H. O. PUB. NO. 214
VOL. IV

TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Latitudes 30° – 39°, Inclusive

U. S. NAVY HYDROGRAPHIC OFFICE

SPEED-TIME-DISTANCE TABLE
SPEED IN KNOTS

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

TIME

SPEED-TIME-DISTANCE TABLE

Min.	Hr.	28	29	30	31	32	33	34	35	36	37	38	39	40	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1	.017	0.5	0.5	0.5	0.5	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	.033	0.9	1.0	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.2	1.3	1.3	1.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	.050	1.4	1.4	1.5	1.6	1.6	1.6	1.7	1.8	1.8	1.8	1.9	2.0	2.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	.067	1.9	1.9	2.0	2.1	2.1	2.2	2.3	2.3	2.4	2.5	2.5	2.6	2.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
5	.083	2.3	2.4	2.5	2.6	2.7	2.8	2.8	2.9	3.0	3.1	3.2	3.2	3.3	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
6	.100	2.8	2.9	3.0	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	4.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
7	.117	3.3	3.4	3.5	3.6	3.7	3.8	4.0	4.1	4.2	4.3	4.4	4.6	4.7	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
8	.133	3.7	3.9	4.0	4.1	4.3	4.4	4.5	4.7	4.8	4.9	5.1	5.2	5.3	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1
9	.150	4.2	4.4	4.5	4.6	4.8	5.0	5.1	5.2	5.4	5.6	5.7	5.8	6.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
10	.167	4.7	4.8	5.0	5.2	5.3	5.5	5.7	5.8	6.0	6.2	6.3	6.5	6.7	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2
11	.183	5.1	5.3	5.5	5.7	5.9	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.3	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.2
12	.200	5.6	5.8	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.8	8.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2
13	.217	6.1	6.3	6.5	6.7	6.9	7.2	7.4	7.6	7.8	8.0	8.2	8.4	8.7	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
14	.233	6.5	6.8	7.0	7.2	7.5	7.7	7.9	8.2	8.4	8.6	8.9	9.1	9.3	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
15	.250	7.0	7.2	7.5	7.8	8.0	8.2	8.5	8.8	9.0	9.2	9.5	9.8	10.0	0.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2
16	.267	7.5	7.7	8.0	8.3	8.5	8.8	9.1	9.3	9.6	9.9	10.1	10.4	10.7	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
17	.283	7.9	8.2	8.5	8.8	9.1	9.4	9.6	9.9	10.2	10.5	10.8	11.0	11.3	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
18	.300	8.4	8.7	9.0	9.3	9.6	9.9	10.2	10.5	10.8	11.1	11.4	11.7	12.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3
19	.317	8.9	9.2	9.5	9.8	10.1	10.4	10.8	11.1	11.4	11.7	12.0	12.4	12.7	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
20	.333	9.3	9.7	10.0	10.3	10.7	11.0	11.3	11.7	12.0	12.3	12.7	13.0	13.3	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3
21	.350	9.8	10.2	10.5	10.8	11.2	11.6	11.9	12.2	12.6	13.0	13.3	13.6	14.0	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.4
22	.367	10.3	10.6	11.0	11.4	11.7	12.1	12.5	12.8	13.2	13.6	13.9	14.3	14.7	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
23	.383	10.7	11.1	11.5	11.9	12.3	12.6	13.0	13.4	13.8	14.2	14.6	15.0	15.3	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	0.4
24	.400	11.2	11.6	12.0	12.4	12.8	13.2	13.6	14.0	14.4	14.8	15.2	15.6	16.0	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
25	.417	11.7	12.1	12.5	12.9	13.3	13.8	14.2	14.6	15.0	15.4	15.8	16.2	16.7	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4
26	.433	12.1	12.6	13.0	13.4	13.9	14.3	14.7	15.2	15.6	16.0	16.5	16.9	17.3	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	0.4
27	.450	12.6	13.0	13.5	14.0	14.4	14.8	15.3	15.8	16.2	16.6	17.1	17.6	18.0	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.4
28	.467	13.1	13.5	14.0	14.5	14.9	15.4	15.9	16.3	16.8	17.3	17.7	18.2	18.7	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
29	.483	13.5	14.0	14.5	15.0	15.5	16.0	16.4	16.9	17.4	17.9	18.4	18.8	19.3	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
30	.500	14.0	14.5	15.0	15.5	16.0	16.5	17.0	17.5	18.0	18.5	19.0	19.5	20.0	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4	0.5
31	.517	14.5	15.0	15.5	16.0	16.5	17.0	17.6	18.1	18.6	19.1	19.6	20.2	20.7	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
32	.533	14.9	15.5	16.0	16.5	17.1	17.6	18.1	18.7	19.2	19.7	20.3	20.8	21.3	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5
33	.550	15.4	16.0	16.5	17.0	17.6	18.2	18.7	19.2	19.8	20.4	20.9	21.4	22.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.6
34	.567	15.9	16.4	17.0	17.6	18.1	18.7	19.3	19.8	20.4	21.0	21.5	22.1	22.7	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	0.6
35	.583	16.3	16.9	17.5	18.1	18.7	19.2	19.8	20.4	21.0	21.6	22.2	22.8	23.3	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
36	.600	16.8	17.4	18.0	18.6	19.2	19.8	20.4	21.0	21.6	22.2	22.8	23.4	24.0	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6
37	.617	17.3	17.9	18.5	19.1	19.7	20.4	21.0	21.6	22.2	22.8	23.4	24.0	24.7	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.6
38	.633	17.7	18.4	19.0	19.6	20.3	20.9	21.5	22.2	22.8	23.4	24.1	24.7	25.3	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	0.6
39	.650	18.2	18.8	19.5	20.2	20.8	21.4	22.1	22.8	23.4	24.0	24.7	25.4	26.0	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.6
40	.667	18.7	19.3	20.0	20.7	21.3	22.0	22.7	23.3	24.0	24.7	25.3	26.0	26.7	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
41	.683	19.1	19.8	20.5	21.2	21.9	22.6	23.2	23.9	24.6	25.3	26.0	26.6	27.3	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	0.7
42	.700	19.6	20.3	21.0	21.7	22.4	23.1	23.8	24.5	25.2	25.9	26.6	27.3	28.0	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7
43	.717	20.1	20.8	21.5	22.2	22.9	23.6	24.4	25.1	25.8	26.5	27.2	28.0	28.7	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7
44	.733	20.5	21.3	22.0	22.7	23.5	24.2	24.9	25.7	26.4	27.1	27.9	28.6	29.3	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.7
45	.750	21.0	21.8	22.5	23.2	24.0	24.8	25.5	26.2	27.0	27.8	28.5	29.2	30.0	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8
46	.767	21.5	22.2	23.0	23.8	24.5	25.3	26.1	26.8	27.6	28.4	29.1	29.9	30.7	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
47	.783	21.9	22.7	23.5	24.3	25.1	25.8	26.6	27.4	28.2	29.0	29.8	30.6	31.3	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
48	.800	22.4	23.2	24.0	24.8	25.6	26.4	27.2	28.0	28.8	29.6	30.4	31.2	32.0	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8
49	.817	22.9	23.7	24.5	25.3	26.1	27.0	27.8	28.6	29.4	30.2	31.0	31.8	32.7	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8
50	.833	23.3	24.2	25.0	25.8	26.7	27.5	28.3	29.2	30.0	30.8	31.7	32.5	33.3	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8
51	.850	23.8	24.6	25.5	26.4	27.2	28.0	28.9	29.8	30.6	31.4	32.3	33.2	34.0	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.8
52	.867	24.3	25.1	26.0	26.9	27.7	28.6	29.5	30.3	31.2	32.1	32.9	33.8	34.7	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	0.9
53	.883	24.7	25.6	26.5	27.4	28.3	29.2	30.0	30.9	31.8	32.7	33.6	34.4	35.3	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9
54	.900	25.2	26.1	27.0	27.9	28.8	29.7	30.6	31.5	32.4	33.3	34.2	35.1	36.0	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	0.9
55	.917	25.7	26.6	27.5	28.4	29.3	30.2	31.2	32.1	33.0	33.9	34.8	35.8	36.7	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.9
56	.933	26.1	27.1	28.0	28.9	29.9	30.8	31.7	32.7	33.6	34.5	35.5	36.4	37.3	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.9
57	.950	26.6	27.6	28.5	29.4	30.4	31.4	32.3	33.2	34.2	35.2	36.1	37.0	38.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
58	.967	27.1	28.0	29.0	30.0	30.9	31.9	32.9	33.8	34.8	35.8	36.7	37.7	38.7	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
59	.983	27.5	28.5	29.5	30.5	31.5	32.4	33.4	34.4	35.4	36.4	37.4	38.4	39.3	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0

Hr.	28	29	30	31	32	33	34	35	36	37	38	39	40	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
1	28	29	30	31	32	33	34	35	36	37	38	39	40	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
2	56	58	60	62	64	66	68	70	72	74	76	78	80	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0
3	84	87	90	93	96	99	102	105	108	111	114	117	120	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0
4	112	116	120	124	128	132	136	140	144	148	152	156	160	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0
5	140	145	150	155	160	165	170	175	180	185	190	195	200	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0
6	168	174	180	186	192	198	204	210	216	222	228	234	240	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0
7	196	203	210	217	224	231	238	245	252	259	266	273	280	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0
8	224	232	240	248	256	264	272	280	288	296	304	312	320	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0
9	252	261	270	279	288	297	306	315	324	333	342	351	360	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0
10	280	290	300	310	320	330	340	350	360	370	380	390	400	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0
11	308	319	330	341	352	363	374	385	396	407	418	429	440	1.1	2.2	3.3	4.4	5.5	6.6	7.7	8.8	9.9	11.0
12	336	348	360	372	384	396	408	420	432	444	456	468	480	1.2	2.4	3.6	4.8	6.0	7.2	8.4	9.6	10.8	12.0
13	364	377	390	403	416	429	442	455	468	481	494	507	520	1.3	2.6	3.9	5.2	6.5	7.8	9.1	10.4	11.7	13.0
14	392	406	420	434	448	462	476	490	504	518	532	546	560	1.4	2.8	4.2	5.6	7.0	8.4	9.8	11.2	12.6	14.0
15	420	435	450	465	480	495	510	525	540	555	570	585	600	1.5	3.0	4.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0
16	448	464	480	496	512	528	544	560	576	592	608	624	640	1.6	3.2	4.8	6.4	8.0	9.6	11.2	12.8	14.4	16.0
17	476	493	510	527	544	561	578	595	612	629	646	663	680	1.7	3.4	5.1	6.8	8.5	10.2	11.9	13.6	15.3	17.0
18	504	522	540	558	576	594	612	630	648	666	684	702	720	1.8	3.6	5.4	7.2	9.0	10.8	12.6	14.4	16.2	18.0
19	532	551	570	589	608	627	646	665	684	703	722	741	760	1.9	3.8	5.7	7.6	9.5	11.4	13.3	15.2	17.1	19.0
20	560	580	600	620	640	660	680	700	720	740	760	780	800	2.0	4.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0
21	588	609	630	651	672	693	714	735	756	777	798	819	840	2.1	4.2	6.3	8.4	10.5	12.6	14.7	16.8	18.9	21.0
22	616	638	660	682	704	726	748	770	792	814	836	858	880	2.2	4.4	6.6	8.8	11.0	13.2	15.4	17.6	19.8	22.0
23	644	667	690	713	736	759	782	805	828	851	874	897	920	2.3	4.6	6.9	9.2	11.5	13.8	16.1	18.4	20.7	23.0
24	672	696	720	744	768	792	816	840	864	888	912	936	960	2.4	4.8	7.2	9.6	12.0	14.4	16.8	19.2	21.6	24.0
25	700	725	750	775	800	825	850	875	900	925	950	975	1000	2.5	5.0	7.5	10.0	12.5	15.0	17.5	20.0	22.5	25.0

°	h m	°	h m	°	h m	°	h m	°	h m	°	h m	′	m s	″	s
0	0 0	60	4 0	120	8 0	180	12 0	240	16 0	300	20 0	0	0 0	0	0.00
1	0 4	61	4 4	121	8 4	181	12 4	241	16 4	301	20 4	1	0 4	1	0.07
2	0 8	62	4 8	122	8 8	182	12 8	242	16 8	302	20 8	2	0 8	2	0.13
3	0 12	63	4 12	123	8 12	183	12 12	243	16 12	303	20 12	3	0 12	3	0.20
4	0 16	64	4 16	124	8 16	184	12 16	244	16 16	304	20 16	4	0 16	4	0.27
5	0 20	65	4 20	125	8 20	185	12 20	245	16 20	305	20 20	5	0 20	5	0.33
6	0 24	66	4 24	126	8 24	186	12 24	246	16 24	306	20 24	6	0 24	6	0.40
7	0 28	67	4 28	127	8 28	187	12 28	247	16 28	307	20 28	7	0 28	7	0.47
8	0 32	68	4 32	128	8 32	188	12 32	248	16 32	308	20 32	8	0 32	8	0.53
9	0 36	69	4 36	129	8 36	189	12 36	249	16 36	309	20 36	9	0 36	9	0.60
10	0 40	70	4 40	130	8 40	190	12 40	250	16 40	310	20 40	10	0 40	10	0.67
11	0 44	71	4 44	131	8 44	191	12 44	251	16 44	311	20 44	11	0 44	11	0.73
12	0 48	72	4 48	132	8 48	192	12 48	252	16 48	312	20 48	12	0 48	12	0.80
13	0 52	73	4 52	133	8 52	193	12 52	253	16 52	313	20 52	13	0 52	13	0.87
14	0 56	74	4 56	134	8 56	194	12 56	254	16 56	314	20 56	14	0 56	14	0.93
15	1 0	75	5 0	135	9 0	195	13 0	255	17 0	315	21 0	15	1 0	15	1.00
16	1 4	76	5 4	136	9 4	196	13 4	256	17 4	316	21 4	16	1 4	16	1.07
17	1 8	77	5 8	137	9 8	197	13 8	257	17 8	317	21 8	17	1 8	17	1.13
18	1 12	78	5 12	138	9 12	198	13 12	258	17 12	318	21 12	18	1 12	18	1.20
19	1 16	79	5 16	139	9 16	199	13 16	259	17 16	319	21 16	19	1 16	19	1.27
20	1 20	80	5 20	140	9 20	200	13 20	260	17 20	320	21 20	20	1 20	20	1.33
21	1 24	81	5 24	141	9 24	201	13 24	261	17 24	321	21 24	21	1 24	21	1.40
22	1 28	82	5 28	142	9 28	202	13 28	262	17 28	322	21 28	22	1 28	22	1.47
23	1 32	83	5 32	143	9 32	203	13 32	263	17 32	323	21 32	23	1 32	23	1.53
24	1 36	84	5 36	144	9 36	204	13 36	264	17 36	324	21 36	24	1 36	24	1.60
25	1 40	85	5 40	145	9 40	205	13 40	265	17 40	325	21 40	25	1 40	25	1.67
26	1 44	86	5 44	146	9 44	206	13 44	266	17 44	326	21 44	26	1 44	26	1.73
27	1 48	87	5 48	147	9 48	207	13 48	267	17 48	327	21 48	27	1 48	27	1.80
28	1 52	88	5 52	148	9 52	208	13 52	268	17 52	328	21 52	28	1 52	28	1.87
29	1 56	89	5 56	149	9 56	209	13 56	269	17 56	329	21 56	29	1 56	29	1.93
30	2 0	90	6 0	150	10 0	210	14 0	270	18 0	330	22 0	30	2 0	30	2.00
31	2 4	91	6 4	151	10 4	211	14 4	271	18 4	331	22 4	31	2 4	31	2.07
32	2 8	92	6 8	152	10 8	212	14 8	272	18 8	332	22 8	32	2 8	32	2.13
33	2 12	93	6 12	153	10 12	213	14 12	273	18 12	333	22 12	33	2 12	33	2.20
34	2 16	94	6 16	154	10 16	214	14 16	274	18 16	334	22 16	34	2 16	34	2.27
35	2 20	95	6 20	155	10 20	215	14 20	275	18 20	335	22 20	35	2 20	35	2.33
36	2 24	96	6 24	156	10 24	216	14 24	276	18 24	336	22 24	36	2 24	36	2.40
37	2 28	97	6 28	157	10 28	217	14 28	277	18 28	337	22 28	37	2 28	37	2.47
38	2 32	98	6 32	158	10 32	218	14 32	278	18 32	338	22 32	38	2 32	38	2.53
39	2 36	99	6 36	159	10 36	219	14 36	279	18 36	339	22 36	39	2 36	39	2.60
40	2 40	100	6 40	160	10 40	220	14 40	280	18 40	340	22 40	40	2 40	40	2.67
41	2 44	101	6 44	161	10 44	221	14 44	281	18 44	341	22 44	41	2 44	41	2.73
42	2 48	102	6 48	162	10 48	222	14 48	282	18 48	342	22 48	42	2 48	42	2.80
43	2 52	103	6 52	163	10 52	223	14 52	283	18 52	343	22 52	43	2 52	43	2.87
44	2 56	104	6 56	164	10 56	224	14 56	284	18 56	344	22 56	44	2 56	44	2.93
45	3 0	105	7 0	165	11 0	225	15 0	285	19 0	345	23 0	45	3 0	45	3.00
46	3 4	106	7 4	166	11 4	226	15 4	286	19 4	346	23 4	46	3 4	46	3.07
47	3 8	107	7 8	167	11 8	227	15 8	287	19 8	347	23 8	47	3 8	47	3.13
48	3 12	108	7 12	168	11 12	228	15 12	288	19 12	348	23 12	48	3 12	48	3.20
49	3 16	109	7 16	169	11 16	229	15 16	289	19 16	349	23 16	49	3 16	49	3.27
50	3 20	110	7 20	170	11 20	230	15 20	290	19 20	350	23 20	50	3 20	50	3.33
51	3 24	111	7 24	171	11 24	231	15 24	291	19 24	351	23 24	51	3 24	51	3.40
52	3 28	112	7 28	172	11 28	232	15 28	292	19 28	352	23 28	52	3 28	52	3.47
53	3 32	113	7 32	173	11 32	233	15 32	293	19 32	353	23 32	53	3 32	53	3.53
54	3 36	114	7 36	174	11 36	234	15 36	294	19 36	354	23 36	54	3 36	54	3.60
55	3 40	115	7 40	175	11 40	235	15 40	295	19 40	355	23 40	55	3 40	55	3.67
56	3 44	116	7 44	176	11 44	236	15 44	296	19 44	356	23 44	56	3 44	56	3.73
57	3 48	117	7 48	177	11 48	237	15 48	297	19 48	357	23 48	57	3 48	57	3.80
58	3 52	118	7 52	178	11 52	238	15 52	298	19 52	358	23 52	58	3 52	58	3.87
59	3 56	119	7 56	179	11 56	239	15 56	299	19 56	359	23 56	59	3 56	59	3.93
60	4 0	120	8 0	180	12 0	240	16 0	300	20 0	360	24 0	60	4 0	60	4.00

H. O. PUB. NO. 214

VOL. IV

U.S. Hydrographic Office

TABLES OF COMPUTED

ALTITUDE AND AZIMUTH

LATITUDES 30° — 39°, INCLUSIVE

CORRECTED REPRINT

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PREFACE

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

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

The 1952 corrected reprint of this volume contains recomputed data and possesses the same high standard of accuracy to be found in all other volumes of the series. Former printings of the volume now in use are considered of sufficient accuracy for practical navigation. Some modification has been made in the descriptive text and the illustrative examples have been changed to reflect recent modifications of the *Nautical Almanac*. The sextant altitude correction tables formerly shown on the inside front cover have been omitted since recent almanac changes render them unnecessary.

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Captain, U. S. Navy (Ret.),
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TABLES OF COMPUTED ALTITUDE AND AZIMUTH

Description of the Tables

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Example 1.—On July 1, 1951, the 1046 dead reckoning position of a ship is lat. 29° 54'.0 N, long. 65° 30'.2 W. About this time the navigator observes the lower limb of the sun, as follows: watch time (W) 10ʰ 46ᵐ 04ˢ ᴀᴍ, watch error (WE) on zone time 13ˢ fast, height of eye 45 feet, index correction (IC) (+) 1'.0, sextant altitude (hs) 66° 39'.5. Solve the observation for altitude difference (a) and azimuth (Zn), using Δd only.

July 1, 1951

			+ ☉ −
W	10ʰ 46ᵐ 04ˢ ᴀᴍ	IC	1'.0
WE	(F) 13ˢ	Additional	0'.1
ZT	10ʰ 45ᵐ 51ˢ	Correction	15'.3
ZD	(+)4ʰ	Dip	6'.4
GMT*	14ʰ 45ᵐ 51ˢ July 1	Sum	16'.4 6'.4
GHA for 14ʰ GMT	29° 06'.1	Correction	(+)10'.0
Correction for 45ᵐ 51ˢ	11° 27'.8	hs	66° 39'.5
GHA	40° 33'.9	Ho	66° 49'.5
aλ	65° 33'.9 W (assumed longitude)		
LHA	335° 00'.0	d for 14ʰ GMT	(+)23° 08'.9 code
t(H.A.)	25° 00'.0 E	Correction	(−)0'.2 (−) 2
d	23° 08'.7 N d diff. 8'.7	d	23° 08'.7 N
aL	30° 00'.0 N (assumed latitude)		
ht(Alt.)	66° 36'.9 Δd (+) 0.39	Z(Az.)	N 101°.4 E
Correction	(+) 3'.4		
Hc	66° 40'.3		
Ho	66° 49'.5		
a	9. 2 miles toward		
Zn	101°.4		
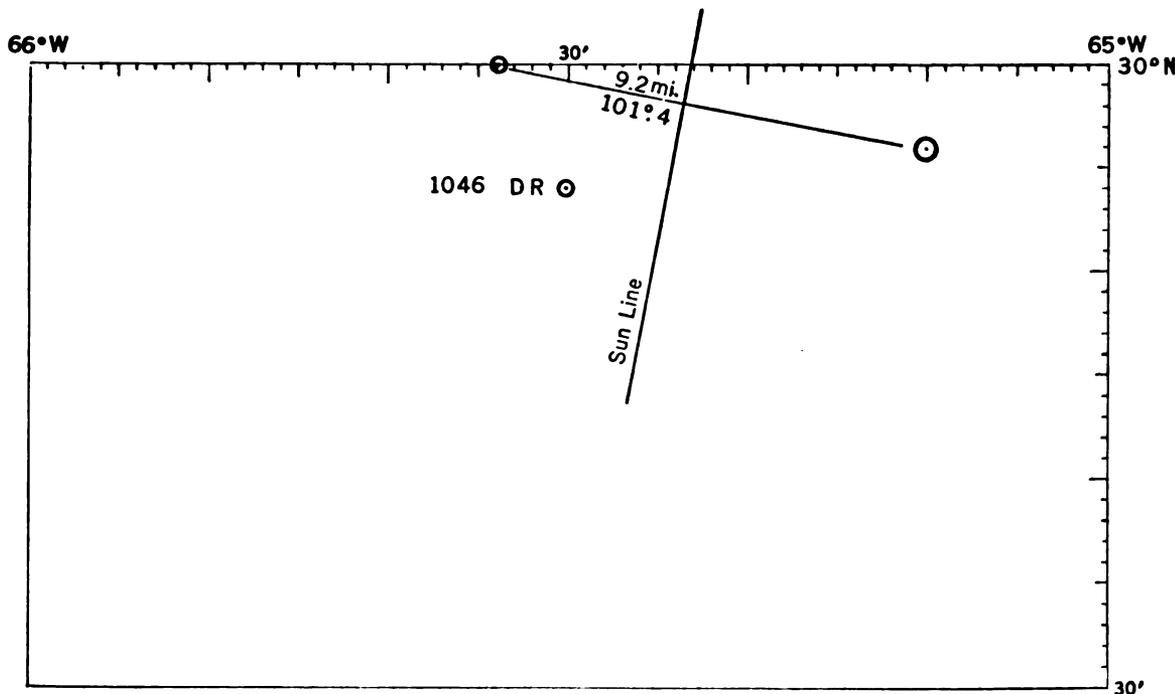
Note.—Plus 0.39 is obtained from the Δd column abreast Alt. in the tables. The value (+)3'.4 (correction for 8'.7 of declination difference) is obtained by multiplying 8'.7 by 0.39, or by referring to the multiplication table on the inside back cover, entering with 8' and then with 0'.7 at the top and with 39 at the side. The two values (3'.1 and 0'.3) thus obtained are then added to obtain the correction. The correction 3'.4 is added because as the tabulated declination (23°) approaches the exact declination of the body (23° 08'.7), the altitude increases, as determined by inspection of the table. The tabulated azimuth angle, taken from the table without correction, is reckoned from the observer's elevated pole toward the east when the body is rising, or east of the meridian. The sight is plotted from the nearest whole degree of latitude (30° 00'.0 N) and the assumed longitude (65° 33'.9 W).

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

Example 2.—On March 1, 1951, the GMT 2330 dead reckoning position of a ship is lat. 32° 21′0 N, long. 77° 05′0 W. The ship is on course 240°, speed 18 knots. Observations are made as indicated below. Solve for a and Zn, using Δd only.

Stars	GMT	Declination	Obs. Alt. (Ho)
Rigel	23ʰ 14ᵐ 51ˢ	8° 15′4 S	48° 47′2
Procyon	23ʰ 20ᵐ 15ˢ	5° 21′1 N	42° 16′3
Dubhe	23ʰ 33ᵐ 09ˢ	62° 00′8 N	28° 06′6

	RIGEL		PROCYON		DUBHE
GMT	23ʰ 14ᵐ 51ˢ		23ʰ 20ᵐ 15ˢ		23ʰ 33ᵐ 09ˢ
GHA♈ for 23ʰ GMT	143° 56′1		143° 56′1		143° 56′1
Correction for 14ᵐ 51ˢ	3° 43′4	(20ᵐ 15ˢ)	5° 04′6	(33ᵐ 09ˢ)	8° 18′6
SHA	281° 57′0		245° 48′5		194° 48′0
GHA☆	69° 36′5		34° 49′2		347° 02′7
aλ	76° 36′5 W		76° 49′2 W		77° 02′7 W
LHA	353° 00′0		318° 00′0		270° 00′0
t(H.A.)	7° 00′0 E		42° 00′0 E		90° 00′0 E
d	8° 15′4 S d diff. 14′6		5° 21′1 N d diff. 8′9		62° 00′8 N d diff. 0′8
aL	32° 00′0 N		32° 00′0 N		32° 00′0 N
Δd and correction (+)0.99	(+)14′5	(−)0.64	(−)5′7	(+)0.28	(+)0′2
ht(Alt.)	48° 57′1		42° 41′8		27° 53′8
Hc	49° 11′6		42° 36′1		27° 54′0
Ho	48° 47′2		42° 16′3		28° 06′6
a	24.4 miles away		19.8 miles away		12.6 miles toward
Z(Az.) and Zn N 169°4 E	169°4	N 115°0 E	115°0	N 32°1 E	032°1
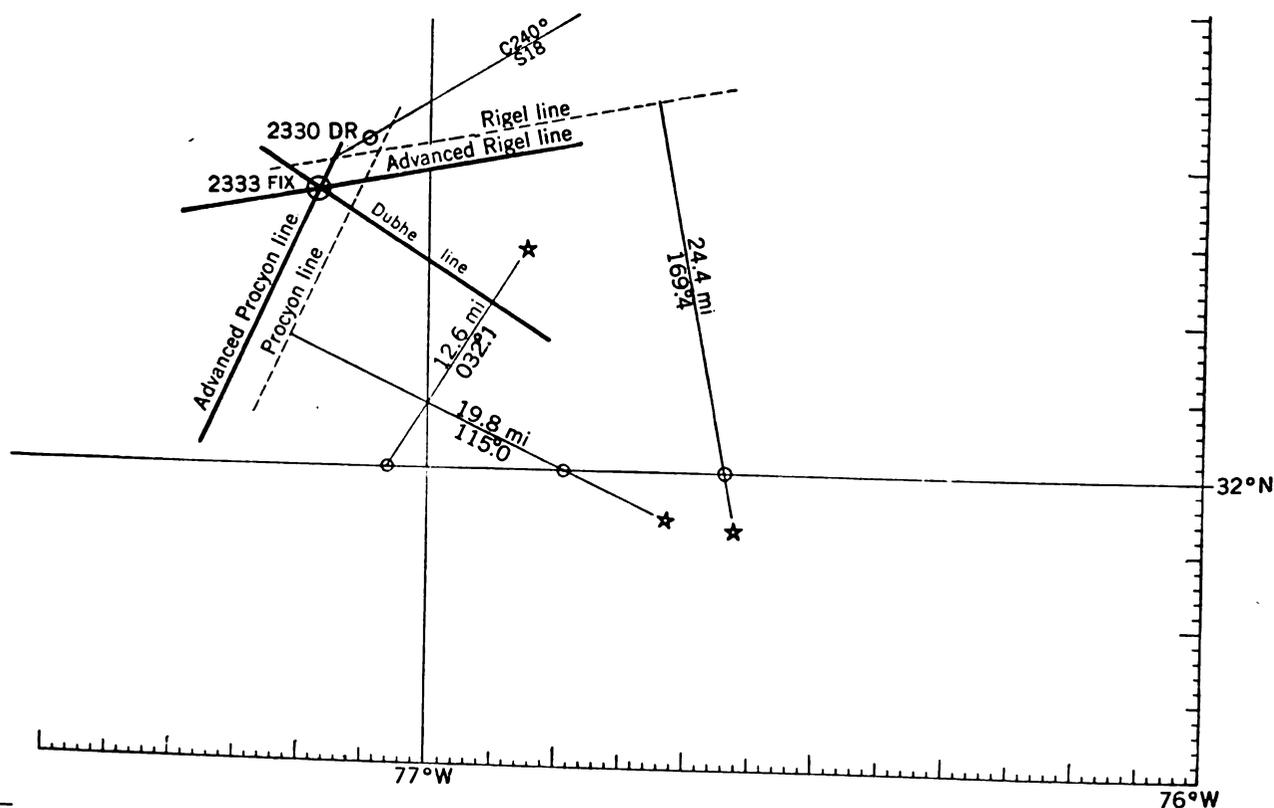
NOTE.—The Rigel sight is plotted from lat. 32° 00′0 N, long. 76° 36′5 W; the Procyon sight from lat. 32° 00′0 N, long. 76° 49′2 W and the Dubhe sight from lat. 32° 00′0 N, long, 77° 02′7 W. In the illustration the Rigel line of position is advanced 5.4 miles for an 18-minute run and the Procyon line is advanced 3.9 miles for a 13-minute run, both in the direction of the course, 240°, to obtain a fix at the time of the Dubhe sight.

VI

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

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

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

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

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

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

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

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

Longitude.—The dead reckoning longitude.

Example 3.—On July 2, 1951, the 1725 dead reckoning position of a ship is lat. 35° 05′3 S, long. 15° 43′1 W. About this time the navigator observes the star Regulus, as follows: Watch time (W) 5ʰ 25ᵐ 15ˢ PM, watch error (WE) on zone time 12ˢ slow, height of eye 36 feet, index correction (IC) (−)1′5, hs 35° 12′7. Solve the observation for a and Zn, using Δd and Δt.

July 2, 1951

			+	☆	−
W	5ʰ 25ᵐ 15ˢ PM		IC			1′5
WE	(S) 12ˢ		Additional			----
ZT	17ʰ 25ᵐ 27ˢ		Correction			1′4
ZD	(+)1ʰ		Dip			5′7
GMT	18ʰ 25ᵐ 27ˢ July 2		Sum	0′0		8′6
GHA ϒ for 18ʰ GMT	189° 57′9		Correction			(−)8′6
Correction for 25ᵐ 27ˢ	6° 22′8		hs			35° 12′7
SHA	208° 33′2		Ho			35° 04′1
GHA ☆	44° 53′9					
aλ	15° 43′1 W					
LHA	29° 10′8					
t(H.A.)	29° 10′8 W t diff. 10′8		t correction			(−)5′2
d	12° 12′4 N d diff. 12′4		d correction			(−)10′7
aL	35° 00′0 S		Correction			(−)15′9
ht(Alt.)	35° 33′5 Δd(−)0.87; Δt(−)0.48		Z(Az.)			S 144°3 W
Correction	(−)15′9					
Hc	35° 17′6					
Ho	35° 04′1					
a	13. 5 miles away					
Zn	324°3					

Example 4.—On September 22, 1951, the GMT 1440 dead reckoning position of a ship is lat. 37° 13!1 N, long. 137° 37!3 W. Nearly simultaneous observations are made as follows:

Stars	GMT	Declination	Obs. Alt. (Ho)
Alphard	14^h 39^m 58^s	8° 26!7 S	19° 16!1
Sirius	14^h 40^m 30^s	16° 38!5 S	33° 53!7
Aldebaran	14^h 41^m .03^s	16° 25!0 N	65° 20!6

	ALPHARD		SIRIUS		ALDEBARAN	
GMT	14^h 39^m 58^s		14^h 40^m 30^s		14^h 41^m 03^s	
GHA♈ for 14^h GMT	210° 37!5		210° 37!5		210° 37!5	
Correction for 39^m 58^s	10° 01!1	(40^m 30^s)	10° 09!2	(41^m 03^s)	10° 17!4	
SHA	218° 42!0		259° 14!7		291° 42!6	
GHA☆	79° 20!6		120° 01!4		152° 37!5	
aλ	137° 37!3 W		137° 37!3 W		137° 37!3 W	
LHA	301° 43!3		342° 24!1		15° 00!2	
t(H.A.)	58° 16!7 E	t diff. 16.7	17° 35!9 E	t diff. 24.1	15° 00!2 W	t diff. 0!2
d	8° 26!7 S	d diff. 3!3	16° 38!5 S	d diff. 8!5	16° 25!0 N	d diff. 5!0
aL	37° 00!0 N		37° 00!0 N		37° 00!0 N	
Δd and correction (+)0.70	(+)2!3	(−)0.95	(−)8!1	(−)0.87	(−)4!4	
Δt and correction (−)0.71	(−)11!9	(+)0.29	(+)7!0	(−)0.49	(−)0!1	
ht(Alt.)	19° 14!7		33° 52!3		65° 35!1	
Hc	19° 05!1		33° 51!2		65° 30!6	
Ho	19° 16!1		33° 53!7		65° 20!6	
a	11. 0 miles toward		2.5 miles toward		10. 0 miles away	
Z(Az.) and Zn	N 117°3 E	117°3	N 159°1 E	159°1	N 143°1 W	216°9
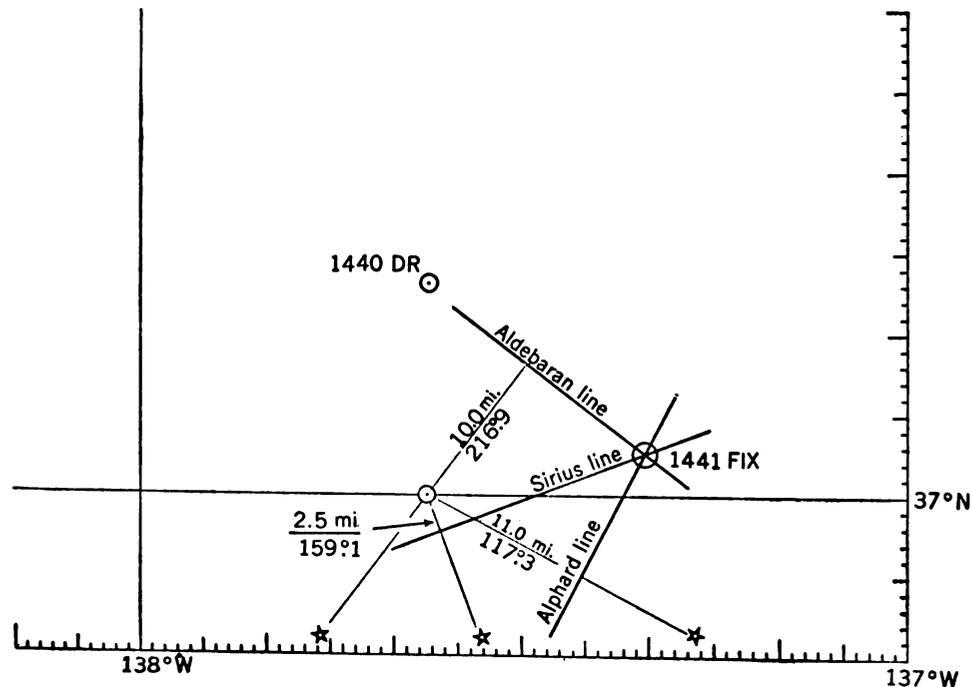
NOTE.—All three sights are plotted from lat. 37° 00!0 N, long. 137° 37!3 W.

VIII

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

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

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

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

Azimuth angle greater than 90°:

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

Azimuth angle less than 90°:

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

Example 5.—On February 1, 1951, the 0915 dead reckoning position of a ship is lat. 38° 47′.2 N, long. 160° 16′.4 E. About this time the navigator observes the upper limb of the moon, as follows: watch time (W) 9^h 13^m 48^s AM, watch error (WE) on zone time 17^s slow, height of eye 36 feet, index correction (IC) (−) 1′.5, sextant altitude (hs) 20° 29′.0. Solve the observation for altitude difference (a) and azimuth (Zn), using Δd, Δt, and ΔL.

	Feb. 1, 1951			+ ☽ −		
W	9^h 13^m 48^s AM			IC		1′.5
WE	(S) 17^s			Additional		14′.0
ZT	9^h 14^m 05^s			Correction	50′.8	
ZD	(−)11^h			Dip		5′.7
GMT	22^h 14^m 05^s Jan. 31			Sum	50′.8	21′.2
GHA for 22^h GMT	225° 41′.9			Correction		(+)29′.6
Correction for 14^m 05^s	3° 21′.6 code			hs	20° 29′.0	
Code correction	1′.4 (+) 57			Ho	20° 58′.6	
GHA	229° 04′.9	d for 22^h GMT..(−)24° 25′.2 code				
aλ	160° 16′.4 E	Correction............ (−)2′.2 (−)93				
LHA	29° 21′.3	d.................. 24° 27′.4 S			+	−
t(H.A.)	29° 21′.3 W	t diff. 21′.3		t correction		7′.9
d	24° 27′.4 S	d diff. 2′.6		d correction	2′.4	
aL	38° 47′.2 N	L diff. 12′.8		L correction	11′.3	
ht(Alt.)	20° 56′.9		Δd(+)0.92; Δt(−)0.37	Sum	13′.7	7′.9
Correction	(+)5′.8			Correction		(+)5′.8
Hc	21° 02′.7					
Ho	20° 58′.6					
a	4.1 miles away					
Zn	208°.2			Z (Az.)		N 151°.8 W

NOTE.—The Greenwich time and date (Jan. 31) are used for entering the almanac. The moon line is plotted from the dead reckoning position.

Example 6.—On April 15, 1951, the GMT 1210 dead reckoning position of a ship is lat. 29° 55.′0 S, long. 88° 07.′3 E. Nearly simultaneous observations are made, as follows:

Stars	GMT	Declination	Obs. Alt. (Ho)
Procyon	12ʰ 09ᵐ 42ˢ	5° 21.′1 N	54° 41.′6
Regulus	12ʰ 10ᵐ 50ˢ	12° 12.′4 N	34° 16.′0
Rigel	12ʰ 12ᵐ 00ˢ	8° 15.′4 S	50° 05.′1

	PROCYON		REGULUS		RIGEL
GMT	12ʰ 09ᵐ 42ˢ		12ʰ 10ᵐ 50ˢ		12ʰ 12ᵐ 00ˢ
GHA ♈ for 12ʰ GMT	22° 50.′3		22° 50.′3		22° 50.′3
Correction for 9ᵐ 42ˢ	2° 25.′9	(10ᵐ 50ˢ)	2° 42.′9	(12ᵐ 00ˢ)	3° 00.′5
SHA	245° 48.′7		208° 33.′1		281° 57.′2
GHA ☆	271° 04.′9		234° 06.′3		307° 48.′0
aλ	88° 07.′3 E		88° 07.′3 E		88° 07.′3 E
LHA	359° 12.′2		322° 13.′6		35° 55.′3
t(H.A.)	0° 47.′8 E t diff. 12.′2		37° 46.′4 E t diff. 13.′6		35° 55.′3 W t diff. 4.′7
d	5° 21.′1 N d diff. 8.′9		12° 12.′4 N d diff. 12.′4		8° 15.′4 S d diff. 14.′6
aL	29° 55.′0 S L diff. 5.′0		29° 55.′0 S L diff. 5.′0		29° 55.′0 S L diff. 5.′0
Δd and correction ....(+)1.0	(+)8.′9	(−)0.76	(−)9.′4	(−)0.61	(−)8.′9
Δt and correction ....(+)0.04	(+)0.′5	(+)0.64	(+)8.′7	(+)0.79	(+)3.′8
ΔL correction	(+)5.′0		(+)3.′4		(+)2.′1
ht(Alt.)	54° 29.′2		34° 18.′2		50° 04.′2
Hc	54° 43.′6		34° 20.′9		50° 01.′2
Ho	54° 41.′6		34° 16.′0		50° 05.′1
a	2.0 miles away		4.9 miles away		3.9 miles toward
Z(Az.) and Zn .... S 178.°3 E	001.°7	S 133.°2 E	046.°8	S 115.°1 W	295.°1
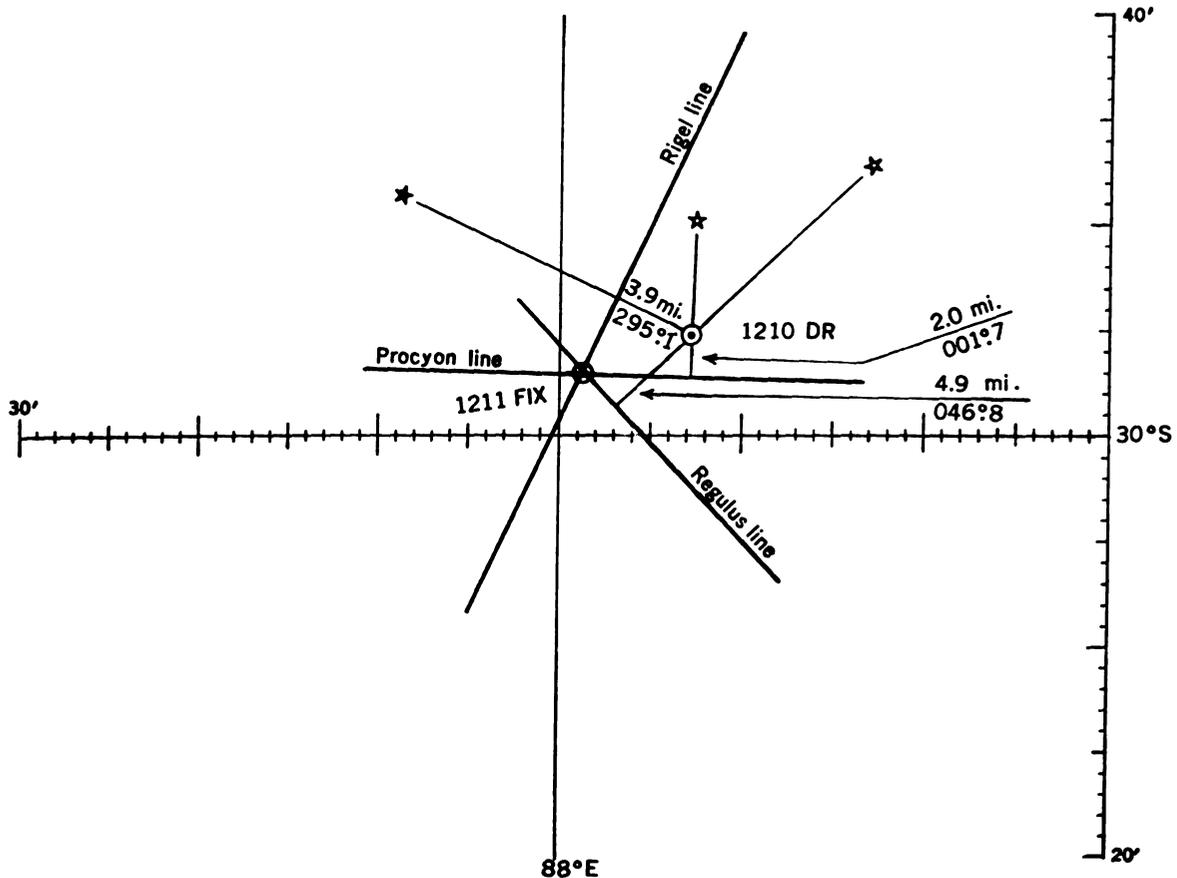
NOTE.—All three sights are plotted from the dead reckoning position.

STAR IDENTIFICATION

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

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

Example 7.—On November 26, 1951, the GMT 0220 (Nov. 27) dead reckoning position of a ship is lat. 31° 12′.2 N, long. 135° 10′.4 W. About this time the navigator observes a star through a break in the clouds, as follows: sextant altitude (hs) 55° 48′.4; azimuth (Zn) 235°. Identify the star.

SOLUTION

Enter the star identification table for latitude 31° with the approximate arguments Alt. 56° and Az. 125° (Zn 235°=Az. N 125° W in north latitude) and find approximate

Dec. 9° N, t(H.A.) 28° W

t(H.A.)	28° W	GMT	2^h 20^m
LHA☆	28°	GHA♈ for 2^h	95° 11′.0
Longitude	135° W	Correction for 20^m	5° 00′.8
GHA☆	163°	GHA♈	100° 11′.8
GHA♈	100°		
SHA	63°		

Enter the *Nautical Almanac* star list with the approximate sidereal hour angle (SHA) 63° and declination 9° N and identify the star as Altair.

GREAT-CIRCLE SAILING

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

Example 8.—Find the great-circle distance and the initial course between points near Mobile, Alabama, and Stockholm, Sweden.

Departure		*Destination*	
Lat. (L_1)	30° 13′.6 N	Lat. (L_2)	59° 20′.5 N
Long. (λ_1)	88° 01′.5 W	Long. (λ_2)	18° 03′.5 E

SOLUTION

Enter the tables with the nearest tabulated value to L_1 as latitude, L_2 as declination, and DLo ($\lambda_2-\lambda_1=18°$ 03′.5−(−88° 01′.5)=18° 03′.5+88° 01′.5=106° 05′.0) as meridian angle (H.A.).

		Alt.	Δd	Δt	Az.
		18° 02′.3	(−) 0.48	(−) 0.44	N 30°.9 E
Δd correction for 9′.5	(−) 4′.5				
Δt correction for 5′.0	(−) 2′.2				
ΔL correction for 13′.6	(+) 11′.6				
	(+) 4′.9	(+) 4′.9			
	Hc	18° 07′.2			
	Subtract from	90°			

Zenith distance (great-circle distance) .... 71° 52′.8 = 4312.8 nautical miles
Great-circle course N 30°.9 E .... 030°.9

If the combination of latitude of departure, latitude of destination, and difference of longitude cannot be found in the table, the name of the latitude of destination is reversed and the supplement of the difference of longitude is used for entering the table. The distance is found by *adding* the altitude to 90°; the great-circle course angle is the supplement of the azimuth angle. In the example, if the latitude of the destination is 59° 20′.5 S, the name is changed to N and the supplement of the difference of longitude is found (180°−106° 05′.0=73° 55′.0). Enter the table with lat. 30°, dec. 59° 30′ (same name as latitude), and H.A. 74°.

		Alt.	Δd	Δt	Az.
		33° 30′.1	(−) 0.06	(+) 0.51	35°.8
Δd correction for 9′.5	(−) 0′.5				
Δt correction for 5′.0	(+) 2′.6				
ΔL correction for 13′.6	(+) 11′.0				
	(+) 13′.1	(+) 13′.1			
	Hc	33° 43′.2			
	Add to	90°			

Zenith distance (great-circle distance) .... 123° 43′.2 = 7423.2 nautical miles
Great-circle course (180°−35°.8=N 144°.2 E) .... 144°.2

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

Lat. 30°

H.A.	0°00' Alt.	Δd Δt	Az.	0°30' Alt.	Δd Δt	Az.	1°00' Alt.	Δd Δt	Az.	1°30' Alt.	Δd Δt	Az.	2°00' Alt.	Δd Δt	Az.	2°30' Alt.	Δd Δt	Az.	3°00' Alt.	Δd Δt	Az.	3°30' Alt.	Δd Δt	Az.	H.A.
00	60 00.0	1.0 02	180.0	60 30.0	1.0 02	180.0	61 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	62 00.0	1.0 02	180.0	62 30.0	1.0 02	180.0	63 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0	00
1	59 59.1	1.0 05	178.0	60 29.1	1.0 05	178.0	60 59.1	1.0 05	177.9	61 29.1	1.0 05	177.9	61 59.0	1.0 05	177.9	62 29.0	1.0 05	177.8	62 59.0	1.0 05	177.8	63 29.0	1.0 05	177.8	1
2	59 56.4	1.0 08	176.0	60 26.3	1.0 08	175.9	60 56.3	1.0 08	175.9	61 26.2	1.0 08	175.8	61 56.1	1.0 08	175.7	62 26.1	1.0 08	175.7	62 56.0	1.0 08	175.6	63 25.9	1.0 08	175.5	2
3	59 51.9	1.0 11	174.0	60 21.7	1.0 11	173.9	60 51.6	1.0 11	173.8	61 21.5	1.0 11	173.7	61 51.3	1.0 11	173.6	62 21.2	1.0 11	173.4	62 51.0	99 12	173.3	63 20.9	99 12	173.3	3
4	59 45.5	99 13	172.0	60 15.3	99 14	171.9	60 45.1	99 14	171.8	61 14.9	99 14	171.7	61 44.6	99 14	171.5	62 14.4	99 15	171.4	62 44.1	99 15	171.3	63 13.9	99 15	171.1	4
05	59 37.5	99 16	170.1	60 07.1	99 17	169.9	60 36.8	99 17	169.8	61 06.4	99 17	169.6	61 36.0	99 17	169.4	62 05.7	99 18	169.3	62 35.3	99 18	169.1	63 04.8	99 18	168.9	05
6	59 27.6	98 19	168.1	59 57.2	98 20	168.0	60 26.7	98 20	167.8	60 56.1	98 20	167.6	61 25.6	98 20	167.4	61 55.1	98 21	167.2	62 24.5	98 21	167.0	62 53.9	98 21	166.8	6
7	59 16.1	98 22	166.2	59 45.4	98 22	166.0	60 14.8	98 23	165.8	60 44.1	98 23	165.6	61 13.4	98 23	165.3	61 42.6	97 24	165.1	62 11.8	97 24	164.9	62 41.1	97 24	164.6	7
8	59 02.9	97 25	164.3	59 32.0	97 25	164.1	60 01.2	97 26	163.8	60 30.3	97 26	163.6	60 59.3	97 26	163.3	61 28.4	97 27	163.1	61 57.4	97 27	162.8	62 26.4	97 27	162.5	8
9	58 48.0	97 28	162.4	59 16.9	96 28	162.2	59 45.8	96 28	161.9	60 14.7	96 29	161.6	60 43.6	96 29	161.4	61 12.4	96 30	161.1	61 41.1	96 30	160.8	62 09.9	96 30	160.5	9
10	58 31.5	96 30	160.6	59 00.2	96 31	160.3	59 28.9	96 31	160.0	59 57.5	95 31	159.7	60 26.1	95 32	159.4	60 54.7	95 32	159.1	61 23.2	95 33	158.8	61 51.6	95 33	158.4	10
1	58 13.4	95 33	158.8	58 41.9	95 33	158.5	59 10.3	95 34	158.1	59 38.7	95 34	157.8	60 07.0	94 34	157.5	60 35.3	94 35	157.2	61 03.5	94 35	156.8	61 31.7	94 36	156.5	1
2	57 53.9	94 35	157.0	58 22.1	94 36	156.6	58 50.2	94 36	156.3	59 18.3	94 37	156.0	59 46.4	93 37	155.6	60 14.3	93 38	155.3	60 42.3	93 38	154.9	61 10.1	93 39	154.5	2
3	57 32.8	93 37	155.2	58 00.7	93 38	154.9	58 28.6	93 38	154.5	58 56.4	93 39	154.2	59 24.2	93 39	153.8	59 51.8	92 40	153.4	60 19.5	92 41	153.0	60 47.0	92 41	152.6	3
4	57 10.3	92 40	153.5	57 38.0	92 40	153.1	58 05.5	92 41	152.8	58 33.0	92 41	152.4	59 00.5	91 42	152.0	59 27.8	91 42	151.6	59 55.1	91 43	151.2	60 22.4	91 44	150.8	4
15	56 46.4	91 42	151.8	57 13.8	91 42	151.4	57 41.1	91 43	151.0	58 08.3	91 44	150.7	58 35.4	90 44	150.2	59 02.4	90 45	149.8	59 29.4	90 45	149.4	59 56.3	90 46	149.0	15
6	56 21.2	90 44	150.2	56 48.3	90 45	149.8	57 15.2	90 45	149.4	57 42.1	89 46	149.0	58 08.9	89 46	148.5	58 35.6	89 47	148.1	59 02.2	89 47	147.7	59 28.8	89 48	147.2	6
7	55 54.8	89 47	148.6	56 21.5	89 47	148.1	56 48.1	89 47	147.7	57 14.7	88 48	147.3	57 41.1	88 48	146.9	58 07.5	88 49	146.4	58 33.8	87 50	146.0	59 00.0	87 50	145.5	7
8	55 27.0	88 48	147.0	55 53.5	88 49	146.6	56 19.8	88 49	146.1	56 46.0	87 50	145.7	57 12.1	87 50	145.2	57 38.2	87 51	144.8	58 04.1	86 51	144.3	58 29.9	86 52	143.8	8
9	54 58.1	87 50	145.4	55 24.2	87 51	145.0	55 50.2	86 51	144.6	56 16.1	86 52	144.1	56 41.9	86 52	143.7	57 07.6	85 53	143.2	57 33.2	85 53	142.7	57 58.7	85 54	142.2	9
20	54 28.1	86 52	143.9	54 53.9	86 52	143.5	55 19.5	85 53	143.1	55 45.1	85 54	142.6	56 10.6	85 54	142.1	56 35.9	84 55	141.6	57 01.1	84 55	141.1	57 26.2	83 56	140.6	20
1	53 57.0	85 54	142.5	54 22.4	85 54	142.0	54 47.8	84 55	141.6	55 13.0	84 55	141.1	55 38.1	84 56	140.6	56 03.1	83 56	140.1	56 28.0	83 57	139.6	56 52.8	82 58	139.1	1
2	53 24.8	84 56	141.1	53 50.0	84 56	140.6	54 15.0	83 56	140.1	54 39.9	83 57	139.6	55 04.6	83 57	139.2	55 29.3	82 58	138.7	55 53.8	82 59	138.1	56 18.2	81 59	137.6	2
3	52 51.7	83 57	139.7	53 16.5	83 57	139.2	53 41.2	82 58	138.7	54 05.7	82 58	138.2	54 30.2	81 59	137.7	54 54.5	81 60	137.2	55 18.7	80 60	136.7	55 42.7	80 61	136.2	3
4	52 17.6	82 58	138.3	52 42.1	81 59	137.8	53 06.4	81 59	137.4	53 30.7	81 60	136.9	53 54.8	80 60	136.4	54 18.7	80 61	135.8	54 42.6	79 62	135.3	55 06.3	79 62	134.8	4
25	51 42.6	81 60	137.0	52 06.8	80 60	136.5	52 30.8	80 61	136.0	52 54.7	79 61	135.5	53 18.5	79 62	135.0	53 42.1	79 62	134.5	54 05.6	78 63	134.0	54 29.0	78 64	133.4	25
6	51 06.7	80 61	135.7	51 30.6	79 62	135.2	51 54.3	79 62	134.7	52 17.9	78 63	134.2	52 41.3	78 63	133.7	53 04.6	78 64	133.2	53 27.8	77 64	132.7	53 50.9	77 65	132.1	6
7	50 30.1	79 62	134.5	50 53.6	78 63	134.0	51 17.0	78 63	133.5	51 40.2	77 64	133.0	52 03.4	77 65	132.4	52 26.4	76 65	131.9	52 49.2	76 66	131.4	53 11.9	76 66	130.8	7
8	49 52.6	78 63	133.2	50 15.8	77 64	132.7	50 38.9	77 65	132.2	51 01.8	76 65	131.7	51 24.7	76 66	131.2	51 47.3	75 66	130.7	52 09.9	75 67	130.2	52 32.3	74 67	129.6	8
9	49 14.4	77 65	132.1	49 37.3	76 65	131.6	50 00.0	76 66	131.1	50 22.7	75 66	130.5	50 45.2	75 67	130.0	51 07.6	74 67	129.5	51 29.8	74 68	129.0	51 51.9	73 68	128.4	9
30	48 35.4	76 66	130.9	48 58.0	75 66	130.4	49 20.5	75 67	129.9	49 42.9	74 68	129.4	50 05.1	74 68	128.9	50 27.1	73 68	128.3	50 49.1	73 69	127.8	51 10.8	72 69	127.2	30
1	47 55.8	75 67	129.8	48 18.1	74 68	129.3	48 40.3	74 68	128.8	49 02.4	73 69	128.2	49 24.3	73 69	127.7	49 46.1	72 70	127.2	50 07.7	72 70	126.6	50 29.2	71 70	126.1	1
2	47 15.6	74 68	128.7	47 37.6	73 69	128.2	47 59.5	73 69	127.7	48 21.3	72 70	127.1	48 42.9	72 70	126.6	49 04.4	71 71	126.1	49 25.7	71 71	125.5	49 46.9	70 71	125.0	2
3	46 34.7	73 69	127.6	46 56.4	72 70	127.1	47 18.1	72 70	126.6	47 39.5	71 70	126.1	48 00.9	71 71	125.5	48 22.1	70 71	125.0	48 43.1	70 72	124.5	49 04.0	69 72	123.9	3
4	45 53.2	72 70	126.5	46 14.7	71 70	126.0	46 36.0	71 71	125.5	46 57.3	70 71	125.0	47 18.3	70 72	124.5	47 39.3	70 72	124.0	48 00.0	69 73	123.4	48 20.7	68 73	122.9	4
35	45 11.2	71 71	125.5	45 32.4	71 71	125.0	45 53.5	70 72	124.5	46 14.4	70 72	124.0	46 35.2	69 73	123.5	46 55.9	69 73	122.9	47 16.4	68 74	122.4	47 36.8	68 74	121.9	35
6	44 28.6	70 72	124.5	44 49.6	70 72	124.0	45 10.4	69 73	123.5	45 31.1	69 73	123.0	45 51.7	68 74	122.5	46 12.1	68 74	121.9	46 32.3	67 74	121.4	46 52.4	67 75	120.9	6
7	43 45.6	69 73	123.6	44 06.3	69 73	123.1	44 26.9	68 73	122.6	44 47.3	68 74	122.0	45 07.6	67 74	121.5	45 27.7	67 75	121.0	45 47.7	66 75	120.5	46 07.6	66 75	119.9	7
8	43 02.1	68 73	122.6	43 22.5	68 74	122.1	43 42.8	68 74	121.6	44 03.0	67 75	121.1	44 23.1	67 75	120.6	44 43.0	66 75	120.1	45 02.7	66 76	119.5	45 22.4	65 76	119.0	8
9	42 18.1	68 74	121.7	42 38.3	67 74	121.2	42 58.4	67 75	120.7	43 18.3	66 75	120.2	43 38.1	66 76	119.7	43 57.8	65 76	119.1	44 17.3	65 76	118.6	44 36.7	64 77	118.1	9
40	41 33.6	67 75	120.8	41 53.6	66 75	120.3	42 13.5	66 76	119.8	42 33.2	66 76	119.3	42 52.8	65 76	118.8	43 12.2	65 77	118.2	43 31.5	64 77	117.7	43 50.7	64 77	117.2	40
1	40 48.8	66 75	119.9	41 08.6	66 76	119.4	41 28.2	65 76	118.9	41 47.7	65 76	118.4	42 07.0	64 77	117.9	42 26.2	64 77	117.4	42 45.3	63 78	116.8	43 04.3	63 78	116.3	1
2	40 03.6	65 76	119.0	40 23.1	65 76	118.5	40 42.5	64 77	118.0	41 01.8	64 77	117.5	41 20.9	64 77	117.0	41 39.9	63 78	116.5	41 58.8	63 78	116.0	42 17.5	62 78	115.5	2
3	39 18.0	65 77	118.2	39 37.3	64 77	117.7	39 56.5	64 77	117.2	40 15.5	63 78	116.7	40 34.5	63 78	116.2	40 53.3	62 78	115.7	41 11.9	62 79	115.2	41 30.4	61 79	114.6	3
4	38 32.0	64 77	117.4	38 51.1	64 78	116.9	39 10.1	63 78	116.4	39 28.9	63 78	115.9	39 47.7	62 78	115.4	40 06.3	62 79	114.9	40 24.7	61 79	114.3	40 43.0	61 79	113.8	4
45	37 45.7	63 78	116.6	38 04.6	63 78	116.1	38 23.4	62 79	115.6	38 42.0	62 79	115.1	39 00.6	62 79	114.6	39 19.0	61 79	114.1	39 37.2	60 80	113.6	39 55.4	60 80	113.0	45
6	36 59.0	63 78	115.8	37 17.8	62 79	115.3	37 36.4	62 79	114.8	37 54.8	61 79	114.3	38 13.2	61 79	113.8	38 31.4	60 80	113.3	38 49.5	60 80	112.8	39 07.4	60 80	112.3	6
7	36 12.1	62 79	115.0	36 30.6	62 79	114.5	36 49.0	61 79	114.0	37 07.3	61 80	113.5	37 25.5	60 80	113.0	37 43.5	60 80	112.5	38 01.4	59 80	112.0	38 19.2	59 81	111.5	7
8	35 24.9	61 79	114.2	35 43.2	61 80	113.8	36 01.4	60 80	113.3	36 19.5	60 80	112.8	36 37.5	60 80	112.3	36 55.4	59 81	111.8	37 13.1	59 81	111.3	37 30.7	58 81	110.8	8
9	34 37.3	61 80	113.5	34 55.5	60 80	113.0	35 13.6	60 80	112.5	35 31.5	60 81	112.0	35 49.3	59 81	111.5	36 06.9	59 81	111.0	36 24.6	58 81	110.5	36 42.0	58 82	110.0	9
50	33 49.6	60 80	112.8	34 07.6	60 80	112.3	34 25.4	59 81	111.8	34 43.2	59 81	111.3	35 00.9	59 81	110.8	35 18.4	58 81	110.3	35 35.8	58 82	109.8	35 53.1	57 82	109.3	50
1	33 01.5	60 80	112.0	33 19.3	59 81	111.6	33 37.1	59 81	111.1	33 54.7	59 81	110.6	34 12.2	58 82	110.1	34 29.6	58 82	109.6	34 46.8	57 82	109.1	35 03.9	57 82	108.6	1
2	32 13.2	59 81	111.3	32 30.9	59 81	110.9	32 48.5	58 81	110.4	33 05.9	58 82	109.9	33 23.3	58 82	109.4	33 40.5	57 82	108.9	33 57.6	57 82	108.4	34 14.6	56 83	107.9	2
3	31 24.7	59 81	110.6	31 42.2	58 81	110.2	31 59.7	58 82	109.7	32 17.0	58 82	109.2	32 34.2	57 82	108.7	32 51.2	57 83	108.2	33 08.2	56 83	107.7	33 25.1	56 83	107.2	3
4	30 36.0	58 82	110.0	30 53.4	58 82	109.5	31 10.6	57 82	109.0	31 27.8	57 82	108.5	31 44.8	57 83	108.1	32 01.8	56 83	107.6	32 18.6	56 83	107.1	32 35.4	55 83	106.6	4
55	29 47.0	58 82	109.3	30 04.3	57 82	108.8	30 21.4	57 82	108.3	30 38.4	57 83	107.9	30 55.4	56 83	107.4	31 12.2	56 83	106.9	31 28.9	55 83	106.4	31 45.5	55 84	105.9	55
6	28 57.9	57 82	108.6	29 15.0	57 82	108.2	29 32.0	56 83	107.7	29 48.9	56 83	107.2	30 05.7	56 83	106.7	30 22.4	55 83	106.3	30 38.9	55 83	105.8	30 55.4	54 84	105.3	6
7	28 08.6	57 82	108.0	28 25.5	56 83	107.5	28 42.4	56 83	107.0	28 59.2	56 83	106.6	29 15.8	55 83	106.1	29 32.4	55 84	105.6	29 48.9	55 84	105.1	30 05.2	54 84	104.7	7
8	27 19.1	56 83	107.4	27 35.9	56 83	106.9	27 52.6	55 83	106.4	28 09.3	55 83	105.9	28 25.8	55 84	105.5	28 42.3	54 84	105.0	28 58.6	54 84	104.5	29 14.9	54 84	104.0	8
9	26 29.4	56 83	106.7	26 46.1	55 83	106.3	27 02.7	55 83	105.8	27 19.2	55 84	105.3	27 35.7	54 84	104.9	27 52.0	54 84	104.4	28 08.3	54 84	103.9	28 24.4	54 84	103.4	9
60	25 39.5	55 83	106.1	25 56.1	55 84	105.6	26 12.6	55 84	105.2	26 29.1	54 84	104.7	26 45.4	54 84	104.2	27 01.6	54 84	103.8	27 17.8	54 84	103.3	27 33.8	53 85	102.8	60
1	24 49.5	55 84	105.5	25 06.0	55 84	105.0	25 22.4	54 84	104.6	25 38.7	54 84	104.1	25 55.0	54 84	103.6	26 11.1	54 84	103.2	26 27.1	53 85	102.7	26 43.1	53 85	102.2	1
2	23 59.4	55 84	104.9	24 15.8	54 84	104.4	24 32.1	54 84	104.0	24 48.3	54 84	103.5	25 04.4	54 84	103.0	25 20.4	53 85	102.6	25 36.4	53 85	102.1	25 52.2	53 85	101.6	2
3	23 09.1	54 84	104.3	23 25.4	54 84	103.8	23 41.6	54 84	103.4	23 57.7	53 85	102.9	24 13.7	53 85	102.5	24 29.7	53 85	102.0	24 45.5	53 85	101.5	25 01.3	52 85	101.1	3
4	22 18.7	54 84	103.7	22 34.9	54 84	103.2	22 51.0	54 85	102.8	23 07.0	53 85	102.3	23 22.9	53 85	101.9	23 38.8	53 85	101.4	23 54.6	52 85	100.9	24 10.2	52 85	100.5	4
65	21 28.1	54 84	103.1	21 44.2	53 85	102.7	22 00.2	53 85	102.2	22 16.2	53 85	101.8	22 32.0	53 85	101.3	22 47.8	52 85	100.8	23 03.5	52 85	100.4	23 19.1	52 85	99.9	65
6	20 37.5	53 85	102.6	20 53.5	53 85	102.1	21 09.4	53 85	101.6	21 25.2	53 85	101.2	21 41.0	52 85	100.7	21 56.7	52 85	100.3	22 12.3	52 85	99.8	22 27.9	52 86	99.3	6
7	19 46.7	53 85	102.0	20 02.6	53 85	101.5	20 18.4	53 85	101.1	20 34.2	52 85	100.6	20 49.9	52 85	100.2	21 05.5	52 85	99.7	21 21.1	52 86	99.3	21 36.6	51 86	98.8	7
8	18 55.8	53 85	101.4	19 11.6	53 85	101.0	19 27.4	52 85	100.5	19 43.1	52 85	100.1	19 58.7	52 86	99.6	20 14.3	52 86	99.2	20 29.8	51 86	98.7	20 45.2	51 86	98.2	8
9	18 04.8	53 85	100.9	18 20.6	52 85	100.4	18 36.3	52 85	100.0	18 51.9	52 86	99.5	19 07.4	52 86	99.1	19 22.9	51 86	98.6	19 38.4	51 86	98.2	19 53.7	51 86	97.7	9
70	17 13.8	52 85	100.3	17 29.4	52 86	99.9	17 45.1	52 86	99.4	18 00.6	52 86	99.0	18 16.1	52 86	98.5	18 31.5	51 86	98.1	18 46.9	51 86	97.6	19 02.2	51 86	97.2	70
1	16 22.6	52 85	99.8	16 38.2	52 86	99.3	16 53.8	52 86	98.9	17 09.2	52 86	98.4	17 24.7	51 86	98.0	17 40.0	51 86	97.5	17 55.4	51 86	97.1	18 10.6	51 86	96.6	1
2	15 31.3	52 86	99.2	15 46.9	52 86	98.8	16 02.4	52 86	98.3	16 17.8	51 86	97.9	16 33.2	51 86	97.4	16 48.5	51 86	97.0	17 03.8	51 86	96.5	17 19.0	51 86	96.1	2
3	14 40.0	52 86	98.7	14 55.5	52 86	98.2	15 10.9	51 86	97.8	15 26.3	51 86	97.4	15 41.6	51 86	96.9	15 56.9	51 86	96.5	16 12.1	51 86	96.0	16 27.3	50 86	95.6	3
4	13 48.6	51 86	98.2	14 04.0	51 86	97.7	14 19.4	51 86	97.3	14 34.7	51 86	96.8	14 50.0	51 86	96.4	15 05.2	51 86	95.9	15 20.4	50 86	95.5	15 35.5	50 86	95.0	4
75	12 57.2	51 86	97.6	13 12.5	51 86	97.2	13 27.8	51 86	96.7	13 43.1	51 86	96.3	13 58.4	51 86	95.9	14 13.5	51 86	95.4	14 28.7	50 86	95.0	14 43.7	50 86	94.5	75
6	12 05.6	51 86	97.1	12 20.9	51 86	96.7	12 36.2	51 86	96.2	12 51.5	51 86	95.8	13 06.6	51 86	95.3	13 21.8	50 86	94.9	13 36.9	50 86	94.5	13 51.9	50 86	94.0	6
7	11 14.0	51 86	96.6	11 29.3	51 86	96.1	11 44.5	51 86	95.7	11 59.7	51 86	95.3	12 14.9	50 86	94.8	12 30.0	50 86	94.4	12 45.1	50 86	93.9	13 00.1	50 86	93.5	7
8	10 22.4	51 86	96.0	10 37.6	51 86	95.6	10 52.8	51 86	95.2	11 08.0	50 86	94.8	11 23.1	50 86	94.3	11 38.2	50 86	93.9	11 53.2	50 86	93.4	12 08.2	50 86	93.0	8
9	9 30.7	51 86	95.6	9 45.9	51 86	95.1	10 01.0	50 86	94.7	10 16.2	50 86	94.2	10 31.3	50 86	93.8	10 46.3	50 86	93.4	11 01.3	50 86	92.9	11 16.3	50 87	92.5	9
80	8 38.9	51 86	95.0	8 54.1	50 86	94.6	9 09.2	50 86	94.2	9 24.3	50 86	93.7	9 39.4	50 86	93.3	9 54.4	50 86	92.8	10 09.4	50 87	92.4	10 24.4	50 87	92.0	80
1	7 47.2	50 86	94.5	8 02.3	50 86	94.1	8 17.4	50 86	93.7	8 32.5	50 86	93.2	8 47.5	50 86	92.8	9 02.5	50 87	92.3	9 17.5	50 87	91.9	9 32.4	50 87	91.5	1
2	6 55.4	50 86	94.0	7 10.5	50 86	93.6	7 25.5	50 86	93.1	7 40.6	50 86	92.7	7 55.6	50 87	92.3	8 10.6	50 87	91.8	8 25.6	50 87	91.4	8 40.5	50 87	91.0	2
3	6 03.5	50 86	93.5	6 18.6	50 86	93.1	6 33.6	50 87	92.6	6 48.7	50 87	92.2	7 03.7	50 87	91.8	7 18.6	50 87	91.3	7 33.6	50 87	90.9	7 48.5	50 87	90.5	3
4	5 11.6	50 86	93.0	5 26.7	50 87	92.6	5 41.7	50 87	92.1	5 56.7	50 87	91.7	6 11.7	50 87	91.3	6 26.7	50 87	90.8	6 41.6	50 87	90.4	6 56.6	50 87	90.0	4
85										5 04.8	50 87	91.2	5 19.8	50 87	90.8	5 34.7	50 87	90.3	5 49.7	50 87	89.9	6 04.6	50 87	89.5	85
6																						5 12.7	50 87	89.0	6

H.A.	0° 00'			0° 30'			1° 00'			1° 30'			2° 00'			2° 30'			3° 00'			3° 30'			H.A.
°	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	°
00	60 00.0	1.0 02	180.0	59 30.0	1.0 02	180.0	59 00.0	1.0 01	180.0	58 30.0	1.0 01	180.0	58 00.0	1.0 01	180.0	57 30.0	1.0 01	180.0	57 00.0	1.0 01	180.0	56 30.0	1.0 01	180.0	00
1	59 59.1	1.0 05	178.0	59 29.1	1.0 04	178.0	58 59.1	1.0 04	178.1	58 29.1	1.0 04	178.1	57 59.1	1.0 04	178.1	57 29.2	1.0 04	178.1	56 59.2	1.0 04	178.2	56 29.2	1.0 04	178.2	1
2	59 56.4	1.0 08	176.0	59 26.4	1.0 07	176.1	58 56.5	1.0 07	176.1	58 26.5	1.0 07	176.2	57 56.6	1.0 07	176.2	57 26.6	1.0 07	176.3	56 56.7	1.0 07	176.3	56 26.7	1.0 07	176.4	2
3	59 51.9	1.0 10	174.0	59 22.0	1.0 10	174.1	58 52.1	1.0 10	174.2	58 22.2	1.0 10	174.3	57 52.3	1.0 10	174.4	57 22.4	1.0 10	174.5	56 52.5	1.0 10	174.5	56 22.6	1.0 10	174.6	3
4	59 45.5	99 13	172.0	59 15.8	99 13	172.2	58 46.0	99 13	172.3	58 16.2	99 13	172.4	57 46.4	99 13	172.5	57 16.6	99 13	172.6	56 46.7	99 12	172.7	56 16.9	99 12	172.8	4
05	59 37.5	99 16	170.1	59 07.8	99 16	170.2	58 38.1	99 16	170.4	58 08.4	99 16	170.5	57 38.7	99 15	170.6	57 09.0	99 15	170.8	56 39.3	99 15	170.9	56 09.6	99 15	171.0	05
6	59 27.6	98 19	168.1	58 58.1	98 19	168.3	58 28.6	98 18	168.5	57 59.0	98 18	168.6	57 29.5	99 18	168.8	56 59.9	99 18	168.9	56 30.3	99 18	169.1	56 00.7	99 17	169.2	6
7	59 16.1	98 22	166.2	58 46.7	98 22	166.4	58 17.4	98 21	166.6	57 48.0	98 21	166.8	57 18.5	98 21	167.1	56 49.1	98 21	167.1	56 19.7	98 20	167.3	55 50.2	98 20	167.5	7
8	59 02.9	97 25	164.3	58 33.7	97 24	164.5	58 04.5	97 24	164.7	57 35.3	97 24	165.0	57 06.0	98 23	165.2	56 36.8	98 23	165.4	56 07.5	98 23	165.6	55 38.2	98 23	165.8	8
9	58 48.0	97 28	162.4	58 19.0	97 27	162.7	57 50.0	97 27	162.9	57 21.0	97 26	163.2	56 51.9	97 26	163.4	56 22.9	97 26	163.6	55 53.8	97 25	163.8	55 24.6	97 25	164.0	9
10	58 31.5	96 30	160.6	58 02.8	96 30	160.8	57 34.0	96 29	161.1	57 05.2	96 29	161.4	56 36.3	96 29	161.6	56 07.4	96 28	161.9	55 38.5	96 28	162.1	55 09.6	96 27	162.3	10
1	58 13.4	95 33	158.8	57 44.9	95 32	159.0	57 16.4	95 32	159.3	56 47.8	95 31	159.6	56 19.2	95 31	159.9	55 50.5	95 31	160.2	55 21.8	96 30	160.4	54 53.1	96 30	160.7	1
2	57 53.9	94 35	157.0	57 25.6	94 35	157.3	56 57.3	94 34	157.6	56 29.0	94 34	157.9	56 00.6	95 33	158.2	55 32.2	95 33	158.5	55 03.7	95 33	158.7	54 35.2	96 32	159.0	2
3	57 32.8	93 37	155.2	57 04.8	93 37	155.5	56 36.8	94 35	155.7	56 08.7	94 36	156.2	55 40.6	94 35	156.5	55 12.4	94 35	156.8	54 44.2	94 35	157.1	54 15.9	94 34	157.4	3
4	57 10.3	92 40	153.5	56 42.6	92 39	153.8	56 14.9	93 39	154.2	55 47.0	93 38	154.5	55 19.2	93 38	154.9	54 51.3	93 37	155.2	54 23.3	93 37	155.5	53 55.3	93 37	155.8	4
15	56 46.4	91 42	151.8	56 19.0	91 42	152.2	55 51.6	92 41	152.5	55 24.0	92 41	152.9	54 56.4	92 40	153.2	54 28.8	92 40	153.6	54 01.1	92 39	153.9	53 33.3	93 39	154.2	15
6	56 21.2	90 44	150.2	55 54.1	90 44	150.6	55 27.0	91 43	150.9	54 59.7	91 43	151.3	54 32.4	91 42	151.7	54 05.0	91 42	152.0	53 37.6	92 41	152.3	53 10.1	92 41	152.7	6
7	55 54.8	89 46	148.6	55 28.0	89 46	149.0	55 01.1	90 45	149.3	54 34.1	90 45	149.7	54 07.3	90 44	150.1	53 40.6	90 44	150.5	53 12.9	91 43	150.8	52 45.5	91 43	151.2	7
8	55 27.0	88 48	147.0	55 00.6	88 48	147.4	54 34.0	89 47	147.8	54 07.3	89 47	148.2	53 40.6	89 46	148.6	53 13.8	89 46	149.0	52 46.9	90 45	149.3	52 20.0	90 45	149.7	8
9	54 58.1	87 50	145.4	54 32.0	87 50	145.9	54 05.7	88 49	146.3	53 39.4	88 48	146.7	53 12.9	88 48	147.1	52 46.4	88 47	147.5	52 19.9	89 47	147.9	51 53.2	89 46	148.2	9
20	54 28.1	86 52	143.9	54 02.3	86 51	144.4	53 36.3	87 51	144.8	53 10.3	87 50	145.2	52 44.1	87 50	145.6	52 17.9	87 49	146.0	51 51.7	88 49	146.4	51 25.3	88 48	146.8	20
1	53 57.0	85 54	142.5	53 31.5	85 53	142.9	53 05.8	86 53	143.4	52 40.1	86 52	143.8	52 14.3	86 52	144.2	51 48.4	86 51	144.6	51 22.4	87 50	145.0	50 56.3	87 50	145.4	1
2	53 24.8	85 55	141.1	52 59.6	84 55	141.5	52 34.3	85 54	142.0	52 08.9	85 54	142.4	51 43.4	85 53	142.8	51 17.8	85 53	143.2	50 52.1	86 52	143.6	50 26.3	86 52	144.1	2
3	52 51.7	83 57	139.7	52 26.8	83 56	140.1	52 01.8	84 56	140.6	51 36.7	84 55	141.0	51 11.5	84 55	141.5	50 46.2	84 54	141.9	50 20.8	85 54	142.3	49 55.3	85 53	142.7	3
4	52 17.6	82 58	138.3	51 53.0	82 58	138.8	51 28.3	82 57	139.2	51 03.5	83 57	139.7	50 38.6	83 56	140.1	50 13.7	83 56	140.6	49 48.6	84 55	141.0	49 23.4	84 55	141.4	4
25	51 42.6	81 60	137.0	51 18.3	81 59	137.5	50 54.0	81 59	137.9	50 29.5	82 58	138.4	50 04.9	82 58	138.8	49 40.2	82 57	139.3	49 15.4	83 57	139.7	48 50.5	83 56	140.1	25
6	51 06.7	80 61	135.7	50 42.8	80 61	136.2	50 18.7	80 60	136.7	49 54.5	81 60	137.1	49 30.3	81 59	137.6	49 05.9	81 59	138.0	48 41.4	82 58	138.5	48 16.8	82 58	138.9	6
7	50 30.1	79 62	134.5	50 06.4	79 62	134.9	49 42.6	79 61	135.5	49 18.8	80 61	135.9	48 54.8	80 60	136.3	48 30.7	80 60	136.7	48 06.5	81 59	137.2	47 42.2	81 59	137.7	7
8	49 52.6	78 64	133.2	49 29.2	78 63	133.7	49 05.8	78 63	134.2	48 42.2	79 62	134.7	48 18.5	79 62	135.1	47 54.7	80 61	135.6	47 30.8	80 61	136.0	47 06.8	80 60	136.5	8
9	49 14.4	77 65	132.1	48 51.3	77 64	132.5	48 28.2	77 64	133.0	48 04.9	78 63	133.5	47 41.5	78 63	134.0	47 18.0	79 62	134.4	46 54.4	79 62	134.9	46 30.7	79 62	135.3	9
30	48 35.4	76 66	130.9	48 12.7	76 66	131.4	47 49.8	76 65	131.9	47 26.8	77 65	132.3	47 03.7	77 64	132.8	46 40.5	78 64	133.3	46 17.2	78 63	133.7	45 53.8	78 63	134.2	30
1	47 55.8	75 67	129.8	47 33.4	75 67	130.3	47 10.8	75 66	130.7	46 48.1	76 66	131.2	46 25.3	76 65	131.7	46 02.3	77 65	132.2	45 39.3	77 64	132.6	45 16.1	77 64	133.1	1
2	47 15.6	74 68	128.7	46 53.4	74 68	129.2	46 31.1	75 67	129.6	46 08.7	75 67	130.1	45 46.1	76 66	130.6	45 23.5	76 66	131.1	45 00.7	76 65	131.5	44 37.9	76 65	132.0	2
3	46 34.7	73 69	127.6	46 12.8	73 69	128.1	45 50.8	74 68	128.6	45 28.6	74 68	129.1	45 06.4	74 67	129.5	44 44.0	75 67	130.0	44 21.5	75 66	130.5	43 58.9	76 66	130.9	3
4	45 53.2	72 70	126.5	45 31.6	72 70	127.0	45 09.9	73 69	127.5	44 48.0	73 69	128.0	44 26.0	73 68	128.5	44 03.9	74 68	129.0	43 41.7	74 67	129.4	43 19.4	75 67	129.9	4
35	45 11.2	71 71	125.5	44 49.9	71 70	126.0	44 28.4	72 70	126.5	44 06.8	72 70	127.0	43 45.1	73 69	127.5	43 23.2	73 69	128.0	43 01.3	73 68	128.4	42 39.2	74 68	128.9	35
6	44 28.6	70 72	124.5	44 07.6	71 71	125.0	43 46.3	71 71	125.5	43 25.0	71 70	126.0	43 03.5	72 70	126.5	42 42.0	72 70	127.0	42 20.3	73 69	127.4	41 58.5	73 69	127.9	6
7	43 45.6	69 73	123.6	43 24.8	70 72	124.1	43 03.8	70 72	124.6	42 42.7	70 71	125.1	42 21.5	71 71	125.5	42 00.2	71 70	126.1	41 38.7	72 70	126.5	41 17.2	72 70	126.9	7
8	43 02.1	68 73	122.6	42 41.5	69 73	123.1	42 20.8	69 73	123.6	41 59.9	70 72	124.1	41 39.0	70 72	124.6	41 17.9	70 71	125.0	40 56.7	71 71	125.5	40 35.4	71 70	126.0	8
9	42 18.1	68 74	121.7	41 57.7	68 74	122.2	41 37.3	68 73	122.7	41 16.7	69 73	123.2	40 55.9	69 72	123.6	40 35.1	70 72	124.1	40 14.2	70 72	124.6	39 53.1	70 71	125.1	9
40	41 33.6	67 75	120.8	41 13.5	67 74	121.3	40 53.3	68 74	121.8	40 32.9	68 74	122.3	40 12.5	68 73	122.7	39 51.9	69 73	123.2	39 31.2	69 72	123.7	39 10.3	70 72	124.1	40
1	40 48.8	66 75	119.9	40 28.9	66 75	120.4	40 08.9	67 75	120.9	39 48.8	67 74	121.4	39 28.5	68 74	121.9	39 06.2	68 74	122.3	38 47.7	68 73	122.8	38 27.1	69 73	123.3	1
2	40 03.6	65 76	119.0	39 43.9	66 75	119.5	39 24.1	66 75	120.0	39 04.2	67 75	120.5	38 44.2	67 75	121.0	38 24.1	67 74	121.5	38 07.3	68 74	121.9	37 43.4	68 73	122.4	2
3	39 18.0	65 77	118.2	38 58.5	65 76	118.7	38 38.9	66 76	119.2	38 19.3	66 76	119.7	37 59.4	66 75	120.1	37 39.5	67 75	120.6	37 19.5	67 74	121.1	36 59.4	67 74	121.5	3
4	38 32.0	64 77	117.4	38 12.7	64 77	117.9	37 53.4	65 76	118.3	37 33.9	65 76	118.8	37 14.3	65 75	119.3	36 54.6	66 75	119.8	36 34.8	66 75	120.2	36 14.9	67 75	120.7	4
45	37 45.7	63 78	116.6	37 26.6	64 77	117.1	37 07.5	64 77	117.5	36 48.2	64 76	118.0	36 28.8	65 76	118.5	36 09.4	65 76	119.0	35 49.7	66 76	119.4	35 30.0	66 75	119.9	45
6	36 59.0	63 78	115.8	36 40.2	63 78	116.3	36 21.2	63 78	116.7	36 02.2	64 77	117.2	35 43.0	64 77	117.7	35 23.7	64 77	118.2	35 04.3	65 76	118.6	34 44.8	65 76	119.1	6
7	36 12.1	62 79	115.0	35 53.4	62 78	115.5	35 34.7	63 78	115.9	35 15.8	63 78	116.4	34 56.8	63 77	116.9	34 37.7	64 77	117.4	34 18.5	64 77	117.8	33 59.2	65 77	118.3	7
8	35 24.9	61 79	114.2	35 06.4	62 79	114.7	34 47.8	62 79	115.2	34 29.1	62 78	115.7	34 10.3	63 78	116.1	33 51.4	63 78	116.6	33 32.4	64 77	117.1	33 13.3	64 77	117.5	8
9	34 37.3	61 80	113.5	34 19.1	61 79	114.0	34 00.7	62 79	114.4	33 42.2	62 79	114.9	33 23.5	62 78	115.4	33 04.8	63 78	115.9	32 46.0	63 78	116.3	32 27.1	63 78	116.8	9
50	33 49.6	60 80	112.8	33 31.4	61 80	113.2	33 13.2	61 80	113.7	32 54.9	61 79	114.2	32 36.5	62 79	114.7	32 17.9	62 79	115.1	31 59.3	62 78	115.6	31 40.5	63 78	116.0	50
1	33 01.5	60 80	112.0	32 43.5	60 80	112.5	32 25.5	60 80	113.0	32 07.4	61 80	113.5	31 49.1	61 79	113.9	31 30.7	61 79	114.4	31 12.3	62 79	114.9	30 53.7	62 78	115.3	1
2	32 13.2	59 81	111.3	31 55.4	59 81	111.8	31 37.6	60 80	112.3	31 19.6	60 80	112.7	31 01.5	60 80	113.2	30 43.3	61 80	113.7	30 25.0	61 79	114.1	30 06.6	61 79	114.6	2
3	31 24.7	59 81	110.6	31 07.1	59 81	111.1	30 49.4	59 81	111.6	30 31.5	60 80	112.1	30 13.6	60 80	112.5	29 55.6	60 80	113.0	29 37.4	61 80	113.4	29 19.2	61 79	113.9	3
4	30 36.0	58 82	110.0	30 18.5	58 81	110.4	30 00.9	59 81	110.9	29 43.2	59 81	111.4	29 25.5	59 81	111.8	29 07.6	60 80	112.3	28 49.6	60 80	112.8	28 31.6	60 80	113.2	4
55	29 47.0	58 82	109.3	29 29.7	58 82	109.8	29 12.3	58 81	110.2	28 54.7	59 81	110.7	28 37.1	59 81	111.2	28 19.4	59 81	111.6	28 01.6	60 80	112.1	27 43.7	60 80	112.5	55
6	28 57.9	57 82	108.6	28 40.7	57 82	109.1	28 23.4	58 82	109.6	28 05.6	58 81	110.0	27 48.5	58 81	110.5	27 31.0	59 81	111.0	27 13.3	59 81	111.4	26 55.6	59 81	111.9	6
7	28 08.6	57 82	108.0	27 51.5	57 82	108.5	27 34.4	57 82	108.9	27 17.1	58 82	109.4	26 59.8	58 81	109.8	26 42.4	58 81	110.3	26 24.9	59 81	110.7	26 07.3	59 81	111.2	7
8	27 19.1	56 83	107.4	27 02.1	57 83	107.8	26 45.1	57 82	108.3	26 28.0	57 82	108.7	26 10.8	57 82	109.2	25 53.5	58 82	109.6	25 36.2	58 81	110.1	25 18.7	58 81	110.6	8
9	26 29.4	56 83	106.7	26 12.6	56 83	107.2	25 55.7	56 83	107.6	25 38.7	57 82	108.1	25 21.6	57 82	108.5	25 04.5	57 82	109.0	24 47.3	58 82	109.5	24 29.9	58 82	109.9	9
60	25 39.5	55 83	106.1	25 22.8	55 83	106.6	25 06.1	56 83	107.0	24 49.2	56 83	107.5	24 32.3	57 83	107.9	24 15.3	57 82	108.4	23 58.2	57 82	108.8	23 41.0	57 82	109.3	60
1	24 49.5	55 84	105.5	24 33.0	55 83	105.9	24 16.3	55 83	106.4	23 59.6	56 83	106.9	23 42.8	56 83	107.3	23 25.9	56 83	107.8	23 08.9	57 82	108.2	22 51.9	57 82	108.7	1
2	23 59.4	54 84	104.9	23 42.9	55 84	105.3	23 26.4	55 83	105.8	23 09.8	55 83	106.3	22 53.1	56 83	106.7	22 36.3	56 83	107.2	22 19.5	56 83	107.6	22 02.5	57 82	108.0	2
3	23 09.1	54 84	104.3	22 52.8	54 84	104.7	22 36.4	55 84	105.2	22 19.8	55 83	105.7	22 03.2	55 83	106.1	21 46.6	56 83	106.6	21 29.8	56 83	107.0	21 13.1	56 83	107.4	3
4	22 18.7	54 84	103.7	22 02.4	54 84	104.2	21 46.1	55 84	104.6	21 29.7	55 83	105.1	21 13.2	55 83	105.5	20 56.7	55 83	106.0	20 40.1	55 83	106.4	20 23.4	56 83	106.8	4
65	21 28.1	54 84	103.1	21 12.0	54 84	103.6	20 55.8	54 84	104.0	20 39.5	54 84	104.5	20 23.1	55 84	104.9	20 06.7	55 84	105.4	19 50.2	55 83	105.8	19 33.6	55 83	106.3	65
6	20 37.5	53 85	102.6	20 21.4	54 85	103.0	20 05.3	54 84	103.5	19 49.1	54 84	103.9	19 32.8	54 84	104.4	19 16.5	55 84	104.8	19 00.1	55 84	105.2	18 43.6	55 84	105.7	6
7	19 46.7	53 85	102.0	19 30.7	53 85	102.4	19 14.7	54 84	102.9	18 58.6	54 84	103.3	18 42.4	54 84	103.8	18 26.2	54 84	104.2	18 09.9	54 84	104.7	17 53.5	55 84	105.1	7
8	18 55.8	53 85	101.4	18 39.9	53 85	101.9	18 24.0	53 85	102.3	18 08.0	53 85	102.8	17 51.9	54 84	103.2	17 35.7	54 84	103.6	17 19.6	54 84	104.1	17 03.3	54 84	104.5	8
9	18 04.8	53 85	100.9	17 49.0	53 85	101.3	17 33.2	53 85	101.8	17 17.2	53 85	102.2	17 01.2	53 85	102.6	16 45.2	54 84	103.1	16 29.1	54 84	103.5	16 12.9	54 84	104.0	9
70	17 13.8	52 85	100.3	16 58.0	53 85	100.8	16 42.2	53 85	101.2	16 26.4	53 85	101.6	16 10.5	53 85	102.1	15 54.5	53 85	102.5	15 38.5	53 84	103.0	15 22.4	54 84	103.4	70
1	16 22.6	52 85	99.8	16 06.9	52 85	100.2	15 51.2	52 85	100.7	15 35.4	53 85	101.1	15 19.6	53 85	101.5	15 03.7	53 85	102.0	14 47.8	53 85	102.4	14 31.8	53 85	102.9	1
2	15 31.3	52 86	99.2	15 15.8	52 85	99.7	15 00.1	52 85	100.1	14 44.4	52 85	100.6	14 28.7	53 85	101.0	14 12.9	53 85	101.4	13 57.0	53 85	101.9	13 41.1	53 85	102.3	2
3	14 40.0	52 86	98.7	14 24.5	52 86	99.1	14 08.9	52 86	99.6	13 53.3	52 85	100.0	13 37.6	52 85	100.5	13 21.9	53 85	100.9	13 06.1	53 85	101.3	12 50.3	53 85	101.8	3
4	13 48.6	51 86	98.2	13 33.2	52 86	98.6	13 17.6	52 86	99.0	13 02.1	52 86	99.5	12 46.5	52 85	99.9	12 30.8	52 85	100.4	12 15.1	52 85	100.8	11 59.4	53 85	101.2	4
75	12 57.2	51 86	97.6	12 41.7	51 86	98.1	12 26.3	52 86	98.5	12 10.8	52 86	98.9	11 55.2	52 86	99.4	11 39.7	52 85	99.8	11 24.0	52 85	100.3	11 08.4	52 85	100.7	75
6	12 05.6	51 86	97.1	11 50.3	51 86	97.5	11 34.9	51 86	98.0	11 19.4	52 86	98.4	11 03.9	52 86	98.9	10 48.4	52 86	99.3	10 32.9	52 86	99.7	10 17.3	52 85	100.2	6
7	11 14.0	51 86	96.6	10 58.7	51 86	97.0	10 43.4	51 86	97.5	10 28.0	51 86	97.9	10 12.6	51 86	98.3	9 57.1	52 86	98.8	9 41.6	52 86	99.2	9 26.1	52 86	99.6	7
8	10 22.4	51 86	96.1	10 07.1	51 86	96.5	9 51.8	51 86	96.9	9 36.5	51 86	97.4	9 21.1	51 86	97.8	9 05.7	51 86	98.2	8 50.3	51 86	98.7	8 34.8	52 86	99.1	8
9	9 30.7	51 86	95.6	9 15.5	51 86	96.0	9 00.2	51 86	96.4	8 44.9	51 86	96.9	8 29.6	51 86	97.3	8 14.3	51 86	97.7	7 58.9	51 86	98.2	7 43.5	51 86	98.6	9
80	8 38.9	51 86	95.0	8 23.8	51 86	95.5	8 08.5	51 86	95.9	7 53.3	51 86	96.3	7 38.0	51 86	96.8	7 22.7	51 86	97.2	7 07.4	51 86	97.6	6 52.1	51 86	98.1	80
1	7 47.2	50 86	94.5	7 32.0	51 86	95.0	7 16.8	51 86	95.4	7 01.6	51 86	95.8	6 46.4	51 86	96.3	6 31.2	51 86	96.7	6 15.9	51 86	97.1	6 00.6	51 86	97.6	1
2	6 55.4	50 86	94.0	6 40.2	50 86	94.5	6 25.1	51 86	94.9	6 09.9	51 86	95.3	5 54.7	51 86	95.8	5 39.5	51 86	96.2	5 24.3	51 86	96.6	5 09.1	51 86	97.1	2
3	6 03.5	50 86	93.5	5 48.4	50 86	93.9	5 33.3	50 86	94.4	5 18.2	50 86	94.8	5 03.0	51 86	95.2										3
4	5 11.6	50 86	93.0																						4

DECLINATION SAME NAME AS LATITUDE

Lat. 30° — TIME

Each declination cell below is given as: **Alt.** (Δd Δt) **Az.**

H.A.	4° 00′	4° 30′	5° 00′	5° 30′	6° 00′	6° 30′	7° 00′	7° 30′	H.A.
00	64 00.0 1.0 02 180.0	64 30.0 1.0 05 180.0	65 00.0 1.0 02 180.0	65 30.0 1.0 02 180.0	66 00.0 1.0 02 180.0	66 30.0 1.0 06 180.0	67 00.0 1.0 02 180.0	67 30.0 1.0 02 180.0	00
1	63 59.0 1.0 05 177.7	64 29.0 1.0 05 177.7	64 58.9 1.0 06 177.6	65 28.9 1.0 05 177.6	65 58.9 1.0 06 177.6	66 28.9 1.0 06 177.5	66 58.8 1.0 06 177.5	67 28.8 1.0 06 177.4	1
2	63 55.9 1.0 09 175.5	64 25.8 1.0 09 175.4	64 55.7 1.0 09 175.3	65 25.7 1.0 09 175.2	65 55.6 1.0 09 175.1	66 25.5 1.0 09 175.0	66 55.4 1.0 10 174.9	67 25.3 1.0 10 174.8	2
3	63 50.7 99 12 173.2	64 20.6 99 12 173.1	64 50.4 99 12 173.0	65 20.2 99 13 172.8	65 50.1 99 13 172.7	66 19.9 99 13 172.6	66 49.7 99 13 172.4	67 19.5 99 14 172.3	3
4	63 43.6 99 15 171.0	64 13.3 99 16 170.8	64 43.0 99 16 170.6	65 12.7 99 16 170.6	65 42.4 99 16 170.3	66 12.0 99 17 170.1	66 41.7 99 17 170.1	67 11.3 99 17 169.7	4
05	63 34.4 99 19 168.7	64 04.0 98 19 168.5	64 33.5 98 19 168.3	65 03.0 98 20 168.1	65 32.5 98 20 167.9	66 02.0 98 20 167.7	66 31.5 98 21 167.5	67 00.9 98 21 167.2	05
6	63 23.3 98 22 166.5	63 52.7 98 22 166.3	64 22.0 98 22 166.1	64 51.3 98 23 165.8	65 20.6 98 23 165.6	65 49.9 98 24 165.3	66 19.1 97 24 165.0	66 48.4 97 25 164.7	6
7	63 10.2 97 25 164.4	63 39.4 97 25 164.1	64 08.5 97 26 163.8	64 37.6 97 26 163.6	65 06.7 97 27 163.3	65 35.7 97 27 163.0	66 04.7 97 28 162.6	66 33.6 96 28 162.3	7
8	62 55.3 96 28 162.2	63 24.2 96 28 161.9	63 53.1 96 29 161.6	64 21.9 96 30 161.3	64 50.7 96 30 161.0	65 19.5 96 30 160.7	65 48.2 96 31 160.3	66 16.8 95 31 159.9	8
9	62 38.6 96 31 160.1	63 07.2 95 31 159.8	63 35.8 95 32 159.5	64 04.4 95 32 159.1	64 32.8 95 33 158.8	65 01.3 95 33 158.4	65 29.7 95 34 158.0	65 58.0 94 35 157.6	9
10	62 20.0 95 34 158.1	62 48.4 94 34 157.7	63 16.7 94 35 157.4	63 44.9 94 35 157.0	64 13.1 94 36 156.6	64 41.2 94 36 156.2	65 09.3 93 37 155.8	65 37.3 93 38 155.3	10
1	61 59.8 94 36 156.1	62 27.9 93 37 155.7	62 55.8 93 38 155.3	63 23.8 93 38 154.9	63 51.6 93 39 154.5	64 19.4 92 39 154.1	64 47.1 92 40 153.6	65 14.7 92 41 153.1	1
2	61 37.9 93 39 154.1	62 05.7 92 40 153.7	62 33.3 92 40 153.3	63 00.9 92 41 152.9	63 28.4 92 41 152.4	63 55.8 91 42 152.0	64 23.1 91 43 151.5	64 50.3 91 43 151.0	2
3	61 14.5 91 42 152.2	61 41.9 91 42 151.8	62 09.2 91 43 151.3	62 36.4 91 43 150.9	63 03.5 90 44 150.4	63 30.6 90 45 149.9	63 57.5 90 45 149.4	64 24.3 89 46 148.9	3
4	60 49.5 90 44 150.3	61 16.5 90 45 149.9	61 43.5 90 45 149.4	62 10.3 89 46 148.9	62 37.1 89 47 148.5	63 03.7 89 47 148.0	63 30.3 88 48 147.4	63 56.7 88 49 146.9	4
15	60 23.0 89 46 148.5	60 49.7 89 47 148.0	61 16.3 88 48 147.6	61 42.8 88 48 147.1	62 09.2 88 49 146.6	62 35.4 87 50 146.0	63 01.6 87 50 145.5	63 27.6 87 51 145.0	15
6	59 55.2 88 49 146.7	60 21.5 88 49 146.2	60 47.8 87 50 145.8	61 13.9 87 50 145.2	61 39.8 86 51 144.7	62 05.7 86 52 144.2	62 31.5 86 52 143.6	62 57.1 85 53 143.1	6
7	59 26.0 87 51 145.0	59 52.0 86 51 144.5	60 17.9 86 52 144.0	60 43.6 86 53 143.5	61 09.2 85 53 142.9	61 34.7 85 54 142.4	62 00.0 84 55 141.8	62 25.2 84 55 141.2	7
8	58 55.6 86 53 143.3	59 21.3 85 54 142.8	59 46.8 85 54 142.3	60 12.0 84 55 141.8	60 37.2 84 55 141.3	61 02.3 83 56 140.6	61 27.2 83 57 140.1	61 52.0 82 57 139.5	8
9	58 24.0 84 55 141.7	58 49.2 84 55 141.2	59 14.3 83 56 140.6	59 39.3 83 56 140.1	60 04.1 83 57 139.5	60 28.8 82 58 139.0	60 53.3 81 58 138.4	61 17.7 81 59 137.8	9
20	57 51.2 83 56 140.1	58 16.1 83 57 139.6	58 40.8 82 58 139.0	59 05.4 82 58 138.5	59 29.8 81 59 137.9	59 54.1 81 60 137.3	60 18.2 80 60 136.7	60 42.2 80 61 136.1	20
1	57 17.4 82 58 138.6	57 41.9 81 59 138.0	58 06.2 81 59 137.5	58 30.4 80 60 136.9	58 54.5 80 61 136.4	59 18.4 79 61 135.8	59 42.1 79 62 135.2	60 05.7 78 63 134.5	1
2	56 42.5 81 60 137.1	57 06.6 80 60 136.5	57 30.6 80 61 136.0	57 54.4 79 62 135.4	58 18.1 79 62 134.8	58 41.6 78 63 134.2	59 05.0 78 63 133.6	59 28.2 77 64 133.0	2
3	56 06.6 79 61 135.6	56 30.4 79 62 135.1	56 54.0 78 62 134.5	57 17.5 78 63 134.0	57 40.8 77 64 133.4	58 04.0 77 64 132.8	58 26.9 76 65 132.2	58 49.7 76 66 131.5	3
4	55 29.3 78 63 134.2	55 53.3 78 63 133.7	56 16.6 77 64 133.1	56 39.7 77 64 132.6	57 02.6 76 65 132.0	57 25.4 76 66 131.4	57 48.0 75 66 130.7	58 10.4 74 67 130.1	4
25	54 52.2 77 64 132.9	55 15.3 77 65 132.3	55 38.2 76 65 131.8	56 01.0 76 66 131.2	56 23.6 75 66 130.6	56 46.0 74 67 130.0	57 08.2 74 68 129.4	57 30.3 73 68 128.7	25
6	54 13.7 76 65 131.6	54 36.5 76 66 131.0	54 59.1 75 67 130.4	55 21.5 74 67 129.9	55 43.7 74 68 129.3	56 05.8 73 68 128.7	56 27.7 73 69 128.0	56 49.4 72 69 127.4	6
7	53 34.5 75 67 130.3	53 56.9 74 67 129.7	54 19.1 74 68 129.2	54 41.2 73 68 128.6	55 03.1 73 69 128.0	55 24.8 72 70 127.4	55 46.4 72 70 126.7	56 07.7 71 70 126.1	7
8	52 54.5 74 68 129.1	53 16.6 73 68 128.5	53 38.5 73 69 127.9	54 00.2 72 69 127.3	54 21.8 72 70 126.7	54 43.2 71 70 126.1	55 04.4 70 71 125.5	55 25.5 70 72 124.9	8
9	52 13.8 73 69 127.9	52 35.6 72 69 127.3	52 57.2 72 70 126.7	53 18.6 71 70 126.1	53 39.8 71 71 125.5	54 00.9 70 72 124.9	54 21.8 69 72 124.3	54 42.5 69 73 123.7	9
30	51 32.4 72 70 126.7	51 53.9 71 70 126.1	52 15.2 71 71 125.5	52 36.3 70 71 125.0	52 57.3 70 72 124.4	53 18.0 69 72 123.8	53 38.6 68 73 123.2	53 59.0 68 73 122.5	30
1	50 50.5 71 71 125.5	51 11.6 70 71 125.0	51 32.6 70 72 124.4	51 53.4 69 72 123.8	52 14.1 69 73 123.2	52 34.6 68 73 122.6	52 54.8 67 74 122.0	53 14.9 67 74 121.4	1
2	50 07.9 70 72 124.4	50 28.8 69 72 123.9	50 49.5 69 73 123.3	51 10.0 68 73 122.7	51 30.4 68 74 122.1	51 50.5 67 74 121.5	52 10.5 66 75 120.9	52 30.3 66 75 120.3	2
3	49 24.8 69 73 123.4	49 45.4 68 73 122.8	50 05.8 68 74 122.2	50 26.0 67 74 121.7	50 46.1 67 75 121.1	51 06.0 66 75 120.5	51 25.7 65 75 119.9	51 45.2 65 76 119.3	3
4	48 41.1 68 74 122.3	49 01.4 67 74 121.8	49 21.6 67 74 121.2	49 41.6 66 75 120.6	50 01.4 66 75 120.0	50 21.0 65 76 119.5	50 40.4 65 76 118.9	50 59.7 64 77 118.3	4
35	47 57.0 67 74 121.3	48 17.0 67 75 120.8	48 36.9 66 75 120.2	48 56.6 65 76 119.6	49 16.2 65 76 119.0	49 35.5 64 76 118.5	49 54.7 64 77 117.9	50 13.7 63 77 117.3	35
6	47 12.4 66 75 120.3	47 32.1 66 76 119.8	47 51.8 65 76 119.2	48 11.2 65 76 118.6	48 30.5 64 77 118.1	48 49.6 63 77 117.5	49 08.6 63 78 116.9	49 27.3 62 78 116.3	6
7	46 27.3 65 76 119.4	46 46.8 65 76 118.8	47 06.2 64 77 118.2	47 25.4 64 77 117.7	47 44.5 63 77 117.1	48 03.3 63 78 116.5	48 22.0 62 78 115.9	48 40.5 61 79 115.4	7
8	45 41.8 65 76 118.4	46 01.1 64 77 117.9	46 20.2 64 77 117.3	46 39.2 63 78 116.8	46 58.0 62 78 116.2	47 16.7 62 78 115.6	47 35.1 61 79 115.0	47 53.4 61 79 114.5	8
9	44 55.9 64 77 117.5	45 15.0 63 77 117.0	45 33.9 63 78 116.4	45 52.6 62 78 115.9	46 11.2 62 79 115.3	46 29.6 61 79 114.7	46 47.9 61 79 114.2	47 06.0 60 80 113.6	9
40	44 09.7 63 78 116.6	44 28.5 63 78 116.1	44 47.2 62 78 115.5	45 05.7 61 79 115.0	45 24.1 61 79 114.4	45 42.3 60 79 113.9	46 00.3 60 80 113.3	46 18.2 59 80 112.7	40
1	43 23.0 62 78 115.8	43 41.7 62 79 115.2	44 00.1 61 79 114.7	44 18.5 61 79 114.1	44 36.6 60 80 113.6	44 54.6 60 80 113.0	45 12.4 59 80 112.4	45 30.1 59 81 111.9	1
2	42 36.1 62 79 114.9	42 54.5 61 79 114.4	43 12.8 61 79 113.8	43 30.9 60 80 113.3	43 48.8 60 80 112.7	44 06.6 59 80 112.2	44 24.3 58 81 111.6	44 41.7 58 81 111.1	2
3	41 48.8 61 79 114.1	42 07.0 60 80 113.6	42 25.1 60 80 113.0	42 43.0 59 80 112.5	43 00.8 59 81 111.9	43 18.4 58 81 111.4	43 35.8 58 81 110.8	43 53.1 57 81 110.3	3
4	41 01.2 60 80 113.3	41 19.3 60 80 112.8	41 37.1 59 80 112.2	41 54.9 59 81 111.7	42 12.5 58 81 111.1	42 29.9 58 81 110.6	42 47.1 57 82 110.0	43 04.2 57 82 109.5	4
45	40 13.4 60 80 112.5	40 31.2 59 81 112.0	40 48.9 59 81 111.4	41 06.5 58 81 110.9	41 23.9 58 81 110.4	41 41.1 57 82 109.8	41 58.2 57 82 109.3	42 15.1 56 82 108.7	45
6	39 25.2 59 81 111.7	39 42.9 59 81 111.2	40 00.4 58 81 110.7	40 17.8 58 82 110.1	40 35.0 57 82 109.6	40 52.1 57 82 109.1	41 09.0 56 82 108.5	41 25.8 56 83 108.0	6
7	38 36.8 59 81 111.0	38 54.3 58 81 110.5	39 11.7 58 82 109.9	39 28.9 57 82 109.4	39 46.0 57 82 108.9	40 02.9 56 82 108.3	40 19.7 56 83 107.8	40 36.3 55 83 107.2	7
8	37 48.2 58 81 110.2	38 05.5 58 82 109.7	38 22.7 57 82 109.2	38 39.8 57 82 108.7	38 56.7 56 82 108.1	39 13.5 56 83 107.6	39 30.1 55 83 107.1	39 46.6 55 83 106.5	8
9	36 59.3 57 82 109.5	37 16.5 57 82 109.0	37 33.5 57 82 108.5	37 50.5 56 83 108.0	38 07.2 56 83 107.4	38 23.8 55 83 106.9	38 40.3 55 83 106.4	38 56.7 54 83 105.8	9
50	36 10.2 57 82 108.8	36 27.3 57 82 108.3	36 44.2 56 83 107.8	37 00.9 56 83 107.3	37 17.6 55 83 106.7	37 34.0 55 83 106.2	37 50.4 54 84 105.7	38 06.6 54 84 105.1	50
1	35 21.0 56 82 108.1	35 37.8 56 83 107.6	35 54.6 56 83 107.1	36 11.2 55 83 106.6	36 27.7 55 83 106.1	36 44.1 54 84 105.5	37 00.3 54 84 105.0	37 16.4 53 84 104.5	1
2	34 31.5 56 83 107.4	34 48.2 55 83 106.9	35 04.8 55 83 106.4	35 21.3 55 83 105.9	35 37.7 54 84 105.4	35 53.9 54 84 104.9	36 10.0 53 84 104.3	36 26.0 53 84 103.8	2
3	33 41.8 55 83 106.7	33 58.4 55 83 106.2	34 14.9 55 83 105.7	34 31.3 54 84 105.2	34 47.5 54 84 104.7	35 03.6 53 84 104.2	35 19.6 53 84 103.7	35 35.4 53 84 103.2	3
4	32 52.0 55 83 106.1	33 08.4 55 84 105.6	33 24.8 54 84 105.1	33 41.1 54 84 104.6	33 57.2 54 84 104.1	34 13.2 53 84 103.6	34 29.0 53 84 103.1	34 44.8 52 85 102.5	4
55	32 01.9 54 84 105.4	32 18.3 54 84 104.9	32 34.6 54 84 104.4	32 50.7 54 84 103.9	33 06.7 53 84 103.4	33 22.6 53 84 102.9	33 38.4 52 85 102.3	33 54.0 52 85 101.9	55
6	31 11.8 54 84 104.8	31 28.0 54 84 104.3	31 44.2 54 84 103.8	32 00.2 53 84 103.3	32 16.1 53 85 102.8	32 31.9 52 85 102.3	32 47.6 52 85 101.8	33 03.1 52 85 101.3	6
7	30 21.5 54 84 104.2	30 37.6 54 84 103.7	30 53.7 53 84 103.2	31 09.6 53 85 102.7	31 25.4 52 85 102.2	31 41.1 52 85 101.7	31 56.6 52 85 101.2	32 12.1 51 85 100.7	7
8	29 31.0 54 84 103.6	29 47.1 53 84 103.1	30 03.0 53 85 102.6	30 18.8 52 85 102.1	30 34.5 52 85 101.6	30 50.1 52 85 101.1	31 05.6 51 85 100.6	31 21.0 51 85 100.1	8
9	28 40.4 53 84 102.9	28 56.4 53 85 102.5	29 12.2 52 85 102.0	29 28.0 52 85 101.5	29 43.6 52 85 101.0	29 59.1 52 85 100.5	30 14.5 51 85 100.0	30 29.8 51 86 99.5	9
60	27 49.7 53 85 102.3	28 05.6 53 85 101.9	28 21.3 52 85 101.4	28 37.0 52 85 100.9	28 52.5 52 85 100.4	29 07.9 51 86 99.9	29 23.3 51 86 99.4	29 38.5 51 86 98.9	60
1	26 58.9 53 85 101.7	27 14.7 52 85 101.3	27 30.3 52 85 100.8	27 45.9 52 85 100.3	28 01.4 51 85 99.8	28 16.7 51 86 99.3	28 32.0 51 86 98.8	28 47.1 50 86 98.4	1
2	26 08.0 52 85 101.2	26 23.7 52 85 100.7	26 39.3 52 85 100.2	26 54.7 51 85 99.7	27 10.1 51 86 99.2	27 25.4 51 86 98.8	27 40.6 50 86 98.3	27 55.7 50 86 97.8	2
3	25 17.0 52 85 100.6	25 32.6 52 85 100.1	25 48.1 51 85 99.6	26 03.5 51 86 99.2	26 18.3 51 86 98.7	26 34.0 51 86 98.2	26 49.1 50 86 97.7	27 04.2 50 86 97.2	3
4	24 25.8 52 85 100.0	24 41.4 52 85 99.5	24 56.8 51 86 99.1	25 12.1 51 86 98.6	25 27.4 51 86 98.1	25 42.5 50 86 97.6	25 57.6 50 86 97.2	26 12.6 50 86 96.7	4
65	23 34.6 52 86 99.4	23 50.1 51 86 99.0	24 05.4 51 86 98.5	24 20.7 51 86 98.0	24 35.9 50 86 97.6	24 51.0 50 86 97.1	25 06.0 50 86 96.6	25 20.9 49 86 96.1	65
6	22 43.3 51 86 98.9	22 58.7 51 86 98.4	23 14.0 51 86 98.0	23 29.2 51 86 97.5	23 44.4 50 86 97.0	23 59.4 50 86 96.5	24 14.4 50 86 96.1	24 29.2 49 86 95.6	6
7	21 52.0 51 86 98.3	22 07.3 51 86 97.9	22 22.5 51 86 97.4	22 37.7 50 86 96.9	22 52.8 50 86 96.5	23 07.8 50 86 96.0	23 22.7 50 86 95.5	23 37.5 49 86 95.1	7
8	21 00.5 51 86 97.8	21 15.8 51 86 97.3	21 31.0 50 86 96.9	21 46.1 50 86 96.4	22 01.1 50 86 95.9	22 16.1 50 86 95.5	22 30.9 49 86 95.0	22 45.7 49 86 94.5	8
9	20 09.0 51 86 97.2	20 24.2 51 86 96.8	20 39.3 50 86 96.3	20 54.4 50 86 95.9	21 09.3 50 86 95.4	21 24.3 50 86 94.9	21 39.2 49 86 94.5	21 53.9 49 86 94.0	9
70	19 17.4 51 86 96.7	19 32.6 50 86 96.2	19 47.7 50 86 95.8	20 02.7 50 86 95.3	20 17.6 50 86 94.9	20 32.5 49 86 94.4	20 47.3 49 86 93.9	21 02.1 49 86 93.5	70
1	18 25.8 51 86 96.2	18 40.9 50 86 95.7	18 56.0 50 86 95.3	19 10.9 50 86 94.8	19 25.9 50 86 94.3	19 40.7 49 86 93.9	19 55.5 49 87 93.4	20 10.2 49 87 93.0	1
2	17 34.1 50 86 95.6	17 49.2 50 86 95.2	18 04.2 50 86 94.7	18 19.1 50 86 94.3	18 34.0 50 86 93.8	18 48.8 49 86 93.4	19 03.6 49 87 92.9	19 18.3 49 87 92.4	2
3	16 42.4 50 86 95.1	16 57.4 50 86 94.7	17 12.4 50 86 94.2	17 27.3 50 86 93.8	17 42.2 49 86 93.3	17 57.0 49 86 92.8	18 11.7 49 87 92.4	18 26.4 49 87 91.9	3
4	15 50.6 50 86 94.6	16 05.6 50 86 94.1	16 20.5 50 86 93.7	16 35.4 50 86 93.2	16 50.3 49 87 92.8	17 05.0 49 87 92.3	17 19.8 49 87 91.9	17 34.4 49 87 91.4	4
75	14 58.8 50 86 94.1	15 13.8 50 86 93.6	15 28.7 50 86 93.2	15 43.6 49 87 92.7	15 58.4 49 87 92.3	16 13.1 49 87 91.8	16 27.8 49 87 91.4	16 42.5 49 87 90.9	75
6	14 06.9 50 86 93.6	14 21.9 50 86 93.1	14 36.8 50 87 92.7	14 51.6 49 87 92.2	15 06.4 49 87 91.8	15 21.2 49 87 91.3	15 35.9 49 87 90.9	15 50.5 49 87 90.4	6
7	13 15.1 50 86 93.0	13 30.0 50 87 92.6	13 44.9 49 87 92.2	13 59.7 49 87 91.7	14 14.5 49 87 91.3	14 29.2 49 87 90.8	14 43.9 49 87 90.4	14 58.5 49 87 89.9	7
8	12 23.2 50 87 92.5	12 38.1 49 87 92.1	12 52.9 49 87 91.7	13 07.8 49 87 91.2	13 22.5 49 87 90.8	13 37.3 49 87 90.3	13 52.0 49 87 89.9	14 06.6 49 87 89.4	8
9	11 31.2 50 87 92.0	11 46.1 50 87 91.6	12 01.0 49 87 91.1	12 15.8 49 87 90.7	12 30.6 49 87 90.3	12 45.3 49 87 89.8	13 00.0 49 87 89.4	13 14.6 49 87 88.9	9
80	10 39.3 50 87 91.5	10 54.2 50 87 91.1	11 09.0 49 87 90.6	11 23.8 49 87 90.2	11 38.5 49 87 89.8	11 53.3 49 87 89.3	12 08.0 49 87 88.9	12 22.7 49 87 88.4	80
1	9 47.4 50 87 91.0	10 02.2 50 87 90.6	10 17.1 49 87 90.1	10 31.9 49 87 89.7	10 46.7 49 87 89.3	11 01.4 49 87 88.8	11 16.1 49 87 88.4	11 30.7 49 87 87.9	1
2	8 55.4 50 87 90.5	9 10.3 50 87 90.1	9 25.1 49 87 89.6	9 39.9 49 87 89.2	9 54.7 49 87 88.8	10 09.4 49 87 88.3	10 24.2 49 87 87.9	10 38.9 49 86 87.4	2
3	8 03.4 50 87 90.0	8 18.3 50 87 89.6	8 33.2 49 87 89.1	8 48.0 49 87 88.7	9 02.8 49 87 88.3	9 17.5 49 87 87.8	9 32.2 49 86 87.4	9 46.9 49 86 86.9	3
4	7 11.5 50 87 89.5	7 26.4 50 87 89.1	7 41.2 49 87 88.6	7 56.0 49 87 88.2	8 10.8 49 87 87.8	8 25.6 49 86 87.3	8 40.3 49 86 86.9	8 55.1 49 86 86.4	4
85	6 19.5 50 87 89.0	6 34.4 50 87 88.6	6 49.3 50 87 88.1	7 04.1 49 87 87.7	7 18.9 49 86 87.3	7 33.7 49 86 86.8	7 48.5 49 86 86.4	8 03.2 49 86 86.0	85
6	5 27.6 50 87 88.5	5 42.5 50 87 88.1	5 57.3 50 86 87.7	6 12.2 49 86 87.2	6 27.0 49 86 86.8	6 41.8 49 86 86.3	6 56.6 49 86 85.9	7 11.4 49 86 85.5	6
7			5 05.4 50 86 87.2	5 20.3 50 86 86.7	5 35.2 49 86 86.3	5 50.0 49 86 85.8	6 04.8 49 86 85.4	6 19.6 49 86 85.0	7
8					5 13.0 49 86 84.9			…… 84.5	8

H.A.	4° 00′ Alt.	Δd Δt	Az.	4° 30′ Alt.	Δd Δt	Az.	5° 00′ Alt.	Δd Δt	Az.	5° 30′ Alt.	Δd Δt	Az.	6° 00′ Alt.	Δd Δt	Az.	6° 30′ Alt.	Δd Δt	Az.	7° 00′ Alt.	Δd Δt	Az.	7° 30′ Alt.	Δd Δt	Az.	H.A.
00	56 00.0	1.00 01	180.0	55 30.0	1.00 01	180.0	55 00.0	1.00 01	180.0	54 30.0	1.00 01	180.0	54 00.0	1.00 01	180.0	53 30.0	1.00 01	180.0	53 00.0	1.00 01	180.0	52 30.0	1.00 01	180.0	00
1	55 59.2	1.00 04	178.2	55 29.2	1.00 04	178.2	54 59.2	1.00 04	178.3	54 29.2	1.00 04	178.3	53 59.2	1.00 04	178.3	53 29.2	1.00 04	178.3	52 59.3	1.00 04	178.4	52 29.3	1.00 04	178.4	1
2	55 56.8	1.00 07	176.4	55 26.8	1.00 07	176.5	54 56.9	1.00 07	176.5	54 26.9	1.00 06	176.6	53 56.9	1.00 06	176.6	53 27.0	1.00 06	176.7	52 57.0	1.00 06	176.7	52 27.0	1.00 06	176.7	2
3	55 52.7	1.00 09	174.7	55 22.8	1.00 09	174.7	54 52.9	1.00 09	174.8	54 23.0	1.00 09	174.9	53 53.1	1.00 09	174.9	53 23.2	1.00 09	175.0	52 53.3	1.00 09	175.1	52 23.4	1.00 09	175.1	3
4	55 47.1	99 12	172.9	55 17.3	99 12	173.0	54 47.4	99 12	173.1	54 17.6	99 12	173.2	53 47.8	99 11	173.3	53 17.9	99 11	173.3	52 48.1	99 11	173.4	52 18.2	1.00 11	173.5	4
05	55 39.9	99 15	171.1	55 10.1	99 14	171.2	54 40.4	99 14	171.4	54 10.7	99 14	171.5	53 40.9	99 14	171.7	53 11.1	99 14	171.7	52 41.4	99 14	171.8	52 11.6	99 13	171.9	05
6	55 31.1	99 17	169.4	55 01.5	99 17	169.5	54 31.8	99 17	169.7	54 02.2	99 17	169.8	53 32.6	99 16	170.1	53 02.9	99 16	170.2	52 33.2	99 16	170.2	52 03.6	99 16	170.3	6
7	55 20.7	98 20	167.7	54 51.3	98 20	167.8	54 21.8	98 19	168.0	53 52.3	98 19	168.1	53 22.7	98 19	168.3	52 53.2	98 19	168.4	52 23.7	98 19	168.6	51 54.1	99 18	168.7	7
8	55 08.9	98 22	165.9	54 39.5	98 22	166.1	54 10.2	98 22	166.3	53 40.8	98 21	166.5	53 11.4	98 21	166.6	52 42.1	98 21	166.8	52 12.6	98 21	167.0	51 43.2	98 20	167.1	8
9	54 55.5	97 25	164.2	54 26.3	97 24	164.4	53 57.2	97 24	164.6	53 28.0	97 24	164.8	52 58.7	97 24	165.0	52 29.5	97 23	165.2	52 00.2	98 23	165.4	51 31.0	98 23	165.6	9
10	54 40.7	97 27	162.6	54 11.7	97 27	162.8	53 42.7	97 26	163.0	53 13.7	97 26	163.2	52 44.6	97 26	163.4	52 15.5	97 26	163.6	51 46.4	97 25	163.8	51 17.3	97 26	164.0	10
1	54 24.4	96 30	160.9	53 55.6	96 29	161.2	53 26.8	96 29	161.4	52 58.0	96 28	161.6	52 29.1	96 28	161.8	52 00.2	96 28	162.1	51 31.3	96 27	162.3	51 02.4	96 27	162.5	1
2	54 06.7	95 32	159.3	53 38.1	95 31	159.5	53 09.5	95 31	159.8	52 40.9	95 31	160.0	52 12.2	96 30	160.3	51 43.5	96 30	160.5	51 14.8	96 30	160.8	50 46.1	96 29	161.0	2
3	53 47.6	94 34	157.7	53 19.3	95 34	157.9	52 50.9	95 33	158.2	52 22.5	95 33	158.5	51 54.0	95 32	158.7	51 25.6	96 32	159.0	50 57.0	95 32	159.2	50 28.5	95 31	159.5	3
4	53 27.2	94 36	156.1	52 59.1	94 36	156.4	52 31.0	94 35	156.7	52 02.8	94 35	156.9	51 34.6	94 35	157.2	51 06.3	94 34	157.5	50 38.0	94 34	157.8	50 09.7	95 33	158.0	4
15	53 05.5	93 38	154.5	52 37.7	93 38	154.8	52 09.8	93 37	155.1	51 41.8	93 37	155.4	51 13.8	93 37	155.7	50 45.8	94 36	156.0	50 17.7	94 36	156.3	49 49.6	94 35	156.6	15
6	52 42.6	92 40	153.0	52 15.0	92 40	153.3	51 47.3	92 39	153.6	51 19.6	92 39	154.0	50 51.9	93 39	154.3	50 24.1	93 38	154.6	49 56.2	93 38	154.8	49 28.3	93 37	155.1	6
7	52 18.4	91 42	151.5	51 51.0	91 42	151.8	51 23.6	91 41	152.2	50 56.2	92 41	152.5	50 28.7	92 41	152.8	50 01.1	92 40	153.1	49 33.6	92 40	153.4	49 05.9	92 39	153.7	7
8	51 53.0	90 44	150.0	51 25.9	90 44	150.4	50 58.8	91 43	150.7	50 31.6	91 43	151.1	50 04.4	91 42	151.4	49 37.1	91 42	151.7	49 09.7	91 42	152.0	48 42.3	91 41	152.3	8
9	51 26.5	89 46	148.6	50 59.7	89 46	149.0	50 32.8	90 45	149.3	50 05.9	90 45	149.7	49 38.9	90 44	150.0	49 11.9	90 44	150.3	48 44.8	90 43	150.7	48 17.7	91 43	151.0	9
20	50 58.9	88 48	147.2	50 32.4	88 47	147.6	50 05.8	89 47	147.9	49 39.1	89 46	148.3	49 12.4	89 46	148.6	48 45.7	89 46	149.0	48 18.8	90 45	149.3	47 51.9	90 45	149.6	20
1	50 30.2	87 50	145.8	50 04.0	88 49	146.2	49 37.7	88 49	146.6	49 11.3	88 48	146.9	48 44.9	88 48	147.3	48 18.3	88 47	147.6	47 51.8	89 47	148.0	47 25.2	89 46	148.3	1
2	50 00.5	86 51	144.4	49 34.5	87 51	144.8	49 08.5	87 50	145.2	48 42.4	87 50	145.6	48 16.3	87 49	146.0	47 50.0	88 49	146.3	47 23.7	88 48	146.7	46 57.4	88 48	147.0	2
3	49 29.8	85 53	143.1	49 04.1	86 52	143.5	48 38.4	86 52	143.9	48 12.6	86 51	144.3	47 46.7	86 51	144.7	47 20.7	87 50	145.0	46 54.7	87 50	145.4	46 28.6	87 50	145.8	3
4	48 58.1	84 54	141.8	48 32.7	85 54	142.2	48 07.3	85 53	142.6	47 41.8	85 53	143.0	47 16.2	85 52	143.4	46 50.5	86 52	143.8	46 24.7	86 51	144.2	45 58.9	86 51	144.5	4
25	48 25.5	83 56	140.6	48 00.5	84 55	141.0	47 35.3	84 55	141.4	47 10.1	84 54	141.8	46 44.8	85 54	142.2	46 19.4	85 53	142.6	45 53.9	85 53	142.9	45 28.3	85 52	143.3	25
6	47 52.1	82 57	139.3	47 27.3	83 57	139.7	47 02.4	83 56	140.1	46 37.5	83 56	140.6	46 12.4	84 55	141.0	45 47.3	84 55	141.4	45 22.1	84 54	141.7	44 56.8	84 54	142.1	6
7	47 17.8	81 58	138.1	46 53.3	82 58	138.5	46 28.7	82 58	138.9	46 04.1	82 57	139.4	45 39.3	83 57	139.8	45 14.4	83 56	140.2	44 49.5	83 56	140.6	44 24.5	83 56	140.9	7
8	46 42.7	81 60	136.9	46 18.5	81 59	137.3	45 54.2	81 59	137.8	45 29.8	81 58	138.2	45 05.3	82 58	138.6	44 40.8	82 57	139.0	44 16.1	82 57	139.4	43 51.4	83 57	139.8	8
9	46 06.8	80 61	135.8	45 42.9	80 61	136.2	45 18.9	80 60	136.6	44 54.8	81 60	137.0	44 30.6	81 59	137.5	44 06.3	81 59	137.9	43 41.9	81 58	138.3	43 17.4	82 58	138.7	9
30	45 30.2	79 62	134.6	45 06.6	79 62	135.1	44 42.8	79 61	135.5	44 19.0	80 61	135.9	43 55.1	80 60	136.3	43 31.1	80 60	136.8	43 06.9	81 59	137.2	42 42.8	81 59	137.6	30
1	44 52.9	78 63	133.5	44 29.5	78 63	134.0	44 06.1	78 62	134.4	43 42.5	79 62	134.8	43 18.8	79 62	135.3	42 55.1	79 61	135.7	42 31.3	80 61	136.1	42 07.3	80 60	136.5	1
2	44 14.9	77 64	132.4	43 51.8	77 64	132.9	43 28.6	77 64	133.3	43 05.3	78 63	133.8	42 41.9	78 63	134.2	42 18.4	78 62	134.6	41 54.9	79 62	135.0	41 31.2	79 61	135.4	2
3	43 36.2	76 65	131.4	43 13.4	76 65	131.8	42 50.5	77 65	132.3	42 27.5	77 64	132.7	42 04.3	77 64	133.1	41 41.1	78 63	133.6	41 17.8	78 63	134.0	40 54.4	78 62	134.4	3
4	42 56.9	75 66	130.4	42 34.4	75 66	130.8	42 11.7	76 66	131.2	41 49.0	76 65	131.7	41 26.1	76 65	132.1	41 03.2	77 64	132.5	40 40.1	77 64	133.0	40 17.0	77 63	133.4	4
35	42 17.0	74 67	129.3	41 54.7	74 67	129.8	41 32.3	75 67	130.2	41 09.8	75 66	130.7	40 47.3	75 66	131.1	40 24.6	76 65	131.5	40 01.8	76 65	132.0	39 38.9	76 64	132.4	35
6	41 36.5	73 68	128.3	41 14.5	74 68	128.8	40 52.4	74 68	129.3	40 30.1	74 67	129.7	40 07.8	75 67	130.1	39 45.4	75 66	130.6	39 22.9	75 66	131.0	39 00.2	76 65	131.4	6
7	40 55.7	72 69	127.4	40 33.7	73 69	127.8	40 11.9	73 68	128.3	39 49.9	73 68	128.7	39 27.8	74 68	129.2	39 05.6	74 67	129.6	38 43.3	74 67	130.0	38 21.0	75 66	130.5	7
8	40 14.0	72 70	126.4	39 52.5	72 70	126.9	39 30.8	72 69	127.3	39 09.1	73 69	127.8	38 47.3	73 68	128.2	38 25.3	73 68	128.7	38 03.3	74 68	129.1	37 41.2	74 67	129.5	8
9	39 31.9	71 71	125.5	39 10.6	71 70	126.0	38 49.3	71 70	126.4	38 27.8	72 70	126.9	38 06.2	72 69	127.3	37 44.5	72 69	127.7	37 22.7	73 68	128.2	37 00.8	73 68	128.6	9
40	38 49.4	70 72	125.1	38 28.4	70 71	125.5	38 07.2	70 71	125.9	37 46.0	71 70	126.3	37 24.6	71 70	126.7	37 03.2	71 70	127.1	36 41.6	72 69	127.5	36 20.0	72 69	127.9	40
1	38 06.4	69 72	123.7	37 45.6	69 72	124.2	37 24.7	69 72	124.6	37 03.7	70 72	125.1	36 42.5	70 71	125.5	36 21.3	70 71	126.0	36 00.0	71 70	126.4	35 38.6	71 70	126.8	1
2	37 23.0	69 73	122.9	37 02.4	69 73	123.3	36 41.7	69 72	123.7	36 20.9	69 72	124.2	36 00.0	70 72	124.6	35 39.0	70 71	125.1	35 18.0	70 71	125.5	34 56.8	71 70	126.0	2
3	36 39.1	68 74	122.0	36 18.8	68 73	122.5	35 58.3	68 73	122.9	35 37.7	69 73	123.4	35 17.1	69 72	123.8	34 56.3	69 73	124.2	34 35.5	70 72	124.7	34 14.5	70 71	125.1	3
4	35 54.8	67 74	121.2	35 34.7	67 74	121.6	35 14.5	68 74	122.1	34 54.1	68 74	122.5	34 33.7	68 73	123.0	34 13.2	69 73	123.4	33 52.5	69 72	123.9	33 31.8	69 72	124.3	4
45	35 10.2	66 75	120.4	34 50.3	67 75	120.8	34 30.2	67 75	121.3	34 10.1	67 74	121.7	33 49.9	68 74	122.2	33 29.2	67 74	122.6	33 09.0	68 73	123.0	32 48.7	68 73	123.5	45
6	34 25.2	66 75	119.6	34 05.5	66 75	120.0	33 45.6	66 75	120.5	33 25.7	67 75	120.9	33 05.7	67 74	121.3	32 45.6	67 74	121.8	32 25.4	67 74	122.2	32 05.1	68 73	122.6	6
7	33 39.8	65 76	118.8	33 20.3	65 76	119.2	33 00.7	66 76	119.7	32 41.0	66 75	120.1	32 21.2	66 75	120.6	32 01.3	66 75	121.0	31 41.3	67 74	121.5	31 21.2	67 74	121.9	7
8	32 54.1	64 77	118.0	32 34.8	65 76	118.5	32 15.4	65 76	118.9	31 55.8	65 76	119.4	31 36.2	65 75	119.8	31 16.5	66 75	120.2	30 56.8	66 75	120.7	30 36.9	66 74	121.1	8
9	32 08.0	64 77	117.2	31 48.9	64 77	117.7	31 29.7	64 77	118.1	31 10.4	65 76	118.6	30 51.0	65 76	119.0	30 31.5	65 76	119.5	30 11.9	65 75	119.9	29 52.2	66 75	120.4	9
50	31 21.7	63 78	116.5	31 02.8	63 78	116.9	30 43.7	63 78	117.4	30 24.6	63 77	117.9	30 05.4	64 76	118.3	29 46.1	64 77	118.7	29 26.7	64 76	119.2	29 07.2	65 76	119.6	50
1	30 35.0	62 78	115.8	30 16.3	63 78	116.2	29 57.4	62 78	116.7	29 38.5	63 78	117.1	29 19.5	63 78	117.6	29 00.4	64 77	118.0	28 41.2	64 76	118.4	28 21.9	64 76	118.9	1
2	29 48.1	62 79	115.1	29 29.5	62 78	115.5	29 10.9	62 79	116.0	28 52.1	62 78	116.4	28 33.3	63 78	116.8	28 14.3	63 78	117.3	27 55.3	63 77	117.7	27 36.2	64 77	118.2	2
3	29 00.9	61 79	114.4	28 42.5	61 79	114.8	28 24.0	62 79	115.3	28 05.4	62 79	115.7	27 46.8	62 78	116.1	27 28.0	63 78	116.6	27 09.2	63 77	117.0	26 50.3	63 77	117.5	3
4	28 13.4	61 80	113.7	27 55.2	61 79	114.1	27 36.9	61 79	114.6	27 18.5	61 79	115.0	27 00.0	62 78	115.4	26 41.4	62 78	115.9	26 22.7	62 78	116.3	26 04.0	63 78	116.8	4
55	27 25.7	60 80	113.0	27 07.6	60 80	113.4	26 49.5	60 80	113.9	26 31.2	61 79	114.3	26 12.9	61 79	114.8	25 54.5	61 79	115.2	25 36.0	61 79	115.6	25 17.5	62 78	116.1	55
6	26 37.8	60 80	112.3	26 19.8	60 80	112.8	26 01.8	60 80	113.2	25 43.8	60 79	113.6	25 25.6	60 79	114.1	25 07.4	61 79	114.5	24 49.1	61 78	115.0	24 30.7	61 78	115.4	6
7	25 49.6	59 81	111.6	25 31.8	59 81	112.1	25 14.0	60 80	112.5	24 56.1	60 80	113.0	24 38.1	60 80	113.4	24 20.0	60 79	113.9	24 01.8	60 79	114.3	23 43.6	61 79	114.7	7
8	25 01.2	59 81	111.0	24 43.6	59 81	111.4	24 25.9	59 81	111.9	24 08.1	59 80	112.3	23 50.3	60 80	112.8	23 32.3	60 80	113.2	23 14.3	60 80	113.6	22 56.3	60 79	114.1	8
9	24 12.6	58 81	110.4	23 55.1	58 81	110.8	23 37.5	59 81	111.2	23 19.9	59 81	111.7	23 02.2	59 80	112.1	22 44.5	59 80	112.6	22 26.6	60 80	113.0	22 08.7	60 80	113.4	9
60	23 23.7	58 81	109.7	23 06.4	58 81	110.2	22 49.0	58 81	110.6	22 31.5	58 80	111.1	22 14.0	59 81	111.5	21 56.4	59 81	111.9	21 38.7	59 80	112.4	21 20.9	59 80	112.8	60
1	22 34.7	57 82	109.1	22 17.5	57 82	109.5	22 00.3	58 82	110.0	21 42.9	58 81	110.4	21 25.5	58 81	110.9	21 08.1	58 81	111.3	20 50.5	59 81	111.7	20 32.9	59 80	112.2	1
2	21 45.5	57 82	108.5	21 28.5	57 82	108.9	21 11.4	57 82	109.4	20 54.2	57 82	109.8	20 36.9	58 81	110.3	20 19.6	58 81	110.7	20 02.2	58 81	111.1	19 44.7	58 81	111.6	2
3	20 56.2	56 83	107.9	20 39.2	57 82	108.3	20 22.2	57 82	108.8	20 05.2	57 82	109.2	19 48.0	57 82	109.6	19 30.8	58 82	110.1	19 13.6	58 81	110.5	18 56.3	58 81	110.9	3
4	20 06.7	56 83	107.3	19 49.8	56 83	107.7	19 33.0	56 83	108.2	19 16.0	57 82	108.6	18 59.0	57 82	109.0	18 41.9	57 82	109.5	18 24.8	57 82	109.9	18 07.6	57 81	110.3	4
65	19 17.0	56 83	106.7	19 00.3	56 83	107.1	18 43.5	56 83	107.6	18 26.7	56 83	108.0	18 09.8	56 82	108.4	17 52.9	57 82	108.9	17 35.9	57 82	109.3	17 18.8	57 82	109.7	65
6	18 27.1	55 83	106.1	18 10.5	55 83	106.6	17 53.9	56 83	107.0	17 37.2	56 83	107.4	17 20.4	56 83	107.9	17 03.6	56 83	108.3	16 46.8	56 82	108.7	16 29.8	57 82	109.2	6
7	17 37.1	55 84	105.5	17 20.6	55 83	106.0	17 04.1	55 83	106.4	16 47.5	56 83	106.8	16 30.9	56 83	107.3	16 14.2	56 83	107.7	15 57.5	56 82	108.1	15 40.7	56 82	108.6	7
8	16 47.0	54 84	105.0	16 30.6	55 84	105.4	16 14.2	55 83	105.8	15 57.7	55 83	106.3	15 41.2	55 83	106.7	15 24.6	55 83	107.1	15 08.0	56 83	107.6	14 51.3	56 82	108.0	8
9	15 56.7	54 84	104.4	15 40.5	54 84	104.8	15 24.1	55 83	105.3	15 07.8	55 84	105.7	14 51.4	55 83	106.1	14 34.9	55 83	106.6	14 18.4	55 83	107.0	14 01.8	55 82	107.4	9
70	15 06.3	54 84	103.8	14 50.2	54 84	104.7	14 34.0	54 84	104.7	14 17.7	54 84	105.1	14 01.3	54 84	105.6	13 45.0	55 83	106.0	13 28.6	55 83	106.4	13 12.2	55 83	106.9	70
1	14 15.8	53 85	103.3	13 59.8	53 85	103.7	13 43.6	54 84	104.2	13 27.4	54 84	104.6	13 11.3	54 84	105.0	12 55.0	54 84	105.5	12 38.7	54 83	105.9	12 22.4	55 83	106.3	1
2	13 25.2	53 85	102.7	13 09.2	53 84	103.2	12 53.2	53 84	103.6	12 37.1	53 84	104.0	12 21.0	53 84	104.5	12 04.9	54 84	104.9	11 48.7	54 83	105.3	11 32.4	54 83	105.8	2
3	12 34.5	53 85	102.2	12 18.6	53 85	102.6	12 02.6	53 84	103.1	11 46.7	53 84	103.5	11 30.6	53 84	103.9	11 14.6	53 84	104.4	10 58.5	54 84	104.8	10 42.4	54 84	105.2	3
4	11 43.6	53 85	101.7	11 27.8	53 85	102.1	11 12.0	53 85	102.5	10 56.1	53 84	103.0	10 40.1	53 84	103.4	10 24.2	53 84	103.8	10 08.2	53 84	104.3	9 52.2	53 84	104.7	4
75	10 52.7	52 85	101.1	10 37.0	52 85	101.5	10 21.2	52 85	101.9	10 05.4	52 85	102.4	9 49.5	53 85	102.9	9 33.7	53 85	103.3	9 17.8	53 84	103.7	9 01.8	53 84	104.1	75
6	10 01.7	52 85	100.6	9 46.0	52 85	101.0	9 30.3	52 85	101.5	9 14.6	52 85	101.9	8 58.8	52 85	102.4	8 43.0	52 85	102.8	8 27.2	52 84	103.2	8 11.4	53 84	103.6	6
7	9 10.5	52 85	100.1	8 54.9	52 85	100.5	8 39.3	52 85	100.9	8 23.7	52 85	101.4	8 08.0	52 85	101.8	7 52.3	52 85	102.2	7 36.6	52 85	102.7	7 20.8	52 84	103.1	7
8	8 19.3	52 85	99.5	8 03.8	52 86	100.0	7 48.3	52 85	100.4	7 32.7	52 85	100.8	7 17.1	52 85	101.3	7 01.5	52 85	101.7	6 45.8	52 85	102.1	6 30.2	52 85	102.6	8
9	7 28.1	51 86	99.0	7 12.6	51 86	99.5	6 57.1	52 85	99.9	6 41.6	52 85	100.3	6 26.1	52 85	100.8	6 10.6	52 85	101.2	5 55.0	52 85	101.6	5 39.4	52 85	102.0	9
80	6 36.7	51 86	98.5	6 21.3	51 86	98.9	6 05.9	51 86	99.4	5 50.5	52 85	99.8	5 35.0	52 85	100.2	5 19.5	52 85	100.7	5 04.0	52 85	101.1				80
1	5 45.3	51 86	98.0	5 29.9	51 86	98.4	5 14.6	51 86	98.9																1

Lat. 30°

Columns give, for each declination: Alt. (° ′) · Δd Δt · Az. (°)

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
00	68 00.0 1.0 02 180.0	68 30.0 1.0 02 180.0	69 00.0 1.0 02 180.0	69 30.0 1.0 02 180.0	70 00.0 1.0 02 180.0	70 30.0 1.0 02 180.0	71 00.0 1.0 02 180.0	71 30.0 1.0 02 180.0	00
1	67 58.8 1.0 06 177.4	68 28.8 1.0 06 177.3	68 58.8 1.0 06 177.2	69 28.7 1.0 06 177.2	69 58.7 1.0 07 177.1	70 28.7 1.0 07 177.1	70 58.6 1.0 07 177.0	71 28.6 1.0 07 176.9	1
2	67 55.2 1.0 10 174.7	68 25.1 1.0 10 174.6	68 55.0 1.0 10 174.5	69 24.9 1.0 11 174.4	69 54.8 1.0 11 174.3	70 24.7 1.0 11 174.1	70 54.5 1.0 11 174.0	71 24.4 1.0 12 173.8	2
3	67 49.3 99 14 172.1	68 19.0 99 14 171.9	68 48.8 99 14 171.6	69 18.6 99 15 171.6	69 48.3 99 15 171.4	70 18.0 99 15 171.2	70 47.8 99 16 171.0	71 17.5 99 16 170.8	3
4	67 41.0 99 19 169.5	68 10.6 99 19 169.3	68 40.2 99 19 169.1	69 09.7 99 19 168.9	69 39.3 98 19 168.5	70 08.8 98 20 168.3	70 38.3 98 20 168.1	71 07.8 98 20 167.8	4
05	67 30.4 98 21 167.0	67 59.8 98 22 166.7	68 29.1 98 22 166.4	68 58.5 98 23 166.1	69 27.8 98 23 165.8	69 57.1 98 24 165.5	70 26.3 97 24 165.2	70 55.5 97 25 164.9	05
6	67 17.5 97 25 164.4	67 46.7 97 26 164.1	68 15.8 97 26 163.8	68 44.9 97 27 163.5	69 13.9 97 27 163.1	69 42.9 97 28 162.8	70 11.8 96 28 162.4	70 40.7 96 29 162.0	6
7	67 02.5 96 29 162.0	67 31.4 96 29 161.6	68 00.2 96 30 161.3	68 29.0 96 30 160.9	68 57.6 96 31 160.5	69 26.3 95 31 160.1	69 54.9 95 32 159.6	70 23.4 95 33 159.2	7
8	66 45.4 95 32 159.6	67 13.9 95 32 159.2	67 42.4 95 33 158.8	68 10.8 95 34 158.3	68 39.2 94 34 157.9	69 07.4 94 35 157.4	69 35.5 94 36 156.9	70 03.7 94 36 156.4	8
9	66 26.3 94 35 157.2	66 54.4 94 36 156.8	67 22.6 94 36 156.3	67 50.6 94 37 155.9	68 18.6 93 38 155.4	68 46.4 93 38 154.9	69 14.2 92 39 154.3	69 41.9 92 40 153.8	9
10	66 05.2 93 38 154.9	66 33.0 93 39 154.4	67 00.7 92 40 153.9	67 28.4 92 40 153.4	67 55.9 92 41 152.9	68 23.3 91 42 152.4	68 50.7 91 43 151.8	69 17.9 91 43 151.2	10
1	65 42.2 92 41 152.7	66 09.6 91 42 152.2	66 37.0 91 43 151.7	67 04.2 91 43 151.1	67 31.3 90 44 150.6	67 58.3 90 45 150.0	68 25.2 89 46 149.4	68 51.9 80 46 148.8	1
2	65 17.5 90 44 150.5	65 44.5 90 45 150.0	66 11.4 90 45 149.4	66 38.2 89 46 148.9	67 04.8 89 47 148.3	67 31.4 88 48 147.7	67 57.8 88 49 147.0	68 24.0 87 49 146.4	2
3	64 51.0 89 47 148.4	65 17.6 88 47 147.8	65 44.1 88 48 147.3	66 10.5 87 49 146.7	66 36.7 87 50 146.1	67 02.7 87 50 145.4	67 28.7 86 51 144.8	67 54.4 86 51 144.1	3
4	64 23.0 87 49 146.4	64 49.2 87 50 145.8	65 15.2 87 51 145.2	65 41.1 86 51 144.6	66 06.9 86 52 144.0	66 32.5 85 53 143.3	66 57.9 84 54 142.6	67 23.2 84 55 141.9	4
15	63 53.5 86 52 144.4	64 19.2 86 52 143.8	64 44.8 85 53 143.2	65 10.3 85 54 142.6	65 35.6 84 55 141.9	66 00.7 83 55 141.2	66 25.6 83 56 140.6	66 50.4 82 57 139.8	15
6	63 22.5 85 54 142.5	63 47.8 84 55 141.9	64 13.0 84 55 141.3	64 38.0 83 56 140.6	65 02.8 82 57 140.0	65 27.5 82 58 139.3	65 51.9 81 58 138.6	66 16.2 81 50 137.8	6
7	62 50.2 83 56 140.6	63 15.1 83 57 139.4	63 39.8 82 57 139.4	64 04.4 82 58 138.7	64 28.7 81 50 138.1	64 52.9 80 60 137.4	65 16.9 80 60 136.7	65 40.7 79 61 135.9	7
8	62 16.6 82 58 138.9	62 41.1 81 59 138.2	63 05.4 81 59 137.9	63 29.5 80 60 137.0	63 53.4 79 61 136.3	64 17.1 79 62 135.6	64 40.6 78 62 134.8	65 03.9 77 63 134.1	8
9	61 41.9 80 60 137.2	62 05.9 80 60 136.5	62 29.8 79 61 135.9	62 53.4 79 62 135.2	63 16.9 78 63 134.5	63 40.2 77 63 133.8	64 03.2 76 64 133.1	64 26.0 76 65 132.3	9
20	61 06.0 79 62 135.5	61 29.6 78 62 134.9	61 53.0 78 63 134.2	62 16.3 77 64 133.5	62 39.3 76 64 132.8	63 02.1 76 65 132.1	63 24.7 75 66 131.4	63 47.1 74 66 130.6	20
1	60 29.1 78 63 133.9	60 52.3 77 64 133.3	61 15.3 76 65 132.6	61 38.1 76 65 131.9	62 00.7 75 66 131.2	62 23.1 74 67 130.5	62 45.3 74 67 129.8	63 07.2 73 68 129.0	1
2	59 51.2 76 65 132.4	60 14.0 76 65 131.7	60 36.6 75 66 131.1	60 59.0 74 67 130.4	61 21.2 74 67 129.7	61 43.2 73 68 129.0	62 04.9 72 69 128.2	62 26.4 71 70 127.5	2
3	59 12.3 75 66 130.9	59 34.7 74 67 130.3	59 57.0 74 67 129.6	60 19.0 73 68 128.9	60 40.8 72 69 128.2	61 02.3 72 69 127.5	61 23.7 71 70 126.8	61 44.8 70 71 126.0	3
4	58 32.6 74 68 129.5	58 54.7 73 68 128.8	59 16.5 72 69 128.2	59 38.1 72 69 127.5	59 59.5 71 70 126.8	60 20.7 70 71 126.1	60 41.7 69 71 125.3	61 02.4 69 72 124.6	4
25	57 52.1 73 69 128.1	58 13.8 72 69 127.5	58 35.3 71 70 126.8	58 56.5 70 71 126.1	59 17.6 70 71 125.4	59 38.4 69 72 124.7	59 58.9 68 72 124.0	60 19.3 67 73 123.2	25
6	57 10.9 71 70 126.8	57 32.2 71 70 126.1	57 53.3 70 71 125.5	58 14.2 69 72 124.8	58 34.9 69 72 124.1	58 55.3 68 73 123.4	59 15.5 67 73 122.7	59 35.5 66 74 121.9	6
7	56 28.9 70 71 125.5	56 49.9 69 72 124.8	57 10.6 69 72 124.2	57 31.2 68 73 123.5	57 51.5 67 73 122.8	58 11.6 67 74 122.1	58 31.5 66 74 121.4	58 51.1 65 75 120.7	7
8	55 46.3 69 72 124.3	56 06.9 68 73 123.6	56 27.3 68 73 123.0	56 47.5 67 74 122.3	57 07.5 66 74 121.6	57 27.3 65 75 120.9	57 46.8 65 75 120.2	58 06.1 64 76 119.5	8
9	55 03.0 68 73 123.1	55 23.3 67 74 122.4	55 43.4 67 74 121.8	56 03.3 66 75 121.1	56 23.0 65 75 120.4	56 42.4 64 76 119.7	57 01.6 64 76 119.0	57 20.6 63 77 118.3	9
30	54 19.2 67 74 121.9	54 39.2 66 74 121.3	54 59.0 66 75 120.6	55 18.6 65 75 119.9	55 37.9 64 76 119.3	55 57.1 63 76 118.6	56 16.0 63 77 117.9	56 34.6 62 77 117.2	30
1	53 34.8 66 75 120.8	53 54.5 65 75 120.1	54 14.0 64 76 119.5	54 33.3 64 76 118.8	54 52.4 63 77 118.2	55 11.2 62 77 117.5	55 29.8 62 78 116.8	55 48.2 61 78 116.1	1
2	52 49.9 65 76 119.7	53 09.3 64 76 119.1	53 28.6 64 77 118.4	53 47.5 63 77 117.8	54 06.3 62 77 117.1	54 24.9 61 78 116.4	54 43.2 61 78 115.8	55 01.3 60 79 115.1	2
3	52 04.6 64 76 118.7	52 23.7 63 77 118.0	52 42.6 63 77 117.4	53 01.4 62 78 116.7	53 19.9 61 78 116.1	53 38.2 61 79 115.4	53 56.2 60 79 114.7	54 14.1 59 80 114.1	3
4	51 18.8 63 77 117.6	51 37.6 63 77 117.0	51 56.3 62 78 116.4	52 14.7 61 78 115.7	52 33.0 60 79 115.1	52 51.0 60 79 114.4	53 08.8 59 80 113.8	53 26.4 58 80 113.1	4
35	50 32.5 62 78 116.7	50 51.1 62 78 116.0	51 09.5 61 79 115.4	51 27.8 60 79 114.8	51 45.8 60 79 114.1	52 03.5 59 80 113.5	52 21.1 58 80 112.8	52 38.5 57 80 112.1	35
6	49 45.9 62 78 115.7	50 04.2 61 79 115.1	50 22.4 60 79 114.5	50 40.4 60 80 113.8	50 58.2 59 80 113.2	51 15.7 58 80 112.5	51 33.1 57 81 111.9	51 50.2 57 81 111.2	6
7	48 58.9 61 79 114.8	49 17.0 60 79 114.2	49 35.0 59 80 113.5	49 52.7 59 80 112.9	50 10.2 58 80 112.3	50 27.6 57 81 111.6	50 44.7 57 81 111.0	51 01.6 56 81 110.3	7
8	48 11.5 60 79 113.9	48 29.4 59 80 113.3	48 47.2 59 80 112.6	49 04.7 58 81 112.0	49 22.0 57 81 111.4	49 39.1 57 81 110.8	49 56.0 56 82 110.1	50 12.7 55 82 109.5	8
9	47 23.8 59 80 113.0	47 41.5 59 80 112.4	47 59.0 58 81 111.8	48 16.4 57 81 111.2	48 33.5 57 81 110.5	48 50.4 56 82 109.9	49 07.1 55 82 109.3	49 23.6 55 82 108.6	9
40	46 35.8 59 80 112.1	46 53.3 58 81 111.5	47 10.7 57 81 110.9	47 27.8 57 81 110.3	47 44.7 56 82 109.7	48 01.4 55 82 109.1	48 18.0 55 82 108.5	48 34.3 54 83 107.8	40
1	45 47.6 58 81 111.3	46 04.9 57 81 110.7	46 22.0 57 81 110.1	46 38.9 56 82 109.5	46 55.7 55 82 108.9	47 12.2 55 82 108.3	47 28.6 54 83 107.7	47 44.7 53 83 107.0	1
2	44 59.0 57 81 110.5	45 16.1 57 82 109.9	45 33.1 56 82 109.3	45 49.8 56 82 108.7	46 06.4 55 82 108.1	46 22.8 54 83 107.5	46 38.9 54 83 106.9	46 54.9 53 83 106.3	2
3	44 10.2 57 82 109.7	44 27.2 56 82 109.1	44 43.9 56 82 108.5	45 00.5 55 83 107.9	45 16.9 54 83 107.3	45 33.1 54 83 106.7	45 49.1 53 83 106.1	46 05.0 52 84 105.5	3
4	43 21.2 56 82 108.9	43 37.9 56 82 108.3	43 54.5 55 83 107.8	44 11.0 54 83 107.2	44 27.2 54 83 106.6	44 43.2 53 84 106.0	44 59.1 53 84 105.4	45 14.8 52 84 104.8	4
45	42 31.9 56 82 108.2	42 48.5 55 83 107.6	43 04.9 54 83 107.0	43 21.2 54 83 106.4	43 37.3 53 83 105.8	43 53.2 53 84 105.3	44 08.9 52 84 104.7	44 24.5 51 84 104.1	45
6	41 42.4 55 83 107.4	41 58.9 55 83 106.9	42 15.2 54 83 106.3	42 31.3 53 83 105.7	42 47.2 53 84 105.1	43 03.0 52 84 104.6	43 18.6 51 84 104.0	43 34.0 51 84 103.4	6
7	40 52.8 55 83 106.7	41 09.1 54 83 106.1	41 25.2 54 83 105.6	41 41.2 53 84 105.0	41 57.0 52 84 104.4	42 12.6 51 84 103.9	42 28.1 51 84 103.3	42 43.4 50 85 102.7	7
8	40 02.9 54 83 106.0	40 19.1 54 84 105.4	40 35.1 53 84 104.9	40 50.9 52 84 104.3	41 06.6 52 84 103.8	41 22.1 51 84 103.2	41 37.5 51 85 102.6	41 52.6 50 85 102.0	8
9	39 12.9 54 84 105.3	39 28.9 53 84 104.7	39 44.8 53 84 104.2	40 00.5 52 84 103.6	40 16.0 52 84 103.1	40 31.4 51 85 102.5	40 46.7 50 85 101.9	41 01.7 50 85 101.4	9
50	38 22.6 53 84 104.6	38 38.6 53 84 104.1	38 54.3 52 84 103.5	39 09.9 52 84 103.0	39 25.4 51 85 102.4	39 40.7 51 85 101.9	39 55.9 50 85 101.3	40 10.7 50 85 100.7	50
1	37 32.3 53 84 103.9	37 48.1 52 84 103.4	38 03.7 52 85 102.9	38 19.2 51 85 102.3	38 34.6 51 85 101.8	38 49.7 50 85 101.2	39 04.8 50 85 100.7	39 19.6 49 85 100.1	1
2	36 41.8 52 84 103.3	36 57.5 52 85 102.8	37 13.0 52 85 102.2	37 28.4 51 85 101.7	37 43.6 51 85 101.1	37 58.7 50 85 100.6	38 13.7 50 85 100.0	38 28.4 49 86 99.5	2
3	35 51.2 52 85 102.6	36 06.7 52 85 102.1	36 22.2 51 85 101.6	36 37.4 51 85 101.1	36 52.6 50 85 100.5	37 07.6 50 85 100.0	37 22.4 49 86 99.4	37 37.1 49 86 98.9	3
4	35 00.4 52 85 102.0	35 15.9 51 85 101.5	35 31.2 51 85 101.0	35 46.4 50 85 100.4	36 01.5 50 85 99.9	36 16.3 49 86 99.4	36 31.1 49 86 98.8	36 45.8 48 86 98.3	4
55	34 09.5 51 85 101.4	34 24.9 51 85 100.9	34 40.1 51 85 100.4	34 55.2 50 85 99.8	35 10.2 50 86 99.3	35 25.1 49 86 98.8	35 39.8 49 86 98.2	35 54.3 48 86 97.7	55
6	33 18.5 51 85 100.8	33 33.8 51 85 100.3	33 49.0 50 85 99.7	34 04.0 50 86 99.2	34 18.9 49 86 98.7	34 33.7 49 86 98.2	34 48.3 49 86 97.6	35 02.8 48 86 97.1	6
7	32 27.4 51 85 100.2	32 42.6 50 85 99.7	32 57.7 50 86 99.2	33 12.7 50 86 98.6	33 27.5 49 86 98.1	33 42.2 49 86 97.6	33 56.8 48 86 97.1	34 11.2 48 86 96.5	7
8	31 36.2 51 85 99.6	31 51.4 50 86 99.1	32 06.4 50 86 98.6	32 21.3 49 86 98.1	32 36.0 49 86 97.5	32 50.7 49 86 97.0	33 05.2 48 86 96.5	33 19.5 48 86 96.0	8
9	30 45.0 50 86 99.0	31 00.1 50 86 98.5	31 15.0 50 86 98.0	31 29.8 49 86 97.5	31 44.5 49 86 97.0	31 59.1 48 86 96.5	32 13.5 48 86 95.9	32 27.8 48 86 95.4	9
60	29 53.6 50 86 98.4	30 08.6 50 86 97.9	30 23.5 49 86 97.4	30 38.2 49 86 96.9	30 52.9 49 86 96.4	31 07.4 48 86 95.9	31 21.8 48 86 95.4	31 36.1 47 86 94.9	60
1	29 02.2 50 86 97.9	29 17.1 50 86 97.4	29 31.9 49 86 96.9	29 46.6 49 86 96.4	30 01.2 48 86 95.9	30 15.7 48 86 95.3	30 30.0 48 86 94.8	30 44.3 47 86 94.3	1
2	28 10.6 50 86 97.3	28 25.5 49 86 96.8	28 40.3 49 86 96.3	28 54.9 49 86 95.8	29 09.5 48 86 95.3	29 23.9 48 86 94.8	29 38.2 48 86 94.3	29 52.4 47 86 93.8	2
3	27 19.1 50 86 96.7	27 33.9 49 86 96.2	27 48.6 49 86 95.8	28 03.2 48 86 95.3	28 17.7 48 86 94.8	28 32.1 48 86 94.3	28 46.4 47 86 93.8	29 00.6 47 86 93.3	3
4	26 27.4 49 86 96.2	26 42.2 49 86 95.7	26 56.9 49 86 95.2	27 11.5 48 86 94.7	27 25.9 48 86 94.2	27 40.3 48 86 93.7	27 54.5 47 86 93.2	28 08.7 47 86 92.7	4
65	25 35.8 49 86 95.6	25 50.5 49 86 95.2	26 05.1 48 86 94.7	26 19.7 48 86 94.2	26 34.1 48 86 93.7	26 48.4 48 86 93.2	27 02.7 47 86 92.7	27 16.8 47 87 92.2	65
6	24 44.0 49 86 95.1	24 58.7 48 86 94.6	25 13.3 48 86 94.1	25 27.8 48 86 93.7	25 42.2 48 86 93.2	25 56.5 48 87 92.7	26 10.7 47 86 92.2	26 24.9 47 87 91.7	6
7	23 52.4 49 86 94.6	24 06.9 48 86 94.1	24 21.5 48 86 93.6	24 35.9 48 86 93.1	24 50.3 48 87 92.7	25 04.6 47 87 92.2	25 18.8 47 87 91.7	25 32.9 47 87 91.2	7
8	23 00.8 49 86 94.0	23 15.1 49 86 93.6	23 30.1 48 86 93.1	23 44.0 48 87 92.6	23 58.4 48 87 92.1	24 12.7 47 87 91.7	24 26.9 47 87 91.2	24 41.0 47 87 90.7	8
9	22 08.6 49 86 93.5	22 23.2 48 86 93.1	22 37.7 48 87 92.6	22 52.1 48 87 92.1	23 06.5 48 87 91.6	23 20.7 47 87 91.1	23 34.9 47 87 90.7	23 49.0 47 87 90.2	9
70	21 16.7 49 86 93.0	21 31.3 48 87 92.5	21 45.8 48 87 92.1	22 00.2 48 87 91.6	22 14.5 48 87 91.1	22 28.8 47 87 90.6	22 42.9 47 87 90.2	22 57.0 47 87 89.7	70
1	20 24.8 49 87 92.5	20 39.4 48 87 92.0	20 53.8 48 87 91.6	21 08.2 48 87 91.1	21 22.6 47 87 90.6	21 36.8 47 87 90.1	21 51.0 47 87 89.7	22 05.1 47 87 89.2	1
2	19 32.9 49 87 92.0	19 47.4 48 87 91.5	20 01.9 48 87 91.0	20 16.3 48 87 90.6	20 30.6 48 87 90.1	20 44.9 47 87 89.6	20 59.0 47 87 89.2	21 13.1 47 87 88.7	2
3	18 41.0 49 87 91.5	18 55.5 48 87 91.0	19 09.9 48 87 90.5	19 24.3 48 87 90.1	19 38.7 48 87 89.6	19 52.9 47 87 89.1	20 07.1 47 87 88.7	20 21.2 47 87 88.2	3
4	17 49.0 49 87 91.0	18 03.5 48 87 90.5	18 18.0 48 87 90.0	18 32.4 48 87 89.6	18 46.7 48 87 89.1	19 01.0 47 87 88.6	19 15.1 47 87 88.2	19 29.2 47 87 87.7	4
75	16 57.0 49 87 90.5	17 11.6 48 87 90.0	17 26.0 48 87 89.5	17 40.4 48 87 89.1	17 54.7 48 87 88.6	18 09.0 47 87 88.2	18 23.2 47 86 87.7	18 37.3 47 86 87.2	75
6	16 05.1 49 87 90.0	16 19.6 48 87 89.5	16 34.1 48 87 89.0	16 48.5 48 87 88.6	17 02.8 48 87 88.1	17 17.1 47 87 87.7	17 31.3 47 86 87.2	17 45.4 47 86 86.7	6
7	15 13.1 49 87 89.5	15 27.6 48 87 89.0	15 42.1 48 87 88.5	15 56.5 48 87 88.1	16 10.9 48 87 87.6	16 25.2 47 86 87.2	16 39.4 47 86 86.7	16 53.6 47 86 86.3	7
8	14 21.2 49 87 89.0	14 35.7 48 87 88.5	14 50.2 48 87 88.1	15 04.6 48 86 87.6	15 19.0 48 86 87.1	15 33.3 47 86 86.7	15 47.5 47 86 86.2	16 01.7 47 86 85.8	8
9	13 29.2 49 87 88.5	13 43.8 48 87 88.0	13 58.3 48 87 87.6	14 12.7 48 86 87.1	14 27.1 48 86 86.7	14 41.4 47 86 86.2	14 55.7 47 86 85.8	15 09.9 47 86 85.3	9
80	12 37.3 49 87 88.0	12 51.8 48 87 87.5	13 06.3 48 87 87.1	13 20.8 48 86 86.6	13 35.2 48 86 86.2	13 49.6 47 86 85.7	14 03.9 47 86 85.3	14 18.2 47 86 84.8	80
1	11 45.4 49 87 87.5	11 59.9 48 87 87.0	12 14.5 48 86 86.6	12 29.0 48 86 86.1	12 43.4 48 86 85.7	12 57.8 48 86 85.2	13 12.1 47 86 84.8	13 26.4 47 86 84.3	1
2	10 53.5 48 87 87.0	11 08.1 48 86 86.5	11 22.6 48 86 86.1	11 37.1 48 86 85.6	11 51.6 48 86 85.2	12 06.0 48 86 84.8	12 20.4 48 86 84.3	12 34.8 48 86 83.9	2
3	10 01.6 48 86 86.5	10 16.2 48 86 86.1	10 30.8 48 86 85.6	10 45.3 48 86 85.2	10 59.8 48 86 84.7	11 14.3 48 86 84.3	11 28.7 48 86 83.8	11 43.1 48 86 83.4	3
4	9 09.7 48 86 86.0	9 24.4 48 86 85.6	9 39.0 48 86 85.1	9 53.6 48 86 84.7	10 08.1 48 86 84.2	10 22.6 48 86 83.8	10 37.1 48 86 83.3	10 51.5 48 86 82.9	4
85	8 17.9 48 86 85.5	8 32.6 48 86 85.1	8 47.2 48 86 84.6	9 01.9 48 86 84.2	9 16.4 48 86 83.7	9 31.0 48 86 83.3	9 45.5 48 86 82.9	10 00.0 48 86 82.4	85
6	7 26.1 48 86 85.1	7 40.8 48 86 84.6	7 55.5 48 86 84.1	8 10.2 48 86 83.7	8 24.8 48 86 83.3	8 39.4 48 86 82.8	8 54.0 48 86 82.4	9 08.5 48 86 81.9	6
7	6 34.4 48 86 84.5	6 49.1 48 86 84.1	7 03.9 48 86 83.7	7 18.6 48 86 83.2	7 33.2 48 86 82.8	7 47.9 48 86 82.3	8 02.5 48 86 81.9	8 17.1 48 86 81.5	7
8	5 42.7 48 86 84.0	5 57.5 48 86 83.6	6 12.2 48 86 83.2	6 27.0 48 86 82.7	6 41.7 48 86 82.3	6 56.4 48 86 81.9	7 11.1 48 86 81.4	7 25.8 48 86 81.0	8
90		5 05.9 48 86 83.1	5 20.7 48 86 82.7	5 35.5 48 86 82.2	5 50.3 48 86 81.8	6 05.0 48 86 81.4	6 19.8 49 85 80.9	6 34.5 48 86 80.5	90
						5 13.7 49 86 80.4	5 28.5 49 85 80.4	5 43.3 48 86 80.0	

Each data cell below lists: **Alt ° ′   Δd Δt   Az**

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
00	52 00.0 1.0 01 180.0	51 30.0 1.0 01 180.0	51 00.0 1.0 01 180.0	50 30.0 1.0 01 180.0	50 00.0 1.0 01 180.0	49 30.0 1.0 01 180.0	49 00.0 1.0 01 180.0	48 30.0 1.0 01 180.0	00
1	51 59.3 1.0 04 178.4	51 29.3 1.0 04 178.4	50 59.3 1.0 04 178.4	50 29.3 1.0 04 178.5	49 59.3 1.0 04 178.5	49 29.3 1.0 03 178.5	48 59.3 1.0 03 178.5	48 29.3 1.0 03 178.5	1
2	51 57.1 1.0 06 176.8	51 27.1 1.0 06 176.9	50 57.2 1.0 06 176.9	50 27.2 1.0 06 176.9	49 57.2 1.0 06 177.0	49 27.3 1.0 06 177.0	48 57.3 1.0 06 177.0	48 27.3 1.0 06 177.0	2
3	51 53.4 1.0 08 175.2	51 23.5 1.0 08 175.2	50 53.6 1.0 08 175.3	50 23.7 1.0 08 175.4	49 53.8 1.0 08 175.4	49 23.8 1.0 08 175.5	48 53.9 1.0 08 175.5	48 24.0 1.0 08 175.6	3
4	51 48.4 1.0 11 173.6	51 18.5 1.0 11 173.7	50 48.6 1.0 11 173.7	50 18.8 1.0 10 173.8	49 48.9 1.0 10 173.9	49 19.0 1.0 10 174.0	48 49.2 1.0 10 174.0	48 19.3 1.0 10 174.1	4
05	51 41.8 99 13 172.0	51 12.1 99 13 172.1	50 42.3 99 13 172.2	50 12.5 99 13 172.3	49 42.7 99 13 172.4	49 12.9 99 12 172.5	48 43.1 99 12 172.5	48 13.3 99 12 172.6	05
6	51 33.9 99 16 170.4	51 04.2 99 15 170.5	50 34.5 99 15 170.6	50 04.8 99 15 170.8	49 35.1 99 15 170.9	49 05.4 99 15 171.0	48 35.7 99 15 171.1	48 06.0 99 14 171.2	6
7	51 24.5 99 18 168.8	50 55.0 98 18 169.0	50 25.4 99 17 169.1	49 55.8 99 17 169.2	49 26.2 99 17 169.4	48 56.6 99 17 169.5	48 27.0 99 17 169.6	47 57.4 99 16 169.7	7
8	51 13.8 98 20 167.3	50 44.3 98 20 167.4	50 14.9 98 20 167.6	49 45.4 98 20 167.7	49 15.9 98 19 167.9	48 46.5 98 19 168.0	48 17.0 98 19 168.2	47 47.4 98 19 168.3	8
9	51 01.7 98 22 165.7	50 32.4 98 22 165.9	50 03.1 98 22 166.1	49 33.7 98 22 166.2	49 04.4 98 21 166.4	48 35.0 98 21 166.6	48 05.6 98 21 166.7	47 36.3 98 21 166.9	9
10	50 48.2 97 25 164.2	50 19.1 97 24 164.4	49 49.9 97 24 164.6	49 20.7 97 24 164.8	48 51.5 97 24 164.9	48 22.3 97 23 165.1	47 53.1 97 23 165.3	47 23.8 98 23 165.4	10
1	50 33.4 97 27 162.7	50 04.4 97 27 162.9	49 35.4 97 26 163.1	49 06.4 97 26 163.3	48 37.4 97 26 163.5	48 08.3 97 26 163.7	47 39.2 97 25 163.9	47 10.1 97 25 164.0	1
2	50 17.3 96 30 161.2	49 48.5 96 29 161.4	49 19.7 96 29 161.6	48 50.8 96 28 161.8	48 22.0 96 28 162.0	47 53.1 96 27 162.3	47 24.2 96 27 162.4	46 55.3 96 27 162.6	2
3	49 59.9 95 31 159.7	49 31.3 95 31 160.0	49 02.7 95 30 160.2	48 34.0 95 30 160.4	48 05.4 96 30 160.6	47 36.6 95 29 160.8	47 07.9 96 29 161.1	46 39.2 96 29 161.3	3
4	49 41.3 95 33 158.3	49 12.9 95 33 158.5	48 44.5 95 32 158.8	48 16.0 95 32 159.0	47 47.5 95 32 159.2	47 19.0 95 31 159.5	46 50.5 95 31 159.7	46 21.9 95 31 159.9	4
15	49 21.5 94 35 156.8	48 53.3 94 35 157.1	48 25.0 94 34 157.3	47 56.8 94 34 157.6	47 28.5 94 34 157.8	47 00.2 94 33 158.1	46 31.8 95 33 158.3	46 03.5 95 33 158.6	15
6	49 00.4 93 37 155.4	48 32.5 93 37 155.7	48 04.5 93 36 156.0	47 36.4 94 36 156.2	47 08.3 94 36 156.5	46 40.2 94 35 156.7	46 12.1 94 35 157.0	45 43.9 94 34 157.2	6
7	48 38.2 92 39 154.0	48 10.5 93 38 154.3	47 42.7 92 38 154.6	47 14.9 93 38 154.9	46 47.0 93 37 155.1	46 19.2 93 37 155.4	45 51.2 93 37 155.7	45 23.3 93 36 155.9	7
8	48 14.9 92 41 152.6	47 47.4 92 40 152.9	47 19.9 92 40 153.2	46 52.3 92 40 153.5	46 24.6 92 39 153.8	45 57.0 92 39 154.1	45 29.3 92 38 154.4	45 01.5 93 38 154.6	8
9	47 50.5 91 42 151.3	47 23.2 91 42 151.6	46 55.9 91 42 151.9	46 28.6 91 41 152.2	46 01.2 91 41 152.5	45 33.7 92 40 152.8	45 06.3 92 40 153.1	44 38.7 92 40 153.4	9
20	47 25.0 90 44 150.0	46 58.0 90 44 150.3	46 30.9 90 43 150.6	46 03.8 90 43 150.9	45 36.7 91 43 151.2	45 09.5 91 42 151.5	44 42.2 91 42 151.8	44 14.9 91 41 152.1	20
1	46 58.5 89 46 148.7	46 31.7 89 45 149.0	46 04.9 90 45 149.3	45 38.1 90 45 149.6	45 11.2 90 44 150.0	44 44.2 90 44 150.3	44 17.2 90 43 150.6	43 50.1 90 43 150.9	1
2	46 30.9 88 48 147.4	46 04.5 88 47 147.7	45 37.9 89 47 148.1	45 11.3 89 46 148.4	44 44.6 89 46 148.7	44 17.9 89 45 149.0	43 51.2 89 45 149.3	43 24.3 89 45 149.7	2
3	46 02.5 87 49 146.1	45 36.2 88 49 146.5	45 09.9 88 48 146.8	44 43.6 88 48 147.2	44 17.2 88 47 147.5	43 50.7 88 47 147.8	43 24.2 88 46 148.1	42 57.6 89 46 148.5	3
4	45 33.0 86 51 144.9	45 07.1 87 50 145.2	44 41.0 87 50 145.6	44 14.9 87 49 145.9	43 48.8 87 49 146.3	43 22.6 87 48 146.6	42 56.3 88 48 146.9	42 30.0 88 48 147.3	4
25	45 02.7 86 52 143.7	44 37.0 86 52 144.0	44 11.2 86 51 144.4	43 45.4 86 51 144.8	43 19.5 86 50 145.1	42 53.5 87 50 145.4	42 27.5 87 49 145.8	42 01.5 87 49 146.1	25
6	44 31.5 85 54 142.5	44 06.1 85 53 142.9	43 40.6 85 53 143.2	43 15.0 85 52 143.6	42 49.3 86 52 143.9	42 23.6 86 51 144.3	41 57.9 86 51 144.6	41 32.1 86 50 145.0	6
7	43 59.4 84 55 141.3	43 34.3 84 54 141.7	43 09.0 84 54 142.0	42 43.7 84 53 142.4	42 18.3 85 53 142.8	41 52.9 85 52 143.2	41 27.4 85 52 143.5	41 01.8 85 52 143.9	7
8	43 26.6 83 56 140.2	43 01.7 83 56 140.6	42 36.7 83 55 140.9	42 11.6 84 55 141.3	41 46.5 84 54 141.7	41 21.3 84 54 142.0	40 56.1 84 53 142.4	40 30.8 84 53 142.8	8
9	42 52.9 82 57 139.1	42 28.3 82 57 139.5	42 03.6 82 56 139.8	41 38.8 83 56 140.2	41 13.9 83 56 140.6	40 49.0 83 55 141.0	40 24.0 83 55 141.3	39 58.9 84 54 141.7	9
30	42 18.5 81 59 138.0	41 54.1 81 58 138.4	41 29.7 82 58 138.8	41 05.2 82 57 139.1	40 40.6 82 57 139.5	40 15.9 82 56 139.9	39 51.2 83 56 140.3	39 26.4 83 56 140.6	30
1	41 43.3 80 60 136.9	41 19.2 81 59 137.3	40 55.1 81 59 137.7	40 30.8 81 58 138.1	40 06.5 81 58 138.5	39 42.1 81 58 138.8	39 17.6 82 57 139.2	38 53.0 82 57 139.6	1
2	41 07.5 79 61 135.8	40 43.6 80 60 136.2	40 19.7 80 60 136.6	39 55.7 80 60 137.0	39 31.7 80 59 137.4	39 07.5 81 59 137.8	38 43.3 81 58 138.2	38 19.0 81 58 138.6	2
3	40 30.9 78 62 134.8	40 07.4 79 62 135.2	39 43.7 79 61 135.6	39 20.0 79 61 136.0	38 56.2 80 60 136.4	38 32.3 80 60 136.8	38 08.3 80 59 137.2	37 44.3 80 59 137.6	3
4	39 53.8 78 63 133.8	39 30.4 78 63 134.2	39 07.0 78 62 134.6	38 43.6 78 62 135.0	38 20.0 79 61 135.4	37 56.4 79 61 135.8	37 32.6 79 60 136.2	37 08.9 79 60 136.6	4
35	39 15.9 77 64 132.8	38 52.9 77 64 133.2	38 29.7 77 63 133.6	38 06.5 78 63 134.0	37 43.2 78 62 134.4	37 19.8 78 62 134.8	36 56.4 78 62 135.2	36 32.8 79 61 135.6	35
6	38 37.5 76 65 131.8	38 14.7 76 65 132.3	37 51.8 76 64 132.7	37 28.9 77 64 133.1	37 05.8 77 63 133.5	36 42.7 77 63 133.9	36 19.4 78 63 134.3	35 56.2 78 62 134.7	6
7	37 58.5 75 66 130.9	37 36.0 75 66 131.3	37 13.3 76 65 131.7	36 50.6 76 65 132.1	36 27.8 76 64 132.5	36 04.9 77 64 132.9	35 41.9 77 63 133.3	35 18.9 77 63 133.7	7
8	37 19.0 74 67 130.0	36 56.7 74 66 130.4	36 34.3 75 66 130.8	36 11.8 75 66 131.2	35 49.2 75 65 131.6	35 26.6 76 65 132.0	35 03.9 76 64 132.4	34 41.1 76 64 132.8	8
9	36 38.9 73 68 129.0	36 16.8 74 67 129.5	35 54.6 74 67 129.9	35 32.4 74 66 130.3	35 10.1 75 66 130.7	34 47.7 75 66 131.1	34 25.2 75 65 131.5	34 02.7 75 65 131.9	9
40	35 58.2 73 68 128.1	35 36.4 73 68 128.6	35 14.5 73 68 129.0	34 52.5 73 67 129.4	34 30.4 74 67 129.8	34 08.3 74 67 130.2	33 46.0 74 66 130.6	33 23.7 75 66 131.0	40
1	35 17.1 72 69 127.3	34 55.5 72 69 127.7	34 33.9 72 69 128.1	34 12.1 73 69 128.5	33 50.3 73 68 128.9	33 28.3 73 67 129.3	33 06.3 73 67 129.8	32 44.3 74 67 130.2	1
2	34 35.5 71 70 126.4	34 14.2 71 70 126.8	33 52.7 72 69 127.2	33 31.2 72 69 127.7	33 09.6 72 69 128.1	32 47.9 72 68 128.5	32 26.1 73 68 128.9	32 04.3 73 67 129.3	2
3	33 53.5 70 71 125.6	33 32.4 71 70 126.0	33 11.1 71 70 126.4	32 49.9 71 70 126.8	32 28.5 71 69 127.2	32 07.0 72 69 127.7	31 45.5 72 68 128.1	31 23.8 72 68 128.5	3
4	33 11.0 70 72 124.7	32 50.1 70 71 125.1	32 29.1 70 71 125.6	32 08.0 70 70 126.0	31 46.9 71 70 126.4	31 25.6 71 70 126.8	31 04.3 71 69 127.2	30 42.9 71 69 127.6	4
45	32 28.1 69 73 123.9	32 07.4 69 72 124.3	31 46.6 69 72 124.8	31 25.8 70 71 125.2	31 04.8 70 71 125.6	30 43.5 70 70 126.0	30 22.7 70 70 126.4	30 01.6 71 70 126.8	45
6	31 44.7 68 73 123.1	31 24.3 68 73 123.5	31 03.7 69 73 124.0	30 43.1 69 72 124.4	30 22.4 69 71 124.8	30 01.6 69 71 125.2	29 40.7 70 71 125.6	29 19.8 70 70 126.0	6
7	31 01.0 67 73 122.3	30 40.5 68 73 122.8	30 20.4 68 73 123.2	30 00.0 68 72 123.6	29 39.5 69 72 124.0	29 18.9 69 72 124.4	28 58.3 69 71 124.9	28 37.5 69 71 125.3	7
8	30 16.9 67 74 121.5	29 56.9 67 74 122.0	29 36.8 67 73 122.4	29 16.5 68 73 122.8	28 56.3 68 73 123.3	28 35.9 68 72 123.7	28 15.4 68 72 124.1	27 54.9 69 72 124.5	8
9	29 32.5 66 75 120.8	29 12.6 66 74 121.2	28 52.7 67 74 121.6	28 32.7 67 73 122.1	28 12.6 67 73 122.5	27 52.5 67 73 122.9	27 32.2 68 73 123.3	27 11.9 68 72 123.7	9
50	28 47.7 65 76 120.0	28 28.0 65 75 120.5	28 08.6 65 75 120.9	27 48.5 66 74 121.3	27 28.6 66 74 121.8	27 08.6 66 74 122.2	26 48.6 67 73 122.6	26 28.5 67 73 123.0	50
1	28 02.5 65 76 119.3	27 43.1 65 75 119.7	27 23.5 65 75 120.2	27 03.9 65 75 120.6	26 44.2 66 74 121.0	26 24.5 66 74 121.4	26 04.7 66 74 121.9	25 44.8 66 74 122.3	1
2	27 17.0 64 76 118.6	26 57.8 64 76 119.0	26 38.5 65 75 119.5	26 19.0 65 75 119.9	25 59.6 65 75 120.3	25 40.0 65 75 120.7	25 20.4 66 74 121.1	25 00.7 66 74 121.6	2
3	26 31.3 63 77 117.9	26 12.2 63 77 118.3	25 53.0 64 76 118.7	25 33.8 64 76 119.2	25 14.5 64 76 119.6	24 55.2 65 75 120.0	24 35.7 65 75 120.4	24 16.2 65 75 120.9	3
4	25 45.2 63 77 117.2	25 26.3 63 77 117.6	25 07.3 63 77 118.0	24 48.3 64 76 118.5	24 29.2 64 76 118.9	24 10.0 64 76 119.3	23 50.8 64 75 119.7	23 31.4 65 75 120.2	4
55	24 58.6 62 78 116.5	24 40.1 62 77 116.9	24 21.3 62 77 117.4	24 02.5 63 77 117.8	23 43.6 63 77 118.2	23 24.6 63 76 118.6	23 05.5 64 76 119.1	22 46.4 64 76 119.5	55
6	24 12.2 61 78 115.8	23 53.7 62 78 116.3	23 35.0 62 78 116.7	23 16.4 62 77 117.1	22 57.6 63 77 117.5	22 38.8 63 77 118.0	22 19.9 63 76 118.4	22 01.0 63 76 118.8	6
7	23 25.3 61 79 115.2	23 06.9 61 78 115.6	22 48.5 61 78 116.0	22 30.0 62 78 116.5	22 11.4 62 77 116.9	21 52.8 62 77 117.3	21 34.1 62 77 117.7	21 15.3 63 77 118.1	7
8	22 38.1 61 79 114.5	22 19.9 61 79 114.9	22 01.7 61 78 115.4	21 43.3 61 78 115.8	21 24.9 61 78 116.2	21 06.5 62 78 116.6	20 47.9 62 77 117.1	20 29.3 62 77 117.5	8
9	21 50.7 60 79 113.9	21 32.7 60 79 114.3	21 14.6 60 79 114.7	20 56.4 61 79 115.2	20 38.2 61 78 115.6	20 19.9 61 78 116.0	20 01.5 61 78 116.4	19 43.1 61 77 116.8	9
60	21 03.1 60 80 113.2	20 45.2 60 80 113.7	20 27.3 60 79 114.1	20 09.3 60 79 114.5	19 51.2 60 79 114.9	19 33.1 61 78 115.3	19 14.9 61 78 115.8	18 56.6 61 78 116.2	60
1	20 15.2 59 80 112.6	19 57.5 59 80 113.0	19 39.7 59 80 113.5	19 21.9 60 79 113.9	19 04.0 60 79 114.3	18 46.0 60 79 114.7	18 27.9 60 79 115.2	18 09.9 60 78 115.6	1
2	19 27.2 59 80 112.0	19 09.6 59 80 112.4	18 51.9 59 80 112.8	18 34.2 59 80 113.3	18 16.5 59 79 113.7	17 58.7 59 79 114.1	17 40.8 60 79 114.5	17 22.9 60 79 115.0	2
3	18 38.9 58 81 111.4	18 21.4 58 81 111.8	18 03.9 58 80 112.2	17 46.4 59 80 112.7	17 28.8 59 80 113.1	17 11.1 59 80 113.5	16 53.4 59 79 113.9	16 35.6 59 79 114.3	3
4	17 50.4 58 81 110.8	17 33.1 58 81 111.2	17 15.7 58 81 111.6	16 58.3 58 80 112.1	16 40.9 58 80 112.5	16 23.4 58 80 112.9	16 05.8 59 80 113.3	15 48.2 59 79 113.7	4
65	17 01.7 57 81 110.2	16 44.6 57 81 110.6	16 27.3 57 81 111.0	16 10.1 58 81 111.5	15 52.8 58 81 111.9	15 35.4 58 80 112.3	15 18.0 58 80 112.7	15 00.5 58 80 113.2	65
6	16 12.9 57 82 109.6	15 55.8 57 82 110.0	15 38.8 57 81 110.4	15 21.6 57 81 110.9	15 04.4 57 81 111.3	14 47.2 57 81 111.7	14 30.0 58 80 112.1	14 12.6 58 80 112.6	6
7	15 23.8 56 82 109.0	15 06.9 56 82 109.4	14 50.0 57 82 109.9	14 33.0 57 81 110.3	14 15.9 57 81 110.7	13 58.9 57 81 111.1	13 41.7 57 81 111.6	13 24.6 57 80 112.0	7
8	14 34.6 56 82 108.4	14 17.8 56 82 108.9	14 01.0 56 82 109.3	13 44.2 56 81 109.7	13 27.2 56 81 110.1	13 10.3 57 81 110.6	12 53.3 57 81 111.0	12 36.3 57 81 111.4	8
9	13 45.2 55 83 107.9	13 28.6 56 83 108.3	13 11.9 56 82 108.7	12 55.1 56 82 109.1	12 38.4 56 82 109.6	12 21.6 56 82 110.0	12 04.7 56 81 110.4	11 47.8 56 81 110.8	9
70	12 55.7 55 83 107.7	12 39.0 55 83 108.2	12 22.6 55 82 108.6	12 06.0 55 82 109.0	11 49.3 55 82 109.4	11 32.6 55 82 109.9	11 15.9 55 82 110.3	10 59.2 55 82 110.7	70
1	12 06.2 55 83 106.7	11 49.6 55 83 107.2	11 33.1 55 83 107.6	11 16.6 55 82 108.0	11 00.1 55 82 108.5	10 43.6 55 82 108.9	10 27.0 55 82 109.3	10 10.3 55 82 109.7	1
2	11 16.2 54 83 106.2	10 59.9 54 83 106.6	10 43.5 55 83 107.0	10 27.2 55 83 107.5	10 10.7 55 83 107.9	9 54.3 55 82 108.3	9 37.8 55 82 108.8	9 21.3 55 82 109.2	2
3	10 26.2 54 84 105.6	10 10.0 54 83 106.1	9 53.6 54 83 106.5	9 37.5 54 83 106.9	9 21.2 55 83 107.4	9 04.9 55 82 107.8	8 48.6 55 82 108.2	8 32.2 55 82 108.6	3
4	9 36.1 54 84 105.1	9 20.0 54 84 105.5	9 03.9 54 83 106.0	8 47.7 54 83 106.4	8 31.6 54 83 106.8	8 15.4 54 83 107.2	7 59.1 54 83 107.7	7 42.9 54 82 108.1	4
75	8 45.9 53 84 104.6	8 29.9 53 84 105.0	8 13.9 53 84 105.4	7 57.8 53 84 105.9	7 41.8 53 84 106.3	7 25.7 54 83 106.7	7 09.5 54 83 107.1	6 53.4 53 83 107.6	75
6	7 55.5 53 84 104.0	7 39.6 53 84 104.5	7 23.7 53 84 104.9	7 07.8 53 84 105.3	6 51.8 53 84 105.8	6 35.8 53 83 106.2	6 19.8 53 83 106.6	6 03.8 53 83 107.0	6
7	7 05.1 52 84 103.5	6 49.3 52 84 103.9	6 33.4 53 84 104.4	6 17.6 53 84 104.8	6 01.7 53 84 105.2	5 45.8 53 83 105.7	5 29.9 53 83 106.1	5 14.0 53 83 106.5	7
8	6 14.5 52 84 103.0	5 58.8 52 84 103.4	5 43.0 52 84 103.8	5 27.3 52 84 104.3	5 11.5 53 84 104.7				8
9	5 23.8 52 85 102.5	5 08.2 52 85 102.9							9

Lat. 30° — TIME

H.A.	12° 00'			12° 30'			13° 00'			13° 30'			14° 00'			14° 30'			15° 00'			15° 30'			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
00	72 00.0	1.0 02	180.0	72 30.0	1.0 02	180.0	73 00.0	1.0 03	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	00
1	71 58.6	1.0 07	176.8	72 28.5	1.0 07	176.8	72 58.5	1.0 08	176.7	73 28.4	1.0 08	176.6	73 58.4	1.0 08	176.5	74 28.4	1.0 08	176.4	74 58.3	1.0 08	176.3	75 28.3	1.0 09	176.2	1
2	71 54.3	1.0 12	173.7	72 24.1	99 12	173.5	72 54.0	99 13	173.4	73 23.8	99 13	173.2	73 53.6	99 13	173.0	74 23.5	99 14	172.8	74 53.3	99 14	172.6	75 23.0	99 14	172.3	2
3	71 47.2	99 16	170.6	72 16.8	99 17	170.3	72 46.5	99 17	170.1	73 16.1	99 18	169.8	73 45.7	99 18	169.5	74 15.3	99 19	169.2	74 44.9	99 19	168.9	75 14.5	99 19	168.6	3
4	71 37.3	98 21	167.5	72 06.7	98 21	167.2	72 36.1	98 22	166.9	73 05.5	98 23	166.6	73 34.8	98 23	166.1	74 04.1	98 24	165.8	74 33.3	97 24	165.3	75 02.5	97 25	164.9	4
05	71 24.7	97 25	164.5	71 53.8	97 26	164.1	72 22.9	97 27	163.7	72 51.9	97 27	163.3	73 20.9	96 28	162.8	73 49.8	96 29	162.4	74 18.6	96 29	161.9	74 47.4	96 30	161.3	05
6	71 09.5	96 29	161.5	71 38.3	96 30	161.1	72 07.0	96 31	160.6	72 35.6	95 32	160.1	73 04.2	95 32	159.6	73 32.6	95 33	159.1	74 01.0	94 34	158.5	74 29.3	94 35	157.9	6
7	70 51.8	95 33	158.7	71 20.2	94 34	158.2	71 48.5	94 35	157.6	72 16.7	94 36	157.1	72 44.7	93 37	156.5	73 12.7	93 38	155.9	73 40.6	93 38	155.2	74 08.3	92 39	154.6	7
8	70 31.8	93 37	155.9	70 59.7	93 38	155.3	71 27.5	93 39	154.8	71 55.2	92 41	154.1	72 22.8	92 41	153.5	72 50.2	91 42	152.8	73 17.5	91 42	152.1	73 44.7	90 43	151.4	8
9	70 09.4	92 41	153.2	70 36.9	91 42	152.6	71 04.2	91 42	152.0	71 31.4	90 43	151.3	71 58.4	90 44	150.6	72 25.3	89 45	149.9	72 52.1	89 46	149.1	73 18.6	88 47	148.3	9
10	69 45.0	90 44	150.6	70 11.9	90 45	150.0	70 38.7	89 46	149.3	71 05.4	89 47	148.6	71 31.9	88 48	147.9	71 58.2	87 49	147.1	72 24.3	87 50	146.3	72 50.2	86 51	145.5	10
1	69 18.5	88 47	148.1	69 44.9	88 48	147.4	70 11.2	87 49	146.7	70 37.3	87 50	146.0	71 03.2	86 51	145.2	71 28.9	85 52	144.4	71 54.5	85 53	143.6	72 19.7	84 54	142.7	1
2	68 50.1	87 50	145.7	69 16.0	86 51	145.0	69 41.8	85 53	144.3	70 07.3	85 53	143.5	70 32.7	84 54	142.7	70 57.8	83 55	141.9	71 22.7	83 56	141.0	71 47.3	82 57	140.1	2
3	68 20.0	85 53	143.4	68 45.4	84 54	142.7	69 10.6	84 55	141.9	69 35.6	83 56	141.1	70 00.3	82 57	140.3	70 24.9	81 58	139.5	70 49.1	81 59	138.6	71 13.2	80 60	137.7	3
4	67 48.2	83 56	141.2	68 13.1	83 56	140.5	68 37.7	82 57	139.7	69 02.2	81 58	138.9	69 26.4	80 59	138.1	69 50.3	79 60	137.2	70 14.0	78 61	136.3	70 37.4	78 62	135.4	4
15	67 14.9	81 58	139.1	67 39.3	81 59	138.3	68 03.4	80 60	137.6	68 27.3	79 60	136.7	68 50.9	78 61	135.9	69 14.3	77 62	135.0	69 37.4	77 63	134.1	70 00.2	76 64	133.2	15
6	66 40.2	80 60	137.1	67 04.0	79 61	136.3	67 27.6	78 62	135.5	67 51.0	77 63	134.7	68 14.1	77 64	133.8	68 36.9	76 64	133.0	68 59.4	75 65	132.0	69 21.7	74 66	131.1	6
7	66 04.2	78 62	135.2	66 27.5	77 63	134.4	66 50.6	77 64	133.6	67 13.4	76 65	132.7	67 36.0	75 66	131.9	67 58.3	74 66	131.0	68 20.2	73 67	130.1	68 41.9	72 68	129.1	7
8	65 27.0	76 64	133.3	65 49.8	76 65	132.5	66 12.4	75 66	131.7	66 34.7	74 66	130.9	66 56.7	73 67	130.0	67 18.5	72 68	129.1	67 40.0	71 69	128.2	68 01.1	70 70	127.3	8
9	64 48.6	75 66	131.6	65 11.0	74 66	130.8	65 33.1	73 67	130.0	65 54.9	72 68	129.1	66 16.4	71 69	128.3	66 37.7	70 70	127.4	66 58.6	69 70	126.5	67 19.3	68 71	125.5	9
20	64 09.2	73 67	129.9	64 31.1	73 68	129.1	64 52.8	72 69	128.3	65 14.1	71 70	127.4	65 35.2	70 70	126.6	65 56.0	69 71	125.7	66 16.4	68 72	124.8	66 36.6	67 73	123.9	20
1	63 28.9	72 69	128.3	63 50.3	71 69	127.5	64 11.5	70 70	126.7	64 32.4	69 71	125.8	64 53.0	68 72	125.0	65 13.3	67 72	124.1	65 33.4	66 73	123.2	65 53.0	65 74	122.3	1
2	62 47.7	70 70	126.7	63 08.7	70 70	125.9	63 29.4	69 71	125.1	63 49.9	68 72	124.3	64 10.1	67 73	123.5	64 29.9	66 74	122.6	64 49.5	65 74	121.7	65 08.7	64 75	120.8	2
3	62 05.6	68 71	125.3	62 26.2	68 72	124.5	62 46.6	67 73	123.7	63 06.0	66 73	122.9	63 25.4	66 74	122.0	63 45.6	64 75	121.2	64 05.0	63 75	120.3	64 23.8	62 76	119.4	3
4	61 22.8	68 72	123.8	61 43.0	67 73	123.1	62 03.0	67 74	122.3	62 22.6	65 74	121.5	62 42.0	64 75	120.6	63 01.0	63 76	119.8	63 19.8	63 76	118.9	63 38.2	61 77	118.0	4
25	60 39.3	66 74	122.5	60 59.2	66 74	121.7	61 18.7	65 75	120.9	61 38.0	64 75	120.1	61 57.0	63 76	119.3	62 15.6	62 77	118.5	62 34.0	61 77	117.6	62 52.1	60 78	116.7	25
6	59 55.2	65 75	121.2	60 14.6	64 75	120.4	60 33.8	64 76	119.6	60 52.7	63 76	118.8	61 11.4	62 77	118.0	61 29.7	61 77	117.2	61 47.7	60 78	116.4	62 05.4	58 79	115.5	6
7	59 10.4	64 76	119.9	59 29.6	63 76	119.2	59 48.4	62 77	118.4	60 07.0	61 77	117.6	60 25.3	60 78	116.8	60 43.2	59 78	116.0	61 00.9	58 79	115.2	61 18.3	57 79	114.3	7
8	58 25.1	63 76	118.7	58 43.9	62 77	118.0	59 02.4	61 77	117.2	59 20.7	60 78	116.4	59 38.6	59 78	115.7	59 56.3	58 79	114.9	60 13.7	57 79	114.0	60 30.8	56 80	113.2	8
9	57 39.3	62 77	117.6	57 57.8	61 78	116.8	58 16.0	60 78	116.1	58 33.9	59 79	115.3	58 51.6	58 79	114.5	59 09.0	57 80	113.8	59 26.0	56 80	112.9	59 42.8	55 80	112.1	9
30	56 53.0	61 78	116.5	57 11.2	60 78	115.7	57 29.1	59 79	115.0	57 46.8	58 79	114.2	58 04.1	57 80	113.5	58 21.2	56 80	112.7	58 38.0	55 81	111.9	58 54.5	54 81	111.1	30
1	56 06.3	60 79	115.4	56 24.2	59 79	114.7	56 41.8	58 79	113.9	56 59.2	57 80	113.2	57 16.3	57 80	112.4	57 33.1	55 81	111.7	57 49.6	55 81	110.9	58 05.9	54 82	110.1	1
2	55 19.2	59 79	114.4	55 36.8	58 80	113.6	55 54.1	57 80	112.9	56 11.2	57 80	112.2	56 28.1	56 81	111.4	56 44.6	55 81	110.7	57 00.9	54 82	109.9	57 16.9	53 82	109.1	2
3	54 31.7	58 80	113.4	54 49.0	57 80	112.7	55 06.1	57 81	111.9	55 23.0	56 81	111.2	55 39.6	55 81	110.5	55 55.9	54 82	109.7	56 11.9	53 82	109.0	56 27.7	52 82	108.2	3
4	53 43.8	57 80	112.4	54 00.9	57 81	111.7	54 17.8	56 81	111.0	54 34.4	55 81	110.3	54 50.7	54 82	109.6	55 06.8	53 82	108.8	55 22.6	52 83	108.1	55 38.2	51 83	107.3	4
35	52 55.6	57 81	111.5	53 12.5	56 81	110.8	53 29.1	55 82	110.1	53 45.5	54 82	109.4	54 01.6	53 82	108.7	54 17.5	53 83	107.9	54 33.1	52 83	107.2	54 48.5	51 83	106.5	35
6	52 07.1	56 81	110.6	52 23.7	55 82	109.9	52 40.2	54 82	109.2	52 56.3	54 83	108.5	53 12.3	53 83	107.8	53 28.0	52 83	107.1	53 43.4	51 84	106.4	53 58.5	50 84	105.6	6
7	51 18.3	56 82	109.7	51 34.7	54 82	109.0	51 51.0	54 83	108.3	52 06.9	53 83	107.6	52 22.7	52 83	106.9	52 38.2	51 84	106.2	52 53.4	50 84	105.4	53 08.4	49 84	104.8	7
8	50 29.2	55 82	108.8	50 45.5	54 82	108.2	51 01.5	53 83	107.5	51 17.3	52 83	106.8	51 32.9	51 83	106.1	51 48.2	51 84	105.4	52 03.3	49 84	104.7	52 18.1	49 84	104.0	8
9	49 39.9	54 83	108.0	49 56.0	53 83	107.3	50 11.8	52 83	106.7	50 27.5	52 83	106.0	50 42.9	51 84	105.3	50 58.0	50 84	104.7	51 12.9	49 84	104.0	51 27.6	48 84	103.3	9
40	48 50.4	53 83	107.2	49 06.3	53 83	106.6	49 22.0	52 83	105.9	49 37.4	51 84	105.2	49 52.7	50 84	104.6	50 07.6	50 84	103.9	50 22.4	49 84	103.2	50 36.9	48 85	102.5	40
1	48 00.6	53 83	106.4	48 16.4	52 84	105.8	48 31.9	51 84	105.1	48 47.2	51 84	104.5	49 02.3	50 84	103.8	49 17.1	49 84	103.2	49 31.7	48 85	102.5	49 46.1	48 85	101.8	1
2	47 10.7	52 84	105.7	47 26.3	52 84	105.0	47 41.7	51 84	104.4	47 56.8	50 84	103.7	48 11.7	49 84	103.1	48 26.5	49 85	102.4	48 40.9	48 85	101.8	48 55.2	47 85	101.1	2
3	46 20.6	52 84	104.9	46 36.0	51 84	104.3	46 51.2	50 84	103.7	47 06.3	50 84	103.0	47 21.1	49 85	102.4	47 35.6	48 85	101.7	47 50.0	48 85	101.1	48 04.2	47 85	100.4	3
4	45 30.3	51 84	104.2	45 45.6	51 84	103.6	46 00.7	50 84	102.9	46 15.6	49 85	102.3	46 30.2	49 85	101.7	46 44.7	48 85	101.1	46 59.0	47 85	100.4	47 13.0	46 85	99.8	4
45	44 39.8	51 84	103.5	44 55.0	50 85	102.9	45 10.0	50 85	102.3	45 24.7	49 85	101.6	45 39.3	48 85	101.0	45 53.7	47 85	100.4	46 07.8	47 85	99.8	46 21.7	46 85	99.1	45
6	43 49.2	50 85	102.8	44 04.3	50 85	102.2	44 19.1	49 85	101.6	44 33.8	49 85	101.0	44 48.2	48 85	100.4	45 02.5	47 85	99.7	45 16.6	47 86	99.1	45 30.4	46 86	98.5	6
7	42 58.5	50 85	102.1	43 13.4	49 85	101.5	43 28.2	49 85	100.9	43 42.7	48 85	100.3	43 57.1	48 85	99.7	44 11.2	47 86	99.1	44 25.2	46 86	98.5	44 39.0	46 86	97.8	7
8	42 07.6	50 85	101.4	42 22.4	49 85	100.9	42 37.1	48 85	100.3	42 51.5	48 85	99.7	43 05.8	47 86	99.1	43 19.9	47 86	98.5	43 33.8	46 86	97.9	43 47.4	45 86	97.2	8
9	41 16.6	49 85	100.8	41 31.4	49 85	100.2	41 45.9	48 85	99.6	42 00.3	48 85	99.0	42 14.4	47 86	98.4	42 28.4	46 86	97.9	42 42.3	46 86	97.2	42 56.1	45 86	96.6	9
50	40 25.5	49 85	100.2	40 40.2	49 86	99.6	40 54.6	48 86	99.0	41 08.9	47 86	98.4	41 23.0	47 86	97.8	41 36.9	46 86	97.2	41 50.7	45 86	96.7	42 04.2	45 86	96.1	50
1	39 34.3	49 85	99.5	39 48.9	48 86	99.0	40 03.3	48 86	98.4	40 17.5	47 86	97.8	40 31.5	46 86	97.2	40 45.4	46 86	96.7	40 59.0	45 86	96.1	41 12.5	45 86	95.5	1
2	38 43.1	48 86	98.9	38 57.5	48 86	98.4	39 11.8	47 86	97.8	39 26.0	47 86	97.2	39 39.9	46 86	96.7	39 53.7	46 86	96.1	40 07.3	45 86	95.5	40 20.8	45 86	94.9	2
3	37 51.7	48 86	98.3	38 06.1	48 86	97.8	38 20.3	47 86	97.2	38 34.4	46 86	96.6	38 48.3	46 86	96.1	39 02.0	46 86	95.5	39 15.6	45 86	94.9	39 29.0	44 86	94.3	3
4	37 00.2	48 86	97.7	37 14.6	47 86	97.2	37 28.7	47 86	96.6	37 42.7	46 86	96.1	37 56.6	46 86	95.5	38 10.3	45 86	94.9	38 23.8	45 86	94.4	38 37.4	44 86	93.8	4
55	36 08.7	48 86	97.1	36 23.0	47 86	96.6	36 37.1	47 86	96.1	36 51.0	46 86	95.5	37 04.6	46 86	94.9	37 18.5	45 86	94.4	37 32.0	45 86	93.8	37 45.3	44 86	93.3	55
6	35 17.1	48 86	96.6	35 31.3	47 86	96.0	35 45.4	47 86	95.5	35 59.3	46 86	94.9	36 13.0	46 86	94.4	36 26.7	45 86	93.8	36 40.1	45 86	93.3	36 53.4	44 87	92.7	6
7	34 25.5	47 86	96.0	34 39.6	47 86	95.5	34 53.6	46 86	94.9	35 07.5	46 86	94.4	35 21.2	45 86	93.8	35 34.8	45 86	93.3	35 48.2	44 87	92.7	36 01.5	44 87	92.2	7
8	33 33.8	47 86	95.4	33 47.9	46 86	94.9	34 01.8	46 86	94.4	34 15.7	46 86	93.8	34 29.4	45 86	93.3	34 42.9	45 87	92.7	34 56.3	44 87	92.2	35 09.6	44 87	91.7	8
9	32 42.0	47 86	94.9	32 56.1	46 86	94.4	33 10.0	46 86	93.8	33 23.8	46 86	93.3	33 37.5	45 86	92.8	33 51.0	45 87	92.2	34 04.4	44 87	91.7	34 17.6	44 87	91.2	9
60	31 50.2	47 86	94.4	32 04.3	46 86	93.8	32 18.2	46 86	93.3	32 31.9	46 86	92.8	32 45.6	45 87	92.3	32 59.1	45 87	91.7	33 12.4	44 87	91.2	33 25.7	44 87	90.7	60
1	30 58.4	47 86	93.8	31 12.4	46 86	93.3	31 26.3	46 87	92.8	31 40.0	46 87	92.3	31 53.6	45 87	91.7	32 07.1	45 87	91.2	32 20.5	44 87	90.7	32 33.7	44 87	90.1	1
2	30 06.5	47 86	93.3	30 20.5	46 86	92.8	30 34.4	46 87	92.3	30 48.1	45 87	91.7	31 01.7	45 87	91.2	31 15.2	44 87	90.7	31 28.5	44 87	90.2	31 41.7	44 87	89.6	2
3	29 14.6	47 87	92.8	29 28.6	46 87	92.2	29 42.4	46 87	91.7	29 56.1	45 87	91.2	30 09.7	45 87	90.7	30 23.2	44 87	90.2	30 36.6	44 87	89.7	30 49.6	44 87	89.1	3
4	28 22.7	47 87	92.2	28 36.7	46 87	91.7	28 50.5	46 87	91.2	29 04.2	45 87	90.7	29 17.8	45 87	90.2	29 31.2	44 87	89.7	29 44.6	44 87	89.2	29 57.8	44 87	88.7	4
65	27 30.8	47 87	91.7	27 44.7	46 87	91.2	27 58.5	46 87	90.7	28 12.2	45 87	90.2	28 25.8	45 87	89.7	28 39.3	45 87	89.2	28 52.6	44 87	88.7	29 05.9	44 87	88.2	65
6	26 38.9	47 87	91.2	26 52.8	46 87	90.7	27 06.6	46 87	90.2	27 20.3	45 87	89.7	27 33.9	45 87	89.2	27 47.3	45 87	88.7	28 00.7	44 87	88.2	28 14.0	44 86	87.7	6
7	25 46.9	47 87	90.7	26 00.8	46 87	90.2	26 14.6	46 87	89.7	26 28.3	45 87	89.2	26 41.9	45 87	88.7	26 55.3	45 87	88.2	27 08.8	44 86	87.7	27 22.0	44 86	87.2	7
8	24 54.9	46 87	90.2	25 08.8	46 87	89.7	25 22.6	46 87	89.2	25 36.4	45 87	88.7	25 50.0	45 87	88.2	26 03.5	44 87	87.7	26 16.9	44 86	87.2	26 30.2	44 86	86.7	8
9	24 03.0	46 87	89.7	24 16.9	46 87	89.2	24 30.7	46 87	88.7	24 44.4	45 87	88.2	24 58.0	45 87	87.7	25 11.5	45 86	87.3	25 25.0	45 86	86.8	25 38.3	44 86	86.3	9
70	23 11.0	47 87	89.2	23 24.9	46 87	88.7	23 38.8	46 87	88.2	23 52.5	46 87	87.8	24 06.1	45 86	87.3	24 19.7	45 86	86.8	24 33.1	45 86	86.3	24 46.5	44 86	85.8	70
1	22 19.1	47 87	88.7	22 33.0	46 87	88.2	22 46.8	46 86	87.7	23 00.6	45 86	87.3	23 14.2	45 86	86.8	23 27.8	45 86	86.3	23 41.3	45 86	85.8	23 54.7	44 86	85.3	1
2	21 27.1	47 87	88.2	21 41.1	46 87	87.7	21 54.9	46 86	87.3	22 08.7	46 86	86.8	22 22.4	45 86	86.3	22 36.0	45 86	85.8	22 49.5	45 86	85.3	23 02.9	44 86	84.9	2
3	20 35.2	47 87	87.7	20 49.1	46 86	87.3	21 03.0	46 86	86.8	21 16.8	46 86	86.3	21 30.5	45 86	85.8	21 44.1	45 86	85.3	21 57.7	45 86	84.9	22 11.1	45 86	84.4	3
4	19 43.3	47 86	87.2	19 57.3	46 86	86.8	20 11.2	46 86	86.3	20 25.0	45 86	85.8	20 38.7	45 86	85.4	20 52.4	45 86	84.9	21 06.0	45 86	84.4	21 19.5	45 86	83.9	4
75	18 51.4	47 86	86.8	19 05.4	47 86	86.3	19 19.3	46 86	85.8	19 33.2	46 86	85.4	19 46.9	46 86	84.9	20 00.6	46 86	84.4	20 14.3	45 86	83.9	20 27.8	45 86	83.5	75
6	17 59.5	47 86	86.3	18 13.6	47 86	85.8	18 27.5	46 86	85.3	18 41.4	46 86	84.9	18 55.2	46 86	84.4	19 08.9	46 86	83.9	19 22.6	45 86	83.5	19 36.2	45 86	83.0	6
7	17 07.7	47 86	85.8	17 21.7	47 86	85.3	17 35.7	46 86	84.9	17 49.7	46 86	84.4	18 03.5	46 86	83.9	18 17.3	46 86	83.5	18 31.0	45 86	83.0	18 44.7	45 86	82.5	7
8	16 15.9	47 86	85.3	16 30.0	47 86	84.9	16 44.0	46 86	84.4	16 58.0	46 86	83.9	17 11.9	46 86	83.5	17 25.7	46 86	83.0	17 39.5	45 86	82.5	17 53.2	45 86	82.1	8
9	15 24.1	47 86	84.8	15 38.2	47 86	84.4	15 52.3	46 86	83.9	16 06.3	46 86	83.5	16 20.3	46 86	83.0	16 34.1	46 86	82.5	16 48.0	45 86	82.1	17 01.7	45 86	81.6	9
80	14 32.4	47 86	84.4	14 46.6	47 86	83.9	15 00.7	47 86	83.4	15 14.7	47 86	83.0	15 28.7	47 86	82.5	15 42.7	46 86	82.1	15 56.5	46 86	81.6	16 10.4	46 86	81.1	80
1	13 40.5	47 86	83.9	13 54.7	47 86	83.4	14 09.1	47 86	83.0	14 23.2	47 86	82.5	14 37.2	47 86	82.1	14 51.2	47 86	81.6	15 05.2	46 86	81.1	15 19.1	46 86	80.7	1
2	12 49.1	48 86	83.4	13 03.2	47 86	83.0	13 17.5	47 86	82.5	13 31.7	47 86	82.0	13 45.8	47 86	81.6	13 59.8	47 86	81.1	14 13.9	47 86	80.7	14 27.8	46 86	80.2	2
3	11 57.5	48 86	82.9	12 11.8	47 86	82.5	12 26.0	47 86	82.0	12 40.2	47 86	81.6	12 54.4	47 86	81.1	13 08.5	47 86	80.7	13 22.6	47 85	80.2	13 36.6	47 85	79.8	3
4	11 05.9	48 86	82.4	11 20.3	48 86	82.0	11 34.6	48 86	81.6	11 48.9	47 86	81.1	12 03.1	47 85	80.7	12 17.3	47 85	80.2	12 31.4	47 85	79.8	12 45.5	47 85	79.3	4
85	10 14.4	48 86	82.0	10 28.9	48 86	81.5	10 43.2	48 86	81.1	10 57.6	48 85	80.6	11 11.9	48 85	80.2	11 26.1	47 85	79.7	11 40.3	47 85	79.3	11 54.5	47 85	78.8	85
6	9 23.0	48 86	81.5	9 37.5	48 86	81.0	9 51.9	48 85	80.6	10 06.3	48 85	80.1	10 20.7	48 85	79.7	10 35.0	48 85	79.3	10 49.3	48 85	78.8	11 03.6	47 85	78.4	6
7	8 31.7	49 86	81.0	8 46.2	48 86	80.6	9 00.7	48 85	80.1	9 15.2	48 85	79.7	9 29.6	48 85	79.2	9 44.9	48 85	78.8	9 58.4	48 85	78.4	10 12.7	48 85	77.9	7
8	7 40.4	49 85	80.5	7 55.0	49 85	80.1	8 09.6	49 85	79.7	8 24.1	48 85	79.2	8 38.6	48 85	78.8	8 53.1	48 85	78.3	9 07.6	48 85	77.9	9 22.0	48 84	77.4	8
9	6 49.2	49 85	80.1	7 03.8	49 85	79.6	7 18.5	49 85	79.2	7 33.1	49 85	78.7	7 47.7	49 85	78.3	8 02.3	48 85	77.9	8 16.8	48 85	77.4	8 31.3	48 85	77.0	9
90	5 58.0	49 85	79.6	6 12.8	49 85	79.1	6 27.5	49 85	78.7	6 42.2	49 85	78.3	6 56.9	49 85	77.8	7 11.5	49 84	77.4	7 26.1	49 84	76.9	7 40.7	49 84	76.5	90

H.A.	12° 00' Alt	Az	12° 30' Alt	Az	13° 00' Alt	Az	13° 30' Alt	Az	14° 00' Alt	Az	14° 30' Alt	Az	15° 00' Alt	Az	15° 30' Alt	Az	H.A.
00	48 00.0 1.00 1	180.0	47 30.0 1.00 1	180.0	47 00.0 1.00 1	180.0	46 30.0 1.00 1	180.0	46 00.0 1.00 1	180.0	45 30.0 1.00 1	180.0	45 00.0 1.00 1	180.0	44 30.0 1.00 1	180.0	00
1	47 59.3 1.00 3	178.5	47 29.3 1.00 3	178.6	46 59.4 1.00 3	178.6	46 29.4 1.00 3	178.6	45 59.4 1.00 3	178.6	45 29.4 1.00 3	178.6	44 59.4 1.00 3	178.6	44 29.4 1.00 3	178.6	1
2	47 57.4 1.00 5	177.1	47 27.4 1.00 5	177.1	46 57.4 1.00 5	177.1	46 27.4 1.00 5	177.2	45 57.5 1.00 5	177.2	45 27.5 1.00 5	177.2	44 57.5 1.00 5	177.3	44 27.6 1.00 5	177.3	2
3	47 54.0 1.00 8	175.6	47 24.1 1.00 8	175.7	46 54.2 1.00 8	175.7	46 24.2 1.00 7	175.8	45 54.3 1.00 7	175.8	45 24.4 1.00 7	175.9	44 54.4 1.00 7	175.9	44 24.5 1.00 7	176.0	3
4	47 49.4 1.00 10	174.2	47 19.5 1.00 10	174.2	46 49.7 1.00 10	174.3	46 19.8 1.00 10	174.4	45 49.9 1.00 9	174.4	45 20.0 1.00 9	174.5	44 50.1 1.00 9	174.5	44 20.2 1.00 9	174.6	4
05	47 43.5 99 12	172.7	47 13.7 99 12	172.8	46 43.9 99 12	172.9	46 14.0 99 12	173.0	45 44.2 99 12	173.0	45 14.4 99 11	173.1	44 44.6 99 11	173.2	44 14.7 99 11	173.3	05
6	47 36.2 99 14	171.3	47 06.5 99 14	171.4	46 36.8 99 14	171.5	46 07.0 99 14	171.6	45 37.3 99 14	171.7	45 07.5 99 13	171.8	44 37.8 99 13	171.8	44 08.0 99 13	171.9	6
7	47 27.7 99 16	169.9	46 58.1 99 16	170.0	46 28.4 99 16	170.1	45 58.8 99 16	170.2	45 29.1 99 16	170.3	44 59.5 99 15	170.4	44 29.8 99 15	170.5	44 00.1 99 15	170.6	7
8	47 17.9 98 18	168.4	46 48.4 98 18	168.6	46 18.9 98 18	168.7	45 49.3 98 18	168.8	45 19.8 99 18	168.9	44 50.2 99 17	169.0	44 20.6 99 17	169.2	43 51.1 99 17	169.3	8
9	47 06.9 98 20	167.0	46 37.5 98 20	167.2	46 08.1 98 20	167.3	45 38.6 98 20	167.4	45 09.2 98 20	167.6	44 39.7 98 19	167.7	44 10.3 98 19	167.8	43 40.8 98 19	168.0	9
10	46 54.6 98 22	165.6	46 25.3 98 22	165.8	45 56.0 98 22	165.9	45 26.7 98 22	166.1	44 57.4 98 21	166.2	44 28.1 98 21	166.4	43 58.8 98 21	166.5	43 29.4 98 21	166.7	10
1	46 41.0 97 25	164.2	46 11.9 97 24	164.4	45 42.8 97 24	164.6	45 13.6 97 24	164.7	44 44.5 97 24	164.9	44 15.3 97 23	165.1	43 46.1 97 23	165.2	43 16.9 97 23	165.4	1
2	46 26.3 97 27	162.8	45 57.5 97 26	163.0	45 28.4 97 26	163.2	44 59.3 97 26	163.4	44 30.3 97 26	163.6	44 01.3 97 25	163.7	43 32.2 97 25	163.9	43 03.0 97 25	164.1	2
3	46 10.4 96 28	161.5	45 41.6 96 28	161.7	45 12.8 96 28	161.9	44 43.9 96 28	162.1	44 15.1 96 27	162.3	43 46.2 96 27	162.4	43 17.3 96 27	162.6	42 48.4 96 26	162.8	3
4	45 53.3 95 30	160.1	45 24.7 95 30	160.3	44 56.0 96 30	160.6	44 27.4 96 30	160.8	43 58.7 96 29	161.0	43 30.0 96 29	161.2	43 01.2 96 29	161.4	42 32.5 96 28	161.6	4
15	45 35.1 95 32	158.8	45 06.5 94 33	159.0	44 38.2 94 33	159.2	44 09.2 95 31	159.5	43 41.2 95 31	159.7	43 12.6 95 31	159.9	42 44.1 95 31	160.1	42 15.5 95 32	160.3	15
6	45 15.7 94 34	157.5	44 47.6 94 34	157.7	44 19.2 95 33	157.9	43 50.9 95 31	158.2	43 22.6 95 31	158.4	42 54.2 95 32	158.6	42 25.9 95 32	158.8	41 57.5 95 32	159.1	6
7	44 55.3 94 36	156.2	44 27.2 93 36	156.4	43 59.2 94 35	156.7	43 31.1 94 35	156.9	43 02.9 94 34	157.2	42 34.8 94 34	157.4	42 06.6 94 34	157.6	41 38.4 94 34	157.9	7
8	44 33.7 93 38	154.9	44 05.9 93 37	155.2	43 38.1 93 37	155.4	43 10.2 93 37	155.7	42 42.2 93 35	155.9	42 14.3 93 36	156.2	41 46.3 93 35	156.4	41 18.3 93 35	156.6	8
9	44 11.2 92 39	153.6	43 43.6 92 39	153.9	43 15.9 92 38	154.2	42 48.2 92 38	154.4	42 20.5 92 38	154.7	41 52.8 93 38	155.0	41 25.0 93 37	155.2	40 57.2 93 37	155.5	9
20	43 47.6 91 41	152.4	43 20.2 91 41	152.7	42 52.8 91 40	152.9	42 25.3 90 40	153.2	41 57.8 92 39	153.5	41 30.3 92 39	153.8	41 02.7 92 39	154.0	40 35.1 92 38	154.3	20
1	43 23.0 90 43	151.2	42 55.9 91 42	151.5	42 28.7 91 42	151.7	42 01.4 91 41	152.0	41 34.2 91 41	152.3	41 06.8 91 41	152.6	40 39.5 91 40	152.9	40 12.1 91 40	153.1	1
2	42 57.5 90 44	150.0	42 30.6 90 44	150.3	42 03.6 90 43	150.6	41 36.6 90 43	150.8	41 09.5 90 43	151.1	40 42.5 90 42	151.4	40 15.3 91 42	151.7	39 48.1 91 41	152.0	2
3	42 31.0 89 46	148.8	42 04.3 89 45	149.1	41 37.6 89 45	149.4	41 10.8 89 44	149.7	40 44.0 89 44	150.0	40 17.1 90 44	150.3	39 50.2 90 43	150.6	39 23.3 90 43	150.8	3
4	42 03.6 88 47	147.6	41 37.2 88 47	147.9	41 10.7 88 46	148.2	40 44.1 89 46	148.5	40 17.5 89 45	148.8	39 50.9 89 45	149.1	39 24.2 89 45	149.4	38 57.5 89 44	149.7	4
25	41 35.3 87 49	146.4	41 09.1 87 48	146.8	40 42.9 88 48	147.1	40 16.6 88 47	147.4	39 50.2 88 47	147.7	39 23.8 88 47	148.0	38 57.4 88 46	148.3	38 30.9 88 46	148.6	25
6	41 06.2 86 50	145.3	40 40.2 87 50	145.6	40 14.2 87 49	146.0	39 48.2 87 49	146.3	39 22.1 87 48	146.6	38 55.9 87 48	146.9	38 29.7 87 48	147.2	38 03.4 88 47	147.6	6
7	40 36.2 86 51	144.2	40 10.5 86 51	144.5	39 44.7 86 50	144.9	39 18.9 86 50	145.2	38 53.1 86 50	145.5	38 27.2 86 49	145.9	38 01.2 87 49	146.2	37 35.2 87 48	146.5	7
8	40 05.4 85 53	143.1	39 40.0 85 52	143.5	39 14.5 85 52	143.8	38 48.9 85 51	144.1	38 23.3 85 51	144.5	37 57.6 86 51	144.8	37 31.9 86 50	145.1	37 06.1 86 50	145.4	8
9	39 33.8 84 54	142.0	39 08.6 84 54	142.4	38 43.4 84 53	142.7	38 18.1 84 53	143.1	37 52.7 85 53	143.4	37 27.2 85 52	143.8	37 01.8 85 51	144.1	36 36.2 85 51	144.4	9
30	39 01.5 83 55	141.0	38 36.5 83 55	141.3	38 11.5 83 54	141.7	37 46.5 84 54	142.0	37 21.3 84 53	142.4	36 56.2 84 53	142.7	36 30.9 84 53	143.1	36 05.6 84 52	143.4	30
1	38 28.4 82 56	139.9	38 03.7 82 56	140.3	37 39.0 83 56	140.7	37 14.1 83 55	141.0	36 49.3 83 55	141.4	36 24.3 83 54	141.7	35 59.3 84 54	142.1	35 34.3 84 53	142.4	1
2	37 54.6 81 57	138.9	37 30.2 82 57	139.3	37 05.7 82 57	139.7	36 41.1 82 56	140.0	36 16.5 82 56	140.4	35 51.8 82 55	140.7	35 27.0 83 55	141.1	35 02.2 83 55	141.4	2
3	37 20.1 81 59	138.0	36 55.9 81 58	138.3	36 31.7 81 58	138.7	36 07.4 81 57	139.0	35 43.0 81 57	139.4	35 18.5 82 56	139.7	34 54.0 82 56	140.1	34 29.5 82 56	140.4	3
4	36 45.0 80 60	136.9	36 21.1 80 59	137.3	35 57.0 80 59	137.7	35 33.0 80 59	138.1	35 08.8 81 58	138.4	34 44.6 81 58	138.8	34 20.4 81 57	139.1	33 56.0 81 57	139.5	4
35	36 09.2 79 61	136.0	35 45.5 79 60	136.4	35 21.8 79 60	136.7	34 57.9 80 59	137.1	34 34.0 80 59	137.5	34 10.1 80 59	137.8	33 46.1 80 58	138.2	33 22.0 80 58	138.6	35
6	35 32.8 78 62	135.0	35 09.3 78 61	135.4	34 45.8 78 61	135.8	34 22.3 79 60	136.2	33 58.6 79 60	136.5	33 34.9 79 60	136.9	33 11.1 79 59	137.3	32 47.3 80 59	137.6	6
7	34 55.8 77 63	134.1	34 32.6 77 62	134.5	34 09.3 78 62	134.9	33 46.0 78 61	135.3	33 22.6 78 61	135.6	32 59.1 78 61	136.0	32 35.6 79 60	136.4	32 12.0 79 60	136.7	7
8	34 18.2 76 64	133.2	33 55.2 77 63	133.6	33 32.2 77 63	134.0	33 09.1 77 62	134.4	32 45.9 77 62	134.7	32 22.7 78 62	135.1	31 59.4 78 61	135.5	31 36.1 78 61	135.8	8
9	33 40.0 76 64	132.3	33 17.3 76 64	132.7	32 54.5 76 64	133.1	32 31.7 76 63	133.5	32 08.7 77 63	133.8	31 45.8 77 62	134.2	31 22.7 77 62	134.6	30 59.6 77 62	135.0	9
40	33 01.3 75 65	131.4	32 38.8 75 65	131.8	32 16.3 75 65	132.2	31 53.7 76 64	132.6	31 31.0 76 64	133.0	31 08.2 76 63	133.4	30 45.4 76 63	133.7	30 22.5 76 63	134.1	40
1	32 22.1 74 66	130.6	31 59.9 74 66	131.0	31 37.6 74 65	131.3	31 15.2 75 65	131.7	30 52.7 75 65	132.1	30 30.2 75 64	132.5	30 07.6 75 64	132.9	29 45.0 76 64	133.3	1
2	31 42.4 73 67	129.7	31 20.4 73 67	130.1	30 58.3 74 66	130.5	30 36.1 74 66	130.9	30 13.9 74 66	131.3	29 51.5 74 65	131.7	29 29.3 75 65	132.1	29 06.9 75 64	132.4	2
3	31 02.2 72 68	128.9	30 40.4 73 67	129.3	30 18.5 73 67	129.7	29 56.5 73 67	130.1	29 34.6 73 66	130.5	29 12.6 74 66	130.9	28 50.5 74 66	131.3	28 28.3 74 65	131.6	3
4	30 21.5 72 69	128.1	29 59.9 72 68	128.5	29 38.3 72 67	128.9	29 16.6 72 67	129.3	28 54.9 73 67	129.7	28 33.0 73 67	130.0	28 11.1 73 66	130.4	27 49.2 73 66	130.8	4
45	29 40.3 71 69	127.2	29 19.0 71 69	127.7	28 57.6 71 69	128.1	28 36.1 72 68	128.5	28 14.6 72 68	128.8	27 53.0 72 67	129.2	27 31.3 72 67	129.6	27 09.6 73 67	130.0	45
6	28 58.7 70 70	126.5	28 37.6 70 70	126.9	28 16.5 71 69	127.3	27 55.2 71 69	127.7	27 33.9 71 69	128.1	27 12.5 71 68	128.5	26 51.1 72 68	128.8	26 29.6 72 67	129.2	6
7	28 16.7 69 71	125.7	27 55.9 70 70	126.1	27 34.9 70 70	126.5	27 13.9 70 70	126.9	26 52.8 70 69	127.3	26 31.6 71 69	127.7	26 10.4 71 69	128.1	25 49.1 71 68	128.5	7
8	27 34.4 69 72	124.9	27 13.7 69 71	125.3	26 52.9 69 71	125.7	26 32.1 69 70	126.1	26 11.2 70 70	126.5	25 50.3 70 70	126.9	25 29.3 70 69	127.3	25 08.2 70 69	127.7	8
9	26 51.5 68 72	124.2	26 31.1 68 72	124.6	26 10.5 69 71	125.0	25 50.0 69 71	125.4	25 29.3 69 71	125.8	25 08.6 69 70	126.2	24 47.8 69 70	126.6	24 26.9 70 70	127.0	9
50	26 08.3 67 73	123.4	25 48.1 68 72	123.8	25 27.8 68 72	124.2	25 07.4 68 72	124.6	24 46.9 68 71	125.0	24 26.4 69 71	125.4	24 05.9 69 70	125.8	23 45.2 69 70	126.2	50
1	25 24.8 67 73	122.7	25 04.7 67 73	123.1	24 44.6 67 73	123.5	24 24.5 67 72	123.9	24 04.2 68 72	124.3	23 43.9 68 72	124.7	23 23.5 68 71	125.1	23 03.1 68 71	125.5	1
2	24 40.9 66 74	122.0	24 21.0 66 73	122.4	24 01.1 66 73	122.8	23 41.2 67 73	123.2	23 21.1 67 72	123.6	23 01.0 67 72	124.0	22 40.9 67 72	124.4	22 20.6 67 71	124.8	2
3	23 56.6 65 74	121.3	23 37.0 66 74	121.7	23 17.3 66 74	122.1	22 57.5 66 73	122.5	22 37.7 66 73	122.9	22 17.8 66 73	123.3	21 57.8 67 72	123.7	21 37.8 67 72	124.1	3
4	23 12.1 65 75	120.6	22 52.6 65 75	121.0	22 33.1 65 74	121.4	22 13.5 65 74	121.8	21 53.9 66 74	122.2	21 34.2 66 73	122.6	21 14.4 66 73	123.0	20 54.6 66 73	123.4	4
55	22 27.2 64 75	119.9	22 07.9 64 75	120.3	21 48.6 65 75	120.7	21 29.2 65 74	121.1	21 09.8 65 74	121.5	20 50.8 65 74	121.9	20 30.7 65 73	122.3	20 11.1 65 73	122.8	55
6	21 42.0 63 76	119.2	21 22.9 64 76	119.6	21 03.8 64 75	120.0	20 44.6 64 75	120.5	20 25.3 64 75	120.9	20 06.0 64 74	121.3	19 46.6 65 74	121.7	19 27.2 65 74	122.1	6
7	20 56.5 63 76	118.6	20 37.6 63 76	119.0	20 18.6 63 76	119.4	19 59.6 63 75	119.8	19 40.6 64 75	120.2	19 21.4 64 75	120.6	19 02.3 64 74	121.0	18 43.0 64 74	121.4	7
8	20 10.7 62 77	117.9	19 52.0 62 76	118.3	19 33.2 63 76	118.7	19 14.4 63 76	119.1	18 55.5 63 76	119.6	18 36.6 63 75	120.0	18 17.6 63 75	120.4	17 58.5 64 75	120.7	8
9	19 24.6 62 77	117.3	19 06.1 62 77	117.7	18 47.5 62 77	118.1	18 28.9 62 76	118.5	18 10.2 62 76	118.9	17 51.4 63 76	119.3	17 32.6 63 75	119.7	17 13.8 63 75	120.1	9
60	18 38.3 61 78	116.6	18 19.9 61 77	117.0	18 01.5 61 77	117.5	17 43.1 62 77	117.9	17 24.5 62 77	118.3	17 06.0 62 76	118.7	16 47.3 62 76	119.1	16 28.7 62 76	119.5	60
1	17 51.7 61 78	116.0	17 33.5 61 78	116.4	17 15.3 61 78	116.8	16 57.0 61 77	117.2	16 38.6 61 77	117.7	16 20.2 61 77	118.1	16 01.8 62 76	118.5	15 43.3 62 76	118.9	1
2	17 04.9 60 78	115.4	16 46.9 60 78	115.8	16 28.8 60 78	116.2	16 10.7 61 78	116.6	15 52.5 61 77	117.0	15 34.3 61 77	117.5	15 16.0 61 77	117.9	14 57.7 61 76	118.3	2
3	16 17.8 59 79	114.8	16 00.0 59 79	115.2	15 42.1 60 78	115.6	15 24.1 60 78	116.0	15 06.1 60 78	116.4	14 48.0 60 77	116.9	14 29.9 60 77	117.3	14 11.8 61 77	117.7	3
4	15 30.5 59 79	114.2	15 12.8 59 79	114.6	14 55.1 59 79	115.0	14 37.3 59 78	115.4	14 19.4 60 78	115.8	14 01.5 60 78	116.2	13 43.6 60 78	116.7	13 25.6 60 77	117.1	4
65	14 43.0 58 80	113.6	14 25.5 58 79	114.0	14 07.9 59 79	114.4	13 50.2 59 79	114.8	13 32.5 59 78	115.2	13 14.8 59 78	115.7	12 57.1 59 78	116.1	12 39.3 59 78	116.5	65
6	13 55.3 58 80	113.0	13 37.9 58 80	113.4	13 20.4 58 79	113.8	13 03.0 59 79	114.2	12 45.4 58 79	114.7	12 27.9 59 78	115.1	12 10.3 59 78	115.5	11 52.6 59 78	115.9	6
7	13 07.3 57 80	112.4	12 50.1 57 80	112.8	12 32.8 58 80	113.2	12 15.5 58 79	113.7	11 58.1 58 79	114.1	11 40.7 58 79	114.5	11 23.2 58 79	114.9	11 05.8 59 78	115.3	7
8	12 19.2 57 81	111.8	12 02.1 57 81	112.2	11 45.0 57 80	112.7	11 27.8 57 80	113.1	11 10.6 58 80	113.5	10 53.3 58 79	113.9	10 36.0 58 79	114.3	10 18.7 58 79	114.7	8
9	11 30.9 56 81	111.3	11 13.9 57 81	111.7	10 56.9 57 80	112.1	10 39.9 57 80	112.5	10 22.8 57 80	112.9	10 05.7 57 80	113.4	9 48.6 57 79	113.8	9 31.4 57 79	114.2	9
70	10 42.4 56 81	110.7	10 25.5 56 81	111.1	10 08.7 56 81	111.5	9 51.8 56 80	112.0	9 34.8 56 80	112.4	9 17.9 57 80	112.8	9 00.9 57 80	113.2	8 43.9 57 80	113.6	70
1	9 53.7 56 81	110.1	9 37.0 56 81	110.6	9 20.2 56 81	111.0	9 03.5 56 81	111.4	8 46.7 56 81	111.8	8 29.9 56 80	112.2	8 13.1 56 80	112.7	7 56.2 56 80	113.1	1
2	9 04.8 55 82	109.6	8 48.2 55 82	110.0	8 31.6 55 82	110.4	8 15.0 55 81	110.9	7 58.4 56 81	111.3	7 41.7 56 81	111.7	7 25.0 56 80	112.1	7 08.3 56 80	112.5	2
3	8 15.8 55 82	109.1	7 59.3 55 82	109.5	7 42.9 55 82	109.9	7 26.4 55 82	110.3	7 09.9 55 81	110.7	6 53.3 55 81	111.2	6 36.8 55 81	111.6	6 20.2 55 80	112.0	3
4	7 26.6 54 82	108.5	7 10.3 54 82	108.9	6 53.9 54 82	109.4	6 37.6 55 82	109.8	6 21.2 55 81	110.2	6 04.8 55 81	110.6	5 48.4 55 81	111.0	5 31.9 55 81	111.5	4
75	6 37.2 54 82	108.0	6 21.0 54 82	108.4	6 04.8 54 82	108.8	5 48.6 54 82	109.3	5 32.3 54 82	109.7	5 16.1 54 82	110.1					75
6	5 47.7 54 83	107.5	5 31.7 54 83	107.9	5 15.6 54 82	108.3											6

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00' Alt	Az	12° 30' Alt	Az	13° 00' Alt	Az	13° 30' Alt	Az	14° 00' Alt	Az	14° 30' Alt	Az	15° 00' Alt	Az	15° 30' Alt	Az	H.A.
91	5 07.0 49 85	79.1	5 21.8 49 85	78.6	5 36.6 49 85	78.2	5 51.4 49 85	77.8	6 06.1 49 84	77.3	6 20.8 49 84	76.9	6 35.4 49 84	76.5	6 50.3 49 84	76.0	91
2							5 00.6 50 84	77.3	5 15.5 49 84	76.9	5 30.3 49 84	76.4	5 45.1 49 84	76.0	5 59.9 49 84	75.5	2
3															5 09.6 50 84	75.1	3

Lat. 30°

H.A.	16° 00' Alt.	Δd Δt	Az.	16° 30' Alt.	Δd Δt	Az.	17° 00' Alt.	Δd Δt	Az.	17° 30' Alt.	Δd Δt	Az.	18° 00' Alt.	Δd Δt	Az.	18° 30' Alt.	Δd Δt	Az.	19° 00' Alt.	Δd Δt	Az.	19° 30' Alt.	Δd Δt	Az.	H.A.
00	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	77 00.0	1.0 03	180.0	77 30.0	1.0 03	180.0	78 00.0	1.0 03	180.0	78 30.0	1.0 04	180.0	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	00
1	75 58.2	1.00 00	176.0	76 28.1	1.00 00	175.9	76 58.1	1.0 10	175.8	77 28.0	1.0 10	175.6	77 57.9	1.0 10	175.4	78 27.8	1.0 11	175.3	78 57.8	1.0 11	175.1	79 27.7	1.0 12	174.8	1
2	75 52.8	99 15	172.1	76 22.6	99 15	171.8	76 52.3	99 16	171.6	77 22.6	99 16	171.2	77 51.7	99 17	170.9	78 21.4	99 18	170.6	78 51.1	99 18	170.2	79 20.7	99 19	169.8	2
3	75 43.9	98 20	168.2	76 13.4	98 21	167.8	76 42.8	98 22	167.4	77 12.2	98 23	167.0	77 41.6	98 24	166.5	78 10.9	98 24	166.0	78 40.1	97 25	165.4	79 09.2	97 26	164.8	3
4	75 31.6	97 26	164.4	76 00.7	97 27	163.9	76 29.7	97 28	163.4	76 58.7	96 28	162.8	77 27.5	96 29	162.2	77 56.3	96 30	161.5	78 25.0	95 32	160.8	78 53.5	95 32	160.0	4
05	75 16.1	95 31	160.8	75 44.7	95 32	160.2	76 13.2	95 33	159.5	76 41.6	94 34	158.8	77 09.9	94 35	158.1	77 38.0	94 36	157.3	78 06.0	93 37	156.4	78 33.9	92 39	155.5	05
6	74 57.5	94 36	157.2	75 25.5	93 37	156.5	75 53.5	93 38	155.8	76 21.2	92 39	155.0	76 48.9	92 40	154.2	77 16.3	91 42	153.3	77 43.6	90 43	152.3	78 10.6	90 44	151.3	6
7	74 35.9	92 40	153.8	75 03.4	91 41	153.1	75 30.7	91 43	152.2	75 57.8	90 44	151.4	76 24.7	89 45	150.4	76 51.4	89 46	149.5	77 17.8	88 48	148.4	77 44.0	87 49	147.3	7
8	74 11.7	90 45	150.6	74 38.5	89 47	149.6	75 05.1	89 47	148.9	75 31.5	88 49	147.9	75 57.7	87 49	146.9	76 23.6	86 51	145.9	76 49.2	85 52	144.8	77 14.5	84 54	143.6	8
9	73 45.0	87 48	147.5	74 11.1	87 50	146.6	74 37.0	86 51	145.7	75 02.7	85 52	144.7	75 28.1	84 53	143.6	75 53.2	83 55	142.5	76 18.0	82 56	141.4	76 42.4	81 57	140.1	9
10	73 15.9	85 52	144.6	73 41.4	84 53	143.6	74 06.6	84 54	142.7	74 31.5	83 55	141.6	74 56.1	82 57	140.5	75 20.4	80 58	139.4	75 44.4	79 59	138.2	76 08.0	78 61	136.9	10
1	72 44.8	83 55	141.8	73 09.6	82 56	140.8	73 34.1	81 57	139.8	73 58.2	80 59	138.8	74 22.1	79 60	137.7	74 45.6	78 61	136.5	75 08.8	76 62	135.3	75 31.5	75 64	134.0	1
2	72 11.7	81 58	139.2	72 35.8	80 59	138.2	72 59.6	79 60	137.2	73 23.1	78 61	136.1	73 46.2	78 63	135.0	74 09.0	75 64	133.8	74 31.3	74 65	132.6	74 53.2	72 66	131.3	2
3	71 36.9	79 61	136.7	72 00.3	78 62	135.7	72 23.5	77 63	134.7	72 46.2	75 64	133.6	73 08.7	74 65	132.5	73 30.7	73 67	131.3	73 52.3	71 67	130.0	74 13.4	70 69	128.7	3
4	71 00.5	77 63	134.4	71 23.5	75 64	133.4	71 45.8	74 65	132.3	72 07.9	73 66	131.2	72 29.6	72 67	130.1	72 50.9	70 68	128.9	73 11.8	69 70	127.7	73 32.3	67 71	126.4	4
15	70 22.7	74 65	132.2	70 44.9	73 66	131.2	71 06.7	72 67	130.1	71 28.2	71 68	129.0	71 49.2	70 69	127.9	72 09.9	68 70	126.7	72 30.1	67 71	125.5	72 49.9	65 72	124.3	15
6	69 43.6	72 67	130.1	70 05.1	71 68	129.1	70 26.4	70 69	128.1	70 47.2	69 70	127.0	71 07.7	67 71	125.9	71 27.7	66 72	124.7	71 47.3	65 73	123.5	72 06.4	63 74	122.3	6
7	69 04.3	71 69	128.2	69 24.3	69 70	127.2	69 44.9	68 71	126.1	70 05.2	67 72	125.0	70 25.0	66 73	123.9	70 44.5	64 74	122.7	71 03.5	63 74	121.6	71 22.0	61 75	120.4	7
8	68 21.0	69 71	126.3	68 42.4	68 71	125.3	69 02.5	66 72	124.3	69 22.2	65 73	123.2	69 41.5	64 74	122.1	70 00.4	62 75	121.0	70 18.8	61 76	119.8	70 36.8	59 77	118.7	8
9	67 39.6	67 72	124.6	67 59.5	66 73	123.6	68 19.1	65 74	122.6	68 38.3	63 74	121.5	68 57.1	62 75	120.4	69 15.4	61 76	119.3	69 33.4	59 77	118.2	69 50.9	57 78	117.0	9
20	66 56.4	65 73	122.9	67 15.8	64 74	122.0	67 34.9	63 75	120.9	67 53.6	62 76	119.9	68 11.9	60 76	118.9	68 29.8	59 77	117.8	68 47.3	57 78	116.7	69 04.2	56 79	115.5	20
1	66 12.4	64 75	121.4	66 31.4	63 75	120.4	66 50.0	61 76	119.4	67 08.2	60 77	118.4	67 26.1	59 77	117.4	67 43.5	57 78	116.3	68 00.5	56 79	115.2	68 17.1	54 80	114.1	1
2	65 27.7	62 76	119.9	65 46.2	61 76	118.9	66 04.4	60 77	118.0	66 22.2	59 78	117.0	66 39.6	57 78	115.9	66 56.6	56 79	114.9	67 13.2	55 80	113.8	67 29.4	53 80	112.7	2
3	64 42.3	61 77	118.5	65 00.4	60 77	117.5	65 18.2	59 78	116.6	65 35.6	57 79	115.6	65 52.6	56 79	114.6	66 09.3	55 80	113.6	66 25.5	53 80	112.5	66 41.2	52 81	111.5	3
4	63 56.3	60 78	117.1	64 14.1	59 78	116.2	64 31.5	57 79	115.3	64 48.5	56 79	114.3	65 05.2	55 80	113.3	65 21.4	54 80	112.3	65 37.3	52 81	111.3	65 52.7	51 82	110.3	4
25	63 09.8	59 78	115.9	63 27.2	57 79	115.0	63 44.2	56 79	114.0	64 00.9	55 80	113.1	64 17.2	54 81	112.1	64 33.1	52 81	111.1	64 48.7	51 82	110.1	65 03.8	50 82	109.1	25
6	62 22.8	57 79	114.6	62 39.9	56 80	113.7	62 56.6	55 80	112.8	63 12.9	54 81	111.8	63 28.9	53 81	111.0	63 44.5	51 82	110.0	63 59.7	50 82	109.0	64 14.5	49 83	108.0	6
7	61 35.4	56 80	113.5	61 52.1	55 80	112.6	62 08.5	54 81	111.7	62 24.5	53 81	110.8	62 40.2	52 82	109.9	62 55.5	50 82	108.9	63 10.4	49 83	108.0	63 25.0	48 83	107.0	7
8	60 47.5	55 80	112.4	61 03.9	54 81	111.5	61 20.0	53 81	110.6	61 35.8	52 82	109.7	61 51.2	51 82	108.8	62 06.2	49 83	107.9	62 20.9	48 83	107.0	62 35.1	47 83	106.0	8
9	59 59.3	54 81	111.3	60 15.4	53 81	110.4	60 31.2	52 82	109.6	60 46.7	51 82	108.7	61 01.8	50 83	107.8	61 16.6	49 83	106.9	61 31.0	47 83	106.0	61 45.1	46 84	105.1	9
30	59 10.7	53 82	110.3	59 26.6	52 82	109.4	59 42.1	51 82	108.6	59 57.4	50 83	107.7	60 12.4	49 83	106.9	60 26.8	48 83	106.0	60 41.0	47 84	105.1	60 54.8	45 84	104.2	30
1	58 21.8	52 82	109.3	58 37.4	52 82	108.5	58 52.7	51 83	107.6	59 07.7	49 83	106.8	59 22.4	48 83	105.9	59 36.7	47 84	105.1	59 50.7	46 84	104.2	60 04.3	45 84	103.3	1
2	57 32.6	52 82	108.3	57 48.0	51 83	107.5	58 03.1	50 83	106.7	58 17.9	49 83	105.9	58 32.3	48 84	105.1	58 46.5	47 84	104.2	59 00.2	46 84	103.4	59 13.7	44 85	102.5	2
3	56 43.2	51 83	107.4	56 58.3	50 83	106.6	57 13.2	49 84	105.8	57 27.8	48 84	105.0	57 42.1	47 84	104.2	57 56.0	46 84	103.4	58 09.6	45 85	102.5	58 22.9	44 85	101.7	3
4	55 53.5	50 83	106.6	56 08.4	49 84	105.8	56 23.1	48 84	105.0	56 37.5	47 84	104.2	56 51.6	46 84	103.4	57 05.4	45 85	102.6	57 18.8	44 85	101.8	57 31.9	43 85	100.9	4
35	55 03.6	50 84	105.7	55 18.3	49 84	104.9	55 32.8	48 84	104.2	55 47.1	47 85	103.4	56 01.0	46 85	102.6	56 14.6	45 85	101.8	56 27.9	44 85	101.0	56 40.8	43 85	100.2	35
6	54 13.4	49 84	104.9	54 28.0	48 84	104.1	54 42.4	47 84	103.4	54 56.4	46 85	102.6	55 10.2	45 85	101.8	55 23.6	44 85	101.0	55 36.8	43 86	100.3	55 49.6	42 86	99.4	6
7	53 23.1	49 84	104.1	53 37.6	48 84	103.3	53 51.7	47 85	102.6	54 05.6	46 85	101.8	54 19.3	45 85	101.1	54 32.6	44 85	100.3	54 45.6	43 86	99.5	54 58.3	42 86	98.8	7
8	52 32.6	48 84	103.3	52 46.9	47 85	102.6	53 01.0	46 85	101.9	53 14.7	45 85	101.1	53 28.2	44 85	100.4	53 41.4	44 85	99.6	53 54.3	43 86	98.8	54 06.9	42 86	98.1	8
9	51 42.0	48 85	102.6	51 56.1	47 85	101.8	52 10.0	46 85	101.1	52 23.7	45 85	100.4	52 37.0	44 85	99.7	52 50.1	43 86	98.9	53 02.9	42 86	98.2	53 15.4	41 86	97.4	9
40	50 51.2	47 85	101.8	51 05.2	46 85	101.1	51 19.0	45 85	100.4	51 32.5	45 85	99.7	51 45.8	44 86	99.0	51 58.7	43 86	98.3	52 11.4	42 86	97.5	52 23.9	41 86	96.8	40
1	50 00.3	47 85	101.1	50 14.2	46 85	100.4	50 27.8	45 85	99.7	50 41.2	44 86	99.0	50 54.4	43 86	98.3	51 07.3	43 86	97.6	51 19.9	42 86	96.9	51 32.2	41 86	96.1	1
2	49 09.2	46 85	100.4	49 23.0	46 85	99.8	49 36.6	45 86	99.1	49 49.9	44 86	98.4	50 02.9	43 86	97.7	50 15.7	42 86	97.0	50 28.3	41 86	96.3	50 40.5	40 86	95.5	2
3	48 18.1	46 85	99.8	48 31.8	45 86	99.1	48 45.2	44 86	98.4	48 58.4	44 86	97.7	49 11.4	43 86	97.0	49 24.1	42 86	96.4	49 36.6	41 86	95.7	49 48.8	40 86	94.9	3
4	47 26.8	46 86	99.1	47 40.4	45 86	98.4	47 53.8	44 86	97.8	48 06.9	43 86	97.1	48 19.8	43 86	96.4	48 32.4	42 86	95.7	48 44.8	41 86	95.1	48 57.0	40 86	94.4	4
45	46 35.5	45 86	98.5	46 49.0	45 86	97.8	47 02.3	44 86	97.2	47 15.3	43 86	96.5	47 28.1	42 86	95.8	47 40.7	42 86	95.2	47 53.1	41 86	94.5	48 05.2	40 86	93.8	45
6	45 44.0	45 86	97.8	45 57.5	44 86	97.2	46 10.7	44 86	96.5	46 23.6	43 86	95.9	46 36.4	42 86	95.2	46 48.9	41 86	94.6	47 01.2	41 86	93.9	47 13.3	40 86	93.2	6
7	44 52.5	45 86	97.2	45 05.9	44 86	96.6	45 19.0	43 86	96.0	45 31.9	43 86	95.3	45 44.6	42 86	94.7	45 57.1	41 86	94.0	46 09.4	40 86	93.3	46 21.4	40 87	92.7	7
8	44 00.9	44 86	96.6	44 14.2	44 86	96.0	44 27.3	43 86	95.4	44 40.2	42 86	94.7	44 52.8	42 86	94.1	45 05.3	41 86	93.4	45 17.5	40 87	92.8	45 29.5	40 87	92.1	8
9	43 09.3	44 86	96.0	43 22.5	44 86	95.4	43 35.5	43 86	94.8	43 48.4	42 86	94.2	44 01.0	42 86	93.5	44 13.4	41 87	92.9	44 25.6	40 87	92.2	44 37.6	40 87	91.6	9
50	42 17.6	44 86	95.4	42 30.8	44 86	94.8	42 43.7	43 86	94.2	42 56.5	42 86	93.6	43 09.1	42 86	93.0	43 21.5	41 87	92.4	43 33.7	40 87	91.7	43 45.6	40 87	91.1	50
1	41 25.8	44 86	94.9	41 39.0	43 86	94.3	41 51.9	43 86	93.7	42 04.7	42 86	93.1	42 17.2	42 87	92.5	42 29.6	41 87	91.8	42 41.7	41 87	91.2	42 53.7	40 87	90.6	1
2	40 34.0	44 86	94.3	40 47.1	43 86	93.7	41 00.0	43 86	93.1	41 12.8	42 87	92.5	41 25.3	41 87	91.9	41 37.6	41 87	91.3	41 49.8	40 87	90.7	42 01.7	39 87	90.1	2
3	39 42.2	44 86	93.8	39 55.2	43 86	93.2	40 08.1	43 87	92.6	40 20.8	42 87	92.0	40 33.2	41 87	91.4	40 45.7	41 87	90.8	40 57.8	40 87	90.2	41 09.7	39 87	89.6	3
4	38 50.4	44 86	93.2	39 03.4	43 87	92.6	39 16.2	42 87	92.1	39 28.9	42 87	91.5	39 41.4	41 87	90.9	39 53.7	41 87	90.3	40 05.5	40 87	89.7	40 17.8	40 87	89.1	4
55	37 58.5	44 86	92.7	38 11.5	43 87	92.1	38 24.3	42 87	91.5	38 36.9	42 87	91.0	38 49.4	41 87	90.4	39 01.7	41 87	89.8	39 13.9	40 87	89.2	39 25.8	40 87	88.6	55
6	37 06.5	44 87	92.2	37 19.5	43 87	91.6	37 32.3	42 87	91.0	37 45.0	42 87	90.5	37 57.5	41 87	89.9	38 09.8	41 87	89.3	38 21.9	40 87	88.7	38 33.9	40 87	88.1	6
7	36 14.6	43 87	91.6	36 27.6	43 87	91.1	36 40.4	42 87	90.5	36 53.0	42 87	90.0	37 05.5	41 87	89.4	37 17.8	41 87	88.8	37 30.0	40 87	88.2	37 42.0	40 86	87.7	7
8	35 22.7	43 87	91.1	35 35.6	43 87	90.6	35 48.4	42 87	90.0	36 01.1	41 87	89.5	36 13.6	41 87	88.9	36 25.9	41 87	88.3	36 38.1	40 86	87.8	36 50.1	40 86	87.2	8
9	34 30.7	43 87	90.6	34 43.7	43 87	90.1	34 56.5	42 87	89.5	35 09.1	41 87	89.0	35 21.6	41 87	88.4	35 34.0	41 87	87.8	35 46.1	40 86	87.3	35 58.2	40 86	86.7	9
60	33 38.7	43 87	90.1	33 51.7	43 87	89.6	34 04.5	42 87	89.0	34 17.2	42 87	88.5	34 29.7	41 87	87.9	34 42.0	41 86	87.4	34 54.3	40 86	86.8	35 06.3	40 86	86.3	60
1	32 46.8	43 87	89.6	32 59.7	43 87	89.1	33 12.6	42 87	88.5	33 25.2	42 87	88.0	33 37.8	42 86	87.4	33 50.1	41 86	86.9	34 02.4	41 86	86.4	34 14.5	40 86	85.8	1
2	31 54.8	43 87	89.1	32 07.8	43 87	88.6	32 20.5	42 87	88.1	32 33.3	42 86	87.5	32 45.9	42 86	87.0	32 58.3	41 86	86.4	33 10.5	41 86	85.9	33 22.7	40 86	85.3	2
3	31 02.9	43 87	88.6	31 15.8	43 87	88.1	31 28.7	42 86	87.6	31 41.4	42 86	87.0	31 54.0	42 86	86.5	32 06.4	41 86	86.0	32 18.7	41 86	85.4	32 30.9	40 86	84.9	3
4	30 10.9	43 87	88.1	30 23.9	43 86	87.6	30 36.8	42 86	87.1	30 49.5	42 86	86.6	31 02.1	42 86	86.0	31 14.6	41 86	85.5	31 26.9	41 86	85.0	31 39.2	40 86	84.4	4
65	29 19.0	44 87	87.7	29 32.0	43 86	87.1	29 44.9	43 86	86.6	29 57.7	42 86	86.1	30 10.3	42 86	85.6	30 22.8	42 86	85.1	30 35.2	41 86	84.5	30 47.5	41 86	84.0	65
6	28 27.1	44 86	87.2	28 40.1	43 86	86.7	28 53.0	43 86	86.2	29 05.8	42 86	85.6	29 18.5	42 86	85.1	29 31.1	42 86	84.6	29 43.5	41 86	84.1	29 55.8	41 86	83.5	6
7	27 35.2	44 86	86.7	27 48.3	43 86	86.2	28 01.2	43 86	85.7	28 14.0	43 86	85.2	28 26.8	42 86	84.7	28 39.4	42 86	84.1	28 51.8	41 86	83.6	29 04.2	41 86	83.1	7
8	26 43.4	44 86	86.2	26 56.4	43 86	85.7	27 09.4	43 86	85.2	27 22.3	43 86	84.7	27 35.0	42 86	84.2	27 47.7	42 86	83.7	28 00.2	42 86	83.2	28 12.6	41 86	82.7	8
9	25 51.5	44 86	85.8	26 04.6	44 86	85.3	26 17.7	43 86	84.8	26 30.6	43 86	84.3	26 43.4	43 86	83.8	26 56.1	42 86	83.2	27 08.7	42 86	82.7	27 21.1	41 86	82.2	9
70	24 59.7	44 86	85.3	25 12.9	44 86	84.8	25 25.9	43 86	84.3	25 38.9	43 86	83.8	25 51.7	43 86	83.3	26 04.5	43 86	82.8	26 17.1	42 86	82.3	26 29.7	42 86	81.8	70
1	24 07.9	44 86	84.8	24 21.1	44 86	84.3	24 34.2	44 86	83.9	24 47.2	43 86	83.3	25 00.1	43 86	82.9	25 13.0	43 86	82.4	25 25.7	42 86	81.8	25 38.3	42 86	81.3	1
2	23 16.2	44 86	84.4	23 29.5	44 86	83.9	23 42.6	44 86	83.4	23 55.7	43 86	82.9	24 08.6	43 86	82.4	24 21.5	43 86	81.9	24 34.3	42 86	81.4	24 46.9	42 86	80.9	2
3	22 24.5	44 86	83.9	22 37.8	44 86	83.4	22 51.0	44 86	82.9	23 04.1	43 86	82.4	23 17.1	43 86	82.0	23 30.1	43 86	81.5	23 42.9	43 85	81.0	23 55.7	42 85	80.5	3
4	21 32.9	45 86	83.4	21 46.2	44 86	83.0	21 59.5	44 86	82.5	22 12.6	44 86	82.0	22 25.7	43 86	81.5	22 38.7	43 85	81.0	22 51.6	43 85	80.5	23 04.4	43 85	80.0	4
75	20 41.3	45 86	83.0	20 54.7	45 86	82.5	21 08.0	44 86	82.0	21 21.2	44 86	81.5	21 34.4	44 86	81.1	21 47.4	43 85	80.6	22 00.4	43 85	80.1	22 13.3	43 85	79.6	75
6	19 49.7	45 86	82.5	20 03.2	45 86	82.0	20 16.6	44 86	81.6	20 29.9	44 86	81.1	20 43.1	44 85	80.6	20 56.2	44 85	80.1	21 09.3	43 85	79.6	21 22.2	43 85	79.2	6
7	18 58.2	45 86	82.1	19 11.8	45 86	81.6	19 25.2	45 86	81.1	19 38.5	44 85	80.6	19 51.8	44 85	80.2	20 05.0	44 85	79.7	20 18.2	44 85	79.2	20 31.2	43 85	78.7	7
8	18 06.8	45 86	81.6	18 20.4	45 86	81.1	18 33.9	45 85	80.7	18 47.3	45 85	80.2	19 00.7	44 85	79.7	19 14.0	44 85	79.2	19 27.2	44 85	78.8	19 40.3	44 85	78.3	8
9	17 15.4	46 86	81.1	17 29.1	45 86	80.7	17 42.6	45 85	80.2	17 56.1	45 85	79.7	18 09.6	45 85	79.3	18 22.9	44 85	78.8	18 36.2	44 85	78.3	18 49.5	44 85	77.9	9
80	16 24.1	46 86	80.7	16 37.8	46 86	80.2	16 51.5	45 85	79.3	17 05.1	45 85	78.8	17 18.6	45 85	78.8	17 32.0	45 85	78.4	17 45.4	45 85	77.9	17 58.7	44 84	77.4	80
1	15 32.9	46 85	80.2	15 46.7	46 85	79.8	16 00.4	46 85	79.3	16 14.0	46 85	78.8	16 27.6	45 85	78.4	16 41.2	45 85	77.9	16 54.6	45 84	77.4	17 08.0	45 84	77.0	1
2	14 41.7	46 85	79.8	14 55.6	46 85	79.3	15 09.4	46 85	78.8	15 23.1	46 85	78.4	15 36.8	46 85	77.9	15 50.4	45 85	77.5	16 04.0	45 84	77.0	16 17.5	45 84	76.5	2
3	13 50.6	47 85	79.3	14 04.5	46 85	78.9	14 18.4	46 85	78.4	14 32.2	46 85	77.9	14 46.0	46 85	77.5	14 59.7	45 84	77.0	15 13.4	45 84	76.6	15 27.0	45 84	76.1	3
4	12 59.6	47 85	78.9	13 13.6	47 85	78.4	13 27.6	46 85	77.9	13 41.5	46 84	77.5	13 55.3	46 84	77.0	14 09.1	46 84	76.6	14 22.9	46 84	76.1	14 36.6	46 84	75.7	4
85	12 08.7	47 85	78.4	12 22.7	47 85	77.9	12 36.8	47 84	77.5	12 50.8	47 84	77.0	13 04.7	46 84	76.6	13 18.6	46 84	76.1	13 32.5	46 84	75.7	13 46.3	46 84	75.2	85
6	11 17.8	47 85	77.9	11 32.0	47 84	77.5	11 46.1	47 84	77.0	12 00.2	47 84	76.6	12 14.2	47 84	76.1	12 28.2	47 84	75.7	12 42.2	46 83	75.2	12 56.1	46 83	74.8	6
7	10 27.0	48 84	77.5	10 41.3	47 84	77.0	10 55.5	47 84	76.6	11 09.7	47 84	76.1	11 23.8	47 84	75.7	11 38.0	47 84	75.2	11 52.0	47 83	74.8	12 06.0	47 83	74.3	7
8	9 36.4	48 84	77.0	9 50.7	48 84	76.6	10 05.0	48 84	76.1	10 19.3	48 84	75.7	10 33.6	48 84	75.2	10 47.8	47 83	74.8	11 01.9	47 83	74.3	11 16.1	47 83	73.9	8
9	8 45.8	48 84	76.5	9 00.2	48 84	76.1	9 14.6	48 84	75.6	9 29.0	48 84	75.2	9 43.4	48 83	74.7	9 57.7	48 83	74.3	10 12.0	48 83	73.9	10 26.2	47 83	73.4	9
90	7 55.3	49 84	76.1	8 09.8	48 84	75.6	8 24.4	48 84	75.2	8 38.8	48 83	74.7	8 53.3	48 83	74.3	9 07.7	48 83	73.8	9 22.1	48 83	73.4	9 36.5	48 83	73.0	90

Table format per latitude column: Alt. (° ′) · Δd · Δt · Az. (°)

H.A.	16° 00′	16° 30′	17° 00′	17° 30′	18° 00′	18° 30′	19° 00′	19° 30′	H.A.
00	44 00.0 1.0 01 180.0	43 30.0 1.0 01 180.0	43 00.0 1.0 01 180.0	42 30.0 1.0 01 180.0	42 00.0 1.0 01 180.0	41 30.0 1.0 01 180.0	41 00.0 1.0 01 180.0	40 30.0 1.0 01 180.0	00
1	43 59.4 1.0 08 178.7	43 29.4 1.0 03 178.7	42 59.4 1.0 03 178.7	42 29.4 1.0 03 178.7	41 59.4 1.0 03 178.7	41 29.4 1.0 03 178.7	40 59.4 1.0 05 178.7	40 29.4 1.0 03 178.8	1
2	43 57.6 1.0 05 177.4	43 27.6 1.0 05 177.4	42 57.6 1.0 05 177.4	42 27.7 1.0 05 177.4	41 57.7 1.0 05 177.4	41 27.7 1.0 05 177.5	40 57.7 1.0 05 177.5	40 27.8 1.0 05 177.5	2
3	43 54.6 1.0 07 176.0	43 24.6 1.0 07 176.1	42 54.7 1.0 07 176.1	42 24.7 1.0 07 176.1	41 54.8 1.0 07 176.2	41 24.8 1.0 07 176.2	40 54.9 1.0 07 176.2	40 24.9 1.0 07 176.3	3
4	43 50.3 1.0 09 174.7	43 20.4 1.0 09 174.7	42 50.5 1.0 09 174.8	42 20.6 1.0 09 174.8	41 50.7 1.0 09 174.9	41 20.8 1.0 09 174.9	40 50.9 1.0 08 175.0	40 21.0 1.0 07 175.1	4
05	43 44.9 99 11 173.3	43 15.1 99 11 173.4	42 45.2 99 11 173.5	42 15.4 99 11 173.6	41 45.5 99 11 173.6	41 15.7 99 10 173.7	40 45.8 1.0 10 173.8	40 16.0 1.0 10 173.8	05
6	43 38.3 99 13 172.0	43 08.5 99 13 172.1	42 38.7 99 13 172.2	42 09.0 99 13 172.3	41 39.2 99 12 172.4	41 09.4 99 12 172.4	40 39.6 99 12 172.5	40 09.8 99 12 172.6	6
7	43 30.5 99 15 170.7	43 00.8 99 15 170.8	42 31.1 99 15 170.9	42 01.4 99 14 171.0	41 31.7 99 14 171.1	41 02.0 99 14 171.2	40 32.3 99 14 171.3	40 02.6 99 14 171.4	7
8	43 21.5 99 17 169.4	42 51.9 99 17 169.5	42 22.3 99 17 169.6	41 52.7 99 16 169.7	41 23.1 99 16 169.8	40 53.5 99 16 169.9	40 23.9 99 16 170.0	39 54.2 99 16 170.2	8
9	43 11.3 98 19 168.1	42 41.9 98 18 168.2	42 12.4 98 18 168.3	41 42.9 98 18 168.5	41 13.4 98 18 168.6	40 43.9 98 18 168.7	40 14.3 98 18 168.8	39 44.8 98 18 168.9	9
10	43 00.1 98 21 166.8	42 30.7 98 20 166.9	42 01.3 98 20 167.1	41 31.9 98 20 167.2	41 02.5 98 20 167.4	40 33.1 98 20 167.5	40 03.7 98 19 167.6	39 34.3 98 19 167.7	10
1	42 47.6 97 23 165.5	42 18.4 97 22 165.7	41 49.2 98 22 165.8	41 19.9 98 22 166.0	40 50.6 98 22 166.1	40 21.3 98 21 166.3	39 52.1 98 21 166.4	39 22.7 98 21 166.5	1
2	42 34.1 97 24 164.3	42 05.0 97 24 164.4	41 35.9 97 24 164.6	41 06.8 97 24 164.7	40 37.6 97 23 164.9	40 08.5 97 23 165.1	39 39.3 97 23 165.2	39 10.1 97 23 165.4	2
3	42 19.4 96 26 163.0	41 50.5 97 25 163.2	41 21.5 97 26 163.3	40 52.5 97 25 163.5	40 23.5 97 25 163.7	39 54.5 97 25 163.9	39 25.5 97 25 164.0	38 56.5 97 24 164.2	3
4	42 03.7 96 28 161.7	41 34.9 96 28 161.9	41 06.1 96 27 162.1	40 37.3 96 27 162.3	40 08.4 96 27 162.5	39 39.6 96 27 162.7	39 10.7 96 25 162.8	38 41.8 96 26 163.0	4
15	41 46.9 95 30 160.5	41 18.3 95 29 160.7	40 49.6 96 29 160.9	40 21.0 96 29 161.1	39 52.3 96 29 161.3	39 23.6 96 28 161.5	38 54.9 96 28 161.7	38 26.1 96 28 161.9	15
6	41 29.0 95 31 159.3	41 00.6 95 31 159.5	40 32.1 95 31 159.7	40 03.6 95 31 159.9	39 35.1 95 30 160.1	39 06.6 95 30 160.3	38 38.0 95 30 160.5	38 09.4 95 29 160.7	6
7	41 10.1 94 33 158.1	40 41.9 94 33 158.3	40 13.6 94 33 158.5	39 45.3 94 32 158.7	39 16.9 94 32 158.9	38 48.6 95 32 159.2	38 20.2 95 31 159.4	37 51.8 95 31 159.6	7
8	40 50.2 94 35 156.9	40 22.2 94 34 157.1	39 54.1 94 34 157.3	39 25.9 94 34 157.6	38 57.8 94 34 157.8	38 29.6 94 33 158.0	38 01.4 94 33 158.2	37 33.2 94 33 158.4	8
9	40 29.3 93 36 155.7	40 01.5 93 36 155.9	39 33.6 93 36 156.2	39 05.6 93 35 156.4	38 37.7 93 35 156.6	38 09.7 93 35 156.9	37 41.7 93 34 157.1	37 13.6 94 34 157.3	9
20	40 07.5 92 38 154.5	39 39.8 92 38 154.8	39 12.1 92 37 155.0	38 44.4 93 37 155.3	38 16.6 93 37 155.5	37 48.8 93 36 155.8	37 21.0 93 36 156.0	36 53.1 93 36 156.2	20
1	39 44.7 91 40 153.4	39 17.2 92 39 153.6	38 49.7 92 39 153.9	38 22.2 92 38 154.2	37 54.6 92 38 154.4	37 27.0 92 38 154.7	36 59.4 92 37 154.9	36 31.7 92 37 155.1	1
2	39 20.9 91 41 152.2	38 53.7 91 41 152.5	38 26.4 91 40 152.8	37 59.1 91 40 153.0	37 31.7 91 40 153.3	37 04.3 91 39 153.6	36 36.9 91 39 153.8	36 09.4 92 39 154.1	2
3	38 56.3 90 43 151.0	38 29.3 90 42 151.4	38 02.1 90 42 151.7	37 35.1 90 41 152.0	37 07.9 91 41 152.2	36 40.7 91 41 152.5	36 13.5 91 40 152.7	35 46.3 91 40 153.0	3
4	38 30.8 89 44 150.0	38 03.9 89 44 150.3	37 37.1 90 43 150.6	37 10.2 90 43 150.9	36 43.3 90 42 151.1	36 16.3 90 42 151.4	35 49.3 90 42 151.7	35 22.3 90 41 152.0	4
25	38 04.4 89 45 148.9	37 37.8 89 45 149.2	37 11.2 89 45 149.5	36 44.5 89 44 149.8	36 17.8 89 44 150.1	35 51.0 89 44 150.4	35 24.2 89 43 150.6	34 57.4 89 43 150.9	25
6	37 37.1 88 47 147.9	37 10.8 88 46 148.2	36 44.4 88 46 148.5	36 17.9 88 46 148.8	35 51.5 88 45 149.0	35 24.9 88 45 149.3	34 58.4 89 44 149.6	34 31.8 89 44 149.9	6
7	37 09.1 87 48 146.8	36 43.0 87 48 147.1	36 16.6 87 47 147.4	35 50.6 87 47 147.7	35 24.3 88 47 148.0	34 58.0 88 46 148.3	34 31.7 88 46 148.6	34 05.4 88 45 148.9	7
8	36 40.2 86 49 145.8	36 14.4 86 49 146.1	35 48.4 87 49 146.4	35 22.4 87 48 146.7	34 56.4 87 48 147.0	34 30.3 87 47 147.3	34 04.2 87 47 147.6	33 38.1 87 47 147.9	8
9	36 10.6 85 51 144.7	35 45.0 86 50 145.1	35 19.3 86 50 145.4	34 53.5 86 49 145.7	34 27.7 86 49 146.0	34 01.9 86 49 146.3	33 36.0 86 48 146.6	33 10.1 87 48 146.9	9
30	35 40.2 85 52 143.7	35 14.8 85 51 144.1	34 49.4 85 51 144.4	34 23.9 85 51 144.7	33 58.3 85 50 145.0	33 32.7 85 50 145.3	33 07.0 86 49 145.6	32 41.3 86 49 145.9	30
1	35 09.1 84 53 142.7	34 44.0 84 53 143.1	34 18.8 84 52 143.4	33 53.5 84 52 143.7	33 28.1 85 51 144.0	33 02.8 85 51 144.4	32 37.3 85 51 144.7	32 11.9 85 50 145.0	1
2	34 37.3 83 54 141.8	34 12.4 83 54 142.1	33 47.4 83 53 142.4	33 22.4 84 53 142.8	32 57.3 84 53 143.1	32 32.1 84 52 143.4	32 07.0 84 52 143.7	31 41.7 84 51 144.0	2
3	34 04.8 82 55 140.8	33 40.1 82 55 141.1	33 15.4 83 54 141.5	32 50.6 83 54 141.8	32 25.7 83 54 142.1	32 00.8 83 53 142.5	31 35.9 83 53 142.8	31 10.9 83 52 143.1	3
4	33 31.6 81 56 139.8	33 07.2 82 56 140.2	32 42.7 82 56 140.5	32 18.1 82 55 140.9	31 53.5 82 55 141.2	31 28.8 82 54 141.6	31 04.1 82 54 141.9	30 39.4 83 54 142.2	4
35	32 57.8 81 57 138.9	32 33.6 81 57 139.3	32 09.3 81 57 139.6	31 45.0 81 56 140.0	31 20.6 81 56 140.3	30 56.2 82 55 140.6	30 31.7 82 55 141.0	30 07.2 82 55 141.3	35
6	32 23.4 80 58 138.0	31 59.4 80 58 138.4	31 35.4 80 58 138.7	31 11.3 80 57 139.1	30 47.1 81 57 139.4	30 23.0 81 56 139.7	29 58.7 81 56 140.1	29 34.4 81 56 140.4	6
7	31 48.5 79 59 137.1	31 24.6 79 59 137.5	31 00.8 79 59 137.8	30 36.9 80 58 138.2	30 13.0 80 58 138.5	29 49.1 80 57 138.9	29 25.1 80 57 139.2	29 01.0 80 57 139.6	7
8	31 12.6 78 60 136.2	30 49.1 78 60 136.6	30 25.6 79 60 136.9	30 02.0 79 59 137.3	29 38.3 79 59 137.6	29 14.6 79 58 138.0	28 50.8 79 58 138.3	28 27.0 80 58 138.7	8
9	30 36.4 77 61 135.3	30 13.1 78 61 135.7	29 49.8 78 61 136.1	29 26.5 78 60 136.4	29 03.0 78 60 136.8	28 39.5 78 59 137.1	28 16.0 79 59 137.5	27 52.4 79 59 137.8	9
40	29 59.6 77 62 134.5	29 36.6 77 62 134.9	29 13.5 77 61 135.2	28 50.4 77 61 135.6	28 27.2 77 61 135.9	28 03.9 78 60 136.3	27 40.6 78 60 136.7	27 17.3 78 60 137.0	40
1	29 22.2 76 63 133.6	28 59.5 76 63 134.0	28 36.6 76 62 134.4	28 13.7 76 62 134.8	27 50.8 77 62 135.1	27 27.8 77 61 135.5	27 04.7 77 61 135.8	26 41.6 77 60 136.2	1
2	28 44.4 75 64 132.8	28 21.8 75 64 133.2	27 59.2 75 63 133.6	27 36.6 76 63 133.9	27 13.8 76 62 134.3	26 51.1 76 62 134.7	26 28.2 76 62 135.0	26 05.3 76 61 135.4	2
3	28 06.0 74 65 132.0	27 43.7 74 64 132.4	27 21.3 75 64 132.8	26 58.9 75 64 133.1	26 36.4 75 63 133.5	26 13.8 75 63 133.9	25 51.2 75 62 134.2	25 28.6 76 62 134.6	3
4	27 27.2 74 66 131.2	27 05.1 74 65 131.6	26 42.9 74 65 132.0	26 20.7 74 64 132.3	25 58.5 74 64 132.7	25 36.1 74 64 133.1	25 13.8 75 63 133.4	24 51.3 75 63 133.8	4
45	26 47.8 73 66 130.4	26 26.0 73 66 130.8	26 04.0 73 66 131.2	25 42.1 73 65 131.5	25 20.0 74 65 131.9	24 57.9 74 64 132.3	24 35.8 74 64 132.7	24 13.6 74 64 133.0	45
6	26 08.0 72 67 129.6	25 46.4 72 67 130.0	25 24.7 72 66 130.4	25 02.9 73 66 130.8	24 41.1 73 66 131.2	24 19.3 73 65 131.5	23 57.4 73 65 131.9	23 35.4 73 64 132.3	6
7	25 27.8 71 68 128.9	25 06.4 71 67 129.2	24 44.9 72 67 129.6	24 23.4 72 67 130.0	24 01.8 72 66 130.4	23 40.1 72 66 130.8	23 18.4 72 66 131.1	22 56.7 73 65 131.5	7
8	24 47.1 71 68 128.1	24 25.9 71 68 128.5	24 04.7 71 68 128.9	23 43.4 71 67 129.3	23 22.0 71 67 129.7	23 00.6 71 67 130.0	22 39.1 72 66 130.4	22 17.6 72 66 130.8	8
9	24 06.0 70 69 127.4	23 45.0 70 69 127.8	23 24.0 70 68 128.1	23 02.9 70 68 128.5	22 41.8 71 68 128.9	22 20.6 71 67 129.3	21 59.3 71 67 129.7	21 38.0 71 67 130.1	9
50	23 24.5 69 70 126.6	23 03.8 69 69 127.0	22 42.9 69 69 127.4	22 22.1 70 69 127.8	22 01.1 70 68 128.2	21 40.2 70 68 128.6	21 19.1 70 68 129.0	20 58.0 70 67 129.3	50
1	22 42.6 68 71 125.9	22 22.1 69 70 126.3	22 01.5 69 70 126.7	21 40.8 69 69 127.1	21 20.1 69 69 127.5	20 59.3 69 69 127.9	20 38.5 69 68 128.3	20 17.7 70 68 128.6	1
2	22 00.4 68 71 125.2	21 40.0 68 71 125.6	21 19.6 68 70 126.0	20 59.2 68 70 126.4	20 38.7 68 70 126.8	20 18.1 69 69 127.2	19 57.5 69 69 127.6	19 36.9 69 69 127.9	2
3	21 17.7 67 72 124.5	20 57.6 67 71 124.9	20 37.4 67 71 125.3	20 17.2 68 71 125.7	19 56.9 68 70 126.1	19 36.5 68 70 126.5	19 16.2 68 70 126.9	18 55.7 68 69 127.3	3
4	20 34.7 66 72 123.8	20 14.8 67 72 124.2	19 54.8 67 72 124.6	19 34.8 67 71 125.0	19 14.7 67 71 125.4	18 54.6 67 71 125.8	18 34.4 67 70 126.2	18 14.2 68 70 126.6	4
55	19 51.4 66 73 123.2	19 31.7 66 72 123.6	19 11.9 66 72 124.0	18 52.1 66 72 124.4	18 32.2 66 71 124.7	18 12.3 67 71 125.1	17 52.3 67 71 125.5	17 32.3 67 70 125.9	55
6	19 07.7 65 73 122.5	18 48.2 65 73 122.9	18 28.6 65 73 123.3	18 09.0 66 72 123.7	17 49.3 66 72 124.1	17 29.6 66 72 124.5	17 09.8 66 71 124.9	16 50.0 66 71 125.3	6
7	18 23.8 64 74 121.8	18 04.4 65 74 122.2	17 45.0 65 73 122.6	17 25.6 65 73 123.0	17 06.1 65 73 123.4	16 46.6 65 72 123.8	16 27.0 65 72 124.2	16 07.4 65 72 124.6	7
8	17 39.5 64 74 121.2	17 20.3 64 74 121.6	17 01.1 64 74 122.0	16 41.9 64 73 122.4	16 22.6 64 73 122.8	16 03.3 64 73 123.2	15 43.9 65 72 123.6	15 24.5 65 72 124.0	8
9	16 54.8 63 75 120.5	16 35.9 63 75 121.0	16 16.9 64 74 121.4	15 57.9 64 74 121.8	15 38.8 64 74 122.2	15 19.6 64 73 122.6	15 00.5 64 73 123.0	14 41.3 64 73 123.4	9
60	16 10.0 62 75 119.9	15 51.2 63 75 120.3	15 32.4 63 75 120.7	15 13.5 63 74 121.1	14 54.6 63 74 121.5	14 35.7 63 74 121.9	14 16.7 63 73 122.3	13 57.7 63 73 122.7	60
1	15 24.8 62 76 119.3	15 06.2 62 75 119.7	14 47.6 62 75 120.1	14 28.9 62 75 120.5	14 10.2 62 75 120.9	13 51.5 63 74 121.3	13 32.7 63 74 121.7	13 13.8 63 74 122.1	1
2	14 39.3 61 76 118.7	14 20.9 61 76 119.1	14 02.5 62 76 119.5	13 44.0 62 75 119.9	13 25.5 62 75 120.3	13 06.9 62 75 120.7	12 48.3 62 74 121.1	12 29.7 62 74 121.5	2
3	13 53.6 61 77 118.1	13 35.4 61 76 118.5	13 17.1 61 76 118.9	12 58.8 61 76 119.3	12 40.5 61 75 119.7	12 22.1 61 75 120.1	12 03.7 61 75 120.5	11 45.2 62 75 120.9	3
4	13 07.6 60 77 117.5	12 49.6 60 77 117.9	12 31.5 60 76 118.3	12 13.4 60 76 118.7	11 55.2 61 76 119.1	11 37.0 61 76 119.5	11 18.8 61 75 119.9	11 00.5 61 75 120.3	4
65	12 21.4 60 77 116.9	12 03.5 60 77 117.3	11 45.6 60 77 117.7	11 27.7 60 77 118.1	11 09.7 60 76 118.5	10 51.7 60 76 118.9	10 33.6 60 76 119.3	10 15.6 60 75 119.7	65
6	11 35.0 59 78 116.3	11 17.2 59 78 116.7	10 59.5 59 77 117.1	10 41.7 59 77 117.5	10 23.9 59 77 117.9	10 06.1 60 76 118.4	9 48.2 60 76 118.8	9 30.3 60 76 119.2	6
7	10 48.3 58 78 115.7	10 30.7 59 78 116.1	10 13.1 59 78 116.6	9 55.5 59 77 117.0	9 37.9 59 77 117.4	9 20.2 59 77 117.8	9 02.5 59 77 118.2	8 44.8 59 76 118.6	7
8	10 01.3 58 79 115.2	9 44.0 58 78 115.6	9 26.5 58 78 116.0	9 09.1 58 78 116.4	8 51.6 58 77 116.8	8 34.1 58 77 117.2	8 16.6 59 77 117.6	7 59.1 59 77 118.0	8
9	9 14.2 57 79 114.6	8 57.0 57 79 115.0	8 39.7 58 78 115.4	8 22.5 58 78 115.8	8 05.2 58 78 116.3	7 47.8 58 77 116.7	7 30.5 58 77 117.1	7 13.1 58 77 117.5	9
70	8 26.9 57 79 114.0	8 09.8 57 79 114.5	7 52.7 57 79 114.9	7 35.6 57 78 115.3	7 18.4 57 78 115.7	7 01.3 57 78 116.1	6 44.1 57 78 116.5	6 26.9 57 77 116.9	70
1	7 39.3 56 80 113.5	7 22.4 56 79 113.9	7 05.5 56 79 114.3	6 48.5 57 79 114.7	6 31.5 57 79 115.2	6 14.5 57 78 115.6	5 57.5 57 78 116.0	5 40.5 57 78 116.4	1
2	6 51.6 56 80 113.0	6 34.8 56 80 113.4	6 18.0 56 79 113.8	6 01.2 56 79 114.2	5 44.4 56 79 114.6	5 27.5 56 79 115.0	5 10.7 56 78 115.5		2
3	6 03.6 55 80 112.4	5 47.0 55 80 112.8	5 30.4 55 80 113.3	5 13.7 56 79 113.7					3
4	5 15.5 55 80 111.9								4

DECLINATION **SAME** NAME **AS** LATITUDE

H.A.	16° 00′	16° 30′	17° 00′	17° 30′	18° 00′	18° 30′	19° 00′	19° 30′	H.A.
91	7 04.9 49 84 75.6	7 19.6 49 84 75.1	7 34.2 49 83 74.7	7 48.9 49 83 74.3	8 03.3 48 83 73.8	8 17.9 48 83 73.4	8 32.4 48 83 72.9	8 46.9 48 82 72.5	91
2	6 14.6 49 84 75.1	6 29.4 49 84 74.7	6 44.1 49 83 74.2	6 58.8 49 83 73.8	7 13.5 49 83 73.4	7 28.1 49 83 72.9	7 42.8 49 82 72.5	7 57.4 49 82 72.1	2
3	5 24.5 50 84 74.6	5 39.3 49 83 74.2	5 54.2 49 83 73.8	6 09.0 49 83 73.3	6 23.8 49 83 72.9	6 38.5 49 82 72.4	6 53.3 49 82 72.0	7 08.0 49 82 71.6	3
4			5 04.3 50 83 73.3	5 19.3 50 83 72.8	5 34.2 50 82 72.4	5 49.1 50 82 72.0	6 03.9 49 82 71.5	6 18.8 49 82 71.1	4
95							5 14.7 50 82 71.1	5 29.7 50 82 70.6	95

Lat. 30°

H.A.	20°00' Alt	Δd	Δt	Az	20°30' Alt	Δd	Δt	Az	21°00' Alt	Δd	Δt	Az	21°30' Alt	Δd	Δt	Az	22°00' Alt	Δd	Δt	Az	22°30' Alt	Δd	Δt	Az	23°00' Alt	Δd	Δt	Az	23°30' Alt	Δd	Δt	Az	H.A.
00	80 00.0	1.0	04	180.0	80 30.0	1.0	04	180.0	81 00.0	1.0	04	180.0	81 30.0	1.0	05	180.0	82 00.0	1.0	05	180.0	82 30.0	1.0	05	180.0	83 00.0	1.0	06	180.0	83 30.0	1.0	06	180.0	00
1	79 57.6	1.0	12	174.6	80 27.4	1.0	13	174.1	80 57.3	1.0	13	174.1	81 27.2	99	15	173.7	81 57.0	99	15	173.3	82 26.8	99	16	172.5	82 56.5	99	17	171.9	83 26.3	99	18	171.9	1
2	79 50.3	99	20	169.3	80 19.8	98	21	168.8	80 49.3	98	21	168.2	81 18.7	98	23	167.6	81 48.1	98	24	166.9	82 17.3	97	26	166.1	82 46.5	97	27	165.2	83 15.6	97	29	164.2	2
3	79 38.3	97	27	164.1	80 07.3	96	28	163.4	80 36.2	96	30	162.6	81 04.9	96	31	161.7	81 33.5	96	33	160.7	82 02.0	95	35	159.6	82 30.2	94	36	158.3	82 58.2	93	39	156.9	3
4	79 22.0	94	34	159.2	79 50.2	94	35	158.3	80 18.3	93	37	157.2	80 46.2	93	39	156.1	81 13.9	92	40	154.9	81 41.3	91	42	153.5	82 08.4	90	44	152.0	82 35.1	88	47	150.3	4
05	79 01.5	92	40	154.5	79 28.9	91	42	153.4	79 56.1	90	43	152.3	80 23.0	89	45	151.0	80 49.6	88	47	149.5	81 15.9	87	49	148.0	81 41.7	85	51	146.3	82 07.0	83	54	144.4	05
6	78 37.4	89	46	150.1	79 03.9	88	47	148.9	79 30.1	87	49	147.6	79 55.9	86	51	146.2	80 21.4	84	53	144.7	80 46.4	83	55	143.0	81 10.9	81	57	141.3	81 34.8	79	59	139.1	6
7	78 09.9	86	51	146.1	78 35.4	85	52	144.8	79 00.6	83	54	143.3	79 25.4	82	56	141.8	79 49.7	80	58	140.2	80 13.5	78	60	138.5	80 36.7	76	62	136.6	80 59.2	74	64	134.5	7
8	77 39.5	83	55	142.3	78 04.0	81	57	140.9	78 28.2	80	58	139.5	78 51.9	78	60	137.9	79 15.1	76	62	136.2	79 37.7	74	64	134.4	79 59.6	72	66	132.5	80 20.8	70	68	130.4	8
9	77 06.4	79	59	138.8	77 30.0	78	60	137.4	77 53.2	76	62	135.9	78 15.8	75	64	134.3	78 37.0	73	65	132.6	78 59.4	70	67	130.8	79 20.2	68	69	128.9	79 40.2	66	71	126.9	9
10	76 31.1	76	62	135.6	76 53.8	75	64	134.2	77 16.0	73	65	132.7	77 37.6	71	67	131.1	77 58.7	69	68	129.4	78 19.1	67	70	127.6	78 38.9	65	72	125.7	78 58.0	62	73	123.7	10
1	75 53.8	73	66	132.6	76 15.6	72	67	131.2	76 36.9	70	68	129.7	76 57.6	68	69	128.1	77 17.7	66	71	126.4	77 37.2	64	72	124.7	77 55.9	61	74	122.9	78 13.9	59	75	120.9	1
2	75 14.7	71	68	129.9	75 35.7	69	69	128.5	75 56.1	67	70	127.0	76 16.0	65	72	125.4	76 35.2	63	73	123.8	76 53.8	61	74	122.1	77 11.6	58	76	120.3	77 28.7	56	77	118.4	2
3	74 34.1	68	70	127.4	74 54.3	66	71	126.0	75 13.9	64	72	124.5	75 33.0	62	74	123.0	75 51.4	60	75	121.4	76 09.2	58	76	119.7	76 26.2	56	77	118.0	76 42.6	53	78	116.2	3
4	73 52.2	66	72	125.1	74 11.6	64	73	123.7	74 30.5	62	74	122.3	74 48.8	60	75	120.8	75 06.5	58	76	119.2	75 23.6	56	77	117.6	75 39.9	53	78	115.9	75 55.5	51	80	114.2	4
15	73 09.1	63	73	122.9	73 27.9	62	75	121.6	73 46.1	60	76	120.2	74 03.7	58	77	118.7	74 20.7	56	78	117.2	74 37.1	53	79	115.6	74 52.8	51	80	114.0	75 07.8	49	81	112.3	15
6	72 25.0	61	75	121.0	72 43.2	60	76	119.6	73 00.7	58	77	118.3	73 17.8	56	78	116.8	73 34.2	54	79	115.4	73 49.9	51	80	113.9	74 05.0	49	80	112.3	74 19.5	47	81	110.7	6
7	71 40.1	59	76	119.1	71 57.6	58	77	117.8	72 14.6	56	78	116.5	72 31.0	54	79	115.1	72 46.9	52	80	113.7	73 02.1	50	81	112.2	73 16.7	47	81	110.7	73 30.6	45	82	109.2	7
8	70 54.3	57	77	117.4	71 11.3	56	78	116.2	71 27.8	54	79	114.8	71 43.7	52	80	113.5	71 59.0	50	81	112.1	72 13.8	48	81	110.7	72 27.9	46	82	109.3	72 41.3	44	83	107.8	8
9	70 07.8	55	78	115.6	70 24.3	54	79	114.5	70 40.3	52	80	113.2	70 55.5	51	81	112.0	71 10.6	49	81	110.7	71 24.9	47	82	109.3	71 38.6	45	83	107.9	71 51.6	42	83	106.5	9
20	69 20.8	54	79	114.3	69 36.8	53	80	113.1	69 52.4	51	81	111.9	70 07.4	49	81	110.8	70 21.8	47	82	109.3	70 35.7	45	83	108.0	70 49.0	43	84	106.6	71 01.7	41	84	105.3	20
1	68 33.2	53	80	112.9	68 48.8	51	81	111.8	69 03.9	50	81	110.6	69 18.5	48	82	109.3	69 32.6	46	83	108.1	69 46.1	44	83	106.8	69 59.0	42	84	105.5	70 11.4	40	84	104.1	1
2	67 45.1	52	81	111.6	68 00.3	50	81	110.5	68 15.1	48	82	109.3	68 29.3	47	83	108.1	68 43.0	45	83	106.9	68 56.2	43	84	105.6	69 08.8	41	84	104.4	69 20.9	39	85	103.1	2
3	66 56.6	50	81	110.4	67 11.4	49	82	109.3	67 25.8	47	82	108.1	67 39.8	45	83	107.0	67 53.2	44	84	105.8	68 06.0	42	84	104.6	68 18.4	40	84	103.3	68 30.2	38	85	102.1	3
4	66 07.7	49	82	109.2	66 22.2	48	83	108.1	66 36.3	46	83	107.0	66 49.9	45	84	105.9	67 03.0	43	84	104.7	67 15.6	41	84	103.6	67 27.7	39	85	102.4	67 39.3	38	85	101.2	4
25	65 18.4	48	83	108.1	65 32.7	47	83	107.0	65 46.5	45	84	105.9	65 59.8	44	84	104.8	66 12.7	42	84	103.7	66 25.0	40	85	102.6	66 36.9	39	85	101.4	66 48.2	37	85	100.3	25
6	64 28.9	47	83	107.0	64 42.9	46	83	106.0	64 56.4	44	84	104.9	65 09.5	43	84	103.9	65 22.1	41	85	102.8	65 34.2	40	85	101.7	65 45.9	38	85	100.6	65 57.0	36	86	99.4	6
7	63 39.1	46	83	106.0	63 52.8	45	84	105.0	64 06.1	44	84	104.0	64 18.9	42	85	102.9	64 31.3	41	85	101.9	64 43.3	39	85	100.8	64 54.7	37	86	99.7	65 05.7	36	86	98.6	7
8	62 49.0	46	84	105.1	63 02.5	44	84	104.1	63 15.6	43	85	103.1	63 28.2	41	85	102.0	63 40.4	40	85	101.0	63 52.2	38	85	100.0	64 03.5	37	86	98.9	64 14.3	35	86	97.9	8
9	61 58.7	45	84	104.1	62 12.0	44	84	103.2	62 24.9	42	85	102.2	62 37.3	41	85	101.2	62 49.3	39	85	100.2	63 00.9	38	86	99.2	63 12.1	36	86	98.2	63 22.8	35	86	97.1	9
30	61 08.2	44	84	103.3	61 21.3	43	85	102.3	61 34.0	42	85	101.4	61 46.3	40	85	100.4	61 58.1	39	86	99.4	62 09.6	37	86	98.5	62 20.6	36	86	97.5	62 31.2	34	86	96.4	30
1	60 17.6	44	85	102.4	60 30.5	42	85	101.5	60 43.0	41	85	100.6	60 55.1	40	85	99.6	61 06.8	38	86	98.7	61 18.1	37	86	97.7	61 29.0	36	86	96.8	61 39.5	34	86	95.8	1
2	59 26.8	43	85	101.6	59 39.5	42	85	100.7	59 51.8	41	85	99.8	60 03.8	39	86	98.9	60 15.4	38	86	98.0	60 26.6	37	86	97.0	60 37.4	35	86	96.1	60 47.8	34	86	95.1	2
3	58 35.8	42	85	100.8	58 48.4	41	85	99.9	59 00.6	40	86	99.1	59 12.4	39	86	98.2	59 23.9	38	86	97.3	59 35.3	36	86	96.4	59 45.7	35	86	95.4	59 56.0	34	86	94.5	3
4	57 44.7	42	85	100.1	57 57.1	41	86	99.2	58 09.2	40	86	98.4	58 20.9	38	86	97.5	58 32.3	37	86	96.6	58 43.3	36	86	95.7	58 53.9	35	86	94.8	59 04.2	34	86	93.9	4
35	56 53.5	42	86	99.3	57 05.8	40	86	98.5	57 17.8	39	86	97.7	57 29.4	38	86	96.8	57 40.7	37	86	95.9	57 51.6	36	86	95.1	58 02.1	35	86	94.2	58 12.3	33	86	93.3	35
6	56 02.1	41	86	98.6	56 14.3	40	86	97.8	56 26.2	39	86	97.0	56 37.8	38	86	96.2	56 48.9	37	86	95.3	56 59.8	36	86	94.5	57 10.3	34	86	93.6	57 20.4	33	87	92.7	6
7	55 10.7	41	86	98.0	55 22.8	40	86	97.2	55 34.6	39	86	96.3	55 46.1	38	86	95.5	55 57.2	37	86	94.7	56 08.0	36	86	93.9	56 18.4	34	86	93.0	56 28.5	33	87	92.2	7
8	54 19.2	41	86	97.3	54 31.2	40	86	96.5	54 42.9	38	86	95.7	54 54.3	37	86	94.9	55 05.4	36	86	94.1	55 16.1	35	86	93.3	55 26.5	34	86	92.5	55 36.6	33	87	91.6	8
9	53 27.6	40	86	96.6	53 39.6	39	86	95.9	53 51.2	38	86	95.1	54 02.5	37	86	94.3	54 13.5	36	86	93.5	54 24.2	35	86	92.7	54 34.6	34	86	91.9	54 44.6	33	87	91.1	9
40	52 36.0	40	86	96.0	52 47.9	39	86	95.3	52 59.4	38	86	94.5	53 10.7	37	86	93.7	53 21.7	36	86	93.0	53 32.3	35	87	92.2	53 42.7	34	87	91.4	53 52.7	33	87	90.6	40
1	51 44.3	40	86	95.4	51 56.1	39	86	94.7	52 07.6	38	86	93.9	52 18.8	37	86	93.2	52 29.7	36	86	92.4	52 40.4	35	87	91.6	52 50.7	34	87	90.9	53 00.7	33	87	90.1	1
2	50 52.5	40	86	94.8	51 04.3	39	86	94.1	51 15.7	38	86	93.3	51 26.9	37	87	92.6	51 37.8	36	86	91.9	51 48.4	35	87	91.1	51 58.7	34	87	90.3	52 08.8	33	87	89.6	2
3	50 00.7	39	86	94.2	50 12.4	38	86	93.5	50 23.9	38	86	92.8	50 35.0	37	87	92.1	50 45.9	36	86	91.3	50 56.5	35	87	90.6	51 06.8	34	87	89.8	51 16.8	33	87	89.1	3
4	49 08.8	39	86	93.7	49 20.6	38	86	93.0	49 31.9	38	86	92.2	49 43.1	37	87	91.5	49 53.9	36	87	90.8	50 04.5	35	87	90.1	50 14.8	34	87	89.3	50 24.9	33	87	88.6	4
45	48 17.0	39	86	93.1	48 28.7	38	87	92.4	48 40.0	37	87	91.7	48 51.1	37	87	91.0	49 02.0	36	86	90.3	49 12.6	35	87	89.6	49 22.9	34	87	88.9	49 32.9	33	87	88.1	45
6	47 25.1	39	87	92.6	47 36.7	38	87	91.9	47 48.1	37	87	91.2	47 59.2	37	87	90.5	48 10.0	36	87	89.8	48 20.6	35	87	89.1	48 30.9	34	86	88.4	48 41.0	33	86	87.7	6
7	46 33.2	39	87	92.0	46 44.8	38	87	91.3	46 56.1	37	87	90.7	47 07.2	37	87	90.0	47 18.0	36	86	89.3	47 28.6	35	87	88.6	47 39.0	34	86	87.9	47 49.1	33	86	87.2	7
8	45 41.3	39	87	91.5	45 52.8	38	87	90.8	46 04.2	37	87	90.2	46 15.2	37	87	89.5	46 26.1	36	86	88.8	46 36.7	35	87	88.1	46 47.1	34	86	87.5	46 57.2	33	86	86.8	8
9	44 49.3	39	87	91.0	45 00.9	38	87	90.3	45 12.2	37	87	89.7	45 23.3	37	87	89.0	45 34.1	36	86	88.3	45 44.8	35	87	87.7	45 55.2	34	86	87.0	46 05.3	33	86	86.3	9
50	43 57.4	39	87	90.5	44 08.9	38	87	89.8	44 20.2	37	87	89.2	44 31.3	37	87	88.5	44 42.2	36	86	87.9	44 52.9	35	86	87.2	45 03.3	34	86	86.5	45 13.5	34	86	85.9	50
1	43 05.4	39	87	90.0	43 17.0	38	87	89.3	43 28.3	37	87	88.7	43 39.4	37	87	88.0	43 50.3	36	86	87.4	44 01.0	35	86	86.8	44 11.4	34	86	86.1	44 21.7	34	86	85.4	1
2	42 13.5	39	87	89.5	42 25.0	38	87	88.8	42 36.3	37	87	88.2	42 47.5	37	86	87.6	42 58.4	36	86	86.9	43 09.1	35	86	86.3	43 19.6	35	86	85.7	43 29.9	34	86	85.0	2
3	41 21.5	39	87	89.0	41 33.1	38	87	88.4	41 44.4	37	87	87.7	41 55.6	37	86	87.1	42 06.5	36	86	86.5	42 17.3	35	86	85.9	42 27.8	35	86	85.2	42 38.1	34	86	84.6	3
4	40 29.6	39	87	88.5	40 41.1	38	87	87.9	40 52.5	38	86	87.3	41 03.7	37	86	86.7	41 14.7	36	86	86.0	41 25.5	36	86	85.4	41 36.0	35	86	84.8	41 46.4	34	86	84.2	4
55	39 37.6	39	87	88.0	39 49.2	38	86	87.4	40 00.6	38	86	86.8	40 11.8	37	86	86.2	40 22.8	36	86	85.6	40 33.7	36	86	85.0	40 44.3	35	86	84.4	40 54.8	34	86	83.7	55
6	38 45.7	39	86	87.5	38 57.3	38	86	86.9	39 08.7	38	86	86.4	39 20.0	37	86	85.8	39 31.1	37	86	85.2	39 41.9	36	86	84.5	39 52.6	35	86	83.9	40 03.1	35	86	83.3	6
7	37 53.8	39	86	87.1	38 05.4	39	86	86.5	38 16.9	38	86	85.9	38 28.2	37	86	85.3	38 39.3	37	86	84.7	38 50.2	36	86	84.1	39 01.0	36	86	83.5	39 11.5	35	86	82.9	7
8	37 01.9	39	86	86.6	37 13.6	39	86	86.0	37 25.1	38	86	85.5	37 36.4	38	86	84.9	37 47.6	37	86	84.3	37 58.6	36	86	83.7	38 09.4	36	86	83.1	38 20.0	35	86	82.5	8
9	36 10.0	39	86	86.2	36 21.8	39	86	85.6	36 33.3	38	86	85.0	36 44.7	38	86	84.4	36 55.9	37	86	83.8	37 06.9	37	86	83.3	37 17.8	36	86	82.7	37 28.5	35	86	82.1	9
60	35 18.2	39	86	85.7	35 30.0	39	86	85.1	35 41.6	38	86	84.6	35 53.0	38	86	84.0	36 04.3	37	86	83.4	36 15.4	37	86	82.8	36 26.3	36	86	82.3	36 37.1	36	86	81.7	60
1	34 26.4	40	86	85.2	34 38.2	39	86	84.7	34 49.8	38	86	84.1	35 01.3	38	86	83.6	35 12.7	37	86	83.0	35 23.8	37	86	82.4	35 34.8	36	86	81.9	35 45.7	36	86	81.3	1
2	33 34.7	40	86	84.8	33 46.5	39	86	84.2	33 58.2	39	86	83.7	34 09.7	38	86	83.1	34 21.1	38	86	82.6	34 32.3	37	86	82.0	34 43.4	37	86	81.4	34 54.3	36	85	80.9	2
3	32 42.9	40	86	84.3	32 54.8	39	86	83.8	33 06.6	39	86	83.3	33 18.2	38	86	82.7	33 29.6	38	86	82.1	33 40.0	37	86	81.6	33 52.1	37	86	81.0	34 03.0	36	85	80.5	3
4	31 51.2	40	86	83.9	32 03.2	40	86	83.3	32 15.0	39	86	82.8	32 26.6	39	86	82.3	32 38.2	38	86	81.7	32 49.5	38	86	81.2	33 00.8	37	85	80.6	33 11.9	36	85	80.1	4
65	30 59.6	40	86	83.5	31 11.6	40	86	82.9	31 23.4	39	86	82.4	31 35.2	39	86	81.8	31 46.8	38	86	81.3	31 58.2	38	85	80.8	32 09.5	37	85	80.2	32 20.7	37	85	79.7	65
6	30 08.0	40	86	83.0	30 20.0	40	86	82.5	30 32.0	40	86	82.0	30 43.8	39	86	81.4	30 55.4	39	85	80.9	31 07.0	38	85	80.3	31 18.4	38	85	79.8	31 29.6	37	85	79.3	6
7	29 16.4	41	86	82.6	29 28.6	40	86	82.1	29 40.6	40	86	81.5	29 52.4	39	86	81.0	30 04.2	39	85	80.5	30 15.8	38	85	79.9	30 27.2	38	85	79.4	30 38.6	38	85	78.9	7
8	28 24.9	41	86	82.1	28 37.1	40	86	81.6	28 49.2	40	86	81.1	29 01.1	40	85	80.6	29 12.9	39	85	80.1	29 24.4	39	85	79.5	29 36.2	38	85	79.0	29 47.7	38	85	78.5	8
9	27 33.5	41	86	81.7	27 45.7	41	86	81.2	27 57.9	40	86	80.7	28 09.9	40	85	80.2	28 21.8	39	85	79.6	28 33.6	39	85	79.1	28 45.2	39	85	78.6	28 56.8	38	85	78.1	9
70	26 42.1	41	86	81.3	26 54.4	41	85	80.8	27 06.6	41	85	80.3	27 18.7	40	85	79.7	27 30.7	40	85	79.2	27 42.6	39	85	78.7	27 54.3	39	85	78.2	28 06.0	39	85	77.7	70
1	25 50.8	41	85	80.8	26 03.2	41	85	80.3	26 15.5	41	85	79.8	26 27.6	41	85	79.3	26 39.7	40	85	78.8	26 51.7	40	85	78.3	27 03.5	39	84	77.8	27 15.3	39	84	77.3	1
2	24 59.5	42	85	80.4	25 12.0	41	85	79.9	25 24.3	41	85	79.4	25 36.4	41	85	78.9	25 48.8	40	85	78.4	26 00.8	40	85	77.9	26 12.8	40	84	77.4	26 24.6	39	84	76.9	2
3	24 08.3	42	85	79.9	24 20.9	42	85	79.5	24 33.3	41	85	79.0	24 45.7	41	85	78.5	24 57.9	41	85	78.0	25 10.1	40	84	77.5	25 22.1	40	84	77.0	25 34.1	40	84	76.5	3
4	23 17.2	42	85	79.5	23 29.8	42	85	79.1	23 42.3	42	85	78.6	23 54.8	41	85	78.1	24 07.1	41	84	77.6	24 19.4	41	84	77.1	24 31.5	40	84	76.6	24 43.6	40	84	76.1	4
75	22 26.1	43	85	79.1	22 38.8	42	85	78.6	22 51.4	42	85	78.1	23 04.0	42	85	77.6	23 16.4	41	84	77.1	23 28.8	41	84	76.6	23 41.0	41	84	76.1	23 53.2	40	84	75.6	75
6	21 35.1	43	85	78.7	21 47.9	43	85	78.2	22 00.6	42	84	77.7	22 13.3	42	84	77.2	22 25.8	42	84	76.7	22 38.3	41	84	76.2	22 50.6	41	84	75.7	23 02.9	41	84	75.2	6
7	20 44.2	43	85	78.2	20 57.1	43	85	77.7	21 09.8	43	84	77.3	21 22.6	42	84	76.8	21 35.3	42	84	76.3	21 47.8	42	84	75.8	22 00.3	41	84	75.3	22 12.7	41	84	74.8	7
8	19 53.4	43	85	77.8	20 06.4	43	85	77.3	20 19.3	43	84	76.9	20 32.1	43	84	76.4	20 44.8	42	84	75.9	20 57.5	42	84	75.4	21 10.1	42	84	74.9	21 22.6	42	84	74.4	8
9	19 02.6	44	84	77.4	19 15.7	43	84	76.9	19 28.7	43	84	76.4	19 41.6	43	84	75.9	19 54.5	43	84	75.5	20 07.3	42	84	75.0	20 20.0	42	84	74.5	20 32.6	42	83	74.0	9
80	18 12.0	44	84	76.9	18 25.1	44	84	76.5	18 38.2	43	84	76.0	18 51.3	43	84	75.5	19 04.2	43	84	75.0	19 17.1	43	83	74.6	19 30.0	43	83	74.1	19 42.7	42	83	73.6	80
1	17 21.4	44	84	76.5	17 34.7	44	84	76.0	17 47.9	44	84	75.6	18 01.0	43	84	75.1	18 14.1	43	83	74.6	18 27.1	43	83	74.1	18 40.0	43	83	73.7	18 52.9	43	83	73.2	1
2	16 30.9	45	84	76.1	16 44.3	44	84	75.6	16 57.6	44	84	75.1	17 10.9	44	83	74.7	17 24.0	44	83	74.2	17 37.2	43	83	73.7	17 50.2	43	83	73.3	18 03.2	43	83	72.8	2
3	15 40.5	45	84	75.6	15 54.0	45	84	75.2	16 07.4	45	83	74.7	16 20.8	44	83	74.2	16 34.1	44	83	73.8	16 47.3	44	83	73.3	17 00.5	44	83	72.8	17 13.6	44	82	72.4	3
4	14 50.2	45	84	75.2	15 03.8	45	83	74.7	15 17.4	45	83	74.3	15 30.8	44	83	73.8	15 44.3	45	83	73.3	15 57.6	44	83	72.9	16 10.9	44	82	72.4	16 24.2	44	82	71.9	4
85	14 00.1	46	83	74.7	14 13.8	46	83	74.3	14 27.4	45	83	73.8	14 41.0	45	83	73.4	14 54.5	45	83	72.9	15 08.0	45	82	72.4	15 21.5	45	82	72.0	15 34.8	44	82	71.5	85
6	13 10.0	46	83	74.3	13 23.8	46	83	73.9	13 37.6	46	83	73.4	13 51.3	45	82	72.9	14 04.9	45	82	72.5	14 18.6	45	82	72.0	14 32.1	45	82	71.6	14 45.6	45	82	71.1	6
7	12 20.0	46	83	73.9	12 33.9	46	83	73.4	12 47.8	46	82	73.0	13 01.7	46	82	72.5	13 15.4	46	82	72.0	13 29.2	45	82	71.6	13 42.9	45	82	71.1	13 56.5	45	82	70.7	7
8	11 30.2	47	83	73.4	11 44.2	47	83	73.0	11 58.2	47	82	72.5	12 12.2	46	82	72.1	12 26.1	46	82	71.6	12 40.0	46	82	71.1	12 53.8	46	82	70.7	13 07.6	46	81	70.2	8
9	10 40.4	47	83	73.0	10 54.6	47	82	72.5	11 08.7	47	82	72.1	11 22.8	47	82	71.6	11 36.8	46	82	71.2	11 50.8	47	82	70.7	12 04.8	46	81	70.3	12 18.7	46	81	69.8	9
90	9 50.8	48	82	72.5	10 05.1	48	82	72.1	10 19.3	47	82	71.6	10 33.5	47	82	71.2	10 47.7	47	82	70.7	11 01.9	47	81	70.3	11 16.0	47	81	69.8	11 30.0	47	81	69.4	90

DECLINATION CONTRARY NAME TO LATITUDE

Each cell lists: Alt.   Δd Δt   Az.

H.A.	20° 00′	20° 30′	21° 00′	21° 30′	22° 00′	22° 30′	23° 00′	23° 30′	H.A.
00	40 00.0 1.00 01 180.0	39 30.0 1.00 01 180.0	39 00.0 1.00 01 180.0	38 30.0 1.00 01 180.0	38 00.0 1.00 01 180.0	37 30.0 1.00 01 180.0	37 00.0 1.00 01 180.0	36 30.0 1.00 01 180.0	00
1	39 59.4 1.00 03 178.8	39 29.4 1.00 03 178.8	38 59.5 1.00 03 178.8	38 29.5 1.00 03 178.8	37 59.5 1.00 03 178.8	37 29.5 1.00 03 178.8	36 59.5 1.00 03 178.9	36 29.5 1.00 03 178.9	1
2	39 57.4 1.00 05 177.5	39 27.8 1.00 05 177.6	38 57.8 1.00 04 177.6	38 27.8 1.00 04 177.6	37 57.9 1.00 04 177.6	37 27.9 1.00 04 177.7	36 57.9 1.00 04 177.7	36 27.9 1.00 04 177.7	2
3	39 55.0 1.00 06 176.3	39 25.1 1.00 06 176.4	38 55.1 1.00 06 176.4	38 25.1 1.00 06 176.4	37 55.2 1.00 06 176.5	37 25.3 1.00 06 176.5	36 55.3 1.00 06 176.6	36 25.3 1.00 06 176.6	3
4	39 51.1 1.00 08 175.1	39 21.2 1.00 08 175.2	38 51.3 1.00 08 175.2	38 21.4 1.00 08 175.3	37 51.5 1.00 08 175.3	37 21.6 1.00 08 175.3	36 51.6 1.00 08 175.4	36 21.7 1.00 08 175.4	4
05	39 46.1 1.0 10 173.9	39 16.3 1.0 10 173.9	38 46.4 1.0 10 174.0	38 16.6 1.0 10 174.1	37 46.7 1.0 10 174.1	37 16.8 1.0 10 174.2	36 47.0 1.0 10 174.3	36 17.1 1.00 09 174.3	05
6	39 40.0 99 12 172.7	39 10.2 99 12 172.7	38 40.5 99 12 172.8	38 10.7 99 12 172.9	37 40.9 99 12 173.0	37 11.0 99 11 173.0	36 41.2 99 11 173.1	36 11.4 99 11 173.2	6
7	39 32.9 99 14 171.5	39 03.1 99 14 171.5	38 33.4 99 14 171.6	38 03.7 99 13 171.7	37 34.0 99 13 171.8	37 04.2 99 13 171.9	36 34.5 99 13 172.0	36 04.8 99 13 172.1	7
8	39 24.6 99 16 170.3	38 55.0 99 15 170.4	38 25.3 99 15 170.5	37 55.7 99 15 170.6	37 26.0 99 15 170.6	36 56.4 99 15 170.7	36 26.7 99 15 170.8	35 57.1 99 14 170.9	8
9	39 15.3 98 17 169.1	38 45.7 98 17 169.2	38 16.2 98 17 169.3	37 46.6 99 17 169.4	37 17.1 99 17 169.5	36 47.5 99 16 169.6	36 17.9 99 16 169.7	35 48.4 99 16 169.8	9
10	39 04.9 98 19 167.9	38 35.5 98 19 168.0	38 06.0 98 19 168.1	37 36.6 98 18 168.2	37 07.1 98 18 168.4	36 37.6 98 18 168.5	36 08.2 98 18 168.6	35 38.7 98 18 168.7	10
1	38 53.4 98 21 166.7	38 24.1 98 21 166.8	37 54.8 98 20 167.0	37 25.4 98 20 167.1	36 56.1 98 20 167.2	36 26.7 98 20 167.3	35 57.4 98 20 167.5	35 28.0 98 19 167.6	1
2	38 40.9 97 22 165.5	38 11.8 97 22 165.7	37 42.5 97 22 165.8	37 13.3 97 22 165.9	36 44.1 97 22 166.1	36 14.9 97 21 166.2	35 45.6 98 21 166.4	35 16.4 98 21 166.5	2
3	38 27.4 97 24 164.3	37 58.4 97 24 164.5	37 29.3 97 24 164.7	37 00.2 97 24 164.8	36 31.1 97 23 165.0	36 02.0 97 23 165.1	35 32.9 97 23 165.3	35 03.7 97 23 165.4	3
4	38 12.9 96 26 163.2	37 44.0 96 26 163.4	37 15.0 96 25 163.5	36 46.1 97 25 163.7	36 17.1 97 25 163.8	35 48.2 97 25 164.0	35 19.2 97 24 164.2	34 50.2 97 24 164.3	4
15	37 57.4 96 28 162.0	37 28.6 96 27 162.2	36 59.8 96 27 162.4	36 31.0 96 27 162.6	36 02.2 96 26 162.7	35 33.4 96 26 162.9	35 04.5 96 26 163.1	34 35.7 96 26 163.2	15
6	37 40.9 95 29 160.9	37 12.2 95 29 161.1	36 43.6 95 28 161.3	36 15.0 96 28 161.5	35 46.3 96 28 161.6	35 17.6 96 28 161.8	34 48.9 96 28 162.0	34 20.2 96 27 162.2	6
7	37 23.4 95 31 159.8	36 54.9 95 30 160.0	36 26.5 95 30 160.2	35 58.0 95 30 160.4	35 29.5 95 30 160.6	35 00.9 95 29 160.7	34 32.4 95 29 160.9	34 03.8 95 29 161.1	7
8	37 04.9 94 32 158.7	36 36.6 94 32 158.9	36 08.4 94 32 159.1	35 40.0 94 31 159.3	35 11.7 94 31 159.5	34 43.3 95 31 159.7	34 15.0 95 30 159.9	33 46.6 95 30 160.1	8
9	36 45.5 94 34 157.6	36 17.4 94 34 157.8	35 49.3 94 33 158.0	35 21.2 94 33 158.2	34 53.0 94 33 158.4	34 24.8 94 32 158.6	33 56.6 94 32 158.8	33 28.4 94 32 159.0	9
20	36 25.2 93 35 156.5	35 57.4 93 35 156.7	35 29.4 93 35 156.9	35 01.4 93 34 157.1	34 33.5 93 34 157.4	34 05.5 93 34 157.6	33 37.4 93 34 157.8	33 09.4 94 33 158.0	20
1	36 04.0 92 37 155.4	35 36.3 92 36 155.6	35 08.6 93 36 155.8	34 40.8 93 36 156.1	34 13.0 93 36 156.3	33 45.2 93 35 156.5	33 17.4 93 35 156.8	32 49.5 93 35 157.0	1
2	35 42.0 92 38 154.3	35 14.4 92 38 154.6	34 46.9 92 38 154.8	34 19.3 92 37 155.0	33 51.7 92 37 155.3	33 24.1 92 37 155.5	32 56.4 92 36 155.7	32 28.7 92 36 156.0	2
3	35 19.0 91 40 153.3	34 51.7 91 39 153.5	34 24.3 91 39 153.8	33 57.0 91 39 154.0	33 29.6 91 38 154.3	33 02.1 91 38 154.5	32 34.7 92 38 154.7	32 07.2 92 37 155.0	3
4	34 55.2 90 41 152.2	34 28.1 90 41 152.5	34 00.9 91 40 152.7	33 33.8 91 40 153.0	33 06.5 91 40 153.2	32 39.3 91 39 153.5	32 12.1 91 39 153.7	31 44.8 91 39 154.0	4
25	34 30.6 90 42 151.2	34 03.7 90 42 151.5	33 36.7 90 42 151.7	33 09.8 90 41 152.0	32 42.8 90 41 152.2	32 15.7 90 41 152.5	31 48.7 90 40 152.8	31 21.6 90 40 153.0	25
6	34 05.1 89 44 150.2	33 38.4 89 43 150.4	33 11.7 89 43 150.7	32 45.0 89 43 151.0	32 18.2 89 42 151.3	31 51.4 89 42 151.5	31 24.5 90 42 151.8	30 57.6 90 41 152.0	6
7	33 38.9 88 45 149.2	33 12.4 88 45 149.5	32 45.9 88 44 149.7	32 19.4 89 44 150.0	31 52.8 89 44 150.3	31 26.2 89 43 150.6	30 59.6 89 43 150.8	30 32.9 89 42 151.1	7
8	33 11.9 87 46 148.2	32 45.6 88 46 148.5	32 19.3 88 46 148.8	31 53.0 88 45 149.0	31 26.7 88 45 149.3	31 00.3 88 44 149.6	30 33.9 88 44 149.9	30 07.4 88 44 150.1	8
9	32 44.1 87 48 147.2	32 18.1 87 47 147.5	31 52.0 87 47 147.8	31 25.9 87 46 148.1	30 59.8 87 46 148.4	30 33.6 87 46 148.7	30 07.4 87 45 148.9	29 41.2 88 45 149.2	9
30	32 15.6 86 49 146.2	31 49.8 86 48 146.5	31 24.0 86 48 146.8	30 58.1 86 48 147.1	30 32.2 86 47 147.4	30 06.2 87 47 147.7	29 40.2 87 46 148.0	29 14.2 87 46 148.3	30
1	31 46.4 85 50 145.3	31 20.8 85 50 145.6	30 55.2 85 49 145.9	30 29.5 86 49 146.2	30 03.9 86 48 146.5	29 38.1 86 48 146.8	29 12.4 86 48 147.1	28 46.6 86 47 147.4	1
2	31 16.4 84 51 144.4	30 51.1 85 51 144.7	30 25.7 85 50 145.0	30 00.3 85 50 145.3	29 34.8 85 50 145.6	29 09.3 85 49 145.9	28 43.6 85 48 146.2	28 18.2 85 48 146.5	2
3	30 45.8 84 52 143.4	30 20.7 84 52 143.8	29 55.6 84 51 144.1	29 30.4 84 51 144.4	29 05.2 84 51 144.7	28 39.9 84 50 145.0	28 14.6 84 50 145.3	27 49.2 85 49 145.6	3
4	30 14.5 83 53 142.5	29 49.7 83 53 142.9	29 24.8 83 52 143.2	28 59.8 83 52 143.5	28 34.8 83 52 143.8	28 09.8 84 51 144.1	27 44.7 84 51 144.4	27 19.5 84 51 144.7	4
35	29 42.6 82 54 141.6	29 18.0 82 54 142.0	28 53.3 82 54 142.3	28 28.6 83 53 142.6	28 03.8 83 53 142.9	27 39.0 83 52 143.3	27 14.1 83 52 143.6	26 49.2 83 52 143.9	35
6	29 10.1 81 55 140.8	28 45.7 81 55 141.1	28 21.2 82 54 141.4	27 56.7 82 54 141.8	27 32.2 82 54 142.1	27 07.6 82 53 142.4	26 43.0 82 53 142.7	26 18.3 82 53 143.0	6
7	28 36.9 80 56 139.9	28 12.7 81 56 140.2	27 48.5 81 56 140.6	27 24.2 81 55 140.9	26 59.9 81 55 141.2	26 35.6 81 54 141.6	26 11.2 81 54 141.9	25 46.7 82 54 142.2	7
8	28 03.1 80 57 139.0	27 39.2 80 57 139.4	27 15.2 80 56 139.7	26 51.2 80 56 140.1	26 27.1 80 56 140.4	26 03.0 80 55 140.7	25 38.8 81 55 141.0	25 14.6 81 55 141.4	8
9	27 28.8 79 58 138.2	27 05.1 79 58 138.5	26 41.3 79 57 138.9	26 17.5 79 57 139.2	25 53.7 80 57 139.6	25 29.8 80 56 139.9	25 05.9 80 56 140.2	24 41.9 80 55 140.6	9
40	26 53.8 78 59 137.4	26 30.4 78 59 137.7	26 06.9 78 58 138.1	25 43.3 79 58 138.4	25 19.7 79 58 138.7	24 56.0 79 57 139.1	24 32.3 79 57 139.4	24 08.6 79 56 139.8	40
1	26 18.4 77 60 136.6	25 55.2 78 60 136.9	25 31.9 78 59 137.3	25 08.5 78 59 137.6	24 45.2 78 58 137.9	24 21.7 78 58 138.3	23 58.3 78 58 138.6	23 34.7 78 57 139.0	1
2	25 42.4 77 61 135.7	25 19.4 77 60 136.1	24 56.3 77 60 136.5	24 33.2 77 60 136.8	24 10.1 77 59 137.2	23 46.9 77 59 137.5	23 23.7 78 58 137.8	23 00.4 78 58 138.2	2
3	25 05.9 76 62 135.0	24 43.1 76 61 135.3	24 20.3 76 61 135.7	23 57.4 76 61 136.0	23 34.5 76 60 136.4	23 11.5 77 60 136.7	22 48.5 77 59 137.1	22 25.5 77 59 137.4	3
4	24 28.8 75 63 134.2	24 06.3 75 62 134.5	23 43.7 75 62 134.9	23 21.1 76 61 135.3	22 58.4 76 61 135.6	22 35.7 76 61 136.0	22 12.9 76 60 136.3	21 50.1 76 60 136.7	4
45	23 51.3 74 63 133.4	23 29.0 74 63 133.8	23 06.7 75 63 134.1	22 44.3 75 62 134.5	22 21.8 75 62 134.9	21 59.3 75 61 135.2	21 36.7 75 61 135.6	21 14.2 75 61 135.9	45
6	23 13.3 74 64 132.6	22 51.3 74 63 133.0	22 29.1 74 63 133.4	22 07.0 74 63 133.7	21 44.7 74 62 134.1	21 22.4 74 62 134.5	21 00.1 74 62 134.8	20 37.8 75 61 135.2	6
7	22 34.9 73 65 131.9	22 13.0 73 64 132.3	21 51.1 73 64 132.6	21 29.2 73 64 133.0	21 07.2 73 63 133.3	20 45.1 74 63 133.7	20 23.0 74 62 134.1	20 00.9 74 62 134.5	7
8	21 56.0 72 66 131.2	21 34.4 72 65 131.5	21 12.7 72 65 131.9	20 51.0 73 64 132.3	20 29.2 73 64 132.6	20 07.4 73 63 133.0	19 45.5 73 63 133.4	19 23.6 73 63 133.7	8
9	21 16.7 71 66 130.4	20 55.3 71 66 130.8	20 33.8 72 66 131.2	20 12.3 72 65 131.6	19 50.7 72 65 131.9	19 29.1 72 64 132.3	19 07.5 72 64 132.7	18 45.8 72 64 133.0	9
50	20 36.9 71 67 129.7	20 15.7 71 67 130.1	19 54.5 71 66 130.5	19 33.2 71 66 130.9	19 11.9 71 66 131.2	18 50.5 71 65 131.6	18 29.1 71 65 132.0	18 07.6 72 64 132.3	50
1	19 56.7 70 68 129.0	19 35.8 70 67 129.4	19 14.8 70 67 129.8	18 53.7 70 67 130.2	18 32.6 70 66 130.5	18 11.4 71 66 130.9	17 50.2 71 65 131.3	17 29.0 71 65 131.7	1
2	19 16.2 69 68 128.3	18 55.4 69 68 128.7	18 34.6 69 68 129.1	18 13.8 70 67 129.5	17 52.9 70 67 129.9	17 32.0 70 66 130.2	17 11.0 70 66 130.6	16 50.0 70 66 131.0	2
3	18 35.2 68 69 127.6	18 14.7 69 69 128.0	17 54.1 69 68 128.4	17 33.5 69 68 128.8	17 12.8 69 68 129.2	16 52.1 69 67 129.6	16 31.3 69 67 129.9	16 10.5 69 66 130.3	3
4	17 53.9 68 70 127.0	17 33.6 68 69 127.4	17 13.2 68 69 127.7	16 52.8 68 68 128.1	16 32.3 68 68 128.5	16 11.8 68 68 128.9	15 51.3 69 67 129.3	15 30.7 69 67 129.6	4
55	17 12.1 67 70 126.3	16 52.1 67 70 126.7	16 31.9 67 69 127.1	16 11.7 67 69 127.5	15 51.5 68 69 127.9	15 31.2 68 68 128.2	15 10.9 68 68 128.6	14 50.5 68 68 129.0	55
6	16 30.2 66 71 125.7	16 10.3 66 70 126.0	15 50.3 67 70 126.4	15 30.3 67 70 126.8	15 10.3 67 69 127.2	14 50.2 67 69 127.6	14 30.1 67 68 128.0	14 10.0 67 68 128.4	6
7	15 47.8 66 71 125.0	15 28.1 66 71 125.4	15 08.3 66 70 125.8	14 48.6 66 70 126.2	14 28.7 66 70 126.6	14 08.9 66 69 127.0	13 49.0 66 69 127.3	13 29.0 66 69 127.7	7
8	15 05.0 65 72 124.4	14 45.6 65 71 124.8	14 26.0 65 71 125.2	14 06.4 65 71 125.6	13 46.8 65 70 125.9	13 27.2 66 70 126.3	13 07.5 66 69 126.7	12 47.8 66 69 127.1	8
9	14 22.0 64 72 123.8	14 02.7 64 72 124.1	13 43.4 65 72 124.5	13 24.0 65 71 124.9	13 04.6 65 71 125.3	12 45.2 65 71 125.7	12 25.7 65 70 126.1	12 06.2 65 70 126.5	9
60	13 38.6 64 73 123.1	13 19.5 64 72 123.5	13 00.4 64 72 123.9	12 41.2 64 72 124.3	12 22.0 64 71 124.7	12 02.8 64 71 125.1	11 43.5 64 71 125.5	11 24.2 64 70 125.9	60
1	12 55.0 63 73 122.5	12 36.1 63 73 122.9	12 17.1 63 72 123.3	11 58.2 63 72 123.7	11 39.2 63 72 124.1	11 20.1 64 72 124.5	11 01.1 64 71 124.9	10 42.0 64 71 125.3	1
2	12 11.0 62 74 121.9	11 52.3 62 73 122.3	11 33.6 62 73 122.7	11 14.8 63 73 123.1	10 56.0 63 73 123.5	10 37.2 63 72 123.9	10 18.3 63 72 124.3	9 59.4 63 71 124.7	2
3	11 26.8 62 74 121.3	11 08.3 62 74 121.7	10 49.7 62 73 122.1	10 31.1 62 73 122.5	10 12.5 62 73 122.9	9 53.9 62 72 123.3	9 35.2 62 72 123.7	9 16.5 63 72 124.1	3
4	10 42.2 61 75 120.7	10 23.9 61 74 121.1	10 05.6 61 74 121.5	9 47.2 61 74 121.9	9 28.8 61 73 122.3	9 10.3 62 73 122.7	8 51.9 62 73 123.1	8 33.4 62 72 123.5	4
65	9 57.4 60 75 120.2	9 39.3 61 75 120.6	9 21.1 61 74 121.0	9 02.9 61 74 121.4	8 44.7 61 74 121.8	8 26.5 61 74 122.2	8 08.2 61 73 122.6	7 49.9 61 73 123.0	65
6	9 12.4 60 76 119.6	8 54.4 60 75 120.0	8 36.4 60 75 120.4	8 18.4 60 75 120.8	8 00.4 60 74 121.2	7 42.4 60 74 121.6	7 24.3 60 74 122.0	7 06.2 60 73 122.4	6
7	8 27.1 59 76 119.0	8 09.3 59 76 119.4	7 51.5 59 75 119.8	7 33.7 59 75 120.2	7 15.8 60 75 120.6	6 58.0 60 74 121.0	6 40.1 60 74 121.4	6 22.2 60 74 121.9	7
8	7 41.5 59 76 118.5	7 23.9 59 76 118.9	7 06.3 59 76 119.3	6 48.7 59 75 119.7	6 31.0 59 75 120.1	6 13.3 59 75 120.5	5 55.6 59 74 120.9	5 37.9 59 74 121.3	8
9	6 55.7 58 77 117.9	6 38.3 58 76 118.3	6 20.9 58 76 118.7	6 03.4 58 76 119.1	5 45.9 58 75 119.5	5 28.4 58 75 119.9	5 10.9 58 75 120.4		9
70	6 09.7 57 77 117.4	5 52.4 58 77 117.8	5 35.2 58 77 118.2	5 17.9 58 76 118.6	5 00.6 58 76 119.0				70
1	5 23.4 57 78 116.8	5 06.3 57 77 117.2							1

DECLINATION SAME NAME AS LATITUDE

Each cell lists: Alt.   Δd Δt   Az.

