2	79 36	23.9	60 17.4	80 35	23.3	59 29.2	81 34	22.1	59 04.9	81 33	21.6	58 40.4	82 32	21.0	58 15.8	82 31	20.4	57 01.2	84 29	18.9	56 36.1	84 28	18.4	20
1	60 19.5	77 37	24.9	59 56.2	78 36	24.2	59 09.1	79 35	23.0	58 45.2	80 34	22.4	58 21.3	80 33	21.8	57 57.1	81 32	21.3	56 43.9	82 30	19.7	56 19.2	82 29	19.1	1
2	59 57.1	76 39	25.7	59 34.3	76 38	25.1	58 48.2	77 36	23.9	58 24.9	78 35	23.3	58 01.4	79 34	22.7	57 37.7	79 33	22.1	56 25.9	81 31	20.4	56 01.7	81 30	19.9	2
3	59 33.9	74 40	26.6	59 11.7	74 39	26.0	58 26.6	76 37	24.7	58 03.8	76 36	24.1	57 40.8	77 35	23.5	57 17.7	77 34	22.9	56 07.3	79 32	21.2	55 43.5	79 31	20.6	3
4	59 10.1	72 41	27.4	58 48.4	73 40	26.8	58 04.4	74 38	25.5	57 42.1	75 37	24.8	57 19.6	75 36	24.2	56 57.0	76 36	23.6	55 48.0	77 33	21.9	55 24.7	78 32	21.3	4
25	58 45.6	70 42	28.2	58 24.4	71 41	27.6	57 41.5	72 39	26.2	57 19.7	73 38	25.6	56 57.8	74 37	25.0	56 35.6	74 36	24.4	55 28.1	76 34	22.6	55 05.3	76 33	22.0	25
6	58 29.4	68 43	29.0	57 59.8	69 42	28.3	57 18.0	70 40	27.0	56 56.8	71 39	26.3	56 35.3	72 38	25.7	56 13.7	72 38	25.1	55 07.7	74 35	23.3	54 45.4	75 34	22.7	6
7	57 54.7	66 44	29.8	57 34.6	67 43	29.1	56 53.9	69 41	27.7	56 33.2	69 40	27.0	56 12.3	70 39	26.4	55 51.2	71 38	25.8	54 46.7	73 36	23.9	54 24.9	73 35	23.3	7
8	57 28.4	65 45	30.5	57 08.9	65 44	29.8	56 29.2	67 42	28.4	56 09.0	68 41	27.7	55 48.7	68 40	27.1	55 28.1	69 39	26.4	54 25.2	71 37	24.6	54 03.8	71 36	24.0	8
9	57 01.5	63 46	31.1	56 42.6	63 45	30.4	56 04.0	65 43	29.1	55 44.4	66 42	28.4	55 24.5	67 41	27.7	55 04.5	67 40	27.1	54 03.1	69 38	25.2	53 42.3	70 37	24.6	9
30	56 34.1	61 46	31.8	56 15.7	62 46	31.1	55 38.2	63 44	29.7	55 19.2	64 43	29.0	54 59.9	65 42	28.3	54 40.3	65 41	27.7	53 40.5	68 38	25.8	53 20.2	68 38	25.2	30
1	56 06.2	59 47	32.4	55 48.4	60 46	31.7	55 12.0	61 44	30.3	54 53.5	62 44	29.6	54 34.7	63 43	28.9	54 15.7	64 42	28.3	53 17.5	66 39	26.3	52 57.7	66 38	25.7	1
2	55 37.8	57 48	33.0	55 20.5	58 47	32.3	54 45.3	60 45	30.9	54 27.3	60 44	30.2	54 09.1	61 44	29.5	53 50.6	62 42	28.9	52 54.9	64 40	26.9	52 34.7	65 39	26.3	2
3	55 09.0	55 49	33.6	54 52.3	56 48	32.9	54 18.1	58 46	31.5	54 00.7	59 45	30.8	53 43.0	59 44	30.1	53 25.1	60 43	29.4	52 30.0	62 41	27.4	52 11.2	63 40	26.8	3
4	54 39.7	53 49	34.2	54 23.6	54 48	33.4	53 50.5	56 47	32.0	53 33.6	57 46	31.3	53 16.5	58 45	30.6	52 59.1	58 44	29.9	52 05.6	61 41	28.0	51 47.3	61 40	27.3	4
35	54 10.1	52 50	34.7	53 54.5	52 49	34.0	53 22.5	54 47	32.5	53 06.1	55 46	31.8	52 49.5	56 46	31.1	52 32.7	57 45	30.4	51 40.8	59 42	28.5	51 23.1	59 41	27.8	35
6	53 40.0	50 51	35.2	53 25.0	51 50	34.4	52 54.1	52 48	33.0	52 38.3	53 47	32.3	52 22.2	54 46	31.6	52 05.9	55 45	30.9	51 15.6	57 43	28.9	50 58.4	58 42	28.3	6
7	53 09.6	48 51	35.7	52 55.1	49 50	34.9	52 25.3	51 48	33.5	52 10.0	51 48	32.8	51 54.5	52 47	32.1	51 38.7	53 46	31.4	50 50.0	55 43	29.4	50 33.3	56 42	28.7	7
8	52 38.8	46 52	36.1	52 24.9	47 51	35.4	51 56.2	49 49	33.9	51 41.4	50 48	33.2	51 26.5	50 47	32.5	51 11.2	51 46	31.9	50 24.1	54 44	29.8	50 07.9	54 43	29.2	8
9	52 07.8	44 52	36.5	51 54.3	45 52	35.8	51 26.7	47 50	34.4	51 12.5	48 49	33.7	50 58.1	49 48	33.0	50 43.4	49 47	32.3	49 57.8	52 44	30.3	49 42.2	52 44	29.6	9
40	51 36.4	42 53	36.9	51 23.5	43 52	36.2	50 56.9	45 50	34.8	50 43.3	46 49	34.1	50 29.3	47 48	33.4	50 15.2	48 48	32.7	49 31.2	50 45	30.7	49 16.1	51 44	30.0	40
1	51 04.7	41 53	37.3	50 52.3	42 52	36.6	50 26.8	43 51	35.2	50 13.7	44 50	34.5	50 00.3	45 49	33.8	49 46.7	46 48	33.1	49 04.3	48 45	31.0	48 49.7	49 44	30.4	1
2	50 32.7	39 54	37.7	50 20.9	40 53	37.0	49 56.5	42 51	35.5	49 43.9	42 50	34.8	49 31.0	43 49	34.1	49 17.9	44 48	33.5	48 37.1	47 46	31.4	48 23.0	47 45	30.8	2
3	50 00.5	37 54	38.0	49 49.2	38 53	37.3	49 25.8	40 52	35.9	49 13.7	41 50	35.2	49 01.4	42 50	34.5	48 48.8	42 49	33.8	48 09.6	45 46	31.8	47 56.1	46 46	31.1	3
4	49 28.1	35 54	38.4	49 17.3	36 54	37.7	48 54.9	38 52	36.2	48 43.4	39 51	35.5	48 31.6	40 50	34.8	48 19.5	41 49	34.1	47 41.8	43 47	32.1	47 28.8	44 46	31.4	4
45	48 55.4	34 55	38.7	48 45.1	35 54	38.0	48 23.8	36 52	36.5	48 12.7	37 51	35.9	48 01.5	38 50	35.2	47 49.9	39 50	34.5	47 13.8	41 47	32.4	47 01.3	42 46	31.8	45
6	48 22.5	32 55	39.0	48 12.7	33 54	38.3	47 52.4	35 53	36.8	47 41.9	36 52	36.2	47 31.1	36 51	35.5	47 20.1	37 50	34.8	46 45.5	40 48	32.7	46 33.6	40 47	32.1	6
7	47 49.4	30 56	39.2	47 40.1	31 55	38.5	47 20.9	33 53	37.1	47 10.8	34 52	36.4	47 00.6	35 51	35.7	46 50.1	35 50	35.1	46 17.1	38 48	33.0	46 05.6	39 47	32.4	7
8	47 16.1	29 56	39.5	47 07.3	30 55	38.8	46 49.1	31 53	37.4	46 39.6	32 52	36.7	46 29.8	33 52	36.0	46 19.8	34 51	35.3	45 48.3	36 48	33.3	45 37.4	37 47	32.6	8
9	46 42.6	27 56	39.7	46 34.4	28 55	39.0	46 17.1	30 54	37.6	46 08.1	30 53	37.0	45 58.9	31 52	36.3	45 49.4	32 51	35.6	45 19.4	34 48	33.6	45 09.0	35 48	32.9	9
50	46 09.0	25 56	39.9	46 01.3	26 56	39.3	45 45.0	28 54	37.9	45 36.5	29 53	37.2	45 27.7	30 52	36.5	45 18.7	30 51	35.8	44 50.3	33 49	33.8	44 40.4	34 48	33.1	50
1	45 35.2	24 56	40.2	45 28.0	25 56	39.5	45 12.7	26 54	38.1	45 04.7	27 53	37.4	44 56.4	28 52	36.7	44 47.9	29 52	36.0	44 21.0	31 49	34.0	44 11.6	32 48	33.4	1
2	45 01.3	22 57	40.3	44 54.6	23 56	39.7	44 40.3	25 54	38.3	44 32.7	25 54	37.6	44 25.0	26 53	36.9	44 17.0	27 52	36.3	43 51.6	29 49	34.3	43 42.7	30 49	33.6	2
3	44 27.3	21 57	40.5	44 21.0	21 56	39.8	44 07.7	23 54	38.5	44 00.6	24 54	37.8	43 53.4	25 53	37.1	43 45.9	25 52	36.5	43 22.0	28 50	34.5	43 13.5	28 49	33.8	3
4	43 53.2	19 57	40.7	43 47.3	20 56	40.0	43 35.0	21 55	38.6	43 28.4	22 54	38.0	43 21.6	23 53	37.3	43 14.6	24 52	36.6	42 52.2	26 50	34.6	42 44.3	27 49	34.0	4
55	43 18.9	17 57	40.8	43 13.5	18 56	40.2	43 02.1	20 55	38.8	42 56.1	21 54	38.1	42 49.8	21 53	37.5	42 43.2	22 52	36.8	42 22.3	24 50	34.8	42 14.9	25 49	34.2	55
6	42 44.5	16 57	41.0	42 39.7	17 57	40.3	42 29.2	18 55	39.0	42 23.6	19 54	38.3	42 17.8	20 54	37.6	42 11.8	21 53	37.0	41 52.3	23 50	35.0	41 45.3	24 49	34.3	6
7	42 10.1	14 58	41.1	42 05.7	15 57	40.4	41 56.2	17 55	39.1	41 51.0	17 54	38.4	41 45.7	18 54	37.8	41 40.2	19 53	37.1	41 22.1	21 50	35.1	41 15.7	22 50	34.5	7
8	41 35.6	13 58	41.2	41 31.6	14 57	40.5	41 23.0	15 55	39.2	41 18.4	16 55	38.5	41 13.5	17 54	37.9	41 08.4	17 53	37.2	40 51.9	20 51	35.3	40 45.9	20 50	34.6	8
9	41 01.0	11 58	41.3	40 57.5	12 57	40.6	40 49.8	14 56	39.3	40 45.6	14 55	38.7	40 41.3	15 54	38.0	40 36.6	16 53	37.3	40 21.5	18 51	35.4	40 16.0	19 50	34.8	9
60	40 26.3	10 58	41.4	40 23.3	11 57	40.7	40 16.5	12 56	39.4	40 12.8	13 55	38.8	40 08.9	13 54	38.1	40 04.8	14 53	37.5	39 51.1	16 51	35.5	39 46.1	17 50	34.9	60
1	39 51.6	08 58	41.4	39 49.0	09 57	40.8	39 43.2	10 56	39.5	39 40.0	11 55	38.8	39 36.5	12 54	38.2	39 32.8	13 53	37.5	39 20.5	15 51	35.6	39 16.0	15 50	35.0	1
2	39 16.9	07 58	41.5	39 14.7	08 57	40.8	39 09.8	09 56	39.6	39 07.0	10 55	38.9	39 04.0	10 54	38.3	39 00.8	11 54	37.6	38 49.9	13 51	35.7	38 45.9	14 50	35.1	2
3	38 42.1	05 58	41.5	38 40.4	06 57	40.9	38 36.4	07 56	39.6	38 34.0	08 55	39.0	38 31.5	09 54	38.3	38 28.7	10 54	37.7	38 19.3	12 51	35.8	38 15.7	12 50	35.2	3
4	38 07.3	04 58	41.6	38 06.0	05 57	40.9	38 02.9	06 56	39.7	38 01.0	07 55	39.0	37 58.9	07 54	38.4	37 56.6	08 54	37.8	37 48.5	10 51	35.9	37 45.4	11 50	35.2	4
65	37 32.5	02 58	41.6	37 31.7	03 57	41.0	37 29.4	04 56	39.7	37 28.0	05 55	39.1	37 26.3	06 54	38.4	37 24.5	06 54	37.8	37 17.8	08 51	35.9	37 15.1	09 50	35.3	65
6	36 57.7	01 58	41.6	36 57.3	02 57	41.0	36 55.9	03 56	39.7	36 54.9	04 55	39.1	36 53.7	04 54	38.5	36 52.3	05 54	37.8	36 47.0	07 51	36.0	36 44.8	08 51	35.4	6
7	36 22.8	00 58	41.6	36 22.8	00 57	41.0	36 22.3	02 56	39.7	36 21.8	02 55	39.1	36 21.0	03 54	38.5	36 20.1	03 54	37.9	36 16.1	05 52	36.0	36 14.4	06 51	35.4	7
8	35 48.0	02 58	41.6	35 48.4	01 57	41.0	35 48.8	00 56	39.7	35 48.7	01 55	39.1	35 48.3	01 54	38.5	35 47.9	02 54	37.9	35 45.3	04 52	36.0	35 44.0	04 51	35.4	8
9	35 13.1	03 58	41.6	35 14.0	03 57	41.0	35 15.2	01 56	39.7	35 15.5	01 55	39.1	35 15.7	00 54	38.5	35 15.6	00 54	37.9	35 14.4	02 52	36.1	35 13.6	03 51	35.5	9
70	34 38.3	05 58	41.5	34 39.6	04 57	40.9	34 41.7	03 56	39.7	34 42.4	02 55	39.1	34 43.0	02 54	38.5	34 43.4	01 54	37.9	34 43.5	01 52	36.1	34 43.1	01 51	35.5	70
1	34 03.5	06 58	41.5	34 05.2	05 57	40.9	34 08.1	04 56	39.7	34 09.3	04 55	39.1	34 10.3	03 54	38.5	34 11.2	02 54	37.9	34 12.6	01 52	36.1	34 12.7	00 51	35.5	1
2	33 28.8	07 58	41.5	33 30.9	07 57	40.9	33 34.6	06 56	39.7	33 36.2	05 55	39.1	33 37.7	04 54	38.5	33 38.9	04 54	37.9	33 41.7	02 52	36.1	33 42.2	02 51	35.5	2
3	32 54.0	09 58	41.4	32 56.6	08 57	40.8	33 01.1	07 56	39.6	33 03.2	06 55	39.0	33 05.0	06 54	38.4	33 06.7	05 54	37.8	33 10.8	04 52	36.0	33 11.8	03 51	35.5	3
4	32 19.4	10 58	41.3	32 22.3	10 57	40.8	32 27.7	08 56	39.6	32 30.1	08 55	39.0	32 32.4	07 54	38.4	32 34.6	07 54	37.8	32 39.9	05 52	36.0	32 41.4	05 51	35.4	4
75	31 44.7	11 58	41.3	31 48.1	11 57	40.7	31 54.3	10 56	39.5	31 57.2	09 55	38.9	31 59.9	09 54	38.3	32 02.4	08 54	37.8	32 09.1	07 51	36.0	32 10.9	06 51	35.4	75
6	31 10.1	13 58	41.2	31 13.9	12 57	40.6	31 20.9	11 56	39.4	31 24.2	11 55	38.9	31 27.3	10 54	38.3	31 30.3	10 54	37.7	31 38.2	08 51	35.9	31 40.6	07 51	35.4	6
7	30 35.6	14 58	41.1	30 39.8	14 57	40.5	30 47.6	13 55	39.4	30 51.3	12 55	38.8	30 54.8	12 54	38.2	30 58.2	11 53	37.6	31 07.5	09 51	35.9	31 10.2	09 50	35.3	7
8	30 01.1	15 57	41.0	30 05.7	15 57	40.4	30 14.4	14 56	39.3	30 18.5	13 55	38.7	30 22.4	13 54	38.1	30 26.2	12 53	37.6	30 36.7	11 51	35.8	30 39.9	10 50	35.3	8
9	29 26.8	17 57	40.9	29 31.7	16 56	40.3	29 41.2	15 55	39.2	29 45.7	15 54	38.6	29 50.0	14 54	38.0	29 54.3	14 53	37.5	30 06.0	12 51	35.8	30 09.6	12 50	35.2	9
80	28 52.4	18 57	40.8	28 57.8	18 56	40.2	29 08.0	17 55	39.1	29 13.0	16 54	38.5	29 17.7	16 54	38.0	29 22.4	15 53	37.4	29 35.4	14 51	35.7	29 39.4	13 50	35.1	80
1	28 18.2	19 57	40.7	28 23.9	19 56	40.1	28 35.0	18 55	39.0	28 40.3	18 54	38.4	28 45.5	17 54	37.9	28 50.5	17 53	37.3	29 04.8	15 51	35.6	29 09.3	15 50	35.0	1
2	27 44.1	21 57	40.5	27 50.2	20 56	40.0	28 02.0	19 55	38.9	28 07.7	19 54	38.3	28 13.3	18 54	37.7	28 18.8	18 53	37.2	28 34.3	17 51	35.5	28 39.2	16 50	34.9	2
3	27 10.0	22 56	40.4	27 16.5	21 56	39.8	27 29.2	21 55	38.7	27 35.3	20 54	38.2	27 41.2	20 53	37.6	27 47.1	19 53	37.1	28 03.9	18 51	35.4	28 09.2	18 50	34.8	3
4	26 36.1	23 56	40.2	26 43.0	23 56	39.7	26 56.4	22 54	38.6	27 02.9	21 54	38.0	27 09.3	21 53	37.5	27 15.5	21 52	36.9	27 33.5	19 50	35.3	27 39.2	19 50	34.7	4
85	26 02.2	24 56	40.1	26 09.5	24 56	39.5	26 23.7	23 54	38.5	26 30.6	23 54	37.9	26 37.4	22 53	37.4	26 44.0	22 52	36.8	27 03.2	21 50	35.2	27 09.4	20 50	34.6	85
6	25 28.5	26 56	39.9	25 36.2	25 55	39.4	25 51.1	25 54	38.3	25 58.4	24 54	37.8	26 05.6	24 53	37.2	26 12.6	23 52	36.7	26 33.0	22 50	35.1	26 39.6	22 50	34.5	6
7	24 54.9	27 56	39.7	25 02.9	27 55	39.2	25 18.6	26 54	38.1	25 26.3	25 53	37.6	25 33.9	25 53	37.1	25 41.3	25 52	36.5	26 02.9	23 50	34.9	26 09.9	23 49	34.4	7
8	24 21.4	28 56	39.6	24 29.8	28 55	39.0	24 46.3	27 54	38.0	24 54.3	27 53	37.5	25 02.3	26 52	36.9	25 10.1	26 52	36.4	25 32.9	25 50	34.8	25 40.3	24 49	34.2	8
9	23 48.0	29 55	39.4	23 56.8	29 55	38.9	24 14.0	28 54	37.8	24 22.5	28 53	37.3	24 30.8	28 52	36.8	24 39.0	27 52	36.2	25 03.1	26 50	34.6	25 10.8	26 49	34.1	9
90	23 14.8	31 55	39.2	23 23.9	30 54	38.7	23 41.9	30 53	37.6	23 50.7	29 53	37.1	23 59.5	29 52	36.6	24 08.1	29 51	36.1	24 33.3	27 49	34.5	24 41.5	27 49	34.0	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
00	6 30.0	1.0	00	180.0	6 00.0	1.0	00	180.0	5 00.0	1.0	00	180.0																	00
1	6 29.7	1.0	01	179.4	5 59.7	1.0	01	179.4																					1
2	6 28.9	1.0	02	178.8	5 58.9	1.0	02	178.8																					2
3	6 27.6	1.0	03	178.2	5 57.6	1.0	03	178.3																					3
4	6 25.7	1.0	04	177.7	5 55.8	1.0	04	177.7																					4
05	6 23.3	1.0	05	177.1	5 53.4	1.0	05	177.1																					05
6	6 20.4	1.0	06	176.5	5 50.5	1.0	06	176.5																					6
7	6 16.9	99	07	175.9	5 47.1	99	07	176.0																					7
8	6 12.9	99	08	175.3	5 43.1	99	08	175.4																					8
9	6 08.4	99	08	174.8	5 38.7	99	08	174.8																					9
10	6 03.3	99	09	174.2	5 33.7	99	09	174.3																					10
1	5 57.7	99	10	173.6	5 28.2	99	10	173.7																					1
2	5 51.6	98	11	173.0	5 22.1	98	11	173.1																					2
3	5 45.0	98	12	172.5	5 15.6	98	12	172.6																					3
4	5 37.8	98	13	171.9	5 08.5	98	13	172.0																					4
15	5 30.2	97	14	171.3	5 01.0	97	14	171.4																					15
6	5 22.0	97	14	170.7																									6
7	5 13.3	97	15	170.2																									7
8	5 04.1	96	16	169.6																									8