H.A.	20° 00′	20° 30′	21° 00′	21° 30′	22° 00′	22° 30′	23° 00′	23° 30′	H.A.
91	9 01.3 48 82 72.0	9 15.7 48 82 71.6	9 30.1 48 82 71.2	9 44.4 48 82 70.7	9 58.7 48 81 70.3	10 13.0 48 81 69.8	10 27.3 47 81 69.4	10 41.5 47 81 68.9	91
2	8 11.9 49 82 71.6	8 26.5 48 82 71.1	8 41.0 48 82 70.7	8 55.5 48 81 70.3	9 09.9 48 81 69.8	9 24.3 48 81 69.4	9 38.7 48 81 68.9	9 53.1 48 80 68.5	2
3	7 22.7 49 82 71.1	7 37.4 49 82 70.7	7 52.0 49 81 70.2	8 06.6 49 81 69.8	8 21.2 49 81 69.4	8 35.8 48 81 68.9	8 50.3 48 80 68.5	9 04.8 48 80 68.0	3
4	6 33.6 49 82 70.7	6 48.4 49 81 70.2	7 03.2 49 81 69.8	7 17.9 49 81 69.3	7 32.7 49 81 68.9	7 47.4 49 80 68.5	8 02.0 49 80 68.0	8 16.7 49 80 67.6	4
95	5 44.6 50 81 70.2	5 59.6 50 81 69.8	6 14.5 50 81 69.3	6 29.4 50 81 68.9	6 44.2 50 80 68.4	6 59.1 49 80 68.0	7 13.9 49 80 67.6	7 28.7 49 80 67.1	95
6		5 10.9 50 81 69.3	5 25.9 50 81 68.9	5 41.0 50 80 68.4	5 56.0 50 80 68.0	6 11.0 50 80 67.6	6 26.0 50 80 67.1	6 40.9 50 79 66.7	6
7					5 07.9 51 80 67.5	5 23.1 50 80 67.1	5 38.2 50 80 66.6	5 53.3 50 79 66.2	7
8								5 05.8 51 79 65.7	8

Lat. 30°

H.A.	24° 00' Alt.	Δd Δt	Az.	24° 30' Alt.	Δd Δt	Az.	25° 00' Alt.	Δd Δt	Az.	25° 30' Alt.	Δd Δt	Az.	26° 00' Alt.	Δd Δt	Az.	26° 30' Alt.	Δd Δt	Az.	27° 00' Alt.	Δd Δt	Az.	27° 30' Alt.	Δd Δt	Az.	H.A.
00	84 00.0	1.00 6	180.0	84 30.0	1.00 7	180.0	85 00.0	1.00 8	180.0	85 30.0	1.00 9	180.0	86 00.0	1.0 11	180.0	86 30.0	1.0 11	180.0	87 00.0	1.0 13	180.0	87 30.0	1.0 15	180.0	00
1	83 56.1	99 19	171.3	84 25.7	99 21	170.6	84 55.3	99 23	169.7	85 24.8	98 25	168.6	85 54.2	98 28	167.3	86 23.4	97 31	165.6	86 52.4	96 35	163.4	87 21.0	95 40	160.4	1
2	83 44.5	96 51	163.0	84 13.2	96 53	161.6	84 41.7	96 56	160.0	85 09.9	93 89	158.1	85 37.7	92 42	155.7	86 04.9	90 47	152.8	86 31.4	87 52	149.2	86 56.8	70 68	144.5	2
3	83 25.9	92 41	155.3	83 53.3	90 44	153.4	84 20.2	89 47	151.3	84 46.6	87 50	148.7	85 12.2	84 54	145.8	85 36.9	81 58	142.2	86 00.4	76 63	138.0	86 22.3	70 68	132.8	3
4	83 01.4	87 49	148.4	83 27.1	86 52	146.2	83 52.2	82 65	143.7	84 16.5	80 68	140.9	84 39.9	76 62	137.6	85 02.1	72 66	133.8	85 22.8	66 70	129.5	85 42.4	60 74	124.5	4
05	82 31.8	81 56	142.2	82 55.8	79 59	139.9	83 19.1	76 62	137.2	83 41.4	73 65	134.3	84 02.6	69 68	131.0	84 22.5	64 71	127.3	84 40.8	58 74	123.1	84 57.3	51 78	118.5	05
6	81 58.0	76 62	136.9	82 20.5	73 64	134.5	82 42.0	70 67	131.8	83 02.5	66 70	128.8	83 21.6	62 72	125.6	83 39.8	57 75	122.1	83 56.1	52 78	118.2	84 10.6	45 80	114.0	6
7	81 21.0	71 66	132.2	81 41.9	68 66	129.8	82 01.9	65 71	127.2	82 20.8	61 73	124.3	82 38.4	57 75	121.2	82 54.7	52 78	117.9	83 09.5	46 80	114.3	83 22.5	40 82	110.5	7
8	80 41.3	67 70	128.2	81 00.8	64 72	125.8	81 19.4	60 74	123.3	81 36.9	56 76	120.5	81 53.2	52 78	117.6	82 08.1	47 80	114.5	82 21.2	42 82	111.2	82 33.4	37 83	107.7	8
9	79 59.5	63 72	124.7	80 17.8	59 74	122.4	80 35.1	55 76	119.9	80 51.4	52 78	117.3	81 06.5	48 80	114.5	81 20.2	44 81	111.6	81 32.6	39 83	108.6	81 43.6	34 84	105.4	9
10	79 16.0	59 75	121.6	79 33.2	56 76	119.4	79 49.5	52 78	117.0	80 04.7	49 80	114.6	80 18.7	45 81	112.0	80 31.6	41 82	109.2	80 43.1	36 84	106.4	80 53.2	31 84	103.5	10
1	78 31.1	56 77	118.9	78 47.3	53 78	116.7	79 02.6	49 80	114.5	79 17.0	46 81	112.2	79 30.2	42 82	109.7	79 42.2	38 83	107.2	79 53.0	34 84	104.6	80 02.5	29 85	101.8	1
2	77 45.0	53 78	116.5	78 00.5	50 80	114.4	78 15.0	47 81	112.3	78 28.5	43 82	110.1	78 40.9	40 83	107.8	78 52.3	36 84	105.4	79 02.5	32 85	103.0	79 11.5	28 85	100.4	2
3	76 58.1	50 80	114.3	77 12.8	47 81	112.4	77 26.6	44 82	110.3	77 39.4	41 83	108.2	77 51.2	38 84	106.1	78 02.0	34 84	103.8	78 11.8	31 85	101.5	78 20.3	27 86	99.2	3
4	76 10.4	48 81	112.4	76 24.4	45 82	110.5	76 37.6	42 82	108.6	76 49.8	39 83	106.6	77 01.1	36 84	104.5	77 11.4	33 85	102.4	77 20.7	29 85	100.3	77 29.0	26 86	98.1	4
15	75 22.0	46 82	110.6	75 35.5	43 82	108.8	75 48.1	41 83	107.0	75 59.8	38 84	105.1	76 10.7	35 85	103.2	76 20.6	31 85	101.2	76 29.5	28 86	99.2	76 37.4	25 86	97.1	15
6	74 33.1	44 82	109.0	74 46.1	42 83	107.3	74 58.2	39 84	105.6	75 09.5	36 84	103.8	75 19.9	33 85	101.9	75 29.5	30 85	100.0	75 38.1	27 86	98.1	75 45.8	24 86	96.2	6
7	73 43.8	43 83	107.6	73 56.3	40 84	105.9	74 08.0	38 84	104.3	74 18.9	35 85	102.5	74 29.0	32 85	100.8	74 38.3	29 86	99.0	74 46.6	26 86	97.2	74 54.1	23 86	95.3	7
8	72 54.1	41 83	106.2	73 06.2	39 84	104.6	73 17.5	37 84	103.1	73 28.1	34 85	101.4	73 37.7	31 85	99.8	73 46.9	28 86	98.1	73 55.0	26 86	96.3	74 02.5	23 86	94.6	8
9	72 04.0	40 84	105.0	72 15.7	38 84	103.5	72 26.8	36 85	102.0	72 37.0	33 85	100.4	72 46.6	31 86	98.8	72 55.4	28 86	97.2	73 03.4	25 86	95.5	73 10.5	22 86	93.9	9
20	71 13.7	39 84	103.8	71 25.1	37 85	102.4	71 35.8	35 85	100.9	71 45.9	32 85	99.4	71 55.2	30 86	97.9	72 03.8	27 86	96.4	72 11.6	25 86	94.8	72 18.7	22 87	93.2	20
1	70 23.1	38 85	102.8	70 34.3	36 85	101.4	70 44.7	34 85	100.0	70 54.5	32 86	98.5	71 03.7	29 86	97.1	71 12.1	27 86	95.6	71 19.8	25 86	94.1	71 26.8	22 87	92.6	1
2	69 32.4	37 85	101.8	69 43.2	35 85	100.4	69 53.5	33 86	99.1	70 03.1	31 86	97.7	70 12.0	29 86	96.3	70 20.3	27 86	94.9	70 27.9	24 86	93.4	70 34.9	22 87	92.0	2
3	68 41.4	36 85	100.8	68 52.1	35 86	99.5	69 02.1	32 86	98.2	69 11.5	30 86	96.9	69 20.4	28 86	95.5	69 28.5	26 86	94.2	69 36.1	24 86	92.7	69 42.9	22 87	91.4	3
4	67 50.3	36 85	99.9	68 00.8	34 86	98.7	68 10.6	32 86	97.4	68 19.9	30 86	96.1	68 28.6	28 86	94.8	68 36.7	26 86	93.5	68 44.2	24 86	92.2	68 51.0	22 87	90.8	4
25	66 59.0	35 86	99.1	67 09.3	33 86	97.9	67 19.1	31 86	96.7	67 28.2	30 86	95.4	67 36.8	28 86	94.2	67 44.8	26 87	92.9	67 52.2	24 87	91.6	67 59.0	22 87	90.3	25
6	66 07.7	35 86	98.3	66 17.8	33 86	97.1	66 27.4	31 86	95.9	66 36.5	29 86	94.7	66 45.0	27 86	93.5	66 52.9	26 87	92.3	67 00.3	24 87	91.1	67 07.1	22 87	89.8	6
7	65 16.2	34 86	97.5	65 26.2	32 86	96.4	65 35.7	31 86	95.2	65 44.7	29 86	94.1	65 53.1	27 86	92.9	66 01.0	25 87	91.7	66 08.3	24 87	90.5	66 15.1	22 87	89.3	7
8	64 24.7	34 86	96.8	64 34.5	32 86	95.7	64 43.9	30 86	94.6	64 52.8	29 86	93.5	65 01.2	27 86	92.3	65 09.0	25 87	91.2	65 16.4	24 87	90.0	65 23.1	22 87	88.9	8
9	63 33.0	33 86	96.1	63 42.8	32 86	95.0	63 52.1	30 86	93.9	64 00.9	29 87	92.9	64 09.3	27 87	91.8	64 17.1	25 87	90.7	64 24.4	24 87	89.5	64 31.2	22 87	88.4	9
30	62 41.3	33 86	95.4	62 51.0	32 86	94.4	63 00.3	30 86	93.3	63 09.0	28 86	92.3	63 17.3	27 87	91.2	63 25.1	25 87	90.1	63 32.4	24 86	89.1	63 39.3	22 87	88.0	30
1	61 49.6	33 86	94.8	61 59.2	31 86	93.8	62 08.4	30 86	92.8	62 17.1	28 87	91.7	62 25.4	27 87	90.7	62 33.2	26 87	89.6	62 40.5	24 86	88.6	62 47.3	22 86	87.5	1
2	60 57.8	33 86	94.1	61 07.3	31 86	93.2	61 16.5	30 86	92.2	61 25.1	28 87	91.2	61 33.4	27 87	90.2	61 41.2	25 87	89.2	61 48.5	24 86	88.1	61 55.4	22 86	87.1	2
3	60 05.9	32 86	93.5	60 15.4	31 87	92.6	60 24.5	30 86	91.6	60 33.2	28 87	90.7	60 41.4	27 87	89.7	60 49.2	25 87	88.7	60 56.6	24 86	87.7	61 03.5	22 86	86.7	3
4	59 14.0	32 86	93.0	59 23.5	31 87	92.0	59 32.6	30 87	91.1	59 41.2	28 87	90.1	59 49.5	27 87	89.2	59 57.3	25 87	88.2	60 04.7	24 86	87.3	60 11.7	23 86	86.3	4
35	58 22.1	32 86	92.4	58 31.6	31 87	91.5	58 40.6	29 87	90.6	58 49.3	28 87	89.7	58 57.5	27 87	88.7	59 05.4	25 87	87.8	59 12.8	24 86	86.8	59 19.8	23 86	85.9	35
6	57 30.2	32 87	91.8	57 39.6	31 87	91.0	57 48.4	29 87	90.1	57 57.3	28 87	89.2	58 05.6	27 87	88.3	58 13.5	26 86	87.3	58 20.9	24 86	86.4	58 28.0	23 86	85.5	6
7	56 38.3	32 87	91.3	56 47.7	31 87	90.4	56 56.7	29 87	89.6	57 05.4	28 87	88.7	57 13.6	27 87	87.8	57 21.6	26 86	86.9	57 29.1	24 86	86.0	57 36.2	23 86	85.1	7
8	55 46.3	32 87	90.8	55 55.7	31 87	89.9	56 04.7	30 87	89.1	56 13.4	28 87	88.2	56 21.7	27 86	87.4	56 29.7	26 86	86.5	56 37.3	25 86	85.6	56 44.5	24 86	84.7	8
9	54 54.4	32 87	90.3	55 03.7	31 87	89.4	55 12.8	30 86	88.6	55 21.5	28 87	87.8	55 29.8	27 86	86.9	55 37.8	26 86	86.1	55 45.5	25 86	85.2	55 52.8	24 86	84.4	9
40	54 02.4	32 87	89.8	54 11.8	31 87	89.0	54 20.8	30 86	88.1	54 29.6	29 86	87.3	54 38.0	27 86	86.5	54 46.0	26 86	85.7	54 53.7	25 86	84.8	55 01.1	24 86	84.0	40
1	53 10.4	32 87	89.3	53 19.8	31 87	88.5	53 28.9	30 86	87.7	53 37.7	29 86	86.9	53 46.1	28 86	86.1	53 54.2	26 86	85.3	54 02.0	26 86	84.4	54 09.4	24 86	83.6	1
2	52 18.5	32 87	88.8	52 27.9	31 87	88.0	52 37.0	30 86	87.2	52 45.8	29 86	86.5	52 54.3	28 86	85.7	53 02.4	27 86	84.9	53 10.3	26 86	84.1	53 17.8	24 86	83.2	2
3	51 26.5	32 86	88.3	51 36.0	31 87	87.6	51 45.1	30 86	86.8	51 54.0	29 86	86.0	52 02.5	28 86	85.2	52 10.7	27 86	84.5	52 18.6	26 86	83.7	52 26.2	25 86	82.9	3
4	50 34.6	32 86	87.9	50 44.1	31 86	87.1	50 53.2	30 86	86.4	51 02.1	29 86	85.6	51 10.7	28 86	84.8	51 19.0	27 86	84.1	51 27.0	26 86	83.3	51 34.7	25 86	82.5	4
45	49 42.7	32 86	87.4	49 52.2	31 86	86.7	50 01.4	30 86	85.9	50 10.3	29 86	85.2	50 19.0	29 86	84.4	50 27.3	27 86	83.7	50 35.4	26 86	82.9	50 43.2	26 86	82.2	45
6	48 50.8	32 86	87.0	49 00.3	31 86	86.2	49 09.6	30 86	85.5	49 18.6	29 86	84.8	49 27.3	29 86	84.0	49 35.7	28 86	83.3	49 43.9	27 86	82.6	49 51.7	26 86	81.8	6
7	47 58.9	32 86	86.5	48 08.5	31 86	85.8	48 17.8	31 86	85.1	48 26.8	30 86	84.4	48 35.6	29 86	83.6	48 44.1	28 86	82.9	48 52.4	27 86	82.2	49 00.3	26 86	81.5	7
8	47 07.1	32 86	86.1	47 16.7	32 86	85.4	47 26.0	31 86	84.7	47 35.2	30 86	84.0	47 44.0	29 86	83.3	47 52.6	28 86	82.5	48 00.9	27 86	81.8	48 08.9	26 86	81.1	8
9	46 15.2	32 86	85.6	46 24.9	32 86	85.0	46 34.3	31 86	84.3	46 43.5	30 86	83.6	46 52.4	29 86	82.9	47 01.1	28 86	82.2	47 09.5	27 86	81.5	47 17.6	27 85	80.8	9
50	45 23.4	33 86	85.2	45 33.2	32 86	84.5	45 42.6	31 86	83.9	45 51.9	30 86	83.2	46 00.9	30 86	82.5	46 09.6	29 86	81.8	46 18.1	28 86	81.1	46 26.4	27 85	80.4	50
1	44 31.7	33 86	84.8	44 41.5	32 86	84.1	44 51.0	31 86	83.5	45 00.3	31 86	82.8	45 09.4	30 86	82.1	45 18.2	29 86	81.4	45 26.8	28 86	80.7	45 35.2	27 85	80.1	1
2	43 40.0	33 86	84.4	43 49.8	32 86	83.7	43 59.4	31 86	83.1	44 08.8	31 86	82.4	44 17.9	30 86	81.7	44 26.9	29 86	81.1	44 35.6	29 85	80.4	44 44.0	28 85	79.7	2
3	42 48.3	33 86	83.9	42 58.1	32 86	83.3	43 07.8	32 86	82.7	43 17.3	31 86	82.0	43 26.5	30 86	81.4	43 35.6	29 85	80.7	43 44.3	29 85	80.0	43 52.9	28 85	79.4	3
4	41 56.6	34 86	83.5	42 06.6	33 86	82.9	42 16.3	32 86	82.3	42 25.9	31 86	81.6	42 35.2	31 86	81.0	42 44.3	30 85	80.3	42 53.2	29 85	79.7	43 01.9	28 85	79.0	4
55	41 05.0	34 86	83.1	41 15.0	33 86	82.5	41 24.9	32 86	81.9	41 34.5	32 86	81.2	41 43.9	31 85	80.6	41 53.1	30 85	80.0	42 02.1	30 85	79.3	42 10.9	29 85	78.7	55
6	40 13.4	34 86	82.7	40 23.5	33 86	82.1	40 33.5	33 86	81.5	40 43.2	32 85	80.9	40 52.7	31 85	80.2	41 02.0	31 85	79.6	41 11.1	30 85	79.0	41 20.0	29 85	78.3	6
7	39 21.9	34 86	82.3	39 32.1	34 86	81.7	39 42.1	33 86	81.1	39 51.9	32 85	80.5	40 01.5	32 85	79.9	40 10.9	31 85	79.2	40 20.1	30 85	78.6	40 29.1	30 85	78.0	7
8	38 30.4	35 86	81.9	38 40.7	34 86	81.3	38 50.8	33 85	80.7	39 00.7	33 85	80.1	39 10.4	32 85	79.5	39 19.9	31 85	78.9	39 29.2	31 85	78.3	39 38.3	30 85	77.6	8
9	37 39.0	35 86	81.5	37 49.4	34 85	80.9	37 59.5	34 85	80.3	38 09.5	33 85	79.7	38 19.3	32 85	79.1	38 28.9	32 85	78.5	38 38.4	31 85	77.9	38 47.6	30 84	77.3	9
60	36 47.7	35 86	81.1	36 58.1	34 85	80.5	37 08.3	34 85	79.9	37 18.4	33 85	79.3	37 28.3	33 85	78.7	37 38.0	32 85	78.1	37 47.6	31 84	77.5	37 56.9	31 84	76.9	60
1	35 56.4	35 85	80.7	36 06.9	35 85	80.1	36 17.2	34 85	79.5	36 27.4	34 85	79.0	36 37.4	33 85	78.4	36 47.2	32 85	77.8	36 56.9	32 84	77.2	37 06.4	31 84	76.6	1
2	35 05.1	36 85	80.3	35 15.7	35 85	79.7	35 26.1	35 85	79.2	35 36.4	34 85	78.6	35 46.5	33 85	78.0	35 56.5	33 84	77.4	36 06.3	32 84	76.8	36 15.9	32 84	76.2	2
3	34 13.9	36 85	79.9	34 24.6	35 85	79.3	34 35.1	35 85	78.8	34 45.5	34 85	78.2	34 55.7	34 85	77.6	35 05.8	33 84	77.1	35 15.7	32 84	76.5	35 25.4	32 84	75.9	3
4	33 22.8	36 85	79.5	33 33.6	36 85	79.0	33 44.2	35 85	78.4	33 54.7	35 85	77.8	34 05.0	34 84	77.3	34 15.2	34 84	76.7	34 25.2	33 84	76.1	34 35.1	33 84	75.5	4
65	32 31.7	37 85	79.1	32 42.6	36 85	78.6	32 53.4	36 85	78.0	33 03.9	35 84	77.4	33 14.4	35 84	76.9	33 24.7	34 84	76.3	33 34.8	34 84	75.8	33 44.8	33 84	75.2	65
6	31 40.7	37 85	78.7	31 51.7	36 85	78.2	32 02.6	36 84	77.6	32 13.3	35 84	77.1	32 23.8	35 84	76.5	32 34.2	34 84	76.0	32 44.5	34 84	75.4	32 54.6	33 84	74.8	6
7	30 49.8	37 85	78.3	31 00.9	37 85	77.8	31 11.8	36 84	77.2	31 22.7	36 84	76.7	31 33.3	35 84	76.1	31 43.8	35 84	75.6	31 54.2	34 84	75.0	32 04.5	34 83	74.5	7
8	29 59.0	38 85	77.9	30 10.2	37 84	77.4	30 21.2	37 84	76.9	30 32.1	36 84	76.3	30 42.9	36 84	75.8	30 53.6	35 84	75.2	31 04.1	35 84	74.7	31 14.5	34 83	74.1	8
9	29 08.2	38 84	77.5	29 19.5	37 84	77.0	29 30.6	37 84	76.5	29 41.7	37 84	75.9	29 52.6	36 84	75.4	30 03.4	36 84	74.9	30 14.0	35 83	74.3	30 24.5	35 83	73.8	9
70	28 17.5	38 84	77.1	28 28.9	38 84	76.6	28 40.2	37 84	76.1	28 51.3	37 84	75.6	29 02.3	37 84	75.0	29 13.2	36 83	74.5	29 24.0	36 83	74.0	29 34.7	35 83	73.4	70
1	27 26.6	39 84	76.7	27 38.4	38 84	76.2	27 49.8	38 84	75.7	28 01.0	37 84	75.2	28 12.2	37 84	74.6	28 23.2	37 83	74.1	28 34.1	36 83	73.6	28 44.9	36 83	73.1	1
2	26 36.3	39 84	76.3	26 48.0	39 84	75.8	26 59.5	38 84	75.3	27 10.9	38 84	74.8	27 22.1	37 83	74.3	27 33.3	37 83	73.7	27 44.3	37 83	73.2	27 55.3	36 83	72.7	2
3	25 45.9	39 84	75.9	25 57.6	39 84	75.4	26 09.2	39 84	74.9	26 20.8	38 84	74.4	26 32.2	38 83	73.9	26 43.5	37 83	73.4	26 54.6	37 83	72.9	27 05.7	37 82	72.3	3
4	24 55.5	40 84	75.5	25 07.4	39 84	75.0	25 19.1	39 83	74.5	25 30.8	39 83	74.0	25 42.3	38 83	73.5	25 53.7	38 83	73.0	26 05.0	38 82	72.5	26 16.2	37 82	72.0	4
75	24 05.3	40 84	75.1	24 17.2	40 83	74.6	24 29.1	40 83	74.1	24 40.9	39 83	73.6	24 52.5	39 83	73.1	25 04.1	38 83	72.6	25 15.5	38 82	72.1	25 26.9	38 82	71.6	75
6	23 15.1	40 84	74.7	23 27.2	40 83	74.2	23 39.2	40 83	73.7	23 51.0	39 83	73.2	24 02.8	39 83	72.7	24 14.4	39 82	72.2	24 26.1	38 82	71.7	24 37.6	38 82	71.2	6
7	22 25.0	41 83	74.3	22 37.2	41 83	73.8	22 49.3	40 83	73.4	23 01.3	40 83	72.9	23 13.3	40 82	72.4	23 25.1	39 82	71.9	23 36.8	39 82	71.4	23 48.5	38 82	70.9	7
8	21 35.0	41 83	73.9	21 47.3	41 83	73.4	21 59.6	41 83	73.0	22 11.7	40 82	72.5	22 23.8	40 82	72.0	22 35.8	40 82	71.5	22 47.7	39 82	71.0	22 59.5	39 81	70.5	8
9	20 45.1	42 83	73.5	20 57.6	41 83	73.0	21 10.0	41 82	72.6	21 22.3	41 82	72.1	21 34.5	41 82	71.6	21 46.6	40 82	71.1	21 58.6	40 81	70.6	22 10.5	40 81	70.1	9
80	19 55.4	42 83	73.1	20 07.9	42 83	72.6	20 20.4	42 82	72.2	20 32.8	41 82	71.7	20 45.2	41 82	71.2	20 57.5	41 82	70.8	21 09.7	40 81	70.3	21 21.7	40 81	69.7	80
1	19 05.7	43 83	72.7	19 18.4	42 82	72.2	19 31.0	42 82	71.8	19 43.6	42 82	71.3	19 56.1	41 82	70.8	20 08.5	41 81	70.3	20 20.8	41 81	69.8	20 33.1	41 81	69.3	1
2	18 16.1	43 82	72.3	18 29.0	42 82	71.8	18 41.7	42 82	71.3	18 54.4	42 82	70.9	19 07.1	42 82	70.4	19 19.6	42 81	69.9	19 32.1	41 81	69.4	19 44.5	41 81	68.9	2
3	17 26.7	43 82	71.9	17 39.7	43 82	71.4	17 52.6	43 82	70.9	18 05.4	42 82	70.5	18 18.2	42 81	70.0	18 30.9	42 81	69.5	18 43.5	41 81	69.0	18 56.1	41 80	68.6	3
4	16 37.4	44 82	71.5	16 50.4	44 82	71.0	17 03.5	43 82	70.5	17 16.5	43 81	70.1	17 29.4	43 81	69.6	17 42.3	43 81	69.1	17 55.1	42 81	68.6	18 07.8	42 80	68.2	4
85	15 48.1	44 82	71.1	16 01.4	44 82	70.6	16 14.6	44 81	70.1	16 27.7	44 81	69.6	16 40.8	43 81	69.2	16 53.8	43 81	68.7	17 06.7	43 80	68.2	17 19.6	43 80	67.8	85
6	14 59.1	45 82	70.6	15 12.5	45 81	70.2	15 25.8	44 81	69.7	15 39.1	44 81	69.2	15 52.3	44 80	68.8	16 05.5	44 80	68.3	16 18.6	44 80	67.8	16 31.6	43 80	67.4	6
7	14 10.1	45 81	70.2	14 23.6	45 81	69.7	14 37.1	45 81	69.3	14 50.6	45 81	68.8	15 03.9	44 80	68.4	15 17.2	44 80	67.9	15 30.5	44 80	67.4	15 43.7	44 80	67.0	7
8	13 21.3	46 81	69.8	13 35.0	46 81	69.3	13 48.6	45 81	68.9	14 02.3	45 80	68.4	14 15.7	45 80	67.9	14 29.2	45 80	67.5	14 42.6	45 79	67.0	14 56.0	44 79	66.6	8
9	12 32.6	46 81	69.3	12 46.4	46 81	68.9	13 00.2	46 80	68.4	13 14.0	46 80	68.0	13 27.6	46 80	67.5	13 41.2	46 80	67.1	13 54.8	45 79	66.6	14 08.4	45 79	66.1	9
90	11 44.0	47 81	68.9	11 58.0	47 80	68.5	12 11.9	46 80	68.0	12 25.8	46 80	67.6	12 39.7	46 80	67.1	12 53.5	46 79	66.6	13 07.2	46 79	66.2	13 20.9	46 79	65.7	90

H.A.	24° 00' Alt. / Δd Δt / Az.	24° 30' Alt. / Δd Δt / Az.	25° 00' Alt. / Δd Δt / Az.	25° 30' Alt. / Δd Δt / Az.	26° 00' Alt. / Δd Δt / Az.	26° 30' Alt. / Δd Δt / Az.	27° 00' Alt. / Δd Δt / Az.	27° 30' Alt. / Δd Δt / Az.	H.A.
00	36 00.0 1.00 1 180.0	35 30.0 1.00 1 180.0	35 00.0 1.00 1 180.0	34 30.0 1.00 1 180.0	34 00.0 1.00 1 180.0	33 30.0 1.00 1 180.0	33 00.0 1.00 1 180.0	32 30.0 1.00 1 180.0	00
1	35 59.5 1.00 2 178.9	35 29.5 1.00 3 178.9	34 59.5 1.00 2 178.9	34 29.5 1.00 2 178.9	33 59.5 1.00 2 178.9	33 29.5 1.00 2 178.9	32 59.5 1.00 2 178.9	32 29.5 1.00 2 178.9	1
2	35 58.0 1.00 4 177.7	35 28.0 1.00 4 177.8	34 58.0 1.00 4 177.8	34 28.0 1.00 4 177.8	33 58.0 1.00 4 177.8	33 28.1 1.00 4 177.9	32 58.1 1.00 4 177.9	32 28.1 1.00 4 177.9	2
3	35 55.4 1.00 6 176.6	35 25.4 1.00 6 176.7	34 55.5 1.00 6 176.7	34 25.5 1.00 6 176.7	33 55.6 1.00 6 176.8	33 25.6 1.00 7 176.8	32 55.7 1.00 7 176.8	32 25.7 1.00 6 176.8	3
4	35 51.8 1.00 8 175.5	35 21.9 1.00 8 175.5	34 52.0 1.00 8 175.6	34 22.1 1.00 7 175.7	33 52.1 1.00 7 175.7	33 22.2 1.00 7 175.7	32 52.3 1.00 7 175.8	32 22.4 1.00 7 175.8	4
05	35 47.2 1.00 9 174.4	35 17.4 1.00 9 174.4	34 47.5 1.00 9 174.5	34 17.6 1.00 9 174.5	33 47.7 1.00 9 174.6	33 17.9 1.00 9 174.6	32 48.0 1.00 9 174.7	32 18.1 1.00 9 174.8	05
6	35 41.6 99 11 173.2	35 11.8 99 11 173.3	34 42.0 99 11 173.4	34 12.2 99 11 173.4	33 42.3 99 10 173.5	33 12.5 99 10 173.6	32 42.7 99 10 173.6	32 12.9 99 10 173.7	6
7	35 35.0 99 13 172.1	35 05.3 99 13 172.2	34 35.5 99 13 172.3	34 05.8 99 12 172.4	33 36.0 99 12 172.4	33 06.2 99 12 172.5	32 36.5 99 12 172.6	32 06.7 99 12 172.7	7
8	35 27.4 99 14 171.0	34 57.7 99 14 171.1	34 28.0 99 14 171.2	33 58.4 99 14 171.3	33 28.7 99 14 171.4	32 59.0 99 14 171.5	32 29.3 99 14 171.5	31 59.6 99 13 171.6	8
9	35 18.8 99 16 169.9	34 49.2 99 16 170.0	34 19.6 99 16 170.1	33 50.0 99 16 170.2	33 20.4 99 15 170.3	32 50.8 99 15 170.4	32 21.2 99 15 170.5	31 51.6 99 15 170.6	9
10	35 09.2 98 18 168.8	34 39.7 98 17 168.9	34 10.2 98 17 169.0	33 40.7 98 17 169.1	33 11.2 98 17 169.3	32 41.7 98 17 169.4	32 12.2 98 16 169.5	31 42.6 98 16 169.6	10
1	34 58.6 98 19 167.7	34 29.2 98 19 167.8	33 59.8 98 19 168.0	33 30.4 98 18 168.1	33 01.0 98 18 168.2	32 31.6 98 18 168.3	32 02.2 98 18 168.4	31 32.8 98 18 168.5	1
2	34 47.1 98 21 166.6	34 17.8 98 21 166.8	33 48.5 98 20 166.9	33 19.2 98 20 167.0	32 49.9 98 20 167.2	32 20.6 98 20 167.3	31 51.3 98 20 167.4	31 22.0 98 19 167.5	2
3	34 34.6 97 22 165.5	34 05.4 97 22 165.7	33 36.3 97 22 165.8	33 07.1 97 22 166.0	32 38.0 97 22 166.1	32 08.7 97 21 166.2	31 39.5 97 21 166.4	31 10.3 97 21 166.5	3
4	34 21.2 97 24 164.5	33 52.1 97 24 164.6	33 23.1 97 24 164.8	32 54.1 97 23 164.9	32 25.0 97 23 165.2	31 55.9 97 23 165.2	31 26.9 97 23 165.4	30 57.8 97 22 165.5	4
15	34 06.8 96 26 163.4	33 37.9 96 25 163.6	33 09.0 96 25 163.7	32 40.1 96 25 163.9	32 11.2 96 25 164.0	31 42.3 96 24 164.2	31 13.3 97 24 164.4	30 44.3 97 24 164.5	15
6	33 51.5 96 27 162.3	33 22.7 96 27 162.5	32 54.0 96 26 162.7	32 25.2 96 26 162.9	31 56.4 96 26 163.0	31 27.6 96 26 163.2	30 58.8 96 26 163.4	30 30.0 96 25 163.5	6
7	33 35.3 95 28 161.3	33 06.7 95 28 161.5	32 38.1 95 28 161.7	32 09.5 95 28 161.8	31 40.8 95 28 162.0	31 12.2 96 27 162.2	30 43.5 96 27 162.4	30 14.8 96 27 162.5	7
8	33 18.2 95 30 160.4	32 49.7 95 30 160.4	32 21.3 95 30 160.6	31 52.8 95 29 160.8	31 24.3 95 29 161.0	30 55.9 95 29 161.2	30 27.3 96 28 161.3	29 58.8 96 28 161.6	8
9	33 00.2 94 32 159.2	32 31.9 94 31 159.4	32 03.6 94 31 159.6	31 35.3 94 31 159.8	31 07.0 94 30 160.0	30 38.7 94 30 160.2	30 10.3 95 30 160.4	29 42.0 95 30 160.6	9
20	32 41.3 94 33 158.2	32 13.2 94 33 158.4	31 45.1 94 32 158.6	31 17.0 94 32 158.8	30 48.8 94 32 159.0	30 20.7 94 31 159.2	29 52.5 94 31 159.4	29 24.3 94 31 159.6	20
1	32 21.6 93 34 157.2	31 53.7 93 34 157.4	31 25.8 93 34 157.6	30 57.9 93 33 157.8	30 29.8 93 33 158.0	30 01.8 93 33 158.3	29 33.8 93 32 158.5	29 05.8 93 32 158.7	1
2	32 01.0 92 36 156.2	31 33.3 92 35 156.4	31 05.6 92 35 156.6	30 37.9 92 35 156.9	30 10.0 92 34 157.1	29 42.4 92 34 157.3	29 14.3 93 34 157.5	28 46.5 93 33 157.7	2
3	31 39.7 92 37 155.2	31 12.1 92 37 155.4	30 44.6 92 36 155.7	30 17.0 92 36 155.9	29 49.4 92 36 156.1	29 21.7 92 35 156.3	28 54.1 92 35 156.6	28 26.4 92 35 156.8	3
4	31 17.5 91 38 154.2	30 50.1 91 38 154.5	30 22.7 91 38 154.7	29 55.3 91 37 154.9	29 27.9 91 37 155.2	29 00.5 92 37 155.4	28 33.0 92 36 155.6	28 05.5 92 36 155.9	4
25	30 54.5 90 40 153.3	30 27.3 91 39 153.5	30 00.2 91 39 153.8	29 33.0 91 39 154.0	29 05.7 91 38 154.2	28 38.5 91 38 154.5	28 11.2 91 38 154.7	27 43.9 91 37 154.9	25
6	30 30.7 90 41 152.3	30 03.8 90 41 152.6	29 36.8 90 40 152.8	29 09.8 90 40 153.1	28 42.8 90 40 153.3	28 15.7 90 39 153.6	27 48.6 90 39 153.8	27 21.5 90 39 154.0	6
7	30 06.2 89 42 151.4	29 39.4 89 42 151.6	29 12.7 89 42 151.9	28 45.9 89 41 152.1	28 19.0 89 41 152.4	27 52.2 90 40 152.6	27 25.3 90 40 152.9	26 58.4 90 40 153.1	7
8	29 40.9 88 43 150.4	29 14.4 88 43 150.7	28 47.8 89 43 151.0	28 21.2 89 42 151.2	27 54.6 89 42 151.5	27 27.9 89 42 151.7	27 01.3 89 41 152.0	26 34.6 89 41 152.2	8
9	29 14.9 88 44 149.5	28 48.6 88 44 149.8	28 22.2 88 44 150.0	27 55.8 88 43 150.3	27 29.4 88 43 150.6	27 03.0 88 43 150.8	26 36.5 88 42 151.1	26 10.0 88 42 151.4	9
30	28 48.1 87 46 148.6	28 22.0 87 45 148.9	27 55.9 87 45 149.1	27 29.7 87 45 149.4	27 03.5 87 44 149.7	26 37.3 87 44 150.0	26 11.1 88 44 150.2	25 44.8 88 43 150.5	30
1	28 20.7 86 47 147.7	27 54.8 86 46 148.0	27 28.9 86 46 148.3	27 03.0 87 46 148.5	26 37.0 87 45 148.8	26 11.0 87 45 149.1	25 44.9 87 45 149.4	25 18.8 87 44 149.6	1
2	27 52.6 85 48 146.8	27 26.9 86 48 147.1	27 01.2 86 47 147.4	26 35.5 86 47 147.7	26 09.7 86 46 148.0	25 43.9 86 46 148.2	25 18.1 86 46 148.5	24 52.3 86 45 148.8	2
3	27 23.8 85 49 145.9	26 58.4 84 49 146.2	26 32.9 84 48 146.5	26 07.4 85 48 146.8	25 41.8 85 48 147.1	25 16.3 85 47 147.4	24 50.6 85 47 147.7	24 25.0 86 46 148.0	3
4	26 54.4 84 50 145.1	26 29.1 84 50 145.4	26 03.9 84 49 145.7	25 38.6 84 49 146.0	25 13.3 84 49 146.3	24 47.9 85 48 146.5	24 22.5 85 48 146.8	23 57.1 85 48 147.1	4
35	26 21.3 83 51 144.2	25 59.3 83 51 144.5	25 34.3 83 50 144.8	25 09.2 84 50 145.1	24 44.1 84 50 145.4	24 19.0 84 49 145.7	23 53.8 84 49 146.0	23 28.6 84 49 146.3	35
6	25 53.6 82 52 143.4	25 28.8 83 52 143.7	25 04.0 83 52 144.0	24 39.2 83 51 144.3	24 14.3 83 51 144.6	23 49.4 83 50 144.9	23 24.5 83 50 145.2	22 59.5 83 50 145.5	6
7	25 22.2 82 53 142.5	24 57.7 82 52 142.8	24 33.2 82 52 143.2	24 08.5 82 52 143.5	23 43.9 82 52 143.8	23 19.2 82 51 144.1	22 54.5 82 51 144.4	22 29.8 83 51 144.7	7
8	24 50.3 81 54 141.7	24 26.0 81 54 142.0	24 01.7 81 53 142.3	23 37.3 81 53 142.7	23 12.9 81 53 143.0	22 48.5 82 52 143.3	22 24.0 82 52 143.6	21 59.4 82 51 143.9	8
9	24 17.8 80 55 140.9	23 53.8 80 55 141.2	23 29.7 80 54 141.5	23 05.5 81 54 141.9	22 41.3 81 54 142.2	22 17.1 81 53 142.5	21 52.8 81 53 142.8	21 28.6 81 52 143.1	9
40	23 44.8 79 56 140.1	23 21.0 80 56 140.4	22 57.1 80 55 140.8	22 33.2 80 55 141.1	22 09.2 80 54 141.4	21 45.2 80 54 141.7	21 21.2 80 54 142.1	20 57.1 80 53 142.4	40
1	23 11.2 79 57 139.3	22 47.6 79 57 139.6	22 23.9 79 56 140.0	22 00.2 79 56 140.3	21 36.5 79 55 140.6	21 12.8 79 55 141.0	20 48.9 79 55 141.3	20 25.1 80 54 141.6	1
2	22 37.0 78 58 138.5	22 13.7 78 57 138.9	21 50.2 78 57 139.2	21 26.8 78 57 139.5	21 03.3 78 56 139.9	20 39.8 79 56 140.2	20 16.2 79 56 140.5	19 52.6 79 55 140.9	2
3	22 02.4 77 59 137.8	21 39.2 77 58 138.1	21 16.0 77 58 138.5	20 52.8 77 57 138.8	20 29.5 78 57 139.1	20 06.2 78 57 139.5	19 42.9 78 56 139.8	19 19.5 78 56 140.1	3
4	21 27.2 76 60 137.0	21 04.3 76 59 137.4	20 41.3 77 59 137.7	20 18.3 77 58 138.0	19 55.2 77 58 138.4	19 32.2 77 58 138.7	19 09.1 77 57 139.1	18 46.0 77 57 139.4	4
45	20 51.5 76 60 136.3	20 28.8 76 60 136.6	20 06.1 76 60 137.0	19 43.1 76 59 137.3	19 20.5 76 59 137.7	18 57.7 76 58 138.0	18 34.8 76 58 138.3	18 11.9 76 58 138.7	45
6	20 15.4 75 61 135.5	19 52.9 75 61 135.9	19 30.4 75 60 136.2	19 07.9 75 60 136.6	18 45.3 75 60 136.9	18 22.7 75 59 137.3	18 00.0 76 59 137.6	17 37.3 76 58 138.0	6
7	19 38.7 74 62 134.8	19 16.5 74 61 135.2	18 54.2 74 61 135.5	18 31.9 74 61 135.9	18 09.6 75 60 136.2	17 47.2 75 60 136.6	17 24.8 75 60 136.9	17 02.3 75 59 137.3	7
8	19 01.6 73 62 134.1	18 39.6 73 62 134.5	18 17.6 74 62 134.8	17 55.5 74 61 135.2	17 33.4 74 61 135.5	17 11.3 74 61 135.9	16 49.1 74 60 136.2	16 26.8 74 60 136.6	8
9	18 24.1 72 63 133.4	18 02.3 73 63 133.8	17 40.5 73 62 134.1	17 18.7 73 62 134.5	16 56.8 73 62 134.8	16 34.9 74 61 135.2	16 12.9 73 61 135.5	15 50.9 73 61 135.9	9
50	17 46.1 72 64 132.7	17 24.6 72 64 133.1	17 03.0 72 63 133.4	16 41.4 72 63 133.8	16 19.7 72 62 134.2	15 58.0 72 62 134.5	15 36.3 72 62 134.9	15 14.5 73 61 135.2	50
1	17 07.7 71 65 132.0	16 46.4 71 64 132.4	16 25.1 71 64 132.8	16 03.7 71 64 133.1	15 42.2 71 63 133.5	15 20.8 72 63 133.8	14 59.3 72 62 134.2	14 37.7 72 62 134.6	1
2	16 28.9 70 65 131.3	16 07.8 70 65 131.7	15 46.7 71 65 132.1	15 25.5 71 64 132.5	15 04.3 71 64 132.8	14 43.1 71 64 133.2	14 21.8 71 63 133.5	14 00.5 71 63 133.9	2
3	15 49.7 70 66 130.7	15 28.8 70 66 131.1	15 07.9 70 65 131.4	14 47.0 70 65 131.8	14 26.0 70 64 132.2	14 05.0 70 64 132.5	13 43.9 70 64 132.9	13 22.9 70 63 133.3	3
4	15 10.1 69 67 130.0	14 49.5 69 66 130.4	14 28.8 69 66 130.8	14 08.1 69 66 131.1	13 47.3 69 65 131.5	13 26.5 69 65 131.9	13 05.7 70 64 132.3	12 44.8 70 64 132.6	4
55	14 30.1 68 67 129.4	14 09.7 68 67 129.8	13 49.2 68 66 130.1	13 28.7 68 66 130.5	13 08.2 69 66 130.9	12 47.6 69 65 131.3	12 27.0 69 65 131.6	12 06.4 69 65 132.0	55
6	13 49.8 67 68 128.7	13 29.6 67 67 129.1	13 09.3 68 67 129.5	12 49.0 68 67 129.9	12 28.7 68 66 130.3	12 08.4 68 66 130.6	11 48.0 68 66 131.0	11 27.6 68 65 131.4	6
7	13 09.1 67 68 128.1	12 49.1 67 68 128.5	12 29.1 67 68 128.9	12 09.0 67 67 129.3	11 48.9 67 67 129.6	11 28.8 67 67 130.0	11 08.6 67 66 130.4	10 48.4 67 66 130.8	7
8	12 28.0 66 69 127.5	12 08.2 66 69 127.9	11 48.4 66 68 128.3	11 28.6 66 68 128.6	11 08.7 66 68 129.0	10 48.6 66 67 129.4	10 28.9 66 67 129.8	10 08.9 66 67 130.2	8
9	11 46.6 65 70 126.9	11 27.1 65 69 127.3	11 07.5 65 69 127.7	10 47.8 65 68 128.0	10 28.2 66 68 128.4	10 08.5 66 68 128.8	9 48.8 66 67 129.2	9 29.0 66 67 129.6	9
60	11 04.9 64 70 126.3	10 45.5 65 70 126.7	10 26.1 65 69 127.1	10 06.7 65 69 127.4	9 47.3 65 69 127.8	9 27.8 65 68 128.2	9 08.3 65 68 128.6	8 48.8 65 68 129.0	60
1	10 22.9 64 71 125.7	10 03.7 64 70 126.1	9 44.5 64 70 126.5	9 25.3 64 70 126.8	9 06.1 64 69 127.2	8 46.8 64 69 127.6	8 27.5 64 68 128.0	8 08.2 64 68 128.4	1
2	9 40.5 63 71 125.1	9 21.5 63 71 125.5	9 02.6 63 70 125.9	8 43.6 63 70 126.2	8 24.5 63 70 126.7	8 05.5 64 69 127.0	7 46.4 64 69 127.4	7 27.3 64 68 127.8	2
3	8 57.8 62 72 124.5	8 39.1 63 71 124.9	8 20.3 63 71 125.3	8 01.5 63 71 125.7	7 42.7 63 70 126.1	7 23.9 63 70 126.5	7 05.0 63 70 126.9	6 46.1 63 69 127.3	3
4	8 14.9 62 72 123.9	7 56.3 62 72 124.3	7 37.8 62 72 124.7	7 19.2 62 71 125.1	7 00.6 62 71 125.5	6 41.9 62 70 125.9	6 23.3 62 70 126.3	6 04.6 62 70 126.7	4
65	7 31.6 61 72 123.4	7 13.3 61 72 123.8	6 54.9 61 72 124.2	6 36.5 61 71 124.6	6 18.1 61 71 125.0	5 59.7 61 71 125.4	5 41.3 62 70 125.8	5 22.8 62 70 126.2	65
6	6 48.1 60 73 122.8	6 29.9 60 73 123.2	6 11.8 61 72 123.6	5 53.6 61 72 124.0	5 35.4 61 72 124.4	5 17.2 61 71 124.8			6
7	6 04.3 60 74 122.3	5 46.3 60 73 122.7	5 28.4 60 73 123.1	5 10.4 60 72 123.5					7
8	5 20.2 59 74 121.7	5 02.4 59 74 122.1							8

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00' Alt. / Δd Δt / Az.	24° 30' Alt. / Δd Δt / Az.	25° 00' Alt. / Δd Δt / Az.	25° 30' Alt. / Δd Δt / Az.	26° 00' Alt. / Δd Δt / Az.	26° 30' Alt. / Δd Δt / Az.	27° 00' Alt. / Δd Δt / Az.	27° 30' Alt. / Δd Δt / Az.	H.A.
91	10 55.6 47 80 68.5	11 09.8 47 80 68.0	11 23.8 47 80 67.6	11 37.9 47 80 67.1	11 51.9 47 80 66.7	12 05.8 46 79 66.2	12 19.8 46 79 65.8	12 33.6 46 79 65.3	91
2	10 07.4 48 80 68.0	10 21.6 48 80 67.6	10 35.9 47 80 67.1	10 50.1 47 79 66.7	11 04.2 47 79 66.3	11 18.4 47 79 65.8	11 32.4 47 78 65.4	11 46.5 47 78 64.9	2
3	9 19.2 48 80 67.6	9 33.7 48 80 67.1	9 48.1 48 80 66.7	10 02.4 47 79 66.3	10 16.8 47 79 65.8	10 31.1 47 79 65.4	10 45.3 47 78 64.9	10 59.5 47 78 64.5	3
4	8 31.3 49 80 67.1	8 45.9 49 79 66.7	9 00.4 48 79 66.3	9 15.0 48 79 65.8	9 29.4 48 78 65.4	9 43.9 48 78 64.9	9 58.3 48 78 64.5	10 12.7 48 78 64.0	4
95	7 43.5 49 79 66.7	7 58.2 49 79 66.3	8 12.9 49 79 65.8	8 27.6 49 79 65.4	8 42.3 49 78 64.9	8 56.9 49 78 64.5	9 11.5 48 78 64.0	9 26.1 48 77 63.6	95
6	6 55.5 49 79 66.2	7 10.8 50 79 65.8	7 25.6 49 79 65.4	7 40.5 49 78 64.9	7 55.3 49 78 64.5	8 10.1 49 78 64.0	8 24.9 49 78 63.6	8 39.6 49 77 63.2	6
7	6 08.4 50 79 65.8	6 23.3 50 79 65.3	6 38.5 50 78 64.9	6 53.4 50 78 64.5	7 08.5 50 78 64.0	7 23.5 50 77 63.6	7 38.4 50 77 63.2	7 53.4 50 77 62.7	7
8	5 21.1 51 79 65.3	5 36.3 51 78 64.9	5 51.5 51 78 64.4	6 06.7 51 78 64.0	6 21.9 51 78 63.6	6 37.0 51 77 63.1	6 52.2 50 77 62.7	7 07.3 50 76 62.3	8
9			5 04.7 51 78 64.0	5 20.1 51 77 63.6	5 35.4 51 77 63.1	5 50.8 51 77 62.7	6 06.1 51 76 62.3	6 21.4 51 76 61.8	9
100					5 04.7 52 76 62.2	5 20.2 52 76 61.8	5 35.7 52 76 61.4		100

Lat. 30°

H.A.	28° 00' Alt.	Δd Δt	Az.	28° 30' Alt.	Δd Δt	Az.	29° 00' Alt.	Δd Δt	Az.	30° 00' Alt.	Δd Δt	Az.	32° 00' Alt.	Δd Δt	Az.	34° 00' Alt.	Δd Δt	Az.	34° 30' Alt.	Δd Δt	Az.	35° 30' Alt.	Δd Δt	Az.	H.A.
00	88 00.0	1.0 18	180.0	88 30.0	1.0 24	180.0	89 00.0	1.0 33	180.0	90 00.0	.. 87	....	88 00.0	1.0 08	00.0	86 00.0	1.0 09	00.0	85 30.0	1.0 08	00.0	84 30.0	1.0 06	00.0	00
1	87 49.0	92 47	156.1	88 15.9	87 57	149.6	88 40.4	76 68	138.7	89 06.0	00 87	89.8	87 49.5	92 46	22.9	85 54.7	98 26	11.7	85 25.3	98 28	10.4	84 26.2	99 19	08.4	1
2	87 20.6	76 64	138.3	87 41.9	66 72	130.2	87 59.6	51 79	119.4	88 16.1	01 87	89.5	87 21.9	75 62	40.1	85 39.3	92 40	22.5	85 11.6	93 36	20.1	84 14.9	95 30	16.5	2
3	86 42.1	62 73	126.6	86 59.0	51 78	119.1	87 12.2	37 83	110.2	87 24.1	01 87	89.2	86 44.6	60 71	51.4	85 15.6	84 50	31.7	84 50.1	86 46	28.6	83 57.0	90 40	23.8	3
4	85 58.2	51 78	118.8	86 12.1	41 81	112.3	86 22.7	29 84	105.0	86 32.2	02 87	89.0	86 01.9	49 76	58.7	84 45.4	75 58	39.3	84 22.3	79 54	35.9	83 33.3	84 48	30.4	4
05	85 11.5	43 81	113.3	85 23.2	35 83	107.7	85 32.1	24 85	101.7	85 40.2	02 87	88.7	85 10.4	40 79	63.7	84 10.4	67 64	45.4	83 49.6	71 61	41.9	83 04.7	78 34	36.1	05
6	84 23.1	38 82	109.4	84 33.3	30 84	104.5	84 41.0	21 86	99.4	84 48.3	03 87	88.5	84 29.0	34 81	67.2	83 31.8	60 69	50.3	83 13.2	64 65	46.9	82 32.4	73 59	40.9	6
7	83 33.6	34 84	106.4	83 42.7	27 85	102.1	83 49.6	19 86	97.6	83 56.3	03 87	88.2	83 40.6	29 82	69.8	82 50.7	53 72	54.2	82 34.0	58 69	50.9	81 56.9	66 63	45.1	7
8	82 43.5	31 84	104.0	82 51.7	24 85	100.2	82 58.0	18 86	96.2	83 04.4	03 87	88.0	82 51.5	24 83	71.7	82 07.7	47 74	57.4	81 52.7	52 72	54.3	81 18.9	60 66	48.6	8
9	81 52.8	28 85	102.0	82 00.5	22 86	98.6	82 06.3	16 86	95.0	82 12.5	04 87	87.7	82 02.0	21 83	73.2	81 23.3	43 76	60.0	81 09.8	47 74	57.1	80 39.0	55 69	51.9	9
10	81 01.9	26 85	100.4	81 09.0	21 86	97.3	81 14.5	16 86	94.1	81 20.6	04 86	87.5	81 12.1	18 84	74.3	80 37.8	38 77	62.2	80 25.6	43 75	59.4	79 57.6	51 71	54.2	10
1	80 10.7	25 86	99.0	80 17.4	20 86	96.2	80 22.7	15 86	93.2	80 28.6	05 86	87.2	80 22.0	16 84	75.2	79 51.5	35 78	63.9	79 40.5	39 77	61.3	79 14.9	46 73	56.4	1
2	79 19.3	24 86	97.8	79 25.7	19 86	95.2	79 30.8	15 86	92.5	79 36.7	05 86	87.0	79 31.6	14 84	75.9	79 04.5	31 79	65.4	78 54.5	35 78	63.0	78 31.1	43 74	58.3	2
3	78 27.7	23 86	96.8	78 33.9	19 86	94.3	78 38.8	14 86	91.8	78 44.9	06 86	86.7	78 41.2	12 84	76.5	78 17.0	28 80	66.7	78 07.9	32 78	64.4	77 46.5	39 75	59.9	3
4	77 36.1	22 86	95.8	77 42.1	18 86	93.5	77 46.9	14 87	91.2	77 53.0	06 86	86.5	77 50.6	10 84	77.0	77 29.1	26 80	67.7	77 20.9	29 79	65.5	77 01.3	36 76	61.3	4
15	76 44.4	21 86	95.0	76 50.2	18 86	92.8	76 54.9	14 87	90.6	77 01.1	07 86	86.2	76 59.9	09 85	77.3	76 40.8	23 81	68.6	76 33.4	27 80	66.6	76 15.4	33 77	62.5	15
6	75 52.6	21 86	94.2	75 58.3	17 87	92.2	76 03.0	14 87	90.1	76 09.3	07 86	86.0	76 09.2	07 85	77.6	75 52.3	21 81	69.4	75 45.5	24 80	67.4	75 29.1	30 78	63.6	6
7	75 00.7	20 86	93.5	75 06.3	17 87	91.6	75 11.0	14 87	89.6	75 17.5	07 86	85.7	75 18.4	06 85	77.8	75 03.5	19 82	70.1	74 57.4	23 81	68.2	74 42.4	28 78	64.5	7
8	74 08.8	20 86	92.8	74 14.4	17 87	91.0	74 19.1	14 87	89.2	74 25.7	08 86	85.5	74 27.6	06 85	78.0	74 14.6	17 82	70.6	74 09.1	20 81	68.8	73 55.4	26 79	65.3	8
9	73 16.9	20 86	92.2	73 22.4	17 87	90.4	73 27.1	14 86	88.7	73 33.9	08 86	85.2	73 36.8	04 85	78.1	73 25.5	15 82	71.1	73 20.5	18 81	69.4	73 08.0	24 79	66.0	9
20	72 25.0	20 87	91.6	72 30.5	17 87	89.9	72 35.2	14 86	88.3	72 42.1	09 86	85.0	72 45.9	02 85	78.2	72 36.3	14 82	71.5	72 31.8	16 81	69.9	72 20.4	22 80	66.6	20
1	71 33.0	20 87	91.0	71 38.5	17 87	89.5	71 43.2	14 86	87.9	71 50.4	09 86	84.7	71 55.0	01 85	78.3	71 47.0	12 82	71.9	71 43.0	15 82	70.3	71 32.6	20 80	67.2	1
2	70 41.1	20 87	90.5	70 46.6	17 87	89.0	70 51.3	15 86	87.5	70 58.6	10 86	84.4	71 04.2	00 85	78.3	70 57.5	11 82	72.2	70 54.0	13 82	70.6	70 44.7	18 80	67.6	2
3	69 49.1	19 87	90.0	69 54.6	17 87	88.5	69 59.4	15 86	87.1	70 06.9	10 86	84.2	70 13.3	00 85	78.3	70 08.0	09 83	72.4	70 04.9	12 82	70.9	69 56.5	16 80	68.0	3
4	68 57.1	20 87	89.5	69 02.7	17 87	88.1	69 07.5	15 86	86.7	69 15.2	11 86	83.9	69 22.4	01 85	78.3	69 18.5	08 83	72.6	69 15.8	10 82	71.2	69 08.3	15 81	68.4	4
25	68 05.2	20 87	89.0	68 10.7	17 87	87.7	68 15.7	15 86	86.4	68 23.6	11 86	83.7	68 31.5	02 85	78.2	68 28.9	07 83	72.8	68 26.5	09 82	71.4	68 19.9	13 81	68.7	25
6	67 13.2	20 87	88.6	67 18.8	18 86	87.3	67 23.8	16 86	86.0	67 31.9	11 86	83.4	67 40.7	03 85	78.2	67 39.2	05 82	72.9	67 37.3	08 82	71.6	67 31.5	12 81	69.0	6
7	66 21.3	20 86	88.1	66 26.9	18 86	86.9	66 32.0	16 86	85.6	66 40.3	12 86	83.2	66 49.8	04 85	78.1	66 49.5	04 83	73.0	66 47.7	06 82	71.7	66 42.9	10 81	69.2	7
8	65 29.4	20 86	87.7	65 35.1	18 86	86.5	65 40.2	16 86	85.3	65 48.8	12 86	82.9	65 59.0	05 85	78.0	65 59.8	03 83	73.1	65 58.6	05 82	71.9	65 54.3	09 81	69.4	8
9	64 37.5	20 86	87.3	64 43.2	18 86	86.1	64 48.4	16 86	85.0	64 57.2	13 86	82.6	65 08.2	05 85	77.9	65 10.1	02 83	73.2	65 09.2	04 82	72.0	65 05.6	08 81	69.6	9
30	63 45.6	20 86	86.9	63 51.4	19 86	85.7	63 56.7	17 86	84.6	64 05.7	13 86	82.4	64 17.4	06 85	77.8	64 20.4	01 83	73.2	64 19.8	03 82	72.0	64 16.9	07 81	69.7	30
1	62 53.7	20 86	86.5	62 59.6	19 86	85.4	63 05.0	17 86	84.3	63 14.2	14 86	82.1	63 26.6	07 85	77.7	63 30.6	00 83	73.2	63 30.3	02 82	72.1	63 28.1	06 81	69.8	1
2	62 01.8	21 86	86.1	62 07.8	19 86	85.0	62 13.3	17 86	84.0	62 22.8	14 86	81.8	62 35.8	08 85	77.5	62 40.9	01 83	73.2	62 40.9	01 82	72.1	62 39.3	04 81	69.9	2
3	61 10.0	21 86	85.7	61 16.0	19 86	84.7	61 21.6	18 86	83.6	61 31.3	15 86	81.6	61 45.1	08 84	77.4	61 51.2	01 83	73.2	61 51.4	00 82	72.1	61 50.5	03 81	70.0	3
4	60 18.2	21 86	85.3	60 24.3	20 86	84.3	60 30.0	18 86	83.3	60 40.0	15 86	81.3	60 54.4	09 84	77.2	61 01.4	03 82	73.1	61 02.0	01 82	72.1	61 01.7	02 81	70.0	4
35	59 26.4	21 86	84.9	59 32.6	20 86	84.0	59 38.4	18 86	83.0	59 48.6	16 86	81.0	60 03.8	10 84	77.1	60 11.7	04 83	73.1	60 12.5	02 82	72.1	60 12.9	01 81	70.1	35
6	58 34.7	22 86	84.6	58 41.0	20 86	83.6	58 46.8	19 86	82.7	58 57.3	16 85	80.8	59 13.1	10 84	76.9	59 22.0	04 83	73.0	59 23.1	03 82	72.0	59 24.0	00 81	70.1	6
7	57 43.0	22 86	84.2	57 49.4	21 86	83.3	57 55.3	19 86	82.4	58 06.0	17 85	80.5	58 22.5	11 84	76.7	58 32.3	05 83	72.9	58 33.7	04 82	72.0	58 35.2	01 81	70.1	7
8	56 51.3	22 86	83.8	56 57.8	21 86	82.9	57 03.8	20 86	82.0	57 14.8	17 85	80.2	57 32.0	12 84	76.6	57 42.6	06 82	72.8	57 44.3	05 82	71.9	57 46.3	02 81	70.0	8
9	55 59.7	22 86	83.5	56 06.2	21 86	82.6	56 12.4	20 86	81.7	56 23.6	17 85	80.0	56 41.5	12 84	76.4	56 53.0	07 83	72.7	56 54.9	06 82	71.8	56 57.5	03 81	70.0	9
40	55 08.1	22 86	83.1	55 14.7	21 86	82.3	55 21.0	20 86	81.4	55 32.5	18 85	79.7	55 51.0	13 84	76.2	56 03.4	08 83	72.6	56 05.6	07 82	71.7	56 08.7	04 81	69.9	40
1	54 16.5	23 86	82.8	54 23.2	22 86	81.9	54 29.6	21 86	81.1	54 41.4	18 85	79.4	55 00.5	13 84	76.0	55 13.8	09 83	72.5	55 16.2	07 82	71.6	55 19.9	05 81	69.9	1
2	53 25.0	23 86	82.4	53 31.8	22 86	81.6	53 38.3	21 86	80.8	53 50.3	19 85	79.1	54 10.1	14 84	75.8	54 24.3	09 83	72.4	54 26.9	08 82	71.5	54 31.1	06 81	69.8	2
3	52 33.5	24 86	82.1	52 40.4	23 86	81.3	52 47.1	22 85	80.5	52 59.3	19 85	78.9	53 19.8	15 84	75.6	53 34.8	10 82	72.2	53 37.7	09 82	71.4	53 42.3	07 81	69.7	3
4	51 42.0	24 86	81.7	51 49.1	23 85	81.0	51 55.8	22 85	80.2	52 08.4	20 85	78.6	52 29.5	16 84	75.4	52 45.3	11 82	72.1	52 48.4	10 82	71.3	52 53.6	08 81	69.6	4
45	50 50.6	24 86	81.4	50 57.8	23 85	80.6	51 04.7	22 85	79.9	51 17.4	20 85	78.3	51 39.3	16 84	75.1	51 55.9	12 82	71.9	51 59.2	11 81	71.1	52 04.9	08 81	69.5	45
6	49 59.3	24 86	81.1	50 06.6	24 85	80.3	50 13.5	23 85	79.5	50 26.6	21 85	78.0	50 49.1	17 84	74.9	51 06.5	12 82	71.8	51 10.1	11 82	71.0	51 16.3	09 81	69.4	6
7	49 08.0	25 86	80.7	49 15.4	24 85	80.0	49 22.5	23 85	79.2	49 35.8	21 85	77.7	49 58.9	17 84	74.7	50 17.2	13 82	71.6	50 21.0	12 82	70.8	50 27.7	10 81	69.3	7
8	48 16.7	25 85	80.4	48 24.2	25 85	79.7	48 31.4	24 85	78.9	48 45.0	21 84	77.4	49 08.6	18 83	74.5	49 27.9	14 82	71.4	49 31.9	13 82	70.7	49 39.1	11 81	69.1	8
9	47 25.5	26 85	80.0	47 33.1	24 85	79.3	47 40.5	24 85	78.6	47 54.4	22 84	77.2	48 18.8	18 83	74.2	48 38.7	15 82	71.3	48 42.9	14 82	70.5	48 50.5	12 81	69.0	9
50	46 34.4	26 85	79.7	46 42.1	25 85	79.0	46 49.6	24 85	78.3	47 03.7	23 84	76.9	47 28.8	19 83	74.0	47 49.5	15 82	71.1	47 54.0	14 81	70.3	48 02.1	13 81	68.9	50
1	45 43.3	27 85	79.4	45 51.1	26 85	78.7	45 58.7	25 85	78.0	46 13.1	23 84	76.6	46 38.9	20 83	73.8	47 00.4	16 82	70.9	47 05.1	15 81	70.2	47 13.6	13 81	68.7	1
2	44 52.2	27 85	79.0	45 00.2	26 85	78.4	45 07.9	25 84	77.7	45 22.6	24 84	76.3	45 49.0	20 83	73.5	46 11.3	17 82	70.7	46 16.2	16 81	70.0	46 25.2	14 81	68.5	2
3	44 01.2	27 85	78.7	44 09.3	27 85	78.0	44 17.2	26 84	77.4	44 32.2	24 84	76.0	44 59.2	21 83	73.3	45 22.3	18 82	70.5	45 27.4	17 81	69.8	45 36.9	15 80	68.4	3
4	43 10.3	28 85	78.3	43 18.5	27 85	77.7	43 26.5	26 84	77.1	43 41.8	25 84	75.7	44 09.5	22 83	73.0	44 33.4	18 81	70.3	44 38.7	17 81	69.6	44 48.7	16 80	68.2	4
55	42 19.4	28 85	78.0	42 27.8	27 84	77.4	42 35.9	27 84	76.7	42 51.5	25 84	75.4	43 19.9	22 83	72.7	43 44.5	19 81	70.0	43 50.0	18 81	69.4	44 00.4	16 80	68.0	55
6	41 28.6	29 84	77.7	41 37.1	28 84	77.1	41 45.4	27 84	76.4	42 01.2	26 84	75.1	42 30.3	23 83	72.5	42 55.7	20 81	69.8	43 01.5	19 81	69.2	43 12.3	17 80	67.8	6
7	40 37.9	29 84	77.4	40 46.5	28 84	76.7	40 54.9	28 84	76.1	41 11.0	26 84	74.8	41 40.8	23 82	72.2	42 06.9	20 81	69.6	42 12.9	20 81	68.9	42 24.2	18 80	67.6	7
8	39 47.2	30 84	77.0	39 56.0	29 84	76.4	40 04.5	28 84	75.8	40 20.9	27 83	74.5	40 51.3	24 82	72.0	41 18.3	21 81	69.4	41 24.5	20 81	68.7	41 36.2	19 80	67.4	8
9	38 56.6	30 84	76.7	39 05.5	29 84	76.1	39 14.2	29 84	75.4	39 30.9	27 83	74.2	40 01.9	25 82	71.7	40 29.7	22 81	69.1	40 36.1	21 80	68.5	40 48.3	20 80	67.2	9
60	38 06.1	30 84	76.3	38 15.1	30 84	75.7	38 23.9	29 84	75.1	38 40.9	28 83	73.9	39 12.6	25 82	71.4	39 41.2	22 81	68.9	39 47.8	22 80	68.3	40 00.4	20 80	67.0	60
1	37 15.7	31 84	76.0	37 24.8	30 84	75.4	37 33.7	29 84	74.8	37 51.0	28 83	73.6	38 23.4	26 82	71.1	38 52.7	23 81	68.7	38 59.6	22 80	68.0	39 12.6	21 80	66.8	1
2	36 25.3	31 84	75.7	36 34.5	31 84	75.1	36 43.6	30 83	74.5	37 01.2	29 83	73.3	37 34.3	26 82	70.9	38 04.4	24 80	68.4	38 11.4	23 80	67.8	38 24.9	22 79	66.6	2
3	35 35.0	32 84	75.3	35 44.4	31 83	74.7	35 53.6	30 83	74.1	36 11.5	29 83	73.0	36 45.3	27 82	70.6	37 16.1	24 80	68.2	37 23.3	24 80	67.5	37 37.3	23 79	66.3	3
4	34 44.8	32 84	75.0	34 54.3	31 83	74.4	35 03.6	31 83	73.8	35 21.9	30 83	72.6	35 56.3	28 81	70.3	36 27.9	25 80	67.9	36 35.4	25 80	67.3	36 49.7	23 79	66.1	4
65	33 54.6	32 84	74.6	34 04.3	32 83	74.1	34 13.8	31 83	73.5	34 32.3	30 82	72.3	35 07.4	28 81	70.0	35 39.8	26 80	67.6	35 47.5	25 80	67.0	36 02.3	24 79	65.8	65
6	33 04.6	33 83	74.3	33 14.4	32 83	73.7	33 24.0	32 83	73.2	33 42.9	31 82	72.0	34 18.6	29 81	69.7	34 51.8	27 80	67.4	34 59.7	26 80	66.8	35 14.9	25 79	65.6	6
7	32 14.6	34 83	73.9	32 24.5	33 83	73.4	32 34.3	32 83	72.8	32 53.5	31 82	71.7	33 29.9	29 81	69.4	34 03.9	27 79	67.1	34 12.0	27 79	66.5	34 27.6	26 79	65.4	7
8	31 24.7	34 83	73.6	31 34.8	33 83	73.0	31 44.7	33 82	72.5	32 04.2	32 82	71.4	32 41.4	30 81	69.1	33 16.1	28 80	66.8	33 24.3	27 79	66.3	33 40.4	26 78	65.1	8
9	30 34.9	34 83	73.2	30 45.1	34 83	72.7	30 55.2	33 82	72.1	31 15.0	32 82	71.0	31 52.9	31 81	68.8	32 28.3	29 79	66.6	32 36.8	28 79	66.0	32 53.4	27 78	64.8	9
70	29 45.2	35 83	72.9	29 55.6	34 82	72.3	30 05.8	34 82	71.8	30 25.9	33 82	70.7	31 04.5	31 80	68.5	31 40.7	29 79	66.3	31 49.4	29 79	65.7	32 06.4	28 78	64.6	70
1	28 55.6	35 82	72.5	29 06.1	35 82	72.0	29 16.5	34 82	71.5	29 36.9	34 82	70.4	30 16.2	32 80	68.2	30 53.2	30 79	66.0	31 02.1	29 79	65.4	31 19.5	28 78	64.3	1
2	28 06.1	36 82	72.2	28 16.7	35 82	71.6	28 27.3	35 81	71.1	28 48.0	34 81	70.0	29 28.0	32 80	67.9	30 05.8	31 79	65.7	30 14.9	30 78	65.1	30 32.7	29 78	64.0	2
3	27 16.6	36 82	71.8	27 27.5	36 82	71.3	27 38.2	36 82	70.8	27 59.2	35 81	69.7	28 39.9	33 80	67.6	29 18.5	31 79	65.4	29 27.8	31 78	64.8	29 46.1	30 78	63.8	3
4	26 27.3	37 82	71.4	26 38.3	36 82	70.9	26 49.2	36 82	70.4	27 10.6	35 81	69.4	27 51.9	34 80	67.2	28 31.3	32 78	65.1	28 40.8	32 78	64.6	28 59.5	31 77	63.5	4
75	25 38.1	37 82	71.1	25 49.3	37 82	70.6	26 00.3	37 81	70.0	26 22.0	36 81	69.0	27 04.1	34 80	66.9	27 44.2	33 78	64.8	27 54.0	32 78	64.3	28 13.1	31 77	63.2	75
6	24 49.0	38 82	70.7	25 00.3	37 81	70.2	25 11.5	37 81	69.7	25 33.5	36 81	68.7	26 16.3	35 79	66.6	26 57.3	33 78	64.5	27 07.2	33 78	64.0	27 26.8	32 77	62.9	6
7	24 00.0	38 82	70.3	24 11.5	38 81	69.8	24 22.8	38 81	69.3	24 45.2	37 80	68.3	25 28.7	36 79	66.3	26 10.5	34 78	64.2	26 20.6	34 78	63.6	26 40.6	33 77	62.6	7
8	23 11.2	39 81	70.0	23 22.8	39 81	69.5	23 34.3	38 81	69.0	23 57.0	38 80	68.0	24 41.2	36 79	65.9	25 23.8	35 78	63.9	25 34.1	34 77	63.3	25 54.5	34 77	62.3	8
9	22 22.4	39 81	69.6	22 34.2	39 81	69.1	22 45.8	39 80	68.6	23 08.9	38 80	67.6	23 53.8	37 79	65.6	24 37.2	35 77	63.5	24 47.8	35 77	63.0	25 08.6	34 76	62.0	9
80	21 33.8	40 81	69.2	21 45.7	40 81	68.7	21 57.5	39 80	68.2	22 20.9	39 80	67.2	23 06.6	37 79	65.2	23 50.7	36 77	63.2	24 01.5	36 77	62.7	24 22.8	35 76	61.7	80
1	20 45.2	40 81	68.8	20 57.3	40 80	68.4	21 09.3	40 80	67.9	21 33.0	39 80	66.9	22 19.5	38 78	64.9	23 04.4	37 77	62.9	23 15.4	36 77	62.4	23 37.1	36 76	61.4	1
2	19 56.8	41 80	68.5	20 09.1	41 80	68.0	20 21.2	40 80	67.5	20 45.3	40 79	66.5	21 32.5	39 78	64.5	22 18.2	37 77	62.5	22 29.4	37 76	62.0	22 51.6	37 76	61.0	2
3	19 08.6	41 80	68.1	19 21.0	41 80	67.6	19 33.3	41 80	67.1	19 57.7	40 79	66.1	20 45.6	39 78	64.2	21 32.2	38 76	62.2	21 43.6	38 76	61.7	22 06.2	37 75	60.7	3
4	18 20.4	42 80	67.7	18 33.0	42 80	67.2	18 45.5	42 79	66.7	19 10.3	41 79	65.8	19 58.9	40 78	63.8	20 46.3	39 76	61.9	20 57.9	39 76	61.4	21 20.9	38 75	60.4	4
85	17 32.4	42 79	67.3	17 45.2	42 79	66.8	17 57.8	42 79	66.3	18 23.0	42 79	65.4	19 12.4	41 77	63.5	20 00.6	39 76	61.5	20 12.4	39 76	61.0	20 35.6	39 75	60.0	85
6	16 44.6	43 80	66.9	16 57.5	43 79	66.4	17 10.3	43 79	66.0	17 35.8	42 78	65.0	18 26.0	41 77	63.1	19 15.0	40 76	61.2	19 27.0	40 75	60.7	19 50.9	40 75	59.7	6
7	15 56.8	44 79	66.5	16 09.9	43 79	66.0	16 22.9	43 79	65.6	16 48.8	43 78	64.6	17 39.7	42 77	62.7	18 29.5	41 75	60.8	18 41.8	41 75	60.3	19 06.1	40 74	59.4	7
8	15 09.3	44 79	66.1	15 22.5	44 79	65.6	15 35.7	44 78	65.2	16 01.9	43 78	64.2	16 53.6	43 77	62.3	17 44.2	42 75	60.4	17 56.7	42 75	60.0	18 21.5	41 74	59.0	8
9	14 21.8	45 79	65.7	14 36.3	45 78	65.2	14 48.6	44 78	64.8	15 15.2	44 78	63.8	16 07.7	43 76	62.0	16 59.1	42 75	60.1	17 11.8	42 75	59.6	17 37.0	42 74	58.7	9
90	13 34.6	45 78	65.3	13 48.2	45 78	64.8	14 01.7	45 78	64.4	14 28.7	45 77	63.4	15 21.9	44 76	61.6	16 14.2	43 75	59.7	16 27.1	43 74	59.2	16 52.1	43 74	58.3	90

Lat. 30°

Each cell below is given as: Alt (° ′) · Δd Δt · Az (°)

H.A.	28° 00′	28° 30′	29° 00′	30° 00′	32° 00′	34° 00′	34° 30′	35° 30′	H.A.
00	32 00.0 1.01 180.0	31 30.0 1.01 180.0	31 00.0 1.01 180.0	30 00.0 1.01 180.0	28 00.0 1.01 180.0	26 00.0 1.01 180.0	25 30.0 1.01 180.0	24 30.0 1.01 180.0	00
1	31 59.5 1.02 179.0	31 29.5 1.02 179.0	30 59.5 1.02 179.0	29 59.5 1.02 179.0	27 59.6 1.02 179.0	25 59.6 1.02 179.1	25 29.6 1.02 179.1	24 29.6 1.02 179.1	1
2	31 58.1 1.04 177.9	31 28.1 1.04 177.9	30 58.2 1.04 178.0	29 58.2 1.04 178.0	27 58.3 1.04 178.1	25 58.3 1.04 178.2	25 28.3 1.04 178.2	24 28.4 1.03 178.2	2
3	31 55.8 1.06 176.9	31 25.8 1.05 176.9	30 55.8 1.06 176.9	29 55.9 1.05 177.0	27 56.1 1.04 177.1	25 56.2 1.05 177.2	25 26.3 1.05 177.3	24 26.4 1.05 177.3	3
4	31 52.5 1.07 175.8	31 22.5 1.07 175.9	30 52.6 1.07 175.9	29 52.8 1.07 176.0	27 53.0 1.06 176.2	25 53.3 1.06 176.3	25 23.4 1.06 176.4	24 23.5 1.06 176.4	4
05	31 48.2 1.09 174.8	31 18.3 1.09 174.9	30 48.5 1.08 174.9	29 48.7 1.08 175.0	27 49.1 1.08 175.2	25 49.6 1.08 175.4	25 19.7 1.08 175.4	24 19.9 1.07 175.5	05
6	31 43.0 99 10 173.8	31 13.2 99 10 173.8	30 43.4 99 10 173.9	29 43.7 99 10 174.0	27 44.4 99 09 174.3	25 45.0 99 09 174.5	25 15.1 99 09 174.5	24 15.4 99 10 174.6	6
7	31 36.9 99 12 172.7	31 07.2 99 12 172.8	30 37.4 99 12 172.9	29 37.8 99 11 173.0	27 38.7 99 11 173.3	25 39.6 99 10 173.6	25 09.8 99 10 173.6	24 10.2 99 10 173.8	7
8	31 29.9 99 13 171.7	31 00.2 99 13 171.8	30 30.5 99 13 171.9	29 31.1 99 12 172.0	27 32.2 99 12 172.4	25 33.3 99 12 172.7	25 03.6 99 11 172.7	24 04.1 99 11 172.9	8
9	31 22.0 99 15 170.7	30 52.3 99 15 170.8	30 22.7 99 14 170.9	29 23.5 99 14 171.1	27 24.9 99 14 171.4	25 26.3 99 13 171.7	24 56.6 99 13 171.8	23 57.3 99 13 172.0	9
10	31 13.1 98 16 169.7	30 43.6 98 16 169.8	30 14.0 98 16 169.9	29 14.9 99 16 170.1	27 16.7 99 15 170.5	25 18.4 99 14 170.8	24 48.8 99 14 170.9	23 49.6 99 14 171.1	10
1	31 03.3 98 18 168.7	30 33.9 98 17 168.8	30 04.5 98 17 168.9	29 05.5 98 17 169.1	27 07.7 98 16 169.5	25 09.7 98 16 169.9	24 40.2 98 16 170.0	23 41.2 98 15 170.2	1
2	30 52.7 98 19 167.6	30 23.3 98 19 167.8	29 54.0 98 19 167.9	28 55.3 98 18 168.1	26 57.8 98 18 168.6	25 00.2 98 17 169.0	24 30.8 98 17 169.1	23 32.0 98 17 169.4	2
3	30 41.1 97 21 166.6	30 11.9 97 21 166.8	29 42.7 97 20 166.9	28 44.2 98 20 167.2	26 47.1 98 19 167.7	24 50.0 98 18 168.1	24 20.7 98 18 168.3	23 22.0 98 18 168.5	3
4	30 28.7 97 22 165.6	29 59.6 97 22 165.8	29 30.5 97 22 165.9	28 32.2 97 21 166.2	26 35.6 97 21 166.7	24 38.9 97 20 167.3	24 09.7 97 20 167.4	23 11.3 97 19 167.6	4
15	30 15.4 97 24 164.7	29 46.4 97 23 164.8	29 17.4 97 23 165.0	28 19.4 97 23 165.2	26 23.3 97 22 165.8	24 27.0 97 21 166.4	23 58.0 97 21 166.5	22 59.8 97 20 166.8	15
6	30 01.2 96 25 163.7	29 32.3 96 25 163.8	29 03.5 96 25 164.0	28 05.7 96 24 164.3	26 10.1 96 23 164.9	24 14.4 97 22 165.5	23 45.4 97 22 165.6	22 47.5 97 22 165.9	6
7	29 46.2 96 26 162.7	29 17.4 96 26 162.9	28 48.7 96 26 163.0	27 51.3 96 25 163.4	25 56.2 96 25 164.0	24 01.0 96 24 164.6	23 32.2 96 23 164.8	22 34.5 96 23 165.1	7
8	29 30.3 95 28 161.7	29 01.7 95 28 161.9	28 33.2 95 27 162.1	27 36.0 95 27 162.4	25 41.5 95 26 163.1	23 46.8 96 25 163.7	23 18.1 96 25 163.9	22 20.7 96 24 164.2	8
9	29 13.6 95 29 160.8	28 45.2 95 29 161.0	28 16.8 95 29 161.1	27 19.9 95 28 161.5	25 26.0 95 27 162.2	23 31.9 95 26 162.9	23 03.3 95 26 163.0	22 06.2 95 25 163.4	9
20	28 56.1 94 30 159.8	28 27.8 94 30 160.0	27 59.6 94 30 160.2	27 03.0 94 29 160.6	25 09.7 94 28 161.3	23 16.2 95 27 162.0	22 47.8 95 27 162.2	21 51.0 95 27 162.5	20
1	28 37.7 94 32 158.8	28 09.6 94 32 159.1	27 41.6 94 31 159.3	26 45.3 94 31 159.7	24 52.7 94 30 160.4	22 59.8 94 29 161.2	22 31.6 94 28 161.4	21 35.0 94 28 161.7	1
2	28 18.6 93 33 157.9	27 50.7 93 33 158.1	27 22.8 93 33 158.3	26 26.9 93 32 158.8	24 34.9 93 31 159.6	22 42.7 94 30 160.3	22 14.6 94 29 160.5	21 18.4 94 29 160.9	2
3	27 58.7 92 34 157.0	27 31.0 92 34 157.2	27 03.2 93 34 157.4	26 07.7 93 33 157.9	24 16.4 93 32 158.7	22 24.8 93 31 159.5	21 56.9 93 31 159.7	21 01.0 93 30 160.1	3
4	27 38.0 92 36 156.1	27 10.5 92 35 156.3	26 42.9 92 35 156.5	25 47.7 92 34 157.0	23 57.1 92 33 157.8	22 06.3 92 32 158.7	21 38.5 93 32 158.9	20 43.0 93 31 159.3	4
25	27 16.6 91 37 155.2	26 49.2 91 37 155.4	26 21.8 91 36 155.6	25 27.0 91 36 156.1	23 37.2 92 34 157.0	21 47.0 92 33 157.8	21 19.4 92 33 158.0	20 24.2 92 32 158.5	25
6	26 54.4 90 38 154.3	26 27.2 91 38 154.5	26 00.0 91 38 154.7	25 05.6 91 37 155.2	23 16.5 91 36 156.1	21 27.1 91 34 157.2	20 59.7 91 34 157.2	20 04.8 91 33 157.7	6
7	26 31.5 90 39 153.4	26 04.5 90 39 153.6	25 37.5 90 39 153.9	24 43.5 90 38 154.4	22 55.1 90 37 155.3	21 06.4 91 36 156.2	20 39.2 91 35 156.4	19 44.7 91 35 156.9	7
8	26 07.8 89 40 152.5	25 41.1 89 40 152.8	25 14.3 89 40 153.0	24 20.6 89 39 153.5	22 33.1 90 38 154.5	20 45.1 90 37 155.4	20 18.1 90 36 155.6	19 24.0 90 36 156.1	8
9	25 43.5 88 42 151.6	25 16.9 89 41 151.9	24 50.3 89 41 152.1	23 57.1 89 40 152.7	22 10.3 89 39 153.6	20 23.2 89 38 154.6	19 56.4 89 37 154.8	19 02.6 90 37 155.3	9
30	25 18.4 88 43 150.8	24 52.1 88 42 151.0	24 25.7 88 42 151.3	23 32.9 88 41 151.8	21 46.9 88 40 152.8	20 00.6 89 39 153.8	19 34.0 89 38 154.1	18 40.6 89 38 154.6	30
1	24 52.7 87 44 149.9	24 26.6 87 44 150.2	24 00.4 87 43 150.5	23 08.0 87 43 151.0	21 22.9 88 41 152.0	19 37.4 88 40 153.0	19 10.9 88 39 153.3	18 18.0 88 39 153.8	1
2	24 26.4 86 45 149.1	24 00.4 86 45 149.3	23 34.5 87 44 149.6	22 42.5 87 44 150.2	20 58.2 87 42 151.2	19 13.5 87 41 152.3	18 47.3 87 40 152.5	17 54.7 88 40 153.0	2
3	23 59.3 86 46 148.2	23 33.6 86 46 148.5	23 07.9 86 45 148.8	22 16.3 86 45 149.4	20 32.9 86 43 150.4	18 49.0 87 42 151.5	18 23.0 87 41 151.8	17 30.9 87 41 152.3	3
4	23 31.7 85 47 147.4	23 06.2 85 47 147.7	22 40.6 85 46 148.0	21 49.5 85 46 148.6	20 06.9 86 44 149.7	18 23.9 86 43 150.8	17 58.1 86 42 151.0	17 06.4 86 42 151.6	4
35	23 03.4 84 48 146.6	22 38.1 84 48 146.9	22 12.8 84 48 147.2	21 22.1 85 47 147.8	19 40.4 85 45 148.9	17 58.2 85 45 149.9	17 32.6 85 43 150.3	16 41.4 86 43 150.8	35
6	22 34.5 83 49 145.8	22 09.4 84 49 146.1	21 44.3 84 48 146.4	20 54.1 84 48 147.0	19 13.2 84 46 148.1	17 32.0 85 45 149.3	17 06.6 84 44 149.5	16 15.8 85 44 150.1	6
7	22 05.0 83 50 145.0	21 40.1 83 50 145.3	21 15.3 83 49 145.6	20 25.5 83 49 146.2	18 45.5 83 47 147.4	17 05.1 84 46 148.5	16 40.0 84 45 148.8	15 49.6 84 45 149.4	7
8	21 34.9 82 51 144.2	21 10.3 82 51 144.5	20 45.7 82 50 144.8	19 56.3 82 50 145.4	18 17.2 83 48 146.6	16 37.7 83 47 147.8	16 12.8 83 46 148.1	15 22.8 83 45 148.7	8
9	21 04.2 81 52 143.3	20 39.8 81 52 143.8	20 15.4 81 51 144.1	19 26.5 82 51 144.7	17 48.4 82 49 145.9	16 09.8 82 47 147.1	15 45.1 82 47 147.4	14 55.6 83 46 148.0	9
40	20 33.0 80 53 142.7	20 08.9 81 53 143.0	19 44.7 81 52 143.3	18 56.2 81 51 143.9	17 19.0 81 50 145.2	15 41.3 82 48 146.4	15 16.8 82 48 146.7	14 27.7 82 47 147.3	40
1	20 01.2 80 54 141.9	19 37.3 80 53 142.3	19 13.4 80 53 142.6	18 25.4 80 52 143.2	16 49.0 80 51 144.5	15 12.3 81 49 145.7	14 48.0 81 49 146.0	13 59.4 81 48 146.6	1
2	19 28.9 79 55 141.2	19 05.2 79 54 141.5	18 41.5 79 54 141.8	17 54.0 79 53 142.5	16 18.6 80 52 143.8	14 42.7 80 50 145.0	14 18.7 80 50 145.3	13 30.5 80 49 145.9	2
3	18 56.1 78 56 140.5	18 32.7 78 55 140.8	18 09.2 78 55 141.1	17 22.1 79 54 141.8	15 47.6 79 52 143.1	14 12.7 79 51 144.3	13 48.9 79 51 144.6	13 01.2 80 50 145.3	3
4	18 22.8 77 56 139.7	17 59.6 77 56 140.1	17 36.3 78 56 140.4	16 49.7 78 55 141.1	15 16.1 78 52 142.4	13 42.1 79 52 143.6	13 18.5 79 51 144.0	12 31.3 79 51 144.6	4
45	17 48.9 77 57 139.0	17 26.0 77 57 139.4	17 02.9 77 56 139.7	16 16.8 77 56 140.4	14 44.1 77 54 141.7	13 11.1 78 53 143.0	12 47.7 78 52 143.3	12 01.0 78 51 143.9	45
6	17 14.6 76 58 138.3	16 51.9 76 58 138.7	16 29.1 76 57 139.0	15 43.4 76 56 139.7	14 11.7 77 55 141.0	12 39.5 77 53 142.3	12 16.4 77 53 142.6	11 30.2 77 52 143.3	6
7	16 39.8 75 59 137.6	16 17.3 75 58 138.0	15 54.8 75 58 138.3	15 09.5 75 57 139.0	13 38.8 76 56 140.3	12 07.5 76 54 141.7	11 44.7 76 54 142.0	10 58.9 76 53 142.7	7
8	16 04.6 74 60 136.9	15 42.3 74 59 137.3	15 20.0 74 59 137.6	14 35.2 75 58 138.3	13 05.4 75 56 139.7	11 35.1 75 55 141.0	11 12.5 75 54 141.4	10 27.1 76 54 142.0	8
9	15 28.9 73 60 136.3	15 06.8 74 60 136.6	14 44.7 74 60 137.0	14 00.4 74 59 137.7	12 31.5 74 57 139.0	11 02.2 75 56 140.4	10 39.8 75 56 140.7	9 54.9 75 54 141.4	9
50	14 52.7 73 61 135.6	14 30.9 73 61 135.9	14 09.0 73 60 136.3	13 25.2 73 59 137.0	11 57.2 73 58 138.4	10 28.5 74 56 139.8	10 06.7 74 56 140.1	9 22.3 74 55 140.8	50
1	14 16.1 72 62 134.9	13 54.5 72 61 135.3	13 32.9 72 61 135.6	12 49.6 72 60 136.3	11 22.5 73 59 137.8	9 55.1 73 57 139.2	9 33.2 73 57 139.5	8 49.3 73 56 140.2	1
2	13 39.2 71 62 134.3	13 17.8 71 62 134.6	12 56.4 71 62 135.0	12 13.9 72 60 135.7	10 47.4 72 59 137.1	9 20.9 72 58 138.5	8 59.2 72 57 138.9	8 15.8 72 56 139.6	2
3	13 01.7 70 63 133.6	12 40.6 71 63 134.0	12 19.4 71 62 134.4	11 37.0 71 60 135.0	10 11.8 71 60 136.5	8 46.3 71 58 137.9	8 24.8 71 58 138.3	7 41.9 72 57 139.0	3
4	12 23.9 70 64 133.0	12 03.0 70 63 133.4	11 42.1 70 63 133.7	11 00.1 70 62 134.5	9 35.9 70 61 135.9	8 11.3 70 57 137.3	7 50.1 71 57 137.7	7 07.6 71 58 138.4	4
55	11 45.7 69 64 132.4	11 25.1 69 64 132.7	11 04.3 69 64 133.1	10 22.8 69 63 133.8	8 59.5 69 61 135.3	7 35.8 70 60 136.8	7 14.9 70 59 137.1	6 32.9 70 58 137.8	55
6	11 07.2 68 65 131.8	10 46.7 68 65 132.1	10 26.2 68 64 132.5	9 45.2 69 63 133.2	8 22.8 69 62 134.7	7 00.1 69 60 136.2	6 39.3 69 60 136.5	5 57.8 69 59 137.3	6
7	10 28.2 67 66 131.1	10 08.0 68 65 131.5	9 47.7 68 65 131.9	9 07.1 68 64 132.6	7 45.7 68 62 134.1	6 23.9 68 61 135.6	6 03.4 68 60 136.0	5 22.4 68 60 136.7	7
8	9 48.9 67 66 130.5	9 28.9 67 66 130.9	9 08.9 67 65 131.3	8 28.7 67 63 132.1	7 08.2 67 63 133.5	5 47.4 67 62 135.0	5 27.1 68 61 135.4		8
9	9 09.2 66 67 130.0	8 49.5 66 66 130.3	8 29.6 66 66 130.7	7 50.0 66 65 131.5	6 30.3 66 64 132.9	5 10.5 67 62 134.5			9
60	8 29.2 65 67 129.4	8 09.7 65 67 129.7	7 50.1 65 66 130.1	7 10.8 65 66 130.9	5 52.1 66 64 132.4				60
1	7 48.9 64 68 128.8	7 29.6 65 67 129.2	7 10.2 65 67 129.6	6 31.4 65 66 130.3	5 13.6 65 65 131.9				1
2	7 08.2 64 68 128.2	6 49.1 64 68 128.6	6 30.0 64 68 129.0	5 51.6 64 67 129.8					2
3	6 27.3 62 69 127.7	6 08.3 63 68 128.0	5 49.4 63 68 128.4	5 11.5 63 67 129.2					3
4	5 46.0 62 69 127.1	5 27.3 62 69 127.5	5 08.6 62 69 127.9						4
65	5 04.4 62 70 126.5								65

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00′	28° 30′	29° 00′	30° 00′	32° 00′	34° 00′	34° 30′	35° 30′	H.A.
91	12 47.4 46 78 64.9	13 01.2 46 78 64.4	13 14.9 46 78 63.9	13 42.3 45 77 63.0	14 36.3 45 76 61.2	15 29.4 44 74 59.3	15 42.5 44 74 58.9	16 08.6 43 73 57.9	91
2	12 00.5 47 78 64.4	12 14.4 46 78 64.0	12 28.3 46 77 63.5	12 56.0 46 77 62.6	13 50.8 45 76 60.8	14 44.8 45 74 59.0	14 58.1 44 74 58.5	15 24.7 44 73 57.6	2
3	11 13.7 47 78 64.0	11 27.8 47 77 63.6	11 41.9 47 77 63.1	12 10.0 47 76 62.2	13 05.5 46 75 60.4	14 00.4 45 74 58.6	14 13.9 45 73 58.1	14 40.9 45 73 57.2	3
4	10 27.1 48 77 63.6	10 41.4 48 77 63.1	10 55.7 48 77 62.7	11 24.1 47 76 61.8	12 20.5 47 75 60.0	13 16.1 46 73 58.2	13 29.9 46 73 57.7	13 57.3 46 72 56.8	4
95	9 40.6 48 77 63.2	9 55.1 48 77 62.7	10 09.6 48 76 62.3	10 38.4 48 76 61.4	11 35.6 47 75 59.6	12 32.0 47 73 57.8	12 46.1 47 73 57.3	13 13.9 46 72 56.4	95
6	8 54.3 49 77 62.7	9 09.0 49 76 62.3	9 23.7 49 76 61.8	9 52.9 49 76 61.0	10 50.8 48 74 59.2	11 48.2 48 73 57.4	12 02.4 47 72 56.9	12 30.8 47 72 56.0	6
7	8 08.2 50 76 62.3	8 23.1 50 76 61.8	8 37.9 49 76 61.4	9 07.5 49 75 60.5	10 06.3 49 74 58.8	11 04.5 49 72 57.0	11 19.0 48 72 56.5	11 47.8 48 71 55.6	7
8	7 22.3 50 76 61.8	7 37.4 50 76 61.4	7 52.4 50 76 61.0	8 22.4 50 75 60.1	9 22.0 49 74 58.3	10 21.0 49 72 56.6	10 35.7 49 72 56.1	11 05.0 49 71 55.2	8
9	6 36.6 51 76 61.4	6 51.9 51 76 61.0	7 07.1 51 75 60.5	7 37.4 51 75 59.7	8 37.9 50 73 57.9	9 37.8 50 72 56.2	9 52.7 50 71 55.7	10 22.4 49 71 54.8	9
100	5 51.1 51 76 60.9	6 06.5 51 75 60.5	6 21.9 51 75 60.1	6 52.7 51 74 59.2	7 53.9 51 73 57.5	8 54.7 50 71 55.7	9 09.9 50 71 55.3	9 40.0 50 70 54.4	100
1	5 05.8 52 75 60.5	5 21.4 52 75 60.0	5 37.0 52 74 59.6	6 08.2 52 74 58.8	7 10.2 52 72 57.0	8 11.9 51 71 55.3	8 27.3 51 71 54.9	8 57.9 51 70 54.0	1
2			5 23.9 53 74 58.3	6 26.7 52 72 56.6	7 29.3 52 71 54.8	7 44.9 52 70 54.4	8 15.9 52 70 53.6		2
3				5 43.5 53 72 56.1	6 46.7 53 70 54.4	7 02.7 53 70 54.0	7 34.2 52 69 53.2		3
4				5 00.4 54 71 55.7	6 04.8 53 70 54.0	6 20.8 53 69 53.6	6 52.8 53 69 52.8		4
105					5 22.8 54 69 53.5	5 39.1 54 69 53.1	6 11.6 54 68 52.3		105
6							5 30.6 55 68 51.8		6

Lat. 30°

H.A.	36°00' Alt	Δd	Δt	Az	37°00' Alt	Δd	Δt	Az	38°30' Alt	Δd	Δt	Az	40°00' Alt	Δd	Δt	Az	42°00' Alt	Δd	Δt	Az	42°30' Alt	Δd	Δt	Az	43°00' Alt	Δd	Δt	Az	45°00' Alt	Δd	Δt	Az	H.A.
00	84 00.0	1.00	6	00.0	83 00.0	1.00	5	00.0	81 30.0	1.00	4	00.0	80 00.0	1.00	3	00.0	78 00.0	1.00	3	00.0	77 30.0	1.00	3	00.0	77 00.0	1.00	2	00.0	75 00.0	1.00	2	00.0	00
1	83 56.5	99	17	07.7	82 57.0	99	15	06.5	81 27.6	99	12	05.3	79 58.5	1.0	10	04.4	77 58.4	1.008		03.6	77 28.5	1.008		03.4	76 58.5	1.007		03.2	74 58.1	1.006		02.7	1
2	83 46.2	96	28	15.1	82 48.3	97	24	12.9	81 20.5	98	19	10.5	79 52.0	99	16	08.7	77 53.5	99	13	07.1	77 23.8	99	13	06.8	76 54.1	99	12	06.5	74 55.1	99	10	05.4	2
3	83 29.7	92	37	21.9	82 34.1	94	32	18.9	81 08.8	96	26	15.4	79 42.2	97	22	13.0	77 45.6	98	18	10.6	77 16.2	98	18	10.1	76 46.8	98	17	09.6	74 48.9	98	14	08.1	3
4	83 07.7	86	44	28.1	82 14.9	89	39	24.4	80 52.9	92	33	20.2	79 28.8	94	28	17.0	77 34.5	96	23	13.9	77 05.7	96	22	13.3	76 36.8	97	21	12.7	74 40.4	97	18	10.8	4
05	82 41.0	81	51	33.6	81 51.3	85	46	29.4	80 33.2	88	39	24.6	79 11.9	92	33	20.9	77 20.6	94	28	17.2	76 52.3	94	27	16.4	76 24.0	95	26	15.7	74 29.6	96	22	13.3	05
6	82 10.4	78	56	38.4	81 24.0	80	51	33.9	80 09.9	85	44	28.6	78 51.9	88	38	24.5	77 03.9	91	32	20.3	76 36.3	92	31	19.4	76 08.6	93	30	18.6	74 16.5	94	25	15.8	6
7	81 36.6	69	60	42.5	80 53.5	75	55	37.9	79 43.5	81	48	32.3	78 28.9	85	43	27.9	76 44.6	89	36	23.3	76 17.8	90	35	22.3	75 50.9	90	33	21.4	74 01.2	92	29	18.2	7
8	81 00.3	64	64	46.1	80 20.3	70	59	41.5	79 14.4	76	52	35.7	78 03.4	81	46	31.0	76 22.9	86	40	26.1	75 57.0	87	38	25.0	75 30.8	88	37	24.0	73 44.0	90	32	20.6	8
9	80 21.9	59	67	49.1	79 44.8	65	62	44.6	78 43.0	72	56	38.7	77 35.5	78	50	33.9	75 59.0	83	43	28.7	75 34.0	84	42	27.6	75 08.6	85	40	26.5	73 24.8	88	35	22.8	9
10	79 41.9	54	69	51.8	79 07.5	60	65	47.3	78 09.5	68	59	41.5	77 05.5	74	53	36.5	75 33.1	80	46	31.1	75 08.9	81	45	30.0	74 44.5	82	43	28.9	73 03.7	86	38	24.9	10
1	79 00.4	50	71	54.0	78 28.5	56	67	49.7	77 34.3	64	61	43.9	76 33.7	70	56	39.0	75 05.3	77	49	33.4	74 42.1	78	48	32.2	74 18.5	79	46	31.1	72 41.0	83	41	27.0	1
2	78 17.8	46	73	56.0	77 48.3	52	69	51.8	76 57.5	60	63	46.1	76 00.2	67	58	41.2	74 35.8	74	52	35.6	74 13.6	75	50	34.3	73 50.9	76	49	33.1	72 16.7	81	43	28.9	2
3	77 34.3	43	74	57.7	77 06.9	49	70	53.7	76 19.4	57	65	48.1	75 25.3	63	60	43.2	74 04.9	70	54	37.6	73 43.5	72	52	35.8	73 21.8	73	51	35.1	71 50.9	78	45	30.7	3
4	76 50.0	39	75	59.2	76 24.6	45	72	55.3	75 40.2	53	67	49.9	74 49.1	60	62	45.0	73 32.6	67	56	39.4	73 12.1	69	54	38.1	72 51.2	70	53	36.9	71 23.6	75	47	32.4	4
15	76 05.0	36	76	60.5	75 41.5	42	73	56.8	74 59.9	50	68	51.5	74 11.8	57	64	46.7	72 59.0	64	58	41.1	72 39.4	66	56	39.8	72 19.4	67	55	38.6	70 55.2	73	49	34.0	15
6	75 19.5	33	77	61.7	74 57.7	39	74	58.0	74 18.9	47	70	52.9	73 33.5	54	65	48.2	72 24.3	61	60	42.7	72 05.6	63	58	41.4	71 46.5	65	57	40.1	70 25.5	70	51	35.6	6
7	74 33.6	31	77	62.7	74 13.4	36	75	59.2	73 37.1	44	71	54.2	72 54.3	51	67	49.6	71 48.6	58	61	44.1	71 30.8	60	60	42.8	71 12.5	62	58	41.6	69 54.7	68	53	37.0	7
8	73 47.2	29	78	63.6	73 28.5	34	75	60.2	72 54.6	41	72	55.4	72 14.3	48	68	50.9	71 12.0	56	62	45.4	70 55.0	57	61	44.2	70 37.5	59	60	42.9	69 23.0	65	54	38.4	8
9	73 00.5	26	78	64.3	72 43.2	31	76	61.1	72 11.6	39	73	56.4	71 33.7	45	69	52.0	70 34.6	53	64	46.7	70 18.4	55	62	45.4	70 01.7	56	61	44.2	68 50.3	62	56	39.6	9
20	72 13.6	24	79	65.0	71 57.5	29	77	61.9	71 28.0	36	73	57.4	70 52.4	43	70	53.1	69 56.4	50	65	47.8	69 41.0	52	63	46.6	69 25.1	54	62	45.4	68 16.7	60	57	40.8	20
1	71 26.4	22	79	65.6	71 11.6	27	77	62.6	70 44.1	34	74	58.2	70 10.6	40	70	54.0	69 17.6	48	66	48.9	69 02.9	50	64	47.6	68 47.8	51	63	46.4	67 42.4	58	58	41.9	1
2	70 38.9	20	79	66.2	70 25.3	25	78	63.2	69 59.7	32	74	59.0	69 28.3	38	71	54.9	68 38.2	45	67	49.8	68 24.2	47	65	48.6	68 09.8	49	64	47.4	67 07.3	55	60	42.9	2
3	69 51.3	19	80	66.6	69 38.8	23	78	63.8	69 15.0	30	75	59.7	68 45.6	36	72	55.7	67 58.2	43	67	50.7	67 45.0	45	66	49.5	67 31.3	47	65	48.4	66 31.6	53	61	43.9	3
4	69 03.5	17	80	67.0	68 52.1	21	78	64.3	68 30.0	28	75	60.3	68 02.5	34	72	56.4	67 17.7	41	68	51.5	67 05.2	43	67	50.4	66 52.2	44	66	49.2	65 55.3	50	61	44.8	4
25	68 15.6	15	80	67.4	68 05.2	20	78	64.7	67 44.8	26	76	60.8	67 19.0	32	73	57.1	66 36.8	39	69	52.3	66 25.0	40	68	51.1	66 12.6	42	67	50.0	65 18.4	48	62	45.7	25
6	67 27.6	14	80	67.7	67 18.1	18	79	65.1	66 59.3	24	76	61.4	66 35.2	30	73	57.7	65 55.5	37	69	53.0	65 44.3	38	68	51.9	65 32.6	40	67	50.7	64 40.9	46	63	46.5	6
7	66 39.5	12	80	68.0	66 30.9	16	79	65.5	66 13.6	22	76	61.8	65 51.2	28	74	58.2	65 13.8	35	70	53.6	65 03.2	36	69	52.5	64 52.1	38	68	51.4	64 03.0	44	64	47.2	7
8	65 51.3	11	80	68.2	65 43.5	15	79	65.8	65 27.7	20	77	62.2	65 06.9	26	74	58.7	64 31.8	33	70	54.2	64 21.8	34	70	53.1	64 11.3	36	69	52.1	63 24.7	42	65	47.9	8
9	65 03.0	10	81	68.4	64 56.1	13	79	66.1	64 41.6	19	77	62.6	64 22.4	24	75	59.2	63 49.5	31	71	54.8	63 40.1	32	70	53.7	63 30.2	34	69	52.6	62 46.0	40	65	48.5	9
30	64 14.7	08	81	68.6	64 08.6	12	79	66.3	63 55.5	17	77	62.9	63 37.7	22	75	59.6	63 07.0	29	71	55.3	62 58.1	30	70	54.2	62 48.7	32	70	53.2	62 06.9	38	66	49.1	30
1	63 26.3	07	81	68.7	63 21.0	11	79	66.5	63 09.1	16	77	63.2	62 52.8	21	75	59.9	62 24.1	27	72	55.7	62 15.8	29	71	54.7	62 07.0	30	70	53.7	61 27.4	36	66	49.7	1
2	62 37.6	06	81	68.8	62 33.3	09	80	66.7	62 22.7	14	78	63.4	62 07.7	19	75	60.3	61 41.1	25	72	56.1	61 33.3	27	71	55.1	61 25.2	29	71	54.1	60 47.7	34	67	50.2	2
3	61 49.4	05	81	68.9	61 45.5	08	80	66.8	61 36.2	13	78	63.7	61 22.5	18	76	60.6	60 57.9	24	72	56.5	60 50.6	25	72	55.5	60 42.8	27	71	54.5	60 07.6	32	67	50.6	3
4	61 00.9	04	81	69.0	60 57.7	07	80	66.9	60 49.6	11	78	63.9	60 37.2	16	76	60.8	60 14.4	22	73	56.8	60 07.7	23	72	55.9	60 00.4	25	71	54.9	59 27.3	30	68	51.1	4
35	60 12.3	03	81	69.0	60 09.9	06	80	67.0	60 02.9	10	78	64.0	59 51.8	15	76	61.1	59 30.9	20	73	57.2	59 24.6	22	72	56.2	59 17.8	23	71	55.2	58 46.8	29	68	51.5	35
6	59 23.8	01	81	69.1	59 22.1	04	80	67.1	59 16.1	09	78	64.2	59 06.3	13	76	61.3	58 47.1	19	73	57.4	58 41.3	20	72	56.5	58 35.1	22	72	55.6	58 06.0	27	68	51.9	6
7	58 35.3	00	81	69.1	58 34.2	03	80	67.2	58 29.3	08	78	64.3	58 20.7	12	76	61.5	58 03.3	17	73	57.7	57 57.9	19	72	56.8	57 52.1	20	72	55.9	57 25.0	26	69	52.2	7
8	57 46.7	00	81	69.1	57 46.3	02	80	67.2	57 42.5	06	78	64.4	57 35.0	10	76	61.6	57 19.3	16	73	57.9	57 14.4	17	73	57.0	57 09.1	18	72	56.1	56 43.9	24	69	52.5	8
9	56 58.2	02	81	69.1	56 58.4	01	80	67.2	56 55.6	05	78	64.5	56 49.3	09	76	61.8	56 35.2	14	74	58.1	56 30.7	16	73	57.2	56 25.9	17	72	56.3	56 02.6	22	69	52.8	9
40	56 09.7	03	81	69.0	56 10.4	00	80	67.2	56 08.7	04	78	64.6	56 03.4	08	76	61.9	55 51.0	13	74	58.3	55 47.0	14	73	57.4	55 42.6	15	72	56.6	55 21.1	20	69	53.1	40
1	55 21.1	04	81	69.0	55 22.5	01	80	67.2	55 21.8	03	78	64.6	55 17.6	07	76	62.0	55 06.8	11	74	58.5	55 03.2	13	73	57.6	54 59.1	14	72	56.7	54 39.5	19	70	53.3	1
2	54 32.6	05	81	68.9	54 34.6	02	80	67.2	54 34.8	02	78	64.6	54 31.7	05	76	62.0	54 22.5	10	74	58.6	54 19.2	11	73	57.8	54 15.7	13	73	56.9	53 57.8	17	70	53.5	2
3	53 44.2	05	81	68.9	53 46.7	03	80	67.2	53 47.9	01	78	64.6	53 45.8	04	77	62.1	53 38.1	09	74	58.7	53 35.3	10	73	57.9	53 32.1	11	73	57.1	53 15.9	16	70	53.7	3
4	52 55.7	06	81	68.8	52 58.8	04	80	67.1	53 00.9	01	78	64.6	52 59.9	03	77	62.2	52 53.6	08	74	58.8	52 51.2	09	74	58.0	52 48.4	10	73	57.2	52 34.0	14	70	53.9	4
45	52 07.3	07	81	68.7	52 11.0	05	80	67.1	52 14.0	02	78	64.6	52 13.9	02	77	62.2	52 09.2	06	74	58.9	52 07.1	07	74	58.1	52 04.7	08	73	57.3	51 51.9	13	70	54.1	45
6	51 18.9	08	81	68.6	51 23.1	06	80	67.0	51 27.0	03	78	64.6	51 28.0	01	77	62.2	51 24.6	05	74	59.0	51 23.0	06	74	58.2	51 21.0	07	73	57.4	51 09.8	11	70	54.2	6
7	50 30.5	09	81	68.5	50 35.3	07	80	66.9	50 40.1	04	78	64.6	50 42.0	01	77	62.2	50 40.1	04	74	59.0	50 38.8	05	74	58.3	50 37.2	06	73	57.5	50 27.7	10	70	54.3	7
8	49 42.2	10	80	68.4	49 47.5	08	80	66.8	49 53.2	05	78	64.5	49 56.0	02	77	62.2	49 55.5	03	74	59.1	49 54.6	04	74	58.3	49 53.4	05	73	57.5	49 45.4	09	70	54.4	8
9	48 53.9	11	80	68.2	48 59.8	09	80	66.7	49 06.3	06	78	64.4	49 10.1	03	77	62.2	49 10.9	01	74	59.1	49 10.4	02	74	58.3	49 09.5	03	73	57.6	49 03.1	07	71	54.5	9
50	48 05.7	12	80	68.1	48 12.0	10	79	66.5	48 19.4	07	78	64.4	48 24.2	04	77	62.1	48 26.4	00	74	59.1	48 26.2	01	74	58.4	48 25.7	02	73	57.6	48 20.3	06	71	54.6	50
1	47 17.5	12	80	68.0	47 24.4	11	79	66.5	47 32.6	08	78	64.3	47 38.2	05	76	62.1	47 41.8	01	74	59.1	47 41.9	00	74	58.4	47 41.9	00	73	57.6	47 38.4	05	71	54.6	1
2	46 29.3	13	80	67.8	46 36.7	11	79	66.4	46 45.8	09	78	64.2	46 52.3	06	76	62.0	46 57.2	02	74	59.1	46 57.7	01	74	58.4	46 57.9	00	73	57.6	46 56.0	03	71	54.7	2
3	45 41.3	14	80	67.7	45 49.2	12	79	66.2	45 59.0	10	78	64.1	46 06.5	07	76	61.9	46 12.6	03	74	59.1	46 13.5	02	74	58.3	46 14.0	01	73	57.6	46 13.6	02	71	54.7	3
4	44 53.2	15	80	67.5	45 01.6	13	79	66.1	45 12.1	11	78	64.0	45 20.6	08	76	61.9	45 28.1	04	74	59.0	45 29.2	04	74	58.3	45 30.2	03	73	57.6	45 31.2	01	71	54.7	4
55	44 05.3	16	80	67.3	44 14.2	14	79	65.9	44 25.6	11	78	63.9	44 34.8	09	76	61.8	44 43.5	06	74	59.0	44 45.0	05	74	58.3	44 46.3	04	73	57.6	44 48.8	00	71	54.7	55
6	43 17.3	16	80	67.1	43 26.7	15	79	65.8	43 39.0	12	78	63.7	43 49.1	10	76	61.6	43 59.0	07	74	58.9	44 00.9	06	74	58.2	44 02.5	05	73	57.5	44 06.4	02	71	54.7	6
7	42 29.5	17	80	66.9	42 39.4	16	79	65.6	42 52.5	13	78	63.6	43 03.4	11	76	61.6	43 14.5	08	74	58.8	43 16.7	07	74	58.1	43 18.7	06	73	57.5	43 23.9	03	71	54.7	7
8	41 41.7	18	80	66.8	41 52.1	17	79	65.4	42 05.9	14	77	63.4	42 17.7	12	76	61.4	42 30.1	09	74	58.7	42 32.6	08	73	58.1	42 34.9	07	73	57.4	42 41.5	04	71	54.7	8
9	40 54.0	19	79	66.6	41 04.9	17	79	65.3	41 19.5	15	77	63.3	41 32.1	13	76	61.3	41 45.7	10	74	58.6	41 48.5	09	73	58.0	41 51.1	08	73	57.3	41 59.2	05	71	54.6	9
60	40 06.4	20	79	66.4	40 17.7	18	78	65.1	40 33.1	16	77	63.1	40 46.5	14	76	61.2	41 01.4	11	74	58.5	41 04.5	10	73	57.9	41 07.4	09	73	57.2	41 16.8	06	71	54.6	60
1	39 18.8	20	79	66.1	39 30.6	19	78	64.9	39 46.8	17	77	63.0	40 01.1	15	76	61.0	40 17.1	12	74	58.4	40 20.5	11	73	57.8	40 23.7	10	73	57.1	40 34.5	07	70	54.5	1
2	38 31.3	21	79	65.9	38 43.6	20	78	64.7	39 00.6	18	77	62.8	39 15.6	16	76	60.9	39 32.8	13	74	58.3	39 36.6	12	73	57.7	39 40.1	11	73	57.0	39 52.2	09	70	54.4	2
3	37 43.9	22	79	65.7	37 56.7	21	78	64.5	38 14.4	19	77	62.6	38 30.3	17	75	60.7	38 48.6	14	74	58.2	38 52.7	13	73	57.5	38 56.6	13	72	56.9	39 09.9	10	70	54.4	3
4	36 56.6	23	79	65.5	37 09.9	21	78	64.3	37 28.0	20	77	62.4	37 45.0	18	75	60.5	38 04.5	15	73	58.0	38 08.9	14	73	57.4	38 13.1	14	72	56.7	38 27.7	11	70	54.3	4
65	36 09.4	23	79	65.2	36 23.1	22	78	64.0	36 42.3	20	77	62.2	36 59.8	19	75	60.4	37 20.4	16	73	57.9	37 25.1	15	73	57.3	37 29.6	15	72	56.7	37 45.6	12	70	54.2	65
6	35 22.2	24	78	65.0	35 36.4	23	78	63.8	35 56.4	21	76	62.0	36 14.7	19	75	60.2	36 36.5	17	73	57.8	36 41.4	16	73	57.1	36 46.2	16	72	56.5	37 03.5	13	70	54.0	6
7	34 35.2	26	78	64.8	34 49.8	24	77	63.6	35 10.5	22	76	61.8	35 29.6	20	75	60.0	35 52.6	18	73	57.6	35 57.8	17	73	57.0	36 02.9	17	72	56.4	36 21.5	14	70	53.9	7
8	33 48.2	26	78	64.5	34 03.3	25	77	63.4	34 24.8	23	76	61.6	34 44.6	21	75	59.8	35 08.7	19	73	57.4	35 14.3	18	72	56.8	35 19.7	18	72	56.3	35 39.5	15	70	53.8	8
9	33 01.4	26	78	64.3	33 17.0	25	76	63.1	33 39.1	24	76	61.4	33 59.8	22	75	59.6	34 25.0	20	73	57.2	34 30.9	19	72	56.7	34 36.6	19	72	56.1	34 57.6	16	70	53.7	9
70	32 14.6	27	78	64.0	32 30.7	26	77	62.9	32 53.5	25	76	61.1	33 15.0	23	74	59.4	33 41.3	21	73	57.1	33 47.5	20	72	56.5	33 53.5	20	72	55.9	34 15.8	17	70	53.5	70
1	31 28.0	28	78	63.7	31 44.5	27	77	62.6	32 08.1	25	76	60.9	32 30.3	24	74	59.2	32 57.8	22	72	56.9	33 04.2	21	72	56.3	33 10.5	21	71	55.7	33 34.1	19	69	53.4	1
2	30 41.4	29	77	63.5	30 58.4	28	77	62.4	31 22.7	26	75	60.7	31 45.8	25	74	59.0	32 14.3	23	72	56.7	32 21.1	22	72	56.1	32 27.6	22	71	55.5	32 52.4	20	69	53.2	2
3	29 55.0	29	77	63.2	30 12.4	28	77	62.1	30 37.5	27	75	60.4	31 01.3	26	74	58.7	31 30.9	24	72	56.5	31 38.0	23	72	55.9	31 44.9	23	71	55.3	32 10.9	21	69	53.3	3
4	29 08.7	30	77	62.9	29 26.5	29	76	61.8	29 52.4	28	75	60.2	30 16.9	27	74	58.5	30 47.7	25	72	56.3	30 55.0	24	71	55.7	31 02.2	24	71	55.1	31 29.4	22	69	52.9	4
75	28 22.5	31	76	62.6	28 40.8	30	76	61.6	29 07.3	29	75	59.9	29 32.7	27	74	58.3	30 04.5	26	72	56.0	30 12.1	25	71	55.5	30 19.6	25	71	54.9	30 48.0	23	69	52.7	75
6	27 36.4	32	77	62.4	27 55.2	31	76	61.3	28 22.4	30	75	59.7	28 48.5	28	73	58.0	29 21.5	27	72	55.8	29 29.4	26	71	55.3	29 37.1	26	71	54.7	30 06.8	24	69	52.5	6
7	26 50.4	33	76	62.1	27 09.7	32	76	61.0	27 37.6	30	74	59.4	28 04.5	29	73	57.8	28 38.5	27	71	55.6	28 46.7	27	71	55.0	28 54.8	27	70	54.5	29 25.6	25	68	52.3	7
8	26 04.6	33	76	61.8	26 24.3	32	76	60.7	26 53.0	31	74	59.1	27 20.6	30	73	57.5	27 55.7	28	71	55.4	28 04.2	28	71	54.8	28 12.5	28	70	54.3	28 44.5	26	68	52.1	8
9	25 18.8	34	76	61.5	25 39.0	33	75	60.4	26 08.5	32	74	58.8	26 36.8	31	73	57.3	27 13.0	29	71	55.1	27 21.8	29	70	54.6	27 30.4	29	70	54.0	28 03.6	27	68	51.9	9
80	24 33.3	35	76	61.2	24 53.9	34	75	60.1	25 24.1	33	74	58.5	25 53.2	32	72	57.0	26 30.5	30	71	54.9	26 39.5	30	70	54.3	26 48.4	29	70	53.8	27 22.8	28	68	51.6	80
1	23 47.8	36	76	60.8	24 08.9	35	75	59.8	24 39.8	34	74	58.3	25 09.7	33	72	56.7	25 48.0	31	70	54.6	25 57.4	31	70	54.1	26 06.5	30	70	53.6	26 42.1	29	68	51.4	1
2	23 02.5	36	75	60.5	23 24.1	35	75	59.5	23 55.7	35	73	58.0	24 26.3	34	72	56.4	25 05.8	32	70	54.4	25 15.3	32	70	53.8	25 24.8	31	69	53.3	26 01.6	30	67	51.2	2
3	22 17.3	36	75	60.2	22 39.4	36	74	59.2	23 11.7	35	73	57.7	23 43.1	34	72	56.1	24 23.6	33	70	54.1	24 33.3	33	70	53.6	24 43.2	32	69	53.0	25 21.1	31	67	51.0	3
4	21 32.3	38	75	59.9	21 54.8	37	74	58.9	22 27.8	36	73	57.4	23 00.6	35	72	55.9	23 41.6	34	70	53.8	23 51.7	34	69	53.3	24 01.8	33	69	52.8	24 40.9	32	67	50.7	4
85	20 47.4	39	75	59.6	21 10.4	38	74	58.6	21 44.2	37	73	57.1	22 17.1	36	71	55.6	22 59.7	35	70	53.5	23 10.1	35	69	53.0	23 20.5	34	69	52.5	24 00.7	33	67	50.5	85
6	20 02.7	39	74	59.2	20 26.1	39	74	58.2	21 00.6	38	72	56.8	21 34.3	37	71	55.3	22 18.0	36	69	53.3	22 28.7	35	69	52.7	22 39.3	35	68	52.2	23 20.7	34	66	50.2	6
7	19 18.2	40	74	58.9	19 42.0	40	73	57.9	20 17.2	39	72	56.4	20 51.7	38	71	55.0	21 36.5	37	69	53.0	21 47.4	36	69	52.5	21 58.3	36	68	52.0	22 40.9	35	66	49.9	7
8	18 33.8	41	74	58.5	18 58.1	40	73	57.6	19 34.0	40	72	56.1	20 09.2	39	70	54.6	20 55.1	38	69	52.7	21 06.3	37	68	52.2	21 17.5	37	68	51.7	22 01.2	36	66	49.7	8
9	17 49.5	42	73	58.2	18 14.3	41	73	57.2	18 51.0	40	71	55.8	19 27.0	40	70	54.3	20 13.8	39	68	52.4	20 25.3	38	68	51.9	20 36.8	38	68	51.4	21 21.7	37	66	49.4	9
90	17 05.5	42	73	57.8	17 30.7	42	72	56.9	18 08.1	41	71	55.4	18 44.8	40	70	54.0	19 32.8	39	68	52.1	19 44.6	39	68	51.6	19 56.3	39	67	51.1	20 42.3	38	66	49.1	90

DECLINATION CONTRARY NAME TO LATITUDE

Each cell: Alt. (° ′ Δd Δt) Az.

H.A.	36° 00′	37° 00′	38° 30′	40° 00′	42° 00′	42° 30′	43° 00′	45° 00′	H.A.
00	24 00.0 1.00 1 180.0	23 00.0 1.00 1 180.0	21 30.0 1.00 1 180.0	20 00.0 1.00 1 180.0	18 00.0 1.00 1 180.0	17 30.0 1.00 1 180.0	17 00.0 1.00 1 180.0	15 00.0 1.00 1 180.0	00
1	23 59.6 1.00 2 179.1	22 59.6 1.00 2 179.1	21 29.6 1.00 2 179.2	19 59.6 1.00 2 179.2	17 59.6 1.00 2 179.2	17 29.6 1.00 2 179.2	16 59.7 1.00 2 179.2	14 59.7 1.00 2 179.3	1
2	23 58.4 1.00 3 178.2	22 58.4 1.00 3 178.3	21 28.5 1.00 3 178.3	19 58.5 1.00 3 178.4	17 58.6 1.00 3 178.5	17 28.6 1.00 3 178.5	16 58.6 1.00 3 178.5	14 58.7 1.00 3 178.5	2
3	23 56.4 1.00 5 177.4	22 56.5 1.00 5 177.4	21 26.6 1.00 4 177.5	19 56.7 1.00 4 177.6	17 56.8 1.00 4 177.7	17 26.8 1.00 4 177.7	16 56.7 1.00 4 177.7	14 57.0 1.00 4 177.8	3
4	23 53.6 1.00 6 176.5	22 53.7 1.00 6 176.5	21 23.9 1.00 6 176.6	19 54.1 1.00 6 176.7	17 54.3 1.00 5 176.9	17 24.4 1.00 5 176.9	16 54.5 1.00 5 176.9	14 54.7 1.00 5 177.1	4
05	23 50.0 1.00 7 175.6	22 50.2 1.00 7 175.7	21 20.5 1.00 7 175.8	19 50.8 1.00 7 175.9	17 51.2 1.00 6 176.1	17 21.2 1.00 6 176.1	16 51.3 1.00 6 176.2	14 51.7 1.00 6 176.3	05
6	23 45.6 1.00 9 174.7	22 45.9 1.00 8 174.8	21 16.3 1.00 8 175.0	19 46.7 1.00 8 175.1	17 47.3 1.00 8 175.3	17 17.4 1.00 8 175.4	16 47.5 1.00 8 175.4	14 48.1 1.00 7 175.6	6
7	23 40.4 99 11 173.8	22 40.8 99 10 173.9	21 11.4 99 09 174.1	19 41.9 99 09 174.5	17 42.7 99 09 174.5	17 07.6 99 10 173.8	16 37.9 99 10 173.9	14 38.8 99 09 174.2	7
8	23 34.4 99 11 172.9	22 34.9 99 11 173.1	21 05.7 99 11 173.3	19 36.4 99 10 173.5	17 31.4 99 11 173.0	17 01.7 99 11 173.1	16 32.0 99 11 173.1	14 33.2 99 10 173.4	8
9	23 27.6 99 13 172.1	22 28.3 99 12 172.2	20 59.2 99 12 172.5	19 30.2 99 12 172.7	17 24.7...				9
10	23 20.0 99 14 171.2	22 20.9 99 14 171.4	20 52.0 99 13 171.6	19 23.2 99 13 171.9	17 24.7 99 12 172.2	16 55.1 99 12 172.3	16 25.5 99 12 172.4	14 26.9 99 12 172.7	10
1	23 11.7 98 15 170.3	22 12.7 98 15 170.5	20 44.1 98 14 170.8	19 15.5 98 14 171.1	17 17.3 98 13 171.5	16 47.8 98 13 171.5	16 18.2 98 13 171.6	14 20.0 99 13 172.0	1
2	23 02.6 98 16 169.5	22 03.7 98 16 169.7	20 35.4 98 16 170.0	19 07.1 98 15 170.3	17 09.3 98 15 170.7	16 39.8 98 14 170.8	16 10.4 98 14 171.3	14 12.5 98 14 171.3	2
3	22 52.7 98 18 168.6	21 54.1 98 17 168.8	20 26.0 98 17 169.2	18 58.0 98 16 169.5	17 00.5 98 16 169.9	16 31.2 98 16 170.0	16 01.8 98 15 170.1	14 04.3 98 15 170.6	3
4	22 42.1 97 19 167.8	21 43.6 97 19 168.0	20 15.9 97 18 168.4	18 48.2 98 18 168.7	16 51.1 98 17 169.2	16 21.8 98 17 169.3	15 52.6 98 16 169.4	13 55.4 98 16 169.8	4
15	22 30.7 97 20 166.9	21 32.4 97 20 167.2	20 05.1 97 19 167.5	18 37.7 97 19 167.9	16 41.0 97 18 168.4	16 11.9 97 18 168.5	15 42.7 97 18 168.7	13 45.9 97 17 169.1	15
6	22 18.5 97 22 166.1	21 20.5 97 21 166.3	19 53.5 97 20 166.7	18 26.4 97 20 167.1	16 30.3 97 19 167.7	16 01.2 97 19 167.8	15 32.1 97 19 167.9	13 35.8 97 18 168.4	6
7	22 05.6 96 23 165.2	21 07.9 96 23 165.5	19 41.2 96 22 165.9	18 14.5 96 21 166.4	16 18.8 96 20 166.9	15 49.9 96 20 167.1	15 20.9 96 20 167.2	13 25.1 97 19 167.7	7
8	21 52.0 96 24 164.4	20 54.5 96 23 164.7	19 28.3 96 23 165.1	18 01.9 96 22 165.6	16 07.5 96 21 166.2	15 37.9 96 21 166.3	15 09.1 96 21 166.5	13 13.8 96 20 167.0	8
9	21 37.6 95 25 163.5	20 40.4 95 25 163.9	19 14.6 95 24 164.3	17 48.7 96 23 164.8	15 54.0 96 22 165.4	15 25.3 96 22 165.6	14 56.6 96 22 165.7	13 01.8 96 21 166.3	9
20	21 22.5 95 26 162.7	20 25.6 95 26 163.1	19 00.2 95 25 163.6	17 34.7 95 24 164.0	15 40.6 95 23 164.7	15 12.0 95 23 164.9	14 43.5 95 23 165.0	12 49.2 95 22 165.6	20
1	21 06.8 94 28 161.9	20 10.1 94 27 162.2	18 45.2 94 26 162.8	17 20.1 95 25 163.3	15 26.5 95 24 164.1	14 58.1 95 24 164.1	14 29.7 95 24 164.3	12 36.0 95 23 165.0	1
2	20 50.3 94 29 161.1	19 54.0 94 28 161.4	18 29.4 94 27 162.0	17 04.8 94 27 162.5	15 11.9 94 26 163.2	14 43.6 94 25 163.4	14 15.4 94 25 163.6	12 22.2 94 24 164.3	2
3	20 33.1 93 30 160.3	19 37.1 93 29 160.7	18 13.0 94 28 161.2	16 48.9 94 28 161.8	14 56.6 94 27 162.5	14 28.5 94 26 162.7	14 00.4 94 26 162.9	12 07.8 94 25 163.6	3
4	20 15.2 93 31 159.5	19 19.5 93 30 159.9	17 56.0 93 30 160.5	16 32.3 93 29 161.0	14 40.6 93 28 161.8	14 12.7 93 27 162.0	13 44.7 93 27 162.2	11 52.8 93 26 162.9	4
25	19 56.6 92 32 158.7	19 01.3 92 31 159.1	17 38.3 92 31 159.7	16 15.1 92 30 160.3	14 24.1 93 29 161.1	13 56.3 93 28 161.3	13 28.5 93 28 161.5	11 37.3 93 27 162.2	25
6	19 37.4 92 33 157.8	18 42.4 92 33 158.3	17 19.9 92 32 158.9	15 57.7 92 31 159.6	14 06.9 92 30 160.4	13 39.3 92 29 160.6	13 11.7 92 29 160.8	11 21.1 92 28 161.6	6
7	19 17.5 91 34 157.1	18 22.9 91 34 157.5	17 00.9 91 33 158.2	15 38.8 91 32 158.8	13 49.2 91 31 159.7	13 21.8 91 30 159.9	12 54.3 92 30 160.1	11 04.4 92 29 160.9	7
8	18 56.9 90 35 156.3	18 02.7 90 35 156.8	16 41.3 91 34 157.4	15 19.8 91 33 158.1	13 30.8 91 32 159.0	13 03.6 91 31 159.2	12 36.3 91 31 159.4	10 47.2 91 30 160.2	8
9	18 35.8 90 36 155.6	17 41.9 90 36 156.0	16 21.1 90 35 156.7	15 00.1 90 34 157.4	13 11.9 90 33 158.3	12 44.8 90 32 158.5	12 17.8 90 32 158.7	10 29.3 90 31 159.6	9
30	18 13.9 89 37 154.8	17 20.5 89 37 155.3	16 00.2 89 36 156.0	14 39.8 89 35 156.7	12 52.4 90 33 157.6	12 25.5 90 33 157.8	11 58.6 90 33 158.0	10 10.9 90 32 158.9	30
1	17 51.5 88 38 154.0	16 58.5 88 38 154.5	15 38.8 89 37 155.3	14 18.9 89 36 156.0	12 32.3 89 34 156.9	12 05.6 89 34 157.1	11 39.3 89 34 157.4	9 52.0 89 32 158.3	1
2	17 28.4 88 39 153.3	16 35.8 88 39 153.8	15 16.7 88 38 154.5	13 57.5 88 37 155.3	12 11.6 89 35 156.2	11 45.1 88 35 156.5	11 18.6 89 35 156.7	9 32.5 89 33 157.7	2
3	17 04.8 87 40 152.6	16 12.6 87 40 153.1	14 54.1 87 39 153.8	13 35.5 87 38 154.6	11 50.4 88 36 155.6	11 24.1 88 36 155.8	10 57.8 88 36 156.1	9 12.5 88 34 157.0	3
4	16 40.5 86 41 151.8	15 48.7 86 41 152.3	14 30.9 87 40 153.1	13 12.9 87 39 153.9	11 28.7 87 37 154.9	11 02.6 87 37 155.2	10 36.5 87 36 155.4	8 52.0 87 35 156.4	4
35	16 15.7 86 42 151.1	15 24.3 86 42 151.6	14 07.1 86 41 152.4	12 49.7 86 40 153.2	11 06.4 86 38 154.3	10 40.5 86 38 154.5	10 14.6 86 37 154.8	8 30.9 86 35 155.8	35
6	15 50.3 85 43 150.4	14 59.4 85 43 150.9	13 42.8 85 41 151.7	12 26.1 85 40 152.5	10 43.5 86 39 153.6	10 17.9 85 39 153.9	9 52.2 86 38 154.1	8 09.4 86 37 155.2	6
7	15 24.4 84 44 149.7	14 33.8 84 43 150.2	13 17.9 84 42 151.1	12 01.8 85 41 151.9	10 20.2 85 40 153.0	9 54.7 85 39 153.2	9 29.3 85 39 153.5	7 47.3 85 38 154.6	7
8	14 57.8 83 45 149.0	14 07.8 84 44 149.5	12 52.5 84 43 150.4	11 37.1 84 42 151.2	9 56.3 84 41 152.3	9 31.1 84 40 152.6	9 05.8 84 40 152.9	7 24.7 84 38 154.0	8
9	14 30.3 83 46 148.3	13 41.1 83 45 148.8	12 26.6 83 44 149.7	11 11.8 83 43 150.6	9 31.9 84 42 151.7	9 06.9 83 41 152.0	8 41.9 83 41 152.3	7 01.7 84 39 153.4	9
40	14 03.2 82 47 147.6	13 14.0 82 46 148.2	12 00.1 82 45 149.0	10 46.0 82 44 149.9	9 07.0 83 42 151.1	8 42.2 83 42 151.4	8 17.4 83 40 151.6	6 38.1 83 40 152.8	40
1	13 35.1 81 48 146.9	12 46.3 81 47 147.5	11 33.1 81 46 148.4	10 19.7 82 45 149.3	8 41.6 82 43 150.4	8 17.1 82 43 150.7	7 52.5 82 42 151.0	6 14.1 82 41 152.2	1
2	13 06.4 80 49 146.2	12 18.2 81 48 146.8	11 05.6 81 47 147.7	9 52.9 81 45 148.6	8 15.8 81 44 149.8	7 51.4 81 44 150.1	7 27.1 81 43 150.4	5 49.6 81 42 151.6	2
3	12 37.3 80 49 145.6	11 49.5 80 49 146.2	10 37.7 80 47 147.1	9 25.6 80 46 148.0	7 49.4 80 45 149.2	7 25.3 80 44 149.5	7 01.2 80 44 149.8	5 24.7 80 42 151.0	3
4	12 07.7 79 50 144.9	11 20.3 79 49 145.5	10 09.2 79 48 146.5	8 57.9 79 47 147.4	7 22.6 80 45 148.6	6 58.7 80 45 148.9	6 34.9 80 45 149.2		4
45	11 37.6 78 51 144.3	10 50.7 78 50 144.9	9 40.3 78 49 145.9	8 29.7 79 48 146.8	6 55.3 79 46 148.0	6 31.7 79 46 148.3	6 08.1 79 45 148.7		45
6	11 07.0 77 52 143.6	10 20.6 77 51 144.3	9 10.9 78 50 145.2	8 01.0 78 49 146.2	6 27.6 78 47 147.5	6 04.2 78 47 147.8	5 40.8 78 46 148.1		6
7	10 35.9 76 53 143.0	9 50.0 77 52 143.6	8 41.0 77 51 144.6	7 31.8 77 49 145.6	5 59.4 77 48 146.9	5 36.3 77 47 147.2	5 13.1 77 47 147.5		7
8	10 04.4 76 53 142.4	9 19.0 76 52 143.0	8 10.7 76 51 144.0	7 02.2 76 50 145.0	5 30.8 76 48 146.3	5 07.9 76 48 146.6			8
9	9 32.5 75 54 141.7	8 47.5 75 53 142.4	7 39.9 75 52 143.4	6 32.2 75 51 144.4	5 01.7 75 49 145.7				9
50	9 00.1 74 55 141.1	8 15.6 74 54 141.8	7 08.8 74 53 142.8	6 01.8 74 51 143.8	5 30.9 74 52 143.3				50
1	8 27.3 73 55 140.5	7 43.3 73 55 141.2	6 37.7 74 53 142.2	5 30.9 74 52 143.3					1
2	7 54.0 72 56 139.9	7 10.5 73 55 140.6	6 05.1 73 54 141.7						2
3	7 20.4 72 57 139.3	6 37.4 72 56 140.1	5 32.7 72 55 141.1						3
4	6 46.3 71 57 138.8	6 03.8 71 57 139.5							4
55	6 11.9 70 58 138.2	5 29.8 70 57 138.9							55
6	5 37.1 69 59 137.6								6
7	5 01.9 68 59 137.1								7

DECLINATION SAME NAME AS LATITUDE

Each cell: Alt. (° ′ Δd Δt) Az.

H.A.	36° 00′	37° 00′	38° 30′	40° 00′	42° 00′	42° 30′	43° 00′	45° 00′	H.A.
91	16 21.6 43 73 57.5	16 47.3 43 72 56.5	17 25.4 42 71 55.1	18 02.9 41 70 53.7	18 51.9 40 68 51.7	19 03.9 40 67 51.3	19 15.9 40 67 50.8	20 03.1 39 65 48.8	91
2	15 37.9 44 73 57.1	16 04.1 43 72 56.2	16 42.9 43 71 54.7	17 21.1 42 69 53.3	18 11.2 41 68 51.4	18 23.5 41 67 50.9	18 35.8 41 67 50.5	19 24.1 40 65 48.5	2
3	14 54.3 45 72 56.7	15 21.0 44 71 55.8	16 00.5 44 70 54.4	16 39.5 43 69 53.0	17 30.6 42 67 51.1	17 43.2 42 67 50.6	17 55.8 42 66 50.1	18 45.2 41 64 48.2	3
4	14 11.0 45 71 56.3	14 38.1 45 71 55.4	15 18.1 44 70 54.0	15 58.1 44 69 52.6	16 50.3 43 67 50.8	17 03.2 42 66 50.3	17 16.0 43 66 49.8	18 06.5 42 64 47.9	4
95	13 27.8 46 72 56.0	13 55.4 46 71 55.1	14 36.4 45 70 53.7	15 16.9 45 68 52.3	16 10.1 44 67 50.4	16 23.3 44 66 50.0	16 36.4 44 66 49.5	17 28.1 43 64 47.6	95
6	12 44.9 47 71 55.6	13 12.9 47 70 54.7	13 54.7 46 69 53.3	14 35.9 46 68 51.9	15 30.2 45 66 50.1	15 43.6 45 66 49.6	15 57.0 44 65 49.2	16 49.8 44 63 47.3	6
7	12 02.1 48 71 55.2	12 30.6 47 70 54.3	13 13.1 47 69 52.9	13 55.1 46 68 51.6	14 50.4 46 66 49.7	15 04.1 46 65 49.3	15 17.8 45 65 48.8	16 11.8 45 63 47.0	7
8	11 19.5 48 70 54.8	11 48.5 48 70 53.9	12 31.7 48 69 52.6	13 14.5 47 67 51.2	14 10.9 47 66 49.4	14 24.9 46 65 48.9	14 38.8 46 65 48.5	15 33.9 46 63 46.6	8
9	10 37.2 49 70 54.4	11 06.7 49 69 53.5	11 50.6 49 68 52.2	12 34.1 48 67 50.8	13 31.6 48 65 49.0	13 45.8 47 65 48.6	14 00.0 47 64 48.1	14 56.2 47 62 46.3	9
100	9 55.0 50 70 54.0	10 25.0 50 69 53.1	11 09.7 49 68 51.8	11 54.0 49 67 50.4	12 52.4 48 65 48.7	13 07.0 48 64 48.2	13 21.4 48 64 47.8	14 18.8 47 62 45.9	100
1	9 13.1 51 70 53.6	9 43.6 51 69 52.7	10 28.9 50 67 51.4	11 14.0 50 66 50.1	12 13.5 49 64 48.3	12 28.3 49 64 47.8	12 43.1 49 64 47.4	13 41.5 48 62 45.6	1
2	8 31.4 52 69 53.1	9 02.3 51 68 52.3	9 48.5 51 67 51.0	10 34.3 51 66 49.7	11 34.9 50 64 47.9	11 49.9 50 64 47.5	12 04.9 50 63 47.0	13 04.5 49 61 45.2	2
3	7 50.0 52 69 52.7	8 21.4 52 68 51.9	9 08.2 52 67 50.6	9 54.6 52 65 49.3	10 56.1 51 64 47.5	11 11.3 51 63 47.1	11 27.0 51 63 46.6	12 27.7 50 61 44.9	3
4	7 08.7 53 68 52.3	7 40.6 53 68 51.4	8 28.2 53 66 50.2	9 15.5 52 65 48.9	10 18.2 52 63 47.1	10 33.8 52 63 46.7	10 49.4 52 62 46.3	11 51.2 51 60 44.5	4
105	6 27.8 54 68 51.9	7 00.1 54 67 51.0	7 48.4 54 66 49.7	8 36.5 53 65 48.4	9 40.3 53 63 46.7	9 56.1 53 62 46.3	10 12.0 53 62 45.9	11 14.5 52 60 44.1	105
6	5 47.0 55 67 51.4	6 19.8 55 67 50.6	7 08.9 54 65 49.3	7 57.8 54 64 48.0	9 02.6 54 62 46.3	9 18.7 54 62 45.9	9 34.8 54 62 45.5	10 38.8 53 60 43.8	6
7	5 06.5 56 67 51.0	5 39.8 55 66 50.1	6 29.6 55 65 48.9	7 19.3 55 64 47.6	8 25.1 55 62 45.9	8 41.5 55 62 45.5	8 57.9 55 61 45.1	10 03.0 54 59 43.4	7
8		5 00.1 56 66 49.7	5 50.6 56 65 48.4	6 41.0 56 63 47.2	7 47.9 56 61 45.5	8 04.6 55 61 45.1	8 21.2 55 61 44.7	9 27.5 55 59 43.0	8
9			5 11.9 57 64 48.0	6 03.0 57 63 46.7	7 11.0 56 61 45.1	7 27.9 56 61 44.7	7 44.8 56 60 44.3	8 52.2 56 58 42.6	9
110				5 25.3 58 62 46.3	6 34.3 57 61 44.7	6 51.5 57 60 44.3	7 08.7 57 60 43.8	8 17.1 57 58 42.2	110
1					5 57.9 58 60 44.2	6 15.4 58 60 43.8	6 32.8 58 59 43.4	7 42.4 58 57 41.8	1
2					5 21.8 59 60 43.8	5 39.5 59 59 43.4	5 57.3 59 59 43.0	7 07.9 59 57 41.4	2
3						5 04.0 60 59 42.9	5 22.0 60 58 42.5	6 33.7 60 56 40.9	3
4								5 59.8 61 56 40.5	4
115								5 26.2 62 56 40.1	115

Lat. 30°

H.A.	46°00' Alt.	Δd Δt	Az.	47°00' Alt.	Δd Δt	Az.	48°30' Alt.	Δd Δt	Az.	49°30' Alt.	Δd Δt	Az.	50°30' Alt.	Δd Δt	Az.	51°30' Alt.	Δd Δt	Az.	52°30' Alt.	Δd Δt	Az.	54°00' Alt.	Δd Δt	Az.	H.A.
00	74 00.0	1.002	00.0	73 00.0	1.002	00.0	71 30.0	1.002	00.0	70 30.0	1.001	00.0	69 30.0	1.001	00.0	68 30.0	1.001	00.0	67 30.0	1.001	00.0	66 00.0	1.001	00.0	00
1	73 58.9	1.006	02.5	72 58.9	1.005	02.3	71 29.1	1.005	02.1	70 29.1	1.004	01.9	69 29.1	1.004	01.8	68 29.1	1.004	01.7	67 29.1	1.001	01.6	65 59.1	1.005	01.4	1
2	73 55.4	99 09	05.0	72 55.8	99 09	04.7	71 26.2	1.008	04.2	70 26.5	1.007	03.9	69 26.7	1.007	03.6	68 26.9	1.006	03.4	67 27.1	1.006	03.2	65 57.4	1.005	02.9	2
3	73 49.8	99 13	07.5	72 50.5	99 12	06.9	71 21.5	99 11	06.2	70 22.1	99 10	05.8	69 22.6	99 10	05.4	68 23.1	99 09	05.1	67 23.5	99 08	04.8	65 54.1	99 08	04.3	3
4	73 41.9	98 17	09.9	72 43.2	98 16	09.2	71 15.0	98 14	07.7	70 16.0	98 13	07.7	69 17.7	99 12	07.2	68 17.7	99 11	06.7	67 18.5	99 11	06.3	65 49.6	99 10	05.7	4
05	73 31.9	96 20	12.3	72 33.9	97 19	11.4	71 06.6	97 17	10.3	70 08.2	98 16	09.6	69 09.6	98 15	09.0	68 10.9	98 14	08.4	67 12.1	98 12	07.9	65 43.7	98 12	07.2	05
6	73 19.7	95 24	14.7	72 22.6	95 22	13.6	70 56.4	96 20	12.2	69 58.7	96 18	11.4	69 00.7	97 17	10.7	68 02.6	97 16	10.0	67 04.3	97 15	09.4	65 36.6	98 14	08.6	6
7	73 05.6	93 27	16.9	72 09.4	94 25	15.7	70 44.6	95 23	14.2	69 47.6	95 21	13.2	68 50.3	96 20	12.4	67 52.8	96 19	11.6	66 55.1	96 18	10.9	65 28.3	97 16	09.9	7
8	72 49.5	91 30	19.1	71 54.5	92 28	17.8	70 31.0	93 25	16.1	69 34.9	94 24	15.0	68 38.4	94 22	14.1	67 41.6	95 21	13.2	66 44.6	95 20	12.4	65 18.7	96 18	11.3	8
9	72 31.5	89 33	21.2	71 37.7	90 31	19.8	70 15.3	92 28	17.9	69 20.7	92 25	16.7	68 25.1	93 25	15.7	67 29.1	94 23	14.7	66 33.7	94 22	13.8	65 07.9	95 20	12.6	9
10	72 11.9	87 36	23.2	71 19.3	88 33	21.7	69 59.1	90 30	19.6	69 05.0	91 29	18.4	68 10.3	91 27	17.3	67 15.2	92 25	16.2	66 19.8	93 24	15.3	64 56.0	93 22	13.9	10
1	71 50.6	85 38	25.2	70 59.3	86 36	23.5	69 40.9	88 33	21.4	68 47.8	89 31	20.0	67 54.2	90 29	18.8	67 00.1	91 27	17.7	66 05.5	91 26	16.7	64 42.9	92 24	15.2	1
2	71 27.7	82 41	27.0	70 37.8	84 38	25.3	69 21.3	86 35	23.0	68 29.4	87 33	21.6	67 36.8	88 31	20.3	66 43.7	89 29	19.1	65 50.0	90 28	18.0	64 28.7	91 26	16.5	2
3	71 03.4	80 43	28.8	70 14.9	82 40	27.0	69 00.0	84 37	24.6	68 09.6	85 35	23.1	67 18.1	86 33	21.8	66 26.0	87 31	20.5	65 33.4	88 30	19.3	64 13.4	89 27	17.7	3
4	70 37.8	78 45	30.4	69 50.7	79 42	28.6	68 38.1	82 39	26.1	67 48.6	83 37	24.6	66 58.3	84 35	23.2	66 07.3	86 33	21.8	65 15.6	87 31	20.6	63 57.1	88 29	18.9	4
15	70 10.8	75 47	32.0	69 25.2	77 44	30.1	68 14.6	80 41	27.6	67 26.4	81 39	26.0	66 37.3	83 37	24.5	65 47.4	84 35	23.1	64 56.8	85 33	21.8	63 39.8	86 30	20.1	15
6	69 42.7	73 49	33.5	68 58.5	75 46	31.6	67 50.0	77 43	29.0	67 03.1	79 41	27.3	66 15.2	81 39	25.8	65 26.5	82 37	24.4	64 37.0	83 35	23.0	63 21.5	85 32	21.2	6
7	69 13.4	70 50	34.9	68 30.7	72 48	33.0	67 24.4	75 44	30.3	66 38.7	77 42	28.6	65 52.0	79 40	27.1	65 04.5	80 38	25.6	64 16.1	81 36	24.2	63 02.2	83 34	22.3	7
8	68 43.2	68 52	36.3	68 02.0	70 50	34.3	66 57.6	73 46	31.5	66 13.3	75 44	29.9	65 27.9	76 42	28.3	64 41.6	78 40	26.7	63 54.4	79 38	25.3	62 42.1	81 33	23.3	8
9	68 12.0	65 53	37.5	67 32.2	67 51	35.5	66 30.0	71 48	32.8	65 47.0	73 45	31.0	65 02.9	74 43	29.4	64 17.8	76 41	27.9	63 31.7	77 39	26.4	62 21.1	79 36	24.4	9
20	67 39.9	63 55	38.7	67 01.6	65 52	36.7	66 01.4	68 49	33.9	65 19.8	70 47	32.2	64 36.9	72 45	30.5	63 53.0	74 43	28.9	63 08.2	76 41	27.4	61 59.3	78 38	25.3	20
1	67 07.0	60 56	39.8	66 30.1	63 54	37.8	65 32.1	66 50	35.0	64 51.7	68 48	33.2	64 10.2	70 46	31.5	63 27.5	72 44	30.0	62 43.8	74 42	28.4	61 36.6	76 39	26.3	1
2	66 33.4	58 57	40.9	65 57.9	60 55	38.8	65 01.9	64 52	36.0	64 22.8	66 49	34.2	63 42.6	68 47	32.5	63 01.2	70 43	30.9	62 18.7	72 43	29.4	61 13.2	74 40	27.2	2
3	65 59.1	56 58	41.8	65 25.0	58 55	39.8	64 31.0	62 53	37.0	63 53.2	64 50	35.2	63 14.2	66 45	33.5	62 34.1	68 45	31.9	61 52.9	70 44	30.3	60 49.1	72 42	28.1	3
4	65 24.1	53 59	42.7	64 51.4	56 57	40.8	63 59.4	60 54	37.9	63 22.9	62 52	36.1	62 45.2	64 50	34.4	62 06.3	66 47	32.8	61 26.9	68 45	31.2	60 24.3	70 42	29.0	4
25	64 48.6	51 60	43.6	64 17.1	54 58	41.6	63 27.1	57 55	38.8	62 52.0	60 53	37.0	62 15.5	62 50	35.3	61 37.9	64 48	33.6	60 59.0	66 46	32.0	59 58.8	68 44	29.8	25
6	64 12.5	49 61	44.4	63 42.3	52 59	42.4	62 54.3	55 56	39.6	62 20.4	58 54	37.8	61 45.2	60 52	36.1	61 08.6	62 49	34.4	60 31.2	64 47	32.8	59 32.7	66 44	30.6	6
7	63 35.8	47 62	45.2	63 07.0	49 60	43.2	62 20.8	53 57	40.4	61 48.3	55 54	38.5	61 14.3	58 52	36.8	60 39.0	60 50	35.2	60 02.7	62 48	33.6	59 06.0	64 45	31.3	7
8	62 58.8	45 62	45.9	62 31.2	47 60	43.9	61 46.9	51 57	41.1	61 15.6	53 55	39.4	60 42.9	56 53	37.6	60 08.9	58 51	36.0	59 33.7	60 49	34.3	58 38.7	62 44	32.0	8
9	62 21.3	43 63	46.5	61 54.9	45 61	44.6	61 12.5	49 58	41.8	60 42.4	51 56	40.1	60 10.9	54 54	38.3	59 38.1	56 52	36.7	59 04.1	58 50	35.0	58 10.9	60 47	32.7	9
30	61 43.4	41 64	47.2	61 18.2	43 62	45.2	60 37.6	47 59	42.5	60 08.7	49 57	40.7	59 38.4	52 55	39.0	59 06.8	54 53	37.3	58 34.0	56 51	35.7	57 42.6	59 48	33.4	30
1	61 05.2	39 64	47.7	60 41.1	41 62	45.8	60 02.3	45 60	43.1	59 34.6	47 58	41.3	59 05.5	50 56	39.6	58 35.1	52 54	38.0	58 03.4	54 52	36.3	57 13.7	57 49	34.0	1
2	60 26.5	37 65	48.3	60 03.7	39 63	46.4	59 26.6	43 60	43.6	59 00.1	45 58	41.9	58 32.2	48 56	40.2	58 02.9	50 54	38.6	57 32.4	52 52	36.9	56 44.4	55 50	34.6	2
3	59 47.5	35 65	48.8	59 25.9	37 64	46.9	58 50.5	41 61	44.2	58 25.2	43 59	42.5	57 58.4	46 57	40.7	57 30.3	48 55	39.1	57 01.0	50 53	37.5	56 14.7	53 50	35.2	3
4	59 08.3	33 66	49.2	58 47.8	36 64	47.4	58 14.1	39 61	44.7	57 49.9	42 59	43.0	57 24.3	44 57	41.3	56 57.3	46 56	39.7	56 29.1	48 54	38.1	55 44.6	51 51	35.7	4
35	58 28.8	31 66	49.7	58 09.4	34 64	47.9	57 37.4	37 62	45.2	57 14.3	40 60	43.5	56 49.8	42 58	41.8	56 24.0	44 56	40.2	55 56.9	46 54	38.6	55 14.0	49 52	36.2	35
6	57 49.1	29 67	50.1	57 30.7	32 65	48.3	57 00.4	36 62	45.7	56 38.4	38 60	44.0	56 15.0	40 59	42.3	55 50.3	42 57	40.7	55 24.3	44 55	39.1	54 43.1	47 52	36.7	6
7	57 09.2	28 67	50.4	56 51.7	30 65	48.7	56 23.1	34 63	46.1	56 02.1	36 61	44.4	55 39.8	38 57	42.7	55 16.3	40 57	41.2	54 51.4	42 55	39.5	54 11.9	46 53	37.2	7
8	56 29.0	26 67	50.8	56 12.7	28 66	49.0	55 45.5	32 63	46.5	55 25.7	34 61	44.8	55 04.5	36 59	43.2	54 42.0	39 58	41.5	54 18.2	41 56	40.0	53 40.3	44 53	37.7	8
9	55 48.7	24 68	51.1	55 33.4	27 66	49.4	55 07.7	30 63	46.8	54 48.9	32 62	45.2	54 28.8	35 60	43.6	54 07.4	37 58	42.0	53 44.7	39 56	40.4	53 08.4	42 54	38.1	9
40	55 08.2	23 68	51.4	54 53.8	25 66	49.7	54 29.7	29 64	47.2	54 12.0	31 62	45.5	53 52.9	33 60	43.9	53 32.5	35 59	42.3	53 10.9	37 57	40.8	52 36.2	40 54	38.5	40
1	54 27.5	21 68	51.6	54 14.1	24 66	50.0	53 51.5	27 64	47.5	53 34.4	29 62	45.9	53 16.7	31 61	44.3	52 57.4	33 59	42.7	52 36.8	35 57	41.1	52 03.8	38 55	38.8	1
2	53 46.7	20 68	51.9	53 34.3	22 67	50.2	53 13.1	25 64	47.8	52 57.4	27 63	46.2	52 40.3	29 61	44.6	52 22.0	32 59	43.0	52 02.5	34 58	41.5	51 31.0	36 55	39.2	2
3	53 05.8	18 68	52.1	52 54.3	20 67	50.5	52 34.6	24 65	48.0	52 19.8	26 63	46.5	52 03.8	28 61	44.9	51 46.5	30 60	43.3	51 28.0	32 58	41.8	50 58.1	35 55	39.5	3
4	52 24.7	17 69	52.3	52 14.2	19 67	50.7	51 55.9	22 65	48.3	51 42.1	24 63	46.7	51 27.0	26 62	45.2	51 10.8	28 60	43.6	50 53.3	30 58	42.1	50 24.9	33 56	39.8	4
45	51 43.6	15 69	52.5	51 33.9	17 67	50.9	51 17.0	20 65	48.5	51 04.2	22 63	47.0	50 50.1	24 62	45.4	50 34.8	26 60	43.9	50 18.4	28 58	42.4	49 51.5	31 56	40.1	45
6	51 02.3	14 69	52.6	50 53.5	16 67	51.1	50 38.0	19 65	48.7	50 26.1	21 64	47.2	50 13.0	23 62	45.6	49 58.7	25 60	44.1	49 43.2	27 59	42.6	49 17.9	30 56	40.4	6
7	50 21.0	12 69	52.8	50 13.1	14 68	51.2	49 58.9	17 65	48.9	49 47.9	19 64	47.4	49 35.8	21 61	45.9	49 22.5	23 61	44.4	49 08.0	25 59	42.9	48 44.1	28 57	40.7	7
8	49 39.6	11 69	52.9	49 32.5	13 68	51.4	49 19.7	16 66	49.1	49 09.6	18 64	47.6	48 58.4	20 62	46.1	48 46.1	22 61	44.6	48 32.5	23 59	43.1	48 10.2	26 57	40.9	8
9	48 58.1	09 69	53.0	48 51.9	11 68	51.5	48 40.4	14 66	49.2	48 31.2	16 64	47.7	48 21.0	18 63	46.2	48 09.5	20 61	44.8	47 57.0	22 60	43.3	47 36.1	25 57	41.1	9
50	48 16.6	08 69	53.1	48 11.2	10 68	51.6	48 01.0	13 66	49.4	47 52.7	15 64	47.9	47 43.4	17 63	46.4	47 32.9	18 61	45.0	47 21.3	20 60	43.5	47 01.8	23 57	41.3	50
1	47 35.0	07 69	53.2	47 30.5	09 68	51.7	47 21.5	11 66	49.5	47 14.2	13 64	48.0	47 05.7	15 63	46.6	46 56.1	17 61	45.1	46 45.4	19 60	43.7	46 27.4	21 58	41.5	1
2	46 53.4	05 69	53.2	46 49.7	07 68	51.8	46 42.0	10 66	49.6	46 35.5	12 65	48.1	46 27.9	14 63	46.7	46 19.2	15 62	45.3	46 09.5	17 60	43.8	45 52.9	20 58	41.7	2
3	46 11.8	04 69	53.3	46 08.8	06 68	51.8	46 02.4	09 66	49.7	45 56.8	10 65	48.2	45 50.1	12 63	46.8	45 42.3	14 62	45.4	45 33.5	16 60	44.0	45 18.3	18 58	41.9	3
4	45 30.1	03 69	53.3	45 28.0	04 68	51.9	45 22.8	07 66	49.8	45 18.0	09 65	48.3	45 12.1	11 63	46.9	45 05.3	12 62	45.5	44 57.3	14 60	44.1	44 43.5	17 58	42.0	4
55	44 48.5	01 69	53.3	44 47.1	03 68	51.9	44 43.1	06 66	49.8	44 39.1	07 65	48.4	44 34.2	09 63	47.0	44 28.2	11 62	45.6	44 21.1	13 60	44.2	44 08.7	15 58	42.1	55
6	44 06.8	00 69	53.3	44 06.2	02 68	51.9	44 03.4	04 66	49.8	44 00.0	06 65	48.4	43 56.1	07 63	47.1	43 51.0	09 62	45.7	43 44.9	11 61	44.3	43 33.8	14 58	42.3	6
7	43 25.1	01 69	53.3	43 25.3	01 68	52.0	43 23.7	03 66	49.9	43 21.4	05 65	48.5	43 18.1	06 64	47.1	43 13.8	08 62	45.8	43 08.5	10 61	44.4	42 58.8	12 58	42.4	7
8	42 43.4	02 69	53.3	42 44.4	01 68	52.0	42 43.9	02 66	49.9	42 42.4	03 65	48.5	42 40.0	05 64	47.2	42 36.5	07 62	45.8	42 32.2	08 61	44.5	42 23.8	10 58	42.5	8
9	42 01.8	04 69	53.3	42 03.4	02 68	51.9	42 04.2	00 66	49.9	42 03.5	01 65	48.6	42 01.8	04 64	47.2	41 59.2	05 62	45.9	41 55.7	07 61	44.5	41 48.7	09 59	42.5	9
60	41 20.1	05 69	53.2	41 22.5	03 68	51.9	41 24.4	01 66	49.9	41 24.5	01 65	48.6	41 23.7	02 64	47.3	41 21.9	04 62	45.9	41 19.3	05 61	44.6	41 13.5	08 59	42.6	60
1	40 38.5	06 69	53.2	40 41.6	04 68	51.9	40 44.7	02 66	49.9	40 45.5	01 65	48.6	40 45.5	01 64	47.3	40 44.6	02 62	46.0	40 42.8	04 61	44.6	40 38.4	06 59	42.6	1
2	39 56.9	07 69	53.1	40 00.8	06 68	51.8	40 04.9	04 66	49.9	40 06.6	02 65	48.6	40 07.4	01 64	47.3	40 07.3	01 62	46.0	40 06.3	02 61	44.6	40 03.1	05 59	42.7	2
3	39 15.4	08 69	53.1	39 19.9	07 68	51.8	39 25.2	05 66	49.8	39 27.6	03 65	48.5	39 29.2	02 64	47.3	39 29.9	00 62	46.0	39 29.7	01 61	44.7	39 27.9	03 59	42.7	3
4	38 33.8	09 69	53.0	38 39.1	08 68	51.7	38 45.5	06 66	49.8	38 48.7	05 65	48.5	38 51.0	03 64	47.2	38 52.6	02 62	45.9	38 53.0	00 61	44.7	38 52.5	02 59	42.7	4
65	37 52.4	11 69	52.9	37 58.4	09 68	51.6	38 05.8	07 66	49.7	38 09.8	06 65	48.5	38 12.9	03 62	47.2	38 15.2	03 62	45.9	38 16.7	02 61	44.7	38 17.4	00 59	42.7	65
6	37 11.0	12 69	52.8	37 17.6	10 68	51.6	37 26.2	08 66	49.7	37 30.9	07 65	48.4	37 34.8	06 63	47.2	37 37.9	04 62	45.9	37 40.2	03 61	44.6	37 42.1	01 59	42.7	6
7	36 29.6	13 69	52.7	36 37.0	12 68	51.5	36 46.6	10 66	49.6	36 52.0	08 65	48.4	36 56.7	06 62	47.1	37 00.6	06 62	45.8	37 03.7	05 61	44.6	37 06.8	03 59	42.7	7
8	35 48.3	14 69	52.6	35 56.4	13 68	51.4	36 07.1	11 66	49.5	36 13.2	10 65	48.3	36 18.7	07 63	47.1	36 23.3	07 62	45.8	36 27.0	06 61	44.6	36 31.6	04 59	42.7	8
9	35 07.1	15 69	52.5	35 15.8	14 67	51.2	35 27.6	12 66	49.4	35 34.5	11 65	48.2	35 40.7	10 63	47.0	35 46.1	08 62	45.7	35 50.8	07 61	44.5	35 56.4	05 59	42.7	9
70	34 25.9	16 68	52.3	34 35.3	15 67	51.1	34 48.1	13 66	49.3	34 55.5	12 64	48.1	35 02.7	11 63	46.9	35 08.9	10 62	45.7	35 14.3	08 61	44.5	35 21.2	07 59	42.6	70
1	33 44.8	17 68	52.2	33 54.9	16 67	51.0	34 08.8	15 66	49.2	34 17.1	13 64	48.0	34 24.8	12 63	46.8	34 31.7	11 62	45.6	34 38.0	10 61	44.4	34 46.0	08 59	42.6	1
2	33 03.8	18 68	52.0	33 14.6	17 67	50.9	33 29.5	16 65	49.1	33 38.5	15 64	47.9	33 46.9	13 63	46.7	33 54.6	12 62	45.5	34 01.7	11 60	44.3	34 10.9	09 58	42.5	2
3	32 22.9	20 68	51.9	32 34.3	18 67	50.7	32 50.3	17 65	49.0	33 00.0	16 64	47.8	33 09.1	15 63	46.6	33 17.6	14 62	45.4	33 25.4	12 60	44.2	33 35.8	11 58	42.4	3
4	31 42.1	21 68	51.7	31 54.2	20 67	50.6	32 11.1	18 65	48.8	32 21.6	17 64	47.7	32 31.4	16 63	46.5	32 40.6	15 62	45.3	32 49.2	14 60	44.1	33 00.7	12 58	42.4	4
75	31 01.3	22 68	51.5	31 14.1	21 67	50.4	31 32.0	19 65	48.7	31 43.2	18 64	47.5	31 53.8	17 63	46.4	32 03.7	16 61	45.2	32 13.0	15 60	44.0	32 25.7	13 58	42.3	75
6	30 20.7	23 68	51.4	30 34.1	22 66	50.2	30 53.0	20 65	48.5	31 04.9	19 64	47.4	31 16.2	18 62	46.2	31 26.9	17 61	45.1	31 36.9	16 60	43.9	31 50.8	15 58	42.2	6
7	29 40.2	24 67	51.2	29 54.2	23 66	50.0	30 14.2	21 65	48.4	30 26.6	20 63	47.2	30 38.7	19 62	46.1	30 50.1	18 61	44.9	31 00.9	17 60	43.8	31 16.0	16 58	42.1	7
8	28 59.8	25 67	51.0	29 14.4	24 66	49.9	29 35.4	23 64	48.2	29 48.7	22 63	47.1	30 01.4	21 62	46.0	30 13.5	20 61	44.8	30 25.0	19 60	43.7	30 41.2	17 58	42.0	8
9	28 19.4	26 67	50.8	28 34.8	25 66	49.7	28 56.7	24 64	48.0	29 10.7	23 63	46.9	29 24.1	22 62	45.8	29 36.9	21 61	44.7	29 49.2	20 60	43.5	30 06.5	19 58	41.8	9
80	27 39.3	27 67	50.6	27 55.2	26 66	49.5	28 18.1	25 64	47.8	28 32.8	24 63	46.7	28 46.9	23 62	45.6	29 00.4	22 61	44.5	29 13.4	21 59	43.2	29 31.9	20 58	41.7	80
1	26 59.2	28 67	50.3	27 15.8	27 66	49.3	27 39.7	26 64	47.6	27 55.0	25 63	46.5	28 09.8	24 62	45.4	28 24.1	23 60	44.3	28 37.8	22 59	43.1	28 57.4	21 57	41.6	1
2	26 19.2	29 66	50.1	26 36.5	28 65	49.1	27 01.3	27 64	47.4	27 17.3	26 63	46.2	27 32.6	25 61	45.1	27 47.8	25 60	44.0	28 02.2	24 59	43.1	28 22.9	22 57	41.4	2
3	25 39.4	30 66	49.8	25 57.3	29 65	48.8	26 23.1	28 63	47.2	26 39.8	27 62	46.2	26 56.0	27 61	45.1	27 11.6	26 60	44.0	27 26.8	25 59	42.9	27 48.6	24 57	41.3	3
4	24 59.8	31 66	49.7	25 18.2	30 65	48.6	25 45.1	29 63	47.0	26 02.4	28 62	46.0	26 19.2	28 61	44.9	26 35.6	27 60	43.8	26 51.5	26 59	42.7	27 14.4	25 57	41.1	4
85	24 20.2	32 66	49.4	24 39.3	31 65	48.4	25 07.1	30 63	46.8	25 25.1	30 62	45.8	25 42.6	29 61	44.7	25 59.7	28 60	43.6	26 16.3	27 58	42.6	26 40.3	26 57	40.9	85
6	23 40.8	33 65	49.2	24 00.5	32 64	48.1	24 29.3	31 63	46.6	24 47.9	31 62	45.5	25 06.1	30 61	44.5	25 23.9	29 59	43.4	25 41.2	28 58	42.4	26 06.3	27 56	40.8	6
7	23 01.6	34 65	48.7	23 21.9	34 64	47.8	23 51.6	33 63	46.3	24 10.9	32 61	45.2	24 29.8	31 60	44.2	24 48.3	30 59	43.2	25 06.2	29 58	42.2	25 32.4	29 56	40.6	7
8	22 22.5	35 65	48.7	22 43.4	35 64	47.6	23 14.1	34 62	46.1	23 34.1	33 61	45.1	23 53.6	32 60	44.0	24 12.7	31 59	43.0	24 31.4	31 58	42.0	24 58.7	30 56	40.4	8
9	21 43.6	36 65	48.4	22 05.1	36 64	47.4	22 36.7	35 62	45.9	22 57.3	34 61	44.8	23 17.6	33 60	43.8	23 37.4	33 59	42.8	23 56.8	32 58	41.8	24 25.1	31 56	40.2	9
90	21 04.8	37 64	48.1	21 27.0	37 63	47.1	21 59.5	36 62	45.6	22 20.8	35 61	44.6	22 41.7	34 60	43.6	23 02.1	34 58	42.6	23 22.2	33 57	41.5	23 51.6	32 56	40.0	90

H.A.	46° 00'			47° 00'			48° 30'			49° 30'			50° 30'			51° 30'			52° 30'			54° 00'			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	
00	14 00.0	1.00 01	180.0	13 00.0	1.00 01	180.0	11 30.0	1.00 00	180.0	10 30.0	1.00 00	180.0	9 30.0	1.00 00	180.0	8 30.0	1.00 00	180.0	7 30.0	1.00 00	180.0	6 00.0	1.00 00	180.0	00
1	13 59.7	1.00 02	179.3	12 59.7	1.00 02	179.3	11 29.7	1.00 02	179.3	10 29.7	1.00 02	179.3	9 29.7	1.00 01	179.4	8 29.7	1.00 01	179.4	7 29.7	1.00 01	179.4	5 59.7	1.00 01	179.4	1
2	13 58.7	1.00 03	178.6	12 58.7	1.00 03	178.6	11 28.8	1.00 03	178.6	10 28.8	1.00 02	178.7	9 28.8	1.00 02	178.7	8 28.9	1.00 02	178.7	7 28.9	1.00 02	178.8	5 58.9	1.00 02	178.8	2
3	13 57.1	1.00 04	177.9	12 57.1	1.00 04	177.9	11 27.2	1.00 04	178.0	10 27.3	1.00 03	178.0	9 27.4	1.00 03	178.1	8 27.4	1.00 03	178.1	7 27.5	1.00 03	178.2	5 57.6	1.00 03	178.2	3
4	13 54.8	1.00 05	177.1	12 54.9	1.00 05	177.2	11 25.1	1.00 05	177.3	10 25.2	1.00 04	177.4	9 25.3	1.00 04	177.4	8 25.4	1.00 04	177.5	7 25.5	1.00 04	177.5	5 55.7	1.00 04	177.6	4
05	13 51.9	1.00 06	176.4	12 52.1	1.00 06	176.4	11 22.3	1.00 06	176.6	10 22.5	1.00 05	176.7	9 22.7	1.00 05	176.8	8 22.9	1.00 05	176.9	7 23.0	1.00 05	176.9	5 53.3	1.00 05	177.0	05
6	13 48.3	1.00 07	175.7	12 48.6	1.00 07	175.8	11 19.0	1.00 07	175.9	10 19.2	1.00 06	176.0	9 19.5	1.00 06	176.1	8 19.7	1.00 06	176.2	7 20.0	1.00 06	176.3	5 50.4	1.00 06	176.5	6
7	13 44.1	99 08	175.0	12 44.5	99 08	175.1	11 15.0	99 08	175.3	10 15.3	99 07	175.4	9 15.7	99 07	175.5	8 16.0	99 07	175.6	7 16.4	99 07	175.7	5 46.9	99 07	175.9	7
8	13 39.3	99 09	174.3	12 39.7	99 09	174.4	11 10.4	99 09	174.6	10 10.9	99 08	174.7	9 11.3	99 08	174.9	8 11.8	99 08	175.0	7 12.2	99 08	175.1	5 42.8	99 08	175.3	8
9	13 33.8	99 10	173.6	12 34.4	99 10	173.7	11 05.2	99 10	173.9	10 05.8	99 09	174.1	9 06.4	99 09	174.2	8 06.9	99 09	174.4	7 07.5	99 09	174.5	5 38.3	99 08	174.7	9
10	13 27.7	99 11	172.9	12 28.4	99 11	173.0	10 59.4	99 11	173.3	10 00.1	99 10	173.4	8 54.8	99 11	173.6	8 01.5	99 10	173.7	7 02.2	99 10	173.9	5 33.3	99 09	174.1	10
1	13 20.9	99 12	172.2	12 21.8	99 12	172.3	10 53.1	99 12	172.6	9 53.9	99 11	172.8	8 54.8	99 11	172.9	7 55.6	99 11	173.1	6 56.4	99 11	173.3	5 27.7	99 10	173.5	1
2	13 13.5	98 13	171.5	12 14.5	98 13	171.7	10 46.1	98 13	171.9	9 47.1	98 12	172.1	8 48.1	98 12	172.3	7 49.1	98 12	172.5	6 50.1	98 12	172.7	5 21.6	98 11	172.9	2
3	13 05.5	98 14	170.8	12 06.7	98 14	171.0	10 38.5	98 14	171.3	9 39.7	98 13	171.5	8 40.8	98 13	171.7	7 42.0	98 13	171.9	6 43.2	98 12	172.1	5 14.9	98 12	172.4	3
4	12 56.8	98 15	170.1	11 58.2	98 15	170.3	10 30.3	98 15	170.6	9 31.7	98 14	170.8	8 33.0	98 14	171.1	7 34.4	98 14	171.3	6 35.8	98 13	171.5	5 07.8	98 13	171.8	4
15	12 47.6	97 16	169.4	11 49.2	97 16	169.6	10 21.5	97 16	170.0	9 23.1	97 15	170.2	8 24.7	97 15	170.4	7 26.2	97 15	170.6	6 27.8	97 14	170.9	5 00.1	97 14	171.2	15
6	12 37.7	97 18	168.7	11 39.5	97 17	168.9	10 12.2	97 17	169.3	9 14.0	97 16	169.6	8 15.7	97 16	169.8	7 17.5	97 15	170.0	6 19.3	97 15	170.3				6
7	12 27.2	97 19	168.0	11 29.2	97 18	168.3	10 02.3	97 18	168.7	9 04.3	97 17	168.9	8 06.3	97 17	169.2	7 08.3	97 16	169.4	6 10.2	97 16	169.7				7
8	12 16.1	96 20	167.3	11 18.3	96 19	167.6	9 51.7	96 19	168.0	8 54.0	96 18	168.3	7 56.2	96 18	168.6	6 58.5	96 17	168.8	6 00.7	96 17	169.1				8
9	12 04.3	96 21	166.6	11 06.9	96 20	166.9	9 40.7	96 19	167.4	8 43.2	96 19	167.6	7 45.6	96 19	167.9	6 48.1	96 18	168.2	5 50.6	96 18	168.5				9
20	11 52.0	95 22	165.9	10 54.8	95 21	166.3	9 29.0	95 20	166.7	8 31.8	95 20	167.0	7 34.5	95 19	167.3	6 37.2	95 19	167.6	5 40.0	95 19	167.9				20
1	11 39.1	95 22	165.3	10 42.2	95 22	165.6	9 16.8	95 21	166.1	8 19.8	95 21	166.4	7 22.8	95 20	166.7	6 25.8	95 20	167.0	5 28.8	95 19	167.3				1
2	11 25.6	94 24	164.6	10 29.0	94 23	164.9	9 04.0	94 22	165.4	8 07.3	94 22	165.8	7 10.6	95 21	166.1	6 13.9	95 21	166.4	5 17.2	95 20	166.8				2
3	11 11.5	94 25	163.9	10 15.2	94 24	164.3	8 50.7	94 23	164.8	7 54.3	94 23	165.2	6 57.9	94 22	165.5	6 01.5	94 22	165.8	5 05.0	94 21	166.2				3
4	10 56.9	93 25	163.3	10 00.8	93 25	163.6	8 36.8	93 24	164.2	7 40.7	93 24	164.5	6 44.6	93 23	164.9	5 48.5	94 23	165.3							4
25	10 41.6	93 26	162.6	9 45.9	93 26	163.0	8 22.3	93 25	163.6	7 26.6	93 24	163.9	6 30.8	93 24	164.3	5 35.0	93 23	164.7							25
6	10 25.8	92 27	162.0	9 30.4	92 27	162.4	8 07.4	92 26	162.9	7 11.9	92 25	163.3	6 16.5	92 25	163.7	5 21.0	92 24	164.1							6
7	10 09.4	92 28	161.3	9 14.4	92 28	161.7	7 51.8	92 27	162.3	6 56.8	92 26	162.7	6 01.7	92 26	163.1	5 06.5	92 25	163.5							7
8	9 52.5	91 29	160.7	8 57.9	91 29	161.1	7 35.8	91 28	161.7	6 41.1	91 27	162.1	5 46.3	91 26	162.5										8
9	9 35.0	90 30	160.0	8 40.7	91 29	160.5	7 19.2	91 28	161.1	6 24.9	91 28	161.5	5 30.5	91 27	162.0										9
30	9 17.0	90 31	159.4	8 23.1	90 30	159.8	7 02.1	90 29	160.5	6 08.1	90 29	160.9	5 14.1	90 28	161.4										30
1	8 58.5	89 32	158.8	8 04.9	89 31	159.2	6 44.5	89 30	159.9	5 50.9	89 30	160.4													1
2	8 39.4	89 33	158.1	7 46.2	89 32	158.6	6 26.4	89 31	159.3	5 33.2	89 30	159.8													2
3	8 19.8	88 34	157.5	7 27.0	88 33	158.0	6 07.8	88 32	158.7	5 15.0	88 31	159.2													3
4	7 59.7	87 34	156.9	7 07.3	87 34	157.4	5 48.7	87 33	158.1																4
35	7 39.0	87 35	156.3	6 47.1	87 35	156.8	5 29.1	87 33	157.6																35
6	7 17.9	86 36	155.7	6 26.4	86 35	156.2	5 09.0	86 34	157.0																6
7	6 56.2	85 37	155.1	6 05.2	85 36	155.6																		7
8	6 34.1	84 38	154.5	5 43.5	84 37	155.0																		8
9	6 11.5	84 38	153.9	5 21.3	84 38	154.5																		9
40	5 48.4	83 39	153.3																					40
1	5 24.9	82 40	152.8																					1
2	5 00.8	81 41	152.2																					2

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00'			47° 00'			48° 30'			49° 30'			50° 30'			51° 30'			52° 30'			54° 00'			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	° '	Δd Δt	°	
91	20 26.2	38 64	47.8	20 49.0	38 63	46.8	21 22.5	37 61	45.4	21 44.4	36 60	44.4	22 05.9	36 59	43.3	22 27.1	35 58	42.3	22 47.9	34 57	41.3	23 18.3	33 55	39.8	91
2	19 47.8	39 64	47.5	20 11.1	39 63	46.6	20 45.6	38 61	45.1	21 08.1	37 60	44.1	21 30.3	37 59	43.1	21 52.2	36 58	42.1	22 13.6	35 57	41.1	22 45.1	35 55	39.6	2
3	19 09.5	40 63	47.3	19 33.5	40 62	46.3	20 08.9	39 61	44.8	20 32.1	38 60	43.8	20 54.9	38 58	42.8	21 17.4	37 58	41.9	21 39.6	37 56	40.9	22 12.1	36 55	39.3	3
4	18 31.5	41 63	47.0	18 56.0	41 62	46.0	19 32.3	40 61	44.5	19 56.2	39 60	43.6	20 19.7	39 58	42.6	20 42.8	38 57	41.6	21 05.6	38 56	40.6	21 39.2	37 54	39.1	4
95	17 53.6	42 63	46.7	18 18.8	42 62	45.7	18 56.0	41 60	44.3	19 20.4	40 59	43.3	19 44.6	40 58	42.3	20 08.4	39 57	41.3	20 31.9	39 56	40.4	21 06.5	38 54	38.9	95
6	17 15.9	43 63	46.3	17 41.7	43 62	45.4	18 44.9	42 59	43.0	19 09.7	41 58	42.0	19 34.2	41 57	41.1	19 58.3	40 56	40.1	20 34.0	39 54	38.6				6
7	16 38.4	44 62	46.0	17 04.8	44 61	45.1	17 43.8	43 60	43.7	18 09.6	43 59	42.7	18 35.0	42 58	41.8	19 00.1	41 55	40.8	19 25.0	41 55	39.8	20 01.7	40 54	38.4	7
8	16 01.1	45 62	45.7	16 28.1	45 61	44.8	17 08.1	44 59	43.4	17 34.4	44 58	42.4	18 00.5	43 57	41.5	18 26.3	43 56	40.5	18 51.8	42 55	39.6	19 29.5	42 53	38.1	8
9	15 24.0	46 61	45.4	15 51.6	46 60	44.4	16 32.5	45 59	43.1	16 59.4	45 58	42.1	17 26.2	44 57	41.2	17 52.6	44 56	40.2	18 18.8	43 55	39.3	18 57.5	43 53	37.9	9
100	14 47.1	47 61	45.0	15 15.3	47 60	44.1	15 57.1	46 59	42.7	16 24.7	46 58	41.8	16 52.0	45 57	40.9	17 19.1	45 55	40.0	17 46.0	44 54	39.0	18 25.7	44 53	37.6	100
1	14 10.5	48 61	44.7	14 39.2	48 60	43.8	15 22.0	47 58	42.4	15 50.2	47 57	41.5	16 18.1	46 56	40.6	16 45.9	46 55	39.7	17 13.3	45 54	38.7	17 54.1	45 52	37.3	1
2	13 34.1	49 60	44.3	14 03.4	49 59	43.4	14 47.0	48 58	42.1	15 15.8	48 57	41.2	15 44.4	47 56	40.3	16 12.8	47 55	39.4	16 40.9	47 54	38.4	17 22.7	46 52	37.0	2
3	12 57.8	50 60	44.0	13 27.8	50 59	43.1	14 12.3	49 58	41.8	14 41.7	49 56	40.9	15 11.0	49 55	40.0	15 40.0	48 54	39.0	16 08.7	48 53	38.1	16 51.5	47 52	36.8	3
4	12 21.9	51 60	43.6	12 52.4	51 59	42.8	13 37.8	50 57	41.4	14 07.8	50 56	40.5	14 37.7	50 55	39.6	15 07.3	49 54	38.7	15 36.8	49 53	37.8	16 20.5	48 51	36.5	4
105	11 46.1	52 59	43.3	12 17.2	52 58	42.4	13 03.5	51 57	41.1	13 34.2	51 56	40.2	14 04.7	51 55	39.3	14 34.9	50 54	38.4	15 05.0	50 53	37.5	15 49.7	49 51	36.2	105
6	11 10.6	53 59	42.9	11 42.3	53 58	42.0	12 29.5	52 56	40.7	13 01.3	52 56	39.8	13 31.9	52 54	39.0	14 02.8	51 53	38.1	14 33.5	51 52	37.2	15 19.2	50 51	35.9	6
7	10 35.4	54 58	42.5	11 07.7	54 57	41.7	11 55.7	53 56	40.4	12 27.6	53 55	39.5	12 59.3	53 54	38.6	13 30.8	52 53	37.8	14 02.2	52 52	36.9	14 48.8	52 50	35.6	7
8	10 00.4	55 58	42.1	10 33.2	55 57	41.3	11 22.2	54 55	40.0	11 54.7	54 54	39.1	12 27.0	54 53	38.3	12 59.1	53 52	37.4	13 31.1	53 51	36.5	14 18.7	53 50	35.2	8
9	9 25.7	56 57	41.7	9 59.1	56 56	40.9	10 48.9	55 55	39.6	11 22.0	55 54	38.8	11 54.9	55 53	37.9	12 27.7	54 52	37.1	13 00.3	54 51	36.2	13 48.9	54 49	34.9	9
110	8 51.2	57 57	41.3	9 25.2	57 56	40.5	10 15.9	56 55	39.3	10 49.6	56 54	38.4	11 23.1	56 53	37.6	11 56.5	56 52	36.7	12 29.7	55 51	35.9	13 19.3	55 49	34.6	110
1	8 17.0	58 57	40.9	8 51.6	57 56	40.1	9 43.2	57 54	38.9	10 17.4	57 53	38.0	10 51.6	57 52	37.2	11 25.6	57 51	36.4	11 59.4	56 50	35.5	12 49.9	56 49	34.2	1
2	7 43.1	59 56	40.5	8 18.2	58 55	39.7	9 10.7	58 54	38.5	9 45.6	58 53	37.7	10 20.3	58 52	36.8	10 54.9	58 51	36.0	11 29.4	57 50	35.2	12 20.8	57 48	33.9	2
3	7 09.5	60 56	40.1	7 45.2	59 55	39.3	8 38.5	59 53	38.1	9 13.9	59 52	37.3	9 49.3	59 51	36.5	10 24.5	59 50	35.6	10 59.6	58 49	34.8	11 51.9	58 48	33.6	3
4	6 36.2	60 55	39.7	7 12.4	60 54	38.9	8 06.6	60 53	37.7	8 42.6	60 52	36.9	9 18.5	60 51	36.1	9 54.3	60 50	35.3	10 30.0	59 49	34.4	11 23.3	59 47	33.2	4
115	6 03.1	61 55	39.3	6 39.9	61 54	38.5	7 35.0	61 52	37.3	8 11.6	61 51	36.5	8 48.1	61 50	35.7	9 24.5	61 49	34.9	10 00.8	60 48	34.1	10 55.5	60 47	32.9	115
6	5 30.4	62 54	38.8	6 07.7	62 53	38.1	7 03.6	62 52	36.9	7 40.8	62 51	36.1	8 17.9	62 50	35.3	8 54.9	62 49	34.5	9 31.8	61 48	33.7	10 26.5	61 46	32.5	6
7				5 35.8	63 53	37.6	6 32.6	63 51	36.5	7 10.4	63 50	35.7	7 48.0	63 49	34.9	8 25.6	63 48	34.1	9 03.1	62 47	33.3	9 59.2	62 46	32.1	7
8				5 04.3	64 52	37.2	6 01.9	64 51	36.0	6 40.2	64 50	35.3	7 18.5	64 49	34.5	7 56.6	64 48	33.7	8 34.7	63 47	32.9	9 31.7	63 45	31.8	8
9							5 31.5	65 50	35.6	6 10.4	65 49	34.8	6 49.2	65 48	34.1	7 28.0	65 47	33.3	8 06.6	64 46	32.5	9 04.5	64 45	31.4	9
120							5 01.4	66 50	35.2	5 40.8	66 49	34.4	6 20.2	66 48	33.7	6 59.5	66 47	32.9	7 38.6	66 45	31.0	8 37.6	65 44	31.0	120
1										5 11.6	67 48	34.0	5 51.6	67 47	33.2	6 31.5	66 46	32.5	7 11.4	66 45	31.7	8 11.0	66 44	30.6	1
2													5 23.3	68 47	32.8	6 03.8	67 46	32.1	6 44.2	67 45	31.3	7 44.7	67 43	30.2	2
3																5 36.3	68 45	31.6	6 17.3	68 44	30.9	7 18.7	68 43	29.8	3
4																5 09.2	69 45	31.2	5 50.8	69 44	30.5	6 53.0	69 42	29.4	4
125																			5 24.6	70 43	30.1	6 27.7	70 42	29.0	125
6																						6 02.7	71 41	28.6	6
7																						5 38.0	72 41	28.1	7
8																						5 13.7	73 40	27.7	8

Lat. 30°

Each cell below lists **Alt. (° ′ ∆d ∆t)** then **Az. (°)**.

H.A.	54° 30′	55° 00′	56° 00′	56° 30′	57° 00′	57° 30′	59° 00′	59° 30′	H.A.
00	65 30.0 1.001 00.0	65 00.0 1.001 00.0	64 00.0 1.001 00.0	63 30.0 1.001 00.0	63 00.0 1.001 00.0	62 30.0 1.001 00.0	61 00.0 1.001 00.0	60 30.0 1.001 00.0	00
1	65 29.4 1.003 01.4	64 59.4 1.003 01.3	63 59.4 1.003 01.3	63 29.4 1.003 01.2	62 59.5 1.005 01.2	62 29.5 1.005 01.2	60 59.5 1.002 01.1	60 29.5 1.002 01.0	1
2	65 27.5 1.005 02.8	64 57.5 1.005 02.7	63 57.8 1.005 02.5	63 27.8 1.005 02.5	62 57.8 1.005 02.4	62 27.5 1.006 02.3	60 58.1 1.004 02.1	60 28.1 1.005 02.1	2
3	65 24.3 99 07 04.2	64 54.5 99 07 04.1	63 54.8 99 07 03.8	63 25.0 99 07 03.7	62 55.1 1.006 03.6	62 25.3 1.006 03.5	60 55.7 1.006 03.2	60 25.8 1.005 03.1	3
4	65 19.9 99 09 05.6	64 50.2 99 09 05.4	63 50.8 99 09 05.1	63 21.1 99 08 04.9	62 51.3 99 08 04.8	62 21.6 99 08 04.6	60 52.3 99 07 04.2	60 22.5 99 07 04.1	4
05	65 14.2 98 11 06.9	64 44.7 98 11 06.7	63 45.6 99 10 06.3	63 16.0 99 10 06.1	62 46.5 99 10 06.0	62 16.9 99 10 05.8	60 48.0 99 09 05.3	60 18.4 99 08 05.1	05
6	65 07.3 98 14 08.3	64 38.0 98 13 07.6	63 39.3 98 12 07.5	63 10.0 98 12 07.3	62 40.5 98 12 07.1	62 11.1 98 11 06.9	60 42.8 98 10 06.1	60 13.3 98 10 06.1	6
7	64 59.2 97 16 09.6	64 30.2 97 15 09.3	63 31.9 97 14 08.6	63 02.8 97 14 08.5	62 33.6 97 13 08.3	62 04.4 97 13 08.0	60 36.6 98 12 07.3	60 07.3 98 12 07.1	7
8	64 49.9 96 17 11.0	64 21.1 96 17 10.6	63 23.4 96 16 10.0	62 54.5 96 15 09.7	62 25.6 97 15 09.4	61 56.6 97 15 09.1	60 29.5 97 13 08.4	60 00.4 97 13 08.1	8
9	64 39.5 95 19 12.3	64 11.0 95 19 11.9	63 13.9 95 18 11.2	62 45.2 96 17 10.9	62 16.6 96 17 10.6	61 47.8 96 16 10.2	60 21.4 96 15 09.4	59 52.6 96 14 09.1	9
10	64 27.9 94 21 13.5	63 59.7 94 21 13.1	63 03.3 94 19 12.4	62 34.9 94 19 12.0	62 06.6 95 18 11.7	61 38.1 95 18 11.3	60 12.5 95 16 10.4	59 43.9 95 16 10.1	10
1	64 15.2 93 23 14.8	63 47.4 93 22 14.3	62 51.6 93 21 13.5	62 23.6 93 20 13.1	61 55.6 94 19 12.8	61 27.4 94 19 12.4	60 02.7 94 18 11.4	59 34.4 95 17 11.0	1
2	64 01.4 91 25 16.0	63 34.0 91 24 15.5	62 39.0 92 23 14.7	62 11.3 92 22 14.2	61 43.6 92 22 13.8	61 15.8 93 21 13.4	59 52.1 93 19 12.3	59 24.1 94 19 12.0	2
3	63 46.5 90 26 17.2	63 19.6 90 26 16.7	62 25.3 91 24 15.8	61 58.1 91 24 15.3	61 30.7 91 23 14.9	61 03.3 92 22 14.5	59 40.6 92 21 13.3	59 12.9 92 20 12.9	3
4	63 30.7 88 28 18.4	63 04.1 89 27 17.8	62 10.7 89 26 16.8	61 43.9 90 25 16.4	61 16.9 90 24 15.9	60 49.9 90 24 15.5	59 28.2 91 22 14.2	59 00.9 91 21 13.8	4
15	63 13.8 87 30 19.5	62 47.7 87 29 20.0	61 55.2 88 27 17.9	61 28.8 88 27 17.4	61 02.2 89 26 16.9	60 35.6 89 25 16.5	59 15.1 90 23 15.1	58 48.1 90 23 14.7	15
6	62 56.0 85 31 20.6	62 30.4 86 30 20.0	61 38.8 86 29 18.9	61 12.8 87 28 18.4	60 46.7 87 27 17.9	60 20.5 88 25 16.0	59 01.2 89 24 16.0	58 34.5 89 24 15.6	6
7	62 37.3 83 33 21.7	62 12.2 84 32 21.1	61 21.5 85 30 19.9	60 56.0 85 29 19.4	60 30.3 86 29 18.9	60 04.5 86 28 18.4	58 46.4 87 26 16.9	58 20.2 88 25 16.4	7
8	62 17.7 82 34 22.7	61 53.0 82 33 22.1	61 03.4 83 32 20.9	60 38.3 84 31 20.4	60 13.1 84 30 19.8	59 47.7 85 29 19.3	58 31.0 86 27 17.7	58 05.2 86 26 17.3	8
9	61 57.2 80 36 23.7	61 33.1 81 35 23.1	60 44.4 82 33 21.9	60 19.8 82 32 21.3	59 55.1 83 31 20.7	59 30.2 83 30 20.2	58 14.8 84 28 18.6	57 49.4 85 27 18.1	9
20	61 35.9 78 37 24.7	61 12.3 79 36 24.0	60 24.7 80 34 22.8	60 00.6 81 33 22.2	59 36.3 81 32 21.6	59 11.9 82 32 21.0	57 57.9 83 29 19.4	57 32.9 83 29 18.9	20
1	61 13.8 76 38 25.6	60 50.8 77 37 25.0	60 04.2 78 35 23.7	59 40.6 79 35 23.1	59 16.8 79 34 22.5	58 52.9 80 33 21.9	57 40.3 81 30 20.2	57 15.8 82 30 19.7	1
2	60 51.0 75 39 26.5	60 28.5 75 38 25.8	59 42.9 77 37 24.5	59 19.9 77 36 23.9	58 56.6 78 35 23.3	58 33.2 78 34 22.7	57 22.0 80 32 21.0	56 58.0 80 31 20.4	2
3	60 27.4 73 40 27.4	60 05.5 73 39 26.7	59 21.0 75 38 25.4	58 58.5 75 37 24.7	58 35.7 76 36 24.1	58 12.8 77 35 23.5	57 03.1 78 33 21.7	56 39.5 79 32 21.2	3
4	60 03.1 71 42 28.2	59 41.8 72 41 27.5	58 58.4 73 39 26.2	58 36.4 74 38 25.5	58 14.3 74 37 24.9	57 51.8 75 35 24.2	56 43.6 77 34 22.4	56 20.5 77 33 21.9	4
25	59 38.2 69 43 29.0	59 17.4 70 42 28.3	58 35.1 71 40 27.0	58 13.7 72 39 26.3	57 52.0 73 38 25.6	57 30.1 73 37 25.0	56 23.4 75 35 23.2	56 00.8 76 34 22.6	25
6	59 12.7 67 44 29.8	58 52.5 68 43 29.1	58 11.3 69 41 27.7	57 50.4 70 40 27.0	57 29.2 71 39 26.4	57 07.9 71 38 25.7	56 02.7 73 35 23.8	55 40.6 74 35 23.2	6
7	58 46.6 65 44 30.6	58 26.9 66 44 29.8	57 46.8 68 42 28.4	57 26.5 68 41 27.7	57 05.9 69 40 27.1	56 45.1 70 39 26.4	55 41.4 72 36 24.5	55 19.8 72 36 23.9	7
8	58 19.9 63 45 31.3	58 00.8 64 44 30.6	57 21.8 66 43 29.1	57 02.0 66 42 28.4	56 41.9 67 41 27.8	56 21.7 68 40 27.1	55 19.6 70 37 25.2	54 58.5 71 36 24.5	8
9	57 52.6 61 46 32.0	57 34.1 62 45 31.2	56 56.2 64 43 29.8	56 37.0 65 43 29.1	56 17.5 65 42 28.4	55 57.7 66 41 27.7	54 57.3 69 38 25.9	54 36.7 69 37 25.1	9
30	57 24.8 59 47 32.6	57 06.9 60 46 31.9	56 30.2 62 44 30.4	56 11.5 63 43 29.7	55 52.5 64 42 29.0	55 33.3 64 42 28.4	54 34.4 66 39 26.4	54 14.4 67 38 25.7	30
1	56 56.6 58 48 33.3	56 39.2 58 47 32.5	56 03.6 60 45 31.1	55 45.4 61 44 30.3	55 27.0 62 43 29.6	55 08.4 63 42 29.0	54 11.1 65 40 27.0	53 51.6 65 39 26.3	1
2	56 27.9 56 49 33.8	56 11.0 57 48 33.1	55 36.6 58 46 31.6	55 19.0 59 45 30.9	55 01.1 60 44 30.2	54 43.0 61 43 29.5	53 47.3 63 40 27.5	53 28.3 64 39 26.9	2
3	55 58.7 54 49 34.4	55 42.4 55 48 33.7	55 09.1 56 47 32.2	54 52.0 57 46 31.5	54 34.7 58 45 30.8	54 17.2 59 44 30.1	53 23.1 61 41 28.1	53 04.6 62 40 27.4	3
4	55 29.1 52 50 35.0	55 13.4 53 49 34.2	54 41.2 54 47 32.8	54 24.7 55 46 32.0	54 07.9 56 45 31.3	53 50.9 57 44 30.6	52 58.5 59 42 28.6	52 40.5 60 41 27.9	4
35	54 59.2 50 51 35.5	54 44.0 51 50 34.7	54 12.9 53 48 33.3	53 56.9 54 47 32.5	53 40.7 54 46 31.8	53 24.2 55 45 31.1	52 33.4 58 42 29.1	52 16.0 58 42 28.4	35
6	54 28.8 48 51 36.0	54 14.2 49 50 35.2	53 44.2 51 48 33.8	53 28.8 52 48 33.0	53 13.1 53 47 32.3	52 57.2 53 46 31.6	52 08.0 56 43 29.5	51 51.1 57 42 28.9	6
7	53 58.1 46 52 36.4	53 44.1 47 51 35.7	53 15.1 49 49 34.2	53 00.3 50 48 33.5	52 45.2 51 47 32.8	52 29.8 52 46 32.1	51 42.2 54 44 30.0	51 25.8 55 43 29.3	7
8	53 27.1 45 52 36.9	53 13.6 45 51 36.1	52 45.7 47 50 34.7	52 31.4 48 49 34.0	52 16.8 49 48 33.2	52 02.0 50 47 32.5	51 16.0 52 44 30.4	51 00.2 53 43 29.8	8
9	52 55.7 43 53 37.3	52 42.8 44 52 36.6	52 16.0 45 50 35.1	52 02.2 46 49 34.4	51 48.2 47 48 33.7	51 33.9 48 47 33.0	50 49.5 51 45 30.9	50 34.2 51 44 30.2	9
40	52 24.1 41 53 37.7	52 11.7 42 52 37.0	51 46.0 44 51 35.5	51 32.7 45 50 34.8	51 19.2 45 49 34.1	51 05.5 46 48 33.4	50 22.7 49 45 31.3	50 07.9 50 44 30.6	40
1	51 52.2 39 54 38.1	51 40.3 40 53 37.4	51 15.7 42 51 35.9	51 03.0 43 50 35.2	50 50.0 44 49 34.5	50 36.8 45 48 33.7	49 55.5 47 46 31.7	49 41.3 48 45 31.0	1
2	51 20.0 37 54 38.5	51 08.6 38 53 37.7	50 45.1 40 51 36.3	50 32.9 41 51 35.5	50 20.5 42 50 34.8	50 07.8 43 49 34.1	49 28.1 45 46 32.0	49 14.4 46 45 31.3	2
3	50 47.5 35 54 38.8	50 36.7 35 54 38.0	50 14.2 38 52 36.6	50 02.6 39 51 35.8	49 50.7 40 50 35.2	49 38.5 41 49 34.4	49 00.4 44 47 32.4	48 47.3 44 46 31.7	3
4	50 14.9 34 55 39.1	50 04.6 35 54 38.4	49 43.1 37 52 36.9	49 32.0 38 51 36.2	49 20.6 38 50 35.5	49 09.0 39 50 34.8	48 32.5 42 47 32.7	48 19.8 43 46 32.0	4
45	49 42.0 32 55 39.4	49 32.2 33 54 38.7	49 11.8 35 53 37.2	49 01.2 36 52 36.5	48 50.3 37 51 35.8	48 39.2 38 50 35.1	48 04.3 40 47 33.0	47 52.2 41 47 32.3	45
6	49 08.9 30 55 39.7	48 59.6 31 55 39.0	48 40.2 33 53 37.5	48 30.1 34 52 36.8	48 19.8 35 51 36.1	48 09.2 36 50 35.4	47 35.9 38 48 33.3	47 24.2 39 47 32.6	6
7	48 35.6 29 56 40.0	48 26.8 30 55 39.2	48 08.5 31 53 37.8	47 58.9 32 52 37.1	47 49.1 33 52 36.4	47 39.0 34 51 35.7	47 07.2 37 48 33.6	46 56.1 37 47 32.9	7
8	48 02.2 27 56 40.2	47 53.9 28 55 39.5	47 36.5 30 54 38.1	47 27.5 31 53 37.3	47 18.2 32 52 36.7	47 08.6 32 51 35.9	46 38.3 34 48 33.8	46 27.8 36 48 33.3	8
9	47 28.5 25 56 40.4	47 20.8 26 55 39.7	47 04.4 28 54 38.3	46 55.9 29 53 37.6	46 47.0 30 52 36.9	46 38.0 31 51 36.2	46 09.3 33 49 34.1	45 59.2 34 48 33.5	9
50	46 54.8 24 56 40.6	46 47.5 25 56 39.9	46 32.2 26 54 38.5	46 24.1 27 53 37.8	46 15.8 28 52 37.1	46 07.2 29 52 36.4	45 40.0 31 49 34.4	45 30.5 32 48 33.7	50
1	46 20.9 22 57 40.8	46 14.1 23 56 40.1	45 59.7 25 54 38.7	45 52.2 26 53 38.0	45 44.3 26 53 37.3	45 36.3 27 52 36.6	45 10.6 30 49 34.6	45 01.6 31 48 33.9	1
2	45 46.8 21 57 41.0	45 40.5 21 56 40.3	45 27.1 23 54 38.2	45 20.1 24 54 38.2	45 12.5 25 53 37.5	45 05.2 26 52 36.9	44 41.0 28 50 34.8	44 32.5 29 49 34.1	2
3	45 12.7 19 57 41.2	45 06.9 20 56 40.5	44 54.4 22 55 39.1	44 47.9 22 54 38.5	44 41.0 24 52 37.7	44 34.0 24 52 37.0	44 11.3 26 50 35.0	44 03.2 27 49 34.3	3
4	44 38.4 17 57 41.3	44 33.1 18 56 40.6	44 21.6 20 55 39.3	44 15.5 21 54 38.6	44 09.2 22 53 37.9	44 02.6 22 52 37.2	43 41.4 25 50 35.2	43 33.9 26 49 34.5	4
55	44 04.1 16 57 41.5	43 59.2 17 57 40.8	43 48.7 18 55 39.4	43 43.1 19 54 38.7	43 37.2 20 53 38.0	43 31.1 21 53 37.4	43 11.4 23 50 35.4	43 04.4 24 49 34.7	55
6	43 29.6 14 58 41.6	43 25.2 15 57 40.9	43 15.7 17 55 39.5	43 10.5 18 54 38.9	43 05.1 18 54 38.2	42 59.5 19 53 37.5	42 41.3 21 50 35.5	42 34.7 22 50 34.8	6
7	42 55.1 13 58 41.7	42 51.2 14 57 41.0	42 42.5 15 55 39.7	42 37.9 16 55 39.0	42 33.0 17 54 38.3	42 27.8 18 53 37.7	42 11.0 20 51 35.7	42 05.0 21 50 35.0	7
8	42 20.5 11 58 41.8	42 17.0 12 57 41.1	42 09.3 14 55 39.8	42 05.1 14 55 39.1	42 00.7 15 54 38.4	41 56.0 16 53 37.8	41 40.7 18 51 35.8	41 35.1 19 50 35.1	8
9	41 45.9 10 58 41.9	41 42.8 11 57 41.2	41 36.1 12 56 39.9	41 32.3 13 55 39.2	41 28.4 14 54 38.5	41 24.2 14 53 37.9	41 10.3 17 51 35.9	41 05.2 17 50 35.3	9
60	41 11.2 08 58 41.9	41 08.6 09 57 41.3	41 02.7 11 56 39.9	40 59.5 11 55 39.3	40 56.0 12 54 38.6	40 52.2 13 53 38.0	40 39.7 15 51 36.0	40 35.1 16 50 35.4	60
1	40 36.4 07 58 42.0	40 34.3 08 57 41.3	40 29.3 09 56 40.0	40 26.5 10 55 39.4	40 23.3 10 54 38.7	40 20.2 11 53 38.1	40 09.2 13 51 36.1	40 05.0 14 50 35.5	1
2	40 01.7 06 58 42.0	40 00.0 06 57 41.3	39 55.9 07 56 40.1	39 53.5 08 55 39.4	39 51.0 09 54 38.8	39 48.1 09 53 38.1	39 38.5 12 51 36.2	39 34.9 13 50 35.6	2
3	39 26.9 04 58 42.1	39 25.6 05 57 41.4	39 22.4 06 56 40.1	39 20.5 07 55 39.5	39 18.4 07 54 38.8	39 16.1 08 54 38.2	39 07.8 10 51 36.3	39 04.6 11 50 35.6	3
4	38 52.0 02 58 42.1	38 51.2 03 57 41.5	38 48.9 05 56 40.2	38 47.5 05 55 39.5	38 45.8 06 54 38.9	38 43.9 07 54 38.2	38 37.0 09 51 36.3	38 34.3 09 51 35.7	4
65	38 17.2 01 58 42.1	38 16.8 02 57 41.5	38 15.4 03 56 40.2	38 14.4 04 55 39.6	38 13.2 04 54 38.9	38 11.7 05 54 38.3	38 06.2 07 51 36.4	38 04.0 08 51 35.8	65
6	37 42.3 00 58 42.1	37 42.4 00 57 41.5	37 41.8 02 55 40.2	37 41.3 02 55 39.6	37 41.0 03 55 38.9	37 39.5 04 54 38.3	37 35.5 06 51 36.4	37 33.6 06 51 35.8	6
7	37 07.5 02 58 42.1	37 08.0 01 57 41.5	37 08.3 00 56 40.2	37 08.2 01 56 39.6	37 07.8 01 54 39.0	37 07.3 02 54 38.3	37 04.5 04 51 36.5	37 03.2 05 51 35.9	7
8	36 32.7 03 58 42.1	36 33.6 03 57 41.5	36 34.7 01 56 40.2	36 35.0 01 55 39.6	36 35.2 00 54 39.0	36 35.1 01 54 38.3	36 33.6 03 52 36.5	36 32.8 03 51 35.9	8
9	35 57.9 05 58 42.1	35 59.2 04 57 41.4	36 01.2 03 56 40.2	36 01.9 02 55 39.6	36 02.5 01 55 39.0	36 02.8 01 54 38.3	36 02.7 01 52 36.5	36 02.3 02 51 35.9	9
70	35 23.1 06 58 42.0	35 24.8 05 57 41.4	35 27.7 04 56 40.2	35 28.8 04 55 39.6	35 29.8 03 54 38.9	35 30.6 02 54 38.3	35 31.8 00 52 36.5	35 31.9 00 51 35.9	70
1	34 48.3 07 58 42.0	34 50.4 07 57 41.3	34 54.1 05 56 40.1	34 55.7 05 55 39.5	34 57.1 04 54 38.9	34 58.4 04 54 38.3	35 00.9 02 51 36.5	35 01.4 01 51 35.9	1
2	34 13.6 09 58 41.9	34 16.1 08 57 41.3	34 20.7 07 56 40.1	34 22.7 06 55 39.5	34 24.5 05 54 38.9	34 26.2 05 54 38.2	34 30.0 02 51 36.5	34 31.0 01 51 35.9	2
3	33 38.9 10 58 41.8	33 41.8 10 57 41.2	33 47.2 08 56 40.0	33 49.6 08 55 39.4	33 51.9 07 54 38.8	33 54.0 07 54 38.2	33 59.2 05 51 36.4	34 00.5 04 51 35.8	3
4	33 04.3 11 58 41.8	33 07.6 11 57 41.2	33 13.8 10 56 40.0	33 16.7 09 55 39.4	33 19.3 09 54 38.8	33 21.8 08 54 38.2	33 28.3 06 51 36.4	33 30.1 06 51 35.8	4
75	32 29.7 13 58 41.7	32 33.4 12 57 41.1	32 40.4 11 56 39.9	32 43.7 11 55 39.3	32 46.8 10 54 38.7	32 49.7 09 53 38.1	32 57.5 08 51 36.4	32 59.7 07 51 35.8	75
6	31 55.1 14 57 41.6	31 59.3 14 57 41.0	32 07.1 13 56 39.8	32 10.8 12 55 39.2	32 14.3 11 53 38.7	32 17.6 11 53 38.1	32 26.7 09 51 36.3	32 29.4 09 51 35.7	6
7	31 20.7 15 57 41.5	31 25.2 15 57 40.9	31 33.9 14 55 39.8	31 37.9 13 55 39.2	31 41.9 13 54 38.6	31 45.6 12 53 38.0	31 56.0 11 51 36.3	31 59.1 10 50 35.7	7
8	30 46.3 17 57 41.4	30 51.2 16 57 40.8	31 00.7 15 55 39.7	31 05.2 15 55 39.1	31 09.5 14 54 38.5	31 13.7 14 53 37.9	31 25.2 12 51 36.2	31 28.8 12 50 35.6	8
9	30 12.0 18 57 41.3	30 17.3 18 56 40.7	30 27.5 17 55 39.6	30 32.4 16 54 39.0	30 37.2 16 54 38.5	30 41.8 15 53 37.8	30 54.6 14 51 36.1	30 58.6 13 50 35.5	9
80	29 37.8 19 57 41.2	29 43.5 19 56 40.6	29 54.5 18 55 39.5	29 59.6 17 54 38.8	30 04.9 17 54 38.3	30 09.9 16 53 37.7	30 24.0 15 51 36.0	30 28.4 14 50 35.4	80
1	29 03.6 21 57 41.0	29 09.7 20 56 40.4	29 21.5 19 55 39.3	29 27.2 19 54 38.8	29 32.8 18 53 38.2	29 38.2 18 53 37.5	29 53.5 16 51 35.9	29 58.3 16 50 35.4	1
2	28 29.6 22 57 40.9	28 36.1 21 56 40.3	28 48.6 21 55 39.2	28 54.7 20 54 38.6	29 00.7 20 53 38.1	29 06.5 19 53 37.5	29 23.0 18 51 35.8	29 28.3 17 50 35.3	2
3	27 55.6 23 56 40.7	28 02.5 23 56 40.2	28 15.8 22 54 39.1	28 22.3 21 54 38.5	28 28.7 21 53 38.0	28 34.9 20 52 37.4	28 52.7 19 50 35.7	28 58.3 19 50 35.2	3
4	27 21.8 24 56 40.6	27 29.0 24 56 40.0	27 43.2 23 54 38.9	27 50.0 23 54 38.4	27 56.8 22 53 37.8	28 03.4 22 52 37.3	28 22.4 20 50 35.6	28 28.4 20 50 35.0	4
85	26 48.0 26 56 40.4	26 55.7 26 55 39.9	27 10.6 24 54 38.8	27 17.8 24 54 38.3	27 24.9 24 53 37.7	27 31.9 23 52 37.1	27 52.2 22 50 35.5	27 58.6 21 50 34.9	85
6	26 14.4 27 56 40.2	26 22.4 26 55 39.7	26 38.1 26 54 38.6	26 45.7 25 53 38.1	26 53.2 25 53 37.4	27 00.6 24 52 37.0	27 22.1 23 49 35.4	27 28.9 23 49 34.8	6
7	25 40.9 28 56 40.1	25 49.3 28 55 39.5	26 05.7 27 54 38.4	26 13.7 27 53 37.9	26 21.6 26 52 37.4	26 29.4 26 52 36.8	26 52.0 25 50 35.2	26 59.3 24 49 34.7	7
8	25 07.6 29 55 39.9	25 16.3 29 55 39.3	25 33.5 28 54 38.1	25 41.9 28 53 37.7	25 50.2 27 52 37.2	25 58.3 27 52 36.7	26 22.1 25 49 35.1	26 29.8 25 49 34.5	8
9	24 34.3 31 55 39.7	24 43.4 30 55 39.0	25 01.3 29 53 38.1	25 10.1 29 53 37.5	25 18.8 29 52 37.0	25 27.4 28 51 36.5	25 52.3 27 49 34.9	26 00.4 27 49 34.4	9
90	24 01.2 32 55 39.5	24 10.7 31 54 39.0	24 29.3 31 53 37.9	24 38.5 30 52 37.4	24 47.6 30 52 36.9	24 56.5 30 51 36.3	25 22.7 29 49 34.8	25 31.2 28 49 34.2	90

H.A.	54° 30' Alt. Δd Δt / Az.	55° 00' Alt. Δd Δt / Az.	56° 00'	56° 30'	57° 00'	57° 30'	59° 00'	59° 30'	H.A.
00	5 30.0 1.00 180.0	5 00.0 1.00 180.0							00
1	5 29.7 1.001 179.4								1
2	5 28.9 1.002 178.8								2
3	5 27.6 1.003 178.3								3
4	5 25.8 1.004 177.7								4
05	5 23.4 1.005 177.1								05
6	5 20.5 1.006 176.5								6
7	5 17.1 99 07 175.9								7
8	5 13.1 99 07 175.3								8
9	5 08.6 99 08 174.8								9
10	5 03.6 99 09 174.2								10

DECLINATION SAME NAME AS LATITUDE

H.A.	54° 30' Alt. Δd Δt / Az.	55° 00'	56° 00'	56° 30'	57° 00'	57° 30'	59° 00'	59° 30'	H.A.
91	23 28.2 33 55 39.3	23 38.1 83 54 38.8	23 57.5 32 53 37.7	24 07.0 32 52 37.2	24 16.5 31 52 36.7	24 25.8 31 51 36.2	24 53.1 30 49 34.6	25 02.0 29 48 34.1	91
2	22 55.4 34 54 39.1	23 05.6 34 54 38.5	23 25.8 33 53 37.5	23 35.7 33 52 37.0	23 45.5 33 51 36.5	23 55.2 32 51 36.0	24 23.7 31 49 34.4	24 33.0 31 48 33.9	2
3	22 22.8 35 54 38.8	22 33.3 35 54 38.3	22 54.2 34 52 37.3	23 04.5 34 52 36.8	23 14.6 34 51 36.3	23 24.7 33 51 35.8	23 54.4 32 49 34.2	24 04.0 32 48 33.7	3
4	21 50.3 37 54 38.6	22 01.2 36 53 38.1	22 22.8 36 52 37.1	22 33.4 35 52 36.6	22 44.0 35 51 36.1	22 54.4 35 50 35.6	23 25.2 34 48 34.0	23 35.3 33 48 33.5	4
95	21 17.9 38 54 38.4	21 29.2 37 53 37.9	21 51.5 37 52 36.9	22 02.5 37 51 36.4	22 13.4 36 51 35.9	22 24.3 36 50 35.4	22 56.2 35 48 33.9	23 06.6 35 48 33.3	95
6	20 45.7 39 53 38.1	20 57.4 39 53 37.7	21 20.4 38 52 36.7	21 31.8 38 51 36.2	21 43.1 37 50 35.7	21 54.3 37 50 35.2	22 27.3 36 48 33.7	22 38.1 36 47 33.2	6
7	20 13.7 40 53 37.9	20 25.7 40 52 37.4	20 49.4 39 51 36.4	21 01.2 39 51 35.9	21 12.8 39 50 35.4	21 24.4 38 49 34.9	21 58.6 38 48 33.5	22 09.8 37 47 33.0	7
8	19 41.9 41 53 37.6	19 54.2 41 52 37.2	20 18.7 40 51 36.2	20 30.8 40 50 35.7	20 42.8 40 50 35.2	20 54.7 40 49 34.7	21 30.0 39 47 33.2	21 41.6 38 47 32.7	8
9	19 10.3 42 52 37.4	19 22.9 42 52 36.9	19 48.1 42 51 35.9	20 00.5 41 50 35.5	20 12.9 41 50 35.0	20 25.2 41 49 34.5	21 01.6 40 47 33.0	21 13.6 40 46 32.5	9
100	18 38.8 44 52 37.1	18 51.8 43 52 36.6	19 17.7 43 50 35.7	19 30.5 43 50 35.2	19 43.2 42 49 34.7	19 55.9 42 49 34.3	20 33.4 41 47 32.8	20 45.7 41 46 32.3	100
1	18 07.5 45 52 36.9	18 20.9 44 51 36.4	18 47.5 44 50 35.4	19 00.6 44 49 35.0	19 13.7 44 49 34.5	19 26.7 43 48 34.0	20 05.3 43 46 32.6	20 18.0 42 46 32.1	1
2	17 36.5 46 51 36.6	17 50.2 46 51 36.1	18 17.4 45 50 35.2	18 30.9 45 49 34.7	18 44.4 45 49 34.2	18 57.8 44 48 33.8	19 37.4 44 46 32.3	19 50.5 43 46 31.9	2
3	17 05.6 47 51 36.3	17 19.7 47 51 35.8	17 47.6 46 49 34.9	18 01.5 46 49 34.4	18 15.2 46 48 34.0	18 29.0 46 48 33.5	19 09.7 45 46 32.1	19 23.2 45 45 31.6	3
4	16 34.9 48 51 36.0	16 49.3 48 50 35.6	17 18.0 47 49 34.6	17 32.2 47 48 34.2	17 46.3 47 48 33.7	18 00.4 47 47 33.2	18 42.2 46 46 31.8	18 56.0 46 45 31.4	4
105	16 04.5 49 50 35.7	16 19.2 49 50 35.3	16 48.5 49 49 34.4	17 03.1 48 48 33.9	17 17.6 48 48 33.4	17 32.0 48 47 33.0	18 14.9 47 45 31.6	18 29.1 47 45 31.1	105
6	15 34.3 50 50 35.4	15 49.3 50 49 35.0	16 19.3 50 48 34.1	16 34.2 50 48 33.6	16 49.1 49 47 33.2	17 03.8 49 47 32.7	17 47.8 49 45 31.3	18 02.3 48 44 30.9	6
7	15 04.3 51 50 35.1	15 19.7 51 49 34.7	15 50.3 51 48 33.8	16 05.6 51 47 33.3	16 20.7 51 47 32.9	16 35.9 50 46 32.4	17 20.9 50 44 31.1	17 35.8 50 44 30.6	7
8	14 34.5 53 49 34.8	14 50.2 52 49 34.4	15 21.6 52 48 33.5	15 37.1 52 47 33.0	15 52.6 52 46 32.6	16 08.1 51 46 32.1	16 54.2 51 44 30.8	17 09.4 51 44 30.3	8
9	14 05.0 54 49 34.5	14 21.0 53 48 34.0	14 53.0 53 47 33.2	15 08.9 53 47 32.7	15 24.8 53 46 32.3	15 40.6 53 46 31.8	16 27.7 52 44 30.5	16 43.3 52 43 30.1	9
110	13 35.7 55 48 34.2	13 52.1 55 48 33.7	14 24.7 54 47 32.9	14 40.9 54 46 32.4	14 57.1 54 46 32.0	15 13.3 54 45 31.6	16 01.4 53 43 30.2	16 17.3 53 43 29.8	110
1	13 06.6 56 48 33.8	13 23.3 56 47 33.4	13 56.6 55 46 32.5	14 13.2 55 46 32.1	14 29.7 55 45 31.7	14 46.2 55 45 31.2	15 35.4 54 43 29.9	15 51.6 54 42 29.5	1
2	12 37.8 57 48 33.5	12 54.9 57 47 33.1	13 28.8 56 46 32.2	13 45.7 56 45 31.8	14 02.6 56 45 31.4	14 19.4 56 44 30.9	15 09.5 55 43 29.7	15 26.2 55 42 29.2	2
3	12 09.3 58 47 33.1	12 26.6 58 47 32.7	13 01.2 57 46 31.9	13 18.4 57 45 31.5	13 35.6 57 44 31.1	13 52.8 57 44 30.6	14 43.9 57 42 29.4	15 00.9 56 42 28.9	3
4	11 41.0 59 47 32.8	11 58.7 59 46 32.4	12 33.9 59 45 31.6	12 51.4 58 45 31.1	13 09.0 58 44 30.7	13 26.4 58 44 30.3	14 18.6 58 42 29.1	14 35.9 58 41 28.6	4
115	11 13.0 60 46 32.4	11 31.0 60 46 32.0	12 06.8 60 45 31.2	12 24.7 60 44 30.8	12 42.5 59 44 30.4	13 00.3 59 43 30.0	13 53.5 59 41 28.7	14 11.1 59 41 28.3	115
6	10 45.3 61 46 32.1	11 03.6 61 45 31.7	11 40.0 61 44 30.9	11 58.2 61 44 30.5	12 16.4 60 43 30.1	12 34.5 60 43 29.7	13 28.6 60 41 28.4	13 46.6 60 40 28.0	6
7	10 17.8 62 45 31.7	10 36.4 62 45 31.3	11 13.5 62 44 30.5	11 32.0 62 43 30.1	11 50.5 62 43 29.7	12 08.9 61 42 29.3	13 04.0 61 41 28.1	13 22.3 61 40 27.7	7
8	9 50.6 63 45 31.4	10 09.5 63 44 31.0	10 47.2 63 43 30.2	11 06.1 63 43 29.8	11 24.8 63 42 29.4	11 43.6 62 42 29.0	12 39.7 62 40 27.8	12 58.3 62 40 27.4	8
9	9 23.7 64 44 31.0	9 42.9 64 44 30.6	10 21.3 64 43 29.8	10 40.4 64 42 29.4	10 59.5 64 42 29.0	11 18.6 64 41 28.6	12 15.6 63 40 27.5	12 34.5 63 39 27.1	9
120	8 57.1 65 44 30.6	9 16.6 65 43 30.2	9 55.6 65 42 29.4	10 15.0 65 42 29.1	10 34.4 65 41 28.7	10 53.8 65 41 28.3	11 51.8 64 39 27.2	12 11.0 64 39 26.7	120
1	8 30.8 66 43 30.2	8 50.6 66 43 29.8	9 30.2 66 42 29.1	9 49.9 66 41 28.7	10 09.6 66 41 28.3	10 29.3 66 40 27.9	11 28.2 65 39 26.8	11 47.8 65 38 26.4	1
2	8 04.8 67 43 29.8	8 24.9 67 42 29.5	9 05.1 67 41 28.7	9 25.1 67 41 28.3	9 45.1 67 40 27.9	10 05.1 67 40 27.6	11 04.9 66 38 26.4	11 24.8 66 38 26.0	2
3	7 39.1 68 42 29.4	7 59.5 68 42 29.1	8 40.3 68 41 28.3	9 00.6 68 40 27.9	9 20.9 68 40 27.6	9 41.2 68 39 27.2	10 42.0 67 38 26.1	11 02.2 67 37 25.7	3
4	7 13.7 69 42 29.0	7 34.4 69 41 28.7	8 15.8 69 40 27.9	8 36.4 69 40 27.6	8 57.0 69 39 27.2	9 17.6 69 39 26.8	10 19.3 68 37 25.7	10 39.8 68 37 25.4	4
125	6 48.7 70 41 28.6	7 09.7 70 41 28.3	7 51.6 70 40 27.5	8 12.5 70 39 27.2	8 33.4 70 39 26.8	8 54.3 70 38 26.5	9 56.9 69 37 25.3	10 17.7 69 36 25.0	125
6	6 24.0 71 41 28.2	6 45.2 71 40 27.9	7 27.7 71 39 27.1	7 48.9 71 39 26.8	8 10.1 71 38 26.4	8 31.3 71 38 26.1	9 34.7 70 36 25.0	9 55.8 70 36 24.6	6
7	5 59.6 72 40 27.8	6 21.1 72 40 27.4	7 04.2 72 39 26.7	7 25.7 72 38 26.4	7 47.2 72 38 26.0	8 08.6 72 37 25.7	9 12.9 71 36 24.6	9 34.3 71 35 24.3	7
8	5 35.5 73 40 27.4	5 57.3 73 39 27.0	6 41.0 73 38 26.3	7 02.7 73 38 26.0	7 24.5 73 37 25.6	7 46.3 72 37 25.3	8 51.4 72 35 24.3	9 13.1 72 35 23.9	8
9	5 11.8 74 39 26.9	5 33.9 74 38 26.6	6 18.1 74 38 25.9	6 40.1 74 37 25.6	7 02.2 73 37 25.2	7 24.2 73 36 24.9	8 30.3 73 35 23.9	8 52.2 73 34 23.5	9
130		5 10.8 75 38 26.2	5 55.5 75 37 25.5	6 17.9 74 37 25.2	6 40.2 74 36 24.8	7 02.5 74 36 24.5	8 09.4 74 34 23.5	8 31.6 74 34 23.2	130
1			5 33.3 75 36 25.1	5 55.9 75 36 24.8	6 18.5 75 36 24.4	6 41.1 75 35 24.1	7 48.8 75 34 23.1	8 11.4 75 33 22.8	1
2			5 11.5 76 36 24.7	5 34.3 76 35 24.3	5 57.2 76 35 24.0	6 20.1 76 35 23.7	7 28.6 76 33 22.7	7 51.4 76 33 22.4	2
3				5 13.1 77 35 23.9	5 36.3 77 34 23.6	5 59.4 77 34 23.3	7 06.7 77 33 22.3	7 31.8 77 32 22.0	3
4					5 15.6 78 34 23.2	5 39.0 78 33 22.9	6 49.2 78 32 21.9	7 12.5 78 32 21.6	4
135						5 19.0 79 33 22.4	6 29.9 79 31 21.5	6 53.6 79 31 21.2	135
6							6 11.1 80 31 21.1	6 35.0 80 30 20.8	6
7							5 52.6 80 30 20.7	6 16.7 80 30 20.4	7
8							5 34.4 81 30 20.3	5 58.8 81 29 20.0	8
9							5 16.6 82 29 19.8	5 41.2 82 29 19.5	9
140								5 24.0 83 28 19.1	140
1								5 07.1 84 28 18.7	1

Lat. 30°

Alt. columns give ° ′ Δd Δt ; Az. columns give °.

H.A.	60° 00′ Alt.	Az.	60° 30′ Alt.	Az.	62° 00′ Alt.	Az.	62° 30′ Alt.	Az.	63° 00′ Alt.	Az.	69° 00′ Alt.	Az.	69° 30′ Alt.	Az.	74° 30′ Alt.	Az.	H.A.
00	60 00.0 1.001	00.0	59 30.0 1.001	00.0	58 00.0 1.001	00.0	57 30.0 1.001	00.0	57 00.0 1.001	00.0	51 00.0 1.000	00.0	50 30.0 1.000	00.0	45 30.0 1.000	00.0	00
1	59 59.5 1.002	01.0	59 29.6 1.002	01.0	57 59.6 1.002	00.9	57 29.6 1.002	00.9	56 59.6 1.002	00.8	50 59.7 1.001	00.6	50 29.8 1.001	00.6	45 29.8 1.001	00.4	1
2	59 58.2 1.004	02.0	59 28.2 1.004	01.9	57 58.1 1.003	01.7	57 28.4 1.003	01.7	56 58.5 1.003	01.7	50 59.0 1.002	01.1	50 29.0 1.002	01.1	45 29.3 1.001	00.8	2
3	59 55.9 1.005	03.0	59 26.0 1.005	02.9	57 56.4 1.005	02.7	57 26.5 1.005	02.6	56 56.6 1.004	02.5	50 57.7 1.003	01.7	50 27.8 1.003	01.7	45 28.4 1.002	01.1	3
4	59 52.8 99 07	04.0	59 23.0 99 07	03.9	57 53.6 99 06	03.5	57 23.8 99 06	03.4	56 54.0 99 06	03.3	50 55.9 1.004	02.3	50 26.0 1.004	02.2	45 27.2 1.003	01.5	4
05	59 48.7 99 08	05.0	59 19.0 99 08	04.8	57 50.0 99 07	04.4	57 20.3 99 07	04.3	56 50.6 99 07	04.1	50 53.6 99 05	02.8	50 23.8 99 05	02.7	45 25.7 99 03	01.9	05
6	59 43.8 98 10	06.0	59 14.2 98 09	05.8	57 45.6 99 09	05.3	57 16.0 99 08	05.1	56 46.4 99 08	05.0	50 50.7 99 06	03.4	50 21.0 99 05	03.3	45 23.8 99 04	02.3	6
7	59 37.9 98 11	06.9	59 08.6 98 11	06.7	57 40.4 98 10	06.1	57 11.0 98 10	06.0	56 41.6 98 09	05.8	50 47.4 99 06	04.0	50 17.8 99 06	03.8	45 21.6 99 04	02.7	7
8	59 31.2 97 13	07.9	59 02.1 97 12	07.7	57 34.5 97 11	07.0	57 05.2 98 11	06.8	56 36.0 98 11	06.6	50 43.6 98 07	04.5	50 14.1 98 07	04.4	45 19.0 99 05	03.0	8
9	59 23.7 96 14	08.8	58 54.7 96 14	08.6	57 27.8 97 12	07.8	56 58.7 97 12	07.6	56 29.7 97 12	07.4	50 39.2 98 06	05.1	50 09.9 98 06	04.9	45 16.1 98 05	03.4	9
10	59 15.3 96 15	09.8	58 46.6 96 15	09.5	57 20.3 96 14	08.7	56 51.5 96 13	08.4	56 22.6 96 13	08.2	50 34.4 97 09	05.6	50 05.2 97 09	05.4	45 12.8 98 06	03.8	10
1	59 06.0 95 17	10.7	58 37.6 95 16	10.4	57 12.1 95 15	09.5	56 43.5 95 14	09.2	56 14.9 95 14	09.0	50 29.0 97 10	06.2	50 00.0 97 09	06.0	45 09.2 97 07	04.1	1
2	58 56.0 94 18	11.6	58 27.8 94 18	11.3	57 03.1 94 16	10.3	56 34.8 94 16	10.0	56 06.4 95 15	09.7	50 23.2 96 11	06.7	49 54.4 96 10	06.5	45 05.3 97 07	04.5	2
3	58 45.1 93 19	12.5	58 17.3 93 19	12.2	56 53.4 93 17	11.1	56 25.4 94 17	10.8	55 57.3 94 16	10.5	50 16.9 95 11	07.2	49 48.3 95 11	07.0	45 01.0 96 08	04.9	3
4	58 33.4 92 21	13.4	58 05.9 92 20	13.0	56 43.0 92 19	11.9	56 15.3 93 18	11.6	55 47.5 93 18	11.3	50 10.1 94 12	07.8	49 41.7 95 12	07.5	44 56.4 96 08	05.2	4
15	58 21.0 90 22	14.3	57 53.8 91 21	13.9	56 31.9 91 20	12.7	56 04.5 92 19	12.4	55 37.0 92 19	12.0	50 02.8 94 13	08.3	49 34.7 94 12	08.0	44 51.5 95 09	05.6	15
6	58 07.8 89 23	15.1	57 41.0 89 23	14.7	56 20.1 90 21	13.5	55 53.0 90 20	13.1	55 25.8 91 20	12.7	49 55.1 93 14	08.8	49 27.2 93 13	08.5	44 46.3 94 09	06.0	6
7	57 53.9 88 24	16.0	57 27.5 88 24	15.5	56 07.7 89 22	14.3	55 40.9 89 21	13.9	55 14.1 90 21	13.5	49 46.9 92 14	09.3	49 19.3 92 14	09.0	44 40.8 93 10	06.3	7
8	57 39.2 87 26	16.8	57 13.2 87 25	16.3	55 54.5 88 23	15.0	55 28.1 88 22	14.6	55 01.7 88 22	14.2	49 38.2 91 15	09.8	49 10.9 91 15	09.5	44 34.9 93 10	06.7	8
9	57 23.9 85 27	17.6	56 58.3 86 26	17.1	55 40.8 87 24	15.7	55 14.7 87 23	15.3	54 48.6 87 23	14.9	49 29.1 90 16	10.3	49 02.1 90 15	10.0	44 28.7 92 11	07.0	9
20	57 07.8 84 28	18.4	56 42.6 84 27	17.9	55 26.4 85 25	16.4	55 00.7 86 24	16.0	54 35.0 86 24	15.5	49 19.6 89 17	10.8	48 52.8 89 16	10.5	44 22.2 91 11	07.3	20
1	56 51.1 82 29	19.1	56 26.4 83 28	18.6	55 11.4 84 26	17.1	54 46.1 84 25	16.7	54 20.8 85 25	16.2	49 09.6 88 17	11.3	48 43.1 88 17	11.0	44 15.4 90 12	07.7	1
2	56 33.8 81 30	19.9	56 09.5 81 29	19.3	54 55.8 83 27	17.8	54 30.9 83 26	17.3	54 06.0 83 26	16.9	48 59.1 87 18	11.8	48 33.0 87 18	11.4	44 08.3 89 12	08.0	2
3	56 15.8 79 31	20.6	55 52.0 80 30	20.1	54 39.6 81 28	18.5	54 15.2 82 27	18.0	53 50.7 82 26	17.5	48 48.3 86 19	12.3	48 22.5 86 18	11.9	44 00.9 89 13	08.3	3
4	55 57.2 78 32	21.3	55 33.9 78 31	20.7	54 22.8 80 29	19.1	53 58.8 80 28	18.6	53 34.8 80 27	18.1	48 37.1 85 19	12.7	48 11.6 85 19	12.3	43 53.2 87 13	08.7	4
25	55 38.1 76 33	22.0	55 15.2 77 32	21.4	54 05.5 78 30	19.8	53 42.0 79 29	19.2	53 18.3 79 28	18.7	48 25.4 84 19	13.2	48 00.3 84 19	12.8	43 45.3 86 14	09.0	25
6	55 18.4 75 34	22.6	54 55.9 75 33	22.1	53 47.6 77 31	20.4	53 24.6 77 30	19.9	53 01.4 78 29	19.3	48 13.3 82 21	13.6	47 48.6 82 20	13.2	43 37.0 85 14	09.3	6
7	54 58.1 73 35	23.3	54 36.1 73 34	22.7	53 29.3 75 31	21.0	53 06.7 76 31	20.4	52 44.0 76 30	19.9	48 00.9 81 21	14.1	47 36.6 81 21	13.6	43 28.4 84 15	09.6	7
8	54 37.3 71 36	23.9	54 15.8 72 35	23.3	53 10.4 73 32	21.6	52 48.3 74 31	21.0	52 26.0 75 31	20.5	47 48.1 80 22	14.5	47 24.1 80 21	14.1	43 19.6 83 15	09.9	8
9	54 15.9 70 36	24.5	53 55.0 70 36	23.9	52 51.1 72 33	22.1	52 29.4 72 32	21.6	52 07.6 73 31	21.0	47 34.9 78 23	14.9	47 11.3 79 22	14.5	43 10.5 82 16	10.2	9
30	53 54.1 68 37	25.1	53 33.7 68 36	24.5	52 31.3 70 34	22.7	52 10.1 71 33	22.1	51 48.8 71 32	21.5	47 21.3 77 23	15.3	46 58.2 77 23	14.9	43 01.2 81 16	10.5	30
1	53 31.8 66 38	25.7	53 11.9 67 37	25.0	52 11.0 69 35	23.2	51 50.3 69 34	22.6	51 29.5 70 33	22.1	47 07.4 76 24	15.7	46 44.7 76 23	15.3	42 51.5 79 16	10.8	1
2	53 09.1 64 39	26.2	52 49.7 65 38	25.6	51 50.3 67 35	23.7	51 30.1 68 34	23.1	51 09.8 68 34	22.6	46 53.1 74 24	16.1	46 30.8 75 24	15.6	42 41.6 78 17	11.1	2
3	52 45.9 63 39	26.7	52 27.0 63 38	26.1	51 29.2 65 36	24.2	51 09.5 66 35	23.6	50 49.6 67 34	23.0	46 38.5 73 25	16.5	46 16.6 73 24	16.0	42 31.5 77 17	11.4	3
4	52 22.3 61 40	27.3	52 04.0 62 39	26.6	51 07.6 64 37	24.7	50 48.4 64 36	24.1	50 29.1 65 35	23.5	46 23.6 71 25	16.9	46 02.1 72 25	16.4	42 21.1 76 18	11.7	4
35	51 58.4 59 41	27.7	51 40.5 60 40	27.1	50 45.7 62 37	25.2	50 27.0 63 36	24.6	50 08.2 63 35	24.0	46 08.3 70 26	17.3	45 47.3 70 25	16.7	42 10.5 74 18	11.9	35
6	51 34.0 57 41	28.2	51 16.6 58 40	27.6	50 23.4 60 38	25.6	50 05.2 61 37	25.0	49 46.9 62 36	24.4	45 52.8 68 26	17.6	45 32.2 69 26	17.1	41 59.6 73 18	12.2	6
7	51 09.2 56 42	28.7	50 52.4 56 41	28.0	50 00.7 59 38	26.1	49 43.1 59 38	25.5	49 25.2 60 37	24.8	45 36.9 67 27	18.0	45 16.8 67 26	17.4	41 48.5 71 19	12.5	7
8	50 44.1 54 42	29.1	50 27.8 55 42	28.4	49 37.7 57 39	26.5	49 20.6 57 38	25.9	49 03.2 58 37	25.2	45 20.7 65 27	18.3	45 01.1 66 27	17.8	41 37.2 70 19	12.7	8
9	50 18.7 52 43	29.5	50 02.9 53 42	28.9	49 14.4 56 39	26.9	48 57.7 56 39	26.3	48 40.9 56 38	25.6	45 04.3 64 28	18.6	44 45.1 64 27	18.1	41 25.7 69 20	13.0	9
40	49 52.9 50 43	29.9	49 37.7 51 43	29.3	48 50.7 53 40	27.3	48 34.6 54 39	26.7	48 18.3 55 38	26.0	44 47.5 62 28	18.9	44 28.8 63 28	18.4	41 13.9 67 20	13.2	40
1	49 26.9 49 44	30.3	49 12.2 49 43	29.6	48 26.7 52 40	27.7	48 11.1 52 40	27.0	47 55.3 53 39	26.4	44 30.5 60 29	19.2	44 12.3 61 28	18.7	41 01.9 66 20	13.4	1
2	49 00.5 47 44	30.7	48 46.3 48 44	30.0	48 02.4 50 41	28.0	47 47.4 51 40	27.4	47 32.1 51 39	26.7	44 13.3 59 29	19.5	43 55.5 59 28	19.0	40 49.7 64 21	13.7	2
3	48 33.9 45 45	31.0	48 20.2 46 44	30.3	47 37.9 48 41	28.4	47 23.3 49 40	27.7	47 08.6 50 40	27.1	43 55.8 57 30	19.8	43 38.5 58 29	19.3	40 37.4 63 21	13.9	3
4	48 07.0 43 45	31.3	47 53.8 44 44	30.7	47 13.1 46 42	28.7	46 59.0 47 41	28.0	46 44.8 48 40	27.4	43 38.0 56 30	20.1	43 21.2 56 29	19.6	40 24.8 61 21	14.1	4
45	47 39.8 42 46	31.7	47 27.2 42 45	31.0	46 48.0 45 42	29.0	46 34.5 45 41	28.4	46 20.7 46 40	27.7	43 20.0 54 30	20.4	43 03.7 55 30	19.8	40 12.0 60 22	14.3	45
6	47 12.4 40 46	32.0	47 00.3 41 45	31.3	46 22.7 43 43	29.3	46 09.7 44 42	28.7	45 56.4 44 41	28.0	43 01.8 52 31	20.6	42 46.0 53 30	20.1	39 59.1 58 22	14.5	6
7	46 44.8 38 46	32.3	46 33.2 39 46	31.6	45 57.1 41 43	29.6	45 44.6 42 42	28.9	45 31.9 43 41	28.3	42 43.4 51 31	20.9	42 28.1 51 30	20.3	39 46.0 57 22	14.7	7
8	46 16.9 36 47	32.5	46 05.9 37 46	31.9	45 31.3 40 43	29.9	45 19.4 40 42	29.2	45 07.2 41 42	28.6	42 24.7 49 31	21.1	42 09.9 50 31	20.6	39 32.7 55 22	14.9	8
9	45 48.9 35 47	32.8	45 38.4 36 46	32.1	45 05.4 38 44	30.1	44 53.9 39 43	29.4	44 42.2 39 42	28.8	42 05.9 47 32	21.4	41 51.6 48 31	20.8	39 19.2 53 23	15.1	9
50	45 20.7 33 47	33.0	45 10.7 34 46	32.4	44 39.2 36 44	30.4	44 28.3 37 43	29.7	44 17.1 38 42	29.1	41 46.8 46 32	21.6	41 33.1 46 31	21.0	39 05.6 52 23	15.3	50
1	44 52.3 31 48	33.2	44 42.8 32 47	32.6	44 12.8 34 44	30.6	44 02.4 35 43	29.9	43 51.8 36 42	29.3	41 27.6 44 32	21.8	41 14.3 45 31	21.2	38 51.8 50 23	15.5	1
2	44 23.7 30 48	33.5	44 14.7 30 47	32.8	43 46.3 33 44	30.8	43 36.4 33 44	30.2	43 26.2 34 43	29.5	41 08.2 42 33	22.0	40 55.4 43 32	21.4	38 37.9 49 24	15.6	2
3	43 55.0 28 48	33.7	43 46.5 29 47	33.0	43 19.6 31 45	31.0	43 10.2 32 44	30.4	43 00.4 32 43	29.7	40 48.7 41 33	22.2	40 36.4 41 32	21.6	38 23.8 47 24	15.8	3
4	43 26.1 26 48	33.9	43 18.1 27 48	33.2	42 52.7 29 45	31.2	42 43.8 30 44	30.6	42 34.7 31 43	29.9	40 28.9 39 33	22.4	40 17.2 40 32	21.8	38 09.6 45 24	16.0	4
55	42 57.1 25 49	34.0	42 49.6 25 48	33.4	42 25.7 28 45	31.4	42 17.3 28 44	30.8	42 08.7 29 44	30.1	40 09.1 37 33	22.6	39 57.8 38 33	22.0	37 55.2 44 24	16.1	55
6	42 27.9 23 49	34.2	42 20.9 24 48	33.5	41 58.6 26 45	31.6	41 50.7 27 45	30.9	41 42.6 27 44	30.3	39 49.0 36 34	22.8	39 38.3 36 33	22.1	37 40.7 42 24	16.3	6
7	41 58.7 21 49	34.3	41 52.2 22 48	33.7	41 31.3 24 46	31.7	41 23.9 25 45	31.1	41 16.3 26 44	30.4	39 28.9 34 34	22.9	39 18.6 34 33	22.3	37 26.1 40 25	16.4	7
8	41 29.3 20 49	34.5	41 23.3 20 48	33.8	41 03.9 23 46	31.9	40 57.1 23 45	31.2	40 50.0 24 44	30.6	39 08.6 32 34	23.1	38 58.8 33 33	22.5	37 11.4 39 25	16.5	8
9	40 59.9 18 49	34.6	40 54.3 19 48	34.0	40 36.5 21 46	32.0	40 30.1 22 45	31.4	40 23.5 22 44	30.7	38 48.1 30 34	23.2	38 38.9 31 33	22.6	36 56.6 37 25	16.7	9
60	40 30.3 16 49	34.7	40 25.3 17 49	34.1	40 08.9 19 46	32.1	40 03.0 20 45	31.5	39 56.9 21 44	30.9	38 27.6 29 34	23.3	38 18.9 29 34	22.7	36 41.6 35 25	16.8	60
1	40 00.7 15 50	34.8	39 56.1 16 49	34.2	39 41.2 18 46	32.2	39 35.8 18 45	31.6	39 30.2 19 45	31.0	38 07.0 27 35	23.5	37 58.7 28 34	22.9	36 26.6 34 26	16.9	1
2	39 31.0 13 50	34.9	39 26.9 14 49	34.3	39 13.4 16 46	32.3	39 08.5 17 46	31.7	39 03.4 17 45	31.1	37 46.2 25 35	23.6	37 38.5 26 34	23.0	36 11.4 32 25	17.0	2
3	39 01.2 12 50	35.0	38 57.6 12 49	34.3	38 45.6 14 47	32.4	38 41.2 15 46	31.8	38 36.5 16 45	31.2	37 25.4 24 35	23.7	37 18.2 24 34	23.1	35 56.2 30 26	17.1	3
4	38 31.4 10 50	35.1	38 28.3 11 49	34.4	38 17.7 13 47	32.5	38 13.7 13 46	31.9	38 09.6 14 45	31.3	37 04.4 22 35	23.8	36 57.7 23 34	23.2	35 40.9 29 26	17.2	4
65	38 01.5 08 50	35.1	37 58.9 09 49	34.5	37 49.7 11 47	32.6	37 46.2 12 46	32.0	37 42.6 13 45	31.3	36 43.4 20 35	23.9	36 37.2 21 34	23.3	35 25.4 27 26	17.3	65
6	37 31.6 07 50	35.2	37 29.4 08 49	34.5	37 21.7 10 47	32.7	37 18.7 10 46	32.0	37 15.5 11 45	31.4	36 22.3 19 35	24.0	36 16.6 19 34	23.4	35 10.0 25 26	17.4	6
7	37 01.7 05 50	35.2	37 00.0 06 49	34.6	36 53.6 08 47	32.7	36 51.1 09 46	32.1	36 48.4 09 45	31.5	36 01.2 17 35	24.1	35 56.0 18 35	23.5	34 54.4 23 26	17.5	7
8	36 31.7 04 50	35.2	36 30.5 04 49	34.6	36 25.4 06 47	32.8	36 23.5 07 46	32.1	36 21.3 08 45	31.5	35 39.9 15 35	24.1	35 35.3 14 35	23.6	34 38.8 22 26	17.6	8
9	36 01.7 02 50	35.3	36 00.9 03 49	34.6	35 57.4 05 47	32.8	35 55.9 05 46	32.2	35 54.1 06 45	31.6	35 18.6 14 36	24.2	35 14.5 14 35	23.6	34 23.1 20 26	17.6	9
70	35 31.7 01 50	35.3	35 31.4 01 49	34.6	35 29.3 03 47	32.8	35 28.2 04 46	32.2	35 26.9 05 45	31.6	34 57.3 12 36	24.3	34 53.7 12 35	23.7	34 07.4 18 26	17.7	70
1	35 01.7 01 50	35.3	35 01.8 00 49	34.7	35 01.1 02 47	32.8	35 00.5 02 46	32.2	34 59.7 03 45	31.6	34 36.0 10 36	24.3	34 32.8 11 35	23.7	33 51.6 17 26	17.7	1
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3	34 01.7 04 50	35.2	34 02.8 03 49	34.6	34 04.8 01 47	32.8	34 05.1 01 46	32.2	34 05.2 00 45	31.6	33 53.1 07 36	24.4	33 51.0 07 35	23.8	33 19.9 13 27	17.8	3
4	33 31.8 05 50	35.2	33 33.2 05 49	34.6	33 36.6 03 47	32.8	33 37.4 02 46	32.2	33 38.0 02 45	31.6	33 31.6 05 36	24.4	33 30.0 06 35	23.8	33 04.0 12 27	17.9	4
75	33 01.8 07 50	35.2	33 03.7 06 49	34.6	33 08.5 04 47	32.8	33 09.7 04 46	32.2	33 10.8 03 45	31.6	33 10.2 04 36	24.4	33 09.0 04 35	23.8	32 48.0 10 27	17.9	75
6	32 31.9 08 50	35.1	32 34.3 08 49	34.5	32 40.4 05 48	32.8	32 42.0 05 46	32.1	32 43.5 05 45	31.6	32 48.7 02 36	24.4	32 48.0 03 35	23.8	32 32.1 08 27	17.9	6
7	32 02.0 10 50	35.1	32 04.8 09 49	34.5	32 12.2 07 47	32.7	32 14.4 07 46	32.1	32 16.4 06 45	31.5	32 27.2 00 36	24.4	32 27.0 01 35	23.8	32 16.1 06 27	17.9	7
8	31 32.2 11 50	35.0	31 35.4 11 49	34.4	31 44.2 09 47	32.7	31 46.7 08 46	32.1	31 49.2 08 45	31.5	32 05.7 01 36	24.4	32 06.0 01 35	23.9	32 00.1 05 27	18.0	8
9	31 02.4 12 50	34.9	31 06.1 12 49	34.4	31 16.1 10 47	32.6	31 19.2 10 46	32.0	31 22.0 09 45	31.5	31 44.2 03 36	24.4	31 45.0 02 35	23.8	31 44.0 03 27	18.0	9
80	30 32.7 14 49	34.9	30 36.8 13 49	34.3	30 48.1 12 47	32.6	30 51.6 11 46	32.0	30 54.9 11 45	31.4	31 22.7 05 36	24.4	31 24.0 04 35	23.8	31 28.0 01 27	18.0	80
1	30 03.0 15 49	34.8	30 07.5 15 49	34.2	30 20.2 13 46	32.5	30 24.1 12 46	31.9	30 27.7 12 45	31.3	31 01.2 06 36	24.4	31 03.0 06 35	23.8	31 12.0 00 27	18.0	1
2	29 33.4 17 49	34.7	29 38.1 16 49	34.1	29 52.3 15 46	32.4	29 56.7 14 46	31.8	30 00.9 14 45	31.2	30 39.8 08 36	24.4	30 42.0 07 35	23.8	30 55.9 02 27	18.0	2
3	29 03.8 18 49	34.6	29 09.2 18 48	34.0	29 24.5 16 46	32.3	29 29.3 16 45	31.8	29 33.9 15 45	31.2	30 18.3 09 36	24.3	30 21.1 09 35	23.8	30 39.9 04 27	18.0	3
4	28 34.4 20 49	34.5	28 40.2 19 48	33.9	28 56.7 18 46	32.2	29 01.9 17 45	31.7	29 07.0 17 45	31.1	29 57.0 11 36	24.3	30 00.2 10 35	23.7	30 23.9 05 27	17.9	4
85	28 05.0 21 49	34.4	28 11.2 20 48	33.8	28 29.0 19 46	32.1	28 34.7 19 45	31.6	28 40.2 18 45	31.0	29 35.6 13 36	24.2	29 39.3 12 35	23.7	30 07.9 07 27	17.9	85
6	27 35.7 22 49	34.2	27 42.3 22 48	33.8	28 01.4 20 45	32.0	28 07.5 20 45	31.5	28 13.5 20 44	30.9	29 14.3 14 35	24.2	29 18.4 14 35	23.6	29 51.9 09 27	17.9	6
7	27 06.5 24 48	34.1	27 13.5 23 48	33.6	27 33.9 22 46	31.9	27 40.4 22 45	31.3	27 46.8 21 44	30.8	28 53.0 16 35	24.1	28 57.6 15 35	23.6	29 35.9 10 27	17.9	7
8	26 37.4 25 48	34.0	26 44.9 25 48	33.4	27 06.5 23 46	31.8	27 13.4 23 45	31.3	27 20.2 23 44	30.7	28 31.8 17 35	24.1	28 36.9 17 34	23.5	29 20.0 12 27	17.8	8
9	26 08.4 26 48	33.8	26 16.3 26 47	33.3	26 39.1 25 45	31.7	26 46.5 24 45	31.1	26 53.7 24 44	30.6	28 10.7 19 35	24.0	28 16.2 18 34	23.4	29 04.1 14 26	17.8	9
0	25 39.5 28 48	33.7	25 47.8 27 47	33.2	26 11.9 26 45	31.5	26 19.7 26 45	31.0	26 27.3 25 44	30.5	27 49.6 20 35	23.9	27 55.6 20 34	23.4	28 48.2 16 26	17.8	0

Lat. 30°

Alt. columns give: ° ′ Δd Δt ; Az. column gives: °

H.A.	60° 00′ Alt.	Az.	60° 30′ Alt.	Az.	62° 00′ Alt.	Az.	62° 30′ Alt.	Az.	63° 00′ Alt.	Az.	69° 00′ Alt.	Az.	69° 30′ Alt.	Az.	74° 30′ Alt.	Az.	H.A.
91	25 10.8 29 48	33.5	25 19.4 29 47	33.0	25 44.7 28 45	31.4	25 52.9 27 44	30.9	26 01.0 27 44	30.3	27 28.5 22 35	23.8	27 35.0 21 34	23.3	28 32.4 17 26	17.7	91
2	24 42.1 30 48	33.4	24 51.2 30 47	32.8	25 17.7 29 45	31.3	25 26.3 29 44	30.7	25 34.8 28 43	30.2	27 07.6 23 35	23.7	27 14.5 23 34	23.1	28 16.6 18 26	17.7	2
3	24 13.6 32 47	33.2	24 23.1 31 47	32.7	24 50.8 30 45	31.1	24 59.8 30 44	30.6	25 08.8 30 43	30.1	26 46.7 25 35	23.6	26 54.1 24 34	23.1	28 00.9 20 26	17.6	3
4	23 45.2 33 47	33.0	23 55.1 33 46	32.5	24 24.0 32 44	30.9	24 33.5 31 44	30.4	24 42.8 31 43	29.9	26 25.9 26 35	23.5	26 33.8 26 34	23.0	27 45.2 22 26	17.5	4
95	23 17.0 34 47	32.8	23 27.2 34 46	32.3	23 57.4 33 44	30.8	24 07.2 33 44	30.3	24 17.0 32 43	29.7	26 05.2 28 34	23.4	26 13.5 27 34	22.9	27 29.6 23 26	17.5	95
6	22 48.9 36 47	32.6	22 59.5 35 46	32.1	23 30.8 34 44	30.6	23 41.1 34 43	30.1	23 51.2 34 43	29.6	25 44.6 29 34	23.3	25 53.4 29 33	22.8	27 14.0 25 26	17.4	6
7	22 20.9 37 46	32.5	22 31.9 37 46	31.9	23 04.5 36 44	30.4	23 15.1 35 43	29.9	23 25.6 35 42	29.4	25 24.1 31 34	23.2	25 33.3 30 33	22.7	26 58.5 26 26	17.3	7
8	21 53.1 38 46	32.2	22 04.5 38 45	31.7	22 38.2 37 44	30.2	22 49.3 37 43	29.7	23 00.2 36 42	29.2	25 03.7 32 34	23.1	25 13.3 32 33	22.5	26 43.1 28 26	17.2	8
9	21 25.5 39 46	32.0	21 37.3 39 45	31.5	22 12.1 38 43	30.1	22 23.6 38 43	29.6	22 34.9 38 42	29.1	24 43.4 34 34	22.9	24 53.5 33 33	22.4	26 27.7 30 25	17.1	9
100	20 58.0 41 46	31.8	21 10.2 40 45	31.3	21 46.2 40 43	29.9	21 58.0 39 42	29.4	22 09.7 39 42	28.9	24 23.2 35 33	22.8	24 33.7 35 33	22.3	26 12.5 31 25	17.1	100
1	20 30.7 42 45	31.6	20 43.2 41 45	31.1	21 20.4 41 43	29.7	21 32.6 41 42	29.2	21 44.7 40 41	28.7	24 03.1 37 33	22.7	24 14.0 36 33	22.1	25 57.3 33 25	17.0	1
2	20 03.5 43 45	31.4	20 16.5 43 44	30.9	20 54.8 42 42	29.4	21 07.4 42 42	29.0	21 19.9 42 41	28.5	23 43.2 38 33	22.5	23 54.5 38 32	22.0	25 42.1 34 25	16.9	2
3	19 36.6 44 45	31.1	19 49.9 44 44	30.7	20 29.3 43 42	29.2	20 42.3 43 42	28.7	20 55.2 43 41	28.3	23 23.4 39 33	22.4	23 35.1 39 32	21.9	25 27.1 36 25	16.8	3
4	19 09.8 46 44	30.9	19 23.4 45 44	30.4	20 04.0 45 42	29.0	20 17.4 44 41	28.5	20 30.7 44 41	28.1	23 03.7 41 33	22.2	23 15.8 40 32	21.7	25 12.2 37 25	16.7	4
105	18 43.2 47 44	30.7	18 57.2 47 43	30.2	19 38.9 46 42	28.8	19 52.6 46 41	28.3	20 06.3 45 40	27.8	22 44.1 42 32	22.0	22 56.7 42 32	21.6	24 57.3 39 25	16.5	105
6	18 16.8 48 44	30.4	18 31.2 48 43	29.9	19 14.0 47 41	28.6	19 28.1 47 41	28.1	19 42.1 47 40	27.6	22 24.6 43 32	21.9	22 37.7 43 31	21.4	24 42.6 40 24	16.4	6
7	17 50.6 49 43	30.1	18 05.3 49 43	29.7	18 49.2 48 41	28.3	19 03.7 48 40	27.9	19 18.1 48 40	27.4	22 05.4 45 32	21.7	22 18.8 45 31	21.2	24 27.9 41 24	16.3	7
8	17 24.6 50 43	29.9	17 39.7 50 42	29.4	18 24.7 50 41	28.1	18 39.5 49 40	27.6	18 54.3 49 39	27.2	21 46.2 46 32	21.5	22 00.0 46 31	21.1	24 13.4 43 24	16.2	8
9	16 58.8 52 43	29.6	17 14.3 51 42	29.2	18 00.3 51 40	27.8	18 15.5 51 40	27.4	18 30.7 50 39	26.9	21 27.2 48 31	21.4	21 41.4 47 31	20.9	23 59.0 44 24	16.1	9
110	16 33.2 53 42	29.4	16 49.0 53 42	28.9	17 36.2 52 40	27.6	17 51.8 52 39	27.1	18 07.3 52 39	26.7	21 08.4 49 31	21.2	21 23.0 49 30	20.7	23 44.7 46 24	15.9	110
1	16 07.9 54 42	29.1	16 24.0 54 41	28.6	17 12.1 53 40	27.3	17 28.2 53 39	26.9	17 44.1 53 38	26.4	20 49.7 50 31	21.0	21 04.7 50 30	20.5	23 30.5 47 23	15.8	1
2	15 42.7 55 42	28.8	15 59.2 55 41	28.4	16 48.5 54 39	27.0	17 04.8 54 39	26.6	17 21.0 54 38	26.2	20 31.2 51 31	20.8	20 46.6 51 30	20.3	23 16.4 49 23	15.6	2
3	15 17.8 56 41	28.5	15 34.7 56 41	28.1	16 25.0 56 39	26.8	16 41.6 55 38	26.3	16 58.2 55 38	25.9	20 12.8 53 30	20.6	20 28.6 53 30	20.1	23 02.4 50 23	15.5	3
4	14 53.1 57 41	28.2	15 10.3 57 40	27.8	16 01.7 57 38	26.5	16 18.7 57 38	26.1	16 35.6 56 37	25.6	19 54.6 54 30	20.4	20 10.8 54 29	19.9	22 48.6 51 23	15.4	4
115	14 28.7 59 40	27.9	14 46.2 58 40	27.5	15 38.6 58 38	26.2	15 56.0 58 38	25.8	16 13.3 58 37	25.4	19 36.6 55 30	20.2	19 53.2 55 29	19.7	22 34.9 53 23	15.2	115
6	14 04.5 60 40	27.6	14 22.4 60 39	27.2	15 15.8 59 38	25.9	15 33.5 59 37	25.5	15 51.1 59 37	25.1	19 18.8 57 29	20.0	19 35.8 56 29	19.5	22 21.4 54 22	15.1	6
7	13 40.6 61 40	27.3	13 58.8 61 39	26.9	14 53.1 60 37	25.6	15 11.2 60 37	25.2	15 29.2 60 36	24.8	19 01.2 58 29	19.7	19 18.5 58 28	19.3	22 07.9 55 22	14.9	7
8	13 16.9 62 39	27.0	13 35.4 62 39	26.6	14 30.8 61 37	25.4	14 49.2 61 36	24.9	15 07.5 61 36	24.5	18 43.7 59 29	19.5	19 01.4 59 28	19.1	21 54.6 57 22	14.7	8
9	12 53.4 63 39	26.7	13 12.3 63 38	26.3	14 08.7 62 36	25.1	14 27.4 62 36	24.6	14 46.0 62 35	24.2	18 26.5 60 28	19.3	18 44.5 60 28	18.9	21 41.5 58 22	14.6	9
120	12 30.2 64 38	26.3	12 49.4 64 38	25.9	13 46.8 64 36	24.7	14 05.8 63 36	24.3	14 24.8 63 35	24.0	18 09.4 61 28	19.1	18 27.8 61 28	18.6	21 28.5 59 21	14.4	120
1	12 07.3 65 38	26.0	12 26.8 65 37	25.6	13 25.1 65 36	24.4	13 44.5 64 35	24.0	14 03.8 64 35	23.7	17 52.5 63 28	18.8	18 11.3 62 27	18.4	21 15.7 60 21	14.2	1
2	11 44.7 66 37	25.7	12 04.5 66 37	25.3	13 03.5 66 35	24.1	13 23.5 66 35	23.7	13 43.1 65 34	23.3	17 35.8 64 27	18.6	17 54.9 64 27	18.2	21 03.0 62 21	14.1	2
3	11 22.3 67 37	25.3	11 42.5 67 36	24.9	12 42.7 67 35	23.8	13 02.7 67 34	23.4	13 22.7 67 34	23.0	17 19.4 65 27	18.4	17 38.8 65 27	18.0	20 50.4 63 21	13.9	3
4	11 00.2 68 36	25.0	11 20.7 68 36	24.6	12 21.8 68 34	23.5	12 42.2 68 34	23.1	13 02.5 68 33	22.7	17 03.1 66 27	18.1	17 22.9 66 26	17.7	20 38.0 64 20	13.7	4
125	10 38.4 69 36	24.6	10 59.2 69 35	24.3	12 01.3 69 34	23.2	12 21.9 69 33	22.8	12 42.5 69 33	22.4	16 47.1 67 26	17.9	17 07.2 67 26	17.5	20 25.8 65 20	13.5	125
6	10 16.9 70 35	24.3	10 38.0 70 35	23.9	11 41.0 70 33	22.8	12 01.9 70 33	22.5	12 22.8 70 32	22.1	16 31.3 68 26	17.6	16 51.7 68 25	17.2	20 13.8 67 20	13.3	6
7	9 55.7 71 35	23.9	10 17.1 71 34	23.6	11 21.0 71 33	22.5	11 42.2 71 32	22.1	12 03.4 71 32	21.8	16 15.7 69 26	17.3	16 36.4 69 25	17.0	20 01.9 68 20	13.1	7
8	9 34.8 72 34	23.6	9 56.4 72 34	23.3	11 01.2 72 32	22.1	11 22.8 72 32	21.8	11 44.3 72 31	21.4	16 00.3 70 25	17.1	16 21.4 70 25	16.7	19 50.2 69 19	12.9	8
9	9 14.2 73 34	23.2	9 36.1 73 33	22.8	10 41.8 73 32	21.8	11 03.6 73 31	21.4	11 25.5 73 31	21.1	15 45.1 71 25	16.8	16 06.6 71 24	16.5	19 38.6 70 19	12.7	9
130	8 53.9 74 33	22.8	9 16.1 74 33	22.5	10 22.6 74 31	21.4	10 44.8 74 31	21.1	11 06.9 74 30	20.8	15 30.2 73 24	16.6	15 52.0 72 24	16.2	19 27.2 71 19	12.5	130
1	8 33.9 75 33	22.4	8 56.4 75 32	22.1	10 03.8 75 31	21.1	10 26.2 75 30	20.8	10 48.6 75 30	20.4	15 15.5 74 24	16.3	15 37.6 73 24	15.9	19 16.1 72 18	12.3	1
2	8 14.2 76 32	22.1	8 37.0 76 32	21.7	9 45.3 76 30	20.7	10 08.0 76 30	20.4	10 30.7 76 29	20.1	15 01.1 75 24	16.0	15 23.4 74 23	15.7	19 05.0 73 18	12.1	2
3	7 54.9 77 32	21.7	8 17.9 77 31	21.4	9 27.0 77 30	20.4	9 50.0 77 29	20.0	10 13.0 77 29	19.7	14 46.9 76 23	15.7	15 09.5 75 23	15.4	18 54.2 74 18	11.9	3
4	7 35.9 78 31	21.3	7 59.2 78 31	21.0	9 09.1 78 29	20.0	9 32.3 78 29	19.7	9 55.6 77 28	19.4	14 32.9 77 23	15.4	14 55.9 76 22	15.1	18 43.6 75 17	11.7	4
135	7 17.2 79 31	20.9	7 40.8 79 30	20.6	8 51.5 78 29	19.6	9 15.0 78 28	19.3	9 38.5 78 28	19.0	14 19.2 77 22	15.2	14 42.4 77 22	14.8	18 33.1 76 17	11.5	135
6	6 58.8 80 30	20.5	7 22.7 79 30	20.2	8 34.2 79 28	19.3	8 58.0 79 28	18.9	9 21.8 79 27	18.6	14 05.7 78 22	14.9	14 29.2 78 22	14.6	18 22.9 77 17	11.3	6
7	6 40.8 80 29	20.1	7 04.9 80 29	19.8	8 17.2 80 28	18.9	8 41.3 80 27	18.6	9 05.3 80 27	18.3	13 52.5 79 22	14.6	14 16.3 79 21	14.3	18 12.8 78 16	11.1	7
8	6 23.1 81 29	19.7	6 47.5 81 28	19.4	8 00.5 81 27	18.5	8 24.9 81 27	18.2	8 49.2 81 26	17.9	13 39.6 80 21	14.3	14 03.6 80 21	14.0	18 02.9 79 16	10.8	8
9	6 05.8 82 28	19.3	6 30.4 82 28	19.0	7 44.2 82 27	18.1	8 08.8 82 26	17.8	8 33.4 82 26	17.5	13 26.9 81 21	14.0	13 51.2 81 20	13.7	17 53.2 80 16	10.6	9
140	5 48.9 83 28	18.8	6 13.7 83 27	18.6	7 28.2 83 26	17.7	7 53.1 83 26	17.4	8 17.9 83 25	17.2	13 14.4 82 20	13.7	13 39.0 82 20	13.4	17 43.8 81 15	10.4	140
1	5 32.3 84 27	18.4	5 57.4 84 27	18.2	7 12.6 84 26	17.3	7 37.7 84 25	17.0	8 02.7 83 25	16.8	13 02.3 83 20	13.4	13 27.1 83 19	13.1	17 34.5 82 15	10.2	1
2	5 16.0 84 26	18.0	5 41.3 84 26	17.7	6 57.3 84 25	16.9	7 22.6 84 25	16.7	7 47.9 84 24	16.4	12 50.4 84 19	13.1	13 15.5 84 19	12.8	17 25.4 83 15	09.9	2
3	5 00.1 85 26	17.6	5 25.7 85 25	17.3	6 42.3 85 24	16.5	7 07.9 85 24	16.3	7 33.4 85 24	16.0	12 38.8 85 19	12.8	13 04.1 84 18	12.5	17 16.6 84 14	09.7	3
4			5 10.4 86 25	16.9	6 27.7 86 24	16.1	6 53.5 86 23	15.9	7 19.2 86 23	15.6	12 27.4 85 18	12.5	12 53.0 85 18	12.2	17 07.9 85 14	09.5	4
145					6 13.5 87 23	15.7	6 39.5 87 23	15.5	7 05.4 87 22	15.2	12 16.4 86 18	12.1	12 42.2 86 18	11.9	16 59.5 85 14	09.2	145
6					5 59.6 87 23	15.3	6 25.8 87 22	15.1	6 52.0 87 22	14.8	12 05.6 87 18	11.8	12 31.6 86 17	11.6	16 51.3 86 13	09.0	6
7					5 46.1 88 22	14.9	6 12.5 88 22	14.7	6 38.9 88 21	14.4	11 55.1 88 17	11.5	12 21.3 87 17	11.3	16 43.3 87 13	08.7	7
8					5 32.9 89 21	14.5	5 59.5 89 21	14.2	6 26.1 89 21	14.0	11 44.8 88 17	11.2	12 11.3 88 16	10.9	16 35.5 88 13	08.5	8
9					5 20.1 89 21	14.1	5 46.9 89 20	13.8	6 13.7 89 20	13.6	11 34.9 89 16	10.9	12 01.6 89 16	10.6	16 27.9 89 12	08.3	9
150					5 07.6 90 20	13.6	5 34.7 90 20	13.4	6 01.7 90 19	13.2	11 25.3 90 16	10.5	11 52.2 90 15	10.3	16 20.6 89 12	08.0	150
1							5 22.8 91 19	13.0	5 50.0 90 19	12.8	11 15.9 90 15	10.2	11 43.0 90 15	10.0	16 13.5 90 12	07.8	1
2							5 11.3 91 19	12.6	5 38.7 91 18	12.4	11 06.8 91 15	09.9	11 34.1 91 14	09.7	16 06.6 91 11	07.5	2
3							5 00.2 92 18	12.1	5 27.7 92 18	11.9	10 58.1 92 14	09.5	11 25.6 92 14	09.3	15 59.9 91 11	07.3	3
4									5 17.2 92 17	11.5	10 49.6 92 14	09.2	11 17.3 92 13	09.0	15 53.4 92 10	07.0	4
155									5 07.0 93 16	11.1	10 41.5 93 13	08.9	11 09.3 93 13	08.7	15 47.2 92 10	06.7	155
6											10 33.6 93 13	08.5	11 01.6 93 12	08.3	15 41.2 93 10	06.5	6
7											10 26.1 94 12	08.2	10 54.2 94 12	08.0	15 35.5 94 09	06.2	7
8											10 18.8 94 12	07.8	10 47.1 94 11	07.7	15 30.0 94 09	06.0	8
9											10 11.9 95 11	07.5	10 40.3 95 11	07.3	15 24.7 95 08	05.7	9
160											10 05.2 95 11	07.2	10 33.9 95 10	07.0	15 19.7 95 08	05.4	160
1											9 58.9 96 10	06.8	10 27.7 96 10	06.7	15 14.8 96 08	05.2	1
2											9 52.9 96 09	06.5	10 21.8 96 09	06.3	15 10.3 96 07	04.9	2
3											9 47.3 97 09	06.1	10 16.2 97 09	06.0	15 06.0 96 07	04.6	3
4											9 41.9 97 08	05.8	10 11.0 97 08	05.6	15 01.9 96 06	04.4	4
165											9 36.8 97 08	05.4	10 06.1 97 08	05.3	14 58.0 97 06	04.1	165
6											9 32.1 98 07	05.0	10 01.4 98 07	04.9	14 54.4 98 06	03.8	6
7											9 27.7 98 07	04.7	9 57.1 98 07	04.6	14 51.1 98 05	03.6	7
8											9 23.6 98 06	04.3	9 53.1 98 06	04.2	14 48.0 98 05	03.3	8
9											9 19.9 99 06	04.0	9 49.4 99 06	03.9	14 45.1 99 04	03.0	9
170											9 16.4 99 05	03.6	9 46.1 99 05	03.5	14 42.5 99 04	02.8	170
1											9 13.3 99 05	03.3	9 43.0 99 05	03.2	14 40.1 99 04	02.5	1
2											9 10.5 99 04	02.9	9 40.3 99 04	02.8	14 38.0 99 03	02.2	2
3											9 08.1 99 04	02.5	9 37.9 99 03	02.5	14 36.1 99 03	01.9	3
4											9 05.9 1.0 03	02.2	9 35.8 1.0 03	02.1	14 34.5 1.0 02	01.7	4
175											9 04.1 1.0 02	01.8	9 34.1 1.0 02	01.4	14 33.1 1.0 02	01.4	175
6											9 02.6 1.0 02	01.5	9 32.6 1.0 02	01.4	14 32.0 1.0 01	01.1	6
7											9 01.5 1.0 01	01.1	9 31.4 1.0 01	01.1	14 31.1 1.0 01	00.8	7
8											9 00.7 1.0 01	00.7	9 30.6 1.0 01	00.7	14 30.5 1.0 01	00.6	8
9											9 00.2 1.0 01	00.4	9 30.2 1.0 00	00.4	14 30.1 1.0 00	00.3	9
180											9 00.0 1.0 00	00.0	9 30.0 1.0 00	00.0	14 30.0 1.0 00	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 30°

AZ.	4° Dec.	4° H.A.	8° Dec.	8° H.A.	12° Dec.	12° H.A.	16° Dec.	16° H.A.	20° Dec.	20° H.A.	24° Dec.	24° H.A.	28° Dec.	28° H.A.	32° Dec.	32° H.A.	36° Dec.	36° H.A.	40° Dec.	40° H.A.	44° Dec.	44° H.A.	AZ.
00	64	180	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	76	00	00
4	64	171	68	170	72	168	76	164	79	159	83	148	86	119	86	59	83	28	79	17	76	12	4
8	63	162	67	160	71	156	74	151	78	142	81	128	83	104	83	72	81	46	78	31	75	22	8
12	62	154	65	150	69	146	72	139	75	130	78	116	79	98	80	76	78	56	76	41	73	31	12
16	60	147	63	142	67	137	70	130	72	121	75	109	76	94	76	78	75	62	74	48	71	38	16
20	58	140	61	136	64	130	67	123	69	114	71	104	72	92	73	78	72	65	71	53	69	43	20
24	55	134	59	129	61	124	64	117	66	109	68	100	69	89	69	78	69	67	68	56	66	47	24
28	53	129	56	124	58	119	61	112	63	105	64	97	66	88	66	78	66	68	65	59	64	50	28
32	50	124	53	120	55	114	58	108	59	102	61	94	62	86	63	78	63	69	62	60	61	52	32
36	47	120	50	116	52	111	54	105	56	99	58	92	59	85	59	77	59	69	59	61	58	54	36
40	44	117	47	112	49	107	51	102	53	96	54	90	55	83	56	76	56	69	56	62	56	55	40
44	41	113	43	109	46	104	47	99	49	94	51	88	52	82	52	75	53	69	53	62	53	56	44
48	38	110	40	106	42	101	44	97	46	91	47	86	48	80	49	74	50	68	50	62	50	56	48
52	35	107	37	103	39	99	41	94	42	89	44	84	45	79	46	74	46	68	47	62	47	56	52
56	31	105	33	101	35	97	37	92	39	88	40	83	41	78	43	72	43	67	44	62	44	56	56
60	28	102	30	98	32	94	34	90	35	86	37	81	38	76	39	71	40	66	41	61	41	56	60
64	24	100	26	96	28	92	30	88	32	84	33	80	35	75	36	70	37	65	38	61	38	56	64
68	21	98	23	94	25	90	27	86	28	82	30	78	31	74	33	69	34	65	35	60	35	55	68
72	18	96	20	92	21	88	23	84	25	80	27	76	28	72	29	68	31	63	32	59	33	54	72
76	14	94	16	90	18	86	20	83	22	79	23	75	25	71	26	67	28	62	29	58	30	54	76
80	11	92	13	88	15	84	16	81	18	77	20	73	22	69	23	65	25	61	26	57	27	53	80
84	07	90	09	86	11	82	13	79	15	75	17	71	18	68	20	64	22	60	23	56	24	52	84
88	04	88	06	84	08	81	10	77	12	73	13	70	15	66	17	62	19	59	20	55	22	51	88
92	00	86	02	82	04	79	06	75	08	72	10	68	12	64	14	61	16	57	17	53	19	49	92
96	*03*	84	01	80	01	77	03	73	05	70	07	66	09	63	11	59	13	56	15	52	16	48	96
100	*07*	81	*05*	78	02	75	00	71	02	68	04	64	06	61	08	57	10	54	12	50	14	47	100
104	*10*	79	*08*	76	*06*	73	04	69	01	66	01	62	03	59	05	56	07	52	09	49	11	45	104
108	*13*	77	*11*	74	*09*	70	*07*	67	*05*	64	*02*	60	00	57	02	54	04	51	07	47	09	44	108
112	*17*	75	*15*	72	*12*	68	*10*	65	*08*	62	*05*	58	*03*	55	01	52	02	49	04	45	07	42	112
116	*20*	73	*18*	69	*16*	66	*13*	63	*11*	59	*08*	56	*06*	53	*03*	50	01	47	02	44	04	40	116
120	*23*	70	*21*	67	*19*	63	*16*	60	*14*	57	*11*	54	*08*	51	*06*	48	*03*	45	01	42	02	39	120
124	*27*	68	*24*	64	*22*	61	*19*	58	*17*	54	*14*	51	*11*	48	*08*	45	*06*	42	*03*	39	00	37	124
128	*30*	65	*27*	61	*25*	58	*22*	55	*19*	52	*16*	49	*14*	46	*11*	43	*08*	40	*05*	37	*02*	35	128
132	*33*	62	*30*	58	*28*	55	*25*	52	*22*	49	*19*	46	*16*	43	*13*	40	*10*	38	*07*	35	*04*	32	132
136	*36*	59	*33*	55	*30*	52	*27*	49	*24*	46	*21*	43	*18*	40	*15*	38	*12*	35	*09*	33	*06*	30	136
140	*39*	55	*36*	52	*33*	49	*30*	46	*27*	43	*24*	40	*21*	37	*17*	35	*14*	32	*11*	30	*07*	28	140
144	*42*	52	*39*	48	*36*	45	*32*	42	*29*	39	*26*	37	*23*	34	*19*	32	*16*	30	*12*	27	*09*	25	144
148	*44*	48	*41*	44	*38*	41	*35*	38	*31*	36	*28*	33	*24*	31	*21*	29	*17*	27	*14*	25	*10*	23	148
152	*47*	43	*43*	40	*40*	37	*37*	34	*33*	32	*30*	30	*26*	27	*23*	26	*19*	24	*15*	22	*12*	20	152
156	*49*	38	*46*	35	*42*	32	*39*	30	*35*	28	*31*	26	*28*	24	*24*	22	*20*	21	*17*	19	*13*	17	156
160	*51*	33	*47*	30	*44*	28	*40*	25	*36*	24	*33*	22	*29*	20	*25*	19	*21*	17	*18*	16	*14*	15	160
164	*53*	27	*49*	25	*45*	23	*41*	21	*38*	19	*34*	18	*30*	16	*26*	15	*22*	14	*18*	13	*15*	12	164
168	*54*	21	*50*	19	*46*	17	*43*	16	*39*	14	*35*	13	*31*	12	*27*	11	*23*	11	*19*	10	*15*	09	168
172	*55*	14	*51*	13	*47*	12	*43*	11	*39*	10	*35*	09	*31*	08	*28*	08	*24*	07	*20*	06	*16*	06	172
176	*56*	07	*52*	06	*48*	06	*44*	05	*40*	05	*36*	05	*32*	04	*28*	04	*24*	04	*20*	03	*16*	03	176
180	*56*	00	*52*	00	*48*	00	*44*	00	*40*	00	*36*	00	*32*	00	*28*	00	*24*	00	*20*	00	*16*	00	180

4°	8°	12°	16°	20°	24°	28°	32°	36°	40°	44°

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

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 30°

AZ.	48° Dec.	H.A.	52° Dec.	H.A.	56° Dec.	H.A.	60° Dec.	H.A.	64° Dec.	H.A.	68° Dec.	H.A.	72° Dec.	H.A.	76° Dec.	H.A.	80° Dec.	H.A.	84° Dec.	H.A.	88° Dec.	H.A.	AZ.
00	72	00	68	00	64	00	60	00	56	00	52	00	48	00	44	00	40	00	36	00	32	00	00
4	72	09	68	07	64	05	60	04	56	03	52	02	48	02	44	01	40	01	36	01	32	00	4
8	71	17	67	13	63	10	60	08	56	06	52	05	48	04	44	03	40	02	36	01	32	00	8
12	70	24	66	19	63	15	59	12	55	09	51	07	48	05	44	04	40	03	36	02	32	00	12
16	68	30	65	24	62	19	58	15	55	12	51	09	47	07	43	05	40	04	36	02	32	01	16
20	66	35	64	28	60	23	57	18	54	15	50	12	47	09	43	06	39	04	36	03	32	01	20
24	64	39	62	32	59	26	56	21	53	17	49	14	46	10	43	08	39	05	35	03	32	01	24
28	62	42	60	35	57	29	55	24	52	19	49	15	45	12	42	09	39	06	35	03	32	01	28
32	60	45	58	38	56	32	53	26	50	21	48	17	45	13	42	10	38	07	35	04	32	01	32
36	57	47	56	40	54	34	52	28	49	23	47	19	44	15	41	11	38	07	35	04	32	01	36
40	55	48	53	42	52	36	50	30	48	25	45	20	43	16	40	12	37	08	35	05	32	02	40
44	52	49	51	43	50	37	48	31	46	26	44	21	42	17	39	13	37	09	34	05	31	02	44
48	49	50	49	44	48	38	46	33	45	27	43	22	41	18	39	13	36	09	34	05	31	02	48
52	47	50	46	45	45	39	44	33	43	28	42	23	40	18	38	14	36	10	34	06	31	02	52
56	44	51	44	45	43	40	42	34	41	29	40	24	39	19	37	15	35	10	33	06	31	02	56
60	41	51	41	45	41	40	41	35	40	30	39	25	38	20	36	15	35	11	33	06	31	02	60
64	39	50	39	45	39	40	39	35	38	30	37	25	36	20	35	15	34	11	32	06	31	02	64
68	36	50	36	45	37	40	37	35	36	30	36	25	35	21	34	16	33	11	32	07	31	02	68
72	33	50	34	45	34	40	35	35	35	30	34	26	34	21	33	16	33	11	32	07	31	02	72
76	31	49	32	44	32	40	33	35	33	30	33	26	33	21	32	16	32	11	31	07	30	02	76
80	28	48	29	44	30	39	31	35	31	30	31	26	31	21	31	16	31	12	31	07	30	02	80
84	26	48	27	43	28	39	29	34	29	30	30	25	30	21	30	16	31	12	30	07	30	02	84
88	23	47	24	42	26	38	27	34	28	30	28	25	29	21	30	16	30	12	30	07	30	02	88
92	21	46	22	42	23	38	25	33	26	29	27	25	28	20	29	16	29	11	30	07	30	02	92
96	18	44	20	41	21	37	23	33	24	29	25	24	27	20	28	16	28	11	29	07	30	02	96
100	16	43	18	39	19	36	21	32	23	28	24	24	25	20	27	15	28	11	29	07	30	02	100
104	13	42	15	38	17	35	19	31	21	27	23	23	24	19	26	15	27	11	28	07	29	02	104
108	11	40	13	37	15	33	17	30	19	26	21	22	23	19	25	15	26	11	28	06	29	02	108
112	09	39	11	36	13	32	16	29	18	25	20	22	22	18	24	14	26	10	28	06	29	02	112
116	07	37	09	34	12	31	14	28	16	24	19	21	21	17	23	14	25	10	27	06	29	02	116
120	05	36	07	33	10	29	13	26	15	23	18	20	20	17	22	13	25	10	27	06	29	02	120
124	03	34	06	31	08	28	11	25	14	22	16	19	19	16	22	12	24	09	27	06	29	02	124
128	01	32	04	29	07	26	10	24	12	21	15	18	18	15	21	12	24	09	26	05	29	02	128
132	*01*	30	02	27	05	25	08	22	11	19	14	17	17	14	20	11	23	08	26	05	29	02	132
136	*03*	28	*01*	25	04	23	07	20	10	18	13	16	16	13	20	10	23	08	26	05	29	02	136
140	*04*	26	*01*	23	02	21	06	19	09	17	12	14	16	12	19	09	22	07	25	04	28	01	140
144	*06*	23	*02*	21	01	19	05	17	08	15	12	13	15	11	18	09	22	06	25	04	28	01	144
148	*07*	21	*03*	19	*00*	17	04	15	07	14	11	12	14	10	18	08	21	06	25	04	28	01	148
152	*08*	18	*04*	17	*01*	15	03	14	07	12	10	10	14	09	17	07	21	05	25	03	28	01	152
156	*09*	16	*05*	15	*02*	13	02	12	06	10	10	09	13	07	17	06	21	04	24	03	28	01	156
160	*10*	13	*06*	12	*02*	11	01	10	05	09	09	07	13	06	17	05	21	04	24	02	28	01	160
164	*11*	11	*07*	10	*03*	09	01	08	05	07	09	06	13	05	16	04	20	03	24	02	28	01	164
168	*11*	08	*07*	07	*03*	07	01	06	04	05	08	05	12	04	16	03	20	02	24	01	28	00	168
172	*12*	05	*08*	05	*04*	04	*00*	04	04	04	08	03	12	02	16	02	20	01	24	01	28	00	172
176	*12*	03	*08*	02	*04*	02	*00*	02	04	02	08	02	12	01	16	01	20	01	24	00	28	00	176
180	*12*	00	*08*	00	*04*	00	*00*	00	04	00	08	00	12	00	16	00	20	00	24	00	28	00	180

48°	52°	56°	60°	64°	68°	72°	76°	80°	84°	88°

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

Lat. 31°

H.A.	0°00′ Alt.	Δd Δt	Az.	0°30′ Alt.	Δd Δt	Az.	1°00′ Alt.	Δd Δt	Az.	1°30′ Alt.	Δd Δt	Az.	2°00′ Alt.	Δd Δt	Az.	2°30′ Alt.	Δd Δt	Az.	3°00′ Alt.	Δd Δt	Az.	3°30′ Alt.	Δd Δt	Az.	H.A.
00	59 00.0	1.00 01	180.0	59 30.0	1.00 01	180.0	60 00.0	1.00 02	180.0	60 30.0	1.00 02	180.0	61 00.0	1.00 02	180.0	61 30.0	1.00 02	180.0	62 00.0	1.00 02	180.0	62 30.0	1.00 02	180.0	00
1	58 59.1	1.00 04	178.1	59 29.1	1.00 04	178.0	59 59.1	1.00 04	178.0	60 29.1	1.00 05	177.9	60 59.1	1.00 05	177.9	61 29.1	1.00 05	177.9	61 59.0	1.00 05	177.9	62 29.0	1.00 05	177.8	1
2	58 56.5	1.00 07	176.1	59 26.5	1.00 07	176.1	59 56.4	1.00 07	176.0	60 26.4	1.00 08	175.9	60 56.3	1.00 08	175.9	61 26.2	1.00 08	175.8	61 56.2	1.00 08	175.8	62 26.1	1.00 08	175.7	2
3	58 52.2	1.01 10	174.2	59 22.1	1.01 10	174.1	59 51.9	1.01 10	174.0	60 21.8	1.01 11	173.9	60 51.7	1.01 11	173.8	61 21.6	1.01 11	173.7	61 51.4	1.01 11	173.6	62 21.3	1.01 11	173.5	3
4	58 46.1	99 13	172.3	59 15.9	99 13	172.2	59 45.7	99 13	172.0	60 15.5	99 14	171.9	60 45.3	99 14	171.8	61 15.0	99 14	171.7	61 44.8	99 14	171.5	62 14.6	99 14	171.4	4
05	58 38.3	99 16	170.4	59 08.0	99 16	170.2	59 37.7	99 16	170.1	60 07.4	99 16	169.9	60 37.0	99 17	169.8	61 06.7	99 17	169.6	61 36.3	99 17	169.5	62 05.9	99 17	169.3	05
6	58 28.9	99 18	168.5	58 58.4	99 18	168.3	59 28.0	99 18	168.0	59 57.5	98 19	168.0	60 27.0	98 19	167.8	60 56.5	98 20	167.6	61 26.0	98 20	167.4	61 55.4	98 20	167.2	6
7	58 17.8	98 21	166.6	58 47.2	98 22	166.4	59 16.6	98 22	166.2	59 45.9	98 22	166.0	60 15.2	98 22	165.8	60 44.6	98 23	165.6	61 13.9	98 23	165.4	61 43.1	98 23	165.1	7
8	58 05.0	97 24	164.7	58 34.3	97 24	164.5	59 03.5	97 25	164.2	59 32.6	97 25	164.1	60 01.8	97 25	163.8	60 30.9	97 26	163.6	61 00.0	97 26	163.3	61 29.0	97 26	163.1	8
9	57 50.7	97 26	162.9	58 19.7	97 27	162.7	58 48.7	97 27	162.4	59 17.7	96 28	162.2	59 46.6	96 28	161.9	60 15.5	96 28	161.6	60 44.4	96 29	161.4	61 13.2	96 29	161.1	9
10	57 34.8	96 29	161.1	58 03.6	96 29	160.8	58 32.4	96 30	160.6	59 01.1	96 30	160.3	59 29.8	96 31	160.0	59 58.5	95 31	159.7	60 27.1	95 31	159.4	60 55.7	95 32	159.1	10
1	57 17.4	95 32	159.3	57 46.0	95 32	159.0	58 14.5	95 32	158.7	58 43.0	95 33	158.4	59 11.5	95 33	158.1	59 39.9	95 34	157.7	60 08.2	94 34	157.5	60 36.5	94 35	157.2	1
2	56 58.5	95 34	157.6	57 26.8	94 34	157.3	57 55.1	94 35	157.0	58 23.4	94 35	156.6	58 51.6	94 36	156.3	59 19.7	94 36	156.0	59 47.8	93 37	155.7	60 15.8	93 37	155.3	2
3	56 38.2	94 36	155.9	57 06.3	93 37	155.5	57 34.3	93 37	155.2	58 02.2	93 38	154.9	58 30.2	93 38	154.5	58 58.0	93 39	154.2	59 25.8	93 39	153.8	59 53.5	92 40	153.4	3
4	56 16.5	93 38	154.2	56 44.3	93 39	153.8	57 12.0	92 39	153.5	57 39.7	92 40	153.1	58 07.3	92 40	152.8	58 34.9	92 41	152.4	59 02.4	92 41	152.0	59 29.8	91 42	151.6	4
15	55 53.4	92 41	152.5	56 20.9	92 41	152.2	56 48.4	91 42	151.8	57 15.8	91 42	151.4	57 43.1	91 43	151.0	58 10.3	91 43	150.6	58 37.5	90 44	150.2	59 04.6	90 44	149.8	15
6	55 29.0	91 43	150.9	55 56.2	91 43	150.5	56 23.4	90 44	150.1	56 50.5	90 44	149.8	57 17.5	90 45	149.4	57 44.5	90 45	148.9	58 11.3	89 46	148.5	58 38.1	89 46	148.1	6
7	55 03.4	90 45	149.3	55 30.3	90 45	148.9	55 57.2	89 46	148.5	56 24.0	89 46	148.1	56 50.7	89 47	147.7	57 17.3	89 47	147.3	57 43.8	88 48	146.8	58 10.3	88 48	146.4	7
8	54 36.5	89 47	147.8	55 03.2	89 47	147.4	55 29.7	88 48	146.9	55 56.2	88 48	146.5	56 22.6	88 49	146.1	56 48.9	88 49	145.7	57 15.1	87 50	145.2	57 41.2	87 50	144.8	8
9	54 08.5	88 49	146.2	54 34.8	88 49	145.8	55 01.1	87 50	145.4	55 27.2	87 50	145.0	55 53.3	87 51	144.5	56 19.3	86 51	144.1	56 45.2	86 52	143.6	57 10.9	86 52	143.2	9
20	53 39.4	87 50	144.8	54 05.4	87 51	144.3	54 31.3	86 51	143.9	54 57.2	86 52	143.5	55 22.9	86 52	143.0	55 48.6	85 53	142.6	56 14.1	85 54	142.1	56 39.5	85 54	141.6	20
1	53 09.2	86 52	143.3	53 34.9	86 53	142.9	54 00.5	85 53	142.4	54 26.0	85 54	142.0	54 51.4	85 54	141.5	55 16.8	84 55	141.1	55 42.0	84 55	140.6	56 07.1	83 56	140.1	1
2	52 37.9	85 54	141.9	53 03.3	85 54	141.4	53 28.6	84 55	141.0	53 53.8	84 55	140.5	54 18.9	84 56	140.1	54 43.9	83 56	139.6	55 08.8	83 57	139.1	55 33.6	82 57	138.6	2
3	52 05.7	84 55	140.5	52 30.8	83 56	140.1	52 55.8	83 56	139.6	53 20.7	83 57	139.1	53 45.4	82 57	138.7	54 10.1	82 58	138.2	54 34.6	82 58	137.7	54 59.1	81 59	137.2	3
4	51 32.5	83 57	139.2	51 57.3	82 57	138.7	52 22.0	82 58	138.2	52 46.6	82 58	137.8	53 11.0	81 59	137.3	53 35.4	81 59	136.8	53 59.6	81 60	136.3	54 23.7	80 60	135.8	4
25	50 58.4	82 58	137.8	51 22.9	81 59	137.3	51 47.7	81 60	136.9	52 11.5	81 60	136.4	52 35.7	80 60	135.9	52 59.7	80 61	135.5	53 23.2	79 61	134.9	53 47.4	79 62	134.4	25
6	50 23.5	81 60	136.6	50 47.7	80 60	136.1	51 11.7	80 61	135.6	51 35.7	80 61	135.1	51 59.5	79 62	134.6	52 23.2	79 62	134.1	52 46.8	78 63	133.6	53 10.2	78 63	133.1	6
7	49 47.7	80 61	135.3	50 11.6	79 61	134.8	50 35.4	79 62	134.4	50 59.0	79 62	133.9	51 22.5	78 63	133.4	51 45.9	78 63	132.9	52 09.2	77 64	132.4	52 32.3	77 64	131.8	7
8	49 11.2	79 62	134.1	49 34.7	78 63	133.6	49 58.2	78 63	133.1	50 21.5	78 64	132.6	50 44.8	77 64	132.1	51 07.8	77 65	131.6	51 30.8	76 65	131.1	51 53.6	76 66	130.6	8
9	48 33.8	78 63	132.9	48 57.1	77 64	132.4	49 20.3	77 64	131.9	49 43.3	77 65	131.4	50 06.3	76 65	130.9	50 29.0	76 66	130.4	50 51.7	75 66	129.9	51 14.2	75 67	129.4	9
30	47 55.8	77 65	131.7	48 18.8	76 65	131.3	48 41.7	76 65	130.8	49 04.4	76 66	130.3	49 27.1	75 66	129.8	49 49.6	75 66	129.3	50 11.9	74 67	128.7	50 34.1	74 68	128.2	30
1	47 17.1	76 66	130.5	47 39.8	76 66	130.1	48 02.4	75 67	129.6	48 24.9	75 67	129.1	48 47.2	74 67	128.6	49 09.4	74 68	128.1	49 31.5	73 68	127.6	49 53.4	73 69	127.1	1
2	46 37.7	75 67	129.5	47 00.2	75 67	129.0	47 22.5	74 68	128.5	47 44.7	74 68	128.0	48 06.7	73 68	127.5	48 28.6	73 69	127.0	48 50.4	72 69	126.5	49 12.1	72 70	126.0	2
3	45 57.7	74 68	128.4	46 19.9	74 68	127.9	46 41.9	73 69	127.4	47 03.8	73 69	126.9	47 25.6	72 69	126.4	47 47.3	72 70	125.9	48 08.8	71 70	125.4	48 30.1	71 71	124.9	3
4	45 17.1	73 69	127.4	45 39.0	73 69	126.9	46 00.8	72 69	126.4	46 22.5	72 70	125.9	46 44.0	71 70	125.4	47 05.3	71 71	124.9	47 26.6	71 71	124.3	47 47.7	70 72	123.8	4
35	44 36.0	72 70	126.3	44 57.6	72 70	125.8	45 19.1	71 70	125.3	45 40.5	71 71	124.8	46 01.8	71 71	124.3	46 22.9	70 72	123.8	46 43.9	70 72	123.3	47 04.7	69 72	122.8	35
6	43 54.3	71 70	125.3	44 15.7	71 71	124.8	44 36.9	71 71	124.4	44 58.1	70 72	123.8	45 19.1	70 72	123.3	45 39.9	69 72	122.8	46 00.6	69 73	122.3	46 21.2	68 73	121.8	6
7	43 12.1	71 71	124.4	43 33.2	70 72	123.9	43 54.2	70 72	123.4	44 15.1	69 72	122.9	44 35.8	69 73	122.4	44 56.5	68 73	121.9	45 16.9	68 74	121.3	45 37.3	68 74	120.8	7
8	42 29.4	70 72	123.4	42 50.3	69 72	122.9	43 11.0	69 73	122.4	43 31.7	69 73	121.9	43 52.2	68 74	121.4	44 12.6	68 74	120.9	44 32.8	67 74	120.4	44 52.9	67 75	119.9	8
9	41 46.2	69 73	122.5	42 07.4	68 73	122.0	42 27.4	68 73	121.5	42 47.4	68 74	121.0	43 08.1	67 75	120.5	43 28.2	67 75	120.0	43 48.2	66 75	119.5	44 08.1	66 75	119.0	9
40	41 02.6	68 73	121.5	41 23.0	68 74	121.1	41 43.3	67 74	120.6	42 03.5	67 75	120.1	42 23.5	67 75	119.6	42 43.4	66 75	119.1	43 03.2	66 76	118.5	43 22.9	65 76	118.0	40
1	40 18.6	68 74	120.6	40 38.8	67 74	120.2	40 58.8	67 75	119.7	41 18.8	66 75	119.2	41 38.6	66 76	118.7	41 58.3	65 76	118.2	42 17.9	65 76	117.7	42 37.3	64 77	117.1	1
2	39 34.1	67 75	119.8	39 54.1	66 75	119.3	40 14.0	66 75	118.8	40 33.7	66 76	118.3	40 53.3	65 76	117.8	41 12.8	65 77	117.3	41 32.1	64 77	116.8	41 51.3	64 77	116.3	2
3	38 49.3	66 75	118.9	39 09.0	66 76	118.4	39 28.7	65 76	117.9	39 48.2	65 76	117.4	40 07.6	64 77	116.9	40 26.9	64 77	116.4	40 46.0	64 78	115.9	41 05.0	63 78	115.4	3
4	38 04.1	65 76	118.1	38 23.6	65 76	117.6	38 43.1	65 77	117.1	39 02.4	64 77	116.6	39 21.6	64 77	116.1	39 40.7	63 78	115.6	39 59.6	63 78	115.1	40 18.4	62 78	114.6	4
45	37 18.5	64 77	117.3	37 37.9	64 77	116.8	37 57.1	64 77	116.3	38 16.3	63 78	115.8	38 35.3	63 78	115.3	38 54.2	63 78	114.8	39 12.9	62 78	114.3	39 31.5	62 79	113.8	45
6	36 32.6	64 77	116.4	36 51.8	64 77	116.0	37 10.9	63 78	115.5	37 29.8	63 78	115.0	37 48.6	63 78	114.5	38 07.3	62 79	114.0	38 25.9	62 79	113.5	38 44.3	61 79	113.0	6
7	35 46.4	63 78	115.7	36 05.4	63 78	115.2	36 24.3	63 78	114.7	36 43.0	62 78	114.2	37 01.7	62 79	113.7	37 20.2	62 79	113.2	37 38.6	61 79	112.7	37 56.8	61 80	112.2	7
8	34 59.9	63 78	115.0	35 18.7	62 79	114.4	35 37.4	62 79	113.9	35 56.0	62 79	113.4	36 14.5	61 79	113.0	36 32.8	61 79	112.5	36 51.0	61 80	112.0	37 09.1	60 80	111.5	8
9	34 13.1	62 78	114.1	34 31.7	62 79	113.6	34 50.3	62 79	113.1	35 08.7	61 79	112.7	35 27.0	61 80	112.2	35 45.1	60 80	111.7	36 03.2	60 80	111.2	36 21.1	60 80	110.7	9
50	33 26.0	62 79	113.4	33 44.5	61 79	112.9	34 02.9	61 79	112.4	34 21.1	61 80	111.9	34 39.2	60 80	111.5	34 57.2	60 80	111.0	35 15.1	59 80	110.5	35 32.9	59 81	110.0	50
1	32 38.7	61 79	112.6	32 57.0	61 80	112.2	33 15.2	60 80	111.7	33 33.3	60 80	111.2	33 51.2	60 80	110.7	34 09.1	59 80	110.2	34 26.8	59 81	109.8	34 44.5	59 81	109.3	1
2	31 51.1	61 80	111.9	32 09.2	60 80	111.5	32 27.3	60 80	111.0	32 45.2	60 80	110.5	33 03.0	59 81	110.0	33 20.7	59 81	109.5	33 38.3	58 81	109.1	33 55.8	58 81	108.6	2
3	31 03.3	60 80	111.2	31 21.3	60 80	110.7	31 39.2	59 81	110.3	31 56.9	59 81	109.8	32 14.6	59 81	109.3	32 32.2	58 81	108.8	32 49.6	58 82	108.4	33 07.0	58 82	107.9	3
4	30 15.2	60 80	110.5	30 33.1	59 81	110.0	30 50.8	59 81	109.6	31 08.4	59 81	109.1	31 26.0	58 82	108.6	31 43.4	58 82	108.2	32 00.7	58 82	107.7	32 17.9	57 82	107.2	4
55	29 26.9	59 81	109.8	29 44.6	59 81	109.4	30 02.2	58 81	108.9	30 19.7	58 81	108.4	30 37.1	58 82	108.0	30 54.4	57 82	107.5	31 11.6	57 82	107.0	31 28.7	57 82	106.5	55
6	28 38.5	59 81	109.2	28 56.0	58 81	108.7	29 13.5	58 82	108.2	29 30.9	58 82	107.8	29 48.1	57 82	107.3	30 05.3	57 82	106.8	30 22.4	57 83	106.3	30 39.4	56 83	105.9	6
7	27 49.8	58 81	108.5	28 07.2	58 82	108.0	28 24.5	58 82	107.6	28 41.8	57 82	107.1	28 58.9	57 82	106.6	29 16.0	57 82	106.2	29 32.9	56 83	105.7	29 49.8	56 83	105.2	7
8	27 00.9	58 82	107.8	27 18.2	58 82	107.4	27 35.4	57 82	106.9	27 52.5	57 82	106.5	28 09.6	57 83	106.0	28 26.5	56 83	105.5	28 43.3	56 83	105.0	29 00.1	56 83	104.6	8
9	26 11.9	57 82	107.2	26 29.1	57 82	106.7	26 46.1	57 82	106.3	27 03.1	57 83	105.8	27 20.1	56 83	105.4	27 36.9	56 83	104.9	27 53.6	56 83	104.4	28 10.2	55 83	103.9	9
60	25 22.7	57 82	106.6	25 39.7	57 82	106.1	25 56.7	56 83	105.6	26 13.6	56 83	105.2	26 30.4	56 83	104.7	26 47.1	56 83	104.3	27 03.7	55 84	103.8	27 20.2	55 84	103.3	60
1	24 33.3	57 83	105.9	24 50.2	56 83	105.5	25 07.1	56 83	105.0	25 23.9	56 83	104.6	25 40.6	56 83	104.1	25 57.2	55 83	103.6	26 13.7	55 84	103.2	26 30.1	55 84	102.7	1
2	23 43.8	56 83	105.3	24 00.6	56 83	104.9	24 17.4	56 83	104.4	24 34.1	55 84	103.9	24 50.6	55 83	103.5	25 07.1	55 84	103.0	25 23.6	54 84	102.6	25 39.9	54 84	102.1	2
3	22 54.1	56 83	104.7	23 10.8	55 83	104.3	23 27.5	55 83	103.8	23 44.1	55 84	103.3	24 00.6	55 84	102.9	24 17.0	55 84	102.4	24 33.3	54 84	102.0	24 49.6	54 84	101.5	3
4	22 04.3	56 83	104.1	22 20.9	55 83	103.7	22 37.5	55 83	103.2	22 54.0	55 84	102.7	23 10.4	55 84	102.3	23 26.7	54 84	101.8	23 42.9	54 84	101.4	23 59.1	54 84	100.9	4
65	21 14.3	55 83	103.5	21 30.9	55 83	103.1	21 47.3	55 84	102.6	22 03.7	55 84	102.2	22 20.1	54 84	101.7	22 36.3	54 84	101.2	22 52.5	54 84	100.8	23 08.6	54 84	100.3	65
6	20 24.3	55 84	102.9	20 40.7	55 84	102.5	20 57.1	54 84	102.0	21 13.4	54 84	101.6	21 29.6	54 84	101.1	21 45.8	54 84	100.7	22 01.9	53 85	100.2	22 17.9	53 85	99.8	6
7	19 34.1	55 84	102.3	19 50.4	54 84	101.9	20 06.7	54 84	101.4	20 23.0	54 84	101.0	20 39.1	54 84	100.5	20 55.2	54 84	100.1	21 11.1	53 85	99.6	21 27.2	53 85	99.2	7
8	18 43.8	54 84	101.8	19 00.1	54 84	101.3	19 16.3	54 84	100.9	19 32.4	54 84	100.4	19 48.5	54 84	100.0	20 04.5	53 85	99.5	20 20.5	53 85	99.1	20 36.4	53 85	98.6	8
9	17 53.4	54 84	101.2	18 09.6	54 84	100.7	18 25.7	54 84	100.3	18 41.8	54 85	99.9	18 57.8	53 85	99.4	19 13.8	53 85	99.0	19 29.7	53 85	98.5	19 45.5	53 85	98.1	9
70	17 02.9	54 84	100.6	17 19.0	54 84	100.2	17 35.1	53 85	99.7	17 51.1	53 85	99.3	18 07.0	53 85	98.8	18 22.9	53 85	98.4	18 38.8	52 85	98.0	18 54.5	52 85	97.5	70
1	16 12.3	54 84	100.1	16 28.3	53 85	99.6	16 44.3	53 85	99.2	17 00.3	53 85	98.7	17 16.2	53 85	98.3	17 32.0	53 85	97.8	17 47.8	52 85	97.4	18 03.5	52 85	96.9	1
2	15 21.6	53 85	99.5	15 37.6	53 85	99.1	15 53.5	53 85	98.6	16 09.4	53 85	98.2	16 25.3	53 85	97.7	16 41.0	52 85	97.3	16 56.7	52 85	96.8	17 12.4	52 85	96.4	2
3	14 30.8	53 85	98.9	14 46.8	53 85	98.5	15 02.6	53 85	98.1	15 18.5	53 85	97.6	15 34.3	53 85	97.2	15 50.0	52 85	96.7	16 05.7	52 85	96.3	16 21.3	52 85	95.9	3
4	13 40.0	53 85	98.4	13 55.9	53 85	98.0	14 11.7	53 85	97.5	14 27.5	53 85	97.1	14 43.2	52 85	96.6	14 58.9	52 85	96.2	15 14.5	52 85	95.8	15 30.1	52 85	95.3	4
75	12 49.1	53 85	97.9	13 04.9	53 85	97.4	13 20.7	53 85	97.0	13 36.4	52 85	96.5	13 52.1	52 85	96.1	14 07.7	52 85	95.7	14 23.3	52 85	95.2	14 38.9	52 85	94.8	75
6	11 58.1	53 85	97.3	12 13.9	52 85	96.9	12 29.6	52 85	96.4	12 45.3	52 85	96.0	13 00.9	52 85	95.6	13 16.5	52 85	95.1	13 32.1	52 86	94.7	13 47.6	52 86	94.3	6
7	11 07.0	52 85	96.8	11 22.8	52 85	96.3	11 38.5	52 85	95.9	11 54.1	52 85	95.5	12 09.7	52 85	95.0	12 25.3	52 85	94.6	12 40.8	52 86	94.2	12 56.3	52 86	93.7	7
8	10 15.9	52 85	96.2	10 31.6	52 85	95.8	10 47.3	52 85	95.4	11 02.9	52 85	94.9	11 18.5	52 85	94.5	11 34.0	52 86	94.1	11 49.5	52 86	93.6	12 05.0	51 86	93.2	8
9	9 24.8	52 85	95.7	9 40.4	52 85	95.3	9 56.1	52 85	94.9	10 11.6	52 85	94.4	10 27.2	52 86	94.0	10 42.7	52 86	93.5	10 58.2	52 86	93.1	11 13.6	51 86	92.7	9
80	8 33.6	52 85	95.2	8 49.2	52 85	94.8	9 04.8	52 86	94.3	9 20.3	52 86	93.9	9 35.9	52 86	93.5	9 51.3	52 86	93.0	10 06.8	51 86	92.6	10 22.2	51 86	92.2	80
1	7 42.4	52 85	94.7	7 57.9	52 86	94.2	8 13.5	52 86	93.8	8 29.0	52 86	93.4	8 44.5	52 86	92.9	9 00.0	52 86	92.5	9 15.4	51 86	92.1	9 30.8	51 86	91.6	1
2	6 51.1	52 86	94.1	7 06.6	52 86	93.7	7 22.2	52 86	93.3	7 37.7	52 86	92.8	7 53.1	52 86	92.4	8 08.6	51 86	92.0	8 24.0	51 86	91.5	8 39.4	51 86	91.1	2
3	5 59.8	52 86	93.6	6 15.3	52 86	93.2	6 30.8	52 86	92.8	6 46.3	52 86	92.3	7 01.7	51 86	91.9	7 17.2	51 86	91.5	7 32.6	51 86	91.0	7 48.0	51 86	90.6	3
4	5 08.4	52 86	93.1	5 23.9	52 86	92.7	5 39.4	52 86	92.2	5 54.9	52 86	91.8	6 10.3	51 86	91.4	6 25.8	51 86	90.9	6 41.2	51 86	90.5	6 56.6	51 86	90.1	4
85													5 03.5	51 86	91.3	5 18.9	51 86	90.9	5 34.3	51 86	90.4	5 49.7	51 86	90.0	85
6																						6 05.1	51 86	89.6	6
																						5 13.7	51 86	89.1	

Lat. 31°

H.A.	0° 00'	0° 30'	1° 00'	1° 30'	2° 00'	2° 30'	3° 00'	3° 30'	H.A.
	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	
00	59 00.0 1.00 01 180.0	58 30.0 1.00 01 180.0	58 00.0 1.00 01 180.0	57 30.0 1.00 01 180.0	57 00.0 1.00 01 180.0	56 30.0 1.00 01 180.0	56 00.0 1.00 01 180.0	55 30.0 1.00 01 180.0	00
1	58 59.1 1.00 04 178.1	58 29.1 1.00 04 178.1	57 59.2 1.00 04 178.1	57 29.2 1.00 04 178.1	56 59.2 1.00 04 178.2	56 29.2 1.00 04 178.2	55 59.2 1.00 04 178.2	55 29.2 1.00 04 178.2	1
2	58 56.5 1.00 07 176.1	58 26.6 1.00 07 176.2	57 56.6 1.00 07 176.2	57 26.7 1.00 07 176.3	56 56.7 1.00 07 176.3	56 26.8 1.00 07 176.4	55 56.8 1.00 07 176.4	55 26.8 1.00 07 176.5	2
3	58 52.2 1.0 10 174.2	58 22.3 1.0 10 174.3	57 52.4 1.0 10 174.4	57 22.5 1.0 10 174.4	56 52.6 1.0 10 174.5	56 22.7 1.0 09 174.6	55 52.8 1.0 09 174.7	55 22.9 1.0 09 174.7	3
4	58 46.1 99 13 172.3	58 16.3 99 13 172.4	57 46.5 99 13 172.5	57 16.7 99 12 172.6	56 46.9 99 12 172.7	56 17.0 99 12 172.8	55 47.2 99 12 172.9	55 17.4 99 12 173.0	4
05	58 38.3 99 16 170.4	58 08.6 99 16 170.5	57 38.9 99 15 170.6	57 09.2 99 15 170.8	56 39.5 99 15 170.9	56 09.8 99 15 171.0	55 40.1 99 15 171.1	55 10.3 99 14 171.2	05
6	58 28.9 99 18 168.5	57 59.3 99 18 168.6	57 29.8 99 18 168.8	57 00.2 99 18 168.9	56 30.6 99 18 169.1	56 01.0 99 17 169.2	55 31.3 99 17 169.4	55 01.7 99 17 169.5	6
7	58 17.8 98 21 166.6	57 48.4 98 21 166.8	57 18.9 98 21 167.0	56 49.5 98 20 167.1	56 20.1 98 20 167.3	55 50.6 98 20 167.5	55 21.1 98 20 167.6	54 51.6 98 19 167.8	7
8	58 05.0 97 24 164.7	57 35.8 97 24 164.9	57 06.6 98 23 165.2	56 37.3 98 23 165.4	56 08.0 98 23 165.5	55 38.7 98 22 165.7	55 09.3 98 22 165.9	54 40.0 98 22 166.1	8
9	57 50.7 97 26 162.9	57 21.7 97 26 163.1	56 52.6 97 26 163.4	56 23.5 97 25 163.6	55 54.4 97 25 163.8	55 25.2 97 25 164.0	54 56.1 97 24 164.2	54 26.9 97 24 164.4	9
10	57 34.8 96 29 161.1	57 06.0 96 29 161.4	56 37.1 96 28 161.6	56 08.2 96 28 161.8	55 39.3 96 28 162.1	55 10.4 97 27 162.3	54 41.4 97 27 162.5	54 12.4 97 27 162.8	10
1	57 17.4 95 32 159.3	56 48.8 95 31 159.6	56 20.2 95 31 159.9	55 51.5 96 30 160.1	55 22.8 96 30 160.4	54 54.0 96 30 160.6	54 25.2 96 29 160.9	53 56.4 96 29 161.1	1
2	56 58.5 95 34 157.6	56 30.2 95 33 157.9	56 01.7 95 33 158.2	55 33.3 95 33 158.4	55 04.8 95 32 158.7	54 36.3 95 32 159.0	54 07.7 95 32 159.2	53 39.1 95 31 159.5	2
3	56 38.2 94 36 155.9	56 10.1 94 36 156.2	55 41.9 94 35 156.5	55 13.7 94 35 156.8	54 45.4 94 34 157.1	54 17.1 94 34 157.4	53 48.8 95 34 157.6	53 20.4 95 33 157.9	3
4	56 16.5 93 38 154.2	55 48.6 93 38 154.5	55 20.7 93 38 154.8	54 52.7 93 37 155.1	54 24.7 93 37 155.5	53 56.7 94 36 155.8	53 28.6 94 36 156.1	53 00.4 94 35 156.3	4
15	55 53.4 92 41 152.5	55 25.8 92 40 152.9	54 58.2 92 40 153.2	54 30.5 92 39 153.5	54 02.7 93 39 153.9	53 34.9 93 38 154.2	53 07.1 93 38 154.5	52 39.2 93 38 154.8	15
6	55 29.0 91 43 150.9	55 01.7 91 42 151.3	54 34.3 91 42 151.6	54 06.9 92 41 152.0	53 39.4 92 41 152.3	53 11.9 92 40 153.0	52 44.3 92 40 153.3	52 16.6 92 40 153.6	6
7	55 03.4 90 45 149.3	54 36.4 90 44 149.7	54 09.3 90 44 150.1	53 42.1 91 43 150.4	53 14.9 91 43 150.8	52 47.6 91 42 151.1	52 20.3 91 42 151.5	51 52.9 91 41 151.8	7
8	54 36.5 89 47 147.8	54 09.8 89 46 148.1	53 43.0 89 46 148.5	53 16.1 90 45 148.9	52 49.2 90 45 149.3	52 22.2 90 44 149.6	51 55.2 90 44 150.0	51 28.0 91 43 150.3	8
9	54 08.5 88 49 146.2	53 42.1 88 48 146.6	53 15.6 88 48 147.0	52 49.0 89 47 147.4	52 22.4 89 47 147.8	51 55.6 89 46 148.2	51 28.9 89 46 148.5	51 02.0 90 45 148.9	9
20	53 39.4 87 50 144.8	53 13.2 87 50 145.2	52 47.0 87 49 145.6	52 20.8 88 49 146.0	51 54.4 88 48 146.4	51 28.0 88 48 146.7	51 01.5 88 47 147.1	50 34.9 89 47 147.5	20
1	53 09.2 86 52 143.3	52 43.3 86 52 143.7	52 17.4 86 51 144.1	51 51.5 87 51 144.5	51 25.4 87 50 144.9	50 59.2 87 50 145.3	50 33.0 88 49 145.7	50 06.7 88 49 146.1	1
2	52 37.9 85 54 141.9	52 12.4 85 53 142.3	51 46.8 85 53 142.7	51 21.1 86 52 143.2	50 55.3 86 52 143.6	50 29.5 86 51 144.0	50 03.5 87 51 144.4	49 37.5 87 50 144.7	2
3	52 05.7 84 55 140.5	51 40.5 84 55 140.9	51 15.2 84 54 141.4	50 49.8 85 54 141.8	50 24.3 85 53 142.2	49 58.7 85 53 142.6	49 33.1 86 52 143.0	49 07.4 86 52 143.4	3
4	51 32.5 83 57 139.2	51 07.6 83 56 139.6	50 42.6 83 56 140.0	50 17.5 84 55 140.5	49 52.3 84 55 140.9	49 27.1 84 54 141.3	49 01.7 85 54 141.7	48 36.2 85 53 142.1	4
25	50 58.4 82 58 137.8	50 33.8 82 58 138.3	50 09.1 82 57 138.7	49 44.3 83 57 139.2	49 19.5 83 56 139.6	48 54.5 83 56 140.0	48 29.4 84 55 140.4	48 04.2 84 55 140.9	25
6	50 23.5 81 60 136.6	49 59.2 81 59 137.0	49 34.8 81 59 137.5	49 10.3 82 58 137.9	48 45.7 82 58 138.3	48 21.0 82 57 138.8	47 56.2 83 57 139.2	47 31.3 83 56 139.6	6
7	49 47.7 80 61 135.3	49 23.7 80 60 135.8	48 59.6 81 60 136.2	48 35.4 81 59 136.7	48 11.1 81 59 137.1	47 46.7 82 59 137.6	47 22.2 82 58 138.0	46 57.6 82 58 138.4	7
8	49 11.2 79 62 134.1	48 47.5 79 62 134.6	48 23.6 80 61 135.0	47 59.7 80 61 135.5	47 35.7 80 60 135.9	47 11.6 81 60 136.4	46 47.4 81 59 136.8	46 23.0 81 59 137.2	8
9	48 33.8 78 63 132.9	48 10.4 78 63 133.4	47 46.9 79 62 133.8	47 23.3 79 62 134.3	46 59.6 79 62 134.7	46 35.7 80 61 135.2	46 11.8 80 61 135.6	45 47.7 80 60 136.0	9
30	47 55.8 77 65 131.7	47 32.7 77 64 132.2	47 09.5 78 64 132.7	46 46.1 78 63 133.1	46 22.7 78 63 133.6	45 59.1 79 62 134.0	45 35.4 79 62 134.5	45 11.7 79 61 134.9	30
1	47 17.1 76 66 130.6	46 54.3 76 65 131.1	46 31.3 77 65 131.5	46 08.2 77 64 132.0	45 45.1 77 64 132.5	45 21.8 78 63 132.9	44 58.4 78 63 133.4	44 34.9 78 62 133.8	1
2	46 37.7 75 67 129.5	46 15.2 75 66 130.0	45 52.5 76 66 130.4	45 29.7 76 65 130.9	45 06.8 77 65 131.4	44 43.8 77 64 131.8	44 20.7 77 64 132.3	43 57.4 78 64 132.7	2
3	45 57.7 74 68 128.4	45 35.4 74 67 128.9	45 13.0 75 67 129.4	44 50.5 75 66 129.8	44 27.9 76 66 130.3	44 05.1 76 65 130.8	43 42.3 76 65 131.2	43 19.3 77 65 131.6	3
4	45 17.1 73 69 127.4	44 55.1 74 68 127.9	44 33.0 74 68 128.3	44 10.7 74 67 128.8	43 48.4 75 67 129.3	43 25.9 75 66 129.7	43 03.3 76 66 130.2	42 40.6 76 66 130.6	4
35	44 36.0 72 70 126.3	44 14.2 73 69 126.8	43 52.3 73 69 127.3	43 30.3 73 68 127.8	43 08.2 74 68 128.2	42 46.0 74 67 128.7	42 23.7 75 67 129.1	42 01.2 75 67 129.6	35
6	43 54.3 71 70 125.3	43 32.8 72 70 125.8	43 11.2 72 70 126.3	42 49.4 73 69 126.8	42 27.6 73 69 127.2	42 05.6 73 68 127.7	41 43.5 74 68 128.1	41 21.3 74 67 128.6	6
7	43 12.1 71 71 124.4	42 50.8 71 71 124.8	42 29.4 71 70 125.3	42 08.0 72 70 125.8	41 46.3 72 70 126.2	41 24.6 73 69 126.7	41 02.8 73 69 127.2	40 40.9 74 68 127.6	7
8	42 29.4 70 72 123.4	42 08.4 70 72 123.9	41 47.2 71 71 124.4	41 26.0 71 71 124.8	41 04.6 71 70 125.3	40 43.1 72 70 125.8	40 21.5 72 70 126.2	39 59.9 72 69 126.7	8
9	41 46.2 69 73 122.5	41 25.4 69 72 122.9	41 04.5 70 72 123.4	40 43.3 70 72 123.9	40 22.4 71 71 124.4	40 01.2 71 71 124.8	39 39.8 71 70 125.3	39 18.3 72 70 125.7	9
40	41 02.6 68 73 121.5	40 42.0 69 73 122.0	40 21.4 69 73 122.5	40 00.6 69 72 123.0	39 39.7 70 72 123.4	39 18.7 70 72 123.9	38 57.6 71 71 124.4	38 36.4 71 71 124.8	40
1	40 18.6 68 74 120.6	39 58.2 68 74 121.1	39 37.8 68 73 121.6	39 17.2 69 73 122.1	38 56.6 69 73 122.5	38 35.8 69 72 123.0	38 14.9 70 72 123.5	37 53.9 70 72 123.9	1
2	39 34.1 67 75 119.8	39 14.0 67 74 120.2	38 53.8 68 74 120.7	38 33.4 68 74 121.2	38 13.0 68 73 121.7	37 52.4 69 73 122.1	37 31.8 69 73 122.6	37 11.0 69 72 123.0	2
3	38 49.3 66 75 118.9	38 29.4 66 75 119.4	38 09.4 67 75 119.9	37 49.3 67 74 120.3	37 29.0 68 74 120.8	37 08.7 68 74 121.3	36 48.2 68 73 121.7	36 27.7 69 73 122.2	3
4	38 04.1 65 76 118.1	37 44.4 66 75 118.6	37 24.6 66 75 119.0	37 04.7 67 75 119.5	36 44.7 67 75 120.0	36 24.5 67 74 120.4	36 04.3 68 74 120.9	35 44.0 68 74 121.3	4
45	37 18.5 65 76 117.3	36 59.0 65 76 117.7	36 39.4 66 76 118.2	36 19.7 66 76 118.7	35 59.9 66 75 119.1	35 40.0 67 75 119.6	35 20.0 67 74 120.1	34 59.8 67 74 120.5	45
6	36 32.6 64 77 116.4	36 13.3 64 77 116.9	35 53.9 65 76 117.4	35 34.4 65 76 117.9	35 14.8 66 76 118.3	34 55.1 66 75 118.8	34 35.3 66 75 119.2	34 15.3 67 75 119.7	6
7	35 46.4 63 78 115.7	35 27.3 64 77 116.1	35 08.1 64 77 116.6	34 48.8 65 77 117.1	34 29.4 65 76 117.5	34 09.8 65 76 118.0	33 50.2 66 76 118.4	33 30.5 66 75 118.9	7
8	34 59.9 63 78 114.9	34 41.0 63 78 115.4	34 22.0 64 77 115.8	34 02.8 64 77 116.3	33 43.6 64 77 116.7	33 24.3 65 76 117.2	33 04.8 65 76 117.7	32 45.3 65 76 118.1	8
9	34 13.1 62 78 114.1	33 54.4 63 78 114.6	33 35.5 63 78 115.1	33 16.6 63 78 115.5	32 57.5 64 77 116.0	32 38.4 64 77 116.4	32 19.1 64 76 116.9	31 59.8 65 76 117.3	9
50	33 26.0 62 79 113.4	33 07.5 62 79 113.8	32 48.8 62 78 114.3	32 30.0 63 78 114.8	32 11.1 63 78 115.2	31 52.2 63 77 115.7	31 33.1 64 77 116.1	31 13.9 64 77 116.6	50
1	32 38.7 61 79 112.6	32 20.3 62 79 113.1	32 01.8 62 79 113.6	31 43.2 62 78 114.0	31 24.5 63 78 114.5	31 05.7 63 78 114.9	30 46.8 63 78 115.4	30 27.8 63 77 115.9	1
2	31 51.1 61 80 111.9	31 32.9 61 79 112.4	31 14.5 61 79 112.8	30 56.1 62 79 113.3	30 37.5 62 79 113.8	30 18.9 62 78 114.2	30 00.2 63 78 114.7	29 41.4 63 78 115.1	2
3	31 03.3 60 80 111.2	30 45.2 60 80 111.7	30 27.0 61 80 112.1	30 08.7 61 79 112.6	29 50.4 61 79 113.0	29 31.9 62 79 113.5	29 13.3 62 79 114.0	28 54.7 62 78 114.4	3
4	30 15.2 60 80 110.5	29 57.3 60 80 111.0	29 39.3 60 80 111.4	29 21.1 61 80 111.9	29 02.9 61 79 112.4	28 44.6 61 79 112.8	28 26.2 62 79 113.3	28 07.7 62 79 113.7	4
55	29 26.9 59 81 109.8	29 09.2 59 81 110.3	28 51.4 60 81 110.8	28 33.3 60 80 111.2	28 15.2 60 80 111.7	27 57.1 61 80 112.1	27 38.8 61 79 112.6	27 20.5 61 79 113.0	55
6	28 38.5 59 81 109.2	28 20.8 59 81 109.6	28 03.1 59 81 110.1	27 45.2 60 80 110.5	27 27.3 60 80 111.0	27 09.3 60 80 111.4	26 51.2 60 80 111.9	26 33.0 61 80 112.3	6
7	27 49.8 58 81 108.5	27 32.3 59 81 109.0	27 14.7 59 81 109.4	26 57.0 59 81 109.9	26 39.2 59 81 110.3	26 21.3 60 80 110.8	26 03.4 60 80 111.2	25 45.3 60 80 111.7	7
8	27 00.9 58 82 107.8	26 43.5 58 82 108.3	26 26.1 58 81 108.8	26 08.5 59 81 109.2	25 51.0 59 81 109.7	25 33.1 59 81 110.1	25 15.3 59 80 110.6	24 57.4 60 80 111.0	8
9	26 11.9 57 82 107.2	25 54.6 58 82 107.7	25 37.3 58 82 108.1	25 19.8 58 81 108.6	25 02.3 59 81 109.0	24 44.7 59 81 109.4	24 27.1 59 81 109.9	24 09.3 59 81 110.3	9
60	25 22.7 57 82 106.6	25 05.5 57 82 107.0	24 48.3 58 82 107.5	24 31.0 58 82 107.9	24 13.6 58 82 108.4	23 56.1 58 81 108.8	23 38.6 59 81 109.3	23 21.0 59 81 109.7	60
1	24 33.3 57 83 105.9	24 16.3 57 82 106.4	23 59.2 57 82 106.8	23 42.0 57 82 107.3	23 24.7 58 82 107.7	23 07.4 58 82 108.2	22 50.0 58 81 108.6	22 32.5 58 81 109.1	1
2	23 43.8 56 83 105.3	23 26.8 57 83 105.8	23 09.8 57 82 106.2	22 52.8 57 82 106.7	22 35.6 57 82 107.1	22 18.4 58 82 107.5	22 01.1 58 82 108.0	21 43.8 58 81 108.4	2
3	22 54.1 56 83 104.7	22 37.3 56 83 105.2	22 20.4 56 83 105.6	22 03.4 57 82 106.0	21 46.4 57 82 106.5	21 29.3 57 82 106.9	21 12.1 57 82 107.4	20 54.9 58 82 107.8	3
4	22 04.3 56 83 104.1	21 47.6 56 83 104.5	21 30.8 56 83 105.0	21 13.9 56 83 105.4	20 57.0 57 83 105.9	20 40.0 57 82 106.3	20 23.0 57 82 106.8	20 05.8 57 82 107.2	4
65	21 14.3 55 83 103.5	20 57.7 55 83 104.0	20 41.0 56 83 104.4	20 24.3 56 83 104.8	20 07.5 56 83 105.3	19 50.6 56 83 105.7	19 33.6 57 82 106.2	19 16.6 57 82 106.6	65
6	20 24.3 55 84 102.9	20 07.7 55 84 103.4	19 51.1 55 83 103.8	19 34.5 56 83 104.2	19 17.8 56 83 104.7	19 01.0 56 83 105.1	18 44.2 56 83 105.6	18 27.3 56 83 106.0	6
7	19 34.1 55 84 102.3	19 17.6 55 84 102.8	19 01.1 55 84 103.2	18 44.6 55 83 103.7	18 28.0 55 83 104.1	18 11.3 56 83 104.5	17 54.5 56 83 105.0	17 37.7 56 83 105.4	7
8	18 43.8 54 84 101.8	18 27.4 54 84 102.2	18 11.0 55 84 102.6	17 54.5 55 83 103.1	17 38.0 55 83 103.5	17 21.4 55 83 104.0	17 04.8 56 83 104.4	16 48.1 56 83 104.8	8
9	17 53.4 54 84 101.2	17 37.1 54 84 101.6	17 20.8 54 84 102.1	17 04.4 54 84 102.5	16 48.0 55 84 102.9	16 31.5 55 84 103.4	16 14.9 55 83 103.8	15 58.3 55 83 104.2	9
70	17 02.9 54 84 100.6	16 46.7 54 84 101.1	16 30.4 54 84 101.5	16 14.1 54 84 101.9	15 57.8 55 84 102.4	15 41.4 55 84 102.8	15 24.9 55 84 103.2	15 08.4 55 83 103.7	70
1	16 12.3 54 84 100.1	15 56.2 54 84 100.5	15 40.0 54 84 100.9	15 23.8 54 84 101.4	15 07.5 54 84 101.8	14 51.2 55 84 102.2	14 34.8 55 84 102.7	14 18.4 55 84 103.1	1
2	15 21.6 53 85 99.5	15 05.5 54 84 99.9	14 49.4 54 84 100.4	14 33.2 54 84 100.8	14 17.1 54 84 101.2	14 00.8 54 84 101.7	13 44.6 54 84 102.1	13 28.2 55 84 102.5	2
3	14 30.8 53 85 98.9	14 14.8 53 85 99.4	13 58.8 54 85 99.8	13 42.7 54 84 100.3	13 26.6 54 84 100.7	13 10.4 54 84 101.1	12 54.2 54 84 101.6	12 38.0 54 84 102.0	3
4	13 40.0 53 85 98.4	13 24.1 53 85 98.8	13 08.1 53 85 99.3	12 52.1 54 84 99.7	12 36.0 54 84 100.1	12 19.9 54 84 100.6	12 03.8 54 84 101.0	11 47.6 54 84 101.4	4
75	12 49.1 53 85 97.9	12 33.2 53 85 98.3	12 17.3 53 85 98.7	12 01.3 53 85 99.2	11 45.4 53 85 99.6	11 29.3 53 84 100.0	11 13.3 54 84 100.5	10 57.2 54 84 100.9	75
6	11 58.1 53 85 97.3	11 42.3 53 85 97.8	11 26.4 53 85 98.2	11 10.5 53 85 98.6	10 54.6 53 85 99.0	10 38.6 53 85 99.5	10 22.6 53 84 99.9	10 06.6 54 84 100.3	6
7	11 07.0 52 85 96.8	10 51.3 53 85 97.2	10 35.5 53 85 97.6	10 19.6 53 85 98.1	10 03.8 53 85 98.5	9 47.9 53 85 98.9	9 31.9 53 85 99.4	9 16.0 53 85 99.8	7
8	10 15.9 52 85 96.2	10 00.2 52 85 96.7	9 44.5 53 85 97.1	9 28.7 53 85 97.5	9 12.9 53 85 98.0	8 57.0 53 85 98.4	8 41.1 53 85 98.8	8 25.2 53 85 99.3	8
9	9 24.8 52 85 95.7	9 09.1 52 85 96.1	8 53.4 52 85 96.6	8 37.7 53 85 97.0	8 21.9 53 85 97.4	8 06.1 53 85 97.9	7 50.3 53 85 98.3	7 34.4 53 85 98.7	9
80	8 33.6 52 85 95.2	8 18.0 52 85 95.6	8 02.3 52 85 96.1	7 46.6 52 85 96.5	7 30.9 52 85 96.9	7 15.1 53 85 97.3	6 59.4 53 85 97.8	6 43.6 53 85 98.2	80
1	7 42.4 52 85 94.7	7 26.8 52 85 95.1	7 11.1 52 85 95.5	6 55.5 52 85 96.0	6 39.8 52 85 96.4	6 24.1 52 85 96.8	6 08.4 52 85 97.2	5 52.6 53 85 97.7	1
2	6 51.1 52 85 94.1	6 35.5 52 85 94.6	6 19.9 52 85 95.0	6 04.3 52 85 95.4	5 48.7 52 85 95.9	5 33.0 52 85 96.3	5 17.3 52 85 96.7	5 01.6 52 85 97.1	2
3	5 59.8 52 86 93.6	5 44.2 52 86 94.0	5 28.7 52 85 94.5	5 13.1 52 85 94.9					3
4	5 08.4 52 86 93.1								4

Lat. 31°

H.A.	4° 00' Alt. Δd Δt	Az.	4° 30' Alt. Δd Δt	Az.	5° 00' Alt. Δd Δt	Az.	5° 30' Alt. Δd Δt	Az.	6° 00' Alt. Δd Δt	Az.	6° 30' Alt. Δd Δt	Az.	7° 00' Alt. Δd Δt	Az.	7° 30' Alt. Δd Δt	Az.	H.A.
00	63 00.0 1.0 02	180.0	63 30.0 1.0 02	180.0	64 00.0 1.0 02	180.0	64 30.0 1.0 02	180.0	65 00.0 1.0 02	180.0	65 30.0 1.0 02	180.0	66 00.0 1.0 02	180.0	66 30.0 1.0 02	180.0	00
1	62 59.0 1.0 05	177.8	63 29.0 1.0 05	177.8	63 59.0 1.0 08	177.7	64 29.0 1.0 05	177.7	64 58.9 1.0 05	177.6	65 28.9 1.0 05	177.6	65 58.9 1.0 09	177.6	66 28.9 1.0 06	177.5	1
2	62 56.1 1.0 08	175.6	63 26.0 1.0 08	175.5	63 55.9 1.0 08	175.5	64 25.9 1.0 09	175.4	64 55.8 1.0 09	175.3	65 25.7 1.0 09	175.2	65 55.6 1.0 09	175.1	66 25.5 1.0 09	175.0	2
3	62 51.2 1.0 11	173.4	63 21.0 99 12	173.3	63 50.8 99 12	173.2	64 20.7 99 12	173.1	64 50.5 99 12	173.0	65 20.3 99 12	172.8	65 50.2 99 13	172.7	66 20.0 99 13	172.6	3
4	62 44.3 99 15	171.3	63 14.0 99 15	171.1	63 43.8 99 15	171.0	64 13.5 99 15	170.8	64 43.2 99 16	170.7	65 12.9 99 16	170.5	65 42.6 99 16	170.3	66 12.3 99 16	170.1	4
05	62 35.5 99 18	169.1	63 05.1 99 18	168.9	63 34.7 99 18	168.7	64 04.3 99 19	168.6	64 33.8 98 19	168.4	65 03.4 98 19	168.2	65 32.9 98 20	167.9	66 02.4 98 20	167.7	05
6	62 24.9 98 21	167.0	62 54.3 98 21	166.8	63 23.7 98 22	166.6	63 53.1 98 22	166.3	64 22.5 98 22	166.1	64 51.8 98 23	165.8	65 21.1 98 23	165.6	65 50.4 98 23	165.3	6
7	62 12.4 97 24	164.9	62 41.6 97 24	164.6	63 10.8 97 25	164.4	63 40.0 97 25	164.1	64 09.1 97 25	163.8	64 38.2 97 26	163.6	65 07.3 97 26	163.3	65 36.4 97 27	163.0	7
8	61 58.1 97 27	162.8	62 27.1 97 27	162.5	62 56.0 97 28	162.2	63 25.0 96 28	162.0	63 53.9 96 28	161.7	64 22.7 96 29	161.4	64 51.5 96 29	161.1	65 20.3 96 30	160.7	8
9	61 42.0 96 30	160.8	62 10.8 96 30	160.5	62 39.5 96 31	160.2	63 08.2 95 31	159.8	63 36.8 95 32	159.5	64 05.4 95 32	159.2	64 33.9 95 32	158.8	65 02.4 95 33	158.4	9
10	61 24.2 95 32	158.8	61 52.7 95 33	158.5	62 21.2 95 33	158.1	62 49.6 95 34	157.8	63 17.9 94 34	157.4	63 46.2 94 35	157.0	64 14.4 94 35	156.6	64 42.5 94 36	156.2	10
1	61 04.8 94 35	156.8	61 33.0 94 36	156.5	62 01.2 94 36	156.1	62 29.2 94 37	155.7	62 57.3 93 37	155.3	63 25.2 93 38	154.9	63 53.1 93 38	154.5	64 20.9 93 39	154.1	1
2	60 43.8 93 38	154.9	61 11.7 93 38	154.5	61 39.5 93 39	154.1	62 07.3 92 39	153.7	62 35.0 92 40	153.3	63 02.6 92 40	152.9	63 30.2 92 41	152.4	63 57.6 91 42	152.0	2
3	60 21.2 92 40	153.0	60 48.8 92 41	152.6	61 16.3 92 41	152.2	61 43.7 91 42	151.8	62 11.1 91 42	151.4	62 38.4 91 43	150.9	63 05.6 90 44	150.4	63 32.7 90 44	150.0	3
4	59 57.1 91 42	151.2	60 24.4 91 43	150.8	60 51.6 90 44	150.3	61 18.7 90 44	149.9	61 45.7 90 45	149.4	62 12.6 90 45	149.0	62 39.4 89 46	148.5	63 06.1 89 47	148.0	4
15	59 31.6 90 45	149.4	59 58.6 90 45	149.0	60 25.4 89 46	148.5	60 52.2 89 46	148.0	61 18.8 89 47	147.6	61 45.4 88 48	147.1	62 11.8 88 48	146.6	62 38.1 88 49	146.1	15
6	59 04.8 89 47	147.6	59 31.4 88 48	147.2	59 57.9 88 48	146.7	60 24.3 88 49	146.3	60 50.6 87 49	145.8	61 16.7 87 50	145.3	61 42.8 87 51	144.7	62 08.7 86 51	144.2	6
7	58 36.6 88 49	145.9	59 02.9 87 50	145.5	59 29.0 87 51	145.0	59 55.0 87 51	144.5	60 21.0 86 51	144.0	60 46.8 86 52	143.5	61 12.5 85 53	143.0	61 38.0 85 53	142.4	7
8	58 07.2 87 51	144.3	58 33.1 86 52	143.8	58 58.9 86 52	143.3	59 24.6 85 53	142.8	59 50.1 85 53	142.3	60 15.6 85 54	141.8	60 40.8 84 55	141.2	61 06.0 84 55	140.7	8
9	57 36.6 85 53	142.7	58 02.1 85 54	142.2	58 27.6 85 54	141.7	58 52.9 84 55	141.2	59 18.1 84 55	140.6	59 43.1 83 56	140.1	60 08.0 83 57	139.5	60 32.8 82 57	139.0	9
20	57 04.9 84 55	141.1	57 30.1 84 55	140.6	57 55.1 83 56	140.1	58 20.1 83 56	139.6	58 44.9 83 57	139.0	59 09.6 82 58	138.5	59 34.1 82 58	137.9	59 58.5 81 59	137.3	20
1	56 32.0 83 56	139.6	56 56.9 83 57	139.1	57 21.6 82 58	138.6	57 46.2 82 58	138.0	58 10.7 81 59	137.5	58 35.0 81 59	136.9	58 59.1 80 60	136.3	59 23.1 80 61	135.8	1
2	55 58.2 82 58	138.1	56 22.7 81 59	137.6	56 47.1 81 59	137.1	57 11.3 81 60	136.5	57 35.4 80 60	136.0	57 59.3 80 61	135.4	58 23.1 79 62	134.8	58 46.8 79 62	134.2	2
3	55 23.4 81 60	136.7	55 47.5 80 60	136.1	56 11.6 80 61	135.6	56 35.4 79 61	135.1	56 59.2 79 62	134.5	57 22.8 78 62	133.9	57 46.2 78 63	133.4	58 09.5 77 64	132.8	3
4	54 47.6 80 61	135.3	55 11.4 79 62	134.7	55 35.1 79 62	134.2	55 58.7 78 63	133.6	56 22.1 78 63	133.1	56 45.3 77 64	132.5	57 08.4 77 64	131.9	57 31.3 76 65	131.3	4
25	54 11.0 79 62	133.9	54 34.5 78 63	133.4	54 57.8 78 64	132.8	55 21.0 77 64	132.3	55 44.1 77 65	131.7	56 07.0 76 65	131.1	56 29.7 75 66	130.5	56 52.2 75 66	129.9	25
6	53 33.5 77 64	132.6	53 56.7 77 64	132.1	54 19.7 76 65	131.5	54 42.6 76 65	130.9	55 05.5 75 66	130.4	55 27.8 75 66	129.8	55 50.2 74 67	129.2	56 12.4 74 68	128.6	6
7	52 55.3 76 65	131.3	53 18.1 76 66	130.8	53 40.8 75 66	130.2	54 03.4 75 67	129.7	54 25.7 74 67	129.1	54 47.9 74 68	128.5	55 10.0 73 68	127.9	55 31.9 73 69	127.3	7
8	52 16.3 75 66	130.1	52 38.8 75 67	129.5	53 01.2 74 67	129.0	53 23.4 74 68	128.4	53 45.5 73 68	127.8	54 07.4 73 69	127.3	54 29.1 72 69	126.7	54 50.6 72 70	126.1	8
9	51 36.6 74 67	128.9	51 58.8 74 68	128.3	52 20.9 73 68	127.7	52 42.8 73 69	127.2	53 04.5 72 69	126.6	53 26.1 72 70	126.0	53 47.5 71 70	125.5	54 08.7 70 71	124.9	9
30	50 56.2 73 68	127.7	51 18.1 73 69	127.1	51 39.9 72 69	126.6	52 01.5 72 70	126.0	52 22.9 71 70	125.4	52 44.2 71 71	124.9	53 05.3 70 71	124.3	53 26.2 69 72	123.7	30
1	50 15.2 72 69	126.5	50 36.8 72 70	126.0	50 58.3 71 70	125.4	51 19.6 71 71	124.9	51 40.7 70 71	124.3	52 01.7 70 72	123.7	52 22.5 69 72	123.1	52 43.2 68 73	122.5	1
2	49 33.5 71 70	125.4	49 54.9 71 71	124.9	50 16.1 70 71	124.3	50 37.1 70 72	123.8	50 58.0 69 72	123.2	51 18.7 69 73	122.6	51 39.2 68 73	122.0	51 59.5 68 74	121.4	2
3	48 51.4 70 71	124.3	49 12.4 70 72	123.8	49 33.3 69 72	123.2	49 54.1 69 73	122.7	50 14.7 68 73	122.1	50 35.1 68 73	121.5	50 55.3 67 74	121.0	51 15.4 67 74	120.4	3
4	48 08.6 70 72	123.3	48 29.4 69 72	122.7	48 50.1 69 73	122.2	49 10.5 68 73	121.7	49 30.9 67 74	121.0	49 51.0 67 74	120.5	50 10.6 66 75	119.9	50 30.8 66 75	119.3	4
35	47 25.4 69 73	122.3	47 45.9 68 73	121.7	48 06.3 68 74	121.2	48 26.5 67 74	120.6	48 46.6 67 75	120.0	49 06.5 66 75	119.5	49 26.2 65 75	118.9	49 45.7 65 76	118.3	35
6	46 41.6 68 74	121.3	47 01.9 67 74	120.7	47 22.0 67 74	120.2	47 42.0 66 75	119.6	48 01.8 66 75	119.1	48 21.5 65 76	118.5	48 40.9 65 76	117.9	49 00.2 64 76	117.3	6
7	45 57.4 67 74	120.3	46 17.5 67 75	119.7	46 37.4 66 75	119.2	46 57.1 65 76	118.6	47 16.7 65 76	118.1	47 36.1 64 76	117.5	47 55.3 64 77	117.0	48 14.4 63 77	116.4	7
8	45 12.9 66 75	119.3	45 32.6 66 75	118.8	45 52.3 65 76	118.3	46 11.8 65 76	117.7	46 31.1 64 77	117.2	46 50.3 64 77	116.6	47 09.3 63 77	116.0	47 28.1 62 78	115.5	8
9	44 27.8 65 76	118.4	44 47.4 65 76	117.9	45 06.8 64 76	117.3	45 26.0 64 77	116.8	45 45.1 63 77	116.2	46 04.1 63 78	115.7	46 22.9 62 78	115.1	46 41.5 62 78	114.5	9
40	43 42.3 65 76	117.5	44 01.7 64 77	117.0	44 20.9 64 77	116.4	44 39.9 63 77	115.9	44 58.8 63 78	115.3	45 17.6 62 78	114.8	45 36.1 62 78	114.2	45 54.5 61 79	113.7	40
1	42 56.5 64 77	116.6	43 15.7 64 77	116.1	43 34.7 63 78	115.6	43 53.5 63 78	115.0	44 12.2 62 78	114.5	44 30.7 61 79	113.9	44 49.1 61 79	113.4	45 07.3 60 79	112.8	1
2	42 10.4 63 77	115.8	42 29.3 63 78	115.2	42 48.1 62 78	114.7	43 06.7 62 78	114.2	43 25.2 61 79	113.6	43 43.6 61 79	113.1	44 01.7 60 79	112.5	44 19.7 60 80	112.0	2
3	41 23.9 63 78	114.9	41 42.6 62 79	114.4	42 01.2 62 79	113.9	42 19.7 61 79	113.3	42 38.0 61 79	112.8	42 56.1 60 80	112.2	43 14.1 60 80	111.7	43 31.9 59 80	111.1	3
4	40 37.1 62 78	114.1	40 55.6 62 79	113.6	41 14.0 61 79	113.0	41 32.3 61 79	112.5	41 50.4 60 80	112.0	42 08.4 60 80	111.4	42 26.2 59 80	110.9	42 43.8 59 81	110.3	4
45	39 50.0 61 79	113.3	40 08.4 61 79	112.8	40 26.6 60 80	112.2	40 44.7 60 80	111.7	41 02.6 60 80	111.2	41 20.4 59 80	110.7	41 38.0 59 81	110.1	41 55.5 58 81	109.6	45
6	39 02.6 61 79	112.5	39 20.8 60 80	112.0	39 38.8 60 80	111.5	39 56.7 59 80	110.9	40 14.5 59 81	110.4	40 32.1 58 81	109.9	40 49.6 58 81	109.3	41 06.9 57 81	108.8	6
7	38 15.0 60 80	111.7	38 33.0 60 80	111.2	38 50.9 59 80	110.7	39 08.6 59 81	110.2	39 26.2 58 81	109.7	39 43.6 58 81	109.1	40 00.9 57 81	108.6	40 18.1 57 82	108.1	7
8	37 27.1 60 80	111.0	37 44.9 59 80	110.5	38 02.6 59 81	109.9	38 20.2 58 81	109.4	38 37.6 58 81	108.9	38 54.9 57 82	108.4	39 12.1 57 82	107.9	39 29.1 56 82	107.3	8
9	36 38.9 59 81	110.3	36 56.6 59 81	109.7	37 14.2 58 81	109.2	37 31.6 58 81	108.7	37 48.9 57 82	108.2	38 06.0 57 82	107.7	38 23.0 56 82	107.1	38 39.9 56 82	106.6	9
50	35 50.6 59 81	109.5	36 08.1 58 81	109.0	36 25.5 58 81	108.5	36 42.8 57 82	108.0	36 59.9 57 82	107.5	37 16.9 56 82	106.9	37 33.8 56 82	106.4	37 50.5 56 83	105.9	50
1	35 02.0 58 81	108.8	35 19.4 58 82	108.3	35 36.6 57 82	107.8	35 53.8 57 82	107.3	36 10.8 56 82	106.8	36 27.6 56 82	106.2	36 44.4 55 83	105.7	37 01.0 55 83	105.2	1
2	34 13.2 58 82	108.1	34 30.4 57 82	107.6	34 47.5 57 82	107.1	35 04.5 56 82	106.6	35 21.4 56 82	106.1	35 38.2 56 83	105.6	35 54.8 55 83	105.0	36 11.3 55 83	104.5	2
3	33 24.2 57 82	107.4	33 41.3 57 82	106.9	33 58.3 56 82	106.4	34 15.2 56 83	105.9	34 31.9 56 83	105.4	34 48.5 55 83	104.9	35 05.0 55 83	104.4	35 21.4 54 83	103.9	3
4	32 35.0 57 82	106.7	32 52.0 56 82	106.2	33 08.9 56 83	105.7	33 25.6 56 83	105.2	33 42.3 55 83	104.7	33 58.8 55 83	104.2	34 15.2 54 84	103.7	34 31.4 54 84	103.2	4
55	31 45.7 56 82	106.0	32 02.5 56 83	105.6	32 19.3 56 83	105.1	32 35.9 55 83	104.6	32 52.4 55 83	104.1	33 08.8 54 83	103.6	33 25.1 54 84	103.1	33 41.3 54 84	102.6	55
6	30 56.2 56 83	105.4	31 12.9 56 83	104.9	31 29.5 55 83	104.4	31 46.1 55 83	103.9	32 02.5 55 83	103.4	32 18.8 54 84	102.9	32 35.0 54 84	102.4	32 51.1 53 84	101.9	6
7	30 06.5 56 83	104.7	30 23.1 55 83	104.3	30 39.7 55 83	103.8	30 56.1 54 83	103.3	31 12.4 54 84	102.8	31 28.6 54 84	102.3	31 44.7 53 84	101.8	32 00.6 53 84	101.3	7
8	29 16.7 55 83	104.1	29 33.2 55 83	103.6	29 49.6 54 84	103.1	30 06.0 54 84	102.7	30 22.2 54 84	102.2	30 38.3 53 84	101.7	30 54.3 53 84	101.2	31 10.2 53 84	100.7	8
9	28 26.7 55 83	103.5	28 43.2 54 84	103.0	28 59.5 54 84	102.5	29 15.7 54 84	102.0	29 31.8 53 84	101.6	29 47.9 53 84	101.1	30 03.8 53 84	100.6	30 19.6 52 84	100.1	9
60	27 36.7 55 84	102.9	27 53.0 54 84	102.4	28 09.2 54 84	101.9	28 25.4 54 84	101.4	28 41.4 53 84	100.9	28 57.3 53 84	100.5	29 13.2 53 84	100.0	29 28.9 52 85	99.5	60
1	26 46.5 54 84	102.2	27 02.7 54 84	101.7	27 18.9 54 84	101.3	27 34.9 53 84	100.8	27 50.9 53 84	100.3	28 06.7 53 85	99.9	28 22.5 52 85	99.4	28 38.1 52 85	98.9	1
2	25 56.1 54 84	101.6	26 12.3 54 84	101.2	26 28.4 54 84	100.7	26 44.3 53 84	100.2	27 00.2 53 85	99.7	27 16.0 52 85	99.2	27 31.7 52 85	98.8	27 47.3 52 85	98.3	2
3	25 05.7 54 84	101.0	25 21.8 54 84	100.6	25 37.8 53 84	100.1	25 53.7 53 85	99.6	26 09.5 53 85	99.2	26 25.2 52 85	98.7	26 40.8 52 85	98.2	26 56.3 52 85	97.7	3
4	24 15.2 53 84	100.5	24 31.2 54 84	100.0	24 47.1 53 85	99.5	25 02.9 53 85	99.1	25 18.7 52 85	98.6	25 34.3 52 85	98.1	25 49.9 52 85	97.6	26 05.3 51 85	97.2	4
65	23 24.6 53 85	99.9	23 40.5 53 85	99.4	23 56.3 53 85	98.9	24 12.1 52 85	98.5	24 27.8 52 85	98.0	24 43.4 52 85	97.5	24 58.9 52 85	97.1	25 14.3 51 85	96.6	65
6	22 33.9 53 85	99.3	22 49.7 53 85	98.8	23 05.5 52 85	98.4	23 21.2 52 85	97.9	23 36.8 52 85	97.4	23 52.4 52 85	96.9	24 07.8 51 85	96.5	24 23.2 51 85	96.0	6
7	21 43.1 53 85	98.7	21 58.9 53 85	98.3	22 14.6 52 85	97.8	22 30.2 52 85	97.3	22 45.8 52 85	96.9	23 01.3 51 85	96.4	23 16.7 51 85	96.0	23 32.0 51 85	95.5	7
8	20 52.2 53 85	98.2	21 07.9 52 85	97.7	21 23.6 52 85	97.2	21 39.2 52 85	96.8	21 54.7 52 85	96.3	22 10.1 51 85	95.9	22 25.5 51 85	95.4	22 40.8 51 85	94.9	8
9	20 01.2 52 85	97.6	20 16.9 52 85	97.2	20 32.5 52 85	96.7	20 48.1 52 85	96.2	21 03.6 51 85	95.8	21 19.0 51 85	95.3	21 34.3 51 85	94.9	21 49.5 51 85	94.4	9
70	19 10.2 52 85	97.1	19 25.9 52 85	96.6	19 41.4 52 85	96.1	19 56.9 52 85	95.7	20 12.4 51 85	95.2	20 27.7 51 86	94.8	20 43.0 51 86	94.3	20 58.2 51 86	93.9	70
1	18 19.2 52 85	96.5	18 34.8 52 85	96.1	18 50.3 52 85	95.6	19 05.7 51 85	95.1	19 21.1 51 86	94.7	19 36.5 51 86	94.2	19 51.7 51 86	93.8	20 06.9 51 86	93.3	1
2	17 28.0 52 85	96.0	17 43.6 52 85	95.5	17 59.1 52 85	95.1	18 14.5 51 86	94.6	18 29.9 51 86	94.2	18 45.1 51 86	93.7	19 00.4 51 86	93.2	19 15.5 50 86	92.8	2
3	16 36.9 52 85	95.4	16 52.4 52 85	95.0	17 07.8 51 86	94.5	17 23.2 51 86	94.1	17 38.5 51 86	93.6	17 53.8 51 86	93.2	18 09.0 51 86	92.7	18 24.2 50 86	92.3	3
4	15 45.6 52 85	94.9	16 01.1 51 86	94.4	16 16.5 51 86	94.0	16 31.9 51 86	93.5	16 47.2 51 86	93.1	17 02.4 51 86	92.6	17 17.6 51 86	92.2	17 32.8 50 86	91.7	4
75	14 54.4 52 86	94.3	15 09.8 51 86	93.9	15 25.2 51 86	93.5	15 40.5 51 86	93.0	15 55.8 51 86	92.6	16 11.1 51 86	92.1	16 26.2 50 86	91.7	16 41.3 50 86	91.2	75
6	14 03.1 51 86	93.8	14 18.5 51 86	93.4	14 33.9 51 86	92.9	14 49.2 51 86	92.5	15 04.4 51 86	92.0	15 19.7 51 86	91.6	15 34.8 50 86	91.1	15 49.9 50 86	90.7	6
7	13 11.7 51 86	93.3	13 27.1 51 86	92.8	13 42.5 51 86	92.4	13 57.8 51 86	92.0	14 13.0 51 86	91.5	14 28.2 51 86	91.1	14 43.4 50 86	90.6	14 58.5 50 86	90.2	7
8	12 20.4 51 86	92.8	12 35.8 51 86	92.3	12 51.1 51 86	91.9	13 06.4 51 86	91.4	13 21.6 51 86	91.0	13 36.8 51 86	90.6	13 52.0 50 86	90.1	14 07.1 50 86	89.7	8
9	11 29.0 51 86	92.2	11 44.4 51 86	91.8	11 59.7 51 86	91.4	12 15.0 51 86	90.9	12 30.2 51 86	90.5	12 45.4 51 86	90.1	13 00.5 50 86	89.6	13 15.6 50 86	89.1	9
80	10 37.6 51 86	91.7	10 53.0 51 86	91.3	11 08.3 51 86	90.8	11 23.5 51 86	90.4	11 38.8 51 86	90.0	11 54.0 51 86	89.5	12 09.1 50 86	89.1	12 24.2 50 86	88.6	80
1	9 46.2 51 86	91.2	10 01.5 51 86	90.8	10 16.8 51 86	90.3	10 32.1 51 86	89.9	10 47.3 51 86	89.4	11 02.5 51 86	89.0	11 17.7 50 86	88.6	11 32.8 50 86	88.1	1
2	8 54.8 51 86	90.7	9 10.1 51 86	90.2	9 25.4 51 86	89.8	9 40.7 51 86	89.4	9 55.9 51 86	88.9	10 11.1 51 86	88.5	10 26.3 50 86	88.1	10 41.4 50 86	87.6	2
3	8 03.5 51 86	90.2	8 18.7 51 86	89.7	8 34.0 51 86	89.3	8 49.3 51 86	88.8	9 04.5 51 86	88.4	9 19.7 51 86	88.0	9 34.9 50 86	87.5	9 50.0 50 86	87.1	3
4	7 11.9 51 86	89.6	7 27.2 51 86	89.2	7 42.6 51 86	88.8	7 57.8 51 86	88.3	8 13.1 51 86	87.9	8 28.3 51 86	87.5	8 43.5 51 86	87.0	8 58.7 50 86	86.6	4
85	6 20.5 51 86	89.1	6 35.8 51 86	88.7	6 51.1 51 86	88.3	7 06.4 51 86	87.8	7 21.7 51 86	87.4	7 37.0 51 86	87.0	7 52.2 51 86	86.5	8 07.4 51 86	86.1	85
6	5 29.1 51 86	88.6	5 44.4 51 86	88.2	5 59.7 51 86	87.8	6 15.1 51 86	87.3	6 30.3 51 86	86.9	6 45.6 51 86	86.5	7 00.8 51 85	86.0	7 16.1 51 85	85.6	6
7					5 08.4 51 86	87.2	5 23.7 51 86	86.8	5 39.0 51 86	86.4	5 54.3 51 85	86.0	6 09.6 51 85	85.5	6 24.8 51 85	85.1	7
8											5 03.0 51 85	85.4	5 18.3 51 85	85.0	5 33.6 51 85	84.6	8

H.A.	4° 00'	4° 30'	5° 00'	5° 30'	6° 00'	6° 30'	7° 00'	7° 30'	H.A.
	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	
00	55 00.0 1.00 01 180.0	54 30.0 1.00 01 180.0	54 00.0 1.00 01 180.0	53 30.0 1.00 01 180.0	53 00.0 1.00 01 180.0	52 30.0 1.00 01 180.0	52 00.0 1.00 01 180.0	51 30.0 1.00 01 180.0	00
1	54 59.2 1.00 04 178.3	54 29.2 1.00 04 178.3	53 59.2 1.00 04 178.3	53 29.2 1.00 04 178.3	52 59.3 1.00 04 178.3	52 29.3 1.00 04 178.4	51 59.3 1.00 04 178.4	51 29.3 1.00 04 178.4	1
2	54 56.9 1.00 06 176.5	54 26.9 1.00 06 176.6	53 57.0 1.00 06 176.6	53 27.0 1.00 06 176.7	52 57.0 1.00 06 176.7	52 27.1 1.00 06 176.8	51 57.1 1.00 06 176.8	51 27.1 1.00 06 176.8	2
3	54 53.0 1.00 09 174.8	54 23.1 1.00 09 174.9	53 53.2 1.00 09 174.9	53 23.3 1.00 09 175.0	52 53.3 1.00 09 175.1	52 23.4 1.00 08 175.1	51 53.5 1.00 08 175.2	51 23.6 1.00 08 175.2	3
4	54 47.5 99 12 173.1	54 17.7 99 11 173.2	53 47.9 99 11 173.2	53 18.0 99 11 173.3	52 48.2 1.0 11 173.4	52 18.3 1.0 11 173.5	51 48.5 1.0 11 173.6	51 18.6 1.0 11 173.6	4
05	54 40.6 99 14 171.4	54 10.8 99 14 171.5	53 41.1 99 14 171.6	53 11.3 99 14 171.7	52 41.5 99 13 171.8	52 11.8 99 13 171.9	51 42.0 99 13 172.0	51 12.2 99 13 172.1	05
6	54 32.1 99 17 169.6	54 02.4 99 16 169.8	53 32.8 99 16 169.9	53 03.1 99 16 170.0	52 33.5 99 16 170.2	52 03.8 99 16 170.3	51 34.1 99 15 170.4	51 04.4 99 15 170.5	6
7	54 22.1 98 19 168.0	53 52.6 98 19 168.1	53 23.0 98 18 168.3	52 53.5 98 18 168.4	52 24.0 99 18 168.5	51 54.4 99 18 168.7	51 24.8 99 18 168.8	50 55.2 99 18 169.0	7
8	54 10.6 98 22 166.3	53 41.2 98 21 166.5	53 11.9 98 21 166.6	52 42.5 98 21 166.8	52 13.0 98 21 166.9	51 43.6 98 20 167.1	51 14.2 98 20 167.3	50 44.7 98 20 167.4	8
9	53 57.7 97 24 164.6	53 28.5 97 24 164.8	52 59.2 97 23 165.0	52 30.0 97 23 165.2	52 00.7 98 23 165.4	51 31.4 98 23 165.5	51 02.1 98 22 165.7	50 32.8 98 22 165.9	9
10	53 43.4 97 26 163.0	53 14.3 97 26 163.2	52 45.2 97 26 163.4	52 16.2 97 25 163.6	51 47.0 97 25 163.8	51 17.9 97 25 164.0	50 48.8 97 24 164.2	50 19.6 97 24 164.4	10
1	53 27.6 96 29 161.4	52 58.7 96 28 161.6	52 29.9 96 28 161.8	52 00.9 96 28 162.0	51 32.0 96 27 162.2	51 03.1 96 27 162.7	50 34.1 96 27 162.7	50 05.1 96 26 162.9	1
2	53 10.5 95 31 159.8	52 41.8 96 30 160.0	52 13.1 96 30 160.2	51 44.4 96 30 160.5	51 15.7 96 29 160.7	50 46.9 96 29 160.9	50 18.1 96 29 161.2	49 49.3 96 28 161.4	2
3	52 52.0 95 33 158.2	52 23.6 95 33 158.4	51 55.1 95 32 158.7	51 26.6 95 32 158.9	50 58.0 95 32 159.2	50 29.5 95 31 159.4	50 00.9 95 31 159.7	49 32.2 95 30 159.9	3
4	52 32.3 94 35 156.6	52 04.0 94 35 156.9	51 35.8 94 34 157.2	51 07.5 94 34 157.4	50 39.1 95 34 157.7	50 10.8 95 33 158.0	49 42.4 95 33 158.2	49 13.9 95 32 158.5	4
15	52 11.2 93 37 155.1	51 43.2 93 37 155.4	51 15.2 94 36 155.7	50 47.1 94 36 156.0	50 19.0 94 36 156.2	49 50.9 94 35 156.5	49 22.7 94 35 156.8	48 54.5 94 34 157.0	15
6	51 49.0 92 39 153.6	51 21.2 93 39 153.9	50 53.4 93 38 154.2	50 25.6 93 38 154.5	49 57.7 93 37 154.8	49 29.8 93 37 155.1	49 01.8 93 37 155.3	48 33.8 93 36 155.6	6
7	51 25.5 92 41 152.1	50 58.0 92 41 152.4	50 30.4 92 40 152.7	50 02.8 92 40 153.0	49 35.2 92 39 153.4	49 07.5 92 39 153.6	48 39.8 93 39 153.9	48 12.0 93 38 154.2	7
8	51 00.8 91 43 150.7	50 33.6 91 42 151.0	50 06.3 91 42 151.3	49 39.0 91 42 151.6	49 11.6 91 41 151.9	48 44.1 92 41 152.3	48 16.6 92 40 152.6	47 49.1 92 40 152.9	8
9	50 35.1 90 45 149.2	50 08.1 90 44 149.6	49 41.1 90 44 149.9	49 14.0 90 43 150.2	48 46.8 91 43 150.6	48 19.6 91 43 150.9	47 52.4 91 42 151.2	47 25.1 91 42 151.5	9
20	50 08.2 89 46 147.8	49 41.5 89 46 148.2	49 14.8 89 46 148.5	48 47.9 90 45 148.9	48 21.0 90 45 149.2	47 54.1 90 44 149.5	47 27.1 90 44 149.9	47 00.0 90 43 150.2	20
1	49 40.4 88 48 146.5	49 13.9 88 48 146.8	48 47.4 88 47 147.2	48 20.8 89 47 147.5	47 54.2 89 46 147.9	47 27.5 89 46 148.2	47 00.7 89 46 148.6	46 33.9 89 45 148.9	1
2	49 11.4 87 50 145.1	48 45.3 87 49 145.5	48 19.0 88 49 145.9	47 52.7 88 48 146.2	47 26.4 88 48 146.6	46 59.9 88 48 146.9	46 33.4 88 47 147.3	46 06.9 89 47 147.6	2
3	48 41.5 86 51 143.8	48 15.7 86 51 144.2	47 49.7 87 50 144.6	47 23.7 87 50 144.9	46 57.6 87 50 145.3	46 31.4 87 49 145.7	46 05.1 88 49 146.0	45 38.8 88 48 146.3	3
4	48 10.7 85 53 142.5	47 45.1 86 52 142.9	47 19.4 86 52 143.3	46 53.6 86 52 143.7	46 27.8 86 51 144.0	46 01.9 86 51 144.4	45 35.9 87 50 144.8	45 09.9 87 50 145.1	4
25	47 39.0 84 54 141.3	47 13.6 84 54 141.7	46 48.2 85 53 142.0	46 22.7 85 53 142.4	45 57.2 85 53 142.8	45 31.5 86 52 143.2	45 05.8 86 52 143.5	44 40.0 86 51 143.9	25
6	47 06.4 83 56 140.0	46 41.3 84 55 140.4	46 16.2 84 55 140.8	45 50.9 84 54 141.2	45 25.6 84 54 141.6	45 00.3 85 54 142.0	44 34.8 85 53 142.3	44 09.3 85 53 142.7	6
7	46 32.9 82 57 138.8	46 08.1 83 57 139.2	45 43.3 83 56 139.6	45 18.3 83 56 140.0	44 53.3 84 55 140.4	44 28.2 84 55 140.8	44 03.0 84 54 141.2	43 37.7 84 54 141.5	7
8	45 58.6 82 58 137.6	45 34.1 82 58 138.0	45 09.5 82 58 138.5	44 44.9 82 57 138.9	44 20.1 83 57 139.2	43 55.3 83 56 139.6	43 30.3 83 56 140.0	43 05.3 83 55 140.4	8
9	45 23.6 81 60 136.5	44 59.4 81 59 136.9	44 35.0 81 59 137.3	44 10.6 82 58 137.7	43 46.1 82 58 138.1	43 21.6 82 57 138.5	42 56.9 82 57 138.9	42 32.2 83 57 139.3	9
30	44 47.8 80 61 135.3	44 23.8 80 60 135.8	43 59.8 80 60 136.2	43 35.7 81 60 136.6	43 11.4 81 60 137.0	42 47.1 81 59 137.4	42 22.7 81 58 137.8	41 58.2 82 58 138.2	30
1	44 11.3 79 62 134.2	43 47.6 79 62 134.7	43 23.8 79 61 135.1	43 00.0 80 61 135.5	42 36.0 80 60 135.9	42 11.9 80 60 136.3	41 47.8 81 59 136.7	41 23.6 81 59 137.1	1
2	43 34.1 78 63 133.1	43 10.7 78 63 133.6	42 47.2 79 62 134.0	42 23.6 79 62 134.4	41 59.9 79 61 134.8	41 36.1 79 61 135.2	41 12.2 80 60 135.6	40 48.2 80 60 136.0	2
3	42 56.3 77 64 132.1	42 33.1 77 64 132.5	42 09.8 78 63 132.9	41 46.5 78 63 133.4	41 23.1 78 62 133.8	40 59.5 79 62 134.2	40 35.9 79 62 134.6	40 12.2 79 61 135.0	3
4	42 17.8 76 65 131.0	41 54.9 76 65 131.5	41 31.9 77 64 131.9	41 08.8 77 64 132.3	40 45.6 77 63 132.8	40 22.3 78 63 133.2	39 59.0 78 63 133.6	39 35.5 78 62 134.0	4
35	41 38.7 75 66 130.0	41 16.1 76 66 130.5	40 53.3 76 65 130.9	40 30.5 76 65 131.3	40 07.5 77 64 131.8	39 44.5 77 64 132.2	39 21.4 77 64 132.6	38 58.2 77 63 133.0	35
6	40 59.0 74 67 129.0	40 36.6 75 67 129.5	40 14.2 75 66 129.9	39 51.6 75 66 130.3	39 28.9 76 65 130.8	39 06.1 76 65 131.2	38 43.3 76 65 131.6	38 20.3 77 64 132.0	6
7	40 18.8 74 68 128.1	39 56.7 74 68 128.5	39 34.4 74 67 128.9	39 12.1 75 67 129.4	38 49.7 75 66 129.8	38 27.1 75 66 130.2	38 04.5 76 66 130.6	37 41.8 76 65 131.1	7
8	39 38.1 73 69 127.1	39 16.2 73 68 127.6	38 54.2 73 68 128.0	38 32.1 74 68 128.4	38 09.9 74 67 128.9	37 47.6 74 67 129.3	37 25.2 75 66 129.7	37 02.7 75 66 130.1	8
9	38 56.8 72 70 126.2	38 35.0 72 69 126.6	38 13.4 73 69 127.0	37 51.5 73 68 127.5	37 29.6 73 68 127.9	37 07.5 74 68 128.4	36 45.4 74 67 128.8	36 23.1 74 67 129.2	9
40	38 15.0 71 70 125.3	37 53.6 72 70 125.7	37 32.1 72 70 126.1	37 10.5 72 69 126.6	36 48.7 73 69 127.0	36 26.9 73 68 127.4	36 05.0 73 68 127.9	35 43.0 74 68 128.3	40
1	37 32.8 70 71 124.4	37 11.6 71 71 124.8	36 50.3 71 70 125.3	36 28.9 71 70 125.7	36 07.4 72 70 126.1	35 45.8 72 69 126.6	35 24.2 72 69 127.0	35 02.4 73 68 127.4	1
2	36 50.1 70 72 123.5	36 29.2 70 72 123.9	36 08.1 70 71 124.4	35 46.9 71 71 124.8	35 25.7 71 70 125.2	35 04.0 71 70 125.7	34 42.9 72 70 126.1	34 21.3 72 69 126.5	2
3	36 07.0 69 73 122.6	35 46.3 69 72 123.1	35 25.4 70 72 123.5	35 04.5 70 71 124.0	34 43.4 70 71 124.4	34 22.3 71 71 124.8	34 01.1 71 70 125.2	33 39.8 71 70 125.7	3
4	35 23.5 68 74 121.8	35 03.0 69 73 122.2	34 42.2 69 72 122.7	34 21.6 69 72 123.1	34 00.8 70 72 123.5	33 39.9 70 71 124.0	33 18.9 70 71 124.4	32 58.0 71 71 124.8	4
45	34 39.6 68 74 121.0	34 19.3 68 73 121.4	33 58.8 68 73 121.8	33 38.3 69 73 122.3	33 17.7 69 72 122.7	32 57.0 69 72 123.2	32 36.2 69 72 123.6	32 15.3 70 71 124.0	45
6	33 55.5 67 74 120.1	33 35.2 67 74 120.6	33 15.0 68 74 121.0	32 54.6 68 73 121.5	32 34.2 68 73 121.9	32 13.7 68 73 122.3	31 53.2 69 72 122.8	31 32.5 69 72 123.2	6
7	33 10.7 66 75 119.3	32 50.7 67 75 119.8	32 30.7 67 74 120.2	32 10.6 67 74 120.7	31 50.4 67 74 121.1	31 30.1 68 73 121.5	31 09.7 68 73 122.0	30 49.3 68 73 122.4	7
8	32 25.7 66 76 118.6	32 05.9 66 75 119.0	31 46.1 66 75 119.5	31 26.2 67 75 119.9	31 06.2 67 74 120.3	30 46.1 67 74 120.8	30 25.9 67 74 121.2	30 05.7 68 73 121.6	8
9	31 40.3 65 76 117.8	31 20.8 65 76 118.2	31 01.1 66 75 118.7	30 41.4 66 75 119.1	30 21.6 66 75 119.6	30 01.7 66 75 120.0	29 41.7 67 74 120.4	29 21.7 67 74 120.8	9
50	30 54.7 64 77 117.0	30 35.3 65 76 117.5	30 15.9 65 76 117.9	29 56.3 65 76 118.4	29 36.7 66 75 118.8	29 17.0 66 75 119.2	28 57.2 66 75 119.7	28 37.4 66 74 120.1	50
1	30 08.7 64 77 116.3	29 49.5 64 77 116.7	29 30.3 64 76 117.2	29 10.9 65 76 117.6	28 51.5 65 76 118.1	28 32.0 65 76 118.5	28 12.4 65 75 118.9	27 52.7 66 75 119.3	1
2	29 22.5 63 78 115.6	29 03.5 63 77 116.0	28 44.4 64 77 116.5	28 25.2 64 77 116.9	28 05.9 64 76 117.3	27 46.6 65 76 117.8	27 27.2 65 76 118.2	27 07.5 65 76 118.6	2
3	28 35.9 63 78 114.9	28 17.1 63 78 115.3	27 58.2 63 77 115.7	27 39.2 63 77 116.2	27 20.1 64 77 116.6	27 00.9 64 77 117.0	26 41.7 64 76 117.5	26 22.4 65 76 117.9	3
4	27 49.1 62 78 114.1	27 30.5 62 78 114.6	27 11.7 63 78 115.0	26 52.9 63 78 115.5	26 34.0 63 77 115.9	26 15.0 63 77 116.3	25 55.9 64 77 116.8	25 36.8 64 76 117.2	4
55	27 02.1 62 79 113.5	26 43.6 62 79 113.9	26 25.0 62 78 114.3	26 06.3 62 78 114.8	25 47.6 63 78 115.2	25 28.8 63 78 115.6	25 09.9 63 77 116.1	24 50.9 63 77 116.5	55
6	26 14.8 61 79 112.8	25 56.4 61 79 113.2	25 38.0 62 79 113.6	25 19.5 62 78 114.1	25 00.9 62 78 114.5	24 42.3 62 78 114.9	24 23.5 63 78 115.4	24 04.7 63 77 115.8	6
7	25 27.2 61 80 112.1	25 09.0 61 79 112.5	24 50.8 61 79 113.0	24 32.4 61 79 113.4	24 14.0 62 79 113.8	23 55.5 62 78 114.3	23 36.9 62 78 114.7	23 18.3 62 78 115.1	7
8	24 39.5 60 80 111.4	24 21.4 60 80 111.9	24 03.3 61 80 112.3	23 45.1 61 79 112.8	23 26.8 61 79 113.2	23 08.5 61 79 113.6	22 50.1 61 78 114.0	22 31.6 62 78 114.5	8
9	23 51.5 60 80 110.8	23 33.6 60 80 111.2	23 15.6 60 80 111.7	22 57.6 60 80 112.1	22 39.4 61 79 112.5	22 21.3 61 79 112.9	22 03.0 61 79 113.4	21 44.7 61 79 113.8	9
60	23 03.2 59 81 110.1	22 45.5 59 80 110.6	22 27.7 60 80 111.0	22 09.8 60 80 111.4	21 51.8 60 80 111.9	21 33.8 60 80 112.3	21 15.7 60 79 112.7	20 57.5 61 79 113.2	60
1	22 14.9 59 81 109.5	21 57.3 59 81 109.9	21 39.6 59 80 110.4	21 21.8 59 80 110.8	21 04.0 60 80 111.2	20 46.1 60 80 111.7	20 28.1 60 80 112.1	20 10.1 60 79 112.5	1
2	21 26.3 58 81 108.9	21 08.8 58 81 109.3	20 51.3 59 81 109.7	20 33.6 59 81 110.2	20 15.9 59 80 110.6	19 58.2 59 80 111.0	19 40.4 59 80 111.5	19 22.5 60 80 111.9	2
3	20 37.6 58 82 108.2	20 20.2 58 81 108.7	20 02.8 58 81 109.1	19 45.3 58 81 109.5	19 27.7 59 81 109.9	19 10.1 59 81 110.4	18 52.4 59 80 110.8	18 34.7 59 80 111.3	3
4	19 48.6 57 82 107.6	19 31.4 58 82 108.1	19 14.1 58 81 108.5	18 56.7 58 81 108.9	18 39.3 58 81 109.4	18 21.8 58 81 109.8	18 04.2 59 81 110.2	17 46.6 59 80 110.6	4
65	18 59.6 57 82 107.0	18 42.4 57 82 107.5	18 25.2 57 82 107.9	18 08.0 58 82 108.3	17 50.7 58 81 108.8	17 33.3 58 81 109.2	17 15.9 58 81 109.6	16 58.4 58 81 110.0	65
6	18 10.3 57 82 106.4	17 53.3 57 82 106.9	17 36.2 57 82 107.3	17 19.1 57 82 107.7	17 01.9 57 82 108.2	16 44.6 58 81 108.6	16 27.3 58 81 109.0	16 10.0 58 81 109.4	6
7	17 20.9 56 83 105.8	17 04.0 56 82 106.3	16 47.0 57 82 106.7	16 30.0 57 82 107.1	16 12.9 57 82 107.6	15 55.7 57 82 108.0	15 38.6 57 81 108.4	15 21.4 57 81 108.8	7
8	16 31.3 56 83 105.3	16 14.5 56 83 105.7	15 57.7 56 82 106.1	15 40.8 56 82 106.5	15 23.8 57 82 107.0	15 06.8 57 82 107.4	14 49.8 57 82 107.8	14 32.7 57 82 108.2	8
9	15 41.7 56 83 104.7	15 25.0 56 83 105.1	15 08.2 56 83 105.5	14 51.4 56 83 106.0	14 34.6 56 82 106.4	14 17.7 56 82 106.8	14 00.7 57 82 107.2	13 43.7 57 82 107.7	9
70	14 51.8 55 83 104.1	14 35.2 55 83 104.5	14 18.6 56 83 105.0	14 01.9 56 83 105.4	13 45.1 56 83 105.8	13 28.4 56 82 106.2	13 11.5 56 82 106.7	12 54.6 56 82 107.1	70
1	14 01.9 55 83 103.5	13 45.4 55 83 104.0	13 28.8 55 83 104.4	13 12.2 55 83 104.8	12 55.6 56 83 105.2	12 38.9 56 83 105.7	12 22.2 56 82 106.1	12 05.4 56 82 106.5	1
2	13 11.8 54 84 103.0	12 55.4 55 84 103.4	12 39.0 55 83 103.8	12 22.5 55 83 104.3	12 05.9 55 83 104.7	11 49.3 55 83 105.1	11 32.7 55 83 105.5	11 16.0 56 83 106.0	2
3	12 21.7 54 84 102.4	12 05.3 54 84 102.8	11 49.0 55 84 103.3	11 32.5 55 83 103.7	11 16.1 55 83 104.1	10 59.6 55 83 104.6	10 43.1 55 83 105.0	10 26.5 55 83 105.4	3
4	11 31.4 54 84 101.9	11 15.1 54 84 102.3	10 58.8 54 84 102.7	10 42.5 54 84 103.1	10 26.2 55 83 103.6	10 09.8 55 83 104.0	9 53.3 55 83 104.4	9 36.9 55 83 104.8	4
75	10 41.0 54 84 101.3	10 24.8 54 84 101.7	10 08.6 54 84 102.2	9 52.4 54 84 102.6	9 36.1 54 84 103.0	9 19.8 55 83 103.4	9 03.5 55 83 103.9	8 47.1 55 83 104.3	75
6	9 50.5 54 84 100.8	9 34.4 54 84 101.2	9 18.3 54 84 101.6	9 02.1 54 84 102.1	8 45.9 54 84 102.5	8 29.7 54 84 102.9	8 13.5 54 84 103.3	7 57.2 54 83 103.8	6
7	9 00.0 53 84 100.2	8 43.9 54 84 100.7	8 27.9 54 84 101.1	8 11.8 54 84 101.5	7 55.7 54 84 101.9	7 39.5 54 84 102.4	7 23.4 54 84 102.8	7 07.2 54 84 103.2	7
8	8 09.3 53 85 99.7	7 53.3 53 84 100.1	7 37.4 53 84 100.5	7 21.3 53 84 101.0	7 05.3 53 84 101.4	6 49.3 54 84 101.8	6 33.2 54 84 102.2	6 17.1 54 84 102.7	8
9	7 18.6 53 85 99.2	7 02.7 53 85 99.6	6 46.8 53 84 100.0	6 30.8 53 84 100.4	6 14.8 53 84 100.9	5 58.8 53 84 101.3	5 42.9 53 84 101.7	5 26.8 53 84 102.1	9
80	6 27.8 53 85 98.6	6 11.9 53 85 99.1	5 56.1 53 85 99.5	5 40.2 53 85 99.9	5 24.3 53 85 100.3	5 08.4 53 85 100.8			80
1	5 36.9 53 85 98.1	5 21.1 53 85 98.5	5 05.3 53 85 99.0						1

Lat. 31°

Each cell: Alt (° ′) · Δd · Δt · Az.