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30′			55° 00′			56° 00′			56° 30′			57° 00′			57° 30′			59° 00′			59° 30′			H.A.
	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	Alt.	Δd	Δt	Az.	
°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	° ′			°	°
91	22 41.7	32	55	39.0	22 51.2	32	54	38.5	23 09.9	31	53	37.5	23 19.1	31	52	36.9	23 28.2	30	52	36.4	23 37.3	30	51	35.9	24 03.6	29	49	34.3	24 12.2	28	48	33.8	91
2	22 08.8	33	55	38.8	22 18.6	33	54	38.3	22 38.1	32	53	37.3	22 47.7	32	52	36.8	22 57.2	31	52	36.2	23 06.5	31	51	35.7	23 34.1	30	49	34.2	23 43.1	30	48	33.6	2
3	21 35.9	34	54	38.6	21 46.2	34	54	38.1	22 06.4	33	53	37.1	22 16.3	33	52	36.6	22 26.2	33	51	36.0	22 36.0	32	51	35.5	23 04.7	31	49	34.0	23 14.1	31	48	33.5	3
4	21 03.3	36	54	38.4	21 13.9	35	54	37.9	21 34.8	35	52	36.9	21 45.2	34	52	36.4	21 55.4	34	51	35.8	22 05.6	34	50	35.3	22 35.4	33	48	33.8	22 45.2	32	48	33.3	4
96	20 30.8	37	54	38.1	20 41.8	36	53	37.6	21 03.4	36	52	36.6	21 14.1	36	51	36.1	21 24.7	35	51	35.6	21 35.3	35	50	35.1	22 06.3	34	48	33.6	22 16.4	34	48	33.1	95
6	19 58.5	38	54	37.9	20 09.8	38	53	37.4	20 32.2	37	52	36.4	20 43.3	37	51	35.9	20 54.2	36	50	35.4	21 05.1	36	50	34.9	21 37.3	35	48	33.4	21 47.8	35	47	32.9	6
7	19 26.3	39	53	37.7	19 38.0	39	53	37.2	20 01.1	38	52	36.2	20 12.5	38	51	35.7	20 23.9	38	50	35.2	20 35.2	37	50	34.7	21 08.5	37	48	33.2	21 19.4	36	47	32.7	7
8	18 54.3	40	53	37.4	19 06.4	40	52	36.9	19 30.2	39	51	36.0	19 42.0	39	51	35.5	19 53.7	39	50	35.0	20 05.4	39	50	34.5	20 39.8	38	48	33.0	20 51.1	38	47	32.5	8
9	18 22.5	41	53	37.2	18 34.9	41	52	36.7	18 59.4	41	51	35.7	19 11.6	40	50	35.3	19 23.7	40	50	34.8	19 35.7	40	49	34.3	20 11.3	39	47	32.8	20 22.9	39	46	32.3	9
100	17 50.9	43	52	36.9	18 03.6	42	52	36.5	18 28.9	42	51	35.5	18 41.4	42	50	35.0	18 53.9	41	49	34.5	19 06.2	41	49	34.1	19 42.9	40	47	32.6	19 55.0	40	46	32.1	100
1	17 19.5	44	52	36.7	17 32.5	43	52	36.2	17 58.5	43	50	35.2	18 11.4	43	50	34.8	18 24.2	43	49	34.3	18 36.9	42	48	33.8	19 14.7	42	47	32.4	19 27.2	41	46	31.9	1
2	16 48.2	45	52	36.4	17 01.7	45	51	35.9	17 28.3	44	50	35.0	17 41.6	44	50	34.5	17 54.7	44	49	34.0	18 07.8	44	48	33.6	18 46.7	43	46	32.1	18 59.5	43	46	31.7	2
3	16 17.2	46	51	36.1	16 31.0	46	51	35.7	16 58.3	45	50	34.7	17 11.9	45	49	34.3	17 25.4	45	49	33.8	17 38.9	45	48	33.3	18 18.9	44	46	31.9	18 32.0	44	45	31.4	3
4	15 46.4	47	51	35.8	16 00.5	47	50	35.4	16 28.5	47	49	34.5	16 42.5	46	49	34.0	16 56.3	46	48	33.5	17 10.2	46	48	33.1	17 51.2	45	46	31.7	18 04.8	45	45	31.2	4
105	15 15.7	48	51	35.6	15 30.2	48	50	35.1	15 58.9	48	49	34.2	16 13.2	48	48	33.7	16 27.5	47	48	33.3	16 41.6	47	47	32.8	17 23.8	47	46	31.4	17 37.7	46	45	31.0	105
6	14 45.3	49	50	35.3	15 00.1	49	50	34.8	15 29.6	49	49	33.9	15 44.2	49	48	33.5	15 58.8	48	48	33.0	16 13.3	48	47	32.5	16 56.5	48	45	31.2	17 10.8	48	44	30.7	6
7	14 15.2	51	50	35.0	14 30.3	50	49	34.5	15 00.4	50	48	33.6	15 15.4	50	48	33.2	15 30.3	50	47	32.7	15 45.2	49	46	32.3	16 29.4	49	45	30.9	16 44.1	49	44	30.5	7
8	13 45.2	52	50	34.7	14 00.7	51	49	34.2	14 31.5	51	48	33.3	14 46.8	51	47	32.9	15 02.0	51	47	32.4	15 17.3	51	46	32.0	16 02.6	50	44	30.6	16 17.6	50	44	30.2	8
9	13 15.5	53	49	34.3	13 31.3	53	49	33.9	14 02.7	52	48	33.0	14 18.4	52	47	32.6	14 34.0	52	46	32.1	14 49.6	52	46	31.7	15 36.0	51	44	30.4	15 51.3	51	44	29.9	9
110	12 46.0	54	49	34.0	13 02.1	54	48	33.6	13 34.3	53	47	32.7	13 50.3	53	47	32.3	14 06.2	53	46	31.8	14 22.1	53	45	31.4	15 09.5	52	44	30.1	15 25.2	52	43	29.7	110
1	12 16.8	55	48	33.7	12 33.2	55	48	33.3	13 06.0	55	47	32.4	13 22.3	54	46	32.0	13 38.6	54	46	31.5	13 54.9	54	45	31.1	14 43.3	54	43	29.8	14 59.4	53	43	29.4	1
2	11 47.8	56	48	33.4	12 04.6	56	47	32.9	12 38.0	56	46	32.1	12 54.7	55	46	31.7	13 11.3	55	45	31.2	13 27.9	55	45	30.8	14 17.4	55	43	29.5	14 33.8	55	42	29.1	2
3	11 19.0	57	47	33.0	11 36.1	57	47	32.6	12 10.2	57	46	31.8	12 27.3	57	45	31.4	12 44.2	56	45	30.9	13 01.1	56	44	30.5	13 51.6	56	42	29.2	14 08.4	56	42	28.8	3
4	10 50.6	58	47	32.7	11 08.0	58	46	32.3	11 42.7	58	45	31.4	12 00.1	58	45	31.0	12 17.4	58	44	30.6	12 34.6	57	44	30.2	13 26.1	57	42	28.9	13 43.2	57	42	28.5	4
115	10 22.3	59	46	32.3	10 40.1	59	46	31.9	11 15.5	59	45	31.1	11 33.1	59	44	30.7	11 50.8	59	44	30.3	12 08.3	59	43	29.9	13 00.8	58	42	28.6	13 18.3	58	41	28.2	115
6	9 54.4	60	46	32.0	10 12.5	60	46	31.6	10 48.5	60	44	30.8	11 06.5	60	44	30.4	11 24.4	60	44	30.0	11 42.3	60	43	29.6	12 35.8	59	41	28.3	12 53.6	59	41	27.9	6
7	9 26.7	61	46	31.6	9 45.1	61	45	31.2	10 21.8	61	44	30.4	10 40.1	61	44	30.0	10 58.3	61	43	29.6	11 16.6	61	42	29.2	12 11.1	60	41	28.0	12 29.2	60	40	27.6	7
8	8 59.4	62	45	31.3	9 18.0	62	45	30.9	9 55.3	62	44	30.1	10 14.0	62	43	29.7	10 32.5	62	42	29.3	10 51.1	62	42	28.9	11 46.6	61	40	27.7	12 05.0	61	40	27.3	8
9	8 32.3	63	45	30.9	8 51.3	63	44	30.5	9 29.2	63	43	29.7	9 48.1	63	43	29.3	10 07.0	63	42	28.9	10 25.9	63	42	28.5	11 22.3	63	40	27.4	11 41.1	62	40	27.0	9
120	8 05.5	64	44	30.5	8 24.8	64	44	30.1	9 03.3	64	43	29.4	9 22.5	64	42	29.0	9 41.8	64	42	28.6	10 00.9	64	41	28.2	10 58.3	64	40	27.0	11 17.4	64	39	26.6	120
1	7 38.9	65	44	30.1	7 58.6	65	43	29.8	8 37.7	65	42	29.0	8 57.3	65	42	28.6	9 16.8	65	41	28.2	9 36.3	65	41	27.8	10 34.6	65	39	26.7	10 54.0	65	38	26.3	1
2	7 12.7	66	43	29.8	7 32.7	66	43	29.4	8 12.4	66	42	28.6	8 32.3	66	41	28.2	8 52.1	66	41	27.9	9 11.9	66	40	27.5	10 11.2	66	39	26.3	10 30.9	66	38	26.0	2
3	6 46.9	67	43	29.4	7 07.1	67	42	29.0	7 47.4	67	41	28.3	8 07.6	67	41	27.9	8 27.7	67	40	27.5	8 47.8	67	40	27.1	9 48.0	67	38	26.0	10 08.1	67	38	25.6	3
4	6 21.3	68	42	29.0	6 41.8	68	42	28.6	7 22.7	68	41	27.9	7 43.2	68	40	27.5	8 03.6	68	40	27.1	8 24.1	68	39	26.8	9 25.2	68	38	25.6	9 45.5	68	37	25.3	4
125	5 56.0	69	42	28.6	6 16.8	69	41	28.2	6 58.4	69	40	27.5	7 19.1	69	40	27.1	7 39.9	69	39	26.8	8 00.6	69	39	26.4	9 02.6	69	37	25.3	9 23.3	69	37	24.9	125
6	5 31.1	70	41	28.2	5 52.2	70	40	27.8	6 34.3	70	40	27.1	6 55.4	70	39	26.7	7 16.4	70	39	26.4	7 37.4	70	38	26.0	8 40.4	70	37	24.9	9 01.3	70	36	24.6	6
7	5 06.5	71	40	27.8	5 27.9	71	40	27.4	6 10.6	71	39	26.7	6 31.9	71	38	26.3	6 53.2	71	38	26.0	7 14.6	71	38	25.6	8 18.4	71	36	24.6	8 39.6	71	36	24.2	7
8					5 03.9	72	40	27.0	5 47.2	72	38	26.3	6 08.8	72	38	25.9	6 30.4	72	38	25.6	6 52.0	72	37	25.2	7 56.7	72	36	24.2	8 18.3	72	35	23.8	8
9									5 24.1	73	38	25.9	5 46.0	73	37	25.5	6 07.9	73	37	25.2	6 29.8	73	36	24.9	7 35.4	73	35	23.8	7 57.2	73	34	23.5	9
130									5 01.4	74	37	25.5	5 23.6	74	37	25.1	5 45.7	74	36	24.8	6 07.9	74	36	24.5	7 14.3	74	34	23.4	7 36.5	74	34	23.1	130
1													5 01.4	74	37	24.7	5 23.9	75	36	24.4	5 46.4	75	36	24.1	6 53.6	75	34	23.0	7 16.0	75	34	22.7	1
2																	5 02.4	76	35	24.0	5 25.1	76	35	23.6	6 33.3	76	34	22.7	6 55.9	76	33	22.3	2
3																					5 04.3	77	34	23.2	6 13.2	77	33	22.3	6 36.2	77	32	21.9	3
4																									5 53.5	77	32	21.9	6 16.7	77	32	21.5	4
135																									5 34.1	78	32	21.5	5 57.6	78	31	21.2	135
6																									5 15.1	79	31	21.1	5 38.9	79	31	20.7	6
7																													5 20.4	80	30	20.3	7
8																													5 02.4	81	30	19.9	8

Lat. 29°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	59 00.0	1.0 01	00.0	58 30.0	1.0 01	00.0	57 00.0	1.0 01	00.0	56 30.0	1.0 01	00.0
1	58 59.6	1.0 02	01.0	58 29.6	1.0 02	00.9	56 59.6	1.0 02	00.9	56 29.6	1.0 02	00.8
2	58 58.2	1.0 04	01.9	58 28.3	1.0 04	01.9	56 58.4	1.0 03	01.7	56 28.5	1.0 03	01.7
3	58 56.0	1.0 05	02.9	58 26.1	1.0 05	02.8	56 56.5	1.0 05	02.6	56 26.6	1.0 04	02.5
4	58 52.9	99 07	03.9	58 23.1	99 06	03.8	56 53.7	99 06	03.4	56 23.9	99 06	03.3
05	58 48.9	99 08	04.8	58 19.2	99 08	04.7	56 50.2	99 07	04.3	56 20.4	99 07	04.2
6	58 44.1	98 10	05.8	58 14.5	98 09	05.6	56 45.8	99 08	05.1	56 16.3	99 08	05.0
7	58 38.4	98 11	06.7	58 09.0	98 11	06.5	56 40.8	98 10	06.0	56 11.3	98 10	05.8
8	58 31.8	97 12	07.7	58 02.6	97 12	07.4	56 34.9	98 11	06.8	56 05.6	98 11	06.6
9	58 24.4	97 14	08.6	57 55.4	97 13	08.3	56 28.3	97 12	07.6	55 59.2	97 12	07.4
10	58 16.1	96 15	09.5	57 47.4	96 15	09.2	56 21.0	96 14	08.5	55 52.1	96 13	08.2
1	58 07.0	95 16	10.4	57 38.6	95 16	10.1	56 12.9	95 15	09.3	55 44.2	96 14	09.0
2	57 57.2	94 18	11.3	57 29.0	94 17	11.0	56 04.1	95 16	10.1	55 35.7	95 16	09.8
3	57 46.5	93 19	12.2	57 18.6	93 19	11.8	55 54.5	94 17	10.9	55 26.4	94 16	10.6
4	57 35.0	92 20	13.0	57 07.4	92 20	12.7	55 44.3	93 18	11.6	55 16.5	93 18	11.3
15	57 22.8	91 22	13.9	56 55.5	91 21	13.5	55 33.4	92 20	12.4	55 05.8	92 19	12.1
6	57 09.8	90 23	14.7	56 42.9	90 22	14.3	55 21.7	91 20	13.2	54 54.5	91 20	12.8
7	56 56.1	88 24	15.5	56 29.6	89 23	15.1	55 09.5	89 22	13.9	54 42.6	90 21	13.5
8	56 41.7	87 25	16.3	56 15.6	87 24	15.9	54 56.5	88 22	14.6	54 30.0	89 22	14.2
9	56 26.6	86 26	17.1	56 00.9	86 26	16.7	54 43.0	87 24	15.3	54 16.8	87 23	14.9
20	56 10.8	84 28	17.9	55 45.5	85 27	17.4	54 28.8	86 25	16.0	54 03.0	86 24	15.6
1	55 54.4	83 28	18.6	55 29.4	83 28	18.1	54 14.0	84 26	16.7	53 48.6	85 25	16.3
2	55 37.3	81 30	19.4	55 12.8	82 29	18.9	53 58.6	83 27	17.4	53 33.6	83 26	16.9
3	55 19.6	80 30	20.1	54 55.5	80 30	19.6	53 42.6	82 28	18.1	53 18.0	82 27	17.6
4	55 01.2	78 32	20.8	54 37.6	79 31	20.2	53 26.0	80 28	18.7	53 01.9	81 28	18.2
25	54 42.3	77 32	21.5	54 19.2	77 32	20.9	53 09.0	79 30	19.3	52 45.3	79 29	18.8
6	54 22.9	75 33	22.1	54 00.2	76 32	21.5	52 51.3	77 30	19.9	52 28.1	78 30	19.4
7	54 02.8	74 34	22.7	53 40.7	74 34	22.2	52 33.2	76 31	20.5	52 10.4	76 30	20.0
8	53 42.3	72 35	23.4	53 20.6	73 34	22.8	52 14.5	74 32	21.1	51 52.2	75 31	20.6
9	53 21.2	70 36	24.0	53 00.0	71 35	23.4	51 55.4	73 33	21.7	51 33.5	73 32	21.1
30	52 59.7	69 37	24.5	52 39.0	69 36	23.9	51 35.8	71 33	22.2	51 14.4	72 33	21.6
1	52 37.6	67 38	25.1	52 17.4	68 36	24.5	51 15.8	69 34	22.7	50 54.8	70 33	22.2
2	52 15.2	65 38	25.6	51 55.5	66 38	25.0	50 55.3	68 35	23.2	50 34.8	68 34	22.7
3	51 52.2	64 39	26.2	51 33.0	64 38	25.6	50 34.3	66 36	23.7	50 14.4	67 35	23.2
4	51 28.9	62 40	26.7	51 10.2	63 39	26.0	50 13.0	64 36	24.2	49 53.6	65 36	23.6
35	51 05.1	60 40	27.2	50 47.0	61 40	26.5	49 51.3	63 37	24.7	49 32.3	63 36	24.1
6	50 41.0	58 41	27.6	50 23.3	59 40	27.0	49 29.2	61 38	25.1	49 10.7	62 36	24.5
7	50 16.4	57 42	28.1	49 59.3	57 41	27.4	49 06.7	59 38	25.6	48 48.8	60 37	25.0
8	49 51.6	55 42	28.5	49 34.9	56 41	27.9	48 43.9	58 39	26.0	48 26.5	58 38	25.4
9	49 26.3	53 43	28.9	49 10.2	54 42	28.3	48 20.7	56 39	26.4	48 03.8	57 38	25.8
40	49 00.8	52 43	29.3	48 45.2	52 42	28.7	47 57.2	54 40	26.8	47 40.8	55 39	26.2
1	48 34.9	50 44	29.7	48 19.9	51 43	29.1	47 33.4	53 40	27.2	47 17.5	53 39	26.5
2	48 08.7	48 44	30.1	47 54.2	49 43	29.4	47 09.3	51 40	27.5	46 54.0	52 40	26.9
3	47 42.3	46 44	30.4	47 28.3	47 44	29.8	46 45.0	49 41	27.9	46 30.1	50 40	27.2
4	47 15.6	45 45	30.8	47 02.1	45 44	30.1	46 20.3	47 42	28.2	46 05.9	48 41	27.6
45	46 48.6	43 45	31.1	46 35.6	44 44	30.4	45 55.4	46 42	28.5	45 41.5	46 41	27.9
6	46 21.3	41 46	31.4	46 08.9	42 45	30.8	45 30.2	44 42	28.8	45 16.9	45 42	28.2
7	45 53.9	39 46	31.7	45 41.9	40 45	31.0	45 04.8	42 43	29.1	44 52.0	43 42	28.5
8	45 26.2	38 46	32.0	45 14.8	38 46	31.3	44 39.2	41 43	29.4	44 26.9	41 42	28.7
9	44 58.3	36 47	32.2	44 47.4	37 46	31.6	44 13.3	39 43	29.6	44 01.6	40 43	29.0
50	44 30.2	34 47	32.5	44 19.8	35 46	31.8	43 47.3	37 44	29.9	43 36.0	38 43	29.2
1	44 01.9	33 47	32.7	43 52.1	33 47	32.1	43 21.1	36 44	30.1	43 10.3	36 43	29.5
2	43 33.5	31 48	32.9	43 24.1	32 47	32.3	42 54.6	34 44	30.3	42 44.4	35 44	29.7
3	43 04.9	29 48	33.1	42 56.0	30 47	32.5	42 28.1	32 45	30.5	42 18.3	33 44	29.9
4	42 36.1	28 48	33.3	42 27.7	28 47	32.7	42 01.3	30 45	30.7	41 52.1	31 44	30.1
55	42 07.2	26 48	33.5	41 59.3	27 48	32.9	41 34.4	29 45	30.9	41 25.7	29 44	30.3
6	41 38.2	24 49	33.7	41 30.8	25 48	33.0	41 07.3	27 45	31.1	40 59.1	28 44	30.5
7	41 09.0	23 49	33.8	41 02.1	23 48	33.2	40 40.2	25 46	31.3	40 32.4	26 45	30.6
8	40 39.7	21 49	34.0	40 33.3	22 48	33.3	40 12.9	24 46	31.4	40 05.6	24 45	30.8
9	40 10.3	19 49	34.1	40 04.4	20 48	33.5	39 45.5	22 46	31.6	39 38.7	23 45	30.9
60	39 40.9	18 49	34.2	39 35.4	18 48	33.6	39 17.9	20 46	31.7	39 11.7	21 45	31.1
1	39 11.3	16 49	34.3	39 06.4	17 49	33.7	38 50.3	19 46	31.8	38 44.6	20 46	31.2
2	38 41.6	15 50	34.4	38 37.2	15 49	33.8	38 22.6	17 46	31.9	38 17.3	18 46	31.3
3	38 11.9	13 50	34.5	38 08.0	14 49	33.9	37 54.8	16 46	32.0	37 50.0	16 46	31.4
4	37 42.1	11 50	34.6	37 38.7	12 49	34.0	37 27.0	14 47	32.1	37 22.7	15 46	31.5
65	37 12.3	10 50	34.7	37 09.3	10 49	34.1	36 59.0	12 47	32.2	36 55.2	13 46	31.6
6	36 42.4	08 50	34.7	36 39.9	09 49	34.1	36 31.1	11 47	32.3	36 27.7	11 46	31.6
7	36 12.5	07 50	34.8	36 10.4	07 49	34.2	36 03.0	09 47	32.3	36 00.2	10 46	31.7
8	35 42.6	06 50	34.8	35 41.0	06 49	34.2	35 35.0	08 47	32.4	35 32.6	08 46	31.7
9	35 12.6	04 50	34.8	35 11.4	04 49	34.2	35 06.9	06 47	32.4	35 05.0	07 46	31.8
70	34 42.6	02 50	34.9	34 41.9	03 49	34.3	34 38.7	04 47	32.4	34 37.3	05 46	31.8
1	34 12.6	00 50	34.9	34 12.4	01 49	34.3	34 10.6	03 47	32.4	34 09.6	03 46	31.8
2	33 42.6	01 50	34.9	33 42.8	00 49	34.3	33 42.4	01 47	32.5	33 41.9	02 46	31.9
3	33 12.6	03 50	34.9	33 13.3	02 49	34.3	33 14.3	00 47	32.5	33 14.2	00 46	31.9
4	32 42.6	04 50	34.8	32 43.8	03 49	34.2	32 46.1	02 47	32.5	32 46.5	01 46	31.9
75	32 12.7	05 50	34.8	32 14.2	05 49	34.2	32 17.9	03 47	32.4	32 18.8	03 46	31.9
6	31 42.7	07 50	34.8	31 44.7	06 49	34.2	31 49.8	05 47	32.4	31 51.1	04 46	31.8
7	31 12.8	08 50	34.7	31 15.3	08 49	34.1	31 21.7	06 47	32.4	31 23.5	06 46	31.8
8	30 42.9	10 50	34.7	30 45.8	09 49	34.1	30 53.6	08 47	32.4	30 55.8	07 46	31.8
9	30 13.1	11 50	34.6	30 16.4	11 49	34.0	30 25.5	09 47	32.3	30 28.2	09 46	31.7
80	29 43.3	13 50	34.5	29 47.1	12 49	34.0	29 57.5	11 47	32.3	30 00.6	10 46	31.7
1	29 13.6	14 49	34.5	29 17.8	14 49	33.9	29 29.5	12 46	32.2	29 33.1	12 46	31.6
2	28 43.9	16 49	34.4	28 48.6	15 49	33.8	29 01.6	14 46	32.1	29 05.6	13 46	31.6
3	28 14.3	17 49	34.3	28 19.4	17 48	33.7	28 33.7	15 46	32.0	28 38.2	15 46	31.5
4	27 44.8	18 49	34.2	27 50.3	18 48	33.6	28 05.9	17 46	32.0	28 10.8	16 46	31.4
85	27 15.4	20 49	34.1	27 21.3	19 48	33.5	27 38.1	18 46	31.9	27 43.5	18 45	31.3
6	26 46.0	21 49	34.0	26 52.3	21 48	33.4	27 10.5	20 46	31.8	27 16.3	19 45	31.2
7	26 16.7	23 49	33.8	26 23.5	22 48	33.3	26 42.9	21 46	31.7	26 49.1	21 45	31.1
8	25 47.6	24 48	33.7	25 54.7	24 48	33.2	26 15.4	22 46	31.5	26 22.0	22 45	31.0
9	25 18.5	26 48	33.6	25 26.0	26 48	33.0	25 48.0	24 46	31.4	25 55.1	23 45	30.9
90	24 49.5	27 48	33.4	24 57.5	26 48	32.9	25 20.7	25 45	31.3	25 28.2	25 45	30.8