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
00	67 00.0 1.0 02 180.0	67 30.0 1.0 02 180.0	68 00.0 1.0 02 180.0	68 30.0 1.0 02 180.0	69 00.0 1.0 02 180.0	69 30.0 1.0 02 180.0	70 00.0 1.0 02 180.0	70 30.0 1.0 02 180.0	00
1	66 58.9 1.0 02 177.5	67 28.8 1.0 06 177.7	67 58.8 1.0 06 177.4	68 28.8 1.0 06 177.3	68 58.8 1.0 06 177.3	69 28.7 1.0 06 177.2	69 58.7 1.0 06 177.1	70 28.7 1.0 07 177.1	1
2	66 55.5 1.0 09 174.9	67 25.4 1.0 10 174.8	67 55.3 1.0 10 174.7	68 25.2 1.0 10 174.6	68 55.1 1.0 10 174.5	69 25.0 1.0 10 174.4	69 54.9 1.0 11 174.3	70 24.7 1.0 11 174.1	2
3	66 49.8 99 13 172.4	67 19.6 99 13 172.3	67 49.4 99 14 172.1	68 19.2 99 14 172.0	68 49.0 99 14 171.8	69 18.7 99 15 171.6	69 48.5 99 15 171.4	70 18.2 99 15 171.2	3
4	66 41.9 99 17 169.9	67 11.6 99 17 169.7	67 41.2 99 17 169.5	68 10.8 99 18 169.3	68 40.4 99 18 169.1	69 10.0 99 18 168.9	69 39.6 99 19 168.6	70 09.1 99 19 168.4	4
05	66 31.9 98 20 167.5	67 01.3 98 21 167.2	67 30.7 98 21 167.0	68 00.2 98 22 166.7	68 29.5 98 22 166.4	68 58.9 98 22 166.2	69 28.2 98 23 165.9	69 57.5 98 23 165.6	05
6	66 19.6 97 24 165.1	66 48.9 97 24 164.8	67 18.1 97 25 164.5	67 47.2 97 25 164.2	68 16.4 97 26 163.9	68 45.4 97 26 163.5	69 14.5 97 27 163.2	69 43.5 97 27 162.8	6
7	66 05.4 97 27 162.7	66 34.3 96 28 162.4	67 03.2 96 28 162.0	67 32.1 96 29 161.7	68 01.0 96 29 161.3	68 29.7 96 30 160.9	68 58.5 96 30 160.5	69 27.1 95 31 160.1	7
8	65 49.0 96 30 160.3	66 17.7 95 31 159.9	66 46.3 95 32 159.6	67 14.9 95 32 159.2	67 43.4 95 33 158.8	68 11.9 95 33 158.4	68 40.2 94 34 157.9	69 08.5 94 35 157.5	8
9	65 30.8 95 34 158.1	65 59.1 94 34 157.7	66 27.4 94 35 157.2	66 55.6 94 35 156.8	67 23.8 94 36 156.4	67 51.9 93 37 155.9	68 19.9 93 37 155.4	68 47.8 93 38 154.9	9
10	65 10.6 94 37 155.8	65 38.6 93 37 155.4	66 06.6 93 38 154.9	66 34.4 93 38 154.5	67 02.2 92 39 154.0	67 29.9 92 40 153.5	67 57.5 92 40 153.0	68 25.0 91 41 152.4	10
1	64 48.7 92 39 153.6	65 16.3 92 40 153.2	65 43.9 92 41 152.7	66 11.4 91 41 152.2	66 38.7 91 42 151.7	67 06.0 91 43 151.2	67 33.2 90 44 150.6	68 00.2 90 44 150.1	1
2	64 25.0 91 42 151.5	64 52.3 91 43 151.0	65 19.4 90 44 150.5	65 46.5 90 44 150.0	66 13.5 90 45 149.5	66 40.3 89 46 148.9	67 07.1 89 46 148.3	67 33.7 88 47 147.7	2
3	63 59.7 90 45 149.5	64 26.5 89 45 149.0	64 53.3 89 46 148.5	65 20.0 89 47 147.9	65 46.5 88 48 147.3	66 12.9 88 48 146.7	66 39.2 87 49 146.1	67 05.4 87 50 145.5	3
4	63 32.8 89 47 147.5	63 59.2 88 48 146.9	64 25.6 88 49 146.4	64 51.9 87 49 145.8	65 18.0 87 50 145.2	65 44.0 86 51 144.6	66 09.8 86 52 144.0	66 35.4 85 52 143.4	4
15	63 04.4 87 50 145.5	63 30.5 87 50 145.0	63 56.4 86 51 144.4	64 22.2 86 52 143.8	64 47.9 85 52 143.2	65 13.4 85 53 142.6	65 38.8 84 54 142.0	66 04.0 84 55 141.3	15
6	62 34.6 86 52 143.7	63 00.2 85 53 143.1	63 25.8 85 53 142.5	63 51.2 84 54 141.9	64 16.4 84 55 141.3	64 41.5 83 55 140.7	65 06.4 83 56 140.0	65 31.2 82 57 139.3	6
7	62 03.4 84 54 141.8	62 28.7 84 55 141.3	62 53.8 84 55 140.7	63 18.8 83 56 140.1	63 43.6 82 57 139.4	64 08.3 82 58 138.8	64 32.7 81 58 138.1	64 57.0 81 59 137.4	7
8	61 31.0 83 56 140.1	61 55.9 83 57 139.5	62 20.6 82 58 138.9	62 45.2 82 58 138.3	63 09.6 81 59 137.6	63 33.8 80 59 137.0	63 57.9 80 60 136.3	64 21.6 79 61 135.6	8
9	60 57.4 82 58 138.4	61 21.9 81 58 137.8	61 46.2 81 59 137.2	62 10.4 80 60 136.5	62 34.3 80 61 135.9	62 58.1 79 61 135.2	63 21.7 78 62 134.5	63 45.1 78 63 133.8	9
20	60 22.7 81 60 136.7	60 46.8 80 60 136.1	61 10.7 79 61 135.5	61 34.4 79 62 134.9	61 58.0 78 62 134.2	62 21.3 78 63 133.5	62 44.5 77 64 132.9	63 07.4 76 64 132.2	20
1	59 47.0 79 61 135.2	60 10.7 79 62 134.5	60 34.2 78 63 133.9	60 57.5 77 63 133.3	61 20.6 77 64 132.6	61 43.6 76 65 131.9	62 06.3 75 65 131.2	62 28.8 75 66 130.5	1
2	59 10.2 78 63 133.6	59 33.5 77 63 133.0	59 56.6 77 64 132.4	60 19.6 76 65 131.7	60 42.3 75 65 131.1	61 04.8 75 66 130.4	61 27.2 74 67 129.7	61 49.3 73 67 129.0	2
3	58 32.6 77 64 132.1	58 55.5 76 65 131.5	59 18.2 75 66 130.9	59 40.7 75 66 130.2	60 03.1 74 67 129.6	60 25.2 73 67 128.9	60 47.2 73 68 128.2	61 08.9 72 69 127.5	3
4	57 54.0 75 66 130.7	58 16.5 75 66 130.1	58 38.9 74 67 129.5	59 01.1 74 67 128.8	59 23.0 73 68 128.1	59 44.8 72 69 127.5	60 06.4 71 69 126.8	60 27.7 71 70 126.1	4
25	57 14.6 74 67 129.3	57 36.8 74 68 128.7	57 58.8 73 68 128.1	58 20.6 72 69 127.4	58 42.2 72 69 126.6	59 03.6 71 70 126.1	59 24.8 70 70 125.4	59 45.7 69 71 124.7	25
6	56 34.4 73 68 128.0	56 56.3 72 69 127.4	57 17.9 72 69 126.7	57 39.4 71 70 126.1	58 00.6 70 70 125.4	58 21.7 70 71 124.7	58 42.5 69 72 124.1	59 03.1 68 72 123.4	6
7	55 53.6 72 69 126.7	56 15.1 71 70 126.0	56 36.4 71 70 125.5	56 57.5 70 71 124.8	57 18.4 69 71 124.1	57 39.1 69 72 123.5	57 59.6 68 73 122.8	58 19.8 67 73 122.1	7
8	55 12.0 71 70 125.5	55 33.2 70 71 124.8	55 54.2 70 71 124.2	56 14.9 69 72 123.5	56 35.5 68 72 122.9	56 55.9 68 73 122.2	57 16.0 67 74 121.5	57 36.0 66 74 120.8	8
9	54 29.8 70 71 124.2	54 50.6 69 72 123.6	55 11.3 69 72 123.0	55 31.8 68 73 122.3	55 52.0 67 73 121.7	56 12.1 66 74 121.0	56 31.9 66 75 120.3	56 51.5 65 75 119.7	9
30	53 47.0 69 72 123.1	54 07.5 68 73 122.5	54 27.9 68 73 121.8	54 48.1 67 74 121.2	55 08.0 66 74 120.5	55 27.8 65 75 119.9	55 47.3 65 75 119.2	56 06.6 64 76 118.5	30
1	53 03.6 68 73 121.9	53 23.9 67 74 121.3	53 43.9 67 74 120.7	54 03.8 66 75 120.1	54 23.5 65 75 119.4	54 42.9 64 76 118.8	55 02.2 64 76 118.1	55 21.2 63 76 117.4	1
2	52 19.7 67 74 120.8	52 39.7 66 74 120.2	52 59.4 66 75 119.6	53 19.0 65 75 119.0	53 38.4 64 76 118.3	53 57.6 64 76 117.7	54 16.6 63 77 117.0	54 35.3 62 77 116.3	2
3	51 35.3 66 75 119.8	51 55.0 65 75 119.2	52 14.5 65 76 118.5	52 33.8 64 76 117.9	52 52.9 63 77 117.3	53 11.8 63 77 116.6	53 30.5 62 77 116.0	53 49.0 61 78 115.3	3
4	50 50.4 65 76 118.7	51 09.8 64 76 118.1	51 29.1 64 76 117.5	51 48.2 63 77 116.9	52 07.0 63 77 116.3	52 25.7 62 78 115.6	52 44.1 61 78 115.0	53 02.3 61 78 114.3	4
35	50 05.1 64 76 117.7	50 24.3 64 77 117.1	50 43.3 63 77 116.5	51 02.1 62 77 115.9	51 20.7 62 78 115.3	51 39.1 61 78 114.6	51 57.3 60 79 114.0	52 15.3 60 79 113.3	35
6	49 19.4 63 77 116.7	49 38.5 63 77 116.1	49 57.1 62 78 115.5	50 15.6 62 78 114.9	50 34.0 61 78 114.3	50 52.2 60 79 113.7	51 10.1 60 79 113.0	51 27.9 59 80 112.4	6
7	48 33.2 62 78 115.8	48 52.0 61 78 115.2	49 10.5 61 78 114.6	49 28.8 60 79 114.0	49 47.0 60 79 113.4	50 04.9 59 79 112.8	50 22.6 58 80 112.2	50 40.2 58 80 111.5	7
8	47 46.8 62 78 114.9	48 05.2 61 78 114.3	48 23.5 61 79 113.7	48 41.7 60 79 113.1	48 59.6 59 79 112.5	49 17.3 59 80 111.9	49 34.8 58 80 111.2	49 52.2 57 80 110.6	8
9	46 59.9 61 79 114.0	47 18.2 61 79 113.4	47 36.3 60 79 112.8	47 54.2 59 80 112.2	48 11.9 59 80 111.6	48 29.4 58 80 111.0	48 46.8 57 81 110.4	49 03.9 57 81 109.7	9
40	46 12.8 60 79 113.1	46 30.8 60 79 112.5	46 48.7 59 80 111.9	47 06.4 59 80 111.3	47 24.0 58 80 110.7	47 41.3 57 81 110.1	47 58.4 57 81 109.5	48 15.4 56 81 108.9	40
1	45 25.3 60 80 112.2	45 43.2 59 80 111.7	46 00.9 59 80 111.1	46 18.4 58 80 110.4	46 35.7 57 81 109.9	46 52.9 57 81 109.3	47 09.8 56 81 108.7	47 26.6 56 82 108.1	1
2	44 37.6 59 80 111.4	44 55.3 59 80 110.8	45 12.8 58 80 110.3	45 30.1 57 81 109.7	45 47.2 57 81 109.1	46 04.2 56 81 108.5	46 21.0 56 82 107.9	46 37.6 55 82 107.3	2
3	43 49.6 59 80 110.6	44 07.1 58 80 110.0	44 24.4 57 81 109.5	44 41.5 57 81 108.9	44 58.5 56 82 108.3	45 15.3 56 82 107.7	45 32.0 55 82 107.1	45 48.4 55 83 106.5	3
4	43 01.3 58 81 109.8	43 18.6 57 81 109.2	43 35.8 57 81 108.7	43 52.8 56 82 108.1	44 09.6 56 82 107.5	44 26.2 55 82 106.9	44 42.7 55 82 106.4	44 59.0 54 83 105.8	4
45	42 12.8 57 81 109.0	42 29.9 57 82 108.5	42 46.9 56 82 107.9	43 03.8 56 82 107.3	43 20.4 55 82 106.8	43 36.9 55 82 106.2	43 53.3 54 83 105.6	44 09.4 54 83 105.0	45
6	41 24.1 57 82 108.3	41 41.1 56 82 107.7	41 57.9 56 82 107.2	42 14.6 55 82 106.6	42 31.1 55 83 106.0	42 47.5 54 83 105.5	43 03.6 54 83 104.9	43 19.6 53 83 104.3	6
7	40 35.1 56 82 107.5	40 52.0 56 82 107.0	41 08.7 55 82 106.4	41 25.2 55 83 105.8	41 41.6 54 83 105.3	41 57.8 54 83 104.7	42 13.9 53 83 104.2	42 29.7 53 83 103.6	7
8	39 46.0 56 82 106.8	40 02.7 55 82 106.2	40 19.2 55 83 105.7	40 35.6 54 83 105.1	40 51.9 54 83 104.6	41 08.0 53 83 104.0	41 23.9 53 84 103.5	41 39.7 52 84 102.9	8
9	38 56.6 56 82 106.1	39 13.2 55 83 105.5	39 29.6 55 83 105.0	39 45.9 54 83 104.4	40 02.1 54 83 103.9	40 18.0 53 84 103.3	40 33.8 52 84 102.8	40 49.5 52 84 102.2	9
50	38 07.1 55 83 105.4	38 23.6 55 83 104.8	38 39.9 54 83 104.3	38 56.0 54 83 103.8	39 12.1 53 84 103.2	39 27.9 53 84 102.7	39 43.6 52 84 102.1	39 59.1 52 84 101.6	50
1	37 17.5 54 83 104.7	37 33.8 54 83 104.2	37 50.0 54 83 103.6	38 06.0 53 84 103.1	38 21.9 53 84 102.6	38 37.7 52 84 102.0	38 53.3 52 84 101.5	39 08.7 51 84 100.9	1
2	36 27.6 54 83 104.0	36 43.8 54 83 103.5	36 59.9 53 84 103.0	37 15.9 53 84 102.4	37 31.7 52 84 101.9	37 47.3 52 84 101.4	38 02.8 51 84 100.8	38 18.1 51 84 100.3	2
3	35 37.7 54 84 103.3	35 53.8 53 84 102.8	36 09.7 53 84 102.3	36 25.6 52 84 101.8	36 41.3 52 84 101.2	36 56.8 52 84 100.7	37 12.2 51 85 100.2	37 27.5 51 85 99.6	3
4	34 47.6 54 84 102.7	35 03.6 53 84 102.2	35 19.4 53 84 101.7	35 35.2 52 84 101.1	35 50.8 52 84 100.6	36 06.2 51 84 100.1	36 21.6 51 85 99.6	36 37.7 50 85 99.0	4
55	33 57.3 53 84 102.1	34 13.2 53 84 101.6	34 29.0 52 84 101.0	34 44.7 52 84 100.5	35 00.2 51 84 100.0	35 15.6 51 85 99.5	35 30.8 51 85 98.9	35 45.9 50 85 98.4	55
6	33 07.0 53 84 101.4	33 22.8 53 84 100.9	33 38.5 52 84 100.4	33 54.0 52 84 99.9	34 09.5 51 85 99.4	34 24.8 51 85 98.9	34 40.0 50 85 98.3	34 55.0 50 85 97.8	6
7	32 16.5 53 84 100.8	32 32.2 52 84 100.3	32 47.8 52 85 99.8	33 03.3 51 85 99.3	33 18.7 51 85 98.8	33 33.9 51 85 98.3	33 49.0 50 85 97.7	34 04.0 50 85 97.2	7
8	31 25.9 52 84 100.2	31 41.6 52 85 99.7	31 57.1 51 85 99.2	32 12.5 51 85 98.7	32 27.8 51 85 98.2	32 43.0 50 85 97.7	32 58.0 50 85 97.1	33 12.9 50 85 96.6	8
9	30 35.3 52 85 99.6	30 50.8 52 85 99.1	31 06.3 51 85 98.6	31 21.6 51 85 98.1	31 36.9 50 85 97.6	31 52.0 50 85 97.1	32 07.0 50 85 96.6	32 21.8 49 85 96.1	9
60	29 44.5 52 85 99.0	30 00.0 51 85 98.5	30 15.4 51 85 98.0	30 30.7 51 85 97.5	30 45.9 50 85 97.0	31 00.9 50 85 96.5	31 15.8 50 85 96.0	31 30.7 49 85 95.5	60
1	28 53.7 52 85 98.4	29 09.1 51 85 97.9	29 24.4 51 85 97.4	29 39.7 50 85 96.9	29 54.8 50 85 96.4	30 09.8 50 85 95.9	30 24.7 49 85 95.4	30 39.4 49 85 94.9	1
2	28 02.8 51 85 97.8	28 18.1 51 85 97.3	28 33.4 51 85 96.8	28 48.6 50 85 96.4	29 03.6 50 85 95.9	29 18.6 50 85 95.4	29 33.4 49 85 94.9	29 48.2 49 86 94.4	2
3	27 11.8 51 85 97.2	27 27.1 51 85 96.8	27 42.3 50 85 96.3	27 57.4 50 85 95.8	28 12.5 50 85 95.3	28 27.4 50 85 94.8	28 42.2 49 86 94.3	28 56.9 49 86 93.8	3
4	26 20.7 51 85 96.7	26 36.0 51 85 96.2	26 51.2 50 85 95.7	27 06.3 50 85 95.2	27 21.2 50 85 94.7	27 36.1 49 86 94.3	27 50.9 49 86 93.8	28 05.5 49 86 93.3	4
65	25 29.6 51 85 96.1	25 44.8 51 85 95.6	26 00.0 50 85 95.2	26 15.0 50 85 94.7	26 30.0 50 86 94.2	26 44.8 49 86 93.7	26 59.5 49 86 93.2	27 14.2 49 86 92.7	65
6	24 38.4 51 85 95.6	24 53.6 50 85 95.1	25 08.7 50 85 94.6	25 23.7 50 86 94.1	25 38.6 49 86 93.7	25 53.5 49 86 93.2	26 08.2 49 86 92.7	26 22.8 49 86 92.2	6
7	23 47.2 51 85 95.0	24 02.4 50 85 94.5	24 17.4 50 86 94.1	24 32.4 50 86 93.6	24 47.3 49 86 93.1	25 02.1 49 86 92.6	25 16.8 49 86 92.2	25 31.4 48 86 91.7	7
8	22 56.0 51 86 94.5	23 11.1 50 86 94.0	23 26.1 50 86 93.5	23 41.1 49 86 93.1	23 55.9 49 86 92.6	24 10.7 49 86 92.1	24 25.4 49 86 91.6	24 40.0 48 86 91.1	8
9	22 04.7 50 86 93.9	22 19.8 50 86 93.5	22 34.8 49 86 93.0	22 49.7 49 86 92.5	23 04.6 49 86 92.1	23 19.3 49 86 91.6	23 34.0 48 86 91.1	23 48.6 48 86 90.6	9
70	21 13.4 50 86 93.4	21 28.4 50 86 92.9	21 43.4 49 86 92.5	21 58.3 49 86 92.0	22 13.1 49 86 91.5	22 27.9 49 86 91.1	22 42.6 49 86 90.6	22 57.1 48 86 90.1	70
1	20 22.0 50 86 92.9	20 37.1 50 86 92.4	20 52.0 49 86 91.9	21 06.9 49 86 91.5	21 21.7 49 86 91.0	21 36.5 49 86 90.5	21 51.1 48 86 90.1	22 05.7 48 86 89.6	1
2	19 30.6 50 86 92.3	19 45.7 50 86 91.9	20 00.6 50 86 91.4	20 15.5 49 86 90.9	20 30.3 49 86 90.5	20 45.0 49 86 90.0	20 59.7 48 86 89.6	21 14.3 48 86 89.1	2
3	18 39.2 50 86 91.8	18 54.2 50 86 91.3	19 09.2 50 86 90.9	19 24.1 49 86 90.4	19 38.9 49 86 90.0	19 53.6 49 86 89.5	20 08.3 49 86 89.0	20 22.9 48 86 88.6	3
4	17 47.8 50 86 91.3	18 02.8 50 86 90.8	18 17.8 49 86 90.4	18 32.6 49 86 89.9	18 47.4 49 86 89.5	19 02.2 49 86 89.0	19 16.9 48 86 88.5	19 31.5 48 86 88.1	4
75	16 56.4 50 86 90.8	17 11.4 50 86 90.3	17 26.3 50 86 89.9	17 41.2 49 86 89.4	17 56.0 49 86 88.9	18 10.8 49 86 88.5	18 25.4 49 86 88.0	18 40.1 49 86 87.6	75
6	16 05.0 50 86 90.2	16 20.0 50 86 89.8	16 34.9 49 86 89.3	16 49.8 49 86 88.9	17 04.6 49 86 88.4	17 19.4 49 86 88.0	17 34.1 49 86 87.5	17 48.7 49 86 87.1	6
7	15 13.5 50 86 89.7	15 28.5 50 86 89.3	15 43.5 49 86 88.8	15 58.4 49 86 88.4	16 13.2 49 86 87.9	16 28.0 49 86 87.5	16 42.7 49 86 87.0	16 57.3 49 86 86.6	7
8	14 22.1 50 86 89.2	14 37.1 50 86 88.8	14 52.1 50 86 88.3	15 07.0 49 86 87.9	15 21.8 49 86 87.4	15 36.5 49 86 87.0	15 51.3 49 86 86.5	16 06.0 49 86 86.1	8
9	13 30.7 50 86 88.7	13 45.7 50 86 88.3	14 00.7 50 86 87.8	14 15.6 49 86 87.4	14 30.4 49 86 86.9	14 45.2 49 86 86.5	15 00.0 49 86 86.0	15 14.5 49 86 85.6	9
80	12 39.3 50 86 88.2	12 54.3 50 86 87.8	13 09.3 50 86 87.3	13 24.2 49 86 86.9	13 39.1 49 86 86.4	13 53.9 49 85 86.0	14 08.7 49 85 85.5	14 23.5 49 85 85.1	80
1	11 47.9 50 86 87.7	12 02.9 50 86 87.2	12 17.9 50 86 86.8	12 32.9 49 86 86.4	12 47.8 49 85 85.9	13 02.7 49 85 85.5	13 17.5 49 85 85.0	13 32.2 49 85 84.6	1
2	10 56.5 50 86 87.2	11 11.6 50 86 86.7	11 26.6 50 86 86.3	11 41.6 49 85 85.9	11 56.5 49 85 85.4	12 11.4 49 85 85.0	12 26.3 49 85 84.5	12 41.1 49 85 84.1	2
3	10 05.2 50 86 86.7	10 20.2 50 86 86.2	10 35.3 50 85 85.8	10 50.3 50 85 85.4	11 05.2 49 85 84.9	11 20.2 49 85 84.5	11 35.1 49 85 84.0	11 49.9 49 85 83.6	3
4	9 13.8 50 86 86.2	9 28.9 50 85 85.7	9 44.0 50 85 85.3	9 59.0 50 85 84.9	10 14.1 49 85 84.4	10 29.0 49 85 84.0	10 44.0 49 85 83.5	10 58.9 49 85 83.1	4
85	8 22.5 51 85 85.7	8 37.7 50 85 85.2	8 52.8 50 85 84.8	9 07.8 50 85 84.4	9 22.9 49 85 83.9	9 37.9 49 85 83.5	9 52.9 49 85 83.0	10 07.8 49 85 82.6	85
6	7 31.3 51 85 85.2	7 46.4 50 85 84.7	8 01.6 50 85 84.3	8 16.7 50 85 83.9	8 31.8 50 85 83.4	8 46.8 49 85 83.0	9 01.9 49 85 82.5	9 16.9 49 85 82.1	6
7	6 40.0 51 85 84.7	6 55.2 50 85 84.2	7 10.4 50 85 83.8	7 25.6 50 85 83.3	7 40.7 50 85 82.9	7 55.8 50 85 82.5	8 10.9 49 85 82.0	8 25.9 49 85 81.6	7
8	5 48.9 51 85 84.1	6 04.1 51 85 83.7	6 19.3 50 85 83.3	6 34.5 50 85 82.8	6 49.7 50 85 82.4	7 04.9 50 85 82.0	7 20.0 49 85 81.5	7 35.1 49 85 81.1	8
9		5 13.0 51 85 83.2	5 28.3 51 85 82.8	5 43.5 50 85 82.3	5 58.8 50 85 81.9	6 14.0 50 85 81.5	6 29.2 50 85 81.0	6 44.3 51 84 80.6	9
90			5 07.9 51 85 81.4	5 23.1 51 85 81.0	5 38.4 51 85 80.5	5 53.6 51 84 80.1			90

Each cell below lists: Alt. ° ′ — Δd Δt — Az. °

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
00	51 00.0 1.00 01 180.0	50 30.0 1.00 01 180.0	50 00.0 1.00 01 180.0	49 30.0 1.00 01 180.0	49 00.0 1.00 01 180.0	48 30.0 1.00 01 180.0	48 00.0 1.00 01 180.0	47 30.0 1.00 01 180.0	00
1	50 59.3 1.004 178.4	50 29.3 1.003 178.5	49 59.3 1.003 178.5	49 29.3 1.003 178.5	48 59.3 1.003 178.5	48 29.3 1.003 178.5	47 59.3 1.003 178.5	47 29.3 1.003 178.5	1
2	50 57.2 1.006 176.9	50 27.2 1.006 176.9	49 57.2 1.006 176.9	49 27.3 1.006 177.0	48 57.3 1.006 177.0	48 27.3 1.006 177.0	47 57.4 1.005 177.1	47 27.4 1.005 177.1	2
3	50 53.7 1.008 175.3	50 23.7 1.008 175.3	49 53.8 1.008 175.4	49 23.9 1.008 175.5	48 53.9 1.008 175.5	48 24.0 1.008 175.6	47 54.1 1.008 175.6	47 24.1 1.008 175.7	3
4	50 48.7 1.0 11 173.7	50 18.9 1.0 10 173.8	49 49.0 1.0 10 173.9	49 19.1 1.0 10 173.9	48 49.2 1.0 10 174.0	48 19.4 1.0 10 174.1	47 49.5 1.0 10 174.1	47 19.6 1.0 10 174.2	4
05	50 42.4 99 13 172.2	50 12.6 99 13 172.3	49 42.8 99 13 172.3	49 13.0 99 12 172.4	48 43.2 99 12 172.5	48 13.4 99 12 172.6	47 43.6 99 12 172.7	47 13.8 99 12 172.8	05
6	50 34.7 99 15 170.6	50 05.0 99 15 170.7	49 35.3 99 15 170.8	49 05.6 99 15 171.0	48 35.9 99 14 171.0	48 06.1 99 14 171.1	47 36.4 99 14 171.2	47 06.7 99 14 171.3	6
7	50 25.6 99 17 169.1	49 56.0 99 17 169.2	49 26.4 99 17 169.3	48 56.8 99 17 169.5	48 27.2 99 17 169.6	47 57.6 99 16 169.7	47 27.9 99 16 169.8	46 58.3 99 16 169.9	7
8	50 15.2 98 20 167.6	49 45.8 98 19 167.7	49 16.3 98 19 167.8	48 46.8 98 19 168.0	48 17.3 98 19 168.1	47 47.7 98 18 168.2	47 18.2 98 18 168.4	46 48.7 98 18 168.5	8
9	50 03.5 98 22 166.0	49 34.1 98 22 166.2	49 04.8 98 21 166.4	48 35.4 98 21 166.5	48 06.0 98 21 166.7	47 36.6 98 21 166.8	47 07.2 98 20 167.0	46 37.8 98 20 167.1	9
10	49 50.4 97 24 164.5	49 21.2 97 24 164.7	48 52.0 97 23 164.9	48 22.8 97 23 165.1	47 53.5 97 23 165.2	47 24.3 97 23 165.4	46 55.0 97 22 165.5	46 25.7 97 22 165.7	10
1	49 36.1 97 26 163.0	49 07.0 97 26 163.2	48 38.0 97 25 163.4	48 08.9 97 25 163.6	47 39.8 97 25 163.8	47 10.7 97 25 164.0	46 41.6 97 24 164.2	46 12.4 97 24 164.3	1
2	49 20.4 96 28 161.6	48 51.6 96 28 161.8	48 22.7 96 28 162.0	47 53.8 96 27 162.2	47 24.8 96 27 162.4	46 55.9 96 27 162.6	46 26.9 96 26 162.8	45 57.9 96 26 163.0	2
3	49 03.6 96 30 160.1	48 34.9 96 30 160.3	48 06.2 96 30 160.6	47 37.4 96 29 160.8	47 08.7 96 29 161.0	46 39.9 96 29 161.2	46 11.1 96 28 161.4	45 42.3 96 28 161.6	3
4	48 45.5 95 32 158.7	48 17.0 95 32 158.9	47 48.5 95 31 159.2	47 19.9 95 31 159.4	46 51.3 95 31 159.6	46 22.7 95 30 159.8	45 54.1 95 30 160.0	45 25.5 96 30 160.3	4
15	48 26.2 94 34 157.3	47 57.9 94 34 157.5	47 29.6 94 33 157.8	47 01.2 94 33 158.0	46 32.9 94 33 158.2	46 04.4 94 32 158.5	45 36.0 94 32 158.7	45 07.5 95 32 158.9	15
6	48 05.8 94 36 155.9	47 37.7 94 36 156.1	47 09.6 94 35 156.4	46 41.4 94 35 156.7	46 13.2 94 35 156.9	45 45.0 94 34 157.1	45 16.8 94 34 157.4	44 48.5 94 34 157.6	6
7	47 44.2 93 38 154.5	47 16.3 93 37 154.8	46 48.4 93 37 155.0	46 20.5 93 37 155.3	45 52.5 93 36 155.6	45 24.5 93 36 155.8	44 56.5 94 36 156.1	44 28.4 94 35 156.3	7
8	47 21.5 92 40 153.1	46 53.9 92 39 153.4	46 26.2 92 39 153.7	45 58.5 92 38 154.0	45 30.7 93 38 154.3	45 02.9 93 38 154.5	44 35.1 93 37 154.8	44 07.2 93 37 155.1	8
9	46 57.7 91 41 151.8	46 30.3 91 41 152.1	46 02.9 92 41 152.4	45 35.4 92 40 152.7	45 07.8 92 40 153.0	44 40.3 92 39 153.3	44 12.7 92 39 153.5	43 45.0 92 39 153.8	9
20	46 32.9 90 43 150.5	46 05.7 91 43 150.8	45 38.5 91 42 151.1	45 11.3 91 42 151.4	44 44.0 91 41 151.7	44 16.6 91 41 152.0	43 49.2 91 41 152.3	43 21.8 92 40 152.5	20
1	46 07.1 90 45 149.2	45 40.2 90 44 149.5	45 13.2 90 44 149.8	44 46.2 90 44 150.1	44 19.1 90 43 150.4	43 52.0 90 43 150.7	43 24.8 91 42 151.0	42 57.6 91 42 151.3	1
2	45 40.3 89 46 147.9	45 13.6 89 46 148.3	44 46.9 89 45 148.6	44 20.1 89 45 148.9	43 53.0 89 45 149.2	43 26.4 90 44 149.5	42 59.4 90 44 149.8	42 32.4 90 43 150.1	2
3	45 12.5 88 48 146.7	44 46.1 88 47 147.0	44 19.1 88 47 147.4	43 53.0 89 47 147.7	43 26.4 89 46 148.0	42 59.8 89 46 148.3	42 33.1 89 45 148.6	42 06.4 89 45 148.9	3
4	44 43.8 87 49 145.5	44 17.6 87 49 145.8	43 51.4 88 48 146.1	43 25.1 88 48 146.5	42 58.7 88 48 146.8	42 32.3 88 47 147.1	42 05.9 88 47 147.4	41 39.4 88 46 147.8	4
25	44 14.2 86 51 144.3	43 48.3 86 50 144.6	43 22.3 87 50 145.0	42 56.2 87 50 145.3	42 30.1 87 49 145.6	42 04.0 87 49 146.0	41 37.8 87 48 146.3	41 11.5 88 48 146.6	25
6	43 43.7 85 52 143.1	43 18.0 85 52 143.4	42 52.3 86 51 143.8	42 26.5 86 51 144.1	42 00.7 86 50 144.5	41 34.8 86 50 144.8	41 08.8 87 50 145.1	40 42.8 87 49 145.5	6
7	43 12.4 85 54 141.9	42 47.0 85 53 142.3	42 21.5 85 53 142.6	41 56.0 85 52 143.0	41 30.4 85 52 143.3	41 04.7 86 51 143.7	40 39.0 86 51 144.0	40 13.2 86 51 144.4	7
8	42 40.3 84 55 140.8	42 15.1 84 54 141.2	41 49.9 84 54 141.5	41 24.6 84 54 141.9	40 59.3 85 53 142.2	40 33.9 85 53 142.6	40 08.4 85 52 142.9	39 42.9 85 52 143.3	8
9	42 07.4 83 56 139.7	41 42.5 83 56 140.0	41 17.5 83 55 140.4	40 52.5 84 55 140.8	40 27.4 84 54 141.1	40 02.2 84 54 141.5	39 37.0 84 54 141.8	39 11.7 84 53 142.2	9
30	41 33.7 82 57 138.6	41 09.1 82 57 138.9	40 44.4 82 56 139.3	40 19.6 83 56 139.7	39 54.7 83 56 140.1	39 29.8 83 55 140.4	39 04.9 83 55 140.8	38 39.8 84 54 141.1	30
1	40 59.3 81 58 137.5	40 34.9 81 58 137.9	40 10.5 82 58 138.3	39 46.0 82 57 138.6	39 21.4 82 57 139.0	38 56.7 82 56 139.4	38 32.0 83 56 139.7	38 07.2 83 56 140.1	1
2	40 24.2 80 60 136.4	40 00.1 81 59 136.8	39 35.9 81 59 137.2	39 11.6 81 58 137.6	38 47.3 81 58 138.0	38 22.9 82 58 138.3	37 58.4 82 57 138.7	37 33.8 82 57 139.1	2
3	39 48.4 79 61 135.3	39 24.6 80 60 135.8	39 00.6 80 60 136.1	38 36.6 80 60 136.5	38 12.5 80 59 137.0	37 48.3 81 59 137.3	37 24.1 81 58 137.7	36 59.8 81 58 138.1	3
4	39 12.0 79 62 134.4	38 48.4 79 61 134.8	38 24.7 79 61 135.2	38 00.9 79 61 135.6	37 37.1 80 60 136.0	37 13.2 80 60 136.3	36 49.2 80 59 136.7	36 25.1 80 59 137.1	4
35	38 34.9 78 63 133.4	38 11.6 78 62 133.8	37 48.1 78 62 134.2	37 24.6 79 62 134.6	37 01.0 79 61 135.0	36 37.3 79 61 135.4	36 13.6 79 60 135.7	35 49.8 80 60 136.1	35
6	37 57.3 77 64 132.4	37 34.1 77 63 132.8	37 10.9 77 63 133.2	36 47.7 78 63 133.6	36 24.3 78 62 134.0	36 00.9 78 62 134.4	35 37.4 78 61 134.8	35 13.8 79 61 135.2	6
7	37 19.0 76 65 131.5	36 56.1 76 64 131.9	36 33.2 77 64 132.3	36 10.1 77 64 132.7	35 47.0 77 63 133.1	35 23.8 77 63 133.5	35 00.6 78 62 133.8	34 37.2 78 62 134.2	7
8	36 40.2 76 66 130.5	36 17.6 76 65 130.9	35 54.8 76 65 131.3	35 32.0 76 64 131.7	35 09.2 76 64 132.1	34 46.2 77 64 132.5	34 23.2 77 63 132.9	34 00.1 77 63 133.3	8
9	36 00.8 75 66 129.6	35 38.4 75 66 130.0	35 16.0 75 66 130.4	34 53.4 75 65 130.8	34 30.8 76 65 131.2	34 08.0 76 65 131.6	33 45.3 76 64 132.0	33 22.4 76 64 132.4	9
40	35 21.0 74 67 128.7	34 58.8 74 67 129.1	34 36.5 74 67 129.5	34 14.2 75 66 129.9	33 51.8 75 66 130.3	33 29.3 75 65 130.7	33 06.8 75 65 131.1	32 44.1 76 65 131.5	40
1	34 40.6 73 68 127.8	34 18.6 73 68 128.2	33 56.6 74 67 128.6	33 34.5 74 67 129.0	33 12.4 74 67 129.4	32 50.1 74 66 129.8	32 27.8 75 66 130.2	32 05.4 75 65 130.6	1
2	33 59.7 72 69 126.9	33 38.0 72 69 127.4	33 16.2 73 68 127.8	32 54.3 73 68 128.2	32 32.4 73 67 128.6	32 10.4 74 67 129.0	31 48.3 74 67 129.4	31 26.1 74 66 129.8	2
3	33 18.4 71 70 126.1	32 56.9 72 69 126.5	32 35.3 72 69 126.9	32 13.7 72 69 127.3	31 52.0 73 68 127.7	31 30.2 73 68 128.1	31 08.3 73 67 128.5	30 46.3 73 67 128.9	3
4	32 36.6 71 70 125.3	32 15.3 71 70 125.7	31 54.0 71 70 126.1	31 32.6 72 69 126.5	31 11.1 72 69 126.9	30 49.5 72 69 127.3	30 27.8 72 68 127.7	30 06.1 73 68 128.1	4
45	31 54.0 70 71 124.4	31 33.3 70 71 124.8	31 12.2 71 70 125.3	30 51.0 71 70 125.7	30 29.7 71 70 126.1	30 08.3 71 69 126.5	29 46.9 72 69 126.9	29 25.4 72 69 127.3	45
6	31 11.7 69 72 123.6	30 50.9 70 71 124.0	30 30.0 70 71 124.5	30 09.0 70 71 124.9	29 47.9 70 70 125.3	29 26.8 71 70 125.7	29 05.6 71 70 126.1	28 44.3 71 69 126.5	6
7	30 28.7 69 72 122.8	30 08.1 69 72 123.2	29 47.4 69 72 123.7	29 26.6 69 71 124.1	29 05.7 70 71 124.5	28 44.8 70 71 124.9	28 23.8 70 70 125.3	28 02.7 70 70 125.7	7
8	29 45.3 68 73 122.0	29 24.9 68 73 122.5	29 04.4 69 72 122.9	28 43.8 69 72 123.3	28 23.2 69 72 123.7	28 02.4 69 71 124.1	27 41.6 69 71 124.5	27 20.8 70 71 124.9	8
9	29 01.5 67 74 121.3	28 41.3 68 73 121.7	28 21.0 68 73 122.1	28 00.6 68 73 122.5	27 40.2 68 72 122.9	27 19.7 69 72 123.4	26 59.1 69 72 123.8	26 38.4 69 71 124.2	9
50	28 17.4 67 74 120.5	27 57.4 67 74 120.9	27 37.3 67 73 121.4	27 17.1 67 73 121.8	26 56.8 68 73 122.2	26 36.5 68 73 122.6	26 16.1 68 72 123.0	25 55.7 68 72 123.4	50
1	27 32.9 66 75 119.8	27 13.1 66 74 120.2	26 53.2 67 74 120.6	26 33.2 67 74 121.0	26 13.1 67 73 121.4	25 53.0 67 73 121.9	25 32.8 67 73 122.3	25 12.5 68 72 122.7	1
2	26 48.1 65 75 119.0	26 28.5 66 75 119.5	26 08.8 66 75 119.9	25 49.0 66 74 120.3	25 29.1 66 74 120.7	25 09.2 67 74 121.1	24 49.1 67 73 121.5	24 29.1 67 73 122.0	2
3	26 03.0 65 76 118.3	25 43.5 65 75 118.7	25 24.0 65 75 119.2	25 04.4 66 75 119.6	24 44.7 66 74 120.0	24 25.0 66 74 120.4	24 05.1 66 74 120.8	23 45.3 66 74 121.2	3
4	25 17.6 64 76 117.6	24 58.3 64 76 118.0	24 38.9 65 76 118.5	24 19.5 65 75 118.9	24 00.0 65 75 119.3	23 40.5 65 75 119.7	23 20.8 66 74 120.1	23 01.1 66 74 120.5	4
55	24 31.9 64 77 116.9	24 12.8 64 76 117.3	23 53.6 64 76 117.8	23 34.3 64 76 118.2	23 15.0 64 76 118.6	22 55.6 65 75 119.0	22 36.2 65 75 119.4	22 16.7 65 75 119.8	55
6	23 45.9 63 77 116.2	23 26.9 63 77 116.7	23 07.9 63 77 117.1	22 48.8 64 76 117.5	22 29.7 64 76 117.9	22 10.5 64 76 118.3	21 51.2 64 75 118.7	21 31.9 65 75 119.2	6
7	22 59.6 62 78 115.6	22 40.8 63 77 116.0	22 22.0 63 77 116.4	22 03.1 63 77 116.8	21 44.1 63 76 117.2	21 25.1 64 76 117.7	21 06.0 64 76 118.1	20 46.8 64 76 118.5	7
8	22 13.1 62 78 114.9	21 54.5 62 78 115.3	21 35.8 62 77 115.7	21 17.2 62 77 116.2	20 58.3 63 77 116.6	20 39.4 63 77 117.0	20 20.5 63 76 117.4	20 01.5 63 76 117.8	8
9	21 26.3 61 78 114.2	21 07.8 62 78 114.7	20 49.3 62 78 115.1	20 30.8 62 78 115.5	20 12.1 62 77 115.9	19 53.4 62 77 116.3	19 34.7 63 77 116.7	19 15.9 63 76 117.2	9
60	20 39.3 61 79 113.6	20 21.0 61 78 114.0	20 02.6 61 78 114.4	19 44.2 61 78 114.8	19 25.7 62 78 115.3	19 07.2 62 77 115.7	18 48.6 62 77 116.1	18 30.0 62 77 116.5	60
1	19 52.0 60 79 112.9	19 33.9 61 79 113.4	19 15.7 61 78 113.8	18 57.4 61 78 114.2	18 39.1 61 78 114.6	18 20.7 61 78 115.0	18 02.3 62 78 115.5	17 43.8 62 77 115.9	1
2	19 04.6 60 79 112.3	18 46.6 60 79 112.7	18 28.5 60 79 113.2	18 10.4 60 79 113.6	17 52.2 61 78 114.0	17 34.0 61 78 114.4	17 15.7 61 78 114.8	16 57.4 61 78 115.2	2
3	18 16.9 59 80 111.7	17 59.0 60 80 112.1	17 41.1 60 79 112.5	17 23.1 60 79 112.9	17 05.1 60 79 113.4	16 47.1 60 78 113.8	16 28.9 60 78 114.2	16 10.8 61 78 114.6	3
4	17 29.0 59 80 111.1	17 11.3 59 80 111.5	16 53.5 59 80 111.9	16 35.7 59 79 112.3	16 17.8 60 79 112.7	15 59.9 60 79 113.2	15 41.9 60 78 113.6	15 23.9 60 78 114.0	4
65	16 40.9 59 80 110.5	16 23.3 59 80 110.9	16 05.7 59 80 111.3	15 48.0 59 80 111.7	15 30.3 59 80 112.1	15 12.5 59 79 112.6	14 54.7 59 79 113.0	14 36.8 60 79 113.4	65
6	15 52.6 58 81 109.9	15 35.2 58 81 110.3	15 17.7 58 80 110.7	15 00.1 59 80 111.1	14 42.5 59 80 111.5	14 24.9 59 80 112.0	14 07.2 59 79 112.4	13 49.5 59 79 112.8	6
7	15 04.1 58 81 109.3	14 46.8 58 81 109.7	14 29.5 58 80 110.1	14 12.1 58 80 110.5	13 54.6 58 80 110.9	13 37.1 58 80 111.4	13 19.6 59 80 111.8	13 02.0 59 80 112.2	7
8	14 15.5 57 81 108.7	13 58.3 57 81 109.1	13 41.1 57 81 109.5	13 23.8 58 81 109.9	13 06.3 58 80 110.4	12 49.1 58 80 110.8	12 31.7 58 80 111.2	12 14.3 58 80 111.6	8
9	13 26.7 57 82 108.1	13 09.6 57 81 108.5	12 52.5 57 81 108.9	12 35.4 57 81 109.4	12 18.2 57 81 109.8	12 00.9 57 81 110.2	11 43.7 58 80 110.6	11 26.4 58 80 111.0	9
70	12 37.7 56 82 107.5	12 20.8 57 82 107.9	12 03.8 57 81 108.4	11 46.8 57 81 108.8	11 29.7 57 81 109.2	11 12.6 57 81 109.6	10 55.4 57 81 110.0	10 38.3 57 80 110.5	70
1	11 48.6 56 82 106.9	11 31.8 56 82 107.4	11 14.9 56 82 107.8	10 58.0 56 82 108.2	10 41.0 57 81 108.6	10 24.1 57 81 109.1	10 07.0 57 81 109.5	9 50.0 57 81 109.9	1
2	10 59.3 56 82 106.4	10 42.6 56 82 106.8	10 25.8 56 82 107.2	10 09.1 56 82 107.6	9 52.2 56 82 108.1	9 35.4 56 81 108.5	9 18.5 56 81 108.9	9 01.5 56 81 109.3	2
3	10 09.9 55 83 105.8	9 53.3 55 82 106.2	9 36.7 56 82 106.7	9 20.0 56 82 107.1	9 03.3 56 82 107.5	8 46.5 56 82 107.9	8 29.7 56 81 108.4	8 12.9 56 81 108.8	3
4	9 20.4 55 83 105.3	9 03.9 55 83 105.7	8 47.3 55 82 106.1	8 30.7 55 82 106.5	8 14.1 56 82 107.0	7 57.5 56 82 107.4	7 40.8 56 82 107.8	7 24.2 56 82 108.2	4
75	8 30.7 55 83 104.7	8 14.3 55 83 105.1	7 57.8 55 83 105.6	7 41.4 55 83 106.0	7 24.9 55 82 106.4	7 08.3 55 82 106.8	6 51.8 55 82 107.2	6 35.2 55 82 107.7	75
6	7 40.9 54 83 104.2	7 24.6 54 83 104.6	7 08.2 55 83 105.0	6 51.9 55 83 105.4	6 35.5 55 83 105.9	6 19.0 55 82 106.3	6 02.6 55 82 106.7	5 46.2 55 82 107.1	6
7	6 51.0 54 83 103.6	6 34.7 54 83 104.1	6 18.5 54 83 104.5	6 02.2 54 83 104.9	5 45.9 54 83 105.3	5 29.6 54 83 105.7	5 13.3 54 82 106.2		7
8	6 00.9 54 84 103.1	5 44.8 54 83 103.5	5 28.6 54 83 103.9	5 12.5 54 83 104.4					8
9	5 10.8 53 84 102.6								9

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
91								5 03.0 51 84 79.6	91

Lat. 31°

H.A.	12° 00' Alt.	Δd Δt	Az.	12° 30' Alt.	Δd Δt	Az.	13° 00' Alt.	Δd Δt	Az.	13° 30' Alt.	Δd Δt	Az.	14° 00' Alt.	Δd Δt	Az.	14° 30' Alt.	Δd Δt	Az.	15° 00' Alt.	Δd Δt	Az.	15° 30' Alt.	Δd Δt	Az.	H.A.
00	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	72 00.0	1.0 02	180.0	72 30.0	1.0 02	180.0	73 00.0	1.0 02	180.0	73 30.0	1.0 03	180.0	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	00
1	70 58.7	1.0 07	177.0	71 28.6	1.0 07	176.9	71 58.6	1.0 07	176.8	72 28.6	1.0 07	176.8	72 58.5	1.0 07	176.7	73 28.5	1.0 08	176.6	73 58.4	1.0 08	176.5	74 28.4	1.0 08	176.4	1
2	70 54.6	1.0 11	174.0	71 24.5	1.0 11	173.9	71 54.4	1.0 12	173.7	72 24.2	1.0 12	173.6	72 54.1	99 12	173.4	73 23.9	99 13	173.2	73 53.7	99 13	173.0	74 23.6	99 13	172.8	2
3	70 47.9	98 16	171.0	71 17.6	99 16	170.8	71 47.3	99 16	170.6	72 16.9	99 17	170.1	72 46.7	99 17	170.1	73 16.3	99 18	169.9	73 45.9	99 18	169.6	74 15.6	99 18	169.3	3
4	70 38.6	98 20	168.1	71 08.1	98 20	167.8	71 37.6	98 21	167.5	72 07.0	98 21	167.2	72 36.4	98 22	166.9	73 05.8	98 22	166.6	73 35.2	98 23	166.2	74 04.5	98 23	165.8	4
05	70 26.8	97 24	165.2	70 56.0	97 24	164.9	71 25.2	97 25	164.5	71 54.3	97 26	164.2	72 23.4	97 26	163.8	72 52.5	97 27	163.3	73 21.5	97 28	162.9	73 50.4	96 28	162.4	05
6	70 12.5	96 28	162.4	70 41.4	96 28	162.0	71 10.2	96 29	161.6	71 39.0	96 30	161.2	72 07.7	96 30	160.7	72 36.4	95 31	160.2	73 05.0	95 32	159.7	73 33.5	95 33	159.2	6
7	69 55.8	95 32	159.7	70 24.3	95 32	159.2	70 52.8	95 33	158.7	71 21.2	95 34	158.2	71 49.5	94 34	157.7	72 17.7	94 35	157.2	72 45.8	94 36	156.6	73 13.8	93 37	156.0	7
8	69 35.7	93 36	157.0	70 04.9	94 36	156.5	70 33.0	93 37	156.0	71 00.8	93 38	155.4	71 28.8	93 38	154.8	71 56.5	92 39	154.2	72 24.0	92 40	153.5	72 51.6	92 41	152.8	8
9	69 15.6	93 39	154.3	69 43.3	92 39	153.9	70 10.9	92 40	153.3	70 38.4	91 41	152.7	71 05.8	91 42	152.1	71 33.0	91 43	151.4	72 00.1	90 44	150.7	72 27.1	90 45	150.0	9
10	68 52.4	91 42	151.9	69 19.6	91 43	151.3	69 46.8	90 44	150.7	70 13.8	90 44	150.1	70 40.6	89 45	149.4	71 07.3	89 46	148.7	71 33.9	88 47	148.0	72 00.3	88 48	147.2	10
1	68 27.2	90 45	149.5	68 54.0	89 46	148.8	69 20.6	89 47	148.2	69 47.1	88 48	147.5	70 13.5	88 48	146.8	70 39.6	87 49	146.1	71 05.6	86 50	145.3	71 31.4	86 51	144.5	1
2	68 00.1	88 48	147.1	68 26.4	87 49	146.5	68 52.6	87 50	145.8	69 18.6	86 50	145.1	69 44.4	86 51	144.4	70 10.0	85 52	143.6	70 35.4	84 53	142.8	71 00.7	84 54	142.0	2
3	67 31.3	86 51	144.9	67 57.2	86 51	144.3	68 22.8	85 52	143.5	68 48.3	85 53	142.8	69 13.6	84 54	142.0	69 38.6	83 55	141.2	70 03.5	82 56	140.4	70 28.1	82 57	139.6	3
4	67 01.0	85 53	142.7	67 26.3	84 54	142.0	67 51.4	84 55	141.3	68 16.4	83 56	140.5	68 41.1	82 57	139.8	69 05.7	81 57	139.0	69 30.0	81 58	138.1	69 54.0	80 59	137.3	4
15	66 29.0	83 56	140.6	66 53.9	82 56	139.9	67 18.5	82 57	139.2	67 43.0	81 58	138.4	68 07.2	80 59	137.6	68 31.2	80 60	136.8	68 54.9	79 61	136.0	69 18.4	78 62	135.1	15
6	65 55.7	82 58	138.6	66 20.1	81 59	137.9	66 44.2	80 59	137.2	67 08.2	79 60	136.4	67 31.9	79 61	135.6	67 55.3	78 62	134.8	68 18.5	77 63	133.9	68 41.4	76 64	133.0	6
7	65 21.1	80 60	136.7	65 45.0	79 61	136.0	66 08.6	78 61	135.2	66 32.0	78 62	134.4	66 55.2	77 63	133.6	67 18.2	76 64	132.8	67 40.9	75 65	132.0	68 03.3	74 66	131.1	7
8	64 45.2	78 62	134.9	65 08.6	78 62	134.1	65 31.8	77 63	133.4	65 54.8	76 64	132.6	66 17.4	75 65	131.8	66 39.9	74 66	131.0	67 02.1	73 66	130.1	67 23.9	72 67	129.2	8
9	64 08.2	77 63	133.1	64 31.2	76 64	132.4	64 53.9	75 65	131.6	65 16.4	74 66	130.8	65 38.6	74 66	130.0	66 00.5	73 67	129.2	66 22.2	72 68	128.3	66 43.6	71 69	127.4	9
20	63 30.2	75 65	131.4	63 52.7	75 66	130.7	64 14.9	74 67	129.9	64 36.9	73 67	129.1	64 58.7	72 68	128.3	65 20.2	71 69	127.5	65 41.4	70 70	126.6	66 02.3	69 70	125.8	20
1	62 51.1	74 67	129.8	63 13.2	73 67	129.1	63 35.0	72 68	128.3	63 56.6	71 69	127.5	64 17.9	71 69	126.7	64 38.9	70 70	125.9	64 59.7	69 71	125.0	65 20.1	68 72	124.2	1
2	62 11.2	73 68	128.3	62 32.8	72 69	127.5	62 54.2	71 69	126.7	63 15.4	70 70	126.0	63 36.2	69 71	125.2	63 56.9	68 71	124.3	64 17.2	67 72	123.5	64 37.2	66 73	122.5	2
3	61 30.4	71 69	126.8	61 51.6	70 70	126.0	62 12.6	70 71	125.3	62 33.3	69 71	124.5	62 53.8	68 72	123.7	63 14.0	67 73	122.9	63 33.9	66 73	122.0	63 53.5	65 74	121.2	3
4	60 48.8	70 71	125.3	61 09.6	69 71	124.6	61 30.2	68 72	123.8	61 50.6	67 72	123.1	62 10.7	66 73	122.3	62 30.5	66 74	121.5	62 50.0	65 74	120.6	63 09.2	64 75	119.8	4
25	60 06.5	69 72	124.0	60 26.9	68 72	123.2	60 47.2	67 73	122.5	61 07.1	66 73	121.7	61 26.9	65 74	120.9	61 46.3	64 75	120.1	62 05.4	63 75	119.3	62 24.3	62 76	118.5	25
6	59 23.5	67 73	122.6	59 43.6	67 73	121.9	60 03.5	66 74	121.2	60 23.1	65 74	120.4	60 42.4	64 75	119.6	61 01.5	63 76	118.8	61 20.3	62 76	118.0	61 38.8	61 77	117.2	6
7	58 39.9	66 74	121.4	58 59.6	66 74	120.6	59 19.2	65 75	119.9	59 38.4	64 75	119.1	59 57.4	63 76	118.4	60 16.2	62 77	117.6	60 34.6	61 77	116.7	60 52.8	60 77	116.0	7
8	57 55.7	65 75	120.1	58 15.1	64 75	119.4	58 34.3	64 76	118.7	58 53.3	63 76	117.9	59 11.9	62 77	117.2	59 30.4	61 77	116.4	59 48.5	60 78	115.6	60 06.3	59 78	114.8	8
9	57 10.9	64 75	119.0	57 30.1	63 76	118.2	57 48.9	63 76	117.5	58 07.6	62 77	116.8	58 26.0	61 77	116.0	58 44.1	60 78	115.3	59 01.9	59 78	114.5	59 19.4	58 79	113.7	9
30	56 25.7	63 76	117.8	56 44.5	62 77	117.1	57 03.1	62 77	116.4	57 21.4	61 78	115.7	57 39.5	60 78	114.9	57 57.3	59 79	114.2	58 14.9	58 79	113.4	58 32.2	57 79	112.6	30
1	55 40.0	62 77	116.7	55 58.5	61 77	116.0	56 16.8	61 78	115.3	56 34.9	60 78	114.6	56 52.7	59 79	113.9	57 10.2	58 79	113.1	57 27.5	57 80	112.4	57 44.5	56 80	111.6	1
2	54 53.8	61 78	115.7	55 12.1	61 78	115.0	55 30.1	60 78	114.3	55 47.9	59 79	113.6	56 05.5	58 79	112.8	56 22.8	57 80	112.1	56 39.8	56 80	111.3	56 56.5	55 80	110.6	2
3	54 07.2	60 78	114.6	54 25.3	60 79	114.0	54 43.1	59 79	113.3	55 00.6	58 79	112.6	55 17.9	57 80	111.8	55 34.9	56 80	111.1	55 51.7	55 81	110.4	56 08.2	55 81	109.6	3
4	53 20.3	60 79	113.6	53 38.1	59 79	113.0	53 55.6	58 80	112.3	54 12.9	57 80	111.6	54 30.0	56 80	110.9	54 46.8	56 81	110.2	55 03.4	55 81	109.4	55 19.6	54 81	108.7	4
35	52 33.0	59 79	112.7	52 50.6	58 80	112.0	53 07.9	57 80	111.3	53 25.0	57 80	110.6	53 41.8	56 81	109.9	53 58.4	55 81	109.2	54 14.7	54 81	108.5	54 30.8	53 82	107.8	35
6	51 45.4	58 80	111.7	52 02.7	57 80	111.1	52 19.8	57 81	110.4	52 36.7	56 81	109.7	52 53.3	55 81	109.0	53 09.7	54 82	108.4	53 25.8	53 82	107.6	53 41.7	53 82	106.9	6
7	50 57.5	57 80	110.8	51 14.6	57 81	110.2	51 31.5	56 81	109.5	51 48.1	55 81	108.9	52 04.6	54 82	108.2	52 20.8	54 82	107.5	52 36.7	53 82	106.8	52 52.4	52 83	106.1	7
8	50 09.3	57 81	110.0	50 26.2	56 81	109.3	50 42.9	56 81	108.7	50 59.4	55 82	108.0	51 15.6	54 82	107.3	51 31.6	53 82	106.7	51 47.4	52 83	106.0	52 02.9	51 83	105.3	8
9	49 20.8	56 81	109.1	49 37.5	55 81	108.5	49 54.0	55 82	107.8	50 10.3	54 82	107.2	50 26.4	53 82	106.5	50 42.2	52 83	105.8	50 57.8	52 83	105.2	51 13.2	51 83	104.5	9
40	48 32.1	55 82	108.3	48 48.6	55 82	107.6	49 05.0	54 82	107.0	49 21.1	53 82	106.4	49 37.0	53 83	105.7	49 52.6	52 83	105.1	50 08.1	51 83	104.4	50 23.3	50 83	103.7	40
1	47 43.2	55 82	107.5	47 59.5	54 82	106.8	48 15.7	54 82	106.3	48 31.6	53 83	105.6	48 47.4	52 83	104.9	49 02.9	51 83	104.3	49 18.2	51 83	103.6	49 33.3	50 84	103.0	1
2	46 54.0	54 82	106.7	47 10.2	54 83	106.1	47 26.2	53 83	105.4	47 42.0	52 83	104.8	47 57.6	52 83	104.2	48 13.0	51 83	103.5	48 28.1	50 84	102.9	48 43.1	49 84	102.2	2
3	46 04.6	54 83	105.9	46 20.7	53 83	105.3	46 36.5	53 83	104.7	46 52.2	52 83	104.1	47 07.7	51 84	103.4	47 22.9	50 84	102.8	47 37.9	50 84	102.2	47 52.7	49 84	101.5	3
4	45 15.1	53 83	105.2	45 31.0	53 83	104.6	45 46.7	52 83	104.0	46 02.2	51 84	103.3	46 17.6	51 84	102.7	46 32.7	50 84	102.1	46 47.6	49 84	101.5	47 02.3	49 84	100.8	4
45	44 25.4	53 83	104.4	44 41.1	52 83	103.8	44 56.7	52 84	103.2	45 12.1	51 84	102.6	45 27.3	50 84	102.0	45 42.3	50 84	101.4	45 57.1	49 84	100.8	46 11.7	48 85	100.1	45
6	43 35.5	52 83	103.7	43 51.1	52 84	103.1	44 06.5	51 84	102.5	44 21.9	51 84	101.9	44 37.0	50 84	101.3	44 51.8	49 84	100.7	45 06.5	49 84	100.1	45 21.0	48 85	99.5	6
7	42 45.4	52 84	103.0	43 01.0	51 84	102.4	43 16.3	51 84	101.8	43 31.5	50 84	101.2	43 46.5	50 84	100.7	44 01.3	49 84	100.0	44 15.9	48 85	99.4	44 30.3	48 85	98.8	7
8	41 55.3	52 84	102.3	42 10.7	51 84	101.8	42 25.9	51 84	101.2	42 41.0	50 84	100.6	42 55.9	49 84	100.0	43 10.6	49 85	99.4	43 25.1	48 85	98.8	43 39.4	47 85	98.2	8
9	41 05.0	51 84	101.7	41 20.3	51 84	101.1	41 35.4	50 84	100.5	41 50.4	50 85	99.9	42 05.2	49 85	99.3	42 19.8	48 85	98.8	42 34.2	48 85	98.2	42 48.5	47 85	97.6	9
50	40 14.5	51 84	101.0	40 29.7	50 84	100.4	40 44.8	50 85	99.9	40 59.7	49 85	99.3	41 14.4	49 85	98.7	41 28.9	48 85	98.1	41 43.3	48 85	97.5	41 57.4	47 85	96.9	50
1	39 24.0	51 84	100.3	39 39.1	50 84	99.8	39 54.1	50 85	99.2	40 08.9	49 85	98.7	40 23.5	48 85	98.1	40 38.0	48 85	97.5	40 52.2	47 85	96.9	41 06.4	47 85	96.3	1
2	38 33.3	50 85	99.7	38 48.4	50 85	99.2	39 03.3	49 85	98.6	39 18.0	49 85	98.0	39 32.5	48 85	97.5	39 46.9	48 85	96.9	40 01.2	47 85	96.3	40 15.2	47 85	95.8	2
3	37 42.6	50 85	99.1	37 57.6	50 85	98.5	38 12.4	49 85	98.0	38 27.0	49 85	97.4	38 41.5	48 85	96.9	38 55.8	47 85	96.3	39 10.0	47 85	95.7	39 24.0	46 85	95.2	3
4	36 51.8	50 85	98.5	37 06.7	49 85	97.9	37 21.4	49 85	97.4	37 36.0	48 85	96.8	37 50.4	48 85	96.3	38 04.7	47 85	95.7	38 18.8	47 85	95.2	38 32.8	46 85	94.6	4
55	36 00.9	49 85	97.9	36 15.7	49 85	97.3	36 30.4	48 85	96.8	36 44.9	48 85	96.2	36 59.3	48 85	95.7	37 13.5	47 85	95.1	37 27.6	47 85	94.6	37 41.5	46 86	94.0	55
6	35 09.9	49 85	97.3	35 24.6	48 85	96.7	35 39.3	48 85	96.2	35 53.7	48 85	95.7	36 08.1	48 85	95.1	36 22.3	47 85	94.6	36 36.3	47 85	94.0	36 50.2	46 86	93.5	6
7	34 18.8	49 85	96.7	34 33.5	48 85	96.2	34 48.1	48 85	95.6	35 02.5	48 85	95.1	35 16.8	47 85	94.6	35 31.0	47 85	94.0	35 45.0	46 86	93.5	35 58.8	46 86	92.9	7
8	33 27.7	49 85	96.1	33 42.4	48 85	95.6	33 56.9	48 85	95.1	34 11.3	47 85	94.5	34 25.5	47 86	94.0	34 39.6	47 86	93.5	34 53.6	46 86	92.9	35 07.4	46 86	92.4	8
9	32 36.6	49 85	95.5	32 51.2	48 85	95.0	33 05.7	48 85	94.5	33 20.0	48 86	93.9	33 34.2	47 86	93.4	33 48.3	47 86	92.9	34 02.2	46 86	92.4	34 16.0	46 86	91.8	9
60	31 45.4	49 85	95.0	31 59.9	48 85	94.5	32 14.4	48 86	93.9	32 28.7	48 86	93.4	32 42.9	47 86	92.9	32 56.9	47 86	92.4	33 10.8	46 86	91.9	33 24.6	46 86	91.3	60
1	30 54.1	49 86	94.4	31 08.6	48 86	93.9	31 23.0	48 86	93.4	31 37.3	47 86	92.9	31 51.5	47 86	92.4	32 05.5	47 86	91.8	32 19.4	46 86	91.3	32 33.2	46 86	90.8	1
2	30 02.8	49 86	93.9	30 17.3	48 86	93.4	30 31.7	48 86	92.8	30 45.9	47 86	92.3	31 00.1	47 86	91.8	31 14.1	47 86	91.3	31 28.0	46 86	90.8	31 41.8	46 86	90.3	2
3	29 11.5	48 86	93.3	29 25.9	48 86	92.8	29 40.3	48 86	92.3	29 54.6	47 86	91.8	30 08.7	47 86	91.3	30 22.7	47 86	90.8	30 36.6	46 86	90.3	30 50.4	46 86	89.7	3
4	28 20.1	48 86	92.8	28 34.6	48 86	92.3	28 48.9	48 86	91.8	29 03.1	47 86	91.3	29 17.3	47 86	90.8	29 31.3	46 86	90.3	29 45.2	46 86	89.8	29 58.9	46 86	89.2	4
65	27 28.7	48 86	92.2	27 43.2	48 86	91.7	27 57.5	48 86	91.2	28 11.7	47 86	90.8	28 25.8	47 86	90.2	28 39.8	46 86	89.7	28 53.7	46 86	89.2	29 07.5	46 86	88.7	65
6	26 37.3	48 86	91.7	26 51.8	48 86	91.2	27 06.1	48 86	90.7	27 20.3	47 86	90.2	27 34.4	47 86	89.7	27 48.4	46 86	89.2	28 02.3	46 86	88.7	28 16.1	46 86	88.2	6
7	25 45.9	48 86	91.2	26 00.3	48 86	90.7	26 14.6	48 86	90.2	26 28.9	47 86	89.7	26 43.0	47 86	89.2	26 57.0	46 86	88.7	27 10.9	46 86	88.2	27 24.7	46 86	87.7	7
8	24 54.5	48 86	90.7	25 09.0	48 86	90.2	25 23.2	48 86	89.7	25 37.4	47 86	89.2	25 51.6	47 86	88.7	26 05.6	46 86	88.2	26 19.5	46 86	87.7	26 33.3	46 86	87.2	8
9	24 03.1	48 86	90.1	24 17.5	48 86	89.7	24 31.8	48 86	89.2	24 46.0	47 86	88.7	25 00.1	47 86	88.2	25 14.2	46 86	87.7	25 28.1	46 86	87.2	25 42.0	46 86	86.7	9
70	23 11.6	48 86	89.6	23 26.0	48 86	89.2	23 40.4	48 86	88.7	23 54.6	47 86	88.2	24 08.7	47 86	87.7	24 22.8	47 86	87.2	24 36.8	46 86	86.7	24 50.6	46 86	86.3	70
1	22 20.2	48 86	89.1	22 34.6	48 86	88.6	22 49.0	48 86	88.2	23 03.2	47 86	87.7	23 17.4	47 86	87.2	23 31.4	46 86	86.7	23 45.4	46 85	86.2	23 59.3	46 85	85.8	1
2	21 28.8	48 86	88.6	21 43.2	48 86	88.1	21 57.6	48 86	87.7	22 11.8	47 86	87.2	22 26.0	47 86	86.7	22 40.1	47 86	86.2	22 54.1	46 85	85.8	23 08.0	46 85	85.3	2
3	20 37.4	48 86	88.1	20 51.8	48 86	87.6	21 06.2	48 86	87.2	21 20.5	47 86	86.7	21 34.7	47 86	86.2	21 48.8	47 85	85.7	22 02.8	47 85	85.3	22 16.8	46 85	84.8	3
4	19 46.0	48 86	87.6	20 00.4	48 86	87.1	20 14.8	48 86	86.7	20 29.1	48 86	86.2	20 43.4	47 85	85.7	20 57.5	47 85	85.3	21 11.6	47 85	84.8	21 25.6	47 85	84.3	4
75	18 54.6	48 86	87.1	19 09.1	48 86	86.6	19 23.5	48 86	86.2	19 37.8	48 85	85.7	19 52.1	47 85	85.2	20 06.3	47 85	84.8	20 20.4	47 85	84.3	20 34.5	47 85	83.8	75
6	18 03.3	48 86	86.6	18 17.8	48 86	86.1	18 32.2	48 85	85.7	18 46.6	48 85	85.2	19 00.9	47 85	84.8	19 15.1	47 85	84.3	19 29.3	47 85	83.8	19 43.3	47 85	83.4	6
7	17 11.9	49 86	86.1	17 26.5	48 85	85.6	17 40.9	48 85	85.2	17 55.3	47 85	84.7	18 09.7	47 85	84.3	18 23.9	47 85	83.8	18 38.2	47 85	83.3	18 52.3	47 85	82.9	7
8	16 20.6	49 86	85.6	16 35.2	48 85	85.1	16 49.7	48 85	84.7	17 04.1	48 85	84.2	17 18.5	48 85	83.8	17 32.8	48 85	83.3	17 47.1	47 85	82.8	18 01.3	47 85	82.4	8
9	15 29.4	49 86	85.1	15 44.0	48 85	84.7	15 58.5	48 85	84.2	16 13.0	48 85	83.7	16 27.4	48 85	83.3	16 41.8	48 85	82.8	16 56.1	48 85	82.4	17 10.3	47 85	81.9	9
80	14 38.2	49 85	84.6	14 52.8	48 85	84.2	15 07.4	48 85	83.7	15 21.9	48 85	83.3	15 36.4	48 85	82.8	15 50.8	48 85	82.4	16 05.1	48 85	81.9	16 19.4	48 85	81.4	80
1	13 47.0	49 85	84.1	14 01.6	48 85	83.7	14 16.3	49 85	83.2	14 30.8	48 85	82.8	14 45.4	48 85	82.3	14 59.8	48 85	81.9	15 14.3	48 85	81.4	15 28.6	48 85	81.0	1
2	12 55.8	49 85	83.6	13 10.6	49 85	83.2	13 25.2	49 85	82.7	13 39.9	49 85	82.3	13 54.4	48 85	81.8	14 09.0	48 85	81.4	14 23.4	48 85	80.9	14 37.9	48 84	80.5	2
3	12 04.7	49 85	83.1	12 19.5	49 85	82.7	12 34.2	49 85	82.2	12 48.9	49 85	81.8	13 03.6	49 85	81.4	13 18.1	48 85	80.9	13 32.7	48 84	80.5	13 47.2	48 84	80.0	3
4	11 13.7	49 85	82.6	11 28.5	49 85	82.2	11 43.3	49 85	81.8	11 58.0	49 85	81.3	12 12.7	49 85	80.9	12 27.4	49 85	80.4	12 42.0	49 84	80.0	12 56.6	48 84	79.5	4
85	10 22.7	50 85	82.2	10 37.6	50 85	81.7	10 52.4	50 85	81.3	11 07.2	49 85	80.8	11 22.0	49 85	80.4	11 36.7	49 84	79.9	11 51.4	49 84	79.5	12 06.0	49 84	79.0	85
6	9 31.8	50 85	81.7	9 46.7	50 85	81.2	10 01.6	50 85	80.8	10 16.5	49 85	80.3	10 31.3	49 84	79.9	10 46.1	49 84	79.5	11 00.9	49 84	79.0	11 15.6	49 84	78.6	6
7	8 41.0	50 85	81.2	8 56.0	50 85	80.7	9 10.9	50 84	80.3	9 25.8	50 84	79.8	9 40.7	50 84	79.4	9 55.6	49 84	78.9	10 10.4	49 84	78.5	10 25.2	49 84	78.1	7
8	7 50.2	50 85	80.7	8 05.2	50 84	80.2	8 20.3	50 84	79.8	8 35.3	50 84	79.4	8 50.2	50 84	78.9	9 05.2	50 84	78.5	9 20.1	50 84	78.0	9 34.9	50 84	77.6	8
9	6 59.5	50 84	80.2	7 14.6	50 84	79.7	7 29.7	50 84	79.3	7 44.8	50 84	78.9	7 59.8	50 84	78.4	8 14.8	50 84	78.0	8 29.8	50 83	77.6	8 44.5	50 83	77.1	9
90	6 08.8	51 84	79.7	6 24.0	51 84	79.2	6 39.2	51 84	78.8	6 54.3	50 84	78.4	7 09.5	50 84	77.9	7 24.6	50 84	77.5	7 39.6	50 83	77.1	7 54.7	50 83	76.6	90

H.A.	12° 00' Alt. Δd Δt Az.	12° 30' Alt. Δd Δt Az.	13° 00' Alt. Δd Δt Az.	13° 30' Alt. Δd Δt Az.	14° 00' Alt. Δd Δt Az.	14° 30' Alt. Δd Δt Az.	15° 00' Alt. Δd Δt Az.	15° 30' Alt. Δd Δt Az.	H.A.
00	47 00.0 1.00 1.01 180.0	46 30.0 1.00 1.01 180.0	46 00.0 1.00 1.01 180.0	45 30.0 1.00 1.01 180.0	45 00.0 1.00 1.01 180.0	44 30.0 1.00 1.01 180.0	44 00.0 1.00 1.01 180.0	43 30.0 1.00 1.01 180.0	00
1	46 59.4 1.00 1.03 178.6	46 29.4 1.00 1.03 178.6	45 59.4 1.00 1.03 178.6	45 29.4 1.00 1.03 178.6	44 59.4 1.00 1.03 178.6	44 29.4 1.00 1.03 178.6	43 59.4 1.00 1.03 178.7	43 29.4 1.00 1.03 178.7	1
2	46 57.4 1.00 1.05 177.1	46 27.5 1.00 1.05 177.2	45 57.5 1.00 1.05 177.2	45 27.5 1.00 1.05 177.2	44 57.5 1.00 1.05 177.3	44 27.6 1.00 1.05 177.3	43 57.6 1.00 1.05 177.3	43 27.6 1.00 1.05 177.3	2
3	46 54.2 1.00 1.08 175.7	46 24.3 1.00 1.07 175.8	45 54.3 1.00 1.07 175.8	45 24.4 1.00 1.07 175.9	44 54.5 1.00 1.07 175.9	44 24.5 1.00 1.07 175.9	43 54.6 1.00 1.07 176.0	43 24.6 1.00 1.07 176.0	3
4	46 49.7 1.00 1.10 174.3	46 19.8 1.00 1.10 174.3	45 49.9 1.00 1.09 174.4	45 20.1 1.00 1.09 174.5	44 50.2 1.00 1.09 174.5	44 20.3 1.00 1.09 174.6	43 50.4 1.00 1.09 174.6	43 20.5 1.00 1.09 174.7	4
05	46 44.0 99 12 172.9	46 14.1 99 12 172.9	45 44.3 99 11 173.0	45 14.5 99 11 173.1	44 44.6 99 11 173.2	44 14.8 99 11 173.2	43 45.0 99 11 173.3	43 15.1 99 11 173.4	05
6	46 36.9 99 14 171.4	46 07.2 99 14 171.5	45 37.4 99 13 171.6	45 07.7 99 13 171.7	44 37.9 99 13 171.8	44 08.2 99 13 171.9	43 38.4 99 13 172.0	43 08.6 99 13 172.1	6
7	46 28.7 99 16 170.0	45 59.0 99 16 170.1	45 29.3 99 16 170.2	44 59.7 99 15 170.4	44 30.0 99 15 170.5	44 00.3 99 15 170.6	43 30.6 99 15 170.7	43 00.9 99 15 170.8	7
8	46 19.1 98 18 168.6	45 49.6 99 18 168.8	45 20.0 99 18 168.9	44 50.4 99 17 169.0	44 20.9 99 17 169.1	43 51.3 99 17 169.3	43 21.7 99 17 169.3	42 52.1 99 17 169.5	8
9	46 08.4 98 20 167.2	45 38.9 98 20 167.4	45 09.5 98 20 167.5	44 40.0 98 19 167.7	44 10.6 98 19 167.8	43 41.1 98 19 167.9	43 11.6 98 19 168.0	42 42.1 98 19 168.2	9
10	45 56.4 98 22 165.9	45 27.1 98 22 166.0	44 57.8 98 21 166.2	44 28.5 98 21 166.3	43 59.1 98 21 166.5	43 29.8 98 21 166.6	43 00.4 98 21 166.7	42 31.0 98 20 166.9	10
1	45 43.3 97 24 164.5	45 14.1 97 24 164.7	44 44.9 97 23 164.8	44 15.7 97 23 165.0	43 46.5 97 23 165.1	43 17.3 97 23 165.3	42 48.0 97 22 165.5	42 18.8 97 22 165.6	1
2	45 28.9 96 26 163.1	44 59.9 97 26 163.3	44 30.9 97 25 163.5	44 01.8 97 25 163.8	43 32.7 97 25 163.8	43 03.7 97 25 164.0	42 34.6 97 24 164.3	42 05.4 97 24 164.3	2
3	45 13.4 96 28 161.8	44 44.6 96 27 162.0	44 15.7 96 27 162.2	43 46.8 96 27 162.4	43 17.9 96 26 162.5	42 48.9 96 26 162.7	42 20.0 96 26 162.9	41 51.0 96 26 163.1	3
4	44 56.8 96 30 160.5	44 28.1 96 29 160.7	43 59.4 96 29 160.9	43 30.7 96 29 161.1	43 01.9 96 28 161.3	42 33.1 96 28 161.5	42 04.3 96 28 161.7	41 35.5 96 28 161.8	4
15	44 39.1 95 31 159.2	44 10.5 95 31 159.4	43 42.0 95 31 159.6	43 13.4 95 30 159.8	42 44.8 95 30 160.0	42 16.2 95 30 160.2	41 47.6 95 30 160.4	41 19.0 96 29 160.6	15
6	44 20.2 94 33 157.9	43 51.9 94 33 158.1	43 23.5 95 33 158.3	42 55.1 95 32 158.5	42 26.7 95 32 158.8	41 58.3 95 32 159.0	41 29.8 95 31 159.2	41 01.4 95 31 159.4	6
7	44 00.3 94 35 156.6	43 32.2 94 35 156.8	43 04.0 94 34 157.0	42 35.8 94 34 157.3	42 07.6 94 34 157.5	41 39.3 94 34 157.7	41 11.0 94 33 158.0	40 42.7 94 33 158.2	7
8	43 39.3 93 37 155.3	43 11.4 93 36 155.6	42 43.4 93 36 155.8	42 15.4 93 36 156.0	41 47.4 93 35 156.3	41 19.3 94 35 156.5	40 51.2 94 35 156.8	40 23.1 94 34 157.0	8
9	43 17.3 92 38 154.1	42 49.6 92 38 154.3	42 21.8 93 38 154.6	41 54.0 93 37 154.8	41 26.2 93 37 155.1	40 58.4 93 37 155.3	40 30.5 93 36 155.6	40 02.5 93 36 155.8	9
20	42 54.3 92 40 152.8	42 26.8 92 40 153.1	41 59.3 92 39 153.4	41 31.7 92 39 153.6	41 04.1 92 38 153.9	40 36.4 92 38 154.1	40 08.7 92 38 154.4	39 41.0 92 37 154.6	20
1	42 30.3 91 42 151.6	42 03.1 91 41 151.9	41 35.7 91 41 152.2	41 08.4 91 40 152.4	40 40.9 91 40 152.7	40 13.5 92 40 153.0	39 46.0 92 39 153.2	39 18.5 92 39 153.5	1
2	42 05.4 90 43 150.4	41 38.4 90 43 150.7	41 11.2 90 42 151.0	40 44.1 90 42 151.3	40 16.9 91 42 151.5	39 49.7 91 41 151.8	39 22.4 91 41 152.1	38 55.1 91 40 152.4	2
3	41 39.6 89 45 149.2	41 12.7 90 44 149.5	40 45.8 90 44 149.8	40 18.9 90 43 150.1	39 51.9 90 43 150.4	39 24.9 90 43 150.7	38 57.9 90 42 151.0	38 30.8 90 42 151.2	3
4	41 12.8 89 46 148.1	40 46.2 89 46 148.4	40 19.5 89 45 148.7	39 52.8 89 45 149.0	39 26.1 89 45 149.3	38 59.3 89 44 149.6	38 32.5 90 44 149.8	38 05.6 90 43 150.1	4
25	40 45.2 88 48 146.9	40 18.8 88 47 147.2	39 52.4 88 47 147.5	39 25.9 88 46 147.9	38 59.4 88 46 148.2	38 32.8 89 46 148.5	38 06.2 89 45 148.8	37 39.6 89 45 149.0	25
6	40 16.7 87 49 145.8	39 50.6 87 48 146.1	39 24.4 87 48 146.4	38 58.1 87 48 146.8	38 31.8 88 47 147.1	38 05.5 88 47 147.4	37 39.1 88 46 147.7	37 12.7 88 46 148.0	6
7	39 47.4 86 50 144.7	39 21.5 86 50 145.0	38 55.5 87 49 145.3	38 29.5 87 49 145.7	38 03.5 87 49 146.0	37 37.4 87 48 146.3	37 11.2 87 48 146.6	36 45.0 87 47 146.9	7
8	39 17.3 85 52 143.6	38 51.6 86 51 143.9	38 25.9 86 51 144.3	38 00.1 86 50 144.6	37 34.3 86 50 144.9	37 08.4 86 50 145.2	36 42.5 86 49 145.6	36 16.5 87 49 145.9	8
9	38 46.4 85 53 142.5	38 20.9 85 52 142.9	37 55.5 85 52 143.2	37 29.9 85 52 143.5	37 04.4 85 51 143.9	36 38.7 86 51 144.2	36 13.0 86 50 144.5	35 47.3 86 50 144.8	9
30	38 14.7 84 54 141.5	37 49.5 84 54 141.8	37 24.3 84 53 142.2	36 59.0 84 53 142.5	36 33.7 85 52 142.8	36 08.3 85 52 143.2	35 42.8 85 52 143.5	35 17.3 85 51 143.8	30
1	37 42.3 83 55 140.4	37 17.4 83 55 140.8	36 52.4 83 54 141.1	36 27.3 84 54 141.5	36 02.2 84 54 141.8	35 37.1 84 53 142.2	35 11.9 84 53 142.5	34 46.6 84 52 142.8	1
2	37 09.2 82 56 139.4	36 44.5 82 56 139.8	36 19.8 83 56 140.1	35 55.0 83 55 140.5	35 30.1 83 55 140.8	35 05.2 83 54 141.2	34 40.2 83 54 141.5	34 15.2 84 54 141.8	2
3	36 35.4 81 57 138.4	36 11.0 82 57 138.8	35 46.5 82 57 139.2	35 21.9 82 56 139.5	34 57.3 82 56 139.9	34 32.6 82 55 140.2	34 07.8 83 55 140.6	33 43.0 83 55 140.9	3
4	36 01.0 81 58 137.5	35 36.8 81 58 137.8	35 12.5 81 58 138.2	34 48.2 81 57 138.6	34 23.8 81 57 139.0	33 59.3 82 56 139.3	33 34.8 82 56 139.6	33 10.3 82 56 139.9	4
35	35 25.9 80 60 136.5	35 01.9 80 59 136.9	34 37.9 80 59 137.2	34 13.8 80 58 137.6	33 49.7 81 58 137.9	33 25.4 81 58 138.3	33 01.2 81 57 138.6	32 36.8 81 57 139.0	35
6	34 50.1 79 61 135.5	34 26.4 79 60 135.9	34 02.6 79 60 136.3	33 38.8 80 59 136.6	33 14.9 80 59 137.0	32 50.9 80 59 137.4	32 26.9 80 58 137.7	32 02.8 80 58 138.1	6
7	34 13.8 78 62 134.6	33 50.3 78 61 135.0	33 26.8 79 61 135.3	33 03.2 79 60 135.7	32 39.5 79 60 136.1	32 15.8 79 60 136.4	31 52.0 79 59 136.8	31 28.1 80 59 137.2	7
8	33 36.9 77 62 133.7	33 13.7 78 62 134.1	32 50.4 78 62 134.4	32 27.0 78 61 134.8	32 03.5 78 61 135.2	31 40.0 78 60 135.5	31 16.5 79 60 135.9	30 52.8 79 60 136.3	8
9	32 59.4 77 63 132.8	32 36.4 77 63 133.2	32 13.4 77 63 133.5	31 50.2 77 62 133.9	31 27.0 77 62 134.3	31 03.7 78 61 134.7	30 40.4 78 61 135.0	30 17.0 78 61 135.4	9
40	32 21.4 76 64 131.9	31 58.7 76 64 132.3	31 35.8 76 63 132.7	31 12.9 76 63 133.0	30 49.9 77 63 133.4	30 26.9 77 62 133.8	30 03.8 77 62 134.2	29 40.6 77 62 134.5	40
1	31 42.9 75 65 131.0	31 20.4 75 65 131.4	30 57.7 75 64 131.8	30 35.1 76 64 132.2	30 12.3 76 64 132.6	29 49.5 76 63 132.9	29 26.6 76 63 133.3	29 03.7 77 62 133.7	1
2	31 03.8 74 66 130.2	30 41.5 75 66 130.6	30 19.1 75 65 131.0	29 56.7 75 65 131.4	29 34.2 75 64 131.7	29 11.6 75 64 132.1	28 48.9 76 64 132.5	28 26.2 76 63 132.8	2
3	30 24.3 74 67 129.3	30 02.2 74 66 129.7	29 40.1 74 66 130.1	29 17.8 74 66 130.5	28 55.5 74 65 130.9	28 33.2 75 65 131.3	28 10.7 75 64 131.6	27 48.3 75 64 132.0	3
4	29 44.3 73 67 128.5	29 22.4 73 67 128.9	29 00.5 73 67 129.3	28 38.5 73 66 129.7	28 16.4 74 66 130.1	27 54.3 74 66 130.4	27 32.1 74 65 130.8	27 09.8 74 65 131.2	4
45	29 03.8 72 68 127.7	28 42.2 72 68 128.1	28 20.5 73 67 128.5	27 58.7 73 67 128.9	27 36.8 73 67 129.3	27 14.9 73 66 129.6	26 52.9 73 66 130.0	26 30.9 74 66 130.4	45
6	28 22.9 71 69 126.9	28 01.5 72 69 127.3	27 40.0 72 68 127.7	27 18.4 72 68 128.1	26 56.8 72 67 128.5	26 35.1 72 67 128.9	26 13.3 73 67 129.2	25 51.5 73 66 129.6	6
7	27 41.6 71 69 126.1	27 20.3 71 69 126.5	26 59.1 71 69 126.9	26 37.7 71 69 127.3	26 16.3 72 68 127.7	25 54.8 72 68 128.1	25 33.3 72 67 128.5	25 11.7 72 67 128.8	7
8	26 59.8 70 70 125.3	26 38.8 70 70 125.7	26 17.7 70 70 126.1	25 56.6 71 69 126.5	25 35.4 71 69 126.9	25 14.1 71 69 127.3	24 52.8 71 68 127.7	24 31.4 71 68 128.1	8
9	26 17.7 69 71 124.6	25 56.9 69 71 125.0	25 36.0 70 70 125.4	25 15.0 70 70 125.8	24 54.0 70 70 126.2	24 33.0 70 69 126.6	24 11.9 70 69 126.9	23 50.7 71 68 127.3	9
50	25 35.1 69 72 123.8	25 14.5 69 71 124.2	24 53.9 69 71 124.6	24 33.1 69 70 125.0	24 12.3 69 70 125.4	23 51.5 70 70 125.8	23 30.6 70 69 126.2	23 09.6 70 69 126.6	50
1	24 52.2 68 72 123.1	24 31.8 68 72 123.5	24 11.3 69 71 123.9	23 50.8 69 71 124.3	23 30.2 69 71 124.7	23 09.6 69 70 125.1	22 48.9 69 70 125.5	22 28.1 69 70 125.9	1
2	24 08.9 67 73 122.4	23 48.7 67 72 122.8	23 28.5 68 72 123.2	23 08.1 68 72 123.6	22 47.8 68 71 124.0	22 27.3 68 71 124.4	22 06.8 68 71 124.8	21 46.2 69 70 125.1	2
3	23 25.3 67 73 121.6	23 05.3 67 73 122.0	22 45.2 67 73 122.5	22 25.1 67 72 122.9	22 04.9 68 72 123.3	21 44.7 68 72 123.7	21 24.4 68 71 124.0	21 04.0 68 71 124.4	3
4	22 41.4 66 73 120.8	22 21.6 66 73 121.3	22 01.7 66 73 121.7	21 41.7 67 73 122.1	21 21.7 67 73 122.5	21 01.7 67 72 123.0	20 41.6 67 72 123.3	20 21.4 67 72 123.7	4
55	21 57.1 65 74 120.2	21 37.5 66 74 120.7	21 17.8 66 74 121.1	20 58.0 66 73 121.5	20 38.2 66 73 121.9	20 18.4 66 73 122.3	19 58.5 66 72 122.7	19 38.5 67 72 123.1	55
6	21 12.5 65 75 119.6	20 53.1 65 74 120.0	20 33.6 65 74 120.4	20 14.0 65 74 120.8	19 54.4 65 74 121.2	19 34.7 66 73 121.6	19 15.0 66 73 122.0	18 55.2 66 73 122.4	6
7	20 27.6 64 75 118.9	20 08.4 64 75 119.3	19 49.0 65 75 119.7	19 29.7 65 74 120.1	19 10.2 65 74 120.5	18 50.7 65 74 120.9	18 31.2 65 73 121.3	18 11.6 65 73 121.7	7
8	19 42.5 64 75 118.2	19 23.4 64 75 118.6	19 04.2 64 75 119.0	18 45.0 64 75 119.4	18 25.8 64 75 119.8	18 06.5 64 74 120.3	17 47.1 65 74 120.7	17 27.7 65 74 121.1	8
9	18 57.0 63 76 117.6	18 38.1 63 76 118.0	18 19.1 63 76 118.4	18 00.1 63 75 118.8	17 41.0 64 75 119.2	17 21.9 64 75 119.6	17 02.7 64 74 120.0	16 43.5 64 74 120.4	9
60	18 11.3 62 77 116.9	17 52.5 63 76 117.3	17 33.7 63 76 117.7	17 14.9 63 76 118.1	16 56.0 63 76 118.6	16 37.0 63 75 119.0	16 18.0 63 75 119.4	15 59.0 64 75 119.8	60
1	17 25.3 62 77 116.3	17 06.7 62 77 116.7	16 48.1 62 77 117.1	16 29.4 62 76 117.5	16 10.7 63 76 117.9	15 51.9 63 76 118.3	15 33.1 63 75 118.7	15 14.2 63 75 119.1	1
2	16 39.1 61 77 115.7	16 20.6 61 77 116.1	16 02.2 62 77 116.5	15 43.7 62 77 116.9	15 25.1 62 76 117.3	15 06.5 62 76 117.7	14 47.8 62 76 118.1	14 29.2 62 76 118.5	2
3	15 52.6 61 78 115.0	15 34.3 61 78 115.4	15 16.0 61 77 115.8	14 57.7 61 77 116.2	14 39.3 61 77 116.7	14 20.8 62 77 117.1	14 02.3 62 77 117.5	13 43.8 62 76 117.9	3
4	15 05.9 60 78 114.4	14 47.8 60 78 114.8	14 29.6 61 78 115.2	14 11.4 61 77 115.6	13 53.2 61 77 116.1	13 34.9 61 77 116.5	13 16.6 61 77 116.9	12 58.2 61 76 117.3	4
65	14 18.9 60 79 113.8	14 01.0 60 78 114.2	13 43.0 60 78 114.6	13 24.9 60 78 115.0	13 06.9 60 78 115.5	12 48.7 60 77 115.9	12 30.6 61 77 116.3	12 12.4 61 77 116.7	65
6	13 31.8 59 79 113.2	13 13.9 59 79 113.6	12 56.1 60 78 114.0	12 38.2 60 78 114.4	12 20.3 60 78 114.9	12 02.4 60 78 115.3	11 44.4 60 77 115.7	11 26.3 60 77 116.1	6
7	12 44.4 59 79 112.6	12 26.7 59 79 113.0	12 09.0 59 79 113.4	11 51.3 59 79 113.9	11 33.5 59 78 114.3	11 15.7 59 78 114.7	10 57.9 60 78 115.1	10 40.0 60 78 115.5	7
8	11 56.8 58 80 112.0	11 39.3 58 79 112.4	11 21.7 59 79 112.9	11 04.2 59 79 113.3	10 46.5 59 78 113.7	10 28.9 59 78 114.1	10 11.2 59 78 114.5	9 53.5 59 78 114.9	8
9	11 09.0 58 80 111.4	10 51.7 58 80 111.9	10 34.2 58 79 112.3	10 16.8 58 79 112.7	9 59.3 58 79 113.1	9 41.8 58 79 113.5	9 24.3 58 78 113.9	9 06.7 59 78 114.3	9
70	10 21.1 57 80 110.9	10 03.8 58 80 111.3	9 46.6 58 80 111.7	9 29.3 58 80 112.1	9 11.9 58 79 112.5	8 54.6 58 79 112.9	8 37.2 58 79 113.4	8 19.8 58 79 113.8	70
1	9 32.9 57 81 110.3	9 15.8 57 80 110.7	8 58.7 58 80 111.1	8 41.5 57 80 111.6	8 24.3 57 80 112.0	8 07.1 57 79 112.4	7 49.9 58 79 112.8	7 32.6 58 79 113.2	1
2	8 44.6 57 81 109.7	8 27.6 57 81 110.2	8 10.6 57 80 110.6	7 53.6 57 80 111.0	7 36.5 57 80 111.4	7 19.5 57 80 111.8	7 02.4 57 80 112.2	6 45.2 57 79 112.7	2
3	7 56.1 56 81 109.2	7 39.3 56 81 109.6	7 22.4 56 81 110.0	7 05.5 56 80 110.4	6 48.6 56 80 110.9	6 31.6 57 80 111.3	6 14.7 57 80 111.7	5 57.7 57 80 112.1	3
4	7 07.5 56 81 108.6	6 50.7 56 81 109.1	6 34.0 56 81 109.5	6 17.2 56 81 109.9	6 00.4 56 81 110.3	5 43.6 56 80 110.7	5 26.8 56 80 111.1	5 09.9 56 80 111.6	4
75	6 18.6 55 82 108.1	6 02.0 55 81 108.5	5 45.4 55 81 108.9	5 28.8 56 81 109.3	5 12.1 56 81 109.8				75
6	5 29.7 55 82 107.5	5 13.2 55 82 108.0							6

H.A.	12° 00' Alt. Δd Δt Az.	12° 30' Alt. Δd Δt Az.	13° 00' Alt. Δd Δt Az.	13° 30' Alt. Δd Δt Az.	14° 00' Alt. Δd Δt Az.	14° 30' Alt. Δd Δt Az.	15° 00' Alt. Δd Δt Az.	15° 30' Alt. Δd Δt Az.	H.A.
91	5 18.3 51 84 79.2	5 33.5 51 84 78.7	5 48.8 51 84 78.3	6 04.0 51 84 77.9	6 19.2 51 84 77.4	6 34.4 51 83 77.0	6 49.6 50 83 76.6	7 04.7 50 83 76.1	91
2				5 13.8 51 84 77.4	5 29.1 51 84 76.9	5 44.3 51 83 76.5	5 59.6 51 83 76.1	6 14.8 51 83 75.6	2
3							5 09.7 51 83 75.6	5 25.0 51 83 75.2	3

Lat. 32°
Lat. 33°
Lat. 34°
Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

Lat. 31°

H.A.	16° 00' Alt. / Az.	16° 30' Alt. / Az.	17° 00' Alt. / Az.	17° 30' Alt. / Az.	18° 00' Alt. / Az.	18° 30' Alt. / Az.	19° 00' Alt. / Az.	19° 30' Alt. / Az.	H.A.
00	75 00.0 1.03 03 180.0	75 30.0 1.03 03 180.0	76 00.0 1.03 03 180.0	76 30.0 1.03 03 180.0	77 00.0 1.03 03 180.0	77 30.0 1.03 03 180.0	78 00.0 1.03 03 180.0	78 30.0 1.04 03 180.0	00
1	74 58.3 1.00 176.3	75 28.3 1.00 176.2	75 58.2 1.00 175.9	76 28.2 1.00 175.8	76 58.1 1.00 175.6	77 28.0 1.10 175.6	77 57.9 1.00 175.5	78 27.9 1.01 175.3	1
2	74 53.4 99 14 172.6	75 23.2 99 14 172.4	75 52.9 99 15 172.1	76 22.7 99 15 171.9	76 52.4 99 16 171.6	77 22.2 99 16 171.3	77 51.9 99 17 171.0	78 21.6 99 17 170.6	2
3	74 45.1 99 19 169.0	75 14.7 98 20 168.6	75 44.2 98 20 168.3	76 13.7 98 21 167.9	76 43.1 98 22 167.5	77 12.5 98 22 167.0	77 41.9 98 23 166.6	78 11.2 98 24 166.1	3
4	74 33.7 97 21 165.4	75 02.9 97 25 165.0	75 32.1 97 26 164.5	76 01.2 97 26 164.0	76 30.2 97 27 163.5	76 59.2 96 28 162.9	77 28.1 96 29 162.3	77 56.8 96 30 161.6	4
05	74 19.3 96 29 161.9	74 48.0 96 30 161.4	75 16.8 96 31 160.9	75 45.4 96 32 160.3	76 13.9 96 32 159.6	76 42.4 95 33 158.8	77 10.7 94 35 158.2	77 38.8 94 36 157.4	05
6	74 01.9 95 34 158.6	74 30.2 94 34 158.0	74 58.4 94 35 157.3	75 26.5 93 36 156.6	75 54.5 93 37 155.9	76 22.3 92 39 155.1	76 50.0 92 40 154.3	77 17.4 91 41 153.4	6
7	73 41.7 93 38 155.3	74 09.5 92 39 154.7	74 37.2 92 40 153.9	75 04.7 91 41 153.2	75 32.0 91 42 152.4	75 59.2 90 43 151.5	76 26.1 90 44 150.6	76 52.9 89 46 149.6	7
8	73 19.0 91 42 152.2	73 46.2 90 43 151.5	74 13.3 90 44 150.7	74 40.1 89 45 149.9	75 06.8 89 46 149.0	75 33.3 88 47 148.1	75 59.5 87 49 147.1	76 25.5 86 50 146.0	8
9	72 53.9 89 46 149.2	73 20.5 88 47 148.5	73 46.9 88 48 147.6	74 13.1 87 49 146.7	74 39.1 86 50 145.8	75 04.8 85 51 144.8	75 30.3 84 53 143.8	75 55.5 83 54 142.7	9
10	72 26.5 87 49 146.4	72 52.5 86 50 145.6	73 18.2 86 51 144.7	73 43.8 85 52 143.8	74 09.1 84 54 142.8	74 34.1 83 55 141.8	74 58.8 82 56 140.7	75 23.2 81 57 139.6	10
1	71 57.0 85 52 143.7	72 22.4 84 53 142.8	72 47.5 83 54 141.9	73 12.4 82 56 141.0	73 37.0 81 57 140.0	74 01.2 80 58 138.9	74 25.2 79 59 137.8	74 48.8 78 60 136.6	1
2	71 25.6 83 55 141.1	71 50.4 82 56 140.2	72 14.9 81 57 139.3	72 39.1 80 58 138.3	73 03.0 79 60 137.3	73 26.5 78 61 136.2	73 49.8 77 62 135.1	74 12.6 76 63 133.9	2
3	70 52.5 81 58 138.7	71 16.6 80 59 137.8	71 40.5 79 60 136.8	72 04.0 78 61 135.8	72 27.2 77 62 134.8	72 50.1 76 63 133.7	73 12.7 74 64 132.6	73 34.8 73 65 131.4	3
4	70 17.8 79 60 136.4	70 41.3 78 61 135.5	71 04.5 77 62 134.5	71 27.4 76 63 133.5	71 50.0 75 64 132.4	72 12.2 73 65 131.4	72 34.1 72 66 130.2	72 55.5 71 68 129.0	4
15	69 41.6 77 63 134.2	70 04.5 76 63 133.3	70 27.2 75 64 132.3	70 49.4 73 65 131.3	71 11.4 73 66 130.2	71 33.0 71 67 129.1	71 54.2 70 68 128.0	72 15.0 69 70 126.8	15
6	69 04.1 75 65 132.1	69 26.4 74 65 131.2	69 48.5 73 66 130.2	70 10.2 72 67 129.2	70 31.5 71 68 128.2	70 52.5 69 69 127.1	71 13.1 68 70 126.0	71 33.3 67 71 124.8	6
7	68 25.4 73 66 130.2	68 47.2 72 67 129.2	69 08.6 71 68 128.2	69 29.8 70 69 127.2	69 50.6 69 70 126.2	70 11.0 67 71 125.1	70 31.0 66 72 124.0	70 50.5 65 73 122.9	7
8	67 45.5 71 68 128.3	68 06.8 70 69 127.4	68 27.7 69 70 126.4	68 48.3 68 71 125.4	69 08.6 67 71 124.4	69 28.4 66 72 123.3	69 47.9 64 73 122.2	70 06.9 63 74 121.1	8
9	67 04.7 70 70 126.5	67 25.4 69 70 125.6	67 45.9 68 71 124.6	68 06.0 66 72 123.6	68 25.7 65 73 122.6	68 45.0 64 74 121.6	69 04.0 62 74 120.5	69 22.5 61 75 119.4	9
20	66 22.5 63 71 124.9	66 43.2 67 72 123.9	67 03.1 66 73 123.0	67 22.7 65 73 122.0	67 42.0 63 74 121.0	68 00.8 62 75 120.0	68 19.3 61 76 118.9	68 37.3 59 76 117.8	20
1	65 40.3 67 72 123.3	66 00.1 66 73 122.3	66 19.6 64 74 121.4	66 38.8 63 74 120.4	66 57.5 62 75 119.4	67 15.9 61 76 118.4	67 33.9 59 77 117.4	67 51.5 58 77 116.3	1
2	64 56.9 65 73 121.7	65 16.3 64 74 120.8	65 35.4 63 75 119.9	65 54.1 62 76 119.0	66 12.4 61 76 118.0	66 30.4 59 77 117.0	66 48.0 58 78 116.0	67 05.2 57 78 114.9	2
3	64 12.8 64 75 120.3	64 31.8 63 75 119.4	64 50.5 62 76 118.5	65 08.8 60 76 117.6	65 26.7 59 77 116.6	65 44.3 58 78 115.6	66 01.5 57 78 114.6	66 18.3 55 79 113.6	3
4	63 28.1 63 76 118.9	63 46.7 61 76 118.0	64 05.0 60 77 117.1	64 22.9 59 77 116.2	64 40.5 58 78 115.3	64 57.7 57 78 114.3	65 14.5 55 79 113.3	65 30.9 54 80 112.3	4
25	62 42.8 61 76 117.6	63 01.0 60 77 116.7	63 18.9 59 78 115.8	63 36.5 58 78 114.9	63 53.7 57 79 114.0	64 10.6 56 79 113.0	64 27.0 54 80 112.1	64 43.1 53 80 111.1	25
6	61 57.0 60 77 116.3	62 14.9 58 78 115.5	62 32.4 58 79 114.6	62 49.6 57 79 113.7	63 06.5 56 79 112.8	63 23.0 54 80 111.9	63 39.2 53 80 110.9	63 55.0 52 81 110.0	6
7	61 10.7 59 78 115.1	61 28.2 58 78 114.3	61 45.4 57 79 113.4	62 02.4 56 79 112.6	62 18.9 55 80 111.7	62 35.1 53 80 110.8	62 51.0 52 81 109.8	63 06.5 51 81 108.9	7
8	60 23.9 58 79 114.0	60 41.1 57 79 113.2	60 58.1 56 80 112.3	61 14.7 55 80 111.5	61 30.9 54 80 110.6	61 46.9 53 81 109.7	62 02.4 51 81 108.8	62 17.6 50 82 107.9	8
9	59 36.7 57 79 112.9	59 53.7 56 80 112.1	60 10.3 55 80 111.2	60 26.6 54 81 110.4	60 42.6 53 81 109.5	60 58.3 51 81 108.7	61 13.6 50 82 107.8	61 28.6 49 82 106.9	9
30	58 49.1 56 80 111.8	59 05.8 55 80 111.0	59 22.2 54 81 110.2	59 38.3 53 81 109.4	59 54.0 52 82 108.5	60 09.4 51 82 107.7	60 24.5 50 82 106.8	60 39.2 49 83 105.9	30
1	58 01.2 55 80 110.8	58 17.7 54 81 110.0	58 33.8 53 81 109.2	58 49.6 52 82 108.4	59 05.1 51 82 107.6	59 20.3 50 82 106.7	59 35.1 49 83 105.9	59 49.6 48 83 105.0	1
2	57 13.0 54 81 109.8	57 29.2 53 81 109.0	57 45.1 52 82 108.2	58 00.7 51 82 107.4	58 15.9 50 82 106.6	58 30.9 49 83 105.8	58 45.6 48 83 105.0	58 59.9 47 84 104.1	2
3	56 24.5 54 81 108.9	56 40.4 53 82 108.1	56 56.1 52 82 107.3	57 11.5 51 82 106.5	57 26.6 50 83 105.7	57 41.3 49 83 104.9	57 55.8 48 83 104.1	58 09.4 47 84 103.3	3
4	55 35.7 53 82 108.0	55 51.4 52 82 107.2	56 06.9 51 82 106.4	56 22.1 50 83 105.7	56 36.9 49 83 104.9	56 51.5 48 83 104.1	57 05.8 47 84 103.3	57 19.4 46 84 102.4	4
35	54 46.6 52 82 107.1	55 02.2 51 82 106.3	55 17.4 50 83 105.6	55 32.4 49 83 104.8	55 47.1 49 83 104.0	56 01.6 48 84 103.3	56 15.7 47 84 102.5	56 29.5 45 84 101.7	35
6	53 57.3 52 82 106.2	54 12.7 51 83 105.5	54 27.8 50 83 104.7	54 42.6 49 83 104.0	54 57.2 48 83 103.2	55 11.4 47 84 102.5	55 25.4 46 84 101.7	55 39.0 45 84 100.9	6
7	53 07.9 51 83 105.4	53 23.0 50 83 104.7	53 38.0 49 83 103.9	53 52.6 48 83 103.2	54 07.0 47 84 102.4	54 21.1 47 84 101.7	54 34.9 46 84 100.9	54 48.5 45 84 100.2	7
8	52 18.2 51 83 104.6	52 33.2 50 83 103.9	52 48.0 49 84 103.1	53 02.5 48 84 102.4	53 16.7 47 84 101.7	53 30.7 46 84 100.9	53 44.4 45 84 100.2	53 57.6 44 85 99.4	8
9	51 28.3 50 83 103.8	51 43.1 49 84 103.1	51 57.8 48 84 102.4	52 12.2 47 84 101.7	52 26.3 47 84 100.9	52 40.1 46 84 100.2	52 53.7 45 85 99.5	53 07.0 44 85 98.7	9
40	50 38.3 50 84 103.0	50 53.0 49 84 102.3	51 07.5 48 84 101.6	51 21.8 47 84 100.9	51 35.7 48 84 100.2	51 49.5 45 85 99.5	52 02.9 44 85 98.8	52 16.1 44 85 98.1	40
1	49 48.1 49 84 102.3	50 02.7 48 84 101.6	50 17.1 47 84 100.9	50 31.2 47 84 100.2	50 45.1 46 85 99.5	50 58.7 45 85 98.8	51 12.1 45 85 98.1	51 25.2 43 85 97.4	1
2	48 57.8 49 84 101.6	49 12.3 48 84 100.9	49 26.5 47 84 100.2	49 40.5 46 85 99.5	49 54.3 45 85 98.9	50 07.8 45 85 98.2	50 21.1 45 85 97.5	50 34.1 43 85 96.8	2
3	48 07.3 48 84 100.9	48 21.7 48 84 100.2	48 35.9 47 84 99.5	48 49.8 45 85 98.9	49 03.4 45 85 98.2	49 16.9 44 85 97.5	49 30.1 43 85 96.9	49 43.0 43 85 96.1	3
4	47 16.8 48 84 100.2	47 31.0 47 85 99.5	47 45.1 46 85 98.9	47 58.9 46 85 98.2	48 12.5 45 85 97.5	48 25.8 44 85 96.9	48 39.0 43 86 96.2	48 51.8 43 85 95.5	4
45	46 26.1 48 85 99.5	46 40.3 47 85 98.9	46 54.2 46 85 98.2	47 08.0 45 85 97.6	47 21.5 46 85 96.9	47 34.8 44 85 96.2	47 47.8 43 85 95.6	48 00.6 42 86 94.9	45
6	45 35.3 47 85 98.8	45 49.4 47 85 98.2	46 03.3 46 85 97.6	46 16.9 45 85 96.9	46 30.4 44 85 96.3	46 43.6 44 85 95.6	46 56.6 43 86 95.0	47 09.4 42 86 94.3	6
7	44 44.5 47 85 98.2	44 58.5 46 85 97.6	45 12.3 46 85 96.9	45 25.9 45 85 96.3	45 39.2 44 85 95.7	45 52.4 44 85 95.0	46 05.3 43 86 94.4	46 18.1 42 86 93.7	7
8	43 53.5 47 85 97.6	44 07.5 46 85 97.0	44 21.2 45 85 96.3	44 34.7 45 85 95.7	44 48.0 44 85 95.1	45 01.1 43 86 94.4	45 14.0 43 86 93.8	45 26.7 42 86 93.2	8
9	43 02.5 47 85 97.0	43 16.4 46 85 96.4	43 30.0 45 85 95.7	43 43.5 45 85 95.1	43 56.8 44 86 94.5	44 09.8 43 86 93.9	44 22.7 43 86 93.2	44 35.4 42 86 92.6	9
50	42 11.4 46 85 96.4	42 25.2 45 85 95.8	42 38.8 45 85 95.1	42 52.3 44 86 94.5	43 05.5 44 86 93.9	43 18.5 43 86 93.3	43 31.3 42 86 92.7	43 44.0 42 86 92.1	50
1	41 20.3 46 85 95.8	41 34.0 46 85 95.2	41 47.6 45 85 94.6	42 01.0 44 86 94.0	42 14.2 44 86 93.4	42 27.2 43 86 92.7	42 40.0 42 86 92.1	42 52.6 42 86 91.5	1
2	40 29.1 46 85 95.2	40 42.8 45 86 94.6	40 56.3 45 86 94.0	41 09.6 44 86 93.4	41 22.8 44 86 92.8	41 35.8 43 86 92.2	41 48.6 42 86 91.6	42 01.1 42 86 91.0	2
3	39 37.8 46 85 94.6	39 51.5 45 86 94.0	40 05.0 45 86 93.4	40 18.3 44 86 92.8	40 31.4 43 86 92.2	40 44.4 43 86 91.7	40 57.1 42 86 91.1	41 09.7 42 86 90.5	3
4	38 46.6 46 86 94.0	39 00.2 45 86 93.5	39 13.6 45 86 92.9	39 26.9 44 86 92.3	39 40.0 43 86 91.7	39 53.0 43 86 91.1	40 05.7 42 86 90.5	40 18.3 42 86 89.9	4
55	37 55.2 46 86 93.5	38 08.8 45 86 92.9	38 22.3 44 86 92.3	38 35.5 44 86 91.8	38 48.6 43 86 91.2	39 01.5 43 86 90.6	39 14.3 42 86 90.0	39 26.9 42 86 89.4	55
6	37 03.9 45 86 92.9	37 17.5 45 86 92.4	37 30.9 44 86 91.8	37 44.1 44 86 91.2	37 57.2 43 86 90.7	38 10.1 43 86 90.1	38 22.9 42 86 89.5	38 35.4 42 86 88.9	6
7	36 12.5 45 86 92.4	36 26.1 45 86 91.8	36 39.5 44 86 91.3	36 52.7 44 86 90.7	37 05.8 43 86 90.1	37 18.7 43 86 89.6	37 31.4 42 86 89.0	37 44.0 42 86 88.4	7
8	35 21.1 45 86 91.8	35 34.6 45 86 91.3	35 48.0 44 86 90.7	36 01.3 44 86 90.2	36 14.3 43 86 89.6	36 27.3 43 86 89.1	36 40.0 42 86 88.5	36 52.6 42 86 87.9	8
9	34 29.7 45 86 91.3	34 43.2 45 86 90.7	34 56.6 44 86 90.2	35 09.8 44 86 89.7	35 22.9 43 86 89.1	35 35.8 43 86 88.6	35 48.6 42 86 88.0	36 01.2 42 86 87.4	9
60	33 38.3 45 86 90.8	33 51.8 45 86 90.2	34 05.2 44 86 89.7	34 18.4 44 86 89.2	34 31.5 43 86 88.6	34 44.4 43 86 88.1	34 57.2 42 86 87.5	35 09.9 42 86 87.0	60
1	32 46.9 45 86 90.3	33 00.4 45 86 89.7	33 13.7 44 86 89.2	33 27.0 44 86 88.7	33 40.1 43 86 88.1	33 53.0 43 86 87.6	34 05.8 42 86 87.0	34 18.5 42 86 86.5	1
2	31 55.4 45 86 89.7	32 08.9 44 86 89.2	32 22.3 44 86 88.7	32 35.6 44 86 88.2	32 48.7 43 86 87.6	33 01.7 43 86 87.1	33 14.5 42 86 86.5	33 27.2 42 86 86.0	2
3	31 04.0 45 86 89.2	31 17.5 45 86 88.7	31 30.9 44 86 88.2	31 44.2 44 86 87.7	31 57.3 43 86 87.1	32 10.3 43 86 86.6	32 23.2 42 86 86.1	32 35.9 42 86 85.5	3
4	30 12.6 45 86 88.7	30 26.1 45 86 88.2	30 39.5 44 86 87.7	30 52.8 44 86 87.2	31 06.0 44 86 86.6	31 19.0 43 86 86.1	31 31.9 43 85 85.6	31 44.7 42 86 85.1	4
65	29 21.2 45 86 88.2	29 34.7 45 86 87.7	29 48.1 45 86 87.2	30 01.4 44 86 86.7	30 14.6 44 86 86.2	30 27.7 43 85 85.6	30 40.6 43 85 85.1	30 53.4 42 85 84.6	65
6	28 29.8 45 86 87.7	28 43.3 45 86 87.2	28 56.8 45 86 86.7	29 10.1 44 86 86.2	29 23.3 44 85 85.7	29 36.4 43 85 85.2	29 49.4 43 85 84.6	30 02.3 43 85 84.1	6
7	27 38.4 45 86 87.2	27 52.0 45 86 86.7	28 05.4 45 86 86.2	28 18.8 44 85 85.7	28 32.1 44 85 85.2	28 45.2 44 85 84.7	28 58.2 43 85 84.2	29 11.1 43 85 83.7	7
8	26 47.0 46 86 86.7	27 00.6 45 86 86.2	27 14.1 45 85 85.7	27 27.5 45 85 85.2	27 40.8 44 85 84.7	27 54.0 44 85 84.2	28 07.1 43 85 83.7	28 20.0 43 85 83.2	8
9	25 55.7 46 86 86.2	26 09.3 45 85 85.8	26 22.9 45 85 85.3	26 36.3 45 85 84.8	26 49.6 44 85 84.3	27 02.9 44 85 83.8	27 16.0 44 85 83.2	27 29.0 43 85 82.7	9
70	25 04.4 46 85 85.8	25 18.1 45 85 85.3	25 31.6 45 85 84.8	25 45.1 45 85 84.3	25 58.5 44 85 83.8	26 11.8 44 85 83.3	26 24.9 44 85 82.8	26 38.0 43 85 82.3	70
1	24 13.1 46 85 85.3	24 26.8 46 85 84.8	24 40.4 45 85 84.3	24 54.0 45 85 83.8	25 07.4 45 85 83.3	25 20.7 44 85 82.8	25 33.9 44 85 82.3	25 47.1 44 85 81.8	1
2	23 21.9 46 85 84.8	23 35.6 46 85 84.3	23 49.3 45 85 83.8	24 02.9 45 85 83.3	24 16.3 45 85 82.9	24 29.7 44 85 82.4	24 43.0 44 85 81.9	24 56.2 44 85 81.4	2
3	22 30.7 46 85 84.3	22 44.5 46 85 83.8	22 58.2 46 85 83.4	23 11.8 45 85 82.9	23 25.3 45 85 82.4	23 38.8 45 85 81.9	23 52.1 44 85 81.4	24 05.4 44 85 80.9	3
4	21 39.5 46 85 83.8	21 53.4 46 85 83.4	22 07.1 46 85 82.9	22 20.8 45 85 82.4	22 34.4 45 85 81.9	22 47.9 45 85 81.4	23 01.3 45 85 80.9	23 14.6 44 85 80.5	4
75	20 48.4 46 85 83.4	21 02.3 46 85 82.9	21 16.1 46 85 82.4	21 29.8 46 85 81.9	21 43.5 45 85 81.5	21 57.0 45 84 81.0	22 10.5 45 84 80.5	22 23.9 45 84 80.0	75
6	19 57.4 47 85 82.9	20 11.3 46 85 82.4	20 25.2 46 85 81.9	20 39.0 46 85 81.5	20 52.7 45 85 81.0	21 06.3 45 84 80.5	21 19.8 45 84 80.0	21 33.3 45 84 79.6	6
7	19 06.4 47 85 82.4	19 20.3 47 85 81.9	19 34.3 46 85 81.5	19 48.1 46 85 81.0	20 01.9 46 85 80.5	20 15.6 46 85 80.0	20 29.2 45 84 79.6	20 42.8 45 84 79.1	7
8	18 15.4 47 85 81.9	18 29.5 46 85 81.5	18 43.4 46 85 81.0	18 57.4 46 84 80.5	19 11.2 46 84 80.1	19 25.0 46 84 79.6	19 38.7 46 84 79.1	19 52.3 45 84 78.6	8
9	17 24.5 47 85 81.5	17 38.6 46 85 81.0	17 52.7 46 84 80.5	18 06.7 47 84 80.1	18 20.6 46 84 79.6	18 34.4 46 84 79.1	18 48.2 46 84 78.7	19 01.9 46 84 78.2	9
80	16 33.7 47 85 81.0	16 47.9 47 84 80.5	17 02.0 47 84 80.1	17 16.0 47 84 79.6	17 30.0 47 84 79.1	17 44.0 47 84 78.7	17 57.8 46 84 78.2	18 11.6 46 84 77.7	80
1	15 42.9 48 84 80.5	15 57.2 47 84 80.0	16 11.4 47 84 79.6	16 25.5 47 84 79.1	16 39.6 47 84 78.7	16 53.6 47 84 78.2	17 07.5 46 84 77.7	17 21.4 46 84 77.3	1
2	14 52.2 48 84 80.0	15 06.6 48 84 79.6	15 20.9 47 84 79.1	15 35.0 47 84 78.6	15 49.2 47 84 78.2	16 03.2 47 84 77.7	16 17.3 47 84 77.3	16 31.3 46 84 76.8	2
3	14 01.6 48 84 79.6	14 16.0 48 84 79.1	14 30.4 48 84 78.6	14 44.6 48 84 78.2	14 58.9 47 84 77.7	15 13.1 47 84 77.3	15 27.2 47 83 76.8	15 41.3 47 83 76.4	3
4	13 11.1 48 84 79.1	13 25.6 48 84 78.6	13 40.0 48 84 78.2	13 54.3 48 84 77.7	14 08.7 48 84 77.3	14 22.9 47 84 76.8	14 37.2 47 83 76.4	14 51.3 47 83 75.9	4
85	12 20.6 49 84 78.6	12 35.2 48 84 78.2	12 49.7 48 84 77.7	13 04.1 48 84 77.3	13 18.6 48 83 76.8	13 32.9 48 83 76.4	13 47.2 48 83 75.9	14 01.5 47 83 75.4	85
6	11 30.3 49 84 78.1	11 44.9 49 84 77.7	11 59.5 49 84 77.2	12 14.0 48 83 76.8	12 28.5 48 83 76.3	12 43.0 48 83 75.9	12 57.4 48 83 75.4	13 11.8 48 83 75.0	6
7	10 40.0 49 84 77.7	10 54.7 49 84 77.2	11 09.3 49 83 76.8	11 24.0 49 83 76.3	11 38.6 49 83 75.8	11 53.2 48 83 75.4	12 07.7 48 83 75.0	12 22.2 48 83 74.5	7
8	9 49.8 49 84 77.2	10 04.6 49 83 76.7	10 19.4 49 83 76.3	10 34.1 49 83 75.8	10 48.8 49 83 75.4	11 03.4 49 83 74.9	11 18.1 49 82 74.5	11 32.6 49 82 74.1	8
9	8 59.7 50 84 76.7	9 14.6 50 83 76.2	9 29.4 49 83 75.8	9 44.3 49 83 75.4	9 59.1 49 83 74.9	10 13.8 49 82 74.5	10 28.6 49 82 74.0	10 43.3 49 82 73.6	9
90	8 09.7 50 83 76.2	8 24.7 50 83 75.8	8 39.6 50 83 75.3	8 54.6 50 83 74.9	9 09.5 50 82 74.4	9 24.3 50 82 74.0	9 39.2 49 82 73.6	9 54.1 49 82 73.1	90

Lat. 31°

Each cell below lists: Alt.   Δd Δt   Az.

H.A.	16° 00'	16° 30'	17° 00'	17° 30'	18° 00'	18° 30'	19° 00'	19° 30'	H.A.
00	43 00.0 1.00 01 180.0	42 30.0 1.00 01 180.0	42 00.0 1.00 01 180.0	41 30.0 1.00 01 180.0	41 00.0 1.00 01 180.0	40 30.0 1.00 01 180.0	40 00.0 1.00 01 180.0	39 30.0 1.00 01 180.0	00
1	42 59.4 1.00 03 178.7	42 29.4 1.00 03 178.7	41 59.4 1.00 03 178.7	41 29.4 1.00 03 178.7	40 59.4 1.00 03 178.8	40 29.4 1.00 03 178.8	39 59.4 1.00 03 178.8	39 29.5 1.00 03 178.8	1
2	42 57.6 1.00 05 177.4	42 27.7 1.00 05 177.4	41 57.7 1.00 05 177.4	41 27.7 1.00 05 177.5	'40 57.7 1.00 05 177.5	40 27.8 1.00 05 177.5	39 57.8 1.00 05 177.6	39 27.8 1.00 05 177.6	2
3	42 54.7 1.00 07 176.1	42 24.8 1.00 07 176.1	41 54.8 1.00 07 176.1	41 24.9 1.00 07 176.2	40 54.9 1.00 07 176.2	40 25.0 1.00 07 176.3	39 55.0 1.00 06 176.3	39 25.1 1.00 06 176.3	3
4	42 50.6 1.00 09 174.8	42 20.7 1.00 09 174.8	41 50.7 1.00 09 174.9	41 20.9 1.00 09 174.9	40 51.0 1.00 08 175.0	40 21.1 1.00 08 175.0	39 51.2 1.00 08 175.1	39 21.2 1.00 08 175.1	4
05	42 45.3 99 11 173.4	42 15.4 99 11 173.5	41 45.6 99 11 173.6	41 15.7 1.00 10 173.7	40 45.9 1.00 10 173.7	40 16.0 1.00 10 173.8	39 46.2 1.00 10 173.8	39 16.3 1.00 10 173.9	05
6	42 38.8 99 13 172.1	42 09.1 99 13 172.2	41 39.3 99 12 172.3	41 09.5 99 12 172.4	40 39.7 99 12 172.5	40 09.9 99 12 172.5	39 40.1 99 12 172.6	39 10.3 99 12 172.7	6
7	42 31.2 99 15 170.9	42 01.5 99 14 170.9	41 31.8 99 14 171.0	41 02.1 99 14 171.1	40 32.4 99 14 171.2	40 02.7 99 14 171.3	39 33.0 99 14 171.4	39 03.3 99 14 171.5	7
8	42 22.2 99 16 169.6	41 52.9 99 16 169.7	41 23.3 99 16 169.8	40 53.7 99 16 169.9	40 24.0 99 16 170.0	39 54.4 99 15 170.2	39 24.8 99 15 170.3	38 55.1 99 15 170.3	8
9	42 12.6 98 18 168.3	41 43.1 98 18 168.4	41 13.6 98 18 168.5	40 44.1 98 18 168.6	40 14.5 98 17 168.8	39 45.0 98 17 168.9	39 15.5 98 17 169.0	38 45.9 99 17 169.1	9
10	42 01.6 98 20 167.0	41 32.2 98 20 167.1	41 02.8 98 20 167.3	40 33.4 98 20 167.4	40 04.0 98 19 167.5	39 34.5 98 19 167.7	39 05.1 98 19 167.8	38 35.7 98 19 167.9	10
1	41 49.5 98 22 165.8	41 20.2 98 22 165.9	40 51.0 98 22 166.0	40 21.7 98 21 166.2	39 52.3 98 21 166.3	39 23.0 98 21 166.5	38 53.7 98 21 166.6	38 24.4 98 21 166.7	1
2	41 36.3 97 24 164.5	41 07.2 97 24 164.7	40 38.0 97 23 164.8	40 08.8 97 23 165.0	39 39.7 97 23 165.1	39 10.5 97 23 165.3	38 41.3 97 22 165.4	38 12.1 97 22 165.6	2
3	41 22.0 97 26 163.3	40 53.0 97 25 163.4	40 24.0 97 25 163.6	39 55.0 97 25 163.8	39 25.9 97 25 163.9	38 56.9 97 24 164.1	38 27.8 97 24 164.2	37 58.7 97 24 164.4	3
4	41 06.7 96 27 162.0	40 37.8 96 27 162.2	40 09.0 96 27 162.4	39 40.1 96 27 162.6	39 11.2 96 26 162.7	38 42.3 96 26 162.9	38 13.3 96 26 163.1	37 44.4 96 26 163.2	4
15	40 50.3 96 29 160.8	40 21.6 96 29 161.0	39 52.9 96 28 161.2	39 24.2 96 28 161.4	38 55.4 96 28 161.6	38 26.6 96 28 161.7	37 57.9 96 27 161.9	37 29.1 96 27 162.1	15
6	40 32.9 95 31 159.6	40 04.3 95 30 159.8	39 35.8 95 30 160.0	39 07.2 95 30 160.2	38 38.6 95 30 160.4	38 10.0 95 30 160.6	37 41.4 95 29 160.8	37 12.8 95 29 161.0	6
7	40 14.4 94 32 158.4	39 46.1 94 32 158.6	39 17.7 95 32 158.8	38 49.3 95 31 159.0	38 20.9 95 31 159.2	37 52.5 95 31 159.4	37 24.0 95 31 159.6	36 55.5 95 30 159.8	7
8	39 55.0 94 34 157.2	39 26.8 94 34 157.4	38 58.6 94 33 157.7	38 30.4 94 33 157.9	38 02.1 94 33 158.1	37 33.9 94 32 158.3	37 05.6 94 32 158.5	36 37.3 94 32 158.7	8
9	39 34.6 93 36 156.0	39 06.6 93 35 156.3	38 38.6 93 35 156.5	38 10.6 93 35 156.7	37 42.5 94 34 157.0	37 14.4 94 34 157.2	36 46.3 94 34 157.4	36 18.2 94 33 157.6	9
20	39 13.2 93 37 154.9	38 45.4 93 37 155.1	38 17.6 93 36 155.4	37 49.8 93 36 155.6	37 21.9 93 36 155.8	36 54.0 93 36 156.1	36 26.1 93 35 156.3	35 58.1 93 35 156.5	20
1	38 50.9 92 39 153.7	38 23.4 92 38 154.0	37 55.7 92 38 154.2	37 28.1 92 38 154.5	37 00.4 92 37 154.7	36 32.7 92 37 155.0	36 05.0 92 37 155.2	35 37.2 92 36 155.4	1
2	38 27.7 91 40 152.6	38 00.4 91 40 152.9	37 33.0 91 39 153.1	37 05.5 92 39 153.4	36 38.0 92 39 153.6	36 10.5 92 38 153.9	35 43.0 92 38 154.1	35 15.4 92 38 154.4	2
3	38 03.6 91 42 151.5	37 36.5 91 41 151.8	37 09.3 91 41 152.0	36 42.0 91 41 152.3	36 14.8 91 40 152.6	35 47.5 91 40 152.8	35 20.1 91 40 153.1	34 52.7 91 39 153.3	3
4	37 38.7 90 43 150.4	37 11.7 90 43 150.7	36 44.7 90 42 151.0	36 17.7 90 42 151.2	35 50.6 90 42 151.5	35 23.5 90 41 151.8	34 56.4 91 41 152.0	34 29.2 91 41 152.3	4
25	37 12.9 90 44 149.3	36 46.1 89 44 149.6	36 19.4 89 44 149.9	35 52.5 89 43 150.2	35 25.7 90 43 150.4	34 58.8 90 43 150.7	34 31.9 90 42 151.0	34 04.9 90 42 151.2	25
6	36 46.2 88 46 148.3	36 19.7 88 45 148.6	35 53.1 89 45 148.8	35 26.5 89 45 149.1	34 59.9 89 44 149.4	34 33.2 89 44 149.7	34 06.5 89 44 150.0	33 39.8 89 43 150.2	6
7	36 18.8 88 47 147.2	35 52.5 88 47 147.5	35 26.1 88 46 147.8	34 59.8 88 46 148.1	34 33.3 88 46 148.4	34 06.9 88 45 148.7	33 40.4 88 45 148.9	33 13.8 89 44 149.2	7
8	35 50.5 87 48 146.2	35 24.5 87 48 146.5	34 58.3 87 48 146.8	34 32.2 87 47 147.1	34 06.0 87 47 147.4	33 39.7 88 46 147.7	33 13.5 88 46 148.0	32 47.1 88 46 148.2	8
9	35 21.5 86 50 145.2	34 55.7 86 49 145.5	34 29.8 86 49 145.8	34 03.9 87 48 146.1	33 37.9 87 48 146.4	33 11.9 87 48 146.7	32 45.8 87 47 147.0	32 19.7 87 47 147.3	9
30	34 51.7 85 51 144.1	34 26.1 85 50 144.5	34 00.5 86 50 144.8	33 34.8 86 50 145.1	33 09.0 86 49 145.4	32 43.2 86 49 145.7	32 17.4 86 49 146.0	31 51.5 86 48 146.3	30
1	34 21.3 84 53 143.2	33 55.9 85 52 143.5	33 30.5 85 51 143.8	33 05.0 85 51 144.1	32 39.5 85 50 144.4	32 13.9 85 50 144.7	31 48.3 85 50 145.0	31 22.6 86 49 145.3	1
2	33 50.1 84 53 142.2	33 24.9 84 53 142.5	32 59.7 84 52 142.8	32 34.5 84 52 143.1	32 09.2 84 52 143.5	31 43.9 85 51 143.8	31 18.5 85 51 144.1	30 53.0 85 50 144.4	2
3	33 18.2 83 54 141.2	32 53.3 83 54 141.5	32 28.3 83 53 141.9	32 03.3 83 53 142.2	31 38.2 84 53 142.5	31 13.1 84 52 142.8	30 48.0 84 52 143.2	30 22.8 84 52 143.5	3
4	32 45.6 82 55 140.3	32 21.0 82 55 140.6	31 56.2 83 55 140.9	31 31.5 83 54 141.3	31 06.6 83 54 141.6	30 41.7 83 53 141.9	30 16.8 83 53 142.2	29 51.8 83 53 142.6	4
35	32 12.4 81 56 139.3	31 48.0 82 56 139.7	31 23.5 82 56 140.0	30 59.0 82 55 140.4	30 34.4 82 55 140.7	30 09.7 82 54 141.0	29 45.0 82 54 141.3	29 20.2 83 54 141.7	35
6	31 38.6 81 57 138.4	31 14.4 81 57 138.8	30 50.1 81 57 139.1	30 25.8 81 56 139.4	30 01.5 81 56 139.8	29 37.0 81 55 140.1	29 12.6 82 55 140.5	28 48.0 82 55 140.8	6
7	31 04.2 80 58 137.5	30 40.2 80 58 137.9	30 16.2 80 58 138.2	29 52.1 80 57 138.6	29 27.9 81 57 138.9	29 03.8 81 56 139.2	28 39.5 81 56 139.6	28 15.2 81 56 139.9	7
8	30 29.2 79 59 136.6	30 05.4 79 59 137.0	29 41.6 79 59 137.3	29 17.8 80 58 137.7	28 53.8 80 58 138.0	28 29.9 80 57 138.4	28 05.9 80 57 138.7	27 41.8 80 57 139.0	8
9	29 53.6 78 60 135.8	29 30.0 78 60 136.1	29 06.5 79 60 136.5	28 42.8 79 59 136.8	28 19.2 79 59 137.2	27 55.4 79 58 137.5	27 31.6 79 58 137.9	27 07.8 80 58 138.2	9
40	29 17.4 78 61 134.9	28 54.1 78 61 135.3	28 30.8 78 60 135.6	28 07.4 78 60 136.0	27 43.9 78 60 136.3	27 20.4 78 59 136.7	26 56.9 79 59 137.0	26 33.2 79 59 137.4	40
1	28 40.7 77 62 134.0	28 17.6 77 62 134.4	27 54.5 77 61 134.8	27 31.3 77 61 135.1	27 08.1 78 61 135.5	26 44.8 78 60 135.8	26 21.5 78 60 136.2	25 58.1 78 59 136.5	1
2	28 03.6 76 63 133.2	27 40.6 76 63 133.6	27 17.7 76 62 133.9	26 54.8 77 62 134.3	26 31.8 77 61 134.7	26 08.8 77 61 135.0	25 45.6 77 61 135.4	25 22.5 77 60 135.7	2
3	27 25.7 75 64 132.4	27 03.1 75 63 132.8	26 40.5 76 63 133.1	26 17.7 76 63 133.5	25 55.0 76 62 133.9	25 32.1 76 62 134.2	25 09.3 76 62 134.6	24 46.3 77 61 134.9	3
4	26 47.5 75 64 131.6	26 25.1 75 64 132.0	26 02.7 75 64 132.3	25 40.2 75 63 132.7	25 17.6 75 63 133.1	24 55.0 75 63 133.4	24 32.4 76 62 133.8	24 09.7 76 62 134.1	4
45	26 08.8 74 65 130.8	25 46.6 74 65 131.2	25 24.4 74 65 131.5	25 02.1 74 64 131.9	24 39.8 74 64 132.3	24 17.4 75 63 132.6	23 55.0 75 63 133.0	23 32.5 75 63 133.4	45
6	25 29.6 73 66 130.0	25 07.7 73 66 130.4	24 45.7 73 65 130.8	24 23.6 74 65 131.1	24 01.5 74 65 131.5	23 39.4 74 64 131.9	23 17.1 74 64 132.2	22 54.9 74 63 132.6	6
7	24 50.0 72 67 129.2	24 28.3 72 66 129.6	24 06.5 73 66 130.0	23 44.7 73 66 130.4	23 22.8 73 65 130.7	23 00.8 73 65 131.1	22 38.8 73 65 131.5	22 16.8 74 64 131.8	7
8	24 09.9 72 67 128.5	23 48.4 72 67 128.8	23 26.9 72 67 129.2	23 05.2 72 66 129.6	22 43.6 72 66 130.0	22 21.9 72 66 130.4	22 00.1 73 65 130.7	21 38.3 73 65 131.1	8
9	23 29.5 71 68 127.7	23 08.2 71 68 128.1	22 46.8 71 67 128.5	22 25.4 71 67 128.9	22 04.0 72 67 129.2	21 42.4 72 66 129.6	21 20.9 72 66 130.0	20 59.3 72 66 130.4	9
50	22 48.6 70 69 127.0	22 27.5 70 68 127.4	22 06.4 71 68 127.7	21 45.2 71 68 128.1	21 23.9 71 67 128.5	21 02.6 71 67 128.9	20 41.3 71 67 129.3	20 19.9 71 66 129.6	50
1	22 07.3 69 69 126.3	21 46.4 70 69 126.6	21 25.5 70 69 127.0	21 04.5 70 68 127.4	20 43.5 70 68 127.8	20 22.4 70 68 128.2	20 01.3 71 67 128.6	19 40.1 71 67 128.9	1
2	21 25.6 69 70 125.5	21 05.0 69 70 125.9	20 44.2 69 69 126.3	20 23.5 69 69 126.7	20 02.6 70 69 127.1	19 41.8 70 68 127.5	19 20.8 70 68 127.8	18 59.9 70 68 128.2	2
3	20 43.6 68 71 124.8	20 23.1 68 70 125.2	20 02.6 68 70 125.6	19 42.0 69 70 126.0	19 21.4 69 69 126.4	19 00.8 69 69 126.8	18 40.0 69 69 127.2	18 19.3 69 68 127.5	3
4	20 01.2 67 71 124.1	19 40.9 68 71 124.5	19 20.6 68 71 124.9	19 00.2 68 70 125.3	18 39.8 68 70 125.7	18 19.4 68 70 126.1	17 58.9 68 69 126.5	17 38.3 69 69 126.8	4
55	19 18.5 67 72 123.5	18 58.4 67 71 123.8	18 38.3 67 71 124.2	18 18.1 67 71 124.6	17 57.9 67 70 125.0	17 37.6 68 70 125.4	17 17.3 68 70 125.8	16 57.0 68 70 126.2	55
6	18 35.4 66 72 122.8	18 15.5 66 72 123.2	17 55.6 67 72 123.6	17 35.6 67 71 124.0	17 15.6 67 71 124.3	16 55.5 67 71 124.7	16 35.4 67 70 125.1	16 15.3 67 70 125.5	6
7	17 52.0 66 73 122.1	17 32.3 66 73 122.5	17 12.6 66 72 122.9	16 52.8 66 72 123.3	16 33.0 66 72 123.7	16 13.1 66 71 124.1	15 53.2 67 71 124.5	15 33.2 67 71 124.9	7
8	17 08.3 65 73 121.5	16 48.8 65 73 121.9	16 29.2 65 73 122.2	16 09.6 65 72 122.6	15 50.0 66 72 123.0	15 30.3 66 72 123.4	15 10.6 66 71 123.8	14 50.9 66 71 124.2	8
9	16 24.2 64 74 120.8	16 04.9 64 74 121.2	15 45.6 65 73 121.6	15 26.2 65 73 122.0	15 06.7 65 73 122.4	14 47.3 65 72 122.8	14 27.7 65 72 123.2	14 08.2 65 72 123.6	9
60	15 39.9 64 74 120.2	15 20.8 64 74 120.6	15 01.6 64 74 121.0	14 42.4 64 73 121.4	14 23.2 64 73 121.8	14 03.9 64 73 122.2	13 44.5 64 72 122.5	13 25.2 65 72 122.9	60
1	14 55.3 63 75 119.5	14 36.4 63 75 119.9	14 17.4 63 74 120.3	13 58.3 64 74 120.7	13 39.3 64 74 121.1	13 20.2 64 73 121.5	13 01.0 64 73 121.9	12 41.9 64 73 122.3	1
2	14 10.4 63 75 118.9	13 51.7 63 75 119.3	13 32.8 63 75 119.7	13 14.0 63 74 120.1	12 55.1 63 74 120.5	12 36.2 63 74 120.9	12 17.2 63 73 121.3	11 58.2 63 73 121.7	2
3	13 25.3 62 76 118.3	13 06.7 62 75 118.7	12 48.0 62 76 119.1	12 29.4 62 75 119.5	12 10.7 62 75 119.9	11 51.9 63 74 120.3	11 33.1 63 74 120.7	11 14.3 63 74 121.1	3
4	12 39.9 61 76 117.7	12 21.4 61 76 118.1	12 03.0 62 76 118.5	11 44.5 62 75 118.9	11 25.9 62 75 119.3	11 07.4 62 75 119.7	10 48.8 62 74 120.1	10 30.2 62 74 120.5	4
65	11 54.2 61 76 117.1	11 35.9 61 76 117.5	11 17.6 61 76 117.9	10 59.3 61 76 118.3	10 41.0 61 75 118.7	10 22.6 61 75 119.1	10 04.2 61 75 119.5	9 45.7 62 75 119.9	65
6	11 08.3 60 77 116.5	10 50.2 60 77 116.9	10 32.1 60 76 117.3	10 13.9 61 76 117.7	9 55.7 61 76 118.1	9 37.5 61 76 118.5	9 19.3 61 75 118.9	9 01.0 61 75 119.3	6
7	10 22.1 60 77 115.9	10 04.2 60 77 116.3	9 46.2 60 77 116.7	9 28.3 60 76 117.1	9 10.2 60 76 117.5	8 52.2 60 76 117.9	8 34.1 60 76 118.3	8 16.0 60 75 118.7	7
8	9 35.8 59 78 115.3	9 18.0 59 77 115.7	9 00.2 59 77 116.1	8 42.4 59 77 116.5	8 24.5 60 77 117.0	8 06.6 60 76 117.4	7 48.7 60 76 117.8	7 30.8 60 76 118.2	8
9	8 49.2 59 78 114.7	8 31.5 59 78 115.2	8 13.9 59 78 115.6	7 56.2 59 77 116.0	7 38.5 59 77 116.4	7 20.8 59 77 116.8	7 03.1 59 76 117.2	6 45.4 59 76 117.6	9
70	8 02.3 58 78 114.2	7 44.9 58 78 114.6	7 27.4 58 78 115.0	7 09.9 58 78 115.4	6 52.4 58 77 115.8	6 34.8 59 77 116.2	6 17.2 59 77 116.6	5 59.7 59 77 117.0	70
1	7 15.3 58 79 113.6	6 58.0 58 78 114.0	6 40.7 58 78 114.4	6 23.3 58 78 114.9	6 06.0 58 78 115.3	5 48.6 58 77 115.7	5 31.2 58 77 116.1	5 13.7 58 77 116.5	1
2	6 28.1 57 79 113.1	6 10.9 57 79 113.5	5 53.8 57 79 113.9	5 36.6 57 78 114.3	5 19.3 57 78 114.7	5 02.1 57 78 115.1			2
3	5 40.7 57 79 112.5	5 23.7 57 79 112.9	5 06.6 57 79 113.3						3

Right-margin latitude markers (top to bottom): **Lat. 31°**, **Lat. 32°**, **Lat. 33°**, **Lat. 34°**, **Lat. 35°**, **Lat. 36°**, **Lat. 37°**, **Lat. 38°**

DECLINATION SAME NAME AS LATITUDE

Each cell below lists: Alt.   Δd Δt   Az.

H.A.	16° 00'	16° 30'	17° 00'	17° 30'	18° 00'	18° 30'	19° 00'	19° 30'	H.A.
91	7 19.8 50 83 75.7	7 34.9 50 83 75.3	7 49.9 50 83 74.8	8 05.0 50 82 74.4	8 20.0 50 82 74.0	8 35.0 50 82 73.5	8 49.9 50 82 73.1	9 04.8 50 82 72.6	91
2	6 30.0 51 83 75.2	6 45.2 51 83 74.8	7 00.4 51 82 74.3	7 15.5 51 82 73.9	7 30.6 50 82 73.5	7 45.7 50 82 73.0	8 00.8 50 82 72.6	8 15.8 50 81 72.2	2
3	5 40.3 51 83 74.7	5 55.6 51 82 74.3	6 10.9 51 82 73.9	6 26.2 51 82 73.4	6 41.4 51 82 73.0	6 56.6 51 82 72.6	7 11.8 51 81 72.1	7 26.9 50 81 71.7	3
4		5 06.2 51 82 73.8	5 21.6 51 82 73.4	5 36.9 51 82 72.9	5 52.3 51 82 72.5	6 07.6 51 81 72.1	6 22.9 51 81 71.6	6 38.2 51 81 71.2	4
95					5 03.3 51 81 72.0		5 34.1 51 81 71.2	5 49.5 51 81 70.7	95
6						5 18.7 51 81 71.6		5 01.1 52 81 70.2	6

Lat. 31°   Declination Same Name as Latitude

Each cell lists **Alt. (° ′)**, then **Δd Δt**, then **Az. (°)**.

H.A.	20° 00′ Alt. Δd Δt	Az.	20° 30′ Alt. Δd Δt	Az.	21° 00′ Alt. Δd Δt	Az.	21° 30′ Alt. Δd Δt	Az.	22° 00′ Alt. Δd Δt	Az.	22° 30′ Alt. Δd Δt	Az.	23° 00′ Alt. Δd Δt	Az.	23° 30′ Alt. Δd Δt	Az.	H.A.
00	79 00.0 1.0 04	180.0	79 30.0 1.0 04	180.0	80 00.0 1.0 05	180.0	80 30.0 1.0 05	180.0	81 00.0 1.0 05	180.0	81 30.0 1.0 05	180.0	82 00.0 1.0 05	180.0	82 30.0 1.0 05	180.0	00
1	78 57.8 1.0 11	175.1	79 27.7 1.0 11	174.9	79 57.6 1.0 12	174.6	80 27.5 1.0 12	174.4	80 57.3 1.0 13	174.1	81 27.2 99 14	173.8	81 57.0 99 15	173.4	82 26.9 99 15	173.0	1
2	78 51.2 99 18	170.2	79 20.8 99 19	169.8	79 50.4 99 20	169.4	80 20.0 98 20	168.9	80 49.5 98 22	168.3	81 18.9 98 23	167.7	81 48.3 98 24	167.0	82 17.6 97 25	166.2	2
3	78 40.4 97 25	165.5	79 09.6 97 26	164.9	79 38.7 97 27	164.2	80 07.7 97 28	163.5	80 36.6 96 29	162.7	81 05.4 96 31	161.8	81 34.0 95 32	160.8	82 02.5 95 34	159.7	3
4	78 25.5 95 31	160.9	78 54.1 95 32	160.2	79 22.2 95 34	159.3	79 50.9 93 35	158.4	80 19.0 93 36	157.4	80 46.9 93 38	156.3	81 14.6 92 40	155.1	81 42.1 91 42	153.7	4
05	78 06.9 93 37	156.6	78 34.8 93 38	155.7	79 02.4 92 40	154.7	79 29.9 91 41	153.6	79 57.2 90 43	152.4	80 24.1 89 44	151.1	80 50.8 88 46	149.7	81 17.1 86 45	148.2	05
6	77 44.7 91 42	152.4	78 11.8 90 44	151.4	78 38.7 89 45	150.3	79 05.2 88 47	149.1	79 31.5 87 48	147.8	79 57.4 86 50	146.4	80 23.0 84 52	144.8	80 48.0 83 54	143.2	6
7	77 19.4 88 47	148.5	77 45.6 87 48	147.4	78 11.6 86 50	146.2	78 37.2 85 52	144.9	79 02.5 84 53	143.5	79 27.3 82 55	142.0	79 51.7 80 57	140.4	80 15.6 79 59	138.7	7
8	76 51.2 85 51	144.9	77 16.5 84 53	143.7	77 41.6 83 54	142.4	78 06.2 82 56	141.1	78 30.5 80 58	139.6	78 54.3 78 59	138.1	79 17.6 77 61	136.4	79 40.3 75 63	134.6	8
9	76 20.3 82 55	141.5	76 44.9 81 57	140.3	77 07.0 80 59	139.0	77 32.7 78 60	137.6	77 56.0 77 61	136.1	78 18.7 75 63	134.5	78 40.9 73 63	132.8	79 02.5 71 66	130.8	9
10	75 47.2 80 59	138.3	76 10.9 78 60	137.1	76 34.1 77 61	135.7	76 56.9 75 63	134.3	77 19.2 73 64	132.8	77 41.0 72 66	131.2	78 02.2 70 67	129.5	78 22.8 67 69	127.8	10
1	75 12.1 77 62	135.4	75 34.9 75 63	134.1	75 57.3 74 64	132.8	76 19.2 72 66	131.4	76 40.6 70 67	129.8	77 01.5 69 69	128.3	77 21.7 66 70	126.6	77 41.3 64 71	124.9	1
2	74 35.1 74 64	132.7	74 57.1 73 66	131.4	75 18.7 71 67	130.0	75 39.8 69 68	128.6	76 00.4 68 69	127.1	76 20.3 66 71	125.6	76 39.7 64 72	123.9	76 58.4 61 73	122.2	2
3	73 56.5 72 67	130.2	74 17.8 70 68	128.9	74 38.6 69 69	127.5	74 58.0 67 70	126.1	75 18.7 65 71	124.7	75 37.9 63 73	123.1	75 56.6 61 74	121.5	76 14.4 59 75	119.9	3
4	73 16.6 69 69	127.8	73 37.1 68 69	126.5	73 57.2 66 71	125.2	74 16.8 64 72	123.8	74 35.8 62 73	122.4	74 54.3 60 74	120.9	75 12.1 58 75	119.3	75 29.3 56 77	117.7	4
15	72 35.3 67 71	125.6	72 55.2 66 72	124.4	73 14.6 64 73	123.1	73 33.5 62 74	121.7	73 51.9 60 75	120.3	74 09.7 58 76	118.8	74 26.8 56 77	117.3	74 43.3 54 78	115.7	15
6	71 53.0 65 72	123.6	72 12.3 63 73	122.4	72 31.0 62 74	121.1	72 49.3 60 75	119.7	73 07.0 58 76	118.4	73 24.2 56 77	116.9	73 40.7 54 78	115.5	73 56.7 52 79	113.9	6
7	71 09.7 63 74	121.7	71 28.4 61 75	120.5	71 46.6 60 75	119.2	72 04.2 58 76	117.9	72 21.4 56 77	116.6	72 38.0 54 78	115.2	72 54.0 52 79	113.8	73 09.4 50 80	112.3	7
8	70 25.5 61 75	119.9	70 43.6 60 76	118.7	71 01.3 58 77	117.5	71 18.4 56 77	116.2	71 35.1 54 78	114.9	71 51.1 53 79	113.6	72 06.6 51 80	112.2	72 21.5 49 81	110.8	8
9	69 40.6 60 76	118.3	69 58.2 58 77	117.1	70 15.3 56 78	115.9	70 32.0 55 78	114.6	70 48.1 53 79	113.3	71 03.7 51 80	112.1	71 18.8 49 81	110.7	71 33.2 47 81	109.3	9
20	68 54.9 58 77	116.7	69 12.1 56 78	115.5	69 28.8 55 79	114.4	69 45.0 53 79	113.2	70 00.7 51 80	111.9	70 15.8 50 81	110.7	70 30.4 48 81	109.4	70 44.5 46 82	108.0	20
1	68 08.7 56 78	115.2	68 25.4 55 79	114.1	68 41.7 53 79	113.0	68 57.4 52 80	111.8	69 12.7 50 80	110.6	69 27.5 48 81	109.3	69 41.7 47 82	108.1	69 55.4 45 82	106.8	1
2	67 21.9 55 79	113.8	67 38.2 54 79	112.7	67 54.1 52 80	111.6	68 09.5 51 80	110.5	68 24.4 49 81	109.3	68 38.8 47 82	108.1	68 52.7 45 82	106.9	69 06.0 44 83	105.6	2
3	66 34.6 54 80	112.5	66 50.6 52 80	111.5	67 06.1 51 81	110.4	67 21.1 49 81	109.2	67 35.7 48 82	108.1	67 49.7 46 82	106.9	68 03.3 44 83	105.8	68 16.4 43 83	104.5	3
4	65 46.9 53 80	111.3	66 02.5 51 81	110.2	66 17.7 50 81	109.2	66 32.4 48 82	108.1	66 46.6 47 82	107.0	67 00.4 45 83	105.8	67 13.7 43 83	104.7	67 26.5 42 84	103.4	4
25	64 58.8 52 81	110.1	65 14.1 50 81	109.1	65 28.9 49 82	108.1	65 43.3 47 82	107.0	65 57.3 46 83	105.9	66 10.8 44 83	104.8	66 23.8 43 83	103.7	66 36.4 41 84	102.5	25
6	64 10.3 51 81	109.0	64 25.3 49 82	108.0	64 39.9 48 82	107.0	64 54.0 46 83	105.9	65 07.5 45 83	104.9	65 21.0 43 84	103.8	65 33.8 42 84	102.7	65 46.1 40 84	101.6	6
7	63 21.6 50 82	107.9	63 36.3 48 82	107.0	63 50.6 47 83	106.0	64 04.4 45 83	105.0	64 17.9 44 83	103.9	64 30.9 43 84	102.9	64 43.5 41 84	101.8	64 55.6 40 84	100.8	7
8	62 32.5 49 82	106.9	62 46.9 48 83	106.0	63 01.0 46 83	104.9	63 14.7 44 83	104.0	63 27.9 43 84	103.0	63 40.4 42 84	101.9	63 53.1 41 84	100.9	64 05.0 39 85	99.9	8
9	61 43.2 48 83	105.9	61 57.4 47 83	105.0	62 11.2 45 83	104.1	62 24.7 44 84	103.1	62 37.7 43 84	102.1	62 50.3 41 84	101.1	63 02.5 40 84	100.1	63 14.3 39 85	99.1	9
30	60 53.6 47 83	105.0	61 07.6 46 83	104.1	61 21.2 45 84	103.2	61 34.5 44 84	102.2	61 47.3 42 84	101.3	61 59.8 41 84	100.3	62 11.8 39 85	99.3	62 23.5 38 85	98.3	30
1	60 03.8 47 83	104.1	60 17.6 45 84	103.2	60 31.1 44 84	102.3	60 44.1 43 84	101.4	60 56.8 42 84	100.5	61 09.1 40 85	99.5	61 21.0 39 85	98.6	61 32.5 38 85	97.6	1
2	59 13.8 46 84	103.3	59 27.5 45 84	102.4	59 40.7 44 84	101.5	59 53.6 42 84	100.6	60 06.2 41 84	99.7	60 18.4 40 85	98.8	60 30.1 39 85	97.8	60 41.5 37 85	96.9	2
3	58 23.7 45 84	102.4	58 30.3 43 84	101.6	59 03.0 43 84	100.7	59 03.0 42 85	99.8	59 15.4 41 85	98.9	59 27.5 40 85	98.0	59 39.2 38 85	97.1	59 50.4 37 85	96.2	3
4	57 33.4 45 84	101.6	57 46.7 44 84	100.8	57 59.7 43 84	99.9	58 12.3 42 85	99.1	58 24.6 40 85	98.2	58 36.5 39 85	97.3	58 48.1 38 85	96.4	58 59.3 37 85	95.5	4
35	56 43.0 44 84	100.8	56 56.1 43 84	100.0	57 09.0 42 85	99.2	57 21.5 41 85	98.4	57 33.6 40 85	97.5	57 45.5 39 85	96.6	57 56.9 38 85	95.8	58 08.0 36 85	94.9	35
6	55 52.4 44 84	100.1	56 05.4 43 85	99.3	56 18.1 42 85	98.5	56 30.5 41 85	97.7	56 42.6 40 85	96.8	56 54.3 39 85	96.0	57 05.7 37 85	95.1	57 16.8 36 86	94.3	6
7	55 01.7 44 85	99.4	55 14.6 43 85	98.6	55 27.2 42 85	97.8	55 39.5 40 85	97.0	55 51.5 39 85	96.2	56 03.2 39 85	95.3	56 14.5 37 85	94.5	56 25.5 36 86	93.7	7
8	54 10.9 43 85	98.7	54 23.7 42 85	97.9	54 36.2 41 85	97.1	54 48.4 40 85	96.3	55 00.3 39 85	95.5	55 11.9 38 85	94.7	55 23.3 38 85	93.9	55 34.1 36 86	93.1	8
9	53 20.0 43 85	98.0	53 32.7 42 85	97.2	53 45.2 41 85	96.5	53 57.3 40 85	95.7	54 09.1 39 85	94.9	54 20.7 38 86	94.1	54 31.9 37 86	93.3	54 42.8 36 86	92.5	9
40	52 29.0 43 85	97.3	52 41.7 41 85	96.6	52 54.0 41 85	95.8	53 06.1 40 85	95.1	53 17.9 39 86	94.3	53 29.3 38 86	93.5	53 40.5 37 86	92.7	53 51.4 36 86	91.9	40
1	51 38.0 42 85	96.7	51 50.5 41 85	95.9	52 02.8 40 85	95.2	52 14.8 40 85	94.4	52 26.6 39 86	93.7	52 38.0 38 86	92.9	52 49.1 37 86	92.2	53 00.0 36 86	91.4	1
2	50 46.9 42 85	96.0	50 59.4 41 85	95.3	51 11.6 40 85	94.6	51 23.5 38 86	93.9	51 35.2 38 86	93.1	51 46.6 38 86	92.4	51 57.7 37 86	91.6	52 08.5 36 86	90.9	2
3	49 55.7 42 85	95.4	50 08.1 41 86	94.7	50 20.3 40 86	94.0	50 32.2 39 86	93.3	50 43.9 39 86	92.5	50 55.2 38 86	91.8	51 06.3 36 86	91.1	51 17.1 36 86	90.3	3
4	49 04.5 42 85	94.8	49 16.9 41 86	94.1	49 29.0 40 86	93.4	49 40.9 39 86	92.7	49 52.5 38 86	92.0	50 03.8 37 86	91.3	50 14.9 36 86	90.5	50 25.7 36 86	89.8	4
45	48 13.2 42 86	94.2	48 25.5 41 86	93.5	48 37.6 40 86	92.8	48 49.5 39 86	92.1	49 01.1 38 86	91.4	49 12.4 37 86	90.7	49 23.5 36 86	90.0	49 34.3 36 86	89.3	45
6	47 21.9 41 86	93.6	47 34.2 41 86	93.0	47 46.3 40 86	92.3	47 58.1 39 86	91.6	48 09.6 38 86	90.9	48 21.0 37 86	90.2	48 32.0 36 86	89.5	48 42.8 36 86	88.8	6
7	46 30.6 41 86	93.1	46 42.8 41 86	92.4	46 54.8 40 86	91.7	47 06.7 39 86	91.1	47 18.2 38 86	90.4	47 29.5 38 86	89.7	47 40.6 36 86	89.0	47 51.4 36 86	88.3	7
8	45 39.2 41 86	92.5	45 51.4 40 86	91.9	46 03.4 40 86	91.2	46 15.2 39 86	90.5	46 26.8 38 86	89.9	46 38.1 37 86	89.2	46 49.2 37 86	88.5	47 00.0 36 86	87.8	8
9	44 47.8 41 86	92.0	45 00.0 40 86	91.3	45 12.0 40 86	90.7	45 23.8 39 86	90.0	45 35.4 38 86	89.4	45 46.7 38 86	88.7	45 57.8 37 86	88.0	46 08.6 36 86	87.4	9
50	43 56.4 41 86	91.4	44 08.6 40 86	90.8	44 20.6 40 86	90.2	44 32.4 39 86	89.5	44 43.9 38 86	88.9	44 55.3 37 86	88.2	45 06.4 37 86	87.5	45 17.3 36 86	86.9	50
1	43 05.0 41 86	90.9	43 17.2 40 86	90.3	43 29.2 40 86	89.6	43 40.9 39 86	89.0	43 52.5 38 86	88.4	44 03.9 38 86	87.7	44 15.0 37 86	87.1	44 25.9 36 86	86.4	1
2	42 13.5 41 86	90.4	42 25.7 40 86	89.8	42 37.7 40 86	89.1	42 49.5 39 86	88.5	43 01.1 38 86	87.9	43 12.5 38 86	87.2	43 23.7 37 86	86.6	43 34.6 36 85	86.0	2
3	41 22.1 41 86	89.9	41 34.3 40 86	89.2	41 46.3 40 86	88.6	41 58.1 39 86	88.0	42 09.7 38 86	87.4	42 21.1 38 86	86.8	42 32.3 37 86	86.1	42 43.3 36 85	85.5	3
4	40 30.7 41 86	89.3	40 42.9 40 86	88.7	40 54.9 40 86	88.1	41 06.7 39 86	87.5	41 18.4 38 86	86.9	41 29.8 38 86	86.3	41 41.0 37 85	85.7	41 52.1 36 85	85.1	4
55	39 39.3 41 86	88.8	39 51.5 40 86	88.2	40 03.5 40 86	87.6	40 15.4 39 86	87.0	40 27.0 39 86	86.4	40 38.5 38 85	85.8	40 49.8 37 85	85.2	41 00.8 37 85	84.6	55
6	38 47.8 41 86	88.3	39 00.1 40 86	87.8	39 12.1 40 86	87.2	39 24.0 39 86	86.6	39 35.7 39 85	86.0	39 47.2 38 85	85.4	39 58.5 37 85	84.8	40 09.7 37 85	84.2	6
7	37 56.4 41 86	87.9	38 08.7 41 86	87.3	38 20.8 40 86	86.7	38 32.7 39 86	86.1	38 44.4 39 85	85.5	38 56.0 38 85	84.9	39 07.3 38 85	84.3	39 18.5 37 85	83.7	7
8	37 05.1 41 86	87.4	37 17.3 41 86	86.8	37 29.4 40 86	86.2	37 41.4 40 85	85.6	37 53.2 39 85	85.1	38 04.8 38 85	84.5	38 16.2 38 85	83.9	38 27.4 37 85	83.3	8
9	36 13.7 41 86	86.9	36 26.0 41 86	86.3	36 38.1 40 85	85.7	36 50.1 40 85	85.2	37 01.9 39 85	84.6	37 13.6 39 85	84.0	37 25.1 38 85	83.4	37 36.4 37 85	82.9	9
60	35 22.4 41 86	86.4	35 34.7 41 85	85.8	35 46.9 41 85	85.3	35 58.9 40 85	84.7	36 10.8 39 85	84.1	36 22.5 39 85	83.6	36 34.0 38 85	83.0	36 45.4 38 85	82.4	60
1	34 31.0 41 86	85.9	34 43.4 41 85	85.4	34 55.6 41 85	84.8	35 07.7 40 85	84.3	35 19.6 40 85	83.7	35 31.4 39 85	83.1	35 43.0 38 85	82.6	35 54.4 38 85	82.0	1
2	33 39.8 42 85	85.5	33 52.2 41 85	84.9	34 04.4 41 85	84.4	34 16.5 40 85	83.8	34 28.5 40 85	83.2	34 40.3 39 85	82.7	34 52.0 39 85	82.1	35 03.5 38 85	81.6	2
3	32 48.5 42 85	85.0	33 01.0 41 85	84.4	33 13.3 41 85	83.9	33 25.4 40 85	83.4	33 37.5 40 85	82.8	33 49.3 39 85	82.3	34 01.1 39 85	81.7	34 12.7 38 85	81.1	3
4	31 57.3 42 85	84.5	32 09.8 41 85	84.0	32 22.2 41 85	83.4	32 34.4 41 85	82.9	32 46.5 40 85	82.4	32 58.4 40 85	81.8	33 10.2 39 85	81.3	33 21.9 39 85	80.7	4
65	31 06.1 42 85	84.1	31 18.7 42 85	83.5	31 31.1 41 85	83.0	31 43.4 41 85	82.5	31 55.5 40 85	81.9	32 07.5 40 85	81.4	32 19.4 39 85	80.8	32 31.1 39 84	80.3	65
6	30 15.0 42 85	83.6	30 27.6 42 85	83.1	30 40.1 41 85	82.5	30 52.4 41 85	82.0	31 04.6 41 85	81.5	31 16.7 40 85	80.9	31 28.7 40 84	80.4	31 40.5 39 84	79.9	6
7	29 23.9 42 85	83.1	29 36.6 42 85	82.6	29 49.1 42 85	82.1	30 01.5 41 85	81.6	30 13.8 41 85	81.0	30 26.0 40 84	80.5	30 38.0 40 84	80.0	30 49.9 40 84	79.4	7
8	28 32.9 43 85	82.7	28 45.6 42 85	82.2	28 58.2 42 85	81.6	29 10.7 41 85	81.1	29 23.0 41 84	80.6	29 35.3 41 84	80.1	29 47.4 40 84	79.6	29 59.4 40 84	79.0	8
9	27 41.9 43 85	82.2	27 54.7 42 85	81.7	28 07.3 42 85	81.2	28 19.9 42 85	80.7	28 32.3 41 84	80.2	28 44.6 41 84	79.7	28 56.8 40 84	79.1	29 08.9 40 84	78.6	9
70	26 50.9 43 85	81.8	27 03.8 43 85	81.3	27 16.5 42 85	80.8	27 29.2 42 84	80.2	27 41.7 42 84	79.7	27 54.1 41 84	79.2	28 06.4 41 84	78.7	28 18.5 40 84	78.2	70
1	26 00.1 43 85	81.3	26 13.0 43 85	80.8	26 25.8 43 84	80.3	26 38.5 42 84	79.8	26 51.1 42 84	79.3	27 03.6 41 84	78.8	27 16.0 41 84	78.3	27 28.2 41 84	77.8	1
2	25 09.3 43 85	80.9	25 22.2 43 84	80.4	25 35.1 43 84	79.9	25 47.9 42 84	79.4	26 00.6 42 84	78.9	26 13.2 42 84	78.4	26 25.6 41 84	77.9	26 38.0 41 84	77.3	2
3	24 18.5 44 84	80.4	24 31.6 43 84	79.9	24 44.5 43 84	79.4	24 57.4 43 84	78.9	25 10.2 42 84	78.4	25 22.8 42 84	77.9	25 35.4 42 84	77.4	25 47.9 41 83	76.9	3
4	23 27.8 44 84	80.0	23 41.0 44 84	79.5	23 54.0 43 84	79.0	24 07.0 43 84	78.5	24 19.8 43 84	78.0	24 32.6 42 83	77.5	24 45.3 42 83	77.0	24 57.8 42 83	76.5	4
75	22 37.2 44 84	79.5	22 50.4 44 84	79.0	23 03.6 44 84	78.5	23 16.6 43 84	78.1	23 29.6 43 84	77.6	23 42.4 43 83	77.1	23 55.2 42 83	76.6	24 07.9 42 83	76.1	75
6	21 46.5 44 84	79.1	22 00.0 44 84	78.6	22 13.2 44 84	78.1	22 26.3 44 84	77.6	22 39.4 43 83	77.1	22 52.3 43 83	76.6	23 05.2 43 83	76.1	23 18.0 42 83	75.7	6
7	20 56.2 45 84	78.6	21 09.6 44 84	78.1	21 22.9 44 84	77.7	21 36.2 44 84	77.2	21 49.3 44 83	76.7	22 02.3 43 83	76.2	22 15.3 43 83	75.7	22 28.2 43 83	75.2	7
8	20 05.9 45 84	78.2	20 19.3 45 84	77.7	20 32.7 45 84	77.2	20 46.0 44 83	76.7	20 59.3 44 83	76.3	21 12.4 44 83	75.8	21 25.5 43 83	75.3	21 38.5 43 83	74.8	8
9	19 15.6 45 84	77.7	19 29.1 45 84	77.2	19 42.6 45 83	76.8	19 56.0 45 83	76.3	20 09.4 44 83	75.8	20 22.6 44 83	75.3	20 35.8 44 83	74.9	20 48.9 44 82	74.4	9
80	18 25.4 46 83	77.3	18 39.0 45 83	76.8	18 52.6 45 83	76.3	19 06.1 45 83	75.9	19 19.6 45 83	75.4	19 32.9 45 83	74.9	19 46.2 44 82	74.4	19 59.5 44 82	74.0	80
1	17 35.2 46 83	76.8	17 49.0 46 83	76.3	18 02.7 46 83	75.9	18 16.3 45 83	75.4	18 29.8 45 83	74.9	18 43.3 45 83	74.5	18 56.7 44 82	74.0	19 10.1 44 82	73.6	1
2	16 45.2 46 83	76.4	16 59.1 46 83	75.9	17 12.9 46 83	75.4	17 26.6 46 83	75.0	17 40.2 45 82	74.5	17 53.8 45 82	74.0	18 07.4 45 82	73.6	18 20.8 45 82	73.1	2
3	15 55.3 47 83	75.9	16 09.2 46 83	75.4	16 23.1 46 83	75.0	16 37.0 46 83	74.5	16 50.7 46 82	74.1	17 04.4 46 82	73.6	17 18.1 45 82	73.1	17 31.7 45 82	72.7	3
4	15 05.4 47 83	75.4	15 19.5 47 83	75.0	15 33.5 47 83	74.5	15 47.4 46 83	74.1	16 01.3 46 82	73.6	16 15.2 46 82	73.1	16 28.9 46 82	72.7	16 42.6 46 82	72.2	4
85	14 15.7 47 83	75.0	14 29.9 47 83	74.5	14 44.0 47 82	74.1	14 58.0 47 82	73.6	15 12.1 47 82	73.2	15 26.0 46 82	72.7	15 39.9 46 82	72.2	15 53.7 46 81	71.8	85
6	13 26.1 48 83	74.5	13 40.4 47 82	74.1	13 54.6 47 82	73.6	14 08.8 47 82	73.2	14 22.9 47 82	72.7	14 37.0 47 82	72.3	14 51.0 47 81	71.8	15 04.9 46 81	71.3	6
7	12 36.6 48 82	74.1	12 51.0 48 82	73.6	13 05.3 48 82	73.2	13 19.6 48 82	72.7	13 33.8 47 82	72.3	13 48.0 47 81	71.8	14 02.2 47 81	71.4	14 16.3 47 81	70.9	7
8	11 47.2 48 82	73.6	12 01.7 48 82	73.2	12 16.1 48 82	72.7	12 30.5 48 82	72.3	12 44.9 48 81	71.8	12 59.2 48 81	71.4	13 13.5 48 81	70.9	13 27.7 47 81	70.5	8
9	10 57.9 49 82	73.1	11 12.5 49 82	72.7	11 26.9 49 82	72.3	11 41.6 49 82	71.8	11 56.1 48 81	71.4	12 10.6 48 81	70.9	12 25.0 48 81	70.5	12 39.2 48 81	70.1	9
90	10 08.7 49 82	72.7	10 23.5 49 82	72.2	10 38.2 49 81	71.7	10 52.8 49 81	71.3	11 07.5 49 81	70.9	11 22.0 49 81	70.5	11 36.5 49 81	70.0	11 51.1 49 81	69.6	90

Lat. 31°

H.A.	20° 00' Alt. Δd Δt Az.	20° 30' Alt. Δd Δt Az.	21° 00' Alt. Δd Δt Az.	21° 30' Alt. Δd Δt Az.	22° 00' Alt. Δd Δt Az.	22° 30' Alt. Δd Δt Az.	23° 00' Alt. Δd Δt Az.	23° 30' Alt. Δd Δt Az.	H.A.
00	39 00.0 1.00 01 180.0	38 30.0 1.00 01 180.0	38 00.0 1.00 01 180.0	37 30.0 1.00 01 180.0	37 00.0 1.00 01 180.0	36 30.0 1.00 01 180.0	36 00.0 1.00 01 180.0	35 30.0 1.00 01 180.0	00
1	38 59.5 1.00 03 178.8	38 29.5 1.00 03 178.8	37 59.5 1.00 03 178.8	37 29.5 1.00 03 178.8	36 59.5 1.00 03 178.8	36 29.5 1.00 03 178.9	35 59.5 1.00 03 178.9	35 29.5 1.00 03 178.9	1
2	38 57.8 1.00 05 177.6	38 27.9 1.00 04 177.6	37 57.9 1.00 04 177.7	37 27.9 1.00 04 177.7	36 57.9 1.00 04 177.7	36 27.9 1.00 04 177.7	35 58.0 1.00 04 177.7	35 28.0 1.00 04 177.7	2
3	38 55.1 1.00 06 176.4	38 25.2 1.00 06 176.4	37 55.2 1.00 06 176.4	37 25.2 1.00 06 176.5	36 55.3 1.00 06 176.5	36 25.4 1.00 06 176.5	35 55.4 1.00 06 176.6	35 25.5 1.00 06 176.6	3
4	38 51.3 1.00 08 175.2	38 21.4 1.00 08 175.2	37 51.5 1.00 08 175.3	37 21.6 1.00 08 175.3	36 51.7 1.00 08 175.4	36 21.8 1.00 08 175.4	35 51.8 1.00 08 175.5	35 21.9 1.00 08 175.5	4
05	38 46.5 1.00 10 174.0	38 16.6 1.00 10 174.0	37 46.7 1.00 10 174.1	37 16.9 1.00 10 174.2	36 47.0 1.00 10 174.2	36 17.1 1.00 09 174.3	35 47.3 1.00 09 174.3	35 17.4 1.00 09 174.4	05
6	38 40.5 99 12 172.8	38 10.7 99 12 172.8	37 40.9 99 11 172.9	37 11.1 99 11 173.0	36 41.3 99 11 173.1	36 11.5 99 11 173.2	35 41.7 99 11 173.2	35 11.8 99 11 173.3	6
7	38 33.5 99 13 171.6	38 03.8 99 13 171.7	37 34.1 99 13 171.7	37 04.3 99 13 171.8	36 34.6 99 13 171.9	36 04.8 99 13 172.0	35 35.1 99 13 172.1	35 05.3 99 13 172.1	7
8	38 25.5 99 15 170.4	37 55.8 99 15 170.5	37 26.2 99 15 170.6	36 56.5 99 15 170.7	36 26.8 99 15 170.8	35 57.2 99 14 170.9	35 27.5 99 14 171.0	34 57.8 99 14 171.0	8
9	38 16.4 99 17 169.2	37 46.8 99 17 169.3	37 17.2 99 17 169.4	36 47.7 99 16 169.5	36 18.1 99 16 169.6	35 48.5 99 16 169.7	35 18.9 99 16 169.8	34 49.3 99 16 169.9	9
10	38 06.2 98 19 168.0	37 36.7 98 18 168.2	37 07.3 98 18 168.3	36 37.8 98 18 168.4	36 08.3 98 18 168.5	35 38.8 98 18 168.6	35 09.3 98 18 168.7	34 39.8 98 17 168.8	10
1	37 55.0 98 20 166.9	37 25.7 98 20 167.0	36 56.3 98 20 167.1	36 26.9 98 20 167.2	35 57.6 98 20 167.4	35 28.2 98 19 167.5	34 58.8 98 19 167.6	34 29.4 98 19 167.7	1
2	37 42.8 97 22 165.7	37 13.6 97 22 165.8	36 44.4 97 22 166.0	36 15.1 98 21 166.1	35 45.8 98 21 166.3	35 16.6 98 21 166.4	34 47.3 98 21 166.5	34 18.0 98 21 166.7	2
3	37 29.6 97 24 164.5	37 00.5 97 23 164.7	36 31.4 97 23 164.9	36 02.3 97 23 165.0	35 33.1 97 23 165.1	35 04.0 97 23 165.3	34 34.8 97 22 165.4	34 05.7 97 22 165.6	3
4	37 15.4 97 25 163.4	36 46.5 97 25 163.6	36 17.5 97 25 163.7	35 48.5 97 25 163.9	35 19.5 97 24 164.0	34 50.5 97 24 164.2	34 21.4 97 24 164.4	33 52.4 97 24 164.5	4
15	37 00.3 96 27 162.3	36 31.4 96 27 162.4	36 02.6 96 26 162.6	35 33.7 96 26 162.8	35 04.9 96 26 162.9	34 36.0 96 26 163.1	34 07.1 96 25 163.3	33 38.2 96 25 163.4	15
6	36 44.1 96 28 161.1	36 15.4 96 28 161.3	35 46.7 96 28 161.5	35 18.0 96 28 161.7	34 49.3 96 27 161.9	34 20.6 96 27 162.0	33 51.8 96 27 162.2	33 23.1 96 27 162.4	6
7	36 27.0 95 30 160.0	35 58.5 95 30 160.2	35 30.0 95 30 160.4	35 01.4 95 29 160.6	34 32.8 95 29 160.8	34 04.3 95 29 161.0	33 35.7 95 28 161.2	33 07.0 95 28 161.3	7
8	36 09.0 94 32 158.9	35 40.6 95 31 159.1	35 12.3 95 31 159.3	34 43.9 95 31 159.5	34 15.2 95 30 159.7	33 47.0 95 30 159.9	33 18.6 95 30 160.1	32 50.1 95 30 160.3	8
9	35 50.0 94 33 157.8	35 21.9 94 33 158.0	34 53.7 94 32 158.2	34 25.4 94 32 158.5	33 57.2 94 32 158.7	33 28.9 94 32 158.9	33 00.7 94 31 159.1	32 32.4 94 31 159.3	9
20	35 30.2 93 35 156.7	35 02.2 93 34 157.0	34 34.2 93 34 157.2	34 06.1 93 34 157.4	33 38.0 93 34 157.6	33 09.9 93 34 157.8	32 41.8 93 33 158.0	32 13.7 93 32 158.2	20
1	35 09.4 93 36 155.7	34 41.6 93 36 155.9	34 13.8 93 35 156.1	33 45.9 93 35 156.4	33 18.0 93 35 156.6	32 50.1 93 34 156.8	32 22.2 93 34 157.0	31 54.2 93 34 157.2	1
2	34 47.8 92 37 154.6	34 20.2 92 37 154.9	33 52.5 92 37 155.1	33 24.9 92 36 155.3	32 57.2 92 36 155.5	32 29.4 92 36 155.8	32 01.7 93 36 156.0	31 33.9 93 35 156.2	2
3	34 25.3 91 39 153.6	33 57.9 91 39 153.8	33 30.5 92 38 154.1	33 03.0 92 38 154.3	32 35.5 92 38 154.5	32 07.9 92 37 154.8	31 40.3 92 37 155.0	31 12.8 92 37 155.2	3
4	34 02.0 91 40 152.5	33 34.8 91 40 152.8	33 07.5 91 40 153.0	32 40.3 91 39 153.3	32 12.9 91 39 153.5	31 45.6 91 39 153.8	31 18.2 91 38 154.0	30 50.8 91 38 154.2	4
25	33 37.9 90 42 151.5	33 10.9 90 41 151.8	32 43.8 90 41 152.0	32 16.7 90 41 152.3	31 49.6 90 40 152.5	31 22.5 91 40 152.8	30 55.3 91 40 153.0	30 28.1 91 39 153.3	25
6	33 13.0 89 43 150.5	32 46.2 89 43 150.8	32 19.3 90 42 151.0	31 52.4 90 42 151.3	31 25.5 90 41 151.6	30 58.5 90 41 151.8	30 31.6 90 41 152.1	30 04.6 90 40 152.3	6
7	32 47.3 89 44 149.5	32 20.7 89 44 149.8	31 54.0 89 43 150.1	31 27.3 89 43 150.3	31 00.6 89 43 150.6	30 33.9 89 42 150.8	30 07.1 89 42 151.1	29 40.3 89 42 151.4	7
8	32 20.8 88 45 148.5	31 54.4 88 45 148.8	31 28.0 88 45 149.1	31 01.5 88 44 149.4	30 35.0 88 44 149.6	30 08.4 89 44 149.9	29 41.9 89 43 150.2	29 15.3 89 43 150.4	8
9	31 53.6 87 47 147.5	31 27.4 87 46 147.8	31 01.2 87 46 148.1	30 34.9 88 46 148.4	30 08.6 88 45 148.7	29 42.3 88 45 149.0	29 15.9 88 44 149.2	28 49.5 88 44 149.5	9
30	31 25.6 86 48 146.6	30 59.6 87 47 146.9	30 33.6 87 47 147.2	30 07.6 87 47 147.5	29 41.5 87 46 147.7	29 15.4 87 46 148.0	28 49.3 87 46 148.3	28 23.1 87 45 148.6	30
1	30 56.9 86 49 145.6	30 31.2 86 49 145.9	30 05.4 86 48 146.2	29 39.6 86 48 146.5	29 13.7 86 47 146.8	28 47.8 86 47 147.1	28 21.9 87 47 147.4	27 55.9 87 46 147.7	1
2	30 27.6 85 50 144.7	30 02.0 85 50 145.0	29 36.5 85 49 145.3	29 10.9 85 49 145.6	28 45.2 86 49 145.9	28 19.6 86 48 146.2	27 53.8 86 48 146.5	27 28.1 86 48 146.8	2
3	29 57.5 84 51 143.8	29 32.2 84 51 144.1	29 06.9 85 50 144.4	28 41.5 85 50 144.7	28 16.1 85 50 145.0	27 50.6 85 49 145.3	27 25.1 85 49 145.6	26 59.6 85 49 145.9	3
4	29 26.8 83 52 142.9	29 01.7 84 52 143.2	28 36.6 84 52 143.5	28 11.5 84 51 143.8	27 46.3 84 51 144.1	27 21.0 84 50 144.4	26 55.8 84 50 144.7	26 30.4 84 50 145.0	4
35	28 55.5 83 53 142.0	28 30.6 83 53 142.3	28 05.7 83 53 142.6	27 40.8 83 52 142.9	27 15.8 83 52 143.3	26 50.8 83 51 143.6	26 25.8 84 51 143.9	26 00.7 84 51 144.2	35
6	28 23.5 82 54 141.1	27 58.9 82 54 141.4	27 34.2 82 54 141.8	27 09.5 82 53 142.1	26 44.7 83 53 142.4	26 19.9 83 52 142.7	25 55.1 83 52 143.0	25 30.2 83 52 143.3	6
7	27 50.9 81 55 140.2	27 26.5 81 55 140.6	27 02.1 82 55 140.9	26 37.6 82 54 141.2	26 13.1 82 54 141.5	25 48.5 82 53 141.9	25 23.9 82 53 142.2	24 59.2 82 53 142.5	7
8	27 17.7 80 56 139.4	26 53.5 81 56 139.7	26 29.3 81 56 140.0	26 05.1 81 55 140.4	25 40.8 81 55 140.7	25 16.4 81 54 141.0	24 52.0 81 54 141.3	24 27.6 81 54 141.7	8
9	26 43.9 80 57 138.5	26 20.0 80 57 138.9	25 56.0 80 56 139.2	25 32.0 80 56 139.5	25 07.9 80 56 139.9	24 43.8 80 55 140.2	24 19.6 81 55 140.5	23 55.4 81 55 140.8	9
40	26 09.6 79 58 137.7	25 45.9 79 58 138.0	25 22.1 79 57 138.4	24 58.3 79 57 138.7	24 34.5 80 57 139.1	24 10.6 80 56 139.4	23 46.7 80 56 139.7	23 22.7 80 56 140.0	40
1	25 34.7 78 59 136.9	25 11.2 78 59 137.2	24 47.7 79 58 137.6	24 24.1 79 58 137.9	24 00.5 79 58 138.2	23 36.8 79 57 138.6	23 13.1 79 57 138.9	22 49.4 79 56 139.3	1
2	24 59.3 77 60 136.1	24 36.0 78 60 136.4	24 12.7 78 59 136.8	23 49.4 78 59 137.1	23 26.0 78 58 137.5	23 02.6 78 58 137.8	22 39.1 78 58 138.1	22 15.5 78 57 138.5	2
3	24 23.4 77 61 135.3	24 00.3 77 60 135.6	23 37.2 77 60 136.0	23 14.1 77 60 136.3	22 51.0 77 59 136.7	22 27.7 77 59 137.0	22 04.5 78 58 137.4	21 41.2 78 58 137.7	3
4	23 46.9 76 62 134.5	23 24.1 76 61 134.8	23 01.3 76 61 135.2	22 38.4 77 60 135.6	22 15.4 77 60 135.9	21 52.4 77 60 136.2	21 29.4 77 59 136.6	21 06.3 77 59 136.9	4
45	23 10.0 75 62 133.7	22 47.4 75 62 134.1	22 24.8 76 62 134.4	22 02.1 76 61 134.8	21 39.4 76 61 135.1	21 16.6 76 60 135.5	20 53.8 76 60 135.8	20 31.0 76 60 136.2	45
6	22 32.6 74 63 133.0	22 10.2 75 63 133.3	21 47.8 75 62 133.7	21 25.4 75 62 134.0	21 02.9 75 62 134.4	20 40.3 75 61 134.7	20 17.7 75 61 135.1	19 55.1 75 61 135.4	6
7	21 54.7 74 64 132.2	21 32.6 74 64 132.6	21 10.4 74 63 132.9	20 48.1 74 63 133.3	20 25.9 74 62 133.6	20 03.6 74 62 134.0	19 41.2 75 62 134.4	19 18.8 75 61 134.7	7
8	21 16.4 73 65 131.5	20 54.5 73 64 131.8	20 32.5 73 64 132.2	20 10.5 73 64 132.6	19 48.4 74 63 132.9	19 26.3 74 63 133.3	19 04.2 74 62 133.6	18 42.0 74 62 134.0	8
9	20 37.6 72 65 130.7	20 15.9 72 65 131.1	19 54.2 73 65 131.5	19 32.4 73 64 131.8	19 10.5 73 64 132.2	18 48.7 73 64 132.6	18 26.7 73 63 132.9	18 04.8 73 63 133.3	9
50	19 58.4 72 66 130.0	19 37.0 72 66 130.4	19 15.4 72 65 130.8	18 53.9 72 65 131.1	18 32.2 72 64 131.5	18 10.6 72 64 131.8	17 48.9 72 64 132.2	17 27.1 73 63 132.6	50
1	19 18.8 71 67 129.3	18 57.6 71 66 129.7	18 36.3 71 66 130.0	18 14.9 71 66 130.4	17 53.5 71 65 130.8	17 32.0 72 65 131.2	17 10.6 72 65 131.5	16 49.0 72 64 131.9	1
2	18 38.9 70 67 128.6	18 17.8 70 67 129.0	17 56.7 70 67 129.4	17 35.5 71 66 129.7	17 14.4 71 66 130.1	16 53.1 71 66 130.5	16 31.9 71 65 130.8	16 10.5 71 65 131.2	2
3	17 58.5 69 68 127.9	17 37.6 70 68 128.3	17 16.7 70 67 128.7	16 55.8 70 67 129.0	16 34.8 70 67 129.4	16 13.8 70 66 129.8	15 52.7 70 66 130.2	15 31.6 70 65 130.5	3
4	17 17.7 69 69 127.2	16 57.1 69 68 127.6	16 36.4 69 68 128.0	16 15.6 69 68 128.4	15 54.9 69 67 128.7	15 34.1 69 67 129.1	15 13.2 70 66 129.5	14 52.4 70 66 129.9	4
55	16 36.6 68 69 126.6	16 16.1 68 69 126.9	15 55.7 68 68 127.3	15 35.1 68 68 127.7	15 14.6 69 68 128.1	14 54.0 69 67 128.5	14 33.4 69 67 128.8	14 12.7 69 67 129.2	55
6	15 55.1 67 70 125.9	15 34.8 68 69 126.3	15 14.6 68 69 126.7	14 54.3 68 69 127.0	14 33.9 68 68 127.4	14 13.5 68 68 127.8	13 53.1 68 68 128.2	13 32.7 68 67 128.6	6
7	15 13.2 67 70 125.2	14 53.2 67 70 125.6	14 33.1 67 70 126.0	14 13.0 67 69 126.4	13 52.9 67 69 126.8	13 32.7 67 69 127.2	13 12.5 67 68 127.5	12 52.3 68 68 127.9	7
8	14 31.1 66 71 124.6	14 11.4 66 70 125.0	13 51.4 66 70 125.3	13 31.5 66 70 125.8	13 11.5 67 70 126.1	12 51.6 67 69 126.5	12 31.5 67 69 126.9	12 11.5 67 69 127.3	8
9	13 48.6 65 71 124.0	13 28.9 66 71 124.3	13 09.3 66 71 124.7	12 49.6 66 70 125.1	12 29.8 66 70 125.5	12 10.1 66 70 125.9	11 50.3 66 69 126.3	11 30.4 66 69 126.7	9
60	13 05.8 65 72 123.3	12 46.3 65 72 123.7	12 26.8 65 71 124.1	12 07.3 65 71 124.5	11 47.8 65 71 124.9	11 28.2 65 70 125.3	11 08.6 65 70 125.7	10 49.0 65 70 126.0	60
1	12 22.6 64 72 122.7	12 03.4 64 72 123.1	11 44.1 64 72 123.5	11 24.8 64 71 123.9	11 05.5 65 71 124.3	10 46.1 65 71 124.7	10 26.7 65 70 125.0	10 07.3 65 70 125.4	1
2	11 39.2 63 73 122.1	11 20.2 64 73 122.5	11 01.1 64 72 122.9	10 42.0 64 72 123.3	10 22.8 64 72 123.7	10 03.6 64 71 124.1	9 44.4 64 71 124.4	9 25.2 64 71 124.8	2
3	10 55.5 63 73 121.4	10 36.6 63 73 121.9	10 17.7 63 73 122.3	9 58.8 63 72 122.7	9 39.5 63 72 123.1	9 20.9 63 72 123.5	9 01.9 63 71 123.9	8 42.8 63 71 124.2	3
4	10 11.5 62 74 120.9	9 52.8 62 73 121.3	9 34.1 62 73 121.7	9 15.4 63 73 122.1	8 56.6 63 73 122.5	8 37.8 63 72 122.9	8 19.0 63 72 123.3	8 00.2 63 72 123.7	4
65	9 27.2 62 74 120.3	9 08.7 62 74 120.7	8 50.2 62 74 121.1	8 31.7 62 73 121.5	8 13.1 62 73 121.9	7 54.5 62 73 122.3	7 35.9 62 72 122.7	7 17.2 62 72 123.1	65
6	8 42.7 61 75 119.7	8 24.4 61 74 120.1	8 06.0 61 74 120.5	7 47.7 61 74 120.9	7 29.3 61 73 121.3	7 10.9 61 73 121.7	6 52.4 61 73 122.1	6 34.0 62 72 122.5	6
7	7 57.9 60 75 119.1	7 39.8 61 75 119.5	7 21.6 61 74 119.9	7 03.4 61 74 120.3	6 45.2 61 74 120.7	6 27.0 61 73 121.1	6 08.7 61 73 121.5	5 50.5 61 73 121.9	7
8	7 12.9 60 75 118.6	6 54.9 60 75 119.0	6 36.9 60 75 119.4	6 18.9 60 75 119.8	6 00.9 60 74 120.2	5 42.8 60 74 120.6	5 24.8 60 74 121.0	5 06.7 60 73 121.4	8
9	6 27.6 59 76 118.0	6 09.8 59 76 118.4	5 52.0 59 75 118.8	5 34.1 59 75 119.2	5 16.3 60 75 119.6				9
70	5 42.1 59 76 117.4	5 24.4 59 76 117.9	5 06.8 59 76 118.3						70

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00' Alt. Δd Δt Az.	20° 30' Alt. Δd Δt Az.	21° 00' Alt. Δd Δt Az.	21° 30' Alt. Δd Δt Az.	22° 00' Alt. Δd Δt Az.	22° 30' Alt. Δd Δt Az.	23° 00' Alt. Δd Δt Az.	23° 30' Alt. Δd Δt Az.	H.A.
91	9 19.7 50 82 72.2	9 34.6 49 81 71.8	9 49.4 49 81 71.3	10 04.2 49 81 70.9	10 18.9 49 81 70.4	10 33.6 49 80 70.0	10 48.3 49 80 69.5	11 03.0 49 80 69.1	91
2	8 30.8 50 81 71.7	8 45.8 50 81 71.3	9 00.7 50 81 70.9	9 15.6 50 81 70.4	9 30.5 50 80 70.0	9 45.4 49 80 69.5	10 00.2 49 80 69.1	10 15.0 49 80 68.6	2
3	7 42.0 50 81 71.3	7 57.1 50 81 70.8	8 12.2 50 81 70.4	8 27.3 50 80 69.9	8 42.3 50 80 69.5	8 57.3 50 80 69.1	9 12.2 50 80 68.6	9 27.2 50 79 68.2	3
4	6 53.4 51 81 70.8	7 08.6 51 81 70.3	7 23.8 51 80 69.9	7 39.0 51 80 69.5	7 54.2 50 80 69.0	8 09.3 50 80 68.6	8 24.4 50 79 68.2	8 39.5 50 79 67.7	4
95	6 04.9 51 81 70.3	6 20.3 51 80 69.9	6 35.6 51 80 69.4	6 50.9 51 80 69.0	7 06.2 51 80 68.6	7 21.5 51 79 68.1	7 36.8 51 79 67.7	7 52.0 51 79 67.3	95
6	5 16.6 52 80 69.8	5 32.1 52 80 69.4	5 47.5 52 80 68.9	6 03.0 51 80 68.5	6 18.4 51 79 68.1	6 33.9 51 79 67.7	6 49.3 51 79 67.2	7 04.6 51 79 66.8	6
7				5 15.2 52 79 68.0	5 30.8 52 79 67.6	5 46.4 52 79 67.2	6 01.9 52 78 66.7	6 17.4 52 78 66.3	7
8							5 14.8 52 78 66.3	5 30.4 52 78 65.8	8

Right margin latitude labels: Lat. 32°, Lat. 33°, Lat. 34°, Lat. 35°, Lat. 36°, Lat. 37°, Lat. 38°

Lat. 31°

H.A.	24° 00' Alt.	Δd Δt	Az.	24° 30' Alt.	Δd Δt	Az.	25° 00' Alt.	Δd Δt	Az.	25° 30' Alt.	Δd Δt	Az.	26° 00' Alt.	Δd Δt	Az.	26° 30' Alt.	Δd Δt	Az.	27° 00' Alt.	Δd Δt	Az.	27° 30' Alt.	Δd Δt	Az.	H.A.
00	83 00.0	1.0 06	180.0	83 30.0	1.0 06	180.0	84 00.0	1.0 06	180.0	84 30.0	1.0 07	180.0	85 00.0	1.0 08	180.0	85 30.0	1.0 08	180.0	86 00.0	1.0 09	180.0	86 30.0	1.0 11	180.0	00
1	82 56.6	99 15	172.5	83 26.4	99 18	172.0	83 56.1	99 19	171.4	84 25.8	99 20	170.7	84 55.4	99 22	169.8	85 24.9	98 24	168.7	85 54.3	98 27	167.4	86 23.6	97 30	165.8	1
2	82 46.8	97 27	165.3	83 15.8	97 28	164.3	83 44.8	96 30	163.1	84 13.5	95 33	161.8	84 42.0	95 35	160.1	85 10.2	93 38	158.2	85 38.1	92 42	155.9	86 05.4	90 46	153.0	2
3	82 30.7	94 36	158.5	82 58.8	93 38	157.1	83 26.5	92 40	155.5	83 53.9	91 43	153.6	84 20.9	89 46	151.5	84 47.3	87 49	149.0	85 13.0	84 53	146.0	85 37.8	81 57	142.5	3
4	82 09.2	90 44	152.2	82 36.0	89 46	150.5	83 02.4	87 49	148.6	83 28.2	85 51	146.4	83 53.4	83 54	143.9	84 17.8	80 58	141.1	84 41.2	76 61	137.8	85 03.5	72 65	134.1	4
05	81 43.0	86 51	146.5	82 08.4	84 53	144.6	82 33.2	82 55	142.4	82 57.4	79 58	140.1	83 20.7	76 61	137.5	83 43.2	73 64	134.5	84 04.5	69 67	131.2	84 24.5	64 70	127.5	05
6	81 12.6	81 56	141.3	81 36.6	79 58	139.3	82 00.0	77 61	137.1	82 22.5	74 63	134.7	82 44.2	71 66	132.0	83 04.8	67 69	129.1	83 24.2	63 71	125.8	83 42.3	58 74	122.3	6
7	80 38.9	77 61	136.8	81 01.5	74 63	134.7	81 23.4	71 65	132.7	81 44.5	69 68	130.0	82 04.6	65 70	127.4	82 23.4	61 72	124.5	82 41.4	57 75	121.4	82 57.8	52 77	118.1	7
8	80 02.3	72 65	132.7	80 23.7	70 67	130.6	80 44.3	67 69	128.4	81 03.9	64 71	126.0	81 22.6	61 73	123.5	81 40.7	57 75	120.7	81 56.6	52 77	117.8	82 11.7	48 79	114.7	8
9	79 23.4	69 68	129.1	79 43.6	66 70	127.0	80 03.0	63 72	124.9	80 21.4	60 73	122.5	80 38.9	56 75	120.1	80 55.3	53 77	117.5	81 10.5	49 79	114.7	81 24.4	44 80	111.8	9
10	78 42.6	65 71	125.9	79 01.7	62 72	123.9	79 20.0	59 74	121.8	79 37.4	56 76	119.5	79 53.7	53 77	117.2	80 09.1	49 79	114.7	80 23.3	45 80	112.1	80 36.2	41 81	109.4	10
1	78 00.2	62 73	123.0	78 18.3	59 74	121.1	78 35.6	56 76	119.0	78 52.0	53 77	116.9	79 07.5	50 79	114.6	79 21.9	46 80	112.3	79 35.2	43 81	109.8	79 47.4	39 82	107.3	1
2	77 16.4	59 75	120.4	77 33.7	56 75	118.6	77 50.1	53 77	116.6	78 05.7	50 79	114.5	78 20.4	47 80	112.3	78 34.0	44 81	110.2	78 46.6	40 82	107.9	78 58.1	36 83	105.5	2
3	76 31.6	56 76	118.1	76 48.0	54 78	116.3	77 03.7	51 79	114.4	77 18.5	48 80	112.5	77 32.4	45 81	110.4	77 45.4	42 82	108.3	77 57.4	38 83	106.1	78 08.3	35 83	103.9	3
4	75 45.8	54 78	116.0	76 01.5	51 79	114.3	76 16.5	49 80	112.5	76 30.7	46 81	110.6	76 44.0	43 82	108.7	76 56.4	40 82	106.7	77 07.8	37 83	104.6	77 18.2	35 84	102.5	4
15	74 59.2	52 79	114.1	75 14.3	49 80	112.4	75 28.7	47 81	110.7	75 42.3	44 81	108.9	75 55.0	41 82	107.1	76 06.9	38 83	105.2	76 17.9	35 84	103.2	76 27.9	32 84	101.2	15
6	74 11.9	50 80	112.4	74 26.5	47 81	110.8	74 40.3	45 81	109.1	74 53.4	42 82	107.4	75 05.7	40 83	105.6	75 17.1	37 83	103.8	75 27.4	34 84	102.0	75 37.4	31 85	100.1	6
7	73 24.1	48 81	110.8	73 38.1	46 81	109.2	73 51.5	43 82	107.6	74 04.1	41 83	105.9	74 16.0	38 83	104.3	74 27.0	36 84	102.6	74 37.3	33 84	100.8	74 46.6	30 85	99.0	7
8	72 35.8	46 81	109.3	72 49.4	44 82	107.8	73 02.3	42 83	106.3	73 14.5	40 83	104.7	73 26.0	37 84	103.1	73 36.7	34 84	101.4	73 46.6	34 84	100.4	73 55.9	31 85	98.5	8
9	71 47.0	45 82	107.9	72 00.2	43 82	106.5	72 12.8	41 83	105.0	72 24.6	41 83	103.5	72 35.8	38 84	102.0	72 46.2	34 84	100.4	72 55.9	31 85	98.8	73 04.8	28 85	97.1	9
20	70 57.9	44 82	106.7	71 10.8	42 83	105.3	71 23.0	40 83	103.8	71 34.5	37 84	102.4	71 45.4	35 84	100.9	71 55.5	33 85	99.4	72 05.0	30 85	97.9	72 13.7	28 85	96.3	20
1	70 08.5	43 83	105.5	70 21.0	41 83	104.1	70 32.9	39 84	102.8	70 44.2	36 84	101.4	70 54.8	34 85	99.9	71 04.7	32 85	98.5	71 14.0	30 85	97.0	71 22.6	27 85	95.5	1
2	69 18.8	42 83	104.4	69 31.0	40 84	103.1	69 42.6	38 84	101.7	69 53.7	36 84	100.3	70 04.1	34 85	99.0	70 13.8	31 85	97.6	70 22.9	29 86	96.2	70 31.3	27 85	94.8	2
3	68 28.9	41 84	103.3	68 40.8	39 84	102.1	68 52.2	37 84	100.8	69 03.0	35 85	99.5	69 13.2	33 85	98.2	69 22.8	31 85	96.8	69 31.7	29 85	95.5	69 40.1	27 86	94.1	3
4	67 38.7	40 84	102.3	67 50.4	38 84	101.1	68 01.6	36 85	99.9	68 12.2	34 85	98.6	68 22.2	32 85	97.3	68 31.7	30 85	96.1	68 40.5	28 86	94.7	68 48.7	26 86	93.4	4
25	66 48.4	39 84	101.4	66 59.9	37 84	100.2	67 10.9	36 85	99.0	67 21.3	34 85	97.8	67 31.2	32 85	96.6	67 40.5	30 86	95.3	67 49.2	28 86	94.1	67 57.4	26 86	92.8	25
6	65 57.9	39 84	100.5	66 09.2	37 85	99.4	66 20.0	35 85	98.2	66 30.3	33 85	97.0	66 40.1	32 85	95.8	66 49.3	30 86	94.6	66 57.9	28 86	93.4	67 06.0	26 86	92.2	6
7	65 07.3	38 85	99.7	65 18.4	36 85	98.6	65 29.1	35 85	97.4	65 39.2	33 85	96.3	65 48.9	31 85	95.1	65 58.0	30 86	94.0	66 06.6	28 86	92.8	66 14.6	26 86	91.6	7
8	64 16.5	37 85	98.9	64 27.5	36 85	97.8	64 38.0	34 85	96.7	64 48.1	33 85	95.6	64 57.6	31 86	94.5	65 06.7	29 86	93.3	65 15.2	28 86	92.2	65 23.2	26 86	91.0	8
9	63 25.6	37 85	98.1	63 36.5	35 85	97.0	63 46.9	34 85	96.0	63 56.9	32 85	94.9	64 06.3	31 86	93.8	64 15.3	29 86	92.7	64 23.8	27 86	91.6	64 31.8	26 86	90.5	9
30	62 34.7	37 85	97.3	62 45.4	35 85	96.3	62 55.7	34 85	95.3	63 05.6	32 86	94.3	63 15.0	30 86	93.2	63 23.9	29 86	92.1	63 32.4	27 86	91.1	63 40.3	26 86	90.0	30
1	61 43.6	36 85	96.6	61 54.3	35 85	95.6	62 04.5	33 85	94.6	62 14.3	32 86	93.6	62 23.6	30 86	92.6	62 32.5	29 86	91.6	62 41.0	27 86	90.5	62 48.9	26 86	89.5	1
2	60 52.5	36 85	95.9	61 03.1	35 85	95.0	61 13.2	33 86	94.0	61 22.9	32 86	93.0	61 32.2	30 86	92.0	61 41.1	29 86	91.0	61 49.5	27 86	90.0	61 57.5	26 86	89.0	2
3	60 01.3	36 85	95.3	60 11.8	34 86	94.3	60 21.9	33 86	93.4	60 31.6	32 86	92.4	60 40.8	30 86	91.5	60 49.7	29 86	90.5	60 58.1	27 86	89.5	61 06.1	26 86	88.5	3
4	59 10.1	35 85	94.6	59 20.5	34 86	93.7	59 30.5	33 86	92.8	59 40.2	31 86	91.9	59 49.4	30 86	90.9	59 58.2	29 86	90.0	60 06.7	27 86	89.0	60 14.7	26 86	88.0	4
35	58 18.5	35 86	94.0	58 29.2	34 86	93.1	58 39.2	33 86	92.2	58 48.8	31 86	91.3	58 58.0	30 86	90.4	59 06.8	29 86	89.5	59 15.2	27 86	88.5	59 23.3	26 86	87.6	35
6	57 27.5	35 86	93.4	57 37.8	34 86	92.5	57 47.4	33 86	91.7	57 57.3	31 86	90.8	58 06.6	30 86	89.9	58 15.4	29 86	89.0	58 23.8	27 86	88.0	58 31.9	26 86	87.1	6
7	56 36.1	35 86	92.8	56 46.4	34 86	92.0	56 56.3	33 86	91.1	57 05.9	31 86	90.2	57 15.1	30 86	89.4	57 24.0	29 86	88.5	57 32.4	28 86	87.6	57 40.5	26 86	86.7	7
8	55 44.7	35 86	92.3	55 55.0	34 86	91.4	56 04.9	32 86	90.6	56 14.5	31 86	89.7	56 23.7	30 86	88.9	56 32.6	29 86	88.0	56 41.1	28 86	87.1	56 49.2	26 86	86.2	8
9	54 53.3	35 86	91.7	55 03.6	34 86	90.9	55 13.5	32 86	90.1	55 23.1	31 86	89.2	55 32.3	30 86	88.4	55 41.2	29 86	87.5	55 49.7	28 86	86.7	55 57.9	27 85	85.8	9
40	54 01.9	35 86	91.2	54 12.1	34 86	90.3	54 22.1	32 86	89.5	54 31.6	31 86	88.7	54 40.9	30 86	87.9	54 49.8	29 86	87.1	54 58.4	28 86	86.2	55 06.5	27 85	85.4	40
1	53 10.5	35 86	90.6	53 20.7	34 86	89.8	53 30.6	33 86	89.0	53 40.2	32 86	88.2	53 49.5	30 86	87.4	53 58.5	29 86	86.6	54 07.1	28 85	85.8	54 15.4	27 85	85.0	1
2	52 19.1	35 86	90.1	52 29.3	34 86	89.3	52 39.2	33 86	88.5	52 48.8	32 86	87.8	52 58.1	30 86	87.0	53 07.1	29 86	86.2	53 15.8	29 85	85.4	53 24.2	27 85	84.6	2
3	51 27.6	35 86	89.6	51 37.9	34 86	88.8	51 47.8	33 86	88.1	51 57.4	32 86	87.3	52 06.8	31 86	86.5	52 15.8	30 85	85.7	52 24.6	29 85	85.0	52 33.0	28 85	84.2	3
4	50 36.2	35 86	89.1	50 46.5	34 86	88.3	50 56.4	33 86	87.6	51 06.1	32 86	86.8	51 15.5	31 86	86.1	51 24.6	30 85	85.3	51 33.3	29 85	84.6	51 41.8	28 85	83.8	4
45	49 44.8	35 86	88.6	49 55.1	34 86	87.9	50 05.0	33 86	87.1	50 14.7	32 86	86.4	50 24.2	31 85	85.6	50 33.3	30 85	84.9	50 42.2	29 85	84.1	50 50.7	28 85	83.4	45
6	48 53.4	35 86	88.1	49 03.7	34 86	87.4	49 13.7	33 86	86.7	49 23.4	32 85	85.9	49 32.9	31 85	85.2	49 42.1	30 85	84.5	49 51.0	29 85	83.7	49 59.5	28 85	83.0	6
7	48 02.0	35 86	87.6	48 12.3	34 86	86.9	48 22.4	33 86	86.2	48 32.1	32 85	85.5	48 41.7	31 85	84.8	48 50.9	30 85	84.1	48 59.9	29 85	83.3	49 08.6	29 85	82.6	7
8	47 10.6	35 86	87.1	47 21.0	34 86	86.5	47 31.0	33 85	85.8	47 40.9	32 85	85.1	47 50.5	32 85	84.4	47 59.8	31 85	83.6	48 08.9	30 85	82.9	48 17.6	29 85	82.2	8
9	46 19.3	35 86	86.7	46 29.6	34 85	86.0	46 39.8	33 85	85.3	46 49.7	33 85	84.6	46 59.3	32 85	83.9	47 08.7	31 85	83.2	47 17.8	30 85	82.5	47 26.7	29 85	81.8	9
50	45 27.9	36 85	86.2	45 38.3	34 85	85.6	45 48.5	34 85	84.9	45 58.5	33 85	84.2	46 08.2	32 85	83.5	46 17.6	31 85	82.8	46 26.9	30 85	82.1	46 35.8	29 85	81.5	50
1	44 36.6	36 85	85.8	44 47.1	34 85	85.1	44 57.3	34 85	84.4	45 07.3	33 85	83.8	45 17.1	32 85	83.1	45 26.6	31 85	82.4	45 35.9	31 85	81.8	45 45.0	30 85	81.1	1
2	43 45.3	36 85	85.3	43 55.9	35 85	84.7	44 06.2	34 85	84.0	44 16.2	33 85	83.4	44 26.1	32 85	82.7	44 35.7	32 85	82.0	44 45.1	31 85	81.4	44 54.2	30 85	80.7	2
3	42 54.1	36 85	84.9	43 04.7	35 85	84.2	43 15.0	34 85	83.6	43 25.2	33 85	82.9	43 35.1	33 85	82.3	43 44.8	32 85	81.6	43 54.2	31 85	81.0	44 03.5	30 84	80.3	3
4	42 02.9	36 85	84.4	42 13.5	35 85	83.8	42 23.9	34 85	83.2	42 34.1	34 85	82.5	42 44.1	33 85	81.9	42 53.9	32 85	81.2	43 03.5	32 85	80.6	43 12.8	31 84	79.9	4
55	41 11.7	36 85	84.0	41 22.4	36 85	83.4	41 32.7	34 85	82.7	41 43.2	34 85	82.1	41 53.3	33 85	81.5	42 03.1	33 84	80.8	42 12.8	32 84	80.2	42 22.2	31 84	79.6	55
6	40 20.6	36 85	83.6	40 31.4	36 85	82.9	40 41.9	35 85	82.3	40 52.3	34 85	81.7	41 02.4	34 85	81.1	41 12.4	33 84	80.5	41 22.1	32 84	79.8	41 31.7	32 84	79.2	6
7	39 29.5	36 85	83.1	39 40.3	36 85	82.5	39 51.0	35 85	81.9	40 01.4	35 85	81.3	40 11.6	34 85	80.7	40 21.7	33 84	80.1	40 31.5	32 84	79.4	40 41.2	32 84	78.8	7
8	38 38.5	37 85	82.7	38 49.4	36 85	82.1	39 00.1	35 85	81.5	39 10.6	35 85	80.9	39 20.9	34 85	80.3	39 31.1	33 84	79.7	39 41.0	33 84	79.1	39 50.8	32 84	78.5	8
9	37 47.5	37 85	82.3	37 58.5	36 85	81.7	38 09.2	36 85	81.1	38 19.8	35 84	80.5	38 30.3	34 84	79.9	38 40.5	34 84	79.3	38 50.5	33 84	78.7	39 00.4	33 84	78.1	9
60	36 56.6	37 85	81.8	37 07.6	36 85	81.3	37 18.5	36 85	80.7	37 29.1	35 84	80.1	37 39.7	35 84	79.5	37 50.0	34 84	78.9	38 00.1	34 84	78.3	38 10.1	33 84	77.7	60
1	36 05.7	37 85	81.4	36 16.8	37 85	80.8	36 27.7	36 84	80.3	36 38.5	36 84	79.7	36 49.1	35 84	79.1	36 59.6	34 84	78.5	37 09.8	34 84	77.9	37 19.9	34 83	77.3	1
2	35 14.9	38 85	81.0	35 26.0	37 84	80.4	35 37.1	37 84	79.9	35 47.9	36 84	79.3	35 58.6	35 84	78.7	36 09.2	35 84	78.1	36 19.6	34 83	77.5	36 29.8	34 83	77.0	2
3	34 24.1	38 84	80.6	34 35.4	37 84	80.0	34 46.5	37 84	79.5	34 57.4	36 84	78.9	35 08.2	36 84	78.3	35 18.9	35 84	77.7	35 29.4	35 83	77.2	35 39.7	34 83	76.6	3
4	33 33.4	38 84	80.2	33 44.6	38 84	79.6	33 56.0	37 84	79.0	34 07.0	37 84	78.5	34 17.9	36 84	77.9	34 28.7	36 84	77.4	34 39.3	35 83	76.8	34 49.7	35 83	76.2	4
65	32 42.7	38 84	79.7	32 54.2	38 84	79.2	33 05.5	37 84	78.6	33 16.7	37 84	78.1	33 27.7	36 84	77.5	33 38.5	36 83	77.0	33 49.2	35 83	76.4	33 59.8	35 83	75.9	65
6	31 52.2	39 84	79.3	32 03.7	38 84	78.8	32 15.1	38 84	78.2	32 26.4	37 84	77.7	32 37.5	37 84	77.1	32 48.5	36 83	76.6	32 59.3	36 83	76.0	33 10.0	35 83	75.5	6
7	31 01.7	39 84	78.9	31 13.3	39 84	78.4	31 24.8	38 84	77.8	31 36.2	38 84	77.3	31 47.4	37 83	76.7	31 58.5	37 83	76.2	32 09.4	36 83	75.6	32 20.2	36 83	75.1	7
8	30 11.2	39 84	78.5	30 23.0	39 84	78.0	30 34.6	38 84	77.4	30 46.0	38 83	76.9	30 57.4	38 83	76.4	31 08.6	37 83	75.8	31 19.6	37 83	75.3	31 30.6	36 83	74.7	8
9	29 20.9	40 84	78.1	29 32.4	39 84	77.6	29 44.4	39 83	77.0	29 56.0	39 83	76.5	30 07.4	38 83	76.0	30 18.8	38 83	75.4	30 29.9	37 82	74.9	30 41.0	37 82	74.3	9
70	28 30.6	40 84	77.7	28 42.5	40 84	77.1	28 54.3	39 83	76.6	29 06.0	39 83	76.1	29 17.6	39 83	75.6	29 29.0	38 83	75.0	29 40.3	37 82	74.5	29 51.5	37 82	74.0	70
1	27 40.4	40 84	77.2	27 52.4	40 83	76.7	28 04.3	40 83	76.2	28 16.1	39 83	75.7	28 27.8	39 83	75.2	28 39.4	38 83	74.6	28 50.8	38 82	74.1	29 02.1	38 82	73.6	1
2	26 50.3	41 83	76.8	27 02.4	40 83	76.3	27 14.4	40 83	75.8	27 26.3	40 83	75.3	27 38.1	39 83	74.8	27 49.8	39 82	74.3	28 01.4	38 82	73.7	28 12.9	38 82	73.2	2
3	26 00.2	41 83	76.4	26 12.5	41 83	75.9	26 24.6	40 83	75.4	26 36.6	40 83	74.9	26 48.6	40 82	74.4	27 00.4	39 82	73.9	27 12.1	39 82	73.3	27 23.7	38 82	72.8	3
4	25 10.3	41 83	76.0	25 22.6	41 83	75.5	25 34.9	41 83	75.0	25 47.0	40 83	74.5	25 59.1	40 82	74.0	26 11.0	40 82	73.5	26 22.9	39 82	73.0	26 34.6	39 82	72.4	4
75	24 20.4	42 83	75.6	24 32.9	41 83	75.1	24 45.3	41 82	74.6	24 57.5	41 82	74.1	25 09.7	40 82	73.6	25 21.8	40 82	73.1	25 33.7	40 82	72.6	25 45.6	39 81	72.1	75
6	23 30.7	42 83	75.2	23 43.2	42 83	74.7	23 55.7	41 82	74.2	24 08.1	41 82	73.7	24 20.4	41 82	73.2	24 32.6	40 82	72.7	24 44.7	40 82	72.2	24 56.7	40 81	71.7	6
7	22 41.0	42 83	74.7	22 53.7	42 82	74.3	23 06.3	42 82	73.8	23 18.8	42 82	73.3	23 31.3	41 82	72.8	23 43.6	41 82	72.3	23 55.8	41 81	71.8	24 08.0	40 81	71.3	7
8	21 51.4	43 83	74.3	22 04.2	42 82	73.8	22 16.8	42 82	73.3	22 29.6	42 82	72.9	22 42.0	41 82	72.4	22 54.7	41 82	71.9	23 07.0	41 81	71.4	23 19.3	41 81	70.9	8
9	21 02.0	43 82	73.9	21 14.9	43 82	73.4	21 27.8	42 82	72.9	21 40.5	42 82	72.4	21 53.2	42 81	72.0	22 05.8	42 81	71.5	22 18.4	41 81	71.0	22 30.8	41 81	70.5	9
80	20 12.6	44 82	73.5	20 25.7	43 82	73.0	20 38.7	43 82	72.5	20 51.6	43 81	72.0	21 04.4	43 81	71.5	21 17.1	42 81	71.1	21 29.8	42 81	70.6	21 42.4	42 80	70.1	80
1	19 23.4	44 82	73.0	19 36.5	44 82	72.6	19 49.7	44 81	72.1	20 02.7	43 81	71.6	20 15.7	43 81	71.1	20 28.5	43 81	70.7	20 41.3	43 81	70.2	20 54.1	42 80	69.7	1
2	18 34.2	45 82	72.6	18 47.5	44 82	72.1	19 00.8	44 81	71.7	19 14.0	44 81	71.2	19 27.1	44 81	70.7	19 40.1	43 81	70.2	19 53.0	43 80	69.8	20 05.9	43 80	69.3	2
3	17 45.0	45 82	72.2	17 58.5	45 81	71.7	18 12.0	44 81	71.2	18 25.3	44 81	70.8	18 38.6	44 81	70.3	18 51.7	44 80	69.8	19 04.8	44 80	69.4	19 17.9	43 80	68.9	3
4	16 56.3	45 81	71.8	17 09.9	45 81	71.3	17 23.4	45 81	70.8	17 36.8	45 81	70.4	17 50.2	45 80	69.9	18 03.5	44 80	69.4	18 16.8	44 80	68.9	18 30.0	44 80	68.5	4
85	16 07.5	46 81	71.3	16 21.2	46 81	70.9	16 34.9	45 81	70.4	16 48.5	45 80	69.9	17 02.0	45 80	69.5	17 15.5	45 80	69.0	17 28.9	45 80	68.5	17 42.4	44 79	68.1	85
6	15 18.8	46 81	70.9	15 32.7	46 81	70.4	15 46.5	46 80	70.0	16 00.2	46 80	69.5	16 13.9	46 80	69.0	16 27.5	45 80	68.6	16 41.1	45 79	68.1	16 54.5	45 79	67.6	6
7	14 30.3	47 81	70.4	14 44.3	47 80	70.0	14 58.2	46 80	69.5	15 12.1	46 80	69.1	15 25.9	46 80	68.6	15 39.7	46 79	68.2	15 53.4	45 79	67.7	16 07.1	45 79	67.2	7
8	13 41.9	47 80	70.0	13 56.0	47 80	69.6	14 10.1	47 80	69.1	14 24.1	47 80	68.6	14 38.1	46 79	68.2	14 52.0	46 79	67.7	15 05.9	46 79	67.3	15 19.7	46 78	66.8	8
9	12 53.7	48 80	69.6	13 07.9	48 80	69.1	13 22.1	47 80	68.7	13 36.3	47 79	68.2	13 50.4	47 79	67.7	14 04.5	47 79	67.3	14 18.5	47 78	66.8	14 32.5	46 78	66.4	9
90	12 05.5	48 80	69.1	12 19.9	48 80	68.7	12 34.3	48 79	68.2	12 48.6	48 79	67.8	13 02.9	48 79	67.3	13 17.1	47 79	66.9	13 31.3	47 78	66.4	13 45.5	47 78	66.0	90

DECLINATION CONTRARY NAME TO LATITUDE

Each cell: Alt. (° ′) / Δd Δt / Az. (°)

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
00	35 00.0 1.00 1 180.0	34 30.0 1.00 1 180.0	34 00.0 1.00 1 180.0	33 30.0 1.00 1 180.0	33 00.0 1.00 1 180.0	32 30.0 1.00 1 180.0	32 00.0 1.00 1 180.0	31 30.0 1.00 1 180.0	00
1	34 59.5 1.00 2 178.9	34 29.5 1.00 2 178.9	33 59.5 1.00 2 178.9	33 29.5 1.00 2 178.9	32 59.5 1.00 2 178.9	32 29.5 1.00 2 178.9	31 59.5 1.00 2 178.9	31 29.5 1.00 2 179.0	1
2	34 58.0 1.00 4 177.8	34 28.0 1.00 4 177.8	33 58.0 1.00 4 177.8	33 28.1 1.00 4 177.8	32 58.1 1.00 4 177.9	32 28.1 1.00 4 177.9	31 58.1 1.00 4 177.9	31 28.1 1.00 4 177.9	2
3	34 55.5 1.00 6 176.7	34 25.5 1.00 6 176.7	33 55.6 1.00 6 176.7	33 25.6 1.00 6 176.8	32 55.7 1.00 6 176.8	32 25.7 1.00 6 176.8	31 55.8 1.00 6 176.8	31 25.8 1.00 6 176.9	3
4	34 52.0 1.00 7 175.5	34 22.1 1.00 7 175.6	33 52.2 1.00 7 175.6	33 22.2 1.00 7 175.7	32 52.3 1.00 7 175.7	32 22.4 1.00 7 175.7	31 52.5 1.00 7 175.8	31 22.5 1.00 7 175.8	4
05	34 47.5 1.00 9 174.4	34 17.6 1.00 9 174.5	33 47.8 1.00 9 174.5	33 17.9 1.00 9 174.6	32 48.0 1.00 9 174.7	32 18.1 1.00 9 174.7	31 48.2 1.00 9 174.8	31 18.3 1.00 9 174.8	05
6	34 42.0 99 11 173.3	34 12.2 99 11 173.4	33 42.4 99 11 173.5	33 12.6 99 10 173.5	32 42.7 99 10 173.6	32 12.9 99 10 173.7	31 43.1 99 10 173.7	31 13.2 99 10 173.8	6
7	34 35.6 99 12 172.2	34 05.8 99 12 172.3	33 36.0 99 12 172.4	33 06.3 99 12 172.5	32 36.5 99 12 172.5	32 06.7 99 12 172.6	31 37.0 99 12 172.7	31 07.2 99 12 172.7	7
8	34 28.1 99 14 171.1	33 58.4 99 14 171.2	33 28.7 99 14 171.3	32 59.1 99 14 171.4	32 29.4 99 14 171.5	31 59.7 99 13 171.6	31 30.0 99 13 171.7	31 00.2 99 13 171.7	8
9	34 19.7 99 16 170.0	33 50.1 99 15 170.1	33 20.5 99 15 170.2	32 50.9 99 15 170.3	32 21.3 99 15 170.4	31 51.6 99 15 170.5	31 22.0 99 15 170.6	30 52.4 99 15 170.7	9
10	34 10.3 98 17 168.9	33 40.8 98 17 169.1	33 11.3 98 17 169.2	32 41.8 98 17 169.3	32 12.2 98 17 169.4	31 42.7 98 16 169.5	31 13.2 98 16 169.6	30 43.6 98 16 169.7	10
1	34 00.0 98 19 167.9	33 30.6 98 19 168.0	33 01.2 98 18 168.1	32 31.7 98 18 168.2	32 02.3 98 18 168.3	31 32.9 98 18 168.4	31 03.4 98 18 168.6	30 34.0 98 18 168.7	1
2	33 48.7 98 20 166.8	33 19.4 98 20 166.9	32 50.1 98 20 167.0	32 20.8 98 20 167.2	31 51.4 98 20 167.3	31 22.1 98 19 167.4	30 52.8 98 19 167.5	30 23.4 98 19 167.7	2
3	33 36.5 97 22 165.7	33 07.3 97 22 165.9	32 38.1 97 22 166.0	32 08.9 97 21 166.1	31 39.7 97 21 166.3	31 10.4 97 21 166.4	30 41.2 97 21 166.5	30 12.0 97 21 166.7	3
4	33 23.3 97 23 164.7	32 54.3 97 23 164.8	32 25.2 97 23 164.9	31 56.1 97 23 165.1	31 27.0 97 23 165.2	30 57.9 97 22 165.4	30 28.8 97 22 165.5	29 59.7 97 22 165.7	4
15	33 09.3 96 25 163.6	32 40.3 96 25 163.8	32 11.4 97 24 163.9	31 42.4 97 24 164.1	31 13.5 97 24 164.2	30 44.5 97 24 164.4	30 15.5 97 24 164.5	29 46.5 97 23 164.7	15
6	32 54.3 96 26 162.5	32 25.5 96 26 162.7	31 56.7 96 26 162.8	31 27.9 96 26 163.0	30 59.0 96 25 163.2	30 30.2 96 25 163.3	30 01.3 96 25 163.5	29 32.5 96 25 163.7	6
7	32 38.4 95 28 161.5	32 09.8 96 28 161.7	31 41.1 96 27 161.9	31 12.4 96 27 162.0	30 43.7 96 27 162.2	30 15.0 96 27 162.4	29 46.3 96 26 162.5	29 17.6 96 26 162.7	7
8	32 21.7 95 29 160.5	31 53.2 95 29 160.7	31 24.6 95 29 160.8	30 56.1 95 29 161.0	30 27.6 95 28 161.2	29 59.0 95 28 161.4	29 30.5 95 28 161.6	29 01.9 95 28 161.7	8
9	32 04.0 94 31 159.5	31 35.7 94 31 159.6	31 07.3 95 30 159.8	30 39.0 95 30 160.0	30 10.6 95 30 160.2	29 42.2 95 29 160.4	29 13.8 95 29 160.6	28 45.3 95 29 160.8	9
20	31 45.6 94 32 158.4	31 17.4 94 32 158.6	30 49.2 94 32 158.8	30 21.0 94 31 159.0	29 52.8 94 31 159.2	29 24.5 94 31 159.4	28 56.3 94 31 159.6	28 28.0 94 30 159.8	20
1	31 25.9 93 34 157.4	30 58.2 93 33 157.6	30 30.2 93 33 157.7	30 02.2 93 33 158.1	29 34.1 94 32 158.3	29 06.1 94 32 158.5	28 38.0 94 32 158.7	28 09.8 94 32 158.9	1
2	31 06.1 93 35 156.4	30 38.3 93 35 156.7	30 10.4 93 34 156.9	29 42.6 93 34 157.1	29 14.7 93 34 157.3	28 46.8 93 33 157.5	28 18.9 93 33 157.7	27 50.9 93 33 157.9	2
3	30 45.1 92 36 155.5	30 17.5 92 36 155.7	29 49.8 92 36 155.9	29 22.1 92 35 156.1	28 54.4 92 35 156.3	28 26.7 92 35 156.6	27 59.0 93 34 156.8	27 31.2 93 34 157.0	3
4	30 23.4 91 38 154.5	29 55.9 92 37 154.7	29 28.4 92 37 154.9	29 00.9 92 37 155.2	28 33.4 92 36 155.4	28 05.9 92 36 155.6	27 38.3 92 36 155.9	27 10.7 92 35 156.1	4
25	30 00.8 91 39 153.5	29 33.6 91 39 153.8	29 06.3 91 38 154.0	28 39.0 91 38 154.2	28 11.6 91 38 154.4	27 44.3 91 37 154.7	27 16.9 91 37 155.0	26 49.5 91 37 155.2	25
6	29 37.5 90 40 152.6	29 10.5 90 40 152.8	28 43.4 90 39 153.1	28 16.2 90 39 153.3	27 49.1 90 39 153.5	27 21.9 90 38 153.8	26 54.7 91 38 154.0	26 27.5 91 38 154.3	6
7	29 13.4 90 41 151.6	28 46.6 90 41 151.9	28 19.7 90 41 152.1	27 52.8 90 40 152.4	27 25.8 90 40 152.6	26 58.8 90 40 152.9	26 31.8 90 39 153.1	26 04.8 90 39 153.4	7
8	28 48.6 89 43 150.7	28 22.0 89 42 151.0	27 55.3 89 42 151.2	27 28.6 89 42 151.5	27 01.8 89 41 151.7	26 35.0 89 41 152.0	26 08.2 89 41 152.2	25 41.4 89 40 152.5	8
9	28 23.1 88 44 149.8	27 56.7 88 43 150.0	27 30.2 88 43 150.3	27 03.6 89 43 150.6	26 37.1 89 42 150.8	26 10.5 89 42 151.1	25 43.9 89 42 151.3	25 17.3 89 41 151.6	9
30	27 56.9 87 45 148.9	27 30.6 88 45 149.1	27 04.3 88 44 149.4	26 38.0 88 44 149.7	26 11.7 88 44 149.9	25 45.3 88 43 150.2	25 18.9 88 43 150.5	24 52.5 88 42 150.7	30
1	27 29.9 87 46 148.0	27 03.9 87 46 148.2	26 37.8 87 45 148.5	26 11.7 87 45 148.8	25 45.6 87 45 149.1	25 19.4 87 44 149.3	24 53.2 87 44 149.6	24 27.0 87 44 149.9	1
2	27 02.3 86 47 147.1	26 36.5 86 47 147.4	26 10.6 86 46 147.6	25 44.7 86 46 147.9	25 18.8 86 46 148.2	24 52.9 87 45 148.5	24 26.9 87 45 148.8	24 00.9 87 45 149.0	2
3	26 34.0 85 48 146.2	26 08.4 85 48 146.5	25 42.8 86 48 146.8	25 17.1 86 47 147.1	24 51.4 86 47 147.4	24 25.7 86 46 147.7	23 59.9 86 46 147.9	23 34.1 86 46 148.2	3
4	26 05.1 85 49 145.3	25 39.7 85 49 145.6	25 14.3 85 49 145.9	24 48.8 85 48 146.2	24 23.3 85 48 146.5	23 57.8 85 47 146.8	23 32.2 85 47 147.1	23 06.7 85 47 147.4	4
35	25 35.5 84 50 144.5	25 10.4 84 50 144.8	24 45.2 84 50 145.1	24 19.9 84 49 145.4	23 54.6 84 49 145.7	23 29.3 84 48 146.0	23 04.0 85 48 146.3	22 38.6 85 48 146.5	35
6	25 05.3 83 51 143.6	24 40.4 83 51 143.9	24 15.4 83 51 144.2	23 50.4 83 50 144.5	23 25.3 84 50 144.8	23 00.2 84 49 145.1	22 35.1 84 49 145.4	22 10.0 84 49 145.7	6
7	24 34.5 82 52 142.8	24 09.8 82 52 143.1	23 45.1 83 52 143.4	23 20.3 83 51 143.7	22 55.4 83 51 144.0	22 30.5 83 50 144.4	22 05.6 83 50 144.6	21 40.7 83 50 144.9	7
8	24 03.2 82 53 142.0	23 38.7 82 53 142.3	23 14.1 82 53 142.6	22 49.5 82 52 142.9	22 24.9 82 52 143.2	22 00.3 82 51 143.5	21 35.6 82 51 143.8	21 10.9 82 51 144.1	8
9	23 31.2 81 54 141.2	23 06.9 81 54 141.5	22 42.6 81 53 141.8	22 18.2 81 53 142.1	21 53.9 81 53 142.4	21 29.4 81 52 142.8	21 05.0 82 52 143.1	20 40.5 82 52 143.4	9
40	22 58.7 80 55 140.4	22 34.6 80 55 140.7	22 10.5 80 54 141.0	21 46.4 80 54 141.3	21 22.2 81 54 141.7	20 58.0 81 53 142.0	20 33.8 81 53 142.3	20 09.5 81 53 142.6	40
1	22 25.5 79 56 139.6	22 01.8 79 56 139.9	21 37.9 80 55 140.2	21 14.0 80 55 140.6	20 50.0 80 55 140.9	20 26.1 80 54 141.2	20 02.1 80 54 141.5	19 38.0 80 53 141.8	1
2	21 52.0 79 57 138.8	21 28.4 79 57 139.1	21 04.7 79 56 139.5	20 41.1 79 56 139.8	20 17.3 79 55 140.1	19 53.6 79 55 140.4	19 29.8 79 55 140.8	19 06.0 79 54 141.1	2
3	21 17.8 78 58 138.0	20 54.5 78 57 138.4	20 31.0 78 57 138.7	20 07.6 78 57 139.0	19 44.1 78 56 139.4	19 20.6 78 56 139.7	18 57.0 79 56 140.0	18 33.4 79 55 140.3	3
4	20 43.2 77 59 137.3	20 20.0 77 58 137.6	19 56.9 77 58 138.0	19 33.6 78 57 138.3	19 10.4 78 57 138.6	18 47.0 78 57 139.0	18 23.7 78 56 139.3	18 00.3 78 56 139.6	4
45	20 08.1 76 59 136.5	19 45.1 77 59 136.9	19 22.2 77 59 137.2	18 59.2 77 58 137.6	18 36.1 77 58 137.9	18 13.0 77 58 138.2	17 49.9 77 57 138.6	17 26.8 77 57 138.9	45
6	19 32.4 76 60 135.8	19 09.7 76 60 136.1	18 47.0 76 59 136.5	18 24.2 76 59 136.8	18 01.4 76 59 137.2	17 38.5 76 58 137.5	17 15.6 76 58 137.8	16 52.7 76 58 138.2	6
7	18 56.3 75 61 135.1	18 33.9 75 61 135.4	18 11.3 75 60 135.8	17 48.8 75 60 136.1	17 26.2 75 59 136.4	17 03.5 75 59 136.8	16 40.9 76 59 137.1	16 18.2 76 58 137.5	7
8	18 19.8 74 62 134.3	17 57.5 74 61 134.7	17 35.2 74 61 135.0	17 12.9 74 61 135.4	16 50.5 75 60 135.7	16 28.1 75 60 136.1	16 05.7 75 59 136.4	15 43.2 75 59 136.8	8
9	17 42.8 73 62 133.6	17 20.7 74 62 134.0	16 58.7 74 62 134.3	16 36.5 74 61 134.7	16 14.4 74 61 135.0	15 52.2 74 61 135.4	15 30.0 74 60 135.7	15 07.7 74 60 136.1	9
50	17 05.3 73 63 132.9	16 43.5 73 63 133.3	16 21.7 73 62 133.7	15 59.8 73 62 134.0	15 37.8 73 62 134.4	15 15.9 73 61 134.7	14 53.9 73 61 135.1	14 31.9 73 61 135.4	50
1	16 27.5 72 64 132.2	16 05.9 72 63 132.6	15 44.2 72 63 133.0	15 22.6 72 63 133.3	15 00.9 72 62 133.7	14 39.1 72 62 134.0	14 17.4 73 62 134.4	13 55.5 73 61 134.7	1
2	15 49.2 71 64 131.6	15 27.8 71 64 131.9	15 06.4 71 64 132.3	14 44.9 72 63 132.7	14 23.5 72 63 133.0	14 01.9 72 63 133.4	13 40.4 72 62 133.7	13 18.8 72 62 134.1	2
3	15 10.5 70 65 130.9	14 49.4 71 65 131.3	14 28.2 71 64 131.6	14 06.9 71 64 132.0	13 45.7 71 64 132.4	13 24.4 71 63 132.7	13 03.0 71 63 133.1	12 41.7 71 63 133.4	3
4	14 31.4 70 66 130.2	14 10.5 70 65 130.6	13 49.5 70 65 131.0	13 28.5 70 65 131.3	13 07.4 70 64 131.7	12 46.4 70 64 132.1	12 25.3 70 64 132.4	12 04.1 71 63 132.8	4
55	13 52.0 69 66 129.6	13 31.3 69 66 129.9	13 10.5 69 66 130.3	12 49.7 69 65 130.7	12 28.9 69 65 131.1	12 08.0 70 65 131.4	11 47.1 70 64 131.8	11 26.2 70 64 132.2	55
6	13 12.2 68 67 128.9	12 51.6 68 67 129.3	12 31.1 69 66 129.7	12 10.5 69 66 130.0	11 49.9 69 66 130.4	11 29.2 69 65 130.8	11 08.6 69 65 131.2	10 47.9 69 64 131.5	6
7	12 32.0 68 68 128.3	12 11.7 68 67 128.7	11 51.3 68 67 129.0	11 31.0 68 67 129.4	11 10.6 68 66 129.8	10 50.1 68 66 130.2	10 29.7 68 65 130.5	10 09.2 68 65 130.9	7
8	11 51.4 67 68 127.7	11 31.3 67 68 128.0	11 11.2 67 67 128.4	10 51.0 67 67 128.8	10 30.9 67 67 129.2	10 10.6 67 66 129.5	9 50.4 68 66 129.9	9 30.1 68 66 130.3	8
9	11 10.6 66 69 127.0	10 50.7 66 68 127.4	10 30.7 66 68 127.8	10 10.8 67 68 128.2	9 50.8 67 67 128.5	9 30.8 67 67 128.9	9 10.8 67 67 129.3	8 50.7 67 66 129.7	9
60	10 29.3 66 69 126.4	10 09.6 66 69 126.8	9 49.9 66 69 127.2	9 30.2 66 68 127.6	9 10.4 66 68 128.0	8 50.6 66 68 128.3	8 30.8 66 67 128.7	8 11.0 66 67 129.1	60
1	9 47.8 65 70 125.8	9 28.3 65 69 126.2	9 08.8 65 69 126.6	8 49.3 65 69 127.0	8 29.7 65 68 127.4	8 10.1 65 68 127.7	7 50.5 65 68 128.1	7 30.9 65 67 128.5	1
2	9 05.9 64 70 125.2	8 46.7 64 70 125.6	8 27.4 64 70 126.0	8 08.0 64 69 126.4	7 48.7 65 69 126.8	7 29.3 65 69 127.2	7 09.9 65 68 127.5	6 50.5 65 68 127.9	2
3	8 23.8 64 71 124.6	8 04.7 64 70 125.0	7 45.6 64 70 125.4	7 26.5 64 70 125.8	7 07.3 64 69 126.2	6 48.2 64 69 126.6	6 29.0 64 69 127.0	6 09.8 64 68 127.4	3
4	7 41.3 63 71 124.1	7 22.4 63 71 124.4	7 03.5 63 71 124.8	6 44.6 63 70 125.2	6 25.7 63 70 125.6	6 06.7 63 70 126.0	5 47.7 63 69 126.4	5 28.7 63 69 126.8	4
65	6 58.6 62 72 123.5	6 39.9 62 71 123.9	6 21.2 62 71 124.3	6 02.4 62 71 124.7	5 43.7 62 70 125.0	5 25.0 63 70 125.4	5 06.2 63 70 125.8		65
6	6 15.5 62 72 122.9	5 57.0 62 72 123.3	5 38.5 62 72 123.7	5 20.0 62 71 124.1	5 01.5 62 71 124.5				6
7	5 32.2 61 73 122.3	5 13.9 61 72 122.7							7

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
91	11 17.6 49 80 68.7	11 32.1 48 79 68.2	11 46.6 48 79 67.8	12 01.1 48 79 67.3	12 15.5 48 79 66.9	12 29.9 48 78 66.4	12 44.3 48 78 66.0	12 58.6 48 78 65.5	91
2	10 29.7 49 79 68.2	10 44.4 49 79 67.8	10 59.1 49 79 67.3	11 13.7 49 79 66.9	11 28.3 49 78 66.4	11 42.9 48 78 66.0	11 57.4 48 78 65.5	12 11.9 48 78 65.1	2
3	9 42.0 50 79 67.7	9 56.9 49 79 67.3	10 11.7 49 79 66.9	10 26.5 49 78 66.4	10 41.3 49 78 66.0	10 56.0 49 78 65.5	11 10.7 48 78 65.1	11 25.3 49 77 64.6	3
4	8 54.5 50 79 67.3	9 09.5 50 79 66.8	9 24.5 50 78 66.4	9 39.5 50 78 66.0	9 54.4 50 78 65.5	10 09.3 50 78 65.1	10 24.1 49 77 64.6	10 38.9 49 77 64.2	4
95	8 07.2 51 79 66.8	8 22.3 51 78 66.4	8 37.5 50 78 65.9	8 52.6 50 78 65.5	9 07.6 50 78 65.1	9 22.7 50 77 64.6	9 37.7 50 77 64.2	9 52.7 50 77 63.8	95
6	7 20.0 51 78 66.4	7 35.3 51 78 65.9	7 50.6 51 78 65.5	8 05.9 51 78 65.1	8 21.1 51 77 64.6	8 36.3 51 77 64.2	8 51.5 51 77 63.7	9 06.6 50 76 63.3	6
7	6 32.9 52 78 65.9	6 48.4 52 78 65.4	7 03.9 51 78 65.0	7 19.3 51 77 64.6	7 34.7 51 77 64.2	7 50.1 51 77 63.7	8 05.5 51 76 63.3	8 20.8 51 76 62.9	7
8	5 46.1 52 78 65.4	6 01.7 52 78 65.0	6 17.4 52 77 64.5	6 33.0 52 77 64.1	6 48.5 52 77 63.7	7 04.1 52 76 63.3	7 19.6 52 76 62.8	7 35.1 52 76 62.4	8
9		5 15.2 53 77 64.5	5 31.0 53 77 64.1	5 46.8 53 77 63.6	6 02.5 52 76 63.2	6 18.3 52 76 62.8	6 34.0 52 76 62.4	6 49.6 52 75 61.9	9
100				5 00.8 53 76 63.2	5 16.7 53 76 62.7	5 32.6 53 76 62.3	5 48.5 53 75 61.9	6 04.4 53 75 61.5	100
1							5 03.2 54 75 61.4	5 19.3 53 75 61.0	1

Right margin latitude labels: Lat. 32° · Lat. 33° · Lat. 34° · Lat. 35° · Lat. 36° · Lat. 37° · Lat. 38°

Lat. 31°

H.A.	28° 00' Alt. Δd Δt	Az.	28° 30' Alt. Δd Δt	Az.	29° 00' Alt. Δd Δt	Az.	30° 00' Alt. Δd Δt	Az.	32° 00' Alt. Δd Δt	Az.	34° 00' Alt. Δd Δt	Az.	34° 30' Alt. Δd Δt	Az.	35° 30' Alt. Δd Δt	Az.	H.A.
00	87 00.0 1.0 12	180.0	87 30.0 1.0 15	180.0	88 00.0 1.0 18	180.0	89 00.0 1.0 32	180.0	89 00.0 1.0 31	00.0	87 00.0 1.0 12	00.0	86 30.0 1.0 10	00.0	85 30.0 1.0 06	00.0	00
1	86 52.6 96 34	163.6	87 21.2 95 40	160.6	87 49.2 92 47	156.3	88 40.8 76 67	139.0	88 41.2 76 66	40.2	86 53.0 96 32	15.4	86 24.0 97 28	13.2	85 25.4 98 22	10.3	1
2	86 31.9 87 51	149.4	86 57.4 83 57	144.7	87 21.2 76 63	138.6	88 00.5 51 78	119.6	88 01.4 50 77	59.1	86 33.5 87 48	28.8	86 07.0 90 43	25.1	85 12.0 93 35	19.8	2
3	86 01.4 76 62	138.2	86 23.4 70 67	133.1	86 43.3 62 72	126.8	87 13.7 37 82	110.4	87 15.2 35 81	67.9	86 04.6 76 59	39.3	85 41.2 80 54	35.0	84 50.9 87 45	28.3	3
4	85 24.3 67 69	129.8	85 43.3 60 73	124.7	86 00.0 51 77	119.0	86 24.7 30 83	105.2	86 26.8 26 82	72.6	85 29.2 65 66	47.3	85 08.8 71 62	42.8	84 23.6 79 54	35.5	4
05	84 42.9 58 74	123.3	84 59.5 52 77	118.7	85 13.9 44 80	113.5	85 34.7 25 84	101.8	85 37.3 21 83	75.5	84 49.6 56 71	53.2	84 31.8 62 67	48.9	83 51.6 72 60	41.6	05
6	83 58.7 52 77	118.4	84 13.4 46 79	114.1	84 26.0 38 82	109.5	84 44.1 22 85	99.4	84 47.3 16 84	77.4	84 07.1 49 74	57.8	83 51.6 55 71	53.7	83 15.8 65 64	46.5	6
7	83 12.7 47 70	114.5	83 25.8 41 81	110.6	83 37.1 34 83	106.5	83 53.2 19 85	97.6	83 57.0 13 84	78.7	83 22.8 42 76	61.2	83 09.2 48 73	57.4	82 37.2 58 68	50.6	7
8	82 25.3 43 81	111.3	82 37.2 37 82	107.8	82 47.4 31 83	104.1	83 02.2 18 85	96.2	83 06.5 11 84	79.6	82 37.1 37 78	63.9	82 25.2 43 75	60.4	81 56.5 53 70	53.9	8
9	81 36.9 39 82	108.7	81 47.9 34 83	105.5	81 57.4 29 84	102.1	82 11.0 17 85	95.0	82 15.8 09 85	80.2	81 50.5 33 79	66.1	81 39.9 38 77	62.8	81 14.2 47 73	56.7	9
10	80 47.9 37 83	106.5	80 58.2 32 84	103.5	81 06.9 27 84	100.5	81 19.7 16 86	94.1	81 25.1 07 85	80.7	81 03.2 29 80	67.8	80 53.8 34 78	64.7	80 30.6 43 74	59.0	10
1	79 58.3 34 83	104.6	80 08.0 30 84	101.9	80 16.2 25 85	99.1	80 28.4 15 86	93.2	80 34.3 06 85	81.1	80 15.4 26 80	69.2	80 06.9 30 79	66.4	79 46.1 39 76	61.0	1
2	79 08.4 32 84	103.0	79 17.5 28 84	100.5	79 25.4 24 85	97.8	79 37.0 15 86	92.5	79 43.5 04 85	81.3	79 27.1 23 81	70.3	79 19.6 27 80	67.7	79 00.7 35 77	62.6	2
3	78 18.2 31 84	101.6	78 26.8 27 85	99.2	78 34.4 23 85	96.8	78 45.6 15 86	91.8	78 52.6 03 85	81.5	78 38.5 20 81	71.3	78 31.8 24 80	68.8	78 14.8 32 77	64.0	3
4	77 27.4 30 84	100.3	77 36.0 26 85	98.1	77 43.2 22 85	95.8	77 54.2 14 86	91.1	78 01.8 02 85	81.6	77 49.7 18 82	72.0	77 43.7 22 81	69.7	77 28.3 29 78	65.2	4
15	76 37.0 29 85	99.2	76 45.0 25 85	97.1	76 52.0 22 85	94.9	77 02.8 14 86	90.6	77 10.9 01 85	81.6	77 00.7 16 82	72.7	76 55.3 20 81	70.5	76 41.4 27 79	66.2	15
6	75 46.1 28 85	98.1	75 53.9 24 85	96.1	76 00.8 21 86	94.1	76 11.4 14 86	90.0	76 20.0 00 85	81.6	76 11.5 14 82	73.2	76 06.8 18 81	71.2	75 54.2 24 79	67.1	6
7	74 55.1 27 85	97.2	75 02.8 24 85	95.3	75 09.4 21 86	93.4	75 19.9 14 86	89.5	75 29.1 01 85	81.6	75 22.2 12 82	73.7	75 18.0 16 82	71.7	75 06.7 22 80	67.9	7
8	74 04.1 26 85	96.3	74 11.5 23 86	94.5	74 18.1 20 86	92.7	74 28.5 14 86	89.1	74 38.3 02 85	81.6	74 32.8 11 82	74.0	74 29.1 14 82	72.2	74 18.9 20 80	68.5	8
9	73 12.9 26 85	95.5	73 20.2 23 86	93.8	73 26.7 20 86	92.1	73 37.1 14 86	88.6	73 47.4 03 85	81.5	73 43.3 09 83	74.3	73 40.1 12 82	72.6	73 31.0 18 80	69.1	9
20	72 21.7 25 85	94.7	72 28.9 23 86	93.1	72 35.3 20 86	91.5	72 45.7 15 86	88.2	72 56.5 03 85	81.4	72 53.8 08 83	74.6	72 51.0 11 82	72.9	72 42.8 16 80	69.6	20
1	71 30.4 25 86	94.0	71 37.5 22 86	92.5	71 43.9 20 86	90.9	71 54.3 15 86	87.8	72 05.7 04 85	81.3	72 04.2 07 83	74.8	72 01.8 09 82	73.2	71 54.6 15 81	70.0	1
2	70 39.1 25 86	93.3	70 46.1 22 86	91.9	70 52.4 20 86	90.4	71 02.9 15 86	87.3	71 14.9 05 85	81.2	71 14.5 05 83	75.0	71 12.5 08 82	73.4	71 06.2 13 81	70.3	2
3	69 47.7 24 86	92.7	69 54.7 22 86	91.3	70 01.0 20 86	89.8	70 11.5 15 86	87.0	70 24.0 06 85	81.1	70 24.8 04 83	75.1	70 23.2 07 82	73.6	70 17.7 12 81	70.6	3
4	68 56.3 24 86	92.1	69 03.3 22 86	90.7	69 09.6 20 86	89.3	69 20.2 15 86	86.6	69 33.2 06 85	80.9	69 35.1 03 83	75.2	69 33.8 05 82	73.7	69 29.2 10 81	70.9	4
25	68 04.9 24 86	91.5	68 11.9 22 86	90.2	68 18.2 20 86	88.9	68 28.9 16 86	86.2	68 42.5 07 85	80.7	68 45.4 02 83	75.2	68 44.4 04 82	73.9	68 40.5 09 81	71.1	25
6	67 13.5 24 86	90.9	67 20.4 22 86	89.7	67 26.7 20 86	88.4	67 37.6 16 85	85.8	67 51.7 08 85	80.6	67 55.7 01 83	75.3	67 55.0 03 82	73.9	67 51.8 07 81	71.3	6
7	66 22.1 24 86	90.4	66 29.0 22 86	89.2	66 35.3 20 86	88.0	66 46.3 16 85	85.5	67 01.0 06 84	80.4	67 05.9 00 83	75.3	67 05.6 02 82	74.0	67 03.1 06 81	71.4	7
8	65 30.7 24 86	89.9	65 37.6 22 86	88.7	65 44.0 20 86	87.5	65 55.0 17 85	85.1	66 10.3 09 84	80.2	66 16.2 01 82	75.3	66 16.2 01 82	74.0	66 14.3 05 81	71.5	8
9	64 39.2 24 86	89.4	64 46.2 22 86	88.2	64 52.6 20 86	87.1	65 03.8 17 85	84.8	65 19.6 09 84	80.0	65 26.4 02 83	75.2	65 26.7 00 82	74.0	65 25.5 04 81	71.6	9
30	63 47.8 24 86	88.9	63 54.8 22 86	87.8	64 01.2 21 86	86.7	64 12.6 17 85	84.4	64 29.0 10 84	79.8	64 36.7 03 83	75.2	64 37.3 01 82	74.0	64 36.7 03 81	71.7	30
1	62 56.4 24 86	88.4	63 03.4 23 86	87.3	63 09.9 21 86	86.3	63 21.4 18 85	84.1	63 38.4 11 84	79.6	63 47.0 04 83	75.1	63 47.8 02 82	74.0	63 47.9 02 81	71.7	1
2	62 05.0 24 86	87.9	62 12.0 23 86	86.9	62 18.6 21 85	85.9	62 30.3 18 85	83.7	62 47.8 11 84	79.4	62 57.3 05 83	75.1	62 58.4 03 82	74.0	62 59.0 01 81	71.8	2
3	61 13.6 24 86	87.5	61 20.7 23 86	86.5	61 27.3 21 85	85.5	61 39.2 18 85	83.4	61 57.3 12 84	79.2	62 07.6 05 83	75.0	62 09.0 04 82	73.9	62 10.2 00 81	71.8	3
4	60 22.2 25 86	87.1	60 29.4 23 85	86.1	60 36.1 22 85	85.1	60 48.1 19 85	83.1	61 06.8 12 84	79.0	61 18.0 06 83	74.9	61 19.6 05 82	73.8	61 21.4 01 81	71.7	4
35	59 30.9 25 86	86.6	59 38.1 23 85	85.7	59 44.8 22 85	84.7	59 57.1 19 85	82.7	60 16.3 13 84	78.8	60 28.3 07 83	74.8	60 30.2 05 82	73.7	60 32.5 02 81	71.7	35
6	58 39.5 25 86	86.2	58 46.8 23 85	85.3	58 53.6 22 85	84.3	59 06.1 19 85	82.4	59 25.9 14 84	78.6	59 38.7 08 83	74.6	59 40.8 06 82	73.6	59 43.7 03 81	71.7	6
7	57 48.2 25 85	85.8	57 55.6 24 85	84.9	58 02.5 22 85	83.9	58 15.1 20 85	82.1	58 35.5 14 84	78.3	58 49.1 09 83	74.5	58 51.5 07 82	73.5	58 54.9 04 81	71.6	7
8	56 57.0 25 85	85.4	57 04.3 24 85	84.5	57 11.3 23 85	83.6	57 24.2 20 85	81.8	57 45.1 15 84	78.1	57 59.6 09 82	74.4	58 02.2 08 82	73.4	58 06.1 05 81	71.5	8
9	56 05.7 25 85	85.0	56 13.2 24 85	84.1	56 20.3 23 85	83.2	56 33.3 20 85	81.4	56 54.8 15 84	77.9	57 10.1 10 82	74.2	57 12.9 09 82	73.3	57 17.3 06 81	71.5	9
40	55 14.5 26 85	84.6	55 22.0 25 85	83.7	55 29.2 23 85	82.9	55 42.5 21 85	81.1	56 04.6 16 84	77.6	56 20.6 11 82	74.1	56 23.7 09 82	73.2	56 28.6 07 81	71.4	40
1	54 23.3 26 85	84.2	54 30.9 25 85	83.3	54 38.2 24 85	82.5	54 51.7 21 85	80.8	55 14.4 16 84	77.4	55 31.2 12 82	73.9	55 34.4 10 82	73.0	55 39.8 08 81	71.2	1
2	53 32.2 26 85	83.8	53 39.9 25 85	83.0	53 47.2 24 85	82.1	54 00.9 22 84	80.5	54 24.2 17 84	77.1	54 41.8 12 82	73.7	54 45.3 11 82	72.9	54 51.2 09 81	71.1	2
3	52 41.1 26 85	83.4	52 48.8 25 85	82.6	52 56.3 24 85	81.8	53 10.2 22 84	80.2	53 34.1 18 83	76.9	53 52.4 13 82	73.5	53 56.2 12 82	72.7	54 02.5 09 81	71.0	3
4	51 50.0 27 85	83.0	51 57.9 26 85	82.2	52 05.4 25 85	81.4	52 19.6 23 84	79.8	52 44.0 18 83	76.6	53 03.1 14 82	73.4	53 07.1 13 82	72.5	53 13.9 10 81	70.9	4
45	50 59.0 27 85	82.6	51 06.9 26 85	81.9	51 14.6 25 85	81.1	51 29.0 23 84	79.5	51 54.0 19 83	76.4	52 13.9 14 82	73.2	52 18.0 13 82	72.4	52 25.3 11 81	70.7	45
6	50 08.0 27 85	82.2	50 16.0 26 85	81.5	50 23.8 25 85	80.7	50 38.4 24 84	79.2	51 04.1 19 83	76.1	51 24.7 15 82	73.0	51 29.1 14 82	72.2	51 36.8 12 81	70.6	6
7	49 17.1 28 85	81.9	49 25.2 27 85	81.1	49 33.1 26 84	80.4	49 47.9 24 84	78.9	50 14.2 20 83	75.9	50 35.5 16 82	72.8	50 40.1 15 81	72.0	50 48.3 13 81	70.4	7
8	48 26.2 28 85	81.5	48 34.4 27 85	80.8	48 42.4 26 84	80.0	48 57.5 24 84	78.6	49 24.3 20 83	75.6	49 46.5 16 82	72.6	49 51.2 15 81	71.8	49 59.9 13 81	70.3	8
9	47 35.3 28 85	81.1	47 43.7 27 84	80.4	47 51.8 27 84	79.7	48 07.1 25 84	78.2	48 34.5 21 83	75.3	48 57.4 17 82	72.3	49 02.4 16 81	71.6	49 11.5 14 81	70.1	9
50	46 44.5 29 85	80.8	46 53.0 28 84	80.1	47 01.2 27 84	79.3	47 16.8 25 84	77.9	47 44.8 22 83	75.0	48 08.4 18 82	72.1	48 13.6 17 81	71.4	48 23.2 15 80	69.9	50
1	45 53.8 29 84	80.4	46 02.4 28 84	79.7	46 10.7 27 84	79.0	46 26.5 26 84	77.6	46 55.2 22 83	74.8	47 19.5 18 81	71.9	47 24.9 18 81	71.2	47 34.9 16 80	69.7	1
2	45 03.1 29 84	80.0	45 11.8 28 84	79.3	45 20.2 28 84	78.7	45 36.3 26 84	77.3	46 05.6 23 83	74.5	46 30.7 19 81	71.7	46 36.3 18 81	71.0	46 46.7 16 80	69.5	2
3	44 12.5 30 84	79.7	44 21.3 29 84	79.0	44 29.8 28 84	78.3	44 46.2 26 83	77.0	45 16.0 23 82	74.2	45 41.9 20 81	71.4	45 47.7 19 81	70.7	45 58.6 17 80	69.3	3
4	43 21.9 30 84	79.3	43 30.8 29 84	78.6	43 39.5 29 84	78.0	43 56.1 27 83	76.6	44 26.5 24 82	73.9	44 53.2 21 81	71.2	44 59.2 20 81	70.5	45 10.5 18 80	69.1	4
55	42 31.4 30 84	78.9	42 40.4 30 84	78.3	42 49.2 29 84	77.6	43 06.1 27 83	76.3	43 37.2 24 82	73.7	44 04.5 21 81	71.0	44 10.7 20 81	70.3	44 22.5 19 80	68.9	55
6	41 41.0 31 84	78.6	41 50.1 30 84	77.9	41 59.0 29 84	77.3	42 16.2 28 83	76.0	42 47.9 25 82	73.4	43 15.9 22 81	70.7	43 22.4 21 80	70.0	43 34.5 19 80	68.7	6
7	40 50.6 31 84	78.2	40 59.9 30 84	77.6	41 08.9 30 83	76.9	41 26.3 28 83	75.7	41 58.6 25 82	73.1	42 27.4 22 81	70.5	42 34.1 22 80	69.8	42 46.6 20 80	68.5	7
8	40 00.3 32 84	77.8	40 09.7 31 84	77.2	40 18.8 30 83	76.6	40 36.5 29 83	75.3	41 09.5 26 82	72.8	41 39.0 23 81	70.2	41 45.8 22 80	69.6	41 58.8 21 80	68.2	8
9	39 10.1 32 84	77.5	39 19.6 31 83	76.9	39 28.8 31 83	76.2	39 46.8 29 83	75.0	40 20.4 27 82	72.5	40 50.7 24 80	69.9	40 57.7 23 80	69.3	41 11.1 22 79	68.0	9
60	38 19.9 32 84	77.1	38 29.5 32 83	76.5	38 38.9 31 83	75.9	38 57.2 30 83	74.7	39 31.4 27 82	72.2	40 02.4 24 80	69.6	40 09.8 24 80	69.0	40 23.5 22 79	67.8	60
1	37 29.8 33 83	76.7	37 39.5 32 83	76.1	37 49.1 32 83	75.5	38 07.6 30 82	74.3	38 42.5 28 81	71.9	39 14.2 25 80	69.4	39 21.6 24 80	68.8	39 35.9 23 79	67.5	1
2	36 39.8 33 83	76.4	36 49.6 33 83	75.8	36 59.3 32 83	75.2	37 18.1 31 82	74.0	37 53.6 28 81	71.6	38 26.1 26 80	69.1	38 33.7 25 80	68.5	38 48.4 24 79	67.3	2
3	35 49.8 34 83	76.0	35 59.8 33 83	75.4	36 09.6 32 83	74.8	36 28.7 31 82	73.7	37 04.9 29 81	71.3	37 38.1 26 80	68.9	37 45.9 26 80	68.3	38 01.0 25 79	67.0	3
4	35 00.0 34 83	75.6	35 10.1 33 83	75.1	35 20.0 33 83	74.5	35 39.4 32 82	73.3	36 16.2 29 81	71.0	36 50.1 27 80	68.6	36 58.2 26 80	68.0	37 13.7 25 79	66.8	4
65	34 10.2 34 83	75.3	34 20.4 34 83	74.7	34 30.5 33 82	74.1	34 50.2 32 82	73.0	35 27.6 30 81	70.7	36 02.3 28 80	68.3	36 10.5 27 79	67.7	36 26.5 26 79	66.5	65
6	33 20.5 35 83	74.9	33 30.9 34 82	74.4	33 41.1 34 82	73.8	34 01.1 33 82	72.7	34 39.1 31 81	70.4	35 14.6 28 79	68.0	35 23.0 28 79	67.4	35 39.4 27 78	66.3	6
7	32 30.9 35 83	74.5	32 41.4 35 82	74.0	32 51.8 34 82	73.4	33 12.0 33 82	72.3	33 50.7 31 80	70.0	34 26.9 29 79	67.7	34 35.6 29 79	67.2	34 52.3 27 78	66.0	7
8	31 41.3 36 82	74.2	31 52.0 35 82	73.6	32 02.5 35 82	73.1	32 23.1 34 81	72.0	33 02.3 32 80	69.7	33 39.7 30 79	67.4	33 48.2 29 79	66.9	34 05.4 28 78	65.7	8
9	30 51.9 36 82	73.8	31 02.7 36 82	73.3	31 13.3 35 82	72.7	31 34.2 34 81	71.6	32 14.3 32 80	69.4	32 51.9 30 79	67.1	33 01.0 30 79	66.6	33 18.6 29 78	65.4	9
70	30 02.6 37 82	73.4	30 13.5 36 82	72.9	30 24.3 36 82	72.4	30 45.5 35 81	71.3	31 26.2 33 80	69.1	32 04.6 31 79	66.8	32 13.8 31 78	66.3	32 31.9 30 78	65.1	70
1	29 13.3 37 82	73.1	29 24.4 37 82	72.5	29 35.3 36 81	72.0	29 56.8 35 81	70.9	30 38.2 34 80	68.7	31 17.4 32 79	66.5	31 26.8 31 78	66.0	31 45.3 30 78	64.9	1
2	28 24.2 38 82	72.7	28 35.4 37 82	72.2	28 46.5 37 81	71.6	29 08.3 36 81	70.6	29 50.3 34 80	68.4	30 30.2 32 78	66.2	30 39.9 32 78	65.7	30 58.8 31 77	64.6	2
3	27 35.1 38 82	72.3	27 46.5 38 81	71.8	27 57.7 37 81	71.3	28 19.8 36 81	70.2	29 02.6 35 79	68.1	29 43.2 33 78	65.9	29 53.1 33 78	65.4	30 12.4 32 77	64.3	3
4	26 46.2 39 81	71.9	26 57.7 38 81	71.4	27 09.1 38 81	70.9	27 31.5 37 80	69.8	28 14.9 35 79	67.7	28 56.3 34 78	65.6	29 06.4 33 78	65.1	29 26.1 32 77	64.0	4
75	25 57.4 39 81	71.5	26 09.0 39 81	71.0	26 20.5 38 81	70.5	26 43.3 38 80	69.5	27 27.4 36 79	67.4	28 09.6 34 78	65.3	28 19.8 34 77	64.7	28 39.9 33 77	63.7	75
6	25 08.6 39 81	71.2	25 20.4 39 81	70.6	25 32.1 39 81	70.1	25 55.2 38 80	69.1	26 40.0 37 79	67.0	27 22.9 35 78	64.9	27 33.4 35 77	64.4	27 53.9 34 76	63.4	6
7	24 20.0 40 81	70.8	24 31.9 40 81	70.3	24 43.8 39 80	69.8	25 07.2 39 80	68.7	25 52.5 37 79	66.7	26 36.4 36 77	64.6	26 47.0 35 77	64.1	27 08.0 35 76	63.0	7
8	23 31.5 40 81	70.4	23 43.6 40 80	69.9	23 55.6 40 80	69.4	24 19.3 39 80	68.4	25 05.5 38 78	66.3	25 50.0 37 77	64.3	26 00.8 36 77	63.8	26 22.2 35 76	62.7	8
9	22 43.1 41 80	70.0	22 55.4 41 80	69.5	23 07.5 40 80	69.0	23 31.5 40 79	68.0	24 18.4 38 78	66.0	25 03.7 37 77	63.9	25 14.8 37 77	63.4	25 36.6 36 76	62.4	9
80	21 54.9 41 80	69.6	22 07.3 41 80	69.1	22 19.6 41 80	68.6	22 43.9 40 79	67.6	23 31.5 39 78	65.6	24 17.6 38 77	63.6	24 28.8 37 76	63.1	24 51.1 37 76	62.1	80
1	21 06.7 42 80	69.2	21 19.3 42 80	68.7	21 31.7 41 80	68.2	21 56.4 41 79	67.2	22 44.7 40 78	65.3	23 31.6 38 76	63.3	23 43.1 38 76	62.8	24 05.7 37 75	61.7	1
2	20 18.7 43 80	68.8	20 31.4 42 80	68.3	20 44.1 42 79	67.8	21 09.1 41 79	66.9	21 58.1 40 78	64.9	22 45.7 39 76	62.9	22 57.4 39 76	62.4	23 20.5 38 75	61.4	2
3	19 30.8 43 80	68.4	19 43.7 43 79	67.9	19 56.5 43 79	67.4	20 21.9 42 78	66.5	21 11.6 41 77	64.5	22 00.0 40 76	62.6	22 11.9 39 76	62.1	22 35.4 39 75	61.1	3
4	18 43.1 44 79	68.0	18 56.1 43 79	67.5	19 09.1 43 79	67.0	19 34.8 43 78	66.1	20 25.2 42 77	64.2	21 14.4 40 76	62.2	21 26.5 40 75	61.7	21 50.4 40 75	60.7	4
85	17 55.5 44 79	67.6	18 08.6 44 79	67.1	18 21.8 44 79	66.6	18 47.8 43 78	65.7	19 39.0 42 77	63.8	20 29.0 41 75	61.8	20 41.3 41 75	61.4	21 05.7 40 74	60.4	85
6	17 08.0 45 79	67.2	17 21.3 44 79	66.7	17 34.6 44 78	66.2	18 01.0 44 78	65.3	18 53.0 43 77	63.4	19 43.8 42 75	61.5	19 56.3 42 75	61.0	20 21.0 41 74	60.0	6
7	16 20.6 45 79	66.8	16 34.2 45 78	66.3	16 47.6 45 78	65.8	17 14.4 44 78	64.9	18 07.1 43 76	63.0	18 58.6 43 75	61.1	19 11.4 42 75	60.6	19 36.6 42 74	59.7	7
8	15 33.5 46 78	66.3	15 47.2 46 78	65.9	16 00.8 45 78	65.4	16 27.9 45 77	64.5	17 21.3 44 76	62.6	18 13.7 43 75	60.7	18 26.6 43 74	60.3	18 52.3 42 74	59.3	8
9	14 46.4 46 78	65.9	15 00.3 46 78	65.5	15 14.1 46 78	65.0	15 41.6 46 77	64.1	16 35.7 45 76	62.2	17 28.9 44 74	60.3	17 42.1 44 74	59.9	18 08.1 43 73	58.9	9
90	13 59.6 47 78	65.5	14 13.6 47 78	65.0	14 27.6 47 77	64.6	14 55.4 46 77	63.7	15 50.3 45 75	61.8	16 44.3 45 74	60.0	16 57.1 44 74	59.5	17 24.2 44 73	58.6	90

DECLINATION CONTRARY NAME TO LATITUDE — Lat. 31°

H.A.	28° 00' (Alt. Δd Δt Az.)	28° 30'	29° 00'	30° 00'	32° 00'	34° 00'	34° 30'	35° 30'	H.A.
00	31 00.0 1.00 01 180.0	30 30.0 1.00 01 180.0	30 00.0 1.00 01 180.0	29 00.0 1.00 01 180.0	27 00.0 1.00 01 180.0	25 00.0 1.00 01 180.0	24 30.0 1.00 01 180.0	23 30.0 1.00 01 180.0	00
1	30 59.5 1.00 02 179.0	30 29.5 1.00 02 179.0	29 59.6 1.00 02 179.0	28 59.6 1.00 02 179.0	26 59.6 1.00 02 179.1	24 59.6 1.00 02 179.1	24 29.6 1.00 02 179.1	23 29.6 1.00 02 179.1	1
2	30 58.2 1.00 04 177.9	30 28.2 1.00 04 178.0	29 58.2 1.00 04 178.0	28 58.6 1.00 04 178.0	26 58.3 1.00 04 178.1	24 58.4 1.00 03 178.2	24 28.4 1.00 03 178.2	23 28.4 1.00 03 178.2	2
3	30 55.8 1.00 05 176.9	30 25.9 1.00 05 176.9	29 55.9 1.00 05 177.0	28 56.0 1.00 05 177.0	26 56.2 1.00 05 177.1	24 56.3 1.00 05 177.3	24 26.3 1.00 05 177.3	23 26.4 1.00 05 177.3	3
4	30 52.6 1.00 07 175.9	30 22.7 1.00 07 175.9	29 52.8 1.00 07 176.0	28 52.9 1.00 07 176.0	26 53.2 1.00 06 176.2	24 53.4 1.00 06 176.3	24 23.5 1.00 06 176.4	23 23.6 1.00 06 176.5	4
05	30 48.5 1.00 08 174.9	30 18.6 1.00 08 174.9	29 48.7 1.00 08 175.1	28 48.9 1.00 08 175.1	26 49.3 1.00 08 175.4	24 49.7 1.00 08 175.4	24 19.9 1.00 07 175.5	23 20.1 1.00 07 175.6	05
6	30 43.4 99 10 173.8	30 13.6 99 10 173.9	29 43.7 99 10 174.0	28 44.0 99 10 174.1	26 44.7 99 09 174.3	24 45.2 1.00 09 174.5	24 15.4 1.00 00 174.6	23 15.7 1.00 09 174.7	6
7	30 37.4 99 11 172.8	30 07.6 99 11 172.9	29 37.9 99 11 173.0	28 38.3 99 11 173.1	26 39.1 99 11 173.4	24 39.9 99 10 173.6	24 10.1 99 10 173.7	23 10.5 99 10 173.8	7
8	30 30.5 99 13 171.8	30 00.8 99 13 171.9	29 31.1 99 13 172.0	28 31.7 99 12 172.1	26 32.8 99 12 172.4	24 33.8 99 12 172.7	24 04.1 99 11 172.8	23 04.6 99 11 172.9	8
9	30 22.8 99 14 170.8	29 53.1 99 14 170.9	29 23.5 99 14 171.0	28 24.2 99 14 171.1	26 25.6 99 13 171.5	24 26.9 99 13 171.8	23 57.2 99 13 171.9	22 57.9 99 13 172.0	9
10	30 14.1 99 16 169.8	29 44.5 99 16 169.9	29 15.0 99 16 170.0	28 15.8 99 15 170.2	26 17.5 99 15 170.5	24 19.2 99 14 170.9	23 49.6 99 14 171.0	22 50.4 99 14 171.2	10
1	30 04.5 98 17 168.8	29 35.0 98 17 168.9	29 05.6 98 17 169.0	28 06.6 98 17 169.2	26 08.7 98 16 169.6	24 10.6 98 16 170.0	23 41.1 98 15 170.1	22 42.1 98 15 170.3	1
2	29 54.0 98 19 167.8	29 24.7 98 19 167.9	28 55.3 98 19 168.0	27 56.6 98 18 168.2	25 59.0 98 18 168.7	24 01.3 98 17 169.1	23 31.9 98 17 169.2	22 33.0 98 16 169.4	2
3	29 42.7 98 20 166.8	29 13.5 98 20 166.9	28 44.2 98 20 167.0	27 45.7 98 20 167.3	25 48.5 98 19 167.8	23 51.2 98 18 168.2	23 21.9 98 18 168.3	22 23.2 98 18 168.6	3
4	29 30.5 97 22 165.8	29 01.4 97 22 165.9	28 32.2 97 21 166.1	27 33.9 97 20 166.3	25 37.2 97 20 166.8	23 40.4 97 19 167.3	23 11.1 97 19 167.5	22 12.7 97 19 167.7	4
15	29 17.5 97 23 164.8	28 48.5 97 23 165.0	28 19.4 97 23 165.1	27 21.4 97 22 165.4	25 25.1 97 21 165.9	23 28.7 97 21 166.5	22 59.6 97 20 166.6	22 01.4 97 20 166.9	15
6	29 03.6 96 25 163.8	28 34.7 96 24 164.0	28 05.8 96 24 164.1	27 08.0 96 24 164.4	25 12.2 97 23 165.0	23 16.3 97 22 165.6	22 47.3 97 22 165.7	21 49.3 97 21 166.0	6
7	28 48.8 96 26 162.9	28 20.1 96 26 163.0	27 51.3 96 25 163.2	26 53.8 96 25 163.5	24 58.5 96 24 164.1	23 03.1 96 23 164.7	22 34.3 96 23 164.9	21 36.5 96 23 165.2	7
8	28 33.3 95 27 161.9	28 04.7 95 27 162.1	27 36.0 95 27 162.2	26 38.8 96 26 162.6	24 44.1 96 25 163.2	22 49.2 96 24 163.9	22 20.5 96 24 164.0	21 23.0 96 24 164.3	8
9	28 16.9 95 29 160.9	27 48.4 95 28 161.1	27 20.0 95 28 161.3	26 23.0 95 28 161.7	24 28.8 95 27 162.3	22 34.5 95 26 163.2	22 05.9 95 25 163.2	21 08.7 95 25 163.5	9
20	27 59.7 94 30 160.0	27 31.4 94 30 160.2	27 03.1 94 29 160.4	26 06.4 95 29 160.7	24 12.9 95 28 161.5	22 19.1 95 27 162.2	21 50.7 95 27 162.3	20 53.7 95 26 162.7	20
1	27 41.7 94 31 159.1	27 13.6 94 31 159.3	26 45.4 94 31 159.5	25 49.0 94 30 159.8	23 56.1 94 29 160.6	22 03.0 94 28 161.3	21 34.7 94 28 161.5	20 38.0 94 27 161.8	1
2	27 22.9 93 33 158.1	26 55.0 93 32 158.3	26 27.0 93 32 158.5	25 30.9 93 31 158.9	23 38.7 94 30 159.7	21 46.2 94 29 160.5	21 18.0 94 29 160.6	20 21.7 94 28 161.0	2
3	27 03.4 93 34 157.2	26 35.6 93 34 157.4	26 07.8 93 33 157.6	25 12.1 93 33 158.0	23 20.5 93 32 158.8	21 28.6 93 30 159.6	21 00.6 93 30 159.8	20 04.6 93 30 160.2	3
4	26 43.1 92 35 156.3	26 15.5 92 35 156.5	25 47.8 92 34 156.7	24 52.5 92 34 157.2	23 01.5 93 32 158.0	21 10.4 93 32 158.8	20 42.5 93 31 159.0	19 46.8 93 31 159.4	4
25	26 22.1 91 36 155.4	25 54.6 92 36 155.6	25 27.1 92 36 155.8	24 32.1 92 35 156.3	22 41.9 92 34 157.1	20 51.4 92 33 158.0	20 23.8 92 32 158.2	19 28.4 92 32 158.6	25
6	26 00.3 91 38 154.5	25 33.0 91 37 154.7	25 05.7 91 37 155.0	24 11.1 91 36 155.4	22 21.6 91 35 156.3	20 31.8 92 34 157.2	20 04.3 92 34 157.4	19 09.3 92 33 157.8	6
7	25 37.8 90 39 153.6	25 10.7 90 39 153.8	24 43.6 90 38 154.1	23 49.5 91 37 154.5	22 00.6 91 36 155.5	20 11.5 91 35 156.4	19 44.2 91 35 156.6	18 49.5 91 34 157.0	7
8	25 14.5 90 40 152.7	24 47.7 90 40 153.0	24 20.8 90 39 153.2	23 26.9 90 39 153.7	21 38.9 90 37 154.6	19 50.6 90 36 155.5	19 23.4 90 36 155.8	18 29.1 90 35 156.2	8
9	24 50.6 89 41 151.9	24 23.9 89 41 152.1	23 57.2 89 40 152.4	23 03.8 89 40 152.8	21 16.5 90 36 153.8	19 29.0 90 37 154.8	19 02.0 90 37 155.0	18 08.1 90 36 155.5	9
30	24 26.0 88 42 151.0	23 59.5 88 42 151.3	23 33.0 88 41 151.5	22 40.0 89 41 152.0	20 53.5 89 39 153.0	19 06.7 89 38 154.0	18 40.0 89 38 154.2	17 46.4 89 37 154.7	30
1	24 00.8 88 43 150.1	23 34.5 88 43 150.4	23 08.2 88 43 150.7	22 15.5 88 42 151.2	20 29.8 88 40 152.2	18 43.8 89 39 153.2	18 17.3 89 39 153.4	17 24.1 89 38 153.9	1
2	23 34.8 87 44 149.3	23 08.8 87 44 149.6	22 42.7 87 44 149.8	21 50.4 87 43 150.4	20 05.5 88 40 151.4	18 20.3 88 40 152.4	17 54.0 88 40 152.7	17 01.2 88 39 153.2	2
3	23 08.2 86 45 148.5	22 42.4 86 45 148.7	22 16.5 86 45 149.0	21 24.6 87 44 149.6	19 40.6 87 43 150.6	17 56.2 87 41 151.7	17 30.1 87 41 151.9	16 37.7 87 40 152.4	3
4	22 41.0 85 46 147.6	22 15.4 86 46 147.9	21 49.7 86 46 148.2	20 58.3 86 45 148.8	19 15.1 86 44 149.8	17 31.5 86 42 150.9	17 05.6 87 42 151.2	16 13.6 87 41 151.7	4
35	22 13.2 85 47 146.8	21 47.8 85 47 147.1	21 22.3 85 47 147.4	20 31.3 85 46 148.0	18 49.0 85 45 149.1	17 06.2 86 43 150.2	16 40.5 86 43 150.4	15 49.0 86 42 151.0	35
6	21 44.8 84 48 146.0	21 19.6 84 48 146.3	20 54.3 84 48 146.6	20 03.7 84 47 147.2	18 22.2 85 44 148.3	16 40.4 85 44 149.4	16 14.8 85 44 149.7	15 23.7 85 43 150.2	6
7	21 15.7 83 49 145.2	20 50.7 83 49 145.5	20 25.7 83 49 145.8	19 35.6 84 48 146.4	17 54.9 84 46 147.6	16 13.9 84 45 148.7	15 48.6 84 45 149.0	14 57.9 84 44 149.5	7
8	20 46.1 83 50 144.5	20 21.3 83 50 144.8	19 56.5 83 50 145.1	19 06.8 83 49 145.6	17 27.1 83 47 146.8	15 46.9 84 46 148.0	15 21.8 84 46 148.3	14 31.5 84 45 148.8	8
9	20 15.9 82 51 143.7	19 51.4 82 51 144.0	19 26.8 82 50 144.3	18 37.5 82 50 144.9	16 58.6 83 48 146.1	15 19.4 83 47 147.3	14 54.5 83 46 147.5	14 04.7 83 46 148.1	9
40	19 45.2 81 52 142.9	19 20.9 81 52 143.2	18 56.5 81 51 143.5	18 07.7 81 51 144.1	16 29.7 82 49 145.4	14 51.3 82 48 146.5	14 26.6 82 47 146.8	13 37.2 82 47 147.4	40
1	19 13.9 80 53 142.2	18 49.8 80 53 142.5	18 25.7 81 52 142.8	17 37.3 81 51 143.4	16 00.2 81 50 144.6	14 22.6 81 49 145.8	13 58.2 81 48 146.1	13 09.3 82 47 146.7	1
2	18 42.1 80 54 141.4	18 18.2 80 54 141.7	17 54.3 80 53 142.0	17 06.4 80 52 142.7	15 30.1 80 51 143.9	13 53.5 81 49 145.1	13 29.3 81 49 145.5	12 40.8 81 48 146.1	2
3	18 09.8 79 55 140.7	17 46.1 79 54 141.0	17 22.4 79 54 141.3	16 34.9 79 53 142.0	14 59.6 80 52 143.2	13 23.9 80 50 144.5	12 59.9 80 50 144.8	12 11.8 80 49 145.4	3
4	17 36.9 78 56 139.9	17 13.5 78 55 140.3	16 50.4 78 55 140.6	16 03.0 78 54 141.2	14 28.6 79 53 142.5	12 53.7 79 51 143.8	12 30.0 79 51 144.1	11 42.4 79 50 144.7	4
45	17 03.6 77 56 139.2	16 40.4 77 56 139.6	16 17.1 78 55 139.9	15 30.5 78 55 140.5	13 57.0 78 53 141.8	12 23.1 78 52 143.1	11 59.6 78 51 143.4	11 12.4 79 51 144.1	45
6	16 29.7 77 57 138.5	16 06.8 77 57 138.9	15 43.7 77 56 139.2	14 57.6 77 56 139.8	13 25.0 77 54 141.2	11 52.0 78 53 142.5	11 28.7 78 52 142.8	10 42.0 78 51 143.4	6
7	15 55.4 76 58 137.8	15 32.7 76 58 138.2	15 09.9 76 57 138.5	14 24.2 76 56 139.2	12 52.5 77 55 140.5	11 20.4 77 53 141.8	10 57.4 77 53 142.1	10 11.1 77 52 142.8	7
8	15 20.7 75 59 137.1	14 58.1 75 58 137.5	14 35.6 75 58 137.8	13 50.3 75 57 138.5	12 19.6 76 56 139.8	10 48.4 76 54 141.2	10 25.6 76 54 141.5	9 39.8 76 53 142.1	8
9	14 45.5 74 59 136.4	14 23.1 74 59 136.8	14 00.8 75 59 137.1	13 16.0 75 58 137.8	11 46.2 75 56 139.2	10 15.9 75 55 140.5	9 53.3 75 54 140.9	9 08.0 76 54 141.5	9
50	14 09.8 74 60 135.8	13 47.7 74 60 136.1	13 25.6 74 59 136.5	12 41.3 74 59 137.2	11 12.3 74 57 138.5	9 43.0 75 56 139.9	9 20.6 75 55 140.2	8 35.8 75 54 140.9	50
1	13 33.7 73 61 135.1	13 11.8 73 60 135.5	12 50.0 73 60 135.8	12 06.1 73 59 136.5	10 38.0 74 58 137.9	9 09.6 74 56 139.3	8 47.5 74 56 139.6	8 03.1 74 55 140.3	1
2	12 57.2 72 62 134.4	12 35.6 72 61 134.8	12 13.9 72 61 135.2	11 30.5 72 60 135.9	10 03.3 73 59 137.3	8 35.9 73 57 138.6	8 14.0 73 57 139.0	7 30.1 73 56 139.7	2
3	12 20.3 71 62 133.8	11 58.9 71 62 134.2	11 37.4 72 61 134.5	10 54.5 72 61 135.2	9 28.2 72 59 136.6	8 01.7 72 58 138.0	7 40.0 72 57 138.4	6 56.6 72 56 139.1	3
4	11 43.0 71 63 133.1	11 21.8 71 62 133.5	11 00.5 71 62 133.9	10 18.0 71 61 134.6	8 52.7 71 60 136.0	7 27.1 71 58 137.4	7 05.6 72 58 137.8	6 22.7 72 57 138.5	4
55	11 05.2 70 64 132.5	10 44.3 70 63 132.9	10 23.3 70 63 133.2	9 41.2 70 62 134.0	8 16.8 70 60 135.4	6 52.1 71 59 136.8	6 30.9 71 59 137.2	5 48.4 71 58 137.9	55
6	10 27.2 69 64 131.9	10 06.4 69 64 132.3	9 45.6 69 63 132.6	9 04.0 69 63 133.4	7 40.5 70 61 134.8	6 17.7 70 60 136.3	5 55.8 70 59 136.6	5 13.7 70 58 137.3	6
7	9 48.7 68 65 131.3	9 28.2 68 64 131.7	9 07.6 69 64 132.0	8 26.4 69 63 132.8	7 03.8 69 62 134.2	5 41.0 69 60 135.7	5 20.2 69 60 136.0		7
8	9 09.9 68 65 130.7	8 49.5 68 65 131.0	8 29.2 68 65 131.4	7 48.5 68 64 132.2	6 26.8 68 61 133.6	5 04.9 68 61 135.1			8
9	8 30.7 67 66 130.1	8 10.6 67 66 130.4	7 50.5 67 65 130.8	7 10.2 67 64 131.6	5 49.4 67 63 133.1				9
60	7 51.1 66 66 129.5	7 31.3 66 66 129.9	7 11.4 66 66 130.2	6 31.5 66 65 131.0	5 11.6 67 64 132.5				60
1	7 11.3 65 67 128.9	6 51.6 65 67 129.3	6 31.9 66 66 129.7	5 52.5 66 66 130.4					1
2	6 31.1 65 68 128.3	6 11.6 65 67 128.7	5 52.2 65 67 129.1	5 13.2 65 66 129.8					2
3	5 50.6 64 68 127.7	5 31.3 64 68 128.1	5 12.1 64 67 128.5						3
4	5 09.7 63 69 127.2								4

Right margin: Lat. 31°, Lat. 32°, Lat. 33°, Lat. 34°, Lat. 35°, Lat. 36°, Lat. 37°, Lat. 38°

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00' (Alt. Δd Δt Az.)	28° 30'	29° 00'	30° 00'	32° 00'	34° 00'	34° 30'	35° 30'	H.A.
91	13 12.8 47 78 65.1	13 27.0 47 77 64.6	13 41.2 47 77 64.2	14 09.4 47 76 63.3	15 05.1 46 75 61.4	15 59.9 45 74 59.6	16 13.4 45 73 59.1	16 40.4 45 73 58.2	91
2	12 26.3 48 77 64.6	12 40.7 48 77 64.2	12 55.0 48 77 63.7	13 23.5 47 76 62.8	14 20.0 47 75 61.0	15 15.6 46 73 59.2	15 29.4 46 73 58.7	15 56.6 45 72 57.8	2
3	11 39.7 49 77 64.2	11 54.4 48 77 63.8	12 09.0 48 76 63.3	12 37.9 48 76 62.4	13 35.1 47 75 60.6	14 31.5 47 73 58.8	14 45.5 47 73 58.3	15 13.3 46 72 57.4	3
4	10 53.7 49 77 63.8	11 08.4 49 76 63.3	11 23.1 49 76 62.9	11 52.4 49 76 62.0	12 50.4 48 74 60.2	13 47.7 47 73 58.4	14 01.8 47 72 57.9	14 30.1 47 72 57.0	4
95	10 07.6 50 76 63.3	10 22.5 50 76 62.9	10 37.4 50 76 62.4	11 07.0 49 75 61.5	12 05.8 49 74 59.8	13 04.0 48 72 58.0	13 18.4 48 72 57.5	13 47.0 48 71 56.6	95
6	9 21.8 50 76 62.9	9 36.9 50 76 62.4	9 51.9 50 76 62.0	10 21.9 50 75 61.1	11 21.5 49 74 59.2	12 20.4 49 72 57.6	12 35.1 49 72 57.1	13 04.2 48 71 56.2	6
7	8 36.1 51 76 62.4	8 51.4 51 76 62.0	9 06.6 51 75 61.5	9 37.0 51 75 60.7	10 37.4 50 73 58.9	11 37.1 50 72 57.1	11 52.0 49 71 56.7	12 21.6 49 71 55.8	7
8	7 50.6 52 76 62.0	8 06.1 51 75 61.5	8 21.5 51 75 61.1	8 52.2 51 74 60.2	9 53.4 51 73 58.5	10 54.0 50 71 56.7	11 09.1 50 71 56.3	11 39.1 50 70 55.4	8
9	7 05.3 52 75 61.5	7 20.9 52 75 61.1	7 36.6 52 75 60.6	8 07.7 52 74 59.8	9 09.7 51 73 58.0	10 11.1 51 71 56.3	10 26.4 51 71 55.9	10 56.9 51 70 55.0	9
100	6 20.2 53 75 61.0	6 36.0 53 74 60.6	6 51.8 53 74 60.2	7 23.4 52 74 59.3	8 26.1 52 72 57.6	9 28.5 52 71 55.9	9 44.0 52 70 55.4	10 14.9 51 70 54.6	100
1	5 35.3 53 75 60.6	5 51.3 53 74 60.1	6 07.3 53 74 59.7	6 39.2 53 73 58.9	7 42.8 53 72 57.3	8 46.0 52 70 55.4	9 01.7 52 70 55.0	9 33.1 52 69 54.1	1
2			5 06.8 54 74 59.7	5 55.5 54 73 58.4	6 59.7 54 71 56.7	8 03.8 53 70 55.0	8 19.7 53 70 54.6	8 51.5 53 69 53.7	2
3				5 23.0 54 74 59.2	6 16.9 54 71 56.2	7 21.8 54 70 54.5	7 37.9 54 69 54.1	8 10.2 54 68 53.3	3
4					5 34.2 55 71 55.8	6 40.0 55 69 54.1	6 56.4 55 69 53.7	7 29.1 54 68 52.8	4
105						5 58.5 55 69 53.6	6 15.1 55 68 53.2	6 48.2 55 68 52.4	105
6						5 17.2 56 68 53.2	5 34.0 56 68 52.7	6 07.6 56 67 51.9	6
7								5 27.3 57 67 51.5	7

Lat. 31°

H.A.	36° 00' Alt.	Δd Δt	Az.	37° 00' Alt.	Δd Δt	Az.	38° 30' Alt.	Δd Δt	Az.	40° 00' Alt.	Δd Δt	Az.	42° 00' Alt.	Δd Δt	Az.	42° 30' Alt.	Δd Δt	Az.	43° 00' Alt.	Δd Δt	Az.	45° 00' Alt.	Δd Δt	Az.	H.A.
00	85 00.0	1.007	00.0	84 00.0	1.006	00.0	82 30.0	1.004	00.0	81 00.0	1.004	00.0	79 00.0	1.003	00.0	78 30.0	1.003	00.0	78 00.0	1.003	00.0	76 00.0	1.002	00.0	00
1	84 55.9	99 20	09.2	83 56.6	99 17	07.6	82 27.3	99 13	06.0	80 57.8	1.0 11	04.9	78 58.3	1.0 09	03.9	78 28.3	1.008	03.7	77 58.4	1.008	03.5	75 58.7	1.007	02.9	1
2	84 43.8	95 32	17.9	83 46.5	96 27	14.9	82 19.4	97 22	11.8	80 51.3	98 18	09.7	78 53.0	99 14	07.7	78 23.4	99 14	07.3	77 53.7	99 13	07.0	75 54.8	99 11	05.8	2
3	84 24.6	89 42	25.8	83 30.4	92 36	21.7	82 06.4	94 29	17.3	80 40.6	96 24	14.3	78 44.5	97 20	11.5	78 15.2	98 19	10.9	77 45.9	98 15	10.4	75 48.3	98 15	08.7	3
4	83 59.5	82 50	32.6	83 08.8	87 44	27.8	81 48.8	91 36	22.5	80 25.9	93 31	18.8	78 32.6	95 25	15.1	78 03.9	96 24	14.4	77 35.2	96 23	13.7	75 39.3	97 19	11.5	4
05	83 29.5	75 56	38.5	82 42.6	81 50	33.3	81 27.1	86 42	27.3	80 07.6	90 36	22.9	78 17.7	93 30	18.6	77 49.7	94 28	17.7	77 21.6	94 27	16.9	75 27.8	95 23	14.2	05
6	82 55.8	69 61	43.4	82 12.6	75 55	38.0	81 01.8	82 47	31.6	79 46.0	86 41	26.8	77 59.8	90 34	21.9	77 32.7	91 33	20.9	77 05.3	92 31	20.0	75 14.0	94 27	16.9	6
7	82 19.1	62 65	47.5	81 39.5	69 60	42.1	80 33.3	77 52	35.5	79 21.4	82 45	30.4	77 39.9	87 38	25.1	77 16.3	88 37	24.0	76 46.4	89 35	22.9	74 58.0	92 30	19.4	7
8	81 40.1	57 68	51.0	81 03.8	64 63	45.7	80 02.2	72 56	39.0	78 54.1	78 49	33.6	77 16.3	84 42	28.0	76 50.9	85 40	26.8	76 25.3	86 39	25.7	74 39.9	89 34	21.8	8
9	80 59.3	52 70	53.9	80 26.0	59 66	48.7	79 28.7	68 59	42.1	78 24.5	74 53	36.6	76 51.1	81 45	30.7	76 26.7	82 44	29.5	76 01.9	83 42	28.3	74 19.6	87 37	24.2	9
10	80 17.1	47 72	56.4	79 46.6	54 68	51.4	78 53.3	64 62	44.8	77 52.8	71 56	39.3	76 23.8	77 48	33.3	76 00.4	79 47	32.0	75 36.6	80 45	30.7	73 57.8	84 40	26.4	10
1	79 33.8	43 74	58.4	79 05.7	50 70	53.7	78 16.3	59 64	47.3	77 19.4	67 58	41.8	75 54.7	74 51	35.6	75 32.3	76 50	34.3	75 09.4	77 48	33.0	73 34.1	82 42	28.5	1
2	78 49.5	39 75	60.2	78 23.8	46 72	55.6	77 37.8	55 66	49.4	76 44.4	63 61	44.0	75 24.0	71 54	37.8	75 02.5	72 52	36.6	74 40.6	74 51	35.1	73 08.8	79 45	30.5	2
3	78 04.5	36 76	61.7	77 40.9	43 74	57.4	76 58.2	52 68	51.3	76 08.0	59 63	46.0	74 51.7	67 56	39.8	74 31.2	69 54	38.4	74 10.3	71 53	37.1	72 42.0	76 47	32.3	3
4	77 19.0	33 77	63.0	76 57.2	40 74	58.9	76 17.6	48 69	53.0	75 30.5	56 64	47.8	74 18.2	64 58	41.6	73 58.6	66 56	40.3	73 38.6	68 55	38.9	72 13.8	73 49	34.1	4
15	76 32.9	30 77	64.2	76 12.9	36 75	60.2	75 36.1	45 70	54.5	74 51.9	53 66	49.4	73 43.4	61 60	43.3	73 24.8	63 58	41.9	73 05.7	65 57	40.6	71 44.4	71 51	35.7	15
6	75 46.4	28 78	65.1	75 28.0	34 76	61.3	74 53.8	42 71	55.9	74 12.4	50 67	50.9	73 07.6	58 61	44.9	72 49.9	60 60	43.4	72 31.7	62 58	42.2	71 13.8	68 53	37.3	6
7	74 59.6	25 79	66.0	74 42.7	31 76	62.3	74 10.9	39 72	57.1	73 32.1	47 68	52.2	72 30.9	55 63	46.3	72 14.0	57 61	44.9	71 56.7	59 60	43.6	70 42.1	65 54	38.7	7
8	74 12.5	23 79	66.7	73 57.0	29 77	63.2	73 27.5	37 73	58.1	72 51.2	44 69	53.4	71 53.3	52 64	47.6	71 37.3	54 63	46.3	71 20.7	56 61	45.0	70 09.5	63 56	40.1	8
9	73 25.1	21 79	67.4	73 10.9	26 77	64.0	72 43.6	34 74	59.1	72 09.6	41 70	54.5	71 14.9	50 65	48.8	70 59.7	52 64	47.5	70 44.0	53 62	46.2	69 35.9	60 57	41.3	9
20	72 37.5	19 80	67.9	72 24.5	24 78	64.7	71 59.3	32 74	60.0	71 27.5	39 71	55.5	70 35.9	47 66	49.9	70 21.5	49 65	48.6	70 06.5	51 64	47.3	69 01.6	57 59	42.5	20
1	71 49.8	17 80	68.4	71 37.9	22 78	65.3	71 14.6	30 75	60.7	70 44.9	36 72	56.4	69 56.2	45 67	50.9	69 42.6	47 66	50.9	69 28.4	48 65	48.4	68 26.4	55 60	43.6	1
2	71 01.9	16 80	68.8	70 51.1	20 78	65.8	70 29.6	27 75	61.4	70 01.8	34 72	57.2	69 16.0	42 68	51.8	69 03.1	44 67	50.6	68 49.7	46 65	49.3	67 50.6	52 61	44.6	2
3	70 13.9	14 80	69.2	70 04.1	19 79	66.3	69 44.3	25 76	62.0	69 18.4	32 73	57.9	68 35.4	40 69	52.7	68 23.2	42 67	51.4	68 10.4	43 66	50.2	67 14.2	50 62	45.6	3
4	69 25.8	12 80	69.5	69 17.0	17 79	66.7	68 58.7	24 76	62.5	68 34.7	30 73	58.6	67 54.2	38 69	53.5	67 42.7	39 68	52.2	67 30.6	41 67	51.0	66 37.2	48 63	46.4	4
25	68 37.6	11 80	69.7	68 29.7	15 79	67.0	68 13.0	22 77	63.0	67 50.7	28 74	59.1	67 12.5	35 70	54.2	67 01.8	37 69	53.0	66 50.4	39 68	51.8	65 59.7	46 63	47.3	25
6	67 49.3	10 81	70.0	67 42.3	14 79	67.3	67 27.1	20 77	63.5	67 06.4	26 74	59.7	66 30.9	33 70	54.8	66 20.6	35 69	53.7	66 09.8	37 68	52.3	65 21.7	43 64	48.0	6
7	67 00.9	08 81	70.2	66 54.8	12 79	67.6	66 41.0	18 77	63.8	66 21.9	24 75	60.2	65 48.7	31 71	55.4	65 39.0	33 70	54.3	65 28.8	35 69	53.1	64 43.2	41 65	48.7	7
8	66 12.5	07 81	70.3	66 07.2	11 79	67.8	65 54.7	17 77	64.2	65 37.2	22 75	60.6	65 06.2	29 71	56.0	64 57.1	31 70	54.8	64 47.5	33 69	53.7	64 04.4	39 65	49.4	8
9	65 24.1	06 81	70.4	65 19.5	10 80	68.0	65 08.4	15 77	64.5	64 52.3	21 75	61.0	64 23.4	28 72	56.5	64 14.9	29 71	55.4	64 05.9	31 70	54.3	63 25.1	37 66	50.0	9
30	64 35.6	05 81	70.5	64 31.8	08 80	68.2	64 21.9	14 78	65.0	64 07.3	19 75	61.3	63 40.4	26 72	56.9	63 32.5	27 71	55.8	63 24.0	29 70	54.8	62 45.6	35 66	50.6	30
1	63 47.1	03 81	70.6	63 44.0	07 80	68.3	63 35.4	12 78	65.2	63 22.1	17 76	61.7	62 57.2	24 72	57.3	62 49.8	26 71	56.2	62 41.9	27 71	55.2	62 05.7	33 67	51.1	1
2	62 58.6	02 81	70.7	62 56.2	06 80	68.5	62 48.7	11 78	65.2	62 36.7	16 76	61.9	62 13.9	22 73	57.7	62 07.0	24 72	56.7	61 59.6	25 71	55.6	61 25.3	31 67	51.6	2
3	62 10.1	01 81	70.7	62 08.3	05 80	68.6	62 02.0	09 78	65.4	61 51.3	14 76	62.2	61 30.3	21 73	58.0	61 23.9	22 72	57.0	61 17.0	24 71	56.0	60 45.1	30 68	52.0	3
4	61 21.5	00 81	70.7	61 20.4	03 80	68.6	61 15.2	08 78	65.5	61 05.8	13 76	62.4	60 46.6	19 73	58.3	60 40.7	20 72	57.3	60 34.3	22 72	56.3	60 04.5	28 68	52.4	4
35	60 33.0	01 81	70.7	60 32.5	02 80	68.7	60 28.4	07 78	65.6	60 20.1	11 76	62.6	60 02.8	17 73	58.6	59 57.3	19 73	57.6	59 51.4	19 73	56.7	59 23.6	26 68	52.8	35
6	59 44.5	02 81	70.7	59 44.6	01 80	68.7	59 41.5	04 79	65.8	59 34.4	09 76	62.9	59 18.4	16 73	58.9	59 13.8	17 73	57.9	59 08.4	19 72	57.2	58 42.5	24 69	53.2	6
7	58 55.9	03 81	70.6	58 56.7	00 80	68.7	58 54.6	04 78	65.8	58 48.7	09 76	62.9	58 34.7	14 74	59.1	58 30.2	16 73	58.1	58 25.2	17 72	57.2	58 01.3	23 69	53.5	7
8	58 07.4	04 81	70.6	58 08.8	01 80	68.7	58 07.7	03 78	65.9	58 02.9	07 76	63.0	57 50.6	13 74	59.3	57 46.5	14 73	58.3	57 41.9	16 72	57.4	57 19.9	21 69	53.8	8
9	57 18.9	05 81	70.5	57 20.9	02 80	68.7	57 20.8	02 78	65.9	57 17.0	06 76	63.1	57 06.3	12 74	59.4	57 02.6	13 73	58.5	56 58.6	14 72	57.6	56 38.3	19 69	54.0	9
40	56 30.4	06 81	70.5	56 33.0	01 80	68.6	56 33.8	01 78	65.9	56 31.1	05 77	63.2	56 22.0	10 74	59.6	56 18.7	12 73	58.7	56 15.1	13 73	57.8	55 56.7	18 70	54.3	40
1	55 42.0	06 81	70.4	55 45.1	04 80	68.6	55 46.9	00 78	65.9	55 45.2	04 77	63.3	55 37.6	09 74	59.7	55 34.8	10 73	58.8	55 31.5	11 73	58.0	55 14.9	16 70	54.5	1
2	54 53.6	07 81	70.3	54 57.2	05 80	68.5	54 59.9	01 78	65.9	54 59.3	03 77	63.3	54 53.2	08 74	59.8	54 50.7	09 73	59.0	54 47.9	10 73	58.1	54 33.0	15 70	54.7	2
3	54 05.2	08 81	70.2	54 09.4	06 80	68.5	54 13.0	02 78	65.9	54 13.3	01 77	63.3	54 08.7	06 74	59.9	54 06.6	07 74	59.1	54 04.2	09 73	58.2	53 51.0	13 70	54.8	3
4	53 16.8	08 81	70.0	53 21.5	07 80	68.4	53 26.0	03 78	65.9	53 27.4	00 77	63.3	53 24.2	05 74	60.0	53 22.5	06 74	59.1	53 20.5	07 73	58.3	53 08.9	12 70	55.0	4
45	52 28.5	10 80	69.9	52 33.8	08 80	68.3	52 39.1	04 78	65.8	52 41.4	01 77	63.3	52 39.6	04 74	60.0	52 38.3	05 74	59.3	52 36.7	06 73	58.5	52 26.7	11 70	55.1	45
6	51 40.2	11 80	69.8	51 46.0	09 80	68.2	51 52.2	05 78	65.7	51 55.4	02 77	63.3	51 55.1	03 74	60.1	51 54.1	04 74	59.3	51 52.9	05 73	58.5	51 44.5	09 70	55.2	6
7	50 52.0	12 80	69.6	50 58.3	09 79	68.1	51 05.3	06 78	65.7	51 09.5	03 77	63.3	51 10.5	01 74	60.1	51 09.9	02 74	59.3	51 09.0	04 73	58.5	51 02.2	08 71	55.3	7
8	50 03.8	12 80	69.5	50 10.6	10 79	67.9	50 18.5	07 78	65.6	50 23.6	04 77	63.2	50 25.9	00 74	60.1	50 25.7	01 73	59.3	50 25.2	02 73	58.5	50 19.9	06 71	55.4	8
9	49 15.6	13 80	69.3	49 22.9	11 79	67.8	49 31.7	08 78	65.6	49 37.6	05 76	63.2	49 41.4	00 74	60.1	49 41.4	01 73	59.3	49 41.5	01 73	58.6	49 37.5	05 71	55.5	9
50	48 27.5	14 80	69.2	48 35.4	12 79	67.7	48 44.9	09 78	65.4	48 51.7	06 76	63.1	48 56.7	02 74	60.1	48 57.2	01 74	59.3	48 57.4	00 74	58.6	48 55.2	04 71	55.6	50
1	47 39.5	15 80	69.0	47 47.8	13 79	67.5	47 58.1	10 78	65.3	48 05.9	07 76	63.1	48 12.1	03 74	60.1	48 13.0	02 74	59.3	48 13.5	01 73	58.6	48 12.8	03 71	55.6	1
2	46 51.5	16 80	68.8	47 00.3	14 79	67.3	47 11.4	11 78	65.2	47 20.1	08 76	63.0	47 27.6	04 74	60.0	47 28.8	03 74	59.3	47 29.6	02 73	58.5	47 30.3	01 71	55.6	2
3	46 03.6	16 80	68.6	46 12.9	14 79	67.2	46 24.8	12 78	65.0	46 34.3	09 76	62.9	46 43.1	05 74	60.0	46 44.6	05 74	59.2	46 45.8	04 73	58.5	46 47.7	00 71	55.6	3
4	45 15.8	17 80	68.4	45 25.5	15 79	67.0	45 38.2	13 78	64.9	45 48.5	10 76	62.8	45 58.6	07 74	59.9	46 00.4	06 74	59.2	46 01.9	05 73	58.5	46 05.5	01 71	55.6	4
55	44 28.0	18 80	68.2	44 38.2	16 79	66.8	44 51.7	14 78	64.7	45 02.8	11 76	62.6	45 14.1	08 74	59.8	45 16.2	07 74	59.1	45 18.1	06 73	58.4	45 23.1	02 71	55.6	55
6	43 40.2	19 79	68.0	43 50.9	17 79	66.6	44 05.2	15 77	64.6	44 17.2	12 76	62.5	44 29.6	09 74	59.7	44 32.1	08 73	59.0	44 34.3	07 73	58.3	44 40.7	04 71	55.5	6
7	42 52.6	19 79	67.8	43 03.8	18 79	66.5	43 18.7	15 77	64.4	43 31.6	13 76	62.4	43 45.2	10 74	59.6	43 48.0	09 73	58.9	43 50.6	08 73	58.3	43 58.3	05 71	55.5	7
8	42 05.0	20 79	67.6	42 16.6	19 78	66.3	42 32.4	16 77	64.3	42 46.0	14 76	62.2	43 00.9	11 74	59.5	43 04.0	10 73	58.8	43 06.9	09 73	58.3	43 15.9	06 71	55.4	8
9	41 17.5	21 79	67.4	41 29.6	19 78	66.1	41 46.1	17 77	64.1	42 00.5	15 76	62.1	42 16.5	12 74	59.4	42 20.0	11 73	58.7	42 23.2	10 73	58.1	42 33.6	07 70	55.4	9
60	40 30.1	22 79	67.1	40 42.6	20 78	65.8	40 59.9	18 77	63.9	41 15.1	16 76	61.9	41 32.3	13 74	59.3	41 36.1	12 73	58.6	41 39.6	11 73	58.0	41 51.3	08 70	55.3	60
1	39 42.7	22 79	66.9	39 55.8	21 78	65.6	40 13.7	19 77	63.7	40 29.8	17 75	61.8	40 48.1	14 74	59.2	40 52.2	13 73	58.5	40 56.0	12 73	57.9	41 09.0	09 70	55.2	1
2	38 55.5	23 79	66.7	39 08.9	22 78	65.4	39 27.7	20 77	63.5	39 44.5	18 75	61.6	40 04.0	15 73	59.0	40 08.4	14 73	58.4	40 12.5	13 72	57.7	40 26.8	10 70	55.1	2
3	38 08.3	24 78	66.4	38 22.2	23 78	65.2	38 41.7	21 76	63.3	38 59.3	19 75	61.4	39 19.9	16 73	58.9	39 24.6	15 73	58.3	39 29.0	14 72	57.6	39 44.6	12 70	55.0	3
4	37 21.2	25 78	66.2	37 35.6	23 78	64.9	37 55.8	21 76	63.1	38 14.2	19 75	61.2	38 36.0	17 73	58.7	38 40.9	16 73	58.1	38 45.6	15 72	57.5	39 02.5	13 70	54.9	4
65	36 34.2	25 78	65.9	36 49.0	24 77	64.7	37 09.9	22 76	62.9	37 29.1	20 75	61.0	37 52.0	18 73	58.6	37 57.3	17 73	57.9	38 02.3	16 72	57.3	38 20.5	14 70	54.8	65
6	35 47.3	26 78	65.7	36 02.6	25 77	64.5	36 24.2	23 76	62.7	36 44.2	21 75	60.8	37 08.2	19 73	58.4	37 13.7	18 72	57.8	37 19.1	17 72	57.2	37 38.5	15 70	54.7	6
7	35 00.5	27 78	65.4	35 16.2	26 77	64.2	35 38.6	24 76	62.4	35 59.3	22 75	60.6	36 24.4	20 73	58.2	36 30.3	19 72	57.6	36 35.9	18 72	57.0	36 56.5	16 70	54.5	7
8	34 13.8	28 78	65.1	34 30.0	26 77	64.0	34 53.0	24 76	62.2	35 14.5	23 74	60.3	35 40.8	21 73	58.0	35 46.9	20 72	57.4	35 52.8	19 72	56.8	36 14.7	17 70	54.4	8
9	33 27.2	28 78	64.9	33 43.8	27 77	63.7	34 07.6	26 76	62.0	34 29.9	24 74	60.2	34 57.2	22 72	57.8	35 03.6	21 72	57.2	35 09.8	20 72	56.6	35 32.9	18 69	54.2	9
70	32 40.7	29 77	64.6	32 57.8	28 77	63.4	33 22.2	26 75	61.7	33 45.3	25 74	60.0	34 13.7	23 72	57.6	34 20.4	22 72	57.0	34 26.9	21 71	56.4	34 51.2	19 69	54.1	70
1	31 54.3	30 77	64.3	32 11.8	29 76	63.2	32 37.0	27 75	61.5	33 00.8	25 74	59.7	33 30.3	24 72	57.4	33 37.3	23 72	56.8	33 44.1	22 71	56.3	34 09.6	20 69	53.9	1
2	31 08.0	30 77	64.0	31 26.0	30 76	62.9	31 51.9	28 75	61.2	32 16.2	27 74	59.5	32 47.0	24 72	57.2	32 54.3	24 72	56.6	33 01.4	23 71	56.1	33 28.1	21 69	53.7	2
3	30 21.8	31 77	63.7	30 40.2	30 76	62.6	31 06.9	29 75	61.0	31 32.2	27 74	59.3	32 03.8	25 72	57.0	32 11.4	25 71	56.4	32 18.8	24 71	55.9	32 46.7	22 68	53.6	3
4	29 35.7	32 77	63.4	29 54.6	31 76	62.3	30 22.0	30 75	60.7	30 48.0	28 73	59.0	31 20.8	26 72	56.8	31 28.6	26 71	56.2	31 36.3	25 71	55.6	32 05.4	23 69	53.4	4
75	28 49.8	33 76	63.1	29 09.2	32 76	62.0	29 37.2	30 74	60.4	30 04.0	29 73	58.8	30 37.8	27 71	56.5	30 45.9	27 71	56.0	30 53.9	26 70	55.4	31 24.2	24 68	53.2	75
6	28 04.0	33 75	62.8	28 23.8	33 75	61.8	28 52.5	31 74	60.1	29 20.1	30 73	58.5	29 55.0	28 71	56.3	30 03.3	28 71	55.7	30 11.6	27 70	55.2	30 43.1	25 68	52.9	6
7	27 18.3	34 76	62.5	27 38.5	33 75	61.5	28 08.0	32 74	59.8	28 36.3	31 73	58.2	29 12.2	29 71	56.1	29 20.9	28 70	55.5	29 29.4	28 70	55.0	30 01.9	26 68	52.7	7
8	26 32.7	35 76	62.2	26 53.4	34 75	61.2	27 23.6	33 74	59.6	27 52.6	32 73	58.0	28 29.6	30 71	55.8	28 38.6	30 70	55.3	28 47.4	29 70	54.7	29 21.2	27 68	52.5	8
9	25 47.3	36 76	61.9	26 08.4	35 75	60.8	26 39.3	34 74	59.3	27 09.1	33 72	57.7	27 47.2	31 71	55.5	27 56.4	30 70	55.0	28 05.5	30 70	54.5	28 40.5	28 68	52.3	9
80	25 02.0	36 76	61.6	25 23.6	36 74	60.5	25 55.2	35 73	59.0	26 25.7	33 72	57.4	27 04.8	32 70	55.3	27 14.3	31 70	54.7	27 23.7	31 69	54.2	27 59.9	29 68	52.1	80
1	24 16.9	37 75	61.2	24 38.9	36 74	60.2	25 11.2	35 73	58.7	25 42.4	34 72	57.1	26 22.6	32 70	55.0	26 32.4	32 70	54.5	26 42.0	32 69	54.0	27 19.4	30 67	51.8	1
2	23 31.9	38 75	60.9	23 54.3	37 74	59.9	24 27.3	36 73	58.4	24 59.3	35 72	56.8	25 40.6	34 70	54.7	25 50.6	33 69	54.3	26 00.5	33 69	53.9	26 39.0	31 67	51.6	2
3	22 47.0	39 75	60.6	23 09.9	38 74	59.6	23 43.6	37 73	58.0	24 16.4	36 71	56.5	24 58.6	35 70	54.5	25 08.9	34 69	53.9	25 19.1	34 69	53.4	25 58.8	32 67	51.3	3
4	22 02.3	39 74	60.2	22 25.6	39 74	59.2	23 00.0	38 72	57.7	23 33.6	37 71	56.2	24 16.9	35 69	54.2	24 27.4	35 69	53.7	24 37.9	35 68	53.1	25 18.7	32 67	51.1	4
85	21 17.7	40 74	59.9	21 41.5	39 73	58.9	22 16.6	39 72	57.4	22 50.9	38 71	55.9	23 35.2	36 69	53.9	23 46.1	36 69	53.4	23 56.8	36 68	52.9	24 38.8	34 66	50.8	85
6	20 33.3	41 74	59.5	20 57.6	40 73	58.6	21 33.4	39 72	57.1	22 08.4	38 71	55.6	22 53.8	37 69	53.6	23 04.9	37 68	53.2	23 15.9	37 68	52.6	23 59.0	35 66	50.5	6
7	19 49.0	41 73	59.2	20 13.8	41 73	58.2	20 50.3	40 72	56.8	21 26.0	39 70	55.3	22 12.5	37 69	53.3	22 23.8	37 68	52.8	22 35.1	37 68	52.2	23 19.4	36 66	50.2	7
8	19 05.0	42 73	58.8	19 30.2	42 72	57.9	20 07.4	41 71	56.4	20 43.8	40 70	54.9	21 31.3	39 68	53.0	21 43.0	39 68	52.5	21 54.5	38 67	52.0	22 39.9	37 66	50.0	8
9	18 21.0	43 73	58.5	18 46.7	42 72	57.5	19 24.6	42 71	56.1	20 01.8	41 70	54.6	20 50.3	40 68	52.7	21 02.3	40 68	52.2	21 14.1	39 67	51.7	22 00.6	38 65	49.7	9
90	17 37.3	44 73	58.1	18 03.4	43 72	57.1	18 42.0	43 71	55.7	19 20.0	42 69	54.3	20 09.5	41 68	52.3	20 21.7	41 67	51.9	20 33.8	40 67	51.4	21 21.5	37 65	49.4	90

Lat. 31° (top right); Lat. 32°, Lat. 33°, Lat. 34°, Lat. 35° (right margin)

H.A.	36° 00' (Alt. / Δd Δt / Az.)	37° 00'	38° 30'	40° 00'	42° 00'	42° 30'	43° 00'	45° 00'	H.A.
00	23 00.0 1.00 1 180.0	22 00.0 1.00 1 180.0	20 30.0 1.00 1 180.0	19 00.0 1.00 1 180.0	17 00.0 1.00 1 180.0	16 30.0 1.00 1 180.0	16 00.0 1.00 1 180.0	14 00.0 1.00 1 180.0	00
1	22 59.6 1.00 2 179.1	21 59.6 1.00 2 179.1	20 29.6 1.00 2 179.2	18 59.6 1.00 2 179.2	16 59.7 1.00 2 179.2	16 29.7 1.00 2 179.2	15 59.7 1.00 2 179.3	13 59.7 1.00 2 179.3	1
2	22 58.4 1.00 3 178.2	21 58.5 1.00 3 178.3	20 28.5 1.00 3 178.3	18 58.5 1.00 3 178.4	16 58.6 1.00 3 178.4	16 28.6 1.00 3 178.5	15 58.6 1.00 3 178.5	13 58.7 1.00 3 178.5	2
3	22 56.5 1.00 5 177.4	21 56.5 1.00 4 177.4	20 26.6 1.00 4 177.5	18 56.7 1.00 4 177.6	16 56.9 1.00 4 177.7	16 26.9 1.00 4 177.7	15 56.9 1.00 4 177.7	13 57.1 1.00 4 177.8	3
4	22 53.7 1.00 6 176.5	21 53.8 1.00 6 176.6	20 24.0 1.00 6 176.7	18 54.2 1.00 5 176.8	16 54.4 1.00 5 176.9	16 24.5 1.00 5 176.9	15 54.5 1.00 5 177.0	13 54.8 1.00 5 177.1	4
05	22 50.2 1.00 7 175.6	21 50.3 1.00 7 175.7	20 20.5 1.00 7 175.8	18 50.9 1.00 6 176.1	16 51.3 1.00 6 176.1	16 21.4 1.00 6 176.2	15 51.5 1.00 6 176.2	13 51.8 1.00 6 176.4	05
6	22 45.8 1.00 8 174.7	21 46.1 1.00 8 174.8	20 16.5 1.00 8 175.0	18 46.9 1.00 8 175.1	16 47.5 1.00 8 175.3	16 17.6 1.00 7 175.4	15 47.7 1.00 7 175.4	13 48.2 1.00 7 175.6	6
7	22 40.7 99 10 173.9	21 41.1 99 10 174.0	20 11.7 99 09 174.2	18 42.2 99 09 174.3	16 42.9 99 09 174.6	16 13.1 99 09 174.6	15 43.3 99 08 174.7	13 44.0 99 08 174.9	7
8	22 34.8 99 11 173.0	21 35.3 99 11 173.1	20 06.1 99 11 173.3	18 36.8 99 10 173.5	16 37.7 99 10 173.8	16 08.0 99 10 173.9	15 38.2 99 10 173.9	13 39.1 99 09 174.2	8
9	22 28.2 99 12 172.1	21 28.8 99 12 172.3	19 59.7 99 12 172.5	18 30.7 99 11 172.7	16 31.8 99 11 173.0	16 02.1 99 11 173.1	15 32.4 99 11 173.1	13 33.6 99 10 173.5	9
10	22 20.7 99 14 171.3	21 21.5 99 13 171.4	19 52.7 99 13 171.7	18 23.8 99 13 171.9	16 25.3 99 12 172.3	15 55.6 99 12 172.3	15 26.0 99 12 172.4	13 27.4 99 11 172.7	10
1	22 12.6 98 15 170.4	21 13.5 98 15 170.6	19 44.9 98 14 170.9	18 16.2 98 14 171.1	16 18.0 98 13 171.5	15 48.4 98 13 171.6	15 18.9 98 13 171.7	13 20.6 99 12 172.0	1
2	22 03.6 98 16 169.5	21 04.7 98 16 169.7	19 36.4 98 15 170.1	18 08.0 98 15 170.4	16 10.1 98 14 170.7	15 40.6 98 14 170.8	15 11.1 98 14 170.9	13 13.2 98 13 171.3	2
3	21 53.9 98 17 168.7	20 55.2 98 17 168.9	19 27.1 98 17 169.2	17 59.0 98 16 169.6	16 01.5 98 15 170.0	15 32.1 98 15 170.1	15 02.7 98 15 170.2	13 05.1 98 13 170.6	3
4	21 43.4 97 19 167.8	20 44.9 98 18 168.1	19 17.1 98 18 168.4	17 49.3 98 17 168.8	15 52.2 98 16 169.2	15 22.9 98 16 169.3	14 53.6 98 16 169.5	12 56.4 98 16 169.9	4
15	21 32.2 97 20 167.0	20 33.9 97 20 167.2	19 06.5 97 19 167.6	17 39.0 97 18 168.0	15 42.2 97 18 168.5	15 13.0 97 18 168.6	14 43.8 97 17 168.7	12 47.0 97 17 169.2	15
6	21 20.3 97 21 166.1	20 22.2 97 21 166.4	18 55.1 97 20 166.8	17 27.9 97 20 167.2	15 31.6 97 19 167.7	15 02.5 97 19 167.9	14 33.5 97 18 168.0	12 37.1 97 18 168.5	6
7	21 07.6 96 22 165.3	20 09.9 96 22 165.6	18 43.0 96 21 166.0	17 16.2 96 21 166.4	15 20.4 97 20 167.0	14 51.4 97 20 167.1	14 22.4 97 19 167.2	12 26.5 97 19 167.8	7
8	20 54.2 96 24 164.5	19 56.6 96 23 164.8	18 30.3 96 22 165.2	17 03.8 96 22 165.7	15 08.5 96 21 166.2	14 39.6 96 21 166.4	14 10.8 96 20 166.5	12 15.3 96 20 167.1	8
9	20 40.1 95 25 163.6	19 42.8 96 24 164.0	18 16.8 96 24 164.4	16 50.7 96 23 164.9	14 55.9 96 22 165.5	14 27.2 96 22 165.6	13 58.4 96 22 165.8	12 03.5 96 21 166.4	9
20	20 25.2 95 26 162.8	19 28.2 95 25 163.2	18 02.7 95 25 163.6	16 37.0 95 24 164.1	14 42.7 95 23 164.8	14 14.1 95 23 164.9	13 45.5 95 23 165.1	11 51.1 95 22 165.7	20
1	20 09.7 94 27 162.0	19 13.0 95 27 162.4	17 47.8 95 26 162.9	16 22.6 95 25 163.4	14 28.9 95 24 164.0	14 00.4 95 24 164.2	13 32.0 95 24 164.4	11 38.1 95 22 165.0	1
2	19 53.5 94 28 161.2	18 57.1 94 28 161.6	17 32.4 94 27 162.1	16 07.6 94 26 162.6	14 14.4 94 25 163.3	13 46.1 94 25 163.5	13 17.8 94 25 163.6	11 24.5 94 24 164.3	2
3	19 36.6 93 29 160.4	18 40.5 94 29 160.8	17 16.2 94 28 161.3	15 51.9 94 27 161.9	13 59.3 94 26 162.6	13 31.2 94 26 162.8	13 03.0 94 26 162.9	11 10.3 94 25 163.6	3
4	19 19.0 93 30 159.6	18 23.2 93 30 160.0	16 59.4 93 29 160.6	15 35.6 93 28 161.1	13 43.6 93 27 161.9	13 15.6 93 27 162.1	12 47.6 93 27 162.2	10 55.5 93 26 163.0	4
25	19 00.7 92 32 158.8	18 05.2 92 31 159.2	16 42.0 92 30 159.8	15 18.6 93 29 160.4	13 27.3 93 28 161.2	12 59.5 93 28 161.4	12 31.6 93 28 161.5	10 40.1 93 27 162.3	25
6	18 41.8 92 33 158.0	17 46.7 92 32 158.4	16 23.9 92 31 159.0	15 01.0 92 30 159.7	13 10.4 92 29 160.5	12 42.7 92 29 160.7	12 15.1 92 29 160.8	10 24.2 92 28 161.6	6
7	18 22.2 91 34 157.2	17 27.4 91 33 157.7	16 05.2 91 32 158.3	14 42.9 92 31 158.9	12 52.9 92 30 159.8	12 25.4 92 30 160.0	11 57.9 92 30 160.2	10 07.7 92 28 161.0	7
8	18 02.0 91 35 156.5	17 07.6 91 34 156.9	15 45.9 91 33 157.6	14 24.1 91 32 158.2	12 34.8 91 31 159.1	12 07.5 91 31 159.3	11 40.1 91 31 159.5	9 50.7 91 29 160.3	8
9	17 41.1 90 36 155.7	16 47.1 90 35 156.1	15 25.9 90 34 156.8	14 04.7 90 33 157.5	12 16.2 91 32 158.4	11 49.0 91 32 158.6	11 21.8 91 31 158.8	9 33.1 91 30 159.7	9
30	17 19.6 89 37 154.9	16 26.0 89 36 155.4	15 05.4 90 35 156.1	13 44.7 90 34 156.8	11 56.9 90 33 157.7	11 29.9 90 33 157.9	11 02.9 90 32 158.1	9 14.9 90 31 159.0	30
1	16 57.5 89 38 154.2	16 04.3 89 37 154.7	14 44.3 89 36 155.4	13 24.1 89 35 156.1	11 37.1 89 34 157.0	11 10.3 89 34 157.2	10 43.5 89 33 157.5	8 56.2 89 32 158.4	1
2	16 34.8 88 39 153.4	15 41.9 88 38 153.9	14 22.5 88 37 154.7	13 03.0 88 36 155.4	11 16.7 89 35 156.3	10 50.1 89 35 156.6	10 23.5 89 34 156.8	8 37.0 89 33 157.7	2
3	16 11.5 87 40 152.7	15 19.0 88 39 153.2	14 00.2 88 38 153.9	12 41.3 88 37 154.7	10 55.8 88 36 155.7	10 29.4 88 35 155.9	10 03.0 88 35 156.1	8 17.2 88 34 157.1	3
4	15 47.6 87 41 152.0	14 55.6 87 40 152.5	13 37.3 87 39 153.2	12 19.0 87 38 154.0	10 34.3 87 37 155.0	10 08.1 87 36 155.2	9 41.9 87 36 155.5	7 57.0 88 35 156.5	4
35	15 23.2 86 42 151.2	14 31.5 86 41 151.8	13 13.9 86 40 152.5	11 56.2 86 39 153.3	10 12.3 87 38 154.3	9 46.3 87 37 154.6	9 20.3 87 37 154.8	7 36.2 87 36 155.8	35
6	14 58.1 85 43 150.5	14 06.9 85 42 151.1	12 49.9 86 41 151.8	11 32.8 86 40 152.6	9 49.8 86 38 153.7	9 24.0 86 38 153.9	8 58.2 86 38 154.2	7 14.9 86 36 155.2	6
7	14 32.5 85 44 149.8	13 41.7 85 43 150.4	12 25.4 85 42 151.2	11 08.9 85 41 152.0	9 26.7 85 39 153.0	9 01.1 85 39 153.3	8 35.5 85 39 153.6	6 53.1 85 37 154.6	7
8	14 06.4 84 44 149.1	13 16.0 84 44 149.7	12 00.3 84 43 150.5	10 44.5 84 42 151.3	9 03.1 85 40 152.4	8 37.8 85 40 152.7	8 12.4 85 39 152.9	6 30.8 85 38 154.0	8
9	13 39.7 83 45 148.4	12 49.8 83 45 149.0	11 34.7 83 44 149.8	10 19.5 84 42 150.7	8 39.1 84 41 151.8	8 13.9 84 41 152.0	7 48.8 84 40 152.3	6 08.0 84 39 153.4	9
40	13 12.5 82 46 147.7	12 23.0 83 46 148.3	11 08.6 83 44 149.2	9 54.1 83 43 150.0	8 14.5 83 42 151.1	7 49.6 83 41 151.4	7 24.6 83 41 151.7	5 44.8 83 40 152.8	40
1	12 44.8 82 47 147.0	11 55.7 82 46 147.6	10 42.0 82 45 148.5	9 28.1 82 44 149.4	7 49.4 82 43 150.5	7 24.7 82 42 150.8	7 00.0 82 42 151.1	5 21.0 83 40 152.2	1
2	12 16.5 81 48 146.4	11 27.3 81 47 147.0	10 14.9 81 46 147.8	9 01.7 81 45 148.7	7 23.9 82 43 149.9	6 59.4 82 43 150.2	6 34.9 82 43 150.5		2
3	11 47.8 80 49 145.7	10 59.6 80 48 146.3	9 47.2 81 47 147.2	8 34.7 81 46 148.1	6 57.8 81 44 149.3	6 33.6 81 44 149.6	6 09.3 81 43 149.9		3
4	11 18.6 79 50 145.0	10 30.8 80 49 145.6	9 19.1 80 48 146.6	8 07.3 80 46 147.5	6 31.3 80 45 148.7	6 07.3 80 45 149.0	5 43.3 80 44 149.3		4
45	10 48.8 79 50 144.4	10 01.6 79 50 145.0	8 50.6 79 48 145.9	7 39.4 79 47 146.9	6 04.4 79 46 148.1	5 40.6 79 45 148.4	5 16.8 79 45 148.7		45
6	10 18.6 78 51 143.7	9 31.9 78 50 144.4	8 21.5 78 49 145.3	7 11.1 78 48 146.3	5 37.0 78 46 147.5	5 13.4 79 46 147.8			6
7	9 48.0 77 52 143.1	9 01.7 77 51 143.7	7 52.1 77 50 144.7	6 42.3 78 49 145.7	5 09.1 78 47 146.9				7
8	9 16.9 76 53 142.5	8 31.0 76 52 143.1	7 22.1 77 51 144.1	6 13.1 77 49 145.1					8
9	8 45.3 76 53 141.8	7 59.9 76 53 142.5	6 51.7 76 51 143.5	5 43.4 76 50 144.5					9
50	8 13.4 75 54 141.2	7 28.4 75 53 141.9	6 20.9 75 52 142.9	5 13.3 75 51 143.9					50
1	7 40.9 74 55 140.6	6 56.5 74 54 141.3	5 49.7 74 53 142.3						1
2	7 08.1 73 55 140.0	6 24.1 73 55 140.7	5 18.0 73 53 141.7						2
3	6 34.8 72 56 139.4	5 51.3 73 55 140.1							3
4	6 01.2 72 57 138.8	5 18.2 72 56 139.5							4
55	5 27.2 71 57 138.3								55

DECLINATION **SAME** NAME AS LATITUDE

Lat. 36°, Lat. 37°, Lat. 38° (right margin)

H.A.	36° 00' (Alt. / Δd Δt / Az.)	37° 00'	38° 30'	40° 00'	42° 00'	42° 30'	43° 00'	45° 00'	H.A.
91	16 53.7 44 72 57.7	17 20.3 44 72 56.8	17 59.6 43 70 55.4	18 38.3 43 69 53.9	19 28.9 42 67 52.0	19 41.4 41 67 51.5	19 53.8 41 67 51.0	20 42.5 40 65 49.1	91
2	16 10.4 45 72 57.3	16 37.4 45 71 56.4	17 17.4 44 70 55.0	17 56.8 44 69 53.6	18 48.5 43 67 51.7	19 01.2 42 67 51.2	19 13.9 42 66 50.7	20 03.7 41 64 48.8	2
3	15 27.1 46 72 57.0	15 54.6 46 71 56.0	16 35.4 45 70 54.6	17 15.6 44 68 53.2	18 08.2 43 67 51.3	18 21.2 43 66 50.9	18 34.1 43 66 50.4	19 25.1 42 64 48.5	3
4	14 44.1 47 71 56.6	15 12.1 46 71 55.6	15 53.5 46 69 54.3	16 34.4 45 68 52.9	17 28.2 44 66 51.0	17 41.4 44 66 50.6	17 54.6 44 66 50.1	18 46.7 43 64 48.2	4
95	14 01.3 47 71 56.2	14 29.7 47 70 55.3	15 11.9 47 69 53.9	15 53.5 46 68 52.5	16 48.3 45 66 50.7	17 01.8 45 66 50.2	17 15.3 45 65 49.7	18 08.5 44 63 47.8	95
6	13 18.7 48 71 55.8	13 47.5 48 70 54.9	14 30.4 47 69 53.5	15 12.8 47 68 52.1	16 08.6 46 66 50.3	16 22.4 46 65 49.8	16 36.1 46 65 49.4	17 30.5 45 63 47.5	6
7	12 36.3 49 70 55.4	13 05.6 49 70 54.5	13 49.2 48 68 53.1	14 32.3 48 67 51.8	15 29.1 47 65 49.9	15 43.2 47 65 49.5	15 57.2 47 65 49.0	16 52.6 46 63 47.2	7
8	11 54.1 50 70 55.0	12 23.8 49 69 54.1	13 08.1 49 68 52.7	13 52.0 49 67 51.4	14 49.9 48 65 49.6	15 04.2 48 65 49.1	15 18.5 47 64 48.7	16 15.0 47 62 46.8	8
9	11 12.1 51 70 54.5	11 42.3 51 69 53.7	12 27.3 50 68 52.3	13 12.0 49 66 51.0	14 10.8 49 65 49.2	14 25.4 49 64 48.8	14 40.0 48 64 48.3	15 37.6 48 62 46.5	9
100	10 30.3 51 69 54.1	11 01.0 51 68 53.3	11 46.7 51 67 51.9	12 32.1 50 66 50.6	13 32.0 50 64 48.8	13 46.9 49 64 48.4	14 01.7 49 63 47.9	15 00.4 49 62 46.1	100
1	9 48.7 52 69 53.7	10 19.9 52 68 52.8	11 06.3 51 67 51.5	11 52.5 51 66 50.2	12 53.4 50 64 48.4	13 08.4 50 64 48.0	13 23.6 50 63 47.6	14 23.5 50 61 45.8	1
2	9 07.4 53 68 53.3	9 39.0 53 68 52.4	10 26.2 52 66 51.1	11 13.1 52 65 49.8	12 15.0 51 64 48.1	12 30.4 51 63 47.6	12 45.8 51 63 47.2	13 46.7 50 61 45.4	2
3	8 26.3 54 68 52.8	8 58.4 53 67 52.0	9 46.3 53 66 50.7	10 33.9 53 65 49.4	11 36.9 52 63 47.7	11 52.6 52 63 47.2	12 08.2 52 62 46.7	13 10.2 51 60 45.0	3
4	7 45.4 54 68 52.4	8 18.0 54 67 51.5	9 06.6 54 66 50.3	9 55.0 54 64 49.0	10 59.0 53 63 47.3	11 14.9 53 62 46.8	11 30.8 53 62 46.4	12 33.9 52 60 44.7	4
105	7 04.8 55 67 51.9	7 37.8 55 66 51.1	8 27.2 55 65 49.8	9 16.3 54 64 48.6	10 21.3 54 62 46.9	10 37.5 54 62 46.4	10 53.7 54 61 46.0	11 57.9 53 60 44.3	105
6	6 24.4 56 67 51.5	6 57.9 56 66 50.7	7 48.0 56 65 49.4	8 37.9 55 64 48.1	9 43.9 55 62 46.5	10 00.4 55 61 46.0	10 16.8 55 61 45.6	11 22.1 54 59 43.9	6
7	5 44.3 57 66 51.0	6 18.3 57 66 50.2	7 09.1 56 64 49.0	7 59.7 56 63 47.7	9 06.8 56 61 46.0	9 23.5 56 61 45.6	9 40.2 56 61 45.2	10 46.6 55 59 43.5	7
8	5 04.4 57 66 50.6	5 38.9 57 65 49.8	6 30.4 57 64 48.5	7 21.8 57 63 47.3	8 29.8 57 61 45.6	8 46.9 57 61 45.2	9 03.8 56 60 44.8	10 11.3 56 58 43.1	8
9			5 52.0 58 64 48.1	6 44.1 58 62 46.8	7 53.3 57 61 45.2	8 10.5 57 60 44.8	8 27.7 57 60 44.4	9 36.3 57 58 42.7	9
110			5 13.9 59 63 47.6	6 06.7 59 62 46.4	7 16.9 58 60 44.7	7 34.4 58 60 44.3	7 51.9 58 59 43.9	9 01.6 58 57 42.3	110
1				5 29.7 59 61 45.9	6 40.9 59 60 44.3	6 58.6 59 59 43.9	7 16.4 59 59 43.5	8 27.1 59 57 41.9	1
2					6 05.1 60 59 43.9	6 23.1 60 59 43.5	6 41.1 60 58 43.1	7 52.9 60 56 41.4	2
3					5 29.6 61 59 43.4	5 47.9 61 58 43.0	6 06.2 61 58 42.6	7 19.0 61 56 41.0	3
4						5 13.0 62 58 42.6	5 31.5 62 57 42.2	6 45.4 61 56 40.6	4
115								6 12.1 62 55 40.1	115
6								5 39.1 63 54 39.7	6
7								5 06.4 64 54 39.2	7

Lat. 31°

H.A.	46° 00' Alt. (Δd Δt)	46° Az.	47° 00' Alt. (Δd Δt)	47° Az.	48° 30' Alt. (Δd Δt)	48° Az.	49° 30' Alt. (Δd Δt)	49° Az.	50° 30' Alt. (Δd Δt)	50° Az.	51° 30' Alt. (Δd Δt)	51° Az.	52° 30' Alt. (Δd Δt)	52° Az.	54° 00' Alt. (Δd Δt)	54° Az.	H.A.
00	75 00.0 1.0 02	00.0	74 00.0 1.0 02	00.0	72 29.0 1.0 02	00.0	71 30.0 1.0 02	00.0	70 30.0 1.0 01	00.0	69 30.0 1.0 01	00.0	68 30.0 1.0 01	00.0	67 00.3 1.0 01	00.0	00
1	74 58.8 1.0 06	02.7	73 58.9 1.0 06	02.5	72 29.0 1.0 05	02.2	71 29.1 1.0 05	02.0	70 29.1 1.0 04	01.9	69 29.2 1.0 04	01.8	68 29.3 1.0 04	01.7	66 59.3 1.0 03	01.5	1
2	74 55.2 99 10	05.3	73 55.6 99 09	04.9	72 26.1 1.0 08	04.4	71 26.3 1.0 08	04.1	70 26.6 1.0 07	03.8	69 26.8 1.0 07	03.5	68 27.0 1.0 06	03.3	66 57.3 1.0 05	03.0	2
3	74 49.2 99 14	08.0	73 50.1 99 13	07.4	72 21.1 99 11	06.6	71 21.8 99 11	06.1	70 22.3 99 10	05.7	69 22.8 99 09	05.3	68 23.3 99 09	05.0	66 53.9 99 08	04.5	3
4	74 40.9 97 18	10.6	73 42.4 98 16	09.8	72 14.3 98 15	08.7	71 15.4 98 14	08.1	70 16.4 98 13	07.6	69 17.3 99 12	07.1	68 18.1 99 11	06.6	66 49.2 99 10	06.0	4
05	74 30.4 96 21	13.1	73 32.6 96 20	12.1	72 05.6 97 18	10.8	71 07.3 97 16	10.1	70 08.8 98 15	09.4	69 10.2 98 14	08.8	68 11.5 98 13	08.2	66 43.2 98 12	07.4	05
6	74 17.6 94 25	15.6	73 20.8 95 23	14.4	71 55.0 96 21	12.9	70 57.5 96 19	12.0	69 59.6 97 18	11.2	69 01.6 97 17	10.5	68 03.4 97 16	09.8	66 35.5 97 14	08.9	6
7	74 02.8 92 28	17.9	73 07.1 93 26	16.6	71 42.6 94 23	14.9	70 45.9 95 22	13.9	69 48.8 95 20	13.0	68 51.5 96 19	12.1	67 54.0 96 18	11.4	66 27.3 97 16	10.3	7
8	73 46.0 90 31	20.2	72 51.4 91 29	18.8	71 28.5 93 26	16.9	70 32.7 93 25	15.7	69 36.5 94 23	14.7	68 40.0 94 22	13.8	67 43.2 95 20	12.9	66 17.5 95 18	11.7	8
9	73 27.3 88 34	22.4	72 34.0 89 32	20.9	71 12.8 91 29	18.8	70 18.0 92 27	17.5	69 22.7 92 25	16.4	68 27.0 93 24	15.4	67 31.0 94 22	14.4	66 06.4 94 20	13.1	9
10	73 06.8 86 37	24.5	72 14.8 87 35	22.9	70 55.5 89 31	20.6	70 01.7 90 30	19.3	69 07.5 91 28	18.1	68 12.7 92 26	16.9	67 17.6 92 24	15.9	65 54.1 93 22	14.5	10
1	72 44.6 83 40	26.5	71 54.1 85 37	24.8	70 36.6 87 34	22.4	69 44.0 88 32	21.0	68 50.9 89 30	19.7	67 57.1 90 28	18.4	67 02.9 91 27	17.3	65 40.7 92 24	15.8	1
2	72 20.9 81 42	28.4	71 31.8 83 40	26.6	70 16.3 85 36	24.1	69 25.0 86 34	22.6	68 32.9 87 32	21.2	67 40.2 88 30	19.9	66 46.9 89 28	18.7	65 26.1 90 26	17.1	2
3	71 55.6 78 44	30.2	71 08.1 80 42	28.3	69 54.7 83 38	25.7	69 04.6 84 36	24.1	68 13.7 85 34	22.7	67 22.1 87 32	21.3	66 29.9 88 30	20.1	65 10.5 89 28	18.4	3
4	71 29.1 76 46	32.0	70 43.0 78 44	30.0	69 31.7 81 40	27.3	68 42.9 82 38	25.6	67 53.2 84 34	24.1	67 03.2 85 34	22.7	66 11.6 86 32	21.4	64 53.3 87 26	19.7	4
15	71 01.2 73 48	33.6	70 16.7 75 46	31.5	69 07.5 78 42	28.8	68 20.1 80 40	27.1	67 31.7 81 38	25.5	66 42.4 83 38	24.0	65 52.3 84 34	22.7	64 36.0 86 31	20.8	15
6	70 32.3 71 50	35.1	69 49.2 73 48	33.0	68 42.5 76 44	30.2	67 56.1 78 42	28.5	67 09.0 79 40	26.8	66 20.9 81 38	25.3	65 32.0 82 38	23.9	64 17.3 84 33	21.9	6
7	70 02.2 68 52	36.5	69 20.7 70 49	34.4	68 15.8 74 46	31.5	67 31.1 76 43	29.8	66 45.2 77 41	28.1	65 58.4 79 39	26.6	65 10.7 80 37	25.1	63 57.6 82 34	23.0	7
8	69 31.1 65 53	37.8	68 51.1 68 51	35.7	67 48.4 71 47	32.8	67 05.0 73 45	31.0	66 20.5 75 43	29.3	65 34.9 77 41	27.7	64 48.4 78 39	26.2	63 37.0 80 34	24.1	8
9	68 59.1 63 55	39.1	68 20.6 65 52	37.0	67 20.1 69 49	34.0	66 38.1 71 46	32.2	65 54.9 73 44	30.5	65 10.6 75 42	28.9	64 25.2 76 40	27.3	63 15.6 78 37	25.2	9
20	68 26.2 60 56	40.3	67 49.2 63 54	38.2	66 50.9 67 50	35.2	66 10.2 69 48	33.4	65 28.3 71 46	31.6	64 45.3 73 43	29.9	64 01.2 74 41	28.4	62 53.3 77 38	26.2	20
1	67 52.6 58 57	41.4	67 17.1 61 55	39.3	66 20.8 64 51	36.3	65 41.5 67 49	34.4	65 01.0 69 47	32.7	64 19.2 71 45	31.0	63 36.4 72 43	29.4	62 30.2 75 40	27.1	1
2	67 18.3 55 58	42.4	66 44.2 58 56	40.3	65 50.0 62 53	37.3	65 12.1 64 50	35.5	64 32.8 66 48	33.7	63 52.4 68 46	32.0	63 10.7 70 44	30.4	62 06.4 73 41	28.1	2
3	66 43.3 53 59	43.4	66 10.6 55 57	41.3	65 18.5 60 54	38.3	64 41.1 62 52	36.4	64 04.0 64 49	34.4	63 24.8 66 47	32.9	62 44.4 68 43	31.3	61 41.8 71 42	29.0	3
4	66 07.6 51 60	44.3	65 36.3 54 58	42.2	64 46.3 58 55	39.2	64 11.0 60 53	37.3	63 34.4 62 50	35.5	62 56.5 64 48	33.8	62 17.3 66 46	32.2	61 16.6 69 43	29.8	4
25	65 31.5 49 61	45.1	65 01.5 51 59	43.0	64 13.4 55 56	40.1	63 39.5 58 54	38.2	63 04.2 60 51	36.4	62 27.5 62 49	34.7	61 49.6 64 47	33.0	60 50.7 67 44	30.7	25
6	64 54.8 46 62	45.9	64 26.1 49 60	43.9	63 40.0 53 57	40.9	63 07.4 56 54	39.0	62 33.4 58 52	37.2	61 58.0 60 50	35.5	61 21.3 62 48	33.8	60 24.1 65 45	31.4	6
7	64 17.6 44 63	46.6	63 50.2 47 61	44.6	63 06.1 51 57	41.7	62 34.8 53 55	39.8	62 02.0 56 53	38.0	61 27.8 58 51	36.3	60 52.4 60 49	34.6	59 57.0 63 46	32.2	7
8	63 40.4 42 63	47.3	63 13.9 45 61	45.3	62 31.7 49 58	42.4	62 01.6 51 56	40.7	61 30.0 54 54	38.7	60 57.1 56 52	37.0	60 22.9 58 50	35.3	59 29.3 61 47	32.9	8
9	63 02.0 40 64	48.0	62 37.1 43 62	46.0	61 56.8 47 59	43.1	61 27.9 49 57	41.2	60 57.6 52 55	39.4	60 25.9 54 53	37.7	59 52.9 56 51	36.0	59 01.1 59 48	33.6	9
30	62 23.6 38 65	48.5	62 00.0 41 63	46.6	61 21.4 45 60	43.7	60 53.8 47 58	41.9	60 24.7 50 56	40.1	59 54.2 52 54	38.4	59 22.4 54 52	36.7	58 32.4 57 49	34.3	30
1	61 44.9 36 65	49.1	61 22.4 39 63	47.2	60 45.7 43 60	44.3	60 19.2 45 58	42.5	59 51.4 48 56	40.7	59 22.1 50 54	39.0	58 51.5 52 52	37.3	58 03.2 55 49	34.9	1
2	61 05.9 34 66	49.7	60 44.6 37 64	47.7	60 09.6 41 61	44.9	59 44.4 43 59	43.1	59 17.6 46 57	41.3	58 49.5 48 55	39.6	58 20.1 50 53	37.9	57 33.6 53 50	35.5	2
3	60 26.6 32 66	50.1	60 06.4 35 64	47.7	59 33.1 39 61	45.4	59 09.0 41 59	43.6	58 43.5 44 58	41.9	58 16.5 46 56	40.1	57 48.3 48 54	38.5	57 03.5 51 51	36.1	3
4	59 47.0 30 66	50.5	59 27.9 33 65	48.6	58 56.3 37 62	45.9	58 33.4 39 60	44.1	58 09.0 42 58	42.4	57 43.2 44 56	40.7	57 16.1 46 54	39.0	56 33.0 49 51	36.6	4
35	59 07.2 29 67	50.9	58 49.2 31 65	49.1	58 19.2 35 62	46.4	57 57.4 38 60	44.6	57 34.1 40 59	42.9	57 09.5 42 57	41.2	56 43.5 44 55	39.5	56 02.2 47 52	37.1	35
6	58 27.2 27 67	51.3	58 10.2 30 65	49.5	57 41.9 33 63	46.8	57 21.2 36 61	45.0	56 59.0 38 59	43.3	56 35.5 40 57	41.6	56 10.6 43 55	40.0	55 30.9 46 53	37.6	6
7	57 46.9 25 67	51.6	57 31.0 28 66	49.8	57 04.3 32 63	47.2	56 44.4 34 61	45.3	56 23.6 36 60	43.8	56 01.1 38 58	42.1	55 37.4 41 56	40.5	54 59.4 44 53	38.1	7
8	57 06.5 24 68	52.0	56 51.6 26 66	50.2	56 26.4 30 63	47.6	56 07.8 32 62	45.8	55 47.9 34 60	44.2	55 26.5 37 58	42.5	55 03.9 39 56	40.9	54 27.5 42 54	38.5	8
9	56 25.9 22 68	52.2	56 12.0 24 66	50.5	55 48.4 28 64	47.9	55 30.8 30 62	46.2	55 11.9 33 60	44.5	54 51.7 35 59	42.9	54 30.1 37 57	41.3	53 55.4 40 54	38.9	9
40	55 45.2 20 68	52.5	55 32.2 23 67	50.8	55 10.1 26 64	48.2	54 53.6 29 62	46.5	54 35.7 31 61	44.9	54 16.5 33 59	43.3	53 56.0 35 57	41.7	53 22.9 38 55	39.3	40
1	55 04.3 19 68	52.7	54 52.3 21 67	51.0	54 31.7 25 64	48.5	54 16.2 27 63	46.9	53 59.3 29 61	45.2	53 41.2 31 59	43.6	53 21.7 33 58	42.0	52 50.2 37 55	39.7	1
2	54 23.3 17 69	53.0	54 12.3 20 67	51.1	53 53.1 23 65	48.8	53 38.6 26 63	47.1	53 22.7 27 61	45.5	53 05.6 30 60	43.9	52 47.2 32 58	42.3	52 17.3 35 55	40.0	2
3	53 42.2 16 69	53.2	53 32.1 18 67	51.5	53 14.3 21 65	49.0	53 00.8 24 63	47.4	52 45.9 26 62	45.8	52 29.8 28 60	44.2	52 12.4 30 58	42.6	51 44.1 33 56	40.3	3
4	53 01.0 14 69	53.3	52 51.8 17 67	51.7	52 35.4 20 65	49.3	52 22.8 22 63	47.7	52 09.0 24 62	46.1	51 53.9 26 60	44.5	51 37.5 28 59	42.9	51 10.7 31 56	40.6	4
45	52 19.7 13 69	53.5	52 11.4 15 68	51.9	51 56.4 18 65	49.5	51 44.8 20 64	47.9	51 31.9 23 62	46.3	51 17.7 25 60	44.7	51 02.4 27 59	43.2	50 37.1 30 56	40.9	45
6	51 38.3 11 69	53.6	51 30.9 14 68	52.0	51 17.2 17 65	49.7	51 06.6 19 64	48.1	50 54.6 21 62	46.5	50 41.5 23 61	45.0	50 27.5 25 59	43.5	50 03.3 28 57	41.2	6
7	50 56.9 10 69	53.7	50 50.3 12 68	52.2	50 38.0 15 66	49.8	50 28.2 17 64	48.3	50 17.2 19 63	46.7	50 05.0 21 61	45.2	49 51.6 23 59	43.7	49 29.4 26 57	41.4	7
8	50 15.4 09 69	53.8	50 09.6 11 68	52.3	49 58.6 14 66	50.0	49 49.8 16 64	48.4	49 39.7 18 63	46.9	49 28.5 20 61	45.4	49 16.1 22 60	43.9	48 55.3 25 57	41.7	8
9	49 33.8 07 69	53.9	49 28.9 09 68	52.4	49 19.2 12 66	50.1	49 11.3 14 64	48.6	49 02.1 16 63	47.1	48 51.8 18 61	45.6	48 40.3 20 60	44.1	48 21.0 23 57	41.9	9
50	48 52.2 06 69	54.0	48 48.1 08 68	52.5	48 39.7 11 66	50.2	48 32.7 13 64	48.7	48 24.4 15 63	47.2	48 15.0 17 61	45.7	48 04.5 18 60	44.3	47 46.6 21 58	42.1	50
1	48 10.6 05 69	54.1	48 07.3 06 68	52.6	48 00.2 09 66	50.3	47 54.0 11 65	48.8	47 46.6 13 63	47.4	47 38.2 15 62	45.9	47 28.6 17 60	44.4	47 12.1 20 58	42.2	1
2	47 29.0 03 69	54.1	47 26.5 05 68	52.6	47 20.6 08 66	50.4	47 15.2 10 65	48.9	47 08.8 12 63	47.5	47 01.2 14 62	46.1	46 52.5 15 60	44.6	46 37.4 18 58	42.4	2
3	46 47.3 02 69	54.1	46 45.6 04 68	52.7	46 40.9 07 66	50.5	46 36.4 08 65	49.0	46 30.8 10 63	47.6	46 24.1 12 62	46.1	46 16.4 14 60	44.7	46 02.7 17 58	42.6	3
4	46 05.6 01 69	54.1	46 04.7 02 68	52.7	46 01.2 05 66	50.5	45 57.6 07 65	49.1	45 52.8 09 63	47.7	45 47.0 11 62	46.2	45 40.2 12 60	44.8	45 27.9 15 58	42.7	4
55	45 24.0 01 69	54.1	45 23.8 01 68	52.7	45 21.5 04 66	50.6	45 18.7 06 65	49.2	45 14.8 07 63	47.7	45 09.9 09 62	46.3	45 03.9 11 61	44.9	44 53.0 13 58	42.8	55
6	44 42.3 03 69	54.1	44 42.9 00 68	52.7	44 41.8 02 66	50.6	44 39.8 04 65	49.2	44 36.8 06 64	47.8	44 32.6 08 62	46.4	44 27.5 09 61	45.0	44 18.0 12 58	42.9	6
7	44 00.6 03 69	54.1	44 01.9 01 68	52.7	44 02.0 01 66	50.6	44 00.8 03 65	49.2	43 58.6 05 64	47.8	43 55.4 06 62	46.5	43 51.2 08 61	45.1	43 42.9 10 59	43.0	7
8	43 19.0 04 69	54.1	43 21.0 03 68	52.7	43 22.3 00 66	50.6	43 21.9 02 65	49.3	43 20.5 03 64	47.9	43 18.1 05 62	46.5	43 14.7 06 61	45.1	43 07.8 09 59	43.1	8
9	42 37.3 05 69	54.0	42 40.1 04 68	52.7	42 42.5 01 66	50.6	42 42.9 00 65	49.3	42 42.3 02 64	47.9	42 40.5 03 61	46.5	42 38.3 05 61	45.2	42 32.7 07 59	43.1	9
60	41 55.7 07 69	54.0	41 59.2 05 68	52.6	42 03.8 03 66	50.6	42 05.9 01 65	49.3	42 04.4 00 64	47.9	42 03.4 02 62	46.6	42 01.8 04 61	45.2	41 57.5 06 59	43.2	60
1	41 14.2 08 69	53.9	41 18.4 06 68	52.6	41 23.0 04 66	50.6	41 25.0 02 65	49.2	41 26.0 01 64	47.9	41 26.1 01 62	46.6	41 25.1 03 61	45.2	41 22.3 04 59	43.3	1
2	40 32.6 09 69	53.8	40 37.6 08 68	52.5	40 43.3 06 66	50.5	40 46.0 04 65	49.2	40 47.8 02 64	47.9	40 48.7 01 62	46.6	40 48.7 01 61	45.2	40 47.0 03 59	43.3	2
3	39 51.1 10 69	53.7	39 56.8 09 68	52.4	40 03.6 07 66	50.5	40 07.1 05 65	49.2	40 09.7 04 64	47.9	40 11.4 02 62	46.6	40 12.2 01 61	45.3	40 11.8 02 59	43.3	3
4	39 09.7 11 69	53.6	39 16.0 10 68	52.3	39 24.0 08 66	50.4	39 28.2 06 65	49.1	39 31.6 05 64	47.8	39 34.1 03 62	46.5	39 35.7 02 61	45.2	39 36.5 00 59	43.3	4
65	38 28.3 12 69	53.4	38 35.4 11 68	52.2	38 44.4 09 66	50.3	38 49.3 07 65	49.1	38 53.4 05 64	47.8	38 56.7 05 62	46.5	38 59.2 03 61	45.2	39 01.2 01 59	43.3	65
6	37 47.0 14 69	53.3	37 54.7 12 68	52.1	38 04.8 10 66	50.3	38 10.5 09 65	49.0	38 15.4 07 64	47.7	38 19.4 06 62	46.5	38 22.7 05 61	45.1	38 26.0 03 59	43.3	6
7	37 05.7 15 69	53.3	37 14.1 13 68	52.0	37 25.3 11 66	50.2	37 31.7 10 65	48.9	37 37.3 09 64	47.7	37 42.2 07 62	46.4	37 46.2 06 61	45.1	37 50.7 04 59	43.2	7
8	36 24.5 16 69	53.2	36 33.6 14 67	51.9	36 45.8 13 66	50.1	36 53.0 11 64	48.8	36 59.3 10 63	47.6	37 04.9 09 62	46.3	37 09.8 07 61	45.1	37 15.5 05 59	43.2	8
9	35 43.4 17 68	53.1	35 53.4 16 67	51.8	36 06.4 14 66	50.0	36 14.3 13 64	48.7	36 21.4 11 63	47.5	36 27.6 10 62	46.3	36 33.4 09 61	45.0	36 40.3 07 59	43.2	9
70	35 02.4 18 68	52.9	35 12.8 17 67	51.7	35 27.0 15 65	49.8	35 35.6 14 64	48.6	35 43.5 12 63	47.4	35 50.6 11 62	46.1	35 57.8 10 61	45.0	36 05.1 08 58	43.1	70
1	34 21.4 19 68	52.7	34 32.5 18 67	51.5	34 47.8 16 65	49.7	34 57.1 15 64	48.5	35 05.7 14 63	47.3	35 13.5 13 62	46.1	35 20.7 11 60	44.9	35 30.0 09 58	43.1	1
2	33 40.5 20 68	52.5	33 52.2 19 67	51.4	34 08.6 17 65	49.6	34 18.6 16 64	48.4	34 27.9 15 63	47.2	34 36.5 14 62	46.0	34 44.4 13 60	44.8	34 54.9 11 58	43.0	2
3	32 59.7 21 68	52.4	33 12.1 20 67	51.2	33 29.4 18 65	49.4	33 40.2 17 64	48.3	33 50.2 16 63	47.1	33 59.5 15 61	45.9	34 08.2 14 60	44.7	34 19.9 12 58	42.9	3
4	32 19.1 22 68	52.2	32 32.1 21 67	51.1	32 50.4 20 65	49.3	33 01.8 18 64	48.1	33 12.6 16 61	47.0	33 22.6 15 61	45.8	33 32.1 14 60	44.6	33 44.4 13 58	42.8	4
75	31 38.5 23 67	52.0	31 52.1 22 66	50.9	32 11.5 21 65	49.1	32 23.6 20 64	48.0	32 35.0 19 62	46.8	32 45.8 17 61	45.7	32 56.0 16 60	44.5	33 10.0 15 58	42.7	75
6	30 58.0 24 67	51.8	31 12.3 23 66	50.7	31 32.6 22 65	49.0	31 45.4 21 63	47.8	31 57.6 20 62	46.7	32 09.1 19 61	45.6	32 20.0 18 60	44.4	32 35.1 16 58	42.6	6
7	30 17.6 25 67	51.6	30 32.6 24 66	50.5	30 53.9 23 64	48.8	31 07.3 22 63	47.7	31 20.2 21 62	46.5	31 32.5 20 61	45.4	31 44.1 19 60	44.2	32 00.4 17 58	42.5	7
8	29 37.4 26 67	51.4	29 52.9 25 66	50.3	30 15.2 24 64	48.7	30 29.4 23 63	47.5	30 42.9 22 62	46.4	30 55.9 21 61	45.2	31 08.3 20 60	44.1	31 25.7 19 58	42.4	8
9	28 57.2 27 67	51.2	29 13.4 27 66	50.2	29 36.7 25 64	48.4	29 51.5 24 63	47.3	30 05.8 23 62	46.2	30 19.4 22 61	45.1	30 32.5 21 59	43.9	30 51.1 20 58	42.3	9
80	28 17.2 28 66	51.0	28 34.0 26 65	49.9	28 58.3 26 64	48.2	29 13.8 25 63	47.1	29 28.7 24 62	46.0	29 43.1 24 60	44.9	29 56.9 23 59	43.8	30 16.6 21 57	42.1	80
1	27 37.3 29 66	50.7	27 54.8 29 65	49.7	28 20.0 27 64	48.0	28 36.1 26 63	46.9	28 51.7 26 61	45.8	29 06.8 25 60	44.7	29 21.4 24 59	43.6	29 42.1 22 57	41.9	1
2	26 57.6 31 66	50.5	27 15.6 30 65	49.4	27 41.8 28 63	47.8	27 58.6 28 62	46.7	28 14.9 27 61	45.6	28 30.7 26 60	44.6	28 45.9 25 59	43.4	29 07.8 24 57	41.8	2
3	26 17.9 32 66	50.2	26 36.4 31 65	49.2	27 03.7 30 63	47.6	27 21.2 29 62	46.5	27 38.2 28 61	45.4	27 54.7 27 60	44.4	28 10.6 26 59	43.3	28 33.6 25 57	41.6	3
4	25 38.4 33 66	50.0	25 57.7 32 65	49.0	26 25.8 31 63	47.4	26 44.0 30 62	46.3	27 01.6 29 61	45.2	27 18.8 28 60	44.2	27 35.4 27 58	43.1	27 59.5 26 57	41.5	4
85	24 59.1 34 65	49.8	25 19.0 33 64	48.7	25 48.0 32 63	47.2	26 06.8 31 62	46.1	26 25.2 30 61	45.0	26 43.0 29 59	44.0	27 00.4 29 58	42.9	27 25.5 27 56	41.3	85
6	24 19.9 35 65	49.5	24 40.4 34 64	48.5	25 10.4 33 62	46.9	25 29.8 32 61	45.9	25 48.8 31 60	44.8	26 07.4 30 59	43.8	26 25.4 30 58	42.7	26 51.6 29 56	41.1	6
7	23 40.9 36 65	49.2	24 02.0 35 64	48.2	24 32.9 34 62	46.7	24 53.0 33 61	45.6	25 12.7 32 60	44.6	25 31.9 32 59	43.5	25 50.6 31 58	42.5	26 17.9 30 56	40.9	7
8	23 02.0 37 65	49.0	23 23.7 36 64	48.0	23 55.6 35 62	46.4	24 16.3 34 61	45.4	24 36.6 33 60	44.4	24 56.5 33 59	43.3	25 15.9 32 58	42.3	25 44.3 31 56	40.7	8
9	22 23.3 38 64	48.7	22 45.6 37 63	47.7	23 18.4 36 62	46.2	23 39.8 35 61	45.2	24 00.7 34 60	44.1	24 21.3 34 58	43.1	24 41.4 33 57	42.1	25 10.8 32 56	40.5	9
90	21 44.7 39 64	48.4	22 07.7 38 63	47.4	22 41.4 37 61	45.9	23 03.4 36 60	44.9	23 25.0 36 59	43.9	23 46.2 35 58	42.9	24 07.0 34 57	41.8	24 37.5 33 55	40.3	90

Lat. 31° (right margin); continuing down the right margin: **Lat. 32°**, **Lat. 33°**, **Lat. 34°**, **Lat. 35°**, **Lat. 36°**, **Lat. 37°**, **Lat. 38°**

DECLINATION CONTRARY NAME TO LATITUDE

Each cell: Alt. — Δd Δt — Az.

H.A.	46° 00'	47° 00'	48° 30'	49° 30'	50° 30'	51° 30'	52° 30'	54° 00'	H.A.
00	13 00.0 1.00 01 180.0	12 00.0 1.00 01 180.0	10 30.0 1.00 00 180.0	9 30.0 1.00 00 180.0	8 30.0 1.00 00 180.0	7 30.0 1.00 00 180.0	6 30.0 1.00 00 180.0	5 00.0 1.00 00 180.0	00
1	12 59.7 1.00 02 179.3	11 59.7 1.00 02 179.3	10 29.7 1.00 02 179.3	9 29.7 1.00 01 179.3	8 29.7 1.00 01 179.4	7 29.7 1.00 01 179.4	6 29.7 1.00 01 179.4		1
2	12 58.7 1.00 03 178.6	11 58.7 1.00 03 178.6	10 28.8 1.00 02 178.7	9 28.8 1.00 02 178.7	8 28.8 1.00 02 178.7	7 28.9 1.00 02 178.7	6 28.9 1.00 02 178.8		2
3	12 57.1 1.00 04 177.9	11 57.2 1.00 04 177.9	10 27.3 1.00 04 178.0	9 27.3 1.00 03 178.0	8 27.4 1.00 03 178.1	7 27.5 1.00 03 178.1	6 27.5 1.00 03 178.2		3
4	12 54.9 1.00 05 177.2	11 55.0 1.00 05 177.2	10 25.2 1.00 05 177.3	9 25.3 1.00 04 177.4	8 25.4 1.00 04 177.4	7 25.5 1.00 04 177.5	6 25.6 1.00 04 177.6		4
05	12 52.0 1.00 06 176.4	11 52.2 1.00 06 176.5	10 22.4 1.00 06 176.6	9 22.6 1.00 05 176.7	8 22.8 1.00 05 176.8	7 23.0 1.00 05 176.9	6 23.1 1.00 05 176.9		05
6	12 48.5 1.00 07 175.7	11 48.7 1.00 07 175.8	10 19.1 1.00 07 176.0	9 19.4 1.00 06 176.1	8 19.6 1.00 06 176.1	7 19.9 1.00 06 176.2	6 20.1 1.00 06 176.3		6
7	12 44.3 99 08 175.0	11 44.7 99 08 175.1	10 15.2 99 08 175.3	9 15.5 99 07 175.4	8 15.9 99 07 175.5	7 16.2 99 07 175.6	6 16.5 99 07 175.7		7
8	12 39.6 99 09 174.3	11 40.0 99 09 174.4	10 10.7 99 09 174.6	9 11.1 99 08 174.7	8 11.6 99 08 174.9	7 12.0 99 08 175.0	6 12.4 99 08 175.1		8
9	12 34.2 99 10 173.6	11 34.7 99 10 173.7	10 05.6 99 10 174.0	9 06.1 99 09 174.1	8 06.7 99 09 174.2	7 07.2 99 09 174.4	6 07.8 99 09 174.5		9
10	12 28.1 99 11 172.9	11 28.8 99 11 173.1	9 59.9 99 10 173.3	9 00.5 99 10 173.4	8 01.2 99 10 173.6	7 01.9 99 10 173.7	6 02.6 99 10 173.9		10
1	12 21.5 99 12 172.2	11 22.3 99 12 172.4	9 53.6 99 12 172.6	8 54.4 99 11 172.8	7 55.2 99 11 173.0	6 56.0 99 11 173.1	5 56.8 99 10 173.3		1
2	12 14.2 98 13 171.5	11 15.2 98 13 171.7	9 46.7 98 12 172.0	8 47.6 98 12 172.1	7 48.6 98 12 172.3	6 49.6 98 12 172.5	5 50.6 98 11 172.7		2
3	12 06.3 98 14 170.8	11 07.4 98 14 171.0	9 39.2 98 13 171.3	8 40.3 98 13 171.5	7 41.5 98 13 171.7	6 42.6 98 13 171.9	5 43.8 98 12 172.1		3
4	11 57.7 98 15 170.1	10 59.1 98 15 170.3	9 31.1 98 14 170.6	8 32.4 98 14 170.9	7 33.8 98 14 171.1	6 35.1 98 13 171.3	5 36.4 98 13 171.5		4
15	11 48.6 97 16 169.4	10 50.1 97 16 169.6	9 22.5 97 15 170.0	8 24.0 97 15 170.2	7 25.5 97 15 170.4	6 27.0 97 14 170.7	5 28.5 97 14 170.9		15
6	11 38.8 97 17 168.7	10 40.6 97 17 169.0	9 13.2 97 16 169.3	8 15.0 97 16 169.6	7 16.7 97 16 169.8	6 18.4 97 15 170.1	5 20.1 97 15 170.3		6
7	11 28.5 97 18 168.0	10 30.5 97 18 168.3	9 03.4 97 17 168.7	8 05.4 97 17 168.9	7 07.3 97 17 169.2	6 09.3 97 16 169.5	5 11.2 97 16 169.7		7
8	11 17.5 96 19 167.4	10 19.7 96 19 167.6	8 53.0 96 18 168.0	7 55.2 96 18 168.3	6 57.4 96 17 168.6	5 59.6 96 17 168.8	5 01.8 96 17 169.1		8
9	11 06.0 96 20 166.7	10 08.4 96 20 167.0	8 42.1 96 19 167.4	7 44.5 96 19 167.7	6 47.0 96 18 168.0	5 49.4 96 18 168.2			9
20	10 53.8 95 21 166.0	9 56.5 95 21 166.3	8 30.6 96 20 166.7	7 33.3 96 20 167.1	6 36.0 96 19 167.3	5 38.6 96 19 167.6			20
1	10 41.1 95 22 165.3	9 44.1 95 22 165.6	8 18.5 95 21 166.1	7 21.5 95 21 166.4	6 24.4 95 20 166.7	5 27.4 95 20 167.0			1
2	10 27.8 95 23 164.7	9 31.0 95 23 165.0	8 05.9 95 22 165.5	7 09.2 95 21 165.8	6 12.4 95 21 166.1	5 15.6 95 20 166.5			2
3	10 13.9 94 24 164.0	9 17.4 94 24 164.3	7 52.7 94 23 164.8	6 56.3 94 22 165.2	5 59.8 94 22 165.5	5 03.3 94 21 165.9			3
4	9 59.4 94 25 163.3	9 03.3 94 25 163.7	7 39.0 94 24 164.2	6 42.9 94 23 164.6	5 46.7 94 23 164.9				4
25	9 44.3 93 26 162.7	8 48.5 93 25 163.0	7 24.8 93 25 163.6	6 28.9 93 24 164.0	5 33.0 93 24 164.3				25
6	9 28.8 93 27 162.0	8 33.3 93 26 162.4	7 10.0 93 26 163.0	6 14.4 93 25 163.4	5 18.9 93 24 163.7				6
7	9 12.6 92 28 161.4	8 17.4 92 27 161.8	6 54.7 92 26 162.4	5 59.5 92 26 162.8	5 04.2 92 25 163.1				7
8	8 55.9 91 29 160.7	8 01.1 91 28 161.1	6 38.8 91 27 161.7	5 44.0 91 27 162.2					8
9	8 38.6 91 30 160.1	7 44.2 91 29 160.5	6 22.5 91 28 161.1	5 27.9 91 28 161.6					9
30	8 20.9 90 31 159.4	7 26.8 90 30 159.9	6 05.6 90 29 160.5	5 11.4 90 28 161.0					30
1	8 02.5 90 31 158.8	7 08.8 90 31 159.3	5 48.2 90 30 159.9						1
2	7 43.7 89 32 158.2	6 50.3 89 32 158.7	5 30.3 89 31 159.3						2
3	7 24.3 88 33 157.6	6 31.4 89 33 158.0	5 11.9 88 32 158.8						3
4	7 04.4 88 34 157.0	6 11.9 88 33 157.4							4
35	6 44.1 87 35 156.3	5 51.9 87 34 156.8							35
6	6 23.2 86 36 155.7	5 31.4 86 35 156.3							6
7	6 01.8 85 36 155.1	5 10.5 86 36 155.7							7
8	5 39.9 85 37 154.5								8
9	5 17.6 84 38 154.0								9

DECLINATION SAME NAME AS LATITUDE

Each cell: Alt. — Δd Δt — Az.