H.A.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.
°	° ′		°	° ′		°	° ′		°	° ′		°
00	56 00.0	1.0 01	00.0	50 00.0	1.0 00	00.0	49 30.0	1.0 00	00.0	44 30.0	1.0 00	00.0
1	55 59.6	1.0 02	00.8	49 59.7	1.0 01	00.6	49 29.8	1.0 01	00.5	44 29.8	1.0 01	00.4
2	55 58.5	1.0 03	01.6	49 59.0	1.0 02	01.1	49 29.0	1.0 02	01.1	44 29.3	1.0 01	00.7
3	55 56.7	1.0 04	02.4	49 57.7	1.0 03	01.7	49 27.8	1.0 03	01.6	44 28.5	1.0 02	01.1
4	55 54.1	99 06	03.2	49 55.9	1.0 04	02.2	49 26.1	1.0 04	02.2	44 27.3	1.0 03	01.5
05	55 50.7	99 07	04.0	49 53.6	99 05	02.8	49 23.8	99 04	02.7	44 25.7	99 03	01.9
6	55 46.7	99 08	04.8	49 50.8	99 06	03.3	49 21.1	99 05	03.2	44 23.8	99 04	02.2
7	55 41.9	98 09	05.6	49 47.5	99 06	03.9	49 17.9	99 06	03.8	44 21.6	99 04	02.6
8	55 36.4	98 10	06.4	49 43.7	98 07	04.4	49 14.3	98 07	04.3	44 19.1	99 05	03.0
9	55 30.1	97 12	07.2	49 39.4	98 08	05.0	49 10.1	98 08	04.8	44 16.2	98 06	03.3
10	55 23.2	96 13	08.0	49 34.6	97 09	05.5	49 05.5	97 08	05.3	44 12.9	98 06	03.7
1	55 15.6	96 14	08.7	49 29.4	97 10	06.0	49 00.4	97 09	05.8	44 09.4	97 06	04.1
2	55 07.3	95 15	09.5	49 23.6	96 10	06.6	48 54.8	96 10	06.4	44 05.5	97 07	04.4
3	54 58.3	94 16	10.2	49 17.4	95 11	07.1	48 48.7	95 11	06.9	44 01.2	96 08	04.8
4	54 48.6	93 17	11.0	49 10.6	95 12	07.6	48 42.2	95 12	07.4	43 56.7	96 08	05.2
15	54 38.3	92 18	11.7	49 03.4	94 13	08.1	48 35.3	94 12	07.9	43 51.8	95 09	05.5
6	54 27.3	91 19	12.4	48 55.8	93 14	08.6	48 27.8	93 13	08.4	43 46.6	94 09	05.9
7	54 15.7	90 20	13.1	48 47.7	92 14	09.2	48 20.0	92 14	08.9	43 41.1	94 10	06.2
8	54 03.4	89 21	13.8	48 39.1	91 15	09.6	48 11.7	91 15	[illegible]	43 35.3	93 10	06.5
9	53 50.6	88 22	14.5	48 30.1	90 16	10.1	48 02.9	90 15	09.8	43 29.2	92 11	06.9
20	53 37.1	86 23	15.2	48 20.6	89 16	10.6	47 53.8	89 16	10.3	43 22.7	91 11	07.2
1	53 23.1	85 24	15.8	48 10.7	88 17	11.1	47 44.2	88 17	10.8	43 16.0	90 12	07.6
2	53 08.5	84 25	16.5	48 00.4	87 18	11.6	47 34.2	87 17	11.2	43 08.9	89 12	07.9
3	52 53.4	82 26	17.1	47 49.7	86 19	12.0	47 23.8	86 18	11.7	43 01.6	88 13	08.2
4	52 37.7	81 27	17.7	47 38.5	85 19	12.5	47 13.0	85 19	12.1	42 53.9	87 13	08.5
25	52 21.4	80 28	18.3	47 27.0	84 20	12.9	47 01.8	84 19	12.5	42 46.0	86 14	08.8
6	52 04.7	78 29	18.9	47 15.0	83 20	13.4	46 50.2	83 20	13.0	42 37.8	85 14	09.2
7	51 47.5	77 30	19.5	47 02.7	81 21	13.8	46 38.2	82 20	13.4	42 29.3	84 15	09.5
8	51 29.7	75 30	20.0	46 49.9	80 22	14.2	46 25.9	80 21	13.8	42 20.5	83 15	09.8
9	51 11.5	74 31	20.6	46 36.9	79 22	14.7	46 13.2	79 22	14.2	42 11.5	82 16	10.1
30	50 52.9	72 32	21.1	46 23.4	77 23	15.1	46 00.1	78 22	14.6	42 02.2	81 16	10.4
1	50 33.8	71 33	21.6	46 09.6	76 24	15.5	45 46.7	76 23	15.0	41 52.6	80 16	10.7
2	50 14.2	69 33	22.1	45 55.4	75 24	15.8	45 33.0	75 24	15.4	41 42.8	78 17	10.9
3	49 54.3	67 34	22.6	45 40.9	73 25	16.2	45 18.9	74 24	15.7	41 32.7	77 17	11.2
4	49 34.0	66 35	23.0	45 26.1	72 25	16.6	45 04.5	72 24	16.1	41 22.3	76 18	11.5
35	49 13.2	64 35	23.5	45 11.0	70 26	17.0	44 49.8	71 25	16.5	41 11.8	75 18	11.8
6	48 52.1	62 36	23.9	44 55.5	69 26	17.3	44 34.8	69 26	16.8	41 01.0	73 18	12.0
7	48 30.7	61 36	24.4	44 39.8	67 27	17.7	44 19.5	68 26	17.1	40 49.9	72 19	12.3
8	48 08.8	59 37	24.8	44 23.7	66 27	18.0	44 03.9	66 26	17.5	40 38.7	70 19	12.5
9	47 46.7	57 38	25.2	44 07.3	64 28	18.3	43 48.0	65 27	17.8	40 27.2	69 20	12.8
40	47 24.2	56 38	25.5	43 50.7	63 28	18.6	43 31.9	63 28	18.1	40 15.5	68 20	13.0
1	47 01.4	54 38	25.9	43 33.8	61 28	18.9	43 15.4	62 28	18.4	40 03.5	66 20	13.2
2	46 38.4	52 39	26.3	43 16.7	59 29	19.2	42 58.7	60 28	18.7	39 51.4	65 20	13.5
3	46 15.0	51 39	26.6	42 59.3	58 30	19.5	42 41.8	58 29	19.0	39 39.1	63 21	13.7
4	45 51.4	49 40	26.9	42 41.6	56 30	19.8	42 24.6	57 29	19.2	39 26.6	62 21	13.9
45	45 27.5	47 40	27.2	42 23.7	55 30	20.1	42 07.2	55 29	19.5	39 13.9	60 22	14.1
6	45 03.4	45 41	27.5	42 05.6	53 30	20.3	41 49.6	54 30	19.8	39 01.0	59 22	14.3
7	44 39.0	44 41	27.8	41 47.3	51 31	20.6	41 31.8	52 30	20.0	38 47.9	57 22	14.5
8	44 14.4	42 41	28.1	41 28.7	50 31	20.8	41 13.7	50 30	20.2	38 34.7	56 22	14.7
9	43 49.6	40 42	28.4	41 10.0	48 32	21.1	40 55.4	49 31	20.5	38 21.2	54 22	14.9
50	43 24.5	39 42	28.6	40 51.0	46 32	21.3	40 37.0	47 31	20.7	38 07.7	52 23	15.1
1	42 59.3	37 42	28.8	40 31.9	45 32	21.5	40 18.3	45 31	20.9	37 53.9	51 23	15.3
2	42 33.9	35 43	29.1	40 12.5	43 32	21.7	39 59.5	44 32	21.1	37 40.0	49 23	15.4
3	42 08.3	34 43	29.3	39 53.1	41 33	21.9	39 40.5	42 32	21.3	37 26.0	48 24	15.6
4	41 42.6	32 43	29.5	39 33.4	40 33	22.1	39 21.4	40 32	21.5	37 11.8	46 24	15.7
55	41 16.7	30 43	29.7	39 13.6	38 33	22.3	39 02.1	39 32	21.7	36 57.5	44 24	15.9
6	40 50.7	29 44	29.8	38 53.6	36 34	22.4	38 42.6	37 33	21.8	36 43.1	43 24	16.0
7	40 24.5	27 44	30.0	38 33.5	35 34	22.6	38 23.0	35 33	22.0	36 28.5	41 24	16.2
8	39 58.2	25 44	30.2	38 13.3	33 34	22.8	38 03.3	34 33	22.2	36 13.8	39 25	16.3
9	39 31.8	24 44	30.3	37 52.9	31 34	22.9	37 43.5	32 33	22.3	35 59.0	38 25	16.4
60	39 05.2	22 44	30.4	37 32.4	30 34	23.0	37 23.5	30 34	22.4	35 44.1	36 25	16.6
1	38 38.6	20 44	30.6	37 11.9	28 34	23.2	37 03.4	28 34	22.6	35 29.1	34 25	16.7
2	38 11.9	19 45	30.7	36 51.2	26 35	23.3	36 43.2	27 34	22.7	35 14.0	33 25	16.8
3	37 45.1	17 45	30.8	36 30.4	25 35	23.4	36 22.9	25 34	22.8	34 58.8	31 26	16.9
4	37 18.2	15 45	30.9	36 09.5	23 35	23.5	36 02.5	23 34	22.9	34 43.5	29 26	17.0
65	36 51.2	14 45	30.9	35 48.5	21 35	23.6	35 42.0	22 34	23.0	34 28.1	27 26	17.1
6	36 24.2	12 45	31.0	35 27.4	19 35	23.7	35 21.5	20 34	23.1	34 12.7	26 26	17.2
7	35 57.2	10 45	31.1	35 06.3	18 35	23.8	35 00.9	18 34	23.2	33 57.1	24 26	17.3
8	35 30.0	09 45	31.1	34 45.1	16 35	23.9	34 40.2	17 34	23.3	33 41.5	22 26	17.3
9	35 02.9	07 45	31.2	34 23.9	14 36	23.9	34 19.5	15 35	23.3	33 25.9	21 26	17.4
70	34 35.7	06 45	31.2	34 02.6	13 36	24.0	33 58.7	13 35	23.4	33 10.2	19 26	17.5
1	34 08.5	04 45	31.2	33 41.2	11 36	24.0	33 37.8	12 35	23.4	32 54.4	17 26	17.5
2	33 41.3	03 45	31.3	33 19.8	09 36	24.1	33 16.9	10 35	23.5	32 38.6	16 26	17.6
3	33 14.0	01 45	31.3	32 58.4	08 36	24.1	32 56.0	08 35	23.5	32 22.7	14 26	17.6
4	32 46.8	01 45	31.3	32 36.9	06 36	24.1	32 35.0	07 35	23.5	32 06.8	12 26	17.7
75	32 19.6	02 45	31.3	32 15.5	04 36	24.2	32 14.1	05 35	23.6	31 50.9	10 27	17.7
6	31 52.3	04 45	31.2	31 54.0	03 36	24.2	31 53.1	03 35	23.6	31 34.9	09 27	17.7
7	31 25.1	05 45	31.2	31 32.5	01 36	24.2	31 32.1	02 35	23.6	31 19.0	07 27	17.7
8	30 57.9	07 45	31.2	31 11.0	00 36	24.2	31 11.1	00 35	23.6	31 02.9	05 27	17.8
9	30 30.8	08 45	31.2	30 49.5	02 36	24.2	30 50.0	02 35	23.6	30 46.9	04 27	17.8
80	30 03.6	10 45	31.1	30 28.0	04 36	24.2	30 29.0	03 35	23.6	30 30.9	02 27	17.8
1	29 36.6	11 45	31.0	30 06.5	05 36	24.2	30 08.0	05 35	23.6	30 14.9	00 27	17.8
2	29 09.5	13 45	31.0	29 45.1	07 36	24.1	29 47.1	06 35	23.6	29 58.8	01 27	17.8
3	28 42.5	14 45	30.9	29 23.6	09 36	24.1	29 26.1	08 35	23.5	29 42.8	03 27	17.8
4	28 15.6	16 45	30.8	29 02.2	10 36	24.1	29 05.2	10 35	23.5	29 26.8	05 27	17.8
85	27 48.7	17 45	30.8	28 40.8	12 36	24.0	28 44.3	11 35	23.4	29 10.8	06 27	17.8
6	27 21.9	19 44	30.7	28 19.5	13 36	24.0	28 23.4	13 35	23.4	28 54.8	08 27	17.7
7	26 55.2	20 44	30.6	27 58.2	15 35	23.9	28 02.6	14 35	23.3	28 38.8	10 26	17.7
8	26 28.6	22 44	30.5	27 37.0	16 35	23.8	27 41.8	16 34	23.3	28 22.9	11 26	17.7
9	26 02.0	23 44	30.3	27 15.8	18 35	23.8	27 21.1	18 34	23.2	28 07.0	13 26	17.6
90	25 35.6	24 44	30.2	26 54.7	19 35	23.7	27 00.5	19 34	23.1	27 51.1	15 26	17.0

DECLINATION SAME NAME AS LATITUDE

H.A.	60° 00′			60° 30′			62° 00′			62° 30′			63° 00′			69° 00′			69° 30′			74° 30′		
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°
91	24 29.7	28 48	33.3	24 29.0	28 47	32.8	24 53.5	27 45	31.2	25 01.4	26 44	30.6	25 09.2	26 44	30.1	26 33.6	21 35	23.6	26 39.9	21 34	23.1	27 35.2	16 26	17.5
2	23 51.9	29 48	33.1	24 00.7	29 47	32.6	24 26.4	28 45	31.0	24 34.7	28 44	30.5	24 42.9	27 44	30.0	26 12.6	23 35	23.5	26 19.3	22 34	23.0	27 19.4	18 26	17.5
3	23 23.3	31 48	33.0	23 32.5	30 47	32.4	23 59.4	29 45	30.9	24 08.1	29 44	30.4	24 16.8	29 44	29.8	25 51.7	24 35	23.4	25 58.9	24 34	22.9	27 03.7	20 26	17.4
4	22 54.9	32 47	32.8	23 04.4	32 46	32.3	23 32.5	31 44	30.7	23 41.7	30 44	30.2	23 50.7	30 43	29.7	25 30.9	26 35	23.3	25 38.5	25 34	22.8	26 48.0	21 26	17.4
95	22 26.5	33 47	32.6	22 36.5	33 46	32.1	23 05.8	32 44	30.6	23 15.3	32 44	30.0	23 24.8	31 43	29.5	25 10.1	27 34	23.2	25 18.2	27 34	22.7	26 32.3	23 26	17.3
6	21 58.3	35 47	32.4	22 08.6	34 46	31.9	22 39.2	33 44	30.4	22 49.1	33 44	29.9	22 59.0	33 43	29.4	24 49.5	29 34	23.1	24 58.0	28 34	22.6	26 16.8	24 26	17.2
7	21 30.2	36 46	32.2	21 41.0	36 46	31.7	22 12.7	35 44	30.2	22 23.0	34 43	29.7	22 33.3	34 42	29.2	24 28.9	30 34	23.0	24 37.9	30 33	22.5	26 01.2	26 26	17.2
8	21 02.3	37 46	32.0	21 13.4	37 46	31.5	21 46.3	36 44	30.0	21 57.1	36 43	29.5	22 07.8	35 42	29.0	24 08.5	31 34	22.9	24 17.9	31 33	22.4	25 45.8	27 26	17.1
9	20 34.6	39 46	31.8	20 46.1	38 45	31.3	21 20.1	37 43	29.9	21 31.3	37 43	29.4	21 42.4	37 42	28.9	23 48.1	33 34	22.8	23 58.0	33 33	22.2	25 30.4	29 26	17.0
100	20 07.0	40 46	31.6	20 18.9	40 45	31.1	20 54.1	39 43	29.7	21 05.7	38 42	29.2	21 17.1	38 42	28.7	23 27.9	34 34	22.6	23 38.1	34 33	22.1	25 15.1	31 25	16.9
1	19 39.5	41 46	31.4	19 51.8	41 45	30.9	20 28.2	40 43	29.5	20 40.2	40 42	29.0	20 52.0	39 42	28.5	23 07.7	36 33	22.5	23 18.4	36 32	22.0	24 59.9	32 25	16.8
2	19 12.3	42 45	31.2	19 24.9	42 44	30.7	20 02.5	41 43	29.3	20 14.8	41 42	28.8	20 27.1	41 41	28.3	22 47.7	37 33	22.3	22 58.9	37 32	21.8	24 44.7	34 25	16.7
3	18 45.2	44 45	31.0	18 58.2	43 44	30.5	19 36.9	43 42	29.1	19 49.6	42 42	28.6	20 02.3	42 41	28.1	22 27.8	39 33	22.2	22 39.4	38 32	21.7	24 29.6	35 25	16.6
4	18 18.3	45 44	30.7	18 31.7	45 44	30.3	19 11.5	44 42	28.8	19 24.6	44 41	28.4	19 37.7	43 41	27.9	22 08.1	40 33	22.0	22 20.0	40 32	21.6	24 14.7	37 25	16.5
105	17 51.5	46 44	30.5	18 05.3	46 44	30.0	18 46.3	45 42	28.6	18 59.8	45 41	28.1	19 13.2	45 40	27.7	21 48.4	41 32	21.9	22 00.8	41 32	21.4	23 59.8	38 25	16.4
6	17 25.0	47 44	30.2	17 39.2	47 43	29.8	18 21.2	46 41	28.4	18 35.1	46 41	27.9	18 48.9	46 40	27.5	21 28.9	43 32	21.7	21 41.8	43 32	21.2	23 45.0	40 24	16.3
7	16 58.7	48 44	30.0	17 13.2	48 43	29.5	17 56.4	48 41	28.2	18 10.6	47 40	27.7	18 24.8	47 40	27.2	21 09.6	44 32	21.6	21 22.8	44 31	21.1	23 30.3	41 24	16.2
8	16 32.5	50 43	29.7	16 47.4	49 43	29.3	17 31.7	49 41	27.9	17 46.3	49 40	27.5	18 00.9	48 40	27.0	20 50.4	46 32	21.4	21 04.0	45 31	20.9	23 15.8	42 24	16.1
9	16 06.6	51 43	29.5	16 21.8	51 42	29.0	17 07.2	50 40	27.7	17 22.2	50 40	27.2	17 37.2	50 39	26.8	20 31.3	47 32	21.2	20 45.4	47 31	20.7	23 01.3	44 24	15.9
110	15 40.9	52 42	29.2	15 56.5	52 42	28.8	16 42.9	51 40	27.4	16 58.3	51 40	27.0	17 13.6	51 39	26.5	20 12.4	48 31	21.0	20 26.8	48 30	20.6	22 47.0	45 24	15.8
1	15 15.4	53 42	28.9	15 31.3	53 42	28.5	16 18.9	53 40	27.2	16 34.6	52 39	26.7	16 50.3	52 38	26.3	19 53.6	50 31	20.8	20 08.5	49 30	20.4	22 32.7	47 24	15.7
2	14 50.1	54 42	28.7	15 06.4	54 41	28.2	15 55.0	54 39	26.9	16 11.1	54 39	26.5	16 27.2	53 38	26.0	19 35.1	51 31	20.7	19 50.3	51 30	20.2	22 18.6	48 23	15.5
3	14 25.1	56 41	28.4	14 41.7	55 41	27.9	15 31.4	55 39	26.6	15 47.8	55 38	26.2	16 04.2	55 38	25.8	19 16.6	52 30	20.5	19 32.3	52 30	20.0	22 04.6	50 23	15.4
4	14 00.2	57 41	28.1	14 17.2	57 40	27.7	15 07.9	56 39	26.4	15 24.8	56 38	25.9	15 41.5	56 38	25.5	18 58.4	53 30	20.3	19 14.4	53 30	19.8	21 50.7	51 23	15.2
115	13 35.6	58 40	27.8	13 53.0	58 40	27.4	14 44.7	57 38	26.1	15 01.9	57 38	25.7	15 19.0	57 37	25.3	18 40.3	55 30	20.0	18 56.7	55 29	19.6	21 37.0	52 23	15.1
6	13 11.3	59 40	27.5	13 29.0	59 40	27.1	14 21.8	58 38	25.8	14 39.3	58 37	25.4	14 56.7	58 37	25.0	18 22.4	56 30	19.8	18 39.2	56 29	19.4	21 23.4	54 22	14.9
7	12 47.2	60 40	27.2	13 05.2	60 39	26.8	13 59.0	60 38	25.5	14 16.9	59 37	25.1	14 34.7	59 36	24.7	18 04.7	57 29	19.6	18 21.8	57 28	19.2	21 09.9	55 22	14.8
8	12 23.4	61 39	26.9	12 41.7	61 39	26.5	13 36.5	61 37	25.2	13 54.7	61 36	24.8	14 12.9	60 36	24.4	17 47.1	58 29	19.4	18 04.7	58 28	19.0	20 56.6	56 22	14.6
9	11 59.8	62 39	26.6	12 18.4	62 38	26.2	13 14.3	62 37	24.9	13 32.8	62 36	24.5	13 51.3	62 36	24.1	17 29.8	60 28	19.2	17 47.7	60 28	18.8	20 43.4	58 22	14.5
120	11 36.4	63 38	26.2	11 55.4	63 38	25.8	12 52.3	63 36	24.6	13 11.1	63 36	24.2	13 30.0	63 35	23.9	17 12.7	61 28	19.0	17 30.9	61 28	18.5	20 30.4	59 22	14.3
1	11 13.4	64 38	25.9	11 32.7	64 38	25.5	12 30.5	64 36	24.3	12 49.7	64 35	23.9	13 08.9	64 35	23.6	16 55.7	62 28	18.7	17 14.3	62 27	18.3	20 17.5	60 21	14.1
2	10 50.6	66 38	25.6	11 10.2	65 37	25.2	12 09.0	65 35	24.0	12 28.5	65 35	23.6	12 48.0	65 34	23.3	16 39.0	63 28	18.5	16 57.9	63 27	18.1	20 04.8	61 21	14.0
3	10 28.1	67 37	25.2	10 48.0	67 36	24.9	11 47.8	66 35	23.7	12 07.6	66 34	23.3	12 27.4	66 34	23.0	16 22.4	64 27	18.3	16 41.7	64 27	17.9	19 52.2	63 21	13.8
4	10 05.8	68 37	24.9	10 26.1	68 36	24.5	11 26.8	67 34	23.4	11 47.0	67 34	23.0	12 07.1	67 34	22.6	16 06.1	66 27	18.0	16 25.7	65 26	17.6	19 39.7	64 20	13.6
125	9 43.9	69 36	24.6	10 04.5	69 36	24.2	11 06.1	68 34	23.1	11 26.6	68 34	22.7	11 47.0	68 33	22.3	15 50.0	67 26	17.8	16 10.0	67 26	17.4	19 27.5	65 20	13.4
6	9 22.2	70 36	24.2	9 43.1	70 35	23.8	10 45.7	69 34	22.7	11 06.5	69 33	22.4	11 27.2	69 32	22.0	15 34.1	68 26	17.5	15 54.4	68 26	17.1	19 15.4	66 20	13.2
7	9 00.8	71 35	23.8	9 22.0	71 34	23.5	10 25.5	70 33	22.4	10 46.6	70 32	22.0	11 07.7	70 32	21.7	15 18.4	69 26	17.3	15 39.0	69 25	16.9	19 03.4	67 20	13.1
8	8 39.8	72 35	23.5	9 01.3	72 34	23.1	10 05.6	71 32	22.1	10 27.1	71 32	21.7	10 48.4	71 32	21.4	15 02.9	70 25	17.0	15 23.9	70 25	16.6	18 51.7	69 19	12.9
9	8 19.0	73 34	23.1	8 40.8	73 34	22.8	9 46.1	72 32	21.7	10 07.8	72 32	21.4	10 29.5	72 31	21.0	14 47.7	71 25	16.7	15 09.0	71 24	16.4	18 40.1	70 19	12.7
130	7 58.6	74 34	22.8	8 20.6	74 33	22.4	9 26.8	73 32	21.4	9 48.8	73 31	21.0	10 10.8	73 31	20.7	14 32.7	72 25	16.5	14 54.3	72 24	16.1	18 28.7	71 19	12.5
1	7 38.4	75 33	22.4	8 00.8	75 32	22.0	9 07.8	74 31	21.0	9 30.1	74 31	20.7	9 52.4	74 30	20.4	14 17.9	73 24	16.2	14 39.9	73 24	15.9	18 17.4	72 18	12.3
2	7 18.6	76 32	22.0	7 41.3	75 32	21.7	8 49.1	75 30	20.7	9 11.7	75 30	20.3	9 34.3	75 30	20.0	14 03.4	74 24	15.9	14 25.6	74 23	15.6	18 06.4	73 18	12.1
3	6 59.1	76 32	21.6	7 22.0	76 31	21.3	8 30.8	76 30	20.3	8 53.6	76 30	20.0	9 16.5	76 29	19.7	13 49.1	75 23	15.7	14 11.7	75 23	15.3	17 55.5	74 18	11.9
4	6 39.9	77 31	21.2	7 03.2	77 31	20.9	8 12.7	77 30	20.0	8 35.8	77 29	19.6	8 59.0	77 29	19.3	13 35.1	76 23	15.4	13 57.9	76 22	15.0	17 44.8	75 18	11.6
135	6 21.1	78 31	20.8	6 44.6	78 30	20.5	7 54.9	78 29	19.6	8 18.4	78 29	19.3	8 41.8	78 28	19.0	13 21.3	77 23	15.1	13 44.4	77 22	14.8	17 34.3	76 17	11.4
6	6 02.6	79 30	20.4	6 26.4	79 30	20.1	7 37.5	79 28	19.2	8 01.2	79 28	18.9	8 24.9	79 28	18.6	13 07.7	78 22	14.8	13 31.2	78 22	14.5	17 24.0	77 17	11.2
7	5 44.5	80 30	20.0	6 08.5	80 29	19.7	7 20.4	80 28	18.8	7 44.4	80 28	18.5	8 08.3	80 27	18.2	12 54.4	79 22	14.5	13 18.2	79 21	14.2	17 13.9	78 16	11.0
8	5 26.6	81 29	19.6	5 50.9	81 29	19.3	7 03.6	81 27	18.5	7 27.9	81 27	18.2	7 52.1	81 27	17 9	12 41.4	80 21	14.2	13 05.4	80 21	13.9	17 04.0	79 16	10.8
9	5 09.2	82 29	19.2	5 33.7	82 28	18.9	6 47.2	82 27	18.1	7 11.7	82 26	17.8	7 36.1	82 26	17.5	12 28.6	81 21	13.9	12 52.9	81 20	13.6	16 54.3	80 16	10.6
140				5 16.8	83 28	18.5	6 31.1	82 26	17.7	6 55.8	82 26	17.4	7 20.5	82 25	17.1	12 16.1	82 20	13.6	12 40.7	82 20	13.3	16 44.8	81 16	10.3
1				5 00.3	83 27	18.1	6 15.3	83 26	17.3	6 40.3	83 25	17.0	7 05.3	83 25	16.7	12 03.9	83 20	13.3	12 28.7	83 20	13.0	16 35.4	82 15	10.1
2							5 59.9	84 25	16.9	6 25.1	84 25	16.6	6 50.3	84 24	16.4	11 51.9	84 20	13.0	12 17.0	83 19	12.7	16 26.3	83 15	09.9
3							5 44.8	85 24	16.5	6 10.3	85 24	16.2	6 35.7	85 24	16.0	11 40.2	84 19	12.7	12 05.5	84 18	12.4	16 17.4	84 14	09.6
4							5 30.1	86 24	16.1	5 55.8	86 24	15.8	6 21.5	86 23	15.6	11 28.8	85 18	12.4	11 54.4	85 18	12.1	16 08.8	84 14	09.4
145							5 15.7	86 23	15.7	5 41.6	86 23	15.4	6 07.5	86 22	15.2	11 17.7	86 18	12.1	11 43.5	86 18	11.8	16 00.3	85 14	09.2
6							5 01.7	87 23	15.3	5 27.8	87 22	15.0	5 54.0	87 22	14.8	11 06.8	87 18	11.8	11 32.8	87 17	11.5	15 52.0	86 13	08.9
7										5 14.4	88 22	14.6	5 40.8	88 22	14.4	10 56.3	87 17	11.5	11 22.5	87 17	11.2	15 44.0	87 13	08.7
8										5 01.3	89 21	14.2	5 27.9	88 21	14.0	10 46.0	88 17	11.1	11 12.4	88 16	10.9	15 36.1	88 13	08.5
9													5 15.4	89 20	13.6	10 36.0	89 16	10.8	11 02.6	89 16	10.6	15 28.5	88 12	08.2
150													5 03.2	90 20	13.2	10 26.3	90 16	10.5	10 53.1	90 15	10.3	15 21.2	89 12	08.0
1																10 16.8	90 15	10.2	10 43.9	90 15	10.0	15 14.0	90 12	07.7
2																10 07.7	91 15	09.8	10 35.0	91 14	09.6	15 07.1	91 11	07.5
3																9 58.9	92 14	09.5	10 26.4	91 14	09.3	15 00.4	91 11	07.2
4																9 50.4	92 14	09.2	10 18.0	92 13	09.0	14 53.9	92 10	07.0
155																9 42.2	93 13	08.8	10 10.0	93 13	08.6	14 47.6	92 10	06.7
6																9 34.3	93 13	08.5	10 02.2	93 12	08.3	14 41.6	93 10	06.5
7																9 26.7	94 12	08.2	9 54.8	94 12	08.0	14 35.8	94 09	06.2
8																9 19.4	94 12	07.8	9 47.7	94 12	07.7	14 30.3	94 09	05.9
9																9 12.4	95 11	07.5	9 40.8	95 11	07.3	14 25.0	95 08	05.7
160																9 05.7	95 10	07.1	9 34.3	95 10	07.0	14 19.9	95 08	05.4
1																8 59.4	96 10	06.8	9 28.1	96 10	06.6	14 15.1	96 08	05.2
2																8 53.3	96 10	06.4	9 22.2	96 09	06.3	14 10.5	96 07	04.9
3																8 47.6	97 09	06.1	9 16.6	97 09	06.0	14 06.2	96 07	04.6
4																8 42.2	97 08	05.7	9 11.3	97 08	05.6	14 02.0	97 06	04.4
165																8 37.1	97 08	05.4	9 06.3	97 08	05.3	13 58.2	97 06	04.1
6																8 32.3	98 07	05.0	9 01.6	98 07	04.9	13 54.6	98 06	03.8
7																8 27.9	98 07	04.7	8 57.3	98 07	04.6	13 51.2	98 05	03.6
8																8 23.8	98 06	04.3	8 53.3	98 06	04.2	13 48.1	98 05	03.3
9																8 20.0	99 06	04.0	8 49.6	99 06	03.9	13 45.2	99 04	03.0
170																8 16.5	99 05	03.6	8 46.2	99 05	03.5	13 42.6	99 04	02.7
1																8 13.4	99 05	03.2	8 43.1	99 04	03.2	13 40.2	99 04	02.5
2																8 10.6	99 04	02.9	8 40.4	99 04	02.8	13 38.0	99 03	02.2
3																8 08.1	99 04	02.5	8 37.9	99 04	02.5	13 36.1	99 03	01.9
4																8 06.0	1.0 03	02.2	8 35.8	1.0 03	02.1	13 34.5	1.0 02	01.6
175																8 04.1	1.0 02	01.8	8 34.1	1.0 02	01.8	13 33.1	1.0 02	01.4
6																8 02.6	1.0 02	01.4	8 32.6	1.0 02	01.4	13 32.0	1.0 02	01.1
7																8 01.5	1.0 01	01.1	8 31.5	1.0 02	01.1	13 31.1	1.0 01	00.8
8																8 00.7	1.0 01	00.7	8 30.6	1.0 01	00.7	13 30.5	1.0 01	00.5
9																8 00.2	1.0 00	00.4	8 30.2	1.0 00	00.4	13 30.1	1.0 00	00.3
180																8 00.0	1.0 00	00.0	8 30.0	1.0 00	00.0	13 30.0	1.0 00	00.0

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 29°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	65	180	69	180	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	75	00	00
4	65	171	69	169	73	167	76	163	80	157	84	143	86	105	85	48	82	25	79	16	75	11	4
8	64	162	68	159	71	155	75	149	78	139	81	123	83	96	82	64	80	42	77	29	74	21	8
12	63	153	66	149	70	144	73	137	76	127	78	112	79	93	79	71	78	52	75	39	72	29	12
16	61	146	64	141	67	135	70	128	73	118	75	106	76	90	76	74	75	58	73	46	70	36	16
20	59	139	62	134	65	128	67	121	70	112	71	101	72	88	73	75	72	62	70	51	68	41	20
24	56	133	59	128	62	122	64	115	66	107	68	97	69	87	69	76	69	65	67	54	66	45	24
28	54	128	56	123	59	117	61	111	63	103	65	95	65	85	66	76	65	66	65	57	63	48	28
32	51	123	53	119	56	113	58	107	60	100	61	92	62	84	62	76	62	67	62	59	60	51	32
36	48	119	50	115	52	109	54	104	56	97	58	90	58	83	59	75	59	68	59	60	58	52	36
40	45	116	47	111	49	106	51	101	53	95	54	88	55	82	56	75	56	68	56	61	55	54	40
44	41	112	44	108	46	103	48	98	49	93	51	87	52	80	52	74	53	68	53	61	52	54	44
48	38	110	40	105	42	101	44	96	46	90	47	85	48	79	49	73	49	67	49	61	49	55	48
52	35	107	37	103	39	98	41	93	42	89	44	83	45	78	46	73	46	67	46	61	46	55	52
56	31	104	33	100	35	96	37	91	39	87	40	82	41	77	42	72	43	66	43	61	44	55	56
60	28	102	30	98	32	94	34	89	35	85	37	80	38	76	39	71	40	66	40	60	41	55	60
64	25	100	27	96	28	92	30	88	32	83	33	79	34	74	36	70	37	65	37	60	38	55	64
68	21	97	23	94	25	90	27	86	28	82	30	77	31	73	32	69	33	64	34	59	35	54	68
72	18	95	20	92	21	88	23	84	25	80	26	76	28	72	29	67	30	63	31	58	32	54	72
76	14	93	16	90	18	86	20	82	21	78	23	74	24	70	26	66	27	62	28	58	29	53	76
80	11	91	13	88	14	84	16	80	18	77	20	73	21	69	23	65	24	61	25	57	27	52	80
84	07	89	09	86	11	82	13	79	15	75	16	71	18	67	20	64	21	60	22	56	24	51	84
88	04	87	06	84	08	80	09	77	11	73	13	70	15	66	16	62	18	58	20	54	21	50	88
92	00	86	02	82	04	79	06	75	08	71	10	68	12	64	13	61	15	57	17	53	18	49	92
96	*03*	84	*01*	80	01	77	03	73	05	70	07	66	08	63	10	59	12	55	14	52	16	48	96
100	*07*	82	*05*	78	*03*	75	*01*	71	01	68	03	64	05	61	07	57	09	54	11	50	13	47	100
104	*10*	80	*08*	76	*06*	73	*04*	69	*02*	66	00	62	02	59	04	56	07	52	09	49	11	45	104
108	*14*	77	*12*	74	*09*	71	*07*	67	*05*	64	*03*	60	*01*	57	02	54	04	50	06	47	08	44	108
112	*17*	75	*15*	72	*13*	68	*10*	65	*08*	62	*06*	58	*04*	55	*01*	52	01	49	03	45	06	42	112
116	*20*	73	*18*	70	*16*	66	*14*	63	*11*	59	*09*	56	*06*	53	*04*	50	*01*	47	01	44	03	40	116
120	*24*	71	*21*	67	*19*	64	*17*	60	*14*	57	*12*	54	*09*	51	*07*	48	*04*	45	*01*	42	01	39	120
124	*27*	68	*25*	65	*22*	61	*20*	58	*17*	55	*14*	51	*12*	48	*09*	45	*06*	42	*04*	40	*01*	37	124
128	*30*	65	*28*	62	*25*	58	*23*	55	*20*	52	*17*	49	*14*	46	*12*	43	*09*	40	*06*	37	*03*	35	128
132	*33*	63	*31*	59	*28*	56	*25*	52	*23*	49	*20*	46	*17*	43	*14*	40	*11*	38	*08*	35	*05*	32	132
136	*36*	59	*34*	56	*31*	52	*28*	49	*25*	46	*22*	43	*19*	40	*16*	38	*13*	35	*10*	33	*07*	30	136
140	*39*	56	*37*	52	*34*	49	*31*	46	*28*	43	*25*	40	*21*	38	*18*	35	*15*	33	*12*	30	*08*	28	140
144	*42*	52	*39*	49	*36*	45	*33*	42	*30*	40	*27*	37	*23*	34	*20*	32	*17*	30	*13*	28	*10*	25	144
148	*45*	48	*42*	45	*39*	42	*35*	39	*32*	36	*29*	34	*25*	31	*22*	29	*18*	27	*15*	25	*11*	23	148
152	*47*	44	*44*	40	*41*	37	*37*	35	*34*	32	*31*	30	*27*	28	*23*	26	*20*	24	*16*	22	*13*	20	152
156	*50*	39	*46*	36	*43*	33	*39*	30	*36*	28	*32*	26	*29*	24	*25*	22	*21*	21	*17*	19	*14*	18	156
160	*52*	34	*48*	31	*45*	28	*41*	26	*37*	24	*34*	22	*30*	20	*26*	19	*22*	17	*19*	16	*15*	15	160
164	*54*	28	*50*	25	*46*	23	*42*	21	*39*	19	*35*	18	*31*	16	*27*	15	*23*	14	*19*	13	*16*	12	164
168	*55*	21	*51*	19	*47*	17	*44*	16	*40*	15	*36*	14	*32*	12	*28*	12	*24*	11	*20*	10	*16*	09	168
172	*56*	14	*52*	13	*48*	12	*44*	11	*40*	10	*36*	09	*32*	08	*29*	08	*25*	07	*21*	07	*17*	06	172
176	*57*	07	*53*	07	*49*	06	*45*	05	*41*	05	*37*	05	*33*	04	*29*	04	*25*	04	*21*	03	*17*	03	176
180	*57*	00	*53*	00	*49*	00	*45*	00	*41*	00	*37*	00	*33*	00	*29*	00	*25*	00	*21*	00	*17*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°	
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	71	00	67	00	63	00	59	00	55	00	51	00	47	00	43	00	39	00	35	00	31	00
4	71	08	67	06	63	05	59	04	55	03	51	02	47	02	43	01	39	01	35	01	31	00
8	70	16	66	12	62	10	59	08	55	06	51	05	47	04	43	03	39	02	35	01	31	00
12	69	23	65	18	62	14	58	11	54	09	50	07	47	05	43	04	39	03	35	02	31	00
16	67	29	64	23	61	18	57	15	54	12	50	09	46	07	42	05	39	04	35	02	31	01
20	66	34	63	27	59	22	56	18	53	14	49	11	46	09	42	06	38	04	35	02	31	01
24	63	38	61	31	58	25	55	21	52	17	48	13	45	10	42	08	38	05	34	03	31	01
28	61	41	59	34	56	28	54	23	51	19	48	15	44	12	41	09	38	06	34	03	31	01
32	59	43	57	37	55	31	52	26	50	21	47	17	44	13	41	10	37	07	34	04	31	01
36	57	45	55	39	53	33	51	28	48	23	46	18	43	14	40	11	37	07	34	04	31	01
40	54	47	53	41	51	35	49	29	47	24	44	20	42	15	39	12	36	08	34	05	31	01
44	51	48	50	42	49	36	47	31	45	26	43	21	41	17	39	12	36	09	33	05	30	02
48	49	49	48	43	47	37	45	32	44	27	42	22	40	17	38	13	35	09	33	05	30	02
52	46	50	46	44	45	38	44	33	42	28	41	23	39	18	37	14	35	10	33	06	30	02
56	43	50	43	44	42	39	42	34	41	29	39	24	38	19	36	14	34	10	32	06	30	02
60	41	50	41	45	40	39	40	34	39	29	38	24	37	19	35	15	34	10	32	06	30	02
64	38	50	38	45	38	40	38	35	37	30	36	25	35	20	34	15	33	11	31	06	30	02
68	35	50	36	45	36	40	36	35	35	30	35	25	34	20	33	16	32	11	31	06	30	02
72	33	49	33	44	34	40	34	35	34	30	33	25	33	21	32	16	32	11	31	07	30	02
76	30	49	31	44	31	39	32	35	32	30	32	25	32	21	31	16	31	11	30	07	29	02
80	28	48	28	44	29	39	30	35	30	30	30	25	31	21	30	16	30	11	30	07	29	02
84	25	47	26	43	27	39	28	34	28	30	29	25	29	21	30	16	30	11	29	07	29	02
88	22	46	24	42	25	38	26	34	27	29	27	25	28	20	29	16	29	11	29	07	29	02
92	20	45	21	41	23	37	24	33	25	29	26	25	27	20	28	16	28	11	29	07	29	02
96	17	44	19	40	21	36	22	32	23	28	25	24	26	20	27	16	27	11	28	07	29	02
100	15	43	17	39	18	35	20	32	22	28	23	24	24	20	26	15	27	11	28	07	29	02
104	13	42	15	38	16	34	18	31	20	27	22	23	23	19	25	15	26	11	27	07	28	02
108	10	40	12	37	15	33	17	30	18	26	20	22	22	19	24	15	26	11	27	06	28	02
112	08	39	10	35	13	32	15	29	17	25	19	22	21	18	23	14	25	10	27	06	28	02
116	06	37	08	34	11	31	13	27	16	24	18	21	20	17	22	14	24	10	26	06	28	02
120	04	36	06	32	09	29	12	26	14	23	17	20	19	16	21	13	24	09	26	06	28	02
124	02	34	05	31	07	28	10	25	13	22	15	19	18	16	21	12	23	09	26	06	28	02
128	*00*	32	03	29	06	26	09	23	12	21	14	18	17	15	20	12	23	09	25	05	28	02
132	*02*	30	01	27	04	25	07	22	10	19	13	17	16	14	19	11	22	08	25	05	28	02
136	*03*	28	*00*	25	03	23	06	20	09	18	12	15	15	13	19	10	22	07	25	05	28	02
140	*05*	26	*02*	23	02	21	05	19	08	17	11	14	15	12	18	09	21	07	24	04	27	01
144	*06*	23	*03*	21	00	19	04	17	07	15	11	13	14	11	17	09	21	06	24	04	27	01
148	*08*	21	*04*	19	*01*	17	03	15	06	14	10	12	13	10	17	08	20	06	24	03	27	01
152	*09*	19	*05*	17	*02*	15	02	14	06	12	09	10	13	09	16	07	20	05	24	03	27	01
153	*10*	16	*06*	15	*03*	13	01	11	05	10	09	09	12	07	16	06	20	04	23	03	27	01
160	*11*	13	*07*	12	*03*	11	01	10	04	09	08	07	12	06	16	05	20	04	23	02	27	01
164	*12*	11	*08*	10	*04*	09	*00*	08	04	07	08	06	12	05	15	04	19	03	23	02	27	01
168	*12*	08	*08*	07	*04*	07	*00*	06	03	05	07	05	11	04	15	03	19	02	23	01	27	00
172	*13*	05	*09*	05	*05*	04	*01*	04	03	04	07	03	11	03	15	02	19	01	23	01	27	00
176	*13*	03	*09*	02	*05*	02	*01*	02	03	02	07	02	11	01	15	01	19	01	23	00	27	00
180	*13*	00	*09*	00	*05*	00	*01*	00	03	00	07	00	11	00	15	00	19	00	23	00	27	00
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°	