H.A.	46° 00'	47° 00'	48° 30'	49° 30'	50° 30'	51° 30'	52° 30'	54° 00'	H.A.
91	21 06.4 40 64 48.1	21 29.9 39 63 47.1	22 04.5 38 61 45.6	22 27.2 37 60 44.6	22 49.4 37 59 43.6	23 11.3 36 58 42.6	23 32.8 35 57 41.6	24 04.3 34 55 40.1	91
2	20 28.2 40 63 47.8	20 52.3 40 62 46.8	21 27.8 39 61 45.4	21 51.1 38 60 44.4	22 14.0 38 59 43.4	22 36.6 37 58 42.4	22 58.7 37 56 41.4	23 31.3 36 55 39.8	2
3	19 50.1 41 63 47.5	20 14.9 41 62 46.5	20 51.1 40 61 45.1	21 15.2 40 60 44.1	21 38.8 39 58 43.1	22 02.0 38 57 42.1	22 24.8 38 56 41.1	22 58.4 37 55 39.6	3
4	19 12.3 42 63 47.2	19 37.6 42 62 46.2	20 15.0 41 60 44.8	20 39.5 41 59 43.8	21 03.7 40 58 42.8	21 27.6 39 57 41.9	21 51.1 39 56 40.9	22 25.7 38 54 39.4	4
95	18 34.7 43 62 46.9	19 00.6 43 61 45.9	19 38.9 42 60 44.5	20 04.0 42 59 43.5	20 28.9 41 58 42.6	20 53.4 41 57 41.6	21 17.5 40 56 40.6	21 53.2 39 54 39.1	95
6	17 57.2 44 62 46.6	18 23.7 44 61 45.6	19 02.9 43 60 44.2	19 28.7 43 59 43.2	19 54.2 42 58 42.3	20 19.3 42 56 41.3	20 44.2 41 55 40.3	21 20.8 40 54 38.9	6
7	17 20.0 45 62 46.2	17 47.0 45 61 45.3	18 27.2 44 59 43.9	18 53.6 44 58 42.9	19 19.7 43 57 42.0	19 45.5 43 56 41.0	20 11.0 42 55 40.1	20 48.6 41 53 38.6	7
8	16 42.9 46 61 45.9	17 10.6 46 60 45.0	17 51.6 45 59 43.6	18 18.6 45 58 42.6	18 45.3 44 57 41.7	19 11.8 44 56 40.7	19 37.9 43 55 39.8	20 16.6 43 53 38.4	8
9	16 06.1 47 61 45.6	16 34.3 47 60 44.7	17 16.3 46 59 43.3	17 43.9 46 58 42.3	18 11.2 45 56 41.4	18 38.3 45 55 40.5	19 05.1 44 54 39.5	19 44.8 44 53 38.1	9
100	15 29.5 48 61 45.2	15 58.3 48 60 44.3	16 41.1 47 58 42.9	17 09.3 47 57 42.0	17 37.3 46 56 41.1	18 05.1 46 55 40.2	18 32.5 46 54 39.2	19 13.2 45 52 37.8	100
1	14 53.1 49 60 44.9	15 22.5 49 59 44.0	16 06.2 48 58 42.6	16 35.0 48 57 41.7	17 03.6 47 56 40.8	17 32.0 47 55 39.9	18 00.1 47 54 38.9	18 41.7 46 52 37.5	1
2	14 16.9 50 60 44.5	14 46.9 50 59 43.6	15 31.5 49 57 42.3	16 00.9 49 56 41.4	16 30.2 49 55 40.5	16 59.1 48 54 39.5	17 27.9 48 53 38.6	18 10.5 47 52 37.2	2
3	13 41.0 51 60 44.2	14 11.5 51 59 43.3	14 57.0 50 57 41.9	15 27.0 50 56 41.0	15 56.9 50 55 40.1	16 26.5 49 54 39.2	16 55.9 49 53 38.3	17 39.5 48 51 36.9	3
4	13 05.2 52 59 43.8	13 36.4 52 58 42.9	14 22.7 51 57 41.6	14 53.4 51 56 40.7	15 23.9 51 55 39.8	15 54.1 50 54 38.9	16 24.1 50 53 38.0	17 08.7 49 51 36.6	4
105	12 29.8 53 59 43.4	13 01.5 53 58 42.5	13 48.7 52 56 41.2	14 20.0 52 55 40.4	14 51.0 52 54 39.5	15 21.9 51 53 38.6	15 52.5 51 52 37.7	16 38.1 50 51 36.3	105
6	11 54.6 54 58 43.0	12 26.8 54 57 42.2	13 14.9 53 56 40.9	13 46.8 53 55 40.0	14 18.5 53 54 39.1	14 49.9 52 53 38.2	15 21.2 52 52 37.4	16 07.7 51 50 36.0	6
7	11 19.6 55 58 42.6	11 52.4 55 57 41.8	12 41.4 54 55 40.5	13 13.9 54 54 39.6	13 46.1 54 53 38.8	14 18.2 53 52 37.9	14 50.1 53 51 37.0	15 37.6 52 50 35.7	7
8	10 44.9 56 57 42.2	11 18.3 56 56 41.4	12 08.1 55 55 40.1	12 41.2 55 54 39.3	13 14.1 55 53 38.4	13 46.8 54 52 37.6	14 19.3 54 51 36.7	15 07.7 53 49 35.4	8
9	10 10.4 57 57 41.9	10 44.4 57 56 41.0	11 35.1 56 55 39.8	12 08.7 56 54 38.9	12 42.2 56 53 38.1	13 15.5 55 52 37.2	13 48.7 55 51 36.4	14 38.0 55 49 35.1	9
110	9 36.2 58 57 41.5	10 10.8 57 56 40.6	11 02.4 57 54 39.4	11 36.6 57 53 38.5	12 10.6 57 52 37.7	12 44.6 56 51 36.9	13 18.3 56 50 36.0	14 08.6 56 49 34.7	110
1	9 02.3 59 56 41.0	9 37.4 58 55 40.2	10 29.9 58 54 39.0	11 04.7 58 53 38.2	11 39.3 58 52 37.3	12 13.8 57 51 36.5	12 48.2 57 50 35.6	13 39.5 57 48 34.4	1
2	8 28.7 60 55 40.6	9 04.4 59 55 39.8	9 57.6 59 53 38.6	10 33.0 59 52 37.7	11 08.3 59 51 36.9	11 43.4 58 50 36.1	12 18.4 58 49 35.3	13 10.5 58 48 34.0	2
3	7 55.3 60 55 40.2	8 31.6 60 54 39.4	9 25.7 60 53 38.2	10 01.7 60 52 37.4	10 37.5 60 51 36.9	11 13.2 59 50 35.7	11 48.8 59 49 34.9	12 41.9 59 47 33.7	3
4	7 22.3 61 55 39.8	7 59.1 61 54 39.0	8 54.0 61 52 37.8	9 30.6 61 51 37.0	10 07.0 61 50 36.2	10 43.3 60 49 35.4	11 19.5 60 48 34.6	12 13.5 60 47 33.3	4
115	6 49.5 62 54 39.4	7 26.9 62 53 38.6	8 22.7 62 52 37.4	8 59.8 62 51 36.6	9 36.8 62 50 35.8	10 13.7 61 49 35.0	10 50.4 61 48 34.2	11 45.4 61 46 33.0	115
6	6 17.1 63 54 38.9	6 54.9 63 53 38.1	7 51.6 63 51 37.0	8 29.3 63 50 36.2	9 06.9 63 49 35.4	9 44.3 62 48 34.6	10 21.7 62 47 33.8	11 17.5 62 46 32.6	6
7	5 44.9 64 53 38.5	6 23.3 64 52 37.7	7 20.8 64 51 36.5	7 59.1 64 50 35.7	8 37.2 64 49 35.0	9 15.3 63 48 34.2	9 53.2 63 47 33.4	10 50.0 63 45 32.3	7
8	5 13.1 65 53 38.0	5 52.0 65 52 37.2	6 50.4 65 50 36.1	7 29.2 65 49 35.3	8 07.9 64 48 34.6	8 46.5 64 47 33.8	9 25.1 64 46 33.0	10 22.7 64 45 31.8	8
9		5 21.1 66 51 36.8	6 20.2 66 50 35.7	6 59.6 66 49 34.9	7 38.9 65 48 34.1	8 18.1 65 47 33.4	8 57.2 65 46 32.6	9 55.7 65 44 31.5	9
120			5 50.4 67 49 35.2	6 30.3 66 47 34.5	7 10.2 66 47 33.7	7 49.6 66 46 33.0	8 29.6 66 45 32.2	9 29.0 66 44 31.1	120
1			5 20.9 67 49 34.8	6 01.4 67 48 34.0	6 41.8 67 47 33.3	7 22.1 67 46 32.6	8 02.4 67 45 31.8	9 02.6 67 43 30.7	1
2				5 32.7 68 48 33.6	6 13.7 68 46 32.9	6 54.6 68 45 32.1	7 35.4 68 44 31.4	8 36.5 68 43 30.3	2
3				5 04.4 69 47 33.1	5 46.0 69 46 32.4	6 27.4 69 45 31.7	7 08.8 69 44 31.0	8 10.7 69 42 29.9	3
4					5 18.5 70 45 32.0	6 00.6 70 44 31.3	6 42.5 70 43 30.5	7 45.3 70 42 29.5	4
125						5 34.0 71 44 30.8	6 16.5 71 43 30.1	7 20.2 71 41 29.0	125
6						5 07.9 72 43 30.4	5 50.9 72 42 29.7	6 55.4 72 41 28.6	6
7							5 25.9 73 41 29.2	6 30.9 72 40 28.2	7
8							5 00.7 74 41 28.8	6 06.8 73 40 27.8	8
9								5 43.0 74 38 27.3	9
130								5 19.5 75 38 26.9	130

Lat. 31°

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
00	66 30.0	1.00 1.01	00.0	66 00.0	1.00 1.01	00.0	65 00.0	1.00 1.01	00.0	64 30.0	1.00 1.01	00.0	64 00.0	1.00 1.01	00.0	63 30.0	1.00 1.01	00.0	62 00.0	1.00 1.01	00.0	61 30.0	1.00 1.01	00.0	00
1	66 29.3	1.00 03	01.5	65 59.4	1.00 03	01.4	64 59.4	1.00 03	01.3	64 29.4	1.00 03	01.3	63 59.4	1.00 03	01.2	63 29.5	1.00 03	01.2	61 59.5	1.00 02	01.1	61 29.5	1.00 02	01.1	1
2	66 27.4	1.00 05	02.9	65 57.5	1.00 05	02.8	64 57.6	1.00 05	02.6	64 27.7	1.00 05	02.6	63 57.8	1.00 05	02.5	63 27.8	1.00 04	02.4	61 58.0	1.00 04	02.2	61 28.1	1.00 04	02.1	2
3	66 24.1	99 08	04.4	65 54.3	99 07	04.2	64 54.7	99 07	04.0	64 24.8	99 07	03.8	63 55.0	99 06	03.7	63 25.1	99 06	03.6	61 55.6	1.00 06	03.3	61 25.7	1.00 06	03.2	3
4	66 19.6	99 10	05.8	65 49.9	99 09	05.6	64 50.5	99 09	05.3	64 20.8	99 09	05.1	63 51.1	99 08	04.9	63 21.4	99 08	04.8	61 52.1	99 07	04.4	61 22.4	99 07	04.2	4
05	66 13.8	98 12	07.2	65 44.3	98 11	07.0	64 45.2	98 11	06.6	64 15.7	99 10	06.4	63 46.1	98 10	06.2	63 16.6	98 10	06.0	61 47.7	99 09	05.4	61 18.1	99 09	05.3	05
6	66 06.7	98 14	08.6	65 37.4	98 13	08.4	64 38.8	98 13	07.8	64 09.4	98 12	07.6	63 40.1	98 12	07.4	63 10.7	98 12	07.2	61 42.4	98 11	06.5	61 12.9	98 10	06.3	6
7	65 58.3	97 16	10.0	65 29.3	97 15	09.7	64 31.2	97 14	09.1	64 02.1	97 14	08.8	63 32.9	97 14	08.6	63 03.8	97 13	08.3	61 36.1	98 12	07.6	61 06.8	98 12	07.4	7
8	65 48.6	96 18	11.4	65 20.1	96 17	11.0	64 22.5	96 16	10.4	63 53.6	96 16	10.1	63 24.7	96 15	09.8	62 55.8	97 15	09.5	61 28.8	97 14	08.6	60 59.7	97 13	08.4	8
9	65 38.1	95 20	12.7	65 09.7	95 19	12.3	64 11.7	95 18	11.6	63 44.1	95 18	11.3	63 15.5	95 17	10.9	62 46.9	96 17	10.6	61 20.6	96 15	09.7	60 51.8	96 15	09.4	9
10	65 26.2	93 22	14.0	64 58.1	94 21	13.6	64 01.8	94 20	12.8	63 33.6	94 19	12.4	63 05.3	94 19	12.1	62 36.9	95 18	11.7	61 11.5	95 17	10.7	60 43.0	95 16	10.4	10
1	65 13.1	92 24	15.3	64 45.5	92 23	14.9	63 49.9	93 22	14.0	63 22.0	93 21	13.6	62 54.0	93 20	13.2	62 26.0	94 20	12.8	61 01.5	94 18	11.7	60 33.3	94 18	11.4	1
2	64 59.0	91 25	16.6	64 31.7	91 25	16.1	63 36.9	92 23	15.2	63 09.4	92 23	14.7	62 41.8	92 22	14.3	62 14.1	92 21	13.9	60 50.7	93 20	12.7	60 22.7	93 19	12.3	2
3	64 43.8	89 27	17.8	64 16.9	90 26	17.3	63 23.0	90 25	16.3	62 55.9	91 24	15.8	62 28.6	91 24	15.4	62 01.2	91 21	14.9	60 38.9	92 21	13.7	60 11.3	92 20	13.3	3
4	64 27.5	88 28	19.0	64 01.2	88 28	18.5	63 08.1	89 26	17.4	62 41.4	89 26	16.9	62 14.6	90 25	16.4	61 47.6	90 24	16.0	60 26.4	90 22	14.7	59 59.1	91 22	14.3	4
15	64 10.3	86 30	20.2	63 44.4	87 30	19.6	62 52.2	87 28	18.5	62 25.9	88 27	18.0	61 59.6	88 26	17.5	61 33.1	88 26	17.0	60 13.0	89 24	15.6	59 46.1	90 23	15.1	15
6	63 52.0	84 32	21.3	63 26.7	85 31	20.7	62 35.4	86 29	19.6	62 09.6	86 29	19.0	61 43.7	87 28	18.5	61 17.6	87 27	18.0	59 58.8	88 25	16.5	59 32.3	88 24	16.0	6
7	63 32.9	83 33	22.4	63 08.0	83 33	21.8	62 17.8	84 31	20.6	61 52.4	85 30	20.0	61 27.0	85 29	19.5	61 01.4	86 28	18.9	59 43.8	87 26	17.4	59 17.7	87 26	16.9	7
8	63 12.9	81 35	23.5	62 48.5	83 34	22.8	61 59.3	83 33	21.6	61 34.4	84 31	21.0	61 08.9	84 31	20.4	60 44.5	84 30	19.9	59 28.0	86 27	18.3	59 02.4	86 27	17.8	8
9	62 52.0	79 36	24.5	62 28.1	80 35	23.8	61 39.9	81 34	22.6	61 15.6	81 33	21.9	60 51.1	82 32	21.3	60 26.4	82 31	20.8	59 11.6	84 29	18.6	58 46.3	84 28	18.6	9
20	62 30.2	77 38	25.5	62 07.0	78 37	24.8	61 19.8	79 35	23.5	60 56.0	80 34	22.9	60 32.0	80 33	22.3	60 07.8	81 32	21.7	58 54.4	82 30	19.9	58 29.6	83 29	19.4	20
1	62 07.7	75 39	26.4	61 45.0	76 38	25.7	60 58.9	77 36	24.4	60 35.6	78 35	23.8	60 12.1	79 34	23.1	59 48.5	79 33	22.5	58 36.5	81 31	20.8	58 12.2	81 30	20.2	1
2	61 44.5	73 40	27.4	61 22.3	74 39	26.6	60 37.3	76 37	25.3	60 14.6	76 36	24.6	59 51.6	77 35	24.0	59 28.4	77 35	23.3	58 17.9	79 32	21.5	57 54.1	80 31	21.0	2
3	61 20.5	72 41	28.2	60 58.9	72 40	27.5	60 15.0	74 38	26.1	59 52.8	74 37	25.4	59 30.4	75 36	24.8	59 07.7	76 34	24.2	57 58.7	78 33	22.2	57 35.4	78 32	21.7	3
4	60 55.8	70 42	29.1	60 34.8	70 41	28.4	59 52.1	72 39	26.9	59 30.4	73 38	26.3	59 08.5	73 38	25.6	58 46.4	74 37	24.9	57 38.9	76 34	23.0	57 16.1	76 33	22.4	4
25	60 30.5	68 43	29.9	60 10.0	69 42	29.2	59 28.4	70 40	27.7	59 07.3	71 39	27.0	58 45.9	72 39	26.4	58 24.4	72 38	25.7	57 18.5	74 35	23.8	56 56.1	75 34	23.2	25
6	60 04.5	66 44	30.7	59 44.7	67 43	29.9	59 04.2	68 41	28.5	58 43.6	69 40	27.8	58 22.8	70 40	27.1	58 01.8	70 39	26.4	56 57.5	72 36	24.5	56 35.6	73 35	23.8	6
7	59 38.0	64 45	31.4	59 18.7	65 44	30.7	58 39.4	66 42	29.2	58 19.4	67 41	28.5	57 59.1	68 40	27.8	57 38.6	69 40	27.1	56 35.9	71 37	25.1	56 14.6	71 36	24.5	7
8	59 10.9	62 46	32.2	58 52.2	63 45	31.4	58 14.1	65 43	29.9	57 54.6	65 42	29.2	57 34.8	66 41	28.5	57 14.9	67 40	27.8	56 13.8	69 38	25.8	55 53.0	70 37	25.1	8
9	58 43.3	60 47	32.8	58 25.2	61 46	32.1	57 48.1	63 44	30.6	57 29.2	63 43	29.9	57 10.1	64 42	29.1	56 50.7	65 41	28.4	55 51.2	67 39	26.4	55 30.9	68 38	25.8	9
30	58 15.1	58 48	33.5	57 57.6	59 47	32.7	57 21.7	61 45	31.2	57 03.4	62 44	30.5	56 44.8	62 43	29.8	56 25.9	63 42	29.1	55 28.0	65 39	27.0	55 08.3	66 38	26.4	30
1	57 46.5	56 48	34.1	57 29.6	57 47	33.3	56 54.8	59 46	31.8	56 37.0	60 45	31.1	56 19.0	61 44	30.4	56 00.7	61 43	29.7	55 04.4	64 40	27.6	54 45.2	64 39	26.9	1
2	57 17.5	54 49	34.7	57 01.1	55 48	33.9	56 27.4	57 46	32.4	56 10.2	58 45	31.7	55 52.7	59 44	31.0	55 35.0	60 44	30.2	54 40.4	62 41	28.2	54 21.7	63 40	27.5	2
3	56 48.0	52 50	35.3	56 32.6	53 49	34.5	56 00.3	55 48	33.0	55 43.0	56 46	32.3	55 26.1	57 45	31.5	55 08.9	58 44	30.8	54 15.9	60 42	28.7	53 57.7	61 41	28.0	3
4	56 18.0	50 50	35.8	56 02.8	51 50	35.0	55 31.4	53 48	33.5	55 15.3	54 47	32.8	54 59.0	55 46	32.1	54 42.4	56 45	31.3	53 51.0	58 42	29.2	53 33.4	59 41	28.5	4
35	55 47.8	48 51	36.3	55 33.1	49 50	35.6	55 02.8	51 48	34.0	54 47.3	52 47	33.3	54 31.5	53 46	32.6	54 15.4	54 46	31.8	53 25.7	56 43	29.7	53 08.6	57 42	29.0	35
6	55 17.1	47 52	36.8	55 03.0	48 51	36.1	54 33.8	49 49	34.5	54 18.9	50 48	33.8	54 03.6	51 47	33.1	53 48.1	52 46	32.3	53 00.0	55 43	30.2	52 43.5	55 43	29.5	6
7	54 46.1	45 53	37.2	54 32.5	46 51	36.5	54 04.5	48 49	35.0	53 50.1	49 48	34.3	53 35.4	49 48	33.5	53 20.4	50 47	32.8	52 33.9	53 44	30.7	52 17.9	54 43	30.0	7
8	54 14.8	43 53	37.7	54 01.8	44 52	37.0	53 34.9	46 50	35.4	53 21.0	47 49	34.7	53 06.8	48 48	34.0	52 52.4	49 47	33.2	52 07.5	51 45	31.1	51 52.1	52 44	30.4	8
9	53 43.2	41 53	38.1	53 30.7	42 52	37.4	53 04.9	44 50	35.9	52 51.5	45 50	35.1	52 37.9	46 49	34.4	52 24.0	47 48	33.7	51 40.8	49 45	31.5	51 25.9	50 44	30.8	9
40	53 11.3	39 54	38.5	52 59.3	40 53	37.8	52 34.6	42 51	36.3	52 21.8	43 50	35.5	52 08.7	44 49	34.8	51 55.4	45 48	34.1	51 13.8	48 46	31.9	50 59.4	48 45	31.2	40
1	52 39.1	38 54	38.9	52 27.7	38 53	38.1	52 04.0	41 51	36.6	51 51.8	41 50	35.9	51 39.3	42 50	35.2	51 26.4	43 49	34.4	50 46.4	46 46	32.3	50 32.6	47 45	31.6	1
2	52 06.7	36 54	39.3	51 55.8	37 54	38.5	51 33.2	39 52	37.0	51 21.5	40 51	36.3	51 09.5	40 50	35.5	50 57.2	41 49	34.8	50 18.8	44 46	32.7	50 05.5	45 46	32.0	2
3	51 34.0	34 55	39.6	51 23.7	35 54	38.8	51 02.2	37 52	37.3	50 51.0	38 51	36.6	50 39.5	39 50	35.9	50 27.7	40 50	35.1	49 50.9	42 47	33.0	49 38.2	43 46	32.3	3
4	51 01.2	32 55	39.9	50 51.3	33 54	39.1	50 30.8	35 53	37.7	50 20.2	36 52	36.9	50 09.2	37 51	36.2	49 58.0	38 50	35.5	49 22.8	40 47	33.3	49 10.5	41 46	32.6	4
45	50 28.1	31 55	40.2	50 18.8	31 55	39.4	49 59.3	33 53	38.0	49 49.2	34 52	37.2	49 38.8	35 51	36.5	49 28.1	36 50	35.8	48 54.4	39 48	33.6	48 42.7	40 47	32.9	45
6	49 54.8	29 56	40.4	49 46.0	30 55	39.7	49 27.6	32 53	38.2	49 18.0	33 52	37.5	49 08.1	33 52	36.8	48 57.9	34 51	36.1	48 25.8	37 48	33.9	48 14.6	38 47	33.2	6
7	49 21.4	27 56	40.7	49 13.1	28 55	40.0	48 55.7	30 54	38.5	48 46.6	31 53	37.8	48 37.2	32 52	37.1	48 27.5	33 51	36.3	47 57.0	35 49	34.2	47 46.3	36 48	33.5	7
8	48 47.7	25 56	40.9	48 40.0	26 55	40.2	48 23.6	28 54	38.7	48 15.0	29 53	38.0	48 06.1	30 52	37.3	47 56.9	31 51	36.6	47 28.0	33 49	34.5	47 17.8	34 48	33.8	8
9	48 14.0	24 57	41.1	48 06.7	25 56	40.4	47 51.3	27 54	39.0	47 43.2	27 53	38.3	47 34.8	28 52	37.5	47 26.2	29 52	36.8	46 58.8	32 49	34.7	46 49.1	33 48	34.0	9
50	47 40.1	22 57	41.3	47 33.3	23 56	40.6	47 18.9	25 54	39.2	47 11.3	26 53	38.5	47 03.4	27 53	37.8	46 55.3	28 52	37.1	46 29.4	30 49	35.0	46 20.2	31 48	34.3	50
1	47 06.0	21 57	41.5	46 59.7	21 56	40.8	46 46.4	23 54	39.4	46 39.2	24 54	38.7	46 31.8	25 53	38.0	46 24.2	26 52	37.3	45 59.8	28 50	35.2	45 51.2	29 49	34.5	1
2	46 31.9	19 57	41.7	46 26.1	20 56	41.0	46 13.6	22 55	39.6	46 07.0	22 54	38.9	46 00.1	23 53	38.2	45 53.0	24 52	37.5	45 30.1	27 50	35.4	45 22.0	28 49	34.7	2
3	45 57.6	17 57	41.8	45 52.3	18 56	41.1	45 40.8	20 55	39.7	45 34.7	21 54	39.0	45 28.3	22 53	38.3	45 21.7	22 53	37.6	45 00.3	25 50	35.6	44 52.6	26 49	34.9	3
4	45 23.3	16 57	42.0	45 18.4	17 57	41.3	45 07.9	18 55	39.9	45 02.2	19 54	39.2	44 56.3	20 53	38.5	44 50.2	21 53	37.8	44 30.3	23 50	35.7	44 23.1	24 49	35.1	4
55	44 48.8	14 58	42.1	44 44.4	15 57	41.4	44 34.8	17 55	40.0	44 29.7	18 54	39.3	44 24.3	18 54	38.6	44 18.6	19 53	38.0	44 00.2	22 50	35.9	43 53.5	23 50	35.2	55
6	44 14.3	13 58	42.2	44 10.4	14 57	41.5	44 01.7	15 56	40.1	43 57.0	16 55	39.5	43 52.1	17 54	38.8	43 46.9	18 53	38.1	43 29.9	20 51	36.1	43 23.8	21 50	35.4	6
7	43 39.7	11 58	42.3	43 36.2	12 57	41.6	43 28.5	14 55	40.2	43 24.3	14 55	39.6	43 19.9	15 54	39.0	43 15.2	16 53	38.2	42 59.6	19 51	36.2	42 54.0	19 50	35.5	7
8	43 05.1	10 58	42.4	43 02.0	10 57	41.7	42 55.3	12 56	40.4	42 51.5	13 55	39.7	42 47.5	14 54	39.0	42 43.3	14 53	38.3	42 29.2	17 51	36.3	42 24.0	18 50	35.7	8
9	42 30.4	08 58	42.5	42 27.8	09 57	41.8	42 21.9	11 56	40.4	42 18.6	11 55	39.8	42 15.1	12 54	39.1	42 11.4	13 53	38.4	41 58.7	15 51	36.4	41 54.0	16 50	35.8	9
60	41 55.6	07 58	42.5	41 53.5	07 57	41.9	41 48.5	09 56	40.5	41 45.7	10 55	39.9	41 42.6	11 54	39.2	41 39.4	11 53	38.5	41 28.1	14 51	36.5	41 23.9	14 50	35.9	60
1	41 20.8	05 58	42.6	41 19.1	06 57	41.9	41 15.1	07 56	40.6	41 12.7	08 55	39.9	41 10.1	09 54	39.3	41 07.3	10 54	38.6	40 57.5	12 52	36.7	40 53.8	13 50	36.0	1
2	40 46.0	04 58	42.6	40 44.8	05 57	41.9	40 41.6	06 56	40.6	40 39.7	07 55	40.0	40 37.6	08 54	39.3	40 35.2	08 54	38.7	40 26.8	10 51	36.7	40 23.5	11 50	36.0	2
3	40 11.2	02 58	42.6	40 10.4	03 57	42.0	40 08.1	05 56	40.7	40 06.6	05 55	40.0	40 05.0	06 54	39.4	40 03.0	07 54	38.7	39 56.0	09 51	36.8	39 53.2	10 51	36.1	3
4	39 36.4	01 58	42.6	39 36.0	02 57	42.0	39 34.6	03 56	40.7	39 33.6	04 55	40.0	39 32.3	04 54	39.4	39 30.9	05 54	38.8	39 25.2	07 51	36.8	39 22.9	08 51	36.2	4
65	39 01.5	01 58	42.6	39 01.6	00 57	42.0	39 01.0	02 56	40.7	39 00.5	02 55	40.1	38 59.7	03 54	39.4	38 58.7	04 54	38.8	38 54.4	06 51	36.9	38 52.5	07 51	36.2	65
6	38 26.7	02 58	42.6	38 27.2	01 57	42.0	38 27.5	00 56	40.7	38 27.3	00 55	40.1	38 27.0	02 54	39.4	38 26.4	02 54	38.8	38 23.5	05 51	36.9	38 22.1	05 51	36.3	6
7	37 51.8	03 58	42.6	37 52.7	03 57	42.0	37 53.9	01 56	40.7	37 54.2	01 55	40.1	37 54.3	00 54	39.4	37 54.2	01 54	38.8	37 52.6	03 52	36.9	37 51.7	03 51	36.3	7
8	37 17.0	05 58	42.6	37 18.4	04 57	42.0	37 20.4	03 56	40.7	37 21.1	03 55	40.1	37 21.6	01 54	39.4	37 22.0	01 54	38.8	37 21.7	02 52	36.9	37 21.3	01 51	36.3	8
9	36 42.2	06 58	42.5	36 44.0	05 57	41.9	36 46.9	04 56	40.7	36 48.0	04 56	40.1	36 49.0	03 54	39.4	36 49.7	02 54	38.8	36 50.8	00 52	36.9	36 50.8	00 52	36.3	9
70	36 07.5	07 58	42.5	36 09.6	07 57	41.9	36 13.4	06 56	40.6	36 14.9	05 55	40.0	36 16.3	04 54	39.4	36 17.5	04 54	38.8	36 19.9	02 52	36.9	36 20.4	01 51	36.3	70
1	35 32.8	09 58	42.4	35 35.3	08 57	41.8	35 39.9	07 56	40.6	35 41.8	06 55	40.0	35 43.7	06 54	39.3	35 45.3	05 54	38.7	35 49.0	03 51	36.9	35 49.9	03 51	36.3	1
2	34 58.1	10 58	42.4	35 01.0	10 57	41.8	35 06.4	08 56	40.5	35 08.6	08 55	39.9	35 11.1	07 54	39.3	35 13.1	07 54	38.7	35 18.2	05 51	36.9	35 19.5	05 51	36.3	2
3	34 23.4	12 58	42.3	34 26.8	11 57	41.7	34 33.0	10 56	40.5	34 35.8	09 55	39.9	34 38.5	09 54	39.3	34 41.0	08 54	38.7	34 47.3	06 51	36.8	34 49.1	06 51	36.2	3
4	33 48.9	13 58	42.2	33 52.6	12 57	41.6	33 59.6	11 56	40.4	34 02.9	11 55	39.8	34 06.0	10 54	39.2	34 08.8	09 53	38.6	34 16.5	08 51	36.8	34 18.7	07 51	36.2	4
75	33 14.3	14 57	42.1	33 18.5	14 57	41.5	33 26.3	13 55	40.3	33 30.0	13 55	39.7	33 33.5	11 54	39.1	33 36.8	11 53	38.5	33 45.7	10 51	36.8	33 48.3	08 51	36.2	75
6	32 39.9	15 57	42.0	32 44.4	15 57	41.3	32 53.1	14 55	40.2	32 57.1	13 55	39.7	33 01.0	13 53	39.1	33 04.7	12 53	38.5	33 14.9	10 51	36.7	33 18.0	10 50	36.1	6
7	32 05.5	17 57	41.9	32 10.4	16 57	41.3	32 19.9	15 55	40.2	32 24.3	15 55	39.6	32 28.6	14 54	39.0	32 32.8	14 53	38.4	32 44.2	12 51	36.6	32 47.7	11 50	36.0	7
8	31 31.2	18 57	41.8	31 36.5	18 56	41.2	31 46.7	16 55	40.0	31 51.6	16 54	39.5	31 56.3	15 54	38.9	32 00.9	15 53	38.3	32 13.6	13 51	36.5	32 17.5	13 50	36.0	8
9	30 57.0	19 57	41.7	31 02.7	19 56	41.1	31 13.7	17 54	39.9	31 18.9	17 54	39.4	31 24.1	17 54	38.8	31 29.0	16 53	38.2	31 43.0	15 51	36.5	31 47.3	14 50	35.9	9
80	30 22.8	21 57	41.6	30 28.9	20 56	40.9	30 40.6	20 55	39.8	30 46.3	19 54	39.2	30 51.9	19 54	38.6	30 57.3	18 53	38.0	31 12.4	16 51	36.4	31 17.2	16 50	35.8	80
1	29 48.8	22 57	41.4	29 55.3	21 56	40.8	30 07.8	20 55	39.7	30 13.9	19 54	39.1	30 19.8	19 53	38.6	30 25.6	19 53	38.0	30 42.0	17 51	36.3	30 47.1	17 50	35.7	1
2	29 14.8	23 56	41.2	29 21.7	23 56	40.7	29 35.0	22 54	39.6	29 41.5	21 54	39.0	29 47.8	21 53	38.4	29 54.0	20 53	37.9	30 11.6	19 50	36.2	30 17.2	18 50	35.6	2
3	28 41.0	24 56	41.1	28 48.2	24 56	40.5	29 02.3	23 54	39.4	29 09.2	23 54	38.9	29 15.9	22 53	38.3	29 22.4	22 52	37.7	29 41.3	20 50	36.0	29 47.3	20 50	35.5	3
4	28 07.2	26 56	40.9	28 14.9	25 55	40.4	28 29.7	24 54	39.3	28 37.0	24 54	38.7	28 44.0	23 53	38.1	28 51.0	23 52	37.6	29 11.1	22 50	35.9	29 17.5	21 50	35.4	4
85	27 33.5	27 56	40.7	27 41.6	26 55	40.2	27 57.2	26 54	39.1	28 04.8	25 53	38.6	28 12.3	25 53	38.0	28 19.7	24 52	37.4	28 40.9	24 50	35.8	28 47.7	22 49	35.3	85
6	27 00.1	28 56	40.6	27 08.5	28 55	40.0	27 24.9	27 54	38.9	27 32.9	27 53	38.4	27 40.7	26 52	37.9	27 48.5	26 52	37.3	28 10.9	24 50	35.7	28 18.1	24 49	35.1	6
7	26 26.7	29 55	40.4	26 35.5	29 55	39.8	26 52.6	28 53	38.8	27 01.0	28 53	38.2	27 09.2	27 52	37.7	27 17.4	27 52	37.1	27 41.0	26 50	35.5	27 48.6	25 49	35.0	7
8	25 53.5	31 55	40.2	26 02.6	30 55	39.6	26 20.5	29 53	38.6	26 29.2	29 53	38.0	26 37.8	29 52	37.5	26 46.4	28 51	37.0	27 11.2	26 50	35.4	27 19.2	27 49	34.8	8
9	25 20.4	32 55	40.1	25 29.9	31 54	39.4	25 48.4	31 53	38.4	25 57.5	31 52	37.9	26 06.6	30 52	37.3	26 15.5	29 51	36.8	26 41.4	28 49	35.2	26 49.9	28 48	34.7	9
90	24 47.4	33 55	39.8	24 57.3	33 54	39.2	25 16.6	31 53	38.2	25 26.1	31 52	37.7	25 35.5	31 52	37.1	25 44.7	31 51	36.6	26 11.9	30 49	35.0	26 20.7	29 48	34.5	90

Lat. 31°

H.A.	54° 30' Alt.	Δd	Δt	Az.	55° 00' Alt.	Δd	Δt	Az.	56° 00' Alt.	Δd	Δt	Az.	56° 30' Alt.	Δd	Δt	Az.	57° 00' Alt.	Δd	Δt	Az.	57° 30' Alt.	Δd	Δt	Az.	59° 00' Alt.	Δd	Δt	Az.	59° 30' Alt.	Δd	Δt	Az.	H.A.
91	24 14.6	34	54	39.6	24 24.8	34	54	39.0	24 44.9	33	53	38.0	24 54.7	33	52	37.5	25 04.5	32	51	37.0	25 14.1	32	51	36.4	25 42.4	31	49	34.9	25 51.6	30	48	34.3	91
2	23 41.9	35	54	39.3	23 52.5	35	54	38.8	24 13.3	34	52	37.8	24 23.5	34	52	37.3	24 33.6	34	51	36.8	24 43.7	33	51	36.2	25 13.1	32	49	34.7	25 22.7	32	48	34.2	2
3	23 09.4	37	54	39.1	23 20.3	36	53	38.6	23 41.8	36	52	37.6	23 52.4	35	52	37.1	24 02.9	35	51	36.6	24 13.3	34	50	36.0	24 43.9	33	48	34.5	24 53.9	33	48	34.0	3
4	22 37.1	38	54	38.9	22 48.3	37	53	38.4	23 10.5	37	52	37.4	23 21.5	36	51	36.9	23 32.4	36	51	36.3	23 43.1	36	50	35.8	24 14.8	35	48	34.3	24 25.2	34	48	33.8	4
95	22 04.9	39	53	38.6	22 16.5	39	53	38.1	22 39.4	38	52	37.1	22 50.7	38	51	36.6	23 02.0	37	50	36.1	23 13.1	37	50	35.6	23 45.9	36	48	34.1	23 56.7	36	47	33.6	95
6	21 32.8	40	53	38.4	21 44.8	40	52	37.9	22 08.4	39	51	36.9	22 20.1	39	51	36.4	22 31.7	39	50	35.9	22 43.2	38	50	35.4	23 17.2	37	48	33.9	23 28.3	37	47	33.4	6
7	21 01.0	41	53	38.1	21 13.3	41	52	37.6	21 37.7	40	51	36.7	21 49.7	40	50	36.2	22 01.7	40	50	35.7	22 13.5	39	49	35.2	22 48.6	38	47	33.7	23 00.1	38	47	33.2	7
8	20 29.3	42	52	37.9	20 42.0	42	52	37.4	21 07.0	41	51	36.4	21 19.4	41	50	35.9	21 31.7	41	50	35.4	21 44.0	41	49	34.9	22 20.1	40	47	33.5	22 32.0	39	46	33.0	8
9	19 57.9	43	52	37.6	20 10.8	43	52	37.1	20 36.6	43	50	36.2	20 49.3	42	50	35.7	21 02.0	42	49	35.2	21 14.6	42	49	34.7	21 51.9	41	47	33.2	22 04.1	41	46	32.7	9
100	19 26.6	45	52	37.3	19 39.9	44	51	36.9	20 06.3	44	50	35.9	20 19.4	44	50	35.4	20 32.5	43	49	34.9	20 45.4	43	48	34.5	21 23.8	42	47	33.0	21 36.4	42	46	32.5	100
1	18 55.5	46	52	37.1	19 09.1	45	51	36.6	19 36.3	45	50	35.6	19 49.7	45	49	35.2	20 03.1	44	49	34.7	20 16.4	44	48	34.2	20 55.8	43	46	32.8	21 08.8	43	46	32.3	1
2	18 24.6	47	51	36.8	18 38.6	47	51	36.3	19 06.4	46	49	35.4	19 20.2	46	49	34.9	19 33.9	46	48	34.4	19 47.6	45	48	34.0	20 28.1	45	46	32.5	20 41.4	44	45	32.1	2
3	17 53.9	48	51	36.5	18 08.2	48	50	36.0	18 36.7	47	49	35.1	18 50.9	47	49	34.6	19 05.0	47	48	34.2	19 19.0	47	47	33.7	20 00.5	46	46	32.3	20 14.2	46	45	31.8	3
4	17 23.4	49	50	36.2	17 38.1	49	50	35.7	18 07.3	48	49	34.8	18 21.8	48	48	34.4	18 36.2	48	48	33.9	18 50.5	48	47	33.4	19 33.2	47	45	32.0	19 47.2	47	45	31.6	4
105	16 53.2	50	50	35.9	17 08.2	50	50	35.4	17 38.0	50	48	34.5	17 52.8	49	48	34.1	18 07.6	49	47	33.6	18 22.3	49	47	33.2	19 06.0	48	45	31.8	19 20.4	48	44	31.3	105
6	16 23.1	51	50	35.6	16 38.5	51	49	35.1	17 09.0	51	48	34.2	17 24.1	50	47	33.8	17 39.2	50	47	33.3	17 54.3	50	46	32.9	18 39.0	49	45	31.5	18 53.8	49	44	31.0	6
7	15 53.3	52	49	35.3	16 09.0	52	49	34.8	16 40.2	52	48	33.9	16 55.6	52	47	33.5	17 11.1	51	47	33.0	17 26.5	51	46	32.6	18 12.2	51	44	31.2	18 27.4	50	44	30.8	7
8	15 23.7	53	49	34.9	15 39.7	53	48	34.5	16 11.6	53	47	33.6	16 27.4	53	47	33.2	16 43.2	52	46	32.7	16 58.9	52	46	32.3	17 45.7	52	44	31.0	18 01.2	51	43	30.5	8
9	14 54.4	54	48	34.6	15 10.7	54	48	34.2	15 43.2	54	47	33.3	15 59.4	54	46	32.9	16 15.5	54	46	32.4	16 31.5	53	45	32.0	17 19.3	53	44	30.7	17 35.2	53	43	30.2	9
110	14 25.3	56	48	34.3	14 41.9	55	48	33.9	15 15.1	55	46	33.0	15 31.5	55	46	32.6	15 48.0	55	45	32.1	16 04.4	55	45	31.7	16 53.2	54	43	30.4	17 09.4	54	43	29.9	110
1	13 56.4	57	48	34.0	14 13.4	56	47	33.5	14 47.2	56	46	32.7	15 04.0	56	46	32.3	15 20.7	56	45	31.8	15 37.5	56	44	31.4	16 27.3	55	43	30.1	16 43.8	55	42	29.7	1
2	13 27.8	58	47	33.6	13 45.1	57	47	33.2	14 19.5	57	46	32.4	14 36.7	57	45	31.9	14 53.8	57	45	31.5	15 10.8	57	44	31.1	16 01.6	56	42	29.8	16 18.5	56	42	29.4	2
3	12 59.5	59	47	33.3	13 17.1	59	46	32.9	13 52.1	58	45	32.0	14 09.6	58	45	31.6	14 27.0	58	44	31.2	14 44.4	58	44	30.8	15 36.2	57	42	29.5	15 53.4	57	41	29.1	3
4	12 31.4	60	46	32.9	12 49.3	60	46	32.5	13 25.0	59	45	31.7	13 42.8	59	44	31.3	14 00.5	59	44	30.9	14 18.2	59	43	30.4	15 11.0	58	42	29.2	15 28.5	58	41	28.8	4
115	12 03.6	61	46	32.6	12 21.8	61	45	32.2	12 58.1	60	44	31.3	13 16.2	60	44	30.9	13 34.3	60	43	30.5	13 52.3	60	43	30.1	14 46.1	60	41	28.9	15 03.9	59	41	28.4	115
6	11 36.1	62	45	32.2	11 54.6	62	45	31.8	12 31.5	61	44	31.0	12 49.9	61	43	30.6	13 08.3	61	43	30.2	13 26.6	61	42	29.8	14 21.4	61	41	28.5	14 39.5	60	40	28.1	6
7	11 08.8	63	45	31.8	11 27.6	63	44	31.4	12 05.2	62	43	30.6	12 23.9	62	43	30.2	12 42.6	62	42	29.8	13 01.2	62	42	29.4	13 56.9	62	40	28.2	14 15.4	62	40	27.8	7
8	10 41.8	64	44	31.5	11 00.9	64	44	31.1	11 39.1	63	43	30.3	11 58.1	63	42	29.9	12 17.1	63	42	29.5	12 36.1	63	41	29.1	13 32.7	63	40	27.9	13 51.5	63	39	27.5	8
9	10 15.1	65	44	31.1	10 34.6	65	44	30.7	11 13.3	64	42	29.9	11 32.6	64	42	29.5	11 51.9	64	42	29.1	12 11.2	64	41	28.7	13 08.8	64	39	27.6	13 27.9	64	39	27.2	9
120	9 48.7	66	44	30.7	10 08.5	66	43	30.3	10 47.8	65	42	29.5	11 07.4	65	42	29.2	11 27.0	65	41	28.8	11 46.6	65	41	28.4	12 45.1	65	39	27.2	13 04.6	65	38	26.8	120
1	9 22.6	67	43	30.3	9 42.6	67	42	29.9	10 22.6	66	42	29.2	10 42.5	66	41	28.8	11 02.4	66	41	28.4	11 22.3	66	40	28.0	12 21.8	66	38	26.9	12 41.5	66	38	26.5	1
2	8 56.8	68	42	29.9	9 17.1	68	42	29.5	9 57.7	67	41	28.8	10 17.9	67	41	28.4	10 38.1	67	40	28.0	10 58.3	67	40	27.7	11 58.7	67	38	26.5	12 18.7	67	38	26.1	2
3	8 31.4	69	42	29.5	8 52.0	69	41	29.1	9 33.1	68	40	28.4	9 53.6	68	40	28.0	10 14.1	68	40	27.7	10 34.6	68	39	27.3	11 35.8	68	38	26.2	11 56.3	68	37	25.8	3
4	8 06.2	70	41	29.1	8 27.1	70	41	28.7	9 08.8	69	40	28.0	9 29.6	69	40	27.6	9 50.4	69	39	27.3	10 11.1	69	39	26.9	11 13.3	69	37	25.8	11 34.0	69	37	25.4	4
125	7 41.3	71	41	28.7	8 02.5	71	40	28.3	8 44.8	70	39	27.6	9 05.9	70	39	27.3	9 27.0	70	38	26.9	9 48.0	70	38	26.5	10 51.1	70	37	25.4	11 12.0	70	36	25.1	125
6	7 16.8	72	40	28.3	7 38.3	71	40	27.9	8 21.1	71	39	27.2	8 42.5	71	38	26.9	9 03.9	71	38	26.5	9 25.2	71	38	26.1	10 29.1	71	36	25.1	10 50.4	71	36	24.7	6
7	6 52.6	72	40	27.8	7 14.4	72	39	27.5	7 57.7	72	38	26.8	8 19.4	72	38	26.5	8 41.1	72	37	26.1	9 02.7	72	37	25.8	10 07.5	72	36	24.7	10 29.0	72	35	24.3	7
8	6 28.8	73	39	27.4	6 50.8	73	39	27.1	7 34.7	73	38	26.4	7 56.7	73	37	26.0	8 18.6	73	37	25.7	8 40.5	73	36	25.4	9 46.1	73	35	24.3	10 08.0	73	35	24.0	8
9	6 05.3	74	39	27.0	6 27.5	74	38	26.7	7 12.0	74	37	26.0	7 34.2	74	37	25.6	7 56.5	74	36	25.3	8 18.6	74	36	25.0	9 25.1	74	35	23.9	9 47.2	74	34	23.6	9
130	5 42.1	75	38	26.6	6 04.6	75	38	26.2	6 49.7	75	37	25.6	7 12.2	75	36	25.2	7 34.6	75	36	24.9	7 57.1	75	35	24.6	9 04.4	75	34	23.5	9 26.8	75	34	23.2	130
1	5 19.3	76	37	26.1	5 42.1	76	37	25.8	6 27.6	76	36	25.1	6 50.4	76	36	24.8	7 13.2	76	35	24.5	7 35.9	76	35	24.1	8 44.0	76	33	23.2	9 06.7	76	33	22.8	1
2					5 19.9	77	36	25.3	6 06.0	77	36	24.7	6 29.0	77	35	24.4	6 52.0	77	35	24.1	7 15.0	77	34	23.7	8 24.0	77	33	22.8	8 46.9	77	32	22.4	2
3									5 44.7	78	35	24.3	6 07.9	78	34	24.0	6 31.2	78	34	23.6	6 54.5	78	34	23.3	8 04.2	77	32	22.4	8 27.4	77	32	22.0	3
4									5 23.7	79	34	23.8	5 47.2	78	34	23.5	6 10.8	78	33	23.2	6 34.3	78	33	22.9	7 44.8	78	32	22.0	8 08.3	78	31	21.6	4
135									5 03.1	79	34	23.4	5 26.9	79	33	23.1	5 50.7	79	33	22.8	6 14.5	79	32	22.5	7 25.8	79	31	21.5	7 49.5	79	31	21.2	135
6													5 06.9	80	33	22.6	5 31.0	80	32	22.3	5 55.0	80	32	22.0	7 07.0	80	31	21.1	7 31.0	80	30	20.8	6
7																	5 11.6	81	32	21.9	5 35.9	81	31	21.6	6 48.7	81	30	20.7	7 12.9	81	30	20.4	7
8																					5 17.1	82	31	21.2	6 30.7	82	29	20.3	6 55.2	82	29	20.0	8
9																									6 13.0	82	29	19.9	6 37.8	82	28	19.6	9
140																									5 55.7	83	28	19.4	6 20.7	83	28	19.2	140
1																									5 38.8	84	28	19.0	6 04.0	84	27	18.7	1
2																									5 22.2	85	27	18.6	5 47.6	85	27	18.3	2
3																									5 06.0	86	26	18.1	5 31.7	86	26	17.9	3
4																													5 16.1	86	25	17.4	4
145																													5 00.9	87	25	17.0	145

Lat. 32°
Lat. 33°
Lat. 34°
Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

Lat. 31°

H.A.	60° 00' Alt.	Δd Δt	Az.	60° 30' Alt.	Δd Δt	Az.	62° 00' Alt.	Δd Δt	Az.	62° 30' Alt.	Δd Δt	Az.	63° 00' Alt.	Δd Δt	Az.	69° 00' Alt.	Δd Δt	Az.	69° 30' Alt.	Δd Δt	Az.	74° 30' Alt.	Δd Δt	Az.	H.A.
00	61 00.0	1.001	00.0	60 30.0	1.001	00.0	59 00.0	1.001	00.0	58 30.0	1.001	00.0	58 00.0	1.001	00.0	52 00.0	1.001	00.0	51 30.0	1.001	00.0	46 30.0	1.000	00.0	00
1	60 59.5	1.002	01.0	60 29.6	1.002	01.0	58 59.6	1.002	00.9	58 29.6	1.002	00.9	57 59.6	1.002	00.9	51 59.7	1.001	00.6	51 29.7	1.001	00.6	46 29.8	1.001	00.4	1
2	60 58.2	1.004	02.1	60 28.2	1.004	02.0	58 58.4	1.003	01.8	58 28.4	1.003	01.8	57 58.5	1.003	01.7	51 59.0	1.002	01.2	51 29.0	1.002	01.1	46 29.3	1.001	00.8	2
3	60 55.8	1.005	03.1	60 26.0	1.005	03.0	58 56.3	1.005	02.7	58 26.4	1.005	02.6	57 56.7	1.004	02.6	51 57.6	1.003	01.7	51 27.7	1.003	01.7	46 28.4	1.002	01.2	3
4	60 52.6	99 07	04.1	60 22.8	99 07	04.0	58 53.5	99 06	03.6	58 23.7	99 06	03.5	57 53.9	99 06	03.4	51 55.8	1.004	02.3	51 26.0	1.004	02.2	46 27.2	1.003	01.6	4
05	60 48.5	99 08	05.1	60 18.8	99 08	05.0	58 49.8	99 07	04.5	58 20.1	99 07	04.4	57 50.4	99 07	04.3	51 53.5	99 05	02.9	51 23.7	99 05	02.8	46 25.6	99 03	01.9	05
6	60 43.4	98 10	06.1	60 13.9	98 10	06.0	58 45.3	98 09	05.4	58 15.8	99 08	05.3	57 46.2	99 08	05.1	51 50.6	99 06	03.5	51 20.9	99 05	03.4	46 23.7	99 04	02.3	6
7	60 37.5	98 11	07.1	60 08.2	98 11	06.9	58 40.1	98 10	06.3	58 10.7	98 10	06.1	57 41.3	98 10	05.9	51 47.2	99 06	04.0	51 17.7	99 06	03.9	46 21.5	99 04	02.7	7
8	60 30.6	97 13	08.1	60 01.5	97 12	07.9	58 34.0	97 11	07.0	58 04.8	97 11	06.8	57 35.4	97 11	06.8	51 43.4	98 07	04.6	51 13.9	98 07	04.5	46 18.9	98 05	03.1	8
9	60 22.9	96 14	09.1	59 54.1	96 14	08.8	58 27.2	97 13	08.1	57 58.2	97 12	07.8	57 29.1	97 12	07.6	51 39.0	98 08	05.2	51 09.7	98 08	05.0	46 15.9	98 05	03.5	9
10	60 14.4	95 16	10.1	59 45.7	96 15	09.8	58 19.6	96 14	08.9	57 50.8	96 14	08.7	57 22.0	96 13	08.4	51 34.1	97 09	05.7	51 04.9	97 09	05.6	46 12.7	98 06	03.8	10
1	60 05.0	94 17	11.0	59 36.6	95 17	10.7	58 11.2	95 15	09.8	57 42.7	95 15	09.5	57 14.1	95 14	09.2	51 28.7	97 10	06.3	50 59.7	97 10	06.1	46 09.0	97 07	04.2	1
2	59 54.7	93 18	12.0	59 26.6	94 18	11.6	58 02.1	94 16	10.6	57 33.8	94 16	10.3	57 05.5	94 15	10.0	51 22.8	96 11	06.9	50 54.0	96 10	06.6	46 05.1	97 07	04.6	2
3	59 43.6	92 20	12.9	59 15.9	93 19	12.5	57 52.3	93 17	11.5	57 24.3	93 17	11.1	56 56.2	94 17	10.8	51 16.4	95 11	07.4	50 47.8	95 11	07.2	46 00.8	96 08	05.0	3
4	59 31.8	91 21	13.8	59 04.3	91 20	13.4	57 41.7	92 19	12.3	57 14.0	92 16	11.9	56 46.3	93 18	11.6	51 09.5	94 12	07.9	50 41.2	94 12	07.7	45 56.2	95 08	05.3	4
15	59 19.1	90 22	14.7	58 52.0	90 22	14.3	57 30.4	91 19	13.1	57 03.1	91 19	12.7	56 35.6	92 19	12.3	51 02.2	94 13	08.5	50 34.1	94 13	08.2	45 51.2	95 09	05.7	15
6	59 05.7	89 24	15.6	58 39.0	89 23	15.1	57 18.4	90 21	13.9	56 51.4	90 20	13.5	56 24.3	90 20	13.1	50 54.4	93 14	09.0	50 26.5	93 13	08.7	45 46.0	94 09	06.1	6
7	58 51.5	87 25	16.4	58 25.2	88 24	16.0	57 05.8	89 22	14.6	56 39.1	89 22	14.2	56 12.7	89 21	13.8	50 46.1	92 15	09.5	50 18.5	92 14	09.2	45 40.4	93 10	06.4	7
8	58 36.6	86 26	17.3	58 10.7	86 25	16.8	56 52.4	87 23	15.4	56 26.2	88 23	15.0	55 59.8	88 21	14.5	50 37.3	91 15	10.1	50 10.0	91 15	09.7	45 34.5	93 10	06.8	8
9	58 21.0	85 27	18.1	57 55.5	85 26	17.6	56 38.5	86 24	16.1	56 12.6	86 24	15.7	55 46.6	87 23	15.2	50 28.1	90 16	10.6	50 01.1	90 16	10.2	45 28.3	92 11	07.1	9
20	58 04.7	83 28	18.9	57 39.7	84 28	18.4	56 23.9	85 25	16.9	55 58.4	85 25	16.4	55 32.8	86 24	15.9	50 18.5	89 17	11.1	49 51.8	89 16	10.7	45 21.7	91 11	07.5	20
1	57 47.7	82 29	19.6	57 23.2	82 29	19.1	56 08.6	83 26	17.6	55 43.5	84 26	17.1	55 18.3	84 25	16.6	50 08.4	88 18	11.6	49 42.0	88 17	11.2	45 14.9	90 12	07.8	1
2	57 30.1	80 30	20.4	57 06.0	81 30	19.7	55 52.8	82 27	18.3	55 28.1	82 27	17.8	55 03.4	83 26	17.3	49 57.9	87 18	12.0	49 31.8	87 18	11.7	45 07.7	89 12	08.2	2
3	57 11.9	79 31	21.1	56 48.2	79 31	20.6	55 36.4	81 28	18.9	55 12.2	81 26	18.4	54 47.8	81 27	17.9	49 46.9	85 19	12.5	49 21.2	86 18	12.1	45 00.3	88 13	08.5	3
4	56 53.0	77 32	21.9	56 29.9	78 32	21.3	55 19.4	79 29	19.6	54 55.6	79 28	19.1	54 31.7	80 28	18.6	49 35.5	84 20	13.0	49 10.2	85 19	12.6	44 52.5	87 13	08.8	4
25	56 33.6	75 33	22.5	56 10.9	76 32	22.0	55 01.9	77 30	20.3	54 38.5	78 29	19.7	54 15.1	78 29	19.2	49 23.8	83 20	13.5	48 58.8	83 20	13.0	44 44.5	86 14	09.1	25
6	56 13.6	74 34	23.2	55 51.4	74 33	22.6	54 43.8	76 31	20.9	54 20.9	76 30	20.3	53 57.9	77 29	19.8	49 11.6	82 21	13.9	48 47.0	82 21	13.5	44 36.2	85 14	09.5	6
7	55 53.1	72 35	23.9	55 31.4	73 34	23.3	54 25.2	74 31	21.5	54 02.8	75 31	20.9	53 40.3	75 30	20.4	48 59.1	81 22	14.4	48 34.9	81 21	13.9	44 27.6	84 15	09.8	7
8	55 32.0	70 36	24.5	55 10.8	71 35	23.9	54 06.1	73 32	22.1	53 44.2	73 32	21.5	53 22.2	74 31	20.9	48 46.1	79 22	14.8	48 22.3	80 22	14.3	44 18.7	83 15	10.1	8
9	55 10.4	69 37	25.1	54 49.7	69 36	24.5	53 46.6	71 33	22.7	53 25.1	72 33	22.1	53 03.6	72 32	21.5	48 32.8	78 23	15.2	48 09.4	78 22	14.7	44 09.5	82 16	10.4	9
30	54 48.3	67 38	25.7	54 28.2	68 37	25.1	53 26.5	69 34	23.2	53 05.6	70 33	22.6	52 44.5	71 33	22.0	48 19.1	76 23	15.6	47 56.1	77 23	15.2	44 00.1	80 16	10.7	30
1	54 25.8	65 38	26.3	54 06.2	66 37	25.6	53 06.0	68 35	23.7	52 45.6	68 34	23.1	52 25.2	69 33	22.5	48 05.1	75 24	16.0	47 42.5	75 23	15.5	43 50.4	79 17	11.0	1
2	54 02.8	63 39	26.8	53 43.7	64 38	26.2	52 45.1	66 36	24.3	52 25.2	67 35	23.7	52 05.1	67 34	23.0	47 50.7	74 25	16.4	47 28.6	74 24	15.9	43 40.5	78 17	11.3	2
3	53 39.4	62 40	27.4	53 20.8	62 39	26.7	52 23.8	64 36	24.8	52 04.3	65 35	24.2	51 44.7	66 35	23.5	47 36.0	72 25	16.8	47 14.3	73 24	16.3	43 30.3	77 17	11.6	3
4	53 15.5	60 40	27.9	52 57.5	61 40	27.2	52 02.0	63 37	25.3	51 43.1	63 36	24.6	51 24.0	64 35	24.0	47 20.9	71 26	17.2	46 59.7	71 25	16.7	43 19.9	75 18	11.9	4
35	52 51.3	58 41	28.4	52 33.8	59 40	27.7	51 39.9	61 38	25.7	51 21.5	62 37	25.1	51 02.9	62 36	24.5	47 05.6	69 26	17.6	46 44.7	70 25	17.0	43 09.2	74 18	12.1	35
6	52 26.7	56 42	28.8	52 09.7	57 41	28.2	51 17.4	59 38	26.2	50 59.5	60 37	25.5	50 41.4	61 36	24.9	46 49.9	68 27	17.9	46 29.5	68 26	17.4	42 58.3	73 19	12.4	6
7	52 01.7	55 42	29.2	51 45.2	55 41	28.6	50 54.5	58 39	26.6	50 37.1	58 38	26.0	50 19.6	59 37	25.3	46 33.9	66 27	18.3	46 14.0	67 26	17.7	42 47.1	71 19	12.7	7
8	51 36.4	53 43	29.7	51 20.5	54 42	29.0	50 31.3	56 39	27.0	50 14.4	56 38	26.4	49 57.4	57 38	25.7	46 17.6	65 28	18.6	45 58.2	65 27	18.1	42 35.7	70 19	12.9	8
9	51 10.7	51 43	30.1	50 55.3	52 42	29.4	50 07.7	54 40	27.4	49 51.4	55 39	26.8	49 34.9	55 38	26.1	46 01.1	63 28	19.0	45 42.1	64 27	18.4	42 24.1	68 20	13.2	9
40	50 44.8	49 44	30.5	50 29.9	50 43	29.8	49 43.9	52 40	27.8	49 28.1	53 39	27.2	49 12.1	54 39	26.5	45 44.2	61 28	19.3	45 25.7	62 28	18.7	42 12.3	67 20	13.4	40
1	50 18.5	47 44	30.9	50 04.2	48 43	30.2	49 19.7	51 41	28.2	49 04.4	51 40	27.5	48 48.9	52 39	26.9	45 27.1	60 29	19.6	45 09.1	60 28	19.0	42 00.3	65 20	13.6	1
2	49 51.9	46 45	31.3	49 38.1	46 44	30.6	48 55.3	49 41	28.6	48 40.5	50 40	27.9	48 25.5	50 39	27.2	45 09.8	58 29	19.9	44 52.2	59 29	19.3	41 48.0	64 21	13.9	2
3	49 25.1	44 45	31.6	49 11.8	45 44	30.9	48 30.5	47 42	28.9	48 16.3	48 41	28.2	48 01.9	49 40	27.6	44 52.1	57 30	20.2	44 35.1	57 29	19.6	41 35.6	62 21	14.1	3
4	48 58.0	42 46	31.9	48 45.3	43 45	31.3	48 05.6	45 42	29.2	47 51.8	46 41	28.6	47 37.9	47 40	27.9	44 34.3	55 30	20.5	44 17.7	55 29	19.9	41 23.0	61 21	14.3	4
45	48 30.7	40 46	32.3	48 18.5	41 45	31.6	47 40.3	44 42	29.5	47 27.1	44 42	28.7	47 13.7	45 41	28.2	44 16.2	53 31	20.7	44 00.1	54 30	20.1	41 10.1	59 22	14.5	45
6	48 03.1	39 46	32.6	47 51.4	39 45	31.9	47 14.9	42 43	29.8	47 02.2	43 42	29.2	46 49.3	43 41	28.5	43 57.9	52 31	21.0	43 42.3	52 30	20.4	40 57.1	58 22	14.7	6
7	47 35.4	37 47	32.8	47 24.2	38 46	32.1	46 49.2	40 43	30.1	46 37.0	41 42	29.4	46 24.6	42 41	28.8	43 39.4	50 31	21.2	43 24.3	51 30	20.6	40 44.0	56 22	14.9	7
8	47 07.4	35 47	33.1	46 56.7	36 46	32.4	46 23.2	38 44	30.4	46 11.6	39 43	29.7	45 59.8	40 42	29.1	43 20.6	48 32	21.5	43 06.1	49 31	20.9	40 30.6	55 23	15.1	8
9	46 39.2	33 47	33.3	46 29.0	34 46	32.7	45 57.1	37 44	30.6	45 46.0	37 43	30.0	45 34.7	38 42	29.3	43 01.7	47 32	21.7	42 47.6	47 31	21.1	40 17.1	53 23	15.3	9
50	46 10.8	32 48	33.6	46 01.2	33 47	32.9	45 30.8	35 44	30.9	45 20.2	36 43	30.4	45 09.4	36 42	29.5	42 42.6	46 32	21.9	42 29.0	46 31	21.3	40 03.5	51 23	15.5	50
1	45 42.3	30 48	33.8	45 33.2	31 47	33.1	45 04.3	33 44	31.1	44 54.3	34 44	30.4	44 44.0	35 43	29.8	42 23.3	43 32	22.2	42 10.2	44 32	21.5	39 49.6	50 23	15.7	1
2	45 13.6	28 48	34.0	45 05.0	29 47	33.3	44 37.7	31 45	31.3	44 28.1	32 44	30.7	44 18.3	33 43	30.0	42 03.8	42 33	22.4	41 51.2	42 32	21.5	39 35.6	48 24	15.9	2
3	44 44.8	27 48	34.2	44 36.6	27 47	33.5	44 10.9	30 45	31.5	44 01.8	31 44	30.9	43 52.5	31 43	30.2	41 44.1	40 33	22.6	41 32.1	40 32	21.9	39 21.5	46 24	16.0	3
4	44 15.8	25 48	34.4	44 08.2	26 48	33.7	43 43.9	28 45	31.7	43 35.4	29 44	31.0	43 26.6	30 43	30.5	41 24.3	38 33	22.7	41 12.8	39 32	22.1	39 07.2	45 24	16.2	4
55	43 46.7	24 48	33.9	43 10.8	22 48	34.0	43 08.8	27 45	31.2	43 00.5	28 44	30.6	42 54.3	28 44	30.6	41 04.4	36 34	22.9	40 53.4	36 34	22.3	38 52.8	43 24	16.3	55
6	43 17.4	22 49	34.7	43 10.8	22 48	34.2	42 49.6	25 46	32.1	42 42.1	25 46	31.4	42 34.3	26 44	30.9	40 44.3	35 34	23.1	40 33.8	35 34	22.5	38 38.3	42 24	16.5	6
7	42 48.1	20 49	34.9	42 42.0	21 48	34.2	42 22.2	23 46	32.2	42 15.2	24 45	31.5	42 07.9	25 44	30.9	40 24.1	33 34	23.2	40 14.3	34 33	22.6	38 23.6	40 25	16.6	7
8	42 18.6	18 49	35.0	42 13.0	19 48	34.3	41 54.8	21 46	32.3	41 48.2	22 45	31.7	41 41.5	23 44	31.0	40 03.7	31 34	23.4	39 54.2	32 33	22.8	38 08.9	38 25	16.7	8
9	41 49.1	17 49	35.1	41 44.0	18 49	34.4	41 27.1	20 46	32.4	41 21.2	20 45	31.8	41 14.9	21 44	31.2	39 43.2	30 34	23.5	39 34.2	30 33	22.9	37 54.0	36 25	16.9	9
60	41 19.5	15 50	35.3	41 14.8	16 49	34.6	40 59.5	18 46	32.6	40 54.0	19 45	31.9	40 48.2	20 45	31.3	39 22.6	28 34	23.7	39 14.2	29 34	23.1	37 39.0	35 25	17.0	60
1	40 49.8	14 50	35.3	40 45.6	14 49	34.7	40 31.8	16 46	32.7	40 26.8	17 46	32.1	40 21.5	18 45	31.4	39 01.9	26 35	23.8	38 54.0	27 34	23.2	37 23.9	33 25	17.1	1
2	40 20.0	12 50	35.4	40 16.4	13 49	34.7	40 04.0	15 46	32.8	39 59.4	16 46	32.2	39 54.7	16 45	31.5	38 41.1	24 35	23.9	38 33.7	25 34	23.3	37 08.8	31 25	17.2	2
3	39 50.2	10 50	35.5	39 47.0	11 49	34.8	39 36.1	13 47	32.9	39 32.0	14 46	32.2	39 27.7	15 45	31.6	38 20.2	23 35	24.0	38 13.3	23 34	23.4	36 53.5	30 26	17.3	3
4	39 20.4	09 50	35.6	39 17.6	09 49	34.9	39 08.1	12 47	33.0	39 04.6	12 46	32.3	39 00.8	13 45	31.7	37 59.2	21 35	24.1	37 52.8	22 34	23.5	36 38.1	28 26	17.4	4
65	38 50.5	07 50	35.6	38 48.2	08 49	34.9	38 40.1	10 47	33.0	38 37.0	11 46	32.4	38 33.7	11 45	31.7	37 38.2	19 35	24.2	37 32.3	20 34	23.6	36 22.7	26 26	17.5	65
6	38 20.5	06 50	35.6	38 18.7	06 49	35.0	38 12.1	08 47	33.1	38 09.5	09 46	32.4	38 06.6	10 45	31.8	37 17.1	18 35	24.3	37 11.7	18 34	23.7	36 07.2	25 26	17.6	6
7	37 50.6	04 50	35.6	37 49.2	05 49	35.0	37 44.0	07 47	33.1	37 41.9	07 46	32.5	37 39.5	08 45	31.9	36 55.9	16 35	24.4	36 51.0	17 35	23.8	35 51.6	23 26	17.7	7
8	37 20.6	03 50	35.7	37 19.7	03 49	35.0	37 15.9	05 47	33.2	37 14.2	06 46	32.5	37 12.3	07 45	31.9	36 34.4	14 36	24.4	36 30.2	15 35	23.8	35 36.0	21 26	17.7	8
9	36 50.6	01 50	35.7	36 50.2	02 49	35.1	36 47.7	04 47	33.2	36 46.5	04 46	32.6	36 45.2	05 45	31.9	36 13.3	13 36	24.5	36 09.4	13 35	23.9	35 20.3	19 26	17.8	9
70	36 20.6	00 50	35.7	36 20.6	00 49	35.1	36 19.6	02 47	33.2	36 18.9	03 46	32.6	36 17.9	03 45	32.0	35 52.0	11 36	24.6	35 48.6	12 35	23.9	35 04.5	18 26	17.9	70
1	35 50.6	02 50	35.7	35 51.1	01 49	35.1	35 51.4	01 47	33.2	35 51.2	01 46	32.6	35 50.7	02 45	32.0	35 30.6	09 36	24.6	35 27.7	10 35	24.0	34 48.7	16 26	17.9	1
2	35 20.6	03 50	35.7	35 21.5	03 49	35.0	35 23.3	00 47	33.2	35 23.5	00 46	32.6	35 23.5	00 45	32.0	35 09.1	08 36	24.6	35 06.8	08 35	24.0	34 32.9	14 26	18.0	2
3	34 50.6	06 50	35.6	34 52.0	04 49	35.0	34 55.1	02 47	33.2	34 55.8	02 46	32.6	34 56.2	01 45	32.0	34 47.7	06 36	24.7	34 45.5	07 35	24.1	34 17.0	12 27	18.1	3
4	34 20.7	08 50	35.6	34 22.5	06 49	35.0	34 26.9	04 47	33.2	34 28.1	04 46	32.6	34 29.0	03 45	32.0	34 26.2	04 36	24.7	34 24.8	05 35	24.1	34 01.0	11 27	18.1	4
75	33 50.8	08 50	35.6	33 53.0	07 49	35.0	33 58.8	06 47	33.2	34 00.4	05 46	32.6	34 01.8	04 45	31.9	34 04.7	03 36	24.7	34 03.8	03 35	24.1	33 45.1	09 27	18.1	75
6	33 20.9	09 50	35.5	33 23.6	09 49	34.9	33 30.7	07 47	33.1	33 32.7	06 46	32.5	33 34.6	06 45	31.9	33 43.2	01 36	24.7	33 42.8	02 35	24.1	33 29.1	07 27	18.1	6
7	32 51.0	11 50	35.4	32 54.2	10 49	34.9	33 02.6	09 47	33.1	33 05.1	08 46	32.5	33 07.4	07 45	31.9	33 21.7	01 36	24.7	33 21.8	00 35	24.1	33 13.1	06 27	18.1	7
8	32 21.2	12 50	35.4	32 24.8	12 49	34.8	32 34.6	10 47	33.0	32 37.5	09 46	32.4	32 40.2	09 45	31.8	33 00.2	02 35	24.7	33 00.8	02 35	24.1	32 57.1	04 27	18.1	8
9	31 51.5	14 49	35.3	31 55.5	13 49	34.7	32 06.6	11 47	33.0	32 09.9	11 46	32.4	32 13.1	10 45	31.8	32 38.7	04 36	24.7	32 39.8	03 35	24.1	32 41.1	02 27	18.2	9
80	31 21.8	15 49	35.2	31 26.2	15 49	34.6	31 38.6	13 46	32.9	31 42.4	12 46	32.3	31 46.1	12 45	31.7	32 17.3	05 36	24.7	32 18.8	05 35	24.1	32 25.0	01 27	18.2	80
1	30 52.2	16 49	35.1	30 57.0	16 49	34.5	31 10.7	14 46	32.8	31 14.9	14 46	32.2	31 19.0	13 45	31.7	31 55.8	07 36	24.6	31 57.8	06 35	24.1	32 09.0	01 27	18.2	1
2	30 22.6	18 49	35.0	30 27.9	17 48	34.5	30 42.9	16 46	32.7	30 47.5	15 45	32.1	30 52.1	15 45	31.6	31 34.4	09 36	24.6	31 36.9	08 35	24.0	31 53.0	02 27	18.2	2
3	29 53.1	19 49	34.9	29 58.8	19 48	34.4	30 15.1	17 46	32.6	30 20.2	17 45	32.1	30 25.2	16 45	31.5	31 13.0	10 36	24.6	31 15.9	10 35	24.0	31 37.0	04 27	18.1	3
4	29 23.7	21 49	34.8	29 29.9	20 48	34.2	29 47.4	19 46	32.5	29 52.9	18 45	32.0	29 58.3	18 45	31.4	30 51.6	12 36	24.5	30 55.0	11 35	24.0	31 20.9	06 27	18.1	4
85	28 54.4	22 49	34.7	29 01.0	22 48	34.1	29 19.7	20 46	32.4	29 25.7	20 45	31.9	29 31.6	19 44	31.3	30 30.3	13 35	24.5	30 34.2	13 35	23.9	31 04.9	08 27	18.1	85
6	28 25.2	23 49	34.6	28 32.2	23 48	34.0	28 52.2	22 46	32.3	28 58.6	21 45	31.8	29 04.9	21 44	31.2	30 09.0	15 35	24.4	30 13.4	14 35	23.8	30 49.0	09 27	18.1	6
7	27 56.1	26 48	34.4	28 03.4	24 48	33.9	28 24.7	23 46	32.2	28 31.6	23 44	31.7	28 38.3	22 44	31.1	29 47.7	16 35	24.4	29 52.6	16 35	23.8	30 33.0	11 27	18.0	7
8	27 27.1	26 48	34.3	27 34.8	26 48	33.7	27 57.4	24 45	32.1	28 04.6	24 45	31.6	28 11.7	24 44	31.1	29 26.5	18 35	24.3	29 31.9	18 34	23.7	30 17.1	13 26	18.0	8
9	26 58.2	27 48	34.1	27 06.3	27 47	33.6	27 30.1	26 45	32.0	27 37.8	25 45	31.4	27 45.3	25 44	30.9	29 05.4	20 35	24.2	29 11.2	19 34	23.6	30 01.2	14 26	17.9	9
90	26 29.4	29 48	34.0	26 38.0	28 47	33.4	27 02.9	27 45	31.8	27 11.0	27 44	31.3	27 19.0	26 44	30.7	28 44.4	21 35	24.1	28 50.6	21 34	23.6	29 45.4	16 26	17.9	90

H.A.	60° 00' Alt. / Δd Δt	Az.	60° 30' Alt. / Δd Δt	Az.	62° 00' Alt. / Δd Δt	Az.	62° 30' Alt. / Δd Δt	Az.	63° 00' Alt. / Δd Δt	Az.	69° 00' Alt. / Δd Δt	Az.	69° 30' Alt. / Δd Δt	Az.	74° 30' Alt. / Δd Δt	Az.	H.A.
91	26 00.7 30 48	33.8	26 09.7 30 47	33.3	26 35.9 29 45	31.7	26 44.4 28 44	31.1	26 52.8 28 44	30.6	28 23.4 23 35	24.0	28 30.1 22 34	23.5	29 29.5 17 26	17.9	91
2	25 32.2 31 47	33.6	25 41.5 31 47	33.1	26 08.9 30 45	31.5	26 17.8 29 44	31.0	26 26.6 29 43	30.4	28 02.5 24 35	23.9	28 09.6 24 34	23.4	29 13.8 19 26	17.8	2
3	25 03.7 33 47	33.4	25 13.5 32 46	32.9	25 42.1 31 44	31.4	25 51.4 31 44	30.8	26 00.6 30 43	30.3	27 41.7 26 35	23.8	27 49.3 25 34	23.3	28 58.1 21 26	17.8	3
4	24 35.5 34 47	33.3	24 45.6 34 46	32.7	25 15.4 33 44	31.2	25 25.1 32 44	30.7	25 34.7 32 43	30.1	27 20.9 27 34	23.7	27 29.0 27 34	23.2	28 42.4 22 26	17.7	4
95	24 07.3 35 47	33.1	24 17.9 35 46	32.6	24 48.9 34 44	31.0	24 59.0 34 43	30.5	25 09.0 33 43	30.0	27 00.3 29 34	23.6	27 08.8 28 34	23.1	28 26.8 24 26	17.6	95
6	23 39.3 37 46	32.9	23 50.3 36 46	32.4	24 22.4 35 44	30.8	24 32.9 35 43	30.3	24 43.4 35 42	29.8	26 39.7 30 34	23.5	26 48.6 30 33	23.0	28 11.3 25 26	17.6	6
7	23 11.5 38 46	32.7	23 22.8 38 46	32.2	23 56.1 37 44	30.7	24 07.0 36 43	30.1	24 17.9 36 42	29.6	26 19.2 31 34	23.4	26 28.6 31 33	22.8	27 55.8 27 26	17.5	7
8	22 43.8 39 46	32.5	22 55.5 39 45	32.0	23 30.0 38 43	30.5	23 41.3 38 43	30.0	23 52.5 37 42	29.4	25 58.9 33 34	23.3	26 08.7 33 33	22.7	27 40.4 29 26	17.4	8
9	22 16.3 40 46	32.3	22 28.3 40 45	31.8	23 04.0 39 43	30.3	23 15.7 39 42	29.8	23 27.3 39 42	29.3	25 38.6 34 34	23.1	25 48.9 34 33	22.6	27 25.1 30 26	17.3	9
100	21 48.9 42 45	32.0	22 01.4 41 45	31.5	22 38.2 40 43	30.1	22 50.2 40 42	29.6	23 02.2 40 42	29.1	25 18.5 36 33	23.0	25 29.2 35 33	22.5	27 09.8 32 26	17.2	100
1	21 21.7 43 45	31.8	21 34.5 43 44	31.3	22 12.5 42 43	29.9	22 24.9 41 42	29.4	22 37.3 41 41	28.9	24 58.5 37 33	22.8	25 09.6 37 32	22.3	26 54.6 33 25	17.1	1
2	20 54.7 44 45	31.6	21 07.9 44 44	31.1	21 47.0 43 42	29.6	21 59.8 43 42	29.2	22 12.6 42 41	28.7	24 38.6 39 33	22.7	24 50.1 38 32	22.2	26 39.5 35 25	17.0	2
3	20 27.9 45 44	31.3	20 41.4 45 44	30.9	21 21.6 44 42	29.4	21 34.8 44 41	28.9	21 48.0 44 41	28.5	24 18.8 40 33	22.5	24 30.8 40 32	22.0	26 24.5 36 25	16.9	3
4	20 01.2 47 44	31.1	20 15.1 46 44	30.6	20 56.4 45 42	29.2	21 10.0 45 41	28.7	21 23.6 45 40	28.2	23 59.2 41 32	22.4	24 11.5 41 32	21.9	26 09.6 38 25	16.8	4
105	19 34.8 48 44	30.8	19 49.0 48 43	30.4	20 31.4 47 41	29.0	20 45.4 46 41	28.5	20 59.3 46 40	28.0	23 39.7 43 32	22.2	23 52.4 42 32	21.7	25 54.8 39 25	16.7	105
6	19 08.5 49 43	30.6	19 23.1 49 43	30.1	20 06.6 48 41	28.7	20 21.0 48 40	28.2	20 35.3 47 40	27.8	23 20.3 44 32	22.0	23 33.5 44 31	21.5	25 40.1 41 24	16.6	6
7	18 42.4 50 43	30.3	18 57.4 50 42	29.9	19 42.0 49 41	28.5	19 56.7 49 40	28.0	20 11.4 49 39	27.6	23 01.1 45 32	21.9	23 14.7 45 31	21.4	25 25.5 42 24	16.4	7
8	18 16.6 51 43	30.1	18 31.9 51 42	29.6	19 17.6 50 40	28.2	19 32.7 50 40	27.8	19 47.7 50 39	27.3	22 42.0 47 32	21.7	22 56.0 47 31	21.2	25 11.0 43 24	16.3	8
9	17 50.9 52 42	29.8	18 06.6 52 42	29.3	18 53.3 52 40	28.0	19 08.8 51 39	27.5	19 24.2 51 39	27.1	22 23.1 48 31	21.5	22 37.5 48 31	21.0	24 56.6 45 24	16.2	9
110	17 25.5 54 42	29.5	17 41.5 53 41	29.1	18 29.3 53 40	27.8	18 45.1 53 39	27.3	19 00.9 52 38	26.8	22 04.3 49 31	21.3	22 19.1 49 30	20.8	24 42.4 46 24	16.0	110
1	17 00.3 55 42	29.2	17 16.7 55 41	28.8	18 05.5 54 39	27.5	18 21.7 54 39	27.0	18 37.8 54 38	26.6	21 45.7 51 31	21.1	22 00.9 50 30	20.6	24 28.2 48 23	15.9	1
2	16 35.3 56 41	28.9	16 52.0 56 41	28.5	17 41.9 55 39	27.2	17 58.4 55 38	26.8	18 14.9 55 38	26.3	21 27.3 52 30	20.9	21 42.8 52 30	20.5	24 14.2 49 23	15.8	2
3	16 10.5 57 41	28.6	16 27.6 57 40	28.2	17 18.5 56 39	26.9	17 35.4 56 38	26.5	17 52.2 56 37	26.0	21 09.0 53 30	20.7	21 24.9 53 30	20.3	24 00.2 50 23	15.6	3
4	15 46.0 58 40	28.3	16 03.4 58 40	27.9	16 55.3 57 38	26.6	17 12.5 57 38	26.2	17 29.7 57 37	25.8	20 50.9 55 30	20.5	21 07.2 54 29	20.1	23 46.5 52 23	15.5	4
115	15 21.7 59 40	28.0	15 39.4 59 40	27.6	16 32.4 59 38	26.4	16 49.9 58 37	25.9	17 07.4 58 37	25.5	20 32.9 56 30	20.3	20 49.7 56 29	19.9	23 32.8 53 23	15.3	115
6	14 57.6 60 40	27.7	15 15.7 60 39	27.3	16 09.7 60 37	26.1	16 27.6 60 37	25.6	16 45.4 59 36	25.2	20 15.2 57 29	20.1	20 32.3 57 29	19.6	23 19.3 54 23	15.2	6
7	14 33.8 61 39	27.4	14 52.3 61 39	27.0	15 47.2 61 37	25.8	16 05.4 61 36	25.4	16 23.6 61 36	24.9	19 57.6 58 29	19.9	20 15.1 58 28	19.4	23 05.9 56 22	15.0	7
8	14 10.3 63 39	27.1	14 29.0 62 38	26.7	15 25.0 62 37	25.5	15 43.5 62 36	25.1	16 02.0 62 36	24.6	19 40.3 59 29	19.6	19 58.1 59 28	19.2	22 52.7 57 22	14.8	8
9	13 47.0 64 38	26.8	14 06.1 63 38	26.4	15 03.0 63 36	25.3	15 21.9 63 36	24.8	15 40.7 63 35	24.4	19 23.1 61 28	19.4	19 41.2 60 28	19.0	22 39.6 58 22	14.7	9
120	13 24.0 65 38	26.4	13 43.4 65 37	26.0	14 41.2 64 36	24.9	15 00.5 64 35	24.5	15 19.6 64 35	24.1	19 06.1 62 28	19.2	19 24.6 62 27	18.8	22 26.6 60 21	14.5	120
1	13 01.2 66 38	26.1	13 20.9 66 37	25.7	14 19.7 65 35	24.5	14 39.3 65 35	24.1	14 58.8 65 34	23.8	18 49.3 63 28	18.9	19 08.2 63 27	18.5	22 13.8 61 21	14.3	1
2	12 38.7 67 37	25.8	12 58.7 67 36	25.4	13 58.5 66 35	24.2	14 18.4 66 34	23.8	14 38.2 66 34	23.4	18 32.7 64 27	18.7	18 51.9 64 27	18.3	22 01.2 62 21	14.2	2
3	12 16.5 68 37	25.4	12 36.8 68 36	25.0	13 37.5 67 34	23.9	13 57.7 67 34	23.5	14 17.9 67 33	23.1	18 16.3 65 27	18.5	18 35.9 65 26	18.1	21 48.7 63 21	14.0	3
4	11 54.6 69 36	25.1	12 15.2 69 36	24.7	13 16.8 68 34	23.6	13 37.3 68 34	23.2	13 57.8 68 33	22.8	18 00.1 66 27	18.2	18 20.1 66 26	17.8	21 36.3 64 20	13.8	4
125	11 33.0 70 36	24.7	11 53.9 70 35	24.3	12 56.4 69 34	23.2	13 17.2 69 33	22.9	13 38.0 69 33	22.5	17 44.2 68 26	18.0	18 04.4 67 26	17.6	21 24.2 66 20	13.6	125
6	11 11.6 71 35	24.4	11 32.8 71 35	24.0	12 36.3 70 33	22.9	12 57.4 70 33	22.5	13 18.4 70 32	22.2	17 28.4 69 26	17.7	17 49.0 69 25	17.3	21 12.1 67 20	13.4	6
7	10 50.5 72 35	24.0	11 12.0 72 34	23.6	12 16.4 71 33	22.6	12 37.8 71 32	22.2	12 59.1 71 32	21.8	17 12.9 70 26	17.4	17 33.8 70 25	17.1	21 00.3 68 19	13.2	7
8	10 29.8 73 34	23.6	10 51.6 73 34	23.3	11 56.8 72 32	22.2	12 18.5 72 32	21.9	12 40.1 72 31	21.5	16 57.6 71 25	17.2	17 18.8 71 25	16.8	20 48.6 69 19	13.0	8
9	10 09.3 74 34	23.3	10 31.4 74 33	22.9	11 37.5 73 32	21.9	11 59.5 73 31	21.5	12 21.4 73 31	21.2	16 42.6 72 25	16.9	17 04.1 72 24	16.5	20 37.1 70 19	12.8	9
130	9 49.2 75 33	22.9	10 11.5 74 33	22.5	11 18.5 74 31	21.5	11 40.8 74 31	21.2	12 03.0 74 30	20.8	16 27.7 73 24	16.6	16 49.6 73 24	16.3	20 25.8 71 19	12.6	130
1	9 29.3 75 33	22.5	9 52.0 75 32	22.2	10 59.8 75 31	21.2	11 22.3 75 30	20.8	11 44.9 75 30	20.5	16 13.1 74 24	16.4	16 35.3 74 23	16.0	20 14.7 72 18	12.4	1
2	9 09.8 76 32	22.1	9 32.7 76 32	21.8	10 41.4 76 30	20.8	11 04.2 76 30	20.5	11 27.0 76 29	20.1	15 58.7 75 24	16.1	16 21.2 75 23	15.7	20 03.7 73 18	12.2	2
3	8 50.6 77 31	21.7	9 13.7 77 31	21.4	10 23.3 77 30	20.4	10 46.4 77 29	20.1	11 09.4 77 29	19.8	15 44.6 76 23	15.8	16 07.4 76 23	15.5	19 52.9 75 18	12.0	3
4	8 31.8 78 31	21.3	8 55.2 78 30	21.0	10 05.5 78 29	20.1	10 28.8 78 29	19.7	10 52.2 78 28	19.4	15 30.7 77 23	15.5	15 53.8 77 22	15.2	19 42.3 76 17	11.8	4
135	8 13.2 79 30	20.9	8 36.9 79 30	20.6	9 48.0 79 29	19.7	10 11.6 79 28	19.4	10 35.2 79 28	19.1	15 17.1 78 22	15.2	15 40.4 78 22	14.9	19 31.9 77 17	11.6	135
6	7 55.0 80 30	20.5	8 19.0 80 29	20.2	9 30.8 80 28	19.3	9 54.7 80 28	19.0	10 18.6 80 27	18.7	15 03.7 79 22	14.9	15 27.3 79 21	14.6	19 21.7 78 17	11.3	6
7	7 37.2 81 29	20.1	8 01.4 81 29	19.8	9 14.0 81 28	18.9	9 38.1 81 27	18.6	10 02.3 81 27	18.3	14 50.6 80 21	14.6	15 14.5 80 21	14.3	19 11.7 79 16	11.1	7
8	7 19.6 82 29	19.7	7 44.1 82 28	19.4	8 57.4 81 27	18.5	9 21.7 81 27	18.2	9 46.3 81 26	18.0	14 37.7 81 21	14.3	15 01.9 80 21	14.0	19 01.8 79 16	10.9	8
9	7 02.5 82 28	19.3	7 27.2 82 28	19.0	8 41.2 82 26	18.2	9 05.9 82 26	17.9	9 30.6 82 26	17.6	14 25.1 81 21	14.0	14 49.5 81 20	13.7	18 52.2 80 16	10.7	9
140	6 45.6 83 27	18.9	7 10.6 83 27	18.6	8 25.4 83 26	17.8	8 50.3 83 25	17.5	9 15.2 83 25	17.2	14 12.7 82 20	13.7	14 37.4 82 20	13.5	18 42.8 81 15	10.4	140
1	6 29.2 84 27	18.5	6 54.4 84 26	18.2	8 09.9 84 25	17.4	8 35.0 84 25	17.1	9 00.2 84 24	16.8	14 00.6 83 20	13.4	14 25.6 83 19	13.2	18 33.6 82 15	10.2	1
2	6 13.1 85 26	18.0	6 38.5 85 26	17.8	7 54.7 85 25	17.0	8 20.1 85 24	16.7	8 45.4 85 24	16.4	13 48.8 84 19	13.1	14 14.0 84 19	12.9	18 24.5 83 15	10.0	2
3	5 57.3 85 26	17.6	6 23.0 85 25	17.3	7 39.9 85 24	16.6	8 05.5 85 24	16.3	8 31.1 85 23	16.0	13 37.3 85 19	12.8	14 02.7 85 18	12.5	18 15.7 84 14	09.8	3
4	5 41.9 86 25	17.2	6 07.8 86 25	16.9	7 25.4 86 24	16.2	7 51.2 86 23	15.9	8 17.0 86 23	15.6	13 26.0 86 18	12.5	13 51.7 85 18	12.2	18 07.1 85 14	09.5	4
145	5 26.9 87 24	16.7	5 53.0 87 24	16.5	7 11.2 87 23	15.7	7 37.3 87 23	15.5	8 03.3 87 22	15.2	13 15.0 86 18	12.2	13 40.9 86 18	11.9	17 58.7 86 14	09.3	145
6	5 12.3 88 24	16.3	5 38.6 88 23	16.1	6 57.5 88 22	15.3	7 23.7 88 22	15.1	7 50.0 88 22	14.9	13 04.3 87 17	11.9	13 30.4 87 17	11.6	17 50.5 86 13	09.0	6
7			5 24.6 88 23	15.6	6 44.0 88 22	14.9	7 10.5 88 21	14.7	7 37.0 88 21	14.4	12 53.8 88 17	11.6	13 20.2 88 17	11.3	17 42.6 87 13	08.8	7
8			5 10.9 89 22	15.2	6 31.0 89 21	14.5	6 57.6 89 21	14.3	7 24.3 89 20	14.0	12 43.7 88 16	11.2	13 10.2 88 16	11.0	17 34.8 88 13	08.5	8
9					6 18.3 90 21	14.1	6 45.2 90 20	13.9	7 12.0 90 20	13.6	12 33.8 89 16	10.9	13 00.6 89 16	10.7	17 27.3 89 12	08.3	9
150					6 05.9 90 20	13.7	6 33.0 90 20	13.4	7 00.1 90 19	13.2	12 24.2 90 15	10.6	12 51.2 90 15	10.3	17 20.0 89 12	08.0	150
1					5 54.0 91 19	13.2	6 21.2 91 19	13.0	6 48.5 91 19	12.7	12 14.9 91 15	10.2	12 42.1 91 15	09.9	17 12.9 90 11	07.8	1
2					5 42.4 91 19	12.8	6 09.8 91 18	12.6	6 37.3 91 18	12.4	12 06.0 91 14	09.9	12 33.3 91 14	09.7	17 06.0 91 11	07.5	2
3					5 31.2 92 18	12.4	5 58.8 92 18	12.2	6 26.4 92 17	12.0	11 57.2 92 14	09.6	12 24.8 92 14	09.4	16 59.4 91 11	07.3	3
4					5 20.4 93 17	11.9	5 48.2 93 17	11.7	6 15.9 93 17	11.5	11 48.8 92 14	09.2	12 16.5 92 13	09.0	16 53.0 92 10	07.0	4
155					5 10.0 93 17	11.5	5 37.9 93 16	11.3	6 05.8 93 16	11.1	11 40.7 93 13	08.9	12 08.6 93 13	08.7	16 46.8 93 10	06.8	155
6							5 28.1 94 16	10.9	5 56.1 94 16	10.7	11 32.9 94 13	08.6	12 01.0 93 12	08.4	16 40.9 94 10	06.5	6
7							5 18.5 94 15	10.4	5 46.7 94 15	10.3	11 25.4 94 12	08.2	11 53.6 94 12	08.0	16 35.1 94 09	06.3	7
8							5 09.4 95 15	10.0	5 37.8 95 14	09.8	11 18.2 94 12	07.9	11 46.6 94 11	07.7	16 29.7 94 09	06.0	8
9							5 00.6 95 14	09.6	5 29.2 95 14	09.4	11 11.4 95 11	07.5	11 39.8 95 11	07.4	16 24.4 95 08	05.7	9
160									5 21.0 96 13	09.0	11 04.8 95 10	07.2	11 33.4 95 10	07.1	16 19.4 95 08	05.5	160
1									5 13.1 96 12	08.5	10 58.5 96 10	06.8	11 27.3 96 10	06.7	16 14.6 96 08	05.2	1
2									5 05.7 96 12	08.1	10 52.6 96 09	06.5	11 21.4 96 09	06.3	16 10.1 96 07	04.9	2
3											10 46.9 97 09	06.1	11 15.9 97 09	06.0	16 05.8 97 07	04.7	3
4											10 41.6 97 08	05.8	11 10.7 97 08	05.6	16 01.7 97 06	04.4	4
165											10 36.6 97 08	05.4	11 05.8 97 08	05.3	15 57.9 97 06	04.1	165
6											10 31.9 98 07	05.1	11 01.2 98 07	05.0	15 54.3 98 06	03.6	6
7											10 27.5 98 07	04.7	10 56.9 98 07	04.6	15 51.0 98 05	03.6	7
8											10 23.4 98 06	04.3	10 52.9 98 06	04.3	15 47.9 98 05	03.3	8
9											10 19.7 99 06	04.0	10 49.3 99 06	04.0	15 45.0 99 04	03.0	9
170											10 16.3 99 05	03.6	10 46.0 99 05	03.5	15 42.4 99 04	02.8	170
1											10 13.2 99 05	03.3	10 42.9 99 05	03.2	15 40.1 99 04	02.5	1
2											10 10.4 99 04	02.9	10 40.2 99 04	02.8	15 38.0 99 03	02.2	2
3											10 08.0 99 04	02.5	10 37.8 99 03	02.5	15 36.1 99 03	01.9	3
4											10 05.9 1.00 03	02.2	10 35.8 1.00 03	02.1	15 34.5 1.00 02	01.7	4
175											10 04.1 1.00 02	01.8	10 34.0 1.00 02	01.8	15 33.1 1.00 02	01.4	175
6											10 02.6 1.00 02	01.5	10 32.6 1.00 02	01.4	15 32.0 1.00 01	01.1	6
7											10 01.5 1.00 01	01.1	10 31.4 1.00 01	01.1	15 31.1 1.00 01	00.8	7
8											10 00.7 1.00 01	00.7	10 30.6 1.00 01	00.7	15 30.5 1.00 00	00.6	8
9											10 00.2 1.00 00	00.4	10 30.2 1.00 00	00.4	15 30.1 1.00 00	00.3	9
180											10 00.0 1.00 00	00.0	10 30.0 1.00 00	00.0	15 30.0 1.00 00	00.0	180

Lat. 31°

Lat. 32°

Lat. 33°

Lat. 34°

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 31°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	63	180	67	180	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	77	00	00
4	63	171	67	170	71	168	75	165	78	161	82	152	85	130	86	73	84	33	80	19	77	13	4
8	62	163	66	160	70	157	73	152	77	145	80	133	82	111	83	80	82	51	79	34	76	24	8
12	61	155	64	152	68	147	71	141	75	133	77	120	79	103	80	81	79	60	77	44	74	33	12
16	59	148	63	144	66	139	69	132	72	124	74	112	76	98	76	82	76	65	74	51	72	40	16
20	57	141	60	137	64	131	66	125	69	117	71	107	72	95	73	81	73	68	71	55	70	45	20
24	55	135	58	131	61	125	63	119	66	111	68	102	69	92	70	81	69	69	69	59	67	49	24
28	52	130	55	125	58	120	60	114	63	107	64	99	66	90	66	80	66	70	66	61	64	52	28
32	50	125	52	121	55	116	57	110	59	103	61	96	62	88	63	79	63	71	63	62	62	54	32
36	47	121	49	117	52	112	54	106	56	100	57	93	59	86	59	79	60	71	60	63	59	55	36
40	44	117	46	113	49	108	51	103	52	97	54	91	55	85	56	78	57	70	57	63	56	56	40
44	41	114	43	110	45	105	47	100	49	95	51	89	52	83	53	77	53	70	53	63	53	57	44
48	37	111	40	107	42	102	44	98	46	93	47	87	48	81	49	76	50	69	50	63	50	57	48
52	34	108	36	104	39	100	40	95	42	90	44	85	45	80	46	75	47	69	47	63	48	57	52
56	31	105	33	101	35	97	37	93	39	88	40	84	42	79	43	73	44	68	44	63	45	57	56
60	28	103	30	99	32	95	34	91	35	86	37	82	39	77	40	72	41	67	41	62	42	57	60
64	24	100	26	97	28	93	30	89	32	85	34	80	35	76	36	71	37	66	38	61	39	56	64
68	21	98	23	94	25	91	27	87	29	83	30	78	32	74	33	70	34	65	35	60	36	56	68
72	17	96	20	92	21	89	23	85	25	81	27	77	28	73	30	68	31	64	32	60	33	55	72
76	14	94	16	90	18	87	20	83	22	79	24	75	25	71	27	67	28	63	29	58	30	54	76
80	11	92	13	88	15	85	17	81	18	77	20	73	22	70	24	66	25	62	26	57	28	53	80
84	07	90	09	86	11	83	13	79	15	75	17	72	19	68	20	64	22	60	24	56	25	52	84
88	04	88	06	84	08	81	10	77	12	74	14	70	16	66	17	63	19	59	21	55	22	51	88
92	00	86	02	82	04	79	07	75	09	72	10	68	12	65	14	61	16	57	18	54	20	50	92
96	*03*	83	*01*	80	*01*	77	03	73	05	70	07	66	09	63	11	59	13	56	15	52	17	48	96
100	*06*	81	*04*	78	*02*	75	*00*	71	02	68	04	64	06	61	08	58	11	54	13	51	15	47	100
104	*10*	79	*08*	76	*05*	72	*03*	69	*01*	66	01	62	03	59	06	56	08	52	10	49	12	46	104
108	*13*	77	*11*	74	*09*	70	*06*	67	*04*	64	*02*	60	00	57	03	54	05	51	07	47	10	44	108
112	*17*	75	*14*	71	*12*	68	*10*	65	*07*	61	*05*	58	*02*	55	00	52	02	49	05	45	07	42	112
116	*20*	72	*17*	69	*15*	66	*13*	62	*10*	59	*08*	56	*05*	53	*03*	50	00	47	02	44	05	40	116
120	*23*	70	*21*	66	*18*	63	*16*	60	*13*	57	*10*	54	*08*	51	*05*	48	*03*	45	00	42	03	39	120
124	*26*	67	*24*	64	*21*	60	*19*	57	*16*	54	*13*	51	*10*	48	*08*	45	*05*	42	*02*	39	01	37	124
128	*29*	64	*27*	61	*24*	58	*21*	54	*19*	51	*16*	48	*13*	46	*10*	43	*07*	40	*04*	37	*01*	35	128
132	*32*	61	*30*	58	*27*	55	*24*	52	*21*	49	*18*	46	*15*	43	*12*	40	*09*	38	*06*	35	*03*	32	132
136	*35*	58	*33*	55	*30*	51	*27*	48	*24*	46	*21*	43	*18*	40	*14*	37	*11*	35	*08*	33	*05*	30	136
140	*38*	55	*35*	51	*32*	48	*29*	45	*26*	42	*23*	40	*20*	37	*16*	35	*13*	32	*10*	30	*07*	28	140
144	*41*	51	*38*	48	*35*	44	*32*	42	*28*	39	*25*	36	*22*	34	*18*	32	*15*	29	*12*	27	*08*	25	144
148	*44*	47	*40*	44	*37*	41	*34*	38	*30*	35	*27*	33	*24*	31	*20*	29	*17*	27	*13*	25	*10*	23	148
152	*46*	42	*43*	39	*39*	36	*36*	34	*32*	31	*29*	29	*25*	27	*22*	25	*18*	24	*14*	22	*11*	20	152
156	*48*	37	*45*	35	*41*	32	*38*	30	*34*	27	*30*	26	*27*	24	*23*	22	*19*	20	*16*	19	*12*	17	156
160	*50*	32	*47*	30	*43*	27	*39*	25	*36*	23	*32*	22	*28*	20	*24*	19	*20*	17	*17*	16	*13*	15	160
164	*52*	26	*48*	24	*44*	22	*41*	20	*37*	19	*33*	17	*29*	16	*25*	15	*21*	14	*17*	13	*14*	12	164
168	*53*	20	*49*	18	*45*	17	*42*	16	*38*	14	*34*	13	*30*	12	*26*	11	*22*	10	*18*	10	*14*	09	168
172	*54*	14	*50*	12	*46*	11	*42*	10	*38*	10	*34*	09	*31*	08	*27*	08	*23*	07	*19*	06	*15*	06	172
176	*55*	07	*51*	06	*47*	06	*43*	05	*39*	05	*35*	05	*31*	04	*27*	04	*23*	04	*19*	03	*15*	03	176
180	*55*	00	*51*	00	*47*	00	*43*	00	*39*	00	*35*	00	*31*	00	*27*	00	*23*	00	*19*	00	*15*	00	180

4°	8°	12°	16°	20°	24°	28°	32°	36°	40°	44°

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

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 31°

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	73	00	69	00	65	00	61	00	57	00	53	00	49	00	45	00	41	00	37	00	33	00	00
4	73	09	69	07	65	05	61	04	57	03	53	02	49	02	45	01	41	01	37	01	33	00	4
8	72	17	68	13	64	10	61	08	57	06	53	05	49	04	45	03	41	02	37	01	33	00	8
12	71	25	67	19	64	15	60	12	56	09	52	07	48	06	45	04	41	03	37	02	33	00	12
16	69	31	66	25	63	20	59	16	55	12	52	10	48	07	44	05	41	04	37	02	33	01	16
20	67	36	64	29	61	23	58	19	55	15	51	12	48	09	44	07	40	04	37	03	33	01	20
24	65	40	63	33	60	27	57	22	54	18	50	14	47	11	44	08	40	05	36	03	33	01	24
28	63	43	61	36	58	30	56	25	53	20	50	16	46	12	43	09	40	06	36	03	33	01	28
32	60	46	59	39	56	32	54	27	51	22	49	17	46	14	43	10	39	07	36	04	33	01	32
36	58	48	56	41	55	35	52	29	50	24	48	19	45	15	42	11	39	08	36	04	33	01	36
40	55	49	54	42	53	36	51	31	49	25	46	20	44	16	41	12	38	08	36	05	33	02	40
44	53	50	52	44	51	38	49	32	47	27	45	22	43	17	40	13	38	09	35	05	32	02	44
48	50	51	49	45	48	39	47	33	46	28	44	23	42	18	40	14	37	09	35	05	32	02	48
52	47	51	47	45	46	40	45	34	44	29	42	24	41	19	39	14	37	10	35	06	32	02	52
56	45	51	45	46	44	40	43	35	42	29	41	24	40	19	38	15	36	10	34	06	32	02	56
60	42	51	42	46	42	41	41	35	41	30	40	25	38	20	37	15	36	11	34	06	32	02	60
64	39	51	40	46	40	41	39	36	39	30	38	25	37	20	36	16	35	11	33	06	32	02	64
68	37	51	37	46	37	41	37	36	37	31	37	26	36	21	35	16	34	11	33	07	32	02	68
72	34	50	35	45	35	41	35	36	35	31	35	26	35	21	34	16	34	11	33	07	32	02	72
76	31	50	32	45	33	40	33	36	34	31	34	26	34	21	33	16	33	12	32	07	31	02	76
80	29	49	30	44	31	40	31	35	32	31	32	26	32	21	32	16	32	12	32	07	31	02	80
84	26	48	27	44	28	39	29	35	30	30	31	26	31	21	31	16	32	12	31	07	31	02	84
88	24	47	25	43	26	39	27	34	28	30	29	25	30	21	30	16	31	12	31	07	31	02	88
92	21	46	23	42	24	38	26	34	27	29	28	25	29	21	30	16	30	12	31	07	31	02	92
96	19	45	21	41	22	37	24	33	25	29	26	25	28	20	29	16	29	11	30	07	31	02	96
100	16	43	18	40	20	36	22	32	23	28	25	24	26	20	28	16	29	11	30	07	31	02	100
104	14	42	16	38	18	35	20	31	22	27	24	23	25	19	27	15	28	11	29	07	30	02	104
108	12	41	14	37	16	34	18	30	20	26	22	23	24	19	26	15	27	11	29	07	30	02	108
112	10	39	12	36	14	32	17	29	19	25	21	22	23	18	25	14	27	10	29	06	30	02	112
116	08	37	10	34	13	31	15	28	17	24	20	21	22	17	24	14	26	10	28	06	30	02	116
120	06	36	08	33	11	30	13	26	16	23	18	20	21	17	23	13	26	10	28	06	30	02	120
124	04	34	06	31	09	28	12	25	15	22	17	19	20	16	23	13	25	09	28	06	30	02	124
128	02	32	05	29	08	26	10	24	13	21	16	18	19	15	22	12	25	09	27	05	30	02	128
132	*00*	30	03	27	06	25	09	22	12	19	15	17	18	14	21	11	24	08	27	05	30	02	132
136	*02*	28	02	25	05	23	08	20	11	18	14	16	17	13	21	10	24	08	27	05	30	02	136
140	*03*	26	00	23	03	21	07	19	10	17	13	14	17	12	20	10	23	07	26	04	29	01	140
144	*05*	23	*01*	21	02	19	06	17	09	15	13	13	16	11	19	09	23	06	26	04	29	01	144
148	*06*	21	*02*	19	01	17	05	15	08	14	12	12	15	10	19	08	22	06	26	04	29	01	148
152	*07*	18	*03*	17	00	15	04	14	08	12	11	10	15	09	18	07	22	05	26	03	29	01	152
156	*08*	16	*04*	15	*01*	13	03	12	07	10	11	09	14	07	18	06	22	04	25	03	29	01	156
160	*09*	13	*05*	12	*01*	11	02	10	06	09	10	07	14	06	18	05	22	04	25	02	29	01	160
164	*10*	11	*06*	10	*02*	09	02	08	06	07	10	06	14	05	17	04	21	03	25	02	29	01	164
168	*10*	08	*06*	07	*02*	07	02	06	05	05	09	05	13	04	17	03	21	02	25	01	29	00	168
172	*11*	05	*07*	05	*03*	04	01	04	05	04	09	03	13	02	17	02	21	01	25	01	29	00	172
176	*11*	03	*07*	02	*03*	02	01	02	05	02	09	02	13	01	17	01	21	01	25	00	29	00	176
180	*11*	00	*07*	00	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	25	00	29	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 32°

Lat. 33°

Lat. 34°

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

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

Lat. 32°

H.A.	0° 00' Alt.	Δd Δt	Az.	0° 30' Alt.	Δd Δt	Az.	1° 00' Alt.	Δd Δt	Az.	1° 30' Alt.	Δd Δt	Az.	2° 00' Alt.	Δd Δt	Az.	2° 30' Alt.	Δd Δt	Az.	3° 00' Alt.	Δd Δt	Az.	3° 30' Alt.	Δd Δt	Az.	H.A.
00	58 00.0	1.00 01	180.0	58 30.0	1.00 01	180.0	59 00.0	1.00 01	180.0	59 30.0	1.00 01	180.0	60 00.0	1.00 01	180.0	60 30.0	1.00 02	180.0	61 00.0	1.00 02	180.0	61 30.0	1.00 02	180.0	00
1	57 59.2	1.00 04	178.1	58 29.2	1.00 04	178.1	58 59.1	1.00 04	178.0	59 29.1	1.00 04	178.0	59 59.1	1.00 04	178.0	60 29.1	1.00 04	177.9	60 59.1	1.00 05	177.9	61 29.1	1.00 05	177.9	1
2	57 55.7	1.00 07	176.2	58 26.5	1.00 07	176.2	58 56.6	1.00 07	176.1	59 26.5	1.00 07	176.1	59 56.5	1.00 07	176.0	60 26.4	1.00 07	175.9	60 56.3	1.00 08	175.9	61 26.3	1.00 08	175.8	2
3	57 52.5	1.0 10	174.4	58 22.4	1.0 10	174.3	58 52.3	1.0 10	174.2	59 22.1	1.0 10	174.1	59 52.0	1.0 10	174.0	60 21.9	1.0 10	173.9	60 51.8	1.0 11	173.8	61 21.7	1.0 11	173.7	3
4	57 46.6	99 12	172.5	58 16.5	99 13	172.4	58 46.3	99 13	172.3	59 16.1	99 13	172.2	59 45.9	99 13	172.0	60 15.6	99 13	171.9	60 45.4	99 14	171.8	61 15.2	99 14	171.7	4
05	57 39.2	99 15	170.6	58 08.9	99 15	170.5	58 38.6	99 16	170.4	59 08.3	99 16	170.2	59 37.9	99 16	170.1	60 07.6	99 16	169.9	60 37.3	99 16	169.8	61 06.9	99 17	169.6	05
6	57 30.1	99 18	168.8	57 59.7	99 18	168.6	58 29.2	99 19	168.5	58 58.8	99 19	168.3	59 28.3	99 19	168.0	59 57.9	99 19	168.0	60 27.4	98 19	167.8	60 56.9	98 19	167.6	6
7	57 19.4	98 20	167.0	57 48.8	98 21	166.8	58 18.2	98 21	166.4	58 47.6	98 21	166.4	59 17.0	98 22	166.2	59 46.4	98 22	166.0	60 15.8	98 22	165.8	60 45.1	98 23	165.6	7
8	57 07.1	98 23	165.1	57 36.4	98 23	164.9	58 05.6	97 24	164.7	58 34.9	97 24	164.5	59 04.1	97 24	164.3	59 33.3	97 25	164.1	60 02.4	97 25	163.8	60 31.6	97 25	163.6	8
9	56 53.3	97 26	163.4	57 22.4	97 26	163.1	57 51.5	97 26	162.9	58 20.5	97 27	162.7	58 49.5	97 27	162.4	59 18.5	97 27	162.2	59 47.4	96 28	161.9	60 16.4	96 28	161.6	9
10	56 38.0	96 28	161.6	57 06.9	96 28	161.3	57 35.7	96 29	161.1	58 04.6	96 29	160.8	58 33.4	96 29	160.6	59 02.1	96 30	160.3	59 30.8	96 30	160.0	59 59.5	96 31	159.7	10
1	56 21.2	96 30	159.9	56 49.9	96 31	159.6	57 18.5	95 31	159.3	57 47.1	95 31	159.0	58 15.7	95 32	158.7	58 44.2	95 32	158.4	59 12.7	95 33	158.1	59 41.1	95 33	157.8	1
2	56 02.9	95 33	158.1	56 31.4	95 33	157.9	56 59.8	94 34	157.6	57 28.2	94 34	157.3	57 56.5	94 34	157.0	58 24.8	94 35	156.6	58 53.0	94 35	156.3	59 21.2	94 36	156.0	2
3	55 43.3	94 35	156.5	56 11.5	94 35	156.2	56 39.7	94 36	155.8	57 07.8	94 36	155.5	57 35.8	93 37	155.2	58 03.8	93 37	154.9	58 31.8	93 38	154.5	58 59.7	93 38	154.2	3
4	55 22.3	93 37	154.8	55 50.3	93 38	154.5	56 18.2	93 38	154.2	56 46.0	93 39	153.8	57 13.8	93 39	153.5	57 41.5	92 39	153.1	58 09.2	92 40	152.8	58 36.8	92 40	152.4	4
15	55 00.0	92 39	153.2	55 27.7	92 40	152.8	55 55.3	92 40	152.5	56 22.9	92 41	152.1	56 50.4	92 41	151.8	57 17.8	91 42	151.4	57 45.2	91 42	151.0	58 12.5	91 43	150.6	15
6	54 36.4	91 41	151.6	55 03.8	91 42	151.2	55 31.2	91 42	150.9	55 58.5	91 43	150.5	56 25.7	91 43	150.1	56 52.8	90 44	149.7	57 19.9	90 44	149.3	57 46.9	90 45	148.9	6
7	54 11.6	91 43	150.0	54 38.7	90 44	149.7	55 05.8	90 44	149.3	55 32.8	90 45	148.9	55 59.7	90 45	148.5	56 26.6	89 46	148.1	56 53.3	89 46	147.7	57 20.0	89 47	147.3	7
8	53 45.6	90 45	148.5	54 12.4	89 46	148.1	54 39.2	89 46	147.7	55 05.9	89 47	147.3	55 32.5	89 47	146.9	55 59.1	88 48	146.5	56 25.5	88 48	146.1	56 51.9	88 49	145.6	8
9	53 18.4	89 47	147.0	53 45.0	88 48	146.6	54 11.5	88 48	146.2	54 37.9	88 49	145.8	55 04.2	88 49	145.4	55 30.4	87 50	144.9	55 56.6	87 50	144.5	56 22.6	87 51	144.1	9
20	52 50.1	88 49	145.5	53 16.4	87 49	145.1	53 42.6	87 50	144.7	54 08.7	87 50	144.3	54 34.7	87 51	143.9	55 00.7	86 51	143.4	55 26.5	86 52	143.0	55 52.2	86 52	142.5	20
1	52 20.8	87 51	144.1	52 46.8	86 51	143.7	53 12.7	86 52	143.3	53 38.5	86 52	142.8	54 04.2	86 53	142.4	54 29.8	85 53	141.9	54 55.3	85 54	141.5	55 20.7	85 54	141.0	1
2	51 50.4	86 52	142.7	52 16.1	85 53	142.3	52 41.7	85 53	141.8	53 07.2	85 54	141.4	53 32.6	85 54	140.9	53 57.9	84 55	140.5	54 23.1	84 55	140.0	54 48.2	83 56	139.6	2
3	51 19.1	85 54	141.3	51 44.5	84 54	140.9	52 09.8	84 55	140.4	52 35.0	84 55	140.0	53 00.1	83 56	139.5	53 25.1	83 56	139.1	53 50.0	83 57	138.6	54 14.7	82 57	138.1	3
4	50 46.8	84 55	140.0	51 11.9	83 56	139.5	51 36.9	83 56	139.1	52 01.8	83 57	138.6	52 26.6	82 57	138.2	52 51.3	82 58	137.7	53 15.9	82 58	137.2	53 40.3	81 59	136.7	4
25	50 13.7	83 57	138.7	50 38.5	82 57	138.3	51 03.2	82 58	137.8	51 27.8	82 58	137.3	51 52.2	81 59	136.8	52 16.6	81 60	136.4	52 40.9	81 60	135.9	53 05.0	80 60	135.4	25
6	49 39.6	82 58	137.4	50 04.1	82 59	136.9	50 28.5	81 59	136.5	50 52.8	81 59	136.0	51 17.0	80 60	135.5	51 41.1	80 61	135.1	52 05.0	80 61	134.6	52 28.8	79 62	134.1	6
7	49 04.8	81 59	136.1	49 29.0	81 60	135.7	49 53.1	80 60	135.2	50 17.1	80 61	134.7	50 41.0	79 61	134.3	51 04.7	79 62	133.8	51 28.4	79 62	133.3	51 51.9	78 63	132.8	7
8	48 29.1	80 61	134.9	48 53.0	80 61	134.4	49 16.8	79 62	134.0	49 40.6	79 62	133.5	50 04.2	78 63	133.0	50 27.6	78 63	132.5	50 51.0	78 64	132.0	51 14.2	77 64	131.5	8
9	47 52.7	79 62	133.7	48 16.3	79 62	133.3	48 39.9	78 63	132.8	49 03.5	78 63	132.3	49 26.6	77 64	131.8	49 49.8	77 64	131.3	50 12.8	77 65	130.8	50 35.7	76 65	130.3	9
30	47 15.6	78 63	132.1	47 38.9	78 64	131.6	48 02.2	77 64	131.1	48 25.3	77 64	130.6	48 48.3	77 65	130.2	49 11.2	76 65	129.7	49 34.0	76 66	129.1	49 56.6	76 66	128.7	30
1	46 37.7	77 64	131.4	47 00.8	77 65	130.9	47 23.8	76 65	130.5	47 46.7	76 66	130.0	48 09.4	76 66	129.5	48 32.0	75 66	129.0	48 54.5	75 67	128.5	49 16.8	74 67	128.0	1
2	45 59.2	76 65	130.3	46 22.1	76 66	129.8	46 44.8	75 66	129.4	47 07.4	75 67	128.9	47 29.8	75 67	128.4	47 52.2	74 67	127.9	48 14.4	74 68	127.4	48 36.4	73 68	126.9	2
3	45 20.1	75 66	129.2	45 42.7	75 67	128.7	46 05.1	75 67	128.3	46 27.4	74 68	127.8	46 49.6	74 68	127.3	47 11.7	73 68	126.8	47 33.6	73 69	126.3	47 55.4	72 69	125.8	3
4	44 40.4	75 67	128.2	45 02.7	74 68	127.7	45 24.9	74 68	127.2	45 46.9	73 68	126.7	46 08.9	73 69	126.2	46 30.7	72 69	125.7	46 52.3	72 70	125.2	47 13.9	72 70	124.7	4
35	44 00.1	74 68	127.1	44 22.1	73 68	126.6	44 44.1	73 69	126.2	45 05.9	72 69	125.7	45 27.6	72 70	125.2	45 49.1	72 70	124.7	46 10.5	71 71	124.2	46 31.8	71 71	123.7	35
6	43 19.3	73 69	126.1	43 41.1	72 69	125.6	44 02.7	72 70	125.2	44 24.3	72 70	124.7	44 45.7	71 71	124.2	45 07.0	71 71	123.7	45 28.2	70 72	123.2	45 49.2	70 72	122.7	6
7	42 37.9	72 70	125.1	42 59.4	72 70	124.6	43 20.9	71 71	124.2	43 42.2	71 71	123.7	44 03.4	70 71	123.2	44 24.4	70 72	122.7	44 45.4	70 72	122.2	45 06.1	69 73	121.7	7
8	41 56.0	71 71	124.1	42 17.3	71 71	123.7	42 38.5	70 71	123.2	42 59.6	70 72	122.7	43 20.5	70 72	122.2	43 41.4	69 72	121.7	44 02.1	69 73	121.2	44 22.6	68 73	120.7	8
9	41 13.7	70 72	123.2	41 34.8	70 72	122.7	41 55.7	70 72	122.2	42 16.6	69 72	121.8	42 37.3	69 73	121.3	42 57.9	68 73	120.8	43 18.3	68 74	120.3	43 38.7	68 74	119.8	9
40	40 30.9	70 72	122.3	40 51.7	69 72	121.8	41 12.5	69 73	121.3	41 33.1	69 73	120.8	41 53.6	68 73	120.3	42 13.9	68 74	119.9	42 34.2	67 75	119.4	42 54.3	67 75	118.8	40
1	39 47.6	69 73	121.4	40 08.3	69 73	120.9	40 28.8	68 73	120.4	40 49.2	68 74	119.9	41 09.5	67 74	119.4	41 29.6	67 75	118.9	41 49.6	67 75	118.5	42 09.5	66 75	117.9	1
2	39 04.0	68 73	120.5	39 24.4	68 74	120.0	39 44.7	67 74	119.5	40 04.9	67 74	119.0	40 25.0	67 75	118.6	40 44.9	66 75	118.1	41 04.7	66 75	117.6	41 24.4	65 76	117.1	2
3	38 19.9	68 74	119.6	38 40.2	67 74	119.1	39 00.3	67 75	118.7	39 20.2	66 75	118.2	39 40.1	66 75	117.7	39 59.8	66 76	117.2	40 19.4	65 76	116.7	40 38.9	65 76	116.2	3
4	37 35.5	67 75	118.7	37 55.5	67 75	118.3	38 15.4	66 75	117.8	38 35.2	66 76	117.3	38 54.9	65 76	116.8	39 14.4	65 76	116.4	39 33.8	65 77	115.9	39 53.1	64 77	115.4	4
45	36 50.7	66 75	117.9	37 10.5	66 76	117.4	37 30.2	66 76	117.0	37 49.8	65 76	116.5	38 09.3	65 76	116.0	38 28.6	64 77	115.5	38 47.9	64 77	115.0	39 07.0	63 77	114.5	45
6	36 05.6	66 76	117.1	36 25.2	65 76	116.6	36 44.7	65 76	116.2	37 04.1	64 77	115.7	37 23.4	64 77	115.2	37 42.6	64 77	114.7	38 01.6	63 78	114.2	38 20.5	63 78	113.7	6
7	35 20.1	65 76	116.3	35 39.6	65 77	115.8	35 58.9	64 77	115.4	36 18.1	64 77	114.9	36 37.2	63 78	114.4	36 56.2	63 78	113.9	37 15.1	63 78	113.4	37 33.8	62 78	112.9	7
8	34 34.4	64 77	115.5	34 53.6	64 77	115.0	35 12.8	64 77	114.6	35 31.8	63 78	114.1	35 50.7	63 78	113.6	36 09.5	63 78	113.1	36 28.2	62 78	112.7	36 46.8	62 79	112.2	8
9	33 48.3	64 77	114.7	34 07.4	63 78	114.3	34 26.4	63 78	113.8	34 45.2	63 78	113.3	35 04.0	62 78	112.9	35 22.6	62 79	112.4	35 41.2	62 79	111.9	35 59.6	61 79	111.4	9
50	33 02.0	63 78	114.0	33 20.9	63 78	113.5	33 39.7	63 78	113.0	33 58.4	62 78	112.6	34 17.0	62 79	112.1	34 35.4	61 79	111.6	34 53.8	61 79	111.1	35 12.1	61 80	110.7	50
1	32 15.3	63 78	113.2	32 34.1	62 78	112.8	32 52.7	62 79	112.3	33 11.3	62 79	111.8	33 29.7	61 79	111.4	33 48.0	61 79	110.9	34 06.2	61 80	110.4	34 24.3	60 80	109.9	1
2	31 28.4	62 79	112.5	31 47.0	62 79	112.0	32 05.5	61 79	111.6	32 23.9	61 79	111.1	32 42.2	61 80	110.6	33 00.4	60 80	110.2	33 18.4	60 80	109.7	33 36.4	60 80	109.2	2
3	30 41.3	62 79	111.8	30 59.7	61 79	111.3	31 18.1	61 79	110.8	31 36.3	61 80	110.4	31 54.5	60 80	109.9	32 12.5	60 80	109.4	32 30.4	60 80	109.0	32 48.2	59 81	108.5	3
4	29 53.9	61 79	111.1	30 12.2	61 80	110.6	30 30.4	60 80	110.1	30 48.5	60 80	109.7	31 06.5	60 80	109.2	31 24.4	59 81	108.7	31 42.2	59 81	108.3	31 59.9	59 81	107.8	4
55	29 06.3	61 80	110.4	29 24.5	60 80	109.9	29 42.5	60 80	109.4	30 00.5	60 80	109.0	30 18.4	59 81	108.5	30 36.1	59 81	108.0	30 53.8	59 81	107.6	31 11.3	58 81	107.1	55
6	28 18.5	60 80	109.7	28 36.5	60 80	109.2	28 54.5	60 80	108.8	29 12.3	59 81	108.3	29 30.0	59 81	107.8	29 47.7	59 81	107.4	30 05.2	58 81	106.9	30 22.6	58 82	106.4	6
7	27 30.5	60 80	109.0	27 48.4	59 81	108.5	28 06.2	59 81	108.1	28 23.9	59 81	107.6	28 41.5	59 81	107.2	28 59.0	58 81	106.7	29 16.4	58 82	106.2	29 33.7	58 82	105.8	7
8	26 42.3	59 81	108.3	27 00.1	59 81	107.9	27 17.7	59 81	107.4	27 35.3	58 81	107.0	27 52.8	58 82	106.5	28 10.2	58 82	106.0	28 27.5	58 82	105.6	28 44.7	57 82	105.1	8
9	25 53.9	59 81	107.7	26 11.5	59 81	107.2	26 29.1	58 81	106.8	26 46.5	58 82	106.3	27 03.9	58 82	105.8	27 21.2	57 82	105.4	27 38.4	57 82	104.9	27 55.5	57 82	104.5	9
60	25 05.3	59 81	107.0	25 22.8	58 81	106.6	25 40.3	58 82	106.1	25 57.6	58 82	105.7	26 14.9	57 82	105.2	26 32.1	57 82	104.7	26 49.2	57 82	104.3	27 06.2	56 83	103.8	60
1	24 16.6	58 82	106.4	24 34.0	58 82	105.9	24 51.3	58 82	105.5	25 08.6	57 82	105.0	25 25.7	57 82	104.6	25 42.8	57 82	104.1	25 59.8	56 82	103.7	26 16.7	56 83	103.2	1
2	23 27.7	58 82	105.7	23 45.0	58 82	105.3	24 02.2	57 82	104.8	24 19.3	57 82	104.4	24 36.4	56 83	103.9	24 53.4	56 83	103.5	25 10.3	56 83	103.0	25 27.1	56 83	102.6	2
3	22 38.6	57 82	105.1	22 55.8	57 82	104.7	23 12.9	57 82	104.2	23 30.0	57 82	103.8	23 46.9	56 83	103.3	24 03.8	56 83	102.9	24 20.6	56 83	102.4	24 37.4	56 83	102.0	3
4	21 49.5	57 82	104.5	22 06.5	57 82	104.0	22 23.6	57 83	103.6	22 40.5	56 83	103.2	22 57.4	56 83	102.7	23 14.2	56 83	102.3	23 30.9	55 83	101.8	23 47.5	55 83	101.4	4
65	21 00.1	57 82	103.9	21 17.1	57 83	103.4	21 34.0	56 83	103.0	21 50.9	56 83	102.5	22 07.7	56 83	102.1	22 24.4	56 83	101.7	22 41.0	55 83	101.2	22 57.6	55 83	100.8	65
6	20 10.7	56 83	103.3	20 27.6	56 83	102.8	20 44.4	56 83	102.4	21 01.2	56 83	101.9	21 17.9	55 83	101.5	21 34.5	55 83	101.1	21 51.1	55 83	100.6	22 07.5	55 84	100.2	6
7	19 21.1	56 83	102.7	19 37.9	56 83	102.2	19 54.6	56 83	101.8	20 11.3	56 83	101.4	20 28.0	55 83	100.9	20 44.5	55 83	100.5	21 01.0	55 84	100.0	21 17.4	55 84	99.6	7
8	18 31.4	56 83	102.1	18 48.1	56 83	101.6	19 04.8	56 83	101.2	19 21.4	55 83	100.8	19 37.9	55 83	100.3	19 54.4	55 84	99.9	20 10.8	55 84	99.4	20 27.2	54 84	99.0	8
9	17 41.6	56 83	101.5	17 58.2	55 83	101.1	18 14.8	55 83	100.6	18 31.4	55 84	100.2	18 47.8	55 84	99.7	19 04.3	54 84	99.3	19 20.6	54 84	98.9	19 36.9	54 84	98.4	9
70	16 51.7	55 83	100.9	17 08.2	55 83	100.5	17 24.8	55 84	100.0	17 41.2	55 84	99.6	17 57.6	54 84	99.2	18 14.0	54 84	98.7	18 30.3	54 84	98.3	18 46.5	54 84	97.8	70
1	16 01.6	55 84	100.3	16 18.2	55 84	99.9	16 34.6	55 84	99.5	16 51.0	54 84	99.0	17 07.4	54 84	98.6	17 23.7	54 84	98.2	17 39.9	54 84	97.7	17 56.1	54 84	97.3	1
2	15 11.5	55 84	99.8	15 28.0	55 84	99.3	15 44.4	55 84	98.9	16 00.7	54 84	98.5	16 17.0	54 84	98.0	16 33.3	54 84	97.6	16 49.5	54 84	97.2	17 05.6	54 84	96.7	2
3	14 21.4	55 84	99.2	14 37.8	54 84	98.8	14 54.1	54 84	98.3	15 10.4	54 84	97.9	15 26.6	54 84	97.5	15 42.8	54 84	97.0	15 58.9	54 84	96.6	16 15.0	54 84	96.2	3
4	13 31.1	55 84	98.6	13 47.4	54 84	98.2	14 03.7	54 84	97.8	14 19.9	54 84	97.3	14 36.1	54 84	96.9	14 52.3	54 84	96.5	15 08.4	54 84	96.0	15 24.4	54 84	95.6	4
75	12 40.7	54 84	98.1	12 57.0	54 84	97.7	13 13.3	54 84	97.2	13 29.4	54 84	96.8	13 45.6	54 84	96.4	14 01.7	54 84	95.9	14 17.7	53 84	95.5	14 33.7	53 84	95.0	75
6	11 50.3	54 84	97.5	12 06.6	54 84	97.1	12 22.7	54 84	96.7	12 38.9	54 84	96.2	12 55.0	54 84	95.8	13 11.0	54 84	95.4	13 27.1	53 85	94.9	13 43.0	53 85	94.5	6
7	10 59.9	54 84	97.0	11 16.0	54 84	96.5	11 32.2	54 84	96.1	11 48.3	54 84	95.7	12 04.3	53 85	95.3	12 20.4	53 85	94.8	12 36.3	53 85	94.4	12 52.3	53 85	94.0	7
8	10 09.3	54 84	96.4	10 25.5	54 84	96.0	10 41.6	54 84	95.6	10 57.6	53 85	95.1	11 13.7	53 85	94.7	11 29.6	53 85	94.3	11 45.6	53 85	93.8	12 01.5	53 85	93.4	8
9	9 18.7	54 84	95.9	9 34.8	54 84	95.5	9 50.9	53 85	95.0	10 06.9	53 85	94.6	10 22.9	53 85	94.2	10 38.9	53 85	93.7	10 54.8	53 85	93.3	11 10.7	53 85	92.9	9
80	8 28.1	54 84	95.3	8 44.2	53 85	94.9	9 00.2	53 85	94.5	9 16.2	53 85	94.1	9 32.2	53 85	93.6	9 48.1	53 85	93.2	10 04.0	53 85	92.8	10 19.9	53 85	92.3	80
1	7 37.4	53 85	94.8	7 53.4	53 85	94.4	8 09.4	53 85	93.9	8 25.4	53 85	93.5	8 41.4	53 85	93.1	8 57.3	53 85	92.7	9 13.2	53 85	92.2	9 29.0	53 85	91.8	1
2	6 46.7	53 85	94.3	7 02.7	53 85	93.8	7 18.7	53 85	93.4	7 34.6	53 85	93.0	7 50.5	53 85	92.6	8 06.4	53 85	92.1	8 22.3	53 85	91.7	8 38.2	53 85	91.3	2
3	5 55.9	53 85	93.7	6 11.9	53 85	93.3	6 27.9	53 85	92.9	6 43.8	53 85	92.4	6 59.7	53 85	92.0	7 15.6	53 85	91.6	7 31.4	53 85	91.2	7 47.3	53 85	90.7	3
4	5 05.1	53 85	93.2	5 21.1	53 85	92.8	5 37.0	53 85	92.3	5 52.9	53 85	91.9	6 08.8	53 85	91.5	6 24.7	53 85	91.1	6 40.6	53 85	90.6	6 56.4	53 85	90.2	4
85										5 02.1	53 85	91.4	5 18.0	53 85	91.0	5 33.8	53 85	90.5	5 49.7	53 85	90.1	6 05.5	53 85	89.7	85
6																						5 14.6	53 85	89.1	6

Lat. 32°

H.A.	0° 00' Alt.	Δd Δt	Az.	0° 30' Alt.	Δd Δt	Az.	1° 00' Alt.	Δd Δt	Az.	1° 30' Alt.	Δd Δt	Az.	2° 00' Alt.	Δd Δt	Az.	2° 30' Alt.	Δd Δt	Az.	3° 00' Alt.	Δd Δt	Az.	3° 30' Alt.	Δd Δt	Az.	H.A.
00	58 00.0	1.00 1	180.0	57 30.0	1.00 1	180.0	57 00.0	1.00 1	180.0	56 30.0	1.00 1	180.0	56 00.0	1.00 1	180.0	55 30.0	1.00 1	180.0	55 00.0	1.00 1	180.0	54 30.0	1.00 1	180.0	00
1	57 59.2	1.00 4	178.1	57 29.2	1.00 4	178.1	56 59.2	1.00 4	178.2	56 29.2	1.00 4	178.2	55 59.2	1.00 4	178.2	55 29.2	1.00 4	178.2	54 59.2	1.00 4	178.3	54 29.2	1.00 4	178.3	1
2	57 56.7	1.00 7	176.2	57 26.7	1.00 7	176.3	56 56.7	1.00 7	176.3	56 26.8	1.00 7	176.4	55 56.8	1.00 7	176.4	55 26.9	1.00 6	176.5	54 56.9	1.00 6	176.5	54 27.0	1.00 6	176.6	2
3	57 52.5	1.0 10	174.4	57 22.6	1.0 10	174.4	56 52.7	1.0 09	174.5	56 22.8	1.0 09	174.6	55 52.9	1.0 09	174.6	55 23.0	1.0 09	174.7	54 53.1	1.0 09	174.8	54 23.1	1.0 09	174.9	3
4	57 46.6	99 12	172.5	57 16.8	99 12	172.6	56 47.0	99 12	172.7	56 17.2	99 12	172.8	55 47.3	99 12	172.9	55 17.5	99 12	173.0	54 47.7	99 12	173.1	54 17.8	99 11	173.1	4
05	57 39.2	99 15	170.6	57 09.4	99 15	170.8	56 39.7	99 15	170.9	56 10.0	99 15	171.0	55 40.3	99 14	171.1	55 10.5	99 14	171.2	54 40.8	99 14	171.3	54 11.0	99 14	171.5	05
6	57 30.1	99 18	168.8	57 00.5	99 18	168.9	56 30.9	99 17	169.1	56 01.3	99 17	169.2	55 31.6	99 17	169.4	55 02.0	99 17	169.5	54 32.4	99 16	169.6	54 02.7	99 16	169.8	6
7	57 19.4	98 20	167.0	56 49.9	98 20	167.1	56 20.5	98 20	167.3	55 51.0	98 20	167.5	55 21.5	98 19	167.6	54 52.0	98 19	167.8	54 22.5	98 19	167.9	53 52.9	98 19	168.1	7
8	57 07.1	98 23	165.1	56 37.8	98 23	165.3	56 08.5	98 22	165.5	55 39.2	98 22	165.7	55 09.8	98 22	165.9	54 40.5	98 22	166.1	54 11.1	98 21	166.3	53 41.7	98 21	166.4	8
9	56 53.3	97 26	163.4	56 24.2	97 25	163.6	55 55.0	97 25	163.8	55 25.9	97 25	164.0	54 56.7	97 24	164.2	54 27.5	97 24	164.4	53 58.3	97 24	164.6	53 29.1	97 23	164.8	9
10	56 38.0	96 28	161.6	56 09.1	96 28	161.8	55 40.1	97 27	162.1	55 11.1	97 27	162.3	54 42.1	97 27	162.5	54 13.1	97 26	162.7	53 44.1	97 26	163.0	53 15.0	97 26	163.2	10
1	56 21.2	96 30	159.9	55 52.5	96 30	160.1	55 23.7	96 30	160.4	54 55.0	96 29	160.6	54 26.2	96 29	160.9	53 57.3	96 29	161.1	53 28.5	96 28	161.3	52 59.6	96 28	161.6	1
2	56 02.9	95 33	158.1	55 34.5	95 32	158.4	55 05.9	95 32	158.7	54 37.4	95 32	159.0	54 08.8	95 31	159.2	53 40.2	95 31	159.5	53 11.5	96 30	159.7	52 42.8	96 30	160.0	2
3	55 43.3	94 35	156.5	55 15.1	94 35	156.8	54 46.8	94 34	157.0	54 18.4	95 34	157.3	53 50.1	95 33	157.6	53 21.7	95 33	157.9	52 53.2	95 33	158.1	52 24.7	95 32	158.4	3
4	55 22.3	93 37	154.8	54 54.3	93 37	155.1	54 26.3	94 36	155.4	53 58.2	94 36	155.7	53 30.0	94 36	156.0	53 01.9	94 35	156.3	52 33.6	94 35	156.6	52 05.4	94 34	156.9	4
15	55 00.0	92 39	153.2	54 32.3	93 39	153.5	54 04.5	93 38	153.8	53 36.6	93 38	154.1	53 08.7	93 38	154.5	52 40.8	93 37	154.8	52 12.8	93 37	155.0	51 44.8	94 36	155.3	15
6	54 36.4	91 41	151.6	54 08.9	92 41	151.9	53 41.4	92 40	152.2	53 13.8	92 40	152.6	52 46.2	92 40	152.9	52 18.5	92 39	153.2	51 50.7	93 39	153.5	51 22.9	93 38	153.8	6
7	54 11.6	91 43	150.0	53 44.4	91 43	150.4	53 17.1	91 42	150.7	52 49.8	91 42	151.1	52 22.4	91 42	151.4	51 55.0	92 41	151.7	51 27.5	92 41	152.1	50 59.9	92 40	152.4	7
8	53 45.6	90 45	148.5	53 18.6	90 45	148.9	52 51.6	90 44	149.2	52 24.6	90 44	149.6	51 57.5	91 43	149.9	51 30.3	91 43	150.3	51 03.0	91 43	150.6	50 35.7	91 42	150.9	8
9	53 18.4	89 47	147.0	52 51.8	89 47	147.4	52 25.0	89 46	147.7	51 58.3	89 46	148.1	51 31.4	90 45	148.5	51 04.5	90 45	148.8	50 37.5	90 44	149.2	50 10.5	90 44	149.5	9
20	52 50.1	88 49	145.5	52 23.8	88 49	145.9	51 57.3	88 48	146.3	51 30.8	88 47	146.7	51 04.3	89 47	147.0	50 37.6	89 47	147.4	50 10.9	89 46	147.8	49 44.1	89 46	148.1	20
1	52 20.8	87 51	144.1	51 54.7	87 50	144.5	51 28.6	87 50	144.9	51 02.4	88 49	145.3	50 36.1	88 49	145.6	50 09.7	88 48	146.0	49 43.2	88 48	146.4	49 16.7	88 47	146.7	1
2	51 50.4	86 52	142.7	51 24.7	86 52	143.1	50 58.8	86 51	143.5	50 32.9	87 51	143.9	50 06.8	87 50	144.3	49 40.8	87 50	144.7	49 14.6	87 49	145.0	48 48.3	88 49	145.4	2
3	51 19.1	85 54	141.3	50 53.6	85 53	141.7	50 28.1	85 53	142.1	50 02.4	86 52	142.5	49 36.7	86 52	142.9	49 10.8	86 51	143.3	48 44.9	86 51	143.7	48 19.0	87 50	144.1	3
4	50 46.8	84 55	140.0	50 21.6	84 55	140.4	49 56.4	84 54	140.8	49 31.0	84 54	141.2	49 05.5	85 53	141.6	48 40.0	85 53	142.0	48 14.4	86 52	142.4	47 48.7	86 52	142.8	4
25	50 13.7	83 57	138.7	49 48.8	83 56	139.1	49 23.8	83 56	139.5	48 58.7	84 55	139.9	48 33.5	84 55	140.3	48 08.2	84 54	140.8	47 42.9	84 54	141.2	47 17.5	85 53	141.5	25
6	49 39.6	82 58	137.4	49 15.0	82 58	137.8	48 50.3	83 57	138.2	48 25.5	83 57	138.7	48 00.6	83 56	139.1	47 35.6	83 56	139.5	47 10.5	84 55	139.9	46 45.4	84 55	140.3	6
7	49 04.8	81 59	136.1	48 40.4	81 59	136.6	48 16.0	82 58	137.0	47 51.5	82 58	137.4	47 26.9	82 58	137.9	47 02.2	83 57	138.3	46 37.4	83 57	138.7	46 12.5	83 56	139.1	7
8	48 29.1	80 61	134.9	48 05.1	80 60	135.4	47 40.9	81 60	135.8	47 16.7	81 59	136.2	46 52.3	81 59	136.7	46 27.9	82 58	137.1	46 03.4	82 58	137.5	45 38.8	82 58	137.9	8
9	47 52.7	79 62	133.7	47 28.9	79 61	134.2	47 05.1	80 61	134.6	46 41.1	80 60	135.1	46 17.0	80 60	135.5	45 52.9	81 59	135.9	45 28.6	81 59	136.3	45 04.3	81 59	136.7	9
30	47 15.6	78 63	132.5	46 52.1	78 63	133.0	46 28.5	79 62	133.5	46 04.8	79 62	133.9	45 41.0	79 61	134.3	45 17.1	80 61	134.8	44 53.1	80 60	135.2	44 29.0	80 60	135.6	30
1	46 37.7	77 64	131.4	46 14.5	78 64	131.9	45 51.2	78 63	132.3	45 27.8	78 63	132.8	45 04.3	79 62	133.2	44 40.6	79 62	133.6	44 16.9	79 62	134.1	43 53.1	80 61	134.5	1
2	45 59.2	76 65	130.3	45 36.3	77 65	130.8	45 13.3	77 64	131.2	44 50.1	77 64	131.7	44 26.8	78 63	132.1	44 03.5	78 63	132.5	43 40.0	78 63	133.0	43 16.5	79 62	133.4	2
3	45 20.1	75 66	129.2	44 57.4	76 66	129.7	44 34.7	76 65	130.1	44 11.8	76 65	130.6	43 48.8	77 64	131.0	43 25.7	77 64	131.5	43 02.5	78 64	131.9	42 39.2	78 63	132.3	3
4	44 40.4	75 67	128.2	44 18.0	75 67	128.6	43 55.5	76 66	129.1	43 32.8	76 66	129.6	43 10.1	76 65	130.0	42 47.2	76 65	130.4	42 24.7	77 65	130.9	42 01.3	77 64	131.3	4
35	44 00.1	74 68	127.1	43 37.9	74 68	127.6	43 15.7	74 67	128.0	42 53.3	75 67	128.5	42 30.8	75 66	129.0	42 08.2	75 66	129.4	41 45.5	76 66	129.8	41 22.7	76 65	130.3	35
6	43 19.3	73 69	126.1	42 57.4	73 69	126.6	42 35.3	74 68	127.0	42 13.2	74 68	127.5	41 51.0	74 67	127.9	41 28.6	75 67	128.4	41 06.2	75 67	128.8	40 43.6	75 66	129.3	6
7	42 37.9	72 70	125.1	42 16.2	72 69	125.6	41 54.4	73 69	126.0	41 32.6	73 69	126.5	41 10.6	74 68	127.0	40 48.5	74 68	127.4	40 26.3	74 67	127.8	40 03.9	75 67	128.3	7
8	41 56.0	71 71	124.1	41 34.6	72 70	124.6	41 13.1	72 70	125.1	40 51.4	72 69	125.5	40 29.6	73 69	126.0	40 07.8	73 69	126.4	39 45.8	74 68	126.9	39 23.7	74 68	127.3	8
9	41 13.7	70 71	123.2	40 52.5	71 71	123.7	40 31.2	71 71	124.1	40 09.8	72 70	124.6	39 48.2	72 70	125.0	39 26.6	72 69	125.5	39 04.9	73 69	125.9	38 43.0	73 69	126.4	9
40	40 30.9	70 72	122.3	40 09.9	70 72	122.7	39 48.8	70 71	123.2	39 27.6	71 71	123.7	39 06.3	71 71	124.1	38 44.9	72 70	124.6	38 23.4	72 70	125.0	38 01.8	72 69	125.5	40
1	39 47.6	69 73	121.4	39 26.9	69 72	121.8	39 06.0	70 72	122.3	38 45.1	70 72	122.8	38 24.0	70 71	123.2	38 02.8	71 71	123.7	37 41.5	71 71	124.1	37 20.1	71 70	124.6	1
2	39 04.0	68 73	120.5	38 43.5	69 73	120.9	38 22.8	69 73	121.4	38 02.1	69 72	121.9	37 41.2	70 72	122.3	37 20.2	70 72	122.8	36 59.2	70 71	123.2	36 38.0	71 71	123.7	2
3	38 19.9	67 74	119.6	37 59.6	68 74	120.1	37 39.2	68 73	120.5	37 18.6	69 73	121.0	36 58.0	69 72	121.5	36 37.3	69 72	121.9	36 16.4	70 72	122.4	35 55.5	70 72	122.8	3
4	37 35.5	67 75	118.8	37 15.4	67 74	119.2	36 55.2	68 74	119.7	36 34.8	68 74	120.1	36 14.4	68 73	120.6	35 53.9	69 73	121.0	35 33.2	69 73	121.5	35 12.5	69 72	121.9	4
45	36 50.7	66 75	117.9	36 30.8	67 75	118.4	36 10.8	67 75	118.8	35 50.7	67 74	119.3	35 30.4	68 74	119.8	35 10.1	68 74	120.2	34 49.6	68 73	120.7	34 29.1	69 73	121.1	45
6	36 05.6	66 76	117.1	35 45.9	66 75	117.6	35 26.0	66 75	118.0	35 06.1	67 75	118.5	34 46.1	67 74	118.9	34 25.9	67 74	119.4	34 05.7	68 74	119.8	33 45.3	68 74	120.3	6
7	35 20.1	65 76	116.3	35 00.6	65 76	116.8	34 41.0	66 76	117.2	34 21.2	66 75	117.7	34 01.4	66 75	118.1	33 41.4	67 75	118.6	33 21.4	67 74	119.0	33 01.2	67 74	119.5	7
8	34 34.4	64 77	115.5	34 15.0	65 76	116.0	33 55.6	65 76	116.4	33 36.0	65 76	116.9	33 16.2	66 75	117.3	32 56.6	66 75	117.8	32 36.7	66 75	118.2	32 16.8	67 75	118.7	8
9	33 48.3	64 77	114.7	33 29.1	64 77	115.2	33 09.8	64 77	115.7	32 50.5	65 76	116.1	32 31.0	65 76	116.6	32 11.4	65 76	117.0	31 51.7	66 76	117.5	31 31.9	66 75	117.9	9
50	33 02.0	63 78	114.0	32 42.9	64 77	114.4	32 23.8	64 77	114.9	32 04.6	64 77	115.3	31 45.3	65 77	115.8	31 25.9	65 76	116.2	31 06.4	65 76	116.7	30 46.8	65 76	117.1	50
1	32 15.3	63 78	113.2	31 56.5	63 78	113.7	31 37.5	63 78	114.1	31 18.5	64 77	114.6	30 59.3	64 77	115.0	30 40.1	64 77	115.5	30 20.8	65 77	115.9	30 01.4	65 76	116.4	1
2	31 28.4	62 79	112.5	31 09.7	62 78	112.9	30 51.0	63 78	113.4	30 32.1	63 78	113.9	30 13.1	63 78	114.3	29 54.0	64 77	114.8	29 34.9	64 77	115.2	29 15.6	64 77	115.6	2
3	30 41.3	62 79	111.8	30 22.8	62 79	112.2	30 04.1	62 78	112.7	29 45.4	63 78	113.1	29 26.6	63 78	113.6	29 07.7	63 78	114.0	28 48.7	64 77	114.5	28 29.6	64 77	114.9	3
4	29 53.9	61 79	111.1	29 35.5	61 79	111.5	29 17.1	62 79	112.0	28 58.5	62 79	112.4	28 39.8	62 78	112.9	28 21.1	63 78	113.3	28 02.3	63 78	113.7	27 43.3	63 78	114.2	4
55	29 06.3	61 80	110.4	28 48.1	61 79	110.8	28 29.8	61 79	111.3	28 11.3	62 79	111.7	27 52.8	62 79	112.2	27 34.2	62 78	112.6	27 15.6	62 78	113.0	26 56.8	63 78	113.5	55
6	28 18.5	60 80	109.7	28 00.4	60 80	110.1	27 42.2	61 80	110.6	27 24.0	61 79	111.0	27 05.6	61 79	111.5	26 47.1	62 79	111.9	26 28.6	62 79	112.3	26 10.0	62 78	112.8	6
7	27 30.5	60 80	109.0	27 12.5	60 80	109.4	26 54.5	60 80	109.9	26 36.4	61 80	110.3	26 18.1	61 79	110.7	25 59.8	61 79	111.2	25 41.4	61 79	111.7	25 23.0	62 79	112.1	7
8	26 42.3	59 81	108.3	26 24.5	59 81	108.8	26 06.5	60 80	109.2	25 48.5	60 80	109.7	25 30.5	60 80	110.1	25 12.3	61 80	110.5	24 54.0	61 79	111.0	24 35.7	61 79	111.4	8
9	25 53.9	59 81	107.7	25 36.2	59 81	108.1	25 18.4	59 81	108.6	25 00.5	60 80	109.0	24 42.6	60 80	109.4	24 24.5	60 80	109.9	24 06.4	61 79	110.3	23 48.2	61 79	110.8	9
60	25 05.3	59 81	107.0	24 47.7	59 81	107.5	24 30.1	59 81	107.9	24 12.3	59 81	108.3	23 54.5	60 80	108.8	23 36.6	60 80	109.2	23 18.6	60 80	109.7	23 00.6	60 80	110.1	60
1	24 16.6	58 82	106.4	23 59.1	58 81	106.8	23 41.6	59 81	107.3	23 23.9	59 81	107.7	23 06.2	59 81	108.1	22 48.4	60 81	108.6	22 30.6	60 80	109.0	22 12.7	60 80	109.4	1
2	23 27.7	58 82	105.7	23 10.3	58 82	106.2	22 52.9	58 81	106.6	22 35.4	59 81	107.1	22 17.8	59 81	107.5	22 00.1	59 81	107.9	21 42.4	59 81	108.4	21 24.6	60 80	108.8	2
3	22 38.6	57 82	105.1	22 21.4	58 82	105.6	22 04.1	58 82	106.0	21 46.6	58 81	106.4	21 29.2	58 81	106.9	21 11.6	59 81	107.3	20 54.0	59 81	107.7	20 36.3	59 81	108.2	3
4	21 49.5	57 82	104.5	21 32.3	57 82	104.9	21 15.1	58 82	105.4	20 57.8	58 82	105.8	20 40.4	58 82	106.2	20 23.0	58 81	106.7	20 05.5	58 81	107.1	19 47.9	59 81	107.5	4
65	21 00.1	57 82	103.9	20 43.1	57 82	104.3	20 25.9	57 82	104.8	20 08.7	57 82	105.2	19 51.5	58 82	105.6	19 34.2	58 82	106.1	19 16.8	58 81	106.5	18 59.3	58 81	106.9	65
6	20 10.7	56 83	103.3	19 53.7	57 82	103.7	19 36.7	57 82	104.2	19 19.6	57 82	104.6	19 02.4	57 82	105.0	18 45.2	57 82	105.5	18 27.9	58 82	105.9	18 10.6	58 82	106.3	6
7	19 21.1	56 83	102.7	19 04.2	56 83	103.1	18 47.3	57 83	103.6	18 30.2	57 82	104.0	18 13.2	57 82	104.4	17 56.1	57 82	104.9	17 38.9	57 82	105.3	17 21.7	58 82	105.7	7
8	18 31.4	56 83	102.1	18 14.6	56 83	102.5	17 57.7	56 83	103.0	17 40.8	56 82	103.4	17 23.8	57 82	103.8	17 06.6	57 82	104.3	16 49.7	57 82	104.7	16 32.6	57 82	105.1	8
9	17 41.6	56 83	101.5	17 24.9	56 83	101.9	17 08.1	56 83	102.4	16 51.3	56 83	102.8	16 34.4	56 83	103.2	16 17.4	57 82	103.7	16 00.4	57 82	104.1	15 43.4	57 82	104.5	9
70	16 51.7	55 83	100.9	16 35.0	56 83	101.4	16 18.3	56 83	101.8	16 01.6	56 83	102.2	15 44.8	56 83	102.6	15 27.9	56 83	103.1	15 11.0	56 83	103.5	14 54.1	57 82	103.9	70
1	16 01.6	55 84	100.3	15 45.1	55 83	100.8	15 28.5	55 83	101.3	15 11.8	56 83	101.7	14 55.1	56 83	102.1	14 38.3	56 83	102.5	14 21.5	56 83	102.9	14 04.6	56 83	103.4	1
2	15 11.5	55 84	99.8	14 55.0	55 84	100.2	14 38.5	55 83	100.6	14 21.9	55 83	101.1	14 05.3	56 83	101.5	13 48.6	56 83	101.9	13 31.8	56 83	102.3	13 15.1	56 83	102.8	2
3	14 21.4	55 84	99.2	14 04.9	55 84	99.6	13 48.4	55 84	100.1	13 31.9	55 83	100.5	13 15.4	55 83	100.9	12 58.7	56 83	101.4	12 42.1	56 83	101.8	12 25.4	56 83	102.2	3
4	13 31.1	55 84	98.6	13 14.7	55 84	99.1	12 58.3	55 84	99.5	12 41.8	55 84	99.9	12 25.3	55 83	100.4	12 08.8	55 83	100.8	11 52.2	55 83	101.2	11 35.6	55 83	101.6	4
75	12 40.7	54 84	98.1	12 24.4	54 84	98.5	12 08.1	55 84	98.9	11 51.7	55 84	99.4	11 35.2	55 84	99.8	11 18.8	55 84	100.2	11 02.3	55 83	100.6	10 45.7	55 83	101.1	75
6	11 50.3	54 84	97.5	11 34.1	54 84	98.0	11 17.8	54 84	98.4	11 01.4	54 84	98.8	10 45.1	55 84	99.2	10 28.7	55 84	99.7	10 12.2	55 84	100.1	9 55.7	55 83	100.5	6
7	10 59.9	54 84	97.0	10 43.6	54 84	97.4	10 27.4	54 84	97.8	10 11.1	54 84	98.3	9 54.8	54 84	98.7	9 38.5	55 84	99.1	9 22.1	55 84	99.5	9 05.7	55 84	100.0	7
8	10 09.3	54 84	96.4	9 53.2	54 84	96.9	9 37.0	54 84	97.3	9 20.7	54 84	97.7	9 04.5	54 84	98.1	8 48.2	54 84	98.6	8 31.9	54 84	99.0	8 15.5	54 84	99.4	8
9	9 18.7	54 84	95.9	9 02.6	54 84	96.3	8 46.5	54 84	96.7	8 30.3	54 84	97.2	8 14.1	54 84	97.6	7 57.8	54 84	98.0	7 41.6	54 84	98.4	7 25.3	54 84	98.9	9
80	8 28.1	54 84	95.3	8 12.0	54 84	95.8	7 55.9	54 84	96.2	7 39.8	54 84	96.6	7 23.6	54 84	97.0	7 07.4	54 84	97.5	6 51.2	54 84	97.9	6 35.0	54 84	98.3	80
1	7 37.4	53 85	94.8	7 21.4	54 84	95.2	7 05.3	54 84	95.6	6 49.2	54 84	96.1	6 33.1	54 84	96.5	6 16.9	54 84	96.9	6 00.8	54 84	97.3	5 44.6	54 84	97.8	1
2	6 46.7	53 85	94.3	6 30.7	53 85	94.7	6 14.6	54 84	95.1	5 58.6	54 84	95.5	5 42.5	54 84	96.0	5 26.4	54 84	96.4							2
3	5 55.9	53 85	93.7	5 39.9	53 85	94.1	5 23.9	53 85	94.6	5 07.9	53 85	95.0													3
4	5 05.1	53 85	93.2																						4

Right-margin latitude labels: Lat. 32°, Lat. 33°, Lat. 34°, Lat. 35°, Lat. 36°, Lat. 37°, Lat. 38°

Lat. 32°

H.A.	4° 00′ (Alt — Δd Δt — Az)	4° 30′	5° 00′	5° 30′	6° 00′	6° 30′	7° 00′	7° 30′	H.A.
00	62 00.0 1.0 02 180.0	62 30.0 1.0 02 180.0	63 00.0 1.0 02 180.0	63 30.0 1.0 02 180.0	64 00.0 1.0 02 180.0	64 30.0 1.0 02 180.0	65 00.0 1.0 02 180.0	65 30.0 1.0 02 180.0	00
1	61 59.1 1.0 02 177.9	62 29.0 1.0 05 177.8	62 59.0 1.0 05 177.8	63 29.0 1.0 05 177.7	63 59.0 1.0 05 177.7	64 29.0 1.0 05 177.7	64 59.0 1.0 05 177.7	65 28.9 1.0 05 177.6	1
2	61 56.2 1.0 08 175.8	62 26.2 1.0 08 175.7	62 56.1 1.0 08 175.6	63 26.0 1.0 08 175.5	63 56.0 1.0 08 175.5	64 25.9 1.0 08 175.4	64 55.8 1.0 09 175.3	65 25.8 1.0 09 175.2	2
3	61 51.5 1.0 11 173.6	62 21.4 1.0 11 173.5	62 51.3 1.0 11 173.4	63 21.1 1.0 11 173.3	63 51.0 99 12 173.2	64 20.8 99 12 173.1	64 50.6 99 12 173.0	65 20.5 99 12 172.9	3
4	61 45.0 99 14 171.5	62 14.7 99 14 171.4	62 44.5 99 14 171.3	63 14.2 99 15 171.1	63 44.0 99 15 171.0	64 13.7 99 15 170.8	64 43.4 99 15 170.7	65 13.1 99 16 170.5	4
05	61 36.6 99 17 169.5	62 06.2 99 17 169.3	62 35.8 99 18 169.1	63 05.4 99 18 168.9	63 35.0 99 18 168.8	64 04.6 99 18 168.6	64 34.2 99 19 168.4	65 03.7 99 19 168.2	05
6	61 26.4 98 20 167.4	61 55.8 98 20 167.2	62 25.3 98 21 167.0	62 54.7 98 21 166.8	63 24.2 98 21 166.6	63 53.5 98 22 166.3	64 22.9 98 22 166.1	64 52.3 98 22 165.9	6
7	61 14.4 98 23 165.4	61 43.7 98 23 165.1	62 12.9 98 24 164.9	62 42.2 97 24 164.7	63 11.4 97 24 164.4	63 40.6 97 25 164.2	64 09.7 97 25 163.9	64 38.9 97 25 163.6	7
8	61 00.7 97 26 163.4	61 29.8 97 26 163.1	61 58.8 97 26 162.8	62 27.8 97 27 162.6	62 56.8 97 27 162.3	63 25.8 96 28 162.0	63 54.7 96 28 161.7	64 23.6 96 29 161.4	8
9	60 45.3 96 28 161.4	61 14.1 96 29 161.1	61 42.9 96 29 160.8	62 11.7 96 30 160.5	62 40.4 96 30 160.2	63 09.1 96 31 159.9	63 37.8 95 31 159.5	64 06.4 95 32 159.2	9
10	60 28.2 95 31 159.4	60 56.8 95 32 159.1	61 25.4 95 32 158.8	61 53.9 95 33 158.5	62 22.3 95 33 158.1	62 50.8 95 33 157.8	63 19.1 94 34 157.4	63 47.4 94 34 157.1	10
1	60 09.5 95 34 157.5	60 37.8 94 34 157.2	61 06.1 94 35 156.8	61 34.4 94 35 156.5	62 02.6 94 36 156.1	62 30.7 94 36 155.7	62 58.8 94 37 155.4	63 26.8 94 37 155.0	1
2	59 49.9 94 36 155.6	60 17.3 93 37 155.3	60 45.3 93 37 154.9	61 13.3 93 38 154.5	61 41.2 93 38 154.2	62 09.0 93 39 153.8	62 36.7 92 39 153.3	63 04.4 92 40 152.9	2
3	59 27.5 93 39 153.8	59 55.3 92 39 153.4	60 23.0 92 40 153.0	60 50.7 92 40 152.6	61 18.2 92 41 152.2	61 45.7 92 41 151.8	62 13.1 91 42 151.4	62 40.5 91 42 150.9	3
4	59 04.4 92 41 152.0	59 31.8 91 41 151.6	59 59.2 91 42 151.2	60 26.5 91 43 150.8	60 53.8 91 43 150.4	61 20.9 90 44 149.9	61 48.0 90 44 149.5	62 15.0 90 45 149.0	4
15	58 39.8 91 43 150.2	59 06.9 90 45 149.8	59 34.0 90 46 149.4	60 01.0 89 46 149.0	60 27.1 89 47 148.5	60 54.7 89 46 148.1	61 21.4 89 47 147.6	61 48.1 89 47 147.1	15
6	58 13.8 90 45 148.5	58 40.7 89 46 148.1	59 07.4 89 46 147.7	59 34.1 89 47 147.2	60 00.7 88 48 146.7	60 27.1 88 49 146.3	60 53.5 88 49 145.8	61 19.7 87 49 145.3	6
7	57 46.6 89 47 146.8	58 13.2 88 48 146.4	58 39.6 88 48 145.9	59 05.9 88 49 145.5	59 32.1 87 50 145.0	59 58.2 87 50 144.5	60 24.2 86 51 144.0	60 50.1 86 51 143.5	7
8	57 18.2 87 49 145.2	57 44.4 87 50 144.7	58 10.5 87 50 144.3	58 36.5 86 51 143.8	59 02.3 86 52 143.3	59 28.1 86 52 142.8	59 53.7 85 53 142.3	60 19.2 85 53 141.8	8
9	56 48.6 86 51 143.6	57 14.4 86 52 143.1	57 40.2 86 52 142.7	58 05.8 85 53 142.2	58 31.3 85 54 141.7	58 56.7 84 54 141.2	59 22.0 84 55 140.6	59 47.2 84 55 140.1	9
20	56 17.8 85 53 142.1	56 43.4 85 54 141.6	57 08.8 85 54 141.1	57 34.1 84 55 140.6	57 59.2 84 55 140.0	58 24.3 84 56 139.6	58 49.3 83 56 139.0	59 14.0 82 57 138.5	20
1	55 46.0 84 55 140.5	56 11.2 84 55 140.1	56 36.3 83 56 139.6	57 01.2 83 56 139.1	57 26.1 83 57 138.5	57 50.8 82 58 138.0	58 15.3 82 58 137.5	58 39.7 81 59 136.9	1
2	55 13.2 83 56 139.1	55 38.0 83 57 138.6	56 02.8 82 57 138.1	56 27.4 82 58 137.6	56 51.9 81 59 137.0	57 16.2 81 59 136.5	57 40.4 80 60 135.9	58 04.5 80 60 135.4	2
3	54 39.4 82 58 137.6	55 03.9 82 58 137.1	55 28.3 81 59 136.6	55 52.6 81 60 136.1	56 16.7 80 60 135.6	56 40.7 80 61 135.0	57 04.6 79 61 134.5	57 28.3 79 62 133.9	3
4	54 04.6 81 59 136.2	54 28.8 80 60 135.7	54 52.9 80 60 135.2	55 16.9 80 61 134.7	55 40.7 79 62 134.2	56 04.3 79 63 133.6	56 27.8 78 63 133.1	56 51.2 78 63 132.5	4
25	53 29.0 80 61 134.9	53 52.9 79 61 134.4	54 16.6 79 62 133.9	54 40.3 78 62 133.3	55 03.7 78 63 132.8	55 27.1 77 63 132.2	55 50.2 77 64 131.7	56 13.2 76 65 131.1	25
6	52 52.5 79 62 133.6	53 16.1 78 63 133.1	53 39.5 78 63 132.5	54 02.8 77 64 132.0	54 26.0 77 64 131.4	54 49.0 76 65 130.9	55 11.8 76 65 130.3	55 34.5 75 66 129.8	6
7	52 15.3 78 63 132.3	52 38.5 77 64 131.8	53 01.7 77 64 131.2	53 24.6 76 65 130.7	53 47.5 76 65 130.2	54 10.1 75 66 129.6	54 32.7 75 66 129.0	54 55.0 74 67 128.5	7
8	51 37.3 77 65 131.0	52 00.2 76 65 130.5	52 23.0 76 66 130.0	52 45.7 75 66 129.4	53 08.2 75 67 128.9	53 30.6 74 67 128.3	53 52.8 74 68 127.8	54 14.8 73 68 127.2	8
9	50 58.5 76 66 129.8	51 21.2 75 66 129.3	51 43.7 74 67 128.7	52 06.1 74 67 128.2	52 28.3 73 68 127.7	52 50.3 73 68 127.1	53 12.2 73 69 126.5	53 34.0 72 69 126.0	9
30	50 19.1 75 67 128.6	50 41.5 74 67 128.1	51 03.7 74 68 127.6	51 25.3 73 68 127.0	51 47.7 73 69 126.5	52 09.4 72 69 125.9	52 31.0 72 70 125.4	52 52.5 71 70 124.8	30
1	49 39.1 74 68 127.5	50 01.1 73 68 127.0	50 23.1 73 69 126.4	50 44.8 72 69 125.9	51 06.5 72 70 125.3	51 27.9 71 70 124.8	51 49.2 71 71 124.2	52 10.4 70 71 123.6	1
2	48 58.4 73 69 126.4	49 20.2 72 69 125.8	49 41.8 72 70 125.3	50 03.3 71 70 124.8	50 24.7 71 71 124.2	50 45.9 70 71 123.7	51 06.9 70 71 123.1	51 27.8 69 72 122.5	2
3	48 17.1 72 70 125.3	48 38.6 72 70 124.7	49 00.0 71 71 124.2	49 21.2 71 71 123.7	49 42.3 70 71 123.1	50 03.2 69 72 122.6	50 24.0 69 72 122.0	50 44.6 68 73 121.4	3
4	47 35.3 71 71 124.2	47 56.6 71 71 123.7	48 17.7 70 71 123.1	48 38.7 70 72 122.6	48 59.4 70 72 122.1	49 20.1 69 73 121.5	49 40.6 68 73 120.9	50 00.9 67 74 120.4	4
35	46 53.0 70 71 123.2	47 14.0 70 72 122.6	47 34.8 69 72 122.1	47 55.5 69 73 121.6	48 16.1 68 73 121.0	48 36.5 68 73 120.5	48 56.7 67 74 119.9	49 16.8 67 74 119.3	35
6	46 10.1 69 72 122.1	46 30.9 69 73 121.6	46 51.5 68 73 121.1	47 11.9 68 73 120.6	47 32.2 67 74 120.0	47 52.4 67 74 119.5	48 12.4 66 75 118.9	48 32.2 66 75 118.3	6
7	45 26.8 69 73 121.2	45 47.3 68 73 120.6	46 07.7 68 74 120.1	46 27.9 67 74 119.6	46 48.0 67 74 119.0	47 07.9 66 75 118.5	47 27.6 66 75 117.9	47 47.2 65 76 117.4	7
8	44 43.0 68 74 120.2	45 03.3 67 74 119.7	45 23.4 67 74 119.1	45 43.4 66 75 118.6	46 03.3 66 75 118.0	46 23.0 65 75 117.5	46 42.5 65 76 116.9	47 01.9 64 76 116.4	8
9	43 58.8 67 74 119.3	44 18.9 67 75 118.7	44 38.8 66 75 118.2	44 58.6 66 75 117.7	45 18.2 65 76 117.1	45 37.7 65 76 116.6	45 57.0 64 76 116.1	46 16.1 64 77 115.5	9
40	43 14.3 66 75 118.3	43 34.1 66 75 117.8	43 53.8 65 76 117.3	44 13.3 65 76 116.8	44 32.7 64 76 116.2	44 52.0 64 77 115.7	45 11.1 63 77 115.2	45 30.0 63 77 114.6	40
1	42 29.3 66 75 117.4	42 48.9 65 76 116.9	43 08.4 65 76 116.4	43 27.7 64 77 115.9	43 46.9 64 77 115.3	44 06.0 63 77 114.8	44 24.9 63 78 114.3	44 43.6 62 78 113.7	1
2	41 43.9 65 76 116.6	42 03.4 64 76 116.0	42 22.6 64 77 115.5	42 41.8 64 77 115.0	43 00.8 63 77 114.5	43 19.6 63 78 113.9	43 38.3 62 78 113.4	43 56.9 62 78 112.9	2
3	40 58.3 64 77 115.7	41 17.5 64 77 115.2	41 36.6 63 77 114.7	41 55.5 63 78 114.2	42 14.3 62 78 113.6	42 33.0 62 78 113.1	42 51.5 61 79 112.6	43 09.9 61 79 112.0	3
4	40 12.3 64 77 114.9	40 31.3 63 78 114.4	40 50.2 63 78 113.8	41 08.9 62 78 113.3	41 27.5 62 78 112.8	41 46.0 61 79 112.3	42 04.3 61 79 111.7	42 22.5 60 79 111.2	4
45	39 25.9 63 78 114.0	39 44.8 63 78 113.5	40 03.5 62 78 113.0	40 22.1 62 79 112.5	40 40.5 61 79 112.0	40 58.8 61 79 111.5	41 16.9 60 79 110.9	41 35.0 60 80 110.4	45
6	38 39.3 62 78 113.2	38 58.0 62 78 112.7	39 16.5 62 79 112.2	39 34.9 61 79 111.7	39 53.2 61 79 111.2	40 11.3 60 80 110.7	40 29.3 60 80 110.2	40 47.1 59 80 109.6	6
7	37 52.4 62 79 112.4	38 10.9 61 79 111.9	38 29.3 61 79 111.4	38 47.5 61 79 110.9	39 05.6 60 80 110.4	39 23.6 60 80 109.9	39 41.4 59 80 109.4	39 59.1 59 80 108.9	7
8	37 05.3 61 79 111.7	37 23.6 61 79 111.2	37 41.8 60 80 110.7	37 59.9 60 80 110.2	38 17.8 60 80 109.7	38 35.6 59 80 109.1	38 53.3 59 80 108.6	39 10.8 58 81 108.1	8
9	36 17.9 61 79 110.9	36 36.0 60 80 110.4	36 54.1 60 80 109.9	37 12.0 60 80 109.4	37 29.8 59 80 108.9	37 47.5 59 81 108.4	38 05.0 58 81 107.9	38 22.4 58 81 107.4	9
50	35 30.2 60 80 110.2	35 48.2 60 80 109.7	36 06.1 59 80 109.2	36 23.9 59 80 108.7	36 41.6 59 81 108.2	36 59.1 58 81 107.7	37 16.5 58 81 107.2	37 33.7 57 81 106.6	50
1	34 42.3 60 80 109.4	35 00.2 59 80 108.9	35 18.0 59 81 108.5	35 35.6 59 81 108.0	35 53.1 58 81 107.5	36 10.5 58 81 107.0	36 27.8 57 81 106.4	36 44.9 57 82 105.9	1
2	33 54.2 59 80 108.7	34 12.0 59 81 108.2	34 29.6 59 81 107.7	34 47.1 58 81 107.2	35 04.5 58 81 106.7	35 21.7 57 82 106.2	35 38.9 57 82 105.7	35 55.9 56 82 105.2	2
3	33 06.0 59 81 108.0	33 23.6 58 81 107.5	33 41.0 58 81 107.0	33 58.4 58 81 106.5	34 15.7 57 82 106.1	34 32.8 57 82 105.6	34 49.8 56 82 105.1	35 06.7 56 82 104.5	3
4	32 17.5 58 81 107.3	32 34.9 58 81 106.8	32 52.3 58 82 106.3	33 09.5 57 82 105.8	33 26.7 57 82 105.4	33 43.7 57 82 104.9	34 00.6 56 82 104.4	34 17.4 56 82 103.9	4
55	31 28.8 58 81 106.6	31 46.1 58 82 106.1	32 03.4 57 82 105.7	32 20.5 57 82 105.2	32 37.5 57 82 104.7	32 54.4 56 82 104.2	33 11.2 56 83 103.7	33 27.9 55 83 103.2	55
6	30 40.0 58 82 106.0	30 57.2 57 82 105.5	31 14.3 57 82 105.0	31 31.3 57 82 104.5	31 48.2 56 82 104.0	32 05.0 56 83 103.5	32 21.7 55 83 103.1	32 38.3 55 83 102.6	6
7	29 51.0 57 82 105.3	30 08.1 57 82 104.8	30 25.1 57 82 104.3	30 42.0 56 82 103.9	30 58.8 56 83 103.4	31 15.5 55 83 102.9	31 32.1 55 83 102.4	31 48.6 55 83 101.9	7
8	29 01.8 57 82 104.6	29 18.8 57 82 104.2	29 35.7 56 83 103.7	29 52.5 56 83 103.2	30 09.2 56 83 102.8	30 25.8 55 83 102.3	30 42.3 55 83 101.8	30 58.7 54 83 101.3	8
9	28 12.5 57 82 104.0	28 29.4 56 83 103.5	28 46.2 56 83 103.1	29 02.9 56 83 102.6	29 19.6 55 83 102.1	29 36.1 55 83 101.6	29 52.5 55 83 101.1	30 08.8 54 83 100.7	9
60	27 23.1 56 83 103.4	27 39.9 56 83 102.9	27 56.6 56 83 102.4	28 13.2 55 83 102.0	28 29.7 55 83 101.5	28 46.2 55 83 101.0	29 02.5 54 83 100.5	29 18.7 54 84 100.0	60
1	26 33.5 56 83 102.7	26 50.2 56 83 102.3	27 06.8 55 83 101.8	27 23.4 55 83 101.3	27 39.8 55 83 100.9	27 56.2 54 84 100.4	28 12.4 54 84 99.9	28 28.6 54 84 99.4	1
2	25 43.8 56 83 102.1	26 00.4 55 83 101.6	26 17.0 55 83 101.2	26 33.3 55 84 100.7	26 49.8 54 84 100.2	27 06.1 54 84 99.8	27 22.2 54 84 99.3	27 38.3 53 84 98.8	2
3	24 54.0 55 83 101.5	25 10.5 55 83 101.0	25 27.0 55 83 100.6	25 43.4 54 84 100.1	25 59.7 54 84 99.6	26 15.9 54 84 99.2	26 32.0 54 84 98.7	26 48.0 53 84 98.2	3
4	24 04.1 55 83 100.9	24 20.6 55 83 100.4	24 36.9 55 84 100.0	24 53.3 54 84 99.5	25 09.5 54 84 99.1	25 25.6 54 84 98.6	25 41.7 53 84 98.1	25 57.6 53 84 97.6	4
65	23 14.1 55 84 100.3	23 30.5 55 84 99.8	23 46.8 54 84 99.4	24 03.0 54 84 98.9	24 19.2 54 84 98.5	24 35.3 53 84 98.0	24 51.2 53 84 97.5	25 07.2 53 84 97.1	65
6	22 24.0 55 84 99.7	22 40.3 54 84 99.3	22 56.5 54 84 98.8	23 12.7 54 84 98.3	23 28.8 54 84 97.9	23 44.8 53 84 97.4	24 00.8 53 84 97.0	24 16.6 53 84 96.5	6
7	21 33.8 54 84 99.1	21 50.0 54 84 98.7	22 06.2 54 84 98.2	22 22.3 54 84 97.8	22 38.4 53 84 97.3	22 54.3 53 84 96.8	23 10.2 53 84 96.4	23 26.0 53 84 95.9	7
8	20 43.5 54 84 98.5	20 59.7 54 84 98.1	21 15.8 54 84 97.6	21 31.9 53 84 97.2	21 47.9 53 84 96.7	22 03.8 53 84 96.3	22 19.6 53 84 95.8	22 35.4 52 84 95.4	8
9	19 53.1 54 84 98.0	20 09.3 54 84 97.5	20 25.4 54 84 97.1	20 41.4 53 84 96.6	20 57.3 53 84 96.2	21 13.2 53 84 95.7	21 29.0 53 84 95.2	21 44.7 52 85 94.8	9
70	19 02.7 54 84 97.4	19 18.8 54 84 96.9	19 34.8 53 84 96.5	19 50.8 53 84 96.0	20 06.7 53 84 95.6	20 22.5 53 84 95.1	20 38.3 52 85 94.7	20 54.0 52 85 94.2	70
1	18 12.2 54 84 96.8	18 28.3 54 84 96.4	18 44.2 53 84 95.9	19 00.2 53 84 95.5	19 16.0 53 84 95.0	19 31.8 53 85 94.6	19 47.6 52 85 94.1	20 03.2 52 85 93.7	1
2	17 21.6 54 84 96.3	17 37.7 53 84 95.8	17 53.6 53 84 95.4	18 09.5 53 84 94.9	18 25.3 53 84 94.5	18 41.1 52 85 94.0	18 56.8 52 85 93.6	19 12.4 52 85 93.1	2
3	16 31.0 53 84 95.7	16 47.0 53 84 95.3	17 02.9 53 84 94.8	17 18.8 53 84 94.4	17 34.6 52 85 93.9	17 50.3 52 85 93.5	18 06.0 52 85 93.0	18 21.6 52 85 92.6	3
4	15 40.4 53 84 95.2	15 56.3 53 84 94.7	16 12.2 53 84 94.3	16 28.0 52 85 93.8	16 43.8 52 85 93.4	16 59.5 52 85 92.9	17 15.2 52 85 92.5	17 30.8 52 85 92.1	4
75	14 49.7 53 85 94.6	15 05.6 53 85 94.2	15 21.5 53 85 93.7	15 37.3 53 85 93.3	15 53.0 52 85 92.8	16 08.7 52 85 92.4	16 24.3 52 85 92.0	16 39.9 52 85 91.5	75
6	13 59.0 53 85 94.1	14 14.8 53 85 93.6	14 30.7 53 85 93.2	14 46.5 53 85 92.7	15 02.2 52 85 92.3	15 17.9 52 85 91.9	15 33.5 52 85 91.4	15 49.1 52 85 91.0	6
7	13 08.2 53 85 93.5	13 24.0 53 85 93.1	13 39.8 53 85 92.6	13 55.6 52 85 92.2	14 11.3 52 85 91.8	14 27.0 52 85 91.3	14 42.6 52 85 90.9	14 58.2 52 85 90.4	7
8	12 17.4 53 85 93.0	12 33.2 53 85 92.5	12 49.0 52 85 92.1	13 04.8 52 58 91.7	13 20.5 52 85 91.2	13 36.1 52 85 90.8	13 51.7 52 85 90.4	14 07.3 52 85 89.9	8
9	11 26.6 53 85 92.4	11 42.4 53 85 92.0	11 58.1 52 85 91.6	12 13.9 52 85 91.1	12 29.6 52 85 90.7	12 45.2 52 85 90.3	13 00.8 52 85 89.8	13 16.4 52 85 89.4	9
80	10 35.7 53 85 91.9	10 51.5 53 85 91.5	11 07.3 52 85 91.0	11 23.0 52 85 90.6	11 38.7 52 85 90.2	11 54.4 52 85 89.7	12 10.0 52 85 89.3	12 25.5 52 85 88.9	80
1	9 44.8 53 85 91.4	10 00.6 53 85 90.9	10 16.4 52 85 90.5	10 32.1 52 85 90.1	10 47.8 52 85 89.6	11 03.5 52 85 89.2	11 19.1 52 85 88.8	11 34.7 52 85 88.3	1
2	8 54.0 53 85 90.8	9 09.8 53 85 90.4	9 25.5 52 85 90.0	9 41.2 52 85 89.5	9 56.9 52 85 89.1	10 12.6 52 85 88.7	10 28.2 52 85 88.2	10 43.8 52 85 87.8	2
3	8 03.1 53 85 90.3	8 18.9 53 85 89.9	8 34.6 52 85 89.4	8 50.4 52 85 89.0	9 06.1 52 85 88.6	9 21.7 52 85 88.2	9 37.4 52 85 87.7	9 53.0 52 85 87.3	3
4	7 12.2 53 85 89.8	7 28.0 53 85 89.3	7 43.8 52 85 88.9	7 59.5 52 85 88.5	8 15.2 52 85 88.1	8 30.9 52 85 87.6	8 46.5 52 85 87.2	9 02.2 52 85 86.8	4
85	6 21.3 53 85 89.2	6 37.1 53 85 88.8	6 52.9 53 85 88.4	7 08.6 52 85 88.0	7 24.4 52 85 87.5	7 40.1 52 85 87.1	7 55.7 52 85 86.7	8 11.4 52 85 86.2	85
6	5 30.5 53 85 88.7	5 46.3 53 85 88.3	6 02.0 53 85 87.9	6 17.8 52 85 87.4	6 33.5 52 85 87.0	6 49.3 52 85 86.6	7 04.9 52 85 86.1	7 20.6 52 85 85.7	6
7			5 11.2 53 85 87.3	5 27.0 53 85 86.9	5 42.7 52 85 86.5	5 58.5 52 85 86.1	6 14.2 52 85 85.6	6 29.9 52 85 85.2	7
8						5 07.7 53 84 85.5	5 23.5 52 84 85.1	5 39.2 52 84 84.7	8

Lat. 32°

Each declination cell lists: Alt (° ′) Δd Δt Az (°)

H.A.	4° 00′	4° 30′	5° 00′	5° 30′	6° 00′	6° 30′	7° 00′	7° 30′	H.A.
00	54 00.0 1.0 01 180.0	53 30.0 1.0 01 180.0	53 00.0 1.0 01 180.0	52 30.0 1.0 01 180.0	52 00.0 1.0 01 180.0	51 30.0 1.0 01 180.0	51 00.0 1.0 01 180.0	50 30.0 1.0 01 180.0	00
1	53 59.2 1.00 04 178.3	53 29.3 1.00 04 178.3	52 59.3 1.00 04 178.3	52 29.3 1.00 04 178.4	51 59.3 1.00 04 178.4	51 29.3 1.00 04 178.4	50 59.3 1.00 04 178.4	50 29.3 1.00 03 178.4	1
2	53 57.0 1.00 06 176.7	53 27.0 1.00 06 176.7	52 57.1 1.00 06 176.7	52 27.1 1.00 06 176.7	51 57.1 1.00 06 176.8	51 27.1 1.00 06 176.8	50 57.2 1.00 06 176.8	50 27.2 1.00 06 176.9	2
3	53 53.2 1.00 09 174.9	53 23.3 1.00 09 175.0	52 53.4 1.00 09 175.0	52 23.5 1.00 08 175.1	51 53.6 1.00 08 175.2	51 23.6 1.00 08 175.2	50 53.7 1.00 08 175.3	50 23.8 1.00 06 175.3	3
4	53 48.0 99 11 173.2	53 18.1 1.0 11 173.3	52 48.3 1.0 11 173.4	52 18.4 1.0 11 173.5	51 48.6 1.0 11 173.6	51 18.7 1.0 11 173.6	50 48.8 1.0 10 173.7	50 19.0 1.0 10 173.8	4
05	53 41.2 99 14 171.6	53 11.5 99 14 171.7	52 41.7 99 13 171.8	52 11.9 99 13 171.9	51 42.1 99 13 172.0	51 12.4 99 13 172.1	50 42.6 99 13 172.1	50 12.8 99 13 172.2	05
6	53 33.0 99 16 169.9	53 03.4 99 16 170.0	52 33.7 99 16 170.1	52 04.0 99 16 170.3	51 34.3 99 15 170.5	51 04.6 99 15 170.5	50 34.9 99 15 170.6	50 05.2 99 15 170.7	6
7	53 23.4 98 18 168.2	52 53.8 98 18 168.4	52 24.3 98 18 168.5	51 54.7 98 18 168.7	51 25.1 98 18 168.8	50 55.5 98 17 168.9	50 25.9 98 17 169.1	49 56.3 98 17 169.2	7
8	53 12.3 98 21 166.6	52 42.9 98 21 166.8	52 13.5 98 20 166.9	51 44.0 98 20 167.1	51 14.6 98 20 167.2	50 45.1 98 20 167.4	50 15.6 98 19 167.5	49 46.1 98 19 167.7	8
9	52 59.8 98 23 165.0	52 30.5 98 23 165.2	52 01.2 98 23 165.3	51 31.9 98 22 165.5	51 02.6 98 22 165.7	50 33.3 98 22 165.8	50 04.0 98 22 166.0	49 34.6 98 21 166.2	9
10	52 45.9 97 25 163.4	52 16.8 97 25 163.6	51 47.7 97 25 163.8	51 18.5 97 25 163.9	50 49.4 97 24 164.1	50 20.2 97 24 164.3	49 51.0 97 24 164.5	49 21.8 97 23 164.7	10
1	52 30.7 96 28 161.8	52 01.7 96 27 162.0	51 32.8 97 27 162.2	51 03.8 97 27 162.4	50 34.8 97 26 162.6	50 05.8 97 26 162.8	49 36.8 96 26 163.0	49 07.7 96 26 163.2	1
2	52 14.1 96 30 160.2	51 45.4 96 29 160.4	51 16.6 96 29 160.7	50 47.8 96 29 160.9	50 19.0 96 28 161.1	49 50.1 96 28 161.3	49 21.3 96 28 161.5	48 52.4 96 28 161.7	2
3	51 56.2 95 32 158.7	51 27.7 95 32 158.9	50 59.1 95 31 159.1	50 30.5 95 31 159.4	50 01.9 95 31 159.6	49 33.2 96 30 159.8	49 04.5 96 30 160.1	48 35.8 96 30 160.3	3
4	51 37.1 94 34 157.1	51 08.7 95 34 157.4	50 40.4 95 33 157.6	50 12.0 95 33 157.9	49 43.5 95 33 158.1	49 15.1 95 32 158.4	48 46.6 95 32 158.6	48 18.1 95 32 158.9	4
15	51 16.7 94 36 155.6	50 48.6 94 36 155.9	50 20.4 94 35 156.2	49 52.2 94 35 156.4	49 24.0 94 34 156.7	48 55.7 94 34 157.0	48 27.5 94 34 157.2	47 59.1 94 33 157.5	15
6	50 55.1 93 38 154.1	50 27.2 93 38 154.4	49 59.3 93 37 154.7	49 31.3 93 37 155.0	49 03.3 93 36 155.3	48 35.3 94 36 155.5	48 07.2 94 36 155.8	47 39.1 94 35 156.1	6
7	50 32.3 92 40 152.7	50 04.7 92 39 153.0	49 37.0 92 39 153.3	49 09.2 93 39 153.6	48 41.4 93 38 153.9	48 13.6 93 38 154.1	47 45.8 93 38 154.4	47 17.9 93 37 154.7	7
8	50 08.4 91 42 151.3	49 41.0 91 41 151.6	49 13.5 92 41 151.9	48 46.0 92 40 152.2	48 18.5 92 40 152.5	47 50.9 92 40 152.8	47 23.2 92 39 153.1	46 55.6 92 39 153.3	8
9	49 43.4 90 43 149.8	49 16.2 91 43 150.2	48 49.0 91 43 150.5	48 21.8 91 42 150.8	47 54.4 91 42 151.1	47 27.1 91 41 151.4	46 59.7 91 41 151.7	46 32.2 92 41 152.0	9
20	49 17.3 90 45 148.5	48 50.4 90 45 148.8	48 23.4 90 44 149.1	47 56.4 90 44 149.5	47 29.3 90 44 149.8	47 02.2 90 43 150.1	46 35.0 91 43 150.4	46 07.8 91 42 150.7	20
1	48 50.2 89 47 147.1	48 23.5 89 46 147.5	47 56.8 89 46 147.8	47 30.0 89 46 148.1	47 03.2 89 45 148.5	46 36.3 90 45 148.8	46 09.4 90 44 149.1	45 42.4 90 44 149.4	1
2	48 22.0 88 48 145.8	47 55.6 88 48 146.1	47 29.2 88 48 146.5	47 02.7 88 47 146.8	46 36.1 89 47 147.2	46 09.5 89 46 147.5	45 42.8 89 46 147.8	45 16.1 89 46 148.1	2
3	47 52.9 87 50 144.5	47 26.8 87 50 144.8	47 00.6 87 49 145.2	46 34.4 88 49 145.5	46 08.0 88 48 145.9	45 41.7 88 48 146.2	45 15.2 88 47 146.6	44 48.7 88 47 146.9	3
4	47 22.9 86 52 143.2	46 57.0 86 51 143.6	46 31.1 87 51 143.9	46 05.1 87 50 144.3	45 39.1 87 50 144.6	45 12.9 87 49 145.0	44 46.7 87 49 145.3	44 20.5 88 49 145.7	4
25	46 52.0 85 53 141.9	46 26.4 85 53 142.3	46 00.5 86 52 142.7	45 35.0 86 52 143.1	45 09.2 86 51 143.4	44 43.3 86 51 143.8	44 17.4 87 50 144.1	43 51.4 87 50 144.5	25
6	46 20.1 84 54 140.7	45 54.8 84 54 141.1	45 29.4 85 54 141.5	45 04.0 85 53 141.8	44 38.4 85 53 142.2	44 12.8 85 52 142.6	43 47.1 86 52 142.9	43 21.4 86 51 143.3	6
7	45 47.5 83 56 139.5	45 22.5 84 55 139.9	44 57.3 84 55 140.3	44 32.1 84 54 140.7	44 06.8 84 54 141.0	43 41.5 85 54 141.4	43 16.0 85 53 141.8	42 50.5 85 53 142.1	7
8	45 14.1 82 57 138.3	44 49.3 83 57 138.7	44 24.4 83 56 139.1	43 59.5 83 56 139.5	43 34.4 84 55 139.9	43 09.3 84 55 140.2	42 44.2 84 54 140.6	42 18.9 84 54 141.0	8
9	44 39.8 82 58 137.2	44 15.3 82 58 137.6	43 50.7 82 57 138.0	43 26.0 82 57 138.4	43 01.3 83 57 138.7	42 36.4 83 56 139.1	42 11.5 83 56 139.5	41 46.5 83 55 139.9	9
30	44 04.9 81 59 136.0	43 40.6 81 59 136.4	43 16.3 81 59 136.8	42 51.8 82 58 137.2	42 27.3 82 58 137.6	42 02.7 82 57 138.0	41 38.1 82 57 138.4	41 13.3 83 56 138.8	30
1	43 29.2 80 61 134.9	43 05.2 80 60 135.3	42 41.1 80 60 135.7	42 16.9 81 59 136.1	41 52.7 81 59 136.5	41 28.3 81 58 136.9	41 03.9 82 58 137.3	40 39.4 82 58 137.7	1
2	42 52.8 79 62 133.8	42 29.1 79 61 134.2	42 05.2 80 61 134.7	41 41.3 80 60 135.1	41 17.3 80 60 135.5	40 53.2 80 60 135.9	40 29.1 81 59 136.2	40 04.8 81 59 136.6	2
3	42 15.8 78 63 132.8	41 52.3 78 62 133.2	41 28.7 79 62 133.6	41 05.1 79 62 134.0	40 41.3 79 61 134.4	40 17.5 80 61 134.8	39 53.6 80 60 135.2	39 29.6 80 60 135.6	3
4	41 38.1 77 64 131.7	41 14.9 78 63 132.1	40 51.6 78 63 132.6	40 28.1 78 63 133.0	40 04.6 78 62 133.4	39 41.1 79 62 133.8	39 17.4 79 61 134.2	38 53.6 79 61 134.6	4
35	40 59.8 76 65 130.7	40 36.8 77 64 131.1	40 13.8 77 64 131.5	39 50.6 77 64 132.0	39 27.4 78 63 132.4	39 04.0 78 63 132.8	38 40.6 78 62 133.2	38 17.1 78 62 133.6	35
6	40 21.0 76 66 129.7	39 58.2 76 65 130.1	39 35.4 76 65 130.6	39 12.5 77 64 131.0	38 49.5 77 64 131.4	38 26.4 77 64 131.8	38 03.2 77 63 132.2	37 39.9 78 63 132.6	6
7	39 41.5 75 67 128.7	39 19.0 75 66 129.2	38 56.5 76 65 129.6	38 33.8 76 65 130.0	38 11.0 76 65 130.4	37 48.1 76 65 130.8	37 25.2 77 64 131.2	37 02.2 77 64 131.6	7
8	39 01.6 74 67 127.8	38 39.3 74 67 128.2	38 17.0 75 67 128.6	37 54.5 75 66 129.0	37 32.0 75 66 129.5	37 09.4 76 66 129.9	36 46.6 76 65 130.3	36 23.9 76 65 130.7	8
9	38 21.1 73 68 126.8	37 59.1 74 68 127.3	37 36.9 74 68 127.7	37 14.7 74 67 128.1	36 52.4 74 67 128.5	36 30.0 75 66 128.9	36 07.6 75 66 129.3	35 45.0 75 66 129.8	9
40	37 40.1 73 69 125.9	37 18.3 73 69 126.3	36 56.4 73 68 126.8	36 34.4 73 68 127.2	36 12.4 74 68 127.6	35 50.2 74 67 128.0	35 28.0 74 67 128.4	35 05.6 75 66 128.8	40
1	36 58.7 72 70 125.0	36 37.1 72 70 125.4	36 15.4 72 69 125.9	35 53.7 73 69 126.3	35 31.8 73 68 126.7	35 09.9 73 68 127.1	34 47.9 74 68 127.5	34 25.7 74 67 127.9	1
2	36 16.8 71 71 124.1	35 55.4 71 70 124.5	35 34.0 72 70 125.0	35 12.4 72 70 125.4	34 50.8 72 69 125.8	34 29.1 73 69 126.2	34 07.3 73 68 126.7	33 45.4 73 68 127.1	2
3	35 34.4 70 71 123.2	35 13.3 71 71 123.7	34 52.0 71 70 124.1	34 30.7 71 70 124.5	34 09.3 72 70 125.0	33 47.8 72 70 125.4	33 26.2 72 69 125.8	33 04.6 72 69 126.2	3
4	34 51.6 70 72 122.4	34 30.7 70 72 122.8	34 09.7 70 71 123.2	33 48.6 71 71 123.7	33 27.4 71 71 124.1	33 06.1 71 70 124.5	32 44.7 71 70 124.9	32 23.3 72 70 125.4	4
45	34 08.5 69 73 121.5	33 47.7 69 72 122.0	33 26.9 70 72 122.4	33 06.0 70 72 122.8	32 45.0 70 71 123.3	32 24.0 70 71 123.7	32 02.8 71 71 124.1	31 41.6 71 70 124.5	45
6	33 24.9 68 73 120.7	33 04.4 69 73 121.2	32 43.8 69 73 121.6	32 23.1 69 72 122.0	32 02.3 69 72 122.4	31 41.4 70 72 122.9	31 20.5 70 71 123.3	30 59.4 70 71 123.7	6
7	32 41.0 68 74 119.9	32 20.7 68 73 120.3	32 00.4 68 73 120.8	31 39.7 68 73 121.2	31 19.2 69 73 121.6	30 58.5 69 72 122.0	30 37.7 69 72 122.5	30 16.9 70 72 122.9	7
8	31 56.7 67 74 119.1	31 36.6 67 74 119.6	31 16.4 68 74 120.0	30 56.0 68 73 120.4	30 35.7 68 73 120.8	30 15.2 69 73 121.3	29 54.6 69 72 121.7	29 34.0 69 72 122.1	8
9	31 12.1 66 75 118.3	30 52.1 67 75 118.8	30 32.1 67 74 119.2	30 12.0 67 74 119.6	29 51.8 67 74 120.1	29 31.5 68 73 120.5	29 11.1 68 73 120.9	28 50.7 68 73 121.3	9
50	30 27.1 66 75 117.6	30 07.4 66 75 118.0	29 47.5 66 75 118.4	29 27.6 67 75 118.9	29 07.6 67 74 119.3	28 47.5 67 74 119.7	28 27.3 67 74 120.1	28 07.1 68 73 120.6	50
1	29 41.9 65 76 116.8	29 22.3 65 76 117.2	29 02.6 66 75 117.7	28 42.9 66 75 118.1	28 23.0 66 75 118.5	28 03.1 67 74 118.9	27 43.1 67 74 119.4	27 23.1 67 74 119.8	1
2	28 56.3 65 76 116.1	28 36.9 65 76 116.5	28 17.4 65 76 116.9	27 57.7 66 75 117.4	27 38.2 66 75 117.8	27 18.4 66 75 118.2	26 58.6 66 74 118.6	26 38.8 66 74 119.1	2
3	28 10.5 64 77 115.3	27 51.2 64 77 115.8	27 31.9 65 76 116.2	27 12.5 65 76 116.6	26 53.0 65 76 117.1	26 33.5 65 75 117.5	26 13.8 66 75 117.9	25 54.1 66 75 118.3	3
4	27 24.4 63 77 114.6	27 05.3 64 77 115.1	26 46.1 64 77 115.5	26 26.9 64 77 115.9	26 07.6 65 76 116.3	25 48.2 65 76 116.8	25 28.7 65 75 117.2	25 09.2 65 75 117.6	4
55	26 38.0 63 78 113.9	26 19.0 63 77 114.3	26 00.0 63 77 114.8	25 41.0 64 77 115.2	25 21.8 64 77 115.6	25 02.6 64 76 116.1	24 43.3 64 76 116.5	24 23.9 65 76 116.9	55
6	25 51.3 63 78 113.2	25 32.6 63 78 113.7	25 13.7 63 78 114.1	24 54.8 63 77 114.5	24 35.8 63 77 115.0	24 16.8 64 77 115.4	23 57.6 64 77 115.8	23 38.4 64 76 116.2	6
7	25 04.4 62 79 112.5	24 45.8 62 78 113.0	24 27.1 62 78 113.4	24 08.4 63 78 113.8	23 49.6 63 78 114.2	23 30.6 63 77 114.7	23 11.7 63 77 115.1	22 52.6 64 77 115.5	7
8	24 17.3 61 79 111.9	23 58.9 62 79 112.3	23 40.3 62 78 112.7	23 21.7 62 78 113.1	23 03.0 62 78 113.6	22 44.3 63 78 114.0	22 25.5 63 77 114.4	22 06.6 63 77 114.8	8
9	23 30.0 61 79 111.2	23 11.7 61 79 111.6	22 53.3 61 79 112.0	22 34.8 62 79 112.5	22 16.3 62 78 112.9	21 57.7 62 78 113.3	21 39.0 62 78 113.7	21 20.3 63 78 114.2	9
60	22 42.4 61 80 110.5	22 24.3 61 79 111.0	22 06.0 61 79 111.4	21 47.7 61 79 111.8	21 29.3 61 79 112.2	21 10.8 62 78 112.7	20 52.3 62 78 113.1	20 33.7 62 78 113.5	60
1	21 54.7 60 80 109.9	21 36.6 60 80 110.3	21 18.5 60 79 110.7	21 00.3 61 79 111.2	20 42.1 61 79 111.6	20 23.8 61 79 112.0	20 05.4 61 79 112.4	19 47.0 62 78 112.8	1
2	21 06.7 60 80 109.2	20 48.8 60 80 109.7	20 30.8 60 80 110.1	20 12.8 60 80 110.5	19 54.7 60 79 110.9	19 36.5 61 79 111.4	19 18.3 61 79 111.8	19 00.0 61 79 112.2	2
3	20 18.6 59 81 108.6	20 00.8 59 80 109.0	19 42.9 60 80 109.5	19 25.0 60 80 109.9	19 07.0 60 80 110.3	18 49.0 60 79 110.7	18 30.9 60 79 111.2	18 12.8 61 79 111.6	3
4	19 30.3 59 81 108.0	19 12.6 59 81 108.4	18 54.9 59 80 108.8	18 37.1 59 80 109.3	18 19.2 60 80 109.7	18 01.3 60 80 110.1	17 43.4 60 80 110.5	17 25.3 60 79 110.9	4
65	18 41.8 58 81 107.4	18 24.3 58 81 107.8	18 06.6 59 80 108.2	17 49.0 59 80 108.6	17 31.2 59 80 109.1	17 13.4 59 80 109.5	16 55.6 60 80 109.9	16 37.7 60 80 110.3	65
6	17 53.2 58 82 106.7	17 35.7 58 81 107.2	17 18.2 58 81 107.6	17 00.7 59 81 108.0	16 43.0 59 81 108.4	16 25.4 59 80 108.9	16 07.7 59 80 109.3	15 49.9 59 80 109.7	6
7	17 04.4 58 82 106.1	16 47.0 58 81 106.6	16 29.6 58 81 107.0	16 12.2 58 81 107.4	15 54.7 58 81 107.8	15 37.1 59 81 108.3	15 19.6 59 80 108.7	15 01.9 59 80 109.1	7
8	16 15.4 57 82 105.5	15 58.2 58 82 106.0	15 40.9 58 81 106.4	15 23.6 58 81 106.8	15 06.2 58 81 107.2	14 48.7 58 81 107.7	14 31.3 58 81 108.1	14 13.7 58 81 108.5	8
9	15 26.3 57 82 104.9	15 09.2 57 82 105.4	14 52.0 57 82 105.8	14 34.8 58 82 106.2	14 17.5 58 81 106.6	14 00.2 58 81 107.1	13 42.8 58 81 107.5	13 25.4 58 81 107.9	9
70	14 37.1 57 82 104.3	14 20.1 57 82 104.8	14 03.0 57 82 105.2	13 45.8 57 82 105.6	13 28.7 57 82 106.1	13 11.5 57 81 106.5	12 54.2 58 81 106.9	12 36.9 58 81 107.3	70
1	13 47.5 56 82 103.8	13 30.8 57 82 104.2	13 13.8 57 82 104.6	12 56.8 57 82 105.0	12 39.7 57 82 105.5	12 22.6 57 82 105.9	12 05.4 57 81 106.3	11 48.2 57 81 106.7	1
2	12 58.3 56 83 103.2	12 41.4 56 82 103.6	12 24.5 56 82 104.0	12 07.6 57 82 104.5	11 50.6 57 82 104.9	11 33.6 57 82 105.3	11 16.5 57 82 105.7	10 59.4 57 82 106.1	2
3	12 08.7 56 83 102.6	11 51.9 56 83 103.1	11 35.1 56 83 103.5	11 18.2 56 82 103.9	11 01.4 56 82 104.3	10 44.4 56 82 104.7	10 27.5 57 82 105.2	10 10.5 57 82 105.6	3
4	11 19.0 56 83 102.1	11 02.3 56 83 102.5	10 45.5 56 83 102.9	10 28.8 56 83 103.3	10 12.0 56 82 103.7	9 55.2 56 82 104.2	9 38.3 56 82 104.6	9 21.4 56 82 105.0	4
75	10 29.1 55 83 101.5	10 12.5 55 83 101.9	9 55.9 55 83 102.3	9 39.2 56 83 102.8	9 22.5 56 83 103.2	9 05.8 56 83 103.6	8 49.0 56 82 104.0	8 32.2 56 82 104.4	75
6	9 39.2 55 83 100.9	9 22.7 55 83 101.4	9 06.1 55 83 101.8	8 49.5 55 83 102.2	8 32.9 55 83 102.6	8 16.3 56 83 103.0	7 59.6 56 83 103.5	7 42.9 56 82 103.9	6
7	8 49.2 55 84 100.4	8 32.8 55 83 100.8	8 16.3 55 83 101.2	7 59.7 55 83 101.6	7 43.2 55 83 102.1	7 26.5 55 83 102.5	7 10.0 56 83 102.9	6 53.4 56 83 103.3	7
8	7 59.1 54 84 99.8	7 42.7 55 84 100.3	7 26.3 55 83 100.7	7 09.9 55 83 101.1	6 53.4 55 83 101.5	6 36.9 55 83 101.9	6 20.4 55 83 102.4	6 03.9 55 83 102.8	8
9	7 09.0 54 84 99.3	6 52.6 54 84 99.7	6 36.3 55 84 100.1	6 19.9 55 83 100.5	6 03.5 55 83 101.0	5 47.1 55 83 101.4	5 30.6 55 83 101.8	5 14.2 55 83 102.2	9
80	6 18.7 54 84 98.7	6 02.4 54 84 99.2	5 46.1 54 84 99.6	5 29.8 54 84 100.0	5 13.5 54 83 100.4				80
1	5 28.4 54 84 98.2	5 12.2 54 84 98.6							1

Lat. 33°

Lat. 34°

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 32°

H.A.	8° 00′ (Alt. / Δd Δt / Az.)	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
00	66 00.0 1.0 02 180.0	66 30.0 1.0 02 180.0	67 00.0 1.0 02 180.0	67 30.0 1.0 02 180.0	68 00.0 1.0 02 180.0	68 30.0 1.0 02 180.0	69 00.0 1.0 02 180.0	69 30.0 1.0 02 180.0	00
1	65 58.9 1.0 05 177.6	66 28.9 1.0 06 177.5	66 58.9 1.0 06 177.5	67 28.9 1.0 06 177.4	67 58.8 1.0 06 177.4	68 28.8 1.0 06 177.3	68 58.8 1.0 06 177.3	69 28.8 1.0 06 177.2	1
2	65 55.7 1.0 09 175.1	66 25.6 1.0 09 175.0	66 55.5 1.0 09 175.0	67 25.4 1.0 10 174.9	67 55.3 1.0 10 174.8	68 25.2 1.0 10 174.6	68 55.1 1.0 10 174.5	69 25.0 1.0 10 174.4	2
3	65 50.3 99 12 172.7	66 20.1 99 13 172.6	66 49.9 99 13 172.5	67 19.7 99 13 172.3	67 49.5 99 13 172.2	68 19.3 99 14 172.0	68 49.1 99 14 171.8	69 18.9 99 14 171.7	3
4	65 42.8 99 16 170.3	66 12.5 99 16 170.2	66 42.2 99 17 170.0	67 11.8 99 17 169.9	67 41.5 99 17 169.6	68 11.1 99 18 169.4	68 40.7 99 18 169.1	69 10.3 99 18 168.9	4
05	65 33.2 98 19 168.0	66 02.7 98 20 167.7	66 32.2 98 20 167.5	67 01.7 98 20 167.3	67 31.1 98 21 167.0	68 00.6 98 21 166.8	68 30.0 98 22 166.5	68 59.3 98 22 166.2	05
6	65 21.6 98 23 165.6	65 50.9 98 23 165.4	66 20.2 98 24 165.1	66 49.4 97 24 164.8	67 18.6 97 24 164.5	67 47.8 97 25 164.2	68 17.0 97 25 163.9	68 46.1 97 26 163.6	6
7	65 08.0 97 26 163.3	65 37.0 97 26 163.0	66 06.1 97 27 162.7	66 35.1 97 27 162.4	67 04.0 96 28 162.1	67 32.9 96 28 161.7	68 01.8 96 29 161.4	68 30.6 96 29 161.0	7
8	64 52.4 96 29 161.1	65 21.2 96 30 160.7	65 50.0 96 31 160.4	66 18.7 96 31 160.0	66 47.4 95 31 159.6	67 15.9 95 32 159.3	67 44.4 95 32 158.9	68 12.9 95 33 158.4	8
9	64 35.0 95 32 158.8	65 03.5 95 33 158.5	65 31.9 95 33 158.1	66 00.3 94 34 157.7	66 28.6 94 34 157.3	66 56.9 94 35 156.9	67 25.1 94 36 156.4	67 53.2 94 36 156.0	9
10	64 15.7 94 35 156.7	64 43.9 94 36 156.3	65 12.0 94 36 155.9	65 40.1 93 37 155.4	66 08.1 93 37 155.0	66 36.0 93 38 154.5	67 03.8 93 39 154.1	67 31.5 92 39 153.6	10
1	63 54.7 93 38 154.6	64 22.6 93 38 154.1	64 50.3 92 39 153.7	65 18.0 92 40 153.2	65 45.6 92 40 152.8	66 13.2 92 41 152.3	66 40.6 91 42 151.8	67 07.9 91 42 151.2	1
2	63 32.0 92 40 152.5	63 59.5 92 41 152.0	64 26.9 91 42 151.6	64 54.3 91 42 151.1	65 21.5 91 43 150.6	65 48.6 90 44 150.1	66 15.7 90 44 149.5	66 42.6 90 45 149.0	2
3	63 07.7 91 43 150.5	63 34.9 91 44 150.0	64 01.9 90 45 149.4	64 28.9 90 45 149.0	64 55.7 89 46 148.5	65 22.4 89 46 147.9	65 49.0 88 47 147.4	66 15.5 88 48 146.8	3
4	62 41.9 89 46 148.5	63 08.7 89 46 148.0	63 35.3 89 47 147.5	64 01.9 88 47 147.0	64 28.3 88 48 146.4	64 54.6 88 49 145.9	65 20.8 87 50 145.3	65 46.9 87 50 144.7	4
15	62 14.6 88 48 146.6	62 41.0 88 48 146.1	63 07.3 87 49 145.6	63 33.4 87 50 145.0	63 59.5 87 50 144.5	64 25.4 86 51 143.9	64 51.1 86 52 143.3	65 16.7 85 53 142.7	15
6	61 45.9 87 50 144.8	62 11.9 87 51 144.2	62 37.8 86 51 143.7	63 03.6 86 52 143.1	63 29.2 86 53 142.5	63 54.7 85 53 142.0	64 20.0 84 54 141.3	64 45.2 84 55 140.7	6
7	61 15.9 86 52 143.0	61 41.5 85 53 142.4	62 07.0 85 53 141.9	62 32.4 84 54 141.3	62 57.6 84 55 140.7	63 22.7 83 55 140.1	63 47.6 83 56 139.5	64 12.3 82 57 138.8	7
8	60 44.6 84 54 141.2	61 09.9 84 55 140.7	61 35.0 83 55 140.0	61 59.9 83 56 139.3	62 24.8 82 57 138.9	62 49.4 82 57 138.3	63 13.9 81 58 137.7	63 38.2 81 59 137.0	8
9	60 12.2 83 56 139.5	60 37.1 83 57 139.0	61 01.8 82 57 138.4	61 26.4 82 58 137.8	61 50.8 81 59 137.2	62 15.0 81 59 136.6	62 39.1 80 60 135.9	63 03.0 79 61 135.3	9
20	59 38.6 82 58 137.9	60 03.1 81 58 137.3	60 27.5 81 59 136.8	60 51.6 80 60 136.2	61 15.6 80 60 135.5	61 39.5 79 61 134.9	62 03.1 79 62 134.2	62 26.6 78 62 133.6	20
1	59 04.0 81 59 136.3	59 28.1 80 60 135.8	59 52.1 80 61 135.2	60 15.9 79 61 134.6	60 39.5 78 62 133.9	61 02.9 78 62 133.3	61 26.2 77 63 132.6	61 49.3 77 64 132.0	1
2	58 28.4 79 61 134.8	58 52.1 79 62 134.2	59 15.7 78 62 133.6	59 39.1 78 63 133.0	60 02.4 77 63 132.4	60 25.4 77 64 131.7	60 48.3 76 65 131.1	61 11.0 75 65 130.4	2
3	57 51.8 78 62 133.3	58 15.2 78 63 132.7	58 38.4 77 64 132.1	59 01.5 77 64 131.5	59 24.3 76 65 130.9	59 47.0 76 65 130.2	60 09.5 75 66 129.6	60 31.8 74 67 128.9	3
4	57 14.4 77 64 131.9	57 37.4 76 64 131.3	58 00.3 76 65 130.7	58 23.0 75 66 130.1	58 45.5 75 66 129.4	59 07.8 74 67 128.8	59 29.9 73 67 128.1	59 51.8 73 68 127.5	4
25	56 36.1 76 65 130.5	56 58.8 75 66 129.9	57 21.3 75 66 129.3	57 43.6 74 67 128.7	58 05.8 73 67 128.0	58 27.7 73 68 127.4	58 49.5 72 69 126.7	59 11.0 71 69 126.1	25
6	55 57.0 75 66 129.2	56 19.4 74 67 128.6	56 41.5 74 67 128.0	57 03.5 73 68 127.3	57 25.3 72 69 126.7	57 46.9 72 69 126.1	58 08.3 71 70 125.4	58 29.5 70 70 124.7	6
7	55 17.2 74 68 127.9	55 39.2 73 68 127.3	56 01.1 72 69 126.7	56 22.7 72 69 126.0	56 44.2 71 70 125.4	57 05.5 71 70 124.8	57 26.5 70 71 124.1	57 47.4 69 71 123.4	7
8	54 36.7 73 69 126.6	54 58.4 72 69 126.0	55 19.9 71 70 125.4	55 41.2 71 70 124.8	56 02.4 70 71 124.1	56 23.3 69 71 123.5	56 44.1 69 72 122.8	57 04.6 68 72 122.2	8
9	53 55.5 72 70 125.4	54 16.9 71 70 124.8	54 38.1 70 71 124.2	54 59.1 70 71 123.6	55 20.0 69 72 122.9	55 40.6 68 72 122.3	56 01.0 68 73 121.6	56 21.2 67 73 121.0	9
30	53 13.7 71 71 124.2	53 34.8 70 71 123.6	53 55.7 69 72 123.0	54 16.5 69 72 122.4	54 37.0 68 73 121.7	54 57.3 67 73 121.1	55 17.4 67 74 120.5	55 37.4 66 74 119.8	30
1	52 31.4 70 72 123.0	52 52.2 69 72 122.5	53 12.8 68 72 121.8	53 33.2 68 73 121.2	53 53.4 67 73 120.6	54 13.5 66 74 120.0	54 33.3 66 74 119.3	54 53.0 65 75 118.7	1
2	51 48.4 69 72 121.9	52 09.0 68 73 121.3	52 29.3 67 73 120.7	52 49.4 67 74 120.1	53 09.4 66 74 119.5	53 29.2 66 75 118.9	53 48.7 65 75 118.2	54 08.1 64 76 117.6	2
3	51 05.0 68 73 120.8	51 25.3 67 74 120.3	51 45.3 66 74 119.7	52 05.2 66 74 119.1	52 24.9 65 75 118.4	52 44.4 65 75 117.8	53 03.7 64 76 117.2	53 22.8 63 76 116.5	3
4	50 21.1 67 74 119.8	50 41.1 66 74 119.2	51 00.9 66 75 118.6	51 20.5 65 75 118.0	51 39.9 64 76 117.4	51 59.2 64 76 116.8	52 18.2 63 76 116.1	52 37.0 62 77 115.5	4
35	49 36.7 66 75 118.8	49 56.4 65 75 118.2	50 16.0 65 76 117.6	50 35.4 64 76 117.0	50 54.5 64 76 116.4	51 13.5 63 77 115.8	51 32.3 62 77 115.1	51 50.9 62 77 114.5	35
6	48 51.9 65 75 117.8	49 11.4 65 76 117.2	49 30.7 64 76 116.6	49 49.8 63 77 116.0	50 08.8 63 77 115.4	50 27.5 62 77 114.8	50 46.1 62 78 114.2	51 04.5 61 78 113.5	6
7	48 06.7 64 76 116.8	48 25.9 64 76 116.2	48 45.0 63 77 115.6	49 03.9 63 77 115.1	49 22.6 62 78 114.5	49 41.2 61 78 113.8	49 59.5 61 78 113.2	50 17.6 60 79 112.6	7
8	47 21.1 64 77 115.9	47 40.1 63 77 115.3	47 59.0 62 77 114.7	48 17.6 62 78 114.1	48 36.1 61 78 113.5	48 54.5 61 78 112.9	49 12.6 60 79 112.3	49 30.5 59 79 111.7	8
9	46 35.1 63 77 114.9	46 53.9 62 78 114.4	47 12.6 62 78 113.8	47 31.0 61 78 113.2	47 49.3 61 79 112.6	48 07.4 60 79 112.0	48 25.4 59 79 111.4	48 43.1 59 80 110.8	9
40	45 48.8 62 78 114.0	46 07.4 62 78 113.5	46 25.8 61 78 112.9	46 44.1 61 79 112.3	47 02.2 60 79 111.7	47 20.1 59 79 111.2	47 37.9 59 80 110.6	47 55.4 58 80 110.0	40
1	45 02.2 62 78 113.2	45 20.6 61 79 112.6	45 38.8 60 79 112.0	45 56.9 60 79 111.4	46 14.8 59 79 110.9	46 32.5 59 80 110.3	46 50.1 58 80 109.7	47 07.5 58 80 109.1	1
2	44 15.2 61 79 112.3	44 33.5 60 79 111.8	44 51.5 60 79 111.2	45 09.4 59 80 110.6	45 27.1 59 80 110.1	45 44.7 58 80 109.5	46 02.1 58 80 108.9	46 19.3 57 81 108.3	2
3	43 28.0 60 79 111.5	43 46.1 60 79 110.9	44 04.0 59 80 110.4	44 21.7 59 80 109.8	44 39.2 58 80 109.2	44 56.6 58 81 108.7	45 13.8 57 81 108.1	45 30.8 56 81 107.5	3
4	42 40.5 60 80 110.7	42 58.4 59 80 110.1	43 16.1 59 80 109.6	43 33.7 58 80 109.0	43 51.1 58 81 108.4	44 08.3 57 81 107.9	44 25.3 57 81 107.3	44 42.2 56 81 106.7	4
45	41 52.8 59 80 109.9	42 10.5 59 80 109.3	42 28.1 58 80 108.8	42 45.5 58 81 108.2	43 02.7 57 81 107.7	43 19.8 57 81 107.1	43 36.6 56 81 106.5	43 53.4 55 82 106.0	45
6	41 04.8 59 80 109.1	41 22.4 58 81 108.5	41 39.8 58 81 108.0	41 57.0 57 81 107.2	42 14.1 57 81 106.9	42 31.0 56 82 106.3	42 47.8 56 82 105.8	43 04.4 55 82 105.1	6
7	40 16.6 58 81 108.3	40 34.0 58 81 107.8	40 51.3 57 81 107.2	41 08.4 57 81 106.7	41 25.3 56 82 106.1	41 42.1 56 82 105.6	41 58.7 55 82 105.0	42 15.2 54 83 104.5	7
8	39 28.2 58 81 107.6	39 45.5 57 81 107.0	40 02.6 57 81 106.5	40 19.6 56 82 106.0	40 36.4 56 82 105.4	40 53.0 55 82 104.9	41 09.5 55 83 104.3	41 25.8 54 82 103.8	8
9	38 39.6 57 81 106.8	38 56.8 57 82 106.3	39 13.7 56 82 105.8	39 30.5 56 82 105.2	39 47.2 55 82 104.7	40 03.8 55 82 104.2	40 20.1 54 83 103.6	40 36.3 54 83 103.1	9
50	37 50.8 57 82 106.1	38 07.8 56 82 105.6	38 24.7 56 82 105.1	38 41.4 56 82 104.5	38 57.9 55 82 104.0	39 14.3 54 83 103.5	39 30.6 54 83 102.9	39 46.7 53 83 102.4	50
1	37 01.9 56 82 105.4	37 18.7 56 82 104.9	37 35.5 55 82 104.4	37 52.0 55 83 103.8	38 08.5 55 83 103.3	38 24.8 54 83 102.8	38 40.9 54 83 102.2	38 56.9 53 83 101.7	1
2	36 12.7 56 82 104.7	36 29.5 56 82 104.2	36 46.1 55 83 103.7	37 02.6 55 83 103.2	37 18.9 54 83 102.6	37 35.1 54 83 102.1	37 51.2 53 83 101.6	38 07.1 53 83 101.0	2
3	35 23.5 56 82 104.0	35 40.1 55 83 103.5	35 56.6 55 83 103.0	36 13.0 54 83 102.5	36 29.2 54 83 102.0	36 45.3 53 83 101.4	37 01.2 53 83 100.9	37 17.1 52 84 100.4	3
4	34 34.0 55 83 103.4	34 50.5 55 83 102.9	35 06.9 54 83 102.4	35 23.2 54 83 101.8	35 39.4 54 83 101.3	35 55.4 53 83 100.8	36 11.2 53 84 100.3	36 27.0 52 84 99.7	4
55	33 44.4 55 83 102.7	34 00.9 54 83 102.2	34 17.2 54 83 101.7	34 33.4 54 83 101.2	34 49.4 53 83 100.7	35 05.3 53 84 100.2	35 21.1 52 84 99.6	35 36.8 52 84 99.1	55
6	32 54.8 55 83 102.1	33 11.1 54 83 101.6	33 27.3 54 83 101.1	33 43.4 53 83 100.6	33 59.4 53 83 100.1	34 15.2 52 84 99.5	34 30.9 52 84 99.0	34 46.5 52 84 98.5	6
7	32 04.9 54 83 101.4	32 21.2 54 83 100.9	32 37.3 54 83 100.4	32 53.3 53 84 99.9	33 09.2 53 84 99.4	33 25.0 52 84 98.9	33 40.6 52 84 98.4	33 56.1 51 84 97.9	7
8	31 15.0 54 83 100.8	31 31.2 54 84 100.3	31 47.2 53 84 99.8	32 03.1 53 84 99.3	32 19.0 53 84 98.8	32 34.7 52 84 98.3	32 50.2 51 84 97.8	33 05.7 51 84 97.3	8
9	30 25.0 54 84 100.2	30 41.1 54 84 99.7	30 57.0 53 84 99.2	31 12.9 53 84 98.7	31 28.6 52 84 98.2	31 44.3 52 84 97.7	31 59.8 52 84 97.2	32 15.2 51 84 96.7	9
60	29 34.8 54 84 99.6	29 50.9 53 84 99.1	30 06.6 53 84 98.6	30 22.6 52 84 98.1	30 38.2 52 84 97.6	30 53.8 52 84 97.1	31 09.3 51 84 96.6	31 24.6 51 84 96.1	60
1	28 44.6 53 84 98.9	29 00.6 53 84 98.5	29 16.4 53 84 98.0	29 32.1 52 84 97.5	29 47.8 52 84 97.0	30 03.3 51 84 96.5	30 18.7 51 84 96.0	30 34.0 51 84 95.5	1
2	27 54.3 53 84 98.4	28 10.2 53 84 97.9	28 26.0 52 84 97.4	28 41.7 52 84 96.9	28 57.2 52 84 96.4	29 12.7 51 84 95.9	29 28.1 51 84 95.4	29 43.3 51 84 94.9	2
3	27 03.9 53 84 97.8	27 19.8 53 84 97.3	27 35.5 52 84 96.8	27 51.1 52 84 96.3	28 06.6 52 84 95.8	28 22.1 51 84 95.3	28 37.4 51 85 94.9	28 52.6 51 85 94.4	3
4	26 13.5 53 84 97.2	26 29.3 52 84 96.7	26 44.9 52 84 96.2	27 00.5 52 84 95.7	27 16.0 51 84 95.3	27 31.4 51 85 94.8	27 46.7 51 85 94.3	28 01.8 50 85 93.8	4
65	25 23.0 53 84 96.6	25 38.7 52 84 96.1	25 54.5 52 84 95.6	26 09.9 52 85 95.2	26 25.3 51 85 94.7	26 40.7 51 85 94.2	26 55.9 51 85 93.7	27 11.1 50 85 93.2	65
6	24 32.4 52 84 96.0	24 48.1 52 84 95.6	25 03.7 52 85 95.1	25 19.2 51 85 94.6	25 34.6 51 85 94.1	25 49.9 51 85 93.7	26 05.1 51 85 93.2	26 20.2 50 85 92.7	6
7	23 41.8 52 84 95.5	23 57.4 52 85 95.0	24 13.0 51 85 94.5	24 28.4 51 85 94.0	24 43.8 51 85 93.6	24 59.1 51 85 93.1	25 14.3 50 85 92.6	25 29.4 50 85 92.1	7
8	22 51.1 52 85 94.9	23 06.7 52 85 94.4	23 22.2 51 85 94.0	23 37.7 51 85 93.5	23 53.0 51 85 93.0	24 08.3 51 85 92.6	24 23.5 50 85 92.1	24 38.6 50 85 91.6	8
9	22 00.4 52 85 94.3	22 15.9 52 85 93.9	22 31.4 51 85 93.4	22 46.9 51 85 92.9	23 02.2 51 85 92.5	23 17.4 51 85 92.0	23 32.6 50 85 91.5	23 47.7 50 85 91.1	9
70	21 09.6 52 85 93.8	21 25.2 52 85 93.3	21 40.6 51 85 92.9	21 56.0 51 85 92.4	22 11.3 51 85 91.9	22 26.6 51 85 91.5	22 41.7 50 85 91.0	22 56.8 50 85 90.5	70
1	20 18.8 52 85 93.2	20 34.3 51 85 92.8	20 49.8 51 85 92.3	21 05.2 51 85 91.9	21 20.5 51 85 91.4	21 35.7 50 85 90.9	21 50.9 50 85 90.5	22 05.9 50 85 90.0	1
2	19 28.0 52 85 92.7	19 43.5 52 85 92.2	19 58.9 51 85 91.8	20 14.3 51 85 91.3	20 29.6 50 85 90.9	20 44.8 50 85 90.4	21 00.0 50 85 89.9	21 15.0 50 85 89.5	2
3	18 37.2 52 85 92.1	18 52.7 51 85 91.7	19 08.1 51 85 91.2	19 23.4 51 85 90.8	19 38.7 51 85 90.3	19 53.9 50 85 89.9	20 09.1 50 85 89.4	20 24.2 50 85 88.9	3
4	17 46.3 52 85 91.6	18 01.8 51 85 91.2	18 17.2 51 85 90.7	18 32.6 51 85 90.3	18 47.8 51 85 89.8	19 03.1 51 85 89.3	19 18.2 50 85 88.9	19 33.3 50 85 88.4	4
75	16 55.4 52 85 91.1	17 10.9 51 85 90.6	17 26.3 51 85 90.2	17 41.7 51 85 89.7	17 57.0 51 85 89.3	18 12.1 51 85 88.8	18 27.3 50 85 88.4	18 42.4 50 85 87.9	75
6	16 04.6 52 85 90.5	16 20.0 51 85 90.1	16 35.4 51 85 89.6	16 50.8 51 85 89.2	17 06.1 51 85 88.7	17 21.3 51 85 88.3	17 36.5 50 85 87.8	17 51.6 50 85 87.4	6
7	15 13.7 52 85 90.0	15 29.2 51 85 89.6	15 44.6 51 85 89.1	15 59.9 51 85 88.7	16 15.2 51 85 88.2	16 30.5 51 85 87.8	16 45.7 50 85 87.3	17 00.8 50 85 86.9	7
8	14 22.8 52 85 89.5	14 38.3 51 85 89.0	14 53.7 51 85 88.6	15 09.1 51 85 88.1	15 24.4 51 85 87.7	15 39.6 51 85 87.2	15 54.8 50 85 86.8	16 10.0 50 85 86.4	8
9	13 31.9 52 85 88.9	13 47.4 52 85 88.5	14 02.8 51 85 88.1	14 18.2 51 85 87.6	14 33.5 51 85 87.2	14 48.8 50 85 86.7	15 04.0 50 85 86.3	15 19.2 50 84 85.9	9
80	12 41.1 52 85 88.4	12 56.5 52 85 88.0	13 12.0 51 85 87.5	13 27.4 51 85 87.1	13 42.7 51 85 86.7	13 58.0 51 85 86.2	14 13.3 51 85 85.8	14 28.5 51 84 85.3	80
1	11 50.2 52 85 87.9	12 05.7 52 85 87.5	12 21.2 51 85 87.0	12 36.6 51 85 86.6	12 51.9 51 85 86.1	13 07.3 51 85 85.7	13 22.6 51 84 85.3	13 37.8 51 84 84.8	1
2	10 59.4 52 85 87.4	11 14.9 52 85 86.9	11 30.4 51 85 86.5	11 45.8 51 85 86.1	12 01.2 51 85 85.6	12 16.6 51 84 85.2	12 31.9 51 84 84.7	12 47.1 51 84 84.3	2
3	10 08.5 52 85 86.9	10 24.1 52 85 86.4	10 39.6 52 85 86.0	10 55.1 51 85 85.5	11 10.5 51 84 85.1	11 25.9 51 84 84.7	11 41.2 51 84 84.2	11 56.5 51 84 83.8	3
4	9 17.8 52 85 86.3	9 33.3 52 85 85.9	9 48.8 52 85 85.5	10 04.3 51 84 85.0	10 19.8 51 84 84.6	10 35.2 51 84 84.2	10 50.6 51 84 83.7	11 06.0 51 84 83.3	4
85	8 27.0 52 85 85.8	8 42.6 52 84 85.4	8 58.1 52 85 84.9	9 13.7 52 85 84.5	9 29.2 52 84 84.1	9 44.6 51 84 83.6	10 00.1 51 84 83.2	10 15.5 51 84 82.8	85
6	7 36.3 52 84 85.3	7 51.9 52 84 84.9	8 07.5 52 84 84.4	8 23.0 52 84 84.0	8 38.6 52 84 83.6	8 54.1 52 84 83.1	9 09.6 51 84 82.7	9 25.0 51 84 82.3	6
7	6 45.6 52 84 84.8	7 01.2 52 84 84.3	7 16.9 52 84 83.9	7 32.5 52 84 83.5	7 48.0 52 84 83.0	8 03.6 52 84 82.6	8 19.1 52 84 82.2	8 34.6 52 84 81.7	7
8	5 54.9 52 84 84.2	6 10.6 52 84 83.8	6 26.3 52 84 83.4	6 41.9 52 84 82.9	6 57.5 52 84 82.5	7 13.2 52 84 82.1	7 28.8 52 84 81.7	7 44.3 52 84 81.2	8
9	5 04.3 52 84 83.7	5 20.1 52 84 83.3	5 35.8 52 84 82.9	5 51.5 52 84 82.4	6 07.1 52 84 82.0	6 22.8 52 84 81.6	6 38.5 52 84 81.1	6 54.1 52 84 80.7	9
90			5 01.8 52 84 81.9	5 16.8 52 84 81.5	5 32.5 52 84 81.1	5 48.2 52 84 80.6	6 03.9 52 84 80.2		90

Lat. 32°

H.A.	8° 00' Alt. — Δd Δt / Az.	8° 30'	9° 00'	9° 30'	10° 00'	10° 30'	11° 00'	11° 30'	H.A.
00	50 00.0 1.00 01 180.0	49 30.0 1.00 01 180.0	49 00.0 1.00 01 180.0	48 30.0 1.00 01 180.0	48 00.0 1.00 01 180.0	47 30.0 1.00 01 180.0	47 00.0 1.00 01 180.0	46 30.0 1.00 01 180.0	00
1	49 59.3 1.00 03 178.5	49 29.3 1.00 03 178.5	48 59.3 1.00 03 178.5	48 29.3 1.00 03 178.5	47 59.3 1.00 03 178.5	47 29.4 1.00 03 178.5	46 59.4 1.00 03 178.6	46 29.4 1.00 03 178.6	1
2	49 57.3 1.00 06 176.9	49 27.3 1.00 06 177.0	48 57.3 1.00 06 177.0	48 27.1 1.00 06 177.0	47 57.4 1.00 05 177.1	47 27.4 1.00 05 177.1	46 57.5 1.00 05 177.2	46 27.5 1.00 05 177.2	2
3	49 53.9 1.00 08 175.4	49 23.9 1.00 08 175.4	48 54.0 1.00 08 175.5	48 24.1 1.00 08 175.5	47 54.1 1.00 08 175.6	47 24.2 1.00 08 175.6	46 54.3 1.00 07 175.7	46 24.3 1.00 07 175.7	3
4	49 49.1 1.00 10 173.9	49 19.2 1.00 10 173.9	48 49.3 1.00 10 174.0	48 19.4 1.00 10 174.1	47 49.6 1.00 10 174.1	47 19.7 1.00 10 174.2	46 49.8 1.00 10 174.3	46 19.9 1.00 09 174.3	4
05	49 43.0 99 12 172.3	49 13.2 99 12 172.4	48 43.3 99 12 172.5	48 13.5 99 12 172.6	47 43.7 99 12 172.7	47 13.9 99 12 172.7	46 44.1 99 12 172.8	46 14.2 99 12 172.9	05
6	49 35.5 99 15 170.8	49 05.8 99 14 170.9	48 36.1 99 14 171.0	48 06.3 99 14 171.1	47 36.6 99 14 171.2	47 06.8 99 14 171.3	46 37.1 99 14 171.4	46 07.3 99 14 171.5	6
7	49 26.7 99 17 169.4	48 57.1 99 17 169.5	48 27.5 99 16 169.5	47 57.8 99 16 169.7	47 28.2 99 16 169.8	46 58.5 99 16 170.0	46 28.9 99 16 170.0	45 59.2 99 16 170.1	7
8	49 16.6 98 19 167.8	48 47.1 98 19 167.9	48 17.6 98 19 168.1	47 48.1 98 18 168.2	47 18.5 98 18 168.3	46 49.0 99 18 168.5	46 19.4 98 18 168.6	45 49.9 98 18 168.7	8
9	49 05.2 98 21 166.3	48 35.8 98 21 166.5	48 06.4 98 21 166.6	47 37.0 98 20 166.8	47 07.6 98 20 166.9	46 38.2 98 20 167.1	46 08.7 98 20 167.2	45 39.3 98 20 167.3	9
10	48 52.6 97 23 164.8	48 23.3 98 23 165.0	47 54.0 98 23 165.2	47 24.8 98 22 165.3	46 55.5 98 22 165.5	46 26.2 98 22 165.7	45 56.9 98 22 165.8	45 27.5 98 22 166.0	10
1	48 38.6 97 25 163.4	48 09.5 97 25 163.6	47 40.4 97 25 163.7	47 11.3 97 24 163.9	46 42.1 97 24 164.1	46 13.0 97 24 164.3	45 43.8 97 24 164.4	45 14.6 97 24 164.6	1
2	48 23.5 96 27 161.9	47 54.5 96 27 162.1	47 25.6 97 27 162.3	46 56.6 97 26 162.5	46 27.6 96 26 162.7	45 58.6 97 26 162.9	45 29.6 97 26 163.1	45 00.5 97 25 163.3	2
3	48 07.1 96 29 160.5	47 38.3 96 29 160.7	47 09.5 96 29 160.9	46 40.7 96 28 161.1	46 11.9 96 28 161.3	45 43.0 96 28 161.5	45 14.2 96 28 161.7	44 45.3 96 27 161.9	3
4	47 49.5 95 31 159.1	47 20.9 95 31 159.3	46 52.3 95 31 159.5	46 23.7 95 30 159.8	45 55.0 96 30 160.0	45 26.4 96 30 160.2	44 57.9 96 29 160.4	44 28.9 96 29 160.6	4
15	47 30.8 95 33 157.7	47 02.4 95 33 157.9	46 34.0 95 32 158.2	46 05.5 95 32 158.4	45 37.1 95 32 158.6	45 08.6 95 32 158.9	44 40.0 95 31 159.1	44 11.5 95 31 159.3	15
6	47 10.9 94 35 156.3	46 42.7 94 35 156.6	46 14.5 94 34 156.8	45 46.2 94 34 157.1	45 18.0 94 34 157.3	44 49.7 94 33 157.5	44 21.3 95 33 157.8	43 53.0 95 33 158.0	6
7	46 49.9 93 37 155.0	46 21.9 93 36 155.2	45 53.9 93 36 155.5	45 25.9 94 36 155.7	44 57.8 94 35 156.0	44 29.7 94 35 156.2	44 01.5 94 35 156.5	43 33.4 94 34 156.7	7
8	46 27.8 92 39 153.6	46 00.1 93 38 153.9	45 32.3 93 38 154.2	45 04.4 93 37 154.4	44 36.6 93 37 154.7	44 08.6 93 37 154.9	43 40.7 93 36 155.2	43 12.7 93 36 155.5	8
9	46 04.7 92 40 152.3	45 37.2 92 40 152.6	45 09.6 92 40 152.9	44 42.0 92 39 153.1	44 14.3 92 39 153.4	43 46.6 92 38 153.7	43 18.9 93 38 153.9	42 51.1 93 38 154.2	9
20	45 40.6 91 42 151.0	45 13.2 91 42 151.3	44 45.9 91 41 151.6	44 18.5 91 41 151.9	43 51.0 92 40 152.2	43 23.5 92 40 152.4	42 56.0 92 40 152.7	42 28.4 92 39 153.0	20
1	45 15.4 90 44 149.7	44 48.3 90 43 150.0	44 21.2 91 43 150.3	43 54.0 91 42 150.6	43 26.8 91 42 150.9	42 59.5 91 42 151.2	42 32.2 91 41 151.5	42 04.8 91 41 151.8	1
2	44 49.3 89 45 148.5	44 22.4 90 45 148.8	43 55.5 90 44 149.1	43 28.6 90 44 149.4	43 01.6 90 44 149.7	42 34.5 90 43 150.0	42 07.4 90 43 150.3	41 40.3 91 42 150.6	2
3	44 22.2 89 47 147.2	43 55.6 89 46 147.6	43 28.9 89 46 147.9	43 02.2 89 45 148.2	42 35.4 89 45 148.5	42 08.6 89 45 148.8	41 41.8 90 44 149.1	41 14.8 90 44 149.4	3
4	43 54.2 88 48 146.0	43 27.8 88 48 146.3	43 01.4 88 47 146.7	42 34.9 88 47 147.0	42 08.4 89 47 147.3	41 41.8 89 46 147.6	41 15.2 89 46 147.9	40 48.5 89 45 148.2	4
25	43 25.3 87 50 144.8	42 59.2 87 49 145.2	42 33.0 87 49 145.5	42 06.8 88 48 145.8	41 40.5 88 48 146.1	41 14.1 88 48 146.5	40 47.7 88 47 146.8	40 21.3 88 47 147.1	25
6	42 55.6 86 51 143.6	42 29.7 86 51 144.0	42 03.7 87 50 144.3	41 37.7 87 50 144.7	41 11.7 87 49 145.0	40 45.6 87 49 145.3	40 19.4 87 49 145.6	39 53.2 87 48 146.0	6
7	42 25.0 85 52 142.5	41 59.3 86 52 142.8	41 33.7 86 51 143.2	41 07.9 86 51 143.5	40 42.1 86 51 143.9	40 16.2 86 50 144.2	39 50.3 87 50 144.5	39 24.3 87 49 144.8	7
8	41 53.6 84 54 141.4	41 28.2 85 53 141.7	41 02.8 85 53 142.1	40 37.3 86 52 142.4	40 11.7 85 52 142.8	39 46.0 86 52 143.1	39 20.4 86 51 143.4	38 54.6 86 51 143.8	8
9	41 21.4 84 55 140.2	40 56.3 84 54 140.6	40 31.1 84 54 141.0	40 05.8 84 54 141.3	39 40.5 85 53 141.7	39 15.1 85 53 142.0	38 49.7 85 52 142.3	38 24.1 85 52 142.7	9
30	40 48.5 83 56 139.1	40 23.6 83 56 139.5	39 58.7 83 55 139.9	39 33.6 84 55 140.2	39 08.6 84 54 140.6	38 43.4 84 54 140.9	38 18.2 84 54 141.3	37 52.9 84 53 141.6	30
1	40 14.9 82 57 138.1	39 50.2 82 57 138.4	39 25.5 82 56 138.8	39 00.7 83 56 139.2	38 35.9 83 56 139.5	38 11.0 83 55 139.9	37 46.0 83 55 140.2	37 21.0 84 54 140.6	1
2	39 40.5 81 58 137.0	39 16.1 81 58 137.4	38 51.7 82 58 137.8	38 27.1 82 57 138.1	38 02.5 82 57 138.5	37 37.9 82 56 138.9	37 13.1 83 56 139.2	36 48.3 83 56 139.6	2
3	39 05.5 80 59 136.0	38 41.3 81 59 136.4	38 17.1 81 59 136.7	37 52.8 81 58 137.1	37 28.5 81 58 137.5	37 04.0 82 57 137.8	36 39.5 82 57 138.2	36 15.0 82 57 138.6	3
4	38 29.8 80 61 135.0	38 05.9 80 60 135.3	37 41.9 80 60 135.7	37 17.9 80 59 136.1	36 53.8 81 59 136.5	36 29.6 81 59 136.8	36 05.3 81 58 137.2	35 40.8 81 58 137.6	4
35	37 53.5 79 62 134.0	37 29.8 79 61 134.4	37 06.1 79 61 134.7	36 42.3 79 60 135.1	36 18.4 80 60 135.5	35 54.4 80 60 135.9	35 30.4 80 59 136.2	35 06.3 80 59 136.6	35
6	37 16.6 78 62 133.0	36 53.1 78 62 133.4	36 29.6 78 62 133.8	36 06.1 79 61 134.2	35 42.4 79 61 134.5	35 18.7 79 61 134.9	34 54.9 79 60 135.3	34 31.1 80 60 135.6	6
7	36 39.1 77 63 132.0	36 15.9 77 63 132.4	35 52.6 78 63 132.8	35 29.3 78 62 133.2	35 05.9 78 62 133.6	34 42.4 78 62 134.0	34 18.8 79 61 134.3	33 55.2 79 61 134.7	7
8	36 01.0 76 64 131.1	35 38.0 77 64 131.5	35 15.0 77 64 131.9	34 51.9 77 63 132.3	34 28.7 77 63 132.6	34 05.5 78 62 133.0	33 42.1 78 62 133.4	33 18.5 78 62 133.8	8
9	35 22.4 76 65 130.2	34 59.6 76 65 130.6	34 36.8 76 64 131.0	34 14.0 76 64 131.3	33 51.0 77 64 131.7	33 28.0 77 63 132.1	33 04.9 77 63 132.5	32 41.7 77 63 132.9	9
40	34 43.2 75 66 129.2	34 20.7 75 66 129.6	33 58.1 75 65 130.0	33 35.5 76 65 130.4	33 12.8 76 65 130.8	32 50.0 76 64 131.2	32 27.1 76 64 131.6	32 04.2 77 63 132.0	40
1	34 03.6 74 67 128.4	33 41.3 74 67 128.8	33 18.9 75 66 129.2	32 56.5 75 66 129.6	32 34.0 75 65 129.9	32 11.5 75 65 130.3	31 48.8 76 65 130.7	31 26.1 76 64 131.1	1
2	33 23.4 73 68 127.5	33 01.4 74 67 127.9	32 39.2 74 67 128.3	32 17.0 74 67 128.7	31 54.8 74 66 129.1	31 32.4 75 66 129.5	31 10.0 75 66 129.9	30 47.5 75 65 130.2	2
3	32 42.8 73 68 126.6	32 21.0 73 68 127.0	31 59.1 73 68 127.4	31 37.1 73 67 127.8	31 15.0 74 67 128.3	30 52.9 74 67 128.7	30 30.7 74 66 129.1	30 08.4 74 66 129.4	3
4	32 01.7 72 69 125.8	31 40.1 72 69 126.2	31 18.4 72 68 126.6	30 56.7 73 68 127.0	30 34.8 73 67 127.4	30 12.9 73 67 127.8	29 50.9 73 67 128.2	29 28.9 74 67 128.6	4
45	31 20.2 71 70 124.9	30 58.8 71 70 125.3	30 37.4 72 69 125.7	30 15.8 72 69 126.2	29 54.2 72 68 126.6	29 32.5 72 68 127.0	29 10.7 73 68 127.3	28 48.9 73 67 127.7	45
6	30 38.3 71 71 124.1	30 17.1 71 70 124.5	29 55.8 71 70 124.9	29 34.5 71 70 125.3	29 13.1 72 69 125.7	28 51.6 72 69 126.1	28 30.0 72 69 126.5	28 08.4 72 68 126.9	6
7	29 56.0 70 71 123.3	29 35.0 70 71 123.7	29 13.9 70 71 124.1	28 52.8 71 70 124.5	28 31.6 71 70 124.9	28 10.3 71 70 125.3	27 48.9 71 69 125.7	27 27.5 72 69 126.1	7
8	29 13.3 69 72 122.5	28 52.5 69 72 122.9	28 31.6 70 71 123.3	28 10.7 70 71 123.7	27 49.7 70 70 124.2	27 28.6 70 70 124.6	27 07.4 71 70 125.0	26 46.2 71 70 125.3	8
9	28 30.2 69 72 121.7	28 09.6 69 72 122.2	27 48.9 69 72 122.6	27 28.2 69 71 123.0	27 07.4 69 71 123.4	26 46.5 70 71 123.8	26 25.5 70 70 124.2	26 04.5 70 70 124.6	9
50	27 46.7 68 73 121.0	27 26.3 68 73 121.4	27 05.8 68 72 121.8	26 45.3 69 72 122.2	26 24.7 69 72 122.6	26 04.0 69 71 123.0	25 43.2 69 71 123.4	25 22.4 70 71 123.8	50
1	27 02.9 67 74 120.2	26 42.7 68 73 120.6	26 22.4 68 73 121.0	26 02.1 68 73 121.5	25 41.6 68 72 121.9	25 21.2 68 72 122.3	25 00.6 69 72 122.7	24 40.0 69 71 123.1	1
2	26 18.8 67 74 119.5	25 58.8 67 74 119.9	25 38.7 67 74 120.3	25 18.5 67 73 120.7	24 58.3 68 73 121.1	24 38.0 68 73 121.6	24 17.6 68 72 121.9	23 57.2 68 72 122.3	2
3	25 34.3 66 75 118.7	25 14.5 66 74 119.2	24 54.6 67 74 119.6	24 34.6 67 74 120.0	24 14.5 67 73 120.4	23 54.4 67 73 120.8	23 34.2 68 73 121.2	23 14.0 68 72 121.6	3
4	24 49.6 65 75 118.0	24 29.9 66 75 118.4	24 10.2 66 75 118.9	23 50.4 66 74 119.3	23 30.5 66 74 119.7	23 10.5 67 74 120.1	22 50.5 67 73 120.5	22 30.5 67 73 120.9	4
55	24 04.5 65 76 117.3	23 45.0 65 75 117.7	23 25.4 65 75 118.1	23 05.8 66 75 118.6	22 46.1 66 74 119.0	22 26.4 66 74 119.4	22 06.5 66 74 119.8	21 46.7 66 74 120.2	55
6	23 19.2 64 76 116.6	22 59.8 65 76 117.0	22 40.4 65 75 117.4	22 21.0 65 75 117.9	22 01.5 65 75 118.3	21 41.9 65 74 118.7	21 22.2 66 74 119.1	21 02.5 66 74 119.5	6
7	22 33.5 64 76 115.9	22 14.4 64 76 116.3	21 55.1 64 76 116.7	21 35.8 64 76 117.2	21 16.5 65 75 117.6	20 57.1 65 75 118.0	20 37.6 65 75 118.4	20 18.1 65 74 118.8	7
8	21 47.6 63 77 115.3	21 28.6 63 77 115.7	21 09.6 64 76 116.1	20 50.4 64 76 116.5	20 31.3 64 76 116.9	20 12.0 64 76 117.3	19 52.7 64 75 117.7	19 33.4 65 75 118.1	8
9	21 01.5 63 77 114.6	20 42.7 63 77 115.0	20 23.7 63 77 115.4	20 04.8 63 77 115.8	19 45.7 64 76 116.2	19 26.7 64 76 116.6	19 07.5 64 76 117.1	18 48.3 64 75 117.5	9
60	20 15.1 62 78 113.9	19 56.4 62 77 114.3	19 37.7 63 77 114.8	19 18.8 63 77 115.2	19 00.0 63 77 115.6	18 41.1 63 76 116.0	18 22.1 63 76 116.4	18 03.1 64 76 116.8	60
1	19 28.5 62 78 113.3	19 09.9 62 78 113.7	18 51.3 62 78 114.1	18 32.7 62 77 114.5	18 14.0 62 77 114.9	17 55.2 63 77 115.3	17 36.4 63 77 115.7	17 17.5 63 76 116.2	1
2	18 41.6 61 78 112.6	18 23.2 61 78 113.0	18 04.8 62 78 113.5	17 46.3 62 78 113.9	17 27.7 62 78 114.3	17 09.1 62 77 114.7	16 50.4 62 77 115.1	16 31.7 62 77 115.5	2
3	17 54.5 61 79 112.0	17 36.3 61 79 112.4	17 18.0 61 78 112.8	16 59.6 61 78 113.2	16 41.2 61 78 113.6	16 22.7 62 78 114.1	16 04.2 62 77 114.5	15 45.7 62 77 114.9	3
4	17 07.3 60 79 111.4	16 49.1 60 79 111.8	16 31.0 61 79 112.2	16 12.7 61 78 112.6	15 54.5 61 78 113.0	15 36.2 61 78 113.4	15 17.8 61 78 113.8	14 59.4 61 78 114.2	4
65	16 19.8 60 79 110.7	16 01.8 60 79 111.2	15 43.7 60 79 111.6	15 25.7 60 79 112.0	15 07.5 61 79 112.4	14 49.4 61 78 112.8	14 31.1 61 78 113.2	14 12.9 61 78 113.6	65
6	15 32.1 59 80 110.1	15 14.2 60 80 110.5	14 56.3 60 79 110.9	14 38.4 60 79 111.4	14 20.4 60 79 111.8	14 02.4 60 79 112.2	13 44.3 60 78 112.6	13 26.2 60 78 113.0	6
7	14 44.2 59 80 109.5	14 26.5 59 80 109.9	14 08.7 59 80 110.3	13 50.9 59 79 110.8	13 33.0 59 79 111.2	13 15.1 60 79 111.6	12 57.2 60 79 112.0	12 39.2 60 79 112.4	7
8	13 56.2 59 80 108.9	13 38.6 59 80 109.3	13 20.9 59 80 109.7	13 03.2 59 80 110.2	12 45.5 59 80 110.6	12 27.7 59 79 111.0	12 09.9 59 79 111.4	11 52.1 60 79 111.8	8
9	13 08.0 58 81 108.3	12 50.5 58 80 108.7	12 32.9 58 80 109.2	12 15.4 59 80 109.6	11 57.8 59 80 110.0	11 40.1 59 80 110.4	11 22.5 59 79 110.8	11 04.7 59 79 111.2	9
70	12 19.6 58 81 107.7	12 02.2 58 81 108.1	11 44.8 58 81 108.6	11 27.3 58 80 109.0	11 09.9 58 80 109.4	10 52.3 58 80 109.8	10 34.8 59 80 110.2	10 17.2 59 80 110.6	70
1	11 31.0 57 81 107.1	11 13.8 58 81 107.6	10 56.5 58 81 108.0	10 39.1 58 81 108.4	10 21.8 58 80 108.8	10 04.4 58 80 109.2	9 47.0 58 80 109.6	9 29.5 58 80 110.0	1
2	10 42.3 57 81 106.6	10 25.2 57 81 107.0	10 08.0 57 81 107.4	9 50.8 57 81 107.8	9 33.5 58 81 108.2	9 16.3 58 80 108.6	8 59.0 58 80 109.1	8 41.6 58 80 109.5	2
3	9 53.5 57 82 106.0	9 36.4 57 81 106.4	9 19.4 57 81 106.8	9 02.3 57 81 107.2	8 45.1 57 81 107.7	8 28.0 57 81 108.1	8 10.8 57 81 108.5	7 53.6 57 80 108.9	3
4	9 04.5 56 82 105.4	8 47.6 57 82 105.8	8 30.6 57 82 106.3	8 13.6 57 81 106.7	7 56.6 57 81 107.1	7 39.5 57 81 107.5	7 22.4 57 81 107.9	7 05.3 57 81 108.3	4
75	8 15.4 56 82 104.9	7 58.5 56 82 105.3	7 41.7 56 82 105.7	7 24.8 56 82 106.1	7 07.9 56 81 106.5	6 50.9 57 81 106.9	6 34.0 57 81 107.4	6 17.0 57 81 107.8	75
6	7 26.1 56 82 104.3	7 09.4 56 82 104.7	6 52.6 56 82 105.1	6 35.8 56 82 105.6	6 19.0 56 82 106.0	6 02.2 56 81 106.4	5 45.3 56 81 106.8	5 28.4 56 81 107.2	6
7	6 36.8 56 82 103.7	6 20.1 56 82 104.2	6 03.4 56 82 104.6	5 46.7 56 82 105.0	5 30.0 56 82 105.4	5 13.3 56 81 105.8			7
8	5 47.3 55 83 103.2	5 30.7 55 83 103.6	5 14.1 55 82 104.0						8
9									9

Lat. 33° Lat. 34° Lat. 35° Lat. 36° Lat. 37° Lat. 38°

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00' Alt. — Δd Δt / Az.	8° 30'	9° 00'	9° 30'	10° 00'	10° 30'	11° 00'	11° 30'	H.A.
	° ' Δd Δt °	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	5 13.8 52 83 79.7	91

Lat. 32°

H.A.	12° 00′ Alt.	Δd	Δt	Az.	12° 30′ Alt.	Δd	Δt	Az.	13° 00′ Alt.	Δd	Δt	Az.	13° 30′ Alt.	Δd	Δt	Az.	14° 00′ Alt.	Δd	Δt	Az.	14° 30′ Alt.	Δd	Δt	Az.	15° 00′ Alt.	Δd	Δt	Az.	15° 30′ Alt.	Δd	Δt	Az.	H.A.
00	70 00.0	1.00	2	180.0	70 30.0	1.00	2	180.0	71 00.0	1.00	2	180.0	71 30.0	1.00	2	180.0	72 00.0	1.00	2	180.0	72 30.0	1.00	2	180.0	73 00.0	1.00	2	180.0	73 30.0	1.00	2	180.0	00
1	69 58.7	1.00	5	177.1	70 28.7	1.00	5	177.1	70 58.7	1.00	7	177.0	71 28.6	1.00	7	176.9	71 58.6	1.00	7	176.9	72 28.6	1.00	7	176.8	72 58.5	1.00	7	176.7	73 28.5	1.00	6	176.6	1
2	69 54.9	1.00	10	174.3	70 24.8	1.01	11	174.2	70 54.7	1.01	11	174.0	71 24.6	1.01	11	173.9	71 54.4	1.01	12	173.7	72 24.3	1.01	12	173.6	72 54.1	99	12	173.4	73 24.0	99	12	173.2	2
3	69 48.6	99	15	171.5	70 18.4	99	15	171.3	70 48.1	99	15	171.1	71 17.8	99	16	170.9	71 47.5	99	16	170.6	72 17.2	99	16	170.4	72 46.9	99	17	170.2	73 16.5	99	17	169.9	3
4	69 39.9	99	19	168.7	70 09.4	98	19	168.4	70 38.9	98	19	168.2	71 08.4	98	20	167.9	71 37.9	98	20	167.6	72 07.4	98	21	167.3	72 36.8	98	21	167.0	73 06.2	98	22	166.6	4
05	69 28.7	98	23	165.9	69 58.0	98	23	165.6	70 27.2	98	24	165.0	70 56.5	97	25	164.6	71 25.7	97	25	164.6	71 54.9	97	25	164.2	72 24.0	97	26	163.8	72 53.0	97	26	163.4	05
6	69 15.1	97	26	163.2	69 44.2	97	27	162.9	70 13.1	97	27	162.5	70 42.1	96	28	162.1	71 10.9	96	29	161.7	71 39.7	96	29	161.2	72 08.5	96	30	160.8	72 37.2	95	31	160.3	6
7	68 59.3	96	30	160.6	69 28.0	96	31	160.2	69 56.7	95	31	159.7	70 25.2	95	32	159.3	70 53.7	95	33	158.8	71 22.2	95	33	158.3	71 50.5	94	34	157.8	72 18.8	94	35	157.3	7
8	68 41.3	95	34	158.0	69 09.7	94	34	157.5	69 37.9	94	35	157.1	70 06.1	94	36	156.6	70 34.2	93	36	156.0	71 02.2	93	37	155.5	71 30.1	93	38	154.9	71 57.9	92	39	154.3	8
9	68 21.2	93	37	155.5	68 49.2	93	38	155.0	69 17.0	93	38	154.5	69 44.8	92	39	153.9	70 12.5	92	40	153.4	70 40.0	92	41	152.7	71 07.4	91	41	152.2	71 34.7	91	42	151.5	9
10	67 59.1	92	40	153.1	68 26.7	92	41	152.5	68 54.1	91	41	152.0	69 21.4	91	42	151.4	69 48.6	90	43	150.8	70 15.7	90	44	150.1	70 42.6	90	45	149.5	71 09.4	89	46	148.8	10
1	67 35.2	91	43	150.7	68 02.3	90	44	150.1	68 29.2	90	44	149.5	68 56.1	89	45	148.9	69 22.8	89	46	148.3	69 49.4	88	47	147.6	70 15.8	88	48	146.9	70 42.0	87	49	146.2	1
2	67 09.4	89	46	148.4	67 36.0	89	47	147.8	68 02.6	88	47	147.2	68 28.9	88	48	146.6	68 55.2	87	49	145.9	69 21.2	87	50	145.2	69 47.1	86	51	144.5	70 12.8	85	52	143.7	2
3	66 41.9	88	48	146.2	67 08.1	87	49	145.6	67 34.1	87	50	144.9	68 00.0	86	51	144.3	68 25.8	85	52	143.6	68 51.3	85	53	142.9	69 16.7	84	53	142.1	69 41.9	84	54	141.3	3
4	66 12.8	86	51	144.1	66 38.5	86	52	143.4	67 04.1	86	52	142.8	67 29.5	84	53	142.1	67 54.8	84	54	141.4	68 19.8	83	55	140.6	68 44.7	82	56	139.9	69 09.3	82	57	139.1	4
15	65 42.2	85	53	142.0	66 07.5	84	54	141.4	66 32.6	83	55	140.7	66 57.5	83	56	140.0	67 22.3	82	56	139.3	67 46.8	81	57	138.5	68 11.1	81	58	137.7	68 35.2	80	59	136.9	15
6	65 10.2	83	56	140.1	65 35.0	82	56	139.4	65 59.7	82	57	138.7	66 24.1	81	58	138.0	66 48.4	80	59	137.2	67 12.4	80	59	136.5	67 36.2	79	60	135.7	67 59.8	78	61	134.9	6
7	64 36.9	82	58	138.2	65 01.3	81	58	137.5	65 25.5	80	59	136.8	65 49.4	80	60	136.0	66 13.2	79	61	135.3	66 36.8	78	61	134.5	67 00.1	77	62	133.7	67 23.1	76	63	132.9	7
8	64 02.3	80	60	136.3	64 26.3	79	60	135.6	64 50.0	79	61	134.9	65 13.5	78	62	134.2	65 36.8	77	62	133.4	65 59.9	76	63	132.7	66 22.7	76	64	131.8	66 45.3	75	65	131.0	8
9	63 26.7	79	61	134.6	63 50.1	78	62	133.9	64 13.4	77	63	133.2	64 36.5	77	63	132.4	64 59.3	76	64	131.7	65 21.9	75	65	130.9	65 44.3	74	66	130.1	66 06.4	73	66	129.2	9
20	62 49.9	77	63	132.9	63 12.9	77	64	132.2	63 35.8	76	64	131.5	63 58.4	75	65	130.7	64 20.8	74	66	130.0	64 43.0	73	66	129.2	65 04.9	73	67	128.4	65 26.5	72	68	127.5	20
1	62 12.1	76	64	131.3	62 34.8	75	65	130.6	62 57.2	74	66	129.8	63 19.4	74	67	129.1	63 41.4	73	67	128.3	64 03.1	72	68	127.5	64 24.5	71	69	126.7	64 45.7	70	69	125.9	1
2	61 33.4	75	66	129.7	61 55.7	74	67	129.0	62 17.7	73	67	128.3	62 39.5	72	68	127.5	63 01.0	71	69	126.8	63 22.3	71	69	126.0	63 43.3	70	70	125.2	64 04.1	69	71	124.4	2
3	60 53.8	73	67	128.2	61 15.7	72	68	127.5	61 37.3	72	68	126.7	61 58.7	71	69	126.0	62 19.8	70	70	125.3	62 40.7	69	70	124.5	63 01.4	69	71	123.7	63 21.7	67	72	122.9	3
4	60 13.5	72	69	126.8	60 34.9	71	69	126.1	60 56.2	70	70	125.3	61 17.2	70	70	124.6	61 37.9	69	71	123.8	61 58.4	68	72	123.1	62 18.7	67	72	122.3	62 38.6	66	73	121.5	4
25	59 32.3	71	70	125.4	59 53.4	70	70	124.7	60 14.3	69	71	123.9	60 34.9	68	72	123.2	60 55.3	68	72	122.5	61 15.5	67	73	121.7	61 35.3	66	73	120.9	61 54.9	65	74	120.1	25
6	58 50.5	70	71	124.0	59 11.3	69	71	123.3	59 31.8	68	72	122.6	59 52.1	67	72	121.9	60 12.1	66	73	121.1	60 31.9	65	74	120.4	60 51.4	65	74	119.6	61 10.6	64	75	118.8	6
7	58 08.0	68	72	122.7	58 28.4	68	72	122.0	58 48.6	67	73	121.3	59 08.6	66	73	120.6	59 28.2	65	74	119.9	59 47.7	64	75	119.1	60 06.9	63	75	118.3	60 25.8	63	76	117.6	7
8	57 24.9	67	73	121.5	57 45.0	67	73	120.8	58 04.9	66	74	120.1	58 24.5	65	74	119.4	58 43.9	64	75	118.6	59 03.0	63	75	117.9	59 21.8	62	76	117.1	59 40.4	62	76	116.4	8
9	56 41.3	66	74	120.3	57 01.0	66	74	119.6	57 20.6	65	75	118.9	57 39.9	64	75	118.2	57 59.0	63	76	117.5	58 17.8	62	76	116.7	58 36.3	61	77	116.0	58 54.6	61	77	115.2	9
30	55 57.1	65	74	119.1	56 16.5	65	75	118.4	56 35.8	64	75	117.8	56 54.8	63	76	117.1	57 13.6	62	76	116.3	57 32.1	61	77	115.6	57 50.4	60	77	114.9	58 08.4	60	78	114.1	30
1	55 12.4	64	75	118.0	55 31.6	64	76	117.3	55 50.5	63	76	116.6	56 09.3	62	77	115.9	56 27.8	61	77	115.2	56 46.0	60	77	114.5	57 04.0	60	78	113.8	57 21.7	59	78	113.0	1
2	54 27.2	63	76	116.9	54 46.1	63	76	116.3	55 04.8	62	77	115.5	55 23.3	61	77	114.9	55 41.5	60	78	114.2	55 59.5	60	78	113.5	56 17.2	59	78	112.7	56 34.7	59	79	112.0	2
3	53 41.6	63	77	115.9	54 00.3	62	77	115.2	54 18.7	61	77	114.5	54 37.0	60	78	113.8	54 54.9	60	78	113.2	55 12.7	59	79	112.5	55 30.2	58	79	111.7	55 47.4	58	79	111.0	3
4	52 55.7	62	77	114.9	53 14.1	61	78	114.2	53 32.3	60	78	113.5	53 50.2	60	78	112.9	54 08.0	59	79	112.2	54 25.5	58	79	111.5	54 42.7	57	80	110.8	54 59.7	56	80	110.1	4
35	52 09.3	61	78	113.9	52 27.5	60	78	113.2	52 45.5	59	79	112.6	53 03.2	59	79	111.9	53 20.7	58	79	111.2	53 38.0	57	80	110.5	53 55.0	56	80	109.8	54 11.8	56	80	109.1	35
6	51 22.6	60	78	112.9	51 40.6	59	79	112.2	51 58.3	59	79	111.6	52 15.8	58	79	110.9	52 33.1	57	80	110.2	52 50.2	56	80	109.6	53 07.0	56	80	108.9	53 23.6	55	81	108.2	6
7	50 35.6	59	79	112.0	50 53.3	59	79	111.3	51 10.9	58	80	110.7	51 28.2	57	80	110.0	51 45.3	57	80	109.4	52 02.1	56	81	108.7	52 18.7	55	81	108.0	52 35.1	54	81	107.4	7
8	49 48.3	59	79	111.1	50 05.8	58	80	110.4	50 23.1	57	80	109.8	50 40.2	57	80	109.2	50 57.1	56	81	108.5	51 13.8	55	81	107.9	51 30.3	54	81	107.2	51 46.5	54	81	106.5	8
9	49 00.6	58	80	110.2	49 18.0	57	80	109.6	49 35.1	57	80	108.9	49 52.0	56	81	108.3	50 08.8	55	81	107.7	50 25.3	55	81	107.0	50 41.5	54	82	106.3	50 57.6	53	82	105.7	9
40	48 12.5	58	80	109.3	48 29.9	57	81	108.7	48 46.9	56	81	108.1	49 03.6	55	81	107.5	49 20.2	55	81	106.8	49 36.5	54	82	106.2	49 52.6	53	82	105.5	50 08.5	53	82	104.9	40
1	47 24.6	57	81	108.5	47 41.6	56	81	107.9	47 58.4	56	81	107.3	48 15.0	55	81	106.7	48 31.4	54	82	106.0	48 47.5	54	82	105.4	49 03.5	53	82	104.7	49 19.2	52	82	104.1	1
2	46 36.3	56	81	107.7	46 53.1	56	81	107.1	47 09.7	55	81	106.5	47 26.1	54	82	105.9	47 42.4	54	82	105.2	47 58.4	53	82	104.6	48 14.2	52	82	104.0	48 29.8	52	83	103.3	2
3	45 47.7	56	81	106.9	46 04.3	55	82	106.3	46 20.8	55	82	105.7	46 37.1	54	82	105.1	46 53.2	53	82	104.5	47 09.1	53	82	103.9	47 24.7	52	83	103.2	47 40.2	51	83	102.6	3
4	44 58.9	55	82	106.1	45 15.4	55	82	105.5	45 31.7	54	82	104.9	45 47.9	53	82	104.3	46 03.8	53	82	103.7	46 19.6	52	83	103.1	46 35.1	52	83	102.5	46 50.5	51	83	101.9	4
45	44 09.9	55	82	105.4	44 26.3	54	82	104.8	44 42.5	54	82	104.2	44 58.5	53	83	103.6	45 14.3	52	83	103.0	45 30.0	52	83	102.4	45 45.4	51	83	101.8	46 00.6	50	83	101.2	45
6	43 20.8	54	82	104.6	43 37.0	54	82	104.1	43 53.1	53	83	103.5	44 09.0	53	83	102.9	44 24.7	52	83	102.3	44 40.2	51	83	101.7	44 55.5	51	83	101.1	45 10.6	50	84	100.5	6
7	42 31.5	54	82	103.9	42 47.6	53	83	103.3	43 03.5	53	83	102.8	43 19.3	52	83	102.2	43 34.9	52	83	101.6	43 50.3	51	83	101.0	44 05.5	50	84	100.4	44 20.6	50	84	99.8	7
8	41 42.0	54	83	103.2	41 58.0	53	83	102.6	42 13.8	52	83	102.1	42 29.5	52	83	101.5	42 45.0	51	84	100.9	43 00.3	51	84	100.3	43 15.4	50	84	99.7	43 30.4	49	84	99.1	8
9	40 52.4	53	83	102.5	41 08.3	53	83	101.9	41 24.0	52	83	101.4	41 39.6	52	83	100.8	41 55.0	51	84	100.2	42 10.2	50	84	99.7	42 25.2	50	84	99.1	42 40.1	49	84	98.5	9
50	40 02.7	53	83	101.8	40 18.4	52	83	101.3	40 34.1	52	83	100.7	40 49.5	51	84	100.1	41 04.8	51	84	99.6	41 20.0	50	84	99.0	41 34.9	50	84	98.4	41 49.7	49	84	97.8	50
1	39 12.8	53	83	101.2	39 28.5	52	83	100.6	39 44.0	52	84	100.0	39 59.4	51	84	99.5	40 14.6	50	84	98.9	40 29.7	50	84	98.4	40 44.6	49	84	97.8	40 59.3	49	84	97.2	1
2	38 22.8	52	83	100.5	38 38.4	52	84	100.0	38 53.9	51	84	99.4	39 09.2	51	84	98.8	39 24.3	50	84	98.3	39 39.3	50	84	97.7	39 54.1	49	84	97.2	40 08.8	49	84	96.6	2
3	37 32.7	52	84	99.8	37 48.3	51	84	99.3	38 03.6	51	84	98.8	38 18.9	50	84	98.2	38 33.9	50	84	97.7	38 48.8	49	84	97.1	39 03.6	49	84	96.5	39 18.2	48	84	96.0	3
4	36 42.6	52	84	99.2	36 58.0	51	84	98.7	37 13.3	51	84	98.1	37 28.5	50	84	97.6	37 43.5	50	84	97.0	37 58.3	49	84	96.5	38 13.0	49	84	95.9	38 27.5	48	84	95.4	4
55	35 52.3	51	84	98.6	36 07.7	51	84	98.1	36 22.9	51	84	97.5	36 38.0	50	84	97.0	36 52.9	50	84	96.4	37 07.7	49	84	95.9	37 22.4	49	84	95.4	37 36.9	48	85	94.8	55
6	35 01.9	51	84	98.0	35 17.2	51	84	97.4	35 32.4	50	84	96.9	35 47.4	50	84	96.4	36 02.3	49	84	95.8	36 17.1	49	84	95.3	36 31.7	48	85	94.8	36 46.1	48	85	94.2	6
7	34 11.5	51	84	97.4	34 26.8	51	84	96.8	34 41.9	50	84	96.3	34 56.8	50	84	95.8	35 11.7	49	85	95.3	35 26.4	49	85	94.7	35 41.0	48	85	94.2	35 55.4	48	85	93.6	7
8	33 21.0	51	84	96.8	33 36.2	50	84	96.2	33 51.3	50	84	95.7	34 06.2	50	84	95.2	34 21.0	49	85	94.7	34 35.7	49	85	94.1	34 50.2	48	85	93.6	35 04.6	48	85	93.1	8
9	32 30.4	51	84	96.2	32 45.6	50	84	95.7	33 00.6	50	84	95.1	33 15.5	49	85	94.6	33 30.3	49	85	94.1	33 44.9	49	85	93.6	33 59.3	48	85	93.1	34 13.8	48	85	92.5	9
60	31 39.8	51	84	95.6	31 54.9	50	85	95.1	32 09.9	50	85	94.6	32 24.8	49	85	94.1	32 39.5	49	85	93.5	32 54.1	48	85	93.0	33 08.6	48	85	92.5	33 22.9	48	85	92.0	60
1	30 49.2	50	85	95.0	31 04.2	50	85	94.5	31 19.2	50	85	94.0	31 34.0	49	85	93.5	31 48.7	49	85	93.0	32 03.3	48	85	92.5	32 17.7	48	85	91.9	32 32.1	48	85	91.4	1
2	29 58.5	50	85	94.4	30 13.5	50	85	93.9	30 28.4	49	85	93.4	30 43.2	49	85	92.9	30 57.9	49	85	92.4	31 12.4	48	85	91.9	31 26.9	48	85	91.4	31 41.2	48	85	90.9	2
3	29 07.7	50	85	93.9	29 22.7	50	85	93.4	29 37.6	49	85	92.9	29 52.4	49	85	92.4	30 06.9	49	85	91.9	30 21.6	48	85	91.4	30 36.0	48	85	90.9	30 50.3	47	85	90.3	3
4	28 16.9	50	85	93.3	28 31.9	50	85	92.8	28 46.8	49	85	92.3	29 01.5	49	85	91.8	29 16.2	49	85	91.3	29 30.7	48	85	90.8	29 45.1	48	85	90.3	29 59.4	47	85	89.8	4
65	27 26.1	50	85	92.8	27 41.1	50	85	92.3	27 55.9	49	85	91.8	28 10.7	49	85	91.3	28 25.3	49	85	90.8	28 39.8	48	85	90.3	28 54.2	48	85	89.8	29 08.5	47	85	89.3	65
6	26 35.3	50	85	92.2	26 50.2	50	85	91.7	27 05.0	49	85	91.2	27 19.8	49	85	90.7	27 34.4	49	85	90.3	27 48.9	48	85	89.8	28 03.4	48	85	89.3	28 17.7	48	85	88.8	6
7	25 44.4	50	85	91.7	25 59.3	50	85	91.2	26 14.2	49	85	90.7	26 28.9	49	85	90.2	26 43.5	49	85	89.7	26 58.1	48	85	89.2	27 12.5	48	85	88.7	27 26.8	48	85	88.2	7
8	24 53.6	50	85	91.1	25 08.5	50	85	90.6	25 23.3	49	85	90.2	25 38.0	49	85	89.7	25 52.6	49	85	89.2	26 07.2	48	85	88.7	26 21.6	48	85	88.2	26 35.9	48	85	87.7	8
9	24 02.7	50	85	90.6	24 17.6	50	85	90.1	24 32.4	49	85	89.6	24 47.1	49	85	89.2	25 01.8	49	85	88.7	25 16.3	48	85	88.2	25 30.8	48	85	87.7	25 45.1	48	85	87.2	9
70	23 11.8	50	85	90.1	23 26.7	50	85	89.6	23 41.5	49	85	89.1	23 56.3	49	85	88.6	24 10.9	49	85	88.2	24 25.5	48	85	87.7	24 39.9	48	85	87.2	24 54.3	48	85	86.7	70
1	22 20.9	50	85	89.5	22 35.8	50	85	89.1	22 50.7	49	85	88.6	23 05.4	49	85	88.1	23 20.1	49	85	87.6	23 34.6	48	85	87.2	23 49.1	48	85	86.7	24 03.5	48	85	86.2	1
2	21 30.0	50	85	89.0	21 45.0	50	85	88.5	21 59.8	49	85	88.1	22 14.6	49	85	87.6	22 29.2	49	85	87.1	22 43.8	48	85	86.7	22 58.3	48	85	86.2	23 12.8	48	85	85.7	2
3	20 39.2	50	85	88.5	20 54.1	50	85	88.0	21 08.9	49	85	87.6	21 23.7	49	85	87.1	21 38.4	49	85	86.6	21 53.0	48	85	86.1	22 07.6	48	85	85.7	22 22.0	48	85	85.2	3
4	19 48.3	50	85	88.0	20 03.3	50	85	87.5	20 18.1	49	85	87.0	20 32.9	49	85	86.6	20 47.6	49	85	86.1	21 02.3	48	85	85.6	21 16.9	48	84	85.2	21 31.4	48	84	84.7	4
75	18 57.5	50	85	87.4	19 12.4	50	85	87.0	19 27.3	50	85	86.5	19 42.1	49	85	86.1	19 56.9	49	85	85.6	20 11.6	48	85	85.1	20 26.2	48	84	84.7	20 40.7	48	84	84.2	75
6	18 06.6	50	85	86.9	18 21.6	50	85	86.5	18 36.5	50	85	86.0	18 51.4	49	85	85.6	19 06.2	49	85	85.1	19 20.9	49	84	84.6	19 35.5	48	84	84.2	19 50.1	48	84	83.7	6
7	17 15.8	50	85	86.4	17 30.9	50	85	86.0	17 45.8	50	84	85.5	18 00.7	49	85	85.0	18 15.5	49	84	84.6	18 30.3	49	84	84.1	18 44.9	49	84	83.7	18 59.6	49	84	83.2	7
8	16 25.1	50	85	85.9	16 40.1	50	84	85.5	16 55.1	50	84	85.0	17 10.0	50	84	84.5	17 24.9	49	84	84.1	17 39.7	49	84	83.6	17 54.4	49	84	83.2	18 09.1	49	84	82.7	8
9	15 34.3	50	84	85.4	15 49.4	50	84	84.9	16 04.4	50	84	84.5	16 19.4	50	84	84.0	16 34.3	50	84	83.6	16 49.1	49	84	83.1	17 03.9	49	84	82.7	17 18.6	49	84	82.2	9
80	14 43.6	50	84	84.9	14 58.7	50	84	84.4	15 13.8	50	84	84.0	15 28.8	50	84	83.5	15 43.7	50	84	83.1	15 58.6	49	84	82.6	16 13.5	49	84	82.2	16 28.2	49	84	81.7	80
1	13 53.0	51	84	84.4	14 08.1	50	84	83.9	14 23.2	50	84	83.5	14 38.3	50	84	83.0	14 53.3	50	84	82.6	15 08.2	50	84	82.1	15 23.1	50	84	81.7	15 37.9	49	84	81.2	1
2	13 02.4	51	84	83.9	13 17.6	51	84	83.4	13 32.7	50	84	83.0	13 47.8	50	84	82.5	14 02.8	50	84	82.1	14 17.8	50	84	81.6	14 32.8	50	84	81.2	14 47.7	50	84	80.7	2
3	12 11.8	51	84	83.4	12 27.0	51	84	82.9	12 42.2	51	84	82.5	12 57.4	50	84	82.0	13 12.5	50	84	81.6	13 27.5	50	84	81.1	13 42.5	50	84	80.7	13 57.5	50	83	80.2	3
4	11 21.3	51	84	82.8	11 36.6	51	84	82.4	11 51.8	51	84	82.0	12 07.0	51	84	81.5	12 22.2	50	84	81.1	12 37.3	50	84	80.6	12 52.3	50	84	80.2	13 07.4	50	83	79.8	4
85	10 30.8	51	84	82.3	10 46.2	51	84	81.9	11 01.5	51	84	81.5	11 16.7	51	84	81.0	11 31.9	51	84	80.6	11 47.1	51	84	80.1	12 02.2	50	83	79.7	12 17.3	50	83	79.3	85
6	9 40.4	51	84	81.8	9 55.8	51	84	81.4	10 11.2	51	84	81.0	10 26.5	51	84	80.5	10 41.8	51	83	80.1	10 57.0	51	83	79.6	11 12.2	51	83	79.2	11 27.4	50	83	78.8	6
7	8 50.1	52	84	81.3	9 05.5	51	84	80.9	9 21.0	51	84	80.4	9 36.3	51	83	80.0	9 51.7	51	83	79.6	10 07.0	51	83	79.1	10 22.3	51	83	78.7	10 37.5	51	83	78.3	7
8	7 59.8	52	84	80.8	8 15.3	52	84	80.4	8 30.8	52	83	79.9	8 46.3	51	83	79.5	9 01.7	51	83	79.1	9 17.1	51	83	78.6	9 32.4	51	83	78.2	9 47.7	51	83	77.8	8
9	7 09.6	52	84	80.3	7 25.2	52	83	79.9	7 40.8	52	83	79.4	7 56.3	52	83	79.0	8 11.8	52	83	78.6	8 27.2	51	83	78.1	8 42.7	51	83	77.7	8 58.1	51	83	77.3	9
90	6 19.5	52	83	79.8	6 35.2	52	83	79.4	6 50.8	52	83	78.9	7 06.4	52	83	78.5	7 21.9	52	83	78.1	7 37.5	52	83	77.6	7 53.0	52	83	77.2	8 08.5	52	83	76.8	90

Lat. 32° (right margin, with Lat. 33°, 34°, 35°, 36°, 37°, 38° continuing down the right edge)

H.A.	12° 00' Alt. / Δd Δt / Az.	12° 30' Alt. / Δd Δt / Az.	13° 00' Alt. / Δd Δt / Az.	13° 30' Alt. / Δd Δt / Az.	14° 00' Alt. / Δd Δt / Az.	14° 30' Alt. / Δd Δt / Az.	15° 00' Alt. / Δd Δt / Az.	15° 30' Alt. / Δd Δt / Az.	H.A.
00	46 00.0 1.01 01 180.0	45 30.0 1.01 01 180.0	45 00.0 1.01 01 180.0	44 30.0 1.01 01 180.0	44 00.0 1.01 01 180.0	43 30.0 1.01 01 180.0	43 00.0 1.01 01 180.0	42 30.0 1.01 01 180.0	00
1	45 59.4 1.03 178.6	45 29.4 1.03 178.6	44 59.4 1.03 178.6	44 29.4 1.03 178.6	43 59.4 1.03 178.7	43 29.4 1.03 178.7	42 59.4 1.03 178.7	42 29.4 1.03 178.7	1
2	45 57.5 1.05 177.2	45 27.5 1.05 177.2	44 57.6 1.05 177.2	44 27.6 1.05 177.3	43 57.6 1.05 177.3	43 27.6 1.05 177.3	42 57.7 1.05 177.4	42 27.7 1.05 177.4	2
3	45 54.4 1.07 175.8	45 24.4 1.07 175.8	44 54.5 1.07 175.9	44 24.6 1.07 175.9	43 54.6 1.07 176.0	43 24.7 1.07 176.0	42 54.7 1.07 176.0	42 24.8 1.07 176.1	3
4	45 50.0 1.09 174.4	45 20.1 1.09 174.4	44 50.2 1.09 174.5	44 20.3 1.09 174.6	43 50.4 1.09 174.6	43 20.5 1.09 174.7	42 50.6 1.09 174.7	42 20.7 1.09 174.8	4
05	45 44.4 99 11 173.0	45 14.6 99 11 173.1	44 44.7 99 11 173.1	44 14.9 99 11 173.2	43 45.1 99 11 173.3	43 15.2 99 11 173.3	42 45.4 99 11 173.4	42 15.5 1.0 11 173.5	05
6	45 37.6 99 13 171.6	45 07.8 99 13 171.7	44 38.1 99 13 171.8	44 08.3 99 13 171.9	43 38.5 99 13 171.9	43 08.7 99 13 172.0	42 39.0 99 13 172.1	42 09.2 99 12 172.2	6
7	45 29.5 99 15 170.2	44 59.9 99 15 170.3	44 30.2 99 15 170.4	44 00.5 99 15 170.5	43 30.8 99 15 170.6	43 01.1 99 15 170.7	42 31.4 99 14 170.8	42 01.7 99 14 170.9	7
8	45 20.3 99 17 168.8	44 50.7 99 17 169.1	44 21.1 99 17 169.1	43 51.5 99 17 169.2	43 21.9 99 17 169.3	42 52.3 99 17 169.4	42 22.7 99 16 169.5	41 53.1 99 16 169.6	8
9	45 09.8 98 19 167.5	44 40.4 98 19 167.6	44 10.9 98 19 167.7	43 41.4 98 19 167.9	43 11.9 98 19 168.0	42 42.4 98 18 168.1	42 12.9 98 18 168.2	41 43.4 98 18 168.3	9
10	44 58.2 98 21 166.1	44 28.9 98 21 166.3	43 59.5 98 21 166.4	43 30.1 98 21 166.5	43 00.7 98 20 166.7	42 31.4 98 20 166.8	42 02.0 98 20 166.9	41 32.5 98 20 167.1	10
1	44 45.4 97 23 164.8	44 16.2 97 23 164.9	43 47.0 97 23 165.1	43 17.7 97 23 165.2	42 48.5 98 22 165.4	42 19.2 98 22 165.5	41 49.9 98 22 165.7	41 20.6 98 22 165.8	1
2	44 31.5 97 25 163.4	44 02.4 97 25 163.6	43 33.3 97 25 163.8	43 04.2 97 24 163.9	42 35.1 97 24 164.1	42 05.9 97 24 164.3	41 36.8 97 24 164.4	41 07.6 97 23 164.6	2
3	44 16.4 96 27 162.1	43 47.5 96 27 162.3	43 18.5 96 26 162.5	42 49.6 96 26 162.6	42 20.6 96 26 162.8	41 51.6 96 25 163.0	41 22.6 96 25 163.2	40 53.6 96 25 163.3	3
4	44 00.2 96 29 160.8	43 31.4 96 29 161.0	43 02.6 96 28 161.2	42 33.8 96 28 161.4	42 05.0 96 28 161.6	41 36.2 96 27 161.7	41 07.3 96 27 161.9	40 38.5 96 27 162.1	4
15	43 42.9 95 31 159.5	43 14.3 95 30 159.7	42 45.7 95 30 159.9	42 17.1 95 30 160.1	41 48.4 96 29 160.3	41 19.7 96 29 160.5	40 51.0 96 29 160.7	40 22.3 96 29 160.9	15
6	43 24.6 95 32 158.2	42 56.1 95 32 158.4	42 27.7 95 32 158.7	41 59.2 95 31 158.9	41 30.7 95 31 159.1	41 02.2 95 31 159.3	40 33.7 95 31 159.5	40 05.1 95 30 159.7	6
7	43 05.2 94 34 156.9	42 36.9 94 34 157.2	42 08.5 94 33 157.4	41 40.4 94 33 157.6	41 12.1 94 33 157.8	40 43.7 94 32 158.0	40 15.4 95 32 158.3	39 47.0 95 32 158.5	7
8	42 44.7 94 35 155.7	42 16.7 94 35 155.9	41 48.6 94 35 156.2	41 20.5 94 35 156.4	40 52.4 94 34 156.6	40 24.2 94 34 156.9	39 56.0 94 34 157.1	39 27.8 94 34 157.3	8
9	42 23.3 93 37 154.5	41 55.4 93 37 154.7	41 27.6 93 37 155.0	40 59.7 93 36 155.2	40 31.7 93 36 155.4	40 03.8 93 36 155.7	39 35.8 93 35 155.9	39 07.7 93 35 156.1	9
20	42 00.8 92 39 153.2	41 33.2 92 39 153.5	41 05.5 92 38 153.8	40 37.8 92 38 154.0	40 10.1 93 38 154.3	39 42.3 93 37 154.5	39 14.5 93 37 154.8	38 46.7 93 37 155.0	20
1	41 37.5 91 41 152.0	41 10.0 91 40 152.3	40 42.6 92 40 152.6	40 15.1 92 39 152.8	39 47.5 92 39 153.1	39 20.0 92 39 153.3	38 52.4 92 38 153.6	38 24.7 92 38 153.8	1
2	41 13.1 91 42 150.8	40 45.9 91 42 151.1	40 18.7 91 41 151.4	39 51.4 91 41 151.7	39 24.0 91 41 151.9	38 56.7 91 40 152.2	38 29.3 91 40 152.5	38 01.8 92 40 152.7	2
3	40 47.9 90 44 149.7	40 20.9 90 43 150.0	39 53.9 90 43 150.2	39 26.8 90 42 150.5	38 59.7 90 42 150.8	38 32.5 91 42 151.1	38 05.3 91 41 151.3	37 38.1 91 41 151.6	3
4	40 21.8 89 45 148.5	39 55.0 89 45 148.8	39 28.2 89 44 149.1	39 01.3 90 44 149.4	38 34.4 90 44 149.7	38 07.5 90 43 150.0	37 40.5 90 43 150.2	37 13.5 90 42 150.5	4
25	39 54.8 88 46 147.4	39 28.2 89 46 147.7	39 01.6 89 46 148.0	38 35.0 89 45 148.3	38 08.3 89 45 148.6	37 41.6 89 45 148.9	37 14.8 89 44 149.1	36 48.0 89 44 149.4	25
6	39 26.9 88 48 146.3	39 00.6 88 47 146.6	38 34.2 88 47 146.9	38 07.8 88 47 147.2	37 41.4 88 46 147.5	37 14.9 88 46 147.8	36 48.3 89 46 148.1	36 21.7 89 45 148.4	6
7	38 58.3 87 49 145.2	38 32.2 87 49 145.5	38 06.0 87 48 145.8	37 39.8 87 48 146.1	37 13.6 88 48 146.4	36 47.3 88 47 146.7	36 21.0 88 47 147.0	35 54.6 88 46 147.3	7
8	38 28.8 86 50 144.1	38 02.9 86 50 144.4	37 37.0 86 50 144.7	37 11.1 87 49 145.0	36 45.1 87 49 145.4	36 19.0 87 48 145.7	35 52.9 87 48 146.0	35 26.8 87 48 146.3	8
9	37 58.6 85 52 143.0	37 33.0 86 51 143.3	37 07.3 86 51 143.7	36 41.5 86 50 144.0	36 15.8 86 50 144.3	35 49.9 86 50 144.6	35 24.0 86 49 144.9	34 58.1 87 49 145.2	9
30	37 27.6 85 53 142.0	37 02.2 85 52 142.3	36 36.8 85 52 142.6	36 11.3 85 52 143.0	35 45.7 85 51 143.3	35 20.1 85 51 143.6	34 54.4 86 51 143.9	34 28.7 86 50 144.2	30
1	36 55.9 84 54 140.9	36 30.7 84 54 141.3	36 05.5 84 53 141.6	35 40.2 84 53 141.9	35 14.9 84 52 142.3	34 49.6 85 52 142.6	34 24.1 85 52 142.9	33 58.6 85 51 143.2	1
2	36 23.5 83 55 139.9	35 58.5 83 55 140.3	35 33.6 84 54 140.6	35 08.5 84 54 140.9	34 43.4 84 54 141.3	34 18.3 84 53 141.6	33 53.1 84 53 141.9	33 27.8 84 52 142.3	2
3	35 50.4 82 56 138.9	35 25.7 82 56 139.3	35 00.9 83 56 139.6	34 36.1 83 55 140.0	34 11.3 83 55 140.3	33 46.4 83 54 140.6	33 21.4 83 54 141.0	32 56.4 83 54 141.3	3
4	35 16.6 81 57 137.9	34 52.1 82 57 138.3	34 27.6 82 57 138.6	34 03.1 82 56 139.0	33 38.4 82 56 139.3	33 13.7 82 55 139.7	32 49.0 83 55 140.0	32 24.2 83 55 140.3	4
35	34 42.2 81 58 137.0	34 18.0 81 58 137.3	33 53.7 81 58 137.7	33 29.3 81 57 138.0	33 05.0 81 57 138.4	32 40.5 82 56 138.7	32 16.0 82 56 139.1	31 51.4 82 56 139.4	35
6	34 07.2 80 59 136.0	33 43.2 80 59 136.4	33 19.1 80 59 136.7	32 55.0 80 58 137.1	32 30.8 81 58 137.4	32 06.6 81 57 137.8	31 42.3 81 57 138.1	31 18.0 81 57 138.5	6
7	33 31.5 79 60 135.1	33 07.8 79 60 135.4	32 43.9 79 60 135.8	32 20.1 80 59 136.2	31 56.1 80 59 136.5	31 32.1 80 58 136.9	31 08.1 80 58 137.2	30 44.0 80 58 137.6	7
8	32 55.3 78 61 134.2	32 31.8 79 61 134.5	32 08.2 79 61 134.9	31 44.5 79 60 135.3	31 20.8 79 60 135.6	30 57.1 79 59 136.0	30 33.2 80 59 136.3	30 09.3 80 59 136.7	8
9	32 18.5 78 62 133.3	31 55.2 78 62 133.6	31 31.9 78 61 134.0	31 08.4 78 61 134.4	30 45.0 78 61 134.7	30 21.4 79 60 135.1	29 57.8 79 60 135.4	29 34.1 79 60 135.8	9
40	31 41.2 77 63 132.4	31 18.1 77 63 132.7	30 55.0 77 62 133.1	30 31.8 77 62 133.5	30 08.5 78 62 133.8	29 45.2 78 61 134.2	29 21.8 78 61 134.6	28 58.4 78 60 134.9	40
1	31 03.3 76 64 131.5	30 40.5 76 64 131.9	30 17.6 76 63 132.2	29 54.6 77 63 132.6	29 31.6 77 62 133.0	29 08.5 77 62 133.3	28 45.3 77 62 133.7	28 22.1 77 61 134.1	1
2	30 25.0 75 65 130.6	30 02.3 76 64 131.0	29 39.6 76 64 131.4	29 16.9 76 64 131.8	28 54.1 76 63 132.1	28 31.2 76 63 132.5	28 08.3 77 63 132.9	27 45.3 77 62 133.2	2
3	29 46.1 75 66 129.8	29 23.7 75 65 130.2	29 01.2 75 65 130.5	28 38.7 75 64 130.9	28 16.1 76 64 131.3	27 53.4 76 64 131.7	27 30.7 76 63 132.0	27 08.0 76 63 132.4	3
4	29 06.8 74 66 129.3	28 44.6 74 66 129.3	28 22.3 74 66 129.7	28 00.0 74 65 130.1	27 37.3 75 65 130.5	27 15.2 75 65 130.8	26 52.7 75 64 131.2	26 30.1 75 64 131.6	4
45	28 27.0 73 67 128.1	28 05.0 73 67 128.5	27 42.9 74 66 128.9	27 20.8 74 66 129.3	26 58.7 74 66 129.7	26 36.5 74 65 130.0	26 14.2 74 65 130.4	25 51.8 75 65 130.8	45
6	27 46.7 72 68 127.3	27 24.9 73 67 127.7	27 03.1 73 67 128.1	26 41.2 73 67 128.5	26 19.3 73 66 128.9	25 57.3 73 66 129.2	25 35.2 74 66 129.6	25 13.1 74 65 130.0	6
7	27 06.0 72 68 126.5	26 44.5 72 68 126.9	26 22.9 72 68 127.3	26 01.2 72 67 127.7	25 39.4 73 67 128.1	25 17.6 73 67 128.5	24 55.8 73 66 128.8	24 33.9 73 66 129.2	7
8	26 24.9 71 69 125.7	26 03.6 71 69 126.1	25 42.2 71 68 126.5	25 20.7 72 68 126.9	24 59.0 72 68 127.3	24 37.6 72 67 127.7	24 15.9 72 67 128.1	23 54.2 72 67 128.4	8
9	25 43.4 70 70 125.0	25 22.3 71 69 125.4	25 01.1 71 69 125.8	24 39.8 71 69 126.1	24 18.5 71 68 126.5	23 57.1 71 68 126.9	23 35.7 72 68 127.3	23 14.2 72 67 127.7	9
50	25 01.5 70 70 124.2	24 40.6 70 70 124.6	24 19.6 70 70 125.0	23 58.5 70 69 125.4	23 37.4 71 69 125.8	23 16.2 71 69 126.2	22 55.0 71 68 126.5	22 33.7 71 68 126.9	50
1	24 19.3 69 71 123.5	23 58.5 69 71 123.9	23 37.7 69 70 124.3	23 16.9 70 70 124.6	22 55.9 70 70 125.0	22 35.0 70 69 125.4	22 13.9 70 69 125.8	21 52.8 70 69 126.2	1
2	23 36.7 68 72 122.7	23 16.1 69 71 123.1	22 55.5 69 71 123.5	22 34.8 69 71 123.9	22 14.1 69 70 124.3	21 53.3 69 70 124.7	21 32.5 70 70 125.1	21 11.6 70 69 125.5	2
3	22 53.7 68 72 122.0	22 33.3 68 72 122.4	22 12.9 68 72 122.8	21 52.4 69 71 123.2	21 31.9 69 71 123.6	21 11.3 69 71 124.0	20 50.6 69 70 124.4	20 29.9 69 70 124.8	3
4	22 10.4 67 73 121.3	21 50.2 67 72 121.7	21 30.0 68 72 122.1	21 09.7 68 72 122.5	20 49.3 68 72 122.9	20 28.9 68 71 123.3	20 08.5 68 71 123.7	19 48.0 68 71 124.0	4
55	21 26.7 67 73 120.6	21 06.7 67 73 121.0	20 46.7 67 73 121.4	20 26.6 67 72 121.8	20 06.4 67 72 122.2	19 46.2 67 72 122.6	19 25.9 68 71 123.0	19 05.6 68 71 123.4	55
6	20 42.8 66 74 119.9	20 23.0 66 73 120.3	20 03.1 66 73 120.7	19 43.2 66 73 121.1	19 23.2 67 73 121.5	19 03.2 67 72 121.9	18 43.1 67 72 122.3	18 23.0 67 72 122.7	6
7	19 58.5 65 74 119.2	19 38.9 66 74 119.6	19 19.2 66 74 120.0	18 59.4 66 73 120.4	18 39.6 66 73 120.8	18 19.8 66 73 121.2	17 59.9 66 72 121.6	17 40.0 67 72 122.0	7
8	19 13.9 65 75 118.5	18 54.5 65 74 118.9	18 35.0 65 74 119.3	18 15.4 65 74 119.7	17 55.8 66 74 120.1	17 36.1 66 73 120.5	17 16.4 66 73 120.9	16 56.6 66 73 121.3	8
9	18 29.1 64 75 117.9	18 09.8 64 75 118.3	17 50.5 65 75 118.7	17 31.1 65 74 119.1	17 11.6 65 74 119.5	16 52.1 65 74 119.9	16 32.6 65 73 120.3	16 13.0 65 73 120.7	9
60	17 44.0 64 76 117.2	17 24.9 64 75 117.6	17 05.7 64 75 118.0	16 46.5 64 75 118.4	16 27.2 64 75 118.8	16 07.9 64 74 119.2	15 48.5 65 74 119.6	15 29.1 65 74 120.0	60
1	16 58.5 63 76 116.6	16 39.6 63 76 117.0	16 20.6 63 76 117.4	16 01.6 64 75 117.8	15 42.5 64 75 118.2	15 23.3 64 75 118.6	15 04.1 64 74 119.0	14 44.9 64 74 119.4	1
2	16 13.0 63 76 115.9	15 54.2 63 76 116.3	15 35.3 63 76 116.7	15 16.4 63 76 117.1	14 57.5 63 75 117.5	14 38.3 63 75 117.9	14 19.5 63 75 118.3	14 00.4 64 75 118.7	2
3	15 27.1 62 77 115.3	15 08.4 62 77 115.7	14 49.7 62 76 116.1	14 31.0 63 76 116.5	14 12.2 63 76 116.9	13 53.4 63 76 117.3	13 34.6 63 75 117.7	13 15.7 63 75 118.1	3
4	14 40.9 62 77 114.7	14 22.4 62 77 115.1	14 03.9 62 77 115.5	13 45.3 62 76 115.9	13 26.7 62 76 116.3	13 08.1 62 76 116.7	12 49.4 62 76 117.1	12 30.7 62 75 117.5	4
65	13 54.6 61 78 114.0	13 36.2 61 77 114.4	13 17.9 61 77 114.9	12 59.4 61 77 115.3	12 41.0 62 77 115.7	12 22.5 62 76 116.1	12 03.9 62 76 116.5	11 45.4 62 76 116.9	65
6	13 08.0 61 78 113.4	12 49.8 61 78 113.8	12 31.6 61 78 114.2	12 13.3 61 77 114.6	11 55.0 61 77 115.1	11 36.7 61 77 115.5	11 18.3 61 76 115.9	10 59.9 61 76 116.3	6
7	12 21.2 60 78 112.8	12 03.2 60 78 113.2	11 45.1 60 78 113.6	11 26.9 60 78 114.0	11 08.8 61 77 114.5	10 50.6 61 77 114.9	10 32.4 61 77 115.3	10 14.1 61 77 115.7	7
8	11 34.2 60 79 112.2	11 16.3 60 78 112.6	10 58.3 60 78 113.0	10 40.4 60 78 113.4	10 22.4 60 78 113.9	10 04.3 60 78 114.3	9 46.2 60 77 114.7	9 28.1 60 77 115.1	8
9	10 47.0 59 79 111.6	10 29.2 59 79 112.0	10 11.4 59 79 112.4	9 53.6 60 78 112.9	9 35.7 60 78 113.3	9 17.8 60 78 113.7	8 59.9 60 78 114.1	8 41.9 60 77 114.5	9
70	9 59.6 59 79 111.0	9 42.0 59 79 111.5	9 24.3 59 79 111.9	9 06.6 59 79 112.3	8 48.9 59 78 112.7	8 31.1 59 78 113.1	8 13.3 59 78 113.5	7 55.5 59 78 113.9	70
1	9 12.0 58 80 110.5	8 54.5 58 79 110.9	8 37.0 59 79 111.3	8 19.4 59 79 111.7	8 01.8 59 79 112.1	7 44.2 59 78 112.5	7 26.6 59 78 112.9	7 08.9 59 78 113.3	1
2	8 24.3 58 80 109.9	8 06.9 58 80 110.3	7 49.5 58 79 110.7	7 32.0 58 79 111.1	7 14.6 59 79 111.5	6 57.1 59 79 111.9	6 39.6 59 79 112.3	6 22.1 59 78 112.8	2
3	7 36.3 58 80 109.3	7 19.1 58 80 109.7	7 01.8 58 80 110.1	6 44.5 58 80 110.6	6 27.2 58 79 111.0	6 09.8 58 79 111.4	5 52.4 58 79 111.8	5 35.1 58 79 112.2	3
4	6 48.2 57 80 108.8	6 31.1 57 80 109.2	6 13.9 57 80 109.6	5 56.7 58 80 110.0	5 39.6 58 80 110.4	5 22.3 57 79 110.8	5 05.1 57 79 111.2		4
75	6 00.0 57 81 108.2	5 42.9 57 80 108.6	5 25.9 57 80 109.0	5 08.8 57 80 109.4					75
6	5 11.5 56 81 107.6								6

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00' Alt. / Δd Δt / Az.	12° 30' Alt. / Δd Δt / Az.	13° 00' Alt. / Δd Δt / Az.	13° 30' Alt. / Δd Δt / Az.	14° 00' Alt. / Δd Δt / Az.	14° 30' Alt. / Δd Δt / Az.	15° 00' Alt. / Δd Δt / Az.	15° 30' Alt. / Δd Δt / Az.	H.A.
91	5 29.5 52 83 79.3	5 45.2 52 83 78.8	6 00.9 52 83 78.4	6 16.6 52 83 78.0	6 32.2 52 83 77.6	6 47.8 52 83 77.1	7 03.4 52 82 76.7	7 19.0 52 82 76.3	91
2			5 11.1 53 83 77.9	5 26.8 52 83 77.5	5 42.6 52 83 77.0	5 58.3 52 82 76.6	6 14.0 52 82 76.2	6 29.6 52 82 75.8	2
3						5 08.8 53 82 76.1	5 24.6 52 82 75.7	5 40.4 52 82 75.2	3

Lat. 32° — DECLINATION SAME NAME AS LATITUDE

H.A.	16°00′ Alt.	Δd Δt	Az.	16°30′ Alt.	Δd Δt	Az.	17°00′ Alt.	Δd Δt	Az.	17°30′ Alt.	Δd Δt	Az.	18°00′ Alt.	Δd Δt	Az.	18°30′ Alt.	Δd Δt	Az.	19°00′ Alt.	Δd Δt	Az.	19°30′ Alt.	Δd Δt	Az.	H.A.
00	74 00.0	1.0 03	180.0	74 30.0	1.0 03	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	77 00.0	1.0 03	180.0	77 30.0	1.0 03	180.0	00
1	73 58.5	1.0 08	176.5	74 28.4	1.0 08	176.4	74 58.4	1.0 08	176.3	75 28.3	1.0 08	176.2	75 58.3	1.0 09	176.1	76 28.2	1.0 09	175.9	76 58.1	1.0 09	175.8	77 28.1	1.0 10	175.7	1
2	73 53.8	99 13	173.1	74 23.6	99 13	172.9	74 53.5	99 14	172.7	75 23.3	99 14	172.5	75 53.0	99 14	172.2	76 22.7	99 15	171.9	76 52.6	99 16	171.3	77 22.3	99 16	171.1	2
3	73 46.2	99 18	169.6	74 15.8	99 18	169.3	74 45.4	99 19	169.0	75 14.9	98 19	168.7	75 44.4	98 20	168.3	76 13.9	98 20	168.0	76 43.4	98 21	167.6	77 12.8	98 22	167.1	3
4	73 35.5	98 22	166.3	74 04.9	98 23	165.9	74 34.1	97 24	165.5	75 03.4	97 24	165.0	75 32.5	97 25	164.6	76 01.6	97 26	164.1	76 30.7	97 27	163.6	76 59.7	96 28	163.0	4
05	73 22.0	97 27	163.0	73 51.0	96 28	162.5	74 19.9	96 29	162.0	74 48.7	96 29	161.5	75 17.4	96 30	160.9	75 46.1	95 31	160.4	76 14.7	95 32	159.7	76 43.1	95 33	159.0	05
6	73 05.8	95 31	159.8	73 34.3	95 32	159.2	74 02.8	95 33	158.7	74 31.1	94 34	158.1	74 59.4	94 35	157.4	75 27.5	94 36	156.7	75 55.5	93 37	156.0	76 23.4	93 38	155.2	6
7	72 46.9	94 36	156.7	73 15.0	93 37	156.1	73 42.9	93 37	155.4	74 10.8	93 38	154.8	74 38.4	92 39	154.0	75 06.0	92 40	153.3	75 33.4	91 41	152.5	76 00.6	91 41	151.6	7
8	72 25.6	92 39	153.7	72 53.1	92 40	153.0	73 20.5	91 41	152.3	73 47.8	91 42	151.6	74 14.9	90 43	150.8	74 41.8	89 44	150.0	75 08.5	89 46	149.1	75 35.1	88 47	148.2	8
9	72 01.9	90 43	150.8	72 28.9	90 44	150.1	72 55.7	89 45	149.4	73 22.4	89 46	148.6	73 48.9	88 47	147.7	74 15.2	87 48	146.9	74 41.2	86 49	145.9	75 07.0	86 51	145.0	9
10	71 36.0	88 46	148.1	72 02.5	88 47	147.3	72 28.7	87 48	146.5	72 54.8	87 49	145.7	73 20.6	86 51	144.8	73 46.3	85 52	143.9	74 11.6	84 53	142.9	74 36.7	83 54	141.9	10
1	71 08.1	87 50	145.4	71 34.0	86 51	144.6	71 59.7	85 52	143.8	72 25.1	84 53	143.0	72 50.3	84 54	142.0	73 15.3	83 55	141.1	73 40.0	82 56	140.1	74 04.3	81 57	139.0	1
2	70 38.3	85 53	142.9	71 03.6	84 54	142.1	71 28.7	83 54	141.3	71 53.5	82 56	140.4	72 18.1	81 57	139.4	72 42.4	81 58	138.4	73 06.4	79 59	137.4	73 30.1	78 60	136.4	2
3	70 06.8	83 55	140.5	70 31.5	82 56	139.7	70 56.0	81 57	138.8	71 20.2	80 58	137.9	71 44.2	79 59	136.9	72 07.8	78 60	136.0	72 31.2	77 61	134.9	72 54.2	76 62	133.8	3
4	69 33.7	81 58	138.2	69 57.8	80 59	137.4	70 21.7	79 60	136.5	70 45.4	78 61	135.6	71 08.7	77 62	134.6	71 31.7	76 63	133.6	71 54.4	75 64	132.6	72 16.7	74 65	131.5	4
15	68 59.1	79 60	136.1	69 22.7	78 61	135.2	69 46.0	77 62	134.3	70 09.0	76 63	133.4	70 31.8	75 64	132.4	70 54.2	74 65	131.4	71 16.3	73 66	130.3	71 38.0	72 67	129.3	15
6	68 23.1	77 62	134.0	68 46.2	76 63	133.1	69 08.9	75 64	132.2	69 31.4	74 65	131.3	69 53.6	73 66	130.3	70 15.4	72 67	129.3	70 36.9	71 67	128.2	70 58.0	70 68	127.2	6
7	67 45.9	76 64	132.0	68 08.4	75 65	131.2	68 30.7	74 66	130.2	68 52.6	73 66	129.3	69 14.2	71 67	128.3	69 35.5	70 68	127.3	69 56.4	69 69	126.3	70 16.9	68 70	125.2	7
8	67 07.6	74 66	130.2	67 29.6	73 66	129.3	67 51.3	72 67	128.4	68 12.7	71 68	127.4	68 33.8	70 69	126.5	68 54.5	69 70	125.5	69 14.9	67 71	124.4	69 34.9	66 72	123.4	8
9	66 28.2	72 67	128.4	66 49.7	71 68	127.5	67 10.9	70 69	126.6	67 31.8	69 70	125.7	67 52.4	68 70	124.7	68 12.6	67 71	123.7	68 32.5	66 72	122.7	68 52.0	64 73	121.7	9
20	65 47.8	71 69	126.7	66 08.9	70 69	125.8	66 29.6	69 70	124.9	66 50.1	68 71	124.0	67 10.2	66 72	123.0	67 29.9	65 72	122.1	67 49.3	64 73	121.1	68 08.3	63 74	120.0	20
1	65 06.6	69 70	125.1	65 27.2	68 71	124.2	65 47.5	67 72	123.3	66 07.5	66 72	122.4	66 27.1	65 73	121.4	66 46.4	64 74	120.5	67 05.3	62 74	119.5	67 23.9	61 75	118.5	1
2	64 24.6	68 71	123.5	64 44.7	67 72	122.7	65 04.6	66 73	121.8	65 24.1	65 73	120.9	65 43.4	64 74	119.9	66 02.2	62 75	119.0	66 20.7	61 75	118.0	66 38.9	60 76	117.0	2
3	63 41.8	66 72	122.0	64 01.5	65 73	121.2	64 21.0	64 74	120.3	64 40.1	63 74	119.4	64 59.0	62 75	118.5	65 17.4	61 76	117.6	65 35.5	60 76	116.6	65 53.3	58 77	115.6	3
4	62 58.3	65 73	120.6	63 17.7	64 74	119.8	63 36.8	63 75	118.9	63 55.5	62 75	118.1	64 14.0	61 76	117.1	64 32.0	60 76	116.2	64 49.8	59 77	115.3	65 07.1	57 78	114.3	4
25	62 14.2	64 74	119.3	62 33.3	63 75	118.5	62 52.0	62 76	117.6	63 10.4	61 76	116.7	63 28.4	60 77	115.8	63 46.2	59 77	114.9	64 03.5	57 78	114.0	64 20.5	56 78	113.1	25
6	61 29.6	63 75	118.0	61 48.7	62 76	117.2	62 06.6	61 76	116.3	62 24.7	60 77	115.4	62 42.4	59 77	114.6	62 59.8	57 78	113.7	63 16.8	56 78	112.8	63 33.5	55 79	111.9	6
7	60 44.4	62 76	116.8	61 02.7	61 77	116.0	61 20.8	60 77	115.1	61 38.5	58 78	114.3	61 55.9	57 78	113.4	62 13.0	56 79	112.5	62 29.7	55 79	111.6	62 46.1	54 80	110.7	7
8	59 58.7	61 77	115.6	60 16.8	60 77	114.8	60 34.5	59 78	114.0	60 51.9	58 78	113.1	61 09.0	56 79	112.3	61 25.8	55 79	111.4	61 42.3	54 80	110.5	61 58.4	53 80	109.6	8
9	59 12.6	60 78	114.4	59 30.3	59 78	113.6	59 47.8	58 79	112.8	60 04.9	57 79	112.0	60 21.7	56 79	111.2	60 38.3	54 80	110.3	60 54.4	53 80	109.5	61 10.3	52 81	108.6	9
30	58 26.1	59 78	113.3	58 43.5	58 79	112.6	59 00.7	57 79	111.8	59 17.6	56 79	110.9	59 34.1	55 80	110.1	59 50.4	54 80	109.3	60 06.3	53 81	108.5	60 21.9	51 81	107.6	30
1	57 39.2	58 79	112.3	57 56.4	57 79	111.5	58 13.3	56 80	110.7	58 29.9	55 80	109.9	58 46.2	54 80	109.1	59 02.2	53 81	108.3	59 17.9	52 81	107.5	59 33.3	51 81	106.7	1
2	56 51.9	57 79	111.3	57 08.9	56 80	110.5	57 25.5	55 80	109.7	57 41.9	54 80	109.0	57 58.0	53 81	108.1	58 13.8	52 81	107.4	58 29.6	51 82	106.5	58 44.4	50 82	105.7	2
3	56 04.4	56 80	110.3	56 21.1	55 80	109.5	56 37.5	54 81	108.8	56 53.7	53 81	108.0	57 09.5	52 81	107.2	57 25.1	51 82	106.4	57 40.4	50 82	105.6	57 55.3	49 82	104.8	3
4	55 16.5	55 80	109.3	55 33.0	55 81	108.6	55 49.2	54 81	107.8	56 05.1	53 81	107.1	56 20.8	52 82	106.3	56 36.2	51 82	105.5	56 51.3	50 82	104.8	57 06.0	49 82	104.0	4
35	54 28.3	55 81	108.4	54 44.6	54 81	107.7	55 00.6	53 81	106.9	55 16.4	52 82	106.2	55 31.9	51 82	105.5	55 47.1	50 82	104.7	56 02.0	49 83	103.9	56 16.6	48 83	103.1	35
6	53 39.9	54 81	107.5	53 56.0	54 81	106.8	54 11.9	52 82	106.1	54 27.4	51 82	105.4	54 42.7	51 82	104.6	54 57.8	50 82	103.9	55 12.5	49 83	103.1	55 27.0	48 83	102.3	6
7	52 51.3	53 81	106.7	53 07.2	53 82	106.0	53 22.9	52 82	105.2	53 38.3	51 82	104.5	53 53.4	50 82	103.8	54 08.3	49 83	103.0	54 22.9	48 83	102.3	54 37.2	47 83	101.5	7
8	52 02.4	53 82	105.8	52 18.2	52 82	105.1	52 33.7	51 82	104.4	52 48.9	50 83	103.7	53 03.9	50 83	103.0	53 18.6	49 83	102.3	53 33.1	48 83	101.5	53 47.2	47 83	100.8	8
9	51 13.4	52 82	105.0	51 29.0	52 82	104.3	51 44.3	51 83	103.6	51 59.4	50 83	102.9	52 14.2	49 83	102.2	52 28.8	48 83	101.5	52 43.1	47 83	100.8	52 57.2	46 84	100.0	9
40	50 24.2	52 82	104.2	50 39.6	51 83	103.5	50 54.8	50 83	102.9	51 09.4	49 83	102.2	51 24.4	49 83	101.5	51 38.9	48 83	100.8	51 53.1	47 84	100.1	52 07.0	46 84	99.3	40
1	49 34.7	51 83	103.4	49 50.0	51 83	102.8	50 05.1	50 83	102.1	50 19.9	49 83	101.4	50 34.5	48 83	100.7	50 48.9	47 84	100.0	51 02.9	47 84	99.3	51 16.8	45 84	98.6	1
2	48 45.2	51 83	102.7	49 00.3	50 83	102.0	49 15.3	49 83	101.4	49 30.0	49 83	100.7	49 44.5	48 84	100.0	49 58.7	47 84	99.3	50 12.7	46 84	98.7	50 26.4	45 84	98.0	2
3	47 55.5	50 83	102.0	48 10.5	50 83	101.3	48 25.3	49 83	100.7	48 39.9	48 84	100.0	48 54.3	48 84	99.3	49 08.4	47 84	98.7	49 22.3	46 84	98.0	49 36.0	45 84	97.3	3
4	47 05.6	50 83	101.2	47 20.6	49 83	100.6	47 35.3	48 84	100.0	47 49.8	48 84	99.3	48 04.0	47 84	98.6	48 18.1	46 84	98.0	48 31.9	46 84	97.3	48 45.5	45 84	96.6	4
45	46 15.7	50 83	99.9	46 30.5	49 84	99.3	46 45.1	48 84	98.6	46 59.5	48 84	98.0	47 13.7	47 84	97.3	47 27.7	46 84	96.7	47 41.4	45 84	96.7	47 54.9	44 85	96.0	45
6	45 25.6	49 84	99.9	45 40.4	49 84	99.2	45 54.8	48 84	98.6	46 09.2	47 84	98.0	46 23.3	47 84	97.3	46 37.2	46 84	96.7	46 50.8	45 85	96.0	47 04.3	44 85	95.4	6
7	44 35.4	49 84	99.2	44 50.0	48 84	98.6	45 04.5	48 84	97.9	45 18.7	47 84	97.3	45 32.8	46 84	96.7	45 46.6	46 84	96.1	46 00.2	45 84	95.4	46 13.6	44 85	94.8	7
8	43 45.1	49 84	98.5	43 59.7	48 84	97.9	44 14.1	48 84	97.3	44 28.2	47 84	96.7	44 42.2	46 84	96.1	44 56.0	46 84	95.4	45 09.5	45 85	94.8	45 22.9	44 85	94.2	8
9	42 54.8	49 84	97.9	43 09.2	48 84	97.3	43 23.6	47 84	96.7	43 37.6	47 84	96.1	43 51.6	46 84	95.5	44 05.3	45 85	94.8	44 18.8	45 84	94.2	44 32.1	44 85	93.6	9
50	42 04.3	48 84	97.2	42 18.7	48 84	96.7	42 33.0	47 84	96.1	42 47.0	47 84	95.5	43 00.9	46 85	94.9	43 14.6	45 85	94.2	43 28.0	45 85	93.6	43 41.3	44 85	93.0	50
1	41 13.8	48 84	96.6	41 28.2	48 84	96.0	41 42.4	47 84	95.5	41 56.4	46 85	94.9	42 10.2	46 85	94.3	42 23.8	45 85	93.7	42 37.2	44 85	93.1	42 50.5	44 85	92.4	1
2	40 23.4	48 84	96.0	40 37.5	47 84	95.4	40 51.7	47 85	94.9	41 05.6	46 85	94.3	41 19.4	46 85	93.7	41 33.0	45 85	93.1	41 46.4	45 85	92.5	41 59.6	44 85	91.9	2
3	39 32.6	48 84	95.4	39 46.9	47 84	94.8	40 01.0	47 85	94.3	40 14.9	46 85	93.7	40 28.6	46 85	93.1	40 42.2	45 85	92.5	40 55.6	44 85	91.9	41 08.8	44 85	91.3	3
4	38 41.9	48 84	94.8	38 56.1	47 85	94.3	39 10.2	47 85	93.7	39 24.1	46 85	93.1	39 37.8	45 85	92.5	39 51.3	45 85	92.0	40 04.6	44 85	91.4	40 17.9	44 85	90.8	4
55	37 51.2	48 85	94.2	38 05.4	47 85	93.7	38 19.4	46 85	93.1	38 33.3	46 85	92.6	38 47.0	45 85	92.0	39 00.5	45 85	91.4	39 13.8	44 85	90.8	39 27.0	44 85	90.3	55
6	37 00.4	47 85	93.7	37 14.6	47 85	93.1	37 28.6	46 85	92.6	37 42.4	46 85	92.0	37 56.1	45 85	91.4	38 09.6	45 85	90.9	38 23.0	44 85	90.3	38 36.1	44 85	89.7	6
7	36 09.6	47 85	93.1	36 23.8	47 85	92.6	36 37.7	46 85	92.0	36 51.6	45 85	91.5	37 05.2	45 85	90.9	37 18.7	45 85	90.3	37 32.1	44 85	89.8	37 45.3	44 85	89.2	7
8	35 18.8	47 85	92.5	35 32.9	47 85	92.0	35 46.9	46 85	91.5	36 00.7	45 85	90.9	36 14.3	45 85	90.4	36 27.8	45 85	89.8	36 41.2	44 85	89.2	36 54.4	44 85	88.7	8
9	34 28.0	47 85	92.0	34 42.1	47 85	91.5	34 56.0	46 85	90.9	35 09.8	46 85	90.4	35 23.5	45 85	89.8	35 37.0	45 85	89.3	35 50.3	44 85	88.7	36 03.5	44 85	88.2	9
60	33 37.1	47 85	91.4	33 51.2	47 85	90.9	34 05.1	46 85	90.4	34 18.9	46 85	89.8	34 32.6	45 85	89.3	34 46.1	45 85	88.8	34 59.5	44 85	88.2	35 12.7	44 85	87.7	60
1	32 46.3	47 85	90.9	33 00.3	47 85	90.4	33 14.2	46 85	89.8	33 28.0	46 85	89.3	33 41.7	45 85	88.8	33 55.2	45 85	88.2	34 08.6	44 85	87.7	34 21.8	44 85	87.2	1
2	31 55.4	47 85	90.4	32 09.4	47 85	89.8	32 23.4	46 85	89.3	32 37.2	46 85	88.8	32 50.8	45 85	88.3	33 04.4	45 85	87.7	33 17.8	45 85	87.2	33 31.0	44 85	86.7	2
3	31 04.5	47 85	89.8	31 18.6	47 85	89.3	31 32.4	46 85	88.8	31 46.3	46 85	88.3	32 00.0	45 85	87.7	32 13.5	45 85	87.2	32 27.0	44 85	86.7	32 40.3	44 85	86.2	3
4	30 13.6	47 85	89.3	30 27.7	47 85	88.8	30 41.6	46 85	88.3	30 55.5	46 85	87.8	31 09.2	45 85	87.2	31 22.7	45 85	86.7	31 36.2	45 85	86.2	31 49.5	44 85	85.7	4
65	29 22.7	47 85	88.8	29 36.8	47 85	88.3	29 50.6	46 85	87.8	30 04.6	46 85	87.3	30 18.3	46 85	86.7	30 31.9	45 85	86.2	30 45.4	45 85	85.7	30 58.8	44 84	85.2	65
6	28 31.9	47 85	88.3	28 46.0	47 85	87.8	28 59.9	46 85	87.3	29 13.8	46 85	86.8	29 27.6	46 85	86.2	29 41.2	45 85	85.7	29 54.7	45 84	85.2	30 08.1	44 84	84.7	6
7	27 41.0	47 85	87.8	27 55.1	47 85	87.3	28 09.1	46 85	86.8	28 23.0	46 85	86.3	28 36.8	46 85	85.7	28 50.5	45 85	85.2	29 04.0	45 84	84.7	29 17.5	45 85	84.2	7
8	26 50.2	47 85	87.2	27 04.3	47 85	86.7	27 18.3	47 85	86.3	27 32.3	46 85	85.7	27 46.1	46 84	85.2	27 59.8	45 85	84.7	28 13.4	45 84	84.2	28 26.8	45 84	83.7	8
9	25 59.4	47 85	86.7	26 13.5	47 85	86.2	26 27.6	47 85	85.8	26 41.5	46 84	85.3	26 55.4	46 84	84.8	27 09.1	46 84	84.3	27 22.8	45 84	83.8	27 36.3	45 84	83.3	9
70	25 08.6	47 85	86.2	25 22.8	47 84	85.7	25 36.9	47 84	85.3	25 50.8	46 84	84.8	26 04.7	46 84	84.3	26 18.5	46 84	83.8	26 32.2	45 84	83.3	26 45.8	45 84	82.8	70
1	24 17.8	48 85	85.7	24 32.0	47 84	85.2	24 46.2	47 84	84.8	25 00.2	46 84	84.3	25 14.1	46 84	83.8	25 28.0	46 84	83.3	25 41.7	46 84	82.8	25 55.3	45 84	82.3	1
2	23 27.1	48 85	85.2	23 41.4	47 84	84.7	23 55.5	47 84	84.3	24 09.6	47 84	83.8	24 23.6	46 84	83.3	24 37.5	46 84	82.8	24 51.2	46 84	82.3	25 04.9	45 84	81.8	2
3	22 36.4	48 84	84.7	22 50.7	47 84	84.3	23 04.9	47 84	83.8	23 19.0	47 84	83.3	23 33.1	46 84	82.8	23 47.0	46 84	82.3	24 00.6	46 84	81.8	24 14.6	46 84	81.4	3
4	21 45.8	48 84	84.2	22 00.1	48 84	83.8	22 14.3	47 84	83.3	22 28.5	47 84	82.8	22 42.6	47 84	82.3	22 56.6	46 84	81.8	23 10.5	46 84	81.4	23 24.3	46 84	80.9	4
75	20 55.2	48 84	83.7	21 09.5	48 84	83.3	21 23.8	48 84	82.8	21 38.1	47 84	82.3	21 52.2	47 84	81.8	22 06.3	47 84	81.4	22 20.2	46 84	80.9	22 34.1	46 84	80.4	75
6	20 04.6	48 84	83.2	20 19.0	48 84	82.8	20 33.4	48 84	82.3	20 47.7	47 84	81.8	21 01.9	47 84	81.4	21 16.0	47 84	80.9	21 30.0	47 84	80.4	21 44.0	46 83	79.9	6
7	19 14.1	49 84	82.7	19 28.6	48 84	82.3	19 43.0	48 84	81.8	19 57.3	48 84	81.4	20 11.6	47 84	80.9	20 25.8	47 84	80.4	20 39.9	47 83	79.9	20 53.9	47 83	79.5	7
8	18 23.7	49 84	82.2	18 38.2	48 84	81.8	18 52.7	48 84	81.3	19 07.1	48 84	80.9	19 21.4	48 84	80.4	19 35.6	47 83	79.9	19 49.8	47 83	79.5	20 03.9	47 83	79.0	8
9	17 33.4	49 84	81.8	17 47.9	49 84	81.3	18 02.4	48 84	80.8	18 16.9	48 84	80.4	18 31.2	48 83	79.9	18 45.6	48 83	79.5	18 59.8	47 83	79.0	19 14.0	47 83	78.5	9
80	16 42.9	49 84	81.3	16 57.6	49 84	80.8	17 12.2	49 84	80.4	17 26.7	48 84	79.9	17 41.2	48 83	79.4	17 55.6	48 83	79.0	18 09.9	48 83	78.5	18 24.2	47 83	78.1	80
1	15 52.7	49 84	80.8	16 07.4	49 84	80.3	16 22.1	49 83	79.9	16 36.7	49 83	79.4	16 51.2	48 83	79.0	17 05.7	48 83	78.5	17 20.1	48 83	78.0	17 34.5	48 83	77.6	1
2	15 02.5	49 84	80.3	15 17.3	49 83	79.9	15 32.0	49 83	79.4	15 46.7	49 83	78.9	16 01.3	49 83	78.5	16 15.9	48 83	78.0	16 30.4	48 83	77.6	16 44.8	48 83	77.1	2
3	14 12.4	50 83	79.9	14 27.2	49 83	79.4	14 42.0	49 83	78.9	14 56.8	49 83	78.5	15 11.5	49 83	78.0	15 26.1	49 83	77.5	15 40.7	49 83	77.1	15 55.3	48 82	76.6	3
4	13 22.3	50 83	79.3	13 37.3	50 83	78.9	13 52.1	50 83	78.4	14 07.0	49 83	78.0	14 21.8	49 83	77.5	14 36.5	49 83	77.1	14 51.2	49 82	76.6	15 05.8	49 82	76.2	4
85	12 32.4	50 83	78.8	12 47.4	50 83	78.4	13 02.3	50 83	77.9	13 17.3	50 83	77.5	13 32.1	49 83	77.0	13 47.0	49 82	76.6	14 01.7	49 82	76.1	14 16.5	49 82	75.7	85
6	11 42.5	50 83	78.3	11 57.6	50 83	77.9	12 12.6	50 83	77.4	12 27.6	50 83	77.0	12 42.6	50 82	76.5	12 57.5	50 82	76.1	13 12.4	49 82	75.7	13 27.2	49 82	75.2	6
7	10 52.7	51 83	77.8	11 07.9	50 83	77.4	11 23.0	50 83	76.9	11 38.1	50 82	76.5	11 53.2	50 82	76.1	12 08.2	50 82	75.6	12 23.1	50 82	75.2	12 38.1	50 82	74.7	7
8	10 03.0	51 83	77.3	10 18.3	51 82	76.9	10 33.5	51 82	76.5	10 48.7	51 82	76.0	11 03.8	50 82	75.6	11 18.9	50 82	75.1	11 34.0	50 82	74.7	11 49.0	50 82	74.3	8
9	9 13.4	51 82	76.8	9 28.8	51 82	76.4	9 44.1	51 82	76.0	9 59.4	51 82	75.5	10 14.6	51 82	75.1	10 29.8	51 82	74.6	10 45.0	51 81	74.2	11 00.1	50 81	73.8	9
90	8 23.9	51 82	76.3	8 39.4	51 82	75.9	8 54.8	51 82	75.5	9 10.1	51 82	75.0	9 25.5	51 82	74.6	9 40.8	51 81	74.2	9 56.1	51 81	73.7	10 11.3	51 81	73.3	90

Lat. 32°

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	16° 00' (Alt / Δd Δt / Az)	16° 30'	17° 00'	17° 30'	18° 00'	18° 30'	19° 00'	19° 30'	H.A.
00	42 00.0 1.0 01 180.0	41 30.0 1.0 01 180.0	41 00.0 1.0 01 180.0	40 30.0 1.0 01 180.0	40 00.0 1.0 01 180.0	39 30.0 1.0 01 180.0	39 00.0 1.0 01 180.0	38 30.0 1.0 01 180.0	00
1	41 59.4 1.0 03 178.7	41 29.4 1.0 03 178.7	40 59.4 1.0 03 178.7	40 29.4 1.0 03 178.7	39 59.4 1.0 03 178.8	39 29.5 1.0 03 178.8	38 59.5 1.0 03 178.8	38 29.5 1.0 03 178.8	1
2	41 57.7 1.0 05 177.4	41 27.7 1.0 05 177.4	40 57.7 1.0 05 177.5	40 27.8 1.0 05 177.5	39 57.8 1.0 05 177.5	39 27.8 1.0 05 177.5	38 57.8 1.0 04 177.6	38 27.9 1.0 04 177.6	2
3	41 54.8 1.0 07 176.1	41 24.9 1.0 07 176.2	40 54.9 1.0 07 176.2	40 25.0 1.0 06 176.2	39 55.0 1.0 06 176.3	39 25.1 1.0 06 176.3	38 55.1 1.0 06 176.4	38 25.2 1.0 06 176.4	3
4	41 50.8 1.0 09 174.8	41 20.9 1.0 08 174.9	40 51.0 1.0 08 174.9	40 21.1 1.0 08 175.0	39 51.2 1.0 08 175.0	39 21.3 1.0 08 175.1	38 51.4 1.0 08 175.1	38 21.5 1.0 08 175.1	4
05	41 45.7 1.0 10 173.6	41 15.8 1.0 10 173.6	40 46.0 1.0 10 173.7	40 16.1 1.0 10 173.7	39 46.2 1.0 10 173.8	39 16.4 1.0 10 173.9	38 46.5 1.0 10 173.9	38 16.7 1.0 10 174.0	05
6	41 39.4 99 12 172.3	41 09.6 99 12 172.3	40 39.8 99 12 172.4	40 10.0 99 12 172.5	39 40.2 99 12 172.6	39 10.4 99 12 172.7	38 40.6 99 12 172.7	38 10.8 99 12 172.8	6
7	41 32.0 99 14 171.0	41 02.3 99 14 171.1	40 32.6 99 14 171.2	40 02.8 99 14 171.3	39 33.1 99 14 171.4	39 03.4 99 14 171.4	38 33.6 99 13 171.5	38 03.9 99 13 171.6	7
8	41 23.5 99 16 169.7	40 53.8 99 16 169.8	40 24.2 99 16 169.9	39 54.6 99 16 170.0	39 24.9 99 15 170.1	38 55.3 99 15 170.2	38 25.6 99 15 170.3	37 56.0 99 15 170.4	8
9	41 13.8 98 18 168.5	40 44.3 98 18 168.6	40 14.8 98 18 168.7	39 45.2 98 17 168.8	39 15.7 98 17 168.9	38 46.1 99 17 169.0	38 16.6 99 17 169.1	37 47.0 99 17 169.2	9
10	41 03.1 98 20 167.2	40 33.7 98 19 167.3	40 04.3 98 19 167.5	39 34.8 98 19 167.6	39 05.4 98 19 167.7	38 35.9 98 19 167.8	38 06.4 98 19 168.0	37 37.0 98 18 168.1	10
1	40 51.9 98 21 166.0	40 22.0 98 21 166.1	39 52.7 98 21 166.2	39 23.4 98 21 166.4	38 54.0 98 21 166.5	38 24.7 98 20 166.6	37 55.3 98 20 166.8	37 26.0 98 20 166.9	1
2	40 38.5 97 23 164.7	40 09.3 97 23 164.9	39 40.1 97 23 165.0	39 10.9 97 23 165.2	38 41.6 97 22 165.3	38 12.4 97 22 165.5	37 43.2 97 22 165.6	37 13.9 98 22 165.8	2
3	40 24.5 97 25 163.5	39 55.5 97 25 163.7	39 26.4 97 24 163.8	38 57.3 97 24 164.0	38 28.2 97 24 164.1	37 59.1 97 24 164.3	37 30.0 97 24 164.4	37 00.9 97 23 164.6	3
4	40 09.6 96 27 162.3	39 40.7 96 26 162.5	39 11.7 96 26 162.6	38 42.8 96 26 162.8	38 13.8 97 26 163.0	37 44.9 97 25 163.1	37 15.9 97 25 163.3	36 46.9 97 25 163.5	4
15	39 53.6 96 28 161.1	39 24.8 96 28 161.3	38 56.0 96 28 161.4	38 27.3 96 28 161.6	37 58.4 96 27 161.8	37 29.6 96 27 162.0	37 00.8 96 27 162.2	36 31.9 96 27 162.3	15
6	39 36.6 95 30 159.9	39 08.0 95 30 160.1	38 39.4 95 29 160.3	38 10.7 95 29 160.5	37 42.1 96 29 160.7	37 13.4 96 29 160.8	36 44.7 96 28 161.0	36 16.0 96 28 161.2	6
7	39 18.6 95 32 158.7	38 50.1 95 31 158.9	38 21.7 95 31 159.1	37 53.2 95 31 159.3	37 24.7 95 30 159.5	36 56.2 95 30 159.7	36 27.7 95 30 159.9	35 59.1 95 30 160.1	7
8	38 59.6 94 33 157.5	38 31.4 94 33 157.7	38 03.1 94 33 158.0	37 34.8 94 32 158.2	37 06.5 94 32 158.4	36 38.1 95 32 158.6	36 09.7 95 31 158.8	35 41.4 95 31 159.0	8
9	38 39.7 94 35 156.4	38 11.6 94 34 156.6	37 43.5 94 34 156.8	37 15.4 94 34 157.0	36 47.2 94 34 157.3	36 19.1 94 33 157.5	35 50.9 94 33 157.7	35 22.7 94 33 157.9	9
20	38 18.8 93 36 155.2	37 50.9 93 36 155.5	37 23.0 93 36 155.7	36 55.1 93 35 155.9	36 27.1 93 35 156.1	35 59.1 93 35 156.4	35 31.1 93 34 156.6	35 03.1 94 34 156.8	20
1	37 57.1 92 38 154.1	37 29.4 92 37 154.3	37 01.6 92 37 154.6	36 33.9 92 37 154.8	36 06.1 93 36 155.0	35 38.3 93 36 155.3	35 10.4 93 36 155.5	34 42.6 93 36 155.7	1
2	37 34.4 92 39 153.0	37 06.9 92 39 153.2	36 39.3 92 39 153.5	36 11.8 92 38 153.7	35 44.2 92 38 153.9	35 16.6 92 38 154.2	34 48.9 92 37 154.4	34 21.2 92 37 154.7	2
3	37 10.8 91 41 151.9	36 43.5 91 40 152.1	36 16.2 91 40 152.4	35 48.8 91 40 152.6	35 21.4 91 39 152.9	34 54.0 91 39 153.1	34 26.5 92 39 153.4	33 59.1 92 38 153.6	3
4	36 46.4 90 42 150.8	36 19.3 90 42 151.1	35 52.2 90 41 151.3	35 25.0 91 41 151.6	34 57.8 91 41 151.8	34 30.6 91 40 152.1	34 03.3 91 40 152.3	33 36.0 91 40 152.6	4
25	36 21.2 90 43 149.7	35 54.3 90 43 150.0	35 27.4 90 43 150.3	35 00.4 90 42 150.5	34 33.4 90 42 150.8	34 06.4 90 42 151.1	33 39.3 90 41 151.3	33 12.2 90 41 151.6	25
6	35 55.1 89 45 148.6	35 28.4 89 44 148.9	35 01.7 89 44 149.2	34 35.0 89 44 149.5	34 08.2 89 43 149.8	33 41.3 89 43 150.0	33 14.5 90 43 150.3	32 47.6 90 42 150.6	6
7	35 28.2 88 46 147.6	35 01.8 88 46 147.9	34 35.3 88 45 148.2	34 08.7 88 45 148.5	33 42.1 89 45 148.7	33 15.5 89 44 149.0	32 48.9 89 44 149.3	32 22.2 89 44 149.6	7
8	35 00.6 87 47 146.6	34 34.3 88 47 146.9	34 08.0 88 47 147.2	33 41.7 88 46 147.4	33 15.4 88 46 147.7	32 49.0 88 45 148.0	32 22.5 88 45 148.3	31 56.0 88 45 148.6	8
9	34 32.1 87 49 145.5	34 06.1 87 48 145.8	33 40.1 87 48 146.1	33 14.0 87 48 146.4	32 47.8 87 47 146.7	32 21.6 87 47 147.0	31 55.4 87 46 147.3	31 29.1 88 46 147.6	9
30	34 03.0 86 50 144.5	33 37.2 86 49 144.9	33 11.4 86 49 145.2	32 45.5 86 49 145.5	32 19.5 86 48 145.8	31 53.6 87 48 146.0	31 27.6 87 48 146.3	31 01.5 87 47 146.6	30
1	33 33.1 85 51 143.6	33 07.5 85 51 143.9	32 41.9 85 50 144.2	32 16.3 86 50 144.4	31 50.6 86 50 144.8	31 24.8 86 49 145.1	30 59.0 86 49 145.4	30 33.2 86 48 145.7	1
2	33 02.5 84 52 142.6	32 37.2 85 52 142.9	32 11.8 85 51 143.2	31 46.4 85 51 143.5	31 20.9 85 51 143.8	30 55.3 85 50 144.1	30 29.8 85 50 144.4	30 04.1 85 50 144.7	2
3	32 31.3 84 53 141.6	32 06.2 84 53 141.9	31 41.0 84 52 142.3	31 15.8 84 52 142.6	30 50.5 84 52 142.9	30 25.2 84 51 143.2	29 59.8 85 51 143.5	29 34.4 85 51 143.8	3
4	31 59.4 83 54 140.7	31 34.5 83 54 141.0	31 09.5 83 54 141.3	30 44.5 83 53 141.6	30 19.5 84 53 142.0	29 54.4 84 52 142.3	29 29.3 84 52 142.6	29 04.1 84 52 142.9	4
35	31 26.8 82 55 139.7	31 02.1 82 55 140.1	30 37.4 82 55 140.4	30 12.6 83 54 140.7	29 47.8 83 54 141.1	29 22.9 83 53 141.4	28 58.0 83 53 141.7	28 33.1 83 53 142.0	35
6	30 53.6 81 56 138.8	30 29.2 82 56 139.2	30 04.7 82 56 139.5	29 40.1 82 55 139.8	29 15.5 82 55 140.2	28 50.9 82 54 140.5	28 26.2 82 54 140.8	28 01.4 83 54 141.1	6
7	30 19.8 81 57 137.9	29 55.6 81 57 138.3	29 31.3 81 57 138.6	29 07.0 81 56 138.9	28 42.6 81 56 139.3	28 18.2 81 55 139.6	27 53.7 82 55 139.9	27 29.2 82 55 140.2	7
8	29 45.4 80 58 137.0	29 21.4 80 58 137.4	28 57.4 80 58 137.7	28 33.3 80 57 138.1	28 09.1 81 57 138.4	27 44.9 81 56 138.7	27 20.7 81 56 139.1	26 56.4 81 56 139.4	8
9	29 10.4 79 59 136.1	28 46.7 79 59 136.5	28 22.8 80 58 136.8	27 59.0 80 58 137.2	27 35.0 80 58 137.5	27 11.1 80 57 137.9	26 47.0 80 57 138.2	26 23.0 80 57 138.5	9
40	28 34.9 78 60 135.3	28 11.4 79 60 135.6	27 47.8 79 59 136.0	27 24.1 79 59 136.3	27 00.4 79 59 136.7	26 36.6 79 58 137.0	26 12.8 79 58 137.4	25 49.0 80 58 137.7	40
1	27 58.8 78 61 134.4	27 35.5 78 61 134.8	27 12.1 78 60 135.1	26 48.7 78 60 135.5	26 25.2 78 60 135.8	26 01.7 79 59 136.2	25 38.1 79 59 136.5	25 14.5 79 58 136.9	1
2	27 22.2 77 62 133.6	26 59.1 77 62 133.9	26 36.0 77 61 134.3	26 12.8 77 61 134.7	25 49.5 78 60 135.0	25 26.2 78 60 135.4	25 02.8 78 60 135.7	24 39.4 78 59 136.1	2
3	26 45.1 76 63 132.8	26 22.2 76 62 133.1	25 59.3 77 62 133.5	25 36.7 77 62 133.8	25 13.3 77 61 134.2	24 50.2 77 61 134.5	24 27.0 77 60 134.9	24 03.8 77 60 135.2	3
4	26 07.5 75 63 131.9	25 44.9 76 63 132.3	25 22.1 76 63 132.7	24 59.4 76 62 133.0	24 36.5 76 62 133.4	24 13.7 76 62 133.7	23 50.7 76 61 134.1	23 27.8 77 61 134.5	4
45	25 29.4 75 64 131.1	25 07.0 75 64 131.5	24 44.5 75 64 131.9	24 21.9 75 63 132.2	23 59.1 75 63 132.6	23 36.7 76 62 133.0	23 14.0 76 62 133.3	22 51.2 76 62 133.7	45
6	24 50.9 74 65 130.4	24 28.7 74 65 130.7	24 06.4 74 64 131.1	23 44.0 75 64 131.5	23 21.6 75 64 131.8	22 59.2 75 63 132.2	22 36.7 75 63 132.5	22 14.2 75 63 132.9	6
7	24 11.9 73 66 129.6	23 49.9 74 65 130.0	23 27.8 74 65 130.3	23 05.7 74 65 130.7	22 43.5 74 64 131.1	22 21.3 74 64 131.4	21 59.0 74 64 131.8	21 36.7 74 63 132.1	7
8	23 32.5 73 66 128.8	23 10.7 73 66 129.2	22 48.8 73 66 129.6	22 26.7 73 65 129.9	22 04.9 73 65 130.3	21 42.9 73 65 130.7	21 20.8 74 64 131.0	20 58.7 74 64 131.4	8
9	22 52.6 72 67 128.1	22 31.0 72 67 128.4	22 09.3 73 66 128.8	21 47.6 73 66 129.2	21 25.9 73 66 129.5	21 04.1 73 65 129.9	20 42.2 73 65 130.3	20 20.3 73 65 130.6	9
50	22 12.3 71 68 127.3	21 50.9 71 67 127.7	21 29.5 72 67 128.1	21 08.0 72 67 128.4	20 46.4 72 66 128.8	20 24.8 72 66 129.2	20 03.2 72 66 129.6	19 41.5 72 65 129.9	50
1	21 31.7 71 68 126.6	21 10.5 71 68 127.0	20 49.2 71 68 127.3	20 27.9 71 67 127.7	20 06.6 71 67 128.1	19 45.2 71 67 128.5	19 23.8 72 66 128.8	19 02.3 72 66 129.2	1
2	20 50.6 70 69 125.9	20 29.6 70 69 126.2	20 08.6 70 68 126.6	19 47.5 70 68 127.0	19 26.3 71 68 127.4	19 05.1 71 67 127.7	18 43.9 71 67 128.1	18 22.6 71 67 128.5	2
3	20 09.2 69 70 125.1	19 48.4 69 69 125.5	19 27.5 70 69 125.9	19 06.7 70 69 126.2	18 45.7 70 68 126.7	18 24.7 70 68 127.0	18 03.7 70 68 127.4	17 42.6 70 67 127.8	3
4	19 27.4 69 70 124.4	19 06.8 69 70 124.8	18 46.1 69 70 125.2	18 25.5 69 69 125.6	18 04.7 69 69 126.0	17 43.9 69 69 126.3	17 23.1 70 68 126.7	17 02.1 70 68 127.1	4
55	18 45.3 68 71 123.7	18 24.9 68 70 124.1	18 04.4 68 70 124.5	17 43.9 68 70 124.9	17 23.3 69 70 125.3	17 02.8 69 69 125.7	16 42.1 69 69 126.0	16 21.4 69 69 126.4	55
6	18 02.8 67 71 123.1	17 42.6 67 71 123.4	17 22.3 68 71 123.8	17 02.0 68 70 124.2	16 41.6 68 70 124.6	16 21.2 68 70 125.0	16 00.8 68 69 125.4	15 40.3 68 69 125.7	6
7	17 20.0 67 72 122.4	16 59.9 67 72 122.8	16 39.7 67 71 123.2	16 19.4 67 71 123.5	15 59.6 67 71 124.0	15 39.4 67 70 124.3	15 19.1 68 70 124.7	14 58.9 68 70 125.1	7
8	16 36.8 66 72 121.7	16 17.0 66 72 122.1	15 57.1 66 72 122.5	15 37.2 67 71 122.9	15 17.2 67 71 123.3	14 57.2 67 71 123.7	14 37.1 67 71 124.0	14 17.0 67 70 124.4	8
9	15 53.4 65 73 121.1	15 33.7 66 73 121.4	15 14.0 66 72 121.8	14 54.3 66 72 122.2	14 34.5 66 72 122.6	14 14.7 66 71 123.0	13 54.8 66 71 123.4	13 34.9 66 71 123.8	9
60	15 09.7 65 73 120.4	14 50.2 65 73 120.8	14 30.6 65 73 121.2	14 11.1 65 72 121.6	13 51.5 65 72 122.0	13 31.8 66 72 122.4	13 12.2 66 72 122.7	12 52.5 66 71 123.1	60
1	14 25.6 64 74 119.8	14 06.3 64 74 120.2	13 47.0 65 73 120.5	13 27.6 65 73 120.9	13 08.2 65 73 121.3	12 48.7 65 72 121.7	12 29.2 65 72 122.1	12 09.7 65 72 122.5	1
2	13 41.3 64 74 119.1	13 22.2 64 74 119.5	13 03.0 64 74 119.9	12 43.8 64 73 120.3	12 24.6 64 73 120.7	12 05.3 64 73 121.1	11 46.0 64 73 121.5	11 26.6 65 72 121.9	2
3	12 56.7 63 75 118.5	12 37.8 63 74 118.9	12 18.8 64 74 119.3	11 59.7 64 74 119.7	11 40.7 64 74 120.1	11 21.6 64 73 120.5	11 02.4 64 73 120.9	10 43.3 64 73 121.3	3
4	12 11.9 63 75 117.9	11 53.1 63 75 118.3	11 34.3 63 75 118.7	11 15.4 63 74 119.1	10 56.5 63 74 119.5	10 37.6 63 74 119.9	10 18.6 64 74 120.3	9 59.6 63 73 120.7	4
65	11 26.8 62 76 117.3	11 08.2 62 75 117.7	10 49.5 62 75 118.1	10 30.8 62 75 118.5	10 12.1 62 74 118.9	9 53.3 63 74 119.3	9 34.5 63 74 119.7	9 15.7 63 74 120.0	65
6	10 41.4 62 76 116.7	10 23.0 62 76 117.1	10 04.5 62 75 117.5	9 45.9 62 75 117.9	9 27.4 62 75 118.3	9 08.8 62 75 118.7	8 50.2 62 74 119.1	8 31.6 62 74 119.5	6
7	9 55.8 61 76 116.1	9 37.5 61 76 116.5	9 19.2 61 76 116.9	9 00.8 61 76 117.3	8 42.4 61 75 117.7	8 24.0 61 75 118.1	8 05.6 62 75 118.5	7 47.1 62 74 118.9	7
8	9 10.0 60 77 115.5	8 51.9 61 76 115.9	8 33.7 61 76 116.3	8 15.5 61 76 116.7	7 57.3 61 76 117.1	7 39.0 61 75 117.5	7 20.7 61 75 117.9	7 02.4 61 75 118.3	8
9	8 24.0 60 77 114.9	8 06.0 60 77 115.3	7 47.9 60 77 115.7	7 29.9 60 76 116.1	7 11.8 60 76 116.5	6 53.7 60 76 116.9	6 35.6 60 76 117.3	6 17.5 60 75 117.7	9
70	7 37.7 59 77 114.3	7 19.9 60 77 114.7	7 02.0 60 77 115.1	6 44.1 60 77 115.5	6 26.2 60 76 115.9	6 08.3 60 76 116.3	5 50.3 60 76 116.7	5 32.3 60 76 117.1	70
1	6 51.2 59 78 113.7	6 33.5 59 78 114.1	6 15.8 59 77 114.5	5 58.1 59 77 115.0	5 40.3 59 77 115.4	5 22.5 59 77 115.8	5 04.7 59 76 116.2		1
2	6 04.5 58 78 113.2	5 47.0 59 78 113.6	5 29.4 59 78 114.0	5 11.8 59 77 114.4					2
3	5 17.7 58 78 112.6	5 00.3 58 78 113.0							3

Lat. 33°   Lat. 34°   Lat. 35°   Lat. 36°   Lat. 37°

DECLINATION SAME NAME AS LATITUDE

Lat. 38°

H.A.	16° 00'	16° 30'	17° 00'	17° 30'	18° 00'	18° 30'	19° 00'	19° 30'	H.A.
91	7 34.6 52 82 75.8	7 50.1 52 82 75.4	8 05.6 52 82 75.0	8 21.1 52 82 74.5	8 36.5 51 81 74.1	8 51.9 51 81 73.7	9 07.3 51 81 73.2	9 22.7 51 81 72.8	91
2	6 45.3 52 82 75.3	7 00.9 52 82 74.9	7 16.5 52 82 74.5	7 32.1 52 81 74.0	7 47.6 52 81 73.6	8 03.1 52 81 73.2	8 18.6 52 81 72.7	8 34.1 52 81 72.3	2
3	5 56.1 52 82 74.8	6 11.8 52 82 74.4	6 27.5 52 81 74.0	6 43.2 52 81 73.5	6 58.9 52 81 73.1	7 14.5 52 81 72.7	7 30.1 52 81 72.2	7 45.7 52 80 71.8	3
4	5 07.1 52 82 74.3	5 22.9 53 81 73.9	5 38.7 53 81 73.5	5 54.5 53 81 73.0	6 10.2 53 81 72.6	6 26.0 52 81 72.2	6 41.7 52 80 71.7	6 57.4 52 80 71.3	4
95				5 05.9 53 81 72.5	5 21.8 53 81 72.1	5 37.6 53 80 71.7	5 53.5 53 80 71.2	6 09.3 53 80 70.8	95
6						5 05.4 53 80 70.7	5 21.3 53 80 70.3		6

Lat. 32°

H.A.	20° 00' Alt.	Δd Δt	Az.	20° 30' Alt.	Δd Δt	Az.	21° 00' Alt.	Δd Δt	Az.	21° 30' Alt.	Δd Δt	Az.	22° 00' Alt.	Δd Δt	Az.	22° 30' Alt.	Δd Δt	Az.	23° 00' Alt.	Δd Δt	Az.	23° 30' Alt.	Δd Δt	Az.	H.A.
00	78 00.0	1.00 03	180.0	78 30.0	1.00 03	180.0	79 00.0	1.00 04	180.0	79 30.0	1.00 04	180.0	80 00.0	1.00 04	180.0	80 30.0	1.00 04	180.0	81 00.0	1.00 04	180.0	81 30.0	1.00 05	180.0	00
1	77 58.0	1.0 10	175.5	78 27.9	1.0 10	175.3	78 57.8	1.0 11	175.1	79 27.7	1.0 11	174.9	79 57.6	1.0 12	174.7	80 27.5	1.0 12	174.4	80 57.4	1.0 13	174.1	81 27.3	1.0 14	173.8	1
2	77 52.0	99 16	171.0	78 21.7	99 17	170.7	78 51.4	99 18	170.3	79 21.0	99 18	169.9	79 50.6	99 19	169.4	80 20.1	98 20	168.9	80 49.6	98 21	168.4	81 19.1	98 22	167.8	2
3	77 42.2	98 23	166.6	78 11.5	98 23	166.1	78 40.7	97 24	165.6	79 09.9	97 25	165.0	79 39.0	97 26	164.3	80 08.0	97 28	163.6	80 37.0	96 31	162.8	81 05.8	96 31	161.9	3
4	77 28.6	96 29	162.4	77 57.4	96 30	161.8	78 26.1	96 30	161.0	78 54.7	95 32	160.3	79 23.2	95 33	159.4	79 51.5	94 34	158.5	80 19.7	94 36	157.5	80 47.7	93 37	156.4	4
05	77 11.5	94 34	158.3	77 39.7	94 35	157.5	78 07.8	93 36	156.7	78 35.7	93 38	155.8	79 03.4	92 39	154.8	79 30.9	91 40	153.7	79 58.2	91 42	152.6	80 25.2	90 44	151.3	05
6	76 51.1	92 39	154.4	77 18.6	91 40	153.5	77 46.0	91 42	152.6	78 13.1	90 43	151.6	78 40.0	89 44	150.5	79 06.6	88 46	149.3	79 33.0	87 48	148.0	79 59.0	86 49	146.6	6
7	76 27.6	90 44	150.7	76 54.4	89 45	149.7	77 21.0	88 46	148.7	77 47.3	87 48	147.6	78 13.3	86 49	146.4	78 39.0	85 51	145.1	79 04.4	84 52	143.7	79 29.3	83 54	142.2	7
8	76 01.4	87 48	147.2	76 27.4	86 49	146.2	76 53.2	85 51	145.1	77 18.6	84 52	143.9	77 43.8	83 54	142.6	78 08.5	82 55	141.3	78 32.9	80 57	139.8	78 56.8	79 58	138.3	8
9	75 32.6	85 52	143.9	75 57.9	84 53	142.8	76 22.8	83 54	141.7	76 47.4	81 56	140.4	77 11.7	80 57	139.1	77 35.5	79 59	137.7	77 58.8	77 60	136.3	78 21.7	75 62	134.7	9
10	75 01.5	82 55	140.8	75 26.0	81 56	139.7	75 50.2	80 58	138.5	76 13.9	79 59	137.2	76 37.3	77 61	135.9	77 00.2	76 62	134.5	77 22.6	74 64	133.0	77 44.5	72 65	131.4	10
1	74 28.4	80 58	137.9	74 52.1	78 60	136.8	75 15.5	77 61	135.6	75 38.4	76 62	134.3	76 00.9	74 63	132.9	76 23.0	73 65	131.5	76 44.5	71 66	130.0	77 05.5	69 68	128.4	1
2	73 53.4	77 61	135.2	74 16.4	76 62	134.1	74 39.0	75 64	132.8	75 01.2	73 65	131.6	75 22.9	72 66	130.2	75 44.1	70 67	128.8	76 04.8	68 69	127.2	76 24.9	66 70	125.7	2
3	73 16.8	75 64	132.7	73 39.1	74 65	131.5	74 00.9	72 66	130.3	74 22.3	71 67	129.0	74 43.3	69 68	127.7	75 03.7	67 69	126.3	75 23.6	65 71	124.8	75 42.9	63 72	123.3	3
4	72 38.7	73 66	130.3	73 00.3	71 67	129.2	73 21.4	70 68	127.9	73 42.1	68 69	126.7	74 02.4	67 70	125.3	74 22.1	65 71	124.0	74 41.3	63 72	122.5	74 59.8	61 73	121.0	4
15	71 59.3	70 68	128.1	72 20.2	69 69	127.0	72 40.7	68 70	125.8	73 00.8	66 71	124.5	73 20.3	64 72	123.2	73 39.4	63 73	121.8	73 57.8	61 74	120.4	74 15.8	59 75	118.9	15
6	71 18.5	68 69	126.1	71 39.0	67 70	124.9	71 58.9	65 71	123.7	72 18.3	64 72	122.5	72 37.2	62 73	121.2	72 55.7	61 74	119.8	73 13.5	59 75	118.5	73 30.8	57 76	117.0	6
7	70 37.1	66 71	124.1	70 56.6	65 72	123.0	71 16.1	64 73	121.8	71 34.9	62 74	120.6	71 53.3	60 75	119.3	72 11.1	59 75	118.0	72 28.4	57 76	116.6	72 45.2	55 77	115.3	7
8	69 54.5	65 72	122.3	70 13.7	63 73	121.2	70 32.4	62 74	120.0	70 50.7	60 75	118.8	71 08.5	59 76	117.6	71 25.8	57 77	116.3	71 42.6	55 77	115.0	71 58.8	53 78	113.6	8
9	69 11.1	63 74	120.6	69 29.8	62 74	119.5	69 48.0	60 75	118.3	70 05.8	59 76	117.2	70 23.1	57 77	115.9	70 39.9	55 78	114.7	70 56.2	53 78	113.4	71 12.0	52 79	112.1	9
20	68 26.9	61 75	119.0	68 45.1	60 76	117.9	69 02.9	58 76	116.8	69 20.2	57 77	115.6	69 37.0	55 78	114.4	69 53.4	54 78	113.2	70 09.3	52 79	112.0	70 24.6	50 80	110.7	20
1	67 42.1	60 76	117.4	67 59.8	58 76	116.4	68 17.2	57 77	115.3	68 34.0	56 78	114.1	68 50.5	54 78	113.0	69 06.4	52 79	111.8	69 21.8	51 80	110.6	69 36.8	49 80	109.4	1
2	66 56.6	58 77	116.0	67 14.0	57 77	114.9	67 30.9	54 78	113.9	67 47.4	54 79	112.8	68 03.4	53 79	111.7	68 18.9	51 80	110.5	68 34.0	49 81	109.3	68 48.6	48 81	108.1	2
3	66 10.6	57 77	114.6	66 27.6	56 78	113.6	66 44.1	54 79	112.6	67 00.2	53 79	111.5	67 15.9	51 80	110.4	67 31.1	50 80	109.3	67 45.8	48 81	108.1	68 00.1	47 81	106.9	3
4	65 24.1	56 78	113.3	65 40.7	55 79	112.3	65 56.9	53 79	111.3	66 12.7	52 80	110.2	66 28.0	50 80	109.2	66 42.9	49 81	108.1	66 57.3	47 81	107.0	67 11.3	46 82	105.8	4
25	64 37.2	55 79	112.1	64 53.5	54 79	111.1	65 09.3	52 80	110.1	65 24.8	51 80	109.1	65 39.8	49 81	108.0	65 54.4	48 81	107.0	66 08.5	46 82	105.9	66 22.2	45 82	104.8	25
6	63 49.9	54 80	110.9	64 05.8	53 80	110.0	64 21.4	51 80	109.0	64 36.5	50 81	108.0	64 51.3	48 81	107.0	65 05.6	47 82	105.9	65 19.4	46 82	104.9	65 32.9	44 83	103.8	6
7	63 02.1	53 80	109.8	63 17.8	52 80	108.9	63 33.1	50 81	107.9	63 48.0	49 81	106.9	64 02.5	48 82	105.9	64 16.5	46 82	104.9	64 30.2	45 82	103.9	64 43.4	43 83	102.8	7
8	62 14.1	52 81	108.7	62 29.5	51 81	107.8	62 44.5	49 81	106.9	62 59.2	48 82	105.9	63 13.4	47 82	104.9	63 27.2	45 82	104.0	63 40.7	44 83	102.9	63 53.7	43 83	101.9	8
9	61 25.8	51 81	107.7	61 40.9	50 81	106.8	61 55.7	49 82	105.9	62 10.1	47 82	104.9	62 24.1	46 82	104.0	62 37.8	45 83	103.0	62 51.0	43 83	102.1	63 03.8	42 83	101.1	9
30	60 37.2	50 81	106.7	60 52.1	49 82	105.8	61 06.7	48 82	104.9	61 20.8	47 82	104.0	61 34.7	45 83	103.1	61 48.1	44 83	102.2	62 01.1	43 83	101.2	62 13.8	41 84	100.2	30
1	59 48.3	50 82	105.8	60 03.0	48 82	104.9	60 17.4	47 82	104.0	60 31.4	46 83	103.1	60 45.0	45 83	102.2	60 58.3	44 83	101.3	61 11.2	42 84	100.4	61 23.6	41 84	99.4	1
2	58 59.3	49 82	104.9	59 13.8	48 82	104.0	59 27.9	47 83	103.2	59 41.8	45 83	102.3	59 55.2	44 83	101.4	60 08.3	43 84	100.5	60 21.0	42 84	99.6	60 33.4	41 84	98.7	2
3	58 10.0	48 82	104.0	58 24.3	47 83	103.2	58 38.3	46 83	102.3	58 52.0	45 83	101.5	59 05.3	44 84	100.6	59 18.2	43 84	99.7	59 30.8	41 84	98.8	59 43.0	40 84	97.9	3
4	57 20.5	48 83	103.2	57 34.7	47 83	102.3	57 48.5	46 83	101.5	58 02.0	44 83	100.7	58 15.2	43 84	99.8	58 28.0	42 84	98.9	58 40.5	41 84	98.1	58 52.6	40 84	97.2	4
35	56 30.7	47 83	102.3	56 44.9	46 83	101.5	56 58.6	45 84	100.7	57 12.0	44 84	99.9	57 25.0	43 84	99.1	57 37.7	42 84	98.2	57 50.1	41 84	97.4	58 02.1	39 84	96.5	35
6	55 41.1	47 83	101.5	55 55.0	46 83	100.8	56 08.5	45 84	100.0	56 21.8	44 84	99.1	56 34.7	43 84	98.3	56 47.3	41 84	97.5	56 59.6	40 84	96.7	57 11.5	39 84	95.8	6
7	54 51.2	46 83	100.8	55 04.9	45 84	100.0	55 18.4	44 84	99.2	55 31.5	43 84	98.4	55 44.3	42 84	97.6	55 56.8	41 84	96.8	56 09.0	40 84	96.0	56 20.8	39 84	95.2	7
8	54 01.1	46 84	100.0	54 14.8	45 84	99.3	54 28.1	44 84	98.5	54 41.1	43 84	97.7	54 53.8	42 84	96.9	55 06.2	41 84	96.1	55 18.4	40 85	95.3	55 30.1	39 85	94.5	8
9	53 11.0	45 84	99.3	53 24.5	45 84	98.6	53 37.7	44 84	97.8	53 50.6	43 84	97.0	54 03.3	42 84	96.3	54 15.6	41 84	95.5	54 27.7	40 84	94.7	54 39.4	39 85	93.9	9
40	52 20.7	45 84	98.6	52 34.1	44 84	97.9	52 47.3	43 84	97.1	53 00.1	42 84	96.4	53 12.7	41 84	95.6	53 25.0	40 85	94.9	53 36.9	39 85	94.1	53 48.6	38 85	93.3	40
1	51 30.4	45 84	97.9	51 43.7	44 84	97.2	51 56.7	43 84	96.5	52 09.5	42 84	95.7	52 22.0	41 85	95.0	52 34.2	40 85	94.2	52 46.2	39 85	93.5	52 57.8	38 85	92.7	1
2	50 39.9	45 84	97.3	50 53.2	44 84	96.5	51 06.1	43 84	95.8	51 18.9	42 84	95.1	51 31.3	41 85	94.4	51 43.5	40 85	93.6	51 55.4	39 85	92.9	52 07.0	38 85	92.1	2
3	49 49.4	44 84	96.6	50 02.6	43 84	95.9	50 15.5	43 84	95.2	50 28.2	42 85	94.5	50 40.5	41 85	93.8	50 52.7	40 85	93.0	51 04.5	39 85	92.3	51 16.1	38 85	91.6	3
4	48 58.8	44 84	96.0	49 11.9	43 84	95.3	49 24.8	42 84	94.6	49 37.4	42 85	93.9	49 49.8	41 85	93.2	50 01.8	40 85	92.5	50 13.7	39 85	91.7	50 25.2	38 85	91.0	4
45	48 08.2	44 84	95.3	48 21.2	43 85	94.7	48 34.1	42 85	94.0	48 46.6	41 85	93.3	48 58.9	40 85	92.6	49 11.0	40 85	91.9	49 22.8	39 85	91.2	49 34.4	38 85	90.5	45
6	47 17.5	44 85	94.7	47 30.5	43 85	94.1	47 43.3	42 85	93.4	47 55.8	41 85	92.7	48 08.1	41 85	92.0	48 20.1	40 85	91.3	48 31.9	39 85	90.6	48 43.5	38 85	90.0	6
7	46 26.8	44 85	94.1	46 39.7	43 85	93.5	46 52.5	42 85	92.8	47 05.0	41 85	92.1	47 17.2	40 85	91.5	47 29.3	40 85	90.8	47 41.1	39 85	90.1	47 52.6	38 85	89.4	7
8	45 36.0	43 85	93.5	45 48.9	43 85	92.9	46 01.6	42 85	92.2	46 14.1	41 85	91.6	46 26.4	40 85	90.9	46 38.4	40 85	90.3	46 50.2	39 85	89.6	47 01.7	38 85	88.9	8
9	44 45.2	43 85	93.0	44 58.1	43 85	92.3	45 10.8	42 85	91.7	45 23.2	41 85	91.0	45 35.5	40 85	90.4	45 47.5	40 85	89.7	45 59.3	39 85	89.1	46 10.9	38 85	88.4	9
50	43 54.4	43 85	92.4	44 07.3	43 85	91.8	44 19.9	42 85	91.1	44 32.4	41 85	90.5	44 44.6	40 85	89.8	44 56.6	40 85	89.2	45 08.4	39 85	88.6	45 20.0	38 85	87.9	50
1	43 03.5	43 85	91.8	43 16.4	43 85	91.2	43 29.0	42 85	90.6	43 41.5	41 85	90.0	43 53.7	40 85	89.3	44 05.7	40 85	88.7	44 17.6	39 85	88.0	44 29.2	38 85	87.4	1
2	42 12.7	43 85	91.3	42 25.5	42 85	90.7	42 38.2	42 85	90.1	42 50.6	41 85	89.4	43 02.8	40 85	88.8	43 14.9	40 85	88.2	43 26.7	39 85	87.5	43 38.3	38 85	86.9	2
3	41 21.8	43 85	90.7	41 34.6	42 85	90.1	41 47.3	42 85	89.5	41 59.7	41 85	88.9	42 12.0	41 85	88.3	42 24.0	40 85	87.7	42 35.9	39 85	87.1	42 47.5	38 85	86.4	3
4	40 30.9	43 85	90.2	40 43.3	42 85	89.6	40 56.4	41 85	89.0	41 08.9	41 85	88.4	41 21.1	41 85	87.8	41 33.2	40 85	87.2	41 45.1	39 85	86.6	41 56.8	38 85	86.0	4
55	39 40.0	43 85	89.7	39 52.9	42 85	89.1	40 05.5	42 85	88.5	40 18.0	41 85	87.9	40 30.3	41 85	87.3	40 42.4	40 85	86.7	40 54.3	39 85	86.1	41 06.0	38 85	85.5	55
6	38 49.2	43 85	89.1	39 02.0	43 85	88.6	39 14.7	42 85	88.0	39 27.2	41 85	87.4	39 39.5	41 85	86.8	39 51.6	40 85	86.2	40 03.6	40 84	85.6	40 15.3	39 84	85.0	6
7	37 58.3	43 85	88.6	38 11.1	43 85	88.1	38 23.8	42 85	87.5	38 36.3	41 85	86.9	38 48.7	41 85	86.3	39 00.9	40 85	85.7	39 12.8	40 84	85.1	39 24.6	39 84	84.5	7
8	37 07.4	43 85	88.1	37 20.3	43 85	87.6	37 33.0	42 85	87.0	37 45.5	42 85	86.4	37 57.9	41 85	85.8	38 10.1	40 84	85.3	38 22.2	40 84	84.7	38 34.0	39 84	84.1	8
9	36 16.6	43 85	87.6	36 29.5	43 85	87.1	36 42.2	42 85	86.5	36 54.8	42 85	85.9	37 07.2	41 85	85.4	37 19.4	41 84	84.8	37 31.5	40 84	84.2	37 43.4	39 84	83.6	9
60	35 25.7	43 85	87.1	35 38.7	43 85	86.6	35 51.4	42 84	86.0	36 04.0	41 84	85.4	36 16.5	41 84	84.9	36 28.8	41 84	84.3	36 40.9	40 84	83.7	36 52.9	40 84	83.2	60
1	34 34.9	43 85	86.6	34 47.9	43 85	86.1	35 00.7	42 84	85.5	35 13.3	41 84	85.0	35 25.8	41 84	84.4	35 38.2	41 84	83.8	35 50.4	40 84	83.3	36 02.4	40 84	82.7	1
2	33 44.2	44 85	86.1	33 57.1	43 84	85.6	34 10.0	43 84	85.0	34 22.7	42 84	84.5	34 35.2	42 84	83.9	34 47.6	41 84	83.4	34 59.8	41 84	82.8	35 11.9	40 84	82.3	2
3	32 53.4	44 85	85.6	33 06.4	43 84	85.1	33 19.1	43 84	84.6	33 32.0	42 84	84.0	33 44.6	42 84	83.5	33 57.1	41 84	82.9	34 09.4	41 84	82.4	34 21.5	40 84	81.8	3
4	32 02.7	44 84	85.1	32 15.7	43 84	84.6	32 28.7	43 84	84.1	32 41.5	42 84	83.5	32 54.1	42 84	83.0	33 06.6	41 84	82.5	33 19.0	41 84	81.9	33 31.2	41 84	81.4	4
65	31 12.0	44 84	84.7	31 25.1	43 84	84.1	31 38.1	43 84	83.6	31 50.9	43 84	83.1	32 03.6	42 84	82.5	32 16.2	42 84	82.0	32 28.6	41 84	81.5	32 40.9	41 84	80.9	65
6	30 21.4	44 84	84.2	30 34.5	44 84	83.7	30 47.5	43 84	83.1	31 00.4	43 84	82.6	31 13.2	42 84	82.1	31 25.8	42 84	81.5	31 38.3	41 84	81.0	31 50.7	41 84	80.5	6
7	29 30.8	44 84	83.7	29 44.0	44 84	83.2	29 57.0	43 84	82.7	30 10.0	43 84	82.1	30 22.8	42 84	81.6	30 35.5	42 84	81.1	30 48.1	41 84	80.6	31 00.6	41 84	80.0	7
8	28 40.2	44 84	83.2	28 53.5	44 84	82.7	29 06.6	43 84	82.2	29 19.6	43 84	81.7	29 32.5	43 84	81.2	29 45.3	42 84	80.6	29 58.0	42 83	80.1	30 10.5	42 83	79.6	8
9	27 49.7	45 84	82.8	28 03.0	44 84	82.2	28 16.2	44 84	81.7	28 29.3	43 84	81.2	28 42.3	43 84	80.7	28 55.1	43 84	80.2	29 07.9	42 83	79.7	29 20.3	42 83	79.2	9
70	26 59.3	45 84	82.3	27 12.6	44 84	81.8	27 25.9	44 84	81.3	27 39.1	44 84	80.8	27 52.1	43 84	80.3	28 05.0	43 83	79.7	28 17.8	43 83	79.2	28 30.5	42 83	78.7	70
1	26 08.9	45 84	81.8	26 22.3	45 84	81.3	26 35.6	44 84	80.8	26 48.9	44 84	80.3	27 02.0	44 84	79.8	27 15.0	43 83	79.3	27 27.9	43 83	78.8	27 40.7	42 83	78.3	1
2	25 18.5	45 84	81.3	25 32.0	45 84	80.8	25 45.4	45 84	80.3	25 58.7	44 84	79.8	26 11.9	44 83	79.3	26 25.0	43 83	78.8	26 38.0	43 83	78.3	26 50.9	43 83	77.8	2
3	24 28.3	45 84	80.9	24 41.8	45 84	80.4	24 55.3	45 83	79.9	25 08.7	44 83	79.4	25 22.0	44 83	78.9	25 35.2	44 83	78.4	25 48.2	43 83	77.9	26 01.2	43 83	77.4	3
4	23 38.1	46 84	80.4	23 51.7	45 83	79.9	24 05.3	45 83	79.4	24 18.7	45 83	78.9	24 32.1	44 83	78.4	24 45.3	44 83	78.0	24 58.5	44 83	77.5	25 11.6	43 83	77.0	4
75	22 47.9	46 83	79.9	23 01.6	46 83	79.4	23 15.3	45 83	79.0	23 28.8	45 83	78.5	23 42.3	45 83	78.0	23 55.6	44 83	77.5	24 08.9	44 82	77.0	24 22.1	44 82	76.5	75
6	21 57.9	46 83	79.5	22 11.7	46 83	79.0	22 25.4	45 83	78.5	22 39.0	45 83	78.0	22 52.5	45 83	77.5	23 06.0	45 83	77.1	23 19.4	44 82	76.6	23 32.6	44 82	76.1	6
7	21 07.9	46 83	79.0	21 21.8	46 83	78.5	21 35.6	46 83	78.0	21 49.3	45 83	77.6	22 02.9	45 83	77.1	22 16.5	45 82	76.6	22 29.9	45 82	76.1	22 43.3	44 82	75.6	7
8	20 18.0	47 83	78.5	20 31.9	46 83	78.1	20 45.8	46 83	77.6	20 59.6	46 83	77.1	21 13.4	46 82	76.6	21 27.0	45 82	76.2	21 40.6	45 82	75.7	21 54.0	45 82	75.2	8
9	19 28.2	47 83	78.1	19 42.2	47 83	77.6	19 56.2	46 83	77.1	20 10.1	46 82	76.7	20 23.9	46 82	76.2	20 37.6	46 82	75.7	20 51.3	45 82	75.2	21 04.9	45 82	74.7	9
80	18 38.4	47 83	77.6	18 52.5	47 83	77.1	19 06.6	47 83	76.7	19 20.6	47 82	76.2	19 34.5	46 82	75.7	19 48.4	46 82	75.3	20 02.2	46 82	74.8	20 15.9	46 82	74.3	80
1	17 48.8	48 83	77.1	18 03.0	47 82	76.7	18 17.2	47 82	76.2	18 31.2	47 82	75.7	18 45.3	47 82	75.3	18 59.2	46 82	74.8	19 13.1	46 82	74.3	19 26.9	46 81	73.9	1
2	16 59.2	48 83	76.7	17 13.5	48 82	76.2	17 27.8	47 82	75.7	17 42.0	47 82	75.3	17 56.1	47 82	74.8	18 10.1	47 82	74.3	18 24.2	47 81	73.9	18 38.1	46 81	73.4	2
3	16 09.7	48 82	76.2	16 24.2	48 82	75.7	16 38.5	48 82	75.3	16 52.8	48 82	74.8	17 07.1	47 82	74.4	17 21.2	47 81	73.9	17 35.4	47 81	73.4	17 49.4	47 81	73.0	3
4	15 20.4	48 82	75.7	15 34.9	48 82	75.3	15 49.4	48 82	74.8	16 03.8	48 82	74.3	16 18.1	48 81	73.9	16 32.4	48 81	73.4	16 46.6	47 81	73.0	17 00.8	47 81	72.5	4
85	14 31.1	49 82	75.2	14 45.8	49 82	74.8	15 00.3	48 82	74.3	15 14.8	48 81	73.9	15 29.3	48 81	73.4	15 43.7	48 81	73.0	15 58.1	48 81	72.5	16 12.3	48 81	72.1	85
6	13 42.0	49 82	74.8	13 56.7	49 82	74.3	14 11.4	49 81	73.9	14 26.0	49 81	73.4	14 40.6	49 81	73.0	14 55.1	48 81	72.5	15 09.6	48 81	72.1	15 24.0	48 80	71.6	6
7	12 52.9	49 82	74.3	13 07.8	49 81	73.8	13 22.6	49 81	73.4	13 37.3	49 81	72.9	13 52.0	49 81	72.5	14 06.6	49 81	72.0	14 21.2	49 80	71.6	14 35.8	48 80	71.1	7
8	12 04.0	50 81	73.8	12 19.0	50 81	73.4	12 33.9	50 81	72.9	12 48.7	49 80	72.5	13 03.5	49 80	72.0	13 18.3	49 80	71.6	13 33.0	49 80	71.1	13 47.7	49 80	70.7	8
9	11 15.2	50 81	73.3	11 30.3	50 81	72.9	11 45.3	50 81	72.4	12 00.3	50 81	72.0	12 15.2	50 80	71.6	12 30.1	50 80	71.1	12 44.9	49 80	70.7	12 59.7	49 80	70.2	9
90	10 26.5	51 81	72.8	10 41.7	51 81	72.4	10 56.8	50 80	72.0	11 11.9	50 80	71.5	11 27.0	50 80	71.1	11 42.0	50 80	70.6	11 57.0	50 80	70.2	12 11.9	50 80	69.8	90

Lat. 32°

H.A.	20° 00' (Alt. Δd Δt Az.)	20° 30'	21° 00'	21° 30'	22° 00'	22° 30'	23° 00'	23° 30'	H.A.
00	38 00.0 1.0 01 180.0	37 30.0 1.0 01 180.0	37 00.0 1.0 01 180.0	36 30.0 1.0 01 180.0	36 00.0 1.0 01 180.0	35 30.0 1.0 01 180.0	35 00.0 1.0 01 180.0	34 30.0 1.0 01 180.0	00
1	37 59.5 1.0 03 178.8	37 29.5 1.0 03 178.8	36 59.5 1.0 03 178.8	36 29.5 1.0 03 178.8	35 59.5 1.0 02 178.9	35 29.5 1.0 03 178.9	34 59.5 1.0 02 178.9	34 29.5 1.0 02 178.9	1
2	37 57.9 1.0 04 177.6	37 27.9 1.0 04 177.6	36 57.9 1.0 04 177.7	36 27.9 1.0 04 177.7	35 58.0 1.0 04 177.7	35 28.0 1.0 04 177.7	34 58.0 1.0 04 177.8	34 28.0 1.0 04 177.8	2
3	37 55.2 1.0 06 176.4	37 25.3 1.0 06 176.5	36 55.3 1.0 06 176.5	36 25.4 1.0 06 176.5	35 55.9 1.0 06 176.5	35 25.5 1.0 06 176.6	34 55.1 1.0 06 176.6	34 25.1 1.0 06 176.7	3
4	37 51.5 1.0 08 175.2	37 21.6 1.0 08 175.3	36 51.7 1.0 08 175.3	36 21.8 1.0 08 175.4	35 51.9 1.0 08 175.4	35 21.9 1.0 08 175.5	34 52.0 1.0 08 175.5	34 22.1 1.0 07 175.6	4
05	37 46.8 1.0 10 174.1	37 16.9 1.0 10 174.1	36 47.1 1.0 10 174.2	36 17.2 1.0 09 174.2	35 47.3 1.0 09 174.3	35 17.4 1.0 09 174.3	34 47.5 1.0 09 174.4	34 17.7 1.0 09 174.4	05
6	37 41.0 99 11 172.9	37 11.2 99 11 172.9	36 41.4 99 11 173.0	36 11.6 99 11 173.1	35 41.7 99 11 173.1	35 11.9 99 11 173.2	34 42.1 99 11 173.3	34 12.3 99 11 173.3	6
7	37 34.2 99 13 171.7	37 04.4 99 13 171.8	36 34.7 99 13 171.9	36 04.9 99 13 171.9	35 35.2 99 13 172.0	35 05.4 99 12 172.1	34 35.6 99 12 172.2	34 05.9 99 12 172.2	7
8	37 26.3 99 15 170.5	36 56.6 99 15 170.6	36 27.0 99 15 170.7	35 57.3 99 14 170.8	35 27.6 99 14 170.9	34 57.9 99 14 171.0	34 28.2 99 14 171.1	33 58.5 99 14 171.1	8
9	37 17.4 99 16 169.4	36 47.8 99 16 169.5	36 18.2 99 16 169.6	35 48.6 99 16 169.7	35 19.0 99 16 169.8	34 49.4 99 16 169.9	34 19.8 99 16 170.0	33 50.2 99 15 170.1	9
10	37 07.5 98 18 168.2	36 38.0 98 18 168.3	36 08.5 98 18 168.4	35 39.0 98 18 168.5	35 09.5 98 18 168.6	34 40.0 98 17 168.8	34 10.5 98 17 168.9	33 41.0 98 17 169.0	10
1	36 56.6 98 20 167.0	36 27.2 98 20 167.2	35 57.8 98 20 167.3	35 28.4 98 19 167.4	34 59.0 98 19 167.5	34 29.6 98 19 167.6	34 00.2 98 19 167.8	33 30.7 98 19 167.9	1
2	36 44.7 98 22 165.9	36 15.4 98 21 166.0	35 46.1 98 21 166.2	35 16.8 98 21 166.3	34 47.5 98 20 166.4	34 18.2 98 20 166.6	33 48.9 98 20 166.7	33 19.6 98 20 166.8	2
3	36 31.8 97 23 164.7	36 02.6 97 23 164.9	35 33.5 97 23 165.0	35 04.3 97 22 165.2	34 35.1 97 22 165.3	34 05.9 97 22 165.5	33 36.7 97 22 165.6	33 07.5 97 22 165.7	3
4	36 17.9 97 25 163.6	35 48.9 97 24 163.8	35 19.9 97 24 163.9	34 50.8 97 24 164.1	34 21.8 97 24 164.2	33 52.7 97 24 164.4	33 23.6 97 23 164.5	32 54.5 97 23 164.7	4
15	36 03.1 96 26 162.5	35 34.2 96 26 162.7	35 05.3 96 26 162.8	34 36.4 96 26 163.0	34 07.5 96 25 163.1	33 38.5 96 25 163.3	33 09.6 97 25 163.5	32 40.6 97 25 163.6	15
6	35 47.3 96 28 161.4	35 18.6 96 28 161.6	34 49.8 96 27 161.7	34 21.0 96 27 161.9	33 52.3 96 27 162.2	33 23.5 96 27 162.2	32 54.7 96 26 162.4	32 25.8 96 26 162.6	6
7	35 30.6 95 29 160.3	35 02.0 95 29 160.5	34 33.4 95 29 160.6	34 04.8 95 29 160.8	33 36.2 95 28 161.0	33 07.5 95 28 161.2	32 38.8 96 28 161.4	32 10.2 96 28 161.5	7
8	35 13.0 95 31 159.2	34 44.5 95 31 159.4	34 16.1 95 30 159.6	33 47.6 95 30 159.8	33 19.1 95 30 159.9	32 50.7 95 30 160.1	32 22.1 95 29 160.3	31 53.6 95 29 160.5	8
9	34 54.4 94 32 158.1	34 26.2 94 32 158.3	33 57.9 94 32 158.5	33 29.6 94 32 158.7	33 01.3 94 31 158.9	32 32.9 94 31 159.1	32 04.6 95 31 159.3	31 36.2 95 30 159.5	9
20	34 35.0 94 34 157.0	34 06.9 94 34 157.2	33 38.8 94 33 157.4	33 10.7 94 33 157.7	32 42.5 94 33 157.9	32 14.3 94 32 158.1	31 46.2 94 32 158.3	31 17.9 94 32 158.5	20
1	34 14.7 93 35 156.0	33 46.8 93 35 156.2	33 18.8 93 34 156.4	32 50.9 93 34 156.6	32 22.9 93 34 156.8	31 54.9 93 34 157.0	31 26.9 93 34 157.3	30 58.8 93 33 157.5	1
2	33 53.5 92 37 154.9	33 25.8 92 36 155.1	32 58.1 93 36 155.4	32 30.3 93 36 155.5	32 02.5 93 36 155.8	31 34.7 93 35 156.0	31 06.8 93 35 156.2	30 38.9 93 35 156.5	2
3	33 31.5 92 38 153.9	33 04.0 92 38 154.1	32 36.4 92 37 154.4	32 08.8 92 37 154.6	31 41.2 92 37 154.8	31 13.6 92 36 155.0	30 45.9 92 36 155.3	30 18.2 92 36 155.5	3
4	33 08.7 91 39 152.8	32 41.4 91 39 153.1	32 14.0 91 39 153.3	31 46.6 91 38 153.6	31 19.2 91 38 153.8	30 51.7 92 38 154.0	30 24.2 92 38 154.3	29 56.7 92 37 154.5	4
25	32 45.1 90 41 151.8	32 17.9 90 41 152.1	31 50.8 91 40 152.3	31 23.5 91 40 152.6	30 56.3 91 39 152.8	30 29.0 91 39 153.1	30 01.7 91 39 153.3	29 34.4 91 39 153.5	25
6	32 20.7 90 42 151.1	31 53.7 90 42 151.1	31 26.7 90 41 151.3	30 59.7 90 41 151.6	30 32.7 90 41 151.8	30 05.6 90 40 152.1	29 38.5 90 40 152.3	29 11.4 90 40 152.6	6
7	31 55.5 89 43 149.8	31 28.7 89 43 150.1	31 01.9 89 42 150.4	30 35.1 89 42 150.6	30 08.3 89 42 150.9	29 41.4 89 42 151.1	29 14.5 89 41 151.4	28 47.6 89 41 151.6	7
8	31 29.5 88 44 148.8	31 03.0 89 44 149.1	30 36.4 89 44 149.4	30 09.8 89 43 149.7	29 43.1 89 43 149.9	29 16.5 89 43 150.2	28 49.8 89 42 150.4	28 23.0 89 42 150.7	8
9	31 02.8 88 46 147.9	30 36.5 88 45 148.2	30 10.1 88 45 148.4	29 43.7 88 45 148.7	29 17.3 88 44 149.0	28 50.8 88 44 149.2	28 24.3 88 44 149.5	27 57.8 89 43 149.8	9
30	30 35.4 87 47 146.9	30 09.3 87 47 147.2	29 43.1 87 46 147.5	29 16.9 87 46 147.8	28 50.7 88 46 148.0	28 24.4 88 45 148.3	27 58.1 88 45 148.6	27 31.8 88 44 148.9	30
1	30 07.3 86 48 146.0	29 41.4 86 48 146.3	29 15.4 87 47 146.6	28 49.4 87 47 146.8	28 23.4 87 47 147.1	27 57.4 87 46 147.4	27 31.3 87 46 147.7	27 05.1 87 46 148.0	1
2	29 38.5 86 49 145.0	29 12.8 86 49 145.3	28 47.0 86 48 145.6	28 21.3 86 48 145.9	27 55.5 86 48 146.2	27 29.6 86 47 146.5	27 03.7 86 47 146.8	26 37.8 86 47 147.1	2
3	29 09.0 85 50 144.1	28 43.5 85 50 144.4	28 18.0 85 50 144.7	27 52.4 85 49 145.0	27 26.8 85 49 145.3	27 01.2 86 48 145.6	26 35.5 86 48 145.9	26 09.8 86 48 146.2	3
4	28 38.9 85 51 143.2	28 13.6 84 51 143.5	27 48.3 84 51 143.8	27 22.9 85 50 144.1	26 57.6 85 50 144.4	26 32.1 85 49 144.7	26 06.7 85 49 145.0	25 41.2 85 49 145.3	4
35	28 08.1 83 52 142.3	27 43.0 84 52 142.6	27 17.9 84 52 142.9	26 52.8 84 51 143.3	26 27.6 84 51 143.6	26 02.4 84 51 143.9	25 37.2 84 50 144.2	25 11.9 84 50 144.5	35
6	27 36.7 83 53 141.4	27 11.8 83 53 141.8	26 47.0 83 53 142.1	26 22.1 83 52 142.4	25 57.1 83 52 142.7	25 32.1 83 52 143.0	25 07.1 83 51 143.3	24 42.0 84 51 143.6	6
7	27 04.6 82 54 140.6	26 40.0 82 54 140.9	26 15.4 82 54 141.2	25 50.7 82 53 141.5	25 26.0 83 53 141.8	25 01.2 83 53 142.2	24 36.4 83 52 142.5	24 11.5 83 52 142.8	7
8	26 32.0 81 55 139.7	26 07.6 81 55 140.0	25 43.2 81 54 140.4	25 18.7 82 54 140.7	24 54.2 82 54 141.0	24 29.7 82 53 141.3	24 05.1 82 53 141.6	23 40.5 82 53 141.9	8
9	25 58.8 80 56 138.9	25 34.7 81 56 139.2	25 10.5 81 56 139.5	24 46.2 81 55 139.8	24 21.9 81 55 140.2	23 57.6 81 54 140.5	23 33.2 81 54 140.8	23 08.8 81 54 141.1	9
40	25 25.1 80 57 138.0	25 01.1 80 57 138.4	24 37.2 80 56 138.7	24 13.1 80 56 139.0	23 49.1 80 56 139.3	23 24.9 80 55 139.7	23 00.8 81 55 140.0	22 36.6 81 55 140.3	40
1	24 50.8 79 58 137.2	24 27.1 79 58 137.5	24 03.3 79 57 137.9	23 39.5 79 57 138.2	23 15.6 80 57 138.5	22 51.7 80 56 138.9	22 27.8 80 56 139.2	22 03.8 80 56 139.5	1
2	24 16.0 78 59 136.4	23 52.5 78 59 136.7	23 28.9 79 58 137.1	23 05.3 79 58 137.4	22 41.7 79 58 137.7	22 18.0 79 57 138.1	21 54.3 79 57 138.4	21 30.5 79 56 138.7	2
3	23 40.6 78 60 135.6	23 17.3 78 59 135.9	22 54.0 78 59 136.3	22 30.6 78 59 136.6	22 07.2 78 58 137.0	21 43.8 78 58 137.3	21 20.3 78 58 137.6	20 56.7 79 58 137.9	3
4	23 04.7 77 61 134.8	22 41.7 77 60 135.1	22 18.6 77 60 135.5	21 55.4 77 60 135.8	21 32.2 77 59 136.2	21 09.0 78 59 136.5	20 45.7 78 58 136.9	20 22.4 78 58 137.2	4
45	22 28.4 76 61 134.0	22 05.6 76 61 134.4	21 42.7 76 61 134.7	21 19.7 77 60 135.1	20 56.7 77 60 135.4	20 33.7 77 60 135.8	20 10.7 77 59 136.1	19 47.6 77 59 136.4	45
6	21 51.6 75 62 133.3	21 28.9 76 62 133.6	21 06.3 76 62 134.0	20 43.5 76 61 134.3	20 20.8 76 61 134.7	19 58.0 76 60 135.0	19 35.1 76 60 135.3	19 12.3 76 60 135.7	6
7	21 14.3 75 63 132.5	20 51.9 75 63 132.9	20 29.4 75 62 133.2	20 06.9 75 62 133.6	19 44.4 75 62 133.9	19 21.8 75 61 134.3	18 59.1 75 61 134.6	18 36.5 76 60 135.0	7
8	20 36.5 74 64 131.7	20 14.3 74 63 132.1	19 52.1 74 63 132.5	19 29.8 74 63 132.8	19 07.5 75 62 133.2	18 45.1 75 62 133.5	18 22.7 75 62 133.9	18 00.2 75 61 134.2	8
9	19 58.4 73 64 131.0	19 36.4 73 64 131.4	19 14.3 74 64 131.7	18 52.3 74 63 132.1	18 30.1 74 63 132.4	18 08.0 74 63 132.8	17 45.8 74 62 133.2	17 23.6 74 62 133.5	9
50	19 19.8 73 65 130.3	18 58.0 73 65 130.6	18 36.2 73 64 131.0	18 14.3 73 64 131.4	17 52.4 73 64 131.7	17 30.4 73 63 132.1	17 08.5 73 63 132.4	16 46.4 73 63 132.8	50
1	18 40.7 72 66 129.6	18 19.2 72 65 129.9	17 57.6 72 65 130.3	17 35.9 72 65 130.7	17 14.2 72 64 131.0	16 52.5 72 64 131.4	16 30.7 73 64 131.7	16 08.9 73 63 132.1	1
2	18 01.3 71 66 128.9	17 39.9 71 66 129.2	17 18.5 71 66 129.6	16 57.1 72 65 130.0	16 35.6 72 65 130.3	16 14.1 72 65 130.7	15 52.5 72 64 131.1	15 30.9 72 64 131.4	2
3	17 21.5 70 67 128.2	17 00.3 71 67 128.5	16 39.1 71 66 128.9	16 17.9 71 66 129.3	15 56.6 71 66 129.6	15 35.3 71 65 130.0	15 14.0 71 65 130.4	14 52.6 71 65 130.7	3
4	16 41.3 70 68 127.5	16 20.3 70 67 127.8	15 59.4 70 67 128.2	15 38.3 70 67 128.6	15 17.2 70 66 129.0	14 56.1 70 66 129.3	14 35.0 71 66 129.7	14 13.8 71 65 130.1	4
55	16 00.7 69 68 126.8	15 40.0 69 68 127.2	15 19.2 69 68 127.5	14 58.4 69 67 127.9	14 37.5 70 67 128.3	14 16.6 70 67 128.7	13 55.7 70 66 129.0	13 34.7 70 66 129.4	55
6	15 19.8 68 69 126.1	14 59.3 69 68 126.5	14 38.7 69 68 126.9	14 18.0 69 68 127.2	13 57.4 69 68 127.6	13 36.7 69 67 128.0	13 15.9 69 67 128.4	12 55.2 69 66 128.7	6
7	14 38.5 68 69 125.5	14 18.2 68 69 125.9	13 57.8 69 68 126.2	13 37.4 69 68 126.6	13 16.9 69 68 127.0	12 56.4 69 68 127.3	12 35.9 69 67 127.7	12 15.2 69 67 128.1	7
8	13 56.9 67 70 124.8	13 36.8 67 70 125.2	13 16.6 67 69 125.6	12 56.3 67 69 125.9	12 36.1 68 69 126.3	12 15.8 68 68 126.7	11 55.4 68 68 127.1	11 35.1 68 68 127.5	8
9	13 15.0 67 70 124.2	12 55.0 67 70 124.5	12 35.0 67 70 124.9	12 15.0 67 69 125.3	11 54.9 67 69 125.7	11 34.8 67 69 126.1	11 14.7 68 68 126.4	10 54.5 68 68 126.8	9
60	12 32.7 66 71 123.5	12 12.9 66 71 123.9	11 53.1 66 70 124.3	11 33.3 66 70 124.7	11 13.4 66 70 125.1	10 53.5 66 69 125.4	10 33.6 66 69 125.8	10 13.6 67 69 126.2	60
1	11 50.1 65 71 122.9	11 30.5 65 71 123.3	11 10.9 65 71 123.7	10 51.3 66 70 124.0	10 31.6 66 70 124.4	10 11.9 66 70 124.8	9 52.2 66 70 125.2	9 32.4 66 69 125.6	1
2	11 07.3 65 72 122.3	10 47.9 65 72 122.7	10 28.4 65 71 123.0	10 09.0 65 71 123.4	9 49.5 65 71 123.8	9 30.0 65 70 124.2	9 10.4 65 70 124.6	8 50.9 65 70 125.0	2
3	10 24.1 64 72 121.7	10 04.9 64 72 122.0	9 45.6 64 72 122.4	9 26.3 64 72 122.8	9 07.1 64 71 123.2	8 47.7 64 71 123.6	8 28.4 65 70 124.0	8 09.0 65 70 124.4	3
4	9 40.6 63 73 121.0	9 21.6 64 73 121.4	9 02.5 64 72 121.8	8 43.4 64 72 122.2	8 24.3 64 72 122.6	8 05.2 64 71 123.0	7 46.0 64 71 123.4	7 26.9 64 71 123.8	4
65	8 56.9 63 73 120.4	8 38.0 63 73 120.8	8 19.2 63 73 121.2	8 00.3 63 72 121.6	7 41.3 63 72 122.0	7 22.4 63 72 122.4	7 03.4 63 72 122.8	6 44.4 63 71 123.2	65
6	8 12.9 62 74 119.8	7 54.2 62 73 120.2	7 35.5 62 73 120.6	7 16.8 62 73 121.0	6 58.0 63 73 121.4	6 39.3 63 72 121.8	6 20.5 63 72 122.2	6 01.7 63 72 122.6	6
7	7 28.6 62 74 119.3	7 10.1 62 74 119.7	6 51.6 62 74 120.1	6 33.1 62 73 120.4	6 14.5 62 73 120.8	5 55.9 62 73 121.2	5 37.3 62 72 121.6	5 18.7 62 72 122.0	7
8	6 44.1 61 75 118.7	6 25.8 61 74 119.1	6 07.4 61 74 119.5	5 49.1 61 74 119.9	5 30.7 61 74 120.3	5 12.3 61 73 120.7			8
9	5 59.4 61 75 118.1	5 41.2 61 75 118.5	5 23.0 61 75 118.9	5 04.8 61 74 119.3					9
70	5 14.4 60 75 117.5								70