FIGURES IN ITALICS INDICATE THAT DECLINATION IS OF CONTRARY NAME TO LATITUDE

ALTITUDE CORRECTION FOR D. R. LATITUDE

Az.	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	Az.
0 180	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	0 180
1 179	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	1 179
2 178	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	2 178
3 177	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	3 177
4 176	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	14.0	15.0	4 176
5 175	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0	12.0	13.0	13.9	14 9	5 175
6 174	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	9.9	10.9	11.9	12.9	13.9	14.9	6 174
7 173	1.0	2.0	3.0	4.0	5.0	6.0	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	7 173
8 172	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	8 172
9 171	1.0	2.0	3.0	4.0	4.9	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.8	13.8	14.8	9 171
10 170	1.0	2.0	3.0	3.9	4.9	5.9	6.9	7.9	8.9	9.8	10.8	11.8	12.8	13.8	14.8	10 170
11 169	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.9	8.8	9.8	10.8	11.8	12.8	13.7	14.7	11 169
12 168	1.0	2.0	2.9	3.9	4.9	5.9	6.8	7.8	8.8	9.8	10.8	11.7	12.7	13.7	14.7	12 168
13 167	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.8	9.7	10.7	11.7	12.6	13.6	14.6	13 167
14 166	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	14 166
15 165	1.0	1.9	2.9	3.9	4.8	5.8	6.8	7.7	8.7	9.7	10.6	11.6	12.6	13.5	14.5	15 165
16 164	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.7	9.6	10.6	11.5	12.5	13.5	14.4	16 164
17 163	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.7	8.6	9.6	10.5	11.5	12.4	13.4	14.3	17 163
18 162	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	18 162
19 161	0.9	1.9	2.8	3.8	4.7	5.7	6.6	7.6	8.5	9.5	10.4	11.3	12.3	13.2	14.2	19 161
20 160	0.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	20 160
21 159	0.9	1.9	2.8	3.7	4.7	5.6	6.5	7.5	8.4	9.3	10.3	11.2	12.1	13.1	14.0	21 159
22 158	0.9	1.9	2.8	3.7	4.6	5.6	6.5	7.4	8.3	9.3	10.2	11.1	12.1	13.0	13.9	22 158
23 157	0.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	23 157
24 156	0.9	1.8	2.7	3.7	4.6	5.5	6.4	7.3	8.2	9.1	10.0	11.0	11.9	12.8	13.7	24 156
25 155	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.6	25 155
26 154	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	26 154
27 153	0.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	27 153
28 152	0.9	1.8	2.6	3.5	4.4	5.3	6.2	7.1	7.9	8.8	9.7	10.6	11.5	12.4	13.2	28 152
29 151	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.9	8.7	9.6	10.5	11.4	12.2	13.1	29 151
30 150	0.9	1.7	2.6	3.5	4.3	5.2	6.1	7.0	7.8	8.7	9.5	10.4	11.3	12.1	13.0	30 150
31 149	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.9	7.7	8.6	9.4	10.3	11.1	12.0	12.9	31 149
32 148	0.8	1.7	2.5	3.4	4.2	5.1	5.9	6.8	7.6	8.5	9.3	10.2	11.0	11.9	12.7	32 148
33 147	0.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.5	8.4	9.2	10.1	10.9	11.7	12.6	33 147
34 146	0.8	1.7	2.5	3.3	4.1	5.0	5.8	6.6	7.5	8.3	9.1	9.9	10.8	11.6	12.4	34 146
35 145	0.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.6	11.5	12.3	35 145
36 144	0.8	1.6	2.4	3.2	4.0	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.1	36 144
37 143	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	37 143
38 142	0.8	1.6	2.4	3.2	3.9	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.2	11.0	11.8	38 142
39 141	0.8	1.6	2.3	3.1	3.9	4.7	5.4	6.2	7.0	7.8	8.5	9.3	10.1	10.9	11.7	39 141
40 140	0.8	1.5	2.3	3.1	3.8	4.6	5.4	6.1	6.9	7.7	8.4	9.2	10.0	10.7	11.5	40 140
41 139	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.1	9.8	10.6	11.3	41 139
42 138	0.7	1.5	2.2	3.0	3.7	4.5	5.2	5.9	6.7	7.4	8.2	8.9	9.7	10.4	11.1	42 138
43 137	0.7	1.5	2.2	2.9	3.7	4.4	5.1	5.9	6.6	7.3	8.0	8.8	9.5	10.2	11.0	43 137
44 136	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	44 136
45 135	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.6	45 135
46 134	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	6.9	7.6	8.3	9.0	9.7	10.4	46 134
47 133	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.5	6.1	6.8	7.5	8.2	8.9	9.5	10.2	47 133
48 132	0.7	1.3	2.0	2.7	3.3	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.0	48 132
49 131	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.6	7.2	7.9	8.5	9.2	9.8	49 131
50 130	0.6	1.3	1.9	2.6	3.2	3.9	4.5	5.1	5.8	6.4	7.1	7.7	8.4	9.0	9.6	50 130
51 129	0.6	1.3	1.9	2.5	3.1	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.4	51 129
52 128	0.6	1.2	1.8	2.5	3.1	3.7	4.3	4.9	5.5	6.2	6.8	7.4	8.0	8.6	9.2	52 128
53 127	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	53 127
54 126	0.6	1.2	1.8	2.4	2.9	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.6	8.2	8.8	54 126
55 125	0.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.2	5.7	6.3	6.9	7.5	8.0	8.6	55 125
56 124	0.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	56 124
57 123	0.5	1.1	1.6	2.2	2.7	3.3	3.8	4.4	4.9	5.4	6.0	6.5	7.1	7.6	8.2	57 123
58 122	0.5	1.1	1.6	2.1	2.6	3.2	3.7	4.2	4.8	5.3	5.8	6.4	7.0	7.4	7.9	58 122
59 121	0.5	1.0	1.5	2.1	2.6	3.1	3.6	4.1	4.6	5.2	5.7	6.2	6.7	7.2	7.7	59 121
60 120	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	60 120
61 119	0.5	1.0	1.5	1.9	2.4	2.9	3.4	3.9	4.4	4.8	5.3	5.8	6.3	6.8	7.3	61 119
62 118	0.5	0.9	1.4	1.9	2.3	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.1	6.6	7.0	62 118
63 117	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.4	6.8	63 117
64 116	0.4	0.9	1.3	1.8	2.2	2.6	3.1	3.5	3.9	4.4	4.8	5.3	5.7	6.1	6.6	64 116
65 115	0.4	0.8	1.3	1.7	2.1	2.5	3.0	3.4	3.8	4.2	4.6	5.1	5.5	5.9	6.3	65 115
66 114	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.1	66 114
67 113	0.4	0.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	67 113
68 112	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.4	3.7	4.1	4.5	4.9	5.2	5.6	68 112
69 111	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	3.9	4.3	4.7	5.0	5.4	69 111
70 110	0.3	0.7	1.0	1.4	1.7	2.1	2.4	2.7	3.1	3.4	3.8	4.1	4.4	4.8	5.1	70 110
71 109	0.3	0.7	1.0	1.3	1.6	2.0	2.3	2.6	2.9	3.3	3.6	3.9	4.2	4.6	4.9	71 109
72 108	0.3	0.6	0.9	1.2	1.5	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3	4.6	72 108
73 107	0.3	0.6	0.9	1.2	1.5	1.8	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	73 107
74 106	0.3	0.6	0.8	1.1	1.4	1.7	1.9	2.2	2.5	2.8	3.0	3.3	3.6	3.9	4.1	74 106
75 105	0.3	0.5	0.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.8	3.1	3.4	3.6	3.9	75 105
76 104	0.2	0.5	0.7	1.0	1.2	1.5	1.7	1.9	2.2	2.4	2.7	2.9	3.1	3.4	3.6	76 104
77 103	0.2	0.4	0.7	0.9	1.1	1.3	1.6	1.8	2.0	2.2	2.5	2.7	2.9	3.1	3.4	77 103
78 102	0.2	0.4	0.6	0.8	1.0	1.2	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.1	78 102
79 101	0.2	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	79 101
80 100	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.6	1.7	1.9	2.1	2.3	2.4	2.6	80 100
81 99	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.3	1.4	1.6	1.7	1.9	2.0	2.2	2.3	81 99
82 98	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8	1.9	2.1	82 98
83 97	0.1	0.2	0.4	0.5	0.6	0.7	0.9	1.0	1.1	1.2	1.3	1.5	1.6	1.7	1.8	83 97
84 96	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.3	1.4	1.5	1.6	84 96
85 95	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.2	1.3	85 95
86 94	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.0	86 94
87 93	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	87 93
88 92	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	88 92
89 91	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.3	89 91
90 90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90 90
Az.	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	Az.

LAT. DIFF. (tenths of minutes of arc)

Az.	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Az.
0 180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	0 180
1 179										1 179
2 178										2 178
3 177										3 177
4 176										4 176
5 175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	5 175
6 174										6 174
7 173										7 173
8 172										8 172
9 171										9 171
10 170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	10 170
11 169										11 169
12 168										12 168
13 167										13 167
14 166										14 166
15 165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	15 165
16 164										16 164
17 163										17 163
18 162										18 162
19 161									0.9	19 161
20 160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	20 160
21 159							0.7	0.7		21 159
22 158							0.6			22 158
23 157						0.6				23 157
24 156						0.5				24 156
25 155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	25 155
26 154					0.4					26 154
27 153										27 153
28 152				0.4						28 152
29 151				0.3						29 151
30 150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	30 150
31 149										31 149
32 148										32 148
33 147			0.3						0.8	33 147
34 146			0.2						0.7	34 146
35 145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	35 145
36 144								0.6		36 144
37 143										37 143
38 142							0.6			38 142
39 141							0.5			39 141
40 140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	40 140
41 139		0.2				0.5				41 139
42 138		0.1				0.4				42 138
43 137									0.7	43 137
44 136									0.6	44 136
45 135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	45 135
46 134					0.3			0.6		46 134
47 133								0.5		47 133
48 132										48 132
49 131							0.5			49 131
50 130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	50 130
51 129				0.3						51 129
52 128				0.2					0.6	52 128
53 127									0.5	53 127
54 126						0.4				54 126
55 125	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	55 125
56 124								0.4		56 124
57 123										57 123
58 122										58 122
59 121	0.1				0.3				0.5	59 121
60 120	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	60 120
61 119			0.1				0.3			61 119
62 118										62 118
63 117										63 117
64 116								0.4		64 116
65 115	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	65 115
66 114						0.2			0.4	66 114
67 113				0.2					0.4	67 113
68 112				0.1					0.3	68 112
69 111							0.3		0.3	69 111
70 110	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	70 110
71 109								0.3		71 109
72 108					0.2			0.2		72 108
73 107					0.1				0.3	73 107
74 106									0.2	74 106
75 105	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	75 105
76 104		0.0				0.1				76 104
77 103							0.2			77 103
78 102							0.1			78 102
79 101								0.2		79 101
80 100	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	80 100
81 99			0.0						0.1	81 99
82 98				0.1						82 98
83 97				0.0						83 97
84 96					0.1					84 96
85 95	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	85 95
86 94						0.0	0.0	0.1	0.1	86 94
87 93								0.0	0.0	87 93
88 92										88 92
89 91										89 91
90 90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90 90
Az.	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Az.

Azimuth angle greater than 90°:
If DR latitude is greater than selected tabulated latitude, ΔL correction is *minus*; but for DR latitude less than selected tabulated latitude, the correction is *plus*.
Azimuth angle less than 90°:
If DR latitude is greater than selected tabulated latitude, ΔL correction is *plus*; but for DR latitude less than selected tabulated latitude, the correction is *minus*.

ALTITUDE CORRECTION FOR D. R. LATITUDE

Az.		LATITUDE DIFFERENCE (minutes of arc)															Az.		LAT. DIFF. (tenths of minutes of arc)								
°	°	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′	°	°	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′
0	180	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	0	180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
1	179	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	1	179									
2	178	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	2	178									
3	177	16.0	17.0	18.0	19.0	20.0	21.0	22.0	23.0	24.0	25.0	26.0	27.0	28.0	29.0	30.0	3	177									
4	176	16.0	17.0	18.0	19.0	20.0	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	4	176									
5	175	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.9	28.9	29.9	5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
6	174	15.9	16.9	17.9	18.9	19.9	20.9	21.9	22.9	23.9	24.9	25.9	26.9	27.8	28.8	29.8	6	174									
7	173	15.9	16.9	17.9	18.9	19.9	20.8	21.8	22.8	23.8	24.8	25.8	26.8	27.8	28.8	29.8	7	173									
8	172	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.7	27.7	28.7	29.7	8	172									
9	171	15.8	16.8	17.8	18.8	19.8	20.7	21.7	22.7	23.7	24.7	25.7	26.7	27.7	28.6	29.6	9	171									
10	170	15.8	16.7	17.7	18.7	19.7	20.7	21.7	22.7	23.6	24.6	25.6	26.6	27.6	28.6	29.5	10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
11	169	15.7	16.7	17.7	18.7	19.6	20.6	21.6	22.6	23.6	24.5	25.5	26.5	27.5	28.5	29.4	11	169									
12	168	15.7	16.6	17.6	18.6	19.6	20.5	21.5	22.5	23.5	24.5	25.4	26.4	27.4	28.4	29.3	12	168									
13	167	15.6	16.6	17.5	18.5	19.5	20.5	21.4	22.4	23.4	24.4	25.3	26.3	27.3	28.3	29.2	13	167									
14	166	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.2	27.2	28.1	29.1	14	166									
15	165	15.5	16.4	17.4	18.4	19.3	20.3	21.3	22.2	23.2	24.1	25.1	26.1	27.0	28.0	29.0	15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
16	164	15.4	16.3	17.3	18.3	19.2	20.2	21.1	22.1	23.1	24.0	25.0	26.0	26.9	27.9	28.8	16	164									
17	163	15.3	16.3	17.2	18.2	19.1	20.1	21.0	22.0	23.0	23.9	24.9	25.8	26.8	27.7	28.7	17	163									
18	162	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5	18	162									
19	161	15.1	16.1	17.0	18.0	18.9	19.9	20.8	21.7	22.7	23.6	24.6	25.5	26.5	27.4	28.4	19	161									0.9
20	160	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2	20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8
21	159	14.9	15.9	16.8	17.7	18.7	19.6	20.5	21.5	22.4	23.3	24.3	25.2	26.1	27.1	28.0	21	159							0.7	0.7	
22	158	14.8	15.8	16.7	17.6	18.5	19.5	20.4	21.3	22.3	23.2	24.1	25.0	26.0	26.9	27.8	22	158							0.6		
23	157	14.7	15.6	16.6	17.5	18.4	19.3	20.3	21.2	22.1	23.0	23.9	24.9	25.8	26.7	27.6	23	157						0.6			
24	156	14.6	15.5	16.4	17.4	18.3	19.2	20.1	21.0	21.9	22.8	23.8	24.7	25.6	26.5	27.4	24	156						0.5			
25	155	14.5	15.4	16.3	17.2	18.1	19.0	19.9	20.8	21.8	22.7	23.6	24.5	25.4	26.3	27.2	25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
26	154	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0	26	154					0.4				
27	153	14.3	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.2	24.1	24.9	25.8	26.7	27	153									
28	152	14.1	15.0	15.9	16.8	17.7	18.5	19.4	20.3	21.2	22.1	23.0	23.8	24.7	25.6	26.5	28	152				0.4					
29	151	14.0	14.9	15.7	16.6	17.5	18.4	19.2	20.1	21.0	21.9	22.7	23.6	24.5	25.4	26.2	29	151				0.3					
30	150	13.9	14.7	15.6	16.5	17.3	18.2	19.1	19.9	20.8	21.7	22.5	23.4	24.2	25.1	26.0	30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8
31	149	13.7	14.6	15.4	16.3	17.1	18.0	18.9	19.7	20.6	21.4	22.3	23.1	24.0	24.9	25.7	31	149									
32	148	13.6	14.4	15.3	16.1	17.0	17.8	18.7	19.5	20.4	21.2	22.0	22.9	23.7	24.6	25.4	32	148									
33	147	13.4	14.3	15.1	15.9	16.8	17.6	18.5	19.3	20.1	21.0	21.8	22.6	23.5	24.3	25.2	33	147				0.3					0.8
34	146	13.3	14.1	14.9	15.8	16.6	17.4	18.2	19.1	19.9	20.7	21.6	22.4	23.2	24.0	24.9	34	146				0.2					0.7
35	145	13.1	13.9	14.7	15.6	16.4	17.2	18.0	18.8	19.7	20.5	21.3	22.1	22.9	23.8	24.6	35	145	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7
36	144	12.9	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.2	21.0	21.8	22.7	23.5	24.3	36	144								0.6	
37	143	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0	37	143									
38	142	12.6	13.4	14.2	15.0	15.8	16.5	17.3	18.1	18.9	19.7	20.5	21.3	22.1	22.9	23.6	38	142							0.6		
39	141	12.4	13.2	14.0	14.8	15.5	16.3	17.1	17.9	18.7	19.4	20.2	21.0	21.8	22.5	23.3	39	141							0.5		
40	140	12.3	13.0	13.8	14.6	15.3	16.1	16.9	17.6	18.4	19.2	19.9	20.7	21.4	22.2	23.0	40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7
41	139	12.1	12.8	13.6	14.3	15.1	15.8	16.6	17.4	18.1	18.9	19.6	20.4	21.1	21.9	22.6	41	139		0.2				0.5			
42	138	11.9	12.6	13.4	14.1	14.9	15.6	16.3	17.1	17.8	18.6	19.3	20.1	20.8	21.6	22.3	42	138		0.1				0.4			
43	137	11.7	12.4	13.2	13.9	14.6	15.4	16.1	16.8	17.6	18.3	19.0	19.7	20.5	21.2	21.9	43	137									0.7
44	136	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.5	17.3	18.0	18.7	19.4	20.1	20.9	21.6	44	136									0.6
45	135	11.3	12.0	12.7	13.4	14.1	14.8	15.6	16.3	17.0	17.7	18.4	19.1	19.8	20.5	21.2	45	135	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6
46	134	11.1	11.8	12.5	13.2	13.9	14.6	15.3	16.0	16.7	17.4	18.1	18.8	19.5	20.1	20.8	46	134					0.3			0.6	
47	133	10.9	11.6	12.3	13.0	13.6	14.3	15.0	15.7	16.4	17.1	17.7	18.4	19.1	19.8	20.5	47	133								0.5	
48	132	10.7	11.4	12.0	12.7	13.4	14.1	14.7	15.4	16.1	16.7	17.4	18.1	18.7	19.4	20.1	48	132									
49	131	10.5	11.2	11.8	12.5	13.1	13.8	14.4	15.1	15.7	16.4	17.1	17.7	18.4	19.0	19.7	49	131							0.5		
50	130	10.3	10.9	11.6	12.2	12.9	13.5	14.1	14.8	15.4	16.1	16.7	17.4	18.0	18.6	19.3	50	130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6
51	129	10.1	10.7	11.3	12.0	12.6	13.2	13.8	14.5	15.1	15.7	16.4	17.0	17.6	18.3	18.9	51	129				0.3					
52	128	9.9	10.5	11.1	11.7	12.3	12.9	13.5	14.2	14.8	15.4	16.0	16.6	17.2	17.9	18.5	52	128				0.2					0.6
53	127	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.9	17.5	18.1	53	127									0.5
54	126	9.4	10.0	10.6	11.2	11.8	12.3	12.9	13.5	14.1	14.7	15.3	15.9	16.5	17.0	17.6	54	126						0.4			
55	125	9.2	9.8	10.3	10.9	11.5	12.0	12.6	13.2	13.8	14.3	14.9	15.5	16.1	16.6	17.2	55	125	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5
56	124	8.9	9.5	10.1	10.6	11.2	11.7	12.3	12.9	13.4	14.0	14.5	15.1	15.7	16.2	16.8	56	124								0.4	
57	123	8.7	9.3	9.8	10.3	10.9	11.4	12.0	12.5	13.1	13.6	14.2	14.7	15.2	15.8	16.3	57	123									
58	122	8.5	9.0	9.5	10.1	10.6	11.1	11.7	12.2	12.7	13.2	13.8	14.3	14.8	15.4	15.9	58	122									
59	121	8.2	8.8	9.3	9.8	10.3	10.8	11.3	11.8	12.4	12.9	13.4	13.9	14.4	14.9	15.5	59	121	0.1				0.3				0.5
60	120	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0	60	120	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4
61	119	7.8	8.2	8.7	9.2	9.7	10.2	10.7	11.2	11.6	12.1	12.6	13.1	13.6	14.1	14.5	61	119			0.1				0.3		
62	118	7.5	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.3	11.7	12.2	12.7	13.1	13.6	14.1	62	118									
63	117	7.3	7.7	8.2	8.6	9.1	9.5	10.0	10.4	10.9	11.3	11.8	12.3	12.7	13.2	13.6	63	117									
64	116	7.0	7.5	7.9	8.3	8.8	9.2	9.6	10.1	10.5	11.0	11.4	11.8	12.3	12.7	13.2	64	116								0.4	
65	115	6.8	7.2	7.6	8.0	8.5	8.9	9.3	9.7	10.1	10.6	11.0	11.4	11.8	12.3	12.7	65	115	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
66	114	6.5	6.9	7.3	7.7	8.1	8.5	8.9	9.4	9.8	10.2	10.6	11.0	11.4	11.8	12.2	66	114						0.2			
67	113	6.3	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.2	10.5	10.9	11.3	11.7	67	113				0.2					0.4
68	112	6.0	6.4	6.7	7.1	7.5	7.9	8.2	8.6	9.0	9.4	9.7	10.1	10.5	10.9	11.2	68	112				0.1					0.3
69	111	5.7	6.1	6.5	6.8	7.2	7.5	7.9	8.2	8.6	9.0	9.3	9.7	10.0	10.4	10.8	69	111							0.3		
70	110	5.5	5.8	6.2	6.5	6.8	7.2	7.5	7.9	8.2	8.6	9.0	9.2	9.6	9.9	10.3	70	110	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
71	109	5.2	5.5	5.9	6.2	6.5	6.8	7.2	7.5	7.8	8.1	8.5	8.8	9.1	9.4	9.8	71	109								0.3	
72	108	4.9	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.7	8.0	8.3	8.7	9.0	9.3	72	108					0.2			0.2	
73	107	4.7	5.0	5.3	5.6	5.8	6.1	6.4	6.7	7.0	7.3	7.6	7.9	8.2	8.5	8.8	73	107					0.1				0.3
74	106	4.4	4.7	5.0	5.2	5.5	5.8	6.1	6.3	6.6	6.9	7.2	7.4	7.7	8.0	8.3	74	106									0.2
75	105	4.1	4.4	4.7	4.9	5.2	5.4	5.7	6.0	6.2	6.5	6.7	7.0	7.2	7.5	7.8	75	105	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
76	104	3.9	4.1	4.4	4.6	4.8	5.1	5.3	5.6	5.8	6.0	6.3	6.5	6.8	7.0	7.3	76	104		0.0				0.1			
77	103	3.6	3.8	4.0	4.3	4.5	4.7	5.0	5.2	5.4	5.6	5.8	6.1	6.3	6.5	6.7	77	103							0.2		
78	102	3.3	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0	6.2	78	102							0.1		
79	101	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.3	5.5	5.7	79	101								0.2	
80	100	2.8	3.0	3.1	3.3	3.5	3.6	3.8	4.0	4.2	4.3	4.5	4.7	4.9	5.0	5.2	80	100	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
81	99	2.5	2.7	2.8	3.0	3.1	3.3	3.4	3.6	3.8	3.9	4.1	4.2	4.4	4.5	4.7	81	99			0.0						0.1
82	98	2.2	2.4	2.5	2.6	2.8	2.9	3.1	3.2	3.3	3.5	3.6	3.8	3.9	4.0	4.2	82	98				0.1					
83	97	1.9	2.1	2.2	2.3	2.4	2.6	2.7	2.8	2.9	3.0	3.2	3.3	3.4	3.5	3.7	83	97				0.0					
84	96	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0	3.1	84	96					0.1				
85	95	1.4	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.4	2.5	2.6	85	95	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
86	94	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.7	1.8	1.9	2.0	2.0	2.1	86	94						0.0	0.0	0.1	0.1
87	93	0.8	0.9	0.9	1.0	1.0	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5	1.6	87	93								0.0	0.0
88	92	0.6	0.6	0.6	0.7	0.7	0.7	0.8	0.8	0.8	0.9	0.9	0.9	1.0	1.0	1.0	88	92									
89	91	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.5	0.5	0.5	0.5	0.5	89	91									
90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Az.		16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′	Az.		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′

Azimuth angle greater than 90°:
If DR latitude is greater than selected tabulated latitude, ΔL correction is *minus;* but for DR latitude less than selected tabulated latitude, the correction is *plus.*
Azimuth angle less than 90°:
If DR latitude is greater than selected tabulated latitude, ΔL correction is *plus;* but for DR latitude less than selected tabulated latitude, the correction is *minus.*