Right-margin latitude labels: **Lat. 32°**, **Lat. 33°**, **Lat. 34°**, **Lat. 35°**, **Lat. 36°**, **Lat. 37°**

DECLINATION SAME NAME AS LATITUDE

Lat. 38°

H.A.	20° 00' (Alt. Δd Δt Az.)	20° 30'	21° 00'	21° 30'	22° 00'	22° 30'	23° 00'	23° 30'	H.A.
91	9 38.0 51 81 72.4	9 53.3 51 80 71.9	10 08.5 51 80 71.5	10 23.7 51 80 71.0	10 38.9 51 80 70.6	10 54.1 50 80 70.2	11 09.2 50 80 69.7	11 24.3 50 79 69.3	91
2	8 49.6 51 80 71.9	9 05.0 51 80 71.4	9 20.3 51 80 71.0	9 35.7 51 80 70.6	9 51.0 51 80 70.1	10 06.3 51 79 69.7	10 21.5 51 79 69.3	10 36.7 51 79 68.8	2
3	8 01.3 52 80 71.4	8 16.8 52 80 71.0	8 32.3 52 80 70.5	8 47.8 52 80 70.1	9 03.2 51 79 69.7	9 18.6 51 79 69.2	9 34.0 51 79 68.8	9 49.4 51 79 68.3	3
4	7 13.1 52 80 70.9	7 28.8 52 80 70.5	7 44.4 52 80 70.0	8 00.0 52 79 69.6	8 15.6 52 79 69.2	8 31.1 52 79 68.7	8 46.7 52 79 68.3	9 02.2 52 78 67.9	4
95	6 25.1 53 80 70.4	6 40.9 53 80 70.0	6 56.7 53 79 69.5	7 12.4 52 79 69.1	7 28.1 52 79 68.7	7 43.8 52 79 68.2	7 59.5 52 78 67.8	8 15.1 52 78 67.4	95
6	5 37.2 53 80 69.9	5 53.2 53 79 69.5	6 09.1 53 79 69.0	6 24.9 53 79 68.6	6 40.8 53 79 68.2	6 56.6 53 78 67.8	7 12.4 53 78 67.3	7 28.2 53 78 66.9	6
7		5 05.6 53 79 69.0	5 21.6 53 79 68.5	5 37.6 53 79 68.1	5 53.6 53 78 67.7	6 09.6 53 78 67.3	6 25.6 53 78 66.8	6 41.5 53 78 66.4	7
8					5 06.6 54 78 67.2	5 22.8 54 78 66.8	5 38.9 54 78 66.3	5 55.0 54 77 65.9	8
9								5 08.6 54 77 65.4	9

Lat. 38°

Lat. 32°

H.A.	24°00' Alt	Δd Δt	Az	24°30' Alt	Δd Δt	Az	25°00' Alt	Δd Δt	Az	25°30' Alt	Δd Δt	Az	26°00' Alt	Δd Δt	Az	26°30' Alt	Δd Δt	Az	27°00' Alt	Δd Δt	Az	27°30' Alt	Δd Δt	Az	H.A.
00	82 00.0	1.0 05	180.0	82 30.0	1.0 05	180.0	83 00.0	1.0 06	180.0	83 30.0	1.0 06	180.0	84 00.0	1.0 06	180.0	84 30.0	1.0 07	180.0	85 00.0	1.0 08	180.0	85 30.0	1.0 08	180.0	00
1	81 57.1	99 14	173.5	82 26.9	99 15	173.1	82 56.7	99 16	172.6	83 26.5	99 17	172.1	83 56.2	99 19	171.5	84 25.9	99 20	170.7	84 55.5	99 22	169.9	85 25.0	98 24	168.8	1
2	81 48.5	98 23	167.1	82 17.8	98 25	166.3	82 47.0	97 26	165.4	83 16.1	97 28	164.4	83 45.0	96 30	163.3	84 13.8	96 32	161.9	84 42.4	95 35	160.3	85 10.6	94 38	158.4	2
3	81 34.4	95 32	161.0	82 03.0	95 33	159.9	82 31.3	94 35	158.6	82 59.3	93 37	157.2	83 27.1	92 40	155.6	83 54.6	91 42	153.8	84 21.6	89 45	151.7	84 48.1	87 48	149.2	3
4	81 15.4	92 39	155.2	81 42.9	91 41	153.9	82 10.1	90 43	152.4	82 37.0	89 45	150.7	83 03.4	87 48	148.8	83 29.3	85 51	146.6	83 54.5	83 54	144.1	84 19.0	80 57	141.3	4
05	80 52.0	88 46	149.9	81 18.3	87 48	148.4	81 44.3	86 50	146.7	82 09.8	84 52	144.8	82 34.7	82 55	142.7	82 58.9	80 57	140.3	83 22.4	77 60	137.7	83 45.0	73 63	134.8	05
6	80 24.6	85 51	145.0	80 49.7	83 53	143.4	81 14.4	81 55	141.5	81 38.5	79 58	139.5	82 01.9	77 60	137.3	82 24.6	74 62	134.9	82 46.4	71 65	132.2	83 07.1	67 68	129.3	6
7	79 53.8	81 56	140.6	80 17.8	79 58	138.9	80 41.2	77 60	137.0	81 03.9	75 62	134.9	81 25.9	72 64	132.7	81 47.1	69 67	130.2	82 07.3	66 69	127.6	82 26.5	62 71	124.7	7
8	79 20.1	77 60	136.6	79 43.0	75 62	134.8	80 05.1	73 64	132.9	80 26.5	70 66	130.8	80 47.3	68 68	128.6	81 07.1	64 70	126.2	81 26.0	61 72	123.7	81 43.7	57 74	120.9	8
9	78 44.0	73 64	133.0	79 05.7	71 65	131.2	79 26.8	69 67	129.3	79 47.1	66 69	127.2	80 06.6	64 71	125.1	80 25.2	60 73	122.7	80 42.8	57 74	120.3	80 59.3	53 76	117.6	9
10	78 05.8	70 67	129.7	78 26.5	68 68	127.9	78 46.5	65 70	126.1	79 05.7	63 71	124.1	79 24.1	60 73	121.9	79 41.6	57 75	119.7	79 58.2	53 76	117.3	80 13.6	50 78	114.8	10
1	77 25.8	67 69	126.8	77 45.6	65 71	125.0	78 04.6	62 72	123.2	78 22.9	60 74	121.2	78 40.3	57 75	119.2	78 56.9	54 76	117.0	79 12.4	50 78	114.8	79 27.0	47 79	112.4	1
2	76 44.4	64 71	124.1	77 03.2	62 73	122.4	77 21.4	59 74	120.6	77 38.8	57 75	118.7	77 55.4	54 76	116.7	78 11.1	51 78	114.7	78 25.8	48 79	112.5	78 39.6	44 80	110.3	2
3	76 01.7	61 73	121.7	76 19.7	59 74	120.0	76 37.1	57 76	118.3	76 53.7	54 77	116.4	77 09.5	51 78	114.5	77 24.4	48 79	112.6	77 38.5	45 80	110.5	77 51.6	42 81	108.4	3
4	75 17.8	59 75	119.5	75 35.2	57 76	117.8	75 51.8	54 77	116.1	76 07.7	52 78	114.4	76 22.8	49 79	112.6	76 37.1	46 80	110.7	76 50.6	43 81	108.7	77 03.1	40 82	106.7	4
15	74 33.1	57 76	117.4	74 49.8	54 77	115.8	75 05.7	52 78	114.2	75 21.0	50 79	112.5	75 35.5	47 80	110.8	75 49.3	44 81	109.0	76 02.2	42 81	107.1	76 14.2	39 82	105.2	15
6	73 47.5	55 77	115.6	74 03.6	52 78	114.0	74 19.0	50 79	112.5	74 33.7	48 80	110.8	74 47.7	45 80	109.2	75 00.9	43 81	107.4	75 13.3	40 82	105.7	75 24.9	37 83	103.8	6
7	73 01.3	53 78	113.8	73 16.8	51 79	112.4	73 31.7	49 80	110.8	73 45.9	46 80	109.3	73 59.4	44 81	107.7	74 12.2	41 82	106.0	74 24.2	39 82	104.3	74 35.4	36 83	102.6	7
8	72 14.5	51 79	112.2	72 29.5	49 80	110.8	72 43.9	47 80	109.4	72 57.7	45 81	107.8	73 10.8	42 82	106.3	73 23.1	40 82	104.7	73 34.8	37 83	103.1	73 45.6	35 83	101.4	8
9	71 27.1	50 80	110.8	71 41.7	48 80	109.4	71 55.7	46 81	108.0	72 09.1	43 82	106.5	72 21.8	41 82	105.0	72 33.8	39 83	103.5	72 45.1	36 83	102.0	72 55.7	34 84	100.4	9
20	70 39.4	48 80	109.4	70 53.6	46 81	108.1	71 07.2	44 82	106.7	71 20.2	42 82	105.3	71 32.5	40 82	103.9	71 44.2	38 83	102.4	71 55.2	36 83	100.9	72 05.5	33 84	99.4	20
1	69 51.2	47 81	108.1	70 05.0	45 81	106.8	70 18.3	43 82	105.5	70 30.9	41 82	104.1	70 43.0	39 83	102.8	70 54.4	37 83	101.3	71 05.2	35 84	99.9	71 15.3	33 84	98.5	1
2	69 02.6	46 81	106.9	69 16.1	44 82	105.6	69 29.1	42 82	104.4	69 41.5	40 83	103.1	69 53.3	38 83	101.7	70 04.4	36 84	100.4	70 15.0	34 84	99.0	70 24.9	32 84	97.6	2
3	68 13.8	45 82	105.8	68 27.0	43 82	104.5	68 39.7	41 83	103.3	68 51.8	39 83	102.0	69 03.3	38 83	100.7	69 14.3	36 84	99.4	69 24.7	33 84	98.1	69 34.4	31 84	96.8	3
4	67 24.7	44 82	104.7	67 37.6	42 83	103.5	67 50.1	41 83	102.3	68 02.0	39 83	101.1	68 13.3	37 84	99.8	68 24.0	35 84	98.6	68 34.2	33 84	97.3	68 43.8	31 84	96.0	4
25	66 35.4	43 82	103.7	66 48.1	41 83	102.5	67 00.3	40 83	101.3	67 11.9	38 84	100.2	67 23.1	36 84	99.0	67 33.7	34 84	97.7	67 43.7	33 84	96.5	67 53.2	31 84	95.2	25
6	65 45.8	42 83	102.7	65 58.3	41 83	101.6	66 10.3	39 84	100.4	66 21.8	37 84	99.3	66 32.8	36 84	98.1	66 43.2	34 84	97.0	66 53.1	32 84	95.8	67 02.5	30 85	94.5	6
7	64 56.1	42 83	101.8	65 08.4	40 83	100.7	65 20.2	39 84	99.6	65 31.5	37 84	98.5	65 42.3	35 84	97.3	65 52.7	34 84	96.2	66 02.5	32 84	95.0	66 11.7	30 85	93.9	7
8	64 06.2	41 83	100.9	64 18.3	40 84	99.8	64 30.0	38 84	98.8	64 41.1	36 84	97.7	64 51.8	35 84	96.6	65 01.8	33 84	95.5	65 11.8	32 85	94.4	65 21.0	30 85	93.2	8
9	63 16.2	41 84	100.0	63 28.1	39 84	99.0	63 39.6	38 84	98.0	63 50.7	36 84	96.9	64 01.3	35 84	95.9	64 11.4	33 85	94.8	64 21.0	31 85	93.7	64 30.1	30 85	92.6	9
30	62 26.0	40 84	99.2	62 37.8	39 84	98.2	62 49.2	37 84	97.2	63 00.1	36 84	96.2	63 10.6	34 84	95.2	63 20.6	33 85	94.1	63 30.2	31 85	93.1	63 39.3	30 85	92.0	30
1	61 35.7	40 84	98.5	61 47.4	38 84	97.5	61 58.7	37 84	96.5	62 09.5	35 84	95.5	62 19.9	34 84	94.5	62 29.9	32 85	93.5	62 39.4	31 85	92.5	62 48.4	29 85	91.4	1
2	60 45.4	39 84	97.7	60 56.9	38 84	96.8	61 08.1	37 84	95.8	61 18.8	35 85	94.8	61 29.2	34 85	93.9	61 39.1	32 85	92.9	61 48.5	31 85	91.9	61 57.6	29 85	90.9	2
3	59 54.9	39 84	97.0	60 06.4	38 84	96.1	60 17.4	36 84	95.1	60 28.1	35 85	94.2	60 38.4	33 85	93.2	60 48.2	32 85	92.3	60 57.7	31 85	91.3	61 06.7	29 85	90.3	3
4	59 04.3	39 84	96.3	59 15.7	37 84	95.4	59 26.7	36 85	94.5	59 37.3	35 85	93.6	59 47.6	33 85	92.6	59 57.4	32 85	91.7	60 06.8	31 85	90.7	60 15.8	29 85	89.8	4
35	58 13.7	38 84	95.6	58 25.0	37 85	94.7	58 36.0	36 85	93.9	58 46.5	35 85	93.0	58 56.7	33 85	92.0	59 06.5	32 85	91.1	59 15.9	31 85	90.2	59 24.9	29 85	89.3	35
6	57 23.1	38 84	95.0	57 34.3	37 85	94.1	57 45.2	36 85	93.2	57 55.7	34 85	92.4	58 05.9	33 85	91.5	58 15.6	32 85	90.6	58 25.0	31 85	89.7	58 34.0	29 85	88.8	6
7	56 32.4	38 84	94.3	56 43.5	37 85	93.5	56 54.4	36 85	92.6	57 04.9	34 85	91.8	57 15.0	33 85	90.9	57 24.8	32 85	90.0	57 34.2	31 85	89.2	57 43.2	29 85	88.3	7
8	55 41.6	38 85	93.7	55 52.7	37 85	92.9	56 03.5	35 85	92.0	56 14.0	34 85	91.2	56 24.1	33 85	90.4	56 33.9	32 85	89.5	56 43.3	31 85	88.6	56 52.3	30 85	87.8	8
9	54 50.8	38 85	93.1	55 01.9	36 85	92.3	55 12.7	35 85	91.5	55 23.1	34 85	90.7	55 33.2	33 85	89.8	55 43.0	32 85	89.0	55 52.4	31 85	88.2	56 01.5	30 85	87.3	9
40	54 00.0	37 85	92.5	54 11.1	36 85	91.7	54 21.8	35 85	90.9	54 32.2	34 85	90.1	54 42.3	33 85	89.3	54 52.1	32 85	88.5	55 01.6	31 85	87.7	55 10.7	30 85	86.8	40
1	53 09.1	37 85	92.0	53 20.2	36 85	91.2	53 30.9	35 85	90.4	53 41.4	34 85	89.6	53 51.5	33 85	88.8	54 01.3	32 85	88.0	54 10.7	31 85	87.2	54 19.9	30 85	86.4	1
2	52 18.3	37 85	91.4	52 29.3	36 85	90.6	52 40.0	35 85	89.9	52 50.5	34 85	89.1	53 00.6	33 85	88.3	53 10.4	32 85	87.5	53 19.9	31 85	86.7	53 29.1	30 85	85.9	2
3	51 27.4	37 85	90.8	51 38.4	36 85	90.1	51 49.2	35 85	89.3	51 59.6	34 85	88.6	52 09.8	33 85	87.8	52 19.6	32 85	87.0	52 29.1	31 85	86.3	52 38.4	30 84	85.5	3
4	50 36.5	37 85	90.3	50 47.6	36 85	89.6	50 58.3	35 85	88.8	51 08.7	34 85	88.1	51 18.9	33 85	87.3	51 28.8	32 85	86.6	51 38.4	31 84	85.8	51 47.7	30 84	85.0	4
45	49 45.7	37 85	89.8	49 56.7	36 85	89.0	50 07.4	35 85	88.3	50 17.9	34 85	87.6	50 28.1	34 85	86.9	50 38.0	33 85	86.1	50 47.6	32 84	85.4	50 57.0	31 84	84.6	45
6	48 54.8	37 85	89.2	49 05.8	36 85	88.5	49 16.6	35 85	87.8	49 27.1	35 85	87.1	49 37.3	34 85	86.4	49 47.3	33 85	85.7	49 56.9	32 84	84.9	50 06.4	31 84	84.2	6
7	48 03.9	37 85	88.7	48 14.9	36 85	88.0	48 25.7	36 85	87.3	48 36.3	36 85	86.6	48 46.5	34 85	85.9	48 56.5	33 84	85.2	49 06.3	32 84	84.5	49 15.8	31 84	83.8	7
8	47 13.0	37 85	88.2	47 24.1	36 85	87.5	47 34.9	36 85	86.9	47 45.5	35 85	86.2	47 55.8	34 84	85.5	48 05.9	33 84	84.8	48 15.7	32 84	84.0	48 25.2	31 84	83.3	8
9	46 22.2	37 85	87.7	46 33.3	37 85	87.1	46 44.1	36 85	86.4	46 54.7	35 85	85.7	47 05.1	34 84	85.0	47 15.2	33 84	84.3	47 25.1	32 84	83.6	47 34.7	32 84	82.9	9
50	45 31.3	37 85	87.2	45 42.5	37 85	86.6	45 53.4	36 84	85.9	46 04.0	35 84	85.2	46 14.4	34 84	84.6	46 24.6	34 84	83.9	46 34.5	33 84	83.2	46 44.2	32 84	82.5	50
1	44 40.5	38 85	86.8	44 51.7	37 85	86.1	45 02.6	36 84	85.4	45 13.3	35 84	84.8	45 23.8	35 84	84.1	45 34.0	34 84	83.4	45 44.0	33 84	82.8	45 53.8	32 84	82.1	1
2	43 49.7	38 85	86.3	44 00.9	37 85	85.6	44 11.9	36 84	85.0	44 22.7	35 84	84.3	44 33.2	35 84	83.7	44 43.5	34 84	83.0	44 53.6	33 84	82.3	45 03.4	32 84	81.7	2
3	42 59.0	38 84	85.8	43 10.2	37 84	85.2	43 21.2	36 84	84.5	43 32.0	36 84	83.9	43 42.6	35 84	83.2	43 53.0	34 84	82.6	44 03.2	33 84	81.9	44 13.1	33 84	81.3	3
4	42 08.3	38 84	85.3	42 19.5	37 84	84.7	42 30.6	37 84	84.1	42 41.5	36 84	83.4	42 52.1	35 84	82.8	43 02.6	34 84	82.2	43 12.8	34 84	81.5	43 22.8	33 84	80.9	4
55	41 17.6	38 84	84.9	41 28.9	38 84	84.2	41 40.0	37 84	83.6	41 51.0	36 84	83.0	42 01.7	36 84	82.4	42 12.2	35 84	81.7	42 22.5	34 84	81.1	42 32.6	33 84	80.5	55
6	40 26.9	38 84	84.4	40 38.3	38 84	83.8	40 49.5	37 84	83.2	41 00.5	36 84	82.6	41 11.3	36 84	81.9	41 21.9	35 84	81.3	41 32.3	34 84	80.7	41 42.5	34 84	80.1	6
7	39 36.3	38 84	83.9	39 47.7	38 84	83.3	39 59.0	37 84	82.7	40 10.0	37 84	82.1	40 20.9	36 84	81.5	40 31.6	35 84	80.9	40 42.1	35 84	80.3	40 52.4	34 83	79.7	7
8	38 45.7	39 84	83.5	38 57.2	38 84	82.9	39 08.5	37 84	82.3	39 19.7	37 84	81.7	39 30.6	36 84	81.1	39 41.4	36 84	80.5	39 52.0	35 84	79.9	40 02.3	34 83	79.3	8
9	37 55.2	39 84	83.0	38 06.7	38 84	82.5	38 18.1	38 84	81.9	38 29.3	37 84	81.3	38 40.4	36 84	80.7	38 51.2	36 84	80.1	39 01.9	35 83	79.5	39 12.4	35 83	78.9	9
60	37 04.7	39 84	82.6	37 16.3	38 84	82.0	37 27.8	38 84	81.4	37 39.1	37 84	80.8	37 50.2	37 84	80.3	38 01.1	36 83	79.7	38 11.9	36 83	79.1	38 22.5	35 83	78.5	60
1	36 14.3	39 84	82.1	36 26.0	39 84	81.6	36 37.5	38 84	81.0	36 48.9	38 84	80.4	37 00.1	37 84	79.8	37 11.1	37 83	79.3	37 22.0	36 83	78.7	37 32.7	35 83	78.1	1
2	35 23.9	40 84	81.7	35 35.7	39 84	81.1	35 47.3	38 84	80.6	35 58.7	38 83	80.0	36 10.0	37 83	79.4	36 21.2	37 83	78.8	36 32.1	36 83	78.3	36 42.9	36 83	77.7	2
3	34 33.6	40 84	81.3	34 45.4	39 84	80.7	34 57.1	39 84	80.1	35 08.7	38 83	79.6	35 20.0	38 83	79.0	35 31.3	37 83	78.4	35 42.3	37 83	77.9	35 53.2	36 83	77.3	3
4	33 43.3	40 84	80.8	33 55.2	40 84	80.3	34 07.0	39 83	79.7	34 18.6	39 83	79.2	34 30.1	38 83	78.6	34 41.5	38 83	78.0	34 52.6	37 83	77.5	35 03.6	36 83	76.9	4
65	32 53.1	40 84	80.4	33 05.1	40 83	79.8	33 17.0	39 83	79.3	33 28.7	39 83	78.7	33 40.3	38 83	78.2	33 51.7	38 83	77.6	34 03.0	37 82	77.1	34 14.1	37 82	76.5	65
6	32 03.0	41 84	79.9	32 15.1	40 83	79.4	32 27.0	40 83	78.9	32 38.8	39 83	78.3	32 50.5	39 83	77.8	33 02.1	38 83	77.2	33 13.4	38 82	76.7	33 24.7	37 82	76.1	6
7	31 12.9	41 83	79.5	31 25.1	40 83	79.0	31 37.1	40 83	78.4	31 49.1	39 83	77.9	32 00.8	39 83	77.4	32 12.5	39 82	76.8	32 24.0	38 82	76.3	32 35.3	38 82	75.7	7
8	30 22.7	41 83	79.1	30 35.2	41 83	78.5	30 47.1	40 83	78.0	30 59.3	40 83	77.4	31 11.2	39 83	76.9	31 23.0	39 82	76.4	31 34.6	38 82	75.9	31 46.1	38 82	75.3	8
9	29 33.0	41 83	78.6	29 45.3	41 83	78.1	29 57.6	41 83	77.6	30 09.7	40 83	77.1	30 21.7	40 82	76.5	30 33.6	39 82	76.0	30 45.3	39 82	75.5	30 56.9	38 82	74.9	9
70	28 43.1	42 83	78.2	28 55.6	41 83	77.7	29 07.9	41 83	77.2	29 20.2	41 82	76.6	29 32.3	40 82	76.1	29 44.2	40 82	75.6	29 56.1	39 82	75.1	30 07.8	39 82	74.5	70
1	27 53.4	42 83	77.8	28 05.9	42 83	77.2	28 18.4	41 82	76.7	28 30.7	41 82	76.2	28 42.9	41 82	75.7	28 55.0	40 82	75.2	29 07.0	40 82	74.6	29 18.8	39 81	74.1	1
2	27 03.7	42 83	77.3	27 16.3	42 82	76.8	27 28.9	42 82	76.3	27 41.3	41 82	75.8	27 53.7	41 82	75.3	28 05.9	41 82	74.8	28 18.0	40 81	74.2	28 29.9	40 81	73.7	2
3	26 14.1	43 82	76.9	26 26.8	42 82	76.4	26 39.5	42 82	75.9	26 52.0	42 82	75.4	27 04.5	41 82	74.9	27 16.8	41 82	74.4	27 29.0	41 81	73.8	27 41.1	40 81	73.3	3
4	25 24.6	43 82	76.5	25 37.4	43 82	76.0	25 50.2	42 82	75.5	26 02.9	42 82	75.0	26 15.4	42 82	74.4	26 27.9	41 81	73.9	26 40.2	41 81	73.4	26 52.4	41 81	72.9	4
75	24 35.1	43 82	76.0	24 48.1	43 82	75.5	25 01.0	42 82	75.0	25 13.8	42 82	74.5	25 26.4	42 81	74.0	25 39.0	42 81	73.5	25 51.5	41 81	73.0	26 03.9	41 81	72.5	75
6	23 45.8	44 82	75.6	23 58.9	43 82	75.1	24 11.9	43 82	74.6	24 24.8	43 81	74.1	24 37.6	43 81	73.6	24 50.3	42 81	73.1	25 02.9	42 81	72.6	25 15.4	41 81	72.1	6
7	22 56.6	44 82	75.1	23 09.8	44 82	74.7	23 22.9	44 82	74.2	23 35.9	43 81	73.7	23 48.8	43 81	73.2	24 01.6	43 81	72.7	24 14.4	42 81	72.2	24 27.0	42 80	71.7	7
8	22 07.4	45 82	74.7	22 20.8	44 82	74.2	22 34.0	44 81	73.7	22 47.1	44 81	73.2	23 00.2	43 81	72.8	23 13.1	43 81	72.3	23 26.0	43 80	71.8	23 38.8	42 80	71.3	8
9	21 18.4	45 82	74.3	21 31.8	45 81	73.8	21 45.2	44 81	73.3	21 58.4	44 81	72.8	22 11.6	44 81	72.3	22 24.7	43 80	71.9	22 37.7	43 80	71.4	22 50.6	43 80	70.9	9
80	20 29.5	45 81	73.8	20 43.0	45 81	73.4	20 56.5	45 81	72.9	21 09.9	44 81	72.4	21 23.2	44 80	71.9	21 36.4	44 80	71.4	21 49.6	44 80	70.9	22 02.6	43 80	70.5	80
1	19 40.7	46 81	73.4	19 54.3	45 81	72.9	20 07.9	45 81	72.4	20 21.4	45 81	72.0	20 34.9	45 80	71.5	20 48.2	44 80	71.0	21 01.5	44 80	70.5	21 14.7	44 80	70.0	1
2	18 52.0	46 81	72.9	19 05.8	46 81	72.5	19 19.5	46 80	72.0	19 33.1	45 80	71.5	19 46.7	45 80	71.1	20 00.2	45 80	70.6	20 13.6	45 80	70.2	20 27.0	44 79	69.6	2
3	18 03.4	46 81	72.5	18 17.3	46 81	72.0	18 31.1	46 80	71.6	18 44.9	46 80	71.1	18 58.6	46 80	70.6	19 12.3	45 80	70.2	19 25.8	45 79	69.7	19 39.3	45 79	69.2	3
4	17 14.9	47 81	72.0	17 29.0	47 80	71.6	17 42.9	46 80	71.1	17 56.9	46 80	70.7	18 10.7	46 80	70.2	18 24.5	46 79	69.7	18 38.2	46 79	69.3	18 51.8	45 79	68.8	4
85	16 26.6	47 80	71.6	16 40.7	47 80	71.1	16 54.9	47 80	70.7	17 08.9	47 80	70.2	17 22.9	47 80	69.8	17 36.8	46 79	69.3	17 50.7	46 79	68.8	18 04.5	46 79	68.4	85
6	15 38.4	48 80	71.1	15 52.7	48 80	70.7	16 06.9	47 80	70.2	16 21.1	47 79	69.8	16 35.2	47 79	69.3	16 49.3	47 79	68.9	17 03.3	47 79	68.4	17 17.2	46 78	67.9	6
7	14 50.3	48 80	70.7	15 04.7	48 80	70.2	15 19.1	48 80	69.8	15 33.4	48 79	69.3	15 47.5	47 79	68.9	16 01.9	47 79	68.4	16 16.1	47 78	68.0	16 30.2	47 78	67.5	7
8	14 02.3	49 80	70.2	14 16.9	49 79	69.8	14 31.4	48 79	69.3	14 45.9	48 79	68.9	15 00.3	48 79	68.4	15 14.7	48 78	68.0	15 29.0	48 78	67.5	15 43.2	47 78	67.1	8
9	13 14.5	49 80	69.8	13 29.2	49 79	69.3	13 43.9	49 79	68.9	13 58.5	49 79	68.4	14 13.1	48 78	68.0	14 27.6	48 78	67.5	14 42.0	48 78	67.1	14 56.4	48 78	66.6	9
90	12 26.8	50 79	69.3	12 41.7	49 79	68.9	12 56.5	49 79	68.4	13 11.2	49 78	68.0	13 26.0	49 78	67.5	13 40.6	49 78	67.1	13 55.2	49 78	66.6	14 09.8	48 77	66.2	90

Each declination cell below is given as: Alt (° ′) · Δd Δt · Az (°)

H.A.	24° 00'	24° 30'	25° 00'	25° 30'	26° 00'	26° 30'	27° 00'	27° 30'	H.A.
00	34 00.0 1.00 1 180.0	33 30.0 1.00 1 180.0	33 00.0 1.00 1 180.0	32 30.0 1.00 1 180.0	32 00.0 1.00 1 180.0	31 30.0 1.00 1 180.0	31 00.0 1.00 1 180.0	30 30.0 1.00 1 180.0	00
1	33 59.5 1.00 2 178.9	33 29.5 1.00 2 178.9	32 59.5 1.00 2 178.9	32 29.5 1.00 2 178.9	31 59.5 1.00 2 178.9	31 29.5 1.00 2 179.0	30 59.5 1.00 2 179.0	30 29.5 1.00 2 179.0	1
2	33 58.0 1.00 4 177.8	33 28.1 1.00 4 177.8	32 58.1 1.00 4 177.8	32 28.1 1.00 4 177.9	31 58.1 1.00 4 177.9	31 28.1 1.00 4 177.9	30 58.2 1.00 4 177.9	30 28.2 1.00 4 177.9	2
3	33 55.6 1.00 6 176.7	33 25.6 1.00 6 176.7	32 55.7 1.00 6 176.8	32 25.7 1.00 6 176.8	31 55.8 1.00 6 176.8	31 25.8 1.00 6 176.9	30 55.8 1.00 5 176.9	30 25.9 1.00 5 176.9	3
4	33 52.1 1.00 7 175.6	33 22.3 1.00 7 175.6	32 52.3 1.00 7 175.7	32 22.4 1.00 7 175.7	31 52.5 1.00 7 175.8	31 22.6 1.00 7 175.8	30 52.6 1.00 7 175.8	30 22.7 1.00 7 175.9	4
05	33 47.8 1.00 9 174.5	33 17.9 1.00 9 174.6	32 48.0 1.00 9 174.6	32 18.1 1.00 9 174.7	31 48.3 1.00 9 174.7	31 18.4 1.00 8 174.8	30 48.5 1.00 8 174.8	30 18.6 1.00 8 174.9	05
6	33 42.4 99 10 173.4	33 12.6 99 10 173.5	32 42.8 99 10 173.5	32 12.9 99 10 173.6	31 43.1 99 10 173.7	31 13.3 99 10 173.7	30 43.4 99 10 173.8	30 13.6 99 10 173.8	6
7	33 36.1 99 12 172.3	33 06.3 99 12 172.4	32 36.6 99 12 172.5	32 06.8 99 12 172.5	31 37.0 99 12 172.6	31 07.2 99 12 172.7	30 37.5 99 11 172.8	30 07.7 99 11 172.8	7
8	33 28.8 99 14 171.2	32 59.1 99 14 171.3	32 29.4 99 14 171.4	31 59.7 99 13 171.5	31 30.0 99 13 171.6	31 00.3 99 13 171.6	30 30.6 99 13 171.7	30 00.9 99 13 171.8	8
9	33 20.6 99 15 170.2	32 51.0 99 15 170.2	32 21.4 99 15 170.3	31 51.7 99 15 170.4	31 22.1 99 15 170.5	30 52.5 99 15 170.6	30 22.8 99 14 170.7	29 53.2 99 14 170.8	9
10	33 11.4 98 17 169.1	32 41.9 98 17 169.2	32 12.3 98 16 169.3	31 42.8 98 16 169.4	31 13.3 99 16 169.5	30 43.7 99 16 169.6	30 14.1 99 16 169.7	29 44.6 99 16 169.8	10
1	33 01.3 98 18 168.0	32 31.9 98 18 168.1	32 02.4 98 18 168.2	31 33.0 98 18 168.3	31 03.5 98 18 168.5	30 34.1 98 18 168.6	30 04.6 98 17 168.7	29 35.1 98 17 168.8	1
2	32 50.3 98 20 166.9	32 20.9 98 20 167.1	31 51.6 98 20 167.2	31 22.2 98 19 167.3	30 52.9 98 19 167.4	30 23.5 98 19 167.5	29 54.2 98 19 167.7	29 24.8 98 19 167.8	2
3	32 38.3 97 21 165.9	32 09.1 97 21 166.0	31 39.9 97 21 166.1	31 10.6 97 21 166.3	30 41.4 98 21 166.4	30 12.1 98 20 166.5	29 42.8 98 20 166.7	29 13.6 98 20 166.8	3
4	32 25.4 97 23 164.8	31 56.3 97 23 165.0	31 27.2 97 22 165.1	30 58.1 97 22 165.2	30 29.0 97 22 165.4	29 59.8 97 22 165.5	29 30.7 97 22 165.7	29 01.5 97 22 165.8	4
15	32 11.7 97 24 163.8	31 42.7 97 24 163.9	31 13.7 97 24 164.1	30 44.7 97 24 164.2	30 15.7 97 24 164.4	29 46.7 97 23 164.5	29 17.6 97 23 164.7	28 48.6 97 23 164.8	15
6	31 57.0 96 26 162.7	31 28.2 96 26 162.9	30 59.3 96 26 163.1	30 30.4 96 25 163.2	30 01.6 96 25 163.4	29 32.7 96 25 163.5	29 03.8 96 24 163.7	28 34.8 96 24 163.8	6
7	31 41.5 96 27 161.7	31 12.8 96 27 161.9	30 44.0 96 27 162.0	30 15.3 96 27 162.2	29 46.6 96 26 162.4	29 17.8 96 26 162.5	28 49.0 96 26 162.7	28 20.3 96 26 162.9	7
8	31 25.1 95 29 160.7	30 56.5 95 29 160.9	30 27.9 95 28 161.0	29 59.4 95 28 161.2	29 30.8 95 28 161.4	29 02.1 95 28 161.6	28 33.5 95 27 161.7	28 04.9 95 27 161.9	8
9	31 07.8 95 30 159.7	30 39.4 95 30 159.9	30 11.0 95 30 160.0	29 42.6 95 29 160.2	29 14.1 95 29 160.4	28 45.6 95 29 160.6	28 17.2 95 29 160.8	27 48.7 95 28 160.9	9
20	30 49.7 94 32 158.7	30 21.5 94 31 158.9	29 53.2 94 31 159.1	29 24.9 94 31 159.2	28 56.6 94 30 159.4	28 28.3 94 30 159.6	28 00.0 94 30 159.8	27 31.6 94 30 160.0	20
1	30 30.8 94 33 157.7	30 02.7 94 33 157.9	29 34.6 94 32 158.1	29 06.5 94 32 158.3	28 38.4 94 32 158.5	28 10.2 94 32 158.7	27 42.0 94 31 158.9	27 13.8 94 31 159.1	1
2	30 11.0 93 34 156.7	29 43.1 93 34 156.9	29 15.2 93 34 157.1	28 47.3 93 33 157.3	28 19.3 93 33 157.5	27 51.3 93 33 157.7	27 23.3 93 32 157.9	26 55.3 93 32 158.1	2
3	29 50.5 92 36 155.7	29 22.8 92 35 155.9	28 55.0 93 35 156.1	28 27.2 93 35 156.4	27 59.4 93 34 156.6	27 31.6 93 34 156.8	27 03.8 93 34 157.0	26 35.9 93 34 157.2	3
4	29 29.2 92 37 154.7	29 01.6 92 37 155.0	28 34.0 92 36 155.2	28 06.4 92 36 155.4	27 38.8 92 36 155.6	27 11.2 92 35 155.8	26 43.5 92 35 156.1	26 15.8 92 35 156.3	4
25	29 07.1 91 38 153.8	28 39.7 91 38 154.0	28 12.3 91 38 154.2	27 44.9 91 37 154.5	27 17.4 92 37 154.7	26 50.0 92 37 154.9	26 22.5 92 36 155.1	25 55.0 92 36 155.4	25
6	28 44.2 91 39 152.8	28 17.0 91 39 153.1	27 49.8 91 39 153.3	27 22.6 91 38 153.5	26 55.3 91 38 153.8	26 28.0 91 38 154.0	26 00.7 91 38 154.2	25 33.4 91 37 154.5	6
7	28 20.6 90 40 151.9	27 53.6 90 40 152.1	27 26.6 90 40 152.4	26 59.5 90 40 152.6	26 32.5 90 39 152.9	26 05.4 90 39 153.1	25 38.3 90 39 153.3	25 11.1 90 38 153.6	7
8	27 56.3 89 42 151.0	27 29.5 89 41 151.2	27 02.6 89 41 151.5	26 35.8 89 41 151.7	26 08.9 89 40 152.0	25 42.0 90 40 152.2	25 15.1 90 40 152.5	24 48.1 90 39 152.7	8
9	27 31.2 89 43 150.0	27 04.6 89 43 150.3	26 38.0 89 42 150.6	26 11.3 89 42 150.8	25 44.6 89 42 151.1	25 17.9 89 41 151.3	24 51.2 89 41 151.6	24 24.4 89 41 151.8	9
30	27 05.4 88 44 149.0	26 39.0 88 44 149.4	26 12.6 88 43 149.7	25 46.2 88 43 149.9	25 19.7 88 43 150.2	24 53.2 88 42 150.4	24 26.6 88 42 150.7	24 00.1 89 42 151.0	30
1	26 39.0 87 45 148.2	26 12.8 87 45 148.5	25 46.6 87 44 148.8	25 20.3 88 44 149.0	24 54.1 88 44 149.3	24 27.7 88 43 149.6	24 01.4 88 43 149.8	23 35.0 88 43 150.1	1
2	26 11.9 87 46 147.3	25 45.9 87 46 147.6	25 19.9 87 46 147.9	24 53.8 87 45 148.2	24 27.8 87 45 148.4	24 01.6 87 45 148.7	23 35.5 87 44 149.0	23 09.4 87 44 149.3	2
3	25 44.1 86 47 146.5	25 18.3 86 47 146.8	24 52.5 86 47 147.0	24 26.7 86 47 147.3	24 00.8 86 46 147.6	23 34.9 86 46 147.9	23 09.0 86 45 148.1	22 43.0 87 45 148.4	3
4	25 15.7 85 48 145.6	24 50.1 85 48 145.9	24 24.5 85 48 146.2	23 58.9 85 47 146.5	23 33.2 86 47 146.8	23 07.5 86 47 147.0	22 41.8 86 46 147.3	22 16.1 86 46 147.6	4
35	24 46.6 84 50 144.8	24 21.3 84 49 145.0	23 55.9 84 49 145.3	23 30.5 85 48 145.6	23 05.0 85 48 145.9	22 39.5 85 48 146.2	22 14.0 85 47 146.5	21 48.5 85 47 146.8	35
6	24 16.9 84 50 143.9	23 51.8 84 50 144.2	23 26.6 84 50 144.5	23 01.4 84 49 144.8	22 36.2 84 49 145.1	22 10.9 84 49 145.4	21 45.6 84 48 145.7	21 20.3 84 48 146.0	6
7	23 46.7 83 52 143.1	23 21.7 83 51 143.4	22 56.8 83 51 143.7	22 31.8 83 50 144.0	22 06.8 83 50 144.3	21 41.7 84 50 144.6	21 16.6 84 49 144.9	20 51.5 84 49 145.2	7
8	23 15.8 82 53 142.3	22 51.1 82 52 142.6	22 26.4 83 52 142.9	22 01.6 83 51 143.2	21 36.8 83 51 143.5	21 11.9 83 51 143.8	20 47.1 83 50 144.1	20 22.2 83 50 144.4	8
9	22 44.8 82 53 141.4	22 19.9 82 53 141.8	21 55.4 82 53 142.1	21 30.8 82 52 142.4	21 06.2 82 52 142.7	20 41.6 82 52 143.0	20 16.9 82 51 143.3	19 52.3 82 51 143.6	9
40	22 12.4 81 54 140.6	21 48.1 81 54 141.0	21 23.8 81 54 141.3	20 59.5 81 53 141.6	20 35.1 81 53 141.9	20 10.7 81 52 142.2	19 46.2 82 52 142.5	19 21.8 82 52 142.8	40
1	21 39.8 80 55 139.8	21 15.8 80 55 140.2	20 51.7 80 54 140.5	20 27.6 80 54 140.8	20 03.4 81 54 141.1	19 39.2 81 53 141.4	19 15.0 81 53 141.7	18 50.8 81 53 142.1	1
2	21 06.7 79 56 139.1	20 42.9 79 56 139.4	20 19.0 80 55 139.7	19 55.1 80 55 140.0	19 31.2 80 54 140.4	19 07.2 80 54 140.7	18 43.2 80 54 141.0	18 19.2 80 53 141.3	2
3	20 33.1 79 57 138.3	20 09.5 79 56 138.6	19 45.9 79 56 138.9	19 22.2 79 56 139.3	18 58.5 79 55 139.6	18 34.7 79 55 139.9	18 10.9 79 55 140.2	17 47.1 79 54 140.6	3
4	19 59.0 78 58 137.5	19 35.6 78 57 137.9	19 12.2 78 57 138.2	18 48.8 78 57 138.5	18 25.3 78 56 138.9	18 01.7 78 56 139.2	17 38.2 79 56 139.5	17 14.6 79 54 139.8	4
45	19 24.4 77 58 136.8	19 01.3 77 58 137.1	18 38.0 77 58 137.4	18 14.8 78 57 137.8	17 51.5 78 57 138.1	17 28.2 78 57 138.4	17 04.9 78 56 138.8	16 41.5 78 56 139.1	45
6	18 49.3 76 59 136.0	18 26.4 77 59 136.4	18 03.4 77 58 136.7	17 40.4 77 58 137.0	17 17.3 77 58 137.4	16 54.2 77 57 137.7	16 31.1 77 57 138.0	16 07.9 77 57 138.4	6
7	18 13.8 76 60 135.3	17 51.0 76 60 135.6	17 28.3 76 59 136.0	17 05.5 76 59 136.3	16 42.6 76 58 136.7	16 19.7 76 58 137.0	15 56.8 76 58 137.3	15 33.9 77 57 137.7	7
8	17 37.8 75 61 134.6	17 15.2 75 60 134.9	16 52.7 75 60 135.3	16 30.1 76 60 135.6	16 07.5 76 59 136.0	15 44.8 76 59 136.3	15 22.1 76 59 136.6	14 59.4 76 58 137.0	8
9	17 01.3 74 62 133.9	16 39.0 74 61 134.2	16 16.6 75 61 134.6	15 54.3 75 60 134.9	15 31.9 75 60 135.2	15 09.4 75 60 135.6	14 47.0 75 59 135.9	14 24.4 75 59 136.3	9
50	16 24.4 74 62 133.2	16 02.3 74 62 133.5	15 40.2 74 62 133.9	15 18.0 74 61 134.2	14 55.8 74 61 134.6	14 33.6 74 60 134.9	14 11.3 74 60 135.2	13 49.1 74 60 135.6	50
1	15 47.1 73 63 132.5	15 25.2 73 63 132.8	15 03.3 73 62 133.2	14 41.3 73 62 133.5	14 19.3 73 61 133.9	13 57.3 73 61 134.2	13 35.3 74 61 134.6	13 13.2 74 60 134.9	1
2	15 09.3 72 64 131.8	14 47.6 72 63 132.1	14 26.0 72 63 132.5	14 04.2 72 62 132.8	13 42.5 73 62 133.2	13 20.7 73 62 133.5	12 58.9 73 62 133.9	12 37.0 73 61 134.3	2
3	14 31.2 71 64 131.1	14 09.7 72 64 131.5	13 48.2 72 64 131.8	13 26.7 72 63 132.2	13 05.2 72 63 132.5	12 43.6 72 62 132.9	12 22.0 72 62 133.2	12 00.4 72 62 133.6	3
4	13 52.6 71 65 130.4	13 31.4 71 65 130.8	13 10.1 71 64 131.1	12 48.8 71 64 131.5	12 27.5 71 64 131.9	12 06.1 71 63 132.2	11 44.7 71 63 132.6	11 23.3 71 62 132.9	4
55	13 13.7 70 66 129.8	12 52.7 70 65 130.1	12 31.6 70 65 130.5	12 10.5 70 64 130.9	11 49.4 70 64 131.2	11 28.2 71 64 131.6	11 07.1 71 63 131.9	10 45.9 71 63 132.3	55
6	12 34.4 69 66 129.1	12 13.6 69 66 129.5	11 52.7 70 65 129.8	11 31.8 70 65 130.2	11 10.9 70 64 130.6	10 50.0 70 64 131.0	10 29.0 70 64 131.3	10 08.0 70 64 131.7	6
7	11 54.7 68 67 128.5	11 34.1 69 66 128.8	11 13.5 69 66 129.2	10 52.8 69 66 129.6	10 32.1 69 65 129.9	10 11.4 69 65 130.3	9 50.6 69 65 130.7	9 29.8 69 64 131.0	7
8	11 14.7 68 67 127.8	10 54.3 68 67 128.2	10 33.9 68 67 128.6	10 13.4 68 66 128.9	9 52.9 68 66 129.3	9 32.4 68 66 129.7	9 11.8 68 65 130.1	8 51.3 69 65 130.4	8
9	10 34.3 67 68 127.2	10 14.1 67 68 127.6	9 53.9 67 67 127.9	9 33.6 67 67 128.3	9 13.4 68 66 128.7	8 53.1 68 66 129.1	8 32.7 68 66 129.4	8 12.4 68 65 129.8	9
60	9 53.6 67 68 126.6	9 33.6 67 68 127.0	9 13.6 67 68 127.3	8 53.5 67 67 127.7	8 33.5 67 67 128.1	8 13.4 67 67 128.5	7 53.3 67 66 128.8	7 33.1 67 66 129.2	60
1	9 12.6 66 69 126.0	8 52.8 66 69 126.3	8 33.0 66 68 126.7	8 13.1 66 68 127.1	7 53.3 66 68 127.5	7 33.4 66 67 127.9	7 13.5 66 67 128.2	6 53.5 66 67 128.6	1
2	8 31.3 65 70 125.4	8 11.7 65 69 125.7	7 52.0 65 69 126.1	7 32.4 66 68 126.5	7 12.7 66 68 126.9	6 53.0 66 68 127.3	6 33.5 66 67 127.6	6 13.6 66 67 128.0	2
3	7 49.6 65 70 124.8	7 30.2 65 70 125.1	7 10.8 65 69 125.5	6 51.3 65 69 125.9	6 31.9 65 69 126.3	6 12.4 65 68 126.7	5 52.9 65 68 127.1	5 33.3 65 68 127.4	3
4	7 07.7 64 70 124.2	6 48.4 64 70 124.5	6 29.2 64 70 124.9	6 10.0 64 69 125.3	5 50.7 65 69 125.7	5 31.4 64 69 126.1	5 12.1 64 68 126.5		4
65	6 25.4 63 71 123.6	6 06.4 63 71 124.0	5 47.3 63 70 124.4	5 28.3 64 70 124.7	5 09.2 64 70 125.1				65
6	5 42.9 63 71 123.0	5 24.0 63 71 123.4	5 05.2 63 71 123.8						6
7	5 00.1 62 72 122.4								7

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00'	24° 30'	25° 00'	25° 30'	26° 00'	26° 30'	27° 00'	27° 30'	H.A.
91	11 39.3 50 79 68.8	11 54.3 50 79 68.4	12 09.2 50 78 68.0	12 24.1 50 78 67.5	12 39.0 49 78 67.1	12 53.8 49 78 66.6	13 08.6 49 78 66.2	13 23.3 49 77 65.7	91
2	10 51.9 51 79 68.4	11 07.1 50 79 67.9	11 22.2 50 78 67.5	11 37.2 50 78 67.1	11 52.2 50 78 66.6	12 07.2 50 77 66.2	12 22.1 50 77 65.7	12 37.0 50 77 65.3	2
3	10 04.7 51 78 67.9	10 20.0 51 78 67.5	10 35.2 51 78 67.0	10 50.4 51 77 66.6	11 05.6 51 77 66.2	11 20.7 50 77 65.7	11 35.8 50 77 65.3	11 50.9 50 77 64.8	3
4	9 17.6 51 78 67.4	9 33.1 51 78 67.0	9 48.5 51 78 66.6	10 03.8 51 77 66.1	10 19.2 51 77 65.7	10 34.4 51 77 65.3	10 49.7 51 77 64.8	11 04.9 51 76 64.4	4
95	8 30.7 52 78 67.0	8 46.3 52 78 66.5	9 01.9 52 77 66.1	9 17.4 52 77 65.7	9 32.9 52 77 65.2	9 48.3 52 77 64.8	10 03.7 51 76 64.4	10 19.1 51 76 63.9	95
6	7 44.0 52 78 66.5	7 59.7 52 77 66.0	8 15.4 52 77 65.6	8 31.1 52 77 65.2	8 46.8 52 77 64.8	9 02.4 52 76 64.3	9 18.0 52 76 63.9	9 33.5 52 76 63.5	6
7	6 57.4 53 77 66.0	7 13.3 53 77 65.6	7 29.2 53 77 65.1	7 45.0 53 76 64.7	8 00.8 53 76 64.3	8 16.6 53 76 63.8	8 32.4 52 76 63.4	8 48.1 52 75 63.0	7
8	6 11.0 54 77 65.5	6 27.1 53 77 65.1	6 43.1 53 76 64.6	6 59.1 53 76 64.2	7 15.1 53 76 63.8	7 31.0 53 76 63.3	7 47.0 53 75 62.9	8 02.9 53 75 62.5	8
9	5 24.8 54 77 65.0	5 41.0 54 76 64.6	5 57.3 54 76 64.2	6 13.4 54 76 63.7	6 29.5 54 76 63.3	6 45.4 54 75 62.9	7 01.7 54 75 62.5	7 17.8 54 75 62.0	9
100			5 11.5 54 76 63.7	5 27.8 54 76 63.2	5 44.2 54 75 62.8	6 00.5 54 75 62.4	6 16.7 54 75 62.0	6 33.0 54 74 61.6	100
1						5 15.5 55 75 61.9	5 31.9 55 74 61.5	5 48.4 55 74 61.1	1
2								5 03.9 55 74 60.6	2

Right margin: Lat. 32° · Lat. 33° · Lat. 34° · Lat. 35° · Lat. 36° · Lat. 37° · Lat. 38°

Lat. 32°

H.A.	28°00' Alt.	Δd Δt	Az.	28°30' Alt.	Δd Δt	Az.	29°00' Alt.	Δd Δt	Az.	30°00' Alt.	Δd Δt	Az.	32°00' Alt.	Δd Δt	Az.	34°00' Alt.	Δd Δt	Az.	34°30' Alt.	Δd Δt	Az.	35°30' Alt.	Δd Δt	Az.	H.A.
00	86 00.0	1.0 09	180.0	86 30.0	1.0 10	180.0	87 00.0	1.0 12	180.0	88 00.0	1.0 18	180.0	90 00.0	..85	....	88 00.0	1.0 17	00.0	87 30.0	1.0 14	00.0	86 30.0	1.0 10	00.0	00
1	85 54.4	98 27	167.5	86 23.7	97 30	165.9	86 52.7	96 34	163.7	87 49.5	92 46	156.5	89 09.1	00 85	89.7	87 49.9	92 44	22.5	87 21.8	95 37	18.2	86 24.2	97 28	13.1	1
2	85 38.5	92 41	156.1	86 05.8	90 45	153.2	86 32.4	87 50	149.6	87 21.9	77 62	138.9	88 18.2	01 85	89.5	87 23.4	76 60	39.4	86 59.6	83 53	33.2	86 07.5	90 42	24.9	2
3	85 13.8	85 52	146.2	85 38.7	81 56	142.7	86 02.4	77 61	138.5	86 44.6	62 71	127.1	87 27.4	01 85	89.2	86 47.2	61 69	50.7	86 27.5	70 63	44.3	85 42.2	81 53	34.7	3
4	84 42.6	77 60	138.1	85 05.0	72 64	134.3	85 25.9	67 68	130.0	86 01.9	52 76	119.2	86 36.5	02 85	88.9	86 05.7	50 74	58.1	85 49.5	58 70	52.1	85 10.4	71 61	42.4	4
05	84 06.4	69 66	131.5	84 26.5	65 69	127.7	84 45.1	59 73	123.6	85 16.3	44 79	113.7	85 45.6	02 85	88.7	85 21.3	41 77	63.2	85 07.8	49 73	57.8	84 34.0	62 66	48.5	05
6	83 26.7	63 70	126.1	83 44.9	58 73	122.5	84 01.5	52 76	118.6	84 29.0	39 81	109.7	84 54.7	03 85	88.4	84 35.2	34 79	66.7	84 23.7	42 76	61.9	83 54.5	55 70	53.3	6
7	82 44.4	58 74	121.6	83 01.0	53 76	118.3	83 16.0	47 78	114.8	83 40.6	35 82	106.6	84 03.9	03 85	88.1	83 48.0	29 80	69.3	83 38.2	36 78	65.0	83 12.7	49 72	57.1	7
8	82 00.2	53 76	118.0	82 15.4	47 78	114.8	82 29.1	43 80	111.5	82 51.5	31 83	104.2	83 13.0	04 85	87.9	83 00.1	25 81	71.2	82 51.6	31 79	67.3	82 29.2	43 74	60.1	8
9	81 14.6	49 78	114.9	81 28.7	45 79	111.9	81 41.3	40 81	108.8	82 02.0	29 83	102.2	82 22.2	04 85	87.6	82 11.7	21 81	72.7	82 04.4	27 80	69.2	81 44.6	38 76	62.5	9
10	80 28.0	46 79	112.2	80 41.1	42 80	109.5	80 52.9	37 82	106.6	81 12.1	27 84	100.5	81 31.4	05 85	87.3	81 22.9	18 82	73.9	81 16.6	24 80	70.7	80 59.1	34 77	64.4	10
1	79 40.5	44 80	110.0	79 52.8	39 81	107.4	80 03.9	36 82	104.7	80 22.0	26 84	99.1	80 40.5	05 85	87.1	80 33.9	16 82	74.8	80 28.4	21 81	71.8	80 12.8	31 78	66.1	1
2	78 52.4	41 81	108.0	79 04.0	37 82	105.6	79 14.5	33 83	103.1	79 31.6	24 84	97.9	79 49.7	06 85	86.8	79 44.7	14 82	75.5	79 39.9	18 81	72.8	79 26.1	27 79	67.4	2
3	78 03.7	39 82	106.2	78 14.8	35 83	104.0	78 24.8	31 83	101.6	78 41.2	23 84	96.8	78 58.9	06 85	86.5	78 55.4	12 82	76.1	78 51.2	16 81	73.5	78 38.9	25 79	68.5	3
4	77 14.7	37 82	104.7	77 25.3	34 83	102.5	77 34.8	30 84	100.3	77 50.6	23 84	95.8	78 08.1	06 85	86.3	78 06.0	10 83	76.6	78 02.3	14 82	74.2	77 51.4	22 80	69.4	4
15	76 25.3	35 83	103.3	76 35.5	32 83	101.2	76 44.7	29 84	99.2	76 59.9	22 85	94.9	77 17.4	07 85	86.0	77 16.4	09 83	76.9	77 13.3	12 82	74.7	77 03.7	20 80	70.2	15
6	75 35.6	34 83	102.0	75 45.5	31 84	100.1	75 54.3	28 84	98.1	76 09.2	21 85	94.1	76 26.6	07 85	85.7	76 26.8	07 83	77.2	76 24.2	11 82	75.1	76 15.7	18 80	70.9	6
7	74 45.8	33 84	100.8	74 55.3	30 84	99.0	75 03.9	27 84	97.2	75 18.4	21 85	93.4	75 35.9	08 85	85.5	75 37.2	06 83	77.4	75 35.0	09 82	75.4	75 27.5	16 81	71.4	7
8	73 55.7	32 84	99.7	74 05.0	29 84	98.0	74 13.4	27 84	96.3	74 27.6	21 85	92.7	74 45.2	08 84	85.2	74 47.5	04 83	77.6	74 45.7	08 82	75.7	74 39.2	14 81	71.9	8
9	73 05.5	31 84	98.8	73 14.5	29 84	97.1	73 22.8	26 84	95.4	73 36.8	21 85	92.0	73 54.5	09 84	84.9	73 57.8	03 83	77.7	73 56.4	06 82	75.9	73 50.8	12 81	72.3	9
20	72 15.1	31 84	97.8	72 23.2	28 84	96.3	72 32.1	26 84	94.7	72 45.9	20 85	91.4	73 03.8	09 84	84.7	73 08.1	02 83	77.8	73 07.0	05 82	76.1	73 02.3	11 81	72.6	20
1	71 24.7	30 84	97.0	71 33.4	28 84	95.5	71 41.3	25 85	93.9	71 55.0	20 85	90.8	72 13.2	10 84	84.4	72 18.4	01 83	77.8	72 17.6	04 82	76.2	72 13.7	09 81	72.9	1
2	70 34.1	30 84	96.2	70 42.7	27 85	94.7	70 50.6	25 85	93.2	71 04.2	20 85	90.3	71 22.5	10 84	84.1	71 28.6	00 83	77.8	71 28.2	03 82	76.3	71 25.0	08 81	73.1	2
3	69 43.5	29 84	95.4	69 51.9	27 85	94.0	69 59.7	25 85	92.6	70 13.3	20 85	89.7	70 31.9	11 84	83.8	70 38.9	01 83	77.8	70 38.8	02 82	76.3	70 36.3	07 81	73.3	3
4	68 52.8	29 84	94.7	69 01.2	27 85	93.3	69 08.9	25 85	92.0	69 22.4	20 85	89.2	69 41.4	11 84	83.6	69 49.1	02 83	77.8	69 49.3	01 82	76.4	69 47.5	05 81	73.5	4
25	68 02.1	29 85	94.0	68 10.4	27 85	92.7	68 18.0	25 85	91.4	68 31.5	20 85	88.7	68 50.8	12 84	83.3	68 59.4	03 83	77.8	68 59.9	00 82	76.4	68 58.7	04 81	73.6	25
6	67 11.3	28 85	93.3	67 19.5	26 85	92.1	67 27.2	25 85	90.8	67 40.7	20 85	88.3	68 00.3	12 84	83.0	68 09.7	04 83	77.7	68 10.4	01 82	76.3	68 09.9	03 81	73.6	6
7	66 20.5	28 85	92.7	66 28.7	26 85	91.5	66 36.3	24 85	90.3	66 49.8	21 85	87.8	67 09.8	13 84	82.7	67 20.0	04 83	77.6	67 21.0	02 82	76.3	67 21.1	02 81	73.7	7
8	65 29.6	28 85	92.1	65 37.8	26 85	90.9	65 45.4	24 85	89.7	65 59.0	21 85	87.4	66 19.3	13 84	82.5	66 30.3	05 83	77.5	66 31.6	03 82	76.2	66 32.2	01 81	73.7	8
9	64 38.8	28 85	91.5	64 46.9	26 85	90.4	64 54.5	24 85	89.2	65 08.2	21 85	86.9	65 28.9	14 84	82.2	65 40.6	06 83	77.3	65 42.1	04 82	76.2	65 43.4	00 81	73.7	9
30	63 47.9	28 85	90.9	63 56.0	26 85	89.8	64 03.6	25 85	88.7	64 17.4	21 85	86.5	64 38.5	14 84	81.9	64 51.0	07 83	77.3	64 52.7	05 82	76.1	64 54.6	01 81	73.7	30
1	62 57.0	28 85	90.4	63 05.1	26 85	89.3	63 12.8	25 85	88.2	63 26.6	21 85	86.1	63 48.1	15 84	81.6	64 01.4	07 83	77.1	64 03.4	06 82	76.0	64 05.7	02 81	73.7	1
2	62 06.1	28 85	89.8	62 14.3	26 85	88.8	62 21.9	25 85	87.8	62 35.8	22 85	85.7	62 57.8	15 84	81.4	63 11.8	08 83	77.0	63 14.0	07 82	75.9	63 16.9	03 81	73.6	2
3	61 15.3	28 85	89.3	61 23.4	26 85	88.3	61 31.1	25 85	87.3	61 45.1	22 84	85.3	62 07.5	16 84	81.1	62 22.2	09 83	76.9	62 24.7	07 82	75.7	62 28.1	04 81	73.6	3
4	60 24.4	28 85	88.8	60 32.5	26 85	87.8	60 40.3	25 85	86.9	60 54.4	22 84	84.9	61 17.3	16 84	80.8	61 32.7	10 82	76.7	61 35.4	08 82	75.6	61 39.3	05 81	73.5	4
35	59 33.5	28 85	88.3	59 41.7	27 85	87.4	59 49.5	25 85	86.4	60 03.8	22 84	84.5	60 27.1	16 84	80.5	60 43.2	10 82	76.5	60 46.1	09 82	75.5	60 50.5	06 81	73.4	35
6	58 42.7	28 85	87.8	58 50.9	27 85	86.9	58 58.7	25 85	86.0	59 13.1	23 84	84.1	59 36.9	17 84	80.2	59 53.8	11 82	76.3	59 56.9	10 82	75.3	60 01.7	07 81	73.3	6
7	57 51.8	28 85	87.4	58 00.1	27 85	86.5	58 08.0	26 84	85.5	58 22.5	23 84	83.7	58 46.8	17 83	79.9	59 04.4	12 82	76.1	59 07.7	10 82	75.1	59 13.0	07 81	73.2	7
8	57 01.0	28 85	86.9	57 09.3	27 85	86.0	57 17.3	26 84	85.1	57 32.0	23 84	83.3	57 56.7	18 83	79.7	58 15.0	12 82	75.9	58 18.5	11 82	75.0	58 24.3	08 81	73.1	8
9	56 10.2	28 85	86.4	56 18.6	27 85	85.6	56 26.6	26 84	84.7	56 41.5	24 84	83.0	57 06.7	18 83	79.4	57 25.6	13 82	75.7	57 29.4	12 82	74.8	57 35.7	09 81	72.9	9
40	55 19.4	29 84	86.0	55 27.9	27 84	85.2	55 35.9	26 84	84.3	55 51.0	24 84	82.6	56 16.7	19 83	79.1	56 36.4	14 82	75.5	56 40.3	13 82	74.6	56 47.0	10 81	72.8	40
1	54 28.7	29 84	85.6	54 37.2	28 84	84.7	54 45.3	27 84	83.9	55 00.5	24 84	82.2	55 26.8	19 83	78.8	55 47.1	14 82	75.3	55 51.3	13 82	74.4	55 58.4	11 81	72.6	1
2	53 38.0	29 84	85.1	53 46.5	28 84	84.3	53 54.7	27 84	83.5	54 10.1	25 84	81.9	54 36.9	20 83	78.5	54 57.9	15 82	75.1	55 02.3	14 82	74.2	55 09.9	11 81	72.5	2
3	52 47.3	29 84	84.7	52 55.9	28 84	83.9	53 04.2	27 84	83.1	53 19.8	25 84	81.5	53 47.0	20 83	78.2	54 08.8	16 82	74.9	54 13.3	15 81	74.0	54 21.4	12 81	72.3	3
4	51 56.7	29 84	84.3	52 05.3	28 84	83.5	52 13.7	27 84	82.7	52 29.5	25 84	81.1	52 57.2	21 83	77.9	53 19.7	16 82	74.6	53 24.4	15 81	73.8	53 32.9	13 81	72.1	4
45	51 06.0	30 84	83.8	51 14.8	29 84	83.1	51 23.3	28 84	82.3	51 39.3	26 84	80.8	52 07.5	21 83	77.6	52 30.6	17 82	74.4	52 35.6	16 81	73.6	52 44.5	14 81	72.0	45
6	50 15.5	30 84	83.4	50 24.3	29 84	82.7	50 32.8	28 84	81.9	50 49.1	26 84	80.4	51 17.8	22 83	77.3	51 41.7	18 82	74.2	51 46.8	17 81	73.4	51 56.2	14 80	71.8	6
7	49 24.9	30 84	83.0	49 33.9	29 84	82.3	49 42.5	28 84	81.5	49 58.9	26 84	80.1	50 28.2	22 83	77.0	50 52.7	18 81	73.9	50 58.1	17 81	73.2	51 07.9	15 80	71.6	7
8	48 34.5	30 84	82.6	48 43.5	30 84	81.9	48 52.2	29 84	81.2	49 08.8	27 83	79.7	49 38.7	23 82	76.7	50 03.9	19 81	73.7	50 09.4	18 81	72.9	50 19.6	16 80	71.4	8
9	47 44.0	31 84	82.2	47 53.1	30 84	81.5	48 01.9	29 84	80.8	48 18.8	27 83	79.3	48 49.2	23 82	76.4	49 15.1	20 81	73.4	49 20.8	19 81	72.7	49 31.4	17 80	71.2	9
50	46 53.6	31 84	81.8	47 02.8	30 84	81.1	47 11.7	29 84	80.4	47 28.8	28 83	79.0	47 59.8	24 82	76.1	48 26.3	20 81	73.2	48 32.3	19 81	72.5	48 43.3	17 80	71.0	50
1	46 03.3	31 84	81.4	46 12.6	30 84	80.7	46 21.6	30 84	80.0	46 38.9	28 83	78.6	47 10.4	25 82	75.8	47 37.7	21 81	72.9	47 43.8	20 81	72.2	47 55.2	18 80	70.7	1
2	45 13.0	32 84	81.0	45 22.4	31 84	80.3	45 31.5	30 83	79.7	45 49.0	28 83	78.3	46 21.1	25 82	75.5	46 49.0	22 81	72.7	46 55.4	21 81	72.0	47 07.2	19 80	70.5	2
3	44 22.8	32 84	80.6	44 32.2	31 83	80.0	44 41.5	30 83	79.3	44 59.2	29 83	77.9	45 31.9	26 82	75.2	46 00.5	22 81	72.4	46 07.0	21 80	71.7	46 19.3	20 80	70.3	3
4	43 32.6	32 84	80.2	43 42.2	32 83	79.6	43 51.5	31 83	78.9	44 09.5	30 83	77.6	44 42.7	26 82	74.9	45 12.0	23 81	72.1	45 18.7	22 80	71.5	45 31.4	20 80	70.1	4
55	42 42.5	33 84	79.8	42 52.2	32 83	79.2	43 01.6	31 83	78.5	43 19.9	30 83	77.2	43 53.6	27 82	74.6	44 23.6	23 81	71.9	44 30.5	23 80	71.2	44 43.6	21 80	69.8	55
6	41 52.4	33 83	79.4	42 02.2	32 83	78.8	42 11.8	32 83	78.2	42 30.3	30 83	76.9	43 04.6	27 82	74.3	43 35.3	24 80	71.6	43 42.4	23 80	70.9	43 55.9	22 79	69.6	6
7	41 02.5	33 83	79.0	41 12.3	33 83	78.4	41 22.0	32 83	77.8	41 40.8	31 82	76.5	42 15.7	28 81	73.9	42 47.1	24 80	71.3	42 54.4	24 80	70.7	43 08.2	22 79	69.3	7
8	40 12.5	34 83	78.7	40 22.5	33 83	78.0	40 32.3	32 83	77.4	40 51.3	31 82	76.2	41 26.8	28 81	73.6	41 58.9	25 80	71.0	42 06.4	24 80	70.4	42 20.7	23 79	69.1	8
9	39 22.7	34 83	78.3	39 32.8	33 83	77.7	39 42.7	33 83	77.0	40 01.9	31 82	75.8	40 38.0	29 81	73.3	41 10.8	26 80	70.8	41 18.5	25 80	70.1	41 33.2	24 79	68.8	9
60	38 32.9	34 83	77.9	38 43.1	34 83	77.3	38 53.1	33 82	76.7	39 12.6	32 82	75.5	39 49.3	29 81	73.0	40 22.8	27 80	70.5	40 30.7	26 80	69.8	40 45.8	24 79	68.6	60
1	37 43.2	35 83	77.5	37 53.5	34 83	76.9	38 03.7	34 82	76.3	38 23.4	32 82	75.1	39 00.7	30 81	72.7	39 34.9	27 80	70.2	39 43.0	27 79	69.6	39 58.5	25 79	68.3	1
2	36 53.5	35 83	77.1	37 04.0	35 82	76.5	37 14.3	34 82	75.9	37 34.3	33 82	74.7	38 12.2	30 81	72.3	38 47.1	28 80	69.9	38 55.3	27 79	69.3	39 11.2	26 79	68.0	2
3	36 04.0	36 82	76.7	36 14.6	35 82	76.1	36 25.0	34 82	75.6	36 45.3	33 82	74.4	37 23.7	31 81	72.0	37 59.3	28 79	69.6	38 07.8	28 79	69.0	38 24.1	27 78	67.8	3
4	35 14.5	36 82	76.3	35 25.2	36 82	75.8	35 35.7	35 82	75.2	35 56.3	34 81	74.0	36 35.4	31 81	71.7	37 11.7	29 79	69.3	37 20.3	28 79	68.7	37 37.0	27 78	67.5	4
65	34 25.1	36 82	75.9	34 35.9	36 82	75.4	34 46.6	35 82	74.8	35 07.4	34 81	73.7	35 47.1	32 80	71.3	36 24.2	30 79	69.0	36 33.0	29 79	68.4	36 50.1	28 77	67.2	65
6	33 35.8	37 82	75.6	33 46.7	36 82	75.0	33 57.5	36 82	74.4	34 18.6	35 81	73.3	34 59.0	32 80	71.0	35 36.7	30 79	68.7	35 45.7	30 79	68.1	36 03.2	29 78	66.9	6
7	32 46.6	37 82	75.2	32 57.6	37 82	74.6	33 08.5	36 82	74.1	33 29.9	35 81	72.9	34 10.9	33 80	70.7	34 49.3	31 79	68.4	34 58.6	30 78	67.8	35 16.5	29 78	66.6	7
8	31 57.4	38 82	74.8	32 08.6	37 82	74.2	32 19.7	37 81	73.7	32 41.4	36 81	72.6	33 23.0	34 80	70.3	34 02.1	32 79	68.1	34 11.5	31 78	67.5	34 29.8	30 78	66.3	8
9	31 08.4	38 82	74.4	31 19.7	38 81	73.8	31 30.9	37 81	73.3	31 52.9	36 81	72.2	32 35.1	34 80	70.0	33 15.0	32 78	67.8	33 24.5	32 78	67.2	33 43.2	31 77	66.0	9
70	30 19.4	38 82	74.0	30 30.9	38 81	73.5	30 42.2	38 81	72.9	31 04.5	37 80	71.8	31 47.3	35 79	69.6	32 27.9	33 78	67.4	32 37.7	32 78	66.9	32 56.8	31 77	65.7	70
1	29 30.5	39 81	73.6	29 42.1	38 81	73.1	29 53.6	38 81	72.5	30 16.2	37 80	71.5	30 59.7	35 79	69.3	31 41.0	33 78	67.1	31 51.0	33 78	66.5	32 10.5	32 77	65.4	1
2	28 41.8	39 81	73.2	28 53.5	39 81	72.7	29 05.1	38 81	72.1	29 28.0	38 80	71.1	30 12.1	36 79	68.9	30 54.2	34 78	66.8	31 04.3	34 78	66.2	31 24.3	33 77	65.1	2
3	27 53.1	40 81	72.8	28 05.0	39 81	72.3	28 16.7	39 80	71.8	28 39.9	38 80	70.7	29 24.7	37 79	68.6	30 07.5	35 78	66.5	30 17.8	34 77	65.9	30 38.2	33 77	64.8	3
4	27 04.6	40 81	72.4	27 16.6	40 81	71.9	27 28.5	39 80	71.4	27 51.9	39 80	70.3	28 37.4	37 79	68.2	29 20.9	35 77	66.1	29 31.5	35 77	65.6	29 52.2	34 76	64.5	4
75	26 16.1	41 80	72.0	26 28.3	40 80	71.5	26 40.3	40 80	71.0	27 04.1	39 80	70.0	27 50.2	38 78	67.9	28 34.4	36 77	65.8	28 45.2	36 77	65.2	29 06.3	35 76	64.2	75
6	25 27.8	41 80	71.6	25 40.1	41 80	71.1	25 52.3	40 80	70.6	26 16.3	40 79	69.6	27 03.1	38 78	67.5	27 48.1	37 77	65.4	27 59.1	37 77	64.9	28 20.6	35 76	63.8	6
7	24 39.6	42 80	71.2	24 52.0	41 80	70.7	25 04.3	41 80	70.2	25 28.7	40 79	69.2	26 16.2	39 78	67.1	27 01.9	37 77	65.1	27 13.0	37 76	64.6	27 35.0	36 76	63.5	7
8	23 51.4	42 80	70.8	24 04.0	42 80	70.3	24 16.5	41 80	69.8	24 41.2	41 79	68.8	25 29.4	39 78	66.8	26 16.0	38 76	64.7	26 27.2	38 76	64.2	26 49.5	37 76	63.2	8
9	23 03.5	43 80	70.4	23 16.2	42 80	69.9	23 28.8	42 79	69.4	23 53.8	41 79	68.4	24 42.7	40 78	66.4	25 29.9	39 76	64.4	25 41.4	38 76	63.9	26 04.2	37 76	62.8	9
80	22 15.6	43 80	70.0	22 28.5	43 79	69.5	22 41.3	42 79	69.0	23 06.6	42 79	68.0	23 56.1	41 77	66.0	24 44.1	39 76	64.0	24 55.8	39 76	63.5	25 19.0	38 75	62.5	80
1	21 27.8	44 79	69.6	21 40.9	43 79	69.1	21 53.8	43 79	68.6	22 19.5	42 78	67.6	23 09.7	41 77	65.6	23 58.4	40 76	63.7	24 10.3	40 76	63.2	24 33.9	39 75	62.1	1
2	20 40.2	44 79	69.2	20 53.3	44 79	68.7	21 06.5	44 79	68.2	21 32.5	43 78	67.2	22 23.4	42 77	65.3	23 12.9	41 76	63.3	23 25.0	40 75	62.8	23 49.4	40 75	61.8	2
3	19 52.7	44 79	68.7	20 06.1	44 79	68.3	20 19.3	44 78	67.8	20 45.6	44 78	66.8	21 37.2	42 77	64.9	22 27.5	41 75	62.9	22 39.8	41 75	62.4	23 04.2	40 74	61.4	3
4	19 05.4	45 79	68.3	19 18.9	45 78	67.8	19 32.3	45 78	67.4	19 58.9	44 78	66.4	20 51.2	43 76	64.5	21 42.3	42 75	62.5	21 54.8	42 75	62.1	22 19.6	41 74	61.1	4
85	18 18.2	46 78	67.9	18 31.8	45 78	67.4	18 45.4	45 78	66.9	19 12.4	45 77	66.0	20 05.4	44 76	64.1	20 57.2	43 75	62.2	21 09.9	42 75	61.7	21 35.2	42 74	60.7	85
6	17 31.1	46 78	67.5	17 44.9	46 78	67.0	17 58.7	46 78	66.5	18 26.0	45 77	65.6	19 19.7	44 76	63.7	20 12.3	43 75	61.8	20 25.2	43 74	61.3	20 50.9	42 74	60.3	6
7	16 44.2	47 78	67.1	16 58.2	46 78	66.6	17 12.1	46 77	66.1	17 39.7	46 77	65.2	18 34.2	45 76	63.3	19 27.5	44 74	61.4	19 40.7	44 74	60.9	20 06.7	43 73	59.9	7
8	15 57.4	47 78	66.6	16 11.6	47 77	66.1	16 25.6	47 77	65.7	16 53.6	46 77	64.8	17 48.8	46 75	62.9	18 42.9	45 74	61.0	18 56.3	44 74	60.6	19 22.8	44 73	59.6	8
9	15 10.8	48 78	66.2	15 25.1	47 77	65.7	15 39.3	47 77	65.3	16 07.7	47 76	64.3	17 03.6	46 75	62.5	17 58.5	45 74	60.6	18 12.0	45 73	60.2	18 39.0	44 73	59.2	9
90	14 24.3	48 77	65.7	14 38.5	48 77	65.3	14 53.2	48 77	64.8	15 21.9	48 76	63.9	16 18.5	47 73	62.1	17 14.2	46 73	60.2	17 28.0	46 73	59.8	17 55.3	45 72	58.8	90

Lat. 32°

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	28°00' Alt.	Δd Δt	Az.	28°30' Alt.	Δd Δt	Az.	29°00' Alt.	Δd Δt	Az.	30°00' Alt.	Δd Δt	Az.	32°00' Alt.	Δd Δt	Az.	34°00' Alt.	Δd Δt	Az.	34°30' Alt.	Δd Δt	Az.	35°30' Alt.	Δd Δt	Az.	H.A.
00	30 00.0	1.00 1.01	180.0	29 30.0	1.00 1.01	180.0	29 00.0	1.00 1.01	180.0	28 00.0	1.00 1.01	180.0	26 00.0	1.00 1.01	180.0	24 00.0	1.00 1.01	180.0	23 30.0	1.00 1.01	180.0	22 30.0	1.00 1.01	180.0	00
1	29 59.5	1.00 1.02	179.0	29 29.6	1.00 1.02	179.0	28 59.6	1.00 1.02	179.0	27 59.6	1.00 1.02	179.0	25 59.6	1.00 1.02	179.1	23 59.6	1.00 1.02	179.1	23 29.6	1.00 1.02	179.1	22 29.6	1.00 1.02	179.1	1
2	29 58.2	1.00 1.04	178.0	29 28.2	1.00 1.04	178.0	28 58.2	1.00 1.04	178.0	27 58.3	1.00 1.04	178.0	25 58.3	1.00 1.03	178.1	23 58.4	1.00 1.03	178.2	23 28.4	1.00 1.03	178.2	22 28.4	1.00 1.03	178.2	2
3	29 55.9	1.00 1.05	176.9	29 26.0	1.00 1.05	177.0	28 56.0	1.00 1.05	177.0	27 56.1	1.00 1.05	177.1	25 56.2	1.00 1.05	177.2	23 56.4	1.00 1.05	177.3	23 26.5	1.00 1.05	177.4	22 26.5	1.00 1.05	177.4	3
4	29 52.8	1.00 1.07	175.9	29 22.8	1.00 1.07	176.0	28 52.9	1.00 1.07	176.0	27 53.0	1.00 1.06	176.1	25 53.3	1.00 1.06	176.2	23 53.6	1.00 1.06	176.4	23 23.7	1.00 1.06	176.5	22 23.7	1.00 1.06	176.5	4
05	29 48.7	1.00 1.08	174.9	29 18.8	1.00 1.08	175.0	28 48.9	1.00 1.08	175.0	27 49.1	1.00 1.08	175.1	25 49.5	1.00 1.08	175.3	23 49.9	1.00 1.07	175.5	23 20.0	1.00 1.07	175.5	22 20.2	1.00 1.07	175.6	05
6	29 43.7	99 10	173.9	29 13.9	99 10	174.0	28 44.0	99 10	174.0	27 44.4	99 09	174.1	25 44.9	1.00 1.09	174.4	23 45.5	1.00 1.09	174.6	23 15.7	1.00 1.09	174.6	22 15.9	1.00 1.08	174.7	6
7	29 37.9	99 11	172.9	29 08.1	99 11	173.0	28 38.3	99 11	173.0	27 38.7	99 11	173.2	25 39.5	99 10	173.4	23 40.3	99 10	173.7	23 10.5	99 10	173.7	22 10.9	99 10	173.8	7
8	29 31.1	99 13	171.9	29 01.4	99 13	172.0	28 31.7	99 12	172.0	27 32.2	99 12	172.2	25 33.3	99 12	172.5	23 34.3	99 11	172.8	23 04.5	99 11	172.8	22 05.0	99 11	173.0	8
9	29 23.5	99 14	170.9	28 53.9	99 14	171.0	28 24.2	99 14	171.1	27 24.9	99 14	171.2	25 26.2	99 13	171.6	23 27.5	99 13	171.9	22 57.8	99 13	172.0	21 58.4	99 12	172.1	9
10	29 15.0	99 16	169.9	28 45.4	99 15	170.0	28 15.9	99 15	170.1	27 16.7	99 15	170.3	25 18.3	99 14	170.6	23 19.9	99 14	171.0	22 50.3	99 14	171.1	21 51.1	99 14	171.2	10
1	29 05.6	98 17	168.9	28 36.2	98 17	169.0	28 06.7	98 17	169.1	27 07.7	98 16	169.3	25 09.6	98 16	169.7	23 11.5	98 15	170.1	22 42.0	98 15	170.2	21 42.9	98 15	170.4	1
2	28 55.4	98 18	167.9	28 26.0	98 18	168.0	27 56.6	98 18	168.1	26 57.8	98 18	168.3	25 00.1	98 17	168.8	23 02.4	98 17	169.2	22 33.0	98 16	169.3	21 34.0	98 16	169.5	2
3	28 44.3	98 20	166.9	28 15.0	98 20	167.0	27 45.7	98 20	167.2	26 47.1	98 19	167.4	24 49.8	98 18	167.9	22 52.5	98 18	168.3	22 23.1	98 18	168.4	21 24.4	98 18	168.7	3
4	28 32.3	97 21	165.9	28 03.2	97 21	166.1	27 34.0	97 21	166.2	26 35.6	97 20	166.4	24 38.8	97 20	167.0	22 41.8	97 19	167.4	22 12.5	98 19	167.6	21 14.0	98 19	167.8	4
15	28 19.6	97 23	165.0	27 50.5	97 22	165.1	27 21.4	97 22	165.2	26 23.3	97 22	165.5	24 26.9	97 21	166.0	22 30.4	97 20	166.6	22 01.2	97 20	166.7	21 02.9	97 20	167.0	15
6	28 05.9	96 24	164.0	27 37.0	96 24	164.1	27 08.1	96 24	164.3	26 10.1	97 23	164.6	24 14.2	97 22	165.1	22 18.2	97 22	165.7	21 49.1	97 21	165.8	20 51.1	97 21	166.1	6
7	27 51.5	96 26	163.0	27 22.7	96 25	163.2	26 53.9	96 25	163.3	25 56.2	96 25	163.6	24 00.8	96 24	164.3	22 05.2	96 23	164.8	21 36.3	96 23	165.0	20 38.5	96 22	165.3	7
8	27 36.2	96 27	162.1	27 07.6	96 27	162.2	26 38.9	96 26	162.4	25 41.5	96 26	162.7	23 46.6	96 25	163.4	21 51.5	96 24	164.0	21 22.8	96 24	164.1	20 25.2	96 23	164.4	8
9	27 20.2	95 28	161.1	26 51.6	95 28	161.3	26 23.1	95 28	161.5	25 26.0	95 27	161.8	23 31.6	95 26	162.5	21 37.1	95 25	163.1	21 08.5	96 25	163.3	20 11.2	96 25	163.6	9
20	27 03.3	95 29	160.2	26 34.9	95 29	160.4	26 06.5	95 29	160.5	25 09.7	95 28	160.9	23 16.0	95 27	161.6	21 22.0	95 26	162.3	20 53.5	95 26	162.4	19 56.4	95 26	162.8	20
1	26 45.6	94 31	159.2	26 17.4	94 30	159.4	25 49.2	94 30	159.6	24 52.7	94 30	160.0	22 59.5	94 29	160.7	21 05.8	94 28	161.4	20 37.8	95 27	161.6	19 41.0	95 27	161.9	1
2	26 27.2	93 32	158.3	25 59.2	94 32	158.5	25 31.1	94 31	158.7	24 34.9	94 31	159.1	22 42.4	94 30	159.9	20 49.6	94 29	160.6	20 21.4	94 28	160.8	19 24.9	94 28	161.1	2
3	26 08.1	93 33	157.4	25 40.2	93 33	157.6	25 12.3	93 33	157.8	24 16.4	93 32	158.2	22 24.5	93 31	159.0	20 32.3	94 30	159.8	20 04.3	94 30	160.0	19 08.1	94 29	160.3	3
4	25 48.1	92 34	156.5	25 20.4	92 34	156.7	24 52.7	92 34	156.9	23 57.1	93 33	157.3	22 05.9	93 32	158.1	20 14.4	93 31	158.9	19 46.5	93 31	159.1	18 50.6	93 30	159.5	4
25	25 27.5	92 36	155.6	24 59.9	92 35	155.8	24 32.4	92 35	156.5	23 37.2	92 34	156.5	21 46.6	92 33	157.3	19 55.8	92 32	158.1	19 28.0	92 32	158.3	18 32.5	93 31	158.7	25
6	25 06.1	91 37	154.7	24 38.7	91 37	154.9	24 11.3	91 36	155.1	23 16.5	91 36	155.6	21 26.6	92 34	156.5	19 36.5	92 33	157.3	19 08.9	92 33	157.5	18 13.7	92 32	157.9	6
7	24 44.0	91 38	153.8	24 16.8	91 38	154.0	23 49.6	91 37	154.3	22 55.1	91 37	154.7	21 06.0	91 36	155.6	19 16.5	91 34	156.5	18 49.1	91 34	156.7	17 54.5	91 33	157.1	7
8	24 21.2	90 39	152.9	23 54.2	90 39	153.2	23 27.2	90 38	153.4	22 33.1	90 38	153.9	20 44.6	90 37	154.8	18 55.9	91 35	155.7	18 28.7	91 35	155.9	17 34.2	91 35	156.4	8
9	23 57.7	89 40	152.1	23 30.9	89 40	152.3	23 04.0	89 40	152.6	22 10.3	90 39	153.0	20 22.6	90 38	154.0	18 34.6	90 36	154.9	18 07.6	90 36	155.1	17 13.5	90 36	155.6	9
30	23 33.5	89 41	151.2	23 06.9	89 41	151.5	22 40.3	89 41	151.7	21 46.9	89 40	152.2	20 00.0	89 39	153.2	18 12.8	89 38	154.1	17 45.9	90 37	154.4	16 52.1	90 37	154.8	30
1	23 08.7	88 42	150.4	22 42.3	88 42	150.6	22 15.8	88 42	150.9	21 22.9	88 41	151.4	19 36.7	89 40	152.4	17 50.2	89 39	153.3	17 23.6	89 38	153.6	16 30.2	89 38	154.1	1
2	22 43.2	87 44	149.5	22 17.0	87 43	149.8	21 50.7	87 43	150.0	20 58.2	88 42	150.6	19 12.8	88 41	151.6	17 27.1	88 40	152.6	17 00.6	88 39	152.8	16 07.6	88 39	153.3	2
3	22 17.0	87 45	148.7	21 51.0	87 44	149.0	21 25.0	87 44	149.2	20 32.9	87 43	149.8	18 48.3	87 42	150.8	17 03.4	88 41	151.8	16 37.1	88 40	152.1	15 44.5	88 40	152.6	3
4	21 50.3	86 46	147.9	21 24.5	86 45	148.1	20 58.7	86 45	148.4	20 06.9	86 44	149.0	18 23.2	87 43	150.0	16 39.1	87 42	151.1	16 13.0	87 41	151.3	15 20.8	87 41	151.8	4
35	21 22.9	85 47	147.1	20 57.3	85 46	147.3	20 31.7	85 46	147.6	19 40.4	86 45	148.2	17 57.4	86 44	149.2	16 14.1	86 42	150.3	15 48.3	86 42	150.6	14 56.5	86 41	151.1	35
6	20 54.9	85 48	146.2	20 29.6	85 47	146.5	20 04.1	85 47	146.8	19 13.2	85 46	147.4	17 31.1	85 45	148.5	15 48.7	86 43	149.6	15 23.0	86 43	149.8	14 31.6	86 42	150.4	6
7	20 26.4	84 48	145.5	20 01.2	84 48	145.7	19 36.0	84 48	146.0	18 45.5	84 47	146.6	17 04.2	85 46	147.7	15 22.6	85 44	148.8	14 57.1	85 44	149.1	14 06.2	85 43	149.7	7
8	19 57.2	83 50	144.7	19 32.3	83 49	144.9	19 07.3	83 49	145.3	18 17.2	84 48	145.8	16 36.8	84 47	147.0	14 56.3	84 45	148.1	14 30.7	84 45	148.4	13 40.2	84 44	148.9	8
9	19 27.5	82 50	143.9	19 02.8	83 50	144.2	18 38.0	83 50	144.5	17 48.4	83 49	145.1	16 08.8	83 46	146.2	14 28.8	83 46	147.4	14 03.8	84 46	147.7	13 13.7	84 45	148.2	9
40	18 57.3	82 51	143.1	18 32.7	82 51	143.4	18 08.2	82 51	143.7	17 19.0	82 50	144.3	15 40.3	82 48	145.5	14 01.2	83 47	146.7	13 36.3	83 47	147.0	12 46.6	83 46	147.5	40
1	18 26.5	81 52	142.4	18 02.2	81 52	142.7	17 37.8	81 52	143.0	16 49.0	81 51	143.6	15 11.2	82 49	144.8	13 33.0	82 48	146.0	13 08.3	82 48	146.3	12 19.1	82 47	146.9	1
2	17 55.1	80 53	141.6	17 31.0	80 53	141.9	17 06.9	80 52	142.2	16 18.6	81 52	142.9	14 41.6	81 50	144.1	13 04.2	81 49	145.3	12 39.8	81 48	145.6	11 51.0	81 48	146.2	2
3	17 23.3	80 54	140.9	16 59.4	80 54	141.2	16 35.5	80 53	141.5	15 47.6	80 52	142.1	14 11.5	80 51	143.4	12 35.0	81 50	144.6	12 10.8	81 49	144.9	11 22.4	81 48	145.5	3
4	16 50.9	79 55	140.1	16 27.3	79 54	140.5	16 03.6	79 54	140.8	15 16.1	79 53	141.4	13 40.9	80 52	142.7	12 05.3	80 50	143.9	11 41.3	80 50	144.2	10 53.4	80 49	144.8	4
45	16 18.1	78 56	139.4	15 54.6	78 55	139.7	15 31.2	78 55	140.1	14 44.1	78 54	140.7	13 09.8	79 53	142.0	11 35.1	79 51	143.2	11 11.3	79 51	143.6	10 23.8	79 50	144.2	45
6	15 44.7	77 56	138.7	15 21.5	77 56	139.0	14 58.3	77 56	139.4	14 11.7	78 55	140.0	12 38.2	78 53	141.3	11 04.4	78 52	142.6	10 40.9	78 52	142.9	9 53.8	79 51	143.5	6
7	15 10.9	77 57	138.0	14 47.9	77 57	138.3	14 24.9	77 56	138.7	13 38.8	77 56	139.3	12 06.2	77 54	140.6	10 33.2	78 51	141.9	10 10.0	78 52	142.2	9 23.3	78 52	142.9	7
8	14 36.6	76 58	137.3	14 13.9	76 58	137.6	13 51.1	76 57	138.0	13 05.4	76 56	138.6	11 33.7	77 55	140.0	10 01.6	77 53	141.3	9 38.6	77 53	141.6	8 52.4	77 52	142.2	8
9	14 01.9	75 59	136.6	13 39.4	75 58	137.0	13 16.8	75 58	137.3	12 31.5	76 57	138.0	11 00.7	76 56	139.3	9 29.6	76 54	140.6	9 06.7	76 54	141.0	8 21.0	76 53	141.6	9
50	13 26.7	74 59	135.9	13 04.4	75 59	136.3	12 42.0	75 59	136.6	11 57.2	75 58	137.3	10 27.3	75 56	138.7	8 57.1	75 55	140.0	8 34.5	75 54	140.3	7 49.2	75 54	141.0	50
1	12 51.2	74 60	135.3	12 29.0	74 60	135.6	12 06.9	74 59	136.0	11 22.5	74 59	136.6	9 53.5	74 57	138.0	8 24.1	75 56	139.4	8 01.8	75 55	139.7	7 17.0	75 54	140.4	1
2	12 15.1	73 61	134.6	11 53.2	73 60	135.0	11 31.3	73 60	135.3	10 47.4	73 59	136.0	9 19.2	74 58	137.4	7 50.8	74 56	138.7	7 28.6	74 56	139.1	6 44.3	74 55	139.8	2
3	11 38.7	72 61	133.9	11 17.0	72 61	134.3	10 55.3	72 61	134.7	10 11.8	73 60	135.4	8 44.6	73 58	136.7	7 17.0	73 57	138.1	6 55.1	73 57	138.5	6 11.2	73 56	139.2	3
4	11 01.9	72 62	133.3	10 40.4	72 62	133.7	10 18.9	72 61	134.0	9 35.9	72 61	134.7	8 09.5	72 59	136.1	6 42.9	72 58	137.5	6 21.2	72 57	137.9	5 37.7	72 56	138.6	4
55	10 24.6	71 63	132.7	10 03.4	71 62	133.0	9 42.1	71 62	133.4	8 59.5	71 61	134.1	7 34.0	71 60	135.5	6 08.3	71 58	136.9	5 46.8	71 58	137.3	5 03.9	72 57	138.0	55
6	9 47.0	70 63	132.0	9 26.0	70 63	132.4	9 04.9	70 63	132.8	8 22.8	70 62	133.5	6 58.2	71 60	134.9	5 33.4	71 59	136.3							6
7	9 09.0	69 64	131.4	8 48.2	69 64	131.8	8 27.4	69 63	132.1	7 45.7	70 62	132.9	6 22.0	70 61	134.3										7
8	8 30.7	69 64	130.8	8 10.1	69 64	131.2	7 49.5	69 64	131.5	7 08.2	69 63	132.3	5 45.4	69 62	133.7										8
9	7 52.0	68 65	130.2	7 31.6	68 65	130.6	7 11.2	68 64	130.9	6 30.3	68 64	131.7	5 08.4	68 62	133.1										9
60	7 13.0	67 66	129.6	6 52.8	67 65	130.0	6 32.6	67 65	130.3	5 52.1	67 64	131.1													60
1	6 33.6	67 66	129.0	6 13.6	67 66	129.4	5 53.6	67 66	129.7	5 13.6	67 65	130.5													1
2	5 53.9	66 67	128.4	5 34.1	66 66	128.8	5 14.3	66 66	129.2																2
3	5 13.8	65 67	127.8																						3

DECLINATION SAME NAME AS LATITUDE

H.A.	28°00' Alt.	Δd Δt	Az.	28°30' Alt.	Δd Δt	Az.	29°00' Alt.	Δd Δt	Az.	30°00' Alt.	Δd Δt	Az.	32°00' Alt.	Δd Δt	Az.	34°00' Alt.	Δd Δt	Az.	34°30' Alt.	Δd Δt	Az.	35°30' Alt.	Δd Δt	Az.	H.A.
91	13 38.0	49 77	65.3	13 52.7	49 77	64.8	14 07.2	49 76	64.4	14 36.5	48 76	63.5	15 33.7	47 74	61.7	16 30.1	47 73	59.8	16 44.1	46 73	59.4	17 11.9	46 72	58.4	91
2	12 51.9	49 77	64.8	13 06.7	49 76	64.4	13 21.4	49 76	63.9	13 50.8	49 75	63.0	14 49.0	48 74	61.2	15 46.3	47 73	59.4	16 00.4	47 72	59.0	16 28.6	47 72	58.0	2
3	12 05.9	50 76	64.4	12 20.9	50 76	63.9	12 35.8	50 76	63.5	13 05.5	49 75	62.6	14 04.4	49 74	60.8	15 02.5	48 73	59.0	15 16.9	48 72	58.6	15 45.5	48 72	57.6	3
4	11 20.1	51 76	63.9	11 35.3	50 76	63.5	11 50.4	50 76	63.1	12 20.5	50 75	62.2	13 20.1	49 74	60.4	14 19.0	49 72	58.6	14 33.6	49 72	58.1	15 02.7	48 71	57.2	4
95	10 34.5	51 76	63.5	10 49.8	51 75	63.0	11 05.1	51 75	62.6	11 35.5	51 75	61.7	12 36.0	50 73	60.0	13 35.7	49 72	58.2	13 50.5	49 72	57.7	14 20.0	49 71	56.8	95
6	9 49.1	52 76	63.0	10 04.6	52 75	62.6	10 20.0	51 75	62.1	10 50.8	51 74	61.3	11 52.0	51 73	59.5	12 52.5	50 72	57.8	13 07.6	50 71	57.3	13 37.5	50 70	56.4	6
7	9 03.8	52 75	62.6	9 19.5	52 75	62.1	9 35.1	52 74	61.7	10 06.3	52 74	60.8	11 08.3	51 73	59.1	12 09.6	51 71	57.3	12 24.8	51 71	56.9	12 55.2	50 70	56.0	7
8	8 18.7	53 75	62.1	8 34.6	53 74	61.7	8 50.4	53 74	61.2	9 22.0	52 74	60.4	10 24.7	52 72	58.6	11 26.9	52 71	56.9	11 42.3	51 70	56.5	12 13.1	51 70	55.6	8
9	7 33.9	53 74	61.6	7 49.9	53 74	61.2	8 05.9	53 74	60.8	8 37.9	53 73	59.9	9 41.4	53 72	58.2	10 44.4	52 70	56.5	11 00.0	52 70	56.0	11 31.2	52 69	55.1	9
100	6 49.2	54 74	61.1	7 05.4	54 74	60.7	7 21.6	54 73	60.3	7 53.9	54 73	59.4	8 58.2	54 72	57.7	10 02.1	53 70	56.0	10 17.9	53 70	55.6	10 49.6	53 69	54.7	100
1	6 04.8	55 74	60.6	6 21.2	55 73	60.2	6 37.5	55 73	59.8	7 10.2	54 73	59.0	8 15.3	54 71	57.3	9 20.0	54 70	55.6	9 36.1	54 69	55.1	10 08.2	53 69	54.3	1
2	5 20.5	55 74	60.2	5 37.1	55 73	59.7	5 53.7	55 73	59.3	6 26.7	55 72	58.5	7 32.6	55 71	56.8	8 38.1	54 69	55.1	8 54.5	54 69	54.7	9 27.0	54 68	53.8	2
3							5 10.0	56 72	58.8	5 43.5	55 72	58.0	6 50.2	55 70	56.3	7 56.5	55 69	54.6	8 13.1	55 69	54.2	8 46.0	55 68	53.4	3
4										5 00.4	56 71	57.5	6 07.9	56 70	55.9	7 15.1	55 69	54.2	7 31.9	55 68	53.8	8 05.3	55 67	52.9	4
105													5 26.0	57 70	55.4	6 34.0	57 68	53.7	6 51.0	57 68	53.3	7 24.8	56 67	52.5	105
6																5 53.1	57 68	53.2	6 10.3	57 67	52.8	6 44.6	57 67	52.0	6
7																5 12.5	58 67	52.8	5 29.4	58 67	52.4	6 04.6	56 66	51.5	7
8																						5 24.9	59 66	51.1	8

Lat. 32° · Lat. 33° · Lat. 34° · Lat. 35° · Lat. 36° · Lat. 37° · Lat. 38°

Lat. 32° — DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00' Alt.	Δd Δt	Az.	37° 00' Alt.	Δd Δt	Az.	38° 30' Alt.	Δd Δt	Az.	40° 00' Alt.	Δd Δt	Az.	42° 00' Alt.	Δd Δt	Az.	42° 30' Alt.	Δd Δt	Az.	43° 00' Alt.	Δd Δt	Az.	45° 00' Alt.	Δd Δt	Az.	H.A.
00	86 00.0	1.0 08	00.0	85 00.0	1.0 07	00.0	83 30.3	1.0 05	00.0	82 00.0	1.0 04	00.0	80 00.0	1.0 03	00.0	79 30.0	1.0 03	00.0	79 00.0	1.0 03	00.0	77 00.0	1.0 02	00.0	00
1	85 54.9	98 24	11.4	84 56.0	99 20	09.1	83 26.9	99 15	06.9	81 57.6	99 12	05.5	79 58.1	1.0 09	04.3	79 28.2	1.0 09	04.0	78 58.3	1.0 08	03.8	76 58.6	1.0 07	03.1	1
2	85 40.2	92 38	22.0	84 44.1	95 31	17.7	83 17.9	97 24	13.5	81 50.3	98 20	10.9	79 52.4	99 16	08.5	79 22.9	99 15	08.0	78 53.2	99 14	07.6	76 54.4	99 12	06.3	2
3	85 17.4	84 49	31.0	84 25.4	89 41	25.5	83 03.3	93 33	19.8	81 38.5	95 27	16.0	79 43.1	97 21	12.6	79 14.0	97 20	11.9	78 45.3	97 19	11.3	76 47.5	98 16	09.3	3
4	84 48.3	76 56	38.6	84 00.8	82 49	32.3	82 43.6	88 40	25.5	81 22.4	92 33	20.9	79 30.3	95 27	15.7	79 01.9	95 25	14.9	78 33.3	95 24	14.9	76 38.0	97 20	12.3	4
05	84 14.5	68 62	44.6	83 31.4	76 55	38.1	82 19.6	83 46	30.7	81 02.4	88 39	25.4	79 14.2	92 32	20.3	78 46.6	93 30	19.3	78 18.8	93 29	18.3	76 25.9	95 24	15.2	05
6	83 37.2	60 66	49.5	82 58.3	69 60	43.0	81 51.9	78 51	35.3	80 38.9	84 44	29.5	78 55.1	89 37	23.8	78 28.4	90 35	22.7	78 01.4	90 33	21.6	76 11.3	93 28	18.0	6
7	82 57.3	54 70	53.5	82 22.2	63 64	47.1	81 21.0	73 56	39.4	80 12.4	79 49	33.3	78 33.2	85 41	27.2	78 07.4	86 39	25.9	77 41.3	87 37	24.7	75 54.4	91 32	20.7	7
8	82 15.5	48 72	56.7	81 43.9	57 67	50.6	80 47.5	68 59	42.9	79 43.2	75 52	36.7	78 08.8	82 45	30.2	77 44.0	83 43	28.9	77 18.9	84 41	27.6	75 35.3	88 35	23.3	8
9	81 32.4	43 74	59.3	81 03.7	52 69	53.5	80 11.9	63 62	46.0	79 11.7	71 56	39.7	77 42.0	78 48	33.1	77 18.4	80 46	31.7	76 54.2	81 44	30.3	75 14.2	85 38	25.7	9
10	80 48.1	39 75	61.5	80 22.1	47 71	56.0	79 34.4	58 65	48.7	78 38.2	66 59	42.5	77 13.3	75 51	35.7	76 50.7	76 49	34.2	76 27.6	78 47	32.8	74 51.2	83 41	28.0	10
1	80 03.0	35 76	63.3	79 39.4	43 73	58.1	78 55.5	54 67	51.0	78 03.1	62 61	44.9	76 42.7	71 54	38.1	76 21.2	73 52	36.6	75 59.1	74 50	35.2	74 26.4	80 44	30.2	1
2	79 17.2	32 77	64.8	78 55.8	40 74	59.9	78 15.4	50 69	53.1	77 26.4	59 63	47.1	76 10.6	67 56	40.3	75 50.1	69 54	38.8	75 29.0	71 53	37.3	74 00.1	77 46	32.2	2
3	78 31.0	29 78	66.1	78 11.5	36 75	61.4	77 34.2	46 70	54.9	76 48.6	55 65	49.0	75 37.0	64 58	42.3	75 17.5	66 56	40.8	74 57.4	68 55	39.3	73 32.2	74 49	34.1	3
4	77 44.2	26 78	67.1	77 26.5	33 76	62.7	76 52.2	43 71	56.5	76 09.6	51 66	50.8	75 02.1	61 60	44.1	74 43.6	63 58	42.6	74 24.5	65 57	41.2	73 03.0	71 51	35.9	4
15	76 57.2	23 79	68.1	76 41.1	30 76	63.8	76 09.5	40 72	57.8	75 29.8	48 68	52.3	74 26.2	58 62	45.8	74 08.6	60 60	44.3	73 50.5	61 59	42.9	72 32.5	68 53	37.6	15
6	76 09.9	21 79	68.8	75 55.2	28 77	64.8	75 26.1	37 73	59.1	74 49.1	45 69	53.7	73 49.2	54 63	47.3	73 32.6	56 62	45.8	73 15.4	58 60	44.4	72 00.9	65 54	39.1	6
7	75 22.3	19 80	69.5	75 09.0	25 77	65.7	74 42.2	34 74	60.1	74 07.8	42 70	55.0	73 11.4	51 64	48.7	72 55.7	54 63	47.2	72 39.3	56 62	45.8	71 28.3	63 56	40.6	7
8	74 34.6	17 80	70.1	74 22.5	23 78	66.4	73 57.8	32 75	61.1	73 25.8	39 71	56.1	72 32.8	49 65	50.0	72 17.9	51 64	48.5	72 02.4	53 63	47.1	70 54.8	60 57	41.9	8
9	73 46.7	15 80	70.5	73 35.8	21 78	67.0	73 13.1	29 75	61.9	72 43.3	37 72	57.1	71 53.5	46 66	51.1	71 39.4	48 65	49.7	71 24.7	50 64	48.3	70 20.3	57 59	43.2	9
20	72 58.6	14 80	70.9	72 48.8	19 79	67.6	72 28.0	27 76	62.7	72 00.4	34 72	58.0	71 13.6	43 67	52.2	71 00.3	45 66	50.8	70 46.4	47 65	49.4	69 45.1	55 60	44.3	20
1	72 10.5	12 80	71.3	72 01.7	17 79	68.1	71 42.7	25 76	63.4	71 17.0	32 73	58.8	70 33.2	41 68	53.1	70 20.6	43 67	51.8	70 07.5	45 66	50.4	69 09.2	52 61	45.4	1
2	71 22.2	10 81	71.6	71 14.4	16 79	68.5	70 57.1	23 76	63.9	70 33.3	30 73	59.5	69 52.2	38 69	54.0	69 40.4	40 68	52.7	69 28.0	42 67	51.4	68 32.7	50 62	46.4	2
3	70 33.9	09 81	71.8	70 27.0	14 79	68.8	70 11.3	21 77	64.5	69 49.3	28 74	60.2	69 10.9	36 70	54.8	68 59.7	38 68	53.5	68 48.0	40 67	52.2	67 55.6	47 63	47.3	3
4	69 45.6	08 81	72.0	69 39.5	12 79	69.1	69 25.3	19 77	64.9	69 05.0	26 74	60.8	68 29.1	34 70	55.5	68 18.6	36 69	54.2	68 07.6	38 68	53.0	67 17.9	45 64	48.2	4
25	68 57.2	06 81	72.2	68 52.0	11 79	69.4	68 39.1	18 77	65.3	68 20.5	24 75	61.3	67 47.0	32 71	56.2	67 37.2	34 70	54.9	67 26.7	36 69	53.7	66 39.7	43 64	49.0	25
6	68 08.7	05 81	72.3	68 04.3	10 80	69.6	67 52.8	16 77	65.7	67 35.8	22 75	61.8	67 04.6	30 71	56.8	66 55.4	32 70	55.5	66 45.6	34 69	54.3	66 01.1	40 65	49.7	6
7	67 20.2	04 81	72.4	67 16.6	08 80	69.8	67 06.4	14 78	66.0	66 50.8	20 75	62.2	66 21.9	28 72	57.3	66 13.3	30 71	56.1	66 04.1	31 70	54.9	65 22.1	38 66	50.4	7
8	66 31.7	03 81	72.5	66 28.8	07 80	70.0	66 19.9	13 78	66.2	66 05.8	19 75	62.6	65 39.0	26 72	57.8	65 30.9	28 71	56.6	65 22.3	30 70	55.5	64 42.8	38 66	51.0	8
9	65 43.2	02 81	72.5	65 40.9	06 80	70.1	65 33.3	11 78	66.5	65 20.5	17 76	62.9	64 55.8	24 72	58.2	64 48.3	26 71	57.1	64 40.2	28 70	56.0	64 03.1	34 67	51.6	9
30	64 54.6	01 81	72.5	64 53.1	04 80	70.2	64 46.6	10 78	66.7	64 35.2	15 76	63.2	64 12.4	22 73	58.6	64 05.4	24 72	57.5	63 58.0	26 71	56.4	63 23.1	32 67	52.1	30
1	64 06.1	00 81	72.5	64 05.2	03 80	70.3	63 59.9	09 78	66.8	63 49.7	14 76	63.4	63 28.9	21 73	59.0	63 22.4	22 72	57.9	63 15.5	24 71	56.8	62 42.8	30 68	52.6	1
2	63 17.5	01 81	72.5	63 17.3	02 80	70.3	63 13.0	07 78	67.0	63 04.1	12 76	63.7	62 45.2	19 73	59.3	62 39.2	21 72	58.3	62 32.8	22 71	57.2	62 02.2	29 68	53.0	2
3	62 29.0	02 81	72.5	62 29.4	01 80	70.3	62 26.2	06 78	67.1	62 18.5	11 76	63.9	62 01.4	18 73	59.6	61 55.9	19 72	58.6	61 49.9	21 72	57.5	61 21.4	27 68	53.5	3
4	61 40.3	03 81	72.5	61 41.5	01 80	70.3	61 39.3	05 78	67.2	61 32.8	10 76	64.0	61 17.4	16 73	59.9	61 12.4	17 73	58.9	61 06.9	19 72	57.8	60 40.5	25 69	53.8	4
35	60 52.0	04 81	72.4	60 53.1	02 80	70.3	60 52.4	04 78	67.3	60 47.0	08 76	64.2	60 33.3	14 74	60.1	60 28.8	16 73	59.1	60 23.8	17 72	58.1	59 59.3	23 69	54.2	35
6	60 03.5	05 81	72.3	60 05.6	02 80	70.3	60 05.0	03 78	67.3	60 01.2	07 76	64.3	59 49.2	13 74	60.3	59 45.1	14 73	59.3	59 40.5	16 72	58.4	59 18.0	22 69	54.5	6
7	59 15.0	06 81	72.2	59 17.7	03 80	70.3	59 18.5	01 78	67.3	59 15.3	06 76	64.4	59 04.9	12 74	60.5	59 01.2	13 73	59.5	58 57.1	14 72	58.6	58 36.5	20 69	54.8	7
8	58 26.6	07 81	72.1	58 29.9	04 80	70.2	58 31.6	00 78	67.3	58 29.4	05 77	64.5	58 20.6	10 74	60.7	58 17.3	12 73	59.7	58 13.7	13 73	58.8	57 54.8	18 70	55.0	8
9	57 38.2	08 81	72.0	57 42.0	05 80	70.1	57 44.6	01 78	67.3	57 43.5	03 77	64.5	57 36.2	09 74	60.8	57 33.4	10 73	59.9	57 30.1	11 73	58.9	57 13.1	17 70	55.3	9
40	56 49.8	09 81	71.9	56 54.1	06 80	70.1	56 57.6	02 78	67.3	56 57.5	02 77	64.6	56 51.8	07 74	60.9	56 49.3	09 73	60.0	56 46.5	10 73	59.1	56 31.2	15 70	55.5	40
1	56 01.5	09 80	71.8	56 06.3	07 80	70.0	56 10.7	03 78	67.3	56 11.6	01 77	64.6	56 07.3	06 74	61.0	56 05.2	07 74	60.1	56 02.8	09 73	59.2	55 49.2	14 70	55.7	1
2	55 13.1	10 80	71.6	55 18.5	08 80	69.9	55 23.8	04 78	67.2	55 25.6	00 77	64.6	55 22.8	05 74	61.1	55 21.1	06 74	60.2	55 19.1	07 73	59.3	55 07.2	12 70	55.8	2
3	54 24.9	11 80	71.5	54 30.8	09 80	69.8	54 36.9	05 78	67.2	54 39.7	01 77	64.6	54 38.2	04 74	61.1	54 36.9	05 74	60.3	54 35.3	06 73	59.4	54 25.0	11 70	56.0	3
4	53 36.7	12 80	71.3	53 43.0	09 79	69.6	53 50.0	06 78	67.1	53 53.7	02 77	64.6	53 53.6	02 74	61.2	53 52.7	04 74	60.3	53 51.5	05 73	59.5	53 42.8	10 70	56.1	4
45	52 48.5	13 80	71.1	52 55.4	10 79	69.5	53 03.1	07 78	67.0	53 07.8	03 77	64.5	53 09.1	01 74	61.2	53 08.5	02 74	60.4	53 07.6	04 73	59.5	53 00.6	08 71	56.2	45
6	52 00.4	13 80	71.0	52 07.7	11 79	69.4	52 16.3	08 78	66.9	52 21.8	04 76	64.5	52 24.5	00 74	61.2	52 24.3	01 74	60.4	52 23.8	02 73	59.6	52 18.3	07 71	56.3	6
7	51 12.3	14 80	70.8	51 20.1	12 79	69.2	51 29.5	09 78	66.8	51 35.9	06 76	64.4	51 39.9	01 74	61.2	51 40.1	00 74	60.4	51 39.9	01 73	59.6	51 35.9	06 71	56.4	7
8	50 24.2	15 80	70.6	50 32.6	13 79	69.1	50 42.7	10 78	66.7	50 50.0	07 76	64.3	50 55.3	02 74	61.2	50 55.8	01 74	60.4	50 56.0	00 73	59.6	50 53.5	04 71	56.4	8
9	49 36.3	16 80	70.4	49 45.1	14 79	68.9	49 56.0	11 78	66.6	50 04.2	08 76	64.3	50 10.7	03 74	61.1	50 11.6	02 74	60.4	50 12.1	01 73	59.6	50 11.1	03 71	56.5	9
50	48 48.4	16 80	70.2	48 57.7	14 79	68.7	49 09.4	12 78	66.4	49 18.4	09 76	64.2	49 26.2	04 74	61.1	49 27.4	03 74	60.3	49 28.3	02 73	59.6	49 28.7	02 71	56.5	50
1	48 00.5	17 80	70.0	48 10.3	15 79	68.5	48 22.7	12 78	66.3	48 32.6	09 76	64.1	48 41.7	06 74	61.0	48 43.2	05 74	60.3	48 44.4	04 73	59.5	48 46.3	00 71	56.5	1
2	47 12.7	18 80	69.8	47 22.9	16 79	68.3	47 36.2	13 78	66.2	47 46.9	10 76	63.9	47 57.1	07 74	61.0	47 59.0	06 74	60.2	48 00.5	05 73	59.5	48 03.9	01 71	56.5	2
3	46 25.0	19 79	69.6	46 35.7	17 79	68.2	46 49.7	14 77	66.0	47 01.2	11 76	63.8	47 12.7	08 74	60.9	47 14.8	07 74	60.2	47 16.7	06 73	59.4	47 21.4	02 71	56.5	3
4	45 37.4	19 79	69.4	45 48.5	18 79	68.0	46 03.2	15 77	65.8	46 15.6	12 76	63.7	46 28.2	09 74	60.8	46 30.7	08 73	60.1	46 32.9	07 73	59.4	46 39.0	03 71	56.4	4
55	44 49.8	20 79	69.1	45 01.4	18 78	67.8	45 16.8	16 77	65.7	45 30.0	13 76	63.5	45 43.8	10 74	60.7	45 46.6	09 73	60.0	45 49.2	08 73	59.3	45 56.6	04 71	56.4	55
6	44 02.3	21 79	68.9	44 14.3	19 78	67.5	44 30.5	17 77	65.5	44 44.4	14 76	63.4	44 59.5	11 74	60.6	45 02.6	10 73	59.9	45 05.5	09 73	59.2	45 14.3	06 71	56.4	6
7	43 14.8	21 79	68.7	43 27.3	20 78	67.3	43 44.2	18 77	65.3	43 59.0	15 76	63.2	44 15.2	12 74	60.5	44 18.6	11 73	59.8	44 21.8	10 73	59.1	44 31.9	07 70	56.3	7
8	42 27.5	22 79	68.4	42 40.4	21 78	67.1	42 58.1	18 77	65.1	43 13.6	16 76	63.1	43 30.9	13 74	60.3	43 34.7	12 73	59.7	43 38.2	11 73	59.0	43 49.6	08 70	56.2	8
9	41 40.2	23 79	68.2	41 53.6	22 78	66.9	42 11.9	19 77	64.9	42 28.3	17 75	62.9	42 46.7	14 74	60.2	42 50.8	13 73	59.5	42 54.6	12 73	58.9	43 07.3	09 70	56.1	9
60	40 53.0	24 79	67.9	41 06.8	22 78	66.6	41 25.9	20 77	64.7	41 43.0	18 75	62.7	42 02.6	15 73	60.1	42 07.0	14 73	59.4	42 11.0	13 72	58.7	42 25.1	10 70	56.0	60
1	40 05.9	24 78	67.7	40 20.1	23 78	66.4	40 39.9	21 76	64.5	40 57.8	19 75	62.5	41 18.6	16 73	59.9	41 23.2	15 73	59.3	41 27.6	14 72	58.6	41 42.9	11 70	55.9	1
2	39 18.9	25 78	67.4	39 33.6	24 78	66.2	39 54.1	22 76	64.3	40 12.7	20 75	62.3	40 34.6	17 73	59.8	40 39.5	16 73	59.1	40 44.2	15 72	58.5	41 00.8	12 70	55.8	2
3	38 31.9	26 78	67.1	38 47.1	25 77	65.9	39 08.3	23 76	64.0	39 27.7	21 75	62.1	39 50.6	18 73	59.6	39 55.9	17 73	58.9	40 00.9	16 72	58.3	40 18.7	13 70	55.7	3
4	37 45.1	27 78	66.9	38 00.7	25 77	65.7	38 22.6	23 76	63.8	38 42.7	21 75	61.9	39 06.8	19 73	59.4	39 12.3	18 72	58.8	39 17.6	17 72	58.1	39 36.7	15 70	55.6	4
65	36 58.3	27 78	66.6	37 14.4	26 77	65.4	37 37.0	24 76	63.6	37 57.9	22 75	61.7	38 23.0	20 73	59.2	38 28.8	19 72	58.6	38 34.4	18 72	58.0	38 54.8	16 70	55.4	65
6	36 11.7	28 78	66.3	36 28.1	27 77	65.1	36 51.5	25 76	63.3	37 13.1	23 74	61.5	37 39.4	21 73	59.0	37 45.4	20 72	58.4	37 51.3	19 72	57.8	38 12.9	17 70	55.3	6
7	35 25.1	29 77	66.0	35 42.0	28 77	64.9	36 06.0	26 76	63.1	36 28.5	24 74	61.3	36 55.8	22 72	58.8	37 02.1	21 72	58.2	37 08.3	20 72	57.6	37 31.1	18 70	55.1	7
8	34 38.7	29 77	65.8	34 56.0	28 76	64.6	35 20.7	27 75	62.8	35 43.9	25 74	61.0	36 12.3	22 72	58.6	36 18.9	22 72	58.0	36 25.4	21 71	57.4	36 49.4	19 69	55.0	8
9	33 52.4	30 77	65.5	34 10.1	29 76	64.3	34 35.5	27 75	62.6	34 59.4	26 74	60.8	35 28.9	23 72	58.4	35 35.8	23 72	57.8	35 42.6	22 71	57.2	36 07.8	20 69	54.8	9
70	33 06.1	31 77	65.2	33 24.3	30 76	64.0	33 50.4	29 75	62.3	34 15.0	27 74	60.6	34 45.5	24 72	58.2	34 52.6	24 72	57.6	34 59.8	23 71	57.0	35 26.2	21 69	54.6	70
1	32 20.0	32 77	64.9	32 38.6	31 76	63.7	33 05.4	29 75	62.0	33 30.8	27 74	60.3	34 02.4	25 72	58.0	34 09.9	25 71	57.4	34 17.2	24 71	56.8	34 44.4	22 69	54.5	1
2	31 34.0	32 76	64.6	31 53.1	31 76	63.4	32 20.5	30 75	61.8	32 46.6	28 73	60.1	33 19.3	26 72	57.8	33 27.0	26 71	57.2	33 34.6	25 71	56.6	34 03.4	23 69	54.3	2
3	30 48.1	33 76	64.3	31 07.6	32 76	63.1	31 35.8	31 74	61.5	32 02.6	29 73	59.8	32 36.3	27 71	57.5	32 44.3	27 71	57.0	32 52.2	26 71	56.4	33 22.2	24 69	54.1	3
4	30 02.2	34 76	63.9	30 22.3	33 75	62.8	30 51.1	31 74	61.2	31 18.7	30 73	59.5	31 53.4	28 71	57.3	32 01.7	27 71	56.7	32 09.9	27 70	56.1	32 41.0	25 68	53.9	4
75	29 16.7	34 76	63.6	29 37.0	34 75	62.5	30 06.6	32 74	60.9	30 34.9	31 73	59.3	31 10.7	29 71	57.1	31 19.3	28 70	56.5	31 27.7	28 70	55.9	32 00.0	26 68	53.6	75
6	28 31.2	35 76	63.3	28 52.0	34 75	62.2	29 22.2	33 74	60.6	29 51.2	32 73	59.0	30 28.1	30 71	56.8	30 36.9	29 70	56.2	30 45.6	29 70	55.7	31 19.1	27 68	53.4	6
7	27 45.8	36 75	63.0	28 07.0	35 75	61.9	28 37.9	34 74	60.3	29 07.7	32 72	58.7	29 45.5	31 71	56.5	29 54.7	30 70	56.0	30 03.7	30 70	55.4	30 38.2	28 68	53.2	7
8	27 00.5	36 75	62.6	27 22.2	36 74	61.6	27 53.8	35 73	60.0	28 24.3	33 72	58.4	29 03.2	32 70	56.3	29 12.6	31 70	55.7	29 21.8	31 70	55.2	29 57.6	29 68	53.0	8
9	26 15.4	37 75	62.3	26 37.5	36 74	61.2	27 09.9	35 73	59.7	27 41.0	34 72	58.1	28 20.9	32 70	56.0	28 30.4	32 70	55.4	28 40.1	32 69	54.9	29 17.0	30 67	52.7	9
80	25 30.4	38 75	62.0	25 52.9	37 74	60.9	26 25.9	36 73	59.4	26 57.9	35 71	57.8	27 38.8	33 70	55.8	27 48.8	33 70	55.2	27 58.6	33 69	54.6	28 36.6	31 67	52.5	80
1	24 45.6	39 74	61.6	25 08.5	38 74	60.6	25 42.2	37 73	59.1	26 14.9	36 71	57.5	26 56.8	34 70	55.4	27 07.1	34 69	54.9	27 17.1	33 69	54.4	27 56.3	32 67	52.2	1
2	24 00.9	39 74	61.3	24 24.3	39 74	60.3	24 58.6	38 72	58.8	25 32.0	37 71	57.2	26 15.0	35 69	55.1	26 25.5	35 69	54.6	26 35.9	34 69	54.1	27 16.1	33 67	52.0	2
3	23 16.3	40 74	60.9	23 40.1	39 73	60.0	24 15.2	38 72	58.4	24 49.3	37 71	56.8	25 33.3	36 69	54.8	25 43.9	36 69	54.3	25 54.7	35 68	53.8	26 36.1	34 66	51.7	3
4	22 31.9	41 74	60.6	22 56.2	40 73	59.6	23 31.9	39 72	58.1	24 06.8	38 71	56.6	24 51.8	37 69	54.6	25 02.8	37 68	54.0	25 13.6	36 68	53.5	25 56.3	34 66	51.4	4
85	21 47.7	41 73	60.2	22 12.4	41 73	59.2	22 48.8	40 72	57.8	23 24.4	39 70	56.3	24 10.5	38 69	54.2	24 21.7	37 68	53.7	24 32.9	37 68	53.2	25 16.5	36 66	51.2	85
6	21 03.6	42 73	59.9	21 28.7	42 72	58.9	22 05.8	41 71	57.4	22 42.1	40 70	55.9	23 29.2	39 68	53.9	23 40.8	38 68	53.4	23 52.2	38 68	52.9	24 37.0	37 66	50.9	6
7	20 19.6	43 73	59.5	20 45.3	42 72	58.5	21 23.0	42 71	57.1	22 00.1	41 70	55.6	22 48.2	39 68	53.6	23 00.0	39 68	53.1	23 11.7	39 67	52.6	23 57.6	38 65	50.6	7
8	19 35.9	44 73	59.1	20 01.9	43 72	58.2	20 40.4	42 71	56.7	21 18.2	42 70	55.3	22 07.3	40 68	53.3	22 18.3	40 67	52.8	22 31.4	40 67	52.3	23 18.3	39 65	50.3	8
9	18 52.3	44 72	58.7	19 18.3	44 72	57.8	19 58.0	43 70	56.4	20 36.4	42 69	54.9	21 26.5	41 68	53.0	21 38.9	41 67	52.5	21 51.4	41 67	52.0	22 39.3	39 65	50.0	9
90	18 06.9	45 72	58.4	18 35.8	45 71	57.4	19 15.7	44 70	56.0	19 54.9	43 69	54.6	20 46.1	42 67	52.6	20 58.7	42 67	52.1	21 11.2	42 66	51.7	22 00.4	40 65	49.7	90

Lat. 32°

H.A.	36° 00' Alt. / Δd Δt / Az.	37° 00' Alt. / Δd Δt / Az.	38° 30' Alt. / Δd Δt / Az.	40° 00' Alt. / Δd Δt / Az.	42° 00' Alt. / Δd Δt / Az.	42° 30' Alt. / Δd Δt / Az.	43° 00' Alt. / Δd Δt / Az.	45° 00' Alt. / Δd Δt / Az.	H.A.
00	22 00.0 1.00 01 180.0	21 00.0 1.00 01 180.0	19 30.0 1.00 01 180.0	18 00.0 1.00 01 180.0	16 00.0 1.00 01 180.0	15 30.0 1.00 01 180.0	15 00.0 1.00 01 180.0	13 00.0 1.00 01 180.0	00
1	21 59.6 1.00 02 179.1	20 59.6 1.00 02 179.1	19 29.6 1.00 02 179.2	17 59.6 1.00 02 179.2	15 59.7 1.00 02 179.2	15 29.7 1.00 02 179.2	14 59.7 1.00 02 179.2	12 59.7 1.00 02 179.3	1
2	21 58.5 1.00 03 178.3	20 58.5 1.00 03 178.3	19 28.5 1.00 03 178.3	17 58.6 1.00 03 178.4	15 58.6 1.00 03 178.5	15 28.6 1.00 03 178.5	14 58.7 1.00 03 178.5	12 58.7 1.00 03 178.5	2
3	21 56.5 1.00 04 177.4	20 56.6 1.00 04 177.4	19 26.7 1.00 04 177.5	17 56.8 1.00 04 177.6	15 56.9 1.00 04 177.7	15 26.9 1.00 04 177.7	14 57.0 1.00 04 177.7	12 57.1 1.00 04 177.8	3
4	21 53.8 1.00 06 176.5	20 53.9 1.00 06 176.6	19 24.1 1.00 06 176.7	17 54.3 1.00 05 176.8	15 54.5 1.00 05 176.9	15 24.6 1.00 05 176.9	14 54.6 1.00 05 177.0	12 54.8 1.00 05 177.1	4
05	21 50.5 1.00 07 175.6	20 50.5 1.00 07 175.7	19 20.8 1.00 07 175.9	17 51.1 1.00 07 176.0	15 51.4 1.00 06 176.1	15 21.5 1.00 06 176.2	14 51.6 1.00 06 176.2	12 52.0 1.00 06 176.4	05
6	21 46.1 1.00 08 174.8	20 46.3 1.00 08 174.8	19 16.7 1.00 08 175.0	17 47.1 1.00 08 175.2	15 47.7 1.00 07 175.4	15 17.8 1.00 07 175.5	14 47.9 1.00 07 175.5	12 48.4 1.00 07 175.7	6
7	21 41.1 99 10 173.9	20 41.4 99 09 174.0	19 12.0 99 09 174.2	17 42.5 99 09 174.4	15 43.2 99 09 174.6	15 13.4 99 08 174.7	14 43.6 99 08 174.7	12 44.2 99 08 174.9	7
8	21 35.3 99 11 173.0	20 35.8 99 11 173.2	19 06.5 99 10 173.4	17 37.2 99 10 173.6	15 38.1 99 10 173.8	15 08.3 99 10 173.9	14 38.5 99 09 174.0	12 39.4 99 09 174.2	8
9	21 28.7 99 12 172.2	20 29.3 99 12 172.3	19 00.2 99 12 172.6	17 31.1 99 11 172.8	15 32.3 99 11 173.1	15 02.6 99 11 173.1	14 32.9 99 11 173.2	12 34.0 99 10 173.5	9
10	21 21.4 99 13 171.3	20 22.2 99 13 171.5	18 53.3 99 13 171.7	17 24.4 99 12 172.0	15 25.8 99 12 172.4	14 56.2 99 12 172.4	14 26.5 99 12 172.5	12 27.9 99 11 172.8	10
1	21 13.4 98 15 170.5	20 14.3 99 14 170.7	18 45.6 99 14 170.9	17 16.9 99 14 171.2	15 18.7 99 13 171.5	14 49.1 99 13 171.6	14 19.5 99 13 171.7	12 21.2 99 12 172.1	1
2	21 04.6 98 16 169.6	20 05.7 98 16 169.8	18 37.2 98 15 170.1	17 08.8 98 15 170.4	15 10.8 98 14 170.8	14 41.4 98 14 170.9	14 11.9 98 14 171.0	12 13.8 98 13 171.3	2
3	20 55.0 98 17 168.8	19 56.3 98 17 169.0	18 28.2 98 16 169.3	17 00.0 98 16 169.6	15 02.4 98 15 170.0	14 33.0 98 15 170.1	14 03.5 98 15 170.2	12 05.9 98 14 170.6	3
4	20 44.8 98 18 167.9	19 46.2 98 18 168.2	18 18.4 98 18 168.5	16 50.5 98 17 168.8	14 53.2 98 16 169.3	14 23.9 98 16 169.4	13 54.6 98 16 169.5	11 57.3 98 15 169.9	4
15	20 33.7 97 20 167.1	19 35.4 97 19 167.3	18 07.9 97 19 167.7	16 40.3 97 18 168.1	14 43.4 97 17 168.5	14 14.2 97 17 168.6	13 45.0 97 17 168.8	11 48.1 97 16 169.2	15
6	20 22.0 97 21 166.2	19 23.9 97 20 166.5	17 56.7 97 20 166.9	16 29.4 97 19 167.3	14 33.0 97 18 167.8	14 03.9 97 18 167.9	13 34.8 97 18 168.0	11 38.3 97 17 168.5	6
7	20 09.5 96 22 165.4	19 11.7 96 22 165.7	17 44.8 96 21 166.1	16 17.9 97 20 166.5	14 21.9 97 20 167.0	13 52.9 97 19 167.2	13 23.9 97 19 167.3	11 27.8 97 18 167.8	7
8	19 56.4 96 23 164.6	18 58.7 96 23 164.8	17 32.2 96 22 165.3	16 05.7 96 21 165.7	14 10.0 96 21 166.3	13 41.3 96 20 166.4	13 12.4 96 20 166.5	11 16.8 96 19 167.1	8
9	19 42.5 96 24 163.8	18 45.1 96 24 164.1	17 19.0 96 23 164.5	15 52.8 96 23 165.0	13 57.8 96 22 165.6	13 29.0 96 21 165.7	13 00.3 96 21 165.9	11 05.2 96 20 166.4	9
20	19 27.9 95 25 162.9	18 30.8 95 25 163.3	17 05.1 95 24 163.7	15 39.3 95 24 164.2	13 44.8 95 23 164.8	13 16.2 95 22 165.0	12 47.5 95 22 165.1	10 52.9 95 21 165.7	20
1	19 12.6 95 27 162.1	18 15.8 95 26 162.5	16 50.5 95 25 163.0	15 25.1 95 25 163.5	13 31.2 95 24 164.1	13 02.7 95 24 164.3	12 34.2 95 23 164.4	10 40.1 95 22 165.1	1
2	18 56.7 94 28 161.3	18 00.1 94 27 161.7	16 35.3 94 26 162.2	15 10.3 94 26 162.7	13 16.9 95 25 163.4	12 48.6 95 25 163.5	12 20.2 95 24 163.7	10 26.7 95 23 164.4	2
3	18 40.0 94 29 160.5	17 43.8 94 28 160.9	16 19.4 94 28 161.4	14 54.9 94 27 162.0	13 02.1 94 26 162.7	12 33.9 94 26 162.8	12 05.6 94 25 163.0	10 12.7 94 24 163.7	3
4	18 22.7 93 30 159.7	17 26.8 93 29 160.1	16 02.8 93 29 160.7	14 38.8 93 28 161.2	12 46.6 94 27 161.9	12 18.5 94 27 162.1	11 50.5 94 26 162.3	9 58.1 94 25 163.0	4
25	18 04.7 93 31 158.9	17 09.1 93 30 159.3	15 45.7 93 30 159.9	14 22.1 93 29 160.5	12 30.5 93 28 161.2	12 02.6 93 28 161.4	11 34.7 93 27 161.6	9 43.0 93 26 162.4	25
6	17 46.1 92 32 158.1	16 50.8 92 32 158.5	15 27.9 92 31 159.1	14 04.8 92 30 159.7	12 13.9 92 29 160.5	11 46.1 93 28 160.7	11 18.4 93 28 160.9	9 27.3 93 27 161.7	6
7	17 26.8 91 33 157.4	16 31.9 92 33 157.8	15 09.4 92 32 158.4	13 46.9 92 31 159.0	11 56.6 92 30 159.8	11 29.0 92 29 160.0	11 01.4 92 29 160.2	9 11.0 92 28 161.0	7
8	17 06.9 91 34 156.6	16 12.4 91 34 157.0	14 50.4 91 33 157.7	13 28.3 91 32 158.3	11 38.8 91 31 159.1	11 11.4 91 30 159.3	10 43.9 91 30 159.5	8 54.2 92 29 160.4	8
9	16 46.4 90 35 155.8	15 52.2 90 35 156.3	14 30.8 91 34 156.9	13 09.2 91 33 157.6	11 20.4 91 32 158.4	10 53.1 91 31 158.7	10 25.9 91 31 158.9	8 36.8 91 30 159.7	9
30	16 25.2 90 36 155.1	15 31.4 90 36 155.5	14 10.5 90 35 156.2	12 49.5 90 34 156.9	11 01.4 90 33 157.8	10 34.3 90 32 158.0	10 07.3 90 32 158.2	8 18.9 90 31 159.1	30
1	16 03.5 89 37 154.3	15 10.0 89 37 154.8	13 49.7 89 36 155.5	12 29.3 89 35 156.2	10 41.8 90 33 157.1	10 15.0 90 33 157.3	9 48.1 90 33 157.5	8 00.4 90 32 158.4	1
2	15 41.1 88 38 153.6	14 48.0 89 38 154.0	13 28.3 89 37 154.8	12 08.4 89 36 155.5	10 21.7 89 34 156.4	9 55.1 89 34 156.6	9 28.4 89 34 156.9	7 41.5 89 32 157.8	2
3	15 18.2 88 39 152.8	14 25.5 88 39 153.3	13 06.3 88 38 154.0	11 47.0 88 37 154.8	10 01.1 88 35 155.7	9 34.6 88 35 156.0	9 08.1 88 35 156.2	7 22.0 88 33 157.2	3
4	14 54.4 87 40 152.1	14 02.3 87 40 152.6	12 43.7 87 39 153.3	11 25.0 88 36 154.1	9 39.9 88 36 155.1	9 13.6 88 36 155.3	8 47.3 88 36 155.5	7 01.9 88 34 156.5	4
35	14 30.5 86 41 151.4	13 38.6 87 40 151.9	12 20.6 87 39 152.6	11 02.5 87 38 153.4	9 18.2 87 37 154.4	8 52.1 87 37 154.7	8 26.0 87 36 154.9	6 41.4 87 35 155.9	35
6	14 05.9 86 42 150.6	13 14.4 86 41 151.2	11 57.0 86 40 152.0	10 39.5 86 39 152.7	8 56.0 86 38 153.8	8 30.1 86 38 154.0	8 04.1 86 37 154.3	6 20.4 86 36 155.3	6
7	13 40.6 85 43 149.9	12 49.5 85 42 150.5	11 32.8 85 41 151.3	10 15.9 85 40 152.1	8 33.2 86 39 153.1	8 07.5 86 38 153.4	7 41.8 86 38 153.6	5 58.9 86 37 154.7	7
8	13 14.9 84 44 149.2	12 24.2 85 43 149.8	11 08.1 85 42 150.6	9 51.8 85 41 151.4	8 09.9 85 40 152.5	7 44.5 85 39 152.7	7 18.9 85 39 153.0	5 36.9 85 38 154.1	8
9	12 48.6 84 45 148.5	11 58.3 84 44 149.1	10 42.8 84 43 149.9	9 27.2 84 42 150.7	7 46.2 84 40 151.8	7 20.9 84 40 152.1	6 55.6 84 40 152.4	5 14.4 84 38 153.5	9
40	12 21.7 83 46 147.8	11 31.9 83 45 148.4	10 17.1 83 44 149.3	9 02.1 83 43 150.1	7 21.9 84 41 151.2	6 56.8 84 41 151.5	6 31.8 84 41 151.8		40
1	11 54.4 82 46 147.2	11 05.0 82 46 147.7	9 50.8 83 45 148.6	8 36.5 83 44 149.4	6 57.2 83 42 150.6	6 32.3 83 42 150.9	6 07.5 83 41 151.1		1
2	11 26.5 82 47 146.5	10 37.6 82 47 147.1	9 24.0 82 45 147.9	8 10.3 82 44 148.8	6 31.9 82 43 150.0	6 07.3 82 42 150.3	5 42.7 82 42 150.5		2
3	10 58.2 81 48 145.8	10 09.7 81 47 146.4	8 56.8 81 46 147.3	7 43.8 81 45 148.2	6 06.2 81 44 149.4	5 41.8 81 43 149.6	5 17.4 81 43 149.9		3
4	10 29.4 80 49 145.1	9 41.3 80 48 145.8	8 29.0 80 47 146.7	7 16.7 80 46 147.6	5 40.1 81 44 148.8	5 15.9 81 44 149.0			4
45	10 00.0 79 50 144.5	9 12.4 79 49 145.1	8 00.8 80 48 146.0	6 49.2 80 47 146.9	5 13.4 80 45 148.2				45
6	9 30.2 79 50 143.8	8 43.1 79 50 144.5	7 32.2 79 49 145.4	6 21.2 79 47 146.3					6
7	9 00.0 78 51 143.2	8 13.3 78 50 143.8	7 03.1 78 49 144.8	5 52.7 78 48 145.7					7
8	8 29.3 77 52 142.6	7 43.0 77 51 143.2	6 33.5 77 50 144.2	5 23.9 77 49 145.1					8
9	7 58.1 76 53 141.9	7 12.3 76 52 142.6	6 03.5 77 51 143.6						9
50	7 26.5 76 53 141.3	6 41.2 76 53 142.0	5 33.0 76 51 143.0						50
1	6 54.5 75 54 140.7	6 09.6 75 53 141.4	5 02.2 75 52 142.4						1
2	6 22.1 74 55 140.1	5 37.7 74 54 140.8							2
3	5 49.2 73 55 139.5	5 05.3 73 55 140.2							3
4	5 16.0 72 56 138.9								4

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00' Alt. / Δd Δt / Az.	37° 00' Alt. / Δd Δt / Az.	38° 30' Alt. / Δd Δt / Az.	40° 00' Alt. / Δd Δt / Az.	42° 00' Alt. / Δd Δt / Az.	42° 30' Alt. / Δd Δt / Az.	43° 00' Alt. / Δd Δt / Az.	45° 00' Alt. / Δd Δt / Az.	H.A.
91	17 25.7 46 72 58.0	17 53.0 45 71 57.0	18 33.6 45 70 55.6	19 13.5 44 69 54.2	20 05.7 43 67 52.3	20 18.6 43 66 51.8	20 31.4 42 66 51.3	21 21.7 41 64 49.4	91
2	16 42.6 47 71 57.6	17 10.4 46 71 56.7	17 51.7 46 70 55.3	18 32.4 45 68 53.9	19 25.6 44 67 52.0	19 38.7 44 66 51.5	19 51.7 43 66 51.0	20 43.1 42 64 49.1	2
3	15 59.8 47 71 57.2	16 28.0 47 70 56.3	17 10.0 46 69 54.9	17 58.6 45 68 53.5	18 45.6 45 66 51.6	18 59.0 44 66 51.1	19 12.3 44 65 50.5	20 04.8 43 64 48.8	3
4	15 17.1 48 71 56.8	15 45.8 47 70 55.9	16 28.5 47 69 54.5	17 10.6 46 68 53.1	18 05.8 46 66 51.3	18 19.5 45 66 50.8	18 33.0 45 65 50.3	19 26.6 44 63 48.4	4
95	14 34.6 49 70 56.4	15 03.8 48 70 55.5	15 47.1 48 69 54.1	16 30.0 47 67 52.7	17 26.2 46 66 50.9	17 40.1 46 65 50.4	17 54.0 46 65 50.0	18 48.7 45 63 48.1	95
6	13 52.4 50 70 56.0	14 22.0 49 69 55.1	15 06.0 49 68 53.7	15 49.6 48 67 52.4	16 46.8 47 65 50.5	17 01.0 47 65 50.1	17 15.1 47 64 49.6	18 10.9 46 63 47.7	6
7	13 10.3 50 70 55.6	13 40.4 50 69 54.7	14 25.1 49 68 53.3	15 09.4 49 67 52.0	16 07.7 48 65 50.2	16 22.1 48 64 49.7	16 36.5 48 64 49.2	17 33.3 47 62 47.2	7
8	12 28.4 51 69 55.1	12 59.0 51 69 54.3	13 44.4 50 67 52.9	14 29.4 50 66 51.6	15 28.7 49 65 49.8	15 43.4 49 64 49.3	15 58.0 49 64 48.8	16 56.0 48 62 47.1	8
9	11 46.8 52 69 54.7	12 17.8 51 68 53.8	13 03.9 51 67 52.5	13 49.6 51 66 51.2	14 50.0 50 64 49.4	15 04.9 50 64 49.0	15 19.8 50 63 48.5	16 18.8 49 62 46.7	9
100	11 05.4 53 69 54.3	11 36.8 52 68 53.4	12 23.6 52 67 52.1	13 10.1 51 66 50.8	14 11.4 51 64 49.0	14 26.6 51 63 48.6	14 41.8 50 63 48.1	15 41.9 50 61 46.3	100
1	10 24.2 53 68 53.8	10 56.1 53 68 53.0	11 43.6 53 66 51.7	12 30.8 52 65 50.4	13 33.1 52 63 48.6	13 48.6 51 63 48.2	14 04.0 51 63 47.7	15 05.2 51 61 46.0	1
2	9 43.2 54 68 53.4	10 15.5 54 67 52.5	11 03.8 53 66 51.3	11 51.7 53 65 50.0	12 55.1 53 63 48.2	13 10.8 52 63 47.8	13 26.5 52 62 47.4	14 28.8 52 60 45.6	2
3	9 02.5 55 68 53.0	9 35.3 55 67 52.1	10 24.2 54 66 50.8	11 12.9 54 64 49.5	12 17.2 53 63 47.8	12 33.2 53 62 47.4	12 49.2 53 62 47.0	13 52.5 52 60 45.2	3
4	8 22.0 56 67 52.5	8 55.2 55 66 51.7	9 44.9 55 65 50.4	10 34.3 55 64 49.1	11 39.7 54 62 47.4	11 55.9 54 62 47.0	12 12.1 54 61 46.6	13 16.5 53 60 44.8	4
105	7 41.7 56 67 52.1	8 15.4 56 66 51.2	9 05.8 56 65 50.0	9 55.9 56 64 48.7	11 02.3 55 62 47.0	11 18.8 55 61 46.6	11 35.3 55 61 46.1	12 40.8 54 59 44.4	105
6	7 01.7 57 66 51.6	7 35.9 57 65 50.8	8 27.0 57 64 49.5	9 17.8 56 63 48.3	10 25.2 56 61 46.6	10 42.0 56 61 46.2	10 58.7 56 61 45.7	12 05.3 55 59 44.0	6
7	6 22.0 58 66 51.1	6 56.6 58 65 50.3	7 48.4 57 64 49.1	8 40.0 57 63 47.8	9 48.4 57 61 46.2	10 05.4 57 61 45.7	10 22.4 57 60 45.3	11 30.1 56 58 43.6	7
8	5 42.5 59 65 50.6	6 17.6 58 65 49.8	7 10.1 58 63 48.6	8 02.4 58 62 47.4	9 11.8 58 60 45.7	9 29.1 58 60 45.3	9 46.4 57 60 44.9	10 55.1 57 58 43.2	8
9	5 03.0 59 65 50.2	5 38.9 59 64 49.4	6 32.1 59 63 48.1	7 25.1 59 62 46.9	8 35.5 59 60 45.3	8 53.1 58 60 44.9	9 10.6 58 59 44.5	10 20.4 58 57 42.8	9
110		5 00.4 60 64 48.9	5 54.3 60 62 47.7	6 48.1 60 61 46.5	7 59.5 59 60 44.8	8 17.3 59 59 44.4	8 35.1 59 59 44.0	9 45.9 59 57 42.4	110
1			5 16.9 61 62 47.2	6 11.4 60 61 46.0	7 23.8 60 59 44.4	7 41.8 60 59 44.0	7 59.9 60 58 43.6	9 11.8 60 56 42.0	1
2				5 34.9 61 60 45.5	6 48.3 61 59 43.9	7 06.6 61 58 43.5	7 24.9 61 58 43.1	8 37.9 61 56 41.5	2
3					6 13.2 62 58 43.5	6 31.7 62 58 43.1	6 50.3 62 57 42.7	8 04.3 62 56 41.1	3
4					5 38.3 63 58 43.0	5 57.1 63 57 42.6	6 15.9 63 57 42.2	7 31.0 62 55 40.7	4
115					5 03.7 64 57 42.5	5 22.8 64 57 42.2	5 41.9 64 56 41.8	6 58.0 63 54 40.2	115
6							5 08.1 64 56 41.3	6 25.3 64 54 39.8	6
7								5 52.9 65 53 39.3	7
8								5 20.8 66 53 38.8	8

Lat. 33°   Lat. 34°   Lat. 35°   Lat. 36°   Lat. 37°   Lat. 38°

Lat. 32°

H.A.	46°00′ Alt	Δd	Δt	Az	47°00′ Alt	Δd	Δt	Az	48°30′ Alt	Δd	Δt	Az	49°30′ Alt	Δd	Δt	Az	50°30′ Alt	Δd	Δt	Az	51°30′ Alt	Δd	Δt	Az	52°30′ Alt	Δd	Δt	Az	54°00′ Alt	Δd	Δt	Az	H.A.
00	76 00.9	1.0	02	00.0	75 00.0	1.0	02	00.0	73 30.0	1.0	02	00.0	72 30.0	1.0	02	00.0	71 30.0	1.0	01	00.0	70 30.0	1.0	01	00.0	69 30.0	1.0	01	00.0	68 00.0	1.0	01	00.0	00
1	75 58.7	1.0	06	02.9	74 58.8	1.0	06	02.6	73 29.0	1.0	05	02.3	72 29.0	1.0	05	02.2	71 29.1	1.0	04	02.0	70 29.2	1.0	04	01.9	69 29.2	1.0	04	01.7	67 59.3	1.0	03	01.6	1
2	75 54.9	99	11	05.7	74 55.3	99	10	05.2	73 25.9	99	09	04.7	72 26.2	99	08	04.4	71 26.7	99	07	04.0	70 26.7	1.0	06	03.7	69 26.9	1.0	06	03.5	67 57.2	1.0	06	03.1	2
3	75 48.6	98	15	08.5	74 49.5	99	13	07.8	73 20.7	99	12	07.0	72 21.4	99	11	06.4	71 22.0	99	10	06.0	70 22.6	99	10	05.6	69 23.1	99	09	05.2	67 53.7	99	08	04.7	3
4	75 39.8	97	19	11.3	74 41.5	97	17	10.4	73 13.6	98	15	09.2	72 14.8	98	14	08.5	71 15.8	98	13	07.9	70 16.8	98	12	07.4	69 17.7	99	11	06.9	67 48.9	99	10	06.2	4
05	75 28.7	96	22	14.0	74 31.2	96	21	12.9	73 04.4	97	18	11.4	72 06.3	97	17	10.6	71 08.0	97	16	09.9	70 09.5	98	15	09.2	69 10.9	98	14	08.6	67 42.7	98	13	07.8	05
6	75 15.3	94	26	16.6	74 18.8	94	24	15.3	72 53.4	95	22	13.6	71 56.0	96	20	12.6	70 58.4	96	19	11.8	70 00.6	97	17	11.0	69 02.5	97	16	10.2	67 35.2	97	15	09.3	6
7	74 59.7	92	29	19.1	74 04.4	93	27	17.6	72 40.5	94	24	15.7	71 44.0	94	23	14.6	70 47.2	95	21	13.6	69 50.1	95	20	12.7	68 52.8	96	19	11.9	67 26.3	96	17	10.8	7
8	74 42.1	89	33	21.5	73 48.0	91	30	19.9	72 25.8	92	27	17.8	71 30.4	93	26	16.6	70 34.5	93	24	15.4	69 38.2	94	22	14.4	68 41.6	95	21	13.5	67 16.2	95	19	12.2	8
9	74 22.5	87	36	23.8	73 29.8	88	33	22.1	72 09.4	90	30	19.8	71 15.1	91	28	18.4	70 20.2	92	26	17.2	69 24.8	93	25	16.1	68 29.0	93	23	15.0	67 04.8	94	21	13.7	9
10	74 01.0	84	39	26.0	73 09.9	86	36	24.1	71 51.4	88	33	21.7	70 58.2	89	31	20.2	70 04.4	90	29	18.9	69 10.0	91	27	17.7	68 15.2	92	25	16.6	66 52.2	92	23	15.1	10
1	73 37.9	82	41	28.1	72 48.2	84	39	26.1	71 31.9	86	35	23.5	70 39.9	87	33	22.0	69 47.2	88	31	20.6	68 53.9	89	29	19.3	68 00.0	90	27	18.1	66 38.3	91	25	16.4	1
2	73 13.2	79	44	30.0	72 25.1	81	41	28.0	71 10.8	84	37	25.3	70 20.2	85	35	23.7	69 28.7	86	33	22.2	68 36.5	88	31	20.8	67 43.6	89	29	19.5	66 23.4	90	27	17.8	2
3	72 47.1	76	46	31.9	72 00.5	79	43	29.8	70 48.4	81	40	27.0	69 59.1	83	37	25.3	69 08.8	84	35	23.7	68 17.8	86	33	22.3	67 26.1	87	31	20.9	66 07.3	88	29	19.1	3
4	72 19.5	74	48	33.6	71 34.6	76	45	31.5	70 24.7	79	42	28.6	69 36.7	81	39	26.8	68 47.8	82	37	25.2	67 57.9	84	35	23.7	67 07.3	85	33	22.3	65 50.2	87	30	20.3	4
15	71 50.8	71	50	35.2	71 07.4	73	47	33.1	69 59.8	77	43	30.1	69 13.2	79	41	28.3	68 25.6	80	39	26.6	67 37.0	82	37	25.0	66 47.5	83	35	23.6	65 32.0	85	32	21.6	15
6	71 20.8	68	52	36.8	70 39.1	71	49	34.6	69 33.7	74	45	31.5	68 48.5	76	43	29.7	68 02.2	78	41	28.0	67 14.9	80	38	26.3	66 26.7	81	36	24.8	65 12.8	83	34	22.7	6
7	70 49.9	66	53	38.2	70 09.7	68	51	36.0	69 06.6	72	47	32.9	68 22.8	74	45	31.0	67 37.9	76	42	29.3	66 51.8	78	40	27.6	66 04.8	79	38	26.0	64 52.7	81	35	23.9	7
8	70 17.9	63	55	39.6	69 39.3	66	52	37.3	68 38.5	69	48	34.2	67 56.1	72	46	32.3	67 12.5	74	44	30.5	66 27.8	75	42	28.8	65 42.0	77	40	27.2	64 31.6	79	37	25.0	8
9	69 45.1	60	56	40.8	69 08.0	63	54	38.6	68 09.4	67	50	35.4	67 28.5	69	48	33.5	66 46.3	71	45	31.7	66 02.8	73	43	29.9	65 18.3	75	41	28.3	64 09.7	77	38	26.0	9
20	69 11.4	58	57	42.0	68 35.9	61	55	39.7	67 39.5	65	51	36.6	67 00.0	67	49	34.6	66 19.3	69	47	32.9	65 37.0	71	44	31.0	64 53.8	73	42	29.4	63 46.9	75	39	27.1	20
1	68 37.1	55	58	43.1	68 03.0	58	56	40.8	67 08.6	62	52	37.7	66 30.6	65	50	35.7	65 51.1	67	48	33.9	65 10.4	69	46	32.1	64 28.4	71	44	30.4	63 23.4	73	40	28.1	1
2	68 02.0	53	60	44.1	67 29.4	56	57	41.9	66 37.3	60	54	38.7	66 00.6	62	51	36.8	65 22.4	65	49	34.9	64 42.9	67	47	33.1	64 02.2	69	45	31.4	62 59.1	71	42	29.0	2
3	67 26.3	50	60	45.0	66 55.1	53	58	42.8	66 05.1	58	55	39.7	65 29.8	60	52	37.7	64 53.0	62	50	35.8	64 14.8	65	48	34.0	63 35.4	67	46	32.3	62 34.1	69	43	29.9	3
4	66 50.0	48	61	45.9	66 20.2	51	59	43.7	65 32.3	55	56	40.6	64 58.3	58	53	38.6	64 23.0	60	51	36.8	63 46.0	63	49	34.9	63 07.6	65	47	33.2	62 08.4	67	44	30.8	4
25	66 13.2	46	62	46.7	65 44.8	49	60	44.6	64 58.9	53	57	41.5	64 26.2	56	54	39.5	63 52.1	58	52	37.6	63 16.5	60	50	35.8	62 39.6	63	48	34.1	61 42.0	65	45	31.6	25
6	65 35.9	44	63	47.5	65 08.8	47	61	45.3	64 24.9	51	57	42.3	63 53.6	54	54	40.3	63 20.8	56	53	38.4	62 46.5	58	51	36.6	62 10.8	60	49	34.9	61 15.1	63	46	32.4	6
7	64 58.2	41	64	48.2	64 32.4	44	61	46.1	63 50.4	49	58	43.0	63 20.4	51	56	41.1	62 48.9	54	54	39.2	62 15.8	56	52	37.4	61 41.5	58	50	35.6	60 47.5	61	47	33.2	7
8	64 20.1	39	64	48.8	63 55.6	42	62	46.8	63 15.5	47	59	43.7	62 46.7	49	57	41.8	62 16.3	52	55	39.9	61 44.7	54	53	38.1	61 11.5	56	51	36.4	60 19.4	59	48	33.9	8
9	63 41.6	37	65	49.5	63 18.3	40	63	47.4	62 40.1	46	60	44.4	62 12.6	47	58	42.5	61 43.5	50	56	40.6	61 13.0	52	54	38.8	60 41.1	54	52	37.1	59 50.8	57	49	34.6	9
30	63 02.8	35	65	50.0	62 40.7	38	63	48.0	62 04.3	42	60	45.0	61 38.0	45	58	43.1	61 10.2	48	56	41.3	60 40.9	50	54	39.5	60 10.2	52	52	37.7	59 21.7	55	49	35.2	30
1	62 23.6	33	66	50.5	62 02.7	36	64	48.5	61 28.1	40	61	45.6	61 03.1	43	59	43.7	60 36.4	46	57	41.9	60 08.3	48	55	40.1	59 38.9	50	53	38.4	58 52.1	54	50	35.8	1
2	61 44.2	32	66	51.0	61 24.4	34	64	49.0	60 51.6	39	61	46.1	60 27.7	41	60	44.3	60 02.3	44	58	42.4	59 35.4	46	56	40.7	59 07.1	48	54	38.9	58 22.1	52	51	36.4	2
3	61 04.5	30	67	51.5	60 45.9	33	65	49.5	60 14.8	37	62	46.7	59 52.0	39	60	44.8	59 27.8	42	58	42.9	59 02.0	44	56	41.2	58 34.9	46	54	39.5	57 51.7	50	51	37.0	3
4	60 24.6	28	67	51.9	60 07.0	31	65	49.9	59 37.6	35	62	47.1	59 16.0	37	60	45.3	58 52.9	40	59	43.5	58 28.3	42	57	41.7	58 02.4	44	55	40.0	57 20.9	48	52	37.5	4
35	59 44.5	26	67	52.3	59 28.0	29	65	50.4	59 00.2	33	63	47.6	58 39.7	35	61	45.7	58 17.7	38	59	44.0	57 54.3	40	57	42.2	57 29.5	43	55	40.5	56 49.7	46	53	38.0	35
6	59 04.1	24	68	52.6	58 48.7	27	66	50.7	58 22.5	31	63	48.0	58 03.1	34	61	46.2	57 42.3	36	60	44.4	57 20.0	38	58	42.7	56 56.2	41	56	41.0	56 18.2	44	53	38.5	6
7	58 23.6	23	68	52.9	58 09.2	25	66	51.1	57 44.6	29	64	48.3	57 26.3	32	62	46.6	57 06.5	34	60	44.8	56 45.3	37	58	43.1	56 22.7	39	56	41.4	55 46.3	42	54	39.0	7
8	57 43.0	21	68	53.2	57 29.5	24	66	51.4	57 06.5	28	64	48.7	56 49.2	30	62	46.9	56 30.3	32	60	45.2	56 10.4	35	59	43.5	55 48.9	37	57	41.8	55 14.2	40	54	39.4	8
9	57 02.2	19	68	53.5	56 49.7	22	67	51.7	56 28.2	26	64	49.0	56 12.0	28	62	47.3	55 54.3	31	61	45.6	55 35.3	33	59	43.9	55 14.8	35	57	42.2	54 41.8	38	54	39.8	9
40	56 21.2	18	68	53.7	56 09.7	20	67	51.9	55 49.7	24	64	49.3	55 34.5	27	63	47.6	55 17.9	29	61	45.9	54 59.9	31	59	44.2	54 40.5	33	58	42.6	54 09.1	37	55	40.2	40
1	55 40.1	16	69	53.9	55 29.6	19	67	52.2	55 11.0	22	65	49.6	54 56.8	25	63	47.9	54 41.2	27	61	46.2	54 24.3	29	60	44.6	54 06.0	32	58	42.9	53 36.1	35	55	40.5	1
2	54 59.0	15	69	54.1	54 49.3	17	67	52.4	54 32.2	21	65	49.8	54 19.0	23	63	48.2	54 04.4	26	62	46.5	53 48.5	28	60	44.9	53 31.2	30	58	43.2	53 02.9	33	56	40.9	2
3	54 17.7	13	69	54.3	54 09.0	16	67	52.6	53 53.2	19	65	50.1	53 41.0	22	64	48.4	53 27.4	24	62	46.8	53 12.5	26	60	45.1	52 56.3	28	59	43.5	52 29.5	31	56	41.2	3
4	53 36.4	12	69	54.4	53 28.5	14	68	52.8	53 14.2	18	65	50.3	53 02.9	20	64	48.6	52 50.3	22	62	47.0	52 36.3	24	60	45.4	52 21.1	26	59	43.8	51 55.9	30	56	41.5	4
45	52 55.0	10	69	54.5	52 48.0	13	68	52.9	52 35.0	16	65	50.5	52 24.6	18	64	48.8	52 13.0	21	62	47.2	52 00.0	23	61	45.6	51 45.8	25	59	44.1	51 22.2	28	57	41.7	45
6	52 13.5	09	69	54.7	52 07.4	11	68	53.0	51 55.7	15	66	50.6	51 46.3	17	64	49.0	51 35.6	19	63	47.4	51 23.6	21	61	45.9	51 10.3	23	59	44.3	50 48.2	26	57	42.0	6
7	51 31.9	08	69	54.8	51 26.7	10	68	53.2	51 16.4	13	66	50.8	51 07.8	15	64	49.2	50 58.0	17	63	47.6	50 47.0	19	61	46.1	50 34.7	21	60	44.5	50 14.1	24	57	42.2	7
8	50 50.4	06	69	54.8	50 45.9	08	68	53.3	50 36.9	12	66	50.9	50 29.3	14	64	49.3	50 20.4	16	63	47.8	50 10.3	18	61	46.2	49 59.0	20	60	44.7	49 39.8	23	57	42.4	8
9	50 08.8	05	69	54.9	50 05.1	07	68	53.3	49 57.3	10	66	51.0	49 50.6	12	65	49.5	49 42.7	14	63	47.9	49 33.5	16	62	46.4	49 23.1	18	60	44.9	49 05.4	21	58	42.6	9
50	49 27.1	04	69	54.9	49 24.3	06	68	53.4	49 17.8	09	66	51.1	49 11.9	11	65	49.6	49 04.8	13	63	48.1	48 56.6	15	62	46.6	48 47.2	17	60	45.1	48 30.9	20	58	42.8	50
1	48 45.5	02	69	55.0	48 43.4	04	68	53.5	48 38.1	07	66	51.2	48 33.1	09	65	49.7	48 27.0	11	63	48.2	48 19.6	13	62	46.7	48 11.1	15	60	45.2	47 56.2	18	58	43.0	1
2	48 03.8	01	69	55.0	48 02.5	03	68	53.5	47 58.5	06	66	51.3	47 54.3	08	65	49.8	47 49.0	10	63	48.3	47 42.6	12	62	46.8	47 35.0	14	60	45.3	47 21.5	16	58	43.1	2
3	47 22.1	00	69	55.0	47 21.6	02	68	53.5	47 18.8	05	66	51.3	47 15.4	06	65	49.8	47 11.0	08	63	48.4	47 05.4	10	62	46.9	46 58.7	12	60	45.4	46 46.7	15	58	43.3	3
4	46 40.4	01	69	55.0	46 40.7	00	68	53.5	46 39.0	03	66	51.3	46 36.5	05	65	49.9	46 33.0	07	63	48.4	46 28.3	09	62	47.0	46 22.5	11	61	45.5	46 11.7	13	58	43.4	4
55	45 58.8	03	69	55.0	45 59.8	01	68	53.5	45 59.3	02	66	51.4	45 57.6	04	65	49.9	45 54.9	05	64	48.5	45 51.0	07	62	47.1	45 46.1	09	61	45.6	45 36.7	12	58	43.5	55
6	45 17.1	04	69	54.9	45 18.9	02	68	53.5	45 19.5	01	66	51.4	45 18.7	02	65	50.0	45 16.9	04	64	48.6	45 13.8	06	62	47.1	45 09.7	08	61	45.7	45 01.7	10	59	43.6	6
7	44 35.5	05	69	54.9	44 38.0	04	68	53.5	44 39.8	01	66	51.4	44 39.7	01	65	50.0	44 38.6	03	64	48.6	44 36.5	04	62	47.2	44 33.3	06	61	45.8	44 26.6	09	59	43.7	7
8	43 53.8	06	69	54.8	43 57.1	05	68	53.5	44 00.0	02	66	51.4	44 00.7	00	65	50.0	44 00.4	01	64	48.6	43 59.1	03	62	47.2	43 56.8	05	61	45.8	43 51.4	07	59	43.7	8
9	43 12.3	07	69	54.8	43 16.2	06	68	53.4	43 20.3	03	66	51.3	43 21.8	02	65	50.0	43 22.3	00	64	48.6	43 21.8	02	62	47.2	43 20.3	03	61	45.8	43 16.2	06	59	43.8	9
60	42 30.7	09	69	54.7	42 35.4	07	68	53.3	42 40.6	05	65	51.3	42 42.8	03	65	50.0	42 44.1	01	64	48.6	42 44.4	00	62	47.2	42 43.8	02	61	45.9	42 41.0	04	59	43.8	60
1	41 49.2	10	69	54.6	41 54.6	08	68	53.3	42 00.9	06	65	51.3	42 03.9	04	65	49.9	42 06.0	03	64	48.6	42 07.1	01	62	47.2	42 07.3	00	61	45.9	42 05.8	03	59	43.9	1
2	41 07.8	11	69	54.5	41 13.8	09	68	53.2	41 21.2	07	65	51.2	41 25.0	06	65	49.9	41 27.8	04	64	48.5	41 29.7	02	62	47.2	41 30.7	01	61	45.9	41 30.5	01	59	43.9	2
3	40 26.3	12	69	54.4	40 33.1	11	68	53.1	40 41.5	08	65	51.1	40 46.1	07	65	49.8	40 49.7	05	64	48.5	40 52.4	04	62	47.2	40 54.2	02	61	45.9	40 55.2	00	59	43.9	3
4	39 45.0	13	69	54.3	39 52.4	12	68	53.0	40 01.9	09	65	51.1	40 07.2	06	65	49.8	40 11.6	07	63	48.5	40 15.1	05	62	47.1	40 17.7	04	61	45.8	40 20.0	01	59	43.9	4
65	39 03.7	14	69	54.2	39 11.8	13	68	52.9	39 22.4	11	66	51.0	39 28.4	09	65	49.7	39 33.5	08	63	48.4	39 37.8	06	62	47.1	39 41.4	05	61	45.8	39 44.7	03	59	43.9	65
6	38 22.5	15	69	54.0	38 31.5	14	68	52.8	38 42.9	12	66	50.9	38 49.6	11	65	49.6	38 55.5	09	63	48.3	39 00.5	08	62	47.0	39 04.8	06	61	45.8	39 09.5	04	59	43.8	6
7	37 41.3	16	68	53.9	37 50.8	15	67	52.7	38 03.4	13	66	50.8	38 10.9	12	64	49.5	38 17.5	10	63	48.2	38 23.3	09	61	47.0	38 28.3	08	61	45.7	38 34.2	06	59	43.8	7
8	37 00.3	17	68	53.8	37 10.4	16	67	52.5	37 24.1	14	66	50.7	37 32.2	13	64	49.4	37 39.6	12	63	48.2	37 46.2	10	62	46.9	37 51.9	09	61	45.6	37 59.1	07	59	43.7	8
9	36 19.3	19	68	53.6	36 30.0	17	67	52.4	36 44.7	15	65	50.5	36 53.6	14	64	49.3	37 01.7	13	63	48.1	37 09.0	12	62	46.9	37 15.5	10	61	45.6	37 23.9	08	59	43.7	9
70	35 38.3	20	68	53.4	35 49.8	18	67	52.2	36 05.5	17	65	50.4	36 15.1	15	64	49.2	36 23.9	14	63	48.0	36 32.0	13	62	46.7	36 39.3	12	60	45.5	36 48.8	10	58	43.6	70
1	34 57.5	21	68	53.3	35 09.6	20	67	52.1	35 26.5	18	65	50.3	35 36.6	17	64	49.1	35 46.1	15	63	47.8	35 54.9	14	62	46.6	36 03.0	13	60	45.4	36 13.7	11	58	43.5	1
2	34 16.8	22	68	53.1	34 29.5	21	67	51.9	34 47.2	19	65	50.1	34 58.2	18	64	48.9	35 08.5	16	63	47.7	35 18.0	15	61	46.5	35 26.8	14	60	45.3	35 38.6	12	58	43.5	2
3	33 36.2	23	68	52.9	33 49.6	22	66	51.7	34 08.2	20	65	50.0	34 19.9	19	64	48.8	34 30.9	18	63	47.6	34 41.1	17	61	46.4	34 50.7	15	60	45.2	35 03.7	14	58	43.4	3
4	32 55.6	24	67	52.7	33 09.6	23	66	51.5	33 29.3	21	65	49.8	33 41.7	20	64	48.6	33 53.3	19	62	47.4	34 04.3	18	61	46.2	34 14.6	17	60	45.1	34 28.8	15	58	43.3	4
75	32 15.2	25	67	52.5	32 29.8	24	66	51.4	32 50.5	22	64	49.6	33 03.5	21	63	48.5	33 15.9	20	62	47.3	33 27.6	19	61	46.1	33 38.6	18	60	44.9	33 53.9	16	58	43.2	75
6	31 34.9	26	67	52.3	31 50.1	25	66	51.2	32 11.8	23	64	49.4	32 25.5	22	63	48.3	32 38.6	21	62	47.1	32 51.0	20	61	46.0	33 02.7	19	60	44.8	33 19.2	17	58	43.0	6
7	30 54.7	27	67	52.1	31 10.5	26	66	51.0	31 33.2	24	64	49.3	31 47.6	23	63	48.1	32 01.3	22	62	46.9	32 14.4	21	61	45.8	32 26.9	20	60	44.7	32 44.5	19	58	42.9	7
8	30 14.6	28	67	51.9	30 31.1	27	66	50.7	30 54.7	26	64	49.1	31 09.7	24	63	47.9	31 24.2	24	62	46.8	31 38.0	23	61	45.7	31 51.2	22	59	44.5	32 09.7	20	58	42.8	8
9	29 34.6	29	66	51.6	29 51.7	28	65	50.5	30 16.3	27	64	48.9	30 32.0	26	63	47.7	30 47.1	25	62	46.6	31 01.7	24	60	45.5	31 15.6	23	59	44.4	31 35.4	21	57	42.6	9
80	28 54.8	30	66	51.4	29 12.5	29	65	50.3	29 38.1	28	64	48.7	29 54.4	27	62	47.5	30 10.2	26	61	46.4	30 25.4	25	60	45.3	30 40.1	24	59	44.2	31 00.9	22	57	42.5	80
1	28 15.1	31	66	51.2	28 33.4	30	65	50.1	28 59.9	29	63	48.4	29 16.9	28	62	47.3	29 33.4	27	61	46.2	29 49.3	26	60	45.1	30 04.7	25	59	44.0	30 26.6	24	57	42.3	1
2	27 35.5	32	65	50.9	27 54.5	31	64	49.8	28 21.9	30	63	48.2	28 39.6	29	62	47.0	28 56.7	28	61	46.0	29 13.3	27	60	44.9	29 29.4	26	59	43.8	29 52.4	25	57	42.2	2
3	26 56.1	33	65	50.7	27 15.7	32	64	49.6	27 44.0	31	63	48.0	28 02.3	30	62	46.9	28 20.1	29	61	45.8	28 37.4	28	60	44.7	28 54.2	27	58	43.6	29 18.3	26	57	42.0	3
4	26 16.8	34	65	50.4	26 37.0	33	64	49.3	27 06.3	32	63	47.8	27 25.3	31	62	46.7	27 43.7	30	60	45.6	28 01.7	30	59	44.5	28 19.1	29	58	43.5	28 44.3	27	56	41.8	4
85	25 37.7	35	65	50.1	25 58.5	34	64	49.1	26 28.7	33	62	47.5	26 48.3	32	61	46.5	27 07.4	31	60	45.4	27 25.6	31	59	44.3	27 44.2	30	58	43.2	28 10.5	29	56	41.6	85
6	24 58.7	36	65	49.9	25 20.1	35	64	48.8	25 51.3	34	62	47.3	26 11.5	33	61	46.2	26 31.3	33	60	45.2	26 50.6	32	59	44.1	27 09.4	31	58	43.0	27 36.7	30	56	41.4	6
7	24 19.9	37	64	49.6	24 41.9	36	63	48.6	25 14.8	35	62	47.0	25 34.8	34	61	46.0	25 55.3	34	60	44.9	26 15.2	33	59	43.9	26 35.0	32	58	42.8	27 03.1	31	56	41.2	7
8	23 41.3	38	64	49.3	24 03.8	37	63	48.3	24 38.8	36	62	46.8	24 58.3	35	61	45.7	25 19.4	35	60	44.7	25 40.0	34	59	43.6	26 00.2	33	57	42.6	26 29.7	32	56	41.0	8
9	23 02.8	39	64	49.0	23 25.9	38	63	48.0	23 59.8	37	61	46.5	24 22.0	36	60	45.5	24 43.7	36	59	44.4	25 05.0	35	58	43.4	25 25.9	34	57	42.4	25 56.3	33	55	40.8	9
90	22 24.5	40	64	48.7	22 48.2	39	63	47.7	23 23.0	38	61	46.2	23 45.8	38	60	45.2	24 08.1	37	59	44.2	24 30.1	36	58	43.2	24 51.6	36	57	42.1	25 23.0	34	55	40.6	90

Lat. 32°

DECLINATION CONTRARY NAME TO LATITUDE

Each latitude cell lists: Alt. (° ′)   Δd   Δt   Az.

H.A.	46° 00′	47° 00′	48° 30′	49° 30′	50° 30′	51° 30′	52° 30′	54° 00′	H.A.
00	12 00.0 1.0 01 180.0	11 00.0 1.0 01 180.0	9 30.0 1.0 00 180.0	8 30.0 1.0 00 180.0	7 30.0 1.0 00 180.0	6 30.0 1.0 00 180.0	5 30.0 1.0 00 180.0		00
1	11 59.7 1.0 02 179.3	10 59.7 1.0 02 179.3	9 29.7 1.0 01 179.3	8 29.7 1.0 01 179.3	7 29.7 1.0 01 179.4	6 29.7 1.0 01 179.4	5 29.7 1.0 01 179.4		1
2	11 58.7 1.0 03 178.6	10 58.8 1.0 03 178.6	9 28.8 1.0 02 178.7	8 28.8 1.0 02 178.7	7 28.9 1.0 02 178.7	6 28.9 1.0 02 178.7	5 28.9 1.0 02 178.8		2
3	11 57.2 1.0 04 177.9	10 57.2 1.0 04 177.9	9 27.3 1.0 03 178.0	8 27.4 1.0 03 178.0	7 27.4 1.0 03 178.1	6 27.5 1.0 03 178.1	5 27.6 1.0 03 178.2		3
4	11 55.0 1.0 05 177.2	10 55.1 1.0 05 177.2	9 25.2 1.0 04 177.3	8 25.3 1.0 04 177.4	7 25.4 1.0 04 177.4	6 25.6 1.0 04 177.5	5 25.7 1.0 04 177.6		4
05	11 52.1 1.0 06 176.5	10 52.3 1.0 06 176.5	9 22.5 1.0 05 176.6	8 22.7 1.0 05 176.7	7 22.9 1.0 05 176.8	6 23.1 1.0 05 176.9	5 23.2 1.0 05 176.9		05
6	11 48.7 1.0 07 175.7	10 48.9 1.0 07 175.8	9 19.3 1.0 06 176.0	8 19.5 1.0 06 176.1	7 19.8 1.0 06 176.2	6 20.0 1.0 06 176.3	5 20.2 1.0 06 176.3		6
7	11 44.6 99 08 175.0	10 44.9 99 08 175.1	9 15.4 99 07 175.3	8 15.7 99 07 175.4	7 16.1 99 07 175.5	6 16.4 99 07 175.6	5 16.7 99 07 175.7		7
8	11 39.9 99 09 174.3	10 40.3 99 09 174.5	9 10.9 99 08 174.6	8 11.4 99 08 174.8	7 11.8 99 08 174.9	6 12.2 99 08 175.0	5 12.7 99 08 175.1		8
9	11 34.5 99 10 173.6	10 35.1 99 10 173.8	9 05.9 99 09 174.0	8 06.4 99 09 174.1	7 07.0 99 09 174.2	6 07.5 99 09 174.4	5 08.1 99 09 174.5		9
10	11 28.6 99 11 172.9	10 29.3 99 11 173.1	9 00.3 99 10 173.3	8 00.9 99 10 173.5	7 01.6 99 10 173.6	6 02.3 99 10 173.8	5 02.9 99 09 173.9		10
1	11 22.0 99 12 172.2	10 22.8 99 12 172.4	8 54.0 99 11 172.6	7 54.9 99 11 172.8	6 55.7 99 11 173.0	5 56.5 99 11 173.1			1
2	11 14.8 98 13 171.5	10 15.8 98 13 171.7	8 47.2 98 12 172.0	7 48.2 98 12 172.2	6 49.2 98 12 172.3	5 50.1 98 12 172.5			2
3	11 07.0 98 14 170.8	10 08.2 98 14 171.0	8 39.9 98 13 171.3	7 41.0 98 13 171.5	6 42.1 98 13 171.7	5 43.2 98 12 171.9			3
4	10 58.6 98 15 170.1	9 59.9 98 15 170.4	8 31.9 98 14 170.7	7 33.2 98 14 170.9	6 34.5 98 14 171.1	5 35.8 98 13 171.3			4
15	10 49.6 97 16 169.5	9 51.1 97 16 169.7	8 23.4 98 15 170.0	7 24.9 98 15 170.2	6 26.3 98 14 170.5	5 27.8 98 14 170.7			15
6	10 40.0 97 17 168.8	9 41.7 97 17 169.0	8 14.3 97 16 169.4	7 16.0 97 16 169.6	6 17.6 97 15 169.8	5 19.3 97 15 170.0			6
7	10 29.8 97 18 168.1	9 31.7 97 18 168.3	8 04.6 97 17 168.7	7 06.5 97 17 169.0	6 08.4 97 16 169.2	5 10.3 97 16 169.5			7
8	10 19.0 96 19 167.4	9 21.1 96 19 167.7	7 54.3 96 18 168.1	6 56.5 96 18 168.3	5 58.6 96 17 168.6	5 00.7 96 17 168.9			8
9	10 07.6 96 20 166.7	9 10.0 96 20 167.0	7 43.5 96 19 167.4	6 45.9 96 18 167.7	5 48.3 96 18 168.0				9
20	9 55.6 96 21 166.0	8 58.2 96 20 166.3	7 32.2 96 20 166.8	6 34.8 96 19 167.1	5 37.4 96 19 167.4				20
1	9 43.0 96 22 165.4	8 45.9 95 21 165.7	7 20.3 95 21 166.1	6 23.2 95 20 166.5	5 26.0 95 20 166.8				1
2	9 29.9 95 23 164.7	8 33.1 95 22 165.0	7 07.8 95 22 165.5	6 11.0 95 21 165.8	5 14.1 95 21 166.2				2
3	9 16.2 94 24 164.0	8 19.7 94 23 164.4	6 54.8 94 23 164.9	5 58.3 94 22 165.2	5 01.7 94 22 165.6				3
4	9 01.9 94 25 163.4	8 05.7 94 24 163.7	6 41.3 94 23 164.3	5 45.0 94 23 164.6					4
25	8 47.1 93 26 162.7	7 51.1 93 25 163.1	6 27.2 93 24 163.6	5 31.2 93 24 164.0					25
6	8 31.7 93 27 162.1	7 36.1 93 26 162.4	6 12.6 93 25 163.0	5 17.0 93 25 163.4					6
7	8 15.7 92 27 161.4	7 20.4 92 27 161.8	5 57.5 92 26 162.4	5 02.2 92 26 162.8					7
8	7 59.2 92 28 160.8	7 04.3 92 28 161.2	5 41.8 92 27 161.8						8
9	7 42.2 91 29 160.1	6 47.6 91 29 160.6	5 25.7 91 28 161.2						9
30	7 24.7 90 30 159.5	6 30.4 90 30 159.9	5 09.0 90 29 160.6,						30
1	7 06.6 90 31 158.9	6 12.7 90 30 159.3							1
2	6 48.0 89 32 158.2	5 54.5 89 31 158.7							2
3	6 28.9 89 33 157.6	5 35.7 89 32 158.1							3
4	6 09.2 88 34 157.0	5 16.5 88 33 157.5							4
35	5 49.1 87 34 156.4								35
6	5 28.5 87 35 155.8								6
7	5 07.4 86 36 155.2								7

Lat. 33°

DECLINATION SAME NAME AS LATITUDE

Each latitude cell lists: Alt. (° ′)   Δd   Δt   Az.

Lat. 34°

H.A.	46° 00′	47 00′	48 30′	49° 30′	50° 30′	51° 30′	52° 30′	54° 00′	H.A.
91	21 46.3 41 63 48.4	22 10.6 40 62 47.4	22 46.4 39 61 45.9	23 09.8 39 60 44.9	23 32.8 38 59 43.9	23 55.4 37 58 42.9	24 17.6 37 56 41.9	24 50.1 36 55 40.4	91
2	21 06.3 42 63 48.1	21 33.2 41 62 47.1	22 09.9 40 60 45.6	22 33.9 40 59 44.7	22 57.5 39 58 43.7	23 20.8 38 57 42.7	23 43.7 38 56 41.6	24 17.3 37 54 40.1	2
3	20 30.5 43 63 47.8	20 56.0 42 62 46.8	21 33.6 41 60 45.4	21 58.2 41 59 44.4	22 22.5 40 58 43.4	22 46.4 40 57 42.4	23 10.0 39 56 41.4	23 44.5 38 54 39.9	3
4	19 53.0 44 62 47.5	20 19.0 43 61 46.5	20 57.5 42 60 45.1	21 22.7 42 59 44.1	21 47.6 41 58 43.1	22 12.2 41 57 42.1	22 36.4 40 56 41.1	23 12.0 39 54 39.6	4
95	19 15.6 45 62 47.1	19 42.2 44 61 46.2	20 21.6 43 60 44.8	20 47.4 43 59 43.8	21 13.0 42 58 42.8	21 38.2 42 56 41.8	22 03.0 41 55 40.9	22 39.6 40 54 39.4	95
6	18 38.4 46 62 46.8	19 05.6 45 61 45.9	19 45.8 44 59 44.4	20 12.3 44 58 43.5	20 38.5 43 57 42.5	21 04.3 43 56 41.6	21 29.8 42 55 40.6	22 07.4 41 53 39.1	6
7	18 01.4 47 61 46.5	18 29.2 46 60 45.5	19 10.3 45 59 44.1	19 37.4 45 58 43.2	20 04.2 44 57 42.2	20 30.6 44 56 41.3	20 56.8 43 55 40.3	21 35.4 42 53 38.9	7
8	17 24.6 47 61 46.1	17 52.9 47 60 45.2	18 35.0 46 59 43.8	19 02.7 46 58 42.9	19 30.1 45 56 41.9	19 57.2 45 55 41.0	20 24.0 44 54 40.0	21 03.6 44 53 38.6	8
9	16 48.0 48 61 45.8	17 16.9 48 60 44.9	17 59.9 47 58 43.5	18 28.2 47 57 42.6	18 56.2 46 56 41.6	19 23.9 46 55 40.7	19 51.3 45 54 39.7	20 31.9 45 52 38.3	9
100	16 11.7 49 60 45.4	16 41.2 49 59 44.5	17 25.0 48 58 43.1	17 53.8 48 57 42.2	18 22.5 47 56 41.3	18 50.8 47 55 40.4	19 18.9 47 54 39.4	20 00.5 46 52 38.0	100
1	15 35.5 50 60 45.1	16 05.6 50 59 44.2	16 50.3 49 57 42.8	17 19.8 49 56 41.9	17 49.0 49 55 41.0	18 18.0 48 54 40.1	18 46.7 48 53 39.1	19 29.2 47 52 37.7	1
2	14 59.6 51 59 44.7	15 30.3 51 58 43.8	16 15.8 50 57 42.5	16 45.9 50 56 41.6	17 15.7 50 55 40.7	17 45.3 49 54 39.7	18 14.7 49 53 38.8	18 58.2 48 51 37.4	2
3	14 23.9 52 59 44.3	14 55.1 52 58 43.4	15 41.6 51 57 42.1	16 12.2 51 56 41.2	16 42.7 51 55 40.3	17 12.9 50 54 39.4	17 42.9 50 53 38.5	18 27.4 49 51 37.1	3
4	13 48.5 53 59 44.0	14 20.3 53 58 43.1	15 07.6 52 56 41.8	15 38.8 52 55 40.9	16 09.9 52 54 40.0	16 40.7 51 53 39.1	17 11.3 51 52 38.2	17 56.8 50 51 36.8	4
105	13 13.3 54 58 43.6	13 45.6 54 57 42.7	14 33.8 53 56 41.4	15 05.6 53 55 40.5	15 37.3 53 54 39.6	16 08.7 52 53 38.8	16 40.0 52 52 37.9	17 26.4 51 50 36.5	105
6	12 38.4 55 58 43.2	13 11.3 55 57 42.3	14 00.3 54 55 41.0	14 32.7 54 54 40.2	15 05.0 54 54 39.3	15 37.0 53 52 38.4	16 08.9 53 51 37.5	16 56.2 52 50 36.2	6
7	12 03.7 56 57 42.8	12 37.1 56 56 41.9	13 27.0 55 55 40.7	14 00.0 55 54 39.8	14 32.9 55 53 38.9	15 05.5 54 52 38.0	15 38.0 54 51 37.2	16 26.3 53 50 35.9	7
8	11 29.2 57 57 42.4	12 03.2 57 56 41.5	12 54.0 56 55 40.3	13 27.6 56 54 39.4	14 01.0 56 53 38.6	14 34.3 55 52 37.7	15 07.3 55 51 36.9	15 56.6 54 49 35.5	8
9	10 55.1 58 56 42.0	11 29.6 57 56 41.2	12 21.2 57 54 39.9	12 55.4 57 53 39.1	13 29.4 57 52 38.2	14 03.3 56 51 37.4	14 36.9 56 50 36.5	15 27.1 55 49 35.2	9
110	10 21.2 59 56 41.6	10 56.3 58 55 40.7	11 48.7 58 54 39.5	12 23.5 58 53 38.7	12 58.1 58 52 37.8	13 32.5 57 51 37.0	14 06.8 57 50 36.1	14 57.9 57 48 34.9	110
1	9 47.5 60 56 41.2	10 23.2 59 55 40.3	11 16.5 59 53 39.1	11 51.8 59 52 38.3	12 27.0 59 51 37.5	13 02.0 58 50 36.6	13 36.9 58 49 35.8	14 28.9 58 48 34.5	1
2	9 14.2 60 55 40.7	9 50.4 60 54 39.9	10 44.5 60 53 38.7	11 20.4 60 52 37.9	11 56.2 60 51 37.1	12 31.8 59 50 36.2	13 07.3 59 49 35.4	14 00.2 59 47 34.2	2
3	8 41.1 61 55 40.3	9 17.9 61 54 39.5	10 12.8 61 52 38.3	10 49.3 61 51 37.5	11 25.7 60 50 36.7	12 01.9 60 49 35.9	12 37.9 60 48 35.0	13 31.8 60 47 33.8	3
4	8 06.4 62 54 39.9	8 45.7 62 53 39.1	9 41.4 62 52 37.9	10 18.5 62 51 37.1	10 55.4 61 50 36.3	11 32.2 61 49 35.5	12 08.9 61 48 34.7	13 03.6 61 46 33.5	4
115	7 35.9 63 54 39.4	8 13.7 63 53 38.6	9 10.3 63 51 37.5	9 47.9 63 50 36.7	10 25.4 62 49 35.9	11 02.8 62 48 35.1	11 40.1 62 48 34.3	12 35.7 62 46 33.1	115
6	7 03.7 64 53 39.0	7 42.1 64 52 38.2	8 39.5 64 51 37.0	9 17.7 64 50 36.3	9 55.7 63 49 35.5	10 33.7 63 48 34.7	11 11.5 63 47 33.9	12 06.0 63 46 32.7	6
7	6 31.9 65 53 38.5	7 10.8 65 52 37.8	8 09.0 65 50 36.6	8 47.7 64 49 35.8	9 26.4 64 48 35.1	10 04.9 64 48 34.3	10 43.3 64 47 33.5	11 40.7 64 45 32.3	7
8	6 00.3 66 52 38.1	6 39.8 66 51 37.3	7 38.8 66 50 36.2	8 18.1 65 49 35.4	8 57.3 65 48 34.6	9 36.4 65 47 33.9	10 15.4 65 46 33.1	11 13.6 65 45 31.9	8
9	5 29.1 67 52 37.6	6 09.1 67 51 36.9	7 09.0 66 49 35.7	7 48.8 66 48 35.0	8 28.5 66 47 34.2	9 08.2 66 46 33.5	9 47.7 66 46 32.7	10 46.8 66 44 31.6	9
120		5 38.7 67 50 36.4	6 39.4 67 49 35.3	7 19.8 67 48 34.5	8 00.0 67 47 33.8	8 40.3 67 46 33.0	9 20.4 67 45 32.3	10 24.1 67 44 31.2	120
1		5 08.7 68 50 35.9	6 10.2 68 48 34.8	6 51.1 68 47 34.1	7 31.9 68 46 33.4	8 12.7 68 45 32.6	8 53.3 68 45 31.9	9 54.2 67 43 30.8	1
2			5 41.8 69 48 34.4	6 22.7 69 47 33.7	7 04.1 69 46 32.9	7 45.4 69 45 32.2	8 26.6 69 44 31.5	9 28.3 68 43 30.4	2
3			5 12.7 70 47 33.9	5 54.7 70 46 33.2	6 36.6 70 45 32.5	7 18.4 70 44 31.8	8 00.2 70 43 31.0	9 02.8 69 42 29.9	3
4				5 27.0 71 46 32.7	6 09.4 71 45 32.0	6 51.8 71 44 31.3	7 34.2 70 43 30.6	8 37.5 70 42 29.5	4
125					5 42.6 72 44 31.6	6 25.5 72 43 31.0	7 08.4 71 42 30.2	8 12.6 71 41 29.1	125
6					5 16.1 72 44 31.1	5 59.6 72 43 30.4	6 43.0 72 42 29.7	7 48.0 72 40 28.7	6
7						5 34.0 73 42 30.0	6 18.0 73 41 29.3	7 23.8 73 40 28.3	7
8						5 08.8 74 42 29.5	5 53.2 74 41 28.8	6 59.8 74 39 27.8	8
9							5 28.9 75 40 28.4	6 36.3 75 38 27.4	9
130							5 04.9 76 39 27.9	6 13.1 76 38 26.9	130
1								5 50.2 77 38 26.5	1
2								5 27.7 77 37 26.0	2
3								5 05.5 78 36 25.6	3

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 32°

H.A.	46°00' Alt	Δd Δt	Az	47°00' Alt	Δd Δt	Az	48°30' Alt	Δd Δt	Az	49°30' Alt	Δd Δt	Az	50°30' Alt	Δd Δt	Az	51°30' Alt	Δd Δt	Az	52°30' Alt	Δd Δt	Az	54°00' Alt	Δd Δt	Az	H.A.
00	76 00.0	1.0 02	00.0	75 00.0	1.0 02	00.0	73 30.0	1.0 02	00.0	72 30.0	1.0 02	00.0	71 30.0	1.0 01	00.0	70 30.0	1.0 01	00.0	69 30.0	1.0 01	00.0	68 00.0	1.0 01	00.0	00
1	75 58.7	1.0 06	02.9	74 58.8	1.0 06	02.6	73 29.0	1.0 05	02.3	72 29.0	1.0 05	02.2	71 29.1	1.0 04	02.0	70 29.2	1.0 04	01.9	69 29.2	1.0 04	01.7	67 59.3	1.0 03	01.6	1
2	75 54.9	99 11	05.7	74 55.3	99 10	05.2	73 25.9	99 09	04.7	72 26.2	1.0 08	04.3	71 26.4	1.0 07	04.0	70 26.7	1.0 07	03.7	69 26.9	1.0 06	03.5	67 57.2	1.0 06	03.1	2
3	75 48.6	98 15	08.5	74 49.5	99 13	07.8	73 20.7	99 12	07.0	72 21.4	99 11	06.4	71 22.0	99 10	06.0	70 22.6	99 10	05.6	69 23.1	99 09	05.2	67 53.7	99 08	04.7	3
4	75 39.8	97 19	11.3	74 41.5	97 17	10.4	73 13.6	98 15	09.2	72 14.8	98 14	08.5	71 15.8	98 13	07.9	70 16.8	98 12	07.4	69 17.7	99 11	06.9	67 48.9	99 10	06.2	4
05	75 28.7	96 22	14.0	74 31.2	96 21	12.9	73 04.4	97 18	11.4	72 06.3	97 17	10.6	71 08.0	97 16	09.9	70 09.5	98 15	09.2	69 10.9	98 14	08.6	67 42.7	98 13	07.8	05
6	75 15.3	94 26	16.6	74 18.8	94 24	15.3	72 53.4	95 22	13.6	71 56.0	96 20	12.6	70 58.4	96 19	11.8	70 00.6	97 17	11.0	69 02.5	97 16	10.2	67 35.2	97 15	09.3	6
7	74 59.7	92 29	19.1	74 04.4	93 27	17.6	72 40.5	94 24	15.7	71 44.0	94 23	14.6	70 47.2	95 21	13.6	69 50.1	95 20	12.7	68 52.8	96 19	11.9	67 26.3	96 17	10.8	7
8	74 42.1	89 33	21.5	73 48.0	91 30	19.9	72 25.8	92 27	17.8	71 30.4	93 26	16.6	70 34.5	93 24	15.4	69 38.2	94 22	14.4	68 41.6	95 21	13.5	67 16.2	95 19	12.2	8
9	74 22.5	87 36	23.8	73 29.8	88 33	22.1	72 09.4	90 30	19.8	71 15.1	91 28	18.4	70 20.2	92 26	17.2	69 24.8	93 25	16.1	68 29.0	93 23	15.0	67 04.8	94 21	13.7	9
10	74 01.0	84 39	26.0	73 09.9	86 36	24.1	71 51.4	88 33	21.7	70 58.2	89 31	20.2	70 04.4	90 29	18.9	69 07.2	91 28	17.7	68 15.2	92 25	16.6	66 52.2	93 23	15.1	10
1	73 37.9	82 41	28.1	72 48.2	84 39	26.1	71 31.9	86 35	23.5	70 39.9	87 33	22.0	69 47.2	88 31	20.6	68 53.9	89 29	19.3	68 03.9	90 27	18.1	66 38.3	91 25	16.4	1
2	73 13.2	79 44	30.0	72 25.1	81 41	28.0	71 10.8	84 37	25.3	70 20.2	85 35	23.7	69 28.7	86 33	22.2	68 35.5	88 31	20.8	67 43.6	89 29	19.5	66 23.4	90 27	17.8	2
3	72 47.1	76 46	31.9	72 00.5	79 43	29.8	70 48.4	81 40	27.0	69 59.1	83 37	25.3	69 08.8	84 35	23.7	68 17.8	86 33	22.3	67 26.1	87 31	20.9	66 07.3	88 29	19.1	3
4	72 19.5	74 48	33.6	71 34.6	76 45	31.5	70 24.7	79 42	28.6	69 36.7	81 39	26.8	68 47.8	82 37	25.2	67 57.9	84 35	23.7	67 07.3	85 33	22.3	65 50.2	87 30	20.3	4
15	71 50.8	71 50	35.2	71 07.4	73 47	33.1	69 59.8	77 43	30.1	69 13.2	79 41	28.3	68 25.6	80 39	26.6	67 37.0	82 37	25.0	66 47.5	83 35	23.6	65 32.0	85 32	21.6	15
6	71 20.8	68 52	36.8	70 39.1	71 49	34.6	69 33.7	74 45	31.5	68 48.5	76 43	29.7	68 02.2	78 41	28.0	67 14.9	80 38	26.3	66 26.7	81 36	24.8	65 12.8	83 34	22.7	6
7	70 49.9	66 53	38.2	70 09.7	68 51	36.0	69 06.6	72 47	32.9	68 22.8	74 45	31.0	67 37.9	76 42	29.3	66 51.8	78 40	27.6	66 04.8	79 38	26.0	64 52.7	81 35	23.9	7
8	70 17.9	63 55	39.6	69 39.3	66 52	37.3	68 38.5	69 48	34.2	67 56.1	72 46	32.3	67 12.5	74 44	30.5	66 27.8	75 42	28.8	65 42.0	77 40	27.2	64 31.6	79 37	25.0	8
9	69 45.1	60 56	40.8	69 08.0	63 54	38.6	68 09.4	67 50	35.4	67 28.5	69 48	33.5	66 46.3	71 45	31.7	66 02.8	73 43	29.9	65 18.3	75 41	28.3	64 09.7	77 38	26.0	9
20	69 11.4	58 57	42.0	68 35.9	61 55	39.7	67 39.5	65 51	36.6	67 00.0	67 49	34.6	66 18.1	69 47	32.8	65 37.0	71 44	31.0	64 53.8	73 42	29.4	63 46.9	75 39	27.1	20
1	68 37.1	55 58	43.1	68 03.0	58 56	40.8	67 08.8	62 52	37.7	66 30.6	65 50	35.7	65 51.1	67 48	33.9	65 10.4	69 46	32.1	64 28.4	71 44	30.4	63 23.4	73 40	28.1	1
2	68 02.0	53 60	44.1	67 29.4	56 57	41.9	66 37.3	60 54	38.7	66 00.6	62 51	36.8	65 22.4	65 49	34.9	64 42.9	67 47	33.1	64 02.2	69 45	31.4	62 59.1	71 42	29.0	2
3	67 26.3	50 60	45.0	66 55.1	53 58	42.8	66 05.1	58 55	39.7	65 29.8	60 52	37.7	64 53.0	62 50	35.8	64 14.8	65 48	34.0	63 35.4	67 46	32.3	62 34.1	69 43	29.9	3
4	66 50.0	48 61	45.9	66 20.2	51 60	43.7	65 32.3	55 56	40.6	64 58.3	58 53	38.6	64 22.8	60 51	36.8	63 46.0	63 49	34.9	63 07.8	65 47	33.2	62 08.4	67 44	30.8	4
25	66 13.2	46 62	46.7	65 44.8	49 60	44.6	64 58.9	53 57	41.5	64 26.2	56 54	39.5	63 52.1	58 52	37.6	63 16.5	60 50	35.8	62 39.6	62 48	34.1	61 42.0	65 45	31.6	25
6	65 35.9	44 63	47.5	65 08.8	47 61	45.3	64 24.9	51 57	42.3	63 53.6	54 55	40.3	63 20.8	56 53	38.4	62 46.5	58 51	36.6	62 10.8	60 49	34.9	61 15.1	63 46	32.4	6
7	64 58.2	41 64	48.2	64 32.4	44 61	46.1	63 50.4	49 58	43.0	63 20.4	51 56	41.1	62 46.7	54 54	39.2	62 16.4	55 52	37.4	61 41.5	58 50	35.6	60 47.5	61 47	33.2	7
8	64 20.1	39 64	48.8	63 55.6	42 62	46.8	63 15.5	47 59	43.7	62 46.7	49 57	42.1	62 16.2	52 55	39.9	61 44.7	54 53	38.1	61 11.1	56 51	36.4	60 19.4	59 48	33.9	8
9	63 41.6	37 65	49.5	63 18.3	40 63	47.4	62 40.1	45 60	44.4	62 12.6	47 52	42.5	61 43.5	50 56	40.6	61 13.0	52 54	38.8	60 41.1	54 52	37.1	59 50.8	57 49	34.6	9
30	63 02.8	35 65	50.0	62 40.7	38 63	48.0	62 04.3	42 60	45.0	61 38.0	45 58	43.1	61 10.2	48 56	41.3	60 40.9	50 54	39.5	60 10.2	52 52	37.7	59 21.7	55 49	35.2	30
1	62 23.6	33 66	50.5	62 02.7	36 64	48.5	61 28.1	40 61	45.6	61 03.1	43 59	43.7	60 36.4	46 57	41.9	60 08.3	48 55	40.1	59 38.9	50 53	38.4	58 52.1	54 50	35.8	1
2	61 44.2	32 66	51.0	61 24.4	34 64	49.0	60 51.6	39 61	46.1	60 27.7	41 60	44.3	60 02.3	44 58	42.4	59 35.4	46 56	40.7	59 07.1	48 54	38.9	58 22.1	52 51	36.4	2
3	61 04.5	30 67	51.5	60 45.9	33 65	49.4	60 14.8	37 62	46.6	59 52.0	39 60	44.8	59 27.8	42 58	43.0	59 02.0	44 56	41.2	58 35.0	46 54	39.5	57 51.7	50 51	37.0	3
4	60 24.6	28 67	51.9	60 07.0	31 65	49.9	59 37.6	35 62	47.1	59 16.0	37 60	45.3	58 52.9	40 59	43.7	58 28.3	42 57	41.7	58 02.4	44 55	40.0	57 20.9	48 52	37.5	4
35	59 44.5	26 67	52.3	59 28.0	29 65	50.4	59 00.2	33 63	47.6	58 39.7	35 61	45.7	58 17.7	38 59	44.0	57 54.3	40 57	42.2	57 29.5	43 55	40.5	56 49.7	46 53	38.0	35
6	59 04.1	24 68	52.6	58 48.7	27 66	50.7	58 22.5	31 63	48.0	58 03.1	34 61	46.2	57 42.3	36 60	44.4	57 20.0	38 58	42.7	56 56.2	41 56	41.0	56 18.2	44 53	38.5	6
7	58 23.6	23 68	52.9	58 09.2	25 66	51.1	57 44.6	29 64	48.3	57 26.3	32 62	46.6	57 06.5	34 60	44.8	56 45.3	37 58	43.1	56 22.7	39 56	41.4	55 46.3	42 54	39.0	7
8	57 43.0	21 68	53.2	57 29.5	24 66	51.4	57 06.5	28 64	48.7	56 49.2	30 62	46.9	56 30.5	32 60	45.2	56 10.4	35 58	43.5	55 48.9	37 57	41.8	55 14.2	40 54	39.4	8
9	57 02.2	19 68	53.5	56 49.7	22 67	51.7	56 28.2	26 64	49.0	56 12.0	28 62	47.3	55 54.3	31 61	45.6	55 35.3	33 59	43.9	55 14.8	35 57	42.2	54 41.8	38 54	39.8	9
40	56 21.2	18 68	53.7	56 09.7	20 67	51.9	55 49.7	24 64	49.3	55 34.5	27 63	47.6	55 17.9	29 61	45.9	54 59.9	31 59	44.2	54 40.5	33 58	42.6	54 09.1	37 55	40.2	40
1	55 40.1	16 69	53.9	55 29.6	19 67	52.2	55 11.0	22 65	49.6	54 56.8	25 63	47.9	54 41.2	27 61	46.2	54 24.3	29 60	44.6	54 06.0	32 58	42.9	53 36.1	35 55	40.5	1
2	54 59.0	15 69	54.1	54 49.3	17 67	52.4	54 32.2	21 65	49.8	54 19.0	23 63	48.2	54 04.4	25 62	46.5	53 48.5	28 60	44.9	53 31.2	30 58	43.2	53 02.9	33 56	40.9	2
3	54 17.7	13 69	54.3	54 09.0	16 67	52.6	53 53.2	19 65	50.1	53 41.0	22 63	48.4	53 27.4	24 62	46.8	53 12.5	26 60	45.1	52 56.3	28 59	43.5	52 29.5	31 56	41.2	3
4	53 36.4	12 69	54.4	53 28.5	14 68	52.8	53 14.2	18 65	50.3	53 02.9	20 64	48.6	52 50.3	22 62	47.0	52 36.3	24 60	45.4	52 21.1	26 59	43.8	51 55.9	30 56	41.5	4
45	52 55.0	10 69	54.5	52 48.0	13 68	52.9	52 35.0	16 65	50.5	52 24.6	18 64	48.8	52 13.0	21 62	47.2	52 00.0	23 61	45.6	51 45.8	25 59	44.1	51 22.2	28 57	41.7	45
6	52 13.5	09 69	54.7	52 07.4	11 68	53.0	51 55.7	15 66	50.6	51 46.3	17 64	49.0	51 35.6	19 63	47.4	51 23.6	21 61	45.9	51 10.3	23 59	44.3	50 48.2	26 57	42.0	6
7	51 31.9	08 69	54.8	51 26.7	10 68	53.2	51 16.3	14 66	50.8	51 07.8	15 64	49.2	50 58.0	17 63	47.6	50 47.0	19 61	46.1	50 34.7	21 60	44.5	50 14.1	24 57	42.2	7
8	50 50.4	06 69	54.8	50 45.9	08 68	53.3	50 36.9	12 66	50.9	50 29.3	14 64	49.3	50 20.4	16 63	47.8	50 10.3	18 61	46.2	49 59.0	20 60	44.7	49 39.8	23 57	42.4	8
9	50 08.8	05 69	54.9	50 05.1	07 68	53.3	49 57.3	10 66	51.0	49 50.6	12 65	49.5	49 42.7	14 63	47.9	49 33.5	16 62	46.4	49 23.1	18 60	44.9	49 05.4	21 58	42.6	9
50	49 27.1	04 69	54.9	49 24.3	06 68	53.4	49 17.8	09 66	51.1	49 11.9	11 65	49.7	49 04.8	13 63	48.1	48 56.6	15 62	46.6	48 47.2	17 60	45.1	48 30.9	20 58	42.8	50
1	48 45.5	02 69	55.0	48 43.4	04 68	53.4	48 38.1	07 66	51.2	48 33.1	09 65	49.7	48 27.0	11 63	48.2	48 19.6	13 62	46.7	48 11.5	16 60	45.2	47 56.2	18 58	43.0	1
2	48 03.8	01 69	55.0	48 02.5	03 68	53.5	47 58.5	06 66	51.3	47 54.3	08 65	49.8	47 49.0	10 63	48.3	47 42.6	12 62	46.9	47 35.0	14 60	45.3	47 21.5	16 58	43.1	2
3	47 22.1	00 69	55.0	47 21.6	02 68	53.5	47 18.8	05 66	51.3	47 15.4	06 65	49.8	47 11.0	08 63	48.4	47 05.4	10 62	46.9	46 58.7	12 60	45.4	46 46.7	15 58	43.3	3
4	46 40.4	01 69	55.0	46 40.7	00 68	53.5	46 39.0	03 66	51.3	46 36.5	05 65	49.9	46 33.0	07 63	48.4	46 28.3	09 62	47.0	46 22.5	11 61	45.5	46 11.7	13 58	43.4	4
55	45 58.8	03 69	55.0	45 59.8	01 68	53.5	45 59.3	02 66	51.4	45 57.6	04 65	50.0	45 54.9	05 64	48.5	45 51.0	07 62	47.1	45 46.1	09 61	45.6	45 36.7	12 58	43.5	55
6	45 17.1	04 69	54.9	45 18.9	02 68	53.5	45 19.5	01 66	51.4	45 18.7	02 65	50.0	45 16.7	04 64	48.6	45 13.8	06 62	47.2	45 09.7	08 61	45.7	45 01.7	10 59	43.6	6
7	44 35.5	05 69	54.9	44 38.0	03 68	53.5	44 39.8	01 66	51.4	44 39.7	01 65	50.0	44 38.6	03 64	48.6	44 36.5	04 62	47.2	44 33.3	06 61	45.8	44 26.6	09 59	43.7	7
8	43 53.8	06 69	54.8	43 57.1	05 68	53.5	44 00.0	02 66	51.4	44 00.7	00 65	50.0	44 00.4	01 64	48.6	43 59.1	03 62	47.2	43 56.8	05 61	45.8	43 51.4	07 59	43.7	8
9	43 12.3	07 69	54.8	43 16.2	06 68	53.4	43 20.3	03 66	51.3	43 21.8	02 65	50.0	43 22.3	00 64	48.6	43 22.0	01 62	47.2	43 20.3	03 61	45.8	43 16.2	06 59	43.8	9
60	42 30.7	09 69	54.7	42 35.4	07 68	53.3	42 40.6	05 66	51.3	42 42.8	03 65	50.0	42 44.1	01 64	48.6	42 44.4	00 62	47.2	42 43.8	02 61	45.9	42 41.0	04 59	43.8	60
1	41 49.2	10 69	54.6	41 54.6	08 68	53.3	42 00.9	06 66	51.3	42 03.9	04 65	49.9	42 06.0	03 64	48.6	42 07.1	01 62	47.2	42 07.3	00 61	45.9	42 05.8	03 59	43.9	1
2	41 07.8	11 69	54.5	41 13.8	09 68	53.2	41 21.2	07 66	51.2	41 25.0	06 65	49.9	41 27.8	04 64	48.5	41 29.7	02 62	47.2	41 30.7	01 61	45.9	41 30.5	01 59	43.9	2
3	40 26.3	12 69	54.4	40 33.1	11 68	53.1	40 41.5	08 66	51.1	40 46.1	07 65	49.8	40 49.7	05 63	48.5	40 52.4	04 62	47.2	40 54.2	02 61	45.9	40 55.2	00 59	43.9	3
4	39 45.0	13 69	54.3	39 52.4	12 68	53.0	40 01.9	09 66	51.1	40 07.2	08 65	49.8	40 11.6	07 63	48.5	40 15.1	05 62	47.1	40 17.7	04 61	45.8	40 20.0	01 59	43.9	4
65	39 03.7	14 69	54.2	39 11.8	13 68	52.9	39 22.4	11 66	51.0	39 28.4	09 65	49.7	39 33.5	08 63	48.4	39 37.8	06 62	47.1	39 41.2	05 61	45.8	39 44.7	03 59	43.9	65
6	38 22.5	15 69	54.0	38 31.3	14 68	52.8	38 42.9	12 66	50.9	38 49.6	11 65	49.6	38 55.5	09 63	48.3	39 00.5	08 62	47.0	39 04.8	06 61	45.8	39 09.5	04 59	43.8	6
7	37 41.3	16 68	53.9	37 50.8	15 67	52.7	38 03.4	13 66	50.8	38 10.9	12 64	49.5	38 17.5	10 63	48.2	38 23.3	09 62	47.0	38 28.3	08 61	45.7	38 34.2	06 59	43.8	7
8	37 00.3	17 68	53.8	37 10.4	16 67	52.5	37 24.1	14 66	50.7	37 32.2	13 64	49.4	37 39.6	12 63	48.1	37 46.2	10 62	46.9	37 51.9	09 61	45.6	37 59.1	07 59	43.7	8
9	36 19.3	19 68	53.6	36 30.0	17 67	52.4	36 44.7	15 66	50.5	36 53.6	14 64	49.3	37 01.7	13 63	48.1	37 09.0	12 62	46.9	37 15.6	10 61	45.6	37 23.9	08 59	43.7	9
70	35 38.3	20 68	53.4	35 49.8	18 67	52.2	36 05.5	17 65	50.4	36 15.1	15 64	49.2	36 23.9	14 63	48.0	36 32.0	13 62	46.7	36 39.3	12 60	45.5	36 48.8	10 58	43.6	70
1	34 57.5	21 68	53.3	35 09.6	20 67	52.1	35 26.3	18 65	50.3	35 36.6	17 64	49.1	35 46.1	15 63	47.8	35 54.9	14 62	46.6	36 03.0	13 60	45.4	36 13.7	11 58	43.5	1
2	34 16.8	22 68	53.1	34 29.5	21 67	51.9	34 47.2	19 65	50.1	34 58.2	18 64	48.9	35 08.5	16 63	47.7	35 18.0	15 61	46.5	35 26.8	14 60	45.3	35 38.6	12 58	43.5	2
3	33 36.2	23 68	52.9	33 49.5	22 66	51.8	34 08.2	20 65	50.0	34 19.9	19 64	48.8	34 30.9	18 63	47.6	34 41.1	17 61	46.4	34 50.7	15 60	45.2	35 03.7	14 58	43.4	3
4	32 55.6	24 67	52.7	33 09.6	23 66	51.5	33 29.3	21 65	49.8	33 41.7	20 64	48.6	33 53.3	19 62	47.5	34 04.3	18 61	46.3	34 14.6	17 60	45.1	34 28.8	15 58	43.3	4
75	32 15.2	25 67	52.5	32 29.8	24 66	51.4	32 50.5	22 64	49.6	33 03.5	21 63	48.5	33 15.9	20 62	47.3	33 27.6	19 61	46.1	33 38.6	18 60	44.9	33 53.9	16 58	43.2	75
6	31 34.9	26 67	52.3	31 50.1	25 66	51.2	32 11.8	23 64	49.4	32 25.5	22 63	48.3	32 38.6	21 62	47.1	32 51.0	20 61	46.0	33 02.7	19 60	44.8	33 19.2	17 58	43.0	6
7	30 54.7	27 67	52.1	31 10.5	26 66	51.0	31 33.2	24 64	49.3	31 47.6	23 63	48.1	32 01.3	22 62	47.0	32 14.4	21 61	45.8	32 26.9	20 60	44.7	32 44.5	19 58	42.9	7
8	30 14.6	28 67	51.9	30 31.1	27 66	50.7	30 54.7	26 64	49.1	31 09.7	25 63	47.9	31 24.2	24 62	46.8	31 38.0	23 61	45.7	31 51.2	22 59	44.5	32 09.9	20 58	42.8	8
9	29 34.6	29 66	51.6	29 51.7	28 65	50.5	30 16.3	27 64	48.9	30 32.0	26 63	47.7	30 47.1	25 62	46.6	31 01.7	24 60	45.5	31 15.6	23 59	44.4	31 35.4	21 57	42.6	9
80	28 54.8	30 66	51.4	29 12.5	29 65	50.3	29 38.1	28 64	48.7	29 54.4	27 62	47.5	30 10.2	26 61	46.4	30 25.4	25 60	45.3	30 40.1	24 59	44.2	31 00.9	22 57	42.5	80
1	28 15.1	31 66	51.2	28 33.4	30 65	50.1	28 59.9	29 63	48.4	29 16.9	28 62	47.3	29 33.4	27 61	46.2	29 49.3	26 60	45.1	30 04.7	25 59	44.0	30 26.6	24 57	42.3	1
2	27 35.5	32 66	50.9	27 54.5	31 65	50.0	28 21.9	30 63	48.2	28 39.6	29 62	47.1	28 56.7	28 61	46.0	29 13.3	27 60	44.9	29 29.4	26 59	43.8	29 52.4	25 57	42.2	2
3	26 56.1	33 65	50.7	27 15.7	32 64	49.6	27 44.0	31 63	48.0	28 02.3	30 62	46.9	28 20.1	29 61	45.8	28 37.4	28 60	44.7	28 54.2	27 58	43.6	29 18.3	26 57	42.0	3
4	26 16.8	34 65	50.4	26 37.0	33 64	49.3	27 06.3	32 63	47.8	27 25.3	31 62	46.7	27 43.7	30 60	45.6	28 01.7	30 59	44.5	28 19.1	29 58	43.5	28 44.3	27 56	41.8	4
85	25 37.7	35 65	50.1	25 58.5	34 64	49.1	26 28.7	33 62	47.5	26 48.3	32 61	46.5	27 07.4	31 60	45.4	27 26.1	31 59	44.3	27 44.2	30 58	43.2	28 10.5	29 56	41.6	85
6	24 58.7	36 65	49.9	25 20.1	35 64	48.8	25 51.3	34 62	47.3	26 11.5	33 61	46.3	26 31.3	33 60	45.2	26 50.6	32 59	44.1	27 09.4	31 58	43.0	27 36.7	30 56	41.4	6
7	24 19.9	37 64	49.6	24 41.9	36 63	48.6	25 14.0	35 62	47.0	25 34.8	34 61	46.0	25 55.3	34 60	44.9	26 15.2	33 59	43.9	26 34.5	32 58	42.8	27 03.1	31 56	41.2	7
8	23 41.3	38 64	49.3	24 03.8	37 63	48.3	24 36.8	36 62	46.8	24 58.3	35 61	45.7	25 19.4	35 60	44.7	25 40.0	34 58	43.6	26 00.2	33 57	42.6	26 29.7	32 56	41.0	8
9	23 02.8	39 64	49.0	23 25.9	38 63	48.0	23 59.8	37 61	46.5	24 22.0	37 60	45.5	24 43.7	36 59	44.4	25 05.0	35 58	43.4	25 25.9	34 57	42.4	25 56.3	33 55	40.8	9
90	22 24.5	40 64	48.7	22 48.2	39 63	47.7	23 23.0	38 61	46.2	23 45.8	38 60	45.2	24 08.1	37 59	44.2	24 30.1	36 58	43.2	24 51.6	36 57	42.1	25 23.2	34 55	40.6	90

Lat. 32°

H.A.	46° 00' Alt. Δd Δt Az.	47° 00' Alt. Δd Δt Az.	48° 30' Alt. Δd Δt Az.	49° 30' Alt. Δd Δt Az.	50° 30' Alt. Δd Δt Az.	51° 30' Alt. Δd Δt Az.	52° 30' Alt. Δd Δt Az.	54° 00' Alt. Δd Δt Az.	H.A.
00	12 00.0 1.00 1 180.0	11 00.0 1.00 1 180.0	9 30.0 1.00 0 180.0	8 30.0 1.00 0 180.0	7 30.0 1.00 0 180.0	6 30.0 1.00 0 180.0	5 30.0 1.00 0 180.0		00
1	11 59.7 1.00 2 179.3	10 59.7 1.00 2 179.3	9 29.7 1.00 2 179.3	8 29.7 1.00 1 179.3	7 29.7 1.00 1 179.4	6 29.7 1.00 1 179.4	5 29.7 1.00 1 179.4		1
2	11 58.7 1.00 3 178.6	10 58.8 1.00 3 178.6	9 28.8 1.00 2 178.7	8 28.8 1.00 2 178.7	7 28.9 1.00 2 178.7	6 28.9 1.00 2 178.7	5 28.9 1.00 2 178.8		2
3	11 57.2 1.00 4 177.9	10 57.2 1.00 4 177.9	9 27.3 1.00 3 178.0	8 27.4 1.00 3 178.0	7 27.4 1.00 3 178.1	6 27.5 1.00 3 178.1	5 27.6 1.00 3 178.2		3
4	11 55.5 1.00 5 177.2	10 55.1 1.00 5 177.2	9 25.2 1.00 4 177.3	8 25.3 1.00 4 177.4	7 25.4 1.00 4 177.4	6 25.6 1.00 4 177.5	5 25.7 1.00 4 177.6		4
05	11 52.1 1.00 6 176.5	10 52.3 1.00 6 176.5	9 22.5 1.00 5 176.6	8 22.7 1.00 5 176.7	7 22.9 1.00 5 176.8	6 23.1 1.00 5 176.9	5 23.2 1.00 5 176.9		05
6	11 48.7 1.00 7 175.7	10 48.9 1.00 7 175.8	9 19.3 1.00 6 176.0	8 19.5 1.00 6 176.1	7 19.8 1.00 6 176.2	6 20.0 1.00 6 176.2	5 20.2 1.00 6 176.3		6
7	11 44.6 99 08 175.0	10 44.9 99 08 175.1	9 15.4 99 07 175.3	8 15.7 99 07 175.4	7 16.1 99 07 175.5	6 16.4 99 07 175.6	5 16.7 99 07 175.7		7
8	11 39.9 99 00 174.3	10 40.3 99 09 174.5	9 10.9 99 08 174.6	8 11.4 99 08 174.8	7 11.8 99 08 174.9	6 12.2 99 08 175.0	5 12.7 99 08 175.1		8
9	11 34.5 99 10 173.6	10 35.1 99 10 173.8	9 05.9 99 09 174.0	8 06.4 99 09 174.1	7 07.0 99 09 174.2	6 07.5 99 09 174.4	5 08.1 99 09 174.5		9
10	11 28.6 99 11 172.9	10 29.3 99 11 173.1	9 00.3 99 10 173.3	8 00.9 99 10 173.5	7 01.6 99 10 173.6	6 02.3 99 10 173.8	5 02.9 99 09 173.9		10
1	11 22.0 99 12 172.2	10 22.8 99 12 172.4	8 54.0 99 11 172.6	7 54.9 99 11 172.8	6 55.7 99 11 173.0	5 56.5 99 11 173.1			1
2	11 14.8 98 13 171.5	10 15.8 98 13 171.7	8 47.2 98 12 172.0	7 48.2 98 12 172.2	6 49.2 98 12 172.3	5 50.1 98 12 172.5			2
3	11 07.0 98 14 170.8	10 08.2 98 14 171.0	8 39.9 98 13 171.3	7 41.0 98 13 171.5	6 42.1 98 13 171.7	5 43.2 98 12 171.9			3
4	10 58.6 98 15 170.1	9 59.9 98 15 170.4	8 31.9 98 14 170.7	7 33.2 98 14 170.9	6 34.5 98 14 171.1	5 35.8 98 13 171.3			4
15	10 49.6 97 16 169.5	9 51.1 97 16 169.7	8 23.4 98 15 170.0	7 24.9 98 15 170.2	6 26.3 98 14 170.5	5 27.8 98 14 170.7			15
6	10 40.0 97 17 168.8	9 41.7 97 17 169.0	8 14.3 97 16 169.4	7 16.0 97 16 169.6	6 17.6 97 15 169.8	5 19.3 97 15 170.1			6
7	10 29.8 97 18 168.1	9 31.7 97 18 168.3	8 04.6 97 17 168.7	7 06.5 97 17 169.0	6 08.4 97 16 169.2	5 10.3 97 16 169.5			7
8	10 19.0 96 19 167.4	9 21.1 96 19 167.7	7 54.3 96 18 168.3	6 56.5 96 18 168.3	5 58.6 96 17 168.6	5 00.7 96 17 168.9			8
9	10 07.6 96 20 166.7	9 10.0 96 20 167.0	7 43.5 96 19 167.4	6 45.9 96 18 167.7	5 48.3 96 18 168.0				9
20	9 55.6 96 21 166.0	8 58.2 96 20 166.3	7 32.2 96 20 166.8	6 34.8 96 19 167.1	5 37.4 96 19 167.4				20
1	9 43.0 95 22 165.4	8 45.9 95 21 165.7	7 20.3 95 21 166.1	6 23.2 95 20 166.5	5 26.0 95 20 166.8				1
2	9 29.9 95 23 164.7	8 33.1 95 22 165.0	7 07.8 95 22 165.5	6 11.0 95 21 165.8	5 14.1 95 21 166.2				2
3	9 16.2 94 24 164.0	8 19.7 94 23 164.4	6 54.8 94 23 164.9	5 58.3 94 22 165.2	5 01.7 94 22 165.6				3
4	9 01.9 94 25 163.4	8 05.7 94 24 163.7	6 41.3 94 23 164.3	5 45.0 94 23 164.6					4
25	8 47.1 93 26 162.7	7 51.1 93 26 163.1	6 27.2 93 24 163.6	5 31.2 93 24 164.0					25
6	8 31.7 93 27 162.1	7 36.1 93 26 162.4	6 12.6 93 25 163.0	5 17.0 93 25 163.4					6
7	8 15.7 92 27 161.4	7 20.4 92 27 161.8	5 57.5 92 26 162.4	5 02.2 92 26 162.8					7
8	7 59.2 92 28 160.8	7 04.3 92 28 161.2	5 41.8 92 27 161.8						8
9	7 42.2 91 29 160.1	6 47.6 91 29 160.6	5 25.7 91 28 161.2						9
30	7 24.7 90 30 159.5	6 30.4 90 30 159.9	5 09.0 90 29 160.6						30
1	7 06.6 90 31 158.9	6 12.7 90 30 159.3							1
2	6 48.0 89 32 158.2	5 54.5 89 31 158.7							2
3	6 28.9 89 33 157.6	5 35.7 89 32 158.1							3
4	6 09.2 88 34 157.0	5 16.5 88 33 157.5							4
35	5 49.1 87 34 156.4								35
6	5 28.5 87 35 155.8								6
7	5 07.4 86 36 155.2								7

Lat. 33°

DECLINATION SAME NAME AS LATITUDE

Lat. 34°

H.A.	46° 00' Alt. Δd Δt Az.	47 00' Alt. Δd Δt Az.	48° 30' Alt. Δd Δt Az.	49° 30' Alt. Δd Δt Az.	50° 30' Alt. Δd Δt Az.	51° 30' Alt. Δd Δt Az.	52° 30' Alt. Δd Δt Az.	54° 00' Alt. Δd Δt Az.	H.A.
91	21 46.3 41 63 48.4	22 10.6 40 62 47.4	22 46.4 39 61 45.9	23 09.8 39 60 44.9	23 32.8 38 59 43.9	23 55.4 37 58 42.9	24 17.6 37 56 41.9	24 50.1 36 55 40.4	91
2	21 08.3 42 63 48.1	21 33.2 41 62 47.1	22 09.9 40 60 45.6	22 33.9 40 59 44.7	22 57.5 39 58 43.7	23 20.8 38 57 42.7	23 43.7 38 56 41.6	24 17.3 37 54 40.1	2
3	20 30.6 43 63 47.8	20 56.0 42 62 46.8	21 33.6 41 60 45.4	21 58.2 41 59 44.4	22 22.5 40 58 43.4	22 46.4 40 57 42.4	23 10.0 39 56 41.4	23 44.5 38 54 39.9	3
4	19 53.0 44 62 47.5	20 19.0 43 61 46.5	20 57.5 42 60 45.1	21 22.7 42 59 44.1	21 47.6 41 58 43.1	22 12.2 41 57 42.1	22 36.4 40 56 41.1	23 12.0 39 54 39.6	4
95	19 15.6 45 62 47.1	19 42.2 44 61 46.2	20 21.6 43 60 44.8	20 47.4 43 59 43.8	21 13.0 42 58 42.8	21 38.2 42 56 41.8	22 03.0 41 55 40.9	22 39.6 40 54 39.4	95
6	18 38.4 46 62 46.8	19 05.6 45 61 45.9	19 45.8 44 59 44.4	20 12.3 44 58 43.5	20 38.5 43 57 42.5	21 04.3 43 56 41.6	21 29.8 42 55 40.6	22 07.4 41 53 39.1	6
7	18 01.4 47 61 46.5	18 29.2 46 60 45.5	19 10.3 45 59 44.1	19 37.4 45 58 43.2	20 04.2 44 57 42.2	20 30.6 44 56 41.3	20 56.8 43 55 40.3	21 35.4 42 53 38.9	7
8	17 24.6 47 61 46.1	17 52.9 47 60 45.2	18 35.0 46 59 43.8	19 02.7 46 58 42.9	19 30.1 45 56 41.9	19 57.2 45 55 41.0	20 24.0 44 54 40.0	21 03.6 44 53 38.6	8
9	16 48.0 48 61 45.8	17 16.9 48 60 44.9	17 59.9 47 58 43.5	18 28.2 47 57 42.6	18 56.2 46 56 41.6	19 23.9 46 55 40.7	19 51.3 45 54 39.7	20 31.9 45 52 38.3	9
100	16 11.7 49 60 45.4	16 41.2 49 59 44.5	17 25.0 48 58 43.1	17 53.8 48 57 42.2	18 22.5 47 56 41.3	18 50.8 47 55 40.4	19 18.9 47 54 39.4	20 00.5 46 52 38.0	100
1	15 35.5 50 60 45.1	16 05.6 50 59 44.2	16 50.3 49 57 42.8	17 19.8 49 56 41.9	17 49.0 49 55 41.0	18 18.0 48 54 40.1	18 46.7 48 53 39.1	19 29.2 47 52 37.7	1
2	14 59.6 51 59 44.7	15 30.3 51 58 43.8	16 15.8 50 57 42.5	16 45.9 50 56 41.6	17 15.7 50 55 40.7	17 45.3 49 54 39.7	18 14.7 49 53 38.8	18 58.2 48 51 37.4	2
3	14 23.9 52 59 44.3	14 55.1 52 58 43.4	15 41.6 51 57 42.1	16 12.2 51 56 41.2	16 42.7 51 55 40.3	17 12.9 50 54 39.4	17 42.9 50 53 38.5	18 27.4 49 51 37.1	3
4	13 48.5 53 59 44.0	14 20.3 53 58 43.1	15 07.6 52 56 41.8	15 38.8 52 55 40.9	16 09.9 52 54 40.0	16 40.7 51 53 39.1	17 11.3 51 52 38.2	17 56.8 50 51 36.8	4
105	13 13.3 54 58 43.6	13 45.6 54 57 42.7	14 33.8 53 56 41.4	15 05.6 53 55 40.5	15 37.3 53 54 39.6	16 08.7 52 53 38.8	16 40.0 52 52 37.9	17 26.4 51 50 36.5	105
6	12 38.4 55 58 43.2	13 11.3 55 57 42.3	14 00.3 54 55 41.0	14 32.7 54 54 40.2	15 05.0 54 54 39.3	15 37.0 53 52 38.4	16 08.9 53 51 37.5	16 56.2 52 50 36.2	6
7	12 03.7 56 57 42.8	12 37.1 56 56 41.9	13 27.0 55 55 40.7	14 00.0 55 54 39.8	14 32.9 55 53 38.9	15 05.5 54 52 38.0	15 38.0 54 51 37.2	16 26.3 53 50 35.9	7
8	11 29.2 57 57 42.4	12 03.2 57 56 41.5	12 54.0 56 55 40.3	13 27.6 56 54 39.4	14 01.0 56 53 38.6	14 34.3 55 52 37.7	15 07.3 55 51 36.9	15 56.6 54 49 35.5	8
9	10 55.1 58 56 42.0	11 29.6 57 56 41.2	12 21.2 57 54 39.9	12 55.4 57 53 39.1	13 29.4 57 52 38.2	14 03.3 56 51 37.4	14 36.9 56 50 36.5	15 27.1 54 49 35.2	9
110	10 21.2 59 56 41.6	10 56.3 58 55 40.7	11 48.7 58 54 39.5	12 23.5 58 53 38.7	12 58.1 58 52 37.8	13 32.5 57 51 37.0	14 06.8 57 50 36.1	14 57.9 57 48 34.9	110
1	9 47.5 60 56 41.2	10 23.2 59 55 40.3	11 16.5 59 52 39.1	11 51.8 59 52 38.3	12 27.0 59 51 37.5	13 02.0 58 50 36.6	13 36.9 58 49 35.8	14 28.9 58 48 34.5	1
2	9 14.2 60 56 40.7	9 50.4 60 54 39.9	10 44.5 60 53 38.7	11 20.4 60 52 37.9	11 56.2 60 51 37.1	12 31.8 59 50 36.2	13 07.3 59 49 35.4	14 00.2 59 47 34.2	2
3	8 41.1 61 55 40.3	9 17.9 61 54 39.5	10 12.8 61 52 38.3	10 49.3 61 51 37.5	11 25.7 60 50 36.7	12 01.9 60 49 35.9	12 37.9 60 48 35.0	13 31.8 60 47 33.8	3
4	8 08.4 62 54 39.9	8 45.7 62 53 39.1	9 41.4 62 52 37.9	10 18.5 62 51 37.1	10 55.4 61 50 36.3	11 32.2 61 49 35.5	12 08.9 61 48 34.7	13 03.6 61 46 33.5	4
115	7 35.9 63 54 39.4	8 13.7 63 53 38.6	9 10.3 63 51 37.5	9 47.9 63 50 36.7	10 25.4 62 49 35.9	11 02.8 62 48 35.1	11 40.1 62 48 34.3	12 35.7 62 46 33.1	115
6	7 03.7 64 53 39.0	7 42.1 64 52 38.2	8 39.5 64 51 37.0	9 17.7 64 50 36.3	9 55.7 63 49 35.5	10 33.7 63 48 34.7	11 11.5 63 47 33.9	12 08.0 63 46 32.7	6
7	6 31.9 65 53 38.5	7 10.8 65 52 37.8	8 09.0 65 50 36.6	8 47.7 64 49 35.8	9 26.4 64 48 35.1	10 04.9 64 48 34.3	10 43.3 64 47 33.5	11 40.7 64 45 32.3	7
8	6 00.3 66 52 38.1	6 39.8 66 51 37.3	7 38.8 66 50 36.2	8 18.1 65 49 35.4	8 57.3 65 48 34.6	9 36.4 65 47 33.9	10 15.4 65 46 33.1	11 13.6 65 45 31.9	8
9	5 29.1 67 52 37.6	6 09.1 67 51 36.9	7 09.0 66 49 35.7	7 48.8 66 48 35.0	8 28.5 66 47 34.2	9 08.2 66 46 33.5	9 47.7 66 46 32.7	10 46.8 66 44 31.6	9
120		5 38.7 67 50 36.4	6 39.4 67 49 35.3	7 19.8 67 48 34.5	8 00.0 67 48 33.8	8 40.3 67 46 33.0	9 20.4 67 45 32.3	10 20.4 67 44 31.2	120
1		5 08.7 68 50 35.9	6 10.2 68 48 34.8	6 51.1 68 47 34.1	7 31.9 68 46 33.4	8 12.7 68 45 32.6	8 53.3 68 45 31.9	9 54.2 67 43 30.8	1
2			5 41.3 69 48 34.4	6 22.7 69 47 33.7	7 04.1 69 46 32.9	7 45.4 69 45 32.2	8 26.5 69 44 31.5	9 28.3 68 43 30.4	2
3			5 12.7 70 47 33.9	5 54.7 70 46 33.2	6 36.6 70 45 32.5	7 18.4 70 44 31.8	8 00.2 70 43 31.0	9 02.8 69 42 29.9	3
4				5 27.0 71 46 32.7	6 09.4 71 45 32.0	6 51.8 71 44 31.3	7 34.2 70 43 30.6	8 37.5 70 42 29.5	4
125				5 42.6 72 44 31.6	6 25.5 72 43 30.9	7 08.4 71 42 30.2		8 12.6 71 41 29.1	125
6				5 16.1 72 44 31.1	5 59.6 72 43 30.4	6 43.0 72 42 29.7		7 48.0 72 40 28.7	6
7					5 34.0 73 42 30.0	6 18.0 73 41 29.3		7 23.8 73 40 28.3	7
8					5 08.8 74 42 29.5	5 53.2 74 41 28.8		6 59.8 74 39 27.8	8
9						5 28.9 75 40 28.4		6 36.3 75 39 27.4	9
130						5 04.9 76 39 27.9		6 13.1 76 38 26.9	130
1								5 50.2 77 38 26.5	1
2								5 27.7 77 37 26.0	2
3								5 05.6 78 36 25.6	3

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 32°

H.A.	54° 30' (Alt. / Δd Δt / Az.)	55° 00'	56° 00'	56° 30'	57° 00'	57° 30'	59° 00'	59° 30'	H.A.
00	67 30.0 1.0 01 00.0	67 00.0 1.0 01 00.0	66 00.0 1.0 01 00.0	65 30.0 1.0 01 00.0	65 00.0 1.0 01 00.0	64 30.0 1.0 01 00.0	63 00.0 1.0 01 00.0	62 30.0 1.0 01 00.0	00
1	67 29.3 1.0 03 01.5	66 59.3 1.0 03 01.5	65 59.4 1.0 03 01.4	65 29.4 1.0 03 01.3	64 59.4 1.0 03 01.3	64 29.4 1.0 03 01.2	62 59.5 1.0 03 01.1	62 29.5 1.0 02 01.1	1
2	67 27.3 1.0 06 03.0	66 57.4 1.0 05 02.9	65 57.6 1.0 05 02.7	65 27.6 1.0 05 02.7	64 57.7 1.0 05 02.6	64 27.8 1.0 05 02.5	62 58.0 1.0 04 02.3	62 28.0 1.0 04 02.2	2
3	67 24.0 99 08 04.5	66 54.1 99 08 04.4	65 54.5 99 07 04.1	65 24.7 99 07 04.0	64 54.9 99 07 03.9	64 25.0 99 06 03.7	62 55.5 1.0 06 03.4	62 25.6 1.0 06 03.3	3
4	67 19.3 99 10 06.0	66 49.6 99 10 05.8	65 50.3 99 09 05.5	65 20.6 99 09 05.3	64 50.9 99 08 05.1	64 21.2 99 08 05.0	62 52.0 99 08 04.5	62 22.2 99 07 04.4	4
05	67 13.3 98 12 07.5	66 43.8 98 12 07.3	65 44.8 98 11 06.8	65 15.3 98 11 06.6	64 45.8 98 10 06.4	64 16.6 98 10 06.2	62 47.5 99 09 05.6	62 17.8 99 09 05.5	05
6	67 06.0 97 14 09.0	66 36.7 97 14 08.7	65 38.2 98 13 08.1	65 08.9 98 13 07.9	64 39.5 98 12 07.6	64 10.2 98 12 07.4	62 42.0 98 11 06.7	62 12.5 98 10 06.5	6
7	66 57.4 96 16 10.4	66 28.4 97 16 10.1	65 30.4 97 15 09.5	65 01.3 97 14 09.2	64 32.2 97 14 08.9	64 03.1 97 14 08.6	62 35.5 97 12 07.8	62 06.5 98 12 07.6	7
8	66 47.6 95 18 11.8	66 18.9 96 18 11.5	65 21.5 96 17 10.8	64 52.7 96 16 10.4	64 23.8 96 16 10.1	63 55.0 96 15 09.8	62 28.1 97 14 08.9	61 59.1 97 14 08.6	8
9	66 36.5 94 20 13.2	66 08.2 94 20 12.8	65 11.4 95 19 12.0	64 42.9 95 18 11.7	64 14.4 95 18 11.3	63 45.8 95 17 11.0	62 19.7 96 15 09.9	61 51.0 96 15 09.7	9
10	66 24.3 93 22 14.6	65 56.4 93 22 14.1	65 00.3 94 20 13.3	64 32.1 94 20 12.9	64 03.9 94 19 12.5	63 35.6 94 19 12.1	62 10.5 95 17 11.0	61 42.0 95 16 10.7	10
1	66 10.9 92 24 15.9	65 43.4 92 24 15.4	64 48.0 92 22 14.5	64 20.3 93 21 14.1	63 52.4 93 21 13.7	63 24.5 93 20 13.2	62 00.9 94 18 12.1	61 32.1 94 18 11.7	1
2	65 56.4 90 26 17.2	65 29.3 91 25 16.7	64 34.8 91 24 15.7	64 07.4 91 23 15.2	63 39.9 92 22 14.8	63 12.3 92 22 14.3	61 49.2 93 20 13.1	61 21.3 93 19 12.7	2
3	65 40.8 89 28 18.5	65 14.1 89 27 17.9	64 20.5 90 25 16.9	63 53.5 90 25 16.4	63 26.4 90 24 15.9	62 59.2 91 23 15.4	61 37.2 92 21 14.1	61 09.7 92 21 13.7	3
4	65 24.1 87 29 19.7	64 58.7 88 29 19.1	64 05.2 88 27 18.0	63 38.7 89 26 17.5	63 12.0 89 26 17.0	62 45.2 89 25 16.5	61 24.4 90 23 15.1	60 57.2 91 22 14.6	4
15	65 06.5 85 31 20.9	64 40.8 86 30 20.3	63 49.0 87 29 19.1	63 22.9 87 28 18.6	62 56.7 88 27 18.1	62 30.4 88 26 17.5	61 10.7 89 24 16.1	60 43.9 89 23 15.6	15
6	64 47.8 84 33 22.1	64 22.6 84 32 21.4	63 31.9 85 30 20.2	63 06.2 86 29 19.7	62 40.5 86 28 19.1	62 14.6 86 28 18.5	60 56.2 88 25 17.0	60 29.9 88 25 16.5	6
7	64 28.2 82 34 23.2	64 03.6 82 33 22.5	63 13.8 83 32 21.3	62 48.7 84 31 20.7	62 23.4 84 30 20.1	61 58.0 85 29 19.5	60 41.0 86 27 17.9	60 15.0 87 26 17.4	7
8	64 07.7 80 36 24.3	63 43.6 81 35 23.6	62 54.9 82 33 22.3	62 30.3 82 32 21.7	62 05.5 83 31 21.1	61 40.6 83 30 20.5	60 24.9 85 28 18.8	59 59.4 85 27 18.3	8
9	63 46.4 78 37 25.3	63 22.8 79 36 24.6	62 35.2 80 34 23.3	62 11.1 81 33 22.6	61 46.8 81 32 22.0	61 22.4 82 32 21.4	60 08.2 83 29 19.7	59 43.1 84 28 19.1	9
20	63 24.2 76 38 26.3	63 01.2 77 37 25.6	62 14.7 78 35 24.2	61 51.1 79 35 23.6	61 27.4 79 34 22.9	61 03.4 80 33 22.3	59 50.7 82 30 20.5	59 26.1 82 30 20.0	20
1	63 01.2 74 40 27.3	62 38.9 75 39 26.6	61 53.4 76 37 25.2	61 30.4 77 36 24.5	61 07.2 78 35 23.8	60 43.8 78 34 23.2	59 32.5 80 31 21.4	59 08.4 81 31 20.8	1
2	62 37.5 72 41 28.2	62 15.7 73 40 27.5	61 31.4 75 38 26.1	61 08.9 75 37 25.4	60 46.3 76 36 24.7	60 23.4 77 35 24.0	59 13.6 78 33 22.2	58 50.0 79 32 21.6	2
3	62 13.1 70 42 29.1	61 51.9 71 41 28.4	61 08.7 73 39 26.9	60 46.6 73 38 26.2	60 24.7 74 37 25.5	60 02.3 75 36 24.9	58 54.1 77 34 22.9	58 31.0 77 33 22.3	3
4	61 48.0 68 43 30.0	61 27.4 69 42 29.2	60 45.4 71 40 27.7	60 24.0 72 39 27.0	60 02.4 73 38 26.3	59 40.6 73 37 25.6	58 34.0 75 35 23.7	58 11.4 76 34 23.1	4
25	61 22.3 66 44 30.8	61 02.2 67 43 30.0	60 21.4 69 41 28.5	60 00.6 70 40 27.8	59 39.5 70 39 27.1	59 18.3 71 38 26.4	58 13.2 73 36 24.4	57 51.2 74 35 23.8	25
6	60 55.9 64 45 31.6	60 36.4 65 44 30.8	59 56.7 67 42 29.3	59 36.5 68 41 28.6	59 16.1 69 40 27.9	58 55.4 69 39 27.1	57 51.9 72 36 25.1	57 30.4 72 36 24.5	6
7	60 28.9 62 46 32.3	60 10.1 63 45 31.6	59 31.6 65 43 30.0	59 11.9 66 42 29.3	58 52.0 67 41 28.6	58 31.9 68 40 27.9	57 30.1 70 37 25.8	57 09.0 70 36 25.2	7
8	60 01.4 60 47 33.1	59 43.2 61 46 32.3	59 05.8 63 44 30.7	58 46.7 64 43 30.0	58 27.4 65 42 29.3	58 07.8 66 41 28.5	57 07.7 68 38 26.5	56 47.2 69 37 25.8	8
9	59 33.4 58 48 33.8	59 15.7 59 47 33.0	58 39.5 61 45 31.4	58 21.0 62 44 30.7	58 02.5 63 43 29.9	57 43.2 64 42 29.2	56 44.7 66 39 27.1	56 24.8 67 38 26.4	9
30	59 04.9 56 48 34.4	58 47.8 57 47 33.6	58 12.8 59 45 32.1	57 54.8 60 44 31.3	57 36.6 61 44 30.6	57 18.2 62 43 29.8	56 21.3 64 40 27.7	56 01.9 65 39 27.0	30
1	58 35.9 54 49 35.0	58 19.4 54 48 34.2	57 45.5 57 46 32.7	57 28.2 58 45 31.9	57 10.8 59 44 31.2	56 52.6 60 43 30.4	55 57.4 63 41 28.3	55 38.6 63 40 27.6	1
2	58 06.5 53 50 35.6	57 50.6 53 49 34.8	57 17.8 56 47 33.3	57 01.1 56 46 32.5	56 44.0 57 45 31.7	56 26.6 58 44 31.0	55 33.1 61 41 28.8	55 14.8 62 40 28.2	2
3	57 36.7 51 50 36.2	57 21.3 52 49 35.4	56 49.7 54 48 33.8	56 33.5 54 47 33.1	56 17.0 55 46 32.3	56 00.2 56 45 31.6	55 08.3 59 42 29.4	54 50.5 60 41 28.7	3
4	57 06.4 49 51 36.7	56 51.6 50 50 35.9	56 21.2 52 48 34.4	56 05.5 53 47 33.6	55 49.6 54 46 32.8	55 33.4 54 45 32.1	54 43.2 57 43 29.9	54 25.9 58 42 29.2	4
35	56 35.8 47 52 37.2	56 21.6 48 51 36.4	55 52.3 50 49 34.9	55 37.2 51 48 34.1	55 21.8 52 47 33.3	55 06.2 53 46 32.6	54 17.6 55 43 30.4	54 00.9 56 42 29.7	35
6	56 04.9 45 52 37.7	55 51.2 46 51 36.9	55 23.0 48 49 35.4	55 08.5 49 48 34.6	54 53.7 50 48 33.8	54 38.6 51 47 33.1	53 51.7 53 44 30.9	53 35.5 54 43 30.2	6
7	55 33.6 43 53 38.2	55 20.5 44 52 37.4	54 53.4 46 50 35.8	54 39.5 47 49 35.0	54 25.2 48 48 34.3	54 10.6 49 47 33.5	53 25.4 52 44 31.3	53 09.8 52 43 30.6	7
8	55 02.0 41 53 38.6	54 49.5 42 52 37.8	54 23.5 44 50 36.2	54 10.1 45 49 35.5	53 56.4 46 49 34.7	53 42.4 47 48 34.0	52 58.7 50 45 31.8	52 43.7 51 44 31.1	8
9	54 30.1 39 54 39.0	54 18.1 40 53 38.2	53 53.3 42 51 36.7	53 40.4 43 50 35.9	53 27.2 44 49 35.1	53 13.8 45 48 34.4	52 31.8 48 45 32.2	52 17.3 49 45 31.5	9
40	53 57.9 38 54 39.4	53 46.3 38 54 38.6	53 22.7 41 51 37.1	53 10.4 42 50 36.3	52 57.8 43 50 35.5	52 44.9 43 49 34.8	52 04.5 46 46 32.6	51 50.5 47 45 31.9	40
1	53 25.5 36 54 39.7	53 14.6 37 54 39.0	52 51.9 39 52 37.4	52 40.2 40 51 36.7	52 28.1 41 50 35.9	52 15.7 42 49 35.2	51 37.0 44 46 33.0	51 23.5 45 45 32.3	1
2	52 52.9 34 55 40.1	52 42.5 35 54 39.3	52 20.9 37 52 37.8	52 09.6 38 51 37.0	51 58.1 39 50 36.3	51 46.3 40 49 35.5	51 09.2 43 47 33.3	50 56.2 43 46 32.6	2
3	52 20.0 32 55 40.4	52 10.2 33 54 39.6	51 49.6 35 53 38.1	51 38.9 36 52 37.3	51 27.9 37 51 36.6	51 16.6 38 50 35.9	50 41.1 41 47 33.7	50 28.7 42 46 33.0	3
4	51 46.9 31 55 40.7	51 37.6 32 55 39.9	51 18.1 33 53 38.4	51 07.9 34 52 37.7	50 57.4 35 51 36.9	50 46.7 36 50 36.2	50 12.7 39 48 34.0	50 00.9 40 47 33.3	4
45	51 13.7 29 56 41.0	51 04.9 30 55 40.2	50 46.4 32 53 38.7	50 36.7 33 52 38.0	50 26.8 34 51 37.2	50 15.9 35 51 36.5	49 44.2 37 48 34.3	49 32.9 38 47 33.6	45
6	50 40.2 27 56 41.2	50 31.9 28 55 40.5	50 14.5 30 54 39.0	50 05.3 31 53 38.2	49 55.9 32 52 37.5	49 46.2 33 51 36.8	49 15.4 36 48 34.6	49 04.6 36 47 33.9	6
7	50 06.6 25 56 41.5	49 58.8 26 55 40.7	49 42.4 28 54 39.2	49 33.8 29 53 38.5	49 24.8 30 52 37.8	49 15.6 31 51 37.0	48 46.4 34 49 34.9	48 36.1 35 48 34.1	7
8	49 32.8 24 57 41.7	49 25.5 25 56 40.9	49 10.1 27 54 39.5	49 02.0 28 53 38.7	48 53.6 29 52 38.0	48 44.9 29 52 37.3	48 17.2 32 49 35.1	48 07.5 33 48 34.4	8
9	48 58.9 22 57 41.9	48 52.1 23 56 41.1	48 37.7 25 54 39.7	48 30.1 26 53 39.0	48 22.2 27 53 38.2	48 14.0 28 52 37.5	47 47.9 30 49 35.4	47 38.6 31 48 34.6	9
50	48 24.9 20 57 42.1	48 18.6 21 56 41.3	48 05.2 24 54 39.9	47 58.0 24 54 39.2	47 50.6 25 53 38.4	47 43.0 26 52 37.7	47 18.4 29 49 35.6	47 09.6 30 49 34.9	50
1	47 50.7 19 57 42.3	47 44.9 20 56 41.5	47 32.5 22 55 40.1	47 25.8 23 54 39.4	47 18.9 23 53 38.6	47 11.8 24 52 37.9	46 48.7 27 50 35.8	46 40.5 28 49 35.1	1
2	47 16.4 17 57 42.4	47 11.1 18 56 41.7	46 59.6 20 55 40.2	46 53.5 21 54 39.5	46 47.1 22 53 38.8	46 40.4 23 52 38.1	46 18.8 25 50 36.0	46 11.1 26 49 35.3	2
3	46 42.1 16 57 42.6	46 37.2 17 57 41.8	46 26.7 18 55 40.4	46 21.1 19 54 39.7	46 15.2 20 53 39.0	46 09.0 21 53 38.3	45 48.9 24 50 36.2	45 41.7 24 49 35.5	3
4	46 07.6 14 58 42.7	46 03.2 15 57 42.0	45 53.7 17 55 40.5	45 48.5 18 54 39.8	45 43.1 19 54 39.1	45 37.4 19 53 38.4	45 18.9 22 50 36.3	45 12.1 23 50 35.6	4
55	45 33.1 13 58 42.8	45 29.2 13 57 42.1	45 20.6 15 55 40.7	45 15.9 16 55 40.0	45 10.9 17 54 39.3	45 05.7 18 53 38.6	44 48.6 20 51 36.5	44 42.4 21 50 35.8	55
6	44 58.5 11 58 42.9	44 55.0 12 57 42.2	44 47.4 -14 55 40.8	44 43.2 14 55 40.1	44 38.7 15 54 39.4	44 34.0 16 53 38.7	44 18.3 19 51 36.6	44 12.6 19 50 35.9	6
7	44 23.8 10 58 43.0	44 20.8 10 57 42.3	44 14.1 12 56 40.9	44 10.4 13 55 40.2	44 06.3 14 54 39.5	44 02.1 15 53 38.8	43 47.9 17 51 36.8	43 42.6 18 50 36.1	7
8	43 49.1 08 58 43.0	43 46.6 09 57 42.3	43 40.8 11 56 41.0	43 37.5 11 55 40.3	43 33.9 12 55 39.6	43 30.2 13 53 38.9	43 17.4 15 51 36.9	43 12.6 16 50 36.2	8
9	43 14.4 07 58 43.1	43 12.3 07 57 42.4	43 07.4 09.56 41.0	43 04.5 10 55 40.4	43 01.5 11 54 39.7	42 58.2 11 53 39.0	42 46.8 14 51 37.0	42 42.5 15 50 36.3	9
60	42 39.6 05 58 43.1	42 38.0 06 57 42.5	42 33.9 07 56 41.1	42 31.6 08 55 40.4	42 29.0 09 54 39.8	42 26.1 10 54 39.1	42 16.2 12 51 37.1	42 12.4 13 50 36.4	60
1	42 04.8 04 58 43.2	42 03.6 04 57 42.5	42 00.5 06 56 41.2	41 58.5 07 55 40.5	41 56.4 08 54 39.8	41 54.0 08 54 39.2	41 45.5 11 51 37.1	41 42.2 11 50 36.5	1
2	41 30.0 03 58 43.2	41 29.2 03 57 42.5	41 27.0 05 56 41.2	41 25.5 05 55 40.5	41 23.8 06 54 39.9	41 21.9 07 54 39.2	41 14.7 09 51 37.2	41 11.9 10 51 36.6	2
3	40 55.1 01 58 43.2	40 54.8 02 57 42.6	40 53.4 03 56 41.2	40 52.4 04 55 40.6	40 51.2 05 54 39.9	40 49.7 05 54 39.3	40 44.0 08 51 37.3	40 41.6 08 51 36.6	3
4	40 20.3 01 58 43.2	40 20.4 00 57 42.6	40 19.9 02 56 41.2	40 19.3 03 55 40.6	40 18.5 03 54 39.9	40 17.5 04 54 39.3	40 13.1 06 51 37.3	40 11.2 07 51 36.7	4
65	39 45.4 02 58 43.2	39 46.0 01 57 42.6	39 46.3 00 56 -41.3	39 46.2 01 55 40.6	39 45.8 02 54 40.0	39 45.3 02 54 39.3	39 42.2 04 51 37.4	39 40.8 05 51 36.7	65
6	39 10.6 03 58 43.2	39 11.6 03 57 42.5	39 12.8 01 56 41.2	39 13.1 00 55 40.6	39 13.2 00 54 40.0	39 13.0 01 54 39.3	39 11.4 03 52 37.4	39 10.4 04 51 36.7	6
7	38 35.8 05 58 43.2	38 37.2 04 57 42.5	38 39.2 03 55 41.2	38 40.0 02 55 40.6	38 40.5 01 54 40.0	38 40.7 01 54 39.3	38 40.5 01 52 37.5	38 39.9 02 51 36.8	7
8	38 01.0 06 58 43.1	38 02.8 06 57 42.5	38 05.7 04 56 41.2	38 06.9 04 55 40.6	38 07.8 03 54 39.9	38 08.6 02 54 39.3	38 09.6 01 52 37.4	38 09.5 01 51 36.8	8
9	37 26.3 08 58 43.1	37 28.4 07 57 42.4	37 32.2 06 56 41.2	37 33.8 05 55 40.5	37 35.2 04 54 39.9	37 36.3 04 54 39.3	37 38.7 02 52 37.4	37 39.0 01 51 36.8	9
70	36 51.5 09 58 43.0	36 54.1 08 57 42.4	36 58.7 07 56 41.1	37 00.7 06 55 40.5	37 02.5 06 54 39.9	37 04.1 05 54 39.3	37 07.8 03 51 37.4	37 08.6 02 51 36.7	70
1	36 16.9 10 58 42.9	36 19.9 09 57 42.3	36 25.3 08 56 41.0	36 27.7 08 55 40.5	36 29.9 07 54 39.8	36 31.9 06 54 39.2	36 36.9 05 51 37.4	36 38.1 04 51 36.7	1
2	35 42.2 12 58 42.9	35 45.6 11 57 42.2	35 51.9 10 56 41.0	35 54.7 09 55 40.4	35 57.3 09 54 39.8	35 59.8 08 54 39.2	36 06.0 06 51 37.3	36 07.7 05 51 36.7	2
3	35 07.7 13 58 42.8	35 11.4 12 57 42.2	35 18.5 11 56 40.9	35 21.7 11 55 40.3	35 24.8 10 54 39.7	35 27.7 09 53 39.1	35 35.2 07 51 37.3	35 37.3 07 51 36.7	3
4	34 33.1 14 57 42.7	34 37.3 14 57 42.1	34 45.2 12 55 40.9	34 48.8 12 55 40.3	34 52.3 11 54 39.7	34 55.6 11 53 39.0	35 04.4 09 51 37.2	35 07.0 08 51 36.6	4
75	33 58.7 16 57 42.6	34 03.3 15 57 42.0	34 11.9 14 55 40.8	34 16.0 13 55 40.2	34 19.9 13 54 39.6	34 23.6 12 53 39.0	34 33.6 10 51 37.2	34 36.6 10 50 36.6	75
6	33 24.1 17 57 42.4	33 29.3 16 57 41.9	33 38.7 15 55 40.7	33 43.2 15 55 40.1	33 47.5 14 54 39.5	33 51.6 13 53 38.9	34 02.9 12 51 37.1	34 06.3 11 50 36.5	6
7	32 50.0 18 57 42.3	32 55.4 18 56 41.7	33 05.6 16 55 40.6	33 10.4 16 54 40.0	33 15.1 15 54 39.4	33 19.7 15 53 38.8	33 32.3 13 51 37.0	33 36.1 13 50 36.4	7
8	32 15.8 19 57 42.2	32 21.5 19 56 41.6	32 32.5 18 55 40.5	32 37.8 17 54 39.9	32 42.9 17 54 39.3	32 47.8 16 53 38.7	33 01.6 15 51 36.9	33 05.9 14 50 36.3	8
9	31 41.6 21 57 42.1	31 47.8 20 56 41.5	31 59.6 19 55 40.3	32 05.2 19 54 39.8	32 10.7 18 54 39.2	32 16.0 18 53 38.6	32 31.1 16 51 36.8	32 35.8 15 50 36.3	9
80	31 07.6 22 57 41.9	31 14.1 21 56 41.3	31 26.7 20 55 40.2	31 32.7 20 54 39.6	31 38.6 19 53 39.1	31 44.4 19 53 38.5	32 00.6 17 51 36.7	32 05.7 17 50 36.2	80
1	30 33.7 23 56 41.8	30 40.5 23 56 41.2	30 53.9 22 54 40.1	31 00.3 21 54 39.5	31 06.6 21 53 38.9	31 12.7 20 53 38.4	31 30.2 19 51 36.6	31 35.8 18 50 36.1	1
2	29 59.8 24 56 41.6	30 07.1 24 56 41.0	30 21.2 23 54 39.9	30 28.0 23 54 39.4	30 34.7 22 53 38.8	30 41.2 21 52 38.2	30 59.9 20 50 36.5	31 05.9 20 50 35.9	2
3	29 26.1 26 56 41.4	29 33.7 25 55 40.9	29 48.6 24 54 39.8	29 55.8 24 54 39.2	30 02.8 23 53 38.6	30 09.8 23 52 38.1	30 29.7 21 50 36.4	30 36.0 21 50 35.8	3
4	28 52.5 27 56 41.3	29 00.5 26 55 40.7	29 16.1 26 54 39.6	29 23.7 25 53 39.1	29 31.1 25 53 38.5	29 38.4 24 52 37.9	29 59.5 23 50 36.3	30 06.3 22 49 35.7	4
85	28 19.0 28 56 41.1	28 27.3 28 55 40.5	28 43.7 27 54 39.5	28 51.7 26 53 38.9	28 59.5 26 52 38.3	29 07.2 25 52 37.8	29 29.5 24 50 36.1	29 36.7 24 49 35.6	85
6	27 45.6 29 55 40.9	27 54.3 29 55 40.4	28 11.4 28 54 39.3	28 19.8 28 53 38.7	28 28.0 27 52 38.2	28 36.1 27 52 37.6	28 59.6 25 50 36.0	29 07.1 25 49 35.4	6
7	27 12.4 31 55 40.7	27 21.5 30 55 40.2	27 39.3 29 53 39.1	27 48.0 29 53 38.5	27 56.6 28 52 38.0	28 05.1 28 51 37.5	28 29.7 27 50 35.8	28 37.7 26 49 35.3	7
8	26 39.2 32 55 40.5	26 48.7 31 54 40.0	27 07.3 31 53 38.9	27 16.4 30 53 38.4	27 25.3 30 52 37.8	27 34.2 29 51 37.3	28 00.0 28 49 35.7	28 08.4 28 49 35.1	8
9	26 06.3 33 55 40.3	26 16.1 33 54 39.8	26 35.4 32 53 38.7	26 44.9 31 52 38.2	26 54.2 31 52 37.6	27 03.4 31 51 37.1	27 30.4 29 49 35.5	27 39.1 29 49 35.0	9
90	25 33.4 34 54 40.1	25 43.6 34 54 39.5	26 03.6 33 53 38.5	26 13.5 33 52 38.0	26 23.2 32 51 37.4	26 32.8 32 51 36.9	27 00.9 31 49 35.3	27 10.1 30 48 34.8	90

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
91	25 00.8	35 54	39.8	25 11.3	35 54	39.3	25 32.0	34 52	38.3	25 42.2	34 52	37.8	25 52.3	33 51	37.2	26 02.3	33 51	36.7	26 31.6	32 49	35.1	26 41.1	32 48	34.6	91
2	24 28.2	36 54	39.6	24 39.1	36 53	39.1	25 00.6	35 52	38.1	25 11.2	35 52	37.6	25 21.6	35 51	37.0	25 32.0	34 50	36.5	26 02.4	33 48	35.0	26 12.3	33 48	34.4	2
3	23 55.9	38 54	39.4	24 07.1	37 53	38.9	24 29.3	37 52	37.9	24 40.2	36 51	37.3	24 51.0	36 51	36.8	25 01.8	36 50	36.3	25 33.3	34 48	34.8	25 43.6	34 48	34.2	3
4	23 23.7	39 53	39.1	23 35.3	38 53	38.6	23 58.1	38 52	37.6	24 09.4	37 51	37.1	24 20.6	37 50	36.6	24 31.7	37 50	36.1	25 04.3	36 48	34.6	25 15.0	35 47	34.0	4
95	22 51.7	40 53	38.9	23 03.6	40 53	38.4	23 27.2	39 51	37.4	23 38.8	39 51	36.9	23 50.4	38 50	36.4	24 01.8	38 50	35.9	24 35.6	37 48	34.4	24 46.6	37 47	33.8	95
6	22 19.8	41 53	38.6	22 32.1	41 52	38.1	22 56.3	40 51	37.1	23 08.3	40 50	36.7	23 20.3	40 50	36.2	23 32.1	39 49	35.7	24 06.9	38 47	34.1	24 18.3	38 47	33.6	6
7	21 48.1	42 52	38.4	22 00.7	42 52	37.9	22 25.7	41 51	36.9	22 38.1	41 50	36.4	22 50.3	41 50	35.9	23 02.5	40 49	35.4	23 38.4	39 47	33.9	23 50.2	39 47	33.4	7
8	21 16.6	43 52	38.1	21 29.6	43 52	37.6	21 55.2	42 50	36.6	22 07.9	42 50	36.2	22 20.6	42 49	35.7	22 33.1	42 49	35.2	23 10.1	41 47	33.7	23 22.3	40 46	33.2	8
9	20 45.3	44 52	37.8	20 58.6	44 51	37.4	21 25.0	44 50	36.4	21 38.0	43 50	35.9	21 51.0	43 49	35.4	22 03.9	43 48	34.9	22 42.0	42 47	33.5	22 54.5	42 46	33.0	9
100	20 14.2	46 52	37.6	20 27.8	45 51	37.1	20 54.9	45 50	36.1	21 08.3	45 49	35.6	21 21.6	44 49	35.2	21 34.8	44 48	34.7	22 14.0	43 46	33.2	22 26.9	43 46	32.7	100
1	19 43.3	47 51	37.3	19 57.3	46 51	36.8	20 25.0	46 50	35.9	20 38.7	46 49	35.4	20 52.4	45 48	34.9	21 06.0	45 48	34.4	21 46.2	44 46	33.0	21 59.5	44 45	32.5	1
2	19 12.6	48 51	37.0	19 26.9	48 50	36.5	19 55.3	47 49	35.6	20 09.4	47 49	35.1	20 23.4	47 48	34.6	20 37.3	46 47	34.2	21 18.6	46 46	32.7	21 32.2	45 45	32.3	2
3	18 42.1	49 50	36.7	18 56.7	49 50	36.2	19 25.8	48 49	35.3	19 40.2	48 48	34.8	19 54.5	48 48	34.4	20 08.8	47 47	33.9	20 51.2	47 45	32.5	21 05.2	46 45	32.0	3
4	18 11.8	50 50	36.4	18 26.8	50 50	35.9	18 56.5	49 48	35.0	19 11.2	49 48	34.5	19 25.9	49 47	34.1	19 40.5	49 47	33.6	20 24.0	48 45	32.2	20 38.3	48 44	31.8	4
105	17 41.7	51 50	36.1	17 57.0	51 49	35.6	18 27.4	50 48	34.7	18 42.5	50 48	34.3	18 57.5	50 47	33.8	19 12.5	50 46	33.3	19 56.9	49 45	32.0	20 11.6	49 44	31.5	105
6	17 11.9	52 49	35.8	17 27.5	52 49	35.3	17 58.5	52 48	34.4	18 14.0	51 47	34.0	18 29.3	51 47	33.5	18 44.6	51 46	33.1	19 30.1	50 44	31.7	19 45.1	50 44	31.2	6
7	16 42.3	53 49	35.4	16 58.2	53 48	35.0	17 29.9	53 47	34.1	17 45.6	52 47	33.7	18 01.3	52 46	33.2	18 17.0	52 46	32.8	19 03.5	51 44	31.4	19 18.9	51 43	31.0	7
8	16 12.9	54 49	35.1	16 29.1	54 48	34.7	17 01.5	54 47	33.8	17 17.6	54 46	33.4	17 33.6	53 46	32.9	17 49.5	53 45	32.5	18 37.1	53 44	31.1	18 52.8	52 43	30.7	8
9	15 43.7	55 48	34.8	16 00.3	55 48	34.3	16 33.3	55 47	33.5	16 49.7	54 46	33.0	17 06.1	54 46	32.6	17 22.3	54 45	32.2	18 10.9	54 43	30.8	18 27.0	53 43	30.4	9
110	15 14.8	56 48	34.4	15 31.7	56 47	34.0	16 05.3	56 46	33.2	16 22.1	56 46	32.7	16 38.8	56 45	32.2	16 55.4	55 45	31.9	17 44.9	55 43	30.5	18 01.3	55 42	30.1	110
1	14 46.2	57 47	34.1	15 03.4	57 47	33.7	15 37.6	57 46	32.8	15 54.7	57 45	32.4	16 11.7	57 45	32.0	16 28.6	56 44	31.5	17 19.2	56 43	30.2	17 35.9	56 42	29.8	1
2	14 17.8	58 47	33.8	14 35.3	58 46	33.3	15 10.2	58 45	32.5	15 27.5	58 45	32.1	15 44.9	58 44	31.6	16 02.1	58 44	31.2	16 53.7	57 42	29.9	17 10.7	57 42	29.5	2
3	13 49.6	59 46	33.4	14 07.5	59 46	33.0	14 43.0	59 45	32.2	15 00.7	59 44	31.7	15 18.3	59 44	31.3	15 35.9	59 43	30.9	16 28.4	58 42	29.6	16 45.8	58 41	29.2	3
4	13 21.8	60 46	33.0	13 39.9	60 46	32.6	14 16.0	60 44	31.8	14 34.0	60 44	31.4	14 52.0	60 43	31.0	15 09.9	60 43	30.6	16 03.4	59 41	29.3	16 21.1	59 41	28.9	4
115	12 54.1	62 46	32.7	13 12.6	61 45	32.3	13 49.3	61 44	31.5	14 07.6	61 44	31.1	14 25.9	61 43	30.6	14 44.1	61 42	30.2	15 38.6	60 41	29.0	15 56.6	60 40	28.6	115
6	12 26.8	63 45	32.3	12 45.5	62 45	31.9	13 22.9	62 44	31.1	13 41.5	62 43	30.7	14 00.1	62 43	30.3	14 18.7	62 42	29.9	15 14.0	61 40	28.7	15 32.4	61 40	28.3	6
7	11 59.8	64 45	31.9	12 18.8	63 44	31.5	12 56.8	63 43	30.7	13 15.7	63 43	30.3	13 34.6	63 42	29.9	13 53.4	63 42	29.5	14 49.7	62 40	28.3	15 08.4	62 40	27.9	7
8	11 33.0	64 44	31.6	11 52.3	64 44	31.2	12 30.9	64 43	30.4	12 50.1	64 42	30.0	13 09.3	64 42	29.6	13 28.5	64 41	29.2	14 25.7	63 40	27.9	14 44.7	63 39	27.6	8
9	11 06.5	65 44	31.2	11 26.1	65 43	30.8	12 05.3	65 42	30.0	12 24.8	65 42	29.6	12 44.3	65 41	29.2	13 03.8	65 41	28.8	14 02.0	64 39	27.7	14 21.3	64 39	27.3	9
120	10 40.3	66 43	30.8	11 00.2	66 43	30.4	11 40.0	66 42	29.6	11 59.8	66 41	29.3	12 19.6	66 41	28.9	12 39.4	66 40	28.5	13 38.5	65 39	27.3	13 58.1	65 38	26.9	120
1	10 14.4	67 43	30.4	10 34.6	67 42	30.0	11 15.0	67 41	29.3	11 35.1	67 41	28.9	11 55.2	67 40	28.5	12 15.3	67 40	28.1	13 15.3	67 38	27.0	13 35.2	66 38	26.6	1
2	9 48.8	68 42	30.0	10 09.3	68 42	29.6	10 50.2	68 41	28.9	11 10.7	68 40	28.5	11 31.1	68 40	28.1	11 51.4	68 39	27.7	12 52.3	68 38	26.6	13 12.6	67 37	26.2	2
3	9 23.6	69 42	29.6	9 44.3	69 41	29.2	10 25.8	69 40	28.5	10 46.5	69 40	28.1	11 07.2	69 39	27.7	11 27.9	69 39	27.4	12 29.7	69 37	26.3	12 50.2	68 37	25.9	3
4	8 58.6	70 41	29.2	9 19.7	70 41	28.8	10 01.7	70 40	28.1	10 22.7	70 39	27.7	10 43.7	70 39	27.4	11 04.6	70 38	27.0	12 07.3	69 37	25.9	12 28.1	69 36	25.5	4
125	8 34.0	71 41	28.8	8 55.3	71 40	28.4	9 37.9	71 39	27.7	9 59.2	71 39	27.3	10 20.5	71 38	27.0	10 41.7	71 38	26.6	11 45.2	70 36	25.5	12 06.3	70 36	25.2	125
6	8 09.7	72 40	28.3	8 31.3	72 40	28.0	9 14.4	72 39	27.3	9 36.0	72 38	26.9	9 57.5	72 38	26.6	10 19.0	72 37	26.2	11 23.4	71 36	25.2	11 44.9	71 35	24.8	6
7	7 45.7	73 39	27.9	8 07.6	73 39	27.6	8 51.3	73 38	26.9	9 13.1	73 38	26.5	9 34.9	73 37	26.2	9 56.7	73 37	25.8	11 02.0	72 35	24.8	11 23.7	72 35	24.4	7
8	7 22.0	74 39	27.5	7 44.2	74 38	27.1	8 28.4	74 38	26.5	8 50.6	74 37	26.1	9 12.6	74 37	25.8	9 34.7	74 36	25.4	10 40.8	73 35	24.4	11 02.8	73 34	24.0	8
9	6 58.7	75 38	27.0	7 21.1	75 38	26.7	8 05.9	75 37	26.0	8 28.3	75 36	25.7	8 50.7	75 36	25.4	9 13.0	74 36	25.0	10 19.9	74 34	24.0	10 42.2	74 34	23.7	9
130	6 35.8	76 38	26.6	6 58.4	76 37	26.3	7 43.8	76 36	25.6	8 06.4	75 36	25.3	8 29.1	75 36	25.0	8 51.7	75 35	24.6	9 59.4	75 34	23.6	10 21.9	75 33	23.3	130
1	6 13.1	77 37	26.2	6 36.1	76 37	25.8	7 22.0	76 36	25.2	7 44.9	76 35	24.9	8 07.8	76 35	24.5	8 30.6	76 34	24.2	9 39.2	76 33	23.2	10 02.0	76 33	22.9	1
2	5 50.9	77 36	25.7	6 14.1	77 36	25.4	7 00.5	77 35	24.8	7 23.6	77 35	24.4	7 46.8	77 34	24.1	8 09.9	77 34	23.8	9 19.3	77 33	22.8	9 42.3	77 32	22.5	2
3	5 29.0	78 36	25.3	5 52.5	78 35	24.9	6 39.3	78 35	24.3	7 02.8	78 34	24.0	7 26.2	78 34	23.7	7 49.6	78 33	23.4	8 59.7	78 32	22.4	9 23.0	78 32	22.1	3
4	5 07.5	79 35	24.8	5 31.2	79 35	24.5	6 18.6	79 34	23.9	6 42.3	79 34	23.6	7 05.9	79 33	23.3	7 29.6	79 33	22.9	8 40.5	79 32	22.0	9 04.1	79 31	21.7	4
135				5 10.3	80 34	24.0	5 58.2	80 33	23.4	6 22.1	80 33	23.1	6 46.0	80 33	22.8	7 09.9	80 32	22.5	8 21.6	80 31	21.6	8 45.4	79 30	21.3	135
6							5 38.1	81 33	23.0	6 02.3	81 32	22.7	6 26.5	81 32	22.4	6 50.6	80 32	22.1	8 03.0	80 30	21.2	8 27.1	80 30	20.9	6
7							5 18.4	81 32	22.5	5 42.9	81 32	22.2	6 07.3	81 31	21.9	6 31.7	81 31	21.6	7 44.8	81 30	20.8	8 09.1	81 29	20.5	7
8										5 23.8	82 31	21.8	5 48.4	82 31	21.5	6 13.1	82 30	21.2	7 26.9	82 29	20.3	7 51.5	82 29	20.0	8
9										5 05.1	83 31	21.3	5 30.0	83 30	21.0	5 54.9	83 30	20.8	7 09.4	83 29	19.9	7 34.3	83 28	19.6	9
140													5 11.9	84 30	20.6	5 37.0	84 29	20.3	6 52.3	84 28	19.5	7 17.3	84 28	19.2	140
1																5 19.5	84 28	19.9	6 35.5	84 27	19.0	7 00.8	84 27	18.8	1
2																5 02.5	85 28	19.4	6 19.1	85 27	18.6	6 44.6	85 26	18.3	2
3																			6 03.0	86 26	18.2	6 28.8	86 26	17.9	3
4																			5 47.4	87 25	17.7	6 13.3	87 25	17.5	4
145																			5 32.1	87 25	17.3	5 58.2	87 24	17.0	145
6																			5 17.2	88 24	16.8	5 43.5	88 24	16.6	6
7																			5 02.6	89 24	16.4	5 29.2	89 23	16.1	7
8																						5 15.3	89 23	15.7	8
9																						5 01.7	90 22	15.2	9

Lat. 32°
Lat. 33°
Lat. 34°
Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°
Lat. 39°

DECLINATION SAME NAME AS LATITUDE

Lat. 32°

Columns: for each declination the three sub-columns are **Alt.**, **Δd Δt**, **Az.**

H.A.	60°00′ Alt	Δd Δt	Az	60°30′ Alt	Δd Δt	Az	62°00′ Alt	Δd Δt	Az	62°30′ Alt	Δd Δt	Az	63°00′ Alt	Δd Δt	Az	69°00′ Alt	Δd Δt	Az	69°30′ Alt	Δd Δt	Az	74°30′ Alt	Δd Δt	Az	H.A.
00	62 00.0	1.00 1	00.0	61 30.0	1.00 1	00.0	60 00.0	1.00 1	00.0	59 30.0	1.00 1	00.0	59 00.0	1.00 1	00.0	53 00.0	1.00 1	00.0	52 30.0	1.00 1	00.0	47 30.0	1.00 1	00.0	00
1	61 59.5	1.00 2	01.1	61 29.5	1.00 2	01.0	59 59.6	1.00 2	00.9	59 29.6	1.00 2	00.9	58 59.6	1.00 2	00.9	52 59.7	1.00 1	00.6	52 29.7	1.00 1	00.6	47 29.8	1.00 1	00.4	1
2	61 58.1	1.00 4	02.1	61 28.2	1.00 4	02.1	59 58.3	1.00 3	01.9	59 28.4	1.00 3	01.8	58 58.4	1.00 3	01.8	52 58.9	1.00 2	01.2	52 29.0	1.00 2	01.2	47 29.3	1.00 1	00.8	2
3	61 55.8	1.00 6	03.2	61 25.9	1.00 5	03.1	59 56.3	1.00 5	02.7	59 26.4	1.00 5	02.7	58 56.5	1.00 5	02.6	52 57.6	1.00 3	01.8	52 27.7	1.00 3	01.7	47 28.4	1.00 2	01.2	3
4	61 52.5	99 07	04.2	61 22.7	99 07	04.1	59 53.3	99 06	03.7	59 23.6	99 06	03.6	58 53.8	99 06	03.5	52 55.8	1.00 4	02.4	52 25.9	1.00 4	02.3	47 27.2	1.00 3	01.6	4
05	61 48.2	99 09	05.3	61 18.6	99 08	05.1	59 49.6	99 08	04.7	59 19.9	99 07	04.5	58 50.2	99 07	04.4	52 53.4	99 05	03.0	52 23.6	99 05	02.9	47 25.6	99 03	02.0	05
6	61 43.1	98 10	06.3	61 13.6	98 10	06.1	59 45.1	98 09	05.6	59 15.5	98 09	05.4	58 46.0	99 08	05.3	52 50.5	99 06	03.6	52 20.8	99 06	03.4	47 23.7	99 04	02.4	6
7	61 37.0	98 12	07.4	61 07.7	98 11	07.1	59 39.7	98 10	06.5	59 10.3	98 10	06.3	58 40.9	98 10	06.1	52 47.1	99 07	04.1	52 17.5	99 06	04.0	47 21.4	99 04	02.8	7
8	61 30.0	97 13	08.4	61 00.9	97 13	08.1	59 33.5	97 12	07.4	59 04.4	97 11	07.2	58 35.1	97 11	07.0	52 43.2	98 07	04.7	52 13.7	98 07	04.6	47 18.8	98 05	03.1	8
9	61 22.2	96 15	09.4	60 53.3	96 14	09.1	59 26.6	97 13	08.3	58 57.6	97 12	08.1	58 28.6	97 12	07.8	52 38.7	98 08	05.3	52 09.4	98 08	05.1	47 15.8	98 06	03.5	9
10	61 13.4	95 16	10.4	60 44.8	95 16	10.1	59 18.8	96 14	09.2	58 50.1	96 14	08.9	58 21.3	96 13	08.6	52 33.8	97 09	05.9	52 04.6	97 09	05.7	47 12.5	98 06	03.9	10
1	61 03.8	94 17	11.4	60 35.5	94 17	11.0	59 10.3	95 15	10.1	58 41.8	95 15	09.8	58 13.3	95 15	09.5	52 28.3	96 10	06.4	51 59.4	96 10	06.2	47 08.9	97 07	04.3	1
2	60 53.4	93 19	12.3	60 25.4	93 18	12.0	59 01.1	94 17	10.9	58 32.8	94 16	10.6	58 04.6	94 16	10.3	52 22.3	96 11	07.0	51 53.6	96 10	06.8	47 04.9	97 07	04.7	2
3	60 42.1	92 20	13.3	60 14.4	92 20	12.9	58 51.0	93 18	11.8	58 23.1	93 17	11.4	57 55.2	93 17	11.1	52 15.9	95 12	07.6	51 47.4	95 11	07.3	47 00.6	96 08	05.1	3
4	60 30.0	91 22	14.2	60 02.7	91 21	13.8	58 40.3	92 19	12.6	58 12.7	92 19	12.2	57 45.0	92 18	11.9	52 08.9	94 12	08.1	51 40.6	94 12	07.9	46 55.9	96 08	05.4	4
15	60 17.1	90 23	15.1	59 50.1	90 22	14.7	58 28.8	91 20	13.4	58 01.5	91 20	13.0	57 34.2	91 19	12.7	52 01.5	93 13	08.7	51 33.5	94 13	08.4	46 50.9	95 09	05.8	15
6	60 03.4	88 24	16.0	59 36.9	89 23	15.6	58 16.6	90 21	14.2	57 49.7	90 21	13.8	57 22.7	90 20	13.4	51 53.6	93 14	09.2	51 25.8	93 14	08.9	46 45.6	94 09	06.2	6
7	59 49.0	87 25	16.9	59 22.8	87 25	16.4	58 03.8	89 23	15.0	57 37.2	89 22	14.6	57 10.6	89 21	14.2	51 45.2	92 15	09.7	51 17.7	92 14	09.4	46 40.0	93 10	06.5	7
8	59 33.8	86 26	17.8	59 08.1	86 26	17.3	57 50.2	87 24	15.8	57 24.1	87 23	15.4	56 57.8	88 22	14.9	51 36.4	91 16	10.3	51 09.1	91 15	09.9	46 34.1	92 10	06.9	8
9	59 18.0	84 28	18.6	58 52.7	85 27	18.1	57 36.0	86 25	16.6	57 10.3	86 24	16.1	56 44.4	86 23	15.6	51 27.1	90 16	10.8	51 00.1	90 16	10.4	46 27.8	92 11	07.3	9
20	59 01.4	83 29	19.4	58 36.5	83 28	18.9	57 21.2	84 26	17.3	56 55.9	85 25	16.8	56 30.4	85 24	16.3	51 17.3	89 17	11.3	50 50.7	89 16	10.9	46 21.2	91 12	07.6	20
1	58 44.2	81 30	20.2	58 19.9	82 29	19.6	57 05.8	83 27	18.0	56 40.8	83 26	17.5	56 15.8	84 25	17.0	51 07.1	88 18	11.8	50 40.8	88 17	11.4	46 14.3	90 12	08.0	1
2	58 26.3	79 31	21.0	58 02.3	80 30	20.4	56 49.7	81 28	18.7	56 25.2	82 27	18.2	56 00.6	82 26	17.7	50 56.5	86 18	12.3	50 30.6	87 18	11.9	46 07.1	89 12	08.3	2
3	58 07.7	78 32	21.7	57 44.3	78 31	21.1	56 33.1	80 29	19.4	56 09.0	80 28	18.9	55 44.8	81 27	18.4	50 45.5	85 19	12.8	50 19.9	85 18	12.4	45 59.6	88 13	08.6	3
4	57 48.6	76 33	22.4	57 25.7	77 32	21.8	56 15.8	78 30	20.1	55 52.2	79 29	19.6	55 28.5	79 28	19.0	50 34.0	84 20	13.3	50 08.7	84 19	12.8	45 51.8	87 13	09.0	4
25	57 28.9	75 34	23.1	57 06.5	75 33	22.5	55 58.1	77 30	20.8	55 34.9	77 30	20.2	55 11.7	78 29	19.6	50 22.1	83 20	13.7	49 57.2	83 20	13.3	45 43.7	86 14	09.3	25
6	57 08.6	73 35	23.8	56 46.7	73 34	23.2	55 39.8	75 31	21.4	55 17.1	76 31	20.8	54 54.3	76 30	20.3	50 09.8	81 21	14.2	49 45.3	82 20	13.7	45 35.4	85 14	09.6	6
7	56 47.8	71 36	24.5	56 26.4	72 35	23.9	55 20.9	74 32	22.0	54 58.8	74 31	21.4	54 36.5	75 31	20.8	49 57.1	80 22	14.6	49 33.1	80 21	14.2	45 26.7	84 15	10.0	7
8	56 26.4	69 36	25.1	56 05.5	70 36	24.5	55 01.6	72 33	22.6	54 40.0	73 32	22.0	54 18.1	73 31	21.4	49 44.1	79 22	15.1	49 20.4	79 22	14.6	45 17.8	82 15	10.3	8
9	56 04.6	68 37	25.7	55 44.2	68 36	25.1	54 41.8	70 34	23.2	54 20.6	71 33	22.6	53 59.3	71 32	22.0	49 30.7	77 23	15.5	49 07.4	78 22	15.0	45 08.5	81 16	10.6	9
30	55 42.2	66 38	26.3	55 22.4	67 37	25.7	54 21.5	69 35	23.8	54 00.9	69 34	23.1	53 40.0	70 33	22.5	49 16.9	76 24	15.9	48 54.0	76 23	15.4	44 59.1	80 16	10.9	30
1	55 19.4	64 39	26.9	55 00.1	65 38	26.2	54 00.8	67 35	24.3	53 40.7	68 34	23.7	53 20.3	68 34	23.1	49 02.7	75 24	16.4	48 40.3	75 23	15.9	44 49.3	79 17	11.2	1
2	54 56.2	62 39	27.5	54 37.4	63 39	26.8	53 39.7	65 36	24.8	53 20.0	66 35	24.2	53 00.2	67 34	23.6	48 48.2	73 25	16.8	48 26.2	74 24	16.2	44 39.3	78 17	11.5	2
3	54 32.5	61 40	28.0	54 14.2	61 39	27.3	53 18.1	63 37	25.3	52 59.0	64 36	24.7	52 39.6	65 35	24.1	48 33.4	72 25	17.2	48 11.8	72 25	16.6	44 29.1	76 18	11.8	3
4	54 08.4	59 41	28.5	53 50.7	59 40	27.8	52 56.1	62 37	25.8	52 37.5	62 36	25.2	52 18.7	63 36	24.5	48 18.3	70 26	17.5	47 57.1	71 25	17.0	44 18.6	75 18	12.1	4
35	53 43.9	57 41	29.0	53 26.8	58 41	28.3	52 33.8	60 38	26.3	52 15.7	61 37	25.6	51 57.4	61 36	25.0	48 02.7	69 26	17.9	47 42.1	69 26	17.4	44 07.8	74 18	12.3	35
6	53 19.1	55 42	29.5	53 02.4	56 41	28.8	52 11.1	58 38	26.7	51 53.5	59 38	26.1	51 35.7	60 37	25.4	47 46.9	67 27	18.3	47 26.7	68 26	17.7	43 56.8	72 19	12.6	6
7	52 53.9	53 43	29.9	52 37.8	54 42	29.2	51 48.0	56 39	27.2	51 30.9	57 38	26.5	51 13.7	58 37	25.9	47 30.8	65 27	18.6	47 11.1	66 27	18.1	43 45.6	71 19	12.9	7
8	52 28.3	52 43	30.4	52 12.8	52 42	29.7	51 24.6	55 40	27.6	51 08.0	55 39	26.9	50 51.3	56 38	26.3	47 14.4	64 28	19.0	46 55.2	64 27	18.4	43 34.2	69 19	13.1	8
9	52 02.5	50 44	30.8	51 47.4	51 43	30.1	51 00.8	53 40	28.0	50 44.8	54 39	27.3	50 28.6	54 38	26.7	46 57.8	62 28	19.3	46 39.0	63 27	18.7	43 22.5	68 20	13.4	9
40	51 36.3	48 44	31.2	51 21.8	49 43	30.5	50 36.8	51 41	28.4	50 21.3	52 40	27.7	50 05.6	53 39	27.1	46 40.8	61 29	19.6	46 22.5	61 28	19.0	43 10.6	66 20	13.6	40
1	51 09.8	46 45	31.5	50 55.8	47 44	30.8	50 12.4	49 41	28.8	49 57.5	50 40	28.1	49 42.3	51 39	27.4	46 23.6	59 29	19.9	46 05.8	60 28	19.3	42 58.5	65 20	13.9	1
2	50 43.1	44 45	31.9	50 29.6	45 44	31.2	49 47.8	48 41	29.1	49 33.4	48 41	28.4	49 18.8	49 40	27.8	46 06.1	57 30	20.2	45 48.8	58 29	19.6	42 46.2	63 21	14.1	2
3	50 16.0	43 45	32.2	50 03.1	43 45	31.5	49 22.9	46 42	29.5	49 09.0	47 41	28.8	48 54.9	47 40	28.1	45 48.4	56 30	20.5	45 31.6	56 29	19.9	42 33.7	62 21	14.3	3
4	49 48.8	41 46	32.6	49 36.4	42 45	31.9	48 57.8	44 42	29.8	48 44.4	45 41	29.1	48 30.8	46 41	28.4	45 30.4	54 30	20.8	45 14.1	55 29	20.2	42 21.1	60 21	14.5	4
45	49 21.3	39 46	32.9	49 09.4	40 45	32.2	48 32.4	42 43	30.1	48 19.5	43 42	29.4	48 06.5	44 41	28.7	45 12.2	53 31	21.1	44 56.4	53 30	20.5	42 08.2	59 22	14.8	45
6	48 53.5	37 47	33.2	48 42.2	38 46	32.5	48 06.8	41 43	30.4	47 54.4	41 42	29.7	47 41.9	42 41	29.0	44 53.8	51 31	21.3	44 38.5	51 30	20.7	41 55.1	57 22	15.0	6
7	48 25.6	34 47	33.4	48 14.8	36 46	32.7	47 40.9	39 43	30.7	47 29.1	40 43	30.0	47 17.1	41 42	29.3	44 35.2	49 31	21.6	44 20.4	50 31	21.0	41 41.9	56 22	15.2	7
8	47 57.5	34 47	33.7	47 47.2	35 46	33.0	47 14.9	38 43	30.9	47 03.6	38 43	30.2	46 52.1	39 42	29.6	44 16.4	47 32	21.8	44 02.1	48 31	21.2	41 28.5	54 23	15.4	8
9	47 29.1	32 47	33.9	47 19.4	33 47	33.2	46 48.6	35 44	31.2	46 37.9	36 43	30.5	46 26.9	37 42	29.8	43 57.4	46 32	22.1	43 43.5	46 31	21.5	41 14.9	52 23	15.6	9
50	47 00.6	30 48	34.2	46 51.4	31 47	33.5	46 22.2	34 44	31.4	46 12.0	35 43	30.7	46 01.5	35 43	30.1	43 38.2	44 32	22.3	43 24.8	45 31	21.7	41 01.2	51 23	15.7	50
1	46 32.0	29 48	34.4	46 23.3	30 47	33.7	45 55.6	32 45	31.6	45 45.9	33 44	31.0	45 35.9	34 43	30.3	43 18.6	42 33	22.5	43 06.0	43 32	21.9	40 47.3	49 23	15.9	1
2	46 03.2	27 48	34.6	45 54.9	28 47	33.9	45 28.8	30 45	31.8	45 19.6	31 44	31.2	45 10.2	32 43	30.5	42 59.2	41 33	22.7	42 46.9	41 32	22.1	40 33.3	48 24	16.1	2
3	45 34.2	25 48	34.8	45 26.5	26 48	34.1	45 01.9	29 45	32.0	44 53.2	29 44	31.4	44 44.3	30 43	30.7	42 39.5	39 33	22.9	42 27.7	40 32	22.3	40 19.1	46 24	16.3	3
4	45 05.1	24 49	35.0	44 57.9	24 48	34.3	44 34.8	27 45	32.2	44 26.6	28 44	31.5	44 18.2	28 44	30.9	42 19.6	37 33	23.1	42 08.3	38 33	22.5	40 04.8	44 24	16.4	4
55	44 35.9	22 49	35.1	44 29.2	23 48	34.4	44 07.6	25 46	32.4	44 00.0	26 45	31.7	43 52.0	27 44	31.1	41 59.6	36 34	23.3	41 48.8	36 33	22.6	39 50.4	43 24	16.6	55
6	44 06.6	20 49	35.3	44 00.4	21 48	34.6	43 40.3	23 46	32.6	43 33.1	24 45	31.9	43 25.7	25 44	31.2	41 39.4	34 34	23.4	41 29.2	35 33	22.8	39 35.8	41 24	16.7	6
7	43 37.2	19 49	35.4	43 31.4	19 48	34.7	43 12.9	22 46	32.7	43 06.2	23 44	32.0	42 59.3	23 44	31.4	41 19.1	32 34	23.6	41 09.4	33 33	23.0	39 21.1	39 25	16.8	7
8	43 07.6	17 49	35.5	43 02.4	18 49	34.8	42 45.3	20 46	32.8	42 39.2	21 45	32.2	42 32.8	22 44	31.5	40 58.7	30 34	23.7	40 49.5	31 33	23.1	39 06.3	38 25	17.0	8
9	42 38.0	15 49	35.6	42 33.3	16 49	35.0	42 17.7	19 46	33.0	42 12.0	19 45	32.3	42 06.1	20 45	31.6	40 38.2	29 34	23.9	40 29.4	29 34	23.2	38 51.4	36 25	17.1	9
60	42 08.4	14 50	35.7	42 04.1	15 49	35.1	41 50.0	17 46	33.1	41 44.8	18 46	32.4	41 39.4	18 45	31.8	40 17.5	27 35	24.0	40 09.3	28 34	23.4	38 36.4	34 25	17.2	60
1	41 38.6	12 50	35.8	41 34.8	13 49	35.2	41 22.2	16 46	33.2	41 17.5	16 46	32.5	41 12.6	17 45	31.9	39 56.7	25 35	24.1	39 49.1	25 34	23.5	38 21.2	32 25	17.3	1
2	41 08.8	11 50	35.9	41 05.5	11 49	35.2	40 54.3	14 47	33.3	40 50.1	14 46	32.6	40 45.7	15 45	32.0	39 35.9	24 35	24.2	39 28.7	24 34	23.6	38 06.0	31 26	17.4	2
3	40 39.0	09 50	36.0	40 36.1	10 49	35.3	40 26.3	12 47	33.3	40 22.6	13 46	32.7	40 18.7	13 45	32.0	39 15.0	22 35	24.4	39 08.3	23 34	23.7	37 50.7	29 26	17.6	3
4	40 09.1	07 50	36.0	40 06.7	08 49	35.4	39 58.4	10 47	33.4	39 55.1	11 46	32.8	39 51.7	12 45	32.1	38 53.9	20 35	24.4	38 47.8	21 34	23.8	37 35.3	27 26	17.6	4
65	39 39.1	06 50	36.1	39 37.2	07 49	35.4	39 30.3	09 47	33.5	39 27.6	09 46	32.8	39 24.6	10 45	32.2	38 32.8	19 35	24.5	38 27.2	19 34	23.9	37 19.9	26 26	17.7	65
6	39 09.2	04 50	36.1	39 07.8	05 49	35.5	39 02.2	07 47	33.5	39 00.0	08 46	32.9	38 57.5	09 45	32.2	38 11.7	17 35	24.6	38 06.5	17 35	24.0	37 04.4	24 26	17.8	6
7	38 39.2	03 50	36.1	38 38.2	04 49	35.5	38 34.1	06 47	33.6	38 32.3	06 46	32.9	38 30.4	07 45	32.3	37 50.5	15 35	24.7	37 45.8	16 35	24.1	36 48.7	22 26	17.9	7
8	38 09.2	01 50	36.1	38 08.7	02 49	35.5	38 06.0	04 47	33.6	38 04.7	05 46	32.9	38 03.2	05 45	32.3	37 29.2	13 36	24.8	37 25.0	14 35	24.1	36 33.1	20 26	18.0	8
9	37 39.2	00 50	36.1	37 39.2	00 49	35.5	37 37.8	02 47	33.6	37 37.0	03 46	33.0	37 36.0	04 45	32.4	37 07.8	12 36	24.8	37 04.2	12 35	24.2	36 17.4	19 26	18.0	9
70	37 09.2	02 50	36.1	37 09.6	01 49	35.5	37 09.5	01 47	33.6	37 09.3	02 46	33.0	37 08.7	02 45	32.4	36 46.3	11 35	24.9	36 43.3	11 35	24.3	36 01.6	17 26	18.1	70
1	36 39.2	03 50	36.1	36 40.1	03 49	35.5	36 41.5	01 47	33.6	36 41.6	01 46	33.0	36 41.6	01 46	33.0	36 25.1	08 36	24.9	36 22.4	09 35	24.3	35 45.8	15 26	18.1	1
2	36 09.2	05 50	36.1	36 10.5	04 49	35.5	36 13.3	02 47	33.6	36 13.9	02 46	33.0	36 14.3	01 46	33.0	36 03.6	07 36	24.9	36 01.5	07 35	24.3	35 29.9	14 26	18.2	2
3	35 39.3	06 50	36.0	35 41.0	06 49	35.4	35 45.2	04 47	33.6	35 46.2	04 47	33.0	35 46.8	03 45	33.0	35 42.0	05 36	25.0	35 40.5	06 35	24.3	35 14.0	12 27	18.2	3
4	35 09.3	08 50	36.0	35 11.5	07 49	35.4	35 17.0	05 47	33.6	35 18.5	05 46	33.0	35 19.3	04 45	33.0	35 20.7	03 36	25.0	35 19.5	03 36	24.4	34 58.1	11 27	18.3	4
75	34 39.4	09 50	36.0	34 42.1	09 49	35.3	34 48.9	07 47	33.5	34 50.8	06 46	32.9	34 52.6	05 45	32.3	34 59.2	02 36	25.0	34 58.5	02 35	24.4	34 42.1	09 27	18.3	75
6	34 09.6	11 50	35.9	34 12.7	10 49	35.3	34 20.8	08 47	33.5	34 23.2	08 46	32.9	34 25.4	07 45	32.3	34 37.7	00 36	25.0	34 37.5	01 35	24.4	34 26.1	07 27	18.3	6
7	33 39.8	12 50	35.8	33 43.3	11 49	35.2	33 52.8	10 47	33.4	33 55.6	09 46	32.8	33 58.2	09 45	32.2	34 16.2	01 36	25.0	34 16.5	01 35	24.4	34 10.1	05 27	18.3	7
8	33 10.0	13 50	35.8	33 14.0	13 49	35.2	33 24.8	11 47	33.3	33 28.0	11 46	32.8	33 31.1	10 45	32.2	33 54.7	03 36	25.0	33 55.5	02 35	24.4	33 54.1	03 27	18.4	8
9	32 40.3	15 49	35.7	32 44.7	14 49	35.1	32 56.8	13 47	33.3	33 00.5	12 46	32.7	33 04.0	12 45	32.1	33 33.2	05 36	25.0	33 34.5	04 35	24.4	33 38.1	02 27	18.4	9
80	32 10.7	16 49	35.6	32 15.5	16 49	35.0	32 28.9	14 46	33.2	32 33.0	14 46	32.6	32 37.0	13 45	32.1	33 11.7	06 35	24.9	33 13.5	06 35	24.3	33 22.0	00 27	18.4	80
1	31 41.1	18 49	35.5	31 46.3	17 48	34.9	32 01.0	16 46	33.1	32 05.6	15 46	32.6	32 10.0	14 45	32.0	32 50.3	08 36	24.9	32 52.6	07 35	24.3	33 06.0	02 27	18.4	1
2	31 11.6	19 49	35.4	31 17.3	19 48	34.8	31 33.2	17 46	33.1	31 38.2	16 46	32.5	31 43.1	16 45	31.9	32 28.9	09 36	24.9	32 31.6	09 35	24.3	32 50.0	03 27	18.4	2
3	30 42.2	20 49	35.3	30 48.3	20 48	34.8	31 05.5	18 46	33.0	31 10.7	18 46	32.4	31 16.2	17 45	31.8	32 07.5	10 36	24.8	32 10.7	10 36	24.3	32 33.9	05 27	18.3	3
4	30 12.9	22 49	35.1	30 19.4	21 48	34.6	30 37.9	20 46	32.9	30 43.7	19 45	32.3	30 49.5	19 45	31.7	31 46.1	13 36	24.8	31 49.8	12 35	24.2	32 17.9	07 27	18.3	4
85	29 43.7	23 49	35.0	29 50.5	23 48	34.4	30 10.3	21 46	32.7	30 16.5	21 45	32.2	30 22.7	20 44	31.6	31 24.8	14 35	24.7	31 29.0	14 35	24.1	32 01.9	08 27	18.3	85
6	29 14.5	24 48	34.9	29 21.8	24 48	34.3	29 42.8	23 46	32.6	29 49.5	22 45	32.1	29 56.1	22 44	31.5	31 03.5	16 35	24.7	31 08.2	15 35	24.1	31 46.0	10 27	18.3	6
7	28 45.4	26 48	34.7	28 53.2	25 48	34.2	29 15.4	24 45	32.5	29 22.6	24 45	31.9	29 29.6	23 44	31.4	30 42.3	17 35	24.6	30 47.4	17 34	24.0	31 30.0	12 27	18.2	7
8	28 16.2	27 48	34.6	28 24.7	27 47	34.1	28 48.1	25 45	32.4	28 55.7	25 45	31.9	29 03.1	25 44	31.3	30 21.2	19 35	24.5	30 26.7	18 35	24.0	31 14.1	13 26	18.2	8
9	27 47.8	29 48	34.4	27 56.2	28 47	33.9	28 20.9	26 44	32.2	28 28.9	26 44	31.7	28 36.7	26 44	31.1	30 00.1	20 35	24.4	30 06.1	20 34	23.9	30 58.2	15 26	18.2	9
90	27 19.1	30 48	34.2	27 27.9	29 47	33.7	27 53.8	28 45	32.1	28 02.0	28 44	31.5	28 10.5	27 44	31.0	29 39.1	22 35	24.4	29 45.6	21 34	23.8	30 42.4	16 26	18.1	90

Right-margin continuation column (H.A.): 91, 95, 100, 105, 110, 115, 120, 125, 130, 135, 140, 145, 150, 155, 160, 165, 170, 175, 180.

Lat. 32°

Each station cell below is formatted as: Alt (° ′) Δd Δt Az (°)

H.A.	60° 00′	60° 30′	62° 00′	62° 30′	63° 00′	69° 00′	69° 30′	74° 30′	H.A.
91	26 50.5 31 47 34.1	26 59.8 31 47 33.5	27 26.9 30 45 31.9	27 35.7 29 44 31.4	27 44.3 29 43 30.9	29 18.1 23 35 24.3	29 25.1 23 34 23.7	30 25.6 18 26 18.1	91
2	26 22.0 32 47 33.9	26 31.7 32 47 33.4	27 00.0 31 45 31.8	27 09.2 30 44 31.2	27 18.3 30 43 30.7	28 57.3 25 35 24.2	29 04.7 24 34 23.6	30 10.9 20 26 18.0	2
3	25 53.7 34 47 33.7	26 03.8 33 46 33.2	26 33.3 32 44 31.6	26 42.9 32 44 31.1	26 52.4 31 43 30.5	28 36.5 26 34 24.1	28 44.3 26 34 23.5	29 55.2 21 26 17.9	3
4	25 25.6 35 47 33.5	25 36.0 35 46 33.0	26 06.7 34 44 31.4	26 16.7 33 43 30.9	26 26.6 33 43 30.4	28 15.8 28 34 23.9	28 24.1 27 34 23.4	29 39.5 23 26 17.9	4
95	24 57.5 36 46 33.3	25 08.4 36 46 32.8	25 40.2 35 44 31.3	25 50.6 34 43 30.7	26 00.9 34 43 30.2	27 55.2 29 34 23.8	28 03.9 29 33 23.3	29 24.0 24 26 17.8	95
6	24 29.7 38 46 33.1	24 40.9 37 46 32.6	25 13.9 36 44 31.1	25 24.7 36 43 30.6	25 35.4 36 42 30.0	27 34.7 31 34 23.7	27 43.8 30 33 23.2	29 08.4 26 26 17.7	6
7	24 01.9 39 46 32.9	24 13.5 38 45 32.4	24 47.7 37 43 30.9	24 58.9 37 43 30.4	25 10.0 37 42 29.9	27 14.3 32 34 23.6	27 23.9 32 33 23.0	28 53.0 28 26 17.6	7
8	23 34.4 40 46 32.7	23 46.3 40 45 32.2	24 21.6 39 43 30.7	24 33.2 38 42 30.2	24 44.7 38 42 29.7	26 54.0 34 34 23.4	27 04.0 33 33 22.9	28 37.6 29 26 17.5	8
9	23 07.0 41 45 32.5	23 19.3 41 45 32.0	23 55.8 40 43 30.5	24 07.7 40 42 30.0	24 19.6 39 42 29.5	26 33.8 35 33 23.3	26 44.2 35 33 22.8	28 22.3 31 25 17.5	9
100	22 39.7 43 45 32.2	22 52.4 42 44 31.8	23 30.0 41 43 30.3	23 42.4 41 42 29.8	23 54.6 41 41 29.3	26 13.7 36 33 23.2	26 24.6 36 33 22.6	28 07.1 32 25 17.4	100
1	22 12.7 44 45 32.0	22 25.7 43 44 31.5	23 04.5 43 42 30.1	23 17.2 42 42 29.6	23 29.8 42 41 29.1	25 53.7 38 32 23.0	26 05.1 38 32 22.5	27 52.0 34 25 17.3	1
2	21 45.8 45 44 31.8	21 59.2 45 44 31.3	22 39.0 44 42 29.8	22 52.2 44 41 29.4	23 05.2 43 41 28.9	25 33.9 39 33 22.9	25 45.6 39 32 22.4	27 36.9 35 25 17.2	2
3	21 19.1 46 44 31.5	21 32.9 46 44 31.1	22 13.8 45 42 29.6	22 27.3 45 41 29.1	22 40.7 44 40 28.6	25 14.2 41 33 22.7	25 26.3 40 32 22.2	27 21.9 37 25 17.1	3
4	20 52.5 47 44 31.3	21 06.7 47 43 30.8	21 48.8 46 41 29.4	22 02.6 46 41 28.9	22 16.4 46 40 28.4	24 54.6 42 32 22.5	25 07.2 42 32 22.0	27 07.1 38 25 16.9	4
105	20 26.2 49 44 31.0	20 40.8 48 43 30.6	21 23.9 48 41 29.1	21 38.1 47 41 28.7	21 52.2 47 40 28.2	24 35.2 43 32 22.4	24 48.2 43 31 21.9	26 52.3 40 24 16.8	105
6	20 00.1 50 43 30.8	20 15.0 49 43 30.3	20 59.2 49 41 28.9	21 13.8 48 40 28.4	21 28.3 48 40 28.0	24 15.9 45 32 22.2	24 29.3 44 31 21.7	26 37.6 41 24 16.7	6
7	19 34.2 51 43 30.5	19 49.4 51 42 30.0	20 34.7 50 40 28.7	20 49.7 50 40 28.2	21 04.5 49 39 27.7	23 56.7 46 32 22.0	24 10.5 46 31 21.5	26 23.0 42 24 16.6	7
8	19 08.5 52 42 30.2	19 24.0 52 42 29.8	20 10.4 51 40 28.4	20 25.7 51 40 27.9	20 40.9 51 39 27.5	23 37.7 47 31 21.8	23 51.9 47 31 21.4	26 08.6 44 24 16.4	8
9	18 43.0 53 42 29.9	18 58.9 53 42 29.5	19 46.3 52 40 28.1	20 02.0 52 39 27.7	20 17.6 52 39 27.2	23 18.9 49 31 21.7	23 33.4 48 30 21.2	25 54.2 45 24 16.3	9
110	18 17.7 54 42 29.7	18 33.9 54 41 29.2	19 22.4 54 40 27.9	19 38.4 53 39 27.4	19 54.4 53 38 27.0	23 00.2 50 31 21.5	23 15.1 50 30 21.0	25 40.0 47 24 16.2	110
1	17 52.6 55 41 29.4	18 09.2 55 41 28.9	18 58.7 55 39 27.6	19 15.1 54 39 27.2	19 31.4 54 38 26.7	22 41.6 51 31 21.3	22 57.0 51 30 20.8	25 25.9 48 23 16.0	1
2	17 27.7 57 41 29.1	17 44.7 56 40 28.6	18 35.2 56 39 27.3	18 52.0 56 38 26.9	19 08.6 55 38 26.5	22 23.3 53 30 21.1	22 39.0 52 30 20.6	25 11.9 49 23 15.9	2
3	17 03.1 58 41 28.8	17 20.4 58 40 28.4	18 12.0 57 38 27.1	18 29.0 57 38 26.6	18 46.0 57 37 26.2	22 05.1 54 30 20.9	22 21.2 54 29 20.4	24 58.0 51 23 15.7	3
4	16 38.8 59 40 28.5	16 56.4 59 40 28.1	17 48.9 58 38 26.8	18 06.3 58 37 26.3	18 23.7 58 37 25.9	21 47.0 55 30 20.6	22 03.5 55 29 20.2	24 44.3 52 23 15.6	4
115	16 14.6 60 40 28.2	16 32.6 60 39 27.7	17 26.1 59 38 26.5	17 43.9 59 37 26.1	18 01.6 59 36 25.6	21 29.2 56 29 20.4	21 46.1 56 29 20.0	24 30.7 54 22 15.4	115
6	15 50.7 61 39 27.8	16 09.0 61 39 27.4	17 03.6 60 37 26.2	17 21.6 60 37 25.8	17 39.7 60 36 25.4	21 11.5 58 29 20.2	21 28.8 57 29 19.8	24 17.2 55 22 15.3	6
7	15 27.1 62 39 27.5	15 45.7 62 38 27.1	16 41.2 61 37 25.9	16 59.6 61 36 25.5	17 18.0 61 36 25.1	20 54.0 59 29 20.0	21 11.6 58 28 19.6	24 03.8 56 22 15.1	7
8	15 03.7 63 39 27.2	15 22.6 63 38 26.8	16 19.1 63 36 25.6	16 37.9 62 36 25.2	16 56.6 62 35 24.8	20 36.7 60 28 19.8	20 54.7 60 28 19.4	23 50.6 57 22 15.0	8
9	14 40.6 64 38 26.9	14 59.8 64 38 26.5	15 57.3 64 36 25.3	16 16.3 63 35 24.9	16 35.3 63 35 24.5	20 19.6 61 28 19.5	20 38.0 61 28 19.1	23 37.6 59 22 14.8	9
120	14 17.7 65 38 26.5	14 37.2 65 37 26.1	15 35.7 65 36 25.0	15 55.0 65 35 24.6	16 14.4 64 34 24.2	20 02.7 62 28 19.3	20 21.4 62 27 18.9	23 24.7 60 21 14.6	120
1	13 55.1 66 37 26.2	14 14.9 66 37 25.8	15 14.3 66 35 24.7	15 34.0 66 35 24.3	15 53.7 65 34 23.9	19 46.0 64 28 19.1	20 05.0 63 27 18.6	23 11.9 61 21 14.4	1
2	13 32.8 67 37 25.9	13 52.9 67 36 25.5	14 53.2 67 35 24.3	15 13.2 67 34 24.0	15 33.2 67 34 23.6	19 29.5 65 27 18.8	19 48.9 64 27 18.4	22 59.3 62 21 14.3	2
3	13 10.7 68 36 25.5	13 31.2 68 36 25.1	14 32.4 68 34 24.0	14 52.7 68 34 23.6	15 13.0 68 33 23.2	19 13.2 66 27 18.6	19 32.9 66 26 18.2	22 46.9 64 20 14.1	3
4	12 48.9 69 36 25.2	13 09.7 69 35 24.8	14 11.8 69 34 23.7	14 32.5 69 33 23.3	14 53.1 69 33 22.9	18 57.1 67 26 18.3	19 17.2 67 26 17.9	22 34.6 65 20 13.9	4
125	12 27.4 70 35 24.8	12 48.5 70 35 24.4	13 51.5 70 33 23.3	14 12.5 70 33 23.0	14 33.4 70 32 22.6	18 41.2 68 26 18.1	19 0.16 68 26 17.7	22 22.5 66 20 13.7	125
6	12 06.2 71 35 24.4	12 27.6 71 34 24.1	13 31.5 71 33 23.0	13 52.8 71 32 22.6	14 14.0 71 32 22.2	18 25.6 69 25 17.8	18 46.3 69 25 17.4	22 10.5 67 20 13.5	6
7	11 45.3 72 34 24.1	12 07.0 72 34 23.7	13 11.8 72 32 22.7	13 33.3 72 32 22.3	13 54.8 72 31 21.9	18 10.1 70 25 17.5	18 31.2 70 25 17.2	21 58.7 68 19 13.3	7
8	11 24.7 73 34 23.7	11 46.7 73 33 23.4	12 52.3 73 32 22.3	13 14.2 73 31 21.9	13 36.0 73 31 21.6	17 54.9 71 25 17.3	18 16.3 71 24 16.9	21 47.1 69 19 13.1	8
9	11 04.4 74 33 23.3	11 26.7 74 33 23.0	12 33.2 74 31 21.9	12 55.3 74 31 21.6	13 17.4 74 30 21.3	17 39.9 72 25 17.0	18 01.6 72 24 16.6	21 35.6 71 19 12.9	9
130	10 44.4 75 33 22.9	11 06.9 75 32 22.6	12 14.3 75 31 21.6	12 36.7 75 30 21.3	12 59.1 75 30 20.9	17 25.2 73 24 16.7	17 47.1 73 24 16.4	21 24.3 72 18 12.7	130
1	10 24.8 76 32 22.6	10 47.5 76 32 22.2	11 55.7 76 30 21.2	12 18.4 76 30 20.9	12 41.0 75 30 20.6	17 10.7 74 24 16.4	17 32.9 74 23 16.1	21 13.2 73 18 12.5	1
2	10 05.4 77 32 22.2	10 28.4 77 31 21.8	11 37.4 77 30 20.9	12 00.4 76 30 20.5	12 23.3 76 29 20.2	16 56.4 75 23 16.2	17 18.9 75 23 15.8	21 02.3 74 18 12.3	2
3	9 46.4 78 31 21.8	10 09.7 78 31 21.5	11 19.5 77 29 20.5	11 42.7 77 29 20.2	12 05.9 77 29 19.9	16 42.3 76 23 15.9	17 05.2 76 23 15.5	20 51.6 75 18 12.1	3
4	9 27.6 79 31 21.4	9 51.2 79 30 21.1	11 01.8 78 29 20.1	11 25.3 78 28 19.8	11 48.8 78 28 19.5	16 28.5 77 23 15.6	16 51.7 77 22 15.3	20 41.0 76 17 11.9	4
135	9 09.3 79 30 21.0	9 33.1 79 30 20.7	10 44.5 79 28 19.7	11 08.2 79 28 19.4	11 31.9 79 28 19.1	16 15.0 78 22 15.3	16 38.4 78 22 15.0	20 30.7 77 17 11.6	135
6	8 51.2 80 30 20.6	9 15.3 80 29 20.3	10 27.4 80 28 19.4	10 51.4 80 27 19.1	11 15.4 80 27 18.8	16 01.7 79 22 15.0	16 25.4 79 21 14.7	20 20.5 78 17 11.4	6
7	8 33.5 81 29 20.2	8 57.8 81 29 19.9	10 10.7 81 27 19.0	10 35.0 81 27 18.7	10 59.2 81 26 18.4	15 48.6 80 21 14.7	16 12.6 80 21 14.4	20 10.5 79 16 11.2	7
8	8 16.1 82 28 19.8	8 40.7 82 28 19.5	9 54.3 82 27 18.6	10 18.8 82 26 18.3	10 43.3 82 26 18.0	15 35.8 81 21 14.4	16 00.1 81 20 14.1	20 00.8 80 16 11.0	8
9	7 59.1 83 28 19.3	8 23.9 83 27 19.1	9 38.3 83 26 18.2	10 03.0 83 26 17.9	10 27.8 82 25 17.7	15 23.3 82 20 14.1	15 47.8 82 20 13.8	19 51.2 81 16 10.7	9
140	7 42.4 84 27 18.9	8 07.5 83 27 18.6	9 22.5 83 26 17.8	9 47.5 83 25 17.5	10 12.5 83 20 17.2	15 11.0 83 20 13.8	15 35.8 82 20 13.5	19 41.8 82 15 10.5	140
1	7 26.1 84 27 18.5	7 51.4 84 26 18.2	9 07.1 84 25 17.4	9 32.4 84 25 17.1	9 57.6 84 24 16.9	14 59.0 83 20 13.5	15 24.0 83 19 13.2	19 32.6 82 15 10.3	1
2	7 10.1 85 26 18.1	7 35.6 85 26 17.8	8 52.1 85 24 17.0	9 17.5 85 24 16.7	9 43.0 85 24 16.5	14 47.3 84 19 13.2	15 12.5 84 19 12.9	19 23.6 83 15 10.0	2
3	6 54.5 86 25 17.6	7 20.2 86 25 17.4	8 37.4 86 24 16.6	9 03.0 86 24 16.4	9 28.7 86 23 16.1	14 35.8 85 19 12.9	15 01.3 85 18 12.6	19 14.9 84 14 09.8	3
4	6 39.3 86 25 17.2	7 05.2 86 24 17.0	8 23.0 86 23 16.2	8 48.9 86 23 15.9	9 14.8 86 23 15.7	14 24.6 86 18 12.6	14 50.3 86 18 12.3	19 06.3 85 14 09.6	4
145	6 24.4 87 24 16.8	6 50.6 87 24 16.5	8 09.0 87 23 15.8	8 35.1 87 22 15.5	9 01.2 87 22 15.3	14 13.6 86 18 12.2	14 39.6 86 17 12.0	18 57.9 86 14 09.3	145
6	6 09.9 88 24 16.3	6 36.3 88 23 16.1	7 55.3 88 22 15.4	8 21.6 88 22 15.1	8 48.0 88 22 14.9	14 03.0 87 17 11.9	14 29.2 87 17 11.7	18 49.8 87 13 09.1	6
7	5 55.8 89 23 15.9	6 22.3 89 23 15.7	7 42.0 88 22 15.0	8 08.5 88 21 14.7	8 35.1 88 21 14.5	13 52.6 88 17 11.6	14 19.0 88 16 11.4	18 41.9 87 13 08.8	7
8	5 42.0 90 22 15.4	6 08.8 89 22 15.2	7 29.1 89 21 14.5	7 55.8 89 21 14.3	8 22.5 89 20 14.1	13 42.5 89 16 11.3	14 09.1 89 16 11.0	18 34.2 88 12 08.6	8
9	5 28.7 90 22 15.0	5 55.6 90 21 14.8	7 16.5 90 20 14.1	7 43.4 90 20 13.9	8 10.3 90 20 13.7	13 32.7 89 16 10.9	13 59.5 89 16 10.7	18 26.7 89 12 08.3	9
150	5 15.7 90 21 14.5	5 42.9 90 21 14.3	7 04.3 90 20 13.7	7 31.4 90 19 13.5	7 58.5 90 19 13.3	13 23.2 90 15 10.6	13 50.2 90 15 10.4	18 19.4 89 12 08.1	150
1	5 03.1 91 20 14.1	5 30.5 91 20 13.9	6 52.4 91 19 13.3	7 19.7 91 19 13.0	7 47.0 91 19 12.8	13 14.0 91 15 10.3	13 41.2 91 15 10.1	18 12.3 90 11 07.8	1
2		5 18.4 92 19 13.4	6 40.9 92 18 12.8	7 08.4 92 18 12.6	7 35.9 92 18 12.4	13 05.1 91 14 09.9	13 32.4 91 14 09.7	18 05.5 91 11 07.6	2
3		5 06.8 92 19 13.0	6 29.8 92 18 12.4	6 57.5 92 18 12.2	7 25.1 92 17 12.0	12 56.4 92 14 09.6	13 24.0 92 14 09.4	17 58.9 91 11 07.3	3
4			6 19.1 93 17 12.0	6 46.9 93 17 11.8	7 14.7 93 17 11.6	12 48.1 92 13 09.3	13 15.8 92 13 09.1	17 52.5 92 10 07.1	4
155			6 08.7 93 17 11.5	6 36.7 93 16 11.3	7 04.7 93 16 11.1	12 40.0 93 13 08.9	13 07.9 93 13 08.7	17 46.4 93 10 06.8	155
6			5 58.8 94 16 11.1	6 26.9 94 16 10.9	6 55.1 94 15 10.7	12 32.3 94 12 08.6	13 00.3 94 12 08.4	17 40.5 93 09 06.6	6
7			5 49.2 94 15 10.6	6 17.5 94 15 10.5	6 45.8 94 15 10.3	12 24.8 94 12 08.2	12 53.0 94 12 08.1	17 34.8 94 09 06.3	7
8			5 40.0 95 15 10.2	6 08.5 95 14 10.0	6 36.9 95 14 09.9	12 17.7 95 11 07.9	12 46.0 95 11 07.7	17 29.3 94 09 06.0	8
9			5 31.2 95 14 09.7	5 59.8 95 14 09.6	6 28.4 95 14 09.4	12 10.8 95 11 07.5	12 39.4 95 11 07.4	17 24.1 95 08 05.8	9
160			5 22.8 96 13 09.3	5 51.5 96 13 09.1	6 20.2 96 13 09.0	12 04.3 95 10 07.2	12 33.0 95 10 07.0	17 19.1 95 08 05.5	160
1			5 14.8 96 13 08.8	5 43.6 96 12 08.7	6 12.5 96 12 08.6	11 58.1 96 10 06.8	12 26.9 96 10 06.7	17 14.4 96 08 05.2	1
2			5 07.2 96 12 08.4	5 36.1 96 12 08.2	6 05.1 96 12 08.1	11 52.2 96 09 06.5	12 21.1 96 09 06.4	17 09.8 96 07 05.0	2
3			5 00.0 97 11 07.9	5 29.0 97 11 07.8	5 58.1 97 11 07.7	11 46.6 97 09 06.1	12 15.6 97 09 06.0	17 05.6 97 07 04.7	3
4				5 22.3 97 11 07.3	5 51.5 97 10 07.2	11 41.3 97 08 05.8	12 10.4 97 08 05.7	17 01.5 97 06 04.4	4
165				5 16.0 98 10 06.9	5 45.3 98 10 06.8	11 36.3 97 08 05.4	12 05.5 97 08 05.3	16 57.7 97 06 04.1	165
6				5 10.1 98 09 06.4	5 39.5 98 09 06.3	11 31.6 98 07 05.1	12 01.0 98 07 05.0	16 54.2 98 06 03.9	6
7				5 04.6 98 09 06.0	5 34.1 98 08 05.9	11 27.3 98 07 04.7	11 56.7 98 07 04.6	16 50.8 98 05 03.6	7
8					5 29.0 98 08 05.4	11 23.3 98 06 04.4	11 52.8 98 06 04.3	16 47.8 98 05 03.3	8
9					5 24.4 99 07 05.0	11 19.6 99 06 04.0	11 49.2 99 06 03.9	16 44.9 99 04 03.1	9
170					5 20.2 99 06 04.5	11 16.2 99 05 03.6	11 45.8 99 05 03.6	16 42.4 99 04 02.8	170
1					5 16.4 99 06 04.1	11 13.1 99 05 03.3	11 42.8 99 04 03.2	16 40.0 99 03 02.5	1
2					5 12.9 99 05 03.7	11 10.1 99 04 02.9	11 40.1 99 04 02.9	16 37.9 99 03 02.2	2
3					5 09.9 99 04 03.2	11 07.9 99 04 02.6	11 37.8 99 03 02.5	16 36.1 99 03 01.9	3
4					5 07.3 1.00 4 02.7	11 05.8 1.00 3 02.2	11 35.7 1.00 3 02.1	16 34.5 1.00 2 01.7	4
175					5 05.1 1.00 3 02.3	11 04.1 1.00 2 01.8	11 34.0 1.00 2 01.8	16 33.1 1.00 2 01.4	175
6					5 03.2 1.00 2 01.8	11 02.6 1.00 2 01.5	11 32.5 1.00 2 01.4	16 32.0 1.00 1 01.1	6
7					5 01.8 1.00 1 01.4	11 01.5 1.00 1 01.1	11 31.4 1.00 1 01.1	16 31.0 1.00 1 00.8	7
8					5 00.8 1.00 1 00.9	11 00.6 1.00 1 00.7	11 30.6 1.00 1 00.7	16 30.5 1.00 1 00.6	8
9					5 00.2 1.00 0 00.5	11 00.2 1.00 0 00.4	11 30.2 1.00 0 00.4	16 30.2 1.00 0 00.3	9
180					5 00.0 1.00 0 00.0	11 00.0 1.00 0 00.0	11 30.0 1.00 0 00.0	16 30.0 1.00 0 00.0	180

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Lat. 37°
Lat. 38°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 32°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	
°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°	°
00	62	180	66	180	70	180	74	180	78	180	82	180	86	180	90	...	86	00	82	00	78	00	00
4	62	172	66	170	70	169	74	166	77	162	81	155	85	138	87	89	85	39	81	21	78	14	4
8	61	163	65	161	69	158	72	154	76	147	79	137	82	118	83	88	82	57	80	37	76	25	8
12	60	156	64	152	67	148	71	143	74	135	77	124	79	108	80	87	79	65	77	47	75	35	12
16	58	149	62	145	65	140	68	134	71	126	74	116	76	102	76	86	76	69	75	54	73	42	16
20	56	142	60	138	63	133	66	127	68	119	71	109	72	98	73	85	73	71	72	58	70	47	20
24	54	136	57	132	60	127	63	121	65	113	67	105	69	95	70	84	70	72	69	61	68	51	24
28	52	131	55	127	57	121	60	116	62	109	64	101	65	92	66	82	67	72	66	63	65	53	28
32	49	126	52	122	54	117	57	111	59	105	61	98	62	90	63	81	63	73	63	64	62	55	32
36	46	122	49	118	51	113	54	108	56	102	57	95	59	88	60	80	60	72	60	64	60	56	36
40	43	118	46	114	48	109	50	104	52	99	54	93	55	86	56	79	57	72	57	65	57	57	40
44	40	115	43	111	45	106	47	101	49	96	51	90	52	84	53	78	54	71	54	65	54	58	44
48	37	112	39	108	42	103	44	99	46	94	47	88	49	83	50	77	50	71	51	64	51	58	48
52	34	109	36	105	38	100	40	96	42	91	44	86	45	81	46	75	47	70	48	64	48	58	52
56	31	106	33	102	35	98	37	94	39	89	40	84	42	79	43	74	44	69	45	63	45	58	56
60	27	103	30	100	32	96	34	91	35	87	37	83	39	78	40	73	41	68	42	63	42	57	60
64	24	101	26	97	28	93	30	89	32	85	34	81	35	76	37	72	38	67	39	62	39	57	64
68	21	99	23	95	25	91	27	87	29	83	30	79	32	75	33	70	35	66	36	61	37	56	68
72	17	96	19	93	22	89	23	85	25	81	27	77	29	73	30	69	32	65	33	60	34	55	72
76	14	94	16	91	18	87	20	83	22	79	24	76	25	72	27	68	29	63	30	59	31	55	76
80	11	92	13	88	15	85	17	81	19	78	21	74	22	70	24	66	26	62	27	58	28	54	80
84	07	90	09	86	11	83	13	79	15	76	17	72	19	68	21	64	23	61	24	57	26	52	84
88	04	88	06	84	08	81	10	77	12	74	14	70	16	67	18	63	20	59	21	55	23	51	88
92	00	86	03	82	05	79	07	75	09	72	11	68	13	65	15	61	17	58	19	54	20	50	92
96	*03*	83	*01*	80	01	77	03	73	06	70	08	66	10	63	12	60	14	56	16	52	18	49	96
100	*06*	81	*04*	78	*02*	75	00	71	*02*	68	05	65	07	61	09	58	11	54	13	51	15	47	100
104	*10*	79	*07*	76	*05*	72	*03*	69	*01*	66	02	62	04	59	06	56	08	53	11	49	13	46	104
108	*13*	77	*11*	73	*08*	70	*06*	67	*04*	64	*01*	60	01	57	03	54	06	51	08	47	10	44	108
112	*16*	74	*14*	71	*12*	68	*09*	65	*07*	61	*04*	58	*02*	55	01	52	03	49	06	46	08	42	112
116	*20*	72	*17*	69	*15*	65	*12*	62	*10*	59	*07*	56	*05*	53	*02*	50	01	47	03	44	06	41	116
120	*23*	69	*20*	66	*18*	63	*15*	60	*13*	56	*10*	53	*07*	50	*05*	47	*02*	45	01	42	04	39	120
124	*26*	67	*23*	63	*21*	60	*18*	57	*15*	54	*13*	51	*10*	48	*07*	45	*04*	42	*01*	39	02	37	124
128	*29*	64	*26*	61	*24*	57	*21*	54	*18*	51	*15*	48	*12*	45	*09*	43	*06*	40	*03*	37	00	35	128
132	*32*	61	*29*	57	*26*	54	*24*	51	*21*	48	*18*	45	*15*	43	*12*	40	*08*	37	*05*	35	*02*	32	132
136	*35*	58	*32*	54	*29*	51	*26*	48	*23*	45	*20*	42	*17*	40	*14*	37	*10*	35	*07*	32	*04*	30	136
140	*38*	54	*35*	51	*32*	48	*29*	45	*25*	42	*22*	39	*19*	37	*16*	34	*12*	32	*09*	30	*06*	28	140
144	*40*	50	*37*	47	*34*	44	*31*	41	*28*	39	*24*	36	*21*	34	*18*	32	*14*	29	*11*	27	*07*	25	144
148	*43*	46	*40*	43	*36*	40	*33*	37	*30*	35	*26*	33	*23*	30	*19*	28	*16*	26	*12*	25	*09*	23	148
152	*45*	42	*42*	39	*38*	36	*35*	33	*31*	31	*28*	29	*24*	27	*21*	25	*17*	23	*13*	22	*10*	20	152
156	*47*	37	*44*	34	*40*	31	*37*	29	*33*	27	*29*	25	*26*	24	*22*	22	*18*	20	*15*	19	*11*	17	156
160	*49*	32	*46*	29	*42*	27	*38*	25	*35*	23	*31*	21	*27*	20	*23*	18	*19*	17	*16*	16	*12*	15	160
164	*51*	26	*47*	24	*43*	22	*40*	20	*36*	19	*32*	17	*28*	16	*24*	15	*20*	14	*16*	13	*13*	12	164
168	*52*	20	*48*	18	*45*	17	*41*	15	*37*	14	*33*	13	*29*	12	*25*	11	*21*	10	*17*	10	*13*	09	168
172	*53*	13	*49*	12	*45*	11	*41*	10	*37*	09	*33*	09	*30*	08	*26*	08	*22*	07	*18*	07	*14*	06	172
176	*54*	07	*50*	06	*46*	06	*42*	05	*38*	05	*34*	04	*30*	04	*26*	04	*22*	03	*18*	03	*14*	03	176
180	*54*	00	*50*	00	*46*	00	*42*	00	*38*	00	*34*	00	*30*	00	*26*	00	*22*	00	*18*	00	*14*	00	180

	4°	8°	12°	16°	20°	24°	28°	32°	36°	40°	44°

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

Lat. 32°

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	74	00	70	00	66	00	62	00	58	00	54	00	50	00	46	00	42	00	38	00	34	00	00
4	74	10	70	07	66	05	62	04	58	03	54	03	50	02	46	01	42	01	38	01	34	00	4
8	73	18	69	14	65	11	62	08	58	07	54	05	50	04	46	03	42	02	38	01	34	00	8
12	72	26	68	20	65	16	61	12	57	10	53	07	49	06	46	04	42	03	38	02	34	01	12
16	70	33	67	26	64	20	60	16	56	13	53	10	49	07	45	05	42	04	38	02	34	01	16
20	68	38	65	30	62	24	59	19	56	15	52	12	49	09	45	07	41	05	38	03	34	01	20
24	66	42	63	34	61	28	58	22	55	18	51	14	48	11	45	08	41	05	37	03	34	01	24
28	63	45	61	37	59	31	56	25	54	20	51	16	47	12	44	09	41	06	37	04	34	01	28
32	61	47	59	40	57	33	55	27	52	22	50	18	47	14	43	10	40	07	37	04	34	01	32
36	59	49	57	42	55	35	53	29	51	24	48	19	46	15	43	11	40	08	37	04	34	01	36
40	56	50	55	43	53	37	52	31	50	26	47	21	45	16	42	12	39	08	37	05	34	02	40
44	53	51	52	45	51	38	50	33	48	27	46	22	44	17	41	13	39	09	36	05	33	02	44
48	51	52	50	45	49	39	48	34	46	28	45	23	43	18	41	14	38	09	36	06	33	02	48
52	48	52	48	46	47	40	46	35	45	29	43	24	42	19	40	14	38	10	36	06	33	02	52
56	45	52	45	46	45	41	44	35	43	30	42	25	41	20	39	15	37	10	35	06	33	02	56
60	43	52	43	47	43	41	42	36	41	30	41	25	39	20	38	15	37	11	35	06	33	02	60
64	40	52	40	46	40	41	40	36	40	31	39	26	38	21	37	16	36	11	34	07	33	02	64
68	37	51	38	46	38	41	38	36	38	31	38	26	37	21	36	16	35	11	34	07	33	02	68
72	35	51	35	46	36	41	36	36	36	31	36	26	36	21	35	16	35	12	34	07	33	02	72
76	32	50	33	45	34	41	34	36	34	31	35	26	35	21	34	17	34	12	33	07	32	02	76
80	29	49	31	45	31	40	32	36	33	31	33	26	33	21	33	16	33	12	33	07	32	02	80
84	27	48	28	44	29	40	30	35	31	31	32	26	32	21	32	16	32	12	32	07	32	02	84
88	24	47	26	43	27	39	28	35	29	30	30	26	31	21	31	16	32	12	32	07	32	02	88
92	22	46	24	42	25	38	26	34	28	30	29	25	30	21	30	16	31	12	32	07	32	02	92
96	20	46	21	41	23	37	24	33	26	29	27	25	28	20	30	16	30	12	31	07	32	02	96
100	17	44	19	40	21	36	23	32	24	28	26	24	27	20	29	16	30	11	31	07	32	02	100
104	15	42	17	39	19	35	21	31	23	27	24	24	26	20	28	15	29	11	30	07	32	02	104
108	13	41	15	37	17	34	19	30	21	27	23	23	25	19	27	15	28	11	30	07	31	02	108
112	10	39	13	36	15	32	17	29	20	26	22	22	24	18	26	14	28	10	30	06	31	02	112
116	08	37	11	34	13	31	16	28	18	25	21	21	23	18	25	14	27	10	29	06	31	02	116
120	06	36	09	33	12	30	14	27	17	23	19	20	22	17	24	13	27	10	29	06	31	02	120
124	04	34	07	31	10	28	13	25	16	22	18	19	21	16	24	13	26	09	29	06	31	02	124
128	03	32	06	29	08	26	11	24	14	21	17	18	20	15	23	12	26	09	28	05	31	02	128
132	01	30	04	27	07	25	10	22	13	20	16	17	19	14	22	11	25	08	28	05	31	02	132
136	*01*	28	02	25	06	23	09	21	12	18	15	16	18	13	22	10	25	08	28	05	31	02	136
140	*02*	25	01	23	04	21	08	19	11	17	14	14	18	12	21	10	24	07	*27*	04	30	01	140
144	*04*	23	*00*	21	03	19	07	17	10	15	14	13	17	11	20	09	24	06	*27*	04	30	01	144
148	*05*	21	*01*	19	02	17	06	15	09	14	13	12	16	10	20	08	23	06	*27*	04	30	01	148
152	*06*	18	*02*	17	01	15	05	14	09	12	12	10	16	09	19	07	23	05	*27*	03	30	01	152
156	*07*	16	*03*	15	00	13	04	12	08	10	12	09	15	07	19	06	23	04	26	03	30	01	156
160	*08*	13	*04*	12	*00*	11	03	10	07	09	11	08	15	06	19	05	23	04	26	02	30	01	160
164	*09*	11	*05*	10	*01*	09	03	08	07	07	11	06	15	05	18	04	22	03	26	02	30	01	164
168	*09*	08	*05*	07	*01*	07	03	06	06	05	10	05	14	04	18	03	22	02	26	01	30	00	168
172	*10*	05	*06*	05	*02*	04	02	04	06	04	10	03	14	03	18	02	22	01	26	01	30	00	172
176	*10*	03	*06*	02	*02*	02	02	02	06	02	10	02	14	01	18	01	22	01	26	00	30	00	176
180	*10*	00	*06*	00	*02*	00	02	00	06	00	10	00	14	00	18	00	22	00	26	00	30	00	180

Lat. 33°
Lat. 34°
Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

Bottom column labels: 48° 52° 56° 60° 64° 68° 72° 76° 80° 84° 88°

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

Lat. 33°

Each cell below is given as: Altitude (° ′) · Δd Δt · Azimuth (°)

H.A.	0° 00′	0° 30′	1° 00′	1° 30′	2° 00′	2° 30′	3° 00′	3° 30′	H.A.
00	57 00.0 · 1.0 01 · 180.0	57 30.0 · 1.0 01 · 180.0	58 00.0 · 1.0 01 · 180.0	58 30.0 · 1.0 01 · 180.0	59 00.0 · 1.0 01 · 180.0	59 30.0 · 1.0 01 · 180.0	60 00.0 · 1.0 01 · 180.0	60 30.0 · 1.0 01 · 180.0	00
1	56 59.2 · 1.0 04 · 178.2	57 29.2 · 1.0 04 · 178.1	57 59.2 · 1.0 04 · 178.1	58 29.2 · 1.0 04 · 178.1	58 59.1 · 1.0 04 · 178.0	59 29.1 · 1.0 04 · 178.0	59 59.1 · 1.0 04 · 178.0	60 29.1 · 1.0 04 · 178.0	1
2	56 56.8 · 1.0 07 · 176.3	57 26.7 · 1.0 07 · 176.3	57 56.7 · 1.0 07 · 176.2	58 26.6 · 1.0 07 · 176.2	58 56.6 · 1.0 07 · 176.1	59 26.5 · 1.0 07 · 176.1	59 56.5 · 1.0 07 · 176.0	60 26.4 · 1.0 07 · 176.0	2
3	56 52.8 · 1.0 09 · 174.5	57 22.7 · 1.0 09 · 174.4	57 52.6 · 1.0 10 · 174.4	58 22.5 · 1.0 10 · 174.3	58 52.3 · 1.0 10 · 174.2	59 22.1 · 1.0 10 · 174.1	59 52.1 · 1.0 10 · 174.0	60 22.0 · 1.0 10 · 173.9	3
4	56 47.1 · 99 12 · 172.7	57 17.0 · 99 12 · 172.6	57 46.8 · 99 12 · 172.5	58 16.6 · 99 12 · 172.4	58 46.4 · 99 13 · 172.3	59 16.2 · 99 13 · 172.2	59 46.0 · 99 13 · 172.0	60 15.8 · 99 13 · 171.9	4
05	56 39.9 · 99 15 · 170.9	57 09.7 · 99 15 · 170.8	57 39.4 · 99 15 · 170.6	58 09.1 · 99 15 · 170.5	58 38.8 · 99 15 · 170.4	59 08.5 · 99 16 · 170.2	59 38.2 · 99 16 · 170.1	60 07.9 · 99 16 · 169.9	05
6	56 31.2 · 99 17 · 169.1	57 00.8 · 99 18 · 168.9	57 30.4 · 99 18 · 168.8	58 00.0 · 99 18 · 168.6	58 29.6 · 99 18 · 168.5	58 59.1 · 99 18 · 168.3	59 28.7 · 99 19 · 168.1	59 58.2 · 99 19 · 168.0	6
7	56 20.9 · 98 20 · 167.3	56 50.4 · 98 20 · 167.1	57 19.8 · 98 20 · 167.0	57 49.3 · 98 20 · 166.8	58 18.7 · 98 21 · 166.6	58 48.1 · 98 21 · 166.4	59 17.5 · 98 21 · 166.2	59 46.9 · 98 22 · 166.0	7
8	56 09.1 · 98 22 · 165.5	56 38.4 · 98 22 · 165.3	57 07.7 · 98 23 · 165.1	57 37.0 · 98 23 · 164.9	58 06.3 · 98 23 · 164.7	58 35.5 · 97 24 · 164.5	59 04.7 · 97 24 · 164.3	59 33.9 · 97 24 · 164.1	8
9	55 55.7 · 97 25 · 163.8	56 24.9 · 97 25 · 163.6	56 54.0 · 97 25 · 163.4	57 23.1 · 97 26 · 163.1	57 52.2 · 97 26 · 162.9	58 21.3 · 97 26 · 162.7	58 50.3 · 97 27 · 162.4	59 19.3 · 97 27 · 162.2	9
10	55 41.0 · 97 27 · 162.1	56 09.9 · 96 30 · 161.8	56 38.9 · 96 28 · 161.6	57 07.7 · 96 28 · 161.3	57 36.7 · 96 28 · 161.1	58 05.5 · 96 29 · 160.8	58 34.4 · 96 29 · 160.6	59 03.1 · 96 30 · 160.3	10
1	55 24.8 · 96 29 · 160.4	55 53.5 · 96 30 · 160.1	56 22.3 · 96 30 · 159.8	56 51.0 · 96 30 · 159.6	57 19.6 · 96 31 · 159.3	57 48.3 · 96 31 · 159.0	58 16.9 · 96 32 · 158.8	58 45.4 · 96 32 · 158.5	1
2	55 07.2 · 95 32 · 158.7	55 35.7 · 95 32 · 158.4	56 04.2 · 95 32 · 158.1	56 32.7 · 95 33 · 157.9	57 01.1 · 95 33 · 157.6	57 29.5 · 95 34 · 157.3	57 57.9 · 94 34 · 157.0	58 26.2 · 94 34 · 156.6	2
3	54 48.2 · 94 34 · 157.0	55 16.5 · 94 34 · 156.7	55 44.8 · 94 35 · 156.4	56 13.0 · 94 35 · 156.1	56 41.2 · 94 35 · 155.8	57 09.4 · 94 36 · 155.5	57 37.5 · 94 36 · 155.2	58 05.5 · 93 37 · 154.9	3
4	54 27.9 · 94 36 · 155.4	54 56.0 · 94 36 · 155.1	55 24.0 · 94 35 · 154.8	55 52.0 · 93 37 · 154.5	56 20.0 · 93 38 · 154.1	56 47.9 · 93 38 · 153.8	57 15.7 · 93 39 · 153.5	57 43.5 · 93 39 · 153.1	4
15	54 06.3 · 93 38 · 153.8	54 34.1 · 93 38 · 153.2	55 01.9 · 93 39 · 153.2	55 29.7 · 92 39 · 152.8	55 57.7 · 92 39 · 152.5	56 25.3 · 92 40 · 152.1	56 52.5 · 92 41 · 151.8	57 20.0 · 92 41 · 151.4	15
6	53 43.5 · 92 40 · 152.2	54 11.1 · 92 41 · 151.9	54 38.6 · 92 41 · 151.6	55 06.1 · 91 41 · 151.2	55 33.5 · 91 42 · 150.9	56 00.8 · 91 42 · 150.5	56 28.1 · 91 43 · 150.1	56 55.3 · 91 43 · 149.7	6
7	53 19.4 · 91 42 · 150.7	53 46.8 · 91 42 · 150.3	54 14.0 · 91 43 · 150.0	54 41.2 · 91 43 · 149.6	55 08.4 · 90 44 · 149.3	55 35.4 · 90 44 · 148.9	56 02.4 · 90 45 · 148.5	56 29.3 · 90 45 · 148.1	7
8	52 54.2 · 90 44 · 149.2	53 21.3 · 90 44 · 148.8	53 48.3 · 90 45 · 148.5	54 15.2 · 90 45 · 148.1	54 42.0 · 89 46 · 147.7	55 08.8 · 89 46 · 147.3	55 35.5 · 89 47 · 146.9	56 02.1 · 89 47 · 146.5	8
9	52 27.9 · 89 46 · 147.7	52 54.1 · 89 48 · 147.3	53 21.4 · 89 47 · 146.9	53 48.0 · 89 48 · 146.6	54 14.4 · 88 48 · 146.2	54 41.1 · 88 48 · 145.8	55 08.2 · 88 48 · 145.3	55 33.8 · 88 49 · 145.0	9
20	52 00.5 · 88 47 · 146.2	52 27.0 · 88 48 · 145.9	52 53.4 · 88 49 · 145.5	53 19.7 · 88 49 · 145.1	53 46.0 · 87 49 · 144.7	54 12.3 · 87 50 · 144.3	54 38.3 · 87 50 · 143.8	55 04.3 · 87 51 · 143.4	20
1	51 32.0 · 88 49 · 144.8	51 58.2 · 87 50 · 144.4	52 24.4 · 87 50 · 144.0	52 50.6 · 87 51 · 143.6	53 16.4 · 86 51 · 143.2	53 42.3 · 86 52 · 142.8	54 08.1 · 86 52 · 142.3	54 33.8 · 86 53 · 141.9	1
2	51 02.5 · 87 51 · 143.4	51 28.4 · 86 51 · 143.0	51 54.3 · 86 52 · 142.6	52 20.1 · 86 52 · 142.2	52 45.8 · 85 53 · 141.8	53 11.4 · 85 53 · 141.3	53 36.8 · 85 54 · 140.9	54 02.2 · 84 54 · 140.5	2
3	50 32.0 · 86 52 · 142.1	50 57.7 · 85 53 · 141.7	51 23.3 · 85 53 · 141.2	51 48.8 · 85 54 · 140.8	52 14.1 · 84 54 · 140.4	52 39.4 · 84 55 · 139.9	53 04.6 · 84 55 · 139.5	53 29.7 · 83 56 · 139.0	3
4	50 00.6 · 85 53 · 140.7	50 26.0 · 85 54 · 140.3	50 51.3 · 84 55 · 139.9	51 16.5 · 84 55 · 139.5	51 41.6 · 83 56 · 139.0	52 06.6 · 83 56 · 138.6	52 31.5 · 83 57 · 138.1	52 56.2 · 82 57 · 137.7	4
25	49 28.3 · 84 55 · 139.4	49 53.4 · 84 56 · 139.0	50 18.5 · 83 56 · 138.5	50 43.4 · 83 57 · 138.1	51 08.2 · 83 57 · 137.7	51 32.9 · 83 58 · 137.2	51 57.5 · 81 59 · 136.8	52 21.9 · 81 59 · 136.3	25
6	48 55.2 · 83 57 · 138.2	49 20.0 · 83 57 · 137.7	49 44.7 · 82 58 · 137.3	50 09.4 · 82 58 · 136.8	50 33.9 · 82 58 · 136.4	50 58.3 · 81 59 · 135.9	51 22.6 · 81 59 · 135.5	51 46.8 · 80 60 · 135.0	6
7	48 21.2 · 82 58 · 136.9	48 45.8 · 82 58 · 136.5	49 10.2 · 81 59 · 136.0	49 34.5 · 81 59 · 135.6	49 58.8 · 81 60 · 135.1	50 22.9 · 80 60 · 134.7	50 46.9 · 80 61 · 134.2	51 10.8 · 79 61 · 133.7	7
8	47 46.5 · 81 60 · 135.7	48 10.6 · 81 60 · 135.2	48 34.7 · 80 60 · 134.8	48 58.8 · 80 61 · 134.3	49 22.9 · 80 61 · 133.8	49 46.7 · 79 62 · 133.4	50 11.0 · 79 62 · 132.9	50 34.0 · 78 62 · 132.5	8
9	47 10.9 · 80 60 · 134.5	47 34.9 · 80 61 · 134.1	47 58.8 · 79 61 · 133.6	48 22.6 · 79 62 · 133.1	48 46.2 · 79 62 · 132.7	49 09.8 · 78 63 · 132.2	49 33.2 · 78 63 · 131.7	49 56.5 · 78 64 · 131.2	9
30	46 34.7 · 79 62 · 133.3	46 58.4 · 79 62 · 132.9	47 22.0 · 79 62 · 132.4	47 45.5 · 78 63 · 132.0	48 09.0 · 78 63 · 131.5	48 32.2 · 77 64 · 131.0	48 55.3 · 77 64 · 130.5	49 18.4 · 77 65 · 130.1	30
1	45 57.7 · 78 63 · 132.2	46 21.2 · 78 63 · 131.7	46 44.7 · 78 64 · 131.3	47 07.8 · 77 64 · 130.8	47 30.9 · 77 64 · 130.4	47 53.9 · 76 65 · 129.9	48 16.8 · 76 65 · 129.4	48 39.5 · 76 66 · 128.9	1
2	45 20.1 · 77 64 · 131.1	45 43.3 · 77 64 · 130.6	46 06.4 · 77 65 · 130.2	46 29.4 · 76 65 · 129.7	46 52.2 · 76 66 · 129.2	47 15.0 · 76 66 · 128.7	47 37.6 · 75 66 · 128.3	48 00.1 · 75 67 · 127.8	2
3	44 41.9 · 77 64 · 130.0	45 04.5 · 76 65 · 129.1	45 27.6 · 76 66 · 129.1	45 50.3 · 75 66 · 128.6	46 12.9 · 75 66 · 128.1	46 35.4 · 75 67 · 127.6	46 57.4 · 74 67 · 127.2	47 20.0 · 74 68 · 126.7	3
4	44 03.0 · 76 66 · 128.9	44 25.7 · 75 66 · 128.5	44 48.3 · 75 67 · 128.0	45 10.7 · 75 67 · 127.5	45 33.1 · 74 67 · 127.1	45 55.3 · 74 68 · 126.6	46 17.4 · 73 68 · 126.1	46 39.3 · 73 69 · 125.6	4
35	43 23.6 · 75 67 · 127.9	43 46.0 · 75 67 · 127.4	44 08.3 · 74 67 · 127.0	44 30.5 · 74 68 · 126.5	44 52.6 · 73 68 · 126.0	45 14.6 · 73 69 · 125.5	45 36.4 · 73 69 · 125.0	45 58.2 · 72 70 · 124.5	35
6	42 43.6 · 74 68 · 126.9	43 05.8 · 74 68 · 126.4	43 27.8 · 73 68 · 125.9	43 49.8 · 73 69 · 125.5	44 11.7 · 73 69 · 125.0	44 33.4 · 72 70 · 124.5	44 55.0 · 72 70 · 124.0	45 16.5 · 71 70 · 123.5	6
7	42 03.1 · 74 68 · 125.9	42 25.0 · 73 68 · 125.9	42 46.2 · 73 68 · 124.9	43 08.6 · 72 70 · 124.5	43 30.2 · 72 70 · 124.0	43 51.7 · 71 70 · 123.5	44 13.0 · 71 71 · 123.0	44 34.3 · 71 71 · 122.5	7
8	41 22.0 · 73 69 · 124.9	41 43.7 · 72 70 · 124.4	42 05.3 · 72 70 · 123.9	42 26.8 · 71 71 · 123.5	42 48.2 · 71 71 · 123.0	43 09.5 · 71 71 · 122.5	43 30.6 · 70 71 · 122.0	43 51.6 · 70 72 · 121.5	8
9	40 40.5 · 72 70 · 123.9	41 02.0 · 71 70 · 123.5	41 23.4 · 71 71 · 123.0	41 44.6 · 71 71 · 122.5	42 05.8 · 70 71 · 122.0	42 26.8 · 70 72 · 121.6	42 47.7 · 69 72 · 121.1	43 08.5 · 69 73 · 120.6	9
40	39 58.5 · 71 71 · 123.0	40 19.8 · 71 71 · 122.5	40 40.9 · 70 71 · 122.1	41 02.0 · 70 72 · 121.6	41 22.9 · 70 72 · 121.1	41 43.7 · 69 72 · 120.6	42 04.4 · 69 73 · 120.1	42 25.0 · 68 73 · 119.7	40
1	39 16.1 · 70 71 · 122.1	39 37.1 · 70 72 · 121.6	39 58.1 · 70 72 · 121.1	40 18.9 · 69 72 · 120.7	40 39.6 · 69 73 · 120.2	41 00.2 · 68 73 · 119.7	41 20.7 · 68 74 · 119.2	41 41.0 · 68 74 · 118.7	1
2	38 33.2 · 70 72 · 121.2	38 54.1 · 69 72 · 120.7	39 14.8 · 69 73 · 120.2	39 35.4 · 69 73 · 119.8	39 55.9 · 68 73 · 119.3	40 16.3 · 68 74 · 118.8	40 36.6 · 67 74 · 118.3	40 56.7 · 67 74 · 117.8	2
3	37 50.0 · 69 73 · 120.3	38 10.6 · 68 73 · 119.9	38 31.2 · 68 73 · 119.4	38 51.6 · 68 74 · 118.9	39 11.9 · 67 74 · 118.4	39 32.0 · 67 74 · 117.9	39 52.1 · 67 75 · 117.5	40 12.1 · 66 75 · 117.0	3
4	37 06.4 · 68 73 · 119.4	37 26.8 · 68 74 · 119.0	37 47.1 · 68 74 · 118.5	38 07.3 · 67 74 · 118.0	38 27.4 · 67 75 · 117.6	38 47.4 · 66 75 · 117.1	39 07.3 · 66 75 · 116.6	39 27.0 · 66 76 · 116.1	4
45	36 22.3 · 68 74 · 118.6	36 42.6 · 67 74 · 118.1	37 02.7 · 67 75 · 117.7	37 22.7 · 66 75 · 117.2	37 42.6 · 66 75 · 116.7	38 02.4 · 66 76 · 116.2	38 22.1 · 65 76 · 115.8	38 41.7 · 65 76 · 115.3	45
6	35 38.0 · 67 74 · 117.7	35 58.0 · 67 74 · 117.3	36 18.0 · 66 76 · 116.8	36 37.8 · 66 76 · 116.4	36 57.5 · 65 76 · 115.9	37 17.2 · 65 76 · 115.4	37 36.7 · 65 76 · 114.9	37 56.0 · 65 76 · 114.4	6
7	34 53.3 · 66 75 · 116.9	35 13.1 · 66 75 · 116.5	35 32.9 · 66 76 · 116.0	35 52.6 · 65 76 · 115.5	36 12.1 · 65 76 · 115.1	36 31.5 · 65 76 · 114.6	36 50.9 · 64 77 · 114.1	37 10.1 · 64 77 · 113.6	7
8	34 08.2 · 66 75 · 116.1	34 27.9 · 65 76 · 115.7	34 47.5 · 65 76 · 115.2	35 07.0 · 65 76 · 114.7	35 26.4 · 64 77 · 114.3	35 45.6 · 64 77 · 113.8	36 04.8 · 64 77 · 113.3	36 23.8 · 63 78 · 112.8	8
9	33 22.9 · 65 76 · 115.3	33 42.4 · 65 76 · 114.9	34 01.8 · 65 77 · 114.4	34 21.2 · 64 77 · 114.0	34 40.4 · 64 77 · 113.5	34 59.5 · 63 77 · 113.0	35 18.5 · 63 78 · 112.5	35 37.3 · 63 78 · 112.1	9
50	32 37.3 · 65 76 · 114.6	32 56.6 · 64 77 · 114.1	33 15.9 · 64 77 · 113.6	33 35.0 · 64 77 · 113.2	33 54.1 · 63 78 · 112.7	34 13.0 · 63 78 · 112.3	34 31.9 · 63 78 · 111.8	34 50.6 · 62 78 · 111.3	50
1	31 51.4 · 65 76 · 113.8	32 10.6 · 64 77 · 113.3	32 29.7 · 63 77 · 112.9	32 48.7 · 63 78 · 112.4	33 07.5 · 63 78 · 112.0	33 26.3 · 62 78 · 111.5	33 45.0 · 62 78 · 111.0	34 03.6 · 62 79 · 110.6	1
2	31 05.2 · 64 77 · 113.1	31 24.2 · 63 78 · 112.6	31 43.2 · 62 78 · 112.1	32 02.0 · 62 78 · 111.7	32 20.8 · 62 78 · 111.2	32 39.4 · 62 79 · 110.8	32 57.9 · 62 79 · 110.3	33 16.4 · 61 79 · 109.8	2
3	30 18.8 · 63 78 · 112.3	30 37.7 · 63 78 · 111.9	30 56.5 · 62 78 · 111.4	31 15.1 · 62 79 · 111.0	31 33.7 · 62 79 · 110.5	31 52.2 · 61 79 · 110.0	32 10.6 · 61 79 · 109.6	32 28.9 · 61 79 · 109.1	3
4	29 32.1 · 63 78 · 111.6	29 50.8 · 62 78 · 111.1	30 09.5 · 62 79 · 110.7	30 28.0 · 62 79 · 110.2	30 46.5 · 61 79 · 109.8	31 04.8 · 61 79 · 109.3	31 23.1 · 61 80 · 108.8	31 41.3 · 60 80 · 108.4	4
55	28 45.2 · 62 79 · 110.9	29 03.8 · 61 79 · 110.0	29 22.3 · 61 79 · 110.0	29 40.7 · 61 79 · 109.5	29 59.0 · 61 79 · 109.1	30 17.3 · 61 80 · 108.6	30 35.4 · 60 80 · 108.1	30 53.9 · 60 80 · 107.7	55
6	27 58.1 · 62 79 · 110.2	28 16.5 · 61 79 · 109.3	28 34.9 · 61 79 · 109.3	28 53.2 · 61 80 · 108.8	29 11.4 · 60 80 · 108.4	29 29.5 · 60 80 · 107.9	29 47.5 · 60 80 · 107.0	30 05.4 · 60 80 · 107.0	6
7	27 10.7 · 61 79 · 109.5	27 29.1 · 61 79 · 109.0	27 47.3 · 61 80 · 108.6	28 05.5 · 60 80 · 108.1	28 23.5 · 60 80 · 107.7	28 41.5 · 60 80 · 107.2	28 59.4 · 59 80 · 106.8	29 17.2 · 59 81 · 106.3	7
8	26 23.2 · 61 80 · 108.8	26 41.4 · 61 80 · 108.4	26 59.5 · 60 80 · 107.9	27 17.5 · 60 80 · 107.5	27 35.5 · 60 80 · 107.0	27 53.3 · 59 81 · 106.5	28 11.1 · 59 81 · 106.1	28 28.8 · 59 81 · 105.6	8
9	25 35.5 · 60 80 · 108.1	25 53.5 · 60 80 · 107.7	26 11.5 · 60 80 · 107.2	26 29.5 · 60 80 · 106.8	26 47.3 · 59 81 · 106.3	27 05.0 · 59 81 · 105.9	27 22.7 · 59 81 · 105.4	27 40.2 · 58 81 · 105.0	9
60	24 47.6 · 60 80 · 107.5	25 05.5 · 60 81 · 107.0	25 23.4 · 59 81 · 106.1	25 41.2 · 59 81 · 106.1	25 58.9 · 59 81 · 105.7	26 16.5 · 59 81 · 105.2	26 34.1 · 58 81 · 104.8	26 51.5 · 58 82 · 104.3	60
1	23 59.5 · 60 80 · 106.8	24 17.3 · 59 81 · 106.4	24 35.1 · 59 81 · 105.9	24 52.8 · 59 81 · 105.5	25 10.4 · 59 81 · 105.0	25 27.9 · 58 81 · 104.6	25 45.4 · 58 81 · 104.1	26 02.7 · 58 82 · 103.7	1
2	23 11.2 · 59 81 · 106.2	23 29.0 · 59 81 · 105.7	23 46.6 · 59 81 · 105.3	24 04.2 · 59 81 · 104.8	24 21.7 · 58 81 · 104.4	24 39.2 · 58 82 · 103.9	24 56.5 · 58 82 · 103.5	25 13.8 · 57 82 · 103.0	2
3	22 22.8 · 59 81 · 105.5	22 40.4 · 59 81 · 105.1	22 58.0 · 58 81 · 104.6	23 15.5 · 58 81 · 104.2	23 32.9 · 58 82 · 103.3	23 50.2 · 58 82 · 103.3	24 07.5 · 57 82 · 102.9	24 24.7 · 57 82 · 102.4	3
4	21 34.2 · 59 81 · 104.9	21 51.8 · 58 81 · 104.4	22 09.4 · 58 82 · 103.6	22 27.0 · 58 82 · 103.6	22 44.0 · 57 82 · 103.1	23 01.2 · 57 82 · 102.7	23 18.4 · 57 82 · 102.2	23 35.5 · 57 82 · 101.8	4
65	20 45.5 · 58 81 · 104.2	21 03.0 · 58 82 · 103.8	21 20.4 · 58 82 · 103.4	21 37.7 · 58 82 · 102.9	21 54.9 · 57 82 · 102.5	22 12.1 · 57 82 · 102.1	22 29.2 · 57 82 · 101.6	22 46.2 · 56 83 · 101.2	65
6	19 56.7 · 58 82 · 103.6	20 14.1 · 58 82 · 103.2	20 31.3 · 58 82 · 102.8	20 48.6 · 57 82 · 102.3	21 05.7 · 57 82 · 101.9	21 22.8 · 57 82 · 101.4	21 39.8 · 57 82 · 101.0	21 56.8 · 56 83 · 100.6	6
7	19 07.7 · 58 82 · 103.0	19 25.0 · 57 82 · 102.6	19 42.2 · 57 82 · 102.1	19 59.3 · 57 82 · 101.7	20 16.4 · 57 82 · 101.3	20 33.4 · 56 82 · 100.8	20 50.4 · 56 83 · 100.4	21 07.2 · 56 83 · 100.0	7
8	18 18.6 · 57 82 · 102.4	18 35.8 · 57 82 · 102.0	18 53.0 · 57 82 · 101.5	19 10.0 · 57 82 · 101.1	19 27.0 · 57 82 · 100.7	19 44.0 · 56 83 · 100.2	20 00.8 · 56 83 · 99.8	20 17.6 · 56 83 · 99.4	8
9	17 29.4 · 57 82 · 101.8	17 46.6 · 57 82 · 101.4	18 03.6 · 57 82 · 100.9	18 20.6 · 57 83 · 100.5	18 37.5 · 56 83 · 100.1	18 54.4 · 56 83 · 99.6	19 11.2 · 56 83 · 99.2	19 27.9 · 56 83 · 98.8	9
70	16 40.1 · 57 82 · 101.2	16 57.2 · 57 82 · 100.8	17 14.1 · 56 83 · 100.4	17 31.1 · 56 83 · 99.9	17 47.9 · 56 83 · 99.5	18 04.7 · 56 83 · 99.0	18 21.5 · 56 83 · 98.6	18 38.2 · 56 83 · 98.2	70
1	15 50.7 · 57 82 · 100.6	16 07.7 · 56 83 · 100.2	16 24.6 · 56 83 · 99.8	16 41.5 · 56 83 · 99.3	16 58.3 · 56 83 · 98.9	17 15.0 · 56 83 · 98.5	17 31.7 · 56 83 · 98.0	17 48.3 · 56 83 · 97.6	1
2	15 01.2 · 56 83 · 100.0	15 18.1 · 56 83 · 99.6	15 35.0 · 56 83 · 99.2	15 51.8 · 56 83 · 98.7	16 08.5 · 56 83 · 98.3	16 25.2 · 56 83 · 97.9	16 41.8 · 56 83 · 97.4	16 58.4 · 55 83 · 97.0	2
3	14 11.6 · 56 83 · 99.5	14 28.5 · 56 83 · 98.5	14 45.2 · 56 83 · 98.6	15 02.0 · 56 83 · 98.2	15 18.7 · 56 83 · 97.7	15 35.3 · 56 83 · 97.3	15 51.9 · 56 83 · 96.9	16 08.4 · 55 83 · 96.4	3
4	13 22.0 · 56 83 · 98.9	13 38.7 · 56 83 · 98.5	13 55.5 · 56 83 · 98.0	14 12.1 · 56 83 · 97.6	14 28.8 · 56 83 · 97.2	14 45.4 · 56 83 · 96.7	15 01.9 · 56 83 · 96.3	15 18.4 · 55 83 · 95.9	4
75	12 32.2 · 56 83 · 98.3	12 48.9 · 56 83 · 97.9	13 05.6 · 56 83 · 97.5	13 22.2 · 56 83 · 97.0	13 38.8 · 56 83 · 96.6	13 55.4 · 56 83 · 96.2	14 11.9 · 56 83 · 95.7	14 28.3 · 55 84 · 95.3	75
6	11 42.4 · 56 83 · 97.7	11 59.0 · 56 83 · 97.3	12 15.7 · 56 83 · 96.9	12 32.3 · 56 83 · 96.5	12 48.8 · 56 83 · 96.0	13 05.3 · 56 83 · 95.6	13 21.8 · 56 84 · 95.2	13 38.2 · 55 84 · 94.7	6
7	10 52.5 · 55 83 · 97.2	11 09.1 · 55 83 · 96.7	11 25.7 · 55 83 · 96.3	11 42.3 · 55 83 · 95.9	11 58.7 · 55 83 · 95.5	12 15.2 · 56 84 · 95.0	12 31.6 · 56 84 · 94.6	12 48.0 · 55 84 · 94.2	7
8	10 02.5 · 55 83 · 96.6	10 19.1 · 55 83 · 96.2	10 35.6 · 55 83 · 95.8	10 52.1 · 55 83 · 95.3	11 08.6 · 55 84 · 94.9	11 25.1 · 55 84 · 94.4	11 41.5 · 55 84 · 94.1	11 57.8 · 55 84 · 93.6	8
9	9 12.5 · 55 83 · 96.0	9 29.0 · 55 84 · 95.6	9 45.5 · 55 84 · 95.2	10 02.0 · 55 84 · 94.8	10 18.5 · 55 84 · 94.3	10 34.9 · 55 84 · 93.9	10 51.3 · 55 84 · 93.5	11 07.6 · 54 84 · 93.1	9
80	8 22.4 · 55 84 · 95.5	8 38.9 · 55 84 · 95.1	8 55.4 · 55 84 · 94.6	9 11.9 · 55 84 · 94.2	9 28.3 · 55 84 · 93.8	9 44.7 · 55 84 · 93.4	10 01.0 · 54 84 · 92.9	10 17.3 · 54 84 · 92.5	80
1	7 32.3 · 55 84 · 94.9	7 48.8 · 55 84 · 94.5	8 05.2 · 55 84 · 94.1	8 21.7 · 55 84 · 93.7	8 38.0 · 55 84 · 93.2	8 54.4 · 54 84 · 92.8	9 10.7 · 54 84 · 92.4	9 27.1 · 54 84 · 92.0	1
2	6 42.2 · 55 84 · 94.4	6 58.6 · 55 84 · 94.0	7 15.0 · 55 84 · 93.5	7 31.4 · 55 84 · 93.1	7 47.8 · 55 84 · 92.7	8 04.1 · 54 84 · 92.3	8 20.5 · 54 84 · 91.8	8 36.8 · 54 84 · 91.4	2
3	5 52.0 · 55 84 · 93.8	6 08.4 · 55 84 · 93.4	6 24.8 · 55 84 · 93.0	6 41.2 · 55 84 · 92.6	6 57.5 · 54 84 · 92.1	7 13.9 · 54 84 · 91.7	7 30.2 · 54 84 · 91.3	7 46.4 · 54 84 · 90.9	3
4	5 01.8 · 55 84 · 93.3	5 18.2 · 55 84 · 92.9	5 34.5 · 55 84 · 92.4	5 50.9 · 54 84 · 92.0	6 07.2 · 54 84 · 91.6	6 23.5 · 54 84 · 91.2	6 39.8 · 54 84 · 90.7	6 56.1 · 54 84 · 90.3	4
85				5 00.6 · 54 84 · 91.5	5 16.9 · 54 84 · 91.0	5 33.2 · 54 84 · 90.6	5 49.5 · 54 84 · 90.2	6 05.8 · 54 84 · 89.8	85
6								5 15.5 · 54 84 · 89.2	6

Lat. 33°

Each cell lists: Alt. (° ′) — Δd Δt — Az. (°)