MULTIPLICATION TABLE

Δ	DEC. DIFF. OR H. A. DIFF. (minutes of arc)															Δ	DEC. DIFF. OR H. A. DIFF. (tenths of minutes)									Δ
	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′		0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	
01	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	01
2	.0	.0	.1	.1	.1	.1	.1	.2	.2	.2	.2	.2	.3	.3	.3	2										2
3	.0	.1	.1	.1	.2	.2	.2	.2	.3	.3	.3	.4	.4	.4	.5	3										3
4	.0	.1	.1	.2	.2	.2	.3	.3	.4	.4	.4	.5	.5	.6	.6	4										4
05	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	05
6	.1	.1	.2	.2	.3	.4	.4	.5	.5	.6	.7	.7	.8	.8	.9	6								0.0	0.1	6
7	.1	.1	.2	.3	.4	.4	.5	.6	.6	.7	.8	.8	.9	1.0	1.1	7							0.0	0.1		7
8	.1	.2	.2	.3	.4	.5	.6	.6	.7	.8	.9	1.0	1.0	1.1	1.2	8						0.0	0.1			8
9	.1	.2	.3	.4	.5	.5	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	9					0.0	0.1				9
10	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	10	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	10
1	.1	.2	.3	.4	.6	.7	.8	.9	1.0	1.1	1.2	1.3	1.4	1.5	1.7	1										1
2	.1	.2	.4	.5	.6	.7	.8	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	2				0.0						2
3	.1	.3	.4	.5	.7	.8	.9	1.0	1.2	1.3	1.4	1.6	1.7	1.8	2.0	3				0.1						3
4	.1	.3	.4	.6	.7	.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.1	4										4
15	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3	15	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	15
6	.2	.3	.5	.6	.8	1.0	1.1	1.3	1.4	1.6	1.8	1.9	2.1	2.2	2.4	6			0.0						0.1	6
7	.2	.3	.5	.7	.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	2.2	2.4	2.6	7			0.1						0.2	7
8	.2	.4	.5	.7	.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	8								0.1		8
9	.2	.4	.6	.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	9								0.2		9
20	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	20
1	.2	.4	.6	.8	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.2	1							0.1			1
2	.2	.4	.7	.9	1.1	1.3	1.5	1.8	2.0	2.2	2.4	2.6	2.9	3.1	3.3	2							0.2			2
3	.2	.5	.7	.9	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.8	3.0	3.2	3.5	3										3
4	.2	.5	.7	1.0	1.2	1.4	1.7	1.9	2.2	2.4	2.6	2.9	3.1	3.4	3.6	4				0.0		0.1				4
25	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	25
6	.3	.5	.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.9	3.1	3.4	3.6	3.9	6										6
7	.3	.5	.8	1.1	1.4	1.6	1.9	2.2	2.4	2.7	3.0	3.2	3.5	3.8	4.1	7									0.2	7
8	.3	.6	.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2	8									0.3	8
9	.3	.6	.9	1.2	1.5	1.7	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	9					0.1					9
30	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	30
1	.3	.6	.9	1.2	1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3	4.7	1								0.2		1
2	.3	.6	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.5	3.8	4.2	4.5	4.8	2								0.3		2
3	.3	.7	1.0	1.3	1.7	2.0	2.3	2.6	3.0	3.3	3.6	4.0	4.3	4.6	5.0	3										3
4	.3	.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1	3.4	3.7	4.1	4.4	4.8	5.1	4										4
35	0.4	0.7	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9	4.2	4.6	4.9	5.3	35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	35
6	.4	.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3	4.7	5.0	5.4	6							0.2	0.3		6
7	.4	.7	1.1	1.5	1.9	2.2	2.6	3.0	3.3	3.7	4.1	4.4	4.8	5.2	5.6	7				0.1						7
8	.4	.8	1.1	1.5	1.9	2.3	2.7	3.0	3.4	3.8	4.2	4.6	4.9	5.3	5.7	8				0.2					0.3	8
9	.4	.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	9									0.4	9
40	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0	40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	40
1	.4	.8	1.2	1.6	2.1	2.5	2.9	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.2	1						0.2				1
2	.4	.8	1.3	1.7	2.1	2.5	2.9	3.4	3.8	4.2	4.6	5.0	5.5	5.9	6.3	2						0.3				2
3	.4	.9	1.3	1.7	2.2	2.6	3.0	3.4	3.9	4.3	4.7	5.2	5.6	6.0	6.5	3								0.3		3
4	.4	.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0	4.4	4.8	5.3	5.7	6.2	6.6	4								0.4		4
45	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.3	6.8	45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	45
6	.5	.9	1.4	1.8	2.3	2.8	3.2	3.7	4.1	4.6	5.1	5.5	6.0	6.4	6.9	6										6
7	.5	.9	1.4	1.9	2.4	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.1	6.6	7.1	7										7
8	.5	1.0	1.4	1.9	2.4	2.9	3.4	3.8	4.3	4.8	5.3	5.8	6.2	6.7	7.2	8										8
9	.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	9	0.0		0.1		0.2		0.3		0.4	9
50	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	50
1	.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.6	5.1	5.6	6.1	6.6	7.1	7.7	1										1
2	.5	1.0	1.6	2.1	2.6	3.1	3.6	4.2	4.7	5.2	5.7	6.2	6.8	7.3	7.8	2										2
3	.5	1.1	1.6	2.1	2.7	3.2	3.7	4.2	4.8	5.3	5.8	6.4	6.9	7.4	8.0	3										3
4	.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.6	8.1	4										4
55	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5.0	5.5	6.1	6.6	7.2	7.7	8.3	55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	55
6	.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	6								0.4		6
7	.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.1	5.7	6.3	6.8	7.4	8.0	8.6	7								0.5		7
8	.6	1.2	1.7	2.3	2.9	3.5	4.1	4.6	5.2	5.8	6.4	7.0	7.5	8.1	8.7	8						0.3				8
9	.6	1.2	1.8	2.4	3.0	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.7	8.3	8.9	9						0.4				9
60	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	60
1	.6	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.5	6.1	6.7	7.3	7.9	8.5	9.2	1									0.5	1
2	.6	1.2	1.9	2.5	3.1	3.7	4.3	5.0	5.6	6.2	6.8	7.4	8.1	8.7	9.3	2				0.2					0.6	2
3	.6	1.3	1.9	2.5	3.2	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.5	3				0.3						3
4	.6	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8	6.4	7.0	7.7	8.3	9.0	9.6	4								0.4		4
65	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.5	7.2	7.8	8.5	9.1	9.8	65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	65
6	.7	1.3	2.0	2.6	3.3	4.0	4.6	5.3	5.9	6.6	7.3	7.9	8.6	9.2	9.9	6										6
7	.7	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.1	7										7
8	.7	1.4	2.0	2.7	3.4	4.1	4.8	5.4	6.1	6.8	7.5	8.2	8.8	9.5	10.2	8								0.5		8
9	.7	1.4	2.1	2.8	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	9.7	10.4	9					0.3			0.6		9
70	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	70
1	.7	1.4	2.1	2.8	3.6	4.3	5.0	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.7	1									0.6	1
2	.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	2									0.7	2
3	.7	1.5	2.2	2.9	3.7	4.4	5.1	5.8	6.6	7.3	8.0	8.8	9.5	10.2	11.0	3										3
4	.7	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7	7.4	8.1	8.9	9.6	10.4	11.1	4				0.1		0.4				4
75	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.0	9.8	10.5	11.3	75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	75
6	.8	1.5	2.3	3.0	3.8	4.6	5.3	6.1	6.8	7.6	8.4	9.1	9.9	10.6	11.4	6										6
7	.8	1.5	2.3	3.1	3.9	4.6	5.4	6.2	6.9	7.7	8.5	9.2	10.0	10.8	11.6	7										7
8	.8	1.6	2.3	3.1	3.9	4.7	5.5	6.2	7.0	7.8	8.6	9.4	10.1	10.9	11.7	8							0.5			8
9	.8	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11.1	11.9	9							0.6			9
80	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	80
1	.8	1.6	2.4	3.2	4.1	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.2	1								0.6		1
2	.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.7	11.5	12.3	2								0.7		2
3	.8	1.7	2.5	3.3	4.2	5.0	5.8	6.6	7.5	8.3	9.1	10.0	10.8	11.6	12.5	3				0.2					0.7	3
4	.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.6	8.4	9.2	10.1	10.9	11.8	12.6	4				0.3					0.8	4
85	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	9.4	10.2	11.1	11.9	12.8	85	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	85
6	.9	1.7	2.6	3.4	4.3	5.2	6.0	6.9	7.7	8.6	9.5	10.3	11.2	12.0	12.9	6										6
7	.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.8	8.7	9.6	10.4	11.3	12.2	13.1	7				0.3						7
8	.9	1.8	2.6	3.5	4.4	5.3	6.2	7.0	7.9	8.8	9.7	10.6	11.4	12.3	13.2	8				0.4						8
9	.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	9					0.4					9
90	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	90
1	.9	1.8	2.7	3.6	4.6	5.5	6.4	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.7	1						0.5				1
2	.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	2						0.6	0.6			2
3	.9	1.9	2.8	3.7	4.7	5.6	6.5	7.4	8.4	9.3	10.2	11.2	12.1	13.0	14.0	3							0.7	0.7		3
4	.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	4								0.8	0.8	4
95	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	95	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	95
6	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.6	9.6	10.6	11.5	12.5	13.4	14.4	6										6
7	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	7										7
8	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.8	8.8	9.8	10.8	11.8	12.7	13.7	14.7	8										8
99	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	99										99
Δ	1′	2′	3′	4′	5′	6′	7′	8′	9′	10′	11′	12′	13′	14′	15′	Δ	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′	Δ

Δd or Δt

d Δd or Δt

MULTIPLICATION TABLE

DEC. DIFF. OR H. A. DIFF. (minutes of arc)

Δ	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′
01	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
2	.3	.3	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	.6	.6	.6
3	.5	.5	.5	.6	.6	.6	.7	.7	.7	.8	.8	.8	.8	.9	.9
4	.6	.7	.7	.8	.8	.8	.9	.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2
05	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5
6	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.7	1.8
7	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1
8	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4
9	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.7
10	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
1	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.3
2	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.4	3.5	3.6
3	2.1	2.2	2.3	2.5	2.6	2.7	2.9	3.0	3.1	3.3	3.4	3.5	3.6	3.8	3.9
4	2.2	2.4	2.5	2.7	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.1	4.2
15	2.4	2.6	2.7	2.9	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	4.5
6	2.6	2.7	2.9	3.0	3.2	3.4	3.5	3.7	3.8	4.0	4.2	4.3	4.5	4.6	4.8
7	2.7	2.9	3.1	3.2	3.4	3.6	3.7	3.9	4.1	4.3	4.4	4.6	4.8	4.9	5.1
8	2.9	3.1	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.0	5.2	5.4
9	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1	5.3	5.5	5.7
20	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0
1	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.3	5.5	5.7	5.9	6.1	6.3
2	3.5	3.7	4.0	4.2	4.4	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.2	6.4	6.6
3	3.7	3.9	4.1	4.4	4.6	4.8	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.7	6.9
4	3.8	4.1	4.3	4.6	4.8	5.0	5.3	5.5	5.8	6.0	6.2	6.5	6.7	7.0	7.2
25	4.0	4.3	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.3	6.5	6.8	7.0	7.3	7.5
6	4.2	4.4	4.7	4.9	5.2	5.5	5.7	6.0	6.2	6.5	6.8	7.0	7.3	7.5	7.8
7	4.3	4.6	4.9	5.1	5.4	5.7	5.9	6.2	6.5	6.8	7.0	7.3	7.6	7.8	8.1
8	4.5	4.8	5.0	5.3	5.6	5.9	6.2	6.4	6.7	7.0	7.3	7.6	7.8	8.1	8.4
9	4.6	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7.0	7.3	7.5	7.8	8.1	8.4	8.7
30	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4	8.7	9.0
1	5.0	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.8	8.1	8.4	8.7	9.0	9.3
2	5.1	5.4	5.8	6.1	6.4	6.7	7.0	7.4	7.7	8.0	8.3	8.6	9.0	9.3	9.6
3	5.3	5.6	5.9	6.3	6.6	6.9	7.3	7.6	7.9	8.3	8.6	8.9	9.2	9.6	9.9
4	5.4	5.8	6.1	6.5	6.8	7.1	7.5	7.8	8.2	8.5	8.8	9.2	9.5	9.9	10.2
35	5.6	6.0	6.3	6.7	7.0	7.4	7.7	8.1	8.4	8.8	9.1	9.5	9.8	10.2	10.5
6	5.8	6.1	6.5	6.8	7.2	7.6	7.9	8.3	8.6	9.0	9.4	9.7	10.1	10.4	10.8
7	5.9	6.3	6.7	7.0	7.4	7.8	8.1	8.5	8.9	9.3	9.6	10.0	10.4	10.7	11.1
8	6.1	6.5	6.8	7.2	7.6	8.0	8.4	8.7	9.1	9.5	9.9	10.3	10.6	11.0	11.4
9	6.2	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.1	10.5	10.9	11.3	11.7
40	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6	12.0
1	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.3	10.7	11.1	11.5	11.9	12.3
2	6.7	7.1	7.6	8.0	8.4	8.8	9.2	9.7	10.1	10.5	10.9	11.3	11.8	12.2	12.6
3	6.9	7.3	7.7	8.2	8.6	9.0	9.5	9.9	10.3	10.8	11.2	11.6	12.0	12.5	12.9
4	7.0	7.5	7.9	8.4	8.8	9.2	9.7	10.1	10.6	11.0	11.4	11.9	12.3	12.8	13.2
45	7.2	7.7	8.1	8.6	9.0	9.5	9.9	10.4	10.8	11.3	11.7	12.2	12.6	13.1	13.5
6	7.4	7.8	8.3	8.7	9.2	9.7	10.1	10.6	11.0	11.5	12.0	12.4	12.9	13.3	13.8
7	7.5	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.3	11.8	12.2	12.7	13.2	13.6	14.1
8	7.7	8.2	8.6	9.1	9.6	10.1	10.6	11.0	11.5	12.0	12.5	13.0	13.4	13.9	14.4
9	7.8	8.3	8.8	9.3	9.8	10.3	10.8	11.3	11.8	12.3	12.7	13.2	13.7	14.2	14.7
50	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0
1	8.2	8.7	9.2	9.7	10.2	10.7	11.2	11.7	12.2	12.8	13.3	13.8	14.3	14.8	15.3
2	8.3	8.8	9.4	9.9	10.4	10.9	11.4	12.0	12.5	13.0	13.5	14.0	14.6	15.1	15.6
3	8.5	9.0	9.5	10.1	10.6	11.1	11.7	12.2	12.7	13.3	13.8	14.3	14.8	15.4	15.9
4	8.6	9.2	9.7	10.3	10.8	11.3	11.9	12.4	13.0	13.5	14.0	14.6	15.1	15.7	16.2
55	8.8	9.4	9.9	10.5	11.0	11.6	12.1	12.7	13.2	13.8	14.3	14.9	15.4	16.0	16.5
6	9.0	9.5	10.1	10.6	11.2	11.8	12.3	12.9	13.4	14.0	14.6	15.1	15.7	16.2	16.8
7	9.1	9.7	10.3	10.8	11.4	12.0	12.5	13.1	13.7	14.3	14.8	15.4	16.0	16.5	17.1
8	9.3	9.9	10.4	11.0	11.6	12.2	12.8	13.3	13.9	14.5	15.1	15.7	16.2	16.8	17.4
9	9.4	10.0	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.3	15.9	16.5	17.1	17.7
60	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.8	17.4	18.0
1	9.8	10.4	11.0	11.6	12.2	12.8	13.4	14.0	14.6	15.3	15.9	16.5	17.1	17.7	18.3
2	9.9	10.5	11.2	11.8	12.4	13.0	13.6	14.3	14.9	15.5	16.1	16.7	17.4	18.0	18.6
3	10.1	10.7	11.3	12.0	12.6	13.2	13.9	14.5	15.1	15.8	16.4	17.0	17.6	18.3	18.9
4	10.2	10.9	11.5	12.2	12.8	13.4	14.1	14.7	15.4	16.0	16.6	17.3	17.9	18.6	19.2
65	10.4	11.1	11.7	12.4	13.0	13.7	14.3	15.0	15.6	16.3	16.9	17.6	18.2	18.9	19.5
6	10.6	11.2	11.9	12.5	13.2	13.9	14.5	15.2	15.8	16.5	17.2	17.8	18.5	19.1	19.8
7	10.7	11.4	12.1	12.7	13.4	14.1	14.7	15.4	16.1	16.8	17.4	18.1	18.8	19.4	20.1
8	10.9	11.6	12.2	12.9	13.6	14.3	15.0	15.6	16.3	17.0	17.7	18.4	19.0	19.7	20.4
9	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6	17.3	17.9	18.6	19.3	20.0	20.7
70	11.2	11.9	12.6	13.3	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3	21.0
1	11.4	12.1	12.8	13.5	14.2	14.9	15.6	16.3	17.0	17.8	18.5	19.2	19.9	20.6	21.3
2	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.6	17.3	18.0	18.7	19.4	20.2	20.9	21.6
3	11.7	12.4	13.1	13.9	14.6	15.3	16.1	16.8	17.5	18.3	19.0	19.7	20.4	21.2	21.9
4	11.8	12.6	13.3	14.1	14.8	15.5	16.3	17.0	17.8	18.5	19.2	20.0	20.7	21.5	22.2
75	12.0	12.8	13.5	14.3	15.0	15.8	16.5	17.3	18.0	18.8	19.5	20.3	21.0	21.8	22.5
6	12.2	12.9	13.7	14.4	15.2	16.0	16.7	17.5	18.2	19.0	19.8	20.5	21.3	22.0	22.8
7	12.3	13.1	13.9	14.6	15.4	16.2	16.9	17.7	18.5	19.3	20.0	20.8	21.6	22.3	23.1
8	12.5	13.3	14.0	14.8	15.6	16.4	17.2	17.9	18.7	19.5	20.3	21.1	21.8	22.6	23.4
9	12.6	13.4	14.2	15.0	15.8	16.6	17.4	18.2	19.0	19.8	20.5	21.3	22.1	22.9	23.7
80	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0
1	13.0	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.3	21.1	21.9	22.7	23.5	24.3
2	13.1	13.9	14.8	15.6	16.4	17.2	18.0	18.9	19.7	20.5	21.3	22.1	23.0	23.8	24.6
3	13.3	14.1	14.9	15.8	16.6	17.4	18.3	19.1	19.9	20.8	21.6	22.4	23.2	24.1	24.9
4	13.4	14.3	15.1	16.0	16.8	17.6	18.5	19.3	20.2	21.0	21.8	22.7	23.5	24.4	25.2
85	13.6	14.5	15.3	16.2	17.0	17.9	18.7	19.6	20.4	21.3	22.1	23.0	23.8	24.7	25.5
6	13.8	14.6	15.5	16.3	17.2	18.1	18.9	19.8	20.6	21.5	22.4	23.2	24.1	24.9	25.8
7	13.9	14.8	15.7	16.5	17.4	18.3	19.1	20.0	20.9	21.8	22.6	23.5	24.4	25.2	26.1
8	14.1	15.0	15.8	16.7	17.6	18.5	19.4	20.2	21.1	22.0	22.9	23.8	24.6	25.5	26.4
9	14.2	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.1	24.0	24.9	25.8	26.7
90	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0
1	14.6	15.5	16.4	17.3	18.2	19.1	20.0	20.9	21.8	22.8	23.7	24.6	25.5	26.4	27.3
2	14.7	15.6	16.6	17.5	18.4	19.3	20.2	21.2	22.1	23.0	23.9	24.8	25.8	26.7	27.6
3	14.9	15.8	16.7	17.7	18.6	19.5	20.5	21.4	22.3	23.3	24.2	25.1	26.0	27.0	27.9
4	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2
95	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5
6	15.4	16.3	17.3	18.2	19.2	20.2	21.1	22.1	23.0	24.0	25.0	25.9	26.9	27.8	28.8
7	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.			
8	15.7	16.7	17.6	18.6	19.6	20.6	21.6	22.5	23.5	24.5	25.5	26.			
99	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.			
Δ	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′			

DEC. DIFF. OR H. A. DIFF. (tenths of minu

Δ	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.
01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
2									
3									
4									
05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0
6								0.0	0
7							0.0	0.1	
8						0.0	0.1		
9						0.1			
10	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0
1									
2				0.0					
3				0.1					
4									
15	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0
6			0.0						0
7			0.1						0
8								0.1	
9								0.2	
20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0
1							0.1		
2							0.2		
3									
4						0.1			
25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0
6									
7									0
8									0
9					.1				
30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0
1								0.2	
2								0.3	
3									
4									
35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0
6							.3		
7				0.1					
8				0.2					0
9									0
40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0
1						0.2			
2						0.3			
3								0.3	
4								0.4	
45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0
6									
7									
8									
9			0.1		0.2				0
50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0
1									
2									
3									
4									
55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0
6								0.4	
7								0.5	
8						0.3			
9						0.4			
60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0
1									0
2				0.2					0
3				0.3					
4							0.4		
65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0
6									
7									
8								0.5	
9					0.3			0.6	
70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0
1									0
2									0
3									0
4						0.4			
75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0
6									
7									
8							0.5		
9							0.6		
80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0
1								0.6	
2								0.7	
3			0.2						0
4			0.3						0
85	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0
6									
7				0.3					
8				0.4					
9					0.4				
90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0
1						0.5			
2						0.6	0.6		
3							0.7	0.7	
4								0.8	0
95	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0
6									
7									
8									
99									
Δ		0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0

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