H.A.	0° 00′	0° 30′	1° 00′	1° 30′	2° 00′	2° 30′	3° 00′	3° 30′	H.A.
00	57 00.0 1.0 01 180.0	56 30.0 1.0 01 180.0	56 00.0 1.0 01 180.0	55 30.0 1.0 01 180.0	55 00.0 1.0 01 180.0	54 30.0 1.0 01 180.0	54 00.0 1.0 01 180.0	53 30.0 1.0 01 180.0	00
1	56 59.2 1.0 04 178.2	56 29.2 1.0 04 178.2	55 59.2 1.0 04 178.2	55 29.2 1.0 04 178.3	54 59.2 1.0 04 178.3	54 29.2 1.0 04 178.3	53 59.3 1.0 04 178.3	53 29.3 1.0 04 178.3	1
2	56 56.8 1.0 07 176.3	56 26.8 1.0 07 176.4	55 56.9 1.0 07 176.4	55 26.9 1.0 06 176.5	54 56.9 1.0 06 176.5	54 27.0 1.0 06 176.6	53 57.0 1.0 06 176.6	53 27.1 1.0 06 176.6	2
3	56 52.8 1.0 09 174.5	56 22.9 1.0 09 174.6	55 52.9 1.0 09 174.6	55 23.0 1.0 09 174.7	54 53.1 1.0 09 174.8	54 23.2 1.0 09 174.8	53 53.3 1.0 09 174.9	53 23.4 1.0 09 175.0	3
4	56 47.1 99 12 172.7	56 17.3 99 12 172.8	55 47.5 99 12 172.9	55 17.6 99 12 173.0	54 47.8 99 11 173.1	54 17.9 99 11 173.1	53 48.1 1.0 11 173.2	53 18.2 1.0 11 173.3	4
05	56 39.9 99 15 170.9	56 10.2 99 14 171.0	55 40.5 99 14 171.1	55 10.7 99 14 171.2	54 41.0 99 14 171.3	54 11.2 99 14 171.4	53 41.4 99 14 171.5	53 11.7 99 13 171.7	05
6	56 31.2 99 17 169.1	56 01.6 99 17 169.2	55 31.9 99 17 169.4	55 02.3 99 17 169.5	54 32.6 99 16 169.8	54 03.0 99 16 169.9	53 33.3 99 16 169.9	53 03.6 99 16 170.0	6
7	56 20.9 98 20 167.3	55 51.4 98 19 167.5	55 21.9 98 19 167.6	54 52.4 98 19 167.8	54 22.8 98 19 167.9	53 53.3 98 18 168.1	53 23.7 98 18 168.2	52 54.2 99 18 168.4	7
8	56 09.1 98 22 165.5	55 39.7 98 22 165.7	55 10.4 98 22 165.9	54 41.0 98 21 166.1	54 11.6 98 21 166.2	53 42.2 98 21 166.4	53 12.8 98 21 166.6	52 43.3 98 20 166.7	8
9	55 55.7 97 25 163.8	55 26.6 97 24 164.0	54 57.4 97 24 164.2	54 28.2 97 24 164.4	53 58.9 97 23 164.6	53 29.7 98 23 164.8	53 00.4 98 23 165.0	52 31.1 98 23 165.1	9
10	55 41.0 97 27 162.1	55 11.8 97 27 162.3	54 43.0 97 26 162.5	54 13.9 97 26 162.7	53 44.8 97 26 162.9	53 15.8 97 25 163.1	52 46.7 97 25 163.3	52 17.5 97 25 163.5	10
1	55 24.8 96 29 160.4	54 56.0 96 29 160.6	54 27.1 96 28 160.8	53 58.3 96 28 161.1	53 29.4 96 28 161.3	53 00.5 96 28 161.5	52 31.6 96 27 161.7	52 02.6 97 27 162.0	1
2	55 07.2 95 32 158.7	54 38.6 95 31 158.9	54 09.9 95 31 159.2	53 41.3 96 31 159.5	53 12.6 96 30 159.7	52 43.9 96 30 159.9	52 15.1 96 30 160.2	51 46.4 96 29 160.4	2
3	54 48.2 94 34 157.0	54 19.8 95 33 157.3	53 51.4 95 33 157.6	53 23.0 95 33 157.9	52 54.5 95 32 158.1	52 26.0 95 32 158.4	51 57.4 95 32 158.6	51 28.9 95 31 158.9	3
4	54 27.9 94 36 155.4	53 59.8 94 35 155.7	53 31.6 94 35 156.0	53 03.0 94 35 156.3	52 35.1 94 35 156.6	52 06.8 94 34 156.8	51 38.5 95 34 157.1	51 10.1 95 34 157.4	4
15	54 06.3 93 38 153.8	53 38.4 93 38 154.1	53 10.5 93 37 154.4	52 42.5 93 37 154.7	52 14.5 94 37 155.0	51 46.4 94 36 155.3	51 18.3 94 36 155.6	50 50.1 94 35 155.9	15
6	53 43.5 92 40 152.2	53 15.8 92 40 152.6	52 48.1 92 39 152.9	52 20.4 93 39 153.2	51 52.6 93 38 153.5	51 24.8 93 38 153.8	50 56.9 94 38 154.1	50 28.9 93 37 154.4	6
7	53 19.4 91 42 150.7	52 52.0 91 42 151.0	52 24.6 92 41 151.4	51 57.1 92 41 151.7	51 29.6 92 40 152.0	51 02.0 92 40 152.3	50 34.3 92 40 152.6	50 06.6 92 39 152.9	7
8	52 54.2 90 44 149.2	52 27.1 91 43 149.5	51 59.9 91 43 149.9	51 32.7 91 43 150.2	51 05.4 91 42 150.5	50 38.0 91 42 150.8	50 10.6 91 41 151.1	49 43.2 92 41 151.5	8
9	52 27.9 89 46 147.7	52 01.0 90 45 148.1	51 34.1 90 45 148.4	51 07.1 90 44 148.8	50 40.1 90 44 149.1	50 13.0 90 44 149.4	49 45.8 91 43 149.8	49 18.6 91 43 150.1	9
20	52 00.5 88 47 146.2	51 33.9 89 47 146.6	51 07.2 89 47 147.0	50 40.5 89 46 147.3	50 13.7 89 46 147.7	49 46.9 90 45 148.0	49 20.0 90 45 148.4	48 53.0 90 44 148.7	20
1	51 32.0 88 49 144.8	51 05.7 88 49 145.2	50 39.3 88 48 145.6	50 12.8 88 48 146.0	49 46.3 89 47 146.3	49 19.7 89 47 146.7	48 53.1 89 46 147.0	48 26.4 89 46 147.4	1
2	51 02.5 87 51 143.4	50 36.5 87 50 143.8	50 10.4 87 50 144.2	49 44.2 87 49 144.6	49 17.9 88 49 145.0	48 51.6 88 48 145.3	48 25.2 88 48 145.7	47 58.8 88 48 146.0	2
3	50 32.0 86 52 142.1	50 06.5 86 52 142.5	49 40.5 86 51 142.9	49 14.5 86 51 143.3	48 48.6 87 50 143.6	48 22.5 87 50 144.0	47 56.4 87 50 144.4	47 30.4 87 49 144.7	3
4	50 00.6 85 54 140.7	49 35.2 85 53 141.1	49 09.6 85 53 141.5	48 44.0 85 52 141.9	48 18.3 86 52 142.3	47 52.5 86 52 142.7	47 26.6 86 51 143.1	47 00.7 87 51 143.5	4
25	49 28.3 84 55 139.4	49 03.2 84 55 139.8	48 37.9 84 54 140.3	48 12.5 85 54 140.7	47 47.1 85 53 141.1	47 21.5 85 53 141.4	46 55.9 85 53 141.8	46 30.3 86 52 142.2	25
6	48 55.2 83 57 138.2	48 30.3 83 56 138.6	48 05.3 83 56 139.0	47 40.2 84 55 139.4	47 15.0 84 55 139.8	46 49.8 84 54 140.2	46 24.4 85 54 140.6	45 59.0 85 54 141.0	6
7	48 21.2 82 58 136.9	47 56.6 82 58 137.3	47 31.9 83 57 137.8	47 07.0 83 57 138.2	46 42.1 83 56 138.6	46 17.1 83 56 139.0	45 52.1 84 55 139.4	45 26.9 84 55 139.8	7
8	47 46.5 81 59 135.7	47 22.1 81 59 136.1	46 57.6 82 58 136.5	46 33.1 82 58 137.0	46 08.4 82 57 137.4	45 43.7 83 57 137.8	45 18.9 83 57 138.2	44 54.0 84 56 138.6	8
9	47 10.9 80 60 134.5	46 46.8 80 60 134.9	46 22.6 81 60 135.4	45 58.4 81 59 135.8	45 34.0 81 59 136.2	45 09.5 82 58 136.6	44 45.0 82 58 137.0	44 20.3 82 57 137.4	9
30	46 34.7 79 62 133.3	46 10.9 80 61 133.8	45 46.9 80 61 134.2	45 22.9 80 60 134.6	44 58.8 81 60 135.1	44 34.6 81 59 135.5	44 10.3 81 59 135.9	43 45.9 81 59 136.3	30
1	45 57.7 78 63 132.2	45 34.2 79 62 132.6	45 10.5 79 62 133.1	44 46.8 79 61 133.5	44 22.9 80 61 133.9	43 59.0 80 61 134.3	43 34.9 80 60 134.8	43 10.8 81 60 135.2	1
2	45 20.1 77 64 131.1	44 56.8 78 63 131.5	44 33.4 78 63 132.0	44 09.9 78 62 132.4	43 46.3 79 62 132.8	43 22.6 79 62 133.2	42 58.9 79 61 133.7	42 35.0 80 61 134.1	2
3	44 41.9 77 65 130.0	44 18.8 77 64 130.4	43 55.7 77 64 130.9	43 32.4 78 64 131.3	43 09.1 78 63 131.7	42 45.7 78 63 132.2	42 22.1 78 62 132.6	41 58.5 79 62 133.0	3
4	44 03.0 76 66 128.9	43 40.2 76 65 129.4	43 17.3 76 65 129.8	42 54.3 77 64 130.3	42 31.2 77 64 130.7	42 08.1 77 64 131.1	41 44.8 78 63 131.5	41 21.4 78 63 132.0	4
35	43 23.6 75 67 127.9	43 01.0 75 66 128.3	42 38.4 76 66 128.8	42 15.6 76 65 129.2	41 52.8 76 65 129.7	41 29.9 77 65 130.1	41 06.8 77 64 130.5	40 43.7 77 64 130.9	35
6	42 43.6 74 68 126.9	42 21.3 74 67 127.3	41 58.9 75 67 127.8	41 36.4 75 66 128.2	41 13.8 76 66 128.6	40 51.1 76 66 129.1	40 28.3 76 65 129.5	40 05.4 76 65 129.9	6
7	42 03.1 73 68 125.9	41 41.0 74 68 126.3	41 18.8 74 68 126.8	40 56.6 75 67 127.2	40 34.2 75 67 127.6	40 11.7 75 66 128.1	39 49.2 75 66 128.5	39 26.5 76 66 128.9	7
8	41 22.0 73 69 124.9	41 00.2 73 69 125.3	40 38.3 73 68 125.8	40 16.2 74 68 126.2	39 54.1 74 68 126.7	39 31.9 74 67 127.1	39 09.5 75 67 127.5	38 47.1 75 67 128.0	8
9	40 40.5 72 70 123.9	40 18.9 72 70 124.4	39 57.2 73 69 124.8	39 35.4 73 69 125.3	39 13.5 73 68 125.7	38 51.5 74 68 126.2	38 29.4 74 68 126.6	38 07.2 74 67 127.0	9
40	39 58.5 71 71 123.0	39 37.1 71 70 123.4	39 15.7 72 70 123.9	38 54.1 72 70 124.3	38 32.4 72 69 124.8	38 10.6 73 69 125.2	37 48.7 73 69 125.7	37 26.8 73 68 126.1	40
1	39 16.1 70 71 122.1	38 54.9 71 71 122.3	38 33.7 71 71 123.0	38 12.3 71 70 123.4	37 50.8 72 70 123.9	37 29.3 72 70 124.3	37 07.6 72 69 124.8	36 45.9 73 69 125.2	1
2	38 33.2 70 72 121.2	38 12.3 70 72 121.6	37 51.2 70 71 122.1	37 30.1 71 71 122.5	37 08.8 71 71 123.0	36 47.5 71 70 123.4	36 26.0 72 70 123.8	36 04.5 72 70 124.3	2
3	37 50.0 69 73 120.3	37 29.3 69 72 120.7	37 08.4 70 72 121.2	36 47.5 70 72 121.6	36 26.4 70 71 122.1	36 05.3 71 71 122.5	35 44.0 71 71 123.0	35 22.7 71 71 123.4	3
4	37 06.4 68 73 119.4	36 45.8 69 73 119.9	36 25.2 69 73 120.3	36 04.4 69 72 120.8	35 43.6 70 72 121.2	35 22.6 70 72 121.7	35 01.6 70 71 122.1	34 40.5 71 71 122.5	4
45	36 22.3 68 74 118.6	36 02.0 68 74 119.0	35 41.5 68 73 119.5	35 21.0 69 73 119.9	35 00.4 69 73 120.4	34 39.6 69 72 120.8	34 18.8 70 72 121.3	33 57.8 70 72 121.7	45
6	35 38.0 67 74 117.7	35 17.8 67 74 118.2	34 57.6 68 74 118.6	34 37.2 68 74 119.1	34 16.6 68 73 119.5	33 56.2 69 73 120.0	33 35.6 69 73 120.4	33 14.8 69 73 120.8	6
7	34 53.3 66 75 116.9	34 33.3 67 75 117.4	34 13.2 67 74 117.8	33 53.1 67 74 118.3	33 32.8 68 74 118.7	33 12.4 68 74 119.2	32 52.0 68 73 119.6	32 31.5 69 73 120.0	7
8	34 08.2 66 76 116.1	33 48.5 66 75 116.6	33 28.6 66 75 117.0	33 08.6 67 75 117.5	32 48.5 67 74 117.9	32 28.1 67 74 118.4	32 08.1 68 74 118.8	31 47.7 68 73 119.2	8
9	33 22.9 65 76 115.3	33 03.3 66 76 115.8	32 43.6 66 75 116.2	32 23.8 66 75 116.7	32 03.9 66 75 117.1	31 43.3 67 75 117.6	31 23.6 67 74 118.0	31 03.6 67 74 118.4	9
50	32 37.3 65 76 114.6	32 17.8 65 76 115.0	31 58.3 65 76 115.5	31 38.7 66 76 115.9	31 18.9 66 75 116.3	30 59.1 66 75 116.8	30 39.2 66 75 117.2	30 19.2 67 75 117.7	50
1	31 51.4 64 77 113.8	31 32.1 64 77 114.2	31 12.7 65 76 114.7	30 53.4 65 76 115.1	30 33.7 65 76 115.6	30 14.0 66 76 116.0	29 54.3 66 75 116.5	29 34.5 66 75 116.9	1
2	31 05.2 64 77 113.1	30 46.1 64 77 113.5	30 26.9 64 77 113.9	30 07.6 65 77 114.4	29 48.2 65 76 114.8	29 28.3 65 76 115.3	29 09.1 65 76 115.7	28 49.5 66 76 116.1	2
3	30 18.8 63 78 112.3	29 59.8 63 78 112.8	29 40.7 64 77 113.2	29 21.6 64 77 113.6	29 02.4 64 77 114.1	28 42.3 65 76 114.5	28 23.6 65 76 115.0	28 04.1 65 76 115.4	3
4	29 32.1 63 78 111.6	29 13.3 63 78 112.0	28 54.4 63 78 112.5	28 35.4 63 77 112.9	28 16.3 64 77 113.4	27 57.1 64 77 113.8	27 37.9 64 77 114.2	27 18.5 65 76 114.7	4
55	28 45.2 62 79 110.9	28 26.5 62 78 111.3	28 07.8 63 78 111.8	27 48.9 63 78 112.2	27 30.0 63 78 112.6	27 11.0 64 77 113.1	26 51.9 64 77 113.5	26 32.7 64 77 113.9	55
6	27 58.1 62 79 110.2	27 39.5 62 78 110.6	27 20.9 62 78 111.1	27 02.2 63 78 111.5	26 43.4 63 78 111.9	26 24.5 63 78 112.4	26 05.6 63 78 112.8	25 46.6 64 77 113.2	6
7	27 10.7 61 79 109.5	26 52.3 62 79 109.9	26 33.8 62 79 110.4	26 15.3 62 79 110.8	25 56.6 62 78 111.2	25 37.9 63 78 111.7	25 19.1 63 78 112.1	25 00.2 63 78 112.5	7
8	26 23.2 61 80 108.8	26 05.0 61 79 109.2	25 46.6 61 79 109.7	25 28.1 61 79 110.1	25 09.6 62 79 110.5	24 51.0 62 78 111.0	24 32.3 62 78 111.4	24 13.6 63 78 111.8	8
9	25 35.5 60 80 108.1	25 17.3 61 80 108.6	24 59.1 61 79 109.0	24 40.8 61 79 109.4	24 22.4 61 79 109.9	24 03.9 62 79 110.3	23 45.4 62 79 110.7	23 26.8 62 78 111.2	9
60	24 47.6 60 80 107.5	24 29.5 60 80 107.9	24 11.4 61 80 108.3	23 53.2 61 80 108.8	23 35.0 61 79 109.2	23 16.6 61 79 109.6	22 58.2 61 79 110.1	22 39.8 62 79 110.5	60
1	23 59.5 60 80 106.8	23 41.5 60 80 107.2	23 23.6 60 80 107.7	23 05.5 60 80 108.1	22 47.3 61 80 108.5	22 29.1 61 79 109.0	22 10.9 61 79 109.4	21 52.5 61 79 109.8	1
2	23 11.2 59 81 106.2	22 53.4 60 80 106.6	22 35.6 60 80 107.0	22 17.6 60 80 107.5	21 59.5 60 80 107.9	21 41.5 61 80 108.3	21 23.3 61 80 108.8	21 05.1 61 79 109.2	2
3	22 22.8 59 81 105.5	22 05.1 59 81 105.9	21 47.3 59 81 106.4	21 29.5 59 80 106.8	21 11.6 60 80 107.2	20 53.6 60 80 107.7	20 35.6 60 80 108.1	20 17.5 60 80 108.5	3
4	21 34.2 59 81 104.9	21 16.6 59 81 105.3	20 59.0 59 81 105.7	20 41.2 59 81 106.2	20 23.4 59 80 106.6	20 05.6 60 80 107.0	19 47.6 60 80 107.5	19 29.7 60 80 107.9	4
65	20 45.5 58 81 104.2	20 28.0 58 81 104.7	20 10.5 59 81 105.1	19 52.8 59 81 105.5	19 35.1 59 81 106.0	19 17.4 59 80 106.4	18 59.6 59 80 106.8	18 41.7 60 80 107.3	65
6	19 56.7 58 82 103.6	19 39.3 58 81 104.1	19 21.8 58 81 104.5	19 04.3 58 81 104.9	18 46.7 59 81 105.4	18 29.0 59 81 105.8	18 11.3 59 81 106.2	17 53.6 59 80 106.6	6
7	19 07.7 58 82 103.0	18 50.4 58 82 103.4	18 33.0 58 82 103.9	18 15.6 58 81 104.3	17 58.1 58 81 104.7	17 40.5 59 81 105.2	17 22.9 59 81 105.6	17 05.3 59 81 106.0	7
8	18 18.6 57 82 102.4	18 01.4 58 82 102.8	17 44.1 58 82 103.3	17 26.8 58 82 103.7	17 09.4 58 81 104.1	16 51.9 58 81 104.5	16 34.4 58 81 105.0	16 16.8 58 81 105.4	8
9	17 29.4 57 82 101.8	17 12.3 57 82 102.2	16 55.1 57 82 102.7	16 37.8 57 82 103.1	16 20.5 58 82 103.5	16 03.1 58 82 103.9	15 45.7 58 81 104.4	15 28.2 58 81 104.8	9
70	16 40.1 57 82 101.2	16 23.1 57 82 101.6	16 05.9 57 82 102.1	15 48.7 57 82 102.5	15 31.5 58 82 102.9	15 14.2 58 82 103.3	14 56.9 58 82 103.8	14 39.5 58 81 104.2	70
1	15 50.7 57 83 100.6	15 33.7 57 82 101.0	15 16.7 57 82 101.5	14 59.6 57 82 101.9	14 42.4 57 82 102.3	14 25.2 57 82 102.7	14 08.0 58 82 103.2	13 50.7 58 82 103.6	1
2	15 01.2 56 83 100.0	14 44.3 57 83 100.5	14 27.3 57 82 100.9	14 10.3 57 82 101.3	13 53.2 57 82 101.7	13 36.1 57 82 102.1	13 18.9 57 82 102.6	13 01.7 57 82 103.0	2
3	14 11.6 56 83 99.5	13 54.8 56 83 99.9	13 37.8 56 83 100.3	13 20.9 56 82 100.7	13 03.9 57 82 101.2	12 46.8 57 82 101.6	12 29.7 57 82 102.0	12 12.6 57 82 102.4	3
4	13 22.0 56 83 98.9	13 05.1 56 83 99.3	12 48.3 56 83 99.7	12 31.4 56 83 100.2	12 14.4 57 83 100.6	11 57.5 57 82 101.0	11 40.5 57 82 101.4	11 23.4 57 82 101.8	4
75	12 32.2 56 83 98.3	12 15.4 56 83 98.7	11 58.6 56 83 99.2	11 41.8 56 83 99.6	11 24.9 56 83 100.0	11 08.0 56 83 100.4	10 51.1 57 82 100.8	10 34.1 57 82 101.3	75
6	11 42.4 56 83 97.7	11 25.7 56 83 98.1	11 08.9 56 83 98.6	10 52.1 56 83 99.0	10 35.3 56 83 99.4	10 18.5 56 83 99.8	10 01.6 56 83 100.3	9 44.7 56 82 100.7	6
7	10 52.5 56 83 97.2	10 35.8 56 83 97.6	10 19.1 56 83 98.0	10 02.4 56 83 98.4	9 45.7 56 83 98.9	9 28.9 56 83 99.3	9 12.1 56 83 99.7	8 55.2 56 83 100.1	7
8	10 02.5 55 83 96.6	9 45.9 55 83 97.0	9 29.3 55 83 97.4	9 12.6 55 83 97.9	8 55.9 56 83 98.3	8 39.2 56 83 98.7	8 22.4 56 83 99.1	8 05.6 56 83 99.5	8
9	9 12.5 55 83 96.0	8 55.9 55 83 96.5	8 39.3 55 83 96.9	8 22.7 55 83 97.3	8 06.1 56 83 97.7	7 49.4 56 83 98.1	7 32.7 56 83 98.6	7 16.0 56 83 99.0	9
80	8 22.4 55 84 95.5	8 05.9 55 84 95.9	7 49.4 55 83 96.3	7 32.8 55 83 96.7	7 16.2 55 83 97.2	6 59.7 55 83 97.6	6 42.9 56 83 98.0	6 26.2 56 83 98.4	80
1	7 32.3 55 84 94.9	7 15.8 55 84 95.4	6 59.3 55 84 95.8	6 42.8 55 83 96.2	6 26.2 55 83 96.6	6 09.6 55 83 97.1	5 52.9 55 83 97.4	5 36.4 55 83 97.9	1
2	6 42.2 55 84 94.4	6 25.7 55 84 94.8	6 09.2 55 84 95.2	5 52.7 55 84 95.6	5 36.2 55 84 96.1	5 19.7 55 83 96.5	5 03.1 55 83 96.9		2
3	5 52.0 55 84 93.8	5 35.5 55 84 94.2	5 19.1 55 84 94.7	5 02.6 55 84 95.1					3
4	5 01.8 55 84 93.3								4

Right-margin latitude labels (descending): Lat. 33° · Lat. 34° · Lat. 35° · Lat. 36° · Lat. 37° · Lat. 38°

Lat. 33°

H.A.	4° 00' Alt.	Δd Δt	Az.	4° 30' Alt.	Δd Δt	Az.	5° 00' Alt.	Δd Δt	Az.	5° 30' Alt.	Δd Δt	Az.	6° 00' Alt.	Δd Δt	Az.	6° 30' Alt.	Δd Δt	Az.	7° 00' Alt.	Δd Δt	Az.	7° 30' Alt.	Δd Δt	Az.	H.A.
00	61 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	62 00.0	1.0 02	180.0	62 30.0	1.0 02	180.0	63 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0	64 00.0	1.0 02	180.0	64 30.0	1.0 02	180.0	00
1	60 59.1	1.0 05	177.9	61 29.1	1.0 05	177.9	61 59.1	1.0 05	177.9	62 29.1	1.0 05	177.8	62 59.1	1.0 05	177.8	63 29.0	1.0 05	177.8	63 59.0	1.0 05	177.7	64 29.0	1.0 05	177.7	1
2	60 56.4	1.0 08	175.9	61 26.3	1.0 08	175.8	61 56.3	1.0 08	175.8	62 26.2	1.0 08	175.7	62 56.2	1.0 08	175.6	63 26.1	1.0 08	175.6	63 56.0	1.0 08	175.5	64 26.0	1.0 08	175.4	2
3	60 51.9	1.0 10	173.8	61 21.8	1.0 11	173.8	61 51.6	1.0 11	173.7	62 21.5	1.0 11	173.6	62 51.4	1.0 11	173.4	63 21.2	1.0 11	173.3	63 51.1	1.0 12	173.2	64 20.9	99 12	173.1	3
4	60 45.6	99 13	171.8	61 15.4	99 14	171.7	61 45.2	99 14	171.6	62 14.9	99 14	171.4	62 44.7	99 14	171.3	63 14.4	99 14	171.1	63 44.2	99 15	171.0	64 13.9	99 15	170.8	4
05	60 37.6	99 16	169.8	61 07.2	99 17	169.6	61 36.9	99 17	169.5	62 06.5	99 17	169.3	62 36.1	99 17	169.1	63 05.7	99 18	169.0	63 35.3	99 18	168.8	64 04.9	99 18	168.6	05
6	60 27.8	98 19	167.8	60 57.3	98 19	167.6	61 26.8	98 20	167.4	61 56.3	98 20	167.2	62 25.7	98 20	167.0	62 55.2	98 21	166.8	63 24.6	98 21	166.6	63 54.0	98 21	166.4	6
7	60 16.3	98 22	165.8	60 45.6	98 22	165.6	61 15.0	98 23	165.4	61 44.3	98 23	165.2	62 13.5	98 23	164.9	62 42.8	97 24	164.7	63 12.0	97 24	164.4	63 41.2	97 24	164.2	7
8	60 03.1	97 25	163.9	60 32.3	97 25	163.6	61 01.4	97 25	163.3	61 30.5	97 26	163.1	61 59.6	97 26	162.9	62 28.6	97 27	162.6	62 57.6	97 27	162.3	63 26.6	97 27	162.0	8
9	59 48.3	97 27	161.9	60 17.3	96 28	161.7	60 46.2	96 28	161.4	61 15.0	96 28	161.1	61 43.9	96 29	160.8	62 12.7	96 29	160.5	62 41.5	96 30	160.2	63 10.2	96 30	159.9	9
10	59 31.9	96 30	160.0	60 00.6	96 30	159.7	60 29.3	96 31	159.4	60 57.9	95 31	159.1	61 26.5	95 32	158.8	61 55.1	95 32	158.5	62 23.6	95 33	158.2	62 52.0	95 33	157.8	10
1	59 13.9	95 32	158.2	59 42.4	95 33	157.8	60 10.8	95 33	157.5	60 39.2	95 34	157.2	61 07.5	94 34	156.9	61 35.8	94 35	156.5	62 04.1	94 35	156.2	62 32.2	94 36	155.8	1
2	58 54.5	94 35	156.3	59 22.7	94 36	155.8	59 50.8	94 36	155.5	60 19.0	94 36	155.3	60 47.0	93 37	154.9	61 15.0	93 38	154.5	61 42.9	93 38	154.2	62 10.8	93 38	153.8	2
3	58 33.5	93 37	154.5	59 01.5	93 38	154.2	59 29.4	93 38	153.8	59 57.2	93 39	153.4	60 24.9	92 39	153.1	60 52.6	92 40	152.7	61 20.2	92 40	152.3	61 47.8	92 41	151.8	3
4	58 11.2	92 40	152.8	58 38.8	92 40	152.4	59 06.4	92 40	152.0	59 34.0	92 41	151.6	60 01.4	91 42	151.2	60 28.8	91 42	150.8	60 56.1	91 43	150.4	61 23.3	91 43	149.9	4
15	57 47.5	91 42	151.0	58 14.8	91 42	150.6	58 42.1	91 43	150.2	59 09.4	91 43	149.8	59 36.5	90 44	149.4	60 03.5	90 44	149.0	60 30.5	90 45	148.5	60 57.4	89 45	148.1	15
6	57 22.5	90 44	149.3	57 49.5	90 44	148.9	58 16.5	90 45	148.5	58 43.4	90 45	148.1	59 10.2	89 46	147.7	59 37.0	89 46	147.2	60 03.6	89 47	146.8	60 30.1	88 48	146.3	6
7	56 56.2	89 46	147.7	57 22.9	89 46	147.3	57 49.6	89 47	146.8	58 16.2	88 48	146.4	58 42.7	88 48	146.0	59 09.1	88 49	145.5	59 35.4	87 49	145.0	60 01.6	87 50	144.5	7
8	56 28.7	88 48	146.1	56 55.1	88 48	145.6	57 21.5	88 49	145.2	57 47.7	87 49	144.7	58 13.9	87 50	144.3	58 40.0	87 50	143.8	59 05.9	86 51	143.3	59 31.8	86 52	142.8	8
9	56 00.0	87 50	144.5	56 26.1	87 50	144.1	56 52.2	87 51	143.6	57 18.1	86 51	143.1	57 44.0	86 52	142.7	58 09.7	86 52	142.2	58 35.3	85 53	141.7	59 00.8	85 54	141.2	9
20	55 30.2	86 51	143.0	55 56.1	86 52	142.5	56 21.8	86 52	142.0	56 47.4	85 53	141.6	57 12.9	85 54	141.1	57 38.3	84 54	140.6	58 03.5	84 55	140.1	58 28.7	84 55	139.6	20
1	54 59.4	85 54	141.5	55 24.9	85 54	141.0	55 50.3	84 54	140.5	56 15.6	84 55	140.0	56 40.7	84 55	139.5	57 05.8	83 56	139.0	57 30.7	83 56	138.5	57 55.5	82 57	138.0	1
2	54 27.5	84 55	140.0	54 52.7	84 55	139.5	55 17.8	83 56	139.0	55 42.8	83 56	138.6	56 07.6	83 57	138.1	56 32.3	82 57	137.5	56 56.9	82 58	137.0	57 21.4	81 59	136.5	2
3	53 54.7	83 56	138.6	54 19.6	83 57	138.1	54 44.3	82 57	137.6	55 09.0	82 58	137.1	55 33.5	82 58	136.6	55 57.9	81 59	136.1	56 22.1	81 59	135.6	56 46.2	80 60	135.0	3
4	53 21.0	82 58	137.2	53 45.5	82 58	136.7	54 10.0	81 59	136.2	54 34.3	81 59	135.7	54 58.5	80 60	135.2	55 22.5	80 60	134.7	55 46.5	80 61	134.1	56 10.2	79 61	133.6	4
25	52 46.3	81 59	135.8	53 10.6	81 60	135.3	53 34.7	80 61	134.8	53 58.7	80 61	134.3	54 22.6	79 61	133.8	54 46.3	79 62	133.3	55 09.9	78 62	132.7	55 33.4	78 63	132.2	25
6	52 10.8	80 60	134.5	52 34.8	80 61	134.0	52 58.6	79 61	133.5	53 22.3	79 62	133.0	53 45.9	78 62	132.5	54 09.3	78 63	131.9	54 32.6	77 64	131.4	54 55.7	77 64	130.9	6
7	51 34.6	79 62	133.2	51 58.2	79 62	132.7	52 21.7	78 63	132.2	52 45.1	78 63	131.7	53 08.4	77 64	131.2	53 31.5	77 64	130.6	53 54.4	76 65	130.1	54 17.3	76 65	129.5	7
8	50 57.5	78 63	132.0	51 20.9	78 63	131.5	51 44.1	77 64	131.0	52 07.2	77 64	130.4	52 30.1	76 65	129.9	52 52.9	76 65	129.4	53 15.6	75 66	128.8	53 38.1	75 66	128.3	8
9	50 19.7	77 64	130.7	50 42.8	77 65	130.2	51 05.7	76 65	129.7	51 28.5	76 66	129.2	51 51.2	75 66	128.7	52 13.7	75 66	128.1	52 36.1	74 67	127.6	52 58.3	74 67	127.0	9
30	49 41.3	76 65	129.6	50 04.1	76 66	129.1	50 26.7	75 66	128.5	50 49.2	75 67	128.0	51 11.6	74 67	127.5	51 33.8	74 68	126.9	51 55.9	73 68	126.4	52 17.8	73 68	125.8	30
1	49 02.2	75 66	128.4	49 24.7	75 67	127.9	49 47.0	74 67	127.4	50 09.3	74 68	126.9	50 31.3	73 68	126.3	50 53.3	73 69	125.8	51 15.1	72 69	125.2	51 36.7	72 69	124.7	1
2	48 22.4	74 67	127.3	48 44.6	74 68	126.8	49 06.7	73 68	126.2	49 28.7	73 69	125.7	49 50.5	72 69	125.2	50 12.2	72 69	124.7	50 33.7	71 70	124.1	50 55.0	71 70	123.6	2
3	47 42.1	73 68	126.2	48 04.0	73 69	125.7	48 25.9	73 69	125.1	48 47.6	72 69	124.6	49 09.1	72 70	124.1	49 30.5	71 70	123.6	49 51.8	71 71	123.0	50 12.8	70 71	122.5	3
4	47 01.2	73 69	125.1	47 22.9	72 69	124.6	47 44.5	72 70	124.0	48 05.9	71 70	123.5	48 27.2	71 71	123.0	48 48.3	70 71	122.4	49 09.3	70 72	121.9	49 30.1	69 72	121.4	4
35	46 19.7	72 70	124.0	46 41.2	71 70	123.5	47 02.5	71 71	123.0	47 23.7	70 71	122.5	47 44.7	70 72	122.0	48 05.6	69 72	121.4	48 26.4	69 72	120.9	48 46.9	68 73	120.3	35
6	45 37.8	71 71	123.0	45 59.0	70 71	122.5	46 20.1	70 72	122.0	46 41.0	70 72	121.5	47 01.8	69 72	120.9	47 22.5	69 73	120.4	47 42.9	68 73	119.9	48 03.3	68 73	119.3	6
7	44 55.4	70 72	122.0	45 16.3	70 72	121.5	45 37.2	69 72	121.0	45 57.9	69 73	120.5	46 18.4	68 73	120.0	46 38.8	68 73	119.4	46 59.1	67 74	118.9	47 19.2	67 74	118.3	7
8	44 12.5	69 72	121.0	44 33.2	69 73	120.5	44 53.8	68 73	120.0	45 14.3	68 73	119.5	45 34.6	68 74	119.0	45 54.8	67 74	118.5	46 14.8	67 74	117.9	46 34.7	66 75	117.4	8
9	43 29.1	69 73	120.1	43 49.7	68 73	119.6	44 10.0	68 74	119.1	44 30.3	67 74	118.6	44 50.4	67 74	118.0	45 10.4	66 75	117.5	45 30.2	66 75	117.0	45 49.8	65 75	116.4	9
40	42 45.4	68 74	119.2	43 05.7	67 74	118.7	43 25.9	67 74	118.1	43 45.9	67 75	117.6	44 05.8	66 75	117.1	44 25.5	66 75	116.6	44 45.1	65 76	116.1	45 04.6	65 76	115.5	40
1	42 01.3	67 74	118.2	42 21.4	67 75	117.7	42 41.3	66 75	117.2	43 01.1	66 75	116.7	43 20.8	65 76	116.2	43 40.4	65 76	115.7	43 59.8	64 76	115.2	44 19.0	64 76	114.6	1
2	41 16.7	67 75	117.3	41 36.6	66 75	116.9	41 56.4	66 75	116.3	42 16.0	65 76	115.8	42 35.5	65 76	115.3	42 54.9	64 76	114.8	43 14.1	64 77	114.3	43 33.1	63 77	113.7	2
3	40 31.9	66 75	116.5	40 51.6	65 76	116.0	41 11.1	65 76	115.5	41 30.6	65 76	115.0	41 49.9	64 77	114.5	42 09.0	64 77	113.9	42 28.0	63 77	113.4	42 46.9	63 78	112.9	3
4	39 46.7	65 76	115.6	40 06.2	65 76	115.1	40 25.5	64 76	114.6	40 44.8	64 77	114.1	41 03.9	63 77	113.6	41 22.9	63 77	113.1	41 41.7	63 78	112.6	42 00.4	62 78	112.1	4
45	39 01.1	65 76	114.8	39 20.5	64 77	114.3	39 39.6	64 77	113.8	39 58.7	63 77	113.3	40 17.6	63 78	112.8	40 36.4	62 78	112.3	40 55.1	62 78	111.8	41 13.6	62 78	111.2	45
6	38 15.3	64 77	114.0	38 34.4	64 77	113.5	38 53.5	63 77	113.0	39 12.4	63 78	112.5	39 31.1	62 78	112.0	39 49.7	62 78	111.5	40 08.2	61 79	110.9	40 26.6	61 79	110.4	6
7	37 29.2	63 77	113.2	37 48.1	63 78	112.7	38 07.0	62 78	112.2	38 25.7	62 78	111.7	38 44.3	62 78	111.2	39 02.8	61 79	110.7	39 21.1	61 79	110.2	39 39.3	60 79	109.6	7
8	36 42.8	63 78	112.4	37 01.6	62 78	111.9	37 20.3	62 78	111.4	37 38.8	62 79	110.9	37 57.3	61 79	110.4	38 15.6	61 79	109.9	38 33.8	60 79	109.4	38 51.8	60 80	108.9	8
9	35 56.1	62 78	111.6	36 14.8	62 78	111.1	36 33.3	62 79	110.6	36 51.7	61 79	110.1	37 10.0	61 79	109.6	37 28.2	60 79	109.1	37 46.2	60 80	108.6	38 04.1	59 80	108.1	9
50	35 09.2	62 79	110.8	35 27.7	61 79	110.3	35 46.1	61 79	109.9	36 04.3	61 79	109.4	36 22.5	60 80	108.9	36 40.5	60 80	108.4	36 58.4	59 80	107.9	37 16.2	59 80	107.4	50
1	34 22.1	61 79	110.1	34 40.4	61 79	109.6	34 58.6	61 79	109.1	35 16.8	60 80	108.6	35 34.8	60 80	108.1	35 52.7	59 80	107.6	36 10.4	59 80	107.1	36 28.1	59 80	106.6	1
2	33 34.7	61 79	109.3	33 52.9	61 80	108.9	34 11.0	60 80	108.4	34 29.0	60 80	107.9	34 46.8	60 80	107.4	35 04.6	59 80	106.9	35 22.2	59 81	106.4	35 39.7	58 81	105.9	2
3	32 47.1	60 80	108.6	33 05.2	60 80	108.1	33 23.1	60 80	107.7	33 41.0	59 80	107.2	33 58.7	59 80	106.7	34 16.4	59 81	106.2	34 33.9	58 81	105.7	34 51.3	58 81	105.2	3
4	31 59.3	60 80	107.9	32 17.3	60 80	107.4	32 35.1	59 80	107.0	32 52.8	59 81	106.5	33 10.5	59 81	106.0	33 28.0	58 81	105.5	33 45.4	58 81	105.0	34 02.6	57 81	104.5	4
55	31 11.3	60 80	107.2	31 29.2	59 80	106.7	31 46.9	59 81	106.3	32 04.5	59 81	105.8	32 22.0	58 81	105.3	32 39.4	58 81	104.8	32 56.7	57 81	104.3	33 13.9	57 82	103.9	55
6	30 23.2	59 81	106.5	30 40.9	59 81	106.1	30 58.5	59 81	105.6	31 16.0	58 81	105.1	31 33.4	58 81	104.7	31 50.7	57 81	104.2	32 07.9	57 82	103.7	32 24.9	57 82	103.2	6
7	29 34.9	59 81	105.8	29 52.4	58 81	105.4	30 09.9	58 81	104.9	30 27.3	58 81	104.4	30 44.6	57 82	104.0	31 01.8	57 82	103.5	31 18.9	56 82	103.0	31 35.9	56 82	102.5	7
8	28 46.4	58 81	105.2	29 03.9	58 81	104.7	29 21.2	58 81	104.2	29 38.5	57 82	103.8	29 55.7	57 82	103.3	30 12.8	56 82	102.8	30 29.8	56 82	102.3	30 46.7	56 82	101.9	8
9	27 57.7	58 81	104.5	28 15.1	58 81	104.0	28 32.4	57 82	103.6	28 49.6	57 82	103.1	29 06.7	57 82	102.6	29 23.7	56 82	102.2	29 40.6	56 82	101.7	29 57.4	56 82	101.2	9
60	27 08.9	58 82	103.9	27 26.2	57 82	103.4	27 43.4	57 82	102.9	28 00.5	57 82	102.5	28 17.5	56 82	102.0	28 34.4	56 82	101.5	28 51.3	56 83	101.1	29 08.0	55 83	100.6	60
1	26 20.0	57 82	103.2	26 37.2	57 82	102.8	26 54.3	57 82	102.3	27 11.3	56 82	101.8	27 28.3	56 82	101.4	27 45.1	56 82	100.9	28 01.8	55 83	100.4	28 18.5	55 83	100.0	1
2	25 31.0	57 82	102.6	25 48.1	57 82	102.1	26 05.1	57 82	101.7	26 22.0	56 82	101.2	26 38.9	56 82	100.7	26 55.6	55 83	100.3	27 12.3	55 83	99.8	27 28.9	55 83	99.3	2
3	24 41.8	57 82	102.0	24 58.8	57 82	101.5	25 15.8	56 82	101.0	25 32.6	56 83	100.6	25 49.4	56 83	100.1	26 06.1	55 83	99.7	26 22.7	55 83	99.2	26 39.2	55 83	98.7	3
4	23 52.5	57 82	101.3	24 09.5	56 82	100.9	24 26.3	56 83	100.4	24 43.1	56 83	100.0	24 59.8	55 83	99.5	25 16.4	55 83	99.1	25 32.9	55 83	98.6	25 49.4	54 83	98.1	4
65	23 03.1	56 82	100.7	23 20.0	56 83	100.3	23 36.8	56 83	99.8	23 53.5	56 83	99.4	24 10.1	55 83	98.9	24 26.7	55 83	98.4	24 43.1	55 83	98.0	24 59.5	54 83	97.5	65
6	22 13.6	56 83	100.1	22 30.4	56 83	99.7	22 47.2	56 83	99.2	23 03.8	55 83	98.8	23 20.4	55 83	98.3	23 36.9	55 83	97.9	23 53.3	55 83	97.4	24 09.6	54 83	96.9	6
7	21 24.0	56 83	99.5	21 40.8	56 83	99.1	21 57.4	55 83	98.6	22 14.0	55 83	98.2	22 30.5	55 83	97.7	22 47.0	55 83	97.3	23 03.3	54 83	96.8	23 19.6	54 83	96.3	7
8	20 34.4	55 83	98.9	20 51.0	55 83	98.5	21 07.6	55 83	98.0	21 24.2	55 83	97.6	21 40.6	55 83	97.1	21 57.0	54 83	96.7	22 13.4	54 83	96.2	22 29.6	54 83	95.8	8
9	19 44.6	55 83	98.3	20 01.2	55 83	97.9	20 17.8	55 83	97.4	20 34.3	55 83	97.0	20 50.7	54 83	96.5	21 07.0	54 84	96.1	21 23.3	54 84	95.6	21 39.5	54 84	95.2	9
70	18 54.8	55 83	97.7	19 11.4	55 83	97.3	19 27.9	55 83	96.9	19 44.3	55 84	96.4	20 00.7	54 84	96.0	20 17.0	54 84	95.5	20 33.2	54 84	95.1	20 49.4	54 84	94.6	70
1	18 04.9	55 83	97.2	18 21.4	55 83	96.7	18 37.9	55 83	96.3	18 54.3	55 84	95.8	19 10.6	54 84	95.4	19 26.9	54 84	94.9	19 43.1	54 84	94.5	19 59.2	54 84	94.0	1
2	17 14.9	55 83	96.6	17 31.4	55 83	96.1	17 47.8	55 83	95.7	18 04.2	54 84	95.3	18 20.5	54 84	94.8	18 36.7	54 84	94.4	18 52.9	54 84	93.9	19 09.0	54 84	93.5	2
3	16 24.9	55 83	96.0	16 41.4	55 83	95.6	16 57.7	54 84	95.1	17 14.0	54 84	94.7	17 30.3	54 84	94.3	17 46.5	54 84	93.8	18 02.7	54 84	93.4	18 18.7	54 84	92.9	3
4	15 34.9	55 84	95.4	15 51.2	55 83	95.0	16 07.6	54 84	94.6	16 23.9	54 84	94.1	16 40.1	54 84	93.7	16 56.3	54 84	93.2	17 12.4	54 84	92.8	17 28.5	53 84	92.4	4
75	14 44.7	55 84	94.9	15 01.1	54 84	94.4	15 17.4	54 84	94.0	15 33.7	54 84	93.6	15 49.9	54 84	93.1	16 06.0	54 84	92.7	16 22.1	54 84	92.3	16 38.2	53 84	91.8	75
6	13 54.6	54 84	94.3	14 10.9	54 84	93.9	14 27.2	54 84	93.4	14 43.4	54 84	93.0	14 59.6	54 84	92.6	15 15.8	54 84	92.1	15 31.8	54 84	91.7	15 47.9	53 84	91.3	6
7	13 04.4	54 84	93.8	13 20.7	54 84	93.3	13 36.9	54 84	92.9	13 53.2	54 84	92.5	14 09.3	54 84	92.0	14 25.5	54 84	91.6	14 41.5	54 84	91.1	14 57.6	53 84	90.7	7
8	12 14.2	54 84	93.2	12 30.4	54 84	92.8	12 46.7	54 84	92.3	13 02.9	54 84	91.9	13 19.0	54 84	91.5	13 35.2	54 84	91.0	13 51.2	53 84	90.6	14 07.2	53 84	90.2	8
9	11 23.9	54 84	92.6	11 40.2	54 84	92.2	11 56.4	54 84	91.8	12 12.6	54 84	91.4	12 28.7	54 84	90.9	12 44.8	54 84	90.5	13 00.9	53 84	90.1	13 16.9	53 84	89.6	9
80	10 33.6	54 84	92.1	10 49.9	54 84	91.7	11 06.1	54 84	91.2	11 22.3	54 84	90.8	11 38.4	54 84	90.4	11 54.5	54 84	89.9	12 10.6	53 84	89.5	12 26.6	53 84	89.1	80
1	9 43.3	54 84	91.5	9 59.6	54 84	91.1	10 15.8	54 84	90.7	10 32.0	54 84	90.3	10 48.1	54 84	89.8	11 04.2	54 84	89.4	11 20.3	54 84	89.0	11 36.3	53 84	88.5	1
2	8 53.0	54 84	91.0	9 09.3	54 84	90.6	9 25.5	54 84	90.1	9 41.6	54 84	89.7	9 57.8	54 84	89.3	10 13.9	54 84	88.8	10 30.0	54 84	88.4	10 46.0	53 84	88.0	2
3	8 02.7	54 84	90.4	8 18.9	54 84	90.0	8 35.1	54 84	89.6	8 51.3	54 84	89.2	9 07.5	54 84	88.7	9 23.6	54 84	88.3	9 39.7	54 84	87.9	9 55.7	53 84	87.5	3
4	7 12.4	54 84	89.9	7 28.6	54 84	89.5	7 44.8	54 84	89.1	8 01.0	54 84	88.6	8 17.2	54 84	88.2	8 33.3	54 84	87.8	8 49.4	54 84	87.3	9 05.5	54 84	86.9	4
85	6 22.1	54 84	89.4	6 38.3	54 84	88.9	6 54.5	54 84	88.5	7 10.7	54 84	88.1	7 26.9	54 84	87.7	7 43.0	54 84	87.2	7 59.1	54 84	86.8	8 15.2	54 84	86.4	85
6	5 31.7	54 84	88.8	5 48.0	54 84	88.4	6 04.2	54 84	88.0	6 20.4	54 84	87.5	6 36.6	54 84	87.1	6 52.8	54 84	86.7	7 08.9	54 84	86.3	7 25.0	54 84	85.8	6
7							5 13.9	54 84	87.4	5 30.2	54 84	87.0	5 46.4	54 84	86.6	6 02.5	54 84	86.2	6 18.7	54 84	85.7	6 34.9	54 84	85.3	7
8																5 12.4	54 84	85.6	5 28.5	54 84	85.2	5 44.7	54 84	84.8	8

Lat. 33°

H.A.	4° 00′ (Alt · Δd Δt · Az)	4° 30′	5° 00′	5° 30′	6° 00′	6° 30′	7° 00′	7° 30′	H.A.
00	53 00.0 1.00 1 180.0	52 30.0 1.00 1 180.0	52 00.0 1.00 1 180.0	51 30.0 1.00 1 180.0	51 00.0 1.00 1 180.0	50 30.0 1.00 1 180.0	50 00.0 1.00 1 180.0	49 30.0 1.00 1 180.0	00
1	52 59.3 1.00 4 178.3	52 29.3 1.00 4 178.4	51 59.3 1.00 4 178.4	51 29.3 1.00 4 178.4	50 59.3 1.00 3 178.4	50 29.3 1.00 3 178.4	49 59.3 1.00 3 178.5	49 29.3 1.00 3 178.5	1
2	52 57.1 1.00 6 176.7	52 27.1 1.00 6 176.7	51 57.2 1.00 6 176.8	51 27.2 1.00 6 176.8	50 57.2 1.00 6 176.8	50 27.3 1.00 6 176.9	49 57.3 1.00 6 176.9	49 27.3 1.00 6 176.9	2
3	52 53.5 1.00 8 175.0	52 23.5 1.00 8 175.1	51 53.6 1.00 8 175.2	51 23.7 1.00 8 175.2	50 53.8 1.00 8 175.3	50 23.8 1.00 8 175.3	49 53.9 1.00 8 175.4	49 24.0 1.00 8 175.4	3
4	52 48.4 1.01 1 173.4	52 18.5 1.01 1 173.5	51 48.7 1.01 1 173.5	51 18.8 1.01 0 173.6	50 48.9 1.01 0 173.6	50 19.1 1.01 0 173.7	49 49.2 1.01 0 173.8	49 19.3 1.01 0 173.9	4
05	52 41.9 99 13 171.8	52 12.1 99 13 171.8	51 42.3 99 13 171.9	51 12.5 99 13 172.0	50 42.7 99 13 172.1	50 12.9 99 12 172.2	49 43.1 99 12 172.3	49 13.3 99 12 172.4	05
6	52 34.0 99 15 170.1	52 04.3 99 15 170.2	51 34.6 99 15 170.4	51 04.9 99 15 170.5	50 35.2 99 15 170.6	50 05.4 99 15 170.7	49 35.7 99 15 170.8	49 06.0 99 14 170.9	6
7	52 24.6 99 18 168.5	51 55.0 99 18 168.6	51 25.4 99 18 168.8	50 55.8 99 17 168.9	50 26.2 99 17 169.0	49 56.6 99 17 169.2	49 27.0 99 17 169.3	48 57.4 99 16 169.4	7
8	52 13.9 98 20 166.9	51 44.4 98 20 167.1	51 15.0 98 20 167.4	50 45.5 98 19 167.4	50 16.0 98 19 167.5	49 46.5 98 19 167.8	49 16.5 98 19 167.8	48 47.5 98 19 167.9	8
9	52 01.8 98 22 165.3	51 32.5 98 22 165.5	51 03.2 98 22 165.8	50 33.8 98 22 165.8	50 04.5 98 21 166.0	49 35.1 98 21 166.1	49 05.7 98 21 166.3	48 36.3 98 21 166.4	9
10	51 48.4 97 25 163.7	51 19.2 97 24 163.9	50 50.0 97 24 164.1	50 20.8 97 24 164.3	49 51.6 97 24 164.5	49 22.4 97 23 164.6	48 53.1 98 23 164.8	48 23.9 98 23 165.0	10
1	51 33.6 97 27 162.2	51 04.6 97 26 162.4	50 35.6 97 26 162.6	50 06.6 97 26 162.8	49 37.5 97 26 163.0	49 08.4 97 25 163.2	48 39.3 97 25 163.3	48 10.2 97 25 163.5	1
2	51 17.6 96 29 160.6	50 48.8 96 28 160.9	50 19.9 96 28 161.1	49 52.1 96 28 161.3	49 22.1 96 28 161.5	48 53.2 96 27 161.7	48 24.3 96 27 161.9	47 55.3 97 27 162.1	2
3	51 00.3 95 31 159.1	50 31.6 95 31 159.3	50 03.0 95 31 159.6	49 34.3 96 30 159.8	49 05.6 96 30 160.0	48 36.8 96 30 160.2	48 08.0 96 29 160.5	47 40.8 96 29 160.7	3
4	50 41.7 95 33 157.6	50 13.3 95 33 157.9	49 44.8 95 32 158.1	49 16.3 95 32 158.3	48 47.8 95 32 158.6	48 19.2 95 31 158.8	47 50.6 95 31 159.0	47 22.0 95 31 159.3	4
15	50 21.9 94 35 156.1	49 53.7 94 35 156.4	49 25.4 94 34 156.6	48 57.1 94 34 156.9	48 28.8 94 34 157.2	48 00.4 95 33 157.4	47 32.1 95 33 157.6	47 03.6 95 33 157.9	15
6	50 01.0 93 37 154.7	49 33.0 93 36 154.9	49 04.9 94 36 155.2	48 36.8 94 36 155.5	48 07.4 94 35 155.7	47 40.5 94 35 156.0	47 12.3 94 35 156.3	46 44.1 94 34 156.5	6
7	49 38.9 93 39 153.2	49 11.1 93 38 153.5	48 43.3 93 38 153.8	48 15.4 93 38 154.1	47 47.5 93 37 154.3	47 19.5 93 37 154.6	46 51.5 93 38 154.9	46 23.5 94 36 155.1	7
8	49 15.6 92 41 151.8	48 48.1 92 40 152.1	48 20.5 92 40 152.4	47 52.8 92 39 152.7	47 25.2 92 39 153.0	46 57.4 93 39 153.3	46 29.6 93 38 153.5	46 01.8 93 38 153.8	8
9	48 51.3 91 42 150.4	48 24.0 91 42 150.7	47 56.7 91 41 151.0	47 29.2 91 41 151.3	47 01.8 92 41 151.6	46 34.3 92 40 151.9	46 06.7 92 40 152.2	45 39.1 92 40 152.5	9
20	48 26.0 90 44 149.1	47 58.9 90 44 149.4	47 31.8 91 43 149.7	47 04.6 91 43 150.0	46 37.4 91 42 150.3	46 10.1 91 42 150.6	45 42.7 91 42 150.9	45 15.4 91 41 151.2	20
1	47 59.6 89 46 147.7	47 32.8 90 45 148.4	47 05.9 90 45 148.4	46 38.9 90 44 148.7	46 11.0 90 44 149.0	45 44.9 90 44 149.3	45 17.8 90 43 149.6	44 50.6 91 43 149.9	1
2	47 32.2 89 47 146.4	47 05.6 89 47 146.7	46 39.0 89 46 147.1	46 12.3 89 46 147.4	45 45.5 89 46 147.7	45 18.7 89 45 148.0	44 51.9 90 45 148.4	44 24.9 90 44 148.7	2
3	47 03.9 88 49 145.1	46 37.6 88 48 145.4	46 11.2 88 48 145.8	45 44.7 88 48 146.1	45 18.2 88 47 146.5	44 51.9 89 47 146.8	44 25.0 89 46 147.1	43 58.3 89 46 147.4	3
4	46 34.7 87 50 143.8	46 08.6 87 50 144.2	45 42.4 87 49 144.5	45 16.2 87 49 144.9	44 49.9 88 49 145.2	44 23.6 88 48 145.6	43 57.2 88 48 145.9	43 30.8 88 47 146.2	4
25	46 04.5 86 52 142.6	45 38.7 86 51 142.9	45 12.8 86 51 143.3	44 46.8 87 50 143.7	44 20.8 87 50 144.0	43 54.7 87 50 144.3	43 28.6 87 49 144.7	43 02.4 87 49 145.0	25
6	45 33.5 85 53 141.4	45 07.9 85 53 141.7	44 42.3 86 52 142.1	44 16.6 86 52 142.5	43 50.8 86 51 142.8	43 25.0 86 51 143.2	42 59.4 86 51 143.5	42 33.1 87 50 143.8	6
7	45 01.7 84 54 140.2	44 36.4 84 54 140.5	44 11.0 85 54 140.9	43 45.5 85 53 141.3	43 20.0 85 53 141.6	42 54.4 85 52 142.0	42 28.7 86 52 142.3	42 03.0 86 52 142.7	7
8	44 29.0 83 56 139.0	44 04.0 84 55 139.4	43 38.8 84 54 139.7	43 13.6 84 54 140.1	42 48.3 84 54 140.5	42 23.0 85 54 140.8	41 57.6 85 53 141.2	41 32.1 85 53 141.6	8
9	43 55.6 83 57 137.8	43 30.8 83 56 138.2	43 05.9 83 56 138.6	42 41.0 83 56 139.0	42 15.9 84 55 139.3	41 50.8 84 55 139.7	41 25.7 84 54 140.1	41 00.4 84 54 140.4	9
30	43 21.5 82 58 136.7	42 56.9 82 58 137.1	42 32.3 82 57 137.4	42 07.6 82 57 137.9	41 42.8 83 56 138.2	41 17.9 83 56 138.6	40 53.0 83 56 139.0	40 28.3 83 55 139.3	30
1	42 46.6 81 59 135.6	42 22.3 81 59 136.0	41 57.9 81 58 136.4	41 33.4 82 58 136.8	41 08.9 82 58 137.1	40 44.3 82 57 137.5	40 19.6 82 57 137.9	39 54.9 83 56 138.3	1
2	42 11.0 80 60 134.5	41 47.0 80 60 134.9	41 22.8 81 60 135.3	40 58.6 81 59 135.7	40 34.3 81 59 136.1	40 10.0 81 58 136.4	39 45.5 82 58 136.8	39 21.0 82 58 137.2	2
3	41 34.8 79 61 133.4	41 11.0 79 61 133.8	40 47.1 80 61 134.2	40 23.1 80 60 134.6	39 59.1 80 60 135.0	39 35.0 81 59 135.4	39 10.9 81 59 135.8	38 46.5 81 59 136.2	3
4	40 57.9 78 62 132.4	40 34.4 79 62 132.8	40 10.7 79 62 133.2	39 47.0 79 61 133.6	39 23.2 79 61 134.0	38 59.3 80 60 134.4	38 35.9 80 60 134.8	38 11.3 80 60 135.1	4
35	40 20.4 78 63 131.4	39 57.1 78 63 131.8	39 33.7 78 63 132.2	39 10.2 78 62 132.6	38 46.7 79 62 133.0	38 23.0 79 61 133.4	37 59.3 79 61 133.8	37 35.5 79 61 134.1	35
6	39 42.4 77 64 130.3	39 19.3 77 64 130.8	38 56.1 77 64 131.2	38 32.9 77 63 131.6	38 09.6 78 63 132.0	37 46.2 79 62 132.4	37 22.7 78 62 132.8	36 59.1 79 62 133.2	6
7	39 03.8 76 65 129.4	38 40.9 76 65 129.8	38 18.0 77 65 130.2	37 55.0 77 64 130.6	37 31.9 77 64 131.0	37 08.7 77 63 131.4	36 45.4 78 63 131.8	36 22.1 78 63 132.2	7
8	38 24.6 76 66 128.4	38 02.0 76 66 128.8	37 39.3 76 65 129.2	37 16.5 76 65 129.6	36 53.6 76 65 130.0	36 30.7 77 64 130.4	36 07.6 77 64 130.8	35 44.5 77 64 131.2	8
9	37 44.9 74 67 127.4	37 22.5 75 67 127.9	37 00.0 76 66 128.3	36 37.5 76 66 128.7	36 14.8 76 66 129.1	35 52.1 76 65 129.5	35 29.3 76 65 129.9	35 06.4 76 64 130.3	9
40	37 04.7 74 68 126.5	36 42.5 74 67 126.9	36 20.3 74 67 127.4	35 57.9 75 67 127.8	35 35.5 75 66 128.2	35 13.0 75 66 128.6	34 50.4 75 66 129.0	34 27.8 76 65 129.4	40
1	36 24.0 73 69 125.6	36 02.1 73 68 126.0	35 40.0 74 68 126.4	35 17.9 74 68 126.9	34 55.7 74 67 127.3	34 33.4 74 67 127.7	34 11.1 75 66 128.1	33 48.6 75 66 128.5	1
2	35 42.9 72 69 124.7	35 21.1 73 69 125.1	34 59.3 73 69 125.5	34 37.4 73 68 126.0	34 15.4 73 68 126.4	33 53.4 74 68 126.8	33 31.2 74 67 127.2	33 09.0 74 67 127.6	2
3	35 01.3 72 70 123.8	34 39.8 72 70 124.2	34 18.2 72 69 124.7	33 56.5 73 69 125.1	33 34.7 73 69 125.5	33 12.8 73 68 125.9	32 50.9 73 68 126.3	32 28.9 74 68 126.7	3
4	34 19.3 71 71 123.0	33 57.9 71 70 123.4	33 36.6 71 70 123.8	33 15.1 72 70 124.2	32 53.5 72 69 124.6	32 31.9 72 69 125.1	32 10.1 73 69 125.5	31 48.3 73 68 125.9	4
45	33 36.8 70 71 122.1	33 15.7 70 71 122.5	32 54.5 71 71 123.0	32 33.3 71 70 123.4	32 11.9 71 70 123.8	31 50.5 72 70 124.2	31 28.9 72 69 124.6	31 07.5 72 69 125.0	45
6	32 54.0 70 72 121.3	32 33.1 70 72 121.7	32 12.1 70 71 122.1	31 51.0 70 71 122.5	31 29.9 71 71 123.0	31 08.6 71 71 123.4	30 47.3 71 70 123.8	30 25.9 71 70 124.2	6
7	32 10.8 69 73 120.5	31 50.1 69 72 120.9	31 29.3 69 73 121.3	31 08.4 70 72 121.7	30 47.5 70 71 122.2	30 26.4 70 71 122.6	30 05.5 71 71 123.0	29 44.1 71 70 123.4	7
8	31 27.3 68 73 119.7	31 06.7 69 73 120.1	30 46.1 69 73 120.5	30 25.4 69 72 120.9	30 04.7 70 72 121.3	29 43.8 70 72 121.8	29 22.9 70 71 122.2	29 01.9 70 71 122.6	8
9	30 43.4 68 74 118.9	30 23.0 68 73 119.3	30 02.6 68 73 119.7	29 42.1 68 73 120.1	29 21.5 69 73 120.6	29 00.8 69 72 121.0	28 40.1 69 72 121.4	28 19.3 69 72 121.8	9
50	29 59.1 67 74 118.1	29 39.0 67 74 118.5	29 18.7 68 74 118.9	28 58.4 68 74 119.4	28 38.0 68 73 119.8	28 17.5 68 73 120.2	27 57.0 69 72 120.6	27 36.3 69 72 121.0	50
1	29 14.6 66 75 117.3	28 54.6 67 74 117.7	28 34.5 67 74 118.2	28 14.4 67 74 118.6	27 54.2 68 74 119.0	27 33.9 68 73 119.4	27 13.5 68 73 119.8	26 53.0 68 73 120.2	1
2	28 29.7 66 75 116.6	28 09.9 66 75 116.9	27 50.0 66 75 117.4	27 30.0 67 74 117.8	27 10.0 67 74 118.3	26 49.9 67 74 118.7	26 29.7 67 74 119.1	26 09.4 68 73 119.5	2
3	27 44.6 65 76 115.8	27 24.9 66 75 116.2	27 05.2 66 75 116.7	26 45.4 66 75 117.1	26 25.5 66 75 117.5	26 05.6 66 74 117.9	25 45.5 67 74 118.3	25 25.5 67 74 118.8	3
4	26 59.1 65 76 115.1	26 39.6 65 76 115.5	26 20.1 65 76 115.9	26 00.4 65 76 116.4	25 40.7 66 75 116.8	25 21.0 66 75 117.2	25 01.1 66 75 117.6	24 41.2 67 74 118.0	4
55	26 13.4 64 77 114.4	25 54.1 65 76 114.8	25 34.7 65 76 115.2	25 15.2 65 76 115.6	24 55.7 66 76 116.1	24 36.1 66 75 116.5	24 16.4 66 75 116.9	23 56.6 66 75 117.3	55
6	25 27.5 64 77 113.7	25 08.3 64 77 114.1	24 49.0 64 77 114.5	24 29.7 65 76 114.9	24 10.5 65 76 115.3	23 50.9 65 76 115.8	23 31.3 65 76 116.2	23 11.8 65 75 116.6	6
7	24 41.2 63 77 113.0	24 22.2 63 77 113.4	24 03.1 64 77 113.8	23 44.0 64 77 114.2	23 24.7 64 76 114.6	23 05.4 64 76 115.1	22 46.1 65 76 115.5	22 26.6 65 76 115.9	7
8	23 54.8 63 78 112.3	23 35.9 63 78 112.7	23 17.0 63 77 113.1	22 57.9 64 77 113.5	22 38.9 64 77 114.0	22 19.7 64 77 114.4	22 00.5 64 76 114.8	21 41.2 64 76 115.2	8
9	23 08.1 62 78 111.6	22 49.4 63 78 112.0	22 30.6 63 78 112.4	22 11.7 63 77 112.9	21 52.8 63 77 113.3	21 33.7 63 77 113.7	21 14.7 64 77 114.1	20 55.6 64 77 114.5	9
60	22 21.2 62 78 110.9	22 02.6 62 78 111.3	21 43.9 62 78 111.8	21 25.2 63 78 112.2	21 06.4 63 78 112.6	20 47.6 63 77 113.0	20 28.8 63 77 113.4	20 09.7 63 77 113.8	60
1	21 34.1 61 79 110.3	21 15.6 62 79 110.7	20 57.1 62 78 111.1	20 38.5 62 78 111.5	20 19.8 62 78 112.0	20 01.1 63 78 112.3	19 42.3 63 78 112.8	19 23.5 63 77 113.2	1
2	20 46.8 61 79 109.6	20 28.5 61 79 110.0	20 10.0 61 79 110.4	19 51.6 62 78 110.9	19 33.1 62 78 111.3	19 14.5 62 78 111.7	18 55.8 62 78 112.1	18 37.1 62 78 112.5	2
3	19 59.3 61 79 108.9	19 41.1 61 79 109.4	19 22.8 61 79 109.8	19 04.5 61 79 110.2	18 46.1 61 79 110.6	18 27.6 62 78 111.0	18 09.1 62 78 111.5	17 50.5 62 78 111.9	3
4	19 11.6 60 80 108.3	18 53.5 60 80 108.7	18 35.4 61 79 109.2	18 17.1 61 79 109.6	17 58.9 61 79 110.0	17 40.5 61 79 110.4	17 22.2 61 79 110.8	17 03.7 62 78 111.2	4
65	18 23.8 60 80 107.7	18 05.8 60 80 108.1	17 47.7 60 80 108.5	17 29.6 60 79 109.0	17 11.5 61 79 109.4	16 53.3 61 79 109.8	16 35.0 61 79 110.2	16 16.7 61 79 110.6	65
6	17 35.7 59 80 107.1	17 17.9 60 80 107.5	16 59.9 60 80 107.9	16 41.9 60 80 108.3	16 23.9 60 80 108.7	16 05.8 60 79 109.1	15 47.7 60 79 109.6	15 29.5 61 79 110.0	6
7	16 47.5 59 81 106.4	16 29.8 59 80 106.9	16 12.0 60 80 107.3	15 54.1 60 80 107.7	15 36.2 60 80 108.1	15 18.2 60 80 108.5	15 00.2 60 80 108.9	14 42.2 60 79 109.3	7
8	15 59.2 59 81 105.8	15 41.5 59 81 106.2	15 23.8 59 80 106.7	15 06.1 59 80 107.1	14 48.3 59 80 107.5	14 30.4 60 80 107.9	14 12.5 60 80 108.3	13 54.6 60 80 108.7	8
9	15 10.7 58 81 105.2	14 53.2 58 81 105.6	14 35.5 59 81 106.0	14 17.9 59 81 106.5	14 00.2 59 80 106.9	13 42.5 59 80 107.3	13 24.7 59 80 107.7	13 06.8 60 80 108.1	9
70	14 22.1 58 81 104.6	14 04.6 58 81 105.0	13 47.1 58 81 105.4	13 29.6 59 81 105.9	13 12.0 59 81 106.3	12 54.3 59 81 106.7	12 36.7 59 81 107.1	12 18.9 59 80 107.5	70
1	13 33.3 58 81 104.0	13 16.0 58 81 104.4	12 58.5 58 81 104.8	12 41.1 58 81 105.3	12 23.6 58 81 105.7	12 06.1 59 81 106.1	11 48.5 59 81 106.5	11 30.9 59 81 106.9	1
2	12 44.4 58 82 103.4	12 27.2 58 82 103.8	12 09.8 58 81 104.2	11 52.5 58 81 104.7	11 35.1 58 81 105.1	11 17.6 58 81 105.5	11 00.2 58 81 105.9	10 42.7 58 81 106.3	2
3	11 55.4 57 82 102.8	11 38.2 57 82 103.3	11 21.0 58 81 103.7	11 03.7 58 81 104.1	10 46.4 58 81 104.5	10 29.1 58 81 104.9	10 11.7 58 81 105.3	9 54.3 58 81 105.7	3
4	11 06.3 57 82 102.3	10 49.2 57 82 102.7	10 32.0 57 82 103.1	10 14.9 57 82 103.5	9 57.6 57 82 103.9	9 40.4 58 81 104.3	9 23.1 58 81 104.8	9 05.8 58 81 105.2	4
75	10 17.1 57 82 101.7	10 00.1 57 82 102.1	9 43.0 57 82 102.5	9 25.9 57 82 102.9	9 08.7 57 82 103.3	8 51.6 57 82 103.8	8 34.4 57 81 104.2	8 17.2 57 81 104.6	75
6	9 27.8 57 82 101.1	9 10.8 57 82 101.5	8 53.8 57 82 101.9	8 36.5 57 82 102.4	8 19.7 57 82 102.8	8 02.6 57 82 103.2	7 45.5 57 82 103.6	7 28.4 57 82 104.0	6
7	8 38.3 56 83 100.5	8 21.4 56 83 100.9	8 04.5 56 82 101.4	7 47.6 57 82 101.8	7 30.6 57 82 102.2	7 13.6 57 82 102.6	6 56.6 57 82 103.0	6 39.5 57 82 103.4	7
8	7 48.8 56 83 100.0	7 32.0 56 83 100.4	7 15.1 56 82 100.8	6 58.3 56 83 101.2	6 41.4 56 82 101.6	6 24.4 56 82 102.0	6 07.5 57 82 102.5	5 50.5 57 82 102.9	8
9	6 59.2 56 83 99.4	6 42.5 56 83 99.8	6 25.7 56 83 100.2	6 08.8 56 82 100.7	5 52.0 56 82 101.1	5 35.2 56 82 101.5	5 18.3 56 82 101.9	5 01.4 56 82 102.3	9
80	6 09.5 56 83 98.8	5 52.8 56 83 99.3	5 36.1 56 83 99.7	5 19.4 56 83 100.1	5 02.6 56 83 100.5				80
1	5 19.8 55 83 98.3	5 03.1 56 83 98.7							1

Lat. 34°
Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

Lat. 33°

Columns within each declination heading: Alt. / Δd Δt / Az.

H.A.	8° 00'	8° 30'	9° 00'	9° 30'	10° 00'	10° 30'	11° 00'	11° 30'	H.A.
00	65 00.0 1.00 2 180.0	65 30.0 1.00 2 180.0	66 00.0 1.00 2 180.0	66 30.0 1.00 2 180.0	67 00.0 1.00 2 180.0	67 30.0 1.00 2 180.0	68 00.0 1.00 2 180.0	68 30.0 1.00 2 180.0	00
1	64 59.0 1.00 5 177.7	65 29.0 1.00 5 177.6	65 58.9 1.00 5 177.6	66 28.9 1.00 5 177.5	66 58.9 1.00 6 177.5	67 28.9 1.00 6 177.4	67 58.8 1.00 6 177.4	68 28.8 1.00 6 177.3	1
2	64 55.9 1.00 9 175.3	65 25.8 1.00 9 175.2	65 55.7 1.00 9 175.2	66 25.7 1.00 9 175.1	66 55.6 1.00 9 175.0	67 25.5 1.00 9 174.9	67 55.4 1.0 10 174.8	68 25.3 1.0 10 174.7	2
3	64 50.8 99 12 173.0	65 20.6 99 12 172.9	65 50.4 99 12 172.7	66 20.3 99 13 172.6	66 50.1 99 13 172.5	67 19.9 99 13 172.2	67 49.7 99 13 172.2	68 19.5 99 14 172.0	3
4	64 43.6 99 15 170.7	65 13.3 99 15 170.5	65 43.0 99 16 170.4	66 12.7 99 16 170.2	66 42.4 99 16 170.0	67 12.1 99 17 169.8	67 41.7 99 17 169.6	68 11.4 99 17 169.4	4
05	64 34.5 99 18 168.4	65 04.0 99 19 168.2	65 33.6 99 19 168.0	66 03.1 98 19 167.8	66 32.6 98 20 167.5	67 02.1 98 20 167.3	67 31.5 98 21 167.1	68 01.0 98 21 166.8	05
6	64 23.4 98 22 166.1	64 52.8 98 22 165.9	65 22.1 98 22 165.7	65 51.4 98 23 165.4	66 20.7 98 23 165.1	66 50.0 97 24 164.9	67 19.2 97 24 164.6	67 48.4 97 24 164.3	6
7	64 10.4 97 25 163.9	64 39.6 97 25 163.6	65 08.7 97 26 163.4	65 37.8 97 26 163.1	66 06.8 97 26 162.8	66 35.8 97 27 162.4	67 04.8 96 27 162.1	67 33.7 96 28 161.8	7
8	63 55.5 96 28 161.4	64 24.4 96 28 161.1	64 53.3 96 29 160.8	65 22.1 96 29 160.4	65 50.9 96 30 160.1	66 19.8 96 30 159.7	66 48.3 96 31 159.3	67 16.9 95 31 159.3	8
9	63 38.9 95 31 159.6	64 07.5 95 31 159.2	64 36.1 95 32 158.9	65 04.6 95 32 158.5	65 33.1 95 33 158.1	66 01.5 95 33 157.8	66 29.9 94 34 157.4	66 58.2 94 34 156.9	9
10	63 20.4 95 34 157.5	63 48.8 94 34 157.1	64 17.1 94 35 156.7	64 45.3 94 35 156.3	65 13.5 94 36 155.9	65 41.6 94 36 155.5	66 09.6 93 37 155.1	66 37.5 93 37 154.6	10
1	63 00.3 94 36 155.4	63 28.4 93 37 155.0	63 56.3 93 37 154.6	64 24.2 93 38 154.2	64 52.1 93 38 153.7	65 19.8 92 39 153.3	65 47.5 92 40 152.8	66 15.1 92 40 152.3	1
2	62 38.6 93 39 153.4	63 06.3 93 39 153.0	63 33.9 92 40 152.5	64 01.5 92 41 152.1	64 29.0 91 41 151.6	64 56.4 91 42 151.0	65 23.6 91 42 150.6	65 50.8 90 43 150.1	2
3	62 15.3 91 41 151.4	62 42.6 91 42 151.0	63 09.9 91 43 150.5	63 37.1 91 43 150.0	64 04.3 90 44 149.6	64 31.3 90 44 149.1	64 58.2 90 45 148.5	65 25.0 90 45 148.0	3
4	61 50.4 90 44 149.5	62 17.5 90 44 149.0	62 44.4 90 45 148.6	63 11.3 89 46 148.1	63 38.0 89 46 147.6	64 04.6 89 47 147.0	64 31.2 89 48 146.5	64 57.5 89 48 145.9	4
15	61 24.2 89 46 147.6	61 50.8 89 47 147.1	62 17.5 88 47 146.6	62 43.9 88 48 146.1	63 10.3 88 48 145.6	63 36.5 87 49 145.1	64 02.7 87 50 144.5	64 28.6 86 50 143.9	15
6	60 56.6 88 48 145.8	61 22.9 88 49 145.3	61 49.1 87 49 144.8	62 15.2 87 50 144.3	62 41.2 86 51 143.7	63 07.0 86 51 143.2	63 32.8 85 52 142.6	63 58.3 85 53 142.0	6
7	60 27.6 87 50 144.0	60 53.6 86 51 143.5	61 19.5 86 52 142.5	61 45.2 86 52 142.5	62 10.8 85 53 141.9	62 36.2 85 53 141.3	63 01.6 84 54 140.7	63 26.7 84 55 140.1	7
8	59 57.5 86 52 142.3	60 23.1 85 53 141.8	60 48.6 85 53 141.3	61 13.9 84 54 140.7	61 39.1 84 55 140.1	62 04.2 83 55 139.4	62 29.1 83 56 139.0	62 53.9 82 57 138.3	8
9	59 26.2 84 54 140.7	59 51.4 84 55 140.1	60 16.5 83 55 139.6	60 41.5 83 56 139.0	61 06.3 83 57 138.4	61 31.0 82 57 137.8	61 55.5 81 58 137.2	62 19.8 81 59 136.6	9
20	58 53.7 83 56 139.0	59 18.6 83 56 138.5	59 43.3 82 57 137.9	60 07.9 82 58 137.4	60 32.4 81 58 136.8	60 56.7 81 59 136.2	61 20.8 80 60 135.6	61 44.7 80 60 134.9	20
1	58 20.2 82 58 137.5	58 44.7 82 58 136.9	59 09.1 81 59 136.3	59 33.3 81 59 135.8	59 57.4 80 60 135.2	60 21.3 79 61 134.6	60 45.0 79 61 133.9	61 08.6 78 62 133.3	1
2	57 45.7 81 59 135.9	58 09.9 80 60 135.4	58 33.9 80 60 134.8	58 57.7 79 61 134.2	59 21.4 79 61 133.6	59 45.0 78 62 133.0	60 08.3 78 63 132.4	60 31.5 77 63 131.7	2
3	57 10.2 80 61 134.5	57 34.0 79 61 133.9	57 57.7 79 62 133.3	58 21.2 78 62 132.7	58 44.6 78 63 132.1	59 07.7 77 64 131.5	59 30.7 76 64 130.9	59 53.6 76 65 130.2	3
4	56 33.9 79 62 133.0	56 57.4 78 63 132.5	57 20.7 77 63 131.9	57 43.8 77 64 131.3	58 06.8 76 64 130.7	58 29.6 76 65 130.1	58 52.3 75 65 129.4	59 14.7 74 66 128.8	4
25	55 56.7 77 63 131.6	56 19.8 77 64 131.1	56 42.8 76 64 130.5	57 05.6 76 65 129.9	57 28.3 75 66 129.3	57 50.7 75 66 128.7	58 13.0 74 67 128.0	58 35.1 73 67 127.4	25
6	55 18.7 76 65 130.3	55 41.5 76 65 129.7	56 04.1 75 66 129.1	56 26.6 75 66 128.5	56 49.0 74 67 127.9	57 11.1 73 67 127.3	57 33.0 73 68 126.7	57 54.8 72 68 126.0	6
7	54 39.9 75 66 129.0	55 02.4 75 66 128.4	55 24.8 74 67 127.8	55 46.9 74 67 127.2	56 08.9 73 68 126.6	56 30.7 72 68 126.0	56 52.3 72 69 125.4	57 13.8 71 69 124.7	7
8	54 00.5 74 67 127.7	54 22.6 74 67 127.1	54 44.7 73 68 126.6	55 06.5 73 68 126.0	55 28.2 72 69 125.3	55 49.7 71 69 124.7	56 11.0 71 70 124.1	56 32.1 70 70 123.5	8
9	53 20.3 73 68 126.5	53 42.2 73 68 125.9	54 03.9 72 69 125.3	54 25.5 72 69 124.7	54 46.8 71 70 124.1	55 08.0 70 70 123.5	55 29.0 70 71 122.9	55 49.8 69 71 122.2	9
30	52 39.5 72 69 125.3	53 01.1 72 69 124.7	53 22.6 71 70 124.1	53 43.8 71 70 123.5	54 04.9 70 71 122.9	54 25.8 69 71 122.3	54 46.5 69 72 121.7	55 07.0 68 72 121.1	30
1	51 58.2 71 70 124.1	52 19.5 71 70 123.5	52 40.6 70 71 123.0	53 01.6 70 71 122.4	53 22.4 69 72 121.8	53 43.0 68 72 121.2	54 03.4 68 73 120.5	54 23.6 67 73 119.9	1
2	51 16.2 70 71 123.0	51 37.3 70 71 122.4	51 58.1 69 72 121.8	52 18.8 69 72 121.2	52 39.3 68 73 120.6	52 59.7 67 73 120.0	53 19.8 67 73 119.4	53 39.7 66 74 118.8	2
3	50 33.8 69 72 121.9	50 54.5 69 72 121.3	51 15.1 68 72 120.7	51 35.6 68 73 120.2	51 55.9 67 73 119.6	52 15.9 67 74 119.0	52 35.7 66 74 118.3	52 55.4 65 75 117.7	3
4	49 50.8 69 72 120.8	50 11.3 68 73 120.3	50 31.6 68 73 119.7	50 51.8 67 74 119.1	51 11.8 66 74 118.5	51 31.6 66 74 117.9	51 51.2 65 75 117.3	52 10.7 64 75 116.7	4
35	49 07.4 68 73 119.8	49 27.6 67 74 119.2	49 47.7 67 74 118.6	50 07.6 66 74 118.1	50 27.4 66 75 117.5	50 46.9 65 75 116.9	51 06.3 64 76 116.3	51 25.5 64 76 115.7	35
6	48 23.5 67 74 118.8	48 43.5 66 74 118.2	49 03.3 66 75 117.6	49 23.0 65 75 117.1	49 42.5 65 75 116.5	50 01.8 64 76 115.9	50 21.0 63 76 115.3	50 39.9 63 76 114.7	6
7	47 39.1 66 75 117.8	47 58.9 66 75 117.2	48 18.6 65 75 116.7	48 38.0 64 76 116.1	48 57.3 64 76 115.5	49 16.4 63 76 114.9	49 35.3 63 77 114.3	49 54.0 62 77 113.7	7
8	46 54.4 65 75 116.8	47 14.0 65 76 116.3	47 33.4 64 76 115.7	47 52.6 64 76 115.1	48 11.7 63 77 114.6	48 30.6 63 77 114.0	48 49.3 62 77 113.4	49 07.8 61 78 112.8	8
9	46 09.3 65 76 115.9	46 28.7 64 76 115.3	46 47.9 64 76 114.8	47 06.9 63 77 114.2	47 25.8 63 77 113.6	47 44.4 62 77 113.1	48 02.9 61 78 112.5	48 21.3 61 78 111.9	9
40	45 23.9 64 76 115.0	45 43.0 64 77 114.4	46 02.0 63 77 113.9	46 20.8 62 77 113.3	46 39.5 62 78 112.7	46 58.0 61 78 112.2	47 16.3 61 78 111.6	47 34.4 60 79 111.0	40
1	44 38.1 63 77 114.1	44 57.1 63 77 113.5	45 15.9 62 77 113.0	45 34.5 62 78 112.4	45 52.9 61 78 111.9	46 11.2 61 78 111.3	46 29.4 60 79 110.7	46 47.3 60 79 110.1	1
2	43 52.0 63 77 113.2	44 10.8 62 78 112.7	44 29.4 62 78 112.1	44 47.8 61 78 111.6	45 06.1 61 78 111.0	45 24.2 60 79 110.4	45 42.2 60 79 109.9	45 59.9 59 79 109.3	2
3	43 05.6 62 78 112.4	43 24.2 62 78 111.8	43 42.6 61 78 111.3	44 00.9 61 79 110.7	44 19.0 60 79 110.2	44 36.9 60 79 109.6	44 54.7 59 79 109.0	45 12.3 58 80 108.5	3
4	42 19.0 61 79 111.5	42 37.4 61 79 110.9	42 55.6 60 79 110.4	43 13.7 60 79 109.9	43 31.6 60 79 109.3	43 49.4 58 80 108.8	44 07.0 58 80 108.2	44 24.5 58 80 107.7	4
45	41 32.0 61 79 110.7	41 50.2 61 79 110.2	42 08.3 60 79 109.6	42 26.3 60 79 109.1	42 44.0 59 80 108.5	43 01.7 58 80 108.0	43 19.1 58 80 107.4	43 36.4 57 80 106.9	45
6	40 44.8 60 79 109.9	41 02.9 60 79 109.4	41 20.8 60 80 108.8	41 38.6 59 80 108.3	41 56.2 59 80 107.8	42 13.7 58 80 107.2	42 31.0 57 80 106.7	42 48.2 57 81 106.1	6
7	39 57.4 60 79 109.1	40 15.3 60 80 108.6	40 33.1 59 80 108.1	40 50.7 59 80 107.5	41 08.2 58 80 107.0	41 25.5 58 81 106.5	41 42.7 57 81 105.9	41 59.7 56 81 105.4	7
8	39 09.7 59 80 108.4	39 27.5 59 80 107.8	39 45.1 59 80 107.3	40 02.6 58 80 106.8	40 20.0 58 81 106.2	40 37.2 57 81 105.7	40 54.2 57 81 105.2	41 11.1 56 81 104.6	8
9	38 21.9 59 80 107.6	38 39.5 59 80 107.1	38 57.0 58 81 106.6	39 14.4 58 81 106.0	39 31.6 57 81 105.5	39 48.7 57 81 105.0	40 05.6 56 81 104.4	40 22.4 56 82 103.9	9
50	37 33.8 59 80 106.9	37 51.3 58 81 106.4	38 08.7 58 81 105.8	38 25.9 57 81 105.3	38 43.0 57 81 104.8	39 00.0 56 81 104.3	39 16.8 56 82 103.7	39 33.4 55 82 103.2	50
1	36 45.6 58 81 106.1	37 02.9 58 81 105.6	37 20.2 57 81 105.1	37 37.3 57 81 104.6	37 54.3 56 81 104.1	38 11.1 56 82 103.6	38 27.8 55 82 103.0	38 44.4 55 82 102.5	1
2	35 57.1 58 81 105.4	36 14.4 57 81 104.9	36 31.5 57 81 104.4	36 48.5 56 82 103.9	37 05.4 56 82 103.4	37 22.1 56 82 102.9	37 38.7 55 82 102.3	37 55.2 55 82 101.8	2
3	35 08.5 57 81 104.7	35 25.7 57 81 104.2	35 42.7 57 82 103.7	35 59.6 56 82 103.2	36 16.4 56 82 102.7	36 33.0 55 82 102.2	36 49.5 55 82 101.7	37 05.9 54 83 101.2	3
4	34 19.8 57 81 104.0	34 36.8 57 82 103.5	34 53.8 56 82 103.0	35 10.6 56 82 102.5	35 27.2 55 82 102.0	35 43.8 55 82 101.5	36 00.2 54 82 101.0	36 16.4 54 83 100.5	4
55	33 30.9 57 82 103.4	33 47.9 56 82 102.9	34 04.7 56 82 102.4	34 21.4 55 82 101.9	34 37.9 55 82 101.4	34 54.4 55 82 100.8	35 10.7 54 83 100.3	35 26.9 54 83 99.8	55
6	32 41.9 56 82 102.7	32 58.7 56 82 102.2	33 15.5 56 82 101.7	33 32.1 55 82 101.2	33 48.6 55 82 100.7	34 04.9 54 83 100.2	34 21.2 54 83 99.7	34 37.3 53 83 99.2	6
7	31 52.7 56 82 102.0	32 09.5 56 82 101.5	32 26.1 55 82 101.1	32 42.7 55 82 100.6	32 59.1 54 83 100.1	33 15.3 54 83 99.6	33 31.5 54 83 99.1	33 47.5 53 83 98.5	7
8	31 03.5 56 82 101.4	31 20.1 55 82 100.9	31 36.7 55 83 100.4	31 53.1 54 83 99.9	32 09.5 54 83 99.4	32 25.7 54 83 98.9	32 41.8 53 83 98.4	32 57.7 53 83 97.9	8
9	30 14.1 55 82 100.7	30 30.7 55 83 100.3	30 47.1 55 83 99.8	31 03.5 54 83 99.3	31 19.8 54 83 98.8	31 35.9 54 83 98.3	31 52.0 53 83 97.8	32 07.9 53 83 97.3	9
60	29 24.6 55 83 100.1	29 41.1 55 83 99.6	29 57.5 55 83 99.1	30 13.8 54 83 98.7	30 30.0 54 83 98.2	30 46.1 53 83 97.7	31 02.1 53 83 97.2	31 17.9 53 83 96.7	60
1	28 35.0 55 83 99.5	28 51.4 55 83 99.0	29 07.8 54 83 98.5	29 24.0 54 83 98.1	29 40.2 54 83 97.6	29 56.2 53 83 97.1	30 12.1 53 83 96.6	30 27.9 53 83 96.1	1
2	27 45.3 55 83 98.9	28 01.7 54 83 98.4	28 18.0 54 83 97.9	28 34.2 54 83 97.4	28 50.2 53 83 97.0	29 06.2 53 83 96.5	29 22.1 53 83 96.0	29 37.9 52 84 95.5	2
3	26 55.6 55 83 98.3	27 11.9 54 83 97.8	27 28.1 54 83 97.3	27 44.2 54 83 96.8	28 00.3 53 83 96.4	28 16.2 53 83 95.9	28 32.0 53 84 95.4	28 47.7 52 84 94.9	3
4	26 05.7 54 83 97.7	26 22.0 54 83 97.2	26 38.2 54 83 96.7	26 54.2 53 83 96.2	27 10.2 53 83 95.8	27 26.1 53 84 95.3	27 41.9 52 84 94.8	27 57.6 52 84 94.3	4
65	25 15.8 54 83 97.1	25 32.0 54 83 96.6	25 48.2 54 83 96.1	26 04.2 53 83 95.7	26 20.1 53 83 95.2	26 36.0 53 84 94.7	26 51.7 52 84 94.2	27 07.4 52 84 93.8	65
6	24 25.9 54 83 96.5	24 42.0 54 83 96.0	24 58.1 53 84 95.5	25 14.1 53 84 95.1	25 30.0 53 84 94.6	25 45.8 52 84 94.1	26 01.5 52 84 93.7	26 17.2 52 84 93.2	6
7	23 35.8 54 83 95.9	23 52.0 53 84 95.4	24 08.0 53 84 95.0	24 24.0 53 84 94.5	24 39.8 52 84 94.0	24 55.6 52 84 93.6	25 11.3 52 84 93.1	25 26.9 52 84 92.6	7
8	22 45.8 54 84 95.3	23 01.8 53 84 94.9	23 17.8 53 84 94.4	23 33.8 53 84 93.9	23 49.6 52 84 93.5	24 05.4 52 84 93.0	24 21.0 52 84 92.5	24 36.6 52 84 92.1	8
9	21 55.6 54 84 94.7	22 11.7 53 84 94.3	22 27.7 53 84 93.8	22 43.6 53 84 93.4	22 59.4 52 84 92.9	23 15.1 52 84 92.4	23 30.8 52 84 92.0	23 46.3 52 84 91.5	9
70	21 05.5 54 84 94.2	21 21.5 53 84 93.7	21 37.4 53 84 93.3	21 53.3 53 84 92.8	22 09.1 52 84 92.3	22 24.8 52 84 91.9	22 40.5 52 84 91.4	22 56.0 52 84 91.0	70
1	20 15.3 53 84 93.6	20 31.3 53 84 93.2	20 47.2 53 84 92.7	21 03.0 52 84 92.2	21 18.8 52 84 91.8	21 34.5 52 84 91.3	21 50.2 52 84 90.9	22 05.7 52 84 90.4	1
2	19 25.0 53 84 93.0	19 41.0 53 84 92.6	19 56.9 53 84 92.1	20 12.7 52 84 91.7	20 28.5 52 84 91.2	20 44.2 52 84 90.8	20 59.8 52 84 90.3	21 15.4 52 84 89.9	2
3	18 34.8 53 84 92.5	18 50.7 53 84 92.0	19 06.6 53 84 91.6	19 22.4 52 84 91.1	19 38.2 52 84 90.7	19 53.9 52 84 90.2	20 09.5 52 84 89.8	20 25.1 52 84 89.3	3
4	17 44.5 53 84 91.9	18 00.4 53 84 91.5	18 16.3 53 84 91.0	18 32.1 52 84 90.6	18 47.9 52 84 90.1	19 03.6 52 84 89.7	19 19.2 52 84 89.2	19 34.8 52 84 88.8	4
75	16 54.2 53 84 91.4	17 10.1 53 84 90.9	17 26.0 53 84 90.5	17 41.8 52 84 90.0	17 57.6 52 84 89.6	18 13.3 52 84 89.1	18 28.9 52 84 88.7	18 44.5 52 84 88.2	75
6	16 03.9 53 84 90.8	16 19.8 53 84 90.4	16 35.7 53 84 89.9	16 51.5 52 84 89.5	17 07.2 52 84 89.0	17 22.9 52 84 88.6	17 38.6 52 84 88.1	17 54.2 52 84 87.7	6
7	15 13.5 53 84 90.3	15 29.5 53 84 89.8	15 45.3 53 84 89.4	16 01.2 52 84 88.9	16 16.9 52 84 88.5	16 32.6 52 84 88.1	16 48.3 52 84 87.6	17 03.9 52 84 87.2	7
8	14 23.2 53 84 89.7	14 39.2 53 84 89.3	14 55.0 53 84 88.9	15 10.9 52 84 88.4	15 26.6 52 84 88.0	15 42.4 52 84 87.5	15 58.0 52 84 87.1	16 13.7 52 84 86.6	8
9	13 32.9 53 84 89.2	13 48.8 53 84 88.8	14 04.7 53 84 88.3	14 20.6 52 84 87.9	14 36.4 52 84 87.4	14 52.1 52 84 87.0	15 07.8 52 84 86.6	15 23.4 52 84 86.1	9
80	12 42.6 53 84 88.6	12 58.5 53 84 88.2	13 14.4 53 84 87.8	13 30.3 52 84 87.3	13 46.1 52 84 86.9	14 01.9 52 84 86.5	14 17.6 52 84 86.0	14 33.2 52 84 85.6	80
1	11 52.3 53 84 88.1	12 08.3 53 84 87.7	12 24.2 53 84 87.2	12 40.0 52 84 86.8	12 55.9 52 84 86.4	13 11.7 52 84 85.9	13 27.4 52 84 85.5	13 43.1 52 84 85.1	1
2	11 02.0 53 84 87.6	11 18.0 53 84 87.1	11 33.9 53 84 86.7	11 49.8 52 84 86.3	12 05.7 52 84 85.8	12 21.5 52 84 85.4	12 37.2 52 83 85.0	12 53.0 52 83 84.5	2
3	10 11.7 53 84 87.0	10 27.7 53 84 86.6	10 43.7 53 84 86.2	10 59.6 52 84 85.7	11 15.5 52 84 85.3	11 31.3 52 84 84.9	11 47.1 52 83 84.4	12 02.9 52 83 84.0	3
4	9 21.5 53 84 86.5	9 37.5 53 84 86.1	9 53.5 53 84 85.6	10 09.4 52 84 85.2	10 25.4 52 84 84.8	10 41.2 52 83 84.3	10 57.1 52 83 83.9	11 12.9 52 83 83.5	4
85	8 31.3 54 84 86.0	8 47.3 53 84 85.5	9 03.3 53 84 85.1	9 19.3 53 83 84.7	9 35.3 53 83 84.2	9 51.2 53 83 83.8	10 07.1 53 83 83.4	10 22.9 53 83 83.0	85
6	7 41.1 54 84 85.4	7 57.2 54 84 85.0	8 13.2 53 84 84.6	8 29.2 53 83 84.1	8 45.2 53 83 83.7	9 01.2 53 83 83.3	9 17.1 53 83 82.9	9 33.0 53 83 82.5	6
7	6 51.0 54 84 84.9	7 07.1 54 83 84.5	7 23.2 54 83 84.0	7 39.2 53 83 83.6	7 55.2 53 83 83.2	8 11.2 53 83 82.8	8 27.2 53 83 82.3	8 43.2 53 83 81.9	7
8	6 00.9 54 83 84.4	6 17.0 54 83 83.9	6 33.1 54 83 83.5	6 49.2 54 83 83.1	7 05.3 54 83 82.7	7 21.4 53 83 82.2	7 37.4 53 83 81.8	7 53.4 53 83 81.4	8
9	5 10.8 54 83 83.8	5 27.0 54 83 83.4	5 43.2 54 83 83.0	5 59.3 54 83 82.5	6 15.4 54 83 82.1	6 31.5 54 83 81.7	6 47.6 54 83 81.3	7 03.7 53 83 80.8	9
90				5 09.4 54 83 82.0	5 25.6 54 83 81.6	5 41.8 54 83 81.2	5 57.9 54 83 80.7	6 14.0 54 83 80.3	90

Lat. 33°

H.A.	Alt 8°00'	Δd Δt	Az	Alt 8°30'	Δd Δt	Az	Alt 9°00'	Δd Δt	Az	Alt 9°30'	Δd Δt	Az	Alt 10°00'	Δd Δt	Az	Alt 10°30'	Δd Δt	Az	Alt 11°00'	Δd Δt	Az	Alt 11°30'	Δd Δt	Az	H.A.
00	49 00.0	1.0 01	180.0	48 30.0	1.0 01	180.0	48 00.0	1.0 01	180.0	47 30.0	1.0 01	180.0	47 00.9	1.0 01	180.0	46 30.0	1.0 01	180.0	46 00.0	1.0 01	180.0	45 30.0	1.0 01	180.0	00
1	48 59.3	1.0 03	178.5	48 29.3	1.0 03	178.5	47 59.4	1.0 03	178.5	47 29.4	1.0 03	178.6	46 59.4	1.0 03	178.6	46 29.4	1.0 03	178.6	45 59.4	1.0 03	178.6	45 29.4	1.0 03	178.6	1
2	48 57.4	1.0 06	177.0	48 27.4	1.0 05	177.0	47 57.4	1.0 05	177.0	47 27.4	1.0 05	177.1	46 57.5	1.0 05	177.1	46 27.5	1.0 05	177.1	45 57.5	1.0 05	177.2	45 27.5	1.0 05	177.2	2
3	48 54.0	1.0 06	175.5	48 24.1	1.0 06	175.5	47 54.2	1.0 06	175.6	47 24.2	1.0 07	175.6	46 54.3	1.0 07	175.7	46 24.3	1.0 07	175.7	45 54.4	1.0 07	175.8	45 24.5	1.0 07	175.8	3
4	48 49.4	1.0 10	174.0	48 19.5	1.0 10	174.0	47 49.6	1.0 10	174.1	47 19.8	1.0 10	174.2	46 49.9	1.0 09	174.2	46 20.0	1.0 09	174.3	45 50.1	1.0 09	174.3	45 20.2	1.0 09	174.4	4
05	48 43.5	99 12	172.5	48 13.7	99 12	172.6	47 43.8	99 12	172.6	47 14.0	99 12	172.8	46 44.2	99 12	172.8	46 14.4	99 11	172.9	45 44.5	99 11	173.0	45 14.7	99 11	173.0	05
6	48 36.3	99 14	171.0	48 06.5	99 14	171.1	47 36.8	99 14	171.2	47 07.0	99 14	171.3	46 37.3	99 14	171.4	46 07.5	99 13	171.5	45 37.8	99 13	171.6	45 08.0	99 13	171.7	6
7	48 27.7	99 16	169.5	47 58.1	99 16	169.6	47 28.4	99 16	169.7	46 58.8	99 16	169.9	46 29.1	99 16	170.0	45 59.4	99 15	170.1	45 29.8	99 15	170.2	45 00.1	99 15	170.3	7
8	48 17.9	98 18	168.0	47 48.4	98 18	168.2	47 18.9	99 18	168.3	46 49.3	99 18	168.4	46 19.7	99 18	168.6	45 50.2	99 17	168.7	45 20.6	99 17	168.8	44 51.0	99 17	168.9	8
9	48 06.9	98 20	166.6	47 37.5	98 20	166.7	47 08.0	98 20	166.9	46 38.5	99 20	167.0	46 09.1	98 20	167.2	45 39.7	98 19	167.3	45 10.2	98 19	167.4	44 40.7	98 19	167.6	9
10	47 54.6	98 23	165.1	47 25.3	98 22	165.3	46 56.0	98 22	165.5	46 26.7	98 22	165.6	45 57.4	98 22	165.8	45 28.0	98 21	165.9	44 58.7	98 21	166.1	44 29.3	98 21	166.2	10
1	47 41.1	97 25	163.7	47 11.9	97 24	163.9	46 42.8	97 24	164.0	46 13.6	97 24	164.2	45 44.4	97 24	164.4	45 15.2	97 23	164.5	44 46.0	97 23	164.7	44 16.7	97 23	164.9	1
2	47 26.4	97 26	162.3	46 57.4	97 26	162.5	46 28.3	97 26	162.7	45 59.3	97 26	162.8	45 30.3	97 25	163.0	45 01.2	97 25	163.2	44 32.1	97 25	163.4	44 03.0	97 25	163.5	2
3	47 10.5	96 28	160.9	46 41.6	96 28	161.1	46 12.8	96 28	161.3	45 43.9	96 28	161.5	45 15.0	96 27	161.7	44 46.1	96 27	161.8	44 17.2	96 27	162.0	43 48.2	96 26	162.2	3
4	46 53.4	95 30	159.5	46 24.7	96 30	159.7	45 56.0	96 30	159.9	45 27.3	96 29	160.1	44 58.6	96 29	160.3	44 29.9	96 29	160.5	44 01.1	96 29	160.7	43 32.3	96 28	160.9	4
15	46 35.2	95 32	158.1	46 06.7	95 32	158.3	45 38.2	95 32	158.6	45 09.7	95 31	158.8	44 41.1	95 31	159.0	44 12.5	95 31	159.2	43 43.9	95 30	159.4	43 15.3	95 30	159.6	15
6	46 15.9	94 34	156.7	45 47.6	94 34	157.0	45 19.3	94 33	157.2	44 50.9	95 33	157.5	44 22.5	95 33	157.7	43 54.1	95 32	157.9	43 25.7	95 32	158.1	42 57.3	95 32	158.3	6
7	45 55.5	94 36	155.4	45 27.4	94 35	155.7	44 59.2	94 35	155.9	44 31.1	94 35	156.1	44 02.9	94 34	156.4	43 34.7	94 34	156.6	43 06.4	94 34	156.9	42 38.2	94 34	157.1	7
8	45 34.0	93 38	154.1	45 06.1	93 37	154.3	44 38.2	93 37	154.6	44 10.2	93 36	154.9	43 42.2	93 36	155.1	43 14.2	93 36	155.4	42 46.2	94 35	155.6	42 18.1	94 35	155.8	8
9	45 11.5	92 39	152.8	44 43.8	92 39	153.0	44 16.1	92 38	153.3	43 48.3	93 38	153.6	43 20.5	93 38	153.8	42 52.7	93 37	154.1	42 24.9	93 37	154.3	41 57.0	93 37	154.6	9
20	44 47.9	91 41	151.5	44 20.5	92 40	151.8	43 53.0	92 40	152.1	43 25.4	92 40	152.3	42 57.9	92 39	152.6	42 30.2	92 39	152.9	42 02.6	92 39	153.1	41 34.9	92 38	153.4	20
1	44 23.4	91 42	150.2	43 56.2	91 42	150.5	43 28.9	91 42	150.8	43 01.6	91 41	151.1	42 34.2	91 41	151.4	42 06.8	91 41	151.6	41 39.4	92 40	151.9	41 11.9	92 40	152.2	1
2	43 58.0	91 44	149.0	43 31.0	90 44	149.3	43 03.9	90 43	149.6	42 36.8	90 43	149.9	42 09.6	91 42	150.2	41 42.5	91 42	150.4	41 15.2	91 42	150.7	40 47.9	91 41	151.0	2
3	43 31.6	89 46	147.7	43 04.8	89 45	148.1	42 38.0	90 45	148.4	42 11.1	90 44	148.7	41 44.1	90 44	149.0	41 17.2	90 44	149.3	40 50.2	90 43	149.5	40 23.1	90 43	149.8	3
4	43 04.3	88 47	146.5	42 37.7	89 47	146.9	42 11.1	89 46	147.2	41 44.5	89 46	147.5	41 17.8	89 45	147.8	40 51.0	89 45	148.1	40 24.2	89 45	148.4	39 57.4	90 44	148.7	4
25	42 36.1	88 48	145.4	42 10.0	88 49	145.7	41 43.4	88 48	146.0	41 17.0	88 47	146.3	40 50.5	88 47	146.6	40 24.0	88 46	146.9	39 57.4	89 46	147.2	39 30.8	89 46	147.5	25
6	42 07.1	87 50	144.2	41 41.0	87 49	144.5	41 14.8	87 49	144.8	40 48.6	87 49	145.2	40 22.4	88 48	145.5	39 56.1	88 48	145.8	39 29.7	88 47	146.1	39 03.3	88 47	146.4	6
7	41 37.2	86 51	143.0	41 11.4	86 51	143.4	40 45.5	86 50	143.7	40 19.5	87 50	144.0	39 53.5	87 50	144.4	39 27.4	87 49	144.7	39 01.3	87 49	145.0	38 35.1	87 48	145.3	7
8	41 06.6	85 52	141.9	40 40.9	85 52	142.2	40 15.3	86 52	142.6	39 49.5	86 51	142.9	39 23.8	86 51	143.3	38 57.9	86 50	143.6	38 32.0	86 50	143.9	38 06.1	87 50	144.2	8
9	40 35.1	84 54	140.8	40 09.8	85 53	141.1	39 44.3	85 53	141.5	39 18.8	85 52	141.8	38 53.3	85 52	142.2	38 27.7	85 52	142.5	38 02.0	86 51	142.8	37 36.3	86 51	143.2	9
30	40 02.9	84 55	139.7	39 37.8	84 54	140.1	39 12.6	84 54	140.4	38 47.4	84 54	140.8	38 22.0	84 53	141.1	37 56.7	85 53	141.4	37 31.2	85 52	141.8	37 05.7	85 52	142.1	30
1	39 30.0	83 56	138.6	39 05.1	83 56	139.0	38 40.2	83 55	139.3	38 15.2	84 55	139.7	37 50.1	84 54	140.0	37 24.9	84 54	140.4	36 59.7	84 54	140.7	36 34.5	84 53	141.1	1
2	38 56.4	82 57	137.6	38 31.8	82 57	137.9	38 07.0	83 56	138.3	37 42.3	83 56	138.7	37 17.4	83 56	139.0	36 52.5	83 55	139.4	36 27.5	83 55	139.7	36 02.5	84 54	140.0	2
3	38 22.1	81 58	136.5	37 57.7	82 58	136.9	37 33.2	82 57	137.3	37 08.7	82 57	137.6	36 44.1	82 57	138.0	36 19.4	83 56	138.3	35 54.6	83 56	138.7	35 29.8	83 56	139.0	3
4	37 47.2	80 59	135.5	37 23.0	81 59	135.9	36 58.8	81 58	136.3	36 34.4	81 58	136.6	36 10.1	81 58	137.0	35 45.6	82 57	137.3	35 21.1	82 57	137.7	34 56.5	82 57	138.1	4
35	37 11.6	80 60	134.5	36 47.7	80 60	134.9	36 23.7	80 60	135.3	35 59.6	80 59	135.6	35 35.4	81 59	136.0	35 11.2	81 58	136.4	34 46.9	81 58	136.7	34 22.6	81 58	137.1	35
6	36 35.5	79 61	133.5	36 11.7	79 61	133.9	35 47.9	79 61	134.3	35 24.1	80 60	134.7	35 00.2	80 60	135.0	34 36.2	80 59	135.4	34 12.1	80 59	135.8	33 48.0	81 59	136.1	6
7	35 58.7	78 62	132.6	35 35.2	78 62	133.0	35 11.5	79 61	133.3	34 48.0	79 61	133.7	34 24.3	79 61	134.1	34 00.5	79 60	134.5	33 36.7	80 60	134.8	33 12.8	80 60	135.2	7
8	35 21.3	77 63	131.6	34 58.1	78 63	132.0	34 34.8	78 62	132.4	34 11.3	78 62	132.8	33 47.9	78 62	133.2	33 24.3	79 61	133.5	33 00.7	79 61	133.9	32 37.1	79 61	134.3	8
9	34 43.5	77 64	130.7	34 20.4	77 64	131.1	33 57.3	77 63	131.5	33 34.1	77 63	131.8	33 10.9	78 62	132.2	32 47.6	78 62	132.6	32 24.2	78 62	133.0	32 00.7	78 61	133.3	9
40	34 05.0	76 65	129.8	33 42.2	76 65	130.2	33 19.3	76 64	130.6	32 56.4	77 64	130.9	32 33.4	77 63	131.3	32 10.3	77 63	131.7	31 47.1	77 63	132.1	31 23.9	78 62	132.4	40
1	33 26.1	75 66	128.9	33 03.5	75 65	129.3	32 40.9	76 65	129.7	32 18.1	76 65	130.1	31 55.3	76 64	130.4	31 32.4	76 64	130.8	31 09.5	77 64	131.2	30 46.5	77 63	131.6	1
2	32 46.7	74 66	128.0	32 24.3	75 66	128.4	32 01.9	75 66	128.8	31 39.3	75 65	129.2	31 16.6	75 65	129.6	30 54.1	76 65	129.9	30 31.4	76 64	130.3	30 08.6	76 64	130.7	2
3	32 06.8	74 67	127.1	31 44.6	74 67	127.5	31 22.4	74 67	127.9	31 00.1	74 66	128.3	30 37.7	75 66	128.7	30 15.3	75 66	129.1	29 52.8	75 65	129.5	29 30.2	75 65	129.9	3
4	31 26.5	73 68	126.3	31 04.5	73 68	126.7	30 42.5	74 67	127.1	30 20.4	74 67	127.5	29 58.2	74 67	127.8	29 36.0	74 66	128.2	29 13.7	74 66	128.6	28 51.3	75 66	129.0	4
45	30 45.7	72 69	125.4	30 23.9	73 68	125.8	30 02.1	73 68	126.2	29 40.2	73 68	126.6	29 18.2	73 68	127.0	28 56.2	74 67	127.4	28 34.1	74 67	127.8	28 12.0	74 66	128.2	45
6	30 04.4	72 69	124.6	29 42.9	72 69	125.0	29 21.3	72 69	125.4	28 59.6	72 68	125.8	28 37.8	73 68	126.2	28 16.0	73 68	126.6	27 53.9	73 67	127.0	27 32.2	73 67	127.4	6
7	29 22.8	71 70	123.8	29 01.5	71 70	124.2	28 40.1	72 69	124.6	28 18.6	72 69	125.0	27 57.0	72 69	125.4	27 35.4	72 68	125.8	27 13.7	72 68	126.2	26 52.0	73 68	126.5	7
8	28 40.8	70 71	123.0	28 19.7	71 71	123.4	27 58.4	71 70	123.8	27 37.2	71 70	124.2	27 15.8	71 69	124.6	26 54.4	72 69	125.0	26 32.9	72 69	125.4	26 11.3	72 68	125.8	8
9	27 58.4	70 71	122.2	27 37.5	70 71	122.6	27 16.4	70 71	123.0	26 55.3	70 70	123.4	26 34.2	71 70	123.8	26 12.9	71 69	124.2	25 51.6	71 69	124.6	25 30.3	71 69	125.0	9
50	27 15.6	69 72	121.4	26 54.9	69 72	121.8	26 34.0	70 71	122.2	26 13.1	70 71	122.6	25 52.2	70 71	123.0	25 31.1	70 70	123.4	25 10.0	70 70	123.8	24 48.9	71 70	124.2	50
1	26 32.5	68 72	120.7	26 11.9	69 72	121.1	25 51.3	69 72	121.5	25 30.6	69 72	121.9	25 09.8	69 71	122.3	24 48.9	70 71	122.7	24 28.0	70 71	123.1	24 07.1	70 70	123.4	1
2	25 49.1	68 73	119.9	25 28.7	68 73	120.3	25 08.2	68 72	120.7	24 47.7	69 72	121.1	24 27.1	69 72	121.5	24 06.4	69 71	121.9	23 45.7	69 71	122.3	23 24.9	69 71	122.7	2
3	25 05.3	67 74	119.2	24 45.1	67 73	119.6	24 24.8	68 73	120.0	24 04.4	68 73	120.4	23 44.0	68 72	120.8	23 23.5	68 72	121.2	23 03.0	69 72	121.6	22 42.4	69 71	122.0	3
4	24 21.2	67 74	118.4	24 01.1	67 74	118.8	23 41.0	67 73	119.2	23 20.8	67 73	119.6	23 00.6	68 73	120.0	22 40.3	68 72	120.4	22 19.9	68 72	120.8	21 59.5	68 72	121.2	4
55	23 36.8	66 74	117.7	23 16.9	66 74	118.1	22 57.0	67 74	118.5	22 37.0	67 74	118.9	22 16.9	67 73	119.3	21 56.8	67 73	119.7	21 36.6	67 73	120.1	21 16.3	68 72	120.5	55
6	22 51.4	66 75	117.0	22 32.4	66 75	117.4	22 12.6	66 74	117.8	21 52.8	66 74	118.2	21 32.9	66 74	118.6	21 12.9	67 73	119.0	20 52.9	67 73	119.4	20 32.8	67 73	119.8	6
7	22 07.1	65 76	116.3	21 47.6	65 75	116.7	21 28.0	65 75	117.1	21 08.3	66 75	117.5	20 48.6	66 74	117.9	20 28.8	66 74	118.3	20 08.9	66 74	118.7	19 49.0	66 74	119.1	7
8	21 21.9	65 76	115.6	21 02.5	65 76	116.0	20 43.0	65 75	116.4	20 23.5	65 75	116.8	20 04.0	65 75	117.2	19 44.3	66 75	117.6	19 24.7	66 74	118.0	19 04.9	66 74	118.4	8
9	20 36.4	64 76	114.9	20 17.1	64 76	115.3	19 57.8	64 76	115.7	19 38.5	65 76	116.2	19 19.1	65 75	116.6	18 59.6	65 75	117.0	18 40.1	65 75	117.4	18 20.5	65 74	117.8	9
60	19 50.6	64 77	114.3	19 31.5	64 76	114.7	19 12.4	64 76	115.1	18 53.2	64 76	115.5	18 33.9	64 76	115.9	18 14.6	64 75	116.3	17 55.3	65 75	116.7	17 35.9	65 75	117.1	60
1	19 04.6	63 77	113.6	18 45.7	63 77	114.0	18 26.7	63 77	114.4	18 07.6	64 76	114.8	17 48.5	64 76	115.2	17 29.4	64 76	115.6	17 10.2	64 76	116.0	16 50.9	64 75	116.4	1
2	18 18.4	63 77	112.9	17 59.6	63 77	113.3	17 40.7	63 77	113.8	17 21.8	63 77	114.2	17 02.9	63 76	114.6	16 43.9	63 76	115.0	16 24.8	64 76	115.4	16 05.7	64 76	115.8	2
3	17 31.9	62 78	112.3	17 13.3	62 78	112.7	16 54.6	62 77	113.1	16 35.8	63 77	113.5	16 17.0	63 77	113.9	15 58.2	63 77	114.3	15 39.3	63 76	114.7	15 20.3	63 76	115.1	3
4	16 45.3	62 78	111.6	16 26.7	62 78	112.1	16 08.2	62 78	112.5	15 49.6	62 77	112.9	15 30.9	62 77	113.3	15 12.2	62 77	113.7	14 53.4	63 77	114.1	14 34.6	63 76	114.5	4
65	15 58.4	61 78	111.0	15 40.0	61 78	111.4	15 21.6	62 78	111.8	15 03.1	62 78	112.2	14 44.6	62 78	112.6	14 26.0	62 77	113.0	14 07.4	62 77	113.5	13 48.7	62 77	113.9	65
6	15 11.3	61 79	110.4	14 53.1	61 79	110.8	14 34.8	61 78	111.2	14 16.4	61 78	111.6	13 58.0	61 78	112.0	13 39.6	62 78	112.4	13 21.1	62 77	112.8	13 02.6	62 77	113.2	6
7	14 24.1	60 79	109.8	14 05.9	61 79	110.2	13 47.7	61 79	110.6	13 29.5	61 78	111.0	13 11.3	61 78	111.4	12 53.0	61 78	111.8	12 34.6	61 78	112.2	12 16.2	62 77	112.6	7
8	13 36.6	60 79	109.1	13 18.6	60 79	109.6	13 00.5	60 79	110.0	12 42.4	60 79	110.4	12 24.3	61 79	110.8	12 06.1	61 78	111.2	11 47.9	61 78	111.6	11 29.7	61 78	112.0	8
9	12 49.0	60 80	108.5	12 31.1	60 79	108.9	12 13.1	60 79	109.4	11 55.2	60 79	109.8	11 37.2	60 79	110.2	11 19.1	60 79	110.6	11 01.0	61 79	111.0	10 42.9	61 78	111.4	9
70	12 01.2	59 80	107.9	11 43.4	59 80	108.3	11 25.6	59 80	108.8	11 07.7	60 79	109.2	10 49.8	60 79	109.6	10 31.9	60 79	110.0	10 14.0	60 79	110.4	9 56.0	60 79	110.8	70
1	11 13.2	59 80	107.3	10 55.6	59 80	107.7	10 37.9	59 80	108.2	10 20.1	59 80	108.6	10 02.3	59 79	109.0	9 44.5	59 79	109.4	9 26.7	59 79	109.8	9 08.9	60 79	110.2	1
2	10 25.1	59 80	106.7	10 07.6	59 80	107.2	9 50.0	59 80	107.6	9 32.3	59 80	108.0	9 14.7	59 80	108.4	8 57.0	59 80	108.8	8 39.3	59 79	109.2	8 21.5	59 79	109.6	2
3	9 36.9	58 81	106.2	9 19.4	58 80	106.6	9 01.9	58 80	107.0	8 44.4	58 80	107.4	8 26.8	59 80	107.8	8 09.3	59 80	108.2	7 51.7	59 80	108.6	7 34.1	59 79	109.0	3
4	8 48.5	58 81	105.6	8 31.1	58 81	106.0	8 13.7	58 81	106.4	7 56.3	58 80	106.8	7 38.9	58 80	107.2	7 21.4	58 80	107.6	7 03.9	58 80	108.0	6 46.4	58 80	108.5	4
75	7 59.9	58 81	105.0	7 42.7	58 81	105.4	7 25.4	58 81	105.8	7 08.1	58 81	106.2	6 50.7	58 80	106.6	6 33.4	58 80	107.1	6 16.0	58 80	107.5	5 58.6	58 80	107.9	75
6	7 11.3	57 81	104.4	6 54.1	57 81	104.8	6 36.9	57 81	105.3	6 19.7	57 81	105.7	6 02.4	57 81	106.1	5 45.2	58 81	106.5	5 27.9	58 80	106.9	5 10.6	58 80	107.3	6
7	6 22.5	57 82	103.9	6 05.4	57 81	104.3	5 48.3	57 81	104.7	5 31.2	57 81	105.1	5 14.0	57 81	105.5										7
8	5 33.5	57 82	103.3	5 16.6	57 82	103.7																			8

Lat. 34°   Lat. 35°   Lat. 36°   Lat. 37°   Lat. 38°

DECLINATION SAME NAME AS LATITUDE

H.A.	Alt 8°00'	Δd Δt	Az	Alt 8°30'	Δd Δt	Az	Alt 9°00'	Δd Δt	Az	Alt 9°30'	Δd Δt	Az	Alt 10°00'	Δd Δt	Az	Alt 10°30'	Δd Δt	Az	Alt 11°00'	Δd Δt	Az	Alt 11°30'	Δd Δt	Az	H.A.
91																			5 06.3	54 83	80.2	5 24.5	54 82	79.8	91

Lat. 33°

H.A.	12°00' Alt.	Δd	Δt	Az.	12°30' Alt.	Δd	Δt	Az.	13°00' Alt.	Δd	Δt	Az.	13°30' Alt.	Δd	Δt	Az.	14°00' Alt.	Δd	Δt	Az.	14°30' Alt.	Δd	Δt	Az.	15°00' Alt.	Δd	Δt	Az.	15°30' Alt.	Δd	Δt	Az.	H.A.
00	69 00.0	1.0	02	180.0	69 30.0	1.0	02	180.0	70 00.0	1.0	02	180.0	70 30.0	1.0	02	180.0	71 00.0	1.0	02	180.0	71 30.0	1.0	02	180.0	72 00.0	1.0	02	180.0	72 30.0	1.0	02	180.0	00
1	68 58.1	1.0	06	177.3	69 28.1	1.0	06	177.2	69 58.1	1.0	06	177.1	70 28.1	1.0	06	177.1	70 58.1	1.0	06	177.0	71 28.1	1.0	07	176.9	71 58.1	1.0	07	176.9	72 28.1	1.0	07	176.8	1
2	68 55.2	1.0	10	174.6	69 25.1	1.0	10	174.4	69 55.0	1.0	10	174.3	70 24.9	1.0	11	174.2	70 54.8	1.0	11	174.1	71 24.7	1.0	11	173.9	71 54.5	1.0	11	173.8	72 24.4	1.0	12	173.6	2
3	68 49.3	99	14	171.9	69 19.0	99	14	171.7	69 48.8	99	14	171.5	70 18.5	99	15	171.3	70 48.3	99	15	171.1	71 18.0	99	15	170.9	71 47.7	99	16	170.7	72 17.4	99	16	170.5	3
4	68 41.0	99	18	169.2	69 10.6	99	18	169.0	69 40.2	99	18	168.7	70 09.7	99	19	168.5	70 39.2	98	19	168.2	71 08.8	98	20	167.9	71 38.3	98	20	167.6	72 07.7	98	21	167.3	4
05	68 30.4	98	21	166.5	68 59.8	98	22	166.3	69 29.1	98	22	166.0	69 58.4	98	23	165.7	70 27.7	98	23	165.4	70 57.0	97	24	165.0	71 26.2	97	24	164.7	71 55.4	97	25	164.3	05
6	68 17.6	97	25	164.0	68 46.7	97	25	163.6	69 15.8	97	26	163.3	69 44.8	97	26	162.9	70 13.8	97	27	162.6	70 42.8	96	28	162.2	71 11.7	96	28	161.7	71 40.5	96	29	161.3	6
7	68 02.6	96	28	161.4	68 31.4	96	29	161.0	69 00.2	96	30	160.6	69 28.9	96	30	160.2	69 57.6	96	31	159.8	70 26.2	96	31	159.4	70 54.7	95	32	158.9	71 23.2	95	33	158.4	7
8	67 45.5	95	32	158.9	68 14.0	95	32	158.5	68 42.5	95	33	158.1	69 10.8	94	34	157.6	69 39.1	94	34	157.1	70 07.4	94	35	156.7	70 35.5	94	36	156.1	71 03.5	93	36	155.6	8
9	67 26.4	94	35	156.5	67 54.6	94	36	156.0	68 22.6	93	36	155.6	68 50.6	93	37	155.1	69 18.5	93	38	154.6	69 46.3	93	38	154.0	70 14.1	92	39	153.5	70 41.6	92	40	152.9	9
10	67 05.4	93	38	154.1	67 33.2	92	39	153.6	68 00.9	92	39	153.1	68 28.4	92	40	152.6	68 55.9	91	41	152.0	69 23.3	91	42	151.5	69 50.6	91	42	150.9	70 17.7	90	43	150.2	10
1	66 42.5	91	41	151.5	67 09.9	91	42	151.3	67 37.2	91	42	150.7	68 04.4	90	43	150.2	68 31.4	90	44	149.6	68 58.3	90	45	149.0	69 25.1	89	45	148.4	69 51.7	89	46	147.7	1
2	66 17.9	90	44	149.6	66 44.9	90	44	149.1	67 11.8	89	45	148.5	67 38.5	89	46	147.9	68 05.1	88	47	147.3	68 31.5	88	48	146.6	68 57.8	87	48	146.0	69 24.0	87	49	145.3	2
3	65 51.7	89	46	147.4	66 18.2	88	47	146.9	66 44.6	88	48	146.3	67 10.9	87	49	145.7	67 37.0	87	49	145.0	68 03.0	86	50	144.4	68 28.8	86	51	143.7	68 54.5	85	52	143.0	3
4	65 23.8	87	49	145.4	65 49.9	87	50	144.8	66 15.9	86	50	144.2	66 41.8	86	51	143.5	67 07.4	85	52	142.9	67 32.9	85	53	142.2	67 58.2	84	53	141.5	68 23.4	83	54	140.7	4
15	64 54.5	86	51	143.3	65 20.2	85	52	142.7	65 45.7	85	53	142.1	66 11.1	84	53	141.4	66 36.3	84	54	140.8	67 01.3	83	55	140.1	67 26.2	82	56	139.3	67 50.8	82	57	138.6	15
6	64 23.8	84	53	141.4	64 49.0	84	54	140.8	65 14.1	83	55	140.1	65 39.1	83	56	139.5	66 03.8	82	56	138.8	66 28.4	82	57	138.0	66 52.7	81	58	137.3	67 16.9	80	59	136.5	6
7	63 51.7	83	55	139.5	64 16.6	83	56	138.9	64 41.2	82	57	138.2	65 05.7	81	58	137.5	65 30.0	81	58	136.8	65 54.1	80	59	136.1	66 18.0	79	60	135.4	66 41.6	78	61	134.6	7
8	63 18.4	82	57	137.7	63 42.9	81	58	137.1	64 07.1	80	59	136.4	64 31.1	80	60	135.7	64 55.0	79	60	135.0	65 18.6	78	61	134.3	65 42.0	78	62	133.5	66 05.2	77	62	132.7	8
9	62 44.0	80	59	136.0	63 08.0	80	60	135.3	63 31.8	79	61	134.6	63 55.4	78	61	133.9	64 18.8	78	62	133.2	64 42.0	77	63	132.5	65 05.0	76	63	131.7	65 27.7	75	64	130.9	9
20	62 08.5	79	61	134.3	62 32.1	78	62	133.6	62 55.5	78	62	132.9	63 18.7	77	63	132.2	63 41.7	76	64	131.5	64 04.4	75	64	130.8	64 26.9	75	65	130.0	64 49.2	74	66	129.2	20
1	61 32.0	78	62	132.7	61 55.2	77	63	132.0	62 18.2	76	64	131.3	62 40.9	76	64	130.6	63 03.5	75	65	129.9	63 25.8	74	66	129.1	63 47.9	73	66	128.4	64 09.8	72	67	127.6	1
2	60 54.5	76	64	131.1	61 17.3	76	65	130.4	61 39.9	75	65	129.7	62 02.3	74	66	129.0	62 24.4	73	66	128.3	62 46.4	73	67	127.6	63 08.1	72	68	126.8	63 29.5	71	68	126.0	2
3	60 16.2	75	65	129.6	60 38.6	74	66	128.9	61 00.8	74	67	128.2	61 22.8	73	67	127.5	61 44.6	72	68	126.8	62 06.1	71	68	126.1	62 27.4	70	69	125.3	62 48.4	69	70	124.5	3
4	59 37.0	74	67	128.1	59 59.0	73	67	127.5	60 20.9	72	68	126.8	60 42.5	72	68	126.1	61 03.9	71	69	125.3	61 25.0	70	70	124.6	61 45.9	69	70	123.9	62 06.6	68	71	123.1	4
25	58 57.0	73	68	126.7	59 18.7	72	68	126.1	59 40.2	71	69	125.4	60 01.4	70	70	124.7	60 22.5	70	70	123.9	60 43.3	69	71	123.2	61 03.8	68	71	122.5	61 24.1	67	72	121.7	25
6	58 16.3	72	69	125.4	58 37.7	71	70	124.7	58 58.8	70	70	124.0	59 19.7	69	71	123.3	59 40.4	69	71	122.6	60 00.8	68	72	121.9	60 21.0	67	72	121.1	60 41.0	66	73	120.4	6
7	57 35.0	70	70	124.1	57 56.0	70	70	123.4	58 16.8	69	71	122.7	58 37.4	68	72	122.0	58 57.7	67	72	121.3	59 17.8	67	73	120.6	59 37.7	66	73	119.9	59 57.3	65	74	119.1	7
8	56 53.0	69	71	122.8	57 13.7	69	72	122.1	57 34.2	68	72	121.5	57 54.4	67	73	120.8	58 14.4	66	73	120.1	58 34.2	66	74	119.4	58 53.8	65	74	118.6	59 13.1	64	75	117.9	8
9	56 10.4	68	72	121.6	56 30.8	68	72	120.9	56 51.0	67	73	120.2	57 10.9	66	73	119.6	57 30.6	65	74	118.9	57 50.1	65	74	118.2	58 09.4	64	75	117.4	58 28.3	63	75	116.7	9
30	55 27.3	67	73	120.4	55 47.4	67	73	119.7	56 07.2	66	74	119.1	56 26.9	65	74	118.4	56 46.3	64	75	117.7	57 05.5	64	75	117.0	57 24.5	63	76	116.3	57 43.2	62	76	115.6	30
1	54 43.6	66	74	119.3	55 03.4	66	74	118.6	55 23.0	65	74	117.9	55 42.4	64	75	117.3	56 01.5	63	75	116.6	56 20.5	63	76	115.9	56 39.1	62	76	115.2	56 57.6	61	77	114.5	1
2	53 59.5	65	75	118.2	54 19.0	65	75	117.5	54 38.3	64	75	116.8	54 57.4	63	76	116.2	55 16.3	62	76	115.5	55 35.0	62	77	114.8	55 53.4	61	77	114.1	56 11.6	60	77	113.4	2
3	53 14.9	64	76	117.1	53 34.2	64	76	116.4	53 53.2	63	76	115.8	54 12.1	62	76	115.1	54 30.7	62	77	114.5	54 49.1	61	77	113.8	55 07.3	60	77	113.1	55 25.2	59	78	112.4	3
4	52 29.9	64	76	116.0	52 48.9	63	76	115.4	53 07.7	62	76	114.8	53 26.3	62	77	114.1	53 44.7	61	77	113.4	54 02.9	60	78	112.8	54 20.8	60	78	112.1	54 38.5	59	78	111.4	4
35	51 44.5	63	76	115.0	52 03.3	62	77	114.4	52 21.9	62	77	113.8	52 40.2	61	77	113.1	52 58.4	60	78	112.5	53 16.3	59	78	111.8	53 34.0	59	78	111.1	53 51.5	58	79	110.4	35
6	50 58.7	62	77	114.1	51 17.3	62	77	113.4	51 35.6	61	78	112.8	51 53.8	60	78	112.1	52 11.7	59	78	111.5	52 29.4	59	79	110.8	52 46.9	59	79	110.2	53 04.2	57	79	109.5	6
7	50 12.6	61	77	113.1	50 30.9	61	78	112.5	50 49.1	60	79	111.9	51 07.0	59	79	111.2	51 24.7	59	79	110.6	51 42.3	58	79	109.9	51 59.6	57	79	109.3	52 16.6	57	80	108.6	7
8	49 26.1	61	78	112.2	49 44.3	60	78	111.6	50 02.2	59	79	110.9	50 20.0	59	79	110.3	50 37.5	58	79	109.7	50 54.8	57	79	109.0	51 11.9	57	80	108.4	51 28.8	56	80	107.7	8
9	48 39.4	60	78	111.3	48 57.3	59	79	110.7	49 15.1	59	79	110.0	49 32.6	58	79	109.4	49 50.0	57	80	108.8	50 07.1	57	80	108.2	50 24.1	56	80	107.5	50 40.8	55	80	106.9	9
40	47 52.4	60	79	110.4	48 10.1	59	79	109.8	48 27.7	58	79	109.2	48 45.1	58	80	108.6	49 02.2	57	80	107.9	49 19.2	56	80	107.3	49 36.0	56	81	106.7	49 52.5	55	81	106.0	40
1	47 05.1	59	79	109.5	47 22.6	58	80	108.9	47 40.0	58	80	108.3	47 57.2	57	80	107.7	48 14.2	56	80	107.1	48 31.1	56	81	106.5	48 47.7	55	81	105.9	49 04.0	54	81	105.2	1
2	46 17.5	58	80	108.7	46 34.9	58	80	108.1	46 52.2	57	80	107.5	47 09.2	56	80	106.9	47 26.0	56	81	106.3	47 42.7	55	81	105.7	47 59.2	54	81	105.1	48 15.4	54	81	104.4	2
3	45 29.7	58	80	107.9	45 47.0	57	80	107.3	46 04.1	57	80	106.7	46 21.0	56	81	106.1	46 37.7	55	81	105.5	46 54.2	55	81	104.9	47 10.5	54	81	104.3	47 26.6	53	82	103.7	3
4	44 41.7	57	80	107.1	44 58.8	57	81	106.5	45 15.8	56	81	105.9	45 32.5	56	81	105.3	45 49.1	55	81	104.7	46 05.4	54	81	104.1	46 21.6	54	82	103.5	46 37.6	53	82	102.9	4
45	43 53.5	57	81	106.3	44 10.5	56	81	105.7	44 27.3	56	81	105.2	44 43.9	55	81	104.6	45 00.3	54	82	104.0	45 16.6	54	82	103.4	45 32.6	53	82	102.8	45 48.5	53	82	102.2	45
6	43 05.2	56	81	105.5	43 22.0	56	81	105.0	43 38.6	55	81	104.4	43 55.1	55	82	103.8	44 11.4	54	82	103.2	44 27.5	53	82	102.6	44 43.5	53	82	102.1	44 59.2	52	82	101.5	6
7	42 16.6	56	81	104.8	42 33.3	55	81	104.2	42 49.8	55	82	103.7	43 06.2	54	82	103.1	43 22.4	54	82	102.5	43 38.4	53	82	101.9	43 54.2	52	82	101.3	44 09.9	52	82	100.8	7
8	41 27.9	56	82	104.1	41 44.4	55	82	103.5	42 00.8	54	82	102.9	42 17.1	54	82	102.4	42 33.2	53	82	101.8	42 49.1	53	82	101.2	43 04.8	52	83	100.6	43 20.4	52	83	100.1	8
9	40 39.0	55	82	103.3	40 55.4	55	82	102.8	41 11.7	54	82	102.2	41 27.9	54	82	101.7	41 43.9	53	82	101.1	41 59.7	52	83	100.5	42 15.3	52	83	100.0	42 30.8	51	83	99.4	9
50	39 49.9	55	82	102.6	40 06.3	54	82	102.1	40 22.5	54	82	101.5	40 38.5	53	82	100.9	40 54.4	53	83	100.4	41 10.1	52	83	99.8	41 25.7	52	83	99.3	41 41.1	51	83	98.7	50
1	39 00.8	54	82	102.0	39 17.0	54	82	101.4	39 33.1	53	83	100.9	39 49.1	53	83	100.3	40 04.9	52	83	99.8	40 20.5	52	83	99.2	40 36.0	51	83	98.6	40 51.3	51	83	98.1	1
2	38 11.5	54	82	101.3	38 27.6	54	82	100.7	38 43.7	53	83	100.2	38 59.5	53	83	99.6	39 15.2	52	83	99.1	39 30.8	52	83	98.5	39 46.2	51	83	98.0	40 01.4	51	83	97.4	2
3	37 22.1	54	82	100.6	37 38.2	53	82	100.1	37 54.1	53	83	99.5	38 09.9	52	83	99.0	38 25.5	52	83	98.5	38 41.0	51	83	97.9	38 56.3	51	83	97.4	39 11.5	50	83	96.8	3
4	36 32.6	54	82	99.9	36 48.6	53	83	99.4	37 04.4	53	83	98.9	37 20.1	52	83	98.4	37 35.7	52	83	97.8	37 51.1	51	83	97.3	38 06.4	51	83	96.7	38 21.5	50	83	96.2	4
55	35 43.0	53	83	99.3	35 58.9	53	83	98.8	36 14.7	52	83	98.2	36 30.3	52	83	97.7	36 45.8	51	83	97.2	37 01.2	51	83	96.6	37 16.4	50	83	96.1	37 31.4	50	84	95.6	55
6	34 53.3	53	83	98.7	35 09.1	53	83	98.1	35 24.8	52	83	97.6	35 40.4	52	83	97.1	35 55.8	51	83	96.6	36 11.2	51	83	96.0	36 26.3	50	84	95.5	36 41.3	50	84	95.0	6
7	34 03.5	53	83	98.0	34 19.3	53	83	97.5	34 34.9	52	83	97.0	34 50.4	52	83	96.5	35 05.8	51	83	96.0	35 21.1	51	84	95.4	35 36.2	50	84	94.9	35 51.2	50	84	94.4	7
8	33 13.6	53	83	97.4	33 29.3	52	83	96.9	33 44.9	52	83	96.4	34 00.4	51	83	95.9	34 15.8	51	84	95.4	34 31.0	50	84	94.8	34 46.0	50	84	94.3	35 01.0	49	84	93.8	8
9	32 23.7	52	83	96.8	32 39.3	52	83	96.3	32 54.9	52	84	95.8	33 10.3	51	84	95.3	33 25.6	51	84	94.8	33 40.8	50	84	94.2	33 55.9	50	84	93.7	34 10.8	49	84	93.2	9
60	31 33.7	52	83	96.2	31 49.3	52	84	95.7	32 04.8	51	84	95.2	32 20.2	51	84	94.7	32 35.5	51	84	94.2	32 50.6	50	84	93.7	33 05.6	50	84	93.1	33 20.5	49	84	92.6	60
1	30 43.6	52	84	95.6	30 59.2	52	84	95.1	31 14.7	51	84	94.6	31 30.0	51	84	94.1	31 45.3	50	84	93.6	32 00.4	50	84	93.1	32 15.4	50	84	92.6	32 30.2	49	84	92.1	1
2	29 53.5	52	84	95.0	30 09.1	51	84	94.5	30 24.5	51	84	94.0	30 39.8	51	84	93.5	30 55.0	50	84	93.0	31 10.1	50	84	92.5	31 25.1	50	84	92.0	31 39.9	49	84	91.5	2
3	29 03.4	52	84	94.4	29 18.9	51	84	93.9	29 34.3	51	84	93.4	29 49.6	51	84	92.9	30 04.8	50	84	92.5	30 19.8	50	84	92.0	30 34.8	50	84	91.4	30 49.6	49	84	90.9	3
4	28 13.2	52	84	93.8	28 28.7	51	84	93.4	28 44.0	51	84	92.9	28 59.3	51	84	92.4	29 14.5	50	84	91.9	29 29.5	50	84	91.4	29 44.5	50	84	90.9	29 59.3	49	84	90.4	4
65	27 23.0	52	84	93.3	27 38.4	51	84	92.8	27 53.8	51	84	92.3	28 09.0	51	84	91.8	28 24.2	50	84	91.3	28 39.2	50	84	90.8	28 54.2	50	84	90.3	29 09.0	49	84	89.8	65
6	26 32.7	52	84	92.7	26 48.1	51	84	92.2	27 03.5	51	84	91.7	27 18.7	51	84	91.3	27 33.9	50	84	90.8	27 48.9	50	84	90.3	28 03.8	50	84	89.8	28 18.7	49	84	89.3	6
7	25 42.4	52	84	92.1	25 57.8	51	84	91.7	26 13.2	51	84	91.2	26 28.4	51	84	90.7	26 43.5	50	84	90.2	26 58.6	50	84	89.7	27 13.5	50	84	89.3	27 28.4	49	84	88.8	7
8	24 52.1	51	84	91.6	25 07.5	51	84	91.1	25 22.9	51	84	90.6	25 38.1	51	84	90.2	25 53.2	50	84	89.7	26 08.3	50	84	89.2	26 23.2	50	84	88.7	26 38.1	49	84	88.2	8
9	24 01.8	51	84	91.0	24 17.2	51	84	90.6	24 32.5	51	84	90.1	24 47.8	51	84	89.6	25 02.9	50	84	89.1	25 18.0	50	84	88.7	25 32.9	50	84	88.2	25 47.8	49	84	87.7	9
70	23 11.5	51	84	90.5	23 26.9	51	84	90.0	23 42.2	51	84	89.6	23 57.5	51	84	89.1	24 12.6	50	84	88.6	24 27.7	50	84	88.1	24 42.6	50	84	87.7	24 57.5	49	84	87.2	70
1	22 21.2	51	84	89.9	22 36.6	51	84	89.5	22 51.9	51	84	89.0	23 07.1	51	84	88.5	23 22.3	50	84	88.1	23 37.4	50	84	87.6	23 52.4	50	84	87.1	24 07.3	49	84	86.7	1
2	21 30.9	51	84	89.4	21 46.3	51	84	88.9	22 01.6	51	84	88.5	22 16.9	51	84	88.0	22 32.0	50	84	87.5	22 47.1	50	84	87.1	23 02.1	50	84	86.6	23 17.0	49	84	86.1	2
3	20 40.6	51	84	88.9	20 56.0	51	84	88.4	21 11.3	51	84	87.9	21 26.6	51	84	87.5	21 41.8	50	84	87.0	21 56.9	50	84	86.5	22 11.9	50	84	86.1	22 26.8	49	84	85.6	3
4	19 50.3	52	84	88.3	20 05.7	51	84	87.9	20 21.0	51	84	87.4	20 36.3	51	84	86.9	20 51.5	50	84	86.5	21 06.6	50	84	86.0	21 21.7	50	84	85.6	21 36.7	50	84	85.1	4
75	19 00.0	52	84	87.8	19 15.4	51	84	87.3	19 30.8	51	84	86.9	19 46.1	51	84	86.4	20 01.3	51	84	86.0	20 16.5	50	84	85.5	20 31.6	50	84	85.0	20 46.6	50	83	84.6	75
6	18 09.7	52	84	87.3	18 25.1	51	84	86.8	18 40.5	51	84	86.4	18 55.9	51	84	85.9	19 11.1	51	84	85.4	19 26.3	51	84	85.0	19 41.4	50	83	84.5	19 56.5	50	83	84.1	6
7	17 19.4	52	84	86.7	17 34.9	51	84	86.3	17 50.3	51	84	85.8	18 05.7	51	84	85.4	18 21.0	51	84	84.9	18 36.2	51	83	84.5	18 51.4	50	83	84.0	19 06.5	50	83	83.6	7
8	16 29.2	52	84	86.2	16 44.7	52	84	85.7	17 00.2	51	84	85.3	17 15.6	51	84	84.9	17 30.9	51	84	84.4	17 46.1	51	83	84.0	18 01.4	51	83	83.5	18 16.5	50	83	83.0	8
9	15 39.0	52	84	85.7	15 54.6	52	84	85.2	16 10.0	52	83	84.8	16 25.5	51	84	84.3	16 40.8	51	83	83.9	16 56.1	51	83	83.4	17 11.4	51	83	83.0	17 26.6	51	83	82.5	9
80	14 48.9	52	83	85.1	15 04.4	52	83	84.7	15 19.9	52	83	84.3	15 35.4	51	83	83.8	15 50.8	51	83	83.4	16 06.2	51	83	82.9	16 21.5	51	83	82.5	16 36.7	51	83	82.0	80
1	13 58.7	52	83	84.6	14 14.3	52	83	84.2	14 29.8	52	83	83.7	14 45.4	52	83	83.3	15 00.9	51	83	82.8	15 16.3	51	83	82.4	15 31.6	51	83	81.9	15 47.0	51	83	81.5	1
2	13 08.7	52	83	84.1	13 24.3	52	83	83.7	13 39.9	52	83	83.2	13 55.5	52	83	82.8	14 11.0	52	83	82.3	14 26.4	52	83	81.9	14 41.8	51	83	81.4	14 57.2	51	83	81.0	2
3	12 18.6	52	83	83.6	12 34.3	52	83	83.1	12 50.0	52	83	82.7	13 05.6	52	83	82.3	13 21.1	52	83	81.8	13 36.6	52	83	81.4	13 52.1	51	83	80.9	14 07.5	51	83	80.5	3
4	11 28.7	52	83	83.0	11 44.4	52	83	82.6	12 00.1	52	83	82.2	12 15.7	52	83	81.7	12 31.3	52	83	81.3	12 46.9	52	83	80.8	13 02.4	52	83	80.4	13 17.9	52	83	80.0	4
85	10 38.7	53	83	82.5	10 54.5	53	83	82.1	11 10.3	52	83	81.7	11 26.0	52	83	81.2	11 41.6	52	83	80.8	11 57.3	52	83	80.3	12 12.9	52	82	79.9	12 28.4	52	82	79.5	85
6	9 48.9	53	83	82.0	10 04.7	53	83	81.6	10 20.5	53	83	81.1	10 36.3	52	83	80.7	10 52.0	52	83	80.3	11 07.7	52	82	79.8	11 23.4	52	82	79.4	11 39.0	52	82	78.9	6
7	8 59.1	53	83	81.5	9 15.0	53	83	81.0	9 30.8	53	83	80.6	9 46.7	53	83	80.2	10 02.4	52	83	79.7	10 18.2	52	83	79.3	10 33.9	52	82	78.9	10 49.6	52	82	78.5	7
8	8 09.4	53	83	80.9	8 25.3	53	83	80.5	8 41.2	53	83	80.1	8 57.1	53	82	79.7	9 13.0	53	82	79.2	9 28.8	52	82	78.8	9 44.6	52	82	78.4	10 00.4	52	82	77.9	8
9	7 19.7	53	83	80.4	7 35.7	53	83	80.0	7 51.7	53	82	79.6	8 07.6	53	82	79.1	8 23.6	53	82	78.7	8 39.5	53	82	78.3	8 55.4	53	82	77.9	9 11.2	52	82	77.4	9
90	6 30.1	54	82	79.9	6 46.2	54	82	79.5	7 02.2	53	82	79.0	7 18.3	53	82	78.6	7 34.3	53	82	78.2	7 50.3	53	82	77.8	8 06.2	53	82	77.3	8 22.1	53	82	76.9	90

H.A.	12° 00′ Alt / Δd Δt / Az	12° 30′ Alt / Δd Δt / Az	13° 00′ Alt / Δd Δt / Az	13° 30′ Alt / Δd Δt / Az	14° 00′ Alt / Δd Δt / Az	14° 30′ Alt / Δd Δt / Az	15° 00′ Alt / Δd Δt / Az	15° 30′ Alt / Δd Δt / Az	H.A.
00	45 00.0 1.0 01 180.0	44 30.0 1.0 01 180.0	44 00.0 1.0 01 180.0	43 30.0 1.0 01 180.0	43 00.0 1.0 01 180.0	42 30.0 1.0 01 180.0	42 00.0 1.0 01 180.0	41 30.0 1.0 01 180.0	00
1	44 59.4 1.0 03 178.6	44 29.4 1.0 03 178.6	43 59.4 1.0 03 178.6	43 29.4 1.0 03 178.7	42 59.4 1.0 03 178.7	42 29.4 1.0 03 178.7	41 59.4 1.0 03 178.7	41 29.4 1.0 03 178.7	1
2	44 57.6 1.0 05 177.2	44 27.6 1.0 05 177.3	43 57.6 1.0 05 177.3	43 27.6 1.0 05 177.3	42 57.7 1.0 05 177.3	42 27.7 1.0 05 177.4	41 57.7 1.0 05 177.4	41 27.7 1.0 05 177.4	2
3	44 54.5 1.0 07 175.9	44 24.6 1.0 07 175.9	43 54.7 1.0 07 175.9	43 24.7 1.0 07 176.0	42 54.8 1.0 07 176.0	42 24.8 1.0 07 176.1	41 54.9 1.0 07 176.1	41 24.9 1.0 07 176.1	3
4	44 50.3 1.0 09 174.5	44 20.4 1.0 09 174.5	43 50.5 1.0 09 174.6	43 20.6 1.0 09 174.6	42 50.7 1.0 09 174.7	42 20.8 1.0 09 174.8	41 50.9 1.0 09 174.8	41 21.0 1.0 08 174.9	4
05	44 44.9 99 11 173.1	44 15.0 99 11 173.2	43 45.2 99 11 173.2	43 15.3 99 11 173.3	42 45.5 1.0 11 173.4	42 15.6 1.0 10 173.5	41 45.8 1.0 10 173.5	41 15.9 1.0 10 173.6	05
6	44 38.2 99 13 171.7	44 08.4 99 13 171.8	43 38.7 99 13 171.9	43 08.9 99 13 172.0	42 39.1 99 12 172.1	42 09.3 99 12 172.2	41 39.5 99 12 172.2	41 09.7 99 12 172.3	6
7	44 30.4 99 15 170.4	44 00.7 99 15 170.5	43 31.0 99 15 170.6	43 01.3 99 15 170.7	42 31.6 99 14 170.8	42 01.9 99 14 171.0	41 32.2 99 14 171.0	41 02.4 99 14 171.1	7
8	44 21.4 99 17 169.0	43 51.8 99 17 169.1	43 22.2 99 17 169.2	42 52.6 99 16 169.4	42 23.0 99 16 169.5	41 53.3 99 16 169.6	41 23.7 99 16 169.7	40 54.1 99 16 169.8	8
9	44 11.2 98 19 167.7	43 41.7 98 19 167.8	43 12.2 98 18 167.9	42 42.7 98 18 168.1	42 13.2 98 18 168.2	41 43.7 98 18 168.3	41 14.1 98 18 168.4	40 44.6 98 18 168.5	9
10	43 59.9 98 21 166.3	43 30.5 98 21 166.5	43 01.2 98 20 166.6	42 31.7 98 20 166.8	42 02.3 98 20 166.9	41 32.9 98 20 167.0	41 03.5 98 20 167.1	40 34.0 98 19 167.3	10
1	43 47.5 98 23 165.0	43 18.2 98 22 165.2	42 49.0 98 22 165.3	42 19.7 98 22 165.5	41 50.4 98 22 165.6	41 21.1 98 22 165.8	40 51.8 98 21 165.9	40 22.4 98 21 166.0	1
2	43 33.9 97 24 163.7	43 04.8 97 24 163.9	42 35.7 97 24 164.0	42 06.5 97 24 164.2	41 37.3 97 24 164.3	41 08.2 97 23 164.5	40 39.0 97 23 164.7	40 09.8 97 23 164.8	2
3	43 19.2 97 26 162.4	42 50.3 97 26 162.6	42 21.3 97 26 162.7	41 52.2 97 26 162.9	41 23.2 97 25 163.1	40 54.2 97 25 163.3	40 25.1 97 25 163.4	39 56.0 97 25 163.6	3
4	43 03.5 96 28 161.1	42 34.7 96 28 161.3	42 05.8 96 28 161.5	41 36.9 96 27 161.7	41 08.1 96 27 161.8	40 39.2 96 27 162.0	40 10.2 96 26 162.2	39 41.3 96 26 162.4	4
15	42 46.7 96 30 159.8	42 18.0 96 30 160.0	41 49.3 96 29 160.2	41 20.6 96 29 160.4	40 51.9 96 28 160.6	40 23.1 96 28 160.8	39 54.3 96 28 161.0	39 25.6 96 28 161.2	15
6	42 28.8 95 32 158.6	42 00.3 95 31 158.8	41 31.8 95 31 159.0	41 03.2 95 31 159.2	40 34.6 95 30 159.4	40 06.1 95 30 159.6	39 37.5 95 30 159.8	39 08.8 95 30 160.0	6
7	42 09.9 94 33 157.3	41 41.5 94 33 157.5	41 13.2 95 33 157.7	40 44.8 95 32 158.0	40 16.4 95 32 158.2	39 48.0 95 32 158.4	39 19.6 95 31 158.6	38 51.1 95 31 158.8	7
8	41 50.0 94 35 156.1	41 21.8 94 35 156.3	40 53.6 94 34 156.5	40 25.5 94 34 156.8	39 57.2 94 34 157.0	39 29.0 94 33 157.2	39 00.7 94 33 157.4	38 32.4 94 33 157.6	8
9	41 29.1 93 36 154.8	41 01.1 93 36 155.1	40 33.1 93 36 155.3	40 05.1 93 35 155.6	39 37.1 94 35 155.8	39 09.0 93 35 156.0	38 40.9 94 35 156.2	38 12.8 94 34 156.5	9
20	41 07.2 92 38 153.6	40 39.4 92 38 153.8	40 11.6 93 37 154.1	39 43.8 93 37 154.4	39 16.0 93 37 154.6	38 48.1 93 36 154.9	38 20.2 93 36 155.1	37 52.2 93 36 155.3	20
1	40 44.4 92 40 152.4	40 16.8 92 39 152.7	39 49.2 92 39 153.0	39 21.6 92 39 153.2	38 53.9 92 38 153.5	38 26.2 92 38 153.7	37 58.5 92 38 154.0	37 30.8 92 37 154.2	1
2	40 20.6 91 41 151.3	39 53.3 91 41 151.5	39 25.9 91 40 151.8	38 58.5 91 40 152.1	38 31.0 92 40 152.3	38 03.5 92 39 152.6	37 36.0 92 39 152.8	37 08.4 92 39 153.1	2
3	39 56.0 90 43 150.1	39 28.8 91 42 150.4	39 01.7 91 42 150.7	38 34.4 91 41 150.9	38 07.2 91 41 151.2	37 39.9 91 41 151.5	37 12.6 91 40 151.7	36 45.2 91 40 152.0	3
4	39 30.5 90 44 149.0	39 03.5 90 44 149.2	38 36.6 90 43 149.5	38 09.6 90 43 149.8	37 42.5 90 43 150.1	37 15.4 90 42 150.3	36 48.3 90 42 150.6	36 21.1 91 42 150.9	4
25	39 04.1 89 45 147.8	38 37.4 89 45 148.1	38 10.6 89 45 148.4	37 43.8 89 44 148.7	37 17.0 90 44 149.0	36 50.1 90 44 149.3	36 23.2 90 43 149.5	35 56.2 90 43 149.8	25
6	38 36.9 88 47 146.7	38 10.4 88 46 147.0	37 43.9 89 46 147.3	37 17.3 89 46 147.6	36 50.7 89 45 147.9	36 24.0 89 45 148.2	35 57.3 89 45 148.5	35 30.5 89 44 148.7	6
7	38 08.9 87 48 145.6	37 42.6 88 48 145.9	37 16.3 88 47 146.2	36 49.9 88 47 146.5	36 23.5 88 47 146.8	35 57.1 88 46 147.1	35 30.6 88 46 147.4	35 04.0 89 45 147.7	7
8	37 40.1 87 49 144.5	37 14.0 87 49 144.8	36 47.9 87 49 145.2	36 21.8 87 48 145.5	35 55.6 87 48 145.8	35 29.3 87 48 146.1	35 03.1 87 48 146.4	34 36.7 87 48 146.7	8
9	37 10.5 86 51 143.5	36 44.7 86 50 143.8	36 18.8 86 50 144.1	35 52.9 86 49 144.4	35 26.9 87 49 144.7	35 00.9 87 49 145.0	34 34.8 87 48 145.3	34 08.7 87 48 145.6	9
30	36 40.2 85 52 142.4	36 14.6 85 51 142.8	35 48.9 86 51 143.1	35 23.2 86 51 143.4	34 57.5 86 50 143.7	34 31.7 86 50 144.0	34 05.8 86 50 144.3	33 39.9 86 49 144.6	30
1	36 09.1 84 53 141.4	35 43.8 85 53 141.7	35 18.3 85 52 142.1	34 52.9 85 52 142.4	34 27.3 85 51 142.7	34 01.8 85 51 143.0	33 36.1 86 51 143.3	33 10.5 86 50 143.6	1
2	35 37.4 84 54 140.4	35 12.3 84 54 140.7	34 47.1 84 53 141.0	34 21.8 84 53 141.4	33 56.5 84 53 141.7	33 31.1 85 52 142.0	33 05.7 85 52 142.3	32 40.3 85 51 142.7	2
3	35 05.0 83 55 139.4	34 40.1 83 55 139.7	34 15.1 83 54 140.1	33 50.0 84 54 140.4	33 25.0 84 54 140.7	32 59.8 84 53 141.0	32 34.6 84 53 141.4	32 09.4 84 53 141.7	3
4	34 31.9 82 56 138.4	34 07.2 82 56 138.7	33 42.4 83 55 139.1	33 17.6 83 55 139.4	32 52.8 83 55 139.8	32 27.9 83 54 140.1	32 02.9 83 54 140.4	31 37.9 83 54 140.7	4
35	33 58.2 81 57 137.4	33 33.7 82 57 137.8	33 09.2 82 56 138.1	32 44.6 82 56 138.5	32 19.9 82 56 138.8	31 55.3 82 55 139.1	31 30.5 83 55 139.5	31 05.7 83 55 139.8	35
6	33 23.8 81 58 136.5	32 59.6 81 58 136.8	32 35.3 81 58 137.2	32 10.9 81 57 137.5	31 46.5 81 57 137.9	31 22.0 82 56 138.2	30 57.5 82 56 138.5	30 32.9 82 56 138.9	6
7	32 48.9 80 59 135.5	32 24.8 80 59 135.9	32 00.8 80 58 136.2	31 36.6 81 58 136.6	31 12.4 81 58 136.9	30 48.2 81 57 137.3	30 23.9 81 57 137.6	29 59.5 81 57 138.0	7
8	32 13.3 79 60 134.6	31 49.5 79 60 135.0	31 25.7 80 59 135.3	31 01.8 80 59 135.7	30 37.8 80 59 136.0	30 13.8 80 58 136.4	29 49.7 80 58 136.7	29 25.6 81 58 137.1	8
9	31 37.2 78 61 133.7	31 13.7 79 61 134.1	30 50.0 79 60 134.4	30 26.3 79 60 134.8	30 02.6 79 60 135.1	29 38.8 79 59 135.5	29 14.9 80 59 135.8	28 51.0 80 59 136.2	9
40	31 00.6 78 62 132.8	30 37.2 78 62 133.2	30 13.8 78 61 133.5	29 50.3 78 61 133.9	29 26.8 79 60 134.3	29 03.2 79 60 134.6	28 39.6 79 60 135.0	28 15.9 79 59 135.3	40
1	30 23.4 77 63 131.9	30 00.3 77 62 132.3	29 37.1 77 62 132.7	29 13.8 78 62 133.0	28 50.5 78 61 133.4	28 27.1 78 61 133.7	28 03.7 78 61 134.1	27 40.2 78 60 134.5	1
2	29 45.7 76 64 131.1	29 22.8 77 63 131.4	28 59.8 77 63 131.8	28 36.8 77 63 132.2	28 13.7 77 62 132.5	27 50.5 77 62 132.9	27 27.3 77 62 133.2	27 04.0 78 61 133.6	2
3	29 07.5 76 64 130.2	28 44.8 76 64 130.6	28 22.1 76 64 131.0	27 59.2 76 63 131.3	27 36.3 76 63 131.7	27 13.4 77 63 132.1	26 50.4 77 62 132.4	26 27.4 77 62 132.8	3
4	28 28.9 75 65 129.4	28 06.4 75 65 129.7	27 43.8 75 65 130.1	27 21.2 75 64 130.5	26 58.5 76 64 130.9	26 35.8 76 63 131.2	26 13.0 76 63 131.6	25 50.2 76 63 131.9	4
45	27 49.7 74 66 128.5	27 27.5 74 66 128.9	27 05.1 75 65 129.3	26 42.7 75 65 129.7	26 20.2 75 65 130.0	25 57.7 75 64 130.4	25 35.1 75 64 130.8	25 12.5 76 64 131.1	45
6	27 10.2 73 67 127.7	26 48.1 74 66 128.1	26 25.9 74 66 128.5	26 03.7 74 66 128.9	25 41.5 74 65 129.2	25 19.2 74 65 129.6	24 56.8 75 65 130.0	24 34.4 75 64 130.3	6
7	26 30.1 73 67 126.9	26 08.3 73 67 127.3	25 46.3 73 67 127.7	25 24.3 73 66 128.1	25 02.3 74 66 128.4	24 40.2 74 66 128.8	24 18.0 74 65 129.2	23 55.8 74 65 129.6	7
8	25 49.7 72 68 126.1	25 28.0 72 68 126.5	25 06.3 73 67 126.9	24 44.5 73 67 127.3	24 22.7 73 67 127.7	24 00.8 73 66 128.0	23 38.8 73 66 128.4	23 16.8 73 66 128.8	8
9	25 08.9 71 69 125.4	24 47.4 72 68 125.7	24 25.9 72 68 126.1	24 04.3 72 68 126.5	23 42.6 72 67 126.9	23 20.9 72 67 127.3	22 59.2 73 67 127.6	22 37.3 73 66 128.0	9
50	24 27.6 71 69 124.6	24 06.4 71 69 125.0	23 45.0 71 69 125.4	23 23.6 71 68 125.7	23 02.2 72 68 126.1	22 40.7 72 68 126.5	22 19.1 72 67 126.9	21 57.5 72 67 127.3	50
1	23 46.0 70 70 123.8	23 24.9 70 70 124.2	23 03.8 71 69 124.6	22 42.6 71 69 125.0	22 21.3 71 69 125.4	22 00.0 71 68 125.8	21 38.7 71 68 126.1	21 17.3 71 68 126.5	1
2	23 04.1 70 71 123.1	22 43.2 70 70 123.5	22 22.2 70 70 123.9	22 01.2 70 70 124.3	21 40.1 70 69 124.6	21 19.0 70 69 125.0	20 57.8 71 69 125.4	20 36.6 71 68 125.8	2
3	22 21.7 69 71 122.4	22 01.0 69 71 122.8	21 40.2 69 70 123.2	21 19.4 69 70 123.5	20 58.5 70 70 123.9	20 37.6 70 70 124.3	20 16.6 70 69 124.7	19 55.6 70 69 125.1	3
4	21 39.0 68 72 121.6	21 18.5 69 71 122.0	20 57.9 69 71 122.4	20 37.3 69 71 122.8	20 16.6 69 70 123.2	19 55.9 69 70 123.6	19 35.1 69 70 124.0	19 14.2 70 70 124.3	4
55	20 56.0 68 72 120.9	20 35.7 68 72 121.3	20 15.3 68 72 121.7	19 54.8 68 71 122.1	19 34.3 68 71 122.5	19 13.8 69 71 122.9	18 53.2 69 70 123.3	18 32.5 69 70 123.6	55
6	20 12.7 67 73 120.2	19 52.5 67 72 120.6	19 32.3 68 72 121.0	19 12.0 68 72 121.4	18 51.7 68 72 121.8	18 31.3 68 71 122.2	18 10.9 68 71 122.6	17 50.4 68 71 122.9	6
7	19 29.1 67 73 119.5	19 09.1 67 73 119.9	18 49.0 67 73 120.3	18 28.9 67 72 120.7	18 08.8 67 72 121.1	17 48.6 67 72 121.5	17 28.3 68 71 121.9	17 08.1 68 71 122.3	7
8	18 45.1 66 74 118.8	18 25.3 66 73 119.2	18 05.4 66 73 119.6	17 45.5 67 73 120.0	17 25.5 67 73 120.4	17 05.5 67 72 120.8	16 45.4 67 72 121.2	16 25.3 67 72 121.6	8
9	18 00.9 65 74 118.2	17 41.3 66 74 118.6	17 21.5 66 74 118.9	17 01.8 66 73 119.3	16 42.0 66 73 119.7	16 22.1 66 73 120.1	16 02.2 66 72 120.5	15 42.3 67 72 120.9	9
60	17 16.4 65 75 117.5	16 56.9 65 74 117.9	16 37.4 65 74 118.3	16 17.8 65 74 118.7	15 58.1 66 74 119.1	15 38.5 66 73 119.5	15 18.8 66 73 119.9	14 59.0 66 73 120.2	60
1	16 31.6 64 75 116.8	16 12.3 65 75 117.2	15 52.9 65 75 117.6	15 33.5 65 75 118.0	15 14.0 65 74 118.4	14 54.5 65 74 118.8	14 35.0 65 73 119.2	14 15.4 65 73 119.6	1
2	15 46.6 64 75 116.2	15 27.4 64 75 116.5	15 08.2 64 75 117.0	14 48.9 64 75 117.4	14 29.6 64 74 117.8	14 10.3 65 74 118.2	13 50.9 65 74 118.5	13 31.5 65 74 118.9	2
3	15 01.3 63 76 115.5	14 42.3 63 76 115.9	14 23.2 64 75 116.3	14 04.1 64 75 116.7	13 45.0 64 75 117.1	13 25.8 64 75 117.5	13 06.6 64 74 117.9	12 47.3 64 74 118.3	3
4	14 15.8 63 76 114.9	13 56.9 63 76 115.3	13 38.0 63 76 115.7	13 19.1 63 76 116.1	13 00.1 64 75 116.5	12 41.0 64 75 116.9	12 22.0 64 75 117.3	12 02.9 64 74 117.7	4
65	13 30.0 62 77 114.3	13 11.3 62 76 114.7	12 52.5 63 76 115.1	12 33.7 63 76 115.5	12 14.9 63 76 115.9	11 56.0 63 75 116.3	11 37.1 63 75 116.7	11 18.2 63 75 117.0	65
6	12 44.0 62 77 113.6	12 25.5 62 77 114.0	12 06.8 62 77 114.4	11 48.2 62 76 114.8	11 29.5 62 76 115.2	11 10.8 62 76 115.6	10 52.0 63 76 116.0	10 33.2 63 75 116.4	6
7	11 57.8 61 77 113.0	11 39.4 62 77 113.4	11 20.9 62 77 113.8	11 02.4 62 77 114.2	10 43.9 62 76 114.6	10 25.3 62 76 115.0	10 06.7 62 76 115.4	9 48.1 62 76 115.8	7
8	11 11.4 61 78 112.4	10 53.1 61 77 112.8	10 34.8 61 77 113.2	10 16.4 61 77 113.6	9 58.0 61 77 114.0	9 39.6 61 77 114.4	9 21.1 62 76 114.8	9 02.7 62 76 115.2	8
9	10 24.8 61 78 111.8	10 06.6 61 78 112.2	9 48.4 61 78 112.6	9 30.2 61 77 113.0	9 11.9 61 77 113.4	8 53.7 61 77 113.8	8 35.4 61 77 114.2	8 17.0 61 76 114.6	9
70	9 38.0 60 78 111.2	9 19.9 60 78 111.6	9 01.7 60 78 112.0	8 43.8 60 78 112.4	8 25.7 60 77 112.8	8 07.5 61 77 113.2	7 49.4 61 77 113.6	7 31.2 61 77 114.0	70
1	8 51.0 60 79 110.6	8 33.1 60 78 111.0	8 15.1 60 78 111.4	7 57.2 60 78 111.8	7 39.2 60 78 112.2	7 21.2 60 78 112.6	7 03.1 60 77 113.0	6 45.1 60 77 113.4	1
2	8 03.8 59 79 110.0	7 46.0 59 79 110.4	7 28.2 59 79 110.8	7 10.4 59 78 111.2	6 52.5 60 78 111.6	6 34.6 60 78 112.0	6 16.7 60 78 112.5	5 58.8 60 77 112.9	2
3	7 16.4 59 80 109.4	6 58.8 59 79 109.8	6 41.1 59 79 110.3	6 23.4 59 79 110.7	6 05.6 59 78 111.1	5 47.9 59 78 111.5	5 30.1 59 78 111.9	5 12.4 59 78 112.3	3
4	6 28.9 58 80 108.9	6 11.3 59 79 109.3	5 53.8 59 79 109.7	5 36.2 59 79 110.1	5 18.6 59 79 110.5	5 01.0 59 78 110.9			4
75	5 41.2 58 80 108.3	5 23.8 58 80 108.7	5 06.3 58 79 109.1						75

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′ Alt / Δd Δt / Az	12° 30′ Alt / Δd Δt / Az	13° 00′ Alt / Δd Δt / Az	13° 30′ Alt / Δd Δt / Az	14° 00′ Alt / Δd Δt / Az	14° 30′ Alt / Δd Δt / Az	15° 00′ Alt / Δd Δt / Az	15° 30′ Alt / Δd Δt / Az	H.A.
91	5 40.6 54 82 79.4	5 56.8 54 82 78.9	6 12.9 54 82 78.5	6 29.0 54 82 78.1	6 45.1 54 82 77.7	7 01.1 53 82 77.2	7 17.2 53 82 76.8	7 33.2 53 81 76.4	91
2	5 07.4 54 82 78.4	5 23.6 54 82 78.0	5 39.8 54 82 77.6	5 56.0 54 82 77.1	6 12.1 54 82 76.7	6 28.2 54 81 76.3	6 44.3 54 81 75.9		2
3			5 07.0 54 82 76.6	5 23.2 54 81 76.2	5 39.4 54 81 75.8	5 55.6 54 81 75.3			3
4							5 07.0 54 81 74.8		4

Right-margin thumb index: Lat. 33° · Lat. 34° · Lat. 35° · Lat. 36° · Lat. 37° · Lat. 38°

Lat. 33°

H.A.	16°00' Alt	Δd	Δt	Az	16°30' Alt	Δd	Δt	Az	17°00' Alt	Δd	Δt	Az	17°30' Alt	Δd	Δt	Az	18°00' Alt	Δd	Δt	Az	18°30' Alt	Δd	Δt	Az	19°00' Alt	Δd	Δt	Az	19°30' Alt	Δd	Δt	Az	H.A.
00	73 00.0	1.0	02	180.0	73 30.0	1.0	02	180.0	74 00.0	1.0	03	180.0	74 30.0	1.0	03	180.0	75 00.0	1.0	03	180.0	75 30.0	1.0	03	180.0	76 00.0	1.0	03	180.0	76 30.0	1.0	03	180.0	00
1	72 58.6	1.0	07	176.7	73 28.5	1.0	08	176.6	73 58.5	1.0	08	176.4	74 28.4	1.0	08	176.3	74 58.4	1.0	08	176.2	75 28.3	1.0	08	176.2	75 58.3	1.0	09	176.1	76 28.2	1.0	09	176.0	1
2	72 54.2	1.0	12	173.4	73 24.1	99	12	173.3	73 53.9	99	12	173.1	74 23.8	99	13	172.9	74 53.6	99	13	172.7	75 23.4	99	14	172.5	75 53.3	99	14	172.2	76 22.9	99	15	172.0	2
3	72 47.1	99	17	170.2	73 16.7	99	17	170.0	73 46.4	99	17	169.7	74 16.0	99	18	169.4	74 45.6	99	18	169.1	75 15.2	99	19	168.8	75 44.7	98	20	168.4	76 14.2	98	20	168.0	3
4	72 37.2	98	21	167.0	73 06.6	98	22	166.7	73 35.9	98	22	166.3	74 05.3	98	23	166.0	74 34.5	98	23	165.6	75 03.8	97	24	165.1	75 33.0	97	25	164.7	76 02.1	97	26	164.2	4
05	72 24.5	97	25	163.9	72 53.6	97	26	163.5	73 22.6	97	27	163.1	73 51.6	96	27	162.6	74 20.5	96	27	162.1	74 49.4	96	29	161.6	75 18.1	94	30	161.0	75 46.8	95	31	160.5	05
6	72 09.3	96	30	160.9	72 38.0	96	30	160.4	73 06.6	96	32	159.9	73 35.2	95	32	159.3	74 03.7	95	33	158.7	74 32.1	94	33	158.2	75 00.3	94	34	157.5	75 28.5	94	35	156.9	6
7	71 51.6	94	34	157.9	72 19.9	94	34	157.4	72 48.1	94	35	156.8	73 16.2	93	36	156.2	73 44.1	93	37	155.6	74 12.0	93	38	154.9	74 39.8	92	39	154.2	75 07.4	92	40	153.4	7
8	71 31.5	93	37	155.0	71 59.3	93	38	154.4	72 27.0	92	39	153.8	72 54.6	92	40	153.1	73 22.1	91	41	152.5	73 49.4	91	42	151.7	74 16.6	90	43	151.0	74 43.5	90	44	150.1	8
9	71 09.1	91	41	152.3	71 36.5	91	42	151.6	72 03.7	90	42	150.9	72 30.8	90	43	150.2	72 57.7	89	44	149.5	73 24.4	89	45	148.7	73 51.0	88	46	147.9	74 17.3	87	47	147.0	9
10	70 44.7	90	44	149.6	71 11.5	89	45	148.8	71 38.2	89	46	148.2	72 04.7	88	47	147.4	72 31.0	87	48	146.7	72 57.2	87	49	145.8	73 23.1	86	50	145.0	73 48.8	85	51	144.0	10
1	70 18.2	88	47	147.0	70 44.5	87	48	146.3	71 10.7	87	49	145.6	71 36.6	86	50	144.8	72 02.4	85	51	143.9	72 27.9	85	52	143.1	72 53.2	84	53	142.2	73 18.3	84	54	141.2	1
2	69 49.9	86	50	144.6	70 15.7	86	51	143.8	70 41.3	85	52	143.0	71 06.7	84	53	142.2	71 31.9	83	54	141.4	71 56.8	83	55	140.5	72 21.5	82	56	139.6	72 45.9	81	57	138.6	2
3	69 19.9	85	53	142.2	69 45.2	84	54	141.4	70 10.2	83	54	140.6	70 35.0	82	55	139.8	70 59.6	82	56	138.9	71 23.9	81	57	138.0	71 48.0	80	58	137.1	72 11.8	79	59	136.1	3
4	68 48.3	83	55	140.0	69 13.0	82	56	139.2	69 37.5	81	57	138.4	70 01.8	80	58	137.5	70 25.8	80	60	136.6	70 49.5	79	60	135.7	71 13.0	78	61	134.7	71 36.1	77	62	133.7	4
15	68 15.2	81	57	137.8	68 39.4	80	58	137.0	69 03.4	79	59	136.2	69 27.1	79	60	135.3	69 50.5	78	61	134.4	70 13.7	77	62	133.5	70 36.5	76	63	132.5	70 59.1	76	64	131.5	15
6	67 40.8	79	60	135.8	68 04.5	79	60	134.9	68 27.9	78	61	134.1	68 51.1	77	62	133.2	69 14.0	76	63	132.3	69 36.6	75	64	131.4	69 58.8	74	65	130.4	70 20.8	73	66	129.4	6
7	67 05.1	78	61	133.8	67 28.2	77	62	133.0	67 51.2	76	63	132.1	68 13.8	75	64	131.2	68 36.2	74	65	130.3	68 58.2	73	66	129.4	69 20.0	72	67	128.4	69 41.4	71	67	127.4	7
8	66 28.2	76	63	131.9	66 50.9	75	64	131.1	67 13.4	74	65	130.2	67 35.4	73	66	129.4	67 57.3	72	67	128.5	68 18.8	71	67	127.5	68 40.0	70	68	126.6	69 00.9	69	69	125.6	8
9	65 50.2	75	65	130.1	66 12.4	74	66	129.3	66 34.4	73	66	128.5	66 56.0	72	67	127.6	67 17.4	71	68	126.7	67 38.4	70	69	125.7	67 59.2	69	70	124.8	68 19.5	67	70	123.8	9
20	65 11.3	73	66	128.4	65 33.0	72	67	127.6	65 54.5	71	68	126.7	66 15.7	70	69	125.9	66 36.6	69	69	125.0	66 57.2	68	70	124.1	67 17.4	67	71	123.1	67 37.3	66	72	122.1	20
1	64 31.4	72	68	126.8	64 52.7	71	69	126.0	65 13.8	70	69	125.1	65 34.5	69	70	124.3	65 55.0	68	71	123.4	66 15.1	67	71	122.4	66 34.9	65	72	121.5	66 54.3	64	73	120.5	1
2	63 50.7	70	69	125.2	64 11.6	69	70	124.4	64 32.2	68	70	123.6	64 52.5	67	71	122.7	65 12.6	66	72	121.8	65 32.3	65	72	120.9	65 51.6	64	73	120.0	66 10.7	63	74	119.0	2
3	63 09.2	68	71	123.7	63 29.7	68	71	122.9	63 49.9	67	72	122.1	64 09.8	66	72	121.2	64 29.5	65	73	120.4	64 48.8	64	74	119.5	65 07.7	63	74	118.5	65 26.4	62	75	117.6	3
4	62 27.0	68	71	122.3	62 47.1	67	72	121.5	63 07.0	66	73	120.7	63 26.5	65	73	119.8	63 45.7	64	74	119.0	64 04.7	64	74	118.1	64 23.3	61	75	117.2	64 41.5	60	76	116.2	4
25	61 44.1	66	72	120.9	62 03.9	65	73	120.1	62 23.4	64	74	119.3	62 42.5	63	74	118.5	63 01.4	62	75	117.6	63 20.0	61	75	116.7	63 38.2	60	76	115.9	63 56.1	59	76	114.9	25
6	61 00.7	65	73	119.6	61 20.1	64	74	118.8	61 39.2	63	74	118.0	61 58.0	62	75	117.2	62 16.6	61	76	116.3	62 34.8	60	76	115.5	62 52.7	59	77	114.6	63 10.3	58	77	113.7	6
7	60 16.6	64	74	118.3	60 35.7	63	75	117.5	60 54.5	62	75	116.7	61 13.0	61	76	115.9	61 31.2	60	77	115.1	61 49.2	59	77	114.3	62 06.7	58	77	113.4	62 24.0	57	78	112.5	7
8	59 32.1	63	75	117.1	59 50.9	62	76	116.3	60 09.4	61	76	115.6	60 27.6	60	76	114.8	60 45.5	59	77	113.9	61 03.1	58	77	113.1	61 20.4	57	78	112.3	61 37.3	56	78	111.4	8
9	58 47.1	62	76	115.9	59 05.5	61	76	115.2	59 23.7	60	77	114.4	59 41.7	59	77	113.6	59 59.3	58	78	112.8	60 16.6	57	78	112.0	60 33.6	56	78	111.2	60 50.3	55	79	110.3	9
30	58 01.6	61	76	114.8	58 19.8	60	77	114.1	58 37.7	59	77	113.3	58 55.4	58	78	112.5	59 12.7	57	78	111.7	59 29.8	56	79	110.9	59 46.5	55	79	110.1	60 03.0	54	79	109.3	30
1	57 15.7	60	77	113.7	57 33.7	59	78	113.0	57 51.3	58	78	112.2	58 08.7	57	78	111.5	58 25.8	57	79	110.7	58 42.6	56	79	109.9	58 59.1	55	80	109.1	59 15.3	53	80	108.3	1
2	56 29.5	59	78	112.7	56 47.2	58	78	111.9	57 04.6	58	79	111.4	57 21.7	57	79	110.4	57 38.6	56	79	109.7	57 55.1	55	80	108.9	58 11.4	54	80	108.1	58 27.4	53	80	107.2	2
3	55 42.9	59	78	111.7	56 00.3	58	79	110.9	56 17.5	57	79	110.2	56 34.4	56	79	109.5	56 51.0	55	80	108.7	57 07.4	54	80	107.9	57 23.4	53	80	107.1	57 39.2	52	81	106.4	3
4	54 56.0	58	79	110.7	55 13.2	57	79	110.0	55 30.1	56	79	109.2	55 46.8	55	80	108.5	56 03.2	54	80	107.8	56 19.4	53	80	107.0	56 35.2	52	81	106.2	56 50.8	51	81	105.4	4
35	54 08.7	57	79	109.7	54 25.7	56	80	109.0	54 42.5	55	80	108.3	54 59.0	55	80	107.6	55 15.2	54	80	106.8	55 31.1	53	81	106.1	55 46.8	52	81	105.3	56 02.2	51	81	104.6	35
6	53 21.2	56	80	108.8	53 38.0	55	80	108.1	53 54.6	55	80	107.4	54 10.9	54	80	106.7	54 26.9	53	81	105.9	54 42.7	52	81	105.2	54 58.2	51	81	104.5	55 13.4	50	82	103.7	6
7	52 33.5	56	80	107.9	52 50.1	55	80	107.2	53 06.4	54	81	106.5	53 22.6	53	81	105.8	53 38.4	52	81	105.1	53 54.0	52	81	104.4	54 09.4	51	82	103.7	54 24.5	50	82	102.9	7
8	51 45.5	55	80	107.0	52 01.9	54	81	106.4	52 18.1	54	81	105.7	52 34.0	53	81	105.0	52 49.8	52	81	104.3	53 05.2	51	82	103.6	53 20.4	50	82	102.8	53 35.3	49	82	102.1	8
9	50 57.3	55	81	106.2	51 13.5	54	81	105.5	51 29.6	53	81	104.8	51 45.3	52	81	104.2	52 00.9	51	82	103.5	52 16.2	51	82	102.8	52 31.3	50	82	102.1	52 46.1	49	82	101.3	9
40	50 08.8	54	81	105.4	50 24.9	53	81	104.7	50 40.8	53	81	104.0	50 56.5	52	82	103.4	51 11.9	51	82	102.7	51 27.1	50	82	102.0	51 42.0	49	82	101.3	51 56.7	48	83	100.6	40
1	49 20.2	54	81	104.6	49 36.2	53	82	103.9	49 51.9	52	82	103.3	50 07.4	51	82	102.6	50 22.7	51	82	101.9	50 37.8	50	82	101.2	50 52.6	49	83	100.6	51 07.1	48	83	99.9	1
2	48 31.4	53	82	103.8	48 47.3	52	82	103.1	49 02.9	52	82	102.5	49 18.3	51	82	101.8	49 33.4	50	82	101.2	49 48.4	49	83	100.5	50 03.1	49	83	99.8	50 17.5	48	83	99.1	2
3	47 42.5	53	82	103.0	47 58.2	52	82	102.4	48 13.7	51	82	101.8	48 28.9	51	82	101.1	48 44.0	50	83	100.5	48 58.8	49	83	99.8	49 13.4	48	83	99.1	49 27.8	47	83	98.5	3
4	46 53.4	52	82	102.3	47 09.0	52	82	101.7	47 24.3	51	82	101.0	47 39.5	50	83	100.4	47 54.5	49	83	99.7	48 09.2	49	83	99.1	48 23.7	48	83	98.4	48 38.0	47	83	97.8	4
45	46 04.2	52	82	101.6	46 19.6	51	82	100.9	46 34.9	50	83	100.3	46 50.0	50	83	99.7	47 04.8	50	83	99.0	47 19.4	48	83	98.4	47 33.9	48	83	97.8	47 48.1	47	83	97.1	45
6	45 14.8	52	82	100.8	45 30.2	51	83	100.2	45 45.3	50	83	99.6	46 00.3	49	83	99.0	46 15.1	49	83	98.4	46 29.6	48	83	97.7	46 44.0	47	83	97.1	46 58.1	47	83	96.5	6
7	44 25.3	51	83	100.2	44 40.6	51	83	99.5	44 55.7	50	83	98.9	45 10.6	49	83	98.3	45 25.2	48	83	97.7	45 39.7	48	83	97.1	45 54.0	47	83	96.4	46 08.1	47	83	95.8	7
8	43 35.7	51	83	99.5	43 50.9	50	83	98.9	44 05.9	50	83	98.3	44 20.7	49	83	97.7	44 35.3	48	83	97.1	44 49.8	48	83	96.4	45 04.0	47	83	95.8	45 18.0	46	84	95.2	8
9	42 46.1	51	83	98.8	43 01.2	50	83	98.2	43 16.1	49	83	97.6	43 30.8	49	83	97.0	43 45.4	48	83	96.5	43 59.7	48	83	95.8	44 13.9	47	84	95.2	44 27.8	46	84	94.6	9
50	41 56.3	50	83	98.1	42 11.3	50	83	97.6	42 26.2	49	83	97.0	42 40.8	48	83	96.4	42 55.3	48	84	95.8	43 09.6	47	84	95.2	43 23.7	47	84	94.6	43 37.7	46	84	94.0	50
1	41 06.4	50	83	97.5	41 21.4	50	83	96.9	41 36.2	49	83	96.3	41 50.8	48	83	95.8	42 05.2	48	84	95.2	42 19.5	47	84	94.6	42 33.6	47	84	94.0	42 47.4	46	84	93.4	1
2	40 16.5	50	83	96.9	40 31.4	49	83	96.3	40 46.1	49	84	95.7	41 00.7	48	84	95.1	41 15.1	48	84	94.6	41 29.3	47	84	94.0	41 43.4	46	84	93.4	41 57.2	46	84	92.8	2
3	39 26.5	50	83	96.2	39 41.4	49	84	95.7	39 56.1	49	84	95.1	40 10.6	48	84	94.5	40 24.9	48	84	94.0	40 39.1	47	84	93.4	40 53.1	46	84	92.8	41 06.9	46	84	92.2	3
4	38 36.5	50	84	95.6	38 51.3	49	84	95.1	39 05.9	49	84	94.5	39 20.4	48	84	93.9	39 34.7	47	84	93.4	39 48.9	47	84	92.8	40 02.8	46	84	92.2	40 16.6	46	84	91.6	4
55	37 46.4	49	84	95.0	38 01.1	49	84	94.5	38 15.7	48	84	93.9	38 30.2	48	84	93.4	38 44.5	47	84	92.8	38 58.6	47	84	92.2	39 12.5	46	84	91.7	39 26.3	46	84	91.1	55
6	36 56.2	49	84	94.4	37 10.9	49	84	93.9	37 25.5	48	84	93.3	37 39.9	48	84	92.8	37 54.2	47	84	92.2	38 08.3	47	84	91.7	38 22.2	46	84	91.1	38 36.0	46	84	90.5	6
7	36 06.0	49	84	93.8	36 20.7	48	84	93.3	36 35.3	48	84	92.7	36 49.7	48	84	92.2	37 03.9	47	84	91.6	37 18.0	47	84	91.1	37 31.9	46	84	90.5	37 45.7	46	84	90.0	7
8	35 15.8	49	84	93.2	35 30.5	48	84	92.7	35 45.0	48	84	92.2	35 59.4	48	84	91.6	36 13.6	47	84	91.1	36 27.7	47	84	90.5	36 41.6	46	84	90.0	36 55.4	46	84	89.4	8
9	34 25.5	49	84	92.7	34 40.2	48	84	92.1	34 54.7	48	84	91.6	35 09.1	48	84	91.1	35 23.3	47	84	90.5	35 37.4	47	84	90.0	35 51.3	46	84	89.4	36 05.1	46	84	88.9	9
60	33 35.3	49	84	92.1	33 49.9	49	84	91.6	34 04.4	48	84	91.1	34 18.7	48	84	90.5	34 33.0	47	84	90.0	34 47.0	47	84	89.5	35 01.0	46	84	88.9	35 14.8	46	84	88.4	60
1	32 45.0	49	84	91.5	32 59.6	48	84	91.0	33 14.1	48	84	90.5	33 28.4	48	84	90.0	33 42.6	47	84	89.4	33 56.7	47	84	88.9	34 10.7	46	84	88.4	34 24.5	46	84	87.8	1
2	31 54.7	49	84	91.0	32 09.3	48	84	90.5	32 23.7	48	84	90.0	32 38.1	48	84	89.4	32 52.3	47	84	88.9	33 06.4	47	84	88.4	33 20.4	46	84	87.9	33 34.2	46	84	87.3	2
3	31 04.3	49	84	90.4	31 18.9	48	84	89.9	31 33.4	48	84	89.4	31 47.8	48	84	88.9	32 02.0	47	84	88.4	32 16.1	47	84	87.9	32 30.1	46	84	87.3	32 43.9	46	84	86.8	3
4	30 14.0	49	84	89.9	30 28.6	48	84	89.4	30 43.1	48	84	88.9	30 57.5	48	84	88.4	31 11.7	47	84	87.8	31 25.8	47	84	87.3	31 39.8	46	84	86.8	31 53.7	46	84	86.3	4
65	29 23.7	49	84	89.3	29 38.3	49	84	88.8	29 52.8	48	84	88.3	30 07.2	48	84	87.8	30 21.4	47	84	87.3	30 35.6	47	84	86.8	30 49.6	47	84	86.3	31 03.5	46	84	85.8	65
6	28 33.4	49	84	88.8	28 48.0	49	84	88.3	29 02.5	48	84	87.8	29 16.9	48	84	87.3	29 31.2	47	84	86.8	29 45.4	47	84	86.3	29 59.4	47	84	85.8	30 13.3	46	84	85.3	6
7	27 43.1	49	84	88.3	27 57.7	49	84	87.8	28 12.2	48	84	87.3	28 26.7	48	84	86.8	28 41.0	48	84	86.3	28 55.2	47	84	85.8	29 09.2	47	84	85.3	29 23.2	46	83	84.8	7
8	26 52.8	49	84	87.7	27 07.4	49	84	87.3	27 22.0	48	84	86.8	27 36.4	48	84	86.3	27 50.8	48	84	85.8	28 05.0	47	84	85.3	28 19.1	47	84	84.8	28 33.1	47	83	84.3	8
9	26 02.5	49	84	87.2	26 17.2	49	84	86.7	26 31.8	48	84	86.2	26 46.2	48	84	85.8	27 00.6	48	84	85.3	27 14.9	47	84	84.8	27 29.0	47	83	84.3	27 43.1	47	83	83.8	9
70	25 12.3	49	84	86.7	25 27.0	49	84	86.2	25 41.6	48	84	85.7	25 56.1	48	84	85.2	26 10.5	48	83	84.8	26 24.8	48	83	84.3	26 39.0	47	83	83.8	26 53.1	47	83	83.3	70
1	24 22.1	49	84	86.2	24 36.8	49	84	85.7	24 51.4	49	84	85.2	25 05.9	48	84	84.7	25 20.4	48	83	84.3	25 34.7	48	83	83.8	25 49.0	47	83	83.3	26 03.1	47	83	82.8	1
2	23 31.9	49	84	85.7	23 46.6	49	84	85.2	24 01.3	49	84	84.7	24 15.9	48	84	84.2	24 30.3	48	83	83.8	24 44.7	48	83	83.3	24 59.0	48	83	82.8	25 13.2	47	83	82.3	2
3	22 41.7	49	84	85.1	22 56.5	49	83	84.7	23 11.2	49	83	84.2	23 25.8	48	83	83.7	23 40.3	48	83	83.2	23 54.8	48	83	82.8	24 09.1	48	83	82.3	24 23.4	47	83	81.8	3
4	21 51.6	50	83	84.6	22 06.4	49	83	84.2	22 21.2	49	83	83.7	22 35.8	48	83	83.2	22 50.4	48	83	82.7	23 04.9	48	83	82.3	23 19.3	48	83	81.8	23 33.6	48	83	81.3	4
75	21 01.5	50	83	84.1	21 16.4	49	83	83.7	21 31.2	49	83	83.2	21 45.9	49	83	82.7	22 00.5	49	83	82.2	22 15.1	48	83	81.8	22 29.5	48	83	81.3	22 43.9	48	83	80.8	75
6	20 11.5	50	83	83.6	20 26.4	50	83	83.1	20 41.2	49	83	82.7	20 56.0	49	83	82.2	21 10.7	49	83	81.7	21 25.3	49	83	81.3	21 39.8	48	83	80.8	21 54.3	48	83	80.3	6
7	19 21.5	50	83	83.1	19 36.5	50	83	82.6	19 51.3	50	83	82.2	20 06.2	49	83	81.7	20 20.9	49	83	81.2	20 35.6	49	83	80.8	20 50.2	48	83	80.3	21 04.7	48	82	79.8	7
8	18 31.6	50	83	82.6	18 46.6	50	83	82.1	19 01.5	50	83	81.7	19 16.4	49	83	81.2	19 31.2	49	83	80.8	19 45.9	49	83	80.3	20 00.6	49	82	79.8	20 15.2	48	82	79.4	8
9	17 41.7	50	83	82.1	17 56.8	50	83	81.6	18 11.8	50	83	81.2	18 26.7	50	83	80.7	18 41.6	49	83	80.3	18 56.4	49	82	79.8	19 11.1	49	82	79.3	19 25.8	49	82	78.9	9
80	16 51.9	51	83	81.6	17 07.0	50	83	81.1	17 22.1	50	83	80.7	17 37.1	50	83	80.2	17 52.0	50	82	79.8	18 06.9	49	82	79.3	18 21.7	49	82	78.8	18 36.5	49	82	78.4	80
1	16 02.1	51	83	81.1	16 17.3	51	83	80.6	16 32.5	50	83	80.2	16 47.5	50	82	79.7	17 02.5	50	82	79.2	17 17.5	50	82	78.8	17 32.4	50	82	78.4	17 47.2	49	82	77.9	1
2	15 12.5	51	83	80.6	15 27.7	51	83	80.1	15 42.9	51	82	79.7	15 58.1	50	82	79.2	16 13.1	50	82	78.8	16 28.2	50	82	78.3	16 43.1	50	82	77.9	16 58.1	50	82	77.4	2
3	14 22.9	51	83	80.0	14 38.2	51	82	79.6	14 53.5	51	82	79.2	15 08.7	51	82	78.7	15 23.8	50	82	78.3	15 38.9	50	82	77.8	15 54.0	50	82	77.4	16 09.0	50	82	76.9	3
4	13 33.3	51	82	79.5	13 48.7	51	82	79.1	14 04.1	51	82	78.7	14 19.4	51	82	78.2	14 34.6	51	82	77.8	14 49.8	51	82	77.3	15 04.9	50	82	76.9	15 20.0	50	81	76.4	4
85	12 43.9	52	82	79.0	12 59.4	51	82	78.6	13 14.8	51	82	78.2	13 30.2	51	82	77.7	13 45.5	51	82	77.3	14 00.8	51	82	76.8	14 16.0	51	81	76.4	14 31.2	51	81	75.9	85
6	11 54.5	52	82	78.5	12 10.1	52	82	78.1	12 25.6	51	82	77.6	12 41.0	51	82	77.2	12 56.4	51	82	76.8	13 11.8	51	81	76.3	13 27.1	51	81	75.9	13 42.4	51	81	75.4	6
7	11 05.0	52	82	78.0	11 20.9	52	82	77.6	11 36.5	52	82	77.1	11 52.0	51	82	76.7	12 07.5	51	81	76.3	12 23.0	51	81	75.8	12 38.4	51	81	75.4	12 53.8	51	81	75.0	7
8	10 16.1	52	82	77.5	10 31.8	52	82	77.1	10 47.5	52	82	76.6	11 03.1	52	81	76.2	11 18.7	52	81	75.8	11 34.2	51	81	75.3	11 49.7	51	81	74.9	12 05.2	52	81	74.5	8
9	9 27.0	53	82	77.0	9 42.8	53	81	76.6	9 58.6	53	81	76.1	10 14.3	52	81	75.7	10 30.0	52	81	75.3	10 45.6	52	81	74.8	11 01.2	52	81	74.4	11 16.8	52	80	74.0	9
90	8 38.0	53	81	76.5	8 53.9	53	81	76.0	9 09.8	53	81	75.6	9 25.6	53	81	75.2	9 41.3	52	81	74.8	9 57.1	52	81	74.3	10 12.8	52	80	73.9	10 28.5	52	80	73.5	90

Lat. 33°

H.A.	16° 00' Alt. ΔdΔt Az.	16° 30' Alt. ΔdΔt Az.	17° 00' Alt. ΔdΔt Az.	17° 30' Alt. ΔdΔt Az.	18° 00' Alt. ΔdΔt Az.	18° 30' Alt. ΔdΔt Az.	19° 00' Alt. ΔdΔt Az.	19° 30' Alt. ΔdΔt Az.	H.A.
00	41 00.0 1.0 01 180.0	40 30.0 1.0 01 180.0	40 00.0 1.0 01 180.0	39 30.0 1.0 01 180.0	39 00.0 1.0 01 180.0	38 30.0 1.0 01 180.0	38 00.0 1.0 01 180.0	37 30.0 1.0 01 180.0	00
1	40 59.4 1.0 03 178.7	40 29.4 1.0 03 178.7	39 59.5 1.0 03 178.8	39 29.5 1.0 03 178.8	38 59.5 1.0 03 178.8	38 29.5 1.0 03 178.8	37 59.5 1.0 03 178.8	37 29.5 1.0 03 178.8	1
2	40 57.8 1.0 05 177.5	40 27.8 1.0 05 177.5	39 57.8 1.0 05 177.5	39 27.8 1.0 05 177.5	38 57.9 1.0 04 177.6	38 27.9 1.0 04 177.6	37 57.9 1.0 04 177.6	37 27.9 1.0 04 177.6	2
3	40 55.0 1.0 06 176.2	40 25.0 1.0 06 176.2	39 55.1 1.0 05 176.3	39 25.1 1.0 06 176.3	38 55.2 1.0 06 176.3	38 25.2 1.0 06 176.4	37 55.3 1.0 06 176.4	37 25.3 1.0 06 176.4	3
4	40 51.1 1.0 08 174.9	40 21.2 1.0 08 175.0	39 51.2 1.0 08 175.0	39 21.3 1.0 08 175.1	38 51.4 1.0 08 175.1	38 21.5 1.0 08 175.2	37 51.6 1.0 08 175.2	37 21.7 1.0 08 175.3	4
05	40 46.1 1.0 10 173.6	40 16.2 1.0 10 173.7	39 46.3 1.0 10 173.8	39 16.5 1.0 10 173.8	38 46.6 1.0 10 174.0	38 16.7 1.0 10 174.0	37 46.9 1.0 10 174.0	37 17.0 1.0 10 174.1	05
6	40 39.9 99 12 172.4	40 10.1 99 12 172.5	39 40.3 99 12 172.5	39 10.5 99 12 172.6	38 40.7 99 12 172.7	38 10.9 99 11 172.8	37 41.4 99 11 172.8	37 11.3 99 11 172.9	6
7	40 32.7 99 14 171.1	40 03.0 99 14 171.2	39 33.3 99 14 171.3	39 03.5 99 14 171.4	38 33.8 99 13 171.5	38 04.0 99 13 171.6	37 34.3 99 13 171.6	37 04.5 99 13 171.7	7
8	40 24.4 99 16 169.9	39 54.8 99 15 170.0	39 25.1 99 15 170.1	38 55.5 99 15 170.2	38 25.8 99 15 170.3	37 56.1 99 15 170.4	37 26.5 99 15 170.5	36 56.8 99 15 170.6	8
9	40 15.0 99 17 168.6	39 45.5 99 17 168.7	39 15.9 99 17 168.9	38 46.4 99 17 169.0	38 16.8 99 17 169.1	37 47.2 99 17 169.2	37 17.7 99 17 169.4	36 48.0 99 16 169.4	9
10	40 04.6 98 19 167.4	39 35.1 98 19 167.5	39 05.7 98 19 167.6	38 36.2 98 19 167.8	38 06.7 98 18 167.9	37 37.2 98 18 168.0	37 07.8 98 18 168.1	36 38.3 98 18 168.2	10
1	39 53.1 98 21 166.2	39 23.7 98 21 166.3	38 54.4 98 21 166.4	38 25.0 98 20 166.6	37 55.7 98 20 166.7	37 26.3 98 20 166.8	36 56.9 98 20 167.0	36 27.5 98 20 167.1	1
2	39 40.5 97 23 165.0	39 11.3 97 22 165.1	38 42.1 97 22 165.2	38 12.8 98 22 165.4	37 43.6 98 22 165.5	37 14.3 98 22 165.7	36 45.0 98 21 165.8	36 15.8 98 21 165.9	2
3	39 27.0 97 24 163.7	38 57.9 97 24 163.9	38 28.8 97 24 164.1	37 59.6 97 24 164.2	37 30.5 97 23 164.4	37 01.4 97 23 164.5	36 32.2 97 23 164.6	36 03.0 97 23 164.8	3
4	39 12.4 97 26 162.5	38 43.4 97 26 162.7	38 14.4 97 26 162.9	37 45.4 97 25 163.0	37 16.4 97 25 163.2	36 47.4 97 25 163.3	36 18.4 97 25 163.5	35 49.4 97 24 163.7	4
15	38 56.8 96 28 161.3	38 27.9 96 27 161.5	37 59.1 96 27 161.7	37 30.3 96 27 161.9	37 01.4 96 27 162.0	36 32.5 96 26 162.2	36 03.6 96 26 162.4	35 34.7 96 26 162.5	15
6	38 40.2 96 29 160.2	38 11.5 96 29 160.4	37 42.8 96 29 160.5	37 14.1 96 28 160.7	36 45.4 96 28 160.9	36 16.7 96 28 161.1	35 47.9 96 28 161.3	35 19.2 96 27 161.4	6
7	38 22.6 95 31 159.0	37 54.1 95 31 159.2	37 25.6 95 30 159.4	36 57.0 95 30 159.6	36 28.5 95 30 159.8	35 59.9 95 30 160.0	35 31.3 95 29 160.1	35 02.7 95 29 160.3	7
8	38 04.1 94 32 157.8	37 35.8 94 32 158.0	37 07.4 95 32 158.2	36 39.0 95 32 158.4	36 10.6 95 31 158.6	35 42.2 95 31 158.8	35 13.8 95 31 159.0	34 45.3 95 30 159.2	8
9	37 44.7 94 34 156.7	37 16.5 94 34 156.9	36 48.3 94 33 157.1	36 20.1 94 33 157.3	35 51.8 94 33 157.5	35 23.6 94 32 157.7	34 55.3 94 32 157.9	34 27.0 94 32 158.2	9
20	37 24.3 93 35 155.6	36 56.3 93 35 155.8	36 28.3 93 35 156.0	36 00.2 94 35 156.2	35 32.2 94 34 156.4	35 04.1 94 34 156.7	34 36.0 94 33 156.9	34 07.8 94 33 157.1	20
1	37 03.0 93 37 154.4	36 35.2 93 37 154.7	36 07.4 93 36 154.9	35 39.5 93 36 155.1	35 11.6 93 36 155.4	34 43.7 93 35 155.6	34 15.8 93 35 155.8	33 47.8 93 35 156.0	1
2	36 40.8 92 38 153.3	36 13.2 92 38 153.6	35 45.6 92 38 153.8	35 17.9 92 37 154.0	34 50.2 92 37 154.3	34 22.5 92 37 154.5	33 54.7 93 36 154.7	33 26.9 93 36 155.0	2
3	36 17.8 91 40 152.2	35 50.4 91 39 152.5	35 22.9 92 39 152.7	34 55.5 92 38 153.0	34 27.9 92 38 153.2	34 00.4 92 38 153.7	33 32.8 92 38 153.7	33 05.2 92 38 153.9	3
4	35 54.0 91 41 151.1	35 26.7 91 41 151.4	34 59.5 91 40 151.7	34 32.2 91 40 151.9	34 04.9 91 40 152.2	33 37.5 91 40 152.4	33 10.1 91 39 152.6	32 42.7 91 39 152.9	4
25	35 29.3 90 42 150.1	35 02.2 90 42 150.3	34 35.2 90 42 150.6	34 08.1 90 42 150.9	33 40.9 90 41 151.1	33 13.8 91 41 151.4	32 46.6 91 41 151.6	32 19.4 91 40 151.9	25
6	35 03.7 89 44 149.0	34 36.9 89 43 149.3	34 10.1 90 43 149.6	33 43.2 90 43 149.8	33 16.2 90 42 150.1	32 49.3 90 42 150.4	32 22.3 90 42 150.6	31 55.3 90 41 150.9	6
7	34 37.4 89 45 148.0	34 10.8 89 45 148.3	33 44.2 89 44 148.5	33 17.5 89 44 148.8	32 50.8 89 44 149.1	32 24.0 89 43 149.3	31 57.2 89 43 149.6	31 30.4 89 42 149.9	7
8	34 10.4 88 46 146.9	33 44.0 88 46 147.2	33 17.5 88 46 147.5	32 51.0 88 45 147.8	32 24.5 88 45 148.1	31 58.0 89 45 148.3	31 31.4 89 44 148.6	31 04.8 89 44 148.9	8
9	33 42.6 87 48 145.9	33 16.4 87 47 146.2	32 50.1 88 47 146.5	32 23.9 88 47 146.8	31 57.5 88 46 147.1	31 31.2 88 46 147.4	31 04.8 88 46 147.6	30 38.4 88 45 147.9	9
30	33 14.0 87 49 144.9	32 48.0 87 48 145.2	32 22.0 87 48 145.5	31 55.9 87 48 145.8	31 29.8 87 47 146.1	31 03.7 87 47 146.4	30 37.5 87 47 146.7	30 11.3 87 46 147.0	30
1	32 44.7 86 50 143.9	32 19.0 86 50 144.2	31 53.2 86 49 144.5	31 27.3 86 49 144.8	31 01.4 86 49 145.1	30 35.5 86 48 145.4	30 09.5 87 48 145.7	29 43.5 87 47 146.0	1
2	32 14.8 85 51 143.0	31 49.2 85 51 143.3	31 23.6 85 50 143.6	30 58.0 86 50 143.9	30 32.3 86 50 144.2	30 06.6 86 49 144.5	29 40.8 86 49 144.8	29 15.0 86 49 145.1	2
3	31 44.1 84 52 142.0	31 18.8 85 52 142.3	30 53.4 85 51 142.6	30 28.0 85 51 142.9	30 02.5 85 51 143.2	29 37.0 85 50 143.6	29 11.5 85 50 143.9	28 45.9 85 50 144.2	3
4	31 12.8 84 53 141.1	30 47.7 84 53 141.4	30 22.6 84 52 141.7	29 57.4 84 52 142.0	29 32.1 84 52 142.3	29 06.8 84 51 142.6	28 41.5 85 51 142.9	28 16.1 85 51 143.2	4
35	30 40.9 83 54 140.1	30 16.0 83 54 140.4	29 51.0 83 54 140.8	29 26.1 83 53 141.1	29 01.0 84 53 141.4	28 36.0 84 52 141.7	28 10.8 84 52 142.0	27 45.7 84 52 142.3	35
6	30 08.3 82 55 139.2	29 43.6 82 55 139.5	29 18.9 82 55 139.9	28 54.1 83 54 140.2	28 29.3 83 54 140.5	28 04.5 83 54 140.8	27 39.6 83 53 141.1	27 14.6 83 53 141.4	6
7	29 35.1 81 56 138.3	29 10.7 82 56 138.6	28 46.2 82 56 139.0	28 21.6 82 55 139.3	27 57.0 82 55 139.6	27 32.4 82 54 139.9	27 07.7 82 54 140.3	26 43.0 83 54 140.6	7
8	29 01.4 81 57 137.4	28 37.1 81 57 137.7	28 12.8 81 57 138.1	27 48.5 81 56 138.4	27 24.1 81 56 138.7	26 59.7 82 55 139.1	26 35.2 82 55 139.4	26 10.7 82 55 139.7	8
9	28 27.0 80 58 136.5	28 03.0 80 58 136.9	27 38.9 80 57 137.2	27 14.8 80 57 137.5	26 50.7 81 57 137.9	26 26.4 81 56 138.2	26 02.5 81 56 138.5	25 37.9 81 56 138.9	9
40	27 52.1 79 59 135.7	27 28.3 79 59 136.0	27 04.5 80 58 135.7	26 40.6 80 58 137.0	26 16.6 80 58 137.0	25 52.6 80 57 137.4	25 28.8 80 57 137.7	25 04.5 80 57 138.0	40
1	27 16.7 79 60 134.8	26 53.1 79 60 135.1	26 29.5 79 59 135.5	26 05.8 79 59 135.8	25 42.0 79 59 136.2	25 18.3 79 58 136.5	24 54.4 79 58 136.8	24 30.6 80 57 137.2	1
2	26 40.7 78 61 134.0	26 17.4 78 60 134.3	25 53.9 78 60 134.7	25 30.5 78 60 135.0	25 06.9 78 59 135.3	24 43.4 79 59 135.7	24 19.8 79 59 136.0	23 56.1 79 58 136.4	2
3	26 04.2 77 62 133.1	25 41.1 77 61 133.5	25 17.9 77 61 133.8	24 54.6 78 61 134.2	24 31.3 78 60 134.5	24 08.0 78 60 134.9	23 44.6 78 60 135.2	23 21.1 78 59 135.6	3
4	25 27.3 76 62 132.3	25 04.3 76 62 132.7	24 41.3 77 62 133.0	24 18.3 77 61 133.4	23 55.2 77 61 133.7	23 32.1 77 61 134.1	23 08.9 77 60 134.4	22 45.6 78 60 134.8	4
45	24 49.8 76 63 131.5	24 27.1 76 62 131.8	24 04.3 76 62 132.2	23 41.5 76 62 132.6	23 18.6 76 62 132.9	22 55.7 77 61 133.3	22 32.7 77 61 133.6	22 09.7 77 61 133.8	45
6	24 11.9 75 64 130.7	23 49.4 75 64 131.1	23 26.8 75 63 131.4	23 04.2 76 63 131.8	22 41.5 76 63 132.1	22 18.8 76 62 132.5	21 56.0 76 62 132.8	21 33.2 76 62 133.2	6
7	23 33.5 74 65 129.9	23 11.2 74 64 130.3	22 48.8 75 64 130.6	22 26.4 75 64 131.0	22 04.0 75 63 131.4	21 41.4 75 63 131.7	21 18.9 75 63 132.1	20 56.3 75 62 132.4	7
8	22 54.7 74 65 129.1	22 32.6 74 65 129.5	22 10.4 74 65 129.9	21 48.2 74 64 130.2	21 26.0 74 64 130.6	21 03.7 74 64 131.0	20 41.3 74 64 131.3	20 18.9 75 63 131.7	8
9	22 15.5 73 66 128.4	21 53.6 73 66 128.8	21 31.6 73 65 129.1	21 09.6 73 65 129.5	20 47.6 74 65 129.8	20 25.5 74 64 130.2	20 03.3 74 64 130.6	19 41.1 74 64 130.9	9
50	21 35.8 72 67 127.6	21 14.1 72 66 128.0	20 52.4 73 66 128.4	20 30.6 73 66 128.7	20 08.7 73 65 129.1	19 46.8 73 65 129.5	19 24.9 73 65 129.8	19 02.9 73 64 130.2	50
1	20 55.8 72 67 126.9	20 34.3 72 67 127.3	20 12.7 72 67 127.6	19 51.1 72 66 128.0	19 29.5 72 66 128.4	19 07.8 72 66 128.7	18 46.0 73 65 129.1	18 24.2 73 65 129.5	1
2	20 15.3 71 68 126.2	19 54.0 71 68 126.5	19 32.7 71 67 126.9	19 11.3 71 67 127.3	18 49.8 72 67 127.6	18 28.3 72 66 128.0	18 06.8 72 66 128.4	17 45.2 72 66 128.7	2
3	19 34.5 70 69 125.4	19 13.4 70 68 125.8	18 52.2 71 68 126.2	18 31.0 71 68 126.5	18 09.7 71 67 126.9	17 48.5 71 67 127.3	17 27.1 71 67 127.7	17 05.7 71 66 128.0	3
4	18 53.4 70 69 124.7	18 32.4 70 69 125.1	18 11.4 70 68 125.5	17 50.4 70 68 125.9	17 29.4 70 68 126.2	17 08.3 70 68 126.6	16 47.1 71 67 127.0	16 25.9 71 67 127.3	4
55	18 11.8 69 70 124.0	17 51.1 69 69 124.4	17 30.3 69 69 124.8	17 09.5 70 69 125.2	16 48.7 70 69 125.5	16 27.7 70 68 125.9	16 06.7 70 68 126.3	15 45.7 70 68 126.6	55
6	17 29.9 68 70 123.3	17 09.4 69 70 123.7	16 48.8 69 70 124.1	16 28.1 69 69 124.5	16 07.5 69 69 124.8	15 46.7 69 69 125.2	15 26.0 69 68 125.6	15 05.2 69 68 126.0	6
7	16 47.7 68 71 122.6	16 27.4 68 71 123.0	16 06.9 68 70 123.4	15 46.5 68 70 123.8	15 26.0 68 70 124.2	15 05.5 69 69 124.5	14 44.9 69 69 124.9	14 24.3 69 69 125.3	7
8	16 05.2 67 71 122.0	15 45.0 67 71 122.4	15 24.8 68 71 122.7	15 04.5 68 71 123.2	14 44.2 68 70 123.5	14 23.8 68 70 123.9	14 03.0 68 69 124.2	13 43.0 68 69 124.6	8
9	15 22.3 67 72 121.3	15 02.3 67 72 121.7	14 42.3 67 71 122.1	14 22.2 67 71 122.4	14 02.1 67 71 122.8	13 41.9 67 70 123.2	13 21.7 67 70 123.6	13 01.5 67 70 124.0	9
60	14 39.2 66 72 120.6	14 19.4 66 72 121.0	13 59.5 66 72 121.4	13 39.6 66 72 121.8	13 19.6 67 71 122.2	12 59.6 67 71 122.6	12 39.6 67 71 122.9	12 19.6 67 70 123.3	60
1	13 55.7 65 73 120.0	13 36.1 66 73 120.4	13 16.4 66 72 120.8	12 56.6 66 72 121.1	12 36.9 66 71 121.5	12 17.1 66 71 121.9	11 57.2 66 71 122.3	11 37.4 66 71 122.7	1
2	13 12.0 65 73 119.3	12 52.5 65 73 119.7	12 33.0 65 73 120.1	12 13.4 65 72 120.5	11 54.0 66 72 120.9	11 34.2 66 72 121.2	11 14.6 66 72 121.6	10 54.9 66 71 122.0	2
3	12 28.0 64 74 118.7	12 08.7 64 74 119.1	11 49.3 65 73 119.5	11 29.9 65 73 119.9	11 10.5 65 73 120.3	10 51.1 65 72 120.6	10 31.6 65 72 121.0	10 12.1 65 72 121.4	3
4	11 43.7 64 74 118.1	11 24.6 64 74 118.5	11 05.4 64 73 118.9	10 46.2 64 73 119.2	10 26.9 64 73 119.6	10 07.6 64 73 120.0	9 48.3 64 73 120.4	9 29.0 64 72 120.8	4
65	10 59.2 63 75 117.4	10 40.2 63 74 117.8	10 21.2 63 74 118.2	10 02.1 64 74 118.6	9 43.0 64 74 119.0	9 23.9 64 73 119.4	9 04.8 64 73 119.8	8 45.6 64 73 120.2	65
6	10 14.4 63 75 116.8	9 55.6 63 74 117.2	9 36.7 63 74 117.6	9 17.8 63 74 118.0	8 58.9 63 74 118.4	8 40.0 63 74 118.8	8 21.0 63 73 119.2	8 02.0 63 73 119.6	6
7	9 29.4 62 75 116.2	9 10.7 62 75 116.6	8 52.0 62 75 117.0	8 33.3 62 75 117.4	8 14.5 62 75 117.8	7 55.7 63 74 118.2	7 36.9 63 74 118.6	7 18.1 63 74 119.0	7
8	8 44.1 62 76 115.6	8 25.6 62 76 116.0	8 07.1 62 75 116.4	7 48.5 62 75 116.8	7 29.9 62 75 117.2	7 11.3 62 75 117.6	6 52.6 62 74 118.0	6 34.0 62 74 118.4	8
9	7 58.7 61 76 115.0	7 40.3 61 76 115.4	7 21.9 61 76 115.8	7 03.5 61 75 116.2	6 45.0 62 75 116.6	6 26.5 62 75 117.0	6 08.1 62 75 117.4	5 49.6 62 74 117.8	9
70	7 13.0 61 77 114.4	6 54.7 61 76 114.8	6 36.5 61 76 115.2	6 18.2 61 76 115.6	5 59.9 61 76 116.0	5 41.6 61 75 116.4	5 23.3 61 75 116.8	5 04.9 61 75 117.2	70
1	6 27.0 60 77 113.8	6 08.9 60 77 114.2	5 50.8 60 76 114.6	5 32.7 60 76 115.0	5 14.6 60 76 115.4				1
2	5 40.9 60 77 113.3	5 23.0 60 77 113.7	5 05.0 60 77 114.1						2

(Right margin: Lat. 33°, Lat. 34°, Lat. 35°, Lat. 36°, Lat. 37°, Lat. 38°)

DECLINATION SAME NAME AS LATITUDE

Lat. 38°

H.A.	16° 00' Alt. ΔdΔt Az.	16° 30' Alt. ΔdΔt Az.	17° 00' Alt. ΔdΔt Az.	17° 30' Alt. ΔdΔt Az.	18° 00' Alt. ΔdΔt Az.	18° 30' Alt. ΔdΔt Az.	19° 00' Alt. ΔdΔt Az.	19° 30' Alt. ΔdΔt Az.	H.A.
91	7 49.2 53 81 76.0	8 05.1 53 81 75.5	8 21.1 53 81 75.1	8 37.0 53 81 74.7	8 52.9 53 81 74.2	9 08.7 53 80 73.8	9 24.5 53 80 73.4	9 40.3 53 80 73.0	91
2	7 00.4 54 81 75.4	7 16.5 53 81 75.0	7 32.5 53 81 74.6	7 48.5 53 81 74.2	8 04.5 53 80 73.7	8 20.4 53 80 73.3	8 36.4 53 80 72.9	8 52.3 53 80 72.5	2
3	6 11.8 54 81 74.9	6 27.9 54 81 74.5	6 44.0 54 81 74.1	7 00.2 54 80 73.7	7 16.2 54 80 73.2	7 32.3 54 80 72.8	7 48.3 54 80 72.4	8 04.4 54 80 71.9	3
4	5 23.2 54 81 74.4	5 39.5 54 80 74.0	5 55.7 54 80 73.6	6 11.9 54 80 73.1	6 28.1 54 80 72.7	6 44.3 54 80 72.3	7 00.5 54 80 71.9	7 16.6 54 79 71.4	4
95			5 07.5 54 80 73.0	5 23.8 54 80 72.6	5 40.2 54 80 72.2	5 56.4 54 80 71.8	6 12.7 54 79 71.3	6 29.0 54 79 70.9	95
6						5 08.7 55 79 71.3	5 25.1 55 79 70.8	5 41.5 55 79 70.4	6

Lat. 33°

H.A.	20° 00' Alt.	Δd Δt	Az.	20° 30' Alt.	Δd Δt	Az.	21° 00' Alt.	Δd Δt	Az.	21° 30' Alt.	Δd Δt	Az.	22° 00' Alt.	Δd Δt	Az.	22° 30' Alt.	Δd Δt	Az.	23° 00' Alt.	Δd Δt	Az.	23° 30' Alt.	Δd Δt	Az.	H.A.
00	77 00.0	1.0 03	180.0	77 30.0	1.0 03	180.0	78 00.0	1.0 03	180.0	78 30.0	1.0 03	180.0	79 00.0	1.0 04	180.0	79 30.0	1.0 04	180.0	80 00.0	1.0 04	180.0	80 30.0	1.0 04	180.0	00
1	76 58.2	1.0 09	175.8	77 28.1	1.0 09	175.7	77 58.0	1.0 10	175.5	78 28.0	1.0 10	175.3	78 57.9	1.0 11	175.2	79 27.8	1.0 11	174.9	79 57.7	1.0 12	174.7	80 27.6	1.0 12	174.5	1
2	76 52.7	99 15	171.7	77 22.4	99 16	171.4	77 52.2	99 16	171.1	78 21.8	99 17	170.7	78 51.5	99 17	170.4	79 21.2	99 18	170.0	79 50.8	98 19	169.5	80 20.3	98 20	169.0	2
3	76 43.7	98 21	167.6	77 13.1	98 22	167.2	77 42.5	98 22	166.7	78 11.8	98 23	166.2	78 41.1	97 24	165.7	79 10.3	97 25	165.1	79 39.4	97 26	164.4	80 08.4	97 27	163.7	3
4	76 31.2	97 26	163.7	77 00.2	97 27	163.1	77 29.1	96 28	162.5	77 58.0	96 29	161.9	78 26.7	96 30	161.2	78 55.3	95 31	160.4	79 23.8	95 32	159.6	79 52.2	94 34	158.7	4
05	76 15.4	96 32	159.8	76 43.9	96 32	158.4	77 12.3	94 33	158.4	77 40.5	94 35	157.7	78 08.6	95 36	156.8	78 36.6	93 37	155.9	79 04.4	92 38	155.0	79 32.0	92 40	153.9	05
6	75 56.6	93 36	156.1	76 24.5	93 37	155.4	76 52.2	92 38	154.6	77 19.8	92 40	153.7	77 47.2	91 41	152.7	78 14.4	90 42	151.7	78 41.4	89 44	150.6	79 08.1	89 45	149.4	6
7	75 34.8	91 41	152.6	76 02.1	91 42	151.8	76 29.1	90 43	150.9	76 56.0	89 44	149.9	77 22.6	88 46	148.9	77 49.0	87 47	147.8	78 15.1	86 48	146.6	78 40.9	85 50	145.3	7
8	75 10.3	89 45	149.3	75 36.9	88 46	148.3	76 03.3	87 47	147.4	76 29.4	87 48	146.3	76 55.3	86 50	145.2	77 20.8	85 51	144.1	77 46.0	83 52	142.8	78 10.9	82 54	141.5	8
9	74 43.4	87 49	146.1	75 09.3	86 50	145.1	75 35.0	85 51	144.1	76 00.3	84 52	143.0	76 25.4	83 54	141.8	76 50.1	83 55	140.6	77 14.4	80 56	139.3	77 38.3	79 58	137.9	9
10	74 14.3	84 52	143.1	74 39.5	83 53	142.1	75 04.3	82 54	141.0	75 28.9	81 56	139.9	75 53.2	80 57	138.7	76 17.0	79 58	137.4	76 40.5	78 60	136.1	77 03.5	76 61	134.7	10
1	73 43.0	82 55	140.2	74 07.5	81 56	139.2	74 31.7	80 57	138.1	74 55.5	79 59	137.0	75 19.0	78 00	135.7	75 42.0	76 61	134.5	76 04.7	75 63	133.1	76 26.8	76 64	131.7	1
2	73 10.0	80 58	137.6	73 33.8	79 59	136.5	73 57.2	78 60	135.4	74 20.3	76 61	134.2	74 43.0	75 63	133.0	75 05.3	74 64	131.7	75 27.1	72 65	130.4	75 48.5	70 66	129.0	2
3	72 35.2	78 60	135.1	72 58.3	76 62	134.0	73 21.1	75 63	132.9	73 43.5	74 64	131.7	74 05.4	73 65	130.5	74 27.0	71 66	129.2	74 48.1	69 67	127.8	75 08.6	68 68	126.4	3
4	71 58.9	76 62	132.7	72 21.4	76 64	131.6	72 43.5	73 65	130.5	73 05.2	72 66	129.3	73 26.5	70 67	128.1	73 47.3	69 68	126.8	74 07.7	67 60	125.5	74 27.5	66 70	124.1	4
15	71 21.3	73 65	130.5	71 43.1	72 66	129.4	72 04.6	71 67	128.3	72 25.7	70 68	127.1	72 46.3	68 69	125.9	73 06.5	66 70	124.6	73 26.2	65 71	123.3	73 45.4	63 72	122.0	15
6	70 42.4	71 67	128.4	71 03.7	70 68	127.3	71 24.5	69 69	126.2	71 45.0	67 60	125.0	72 05.0	66 70	123.8	72 24.5	64 71	122.6	72 43.6	63 72	121.3	73 02.2	61 73	120.0	6
7	70 02.4	70 68	126.4	70 23.1	68 69	125.3	70 43.4	67 70	124.2	71 03.3	66 71	123.1	71 22.7	64 72	121.9	71 41.7	62 73	120.7	72 00.2	61 74	119.4	72 18.2	59 75	118.1	7
8	69 21.4	68 70	124.5	69 41.6	67 71	123.5	70 01.3	65 72	122.4	70 20.7	64 72	121.3	70 39.6	62 73	120.1	70 58.0	61 74	118.9	71 16.0	59 77	117.6	71 33.5	57 76	116.4	8
9	68 39.5	66 71	122.8	68 59.2	65 72	121.7	69 18.4	63 72	120.7	69 37.3	62 74	119.6	69 55.7	61 74	118.4	70 13.6	59 75	117.2	70 31.1	57 76	116.0	70 48.1	56 77	114.8	9
20	67 56.9	65 72	121.1	68 16.0	63 73	120.1	68 34.8	62 74	119.0	68 53.2	60 75	117.9	69 11.1	59 75	116.8	69 28.6	57 76	115.7	69 45.6	56 77	114.5	70 02.1	54 77	113.3	20
1	67 13.4	63 73	119.6	67 32.2	62 74	118.5	67 50.5	60 75	117.5	68 08.4	59 76	116.4	68 25.9	58 76	115.3	68 42.9	56 77	114.2	68 59.5	55 78	113.0	69 15.6	53 78	111.9	1
2	66 29.3	62 74	118.1	66 47.6	60 75	117.1	67 05.6	59 76	116.0	67 23.1	58 76	115.0	67 40.1	57 77	113.9	67 56.8	55 78	112.8	68 13.0	53 78	111.7	68 28.7	52 79	110.5	2
3	65 44.7	60 75	116.7	66 02.6	59 76	115.7	66 20.1	58 77	114.7	66 37.2	56 77	113.6	66 53.9	55 77	112.6	67 10.2	54 78	111.5	67 26.0	52 79	110.4	67 41.4	50 79	109.3	3
4	64 59.4	59 76	115.3	65 17.0	58 77	114.3	65 34.1	57 77	113.4	65 50.9	55 78	112.3	66 07.2	54 78	111.3	66 23.2	52 79	110.3	66 38.7	51 79	109.2	66 53.7	49 80	108.1	4
25	64 13.7	58 77	114.0	64 30.9	57 78	113.1	64 47.7	55 78	112.1	65 04.1	54 79	111.1	65 20.2	53 79	110.1	65 35.8	51 80	109.1	65 51.0	50 80	108.0	66 05.8	48 80	107.0	25
6	63 27.5	57 78	112.8	63 44.4	56 78	111.9	64 00.9	54 79	110.9	64 17.0	53 79	110.0	64 32.7	52 80	109.0	64 48.1	50 80	108.0	65 03.0	49 80	106.9	65 17.5	48 81	105.9	6
7	62 40.9	56 78	111.6	62 57.5	55 79	110.7	63 13.7	53 80	109.8	63 29.5	52 80	108.8	63 45.0	51 80	107.9	64 00.1	50 80	106.9	64 14.7	48 81	105.9	64 29.0	47 81	104.9	7
8	61 54.0	55 79	110.5	62 10.3	54 79	109.6	62 26.2	53 80	108.7	62 41.8	51 80	107.8	62 57.0	50 80	106.8	63 11.8	49 81	105.9	63 26.2	47 81	104.9	63 40.2	46 82	103.9	8
9	61 06.7	54 79	109.4	61 22.7	53 80	108.6	61 38.4	52 80	107.7	61 53.7	51 80	106.8	62 08.7	49 81	105.8	62 23.3	48 81	104.9	62 37.5	47 82	103.9	62 51.3	45 82	103.0	9
30	60 19.1	53 80	108.4	60 34.9	52 80	107.5	60 50.3	51 81	106.7	61 05.4	50 81	105.8	61 20.2	49 81	104.9	61 34.5	47 82	104.0	61 48.6	46 82	103.0	62 02.2	45 82	102.1	30
1	59 31.2	52 80	107.4	59 46.8	51 81	106.6	60 02.0	50 81	105.7	60 16.9	49 81	104.8	60 31.4	48 82	104.0	60 45.6	47 82	103.1	60 59.4	45 82	102.1	61 12.9	44 82	101.2	1
2	58 43.1	51 80	106.5	58 58.4	51 81	105.6	59 13.4	50 81	104.8	59 28.1	48 82	103.9	59 42.4	47 82	103.1	59 56.5	46 82	102.2	60 10.2	45 82	101.3	60 23.5	44 83	100.4	2
3	57 54.7	51 81	105.5	58 09.8	50 81	104.7	58 24.7	49 82	103.9	58 39.2	48 82	103.1	58 53.4	47 82	102.2	59 07.3	46 82	101.4	59 20.8	44 83	100.5	59 33.9	43 83	99.6	3
4	57 06.1	50 81	104.7	57 21.1	49 82	103.9	57 35.8	48 82	103.0	57 50.1	47 82	102.2	58 04.1	46 82	101.4	58 17.8	45 83	100.5	58 31.2	44 83	99.7	58 44.2	43 83	98.8	4
35	56 17.3	50 82	103.8	56 32.1	49 82	103.0	56 46.7	48 82	102.2	57 00.9	47 82	101.4	57 14.7	46 83	100.6	57 28.3	45 83	99.8	57 41.6	44 83	98.9	57 54.5	42 83	98.1	35
6	55 28.4	49 82	103.0	55 43.0	48 82	102.2	55 57.4	47 83	101.4	56 11.5	46 83	100.6	56 25.2	46 83	99.8	56 38.7	44 83	99.0	56 51.8	43 83	98.2	57 04.6	42 83	97.4	6
7	54 39.3	49 82	102.2	54 53.8	48 82	101.4	55 08.0	47 83	100.6	55 21.9	46 83	99.9	55 35.6	45 83	99.1	55 48.9	44 83	98.3	56 01.9	43 83	97.5	56 14.7	42 83	96.7	7
8	53 50.0	48 82	101.4	54 04.4	47 83	100.6	54 18.5	47 83	99.9	54 32.3	46 83	99.1	54 45.8	45 83	98.3	54 59.1	44 83	97.6	55 12.0	43 83	96.8	55 24.6	42 83	96.0	8
9	53 00.6	48 83	100.6	53 14.9	47 83	99.9	53 28.9	46 83	99.1	53 42.6	45 83	98.4	53 56.0	45 83	97.6	54 09.2	43 83	96.9	54 22.0	42 83	96.1	54 34.6	41 84	95.3	9
40	52 11.1	48 83	99.9	52 25.2	47 83	99.2	52 39.1	46 83	98.4	52 52.8	45 83	97.7	53 06.1	44 83	97.0	53 19.2	43 83	96.2	53 31.9	42 84	95.4	53 44.4	41 84	94.7	40
1	51 21.5	47 83	99.2	51 35.5	46 83	98.5	51 49.3	46 83	97.7	52 02.9	45 83	97.0	52 16.1	44 83	96.3	52 29.1	43 84	95.5	52 41.8	42 84	94.8	52 54.3	41 84	94.0	1
2	50 31.7	47 83	98.5	50 45.7	46 83	97.8	50 59.4	45 83	97.1	51 12.9	44 83	96.3	51 26.1	44 84	95.6	51 39.0	43 84	94.9	51 51.7	42 84	94.2	52 04.0	41 84	93.4	2
3	49 41.9	47 83	97.8	49 55.8	46 83	97.1	50 09.4	45 84	96.4	50 22.8	44 84	95.7	50 36.0	43 84	95.0	50 48.8	42 84	94.3	51 01.5	42 84	93.6	51 13.8	41 84	92.8	3
4	48 52.0	46 83	97.1	49 05.8	46 83	96.4	49 19.4	45 84	95.7	49 32.7	44 84	95.1	49 45.8	43 84	94.4	49 58.6	42 84	93.7	50 11.2	41 84	92.9	50 23.5	41 84	92.2	4
45	48 02.0	46 83	96.4	48 15.8	45 83	95.8	48 29.3	45 84	95.1	48 42.6	44 84	94.4	48 55.6	43 84	93.7	49 08.4	42 84	93.1	49 21.0	41 84	92.4	49 33.2	41 84	91.7	45
6	47 12.0	46 84	95.8	47 25.7	45 84	95.1	47 39.2	44 84	94.5	47 52.4	44 84	93.8	48 05.4	43 84	93.1	48 18.1	42 84	92.5	48 30.7	41 84	91.8	48 42.9	40 84	91.1	6
7	46 21.9	46 84	95.2	46 35.6	45 84	94.5	46 49.0	44 84	93.9	47 02.2	44 84	93.2	47 15.1	43 84	92.6	47 27.9	42 84	91.9	47 40.4	41 84	91.2	47 52.6	40 84	90.5	7
8	45 31.8	46 84	94.6	45 45.4	45 84	93.9	45 58.8	44 84	93.3	46 11.9	44 84	92.6	46 24.9	43 84	92.0	46 37.6	42 84	91.3	46 50.0	41 84	90.7	47 02.3	40 84	90.0	8
9	44 41.6	46 84	93.9	44 55.2	45 84	93.3	45 08.5	44 84	92.7	45 21.6	44 84	92.0	45 34.6	43 84	91.4	45 47.2	42 84	90.8	45 59.7	41 84	90.1	46 12.0	40 84	89.4	9
50	43 51.4	45 84	93.3	44 04.9	45 84	92.7	44 18.2	44 84	92.1	44 31.3	43 84	91.5	44 44.2	43 84	90.8	44 56.9	42 84	90.2	45 09.4	41 84	89.6	45 21.7	40 84	88.9	50
1	43 01.1	45 84	92.8	43 14.6	45 84	92.2	43 27.9	44 84	91.5	43 41.0	44 84	90.9	43 53.9	43 84	90.3	44 06.6	42 84	89.7	44 19.1	41 84	89.0	44 31.4	40 84	88.4	1
2	42 10.9	45 84	92.2	42 24.3	45 84	91.6	42 37.6	44 84	91.0	42 50.7	43 84	90.4	43 03.6	43 84	89.7	43 16.3	42 84	89.1	43 28.8	41 84	88.5	43 41.1	41 84	87.9	2
3	41 20.6	45 84	91.6	41 34.0	45 84	91.0	41 47.3	44 84	90.4	42 00.4	44 84	89.8	42 13.3	43 84	89.2	42 26.0	43 84	88.6	42 38.5	41 84	88.0	42 50.8	41 84	87.4	3
4	40 30.3	45 84	91.1	40 43.7	45 84	90.5	40 57.0	44 84	89.9	41 10.1	43 84	89.3	41 23.0	43 84	88.7	41 35.7	42 84	88.1	41 48.2	41 84	87.5	42 00.5	41 84	86.8	4
55	39 39.9	45 84	90.5	39 53.4	45 84	89.9	40 06.7	44 84	89.3	40 19.8	44 84	88.7	40 32.7	43 84	88.2	40 45.4	42 84	87.6	40 57.9	42 84	87.0	41 10.3	41 84	86.3	55
6	38 49.6	45 84	90.0	39 03.1	45 84	89.4	39 16.4	44 84	88.8	39 29.5	43 84	88.2	39 42.4	43 84	87.6	39 55.1	42 84	87.0	40 07.7	42 84	86.5	40 20.1	41 84	85.9	6
7	37 59.3	45 84	89.4	38 12.8	45 84	88.8	38 26.1	44 84	88.3	38 39.2	43 84	87.7	38 52.1	43 84	87.1	39 04.9	42 84	86.5	39 17.5	42 84	86.0	39 29.9	41 84	85.4	7
8	37 09.0	45 84	88.9	37 22.5	45 84	88.3	37 35.8	44 84	87.7	37 48.9	44 84	87.2	38 01.9	43 84	86.6	38 14.7	42 84	86.0	38 27.3	42 84	85.5	38 39.8	41 84	84.9	8
9	36 18.7	45 84	88.3	36 32.2	45 84	87.8	36 45.5	44 84	87.2	36 58.7	44 84	86.7	37 11.7	43 84	86.1	37 24.5	43 84	85.5	37 37.2	42 84	85.0	37 49.7	41 84	84.4	9
60	35 28.4	45 84	87.8	35 41.9	45 84	87.3	35 55.2	44 84	86.7	36 08.4	44 84	86.2	36 21.5	43 84	85.6	36 34.4	43 84	85.0	36 47.1	42 83	84.5	36 59.6	42 83	83.9	60
1	34 38.1	45 84	87.3	34 51.6	45 84	86.8	35 05.0	44 84	86.2	35 18.2	44 84	85.7	35 31.3	43 84	85.1	35 44.2	43 83	84.6	35 57.0	42 83	84.0	36 09.6	42 83	83.4	1
2	33 47.9	45 84	86.8	34 01.4	45 84	86.2	34 14.8	44 84	85.7	34 28.1	44 84	85.2	34 41.2	43 84	84.6	34 54.2	43 83	84.1	35 07.0	42 83	83.5	35 19.7	42 83	83.0	2
3	32 57.6	45 84	86.3	33 11.2	45 84	85.7	33 24.7	44 84	85.2	33 38.0	44 83	84.7	33 51.1	43 83	84.1	34 04.1	43 83	83.6	34 17.0	42 83	83.0	34 29.7	42 83	82.5	3
4	32 07.4	46 84	85.8	32 21.1	45 84	85.2	32 34.5	44 83	84.7	32 47.9	44 83	84.2	33 01.1	44 83	83.6	33 14.2	43 83	83.1	33 27.1	43 83	82.6	33 39.9	42 83	82.0	4
65	31 17.3	46 84	85.3	31 30.9	45 84	84.7	31 44.4	45 83	84.2	31 57.8	44 83	83.7	32 11.1	44 83	83.2	32 24.3	44 83	82.6	32 37.2	43 83	82.1	32 50.1	43 83	81.6	65
6	30 27.1	46 83	84.8	30 40.8	45 83	84.2	30 54.4	45 83	83.7	31 07.8	45 83	83.2	31 21.2	44 83	82.7	31 34.3	44 83	82.2	31 47.4	43 83	81.6	32 00.3	43 83	81.1	6
7	29 37.1	46 83	84.3	29 50.8	46 83	83.8	30 04.4	45 83	83.2	30 17.9	45 83	82.7	30 31.3	44 83	82.2	30 44.5	44 83	81.7	30 57.6	44 83	81.2	31 10.6	43 83	80.6	7
8	28 47.0	46 83	83.8	29 00.8	46 83	83.3	29 14.5	45 83	82.8	29 28.0	45 83	82.2	29 41.5	44 83	81.7	29 54.8	44 83	81.2	30 08.0	44 83	80.7	30 21.0	43 83	80.2	8
9	27 57.0	46 83	83.3	28 10.8	46 83	82.8	28 24.6	46 83	82.3	28 38.2	45 83	81.8	28 51.7	44 83	81.3	29 05.1	44 83	80.7	29 18.3	44 83	80.2	29 31.5	44 82	79.7	9
70	27 07.1	46 83	82.8	27 21.0	46 83	82.3	27 34.7	46 83	81.8	27 48.4	45 83	81.3	28 02.0	45 83	80.8	28 15.4	45 83	80.3	28 28.8	44 82	79.8	28 42.0	44 82	79.3	70
1	26 17.2	47 83	82.3	26 31.1	46 83	81.8	26 45.0	46 83	81.3	26 58.7	46 83	80.8	27 12.3	45 83	80.3	27 25.9	45 82	79.8	27 39.3	45 82	79.3	27 52.6	44 82	78.8	1
2	25 27.3	47 83	81.8	25 41.3	47 83	81.3	25 55.3	46 83	80.8	26 09.1	46 83	80.3	26 22.8	46 82	79.8	26 36.4	45 82	79.3	26 49.8	45 82	78.8	27 03.3	44 82	78.3	2
3	24 37.6	47 83	81.3	24 51.6	47 83	80.8	25 05.6	46 83	80.3	25 19.5	46 83	79.9	25 33.3	46 82	79.4	25 47.0	45 82	78.9	26 00.6	45 82	78.4	26 14.0	45 82	77.9	3
4	23 47.8	47 83	80.8	24 02.0	47 83	80.4	24 16.0	47 83	79.9	24 30.0	46 82	79.4	24 43.9	46 82	78.9	24 57.6	46 82	78.4	25 11.3	45 82	77.9	25 24.9	45 82	77.4	4
75	22 58.2	48 82	80.3	23 12.4	47 82	79.9	23 26.5	47 82	79.4	23 40.6	47 82	78.9	23 54.5	46 82	78.4	24 08.4	46 82	77.9	24 22.2	46 82	77.4	24 35.8	45 82	77.0	75
6	22 08.6	48 82	79.9	22 22.9	47 82	79.4	22 37.1	47 82	78.9	22 51.2	47 82	78.4	23 05.3	47 82	78.0	23 19.2	46 82	77.5	23 33.1	46 82	77.0	23 46.8	46 81	76.5	6
7	21 19.1	48 82	79.4	21 33.5	48 82	78.9	21 47.8	47 82	78.4	22 02.0	47 82	78.0	22 16.1	47 82	77.5	22 30.1	47 82	77.0	22 44.1	46 81	76.5	22 58.0	46 81	76.0	7
8	20 29.7	48 82	78.9	20 44.2	48 82	78.4	20 58.5	48 82	78.0	21 12.8	48 82	77.5	21 27.0	47 82	77.0	21 41.2	47 82	76.5	21 55.2	47 81	76.1	22 09.2	46 81	75.6	8
9	19 40.4	49 82	78.4	19 54.9	48 82	77.9	20 09.4	48 82	77.5	20 23.7	48 82	77.0	20 38.0	47 82	76.5	20 52.3	47 81	76.1	21 06.4	47 81	75.6	21 20.5	47 81	75.1	9
80	18 51.1	49 82	77.9	19 05.7	49 82	77.5	19 20.3	48 82	76.5	19 34.8	48 81	76.5	19 49.2	48 81	76.1	20 03.5	48 81	75.6	20 17.7	47 81	75.1	20 31.9	47 81	74.7	80
1	18 02.0	49 82	77.4	18 16.7	49 82	77.0	18 31.3	49 81	76.5	18 45.9	48 81	76.1	19 00.3	48 81	75.6	19 14.8	48 81	75.1	19 29.2	48 81	74.7	19 43.4	48 81	74.2	1
2	17 12.9	49 82	77.0	17 27.7	49 81	76.5	17 42.4	49 81	76.0	17 57.1	49 81	75.6	18 11.7	48 81	75.1	18 26.2	48 81	74.7	18 40.7	48 81	74.2	18 55.1	48 80	73.7	2
3	16 23.9	50 81	76.5	16 38.8	50 81	76.0	16 53.6	49 81	75.6	17 08.4	49 81	75.1	17 23.1	48 81	74.6	17 37.7	48 81	74.2	17 52.3	48 80	73.7	18 06.8	48 80	73.3	3
4	15 35.1	50 81	76.0	15 50.0	50 81	75.5	16 05.0	50 81	75.1	16 19.8	50 81	74.6	16 34.6	49 81	74.2	16 49.4	49 80	73.7	17 04.1	49 80	73.3	17 18.7	49 80	72.8	4
85	14 46.3	50 81	75.5	15 01.4	50 81	75.0	15 16.4	50 81	74.6	15 31.4	50 81	74.1	15 46.3	50 80	73.7	16 01.1	49 80	73.2	16 15.9	49 80	72.8	16 30.7	49 80	72.3	85
6	13 57.6	51 81	75.0	14 12.8	51 81	74.6	14 27.9	50 81	74.1	14 43.0	50 81	73.7	14 58.0	50 80	73.2	15 13.0	50 80	72.8	15 27.9	50 80	72.3	15 42.8	49 79	71.9	6
7	13 09.1	51 81	74.5	13 24.4	51 81	74.1	13 39.6	51 80	73.6	13 54.8	51 80	73.2	14 09.9	50 80	72.7	14 25.0	50 80	72.3	14 40.1	50 80	71.8	14 55.0	50 79	71.4	7
8	12 20.6	51 81	74.0	12 36.0	51 80	73.6	12 51.4	51 80	73.1	13 06.7	51 80	72.7	13 21.9	51 80	72.3	13 37.1	51 80	71.8	13 52.3	50 79	71.4	14 07.4	50 79	70.9	8
9	11 32.3	52 80	73.5	11 47.8	52 80	73.1	12 03.3	51 80	72.6	12 18.7	51 80	72.2	12 34.1	51 80	71.8	12 49.4	51 79	71.3	13 04.7	51 79	70.9	13 19.9	51 79	70.4	9
90	10 44.1	52 80	73.0	10 59.7	52 80	72.6	11 15.3	52 80	72.2	11 30.9	52 80	71.7	11 46.3	52 79	71.3	12 01.8	51 79	70.8	12 17.2	51 79	70.4	12 32.5	51 79	70.0	90

Lat. 33°

H.A.	20° 00' Alt. / Δd Δt / Az.	20° 30' Alt. / Δd Δt / Az.	21° 00' Alt. / Δd Δt / Az.	21° 30' Alt. / Δd Δt / Az.	22° 00' Alt. / Δd Δt / Az.	22° 30' Alt. / Δd Δt / Az.	23° 00' Alt. / Δd Δt / Az.	23° 30' Alt. / Δd Δt / Az.	H.A.
00	37 00.0 1.00 01 180.0	36 30.0 1.00 01 180.0	36 00.0 1.00 01 180.0	35 30.0 1.00 01 180.0	35 00.0 1.00 01 180.0	34 30.0 1.00 01 180.0	34 00.0 1.00 01 180.0	33 30.0 1.00 01 180.0	00
1	36 59.5 1.00 03 178.8	36 29.5 1.00 03 178.8	35 59.5 1.00 03 178.8	35 29.5 1.00 02 178.9	34 59.5 1.00 02 178.9	34 29.5 1.00 02 178.9	33 59.5 1.00 02 178.9	33 29.5 1.00 02 178.9	1
2	36 57.9 1.00 04 177.7	36 28.0 1.00 04 177.7	35 58.0 1.00 04 177.7	35 28.0 1.00 04 177.7	34 58.0 1.00 04 177.8	34 28.0 1.00 04 177.8	33 58.1 1.00 04 177.8	33 28.1 1.00 04 177.8	2
3	36 55.4 1.00 06 176.5	36 25.4 1.00 06 176.5	35 55.4 1.00 06 176.5	35 25.5 1.00 06 176.6	34 55.5 1.00 06 176.6	34 25.6 1.00 06 176.6	33 55.6 1.00 06 176.7	33 25.7 1.00 06 176.7	3
4	36 51.7 1.00 08 175.3	36 21.8 1.00 08 175.3	35 51.9 1.00 08 175.4	35 22.0 1.00 08 175.4	34 52.1 1.00 07 175.5	34 22.1 1.00 07 175.5	33 52.2 1.00 07 175.6	33 22.3 1.00 07 175.6	4
05	36 47.1 1.00 09 174.1	36 17.2 1.00 09 174.2	35 47.4 1.00 09 174.2	35 17.5 1.00 09 174.3	34 47.6 1.00 09 174.4	34 17.7 1.00 09 174.4	33 47.8 1.00 09 174.5	33 17.9 1.00 09 174.5	05
6	36 41.5 99 11 173.0	36 11.6 99 11 173.0	35 41.8 99 11 173.1	35 12.0 99 11 173.2	34 42.2 99 11 173.3	34 12.3 99 10 173.3	33 42.5 99 10 173.4	33 12.7 99 10 173.4	6
7	36 34.8 99 13 171.8	36 05.0 99 13 171.9	35 35.3 99 13 172.0	35 05.5 99 12 172.0	34 35.7 99 12 172.1	34 06.0 99 12 172.2	33 36.2 99 12 172.3	33 06.4 99 12 172.3	7
8	36 27.1 99 14 170.6	35 57.4 99 14 170.7	35 27.7 99 14 170.8	34 58.0 99 14 170.9	34 28.3 99 14 171.0	33 58.6 99 14 171.1	33 28.9 99 14 171.2	32 59.2 99 14 171.2	8
9	36 18.4 99 16 169.5	35 48.8 99 16 169.6	35 19.2 99 16 169.7	34 49.6 99 16 169.8	34 20.0 99 16 169.9	33 50.4 99 15 170.0	33 20.7 99 15 170.1	32 51.1 99 15 170.2	9
10	36 08.7 98 18 168.3	35 39.2 98 18 168.5	35 09.7 98 17 168.6	34 40.2 98 17 168.7	34 10.7 98 17 168.8	33 41.1 98 17 168.9	33 11.6 98 17 169.0	32 42.0 98 17 169.1	10
1	35 58.1 98 19 167.2	35 28.7 98 19 167.4	34 59.3 98 19 167.5	34 29.8 98 19 167.6	34 00.4 98 19 167.7	33 31.0 98 19 167.8	33 01.5 98 18 167.9	32 32.1 98 18 168.0	1
2	35 46.5 98 21 166.1	35 17.2 98 21 166.2	34 47.8 98 21 166.3	34 18.5 98 20 166.5	33 49.2 98 20 166.6	33 19.9 98 20 166.7	32 50.5 98 20 166.8	32 21.2 98 20 167.0	2
3	35 33.9 97 23 164.9	35 04.7 97 22 165.1	34 35.5 97 22 165.2	34 06.3 97 22 165.4	33 37.1 97 22 165.5	33 07.8 97 22 165.6	32 38.6 97 21 165.8	32 09.4 97 21 165.9	3
4	35 20.3 97 24 163.8	34 51.2 97 24 164.0	34 22.2 97 24 164.1	33 53.1 97 24 164.3	33 24.0 97 23 164.4	32 54.9 97 23 164.6	32 25.8 97 23 164.7	31 56.6 97 23 164.8	4
15	35 05.8 96 26 162.7	34 36.9 96 25 162.9	34 07.9 96 25 163.0	33 39.0 96 25 163.2	33 10.0 96 25 163.3	32 41.0 96 25 163.5	32 12.0 96 24 163.6	31 43.0 96 24 163.8	15
6	34 50.4 96 27 161.6	34 21.6 96 27 161.8	33 52.8 96 27 161.9	33 24.0 96 27 162.1	32 55.1 96 26 162.3	32 26.3 96 26 162.4	31 57.4 96 26 162.6	31 28.6 96 26 162.8	6
7	34 34.1 96 29 160.5	34 05.4 96 28 160.7	33 36.8 96 28 160.9	33 08.1 96 28 161.0	32 39.4 96 28 161.2	32 10.7 96 27 161.4	31 42.0 96 27 161.6	31 13.2 96 27 161.7	7
8	34 16.8 95 30 159.4	33 48.3 95 30 159.6	33 19.8 95 30 159.8	32 51.3 95 29 160.0	32 22.7 95 29 160.2	31 54.2 95 29 160.3	31 25.6 95 29 160.5	30 57.0 95 28 160.7	8
9	33 58.7 94 32 158.4	33 30.4 94 31 158.6	33 02.0 95 31 158.7	32 33.6 95 31 158.9	32 05.2 95 31 159.1	31 36.8 95 30 159.3	31 08.4 95 30 159.5	30 40.0 95 30 159.7	9
20	33 39.7 94 33 157.3	33 11.5 94 33 157.5	32 43.3 94 33 157.7	32 15.1 94 33 157.9	31 46.9 94 32 158.1	31 18.6 94 32 158.3	30 50.4 94 31 158.5	30 22.1 94 31 158.7	20
1	33 19.8 93 34 156.2	32 51.8 93 34 156.4	32 23.8 93 34 156.7	31 55.8 93 34 156.9	31 27.7 93 33 157.1	30 59.6 94 33 157.3	30 31.5 93 33 157.5	30 03.4 93 32 157.7	1
2	32 59.1 93 36 155.2	32 31.3 93 36 155.4	32 03.5 93 35 155.6	31 35.6 93 35 155.8	31 07.7 93 35 156.1	30 39.8 93 34 156.3	30 11.8 93 34 156.5	29 43.9 93 34 156.7	2
3	32 37.6 92 37 154.2	32 10.0 92 37 154.4	31 42.3 92 37 154.6	31 14.6 92 36 154.8	30 46.9 92 36 155.1	30 19.1 92 36 155.3	29 51.4 93 35 155.5	29 23.6 93 35 155.7	3
4	32 15.3 92 39 153.1	31 47.8 92 38 153.4	31 20.3 92 38 153.6	30 52.8 92 38 153.8	30 25.3 92 38 154.1	29 57.7 92 37 154.3	29 30.1 92 37 154.5	29 02.5 92 36 154.7	4
25	31 52.1 91 40 152.1	31 24.9 91 40 152.4	30 57.6 91 39 152.6	30 30.2 91 39 152.8	30 02.9 91 39 153.1	29 35.5 91 38 153.3	29 08.1 91 38 153.6	28 40.6 91 38 153.8	25
6	31 28.2 90 41 151.1	31 01.1 90 41 151.4	30 34.0 90 40 151.6	30 06.9 90 40 151.9	29 39.7 90 40 152.1	29 12.5 90 40 152.4	28 45.3 90 39 152.6	28 18.0 90 39 152.8	6
7	31 03.5 90 42 150.1	30 36.6 90 42 150.4	30 09.7 90 42 150.6	29 42.8 90 41 150.9	29 15.8 90 41 151.2	28 48.8 90 41 151.4	28 21.8 90 40 151.6	27 54.7 90 40 151.9	7
8	30 38.1 89 44 149.2	30 11.4 89 43 149.4	29 44.7 89 43 149.7	29 17.9 89 43 149.9	28 51.1 89 42 150.2	28 24.3 89 42 150.5	27 57.5 90 42 150.7	27 30.6 90 41 151.0	8
9	30 11.9 88 45 148.2	29 45.4 88 44 148.5	29 18.9 88 44 148.7	28 52.4 89 44 149.0	28 25.8 89 43 149.3	27 59.2 89 43 149.5	27 32.5 89 43 149.8	27 05.8 89 42 150.0	9
30	29 45.1 88 46 147.2	29 18.8 88 46 147.5	28 52.5 88 45 147.8	28 26.1 88 45 148.1	27 59.7 88 45 148.3	27 33.3 88 44 148.6	27 06.8 88 44 148.9	26 40.4 88 44 149.1	30
1	29 17.5 87 47 146.3	28 51.4 87 47 146.6	28 25.3 87 46 146.9	27 59.1 87 46 147.1	27 33.0 87 46 147.4	27 06.7 87 45 147.7	26 40.5 88 45 148.0	26 14.2 88 45 148.2	1
2	28 49.2 86 48 145.4	28 23.3 86 48 145.7	27 57.4 86 48 145.9	27 31.5 87 47 146.2	27 05.5 87 47 146.5	26 39.5 87 46 146.8	26 13.5 87 46 147.1	25 47.4 87 46 147.3	2
3	28 20.3 85 49 144.4	27 54.6 86 49 144.7	27 28.9 86 49 145.0	27 03.2 86 48 145.3	26 37.4 86 48 145.6	26 11.6 86 48 145.9	25 45.8 86 47 146.2	25 19.9 86 47 146.5	3
4	27 50.7 85 50 143.5	27 25.2 85 50 143.8	26 59.8 85 50 144.1	26 34.2 85 49 144.4	26 08.7 85 49 144.7	25 43.1 85 49 145.0	25 17.4 85 48 145.3	24 51.8 86 48 145.6	4
35	27 20.5 84 51 142.6	26 55.2 84 51 142.9	26 30.0 84 51 143.2	26 04.6 84 50 143.5	25 39.3 85 50 143.8	25 13.9 85 50 144.1	24 48.5 85 49 144.4	24 23.0 85 49 144.7	35
6	26 49.6 83 52 141.8	26 24.6 83 52 142.1	25 59.5 84 52 142.4	25 34.4 84 51 142.7	25 09.3 84 51 143.0	24 44.1 84 51 143.3	24 18.9 84 50 143.6	23 53.7 84 50 143.9	6
7	26 18.2 83 53 140.9	25 53.4 83 53 141.2	25 28.5 83 53 141.5	25 03.6 83 52 141.8	24 38.7 83 52 142.1	24 13.7 83 52 142.4	23 48.7 83 51 142.7	23 23.7 84 51 143.0	7
8	25 46.2 82 54 140.0	25 21.6 82 54 140.3	24 56.9 82 54 140.7	24 32.2 82 53 141.0	24 07.5 82 53 141.3	23 42.8 83 53 141.6	23 18.0 83 52 141.9	22 53.1 83 52 142.2	8
9	25 13.5 81 55 139.2	24 49.2 81 55 139.5	24 24.7 81 55 139.8	24 00.3 82 54 140.1	23 35.8 82 54 140.5	23 11.2 82 54 140.8	22 46.6 82 53 141.1	22 22.0 82 53 141.4	9
40	24 40.4 81 56 138.3	24 16.2 81 56 138.7	23 52.0 81 55 139.0	23 27.7 81 55 139.3	23 03.4 81 55 139.6	22 39.1 81 54 139.9	22 14.7 81 54 140.3	21 50.3 81 54 140.6	40
1	24 06.7 80 57 137.5	23 42.7 80 57 137.8	23 18.7 80 56 138.2	22 54.7 80 56 138.5	22 30.6 80 56 138.8	22 06.5 80 55 139.1	21 42.3 81 55 139.5	21 18.1 81 55 139.8	1
2	23 32.4 79 58 136.7	23 08.7 79 58 137.0	22 44.9 79 57 137.4	22 21.0 79 57 137.7	21 57.2 80 57 138.0	21 33.3 80 56 138.3	21 09.3 80 56 138.7	20 45.4 80 55 139.0	2
3	22 57.6 78 59 135.9	22 34.1 79 58 136.2	22 10.5 79 58 136.6	21 46.9 79 58 136.9	21 23.3 79 57 137.2	20 59.6 79 57 137.6	20 35.8 79 57 137.9	20 12.1 79 56 138.2	3
4	22 22.4 78 60 135.1	21 59.0 78 59 135.4	21 35.7 78 59 135.8	21 12.3 78 59 136.1	20 48.8 78 58 136.4	20 25.4 78 58 136.8	20 01.8 78 57 137.1	19 38.3 79 57 137.4	4
45	21 46.6 77 60 134.3	21 23.5 77 60 134.7	21 00.3 77 60 135.0	20 37.1 77 59 135.3	20 13.9 77 59 135.7	19 50.7 78 59 136.0	19 27.3 78 58 136.3	19 04.0 78 58 136.7	45
6	21 10.4 76 61 133.5	20 47.5 76 61 133.9	20 24.5 77 60 134.2	20 01.5 77 60 134.6	19 38.5 77 60 134.9	19 15.5 77 59 135.3	18 52.4 77 59 135.6	18 29.2 77 59 135.9	6
7	20 33.6 76 62 132.8	20 11.0 76 62 133.1	19 48.2 76 61 133.5	19 25.5 76 61 133.8	19 02.7 76 61 134.2	18 39.8 76 60 134.5	18 16.9 76 60 134.8	17 54.0 76 59 135.2	7
8	19 56.5 75 63 132.0	19 34.0 75 63 132.4	19 11.5 75 62 132.7	18 48.9 75 62 133.1	18 26.3 75 61 133.4	18 03.7 76 61 133.8	17 41.0 76 61 134.1	17 18.3 76 60 134.5	8
9	19 18.9 74 63 131.3	18 56.6 74 63 131.6	18 34.3 74 63 132.0	18 11.9 75 62 132.3	17 49.6 75 62 132.7	17 27.1 75 62 133.0	17 04.7 75 61 133.4	16 42.2 75 61 133.7	9
50	18 40.9 73 64 130.5	18 18.8 74 64 130.9	17 56.7 74 63 131.3	17 34.5 74 63 131.6	17 12.4 74 63 132.0	16 50.1 74 62 132.3	16 27.9 74 62 132.7	16 05.6 74 62 133.0	50
1	18 02.4 73 65 129.8	17 40.6 73 65 130.2	17 18.7 73 64 130.5	16 56.7 73 64 130.9	16 34.7 73 63 131.3	16 12.7 73 63 131.6	15 50.7 74 63 132.0	15 28.6 74 62 132.3	1
2	17 23.6 72 65 129.1	17 01.9 72 65 129.5	16 40.2 72 65 129.8	16 18.5 73 64 130.2	15 56.7 73 64 130.5	15 34.9 73 64 130.9	15 13.0 73 63 131.3	14 51.2 73 63 131.6	2
3	16 44.3 71 66 128.4	16 22.9 72 66 128.8	16 01.4 72 65 129.1	15 39.8 72 65 129.5	15 18.3 72 65 129.9	14 56.7 72 64 130.2	14 35.0 72 64 130.6	14 13.4 72 64 130.9	3
4	16 04.7 71 67 127.7	15 43.4 71 66 128.1	15 22.1 71 66 128.4	15 00.8 71 66 128.8	14 39.4 71 65 129.2	14 18.0 71 65 129.5	13 56.6 72 65 129.9	13 35.1 72 64 130.2	4
55	15 24.7 70 67 127.0	15 03.6 70 67 127.4	14 42.5 70 67 127.8	14 21.4 71 66 128.1	14 00.2 71 66 128.5	13 39.0 71 66 128.8	13 17.8 71 65 129.2	12 56.5 71 65 129.6	55
6	14 44.3 70 68 126.3	14 23.5 70 68 126.7	14 02.6 70 67 127.1	13 41.6 70 67 127.4	13 20.7 70 67 127.8	12 59.7 70 66 128.2	12 38.6 70 66 128.5	12 17.6 70 66 128.9	6
7	14 03.6 69 68 125.7	13 43.0 69 68 126.0	13 22.3 69 68 126.4	13 01.5 69 67 126.8	12 40.7 69 67 127.2	12 19.9 69 67 127.5	11 59.1 69 66 127.9	11 38.2 70 66 128.3	7
8	13 22.6 68 69 125.0	13 02.1 68 69 125.4	12 41.6 68 68 125.8	12 21.0 68 68 126.1	12 00.5 69 68 126.5	11 39.8 69 67 126.9	11 19.2 69 67 127.2	10 58.5 69 67 127.6	8
9	12 41.2 68 70 124.3	12 20.9 68 69 124.7	12 00.6 68 69 125.1	11 40.2 68 69 125.5	11 19.8 68 68 125.9	10 59.4 68 68 126.2	10 39.0 68 68 126.6	10 18.5 68 67 127.0	9
60	11 59.5 67 70 123.7	11 39.4 67 70 124.1	11 19.2 67 69 124.5	10 59.1 67 69 124.8	10 38.9 67 69 125.2	10 18.7 67 68 125.6	9 58.4 68 68 126.0	9 38.1 68 68 126.3	60
1	11 17.5 66 71 123.1	10 57.6 66 70 123.4	10 37.6 67 70 123.8	10 17.6 67 70 124.2	9 57.6 67 69 124.6	9 37.6 67 69 125.0	9 17.5 67 69 125.3	8 57.4 67 68 125.7	1
2	10 35.2 66 71 122.4	10 15.4 66 71 122.8	9 55.6 66 70 123.2	9 35.8 66 70 123.6	9 16.0 66 70 124.0	8 56.2 66 70 124.3	8 36.3 66 69 124.7	8 16.4 66 69 125.1	2
3	9 52.5 65 72 121.8	9 33.0 65 71 122.2	9 13.4 65 71 122.6	8 53.8 65 71 123.0	8 34.1 65 70 123.3	8 14.5 66 70 123.7	7 54.8 66 70 124.1	7 35.1 66 69 124.5	3
4	9 09.6 65 72 121.2	8 50.2 65 72 121.6	8 30.8 65 71 122.0	8 11.4 65 71 122.3	7 51.9 65 71 122.7	7 32.5 65 70 123.1	7 13.0 65 70 123.5	6 53.5 65 70 123.9	4
65	8 26.4 64 72 120.6	8 07.2 64 72 121.0	7 48.0 64 72 121.3	7 28.7 64 72 121.7	7 09.5 64 71 122.1	6 50.2 64 71 122.5	6 30.9 64 71 122.9	6 11.5 64 70 123.3	65
6	7 43.0 63 73 120.0	7 23.9 63 73 120.4	7 04.7 64 72 120.7	6 45.6 64 72 121.1	6 26.4 64 72 121.5	6 07.2 64 71 121.9	5 48.5 64 71 122.3	5 29.3 64 71 122.7	6
7	6 59.3 63 73 119.4	6 40.4 63 73 119.8	6 21.5 63 73 120.2	6 02.6 63 73 120.5	5 43.7 63 72 120.9	5 24.8 63 72 121.3	5 05.8 63 72 121.7		7
8	6 15.3 62 74 118.8	5 56.6 62 73 119.2	5 37.9 62 73 119.6	5 19.1 62 73 120.0	5 00.4 63 73 120.3				8
9	5 31.0 62 74 118.2	5 12.5 62 74 118.6							9

Lat. 34°

Lat. 35°

Lat. 36°

Lat. 37°

DECLINATION **SAME** NAME AS LATITUDE

Lat. 38°

H.A.	20° 00' Alt. / Δd Δt / Az.	20° 30' Alt. / Δd Δt / Az.	21° 00' Alt. / Δd Δt / Az.	21° 30' Alt. / Δd Δt / Az.	22° 00' Alt. / Δd Δt / Az.	22° 30' Alt. / Δd Δt / Az.	23° 00' Alt. / Δd Δt / Az.	23° 30' Alt. / Δd Δt / Az.	H.A.
91	9 56.1 52 80 72.5	10 11.8 52 80 72.1	10 27.5 52 80 71.7	10 43.1 52 79 71.2	10 58.8 52 79 70.8	11 14.3 52 79 70.4	11 29.9 52 79 69.9	11 45.4 52 78 69.5	91
2	9 08.1 53 80 72.0	9 24.0 53 79 71.6	9 39.8 53 79 71.2	9 55.6 53 79 70.7	10 11.3 52 79 70.3	10 27.0 52 79 69.9	10 42.7 52 78 69.4	10 58.3 52 78 69.0	2
3	8 20.3 53 79 71.5	8 36.3 53 79 71.1	8 52.2 53 79 70.7	9 08.1 53 79 70.2	9 24.0 53 79 69.8	9 39.8 53 78 69.4	9 55.7 53 78 68.9	10 11.4 53 78 68.5	3
4	7 32.7 54 79 71.0	7 48.8 54 79 70.6	8 04.8 54 79 70.2	8 20.9 54 79 69.7	8 36.9 53 78 69.3	8 52.8 53 78 68.9	9 08.8 53 78 68.4	9 24.7 53 78 68.0	4
95	6 45.2 54 79 70.5	7 01.4 54 79 70.1	7 17.6 54 78 69.7	7 33.7 54 78 69.2	7 49.9 54 78 68.8	8 06.0 54 78 68.4	8 22.1 54 78 68.0	8 38.1 53 77 67.5	95
6	5 57.8 54 79 70.0	6 14.2 54 78 69.6	6 30.5 54 78 69.1	6 46.8 54 78 68.7	7 03.0 54 78 68.3	7 19.3 54 78 67.9	7 35.5 54 77 67.5	7 51.7 54 77 67.0	6
7	5 10.6 55 78 69.5	5 27.1 55 78 69.1	5 43.5 55 78 68.6	6 00.0 55 78 68.2	6 16.4 54 78 67.8	6 32.7 55 77 67.4	6 49.1 55 77 66.9	7 05.5 54 77 66.5	7
8	5 (?)		5 13.3 55 77 67.7	5 29.9 55 77 67.3	5 46.4 55 77 66.9	6 02.9 55 77 66.4	6 19.4 55 76 66.0	8	
9	5 (?)				5 00.2 56 77 66.3	5 16.9 55 77 65.9	5 33.5 55 76 65.5	9	

Lat. 33°

Each declination cell is given as: Alt (° ′)   Δd   Δt   Az (°)

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
00	81 00.0 1.0 04 180.0	81 30.0 1.0 04 180.0	82 00.0 1.0 05 180.0	82 30.0 1.0 05 180.0	83 00.0 1.0 05 180.0	83 30.0 1.0 06 180.0	84 00.0 1.0 06 180.0	84 30.0 1.0 07 180.0	00
1	80 57.4 1.0 13 174.2	81 27.3 1.0 13 173.5	81 57.2 99 14 172.7	82 27.0 99 15 171.7	82 56.8 99 16 172.7	83 26.6 99 17 172.1	83 56.3 99 18 171.5	84 26.0 99 20 170.8	1
2	80 49.8 98 21 168.5	81 19.3 98 22 167.9	81 48.7 98 24 167.2	82 18.0 98 24 166.4	82 47.2 97 26 165.5	83 16.4 97 27 164.5	83 45.3 96 29 163.4	84 14.1 96 31 162.0	2
3	80 37.4 96 28 162.9	81 06.2 96 30 162.1	81 34.9 96 31 161.1	82 03.4 96 33 160.0	82 31.8 94 35 158.8	82 59.9 93 37 157.4	83 27.8 92 39 155.8	83 55.2 91 41 154.0	3
4	80 20.4 94 35 157.7	80 48.4 93 37 156.6	81 16.2 92 38 155.4	81 43.8 91 40 154.0	82 11.0 90 42 152.5	82 37.9 89 45 150.9	83 04.4 87 47 149.0	83 30.4 86 50 146.8	4
05	79 59.3 91 41 152.7	80 26.4 90 43 151.5	80 53.2 89 45 150.1	81 19.6 87 47 148.6	81 45.6 86 49 146.9	82 11.2 84 51 145.0	82 36.2 82 54 142.9	83 00.5 80 56 140.6	05
6	79 34.5 87 47 148.1	80 00.5 86 49 146.8	80 26.2 85 50 145.2	80 51.5 83 52 143.8	81 16.2 82 55 141.8	81 40.4 80 57 139.8	82 04.0 77 59 137.6	82 26.8 75 62 135.1	6
7	79 06.3 84 52 143.9	79 31.4 83 53 142.4	79 56.0 81 55 140.8	80 20.0 79 57 139.1	80 43.5 77 59 137.2	81 05.7 75 61 135.1	81 28.5 72 63 132.9	81 49.8 69 66 130.5	7
8	78 35.3 81 56 140.0	78 59.3 79 58 138.5	79 22.8 77 59 136.8	79 45.7 75 61 135.0	80 08.0 73 63 133.1	80 29.6 71 65 131.0	80 50.4 68 67 128.8	81 10.4 65 69 126.4	8
9	78 01.8 77 60 136.4	78 24.8 76 61 134.9	78 47.2 74 63 133.2	79 09.0 72 64 131.4	79 30.2 69 66 129.5	79 50.6 67 68 127.4	80 10.3 64 70 125.3	80 29.0 61 72 122.9	9
10	77 26.1 74 63 133.2	77 48.1 72 64 131.6	78 09.5 70 66 129.9	78 30.3 68 67 128.1	78 50.5 66 69 126.2	79 09.8 63 70 124.2	79 28.4 60 72 122.1	79 46.0 57 74 119.9	10
1	76 48.5 71 65 130.2	77 09.6 69 67 128.6	77 30.1 67 68 127.0	77 50.0 65 70 125.2	78 09.1 63 71 123.4	78 27.5 60 73 121.4	78 45.1 57 74 119.4	79 01.8 54 75 117.2	1
2	76 09.3 68 68 127.5	76 29.5 67 69 125.9	76 49.2 64 70 124.3	77 08.2 62 72 122.6	77 26.5 60 73 120.7	77 44.0 57 74 118.9	78 00.7 54 76 116.9	78 16.6 51 77 114.8	2
3	75 28.7 66 70 125.0	75 48.2 64 71 123.4	76 07.0 62 72 121.8	76 25.2 60 73 120.1	76 42.7 57 75 118.4	76 59.5 55 76 116.6	77 15.4 52 77 114.7	77 30.5 49 78 112.7	3
4	74 46.9 63 71 122.2	75 05.6 61 73 120.6	75 23.7 59 74 119.0	75 41.2 57 75 117.3	75 58.0 55 76 115.5	76 14.1 52 77 114.5	76 29.4 50 78 112.7	76 43.4 49 78 110.8	4
15	74 04.0 61 73 120.5	74 22.1 59 74 119.1	74 39.5 57 75 117.5	74 56.4 55 76 116.0	75 12.5 53 77 114.3	75 27.9 50 78 112.6	75 42.6 48 79 110.9	75 56.5 45 80 109.1	15
6	73 20.2 59 74 118.6	73 37.7 57 75 117.1	73 54.6 55 76 115.7	74 10.8 53 77 114.1	74 26.3 51 78 112.6	74 41.2 48 79 110.9	74 55.3 46 80 109.2	75 08.7 43 80 107.5	6
7	72 35.7 57 75 116.8	72 52.6 55 76 115.4	73 08.9 53 77 113.9	73 24.6 51 78 112.5	73 39.6 49 79 110.9	73 54.0 47 79 109.4	74 07.6 44 80 107.7	74 20.5 42 81 106.1	7
8	71 50.4 55 76 115.1	72 06.8 54 77 113.7	72 22.6 52 78 112.3	72 37.8 50 79 110.9	72 52.4 47 79 109.3	73 06.3 45 80 107.9	73 18.2 44 81 106.4	73 32.0 41 81 104.8	8
9	71 04.5 54 77 113.5	71 20.4 52 78 112.2	71 35.8 50 79 110.8	71 50.6 48 79 109.4	72 04.7 46 80 108.0	72 18.2 44 81 106.6	72 31.1 42 81 105.1	72 43.2 39 82 103.5	9
20	70 18.1 53 78 112.0	70 33.6 51 79 110.8	70 48.6 49 79 109.4	71 02.9 47 80 108.1	71 16.7 45 81 106.7	71 29.8 43 81 105.3	71 42.3 41 82 103.9	71 54.2 38 82 102.4	20
1	69 31.3 51 79 110.7	69 46.4 49 79 109.4	70 00.9 48 80 108.1	70 14.9 46 81 106.8	70 28.3 44 81 105.5	70 41.2 42 82 104.1	70 53.4 40 82 102.8	71 04.9 37 82 101.3	1
2	68 44.0 50 79 109.4	68 58.7 48 80 108.1	69 12.9 46 80 106.9	69 26.6 45 81 105.7	69 39.7 43 81 104.4	69 52.3 41 82 103.1	70 04.2 39 82 101.7	70 15.5 37 83 100.3	2
3	67 56.3 49 80 108.1	68 10.7 47 80 107.0	68 24.5 45 81 105.8	68 38.0 44 81 104.5	68 50.8 42 82 103.2	69 03.1 40 82 102.0	69 14.8 39 82 100.7	69 26.0 36 83 99.4	3
4	67 08.3 48 80 107.0	67 22.5 46 81 105.8	67 36.1 45 81 104.7	67 49.2 43 82 103.5	68 01.8 41 82 102.3	68 13.8 39 82 101.0	68 25.3 37 83 99.8	68 36.2 35 83 98.5	4
25	66 20.1 47 81 105.9	66 33.9 45 81 104.8	66 47.3 44 82 103.6	67 00.2 42 82 102.5	67 12.5 40 82 101.3	67 24.4 39 83 100.1	67 35.7 37 83 98.9	67 46.4 35 83 97.7	25
6	65 31.5 46 81 104.8	65 45.1 45 82 103.8	65 58.3 43 82 102.7	66 10.9 41 82 101.5	66 23.1 40 83 100.4	66 34.8 38 83 99.2	66 45.9 36 83 98.1	66 56.5 34 83 96.9	6
7	64 42.8 45 82 103.8	64 56.2 44 82 102.8	65 09.1 42 82 101.7	65 21.6 41 83 100.6	65 33.5 39 83 99.5	65 45.0 37 83 98.4	65 56.0 35 84 97.3	66 06.5 34 84 96.1	7
8	63 53.8 45 82 102.9	64 07.0 43 82 101.9	64 19.7 42 82 100.8	64 32.0 40 83 99.8	64 43.9 39 83 98.7	64 55.2 37 83 97.6	65 06.1 35 84 96.5	65 16.5 34 84 95.4	8
9	63 04.7 44 82 102.0	63 17.7 43 82 101.0	63 30.3 41 83 100.0	63 42.4 40 83 98.9	63 54.1 38 83 97.9	64 05.3 37 83 96.8	64 16.0 35 83 95.8	64 26.3 33 84 94.7	9
30	62 15.4 43 82 101.1	62 28.2 42 83 100.1	62 40.6 41 83 99.2	62 52.6 39 83 98.2	63 04.2 38 83 97.1	63 15.3 36 83 96.1	63 25.9 35 84 95.1	63 36.2 33 84 94.0	30
1	61 26.0 43 83 100.3	61 38.6 42 83 99.3	61 50.9 40 83 98.4	62 02.8 39 83 97.4	62 14.2 37 83 96.4	62 25.2 36 84 95.4	62 35.8 35 84 94.4	62 45.9 33 84 93.4	1
2	60 36.4 42 83 99.5	60 49.1 41 83 98.6	61 01.1 40 83 97.6	61 12.8 38 83 96.7	61 24.2 37 84 95.7	61 35.1 36 84 94.7	61 45.6 34 84 93.7	61 55.7 33 84 92.7	2
3	59 46.7 42 83 98.7	59 59.1 41 83 97.8	60 11.2 39 83 96.9	60 22.8 38 83 95.9	60 34.1 37 84 95.0	60 44.9 36 84 94.1	60 55.4 34 84 93.1	61 05.4 33 84 92.1	3
4	58 56.9 42 83 98.0	59 09.2 40 83 97.1	59 21.2 39 83 96.2	59 32.7 38 84 95.3	59 43.9 37 84 94.3	59 54.7 35 84 93.4	60 05.1 34 84 92.5	60 15.1 33 84 91.5	4
35	58 07.0 41 83 97.2	58 19.2 40 83 96.4	58 31.1 39 84 95.5	58 42.6 38 84 94.6	58 53.7 36 84 93.7	59 04.5 35 84 92.8	59 14.8 34 84 91.9	59 24.8 33 84 91.0	35
6	57 17.1 41 83 96.5	57 29.2 40 84 95.7	57 41.0 39 84 94.8	57 52.4 38 84 94.0	58 03.5 36 84 93.1	58 14.2 35 84 92.2	58 24.5 34 84 91.3	58 34.5 33 84 90.4	6
7	56 27.0 41 83 95.8	56 39.1 40 84 95.0	56 50.8 38 84 94.2	57 02.2 37 84 93.3	57 13.2 36 84 92.5	57 23.9 35 84 91.6	57 34.2 34 84 90.7	57 44.2 33 84 89.8	7
8	55 37.0 41 84 95.2	55 48.9 39 84 94.4	56 00.6 38 84 93.5	56 11.9 37 84 92.7	56 22.9 36 84 91.9	56 33.6 34 84 91.0	56 43.9 34 84 90.2	56 53.9 33 84 89.3	8
9	54 46.8 40 84 94.5	54 58.7 39 84 93.7	55 10.4 38 84 92.9	55 21.7 37 84 92.1	55 32.6 36 84 91.3	55 43.3 35 84 90.5	55 53.6 34 84 89.6	56 03.5 33 84 88.8	9
40	53 56.6 40 84 93.9	54 08.5 39 84 93.1	54 20.1 38 84 92.3	54 31.4 37 84 91.5	54 42.3 36 84 90.7	54 53.0 35 84 89.9	55 03.3 34 84 89.1	55 13.2 33 84 88.3	40
1	53 06.4 40 84 93.3	53 18.3 39 84 92.5	53 29.8 38 84 91.7	53 41.1 37 84 91.0	53 52.0 36 84 90.2	54 02.6 35 84 89.4	54 13.0 34 84 88.6	54 22.8 33 84 87.8	1
2	52 16.2 40 84 92.7	52 28.0 39 84 91.9	52 39.5 38 84 91.2	52 50.7 37 84 90.4	53 01.7 36 84 89.6	53 12.3 35 84 88.9	53 22.7 34 84 88.1	53 32.7 33 84 87.3	2
3	51 25.9 40 84 92.1	51 37.7 39 84 91.4	51 49.2 38 84 90.6	52 00.4 37 84 89.9	52 11.4 36 84 89.1	52 22.0 35 84 88.3	52 32.4 34 84 87.6	52 42.4 33 84 86.8	3
4	50 35.6 40 84 91.5	50 47.4 39 84 90.8	50 58.9 38 84 90.1	51 10.1 37 84 89.3	51 21.1 36 84 88.6	51 31.7 34 84 87.8	51 42.1 34 84 87.1	51 52.2 33 84 86.3	4
45	49 45.3 40 84 90.9	49 57.0 39 84 90.2	50 08.6 38 84 89.5	50 19.8 37 84 88.8	50 30.8 36 84 88.1	50 41.5 35 84 87.3	50 51.9 34 84 86.6	51 02.0 33 84 85.8	45
6	48 55.0 40 84 90.4	49 06.7 39 84 89.7	49 18.2 38 84 89.0	49 29.5 37 84 88.3	49 40.5 36 84 87.6	49 51.2 35 84 86.8	50 01.6 34 84 86.1	50 11.8 33 84 85.4	6
7	48 04.6 40 84 89.8	48 16.4 39 84 89.2	48 27.9 38 84 88.5	48 39.2 37 84 87.8	48 50.2 36 84 87.1	49 01.0 35 84 86.3	49 11.5 34 84 85.6	49 21.7 34 84 84.9	7
8	47 14.3 40 84 89.3	47 26.1 39 84 88.6	47 37.6 38 84 87.9	47 48.9 37 84 87.3	48 00.0 36 84 86.6	48 10.8 36 84 85.9	48 21.3 34 84 85.2	48 31.6 34 83 84.5	8
9	46 24.0 40 84 88.8	46 35.8 39 84 88.1	46 47.4 38 84 87.4	46 58.7 37 84 86.8	47 09.8 37 84 86.1	47 20.6 36 84 85.4	47 31.3 34 84 84.7	47 41.5 34 83 84.0	9
50	45 33.7 40 84 88.3	45 45.5 39 84 87.6	45 57.1 38 84 86.9	46 08.4 37 84 86.3	46 19.6 37 84 85.6	46 30.4 36 84 84.9	46 41.1 35 83 84.2	46 51.5 34 83 83.6	50
1	44 43.4 40 84 87.7	44 55.2 39 84 87.1	45 06.9 38 84 86.4	45 18.3 37 84 85.8	45 29.4 37 84 85.1	45 40.3 36 83 84.5	45 51.0 35 83 83.8	46 01.5 34 83 83.1	1
2	43 53.1 40 84 87.2	44 05.0 39 84 86.6	44 16.7 38 84 86.0	44 28.1 38 84 85.3	44 39.3 37 83 84.7	44 50.3 36 83 84.0	45 01.0 35 83 83.3	45 11.6 35 83 82.7	2
3	43 02.9 40 84 86.7	43 14.8 39 84 86.1	43 26.5 39 84 85.5	43 37.9 38 84 84.8	43 49.2 37 83 84.2	44 00.3 36 83 83.5	44 11.1 36 83 82.9	44 21.7 35 83 82.2	3
4	42 12.7 40 84 86.2	42 24.6 39 84 85.6	42 36.3 39 84 85.0	42 47.9 38 83 84.4	42 59.2 37 83 83.7	43 10.3 37 83 83.1	43 21.2 36 83 82.5	43 31.9 35 83 81.8	4
55	41 22.5 40 84 85.7	41 34.4 40 84 85.1	41 46.2 39 83 84.5	41 57.8 38 83 83.9	42 09.2 38 83 83.3	42 20.3 37 83 82.6	42 31.3 36 83 82.0	42 42.1 36 83 81.4	55
6	40 32.3 40 84 85.3	40 44.3 40 83 84.6	40 56.2 39 83 84.0	41 07.8 38 83 83.4	41 19.2 38 83 82.8	41 30.5 37 83 82.2	41 41.5 36 83 81.6	41 52.4 36 83 81.0	6
7	39 42.2 41 84 84.8	39 54.2 40 83 84.2	40 06.1 39 83 83.6	40 17.8 39 83 83.0	40 29.3 38 83 82.4	40 40.6 37 83 81.8	40 51.8 37 83 81.1	41 02.7 36 83 80.5	7
8	38 52.1 41 83 84.3	39 04.2 40 83 83.7	39 16.1 39 83 83.1	39 27.9 39 83 82.5	39 39.5 38 83 81.9	39 50.9 38 83 81.3	40 02.1 37 83 80.7	40 13.1 36 83 80.1	8
9	38 02.0 41 83 83.8	38 14.2 40 83 83.2	38 26.2 40 83 82.6	38 38.0 39 83 82.1	38 49.7 39 83 81.5	39 01.2 38 83 80.9	39 12.4 37 83 80.3	39 23.5 37 82 79.7	9
60	37 12.0 41 83 83.3	37 24.3 40 83 82.8	37 36.3 40 83 82.2	37 48.2 39 83 81.6	38 00.0 39 83 81.0	38 11.5 38 83 80.4	38 22.9 38 82 79.9	38 34.1 37 82 79.3	60
1	36 22.1 41 83 82.9	36 34.4 41 83 82.3	36 46.5 40 83 81.7	36 58.5 40 83 81.2	37 10.3 39 83 80.6	37 21.9 39 83 80.0	37 33.4 38 82 79.4	37 44.7 38 82 78.8	1
2	35 32.2 41 83 82.4	35 44.5 41 83 81.8	35 56.7 40 83 81.3	36 08.8 40 83 80.7	36 20.7 40 83 80.1	36 32.4 39 82 79.6	36 43.9 39 82 79.0	36 55.3 38 82 78.4	2
3	34 42.3 42 83 81.9	34 54.7 41 83 81.4	35 07.0 41 83 80.8	35 19.2 40 83 80.3	35 31.1 40 82 79.7	35 42.9 39 82 79.1	35 54.6 39 82 78.6	36 06.1 38 82 78.0	3
4	33 52.5 42 83 81.5	34 05.0 41 83 80.9	34 17.4 41 83 80.4	34 29.6 40 82 79.8	34 41.6 40 82 79.3	34 53.5 39 82 78.7	35 05.3 39 82 78.2	35 16.9 38 82 77.6	4
65	33 02.8 42 83 81.0	33 15.4 42 83 80.5	33 27.8 41 82 79.9	33 40.1 41 82 79.4	33 52.2 40 82 78.8	34 04.2 40 82 78.3	34 16.1 39 82 77.7	34 27.8 39 82 77.2	65
6	32 13.1 42 83 80.6	32 25.8 42 83 80.0	32 38.3 41 82 79.5	32 50.7 41 82 78.9	33 02.9 41 82 78.4	33 15.0 40 82 77.9	33 27.0 40 82 77.3	33 38.8 39 82 76.8	6
7	31 23.5 43 83 80.1	31 36.1 42 82 79.6	31 48.8 42 82 79.0	32 01.3 41 82 78.5	32 13.7 41 82 78.0	32 25.9 40 82 77.4	32 37.9 40 82 76.9	32 49.8 39 81 76.3	7
8	30 34.0 43 82 79.6	30 46.8 43 82 79.1	30 59.5 42 82 78.6	31 12.1 42 82 78.1	31 24.5 41 82 77.5	31 36.8 41 82 77.0	31 48.9 41 81 76.5	32 01.0 40 81 75.9	8
9	29 44.5 43 82 79.2	29 57.4 43 82 78.7	30 10.2 42 82 78.1	30 22.9 42 82 77.6	30 35.4 42 82 77.1	30 47.8 41 82 76.6	31 00.1 41 81 76.0	31 12.2 40 81 75.5	9
70	28 55.1 44 82 78.7	29 08.1 43 82 78.2	29 21.0 43 82 77.7	29 33.8 42 82 77.2	29 46.4 42 82 76.7	29 58.9 41 81 76.1	30 11.3 41 81 75.6	30 23.5 41 81 75.1	70
1	28 05.8 44 82 78.3	28 18.9 44 82 77.8	28 31.9 43 82 77.3	28 44.7 43 82 76.7	28 57.5 42 82 76.2	29 10.1 42 81 75.7	29 22.6 41 81 75.2	29 35.0 41 81 74.7	1
2	27 16.6 44 82 77.8	27 29.8 44 82 77.3	27 42.8 43 82 76.8	27 55.8 43 81 76.3	28 08.6 43 81 75.8	28 21.4 42 81 75.3	28 34.0 42 81 74.8	28 46.5 41 81 74.2	2
3	26 27.4 45 82 77.4	26 40.7 44 82 76.9	26 53.9 44 81 76.4	27 06.9 43 81 75.9	27 19.9 43 81 75.4	27 32.7 43 81 74.9	27 45.5 42 81 74.3	27 58.1 42 80 73.8	3
4	25 38.4 45 82 76.9	25 51.8 44 81 76.4	26 05.0 44 81 75.9	26 18.2 44 81 75.4	26 31.3 43 81 74.9	26 44.2 43 81 74.4	26 57.1 42 80 73.9	27 09.8 42 80 73.4	4
75	24 49.4 45 81 76.5	25 02.9 45 81 76.0	25 16.3 44 81 75.5	25 29.5 44 81 75.0	25 42.7 44 81 74.5	25 55.8 43 80 74.0	26 08.5 43 80 73.5	26 21.7 43 80 73.0	75
6	24 00.5 46 81 76.0	24 14.1 45 81 75.5	24 27.6 45 81 75.0	24 41.0 44 81 74.5	24 54.3 44 80 74.1	25 07.5 44 80 73.6	25 20.6 44 80 73.1	25 33.6 44 80 72.6	6
7	23 11.7 46 81 75.6	23 25.4 45 81 75.1	23 39.0 45 81 74.6	23 52.5 45 81 74.1	24 06.0 45 80 73.6	24 19.3 44 80 73.1	24 32.5 44 80 72.6	24 45.4 44 80 72.1	7
8	22 23.1 46 81 75.1	22 36.9 46 81 74.6	22 50.6 46 81 74.1	23 04.2 45 80 73.7	23 17.7 45 80 73.2	23 31.2 45 80 72.7	23 44.5 45 80 72.2	23 57.8 44 80 71.7	8
9	21 34.5 47 81 74.6	21 48.4 46 81 74.2	22 02.2 46 80 73.7	22 16.0 46 80 73.2	22 29.6 45 80 72.7	22 43.2 45 80 72.2	22 56.7 45 80 71.8	23 10.1 45 79 71.3	9
80	20 46.0 47 81 74.2	21 00.0 47 80 73.7	21 14.0 46 80 73.2	21 27.9 46 80 72.8	21 41.6 46 80 72.3	21 55.3 46 80 71.8	22 09.0 45 79 71.3	22 22.5 45 79 70.8	80
1	19 57.7 48 80 73.7	20 11.8 47 80 73.3	20 25.9 47 80 72.8	20 39.8 47 80 72.3	20 53.6 46 80 71.8	21 07.6 46 79 71.4	21 21.3 46 79 70.9	21 35.2 46 79 70.4	1
2	19 09.4 48 80 73.3	19 23.7 47 80 72.8	19 37.9 47 80 72.3	19 52.0 47 79 71.9	20 06.0 47 79 71.4	20 20.0 46 79 70.9	20 33.9 46 79 70.5	20 47.7 46 79 70.0	2
3	18 21.3 48 80 72.8	18 35.7 48 80 72.3	18 50.0 48 80 71.9	19 04.2 47 79 71.4	19 18.4 47 79 71.0	19 32.5 47 79 70.5	19 46.5 47 79 70.0	20 00.5 46 78 69.5	3
4	17 33.3 48 80 72.3	17 47.8 48 80 71.9	18 02.2 48 79 71.4	18 16.6 48 79 71.0	18 30.9 48 79 70.5	18 45.1 47 79 70.0	18 59.3 47 78 69.6	19 13.4 47 78 69.1	4
85	16 45.4 49 80 71.9	17 00.0 49 79 71.4	17 14.6 48 79 71.0	17 29.1 48 79 70.5	17 43.5 48 79 70.1	17 57.9 48 78 69.6	18 12.2 48 78 69.1	18 26.4 47 78 68.7	85
6	15 57.6 49 79 71.4	16 12.4 49 79 71.0	16 27.1 49 79 70.5	16 41.7 49 79 70.1	16 56.3 48 78 69.6	17 10.8 48 78 69.1	17 25.2 48 78 68.7	17 39.6 48 78 68.2	6
7	15 10.0 50 79 70.9	15 24.9 50 79 70.5	15 39.7 49 79 70.0	15 54.5 49 78 69.6	16 09.2 49 78 69.1	16 23.8 49 78 68.7	16 38.4 48 78 68.2	16 53.0 48 78 67.8	7
8	14 22.5 50 79 70.5	14 37.5 50 79 70.0	14 52.5 50 79 69.6	15 07.4 50 78 69.1	15 22.2 49 78 68.7	15 37.0 49 78 68.2	15 51.8 49 78 67.8	16 06.5 49 77 67.3	8
9	13 35.1 51 79 70.0	13 50.3 51 78 69.6	14 05.4 50 78 69.1	14 20.4 50 78 68.7	14 35.4 50 78 68.2	14 50.4 50 78 67.8	15 05.3 50 77 67.3	15 20.1 49 77 66.9	9
90	12 47.9 51 78 69.5	13 03.2 51 78 69.1	13 18.4 51 78 68.6	13 33.6 51 78 68.2	13 48.8 50 78 67.8	14 03.9 50 77 67.3	14 18.9 50 77 66.9	14 34.0 50 77 66.4	90

Lat. 33°

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	24° 00' Alt. Δd Δt Az.	24° 30' Alt. Δd Δt Az.	25° 00' Alt. Δd Δt Az.	25° 30' Alt. Δd Δt Az.	26° 00' Alt. Δd Δt Az.	26° 30' Alt. Δd Δt Az.	27° 00' Alt. Δd Δt Az.	27° 30' Alt. Δd Δt Az.	H.A.
00	33 00.0 1.00 01 180.0	32 30.0 1.00 01 180.0	32 00.0 1.00 01 180.0	31 30.0 1.00 01 180.0	31 00.0 1.00 01 180.0	30 30.0 1.00 01 180.0	30 00.0 1.00 01 180.0	29 30.0 1.00 01 180.0	00
1	32 59.5 1.02 178.9	32 29.5 1.02 178.9	31 59.5 1.02 178.9	31 29.5 1.02 178.9	30 59.5 1.02 179.0	30 29.5 1.02 179.0	29 59.5 1.02 179.0	29 29.6 1.02 179.0	1
2	32 58.1 1.04 177.8	32 28.1 1.04 177.8	31 58.1 1.04 177.9	31 28.1 1.04 177.9	30 58.2 1.04 177.9	30 28.2 1.04 177.9	29 58.2 1.04 177.9	29 28.2 1.04 178.0	2
3	32 55.7 1.06 176.7	32 25.7 1.06 176.8	31 55.8 1.05 176.8	31 25.8 1.06 176.8	30 55.9 1.05 176.9	30 25.9 1.05 176.9	29 55.9 1.05 176.9	29 26.0 1.06 176.9	3
4	32 52.4 1.07 175.6	32 22.4 1.07 175.7	31 52.5 1.07 175.7	31 22.6 1.07 175.8	30 52.6 1.07 175.8	30 22.7 1.07 175.9	29 52.8 1.07 175.9	29 22.8 1.07 175.9	4
05	32 48.1 1.09 174.6	32 18.2 1.09 174.6	31 48.3 1.09 174.7	31 18.4 1.08 174.7	30 48.5 1.08 174.8	30 18.6 1.08 174.8	29 48.7 1.08 174.9	29 18.8 1.08 174.9	05
6	32 42.8 99 10 173.5	32 13.0 99 10 173.5	31 43.1 99 10 173.6	31 13.3 99 10 173.7	30 43.5 99 10 173.7	30 13.6 99 10 173.8	29 43.8 99 10 173.8	29 13.9 99 10 173.9	6
7	32 36.6 99 12 172.4	32 06.9 99 12 172.5	31 37.1 99 12 172.5	31 07.3 99 12 172.6	30 37.5 99 11 172.7	30 07.7 99 11 172.8	29 37.9 99 11 172.8	29 08.1 99 11 172.9	7
8	32 29.5 99 13 171.3	31 59.8 99 13 171.4	31 30.1 99 13 171.5	31 00.4 99 13 171.6	30 30.7 99 13 171.7	30 00.9 99 13 171.7	29 31.2 99 13 171.8	29 01.5 99 13 171.9	8
9	32 21.5 99 15 170.3	31 51.8 99 15 170.4	31 22.2 99 15 170.4	30 52.5 99 15 170.5	30 22.9 99 14 170.6	29 53.2 99 14 170.7	29 23.6 99 14 170.8	28 53.9 99 14 170.9	9
10	32 12.5 99 16 169.2	31 42.9 99 16 169.3	31 13.4 99 16 169.4	30 43.8 99 16 169.5	30 14.3 99 16 169.6	29 44.7 99 16 169.7	29 15.1 99 16 169.8	28 45.5 99 15 169.9	10
1	32 02.6 98 18 168.1	31 33.1 98 18 168.2	31 03.7 98 18 168.4	30 34.2 98 18 168.5	30 04.7 98 17 168.6	29 35.2 98 17 168.7	29 05.7 98 17 168.8	28 36.3 98 17 168.9	1
2	31 51.8 98 20 167.1	31 22.4 98 19 167.2	30 53.1 98 19 167.3	30 23.7 98 19 167.4	29 54.3 98 19 167.6	29 24.9 98 19 167.6	28 55.5 98 18 167.8	28 26.1 98 18 167.9	2
3	31 40.1 98 21 166.0	31 10.8 98 21 166.2	30 41.6 98 21 166.3	30 12.3 98 20 166.4	29 43.0 98 20 166.5	29 13.7 98 20 166.7	28 44.4 98 20 166.8	28 15.1 98 20 166.9	3
4	31 27.5 97 22 165.0	30 58.4 97 22 165.1	30 29.2 97 22 165.3	30 00.1 97 22 165.4	29 30.9 97 22 165.5	29 01.7 97 21 165.7	28 32.5 97 21 165.8	28 03.3 97 21 165.9	4
15	31 14.0 97 24 163.9	30 45.0 97 24 164.1	30 16.0 97 24 164.2	29 46.9 97 23 164.4	29 17.9 97 23 164.5	28 48.8 97 23 164.7	28 19.8 97 23 164.8	27 50.7 97 22 165.0	15
6	30 59.7 96 25 162.9	30 30.8 96 25 163.1	30 01.9 96 25 163.2	29 33.0 96 25 163.4	29 04.0 96 24 163.5	28 35.1 96 24 163.7	28 06.2 97 24 163.8	27 37.2 97 24 164.0	6
7	30 44.5 96 27 161.9	30 15.7 96 27 162.1	29 46.9 96 26 162.2	29 18.2 96 26 162.4	28 49.4 96 26 162.5	28 20.6 96 26 162.7	27 51.7 96 25 162.9	27 22.9 96 25 163.0	7
8	30 28.4 95 28 160.9	29 59.8 95 28 161.1	29 31.2 95 28 161.2	29 02.5 96 27 161.4	28 33.9 96 27 161.6	28 05.2 96 27 161.7	27 36.5 96 27 161.9	27 07.8 96 26 162.1	8
9	30 11.5 95 30 159.9	29 43.0 95 29 160.1	29 14.6 95 29 160.2	28 46.1 95 29 160.4	28 17.5 95 29 160.6	27 49.0 95 28 160.8	27 20.5 95 28 160.9	26 51.9 95 28 161.1	9
20	29 53.8 94 31 159.1	29 25.5 94 31 159.3	28 57.1 94 30 159.3	28 28.8 95 30 159.4	28 00.4 95 30 159.6	27 32.0 95 30 159.8	27 03.6 95 29 160.0	26 35.2 95 29 160.2	20
1	29 35.2 94 32 157.9	29 07.1 94 32 158.1	28 38.9 94 31 158.3	28 10.7 94 31 158.5	27 42.5 94 31 158.7	27 14.3 94 31 158.9	26 46.0 94 31 159.0	26 17.8 94 30 159.2	1
2	29 15.9 93 34 156.9	28 47.9 93 33 157.1	28 19.9 93 33 157.3	27 51.9 93 33 157.5	27 23.8 94 32 157.7	26 55.7 94 32 157.9	26 27.7 94 32 158.1	25 59.6 94 32 158.3	2
3	28 55.8 93 35 155.9	28 27.9 93 35 156.1	28 00.1 93 34 156.4	27 32.2 93 34 156.6	27 04.3 93 34 156.8	26 36.4 93 33 157.0	26 08.5 93 33 157.2	25 40.6 93 33 157.4	3
4	28 34.9 92 36 155.0	28 07.2 92 36 155.2	27 39.5 92 36 155.4	27 11.8 92 35 155.6	26 44.1 92 35 155.8	26 16.4 92 35 156.1	25 48.6 93 34 156.3	25 20.9 93 34 156.5	4
25	28 13.2 92 37 154.0	27 45.7 92 37 154.2	27 18.2 92 37 154.5	26 50.7 92 36 154.7	26 23.1 92 36 154.9	25 55.6 92 36 155.1	25 28.0 92 36 155.3	25 00.4 92 36 155.6	25
6	27 50.8 91 39 153.1	27 23.5 91 38 153.3	26 56.2 91 38 153.5	26 28.8 91 38 153.8	26 01.4 91 37 154.0	25 34.1 91 37 154.2	25 06.7 91 37 154.4	24 39.2 91 36 154.7	6
7	27 27.6 90 40 152.1	27 00.5 90 39 152.4	26 33.4 90 39 152.6	26 06.2 91 39 152.9	25 39.0 91 39 153.1	25 11.8 91 38 153.3	24 44.6 91 38 153.6	24 17.4 91 38 153.8	7
8	27 03.7 90 41 151.2	26 36.8 90 41 151.5	26 09.9 90 40 151.7	25 42.9 90 40 151.9	25 15.9 90 40 152.2	24 48.9 90 39 152.4	24 21.8 90 39 152.7	23 54.8 90 39 152.9	8
9	26 39.1 89 42 150.3	26 12.4 89 42 150.5	25 45.7 89 42 150.8	25 18.9 89 41 151.0	24 52.1 89 41 151.3	24 25.2 89 41 151.5	23 58.4 90 40 151.8	23 31.5 90 40 152.0	9
30	26 13.9 88 43 149.4	25 47.3 88 43 149.6	25 20.8 89 43 149.9	24 54.2 89 42 150.2	24 27.6 89 42 150.4	24 00.9 89 42 150.7	23 34.3 89 41 150.9	23 07.6 89 41 151.2	30
1	25 47.9 88 44 148.5	25 21.6 88 44 148.8	24 55.2 88 44 149.0	24 28.8 88 43 149.3	24 02.4 88 43 149.5	23 35.9 88 43 149.8	23 09.5 88 42 150.1	22 43.0 88 42 150.3	1
2	25 21.3 87 45 147.6	24 55.1 87 45 147.9	24 29.0 87 45 148.1	24 02.8 87 44 148.4	23 36.6 87 44 148.7	23 10.3 88 44 148.9	22 44.0 88 43 149.2	22 17.7 88 43 149.5	2
3	24 54.0 86 47 146.7	24 28.1 86 46 147.0	24 02.1 87 46 147.3	23 36.1 87 46 147.6	23 10.1 87 45 147.8	22 44.0 87 44 148.1	22 18.0 87 44 148.4	21 51.9 87 44 148.6	3
4	24 26.1 86 48 145.9	24 00.3 86 47 146.1	23 34.6 86 47 146.4	23 08.8 86 47 146.7	22 43.0 86 46 147.0	22 17.1 86 46 147.3	21 51.3 86 46 147.5	21 25.4 86 45 147.8	4
35	23 57.5 85 49 145.0	23 32.0 85 48 145.3	23 06.5 85 48 145.6	22 40.9 85 48 145.9	22 15.3 85 47 146.2	21 49.6 86 47 146.4	21 23.9 86 47 146.7	20 58.2 86 46 147.0	35
6	23 28.4 84 50 144.2	23 03.1 84 49 144.5	22 37.7 85 49 144.8	22 12.3 85 49 145.0	21 46.9 85 48 145.3	21 21.5 85 48 145.6	20 56.0 85 48 145.9	20 30.5 85 47 146.2	6
7	22 58.6 84 51 143.3	22 33.5 84 50 143.6	22 08.4 84 50 143.9	21 43.2 84 50 144.2	21 18.0 84 49 144.5	20 52.8 84 49 144.8	20 27.5 84 48 145.1	20 02.2 84 48 145.4	7
8	22 28.3 83 52 142.5	22 03.4 83 51 142.8	21 38.5 83 51 143.1	21 13.5 83 50 143.4	20 48.5 83 50 143.7	20 23.5 83 50 144.0	19 58.4 84 49 144.3	19 33.3 84 49 144.6	8
9	21 57.4 82 52 141.7	21 32.7 82 52 142.0	21 08.0 82 52 142.3	20 43.2 83 51 142.6	20 18.4 83 51 142.9	19 53.6 83 51 143.2	19 28.8 83 50 143.5	19 03.9 83 50 143.8	9
40	21 25.9 82 53 140.9	21 01.4 82 53 141.2	20 36.9 82 53 141.5	20 12.4 82 52 141.8	19 47.8 82 52 142.1	19 23.2 82 52 142.4	18 58.6 82 51 142.7	18 33.9 82 51 143.0	40
1	20 53.9 81 54 140.1	20 29.6 81 54 140.4	20 05.3 81 54 140.7	19 41.0 81 53 141.0	19 16.6 81 53 141.3	18 52.2 81 52 141.6	18 27.8 81 52 142.0	18 03.4 82 52 142.3	1
2	20 21.3 80 55 139.3	19 57.3 80 55 139.6	19 33.2 80 54 139.9	19 09.1 80 54 140.3	18 44.9 81 54 140.6	18 20.8 81 53 141.2	17 56.5 81 53 141.2	17 32.3 81 53 141.5	2
3	19 48.3 79 56 138.5	19 24.4 80 56 138.9	19 00.6 80 55 139.2	18 36.7 80 55 139.5	18 12.7 80 55 139.8	17 48.8 80 54 140.1	17 24.8 80 54 140.4	17 00.7 80 53 140.8	3
4	19 14.7 79 57 137.8	18 51.1 79 56 138.1	18 27.4 79 56 138.4	18 03.7 79 56 138.7	17 40.0 79 55 139.1	17 16.2 79 55 139.4	16 52.5 79 55 139.7	16 28.6 79 54 140.0	4
45	18 40.6 78 58 137.0	18 17.2 78 57 137.3	17 53.8 78 57 137.7	17 30.3 78 57 138.0	17 06.8 78 56 138.3	16 43.2 79 56 138.6	16 19.7 79 55 139.0	15 56.1 79 55 139.3	45
6	18 06.1 78 58 136.3	17 42.9 77 58 136.6	17 19.6 77 58 136.9	16 56.4 78 57 137.3	16 33.1 78 57 137.6	16 09.8 78 57 137.9	15 46.4 78 56 138.3	15 23.0 78 56 138.6	6
7	17 31.1 77 59 135.5	17 08.1 77 59 135.9	16 45.0 77 58 136.2	16 22.0 77 58 136.5	15 58.9 77 58 136.9	15 35.8 77 57 137.2	15 12.6 77 57 137.5	14 49.5 77 57 137.9	7
8	16 55.6 76 60 134.8	16 32.8 76 60 135.1	16 10.0 76 59 135.5	15 47.1 76 59 135.8	15 24.3 76 58 136.1	15 01.4 76 58 136.5	14 38.4 76 58 136.8	14 15.5 77 57 137.1	8
9	16 19.6 75 61 134.1	15 57.1 75 60 134.4	15 34.5 75 60 134.8	15 11.8 75 60 135.1	14 49.2 76 59 135.4	14 26.5 76 59 135.8	14 03.8 76 58 136.1	13 41.0 76 58 136.4	9
50	15 43.3 74 61 133.4	15 20.9 75 61 133.7	14 58.5 75 61 134.1	14 36.1 75 60 134.4	14 13.7 75 60 134.7	13 51.2 75 60 135.1	13 28.7 75 59 135.5	13 06.1 75 59 135.8	50
1	15 06.5 74 62 132.7	14 44.3 74 62 133.0	14 22.1 74 61 133.4	13 59.9 74 61 133.7	13 37.7 74 61 134.1	13 15.4 74 60 134.4	12 53.1 74 60 134.7	12 30.8 74 60 135.1	1
2	14 29.3 73 63 132.0	14 07.3 73 62 132.3	13 45.4 73 62 132.7	13 23.4 73 62 133.0	13 01.3 73 61 133.4	12 39.3 74 61 133.7	12 17.2 74 61 134.1	11 55.1 74 60 134.4	2
3	13 51.6 72 63 131.3	13 29.9 72 63 131.6	13 08.2 73 63 132.0	12 46.4 73 62 132.3	12 24.5 73 62 132.7	12 02.7 73 62 133.0	11 40.8 73 61 133.4	11 18.9 73 61 133.7	3
4	13 13.6 72 64 130.6	12 52.1 72 63 131.0	12 30.6 72 63 131.3	12 09.0 72 63 131.7	11 47.4 73 62 132.0	11 25.7 73 62 132.4	11 04.1 73 62 132.7	10 42.4 72 62 133.1	4
55	12 35.2 71 65 129.9	12 13.9 71 64 130.3	11 52.6 71 64 130.7	11 31.2 71 64 131.0	11 09.8 71 63 131.4	10 48.4 71 63 131.7	10 26.9 72 63 132.1	10 05.4 72 62 132.4	55
6	11 56.5 70 65 129.3	11 35.4 70 65 129.6	11 14.2 71 65 130.0	10 53.0 71 64 130.4	10 31.8 71 64 130.7	10 10.6 71 64 131.1	9 49.4 71 63 131.4	9 28.1 71 63 131.8	6
7	11 17.3 70 66 128.6	10 56.4 70 65 129.0	10 35.5 70 65 129.4	10 14.5 70 65 129.7	9 53.5 70 64 130.1	9 32.5 70 64 130.4	9 11.5 70 64 130.8	8 50.4 70 63 131.2	7
8	10 37.8 69 66 128.0	10 17.1 69 66 128.3	9 56.4 69 66 128.7	9 35.6 69 65 129.1	9 14.8 69 65 129.4	8 54.0 69 65 129.8	8 33.2 69 64 130.2	8 12.3 70 64 130.5	8
9	9 58.0 68 67 127.3	9 37.5 68 67 127.7	9 16.9 69 66 128.1	8 56.2 69 66 128.4	8 35.5 69 66 128.8	8 15.2 69 65 129.2	7 54.6 69 65 129.5	7 33.9 69 65 129.9	9
60	9 17.8 68 68 126.7	8 57.5 68 67 127.1	8 37.2 68 67 127.5	8 16.8 68 66 127.8	7 56.4 68 66 128.2	7 36.0 68 66 128.6	7 15.5 68 65 128.9	6 55.1 68 65 129.3	60
1	8 37.3 67 68 126.1	8 17.2 67 68 126.5	7 57.1 67 67 126.8	7 36.9 67 67 127.2	7 16.7 67 67 127.6	6 56.5 67 66 128.0	6 36.3 67 66 128.3	6 16.0 67 66 128.7	1
2	7 56.5 66 69 125.5	7 36.6 66 68 125.8	7 16.6 67 68 126.2	6 56.7 67 68 126.6	6 36.7 67 67 127.0	6 16.7 67 67 127.4	5 56.6 67 67 127.7	5 36.6 67 66 128.1	2
3	7 15.4 65 69 124.9	6 55.6 66 69 125.2	6 35.9 66 68 125.6	6 16.1 66 68 126.0	5 56.3 66 68 126.4	5 36.5 66 68 126.8	5 16.7 66 67 127.1		3
4	6 33.9 65 70 124.3	6 14.4 65 69 124.6	5 54.8 65 69 125.0	5 35.2 66 69 125.4	5 15.6 65 68 125.8				4
65	5 52.2 65 70 123.7	5 32.8 65 70 124.0	5 13.5 65 69 124.4						65
6	5 10.2 64 71 123.1								6

Lat. 34°

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00' Alt. Δd Δt Az.	24° 30' Alt. Δd Δt Az.	25° 00' Alt. Δd Δt Az.	25° 30' Alt. Δd Δt Az.	26° 00' Alt. Δd Δt Az.	26° 30' Alt. Δd Δt Az.	27° 00' Alt. Δd Δt Az.	27° 30' Alt. Δd Δt Az.	H.A.
91	12 00.8 51 78 69.0	12 16.3 51 78 68.6	12 31.7 51 78 68.2	12 47.0 51 77 67.7	13 02.3 51 77 67.3	13 17.5 51 77 66.8	13 32.7 51 77 66.4	13 47.9 50 76 66.0	91
2	11 13.9 52 78 68.6	11 29.5 52 78 68.1	11 45.0 52 77 67.7	12 00.5 52 77 67.3	12 15.9 51 77 66.8	12 31.3 51 77 66.4	12 46.7 51 76 65.9	13 02.0 51 76 65.5	2
3	10 27.2 52 78 68.1	10 42.9 52 77 67.7	10 58.5 52 77 67.2	11 14.2 52 77 66.8	11 29.8 52 77 66.3	11 45.3 52 76 65.9	12 00.8 52 76 65.5	12 16.3 52 76 65.0	3
4	9 40.6 53 77 67.6	9 56.4 53 77 67.2	10 12.2 53 77 66.7	10 28.0 53 77 66.3	10 43.8 52 76 65.9	10 59.5 52 76 65.4	11 15.2 52 76 65.0	11 30.8 52 76 64.6	4
95	8 54.1 53 77 67.1	9 10.1 53 77 66.7	9 26.1 53 76 66.2	9 42.0 53 76 65.8	9 57.9 53 76 65.4	10 13.8 53 76 64.9	10 29.6 53 75 64.5	10 45.4 53 75 64.1	95
6	8 07.9 54 77 66.6	8 24.0 54 77 66.2	8 40.1 54 76 65.7	8 56.2 54 76 65.3	9 12.3 53 76 64.9	9 28.3 53 76 64.5	9 44.3 53 75 64.0	10 00.3 53 75 63.6	6
7	7 21.5 54 77 66.1	7 38.1 54 76 65.7	7 54.3 54 76 65.3	8 10.6 54 76 64.8	8 26.8 54 76 64.4	8 43.0 54 75 64.0	8 59.2 54 75 63.6	9 15.3 54 75 63.1	7
8	6 35.9 55 76 65.6	6 52.3 55 76 65.2	7 08.7 55 76 64.8	7 25.1 55 75 64.3	7 41.5 55 75 63.9	7 57.9 54 75 63.5	8 14.2 54 75 63.1	8 30.5 54 74 62.6	8
9	5 50.1 55 76 65.1	6 06.7 55 76 64.7	6 23.3 55 75 64.3	6 39.9 55 75 63.8	6 56.4 55 75 63.4	7 12.9 55 75 63.0	7 29.4 55 74 62.6	7 45.9 55 74 62.2	9
100	5 04.6 56 76 64.6	5 21.3 56 75 64.2	5 38.1 56 75 63.7	5 54.8 56 75 63.3	6 11.5 56 74 62.9	6 28.2 56 74 62.5	6 44.9 56 74 62.1	7 01.5 55 74 61.7	100
1				5 09.9 56 74 62.8	5 26.8 56 74 62.4	5 43.7 56 74 62.0	6 00.5 56 74 61.6	6 17.3 56 73 61.2	1
2							5 16.4 57 73 61.1	5 33.4 57 73 60.7	2

Lat. 33°

H.A.	28° 00' Alt.	Δd	Δt	Az.	28° 30' Alt.	Δd	Δt	Az.	29° 00' Alt.	Δd	Δt	Az.	30° 00' Alt.	Δd	Δt	Az.	32° 00' Alt.	Δd	Δt	Az.	34° 00' Alt.	Δd	Δt	Az.	34° 30' Alt.	Δd	Δt	Az.	35° 30' Alt.	Δd	Δt	Az.	H.A.
00	85 00.0	1.007		180.0	85 30.0	1.008		180.0	86 00.0	1.009		180.0	87 00.0	1.012		180.0	89 00.0	1.031		180.0	89 00.0	1.030		00.0	88 30.0	1.022		00.0	87 30.0	1.013		00.0	00
1	84 55.6	99	22	170.0	85 25.1	98	24	168.9	85 54.6	98	26	167.6	86 52.9	98	32	163.9	88 41.5	77	65	139.6	88 41.9	76	64	39.5	88 17.1	87	52	28.7	87 22.0	95	36	18.0	1
2	84 42.7	95	34	160.5	85 11.0	94	37	158.6	85 38.9	92	40	156.3	86 33.0	87	49	149.9	88 02.3	82	76	120.1	88 03.3	51	75	58.5	87 45.6	66	67	47.4	87 00.2	88	52	32.9	2
3	84 22.3	89	44	151.9	84 48.9	87	48	149.4	85 14.7	85	51	146.5	86 03.5	77	60	138.8	87 16.8	80	82	110.8	87 18.4	36	79	67.4	87 05.4	50	74	58.2	86 28.7	70	62	43.3	3
4	83 55.7	83	53	144.4	84 20.3	81	56	141.6	84 44.0	77	59	138.3	85 27.5	67	67	130.3	86 28.9	80	82	105.4	86 31.1	27	81	72.2	86 21.1	39	77	64.6	85 51.3	59	68	51.8	4
05	83 24.1	77	59	138.0	83 46.8	74	62	135.0	84 08.4	70	65	131.7	84 47.3	59	72	123.8	85 40.0	25	82	102.0	85 42.8	21	81	75.1	85 34.9	32	79	68.8	85 10.2	50	72	57.4	05
6	82 48.6	71	64	132.5	83 09.5	68	67	129.5	83 29.2	63	70	126.3	84 04.3	53	75	118.8	84 50.6	22	83	99.6	84 53.9	17	82	77.1	84 47.5	26	80	71.6	84 26.8	42	75	61.6	6
7	82 10.2	66	68	127.8	82 29.4	62	70	125.0	82 47.5	58	73	121.8	83 19.3	48	77	114.8	84 00.8	20	83	97.7	84 04.7	14	82	78.4	83 59.5	22	81	73.6	83 41.9	36	72	64.7	7
8	81 29.4	61	71	123.9	81 47.2	58	73	121.1	82 03.9	53	75	118.1	82 33.1	44	79	111.6	83 10.9	18	83	96.3	83 15.4	11	82	79.3	83 11.0	18	81	75.1	82 56.0	32	78	67.1	8
9	80 46.8	57	73	120.5	81 03.4	54	75	117.8	81 18.9	50	77	115.0	81 45.9	40	80	109.0	82 20.8	17	84	95.1	82 25.9	09	83	79.9	82 22.2	15	82	76.2	82 09.3	28	79	68.9	9
10	80 02.7	54	75	117.5	80 18.3	50	77	115.0	80 32.8	46	78	112.4	80 58.0	37	81	106.7	81 30.6	16	84	94.1	81 36.3	07	83	80.4	81 33.3	13	82	77.0	81 22.1	24	79	70.4	10
1	79 17.6	51	77	114.9	79 32.3	47	78	112.6	79 45.9	43	79	110.1	80 09.5	35	81	104.8	80 40.4	16	84	93.2	80 46.6	06	83	80.8	80 44.2	11	82	77.7	80 34.6	21	80	71.6	1
2	78 31.5	48	78	112.7	78 45.5	45	79	110.4	78 58.3	41	80	108.1	79 20.7	33	82	103.1	79 50.1	15	84	92.4	79 57.0	04	83	81.0	79 55.0	09	82	78.1	79 46.7	19	80	72.5	2
3	77 44.8	46	79	110.6	77 58.0	43	80	108.5	78 10.3	39	81	106.3	78 31.5	32	82	101.7	79 59.8	15	84	91.7	79 07.3	03	83	81.2	79 05.7	07	82	78.5	78 58.6	16	80	73.3	3
4	76 57.4	44	80	108.8	77 10.1	41	81	106.8	77 21.8	37	81	104.7	77 42.2	30	83	100.4	78 09.5	15	84	91.0	78 17.5	02	83	81.3	78 16.4	06	82	78.8	78 10.3	14	81	73.9	4
15	76 09.5	42	80	107.2	76 21.7	39	81	105.3	76 33.0	36	82	103.3	76 52.6	29	83	99.2	77 19.2	15	84	90.4	77 27.8	01	83	81.3	77 27.0	06	82	79.0	77 21.9	12	81	74.4	15
6	75 21.3	41	81	105.7	75 33.0	38	82	103.9	75 43.9	34	83	102.0	76 02.8	28	83	98.1	76 28.9	15	84	89.9	76 38.0	00	83	81.3	76 37.6	08	82	79.1	76 33.4	11	81	74.8	6
7	74 32.7	39	81	104.3	74 44.0	36	82	102.6	74 54.5	34	83	100.8	75 12.9	28	83	97.1	75 38.6	15	84	89.4	75 48.3	01	83	81.3	75 48.2	02	82	79.2	75 44.8	09	81	75.2	7
8	73 43.8	38	82	103.1	73 54.8	35	82	101.5	74 05.0	33	83	99.8	74 23.0	27	83	96.2	74 48.3	15	84	88.9	74 58.6	02	83	81.2	74 58.7	01	82	79.3	74 56.1	08	81	75.4	8
9	72 54.7	37	82	102.0	73 05.4	34	83	100.4	73 15.4	32	83	98.7	73 32.9	27	84	95.4	73 58.0	15	84	88.4	74 08.8	03	83	81.1	74 09.3	00	82	79.3	74 07.4	06	81	75.7	9
20	72 05.4	36	82	100.9	72 15.8	34	83	99.4	72 25.5	31	83	97.8	72 42.8	26	84	94.6	73 07.7	15	84	87.9	73 19.1	04	83	81.0	73 19.8	01	82	79.3	73 18.6	05	81	75.8	20
1	71 15.9	35	83	99.9	71 26.1	33	83	98.4	71 35.6	31	83	96.9	71 52.6	26	84	93.9	72 17.4	15	84	87.5	72 29.4	02	83	80.9	72 30.4	02	82	79.3	72 29.8	04	81	75.9	1
2	70 26.2	35	83	99.0	70 36.3	32	83	97.5	70 45.7	30	83	96.1	71 02.4	26	84	93.2	71 27.1	16	84	87.1	71 39.7	05	83	80.8	71 40.9	03	82	79.2	71 41.0	04	81	76.0	2
3	69 36.5	34	83	98.1	69 46.3	32	83	96.7	69 55.6	30	84	95.3	70 12.1	26	84	92.5	70 36.9	16	84	86.7	70 50.1	06	83	80.6	70 51.5	04	82	79.1	70 52.1	01	81	76.1	3
4	68 46.6	33	83	97.2	68 56.3	31	83	95.9	69 05.5	29	84	94.6	69 21.8	26	84	91.9	69 46.7	16	84	86.3	70 00.4	07	83	80.5	70 02.1	04	82	79.0	70 03.3	00	81	76.1	4
25	67 56.6	33	83	96.4	68 06.2	31	84	95.2	68 15.3	29	84	93.9	68 31.5	25	84	91.3	68 56.5	16	84	85.9	69 10.8	07	83	80.3	69 12.7	05	82	78.9	69 14.4	01	81	76.1	25
6	67 06.6	33	84	95.7	67 16.1	31	84	94.5	67 25.0	29	84	93.2	67 41.2	25	84	90.7	68 06.3	17	84	85.5	68 21.2	08	83	80.1	68 23.3	06	82	78.8	68 25.6	02	81	76.1	6
7	66 16.5	32	84	95.0	66 25.9	31	84	93.8	66 34.8	29	84	92.6	66 50.9	25	84	90.1	67 16.1	17	84	85.1	67 31.7	00	83	80.0	67 34.0	07	82	78.7	67 36.8	02	81	76.0	7
8	65 26.3	32	84	94.3	65 35.7	30	84	93.1	65 44.5	29	84	92.0	66 00.6	25	84	89.6	66 26.0	17	83	84.7	66 42.1	09	82	79.8	66 44.7	07	82	78.5	66 47.9	03	81	76.0	8
9	64 36.1	32	84	93.6	64 45.4	30	84	92.5	64 54.2	28	84	91.4	65 10.3	24	84	89.1	65 35.9	18	83	84.4	65 52.6	10	82	79.6	65 55.4	08	82	78.3	65 59.1	04	81	75.9	9
30	63 45.9	32	84	92.9	63 55.1	30	84	91.9	64 03.9	28	84	90.8	64 19.9	25	84	88.6	64 45.8	18	83	84.0	65 03.2	11	82	79.4	65 06.1	09	82	78.2	65 10.3	05	81	75.8	30
1	62 55.6	32	84	92.3	63 04.8	30	84	91.3	63 13.6	28	84	90.2	63 29.6	25	84	88.1	63 55.9	18	83	83.7	64 13.7	11	82	79.1	64 16.9	10	82	78.0	64 21.6	06	81	75.7	1
2	62 05.3	31	84	91.7	62 14.5	30	84	90.7	62 23.3	28	84	89.7	62 39.4	25	84	87.6	63 05.8	19	83	83.3	63 24.3	12	82	78.9	63 27.7	10	82	77.8	63 32.8	07	81	75.6	2
3	61 15.0	31	84	91.1	61 24.2	30	84	90.1	61 33.0	28	84	89.1	61 49.1	26	84	87.1	62 15.9	19	83	83.0	62 35.0	13	82	78.8	62 37.4	11	82	77.6	62 44.1	08	81	75.4	3
4	60 24.7	31	84	90.6	60 33.9	30	84	89.6	60 42.6	28	84	88.6	60 58.9	26	84	86.7	61 25.9	20	83	82.6	61 45.6	13	82	78.5	61 49.4	12	82	77.4	61 55.4	08	81	75.3	4
35	59 34.4	31	84	90.0	59 43.6	30	84	89.1	59 52.3	29	84	88.1	60 08.6	26	84	86.2	60 36.1	20	83	82.3	60 56.4	14	82	78.2	61 00.3	12	82	77.2	61 06.8	09	81	75.2	35
6	58 44.1	31	84	89.5	58 53.3	30	84	88.6	59 02.1	29	84	87.6	59 18.4	26	84	85.8	59 46.2	20	83	81.9	60 07.1	14	82	78.0	60 11.2	13	82	77.0	60 18.1	10	81	75.0	6
7	57 53.8	31	84	89.0	58 03.0	30	84	88.1	58 11.8	29	84	87.2	58 28.3	26	84	85.3	58 56.4	21	83	81.6	59 17.9	15	82	77.7	59 22.2	14	82	76.8	59 29.5	11	81	74.8	7
8	57 03.4	31	84	88.4	57 12.7	30	84	87.6	57 21.5	29	84	86.7	57 38.1	26	84	84.9	58 06.7	21	83	81.2	58 28.8	16	82	77.5	58 33.3	14	82	76.6	58 41.0	11	81	74.6	8
9	56 13.2	31	84	87.9	56 22.4	30	84	87.1	56 31.3	29	84	86.2	56 48.0	27	83	84.5	57 17.0	22	83	80.9	57 39.7	16	82	77.2	57 44.4	15	81	76.3	57 52.5	12	81	74.5	9
40	55 22.9	32	84	87.4	55 32.2	30	84	86.6	55 41.1	29	84	85.8	55 58.0	27	83	84.0	56 27.3	22	83	80.6	56 50.6	17	82	77.0	56 55.5	16	81	76.1	57 04.0	13	81	74.3	40
1	54 32.6	32	84	87.0	54 41.9	31	84	86.1	54 51.0	29	84	85.3	55 07.9	27	83	83.6	55 37.7	22	83	80.2	56 01.6	17	82	76.7	56 06.7	16	81	75.9	56 15.6	14	81	74.1	1
2	53 42.4	32	84	86.5	53 51.8	31	84	85.7	54 00.8	30	84	84.9	54 17.9	27	83	83.2	54 48.1	23	83	79.9	55 12.7	18	82	76.5	55 17.9	17	81	75.6	55 27.3	14	80	73.9	2
3	52 52.2	32	84	86.0	53 01.6	31	84	85.2	53 10.7	30	84	84.4	53 28.0	28	83	82.8	53 58.6	23	82	79.6	54 23.8	19	81	76.2	54 29.2	17	81	75.4	54 38.9	15	80	73.7	3
4	52 02.0	32	84	85.5	52 11.5	31	84	84.8	52 20.7	30	83	84.0	52 38.1	28	83	82.4	53 09.1	24	82	79.2	53 34.9	19	81	75.9	53 40.5	18	81	75.1	53 50.7	16	80	73.4	4
45	51 11.8	32	84	85.1	51 21.4	31	83	84.3	51 30.6	30	83	83.6	51 48.2	28	83	82.0	52 19.7	24	82	78.9	52 46.1	20	81	75.7	52 51.9	19	81	74.9	53 02.5	16	80	73.2	45
6	50 21.7	33	83	84.6	50 31.3	32	83	83.9	50 40.6	31	83	83.1	50 58.4	29	83	81.6	51 30.4	25	82	78.5	51 57.4	20	81	75.4	52 03.4	19	81	74.6	52 14.3	17	80	73.0	6
7	49 31.6	33	83	84.2	49 41.3	32	83	83.5	49 50.7	31	83	82.7	50 08.7	29	83	81.2	50 41.1	25	82	78.2	51 08.7	21	81	75.1	51 14.9	20	81	74.4	51 26.2	18	80	72.8	7
8	48 41.6	33	83	83.7	48 51.3	32	83	83.0	49 00.8	31	83	82.3	49 19.0	29	83	80.8	49 51.9	26	82	77.9	50 20.1	22	81	74.8	50 26.5	21	81	74.1	50 38.2	19	80	72.5	8
9	47 51.6	33	83	83.3	48 01.4	32	83	82.6	48 11.0	31	83	81.9	48 29.3	30	83	80.5	49 02.7	26	82	77.5	49 31.6	22	81	74.6	49 38.1	21	80	73.8	49 50.2	19	80	72.3	9
50	47 01.6	33	83	82.9	47 11.4	33	83	82.2	47 21.2	32	83	81.5	47 39.7	30	83	80.1	48 13.6	26	82	77.2	48 43.1	23	81	74.3	48 49.8	22	80	73.5	49 02.3	20	80	72.1	50
1	46 11.7	34	83	82.4	46 21.7	33	83	81.8	46 31.4	32	83	81.1	46 50.2	30	82	79.7	47 24.6	27	82	76.9	47 54.7	23	81	74.0	48 01.6	22	80	73.3	48 14.5	21	80	71.8	1
2	45 21.9	34	83	82.0	45 31.9	33	83	81.3	45 41.8	32	83	80.7	46 00.7	31	82	79.3	46 35.6	27	82	76.5	47 06.4	24	80	73.7	47 13.4	23	80	73.0	47 26.7	21	80	71.6	2
3	44 32.1	34	83	81.6	44 42.2	33	83	80.9	44 52.1	33	83	80.3	45 11.3	31	82	78.9	45 46.7	28	81	76.2	46 18.1	25	80	73.4	46 25.4	24	80	72.7	46 39.0	22	79	71.3	3
4	43 42.3	35	83	81.2	43 52.6	34	83	80.5	44 02.6	33	83	79.9	44 21.9	32	82	78.5	44 57.9	28	81	75.9	45 29.9	25	80	73.1	45 37.3	24	80	72.4	45 51.4	23	79	71.0	4
55	42 52.6	35	83	80.7	43 03.0	34	83	80.1	43 13.1	33	82	79.5	43 32.7	32	82	78.2	44 09.1	29	81	75.5	44 41.8	26	80	72.9	44 49.4	25	80	72.1	45 03.8	22	79	70.8	55
6	42 03.0	35	83	80.3	42 13.4	34	82	79.7	42 23.6	34	82	79.1	42 43.4	32	82	77.8	43 20.4	29	81	75.2	43 53.8	26	80	72.5	44 01.6	25	80	71.8	44 16.4	24	79	70.5	6
7	41 13.4	35	83	79.9	41 23.9	35	82	79.3	41 34.3	34	82	78.7	41 54.3	33	82	77.4	42 31.8	30	81	74.8	43 05.8	27	80	72.2	43 13.8	26	80	71.6	43 29.0	25	79	70.2	7
8	40 23.9	36	82	79.5	40 34.5	35	82	78.9	40 45.0	34	82	78.3	41 05.2	33	82	77.0	41 43.3	30	81	74.5	42 18.0	27	80	71.9	42 26.1	27	79	71.3	42 41.7	25	79	69.9	8
9	39 34.5	36	82	79.1	39 45.2	35	82	78.5	39 55.7	35	82	77.9	40 16.2	34	82	76.6	40 54.8	31	81	74.1	41 30.2	28	80	71.7	41 38.5	27	79	70.9	41 54.4	26	79	69.7	9
60	38 45.1	36	82	78.7	38 55.9	36	82	78.1	39 06.6	35	82	77.5	39 27.3	34	81	76.3	40 06.5	31	80	73.8	40 42.5	29	79	71.3	40 51.0	28	79	70.7	41 07.3	27	78	69.4	60
1	37 55.8	37	82	78.3	38 06.7	36	82	77.7	38 17.5	36	82	77.1	38 38.5	34	81	75.9	39 18.2	32	80	73.4	39 54.9	29	79	71.0	40 03.5	29	79	70.3	40 20.3	27	78	69.1	1
2	37 06.6	37	82	77.8	37 17.6	37	82	77.3	37 28.5	36	82	76.7	37 49.7	35	81	75.5	38 30.0	32	80	73.1	39 07.3	30	79	70.7	39 16.2	29	79	70.0	39 33.3	28	78	68.8	2
3	36 17.4	37	82	77.4	36 28.6	37	82	76.9	36 39.6	36	81	76.3	37 01.0	35	81	75.1	37 41.9	33	80	72.7	38 19.9	30	79	70.4	38 28.9	30	79	69.7	38 46.4	29	78	68.5	3
4	35 28.3	38	82	77.0	35 39.6	37	81	76.5	35 50.7	37	81	75.9	36 12.5	36	81	74.7	36 53.9	33	80	72.4	37 32.6	31	79	70.0	37 41.8	30	78	69.4	37 59.7	29	78	68.2	4
65	34 39.3	38	82	76.6	34 50.7	38	81	76.0	35 02.0	37	81	75.5	35 24.0	36	81	74.3	36 06.0	34	80	72.0	36 45.3	32	79	69.7	36 54.7	31	78	69.1	37 13.0	30	78	67.9	65
6	33 50.4	39	81	76.2	34 01.9	38	81	75.6	34 13.3	38	81	75.1	34 35.6	37	81	74.0	35 18.2	34	80	71.7	35 58.2	32	78	69.4	36 07.8	32	78	68.8	36 26.4	30	77	67.6	6
7	33 01.6	39	81	75.8	33 13.2	39	81	75.2	33 24.7	38	81	74.7	33 47.2	37	80	73.6	34 30.5	35	79	71.3	35 11.1	33	78	69.0	35 20.9	32	78	68.4	35 39.9	31	77	67.3	7
8	32 12.9	40	81	75.4	32 24.6	39	81	74.8	32 36.2	38	81	74.3	32 59.0	38	80	73.2	33 42.8	36	79	71.0	34 24.2	33	78	68.7	34 34.2	33	78	68.1	34 53.6	32	77	67.0	8
9	31 24.2	40	81	75.0	31 36.1	39	81	74.4	31 47.8	39	80	73.9	32 10.9	38	80	72.8	32 55.3	36	79	70.6	33 37.4	34	78	68.4	33 47.5	34	78	67.8	34 07.3	32	77	66.6	9
70	30 35.7	40	81	74.6	30 47.7	40	81	74.0	30 59.5	39	80	73.5	31 22.9	38	80	72.4	32 07.9	37	79	70.2	32 50.7	35	78	68.0	33 01.0	34	77	67.5	33 21.2	33	77	66.3	70
1	29 47.2	41	81	74.1	29 59.3	40	80	73.6	30 11.3	40	80	73.1	30 35.0	39	80	72.0	31 20.6	37	79	69.9	32 04.1	35	77	67.7	32 14.6	35	77	67.1	32 35.2	34	77	66.0	1
2	28 58.9	41	81	73.7	29 11.1	41	80	73.2	29 23.3	40	80	72.7	29 47.2	39	80	71.6	30 33.4	38	78	69.5	31 17.6	36	77	67.3	31 28.3	35	77	66.8	31 49.2	34	76	65.7	2
3	28 10.6	41	80	73.3	28 23.0	41	80	72.8	28 35.3	41	80	72.3	28 59.5	40	79	71.2	29 46.4	38	78	69.1	30 31.2	36	77	67.0	30 42.1	36	77	66.4	31 03.4	35	76	65.3	3
4	27 22.5	42	80	72.9	27 35.0	42	80	72.4	27 47.4	41	80	71.9	28 11.9	40	79	70.8	28 59.4	39	78	68.7	29 45.0	37	77	66.6	29 56.0	37	77	66.1	30 17.8	36	76	65.0	4
75	26 34.4	42	80	72.5	26 47.1	42	80	72.0	26 59.6	42	79	71.5	27 24.4	41	79	70.4	28 12.6	39	78	68.4	28 58.8	38	76	66.3	29 10.1	37	76	65.7	29 32.2	36	76	64.7	75
6	25 46.5	43	80	72.1	25 59.3	42	79	71.6	26 12.0	42	79	71.1	26 37.0	41	79	70.0	27 25.8	40	78	68.0	28 12.8	38	76	65.9	28 24.3	38	76	65.4	28 46.8	37	75	64.3	6
7	24 58.7	43	80	71.6	25 11.6	43	79	71.1	25 24.4	42	79	70.6	25 49.8	42	78	69.6	26 39.3	40	77	67.6	27 27.0	39	76	65.6	27 38.6	39	76	65.0	28 01.5	38	75	64.0	7
8	24 11.0	44	79	71.2	24 24.1	43	79	70.7	24 37.0	43	79	70.2	25 02.7	42	78	69.2	25 52.8	41	77	67.2	26 41.2	40	76	65.2	26 53.1	39	76	64.7	27 16.4	38	75	63.6	8
9	23 23.4	44	79	70.8	23 36.6	44	79	70.3	23 49.7	44	79	69.8	24 15.7	43	78	68.8	25 06.5	42	77	66.8	25 55.6	40	76	64.8	26 07.6	40	75	64.3	26 31.4	39	75	63.3	9
80	22 35.9	45	79	70.4	22 49.3	44	79	69.9	23 02.6	44	78	69.4	23 28.8	43	78	68.4	24 20.3	42	77	66.4	25 10.2	41	76	64.4	25 22.4	41	75	63.9	25 46.5	40	75	62.9	80
1	21 48.6	45	79	69.9	22 02.1	45	78	69.5	22 15.6	45	78	69.0	22 42.1	44	78	68.0	23 34.2	43	76	66.0	24 24.8	42	75	64.0	24 37.2	41	75	63.6	25 01.8	41	74	62.6	1
2	21 01.4	46	78	69.5	21 15.1	45	78	69.0	21 28.6	45	78	68.6	21 55.5	45	77	67.6	22 48.3	43	76	65.6	23 39.7	42	75	63.7	23 52.3	42	75	63.2	24 17.2	41	74	62.2	2
3	20 14.3	46	78	69.1	20 28.1	46	78	68.6	20 41.9	46	78	68.1	21 09.1	45	77	67.2	22 02.5	44	76	65.2	22 54.6	43	75	63.3	23 07.4	43	74	62.8	23 32.8	42	74	61.8	3
4	19 27.4	47	78	68.6	19 41.4	46	78	68.2	19 55.2	46	77	67.7	20 22.8	46	77	66.7	21 16.9	45	76	64.8	22 09.8	43	75	62.9	22 22.7	43	74	62.4	22 48.5	43	74	61.4	4
85	18 40.6	47	78	68.2	18 54.7	47	77	67.7	19 08.8	47	77	67.3	19 36.6	46	77	66.3	20 31.5	45	76	64.4	21 25.0	44	74	62.5	21 38.2	44	74	62.0	22 04.4	43	73	61.1	85
6	17 54.0	48	78	67.8	18 08.2	47	77	67.3	18 22.4	47	77	66.8	18 50.6	47	76	65.9	19 46.1	45	76	64.0	20 40.5	45	74	62.1	20 53.9	44	74	61.6	21 20.4	44	73	60.7	6
7	17 07.5	48	77	67.3	17 21.9	48	77	66.9	17 36.2	48	77	66.4	18 04.8	47	76	65.5	19 01.0	46	75	63.6	19 56.1	45	74	61.7	20 09.7	45	73	61.2	20 36.6	45	73	60.3	7
8	16 21.1	49	77	66.9	16 35.7	48	77	66.4	16 50.2	48	76	66.0	17 19.1	47	76	65.0	18 16.0	47	75	63.2	19 11.8	46	73	61.3	19 25.6	46	73	60.8	19 53.0	45	72	59.9	8
9	15 34.9	49	77	66.4	15 49.7	49	76	66.0	16 04.3	49	76	65.5	16 33.5	48	76	64.6	17 31.2	48	75	62.8	18 27.8	47	73	60.9	18 41.8	47	73	60.4	19 09.5	46	72	59.5	9
90	14 48.9	50	76	66.0	15 03.8	50	76	65.5	15 18.6	49	76	65.1	15 48.1	49	75	64.2	16 46.5	48	74	62.3	17 43.9	47	73	60.5	17 58.1	47	72	60.0	18 26.3	47	72	59.1	90

Each latitude cell is given as: **Alt (° ') Δd Δt Az (°)**

H.A.	28° 00'	28° 30'	29° 00'	30° 00'	32° 00'	34° 00'	34° 30'	35° 30'	H.A.
00	29 00.0 1.00 01 180.0	28 30.0 1.00 01 180.0	28 00.0 1.00 01 180.0	27 00.0 1.00 01 180.0	25 00.0 1.00 01 180.0	23 00.0 1.00 01 180.0	22 30.0 1.00 01 180.0	21 30.0 1.00 01 180.0	00
1	28 59.6 1.00 02 179.0	28 29.6 1.00 02 179.0	27 59.6 1.00 02 179.0	26 59.6 1.00 02 179.0	24 59.6 1.00 02 179.1	22 59.6 1.00 02 179.1	22 29.6 1.00 02 179.1	21 29.6 1.00 02 179.1	1
2	28 58.2 1.00 04 178.0	28 28.2 1.00 04 178.0	27 58.3 1.00 04 178.0	26 58.3 1.00 04 178.1	24 58.4 1.00 03 178.1	22 58.4 1.00 03 178.2	22 28.4 1.00 03 178.2	21 28.5 1.00 03 178.3	2
3	28 56.0 1.00 05 177.0	28 26.1 1.00 05 177.0	27 56.1 1.00 05 177.0	26 56.2 1.00 06 177.1	24 56.3 1.00 05 177.2	22 56.4 1.00 05 177.3	22 26.5 1.00 05 177.3	21 26.5 1.00 04 177.4	3
4	28 52.9 1.00 07 176.0	28 23.0 1.00 07 176.0	27 53.0 1.00 07 176.0	26 53.2 1.00 06 176.1	24 53.4 1.00 06 176.3	22 53.7 1.00 06 176.4	22 23.7 1.00 06 176.4	21 23.7 1.00 06 176.5	4
05	28 48.9 1.00 08 175.0	28 19.0 1.00 08 175.0	27 49.1 1.00 08 175.1	26 49.3 1.00 08 175.1	24 49.7 1.00 08 175.3	22 50.1 1.00 07 175.5	22 20.2 1.00 07 175.5	21 20.4 1.00 07 175.6	05
6	28 44.1 99 10 174.0	28 14.2 1.00 09 174.0	27 44.4 1.00 09 174.1	26 44.7 1.00 00 174.2	24 45.2 1.00 09 174.4	22 45.8 1.00 09 174.6	22 15.9 1.00 08 174.7	21 16.2 1.00 08 174.8	6
7	28 38.3 99 11 173.0	28 08.5 99 11 173.0	27 38.7 99 11 173.1	26 39.1 99 11 173.2	24 39.9 99 10 173.5	22 40.7 99 10 173.7	22 10.9 99 10 173.8	21 11.2 99 10 173.9	7
8	28 31.7 99 12 172.0	28 02.0 99 12 172.0	27 32.3 99 12 172.1	26 32.8 99 12 172.2	24 33.8 99 12 172.5	22 34.8 99 11 172.8	22 05.0 99 11 172.9	21 05.5 99 11 173.0	8
9	28 24.3 99 14 171.0	27 54.6 99 14 171.0	27 24.9 99 14 171.1	26 25.6 99 13 171.3	24 26.9 99 13 171.6	22 28.1 99 12 171.9	21 58.4 99 12 172.0	20 59.0 99 11 172.2	9
10	28 15.9 99 15 170.0	27 46.3 99 15 170.1	27 16.8 99 15 170.2	26 17.6 99 15 170.3	24 19.1 99 14 170.7	22 20.6 99 14 171.0	21 51.0 99 14 171.1	20 51.8 99 13 171.3	10
1	28 06.8 98 17 169.0	27 37.2 98 17 169.1	27 07.7 98 16 169.2	26 08.7 98 16 169.4	24 10.6 98 16 169.8	22 12.4 98 15 170.2	21 42.9 98 15 170.3	20 43.8 98 15 170.4	1
2	27 56.7 98 18 168.0	27 27.3 98 18 168.1	26 57.9 98 18 168.2	25 59.0 98 17 168.4	24 01.3 98 17 168.9	22 03.5 98 16 169.3	21 34.0 98 16 169.4	20 35.0 98 16 169.6	2
3	27 45.8 98 20 167.0	27 16.5 98 19 167.1	26 47.2 98 19 167.3	25 48.6 98 19 167.5	23 51.2 98 18 168.0	21 53.7 98 17 168.4	21 24.3 98 17 168.5	20 25.6 98 17 168.7	3
4	27 34.1 97 21 166.1	27 04.9 97 21 166.2	26 35.7 97 20 166.3	25 37.3 97 20 166.6	23 40.3 98 19 167.1	21 43.2 98 19 167.5	21 13.9 98 19 167.6	20 15.4 98 18 167.9	4
15	27 21.6 97 22 165.1	26 52.5 97 22 165.2	26 23.4 97 22 165.4	25 25.2 97 21 165.6	23 28.6 97 21 166.2	21 32.0 97 20 166.7	21 02.8 97 20 166.8	20 04.4 97 19 167.0	15
6	27 08.2 97 24 164.1	26 39.3 97 23 164.3	26 10.3 97 23 164.4	25 12.3 97 23 164.7	23 16.2 97 22 165.3	21 20.0 97 21 165.9	20 50.9 97 21 166.2	19 52.8 97 21 166.2	6
7	26 54.1 96 25 163.2	26 25.2 96 25 163.3	25 56.4 96 24 163.5	24 58.6 96 24 163.8	23 03.0 96 23 164.4	21 07.3 96 22 164.9	20 38.4 97 22 165.1	19 40.4 97 22 165.5	7
8	26 39.1 96 26 162.2	26 10.4 96 26 162.4	25 41.7 96 25 162.5	24 44.2 96 25 162.9	22 49.1 96 24 163.5	20 53.9 96 24 164.1	20 25.0 96 23 164.2	19 27.4 96 23 164.5	8
9	26 23.4 96 28 161.3	25 54.8 95 27 161.5	25 26.2 95 27 161.6	24 29.0 95 27 162.0	22 34.4 96 26 162.6	20 39.7 96 25 163.2	20 11.0 96 25 163.4	19 13.6 96 24 163.7	9
20	26 06.8 95 29 160.3	25 38.4 95 29 160.5	25 09.9 95 28 160.7	24 13.0 95 28 161.0	22 19.0 95 27 161.7	20 24.8 95 26 162.4	19 56.3 95 26 162.6	18 59.1 95 25 162.9	20
1	25 49.5 94 30 159.4	25 21.2 94 30 159.6	24 52.9 94 30 159.8	23 56.3 94 29 160.1	22 02.9 95 28 160.9	20 09.3 95 27 161.6	19 40.8 95 27 161.7	18 44.0 95 26 162.1	1
2	25 31.4 94 31 158.5	25 03.3 94 31 158.7	24 35.2 94 31 158.9	23 38.8 94 30 159.3	21 46.0 94 29 160.0	19 53.0 94 28 160.7	19 24.7 94 28 160.9	18 28.1 94 28 161.2	2
3	25 12.6 93 33 157.6	24 44.7 93 32 157.8	24 16.7 93 32 158.0	23 20.6 93 32 158.4	21 28.4 94 30 159.1	19 36.0 94 29 159.9	19 07.9 94 29 160.1	18 11.6 94 29 160.4	3
4	24 53.1 93 34 156.7	24 25.3 93 34 156.9	23 57.4 93 33 157.1	23 01.7 93 33 157.5	21 10.2 93 32 158.3	19 18.4 93 31 159.1	18 50.4 93 30 159.3	17 54.4 93 30 159.6	4
25	24 32.8 92 35 155.8	24 05.1 92 35 156.0	23 37.5 92 34 156.2	22 42.1 92 34 156.6	20 51.2 93 33 157.4	19 00.1 93 32 158.2	18 32.3 93 31 158.4	17 36.6 93 31 158.8	25
6	24 11.8 92 36 154.9	23 44.3 92 36 155.1	23 16.8 92 36 155.3	22 21.8 92 35 155.8	20 31.6 92 34 156.6	18 41.1 92 33 157.4	18 13.4 92 32 157.6	17 18.1 92 32 158.1	6
7	23 50.1 91 37 154.0	23 22.8 91 37 154.2	22 55.5 91 37 154.5	22 00.8 91 36 154.9	20 11.3 91 35 155.8	18 21.5 92 34 156.6	17 54.0 92 34 156.8	16 59.0 92 33 157.3	7
8	23 27.7 90 38 153.1	23 00.6 90 38 153.4	22 33.5 90 38 153.6	21 39.1 91 37 154.1	19 50.3 91 36 155.0	18 01.2 91 35 155.8	17 33.9 91 35 156.1	16 39.2 91 34 156.5	8
9	23 04.6 90 40 152.3	22 37.7 90 39 152.5	22 10.7 90 39 152.7	21 16.8 90 38 153.2	19 28.7 90 37 154.1	17 40.3 90 36 155.0	17 13.1 90 36 155.4	16 18.8 91 35 155.7	9
30	22 40.9 89 41 151.4	22 14.1 89 40 151.6	21 47.4 89 40 151.9	20 53.8 89 40 152.4	19 06.4 89 38 153.3	17 18.7 90 35 154.3	16 51.8 90 37 154.5	15 57.8 90 36 155.0	30
1	22 16.5 89 42 150.6	21 49.9 89 41 150.8	21 23.4 89 41 151.1	20 30.2 89 40 151.6	18 43.5 89 39 152.5	16 56.6 89 38 153.5	16 29.8 89 38 153.7	15 36.2 89 37 154.2	1
2	21 51.4 88 43 149.7	21 25.1 88 42 150.0	20 58.7 88 42 150.2	20 05.9 88 42 150.7	18 20.0 88 40 151.7	16 33.8 89 39 152.7	16 07.2 89 39 153.0	15 14.0 89 38 153.4	2
3	21 25.7 87 44 148.9	20 59.6 87 44 149.2	20 33.4 87 43 149.4	19 41.0 87 43 149.9	17 55.9 88 41 151.0	16 10.5 88 40 152.0	15 44.1 88 40 152.2	14 51.2 89 39 152.7	3
4	20 59.4 86 45 148.1	20 33.5 87 44 148.3	20 07.5 87 44 148.6	19 15.5 87 44 149.1	17 31.1 87 42 150.2	15 46.5 87 41 151.5	15 20.3 87 41 151.5	14 27.8 87 40 152.0	4
35	20 32.5 86 46 147.3	20 06.8 86 46 147.5	19 41.0 86 45 147.8	18 49.4 86 44 148.3	17 05.8 86 43 149.4	15 22.0 87 42 150.5	14 56.0 87 42 150.7	14 03.9 87 41 151.2	35
6	20 05.0 85 47 146.5	19 39.5 85 46 146.7	19 13.9 85 46 147.0	18 22.7 85 45 147.6	16 39.9 86 44 148.6	14 56.9 86 43 149.7	14 31.1 86 42 150.0	13 39.4 86 42 150.5	6
7	19 36.9 84 48 145.7	19 11.6 85 47 145.9	18 46.2 85 47 146.2	17 55.4 85 46 146.8	16 13.5 85 45 147.9	14 31.2 85 44 149.0	14 05.6 85 43 149.2	13 14.3 86 43 149.8	7
8	19 08.2 84 49 144.9	18 43.1 84 48 145.1	18 17.9 84 48 145.4	17 27.5 84 47 146.0	15 46.4 84 46 147.1	14 05.0 85 45 148.5	13 39.6 85 44 148.5	12 48.7 85 44 149.1	8
9	18 39.0 83 50 144.1	18 14.1 83 49 144.4	17 49.1 83 49 144.7	16 59.1 84 48 145.3	15 18.9 84 47 146.4	13 38.3 84 45 147.5	13 13.1 84 45 147.8	12 22.6 84 44 148.4	9
40	18 09.2 82 51 143.3	17 44.5 82 50 143.6	17 19.8 83 50 143.9	16 30.2 83 49 144.5	14 50.8 83 48 145.7	13 11.0 83 46 146.8	12 46.0 83 46 147.1	11 56.0 83 45 147.7	40
1	17 38.9 82 51 142.6	17 14.4 82 51 142.9	16 49.8 82 51 143.2	16 00.7 82 50 143.8	14 22.1 82 49 144.9	12 43.2 83 47 146.1	12 18.4 83 47 146.4	11 28.8 83 46 147.0	1
2	17 08.0 81 52 141.8	16 43.7 81 52 142.1	16 19.4 81 52 142.4	15 30.7 81 51 143.0	13 53.0 82 49 144.2	12 14.9 82 48 145.4	11 50.3 82 48 145.7	11 01.1 82 47 146.3	2
3	16 36.7 80 53 141.1	16 12.6 80 53 141.4	15 48.5 80 53 141.7	15 00.2 81 50 142.3	13 23.3 81 50 143.5	11 46.1 81 49 144.7	11 21.7 81 48 145.0	10 32.9 81 48 145.6	3
4	16 04.8 80 54 140.3	15 40.9 80 54 140.6	15 17.0 80 53 141.0	14 29.2 80 53 141.6	12 53.1 80 51 142.8	11 16.8 80 50 144.0	10 52.6 81 49 144.3	10 04.3 81 49 144.9	4
45	15 32.4 79 55 139.6	15 08.8 79 54 139.9	14 45.1 79 54 140.2	13 57.7 79 53 140.9	12 22.5 79 52 142.1	10 47.0 80 50 143.4	10 23.0 80 50 143.7	9 35.1 80 49 144.3	45
6	14 59.6 78 56 138.9	14 36.1 78 55 139.2	14 12.7 78 55 139.5	13 25.7 78 54 140.2	11 51.3 79 53 141.4	10 16.7 79 51 142.7	9 53.0 79 51 143.0	9 05.5 79 50 143.6	6
7	14 26.3 77 56 138.2	14 03.0 77 56 138.5	13 39.8 78 56 138.8	12 53.2 78 55 139.5	11 19.7 78 53 140.8	9 46.0 78 52 142.2	9 22.5 78 52 142.3	8 35.5 78 51 143.0	7
8	13 52.5 77 57 137.5	13 29.5 77 57 137.8	13 06.4 77 56 138.1	12 20.3 77 56 138.8	10 47.7 77 54 140.1	9 14.8 78 53 141.4	8 51.5 78 52 141.7	8 04.9 78 52 142.3	8
9	13 18.2 76 58 136.8	12 55.4 76 57 137.1	12 32.6 76 57 137.5	11 46.9 76 56 138.1	10 15.2 77 55 139.4	8 43.2 77 53 140.7	8 20.1 77 53 141.1	7 34.0 77 52 141.7	9
50	12 43.6 75 58 136.1	12 21.0 75 58 136.4	11 58.4 75 58 136.8	11 13.1 76 57 137.4	9 42.2 76 56 138.8	8 11.1 76 54 140.1	7 48.3 76 54 140.4	7 02.6 76 53 141.1	50
1	12 08.5 75 59 135.4	11 46.1 75 59 135.8	11 23.7 75 58 136.1	10 38.8 75 58 136.8	9 08.9 75 56 138.1	7 38.6 75 55 139.5	7 16.0 75 54 139.8	6 30.7 75 54 140.4	1
2	11 32.9 74 60 134.8	11 10.8 74 60 135.1	10 48.6 74 59 135.4	10 04.2 74 58 136.1	8 35.1 74 57 137.5	7 05.7 75 56 138.8	6 43.3 75 55 139.2	5 58.5 75 54 139.8	2
3	10 57.0 73 61 134.1	10 35.1 73 60 134.4	10 13.1 73 60 134.8	9 29.1 73 59 135.5	8 00.8 74 58 136.8	6 32.3 74 56 138.2	6 10.2 74 56 138.5	5 25.8 74 55 139.2	3
4	10 20.7 72 61 133.4	9 58.9 72 61 133.8	9 37.2 73 60 134.1	8 53.6 73 60 134.8	7 26.2 73 58 136.2	5 58.6 73 57 137.6	5 36.7 73 56 137.9		4
55	9 43.9 72 62 132.8	9 22.4 72 62 133.1	9 00.9 72 61 133.5	8 17.7 72 60 134.2	6 51.2 72 59 135.6	5 24.5 72 58 137.0	5 02.7 72 57 137.3		55
6	9 06.8 71 62 132.2	8 45.5 71 62 132.5	8 24.2 71 62 132.9	7 41.5 71 61 133.6	6 15.8 71 60 135.0				6
7	8 29.3 70 63 131.5	8 08.2 70 63 131.9	7 47.1 70 62 132.2	7 04.8 71 62 133.0	5 40.0 71 60 134.4				7
8	7 51.5 70 64 130.9	7 30.6 70 63 131.3	7 09.7 70 63 131.6	6 27.8 70 62 132.3	5 03.9 70 61 133.8				8
9	7 13.3 69 64 130.3	6 52.6 69 64 130.6	6 31.9 69 64 131.0	5 50.4 69 63 131.7					9
60	6 34.7 68 65 129.7	6 14.2 68 65 130.0	5 53.7 68 64 130.4	5 12.7 68 63 131.1					60
1	5 55.8 68 65 129.1	5 35.5 68 65 129.4	5 15.2 68 65 129.8						1
2	5 16.6 67 66 128.5								2

(Right margin tab labels: Lat. 34°, Lat. 35°, Lat. 36°)

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00'	28° 30'	29° 00'	30° 00'	32° 00'	34° 00'	34° 30'	35° 30'	H.A.
91	14 03.0 50 76 65.5	14 18.1 50 76 65.1	14 33.1 50 76 64.6	15 02.9 50 75 63.7	16 02.0 49 74 61.9	17 00.2 48 73 60.1	17 14.6 48 72 59.6	17 43.2 47 72 58.7	91
2	13 17.3 51 76 65.1	13 32.5 51 76 64.6	13 47.7 51 75 64.2	14 17.9 50 75 63.3	15 17.7 49 74 61.5	16 16.7 49 72 59.7	16 31.3 48 72 59.2	17 00.3 48 71 58.3	2
3	12 31.8 51 76 64.6	12 47.1 51 75 64.1	13 02.5 51 75 63.7	13 33.0 51 74 62.8	14 33.6 50 73 61.0	15 33.3 48 72 59.2	15 48.1 49 72 58.8	16 17.5 49 71 57.9	3
4	11 46.4 52 75 64.1	12 01.9 52 75 63.7	12 17.5 52 75 63.2	12 48.4 51 74 62.4	13 49.7 51 73 60.6	14 50.2 50 72 58.8	15 05.2 50 71 58.4	15 35.0 50 71 57.5	4
95	11 01.0 52 75 63.7	11 16.9 52 75 63.2	11 32.6 52 74 62.8	12 03.9 52 74 61.9	13 05.9 51 73 60.2	14 07.2 51 71 58.4	14 22.4 51 71 57.9	14 52.7 50 70 57.1	95
6	10 16.2 53 75 63.2	10 32.1 53 74 62.7	10 48.0 53 74 62.3	11 19.6 53 73 60.9	12 22.4 52 72 59.7	13 24.5 51 71 58.0	13 39.9 51 71 57.5	14 10.6 51 70 56.6	6
7	9 31.4 54 74 62.7	9 47.5 54 74 62.3	10 03.5 54 74 61.8	10 35.5 54 73 61.0	11 39.0 53 72 59.3	12 41.9 52 71 57.5	12 57.5 52 70 57.1	13 28.7 52 70 56.2	7
8	8 46.8 54 74 62.2	9 03.0 54 74 61.8	9 19.2 54 73 61.4	9 51.6 54 73 60.5	10 55.9 53 72 58.8	11 59.6 53 70 57.1	12 15.4 53 70 56.6	12 46.9 52 69 55.8	8
9	8 02.4 55 74 61.7	8 18.8 55 73 61.3	8 35.2 55 73 60.9	9 07.9 54 72 60.0	10 12.9 54 71 58.3	11 17.5 54 70 56.6	11 33.5 53 70 56.2	12 05.5 53 69 55.3	9
100	7 18.1 55 73 61.2	7 34.7 55 73 60.8	7 51.3 55 73 60.4	8 24.4 55 72 59.6	9 30.2 55 71 57.9	10 35.5 54 69 56.2	10 51.8 54 69 55.7	11 24.2 54 68 54.9	100
1	6 34.1 56 73 60.7	6 50.9 56 73 60.3	7 07.7 56 72 59.9	7 41.1 56 72 59.1	8 47.7 55 70 57.4	9 53.9 55 69 55.7	10 10.3 55 69 55.3	10 43.1 55 68 54.4	1
2	5 50.3 57 73 60.2	6 07.3 57 72 59.8	6 24.2 57 72 59.4	6 58.1 57 71 58.6	8 05.4 56 70 56.9	9 12.4 56 69 55.2	9 29.1 56 68 54.8	10 02.3 55 68 54.0	2
3	5 06.8 57 72 59.7	5 23.9 57 72 59.3	5 41.0 57 72 58.9	6 15.2 57 71 58.1	7 23.4 57 70 56.4	8 31.2 56 68 54.8	8 48.1 56 68 54.3	9 21.8 56 67 53.5	3
4				5 32.6 58 71 57.6	6 41.6 57 69 55.9	7 50.2 57 68 54.3	8 07.3 57 68 53.9	8 41.4 57 67 53.0	4
105					6 00.0 58 69 55.5	7 09.5 58 67 53.8	7 26.8 58 67 53.4	8 01.3 58 66 52.6	105
6					5 18.7 59 68 55.0	6 29.0 58 67 52.9	6 46.5 58 67 52.9	7 21.5 58 66 51.6	6
7						5 48.8 59 67 52.8	6 06.5 59 66 52.4	6 41.9 59 66 51.6	7
8						5 08.8 60 66 52.3	5 26.7 60 66 51.9	6 02.6 60 65 51.1	8
9								5 23.6 60 65 50.6	9

(Right margin tab labels: Lat. 37°, Lat. 38°)

Lat. 33°

H.A.	36° 00' Alt. (Δd Δt)	Az.	37° 00' Alt.	Az.	38° 30' Alt.	Az.	40° 00' Alt.	Az.	42° 00' Alt.	Az.	42° 30' Alt.	Az.	43° 00' Alt.	Az.	45° 00' Alt.	Az.	H.A.
00	87 00.0 1.0 11	00.0	86 00.0 1.0 08	00.0	84 30.0 1.0 06	00.0	83 00.0 1.0 05	00.0	81 00.0 1.0 03	00.0	80 30.0 1.0 03	00.0	80 00.0 1.0 03	00.0	78 00.0 1.0 02	00.0	00
1	86 53.3 96 31	15.1	85 55.0 98 24	11.3	84 26.4 99 17	08.1	82 57.2 99 14	06.3	80 57.9 1.0 10	04.7	80 28.0 1.0 10	04.5	79 58.2 1.0 09	04.2	77 58.5 1.0 07	03.4	1
2	86 34.6 87 46	28.2	85 40.7 92 37	21.7	84 16.0 96 28	15.9	82 49.1 97 22	12.3	80 51.7 98 17	09.4	80 22.2 98 16	08.8	79 52.6 99 15	08.4	77 54.1 99 12	06.8	2
3	86 06.8 76 57	38.7	85 18.4 84 48	30.7	83 59.2 91 37	23.0	82 35.8 94 30	18.1	80 41.5 94 20	13.1	80 12.6 97 22	13.9	79 43.6 97 21	12.4	77 46.7 98 17	10.1	3
4	85 32.6 66 64	46.6	84 49.8 76 55	38.2	83 36.9 85 45	29.4	82 18.0 90 37	23.5	80 27.6 94 29	18.2	79 59.4 94 28	17.2	79 31.1 95 26	16.3	77 36.5 96 22	13.3	4
05	84 54.3 57 69	52.5	84 16.6 68 61	44.3	83 10.1 79 51	35.0	81 55.9 85 43	28.4	80 10.2 90 34	22.3	79 42.9 91 33	21.1	79 15.4 92 31	20.0	77 23.6 94 26	16.4	05
6	84 13.1 49 72	57.1	83 39.9 61 65	49.2	82 39.5 73 56	39.8	81 30.2 80 48	32.8	79 49.5 87 39	26.1	79 23.3 88 37	24.7	78 56.8 89 36	23.5	77 08.1 92 30	19.4	6
7	83 30.0 43 74	60.6	83 00.7 54 69	53.1	82 05.9 67 60	43.9	81 01.5 76 52	36.8	79 26.0 83 43	29.6	79 00.9 84 42	28.1	78 35.4 86 40	26.8	76 50.2 89 34	22.2	7
8	82 45.6 38 76	63.3	82 19.6 49 71	56.3	81 29.8 61 63	47.4	80 30.2 71 56	40.3	78 59.7 79 47	32.8	78 35.9 81 45	31.3	78 11.5 82 44	29.8	76 30.1 87 37	24.9	8
9	82 00.2 33 77	65.5	81 37.1 44 73	59.0	80 51.9 56 66	50.5	79 56.6 66 59	43.3	78 31.6 75 51	35.8	78 06.7 77 49	34.2	77 45.4 79 47	32.6	76 07.9 84 40	27.5	9
10	81 14.1 29 78	67.2	80 53.4 39 74	61.2	80 12.3 52 68	53.0	79 21.2 62 62	46.1	78 01.2 71 54	38.4	77 39.5 73 52	36.8	77 17.3 75 50	35.2	75 43.7 81 43	29.9	10
1	80 27.5 26 78	68.6	80 09.0 35 75	63.0	79 31.6 47 70	55.2	78 44.2 57 64	48.5	77 29.1 67 56	40.9	77 08.5 69 54	39.2	76 47.4 71 52	37.6	75 17.8 78 46	32.1	1
2	79 40.4 23 79	69.8	79 23.9 32 76	64.5	78 49.7 44 71	57.1	78 06.0 53 66	50.6	76 55.4 64 58	43.1	76 36.0 66 57	41.4	76 15.9 68 55	39.8	74 50.3 75 48	34.2	2
3	78 53.1 21 79	70.7	78 38.2 29 77	65.8	78 07.1 40 72	58.8	77 26.5 50 67	52.4	76 20.4 60 60	45.1	76 02.0 62 59	43.4	75 43.0 64 57	41.8	74 21.3 71 51	36.1	3
4	78 05.4 18 80	71.5	77 52.1 26 77	66.8	77 23.7 37 73	60.2	76 46.2 46 69	54.1	75 44.2 57 62	46.9	75 26.9 59 60	45.2	75 08.8 61 59	43.6	73 50.9 68 53	37.9	4
15	77 17.6 16 80	72.2	77 05.7 24 78	67.7	76 39.8 34 74	61.4	76 05.1 43 70	55.5	75 07.0 53 64	48.5	74 50.6 56 62	46.9	74 33.6 58 60	45.3	73 19.4 65 54	39.6	15
6	76 29.6 14 80	72.7	76 19.0 21 78	68.5	75 55.4 31 75	62.5	75 23.3 40 71	56.8	74 28.9 50 65	50.0	74 13.4 53 63	48.4	73 57.3 55 62	46.8	72 46.8 62 56	41.2	6
7	75 41.5 12 80	73.2	75 32.1 19 79	69.2	75 10.6 29 75	63.4	74 40.9 37 72	58.0	73 50.0 47 66	51.3	73 35.4 50 65	49.7	73 20.2 52 63	48.2	72 13.2 60 58	42.6	7
8	74 53.3 11 80	73.5	74 44.9 17 79	69.8	74 25.4 26 76	64.2	73 58.0 35 72	59.0	73 10.4 45 67	52.5	72 56.7 47 66	51.0	72 42.3 49 64	49.5	71 38.7 57 59	43.9	8
9	74 05.0 09 81	73.8	73 57.6 15 79	70.2	73 39.9 24 76	65.0	73 14.7 32 73	59.9	72 30.2 42 68	53.6	72 17.3 44 67	52.1	72 03.7 46 65	50.6	71 03.4 54 60	45.2	9
20	73 16.7 08 81	74.1	73 10.2 14 79	70.6	72 54.2 22 77	65.6	72 31.0 30 73	60.7	71 49.4 39 69	54.6	71 37.3 42 67	53.1	71 24.5 44 66	51.7	70 27.3 51 61	46.3	20
1	72 28.3 07 81	74.3	72 22.7 13 79	71.0	72 08.3 20 77	66.1	71 46.9 28 74	61.4	71 08.2 37 69	55.5	70 56.8 39 68	54.0	70 44.8 41 67	52.6	69 50.6 49 62	47.3	1
2	71 39.8 05 81	74.4	71 35.1 10 79	71.3	71 22.2 18 77	66.6	71 02.6 25 74	62.1	70 26.5 35 70	56.3	70 15.9 37 69	54.9	70 04.6 39 68	53.5	69 13.4 46 63	48.3	2
3	70 51.3 04 81	74.6	70 47.4 09 80	71.5	70 36.0 16 77	67.0	70 18.0 23 75	62.6	69 44.5 32 71	57.0	69 34.5 34 70	55.6	69 23.9 36 68	54.3	68 35.5 44 64	49.2	3
4	70 02.8 03 81	74.6	69 59.6 08 80	71.7	69 49.6 15 78	67.4	69 33.2 22 75	63.1	69 02.2 30 71	57.7	68 52.8 32 70	56.3	68 42.8 34 69	55.0	67 57.2 42 65	50.0	4
25	69 14.3 02 81	74.7	69 11.8 06 80	71.9	69 03.1 13 78	67.7	68 48.3 20 75	63.6	68 19.5 28 72	58.2	68 10.8 30 71	57.5	68 01.4 32 70	55.7	67 18.4 39 65	50.8	25
6	68 25.7 01 81	74.7	68 24.0 05 80	72.0	68 16.5 12 78	67.9	68 03.1 18 75	64.0	67 36.6 26 72	58.7	67 28.4 27 71	57.5	67 19.7 30 70	56.3	66 39.2 37 66	51.5	6
7	67 37.2 00 81	74.7	67 36.1 04 80	72.1	67 29.8 10 78	68.2	67 17.9 16 76	64.3	66 53.4 24 72	59.3	66 45.9 26 71	58.0	66 37.7 28 70	56.8	65 59.7 35 66	52.1	7
8	66 48.6 01 81	74.7	66 48.2 03 80	72.2	66 43.1 09 78	68.4	66 32.5 15 76	64.6	66 10.1 22 73	59.7	66 03.1 24 72	58.5	65 55.5 26 71	57.3	65 19.4 33 67	52.7	8
9	66 00.1 02 81	74.7	66 00.3 02 80	72.2	65 56.3 07 78	68.5	65 46.9 13 76	64.9	65 26.4 21 73	60.1	65 20.1 23 72	58.9	65 13.0 24 71	57.8	64 39.7 31 67	53.2	9
30	65 11.6 01 81	74.7	65 12.4 01 80	72.2	65 09.4 06 78	68.7	65 01.3 12 76	65.1	64 42.8 19 73	60.4	64 36.9 21 72	59.3	64 30.4 23 71	58.2	63 59.2 29 68	53.7	30
1	64 23.1 04 81	74.5	64 24.5 01 80	72.2	64 22.5 05 78	68.8	64 15.7 10 76	65.3	63 59.0 17 73	60.8	63 53.5 19 72	59.6	63 47.5 21 72	58.5	63 18.6 27 68	54.2	1
2	63 34.6 05 81	74.5	63 36.6 02 80	72.2	63 35.6 04 78	68.8	63 29.9 09 76	65.5	63 15.0 16 73	61.0	63 10.0 17 73	59.9	63 04.5 19 72	58.9	62 37.6 26 69	54.6	2
3	62 46.1 06 81	74.4	62 48.7 03 80	72.2	62 48.7 03 78	68.9	62 44.1 08 76	65.6	62 31.0 14 74	61.3	62 26.4 16 73	60.2	62 21.4 18 72	59.2	61 56.5 24 69	55.0	3
4	61 57.7 07 81	74.2	62 00.8 04 80	72.1	62 01.7 01 78	68.9	61 58.1 07 76	65.7	61 46.8 13 74	61.5	61 42.7 14 73	60.5	61 38.1 16 72	59.4	61 15.2 22 69	55.3	4
35	61 09.3 08 81	74.1	61 12.9 04 80	72.0	61 14.8 01 78	68.9	61 12.4 05 77	65.8	61 02.5 11 74	61.7	60 58.9 13 73	60.7	60 54.8 14 72	59.6	60 33.8 20 69	55.6	35
6	60 20.9 08 81	74.0	60 25.0 05 80	72.0	60 27.8 01 78	68.9	60 26.5 04 77	65.9	60 18.2 10 74	61.8	60 15.0 11 73	60.8	60 11.3 13 73	59.8	59 52.2 19 70	55.9	6
7	59 32.5 09 80	73.8	59 37.2 06 80	71.9	59 40.9 02 78	68.9	59 40.5 03 77	65.9	59 33.8 09 74	62.0	59 31.0 10 73	61.0	59 27.8 12 73	60.0	59 10.5 17 70	56.1	7
8	58 44.2 10 80	73.7	58 49.4 07 80	71.8	58 53.9 03 78	68.9	58 54.6 00 77	66.0	58 49.3 07 74	62.1	58 46.9 09 74	61.1	58 44.1 10 73	60.2	58 28.6 16 70	56.4	8
9	57 56.0 11 80	73.5	58 01.6 08 80	71.7	58 07.0 04 78	68.8	58 08.6 00 77	66.0	58 04.8 06 74	62.2	58 02.9 07 74	61.1	58 00.4 09 73	60.3	57 46.7 14 70	56.6	9
40	57 07.7 12 80	73.4	57 13.9 09 80	71.5	57 20.1 05 78	68.8	57 22.6 01 77	66.0	57 20.3 05 74	62.3	57 18.7 06 74	61.3	57 16.7 07 73	60.4	57 04.6 13 70	56.7	40
1	56 19.5 12 80	73.2	56 26.2 10 79	71.4	56 33.2 06 78	68.7	56 36.7 02 77	66.0	56 35.8 03 74	62.3	56 34.5 05 74	61.4	56 32.9 06 73	60.5	56 22.5 11 70	56.9	1
2	55 31.4 13 80	73.0	55 38.5 11 79	71.2	55 46.3 07 78	68.6	55 50.7 03 77	65.9	55 51.2 02 74	62.4	55 50.3 03 74	61.5	55 49.1 05 73	60.6	55 40.3 10 70	57.0	2
3	54 43.3 14 80	72.8	54 50.9 11 79	71.1	54 59.5 08 78	68.5	55 04.8 04 77	65.9	55 06.6 01 74	62.4	55 06.1 02 74	61.5	55 05.3 03 73	60.6	54 58.1 08 70	57.2	3
4	53 55.2 15 80	72.6	54 03.3 12 79	70.9	54 12.7 09 78	68.4	54 18.9 04 77	65.8	54 22.0 00 74	62.4	54 21.9 01 74	61.5	54 21.4 02 73	60.7	54 15.8 07 71	57.2	4
45	53 07.2 15 80	72.4	53 15.8 13 79	70.8	53 26.0 10 78	68.3	53 33.0 06 76	65.7	53 37.4 01 74	62.4	53 37.7 00 74	61.5	53 37.5 01 73	60.7	53 33.4 06 71	57.3	45
6	52 19.3 16 80	72.2	52 28.3 14 79	70.6	52 39.2 10 78	68.1	52 47.1 07 76	65.7	52 52.9 02 74	62.4	52 53.4 01 74	61.5	52 53.6 00 73	60.7	52 51.1 04 71	57.4	6
7	51 31.4 17 80	72.0	51 40.9 15 79	70.4	51 52.6 11 78	68.0	52 01.3 08 76	65.6	52 08.3 04 74	62.3	52 09.2 02 74	61.5	52 09.8 01 73	60.7	52 08.7 03 71	57.4	7
8	50 43.6 17 80	71.8	50 53.5 15 79	70.2	51 05.9 12 78	67.8	51 15.5 09 76	65.5	51 23.7 05 74	62.3	51 25.0 04 74	61.4	51 25.9 03 73	60.7	51 26.3 01 71	57.5	8
9	49 55.8 18 79	71.5	50 06.2 16 79	70.0	50 19.4 13 78	67.7	50 29.8 10 76	65.3	50 39.2 06 74	62.2	50 40.8 05 74	61.4	50 42.0 04 73	60.6	50 43.8 01 71	57.5	9
50	49 08.1 19 79	71.3	49 18.9 17 79	69.8	49 32.8 14 77	67.5	49 44.0 11 76	65.2	49 54.7 07 74	62.1	49 56.6 06 74	61.4	49 58.2 05 73	60.6	50 01.4 01 71	57.5	50
1	48 20.5 20 79	71.1	48 31.7 18 79	69.6	48 46.4 15 77	67.3	48 58.4 12 76	65.1	49 10.2 08 74	62.0	49 12.5 07 74	61.3	49 14.4 06 73	60.5	49 19.0 02 71	57.5	1
2	47 32.9 20 79	70.8	47 44.6 18 79	69.4	48 00.0 16 77	67.2	48 12.8 13 76	64.9	48 25.8 08 74	62.0	48 28.3 08 73	61.2	48 30.6 07 73	60.4	48 36.6 03 71	57.4	2
3	46 45.5 21 79	70.6	46 57.5 19 78	69.1	47 13.6 16 77	67.0	47 27.2 14 76	64.8	47 41.4 10 74	61.8	47 44.3 09 73	61.1	47 46.8 08 73	60.4	47 54.2 04 71	57.4	3
4	45 58.0 22 79	70.3	46 10.5 20 78	68.9	46 27.3 17 77	66.8	46 41.7 15 76	64.6	46 57.1 11 74	61.7	47 00.2 10 73	61.0	47 03.1 09 73	60.3	47 11.8 05 71	57.3	4
55	45 10.7 22 79	70.1	45 23.6 21 78	68.7	45 41.1 18 77	66.6	45 56.3 16 76	64.5	46 12.8 12 74	61.6	46 16.2 11 73	60.9	46 19.4 10 73	60.2	46 29.5 07 71	57.3	55
6	44 23.4 23 79	69.8	44 36.8 21 78	68.4	44 55.0 19 77	66.4	45 10.9 16 76	64.3	45 28.5 13 74	61.5	45 32.3 12 73	60.8	45 35.8 11 73	60.1	45 47.1 08 70	57.2	6
7	43 36.2 24 79	69.6	43 50.0 22 78	68.2	44 08.9 20 77	66.2	44 25.4 17 75	64.1	44 44.4 14 74	61.3	44 48.4 13 73	60.6	44 52.2 12 73	59.9	45 04.9 09 70	57.1	7
8	42 49.1 24 79	69.3	43 03.3 23 78	68.0	43 22.9 21 77	65.9	43 40.4 18 75	63.9	44 00.2 15 73	61.2	44 04.6 14 73	60.5	44 08.7 13 72	59.8	44 22.6 10 70	57.0	8
9	42 02.1 25 78	69.0	42 16.7 24 78	67.7	42 37.0 21 76	65.7	42 55.2 19 75	63.7	43 16.2 16 73	61.0	43 20.8 15 73	60.3	43 25.2 14 72	59.7	43 40.4 11 70	56.9	9
60	41 15.2 26 78	68.7	41 30.2 24 77	67.4	41 51.2 22 76	65.5	42 10.1 20 75	63.5	42 32.2 17 73	60.9	42 37.1 16 73	60.2	42 41.8 15 72	59.5	42 58.3 12 70	56.8	60
1	40 28.3 27 78	68.5	40 43.8 25 77	67.2	41 05.4 23 76	65.3	41 25.1 21 75	63.3	41 48.3 18 73	60.7	41 53.5 17 73	60.0	41 58.5 16 72	59.4	42 16.2 13 70	56.7	1
2	39 41.5 27 78	68.2	39 57.5 26 77	66.9	40 19.8 24 76	65.0	40 40.2 22 75	63.1	41 04.4 19 73	60.5	41 10.0 18 72	59.9	41 15.2 17 72	59.2	41 34.2 14 70	56.6	2
3	38 54.9 28 78	67.9	39 11.2 27 77	66.6	39 34.2 25 76	64.8	39 55.4 22 75	62.9	40 20.7 20 73	60.3	40 26.5 19 72	59.7	40 32.1 18 72	59.0	40 52.2 15 70	56.4	3
4	38 08.3 29 77	67.6	38 25.1 27 77	66.4	38 48.7 25 76	64.5	39 10.6 23 74	62.6	39 37.0 21 73	60.1	39 43.1 20 72	59.5	39 49.0 19 72	58.8	40 10.3 16 70	56.3	4
65	37 21.8 29 77	67.3	37 39.0 28 77	66.1	38 03.4 26 75	64.3	38 26.0 24 74	62.4	38 53.4 22 72	59.9	38 59.8 21 72	59.3	39 05.9 20 72	58.7	39 28.5 17 70	56.1	65
6	36 35.5 30 77	67.0	36 53.1 29 76	65.8	37 18.1 27 75	64.0	37 41.4 24 74	62.2	38 09.9 22 72	59.7	38 16.6 22 72	59.1	38 23.0 21 71	58.5	38 46.8 18 69	56.0	6
7	35 49.2 31 77	66.7	36 07.2 29 76	65.5	36 32.9 28 75	63.7	36 57.0 26 74	61.9	37 26.5 23 72	59.5	37 33.4 23 72	58.9	37 40.2 22 71	58.3	38 05.1 19 69	55.8	7
8	35 03.0 31 77	66.4	35 21.5 30 76	65.2	35 47.8 28 75	63.5	36 12.6 27 74	61.7	36 43.2 24 72	59.3	36 50.4 24 72	58.7	36 57.4 23 71	58.1	37 23.5 21 69	55.6	8
9	34 17.0 32 77	66.1	34 35.8 31 76	64.9	35 02.9 29 75	63.2	35 28.4 28 74	61.4	36 00.9 25 72	59.0	36 07.5 25 71	58.4	36 14.8 24 71	57.8	36 42.1 22 69	55.4	9
70	33 31.0 33 76	65.8	33 50.3 32 76	64.6	34 18.0 30 75	62.9	34 44.3 29 73	61.2	35 16.9 26 72	58.8	35 24.6 25 71	58.2	35 32.2 25 71	57.6	36 00.7 23 69	55.2	70
1	32 45.2 33 76	65.4	33 04.9 32 76	64.3	33 33.1 31 74	62.6	34 00.2 29 73	60.9	34 33.9 27 71	58.6	34 41.4 26 71	58.0	34 49.8 26 71	57.4	35 19.4 24 69	55.1	1
2	31 59.5 34 76	65.1	32 19.6 33 75	64.0	32 48.7 32 74	62.3	33 16.3 30 73	60.6	33 51.0 27 71	58.3	33 59.3 27 71	57.7	34 07.4 27 70	57.2	34 38.2 25 68	54.8	2
3	31 13.9 35 76	64.8	31 34.4 34 75	63.7	32 04.2 32 74	62.0	32 32.5 31 73	60.3	33 08.3 29 71	58.1	33 16.8 28 71	57.5	33 25.2 28 70	56.9	33 57.1 26 68	54.6	3
4	30 28.5 35 76	64.5	30 49.4 34 75	63.4	31 19.8 33 74	61.7	31 48.9 32 73	60.1	32 25.6 30 70	57.8	32 34.4 29 70	57.2	32 43.1 29 70	56.7	33 16.2 27 68	54.4	4
75	29 43.1 36 75	64.1	30 04.5 35 75	63.1	30 35.5 34 73	61.4	31 05.3 32 72	59.8	31 43.1 31 70	57.6	31 52.2 30 70	57.0	32 01.1 30 70	56.4	32 35.3 27 68	54.2	75
6	28 57.9 37 75	63.8	29 19.7 36 74	62.7	29 51.4 35 73	61.1	30 21.9 33 72	59.5	31 00.7 31 70	57.3	31 10.0 31 70	56.7	31 19.2 30 70	56.1	31 54.6 28 68	53.9	6
7	28 12.8 37 75	63.5	28 35.0 37 74	62.4	29 07.4 35 73	60.8	29 38.5 34 72	59.2	30 18.4 32 70	57.0	30 28.0 32 70	56.5	30 37.5 31 69	55.9	31 14.0 29 67	53.7	7
8	27 27.9 38 75	63.1	27 50.5 37 74	62.1	28 23.5 36 73	60.5	28 55.5 35 72	58.9	29 36.3 33 70	56.7	29 46.2 33 70	56.2	29 55.9 32 69	55.6	30 33.5 30 67	53.4	8
9	26 43.1 39 74	62.8	27 06.1 38 74	61.7	27 39.8 37 73	60.2	28 12.5 36 71	58.6	28 54.3 34 70	56.4	29 04.4 34 69	55.9	29 14.4 33 69	55.4	29 53.2 31 67	53.2	9
80	25 58.4 39 74	62.4	26 21.9 39 74	61.4	26 56.3 38 72	59.8	27 29.6 36 71	58.3	28 12.4 35 70	56.1	28 22.8 35 69	55.5	28 33.1 34 69	55.0	29 12.9 32 67	52.9	80
1	25 13.9 40 74	62.0	25 37.8 39 73	61.0	26 12.8 38 72	59.5	26 46.9 37 71	57.9	27 30.7 36 69	55.9	27 41.4 35 69	55.3	27 51.9 35 68	54.8	28 32.9 33 67	52.7	1
2	24 29.5 41 74	61.7	24 53.8 40 73	60.7	25 29.5 39 72	59.2	26 04.3 38 71	57.6	26 49.1 37 69	55.5	27 00.1 36 69	55.0	27 10.9 36 68	54.5	27 52.9 34 66	52.4	2
3	23 45.3 42 73	61.3	24 10.1 41 73	60.3	24 46.4 40 72	58.8	25 21.9 39 70	57.3	26 07.7 37 69	55.2	26 18.9 37 68	54.7	26 30.0 37 68	54.2	27 13.1 35 66	52.1	3
4	23 01.2 42 73	61.0	23 26.4 42 72	60.0	24 03.4 41 71	58.5	24 39.6 40 70	57.0	25 26.5 38 68	54.9	25 37.9 38 68	54.4	25 49.2 38 68	53.9	26 33.5 36 66	51.8	4
85	22 17.3 43 73	60.6	22 42.9 42 72	59.6	23 20.6 41 71	58.1	23 57.5 41 70	56.6	24 45.4 40 68	54.6	24 57.1 39 68	54.1	25 08.7 38 67	53.6	25 54.0 37 66	51.5	85
6	21 33.5 44 73	60.2	21 59.6 43 72	59.2	22 38.0 42 71	57.8	23 15.6 41 70	56.3	24 04.4 40 68	54.3	24 16.4 40 68	53.8	24 28.2 40 67	53.3	25 14.7 38 65	51.2	6
7	20 50.0 44 72	59.8	21 16.4 44 72	58.9	21 55.5 43 71	57.4	22 33.8 42 69	55.9	23 23.6 41 68	54.0	23 35.9 41 67	53.5	23 48.0 40 67	53.0	24 35.5 39 65	50.9	7
8	20 06.6 45 72	59.4	20 33.5 45 71	58.5	21 13.2 44 70	57.0	21 52.2 43 69	55.6	22 43.0 42 69	53.6	22 55.5 41 67	53.1	23 07.9 41 67	52.6	23 56.5 40 65	50.6	8
9	19 23.3 46 72	59.0	19 50.6 45 71	58.1	20 31.1 44 70	56.7	21 10.8 44 69	55.2	22 02.6 43 67	53.3	22 15.4 42 67	52.8	22 27.9 41 66	52.3	23 17.7 41 64	50.3	9
90	18 40.3 47 71	58.6	19 08.0 46 71	57.7	19 49.1 45 70	56.3	20 29.6 45 68	54.9	21 22.4 43 67	52.9	21 35.4 43 66	52.5	21 48.3 43 66	52.0	22 39.1 42 64	50.0	90

Lat. 33°

H.A.	36° 00′ Alt. Δd Δt Az.	37° 00′ Alt. Δd Δt Az.	38° 30′ Alt. Δd Δt Az.	40° 00′ Alt. Δd Δt Az.	42° 00′ Alt. Δd Δt Az.	42° 30′ Alt. Δd Δt Az.	43° 00′ Alt. Δd Δt Az.	45° 00′ Alt. Δd Δt Az.	H.A.
00	21 00.0 1.0 01 180.0	20 00.0 1.0 01 180.0	18 30.0 1.0 01 180.0	17 00.0 1.0 01 180.0	15 00.0 1.0 01 180.0	14 30.0 1.0 01 180.0	14 00.0 1.0 01 180.0	12 00.0 1.0 01 180.0	00
1	20 59.6 1.0 02 179.1	19 59.6 1.0 02 179.2	18 29.6 1.0 02 179.2	16 59.6 1.0 02 179.2	14 59.7 1.0 02 179.2	14 29.7 1.0 02 179.2	13 59.7 1.0 02 179.2	11 59.7 1.0 02 179.3	1
2	20 58.5 1.0 03 178.3	19 58.5 1.0 03 178.3	18 28.6 1.0 03 178.4	16 58.6 1.0 03 178.4	14 58.6 1.0 03 178.5	14 28.7 1.0 03 178.5	13 58.7 1.0 03 178.5	11 58.7 1.0 03 178.6	2
3	20 56.6 1.0 04 177.4	19 56.6 1.0 04 177.5	18 26.7 1.0 04 177.5	16 56.8 1.0 04 177.6	14 57.0 1.0 04 177.7	14 27.0 1.0 04 177.7	13 57.0 1.0 04 177.7	11 57.0 1.0 04 177.8	3
4	20 53.9 1.0 06 176.5	19 54.0 1.0 06 176.6	18 24.2 1.0 05 176.7	16 54.4 1.0 05 176.8	14 54.6 1.0 05 176.9	14 24.7 1.0 05 177.0	13 54.7 1.0 05 177.0	11 54.9 1.0 04 177.1	4
05	20 50.5 1.0 07 175.7	19 50.7 1.0 07 175.8	18 20.9 1.0 07 175.9	16 51.2 1.0 06 176.0	14 51.6 1.0 06 176.2	14 21.6 1.0 06 176.2	13 51.7 1.0 06 176.2	11 52.1 1.0 06 176.4	05
6	20 46.3 1.0 08 174.8	19 46.6 1.0 08 174.9	18 17.0 1.0 08 175.1	16 47.4 1.0 08 175.2	14 47.9 1.0 07 175.4	14 18.0 1.0 07 175.4	13 48.1 1.0 07 175.5	11 48.6 1.0 07 175.7	6
7	20 41.4 99 09 174.0	19 41.8 99 09 174.1	18 12.3 99 09 174.2	16 42.8 99 09 174.4	14 43.5 99 08 174.6	14 13.6 99 08 174.7	13 43.8 99 08 174.7	11 44.5 99 08 175.0	7
8	20 35.7 99 11 173.2	19 36.2 99 10 173.3	18 06.9 99 10 173.4	16 37.5 99 10 173.6	14 38.4 99 10 173.9	14 08.6 99 09 173.9	13 38.9 99 09 174.0	11 39.7 99 09 174.2	8
9	20 29.3 99 12 172.2	19 29.9 99 12 172.4	18 00.7 99 11 172.6	16 31.6 99 11 172.8	14 32.7 99 11 173.1	14 03.0 99 11 173.2	13 33.3 99 10 173.2	11 34.4 99 10 173.5	9
10	20 22.1 99 13 171.4	19 22.8 99 13 171.5	17 53.9 99 13 171.8	16 25.0 99 12 172.0	14 26.3 99 12 172.3	13 56.7 99 12 172.4	13 27.0 99 11 172.5	11 28.4 99 11 172.8	10
1	20 14.2 99 14 170.5	19 15.1 99 14 170.7	17 46.4 99 14 171.0	16 17.6 99 13 171.2	14 19.3 99 13 171.6	13 49.7 99 13 171.7	13 20.1 99 13 171.8	11 21.8 99 12 172.1	1
2	20 05.6 98 16 169.7	19 06.6 98 15 169.9	17 38.1 98 15 170.2	16 09.6 98 14 170.5	14 11.6 98 14 170.9	13 42.1 98 14 171.0	13 12.6 98 14 171.1	11 14.5 98 13 171.4	2
3	19 56.2 98 17 168.8	18 57.4 98 16 169.0	17 29.2 98 16 169.4	16 01.0 98 16 169.7	14 03.3 98 15 170.1	13 33.8 98 15 170.2	13 04.4 98 15 170.3	11 06.7 98 14 170.7	3
4	19 46.1 98 18 168.0	18 47.5 98 18 168.2	17 19.6 98 17 168.6	15 51.6 98 17 168.9	13 54.3 98 16 169.3	13 24.9 98 16 169.4	12 55.6 98 16 169.5	10 58.2 98 15 170.0	4
15	19 35.3 97 19 167.2	18 36.9 97 19 167.4	17 09.2 97 18 167.8	15 41.6 97 18 168.1	13 44.6 97 17 168.6	13 15.4 97 17 168.7	12 46.1 97 17 168.8	10 49.1 98 16 169.3	15
6	19 23.7 97 20 166.3	18 25.5 97 20 166.6	16 58.2 97 20 167.0	15 30.9 97 19 167.3	13 34.3 97 18 167.8	13 05.2 97 18 168.0	12 36.1 97 18 168.1	10 39.5 97 17 168.6	6
7	19 11.5 97 22 165.5	18 13.5 97 21 165.7	16 46.5 97 21 166.2	15 19.5 97 20 166.6	13 23.4 97 19 167.1	12 54.4 97 19 167.4	12 25.4 97 19 167.4	10 29.2 97 18 167.9	7
8	18 58.5 96 23 164.7	18 00.8 96 22 165.0	16 34.2 96 22 165.4	15 07.5 96 21 165.8	13 11.9 96 20 166.4	12 43.0 96 20 166.5	12 14.0 96 20 166.6	10 18.3 96 19 167.2	8
9	18 44.9 96 24 163.9	17 47.4 96 23 164.2	16 21.1 96 23 164.6	14 54.8 96 22 165.0	12 59.7 96 21 165.6	12 30.9 96 21 165.8	12 02.1 96 21 165.9	10 06.8 96 20 166.5	9
20	18 30.5 95 25 163.0	17 33.3 95 25 163.4	16 07.5 95 24 163.8	14 41.5 95 23 164.3	12 46.9 96 22 164.9	12 18.2 96 22 165.0	11 49.5 96 22 165.2	9 54.8 96 21 165.8	20
1	18 15.5 95 26 162.2	17 18.6 95 26 162.5	15 53.1 95 25 163.0	14 27.6 95 24 163.5	12 33.5 95 23 164.2	12 04.9 95 23 164.3	11 36.4 95 23 164.5	9 42.1 95 22 165.1	1
2	17 59.8 94 27 161.4	17 03.2 94 27 161.8	15 38.1 94 27 162.3	14 13.0 95 25 162.8	12 19.4 95 24 163.4	11 51.0 95 24 163.6	11 22.6 95 24 163.6	9 28.9 95 23 164.4	2
3	17 43.4 94 28 160.6	16 47.1 94 28 161.0	15 22.5 94 27 161.5	13 57.8 94 26 162.0	12 04.8 94 25 162.7	11 36.5 94 25 162.9	11 08.2 94 25 163.1	9 15.1 94 24 163.7	3
4	17 26.4 93 29 159.8	16 30.4 93 29 160.2	15 06.2 94 28 160.7	13 42.0 94 27 161.3	11 49.5 94 26 162.0	11 21.4 94 26 162.2	10 53.3 94 26 162.4	9 00.7 94 25 163.1	4
25	17 08.7 93 31 159.0	16 13.0 93 30 159.4	14 49.3 93 29 160.0	13 25.5 93 28 160.6	11 33.7 93 27 161.3	11 05.7 93 27 161.5	10 37.8 93 27 161.7	8 45.8 93 26 162.4	25
6	16 50.4 92 32 158.3	15 55.0 92 31 158.7	14 31.8 93 30 159.2	13 08.5 93 29 159.8	11 17.3 93 28 160.6	10 49.5 93 28 160.8	10 21.6 93 28 161.0	8 30.3 93 27 161.7	6
7	16 31.4 92 33 157.5	15 36.3 92 32 157.9	14 13.6 92 31 158.5	12 50.8 92 30 159.1	11 00.3 92 29 159.9	10 32.6 92 29 160.1	10 05.0 92 29 160.3	8 14.2 92 28 161.1	7
8	16 11.8 91 34 156.7	15 17.1 91 33 157.1	13 54.9 91 32 157.8	12 32.6 92 31 158.4	10 42.7 92 30 159.2	10 15.2 92 30 159.4	9 47.7 92 30 159.6	7 57.6 92 29 160.4	8
9	15 51.6 91 35 155.9	14 57.2 91 34 156.4	13 35.5 91 33 157.0	12 13.7 91 32 157.7	10 24.5 91 31 158.5	9 57.1 91 31 158.7	9 29.9 91 31 158.9	7 40.5 91 29 159.8	9
30	15 30.8 90 36 155.2	14 36.8 90 35 155.6	13 15.6 90 34 156.3	11 54.5 90 33 157.0	10 05.8 90 32 157.8	9 38.7 91 32 158.0	9 11.5 90 32 157.6	7 22.8 90 30 159.1	30
1	15 09.4 89 37 154.4	14 15.7 90 36 154.9	12 55.1 90 35 155.6	11 34.4 90 34 156.3	9 46.6 90 33 157.1	9 19.6 90 33 157.4	8 52.6 90 32 157.6	7 04.6 90 31 158.5	1
2	14 47.4 89 38 153.7	13 54.1 89 37 154.2	12 34.0 89 36 154.9	11 13.8 89 35 155.6	9 26.7 89 34 156.5	9 00.0 89 34 156.7	8 33.2 89 33 156.9	6 45.9 89 32 157.8	2
3	14 24.8 88 39 152.9	13 31.8 88 38 153.4	12 12.3 88 37 154.1	10 52.7 89 36 154.9	9 06.4 89 35 155.8	8 39.8 89 34 156.0	8 13.2 89 34 156.3	6 26.7 89 33 157.2	3
4	14 01.6 88 40 152.2	13 09.0 88 38 152.7	11 50.1 88 38 153.4	10 31.0 88 37 154.2	8 45.5 88 36 155.1	8 19.1 88 35 155.4	7 52.7 88 35 155.6	6 06.9 88 34 156.6	4
35	13 37.8 87 40 151.5	12 45.7 87 40 152.0	11 27.3 87 39 152.7	10 08.9 87 38 153.5	8 24.1 87 36 154.7	7 57.9 87 36 154.7	7 31.6 87 36 154.7	5 46.6 88 35 155.3	35
6	13 13.5 86 41 150.8	12 21.8 86 41 151.3	11 04.0 86 40 152.0	9 46.1 87 39 152.8	8 02.1 87 37 153.8	7 36.1 87 37 154.1	7 10.1 87 37 154.3	5 25.9 87 35 155.3	6
7	12 48.7 86 42 150.0	11 57.3 86 42 150.6	10 40.2 86 41 151.4	9 22.9 86 40 152.1	7 39.7 86 38 153.2	7 13.9 86 38 153.4	6 48.0 86 38 153.7	5 04.6 86 36 154.7	7
8	12 23.3 85 43 149.3	11 32.3 85 43 149.9	10 15.8 85 42 150.7	8 59.1 85 40 151.5	7 16.7 85 39 152.5	6 51.1 85 39 152.8	6 25.5 85 38 153.1		8
9	11 57.4 84 44 148.6	11 06.6 84 43 149.2	9 50.9 84 42 150.0	8 34.8 84 41 150.8	6 53.3 84 40 151.9	6 27.9 84 40 152.2	6 02.4 85 39 152.4		9
40	11 30.9 84 45 147.9	10 40.8 84 44 148.5	9 25.5 84 43 149.3	8 10.0 84 42 150.2	6 29.3 84 41 151.3	6 04.1 84 40 151.5	5 38.9 84 40 151.8		40
1	11 04.0 83 46 147.3	10 14.2 83 45 147.8	8 59.6 83 44 148.7	7 44.8 83 43 149.5	6 04.9 83 42 150.6	5 39.9 83 41 150.9	5 14.9 83 41 151.2		1
2	10 36.5 82 47 146.6	9 47.2 82 46 147.2	8 33.2 82 45 148.0	7 19.0 82 44 148.9	5 40.0 83 42 150.0	5 15.2 83 42 150.3			2
3	10 08.5 81 47 145.9	9 19.7 81 47 146.5	8 06.3 82 46 147.4	6 52.8 82 44 148.2					3
4	9 40.1 81 48 145.2	8 51.7 81 47 145.8	7 38.9 81 46 146.7	6 26.0 81 45 147.6					4
45	9 11.2 80 49 144.6	8 23.2 80 48 145.2	7 11.1 80 47 146.1	5 58.9 80 46 147.0					45
6	8 41.8 79 50 143.9	7 54.0 79 49 144.5	6 42.8 79 48 145.5	5 31.2 80 47 146.4					6
7	8 11.9 78 50 143.3	7 24.8 79 50 143.9	6 14.0 79 49 144.8	5 03.2 79 48 145.8					7
8	7 41.6 78 51 142.7	6 54.9 78 49 143.3	5 44.8 78 49 144.2						8
9	7 10.9 77 52 142.0	6 24.6 77 51 142.7	5 15.2 77 50 143.6						9
50	6 39.7 76 53 141.4	5 53.9 76 52 142.0							50
1	6 08.1 76 53 140.8	5 22.7 76 53 141.4							1
2	5 36.0 75 54 140.2								2
3	5 03.6 74 55 139.6								3

Lat. 34°

Lat. 35°

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00′ Alt. Δd Δt Az.	37° 00′ Alt. Δd Δt Az.	38° 30′ Alt. Δd Δt Az.	40° 00′ Alt. Δd Δt Az.	42° 00′ Alt. Δd Δt Az.	42° 30′ Alt. Δd Δt Az.	43° 00′ Alt. Δd Δt Az.	45° 00′ Alt. Δd Δt Az.	H.A.
91	17 57.4 47 71 58.2	18 25.6 47 70 57.3	19 07.4 46 69 55.9	19 48.5 45 68 54.5	20 42.3 44 66 52.6	20 55.6 44 66 52.1	21 08.7 44 66 51.6	22 00.6 43 64 49.7	91
2	17 14.7 48 71 57.8	17 43.3 48 70 56.9	18 25.8 47 69 55.5	19 07.6 46 68 54.1	20 02.4 45 66 52.2	20 15.9 45 65 51.8	20 29.4 45 65 51.3	21 22.3 44 63 49.4	2
3	16 32.2 49 70 57.4	17 01.2 48 70 56.5	17 44.4 48 69 55.1	18 27.0 47 67 53.7	19 22.7 46 66 51.9	19 36.5 46 65 51.4	19 50.2 46 65 50.9	20 44.2 44 63 49.0	3
4	15 49.9 49 70 57.0	16 19.4 49 69 56.1	17 03.2 48 68 54.7	17 46.5 48 67 53.4	18 43.3 47 65 51.5	18 57.3 47 65 51.0	19 11.2 46 65 50.6	20 06.3 45 63 48.7	4
95	15 07.7 50 70 56.6	15 37.7 50 69 55.7	16 22.2 49 68 54.3	17 06.2 49 67 53.0	18 04.0 48 65 51.1	18 18.2 47 65 50.7	18 32.5 47 64 50.2	19 28.6 46 62 48.3	95
6	14 25.8 51 70 56.2	14 56.9 50 69 55.3	15 41.4 50 68 53.9	16 26.1 49 66 52.6	17 24.9 49 65 50.8	17 39.4 48 64 50.3	17 53.9 48 64 49.8	18 51.1 47 62 48.0	6
7	13 44.1 52 69 55.8	14 15.0 51 68 54.9	15 00.0 51 67 53.5	15 46.3 50 66 52.2	16 46.0 49 64 50.4	17 00.8 49 64 49.9	17 15.5 49 64 49.5	18 13.8 48 62 47.6	7
8	13 02.6 52 69 55.3	13 33.9 52 68 54.4	14 20.5 51 67 53.1	15 06.6 51 66 51.8	16 07.4 50 64 50.0	16 22.4 50 64 49.5	16 37.4 50 63 49.1	17 36.8 49 61 47.3	8
9	12 21.4 53 68 54.9	12 53.1 53 68 54.0	13 40.3 52 67 52.7	14 27.2 52 65 51.4	15 28.9 51 64 49.6	15 44.2 51 63 49.2	15 59.5 51 63 48.7	16 59.9 50 61 46.9	9
100	11 40.3 54 68 54.4	12 12.5 53 67 53.6	13 00.4 53 66 52.3	13 48.0 53 65 51.0	14 50.7 52 63 49.2	15 06.3 52 63 48.8	15 21.8 52 62 48.3	16 23.3 51 61 46.5	100
1	10 59.5 54 68 54.0	11 32.1 54 67 53.1	12 20.7 54 66 51.9	13 09.0 53 65 50.6	14 12.7 53 63 48.8	14 28.5 53 62 48.4	14 44.3 52 62 47.9	15 46.9 52 60 46.2	1
2	10 18.9 55 67 53.5	10 52.0 55 66 52.7	11 41.3 54 65 51.4	12 30.3 54 64 50.1	13 35.0 54 63 48.4	13 51.0 53 62 48.0	14 07.1 53 62 47.5	15 10.7 52 60 45.8	2
3	9 38.6 56 67 53.1	10 12.1 55 66 52.2	11 02.1 55 65 51.0	11 51.8 55 64 49.7	12 57.5 54 62 48.0	13 13.8 54 62 47.6	13 30.1 54 61 47.1	14 34.7 54 60 45.4	3
4	8 58.4 57 66 52.6	9 32.4 56 66 51.8	10 23.1 56 65 50.5	11 13.5 56 63 49.3	12 20.2 55 62 47.6	12 36.8 55 61 47.1	12 53.3 55 61 46.7	13 59.0 54 59 45.0	4
105	8 18.6 57 66 52.2	8 53.0 57 65 51.3	9 44.4 57 64 50.1	10 35.5 57 63 48.8	11 43.2 56 61 47.1	12 00.0 56 61 46.7	12 16.8 56 60 46.3	13 23.6 55 59 44.6	105
6	7 39.0 58 66 51.7	8 13.8 58 65 50.9	9 05.9 58 64 49.6	9 57.7 57 62 48.4	11 06.4 57 61 46.7	11 23.5 57 60 46.3	11 40.6 57 60 45.9	12 48.4 56 58 44.2	6
7	6 59.5 59 65 51.2	7 34.9 59 64 50.4	8 27.7 59 63 49.2	9 20.3 58 62 47.9	10 29.9 58 60 46.3	10 47.3 58 60 45.9	11 04.6 58 60 45.5	12 13.4 57 58 43.8	7
8	6 20.5 60 65 50.7	6 56.3 60 64 49.9	7 49.8 59 63 48.7	8 43.0 59 62 47.5	9 53.7 59 60 45.8	10 11.3 59 60 45.4	10 28.8 58 59 45.0	11 38.8 58 57 43.4	8
9	5 41.7 60 64 50.2	6 17.9 60 64 49.4	7 12.1 60 62 48.2	8 06.1 60 61 47.0	9 17.7 60 59 45.4	9 35.6 59 59 45.0	9 53.4 59 59 44.6	11 04.3 59 57 42.9	9
110	5 03.2 61 64 49.7	5 39.8 61 63 49.0	6 34.7 61 62 47.8	7 29.4 61 61 46.6	8 42.0 60 59 44.9	9 00.1 60 59 44.5	9 18.2 60 58 44.1	10 30.2 60 56 42.5	110
1		5 02.0 62 63 48.5	5 57.6 62 61 47.3	6 53.0 61 60 46.1	8 06.6 61 59 44.5	8 25.0 61 58 44.1	8 43.3 61 58 43.7	9 56.3 61 55 42.1	1
2			5 20.8 62 61 46.8	6 16.9 62 60 45.6	7 31.5 62 58 44.0	7 50.1 62 58 43.6	8 08.7 62 57 43.2	9 22.7 62 56 41.6	2
3				5 41.1 63 59 45.1	6 56.7 63 58 43.6	7 15.5 63 57 43.2	7 34.4 63 57 42.8	8 49.5 62 55 41.2	3
4				5 05.6 64 59 44.6	6 22.2 64 57 43.1	6 41.3 64 57 42.7	7 00.3 64 56 42.3	8 16.5 63 54 40.8	4
115					5 47.9 65 57 42.6	6 07.3 64 56 41.8	6 26.6 64 56 41.8	7 43.8 64 54 40.3	115
6					5 14.0 65 56 42.1	5 33.6 65 56 41.2	5 53.2 65 55 41.4	7 11.4 65 53 39.8	6
7						5 00.3 66 55 41.3	5 20.1 66 55 40.9	6 39.3 66 53 39.4	7
8								6 07.5 67 52 38.9	8
9								5 36.1 68 52 38.4	9
120								5 05.0 68 51 37.9	120

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 33°

Each declination cell lists: Alt. (° ′) — Δd Δt — Az. (°)

H.A.	46° 00′	47° 00′	48° 30′	49° 30′	50° 30′	51° 30′	52° 30′	54° 00′	H.A.
00	77 00.0 1.002 00.0	76 00.0 1.002 00.0	74 30.0 1.002 00.0	73 30.0 1.002 00.0	72 30.0 1.002 00.0	71 30.0 1.001 00.0	70 30.0 1.001 00.0	69 00.0 1.001 00.0	00
1	76 58.6 1.007 03.1	75 58.8 1.006 02.8	74 28.9 1.005 02.5	73 29.0 1.005 02.3	72 29.1 1.005 02.1	71 29.1 1.004 02.0	70 29.2 1.004 01.8	68 59.3 1.004 01.6	1
2	76 54.6 99 11 06.1	75 55.1 99 10 05.6	74 25.7 99 09 04.9	73 26.0 99 08 04.6	72 26.3 1.008 04.2	71 26.6 1.007 03.9	70 26.8 1.007 03.6	68 57.1 1.006 03.3	2
3	76 47.9 98 15 09.2	75 48.8 98 14 08.4	74 20.2 98 13 07.4	73 20.9 98 12 07.0	72 21.7 99 11 06.3	71 22.3 99 10 05.9	70 22.8 99 10 04.9	68 53.5 99 08 04.9	3
4	76 38.6 97 20 12.1	75 40.4 97 18 11.1	74 12.7 98 16 09.8	73 14.1 98 15 09.0	72 15.2 98 14 08.4	71 16.3 98 13 07.8	70 17.3 98 12 07.2	68 48.5 98 11 06.5	4
05	76 26.8 96 24 15.0	75 29.6 96 22 13.7	74 03.2 96 19 12.1	73 05.2 97 18 11.2	72 07.0 97 17 10.4	71 08.7 97 15 09.7	70 10.2 98 14 09.0	68 42.1 98 13 08.1	05
6	76 12.6 95 27 17.7	75 16.6 94 25 16.3	73 51.6 95 22 14.4	72 54.5 95 21 13.4	71 57.1 96 19 12.4	70 59.4 96 18 11.5	70 01.5 97 17 10.7	68 34.3 97 15 09.7	6
7	75 56.2 91 31 20.4	75 01.4 92 29 18.8	73 38.1 93 26 16.7	72 42.0 94 24 15.4	71 45.5 95 22 14.3	70 48.6 95 21 13.3	69 51.4 95 19 12.4	68 25.2 96 17 11.2	7
8	75 37.6 88 34 22.9	74 44.2 90 32 21.1	73 22.8 91 28 18.8	72 27.7 92 26 17.5	71 32.2 93 25 16.2	70 36.2 94 23 15.1	69 39.9 94 22 14.1	68 14.8 95 20 12.8	8
9	75 17.0 86 37 25.3	74 25.2 87 35 23.4	73 05.7 89 31 20.9	72 11.8 90 29 19.4	71 17.3 91 27 18.1	70 22.3 92 26 16.9	69 26.9 93 24 15.7	68 03.0 94 22 14.2	9
10	74 54.6 83 40 27.6	74 04.3 85 38 25.6	72 46.9 87 34 22.9	71 54.3 88 32 21.3	71 01.0 89 30 19.8	70 07.0 90 28 18.5	69 12.6 91 26 17.3	67 50.0 92 24 15.7	10
1	74 30.5 80 43 29.8	73 41.8 82 40 27.6	72 26.6 85 36 24.8	71 35.3 86 34 23.1	70 42.3 87 32 21.6	69 50.4 89 30 20.2	68 56.9 90 28 18.9	67 35.8 91 26 17.1	1
2	74 04.7 77 45 31.8	73 17.7 79 43 29.6	72 04.8 82 39 26.6	71 14.9 84 36 24.6	70 24.0 85 34 23.2	69 32.4 87 32 21.7	68 40.0 89 30 20.4	67 20.4 89 28 18.5	2
3	73 37.5 74 48 33.7	72 52.2 77 45 31.4	71 41.6 80 41 28.3	70 53.1 82 38 26.5	70 03.5 83 36 24.8	69 13.1 85 34 23.2	68 21.9 86 32 21.8	67 03.9 87 29 19.8	3
4	73 09.0 71 50 35.4	72 25.3 74 47 33.1	71 17.1 77 48 30.0	70 30.0 79 40 28.1	69 41.8 81 38 26.3	68 52.7 83 36 24.7	68 02.7 84 34 23.2	66 46.3 86 31 21.1	4
15	72 39.2 69 51 37.1	71 57.2 71 49 34.7	70 51.3 75 45 31.5	70 05.7 77 42 29.6	69 18.9 79 40 27.8	68 31.1 81 38 26.1	67 42.3 82 36 24.5	66 27.6 84 33 22.4	15
6	72 08.3 66 53 38.6	71 28.0 69 50 36.3	70 24.5 72 47 33.0	69 40.3 75 44 31.0	68 54.9 77 42 29.2	68 08.4 78 39 27.4	67 20.9 80 37 25.8	66 08.0 82 34 23.6	6
7	71 36.4 63 55 40.1	70 57.7 66 52 37.7	69 56.5 70 48 34.4	69 13.9 72 46 32.4	68 29.9 74 43 30.5	67 44.7 76 41 28.7	66 58.5 78 39 27.1	65 47.3 80 36 24.8	7
8	71 03.6 60 56 41.4	70 26.5 63 54 39.0	69 27.6 67 50 35.7	68 46.5 70 47 33.7	68 03.9 72 45 31.7	67 20.1 74 43 29.9	66 35.1 76 40 28.3	65 25.8 78 37 25.9	8
9	70 29.9 58 57 42.6	69 54.4 61 55 40.3	68 57.8 65 51 36.9	68 18.1 67 49 34.9	67 37.0 70 46 32.9	66 54.5 72 44 31.1	66 10.9 74 42 29.4	65 03.4 76 39 27.0	9
20	69 55.4 55 59 43.8	69 21.5 58 56 41.4	68 27.2 62 52 38.1	67 48.9 65 50 36.0	67 09.2 67 48 34.1	66 28.1 70 45 32.2	65 45.8 72 43 30.5	64 40.1 74 40 28.0	20
1	69 20.2 52 61 44.9	68 47.4 56 57 42.5	67 55.8 60 50 39.2	67 18.9 63 51 37.1	66 40.6 65 49 35.2	66 00.9 67 47 33.3	65 19.8 69 44 31.5	64 16.1 72 41 29.0	1
2	68 44.4 50 61 45.9	68 13.5 53 58 43.5	67 23.6 58 55 40.3	66 48.2 60 52 38.1	66 11.3 63 50 36.2	65 32.9 65 48 34.3	64 53.2 67 46 32.5	63 51.3 70 42 30.0	2
3	68 06.0 48 62 46.8	67 38.5 51 59 44.5	66 50.8 55 56 41.2	66 16.8 58 53 39.1	65 41.2 61 51 37.1	65 04.2 63 49 35.2	64 25.8 65 47 33.4	63 25.8 68 44 30.9	3
4	67 31.0 45 62 47.6	67 03.0 48 60 45.3	66 17.3 53 57 42.1	65 44.7 56 54 40.0	65 10.5 58 52 38.0	64 34.8 61 50 36.1	63 57.7 63 48 34.3	62 59.7 66 45 31.8	4
25	66 53.7 43 63 48.4	66 27.0 46 61 46.2	65 43.3 51 58 42.9	65 12.1 53 55 40.9	64 39.2 56 53 38.9	64 04.8 59 51 37.0	63 29.0 61 49 35.2	62 32.9 64 46 32.6	25
6	66 15.8 40 64 49.2	65 50.4 43 62 46.9	65 08.8 48 56 43.7	64 38.9 51 56 41.7	64 07.3 54 54 39.7	63 34.3 56 52 37.8	62 59.7 59 50 36.0	62 05.4 62 47 33.4	6
7	65 37.6 39 64 49.8	65 13.4 42 62 47.6	64 33.8 46 59 44.5	64 05.2 49 57 42.5	63 34.9 52 55 40.5	63 03.1 54 53 38.6	62 29.9 57 51 36.8	61 37.5 60 48 34.2	7
8	64 58.9 36 65 50.5	64 36.1 40 63 48.3	63 58.3 44 60 45.1	63 31.0 47 58 43.1	63 02.0 50 54 41.2	62 31.5 52 54 39.3	61 59.5 54 51 37.5	61 08.9 58 48 34.9	8
9	64 20.0 34 65 51.0	63 58.3 38 63 48.9	63 22.5 42 60 45.8	62 56.4 45 58 43.8	62 28.7 48 56 41.9	61 59.4 50 54 40.0	61 28.6 52 52 38.2	60 39.9 56 49 35.6	9
30	63 40.7 33 66 51.6	63 20.3 36 64 49.5	62 46.2 40 61 46.4	62 21.4 44 59 44.4	61 54.9 45 57 42.5	61 26.8 48 55 40.6	60 57.3 50 53 38.8	60 10.4 54 50 36.2	30
1	63 01.1 31 66 52.1	62 41.9 34 64 50.0	62 09.6 38 62 47.0	61 46.0 41 60 45.0	61 20.7 43 58 43.1	60 53.9 46 56 41.2	60 25.6 48 54 39.4	59 40.5 52 51 36.8	1
2	62 21.3 29 67 52.5	62 03.2 32 65 50.5	61 32.7 36 62 47.5	61 10.2 39 60 45.5	60 46.1 41 58 43.6	60 20.5 44 56 41.8	59 53.4 46 54 40.0	59 10.1 50 51 37.4	2
3	61 41.3 27 67 52.9	61 24.3 30 65 50.9	60 55.4 34 63 48.0	60 34.1 37 61 46.0	60 11.2 39 59 44.2	59 46.8 42 57 42.3	59 20.8 44 55 40.6	58 39.3 48 52 38.0	3
4	61 01.1 25 67 53.3	60 45.1 28 66 51.3	60 17.9 32 63 48.4	59 57.8 35 61 46.5	59 36.0 38 59 44.7	59 12.7 40 57 42.8	58 47.9 42 55 41.1	58 08.2 46 52 38.5	4
35	60 20.6 23 68 53.6	60 05.7 26 66 51.7	59 40.2 29 64 49.2	59 21.1 31 62 47.4	59 00.5 34 60 45.1	58 38.3 36 58 43.3	58 14.7 41 56 41.6	57 36.7 44 53 39.5	35
6	59 40.0 22 68 53.9	59 26.9 24 66 52.0	59 02.2 28 64 49.6	58 44.2 31 62 47.7	58 24.7 33 60 45.9	58 03.7 35 58 44.0	57 41.2 38 56 42.1	57 04.8 42 54 39.9	6
7	58 59.3 20 68 54.2	58 46.4 23 67 52.3	58 24.0 27 64 49.6	58 07.1 29 62 47.7	57 48.7 32 60 45.9	57 28.7 34 59 44.2	57 07.4 37 57 42.4	56 32.7 40 54 39.9	7
8	58 18.4 18 68 54.5	58 06.5 21 67 52.6	57 45.6 25 64 49.9	57 29.8 28 63 48.1	57 12.4 30 61 46.3	56 53.6 33 59 44.6	56 33.3 35 57 42.8	56 00.3 38 54 40.3	8
9	57 37.3 17 68 54.7	57 26.4 20 67 52.9	57 07.1 23 65 50.1	56 52.2 26 63 48.3	56 35.2 28 61 46.6	56 18.1 31 59 44.9	55 58.9 33 57 43.3	55 27.6 37 55 40.6	9
40	56 56.2 15 69 54.9	56 46.2 18 67 53.1	56 28.3 20 65 50.5	56 14.5 24 63 48.7	55 59.2 27 61 47.0	55 42.5 29 60 45.3	55 24.4 31 58 43.6	54 54.6 35 56 41.1	40
1	56 15.0 14 69 55.1	56 05.9 16 67 53.3	55 49.4 20 65 50.7	55 36.6 23 63 49.0	55 22.4 26 62 47.3	55 06.7 27 60 45.6	54 49.6 30 58 43.9	54 21.4 33 56 41.4	1
2	55 33.7 12 69 55.3	55 25.5 15 68 53.5	55 10.4 19 65 50.9	54 58.6 21 64 49.2	54 45.3 23 62 47.5	54 30.6 26 60 45.8	54 14.6 28 59 44.2	53 48.0 31 56 41.8	2
3	54 52.3 11 69 55.4	54 45.0 13 68 53.7	54 31.3 17 65 51.1	54 20.4 19 64 49.4	54 08.1 22 62 47.8	53 54.5 24 61 46.1	53 39.4 26 59 44.5	53 14.4 29 56 42.1	3
4	54 10.8 10 69 55.5	54 04.4 12 68 53.8	53 52.1 16 66 51.3	53 42.1 18 64 49.6	53 30.8 20 62 48.0	53 18.1 22 61 46.4	53 04.1 24 60 44.7	52 40.6 28 57 42.3	4
45	53 29.3 08 69 55.6	53 23.7 10 68 54.0	53 12.8 14 66 51.5	53 03.7 16 64 49.8	52 53.4 18 63 48.2	52 41.6 21 61 46.6	52 28.6 23 59 45.0	52 06.6 26 57 42.6	45
6	52 47.7 07 69 55.7	52 43.0 09 68 54.1	52 33.3 12 66 51.6	52 25.2 15 64 50.0	52 15.8 17 63 48.4	52 05.0 19 61 46.8	51 53.0 21 60 45.2	51 32.5 24 57 42.8	6
7	52 06.1 05 69 55.8	52 02.2 08 68 54.2	51 53.9 11 66 51.8	51 46.6 13 64 50.1	51 38.1 15 63 48.5	51 28.3 17 61 47.0	51 17.2 20 60 45.4	50 58.2 23 57 43.1	7
8	51 24.5 04 69 55.9	51 21.4 06 68 54.3	51 14.3 09 66 51.9	51 08.0 12 65 50.3	51 00.4 14 63 48.7	50 51.5 16 62 47.1	50 41.3 18 60 45.6	50 23.8 21 58 43.3	8
9	50 42.8 08 69 55.9	50 40.5 05 68 54.3	50 34.7 08 66 52.0	50 29.2 10 65 50.4	50 22.5 12 63 48.9	50 14.5 14 62 47.3	50 05.3 16 60 45.7	49 49.3 19 58 43.4	9
50	50 01.2 01 69 55.9	49 59.7 04 68 54.4	49 55.1 07 66 52.0	49 50.4 09 65 50.5	49 44.6 11 63 48.9	49 37.5 13 62 47.4	49 29.3 15 60 45.9	49 14.6 18 58 43.6	50
1	49 19.5 00 69 55.9	49 18.8 02 68 54.4	49 15.4 05 66 52.1	49 11.6 07 65 50.6	49 06.6 09 63 49.0	49 00.5 11 62 47.5	48 53.1 13 60 46.0	48 39.8 16 58 43.8	1
2	48 37.8 01 69 55.9	48 37.8 01 68 54.4	48 35.7 04 66 52.1	48 32.7 06 65 50.6	48 28.6 08 63 49.1	48 23.3 10 62 47.6	48 16.9 12 61 46.1	48 05.0 15 58 43.9	2
3	47 56.1 02 69 55.9	47 56.9 00 68 54.4	47 55.9 03 66 52.1	47 53.8 04 65 50.7	47 50.5 06 64 49.2	47 46.1 08 62 47.7	47 40.6 10 61 46.2	47 30.1 13 58 44.0	3
4	47 14.5 03 69 55.9	47 16.0 02 68 54.4	47 16.2 01 66 52.2	47 14.9 03 65 50.7	47 12.4 04 64 49.2	47 08.9 07 63 47.8	47 04.2 09 61 46.3	46 55.1 12 58 44.1	4
55	46 32.8 06 69 55.8	46 35.1 03 68 54.4	46 36.4 00 66 52.2	46 35.9 02 65 50.7	46 34.3 04 64 49.3	46 31.6 05 62 47.8	46 27.8 07 61 46.4	46 20.0 10 59 44.2	55
6	45 51.2 06 69 55.8	45 54.2 03 68 54.3	45 56.7 01 66 52.2	45 57.0 00 65 50.7	45 56.2 02 64 49.3	45 54.3 04 62 47.9	45 51.3 06 61 46.4	45 44.9 08 59 44.3	6
7	45 09.6 07 69 55.7	45 13.3 06 68 54.3	45 16.9 03 66 52.2	45 18.0 01 64 50.7	45 18.0 01 64 49.3	45 17.0 03 62 47.9	45 14.9 04 61 46.4	45 09.7 07 59 44.4	7
8	44 28.1 08 69 55.6	44 32.5 07 68 54.2	44 37.2 04 66 52.1	44 39.0 02 65 50.7	44 39.8 00 64 49.3	44 39.6 01 62 47.9	44 38.4 03 61 46.5	44 34.5 06 59 44.4	8
9	43 46.5 09 69 55.6	43 51.7 08 68 54.2	43 57.5 05 66 52.1	44 00.1 04 65 50.7	44 01.7 02 64 49.3	44 02.3 00 62 47.9	44 01.8 02 61 46.5	43 59.3 04 59 44.4	9
60	43 05.1 11 69 55.5	43 10.9 09 68 54.1	43 17.8 06 66 52.0	43 21.1 05 65 50.7	43 23.5 03 64 49.3	43 24.9 01 62 47.9	43 25.3 00 61 46.5	43 24.1 03 59 44.5	60
1	42 23.6 12 69 55.4	42 30.1 10 68 54.0	42 38.1 08 66 52.0	42 42.2 06 65 50.6	42 45.4 04 64 49.3	42 47.6 03 62 47.9	42 48.8 01 61 46.5	42 48.8 01 59 44.5	1
2	41 42.3 13 69 55.2	41 49.5 11 68 53.9	41 58.5 09 66 51.9	42 03.4 07 65 50.6	42 07.3 06 63 49.2	42 10.2 04 62 47.9	42 12.3 03 61 46.5	42 13.5 00 59 44.5	2
3	41 01.0 14 69 55.1	41 08.8 12 68 53.8	41 18.9 10 66 51.8	41 24.5 09 65 50.5	41 29.2 07 63 49.2	41 32.9 05 62 47.8	41 35.8 04 61 46.5	41 38.3 02 59 44.5	3
4	40 19.7 15 69 55.0	40 28.2 13 68 53.7	40 39.4 11 66 51.7	40 45.7 10 65 50.4	40 51.1 08 63 49.1	40 55.7 07 62 47.8	40 59.3 05 61 46.5	41 03.0 03 59 44.5	4
65	39 38.5 16 69 54.8	39 47.7 15 67 53.6	39 59.9 12 66 51.6	40 07.0 11 64 50.3	40 13.1 10 63 49.0	40 18.4 08 62 47.7	40 22.8 07 61 46.4	40 27.8 04 59 44.4	65
6	38 57.4 17 69 54.7	39 07.3 16 67 53.4	39 20.5 14 66 51.5	39 28.2 12 64 50.1	39 35.2 11 63 48.9	39 41.2 09 62 47.6	39 46.4 08 61 46.4	39 52.6 06 59 44.4	6
7	38 16.4 18 69 54.5	38 26.9 17 67 53.3	38 41.1 16 66 51.4	38 49.6 14 64 50.1	38 57.2 12 63 48.8	39 04.0 11 62 47.6	39 10.0 09 61 46.3	39 17.4 07 59 44.4	7
8	37 35.5 19 69 54.4	37 46.6 18 67 53.1	38 01.9 16 65 51.3	38 11.0 15 64 50.0	38 19.4 13 63 48.7	38 26.9 12 62 47.5	38 33.7 11 60 46.2	38 42.2 08 59 44.3	8
9	36 54.6 20 69 54.2	37 06.4 19 67 53.0	37 22.6 17 65 51.1	37 32.5 16 64 49.9	37 41.6 14 63 48.6	37 49.9 13 62 47.4	37 57.4 12 60 46.1	38 07.1 10 58 44.2	9
70	36 13.8 21 68 54.0	36 26.3 20 67 52.8	36 43.5 18 65 51.0	36 54.1 17 64 49.7	37 03.9 16 63 48.5	37 12.9 14 62 47.3	37 21.1 13 60 46.0	37 32.0 11 58 44.1	70
1	35 33.2 22 68 53.8	35 46.2 21 67 52.6	36 04.5 19 65 50.8	36 15.7 18 64 49.4	36 26.2 17 63 48.4	36 36.0 16 61 47.2	36 44.9 14 60 45.9	36 57.0 12 58 44.1	1
2	34 52.6 23 67 53.6	35 06.3 22 66 52.5	35 25.5 20 65 50.7	35 37.4 19 64 49.5	35 48.6 18 62 48.2	35 59.1 17 61 47.0	36 08.8 16 60 45.8	36 22.0 14 58 44.0	2
3	34 12.1 24 67 53.4	34 26.4 23 66 52.3	34 46.6 22 65 50.5	34 59.2 20 64 49.3	35 11.1 19 62 48.1	35 22.3 18 61 46.9	35 32.8 17 60 45.8	35 47.1 15 58 43.9	3
4	33 31.8 26 67 53.2	33 46.7 24 66 52.1	34 07.9 23 64 50.3	34 21.1 22 63 49.1	34 33.7 20 62 47.9	34 45.6 19 61 46.8	34 56.8 18 60 45.6	35 12.3 16 58 43.7	4
75	32 51.5 26 67 53.0	33 07.1 25 66 51.9	33 29.2 24 64 50.1	33 43.1 23 63 49.0	33 56.4 22 62 47.8	34 09.0 20 61 46.6	34 20.9 19 60 45.4	34 37.5 18 58 43.6	75
6	32 11.4 27 67 52.8	32 27.5 26 66 51.7	32 50.6 25 64 49.9	33 05.2 24 63 48.8	33 19.2 23 62 47.6	33 32.5 22 61 46.4	33 45.1 21 59 45.3	34 02.8 19 58 43.5	6
7	31 31.4 28 66 52.6	31 48.1 27 66 51.4	32 12.2 26 64 49.7	32 27.4 25 63 48.6	32 42.1 24 62 47.4	32 56.1 23 61 46.3	33 09.4 22 59 45.1	33 28.3 20 58 43.4	7
8	30 51.5 29 66 52.3	31 08.9 29 66 51.2	31 33.8 27 64 49.5	31 49.8 26 63 48.4	32 05.1 25 61 47.3	32 19.8 24 60 46.1	32 33.8 23 59 45.0	32 53.8 21 57 43.2	8
9	30 11.7 30 66 52.1	30 29.7 30 65 51.0	30 55.6 28 64 49.3	31 12.2 27 62 48.2	31 28.2 26 61 47.1	31 43.6 26 60 45.9	31 58.3 24 59 44.8	32 19.3 23 57 43.1	9
80	29 32.1 31 66 51.8	29 50.7 31 65 50.7	30 17.5 29 63 49.1	30 34.7 28 62 48.0	30 51.4 27 61 46.9	31 07.5 26 60 45.7	31 22.9 25 59 44.6	31 45.0 24 57 42.9	80
1	28 52.6 32 66 51.6	29 11.8 32 65 50.5	29 39.6 30 63 48.9	29 57.4 29 62 47.8	30 14.7 28 61 46.7	30 31.5 27 60 45.5	30 47.7 25 59 44.4	31 10.8 25 57 42.7	1
2	28 13.2 33 65 51.3	28 33.0 33 64 50.3	29 01.7 31 63 48.6	29 20.2 30 62 47.6	29 38.1 30 60 46.4	29 55.6 29 60 45.3	30 12.5 28 58 44.2	30 36.7 26 57 42.6	2
3	27 34.0 34 65 51.1	27 54.4 34 64 50.0	28 24.0 32 63 48.4	28 43.2 31 62 47.3	29 01.8 31 60 46.2	29 19.9 30 59 45.1	29 37.5 29 58 44.0	30 02.8 27 56 42.4	3
4	26 54.9 35 65 50.8	27 15.9 35 64 49.7	27 46.5 33 62 48.1	28 06.3 33 61 47.1	28 25.5 32 60 46.0	28 44.3 31 59 44.9	29 02.6 30 58 43.8	29 28.9 29 56 42.2	4
85	26 16.0 36 65 50.5	26 37.6 36 64 49.5	27 09.1 34 62 47.9	27 29.5 34 61 46.8	27 49.4 33 60 45.8	28 08.8 32 59 44.7	28 27.8 31 58 43.6	28 55.2 30 56 42.0	85
6	25 37.3 37 64 50.2	25 59.4 37 63 49.2	26 31.8 35 62 47.6	26 52.9 35 61 46.6	27 13.4 34 60 45.5	27 33.5 33 59 44.5	27 53.1 32 58 43.4	28 21.6 31 56 41.8	6
7	24 58.7 38 64 49.9	25 21.4 38 63 48.9	25 54.7 36 62 47.4	26 16.4 36 60 46.3	26 37.6 35 59 45.3	26 58.3 34 58 44.2	27 18.6 33 57 43.2	27 48.1 32 56 41.6	7
8	24 20.3 39 64 49.6	24 43.6 39 63 48.6	25 17.8 37 61 47.1	25 40.1 37 60 46.1	26 01.9 36 59 45.0	26 23.3 35 58 44.0	26 44.3 35 57 42.9	27 14.8 33 55 41.4	8
9	23 42.0 40 63 49.3	24 05.9 40 62 48.3	24 41.0 39 61 46.8	25 03.9 38 60 45.8	25 26.4 37 59 44.8	25 48.5 36 58 43.7	26 10.1 36 57 42.7	26 41.6 35 55 41.1	9
90	23 03.9 41 63 49.0	23 28.4 40 62 48.0	24 04.4 40 61 46.5	24 27.9 39 60 45.5	24 51.0 38 59 44.5	25 13.7 37 58 43.5	25 36.0 37 56 42.5	26 08.6 36 55 40.9	90

Lat. 33°

H.A.	46° 00' Alt. / Δd Δt / Az.	47° 00' Alt. / Δd Δt / Az.	48° 30' Alt. / Δd Δt / Az.	49° 30' Alt. / Δd Δt / Az.	50° 30' Alt. / Δd Δt / Az.	51° 30' Alt. / Δd Δt / Az.	52° 30' Alt. / Δd Δt / Az.	54° 00' Alt. / Δd Δt / Az.	H.A.
00	11 00.0 1.0 01 180.0	10 00.0 1.0 00 180.0	8 30.0 1.0 00 180.0	7 30.0 1.0 00 180.0	6 30.0 1.0 00 180.0	5 30.0 1.0 00 180.0			00
1	10 59.7 1.0 02 179.3	9 59.7 1.0 02 179.3	8 29.7 1.0 01 179.3	7 29.7 1.0 01 179.3	6 29.7 1.0 01 179.4	5 29.7 1.0 01 179.4			1
2	10 58.8 1.0 03 178.6	9 58.8 1.0 03 178.6	8 28.8 1.0 02 178.7	7 28.8 1.0 02 178.7	6 28.9 1.0 02 178.7	5 28.9 1.0 02 178.7			2
3	10 57.2 1.0 04 177.9	9 57.3 1.0 04 177.9	8 27.4 1.0 03 178.0	7 27.4 1.0 03 178.0	6 27.5 1.0 03 178.1	5 27.5 1.0 03 178.1			3
4	10 55.0 1.0 05 177.2	9 55.1 1.0 05 177.2	8 25.3 1.0 04 177.3	7 25.4 1.0 04 177.4	6 25.5 1.0 04 177.4	5 25.6 1.0 04 177.5			4
05	10 52.1 1.0 06 176.5	9 52.4 1.0 06 176.5	8 22.7 1.0 05 176.7	7 22.8 1.0 05 176.7	6 23.0 1.0 05 176.8	5 23.1 1.0 05 176.9			05
6	10 48.8 1.0 07 175.8	9 49.1 1.0 07 175.9	8 19.4 1.0 06 176.0	7 19.7 1.0 06 176.1	6 19.9 1.0 06 176.2	5 20.1 1.0 06 176.3			6
7	10 44.8 99 08 175.1	9 45.1 99 08 175.2	8 15.6 99 07 175.3	7 15.9 99 07 175.4	6 16.2 99 07 175.5	5 16.6 99 07 175.6			7
8	10 40.2 99 09 174.4	9 40.6 99 09 174.5	8 11.2 99 08 174.6	7 11.6 99 08 174.9	6 12.0 99 08 174.9	5 12.5 99 08 175.0			8
9	10 34.9 99 10 173.7	9 35.4 99 10 173.8	8 06.2 99 09 174.0	7 06.8 99 09 174.1	6 07.3 99 09 174.3	5 07.8 99 09 174.4			9
10	10 29.0 99 11 173.0	9 29.7 99 11 173.1	8 00.7 99 10 173.3	7 01.3 99 10 173.5	6 02.0 99 10 173.6	5 02.6 99 10 173.8			10
1	10 22.6 99 12 172.3	9 23.4 99 12 172.4	7 54.5 99 11 172.7	6 55.3 99 11 172.8	5 56.1 99 11 173.0				1
2	10 15.5 98 13 171.6	9 16.4 98 12 171.7	7 47.8 98 12 172.0	6 48.8 98 12 172.2	5 49.7 98 12 172.4				2
3	10 07.8 98 14 170.9	9 08.9 98 14 171.1	7 40.5 98 13 171.3	6 41.6 98 13 171.5	5 42.7 98 13 171.7				3
4	9 59.5 98 15 170.2	9 00.8 98 14 170.4	7 32.7 98 14 170.7	6 34.0 98 14 170.9	5 35.2 98 13 171.1				4
15	9 50.6 98 16 169.5	8 52.1 98 15 169.7	7 24.3 98 15 170.0	6 25.7 98 15 170.3	5 27.2 98 14 170.5				15
6	9 41.1 97 17 168.8	8 42.8 97 16 169.0	7 15.3 97 16 169.4	6 16.9 97 16 169.6	5 18.6 97 15 169.9				6
7	9 31.1 97 18 168.1	8 32.9 97 17 168.4	7 05.7 97 17 168.7	6 07.6 97 16 169.0	5 09.4 97 16 169.2				7
8	9 20.4 96 19 167.4	8 22.5 97 18 167.7	6 55.6 97 18 168.1	5 57.7 97 17 168.4					8
9	9 09.2 96 20 166.8	8 11.5 96 19 167.0	6 45.0 96 19 167.5	5 47.3 96 18 167.7					9
20	8 57.4 96 21 166.1	7 59.9 96 20 166.4	6 33.8 96 20 166.8	5 36.3 96 19 167.1					20
1	8 45.0 95 22 165.4	7 47.8 95 21 165.7	6 22.0 95 20 166.2	5 24.8 95 20 166.5					1
2	8 32.0 95 23 164.7	7 35.1 95 22 165.1	6 09.7 95 21 165.5	5 12.8 95 21 165.9					2
3	8 18.5 94 23 164.1	7 21.9 94 23 164.4	5 56.9 94 22 164.9	5 00.2 94 22 165.2					3
4	8 04.4 94 24 163.4	7 08.1 94 24 163.8	5 43.5 94 23 164.3						4
25	7 49.8 93 25 162.8	6 53.7 93 25 163.1	5 29.6 93 24 163.7						25
6	7 34.6 93 26 162.1	6 38.9 93 26 162.5	5 15.2 93 25 163.0						6
7	7 18.9 92 27 161.5	6 23.4 92 27 161.8	5 00.3 92 26 162.4						7
8	7 02.6 92 28 160.8	6 07.5 92 27 161.2							8
9	6 45.8 91 29 160.2	5 51.0 91 28 160.6							9
30	6 28.5 91 30 159.5	5 34.1 91 29 160.0							30
1	6 10.6 90 31 158.9	5 16.6 90 30 159.3							1
2	5 52.2 89 31 158.3								2
3	5 33.4 89 32 157.7								3
4	5 14.0 88 33 157.0								4

DECLINATION SAME NAME AS LATITUDE

Lat. 34° · Lat. 35° · Lat. 36° · Lat. 37° · Lat. 38°

H.A.	46° 00' Alt. / Δd Δt / Az.	47° 00' Alt. / Δd Δt / Az.	48° 30' Alt. / Δd Δt / Az.	49° 30' Alt. / Δd Δt / Az.	50° 30' Alt. / Δd Δt / Az.	51° 30' Alt. / Δd Δt / Az.	52° 30' Alt. / Δd Δt / Az.	54° 00' Alt. / Δd Δt / Az.	H.A.
91	22 26.0 42 63 48.7	22 51.1 41 62 47.7	23 28.0 41 60 46.2	23 52.1 40 59 45.2	24 15.9 39 58 44.2	24 39.2 39 57 43.2	25 02.1 38 56 42.2	25 35.7 37 55 40.7	91
2	21 48.3 43 63 48.4	22 13.9 42 62 47.4	22 51.7 42 60 45.9	23 16.5 41 59 45.0	23 40.8 40 58 44.0	24 04.8 40 57 43.0	24 28.4 39 56 41.9	25 03.0 38 54 40.4	2
3	21 10.8 44 62 48.1	21 37.0 43 61 47.1	22 15.7 43 60 45.6	22 41.0 42 59 44.7	23 06.0 41 58 43.7	23 30.6 41 57 42.7	23 54.9 40 56 41.7	24 30.5 39 54 40.2	3
4	20 33.4 45 62 47.7	21 00.2 44 61 46.8	21 39.8 44 60 45.3	22 05.7 43 58 44.4	22 31.3 42 57 43.4	22 56.6 42 56 42.4	23 21.5 41 55 41.4	23 58.1 40 54 39.9	4
95	19 56.3 46 62 47.4	20 23.6 45 61 46.5	21 04.1 45 59 45.0	21 30.6 44 58 44.1	21 56.9 43 57 43.1	22 22.8 43 56 42.1	22 48.3 42 55 41.1	23 25.9 41 53 39.7	95
6	19 19.3 47 61 47.1	19 47.3 46 60 46.1	20 28.6 46 59 44.7	20 55.7 45 58 43.8	21 22.6 44 57 42.8	21 49.1 44 56 41.8	22 15.3 43 55 40.9	22 53.9 42 53 39.4	6
7	18 42.6 48 61 46.7	19 11.1 47 60 45.8	19 53.3 47 58 44.4	20 21.1 46 58 43.4	20 48.5 45 56 42.5	21 15.6 45 55 41.5	21 42.5 44 54 40.6	22 22.0 44 53 39.1	7
8	18 06.1 49 60 46.4	18 35.1 48 60 45.4	19 18.2 48 58 44.0	19 46.4 47 57 43.1	20 14.6 47 55 42.2	20 42.4 46 55 41.2	21 09.8 45 54 40.3	21 51.4 43 52 38.8	8
9	17 29.8 50 60 46.0	17 59.4 49 59 45.1	18 43.3 48 58 43.7	19 12.3 48 57 42.8	19 40.9 48 56 41.9	20 09.3 47 55 40.9	20 37.4 47 54 40.0	21 18.9 46 52 38.5	9
100	16 53.7 50 60 45.6	17 23.9 50 59 44.7	18 08.7 49 57 43.4	18 38.2 49 56 42.5	19 07.5 49 55 41.5	19 36.5 48 54 40.6	20 05.2 48 53 39.7	20 47.7 47 52 38.3	100
1	16 17.8 51 59 45.3	16 48.6 51 58 44.4	17 34.2 50 57 43.0	18 04.3 50 56 42.1	18 34.2 50 55 41.2	19 03.8 49 54 40.3	19 33.2 49 53 39.4	20 16.6 48 51 38.0	1
2	15 42.2 52 59 44.9	16 13.5 52 58 44.0	17 00.0 51 57 42.7	17 30.7 51 56 41.8	18 01.2 51 55 40.9	18 31.4 50 54 40.0	19 01.4 50 53 39.0	19 45.8 49 51 37.7	2
3	15 06.8 53 59 44.5	15 38.6 53 58 43.6	16 26.0 52 56 42.3	16 57.3 52 55 41.4	17 28.4 52 54 40.5	17 59.2 51 53 39.6	18 29.8 51 52 38.7	19 15.1 50 51 37.3	3
4	14 31.6 54 58 44.1	15 04.0 54 57 43.3	15 52.3 53 56 41.9	16 24.1 53 55 41.1	16 55.8 53 54 40.2	17 27.2 52 53 39.3	17 58.4 52 52 38.4	18 44.7 51 50 37.0	4
105	13 56.7 55 58 43.7	14 29.7 55 57 42.9	15 18.7 54 55 41.6	15 51.1 54 54 40.7	16 23.4 54 54 39.8	16 55.5 53 53 38.9	17 27.3 53 52 38.1	18 14.5 52 50 36.7	105
6	13 22.1 56 57 43.3	13 55.6 56 56 42.5	14 45.5 55 55 41.2	15 18.5 55 54 40.3	15 51.3 55 53 39.5	16 24.0 54 52 38.6	16 56.4 54 51 37.7	17 44.6 53 50 36.4	6
7	12 47.6 57 57 42.9	13 21.7 57 56 42.1	14 12.4 56 54 40.8	14 46.1 56 54 40.0	15 19.5 56 53 39.1	15 52.7 55 52 38.2	16 25.7 55 51 37.4	17 14.8 54 49 36.1	7
8	12 13.5 58 56 42.5	12 48.1 58 55 41.7	13 39.7 57 54 40.4	14 13.9 57 53 39.6	14 47.9 57 52 38.7	15 21.7 56 51 37.9	15 55.3 56 50 37.0	16 45.3 55 49 35.7	8
9	11 39.6 59 56 42.1	12 14.8 58 55 41.3	13 07.2 58 54 40.0	13 41.9 58 53 39.2	14 16.5 57 52 38.4	14 50.9 57 51 37.5	15 25.1 57 50 36.7	16 16.1 56 48 35.4	9
110	11 06.9 60 56 41.7	11 41.7 59 55 40.9	12 34.9 59 53 39.6	13 10.3 59 52 38.8	13 45.4 58 51 38.0	14 20.4 58 50 37.1	14 55.2 58 49 36.3	15 47.1 57 48 35.0	110
1	10 32.7 60 55 41.3	11 08.9 60 54 40.5	12 03.0 60 53 39.2	12 38.9 60 52 38.4	13 14.6 59 51 37.6	13 50.1 59 50 36.8	14 25.5 59 49 35.9	15 18.3 58 48 34.7	1
2	9 59.6 61 55 40.8	10 36.4 61 54 40.0	11 31.3 61 52 38.8	12 07.7 61 51 38.0	12 44.0 60 50 37.2	13 20.2 60 50 36.4	13 56.2 60 49 35.6	14 49.8 59 47 34.3	2
3	9 26.9 62 54 40.4	10 04.1 62 53 39.6	10 59.9 62 52 38.4	11 36.9 62 51 37.6	12 13.7 61 50 36.8	12 50.5 61 49 36.0	13 27.0 61 48 35.2	14 21.6 60 47 34.0	3
4	8 54.4 63 54 40.0	9 32.2 63 53 39.2	10 28.8 63 51 38.0	11 06.3 62 50 37.2	11 43.7 62 50 36.4	12 21.0 62 49 35.6	12 58.2 62 48 34.8	13 53.6 61 46 33.6	4
115	8 22.2 64 53 39.5	9 00.6 64 52 38.7	9 57.9 64 51 37.6	10 36.0 63 50 36.8	11 14.0 63 49 36.0	11 51.9 63 48 35.2	12 29.6 63 47 34.4	13 25.9 62 46 33.2	115
6	7 50.3 65 53 39.1	8 29.2 65 52 38.3	9 27.4 65 50 37.1	10 06.0 64 49 36.4	10 44.6 64 49 35.6	11 23.0 64 48 34.8	12 01.3 64 47 34.0	12 58.5 63 45 32.8	6
7	7 18.8 66 52 38.6	7 58.2 66 51 37.8	8 57.2 65 50 36.7	9 36.4 65 49 35.9	10 15.4 65 48 35.2	10 54.4 65 47 34.4	11 33.3 65 46 33.6	12 31.4 64 45 32.4	7
8	6 47.5 67 52 38.1	7 27.5 67 51 37.4	8 27.2 66 49 36.3	9 07.0 66 48 35.5	9 46.6 66 48 34.7	10 26.2 66 47 34.0	11 05.6 66 46 33.2	12 04.5 65 44 32.1	8
9	6 16.6 67 51 37.7	6 57.1 67 50 36.9	7 57.6 67 49 35.8	8 37.9 67 48 35.1	9 18.1 67 47 34.3	9 58.2 67 46 33.6	10 38.2 67 45 32.8	11 37.9 66 44 31.7	9
120	5 46.0 68 50 37.2	6 27.0 68 50 36.5	7 28.4 68 48 35.4	8 09.2 68 47 34.6	8 49.9 68 46 33.9	9 30.5 68 46 33.1	10 11.1 67 45 32.4	11 11.7 67 43 31.3	120
1	5 15.8 69 50 36.7	5 57.3 69 49 36.0	6 59.4 69 48 34.9	7 40.7 69 47 34.2	8 22.0 69 46 33.4	9 03.2 69 45 32.7	9 44.3 68 44 32.0	10 45.7 68 43 30.9	1
2		5 27.9 70 48 35.5	6 30.8 70 47 34.4	7 12.6 70 46 33.7	7 54.4 70 45 33.0	8 36.1 69 45 32.3	9 17.8 69 44 31.5	10 20.1 69 42 30.4	2
3			6 02.5 71 47 34.0	6 44.9 71 46 33.3	7 27.2 70 45 32.5	8 09.4 70 44 31.8	8 51.6 70 43 31.1	9 54.7 70 42 30.0	3
4			5 34.5 72 46 33.5	6 17.4 71 45 32.8	7 00.3 71 44 32.1	7 43.1 71 43 31.4	8 25.8 71 43 30.7	9 29.7 71 41 29.6	4
125			5 06.9 72 45 33.0	5 50.3 72 45 32.3	6 33.7 72 44 31.6	7 17.0 72 43 30.9	8 00.3 72 42 30.2	9 05.0 72 41 29.2	125
6				5 23.6 73 44 31.9	6 07.5 73 43 31.2	6 51.3 73 42 30.5	7 35.1 73 42 29.8	8 40.6 73 40 28.8	6
7					5 41.6 74 43 30.7	6 26.0 74 42 30.0	7 10.3 74 41 29.3	8 16.6 74 40 28.3	7
8					5 16.1 75 42 30.2	6 01.0 75 41 29.6	6 45.8 75 40 28.9	7 52.9 74 39 27.9	8
9						5 36.3 76 40 29.1	6 21.7 75 40 28.4	7 29.5 75 38 27.4	9
130						5 12.1 76 40 28.6	5 57.9 76 39 28.0	7 06.5 76 38 27.0	130
1							5 34.5 77 38 27.5	6 43.9 77 37 26.5	1
2							5 11.4 78 38 27.0	6 21.6 78 37 26.1	2
3								5 59.6 79 36 25.6	3
4								5 38.1 80 35 25.1	4
135								5 16.9 80 35 24.7	135

16—65156-1

Lat. 33°

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
00	68 30.0	1.0 01	00.0	68 00.0	1.0 01	00.0	67 00.0	1.0 01	00.0	66 30.0	1.0 01	00.0	66 00.0	1.0 01	00.0	65 30.0	1.0 01	00.0	64 00.0	1.0 01	00.0	63 30.0	1.0 01	00.0	00
1	68 29.3	1.0 03	01.6	67 59.3	1.0 03	01.5	66 59.4	1.0 03	01.4	66 29.4	1.0 03	01.4	65 59.4	1.0 03	01.3	65 29.4	1.0 03	01.3	63 59.5	1.0 03	01.2	63 29.5	1.0 02	01.1	1
2	68 27.2	1.0 06	03.2	67 57.3	1.0 06	03.1	66 57.5	1.0 05	02.9	66 27.6	1.0 05	02.8	65 57.6	1.0 05	02.7	65 27.7	1.0 05	02.6	63 57.9	1.0 04	02.3	63 28.0	1.0 04	02.3	2
3	68 23.8	99 08	04.7	67 54.0	99 08	04.6	66 54.4	99 07	04.3	66 24.5	99 07	04.1	65 54.6	99 07	04.0	65 24.9	99 07	04.0	63 55.4	1.0 06	03.5	63 25.5	1.0 05	03.4	3
4	68 18.9	99 10	06.3	67 49.3	99 10	06.1	66 50.0	99 09	05.7	66 20.3	99 09	05.5	65 50.6	99 09	05.3	65 20.9	99 08	05.2	63 51.8	99 08	04.7	63 22.0	99 07	04.5	4
05	68 12.7	98 13	07.8	67 43.3	98 12	07.6	66 44.4	98 11	07.1	66 14.9	98 11	06.9	65 45.4	98 11	06.6	65 15.8	98 10	06.4	63 47.2	99 09	05.8	63 17.6	99 09	05.6	05
6	68 05.2	97 15	09.4	67 36.0	97 14	09.1	66 37.6	98 13	08.5	66 08.3	98 13	08.2	65 39.0	98 13	07.9	65 09.7	98 12	07.7	63 41.5	98 11	07.0	63 12.1	98 11	06.8	6
7	67 56.4	96 17	10.9	67 27.5	96 16	10.5	66 29.6	97 15	09.8	66 00.5	97 15	09.5	65 31.5	97 14	09.2	65 02.4	97 14	08.9	63 34.9	97 13	08.1	63 05.7	97 12	07.9	7
8	67 46.2	95 19	12.3	67 17.7	95 18	11.9	66 20.4	96 17	11.2	65 51.7	96 17	10.8	65 22.9	96 16	10.5	64 54.1	96 16	10.2	63 27.4	97 14	09.2	62 58.4	97 14	09.0	8
9	67 34.9	94 21	13.8	67 06.7	94 20	13.3	66 10.1	95 19	12.5	65 41.6	95 18	12.1	65 13.2	95 18	11.7	64 44.7	95 17	11.4	63 18.8	96 16	10.3	62 50.1	96 15	10.0	9
10	67 22.3	93 23	15.2	66 54.5	93 22	14.7	65 58.6	93 21	13.8	65 30.5	94 20	13.4	65 02.4	94 20	13.0	64 34.2	94 19	12.5	63 09.3	95 17	11.4	62 40.9	95 17	11.1	10
1	67 08.5	91 25	16.6	66 41.1	91 24	16.1	65 46.1	92 23	15.1	65 18.4	92 22	14.6	64 50.6	93 21	14.2	64 22.8	93 21	13.7	62 58.9	94 19	12.5	62 30.8	94 18	12.1	1
2	66 53.6	90 27	17.9	66 27.6	90 26	17.4	65 32.4	91 24	16.3	65 05.2	91 24	15.8	64 37.8	92 23	15.3	64 10.4	92 22	14.9	62 47.5	92 20	13.5	62 19.8	93 20	13.1	2
3	66 37.6	88 28	19.2	66 11.1	88 28	18.6	65 17.8	89 26	17.5	64 51.0	89 25	17.0	64 24.0	90 25	16.5	63 57.0	90 24	16.0	62 35.3	91 22	14.6	62 07.9	91 21	14.1	3
4	66 20.5	86 30	20.5	65 54.5	87 29	19.9	65 02.2	88 28	18.7	64 35.8	88 27	18.1	64 09.3	89 26	17.6	63 42.7	89 25	17.1	62 22.2	90 23	15.6	61 55.2	90 23	15.1	4
15	66 02.3	85 32	21.7	65 36.9	85 31	21.1	64 45.6	86 29	19.8	64 19.7	87 28	19.3	63 53.6	87 28	18.7	63 27.5	87 27	18.1	62 08.3	89 25	16.6	61 41.7	89 24	16.1	15
6	65 43.2	83 33	22.9	65 18.3	83 32	22.2	64 28.0	84 31	21.0	64 02.6	85 30	20.3	63 37.1	85 29	19.7	63 11.4	86 28	19.2	61 53.5	87 26	17.5	61 27.3	88 25	17.0	6
7	65 23.2	81 35	24.1	64 58.8	81 34	23.4	64 09.6	83 32	22.0	63 44.7	83 31	21.4	63 19.6	84 30	20.8	62 54.4	84 30	20.2	61 38.0	86 27	18.5	61 12.2	86 25	17.9	7
8	65 02.2	79 36	25.2	64 38.4	80 35	24.4	63 50.3	81 34	23.1	63 25.9	82 33	22.4	63 01.4	82 32	21.8	62 36.7	83 31	21.2	61 21.6	84 28	19.4	60 56.3	85 28	18.8	8
9	64 40.4	77 38	26.2	64 17.2	78 37	25.5	63 30.2	79 35	24.1	63 06.3	80 34	23.4	62 42.3	80 33	22.7	62 18.1	81 32	22.1	61 04.6	83 30	20.3	60 39.7	83 29	19.7	9
20	64 17.8	75 39	27.3	63 55.1	76 38	26.5	63 09.2	77 36	25.1	62 46.0	78 35	24.4	62 22.5	79 34	23.7	61 58.8	79 33	23.0	60 46.7	81 31	21.2	60 22.4	81 30	20.6	20
1	63 54.3	73 40	28.2	63 32.3	74 39	27.5	62 47.5	75 37	26.0	62 24.8	76 36	25.3	62 01.9	77 36	24.6	61 38.8	77 35	23.9	60 28.2	79 32	22.0	60 04.4	80 31	21.4	1
2	63 30.2	71 41	29.2	63 08.7	72 40	28.4	62 25.1	73 39	26.9	62 03.0	74 38	26.2	61 40.6	75 37	25.5	61 18.0	76 36	24.8	60 09.1	78 33	22.8	59 45.7	78 32	22.2	2
3	63 05.3	69 43	30.1	62 44.4	70 42	29.3	62 02.0	72 40	27.8	61 40.4	72 39	27.0	61 18.6	73 38	26.3	60 56.6	74 37	25.6	59 49.2	76 34	23.6	59 26.4	76 33	23.0	3
4	62 39.7	67 44	31.0	62 19.5	68 43	30.2	61 38.2	70 41	28.6	61 17.2	70 40	27.9	60 56.0	71 39	27.1	60 34.5	72 38	26.4	59 28.8	74 35	24.4	59 06.5	75 34	23.7	4
25	62 13.5	65 45	31.8	61 53.9	66 44	31.0	61 13.8	68 42	29.4	60 53.4	68 41	28.7	60 32.8	69 40	27.9	60 11.8	70 39	27.2	59 07.7	72 36	25.1	58 45.9	73 35	24.4	25
6	61 46.7	63 46	32.6	61 27.7	64 45	31.8	60 48.8	66 43	30.2	60 29.0	67 42	29.4	60 08.9	67 42	28.7	59 48.6	68 40	27.9	58 46.1	71 37	25.8	58 24.8	71 36	25.1	6
7	61 19.4	61 46	33.4	61 00.9	62 46	32.5	60 23.3	64 44	30.9	60 04.0	65 43	30.1	59 44.5	66 42	29.4	59 24.7	66 41	28.6	58 23.9	69 38	26.5	58 03.2	69 37	25.8	7
8	60 51.4	59 47	34.0	60 33.6	60 46	33.2	59 57.1	62 44	31.6	59 38.5	63 43	30.8	59 19.5	64 42	30.1	59 00.3	64 42	29.3	58 01.2	67 39	27.2	57 41.0	68 38	26.5	8
9	60 23.0	57 48	34.7	60 05.8	58 47	33.9	59 30.5	60 43	32.3	59 12.4	61 44	31.5	58 54.1	62 43	30.7	58 35.4	63 42	30.0	57 38.0	65 40	27.8	57 18.3	66 39	27.1	9
30	59 54.1	55 49	35.4	59 37.5	56 48	34.6	59 03.4	58 46	32.9	58 45.9	59 45	32.2	58 28.1	60 44	31.4	58 10.0	61 43	30.6	57 14.3	63 40	28.4	56 55.2	64 39	27.7	30
1	59 24.8	53 50	36.0	59 08.7	54 49	35.2	58 35.8	56 47	33.6	58 18.8	57 46	32.8	58 01.7	58 45	32.0	57 44.2	59 44	31.2	56 50.1	61 41	29.0	56 31.3	62 40	28.3	1
2	58 55.0	51 50	36.6	58 39.6	52 49	35.8	58 07.8	54 47	34.1	57 51.4	55 46	33.3	57 34.7	56 45	32.6	57 17.9	57 45	31.8	56 25.5	60 42	29.6	56 07.5	60 41	28.9	2
3	58 24.8	49 51	37.1	58 09.9	50 50	36.3	57 39.3	52 48	34.7	57 23.6	53 47	33.9	57 07.5	54 46	33.1	56 51.1	55 45	32.4	56 00.4	58 42	30.1	55 43.0	59 41	29.4	3
4	57 54.2	47 52	37.7	57 40.0	48 51	36.8	57 10.5	50 49	35.2	56 55.3	51 48	34.4	56 39.8	52 47	33.7	56 24.0	53 46	32.9	55 35.0	56 43	30.6	55 18.1	57 42	29.9	4
35	57 23.3	45 52	38.2	57 09.6	46 51	37.3	56 41.3	48 49	35.7	56 26.6	49 48	34.9	56 11.7	50 47	34.2	55 56.5	51 46	33.4	55 09.2	54 44	31.1	54 52.8	55 43	30.4	35
6	56 52.0	43 53	38.6	56 38.9	44 52	37.8	56 11.7	46 50	36.1	55 57.5	47 49	35.4	55 43.3	48 48	34.6	55 28.6	49 47	33.8	54 43.0	52 44	31.6	54 27.2	53 43	30.9	6
7	56 20.4	41 53	39.1	56 07.9	42 52	38.3	55 41.8	44 50	36.7	55 28.3	45 49	35.9	55 14.5	46 48	35.1	55 00.4	47 48	34.3	54 16.4	50 45	32.1	54 01.2	51 44	31.3	7
8	55 48.6	39 54	39.5	55 36.6	41 53	38.7	55 11.6	43 51	37.1	54 58.7	44 50	36.3	54 45.4	45 49	35.5	54 31.9	46 48	34.8	53 49.5	48 45	32.5	53 34.9	49 44	31.8	8
9	55 16.4	38 54	39.9	55 05.0	39 53	39.1	54 41.1	41 51	37.5	54 28.7	42 50	36.7	54 16.0	43 49	35.9	54 03.1	44 49	35.2	53 22.4	47 46	32.9	53 08.2	48 45	32.2	9
40	54 44.0	36 54	40.3	54 33.1	37 54	39.5	54 10.4	39 52	37.9	53 58.5	40 51	37.1	53 46.4	41 50	36.3	53 33.9	42 49	35.6	52 54.9	45 46	33.3	52 41.3	46 45	32.6	40
1	54 11.4	34 55	40.6	54 01.0	35 54	39.8	53 39.3	37 52	38.2	53 28.0	38 51	37.5	53 16.4	39 50	36.7	53 04.5	40 49	35.9	52 27.1	43 47	33.7	52 14.1	44 46	32.9	1
2	53 38.5	32 55	41.0	53 28.7	33 54	40.2	53 08.1	35 52	38.6	52 57.3	36 52	37.8	52 46.2	37 51	37.0	52 34.9	38 50	36.3	51 59.1	41 47	34.0	51 46.6	42 46	33.3	2
3	53 05.4	30 55	41.3	52 56.1	32 55	40.5	52 36.6	34 53	38.9	52 26.3	35 52	38.1	52 15.8	36 51	37.4	52 05.0	37 50	36.6	51 30.8	39 48	34.4	51 18.8	40 47	33.6	3
4	52 32.1	29 56	41.6	52 23.4	30 55	40.8	52 04.9	32 53	39.2	51 55.2	33 53	38.4	51 45.2	34 52	37.7	51 34.7	35 51	36.9	51 02.3	38 48	34.7	50 50.9	39 47	33.9	4
45	51 58.7	27 56	41.8	51 50.4	28 55	41.0	51 33.0	30 53	39.5	51 23.8	31 53	38.7	51 14.3	32 52	38.0	51 04.6	33 51	37.2	50 33.5	36 48	35.0	50 22.6	37 47	34.2	45
6	51 25.0	25 56	42.1	51 17.3	26 55	41.3	51 00.9	28 54	39.7	50 52.7	29 53	39.0	50 43.3	30 52	38.2	50 34.0	31 51	37.5	50 04.6	34 49	35.3	49 54.2	35 48	34.5	6
7	50 51.3	24 57	42.3	50 44.0	25 56	41.5	50 28.6	27 54	40.0	50 20.5	28 53	39.2	50 12.0	29 52	38.5	50 03.3	30 51	37.7	49 35.4	32 49	35.5	49 25.6	33 48	34.8	7
8	50 17.3	22 57	42.5	50 10.6	23 56	41.7	49 56.2	25 54	40.2	49 48.6	26 53	39.5	49 40.6	27 53	38.7	49 32.4	28 52	38.0	49 06.1	31 49	35.8	48 56.6	32 48	35.0	8
9	49 43.3	20 57	42.7	49 37.0	21 56	41.9	49 23.6	23 54	40.4	49 16.5	24 54	39.7	49 09.1	25 53	38.9	49 01.6	26 52	38.2	48 36.6	29 49	36.0	48 27.8	30 49	35.3	9
50	49 09.1	19 57	42.9	49 03.4	20 56	42.1	48 51.0	22 55	40.6	48 44.3	23 54	39.9	48 37.4	24 53	39.1	48 30.2	24 52	38.4	48 07.0	27 50	36.2	47 58.7	28 49	35.5	50
1	48 34.9	17 57	43.0	48 29.6	18 56	42.3	48 18.1	20 55	40.8	48 12.0	21 54	40.1	48 05.6	22 53	39.3	47 58.9	23 52	38.6	47 37.1	26 50	36.4	47 29.4	26 49	35.7	1
2	48 00.5	16 57	43.2	47 55.7	17 57	42.4	47 45.2	18 55	41.0	47 39.6	19 54	40.2	47 33.6	20 53	39.5	47 27.4	21 53	38.8	47 07.2	24 50	36.6	46 59.9	25 49	35.9	2
3	47 26.0	14 58	43.3	47 21.7	15 57	42.5	47 12.1	17 55	41.1	47 07.0	18 54	40.4	47 01.6	19 54	39.6	46 55.9	19 53	38.9	46 37.1	22 50	36.8	46 30.3	23 50	36.1	3
4	46 51.5	12 58	43.4	46 47.6	13 57	42.7	46 39.1	15 55	41.2	46 34.4	15 55	40.5	46 29.4	17 54	39.8	46 24.2	18 53	39.1	46 06.9	20 50	36.9	46 00.7	21 50	36.2	4
55	46 16.9	11 58	43.5	46 13.5	12 57	42.8	46 05.9	14 55	41.3	46 01.6	14 55	40.6	45 57.2	15 54	39.9	45 52.4	16 53	39.2	45 36.6	19 51	37.1	45 30.8	20 50	36.4	55
6	45 42.2	09 58	43.6	45 39.3	10 57	42.9	45 32.6	12 56	41.4	45 28.8	13 55	40.7	45 24.8	14 54	40.0	45 20.6	15 53	39.3	45 06.2	17 51	37.2	45 00.9	18 50	36.5	6
7	45 07.5	08 58	43.7	45 05.0	09 57	42.9	44 59.2	10 56	41.5	44 56.0	11 55	40.8	44 52.4	12 54	40.1	44 48.6	13 53	39.4	44 35.8	16 51	37.3	44 31.0	16 50	36.7	7
8	44 32.8	06 58	43.7	44 30.7	07 57	43.0	44 25.8	09 56	41.6	44 23.0	09 55	40.9	44 20.0	11 54	40.2	44 16.7	11 53	39.5	44 05.3	14 51	37.5	44 00.9	15 50	36.8	8
9	43 58.0	05 58	43.8	43 56.4	06 57	43.1	43 52.4	07 56	41.7	43 50.1	08 55	41.0	43 47.5	09 54	40.3	43 44.6	10 54	39.6	43 34.6	12 51	37.6	43 30.7	13 50	36.9	9
60	43 23.2	03 58	43.8	43 22.0	04 57	43.1	43 18.9	06 56	41.7	43 17.0	07 55	41.0	43 14.9	08 54	40.4	43 12.5	08 54	39.7	43 03.9	11 51	37.6	43 00.5	12 50	36.9	60
1	42 48.3	02 58	43.8	42 47.6	03 57	43.1	42 45.4	04 56	41.8	42 44.0	05 55	41.1	42 42.3	06 54	40.4	42 40.4	07 54	39.7	42 33.1	09 51	37.7	42 30.2	10 51	37.0	1
2	42 13.5	01 58	43.8	42 13.2	01 57	43.1	42 11.9	03 56	41.8	42 11.0	03 55	41.1	42 09.7	04 55	40.5	42 08.2	05 54	39.8	42 02.3	08 51	37.8	41 59.9	08 51	37.1	2
3	41 38.6	01 58	43.8	41 38.8	00 57	43.2	41 38.4	01 56	41.8	41 37.8	02 55	41.1	41 37.0	03 54	40.5	41 36.0	03 54	39.8	41 31.5	05 51	37.8	41 29.5	07 51	37.1	3
4	41 03.8	02 58	43.8	41 04.4	01 57	43.1	41 04.8	00 56	41.8	41 04.7	01 55	41.2	41 04.3	02 54	40.5	41 03.7	02 54	39.8	41 00.6	05 51	37.8	40 59.2	05 51	37.2	4
65	40 29.0	04 58	43.8	40 30.0	03 57	43.1	40 31.3	01 56	41.8	40 31.6	01 55	41.2	40 31.7	00 55	40.5	40 31.5	01 54	39.8	40 29.8	03 52	37.9	40 28.7	04 51	37.2	65
6	39 54.2	05 58	43.8	39 55.6	04 57	43.1	39 57.7	03 56	41.8	39 58.5	02 55	41.1	39 59.0	01 54	40.5	39 59.3	01 54	39.8	39 58.9	02 52	37.9	39 58.3	02 51	37.2	6
7	39 19.4	06 58	43.7	39 21.2	06 57	43.1	39 24.2	04 56	41.8	39 25.3	04 55	41.1	39 26.3	03 54	40.5	39 27.0	02 54	39.8	39 28.0	01 52	37.9	39 27.6	01 51	37.2	7
8	38 44.6	08 58	43.7	38 46.9	07 57	43.0	38 50.7	06 56	41.7	38 52.3	05 55	41.1	38 53.6	04 54	40.5	38 54.8	04 54	39.8	38 57.1	01 52	37.9	38 57.4	01 51	37.2	8
9	38 09.9	09 58	43.6	38 12.5	08 57	43.0	38 17.2	07 56	41.7	38 19.2	06 55	41.1	38 21.0	06 54	40.4	38 22.6	05 54	39.8	38 26.2	03 51	37.9	38 26.9	02 51	37.2	9
70	37 35.2	10 58	43.5	37 38.3	10 57	42.9	37 43.7	08 56	41.6	37 46.2	08 55	41.0	37 48.4	07 54	40.4	37 50.4	06 54	39.7	37 55.3	04 51	37.8	37 56.5	04 51	37.2	70
1	37 00.6	12 58	43.4	37 04.0	11 57	42.8	37 10.3	10 56	41.6	37 13.2	09 55	40.9	37 15.8	08 54	40.3	37 18.3	08 54	39.7	37 24.4	06 51	37.8	37 26.1	05 51	37.2	1
2	36 26.0	13 58	43.4	36 29.9	12 57	42.8	36 37.0	11 56	41.5	36 40.2	11 55	40.9	36 43.3	10 54	40.3	36 46.1	09 53	39.6	36 53.4	07 51	37.7	36 55.7	07 51	37.1	2
3	35 51.5	14 57	43.3	35 55.8	14 57	42.6	36 03.6	13 55	41.4	36 07.3	12 55	40.8	36 10.8	11 54	40.2	36 14.1	11 53	39.6	36 22.8	09 51	37.7	36 25.3	08 51	37.1	3
4	35 17.1	16 57	43.1	35 21.7	15 57	42.5	35 30.4	14 55	41.3	35 34.5	13 55	40.7	35 38.3	13 54	40.1	35 42.0	12 53	39.5	35 52.0	10 51	37.7	35 55.0	10 50	37.0	4
75	34 42.7	17 57	43.0	34 47.7	16 57	42.4	34 57.2	15 55	41.2	35 01.7	15 55	40.6	35 06.0	14 54	40.0	35 10.1	13 53	39.4	35 21.3	12 51	37.6	35 24.7	11 50	37.0	75
6	34 08.4	18 57	42.9	34 13.8	18 56	42.3	34 24.1	17 55	41.1	34 28.9	16 54	40.5	34 33.6	15 54	39.9	34 38.1	15 53	39.3	34 50.6	13 51	37.5	34 54.4	12 50	36.9	6
7	33 34.2	20 57	42.8	33 40.0	19 56	42.2	33 51.0	18 55	41.0	33 56.3	17 54	40.4	34 01.4	17 54	39.8	34 06.3	16 53	39.2	34 20.0	14 51	37.4	34 24.1	14 50	36.8	7
8	33 00.1	21 57	42.6	33 06.2	20 56	42.0	33 18.0	19 55	40.9	33 23.7	19 54	40.3	33 29.2	18 54	39.7	33 34.5	17 53	39.1	33 49.5	16 51	37.3	33 54.1	15 50	36.7	8
9	32 26.0	22 57	42.5	32 32.6	22 56	41.9	32 45.2	20 55	40.7	32 51.2	20 54	40.2	32 57.1	19 53	39.6	33 02.8	19 53	39.0	33 19.0	17 51	37.2	33 24.1	17 50	36.6	9
80	31 52.1	23 56	42.3	31 59.0	23 56	41.8	32 12.4	22 54	40.6	32 18.6	21 54	40.0	32 25.1	21 53	39.4	32 31.2	20 53	38.9	32 48.6	19 51	37.1	32 54.1	18 50	36.5	80
1	31 18.3	25 56	42.2	31 25.5	24 56	41.6	31 39.7	23 54	40.5	31 46.5	22 54	39.9	31 53.1	22 53	39.3	31 59.7	21 52	38.7	32 18.2	20 50	37.0	32 24.2	19 50	36.4	1
2	30 44.5	26 56	42.0	30 52.2	25 56	41.4	31 07.1	24 54	40.3	31 14.3	24 54	39.7	31 21.3	23 53	39.2	31 28.2	22 52	38.5	31 48.0	21 50	36.9	31 54.3	21 50	36.3	2
3	30 10.9	27 56	41.8	30 19.0	26 55	41.3	30 34.6	26 54	40.1	30 42.1	25 53	39.6	30 49.6	25 53	39.0	30 56.9	24 52	38.4	31 17.9	23 50	36.7	31 24.6	22 49	36.2	3
4	29 37.4	28 56	41.6	29 45.8	28 55	41.1	30 02.2	27 54	40.0	30 10.1	26 53	39.4	30 18.0	26 53	38.9	30 25.6	25 52	38.3	30 47.8	24 50	36.6	30 54.9	23 49	36.0	4
85	29 04.1	29 55	41.4	29 12.8	29 55	40.9	29 29.9	28 54	39.8	29 38.2	28 53	39.2	29 46.5	27 52	38.7	29 54.5	27 52	38.1	30 17.9	25 50	36.5	30 25.4	24 49	35.9	85
6	28 30.8	31 55	41.2	28 39.9	30 55	40.6	28 57.8	29 53	39.6	29 06.5	29 53	39.1	29 15.1	28 52	38.5	29 23.3	28 52	38.0	29 48.0	27 50	36.3	29 55.9	26 49	35.7	6
7	27 57.7	32 55	41.0	28 07.2	31 54	40.5	28 25.7	30 53	39.4	28 34.8	30 52	38.9	28 43.8	30 52	38.3	28 52.6	29 51	37.8	29 18.3	28 49	36.1	29 26.5	27 49	35.6	7
8	27 24.8	33 55	40.8	27 34.6	33 55	40.3	27 53.9	32 53	39.2	28 03.3	31 52	38.7	28 12.6	31 52	38.1	28 21.8	30 51	37.6	28 48.7	29 49	36.0	28 57.3	29 48	35.4	8
9	26 51.9	34 54	40.6	27 02.1	34 54	40.1	27 22.1	33 53	39.0	27 31.9	33 52	38.5	27 41.6	32 51	38.0	27 51.2	32 51	37.4	28 19.2	30 49	35.8	28 28.2	30 48	35.3	9
90	26 19.3	35 54	40.4	26 29.8	35 54	39.9	26 50.5	34 52	38.8	27 00.7	34 52	38.3	27 10.7	33 51	37.8	27 20.7	33 51	37.2	27 49.8	32 49	35.6	27 59.1	31 48	35.1	90

Lat 33°

H.A.	54° 30' Alt. / Δd Δt / Az.	55° 00' Alt. / Δd Δt / Az.	56° 00' Alt. / Δd Δt / Az.	56° 30' Alt. / Δd Δt / Az.	57° 00' Alt. / Δd Δt / Az.	57° 30' Alt. / Δd Δt / Az.	59° 00' Alt. / Δd Δt / Az.	59° 30' Alt. / Δd Δt / Az.	H.A.
91	25 46.7 36 54 40.1	25 57.6 36 53 39.6	26 19.0 35 52 38.6	26 29.6 35 52 38.1	26 40.0 35 51 37.5	26 50.3 34 50 37.0	27 20.5 33 48 35.4	27 30.4 33 48 34.9	91
2	25 14.4 38 54 39.9	25 25.6 37 53 39.4	25 47.7 37 52 38.4	25 58.6 36 51 37.8	26 09.4 36 51 37.3	26 20.1 35 50 36.8	26 51.4 34 48 35.2	27 01.7 34 48 34.7	2
3	24 42.2 39 53 39.7	24 53.7 38 53 39.2	25 16.6 38 52 38.1	25 27.8 37 51 37.6	25 39.0 37 50 37.1	25 50.0 37 50 36.6	26 22.5 36 48 35.0	26 33.1 35 47 34.5	3
4	24 10.1 40 53 39.4	24 22.0 40 53 38.9	24 45.6 39 51 37.9	24 57.2 39 51 37.4	25 08.7 38 50 36.9	25 20.1 38 50 36.4	25 53.7 37 48 34.8	26 04.6 36 47 34.3	4
95	23 38.3 41 53 39.2	23 50.5 41 52 38.7	24 14.7 40 51 37.7	24 26.7 40 51 37.2	24 38.6 39 50 36.6	24 50.3 39 49 36.1	25 25.0 38 48 34.6	25 36.4 38 47 34.1	95
6	23 06.6 42 53 38.9	23 19.2 42 52 38.4	23 44.1 41 51 37.4	23 56.4 41 50 36.9	24 08.6 41 50 36.4	24 20.7 40 49 35.9	24 56.5 39 47 34.4	25 08.2 39 47 33.9	6
7	22 35.1 43 52 38.6	22 48.0 43 52 38.1	23 13.6 42 51 37.2	23 26.3 42 50 36.7	23 38.8 42 49 36.2	23 51.3 41 49 35.7	24 28.2 40 47 34.2	24 40.2 40 46 33.7	7
8	22 03.8 44 52 38.4	22 17.0 44 51 37.9	22 43.3 44 50 36.9	22 56.3 43 50 36.4	23 09.2 43 49 35.9	23 22.1 43 48 35.4	24 00.0 42 47 33.9	24 12.4 41 46 33.4	8
9	21 32.6 45 52 38.1	21 46.2 45 51 37.6	22 13.2 45 50 36.6	22 26.5 44 49 36.1	22 39.8 44 49 35.7	22 53.0 44 48 35.2	23 32.0 43 46 33.7	23 44.8 43 46 33.2	9
100	21 01.7 47 51 37.8	21 15.6 46 51 37.3	21 43.3 46 50 36.4	21 57.0 46 49 35.9	22 10.6 45 48 35.4	22 24.1 45 48 34.9	23 04.1 44 46 33.5	23 17.3 44 46 33.0	100
1	20 31.0 48 51 37.5	20 45.2 47 50 37.0	21 13.5 47 49 36.1	21 27.6 47 49 35.6	21 41.5 46 48 35.1	21 55.4 46 48 34.6	22 36.5 45 46 33.2	22 50.0 45 45 32.7	1
2	20 00.4 49 51 37.2	20 15.0 49 50 36.7	20 44.0 48 49 35.8	20 58.4 48 48 35.3	21 12.7 48 48 34.9	21 26.9 47 47 34.4	22 09.0 46 45 33.0	22 22.9 46 45 32.5	2
3	19 30.1 50 50 36.9	19 45.1 50 50 36.4	20 14.7 49 49 35.5	20 29.3 49 48 35.0	20 44.0 49 47 34.6	20 58.6 48 47 34.1	21 41.8 48 45 32.7	21 56.0 47 45 32.2	3
4	19 00.0 51 50 36.6	19 15.3 51 49 36.1	19 45.6 50 48 35.2	20 00.6 50 48 34.7	20 15.6 50 47 34.3	20 30.4 50 46 33.8	21 14.7 49 45 32.5	21 29.3 48 44 32.0	4
105	18 30.2 52 49 36.3	18 45.7 52 49 35.8	19 16.7 51 48 34.9	19 32.0 51 47 34.4	19 47.3 51 47 34.0	20 02.5 51 46 33.5	20 47.8 50 44 32.2	21 02.7 50 44 31.7	105
6	18 00.5 53 49 35.9	18 16.4 53 48 35.5	18 48.0 52 47 34.6	19 03.7 52 47 34.1	19 19.3 52 46 33.7	19 34.9 52 46 33.2	20 21.1 51 44 31.9	20 36.4 51 44 31.4	6
7	17 31.1 54 49 35.6	17 47.3 54 48 35.2	18 19.5 53 47 34.3	18 35.5 53 47 33.8	18 51.5 53 46 33.4	19 07.4 53 45 32.9	19 54.7 52 44 31.6	20 10.3 52 43 31.1	7
8	17 01.9 55 48 35.3	17 18.4 55 48 34.8	17 51.3 54 47 34.0	18 07.6 54 46 33.5	18 23.9 54 46 33.1	18 40.1 54 45 32.6	19 28.4 53 43 31.3	19 44.4 53 43 30.9	8
9	16 33.0 56 48 34.9	16 49.8 56 47 34.5	17 23.3 56 46 33.6	17 39.9 55 46 33.2	17 56.5 55 45 32.8	18 13.1 55 45 32.3	19 02.4 54 43 31.0	19 18.7 54 42 30.6	9
110	16 04.3 57 47 34.6	16 21.4 57 47 34.2	16 55.5 57 46 33.3	17 12.5 57 45 32.9	17 29.4 56 45 32.5	17 46.3 56 44 32.0	18 36.6 56 43 30.7	18 53.2 55 42 30.3	110
1	15 35.8 58 47 34.3	15 53.3 58 46 33.8	16 28.0 58 45 33.0	16 45.3 58 45 32.6	17 02.5 57 44 32.1	17 19.7 57 44 31.7	18 11.0 57 42 30.4	18 27.9 56 42 30.0	1
2	15 07.6 59 47 33.9	15 25.4 59 46 33.5	16 00.7 59 45 32.6	16 18.3 59 44 32.2	16 35.9 58 44 31.8	16 53.4 58 43 31.4	17 45.6 58 42 30.1	18 02.9 58 41 29.7	2
3	14 39.7 60 46 33.5	14 57.7 60 46 33.1	15 33.7 60 45 32.3	15 51.6 60 44 31.9	16 09.5 59 44 31.5	16 27.3 59 43 31.0	17 20.5 59 41 29.8	17 38.1 59 41 29.4	3
4	14 12.0 61 46 33.2	14 30.4 61 45 32.8	15 07.0 61 44 31.9	15 25.2 61 44 31.5	15 43.4 61 43 31.1	16 01.5 60 43 30.7	16 55.6 60 41 29.5	17 13.6 60 41 29.0	4
115	13 44.6 62 45 32.8	14 03.3 62 45 32.4	14 40.5 62 44 31.6	14 59.0 62 43 31.2	15 17.5 62 43 30.8	15 35.9 61 42 30.4	16 31.0 61 41 29.1	16 49.3 61 40 28.7	115
6	13 17.5 63 45 32.4	13 36.4 63 44 32.0	14 14.2 63 43 31.2	14 33.1 63 43 30.8	14 51.9 63 42 30.4	15 10.6 62 42 30.0	16 06.6 62 40 28.8	16 25.2 62 40 28.4	6
7	12 50.6 64 44 32.1	13 09.9 64 44 31.7	13 48.3 64 43 30.9	14 07.4 64 42 30.5	14 26.5 64 42 30.1	14 45.6 63 41 29.7	15 42.5 63 40 28.5	16 01.4 63 39 28.1	7
8	12 24.1 65 44 31.7	12 43.6 65 43 31.3	13 22.6 65 42 30.5	13 42.0 65 42 30.1	14 01.4 65 41 29.7	14 20.8 64 41 29.3	15 18.7 64 39 28.1	15 37.9 64 39 27.7	8
9	11 57.8 66 43 31.3	12 17.6 66 43 30.9	12 57.2 66 42 30.1	13 16.9 66 41 29.7	13 36.6 66 41 29.3	13 56.3 65 40 29.0	14 55.1 65 39 27.8	15 14.6 65 38 27.4	9
120	11 31.8 67 43 30.9	11 52.0 67 42 30.5	12 32.1 67 41 29.7	12 52.1 67 41 29.4	13 12.1 67 40 29.0	13 32.1 66 40 28.6	14 31.8 66 38 27.4	14 51.6 66 38 27.0	120
1	11 06.2 68 42 30.5	11 26.6 68 42 30.1	12 07.3 68 41 29.4	12 27.6 68 40 29.0	12 47.9 68 40 28.6	13 08.1 67 39 28.2	14 08.7 67 38 27.1	14 28.8 67 37 26.7	1
2	10 40.8 69 42 30.1	11 01.5 69 41 29.7	11 42.8 69 40 29.0	12 03.4 69 40 28.6	12 23.9 69 39 28.2	12 44.5 68 39 27.9	13 45.9 68 37 26.7	14 06.3 68 37 26.3	2
3	10 15.7 70 41 29.7	10 36.7 70 41 29.3	11 18.5 70 40 28.6	11 39.4 70 39 28.2	12 00.3 69 39 27.8	12 21.1 69 38 27.5	13 23.4 69 37 26.4	13 44.2 69 36 26.0	3
4	9 51.0 71 41 29.3	10 12.2 71 40 28.9	10 54.6 71 39 28.2	11 15.8 71 39 27.8	11 37.0 70 38 27.4	11 58.1 70 38 27.1	13 01.2 70 36 26.0	13 22.2 70 36 25.6	4
125	9 26.5 72 40 28.8	9 48.1 72 40 28.5	10 31.0 72 39 27.8	10 52.5 71 38 27.4	11 13.9 71 38 27.1	11 35.3 71 37 26.7	12 39.3 71 36 25.6	13 00.6 71 36 25.3	125
6	9 02.4 73 40 28.4	9 24.2 73 39 28.1	10 07.7 72 38 27.4	10 29.5 72 38 27.0	10 51.2 72 37 26.7	11 12.9 72 37 26.3	12 17.0 72 36 25.2	12 39.3 72 35 24.9	6
7	8 38.7 74 39 28.0	9 00.7 73 39 27.6	9 44.8 73 38 26.9	10 06.8 73 37 26.6	10 28.8 73 37 26.3	10 50.7 73 36 25.9	11 56.4 73 35 24.9	12 18.3 73 35 24.5	7
8	8 15.2 74 38 27.5	8 37.6 74 38 27.2	9 22.1 74 37 26.5	9 44.4 74 37 26.2	10 06.7 74 36 25.8	10 28.9 74 36 25.5	11 35.4 74 34 24.5	11 57.6 74 34 24.1	8
9	7 52.1 75 38 27.1	8 14.7 75 37 26.8	8 59.8 75 37 26.1	9 22.4 75 36 25.8	9 44.9 75 36 25.4	10 07.4 75 35 25.1	11 14.7 75 34 24.1	11 37.1 75 34 23.7	9
130	7 29.4 76 37 26.7	7 52.2 76 37 26.3	8 37.9 76 36 25.7	9 00.7 76 36 25.3	9 23.4 76 35 25.0	9 46.2 76 35 24.7	10 54.4 76 33 23.7	11 17.0 76 33 23.4	130
1	7 07.0 77 37 26.2	7 30.1 77 36 25.9	8 16.2 77 35 25.2	8 39.3 77 35 24.9	9 02.3 77 35 24.6	9 25.3 77 34 24.3	10 34.3 77 33 23.3	10 57.2 76 32 23.0	1
2	6 44.9 78 36 25.8	7 08.3 78 36 25.4	7 55.0 78 35 24.8	8 18.3 78 34 24.5	8 41.6 78 34 24.2	9 04.8 78 34 23.9	10 14.6 77 32 22.9	10 37.8 77 32 22.6	2
3	6 23.3 79 36 25.3	6 46.9 79 35 25.0	7 34.0 79 34 24.4	7 57.6 79 34 24.1	8 21.1 78 33 23.7	8 44.7 78 33 23.4	9 55.2 78 32 22.5	10 18.6 78 31 22.2	3
4	6 01.9 79 35 24.8	6 25.8 79 35 24.5	7 13.4 79 34 23.9	7 37.2 79 33 23.6	8 01.0 79 33 23.3	8 24.8 79 32 23.0	9 36.1 79 31 22.1	9 59.8 79 31 21.8	4
135	5 41.0 80 34 24.4	6 05.1 80 34 24.1	6 53.2 80 33 23.5	7 17.3 80 33 23.2	7 41.3 80 32 22.9	8 05.3 80 32 22.6	9 17.3 80 31 21.7	9 41.3 80 30 21.4	135
6	5 20.4 81 34 23.9	5 44.7 81 33 23.6	6 33.3 81 32 23.0	6 57.6 81 32 22.7	7 21.9 81 32 22.4	7 46.2 81 31 22.1	8 58.9 81 30 21.2	9 23.2 81 30 20.9	6
7	5 00.2 82 33 23.4	5 24.8 82 33 23.1	6 13.9 82 32 22.6	6 38.4 82 31 22.3	7 02.9 82 31 22.0	7 27.4 82 31 21.7	8 40.9 82 30 20.8	9 05.3 82 29 20.5	7
8		5 05.2 83 32 22.7	5 54.7 83 31 22.1	6 19.5 83 31 21.8	6 44.3 83 30 21.5	7 09.0 82 30 21.2	8 23.2 82 29 20.4	8 47.9 82 29 20.1	8
9		5 36.0 83 31 21.6	6 01.0 83 30 21.4	6 26.0 83 30 21.1	6 51.0 83 29 20.8	8 05.8 83 28 20.0	8 30.8 83 28 19.7		9
140			5 17.6 84 30 21.2	5 42.9 84 30 20.9	6 08.1 84 29 20.6	6 33.3 84 29 20.3	7 48.8 84 28 19.5	8 14.0 84 27 19.2	140
1				5 25.1 85 29 20.4	5 50.5 85 29 20.2	6 16.0 85 28 19.9	7 32.2 85 27 19.1	7 57.6 85 27 18.8	1
2				5 07.8 86 28 19.9	5 33.4 85 28 19.7	5 59.0 85 28 19.4	7 15.9 85 26 18.6	7 41.5 85 26 18.4	2
3					5 16.6 86 27 19.2	5 42.5 86 27 19.0	7 00.0 86 26 18.2	7 25.9 86 26 17.9	3
4					5 00.3 87 27 18.7	5 26.3 87 26 18.5	6 44.5 87 25 17.7	7 10.5 87 25 17.5	4
145						5 10.6 88 26 18.0	6 29.4 87 25 17.3	6 55.6 87 24 17.1	145
6							6 14.6 88 24 16.8	6 41.0 88 24 16.6	6
7							6 00.2 89 23 16.4	6 26.8 89 23 16.2	7
8							5 46.2 89 23 15.9	6 13.0 89 22 15.7	8
9							5 32.6 90 22 15.5	5 59.6 90 22 15.2	9
150							5 19.4 91 21 15.0	5 46.6 91 21 14.8	150
1							5 06.6 91 21 14.5	5 33.9 91 20 14.3	1
2								5 21.7 92 20 13.8	2
3								5 09.9 92 19 13.4	3

Lat. 34° Lat. 35° Lat. 36° Lat. 37° Lat. 38°

Lat. 33°

H.A.	60° 00' Alt. ° '	Δd Δt	Az.	60° 30' Alt. ° '	Δd Δt	Az.	62° 00' Alt. ° '	Δd Δt	Az.	62° 30' Alt. ° '	Δd Δt	Az.	63° 00' Alt. ° '	Δd Δt	Az.	69° 00' Alt. ° '	Δd Δt	Az.	69° 30' Alt. ° '	Δd Δt	Az.	74° 30' Alt. ° '	Δd Δt	Az.	H.A.
00	63 00.0	1.00 1	00.0	62 30.0	1.00 1	00.0	61 00.0	1.00 1	00.0	60 30.0	1.00 1	00.0	60 00.0	1.00 1	00.0	54 00.0	1.00 0	00.0	53 30.0	1.00 0	00.0	48 30.0	1.00 0	00.0	00
1	62 59.5	1.00 2	01.1	62 29.5	1.00 2	01.1	60 59.6	1.00 2	01.0	60 29.6	1.00 2	00.9	59 59.6	1.00 2	00.9	53 59.7	1.00 1	00.6	53 29.7	1.00 1	00.6	48 29.8	1.00 1	00.4	1
2	62 58.1	1.00 4	02.2	62 28.1	1.00 4	02.1	60 58.3	1.00 4	01.9	60 28.4	1.00 3	01.9	59 58.4	1.00 3	01.8	53 58.9	1.00 2	01.2	53 29.0	1.00 1	01.2	48 29.3	1.00 2	00.8	2
3	62 55.7	1.00 5	03.3	62 25.7	1.00 5	03.2	60 56.2	1.00 5	02.9	60 26.3	1.00 5	02.8	59 56.4	1.00 5	02.7	53 57.6	1.00 3	01.8	53 27.7	1.00 3	01.8	48 28.4	1.00 3	01.2	3
4	62 52.3	99 07	04.4	62 22.5	99 07	04.2	60 53.2	99 06	03.9	60 23.4	99 06	03.7	59 53.6	99 06	03.6	53 55.7	1.00 4	02.4	53 25.9	1.00 4	02.4	48 27.2	1.00 3	01.6	4
05	62 48.0	99 09	05.5	62 18.3	99 08	05.3	60 49.4	99 08	04.8	60 19.7	99 07	04.7	59 50.1	99 07	04.5	53 53.3	99 05	03.0	53 23.5	99 05	02.9	48 25.6	99 03	02.0	05
6	62 42.7	98 10	06.5	62 13.2	98 10	06.3	60 44.8	98 09	05.8	60 15.2	98 09	05.6	59 45.7	98 09	05.4	53 50.4	99 06	03.6	53 20.7	99 06	03.5	48 23.6	99 04	02.4	6
7	62 36.5	98 12	07.6	62 07.2	98 12	07.4	60 39.3	98 10	06.7	60 10.0	98 10	06.5	59 40.6	98 10	06.3	53 46.9	98 07	04.2	53 17.4	99 06	04.1	48 21.3	99 04	02.8	7
8	62 29.4	97 13	08.7	62 00.3	97 13	08.4	60 33.0	97 12	07.6	60 03.9	97 11	07.4	59 34.7	97 11	07.2	53 43.0	98 08	04.8	53 13.5	98 07	04.7	48 18.5	99 05	03.2	8
9	62 21.3	96 15	09.7	61 52.5	96 14	09.4	60 25.9	97 13	08.6	59 57.0	97 13	08.3	59 28.0	97 12	08.0	53 38.5	98 08	05.4	53 09.2	98 08	05.2	48 15.7	98 06	03.6	9
10	62 12.4	95 16	10.7	61 43.9	95 16	10.4	60 18.0	96 14	09.5	59 49.4	96 14	09.2	59 20.6	96 14	08.9	53 33.4	97 09	06.0	53 04.3	97 09	05.8	48 12.4	98 06	04.0	10
1	62 02.6	94 18	11.7	61 34.4	94 17	11.4	60 09.4	95 16	10.4	59 40.9	95 15	10.1	59 12.5	95 15	09.7	53 27.9	96 10	06.6	52 59.0	96 10	06.4	48 08.7	97 07	04.4	1
2	61 51.9	93 19	12.7	61 24.0	93 19	12.4	59 59.9	94 17	11.3	59 31.8	94 16	10.9	59 03.6	94 16	10.6	53 21.9	96 11	07.2	52 53.2	96 10	06.9	48 04.7	97 07	04.8	2
3	61 40.4	92 21	13.7	61 12.9	92 20	13.3	59 49.7	93 18	12.1	59 21.9	93 18	11.8	58 54.0	93 17	11.4	53 15.3	95 12	07.7	52 46.9	95 11	07.5	48 00.3	96 08	05.2	3
4	61 28.1	91 22	14.7	61 00.9	91 21	14.2	59 38.8	92 19	13.0	59 11.3	92 19	12.6	58 43.7	92 18	12.2	53 08.3	94 13	08.3	52 40.1	94 12	08.0	47 55.7	96 08	05.5	4
15	61 14.9	89 23	15.6	60 48.1	90 23	15.1	59 27.1	90 21	13.8	59 00.0	91 20	13.4	58 32.7	91 19	13.0	53 00.8	93 13	08.9	52 32.8	93 13	08.6	47 50.6	95 09	05.9	15
6	61 01.0	88 24	16.5	60 34.6	88 24	16.0	59 14.7	89 22	14.7	58 47.9	89 21	14.2	58 21.0	90 21	13.8	52 52.8	92 14	09.4	52 25.1	93 14	09.1	47 45.3	94 09	06.3	6
7	60 46.3	86 26	17.4	60 20.3	87 25	16.9	59 01.7	88 23	15.5	58 35.2	88 22	15.0	58 08.7	89 22	14.6	52 44.3	91 15	10.0	52 16.9	91 14	09.6	47 39.6	93 10	06.7	7
8	60 30.9	85 27	18.3	60 05.3	85 26	17.8	58 47.9	87 24	16.3	58 21.9	87 23	15.8	57 55.7	87 23	15.3	52 35.4	90 16	10.5	52 08.2	91 15	10.2	47 33.6	92 11	07.0	8
9	60 14.7	84 28	19.1	59 49.6	84 27	18.6	58 33.5	85 25	17.0	58 07.9	86 24	16.5	57 42.1	86 24	16.1	52 26.0	89 16	11.0	51 59.1	90 16	10.7	47 27.3	91 11	07.4	9
20	59 57.9	82 29	20.0	59 33.2	82 28	19.4	58 18.4	84 26	17.8	57 53.2	84 25	17.3	57 27.9	85 25	16.8	52 16.1	88 17	11.6	51 49.6	89 17	11.2	47 20.7	91 12	07.8	20
1	59 40.4	80 30	20.8	59 16.2	81 29	20.2	58 02.7	82 27	18.5	57 38.0	83 26	18.0	57 13.1	83 26	17.5	52 05.8	87 18	12.1	51 39.6	87 17	11.7	47 13.7	90 12	08.1	1
2	59 22.2	79 31	21.6	58 58.5	79 31	21.0	57 46.4	81 28	19.3	57 22.1	81 27	18.7	56 57.7	82 27	18.2	51 55.1	86 19	12.6	51 29.2	86 18	12.2	47 06.5	89 13	08.5	2
3	59 03.4	77 32	22.3	58 40.2	78 32	21.7	57 29.5	79 29	20.0	57 05.7	80 28	19.4	56 41.7	80 28	18.8	51 43.9	85 19	13.1	51 18.4	85 19	12.6	46 58.9	88 13	08.8	3
4	58 43.9	75 33	23.1	58 21.2	76 32	22.4	57 12.1	78 30	20.6	56 48.7	78 29	20.1	56 25.2	79 28	19.5	51 32.3	84 20	13.6	51 07.2	84 19	13.1	46 51.1	87 14	09.1	4
25	58 23.9	74 34	23.8	58 01.7	74 33	23.1	56 54.1	76 31	21.3	56 31.2	77 30	20.7	56 08.1	77 29	20.1	51 20.3	82 21	14.0	50 55.6	83 20	13.6	46 42.9	86 14	09.5	25
6	58 03.4	72 35	24.5	57 41.7	73 34	23.8	56 35.5	74 32	21.9	56 13.1	75 31	21.3	55 50.5	76 30	20.8	51 08.0	81 21	14.5	50 43.6	81 21	14.0	46 34.5	84 15	09.8	6
7	57 42.3	70 36	25.1	57 21.1	71 35	24.5	56 16.5	73 32	22.6	55 54.5	73 32	22.0	55 32.4	74 31	21.4	50 55.2	80 22	15.0	50 31.2	80 21	14.5	46 25.8	83 15	10.1	7
8	57 20.6	68 37	25.8	57 00.0	69 36	25.1	55 56.9	71 33	23.2	55 35.5	72 33	22.6	55 13.9	72 32	21.9	50 42.0	78 23	15.4	50 18.4	79 22	14.9	46 16.8	83 15	10.5	8
9	56 58.5	67 38	26.4	56 38.4	67 37	25.7	55 36.9	69 34	23.8	55 15.9	70 33	23.1	54 54.8	71 32	22.5	50 28.4	77 23	15.8	50 05.3	77 22	15.3	46 07.5	81 16	10.8	9
30	56 35.9	65 38	27.0	56 16.3	66 38	26.3	55 16.3	68 35	24.3	54 55.9	68 34	23.7	54 35.3	69 33	23.1	50 14.5	76 24	16.3	49 51.8	76 23	15.8	45 58.0	80 16	11.1	30
1	56 12.8	63 39	27.6	55 53.8	64 38	26.9	54 55.4	66 36	24.9	54 35.5	67 35	24.2	54 15.4	67 34	23.6	50 00.2	74 24	16.7	49 37.9	75 24	16.2	45 48.2	78 17	11.4	1
2	55 49.3	61 40	28.1	55 30.8	62 39	27.4	54 34.0	64 36	25.4	54 14.6	65 35	24.8	53 55.1	66 35	24.1	49 45.6	73 25	17.1	49 23.8	73 24	16.6	45 38.1	77 17	11.7	2
3	55 25.3	59 41	28.7	55 07.4	60 40	28.0	54 12.2	62 37	25.9	53 53.4	63 36	25.3	53 34.3	64 35	24.6	49 30.7	71 25	17.5	49 09.3	72 25	17.0	45 27.8	76 18	12.0	3
4	55 01.0	58 41	29.2	54 43.6	58 40	28.5	53 50.0	61 38	26.4	53 31.7	61 37	25.7	53 13.1	62 36	25.1	49 15.4	70 26	17.9	48 54.4	70 25	17.3	45 17.2	75 18	12.3	4
35	54 36.3	56 42	29.7	54 19.4	57 41	29.0	53 27.4	59 38	26.9	53 09.6	60 37	26.2	52 51.6	60 38	25.5	48 59.8	68 27	18.3	48 39.3	69 26	17.7	45 06.4	73 19	12.5	35
6	54 11.2	54 42	30.1	53 54.9	55 42	29.5	53 04.5	57 39	27.3	52 47.2	58 38	26.7	52 31.1	58 38	26.0	48 43.3	66 27	18.6	48 23.8	67 26	18.1	44 55.4	72 19	12.8	6
7	53 45.7	52 43	30.6	53 30.0	53 42	29.9	52 41.2	55 39	27.8	52 24.5	55 38	27.1	52 07.5	57 38	26.4	48 27.6	65 28	19.0	48 08.1	65 27	18.4	44 44.1	70 19	13.1	7
8	53 19.9	50 44	31.0	53 04.7	51 43	30.3	52 17.6	54 40	28.2	52 01.4	54 39	27.5	51 45.0	55 38	26.8	48 11.1	63 28	19.3	47 52.0	64 27	18.7	44 32.6	69 20	13.3	8
9	52 53.8	48 44	31.4	52 39.2	49 43	30.7	51 53.7	52 40	28.6	51 38.0	53 40	27.9	51 22.1	53 39	27.2	47 54.3	62 28	19.7	47 35.7	62 28	19.1	44 20.9	67 20	13.6	9
40	52 27.4	47 44	31.8	52 13.3	47 44	31.1	51 29.4	50 41	29.0	51 14.3	51 40	28.3	50 58.9	52 39	27.6	47 37.3	60 29	20.0	47 19.2	61 28	19.4	44 08.9	66 20	13.9	40
1	52 00.8	45 45	32.2	51 47.2	46 44	31.5	51 04.9	48 41	29.4	50 50.3	49 40	28.7	50 35.4	50 40	28.0	47 19.9	59 29	20.3	47 02.3	59 28	19.7	43 56.8	64 21	14.1	1
2	51 33.8	43 45	32.6	51 20.8	44 44	31.8	50 40.1	46 42	29.7	50 26.0	47 41	29.0	50 11.7	48 40	28.3	47 02.3	57 30	20.6	46 45.2	57 29	20.0	43 44.4	63 21	14.3	2
3	51 06.6	41 46	32.9	50 54.1	42 45	32.2	50 15.0	45 42	30.0	50 01.5	46 41	29.4	49 47.7	46 40	28.7	46 44.5	55 30	20.9	46 27.9	56 29	20.3	43 31.9	61 21	14.6	3
4	50 39.2	39 46	33.2	50 27.2	40 45	32.5	49 49.7	43 42	30.4	49 36.7	44 42	29.7	49 23.4	45 41	29.0	46 26.5	53 30	21.2	46 10.3	54 30	20.6	43 19.1	60 22	14.8	4
45	50 11.5	38 46	33.5	50 00.0	39 46	32.8	49 24.1	41 43	30.7	49 11.7	42 42	30.0	48 58.9	43 41	29.3	46 08.2	52 31	21.4	45 52.5	52 30	20.8	43 06.2	58 22	15.0	45
6	49 43.6	36 47	33.8	49 32.7	37 46	33.1	48 58.4	39 43	31.0	48 46.4	40 42	30.3	48 34.2	41 42	29.6	45 49.7	50 31	21.7	45 34.5	51 30	21.1	42 53.1	57 22	15.2	6
7	49 15.5	34 47	34.1	49 05.1	35 46	33.4	48 32.4	38 44	31.2	48 20.9	38 43	30.5	48 09.3	39 42	29.8	45 30.9	48 32	22.0	45 16.3	49 31	21.3	42 39.8	55 23	15.4	7
8	48 47.2	32 47	34.3	48 37.3	33 46	33.6	48 06.2	36 44	31.5	47 55.3	37 43	30.8	47 44.1	38 42	30.1	45 12.0	47 32	22.2	44 57.9	47 31	21.6	42 26.3	54 23	15.6	8
9	48 18.7	31 48	34.6	48 09.4	32 47	33.9	47 39.8	34 44	31.7	47 29.5	35 43	31.0	47 18.8	36 43	30.4	44 52.9	45 32	22.4	44 39.3	46 31	21.8	42 12.7	52 23	15.8	9
50	47 50.1	29 48	34.8	47 41.3	30 47	34.1	47 13.2	32 45	32.0	47 03.4	33 44	31.3	46 53.3	34 43	30.6	44 33.6	43 32	22.7	44 20.5	44 32	22.0	41 58.9	50 23	16.0	50
1	47 21.3	27 48	35.0	47 13.0	28 47	34.3	46 46.5	31 45	32.2	46 37.2	32 44	31.5	46 27.6	32 43	30.8	44 14.1	42 33	22.9	44 01.6	42 32	22.2	41 45.0	49 23	16.2	1
2	46 52.4	26 48	35.2	46 44.6	26 48	34.5	46 19.6	29 45	32.4	46 10.8	30 44	31.7	46 01.7	31 43	31.0	43 54.5	40 33	23.1	43 42.4	41 32	22.4	41 30.9	47 24	16.3	2
3	46 23.3	24 49	35.4	46 16.0	25 48	34.8	45 52.6	27 45	32.6	45 44.3	28 44	31.9	45 35.7	29 44	31.2	43 34.7	38 34	23.3	43 23.1	39 32	22.6	41 16.7	45 24	16.5	3
4	45 54.1	22 49	35.5	45 47.3	23 48	34.8	45 25.4	26 46	32.8	45 17.6	26 45	32.1	45 09.6	27 44	31.4	43 14.7	36 34	23.5	43 03.7	37 33	22.8	41 02.3	44 24	16.7	4
55	45 24.8	21 49	35.7	45 18.5	21 48	35.0	44 58.1	24 46	32.9	44 50.8	25 45	32.2	44 43.3	26 44	31.6	42 54.6	35 34	23.6	42 44.1	35 33	23.0	40 47.8	42 24	16.8	55
6	44 55.4	19 49	35.8	44 49.6	20 48	35.1	44 30.7	22 46	33.1	44 23.9	23 45	32.4	44 16.9	24 44	31.7	42 34.4	33 34	23.8	42 24.4	34 33	23.2	40 33.2	40 25	17.0	6
7	44 25.9	17 49	36.0	44 20.6	18 48	35.3	44 03.2	21 46	33.2	43 56.9	21 45	32.5	43 50.4	22 44	31.9	42 14.0	31 34	23.9	42 04.5	32 33	23.3	40 18.5	39 25	17.1	7
8	43 56.3	16 49	36.1	43 51.5	16 49	35.4	43 35.6	19 46	33.3	43 29.8	20 45	32.7	43 23.8	20 44	32.0	41 53.5	30 35	24.1	41 44.6	30 33	23.5	40 03.7	38 25	17.2	8
9	43 26.6	14 50	36.2	43 22.3	15 49	35.5	43 07.9	17 46	33.5	43 02.6	18 45	32.8	42 57.1	19 45	32.1	41 32.9	28 34	24.2	41 24.5	29 34	23.6	39 48.7	36 25	17.3	9
60	42 56.9	12 50	36.3	42 53.1	13 49	35.6	42 40.1	16 46	33.6	42 35.3	16 46	32.9	42 30.4	17 45	32.2	41 12.2	26 35	24.4	41 04.3	27 34	23.7	39 33.6	34 25	17.5	60
1	42 27.1	11 50	36.3	42 23.7	12 49	35.7	42 12.2	14 47	33.7	42 07.9	15 46	33.0	42 03.4	15 45	32.3	40 51.4	24 35	24.5	40 44.0	25 34	23.8	39 18.5	32 25	17.6	1
2	41 57.3	09 50	36.4	41 54.4	10 49	35.7	41 44.3	12 47	33.7	41 40.5	13 46	33.1	41 36.5	14 45	32.4	40 30.5	23 35	24.6	40 23.6	23 34	24.0	39 03.2	30 26	17.7	2
3	41 27.4	08 50	36.5	41 25.0	09 49	35.8	41 16.3	11 47	33.8	41 13.0	11 46	33.2	41 09.5	12 45	32.5	40 09.5	21 35	24.7	40 03.2	22 34	24.1	38 47.9	29 26	17.8	3
4	40 57.4	06 50	36.5	40 55.5	07 49	35.9	40 48.3	09 47	33.8	40 45.5	10 46	33.2	40 42.4	11 45	32.6	39 48.5	19 35	24.8	39 42.6	20 34	24.2	38 32.5	27 26	17.9	4
65	40 27.5	05 50	36.6	40 26.0	05 49	35.9	40 20.2	08 47	33.9	40 17.9	08 46	33.3	40 15.0	09 45	32.6	39 27.4	18 35	24.9	39 22.0	18 34	24.2	38 17.0	25 26	18.0	65
6	39 57.5	03 50	36.6	39 56.5	04 49	35.9	39 52.1	06 47	34.0	39 50.2	07 46	33.3	39 48.1	07 45	32.7	39 06.2	16 35	25.0	39 01.3	17 35	24.3	38 01.4	23 26	18.1	6
7	39 27.5	01 50	36.6	39 27.0	02 49	35.9	39 24.0	04 47	34.0	39 22.6	05 46	33.4	39 21.0	06 45	32.7	38 44.9	14 36	25.0	38 40.5	15 35	24.4	37 45.8	22 26	18.1	7
8	38 57.5	00 50	36.6	38 57.4	01 49	36.0	38 55.9	03 47	34.0	38 54.9	03 46	33.4	38 54.0	04 45	32.8	38 23.5	13 36	25.1	38 19.6	13 35	24.4	37 30.1	20 26	18.2	8
9	38 27.5	02 50	36.6	38 27.9	01 49	36.0	38 27.7	01 47	34.0	38 27.2	02 46	33.4	38 26.5	03 45	32.8	38 02.2	11 36	25.1	37 58.9	12 35	24.5	37 14.4	18 26	18.2	9
70	37 57.5	03 50	36.6	37 58.3	02 49	35.9	37 59.5	00 47	34.0	37 59.5	00 46	33.4	37 59.3	01 45	32.8	37 40.8	09 36	25.2	37 38.0	10 35	24.6	36 58.6	16 26	18.3	70
1	37 27.5	05 50	36.6	37 28.8	04 49	35.9	37 31.4	02 47	34.0	37 31.8	01 46	33.4	37 32.1	01 45	32.8	37 19.4	08 36	25.2	37 17.1	08 35	24.6	36 42.7	15 26	18.4	1
2	36 57.6	06 50	36.5	36 59.3	05 49	35.9	37 03.2	03 47	34.0	37 04.1	03 46	33.4	37 04.8	02 45	32.8	36 58.0	06 36	25.3	36 56.1	07 35	24.6	36 26.9	13 27	18.4	2
3	36 27.6	07 50	36.5	36 29.8	07 49	35.9	36 35.1	04 47	34.0	36 36.4	04 46	33.4	36 37.5	04 45	32.7	36 36.5	04 36	25.3	36 35.1	05 35	24.7	36 10.9	11 27	18.5	3
4	35 57.8	09 50	36.4	36 00.3	08 49	35.8	36 06.9	06 47	34.0	36 08.8	06 46	33.3	36 10.4	05 45	32.7	36 15.0	03 36	25.3	36 14.1	03 35	24.7	35 55.0	10 27	18.5	4
75	35 27.9	10 50	36.4	35 30.9	10 49	35.8	35 38.8	08 47	33.9	35 41.1	07 46	33.3	35 43.2	07 45	32.7	35 53.5	01 36	25.3	35 53.1	02 35	24.7	35 39.0	08 27	18.5	75
6	34 58.1	12 50	36.3	35 01.5	11 49	35.7	35 10.8	09 47	33.9	35 13.5	09 46	33.3	35 16.0	08 45	32.7	35 32.0	01 35	25.3	35 32.1	00 35	24.7	35 23.0	06 27	18.5	6
7	34 28.3	13 50	36.2	34 32.2	13 49	35.6	34 42.7	11 47	33.8	34 45.8	10 46	33.2	34 48.9	10 45	32.6	35 10.5	02 36	25.3	35 11.1	02 35	24.7	35 07.0	04 27	18.6	7
8	33 58.6	15 49	36.1	34 02.9	14 49	35.6	34 14.8	12 47	33.7	34 18.4	12 46	33.1	34 21.8	11 45	32.5	34 49.0	03 36	25.3	34 50.1	03 35	24.7	34 51.0	03 27	18.6	8
9	33 29.0	16 49	36.0	33 33.7	15 49	35.5	33 46.8	14 46	33.7	33 50.9	14 46	33.1	33 54.8	13 45	32.5	34 27.5	06 36	25.3	34 29.1	05 35	24.6	34 35.0	01 27	18.6	9
80	32 59.4	17 49	35.9	33 04.5	17 48	35.4	33 19.0	15 46	33.6	33 23.4	15 46	33.0	33 27.8	14 45	32.4	34 06.1	07 36	25.2	34 08.1	07 35	24.6	34 18.9	01 27	18.6	80
1	32 29.9	19 49	35.8	32 35.4	18 48	35.3	32 51.2	17 46	33.5	32 56.1	16 46	32.9	33 00.8	16 45	32.3	33 44.6	09 36	25.2	33 47.2	08 35	24.6	34 02.9	02 27	18.6	1
2	32 00.5	20 49	35.7	32 06.4	20 48	35.2	32 23.4	18 46	33.4	32 28.8	18 45	32.8	32 33.8	18 45	32.2	33 23.2	10 36	25.1	33 26.2	10 35	24.5	33 46.8	04 27	18.6	2
3	31 31.1	22 49	35.6	31 37.5	21 48	35.0	31 55.8	19 46	33.3	32 01.5	19 45	32.7	32 07.1	18 45	32.1	33 01.9	12 36	25.1	33 05.3	11 35	24.5	33 30.9	06 27	18.6	3
4	31 01.9	23 49	35.5	31 08.7	22 48	34.9	31 28.2	21 46	33.2	31 34.4	20 45	32.6	31 40.4	20 44	32.0	32 40.5	13 35	25.1	32 44.5	13 35	24.5	33 14.9	07 27	18.5	4
85	30 32.7	24 48	35.3	30 39.9	24 48	34.8	31 00.7	22 45	33.1	31 07.3	22 45	32.5	31 13.7	21 44	31.9	32 19.2	15 35	25.0	32 23.7	14 35	24.4	32 58.9	09 27	18.5	85
6	30 03.7	26 48	35.2	30 11.1	25 48	34.6	30 33.3	24 45	32.9	30 40.3	23 45	32.4	30 47.2	23 45	31.8	31 58.0	17 35	24.9	32 02.9	16 34	24.3	32 42.9	11 27	18.5	6
7	29 34.7	27 48	35.0	29 42.7	26 47	34.5	30 05.9	25 45	32.8	30 13.4	26 44	32.3	30 20.7	26 44	32.1	31 36.7	19 34	24.8	31 42.2	17 34	24.2	32 27.0	12 27	18.5	7
8	29 05.9	28 48	34.9	29 14.3	28 47	34.3	29 38.7	26 45	32.7	29 46.6	26 44	32.1	29 54.3	26 44	31.6	31 15.7	20 35	24.8	31 21.5	19 34	24.2	32 11.1	14 26	18.4	8
9	28 37.2	30 48	34.7	28 46.0	29 47	34.2	29 11.6	28 45	32.5	29 19.9	27 44	32.0	29 28.0	27 44	31.4	30 54.7	21 35	24.7	31 00.9	21 34	24.1	31 55.2	15 26	18.3	9
90	28 08.6	31 47	34.5	28 17.8	30 47	34.0	28 44.6	29 45	32.4	28 53.3	29 44	31.8	29 01.8	28 43	31.3	30 33.7	23 35	24.6	30 40.4	22 34	24.0	31 39.4	16 27	18.3	90

Lat. 33°

H.A.	60° 00' Alt.	Δd Δt	Az.	60° 30' Alt.	Δd Δt	Az.	62° 00' Alt.	Δd Δt	Az.	62° 30' Alt.	Δd Δt	Az.	63° 00' Alt.	Δd Δt	Az.	69° 00' Alt.	Δd Δt	Az.	69° 30' Alt.	Δd Δt	Az.	74° 30' Alt.	Δd Δt	Az.	H.A.
91	27 40.1	32 47	34.4	27 49.7	32 47	33.8	28 17.7	31 45	32.2	28 26.8	30 44	31.7	28 35.8	30 43	31.1	30 12.8	24 35	24.5	30 20.0	24 34	23.9	31 23.6	19 26	18.2	91
2	27 11.8	32 47	34.2	27 21.7	33 46	33.7	27 51.0	32 44	32.0	28 00.4	31 44	31.5	28 09.8	31 43	31.0	29 52.0	26 35	24.4	29 59.6	25 34	23.8	31 07.9	20 26	18.2	2
3	26 43.6	35 47	34.0	26 53.9	34 46	33.5	27 24.3	33 44	31.3	27 34.2	33 44	31.3	27 44.0	32 43	30.8	29 31.2	27 34	24.3	29 39.3	27 34	23.7	30 52.2	22 26	18.1	3
4	26 15.5	36 47	33.8	26 26.3	36 46	33.3	26 57.8	34 44	31.7	27 08.1	34 43	31.2	27 18.3	34 43	30.6	29 10.6	29 34	24.2	29 19.1	28 34	23.6	30 36.5	23 26	18.0	4
95	25 47.6	37 46	33.6	25 58.7	37 46	33.1	26 31.4	36 44	31.5	26 42.1	35 43	31.0	26 52.7	35 42	30.5	28 50.0	30 34	24.0	28 59.0	30 33	23.5	30 21.1	25 26	18.0	95
6	25 19.8	39 46	33.4	25 31.3	38 45	32.9	26 05.2	37 43	31.3	26 16.3	37 43	30.8	26 27.2	36 42	30.3	28 29.6	32 34	23.9	28 39.0	31 33	23.4	30 05.6	27 26	17.9	6
7	24 52.2	40 46	33.2	25 04.1	39 45	32.7	25 39.1	38 43	31.1	25 50.6	38 43	30.6	26 01.9	38 42	30.1	28 09.2	33 34	23.8	28 19.0	33 33	23.3	29 50.2	28 26	17.8	7
8	24 24.8	41 45	32.9	24 37.0	41 45	32.4	25 13.2	39 42	30.9	25 25.0	39 42	30.4	25 36.8	39 42	29.9	27 49.0	34 34	23.7	27 59.2	34 33	23.1	29 34.8	30 26	17.7	8
9	23 57.5	42 45	32.7	24 10.1	42 45	32.2	24 47.4	41 43	30.7	24 59.6	41 42	30.2	25 11.8	40 41	29.7	27 28.8	36 33	23.5	27 39.5	35 33	23.0	29 19.5	31 25	17.6	9
100	23 30.4	43 45	32.5	23 43.4	43 44	32.0	24 21.8	42 42	30.5	24 34.4	42 42	30.0	24 46.9	42 41	29.5	27 08.8	37 33	23.4	27 19.9	37 32	22.8	29 04.3	33 25	17.5	100
1	23 03.5	45 45	32.2	23 16.8	44 44	31.8	23 56.3	43 42	30.3	24 09.3	43 42	29.8	24 22.2	43 41	29.3	26 48.9	39 33	23.2	27 00.4	38 32	22.7	28 49.2	34 25	17.4	1
2	22 36.7	46 44	32.0	22 50.4	46 44	31.5	23 31.0	45 42	30.0	23 44.4	44 41	29.6	23 57.7	44 41	29.1	26 29.1	40 33	23.1	26 41.1	40 32	22.5	28 34.2	36 25	17.3	2
3	22 10.1	47 44	31.7	22 24.2	47 43	31.3	23 05.9	46 42	29.8	23 19.7	46 41	29.3	23 33.3	45 40	28.9	26 09.5	41 32	22.9	26 21.9	41 32	22.4	28 19.3	37 25	17.2	3
4	21 43.8	48 44	31.5	21 58.2	48 43	31.0	22 41.0	47 41	29.6	22 55.1	47 41	29.1	23 09.1	47 40	28.6	25 50.0	43 32	22.7	26 02.8	42 32	22.2	28 04.4	39 25	17.1	4
105	21 17.6	49 43	31.2	21 32.4	49 43	30.8	22 16.2	48 41	29.3	22 30.7	48 40	28.9	22 45.1	48 40	28.4	25 30.6	44 32	22.6	25 43.8	44 31	22.1	27 49.7	40 24	17.0	105
6	20 51.6	51 43	31.0	21 06.7	50 42	30.5	21 51.7	50 41	29.1	22 06.5	49 40	28.6	22 21.2	49 39	28.2	25 11.4	45 32	22.4	25 25.0	45 31	21.9	27 35.1	42 24	16.8	6
7	20 25.8	52 43	30.7	20 41.3	51 42	30.2	21 27.3	51 40	28.8	21 42.5	50 40	28.4	21 57.6	50 39	27.9	24 52.3	47 32	22.2	25 06.3	46 31	21.7	27 20.5	43 24	16.7	7
8	20 00.3	53 42	30.4	20 16.1	53 42	29.9	21 03.1	52 40	28.6	21 18.7	52 39	28.1	21 34.1	51 39	27.7	24 33.4	48 31	22.0	24 47.8	48 31	21.5	27 06.1	44 24	16.6	8
9	19 34.9	54 42	30.1	19 51.1	54 41	29.7	20 39.2	53 40	28.3	20 55.0	53 39	27.9	21 10.9	53 38	27.4	24 14.6	49 31	21.8	24 29.4	49 30	21.3	26 51.8	46 24	16.5	9
110	19 09.8	55 42	29.8	19 26.3	55 41	29.4	20 15.4	54 39	28.0	20 31.6	54 39	27.6	20 47.8	54 38	27.2	23 56.0	51 31	21.6	24 11.1	50 30	21.1	26 37.6	47 23	16.3	110
1	18 44.8	56 41	29.5	19 01.7	56 41	29.1	19 51.8	55 39	27.7	20 08.4	55 38	27.3	20 24.9	55 38	26.9	23 37.5	52 30	21.4	23 53.1	52 30	20.8	26 23.5	49 23	16.2	1
2	18 20.1	57 41	29.2	18 37.3	57 40	28.8	19 28.5	57 39	27.5	19 45.4	56 38	27.1	20 02.3	56 37	26.6	23 19.2	53 30	21.2	23 35.2	53 30	20.8	26 09.6	50 23	16.0	2
3	17 55.7	58 40	28.9	18 13.2	58 40	28.5	19 05.4	58 38	27.2	19 22.6	57 38	26.8	19 39.9	57 37	26.3	23 01.1	54 30	21.0	23 17.4	54 29	20.5	25 55.7	51 23	15.9	3
4	17 31.5	60 40	28.6	17 49.3	59 39	28.2	18 42.5	59 38	26.9	19 00.1	59 37	26.5	19 17.6	58 37	26.1	22 43.2	56 30	20.8	22 59.8	55 29	20.3	25 42.0	53 23	15.7	4
115	17 07.5	61 40	28.3	17 25.6	60 39	27.9	18 19.8	60 37	26.6	18 37.7	60 37	26.2	18 55.6	60 36	25.8	22 25.4	57 29	20.6	22 42.4	57 29	20.1	25 28.5	54 22	15.6	115
6	16 43.7	62 39	28.0	17 02.2	62 39	27.6	17 57.4	61 37	26.3	18 15.6	61 36	25.9	18 33.9	61 36	25.5	22 07.8	58 29	20.3	22 25.2	58 28	19.9	25 15.0	55 22	15.4	6
7	16 20.3	63 39	27.7	16 39.1	63 38	27.3	17 35.2	62 36	26.0	17 53.8	62 36	25.6	18 12.3	62 36	25.2	21 50.4	59 29	20.1	22 08.2	59 28	19.7	25 01.6	57 22	15.2	7
8	15 57.0	64 38	27.3	16 16.1	64 38	26.9	17 13.2	63 36	25.7	17 32.1	63 36	25.3	17 51.0	63 35	24.9	21 33.2	61 28	19.9	21 51.3	60 28	19.5	24 48.6	58 22	15.1	8
9	15 34.0	65 38	27.0	15 53.5	65 37	26.6	16 51.5	64 36	25.4	17 10.7	64 35	25.0	17 29.9	64 35	24.6	21 16.2	62 28	19.7	21 34.6	61 27	19.2	24 35.6	59 21	14.9	9
120	15 11.3	66 37	26.7	15 31.1	66 37	26.3	16 30.0	65 35	25.1	16 49.6	65 35	24.7	17 09.1	65 34	24.3	20 59.3	63 28	19.4	21 18.2	63 27	19.0	24 22.7	60 21	14.7	120
1	14 48.9	67 37	26.3	15 08.9	67 36	26.0	16 08.8	66 34	24.7	16 28.7	66 34	24.4	16 48.5	66 34	24.0	20 42.7	64 27	19.2	21 01.9	64 27	18.7	24 10.0	61 21	14.5	1
2	14 26.7	68 36	26.0	14 47.1	68 36	25.6	15 47.9	67 34	24.4	16 08.0	67 34	24.1	16 28.2	67 33	23.7	20 26.3	65 27	18.9	20 45.8	65 26	18.5	23 57.5	62 21	14.4	2
3	14 04.8	69 36	25.6	14 25.5	69 36	25.2	15 27.2	68 34	24.1	15 47.7	68 34	23.7	16 08.1	68 33	23.4	20 10.1	66 27	18.7	20 29.9	66 26	18.3	23 45.1	64 20	14.2	3
4	13 43.2	70 35	25.3	14 04.2	70 35	24.9	15 06.8	69 34	23.8	15 27.5	69 33	23.4	15 48.3	69 33	23.0	19 54.1	67 26	18.4	20 14.2	67 26	18.0	23 32.8	65 20	14.0	4
125	13 21.9	71 35	24.9	13 43.1	71 34	24.5	14 46.6	70 33	23.1	15 07.7	70 33	22.7	15 28.8	70 32	22.7	19 38.3	68 26	18.2	19 58.8	68 25	17.7	23 20.7	66 20	13.8	125
6	13 00.9	72 35	24.5	13 22.4	72 34	24.2	14 26.7	71 33	23.1	14 48.1	71 32	22.7	15 09.5	71 32	22.4	19 22.7	69 26	17.9	19 43.5	69 25	17.5	23 08.8	67 20	13.6	6
7	12 40.1	73 34	24.2	13 01.9	73 34	23.8	14 07.1	72 32	22.7	14 28.8	72 32	22.4	14 50.5	72 31	22.0	19 07.3	71 25	17.6	19 28.5	70 25	17.3	22 57.1	68 19	13.4	7
8	12 19.7	74 34	23.8	12 41.7	74 33	23.4	13 47.8	73 32	22.4	14 09.8	73 31	22.0	14 31.7	73 31	21.7	18 52.2	72 25	17.4	19 13.7	71 24	17.0	22 45.5	70 19	13.2	8
9	11 59.5	75 33	23.4	12 21.9	74 33	23.1	13 28.8	74 31	22.0	13 51.0	74 31	21.7	14 13.3	74 30	21.3	18 37.3	73 24	17.1	18 59.1	72 24	16.7	22 34.1	71 19	13.0	9
130	11 39.7	75 33	23.0	12 02.3	75 32	22.7	13 10.1	75 31	21.7	13 32.6	75 30	21.3	13 55.1	75 30	21.0	18 22.6	74 24	16.8	18 44.7	74 24	16.5	22 22.9	72 18	12.8	130
1	11 20.2	76 32	22.6	11 43.1	76 32	22.3	12 51.6	76 30	21.3	13 14.4	76 30	21.0	13 37.2	76 29	20.6	18 08.2	75 24	16.5	18 30.6	74 23	16.2	22 11.8	73 18	12.6	1
2	11 01.0	77 31	22.2	11 24.1	77 31	21.9	12 33.5	77 30	20.9	12 56.6	77 29	20.6	13 19.6	77 29	20.3	17 54.0	76 23	16.3	18 16.6	75 23	15.9	22 00.9	74 18	12.4	2
3	10 42.1	78 31	21.8	11 05.5	78 31	21.5	12 15.7	78 29	20.6	12 39.0	78 29	20.2	13 02.3	78 28	19.9	17 40.0	77 23	16.0	18 03.0	76 23	15.6	21 50.3	75 18	12.2	3
4	10 23.5	78 31	21.4	10 47.2	79 30	21.1	11 58.1	79 29	20.2	12 21.7	79 28	19.9	12 45.3	79 28	19.6	17 26.3	77 23	15.7	17 49.5	77 22	15.3	21 39.8	76 17	11.9	4
135	10 05.3	80 30	21.0	10 29.2	80 29	20.7	11 40.9	80 28	19.8	12 04.8	80 28	19.5	12 28.6	79 27	19.2	17 12.8	78 22	15.4	17 36.3	78 22	15.1	21 29.4	77 17	11.7	135
6	9 47.4	81 29	20.6	10 11.5	81 29	20.3	11 24.0	80 28	19.4	11 48.1	80 27	19.1	12 12.2	80 27	18.8	16 59.1	79 22	15.1	17 23.4	79 21	14.8	21 19.3	78 17	11.5	6
7	9 29.8	81 29	20.2	9 54.2	81 28	19.9	11 07.4	81 27	19.0	11 31.8	81 27	18.7	11 56.1	81 26	18.4	16 46.6	80 21	14.8	17 10.7	80 21	14.5	21 09.4	79 16	11.3	7
8	9 12.6	82 28	19.8	9 37.2	82 28	19.5	10 51.2	82 27	18.7	11 15.8	82 26	18.4	11 40.4	82 26	18.1	16 33.9	81 21	14.5	16 58.2	81 20	14.2	20 59.7	80 16	11.0	8
9	8 55.7	83 28	19.4	9 20.6	83 27	19.1	10 35.2	83 26	18.3	11 00.1	83 26	18.0	11 24.9	83 25	17.7	16 21.5	82 20	14.2	16 46.0	82 20	13.9	20 50.1	81 16	10.8	9
140	8 39.2	84 27	19.0	9 04.3	84 27	18.7	10 19.6	84 25	17.9	10 44.7	84 25	17.6	11 09.8	84 25	17.3	16 09.3	83 20	13.9	16 34.1	83 19	13.6	20 40.8	82 15	10.6	140
1	8 23.0	85 26	18.5	8 48.3	85 26	18.3	10 04.4	84 25	17.5	10 29.7	84 24	17.2	10 55.0	84 24	16.9	15 57.3	84 19	13.6	16 22.4	84 19	13.3	20 31.6	83 15	10.3	1
2	8 07.1	85 26	18.1	8 32.7	85 25	17.9	9 49.4	85 24	17.1	10 15.0	85 24	16.8	10 40.5	85 24	16.5	15 45.7	84 19	13.3	16 11.0	84 19	13.0	20 22.7	83 15	10.1	2
3	7 51.7	86 26	17.7	8 17.5	86 25	17.4	9 34.9	86 24	16.7	10 00.6	86 23	16.4	10 26.4	86 23	16.1	15 34.3	85 18	12.9	15 59.8	85 18	12.7	20 13.8	84 14	09.9	3
4	7 36.6	87 24	17.2	8 02.6	87 24	17.0	9 20.6	87 23	16.2	9 46.6	87 23	16.0	10 12.6	87 22	15.7	15 23.1	86 18	12.6	15 48.8	86 18	12.4	20 05.5	84 14	09.6	4
145	7 21.8	87 24	16.8	7 48.1	87 24	16.6	9 06.7	87 23	15.8	9 32.9	87 22	15.6	9 59.1	87 22	15.3	15 12.3	87 18	12.3	15 38.3	87 17	12.0	19 57.1	86 14	09.4	145
6	7 07.5	88 23	16.4	7 33.9	88 23	16.1	8 53.2	88 22	15.4	9 19.6	88 22	15.2	9 46.0	88 21	14.9	15 01.7	87 17	12.0	15 27.9	87 17	11.7	19 49.0	87 13	09.1	6
7	6 53.5	89 23	15.9	7 20.1	89 22	15.7	8 40.0	89 21	15.0	9 06.6	89 21	14.8	9 33.2	89 21	14.5	14 51.4	88 17	11.6	15 17.8	88 16	11.4	19 41.2	87 13	08.9	7
8	6 39.9	89 22	15.5	7 06.7	89 22	15.2	8 27.1	89 21	14.6	8 53.9	89 20	14.3	9 20.7	89 20	14.1	14 41.4	89 16	11.3	15 08.0	89 16	11.0	19 33.5	88 12	08.6	8
9	6 26.6	90 21	15.0	6 53.6	90 21	14.8	8 14.7	90 20	14.1	8 41.6	90 20	13.9	9 08.6	90 20	13.7	14 31.6	89 16	11.0	14 58.5	89 15	10.8	19 26.0	89 12	08.4	9
150	6 13.8	91 21	14.6	6 41.0	91 20	14.4	8 02.5	91 20	13.7	8 29.7	91 19	13.5	8 56.9	91 19	13.3	14 22.2	90 15	10.7	14 49.2	90 15	10.4	19 18.8	90 12	08.1	150
1	6 01.3	91 20	14.1	6 28.7	91 20	13.9	7 50.8	91 19	13.3	8 18.2	91 19	13.1	8 45.5	91 18	12.9	14 13.0	91 15	10.3	14 40.2	91 14	10.1	19 11.8	90 11	07.9	1
2	5 49.3	92 19	13.6	6 16.8	92 19	13.4	7 39.4	92 18	12.8	8 07.0	92 18	12.6	8 34.5	92 18	12.4	14 04.1	91 14	10.0	14 31.6	91 14	09.8	19 05.0	91 11	07.6	2
3	5 37.6	92 19	13.2	6 05.3	92 19	13.0	7 28.4	92 18	12.4	7 56.1	92 17	12.2	8 23.8	92 17	12.0	13 55.6	92 14	09.6	14 23.2	92 14	09.4	18 58.4	92 11	07.3	3
4	5 26.3	93 18	12.7	5 54.2	93 18	12.5	7 17.8	93 17	12.0	7 45.7	93 17	11.8	8 13.5	93 17	11.6	13 47.3	93 13	09.3	14 15.0	93 13	09.1	18 52.1	92 10	07.1	4
155	5 15.4	93 17	12.3	5 43.5	93 17	12.1	7 07.5	93 16	11.5	7 35.6	93 16	11.4	8 03.6	93 16	11.2	13 39.3	93 13	09.0	14 07.2	93 12	08.8	18 46.0	93 10	06.9	155
6	5 04.9	94 17	11.8	5 33.1	94 17	11.6	6 57.7	94 16	11.1	7 25.8	94 16	10.9	7 54.0	94 15	10.7	13 31.6	94 12	08.6	13 59.7	94 12	08.4	18 40.1	93 09	06.6	6
7				5 23.2	94 15	11.1	6 48.2	94 15	10.6	7 16.5	94 15	10.5	7 44.8	94 15	10.3	13 24.2	94 12	08.3	13 52.4	94 12	08.1	18 34.4	94 09	06.3	7
8				5 13.7	95 15	10.7	6 39.1	95 14	10.2	7 07.5	95 14	10.0	7 36.0	95 14	09.9	13 17.1	95 11	07.9	13 45.5	95 11	07.8	18 29.0	94 09	06.0	8
9				5 04.6	95 15	10.2	6 30.4	95 14	09.7	6 59.0	95 14	09.6	7 27.5	95 13	09.4	13 10.3	95 11	07.6	13 38.8	95 11	07.4	18 23.8	95 08	05.8	9
160							6 22.0	96 13	09.3	6 50.8	96 13	09.2	7 19.5	96 13	09.0	13 03.8	96 10	07.2	13 32.5	96 10	07.1	18 18.8	95 08	05.5	160
1							6 14.1	96 13	08.8	6 42.9	96 12	08.7	7 11.8	96 12	08.6	12 57.7	96 10	06.9	13 26.5	96 10	06.7	18 14.1	96 07	05.3	1
2							6 06.6	97 12	08.4	6 35.5	97 12	08.3	7 04.5	97 12	08.1	12 51.8	96 09	06.4	13 20.7	96 09	06.4	18 09.6	96 07	05.0	2
3							5 59.4	97 11	07.9	6 28.5	97 11	07.8	6 57.6	97 11	07.7	12 46.2	97 09	06.2	13 15.3	97 09	06.0	18 05.4	97 07	04.7	3
4							5 52.7	97 11	07.5	6 21.8	97 10	07.4	6 51.0	97 10	07.2	12 41.0	97 08	05.8	13 10.1	97 08	05.7	18 01.3	97 06	04.4	4
165							5 46.3	98 10	07.0	6 15.6	98 10	06.9	6 44.9	98 10	06.8	12 36.0	98 08	05.5	13 05.3	98 08	05.3	17 57.6	98 06	04.2	165
6							5 40.4	98 09	06.6	6 09.8	98 09	06.5	6 39.1	98 09	06.3	12 31.4	98 07	05.1	13 00.8	98 07	05.0	17 54.0	98 05	03.9	6
7							5 34.8	98 09	06.1	6 04.3	98 08	06.0	6 33.8	98 08	05.9	12 27.1	98 07	04.7	12 56.5	98 07	04.6	17 50.7	98 05	03.6	7
8							5 29.7	98 08	05.6	5 59.2	98 08	05.5	6 28.8	98 08	05.5	12 23.1	98 06	04.4	12 52.6	98 06	04.3	17 47.7	98 05	03.3	8
9							5 25.0	99 07	05.2	5 54.6	99 07	05.1	6 24.2	99 07	05.0	12 19.4	99 06	04.0	12 49.0	99 06	03.9	17 44.9	99 04	03.1	9
170							5 20.6	99 06	04.7	5 50.3	99 06	04.6	6 20.0	99 06	04.5	12 16.1	99 05	03.7	12 45.7	99 05	03.6	17 42.3	99 04	02.8	170
1							5 16.7	99 06	04.2	5 46.5	99 06	04.2	6 16.2	99 06	04.1	12 13.0	99 05	03.3	12 42.7	99 04	03.2	17 40.0	99 03	02.5	1
2							5 13.2	99 05	03.7	5 43.0	99 05	03.7	6 12.8	99 05	03.6	12 10.3	99 04	02.9	12 40.1	99 04	02.9	17 37.9	99 03	02.2	2
3							5 10.1	99 04	03.3	5 40.0	99 04	03.2	6 09.8	99 04	03.2	12 07.9	99 04	02.6	12 37.7	99 03	02.5	17 36.0	99 03	02.0	3
4							5 07.4	1.004	02.8	5 37.3	1.004	02.8	6 07.2	1.004	02.7	12 05.8	1.003	02.2	12 35.7	1.003	02.1	17 34.4	1.002	01.7	4
175							5 05.2	1.003	02.4	5 35.1	1.003	02.3	6 05.0	1.003	02.3	12 04.0	1.002	01.8	12 33.9	1.002	01.8	17 33.1	1.002	01.4	175
6							5 03.3	1.002	01.9	5 33.3	1.002	01.9	6 03.2	1.002	01.8	12 02.6	1.002	01.5	12 32.5	1.002	01.4	17 32.0	1.001	01.1	6
7							5 01.9	1.002	01.4	5 31.8	1.002	01.4	6 01.8	1.002	01.4	12 01.4	1.001	01.1	12 31.4	1.001	01.1	17 31.1	1.001	00.8	7
8							5 00.8	1.001	00.9	5 30.8	1.001	00.9	6 00.8	1.001	00.9	12 00.6	1.001	00.7	12 30.6	1.001	00.7	17 30.5	1.001	00.6	8
9							5 00.2	1.000	00.5	5 30.2	1.000	00.5	6 00.2	1.000	00.4	12 00.2	1.000	00.4	12 30.2	1.000	00.3	17 30.1	1.000	00.3	9
180							5 00.0	1.000	00.0	5 30.0	1.000	00.0	6 00.0	1.000	00.0	12 00.0	1.000	00.0	12 30.0	1.000	00.0	17 30.0	1.000	00.0	180

Right margin latitude index: Lat. 34°, Lat. 35°, Lat. 36°, Lat. 37°, Lat. 38°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 33°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	Dec.	H.A.	
00	61	180	65	180	69	180	73	180	77	180	81	180	85	180	89	180	87	00	83	00	79	00	00
4	61	172	65	171	69	169	73	167	77	164	80	158	84	144	86	105	86	47	82	24	79	15	4
8	60	164	64	162	68	159	72	155	75	149	79	140	81	124	83	96	83	63	81	40	77	27	8
12	59	156	63	153	66	150	70	145	73	138	76	127	79	113	80	92	80	70	78	51	76	37	12
16	57	149	61	146	64	141	68	136	71	128	73	119	75	106	76	90	76	73	75	57	73	44	16
20	56	143	59	139	62	134	65	128	68	121	70	112	72	101	73	88	73	74	73	61	71	49	20
24	53	137	57	133	60	128	62	122	65	115	67	107	69	97	70	86	70	75	70	63	68	52	24
28	51	132	54	128	57	123	60	117	62	111	64	103	65	94	66	85	67	75	67	65	66	55	28
32	48	127	51	123	54	118	56	113	59	106	61	99	62	92	63	83	64	74	63	65	63	57	32
36	46	123	48	119	51	114	53	109	55	103	57	97	59	89	60	82	60	74	60	66	60	58	36
40	43	119	45	115	48	110	50	105	52	100	54	94	55	87	56	81	57	73	57	66	57	59	40
44	40	116	42	112	45	107	47	102	49	97	51	92	52	86	53	79	54	73	54	66	54	59	44
48	37	112	39	108	41	104	44	99	46	95	47	89	49	84	50	78	51	72	51	65	51	60	48
52	34	109	36	105	38	101	40	97	42	92	44	87	45	82	47	77	48	71	48	65	49	59	52
56	30	107	33	103	35	99	37	94	39	90	41	85	42	80	43	75	44	70	45	64	46	59	56
60	27	104	29	100	32	96	34	92	35	88	37	83	39	79	40	74	41	69	42	64	43	58	60
64	24	101	26	98	28	94	30	90	32	86	34	81	35	77	37	72	38	68	39	63	40	58	64
68	21	99	23	95	25	92	27	88	29	84	31	80	32	75	34	71	35	66	36	62	37	57	68
72	17	97	19	93	22	89	24	86	25	82	27	78	29	74	31	69	32	65	33	61	34	56	72
76	14	94	16	91	18	87	20	84	22	80	24	76	26	72	27	68	29	64	30	59	32	55	76
80	11	92	13	89	15	85	17	82	19	78	21	74	23	70	24	66	26	62	27	58	29	54	80
84	07	90	09	86	11	83	14	80	16	76	18	72	19	69	21	65	23	61	25	57	26	53	84
88	04	88	06	84	08	81	10	78	12	74	14	70	16	67	18	63	20	59	22	56	24	52	88
92	01	86	03	82	05	79	07	75	09	72	11	69	13	65	15	61	17	58	19	54	21	50	92
96	*03*	83	*01*	80	02	77	04	73	06	70	08	67	10	63	12	60	14	56	16	53	18	49	96
100	*06*	81	*04*	78	*02*	75	*01*	71	03	68	05	65	07	61	10	58	12	54	14	51	16	47	100
104	*09*	79	*07*	76	*05*	72	*03*	69	*00*	66	02	62	04	59	07	56	09	53	11	49	13	46	104
108	*13*	77	*10*	73	*08*	70	*06*	67	*03*	64	*01*	60	02	57	04	54	06	51	09	47	11	44	108
112	*16*	74	*14*	71	*11*	68	*09*	64	*06*	61	*04*	58	*01*	55	01	52	04	49	06	46	09	42	112
116	*19*	72	*17*	68	*14*	65	*12*	62	*09*	59	*07*	56	*04*	53	*01*	50	01	47	04	44	07	41	116
120	*22*	69	*20*	66	*17*	63	*15*	59	*12*	56	*09*	53	*07*	50	*04*	47	*01*	44	02	42	04	39	120
124	*25*	66	*23*	63	*20*	60	*17*	57	*15*	54	*12*	51	*09*	48	*06*	45	*03*	42	*01*	39	02	37	124
128	*28*	63	*26*	60	*23*	57	*20*	54	*17*	51	*14*	48	*12*	45	*09*	43	*06*	40	*03*	37	*00*	35	128
132	*31*	60	*29*	57	*26*	54	*23*	51	*20*	48	*17*	45	*14*	43	*11*	40	*08*	37	*05*	35	*01*	32	132
136	*34*	57	*31*	54	*28*	51	*25*	48	*22*	45	*19*	42	*16*	40	*13*	37	*10*	35	*06*	32	*03*	30	136
140	*37*	53	*34*	50	*31*	47	*28*	44	*25*	42	*21*	39	*18*	37	*15*	34	*12*	32	*08*	30	*05*	28	140
144	*40*	50	*37*	46	*33*	44	*30*	41	*27*	38	*23*	36	*20*	34	*17*	31	*13*	29	*10*	27	*06*	25	144
148	*42*	46	*39*	42	*36*	40	*32*	37	*29*	35	*25*	32	*22*	30	*18*	28	*15*	26	*11*	24	*08*	23	148
152	*44*	41	*41*	38	*38*	35	*34*	33	*31*	31	*27*	29	*23*	27	*20*	25	*16*	23	*13*	22	*09*	20	152
156	*47*	36	*43*	33	*40*	31	*36*	29	*32*	27	*29*	25	*25*	23	*21*	22	*17*	20	*14*	19	*10*	17	156
160	*48*	31	*45*	29	*41*	26	*37*	24	*34*	23	*30*	21	*26*	20	*22*	18	*19*	17	*15*	16	*11*	15	160
164	*50*	25	*46*	23	*42*	21	*39*	20	*35*	18	*31*	17	*27*	16	*23*	15	*19*	14	*16*	13	*12*	12	164
168	*51*	19	*47*	18	*44*	16	*40*	15	*36*	14	*32*	13	*28*	12	*24*	11	*20*	10	*16*	10	*12*	09	168
172	*52*	13	*48*	12	*44*	11	*40*	10	*36*	09	*32*	09	*29*	08	*25*	07	*21*	07	*17*	06	*13*	06	172
176	*53*	07	*49*	06	*45*	06	*41*	05	*37*	05	*33*	04	*29*	04	*25*	04	*21*	03	*17*	03	*13*	03	176
180	*53*	00	*49*	00	*45*	00	*41*	00	*37*	00	*33*	00	*29*	00	*25*	00	*21*	00	*17*	00	*13*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

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

ALTITUDE

Lat. 33°

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	75	00	71	00	67	00	63	00	59	00	55	00	51	00	47	00	43	00	39	00	35	00	00
4	75	10	71	07	67	06	63	04	59	03	55	03	51	02	47	01	43	01	39	01	35	00	4
8	74	20	70	15	66	11	62	09	59	07	55	05	51	04	47	03	43	02	39	01	35	00	8
12	72	28	69	21	66	16	62	13	58	10	54	08	50	06	47	04	43	03	39	02	35	01	12
16	71	34	68	27	64	21	61	17	57	13	54	10	50	08	46	06	43	04	39	02	35	01	16
20	69	39	66	31	63	25	60	20	57	16	53	12	50	09	46	07	42	05	39	03	35	01	20
24	67	43	64	35	62	29	59	23	56	18	52	14	49	11	46	08	42	05	38	03	35	01	24
28	64	46	62	38	60	32	57	26	55	21	51	16	48	13	45	09	42	06	38	04	35	01	28
32	62	48	60	41	58	34	56	28	53	23	50	18	48	14	44	10	41	07	38	04	35	01	32
36	59	50	58	43	56	36	54	30	52	25	49	20	47	15	44	11	41	08	38	05	35	01	36
40	57	51	56	44	54	38	52	32	50	26	48	21	46	17	43	12	40	08	38	05	35	02	40
44	54	52	53	46	52	39	51	33	49	28	47	22	45	18	42	13	40	09	37	05	34	02	44
48	51	53	51	46	50	40	49	34	47	29	46	23	44	19	42	14	39	10	37	06	34	02	48
52	49	53	48	47	48	41	47	35	46	30	44	24	43	19	41	15	39	10	37	06	34	02	52
56	46	53	46	47	46	41	45	36	44	30	43	25	42	20	40	15	38	11	36	06	34	02	56
60	43	53	43	47	43	42	43	36	42	31	41	26	40	21	39	16	38	11	36	06	34	02	60
64	41	52	41	47	41	42	41	37	41	31	40	26	39	21	38	16	37	11	35	07	34	02	64
68	38	52	39	47	39	42	39	37	39	31	39	26	38	21	37	16	36	12	35	07	34	02	68
72	35	51	36	46	37	41	37	37	37	32	37	27	37	22	36	17	36	12	35	07	34	02	72
76	33	51	33	46	34	41	35	36	35	31	36	27	35	22	35	17	35	12	34	07	33	02	76
80	30	49	31	45	32	41	33	36	34	31	34	26	34	22	34	17	34	12	34	07	33	02	80
84	28	49	29	44	30	40	31	35	32	31	33	26	33	22	33	17	33	12	33	07	33	02	84
88	25	48	27	43	28	39	29	35	30	30	31	26	32	21	32	17	33	12	33	07	33	02	88
92	23	46	26	42	26	38	27	34	28	30	30	26	31	21	31	16	32	12	33	07	33	02	92
96	20	45	22	41	24	37	25	33	27	29	28	25	29	21	30	16	31	12	32	07	33	02	96
100	18	44	20	40	22	36	24	32	25	28	27	24	28	20	30	16	31	11	32	07	33	02	100
104	16	42	18	39	20	35	22	31	24	28	25	24	27	20	29	16	30	11	31	07	32	02	104
108	13	41	16	37	18	34	20	30	22	27	24	23	26	19	28	15	29	11	31	07	32	02	108
112	11	39	14	36	16	33	18	29	21	26	23	22	25	18	27	15	29	11	31	06	32	02	112
116	09	38	12	34	14	31	17	28	19	25	22	21	24	18	26	14	28	10	30	06	32	02	116
120	07	36	10	33	13	30	15	27	18	23	20	20	23	17	25	13	28	10	30	06	32	02	120
124	05	34	08	31	11	28	14	25	16	22	19	19	22	16	25	13	27	09	30	06	32	02	124
128	03	32	06	29	09	27	12	24	15	21	18	18	21	15	24	12	27	09	29	05	32	02	128
132	02	30	05	27	08	25	11	22	14	20	17	17	20	14	23	11	26	08	29	05	32	02	132
136	00	28	03	25	07	23	10	21	13	18	16	16	19	13	22	10	26	08	29	05	32	02	136
140	*01*	25	*02*	23	05	21	09	19	12	17	15	14	19	12	22	10	25	07	28	04	31	02	140
144	*03*	23	*01*	21	04	19	08	17	11	15	15	13	18	11	21	09	25	06	28	04	31	01	144
148	*04*	21	*00*	19	03	17	07	15	10	14	14	12	17	10	21	08	24	06	28	04	31	01	148
152	*05*	18	*02*	17	*02*	15	06	14	09	12	13	10	17	09	20	07	24	05	28	03	31	01	152
156	*06*	16	*02*	15	*01*	13	05	12	09	10	13	09	16	08	20	06	24	04	27	03	31	01	156
160	*07*	13	*03*	12	*01*	11	04	10	08	09	12	08	16	06	20	05	24	04	27	02	31	01	160
164	*08*	11	*04*	10	*00*	09	04	08	08	07	12	06	16	05	19	04	23	03	27	02	31	01	164
168	*08*	08	*04*	07	*00*	07	04	06	07	05	11	05	15	04	19	03	23	02	27	01	31	00	168
172	*09*	05	*05*	05	*01*	04	*03*	04	07	04	11	03	15	03	19	02	23	02	27	01	31	00	172
176	*09*	03	*05*	02	*01*	02	*03*	02	07	02	11	02	15	01	19	01	23	01	27	00	31	00	176
180	*09*	00	*05*	00	*01*	00	*03*	00	07	00	11	00	15	00	19	00	23	00	27	00	31	00	180

48°	52°	56°	60°	64°	68°	72°	76°	80°	84°	88°

Lat. 34°

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

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

Lat. 34°

H.A.	0° 00′ Alt. / Δd Δt / Az.	0° 30′ Alt. / Δd Δt / Az.	1° 00′ Alt. / Δd Δt / Az.	1° 30′ Alt. / Δd Δt / Az.	2° 00′ Alt. / Δd Δt / Az.	2° 30′ Alt. / Δd Δt / Az.	3° 00′ Alt. / Δd Δt / Az.	3° 30′ Alt. / Δd Δt / Az.	H.A.
00	56 00.0 1.00 01 180.0	56 30.0 1.00 01 180.0	57 00.0 1.00 01 180.0	57 30.0 1.00 01 180.0	58 00.0 1.00 01 180.0	58 30.0 1.00 01 180.0	59 00.0 1.00 01 180.0	59 30.0 1.00 01 180.0	00
1	55 59.2 1.00 04 178.2	56 29.2 1.00 04 178.2	56 59.2 1.00 04 178.1	57 29.1 1.00 04 178.1	57 59.1 1.00 04 178.1	58 29.2 1.00 04 178.1	58 59.2 1.00 04 178.1	59 29.1 1.00 04 178.1	1
2	55 56.9 1.00 06 176.4	56 26.9 1.00 07 176.4	56 56.8 1.00 07 176.3	57 26.8 1.00 07 176.3	57 56.7 1.00 07 176.2	58 26.7 1.00 07 176.2	58 56.6 1.00 07 176.1	59 26.6 1.00 07 176.1	2
3	55 53.0 1.00 09 174.6	56 22.9 1.00 09 174.6	56 52.8 1.00 09 174.5	57 22.7 1.00 09 174.4	57 52.6 1.0 10 174.4	58 22.5 1.0 10 174.3	58 52.4 1.0 10 174.2	59 22.3 1.0 10 174.1	3
4	55 47.6 99 12 172.9	56 17.5 99 12 172.8	56 47.3 99 12 172.7	57 17.1 99 12 172.6	57 46.9 99 12 172.5	58 16.8 99 12 172.4	58 46.6 99 12 172.3	59 16.4 99 13 172.2	4
05	55 40.7 99 14 171.1	56 10.4 99 14 170.9	56 40.2 99 14 170.9	57 09.9 99 15 170.8	57 39.6 99 15 170.6	58 09.4 99 15 170.5	58 39.1 99 15 170.4	59 08.8 99 15 170.2	05
6	55 32.2 99 17 169.4	56 01.9 99 17 169.2	56 31.5 99 17 169.1	57 01.1 99 17 168.9	57 30.8 99 17 168.8	58 00.4 99 18 168.6	58 29.5 98 18 168.5	58 59.5 98 18 168.3	6
7	55 22.3 98 19 167.6	55 51.8 98 19 167.5	56 21.3 98 19 167.3	56 50.8 98 20 167.1	57 20.3 98 20 167.0	57 49.8 98 20 166.8	58 19.2 98 21 166.6	58 48.6 98 21 166.4	7
8	55 10.9 98 21 165.9	55 40.3 98 22 165.7	56 09.6 98 22 165.5	56 39.0 98 22 165.3	57 08.3 98 22 165.1	57 37.6 98 23 164.9	58 06.9 98 23 164.7	58 36.2 98 23 164.5	8
9	54 58.1 97 24 164.2	55 27.3 97 24 164.0	55 56.5 97 24 163.8	56 25.7 97 25 163.6	56 54.8 97 25 163.4	57 23.9 97 25 163.1	57 53.0 97 26 162.9	58 22.1 97 26 162.7	9
10	54 43.8 97 26 162.5	55 12.9 97 26 162.3	55 41.9 97 27 162.1	56 10.9 97 27 161.8	56 39.9 97 27 161.6	57 08.8 96 28 161.4	57 37.7 96 28 161.1	58 06.6 96 28 160.8	10
1	54 28.2 96 28 160.8	54 57.0 96 29 160.6	55 25.8 96 29 160.4	55 54.6 96 30 160.1	56 23.4 96 30 159.8	56 52.1 96 30 159.6	57 20.8 96 30 159.3	57 49.5 96 31 159.0	1
2	54 11.2 96 31 159.2	54 39.8 96 31 158.9	55 08.4 95 31 158.7	55 37.0 95 32 158.4	56 05.6 95 32 158.1	56 34.1 95 32 157.9	57 02.6 95 33 157.6	57 31.0 95 33 157.3	2
3	53 52.8 95 33 157.6	54 21.3 95 33 157.3	54 49.7 95 33 157.0	55 18.0 94 34 156.7	55 46.4 94 34 156.4	56 14.6 94 34 156.1	56 42.9 94 35 155.8	57 11.1 94 35 155.5	3
4	53 33.2 94 35 156.0	54 01.4 94 35 155.7	54 29.6 94 36 155.4	54 57.7 94 35 155.1	55 25.8 94 36 154.8	55 53.9 93 37 154.5	56 21.8 93 37 154.1	56 49.8 93 38 153.8	4
15	53 12.3 93 37 154.4	53 40.3 93 37 154.1	54 08.3 93 38 153.8	54 36.1 93 38 153.5	55 04.0 93 38 153.1	55 31.8 93 39 152.8	55 59.5 92 39 152.5	56 27.2 92 40 152.1	15
6	52 50.2 93 39 152.9	53 18.0 92 39 152.5	53 45.7 92 40 152.2	54 13.3 92 40 151.9	54 40.9 92 40 151.5	55 08.4 92 41 151.2	55 35.9 91 41 150.8	56 03.3 91 42 150.5	6
7	52 26.9 92 41 151.3	52 54.4 92 41 151.0	53 21.9 91 42 150.7	53 49.3 91 42 150.3	54 16.6 91 42 150.0	54 43.9 91 43 149.6	55 11.1 91 43 149.2	55 38.2 90 44 148.9	7
8	52 02.5 91 43 149.8	52 29.8 91 43 149.5	52 56.9 91 43 149.1	53 24.1 90 44 148.8	53 51.1 90 44 148.4	54 18.1 90 45 148.1	54 45.0 90 45 147.7	55 11.9 90 46 147.3	8
9	51 37.0 90 44 148.4	52 04.0 90 45 148.0	52 30.9 90 45 147.7	52 57.7 89 46 147.3	53 24.5 89 46 146.9	53 51.2 89 47 146.5	54 17.9 89 47 146.1	54 44.4 88 48 145.7	9
20	51 10.4 89 46 146.9	51 37.1 89 47 146.6	52 03.7 89 47 146.2	52 30.3 89 47 145.8	52 56.8 88 48 145.4	53 23.3 88 48 145.0	53 49.6 88 49 144.6	54 15.9 87 49 144.2	20
1	50 42.7 88 48 145.5	51 09.2 88 48 145.2	51 35.6 88 49 144.8	52 01.9 88 49 144.4	52 28.1 87 50 144.0	52 54.4 87 50 143.6	53 20.3 87 51 143.2	53 46.3 86 51 142.8	1
2	50 14.1 87 49 144.2	50 40.3 87 50 143.8	51 06.4 87 50 143.4	51 32.4 87 51 143.0	51 58.4 86 51 142.6	52 24.2 86 52 142.2	52 50.0 86 52 141.7	53 15.7 85 53 141.3	2
3	49 44.5 87 51 142.8	50 10.4 86 51 142.4	50 36.2 86 52 142.0	51 02.0 86 52 141.6	51 27.7 85 53 141.2	51 53.2 85 53 140.8	52 18.7 85 54 140.3	52 44.1 84 54 139.9	3
4	49 13.9 86 52 141.5	49 39.6 85 53 141.1	50 05.2 85 53 140.7	50 30.6 85 54 140.3	50 56.0 84 54 139.8	51 21.3 84 55 139.4	51 46.5 84 55 139.0	52 11.6 84 56 138.5	4
25	48 42.5 85 54 140.2	49 07.9 84 54 139.8	49 33.2 84 55 139.4	49 58.4 84 55 138.9	50 23.5 84 56 138.5	50 48.5 83 56 138.1	51 13.4 83 57 137.6	51 38.2 83 57 137.2	25
6	48 10.2 84 55 138.9	48 35.3 84 56 138.5	49 00.4 83 56 138.1	49 25.3 83 57 137.6	49 50.1 83 57 137.2	50 14.9 82 57 136.8	50 39.5 82 58 136.3	51 04.0 82 58 135.9	6
7	47 37.1 83 56 137.7	48 02.0 83 57 137.2	48 26.7 82 57 136.8	48 51.4 82 58 136.4	49 15.9 82 58 135.9	49 40.4 81 59 135.5	50 04.7 81 59 135.1	50 29.0 81 60 134.6	7
8	47 03.2 82 58 136.4	47 27.8 81 58 136.0	47 52.3 81 59 135.6	48 16.7 81 59 135.2	48 41.0 81 60 134.7	49 05.2 80 60 134.2	49 29.2 80 60 133.8	49 53.2 80 61 133.3	8
9	46 28.6 81 59 135.3	46 52.9 81 59 134.8	47 17.1 81 60 134.4	47 41.2 80 60 134.0	48 05.3 80 61 133.5	48 29.2 80 61 133.0	48 53.0 79 62 132.6	49 16.6 79 62 132.1	9
30	45 53.2 80 60 134.1	46 17.3 80 61 133.7	46 41.2 80 61 133.2	47 05.1 79 61 132.8	47 28.8 79 62 132.3	47 52.5 79 62 131.9	48 16.0 78 63 131.4	48 39.4 78 63 130.9	30
1	45 17.1 79 61 132.9	45 40.9 79 62 132.5	46 04.6 79 62 132.1	46 28.2 78 62 131.6	46 51.7 78 63 131.2	47 15.4 78 63 130.7	47 38.3 77 64 130.2	48 01.5 77 64 129.8	1
2	44 40.4 79 62 131.8	45 03.9 78 63 131.4	45 27.4 78 63 130.9	45 50.7 78 64 130.5	46 13.9 77 64 130.0	46 37.1 77 64 129.6	47 00.1 76 65 129.1	47 22.9 76 65 128.6	2
3	44 03.0 78 63 130.7	44 26.3 77 63 130.3	44 49.5 77 64 129.8	45 12.6 77 65 129.4	45 35.6 76 65 128.9	45 58.4 76 65 128.5	46 21.2 76 66 128.0	46 43.8 75 66 127.5	3
4	43 25.0 77 64 129.7	43 48.1 77 65 129.2	44 11.0 76 65 128.8	44 33.8 76 66 128.3	44 56.6 76 66 127.9	45 19.2 75 66 127.4	45 41.7 75 67 126.9	46 04.1 74 67 126.4	4
35	42 46.4 76 65 128.6	43 09.2 76 66 128.2	43 31.9 75 66 127.7	43 54.5 75 66 127.3	44 17.0 75 67 126.8	44 39.4 74 67 126.3	45 01.6 74 68 125.9	45 23.8 74 68 125.4	35
6	42 07.3 75 66 127.6	42 29.9 75 67 127.1	42 52.3 75 67 126.7	43 14.7 74 67 126.2	43 36.9 74 68 125.8	43 59.0 74 68 125.3	44 21.1 73 68 124.8	44 43.0 73 69 124.3	6
7	41 27.6 75 67 126.6	41 49.9 74 67 126.1	42 12.2 74 68 125.7	42 34.3 74 68 125.2	42 56.3 73 69 124.8	43 18.2 73 69 124.3	43 40.0 72 69 123.8	44 01.6 72 70 123.3	7
8	40 47.4 74 68 125.6	41 09.5 74 68 125.1	41 31.5 73 69 124.7	41 53.4 73 69 124.2	42 15.2 72 69 123.8	42 36.9 72 70 123.3	42 58.4 72 70 122.8	43 19.8 71 70 122.3	8
9	40 06.7 73 69 124.6	40 28.6 73 69 124.2	40 50.4 72 69 123.7	41 12.1 72 70 123.3	41 33.6 72 70 122.8	41 55.1 71 70 122.3	42 16.4 71 71 121.9	42 37.6 71 71 121.4	9
40	39 25.6 72 69 123.7	39 47.2 72 70 123.2	40 08.6 72 70 122.8	40 30.2 71 70 122.3	40 51.6 71 71 121.9	41 12.8 71 71 121.4	41 33.9 70 71 120.9	41 54.9 70 72 120.4	40
1	38 43.9 72 70 122.8	39 05.4 71 71 122.3	39 26.7 71 71 121.8	39 48.0 71 71 121.4	40 09.1 70 71 120.9	40 30.1 70 72 120.5	40 51.0 69 72 120.0	41 11.8 69 72 119.5	1
2	38 01.9 71 71 121.8	38 23.1 71 71 121.4	38 44.3 70 71 121.0	39 05.3 70 72 120.5	39 26.2 70 72 120.0	39 47.1 69 72 119.6	40 07.8 69 73 119.1	40 28.4 68 73 118.6	2
3	37 19.4 70 71 120.9	37 40.5 70 72 120.5	38 01.4 70 72 120.0	38 22.3 69 72 119.6	38 43.0 69 73 119.1	39 03.6 69 73 118.7	39 24.1 68 73 118.2	39 44.5 68 74 117.7	3
4	36 36.6 70 72 120.1	36 57.4 69 72 119.6	37 18.2 69 73 119.2	37 38.8 69 73 118.7	37 59.3 68 73 118.3	38 19.8 68 74 117.8	38 40.1 68 74 117.3	39 00.3 67 74 116.8	4
45	35 53.3 69 73 119.2	36 14.0 69 73 118.8	36 34.6 68 73 118.3	36 55.0 68 74 117.9	37 15.4 68 74 117.4	37 35.6 67 74 116.9	37 55.7 67 74 116.5	38 15.7 67 75 116.0	45
6	35 09.8 68 73 118.4	35 30.2 68 74 117.9	35 50.6 68 74 117.5	36 10.9 67 74 117.0	36 31.0 67 74 116.6	36 51.1 67 75 116.1	37 11.0 66 75 115.6	37 30.9 66 75 115.2	6
7	34 25.8 68 74 117.5	34 46.1 67 74 117.1	35 06.3 67 74 116.6	35 26.4 67 75 116.2	35 46.4 66 75 115.7	36 06.3 66 75 115.3	36 26.0 66 76 114.8	36 45.7 65 76 114.3	7
8	33 41.5 67 74 116.7	34 01.7 67 75 116.3	34 21.7 67 75 115.8	34 41.6 66 75 115.4	35 01.4 66 76 114.9	35 21.1 66 76 114.5	35 40.7 65 76 114.0	36 00.2 65 76 113.5	8
9	32 57.0 67 75 115.9	33 16.9 66 75 115.5	33 36.8 66 75 115.0	33 56.5 66 76 114.6	34 16.2 65 76 114.1	34 35.7 65 76 113.7	34 55.1 65 77 113.2	35 14.5 64 77 112.7	9
50	32 12.1 66 75 115.1	32 31.9 66 76 114.7	32 51.5 65 76 114.2	33 11.1 65 76 113.8	33 30.6 65 76 113.3	33 50.0 64 77 112.9	34 09.3 64 77 112.4	34 28.5 64 77 112.0	50
1	31 26.9 66 76 114.4	31 46.5 65 76 113.9	32 06.0 65 77 113.5	32 25.5 65 77 113.0	32 44.8 64 77 112.6	33 04.0 64 77 112.1	33 23.2 64 77 111.6	33 42.2 63 78 111.2	1
2	30 41.5 65 76 113.6	31 00.9 65 76 113.2	31 20.3 64 77 112.7	31 39.6 64 77 112.3	31 58.8 64 77 111.8	32 17.8 63 78 111.4	32 36.8 63 78 110.9	32 55.7 63 78 110.4	2
3	29 55.7 65 77 112.8	30 15.1 64 77 112.4	30 34.3 64 77 112.0	30 53.4 64 77 111.5	31 12.4 63 78 111.1	31 31.4 63 78 110.6	31 50.2 63 78 110.2	32 09.0 62 78 109.7	3
4	29 09.8 64 77 112.1	29 28.9 64 77 111.7	29 48.0 63 78 111.2	30 07.0 63 78 110.8	30 25.9 63 78 110.3	30 44.7 63 78 109.9	31 03.4 62 78 109.4	31 22.0 62 79 109.0	4
55	28 23.6 64 77 111.4	28 42.6 63 78 110.9	29 01.5 63 78 110.5	29 20.4 63 78 110.1	29 39.2 62 78 109.6	29 57.8 62 78 109.2	30 16.4 62 79 108.7	30 34.9 61 79 108.2	55
6	27 37.1 63 78 110.7	27 56.0 63 78 110.2	28 14.6 63 78 109.8	28 33.6 62 78 109.3	28 52.2 62 79 108.9	29 10.8 62 79 108.4	29 29.2 61 79 108.0	29 47.6 61 79 107.5	6
7	26 50.5 63 78 110.0	27 09.3 62 78 109.5	27 27.9 62 79 109.1	27 46.5 62 79 108.6	28 05.0 62 79 108.2	28 23.5 61 79 107.7	28 41.8 61 79 107.3	29 00.0 61 80 106.8	7
8	26 03.6 62 78 109.3	26 22.3 62 79 108.8	26 40.8 62 79 108.4	26 59.3 61 79 107.9	27 17.7 61 79 107.5	27 36.0 61 79 107.1	27 54.2 61 80 106.6	28 12.4 60 80 106.2	8
9	25 16.6 62 79 108.6	25 35.1 62 79 108.1	25 53.5 61 79 107.7	26 11.9 61 79 107.3	26 30.2 61 80 106.8	26 48.4 61 80 106.4	27 06.5 60 80 105.9	27 24.5 60 80 105.5	9
60	24 29.3 61 79 107.9	24 47.7 61 79 107.5	25 06.1 61 79 107.0	25 24.3 61 80 106.6	25 42.5 60 80 106.1	26 00.6 60 80 105.7	26 18.6 60 80 105.3	26 36.5 60 80 104.8	60
1	23 41.9 61 79 107.2	24 00.2 61 80 106.8	24 18.4 60 80 106.4	24 36.5 60 80 105.9	24 54.6 60 80 105.5	25 12.6 60 80 105.0	25 30.5 59 81 104.6	25 48.3 59 81 104.1	1
2	22 54.3 61 80 106.6	23 12.5 60 80 106.1	23 30.6 60 80 105.7	23 48.6 60 80 105.3	24 06.6 60 80 104.8	24 24.5 59 81 104.4	24 42.3 59 81 103.9	25 00.0 59 81 103.5	2
3	22 06.6 60 80 105.9	22 24.6 60 80 105.5	22 42.6 60 80 105.0	23 00.6 60 80 104.6	23 18.4 59 80 104.2	23 36.2 59 81 103.7	23 53.9 59 81 103.3	24 11.6 59 81 102.8	3
4	21 18.6 60 80 105.3	21 36.6 60 80 104.8	21 54.5 60 80 104.4	22 12.4 59 81 104.0	22 30.1 59 81 103.5	22 47.8 59 81 103.1	23 05.5 59 81 102.6	23 23.0 58 81 102.2	4
65	20 30.6 60 80 104.6	20 48.5 60 80 104.2	21 06.3 59 81 103.8	21 24.0 59 81 103.3	21 41.7 59 81 102.9	21 59.3 59 81 102.5	22 16.9 58 81 102.0	22 34.3 58 81 101.6	65
6	19 42.4 59 81 104.0	20 00.2 59 81 103.6	20 17.9 59 81 103.1	20 35.6 59 81 102.7	20 53.2 59 81 102.3	21 10.7 58 81 101.8	21 28.2 58 81 101.4	21 45.6 58 81 100.9	6
7	18 54.0 59 81 103.4	19 11.8 59 81 102.9	19 29.4 59 81 102.5	19 47.0 59 81 102.1	20 04.5 59 81 101.6	20 22.0 58 81 101.2	20 39.3 58 82 100.8	20 56.7 58 82 100.3	7
8	18 05.4 59 81 102.7	18 23.2 59 81 102.3	18 40.8 58 81 101.9	18 58.3 58 81 101.4	19 15.7 58 81 101.0	19 33.1 58 82 100.6	19 50.4 58 82 100.2	20 07.7 57 82 99.7	8
9	17 17.0 59 81 102.1	17 34.6 58 81 101.7	17 52.0 58 81 101.3	18 09.5 58 82 100.8	18 26.8 58 82 100.4	18 44.2 58 82 100.0	19 01.4 57 82 99.5	19 18.6 57 82 99.1	9
70	16 28.3 58 81 101.5	16 45.8 58 81 101.1	17 03.2 58 82 100.7	17 20.6 58 82 100.2	17 37.9 58 82 99.8	17 55.1 57 82 99.4	18 12.3 57 82 98.9	18 29.5 57 82 98.5	70
1	15 39.5 58 82 100.9	15 56.9 58 82 100.5	16 14.3 58 82 100.1	16 31.6 58 82 99.6	16 48.8 57 82 99.2	17 06.0 57 82 98.8	17 23.1 57 82 98.3	17 40.2 57 82 97.9	1
2	14 50.6 58 82 100.3	15 08.0 58 82 99.9	15 25.3 58 82 99.5	15 42.5 57 82 99.0	15 59.7 57 82 98.6	16 16.8 57 82 98.2	16 33.9 57 82 97.7	16 50.9 57 82 97.3	2
3	14 01.6 58 82 99.7	14 18.9 57 82 99.3	14 36.1 57 82 98.9	14 53.3 57 82 98.4	15 10.5 57 82 98.0	15 27.5 57 82 97.6	15 44.6 57 82 97.2	16 01.6 57 82 96.7	3
4	13 12.6 57 82 99.1	13 29.8 57 82 98.7	13 47.0 57 82 98.3	14 04.1 57 82 97.8	14 21.2 57 82 97.4	14 38.2 57 82 97.0	14 55.2 57 82 96.6	15 12.1 56 82 96.1	4
75	12 23.4 57 82 98.5	12 40.6 57 82 98.1	12 57.7 57 82 97.7	13 14.8 57 82 97.3	13 31.8 57 82 96.8	13 48.8 57 82 96.4	14 05.7 56 82 96.0	14 22.6 56 83 95.6	75
6	11 34.2 57 82 97.9	11 51.3 57 82 97.5	12 08.4 57 82 97.1	12 25.4 57 82 96.7	12 42.4 57 82 96.3	12 59.3 56 82 95.8	13 16.2 56 83 95.4	13 33.1 56 83 95.0	6
7	10 44.9 57 82 97.4	11 01.9 57 82 96.9	11 19.0 57 82 96.5	11 36.0 57 82 96.1	11 52.9 56 83 95.7	12 09.8 56 83 95.3	12 26.7 56 83 94.8	12 43.5 56 83 94.4	7
8	9 55.5 57 82 96.8	10 12.5 57 82 96.4	10 29.5 57 82 96.0	10 46.5 56 83 95.5	11 03.4 56 83 95.1	11 20.3 56 83 94.7	11 37.1 56 83 94.3	11 53.9 56 83 93.8	8
9	9 06.1 57 82 96.2	9 23.1 57 82 95.8	9 40.0 56 83 95.4	9 56.9 56 83 94.9	10 13.8 56 83 94.5	10 30.7 56 83 94.1	10 47.5 56 83 93.7	11 04.3 56 83 93.3	9
80	8 16.6 57 83 95.6	8 33.6 56 83 95.2	8 50.5 56 83 94.8	9 07.4 56 83 94.4	9 24.2 56 83 94.0	9 41.0 56 83 93.5	9 57.8 56 83 93.1	10 14.6 56 83 92.7	80
1	7 27.1 56 83 95.1	7 44.0 56 83 94.6	8 00.9 56 83 94.2	8 17.7 56 83 93.8	8 34.6 56 83 93.4	8 51.4 56 83 93.0	9 08.2 56 83 92.6	9 24.9 56 83 92.1	1
2	6 37.5 56 83 94.5	6 54.4 56 83 94.1	7 11.3 56 83 93.7	7 28.1 56 83 93.2	7 44.9 56 83 92.8	8 01.7 56 83 92.4	8 18.5 56 83 92.0	8 35.2 56 83 91.6	2
3	5 47.9 56 83 93.9	6 04.8 56 83 93.5	6 21.6 56 83 93.1	6 38.4 56 83 92.7	6 55.2 56 83 92.3	7 12.0 56 83 91.8	7 28.7 56 83 91.4	7 45.5 56 83 91.0	3
4		5 15.1 56 83 92.9	5 31.9 56 83 92.5	5 48.7 56 83 92.1	6 05.5 56 83 91.7	6 22.3 56 83 91.3	6 39.0 56 83 90.9	6 55.7 56 83 90.4	4
85					5 15.8 56 83 91.1	5 32.5 56 83 90.7	5 49.3 56 83 90.3	6 06.0 56 83 89.9	85
6								5 16.2 56 83 89.3	6

Lat. 34°

H.A.	0° 00' (Alt Δd Δt Az)	0° 30'	1° 00'	1° 30'	2° 00'	2° 30'	3° 00'	3° 30'	H.A.
00	56 00.0 1.00 01 180.0	55 30.0 1.00 01 180.0	55 00.0 1.00 01 180.0	54 30.0 1.00 01 180.0	54 00.0 1.00 01 180.0	53 30.0 1.00 01 180.0	53 00.0 1.00 01 180.0	52 30.0 1.00 01 180.0	00
1	55 59.2 1.00 04 178.2	55 29.2 1.00 04 178.2	54 59.2 1.00 06 178.3	54 29.2 1.00 04 178.3	53 59.3 1.00 04 178.3	53 29.3 1.00 04 178.3	52 59.3 1.00 04 178.3	52 29.3 1.00 04 178.4	1
2	55 56.9 1.00 06 176.4	55 26.9 1.00 06 176.5	54 57.0 1.00 06 176.5	54 27.0 1.00 06 176.6	53 57.0 1.00 06 176.6	53 27.1 1.00 06 176.6	52 57.1 1.00 06 176.6	52 27.2 1.00 06 176.7	2
3	55 53.0 1.00 09 174.6	55 23.1 1.00 09 174.7	54 53.1 1.00 09 174.8	54 23.3 1.00 09 174.8	53 53.4 1.00 09 174.9	53 23.4 1.00 08 175.0	52 53.5 1.00 08 175.0	52 23.6 1.00 08 175.1	3
4	55 47.6 99 12 172.9	55 17.8 99 11 173.0	54 47.9 99 11 173.1	54 18.1 1.00 11 173.1	53 48.2 1.00 11 173.2	53 18.4 1.00 11 173.3	52 48.5 1.00 11 173.4	52 18.6 1.00 11 173.5	4
05	55 40.7 99 14 171.1	55 10.9 99 14 171.2	54 41.2 99 14 171.3	54 11.4 99 14 171.4	53 41.6 99 13 171.5	53 11.8 99 13 171.6	52 42.1 99 13 171.7	52 12.3 99 13 171.8	05
6	55 32.2 99 17 169.4	55 02.6 99 16 169.5	54 32.9 99 16 169.7	54 03.3 99 16 169.7	53 33.6 99 16 170.0	53 03.9 99 16 170.0	52 34.2 99 15 170.1	52 04.5 99 15 170.2	6
7	55 22.3 99 19 167.6	54 52.8 99 18 167.8	54 23.2 99 18 167.9	53 53.7 99 18 168.1	53 24.1 99 18 168.2	52 54.6 99 18 168.4	52 25.0 99 18 168.5	51 55.4 99 18 168.6	7
8	55 10.9 98 21 165.9	54 41.5 98 21 166.1	54 12.1 98 21 166.2	53 42.7 98 21 166.4	53 13.3 98 20 166.6	52 43.8 98 20 166.7	52 14.4 98 20 166.9	51 44.9 98 20 167.0	8
9	54 58.1 97 24 164.2	54 28.8 97 23 164.4	53 59.6 98 23 164.6	53 30.3 98 23 164.8	53 01.0 98 23 164.9	52 31.7 98 22 165.1	52 02.4 98 22 165.3	51 33.1 98 22 165.5	9
10	54 43.8 97 26 162.5	54 14.8 97 26 162.7	53 45.7 97 25 162.9	53 16.6 97 25 163.1	52 47.4 97 25 163.3	52 18.3 97 25 163.5	51 49.1 97 24 163.7	51 19.9 97 24 163.9	10
1	54 28.2 96 28 160.8	53 59.3 96 28 161.1	53 30.4 96 28 161.3	53 01.4 96 27 161.5	52 32.5 97 27 161.7	52 03.5 97 27 161.9	51 34.5 97 26 162.1	51 05.5 97 26 162.3	1
2	54 11.2 96 31 159.2	53 42.5 96 30 159.4	53 13.8 96 30 159.7	52 45.0 96 30 159.9	52 16.2 96 29 160.2	51 47.4 96 29 160.4	51 18.6 96 29 160.6	50 49.8 96 28 160.8	2
3	53 52.8 95 33 157.6	53 24.4 95 32 157.8	52 55.8 95 32 158.1	52 27.3 95 32 158.3	51 58.7 95 31 158.6	51 30.1 95 31 158.8	51 01.5 96 31 159.1	50 32.8 96 30 159.3	3
4	53 33.2 94 35 156.0	53 05.0 94 34 156.3	52 36.7 94 34 156.5	52 08.3 95 34 156.8	51 39.9 95 33 157.1	51 11.5 95 33 157.3	50 43.1 95 33 157.6	50 14.6 95 32 157.8	4
15	53 12.3 93 37 154.4	52 44.3 93 38 154.6	52 16.2 93 36 155.0	51 48.1 94 36 155.3	51 20.0 94 35 155.5	50 51.8 94 35 155.8	50 23.5 94 35 156.1	49 55.3 94 36 156.3	15
6	52 50.2 93 39 152.9	52 22.4 93 38 153.2	51 54.6 93 38 153.5	51 26.7 93 38 153.8	50 58.8 93 37 154.1	50 30.8 93 37 154.3	50 02.8 93 36 154.6	49 34.7 94 36 154.9	6
7	52 26.9 92 41 151.3	51 59.4 92 40 151.7	51 31.8 92 40 152.0	51 04.1 92 39 152.3	50 36.4 92 39 152.6	50 08.7 93 39 152.9	49 40.9 93 38 153.2	49 13.1 93 38 153.5	7
8	52 02.5 91 43 149.8	51 35.2 91 42 150.2	51 07.9 91 42 150.5	50 40.4 91 41 150.8	50 13.0 92 41 151.1	49 45.5 92 41 151.5	49 17.9 92 40 151.8	48 50.3 92 40 152.1	8
9	51 37.0 90 44 148.4	51 09.9 90 44 148.7	50 42.8 90 44 149.1	50 15.7 91 43 149.4	49 48.4 91 43 149.7	49 21.2 91 42 150.0	48 53.8 91 42 150.4	48 26.4 91 41 150.7	9
20	51 10.4 89 46 146.9	50 43.6 89 46 147.3	50 16.7 90 45 147.6	49 49.8 90 45 148.0	49 22.8 90 44 148.3	48 55.3 90 44 148.7	48 28.7 90 44 149.0	48 01.6 91 43 149.3	20
1	50 42.7 88 48 145.5	50 16.2 89 47 145.9	49 49.6 89 47 146.3	49 22.9 89 46 146.6	48 56.2 89 46 147.0	48 29.4 89 46 147.3	48 02.6 90 45 147.6	47 35.7 90 45 148.0	1
2	50 14.1 87 49 144.2	49 47.8 88 49 144.5	49 21.5 88 48 144.9	48 55.1 88 48 145.3	48 28.6 88 48 145.6	48 02.1 89 47 146.0	47 35.5 89 47 146.3	47 08.8 89 46 146.6	2
3	49 44.5 87 51 142.8	49 18.5 87 50 143.2	48 52.4 87 50 143.6	48 26.3 87 50 143.9	48 00.0 88 49 144.3	47 33.8 88 49 144.7	47 07.4 88 48 145.0	46 41.0 88 48 145.4	3
4	49 13.9 86 52 141.5	48 48.2 86 52 141.9	48 22.4 86 52 142.3	47 56.5 86 51 142.6	47 30.6 87 51 143.0	47 04.5 87 50 143.4	46 38.4 87 50 143.7	46 12.3 87 49 144.1	4
25	48 42.5 85 54 140.2	48 17.1 85 53 140.6	47 51.5 85 53 141.0	47 25.9 85 52 141.4	47 00.2 86 52 141.7	46 34.4 86 52 142.1	46 08.6 86 51 142.5	45 42.6 87 51 142.8	25
6	48 10.2 84 55 138.9	47 45.0 84 55 139.3	47 19.8 84 54 139.7	46 54.4 85 54 140.1	46 29.0 85 53 140.5	46 03.4 85 53 140.9	45 37.8 85 53 141.2	45 12.2 86 52 141.6	6
7	47 37.1 83 56 137.7	47 12.2 83 56 138.1	46 47.2 84 56 138.5	46 22.1 84 55 138.9	45 56.9 84 55 139.3	45 31.6 84 54 139.7	45 06.3 85 54 140.0	44 40.9 85 54 140.4	7
8	47 03.2 82 58 136.4	46 38.6 82 57 136.9	46 13.8 83 57 137.3	45 49.0 83 56 137.7	45 24.0 83 56 138.1	44 59.0 83 56 138.5	44 33.9 84 55 138.8	44 08.8 84 55 139.2	8
9	46 28.6 81 59 135.1	46 04.2 82 59 135.6	45 39.7 82 58 136.1	45 15.1 82 58 136.5	44 50.4 82 57 136.9	44 25.7 83 57 137.3	44 00.8 83 56 137.7	43 35.9 83 56 138.1	9
30	45 53.2 80 60 134.1	45 29.1 81 60 134.5	45 04.8 81 59 134.9	44 40.5 81 59 135.3	44 16.1 82 58 135.7	43 51.6 82 58 136.1	43 27.0 82 58 136.5	43 02.3 82 57 136.9	30
1	45 17.1 79 61 132.9	44 53.2 80 61 133.4	44 29.3 80 60 133.8	44 05.2 80 60 134.2	43 41.0 81 60 134.6	43 16.8 81 59 135.0	42 52.4 81 59 135.4	42 28.0 82 58 135.8	1
2	44 40.4 79 62 131.8	44 16.8 79 62 132.3	43 53.0 79 61 132.7	43 29.2 80 61 133.1	43 05.3 80 61 133.5	42 41.3 80 60 133.9	42 17.2 80 60 134.3	41 53.0 81 59 134.7	2
3	44 03.0 78 63 130.7	43 39.6 78 63 131.2	43 16.1 79 62 131.6	42 52.6 79 62 132.0	42 28.9 79 62 132.4	42 05.1 79 61 132.8	41 41.3 80 61 133.3	41 17.3 80 60 133.7	3
4	43 25.0 77 64 129.7	43 01.9 77 64 130.1	42 38.6 78 64 130.5	42 15.3 78 63 131.0	41 51.9 78 63 131.4	41 28.3 79 62 131.8	41 04.7 79 62 132.2	40 41.0 79 62 132.6	4
35	42 46.4 76 65 128.6	42 23.5 77 65 129.1	42 00.5 77 64 129.5	41 37.4 77 64 129.9	41 14.2 77 64 130.3	40 50.9 78 63 130.8	40 27.6 78 63 131.2	40 04.1 78 63 131.6	35
6	42 07.3 75 66 127.6	41 44.6 76 66 128.0	41 21.9 76 65 128.5	40 59.0 76 65 128.9	40 36.0 77 65 129.3	40 13.0 77 64 129.7	39 49.8 77 64 130.2	39 26.6 78 63 130.6	6
7	41 27.6 75 67 126.6	41 05.2 75 67 127.0	40 42.6 75 66 127.5	40 20.0 76 66 127.9	39 57.3 76 65 128.3	39 34.5 76 65 128.7	39 11.5 77 65 129.2	38 48.5 77 64 129.6	7
8	40 47.4 74 68 125.6	40 25.2 74 67 126.0	40 02.9 75 67 126.5	39 40.4 75 67 126.9	39 18.0 75 66 127.3	38 55.4 75 66 127.8	38 32.7 76 66 128.2	38 09.9 76 65 128.6	8
9	40 06.7 73 69 124.6	39 44.7 73 68 125.1	39 22.6 74 68 125.5	39 00.5 74 68 125.9	38 38.2 74 67 126.4	38 15.8 75 67 126.8	37 53.3 75 66 127.2	37 30.8 75 66 127.6	9
40	39 25.6 72 69 123.7	39 03.8 73 69 124.1	38 41.9 73 69 124.6	38 19.9 73 68 125.0	37 57.9 74 68 125.4	37 35.7 74 68 125.9	37 13.5 74 67 126.3	36 51.2 75 67 126.7	40
1	38 43.9 72 70 122.8	38 22.4 72 70 123.2	38 00.7 72 69 123.6	37 39.0 73 69 124.1	37 17.1 73 69 124.5	36 55.2 73 68 124.9	36 33.2 74 68 125.4	36 11.0 74 68 125.8	1
2	38 01.9 71 71 121.8	37 40.5 71 70 122.3	37 19.1 72 70 122.7	36 57.6 72 70 123.2	36 35.9 72 69 123.6	36 14.2 73 69 124.0	35 52.4 73 68 124.4	35 30.4 73 68 124.9	2
3	37 19.4 71 71 120.9	36 58.3 71 71 121.4	36 37.0 71 71 121.8	36 15.7 71 70 122.3	35 54.3 72 70 122.7	35 32.7 72 70 123.1	35 11.1 72 69 123.6	34 49.4 73 69 124.0	3
4	36 36.6 70 72 120.1	36 15.6 70 72 120.5	35 54.6 70 71 121.0	35 33.4 71 71 121.4	35 12.1 71 71 121.8	34 50.9 71 70 122.3	34 29.5 72 70 122.7	34 08.0 72 70 123.1	4
45	35 53.3 69 73 119.2	35 32.6 69 72 119.7	35 11.7 70 72 120.1	34 50.8 70 72 120.5	34 29.7 70 71 121.0	34 08.6 71 71 121.4	33 47.4 71 71 121.8	33 26.1 71 70 122.2	45
6	35 09.8 68 73 118.4	34 49.2 69 73 118.8	34 28.5 69 73 119.3	34 07.6 69 72 119.7	33 46.9 70 72 120.1	33 26.0 70 72 120.6	33 04.9 70 71 121.0	32 43.8 71 71 121.4	6
7	34 25.8 68 74 117.5	34 05.4 68 74 118.0	33 44.9 68 73 118.4	33 24.4 69 73 118.9	33 03.7 69 73 119.3	32 42.9 69 72 119.7	32 22.1 70 72 120.2	32 01.2 70 72 120.6	7
8	33 41.5 67 74 116.7	33 21.3 68 74 117.2	33 01.0 68 74 117.6	32 40.6 68 73 118.0	32 20.2 68 73 118.5	31 59.6 69 73 118.9	31 38.9 69 72 119.3	31 18.2 69 72 119.8	8
9	32 57.0 67 75 115.9	32 36.9 67 75 116.4	32 16.8 67 74 116.8	31 56.6 68 74 117.2	31 36.3 68 74 117.7	31 15.9 68 73 118.1	30 55.4 68 73 118.5	30 34.8 69 73 119.0	9
50	32 12.1 66 75 115.1	31 52.2 66 75 115.6	31 32.2 67 75 116.0	31 12.2 67 74 116.5	30 52.1 67 74 116.9	30 31.8 68 74 117.3	30 11.5 68 74 117.7	29 51.1 68 73 118.2	50
1	31 26.9 66 76 114.4	31 07.2 66 76 114.8	30 47.4 66 75 115.2	30 27.5 66 75 115.7	30 07.5 67 75 116.1	29 47.5 67 74 116.5	29 27.3 67 74 117.0	29 07.1 68 74 117.4	1
2	30 41.5 65 76 113.6	30 21.9 65 76 114.0	30 02.3 66 76 114.5	29 42.5 66 75 114.9	29 22.7 66 75 115.3	29 02.8 66 75 115.8	28 42.9 67 74 116.2	28 22.8 67 74 116.6	2
3	29 55.7 65 77 112.8	29 36.3 65 76 113.3	29 16.9 65 76 113.7	28 57.3 65 76 114.2	28 37.6 66 76 114.6	28 17.9 66 75 115.0	27 58.1 66 75 115.4	27 38.2 67 75 115.9	3
4	29 09.8 64 77 112.1	28 50.5 64 77 112.5	28 31.2 65 77 113.0	28 11.8 65 76 113.4	27 52.3 65 76 113.8	27 32.7 65 76 114.3	27 13.0 66 76 114.7	26 53.3 66 75 115.1	4
55	28 23.6 64 77 111.4	28 04.5 64 77 111.8	27 45.3 64 77 112.3	27 26.0 64 77 112.7	27 06.6 65 76 113.1	26 47.2 65 76 113.5	26 27.7 65 76 114.0	26 08.1 65 76 114.4	55
6	27 37.1 63 78 110.7	27 18.2 63 78 111.1	26 59.1 64 77 111.5	26 40.0 64 77 112.0	26 20.8 64 77 112.4	26 01.5 64 77 112.8	25 42.1 65 76 113.2	25 22.7 65 76 113.7	6
7	26 50.5 63 78 110.0	26 31.7 63 78 110.4	26 12.7 63 77 110.8	25 53.7 63 77 111.3	25 34.7 64 77 111.7	25 15.5 64 77 112.1	24 56.3 64 77 112.5	24 37.0 64 77 113.0	7
8	26 03.6 62 78 109.3	25 44.9 63 78 109.7	25 26.1 63 78 110.1	25 07.3 63 77 110.6	24 48.3 63 77 111.0	24 29.3 63 77 111.4	24 10.2 64 77 111.8	23 51.1 64 77 112.3	8
9	25 16.6 62 79 108.6	24 58.0 62 79 109.0	24 39.3 62 78 109.4	24 20.6 63 78 109.9	24 01.8 63 78 110.3	23 42.9 63 78 110.7	23 24.0 63 78 111.1	23 04.9 64 77 111.6	9
60	24 29.3 61 79 107.9	24 10.9 61 79 108.3	23 52.3 62 79 108.8	23 33.7 62 78 109.2	23 15.0 62 78 109.6	22 56.3 62 78 110.0	22 37.5 63 78 110.5	22 18.6 63 78 110.9	60
1	23 41.9 61 79 107.2	23 23.6 61 79 107.7	23 05.1 61 79 108.1	22 46.6 61 79 108.5	22 28.1 62 79 108.9	22 09.4 62 78 109.4	21 50.7 62 78 109.8	21 32.0 62 78 110.2	1
2	22 54.3 61 80 106.6	22 36.1 61 79 107.0	22 17.8 61 79 107.4	21 59.4 61 79 107.8	21 40.9 61 79 108.3	21 22.4 62 79 108.7	21 03.8 62 78 109.1	20 45.2 62 78 109.5	2
3	22 06.6 60 80 105.9	21 48.4 61 80 106.3	21 30.2 61 80 106.8	21 11.9 61 79 107.2	20 53.6 61 79 107.6	20 35.2 61 79 108.0	20 16.7 62 79 108.5	19 58.2 62 79 108.9	3
4	21 18.6 60 80 105.3	21 00.6 60 80 105.7	20 42.5 60 80 106.1	20 24.3 61 80 106.5	20 06.1 61 79 107.0	19 47.8 61 79 107.4	19 29.5 61 79 107.8	19 11.1 61 79 108.2	4
65	20 30.6 60 80 104.6	20 12.6 60 80 105.0	19 54.6 60 80 105.5	19 36.6 60 80 105.9	19 18.4 61 80 106.3	19 00.3 61 80 106.7	18 42.0 61 79 107.2	18 23.7 61 79 107.6	65
6	19 42.4 59 81 104.0	19 24.5 60 80 104.4	19 06.6 60 80 104.8	18 48.7 60 80 105.3	18 30.6 60 80 105.7	18 12.6 60 80 106.1	17 54.4 61 80 106.5	17 36.2 61 79 106.9	6
7	18 54.0 59 81 103.4	18 36.3 59 81 103.8	18 18.5 59 80 104.2	18 00.6 60 80 104.6	17 42.7 60 80 105.0	17 24.7 60 80 105.5	17 06.6 60 80 105.9	16 48.6 60 80 106.3	7
8	18 05.6 59 81 102.7	17 47.9 59 81 103.2	17 30.2 59 81 103.6	17 12.4 59 81 104.0	16 54.6 60 80 104.4	16 36.7 60 80 104.8	16 18.7 60 80 105.3	16 00.7 60 80 105.7	8
9	17 17.0 58 81 102.1	16 59.4 59 81 102.5	16 41.8 59 81 103.0	16 24.1 59 81 103.4	16 06.3 59 81 103.8	15 48.5 60 81 104.2	15 30.7 60 80 104.6	15 12.8 60 80 105.1	9
70	16 28.3 58 81 101.5	16 10.8 58 81 101.9	15 53.2 59 81 102.3	15 35.6 59 81 102.8	15 18.0 59 81 103.2	15 00.2 59 81 103.6	14 42.5 59 81 104.0	14 24.7 60 80 104.4	70
1	15 39.5 58 82 100.9	15 22.1 58 81 101.3	15 04.6 58 81 101.7	14 47.0 59 81 102.2	14 29.5 59 81 102.6	14 11.8 59 81 103.0	13 54.2 59 81 103.4	13 36.4 59 81 103.8	1
2	14 50.6 58 82 100.3	14 33.3 58 82 100.7	14 15.8 58 81 101.1	13 58.4 58 81 101.6	13 40.9 58 81 102.0	13 23.3 59 81 102.4	13 05.7 59 81 102.8	12 48.1 59 81 103.2	2
3	14 01.6 58 82 99.7	13 44.3 58 82 100.1	13 27.0 58 82 100.5	13 09.6 58 81 101.0	12 52.1 58 81 101.4	12 34.7 58 81 101.8	12 17.2 59 81 102.2	11 59.6 59 81 102.6	3
4	13 12.6 57 82 99.1	12 55.3 58 82 99.5	12 38.0 58 82 99.9	12 20.7 58 82 100.3	12 03.3 58 82 100.8	11 45.9 58 81 101.2	11 28.5 58 81 101.6	11 11.0 58 81 102.0	4
75	12 23.4 57 82 98.5	12 06.2 57 82 98.9	11 49.0 58 82 99.4	11 31.7 58 82 99.8	11 14.4 58 82 100.2	10 57.1 58 82 100.6	10 39.7 58 81 101.0	10 22.3 58 81 101.4	75
6	11 34.2 57 82 97.9	11 17.0 57 82 98.4	10 59.9 57 82 98.8	10 42.7 57 82 99.2	10 25.4 58 82 99.6	10 08.1 58 82 100.0	9 50.8 58 82 100.4	9 33.5 58 82 100.9	6
7	10 44.9 57 82 97.4	10 27.8 57 82 97.8	10 10.7 57 82 98.2	9 53.5 57 82 98.6	9 36.3 57 82 99.0	9 19.1 57 82 99.4	9 01.9 58 82 99.9	8 44.6 58 82 100.3	7
8	9 55.5 57 82 96.8	9 38.5 57 82 97.2	9 21.4 57 82 97.6	9 04.3 57 82 98.0	8 47.2 57 82 98.4	8 30.0 57 82 98.9	8 12.8 57 82 99.3	7 55.6 57 82 99.7	8
9	9 06.1 57 82 96.2	8 49.1 57 82 96.6	8 32.1 57 82 97.0	8 15.0 57 82 97.5	7 57.9 57 82 97.9	7 40.8 57 82 98.3	7 23.7 57 82 98.7	7 06.5 57 82 99.1	9
80	8 16.6 57 83 95.6	7 59.7 57 82 96.0	7 42.7 57 82 96.5	7 25.7 57 82 96.9	7 08.6 57 82 97.3	6 51.6 57 82 97.7	6 34.5 57 82 98.1	6 17.4 57 82 98.5	80
1	7 27.1 56 83 95.1	7 10.2 56 83 95.5	6 53.2 57 82 95.9	6 36.2 57 82 96.3	6 19.2 57 82 96.7	6 02.2 57 82 97.1	5 45.2 57 82 97.6	5 28.2 57 82 98.0	1
2	6 37.5 56 83 94.5	6 20.6 56 83 94.9	6 03.7 56 83 95.3	5 46.8 56 83 95.7	5 29.8 57 82 96.2	5 12.8 57 82 96.6			2
3	5 47.9 56 83 93.9	5 31.1 56 83 94.3	5 14.2 56 83 94.8						3

Right-hand latitude markings: Lat. 34° (upper), Lat. 34°, Lat. 35°, Lat. 36°, Lat. 37°, Lat. 38°

Lat. 34°

H.A.	4° 00' Alt.	Δd Δt	Az.	4° 30' Alt.	Δd Δt	Az.	5° 00' Alt.	Δd Δt	Az.	5° 30' Alt.	Δd Δt	Az.	6° 00' Alt.	Δd Δt	Az.	6° 30' Alt.	Δd Δt	Az.	7° 00' Alt.	Δd Δt	Az.	7° 30' Alt.	Δd Δt	Az.	H.A.
00	60 00.0	1.0 01	180.0	60 30.0	1.0 01	180.0	61 00.0	1.0 02	180.0	61 30.0	1.0 02	180.0	62 00.0	1.0 02	180.0	62 30.0	1.0 02	180.0	63 00.0	1.0 02	180.0	63 30.0	1.0 02	180.0	00
1	59 59.1	1.0 04	178.0	60 29.1	1.0 04	178.0	60 59.1	1.0 04	177.9	61 29.1	1.0 05	177.9	61 59.1	1.0 05	177.9	62 29.1	1.0 05	177.8	62 59.1	1.0 05	177.8	63 29.0	1.0 05	177.8	1
2	59 56.5	1.0 07	176.0	60 26.5	1.0 07	176.0	60 56.4	1.0 07	175.9	61 26.4	1.0 07	175.8	61 56.3	1.0 08	175.8	62 26.3	1.0 08	175.7	62 56.2	1.0 08	175.6	63 26.1	1.0 08	175.6	2
3	59 52.2	1.0 10	174.0	60 22.1	1.0 10	173.9	60 52.0	1.0 10	173.9	61 21.9	1.0 10	173.8	61 51.7	1.0 11	173.7	62 21.6	1.0 11	173.6	62 51.5	1.0 11	173.5	63 21.3	1.0 11	173.4	3
4	59 46.2	99 13	172.1	60 16.0	99 13	171.9	60 45.8	99 13	171.8	61 15.6	99 13	171.7	61 45.4	99 14	171.6	62 15.1	99 14	171.4	62 44.9	99 14	171.3	63 14.6	99 14	171.2	4
05	59 38.5	99 16	170.1	60 08.2	99 16	170.0	60 37.8	99 16	169.8	61 07.5	99 16	169.7	61 37.2	99 17	169.5	62 06.8	99 17	169.3	62 36.4	99 17	169.2	63 06.1	99 17	169.0	05
6	59 29.1	99 18	168.1	59 58.6	99 18	168.0	60 28.2	98 19	167.8	60 57.7	98 19	167.6	61 27.2	98 19	167.4	61 56.7	98 20	167.2	62 26.2	98 20	167.0	62 55.7	98 20	166.9	6
7	59 18.1	98 21	166.2	59 47.5	98 21	166.0	60 16.8	98 22	165.8	60 46.2	98 22	165.6	61 15.5	98 22	165.4	61 44.9	98 23	165.2	62 14.2	98 23	164.9	62 43.4	98 23	164.7	7
8	59 05.4	97 24	164.3	59 34.6	97 24	164.1	60 03.8	97 24	163.9	60 33.0	97 25	163.6	61 02.2	97 25	163.4	61 31.3	97 25	163.1	62 00.4	97 26	162.9	62 29.4	97 26	162.6	8
9	58 51.2	97 26	162.4	59 20.2	97 27	162.2	59 49.2	97 27	161.9	60 18.2	97 27	161.7	60 47.1	96 28	161.4	61 16.0	96 28	161.1	61 44.9	96 29	160.9	62 13.7	96 29	160.6	9
10	58 35.4	96 29	160.6	59 04.2	96 29	160.3	59 33.0	96 30	160.0	60 01.8	96 30	159.8	60 30.5	96 30	159.5	60 59.1	95 33	159.2	61 27.8	95 33	158.9	61 56.4	95 32	158.5	10
1	58 18.1	95 31	158.8	58 46.7	95 32	158.5	59 15.3	95 32	158.2	59 43.8	95 32	157.9	60 12.2	95 33	157.5	60 40.6	95 33	157.2	61 09.0	94 34	156.9	61 37.3	94 34	156.5	1
2	57 59.4	95 34	157.0	58 27.7	94 34	156.7	58 56.0	94 34	156.3	59 24.3	94 35	156.0	59 52.5	94 35	155.7	60 20.6	94 36	155.3	60 48.7	94 36	155.0	61 16.6	93 37	154.6	2
3	57 39.2	94 36	155.2	58 07.3	94 36	154.9	58 35.4	93 37	154.5	59 03.3	93 37	154.2	59 31.3	93 38	153.8	59 59.1	93 38	153.5	60 26.9	93 39	153.1	60 54.4	92 39	152.7	3
4	57 17.7	93 38	153.5	57 45.5	93 39	153.1	58 13.3	92 39	152.8	58 41.4	92 40	152.4	59 08.6	92 40	152.0	59 36.2	92 41	151.7	60 03.7	92 41	151.3	60 30.8	91 42	150.8	4
15	56 54.8	92 40	151.8	57 22.4	92 41	151.0	57 49.8	92 41	151.0	58 17.3	91 42	150.7	58 44.6	91 42	150.3	59 11.9	91 43	149.9	59 39.1	91 43	149.4	60 05.8	90 44	149.0	15
6	56 30.6	91 42	150.1	56 57.9	91 43	149.7	57 25.1	91 43	149.3	57 52.2	90 44	148.9	58 19.3	90 44	148.5	58 46.3	90 45	148.1	59 13.1	89 45	147.7	59 39.4	89 46	147.2	6
7	56 05.2	90 44	148.5	56 32.2	90 45	148.1	56 59.1	90 45	147.7	57 26.0	89 46	147.3	57 52.7	89 46	146.8	58 19.4	89 47	146.4	58 45.9	88 47	146.0	59 11.8	88 48	145.5	7
8	55 38.6	89 46	146.9	56 05.3	89 47	146.5	56 31.9	89 47	146.1	56 58.5	88 48	145.6	57 24.9	88 48	145.2	57 51.2	88 49	144.8	58 17.5	87 49	144.3	58 43.0	87 50	143.8	8
9	55 10.9	88 48	145.3	55 37.3	88 49	144.9	56 03.6	88 49	144.5	56 30.1	87 50	144.0	56 55.9	87 50	143.6	57 22.0	87 51	143.2	57 47.9	86 51	142.7	58 13.0	86 52	142.2	9
20	54 42.1	87 50	143.8	55 08.2	87 50	143.4	55 34.2	87 51	142.9	56 00.1	86 51	142.5	56 25.9	86 52	142.0	56 51.6	85 52	141.6	57 17.2	85 53	141.1	57 42.0	85 54	140.6	20
1	54 12.2	86 52	142.3	54 38.0	86 52	141.9	55 03.7	86 53	141.4	55 29.3	85 53	141.0	55 54.8	85 54	140.5	56 20.1	84 54	140.0	56 45.4	84 55	139.5	57 09.6	84 55	139.0	1
2	53 41.3	85 53	140.9	54 06.8	85 54	140.4	54 32.2	85 54	140.0	54 57.5	84 55	139.5	55 22.6	84 55	139.0	55 47.7	83 56	138.5	56 12.6	83 56	138.0	56 36.5	83 57	137.5	2
3	53 09.4	84 55	139.5	53 34.4	84 55	139.0	53 59.7	83 56	138.5	54 24.7	83 56	138.1	54 49.5	83 57	137.6	55 14.2	82 57	137.0	55 38.9	82 57	136.6	56 02.5	82 58	136.1	3
4	52 36.6	83 56	138.1	53 01.5	83 57	137.6	53 26.3	82 57	137.1	53 51.0	82 58	136.7	54 15.5	82 58	136.2	54 40.0	81 59	135.7	55 04.3	81 59	135.2	55 28.5	80 60	134.6	4
25	52 03.0	82 58	136.7	52 27.4	82 58	136.3	52 52.0	81 58	135.8	53 16.4	81 59	135.3	53 40.7	81 60	134.8	54 04.8	80 60	134.3	54 28.8	80 60	133.8	54 52.7	79 61	133.3	25
6	51 28.4	81 59	135.4	51 52.8	81 59	134.9	52 16.9	80 60	134.5	52 41.0	80 60	134.0	53 05.0	80 61	133.5	53 28.8	79 61	133.0	53 52.5	79 62	132.4	54 16.0	78 62	131.9	6
7	50 53.1	80 60	134.1	51 17.1	80 61	133.6	51 41.0	79 61	133.2	52 04.8	79 62	132.7	52 28.5	79 62	132.2	52 52.0	78 63	131.7	53 15.4	78 63	131.1	53 38.6	77 64	130.6	7
8	50 17.0	79 61	132.9	50 40.8	79 62	132.3	51 04.4	79 62	131.9	51 27.3	78 63	131.4	51 51.2	78 63	130.9	52 14.5	77 64	130.4	52 37.6	77 64	129.8	53 00.0	76 65	129.3	8
9	49 40.2	78 63	131.6	50 03.7	78 63	131.2	50 27.0	78 63	130.7	50 50.2	77 64	130.2	51 13.3	77 64	129.7	51 36.2	76 65	129.1	51 59.0	76 65	128.6	52 21.2	75 66	128.1	9
30	49 02.7	77 64	130.5	49 25.9	77 64	130.0	49 48.9	77 65	129.5	50 11.9	76 65	129.0	50 34.7	76 65	128.5	50 57.3	75 66	127.9	51 19.8	75 66	127.4	51 41.8	74 67	126.9	30
1	48 24.5	77 65	129.3	48 47.4	76 65	128.8	49 10.2	76 66	128.3	49 32.9	75 66	127.8	49 55.4	75 66	127.3	50 17.8	74 67	126.8	50 40.0	74 67	126.2	51 02.1	73 68	125.7	1
2	47 45.7	76 66	128.1	48 08.4	75 66	127.7	48 31.0	75 67	127.2	48 53.3	74 67	126.7	49 15.5	74 67	126.1	49 37.7	73 68	125.6	49 59.6	73 68	125.1	50 21.4	73 69	124.6	2
3	47 06.3	75 67	127.0	47 28.7	74 67	126.5	47 50.9	74 68	126.1	48 13.1	74 68	125.5	48 35.1	73 68	125.0	48 56.9	73 69	124.5	49 18.6	72 69	124.0	49 40.2	72 70	123.5	3
4	46 26.3	74 68	126.0	46 48.5	74 68	125.5	47 10.5	73 68	125.0	47 32.3	73 69	124.5	47 54.1	72 69	123.9	48 15.7	72 70	123.4	48 37.1	71 70	122.9	48 58.4	71 70	122.4	4
35	45 45.8	73 68	124.9	46 07.7	73 69	124.4	46 29.4	72 69	123.9	46 51.1	72 70	123.4	47 12.6	71 70	122.9	47 33.9	71 70	122.4	47 55.1	70 71	121.8	48 16.2	70 71	121.3	35
6	45 04.7	72 69	123.9	45 26.4	72 70	123.4	45 47.9	72 70	122.9	46 09.3	71 70	122.4	46 30.5	71 71	121.9	46 51.7	70 71	121.3	47 12.6	70 72	120.8	47 33.5	69 72	120.3	6
7	44 23.2	72 70	122.9	44 44.6	71 70	122.4	45 05.9	71 71	121.9	45 27.0	71 71	121.4	45 48.1	70 72	120.8	46 08.9	70 72	120.3	46 29.7	69 73	119.8	46 49.8	68 73	119.3	7
8	43 41.2	71 71	121.9	44 02.4	70 71	121.4	44 23.4	70 72	120.9	44 44.3	70 72	120.4	45 05.1	69 72	119.9	45 25.8	69 73	119.3	45 46.3	68 73	118.8	46 06.2	68 73	118.3	8
9	42 58.7	70 72	120.9	43 19.7	70 72	120.4	43 40.5	69 72	119.9	44 01.2	69 73	119.4	44 21.8	68 73	118.9	44 42.2	68 73	118.4	45 02.5	67 74	117.9	45 22.2	67 74	117.3	9
40	42 15.8	69 72	120.0	42 36.6	69 73	119.5	42 57.2	69 73	119.0	43 17.7	68 73	118.5	43 38.1	68 74	118.0	43 58.3	67 74	117.4	44 18.4	67 74	116.9	44 38.3	66 75	116.4	40
1	41 32.5	68 73	119.0	41 53.1	68 73	118.5	42 13.5	68 74	118.0	42 33.8	67 74	117.5	42 53.9	67 74	117.0	43 14.0	67 74	116.5	43 33.9	66 75	116.0	43 53.6	66 75	115.5	1
2	40 48.8	68 73	118.1	41 09.2	68 74	117.6	41 29.4	67 74	117.1	41 49.5	67 74	116.6	42 09.5	66 75	116.1	42 29.3	66 75	115.6	42 49.0	66 75	115.1	43 08.5	65 76	114.6	2
3	40 04.8	67 74	117.2	40 24.9	67 74	116.7	40 45.0	67 75	116.3	41 04.9	66 75	115.8	41 24.6	66 75	115.3	41 44.3	65 76	114.8	42 03.8	65 76	114.2	42 23.2	64 76	113.7	3
4	39 20.4	67 75	116.4	39 40.3	66 75	115.9	40 00.2	66 75	115.4	40 19.9	66 75	114.9	40 39.5	65 76	114.4	40 59.0	65 76	113.9	41 18.3	64 76	113.4	41 37.5	64 77	112.9	4
45	38 35.6	66 75	115.5	38 55.4	66 75	115.0	39 15.1	65 76	114.5	39 34.6	65 76	114.1	39 54.0	65 76	113.6	40 13.3	64 77	113.1	40 32.5	64 77	112.6	40 51.5	63 77	112.0	45
6	37 50.6	66 76	114.7	38 10.2	65 76	114.2	38 29.7	65 76	113.7	38 49.1	64 76	113.2	39 08.3	64 77	112.7	39 27.4	64 77	112.2	39 46.4	63 78	111.7	40 05.3	63 78	111.2	6
7	37 05.2	65 76	113.9	37 24.7	65 76	113.4	37 44.0	64 77	112.9	38 03.2	64 77	112.4	38 22.3	63 77	111.9	38 41.2	63 77	111.4	39 00.1	63 78	110.9	39 18.6	62 78	110.4	7
8	36 19.6	64 77	113.0	36 38.9	64 77	112.6	36 58.0	64 77	112.1	37 17.1	63 77	111.6	37 36.0	63 78	111.1	37 54.8	62 78	110.6	38 13.5	62 78	110.1	38 31.9	62 78	109.6	8
9	35 33.7	64 77	112.3	35 52.8	64 77	111.8	36 11.8	63 77	111.3	36 30.7	63 78	110.8	36 49.5	62 78	110.3	37 08.1	62 78	109.8	37 26.7	62 78	109.4	37 45.0	61 79	108.9	9
50	34 47.5	63 77	111.5	35 06.5	63 78	111.0	35 25.4	63 78	110.5	35 44.1	62 78	110.1	36 02.7	62 78	109.6	36 21.2	61 79	109.1	36 39.6	61 79	108.6	36 58.0	61 79	108.1	50
1	34 01.1	63 78	110.7	34 20.0	63 78	110.2	34 38.7	62 78	109.8	34 57.3	62 78	109.3	35 15.8	61 79	108.8	35 34.1	61 79	108.3	35 52.4	61 79	107.8	36 10.6	60 80	107.3	1
2	33 14.5	62 78	110.0	33 33.2	62 78	109.5	33 51.7	62 79	109.0	34 10.2	61 79	108.6	34 28.6	61 79	108.1	34 46.8	61 79	107.6	35 04.9	60 80	107.1	35 23.0	60 80	106.6	2
3	32 27.6	62 78	109.2	32 46.2	62 79	108.8	33 04.6	61 79	108.3	33 23.0	61 79	107.8	33 41.2	61 79	107.3	33 59.3	60 80	106.9	34 17.3	60 80	106.4	34 35.3	59 80	105.9	3
4	31 40.6	62 79	108.5	31 59.0	61 79	108.0	32 17.3	61 79	107.6	32 35.5	61 79	107.1	32 53.6	60 80	106.6	33 11.6	60 80	106.1	33 29.5	59 80	105.7	33 47.4	59 80	105.2	4
55	30 53.3	61 79	107.8	31 11.6	61 79	107.3	31 29.4	60 80	106.8	31 47.9	60 80	106.4	32 05.9	60 80	105.9	32 23.7	59 80	105.4	32 41.5	59 80	105.0	32 59.3	59 81	104.5	55
6	30 05.8	61 79	107.1	30 24.0	60 80	106.6	30 42.1	60 80	106.2	31 00.1	60 80	105.7	31 17.9	59 80	105.2	31 35.7	59 80	104.7	31 53.4	59 81	104.3	32 11.1	58 81	103.8	6
7	29 18.2	60 80	106.4	29 36.3	60 80	105.9	29 54.2	60 80	105.5	30 12.1	60 80	105.0	30 29.9	59 80	104.5	30 47.5	59 81	104.1	31 05.1	58 81	103.6	31 22.7	58 81	103.1	7
8	28 30.4	60 80	105.7	28 48.3	60 80	105.2	29 06.2	59 80	104.8	29 24.0	59 80	104.3	29 41.6	59 81	103.9	29 59.2	58 81	103.4	30 16.7	58 81	102.9	30 34.2	58 81	102.4	8
9	27 42.4	60 80	105.0	28 00.3	59 80	104.6	28 18.0	59 80	104.1	28 35.7	59 81	103.7	28 53.3	58 81	103.2	29 10.8	58 81	102.7	29 28.1	58 81	102.3	29 45.5	57 81	101.8	9
60	26 54.3	59 80	104.4	27 12.1	59 81	103.9	27 29.7	59 81	103.5	27 47.3	58 81	103.0	28 04.8	58 81	102.5	28 22.2	58 81	102.1	28 39.5	57 81	101.6	28 56.8	57 82	101.1	60
1	26 06.1	59 81	103.7	26 23.7	59 81	103.2	26 41.3	58 81	102.8	26 58.8	58 81	102.3	27 16.2	58 81	101.9	27 33.5	58 81	101.4	27 50.7	57 81	101.0	28 07.9	57 82	100.5	1
2	25 17.7	59 81	103.0	25 35.2	58 81	102.6	25 52.7	58 81	102.1	26 10.1	58 81	101.7	26 27.4	58 81	101.2	26 44.7	57 82	100.8	27 01.8	57 82	100.3	27 18.9	57 82	99.9	2
3	24 29.1	58 81	102.4	24 46.6	58 81	102.0	25 04.0	58 81	101.5	25 21.4	58 81	101.1	25 38.6	57 82	100.6	25 55.7	57 82	100.1	26 12.8	57 82	99.7	26 29.9	56 82	99.2	3
4	23 40.5	58 81	101.8	23 57.9	58 81	101.3	24 15.2	57 82	100.9	24 32.5	57 82	100.5	24 49.6	57 82	100.0	25 06.7	57 82	99.5	25 23.7	57 82	99.1	25 40.7	56 82	98.6	4
65	22 51.7	58 81	101.1	23 09.1	58 82	100.7	23 26.3	57 82	100.2	23 43.5	57 82	99.8	24 00.6	57 82	99.3	24 17.6	57 82	98.9	24 34.6	56 82	98.4	24 51.4	56 82	98.0	65
6	22 02.9	58 82	100.5	22 20.1	57 82	100.1	22 37.3	57 82	99.6	22 54.4	57 82	99.2	23 11.5	57 82	98.7	23 28.4	56 82	98.3	23 45.3	56 82	97.8	24 02.2	56 82	97.4	6
7	21 13.9	57 82	99.9	21 31.1	57 82	99.5	21 48.2	57 82	99.0	22 05.3	57 82	98.6	22 22.3	56 82	98.1	22 39.2	56 82	97.7	22 56.0	56 82	97.2	23 12.8	56 82	96.8	7
8	20 24.9	57 82	99.3	20 42.0	57 82	98.9	20 59.1	56 82	98.4	21 16.1	56 82	98.0	21 33.0	56 82	97.5	21 49.9	56 82	97.1	22 06.6	56 82	96.6	22 23.4	55 82	96.2	8
9	19 35.8	57 82	98.7	19 52.8	57 82	98.2	20 09.8	56 82	97.8	20 26.8	56 82	97.4	20 43.7	56 82	96.9	21 00.5	56 82	96.5	21 17.2	56 83	96.0	21 33.9	55 83	95.6	9
70	18 46.5	57 82	98.1	19 03.6	57 82	97.6	19 20.5	56 82	97.2	19 37.4	56 82	96.8	19 54.2	56 82	96.3	20 11.0	56 83	95.9	20 27.7	56 83	95.4	20 44.4	55 83	95.0	70
1	17 57.3	57 82	97.5	18 14.2	56 82	97.0	18 31.1	56 82	96.6	18 48.0	56 82	96.2	19 04.8	56 83	95.7	19 21.5	56 83	95.3	19 38.2	55 83	94.9	19 54.9	55 83	94.4	1
2	17 07.9	57 82	96.9	17 24.8	56 82	96.5	17 41.7	56 83	96.0	17 58.5	56 83	95.6	18 15.3	56 83	95.1	18 31.9	55 83	94.7	18 48.6	55 83	94.3	19 05.3	55 83	93.8	2
3	16 18.5	56 82	96.3	16 35.4	56 83	95.9	16 52.1	56 83	95.4	17 09.0	56 83	95.0	17 25.7	56 83	94.6	17 42.4	55 83	94.1	17 59.0	55 83	93.7	18 15.6	55 83	93.3	3
4	15 29.0	56 83	95.7	15 45.9	56 83	95.3	16 02.7	56 83	94.9	16 19.4	56 83	94.4	16 36.1	56 83	94.0	16 52.7	55 83	93.6	17 09.3	55 83	93.1	17 25.9	55 83	92.7	4
75	14 39.5	56 83	95.1	14 56.3	56 83	94.7	15 13.1	56 83	94.3	15 29.8	56 83	93.8	15 46.5	55 83	93.4	16 03.1	55 83	93.0	16 19.6	55 83	92.5	16 36.2	55 83	92.1	75
6	13 49.9	56 83	94.6	14 06.7	56 83	94.1	14 23.5	56 83	93.7	14 40.1	56 83	93.3	14 56.8	55 83	92.8	15 13.4	55 83	92.4	15 29.9	55 83	92.0	15 46.5	55 83	91.5	6
7	13 00.3	56 83	94.0	13 17.1	56 83	93.6	13 33.8	56 83	93.1	13 50.5	56 83	92.7	14 07.1	55 83	92.3	14 23.7	55 83	91.8	14 40.2	55 83	91.4	14 56.8	55 83	91.0	7
8	12 10.7	56 83	93.4	12 27.4	56 83	93.0	12 44.1	56 83	92.6	13 00.8	56 83	92.1	13 17.4	55 83	91.7	13 33.9	55 83	91.3	13 50.5	55 83	90.8	14 07.0	55 83	90.4	8
9	11 21.0	56 83	92.8	11 37.7	56 83	92.4	11 54.4	56 83	92.0	12 11.1	56 83	91.6	12 27.7	55 83	91.1	12 44.2	55 83	90.7	13 00.7	55 83	90.3	13 17.2	55 83	89.9	9
80	10 31.3	56 83	92.3	10 48.0	56 83	91.9	11 04.7	55 83	91.4	11 21.3	55 83	91.0	11 37.9	55 83	90.6	11 54.5	55 83	90.2	12 11.0	55 83	89.7	12 27.5	55 83	89.3	80
1	9 41.6	56 83	91.7	9 58.3	56 83	91.3	10 15.0	55 83	90.9	10 31.6	55 83	90.4	10 48.2	55 83	90.0	11 04.7	55 83	89.6	11 21.2	55 83	89.2	11 37.7	55 83	88.7	1
2	8 51.9	56 83	91.1	9 08.6	56 83	90.7	9 25.2	55 83	90.3	9 41.8	55 83	89.9	9 58.4	55 83	89.5	10 15.0	55 83	89.0	10 31.5	55 83	88.6	10 48.0	55 83	88.1	2
3	8 02.2	56 83	90.6	8 18.8	56 83	90.2	8 35.5	55 83	89.7	8 52.1	55 83	89.3	9 08.7	55 83	88.9	9 25.3	55 83	88.5	9 41.8	55 83	88.1	9 58.3	55 83	87.6	3
4	7 12.4	56 83	90.0	7 29.1	56 83	89.6	7 45.7	55 83	89.2	8 02.4	55 83	88.8	8 19.0	55 83	88.3	8 35.5	55 83	87.9	8 52.1	55 83	87.5	9 08.5	55 83	87.1	4
85	6 22.7	56 83	89.5	6 39.4	56 83	89.1	6 56.0	55 83	88.6	7 12.6	55 83	88.2	7 29.3	55 83	87.8	7 45.8	55 83	87.4	8 02.4	55 83	87.0	8 18.9	55 83	86.5	85
6	5 32.9	56 83	88.9	5 49.6	56 83	88.5	6 06.3	55 83	88.1	6 22.9	55 83	87.7	6 39.5	55 83	87.2	6 56.2	55 83	86.8	7 12.7	55 83	86.4	7 29.3	55 83	86.0	6
7							5 16.6	56 83	87.5	5 33.2	56 83	87.1	5 49.9	55 83	86.7	6 06.5	55 83	86.3	6 23.1	55 83	85.8	6 39.7	55 83	85.4	7
8													5 00.1	56 83	86.1	5 16.9	55 83	85.7	5 33.5	55 82	85.3	5 50.1	55 82	84.9	8
9																						5 00.6	55 82	84.3	9

Lat. 34°

Each cell lists: Alt. (° ′) — Δd Δt — Az. (°)

H.A.	4° 00′	4° 30′	5° 00′	5° 30′	6° 00′	6° 30′	7° 00′	7° 30′	H.A.
00	52 00.0 1.0 01 180.0	51 30.0 1.0 01 180.0	51 00.0 1.0 01 180.0	50 30.0 1.0 01 180.0	50 00.0 1.0 01 180.0	49 30.0 1.0 01 180.0	49 00.0 1.0 01 180.0	48 30.0 1.0 01 180.0	00
1	51 59.3 1.0 04 178.4	51 29.3 1.0 03 178.4	50 59.3 1.0 03 178.4	50 29.3 1.0 03 178.4	49 59.3 1.0 03 178.5	49 29.3 1.0 03 178.5	48 59.3 1.0 03 178.5	48 29.4 1.0 03 178.5	1
2	51 57.2 1.0 06 176.8	51 27.2 1.0 06 176.8	50 57.3 1.0 06 176.9	50 27.3 1.0 06 176.9	49 57.3 1.0 06 176.9	49 27.3 1.0 06 177.0	48 57.4 1.0 05 177.0	48 27.4 1.0 06 177.0	2
3	51 53.7 1.0 08 175.1	51 23.8 1.0 08 175.2	50 53.8 1.0 08 175.3	50 23.9 1.0 08 175.3	49 54.0 1.0 08 175.4	49 24.0 1.0 08 175.4	48 54.1 1.0 08 175.5	48 24.2 1.0 08 175.5	3
4	51 48.8 1.0 10 173.5	51 18.9 1.0 10 173.6	50 49.0 1.0 10 173.7	50 19.2 1.0 10 173.8	49 49.3 1.0 10 173.8	49 19.4 1.0 10 173.9	48 49.5 1.0 10 174.0	48 19.6 1.0 10 174.0	4
05	51 42.5 99 13 171.9	51 12.7 99 13 172.0	50 42.9 99 12 172.1	50 13.1 99 12 172.2	49 43.3 99 12 172.3	49 13.5 99 12 172.4	48 43.6 99 12 172.5	48 13.8 99 12 172.5	05
6	51 34.8 99 15 170.3	51 05.1 99 15 170.6	50 35.4 99 15 170.7	50 05.7 99 15 170.7	49 35.9 99 15 170.9	49 06.2 99 14 170.9	48 36.5 99 14 171.0	48 06.7 99 14 171.1	6
7	51 25.8 99 17 168.8	50 56.2 99 17 168.9	50 26.6 99 17 169.1	49 56.9 99 17 169.1	49 27.3 99 17 169.3	48 57.7 99 16 169.4	48 28.0 99 16 169.5	47 58.4 99 16 169.6	7
8	51 15.4 98 20 167.2	50 45.9 98 19 167.3	50 16.4 98 19 167.5	49 46.9 98 19 167.6	49 17.4 98 19 167.7	48 47.9 98 18 167.9	48 18.3 98 18 168.0	47 48.8 98 18 168.1	8
9	51 03.7 98 22 165.6	50 34.4 98 21 165.8	50 05.0 98 21 165.9	49 35.6 98 21 166.1	49 06.2 98 21 166.3	48 36.8 98 21 166.4	48 07.4 98 20 166.6	47 37.9 98 20 166.7	9
10	50 50.7 97 24 164.1	50 21.5 97 24 164.3	49 52.3 97 23 164.4	49 23.0 98 23 164.6	48 53.8 98 23 164.8	48 24.5 98 23 164.9	47 55.2 98 22 165.1	47 25.9 98 22 165.3	10
1	50 36.4 97 26 162.5	50 07.4 97 26 162.7	49 38.3 97 25 162.9	49 09.2 97 25 163.1	48 40.1 97 25 163.3	48 10.9 97 25 163.5	47 41.8 97 24 163.7	47 12.6 97 24 163.8	1
2	50 20.9 96 28 161.0	49 52.0 96 28 161.2	49 23.1 96 27 161.4	48 54.1 97 27 161.6	48 25.2 97 27 161.8	47 56.2 97 27 162.0	47 27.2 97 26 162.2	46 58.2 97 26 162.4	2
3	50 04.1 96 30 159.5	49 35.4 96 30 159.8	49 06.7 96 29 160.0	48 37.9 96 29 160.2	48 09.1 96 29 160.4	47 40.3 96 28 160.6	47 11.4 96 28 160.8	46 42.6 96 28 161.0	3
4	49 46.1 95 32 158.1	49 17.6 95 32 158.3	48 49.0 95 31 158.5	48 20.4 95 31 158.8	47 51.8 95 31 159.0	47 23.2 96 30 159.2	46 54.5 96 30 159.4	46 25.8 96 30 159.6	4
15	49 27.0 94 34 156.6	48 58.6 94 34 156.9	48 30.3 95 33 157.1	48 01.9 95 33 157.3	47 33.4 94 33 157.6	47 05.0 95 32 157.8	46 36.5 95 32 158.0	46 08.0 95 32 158.3	15
6	49 06.6 94 36 155.2	48 38.5 94 35 155.4	48 10.3 94 35 155.7	47 42.1 94 35 155.9	47 13.9 94 34 156.2	46 45.6 94 34 156.4	46 17.3 94 34 156.7	45 49.0 94 33 156.9	6
7	48 45.2 93 38 153.7	48 17.3 93 37 154.0	47 49.3 93 37 154.3	47 21.3 93 36 154.6	46 53.3 93 36 154.8	46 25.2 94 36 155.1	45 57.1 94 35 155.3	45 29.0 94 35 155.6	7
8	48 22.6 92 39 152.3	47 54.9 92 39 152.6	47 27.2 93 39 152.9	46 59.4 93 38 153.2	46 31.6 93 38 153.5	46 03.7 93 38 153.7	45 35.8 93 37 154.0	45 07.9 93 37 154.3	8
9	47 59.0 92 41 151.0	47 31.5 92 41 151.3	47 04.0 92 40 151.6	46 36.5 92 40 151.9	46 08.8 92 40 152.1	45 41.2 92 39 152.4	45 13.5 92 39 152.7	44 45.8 92 39 153.0	9
20	47 34.4 91 43 149.6	47 07.1 91 42 149.9	46 39.8 91 42 150.2	46 12.5 91 42 150.5	45 45.1 91 41 150.8	45 17.7 92 41 151.1	44 50.2 92 40 151.4	44 22.7 92 40 151.7	20
1	47 08.7 90 44 148.3	46 41.7 90 44 148.6	46 14.6 90 44 148.9	45 47.5 90 43 149.2	45 20.4 91 43 149.5	44 53.1 91 42 149.8	44 25.9 91 42 150.1	43 58.6 91 42 150.4	1
2	46 42.1 89 46 147.0	46 15.3 89 46 147.3	45 48.5 90 45 147.6	45 21.6 90 45 147.9	44 54.7 90 44 148.3	44 27.7 90 44 148.6	44 00.6 90 44 148.9	43 33.6 90 43 149.2	2
3	46 14.5 88 47 145.7	45 48.0 89 47 146.0	45 21.4 89 47 146.4	44 54.7 89 46 146.7	44 28.0 89 46 147.0	44 01.3 89 46 147.3	43 34.5 89 45 147.6	43 07.6 90 45 147.9	3
4	45 46.0 88 49 144.4	45 19.7 88 49 144.8	44 53.4 88 48 145.1	44 27.0 88 48 145.4	44 00.5 89 47 145.8	43 34.4 89 47 146.1	43 07.4 89 47 146.4	42 40.8 89 47 146.7	4
25	45 16.7 87 50 143.2	44 50.6 87 50 143.5	44 24.5 87 50 143.9	43 58.3 87 49 144.2	43 32.1 88 49 144.6	43 05.8 88 48 144.9	42 39.4 88 48 145.2	42 13.0 88 48 145.5	25
6	44 46.4 86 52 142.0	44 20.6 86 51 142.3	43 54.8 86 51 142.7	43 28.8 87 51 143.0	43 02.8 87 50 143.4	42 36.8 87 50 143.7	42 10.7 87 49 144.0	41 44.5 87 49 144.4	6
7	44 15.4 85 53 140.8	43 49.8 85 53 141.1	43 24.2 86 52 141.5	42 58.5 86 52 141.9	42 32.8 86 51 142.2	42 06.9 86 51 142.5	41 41.0 86 51 142.9	41 15.1 87 50 143.2	7
8	43 43.5 84 54 139.6	43 18.2 84 54 140.0	42 52.8 85 54 140.3	42 27.4 85 53 140.7	42 01.9 85 53 141.1	41 36.3 85 52 141.4	41 10.6 86 52 141.8	40 44.9 86 52 142.1	8
9	43 10.9 83 56 138.5	42 45.9 84 55 138.8	42 20.7 84 55 139.2	41 55.5 84 54 139.6	41 30.2 84 54 139.9	41 04.9 85 54 140.3	40 39.5 85 53 140.6	40 14.0 85 53 141.0	9
30	42 37.6 83 57 137.3	42 12.7 83 56 137.7	41 47.8 83 56 138.1	41 22.9 83 56 138.4	40 57.8 84 55 138.8	40 32.7 84 55 139.2	40 07.5 84 54 139.5	39 42.3 84 54 139.9	30
1	42 03.5 82 58 136.2	41 38.9 82 58 136.6	41 14.3 82 57 137.0	40 49.5 83 57 137.4	40 24.7 83 56 137.7	39 59.8 83 56 138.1	39 34.9 83 56 138.4	39 09.9 83 55 138.8	1
2	41 28.7 81 59 135.1	41 04.4 81 59 135.5	40 40.0 82 58 135.9	40 15.5 82 58 136.3	39 50.9 82 57 136.7	39 26.3 82 57 137.0	39 01.6 82 57 137.4	38 36.8 83 56 137.7	2
3	40 53.3 80 60 134.1	40 29.2 80 60 134.4	40 05.0 81 59 134.8	39 40.6 81 59 135.2	39 16.4 81 59 135.6	38 52.0 81 58 136.0	38 27.6 82 58 136.3	38 03.0 82 57 136.7	3
4	40 17.2 79 61 133.0	39 53.4 80 61 133.4	39 29.4 80 60 133.8	39 05.4 80 60 134.2	38 41.3 80 60 134.6	38 17.1 81 59 134.9	37 52.9 81 59 135.3	37 28.6 81 58 135.7	4
35	39 40.6 79 62 132.0	39 16.9 79 62 132.4	38 53.2 79 61 132.8	38 29.4 79 61 133.2	38 05.6 80 61 133.5	37 41.6 80 60 133.9	37 17.6 80 60 134.3	36 53.5 80 59 134.7	35
6	39 03.3 78 63 131.0	38 39.9 78 63 131.4	38 16.4 78 62 131.8	37 52.8 79 62 132.2	37 29.2 79 62 132.5	37 05.5 79 61 132.9	36 41.7 79 61 133.3	36 17.8 80 60 133.7	6
7	38 25.5 77 64 130.0	38 02.3 77 64 130.4	37 39.0 78 63 130.8	37 15.7 78 63 131.2	36 52.3 78 62 131.6	36 28.8 78 62 131.9	36 05.2 79 62 132.3	35 41.6 79 61 132.7	7
8	37 47.1 76 65 129.0	37 24.1 77 64 129.4	37 01.1 77 64 129.8	36 38.0 77 64 130.2	36 14.8 77 63 130.6	35 51.5 78 63 131.0	35 28.2 78 63 131.4	35 04.8 78 62 131.8	8
9	37 08.1 76 66 128.0	36 45.4 76 65 128.5	36 22.6 76 65 128.9	35 59.7 76 65 129.3	35 36.8 77 64 129.7	35 13.7 77 64 130.1	34 50.6 77 64 130.4	34 27.4 77 63 130.8	9
40	36 28.7 75 67 127.1	36 06.2 75 66 127.5	35 43.6 75 66 127.9	35 21.0 76 65 128.3	34 58.2 76 65 128.7	34 35.4 76 65 129.1	34 12.5 76 64 129.5	33 49.5 77 64 129.9	40
1	35 48.8 74 67 126.2	35 26.5 74 67 126.6	35 04.1 75 67 127.0	34 41.7 75 66 127.4	34 19.2 75 66 127.8	33 56.5 76 66 128.2	33 33.8 76 65 128.6	33 11.1 76 65 129.0	1
2	35 08.4 73 68 125.3	34 46.4 74 68 125.7	34 24.2 74 67 126.1	34 01.9 74 67 126.5	33 39.6 74 67 126.9	33 17.2 75 66 127.3	32 54.7 75 66 127.8	32 32.2 75 66 128.1	2
3	34 27.6 73 69 124.4	34 05.7 73 68 124.8	33 43.8 73 68 125.2	33 21.7 74 68 125.6	32 59.6 74 67 126.0	32 37.4 74 67 126.4	32 15.2 74 67 126.8	31 52.8 75 66 127.2	3
4	33 46.4 72 69 123.5	33 24.7 72 69 123.9	33 02.9 73 69 124.3	32 41.1 73 68 124.8	32 19.2 73 68 125.2	31 57.2 73 68 125.6	31 35.1 74 67 126.0	31 13.0 74 67 126.4	4
45	33 04.7 71 70 122.7	32 43.2 72 70 123.1	32 21.7 72 69 123.5	32 00.0 72 69 123.9	31 38.3 73 69 124.3	31 16.5 73 68 124.7	30 54.6 73 68 125.1	30 32.7 73 68 125.5	45
6	32 22.6 71 71 121.8	32 01.3 71 70 122.2	31 40.0 71 70 122.7	31 18.5 72 70 123.1	30 57.0 72 69 123.5	30 35.4 72 69 123.9	30 13.7 72 69 124.3	29 52.0 73 69 124.7	6
7	31 40.2 70 71 121.0	31 19.1 70 71 121.4	30 57.9 71 71 121.8	30 36.6 71 70 122.2	30 15.3 71 70 122.6	29 53.9 71 70 123.0	29 32.4 72 70 123.4	29 10.9 72 69 123.8	7
8	30 57.3 70 72 120.2	30 36.4 70 72 120.6	30 15.4 70 71 121.0	29 54.4 71 71 121.4	29 33.2 71 71 121.8	29 12.0 71 70 122.2	28 50.7 71 70 122.6	28 29.4 71 70 123.0	8
9	30 14.2 69 73 119.4	29 53.4 69 72 119.8	29 32.6 69 72 120.2	29 11.8 70 72 120.6	28 50.8 70 71 121.0	28 29.8 70 71 121.4	28 08.7 70 71 121.8	27 47.5 71 70 122.2	9
50	29 30.7 68 73 118.6	29 10.1 69 73 119.0	28 49.5 69 72 119.4	28 28.8 69 72 119.8	28 08.0 69 72 120.2	27 47.1 70 72 120.6	27 26.2 70 71 121.1	27 05.2 70 71 121.5	50
1	28 46.8 68 74 117.8	28 26.4 68 73 118.2	28 06.0 68 73 118.6	27 45.5 69 73 119.1	27 24.9 69 72 119.5	27 04.2 69 72 119.9	26 43.4 69 72 120.3	26 22.6 69 72 120.7	1
2	28 02.7 67 74 117.0	27 42.5 67 74 117.5	27 22.2 68 74 117.9	27 01.8 68 73 118.3	26 41.4 68 73 118.7	26 20.9 68 73 119.1	26 00.3 69 72 119.5	25 39.7 69 72 119.9	2
3	27 18.2 67 75 116.3	26 58.2 67 74 116.7	26 38.0 67 74 117.1	26 17.9 67 74 117.5	25 57.6 68 74 117.9	25 37.3 68 73 118.4	25 16.9 68 73 118.8	24 56.4 68 73 119.2	3
4	26 33.5 66 75 115.5	26 13.6 66 75 116.0	25 53.6 67 74 116.4	25 33.6 67 74 116.8	25 13.5 67 74 117.2	24 53.3 67 74 117.6	24 33.1 68 73 118.0	24 12.8 68 73 118.4	4
55	25 48.5 66 75 114.8	25 28.7 66 75 115.2	25 08.9 66 75 115.6	24 49.1 66 75 116.1	24 29.1 67 74 116.5	24 09.1 67 74 116.9	23 49.0 67 74 117.3	23 28.9 67 74 117.7	55
6	25 03.2 65 76 114.1	24 43.6 65 76 114.5	24 23.9 66 75 114.9	24 04.2 66 75 115.3	23 44.5 66 75 115.7	23 24.6 66 75 116.2	23 04.7 66 74 116.6	22 44.7 67 74 117.0	6
7	24 17.6 65 76 113.4	23 58.2 65 76 113.8	23 38.7 65 76 114.2	23 19.1 65 76 114.6	22 59.5 66 75 115.0	22 39.8 66 75 115.4	22 20.1 66 75 115.9	22 00.2 66 75 116.3	7
8	23 31.9 64 77 112.7	23 12.6 64 76 113.1	22 53.2 65 76 113.5	22 33.8 65 76 113.9	22 14.3 65 76 114.3	21 54.8 65 76 114.7	21 35.2 65 75 115.1	21 15.5 66 75 115.6	8
9	22 45.8 64 77 112.0	22 26.7 64 77 112.4	22 07.5 64 77 112.8	21 48.2 64 76 113.2	21 28.9 65 76 113.6	21 09.5 65 76 114.0	20 50.0 65 76 114.5	20 30.5 65 75 114.9	9
60	21 59.6 63 77 111.3	21 40.6 63 77 111.7	21 21.5 64 77 112.1	21 02.4 64 77 112.5	20 43.2 64 77 112.9	20 23.9 64 76 113.4	20 04.6 64 76 113.8	19 45.2 65 76 114.2	60
1	21 13.2 63 78 110.6	20 54.3 63 78 111.0	20 35.3 63 77 111.4	20 16.3 63 77 111.8	19 57.3 64 77 112.2	19 38.1 64 77 112.7	19 19.0 64 76 113.1	18 59.7 64 76 113.5	1
2	20 26.5 62 78 110.0	20 07.7 63 78 110.4	19 48.9 63 78 110.8	19 30.1 63 77 111.2	19 11.1 63 77 111.6	18 52.1 63 77 112.0	18 33.1 64 77 112.4	18 14.0 64 77 112.8	2
3	19 39.6 62 78 109.3	19 21.0 62 78 109.7	19 02.3 62 78 110.1	18 43.6 63 78 110.5	18 24.8 63 78 110.9	18 05.9 63 77 111.4	17 47.0 63 77 111.8	17 28.1 63 77 112.2	3
4	18 52.6 62 79 108.6	18 34.1 62 78 109.1	18 15.5 62 78 109.5	17 56.9 62 78 109.9	17 38.2 62 78 110.3	17 19.5 63 78 110.7	17 00.7 63 78 111.1	16 41.9 63 77 111.5	4
65	18 05.4 61 79 108.0	17 47.0 61 79 108.4	17 28.5 62 79 108.8	17 10.0 62 79 109.2	16 51.5 62 79 109.6	16 32.9 62 78 110.0	16 14.2 62 78 110.5	15 55.5 62 79 110.9	65
6	17 18.0 61 79 107.4	16 59.7 61 79 107.8	16 41.4 61 79 108.2	16 23.0 61 79 108.6	16 04.5 62 79 109.0	15 46.0 62 78 109.4	15 27.5 62 78 109.8	15 08.9 62 78 110.2	6
7	16 30.4 61 80 106.7	16 12.2 61 79 107.1	15 54.0 61 79 107.5	15 35.7 61 79 108.0	15 17.4 61 79 108.4	14 59.0 61 79 108.8	14 40.6 61 78 109.2	14 22.2 62 78 109.6	7
8	15 42.7 60 80 106.1	15 24.6 60 80 106.5	15 06.5 61 79 106.9	14 48.3 61 79 107.3	14 30.1 61 79 107.7	14 11.8 61 79 108.1	13 53.5 61 79 108.6	13 35.2 61 79 109.0	8
9	14 54.8 60 80 105.5	14 36.9 60 80 105.9	14 18.8 60 80 106.3	14 00.8 60 80 106.7	13 42.6 60 79 107.1	13 24.5 61 79 107.5	13 06.3 61 79 107.9	12 48.1 61 79 108.3	9
70	14 06.8 60 80 104.9	13 48.9 60 80 105.3	13 31.0 60 80 105.7	13 13.0 60 80 106.1	12 55.0 60 80 106.5	12 37.0 60 79 106.9	12 18.9 60 79 107.3	12 00.8 60 79 107.7	70
1	13 18.7 59 80 104.2	13 00.9 59 80 104.7	12 43.1 60 80 105.1	12 25.2 60 80 105.5	12 07.3 60 80 105.9	11 49.3 60 80 106.3	11 31.3 60 80 106.7	11 13.3 60 79 107.1	1
2	12 30.4 59 81 103.6	12 12.7 59 81 104.1	11 55.0 59 80 104.5	11 37.2 59 80 104.9	11 19.4 59 80 105.3	11 01.5 60 80 105.7	10 43.6 60 80 106.1	10 25.7 60 80 106.5	2
3	11 42.0 59 81 103.0	11 24.4 59 81 103.5	11 06.7 59 81 103.9	10 49.0 59 80 104.3	10 31.3 59 80 104.7	10 13.5 59 80 105.1	9 55.8 59 80 105.5	9 37.9 59 80 105.9	3
4	10 53.5 58 81 102.4	10 35.9 59 81 102.9	10 18.4 59 81 103.3	10 00.8 59 81 103.7	9 43.1 59 80 104.1	9 25.5 59 80 104.5	9 07.8 59 80 104.9	8 50.0 59 80 105.3	4
75	10 04.9 58 81 101.9	9 47.4 58 81 102.3	9 29.9 58 81 102.7	9 12.4 58 81 103.1	8 54.8 59 81 103.5	8 37.2 59 81 103.9	8 19.6 59 80 104.3	8 02.0 59 80 104.7	75
6	9 16.1 58 81 101.3	8 58.7 58 81 101.7	8 41.3 58 81 102.1	8 23.9 58 81 102.5	8 06.4 58 81 102.9	7 48.9 59 81 103.3	7 31.4 59 81 103.7	7 13.8 59 80 104.1	6
7	8 27.3 58 82 100.7	8 10.0 58 81 101.1	7 52.6 58 81 101.5	7 35.2 58 81 101.9	7 17.8 58 81 102.3	7 00.4 58 81 102.7	6 43.0 58 81 103.1	6 25.5 58 81 103.6	7
8	7 38.4 57 82 100.1	7 21.1 58 82 100.5	7 03.8 58 82 100.9	6 46.5 58 81 101.3	6 29.2 58 81 101.7	6 11.9 58 81 102.2	5 54.5 58 81 102.6	5 37.1 58 81 103.0	8
9	6 49.4 57 82 99.5	6 32.2 57 82 99.9	6 14.9 57 82 100.3	5 57.7 57 82 100.8	5 40.4 58 81 101.2	5 23.2 58 81 101.6	5 05.9 58 81 102.0		9
80	6 00.3 57 82 98.9	5 43.1 57 82 99.4	5 26.0 57 82 99.8	5 08.5 57 82 100.2					80
1	5 11.1 57 82 98.4								1

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 34°

H.A.	8° 00' Alt.	Δd Δt	Az.	8° 30' Alt.	Δd Δt	Az.	9° 00' Alt.	Δd Δt	Az.	9° 30' Alt.	Δd Δt	Az.	10° 00' Alt.	Δd Δt	Az.	10° 30' Alt.	Δd Δt	Az.	11° 00' Alt.	Δd Δt	Az.	11° 30' Alt.	Δd Δt	Az.	H.A.
00	64 00.0	1.0 02	180.0	64 30.0	1.0 02	180.0	65 00.0	1.0 02	180.0	65 30.0	1.0 02	180.0	66 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	67 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0	00
1	63 59.0	1.0 05	177.7	64 29.0	1.0 05	177.7	64 59.0	1.0 05	177.6	65 29.0	1.0 05	177.6	65 58.9	1.0 05	177.5	66 28.9	1.0 05	177.5	66 58.9	1.0 05	177.5	67 28.9	1.0 06	177.4	1
2	63 56.1	1.0 08	175.5	64 26.0	1.0 08	175.4	64 55.9	1.0 08	175.3	65 25.9	1.0 09	175.3	65 55.8	1.0 09	175.2	66 25.7	1.0 09	175.1	66 55.6	1.0 09	175.0	67 25.6	1.0 09	174.9	2
3	63 51.2	1.0 11	173.2	64 21.1	99 12	173.1	64 50.9	99 12	173.0	65 20.7	99 12	172.9	65 50.6	99 12	172.8	66 20.4	99 12	172.6	66 50.2	99 13	172.5	67 20.0	99 13	172.4	3
4	63 44.4	99 14	171.0	64 14.1	99 15	170.9	64 43.9	99 15	170.7	65 13.6	99 15	170.6	65 43.3	99 16	170.4	66 13.0	99 16	170.2	66 42.7	99 16	170.0	67 12.3	99 16	169.8	4
05	63 35.7	99 18	168.8	64 05.3	99 18	168.6	64 34.9	99 19	168.4	65 04.4	99 19	168.2	65 34.0	98 19	167.8	66 03.5	98 19	167.6	66 33.0	98 20	167.6	67 02.5	98 20	167.4	05
6	63 25.1	98 21	166.6	63 54.5	98 21	166.4	64 23.9	98 21	166.2	64 53.3	98 22	165.9	65 22.7	98 22	165.7	65 52.0	98 22	165.4	66 21.3	98 23	165.2	66 50.6	98 23	164.9	6
7	63 12.7	97 24	164.5	63 41.9	97 24	164.2	64 11.1	97 24	164.0	64 40.3	97 25	163.7	65 09.4	97 25	163.4	65 38.5	97 26	163.1	66 07.6	97 26	162.8	66 36.6	97 27	162.5	7
8	62 58.5	97 27	162.3	63 27.5	97 27	162.1	63 56.4	96 27	161.8	64 25.4	96 28	161.5	64 54.3	96 28	161.1	65 23.1	96 29	160.8	65 51.9	96 29	160.5	66 20.7	96 30	160.1	8
9	62 42.5	96 29	160.3	63 11.3	96 30	159.9	63 40.0	96 30	159.6	64 08.6	95 31	159.3	64 37.3	95 31	158.9	65 05.8	95 32	158.6	65 34.4	95 32	158.2	66 02.8	95 33	157.8	9
10	62 24.9	95 32	158.2	62 53.4	95 33	157.9	63 21.8	95 33	157.5	63 50.2	95 34	157.1	64 18.5	94 34	156.8	64 46.8	94 35	156.4	65 15.0	94 35	156.0	65 43.1	94 36	155.6	10
1	62 05.6	94 35	156.2	62 33.8	94 35	155.9	63 01.9	94 36	155.4	63 30.0	94 36	155.1	63 58.0	93 37	154.6	64 26.0	93 37	154.2	64 53.9	93 38	153.8	65 21.7	93 39	153.4	1
2	61 44.7	93 37	154.2	62 12.6	93 38	153.8	62 40.5	93 38	153.4	63 08.2	92 39	153.0	63 35.9	92 39	152.6	64 03.6	92 40	152.1	64 31.1	92 41	151.7	64 58.5	91 41	151.2	2
3	61 22.3	92 40	152.3	61 49.9	92 40	151.9	62 17.5	92 41	151.5	62 44.9	91 41	151.0	63 12.3	91 42	150.6	63 39.5	91 43	150.1	64 06.7	90 43	149.6	64 33.8	90 44	149.1	3
4	60 58.5	91 42	150.4	61 25.8	91 43	150.0	61 53.0	90 43	149.5	62 20.1	90 44	149.0	62 47.1	90 44	148.6	63 14.0	90 45	148.1	63 40.8	89 46	147.6	64 07.5	89 46	147.1	4
15	60 33.2	90 44	148.6	61 00.2	90 45	148.1	61 27.0	89 45	147.7	61 53.8	89 46	147.2	62 20.5	89 47	146.7	62 47.0	88 47	146.2	63 13.4	88 48	145.7	63 39.8	88 49	145.1	15
6	60 06.7	89 46	146.8	60 33.3	89 47	146.3	60 59.8	88 48	145.8	61 26.2	88 48	145.3	61 52.5	87 49	144.8	62 18.7	87 49	144.3	62 44.7	87 50	143.8	63 10.6	86 51	143.2	6
7	59 38.8	88 48	145.0	60 05.0	87 49	144.6	60 31.2	87 50	144.1	60 57.3	87 50	143.6	61 23.2	86 51	143.0	61 49.0	86 51	142.5	62 14.7	85 52	142.0	62 40.2	85 53	141.4	7
8	59 09.7	87 50	143.3	59 35.6	86 51	142.9	60 01.4	86 52	142.3	60 27.1	85 52	141.8	60 52.7	85 53	141.3	61 18.1	85 53	140.7	61 43.4	84 54	140.2	62 08.6	84 55	139.6	8
9	58 39.4	85 52	141.7	59 05.0	85 53	141.3	59 30.5	85 53	140.7	59 55.8	84 54	140.1	60 21.0	84 55	139.6	60 46.1	83 55	139.0	61 11.0	83 56	138.5	61 35.8	82 56	137.9	9
20	58 08.0	84 54	140.1	58 33.3	84 55	139.6	58 58.4	84 55	139.1	59 23.4	83 56	138.5	59 48.2	83 56	138.0	60 12.9	82 57	137.4	60 37.5	82 58	136.8	61 01.9	81 58	136.2	20
1	57 35.6	83 56	138.5	58 00.5	83 56	138.0	58 25.3	82 57	137.5	58 49.9	82 57	136.9	59 14.4	81 58	136.4	59 38.7	81 59	135.8	60 02.9	80 59	135.2	60 27.0	80 60	134.6	1
2	57 02.2	82 57	137.0	57 26.7	82 58	136.5	57 51.2	81 58	135.9	58 15.5	81 59	135.4	58 39.6	80 60	134.8	59 03.6	80 60	134.2	59 27.4	79 61	133.6	59 51.1	79 61	133.0	2
3	56 27.8	81 59	135.5	56 52.0	81 59	135.0	57 16.1	80 60	134.5	57 40.1	80 60	133.9	58 03.8	79 61	133.3	58 27.5	79 62	132.7	58 51.0	78 62	132.1	59 14.3	77 63	131.5	3
4	55 52.5	80 60	134.1	56 16.4	79 61	133.6	56 40.2	79 61	133.0	57 03.8	78 62	132.5	57 27.2	78 62	131.9	57 50.5	77 63	131.3	58 13.7	77 64	130.7	58 36.6	76 64	130.1	4
25	55 16.4	79 62	132.7	55 40.0	78 62	132.2	56 03.4	78 63	131.6	56 26.7	77 63	131.1	56 49.8	77 64	130.5	57 12.8	76 64	129.9	57 35.5	76 65	129.3	57 58.2	75 65	128.7	25
6	54 39.4	78 63	131.4	55 02.7	77 63	130.8	55 25.8	77 64	130.3	55 48.8	76 64	129.7	56 11.6	76 65	129.1	56 34.2	75 65	128.5	56 56.7	75 66	127.9	57 19.0	74 67	127.3	6
7	54 01.7	77 64	130.1	54 24.7	76 65	129.5	54 47.5	76 65	128.9	55 10.1	75 66	128.4	55 32.6	75 66	127.8	55 54.9	74 67	127.2	56 17.1	74 67	126.6	56 39.0	73 68	126.0	7
8	53 23.3	76 65	128.8	53 45.6	76 65	128.2	54 08.5	75 66	127.7	54 30.8	74 67	127.1	54 53.0	74 67	126.5	55 15.0	73 68	125.9	55 36.8	73 68	125.3	55 58.5	72 69	124.7	8
9	52 44.2	75 66	127.5	53 06.6	74 67	127.0	53 28.5	74 67	126.4	53 50.8	73 68	125.9	54 12.7	73 68	125.2	54 34.4	72 69	124.7	54 55.9	71 69	124.1	55 17.3	71 70	123.5	9
30	52 04.4	74 67	126.3	52 26.5	73 68	125.8	52 48.4	73 68	125.2	53 10.2	72 69	124.6	53 31.8	72 69	124.1	53 53.2	71 70	123.5	54 14.4	70 70	122.9	54 35.5	70 71	122.3	30
1	51 24.1	73 68	125.2	51 45.9	72 69	124.6	52 07.5	72 69	124.0	52 29.0	71 70	123.5	52 50.3	71 70	122.9	53 11.4	70 70	122.3	53 32.4	70 71	121.7	53 53.1	69 71	121.1	1
2	50 43.1	72 69	124.0	51 04.6	71 70	123.5	51 26.0	71 70	122.9	51 47.2	70 70	122.3	52 08.2	70 71	121.8	52 29.1	69 71	121.2	52 49.8	69 72	120.6	53 10.3	68 72	120.0	2
3	50 01.6	71 70	122.9	50 22.9	71 70	122.3	50 44.0	70 71	121.7	51 04.9	70 71	121.2	51 25.7	69 72	120.6	51 46.3	68 72	120.1	52 06.8	67 73	119.4	52 27.0	67 73	118.9	3
4	49 19.6	70 71	121.8	49 40.6	70 71	121.3	50 01.5	69 72	120.7	50 22.2	69 72	120.2	50 42.7	68 73	119.6	51 03.0	68 73	119.0	51 23.2	67 73	118.4	51 43.2	66 74	117.8	4
35	48 37.1	69 72	120.8	48 57.9	69 72	120.2	49 18.5	68 73	119.7	49 38.9	68 73	119.1	49 59.2	67 73	118.5	50 19.3	67 74	118.0	50 39.2	66 74	117.4	50 59.0	65 74	116.8	35
6	47 54.1	69 72	119.7	48 14.7	68 73	119.2	48 35.0	68 73	118.6	48 55.2	67 73	118.1	49 15.3	67 74	117.5	49 35.2	66 74	116.9	49 54.9	65 75	116.4	50 14.4	65 75	115.8	6
7	47 10.7	68 73	118.7	47 31.0	67 73	118.2	47 51.2	67 74	117.6	48 11.2	66 74	117.1	48 31.0	66 74	116.5	48 50.6	65 75	116.0	49 10.1	65 75	115.4	49 29.4	64 76	114.8	7
8	46 26.9	67 74	117.8	46 47.0	67 74	117.2	47 06.9	66 74	116.7	47 26.7	66 75	116.1	47 46.3	65 75	115.6	48 05.7	64 75	115.0	48 25.0	64 76	114.4	48 44.1	63 76	113.8	8
9	45 42.7	66 74	116.8	46 02.6	66 75	116.3	46 22.3	65 75	115.7	46 41.8	65 75	115.2	47 01.2	64 76	114.6	47 20.5	64 76	114.1	47 39.5	63 76	113.5	47 58.4	63 77	112.9	9
40	44 58.1	66 75	115.9	45 17.8	65 75	115.3	45 37.3	65 76	114.8	45 56.7	64 76	114.3	46 15.8	64 76	113.7	46 34.9	63 76	113.1	46 53.7	63 77	112.6	47 12.4	62 77	112.0	40
1	44 13.2	65 75	115.0	44 32.7	65 76	114.4	44 52.0	64 76	113.9	45 11.1	64 76	113.4	45 30.1	63 77	112.8	45 49.0	63 77	112.2	46 07.7	62 77	111.7	46 26.2	61 78	111.1	1
2	43 28.0	64 76	114.1	43 47.2	64 76	113.5	44 06.4	63 77	113.0	44 25.3	63 77	112.5	44 44.1	62 77	111.9	45 02.8	62 77	111.4	45 21.4	61 78	110.8	45 39.6	61 78	110.3	2
3	42 42.4	64 76	113.2	43 01.5	63 77	112.7	43 20.4	63 77	112.2	43 39.2	62 78	111.6	43 57.9	62 78	111.1	44 16.4	61 78	110.5	44 34.7	61 78	110.0	44 52.8	60 78	109.4	3
4	41 56.5	63 77	112.4	42 15.4	63 77	111.8	42 34.2	62 77	111.3	42 52.8	62 78	110.8	43 11.3	61 78	110.2	43 29.6	61 78	109.7	43 47.8	60 78	109.1	44 05.8	60 79	108.6	4
45	41 10.4	63 77	111.5	41 29.1	62 78	111.0	41 47.7	62 78	110.5	42 06.2	61 78	110.0	42 24.5	61 78	109.4	42 42.7	60 79	108.9	43 00.7	60 79	108.3	43 18.6	59 79	107.8	45
6	40 24.0	62 78	110.7	40 42.6	62 78	110.2	41 01.0	61 78	109.7	41 19.3	61 78	109.1	41 37.5	60 79	108.6	41 55.5	60 79	108.1	42 13.4	59 79	107.5	42 31.1	59 79	107.0	6
7	39 37.3	62 78	109.9	39 55.8	61 78	109.4	40 14.1	61 79	108.9	40 32.2	60 79	108.4	40 50.2	60 79	107.8	41 08.1	59 79	107.3	41 25.8	59 79	106.8	41 43.4	58 80	106.2	7
8	38 50.5	61 78	109.1	39 08.7	61 79	108.6	39 26.9	60 79	108.1	39 44.9	60 79	107.6	40 02.8	59 80	107.1	40 20.5	59 80	106.5	40 38.1	58 80	106.0	40 55.6	58 80	105.5	8
9	38 03.3	61 79	108.4	38 21.5	60 79	107.8	38 39.5	60 79	107.3	38 57.4	59 80	106.8	39 15.1	59 80	106.3	39 32.7	58 80	105.8	39 50.2	58 80	105.2	40 07.5	57 80	104.7	9
50	37 16.0	60 79	107.6	37 34.0	60 79	107.1	37 51.9	59 80	106.6	38 09.7	59 80	106.1	38 27.3	59 80	105.6	38 44.8	58 80	105.0	39 02.1	58 80	104.5	39 19.3	57 81	104.0	50
1	36 28.5	60 79	106.9	36 46.4	59 80	106.4	37 04.2	59 80	105.8	37 21.8	59 80	105.3	37 39.3	58 80	104.8	37 56.7	58 80	104.3	38 13.9	57 81	103.8	38 31.0	57 81	103.3	1
2	35 40.8	59 80	106.1	35 58.6	59 80	105.6	36 16.2	58 80	105.1	36 33.8	58 80	104.6	36 51.1	58 81	104.1	37 08.4	57 81	103.6	37 25.5	57 81	103.1	37 42.5	56 81	102.6	2
3	34 53.0	59 80	105.4	35 10.6	58 80	104.9	35 28.1	58 80	104.4	35 45.5	58 81	103.9	36 02.8	57 81	103.4	36 20.0	57 81	102.9	36 37.0	57 81	102.4	36 53.9	56 81	101.9	3
4	34 04.9	58 80	104.7	34 22.5	58 80	104.2	34 39.9	58 81	103.7	34 57.2	57 81	103.2	35 14.4	57 81	102.7	35 31.4	57 81	102.2	35 48.4	56 81	101.7	36 05.2	56 81	101.2	4
55	33 16.7	58 81	104.0	33 34.2	58 81	103.5	33 51.5	58 81	103.0	34 08.7	57 81	102.5	34 25.8	57 81	102.0	34 42.7	56 81	101.5	34 59.6	56 82	101.0	35 16.3	56 82	100.5	55
6	32 28.4	58 81	103.3	32 45.7	58 81	102.8	33 03.0	57 81	102.3	33 20.1	57 81	101.9	33 37.1	56 81	101.4	33 53.9	56 82	100.9	34 10.6	56 82	100.4	34 27.3	55 82	99.9	6
7	31 39.9	58 81	102.6	31 57.2	57 81	102.2	32 14.3	57 81	101.7	32 31.3	56 81	101.2	32 48.2	56 82	100.7	33 05.0	56 82	100.2	33 21.7	55 82	99.7	33 38.3	55 82	99.2	7
8	30 51.3	57 81	102.0	31 08.5	57 81	101.5	31 25.5	57 81	101.0	31 42.5	56 82	100.5	31 59.3	56 82	100.0	32 16.0	55 82	99.6	32 32.7	55 82	99.1	32 49.1	55 82	98.6	8
9	30 02.6	57 81	101.3	30 19.7	57 82	100.8	30 36.7	56 82	100.4	30 53.5	56 82	99.9	31 10.3	55 82	99.4	31 26.9	55 82	98.9	31 43.5	55 82	98.4	31 59.9	55 82	97.9	9
60	29 13.8	57 82	100.7	29 30.8	57 82	100.2	29 47.7	56 82	99.7	30 04.5	56 82	99.2	30 21.2	55 82	98.8	30 37.8	55 82	98.3	30 54.2	55 82	97.8	31 10.6	54 82	97.3	60
1	28 24.8	57 82	100.0	28 41.8	57 82	99.6	28 58.6	56 82	99.1	29 15.3	56 82	98.6	29 32.0	55 82	98.1	29 48.5	55 82	97.6	30 04.9	54 82	97.2	30 21.2	54 82	96.7	1
2	27 35.8	56 82	99.4	27 52.7	56 82	98.9	28 09.4	56 82	98.5	28 26.1	55 82	98.0	28 42.7	55 82	97.5	28 59.2	54 82	97.0	29 15.5	54 82	96.5	29 31.8	54 82	96.1	2
3	26 46.7	56 82	98.8	27 03.5	56 82	98.3	27 20.2	56 82	97.8	27 36.8	55 82	97.4	27 53.3	54 82	96.9	28 09.8	54 83	96.4	28 26.1	54 82	95.9	28 42.3	54 82	95.5	3
4	25 57.5	56 82	98.1	26 14.2	56 82	97.7	26 30.9	55 82	97.2	26 47.5	55 82	96.8	27 03.9	54 82	96.3	27 20.3	54 82	95.8	27 36.6	54 83	95.3	27 52.8	54 83	94.9	4
65	25 08.2	56 82	97.5	25 24.9	56 82	97.1	25 41.5	55 82	96.6	25 58.0	55 82	96.1	26 14.5	54 83	95.7	26 30.8	54 83	95.2	26 47.0	54 83	94.7	27 03.2	54 83	94.3	65
6	24 18.9	56 82	96.9	24 35.5	55 82	96.5	24 52.1	55 82	96.0	25 08.5	55 82	95.5	25 24.9	54 83	95.1	25 41.2	54 83	94.6	25 57.4	54 83	94.2	26 13.6	54 83	93.7	6
7	23 29.5	56 82	96.3	23 46.1	55 82	95.9	24 02.6	55 82	95.4	24 19.0	55 82	95.0	24 35.4	54 83	94.5	24 51.6	54 83	94.0	25 07.8	54 83	93.6	25 23.9	53 83	93.1	7
8	22 40.0	55 83	95.7	22 56.5	55 82	95.3	23 13.0	55 82	94.8	23 29.4	54 82	94.4	23 45.8	54 83	93.9	24 02.0	54 83	93.4	24 18.2	53 83	93.0	24 34.2	53 83	92.5	8
9	21 50.5	55 83	95.1	22 07.0	55 83	94.7	22 23.4	55 82	94.2	22 39.8	54 83	93.8	22 56.1	54 83	93.3	23 12.3	54 83	92.9	23 28.5	53 83	92.4	23 44.5	53 83	91.9	9
70	21 00.9	55 83	94.5	21 17.4	55 83	94.0	21 33.8	55 83	93.7	21 50.2	54 83	93.2	22 06.4	54 83	92.7	22 22.6	54 83	92.3	22 38.8	53 83	91.8	22 54.8	53 83	91.4	70
1	20 11.3	55 83	94.0	20 27.8	55 83	93.5	20 44.2	55 83	93.1	21 00.5	54 83	92.6	21 16.7	54 83	92.2	21 32.9	53 83	91.7	21 49.0	53 83	91.3	22 05.1	53 83	90.8	1
2	19 21.7	55 83	93.4	19 38.1	55 83	92.9	19 54.5	54 83	92.5	20 10.8	54 83	92.1	20 27.0	54 83	91.6	20 43.2	53 83	91.2	20 59.3	53 83	90.7	21 15.3	53 83	90.2	2
3	18 32.0	55 83	92.8	18 48.4	55 83	92.4	19 04.8	54 83	91.9	19 21.1	54 83	91.5	19 37.3	54 83	91.0	19 53.5	53 83	90.6	20 09.6	53 83	90.1	20 25.6	53 83	89.7	3
4	17 42.3	55 83	92.2	17 58.7	54 83	91.8	18 15.0	54 83	91.4	18 31.3	54 83	90.9	18 47.6	54 83	90.5	19 03.7	54 83	90.0	19 19.7	53 83	89.6	19 35.9	53 83	89.1	4
75	16 52.6	55 83	91.7	17 09.0	54 83	91.2	17 25.3	54 83	90.8	17 41.6	54 83	90.4	17 57.8	54 83	89.9	18 14.0	54 83	89.5	18 30.1	53 83	89.0	18 46.1	53 83	88.6	75
6	16 02.9	55 83	91.1	16 19.2	54 83	90.7	16 35.6	54 83	90.2	16 51.9	54 83	89.8	17 08.1	54 83	89.4	17 24.2	54 83	88.9	17 40.4	53 83	88.5	17 56.4	53 83	88.0	6
7	15 13.1	55 83	90.5	15 29.5	54 83	90.1	15 45.8	54 83	89.7	16 02.1	54 83	89.2	16 18.3	54 83	88.8	16 34.5	54 83	88.4	16 50.6	53 83	87.9	17 06.7	53 83	87.5	7
8	14 23.4	55 83	90.0	14 39.8	54 83	89.6	14 56.1	54 83	89.1	15 12.4	54 83	88.7	15 28.6	54 83	88.2	15 44.8	54 83	87.8	16 00.9	53 83	87.4	16 17.0	53 83	86.9	8
9	13 33.6	55 83	89.4	13 50.0	54 83	89.0	14 06.4	54 83	88.6	14 22.7	54 83	88.1	14 38.9	54 83	87.7	14 55.0	53 83	87.3	15 11.1	53 83	86.8	15 27.1	53 83	86.4	9
80	12 43.9	55 83	88.9	13 00.3	54 83	88.4	13 16.6	54 83	88.0	13 33.0	54 83	87.6	13 49.2	54 83	87.1	14 05.4	54 83	86.7	14 21.6	54 83	86.3	14 37.7	54 83	85.8	80
1	11 54.2	55 83	88.3	12 10.6	54 83	87.9	12 26.9	54 83	87.5	12 43.3	54 83	87.0	12 59.5	54 83	86.6	13 15.8	54 83	86.2	13 32.0	54 83	85.7	13 48.1	54 83	85.3	1
2	11 04.5	55 83	87.8	11 20.9	54 83	87.3	11 37.3	54 83	86.9	11 53.6	54 83	86.5	12 09.9	54 83	86.1	12 26.2	54 83	85.6	12 42.4	54 83	85.2	12 58.6	54 83	84.8	2
3	10 14.8	55 83	87.2	10 31.2	54 83	86.8	10 47.6	54 83	86.4	11 04.0	54 83	85.9	11 20.3	54 83	85.5	11 36.6	54 83	85.1	11 52.9	54 83	84.6	12 09.1	54 83	84.2	3
4	9 25.1	55 83	86.7	9 41.5	54 83	86.2	9 58.0	55 83	85.8	10 14.4	55 83	85.4	10 30.7	54 83	85.0	10 47.1	54 83	84.5	11 03.3	54 82	84.1	11 19.6	54 82	83.7	4
85	8 35.4	55 83	86.1	8 51.9	55 83	85.7	9 08.4	55 83	85.3	9 24.8	55 83	84.8	9 41.2	55 82	84.4	9 57.6	54 82	84.0	10 13.9	54 82	83.6	10 30.2	54 82	83.1	85
6	7 45.8	55 83	85.6	8 02.3	55 83	85.1	8 18.8	55 83	84.7	8 35.3	55 82	84.3	8 51.7	55 82	83.9	9 08.1	54 82	83.4	9 24.5	54 82	83.0	9 40.8	54 82	82.6	6
7	6 56.3	55 82	85.0	7 12.8	55 82	84.6	7 29.3	55 82	84.2	7 45.8	55 82	83.7	8 02.3	55 82	83.3	8 18.7	55 82	82.9	8 35.1	54 82	82.5	8 51.5	54 82	82.1	7
8	6 06.7	55 82	84.5	6 23.3	55 82	84.0	6 39.9	55 82	83.6	6 56.4	55 82	83.2	7 12.9	55 82	82.8	7 29.4	54 82	82.3	7 45.9	54 82	81.9	8 02.3	54 82	81.5	8
9	5 17.2	55 82	83.9	5 33.9	55 82	83.5	5 50.5	55 82	83.1	6 07.0	55 82	82.6	6 23.6	55 82	82.2	6 40.1	54 82	81.8	6 56.6	54 82	81.4	7 13.1	54 82	81.0	9
90				5 01.1	55 82	82.5	5 17.7	55 82	82.1	5 34.3	55 82	81.7	5 50.9	55 82	81.3	6 07.5	54 82	80.8	6 24.1	54 82	80.4				90

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 34°

H.A.	8° 00' Alt. Δd Δt Az.	8° 30' Alt. Δd Δt Az.	9° 00' Alt. Δd Δt Az.	9° 30' Alt. Δd Δt Az.	10° 00' Alt. Δd Δt Az.	10° 30' Alt. Δd Δt Az.	11° 00' Alt. Δd Δt Az.	11° 30' Alt. Δd Δt Az.	H.A.
00	48 00.0 1.0 01 180.0	47 30.0 1.0 01 180.0	47 00.0 1.0 01 180.0	46 30.0 1.0 01 180.0	46 00.0 1.0 01 180.0	45 30.0 1.0 01 180.0	45 00.0 1.0 01 180.0	44 30.0 1.0 01 180.0	00
1	47 59.4 1.0 03 178.5	47 29.4 1.0 03 178.5	46 59.4 1.0 03 178.6	46 29.4 1.0 03 178.6	45 59.4 1.0 03 178.6	45 29.4 1.0 03 178.6	44 59.4 1.0 03 178.6	44 29.4 1.0 03 178.6	1
2	47 57.4 1.0 05 177.0	47 27.5 1.0 05 177.1	46 57.5 1.0 05 177.1	46 27.5 1.0 05 177.1	45 57.5 1.0 05 177.2	45 27.6 1.0 05 177.2	44 57.6 1.0 05 177.2	44 27.6 1.0 05 177.3	2
3	47 54.2 1.0 07 175.6	47 24.3 1.0 07 175.6	46 54.3 1.0 07 175.7	46 24.4 1.0 07 175.7	45 54.5 1.0 07 175.8	45 24.5 1.0 07 175.8	44 54.6 1.0 07 175.8	44 24.6 1.0 07 175.9	3
4	47 49.7 1.0 10 174.1	47 19.9 1.0 09 174.2	46 50.0 1.0 09 174.2	46 20.1 1.0 09 174.3	45 50.2 1.0 09 174.3	45 20.3 1.0 09 174.4	44 50.4 1.0 09 174.5	44 20.5 1.0 09 174.5	4
05	47 44.9 99 12 172.7	47 14.2 99 12 172.7	46 44.3 99 11 172.8	46 14.5 99 11 172.9	45 44.7 99 11 172.9	45 14.8 99 11 173.0	44 45.0 99 11 173.1	44 15.1 99 11 173.2	05
6	47 37.0 99 14 171.2	47 07.2 99 14 171.3	46 37.5 99 14 171.4	46 07.7 99 14 171.4	45 37.9 99 13 171.5	45 08.2 99 13 171.6	44 38.4 99 13 171.7	44 08.6 99 13 171.8	6
7	47 28.7 99 16 169.7	46 59.1 99 16 169.8	46 29.4 99 16 169.9	45 59.7 99 15 170.0	45 30.0 99 15 170.1	45 00.3 99 15 170.2	44 30.6 99 15 170.3	44 00.9 99 15 170.4	7
8	47 19.2 99 18 168.3	46 49.7 99 18 168.4	46 20.1 99 18 168.5	45 50.5 99 17 168.6	45 20.9 99 17 168.8	44 51.3 99 17 168.9	44 21.7 99 17 169.0	43 52.1 99 17 169.1	8
9	47 08.5 98 20 166.8	46 39.0 98 20 167.0	46 09.6 98 19 167.1	45 40.1 98 19 167.2	45 10.6 98 19 167.4	44 41.1 98 19 167.5	44 11.6 98 19 167.6	43 42.1 98 19 167.8	9
10	46 56.6 98 22 165.4	46 27.2 98 22 165.6	45 57.9 98 21 165.7	45 28.5 98 21 165.9	44 59.2 98 21 166.2	44 29.8 98 21 166.2	44 00.4 98 21 166.3	43 31.0 98 20 166.4	10
1	46 43.4 97 24 164.0	46 14.2 97 24 164.2	45 45.0 97 23 164.3	45 15.8 97 23 164.5	44 46.6 97 23 164.6	44 17.3 97 23 164.8	43 48.1 97 22 165.0	43 18.8 97 22 165.1	1
2	46 29.2 97 26 162.6	46 00.1 97 26 162.8	45 31.0 97 25 163.0	45 01.9 97 25 163.1	44 32.8 97 25 163.3	44 03.7 97 24 163.5	43 34.6 97 24 163.6	43 05.4 97 24 163.8	2
3	46 13.7 96 28 161.2	45 44.8 96 27 161.4	45 15.9 96 27 161.6	44 47.0 96 27 161.8	44 18.0 97 27 162.0	43 49.0 97 26 162.1	43 20.0 97 26 162.3	42 51.0 97 26 162.5	3
4	45 57.1 96 29 160.0	45 28.4 96 29 160.0	44 59.6 96 29 160.3	44 30.8 96 28 160.5	44 02.1 96 28 160.6	43 33.2 96 28 160.8	43 04.4 96 28 161.0	42 35.5 96 28 161.2	4
15	45 39.4 95 31 158.5	45 10.9 95 31 158.7	44 42.3 95 31 158.9	44 13.7 95 30 159.1	43 45.0 95 30 159.3	43 16.4 96 30 159.5	42 47.7 96 30 159.7	42 19.0 96 29 159.9	15
6	45 20.7 95 33 157.1	44 52.3 95 33 157.4	44 23.9 95 32 157.6	43 55.4 95 32 157.8	43 27.0 95 32 158.0	42 58.5 95 32 158.3	42 30.0 95 31 158.5	42 01.4 95 31 158.7	6
7	45 00.8 94 35 155.8	44 32.6 94 34 156.1	44 04.4 94 34 156.3	43 36.1 94 34 156.5	43 07.8 94 34 156.8	42 39.5 94 33 157.0	42 11.2 94 33 157.2	41 42.8 95 33 157.4	7
8	44 39.9 93 36 154.5	44 11.9 93 36 154.8	43 43.9 94 35 155.0	43 15.8 94 35 155.3	42 47.7 94 35 155.5	42 19.6 94 35 155.7	41 51.4 94 35 156.0	41 23.2 94 34 156.2	8
9	44 18.0 93 38 153.2	43 50.2 93 38 153.5	43 22.4 93 37 153.7	42 54.5 93 37 154.0	42 26.6 93 37 154.2	41 58.7 93 36 154.5	41 30.7 93 36 154.7	41 02.7 93 36 155.0	9
20	43 55.1 92 40 152.0	43 27.5 92 39 152.2	42 59.9 92 39 152.5	42 32.2 92 39 152.8	42 04.5 92 38 153.0	41 36.8 93 38 153.3	41 09.0 93 38 153.5	40 41.2 93 37 153.8	20
1	43 31.2 91 41 150.7	43 03.9 91 41 151.0	42 36.4 91 41 151.3	42 09.0 92 40 151.5	41 41.5 92 40 151.8	41 13.9 92 40 152.1	40 46.3 92 39 152.3	40 18.7 92 39 152.6	1
2	43 06.4 91 43 149.5	42 39.3 91 42 149.8	42 12.0 91 42 150.0	41 44.8 91 42 150.3	41 17.5 91 41 150.6	40 50.2 91 41 150.9	40 22.8 91 41 151.1	39 55.4 91 40 151.4	2
3	42 40.7 90 44 148.5	42 13.7 90 44 148.5	41 46.7 90 44 148.8	41 19.7 90 43 149.1	40 52.6 90 43 149.4	40 25.5 90 43 149.7	39 58.3 91 42 150.0	39 31.1 91 42 150.2	3
4	42 14.1 89 46 147.0	41 47.3 89 45 147.3	41 20.6 89 45 147.6	40 53.7 89 45 147.9	40 26.9 90 44 148.2	39 59.9 90 44 148.5	39 33.0 90 44 148.8	39 06.0 90 43 149.1	4
25	41 46.6 88 47 145.9	41 20.1 88 47 146.2	40 53.5 89 46 146.5	40 26.9 89 46 146.8	40 00.3 89 46 147.1	39 33.6 89 45 147.4	39 06.8 89 45 147.7	38 40.0 89 45 148.0	25
6	41 18.3 88 49 144.7	40 52.0 88 48 145.0	40 25.6 88 48 145.3	39 59.3 88 47 145.6	39 32.8 88 47 146.0	39 06.3 88 47 146.3	38 39.8 88 46 146.6	38 13.2 89 46 146.9	6
7	40 49.1 87 50 143.6	40 23.1 87 50 143.9	39 56.9 87 49 144.2	39 30.8 87 49 144.5	39 04.6 87 48 144.8	38 38.3 88 48 145.1	38 11.8 88 48 145.4	37 45.6 88 47 145.8	7
8	40 19.2 86 51 142.4	39 53.3 86 51 142.8	39 27.5 86 50 143.1	39 01.5 87 50 143.4	38 35.5 87 50 143.7	38 09.5 87 49 144.1	37 43.4 87 49 144.4	37 17.3 87 49 144.7	8
9	39 48.5 85 52 141.3	39 22.9 85 52 141.7	38 57.2 86 52 142.0	38 31.5 86 51 142.3	38 05.7 86 51 142.7	37 39.9 86 51 143.0	37 14.0 86 50 143.3	36 48.1 86 50 143.6	9
30	39 17.0 84 54 140.2	38 51.6 85 53 140.6	38 26.2 85 53 140.9	38 00.7 85 52 141.3	37 35.2 85 52 141.6	37 09.6 85 52 141.9	36 43.9 86 51 142.2	36 18.2 86 51 142.6	30
1	38 44.8 84 55 139.2	38 19.7 84 54 139.5	37 54.5 84 54 139.9	37 29.2 84 54 140.2	37 03.9 84 53 140.5	36 38.5 85 53 140.9	36 13.1 85 53 141.2	35 47.6 85 52 141.5	1
2	38 12.0 83 56 138.1	37 47.0 83 56 138.5	37 22.1 83 55 138.8	36 57.0 84 55 139.2	36 32.0 84 54 139.5	36 06.8 84 54 139.8	35 41.6 84 54 140.2	35 16.3 84 53 140.5	2
3	37 38.4 82 57 137.1	37 13.7 82 57 137.4	36 49.0 83 56 137.8	36 24.2 83 56 138.1	35 59.3 83 56 138.5	35 34.4 83 55 138.8	35 09.4 83 55 139.2	34 44.4 84 54 139.5	3
4	37 04.2 81 58 136.1	36 39.7 82 58 136.4	36 15.2 82 57 136.8	35 50.7 82 57 137.1	35 26.0 82 57 137.5	35 01.3 82 56 137.8	34 36.6 83 56 138.2	34 11.7 83 55 138.5	4
35	36 29.4 81 59 135.1	36 05.1 81 59 135.4	35 40.9 81 58 135.8	35 16.5 81 58 136.1	34 52.1 81 58 136.5	34 27.6 82 57 136.8	34 03.1 82 57 137.2	33 38.5 82 56 137.5	35
6	35 53.9 80 60 134.1	35 29.9 80 60 134.4	35 05.9 80 60 134.8	34 41.7 81 59 135.2	34 17.5 81 59 135.5	33 53.3 81 58 135.9	33 29.0 81 58 136.2	33 04.6 81 58 136.6	6
7	35 17.9 79 61 133.1	34 54.1 79 61 133.5	34 30.3 80 60 133.8	34 06.4 80 60 134.2	33 42.4 80 60 134.6	33 18.3 80 59 134.9	32 54.2 80 59 135.3	32 30.1 81 58 135.6	7
8	34 41.3 78 62 132.1	34 17.7 78 62 132.5	33 54.1 79 61 132.9	33 30.4 79 61 133.3	33 06.7 79 60 133.6	32 42.8 79 60 134.0	32 19.0 80 60 134.3	31 55.0 80 59 134.7	8
9	34 04.1 78 63 131.2	33 40.8 78 62 131.6	33 17.4 78 62 132.0	32 53.9 78 62 132.3	32 30.4 79 61 132.7	32 06.8 79 61 133.1	31 43.1 79 61 133.4	31 19.4 79 60 133.8	9
40	33 26.4 77 64 130.3	33 03.3 77 63 130.7	32 40.1 77 63 131.0	32 16.9 78 63 131.4	31 53.6 78 62 131.8	31 30.2 78 62 132.2	31 06.7 78 62 132.5	30 43.2 78 61 132.9	40
1	32 48.2 76 64 129.4	32 25.3 76 64 129.8	32 02.3 77 64 130.1	31 39.3 77 63 130.5	31 16.2 77 63 130.9	30 53.0 77 63 131.3	30 29.8 78 62 131.6	30 06.5 78 62 132.0	1
2	32 09.6 76 65 128.5	31 46.9 76 65 128.9	31 24.1 76 65 129.3	31 01.1 76 64 129.6	30 38.4 76 64 130.0	30 15.4 77 64 130.4	29 52.4 77 63 130.8	29 29.3 77 63 131.1	2
3	31 30.4 75 66 127.6	31 07.9 75 66 128.0	30 45.3 75 65 128.4	30 22.7 76 65 128.8	30 00.0 76 65 129.1	29 37.3 76 64 129.5	29 14.4 76 64 129.9	28 51.6 76 64 130.3	3
4	30 50.8 74 67 126.8	30 28.5 74 66 127.1	30 06.1 75 66 127.5	29 43.7 75 66 127.9	29 21.2 75 65 128.3	28 58.7 75 65 128.7	28 36.0 75 65 129.0	28 13.4 76 64 129.4	4
45	30 10.7 73 68 125.9	29 48.6 74 67 126.3	29 26.4 74 67 126.7	29 04.2 74 67 127.1	28 41.9 74 66 127.5	28 19.6 75 66 127.8	27 57.2 75 66 128.2	27 34.7 75 65 128.6	45
6	29 30.2 73 68 125.1	29 08.3 73 68 125.5	28 46.3 73 68 125.8	28 24.3 74 67 126.2	28 02.2 74 67 126.6	27 40.1 74 67 127.0	27 17.9 74 66 127.4	26 55.6 74 66 127.8	6
7	28 49.3 72 69 124.2	28 27.6 72 69 124.6	28 05.8 73 68 125.0	27 44.0 73 68 125.4	27 22.1 73 68 125.8	27 00.2 73 67 126.2	26 38.1 74 67 126.6	26 16.1 74 67 126.9	7
8	28 07.9 72 70 123.4	27 46.4 72 69 123.8	27 24.9 72 69 124.2	27 03.3 72 69 124.6	26 41.6 72 68 125.0	26 19.8 73 68 125.4	25 58.0 73 68 125.8	25 36.1 73 67 126.1	8
9	27 26.2 71 70 122.6	27 04.9 71 70 123.0	26 43.5 72 70 123.4	26 22.1 72 69 123.8	26 00.6 72 69 124.2	25 39.0 72 69 124.6	25 17.4 72 68 125.0	24 55.7 72 68 125.4	9
50	26 44.2 70 71 121.9	26 23.0 71 70 122.2	26 01.9 71 70 122.6	25 40.6 71 70 123.0	25 19.3 71 70 123.4	24 57.9 71 69 123.8	24 36.5 72 69 124.2	24 15.0 72 69 124.6	50
1	26 01.7 70 71 121.1	25 40.8 70 71 121.5	25 19.8 70 71 121.9	24 58.7 70 70 122.3	24 37.6 71 70 122.7	24 16.4 71 70 123.0	23 55.1 71 70 123.4	23 33.8 71 69 123.8	1
2	25 19.0 69 72 120.3	24 58.2 69 72 120.7	24 37.4 70 71 121.1	24 16.5 70 71 121.5	23 55.5 70 71 121.9	23 34.5 70 70 122.3	23 13.5 70 70 122.7	22 52.3 71 70 123.1	2
3	24 35.9 69 72 119.6	24 15.3 69 72 120.0	23 54.6 69 72 120.4	23 33.9 69 72 120.7	23 13.1 69 71 121.1	22 52.3 70 71 121.5	22 31.4 70 71 121.9	22 10.5 70 70 122.3	3
4	23 52.4 68 73 118.8	23 32.0 68 73 119.2	23 11.5 69 72 119.6	22 51.0 69 72 120.0	22 30.4 69 72 120.4	22 09.7 69 71 120.8	21 48.9 69 71 121.2	21 28.3 70 71 121.6	4
55	23 08.7 67 73 118.1	22 48.5 68 73 118.5	22 28.1 68 73 118.9	22 07.8 68 73 119.3	21 47.3 68 72 119.7	21 26.9 68 72 120.1	21 06.3 69 72 120.5	20 45.7 69 71 120.9	55
6	22 24.7 67 74 117.4	22 04.6 67 74 117.8	21 44.4 67 73 118.2	21 24.2 68 73 118.6	21 04.0 68 73 119.0	20 43.7 68 72 119.4	20 23.3 68 72 119.8	20 02.9 68 72 120.1	6
7	21 40.4 66 74 116.7	21 20.4 67 74 117.1	21 00.4 67 74 117.5	20 40.4 67 74 117.9	20 20.3 67 73 118.3	20 00.1 67 73 118.7	19 39.9 67 73 119.0	19 19.7 68 72 119.4	7
8	20 55.8 66 75 116.0	20 36.0 66 74 116.4	20 16.2 66 74 116.8	19 56.3 66 74 117.2	19 36.3 67 74 117.6	19 16.4 67 73 118.0	18 56.3 67 73 118.3	18 36.2 67 73 118.7	8
9	20 10.9 66 75 115.3	19 51.3 66 75 115.7	19 31.6 66 75 116.1	19 11.9 66 74 116.5	18 52.1 66 74 116.9	18 32.3 66 74 117.3	18 12.4 66 74 117.7	17 52.5 67 73 118.0	9
60	19 25.8 65 76 114.6	19 06.3 65 75 115.0	18 46.8 65 75 115.4	18 27.2 65 75 115.8	18 07.6 66 75 116.2	17 47.9 66 74 116.6	17 28.2 66 74 117.0	17 08.4 66 74 117.4	60
1	18 40.5 64 76 113.9	18 21.1 65 76 114.3	18 01.7 65 76 114.7	17 42.3 65 75 115.1	17 22.8 65 75 115.5	17 03.3 65 75 115.9	16 43.7 65 75 116.3	16 24.1 65 74 116.7	1
2	17 54.9 64 76 113.2	17 35.7 64 76 113.6	17 16.4 64 76 114.0	16 57.1 64 76 114.4	16 37.8 65 75 114.8	16 18.4 65 75 115.2	15 59.0 65 75 115.6	15 39.5 65 75 116.0	2
3	17 09.0 63 77 112.6	16 50.0 64 77 113.0	16 30.9 64 76 113.4	16 11.7 64 76 113.8	15 52.6 64 76 114.2	15 33.3 64 76 114.5	15 14.0 64 75 114.9	14 54.7 64 75 115.4	3
4	16 23.0 63 77 111.9	16 04.1 63 77 112.3	15 45.1 63 77 112.7	15 26.1 63 76 113.1	15 07.1 64 76 113.5	14 48.0 64 76 113.9	14 28.8 64 76 114.3	14 09.7 64 75 114.7	4
65	15 36.8 63 77 111.3	15 18.0 63 77 111.7	14 59.1 63 77 112.1	14 40.3 63 77 112.5	14 21.3 63 77 112.9	14 02.4 63 76 113.3	13 43.4 63 76 113.7	13 24.4 64 76 114.1	65
6	14 50.3 62 78 110.6	14 31.6 62 78 111.0	14 12.9 62 77 111.4	13 54.2 63 77 111.8	13 35.4 63 77 112.2	13 16.6 63 76 112.6	12 57.7 63 76 113.0	12 38.8 63 76 113.4	6
7	14 03.7 62 78 110.0	13 45.1 62 78 110.4	13 26.5 62 78 110.8	13 07.9 62 77 111.2	12 49.3 62 77 111.6	12 30.6 62 77 112.0	12 11.8 62 77 112.4	11 53.1 62 77 112.8	7
8	13 16.8 61 78 109.4	12 58.4 61 78 109.8	12 39.8 62 78 110.2	12 21.4 62 78 110.6	12 02.9 62 78 111.0	11 44.4 62 77 111.4	11 25.8 62 77 111.8	11 07.1 62 77 112.2	8
9	12 29.8 61 79 108.8	12 11.5 61 78 109.2	11 53.2 61 78 109.6	11 34.8 61 78 110.0	11 16.4 61 78 110.4	10 57.9 62 78 110.8	10 39.5 62 77 111.2	10 21.0 62 77 111.6	9
70	11 42.6 61 79 108.1	11 24.4 61 79 108.5	11 06.2 61 79 108.9	10 47.9 61 78 109.3	10 29.7 61 78 109.8	10 11.3 61 78 110.2	9 53.0 61 78 110.6	9 34.6 61 78 111.0	70
1	10 55.3 60 79 107.5	10 37.2 60 79 107.9	10 19.1 60 79 108.3	10 00.9 61 79 108.7	9 42.8 61 78 109.1	9 24.5 61 78 109.5	9 06.3 61 78 110.0	8 48.1 61 78 110.4	1
2	10 07.8 60 79 106.9	9 49.8 60 79 107.3	9 31.8 60 79 107.7	9 13.7 60 79 108.1	8 55.7 60 79 108.5	8 37.6 60 79 108.9	8 19.5 60 78 109.3	8 01.3 60 78 109.8	2
3	9 20.1 60 80 106.3	9 02.2 60 80 106.7	8 44.3 60 79 107.1	8 26.4 60 79 107.5	8 08.4 60 79 107.9	7 50.5 60 79 108.3	7 32.5 60 79 108.8	7 14.4 60 79 109.2	3
4	8 32.3 59 80 105.7	8 14.5 59 80 106.1	7 56.7 59 80 106.5	7 38.9 59 79 106.9	7 21.0 60 79 107.3	7 03.2 60 79 107.8	6 45.3 60 79 108.2	6 27.4 60 79 108.6	4
75	7 44.3 59 80 105.1	7 26.6 59 80 105.5	7 08.9 59 80 105.9	6 51.2 59 80 106.4	6 33.5 59 80 106.8	6 15.7 59 79 107.2	5 57.9 59 79 107.6	5 40.1 59 79 108.0	75
6	6 56.2 59 80 104.5	6 38.7 59 80 105.0	6 21.0 59 80 105.4	6 03.4 59 80 105.8	5 45.8 59 80 106.2	5 28.1 59 80 106.6	5 10.4 59 79 107.0		6
7	6 08.0 58 81 104.0	5 50.5 58 80 104.4	5 33.0 58 80 104.8	5 15.5 58 80 105.2					7
8	5 19.7 58 81 103.4	5 02.3 58 81 103.8							8

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00' Alt. Az.	8° 30' Alt. Az.	9° 00' Alt. Az.	9° 30' Alt. Az.	10° 00' Alt. Az.	10° 30' Alt. Az.	11° 00' Alt. Az.	11° 30' Alt. Az.	H.A.
91						5 01.8 55 82 80.7	5 18.4 55 82 80.3	5 35.0 55 82 79.9	91

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 34°

H.A.	12° 00' Alt. (Δd Δt)	Az.	12° 30' Alt. (Δd Δt)	Az.	13° 00' Alt. (Δd Δt)	Az.	13° 30' Alt. (Δd Δt)	Az.	14° 00' Alt. (Δd Δt)	Az.	14° 30' Alt. (Δd Δt)	Az.	15° 00' Alt. (Δd Δt)	Az.	15° 30' Alt. (Δd Δt)	Az.	H.A.
00	68 00.0 1.00 02	180.0	68 30.0 1.00 02	180.0	69 00.0 1.00 02	180.0	69 30.0 1.00 02	180.0	70 00.0 1.00 02	180.0	70 30.0 1.00 02	180.0	71 00.0 1.00 02	180.0	71 30.0 1.00 02	180.0	00
1	67 58.9 1.00 06	177.4	68 28.8 1.00 06	177.3	68 58.8 1.00 06	177.3	69 28.8 1.00 06	177.2	69 58.8 1.00 06	177.2	70 28.7 1.00 06	177.1	70 58.7 1.00 06	177.0	71 28.7 1.00 07	177.0	1
2	67 55.5 1.00 09	174.8	68 25.4 1.00 10	174.7	68 55.3 1.00 10	174.6	69 25.2 1.00 10	174.5	69 55.1 1.00 10	174.3	70 25.0 1.00 10	174.2	70 54.9 1.00 11	174.1	71 24.7 1.00 11	173.9	2
3	67 49.8 99 13	172.2	68 19.6 99 13	172.0	68 49.4 99 14	171.9	69 19.2 99 14	171.7	69 49.0 99 14	171.5	70 18.7 99 14	171.4	70 48.5 99 15	171.2	71 18.2 99 15	170.9	3
4	67 42.0 99 17	169.6	68 11.6 99 17	169.4	68 41.3 99 17	169.2	69 10.9 99 18	169.0	69 40.5 99 18	168.8	70 10.0 99 18	168.5	70 39.6 99 19	168.3	71 09.1 98 19	168.0	4
05	67 32.0 98 20	167.1	68 01.4 98 21	166.9	68 30.8 98 21	166.6	69 00.0 98 21	166.3	69 29.6 98 21	166.0	69 58.9 98 23	165.7	70 28.2 98 23	165.4	70 57.5 98 23	165.1	05
6	67 19.8 97 24	164.6	67 49.0 97 24	164.3	68 18.2 97 25	164.0	68 47.4 97 25	163.7	69 16.5 97 26	163.3	69 45.5 97 26	163.0	70 14.6 97 27	162.6	70 43.5 96 27	162.2	6
7	67 05.6 97 27	162.2	67 34.5 96 28	161.8	68 03.4 96 28	161.4	68 32.3 96 29	161.1	69 01.1 96 29	160.7	69 29.9 96 30	160.3	69 58.6 96 30	159.9	70 27.2 95 31	159.5	7
8	66 49.4 96 30	159.8	67 18.0 95 31	159.4	67 46.6 95 31	159.0	68 15.2 95 32	158.6	68 43.6 95 33	158.1	69 12.0 95 33	157.7	69 40.4 94 34	157.2	70 08.6 94 34	156.7	8
9	66 31.2 95 33	157.4	66 59.5 94 34	157.0	67 27.8 94 35	156.6	67 56.0 94 35	156.1	68 24.1 94 36	155.6	68 52.2 93 36	155.2	69 20.1 93 37	154.6	69 48.0 93 38	154.1	9
10	66 11.2 93 36	155.1	66 39.2 93 37	154.7	67 07.1 93 38	154.2	67 34.9 93 38	153.7	68 02.7 92 40	153.2	68 30.3 92 40	152.7	68 57.8 92 40	152.1	69 25.2 91 41	151.6	10
1	65 49.4 92 39	152.9	66 17.0 92 40	152.4	66 44.5 92 40	151.9	67 12.0 91 41	151.4	67 39.3 91 42	150.9	68 06.5 91 43	150.3	68 33.6 90 43	149.7	69 00.6 90 44	149.1	1
2	65 25.9 91 42	150.7	65 53.1 91 43	150.2	66 20.3 90 43	149.7	66 47.3 90 44	149.1	67 14.2 90 45	148.6	67 41.0 89 45	148.0	68 07.7 89 46	147.4	68 34.2 88 47	146.7	2
3	65 00.8 90 44	148.6	65 27.6 89 45	148.1	65 54.4 89 46	147.5	66 21.0 89 46	147.0	66 47.5 88 47	146.4	67 13.8 88 48	145.8	67 40.0 87 49	145.1	68 06.1 87 49	144.5	3
4	64 34.1 88 47	146.6	65 00.6 88 48	146.0	65 26.9 88 48	145.4	65 53.1 87 49	144.8	66 19.2 87 50	144.2	66 45.1 86 50	143.6	67 10.8 86 51	142.9	67 36.4 85 52	142.3	4
15	64 06.0 87 49	144.6	64 32.0 87 50	144.0	64 58.0 86 51	143.4	65 23.7 86 51	142.8	65 49.4 85 52	142.2	66 14.8 85 53	141.5	66 40.1 85 53	140.9	67 05.3 83 54	140.2	15
6	63 36.5 86 51	142.7	64 02.1 85 52	142.1	64 27.6 85 53	141.5	64 53.0 84 53	140.8	65 18.2 84 54	140.2	65 43.2 83 55	139.5	66 08.1 83 56	138.8	66 32.7 83 56	138.1	6
7	63 05.6 84 53	140.8	63 30.9 84 54	140.2	63 56.0 83 55	139.6	64 20.9 83 55	138.9	64 45.7 82 56	138.3	65 10.3 82 57	137.6	65 34.7 81 58	136.9	65 58.9 80 58	136.2	7
8	62 33.6 83 55	139.0	62 58.5 83 56	138.4	63 23.2 82 57	137.8	63 47.7 81 57	137.1	64 12.0 81 58	136.5	64 36.2 80 59	135.8	65 00.0 80 59	135.1	65 23.9 79 60	134.3	8
9	62 00.4 82 57	137.3	62 24.9 81 58	136.7	62 49.2 81 58	136.0	63 13.3 80 59	135.3	63 37.2 79 60	134.7	64 00.9 79 60	134.0	64 24.5 78 61	133.3	64 47.7 78 62	132.5	9
20	61 26.1 81 59	135.6	61 50.2 80 59	135.0	62 14.1 79 60	134.3	62 37.8 79 61	133.7	63 01.3 78 61	133.0	63 24.6 77 62	132.3	63 47.7 77 63	131.6	64 10.6 76 64	130.8	20
1	60 50.8 79 60	134.0	61 14.5 79 61	133.3	61 38.0 78 62	132.7	62 01.3 77 62	132.0	62 24.4 77 63	131.3	62 47.4 76 64	130.6	63 10.1 75 64	129.9	63 32.5 75 65	129.2	1
2	60 14.6 78 62	132.4	60 37.9 77 63	131.8	61 01.0 77 63	131.1	61 23.9 76 64	130.5	61 46.7 75 64	129.8	62 09.2 75 65	129.1	62 31.5 74 66	128.3	62 53.5 73 66	127.6	2
3	59 37.4 77 63	130.9	60 00.3 76 64	130.3	60 23.1 76 65	129.6	60 45.7 75 65	128.9	61 08.0 74 66	128.3	61 30.1 73 66	127.5	61 52.1 73 67	126.8	62 13.7 72 68	126.1	3
4	58 59.4 76 65	129.4	59 22.0 75 65	128.8	59 44.4 74 66	128.1	60 06.6 74 66	127.5	60 28.5 73 67	126.8	60 50.3 72 68	126.1	61 11.9 71 68	125.4	61 33.2 71 69	124.6	4
25	58 20.6 74 66	128.0	58 42.8 74 66	127.4	59 04.9 73 67	126.7	59 26.7 72 68	126.1	59 48.3 72 68	125.4	60 09.8 71 69	124.7	60 30.9 70 69	124.0	60 51.9 69 70	123.2	25
6	57 41.0 73 67	126.7	58 03.0 73 68	126.0	58 24.7 72 68	125.4	58 46.2 71 69	124.7	59 07.4 71 69	124.0	59 28.5 70 70	123.3	59 49.4 69 70	122.6	60 10.0 68 71	121.9	6
7	57 00.8 72 68	125.3	57 22.4 72 69	124.7	57 43.8 71 69	124.1	58 04.9 70 70	123.4	58 25.9 70 70	122.7	58 46.6 69 71	122.0	59 07.2 68 71	121.3	59 27.4 67 72	120.6	7
8	56 19.9 71 69	124.0	56 41.2 71 70	123.4	57 02.2 70 70	122.8	57 23.1 69 71	122.1	57 43.8 68 71	121.4	58 04.2 68 72	120.8	58 24.4 67 72	120.0	58 44.3 66 73	119.3	8
9	55 38.4 70 70	122.8	55 59.4 70 71	122.2	56 20.1 69 71	121.6	56 40.7 68 72	120.9	57 01.0 68 72	120.2	57 21.2 67 73	119.5	57 41.1 66 73	118.8	58 00.7 65 74	118.1	9
30	54 56.3 69 71	121.6	55 17.0 69 72	121.0	55 37.5 68 72	120.4	55 57.7 67 72	119.7	56 17.8 66 73	119.0	56 37.6 66 73	118.4	56 57.2 65 74	117.7	57 16.6 64 74	117.0	30
1	54 13.7 68 72	120.5	54 34.1 68 72	119.8	54 54.3 67 73	119.2	55 14.3 66 73	118.6	55 34.1 66 74	117.9	55 53.6 65 74	117.2	56 13.0 64 75	116.5	56 32.1 63 75	115.8	1
2	53 30.6 67 73	119.4	53 50.7 67 73	118.7	54 10.7 66 74	118.1	54 30.4 65 74	117.4	54 49.9 65 74	116.8	55 09.2 64 75	116.1	55 28.2 63 75	115.4	55 47.1 62 76	114.8	2
3	52 47.0 67 73	118.3	53 06.9 66 74	117.6	53 26.6 65 74	117.0	53 46.0 65 75	116.4	54 05.3 64 75	115.8	54 24.3 63 75	115.1	54 43.1 62 76	114.4	55 01.7 62 76	113.7	3
4	52 03.0 66 74	117.2	52 22.6 65 74	116.6	52 42.0 64 75	116.0	53 01.2 64 75	115.3	53 20.3 63 76	114.7	53 39.1 62 76	114.0	53 57.6 62 76	113.4	54 16.0 61 77	112.7	4
35	51 18.6 65 75	116.2	51 37.9 64 75	115.6	51 57.1 64 75	114.9	52 16.1 63 76	114.3	52 34.9 62 76	113.7	52 53.4 62 77	113.0	53 11.8 61 77	112.4	53 29.9 60 77	111.7	35
6	50 33.7 64 75	115.2	50 52.9 64 76	114.6	51 11.8 63 76	113.9	51 30.6 62 76	113.3	51 49.1 62 77	112.7	52 07.5 61 77	112.0	52 25.6 60 77	111.4	52 43.6 59 78	110.7	6
7	49 48.5 63 76	114.2	50 07.5 63 76	113.6	50 26.2 62 77	113.0	50 44.7 62 77	112.4	51 03.1 61 77	111.7	51 21.2 60 78	111.1	51 39.2 59 78	110.5	51 56.9 59 78	109.8	7
8	49 03.0 63 76	113.2	49 21.7 62 77	112.6	49 40.2 61 77	112.0	49 58.6 61 77	111.4	50 16.7 60 78	110.8	50 34.7 59 78	110.2	50 52.4 59 78	109.5	51 10.0 58 79	108.9	8
9	48 17.1 62 77	112.3	48 35.6 61 77	111.7	48 54.0 61 78	111.1	49 12.1 60 78	110.5	49 30.1 60 78	109.9	49 47.9 59 78	109.3	50 05.4 58 79	108.7	50 22.8 58 79	108.0	9
40	47 31.0 61 77	111.4	47 49.3 61 78	110.8	48 07.5 60 78	110.2	48 25.4 60 78	109.6	48 43.2 59 79	109.0	49 00.8 58 79	108.4	49 18.2 58 79	107.8	49 35.4 57 79	107.2	40
1	46 44.5 61 78	110.5	47 02.7 60 78	110.0	47 20.7 60 78	109.4	47 38.5 59 79	108.8	47 56.1 58 79	108.2	48 13.5 58 79	107.6	48 30.7 57 79	106.9	48 47.7 56 80	106.3	1
2	45 57.8 60 78	109.7	46 15.8 60 79	109.1	46 33.6 59 79	108.5	46 51.2 58 79	107.9	47 08.7 58 79	107.3	47 26.0 57 80	106.7	47 43.3 57 80	106.1	47 59.9 56 80	105.5	2
3	45 10.8 60 79	108.8	45 28.7 59 79	108.3	45 46.3 59 79	107.7	46 03.8 58 79	107.1	46 21.1 57 80	106.5	46 38.2 57 80	105.9	46 55.1 56 80	105.3	47 11.9 55 80	104.7	3
4	44 23.6 59 79	108.0	44 41.3 59 79	107.5	44 58.8 58 80	106.9	45 16.2 58 80	106.3	45 33.3 57 80	105.7	45 50.3 56 80	105.1	46 07.1 56 80	104.5	46 23.7 55 81	103.9	4
45	43 36.2 59 79	107.2	43 53.8 58 80	106.7	44 11.1 58 80	106.1	44 28.3 57 80	105.5	44 45.3 56 80	104.9	45 02.2 56 80	104.4	45 18.8 55 81	103.8	45 35.3 55 81	103.2	45
6	42 48.6 58 80	106.4	43 06.0 58 80	105.9	43 23.2 57 80	105.3	43 40.3 57 80	104.8	43 57.2 56 80	104.2	44 13.9 56 81	103.6	44 30.5 55 81	103.0	44 46.8 54 81	102.4	6
7	42 00.8 58 80	105.7	42 18.1 57 80	105.1	42 35.2 57 80	104.6	42 52.1 56 81	104.0	43 08.9 56 81	103.4	43 25.5 55 81	102.9	43 41.9 54 81	102.3	43 58.2 54 81	101.7	7
8	41 12.8 57 80	104.9	41 30.0 57 80	104.4	41 47.0 56 81	103.8	42 03.8 56 81	103.3	42 20.4 55 81	102.7	42 36.9 55 81	102.1	42 53.3 54 81	101.6	43 09.4 54 81	101.0	8
9	40 24.7 57 80	104.2	40 41.7 56 81	103.6	40 58.6 56 81	103.1	41 15.3 55 81	102.5	41 31.8 55 81	102.0	41 48.2 54 81	101.4	42 04.5 54 82	100.9	42 20.5 53 82	100.3	9
50	39 36.4 57 81	103.5	39 53.3 56 81	102.9	40 10.1 56 81	102.4	40 26.7 55 81	101.8	40 43.1 55 81	101.3	40 59.4 54 82	100.7	41 15.6 54 82	100.2	41 31.5 53 82	99.6	50
1	38 47.9 56 81	102.7	39 04.8 56 81	102.2	39 21.4 55 81	101.7	39 37.9 55 81	101.1	39 54.3 54 82	100.6	40 10.5 54 82	100.0	40 26.5 53 82	99.5	40 42.4 53 82	98.9	1
2	37 59.4 56 81	102.0	38 16.1 55 81	101.5	38 32.6 55 81	100.9	38 49.1 54 82	100.4	39 05.3 54 82	99.9	39 21.5 53 82	99.4	39 37.4 53 82	98.8	39 53.2 52 82	98.3	2
3	37 10.7 56 81	101.4	37 27.3 55 81	100.8	37 43.8 55 82	100.3	38 00.1 54 82	99.8	38 16.3 54 82	99.2	38 32.3 53 82	98.7	38 48.2 53 82	98.2	39 04.0 52 82	97.6	3
4	36 21.8 55 82	100.7	36 38.4 55 82	100.2	36 54.8 54 82	99.6	37 11.0 54 82	99.1	37 27.1 53 82	98.6	37 43.1 53 82	98.0	37 59.0 52 82	97.5	38 14.6 52 82	97.0	4
55	35 32.9 55 82	100.0	35 49.4 55 82	99.5	36 05.7 54 82	99.0	36 21.9 54 82	98.5	36 37.9 53 82	97.9	36 53.8 53 82	97.4	37 09.6 52 82	96.9	37 25.2 52 82	96.3	55
6	34 43.9 54 82	99.3	35 00.2 54 82	98.8	35 16.5 54 82	98.3	35 32.6 54 82	97.8	35 48.6 53 82	97.3	36 04.5 52 82	96.7	36 20.2 52 82	96.2	36 35.8 52 82	95.7	6
7	33 54.7 54 82	98.7	34 11.0 54 82	98.2	34 27.2 54 82	97.7	34 43.3 53 82	97.2	34 59.2 53 82	96.7	35 15.0 52 82	96.1	35 30.7 52 82	95.6	35 46.2 52 82	95.1	7
8	33 05.5 54 82	98.1	33 21.8 54 82	97.6	33 37.9 53 82	97.1	33 53.9 53 82	96.5	34 09.8 52 82	96.0	34 25.6 52 82	95.5	34 41.2 52 82	95.0	34 56.7 51 83	94.5	8
9	32 16.2 54 82	97.4	32 32.4 54 82	96.9	32 48.5 53 82	96.4	33 04.5 53 82	95.9	33 20.3 53 83	95.4	33 36.0 52 83	94.9	33 51.6 51 83	94.4	34 07.1 51 83	93.9	9
60	31 26.9 54 82	96.8	31 43.0 54 82	96.3	31 59.1 53 83	95.8	32 15.0 53 83	95.3	32 30.8 52 83	94.8	32 46.4 52 83	94.3	33 02.0 51 83	93.8	33 17.4 51 83	93.3	60
1	30 37.5 54 82	96.2	30 53.6 53 83	95.7	31 09.5 53 83	95.2	31 25.4 53 83	94.7	31 41.2 52 83	94.2	31 56.8 51 83	93.7	32 12.3 51 83	93.2	32 27.7 51 83	92.7	1
2	29 48.0 54 83	95.6	30 04.0 53 83	95.1	30 20.0 53 83	94.6	30 35.8 53 83	94.1	30 51.5 52 83	93.6	31 07.2 52 83	93.1	31 22.7 51 83	92.6	31 38.0 51 83	92.1	2
3	28 58.4 54 83	95.0	29 14.5 53 83	94.5	29 30.4 53 83	94.0	29 46.2 53 83	93.5	30 01.9 52 83	93.0	30 17.5 52 83	92.5	30 33.0 51 83	92.0	30 48.3 51 83	91.5	3
4	28 08.9 53 83	94.4	28 24.9 53 83	93.9	28 40.7 53 83	93.4	28 56.5 52 83	92.9	29 12.2 52 83	92.4	29 27.8 52 83	92.0	29 43.2 51 83	91.5	29 58.6 51 83	91.0	4
65	27 19.3 53 83	93.8	27 35.2 53 83	93.3	27 51.1 52 83	92.8	28 06.8 52 83	92.4	28 22.5 52 83	91.9	28 38.1 52 83	91.4	28 53.5 51 83	90.9	29 08.9 51 83	90.4	65
6	26 29.6 53 83	93.2	26 45.5 53 83	92.7	27 01.4 52 83	92.3	27 17.1 52 83	91.8	27 32.8 52 83	91.3	27 48.3 51 83	90.8	28 03.8 51 83	90.3	28 19.1 51 83	89.8	6
7	25 39.9 53 83	92.6	25 55.8 53 83	92.2	26 11.7 52 83	91.7	26 27.4 52 83	91.2	26 43.0 52 83	90.7	26 58.6 51 83	90.3	27 14.0 51 83	89.8	27 29.4 51 83	89.3	7
8	24 50.2 53 83	92.1	25 06.1 53 83	91.6	25 21.9 52 83	91.1	25 37.7 52 83	90.6	25 53.3 52 83	90.2	26 08.8 51 83	89.7	26 24.3 51 83	89.2	26 39.6 51 83	88.7	8
9	24 00.5 53 83	91.5	24 16.4 53 83	91.0	24 32.2 53 83	90.6	24 47.9 52 83	90.1	25 03.6 52 83	89.6	25 19.1 52 83	89.1	25 34.5 51 83	88.7	25 49.9 51 83	88.2	9
70	23 10.8 53 83	90.9	23 26.7 53 83	90.5	23 42.5 53 83	90.0	23 58.2 52 83	89.5	24 13.8 52 83	89.1	24 29.4 52 83	88.6	24 44.8 51 83	88.1	25 00.2 51 83	87.6	70
1	22 21.0 53 83	90.4	22 36.9 53 83	89.9	22 52.7 53 83	89.4	23 08.4 52 83	89.0	23 24.1 52 83	88.5	23 39.6 52 83	88.0	23 55.1 51 83	87.6	24 10.5 51 83	87.1	1
2	21 31.3 53 83	89.8	21 47.2 53 83	89.3	22 03.0 53 83	88.9	22 18.7 52 83	88.4	22 34.4 52 83	88.0	22 49.9 52 83	87.5	23 05.4 51 83	87.0	23 20.9 51 83	86.6	2
3	20 41.6 53 83	89.2	20 57.4 53 83	88.8	21 13.3 53 83	88.3	21 29.0 52 83	87.9	21 44.7 52 83	87.4	22 00.3 52 83	87.0	22 15.8 52 83	86.5	22 31.2 51 83	86.0	3
4	19 51.8 53 83	88.7	20 07.7 53 83	88.2	20 23.5 53 83	87.8	20 39.3 52 83	87.3	20 55.0 52 83	86.9	21 10.6 52 83	86.4	21 26.1 52 83	86.0	21 41.6 51 83	85.5	4
75	19 02.1 53 83	88.1	19 18.0 53 83	87.7	19 33.8 53 83	87.2	19 49.6 53 83	86.8	20 05.3 52 83	86.3	20 21.0 52 83	85.9	20 36.5 52 83	85.4	20 52.0 52 83	85.0	75
6	18 12.4 53 83	87.6	18 28.3 53 83	87.1	18 44.2 53 83	86.7	19 00.0 53 83	86.2	19 15.7 52 83	85.8	19 31.4 52 83	85.3	19 47.0 52 83	84.9	20 02.5 52 82	84.4	6
7	17 22.7 53 83	87.0	17 38.6 53 83	86.6	17 54.5 53 83	86.1	18 10.4 53 83	85.7	18 26.1 52 83	85.3	18 41.8 52 83	84.8	18 57.5 52 83	84.4	19 13.0 52 82	83.9	7
8	16 33.0 53 83	86.5	16 49.0 53 83	86.1	17 04.9 53 83	85.6	17 20.8 53 83	85.2	17 36.6 52 83	84.7	17 52.3 52 83	84.3	18 08.0 52 82	83.8	18 23.6 52 82	83.4	8
9	15 43.4 53 83	85.9	15 59.4 53 83	85.5	16 15.3 53 83	85.1	16 31.2 53 83	84.6	16 47.1 52 83	84.2	17 02.8 52 82	83.7	17 18.5 52 82	83.3	17 34.2 52 82	82.8	9
80	14 53.8 54 83	85.4	15 09.8 53 83	85.0	15 25.8 53 82	84.5	15 41.7 53 82	84.1	15 57.6 52 83	83.6	16 13.4 52 82	83.2	16 29.2 52 82	82.8	16 44.9 52 82	82.3	80
1	14 04.2 54 83	84.9	14 20.3 53 82	84.4	14 36.3 53 82	84.0	14 52.3 53 82	83.6	15 08.2 52 82	83.1	15 24.0 52 82	82.7	15 39.9 52 82	82.2	15 55.6 52 82	81.8	1
2	13 14.7 54 82	84.3	13 30.8 54 82	83.9	13 46.9 53 82	83.5	14 02.9 53 82	83.0	14 18.8 53 82	82.6	14 34.7 53 82	82.1	14 50.6 52 82	81.7	15 06.4 52 82	81.3	2
3	12 25.2 54 82	83.8	12 41.4 54 82	83.4	12 57.5 53 82	82.9	13 13.5 53 82	82.5	13 29.5 52 82	82.1	13 45.5 52 82	81.6	14 01.4 52 82	81.2	14 17.3 52 82	80.7	3
4	11 35.8 54 82	83.2	11 52.0 54 82	82.8	12 08.1 54 82	82.4	12 24.2 53 82	82.0	12 40.3 53 82	81.5	12 56.3 53 82	81.1	13 12.3 52 82	80.7	13 28.2 52 82	80.2	4
85	10 46.5 54 82	82.7	11 02.7 54 82	82.3	11 18.9 54 82	81.9	11 35.0 54 82	81.4	11 51.1 53 82	81.0	12 07.2 53 82	80.6	12 23.3 52 82	80.1	12 39.2 52 82	79.7	85
6	9 57.1 54 82	82.2	10 13.4 54 82	81.7	10 29.7 54 82	81.3	10 45.9 54 82	80.9	11 02.0 53 82	80.5	11 18.2 53 82	80.0	11 34.3 53 81	79.6	11 50.4 53 81	79.2	6
7	9 07.9 54 82	81.6	9 24.2 54 82	81.2	9 40.5 54 82	80.8	9 56.8 54 82	80.4	10 13.0 54 82	79.9	10 29.2 53 82	79.5	10 45.4 53 81	79.1	11 01.5 53 81	78.6	7
8	8 18.7 54 82	81.1	8 35.1 54 82	80.7	8 51.5 54 82	80.2	9 07.8 54 82	79.8	9 24.1 54 82	79.4	9 40.3 53 82	79.0	9 56.6 53 81	78.6	10 12.8 53 81	78.1	8
9	7 29.6 54 82	80.5	7 46.1 54 82	80.1	8 02.5 54 82	79.7	8 18.9 54 82	79.3	8 35.3 54 82	78.9	8 51.6 54 82	78.4	9 07.9 53 82	78.0	9 24.2 53 81	77.6	9
90	6 40.6 55 82	80.0	6 57.1 54 82	79.6	7 13.6 54 82	79.2	7 30.1 54 82	78.7	7 46.5 54 82	78.3	8 02.9 54 82	77.9	8 19.3 54 82	77.5	8 35.7 54 81	77.1	90

Lat. 34°

H.A.	12° 00' Alt.	Δd Δt	Az.	12° 30' Alt.	Δd Δt	Az.	13° 00' Alt.	Δd Δt	Az.	13° 30' Alt.	Δd Δt	Az.	14° 00' Alt.	Δd Δt	Az.	14° 30' Alt.	Δd Δt	Az.	15° 00' Alt.	Δd Δt	Az.	15° 30' Alt.	Δd Δt	Az.	H.A.
00	44 00.0	1.00 1.01	180.0	43 30.0	1.00 1.01	180.0	43 00.0	1.00 1.01	180.0	42 30.0	1.00 1.01	180.0	42 00.0	1.00 1.01	180.0	41 30.0	1.00 1.01	180.0	41 00.0	1.00 1.01	180.0	40 30.0	1.00 1.01	180.0	00
1	43 59.4	1.00 1.03	178.6	43 29.4	1.00 1.03	178.7	42 59.4	1.00 1.03	178.7	42 29.4	1.00 1.03	178.7	41 59.4	1.00 1.03	178.7	41 29.4	1.00 1.03	178.7	40 59.4	1.00 1.03	178.7	40 29.4	1.00 1.03	178.7	1
2	43 57.6	1.00 1.05	177.3	43 27.7	1.00 1.05	177.3	42 57.7	1.00 1.05	177.3	42 27.7	1.00 1.05	177.4	41 57.7	1.00 1.05	177.4	41 27.8	1.00 1.05	177.4	40 57.8	1.00 1.05	177.4	40 27.8	1.00 1.05	177.5	2
3	43 54.7	1.00 1.07	175.9	43 24.7	1.00 1.07	176.0	42 54.8	1.00 1.07	176.0	42 24.9	1.00 1.07	176.0	41 54.9	1.00 1.07	176.1	41 25.0	1.00 1.07	176.1	40 55.0	1.00 1.06	176.2	40 25.1	1.00 1.06	176.2	3
4	43 50.6	1.00 1.09	174.6	43 20.7	1.00 1.09	174.6	42 50.8	1.00 1.09	174.7	42 20.9	1.00 1.09	174.7	41 50.9	1.00 1.08	174.8	41 21.0	1.00 1.08	174.8	40 51.1	1.00 1.08	174.9	40 21.2	1.00 1.08	174.9	4
05	43 45.3	99 11	173.1	43 15.4	1.0 11	173.3	42 45.6	1.0 11	173.4	42 15.7	1.0 10	173.4	41 45.9	1.0 10	173.5	41 16.0	1.0 10	173.6	40 46.1	1.0 10	173.6	40 16.3	1.0 10	173.7	05
6	43 38.8	99 13	171.9	43 09.0	99 13	172.0	42 39.3	99 12	172.0	42 09.5	99 12	172.1	41 39.7	99 12	172.2	41 09.9	99 12	172.3	40 40.1	99 12	172.4	40 10.3	99 12	172.4	6
7	43 31.2	99 15	170.5	43 01.5	99 14	170.6	42 31.8	99 14	170.7	42 02.1	99 14	170.8	41 32.4	99 14	170.9	41 02.6	99 14	171.0	40 32.9	99 14	171.1	40 03.2	99 14	171.2	7
8	43 22.5	99 16	169.2	42 52.9	99 16	169.3	42 23.2	99 16	169.4	41 53.6	99 15	169.5	41 24.0	99 16	169.6	40 54.3	99 16	169.7	40 24.7	99 16	169.8	39 55.0	99 15	169.9	8
9	43 12.6	99 18	167.9	42 43.1	98 18	168.0	42 13.5	98 18	168.1	41 44.0	98 18	168.2	41 14.5	98 18	168.4	40 44.9	99 17	168.5	40 15.3	99 17	168.6	39 45.8	99 17	168.7	9
10	43 01.6	98 20	166.6	42 32.2	98 20	166.7	42 02.8	98 20	166.8	41 33.3	98 20	167.0	41 03.9	98 19	167.1	40 34.4	98 19	167.2	40 05.0	98 19	167.3	39 35.5	98 19	167.5	10
1	42 49.5	98 22	165.3	42 20.2	98 22	165.4	41 50.9	98 22	165.5	41 21.6	98 21	165.7	40 52.2	98 21	165.8	40 22.9	98 21	166.0	39 53.5	98 21	166.1	39 24.2	98 21	166.2	1
2	42 36.3	97 24	164.0	42 07.1	97 24	164.1	41 37.9	97 23	164.3	41 08.7	97 23	164.4	40 39.5	97 23	164.6	40 10.3	97 23	164.7	39 41.1	97 22	164.9	39 11.8	97 22	165.0	2
3	42 22.0	97 26	162.7	41 53.0	97 25	162.8	41 23.9	97 25	163.0	40 54.9	97 25	163.2	40 25.8	97 25	163.5	39 56.7	97 24	163.5	39 27.6	97 24	163.7	38 58.5	97 24	163.8	3
4	42 06.7	96 27	161.4	41 37.8	96 27	161.6	41 08.9	96 27	161.8	40 39.9	96 27	161.9	40 11.0	96 26	162.1	39 42.0	97 26	162.3	39 13.1	97 26	162.4	38 44.1	97 26	162.6	4
15	41 50.3	96 29	160.1	41 21.5	96 29	160.3	40 52.8	96 28	160.5	40 24.0	96 28	160.7	39 55.2	96 28	160.9	39 26.4	96 28	161.1	38 57.6	96 27	161.2	38 28.7	96 27	161.4	15
6	41 32.9	95 31	158.9	41 04.3	95 30	159.1	40 35.7	95 30	159.3	40 07.1	95 30	159.5	39 38.4	95 30	159.7	39 09.8	96 29	159.9	38 41.1	96 29	160.1	38 12.4	96 29	160.2	6
7	41 14.4	95 32	157.6	40 46.0	95 32	157.9	40 17.6	95 32	158.1	39 49.1	95 32	158.3	39 20.7	95 31	158.5	38 52.2	95 31	158.7	38 23.7	95 31	158.9	37 55.1	95 30	159.1	7
8	40 55.0	94 34	156.4	40 26.8	94 34	156.5	39 58.5	94 33	156.9	39 30.3	94 33	157.1	39 01.9	94 33	157.3	38 33.6	94 32	157.5	38 05.3	94 32	157.7	37 36.9	95 32	157.9	8
9	40 34.7	93 36	155.2	40 06.6	94 35	155.4	39 38.5	94 35	155.7	39 10.4	94 35	155.9	38 42.3	94 34	156.1	38 14.1	94 34	156.3	37 45.9	94 34	156.6	37 17.7	94 33	156.8	9
20	40 13.3	93 37	154.0	39 45.5	93 37	154.3	39 17.6	93 36	154.5	38 49.6	93 36	154.7	38 21.7	93 36	155.0	37 53.7	93 36	155.2	37 25.7	93 35	155.4	36 57.7	93 35	155.6	20
1	39 51.1	92 39	152.8	39 23.4	92 38	153.1	38 55.7	92 38	153.3	38 27.9	93 38	153.6	38 00.2	93 37	153.8	37 32.4	93 37	154.1	37 04.5	93 37	154.3	36 36.7	93 36	154.5	1
2	39 27.9	92 40	151.9	39 00.4	92 40	151.9	38 32.9	92 39	152.2	38 05.4	92 39	152.4	37 37.8	92 39	152.7	37 10.2	92 38	153.0	36 42.5	92 38	153.2	36 14.9	92 38	153.4	2
3	39 03.9	91 42	150.5	38 36.6	91 41	150.8	38 09.3	91 41	151.0	37 41.9	91 41	151.3	37 14.5	91 40	151.6	36 47.1	91 40	151.8	36 19.7	92 40	152.1	35 52.2	92 39	152.3	3
4	38 39.0	90 43	149.4	38 11.9	90 43	149.7	37 44.8	90 42	149.9	37 17.6	91 42	150.2	36 50.4	91 42	150.5	36 23.2	91 41	150.7	35 55.9	91 41	151.0	35 28.6	91 41	151.2	4
25	38 13.2	90 44	148.3	37 46.3	90 44	148.5	37 19.4	90 44	148.8	36 52.5	90 43	149.1	36 25.5	90 43	149.4	35 58.4	90 43	149.6	35 31.4	90 42	149.9	35 04.3	90 42	150.2	25
6	37 46.6	89 46	147.1	37 20.0	89 45	147.4	36 53.2	89 45	147.7	36 26.5	89 45	148.0	35 59.7	89 44	148.3	35 32.9	89 44	148.6	35 06.0	90 44	148.8	34 39.1	90 43	149.1	6
7	37 19.2	88 47	146.4	36 52.8	88 47	146.4	36 26.3	88 46	146.9	35 59.8	88 46	146.9	35 33.2	88 47	147.2	35 05.9	89 45	147.5	34 39.9	89 45	147.8	34 13.2	89 44	148.1	7
8	36 51.1	87 48	145.0	36 24.8	88 48	145.3	35 58.6	88 47	145.6	35 32.2	88 47	145.9	35 05.9	88 47	146.2	34 39.5	88 46	146.5	34 13.0	88 46	146.7	33 46.5	88 46	147.0	8
9	36 22.1	87 49	143.9	35 56.1	87 49	144.2	35 30.1	87 49	144.5	35 04.0	87 48	144.8	34 37.8	87 48	145.1	34 11.6	87 48	145.4	33 45.4	88 47	145.7	33 19.1	88 47	146.0	9
30	35 52.5	86 51	142.9	35 26.7	86 50	143.2	35 00.8	86 50	143.5	34 34.9	86 50	143.8	34 09.0	87 49	144.1	33 43.0	87 49	144.4	33 17.0	87 48	144.7	32 50.9	87 48	145.0	30
1	35 22.1	85 52	141.8	34 56.5	85 51	142.2	34 30.9	86 51	142.5	34 05.2	86 51	142.8	33 39.5	86 50	143.1	33 13.7	86 50	143.4	32 47.9	86 50	143.7	32 22.0	86 49	144.0	1
2	34 51.0	84 53	140.8	34 25.7	85 53	141.2	34 00.2	85 52	141.5	33 34.8	85 52	141.8	33 09.3	85 51	142.1	32 43.7	85 51	142.4	32 18.1	85 51	142.7	31 52.5	86 50	143.0	2
3	34 19.3	84 54	139.8	33 54.1	84 54	140.2	33 28.9	84 53	140.5	33 03.7	84 53	140.8	32 38.4	84 53	141.1	32 13.0	85 52	141.4	31 47.6	85 52	141.8	31 22.2	85 52	142.1	3
4	33 46.9	83 55	138.8	33 21.9	83 55	139.2	32 57.0	83 54	139.5	32 31.9	84 54	139.8	32 06.8	84 54	140.2	31 41.7	84 53	140.5	31 16.5	84 53	140.8	30 51.3	84 53	141.1	4
35	33 13.8	82 56	137.9	32 49.1	82 56	138.2	32 24.3	83 55	138.6	31 59.5	83 55	138.9	31 34.7	83 55	139.2	31 09.7	83 54	139.5	30 44.8	83 54	139.9	30 19.8	83 54	140.2	35
6	32 40.1	82 57	136.9	32 15.7	82 57	137.3	31 51.1	82 56	137.6	31 26.5	82 56	137.9	31 01.9	82 56	138.3	30 37.2	82 55	138.6	30 12.4	83 55	138.9	29 47.6	83 55	139.3	6
7	32 05.9	81 58	136.0	31 41.6	81 58	136.3	31 17.3	81 57	136.7	30 52.9	81 57	137.0	30 28.5	82 57	137.3	30 04.0	82 56	137.7	29 39.4	82 56	138.0	29 14.8	82 56	138.3	7
8	31 31.0	80 59	135.1	31 07.0	80 59	135.4	30 42.9	80 58	135.8	30 18.7	81 58	136.1	29 54.5	81 58	136.4	29 30.2	81 57	136.8	29 05.9	81 57	137.1	28 41.5	81 57	137.4	8
9	30 55.6	79 60	134.1	30 31.8	80 60	134.5	30 07.9	80 59	134.8	29 43.9	80 59	135.2	29 19.9	80 59	135.5	28 55.8	80 58	135.9	28 31.7	80 58	136.2	28 07.6	81 57	136.6	9
40	30 19.6	79 61	133.2	29 56.0	79 60	133.6	29 32.3	79 60	134.0	29 08.6	79 60	134.3	28 44.8	79 59	134.7	28 20.9	80 59	135.0	27 57.0	80 59	135.3	27 33.1	80 58	135.7	40
1	29 43.1	78 62	132.4	29 19.7	78 61	132.7	28 56.2	78 61	133.1	28 32.7	79 61	133.4	28 09.1	79 60	133.8	27 45.5	79 60	134.1	27 21.8	79 60	134.5	26 58.1	79 59	134.8	1
2	29 06.1	77 62	131.5	28 42.9	77 62	131.9	28 19.7	78 62	132.2	27 56.3	78 61	132.6	27 33.0	78 61	132.9	27 09.5	78 61	133.3	26 46.1	78 60	133.6	26 22.5	79 60	134.0	2
3	28 28.6	77 63	130.6	28 05.6	77 63	131.0	27 42.6	77 63	131.4	27 19.5	77 62	131.7	26 56.3	77 62	132.1	26 33.1	77 62	132.4	26 09.8	78 61	132.8	25 46.5	78 61	133.1	3
4	27 50.6	76 64	129.8	27 27.8	76 64	130.2	27 05.0	76 63	130.5	26 42.1	76 63	130.9	26 19.1	77 63	131.2	25 56.1	77 62	131.6	25 33.0	77 62	132.0	25 09.9	77 62	132.3	4
45	27 12.2	75 65	129.0	26 49.6	75 65	129.3	26 26.9	76 64	129.7	26 04.2	76 64	130.1	25 41.5	76 64	130.4	25 18.7	76 63	130.8	24 55.8	76 63	131.1	24 32.9	76 62	131.5	45
6	26 33.3	75 66	128.1	26 10.9	75 65	128.5	25 48.4	75 65	128.9	25 25.9	75 65	129.2	25 03.4	75 64	129.6	24 40.8	75 64	130.0	24 18.1	76 64	130.3	23 55.4	76 63	130.7	6
7	25 53.9	74 66	127.3	25 31.7	74 66	127.7	25 09.5	74 66	128.1	24 47.2	74 65	128.4	24 24.8	75 65	128.8	24 02.4	75 65	129.2	23 40.0	75 64	129.5	23 17.5	75 64	129.9	7
8	25 14.2	73 67	126.5	24 52.2	73 67	126.9	24 30.1	74 66	127.3	24 08.0	74 66	127.6	23 45.9	74 66	128.0	23 23.6	74 65	128.4	23 01.4	74 65	128.7	22 39.1	74 65	129.1	8
9	24 34.0	73 68	125.7	24 12.2	73 67	126.1	23 50.3	73 67	126.5	23 28.4	73 67	126.9	23 06.5	73 66	127.2	22 44.4	73 66	127.6	22 22.4	74 66	128.0	22 00.3	74 65	128.3	9
50	23 53.4	72 68	125.0	23 31.8	72 68	125.3	23 10.1	72 68	125.7	22 48.4	72 67	126.1	22 26.7	73 67	126.5	22 04.8	73 67	126.8	21 43.0	73 66	127.2	21 21.0	73 66	127.6	50
1	23 12.5	71 69	124.2	22 51.0	71 69	124.6	22 29.6	72 68	125.0	22 08.0	72 68	125.3	21 46.5	72 68	125.7	21 24.8	72 67	126.1	21 03.1	72 67	126.5	20 41.4	73 67	126.8	1
2	22 31.1	71 69	123.4	22 09.9	71 69	123.8	21 48.6	71 69	124.2	21 27.3	71 69	124.6	21 05.9	71 68	125.0	20 44.4	72 68	125.3	20 22.9	72 68	125.7	20 01.4	72 67	126.1	2
3	21 49.5	70 70	122.7	21 28.4	70 70	123.1	21 07.3	70 69	123.5	20 46.1	71 69	123.8	20 24.9	71 69	124.2	20 03.7	71 69	124.6	19 42.4	71 68	125.0	19 21.0	71 68	125.3	3
4	21 07.4	69 71	122.0	20 46.6	70 70	122.4	20 25.6	70 70	122.7	20 04.6	70 70	123.1	19 43.6	70 69	123.5	19 22.6	70 69	123.9	19 01.4	70 69	124.2	18 40.3	71 68	124.6	4
55	20 25.1	69 71	121.2	20 04.4	69 71	121.6	19 43.6	69 71	122.0	19 22.8	69 70	122.4	19 02.0	70 70	122.8	18 41.1	70 70	123.1	18 20.1	70 69	123.5	17 59.2	70 69	123.9	55
6	19 42.4	68 72	120.5	19 21.9	68 71	120.9	19 01.3	69 71	121.3	18 40.7	69 71	121.7	18 20.0	69 71	122.1	17 59.3	69 70	122.4	17 38.5	69 70	122.8	17 17.7	69 70	123.2	6
7	18 59.4	68 72	119.8	18 39.0	68 72	120.2	18 18.6	68 72	120.6	17 58.2	68 71	121.0	17 37.7	68 71	121.4	17 17.1	69 71	121.7	16 56.5	69 70	122.1	16 35.9	69 70	122.5	7
8	18 16.1	67 73	119.1	17 55.9	67 72	119.5	17 35.6	68 72	119.9	17 15.4	68 72	120.3	16 55.0	68 72	120.7	16 34.7	68 71	121.1	16 14.3	68 71	121.4	15 53.8	68 71	121.8	8
9	17 32.5	67 73	118.4	17 12.5	67 73	118.8	16 52.4	67 73	119.2	16 32.3	67 72	119.6	16 12.1	67 72	120.0	15 51.9	67 72	120.4	15 31.7	68 72	120.8	15 11.4	68 71	121.1	9
60	16 48.6	66 74	117.8	16 28.7	66 73	118.2	16 08.8	66 73	118.5	15 48.9	67 73	118.9	15 28.9	67 73	119.3	15 08.8	67 72	119.7	14 48.8	67 72	120.1	14 28.7	67 72	120.5	60
1	16 04.4	66 74	117.1	15 44.7	66 74	117.5	15 25.0	66 73	117.9	15 05.2	66 73	118.3	14 45.4	66 73	118.6	14 25.5	66 73	119.0	14 05.6	66 72	119.4	13 45.7	67 72	119.8	1
2	15 20.0	65 74	116.4	15 00.5	65 74	116.8	14 40.9	65 74	117.2	14 21.2	66 74	117.6	14 01.6	66 73	118.0	13 41.9	66 73	118.4	13 22.1	66 73	118.8	13 02.3	66 73	119.1	2
3	14 35.4	65 75	115.8	14 16.0	65 75	116.2	13 56.5	65 74	116.6	13 37.0	65 74	116.9	13 17.5	65 74	117.3	12 58.0	65 74	117.7	12 38.4	65 73	118.1	12 18.8	65 73	118.5	3
4	13 50.4	64 75	115.1	13 31.2	64 75	115.5	13 11.9	64 75	115.9	12 52.6	64 75	116.3	12 33.2	64 75	116.7	12 13.6	65 74	117.1	11 54.4	65 74	117.5	11 34.9	65 74	117.9	4
65	13 05.3	64 76	114.5	12 46.2	64 75	114.9	12 27.0	64 75	115.3	12 07.8	64 75	115.7	11 48.6	64 75	116.1	11 29.4	64 74	116.4	11 10.1	64 74	116.8	10 50.8	64 74	117.2	65
6	12 19.9	63 76	113.8	12 00.9	63 76	114.2	11 41.9	63 76	114.6	11 22.9	63 75	115.0	11 03.8	63 75	115.4	10 44.7	64 75	115.8	10 25.6	64 74	116.2	10 06.5	64 74	116.6	6
7	11 34.3	63 76	113.2	11 15.5	63 76	113.6	10 56.6	63 76	114.0	10 37.7	63 76	114.4	10 18.8	63 75	114.8	9 59.8	63 75	115.2	9 40.9	63 75	115.6	9 21.9	63 75	116.0	7
8	10 48.5	62 77	112.6	10 29.8	62 76	113.0	10 11.0	62 76	113.4	9 52.3	63 76	113.8	9 33.5	63 76	114.2	9 14.7	63 76	114.6	8 55.9	63 75	115.0	8 37.0	63 75	115.3	8
9	10 02.4	62 77	112.0	9 43.9	62 77	112.4	9 25.3	62 77	112.8	9 06.7	62 76	113.2	8 48.0	62 76	113.6	8 29.4	62 76	114.0	8 10.7	62 76	114.4	7 52.0	62 75	114.7	9
70	9 16.2	61 77	111.4	8 57.8	61 77	111.8	8 39.3	62 77	112.2	8 20.8	62 77	112.6	8 02.3	62 77	113.0	7 43.8	62 76	113.3	7 25.2	62 76	113.7	7 06.7	62 76	114.1	70
1	8 29.8	61 78	110.8	8 11.5	61 77	111.2	7 53.1	61 77	111.6	7 34.8	61 77	112.0	7 16.4	61 77	112.4	6 58.0	61 77	112.7	6 39.6	61 76	113.1	6 21.2	61 76	113.5	1
2	7 43.2	61 78	110.2	7 25.0	61 78	110.6	7 06.8	61 78	111.0	6 48.6	61 77	111.4	6 30.3	61 77	111.8	6 12.1	61 77	112.2	5 53.8	61 77	112.6	5 35.5	61 76	112.9	2
3	6 56.4	60 78	109.6	6 38.3	60 78	110.0	6 20.2	60 78	110.4	6 02.1	60 78	110.8	5 44.0	60 77	111.2	5 25.9	60 77	111.6	5 07.7	61 77	112.0				3
4	6 09.4	60 79	109.0	5 51.5	60 78	109.4	5 33.5	60 78	109.8	5 15.5	60 78	110.2													4
75	5 22.3	59 79	108.4	5 04.5	59 79	108.8																			75

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00' Alt.	Δd Δt	Az.	12° 30' Alt.	Δd Δt	Az.	13° 00' Alt.	Δd Δt	Az.	13° 30' Alt.	Δd Δt	Az.	14° 00' Alt.	Δd Δt	Az.	14° 30' Alt.	Δd Δt	Az.	15° 00' Alt.	Δd Δt	Az.	15° 30' Alt.	Δd Δt	Az.	H.A.
91	5 51.6	55 81	79.5	6 08.2	55 81	79.0	6 24.8	55 81	78.6	6 41.3	55 81	78.2	6 57.8	55 81	77.8	7 14.3	55 81	77.4	7 30.8	55 81	76.9	7 47.2	55 81	76.5	91
2	5 02.8	56 81	78.9	5 19.4	55 81	78.5	5 36.1	55 81	78.1	5 52.7	55 81	77.7	6 09.3	55 81	77.2	6 25.8	55 81	76.8	6 42.4	55 80	76.4	6 58.9	55 80	76.0	2
3							5 04.1	56 81	77.1	5 20.8	56 81	76.7	5 37.5	55 80	76.3	5 54.1	55 80	75.9	6 10.7	55 80	75.5				3
4																			5 05.9	56 80	75.3	5 22.6	56 80	74.9	4

Lat. 39°

Lat. 34°

Each cell below is given as: Alt. (° ′) · Δd · Δt · Az. (°)

H.A.	16° 00′	16° 30′	17° 00′	17° 30′	18° 00′	18° 30′	19° 00′	19° 30′	H.A.
00	72 00.0 1.0 02 180.0	72 30.0 1.0 02 180.0	73 00.0 1.0 02 180.0	73 30.0 1.0 02 180.0	74 00.0 1.0 07 180.0	74 30.0 1.0 08 180.0	75 00.0 1.0 08 180.0	75 30.0 1.0 08 180.0	00
1	71 58.6 1.0 07 176.9	72 28.6 1.0 07 176.8	72 58.6 1.0 07 176.7	73 28.5 1.0 07 176.6	73 58.5 1.0 07 176.6	74 28.5 1.0 08 176.5	74 58.4 1.0 08 176.4	75 28.4 1.0 08 176.2	1
2	71 54.6 1.0 11 173.8	72 24.5 1.0 11 173.6	72 54.3 1.0 12 173.5	73 24.2 99 12 173.3	73 54.0 99 12 173.1	74 23.9 99 13 172.9	74 53.7 99 13 172.7	75 23.5 99 13 172.5	2
3	71 47.9 99 16 170.7	72 17.6 99 16 170.5	72 47.3 99 16 170.3	73 17.0 99 17 170.0	73 46.6 99 17 169.7	74 16.2 99 18 169.5	74 45.8 99 18 169.1	75 15.4 99 19 168.8	3
4	71 38.6 98 20 167.7	72 08.1 98 20 167.4	72 37.5 98 21 167.1	73 06.9 98 21 166.8	73 36.3 98 22 166.4	74 05.7 98 23 166.0	74 35.0 98 23 165.6	75 04.2 97 24 165.2	4
05	71 26.8 97 24 164.7	71 56.0 97 24 164.4	72 25.1 97 25 164.0	72 54.2 97 26 163.6	73 23.3 97 26 163.1	73 52.3 97 27 162.7	74 21.2 96 28 162.2	74 50.1 96 28 161.7	05
6	71 12.4 96 28 161.8	71 41.3 96 28 161.4	72 10.1 96 29 160.9	72 38.9 96 30 160.5	73 07.5 96 30 160.0	73 36.1 95 31 159.4	74 04.6 95 32 158.9	74 33.0 95 33 158.3	6
7	70 55.8 95 32 159.0	71 24.3 95 32 158.5	71 52.7 95 33 158.0	72 21.0 94 34 157.5	72 49.2 94 34 156.9	73 17.4 94 35 156.3	73 45.4 93 36 155.7	74 13.3 93 37 155.0	7
8	70 36.8 94 35 156.2	71 04.9 93 36 155.7	71 32.9 93 37 155.1	72 00.8 93 37 154.5	72 28.5 92 38 153.9	72 56.2 92 39 153.3	73 23.7 91 40 152.6	73 51.1 91 41 151.9	8
9	70 15.7 92 40 153.0	70 43.3 92 39 153.0	71 10.9 92 40 152.4	71 38.3 91 41 151.7	72 05.6 90 42 150.4	72 32.7 90 43 150.0	72 59.6 90 44 149.3	73 26.5 90 44 148.8	9
10	69 52.6 91 42 151.0	70 19.7 91 43 150.4	70 46.8 90 43 149.7	71 13.7 89 44 149.0	71 40.4 89 45 148.3	72 07.0 88 46 147.6	72 33.4 88 47 146.8	72 59.7 87 48 146.0	10
1	69 27.5 89 45 148.5	69 54.2 89 46 147.8	70 20.7 88 46 147.1	70 47.1 88 47 146.4	71 13.3 87 48 145.7	71 39.4 86 49 144.9	72 05.2 86 50 144.1	72 30.8 85 51 143.2	1
2	69 00.6 88 48 146.1	69 26.8 87 48 145.4	69 52.9 87 49 144.7	70 18.7 86 50 143.9	70 44.4 85 51 143.2	71 09.9 85 52 142.4	71 35.1 84 53 141.5	72 00.2 83 54 140.6	2
3	68 32.0 86 50 143.8	68 57.7 85 51 143.1	69 23.3 85 52 142.3	69 48.6 84 53 141.6	70 13.8 83 54 140.8	70 38.7 83 55 139.9	71 03.4 82 56 139.1	71 27.8 81 57 138.2	3
4	68 01.8 84 53 141.6	68 27.1 84 54 140.8	68 52.1 83 54 140.1	69 16.9 82 56 139.3	69 41.5 82 56 138.5	70 05.9 81 57 137.6	70 30.0 80 58 136.7	70 53.8 79 59 135.8	4
15	67 30.2 83 55 139.4	67 54.9 82 56 138.7	68 19.5 81 57 137.9	68 43.8 81 58 137.1	69 07.8 81 58 136.3	69 31.7 79 59 135.4	69 55.2 78 60 134.5	70 18.5 77 61 133.6	15
6	66 57.2 81 57 137.4	67 21.4 80 58 136.6	67 45.5 80 59 135.9	68 09.3 79 60 135.1	68 32.8 78 60 134.2	68 56.1 77 61 133.3	69 19.1 76 62 132.4	69 41.9 75 63 131.5	6
7	66 22.9 80 59 135.5	66 46.7 79 60 134.7	67 10.2 78 61 133.9	67 33.5 77 61 133.1	67 56.6 76 62 132.2	68 19.3 75 63 131.4	68 41.8 74 64 130.5	69 04.0 73 65 129.5	7
8	65 47.4 78 61 133.6	66 10.7 77 62 132.8	66 33.8 76 63 132.0	66 56.6 76 63 131.2	67 19.2 75 64 130.3	67 41.5 74 65 129.5	68 03.3 73 66 128.6	68 25.1 72 66 127.6	8
9	65 10.9 77 63 131.8	65 33.7 76 63 131.0	65 56.3 75 64 130.2	66 18.7 74 65 129.4	66 40.8 73 66 128.5	67 02.6 72 66 127.7	67 24.1 71 67 126.8	67 45.3 70 68 125.8	9
20	64 33.3 75 64 130.1	64 55.7 74 65 129.3	65 17.9 73 66 128.5	65 39.8 73 66 127.7	66 01.4 72 67 126.8	66 22.8 71 68 126.0	66 43.8 70 69 125.1	67 04.5 69 69 124.1	20
1	63 54.8 74 66 128.4	64 16.3 73 66 127.6	64 38.5 72 67 126.9	65 00.0 71 68 126.0	65 21.2 70 68 125.2	65 42.1 69 69 124.3	66 02.7 68 70 123.4	66 23.0 67 70 122.5	1
2	63 15.4 72 67 126.8	63 37.0 72 68 126.1	63 58.3 71 68 125.3	64 19.3 70 69 124.5	64 40.1 69 70 123.6	65 00.5 68 70 122.8	65 20.8 67 71 121.9	65 40.7 66 72 121.0	2
3	62 35.2 71 68 125.3	62 56.4 70 69 124.6	63 17.3 69 70 123.8	63 38.0 68 70 123.0	63 58.3 67 71 122.1	64 18.4 66 71 121.3	64 38.0 65 72 120.3	64 57.7 64 73 119.5	3
4	61 54.2 70 69 123.9	62 15.0 69 70 123.1	62 35.6 68 71 122.3	62 55.9 67 71 121.5	63 15.9 66 72 120.7	63 35.6 65 72 119.9	63 55.0 64 73 119.0	64 14.1 63 74 118.1	4
25	61 12.6 69 70 122.5	61 33.1 68 71 121.7	61 53.3 67 72 120.9	62 13.2 66 72 120.1	62 32.8 65 73 119.3	62 52.2 64 73 118.5	63 11.2 63 74 117.6	63 30.0 62 74 116.8	25
6	60 30.3 67 71 121.1	60 50.4 67 72 120.4	61 10.3 66 73 119.6	61 29.9 65 73 118.8	61 49.2 64 74 118.0	62 08.2 63 74 117.2	62 26.9 62 75 116.4	62 45.3 61 75 115.5	6
7	59 47.5 66 73 119.8	60 07.3 66 73 119.1	60 26.8 65 74 118.3	60 46.0 64 74 117.6	61 05.0 64 74 116.8	61 23.7 63 75 116.0	61 42.1 61 75 115.1	62 00.2 60 76 114.3	7
8	59 04.1 65 73 118.6	59 23.5 64 74 117.9	59 42.7 64 74 117.1	60 01.7 63 75 116.3	60 20.4 62 75 115.5	60 38.7 61 76 114.7	60 56.8 60 76 113.9	61 14.6 59 77 113.1	8
9	58 20.1 64 74 117.4	58 39.3 64 74 116.7	58 58.2 63 75 115.9	59 16.9 63 75 115.2	59 35.3 61 76 114.4	59 53.4 60 76 113.6	60 11.2 59 77 112.8	60 28.7 58 77 112.0	9
30	57 35.8 63 75 116.2	57 54.6 63 75 115.5	58 13.3 62 76 114.8	58 31.6 61 76 114.0	58 49.8 60 76 113.3	59 07.6 59 77 112.5	59 25.1 58 77 111.7	59 42.4 57 78 110.9	30
1	56 50.9 62 75 115.1	57 09.5 62 76 114.4	57 27.9 61 76 113.7	57 46.0 60 77 112.9	58 03.9 59 77 112.2	58 21.4 58 77 111.4	58 38.7 57 78 110.6	58 55.7 56 78 109.8	1
2	56 05.7 62 76 113.9	56 24.1 61 76 113.2	56 42.2 60 77 112.6	57 00.0 59 77 111.9	57 17.6 58 78 111.1	57 35.0 58 78 110.4	57 52.0 56 78 109.6	58 08.8 56 79 108.8	2
3	55 20.1 61 77 113.0	55 38.2 60 77 112.3	55 56.1 59 77 111.6	56 13.7 58 78 110.9	56 31.1 57 78 110.1	56 48.2 57 78 109.4	57 05.0 56 79 108.6	57 21.6 55 79 107.9	3
4	54 34.1 60 77 112.0	54 52.9 59 78 111.3	55 09.7 58 78 110.6	55 27.1 58 78 109.9	55 44.2 57 79 109.2	56 01.1 56 79 108.4	56 17.7 55 79 107.7	56 34.1 54 80 106.9	4
35	53 47.9 59 78 111.0	54 05.5 59 78 110.3	54 23.0 58 78 109.6	54 40.2 57 79 108.9	54 57.1 56 79 108.2	55 13.8 55 79 107.5	55 30.2 54 80 106.7	55 46.4 54 80 106.0	35
6	53 01.3 58 78 110.1	53 18.7 58 78 109.4	53 36.0 57 79 108.7	53 53.0 56 79 108.0	54 09.7 55 79 107.3	54 26.2 54 80 106.5	54 42.5 54 80 105.9	54 58.5 53 80 105.1	6
7	52 14.4 58 79 109.1	52 31.7 57 79 108.5	52 48.7 56 79 107.8	53 05.6 56 79 107.1	53 22.1 55 80 106.4	53 38.5 54 80 105.7	53 54.5 53 80 105.0	54 10.4 52 80 104.3	7
8	51 27.3 57 79 108.2	51 44.4 57 79 107.6	52 01.3 56 80 106.9	52 17.9 55 80 106.2	52 34.3 54 80 105.5	52 50.5 53 80 104.9	53 06.4 53 81 104.1	53 22.1 52 81 103.4	8
9	50 39.9 57 79 107.4	50 56.9 56 80 106.7	51 13.6 55 80 106.1	51 30.0 55 80 105.4	51 46.3 54 80 104.7	52 02.3 53 81 104.0	52 18.1 52 81 103.3	52 33.6 51 81 102.6	9
40	49 52.3 56 80 106.5	50 09.1 56 80 105.9	50 25.7 55 80 105.2	50 42.0 54 80 104.6	50 58.1 53 81 103.9	51 14.0 53 81 103.2	51 29.6 52 81 102.5	51 45.0 51 81 101.8	40
1	49 04.6 56 80 105.7	49 21.2 55 80 105.1	49 37.6 54 80 104.4	49 53.8 54 81 103.8	50 09.7 53 81 103.1	50 25.5 52 81 102.4	50 41.0 51 81 101.8	50 56.2 51 81 101.1	1
2	48 16.6 55 80 104.9	48 33.1 54 81 104.3	48 49.3 54 81 103.6	49 05.4 53 81 103.0	49 21.2 52 81 102.3	49 36.8 52 81 101.7	49 52.2 51 81 101.0	50 07.4 50 82 100.3	2
3	47 28.4 55 81 104.1	47 44.8 54 81 103.5	48 00.9 53 81 102.8	48 16.8 53 81 102.2	48 32.5 52 81 101.6	48 48.0 51 82 100.9	49 03.3 51 82 100.3	49 18.4 50 82 99.6	3
4	46 40.1 54 81 103.3	46 56.3 54 81 102.7	47 12.3 53 81 102.1	47 28.1 52 81 101.5	47 43.7 52 82 100.8	47 59.1 51 82 100.2	48 14.3 50 82 99.5	48 29.3 49 82 98.9	4
45	45 51.6 54 81 102.6	46 07.7 53 81 102.0	46 23.6 53 81 101.4	46 39.3 52 82 100.7	46 54.8 51 82 100.1	47 10.1 51 82 99.5	47 25.2 50 82 98.8	47 40.1 49 82 98.2	45
6	45 03.0 54 81 101.8	45 19.0 53 81 101.2	45 34.8 52 82 100.6	45 50.4 52 82 99.9	46 05.8 51 82 99.4	46 21.0 50 82 98.8	46 36.0 50 82 98.1	46 50.8 49 82 97.5	6
7	44 14.2 53 81 101.1	44 30.1 53 82 100.5	44 45.8 52 82 99.9	45 01.4 51 82 99.3	45 16.7 51 82 98.7	45 31.8 50 82 98.1	45 46.7 49 82 97.5	46 01.5 49 82 96.8	7
8	43 25.4 53 82 100.4	43 41.2 52 82 99.8	43 56.8 52 82 99.2	44 12.2 51 82 98.6	44 27.5 51 82 98.0	44 42.5 50 82 97.4	44 57.4 49 82 96.8	45 12.0 48 83 96.2	8
9	42 36.4 53 82 99.7	42 52.1 52 82 99.1	43 07.6 51 82 98.5	43 23.0 51 82 98.0	43 38.2 50 82 97.4	43 53.2 50 82 96.8	44 08.0 49 82 96.2	44 22.6 48 83 95.5	9
50	41 47.3 52 82 99.0	42 03.0 52 82 98.5	42 18.4 51 82 97.9	42 33.7 51 82 97.3	42 48.8 50 82 96.7	43 03.7 49 82 96.1	43 18.5 49 83 95.5	43 33.0 48 83 94.9	50
1	40 58.2 52 82 98.4	41 13.7 52 82 97.8	41 29.1 51 82 97.2	41 44.3 50 82 96.6	41 59.4 50 82 96.1	42 14.2 49 83 95.5	42 28.9 48 83 94.9	42 43.4 48 83 94.3	1
2	40 08.9 52 82 97.7	40 24.4 51 82 97.1	40 39.7 50 82 96.6	40 54.9 50 82 96.0	41 09.9 50 83 95.4	41 24.7 49 83 94.9	41 39.3 48 83 94.3	41 53.8 48 83 93.7	2
3	39 19.6 52 82 97.1	39 35.0 51 82 96.5	39 50.3 51 82 95.9	40 05.4 50 83 95.4	40 20.3 50 83 94.8	40 35.1 49 83 94.2	40 49.7 48 83 93.7	41 04.2 48 83 93.1	3
4	38 30.2 52 82 96.4	38 45.6 51 82 95.9	39 00.8 51 83 95.3	39 15.8 50 83 94.8	39 30.7 49 83 94.2	39 45.3 49 83 93.6	40 00.1 48 83 93.1	40 14.5 48 83 92.5	4
55	37 40.7 51 83 95.8	37 56.0 51 83 95.2	38 11.2 50 83 94.7	38 26.3 50 83 94.1	38 41.1 49 83 93.6	38 55.8 49 83 93.0	39 10.4 48 83 92.5	39 24.8 48 83 91.9	55
6	36 51.2 51 83 95.2	37 06.5 51 83 94.6	37 21.6 50 83 94.1	37 36.6 50 83 93.5	37 51.5 49 83 93.0	38 06.1 49 83 92.4	38 20.7 48 83 91.9	38 35.0 48 83 91.3	6
7	36 01.6 51 83 94.6	36 16.9 51 83 94.0	36 32.0 50 83 93.5	36 47.0 50 83 92.9	37 01.8 49 83 92.4	37 16.4 49 83 91.9	37 31.0 48 83 91.3	37 45.3 48 83 90.8	7
8	35 12.0 51 83 94.0	35 27.2 50 83 93.4	35 42.3 50 83 92.9	35 57.1 50 83 92.4	36 12.1 49 83 91.8	36 26.7 48 83 91.3	36 41.2 48 83 90.7	36 55.6 48 83 90.2	8
9	34 22.4 51 83 93.4	34 37.6 50 83 92.8	34 52.6 50 83 92.3	35 07.6 50 83 91.8	35 22.3 49 83 91.2	35 37.0 48 83 90.7	35 51.5 48 83 90.2	36 05.8 48 83 89.6	9
60	33 32.7 51 83 92.8	33 47.9 50 83 92.2	34 02.9 50 83 91.7	34 17.8 49 83 91.2	34 32.6 49 83 90.7	34 47.2 49 83 90.1	35 01.7 48 83 89.6	35 16.1 48 83 89.1	60
1	32 43.0 51 83 92.2	32 58.2 50 83 91.7	33 13.2 50 83 91.2	33 28.1 49 83 90.6	33 42.9 49 83 90.1	33 57.5 49 83 89.6	34 12.0 48 83 89.1	34 26.4 48 83 88.5	1
2	31 53.3 51 83 91.6	32 08.4 50 83 91.1	32 23.5 50 83 90.6	32 38.4 49 83 90.1	32 53.1 49 83 89.6	33 07.8 49 83 89.0	33 22.3 48 83 88.5	33 36.6 48 83 88.0	2
3	31 03.6 51 83 91.0	31 18.7 50 83 90.5	31 33.7 50 83 90.0	31 48.6 49 83 89.5	32 03.4 49 83 89.0	32 18.0 49 83 88.5	32 32.6 48 83 88.0	32 46.9 48 83 87.4	3
4	30 13.8 51 83 90.5	30 29.0 50 83 90.0	30 44.0 50 83 89.5	30 58.9 49 83 89.0	31 13.7 49 83 88.5	31 28.3 49 83 87.9	31 42.8 48 83 87.4	31 57.3 48 83 86.9	4
65	29 24.1 51 83 89.9	29 39.2 50 83 89.4	29 54.2 50 83 88.9	30 09.1 49 83 88.4	30 23.9 49 83 87.9	30 38.6 49 83 87.4	30 53.2 48 83 86.9	31 07.6 48 83 86.4	65
6	28 34.4 51 83 89.4	28 49.5 50 83 88.9	29 04.5 50 83 88.4	29 19.4 50 83 87.9	29 34.2 49 83 87.4	29 48.9 49 83 86.9	30 03.5 48 83 86.4	30 18.0 48 83 85.9	6
7	27 44.6 51 83 88.8	27 59.8 50 83 88.3	28 14.8 50 83 87.8	28 29.7 50 83 87.3	28 44.6 49 83 86.8	28 59.3 49 83 86.3	29 13.9 49 83 85.8	29 28.4 48 83 85.3	7
8	26 54.9 51 83 88.3	27 10.0 50 83 87.8	27 25.1 50 83 87.3	27 40.1 50 83 86.8	27 54.9 49 83 86.3	28 09.7 49 83 85.8	28 24.3 49 83 85.3	28 38.8 48 83 84.8	8
9	26 05.2 51 83 87.7	26 20.4 50 83 87.2	26 35.4 50 83 86.7	26 50.4 50 83 86.3	27 05.3 49 83 85.8	27 20.1 49 83 85.3	27 34.7 49 83 84.8	27 49.3 48 82 84.3	9
70	25 15.5 51 83 87.2	25 30.7 50 83 86.7	25 45.8 50 83 86.2	26 00.8 50 83 85.7	26 15.7 50 83 85.2	26 30.5 49 83 84.8	26 45.2 49 82 84.3	26 59.8 49 82 83.8	70
1	24 25.8 51 83 86.6	24 41.0 51 83 86.2	24 56.2 50 83 85.7	25 11.2 50 82 85.2	25 26.1 50 83 84.7	25 41.0 49 82 84.2	25 55.7 49 82 83.8	26 10.4 49 82 83.3	1
2	23 36.2 51 83 86.1	23 51.4 51 83 85.6	24 06.6 50 83 85.1	24 21.7 50 82 84.7	24 36.6 50 82 84.2	24 51.5 49 82 83.7	25 06.3 49 82 83.2	25 21.0 49 82 82.8	2
3	22 46.6 51 83 85.6	23 01.8 51 83 85.1	23 17.0 50 82 84.6	23 32.1 50 82 84.2	23 47.2 50 82 83.7	24 02.1 50 82 83.2	24 17.0 49 82 82.7	24 31.7 49 82 82.2	3
4	21 57.0 51 82 85.0	22 12.3 51 83 84.6	22 27.5 50 82 84.1	22 42.7 50 82 83.6	22 57.8 50 82 83.2	23 12.7 50 82 82.7	23 27.6 49 82 82.2	23 42.5 49 82 81.7	4
75	21 07.5 51 82 84.5	21 22.8 51 82 84.0	21 38.1 51 82 83.6	21 53.3 51 82 83.1	22 08.4 50 82 82.6	22 23.4 50 82 82.2	22 38.4 50 82 81.7	22 53.3 49 82 81.2	75
6	20 18.0 51 82 84.0	20 33.4 51 82 83.5	20 48.7 51 82 83.1	21 03.9 51 82 82.6	21 19.1 50 82 82.1	21 34.2 50 82 81.7	21 49.2 50 82 81.2	22 04.1 50 82 80.7	6
7	19 28.5 51 82 83.4	19 44.0 51 82 83.0	19 59.3 51 82 82.5	20 14.6 51 82 82.1	20 29.8 51 82 81.6	20 45.0 50 82 81.2	21 00.1 50 82 80.7	21 15.1 50 82 80.2	7
8	18 39.1 52 82 82.9	18 54.6 52 82 82.5	19 10.0 51 82 82.0	19 25.4 51 82 81.6	19 40.7 51 82 81.1	19 55.9 51 82 80.6	20 11.0 50 82 80.2	20 26.1 50 82 79.7	8
9	17 49.8 52 82 82.4	18 05.3 52 82 81.9	18 20.8 51 82 81.5	18 36.2 51 82 81.0	18 51.6 51 82 80.6	19 06.8 51 82 80.1	19 22.0 51 82 79.7	19 37.2 50 81 79.2	9
80	17 00.5 52 82 81.9	17 16.1 52 82 81.4	17 31.6 52 82 81.0	17 47.1 51 82 80.5	18 02.5 51 82 80.1	18 17.9 51 81 79.6	18 33.1 51 81 79.2	18 48.4 51 81 78.7	80
1	16 11.3 52 82 81.4	16 27.0 52 82 80.9	16 42.5 52 82 80.5	16 58.1 52 82 80.0	17 13.6 51 82 79.6	17 29.0 51 81 79.1	17 44.3 51 81 78.7	17 59.6 51 81 78.2	1
2	15 22.2 52 82 80.8	15 37.9 52 82 80.4	15 53.5 52 82 79.9	16 09.1 52 81 79.5	16 24.7 52 81 79.1	16 40.2 52 81 78.6	16 55.6 51 81 78.2	17 11.0 51 81 77.7	2
3	14 33.1 53 82 80.3	14 48.9 52 82 79.9	15 04.6 52 81 79.4	15 20.3 52 81 79.0	15 35.9 52 81 78.5	15 51.5 52 81 78.1	16 07.0 52 81 77.7	16 22.4 51 81 77.2	3
4	13 44.1 53 82 79.8	14 00.0 53 81 79.3	14 15.7 53 81 78.9	14 31.5 52 81 78.5	14 47.2 52 81 78.0	15 02.8 52 81 77.6	15 18.4 52 81 77.1	15 34.0 52 81 76.7	4
85	12 55.2 53 81 79.3	13 11.1 53 81 78.8	13 27.0 53 81 78.4	13 42.8 53 81 77.9	13 58.6 53 81 77.5	14 14.3 52 81 77.1	14 30.0 52 81 76.6	14 45.6 52 80 76.2	85
6	12 06.4 54 81 78.7	12 22.4 53 81 78.3	12 38.3 53 81 77.9	12 54.2 53 81 77.4	13 10.1 53 81 77.0	13 25.9 53 81 76.6	13 41.6 52 81 76.1	13 57.4 52 80 75.7	6
7	11 17.6 54 81 78.2	11 33.7 54 81 77.8	11 49.7 53 81 77.3	12 05.7 53 81 76.9	12 21.6 53 80 76.5	12 37.5 53 80 76.0	12 53.4 53 80 75.6	13 09.2 53 80 75.2	7
8	10 28.9 54 81 77.7	10 45.1 54 81 77.3	11 01.2 54 81 76.8	11 17.3 54 80 76.4	11 33.3 53 80 76.0	11 49.3 53 80 75.5	12 05.3 53 80 75.1	12 21.2 53 80 74.7	8
9	9 40.4 54 81 77.2	9 56.7 54 81 76.7	10 12.9 54 80 76.3	10 29.0 54 80 75.9	10 45.1 54 80 75.4	11 01.2 54 80 75.0	11 17.3 53 80 74.6	11 33.3 53 80 74.2	9
90	8 52.0 54 81 76.6	9 08.3 54 80 76.2	9 24.6 54 80 75.8	9 40.8 54 80 75.4	9 57.0 54 80 74.9	10 13.2 54 80 74.5	10 29.4 54 80 74.1	10 45.5 54 79 73.6	90

Lat. 34°

H.A.	16° 00' Alt. / Δd Δt / Az.	16° 30' Alt. / Δd Δt / Az.	17° 00' Alt. / Δd Δt / Az.	17° 30' Alt. / Δd Δt / Az.	18° 00' Alt. / Δd Δt / Az.	18° 30' Alt. / Δd Δt / Az.	19° 00' Alt. / Δd Δt / Az.	19° 30' Alt. / Δd Δt / Az.	H.A.
00	40 00.0 1.001 180.0	39 30.0 1.001 180.0	39 00.0 1.001 180.0	38 30.0 1.001 180.0	38 00.0 1.001 180.0	37 30.0 1.001 180.0	37 00.0 1.001 180.0	36 30.0 1.001 180.0	00
1	39 59.5 1.003 178.7	39 29.5 1.003 178.8	38 59.5 1.003 178.8	38 29.5 1.003 178.8	37 59.5 1.003 178.8	37 29.5 1.003 178.8	36 59.5 1.003 178.8	36 29.5 1.003 178.8	1
2	39 57.8 1.005 177.5	39 27.8 1.004 177.5	38 57.9 1.004 177.5	38 27.9 1.004 177.6	37 57.9 1.004 177.6	37 27.9 1.004 177.6	36 57.9 1.004 177.6	36 28.0 1.004 177.7	2
3	39 55.1 1.006 176.2	39 25.1 1.006 176.3	38 55.2 1.006 176.3	38 25.2 1.006 176.3	37 55.3 1.006 176.4	37 25.3 1.006 176.4	36 55.4 1.006 176.5	36 25.4 1.006 176.5	3
4	39 51.3 1.008 175.0	39 21.4 1.008 175.0	38 51.5 1.008 175.1	38 21.5 1.008 175.1	37 51.6 1.008 175.2	37 21.7 1.008 175.2	36 51.8 1.008 175.3	36 21.9 1.008 175.3	4
05	39 46.4 1.010 173.7	39 16.5 1.010 173.8	38 46.7 1.010 173.9	38 16.8 1.010 173.9	37 46.9 1.010 174.0	37 17.1 1.009 174.0	36 47.2 1.009 174.1	36 17.3 1.009 174.2	05
6	39 40.5 99 12 172.5	39 10.6 99 12 172.5	38 40.8 99 12 172.6	38 11.0 99 11 172.7	37 41.2 99 11 172.7	37 11.4 99 11 172.9	36 41.6 99 11 172.9	36 11.7 99 11 173.0	6
7	39 33.4 99 14 171.3	39 03.7 99 13 171.3	38 33.9 99 13 171.4	38 04.2 99 13 171.5	37 34.4 99 13 171.6	37 04.7 99 13 171.7	36 34.9 99 13 171.7	36 05.2 99 13 171.8	7
8	39 25.3 99 15 170.0	38 55.7 99 15 170.1	38 26.0 99 15 170.2	37 56.3 99 15 170.3	37 26.7 99 15 170.4	36 57.0 99 15 170.5	36 27.3 99 14 170.6	35 57.6 99 14 170.7	8
9	39 16.2 99 17 168.8	38 46.6 99 17 168.9	38 17.0 99 17 169.0	37 47.4 99 16 169.1	37 17.9 99 16 169.2	36 48.3 99 16 169.3	36 18.6 99 16 169.4	35 49.0 99 16 169.5	9
10	39 06.0 98 19 167.6	38 36.5 98 18 167.7	38 07.0 98 18 167.8	37 37.6 98 18 167.9	37 08.0 98 18 168.2	36 38.5 98 18 168.2	36 09.0 98 18 168.3	35 39.5 98 18 168.4	10
1	38 54.8 98 20 166.4	38 25.4 98 20 166.5	37 56.0 98 20 166.6	37 26.6 98 20 166.7	36 57.2 98 20 166.9	36 27.8 98 19 167.0	35 58.4 98 19 167.1	35 29.0 98 19 167.2	1
2	38 42.6 98 22 165.2	38 13.3 98 22 165.3	37 44.0 98 22 165.4	37 14.8 98 21 165.6	36 45.5 98 21 165.7	36 16.2 98 21 165.8	35 46.8 98 21 166.0	35 17.5 98 21 166.1	2
3	38 29.3 97 24 164.0	38 00.2 97 24 164.1	37 31.0 97 23 164.3	37 01.9 97 23 164.4	36 32.7 97 23 164.6	36 03.5 97 23 164.7	35 34.3 97 22 164.8	35 05.1 97 22 165.0	3
4	38 15.1 97 25 162.8	37 46.1 97 25 162.9	37 17.1 97 25 163.1	36 48.0 97 25 163.3	36 19.0 97 24 163.4	35 49.9 97 24 163.6	35 20.8 97 24 163.7	34 51.8 97 24 163.9	4
15	37 59.9 96 27 161.6	37 31.0 96 27 161.8	37 02.1 96 26 161.9	36 33.2 96 26 162.1	36 04.3 96 26 162.3	35 35.4 96 26 162.4	35 06.4 96 26 162.6	34 37.5 96 25 162.8	15
6	37 43.7 96 28 160.4	37 15.0 96 28 160.6	36 46.2 96 28 160.8	36 17.5 96 28 161.0	35 48.7 96 28 161.1	35 19.9 96 27 161.3	34 51.1 96 27 161.5	34 22.3 96 27 161.7	6
7	37 26.6 95 30 159.3	36 58.0 95 30 159.5	36 29.4 95 30 159.6	36 00.8 95 29 159.8	35 32.1 95 29 160.0	35 03.5 95 29 160.2	34 34.8 95 29 160.4	34 06.2 95 28 160.6	7
8	37 08.5 95 32 158.1	36 40.1 95 31 158.3	36 11.6 95 31 158.5	35 43.2 95 31 158.7	35 14.7 95 31 158.9	34 46.2 95 30 159.1	34 17.7 95 30 159.3	33 49.2 95 30 159.5	8
9	36 49.5 94 33 157.0	36 21.2 94 33 157.2	35 53.0 94 33 157.4	35 24.7 94 32 157.6	34 56.3 94 32 158.0	34 28.0 94 32 158.0	33 59.7 94 32 158.2	33 31.3 94 31 158.4	9
20	36 29.6 94 35 155.9	36 01.5 94 34 156.1	35 33.4 94 34 156.3	35 05.3 94 34 156.5	34 37.1 94 33 156.7	34 08.9 94 33 156.9	33 40.7 94 33 157.1	33 12.5 94 33 157.3	20
1	36 08.8 93 36 154.7	35 40.9 93 36 155.0	35 13.0 93 36 155.2	34 45.0 93 35 155.4	34 17.0 93 35 155.6	33 49.0 93 35 155.9	33 21.0 93 34 156.1	32 52.9 93 34 156.3	1
2	35 47.2 92 38 153.6	35 19.4 92 37 153.9	34 51.7 93 37 154.1	34 23.9 93 37 154.3	33 56.1 93 36 154.6	33 28.3 93 36 154.8	33 00.4 93 36 155.0	32 32.5 93 35 155.2	2
3	35 24.7 92 39 152.6	34 57.1 92 39 152.8	34 29.5 92 38 153.0	34 01.9 92 38 153.3	33 34.2 92 39 153.5	33 06.7 92 37 153.7	32 39.0 92 37 154.0	32 11.3 92 37 154.2	3
4	35 01.3 91 40 151.5	34 34.0 91 40 151.7	34 06.6 91 40 152.0	33 39.2 91 39 152.2	33 11.7 92 39 152.5	32 44.3 92 39 152.7	32 16.8 92 38 152.9	31 49.2 92 38 153.2	4
25	34 37.2 90 42 150.4	34 10.0 91 41 150.7	33 42.8 91 41 150.9	33 15.6 91 41 151.2	32 48.3 91 40 151.4	32 21.0 91 40 151.7	31 53.7 91 40 151.9	31 26.4 91 39 152.2	25
6	34 12.2 90 43 149.4	33 45.2 90 43 149.6	33 18.2 90 42 149.9	32 51.2 90 42 150.2	32 24.2 90 42 150.4	31 57.1 90 41 150.7	31 29.9 90 41 150.9	31 02.8 91 41 151.2	6
7	33 46.5 89 44 148.3	33 19.7 89 44 148.6	32 52.9 89 44 148.9	32 26.1 90 43 149.1	31 59.2 90 43 149.4	31 32.3 90 42 149.7	31 05.4 90 42 149.9	30 38.4 90 42 150.2	7
8	33 20.0 88 45 147.3	32 53.4 89 45 147.6	32 26.8 89 45 147.9	32 00.0 89 45 148.1	31 33.5 89 44 148.7	31 06.8 89 44 148.7	30 40.1 89 43 148.9	30 13.3 89 43 149.2	8
9	32 52.8 88 47 146.3	32 26.4 88 46 146.6	32 00.0 88 46 146.9	31 33.6 88 46 147.1	31 07.1 88 45 147.4	30 40.6 88 45 147.7	30 14.0 89 45 148.0	29 47.5 89 44 148.2	9
30	32 24.8 87 48 145.3	31 58.6 87 47 145.6	31 32.4 87 47 145.9	31 06.2 88 47 146.2	30 39.9 88 46 146.4	30 13.6 88 46 146.7	29 47.3 88 46 147.0	29 20.9 88 45 147.3	30
1	31 56.1 86 49 144.3	31 30.2 87 49 144.6	31 04.2 87 48 144.9	30 38.2 87 48 145.2	30 12.1 87 48 145.5	29 46.0 87 47 145.8	29 19.9 87 47 146.0	28 53.7 87 47 146.3	1
2	31 26.8 86 50 143.3	31 01.0 86 50 143.6	30 35.2 86 49 143.9	30 09.4 86 49 144.2	29 43.6 86 49 144.5	29 17.7 86 48 144.8	28 51.7 87 48 145.1	28 25.8 87 48 145.4	2
3	30 56.7 85 51 142.4	30 31.2 85 51 142.7	30 05.6 85 50 143.0	29 40.0 85 50 143.3	29 14.4 86 50 143.6	28 48.7 86 49 143.9	28 22.9 86 49 144.2	27 57.2 86 49 144.5	3
4	30 26.0 84 52 141.4	30 00.7 84 52 141.7	29 35.4 85 52 142.1	29 10.0 85 51 142.4	28 44.5 85 51 142.7	28 19.0 85 50 143.0	27 53.5 85 50 143.3	27 27.9 85 50 143.6	4
35	29 54.7 84 53 140.5	29 29.6 84 53 140.8	29 04.5 84 53 141.1	28 39.3 84 52 141.4	28 14.0 84 52 141.7	27 48.7 84 52 142.1	27 23.4 84 51 142.4	26 58.1 85 51 142.7	35
6	29 22.8 83 54 139.6	28 57.9 83 54 139.9	28 32.9 83 54 140.2	28 07.9 83 53 140.5	27 42.9 83 53 140.8	27 17.9 84 52 141.2	26 52.7 84 52 141.5	26 27.6 84 52 141.8	6
7	28 50.2 83 55 138.7	28 25.5 82 55 139.0	28 00.8 82 55 139.3	27 36.0 83 54 139.6	27 11.2 83 54 140.0	26 46.4 83 53 140.3	26 21.5 83 53 140.6	25 56.5 83 53 140.9	7
8	28 17.1 81 56 137.8	27 52.6 82 56 138.1	27 28.1 82 56 138.4	27 03.5 82 55 138.8	26 38.9 82 55 139.1	26 14.3 82 54 139.4	25 49.6 82 54 139.7	25 24.8 83 54 140.0	8
9	27 43.4 81 57 136.9	27 19.1 81 57 137.2	26 54.8 81 56 137.6	26 30.4 81 56 137.9	26 06.0 81 56 138.2	25 41.6 82 55 138.5	25 17.1 82 55 138.8	24 52.6 82 55 139.2	9
40	27 09.1 80 58 136.0	26 45.0 80 58 136.4	26 20.9 80 57 136.7	25 56.8 81 57 137.0	25 32.6 81 57 137.3	25 08.4 81 56 137.7	24 44.1 81 56 138.0	24 19.8 81 56 138.3	40
1	26 34.3 79 59 135.2	26 10.4 80 59 135.5	25 46.5 80 58 135.8	25 22.6 80 58 136.2	24 58.6 80 58 136.5	24 34.6 80 57 136.8	24 10.6 80 57 137.2	23 46.4 80 56 137.5	1
2	25 58.9 79 60 134.3	25 35.3 79 59 134.7	25 11.9 79 59 135.0	24 47.9 79 59 135.3	24 24.1 79 58 135.7	24 00.3 79 58 136.0	23 36.5 80 58 136.3	23 12.6 80 57 136.7	2
3	25 23.1 78 61 133.5	24 59.7 78 60 133.8	24 36.2 78 60 134.2	24 12.7 78 60 134.5	23 49.1 79 59 134.8	23 25.5 79 59 135.2	23 01.9 79 58 135.5	22 38.2 79 58 135.9	3
4	24 46.8 77 61 132.7	24 23.5 77 61 133.0	24 00.3 78 61 133.3	23 37.0 78 60 133.7	23 13.6 78 60 134.0	22 50.2 78 60 134.4	22 26.8 78 59 134.7	22 03.3 78 59 135.0	4
45	24 09.9 77 62 131.8	23 46.9 77 62 132.2	23 23.9 77 61 132.5	23 00.8 77 61 132.9	22 37.6 77 61 133.2	22 14.4 77 60 133.6	21 51.2 78 60 133.9	21 27.9 78 60 134.3	45
6	23 32.6 76 63 131.0	23 09.8 76 63 131.4	22 47.0 76 62 131.7	22 24.1 76 62 132.1	22 01.1 77 62 132.4	21 38.1 77 61 132.8	21 15.1 77 61 133.1	20 52.0 77 61 133.5	6
7	22 54.9 75 64 130.2	22 32.3 75 63 130.6	22 09.6 76 63 131.0	21 46.9 76 63 131.3	21 24.2 76 62 131.7	21 01.4 76 62 132.0	20 38.6 76 62 132.4	20 15.7 76 61 132.7	7
8	22 16.7 75 64 129.5	21 54.3 75 64 129.8	21 31.9 75 64 130.2	21 09.4 75 63 130.5	20 46.8 75 63 130.9	20 24.2 75 63 131.2	20 01.6 75 62 131.6	19 38.9 76 62 131.9	8
9	21 38.1 74 65 128.7	21 15.9 74 65 129.1	20 53.6 74 64 129.4	20 31.3 74 64 129.8	20 09.0 75 64 130.1	19 46.6 75 63 130.5	19 24.2 75 63 130.8	19 01.7 75 63 131.2	9
50	20 59.1 73 66 127.9	20 37.1 73 65 128.3	20 15.0 74 65 128.7	19 52.9 74 65 129.0	19 30.8 74 64 129.4	19 08.6 74 64 129.7	18 46.3 74 64 130.1	18 24.1 74 63 130.4	50
1	20 19.6 73 66 127.1	19 57.8 73 66 127.6	19 36.0 73 66 127.9	19 14.1 73 65 128.3	18 52.1 73 65 128.6	18 30.1 73 65 129.0	18 08.1 74 64 129.4	17 46.0 74 64 129.7	1
2	19 39.8 72 67 126.4	19 18.2 72 67 126.8	18 56.5 72 66 127.2	18 34.8 72 66 127.5	18 13.1 73 66 127.9	17 51.3 73 65 128.3	17 29.4 73 65 128.6	17 07.5 73 65 129.0	2
3	18 59.6 71 68 125.7	18 38.2 72 67 126.1	18 16.7 72 67 126.5	17 55.2 72 66 126.8	17 33.6 72 66 127.2	17 12.0 72 66 127.6	16 50.4 72 66 127.9	16 28.7 72 65 128.3	3
4	18 19.1 71 68 125.0	17 57.8 71 68 125.4	17 36.5 71 68 125.7	17 15.2 71 67 126.1	16 53.8 71 67 126.5	16 32.4 71 67 126.8	16 10.9 72 66 127.2	15 49.4 72 66 127.6	4
55	17 38.1 70 69 124.3	17 17.1 70 68 124.7	16 56.0 70 68 125.0	16 34.8 71 68 125.4	16 13.6 71 68 125.8	15 52.4 71 67 126.1	15 31.1 71 67 126.5	15 09.8 71 67 126.9	55
6	16 56.9 70 69 123.6	16 36.0 70 69 124.0	16 15.0 70 69 124.3	15 54.1 70 68 124.7	15 33.1 70 68 125.1	15 12.0 70 68 125.5	14 51.0 70 68 125.8	14 29.9 70 67 126.2	6
7	16 15.3 69 70 122.9	15 54.5 69 70 123.3	15 33.8 69 69 123.6	15 13.0 69 69 124.0	14 52.2 69 69 124.4	14 31.3 70 68 124.8	14 10.5 70 68 125.1	13 49.5 70 68 125.5	7
8	15 33.3 68 70 122.2	15 12.8 68 70 122.6	14 52.2 69 70 123.0	14 31.6 69 69 123.3	14 11.0 69 69 123.7	13 50.3 69 69 124.1	13 29.6 69 69 124.5	13 08.9 69 68 124.8	8
9	14 51.1 68 71 121.5	14 30.7 68 71 121.9	14 10.3 68 70 122.3	13 49.9 68 70 122.7	13 29.4 68 70 123.0	13 08.9 68 69 123.4	12 48.4 68 69 123.8	12 27.9 69 69 124.2	9
60	14 08.5 67 71 120.9	13 48.3 67 71 121.2	13 28.1 67 71 121.6	13 07.9 67 71 122.0	12 47.6 68 70 122.3	12 27.3 68 70 122.7	12 06.9 68 70 123.1	11 46.5 68 69 123.5	60
1	13 25.7 67 72 120.2	13 05.7 67 72 120.6	12 45.6 67 71 121.0	12 25.5 67 71 121.3	12 05.4 67 71 121.7	11 45.3 67 70 122.1	11 25.1 67 70 122.5	11 04.9 67 70 122.8	1
2	12 42.5 66 72 119.5	12 22.7 66 72 119.9	12 02.8 66 72 120.3	11 42.9 66 72 120.7	11 23.0 67 71 121.1	11 03.0 67 71 121.4	10 43.0 67 71 121.8	10 23.0 67 70 122.2	2
3	11 59.1 66 73 118.9	11 39.4 66 73 119.3	11 19.7 66 72 119.7	11 00.0 66 72 120.0	10 40.2 66 72 120.4	10 20.4 66 71 120.8	10 00.6 66 71 121.2	9 40.7 66 71 121.6	3
4	11 15.4 65 73 118.2	10 55.9 65 73 118.6	10 36.4 65 72 119.0	10 16.8 65 72 119.4	9 57.2 65 72 119.8	9 37.5 65 72 120.2	9 17.9 66 72 120.6	8 58.2 66 71 120.9	4
65	10 31.5 64 74 117.6	10 12.1 65 73 118.0	9 52.7 65 73 118.4	9 33.3 65 73 118.8	9 13.9 65 73 119.2	8 54.4 65 72 119.5	8 34.9 65 72 119.9	8 15.4 65 72 120.3	65
6	9 47.3 64 74 117.0	9 28.1 64 74 117.4	9 08.8 64 74 117.8	8 49.6 64 73 118.2	8 30.3 64 73 118.5	8 11.0 64 73 118.9	7 51.7 64 72 119.3	7 32.3 65 72 119.7	6
7	9 02.8 63 74 116.4	8 43.8 64 74 116.8	8 24.7 64 74 117.1	8 05.6 64 73 117.5	7 46.5 64 73 117.9	7 27.3 64 73 118.3	7 08.2 64 73 118.7	6 49.0 64 73 119.1	7
8	8 18.1 63 75 115.7	7 59.2 63 74 116.1	7 40.3 63 74 116.5	7 21.4 63 74 116.9	7 02.4 63 74 117.3	6 43.4 63 73 117.7	6 24.4 63 73 118.1	6 05.4 63 73 118.5	8
9	7 33.2 62 75 115.1	7 14.5 63 75 115.5	6 55.7 63 75 115.9	6 36.9 63 74 116.3	6 18.1 63 74 116.7	5 59.3 63 74 117.1	5 40.4 63 74 117.5	5 21.5 63 73 117.9	9
70	6 48.1 62 76 114.5	6 29.5 62 75 114.9	6 10.8 62 75 115.3	5 52.2 62 75 115.7	5 33.5 62 75 116.1	5 14.9 62 74 116.5			70
1	6 02.7 62 76 113.9	5 44.3 62 76 114.3	5 25.8 62 76 114.7	5 07.3 62 75 115.1					1
2	5 17.2 61 76 113.3								2

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00' Alt. / Δd Δt / Az.	16° 30' Alt. / Δd Δt / Az.	17° 00' Alt. / Δd Δt / Az.	17° 30' Alt. / Δd Δt / Az.	18° 00' Alt. / Δd Δt / Az.	18° 30' Alt. / Δd Δt / Az.	19° 00' Alt. / Δd Δt / Az.	19° 30' Alt. / Δd Δt / Az.	H.A.
91	8 03.7 55 80 76.1	8 20.1 55 80 75.7	8 36.4 55 80 75.3	8 52.8 54 80 74.8	9 09.1 54 80 74.4	9 25.4 54 80 74.0	9 41.6 54 79 73.6	9 57.8 54 79 73.1	91
2	7 15.4 55 80 75.6	7 31.9 55 80 75.1	7 48.4 55 80 74.7	8 04.8 55 80 74.3	8 21.2 55 80 73.9	8 37.6 55 79 73.5	8 54.0 54 79 73.0	9 10.3 54 79 72.6	2
3	6 27.3 55 80 75.0	6 43.9 55 80 74.6	7 00.5 55 80 74.2	7 17.0 55 80 73.8	7 33.5 55 79 73.4	7 50.0 55 79 72.9	8 06.4 55 79 72.5	8 22.9 55 79 72.1	3
4	5 39.3 56 80 74.5	5 56.0 56 80 74.1	6 12.7 55 79 73.7	6 29.3 55 79 73.2	6 45.9 55 79 72.8	7 02.5 55 79 72.4	7 19.1 55 79 72.0	7 35.6 55 79 71.6	4
95		5 08.2 56 79 73.5	5 25.0 56 79 73.1	5 41.7 56 79 72.7	5 58.5 56 79 72.3	6 15.2 56 79 71.9	6 31.8 56 78 71.5	6 48.5 56 78 71.0	95
6				5 11.1 56 79 71.8	5 28.0 56 78 71.3	5 44.8 56 78 70.9	6 01.5 56 78 70.5		6
7								5 14.7 56 78 70.0	7

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 34°

H.A.	20° 00′ Alt.	Δd	Δt	Az.	20° 30′ Alt.	Δd	Δt	Az.	21° 00′ Alt.	Δd	Δt	Az.	21° 30′ Alt.	Δd	Δt	Az.	22° 00′ Alt.	Δd	Δt	Az.	22° 30′ Alt.	Δd	Δt	Az.	23° 00′ Alt.	Δd	Δt	Az.	23° 30′ Alt.	Δd	Δt	Az.	H.A.
00	76 00.0	1.0	03	180.0	76 30.0	1.0	03	180.0	77 00.0	1.0	03	180.0	77 30.0	1.0	03	180.0	78 00.0	1.0	03	180.0	78 30.0	1.0	03	180.0	79 00.0	1.0	04	180.0	79 30.0	1.0	04	180.0	00
1	75 58.3	1.0	08	176.1	76 28.3	1.0	09	176.0	76 58.2	1.0	09	175.9	77 28.1	1.0	09	175.7	77 58.1	1.0	10	175.5	78 28.0	1.0	10	175.4	78 57.9	1.0	10	175.2	79 27.8	1.0	11	175.0	1
2	75 53.3	99	14	172.3	76 23.1	99	14	172.0	76 52.8	99	15	171.7	77 22.6	99	15	171.5	77 52.3	99	16	171.1	78 22.0	99	16	170.8	78 51.7	99	17	170.4	79 21.3	99	18	170.0	2
3	75 45.0	98	19	168.5	76 14.5	98	20	168.1	76 44.0	98	20	167.7	77 13.4	98	21	167.3	77 42.8	98	22	166.8	78 12.1	98	23	166.3	78 41.4	98	24	165.8	79 10.6	97	24	165.2	3
4	75 33.4	97	24	164.8	76 02.6	97	25	164.3	76 31.7	97	26	163.8	77 00.7	97	27	163.2	77 29.7	96	28	162.6	77 58.5	96	28	162.0	78 27.3	96	30	161.3	78 56.0	95	31	160.5	4
05	75 18.9	96	29	161.2	75 47.6	96	30	160.6	76 16.2	95	31	160.0	76 44.7	95	32	159.3	77 13.1	95	33	158.6	77 41.4	94	34	157.8	78 09.6	94	35	157.0	78 37.6	93	36	156.1	05
6	75 01.4	94	34	157.7	75 29.6	94	35	157.0	75 57.7	93	36	156.3	76 25.6	93	37	155.5	76 53.4	92	38	154.7	77 21.0	92	39	153.8	77 48.5	91	40	152.9	78 15.8	90	42	151.9	6
7	74 41.1	92	38	154.3	75 08.8	92	39	153.6	75 36.3	91	40	152.8	76 03.6	91	41	151.9	76 30.7	90	42	151.0	76 57.6	89	44	150.1	77 24.3	89	45	149.0	77 50.8	88	46	147.9	7
8	74 18.3	90	42	151.1	74 45.3	90	43	150.3	75 12.2	89	44	149.4	75 38.8	89	45	148.5	76 05.3	88	46	147.5	76 31.5	87	48	146.5	76 57.4	86	49	145.4	77 23.0	85	50	144.2	8
9	73 53.1	88	46	148.0	74 19.5	88	47	147.2	74 45.7	87	48	146.2	75 11.7	86	49	145.3	75 37.4	85	50	144.3	76 02.8	84	52	143.2	76 28.0	83	53	142.0	76 52.8	82	54	140.8	9
10	73 25.7	86	50	145.1	73 51.4	86	50	144.2	74 17.0	85	51	143.2	74 42.3	84	52	142.2	75 07.2	83	54	141.0	75 31.9	82	55	139.8	75 56.3	81	56	138.6	76 20.3	79	57	137.6	10
1	72 56.2	84	52	142.3	73 21.4	83	53	141.1	73 46.2	82	54	140.0	74 10.8	81	55	139.4	74 35.1	80	57	138.3	74 59.0	79	58	137.1	75 22.6	78	59	135.9	75 45.8	77	60	134.6	1
2	72 24.9	82	55	139.7	72 49.4	81	56	138.7	73 13.6	80	57	137.7	73 37.5	79	58	136.7	74 01.1	78	59	135.6	74 24.3	77	61	134.4	74 47.1	75	62	133.2	75 09.5	74	63	131.9	2
3	71 51.9	80	58	137.2	72 15.8	79	59	136.2	72 39.4	78	60	135.2	73 02.6	77	61	134.1	73 25.5	76	62	133.0	73 48.0	74	63	131.8	74 10.1	73	64	130.6	74 31.8	71	65	129.3	3
4	71 17.4	78	61	134.9	71 40.7	77	61	133.9	72 03.6	76	62	132.8	72 26.2	75	63	131.8	72 48.4	73	64	130.6	73 10.2	72	65	129.5	73 31.7	71	66	128.2	73 52.7	69	67	127.0	4
15	70 41.5	76	62	132.6	71 04.1	75	63	131.6	71 26.5	74	64	130.6	71 48.4	73	65	129.5	72 10.0	71	66	128.4	72 31.2	70	67	127.2	72 52.0	69	68	126.0	73 12.4	67	69	124.8	15
6	70 04.3	74	64	130.5	70 26.4	73	65	129.5	70 48.1	72	66	128.5	71 09.5	71	67	127.4	71 30.5	69	68	126.3	71 51.1	68	69	125.2	72 11.3	66	70	124.0	72 31.0	65	70	122.7	6
7	69 25.9	72	66	128.6	69 47.5	71	67	127.6	70 08.7	70	68	126.5	70 29.5	69	68	125.5	70 49.9	67	69	124.3	71 10.0	66	70	123.2	71 29.5	65	71	122.0	71 48.7	63	72	120.8	7
8	68 46.5	71	67	126.7	69 07.5	70	68	125.7	69 28.2	68	69	124.7	69 48.5	67	70	123.6	70 08.4	66	70	122.5	70 27.9	64	71	121.4	70 47.0	63	72	120.2	71 05.6	61	73	119.0	8
9	68 06.1	69	69	124.9	68 26.7	68	69	124.0	68 46.8	67	70	122.9	69 06.6	65	71	121.8	69 26.1	64	72	120.8	69 45.0	63	73	119.7	70 03.6	61	73	118.5	70 21.7	60	74	117.3	9
20	67 24.9	67	70	123.2	67 45.0	66	71	122.2	68 04.7	65	72	121.2	68 24.0	64	72	120.2	68 42.9	62	73	119.1	69 01.5	61	74	118.0	69 19.6	60	74	116.9	69 37.2	58	75	115.8	20
1	66 42.9	66	71	121.6	67 02.5	65	72	120.6	67 21.8	64	73	119.6	67 40.7	62	73	118.6	67 59.2	61	74	117.6	68 17.2	60	75	116.5	68 34.9	58	75	115.4	68 52.1	57	76	114.3	1
2	66 00.2	65	72	120.1	66 19.4	63	73	119.1	66 38.2	62	74	118.1	66 56.7	61	74	117.1	67 14.8	60	75	116.1	67 32.5	58	76	115.0	67 49.7	57	76	114.0	68 06.5	55	77	112.9	2
3	65 16.8	63	73	118.6	65 35.6	62	74	117.6	65 54.1	61	74	116.7	66 12.2	60	75	115.7	66 29.8	58	76	114.7	66 47.1	57	77	113.7	67 04.0	56	77	112.5	67 20.5	54	77	111.5	3
4	64 32.9	62	74	117.2	64 51.3	61	75	116.3	65 09.4	60	75	115.3	65 27.1	58	76	114.4	65 44.4	57	76	113.4	66 01.4	56	77	112.4	66 17.9	54	78	111.3	66 34.0	53	78	110.3	4
25	63 48.4	61	75	115.9	64 06.4	60	76	115.0	64 24.2	59	76	114.0	64 41.6	57	77	113.1	64 58.5	56	77	112.1	65 15.2	55	78	111.1	65 31.4	53	78	110.1	65 47.2	52	79	109.1	25
6	63 03.4	60	76	114.6	63 21.1	59	76	113.7	63 38.5	57	77	112.8	63 55.6	56	77	111.9	64 12.3	55	78	110.9	64 28.6	54	78	110.0	64 44.5	52	79	109.0	65 00.0	51	79	108.0	6
7	62 17.9	59	76	113.4	62 35.4	58	77	112.5	62 52.5	56	77	111.6	63 09.2	55	78	110.7	63 25.6	54	78	109.8	63 41.7	53	79	108.8	63 57.3	51	79	107.9	64 12.6	50	80	106.9	7
8	61 32.1	58	77	112.2	61 49.2	57	78	111.3	62 06.1	56	78	110.5	62 22.5	54	79	109.6	62 38.7	53	79	108.7	62 54.4	52	79	107.8	63 09.8	51	80	106.8	63 24.8	49	80	105.8	8
9	60 45.9	57	78	111.1	61 02.8	56	78	110.3	61 19.3	55	78	109.4	61 35.5	54	79	108.5	61 51.4	52	79	107.6	62 06.9	51	80	106.7	62 22.1	50	80	105.8	62 36.9	49	80	104.9	9
30	59 59.3	56	78	110.1	60 15.9	55	79	109.2	60 32.2	54	79	108.4	60 48.2	53	79	107.5	61 03.9	52	80	106.6	61 19.2	50	80	105.7	61 34.1	49	80	104.8	61 48.7	48	81	103.9	30
1	59 12.4	55	79	109.0	59 28.8	54	79	108.2	59 44.9	53	79	107.4	60 00.7	52	80	106.5	60 16.1	51	80	105.7	60 31.2	50	80	104.8	60 45.9	49	81	103.9	61 00.3	47	81	103.0	1
2	58 25.3	54	79	108.0	58 41.4	53	79	107.2	58 57.3	52	80	106.4	59 12.9	51	80	105.6	59 28.1	50	80	104.7	59 43.0	49	81	103.9	59 57.5	48	81	103.0	60 11.8	47	81	102.1	2
3	57 37.8	54	79	107.1	57 53.8	53	80	106.3	58 09.5	52	80	105.5	58 24.8	51	80	104.7	58 39.9	50	81	103.8	58 54.4	50	81	103.0	59 09.0	47	81	102.1	59 23.0	46	81	101.3	3
4	56 50.2	53	80	106.1	57 05.9	52	80	105.4	57 21.4	51	80	104.6	57 36.6	50	81	103.8	57 51.5	49	81	103.0	58 06.1	48	81	102.1	58 20.3	47	81	101.3	58 34.2	46	82	100.4	4
35	56 02.3	52	80	105.2	56 17.9	52	80	104.5	56 33.2	51	81	103.7	56 48.2	50	81	102.9	57 02.9	49	81	102.1	57 17.3	48	81	101.3	57 31.4	46	82	100.5	57 45.2	45	82	99.7	35
6	55 14.2	52	80	104.4	55 29.6	51	81	103.6	55 44.8	50	81	102.9	55 59.7	49	81	102.1	56 14.2	48	81	101.3	56 28.5	47	82	100.5	56 42.5	46	82	99.7	56 56.1	45	82	98.9	6
7	54 25.9	51	81	103.5	54 41.2	50	81	102.8	54 56.2	50	81	102.0	55 10.9	49	81	101.3	55 25.4	48	82	100.5	55 39.5	47	82	99.7	55 53.4	46	82	98.9	56 06.9	45	82	98.1	7
8	53 37.5	51	81	102.7	53 52.6	50	81	102.0	54 07.5	49	82	101.2	54 22.1	48	82	100.5	54 36.4	47	82	99.7	54 50.4	46	82	99.0	55 04.2	45	82	98.2	55 17.6	44	82	97.4	8
9	52 48.9	50	81	101.9	53 03.9	50	81	101.2	53 18.6	49	82	100.5	53 33.1	48	82	99.7	53 47.3	47	82	99.0	54 01.3	46	82	98.2	54 14.9	44	82	97.5	54 28.3	44	82	96.7	9
40	52 00.1	50	81	101.1	52 15.0	49	82	100.4	52 29.7	48	82	99.7	52 44.0	47	82	99.0	52 58.2	47	82	98.3	53 12.0	46	82	97.5	53 25.6	45	82	96.8	53 38.8	44	82	96.0	40
1	51 11.3	50	82	100.4	51 26.1	49	82	99.7	51 40.6	48	82	99.0	51 54.9	47	82	98.3	52 08.9	46	82	97.6	52 22.6	45	82	96.8	52 36.1	44	82	96.1	52 49.3	44	83	95.4	1
2	50 22.3	49	82	99.7	50 37.0	49	82	99.0	50 51.4	48	82	98.3	51 05.6	47	82	97.6	51 19.5	46	82	96.9	51 33.2	45	82	96.2	51 46.6	44	82	95.4	51 59.8	43	83	94.7	2
3	49 33.2	49	82	98.9	49 47.8	48	82	98.3	50 02.1	47	82	97.6	50 16.3	47	82	96.9	50 30.1	46	82	96.2	50 43.7	45	83	95.5	50 57.1	43	83	94.8	51 10.2	43	83	94.1	3
4	48 44.0	49	82	98.2	48 58.5	48	82	97.6	49 12.8	47	82	96.9	49 26.8	46	82	96.2	49 40.6	46	83	95.5	49 54.2	45	83	94.8	50 07.5	44	83	94.1	50 20.6	43	83	93.4	4
45	47 54.7	48	82	97.5	48 09.2	48	82	96.9	48 23.4	47	82	96.2	48 37.4	46	83	95.6	48 51.1	45	83	94.9	49 04.6	45	83	94.2	49 17.9	43	83	93.5	49 30.9	43	83	92.8	45
6	47 05.4	48	82	96.9	47 19.8	48	82	96.2	47 33.9	47	82	95.6	47 47.8	46	83	94.9	48 01.5	45	83	94.3	48 15.0	44	83	93.6	48 28.2	44	83	92.9	48 41.2	43	83	92.2	6
7	46 16.0	48	82	96.2	46 30.3	47	83	95.6	46 44.4	47	83	94.9	46 58.2	46	83	94.3	47 11.9	45	83	93.6	47 25.3	44	83	93.0	47 38.5	44	83	92.3	47 51.5	43	83	91.6	7
8	45 26.5	48	83	95.6	45 40.7	47	83	94.9	45 54.8	46	83	94.3	46 08.6	46	83	93.7	46 22.2	45	83	93.0	46 35.6	44	83	92.4	46 48.8	43	83	91.7	47 01.8	43	83	91.1	8
9	44 37.0	48	83	94.9	44 51.2	47	83	94.3	45 05.2	46	83	93.7	45 19.0	46	83	93.1	45 32.6	45	83	92.4	45 45.9	44	83	91.8	45 59.1	43	83	91.1	46 12.0	43	83	90.5	9
50	43 47.4	48	83	94.3	44 01.5	47	83	93.7	44 15.5	46	83	93.1	44 29.3	46	83	92.5	44 42.8	45	83	91.8	44 56.2	44	83	91.2	45 09.3	43	83	90.6	45 22.3	43	83	89.9	50
1	42 57.8	47	83	93.7	43 11.9	47	83	93.1	43 25.8	46	83	92.5	43 39.6	45	83	91.9	43 53.1	45	83	91.2	44 06.5	44	83	90.6	44 19.6	43	83	90.0	44 32.5	43	83	89.4	1
2	42 08.1	47	83	93.1	42 22.2	47	83	92.5	42 36.1	46	83	91.9	42 49.8	45	83	91.3	43 03.4	45	83	90.7	43 16.7	44	83	90.1	43 29.9	43	83	89.4	43 42.8	43	83	88.8	2
3	41 18.4	47	83	92.5	41 32.5	47	83	91.9	41 46.4	46	83	91.3	42 00.1	45	83	90.7	42 13.6	45	83	90.1	42 27.0	44	83	89.5	42 40.1	43	83	88.9	42 53.1	43	83	88.3	3
4	40 28.7	47	83	91.9	40 42.8	47	83	91.3	40 56.7	46	83	90.7	41 10.4	45	83	90.2	41 23.9	45	83	89.6	41 37.2	44	83	89.0	41 50.4	44	83	88.4	42 03.4	43	83	87.7	4
55	39 39.0	47	83	91.3	39 53.0	47	83	90.8	40 06.9	46	83	90.2	40 20.6	45	83	89.6	40 34.2	45	83	89.0	40 47.5	44	83	88.4	41 00.7	44	83	87.8	41 13.7	43	83	87.2	55
6	38 49.3	47	83	90.8	39 03.3	47	83	90.2	39 17.2	46	83	89.6	39 30.9	46	83	89.0	39 44.4	45	83	88.5	39 57.8	44	83	87.9	40 11.0	44	83	87.3	40 24.0	43	83	86.7	6
7	37 59.5	47	83	90.2	38 13.6	47	83	89.6	38 27.4	46	83	89.1	38 41.2	46	83	88.5	38 54.7	45	83	87.9	39 08.1	44	83	87.3	39 21.3	44	83	86.8	39 34.4	43	83	86.2	7
8	37 09.8	47	83	89.6	37 23.8	47	83	89.1	37 37.7	46	83	88.5	37 51.4	46	83	88.0	38 05.0	45	83	87.4	38 18.4	44	83	86.8	38 31.7	44	83	86.3	38 44.7	43	83	85.7	8
9	36 20.0	47	83	89.1	36 34.1	47	83	88.5	36 48.0	46	83	88.0	37 01.7	46	83	87.4	37 15.3	45	83	86.9	37 28.8	45	83	86.3	37 42.0	44	83	85.7	37 55.2	43	83	85.2	9
60	35 30.3	47	83	88.5	35 44.4	47	83	88.0	35 58.3	46	83	87.4	36 12.1	46	83	86.9	36 25.7	45	83	86.3	36 39.1	45	83	85.8	36 52.5	44	83	85.2	37 05.6	44	82	84.7	60
1	34 40.6	47	83	88.0	34 54.7	47	83	87.5	35 08.6	46	83	86.9	35 22.4	46	83	86.4	35 36.1	45	83	85.8	35 49.6	45	83	85.3	36 02.9	44	82	84.7	36 16.1	44	82	84.2	1
2	33 50.9	47	83	87.5	34 05.0	47	83	86.9	34 19.0	46	83	86.4	34 32.8	46	83	85.9	34 46.5	45	83	85.3	35 00.0	45	83	84.8	35 13.4	44	82	84.2	35 26.6	44	82	83.7	2
3	33 01.2	47	83	86.9	33 15.3	47	83	86.4	33 29.3	46	83	85.9	33 43.2	46	83	85.3	33 56.9	46	83	84.8	34 10.5	45	83	84.3	34 23.9	44	82	83.7	34 37.2	44	82	83.2	3
4	32 11.5	47	83	86.4	32 25.7	47	83	85.9	32 39.7	47	83	85.4	32 53.6	46	83	84.8	33 07.4	46	82	84.3	33 21.0	45	82	83.8	33 34.5	45	82	83.2	33 47.9	44	82	82.7	4
65	31 21.9	48	83	85.9	31 36.1	47	83	85.4	31 50.2	47	82	84.8	32 04.1	46	82	84.3	32 17.9	46	82	83.8	32 31.6	45	82	83.3	32 45.1	45	82	82.7	32 58.5	44	82	82.2	65
6	30 32.3	48	83	85.4	30 46.5	47	83	84.8	31 00.7	47	82	84.3	31 14.6	46	82	83.8	31 28.5	46	82	83.3	31 42.2	46	82	82.8	31 55.8	45	82	82.2	32 09.3	45	82	81.7	6
7	29 42.8	48	83	84.8	29 57.0	47	82	84.3	30 11.2	47	82	83.8	30 25.2	47	82	83.3	30 39.1	46	82	82.8	30 52.9	46	82	82.3	31 06.6	45	82	81.8	31 20.1	45	82	81.2	7
8	28 53.2	48	82	84.3	29 07.5	48	82	83.8	29 21.7	47	82	83.3	29 35.8	47	82	82.8	29 49.8	46	82	82.3	30 03.6	46	82	81.8	30 17.4	46	82	81.3	30 31.0	45	82	80.8	8
9	28 03.8	48	82	83.8	28 18.1	48	82	83.3	28 32.4	47	82	82.8	28 46.5	47	82	82.3	29 00.5	47	82	81.8	29 14.4	46	82	81.3	29 28.2	46	82	80.8	29 41.9	46	82	80.3	9
70	27 14.3	48	82	83.3	27 28.7	48	82	82.8	27 43.0	47	82	82.3	27 57.2	47	82	81.8	28 11.3	47	82	81.3	28 25.3	46	82	80.8	28 39.2	46	82	80.3	28 52.9	46	82	79.8	70
1	26 25.0	49	82	82.8	26 39.4	48	82	82.3	26 53.8	48	82	81.8	27 08.0	47	82	81.3	27 22.2	47	82	80.8	27 36.2	47	82	80.3	27 50.2	46	82	79.8	28 04.0	46	81	79.3	1
2	25 35.6	49	82	82.3	25 50.2	48	82	81.8	26 04.6	48	82	81.3	26 18.9	48	82	80.8	26 33.1	47	82	80.3	26 47.2	47	82	79.8	27 01.3	47	81	79.3	27 15.2	46	81	78.8	2
3	24 46.4	49	82	81.8	25 01.0	48	82	81.3	25 15.4	48	82	80.8	25 29.8	48	82	80.3	25 44.1	47	82	79.8	25 58.3	47	81	79.3	26 12.4	47	81	78.9	26 26.4	46	81	78.4	3
4	23 57.2	49	82	81.3	24 11.8	49	82	80.8	24 26.4	48	82	80.3	24 40.8	48	82	79.8	24 55.2	48	81	79.3	25 09.5	47	81	78.9	25 23.6	47	81	78.4	25 37.7	47	81	77.9	4
75	23 08.1	49	82	80.8	23 22.8	49	82	80.3	23 37.4	48	82	79.8	23 51.9	48	81	79.3	24 06.4	48	81	78.9	24 20.7	48	81	78.4	24 35.0	47	81	77.9	24 49.1	47	81	77.4	75
6	22 19.0	49	82	80.3	22 33.8	49	82	79.8	22 48.5	49	81	79.3	23 03.1	48	81	78.8	23 17.6	48	81	78.4	23 32.2	48	81	77.9	23 46.4	48	81	77.4	24 00.6	47	81	76.9	6
7	21 30.0	50	82	79.8	21 44.8	49	81	79.3	21 59.6	49	81	78.8	22 14.3	49	81	78.4	22 28.9	48	81	77.9	22 43.4	48	81	77.4	22 57.9	48	81	76.9	23 12.2	48	81	76.5	7
8	20 41.1	50	81	79.3	20 56.0	50	81	78.8	21 10.9	49	81	78.4	21 25.6	49	81	77.9	21 40.3	49	81	77.4	21 54.9	48	81	76.9	22 09.5	48	81	76.5	22 23.9	48	80	76.0	8
9	19 52.3	50	81	78.8	20 07.3	50	81	78.3	20 22.2	50	81	77.8	20 37.0	49	81	77.4	20 51.8	49	81	76.9	21 06.5	49	81	76.4	21 21.2	48	80	76.0	21 35.7	48	80	75.5	9
80	19 03.5	50	81	78.3	19 18.6	50	81	77.8	19 33.6	50	81	77.3	19 48.6	50	81	76.9	20 03.4	49	81	76.4	20 18.2	49	80	76.0	20 32.9	49	80	75.5	20 47.6	49	80	75.0	80
1	18 14.9	51	81	77.8	18 30.0	50	81	77.3	18 45.1	50	81	76.8	19 00.2	50	80	76.4	19 15.1	50	80	75.9	19 30.0	50	80	75.5	19 44.8	49	80	75.0	19 59.6	49	80	74.5	1
2	17 26.3	51	81	77.3	17 41.5	51	81	76.8	17 56.7	50	80	76.4	18 11.9	50	80	75.9	18 26.9	50	80	75.4	18 41.9	50	80	75.0	18 56.8	50	80	74.5	19 11.7	49	80	74.1	2
3	16 37.8	51	81	76.8	16 53.2	51	81	76.3	17 08.4	51	80	75.9	17 23.7	51	80	75.4	17 38.8	50	80	75.0	17 53.9	50	80	74.5	18 09.0	50	80	74.0	18 23.9	50	79	73.6	3
4	15 49.5	52	80	76.3	16 04.9	51	80	75.8	16 20.3	51	80	75.4	16 35.6	51	80	74.9	16 50.8	51	80	74.5	17 06.1	51	80	74.0	17 21.2	50	79	73.6	17 36.3	50	79	73.1	4
85	15 01.2	52	80	75.7	15 16.7	52	80	75.3	15 32.2	51	80	74.9	15 47.6	51	80	74.4	16 03.0	51	80	74.0	16 18.3	51	79	73.5	16 33.6	51	79	73.1	16 48.7	51	79	72.6	85
6	14 13.0	52	80	75.2	14 28.7	52	80	74.8	14 44.2	52	80	74.4	14 59.8	52	80	73.9	15 15.2	51	79	73.5	15 30.7	51	79	73.0	15 46.0	51	79	72.6	16 01.3	51	79	72.1	6
7	13 25.0	53	80	74.7	13 40.7	52	80	74.3	13 56.4	52	80	73.9	14 12.0	52	79	73.5	14 27.6	52	79	73.0	14 43.1	52	79	72.5	14 58.6	51	79	72.1	15 14.1	51	79	71.6	7
8	12 37.1	53	80	74.2	12 52.9	53	80	73.8	13 08.7	53	79	73.4	13 24.4	52	79	72.9	13 40.1	52	79	72.5	13 55.8	52	79	72.0	14 11.4	52	78	71.6	14 26.9	52	78	71.2	8
9	11 49.2	53	79	73.7	12 05.2	53	79	73.3	12 21.1	53	79	72.9	12 36.9	53	79	72.4	12 52.7	52	79	72.0	13 08.5	52	79	71.5	13 24.2	52	78	71.1	13 39.9	52	78	70.7	9
90	11 01.6	54	79	73.2	11 17.6	53	79	72.8	11 33.6	53	79	72.3	11 49.6	53	78	71.9	12 05.5	53	78	71.5	12 21.4	53	78	71.0	12 37.2	52	78	70.6	12 53.0	52	78	70.2	90

Lat. 34°

H.A.	20° 00′ Alt. Δd Δt Az.	20° 30′ Alt. Δd Δt Az.	21° 00′ Alt. Δd Δt Az.	21° 30′ Alt. Δd Δt Az.	22° 00′ Alt. Δd Δt Az.	22° 30′ Alt. Δd Δt Az.	23° 00′ Alt. Δd Δt Az.	23° 30′ Alt. Δd Δt Az.	H.A.
00	36 00.0 1.00 1 180.0	35 30.0 1.00 1 180.0	35 00.0 1.00 1 180.0	34 30.0 1.00 1 180.0	34 00.0 1.00 1 180.0	33 30.0 1.00 1 180.0	33 00.0 1.00 1 180.0	32 30.0 1.00 1 180.0	00
1	35 59.5 1.00 3 178.9	35 29.5 1.00 2 178.8	34 59.5 1.00 2 178.9	34 29.5 1.00 2 178.9	33 59.5 1.00 2 178.9	33 29.5 1.00 2 178.9	32 59.5 1.00 2 178.9	32 29.5 1.00 2 178.9	1
2	35 58.0 1.00 4 177.7	35 28.0 1.00 4 177.7	34 58.0 1.00 4 177.7	34 28.0 1.00 4 177.7	33 58.1 1.00 4 177.8	33 28.1 1.00 4 177.8	32 58.1 1.00 4 177.8	32 28.1 1.00 4 177.8	2
3	35 55.5 1.00 6 176.5	35 25.5 1.00 6 176.6	34 55.6 1.00 6 176.6	34 25.6 1.00 6 176.6	33 55.6 1.00 6 176.6	33 25.7 1.00 6 176.7	32 55.7 1.00 6 176.7	32 25.7 1.00 6 176.7	3
4	35 51.9 1.00 8 175.4	35 22.0 1.00 7 175.4	34 52.1 1.00 7 175.4	34 22.2 1.00 7 175.5	33 52.2 1.00 7 175.5	33 22.3 1.00 7 175.6	32 52.4 1.00 7 175.6	32 22.5 1.00 7 175.7	4
05	35 47.4 1.00 9 174.2	35 17.5 1.00 9 174.3	34 47.7 1.00 9 174.3	34 17.8 1.00 9 174.4	33 47.9 1.00 9 174.4	33 18.0 1.00 9 174.5	32 48.1 1.00 9 174.5	32 18.2 1.00 9 174.6	05
6	35 41.9 99 11 173.1	35 12.1 99 11 173.1	34 42.2 99 11 173.2	34 12.4 99 11 173.2	33 42.6 99 10 173.3	33 12.7 99 10 173.4	32 42.9 99 10 173.4	32 13.0 99 10 173.5	6
7	35 35.4 99 12 171.9	35 05.6 99 12 172.0	34 35.8 99 12 172.1	34 06.1 99 12 172.1	33 36.3 99 12 172.2	33 06.5 99 12 172.3	32 36.7 99 12 172.3	32 07.0 99 12 172.4	7
8	35 27.9 99 14 170.8	34 58.2 99 14 170.8	34 28.5 99 14 170.9	33 58.8 99 14 171.0	33 29.1 99 14 171.1	32 59.4 99 14 171.2	32 29.6 99 13 171.3	31 59.9 99 13 171.3	8
9	35 19.4 99 16 169.6	34 49.8 99 16 169.7	34 20.2 99 16 169.8	33 50.5 99 15 169.9	33 20.9 99 15 170.0	32 51.3 99 15 170.1	32 21.6 99 15 170.2	31 52.0 99 15 170.3	9
10	35 10.0 98 17 168.5	34 40.4 98 17 168.6	34 10.9 98 17 168.7	33 41.4 98 17 168.8	33 11.8 98 18 168.9	32 42.2 98 17 169.0	32 12.7 98 16 169.1	31 43.1 98 16 169.2	10
1	34 59.6 98 19 167.4	34 30.1 98 19 167.5	34 00.7 98 19 167.6	33 31.2 98 18 167.7	33 01.8 98 18 167.9	32 32.3 98 18 167.9	32 02.8 98 18 168.0	31 33.4 98 18 168.2	1
2	34 48.2 98 20 166.2	34 18.9 98 20 166.4	33 49.5 98 20 166.5	33 20.2 98 20 166.6	32 50.8 98 20 166.7	32 21.4 98 20 166.9	31 52.1 98 20 167.0	31 22.7 98 19 167.1	2
3	34 35.9 97 22 165.1	34 06.7 97 22 165.3	33 37.4 97 22 165.4	33 08.2 97 22 165.5	32 38.9 98 21 165.7	32 09.7 98 21 165.8	31 40.4 98 21 165.9	31 11.1 98 21 166.0	3
4	34 22.7 97 24 164.0	33 53.6 97 23 164.2	33 24.4 97 23 164.3	32 55.3 97 23 164.4	32 26.2 97 23 164.6	31 57.0 97 23 164.7	31 27.9 97 22 164.9	30 58.7 97 22 165.0	4
15	34 08.5 97 25 162.9	33 39.5 97 25 163.1	33 10.5 97 25 163.2	32 41.5 97 24 163.4	32 12.5 97 24 163.5	31 43.5 97 24 163.7	31 14.4 97 24 163.8	30 45.4 97 24 164.0	15
6	33 53.4 96 27 161.8	33 24.6 96 26 162.0	32 55.7 96 26 162.1	32 26.8 96 26 162.3	31 58.0 96 26 162.5	31 29.1 96 25 162.6	31 00.2 96 25 162.8	30 31.2 96 25 162.9	6
7	33 37.5 96 28 160.7	33 08.8 96 28 160.9	32 40.0 96 28 161.1	32 11.3 96 27 161.3	31 42.5 96 27 161.4	31 13.8 96 27 161.6	30 45.0 96 27 161.8	30 16.2 96 26 161.9	7
8	33 20.6 95 30 159.7	32 52.0 95 29 159.8	32 23.5 95 29 160.0	31 54.9 95 29 160.2	31 26.3 95 28 160.4	30 57.6 95 28 160.6	30 29.0 95 28 160.7	30 00.4 96 28 160.9	8
9	33 02.9 95 31 158.6	32 34.5 95 31 158.8	32 06.0 95 30 159.0	31 37.6 95 30 159.2	31 09.1 95 30 159.3	30 40.7 95 30 159.5	30 12.2 95 30 159.7	29 43.7 95 29 159.9	9
20	32 44.3 94 33 157.5	32 16.0 94 32 157.7	31 47.8 94 32 157.9	31 19.5 94 32 158.1	30 51.2 94 31 158.3	30 22.9 94 31 158.5	29 54.5 94 31 158.7	29 26.2 95 31 158.9	20
1	32 24.9 94 34 156.5	31 56.8 94 33 156.7	31 28.7 94 33 156.9	31 00.5 94 33 157.1	30 32.4 94 33 157.3	30 04.2 94 32 157.5	29 36.0 94 32 157.7	29 07.8 94 32 157.9	1
2	32 04.6 93 35 155.5	31 36.7 93 35 155.7	31 08.8 93 35 155.9	30 40.8 93 34 156.1	30 12.8 93 34 156.3	29 44.8 93 34 156.5	29 16.8 93 34 156.7	28 48.7 94 33 156.9	2
3	31 43.6 92 36 154.4	31 15.8 93 36 154.6	30 48.0 93 36 154.9	30 20.2 93 36 155.1	29 52.4 93 35 155.3	29 24.6 93 35 155.5	28 56.7 93 35 155.7	28 28.8 93 34 155.9	3
4	31 21.7 92 38 153.4	30 54.1 92 37 153.6	30 26.5 92 37 153.9	29 58.9 92 37 154.1	29 31.2 92 36 154.3	29 03.6 92 36 154.5	28 35.9 92 36 154.8	28 08.2 92 35 155.0	4
25	30 59.0 91 39 152.4	30 31.6 91 39 152.6	30 04.2 91 38 152.9	29 36.8 91 38 153.1	29 09.3 92 38 153.3	28 41.8 92 38 153.6	28 14.3 92 37 153.8	27 46.8 92 37 154.0	25
6	30 35.6 91 40 151.4	30 08.4 91 40 151.7	29 41.2 91 40 151.9	29 13.9 91 39 152.1	28 46.6 91 39 152.4	28 19.3 91 39 152.6	27 52.0 91 38 152.8	27 24.6 91 38 153.1	6
7	30 11.4 90 42 150.4	29 44.4 90 41 150.7	29 17.4 90 41 150.9	28 50.3 90 41 151.2	28 23.2 90 40 151.4	27 56.0 90 40 151.7	27 28.9 91 40 151.9	27 01.7 91 39 152.1	7
8	29 46.5 89 43 149.5	29 19.7 89 42 149.7	28 52.8 90 42 150.0	28 25.9 90 42 150.2	27 59.0 90 42 150.5	27 32.1 90 41 150.7	27 05.1 90 41 151.0	26 38.1 90 40 151.2	8
9	29 20.9 89 44 148.5	28 54.2 89 44 148.8	28 27.6 89 43 149.0	28 00.9 89 43 149.3	27 34.1 89 43 149.5	27 07.4 89 42 149.8	26 40.6 89 42 150.0	26 13.8 89 42 150.3	9
30	28 54.5 88 45 147.5	28 28.1 88 45 147.8	28 01.6 88 44 148.1	27 35.1 88 44 148.3	27 08.6 88 44 148.6	26 42.0 89 43 148.9	26 15.4 89 43 149.1	25 48.8 89 43 149.4	30
1	28 27.5 87 46 146.6	28 01.2 88 46 146.9	27 35.0 88 46 147.1	27 08.7 88 45 147.4	26 42.3 88 45 147.7	26 16.0 88 45 148.0	25 49.6 88 44 148.2	25 23.1 88 44 148.5	1
2	27 59.8 87 47 145.7	27 33.7 87 47 146.0	27 07.6 87 46 146.2	26 41.5 87 46 146.5	26 15.4 87 46 146.8	25 49.2 87 46 147.1	25 23.0 87 45 147.3	24 56.8 87 45 147.6	2
3	27 31.4 86 48 144.8	27 05.5 86 48 145.0	26 39.7 86 48 145.3	26 13.8 86 47 145.6	25 47.8 87 47 145.9	25 21.8 87 47 146.2	24 55.8 87 46 146.4	24 29.8 87 46 146.7	3
4	27 02.3 86 49 143.8	26 36.7 86 49 144.1	26 11.0 86 49 144.4	25 45.3 86 48 144.7	25 19.6 86 48 145.0	24 53.8 86 48 145.3	24 28.0 86 47 145.6	24 02.2 86 47 145.8	4
35	26 32.7 85 50 143.0	26 07.3 85 50 143.2	25 41.8 85 50 143.5	25 16.3 85 49 143.8	24 50.8 85 49 144.1	24 25.2 85 49 144.4	23 59.6 85 48 144.7	23 34.0 85 48 145.0	35
6	26 02.4 84 51 142.1	25 37.2 84 51 142.4	25 11.9 84 51 142.7	24 46.6 84 50 143.0	24 21.3 84 50 143.3	23 55.9 85 50 143.5	23 30.5 85 49 143.8	23 05.1 85 49 144.1	6
7	25 31.5 83 52 141.2	25 06.5 83 52 141.5	24 41.5 84 52 141.8	24 16.4 84 51 142.1	23 51.2 84 51 142.4	23 26.1 84 51 142.7	23 00.9 84 50 143.0	22 35.7 84 50 143.3	7
8	25 00.1 83 53 140.3	24 35.3 83 53 140.6	24 10.4 83 53 140.9	23 45.5 83 52 141.3	23 20.6 83 52 141.6	22 55.7 83 51 141.9	22 30.7 83 51 142.2	22 05.6 83 51 142.5	8
9	24 28.0 82 54 139.5	24 03.4 82 54 139.8	23 38.8 82 54 140.1	23 14.1 82 53 140.4	22 49.4 82 53 140.7	22 24.7 83 53 141.0	21 59.9 83 52 141.3	21 35.1 83 52 141.6	9
40	23 55.4 81 55 138.6	23 31.0 81 55 139.0	23 06.6 82 54 139.3	22 42.1 82 54 139.6	22 17.6 82 54 139.9	21 53.1 82 54 140.2	21 28.5 82 53 140.5	21 03.9 82 53 140.8	40
1	23 22.3 81 56 137.8	22 58.1 81 56 138.1	22 33.9 81 56 138.5	22 09.6 81 55 138.8	21 45.3 81 55 139.1	21 21.0 81 54 139.4	20 56.6 81 54 139.7	20 32.2 81 54 140.0	1
2	22 48.6 80 57 137.0	22 24.7 80 57 137.3	22 00.6 80 56 137.6	21 36.6 80 56 138.0	21 12.5 80 56 138.3	20 48.4 80 55 138.6	20 24.2 81 55 138.9	20 00.0 81 55 139.2	2
3	22 14.4 79 58 136.2	21 50.7 79 57 136.5	21 26.9 79 57 136.8	21 03.0 80 57 137.2	20 39.1 80 56 137.5	20 15.2 80 55 137.8	19 51.2 80 55 138.1	19 27.3 80 55 138.4	3
4	21 39.8 78 59 135.4	21 16.2 78 58 135.7	20 52.6 79 58 136.0	20 28.9 79 58 136.4	20 05.3 79 57 136.7	19 41.5 79 57 137.0	19 17.8 79 57 137.4	18 54.0 79 56 137.7	4
45	21 04.6 78 59 134.6	20 41.2 78 59 134.9	20 17.8 78 59 135.3	19 54.4 78 58 135.6	19 30.9 78 58 135.9	19 07.4 78 58 136.3	18 43.8 79 57 136.6	18 20.3 79 57 136.9	45
6	20 28.9 77 60 133.8	20 05.8 77 60 134.2	19 42.6 77 60 134.5	19 19.3 78 59 134.8	18 56.1 78 59 135.2	18 32.8 78 58 135.5	18 09.4 78 58 135.8	17 46.1 78 58 136.2	6
7	19 52.8 76 61 133.0	19 29.8 77 61 133.4	19 06.9 77 61 133.7	18 43.8 77 60 134.0	18 20.8 77 60 134.4	17 57.7 77 59 134.7	17 34.5 77 59 135.1	17 11.4 77 59 135.4	7
8	19 16.2 76 62 132.3	18 53.5 76 61 132.6	18 30.7 76 61 133.0	18 07.9 76 61 133.3	17 45.0 76 60 133.7	17 22.1 76 60 134.0	16 59.2 76 60 134.3	16 36.2 77 59 134.7	8
9	18 39.2 75 62 131.5	18 16.7 75 62 131.9	17 54.1 75 62 132.2	17 31.4 75 61 132.6	17 08.7 76 61 132.9	16 46.1 76 61 133.3	16 23.4 76 60 133.6	16 00.6 76 60 133.9	9
50	18 01.8 74 63 130.8	17 39.4 75 63 131.1	17 17.0 75 62 131.5	16 54.6 75 62 131.8	16 32.1 75 62 132.2	16 09.7 75 61 132.5	15 47.1 75 61 132.9	15 24.6 75 61 133.2	50
1	17 23.9 74 64 130.1	17 01.7 74 63 130.4	16 39.6 74 63 130.8	16 17.3 74 63 131.1	15 55.1 74 62 131.5	15 32.8 74 62 131.8	15 10.5 74 62 132.2	14 48.1 75 61 132.5	1
2	16 45.6 73 64 129.3	16 23.7 73 64 129.7	16 01.7 73 64 130.1	15 39.7 73 64 130.5	15 17.6 74 63 130.8	14 55.5 74 63 131.1	14 33.4 74 62 131.5	14 11.2 74 62 131.8	2
3	16 07.0 72 65 128.6	15 45.2 73 65 129.0	15 23.4 73 64 129.3	15 01.6 73 64 129.7	14 39.7 73 64 130.1	14 17.8 73 63 130.4	13 55.9 73 63 130.8	13 34.0 73 63 131.1	3
4	15 27.9 72 66 127.9	15 06.4 72 65 128.3	14 44.8 72 65 128.6	14 23.1 72 65 129.0	14 01.5 72 64 129.4	13 39.8 72 64 129.7	13 18.1 72 64 130.1	12 56.3 73 63 130.4	4
55	14 48.5 71 66 127.2	14 27.1 71 66 127.6	14 05.7 71 66 128.0	13 44.3 72 65 128.3	13 22.8 72 65 128.7	13 01.3 72 65 129.0	12 39.8 72 64 129.4	12 18.2 72 64 129.7	55
6	14 08.7 71 67 126.5	13 47.5 71 67 126.9	13 26.3 71 66 127.3	13 05.1 71 66 127.6	12 43.8 71 66 128.0	12 22.5 71 65 128.4	12 01.2 71 65 128.7	11 39.8 71 65 129.1	6
7	13 28.6 70 67 125.8	13 07.6 70 67 126.2	12 46.6 70 67 126.6	12 25.5 70 67 127.0	12 04.4 70 66 127.3	11 43.3 70 66 127.7	11 22.2 70 66 128.1	11 01.0 71 65 128.4	7
8	12 48.1 69 68 125.2	12 27.3 69 68 125.6	12 06.5 69 68 125.9	11 45.6 69 67 126.3	11 24.7 70 67 126.7	11 03.8 70 66 127.0	10 42.8 70 66 127.4	10 21.9 70 66 127.8	8
9	12 07.3 69 69 124.5	11 46.7 69 68 124.9	11 26.0 69 68 125.3	11 05.3 69 68 125.6	10 44.6 69 67 126.0	10 23.9 69 67 126.4	10 03.1 69 67 126.7	9 42.4 69 66 127.1	9
60	11 26.1 68 69 123.9	11 05.7 68 69 124.2	10 45.2 68 68 124.6	10 24.7 68 68 125.0	10 04.2 68 68 125.4	9 43.7 69 68 125.7	9 23.1 69 67 126.1	9 02.5 69 67 126.5	60
1	10 44.7 67 70 123.2	10 24.4 68 69 123.6	10 04.1 68 69 124.0	9 43.8 68 69 124.3	9 23.5 68 68 124.7	9 03.1 68 68 125.1	8 42.8 68 68 125.5	8 22.4 68 67 125.8	1
2	10 02.9 67 70 122.6	9 42.8 67 70 123.0	9 22.7 67 70 123.3	9 02.6 67 69 123.7	8 42.5 67 69 124.1	8 22.3 67 69 124.5	8 02.1 67 68 124.8	7 41.9 67 68 125.2	2
3	9 20.8 66 71 121.9	9 00.9 66 70 122.3	8 41.0 66 70 122.7	8 21.1 67 70 123.1	8 01.1 67 69 123.5	7 41.1 67 69 123.8	7 21.1 67 68 124.2	7 01.1 67 68 124.6	3
4	8 38.5 66 71 121.3	8 18.8 66 71 121.7	7 59.0 66 70 122.1	7 39.2 66 70 122.5	7 19.5 66 70 122.8	6 59.6 66 70 123.2	6 39.8 66 69 123.6	6 20.0 66 69 124.0	4
65	7 55.9 65 72 120.7	7 36.3 65 71 121.1	7 16.7 65 71 121.5	6 57.1 65 71 121.8	6 37.5 65 70 122.2	6 17.9 65 70 122.6	5 58.2 66 70 123.0	5 38.6 66 69 123.4	65
6	7 13.0 65 72 120.1	6 53.6 65 72 120.5	6 34.1 65 72 120.9	6 14.7 65 71 121.2	5 55.3 65 71 121.6	5 35.8 65 70 122.0	5 16.4 65 70 122.4		6
7	6 29.8 64 72 119.5	6 10.6 64 72 119.9	5 51.3 64 72 120.2	5 32.1 64 72 120.6	5 12.8 64 71 121.0				7
8	5 46.3 64 73 118.9	5 27.3 64 73 119.3	5 08.2 64 72 119.6						8
9	5 02.7 63 73 118.3								9

Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

DECLINATION SAME NAME AS LATITUDE

Lat. 38°

H.A.	20° 00′ Alt. Δd Δt Az.	20° 30′ Alt. Δd Δt Az.	21° 00′ Alt. Δd Δt Az.	21° 30′ Alt. Δd Δt Az.	22° 00′ Alt. Δd Δt Az.	22° 30′ Alt. Δd Δt Az.	23° 00′ Alt. Δd Δt Az.	23° 30′ Alt. Δd Δt Az.	H.A.
91	10 14.0 54 79 72.7	10 30.2 54 79 72.3	10 46.3 54 79 71.8	11 02.4 54 78 71.4	11 18.4 53 78 71.0	11 34.4 53 78 70.5	11 50.4 53 78 70.1	12 06.3 53 78 69.7	91
2	9 26.6 54 79 72.2	9 42.8 54 79 71.8	9 59.1 54 79 71.3	10 15.3 54 79 70.9	10 31.5 54 78 70.5	10 47.6 54 78 70.0	11 03.7 54 78 69.6	11 19.7 53 78 69.2	2
3	8 39.3 55 79 71.7	8 55.7 55 78 71.2	9 12.0 55 78 70.8	9 28.4 54 78 70.4	9 44.6 54 78 70.0	10 00.7 54 78 69.5	10 17.1 54 77 69.1	10 33.3 54 77 68.7	3
4	7 52.2 55 78 71.1	8 08.7 55 78 70.7	8 25.1 55 78 70.3	8 41.6 55 78 69.9	8 58.0 55 78 69.5	9 14.4 55 77 69.0	9 30.7 54 77 68.6	9 47.1 54 77 68.2	4
95	7 05.2 55 78 70.6	7 21.8 55 78 70.2	7 38.4 55 78 69.8	7 54.9 55 77 69.4	8 11.5 55 77 68.9	8 28.0 55 77 68.5	8 44.5 55 77 68.1	9 01.0 55 77 67.7	95
6	6 18.3 56 78 70.1	6 35.1 56 78 69.7	6 51.8 56 78 69.3	7 08.5 56 77 68.8	7 25.2 56 77 68.4	7 41.8 55 77 68.0	7 58.4 55 76 67.6	8 15.0 55 76 67.2	6
7	5 31.6 56 78 69.6	5 48.5 56 77 69.1	6 05.3 56 77 68.7	6 22.2 56 77 68.3	6 39.0 56 77 67.9	6 55.8 56 76 67.5	7 12.5 56 76 67.1	7 29.3 56 76 66.6	7
8		5 02.1 57 77 68.6	5 19.1 57 77 68.2	5 36.0 57 77 67.8	5 53.0 56 76 67.4	6 09.9 56 76 67.0	6 26.8 56 76 66.5	6 43.7 56 76 66.1	8
9					5 07.2 57 76 66.8	5 24.2 57 76 66.4	5 41.3 57 76 66.0	5 58.3 57 75 65.6	9
10								5 13.1 57 75 65.1	10

Lat. 34°

H.A.	24° 00' Alt.	Az.	24° 30' Alt.	Az.	25° 00' Alt.	Az.	25° 30' Alt.	Az.	26° 00' Alt.	Az.	26° 30' Alt.	Az.	27° 00' Alt.	Az.	27° 30' Alt.	Az.	H.A.
00	80 00.0 1.0 04	180.0	80 30.0 1.0 04	180.0	81 00.0 1.0 04	180.0	81 30.0 1.0 04	180.0	82 00.0 1.0 05	180.0	82 30.0 1.0 05	180.0	83 00.0 1.0 05	180.0	83 30.0 1.0 06	180.0	00
1	79 57.7 1.0 11	174.8	80 27.6 1.0 12	174.2	80 57.5 1.0 12	173.7	81 27.4 1.0 13	173.9	81 57.2 99 14	173.6	82 27.0 99 16	172.9	82 56.8 99 16	172.7	83 26.6 99 17	172.2	1
2	79 50.9 99 18	169.6	80 20.5 99 19	169.1	80 50.0 98 20	168.5	81 19.5 98 21	167.9	81 48.9 98 22	167.3	82 18.2 98 24	166.5	82 47.5 97 25	165.7	83 16.6 97 27	164.7	2
3	79 39.8 97 26	164.5	80 08.8 97 27	163.8	80 37.8 96 28	163.1	81 06.7 96 29	162.2	81 35.4 96 30	161.2	82 04.0 95 32	160.2	82 32.4 94 34	159.0	83 00.5 93 36	157.6	3
4	79 24.5 95 32	159.7	79 52.9 94 33	158.8	80 21.2 94 34	157.8	80 49.2 93 36	156.8	81 17.1 92 38	155.6	81 44.7 92 40	154.2	82 12.0 90 42	152.7	82 38.9 89 44	151.1	4
05	79 05.4 92 38	155.1	79 33.0 92 39	154.1	80 00.4 91 41	152.9	80 27.6 90 42	151.7	80 54.4 89 44	150.3	81 20.9 88 46	148.8	81 47.0 86 48	147.1	82 12.6 85 50	145.2	05
6	78 42.8 90 43	150.8	79 09.5 89 44	149.6	79 36.0 88 46	148.3	80 02.2 87 48	147.0	80 27.9 85 50	145.4	80 53.3 84 52	143.8	81 18.1 82 54	142.0	81 42.4 80 56	140.0	6
7	78 17.0 87 48	146.7	78 42.8 86 49	145.5	79 08.3 84 51	144.1	79 33.5 83 53	142.6	79 58.1 81 54	141.0	80 22.3 80 56	139.3	80 45.9 78 58	137.4	81 08.9 75 60	135.4	7
8	77 48.3 84 52	143.0	78 13.3 82 53	141.7	78 37.8 81 55	140.2	79 01.9 80 57	138.7	79 25.5 78 58	137.0	79 48.6 76 60	135.3	80 11.0 74 62	133.3	80 32.7 71 64	131.3	8
9	77 17.2 81 56	139.5	77 41.2 79 57	138.1	78 04.8 78 59	136.7	78 27.9 76 60	135.1	78 50.5 74 62	133.4	79 12.4 72 64	131.6	79 33.7 70 65	129.7	79 54.3 67 67	127.7	9
10	76 43.8 78 59	136.3	77 07.0 76 60	134.9	77 29.6 75 62	133.5	77 51.8 73 63	131.8	78 13.4 71 65	130.1	78 34.3 69 66	128.3	78 54.6 66 68	126.5	79 14.1 64 70	124.5	10
1	76 08.5 75 62	133.3	76 30.8 73 63	131.9	76 52.6 72 64	130.4	77 13.8 70 66	128.8	77 34.5 68 67	127.1	77 54.5 66 69	125.4	78 13.8 63 70	123.5	78 32.4 61 72	121.6	1
2	75 31.5 72 64	130.5	75 53.0 71 65	129.1	76 13.9 69 67	127.6	76 34.3 67 68	126.1	76 54.1 65 69	124.4	77 13.3 63 71	122.7	77 31.7 60 72	120.9	77 49.4 58 73	119.0	2
3	74 53.0 70 66	128.0	75 13.7 68 68	126.6	75 33.9 66 69	125.1	75 53.5 64 70	123.6	76 12.5 62 71	122.0	76 30.9 60 72	120.3	76 48.5 58 74	118.6	77 05.4 55 75	116.7	3
4	74 13.2 68 68	125.6	74 33.2 66 69	124.3	74 52.6 64 70	122.8	75 11.5 62 71	121.3	75 29.8 60 73	119.7	75 47.5 58 74	118.1	76 04.4 55 75	116.4	76 20.6 53 76	114.6	4
15	73 32.2 65 70	123.5	73 51.5 64 71	122.1	74 10.3 62 72	120.7	74 28.6 60 73	119.2	74 46.2 58 74	117.7	75 03.2 55 76	116.1	75 19.5 53 76	114.5	75 35.1 51 77	112.8	15
6	72 50.2 63 72	121.4	73 08.9 62 72	120.1	73 27.1 60 73	118.7	73 44.7 58 74	117.3	74 01.8 56 75	115.8	74 18.1 54 76	114.3	74 33.9 51 77	112.7	74 48.9 49 78	111.0	6
7	72 07.3 61 73	119.5	72 25.5 60 74	118.2	72 43.1 58 74	116.9	73 00.2 56 75	115.5	73 16.6 54 76	114.0	73 32.5 52 77	112.6	73 47.7 50 78	111.0	74 02.2 47 79	109.4	7
8	71 23.7 60 74	117.8	71 41.3 58 75	116.5	71 58.4 56 75	115.2	72 15.0 54 76	113.8	72 30.9 52 77	112.4	72 46.3 50 78	111.0	73 01.0 48 78	109.5	73 15.1 46 79	108.0	8
9	70 39.3 58 75	116.1	70 56.5 56 76	114.9	71 13.1 55 76	113.6	71 29.2 53 77	112.3	71 44.7 51 78	110.9	71 59.6 49 78	109.5	72 13.9 47 79	108.1	72 27.6 44 80	106.6	9
20	69 54.4 56 76	114.6	70 11.5 55 77	113.4	70 27.3 53 77	112.1	70 42.9 51 78	110.8	70 58.0 49 78	109.5	71 12.6 47 79	108.2	71 26.5 45 80	106.8	71 39.8 43 80	105.4	20
1	69 08.9 55 77	113.1	69 25.2 53 77	111.9	69 41.0 52 78	110.7	69 56.2 50 78	109.5	70 10.9 48 79	108.2	70 25.1 46 80	106.9	70 38.7 44 80	105.5	70 51.7 42 81	104.2	1
2	68 22.9 54 77	111.7	68 38.8 52 78	110.6	68 54.2 51 78	109.4	69 09.1 49 79	108.2	69 23.5 47 80	106.9	69 37.4 45 80	105.7	69 50.6 43 80	104.4	70 03.4 41 81	103.1	2
3	67 36.5 53 78	110.4	67 52.0 51 79	109.3	68 07.1 49 79	108.2	68 21.7 48 80	107.0	68 35.8 45 80	105.8	68 49.3 44 80	104.5	69 02.3 42 81	103.3	69 14.8 41 81	102.0	3
4	66 49.7 52 78	109.2	67 04.9 50 79	108.1	67 19.7 48 80	107.0	67 34.0 47 80	105.8	67 47.8 45 80	104.7	68 01.1 43 81	103.5	68 13.8 42 81	102.3	68 26.1 40 82	101.0	4
25	66 02.6 51 79	108.0	66 17.5 49 80	107.0	66 32.0 48 80	105.9	66 46.0 46 80	104.8	66 59.6 44 81	103.6	67 12.6 43 81	102.5	67 25.1 41 82	101.3	67 37.2 39 82	100.1	25
6	65 15.1 50 80	106.9	65 29.8 48 80	105.9	65 44.0 47 80	104.8	65 57.8 45 81	103.7	66 11.1 44 81	102.6	66 23.9 42 81	101.5	66 36.3 40 82	100.4	66 48.1 39 82	99.2	6
7	64 27.4 49 80	105.9	64 41.8 47 80	104.9	64 55.8 46 81	103.8	65 09.4 44 81	102.8	65 22.5 43 81	101.7	65 35.1 41 82	100.6	65 47.3 40 82	99.5	65 59.0 38 82	98.4	7
8	63 39.4 48 80	104.9	63 53.6 47 81	103.9	64 07.4 45 81	102.9	64 20.8 44 81	101.8	64 33.7 42 82	100.8	64 46.2 41 82	99.7	64 58.2 39 82	98.6	65 09.7 38 82	97.5	8
9	62 51.3 47 81	103.9	63 05.3 46 81	102.9	63 18.8 45 81	101.9	63 32.0 43 82	100.9	63 44.8 42 82	99.9	63 57.1 40 82	98.9	64 08.9 39 82	97.8	64 20.3 37 82	96.8	9
30	62 02.9 47 81	103.0	62 16.7 45 81	102.0	62 30.1 44 82	101.1	62 43.1 43 82	100.1	62 55.7 41 82	99.1	63 07.9 40 82	98.1	63 19.6 38 82	97.1	63 30.9 37 82	96.0	30
1	61 14.3 46 81	102.1	61 28.0 45 81	101.1	61 41.2 44 82	100.2	61 54.1 42 82	99.3	62 06.5 41 82	98.3	62 18.6 39 82	97.3	62 30.2 38 82	96.3	62 41.4 37 83	95.3	1
2	60 25.6 46 82	101.2	60 39.1 45 81	100.3	60 52.2 43 82	99.4	61 04.9 42 82	98.5	61 17.3 40 82	97.5	61 29.2 39 82	96.6	61 40.7 38 82	95.6	61 51.8 36 83	94.6	2
3	59 36.7 45 82	100.4	59 50.1 44 82	99.5	60 03.1 43 82	98.6	60 15.7 41 82	97.7	60 27.9 40 82	96.8	60 39.8 39 83	95.8	60 51.2 37 83	94.9	61 02.2 36 83	93.9	3
4	58 47.8 45 82	99.6	59 01.0 43 82	98.7	59 13.8 42 82	97.8	59 26.3 41 82	96.9	59 38.5 40 82	96.0	59 50.2 39 83	95.1	60 01.6 37 83	94.2	60 12.6 36 83	93.3	4
35	57 58.7 44 82	98.8	58 11.8 43 82	98.0	58 24.5 42 82	97.1	58 36.9 41 82	96.2	58 49.0 40 83	95.4	59 00.7 38 83	94.5	59 12.0 37 83	93.6	59 22.9 36 83	92.6	35
6	57 09.4 44 82	98.1	57 22.4 43 82	97.2	57 35.1 42 82	96.4	57 47.4 41 83	95.5	57 59.4 39 83	94.7	58 11.1 38 83	93.8	58 22.3 37 83	92.9	58 33.2 36 83	92.0	6
7	56 20.2 44 82	97.3	56 33.1 42 82	96.5	56 45.7 41 82	95.7	56 57.9 40 83	94.9	57 09.8 39 83	94.0	57 21.4 38 83	93.2	57 32.6 37 83	92.3	57 43.5 36 83	91.4	7
8	55 30.8 43 82	96.6	55 43.6 42 82	95.8	55 56.1 41 83	95.0	56 08.3 40 83	94.2	56 20.2 39 83	93.4	56 31.7 38 83	92.5	56 42.9 37 83	91.7	56 53.8 36 83	90.8	8
9	54 41.3 43 82	95.9	54 54.1 42 82	95.2	55 06.6 41 83	94.4	55 18.7 40 83	93.6	55 30.5 39 83	92.7	55 42.0 38 83	91.9	55 53.2 37 83	91.1	56 04.0 36 83	90.3	9
40	53 51.8 43 82	95.3	54 04.5 42 83	94.5	54 16.9 41 83	93.7	54 29.0 40 83	92.9	54 40.8 39 83	92.1	54 52.3 38 83	91.3	55 03.5 37 83	90.5	55 14.3 36 83	89.7	40
1	53 02.3 43 82	94.6	53 14.9 42 83	93.9	53 27.3 41 83	93.1	53 39.3 40 83	92.3	53 51.1 39 83	91.5	54 02.6 38 83	90.8	54 13.7 37 83	90.0	54 24.6 36 83	89.2	1
2	52 12.7 42 83	94.0	52 25.3 42 83	93.2	52 37.6 41 83	92.5	52 49.6 40 83	91.7	53 01.4 39 83	91.0	53 12.8 38 83	90.2	53 24.0 37 83	89.4	53 34.8 36 83	88.6	2
3	51 23.0 42 83	93.3	51 35.6 41 83	92.6	51 47.9 41 83	91.9	51 59.9 40 83	91.1	52 11.6 39 83	90.4	52 23.1 38 83	89.6	52 34.2 37 83	88.9	52 45.1 36 83	88.1	3
4	50 33.4 42 83	92.7	50 45.9 41 83	92.0	50 58.2 40 83	91.3	51 10.2 40 83	90.6	51 21.9 39 83	89.8	51 33.3 38 83	89.1	51 44.5 37 83	88.3	51 55.4 36 83	87.6	4
45	49 43.7 42 83	92.1	49 56.2 41 83	91.4	50 08.4 40 83	90.7	50 20.4 40 83	90.0	50 32.2 39 83	89.3	50 43.6 38 83	88.5	50 54.8 37 83	87.8	51 05.7 36 83	87.1	45
6	48 53.9 42 83	91.5	49 06.4 41 83	90.8	49 18.7 40 83	90.1	49 30.7 40 83	89.4	49 42.4 39 83	88.7	49 53.9 38 83	88.0	50 05.1 37 83	87.3	50 16.0 36 83	86.6	6
7	48 04.2 42 83	91.0	48 16.7 41 83	90.3	48 29.0 40 83	89.6	48 41.0 40 83	88.9	48 52.7 39 83	88.2	49 04.2 38 83	87.5	49 15.4 37 83	86.8	49 26.4 36 83	86.1	7
8	47 14.5 42 83	90.4	47 27.0 41 83	89.7	47 39.2 40 83	89.0	47 51.2 40 83	88.4	48 03.0 39 83	87.7	48 14.5 38 83	87.0	48 25.8 37 83	86.3	48 36.8 36 83	85.6	8
9	46 24.7 42 83	89.8	46 37.2 41 83	89.2	46 49.5 40 83	88.5	47 01.5 40 83	87.8	47 13.3 39 83	87.2	47 24.8 38 83	86.5	47 36.1 37 83	85.8	47 47.2 36 83	85.1	9
50	45 35.0 42 83	89.3	45 47.5 41 83	88.6	45 59.8 41 83	88.0	46 11.8 40 83	87.3	46 23.6 39 83	86.6	46 35.2 38 83	86.0	46 46.6 37 83	85.3	46 57.7 37 82	84.6	50
1	44 45.3 42 83	88.7	44 57.8 41 83	88.1	45 10.1 41 83	87.4	45 22.1 40 83	86.8	45 34.0 39 83	86.1	45 45.6 38 83	85.5	45 57.0 38 82	84.8	46 08.2 37 82	84.1	1
2	43 55.5 42 83	88.2	44 08.1 41 83	87.6	44 20.4 41 83	86.9	44 32.5 40 83	86.3	44 44.4 39 83	85.6	44 56.0 39 83	85.0	45 07.5 38 82	84.3	45 18.7 37 82	83.7	2
3	43 05.8 42 83	87.7	43 18.4 41 83	87.0	43 30.7 41 83	86.4	43 42.9 40 83	85.8	43 54.8 39 83	85.1	44 06.5 39 82	84.5	44 18.0 38 82	83.9	44 29.3 37 82	83.2	3
4	42 16.1 42 83	87.1	42 28.7 41 83	86.5	42 41.1 41 83	85.9	42 53.3 40 83	85.3	43 05.2 40 82	84.7	43 17.0 39 82	84.0	43 28.6 38 82	83.4	43 39.9 37 82	82.8	4
55	41 26.5 42 83	86.6	41 39.1 42 83	86.0	41 51.5 41 83	85.4	42 03.7 40 83	84.8	42 15.7 40 82	84.2	42 27.6 39 82	83.6	42 39.2 38 82	82.9	42 50.6 38 82	82.3	55
6	40 36.8 42 83	86.1	40 49.5 42 83	85.5	41 01.9 41 83	84.9	41 14.2 41 82	84.3	41 26.3 40 82	83.7	41 38.2 39 82	83.1	41 49.8 39 82	82.5	42 01.3 38 82	81.8	6
7	39 47.2 43 83	85.6	39 59.9 42 83	85.0	40 12.4 41 82	84.4	40 24.7 41 82	83.8	40 36.9 40 82	83.2	40 48.8 40 82	82.6	41 00.6 39 82	82.0	41 12.1 38 82	81.4	7
8	38 57.6 43 82	85.1	39 10.4 42 82	84.5	39 22.9 42 82	83.9	39 35.3 41 82	83.3	39 47.5 40 82	82.7	39 59.5 40 82	82.1	40 11.3 39 82	81.5	40 23.0 38 82	80.9	8
9	38 08.1 43 82	84.6	38 20.9 42 82	84.0	38 33.5 42 82	83.4	38 45.9 41 82	82.8	38 58.2 41 82	82.3	39 10.3 40 82	81.7	39 22.2 39 82	81.1	39 33.9 39 82	80.5	9
60	37 18.6 43 82	84.1	37 31.4 42 82	83.5	37 44.1 42 82	83.0	37 56.6 41 82	82.4	38 08.9 41 82	81.8	38 21.1 40 82	81.2	38 33.0 40 82	80.6	38 44.8 39 82	80.0	60
1	36 29.1 43 82	83.6	36 42.0 42 82	83.0	36 54.7 42 82	82.5	37 07.3 42 82	81.9	37 19.7 41 82	81.3	37 31.9 40 82	80.8	37 44.0 40 82	80.2	37 55.9 39 81	79.6	1
2	35 39.7 43 82	83.1	35 52.7 42 82	82.6	36 05.5 42 82	82.0	36 18.1 42 82	81.4	36 30.6 41 82	80.9	36 42.9 41 82	80.3	36 55.0 40 82	79.7	37 07.0 40 81	79.2	2
3	34 50.4 44 82	82.6	35 03.4 43 82	82.1	35 16.2 42 82	81.5	35 28.9 42 82	80.9	35 41.5 42 82	80.4	35 54.0 41 82	79.9	36 06.1 40 81	79.3	36 18.2 40 81	78.7	3
4	34 01.1 44 82	82.1	34 14.1 43 82	81.6	34 27.1 42 82	81.1	34 39.8 42 82	80.5	34 52.5 42 82	80.0	35 04.9 41 82	79.4	35 17.3 41 81	78.8	35 29.4 40 81	78.3	4
65	33 11.8 44 82	81.7	33 25.0 44 82	81.1	33 38.0 43 82	80.6	33 50.8 43 82	80.0	34 03.5 42 82	79.5	34 16.1 42 81	78.9	34 28.5 41 81	78.4	34 40.8 41 81	77.8	65
6	32 22.6 44 82	81.2	32 35.8 44 82	80.7	32 48.9 43 82	80.1	33 01.9 43 81	79.6	33 14.6 42 81	79.0	33 27.3 42 81	78.5	33 39.8 41 81	78.0	33 52.2 41 81	77.4	6
7	31 33.5 44 82	80.7	31 46.8 44 82	80.2	31 59.9 44 82	79.7	32 13.0 43 81	79.1	32 25.8 43 81	78.6	32 38.6 42 81	78.0	32 51.2 42 81	77.5	33 03.7 41 81	77.0	7
8	30 44.5 45 82	80.2	30 57.8 44 82	79.7	31 11.1 44 82	79.2	31 24.2 43 81	78.7	31 37.1 43 81	78.1	31 50.0 43 81	77.6	32 02.7 42 81	77.1	32 15.3 42 81	76.5	8
9	29 55.5 45 82	79.8	30 08.9 45 81	79.2	30 22.2 44 81	78.7	30 35.4 44 81	78.2	30 48.5 43 81	77.7	31 01.4 43 81	77.2	31 14.3 42 81	76.6	31 26.9 42 80	76.1	9
70	29 06.6 45 81	79.3	29 20.1 45 81	78.8	29 33.5 44 81	78.3	29 46.8 44 81	77.7	29 59.9 44 81	77.2	30 13.0 43 81	76.7	30 25.9 43 80	76.2	30 38.7 42 80	75.7	70
1	28 17.7 46 81	78.8	28 31.3 45 81	78.3	28 44.8 45 81	77.8	28 58.2 44 81	77.3	29 11.5 44 81	76.8	29 24.6 44 80	76.3	29 37.6 43 80	75.7	29 50.6 43 80	75.2	1
2	27 29.0 46 81	78.3	27 42.7 45 81	77.8	27 56.3 45 81	77.3	28 09.7 45 81	76.9	28 23.1 44 80	76.3	28 36.3 44 80	75.8	28 49.5 44 80	75.3	29 02.5 43 80	74.8	2
3	26 40.3 46 81	77.9	26 54.1 46 81	77.4	27 07.8 45 81	76.9	27 21.3 45 80	76.4	27 34.8 45 80	75.9	27 48.2 44 80	75.4	28 01.4 44 80	74.8	28 14.6 44 80	74.3	3
4	25 51.7 46 81	77.4	26 05.6 46 81	76.9	26 19.4 46 80	76.4	26 33.1 45 80	75.9	26 46.6 45 80	75.4	27 00.1 45 80	74.9	27 13.5 44 80	74.4	27 26.7 44 80	73.9	4
75	25 03.2 47 81	76.9	25 17.2 46 80	76.4	25 31.1 46 80	75.9	25 44.9 46 80	75.5	25 58.5 45 80	75.0	26 12.1 45 80	74.5	26 25.6 45 79	74.0	26 39.0 44 79	73.5	75
6	24 14.8 47 80	76.5	24 28.9 47 80	76.0	24 42.9 46 80	75.5	24 56.8 46 80	75.0	25 10.6 46 80	74.5	25 24.2 45 80	74.0	25 37.8 45 79	73.5	25 51.3 45 79	73.0	6
7	23 26.5 47 80	76.0	23 40.7 47 80	75.5	23 54.8 47 80	75.0	24 08.8 47 80	74.5	24 22.7 46 80	74.0	24 36.5 46 79	73.6	24 50.2 45 79	73.1	25 03.8 45 79	72.6	7
8	22 38.3 48 80	75.5	22 52.6 47 80	75.0	23 06.8 47 80	74.6	23 20.9 47 80	74.1	23 34.9 46 80	73.6	23 48.8 46 79	73.1	24 02.7 46 79	72.6	24 16.4 46 79	72.1	8
9	21 50.2 48 80	75.0	22 04.6 48 80	74.6	22 18.9 48 80	74.1	22 33.1 47 79	73.6	22 47.2 47 79	73.1	23 01.3 47 79	72.7	23 15.3 46 79	72.2	23 29.1 46 79	71.7	9
80	21 02.2 48 80	74.6	21 16.7 48 80	74.1	21 31.1 48 79	73.7	21 45.4 48 79	73.1	21 59.7 47 79	72.7	22 13.9 47 79	72.2	22 28.0 47 79	71.7	22 42.0 47 78	71.2	80
1	20 14.0 49 80	74.1	20 28.9 49 79	73.6	20 43.4 49 79	73.1	20 57.9 48 79	72.7	21 12.3 48 79	72.2	21 26.6 48 79	71.7	21 40.8 47 79	71.3	21 54.9 47 78	70.8	1
2	19 26.5 49 79	73.6	19 41.2 49 79	73.1	19 55.9 49 79	72.7	20 10.5 48 79	72.2	20 25.0 48 79	71.8	20 39.4 48 79	71.3	20 53.8 48 78	70.8	21 08.0 47 78	70.3	2
3	18 38.8 50 79	73.1	18 53.7 49 79	72.7	19 08.5 49 79	72.2	19 23.2 49 78	71.8	19 37.8 49 78	71.3	19 52.4 48 78	70.8	20 06.8 48 78	70.4	20 21.3 48 78	69.9	3
4	17 51.3 50 79	72.7	18 06.3 50 79	72.2	18 21.2 50 79	71.7	18 36.0 49 78	71.3	18 50.7 49 78	70.8	19 05.4 49 78	70.4	19 20.1 49 78	69.9	19 34.6 48 78	69.4	4
85	17 03.9 50 79	72.2	17 19.0 50 79	71.7	17 34.0 50 78	71.3	17 48.9 50 78	70.8	18 03.8 50 78	70.4	18 18.7 49 78	69.9	18 33.4 49 78	69.4	18 48.1 49 77	69.0	85
6	16 16.6 51 79	71.7	16 31.8 51 78	71.2	16 46.9 50 78	70.8	17 02.0 50 78	70.3	17 17.1 50 78	69.9	17 32.0 50 78	69.4	17 46.9 50 77	69.0	18 01.8 49 77	68.5	6
7	15 29.4 51 78	71.2	15 44.8 51 78	70.8	16 00.0 51 78	70.3	16 15.3 51 78	69.9	16 30.4 50 78	69.4	16 45.5 50 77	69.0	17 00.6 50 77	68.5	17 15.5 50 77	68.1	7
8	14 42.4 52 78	70.7	14 57.9 51 78	70.3	15 13.3 51 78	69.8	15 28.6 51 77	69.4	15 43.9 51 77	68.9	15 59.2 51 77	68.5	16 14.4 50 77	68.0	16 29.5 50 77	67.6	8
9	13 55.5 52 78	70.2	14 11.1 52 78	69.8	14 26.7 52 78	69.3	14 42.1 52 77	68.9	14 57.6 51 77	68.5	15 13.0 51 77	68.0	15 28.3 51 76	67.6	15 43.6 51 76	67.1	9
90	13 08.8 52 78	69.7	13 24.5 52 77	69.3	13 40.2 52 77	68.9	13 55.8 52 77	68.4	14 11.4 52 77	68.0	14 26.9 52 76	67.5	14 42.4 52 76	67.1	14 57.8 51 76	66.7	90

Lat. 34°

H.A.	24°00' Alt	Δd Δt	Az	24°30' Alt	Δd Δt	Az	25°00' Alt	Δd Δt	Az	25°30' Alt	Δd Δt	Az	26°00' Alt	Δd Δt	Az	26°30' Alt	Δd Δt	Az	27°00' Alt	Δd Δt	Az	27°30' Alt	Δd Δt	Az	H.A.
00	32 00.0	1.00 1	180.0	31 30.0	1.00 1	180.0	31 00.0	1.00 1	180.0	30 30.0	1.00 1	180.0	30 00.0	1.00 1	180.0	29 30.0	1.00 1	180.0	29 00.0	1.00 1	180.0	28 30.0	1.00 1	180.0	00
1	31 59.5	1.00 2	178.9	31 29.5	1.00 2	178.9	30 59.5	1.00 2	178.9	30 29.5	1.00 2	179.0	29 59.5	1.00 2	179.0	29 29.6	1.00 2	179.0	28 59.6	1.00 2	179.0	28 29.6	1.00 2	179.0	1
2	31 58.1	1.00 4	177.8	31 28.1	1.00 4	177.9	30 58.2	1.00 4	177.9	30 28.2	1.00 4	177.9	29 58.2	1.00 4	177.9	29 28.2	1.00 4	177.9	28 58.2	1.00 4	178.0	28 28.2	1.00 4	178.0	2
3	31 55.8	1.00 5	176.8	31 25.8	1.00 5	176.8	30 55.9	1.00 5	176.8	30 25.9	1.00 5	176.9	29 55.9	1.00 5	176.9	29 26.0	1.00 5	176.9	28 56.0	1.00 5	176.9	28 26.1	1.00 5	177.0	3
4	31 52.5	1.00 7	175.7	31 22.6	1.00 7	175.7	30 52.7	1.00 7	175.8	30 22.7	1.00 7	175.8	29 52.8	1.00 7	175.9	29 22.9	1.00 7	175.9	28 52.9	1.00 7	175.9	28 23.0	1.00 7	176.0	4
05	31 48.3	1.00 8	174.6	31 18.4	1.00 8	174.7	30 48.5	1.00 8	174.7	30 18.7	1.00 8	174.8	29 48.8	1.00 8	174.8	29 18.9	1.00 8	174.9	28 49.0	1.00 8	174.9	28 19.1	1.00 8	175.0	05
6	31 43.2	99 10	173.6	31 13.4	99 10	173.6	30 43.5	99 10	173.7	30 13.7	99 10	173.7	29 43.8	99 10	173.8	29 14.0	99 10	173.9	28 44.1	99 10	173.9	28 14.2	99 09	174.0	6
7	31 37.2	99 12	172.5	31 07.4	99 11	172.6	30 37.6	99 11	172.6	30 07.8	99 11	172.7	29 38.0	99 11	172.8	29 08.2	99 11	172.8	28 38.4	99 11	172.9	28 08.6	99 11	173.0	7
8	31 30.2	99 13	171.4	31 00.5	99 13	171.5	30 30.7	99 13	171.6	30 01.0	99 13	171.7	29 31.3	99 13	171.7	29 01.5	99 13	171.8	28 31.8	99 12	171.9	28 02.1	99 12	172.0	8
9	31 22.3	99 15	170.4	30 52.7	99 14	170.5	30 23.0	99 14	170.5	29 53.4	99 14	170.6	29 23.7	99 14	170.7	28 54.0	99 14	170.8	28 24.4	99 14	170.9	27 54.7	99 14	171.0	9
10	31 13.6	98 16	169.3	30 44.0	98 16	169.4	30 14.4	98 16	169.5	29 44.8	98 16	169.6	29 15.2	98 16	169.7	28 45.6	98 15	169.8	28 16.0	98 15	169.9	27 46.4	98 15	170.0	10
1	31 03.9	98 18	168.3	30 34.4	98 17	168.4	30 04.9	98 17	168.5	29 35.4	98 17	168.6	29 05.9	98 17	168.7	28 36.4	98 17	168.8	28 06.9	98 17	168.9	27 37.4	98 17	169.0	1
2	30 53.3	98 19	167.2	30 23.9	98 19	167.3	29 54.5	98 19	167.4	29 25.1	98 19	167.6	28 55.7	98 18	167.7	28 26.3	98 18	167.7	27 56.9	98 18	167.9	27 27.4	98 18	168.0	2
3	30 41.9	98 20	166.2	30 12.6	98 20	166.3	29 43.3	98 20	166.4	29 14.0	98 20	166.5	28 44.7	98 20	166.7	28 15.3	98 20	166.8	27 46.0	98 20	166.9	27 16.7	98 19	167.0	3
4	30 29.5	97 22	165.1	30 00.4	97 22	165.3	29 31.2	97 22	165.4	29 02.0	97 21	165.5	28 32.8	97 21	165.7	28 03.6	97 21	165.8	27 34.3	97 21	165.9	27 05.1	97 21	166.1	4
15	30 16.3	97 24	164.1	29 47.3	97 23	164.3	29 18.2	97 23	164.4	28 49.1	97 23	164.5	28 20.0	97 23	164.7	27 50.9	97 22	164.8	27 21.8	97 22	165.0	26 52.7	97 22	165.1	15
6	30 02.3	96 25	163.1	29 33.4	96 25	163.2	29 04.4	96 24	163.4	28 35.4	96 24	163.5	28 06.5	96 24	163.7	27 37.5	96 24	163.8	27 08.5	96 24	164.0	26 39.5	96 23	164.1	6
7	29 47.4	96 26	162.1	29 18.6	96 26	162.2	28 49.8	96 26	162.4	28 20.9	96 26	162.6	27 52.1	96 25	162.7	27 23.2	96 25	162.9	26 54.4	96 25	163.0	26 25.5	96 25	163.2	7
8	29 31.7	96 28	161.1	29 03.0	96 27	161.2	28 34.3	96 27	161.4	28 05.6	96 27	161.6	27 36.9	96 27	161.8	27 08.2	96 26	161.9	26 39.5	96 26	162.1	26 10.7	96 26	162.2	8
9	29 15.1	95 30	160.1	28 46.6	95 29	160.2	28 18.1	95 28	160.4	27 49.5	95 28	160.6	27 20.9	95 28	160.8	26 52.3	95 28	160.9	26 23.7	95 28	161.1	25 55.1	95 27	161.3	9
20	28 57.8	95 30	159.1	28 29.4	95 30	159.3	28 01.0	95 30	159.4	27 32.6	95 30	159.6	27 04.1	95 29	159.8	26 35.7	95 29	160.0	26 07.2	95 29	160.2	25 38.8	95 29	160.3	20
1	28 39.6	94 32	158.1	28 11.4	94 31	158.3	27 43.1	94 31	158.5	27 14.9	94 31	158.7	26 46.6	94 30	158.9	26 18.3	94 30	159.0	25 50.0	94 30	159.2	25 21.6	94 30	159.4	1
2	28 20.7	94 33	157.1	27 52.6	94 33	157.3	27 24.5	94 32	157.5	26 56.4	94 32	157.7	26 28.3	94 32	157.9	26 00.1	94 32	158.1	25 31.9	94 31	158.3	25 03.8	94 31	158.5	2
3	28 00.9	93 34	156.1	27 33.0	93 34	156.4	27 05.1	93 34	156.6	26 37.1	93 33	156.8	26 09.2	93 33	157.0	25 41.2	93 33	157.2	25 13.2	93 32	157.4	24 45.2	93 32	157.6	3
4	27 40.4	93 36	155.2	27 12.7	93 35	155.4	26 44.9	93 35	155.6	26 17.1	93 35	155.8	25 49.3	93 34	156.0	25 21.5	93 34	156.2	24 53.7	93 34	156.4	24 25.8	93 33	156.7	4
25	27 19.2	92 37	154.2	26 51.6	92 36	154.5	26 24.0	92 36	154.7	25 56.4	92 36	154.9	25 28.8	92 36	155.1	25 01.1	92 35	155.3	24 33.4	92 35	155.5	24 05.7	92 35	155.8	25
6	26 57.2	91 38	153.3	26 29.8	91 38	153.5	26 02.4	91 37	153.8	25 34.9	92 37	154.0	25 07.5	92 37	154.2	24 40.0	92 36	154.4	24 12.5	92 36	154.6	23 45.0	92 36	154.9	6
7	26 34.5	91 39	152.4	26 07.3	91 39	152.6	25 40.0	91 38	152.8	25 12.8	91 38	153.1	24 45.5	91 38	153.3	24 18.2	91 38	153.5	23 50.8	91 37	153.8	23 23.5	91 37	154.0	7
8	26 11.1	90 41	151.4	25 44.0	90 40	151.7	25 17.0	90 40	151.9	24 49.9	90 39	152.2	24 22.8	90 39	152.4	23 55.6	90 39	152.6	23 28.5	90 38	152.9	23 01.3	90 38	153.1	8
9	25 47.0	90 41	150.5	25 20.1	90 41	150.8	24 53.2	90 41	151.0	24 26.3	90 40	151.3	23 59.4	90 40	151.5	23 32.4	90 40	151.8	23 05.5	90 40	152.0	22 38.5	90 39	152.2	9
30	25 22.2	89 42	149.6	24 55.5	89 42	149.9	24 28.8	89 42	150.1	24 02.1	89 42	150.4	23 35.3	89 41	150.6	23 08.6	89 41	150.9	22 41.8	89 40	151.1	22 15.0	89 40	151.4	30
1	24 56.7	88 44	148.7	24 30.2	88 43	149.0	24 03.7	88 43	149.3	23 37.2	88 43	149.5	23 10.6	89 42	149.8	22 44.0	89 42	150.0	22 17.4	89 42	150.3	21 50.8	89 41	150.5	1
2	24 30.5	88 45	147.9	24 04.3	88 44	148.1	23 37.9	88 44	148.4	23 11.6	88 44	148.6	22 45.2	88 43	148.9	22 18.9	88 43	149.2	21 52.4	88 43	149.4	21 26.0	88 42	149.7	2
3	24 03.8	87 46	147.0	23 37.7	87 45	147.3	23 11.5	87 45	147.5	22 45.4	87 45	147.8	22 19.2	87 44	148.1	21 53.0	87 44	148.3	21 26.8	87 44	148.6	21 00.6	87 43	148.8	3
4	23 36.3	86 47	146.1	23 10.4	86 46	146.4	22 44.5	86 46	146.7	22 18.6	86 46	146.9	21 52.6	87 44	147.2	21 26.6	87 44	147.5	21 00.6	87 45	147.7	20 34.5	87 44	148.0	4
35	23 08.3	86 48	145.3	22 42.6	86 47	145.5	22 16.9	86 47	145.8	21 51.1	86 47	146.1	21 25.4	86 46	146.4	20 59.6	86 46	146.6	20 33.7	86 46	146.9	20 07.9	86 45	147.2	35
6	22 39.7	85 49	144.4	22 14.2	85 48	144.7	21 48.6	85 48	145.0	21 23.1	85 48	145.3	20 57.5	85 47	145.5	20 31.9	85 47	145.8	20 06.3	85 47	146.1	19 40.6	86 46	146.4	6
7	22 10.4	84 51	143.5	21 45.1	84 49	143.9	21 19.8	84 49	144.2	20 54.5	84 49	144.4	20 29.1	85 48	144.7	20 03.7	85 48	145.0	19 38.2	85 48	145.3	19 12.8	85 47	145.6	7
8	21 40.6	84 51	142.8	21 15.5	84 50	143.0	20 50.4	84 50	143.3	20 25.2	84 50	143.6	20 00.1	84 49	144.0	19 34.9	84 49	144.2	19 09.6	84 49	144.5	18 44.4	84 48	144.8	8
9	21 10.2	83 52	141.9	20 45.3	83 51	142.2	20 20.4	83 51	142.5	19 55.5	83 51	142.8	19 30.5	83 50	143.1	19 05.5	83 50	143.4	18 40.5	83 50	143.7	18 15.4	84 49	144.0	9
40	20 39.3	82 52	141.1	20 14.6	82 52	141.4	19 49.9	82 52	141.7	19 25.1	83 51	142.0	19 00.4	83 51	142.3	18 35.6	83 51	142.6	18 10.8	83 50	142.9	17 45.9	83 50	143.2	40
1	20 07.8	82 53	140.3	19 43.3	82 53	140.6	19 18.8	82 53	140.9	18 54.3	82 52	141.3	18 29.7	82 52	141.6	18 05.1	82 52	141.9	17 40.5	82 51	142.2	17 15.9	82 51	142.5	1
2	19 35.8	81 54	139.5	19 11.5	81 54	139.9	18 47.2	81 54	140.2	18 22.9	81 53	140.5	17 58.5	81 53	140.9	17 34.1	81 52	141.1	17 09.7	81 52	141.4	16 45.3	82 52	141.7	2
3	19 03.2	80 55	138.8	18 39.2	80 55	139.1	18 15.1	80 54	139.4	17 51.0	80 54	139.7	17 26.8	81 54	140.0	17 02.6	81 53	140.3	16 38.4	81 53	140.6	16 14.2	81 53	140.9	3
4	18 30.2	79 56	138.0	18 06.3	80 56	138.3	17 42.5	80 55	138.6	17 18.5	80 55	138.9	16 54.6	80 54	139.3	16 30.6	80 54	139.6	16 06.6	80 54	139.9	15 42.6	80 53	140.2	4
45	17 56.7	79 57	137.2	17 33.0	79 56	137.6	17 09.3	79 56	137.9	16 45.6	79 56	138.2	16 21.9	79 55	138.5	15 58.1	79 55	138.8	15 34.3	79 55	139.2	15 10.5	79 54	139.5	45
6	17 22.6	78 58	136.5	16 59.2	78 57	136.8	16 35.7	78 57	137.1	16 12.2	78 56	137.5	15 48.7	78 56	137.8	15 25.2	79 56	138.1	15 01.6	79 55	138.4	14 38.0	79 55	138.7	6
7	16 48.2	77 58	135.7	16 24.9	77 58	136.1	16 01.7	78 58	136.4	15 38.4	78 57	136.7	15 15.1	78 57	137.1	14 51.7	78 57	137.4	14 28.3	78 56	137.7	14 04.9	78 56	138.0	7
8	16 13.2	77 59	135.0	15 50.2	77 59	135.3	15 27.1	77 58	135.7	15 04.0	77 58	136.0	14 40.9	77 58	136.3	14 17.8	77 57	136.7	13 54.6	77 57	137.0	13 31.4	77 57	137.3	8
9	15 37.8	76 60	134.3	15 15.0	76 59	134.6	14 52.2	76 59	135.0	14 29.3	76 59	135.3	14 06.4	76 58	135.6	13 43.4	76 58	136.0	13 20.5	77 58	136.3	12 57.5	77 57	136.6	9
50	15 02.0	75 60	133.6	14 39.4	75 60	133.9	14 16.7	76 60	134.2	13 54.1	76 59	134.6	13 31.4	76 59	134.9	13 08.6	76 59	135.3	12 45.9	76 58	135.6	12 23.1	76 58	135.9	50
1	14 25.7	74 61	132.9	14 03.3	75 61	133.2	13 40.8	75 60	133.5	13 18.4	75 60	133.9	12 55.9	75 60	134.2	12 33.4	75 59	134.6	12 10.8	75 59	134.9	11 48.3	75 59	135.2	1
2	13 49.1	74 62	132.2	13 26.9	74 61	132.5	13 04.6	74 61	132.8	12 42.4	74 61	133.2	12 20.1	74 60	133.5	11 57.7	74 60	133.9	11 35.4	75 60	134.2	11 13.0	75 59	134.6	2
3	13 12.0	73 62	131.5	12 50.0	73 62	131.8	12 27.9	73 62	132.2	12 05.9	74 61	132.5	11 43.8	74 61	132.9	11 21.7	74 60	133.2	10 59.5	74 60	133.5	10 37.4	74 60	133.9	3
4	12 34.5	73 63	130.8	12 12.7	73 63	131.1	11 50.9	73 62	131.5	11 29.0	73 62	131.8	11 07.1	73 62	132.2	10 45.2	73 61	132.5	10 23.3	73 61	132.9	10 01.3	73 61	133.2	4
55	11 56.7	72 64	130.1	11 35.1	72 63	130.5	11 13.4	72 63	130.8	10 51.8	72 63	131.2	10 30.1	72 62	131.5	10 08.4	72 62	131.9	9 46.6	72 62	132.2	9 24.9	73 61	132.6	55
6	11 18.4	71 64	129.4	10 57.0	71 64	129.8	10 35.6	71 64	130.1	10 14.1	72 63	130.5	9 52.6	72 63	130.8	9 31.1	72 63	131.2	9 09.6	72 62	131.6	8 48.1	72 62	131.9	6
7	10 39.8	71 65	128.8	10 18.6	71 65	129.1	9 57.4	71 64	129.5	9 36.1	71 64	129.9	9 14.8	71 64	130.2	8 53.5	71 63	130.6	8 32.2	71 63	130.9	8 10.9	71 63	131.3	7
8	10 00.9	70 66	128.1	9 39.9	70 65	128.5	9 18.8	70 65	128.8	8 57.7	70 65	129.2	8 36.7	70 64	129.6	8 15.6	70 64	129.9	7 54.4	70 64	130.3	7 33.3	70 63	130.6	8
9	9 21.6	69 66	127.5	9 00.7	69 66	127.8	8 39.9	70 66	128.2	8 19.0	70 65	128.6	7 58.1	70 65	128.9	7 37.2	70 64	129.3	7 16.3	70 64	129.7	6 55.4	70 64	130.0	9
60	8 41.9	69 67	126.8	8 21.3	69 66	127.2	8 00.6	69 66	127.6	7 40.0	69 66	127.9	7 19.3	69 65	128.3	6 58.6	69 65	128.7	6 37.8	69 65	129.0	6 17.1	69 64	129.4	60
1	8 01.9	68 67	126.2	7 41.5	68 67	126.6	7 21.0	68 66	126.9	7 00.6	68 66	127.3	6 40.1	68 66	127.7	6 19.6	68 66	128.0	5 59.0	68 65	128.4	5 38.5	68 65	128.8	1
2	7 21.6	67 68	125.6	7 01.4	68 67	126.0	6 41.1	68 67	126.3	6 20.8	68 67	126.7	6 00.5	68 66	127.1	5 40.2	68 66	127.4	5 19.9	68 66	127.8				2
3	6 41.0	67 68	125.0	6 21.0	67 68	125.3	6 00.9	67 68	125.7	5 40.8	67 67	126.1	5 20.7	67 67	126.5	5 00.6	67 67	126.8							3
4	6 00.1	66 69	124.3	5 40.2	66 68	124.7	5 20.3	66 68	125.1	5 00.4	66 68	125.5													4
65	5 18.9	66 69	123.7																						65

Lat. 35°   Lat. 36°   Lat. 37°   Lat. 38°

DECLINATION SAME NAME AS LATITUDE

H.A.	24°00' Alt	Δd Δt	Az	24°30' Alt	Δd Δt	Az	25°00' Alt	Δd Δt	Az	25°30' Alt	Δd Δt	Az	26°00' Alt	Δd Δt	Az	26°30' Alt	Δd Δt	Az	27°00' Alt	Δd Δt	Az	27°30' Alt	Δd Δt	Az	H.A.
91	12 22.2	53 78	69.2	12 38.1	53 77	68.8	12 53.9	53 77	68.4	13 09.6	52 77	67.9	13 25.3	52 76	67.5	13 41.0	52 76	67.1	13 56.7	52 76	66.6	14 12.2	52 76	66.2	91
2	11 35.8	53 77	68.8	11 51.8	53 77	68.3	12 07.7	53 77	67.9	12 23.6	53 76	67.5	12 39.5	53 76	67.0	12 55.3	53 76	66.6	13 11.1	53 76	66.1	13 26.8	52 75	65.7	2
3	10 49.5	54 77	68.3	11 05.6	54 77	67.8	11 21.7	54 76	67.4	11 37.8	53 76	66.9	11 53.8	53 76	66.5	12 09.7	53 76	66.1	12 25.7	53 75	65.7	12 41.6	53 75	65.2	3
4	10 03.4	54 77	67.7	10 19.6	54 76	67.3	10 35.9	54 76	66.9	10 52.1	54 76	66.5	11 08.2	54 76	66.0	11 24.3	54 75	65.6	11 40.4	54 75	65.2	11 56.5	53 75	64.8	4
95	9 17.4	54 76	67.2	9 33.8	55 76	66.8	9 50.2	55 76	66.4	10 06.5	55 76	66.0	10 22.9	54 75	65.5	10 39.1	54 75	65.1	10 55.4	54 75	64.7	11 11.6	54 75	64.3	95
6	8 31.6	55 76	66.7	8 48.2	55 76	66.3	9 04.7	55 76	65.9	9 21.2	55 75	65.5	9 37.5	55 75	65.0	9 54.1	55 75	64.6	10 10.5	55 74	64.2	10 26.9	55 74	63.8	6
7	7 46.0	56 76	66.2	8 02.7	55 76	65.8	8 19.4	56 75	65.4	8 36.0	55 75	65.0	8 52.7	55 75	64.5	9 09.3	55 74	64.1	9 25.8	55 74	63.7	9 42.3	55 74	63.3	7
8	7 00.6	56 75	65.7	7 17.4	56 75	65.3	7 34.3	56 75	64.9	7 51.1	56 75	64.5	8 07.8	56 74	64.0	8 24.6	56 74	63.6	8 41.3	56 74	63.2	8 58.0	56 74	62.8	8
9	6 15.3	57 75	65.2	6 32.3	57 75	64.8	6 49.3	57 74	64.4	7 06.3	56 74	63.9	7 23.2	56 74	63.5	7 40.1	56 74	63.1	7 57.0	56 74	62.7	8 13.9	56 73	62.3	9
100	5 30.3	57 75	64.7	5 47.4	57 75	64.3	6 04.6	57 74	63.8	6 21.7	57 74	63.4	6 38.8	57 74	63.0	6 55.9	57 73	62.6	7 12.9	57 73	62.2	7 30.0	57 73	61.8	100
1				5 02.7	58 74	63.7	5 20.0	58 74	63.3	5 37.3	58 74	62.9	5 54.6	58 74	62.5	6 11.8	57 73	62.1	6 29.0	57 73	61.7	6 46.2	57 73	61.3	1
2													5 10.5	58 73	62.0	5 28.0	58 73	61.6	5 45.3	58 72	61.2	6 02.7	58 72	60.7	2
3																5 10.5	58 73	62.0	5 01.9	59 72	60.6	5 19.4	58 72	60.2	3

Lat. 34°

H.A.	28° 00' Alt. (° ' Δd Δt)	Az.	28° 30' Alt. (° ' Δd Δt)	Az.	29° 00' Alt. (° ' Δd Δt)	Az.	30° 00' Alt. (° ' Δd Δt)	Az.	32° 00' Alt. (° ' Δd Δt)	Az.	34° 00' Alt. (° ' Δd Δt)	Az.	34° 30' Alt. (° ' Δd Δt)	Az.	35° 30' Alt. (° ' Δd Δt)	Az.	H.A.
00	84 00.0 1.0 06	180.0	84 30.0 1.0 07	180.0	85 00.0 1.0 07	180.0	86 00.0 1.0 09	180.0	88 00.0 1.0 17	180.0	90 00.0 ..83	....	89 30.0 1.0 47	00.0	88 30.0 1.0 21	00.0	00
1	83 56.4 99 18	171.6	84 26.0 99 19	170.9	84 55.7 99 21	170.1	85 54.7 98 26	167.8	87 49.9 92 44	157.0	89 10.2 00 83	89.7	89 02.0 51 76	58.5	88 17.4 87 51	28.4	1
2	83 45.6 96 29	163.5	84 14.4 96 31	162.2	84 43.1 95 33	160.6	85 39.3 92 40	156.5	87 23.4 77 60	139.5	88 20.5 01 83	89.4	88 16.4 28 80	72.6	87 46.5 67 66	47.0	2
3	83 28.4 92 38	156.0	83 55.9 91 41	154.2	84 23.1 90 44	152.1	85 15.6 85 50	146.7	86 47.2 63 69	127.7	87 30.8 01 83	89.2	87 28.2 18 81	77.8	87 06.9 51 73	57.8	3
4	83 05.5 88 46	149.2	83 31.5 86 49	147.1	83 56.9 84 52	144.6	84 45.4 77 58	138.6	86 05.7 53 74	119.7	86 41.0 02 83	88.9	86 39.4 13 82	80.3	86 23.4 40 76	64.3	4
05	82 37.7 83 53	143.1	83 02.2 80 55	140.8	83 25.9 78 56	138.2	84 10.4 70 64	132.0	85 21.3 45 77	114.1	85 51.3 02 83	88.6	85 52.0 10 82	81.7	85 37.6 32 78	68.5	05
6	82 06.1 78 58	137.8	82 28.9 75 61	135.4	82 51.0 72 63	132.7	83 31.8 64 69	126.5	84 35.2 40 79	106.9	85 01.6 03 83	88.3	85 01.0 07 82	82.6	84 50.9 26 79	71.4	6
7	81 31.2 73 62	133.1	81 52.6 70 65	130.7	82 13.1 67 67	128.1	82 50.7 58 72	122.1	83 48.0 35 80	106.9	84 11.9 03 83	88.0	84 11.6 05 82	83.1	84 03.5 22 80	73.4	7
8	80 53.7 68 66	129.1	81 13.7 65 68	126.7	81 32.9 62 70	124.1	82 07.7 54 74	118.4	83 00.1 32 81	104.4	83 22.2 04 83	87.8	83 22.2 04 82	83.4	83 15.6 18 80	74.9	8
9	80 14.1 64 69	125.5	80 32.9 61 71	123.2	80 50.8 58 72	120.7	81 23.3 50 76	115.2	82 11.7 30 81	102.4	82 32.5 04 83	87.5	82 32.8 02 82	83.6	82 27.4 15 81	76.0	9
10	79 32.8 61 71	122.3	79 50.6 58 73	120.1	80 07.4 54 74	117.7	80 37.8 47 77	112.5	81 22.9 28 82	100.7	81 42.8 05 83	87.2	81 43.3 01 82	83.7	81 39.1 13 81	76.8	10
1	78 50.1 58 73	119.5	79 06.9 55 74	117.4	79 22.8 51 76	115.1	79 51.5 44 78	110.2	80 33.9 26 82	99.2	80 53.1 05 83	86.9	80 53.9 00 82	83.8	80 50.6 11 81	77.5	1
2	78 06.5 55 74	117.1	78 22.3 52 76	115.0	78 37.4 49 77	112.8	79 04.5 42 79	108.2	79 44.7 25 82	97.9	80 03.4 06 83	86.6	80 04.4 01 82	83.7	80 02.0 09 81	78.0	2
3	77 21.5 52 76	114.8	77 36.8 49 77	112.8	77 51.2 46 78	110.8	78 17.0 40 80	106.4	78 55.4 24 82	96.8	79 13.8 06 83	86.4	79 15.0 02 82	83.7	79 13.3 07 81	78.3	3
4	76 36.0 50 77	112.8	76 50.6 47 78	110.9	77 04.4 44 79	108.9	77 29.1 38 80	104.8	78 06.0 23 83	95.8	78 24.2 07 83	86.1	78 25.6 03 82	83.6	78 24.4 06 80	78.6	4
15	75 49.9 48 78	111.0	76 03.9 45 79	109.2	76 17.1 43 80	107.3	76 40.8 36 81	103.4	77 16.4 23 83	94.9	77 34.5 07 83	85.8	77 36.1 03 82	83.5	77 35.8 05 81	78.8	15
6	75 03.2 46 78	109.3	75 16.7 44 79	107.6	75 29.4 41 80	105.5	75 52.3 35 81	102.1	76 26.8 22 83	94.0	76 44.9 08 83	85.5	76 46.7 04 82	83.3	76 47.0 03 81	79.0	6
7	74 16.0 45 79	107.8	74 29.1 42 80	106.1	74 41.4 40 80	104.4	75 03.5 34 82	100.9	75 37.2 22 83	93.3	75 55.4 08 83	85.2	75 57.3 05 82	83.2	75 58.2 02 81	79.0	7
8	73 28.5 43 80	106.4	73 41.2 41 80	104.8	73 53.1 38 81	103.2	74 14.6 33 82	99.8	74 47.5 22 83	92.6	75 05.8 09 83	84.9	75 08.0 06 82	83.0	75 09.3 01 81	79.1	8
9	72 40.6 42 80	105.1	72 52.9 40 81	103.6	73 04.5 37 81	102.0	73 25.5 32 82	98.7	73 57.8 21 83	91.9	74 16.3 09 83	84.7	74 18.6 06 82	82.8	74 20.5 00 81	79.1	9
20	71 52.5 41 81	103.9	72 04.5 39 81	102.4	72 15.8 37 82	100.9	72 36.3 32 82	97.8	73 08.1 21 83	91.2	73 26.8 10 82	84.4	73 29.3 07 82	82.6	73 31.6 01 81	79.1	20
1	71 04.5 40 81	102.8	71 15.8 38 81	101.3	71 26.9 36 82	99.9	71 47.0 31 82	96.9	72 18.4 21 83	90.6	72 37.3 10 82	84.1	72 39.9 08 82	82.4	72 42.8 02 81	79.1	1
2	70 15.5 39 81	101.7	70 26.9 37 82	100.3	70 37.8 35 82	98.9	70 57.5 31 82	96.1	71 28.6 21 83	90.1	71 47.8 11 82	83.8	71 50.6 08 82	82.2	71 54.0 03 81	79.0	2
3	69 26.7 39 82	100.7	69 37.9 37 82	99.4	69 48.6 35 82	98.0	70 08.0 30 83	95.3	70 38.9 21 83	89.5	70 58.4 11 82	83.5	71 01.4 09 82	82.0	71 05.1 04 81	78.9	3
4	68 37.7 38 82	99.8	68 48.8 36 82	98.5	68 59.3 34 82	97.2	69 18.5 30 83	94.5	69 49.1 21 83	89.0	70 08.9 12 82	83.2	70 12.1 09 82	81.8	70 16.3 05 81	78.8	4
25	67 48.6 37 82	98.9	67 59.5 35 82	97.6	68 09.9 34 82	96.4	68 28.9 30 83	93.8	68 59.4 21 83	88.5	69 19.6 12 82	82.9	69 22.9 10 82	81.5	69 27.5 05 81	78.7	25
6	66 59.4 37 82	98.0	67 10.2 35 82	96.8	67 20.4 33 82	95.6	67 39.2 29 83	93.1	68 09.7 21 83	88.0	68 30.2 13 82	82.6	68 33.7 11 82	81.3	68 38.8 06 81	78.6	6
7	66 10.1 36 82	97.2	66 20.8 34 82	96.0	66 30.9 33 83	94.8	66 49.5 29 83	92.5	67 20.0 21 83	87.5	67 40.9 13 82	82.4	67 44.6 11 82	81.0	67 50.0 07 81	78.4	7
8	65 20.7 36 82	96.4	65 31.3 34 83	95.3	65 41.3 33 83	94.2	65 59.8 29 83	91.8	66 30.3 22 83	87.0	66 51.6 14 82	82.1	66 55.5 12 82	80.8	67 01.3 08 81	78.3	8
9	64 31.3 36 82	95.7	64 41.7 34 83	94.6	64 51.7 32 83	93.5	65 10.1 29 83	91.2	65 40.6 22 83	86.6	66 02.4 14 82	81.8	66 06.4 12 82	80.5	66 12.6 08 81	78.1	9
30	63 41.7 35 83	95.0	63 52.1 34 83	93.9	64 02.0 32 83	92.8	64 20.4 29 83	90.6	64 51.0 22 83	86.1	65 13.2 15 82	81.5	65 17.3 13 82	80.3	65 24.0 09 81	77.9	30
1	62 52.2 35 83	94.3	63 02.5 34 83	93.2	63 12.3 32 83	92.2	63 30.6 29 83	90.1	64 01.4 22 83	85.7	64 24.0 15 82	81.2	64 28.3 14 82	80.0	64 35.4 10 81	77.7	1
2	62 02.5 35 83	93.6	62 12.8 34 83	92.6	62 22.6 32 83	91.6	62 40.9 29 83	89.5	63 11.8 23 83	85.3	63 34.8 16 82	80.9	63 39.3 14 82	79.8	63 46.8 11 81	77.5	2
3	61 12.9 35 83	93.0	61 23.1 34 83	92.0	61 32.9 32 83	91.0	61 51.1 29 83	89.0	62 22.2 23 83	84.9	62 45.8 16 82	80.6	62 50.4 15 82	79.5	62 58.2 11 81	77.3	3
4	60 23.2 35 83	92.3	60 33.4 33 83	91.4	60 43.1 32 83	90.4	61 01.4 29 83	88.5	61 32.7 23 82	84.4	61 56.7 17 82	80.3	62 01.5 15 81	79.2	62 09.7 12 81	77.1	4
35	59 33.5 35 83	91.7	59 43.6 33 83	90.8	59 53.4 32 83	89.9	60 11.7 29 83	87.9	60 43.2 23 82	84.0	61 07.7 17 82	80.0	61 12.7 16 81	79.0	61 21.2 13 81	76.9	35
6	58 43.7 34 83	91.1	58 53.9 33 83	90.2	59 03.7 32 83	89.3	59 22.0 29 83	87.4	59 53.8 24 82	83.6	60 18.7 18 82	79.7	60 23.9 16 81	78.7	60 32.8 13 81	76.7	6
7	57 54.0 34 83	90.6	58 04.2 33 83	89.7	58 13.9 32 83	88.8	58 32.3 29 83	87.0	59 04.4 24 82	83.2	59 29.8 18 81	79.4	59 35.1 17 81	78.4	59 44.4 14 81	76.5	7
8	57 04.3 34 83	90.0	57 14.4 33 83	89.1	57 24.2 32 83	88.2	57 42.6 30 83	86.5	58 15.0 24 82	82.8	58 40.9 19 81	79.1	58 46.4 18 81	78.2	58 56.1 15 80	76.2	8
9	56 14.5 34 83	89.4	56 24.7 33 83	88.6	56 34.5 32 83	87.7	56 53.0 30 83	86.0	57 25.6 25 82	82.4	57 52.1 19 81	78.8	57 57.8 18 81	77.9	58 07.8 15 80	76.0	9
40	55 24.8 34 83	88.9	55 35.0 33 83	88.1	55 44.8 32 83	87.2	56 03.4 30 83	85.5	56 36.4 25 82	82.1	57 03.4 20 81	78.5	57 09.1 19 81	77.6	57 19.5 16 80	75.8	40
1	54 35.1 35 83	88.4	54 45.3 33 83	87.5	54 55.1 32 83	86.7	55 13.8 30 83	85.1	55 47.1 26 82	81.7	56 14.6 20 81	78.2	56 20.6 19 81	77.3	56 31.4 17 80	75.5	1
2	53 45.4 35 83	87.8	53 55.6 34 83	87.0	54 05.5 32 83	86.2	54 24.3 30 83	84.6	54 57.9 26 82	81.3	55 26.0 21 81	77.9	55 32.1 20 81	77.0	55 43.2 17 80	75.3	2
3	52 55.7 35 83	87.3	53 05.9 34 83	86.5	53 15.8 33 83	85.8	53 34.8 31 82	84.2	54 08.8 26 82	80.9	54 37.4 22 81	77.6	54 43.6 20 81	76.7	54 55.1 18 80	75.0	3
4	52 06.0 35 83	86.8	52 16.3 34 83	86.1	52 26.3 33 83	85.3	52 45.3 31 82	83.7	53 19.7 26 82	80.5	53 48.8 22 81	77.3	53 55.3 21 81	76.4	54 07.1 19 80	74.8	4
45	51 16.3 35 83	86.3	51 26.7 34 83	85.6	51 36.7 33 83	84.8	51 55.9 31 82	83.3	52 30.6 27 82	80.2	53 00.3 23 81	77.0	53 06.9 21 80	76.1	53 19.1 19 80	74.5	45
6	50 26.7 35 83	85.8	50 37.1 34 83	85.1	50 47.2 33 82	84.4	51 06.5 31 82	82.9	51 41.7 27 82	79.8	52 11.9 23 81	76.6	52 18.7 22 80	75.9	52 31.2 20 80	74.2	6
7	49 37.1 35 83	85.4	49 47.5 34 82	84.6	49 57.7 33 82	83.9	50 17.2 32 82	82.4	50 52.7 28 81	79.4	51 23.5 24 80	76.3	51 30.5 23 80	75.6	51 43.4 20 80	74.0	7
8	48 47.5 35 82	84.9	48 58.0 34 82	84.2	49 08.3 34 82	83.4	49 27.9 32 82	82.0	50 03.9 28 81	79.0	50 35.2 24 80	76.0	50 42.3 23 80	75.3	50 55.6 21 80	73.7	8
9	47 58.0 36 82	84.4	48 08.6 35 82	83.7	48 18.9 34 82	83.0	48 38.7 32 82	81.6	49 15.1 28 81	78.7	49 47.0 25 80	75.7	49 54.3 24 80	75.0	50 07.9 22 79	73.4	9
50	47 08.5 36 82	83.9	47 19.1 35 82	83.2	47 29.5 34 82	82.6	47 49.5 32 82	81.2	48 26.3 29 81	78.3	48 58.8 25 80	75.4	49 06.3 24 80	74.6	49 20.3 22 79	73.2	50
1	46 19.1 36 82	83.5	46 29.8 35 82	82.8	46 40.2 34 82	82.1	47 00.4 33 82	80.7	47 37.7 29 81	77.9	48 10.7 26 80	75.1	48 18.3 25 80	74.3	48 32.7 23 79	72.9	1
2	45 29.7 36 82	83.0	45 40.5 35 82	82.3	45 51.0 35 82	81.7	46 11.3 33 82	80.3	46 49.0 30 81	77.6	47 22.7 26 80	74.7	47 30.5 25 80	74.0	47 45.2 24 79	72.6	2
3	44 40.3 36 82	82.6	44 51.2 36 82	81.9	45 01.8 35 82	81.2	45 22.3 33 82	79.9	46 00.5 30 81	77.2	46 34.8 27 80	74.4	46 42.7 26 80	73.7	46 57.8 24 79	72.3	3
4	43 51.0 37 82	82.1	44 01.9 36 82	81.5	44 12.6 35 82	80.8	44 33.4 34 81	79.5	45 12.0 31 81	76.8	45 46.9 27 80	74.1	45 55.0 27 79	73.4	46 10.4 25 79	72.0	4
55	43 01.8 37 82	81.7	43 12.8 36 82	81.0	43 23.6 36 82	80.4	43 44.5 34 81	79.1	44 23.6 31 81	76.5	44 59.1 28 80	73.8	45 07.3 27 79	73.1	45 23.1 26 79	71.7	55
6	42 12.6 37 82	81.2	42 23.7 37 82	80.6	42 34.6 36 82	80.0	42 55.7 34 81	78.7	43 35.3 32 80	76.1	44 11.4 28 79	73.4	44 19.8 28 79	72.8	44 35.9 26 79	71.4	6
7	41 23.5 38 82	80.8	41 34.7 37 82	80.2	41 45.6 36 82	79.5	42 06.9 35 81	78.3	42 47.1 32 80	75.7	43 23.7 29 79	73.1	43 32.3 28 79	72.5	43 48.8 27 78	71.1	7
8	40 34.4 38 82	80.3	40 45.7 37 82	79.7	40 56.7 37 81	79.1	41 18.3 35 81	77.9	41 58.9 32 80	75.3	42 36.2 30 79	72.8	42 44.9 29 79	72.1	43 01.8 27 78	70.8	8
9	39 45.4 38 82	79.9	39 56.8 38 81	79.3	40 07.9 37 81	78.7	40 29.7 36 81	77.5	41 10.8 33 80	75.0	41 48.7 30 79	72.4	41 57.6 29 79	71.8	42 14.9 28 78	70.5	9
60	38 56.5 38 82	79.5	39 07.9 38 81	78.9	39 19.2 37 81	78.3	39 41.2 36 81	77.1	40 22.8 33 80	74.6	41 01.3 31 79	72.1	41 10.4 30 79	71.5	41 28.0 29 78	70.2	60
1	38 07.6 39 81	79.0	38 19.2 38 81	78.4	38 30.5 38 81	77.8	38 52.7 36 81	76.7	39 34.9 34 80	74.2	40 14.0 31 79	71.8	40 23.3 31 78	71.1	40 41.3 29 78	69.9	1
2	37 18.8 39 81	78.6	37 30.5 39 81	78.0	37 41.9 38 81	77.4	38 04.4 37 80	76.2	38 47.1 34 80	73.9	39 26.8 32 79	71.4	39 36.3 31 78	70.8	39 54.6 30 78	69.6	2
3	36 30.1 39 81	78.2	36 41.8 39 81	77.6	36 53.4 38 81	77.0	37 16.1 37 80	75.8	37 59.3 35 79	73.5	38 39.7 32 78	71.1	38 49.3 32 78	70.5	39 08.0 31 77	69.3	3
4	35 41.5 40 81	77.7	35 53.3 39 81	77.2	36 05.0 39 80	76.6	36 27.9 38 80	75.4	37 11.7 35 79	73.1	37 52.7 33 78	70.7	38 02.5 32 78	70.1	38 21.6 31 77	68.9	4
65	34 52.9 40 81	77.3	35 04.9 40 81	76.7	35 16.7 39 80	76.2	35 39.8 38 80	75.0	36 24.2 36 79	72.7	37 05.8 34 78	70.4	37 15.8 33 78	69.8	37 35.2 32 77	68.6	65
6	34 04.4 40 81	76.9	34 16.5 40 80	76.3	34 28.4 39 80	75.7	34 51.8 38 80	74.6	35 36.7 36 79	72.4	36 19.0 34 78	70.0	36 29.2 34 78	69.5	36 48.9 32 77	68.3	6
7	33 16.0 41 80	76.4	33 28.2 40 80	75.9	33 40.3 40 80	75.3	34 03.9 39 80	74.2	34 49.3 37 79	72.0	35 32.3 35 78	69.7	35 42.6 34 77	69.1	36 02.8 33 77	67.9	7
8	32 27.7 41 80	76.0	32 40.0 41 80	75.4	32 52.2 40 80	74.9	33 16.1 39 80	73.8	34 02.1 37 79	71.6	34 45.7 35 77	69.3	34 56.2 35 77	68.7	35 16.7 34 77	67.6	8
9	31 39.5 42 80	75.6	31 51.9 41 80	75.0	32 04.2 41 80	74.5	32 28.3 40 79	73.4	33 15.0 38 78	71.2	33 59.2 36 77	69.0	34 09.9 35 77	68.4	34 30.8 34 76	67.3	9
70	30 51.4 42 80	75.1	31 03.9 42 80	74.6	31 16.3 41 80	74.1	31 40.7 40 79	73.0	32 27.9 38 78	70.8	33 12.8 36 77	68.6	33 23.7 36 77	68.1	33 45.0 35 76	66.9	70
1	30 03.3 42 80	74.7	30 16.0 42 80	74.2	30 28.5 42 80	73.6	30 53.2 41 79	72.6	31 41.0 39 78	70.4	32 26.6 37 77	68.3	32 37.6 37 77	67.7	32 59.3 36 76	66.6	1
2	29 15.4 43 80	74.3	29 28.2 42 80	73.7	29 40.8 42 79	73.2	30 05.8 41 79	72.2	30 54.2 39 78	70.0	31 40.4 38 77	67.9	31 51.7 37 76	67.3	32 13.7 36 76	66.2	2
3	28 27.6 43 80	73.8	28 40.5 43 79	73.3	28 53.3 42 79	72.8	29 18.5 42 79	71.8	30 07.5 40 78	69.7	30 54.4 38 76	67.5	31 05.8 38 76	67.0	31 28.2 37 76	65.9	3
4	27 39.9 44 79	73.4	27 52.9 43 79	72.9	28 05.8 43 79	72.4	28 31.3 42 78	71.3	29 20.9 41 77	69.3	30 08.5 39 76	67.2	30 20.1 38 76	66.6	30 42.9 38 75	65.5	4
75	26 52.2 44 79	73.0	27 05.4 44 79	72.5	27 18.5 43 79	71.9	27 44.2 43 78	70.9	28 34.4 41 77	68.9	29 22.7 39 76	66.8	29 34.5 39 76	66.2	29 57.7 38 75	65.2	75
6	26 04.5 44 79	72.5	26 18.0 44 79	72.0	26 31.3 44 78	71.5	26 57.3 43 78	70.5	27 48.1 42 77	68.5	28 37.1 40 76	66.4	28 49.0 40 76	65.9	29 12.6 39 75	64.8	6
7	25 17.4 45 79	72.1	25 30.8 45 79	71.6	25 44.1 44 78	71.1	26 10.5 44 78	70.1	27 01.9 42 77	68.1	27 51.6 41 76	66.0	28 03.7 40 75	65.5	28 27.6 39 75	64.5	7
8	24 30.1 45 79	71.6	24 43.6 45 78	71.2	24 57.1 45 78	70.7	25 23.8 44 78	69.7	26 15.8 43 77	67.7	27 06.2 41 75	65.6	27 18.5 41 75	65.1	27 42.8 40 74	64.1	8
9	23 42.9 46 78	71.2	23 56.6 46 78	70.7	24 10.2 45 78	70.2	24 37.2 45 77	69.2	25 29.9 43 76	67.3	26 21.0 42 75	65.3	26 33.5 42 75	64.7	26 58.1 41 74	63.7	9
80	22 55.9 46 78	70.8	23 09.7 46 78	70.3	23 23.5 46 78	69.8	23 50.7 45 77	68.8	24 44.1 44 76	66.9	25 35.8 42 75	64.9	25 48.5 42 75	64.4	26 13.6 41 74	63.3	80
1	22 09.0 47 78	70.3	22 23.0 46 78	69.8	22 36.9 46 78	69.4	23 04.4 46 77	68.4	23 58.4 44 76	66.4	24 50.9 43 74	64.5	25 03.8 43 74	64.0	25 29.2 42 74	63.0	1
2	21 22.2 47 78	69.9	21 36.4 47 78	69.4	21 50.4 47 77	68.9	22 18.2 46 77	67.9	23 12.9 45 76	66.0	24 06.1 44 74	64.1	24 19.1 43 74	63.6	24 45.0 43 73	62.6	2
3	20 35.6 48 78	69.4	20 49.9 47 77	69.0	21 04.1 47 77	68.5	21 32.2 47 76	67.5	22 27.5 46 75	65.6	23 21.4 44 74	63.7	23 34.7 44 74	63.2	24 00.9 43 73	62.2	3
4	19 49.1 48 77	69.0	20 03.5 48 77	68.5	20 17.9 48 77	68.0	20 46.3 47 76	67.1	21 42.3 46 75	65.2	22 36.9 45 74	63.3	22 50.4 45 74	62.8	23 17.0 44 73	61.8	4
85	19 02.7 49 77	68.5	19 17.3 48 77	68.1	19 31.8 48 76	67.6	20 00.6 48 76	66.7	20 57.2 47 75	64.8	21 52.6 46 74	62.9	22 06.2 46 73	62.4	22 33.2 45 73	61.4	85
6	18 16.5 49 77	68.1	18 31.2 49 77	67.6	18 45.9 49 76	67.1	19 15.0 49 76	66.2	20 12.3 47 75	64.3	21 08.4 46 73	62.5	21 22.2 46 73	62.0	21 49.6 45 72	61.0	6
7	17 30.5 50 76	67.6	17 45.3 49 76	67.2	18 00.1 49 76	66.7	18 29.5 49 75	65.8	19 27.5 48 74	63.9	20 24.3 47 73	62.0	20 38.4 47 73	61.6	21 06.2 46 72	60.6	7
8	16 44.6 50 76	67.1	16 59.6 50 76	66.7	17 14.5 50 76	66.2	17 44.2 49 75	65.3	18 42.9 48 74	63.5	19 40.5 48 73	61.6	19 54.7 47 72	61.2	20 22.9 47 72	60.2	8
9	15 58.8 51 76	66.7	16 14.0 50 76	66.2	16 29.1 50 76	65.8	16 59.1 50 75	64.9	17 58.5 49 74	63.1	18 56.8 48 72	61.2	19 11.2 48 72	60.7	19 39.8 47 73	59.8	9
90	15 13.2 51 76	66.2	15 28.5 51 75	65.8	15 43.8 51 75	65.3	16 14.2 50 75	64.4	17 14.2 50 73	62.6	18 13.3 49 72	60.8	18 27.9 49 72	60.3	18 56.9 48 71	59.4	90

H.A.	28° 00'	28° 30'	29° 00'	30° 00'	32° 00'	34° 00'	34° 30'	35° 30'	H.A.
	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	
	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	
00	28 00.0 1.0 01 180.0	27 30.0 1.0 01 180.0	27 00.0 1.0 01 180.0	26 00.0 1.0 01 180.0	24 00.0 1.0 01 180.0	22 00.0 1.0 01 180.0	21 30.0 1.0 01 180.0	20 30.0 1.0 01 180.0	00
1	27 59.6 1.0 02 179.0	27 29.6 1.0 02 179.0	26 59.6 1.0 02 179.0	25 59.6 1.0 02 179.1	23 59.6 1.0 02 179.1	21 59.6 1.0 02 179.1	21 29.6 1.0 02 179.1	20 29.6 1.0 02 179.1	1
2	27 58.3 1.0 04 178.0	27 28.3 1.0 04 178.0	26 58.3 1.0 04 178.0	25 58.3 1.0 04 178.1	23 58.4 1.0 03 178.1	21 58.4 1.0 03 178.2	21 28.5 1.0 03 178.2	20 28.5 1.0 03 178.3	2
3	27 56.1 1.0 05 177.0	27 26.1 1.0 05 177.0	26 56.2 1.0 05 177.1	25 56.2 1.0 05 177.1	23 56.4 1.0 05 177.2	21 56.5 1.0 04 177.3	21 26.5 1.0 04 177.3	20 26.6 1.0 04 177.4	3
4	27 53.1 1.0 06 176.0	27 23.1 1.0 06 176.0	26 53.2 1.0 06 176.1	25 53.3 1.0 06 176.1	23 53.6 1.0 06 176.3	21 53.8 1.0 06 176.4	21 23.9 1.0 06 176.5	20 24.0 1.0 06 176.5	4
05	27 49.2 1.0 08 175.1	27 19.3 1.0 08 175.1	26 49.4 1.0 08 175.1	25 49.6 1.0 09 175.2	23 49.9 1.0 07 175.5	21 50.3 1.0 07 175.6	21 20.4 1.0 07 175.6	20 20.5 1.0 07 175.7	05
6	27 44.4 1.0 09 174.1	27 14.5 1.0 09 174.1	26 44.7 1.0 09 174.1	25 45.0 1.0 09 174.2	23 45.5 1.0 09 174.4	21 46.1 1.0 08 174.6	21 16.2 1.0 08 174.7	20 16.4 1.0 08 174.8	6
7	27 38.8 99 11 173.0	27 09.0 99 11 173.1	26 39.2 99 11 173.2	25 39.6 99 10 173.3	23 40.3 99 10 173.5	21 41.0 99 10 173.8	21 11.2 99 10 173.8	20 11.6 99 09 173.9	7
8	27 32.3 99 12 172.0	27 02.6 99 12 172.1	26 32.8 99 12 172.2	25 33.3 99 12 172.3	23 34.3 99 11 172.6	21 35.2 99 11 172.9	21 05.5 99 11 172.9	20 05.9 99 11 173.1	8
9	27 25.0 99 14 171.1	26 55.3 99 14 171.1	26 25.6 99 13 171.2	25 26.3 99 13 171.4	23 27.5 99 13 171.7	21 28.7 99 12 172.0	20 59.0 99 12 172.1	19 59.6 99 12 172.2	9
10	27 16.8 99 15 170.1	26 47.2 99 15 170.2	26 17.6 99 15 170.2	25 18.4 99 14 170.8	23 19.9 99 14 170.8	21 21.4 99 13 171.1	20 51.7 99 13 171.2	19 52.4 99 13 171.4	10
1	27 07.8 98 16 169.1	26 38.3 98 16 169.2	26 08.8 98 16 169.3	25 09.7 98 16 169.5	23 11.5 99 15 169.9	21 13.3 99 15 170.2	20 43.7 99 15 170.3	19 44.6 99 14 170.5	1
2	26 58.0 98 18 168.1	26 28.6 98 18 168.2	25 59.1 98 18 168.3	25 00.2 98 17 168.5	23 02.4 98 17 169.0	21 04.5 98 16 169.4	20 35.0 98 16 169.5	19 36.0 98 15 169.6	2
3	26 47.4 98 19 167.1	26 18.0 98 19 167.3	25 48.7 98 19 167.4	24 50.0 98 18 167.6	22 52.5 98 18 168.1	20 54.9 98 17 168.5	20 25.5 98 17 168.6	19 26.7 98 17 168.8	3
4	26 35.9 97 20 166.2	26 06.6 97 20 166.3	25 37.4 97 20 166.4	24 38.9 98 20 166.7	22 41.8 98 19 167.6	20 44.6 98 18 167.6	20 15.3 98 18 167.7	19 16.7 98 18 168.0	4
15	26 23.6 97 22 165.2	25 54.5 97 22 165.4	25 25.3 97 22 165.5	24 27.0 97 21 165.7	22 30.4 97 20 166.3	20 33.6 97 20 166.8	20 04.4 97 19 166.9	19 06.0 97 19 167.1	15
6	26 10.5 97 23 164.3	25 41.5 97 23 164.4	25 12.5 97 23 164.5	24 14.4 97 22 164.8	22 18.2 97 21 165.4	20 21.8 97 21 165.9	19 52.7 97 21 166.0	18 54.5 97 20 166.3	6
7	25 56.6 96 24 163.3	25 27.7 96 24 163.5	24 58.8 96 24 163.6	24 01.0 96 24 163.9	22 05.2 97 23 164.5	20 09.4 97 22 165.0	19 40.4 97 22 165.2	18 42.4 97 21 165.4	7
8	25 41.9 96 26 162.4	25 13.2 96 26 162.5	24 43.6 96 25 162.7	23 46.8 96 25 163.0	21 51.5 96 24 163.6	19 56.2 96 23 164.2	19 27.3 96 23 164.3	18 29.5 96 23 164.6	8
9	25 26.5 95 27 161.4	24 57.9 95 27 161.6	24 29.2 96 26 161.8	23 31.9 96 26 162.1	21 37.1 96 25 162.7	19 42.2 96 24 163.3	19 13.5 96 24 163.5	18 16.0 96 24 163.8	9
20	25 10.3 95 28 160.5	24 41.8 95 28 160.7	24 13.3 95 28 160.9	23 16.2 95 27 161.2	21 22.0 95 26 161.9	19 27.6 95 26 162.5	18 59.0 95 25 162.7	18 01.8 95 25 163.0	20
1	24 53.3 94 30 159.6	24 25.0 95 29 159.8	23 56.6 95 29 159.9	22 59.8 95 29 160.3	21 06.2 95 28 161.0	19 12.3 95 27 161.7	18 43.8 95 26 161.8	17 46.9 95 26 162.2	1
2	24 35.6 94 31 158.7	24 07.4 94 31 158.9	23 39.2 94 30 159.0	22 42.7 94 30 159.4	20 49.6 94 29 160.1	18 56.3 94 28 160.8	18 28.0 94 28 161.0	17 31.3 95 27 161.3	2
3	24 17.1 93 32 157.8	23 49.1 94 32 158.0	23 21.0 94 32 158.1	22 24.8 94 31 158.5	20 32.3 94 30 159.2	18 39.7 94 29 160.0	18 11.5 94 29 160.2	17 15.0 94 28 160.5	3
4	23 57.9 93 33 156.9	23 30.0 93 33 157.1	23 02.1 93 33 157.3	22 06.3 93 32 157.7	20 14.4 93 31 158.4	18 22.3 93 30 159.2	17 54.3 94 30 159.4	16 58.1 94 29 159.7	4
25	23 38.0 92 34 156.0	23 10.3 92 34 156.2	22 42.6 93 34 156.4	21 47.0 93 33 156.8	19 55.8 93 32 157.6	18 04.3 93 31 158.4	17 36.4 93 31 158.6	16 40.6 93 30 159.0	25
6	23 17.4 92 36 155.1	22 49.9 92 35 155.3	22 22.3 92 35 155.5	21 27.1 92 34 155.9	19 36.5 92 33 156.8	17 45.7 92 32 157.6	17 17.9 92 32 157.8	16 22.4 93 31 158.2	6
7	22 56.5 91 37 154.2	22 28.7 91 36 154.4	22 01.3 91 36 154.6	21 06.4 92 35 155.0	19 16.5 92 34 155.9	17 26.4 92 33 156.8	16 58.8 92 33 157.0	16 03.6 92 32 157.4	7
8	22 34.1 91 38 153.3	22 06.9 91 37 153.6	21 39.7 91 37 153.8	20 45.1 91 37 154.2	18 55.9 91 35 155.1	17 06.4 91 34 156.0	16 39.0 91 34 156.2	15 44.2 91 33 156.6	8
9	22 11.5 90 39 152.5	21 44.4 90 39 152.7	21 17.4 90 38 152.9	20 23.2 90 38 153.4	18 34.6 91 36 154.3	16 45.8 91 35 155.2	16 18.6 91 35 155.4	15 24.1 91 34 155.8	9
30	21 48.1 89 40 151.6	21 21.3 90 40 151.8	20 54.4 90 39 152.1	20 00.6 90 39 152.6	18 12.8 90 38 153.5	16 24.7 90 36 154.4	15 57.6 90 36 154.6	15 03.4 90 35 155.1	30
1	21 24.2 89 41 150.8	20 57.5 89 41 151.0	20 30.8 89 40 151.3	19 37.4 89 40 151.7	17 50.2 89 39 152.7	16 02.9 90 37 153.6	15 36.0 90 37 153.9	14 42.2 90 36 154.3	1
2	20 59.5 88 42 149.9	20 32.6 88 42 150.2	20 06.6 89 41 150.4	19 13.5 89 41 150.9	17 27.1 89 40 151.9	15 40.5 89 38 152.9	15 13.8 89 38 153.1	14 20.3 89 37 153.6	2
3	20 34.3 88 43 149.1	20 08.0 88 43 149.4	19 41.7 88 42 149.6	18 49.0 88 42 150.1	17 03.4 88 41 151.1	15 17.5 89 39 152.1	14 51.0 89 39 152.3	13 57.9 89 38 152.8	3
4	20 08.4 87 44 148.3	19 42.3 87 44 148.5	19 16.2 87 44 148.8	18 23.9 87 43 149.3	16 39.1 88 42 150.3	14 53.9 88 40 151.3	14 27.6 88 40 151.6	13 34.9 88 39 152.1	4
35	19 42.0 86 45 147.5	19 16.1 86 45 147.7	18 50.2 86 44 148.0	17 58.2 87 44 148.5	16 14.1 87 42 149.6	14 29.7 87 41 150.6	14 03.6 87 41 150.8	13 11.3 87 40 151.3	35
6	19 14.9 86 46 146.7	18 49.2 86 46 146.9	18 23.5 86 45 147.2	17 32.0 86 45 147.7	15 48.7 86 43 148.8	14 05.0 86 42 149.8	13 39.1 87 42 150.1	12 47.1 87 41 150.6	6
7	18 47.3 85 47 145.9	18 21.8 85 47 146.1	17 56.3 85 46 146.4	17 05.1 85 46 147.0	15 22.6 86 44 148.0	13 39.8 86 43 149.1	13 14.0 86 43 149.4	12 22.5 86 42 149.9	7
8	18 19.1 84 48 145.1	17 53.8 84 48 145.4	17 28.5 84 47 145.6	16 37.7 85 47 146.2	14 56.0 85 45 147.3	13 14.0 85 44 148.4	12 48.4 85 44 148.6	11 57.2 85 43 149.2	8
9	17 50.3 84 49 144.3	17 25.2 84 48 144.6	17 00.1 84 48 144.9	16 09.8 84 47 145.4	14 28.8 84 46 146.6	12 47.6 84 45 147.7	12 22.3 85 44 147.9	11 31.5 85 44 148.5	9
40	17 21.0 83 50 143.5	16 56.1 83 49 143.8	16 31.2 83 49 144.1	15 41.3 83 48 144.7	14 01.2 84 47 145.8	12 20.7 84 46 146.9	11 55.6 84 45 147.2	11 05.2 84 45 147.8	40
1	16 51.2 82 51 142.8	16 26.5 82 50 143.0	16 01.8 82 50 143.3	15 12.3 83 49 143.9	13 33.3 83 48 145.1	11 53.3 83 46 146.2	11 28.5 83 46 146.5	10 38.5 83 45 147.1	1
2	16 20.8 82 52 142.0	15 56.3 82 51 142.3	15 31.8 82 51 142.6	14 42.7 82 50 143.2	13 04.2 82 49 144.4	11 25.4 82 47 145.5	11 00.7 82 47 145.8	10 11.2 83 46 146.4	2
3	15 49.9 81 52 141.3	15 25.7 81 52 141.6	15 01.3 81 52 141.9	14 12.7 81 51 142.5	12 35.0 82 50 143.7	10 57.0 82 48 144.8	10 32.5 82 48 145.1	9 43.4 82 47 145.7	3
4	15 18.6 80 53 140.5	14 54.5 80 53 140.8	14 30.4 80 52 141.1	13 42.1 81 52 141.7	12 05.3 81 50 143.0	10 28.2 81 49 144.2	10 03.8 81 49 144.4	9 15.1 81 48 145.0	4
45	14 46.7 80 54 139.8	14 22.8 80 54 140.1	13 58.9 80 53 140.4	13 11.1 80 53 141.0	11 35.1 80 51 142.3	9 58.8 80 50 143.5	9 34.7 80 49 143.8	8 46.4 81 49 144.4	45
6	14 14.3 79 55 139.1	13 50.7 79 54 139.4	13 27.0 79 54 139.7	12 39.5 79 53 140.3	11 04.4 79 52 141.6	9 28.9 80 51 142.8	9 05.0 80 50 143.1	8 17.2 80 49 143.7	6
7	13 41.5 78 56 138.3	13 18.0 78 55 138.7	12 54.6 78 55 139.0	12 07.5 78 54 139.6	10 33.2 79 50 140.9	8 58.6 79 51 142.1	8 34.9 79 51 142.4	7 47.5 79 50 143.1	7
8	13 08.2 77 56 137.6	12 45.0 78 56 138.0	12 21.7 78 56 138.3	11 35.1 78 55 138.9	10 01.6 78 53 140.2	8 27.9 78 52 141.5	8 04.4 78 52 141.8	7 17.4 78 51 142.4	8
9	12 34.5 77 57 136.9	12 11.4 77 57 137.3	11 48.4 77 56 137.6	11 02.2 77 56 138.2	9 29.6 77 54 139.5	7 56.7 78 53 140.8	7 33.4 78 52 141.1	6 46.8 78 52 141.8	9
50	12 00.3 76 58 136.3	11 37.5 76 57 136.6	11 14.6 76 57 136.9	10 28.8 76 56 137.6	8 57.1 77 53 138.9	7 25.0 77 53 140.2	7 02.0 77 53 140.5	6 15.9 77 52 141.1	50
1	11 25.7 76 58 135.6	11 03.1 76 58 135.9	10 40.4 76 58 136.2	9 55.1 76 57 136.9	8 24.1 76 56 138.2	6 53.0 76 54 139.5	6 30.1 76 54 139.9	5 44.4 76 53 140.5	1
2	10 50.6 75 59 134.9	10 28.2 75 59 135.2	10 05.8 75 58 135.6	9 20.9 75 58 136.2	7 50.8 75 56 137.6	6 20.5 75 55 138.9	5 57.9 75 54 139.2	5 12.6 75 54 139.9	2
3	10 15.2 74 60 134.2	9 53.0 74 59 134.6	9 30.8 74 59 134.9	8 46.3 74 58 135.6	7 17.0 74 57 136.9	5 47.6 75 56 138.3	5 25.2 75 55 138.6		3
4	9 39.4 73 60 133.6	9 17.4 73 60 133.9	8 55.3 73 60 134.3	8 11.3 74 59 134.9	6 42.9 74 58 136.3	5 14.3 74 56 137.7			4
55	9 03.1 73 61 132.9	8 41.3 73 61 133.2	8 19.5 73 60 133.6	7 35.8 73 60 134.3	6 08.3 73 58 135.7				55
6	8 26.5 72 62 132.3	8 04.9 72 61 132.6	7 43.3 72 61 133.0	7 00.1 72 60 133.7	5 33.4 72 59 135.1				6
7	7 49.5 71 62 131.6	7 28.1 71 62 132.0	7 06.7 71 62 132.3	6 23.9 71 61 133.0					7
8	7 12.1 71 63 131.0	6 51.0 71 63 131.4	6 29.8 71 62 131.7	5 47.4 71 62 132.4					8
9	6 34.4 70 64 130.4	6 13.5 70 63 130.7	5 52.5 70 63 131.1	5 10.5 70 62 131.8					9
60	5 56.4 69 64 129.8	5 35.6 69 64 130.1	5 14.8 69 64 130.5						60
1	5 17.9 69 65 129.1								1

DECLINATION **SAME** NAME AS LATITUDE

H.A.	28° 00'	28° 30'	29° 00'	30° 00'	32° 00'	34° 00'	34° 30'	35° 30'	H.A.
	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	
	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	° ' Δd Δt °	
91	14 27.8 52 76 65.7	14 43.2 52 75 65.3	14 58.7 51 75 64.9	15 29.4 51 74 64.0	16 30.1 50 73 62.2	17 30.0 49 72 60.4	17 44.8 49 72 59.9	18 14.2 49 71 59.0	91
2	13 42.5 52 75 65.3	13 58.1 52 75 64.8	14 13.7 52 75 64.4	14 44.8 52 74 63.5	15 46.3 51 73 61.7	16 46.8 50 72 59.9	17 01.8 50 71 59.5	17 31.7 50 71 58.6	2
3	12 57.4 53 75 64.8	13 13.2 53 75 64.4	13 29.0 52 74 63.9	14 00.4 52 74 63.0	15 02.5 51 73 61.3	16 03.9 51 71 59.4	16 19.1 51 71 59.0	16 49.3 50 70 58.1	3
4	12 12.5 53 74 64.3	12 28.5 53 74 63.9	12 44.4 53 74 63.4	13 16.1 53 73 62.6	14 19.0 52 72 60.8	15 21.1 51 71 59.1	15 36.5 51 71 58.6	16 07.2 51 70 57.7	4
95	11 27.8 54 74 63.8	11 43.9 54 74 63.4	12 00.0 54 74 63.0	12 32.0 53 73 62.1	13 35.7 53 72 60.4	14 38.6 52 71 58.6	14 54.2 52 70 58.2	15 25.2 52 70 57.3	95
6	10 43.2 54 74 63.3	10 59.5 54 74 62.9	11 15.8 54 73 62.5	11 48.2 54 73 61.6	12 52.5 53 72 59.9	13 56.2 53 70 58.2	14 12.0 53 70 57.7	14 43.5 52 69 56.8	6
7	9 58.8 55 74 62.9	10 15.3 55 73 62.4	10 31.7 55 73 62.0	11 04.5 54 72 61.1	12 09.6 54 71 59.4	13 14.1 53 70 57.7	13 30.1 53 70 57.3	14 01.9 53 69 56.4	7
8	9 14.7 55 73 62.4	9 31.3 55 73 61.9	9 47.9 55 73 61.5	10 21.0 55 72 60.7	11 26.9 54 71 59.0	12 32.1 54 70 57.2	12 48.3 54 69 56.8	13 20.6 54 68 56.0	8
9	8 30.7 56 73 61.9	8 47.5 56 73 61.4	9 04.3 56 72 61.0	9 37.8 56 72 60.2	10 44.4 55 70 58.5	11 50.4 55 69 56.8	12 06.8 55 69 56.4	12 39.5 54 68 55.5	9
100	7 47.0 57 72 61.4	8 03.9 57 72 60.9	8 20.6 56 72 60.5	8 54.7 56 71 59.7	10 02.1 56 70 58.0	11 08.9 55 69 56.3	11 25.5 55 68 55.9	11 58.6 55 68 55.0	100
1	7 03.4 57 72 60.8	7 20.6 57 72 60.4	7 37.7 57 72 60.0	8 11.9 57 71 59.2	9 20.0 57 70 57.5	10 27.6 56 68 55.8	10 44.4 56 68 55.4	11 18.0 56 67 54.6	1
2	6 20.1 58 72 60.3	6 37.4 58 72 60.0	6 54.7 57 71 59.5	7 29.3 58 70 58.7	8 38.1 57 69 57.0	9 46.6 57 68 55.5	10 03.6 57 68 55.0	10 37.6 57 67 54.1	2
3	5 37.0 58 72 59.8	5 54.5 58 71 59.4	6 12.0 58 71 59.0	6 46.9 58 70 58.2	7 56.5 58 69 56.5	9 05.8 58 68 54.9	9 23.0 57 67 54.5	9 57.4 57 67 53.6	3
4		5 11.8 59 71 58.9	5 29.4 59 70 58.5	6 04.8 59 70 57.7	7 15.1 59 69 56.0	8 25.2 58 67 54.4	8 42.6 58 67 54.0	9 17.4 58 66 53.2	4
105				5 22.8 59 69 57.2	6 34.0 59 68 55.5	7 44.9 59 67 53.9	8 02.5 59 66 53.5	8 37.8 59 66 52.7	105
6					5 53.1 60 68 55.0	7 04.8 60 66 53.4	7 22.7 60 66 53.0	7 58.3 59 65 52.2	6
7					5 12.5 61 67 54.5	6 25.0 60 66 52.5	6 43.0 60 66 52.5	7 19.1 60 65 51.7	7
8						5 45.4 61 65 52.4	6 03.7 61 65 52.0	6 40.2 61 64 51.2	8
9						5 06.1 62 65 51.9	5 24.6 62 65 51.5	6 01.6 62 64 50.7	9
110								5 23.2 62 63 50.2	110

Lat. 34°

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 39°

Lat. 34°

H.A.	86° 00' Alt	Δd Δt	Az	37° 00' Alt	Δd Δt	Az	38° 30' Alt	Δd Δt	Az	40° 00' Alt	Δd Δt	Az	42° 00' Alt	Δd Δt	Az	42° 30' Alt	Δd Δt	Az	43° 00' Alt	Δd Δt	Az	45° 00' Alt	Δd Δt	Az	H.A.
00	88 00.0	1.0 16	00.0	87 00.0	1.0 11	00.0	85 30.0	1.0 07	00.0	84 00.0	1.0 05	00.0	82 00.0	1.0 04	00.0	81 30.0	1.0 04	00.0	81 00.0	1.0 03	00.0	79 00.0	1.0 03	00.0	00
1	87 50.3	92 42	22.0	86 53.5	96 30	14.9	85 25.7	98 21	09.9	83 56.8	99 10	07.3	81 57.7	1.0 11	05.3	81 58.0	1.0 10	05.0	80 58.0	1.0 10	04.7	78 58.4	1.0 08	03.7	1
2	87 24.9	77 58	38.8	86 35.2	87 45	27.9	85 13.2	94 33	19.1	83 47.5	96 25	14.3	81 50.8	98 19	10.5	81 21.4	98 18	09.9	80 51.9	98 17	09.3	78 53.6	99 12	07.4	2
3	86 49.9	62 67	50.0	86 07.9	77 58	38.3	84 53.5	87 43	27.4	83 32.4	92 34	20.9	81 39.6	95 26	15.6	81 10.9	96 24	14.6	80 42.0	96 23	13.7	78 45.7	97 18	10.9	3
4	86 09.7	50 72	57.5	85 34.4	66 63	46.2	84 27.9	80 50	34.5	83 12.3	87 41	26.8	81 24.2	92 32	20.3	81 00.9	93 30	19.1	80 28.4	94 28	18.0	78 34.8	96 23	14.4	4
05	85 26.6	42 75	62.6	84 56.7	57 68	52.2	83 57.6	73 56	40.4	82 47.7	82 47	32.2	81 05.2	88 37	24.7	80 38.5	90 35	23.3	80 11.5	91 34	22.0	78 21.0	93 28	17.8	05
6	84 41.7	35 77	66.2	84 16.2	50 71	56.7	83 23.7	66 61	45.3	82 19.5	76 52	36.8	80 42.8	84 42	28.8	80 17.3	86 40	27.2	79 51.3	87 38	25.7	78 04.4	91 32	21.0	6
7	83 55.7	30 78	68.8	83 33.7	43 73	60.2	82 47.1	59 65	49.4	81 48.3	71 56	40.9	80 17.4	80 47	32.5	79 53.2	82 44	30.8	79 28.4	83 42	29.2	77 45.4	88 36	24.0	7
8	83 09.0	25 79	70.8	82 50.0	38 75	63.0	82 08.4	54 67	52.8	81 14.5	65 60	44.4	79 49.5	76 50	35.8	79 26.5	78 48	34.1	79 02.9	79 46	32.4	77 24.1	85 39	26.8	8
9	82 21.9	22 79	72.3	82 05.2	34 76	65.2	81 28.0	49 69	55.6	80 38.8	60 62	47.5	79 19.3	71 54	38.9	78 57.5	74 51	37.0	78 35.2	76 49	35.3	77 00.6	82 42	29.5	9
10	81 34.3	19 80	73.4	81 19.8	30 77	66.9	80 46.4	44 71	57.9	80 01.3	56 65	50.1	78 47.2	67 56	41.6	78 26.6	70 54	39.7	78 05.5	72 52	38.0	76 35.2	78 45	32.0	10
1	80 46.5	16 80	74.4	80 33.7	26 77	68.3	80 03.8	40 72	59.9	79 22.5	51 67	54.0	78 13.4	63 59	44.0	77 54.0	66 57	42.2	77 34.0	68 55	40.4	76 08.0	75 48	34.3	1
2	79 58.5	14 80	75.1	79 47.3	23 78	69.5	79 20.3	36 73	61.6	78 42.5	47 68	54.4	77 38.1	59 61	46.2	77 19.9	62 59	44.3	77 01.0	64 57	42.6	75 39.2	72 50	36.4	2
3	79 10.4	12 80	75.7	79 00.6	21 78	70.5	78 36.3	33 74	63.0	78 01.6	44 69	56.2	77 01.6	56 63	48.1	76 44.6	58 61	46.3	76 26.7	61 59	44.6	75 09.0	69 52	38.4	3
4	78 22.2	10 81	76.1	78 13.6	18 79	71.2	77 51.7	30 75	64.2	77 19.9	40 71	57.7	76 24.1	52 64	49.9	76 08.1	55 62	48.1	75 51.3	57 61	46.4	74 37.5	65 54	40.2	4
15	77 33.8	08 81	76.5	77 26.4	16 79	71.9	77 06.7	27 76	65.3	76 37.3	37 72	59.0	75 45.6	49 65	51.4	75 30.6	51 64	49.7	75 14.8	54 62	48.0	74 04.9	62 56	41.9	15
6	76 45.4	07 81	76.8	76 39.0	14 79	72.4	76 21.4	25 76	66.1	75 54.7	34 72	60.2	75 06.3	46 67	52.8	74 52.2	48 65	51.1	74 37.4	51 64	49.5	73 31.2	59 58	43.4	6
7	75 57.0	06 81	77.0	75 51.6	12 79	72.9	75 35.8	22 76	66.9	75 11.3	32 73	61.2	74 26.4	43 68	54.1	74 13.1	45 66	52.4	73 59.2	48 65	50.8	72 56.6	56 59	44.8	7
8	75 08.5	04 81	77.1	75 04.0	11 79	73.3	74 49.9	20 77	67.6	74 27.5	29 73	62.1	73 45.8	40 69	55.2	73 33.4	43 67	53.6	73 20.3	45 66	52.0	72 21.1	53 60	46.1	8
9	74 20.0	03 81	77.3	74 16.3	09 80	73.6	74 03.8	18 77	68.1	73 43.4	27 74	62.9	73 04.7	37 69	56.2	72 53.1	40 68	54.6	72 40.8	42 67	53.1	71 44.9	51 61	47.4	9
20	73 31.5	02 81	77.3	73 28.6	08 80	73.8	73 17.6	16 77	68.6	72 59.0	25 74	63.5	72 23.1	35 70	57.1	72 12.3	37 69	55.6	72 00.7	40 68	54.1	71 08.0	48 62	48.4	20
1	72 43.0	01 81	77.4	72 40.8	06 80	74.0	72 31.2	15 78	69.0	72 14.4	23 75	64.2	71 41.1	33 71	57.9	71 31.0	35 69	56.5	71 20.2	37 68	55.0	70 30.5	46 64	49.4	1
2	71 54.4	00 81	77.4	71 52.9	05 80	74.2	71 44.7	13 78	69.4	71 29.5	21 75	64.7	70 58.8	30 71	58.7	70 49.4	33 70	57.2	70 39.3	35 69	55.8	69 52.4	43 64	50.3	2
3	71 05.9	01 81	77.4	71 05.0	04 80	74.3	70 58.1	11 79	69.7	70 44.4	19 75	65.2	70 16.2	28 72	59.3	70 07.4	30 70	57.9	69 58.0	33 69	56.5	69 13.9	41 65	51.2	3
4	70 17.3	02 81	77.3	70 17.2	03 80	74.4	70 11.4	10 78	69.9	69 59.2	17 76	65.6	69 33.3	26 72	59.9	69 25.1	28 71	58.5	69 16.3	30 70	57.2	68 35.0	38 65	52.0	4
25	69 28.8	03 81	77.3	69 29.3	02 80	74.4	69 24.7	09 78	70.1	69 13.9	15 76	65.9	68 50.1	24 72	60.4	68 42.5	26 71	59.1	68 34.4	28 70	57.8	67 55.6	36 66	52.7	25
6	68 40.3	04 81	77.2	68 41.3	01 80	74.4	68 37.9	07 78	70.3	68 28.4	14 76	66.2	68 06.7	22 73	60.9	67 59.7	24 72	59.6	67 52.1	26 71	58.3	67 15.9	34 67	53.3	6
7	67 51.8	05 81	77.1	67 53.4	01 80	74.4	67 51.0	06 78	70.5	67 42.8	12 76	66.5	67 23.2	20 73	61.3	67 16.7	22 72	60.1	67 09.7	24 71	58.8	66 35.8	32 67	53.9	7
8	67 03.3	06 81	77.0	67 05.5	02 80	74.4	67 04.1	05 78	70.6	66 57.1	11 76	66.7	66 39.4	19 73	61.7	66 33.5	21 72	60.5	66 27.0	23 71	59.2	65 55.5	30 68	54.5	8
9	66 14.9	07 81	76.9	66 17.6	03 80	74.4	66 17.2	03 78	70.6	66 11.5	09 76	66.9	65 55.6	17 73	62.0	65 50.2	19 73	60.8	65 44.2	21 72	59.6	65 14.9	28 68	55.0	9
30	65 26.5	07 81	76.7	65 29.7	03 80	74.3	65 30.3	02 78	70.7	65 25.7	08 76	67.1	65 11.6	15 73	62.3	65 06.7	17 73	61.2	65 01.2	19 72	60.0	64 34.0	26 68	55.4	30
1	64 38.1	08 81	76.6	64 41.8	04 80	74.2	64 43.3	01 78	70.7	64 39.8	07 76	67.2	64 27.5	14 74	62.6	64 23.0	16 73	61.4	64 18.1	17 72	60.3	63 53.0	24 69	55.8	1
2	63 49.7	09 81	76.4	63 54.0	05 80	74.1	63 56.4	00 78	70.7	63 53.9	05 77	67.3	63 43.3	12 74	62.8	63 39.3	14 73	61.7	63 34.8	16 72	60.6	63 11.7	22 69	56.2	2
3	63 01.4	10 80	76.2	63 06.1	06 80	74.0	63 09.4	01 78	70.7	63 08.0	04 77	67.4	62 59.0	11 74	63.0	62 55.5	13 73	61.9	62 51.4	14 73	60.8	62 30.3	21 69	56.5	3
4	62 13.1	10 80	76.1	62 18.3	07 80	73.9	62 22.5	02 78	70.7	62 22.1	03 77	67.5	62 14.6	10 74	63.2	62 11.5	11 73	62.1	62 07.9	13 73	61.0	61 48.7	19 70	56.8	4
35	61 24.8	11 80	75.9	61 30.5	08 80	73.8	61 35.5	03 78	70.7	61 36.2	02 77	67.5	61 30.2	08 74	63.3	61 27.5	10 73	62.3	61 24.4	11 73	61.2	61 07.0	18 70	57.1	35
6	60 36.6	12 80	75.7	60 42.8	09 80	73.7	60 48.6	04 78	70.6	60 50.2	01 77	67.5	60 45.8	07 74	63.4	60 43.5	08 74	62.4	60 40.8	10 73	61.4	60 25.2	16 70	57.3	6
7	59 48.4	13 80	75.5	59 55.1	10 79	73.5	60 01.7	05 78	70.6	60 04.2	01 77	67.5	60 01.3	05 74	63.5	59 59.4	07 74	62.5	59 57.1	09 73	61.5	59 43.3	14 70	57.6	7
8	59 00.3	13 80	75.3	59 07.4	10 79	73.4	59 14.8	06 78	70.4	59 18.3	02 77	67.5	59 16.7	04 74	63.6	59 15.2	06 74	62.6	59 13.3	07 73	61.6	59 01.3	13 70	57.8	8
9	58 12.1	14 80	75.1	58 19.7	11 79	73.2	58 27.9	07 78	70.3	58 32.3	03 77	67.5	58 32.2	04 74	63.6	58 31.1	04 74	62.7	58 29.5	06 73	61.7	58 19.1	11 70	57.9	9
40	57 24.1	15 80	74.9	57 32.2	12 79	73.0	57 41.1	08 78	70.2	57 46.4	04 77	67.4	57 47.6	02 74	63.7	57 46.9	03 74	62.7	57 45.7	05 73	61.8	57 37.0	10 70	58.1	40
1	56 36.2	15 80	74.6	56 44.6	13 78	72.8	56 54.3	09 78	70.1	57 00.5	05 76	67.4	57 03.0	01 74	63.7	57 02.6	02 74	62.8	57 01.9	03 73	61.8	56 54.7	09 70	58.2	1
2	55 48.2	16 80	74.4	55 57.1	14 79	72.6	56 07.6	10 78	70.0	56 14.6	06 76	67.3	56 18.4	01 74	63.7	56 18.0	01 74	62.8	56 18.0	01 73	61.9	56 12.4	07 71	58.3	2
3	55 00.3	17 80	74.2	55 09.7	14 79	72.4	55 20.9	11 78	69.8	55 28.7	07 76	67.2	55 33.8	02 74	63.7	55 34.2	00 74	62.8	55 34.1	01 73	61.9	55 30.1	06 71	58.4	3
4	54 12.5	17 80	73.9	54 22.3	15 79	72.2	54 34.2	11 78	69.7	54 42.8	08 76	67.1	54 49.3	03 74	63.6	54 49.9	02 74	62.8	54 50.2	00 73	61.9	54 47.7	05 71	58.4	4
45	53 24.7	18 80	73.7	53 34.9	16 79	72.0	53 47.6	12 78	69.5	53 57.0	09 76	67.0	54 04.7	04 74	63.6	54 05.7	03 74	62.7	54 06.4	02 73	61.9	54 05.3	03 71	58.5	45
6	52 37.0	19 79	73.4	52 47.6	17 79	71.8	53 01.0	13 78	69.4	53 11.3	10 76	66.8	53 35.5	05 74	63.5	53 21.5	04 74	62.7	53 22.5	02 73	61.9	53 22.9	02 71	58.5	6
7	51 49.4	19 79	73.2	52 00.4	17 79	71.6	52 14.5	14 77	69.2	52 25.6	11 76	66.7	52 35.6	06 74	63.4	52 37.3	05 74	62.6	52 38.6	04 73	61.8	52 40.5	01 71	58.5	7
8	51 01.8	20 79	72.9	51 13.2	18 79	71.4	51 28.0	15 77	69.0	51 39.9	12 76	66.6	51 51.1	07 74	63.3	51 53.1	06 74	62.6	51 54.8	05 73	61.8	51 58.1	01 71	58.5	8
9	50 14.3	21 79	72.7	50 26.1	19 78	71.1	50 41.6	16 77	68.8	50 54.2	12 76	66.5	51 06.7	08 74	63.3	51 09.0	07 74	62.5	51 11.0	06 73	61.7	51 15.6	02 71	58.5	9
50	49 26.8	21 79	72.4	49 39.1	19 78	70.9	49 55.2	16 77	68.6	50 08.7	13 76	66.3	50 22.3	09 74	63.2	50 24.9	08 73	62.4	50 27.2	07 73	61.6	50 33.2	03 71	58.5	50
1	48 39.4	22 79	72.1	48 52.1	20 78	70.7	49 09.0	17 77	68.4	49 23.2	14 76	66.1	49 37.9	10 74	63.1	49 40.8	09 73	62.3	49 43.4	08 73	61.5	49 50.8	04 71	58.5	1
2	47 52.1	23 79	71.9	48 05.2	21 78	70.4	48 22.7	18 77	68.2	48 37.7	15 76	66.0	48 53.6	11 74	63.0	48 56.8	10 73	62.2	48 59.7	09 73	61.3	49 08.5	05 71	58.4	2
3	47 04.9	23 79	71.6	47 18.4	22 78	70.2	47 36.6	19 77	68.0	47 52.3	16 76	65.8	48 09.3	12 74	62.8	48 12.8	11 73	62.1	48 16.1	10 73	61.3	48 26.1	06 71	58.3	3
4	46 17.7	24 78	71.3	46 31.6	22 78	69.9	46 50.5	20 77	67.8	47 07.0	17 75	65.6	47 25.1	13 74	62.7	47 28.9	12 73	62.0	47 32.4	11 73	61.2	47 43.8	08 71	58.3	4
55	45 30.7	25 78	71.0	45 45.0	23 78	69.6	46 04.5	20 77	67.5	46 21.7	18 75	65.4	46 40.9	14 74	62.5	46 45.0	13 73	61.8	46 48.9	12 73	61.1	47 01.5	09 70	58.2	55
6	44 43.7	25 78	70.7	44 58.4	24 78	69.4	45 18.6	21 76	67.3	45 36.5	19 75	65.2	45 56.8	15 73	62.4	46 01.2	14 73	61.7	46 05.3	13 72	61.0	46 19.2	10 70	58.1	6
7	43 56.7	26 78	70.5	44 11.9	24 77	69.1	44 32.7	22 76	67.1	44 51.4	19 75	65.0	45 12.7	16 73	62.2	45 17.4	15 73	61.5	45 21.9	14 72	60.8	45 37.0	11 70	58.0	7
8	43 09.6	27 78	70.2	43 25.4	25 77	68.8	43 47.0	23 76	66.8	44 06.3	20 75	64.8	44 28.8	17 73	62.0	44 33.8	16 73	61.3	44 38.5	15 72	60.7	44 54.9	12 70	57.9	8
9	42 23.2	27 78	69.9	42 39.1	26 77	68.6	43 01.4	23 76	66.6	43 21.4	21 75	64.6	43 44.9	18 73	61.9	43 50.1	17 73	61.2	43 55.2	16 72	60.5	44 12.8	13 70	57.7	9
60	41 36.5	28 78	69.6	41 52.8	27 77	68.3	42 15.7	24 76	66.3	42 36.5	22 74	64.3	43 01.0	19 73	61.7	43 06.6	19 73	61.0	43 11.9	17 72	60.3	43 30.8	14 70	57.6	60
1	40 49.9	29 77	69.3	41 06.7	27 77	68.0	41 30.2	25 76	66.1	41 51.7	23 74	64.1	42 17.3	20 73	61.5	42 23.1	19 72	60.8	42 28.7	18 72	60.1	42 48.8	15 70	57.5	1
2	40 03.5	29 77	69.0	40 20.6	28 77	67.7	40 44.7	26 76	65.8	41 07.0	24 74	63.9	41 33.6	21 73	61.3	41 39.7	20 72	60.6	41 45.6	19 72	60.0	42 06.9	16 70	57.3	2
3	39 17.1	30 77	68.6	39 34.6	29 76	67.4	39 59.4	27 75	65.5	40 22.4	24 74	63.6	40 50.1	22 73	61.1	40 56.4	21 72	60.4	41 02.6	20 72	59.8	41 25.1	17 70	57.2	3
4	38 30.8	31 77	68.3	38 48.8	29 76	67.1	39 14.2	27 75	65.2	39 37.9	25 74	63.4	40 06.6	23 72	60.8	40 13.2	22 72	60.2	40 19.7	21 71	59.6	40 43.3	18 69	57.0	4
65	37 44.7	31 77	68.0	38 03.0	30 76	66.8	38 29.1	28 75	65.0	38 53.4	26 74	63.1	39 23.2	23 72	60.6	39 30.1	23 72	60.0	39 36.8	22 71	59.4	40 01.5	19 69	56.8	65
6	36 58.6	32 77	67.7	37 17.3	31 76	66.5	37 44.1	29 75	64.7	38 09.1	27 74	62.9	38 39.9	24 72	60.4	38 47.1	24 72	59.8	38 54.1	23 71	59.2	39 20.1	20 69	56.6	6
7	36 12.6	32 76	67.4	36 31.8	31 76	66.2	36 59.1	30 75	64.4	37 24.9	28 74	62.6	37 56.7	25 72	60.2	38 04.1	25 71	59.5	38 11.4	24 71	58.9	38 38.6	21 69	56.4	7
8	35 26.8	33 76	67.0	35 46.3	31 76	65.9	36 14.1	30 74	64.1	36 40.8	29 73	62.3	37 13.6	26 72	59.9	37 21.3	25 71	59.3	37 28.9	25 71	58.7	37 57.2	22 69	56.2	8
9	34 41.0	34 76	66.7	35 01.0	33 75	65.6	35 29.6	31 74	63.8	35 56.8	29 73	62.0	36 30.6	27 71	59.7	36 38.6	26 71	59.1	36 46.4	26 71	58.5	37 15.9	23 69	56.0	9
70	33 55.4	34 75	66.4	34 15.7	33 75	65.2	34 45.1	32 74	63.5	35 12.9	30 73	61.8	35 47.7	28 71	59.4	35 56.0	27 71	58.8	36 04.1	27 70	58.2	36 34.6	24 68	55.8	70
1	33 09.9	35 75	66.0	33 39.6	34 75	64.9	34 00.6	33 74	63.2	34 29.2	31 73	61.5	35 04.9	29 71	59.2	35 13.5	28 71	58.6	35 21.8	28 70	58.0	35 53.5	25 68	55.6	1
2	32 24.5	36 75	65.7	32 45.6	35 75	64.6	33 16.3	33 74	62.9	33 45.5	32 73	61.2	34 22.3	30 71	58.9	34 31.1	29 70	58.3	34 39.7	28 70	57.7	35 12.5	26 68	55.4	2
3	31 39.2	36 75	65.4	32 00.8	35 75	64.3	32 32.0	34 73	62.6	33 02.0	33 72	60.9	33 39.8	30 71	58.6	33 48.4	30 70	58.1	33 57.7	29 70	57.5	34 31.7	27 68	55.1	3
4	30 54.1	37 75	65.0	31 16.0	36 74	63.9	31 47.9	35 73	62.3	32 18.6	33 72	60.6	32 57.3	31 70	58.4	33 06.7	31 70	57.8	33 15.8	30 70	57.2	33 50.9	28 68	54.9	4
75	30 09.0	38 75	64.7	30 31.4	37 74	63.6	31 04.0	35 73	61.9	31 35.3	34 72	60.3	32 15.1	32 70	58.1	32 24.6	32 70	57.5	32 34.1	31 69	57.0	33 10.2	29 68	54.7	75
6	29 24.2	38 75	64.3	29 46.9	38 74	63.2	30 20.2	36 73	61.6	30 52.2	35 72	60.0	31 32.9	33 70	57.8	31 42.7	33 70	57.2	31 52.4	32 69	56.7	32 29.7	30 67	54.4	6
7	28 39.4	39 74	63.9	29 02.6	38 74	62.9	29 36.5	37 73	61.3	30 09.2	36 71	59.7	30 50.9	34 70	57.5	31 01.0	33 69	57.0	31 10.9	33 69	56.4	31 49.3	31 67	54.2	7
8	27 54.8	40 74	63.5	28 18.4	39 73	62.5	28 52.9	38 72	61.0	29 26.3	36 71	59.4	30 09.4	34 70	57.2	30 19.4	34 69	56.7	30 29.6	34 69	56.1	31 09.0	32 67	53.9	8
9	27 10.3	40 74	63.2	27 34.3	40 73	62.2	28 09.5	38 72	60.6	28 43.6	37 71	59.0	29 27.3	36 69	56.9	29 37.9	35 69	56.4	29 48.3	35 68	55.8	30 28.9	33 67	53.7	9
80	26 26.0	41 74	62.8	26 50.4	40 73	61.8	27 26.2	39 72	60.3	28 01.0	38 71	58.7	28 45.7	36 69	56.5	28 56.5	36 69	56.1	29 07.3	36 68	55.5	29 48.9	34 66	53.4	80
1	25 41.8	42 73	62.5	26 06.6	41 73	61.5	26 43.1	40 72	59.9	27 18.5	39 70	58.4	28 04.2	37 69	56.3	28 15.3	37 68	55.8	28 26.3	36 68	55.2	29 09.1	35 66	53.1	1
2	24 57.8	42 73	62.1	25 23.0	42 72	61.1	26 00.1	41 71	59.5	26 36.3	40 70	58.0	27 23.4	38 68	56.0	27 34.4	38 68	55.5	27 45.5	37 68	54.9	28 29.4	36 66	52.9	2
3	24 13.9	43 73	61.7	24 39.6	42 72	60.7	25 17.3	41 71	59.2	25 54.1	40 70	57.7	26 41.8	39 68	55.7	26 53.4	39 68	55.1	27 04.9	38 67	54.6	27 49.8	37 66	52.5	3
4	23 30.2	44 73	61.3	23 56.2	43 72	60.3	24 34.7	42 71	58.9	25 12.2	41 70	57.4	26 00.8	40 68	55.3	26 12.7	39 68	54.8	26 24.4	39 67	54.3	27 10.4	38 65	52.2	4
85	22 46.6	44 73	60.9	23 13.1	44 72	60.0	23 52.2	43 71	58.5	24 30.4	42 69	57.0	25 19.9	41 68	55.0	25 32.1	40 67	54.5	25 44.1	40 67	54.0	26 31.2	38 65	51.9	85
6	22 03.2	45 72	60.5	22 30.1	45 71	59.6	23 09.8	44 70	58.1	23 48.7	43 69	56.6	24 39.3	41 67	54.7	24 51.7	41 67	54.2	25 04.0	41 67	53.7	25 52.1	39 65	51.6	6
7	21 20.0	46 72	60.2	21 47.2	45 71	59.2	22 27.7	44 70	57.7	23 07.3	44 69	56.3	23 58.8	42 67	54.3	24 11.4	42 67	53.9	24 24.0	42 66	53.3	25 13.2	40 65	51.3	7
8	20 36.9	47 71	59.8	21 04.7	46 71	58.8	21 45.7	45 70	57.4	22 26.0	44 69	55.9	23 18.5	43 67	54.0	23 31.4	43 66	53.5	23 44.2	42 66	53.0	24 34.4	41 64	51.0	8
9	19 54.0	47 71	59.3	20 22.2	47 70	58.4	21 03.9	46 69	57.0	21 44.9	45 68	55.6	22 38.3	44 67	53.6	22 51.5	44 66	53.1	23 04.6	43 66	52.6	23 55.9	42 64	50.7	9
90	19 11.3	48 71	58.9	19 39.9	47 70	58.0	20 22.3	47 69	56.6	21 04.0	46 68	55.2	21 58.4	45 66	53.3	22 11.8	45 66	52.8	22 25.1	44 65	52.3	23 17.5	43 64	50.3	90

H.A.	36° 00'	37° 00'	38° 30'	40° 00'	42° 00'	42° 30'	43° 00'	45° 00'	H.A.
	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	
00	20 00.0 1.00 01 180.0	19 00.0 1.00 01 180.0	17 30.0 1.00 01 180.0	16 00.0 1.00 01 180.0	14 00.0 1.00 01 180.0	13 30.0 1.00 01 180.0	13 00.0 1.00 01 180.0	11 00.0 1.00 01 180.0	00
1	19 59.6 1.00 02 179.1	18 59.6 1.00 02 179.2	17 29.6 1.00 02 179.2	15 59.7 1.00 02 179.2	13 59.7 1.00 02 179.3	13 29.7 1.00 02 179.3	12 59.7 1.00 02 179.3	10 59.7 1.00 02 179.3	1
2	19 58.5 1.00 03 178.3	18 58.5 1.00 03 178.3	17 28.6 1.00 03 178.4	15 58.6 1.00 03 178.4	13 58.7 1.00 03 178.5	13 28.7 1.00 03 178.5	12 58.7 1.00 03 178.5	10 58.8 1.00 03 178.6	2
3	19 56.6 1.00 04 177.4	18 56.7 1.00 04 177.5	17 26.8 1.00 04 177.5	15 56.9 1.00 04 177.6	13 57.0 1.00 04 177.7	13 27.0 1.00 04 177.7	12 57.1 1.00 04 177.7	10 57.2 1.00 04 177.8	3
4	19 54.0 1.00 06 176.6	18 54.1 1.00 05 176.6	17 24.3 1.00 05 176.7	15 54.5 1.00 05 176.8	13 54.7 1.00 05 176.9	13 24.7 1.00 05 177.0	12 54.8 1.00 05 177.0	10 55.0 1.00 05 177.1	4
05	19 50.7 1.00 07 175.7	18 50.8 1.00 07 175.8	17 21.1 1.00 06 175.9	15 51.4 1.00 06 176.0	13 51.7 1.00 06 176.2	13 21.8 1.00 06 176.2	12 51.9 1.00 06 176.3	10 52.2 1.00 06 176.4	05
6	19 46.6 1.00 08 174.8	18 46.8 1.00 08 174.9	17 17.2 1.00 07 175.1	15 47.6 1.00 07 175.2	13 48.0 1.00 07 175.4	13 18.2 1.00 07 175.5	12 48.3 1.00 07 175.5	10 48.8 1.00 07 175.7	6
7	19 41.7 99 09 174.0	18 42.1 99 09 174.1	17 12.6 99 09 174.3	15 43.1 99 09 174.4	13 43.7 99 08 174.7	13 13.9 99 08 174.7	12 44.1 99 08 174.8	10 44.7 99 08 175.0	7
8	19 36.2 99 11 173.1	18 36.6 99 10 173.3	17 07.3 99 10 173.5	15 37.9 99 10 173.6	13 38.8 99 09 173.9	13 09.0 99 09 174.0	12 39.2 99 09 174.0	10 40.0 99 09 174.3	8
9	19 29.8 99 12 172.3	18 30.4 99 12 172.4	17 01.2 99 11 172.6	15 32.1 99 11 172.9	13 33.2 99 10 173.1	13 03.4 99 10 173.2	12 33.7 99 10 173.3	10 34.7 99 10 173.5	9
10	19 22.8 99 13 171.4	18 23.5 99 13 171.6	16 54.5 99 12 171.8	15 25.5 99 12 172.1	13 26.9 99 12 172.4	12 57.2 99 11 172.5	12 27.5 99 11 172.5	10 28.8 99 11 172.8	10
1	19 15.0 99 14 170.6	18 15.9 99 14 170.8	16 47.1 99 14 171.0	15 18.3 99 13 171.3	13 20.0 99 13 171.6	12 50.4 99 12 171.7	12 20.7 99 12 171.8	10 22.3 99 12 172.1	1
2	19 06.5 98 15 169.7	18 07.5 98 15 169.9	16 39.0 98 15 170.2	15 10.5 98 14 170.5	13 12.4 98 14 170.9	12 42.9 98 14 171.0	12 13.3 98 13 171.0	10 15.2 98 13 171.4	2
3	18 57.3 98 17 168.9	17 58.5 98 16 169.1	16 30.2 98 16 169.4	15 01.9 98 15 169.7	13 04.2 98 15 170.1	12 34.7 98 15 170.2	12 05.3 98 14 170.3	10 07.5 98 14 170.7	3
4	18 47.4 98 18 168.1	17 48.7 98 17 168.3	16 20.7 98 17 168.6	14 52.7 98 16 168.9	12 55.3 98 16 169.4	12 26.0 98 16 169.5	11 56.6 98 15 169.6	9 59.1 98 15 170.0	4
15	18 36.8 97 19 167.2	17 38.3 97 19 167.5	16 10.6 97 18 167.8	14 42.9 97 18 168.1	12 45.8 97 18 168.6	12 16.5 97 18 168.7	11 47.3 97 18 168.9	9 50.2 98 17 169.3	15
6	18 25.4 97 20 166.4	17 27.2 97 20 166.7	15 59.8 97 19 167.0	14 32.3 97 19 167.4	12 35.7 97 18 167.9	12 06.5 97 18 168.0	11 37.4 97 18 168.1	9 40.6 97 17 168.6	6
7	18 13.4 97 21 165.6	17 15.3 97 21 165.8	15 48.3 97 20 166.2	14 21.2 97 20 166.6	12 24.9 97 19 167.1	11 55.9 97 19 167.3	11 26.8 97 19 167.4	9 30.5 97 18 167.9	7
8	18 00.6 96 22 164.8	17 02.8 96 22 165.0	15 36.1 96 21 165.5	14 09.3 96 21 165.9	12 13.6 97 20 166.4	11 44.6 97 20 166.5	11 15.6 97 20 166.7	9 19.8 97 19 167.2	8
9	17 47.2 96 23 163.9	16 49.7 96 23 164.2	15 23.3 96 22 164.7	13 56.9 96 22 165.1	12 01.6 96 21 165.7	11 32.7 96 21 165.8	11 03.9 96 21 166.0	9 08.5 96 20 166.5	9
20	17 33.1 95 25 163.1	16 35.8 95 24 163.4	15 09.8 95 24 163.9	13 43.8 95 24 164.4	11 49.0 95 22 164.9	11 20.2 95 22 165.1	10 51.5 95 22 165.2	8 56.6 95 21 165.8	20
1	17 18.4 95 26 162.3	16 21.3 95 25 162.6	14 55.7 95 25 163.1	13 30.0 95 24 163.6	11 35.7 95 23 164.2	11 07.1 95 23 164.4	10 38.5 95 23 164.5	8 44.1 95 22 165.1	1
2	17 02.9 95 27 161.5	16 06.2 95 26 161.9	14 40.9 95 26 162.4	13 15.7 95 25 162.9	11 21.9 95 24 163.5	10 53.4 95 24 163.7	10 25.0 95 24 163.8	8 31.1 95 23 164.5	2
3	16 46.8 94 28 160.7	15 50.3 94 27 161.1	14 25.6 94 27 161.6	13 00.7 94 26 162.1	11 07.5 94 25 162.8	10 39.2 94 25 163.0	10 10.8 94 25 163.1	8 17.5 94 24 163.8	3
4	16 30.1 94 29 159.9	15 33.9 94 29 160.3	14 09.5 94 28 160.8	12 45.1 94 27 161.4	10 52.5 94 26 162.1	10 24.3 94 26 162.2	9 56.1 94 26 162.4	8 03.3 94 25 163.1	4
25	16 12.7 93 30 159.1	15 16.8 93 30 159.5	13 52.9 93 29 160.1	12 28.9 93 28 160.6	10 36.9 93 27 161.4	10 08.5 93 27 161.5	9 40.8 93 26 161.7	7 48.6 94 25 162.4	25
6	15 54.6 93 31 158.4	14 59.1 93 31 158.8	13 35.6 93 30 159.3	12 12.1 93 29 159.9	10 20.7 93 28 160.7	9 52.8 93 28 160.8	9 24.9 93 27 161.0	7 33.3 93 26 161.8	6
7	15 36.0 92 32 157.6	14 40.7 92 32 158.0	13 17.8 92 31 158.6	11 54.8 92 30 159.2	10 03.9 92 29 160.0	9 36.2 92 29 160.2	9 08.5 92 28 160.3	7 17.5 93 27 161.1	7
8	15 16.7 91 33 156.8	14 21.8 91 33 157.2	12 59.9 92 32 157.8	11 36.8 92 31 158.5	9 46.6 92 30 159.3	9 19.0 92 30 159.5	8 51.5 92 29 159.7	7 01.1 92 26 160.5	8
9	14 56.8 91 34 156.0	14 02.4 91 34 156.5	12 40.3 91 33 157.1	11 18.2 91 32 157.7	9 28.7 91 31 158.6	9 01.3 91 30 158.8	8 33.9 91 30 159.0	6 44.2 91 29 159.8	9
30	14 36.3 90 35 155.3	13 42.1 90 35 155.7	12 20.6 91 34 156.4	10 59.1 91 33 157.0	9 10.3 91 32 157.9	8 43.0 91 31 158.1	8 15.8 91 31 158.3	6 26.8 91 30 159.2	30
1	14 15.2 90 36 154.5	13 21.4 90 36 155.0	12 00.4 90 35 155.7	10 39.4 90 34 156.3	8 51.3 90 33 157.2	8 24.2 90 32 157.4	7 57.1 90 32 157.6	6 08.8 90 31 158.5	1
2	13 53.6 89 37 153.8	13 00.0 89 36 154.3	11 39.6 89 36 154.9	10 19.2 89 35 155.6	8 31.7 90 33 156.5	8 04.8 90 33 156.8	7 38.0 90 33 157.0	5 50.3 90 32 157.9	2
3	13 31.3 89 38 153.1	12 38.1 89 37 153.6	11 18.3 89 36 154.2	9 58.4 89 36 154.9	8 11.6 89 34 155.9	7 44.9 89 34 156.1	7 18.2 89 34 156.3	5 31.3 89 32 157.2	3
4	13 08.5 88 39 152.3	12 15.7 88 38 152.8	10 56.4 88 37 153.5	9 37.0 88 36 154.2	7 51.0 88 35 155.2	7 24.5 88 35 155.5	6 58.0 88 35 155.7	5 11.8 89 33 156.6	4
35	12 45.1 87 40 151.6	11 52.7 87 39 152.1	10 34.0 88 38 152.8	9 15.1 88 37 153.6	7 29.9 88 36 154.5	7 03.6 88 36 154.8	6 37.3 88 35 155.0		35
6	12 21.2 87 41 150.9	11 29.1 87 40 151.4	10 11.0 87 39 152.1	8 52.7 87 38 152.9	7 08.3 87 37 153.9	6 42.1 87 37 154.1	6 16.0 87 36 154.4		6
7	11 56.7 86 42 150.2	11 05.0 86 41 150.7	9 47.5 86 40 151.4	8 29.8 86 39 152.2	6 46.1 86 38 153.2	6 20.2 86 37 153.5	5 54.2 87 37 153.7		7
8	11 31.6 85 43 149.4	10 40.4 85 42 150.0	9 23.4 85 41 150.8	8 06.4 85 40 151.6	6 23.5 86 39 152.6	5 57.7 86 38 152.8	5 32.0 86 38 153.1		8
9	11 06.1 85 43 148.7	10 15.3 85 43 149.3	8 58.9 85 42 150.1	7 42.4 85 41 150.9	6 00.3 85 39 151.9	5 34.8 85 39 152.2	5 09.2 85 39 152.5		9
40	10 40.0 84 44 148.1	9 49.6 84 44 148.6	8 33.8 84 43 149.4	7 18.0 84 42 150.2	5 36.7 84 40 151.3	5 11.4 84 40 151.6			40
1	10 13.5 83 45 147.4	9 23.4 83 44 147.9	8 08.3 84 43 148.8	6 53.0 84 42 149.6	5 12.6 84 41 150.7				1
2	9 46.4 83 46 146.7	8 56.8 83 45 147.3	7 42.2 83 44 148.1	6 27.6 83 43 148.9					2
3	9 18.8 82 47 146.0	8 29.6 82 46 146.6	7 15.7 82 45 147.4	6 01.7 82 44 148.3					3
4	8 50.8 81 48 145.3	8 02.0 81 47 145.9	6 48.7 81 46 146.8	5 35.4 82 45 147.7					4
45	8 22.2 81 48 144.7	7 33.9 81 48 145.3	6 21.2 81 47 146.2	5 08.5 81 45 147.1					45
6	7 53.2 80 49 144.0	7 05.3 80 48 144.6	5 53.3 80 47 145.5						6
7	7 23.8 79 50 143.4	6 36.3 79 49 144.0	5 24.9 79 48 144.9						7
8	6 53.9 78 51 142.7	6 06.8 78 50 143.4							8
9	6 23.5 78 51 142.1	5 36.9 78 51 142.7							9
50	5 52.8 77 52 141.5	5 06.6 77 51 142.1							50
1	5 21.6 76 53 140.8								1

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00'	37° 00'	38° 30'	40° 00'	42° 00'	42° 30'	43° 00'	45° 00'	H.A.
	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	
91	18 28.8 49 71 58.5	18 57.1 48 70 57.6	19 40.9 47 69 56.2	20 23.2 47 68 54.8	21 18.6 46 66 52.9	21 32.3 45 66 52.4	21 45.8 45 65 51.9	22 39.3 44 63 50.0	91
2	17 46.5 49 70 58.1	18 15.9 49 70 57.2	18 59.6 48 68 55.8	19 42.7 47 67 54.4	20 39.0 46 66 52.5	20 53.0 46 65 52.1	21 06.8 46 65 51.6	22 01.3 45 63 49.7	2
3	17 04.4 50 70 57.7	17 34.2 50 69 56.8	18 18.6 49 68 55.4	19 02.3 48 67 54.0	19 59.7 47 65 52.2	20 13.8 47 65 51.7	20 27.9 47 64 51.2	21 23.5 46 63 49.3	3
4	16 22.4 51 70 57.3	16 52.7 50 69 56.4	17 37.7 50 68 55.0	18 22.2 49 67 53.6	19 20.5 48 65 51.8	19 34.9 48 65 51.3	19 49.2 48 64 50.9	20 45.8 47 62 49.0	4
95	15 40.7 51 69 56.8	16 11.4 51 68 55.9	16 57.1 50 67 54.6	17 42.2 50 66 53.2	18 41.5 49 65 51.4	18 56.2 49 64 50.9	19 10.8 49 64 50.5	20 08.4 48 62 48.6	95
6	14 59.1 52 69 56.4	15 30.3 52 68 55.5	16 16.6 51 67 54.2	17 02.5 51 66 52.8	18 02.7 50 64 51.0	18 17.6 50 64 50.6	18 32.5 49 63 50.1	19 31.2 48 62 48.3	6
7	14 17.8 53 69 56.0	14 49.4 52 68 55.1	15 36.4 52 67 53.8	16 22.9 51 66 52.4	17 24.2 51 64 50.6	17 39.3 50 63 50.2	17 54.4 50 63 49.7	18 54.2 49 61 47.9	7
8	13 36.7 54 68 55.5	14 08.7 53 67 54.6	14 56.4 53 66 53.3	15 43.6 52 65 52.0	16 45.8 51 64 50.2	17 01.2 51 63 49.8	17 16.6 51 63 49.3	18 17.4 50 61 47.5	8
9	12 55.8 54 68 55.1	13 28.3 54 67 54.2	14 16.6 53 66 52.9	15 04.5 53 65 51.6	16 07.7 52 63 49.8	16 23.4 52 63 49.4	16 39.0 52 62 48.9	17 40.8 51 61 47.1	9
100	12 15.1 55 67 54.6	12 48.0 55 67 53.8	13 37.1 54 66 52.5	14 25.7 54 64 51.2	15 29.8 53 63 49.4	15 45.7 53 62 49.0	16 01.6 53 62 48.5	17 04.5 52 60 46.8	100
1	11 34.7 56 67 54.2	12 08.0 55 66 53.3	12 57.7 55 65 52.0	13 47.0 55 64 50.7	14 52.2 54 62 49.0	15 08.3 54 62 48.6	15 24.4 54 61 48.1	16 28.3 53 60 46.4	1
2	10 54.5 56 67 53.7	11 28.3 56 66 52.9	12 18.6 56 65 51.6	13 08.6 55 64 50.3	14 14.7 55 62 48.6	14 31.1 55 62 48.2	14 47.5 54 61 47.7	15 52.5 54 59 46.0	2
3	10 14.5 57 66 53.2	10 48.7 57 65 52.4	11 39.8 57 64 51.1	12 30.5 56 63 49.9	13 37.6 56 62 48.2	13 54.2 55 61 47.7	14 10.8 55 61 47.3	15 16.8 55 59 45.6	3
4	9 34.8 58 66 52.8	10 09.4 58 65 51.9	11 01.2 57 64 50.7	11 52.6 57 63 49.4	13 00.6 56 61 47.7	13 17.5 56 61 47.3	13 34.4 56 60 46.9	14 41.4 56 59 45.2	4
105	8 55.3 59 65 52.3	9 30.4 58 65 51.5	10 22.8 58 64 50.2	11 14.9 58 62 49.0	12 23.9 57 61 47.3	12 41.1 57 60 46.9	12 58.2 57 60 46.5	14 06.2 56 58 44.8	105
6	8 16.1 59 65 51.8	8 51.6 59 64 51.0	9 44.7 59 63 49.8	10 37.5 59 62 48.5	11 47.5 58 60 46.9	12 04.9 58 60 46.4	12 22.3 58 59 46.0	13 31.3 57 58 44.4	6
7	7 37.2 60 64 51.3	8 13.1 60 64 50.5	9 06.9 60 63 49.3	10 00.4 59 61 48.1	11 11.3 59 60 46.4	11 29.0 59 59 46.0	11 46.6 59 59 45.6	12 56.7 58 57 43.9	7
8	6 58.5 61 64 50.8	7 34.9 61 63 50.0	8 29.3 60 62 48.8	9 23.5 60 61 47.6	10 35.4 60 59 46.0	10 53.3 60 59 45.6	11 11.2 59 59 45.2	12 22.3 59 57 43.5	8
9	6 20.0 61 64 50.3	6 56.9 61 63 49.5	7 52.0 61 62 48.3	8 46.9 61 61 47.1	9 59.8 61 59 45.5	10 18.0 60 58 45.1	10 36.1 60 58 44.7	11 48.2 60 56 43.1	9
110	5 41.9 62 63 49.8	6 19.2 62 62 49.0	7 15.0 62 61 47.8	8 10.6 62 60 46.7	9 24.5 61 58 45.1	9 42.8 61 58 44.7	10 01.2 61 58 44.3	11 14.4 61 56 42.6	110
1	5 04.0 63 63 49.3	5 41.8 63 62 48.5	6 38.6 63 60 47.4	7 34.6 62 60 46.2	8 49.4 62 58 44.6	9 08.0 62 58 44.2	9 26.6 62 57 43.8	10 40.8 62 55 42.2	1
2		5 04.7 64 61 48.0	6 01.8 63 60 46.9	6 58.3 63 59 45.7	8 14.6 63 57 44.1	8 33.5 63 57 43.7	8 52.4 63 57 43.3	10 07.5 62 55 41.8	2
3			5 25.7 64 60 46.4	6 23.4 64 59 45.2	7 40.1 64 57 43.6	7 59.3 64 57 43.3	8 18.4 64 56 42.9	9 34.6 63 54 41.3	3
4				5 48.3 65 58 44.7	7 05.9 65 56 43.2	7 25.3 65 56 42.8	7 44.7 64 56 42.4	9 01.9 64 54 40.9	4
115				5 13.4 66 58 44.2	6 32.1 65 55 42.7	6 51.7 65 56 42.3	7 11.3 65 55 41.9	8 29.5 65 54 40.4	115
6					5 58.5 66 55 42.2	6 18.4 66 55 41.8	6 38.2 66 55 41.4	7 57.4 66 53 39.9	6
7					5 25.3 67 55 41.7	5 45.4 67 54 41.3	6 05.5 67 54 40.9	7 25.6 67 52 39.4	7
8						5 12.7 68 54 40.8	5 33.0 68 53 40.4	6 54.2 67 52 39.0	8
9						5 00.9 69 53 39.9	6 23.1 68 51 38.5		9
120								5 52.3 69 51 38.0	120
1								5 21.8 70 50 37.5	1

Lat. 34°

In the following table each altitude cell is given as: degrees minutes, then Δd and Δt, then the azimuth.

H.A.	46°00' Alt (Δd Δt)	Az	47°00' Alt (Δd Δt)	Az	48°30' Alt (Δd Δt)	Az	49°30' Alt (Δd Δt)	Az	50°30' Alt (Δd Δt)	Az	51°30' Alt (Δd Δt)	Az	52°30' Alt (Δd Δt)	Az	54°00' Alt (Δd Δt)	Az	H.A.
00	78 00.0 1.00 2	00.0	77 00.0 1.00 2	00.0	75 30.0 1.00 2	00.0	74 30.0 1.00 2	00.0	73 30.0 1.00 2	00.0	72 30.0 1.00 2	00.0	71 30.0 1.00 2	00.0	70 00.0 1.00 1	00.0	00
1	77 58.6 1.00 7	03.3	76 58.7 1.00 7	03.3	75 28.9 1.00 6	02.6	74 28.9 1.00 5	02.4	73 29.0 1.00 5	02.2	72 29.1 1.00 4	02.1	71 29.1 1.00 4	01.9	69 59.3 1.00 4	01.7	1
2	77 54.2 99 12	06.6	76 54.8 99 11	06.0	75 25.4 99 10	05.3	74 25.8 99 09	04.8	73 26.1 99 08	04.5	72 26.4 1.00 7	04.1	71 26.7 1.00 7	03.8	69 57.0 1.00 4	03.4	2
3	77 47.1 98 16	09.9	76 48.2 98 15	09.0	75 19.7 99 13	07.9	74 20.6 99 12	07.2	73 21.3 99 11	06.7	72 21.9 99 10	06.2	71 22.5 99 10	05.7	69 53.3 99 09	05.1	3
4	77 37.2 96 21	13.1	76 39.2 97 19	11.9	75 11.8 97 17	10.4	74 13.3 98 15	09.6	73 14.6 98 14	08.9	72 15.7 98 13	08.2	71 16.8 98 12	07.6	69 48.1 98 12	06.8	4
05	77 24.6 94 25	16.1	76 27.8 95 23	14.7	75 01.7 96 20	12.9	74 04.0 96 19	11.9	73 06.0 97 17	11.0	72 07.8 97 16	10.2	71 09.4 97 15	09.5	69 41.5 98 13	08.5	05
6	77 09.6 92 29	19.1	76 14.0 93 27	17.4	74 49.6 94 24	15.3	73 52.8 95 22	14.2	72 55.6 96 20	13.1	71 58.1 96 19	12.1	71 00.4 96 18	11.3	69 33.4 97 16	10.1	6
7	76 52.2 90 33	21.9	75 58.0 91 30	20.0	74 35.4 92 27	17.7	73 39.7 93 25	16.3	72 43.5 94 23	15.1	71 46.9 95 21	14.0	70 49.9 95 20	13.1	69 24.0 96 18	11.7	7
8	76 32.6 87 36	24.5	75 39.9 88 33	22.5	74 19.4 90 30	20.0	73 24.8 91 28	18.5	72 29.7 92 26	17.1	71 34.0 93 24	15.9	70 38.0 94 22	14.8	69 13.2 95 20	13.3	8
9	76 10.9 84 39	27.1	75 19.9 86 36	24.9	74 01.5 88 33	22.1	73 08.2 89 30	20.5	72 14.2 91 28	19.0	71 19.6 91 26	17.7	70 24.5 92 25	16.5	69 01.1 93 22	14.9	9
10	75 47.3 81 42	29.4	74 58.1 83 39	27.2	73 42.0 86 35	24.2	72 50.0 87 32	22.5	71 57.2 89 31	20.9	71 03.8 90 29	19.5	70 09.7 91 27	18.1	68 47.7 92 24	16.4	10
1	75 22.1 78 45	31.6	74 34.5 80 42	29.3	73 20.8 83 38	26.2	72 30.0 85 35	24.3	71 38.8 86 33	22.7	70 46.5 88 31	21.1	69 53.6 89 29	19.7	68 33.0 90 26	17.9	1
2	74 55.2 75 47	33.7	74 09.4 78 44	31.3	72 58.1 81 40	28.1	72 09.0 83 38	26.1	71 18.9 84 35	24.4	70 27.9 86 33	22.8	69 36.1 87 31	21.3	68 17.2 88 28	19.3	2
3	74 26.9 72 49	35.7	73 42.9 75 46	33.2	72 34.0 78 42	29.8	71 46.4 80 40	27.8	70 57.7 82 37	26.0	70 08.0 84 35	24.3	69 18.3 85 32	22.8	68 00.2 87 30	20.7	3
4	73 57.2 69 51	37.4	73 15.0 72 48	34.9	72 08.6 76 44	31.5	71 22.6 78 42	29.5	70 35.3 80 39	27.6	69 46.9 81 37	25.8	68 57.6 83 35	24.2	67 42.1 85 32	22.0	4
15	73 26.4 66 53	39.1	72 46.0 69 50	36.6	71 42.0 73 46	33.1	70 57.5 75 44	31.0	70 11.7 77 41	29.1	69 24.7 79 39	27.3	68 36.7 81 37	25.6	67 22.9 83 34	23.3	15
6	72 54.5 63 55	40.7	72 15.8 66 52	38.1	71 14.3 70 48	34.6	70 31.4 73 45	32.5	69 47.0 75 43	30.5	69 01.4 77 41	28.6	68 14.7 79 38	26.9	67 02.7 81 35	24.5	6
7	72 21.6 60 56	42.1	71 44.6 63 54	39.5	70 45.6 68 50	36.0	70 04.1 70 47	33.8	69 21.2 73 45	31.8	68 37.0 75 42	29.9	67 51.6 77 40	28.2	66 41.6 79 37	25.7	7
8	71 47.9 57 58	43.4	71 12.5 61 55	40.9	70 15.9 65 51	37.3	69 36.0 68 48	35.2	68 54.5 70 46	33.2	68 11.7 72 44	31.2	67 27.7 74 41	29.4	66 19.5 77 38	26.9	8
9	71 13.3 54 59	44.6	70 39.6 58 56	42.1	69 45.3 63 52	38.6	69 06.9 65 50	36.4	68 26.9 68 47	34.3	67 45.5 70 45	32.4	67 02.8 72 43	30.5	65 56.6 75 40	28.0	9
20	70 38.0 52 60	45.8	70 05.8 55 57	43.3	69 13.9 60 54	39.7	68 37.0 63 51	37.5	67 58.5 65 49	35.5	67 18.5 68 46	33.5	66 37.2 70 44	31.6	65 32.9 73 41	29.1	20
1	70 02.1 49 61	46.8	69 31.4 53 58	44.3	68 41.7 58 55	40.8	68 06.3 60 52	38.6	67 29.2 63 50	36.5	66 50.6 66 48	34.6	66 10.7 68 45	32.7	65 08.3 71 42	30.1	1
2	69 25.5 47 62	47.8	68 56.4 50 59	45.3	68 08.9 55 56	41.8	67 34.9 58 53	39.6	66 59.3 61 51	37.6	66 22.1 63 49	35.6	65 43.4 66 47	33.7	64 43.0 69 43	31.0	2
3	68 48.4 44 63	48.7	68 20.7 48 60	46.2	67 35.4 53 57	42.8	67 02.9 56 54	40.6	66 28.6 58 52	38.6	65 52.8 61 50	36.5	65 15.5 63 48	34.6	64 17.0 67 44	32.0	3
4	68 10.8 42 63	49.5	67 44.5 46 61	47.1	67 01.3 50 58	43.7	66 30.2 53 55	41.5	65 57.3 56 53	39.4	65 22.9 59 51	37.4	64 46.9 61 49	35.5	63 50.4 64 45	32.8	4
25	67 32.8 40 64	50.2	67 07.9 43 62	47.9	66 26.7 48 58	44.5	65 57.0 51 56	42.3	65 25.5 54 54	40.3	64 52.3 56 52	38.3	64 17.7 59 50	36.4	63 23.1 62 46	33.7	25
6	66 54.4 38 65	50.9	66 30.8 41 63	48.6	65 51.6 46 59	45.3	65 23.2 49 57	43.1	64 53.0 52 55	41.1	64 21.2 54 53	39.1	63 47.9 57 51	37.2	62 55.2 60 47	34.5	6
7	66 15.6 35 65	51.6	65 53.2 39 63	49.3	65 16.1 44 60	46.0	64 49.0 47 58	43.9	64 20.1 49 56	42.0	63 49.6 52 54	39.8	63 17.6 55 51	37.9	62 26.8 58 48	35.2	7
8	65 36.4 33 66	52.2	65 15.4 37 64	49.9	64 40.1 42 61	46.6	64 14.3 45 58	44.5	63 46.7 47 56	42.5	63 17.5 50 54	40.6	62 46.7 53 52	38.7	61 57.8 56 49	36.0	8
9	64 57.0 31 66	52.7	64 37.2 35 64	50.5	64 03.7 39 61	47.3	63 39.2 42 59	45.2	63 12.9 45 57	43.2	62 44.9 48 55	41.2	62 15.4 50 53	39.3	61 28.4 54 50	36.6	9
30	64 17.3 30 67	53.2	63 58.6 33 65	51.0	63 27.0 37 62	47.8	63 03.7 40 60	45.8	62 38.7 43 58	43.8	62 12.0 46 56	41.9	61 43.7 48 54	40.0	60 58.5 52 51	37.3	30
1	63 37.4 28 67	53.6	63 19.8 31 65	51.5	62 50.0 35 62	48.4	62 27.9 38 60	46.3	62 04.0 41 58	44.4	61 38.6 44 56	42.5	61 11.5 46 54	40.6	60 28.2 50 51	37.9	1
2	62 57.2 26 67	54.1	62 40.8 29 65	52.0	62 12.7 33 63	48.9	61 51.7 36 61	46.9	61 29.1 39 59	45.0	61 04.8 42 57	43.0	60 39.0 44 55	41.2	59 57.4 48 52	38.5	2
3	62 16.9 24 68	54.4	62 01.5 27 66	52.4	61 35.1 32 63	49.3	61 15.3 34 61	47.3	60 53.8 37 59	45.4	60 30.7 40 57	43.5	60 06.0 42 55	41.7	59 26.3 46 52	39.0	3
4	61 36.3 22 68	54.8	61 22.0 25 66	52.7	60 57.3 30 63	49.7	60 38.6 33 62	47.8	60 18.2 35 60	45.9	59 56.3 38 58	44.0	59 32.8 40 56	42.2	58 54.8 44 53	39.5	4
35	60 55.6 21 68	55.1	60 42.3 24 66	53.1	60 19.2 28 64	50.1	60 01.6 31 62	48.2	59 42.4 33 60	46.3	59 21.6 36 58	44.5	58 59.2 38 56	42.7	58 22.9 42 54	40.0	35
6	60 14.7 19 68	55.4	60 02.5 22 67	53.4	59 40.9 26 64	50.5	59 24.4 29 62	48.6	59 06.3 32 61	46.7	58 46.6 34 59	44.9	58 25.4 37 57	43.1	57 50.8 40 54	40.5	6
7	59 33.7 17 68	55.6	59 22.5 20 67	53.7	59 02.4 24 64	50.9	58 47.0 27 63	48.9	58 30.0 30 61	47.1	58 11.4 32 59	45.3	57 51.3 35 57	43.5	57 18.4 38 54	40.9	7
8	58 52.6 16 69	55.8	58 42.3 19 67	53.9	58 23.8 23 65	51.1	58 09.4 25 63	49.3	57 53.4 28 61	47.5	57 35.9 30 59	45.7	57 16.9 33 58	43.9	56 45.7 36 55	41.3	8
9	58 11.4 14 69	56.0	58 02.1 17 67	54.2	57 45.0 21 65	51.4	57 31.6 24 63	49.6	57 16.7 26 62	47.8	57 00.2 29 60	46.0	56 42.3 31 58	44.3	56 12.7 35 55	41.7	9
40	57 30.1 13 69	56.2	57 21.7 15 67	54.4	57 06.0 19 65	51.6	56 53.7 22 64	49.8	56 39.7 24 62	48.1	56 24.3 27 60	46.3	56 07.5 29 58	44.6	55 39.5 33 56	42.0	40
1	56 48.8 11 69	56.4	56 41.2 14 68	54.6	56 27.0 18 65	51.9	56 15.6 20 64	50.1	56 02.7 22 62	48.3	55 48.3 25 60	46.6	55 32.4 28 59	44.9	55 06.1 31 56	42.4	1
2	56 07.3 10 69	56.5	56 00.7 12 68	54.7	55 47.8 16 65	52.1	55 37.4 19 64	50.3	55 25.4 21 62	48.6	55 12.0 23 61	46.9	54 57.2 26 59	45.2	54 32.4 30 56	42.7	2
3	55 25.8 08 69	56.6	55 20.0 11 68	54.9	55 08.5 15 66	52.2	54 59.0 17 64	50.5	54 48.1 19 62	48.8	54 35.7 22 61	47.1	54 21.9 24 59	45.4	53 58.6 28 57	43.0	3
4	54 44.3 07 69	56.7	54 39.3 09 68	55.0	54 29.1 13 66	52.4	54 20.6 15 64	50.7	54 10.6 18 63	49.0	53 59.2 20 61	47.3	53 46.4 22 59	45.7	53 24.6 26 57	43.2	4
45	54 02.7 06 69	56.8	53 58.5 08 68	55.1	53 49.7 12 66	52.5	53 42.0 14 64	50.9	53 33.0 16 63	49.2	53 22.5 19 61	47.5	53 10.7 21 60	45.9	52 50.5 24 57	43.5	45
6	53 21.0 06 68	56.8	53 17.7 07 68	55.2	53 10.2 10 66	52.7	53 03.4 12 65	51.0	52 55.2 15 63	49.4	52 45.7 17 61	47.7	52 34.9 19 60	46.1	52 16.2 22 57	43.7	6
7	52 39.4 03 69	56.9	52 36.9 05 68	55.2	52 30.6 09 66	52.8	52 24.7 11 65	51.1	52 17.5 13 63	49.5	52 08.9 15 62	47.9	51 59.0 18 60	46.3	51 41.8 21 58	43.9	7
8	51 57.7 02 69	56.9	51 56.0 04 68	55.3	51 51.0 07 66	52.9	51 45.9 09 65	51.2	51 39.6 12 63	49.6	51 31.9 14 62	48.0	51 23.0 16 60	46.5	51 07.2 19 58	44.1	8
9	51 16.0 00 69	56.9	51 15.1 03 68	55.3	51 11.3 06 66	52.9	51 07.1 08 65	51.3	51 01.7 10 63	49.8	50 54.9 12 62	48.2	50 46.9 14 60	46.6	50 32.5 18 58	44.3	9
50	50 34.4 01 68	56.9	50 34.2 01 68	55.4	50 31.6 04 66	53.0	50 28.3 07 65	51.4	50 23.7 09 63	49.8	50 17.8 11 62	48.3	50 10.7 13 60	46.7	49 57.8 16 58	44.4	50
1	49 52.7 02 69	56.9	49 53.3 00 68	55.4	49 51.9 03 66	53.0	49 49.4 05 65	51.5	49 45.6 07 63	49.9	49 40.6 09 62	48.4	49 34.4 11 60	46.8	49 22.9 14 58	44.6	1
2	49 11.0 03 69	56.9	49 12.4 01 68	55.3	49 12.1 02 66	53.0	49 10.4 04 65	51.5	49 07.5 06 64	50.0	49 03.4 08 62	48.5	48 58.1 10 61	46.9	48 48.0 13 58	44.7	2
3	48 29.4 04 69	56.8	48 31.4 02 68	55.3	48 32.4 00 66	53.1	48 31.5 02 65	51.5	48 29.4 04 64	50.0	48 26.2 06 62	48.5	48 21.8 08 61	47.0	48 12.9 11 58	44.8	3
4	47 47.7 06 69	56.8	47 50.6 04 68	55.3	47 52.6 01 66	53.1	47 52.5 01 65	51.6	47 51.3 03 64	50.1	47 48.9 05 62	48.6	47 45.3 07 61	47.1	47 37.9 10 59	44.9	4
55	47 06.1 07 68	56.7	47 09.7 05 68	55.2	47 12.8 04 66	53.0	47 13.6 00 65	51.6	47 13.1 02 64	50.1	47 11.6 04 62	48.6	47 08.6 05 61	47.2	47 02.7 08 59	45.0	55
6	46 24.6 08 69	56.6	46 28.8 06 68	55.2	46 33.1 03 66	53.0	46 34.6 02 65	51.6	46 35.0 01 64	50.1	46 34.2 02 62	48.7	46 32.4 04 61	47.2	46 27.6 07 59	45.0	6
7	45 43.1 09 69	56.6	45 48.0 07 68	55.1	45 53.4 05 66	53.0	45 55.6 03 65	51.5	45 56.8 01 64	50.1	45 56.9 01 62	48.7	45 55.9 03 61	47.2	45 52.4 05 59	45.1	7
8	45 01.6 10 69	56.5	45 07.2 09 68	55.0	45 13.7 06 66	52.9	45 16.7 04 65	51.5	45 18.6 02 64	50.1	45 19.5 01 62	48.7	45 19.4 01 61	47.2	45 17.1 04 59	45.1	8
9	44 20.1 11 69	56.4	44 26.4 10 68	54.9	44 34.0 07 66	52.8	44 37.8 05 65	51.5	44 40.5 04 64	50.1	44 42.2 02 62	48.7	44 42.8 00 61	47.2	44 41.9 02 59	45.1	9
60	43 38.7 12 69	56.2	43 45.7 11 68	54.9	43 54.4 08 66	52.8	43 58.9 07 65	51.4	44 02.4 05 64	50.0	44 04.9 03 62	48.6	44 06.3 02 61	47.2	44 06.6 01 59	45.2	60
1	42 57.4 14 69	56.1	43 05.1 12 68	54.8	43 14.8 10 66	52.7	43 20.0 08 65	51.3	43 24.3 06 63	50.0	43 27.5 05 62	48.6	43 29.8 03 61	47.2	43 31.4 00 59	45.2	1
2	42 16.2 15 69	56.0	42 24.5 13 68	54.6	42 35.2 11 66	52.6	42 41.2 09 65	51.3	42 46.2 08 63	49.9	42 50.2 06 62	48.5	42 53.3 04 61	47.2	42 56.1 02 59	45.1	2
3	41 35.0 16 69	55.8	41 44.0 14 67	54.5	41 55.7 12 66	52.5	42 02.4 10 65	51.2	42 08.2 09 63	49.8	42 13.0 07 62	48.5	42 16.8 05 61	47.1	42 20.8 03 59	45.1	3
4	40 53.8 17 69	55.7	41 03.5 16 67	54.5	41 16.3 13 66	52.5	41 23.7 12 64	51.1	41 30.2 10 63	49.8	41 35.7 09 62	48.4	41 40.4 07 61	47.1	41 45.5 04 59	45.1	4
65	40 12.8 18 68	55.5	40 23.1 16 67	54.2	40 36.9 14 66	52.3	40 45.0 13 64	50.9	40 52.2 11 63	49.7	40 58.5 10 62	48.4	41 04.0 08 61	47.0	41 10.4 06 59	45.0	65
6	39 31.8 19 68	55.4	39 42.8 18 67	54.1	39 57.6 15 65	52.2	40 06.4 14 64	50.9	40 14.3 13 63	49.6	40 21.4 11 62	48.3	40 27.6 10 61	47.0	40 35.4 07 59	45.0	6
7	38 50.9 20 68	55.2	39 02.5 19 67	53.9	39 18.3 17 65	52.0	39 27.8 15 64	50.7	39 36.5 14 63	49.5	39 44.3 12 62	48.2	39 51.2 11 60	46.9	40 00.0 09 59	44.9	7
8	38 10.1 21 68	55.0	38 22.3 20 67	53.8	38 39.2 18 65	51.9	38 49.3 16 64	50.6	38 58.7 15 63	49.3	39 07.2 14 62	48.1	39 15.0 12 60	46.8	39 24.9 10 58	44.9	8
9	37 29.4 22 68	54.8	37 42.3 21 67	53.6	38 00.1 19 65	51.7	38 10.9 17 64	50.5	38 21.0 16 63	49.2	38 30.3 15 62	48.0	38 38.7 13 60	46.7	38 49.7 11 58	44.8	9
70	36 48.8 23 68	54.6	37 02.3 22 66	53.4	37 21.1 20 65	51.6	37 32.6 19 64	50.3	37 43.4 17 63	49.1	37 53.4 16 61	47.9	38 02.6 15 60	46.6	38 14.9 13 58	44.7	70
1	36 08.2 24 67	54.4	36 22.4 23 66	53.2	36 42.1 21 65	51.4	36 54.4 20 64	50.2	37 05.8 18 62	48.9	37 16.5 17 61	47.7	37 26.5 16 60	46.5	37 39.9 14 58	44.6	1
2	35 27.9 25 67	54.2	35 42.6 24 66	53.0	36 03.3 22 65	51.2	36 16.2 21 63	50.0	36 28.4 20 62	48.8	36 39.8 18 61	47.6	36 50.4 17 60	46.3	37 05.0 15 58	44.5	2
3	34 47.6 26 67	54.0	35 02.8 25 66	52.8	35 24.4 23 65	51.0	35 38.2 22 63	49.8	35 51.0 21 62	48.6	36 03.1 20 61	47.5	36 14.3 18 60	46.2	36 30.2 16 58	44.4	3
4	34 07.5 27 67	53.8	34 23.4 26 66	52.6	34 46.0 24 64	50.8	35 00.2 23 63	49.7	35 13.7 22 62	48.5	35 26.5 21 61	47.3	35 38.6 20 60	46.1	35 55.4 18 58	44.2	4
75	33 27.4 28 67	53.5	33 43.9 27 66	52.4	34 07.5 25 64	50.6	34 22.3 24 63	49.5	34 36.5 23 62	48.3	34 50.0 22 61	47.1	35 02.9 21 59	45.9	35 20.8 19 58	44.1	75
6	32 47.4 29 66	53.3	33 04.6 28 65	52.2	33 29.1 26 64	50.4	33 44.6 25 63	49.3	33 59.4 24 62	48.1	34 13.7 23 60	46.9	34 27.2 22 59	45.8	34 46.2 20 57	44.0	6
7	32 07.6 30 66	53.1	32 25.3 29 65	51.9	32 50.8 27 64	50.2	33 06.9 26 63	49.1	33 22.5 25 61	47.9	33 37.4 24 60	46.8	33 51.6 23 59	45.6	34 11.7 21 57	43.8	7
8	31 27.8 31 66	52.8	31 46.2 30 65	51.7	32 12.6 29 64	50.0	32 29.4 28 62	48.9	32 45.9 26 61	47.7	33 01.2 25 60	46.7	33 16.1 24 59	45.4	33 37.3 23 57	43.7	8
9	30 48.4 32 66	52.6	31 07.3 31 65	51.4	31 34.6 30 63	49.8	31 52.0 29 62	48.6	32 08.9 28 61	47.5	32 25.1 27 60	46.4	32 40.8 26 59	45.3	33 03.0 24 57	43.5	9
80	30 09.0 33 65	52.3	30 28.4 32 64	51.2	30 56.6 31 63	49.6	31 14.7 30 62	48.4	31 32.3 29 61	47.3	31 49.2 28 60	46.2	32 05.5 27 59	45.0	32 28.8 25 57	43.3	80
1	29 29.7 34 65	52.0	29 49.8 33 64	50.9	30 18.9 32 63	49.3	30 37.6 31 62	48.2	30 55.8 30 61	47.1	31 13.4 29 60	46.0	31 30.4 28 58	44.8	31 54.8 26 57	43.2	1
2	28 50.5 35 65	51.7	29 11.2 34 64	50.7	29 41.2 33 64	49.1	30 00.6 32 61	47.9	30 19.4 31 60	46.9	30 37.6 30 59	45.8	30 55.3 29 58	44.6	31 20.8 28 56	43.0	2
3	28 11.5 36 65	51.5	28 32.8 35 64	50.4	29 03.7 34 62	48.8	29 23.7 33 61	47.7	29 43.2 32 60	46.6	30 02.1 31 59	45.5	30 20.5 30 58	44.4	30 47.0 29 56	42.8	3
4	27 32.7 37 64	51.2	27 54.5 36 64	50.1	28 26.4 35 62	48.5	28 47.0 34 61	47.5	29 07.1 33 60	46.4	29 26.6 32 59	45.3	29 45.7 31 58	44.2	30 13.2 30 56	42.6	4
85	26 54.0 38 64	50.9	27 16.4 37 63	49.9	27 49.2 36 62	48.3	28 10.4 35 61	47.2	28 31.1 34 60	46.2	28 51.4 33 59	45.1	29 11.1 32 57	44.0	29 39.7 31 56	42.4	85
6	26 15.5 39 64	50.6	26 38.5 38 63	49.6	27 12.1 37 62	48.0	27 34.0 36 60	47.0	27 55.3 35 59	45.9	28 16.2 34 58	44.8	28 36.6 34 57	43.8	29 06.2 32 56	42.2	6
7	25 37.2 40 64	50.3	26 00.7 39 63	49.3	26 35.3 38 61	47.7	26 57.7 37 60	46.7	27 19.7 36 59	45.6	27 41.2 35 58	44.5	28 02.3 35 57	43.5	28 32.9 33 55	41.9	7
8	24 59.0 41 63	50.0	25 23.1 40 62	49.0	25 58.5 39 61	47.4	26 21.6 38 60	46.4	26 44.2 37 59	45.4	27 06.4 37 58	44.3	27 28.1 36 57	43.2	27 59.7 35 55	41.7	8
9	24 21.0 41 63	49.7	24 45.7 41 62	48.7	25 22.0 40 61	47.2	25 45.6 39 60	46.1	26 08.9 38 59	45.1	26 31.7 38 58	44.1	26 54.0 37 56	43.0	27 26.7 36 55	41.5	9
90	23 43.1 42 63	49.4	24 08.4 42 62	48.4	24 45.6 41 60	46.9	25 09.9 40 59	45.9	25 33.7 39 58	44.8	25 57.2 39 57	43.8	26 20.2 38 56	42.8	26 53.9 37 54	41.2	90

Lat. 34°

H.A.	46° 00' Alt.	Δd Δt	Az.	47° 00' Alt.	Δd Δt	Az.	48° 30' Alt.	Δd Δt	Az.	49° 30' Alt.	Δd Δt	Az.	50° 30' Alt.	Δd Δt	Az.	51° 30' Alt.	Δd Δt	Az.	52° 30' Alt.	Δd Δt	Az.	54° 00' Alt.	Δd Δt	Az.	H.A.
00	10 00.0	1.0 01	180.0	9 00.0	1.0 00	180.0	7 30.0	1.0 00	180.0	6 30.0	1.0 00	180.0	5 30.0	1.0 00	180.0										00
1	9 59.7	1.0 02	179.3	8 59.7	1.0 01	179.3	7 29.7	1.0 01	179.3	6 29.7	1.0 01	179.3	5 29.7	1.0 01	179.4										1
2	9 58.8	1.0 03	178.6	8 58.8	1.0 02	178.6	7 28.8	1.0 02	178.7	6 28.9	1.0 02	178.7	5 28.9	1.0 02	178.7										2
3	9 57.2	1.0 04	177.9	8 57.3	1.0 04	177.9	7 27.4	1.0 03	178.0	6 27.4	1.0 03	178.0	5 27.5	1.0 03	178.1										3
4	9 55.1	1.0 05	177.2	8 55.2	1.0 04	177.2	7 25.4	1.0 04	177.3	6 25.5	1.0 04	177.4	5 25.6	1.0 04	177.4										4
05	9 52.4	1.0 06	176.5	8 52.5	1.0 06	176.6	7 22.8	1.0 05	176.7	6 22.9	1.0 05	176.7	5 23.1	1.0 05	176.8										05
6	9 49.0	1.0 07	175.8	8 49.2	1.0 06	175.9	7 19.6	1.0 06	176.1	6 19.8	1.0 06	176.1	5 20.0	1.0 06	176.2										6
7	9 45.0	99 07	175.1	8 45.3	99 07	175.2	7 15.8	99 07	175.3	6 16.1	99 07	175.4	5 16.4	99 07	175.5										7
8	9 40.4	99 08	174.4	8 40.9	99 08	174.5	7 11.5	99 08	174.7	6 11.9	99 08	174.8	5 12.3	99 08	174.9										8
9	9 35.3	99 10	173.7	8 35.8	99 09	173.8	7 06.6	99 09	174.0	6 07.1	99 09	174.1	5 07.6	99 09	174.3										9
10	9 29.5	99 10	173.0	8 30.1	99 10	173.1	7 01.1	99 10	173.3	6 01.7	99 10	173.5	5 02.3	99 10	173.6										10
1	9 23.1	99 12	172.3	8 23.9	99 11	172.4	6 55.0	99 11	172.7	5 55.8	99 11	172.8													1
2	9 16.1	98 13	171.6	8 17.0	98 12	171.8	6 48.4	98 12	172.0	5 49.3	98 12	172.2													2
3	9 08.5	98 14	170.9	8 09.6	98 13	171.1	6 41.2	98 13	171.4	5 42.3	98 13	171.6													3
4	9 00.4	98 15	170.2	8 01.6	98 14	170.4	6 33.5	98 14	170.7	5 34.7	98 14	170.9													4
15	8 51.6	98 16	169.5	7 53.0	98 15	169.7	6 25.2	98 15	170.1	5 26.6	98 14	170.3													15
6	8 42.3	97 17	168.8	7 43.9	97 16	169.1	6 16.3	97 16	169.4	5 17.9	97 15	169.6													6
7	8 32.3	97 18	168.1	7 34.2	97 17	168.4	6 06.9	97 17	168.8	5 08.7	97 16	169.0													7
8	8 21.8	97 18	167.5	7 23.9	97 18	167.7	5 56.9	97 18	168.1																8
9	8 10.8	96 19	166.8	7 13.0	96 19	167.1	5 46.4	96 18	167.5																9
20	7 59.1	96 20	166.1	7 01.6	96 20	166.4	5 35.4	96 19	166.8																20
1	7 46.9	95 21	165.4	6 49.7	95 21	165.8	5 23.8	95 20	166.2																1
2	7 34.1	95 22	164.8	6 37.1	95 22	165.1	5 11.6	95 21	165.6																2
3	7 20.8	95 23	164.1	6 24.1	95 23	164.4																			3
4	7 06.9	94 24	163.5	6 10.5	94 24	163.8																			4
25	6 52.5	94 25	162.8	5 56.3	94 24	163.2																			25
6	6 37.5	93 26	162.1	5 41.6	93 25	162.5																			6
7	6 22.0	93 27	161.5	5 26.4	93 26	161.9																			7
8	6 05.9	92 28	160.9	5 10.7	92 27	161.2																			8
9	5 49.3	91 28	160.2																						9
30	5 32.2	91 29	159.6																						30
1	5 14.6	90 30	158.9																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00' Alt.	Δd Δt	Az.	47° 00' Alt.	Δd Δt	Az.	48° 30' Alt.	Δd Δt	Az.	49° 30' Alt.	Δd Δt	Az.	50° 30' Alt.	Δd Δt	Az.	51° 30' Alt.	Δd Δt	Az.	52° 30' Alt.	Δd Δt	Az.	54° 00' Alt.	Δd Δt	Az.	H.A.
91	23 05.5	43 62	49.0	23 31.3	43 62	48.0	24 09.4	42 60	46.6	24 34.2	41 59	45.6	24 58.7	40 58	44.6	25 22.8	40 57	43.5	25 46.5	39 56	42.5	26 21.1	38 54	41.0	91
2	22 28.0	44 62	48.7	22 54.4	44 61	47.7	23 33.3	43 60	46.3	23 58.8	42 59	45.3	24 23.9	42 58	44.3	24 48.6	41 57	43.3	25 12.9	40 56	42.3	25 48.6	39 54	40.7	2
3	21 50.7	45 62	48.4	22 17.7	45 61	47.4	22 57.5	44 59	45.9	23 23.6	43 58	45.0	23 49.3	43 57	44.0	24 14.6	42 56	43.0	24 39.6	41 55	42.0	25 16.2	40 54	40.5	3
4	21 13.7	46 61	48.0	21 41.2	46 61	47.1	22 21.8	45 59	45.6	22 48.5	44 58	44.7	23 14.8	44 57	43.7	23 40.8	43 56	42.7	24 06.4	42 55	41.7	24 44.0	41 53	40.2	4
95	20 36.8	47 61	47.7	21 04.9	47 60	46.7	21 46.4	46 59	45.3	22 13.7	45 58	44.3	22 40.6	45 57	43.4	23 07.2	44 56	42.4	23 33.4	43 55	41.4	24 12.0	42 53	39.9	95
6	20 00.1	48 61	47.3	20 28.8	47 60	46.4	21 11.1	47 58	45.0	21 39.0	46 57	44.0	22 06.5	46 56	43.1	22 33.7	45 55	42.1	23 00.6	44 54	41.1	23 40.2	44 53	39.7	6
7	19 23.7	49 60	47.0	19 52.8	48 59	46.0	20 36.1	48 58	44.6	21 04.5	47 57	43.7	21 32.7	47 56	42.7	22 00.5	46 55	41.8	22 27.9	46 54	40.8	23 08.5	45 52	39.4	7
8	18 47.4	50 60	46.6	19 17.1	49 59	45.7	20 01.2	49 58	44.3	20 30.3	48 57	43.4	20 59.0	48 56	42.4	21 27.4	47 55	41.5	21 55.5	47 54	40.5	22 37.1	46 52	39.1	8
9	18 11.4	51 60	46.2	18 41.7	50 59	45.3	19 26.6	50 57	44.0	19 56.2	49 56	43.0	20 25.5	49 55	42.1	20 54.6	48 54	41.2	21 23.3	48 53	40.2	22 05.8	47 52	38.8	9
100	17 35.6	52 59	45.9	18 06.4	51 58	45.0	18 52.2	51 57	43.6	19 22.4	50 56	42.7	19 52.3	50 55	41.8	20 21.9	49 54	40.8	20 51.3	49 53	39.9	21 34.7	48 51	38.5	100
1	17 00.0	53 59	45.5	17 31.4	52 58	44.6	18 18.0	52 57	43.2	18 48.8	51 56	42.3	19 19.3	51 55	41.4	19 49.5	50 54	40.5	20 19.5	50 53	39.6	21 03.9	49 51	38.2	1
2	16 24.6	53 59	45.1	16 56.6	53 58	44.2	17 44.0	52 56	42.9	18 15.4	52 55	42.0	18 46.5	52 54	41.1	19 17.3	51 53	40.2	19 47.9	51 52	39.3	20 33.2	50 51	37.9	2
3	15 49.5	54 58	44.7	16 22.0	54 57	43.8	17 10.3	53 56	42.5	17 42.2	53 55	41.6	18 13.9	53 54	40.7	18 45.3	52 53	39.8	19 16.5	52 52	38.9	20 02.8	51 50	37.6	3
4	15 14.6	55 58	44.3	15 47.7	55 57	43.4	16 36.8	54 55	42.1	17 09.3	54 54	41.3	17 41.6	54 54	40.4	18 13.6	53 53	39.5	18 45.4	53 52	38.6	19 32.6	52 50	37.2	4
105	14 40.0	56 57	43.9	15 13.6	56 56	43.1	16 03.6	55 55	41.8	16 36.6	55 54	40.9	17 09.5	55 53	40.0	17 42.1	54 52	39.1	18 14.5	54 51	38.3	19 02.6	53 50	36.9	105
6	14 05.6	57 57	43.5	14 39.7	57 56	42.7	15 30.6	56 55	41.4	16 04.2	56 54	40.5	16 37.6	56 53	39.7	17 10.8	55 52	38.8	17 43.8	55 51	37.9	18 32.8	54 49	36.6	6
7	13 31.5	58 56	43.1	14 06.2	58 56	42.3	14 57.8	57 54	41.0	15 32.0	57 53	40.1	16 06.0	56 52	39.3	16 39.8	56 51	38.4	17 13.3	56 50	37.6	18 03.3	55 49	36.2	7
8	12 57.7	59 56	42.7	13 32.8	59 55	41.8	14 25.3	58 54	40.6	15 00.1	58 53	39.8	15 34.6	57 52	38.9	16 09.0	57 51	38.1	16 43.1	57 50	37.2	17 34.0	56 48	35.9	8
9	12 24.1	60 56	42.3	12 59.8	59 55	41.4	13 53.1	59 53	40.2	14 28.4	59 52	39.4	15 03.5	58 51	38.5	15 38.5	58 50	37.7	16 13.2	58 49	36.8	17 05.0	57 48	35.5	9
110	11 50.8	61 55	41.8	12 27.0	60 55	41.0	13 21.1	60 53	39.8	13 57.0	60 52	39.0	14 32.7	59 51	38.1	15 08.2	59 50	37.3	15 43.5	59 49	36.5	16 36.2	58 48	35.2	110
1	11 17.7	61 55	41.4	11 54.5	61 54	40.6	12 49.4	61 52	39.4	13 25.8	61 51	38.6	14 02.1	60 51	37.7	14 38.2	60 50	36.9	15 14.1	60 48	36.1	16 07.6	59 47	34.8	1
2	10 45.0	62 54	41.0	11 22.3	62 53	40.2	12 18.0	62 52	39.0	12 54.9	61 51	38.2	13 31.8	61 50	37.3	14 08.4	61 49	36.5	14 44.9	61 48	35.7	15 39.3	60 47	34.5	2
3	10 12.5	63 54	40.5	10 50.3	63 53	39.7	11 46.8	63 51	38.5	12 24.4	62 51	37.7	13 01.7	62 50	36.9	13 39.0	62 49	36.1	14 16.0	62 48	35.3	15 11.3	61 46	34.1	3
4	9 40.3	64 53	40.0	10 18.7	64 52	39.3	11 16.0	64 51	38.1	11 54.1	63 50	37.3	12 32.0	63 49	36.5	13 09.8	63 48	35.7	13 47.4	63 47	34.9	14 43.6	62 46	33.7	4
115	9 08.5	65 53	39.6	9 47.3	65 52	38.8	10 45.4	64 50	37.7	11 24.0	64 50	36.9	12 02.5	64 49	36.1	12 40.9	64 48	35.3	13 19.1	64 47	34.5	14 16.1	63 45	33.3	115
6	8 36.9	66 52	39.2	9 16.3	66 51	38.4	10 15.2	65 50	37.2	10 54.3	65 49	36.5	11 33.3	65 48	35.7	12 12.2	65 47	34.9	12 51.0	65 46	34.1	13 48.9	64 45	33.0	6
7	8 05.6	67 52	38.7	8 45.5	66 51	37.9	9 45.2	66 49	36.8	10 24.9	66 49	36.0	11 04.5	66 48	35.3	11 43.9	66 47	34.5	12 23.2	65 46	33.7	13 22.0	65 44	32.6	7
8	7 34.7	67 51	38.2	8 15.1	67 50	37.5	9 15.6	67 49	36.4	9 55.8	67 48	35.6	10 35.9	67 47	34.8	11 15.9	67 46	34.1	11 55.7	66 45	33.3	12 55.3	66 44	32.2	8
9	7 04.1	68 50	37.7	7 45.0	68 50	37.0	8 46.3	68 48	35.9	9 27.0	68 48	35.2	10 07.6	68 47	34.4	10 48.2	67 46	33.7	11 28.6	67 45	33.3	12 29.0	67 43	31.8	9
120	6 33.8	69 50	37.3	7 15.2	69 49	36.5	8 17.3	69 48	35.4	8 58.5	69 47	34.7	9 39.7	69 46	34.0	10 20.7	68 45	33.2	11 01.7	68 44	32.5	12 02.9	68 43	31.4	120
1	6 03.8	70 49	36.8	6 45.8	70 49	36.1	7 48.6	70 47	35.0	8 30.3	70 46	34.3	9 12.0	70 46	33.5	9 53.6	69 45	32.8	10 35.1	69 44	32.1	11 37.2	69 42	31.0	1
2	5 34.2	71 49	36.3	6 16.7	71 48	35.6	7 20.2	71 47	34.5	8 02.5	70 46	33.8	8 44.7	70 45	33.1	9 26.9	70 44	32.4	10 08.9	70 43	31.6	11 11.8	70 42	30.5	2
3	5 05.0	72 48	35.8	5 47.9	72 47	35.1	6 52.2	71 46	33.9	7 35.1	71 45	33.3	8 17.7	71 44	32.6	9 00.4	71 44	31.9	9 43.0	71 43	31.2	10 46.7	71 41	30.1	3
4				5 19.5	72 47	34.6	6 24.5	72 46	33.6	7 08.2	72 45	32.9	7 51.1	72 44	32.2	8 34.3	72 43	31.5	9 17.4	72 42	30.8	10 21.8	72 40	29.8	4
125							5 57.2	73 45	33.1	6 41.0	73 44	32.4	7 24.8	73 43	31.7	8 08.5	73 42	31.0	8 52.1	73 42	30.3	9 57.4	72 40	29.3	125
6							5 30.3	74 44	32.6	6 14.6	74 44	31.9	6 58.8	74 43	31.2	7 43.0	74 42	30.5	8 27.2	73 41	29.9	9 33.2	73 40	28.8	6
7							5 03.6	75 44	32.1	5 48.4	75 43	31.4	6 33.2	75 42	30.8	7 17.9	74 41	30.1	8 02.6	74 40	29.4	9 09.4	74 39	28.4	7
8										5 22.7	75 42	30.9	6 08.0	75 42	30.3	6 53.2	75 42	29.6	7 38.3	75 39	28.9	8 45.9	75 39	27.9	8
9													5 43.1	76 41	29.8	6 28.8	76 40	29.1	7 14.4	76 39	28.5	8 22.8	76 38	27.5	9
130										5 18.5	77 40	29.3	6 04.7	77 39	28.7	6 50.9	77 39	28.0				8 00.0	77 37	27.0	130
1													5 41.1	78 39	28.2	6 27.7	78 38	27.5				7 37.5	78 37	26.6	1
2													5 17.8	79 38	27.7	6 04.9	78 37	27.1				7 15.5	78 36	26.1	2
3																5 42.4	79 37	26.6				6 53.7	79 36	25.6	3
4																5 20.4	80 36	26.1				6 32.4	80 35	25.2	4
135																						6 11.4	81 34	24.7	135
6																						5 50.8	82 34	24.2	6
7																						5 30.6	82 33	23.7	7
8																						5 10.7	83 32	23.3	8

Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°
Lat. 39°

Lat. 34°

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
00	69 30.0	1.0 01	00.0	69 00.0	1.0 01	00.0	68 00.0	1.0 01	00.0	67 30.1	1.0 01	00.0	67 00.0	1.0 01	00.0	66 30.0	1.0 01	00.0	65 00.0	1.0 01	00.0	64 30.1	1.0 01	00.0	00
1	69 29.3	1.0 04	01.7	68 59.3	1.0 03	01.6	67 59.4	1.0 03	01.5	67 29.4	1.0 03	01.4	66 59.4	1.0 03	01.3	66 29.4	1.0 03	01.3	64 59.5	1.0 03	01.2	64 29.5	1.0 03	01.2	1
2	69 27.1	1.0 06	03.3	68 57.2	1.0 06	03.2	67 57.4	1.0 06	03.0	67 27.5	1.0 05	02.9	66 57.6	1.0 05	02.8	66 27.7	1.0 05	02.7	64 57.9	1.0 04	02.4	64 28.0	1.0 04	02.4	2
3	69 23.5	99 08	05.0	68 53.8	99 08	04.8	67 54.2	99 08	04.5	67 24.4	99 07	04.3	66 54.6	99 07	04.2	66 24.7	99 07	04.0	64 55.2	99 06	03.6	64 25.4	99 06	03.5	3
4	69 18.5	99 11	06.6	68 48.9	99 10	06.4	67 49.7	99 10	05.9	67 20.0	99 09	05.7	66 50.4	99 09	05.5	66 20.7	99 09	05.4	64 51.6	99 08	04.9	64 21.8	99 08	04.7	4
05	69 12.1	98 13	08.2	68 42.8	98 12	07.9	67 43.9	98 12	07.4	67 14.4	98 11	07.1	66 45.0	98 11	06.9	66 15.5	98 11	06.7	64 46.8	99 10	06.0	64 17.3	99 09	05.9	05
6	69 04.4	97 15	09.9	68 35.2	97 15	09.5	67 36.9	97 14	08.8	67 07.7	97 13	08.5	66 38.4	98 13	08.3	66 08.9	98 13	08.1	64 41.1	98 11	07.2	64 11.7	98 11	07.0	6
7	68 55.2	96 17	11.3	68 26.4	96 17	11.0	67 28.9	96 16	10.2	66 59.7	97 15	09.9	66 30.7	97 15	09.6	66 01.6	97 14	09.3	64 34.3	97 13	08.4	64 05.1	97 13	08.1	7
8	68 44.8	95 20	12.9	68 16.3	95 19	12.5	67 19.2	95 18	11.6	66 50.5	96 17	11.3	66 21.8	96 17	10.9	65 53.1	96 16	10.5	64 26.5	96 15	09.6	63 57.6	96 14	09.3	8
9	68 33.1	93 22	14.4	68 05.0	94 21	13.9	67 08.6	94 20	13.0	66 40.3	94 19	12.6	66 11.9	95 18	12.2	65 43.4	95 18	11.8	64 17.8	95 16	10.7	63 49.1	96 16	10.4	9
10	68 20.1	92 24	15.9	67 52.4	92 23	15.3	66 56.8	93 21	14.4	66 28.9	93 21	13.9	66 00.8	94 20	13.5	65 32.8	94 20	13.0	64 08.1	94 18	11.8	63 39.7	95 17	11.5	10
1	68 05.9	91 26	17.3	67 38.7	91 25	16.7	66 43.9	92 23	15.7	66 16.4	92 23	15.2	65 48.7	92 22	14.7	65 21.0	93 21	14.2	63 57.4	93 19	12.9	63 29.4	94 19	12.6	1
2	67 50.6	89 27	18.7	67 23.8	89 27	18.1	66 29.9	90 25	17.0	66 02.8	91 24	16.4	65 35.6	91 24	15.9	65 08.3	91 23	15.4	63 45.8	92 21	14.0	63 18.1	92 20	13.6	2
3	67 34.1	87 29	20.0	67 07.8	88 28	19.4	66 14.9	89 27	18.2	65 48.3	89 26	17.6	65 21.5	89 25	17.1	64 54.6	90 24	16.6	63 33.3	91 22	15.1	63 06.0	91 22	14.6	3
4	67 16.5	85 31	21.3	66 50.8	86 30	20.7	65 58.9	87 28	19.4	65 32.7	87 28	18.8	65 06.4	88 27	18.2	64 40.0	88 26	17.7	63 19.9	89 24	16.1	62 53.0	90 23	15.6	4
15	66 57.9	84 32	22.6	66 32.7	84 32	21.9	65 41.9	85 30	20.6	65 16.2	86 29	20.0	64 50.4	86 29	19.4	64 24.4	87 27	18.8	63 05.7	88 25	17.1	62 39.2	88 24	16.6	15
6	66 38.3	82 34	23.8	66 13.7	82 33	23.1	65 23.9	84 31	21.7	64 58.8	84 31	21.1	64 33.4	85 30	20.5	64 07.9	85 29	19.8	62 50.6	87 26	18.1	62 24.6	87 26	17.6	6
7	66 17.8	80 36	25.0	65 53.7	80 35	24.2	65 05.0	82 33	22.8	64 40.4	82 32	22.2	64 15.6	83 31	21.5	63 50.6	84 30	20.9	62 34.8	85 28	19.1	62 09.2	85 27	18.5	7
8	65 56.3	78 37	26.1	65 32.9	79 36	25.4	64 45.3	80 34	23.9	64 21.2	81 33	23.2	63 57.0	81 32	22.5	63 32.5	82 32	21.9	62 18.1	83 29	20.0	61 53.0	84 28	19.4	8
9	65 34.0	76 39	27.2	65 11.1	77 38	26.4	64 24.8	78 36	24.9	64 01.2	79 35	24.2	63 37.5	79 34	23.5	63 13.6	80 33	22.9	62 00.7	82 30	20.9	61 36.1	82 30	20.3	9
20	65 10.9	74 40	28.2	64 48.6	75 39	27.4	64 03.4	76 37	25.9	63 40.4	77 36	25.2	63 17.3	78 35	24.5	62 53.9	78 34	23.8	61 42.6	80 31	21.8	61 18.5	81 31	21.2	20
1	64 46.9	72 41	29.2	64 25.3	73 40	28.4	63 41.3	74 38	26.9	63 18.9	75 37	26.1	62 56.3	76 36	25.4	62 33.5	76 35	24.7	61 23.7	78 33	22.7	61 00.1	79 32	22.0	1
2	64 22.3	70 42	30.2	64 01.3	71 41	29.4	63 18.4	72 39	27.8	62 56.6	73 38	27.0	62 34.6	74 37	26.3	62 12.3	75 36	25.6	61 04.2	77 34	23.5	60 41.1	77 33	22.9	2
3	63 56.9	68 43	31.1	63 36.5	68 42	30.3	62 54.9	70 40	28.7	62 33.7	71 39	27.9	62 12.2	72 38	27.2	61 50.5	73 37	26.4	60 44.1	75 35	24.3	60 21.5	76 34	23.6	3
4	63 30.9	65 44	32.0	63 11.6	66 43	31.1	62 30.7	68 41	29.5	62 10.1	69 40	28.7	61 49.2	70 39	28.0	61 28.1	71 38	27.2	60 23.3	73 36	25.1	60 01.3	74 35	24.4	4
25	63 04.2	63 45	32.8	62 45.1	64 44	32.0	62 05.9	66 42	30.3	61 45.9	67 41	29.5	61 25.6	68 40	28.8	61 05.0	69 39	28.0	60 01.9	71 37	25.8	59 40.4	72 36	25.1	25
6	62 37.0	61 46	33.6	62 18.5	62 45	32.8	61 40.5	64 43	31.1	61 21.0	65 42	30.3	61 01.3	66 41	29.5	60 41.4	67 40	28.8	59 39.9	69 38	26.6	59 19.0	70 37	25.8	6
7	62 09.2	59 47	34.4	61 51.3	60 46	33.5	61 14.5	62 44	31.8	60 55.7	63 43	31.0	60 36.5	64 42	30.3	60 17.2	65 41	29.5	59 17.4	68 38	27.2	58 57.0	68 37	26.5	7
8	61 40.9	57 48	35.1	61 23.5	58 47	34.2	60 48.0	60 45	32.6	60 29.7	61 44	31.7	60 11.2	62 43	31.0	59 52.4	63 42	30.2	58 54.4	66 39	27.9	58 34.6	67 38	27.2	8
9	61 12.0	55 49	35.8	60 55.3	56 48	34.9	60 21.1	58 46	33.2	60 03.1	59 45	32.4	59 45.4	60 44	31.6	59 27.2	61 43	30.8	58 30.9	64 40	28.6	58 11.6	65 38	27.8	9
30	60 42.7	53 50	36.4	60 26.6	54 49	35.5	59 53.5	56 47	33.9	59 36.4	57 46	33.1	59 19.1	58 45	32.3	59 01.4	59 44	31.5	58 06.9	62 41	29.2	57 48.1	63 40	28.4	30
1	60 13.0	51 50	37.0	59 57.5	52 49	36.2	59 25.5	54 47	34.5	59 09.1	55 46	33.7	58 52.3	56 45	32.9	58 35.2	57 44	32.1	57 42.4	60 42	29.8	57 24.1	61 41	29.0	1
2	59 42.8	49 51	37.6	59 27.9	50 50	36.7	58 57.2	52 48	35.1	58 41.3	53 47	34.2	58 25.1	54 46	33.4	58 08.6	55 45	32.6	57 17.5	58 42	30.3	56 59.9	59 41	29.6	2
3	59 12.3	47 52	38.2	58 58.0	48 51	37.3	58 28.4	50 49	35.6	58 13.1	51 48	34.8	57 57.5	53 47	34.0	57 41.6	54 46	33.2	56 52.1	56 43	30.9	56 35.1	57 42	30.1	3
4	58 41.4	45 52	38.7	58 27.7	46 51	37.8	57 59.2	48 49	36.1	57 44.5	50 48	35.3	57 29.5	51 47	34.5	57 14.2	52 46	33.7	56 26.4	54 44	31.4	56 09.9	55 43	30.6	4
35	58 10.1	43 53	39.2	57 57.0	44 52	38.3	57 29.7	47 50	36.6	57 15.6	48 49	35.8	57 01.1	49 48	35.0	56 46.4	50 47	34.2	56 00.3	53 44	31.9	55 44.4	54 43	31.1	35
6	57 38.6	41 53	39.6	57 26.0	42 52	38.8	56 59.8	45 50	37.1	56 46.3	46 49	36.3	56 32.4	47 48	35.5	56 18.2	48 47	34.7	55 33.9	51 45	32.4	55 18.5	52 44	31.6	6
7	57 06.7	39 54	40.1	56 54.7	41 53	39.2	56 29.7	43 51	37.6	56 16.7	44 50	36.7	56 03.4	45 49	35.9	55 49.7	46 48	35.1	55 07.1	49 45	32.8	54 52.3	50 44	32.1	7
8	56 34.5	38 54	40.5	56 23.1	39 53	39.6	55 59.2	41 51	38.0	55 46.6	42 50	37.2	55 34.0	43 49	36.4	55 20.9	44 48	35.6	54 39.9	47 46	33.2	54 25.7	48 45	32.5	8
9	56 02.1	36 54	40.9	55 51.2	37 54	40.0	55 28.4	39 52	38.4	55 16.6	40 51	37.6	55 04.4	41 50	36.8	54 51.9	42 49	36.0	54 12.5	45 46	33.7	53 58.8	46 45	32.9	9
40	55 29.5	34 55	41.2	55 19.1	35 54	40.4	54 57.4	37 52	38.8	54 46.1	38 51	38.0	54 34.5	39 50	37.2	54 22.5	40 49	36.4	53 44.8	43 47	34.0	53 31.7	44 46	33.3	40
1	54 56.6	32 55	41.6	54 46.8	33 54	40.7	54 26.2	35 52	39.1	54 15.4	36 52	38.3	54 04.3	38 51	37.5	53 52.9	39 50	36.7	53 16.8	42 47	34.4	53 04.2	42 46	33.7	1
2	54 23.5	30 56	41.9	54 14.2	31 55	41.0	53 54.7	34 53	39.4	53 44.4	35 52	38.6	53 33.9	36 51	37.9	53 23.0	37 50	37.1	52 48.6	40 47	34.8	52 36.5	41 47	34.0	2
3	53 50.2	29 56	42.2	53 41.5	30 55	41.3	53 23.0	32 53	39.7	53 13.3	34 52	39.0	53 03.2	34 51	38.2	52 52.9	35 51	37.4	52 20.1	38 48	35.1	52 08.6	39 47	34.3	3
4	53 16.7	27 56	42.4	53 08.5	28 55	41.6	52 51.1	30 53	40.0	52 41.9	31 53	39.2	52 32.4	32 52	38.5	52 22.6	33 51	37.7	51 51.4	36 48	35.4	51 40.4	37 47	34.6	4
45	52 43.1	25 56	42.7	52 35.4	26 55	41.9	52 19.0	28 54	40.3	52 10.3	29 53	39.5	52 01.4	30 52	38.7	51 52.1	31 51	38.0	51 22.5	34 49	35.7	51 12.0	35 48	34.9	45
6	52 09.3	23 57	42.9	52 02.1	25 56	42.1	51 46.7	27 54	40.6	51 38.6	28 53	39.8	51 30.1	29 52	39.0	51 21.4	30 51	38.2	50 53.4	33 49	36.0	50 43.4	34 48	35.2	6
7	51 35.4	22 57	43.1	51 28.7	23 56	42.3	51 14.3	25 54	40.8	51 06.7	26 53	40.0	50 58.8	27 53	39.2	50 50.5	28 52	38.5	50 24.1	31 49	36.2	50 14.7	32 48	35.5	7
8	51 01.3	20 57	43.3	50 55.1	21 56	42.5	50 41.8	23 54	41.0	50 34.6	24 54	40.2	50 27.2	25 53	39.5	50 19.5	26 52	38.7	49 54.6	29 49	36.5	49 45.7	30 49	35.7	8
9	50 27.1	19 57	43.5	50 21.4	20 56	42.7	50 09.1	22 55	41.2	50 02.4	23 54	40.4	49 55.5	24 53	39.7	49 48.3	25 52	38.9	49 24.9	27 50	36.7	49 16.6	28 49	36.0	9
50	49 52.8	17 57	43.7	49 47.6	18 57	42.9	49 36.2	20 55	41.4	49 30.1	21 54	40.6	49 23.7	22 53	39.9	49 17.0	23 52	39.1	48 55.1	26 50	36.9	48 47.3	27 49	36.2	50
1	49 18.4	15 57	43.8	49 13.7	16 57	43.0	49 03.3	18 55	41.5	48 57.7	19 54	40.8	48 51.8	20 53	40.0	48 45.5	21 53	39.3	48 25.2	24 50	37.1	48 17.9	25 49	36.4	1
2	48 44.0	14 58	43.9	48 39.7	15 57	43.2	48 30.3	17 55	41.7	48 25.1	18 54	40.9	48 19.7	19 54	40.2	48 14.0	20 53	39.5	47 55.2	22 50	37.3	47 48.3	23 49	36.5	2
3	48 09.4	12 58	44.0	48 05.6	13 57	43.3	47 57.1	15 55	41.8	47 52.5	16 55	41.1	47 47.5	17 54	40.3	47 42.3	18 53	39.6	47 25.0	21 50	37.4	47 18.6	22 50	36.7	3
4	47 34.8	11 58	44.1	47 31.5	12 57	43.4	47 23.9	13 55	41.9	47 19.8	14 55	41.2	47 15.3	15 54	40.5	47 10.5	16 53	39.8	46 54.7	19 51	37.6	46 48.9	20 50	36.9	4
55	47 00.1	09 58	44.2	46 57.3	10 57	43.5	46 50.7	12 56	42.0	46 46.9	13 55	41.3	46 43.0	14 54	40.7	46 38.7	15 53	39.9	46 24.3	17 51	37.7	46 19.0	18 50	37.0	55
6	46 25.4	08 58	44.3	46 23.0	09 57	43.6	46 17.3	10 56	42.1	46 14.1	11 55	41.4	46 10.6	12 54	40.7	46 06.8	13 53	40.0	45 53.8	16 51	37.8	45 49.0	17 50	37.1	6
7	45 50.7	06 58	44.4	45 48.7	07 57	43.6	45 43.9	09 56	42.2	45 41.1	10 55	41.5	45 38.1	11 54	40.8	45 34.8	11 53	40.1	45 23.1	14 51	38.0	45 18.9	15 50	37.3	7
8	45 15.9	05 58	44.4	45 14.3	06 57	43.7	45 10.5	07 56	42.3	45 08.2	08 55	41.6	45 05.6	09 54	40.9	45 02.7	10 54	40.2	44 52.6	12 51	38.1	44 48.8	13 50	37.4	8
9	44 41.1	03 58	44.4	44 40.0	04 57	43.7	44 37.0	06 56	42.3	44 35.1	07 55	41.6	44 33.0	08 54	40.9	44 30.6	08 54	40.2	44 21.9	11 51	38.1	44 18.5	12 50	37.4	9
60	44 06.2	02 58	44.5	44 05.6	03 57	43.8	44 03.5	04 56	42.4	44 02.1	05 55	41.7	44 00.4	06 54	41.0	43 58.5	07 54	40.3	43 51.2	09 51	38.2	43 48.3	10 51	37.5	60
1	43 31.4	00 58	44.5	43 31.2	01 57	43.8	43 30.0	03 56	42.4	43 29.0	04 55	41.7	43 27.8	05 54	41.0	43 26.3	05 54	40.3	43 20.4	08 51	38.3	43 18.0	09 51	37.6	1
2	42 56.5	01 58	44.4	42 56.7	00 57	43.8	42 56.4	01 56	42.4	42 55.9	02 55	41.7	42 55.1	03 54	41.0	42 54.1	04 54	41.0	42 49.6	06 51	38.3	42 47.6	07 51	37.6	2
3	42 21.7	02 58	44.4	42 22.3	02 57	43.8	42 22.9	00 56	42.4	42 22.8	01 55	41.7	42 22.4	02 54	41.1	42 21.9	02 54	40.4	42 18.7	05 51	38.4	42 17.2	05 51	37.7	3
4	41 46.9	04 58	44.4	41 47.9	03 57	43.8	41 49.3	02 56	42.4	41 49.7	01 55	41.7	41 49.8	00 54	41.1	41 49.6	01 54	40.4	41 47.9	03 52	38.4	41 46.8	04 51	37.7	4
65	41 12.1	05 58	44.4	41 13.5	04 57	43.7	41 15.8	03 56	42.4	41 16.5	02 55	41.7	41 17.1	01 54	41.1	41 17.4	01 54	40.4	41 17.0	02 52	38.4	41 16.4	01 51	37.7	65
6	40 37.3	07 58	44.3	40 39.2	06 57	43.7	40 42.2	04 56	42.4	40 43.4	04 55	41.7	40 44.4	03 54	41.0	40 45.2	02 54	40.4	40 46.1	00 52	38.4	40 45.9	01 51	37.7	6
7	40 02.5	08 58	44.2	40 04.8	07 57	43.6	40 08.7	06 56	42.3	40 10.4	05 55	41.7	40 11.8	04 54	41.0	40 12.9	04 54	40.4	40 15.2	01 51	38.4	40 15.5	01 51	37.7	7
8	39 27.8	09 58	44.2	39 30.5	09 57	43.6	39 35.3	07 56	42.3	39 37.3	06 55	41.6	39 39.1	06 54	41.0	39 40.7	05 54	40.3	39 44.3	03 51	38.4	39 45.0	03 51	37.7	8
9	38 53.2	11 58	44.1	38 56.3	10 57	43.5	39 01.8	09 56	42.2	39 04.3	08 55	41.6	39 06.5	07 54	40.9	39 08.5	06 54	40.3	39 13.4	04 51	38.4	39 14.6	04 51	37.7	9
70	38 18.6	12 58	44.1	38 22.0	11 57	43.4	38 28.4	10 56	42.2	38 31.3	09 55	41.5	38 33.9	09 54	40.9	38 36.4	08 54	40.2	38 42.5	06 51	38.3	38 44.1	05 51	37.7	70
1	37 44.0	13 57	44.0	37 47.9	13 57	43.3	37 55.0	11 56	42.1	37 58.3	11 55	41.5	38 01.4	10 54	40.9	38 04.3	09 53	40.2	38 11.7	07 51	38.3	38 13.7	07 51	37.7	1
2	37 09.5	15 57	43.9	37 13.8	14 57	43.2	37 21.7	13 55	42.0	37 25.4	12 55	41.4	37 28.9	11 54	40.7	37 32.2	11 53	40.1	37 40.9	09 51	38.2	37 43.4	08 51	37.6	2
3	36 35.0	16 57	43.8	36 39.7	15 56	43.1	36 48.5	14 55	41.9	36 52.6	13 55	41.3	36 56.5	13 54	40.7	37 00.2	12 53	40.0	37 10.1	10 51	38.2	37 13.0	09 50	37.6	3
4	36 00.7	17 57	43.6	36 05.7	17 56	43.0	36 15.3	15 55	41.8	36 19.8	15 55	41.2	36 24.1	14 54	40.6	36 28.2	13 53	40.0	36 39.4	11 51	38.1	36 42.7	11 50	37.5	4
75	35 26.4	18 57	43.5	35 31.8	18 56	42.9	35 42.2	17 55	41.7	35 47.0	16 54	41.1	35 51.8	15 54	40.5	35 56.3	15 53	39.9	36 08.7	13 51	38.0	36 12.5	12 50	37.4	75
6	34 52.2	20 57	43.4	34 58.0	19 56	42.8	35 09.1	18 55	41.6	35 14.4	17 54	41.0	35 19.5	17 54	40.4	35 24.4	16 53	39.8	35 38.1	14 51	37.9	35 42.3	14 51	37.3	6
7	34 18.1	21 57	43.2	34 24.3	20 56	42.6	34 36.1	19 55	41.4	34 41.8	19 54	40.9	34 47.3	18 54	40.3	34 52.6	17 53	39.7	35 07.5	16 51	37.8	35 12.2	15 50	37.2	7
8	33 44.1	22 57	43.1	33 50.6	22 56	42.5	34 03.0	20 55	41.3	34 09.2	20 54	40.7	34 15.2	19 53	40.1	34 20.9	19 53	39.5	34 37.1	17 51	37.7	34 42.1	16 50	37.1	8
9	33 10.1	23 56	42.9	33 17.1	23 56	42.3	33 30.5	21 54	41.2	33 36.9	21 54	40.6	33 43.2	21 53	40.0	33 49.3	20 53	39.4	34 06.6	18 51	37.6	34 12.1	18 50	37.0	9
80	32 36.3	25 56	42.8	32 43.6	24 56	42.2	32 57.8	23 54	41.0	33 04.6	23 54	40.4	33 11.3	22 53	39.9	33 17.8	21 52	39.3	33 36.3	20 50	37.5	33 42.2	19 50	36.9	80
1	32 02.6	26 56	42.6	32 10.3	25 55	42.0	32 25.2	24 54	40.9	32 32.4	24 54	40.3	32 39.4	23 53	39.8	32 46.3	22 52	39.2	33 06.1	21 50	37.4	33 12.2	21 50	36.8	1
2	31 28.9	27 56	42.4	31 37.0	27 55	41.8	31 52.7	26 54	40.7	32 00.3	25 53	40.1	32 07.7	25 53	39.6	32 15.0	24 52	39.0	32 35.9	22 50	37.3	32 42.6	22 49	36.7	2
3	30 55.5	28 56	42.2	31 03.9	28 55	41.7	31 20.3	27 54	40.5	31 28.3	26 53	40.0	31 36.1	26 53	39.4	31 43.7	25 52	38.8	32 05.8	24 50	37.1	32 12.9	23 49	36.5	3
4	30 22.2	29 55	42.0	30 30.9	29 55	41.5	30 48.0	28 54	40.3	30 56.4	28 53	39.8	31 04.6	27 52	39.2	31 12.6	27 52	38.7	31 35.9	25 50	37.0	31 43.3	25 49	36.4	4
85	29 48.9	31 55	41.8	29 58.0	30 55	41.3	30 15.9	29 53	40.2	30 24.6	29 53	39.6	30 33.2	28 52	39.1	30 41.6	28 52	38.5	31 06.0	26 50	36.8	31 13.9	26 49	36.2	85
6	29 15.8	32 55	41.6	29 25.3	31 54	41.1	29 43.9	30 53	40.0	29 52.9	30 53	39.4	30 01.9	30 52	38.9	30 10.7	29 51	38.3	30 36.2	28 49	36.7	30 44.5	27 49	36.1	6
7	28 42.9	33 55	41.4	28 52.7	33 54	40.9	29 12.0	32 53	39.8	29 21.4	31 52	39.2	29 30.7	31 52	38.7	29 39.9	31 51	38.1	30 06.5	29 49	36.5	30 15.3	29 49	35.9	7
8	28 10.0	34 54	41.2	28 20.2	34 54	40.6	28 40.2	33 53	39.6	28 50.0	32 52	39.0	28 59.7	32 51	38.5	29 09.3	32 51	37.9	29 37.1	30 49	36.3	29 46.1	30 48	35.8	8
9	27 37.4	35 54	40.9	27 47.9	35 54	40.4	28 08.6	34 52	39.4	28 18.8	34 52	38.8	28 28.8	33 51	38.3	28 38.7	33 51	37.7	29 07.8	32 49	36.1	29 17.1	31 48	35.6	9
90	27 04.9	36 54	40.7	27 15.7	36 53	40.2	27 37.1	35 52	39.1	27 47.7	35 52	38.6	27 58.1	34 51	38.1	28 06.4	34 50	37.5	28 38.3	33 49	35.9	28 47.3	33 48	35.4	90

Lat. 34°

H.A.	54° 30' Alt.	Az.	55° 00' Alt.	Az.	56° 00' Alt.	Az.	56° 30' Alt.	Az.	57° 00' Alt.	Az.	57° 30' Alt.	Az.	59° 00' Alt.	Az.	59° 30' Alt.	Az.	H.A.
91	26 32.5 38 54	40.5	26 43.7 37 53	39.9	27 05.8 36 52	38.9	27 16.7 36 51	38.4	27 27.5 36 51	37.9	27 38.1 35 50	37.3	28 09.3 34 48	35.7	28 19.5 34 48	35.2	91
2	26 00.3 39 53	40.2	26 11.9 38 53	39.7	26 34.7 38 52	38.7	26 45.9 37 51	38.2	26 57.0 37 50	37.6	27 08.0 37 50	37.1	27 40.4 35 48	35.5	27 50.9 35 47	35.0	2
3	25 28.3 40 53	40.0	25 40.2 40 53	39.5	26 03.7 39 51	38.4	26 15.3 38 51	37.9	26 26.7 38 50	37.4	26 38.1 38 50	36.9	27 11.5 37 48	35.3	27 22.4 36 47	34.8	3
4	24 56.4 41 53	39.7	25 08.6 41 52	39.2	25 32.8 40 51	38.2	25 44.8 40 51	37.7	25 56.6 39 50	37.2	26 08.3 39 49	36.7	26 42.8 38 48	35.1	26 54.1 37 47	34.6	4
95	24 24.7 42 53	39.4	24 37.3 42 52	38.9	25 02.2 41 51	37.9	25 14.4 41 50	37.4	25 26.6 40 50	36.9	25 38.7 40 49	36.4	26 14.3 39 47	34.9	26 26.0 39 47	34.4	95
6	23 53.2 43 52	39.2	24 06.1 43 52	38.7	24 31.7 42 51	37.7	24 44.3 42 50	37.2	24 56.8 42 49	36.7	25 09.3 41 49	36.2	25 45.9 40 47	34.7	25 57.9 40 46	34.2	6
7	23 21.9 44 52	38.9	23 35.1 44 51	38.4	24 01.3 43 50	37.4	24 14.3 43 50	36.9	24 27.2 43 49	36.4	24 40.0 42 48	35.9	25 17.7 41 47	34.4	25 30.1 41 46	33.9	7
8	22 50.7 45 52	38.6	23 04.3 44 51	38.1	23 31.2 44 50	37.2	23 44.5 44 49	36.7	23 57.7 44 49	36.2	24 10.9 44 48	35.7	24 49.7 43 46	34.2	25 02.4 42 46	33.7	8
9	22 19.8 47 51	38.3	22 33.7 46 51	37.8	23 01.3 46 50	36.9	23 14.9 45 49	36.4	23 28.5 45 48	35.9	23 42.0 45 48	35.4	24 21.8 44 46	33.9	24 34.9 43 46	33.5	9
100	21 49.0 48 51	38.0	22 03.3 47 50	37.6	22 31.5 47 49	36.6	22 45.5 46 49	36.1	22 59.4 46 48	35.6	23 13.2 46 48	35.2	23 54.1 45 46	33.7	24 07.6 45 45	33.2	100
1	21 18.5 49 51	37.7	21 33.1 48 50	37.3	22 02.0 48 49	36.3	22 16.3 48 48	35.8	22 30.5 47 48	35.4	22 44.7 47 47	34.9	23 26.6 46 46	33.4	23 40.4 46 45	33.0	1
2	20 48.2 50 50	37.4	21 03.1 49 50	37.0	21 32.6 49 49	36.0	21 47.3 49 48	35.5	22 01.8 48 47	35.1	22 16.3 48 47	34.6	22 59.3 47 45	33.2	23 13.5 47 45	32.7	2
3	20 18.1 51 50	37.1	20 33.3 51 49	36.6	21 03.5 50 48	35.7	21 18.4 50 48	35.3	21 33.3 50 47	34.8	21 48.2 49 47	34.3	22 32.2 48 45	32.9	22 46.7 48 44	32.4	3
4	19 48.2 52 49	36.8	20 03.7 52 49	36.3	20 34.5 51 48	35.4	20 49.8 51 47	35.0	21 05.1 51 47	34.5	21 20.2 50 46	34.0	22 05.3 50 45	32.6	22 20.1 49 44	32.2	4
105	19 18.5 53 49	36.5	19 34.3 53 49	36.0	20 05.8 52 48	35.1	20 21.4 52 47	34.7	20 37.0 52 46	34.2	20 52.5 52 46	33.7	21 38.5 51 44	32.4	21 53.7 51 44	31.9	105
6	18 49.0 54 49	36.1	19 05.2 54 48	35.7	19 37.3 53 47	34.8	19 53.3 53 47	34.3	20 09.2 53 46	33.9	20 25.0 53 46	33.4	21 12.0 52 44	32.1	21 27.5 52 43	31.6	6
7	18 19.8 55 48	35.8	18 36.3 54 48	35.4	19 09.0 54 47	34.5	19 25.3 54 46	34.0	19 41.5 54 46	33.6	19 57.7 54 45	33.1	20 45.7 53 43	31.8	21 01.6 53 43	31.3	7
8	17 50.8 56 48	35.5	18 07.6 56 47	35.0	18 41.0 55 46	34.2	18 57.6 55 46	33.7	19 14.1 55 45	33.3	19 30.6 55 45	32.8	20 19.6 54 43	31.5	20 35.8 54 43	31.0	8
9	17 22.1 57 48	35.1	17 39.2 57 47	34.7	18 13.2 56 46	33.8	18 30.1 56 45	33.4	18 46.9 56 45	33.0	19 03.7 56 44	32.5	19 53.7 55 43	31.2	20 10.3 55 42	30.7	9
110	16 53.6 58 47	34.8	17 11.0 58 47	34.3	17 45.6 58 46	33.5	18 02.8 57 45	33.1	18 20.0 57 44	32.6	18 37.1 57 44	32.2	19 28.1 56 42	30.9	19 45.0 56 42	30.4	110
1	16 25.4 59 47	34.4	16 43.1 59 46	34.0	17 18.3 59 45	33.1	17 35.8 58 45	32.7	17 53.3 58 44	32.3	18 10.7 58 44	31.9	19 02.7 57 42	30.6	19 19.9 57 41	30.1	1
2	15 57.4 60 46	34.1	16 15.4 60 46	33.6	16 51.2 60 45	32.8	17 09.1 59 44	32.4	17 26.9 59 44	32.0	17 44.6 59 43	31.5	18 37.5 58 42	30.3	18 55.0 58 41	29.8	2
3	15 29.6 61 46	33.7	15 47.9 61 45	33.3	16 24.4 61 44	32.5	16 42.5 60 44	32.0	17 00.7 60 43	31.6	17 18.7 60 43	31.2	18 12.5 60 41	29.9	18 30.4 59 41	29.5	3
4	15 02.2 62 45	33.3	15 20.8 62 45	32.9	15 57.8 62 44	32.1	16 16.3 61 43	31.7	16 34.7 61 43	31.3	16 53.1 61 42	30.9	17 47.8 61 41	29.6	18 06.0 60 40	29.2	4
115	14 35.0 63 45	32.9	14 53.9 63 44	32.5	15 31.5 63 43	31.7	15 50.3 62 43	31.3	16 09.0 62 42	30.9	16 27.7 62 42	30.5	17 23.4 62 40	29.3	17 41.9 61 40	28.9	115
6	14 08.1 64 44	32.6	14 27.3 64 44	32.2	15 05.5 64 43	31.4	15 24.6 63 42	31.0	15 43.6 63 42	30.6	16 02.5 63 41	30.1	16 59.2 63 40	28.9	17 18.0 63 39	28.5	6
7	13 41.5 65 44	32.2	14 00.9 65 43	31.8	14 39.8 65 42	31.0	14 59.1 64 42	30.6	15 18.4 64 41	30.2	15 37.7 64 41	29.8	16 35.2 64 39	28.6	16 54.3 64 39	28.2	7
8	13 15.1 66 43	31.8	13 34.9 66 43	31.4	14 14.3 66 42	30.6	14 33.9 65 42	30.2	14 53.5 65 41	29.8	15 13.1 65 41	29.4	16 11.5 65 39	28.3	16 30.9 65 39	27.9	8
9	12 49.1 67 43	31.4	13 09.1 67 42	31.0	13 49.1 67 41	30.2	14 09.0 66 41	29.8	14 28.9 66 41	29.5	14 48.8 66 40	29.1	15 48.1 66 39	27.9	16 07.8 66 38	27.5	9
120	12 23.3 68 42	31.0	12 43.6 68 42	30.6	13 24.2 67 41	29.9	13 44.4 67 41	29.5	14 04.6 67 40	29.1	14 24.7 67 40	28.7	15 25.0 67 38	27.6	15 45.0 67 38	27.2	120
1	11 57.8 69 42	30.6	12 18.4 69 41	30.2	12 59.6 68 41	29.5	13 20.1 68 40	29.1	13 40.5 68 40	28.7	14 01.0 68 39	28.3	15 02.1 68 38	27.2	15 22.4 68 37	26.8	1
2	11 32.7 70 41	30.2	11 53.6 70 41	29.8	12 35.2 69 40	29.1	12 56.0 69 40	28.7	13 16.8 69 39	28.3	13 37.5 69 39	28.0	14 39.5 69 37	26.8	15 00.1 69 37	26.5	2
3	11 07.8 71 41	29.4	11 29.0 70 40	29.4	12 11.2 70 40	28.7	12 32.3 70 39	28.3	12 53.3 70 39	27.6	13 14.3 70 38	27.6	14 17.2 70 37	26.5	14 38.1 70 36	26.1	3
4	10 43.3 71 40	29.3	11 04.7 71 40	28.3	11 47.5 71 39	28.3	12 08.9 71 39	27.9	12 30.2 71 38	27.5	12 51.5 71 38	27.2	13 55.2 71 36	26.1	14 16.3 71 36	25.7	4
125	10 19.1 72 40	28.9	10 40.8 72 39	28.6	11 24.1 72 38	27.9	11 45.7 72 38	27.5	12 07.3 72 38	27.1	12 28.9 72 37	26.8	13 33.4 72 36	25.7	13 54.9 71 35	25.4	125
6	9 55.2 73 39	28.5	10 17.2 73 39	28.1	11 01.0 73 38	27.4	11 22.9 73 38	27.1	11 44.8 73 37	26.7	12 06.6 73 37	26.4	13 12.0 72 35	25.3	13 33.7 72 35	25.0	6
7	9 31.6 74 39	28.1	9 53.9 74 38	27.7	10 38.3 74 37	27.0	11 00.4 74 37	26.7	11 22.5 74 37	26.3	11 44.7 74 36	26.0	12 50.8 73 35	25.0	13 12.9 73 34	24.6	7
8	9 08.4 75 38	27.6	9 30.9 75 38	27.3	10 15.8 75 37	26.6	10 38.2 75 36	26.3	11 00.6 75 36	25.9	11 23.0 75 36	25.6	12 30.0 74 34	24.6	12 52.3 74 34	24.2	8
9	8 45.5 76 38	27.2	9 08.3 76 37	26.8	9 53.7 76 36	26.2	10 16.4 76 36	25.8	10 39.1 76 35	25.5	11 01.7 75 35	25.2	12 09.5 75 34	24.2	12 32.0 75 33	23.8	9
130	8 23.0 77 37	26.7	8 46.0 77 37	26.4	9 31.9 77 36	25.7	9 54.9 76 35	25.4	10 17.8 76 35	25.1	10 40.7 76 34	24.8	11 49.3 76 33	23.8	12 12.1 76 33	23.4	130
1	8 00.8 78 36	26.3	8 24.0 77 36	25.9	9 10.5 77 35	25.3	9 33.7 77 35	25.0	9 56.9 77 34	24.7	10 20.0 77 34	24.3	11 29.4 77 33	23.4	11 52.5 77 32	23.0	1
2	7 39.0 78 36	25.8	8 02.5 78 35	25.5	8 49.4 78 34	24.9	9 12.8 78 34	24.6	9 36.3 78 34	24.2	9 59.7 78 33	23.9	11 09.8 78 32	23.0	11 33.2 78 32	22.6	2
3	7 17.5 79 35	25.4	7 41.2 79 35	25.1	8 28.7 79 34	24.4	8 52.4 79 34	24.1	9 16.0 79 33	23.8	9 39.7 79 33	23.5	10 50.6 79 32	22.6	11 14.2 79 31	22.2	3
4	6 56.4 80 35	24.9	7 20.3 80 34	24.6	8 06.3 80 33	24.0	8 32.2 80 33	23.7	8 56.1 80 33	23.4	9 20.0 80 32	23.1	10 31.7 80 31	22.1	10 55.5 79 31	21.8	4
135	6 35.6 81 34	24.4	6 59.8 81 34	24.1	7 48.2 81 33	23.5	8 12.4 81 32	23.2	8 36.6 81 32	22.9	9 00.7 80 32	22.6	10 13.1 80 30	21.7	10 37.2 80 30	21.4	135
6	6 15.3 82 33	23.9	6 39.7 81 33	23.6	7 28.6 81 32	23.1	7 53.0 81 32	22.8	8 17.4 81 31	22.5	8 41.8 81 31	22.2	9 54.9 81 30	21.3	10 19.2 81 29	21.0	6
7	5 55.3 82 33	23.5	6 19.9 82 32	23.2	7 09.3 82 32	22.6	7 33.9 82 31	22.3	7 58.5 82 31	22.0	8 23.2 82 30	21.7	9 37.0 82 29	20.9	10 01.5 82 29	20.6	7
8	5 35.6 83 32	23.0	6 00.5 83 32	22.7	6 50.3 83 31	22.1	7 15.2 83 31	21.9	7 40.1 83 30	21.6	8 04.9 83 30	21.3	9 19.4 83 29	20.4	9 44.2 83 28	20.2	8
9	5 16.4 84 31	22.5	5 41.5 84 31	22.2	6 31.8 84 30	21.7	6 56.9 84 30	21.4	7 22.0 84 30	21.1	7 47.0 84 29	20.8	9 02.5 83 28	20.0	9 27.3 83 28	19.7	9
140			5 22.9 84 30	21.7	6 13.6 84 30	21.2	6 38.9 84 29	20.9	7 04.2 84 29	20.7	7 29.5 84 29	20.4	8 45.4 84 27	19.6	9 10.6 84 27	19.3	140
1			5 04.7 85 30	21.2	5 55.8 85 29	20.7	6 21.3 85 29	20.5	6 46.9 85 28	20.2	7 12.4 85 28	19.9	8 28.9 85 27	19.1	8 54.4 85 27	18.9	1
2					5 38.4 86 28	20.2	6 04.1 86 28	20.0	6 29.9 86 28	19.7	6 55.6 86 27	19.5	8 12.8 86 26	18.7	8 38.5 86 26	18.4	2
3					5 21.4 87 28	19.8	5 47.3 87 27	19.5	6 13.3 86 27	19.3	6 39.2 86 27	19.0	7 57.0 86 26	18.2	8 22.9 86 25	18.0	3
4					5 04.8 87 27	19.3	5 30.9 87 27	19.0	5 57.1 87 26	18.8	6 23.2 87 26	18.5	7 41.6 87 25	17.8	8 07.8 87 25	17.5	4
145							5 14.9 88 26	18.5	5 41.3 88 26	18.3	6 07.6 88 25	18.1	7 26.6 88 24	17.3	7 53.0 88 24	17.1	145
6									5 25.9 88 25	17.8	5 52.4 88 25	17.6	7 12.0 88 23	16.9	7 38.5 88 23	16.6	6
7									5 10.8 89 24	17.3	5 37.6 89 23	17.1	6 57.8 89 23	16.4	7 24.5 89 23	16.2	7
8											5 23.2 90 23	16.6	6 43.9 90 22	16.0	7 10.8 90 22	15.7	8
9											5 09.1 90 23	16.1	6 30.4 90 22	15.5	6 57.5 90 22	15.3	9
150													6 17.3 91 21	15.0	6 44.6 91 21	14.8	150
1													6 04.6 91 20	14.5	6 32.1 91 20	14.3	1
2													5 52.4 92 20	14.1	6 20.0 92 20	13.9	2
3													5 40.5 93 19	13.6	6 08.2 93 19	13.4	3
4													5 29.0 93 18	13.1	5 56.9 93 18	12.9	4
155													5 17.9 94 18	12.6	5 46.0 94 18	12.5	155
6													5 07.2 94 17	12.1	5 35.5 94 17	12.0	6
7															5 25.3 95 16	11.5	7
8															5 15.6 95 15	11.0	8
9															5 06.4 95 15	10.5	9

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 34°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
00	64 00.0	1.0 01	00.0	63 30.0	1.0 01	00.0	62 00.0	1.0 01	00.0	61 30.0	1.0 01	00.0	61 00.0	1.0 01	00.0	55 00.0	1.0 01	00.0	54 30.0	1.0 01	00.0	49 30.0	1.0 00	00.0	00
1	63 59.5	1.0 02	01.1	63 29.5	1.0 02	01.1	61 59.6	1.0 02	01.0	61 29.6	1.0 02	01.0	60 59.6	1.0 02	00.9	54 59.7	1.0 01	00.6	54 29.7	1.0 01	00.6	49 29.8	1.0 01	00.4	1
2	63 58.0	1.0 04	02.3	63 28.1	1.0 04	02.2	61 58.3	1.0 04	02.0	61 28.3	1.0 04	01.9	60 58.4	1.0 03	01.9	54 58.9	1.0 02	01.2	54 29.0	1.0 02	01.2	49 29.3	1.0 01	00.8	2
3	63 55.6	1.0 06	03.4	63 25.7	1.0 06	03.3	61 56.1	1.0 05	03.0	61 26.2	1.0 05	02.9	60 57.6	1.0 05	02.8	54 57.6	1.0 03	01.9	54 27.6	1.0 03	01.8	49 28.4	1.0 02	01.2	3
4	63 52.1	99 07	04.5	63 22.4	99 07	04.4	61 53.1	99 06	04.0	61 23.3	99 06	03.9	60 53.5	99 06	03.7	54 55.7	99 04	02.5	54 25.8	99 04	02.4	49 27.1	1.0 03	01.6	4
05	63 47.7	99 09	05.7	63 18.1	99 09	05.5	61 49.2	99 08	05.0	61 19.5	99 08	04.8	60 49.9	99 07	04.7	54 53.2	99 05	03.1	54 23.5	99 05	03.0	49 25.5	99 03	02.1	05
6	63 42.3	98 11	06.8	63 12.9	98 10	06.6	61 44.5	98 09	05.9	61 15.0	98 09	05.8	60 45.4	98 09	05.6	54 50.3	99 06	03.7	54 20.6	99 06	03.6	49 23.6	99 04	02.5	6
7	63 35.9	97 12	07.9	63 06.7	97 12	07.6	61 38.9	98 11	06.9	61 09.6	98 10	06.7	60 40.2	98 10	06.5	54 46.8	98 07	04.3	54 17.2	98 06	04.2	49 21.3	99 04	02.9	7
8	63 28.7	96 14	09.0	62 59.7	97 13	08.7	61 32.5	97 12	07.9	61 03.4	97 12	07.6	60 34.2	97 11	07.4	54 42.7	98 08	05.0	54 13.3	98 07	04.8	49 18.6	98 05	03.3	8
9	63 20.4	96 15	10.0	62 51.7	96 15	09.7	61 25.2	96 13	08.8	60 56.3	96 13	08.6	60 27.4	96 13	08.3	54 38.2	97 08	05.6	54 08.9	98 08	05.4	49 15.6	98 06	03.7	9
10	63 11.3	95 17	11.1	62 42.9	95 16	10.7	61 17.2	95 15	09.8	60 48.6	96 14	09.5	60 19.9	96 14	09.2	54 33.1	97 09	06.2	54 04.0	97 09	05.9	49 12.2	98 06	04.1	10
1	63 01.3	94 18	12.1	62 33.2	94 18	11.8	61 08.4	94 16	10.7	60 40.0	95 16	10.4	60 11.6	95 15	10.0	54 27.5	96 10	06.8	53 58.6	96 10	06.5	49 08.5	97 07	04.5	1
2	62 50.4	93 20	13.2	62 22.6	93 19	12.8	60 58.7	93 17	11.6	60 30.7	94 17	11.2	60 02.5	94 16	10.9	54 21.4	96 11	07.3	53 52.7	96 11	07.1	49 04.5	96 07	04.9	2
3	62 38.7	91 21	14.2	62 11.2	92 20	13.7	60 48.4	92 19	12.5	60 20.6	93 18	12.1	59 52.8	93 17	11.7	54 15.2	95 12	07.9	53 46.3	95 11	07.7	49 00.1	96 08	05.3	3
4	62 26.1	90 22	15.1	61 59.0	90 22	14.7	60 37.2	91 20	13.4	60 09.8	92 19	13.0	59 42.3	92 19	12.6	54 07.7	94 13	08.5	53 39.5	94 12	08.2	48 55.4	95 08	05.6	4
15	62 12.7	89 24	16.1	61 46.0	89 23	15.6	60 25.3	90 21	14.3	59 58.3	90 20	13.8	59 31.4	91 20	13.4	54 00.1	93 13	09.1	53 32.1	93 13	08.8	48 50.3	95 09	06.0	15
6	61 58.5	87 25	17.1	61 32.2	88 24	16.5	60 12.7	89 22	15.1	59 46.0	89 22	14.6	59 19.3	89 21	14.2	53 52.0	92 14	09.6	53 24.3	92 14	09.3	48 44.9	94 10	06.4	6
7	61 43.5	86 26	18.0	61 17.6	86 25	17.4	59 59.4	87 23	15.9	59 33.1	88 23	15.5	59 06.7	88 22	15.0	53 43.4	91 15	10.2	53 16.0	91 15	09.9	48 39.2	93 10	06.8	7
8	61 27.8	84 27	18.9	61 02.4	85 27	18.3	59 45.4	85 24	16.7	59 19.5	86 24	16.2	58 53.5	87 23	15.8	53 34.4	90 16	10.7	53 07.3	90 15	10.4	48 33.2	92 11	07.2	8
9	61 11.3	83 29	19.7	60 46.4	83 28	19.2	59 30.8	85 26	17.5	59 05.3	85 25	17.0	58 39.7	85 24	16.5	53 24.9	89 17	11.3	52 58.1	89 16	11.0	48 26.8	91 11	07.5	9
20	60 54.2	81 30	20.6	60 29.7	82 29	20.0	59 15.5	83 27	18.3	58 50.4	84 26	17.8	58 25.3	84 25	17.2	53 14.9	88 17	11.8	52 48.4	88 17	11.4	48 20.1	90 12	07.9	20
1	60 36.3	80 31	21.4	60 12.4	80 30	20.8	58 59.5	82 28	19.1	58 34.9	82 27	18.5	58 10.2	83 26	18.0	53 04.5	87 18	12.3	52 38.4	87 18	11.9	48 13.1	90 12	08.3	1
2	60 17.9	78 32	22.2	59 54.4	79 31	21.6	58 43.0	80 29	19.8	58 18.9	81 27	19.2	57 54.6	81 27	18.7	52 53.6	86 19	12.9	52 27.9	86 18	12.4	48 05.9	89 13	08.6	2
3	59 58.7	76 33	23.0	59 35.8	77 32	22.3	58 25.8	79 30	20.5	58 02.2	79 29	19.9	57 38.4	80 28	19.4	52 42.3	85 20	13.4	52 16.5	85 19	12.9	47 58.2	88 13	09.0	3
4	59 39.0	74 34	23.7	59 16.6	75 33	23.1	58 08.1	77 30	21.2	57 45.0	78 30	20.6	57 21.6	78 29	20.0	52 30.6	84 20	13.9	52 05.6	84 20	13.4	47 50.3	86 14	09.3	4
25	59 18.7	73 35	24.5	58 56.8	73 34	23.8	57 49.9	75 31	21.9	57 27.2	76 30	21.3	57 04.3	76 30	20.7	52 18.5	82 21	14.3	51 53.9	82 20	13.9	47 42.1	85 14	09.7	25
6	58 57.8	71 36	25.2	58 36.4	72 35	24.5	57 31.1	74 32	22.5	57 08.9	74 31	21.9	56 46.5	75 31	21.3	52 06.0	81 22	14.8	51 41.8	81 21	14.3	47 33.6	84 15	10.0	6
7	58 36.4	69 37	25.8	58 16.0	70 36	25.1	57 11.7	72 33	23.2	56 50.1	73 32	22.5	56 28.2	73 31	21.9	51 53.1	79 22	15.3	51 29.2	80 21	14.8	47 24.8	83 15	10.3	7
8	58 14.5	67 37	26.5	57 54.2	68 36	25.8	56 51.9	70 34	23.8	56 30.8	71 33	23.1	56 09.4	72 32	22.5	51 39.8	78 23	15.7	51 16.4	78 22	15.2	47 15.8	82 16	10.7	8
9	57 52.1	65 38	27.1	57 32.3	66 37	26.4	56 31.6	68 35	24.4	56 11.0	69 34	23.7	55 50.1	70 33	23.1	51 26.1	76 23	16.2	51 03.1	77 23	15.7	47 06.4	81 16	11.0	9
30	57 29.2	64 39	27.7	57 09.9	64 38	27.0	56 10.9	67 35	24.9	55 50.8	67 34	24.3	55 30.4	68 34	23.6	51 12.1	75 24	16.6	50 49.5	75 23	16.1	46 56.8	79 16	11.3	30
1	57 05.8	62 40	28.3	56 47.1	63 39	27.6	55 49.7	65 36	25.5	55 30.1	66 35	24.8	55 10.3	66 34	24.2	50 57.7	74 25	17.0	50 35.5	74 24	16.5	46 47.0	78 17	11.6	1
2	56 42.0	60 40	28.9	56 23.9	61 39	28.1	55 28.1	63 37	26.0	55 09.0	64 35	25.4	54 49.7	65 35	24.7	50 42.9	72 25	17.5	50 21.2	73 24	16.9	46 36.8	77 17	11.9	2
3	56 17.8	58 41	29.4	56 00.2	59 40	28.7	55 06.8	61 37	26.5	54 47.5	62 36	25.9	54 28.7	63 36	25.3	50 27.8	70 26	17.9	50 06.6	71 25	17.3	46 26.5	76 18	12.2	3
4	55 53.2	56 42	29.9	55 36.2	57 41	29.2	54 43.6	60 38	27.0	54 25.6	60 37	26.3	54 07.4	61 36	25.7	50 12.4	69 26	18.2	49 51.6	69 25	17.7	46 15.8	74 18	12.5	4
35	55 28.2	54 42	30.4	55 11.7	55 41	29.7	54 20.8	58 39	27.5	54 03.3	59 38	26.8	53 45.6	59 37	26.1	49 56.7	67 27	18.6	49 36.4	68 26	18.1	46 04.9	73 19	12.8	35
6	55 02.9	53 43	30.9	54 46.9	53 42	30.1	53 57.7	56 39	28.0	53 40.7	57 38	27.3	53 23.5	58 37	26.6	49 40.6	66 27	19.0	49 20.8	66 26	18.4	45 53.8	71 19	13.0	6
7	54 37.2	51 43	31.3	54 21.8	52 42	30.6	53 34.3	54 40	28.4	53 18.1	55 39	27.7	53 01.1	56 38	27.0	49 24.3	64 28	19.4	49 04.8	65 27	18.8	45 42.5	70 19	13.3	7
8	54 11.2	49 44	31.7	53 56.3	50 43	31.0	53 10.3	52 40	28.8	52 54.5	53 39	28.1	52 38.4	54 38	27.4	49 07.7	63 28	19.7	48 48.8	63 27	19.1	45 30.9	69 20	13.6	8
9	53 44.8	47 44	32.1	53 30.6	48 43	31.4	52 46.2	51 41	29.2	52 30.9	51 40	28.5	52 15.3	52 39	27.8	48 50.8	61 29	20.0	48 32.4	62 28	19.4	45 19.1	67 20	13.8	9
40	53 18.2	45 45	32.5	53 04.5	46 44	31.8	52 21.8	49 41	29.6	52 07.0	50 40	28.9	51 51.9	51 39	28.2	48 33.6	59 29	20.4	48 15.7	60 28	19.8	45 07.1	66 20	14.1	40
1	52 51.3	43 45	32.9	52 38.2	44 44	32.2	51 57.0	47 42	30.0	51 42.8	48 41	29.3	51 28.3	49 40	28.6	48 16.1	58 30	20.7	47 58.7	58 29	20.1	44 54.9	64 21	14.3	1
2	52 24.2	42 46	33.3	52 11.6	43 45	32.6	51 32.0	45 42	30.3	51 18.3	46 41	29.6	51 04.4	47 40	28.9	47 58.4	56 30	21.0	47 41.5	57 29	20.4	44 42.5	63 21	14.6	2
3	51 56.8	40 46	33.6	51 44.7	41 45	32.8	51 06.8	43 42	30.7	50 53.6	44 42	30.0	50 40.2	45 41	29.2	47 40.5	54 30	21.3	47 24.1	55 29	20.7	44 29.9	61 21	14.8	3
4	51 29.2	38 46	33.9	51 17.6	39 46	33.2	50 41.3	42 43	31.0	50 28.7	43 41	30.3	50 15.8	43 41	29.6	47 22.3	53 31	21.6	47 06.4	53 30	20.9	44 17.1	59 22	15.0	4
45	51 01.3	36 47	34.2	50 50.3	37 46	33.5	50 15.6	40 43	31.3	50 03.5	41 42	30.6	49 51.1	42 41	29.9	47 03.9	51 31	21.8	46 48.6	52 30	21.2	44 04.1	58 22	15.2	45
6	50 33.2	34 47	34.5	50 22.8	35 46	33.7	49 49.6	38 44	31.6	49 38.1	39 43	30.9	49 26.2	40 42	30.1	46 45.3	49 31	22.1	46 30.4	50 31	21.5	43 50.9	56 23	15.5	6
7	50 05.0	33 47	34.7	49 55.0	34 47	34.0	49 23.5	36 44	31.8	49 12.5	37 43	31.1	49 01.2	38 42	30.4	46 26.5	48 32	22.4	46 12.1	48 31	21.7	43 37.6	55 23	15.7	7
8	49 36.6	31 48	35.0	49 27.1	32 47	34.3	48 57.2	35 44	32.1	48 46.7	35 43	31.4	48 35.9	36 42	30.7	46 07.5	46 32	22.6	45 53.6	47 31	22.0	43 24.1	53 23	15.9	8
9	49 07.9	29 48	35.2	48 59.0	30 47	34.5	48 30.7	33 44	32.3	48 20.7	34 44	31.6	48 10.4	35 43	30.9	45 48.3	44 32	22.8	45 34.9	45 31	22.2	43 10.4	51 23	16.1	9
50	48 39.2	28 48	35.4	48 30.8	28 47	34.7	48 04.0	31 45	32.6	47 54.5	32 44	31.8	47 44.8	33 43	31.1	45 28.9	42 33	23.1	45 16.1	43 32	22.4	42 56.6	50 23	16.2	50
1	48 10.3	26 48	35.6	48 02.4	27 48	34.9	47 37.1	29 45	32.8	47 28.2	30 44	32.1	47 19.0	31 43	31.4	45 09.3	41 33	23.3	44 57.0	41 32	22.6	42 42.6	48 24	16.4	1
2	47 41.2	24 49	35.8	47 33.8	25 48	35.1	47 10.1	28 45	33.0	47 01.7	29 44	32.3	46 53.0	29 44	31.6	44 49.6	39 33	23.5	44 37.8	40 32	22.8	42 28.4	46 24	16.6	2
3	47 12.0	22 49	36.0	47 05.2	23 48	35.3	46 43.0	26 45	33.2	46 35.1	27 45	32.4	46 26.9	28 44	31.8	44 29.7	37 33	23.7	44 18.4	38 33	23.0	42 14.2	45 24	16.8	3
4	46 42.8	21 49	36.2	46 36.4	22 48	35.4	46 15.7	24 46	33.3	46 08.3	25 45	32.6	46 00.7	26 44	31.9	44 09.7	35 34	23.8	43 58.9	36 33	23.2	41 59.8	43 24	16.9	4
55	46 13.4	19 49	36.3	46 07.5	20 48	35.6	45 48.3	23 46	33.5	45 41.4	23 45	32.8	45 34.3	24 44	32.1	43 49.5	34 34	24.0	43 39.3	34 33	23.4	41 45.2	41 24	17.1	55
6	45 43.9	17 49	36.4	45 38.5	18 48	35.7	45 20.8	21 46	33.6	45 14.5	22 45	32.9	45 07.8	23 44	32.2	43 29.2	32 34	24.2	43 19.5	33 33	23.5	41 30.6	40 25	17.2	6
7	45 14.3	16 49	36.5	45 09.4	17 49	35.8	44 53.2	19 46	33.7	44 47.4	20 45	33.1	44 41.2	21 44	32.3	43 08.8	30 34	24.3	42 59.6	31 33	23.7	41 15.8	38 25	17.3	7
8	44 44.6	14 50	36.7	44 40.2	15 49	36.0	44 25.6	18 46	33.9	44 20.2	18 45	33.2	44 14.5	19 45	32.5	42 48.2	29 34	24.5	42 39.5	29 34	23.8	41 00.9	36 25	17.5	8
9	44 14.9	13 50	36.7	44 11.0	13 49	36.1	43 57.8	16 46	34.0	43 52.9	17 46	33.3	43 47.8	18 45	32.6	42 27.6	27 35	24.6	42 19.4	28 34	24.0	40 45.9	35 25	17.6	9
60	43 45.1	11 50	36.8	43 41.7	12 49	36.1	43 29.9	14 47	34.1	43 25.5	15 46	33.5	43 20.9	16 45	32.7	42 06.8	25 35	24.7	41 59.2	26 34	24.1	40 30.8	33 25	17.7	60
1	43 15.3	09 50	36.9	43 12.3	10 49	36.2	43 01.9	13 47	34.2	42 58.4	14 46	33.5	42 54.0	14 45	32.8	41 46.0	23 35	24.8	41 38.8	24 34	24.2	40 15.6	31 25	17.8	1
2	42 45.4	08 50	37.0	42 42.9	09 49	36.3	42 34.1	11 47	34.2	42 30.6	12 46	33.6	42 26.9	12 46	32.9	41 25.0	22 35	25.0	41 18.4	22 34	24.3	40 00.4	29 26	17.9	2
3	42 15.4	06 50	37.0	42 13.4	07 49	36.3	42 06.0	09 47	34.3	42 03.1	10 46	33.6	41 59.9	11 45	33.0	41 04.0	20 35	25.1	40 57.9	21 34	24.4	39 45.0	28 26	18.0	3
4	41 45.5	05 50	37.0	41 44.0	05 49	36.4	41 38.0	08 47	34.4	41 35.5	09 46	33.7	41 32.8	09 45	33.0	40 42.9	18 35	25.1	40 37.3	19 34	24.5	39 29.5	26 26	18.1	4
65	41 15.5	03 50	37.1	41 14.4	04 49	36.4	41 09.9	06 47	34.4	41 07.9	07 46	33.8	41 05.7	08 45	33.1	40 21.7	17 35	25.2	40 16.6	17 35	24.6	39 14.0	24 26	18.2	65
6	40 45.5	02 50	37.1	40 44.4	02 49	36.4	40 41.8	05 47	34.4	40 40.2	05 46	33.8	40 38.5	06 45	33.1	40 00.5	15 35	25.3	39 55.9	16 35	24.7	38 58.4	23 26	18.3	6
7	40 15.5	00 50	37.1	40 15.4	01 49	36.4	40 13.6	03 47	34.5	40 12.6	04 46	33.8	40 11.3	05 45	33.2	39 39.2	13 36	25.4	39 35.1	14 35	24.7	38 42.8	21 26	18.4	7
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9	39 15.5	03 50	37.1	39 16.3	02 49	36.4	39 17.3	00 47	34.5	39 17.2	01 46	33.8	39 16.9	01 45	33.2	38 56.5	10 36	25.5	38 53.4	11 35	24.8	38 11.3	17 26	18.5	9
70	38 45.6	04 50	37.1	38 46.6	04 49	36.4	38 49.1	02 47	34.5	38 49.9	00 45	33.2	38 49.6	00 45	33.2	38 35.1	08 36	25.6	38 32.5	09 35	24.9	37 55.5	16 26	18.6	70
1	38 15.6	06 50	37.0	38 17.2	05 49	36.4	38 20.9	03 47	34.5	38 21.8	02 46	33.8	38 22.4	01 45	33.2	38 13.6	07 36	25.6	38 11.5	07 35	24.9	37 39.6	14 26	18.6	1
2	37 45.7	07 50	37.0	37 47.7	07 49	36.3	37 52.8	05 47	34.4	37 54.1	04 46	33.8	37 55.2	03 45	33.2	37 52.2	05 36	25.6	37 50.6	05 35	24.9	37 23.8	12 27	18.7	2
3	37 15.8	09 50	36.9	37 18.3	08 49	36.3	37 24.7	06 47	34.4	37 26.4	06 46	33.8	37 27.9	05 45	33.2	37 30.7	03 36	25.6	37 29.6	04 35	25.0	37 07.8	11 27	18.7	3
4	36 45.9	10 50	36.9	36 48.9	10 49	36.2	36 56.6	08 47	34.4	36 58.8	07 46	33.8	37 00.7	06 45	33.1	37 09.2	02 36	25.6	37 08.6	02 35	25.0	36 51.9	09 27	18.7	4
75	36 16.1	12 50	36.8	36 19.5	11 49	36.1	36 28.5	09 47	34.3	36 31.1	08 46	33.7	36 33.6	08 45	33.1	36 47.7	00 36	25.6	36 47.6	01 35	25.0	36 35.9	07 27	18.8	75
6	35 46.3	13 50	36.7	35 50.1	12 49	36.1	36 00.5	11 47	34.2	36 03.5	10 46	33.6	36 06.4	09 45	33.0	36 26.2	02 36	25.6	36 26.6	01 35	25.0	36 19.9	05 27	18.8	6
7	35 16.6	14 49	36.6	35 20.8	14 49	36.0	35 32.5	12 47	34.2	35 36.0	11 46	33.6	35 39.3	11 45	33.0	36 04.7	03 36	25.6	36 05.6	03 35	25.0	36 03.9	04 27	18.8	7
8	34 46.9	16 49	36.5	34 51.6	15 49	35.9	35 04.5	13 46	34.1	35 08.5	13 46	33.5	35 12.3	12 45	32.9	35 43.2	05 36	25.6	35 44.6	05 35	25.0	35 47.8	02 27	18.8	8
9	34 17.3	17 49	36.4	34 22.4	17 48	35.8	34 36.5	15 46	34.1	34 41.1	14 45	32.8	34 45.3	14 45	32.8	35 21.6	06 36	25.6	35 23.6	06 35	24.9	35 31.8	00 27	18.8	9
80	33 47.8	19 49	36.3	33 53.3	18 48	35.7	34 08.8	16 46	34.0	34 13.7	16 46	33.4	34 18.3	15 45	32.8	35 00.3	08 36	25.5	35 02.6	07 35	24.9	35 15.8	01 27	18.8	80
1	33 18.4	20 49	36.2	33 24.3	19 48	35.6	33 41.1	18 46	33.9	33 46.3	17 45	33.3	33 51.4	17 45	32.7	34 38.9	10 36	25.5	34 41.7	09 35	24.9	34 59.7	03 27	18.8	1
2	32 49.1	21 49	36.1	32 55.4	21 48	35.5	33 13.4	19 46	33.8	33 19.1	19 45	33.2	33 24.6	18 45	32.6	34 17.5	11 36	25.4	34 20.8	11 35	24.8	34 43.7	05 27	18.8	2
3	32 19.8	23 49	36.0	32 26.5	22 48	35.4	32 45.8	21 46	33.7	32 51.9	20 45	33.1	32 57.8	20 44	32.5	33 56.1	13 36	25.3	33 59.9	12 35	24.8	34 27.7	06 27	18.8	3
4	31 50.5	24 48	35.8	31 57.5	24 48	35.3	32 18.3	22 46	33.5	32 24.8	21 45	33.0	32 31.2	21 44	32.4	33 34.6	14 35	25.3	33 39.0	14 35	24.7	34 11.7	08 27	18.7	4
85	31 21.6	25 48	35.7	31 29.1	25 48	35.1	31 50.8	23 46	33.4	31 57.8	23 46	32.8	32 04.6	22 44	32.3	33 13.6	16 35	25.3	33 18.3	15 35	24.7	33 55.7	10 27	18.7	85
6	30 52.6	27 48	35.5	31 00.5	26 47	35.0	31 23.5	25 45	33.3	31 30.9	24 45	32.7	31 38.1	24 44	32.1	32 52.4	17 35	25.2	32 57.5	17 34	24.6	33 39.8	11 27	18.7	6
7	30 23.7	28 48	35.4	30 32.1	28 47	34.8	30 56.3	26 45	33.1	31 04.0	26 45	32.6	31 11.7	25 44	32.0	32 31.2	19 35	25.1	32 36.8	18 34	24.5	33 23.9	13 26	18.6	7
8	29 55.0	29 48	35.2	30 03.7	29 47	34.7	30 29.1	28 45	33.0	30 37.3	27 44	32.4	30 45.3	27 44	31.9	32 10.1	20 35	25.0	32 16.2	20 34	24.5	33 08.0	15 26	18.6	8
9	29 26.4	31 47	35.0	29 35.5	30 47	34.5	30 02.1	29 45	32.8	30 10.7	28 44	32.3	30 19.1	28 44	31.7	31 49.1	22 35	24.9	31 55.7	21 34	24.4	32 52.1	16 26	18.5	9
90	28 57.9	32 47	34.9	29 07.4	32 47	34.3	29 35.2	30 45	32.7	29 44.2	30 44	32.1	29 53.0	29 43	31.6	31 28.2	23 35	24.8	31 35.2	23 34	24.3	32 36.3	18 26	18.5	90

Lat. 34°

H.A.	60° 00' Alt.	Δd Δt	Az.	60° 30' Alt.	Δd Δt	Az.	62° 00' Alt.	Δd Δt	Az.	62° 30' Alt.	Δd Δt	Az.	63° 00' Alt.	Δd Δt	Az.	69° 00' Alt.	Δd Δt	Az.	69° 30' Alt.	Δd Δt	Az.	74° 80' Alt.	Δd Δt	Az.	H.A.
91	28 29.5	33 47	34.7	28 39.4	33 46	34.1	29 08.4	32 44	32.5	29 17.8	31 44	32.0	29 27.0	31 43	31.4	31 07.3	25 35	24.7	31 14.8	24 34	24.2	32 20.6	19 26	18.4	91
2	28 01.3	35 47	34.5	28 11.6	34 46	33.9	28 41.7	33 44	32.3	28 51.5	32 44	31.8	29 01.2	32 43	31.3	30 46.6	26 34	24.6	30 54.4	26 34	24.1	32 04.9	21 26	18.4	2
3	27 33.2	36 47	34.3	27 43.9	35 46	33.7	28 15.2	34 44	32.2	28 25.4	34 43	31.6	28 35.4	33 43	31.1	30 25.9	28 34	24.5	30 34.2	27 34	24.0	31 49.2	23 26	18.3	3
4	27 05.3	37 46	34.1	27 16.3	37 46	33.5	27 48.8	35 44	32.0	27 59.4	35 43	31.4	28 09.8	35 42	30.9	30 05.3	29 34	24.4	30 14.0	29 33	23.9	31 33.6	24 26	18.2	4
95	26 37.5	38 46	33.9	26 48.9	38 45	33.3	27 22.5	37 44	31.8	27 33.5	36 43	31.3	27 44.3	36 42	30.7	29 44.8	31 34	24.3	29 54.0	30 33	23.7	31 18.1	26 26	18.2	95
6	26 09.9	40 46	33.6	26 21.7	39 45	33.0	26 56.4	38 43	31.6	27 07.7	38 43	31.1	27 19.0	37 42	30.5	29 24.4	32 34	24.1	29 34.0	32 33	23.6	31 02.6	27 26	18.1	6
7	25 42.4	41 46	33.4	25 54.5	40 45	32.9	26 30.4	39 43	31.4	26 42.1	39 42	30.9	26 53.8	39 42	30.3	29 04.1	34 34	24.0	29 14.1	33 33	23.5	30 47.2	29 26	18.0	7
8	25 15.1	42 45	33.2	25 27.6	42 45	32.7	26 04.6	41 43	31.2	26 16.7	40 42	30.7	26 28.7	40 42	30.1	28 43.9	35 33	23.9	28 54.4	35 33	23.3	30 31.9	30 25	17.9	8
9	24 47.9	43 45	33.0	25 00.8	43 44	32.5	25 38.5	42 42	31.0	25 51.4	41 42	30.5	26 03.8	41 41	29.9	28 23.6	37 33	23.7	28 34.7	36 33	23.2	30 16.7	32 25	17.8	9
100	24 20.9	44 45	32.7	24 34.2	44 44	32.1	25 13.4	43 42	30.7	25 26.3	43 42	30.2	25 39.1	42 41	29.7	28 03.9	38 33	23.6	28 15.2	38 32	23.1	30 01.5	33 25	17.7	100
1	23 54.1	46 44	32.5	24 07.8	45 44	32.0	24 48.1	44 42	30.5	25 01.3	44 41	30.0	25 14.5	44 41	29.5	27 44.0	39 33	23.4	27 55.8	39 32	22.9	29 46.4	35 25	17.6	1
2	23 27.5	47 44	32.2	23 41.5	46 43	31.7	24 22.9	46 42	30.3	24 36.5	45 41	29.8	24 50.0	45 40	29.3	27 24.3	41 33	23.3	27 36.5	40 32	22.7	29 31.5	36 25	17.5	2
3	23 01.1	48 44	31.9	23 15.4	48 43	31.5	23 57.0	48 41	30.0	24 11.9	46 41	29.6	24 25.8	46 40	29.1	27 04.7	42 32	23.1	27 17.3	42 32	22.6	29 16.6	38 25	17.4	3
4	22 34.9	49 43	31.7	22 49.6	49 43	31.2	23 33.1	48 41	29.8	23 47.5	48 40	29.3	24 01.7	47 40	28.8	26 45.3	43 32	23.0	26 58.3	43 32	22.4	29 01.8	39 24	17.3	4
105	22 08.8	50 43	31.4	22 23.9	50 42	31.0	23 08.5	49 41	29.5	23 23.2	49 40	29.1	23 37.8	49 40	28.6	26 26.0	45 32	22.7	26 39.4	44 31	22.2	28 47.1	41 24	17.1	105
6	21 43.0	51 43	31.2	21 58.4	51 42	30.7	22 44.1	50 40	29.3	22 59.1	50 40	28.8	23 14.1	50 39	28.4	26 06.8	46 32	22.6	26 20.6	46 31	22.1	28 32.5	42 24	17.0	6
7	21 17.4	53 42	30.9	21 33.1	52 42	30.4	22 19.8	52 40	29.0	22 35.2	51 40	28.6	22 50.6	51 39	28.1	25 47.8	47 31	22.4	26 02.0	47 31	21.9	28 18.0	44 24	16.9	7
8	20 52.0	54 42	30.6	21 08.0	53 41	30.1	21 55.8	53 40	28.8	22 11.5	52 39	28.3	22 27.2	52 39	27.9	25 29.0	49 31	22.2	25 43.4	48 31	21.7	28 03.6	45 24	16.7	8
9	20 26.7	55 42	30.3	20 43.1	55 41	29.9	21 31.9	54 39	28.5	21 48.0	54 39	28.2	22 04.1	53 38	27.6	25 10.3	50 31	22.0	25 25.2	50 30	21.5	27 49.3	46 24	16.6	9
110	20 01.8	56 41	30.0	20 18.5	56 41	29.6	21 08.3	55 38	28.2	21 24.8	55 38	27.8	21 41.1	55 38	27.3	24 51.7	51 31	21.8	25 07.1	51 30	21.3	27 35.2	48 23	16.5	110
1	19 37.0	57 41	29.7	19 54.1	57 40	29.3	20 44.9	56 39	27.9	21 01.7	56 38	27.5	21 18.4	56 38	27.1	24 33.4	53 30	21.6	24 49.1	52 30	21.1	27 21.1	49 23	16.3	1
2	19 12.5	58 40	29.4	19 29.9	58 40	29.0	20 21.7	57 38	27.7	20 38.8	57 38	27.2	20 55.9	57 37	26.8	24 15.1	54 30	21.4	24 31.2	53 29	20.9	27 07.2	50 23	16.2	2
3	18 48.2	59 40	29.1	19 05.9	59 40	28.7	19 58.7	58 38	27.4	20 16.2	58 37	27.0	20 33.6	58 37	26.5	23 57.1	55 30	21.2	24 13.6	55 29	20.7	26 53.4	52 23	16.0	3
4	18 24.1	60 40	28.8	18 42.1	60 39	28.4	19 35.9	59 38	27.1	19 53.7	59 37	26.7	20 11.5	59 36	26.2	23 39.2	56 29	20.9	23 56.1	56 29	20.5	26 39.8	53 23	15.9	4
115	18 00.3	61 39	28.5	18 18.6	61 39	28.0	19 13.4	61 37	26.8	19 31.5	60 37	26.4	19 49.6	60 36	25.9	23 21.5	57 29	20.7	23 38.7	57 29	20.3	26 26.3	54 22	15.7	115
6	17 36.7	62 39	28.1	17 55.4	62 38	27.7	18 51.1	62 37	26.5	19 09.6	61 36	26.1	19 28.0	61 36	25.6	23 04.0	59 29	20.5	23 21.6	58 28	20.1	26 12.9	56 22	15.5	6
7	17 13.4	63 38	27.8	17 32.4	63 38	27.4	18 29.0	63 36	26.2	18 47.8	63 36	25.8	19 06.6	62 35	25.3	22 46.7	60 29	20.3	23 04.6	60 28	19.8	25 59.6	57 22	15.4	7
8	16 50.3	64 38	27.5	17 09.6	64 38	27.1	18 07.2	64 36	25.9	18 26.3	64 35	25.5	18 45.4	63 35	25.0	22 29.6	61 28	20.0	22 47.9	61 28	19.6	25 46.5	58 22	15.2	8
9	16 27.5	65 38	27.1	16 47.1	65 37	26.7	17 45.7	65 36	25.5	18 05.1	65 35	25.1	18 24.5	64 34	24.7	22 12.6	62 28	19.8	22 31.3	62 27	19.4	25 33.6	59 21	15.0	9
120	16 04.9	66 37	26.8	16 24.8	66 37	26.4	17 24.3	66 35	25.2	17 44.1	66 35	24.8	18 03.8	66 34	24.4	21 55.9	63 28	19.5	22 14.9	63 27	19.1	25 20.7	61 21	14.8	120
1	15 42.6	67 37	26.4	16 02.9	67 36	26.1	17 03.3	67 35	24.9	17 23.3	67 34	24.5	17 43.3	67 34	24.1	21 39.4	64 27	19.3	21 58.7	64 27	18.9	25 08.1	62 21	14.7	1
2	15 20.6	68 36	26.1	15 41.2	68 36	25.7	16 42.5	68 34	24.6	17 02.8	68 34	24.2	17 23.1	68 33	23.8	21 23.0	66 27	19.0	21 42.7	65 26	18.6	24 55.6	63 21	14.5	2
3	14 58.9	69 36	25.7	15 19.7	69 35	25.4	16 21.9	69 34	24.2	16 42.6	69 33	23.8	17 03.2	69 33	23.5	21 06.9	67 27	18.8	21 26.9	66 26	18.4	24 43.2	64 20	14.3	3
4	14 37.5	70 35	25.4	14 58.6	70 35	25.0	16 01.6	70 33	23.9	16 22.6	70 33	23.5	16 43.5	70 32	23.1	20 51.0	68 26	18.5	21 11.3	68 26	18.1	24 31.0	66 20	14.1	4
125	14 16.3	71 35	25.0	14 37.7	71 34	24.6	15 41.6	71 33	23.5	16 02.9	71 32	23.2	16 24.1	71 32	22.8	20 35.3	69 26	18.3	20 55.9	69 25	17.9	24 19.0	67 20	13.9	125
6	13 55.4	72 34	24.6	14 17.1	72 34	24.3	15 21.9	72 32	23.2	15 43.4	72 32	22.8	16 04.9	72 31	22.5	20 19.8	70 25	18.0	20 40.7	70 25	17.6	24 07.1	68 20	13.7	6
7	13 34.8	73 34	24.3	13 56.8	73 33	23.9	15 02.4	73 32	22.8	15 24.3	73 31	22.5	15 46.1	73 31	22.1	20 04.5	71 25	17.7	20 25.8	71 25	17.4	23 55.4	69 19	13.5	7
8	13 14.5	74 33	23.9	13 36.8	74 33	23.5	14 43.3	74 31	22.5	15 05.4	74 31	22.1	15 27.5	74 31	21.8	19 49.5	72 25	17.5	20 11.0	72 24	17.1	23 43.9	70 19	13.3	8
9	12 54.6	75 33	23.5	13 17.1	75 32	23.2	14 24.4	75 31	22.1	14 46.8	75 31	21.8	15 09.1	74 30	21.4	19 34.6	73 24	17.2	19 56.5	73 24	16.8	23 32.5	71 19	13.1	9
130	12 34.9	76 32	23.1	12 57.7	76 32	22.8	14 05.8	76 30	21.8	14 28.5	75 30	21.4	14 51.1	75 30	21.1	19 20.1	74 24	16.9	19 42.2	74 23	16.6	23 21.4	72 18	12.9	130
1	12 15.5	77 32	22.7	12 38.6	77 31	22.4	13 47.5	76 30	21.4	14 10.4	76 30	21.1	14 33.3	76 29	20.7	19 05.7	75 24	16.6	19 28.2	75 23	16.3	23 10.4	73 18	12.7	1
2	11 56.5	78 31	22.3	12 19.8	78 31	22.0	13 29.5	77 29	21.0	13 52.7	77 29	20.7	14 15.9	77 29	20.4	18 51.6	76 23	16.3	19 14.3	76 23	16.0	22 59.5	74 18	12.5	2
3	11 37.7	79 31	21.9	12 01.3	78 30	21.6	13 11.8	78 29	20.7	13 35.3	78 29	20.3	13 58.7	78 28	20.0	18 37.7	77 23	16.1	19 00.7	77 22	15.7	22 48.9	75 17	12.2	3
4	11 19.3	79 30	21.5	11 43.1	79 30	21.2	12 54.4	79 28	20.3	13 18.1	79 28	20.0	13 41.8	79 28	19.6	18 24.1	78 22	15.8	18 47.4	78 22	15.4	22 38.4	76 17	12.0	4
135	11 01.3	80 30	21.1	11 25.3	80 29	20.8	12 37.3	80 28	19.9	13 01.3	80 28	19.6	13 25.3	80 27	19.3	18 10.7	79 22	15.5	18 34.3	79 21	15.1	22 28.2	77 17	11.8	135
6	10 43.5	81 29	20.7	11 07.8	81 29	20.4	12 20.7	81 27	19.5	12 44.8	81 27	19.2	13 09.0	81 27	18.9	17 57.5	80 21	15.2	18 21.4	80 21	14.9	22 18.1	78 16	11.6	6
7	10 26.1	82 28	20.3	10 50.6	82 28	20.0	12 04.1	82 27	19.1	12 28.6	82 26	18.8	12 53.1	81 26	18.5	17 44.6	80 21	14.9	18 08.8	80 21	14.6	22 08.2	79 16	11.5	7
8	10 09.0	83 28	19.9	10 33.8	83 28	19.6	11 48.0	82 26	18.7	12 12.7	82 26	18.4	12 37.4	82 26	18.1	17 32.0	81 21	14.6	17 56.4	81 20	14.3	21 58.5	80 16	11.1	8
9	9 52.3	83 27	19.4	10 17.3	83 27	19.2	11 32.2	83 26	18.3	11 57.2	83 25	18.0	12 22.1	83 25	17.8	17 19.6	82 20	14.3	17 44.3	82 20	14.0	21 49.0	81 15	10.9	9
140	9 35.9	84 27	19.0	10 01.1	84 26	18.7	11 16.7	84 26	17.9	11 41.9	84 24	17.5	12 07.1	84 24	17.4	17 07.5	83 20	13.9	17 32.4	83 19	13.7	21 39.7	82 15	10.7	140
1	9 19.8	85 26	18.6	9 45.3	85 26	18.3	11 01.6	85 25	17.5	11 27.0	85 24	17.2	11 52.4	85 24	17.0	16 55.6	84 19	13.6	17 20.8	84 19	13.4	21 30.7	83 15	10.4	1
2	9 04.2	86 26	18.2	9 29.8	86 25	17.9	10 46.8	85 24	17.1	11 12.4	85 24	16.8	11 38.0	85 23	16.6	16 44.1	85 19	13.3	17 09.4	85 18	13.0	21 21.8	84 14	10.2	2
3	8 48.8	86 25	17.7	9 14.7	86 25	17.5	10 32.3	86 24	16.7	10 58.2	86 23	16.4	11 24.0	86 23	16.2	16 32.7	85 18	13.0	16 58.3	85 18	12.7	21 13.1	84 14	09.9	3
4	8 33.9	87 24	17.3	9 00.0	87 24	17.0	10 18.2	87 23	16.3	10 44.3	87 23	16.0	11 10.3	87 22	15.8	16 21.7	86 18	12.7	16 47.5	86 18	12.4	21 04.6	85 14	09.7	4
145	8 19.3	88 24	16.8	8 45.6	88 23	16.6	10 04.4	88 22	15.9	10 30.7	88 22	15.6	10 56.9	87 22	15.4	16 10.9	87 18	12.4	16 36.9	87 17	12.1	20 56.3	86 13	09.4	145
6	8 05.0	88 23	16.4	8 31.5	88 23	16.2	9 51.0	88 22	15.5	10 17.5	88 21	15.2	10 43.9	88 21	15.1	16 00.4	87 17	12.1	16 26.7	87 17	11.8	20 48.3	87 13	09.2	6
7	7 51.2	89 22	16.0	8 17.9	89 22	15.7	9 37.9	89 21	15.0	10 04.6	89 21	14.8	10 31.2	89 21	14.6	15 50.2	88 17	11.7	16 16.6	88 16	11.5	20 40.4	88 13	08.9	7
8	7 37.7	90 22	15.5	8 04.6	90 22	15.3	9 25.2	90 21	14.6	9 52.1	90 20	14.4	10 18.9	89 20	14.2	15 40.2	89 16	11.4	16 06.9	89 16	11.1	20 32.8	88 12	08.7	8
9	7 24.6	90 21	15.1	7 51.7	90 21	14.8	9 12.8	90 20	14.2	9 39.9	90 20	13.9	10 06.9	90 19	13.7	15 30.5	90 16	11.0	15 57.4	90 16	10.8	20 25.4	89 12	08.4	9
150	7 11.9	91 21	14.6	7 39.1	91 20	14.4	9 00.8	91 19	13.7	9 28.1	91 19	13.5	9 55.3	91 19	13.3	15 21.1	90 15	10.7	15 48.2	90 15	10.5	20 18.2	90 12	08.2	150
1	6 59.5	91 20	14.1	7 26.9	91 20	13.9	8 49.2	91 19	13.3	9 16.6	91 18	13.1	9 44.0	91 18	12.9	15 12.0	91 15	10.4	15 39.3	91 14	10.2	20 11.2	90 11	07.9	1
2	6 47.6	92 19	13.7	7 15.2	92 19	13.5	8 37.9	92 18	12.9	9 05.5	92 18	12.7	9 33.1	92 18	12.5	15 03.2	92 14	10.0	15 30.7	91 14	09.8	20 04.5	92 11	07.7	2
3	6 36.0	93 19	13.2	7 03.8	93 18	13.0	8 27.0	92 18	12.4	8 54.8	92 17	12.3	9 22.5	92 17	12.1	14 54.7	92 14	09.7	15 22.3	92 13	09.5	19 57.9	92 10	07.4	3
4	6 24.8	93 18	12.7	6 52.7	93 18	12.6	8 16.5	93 17	12.0	8 44.4	93 17	11.8	9 12.3	93 16	11.6	14 46.5	93 13	09.4	15 14.3	93 13	09.2	19 51.6	92 10	07.2	4
155	6 14.1	94 17	12.3	6 42.1	94 17	12.1	8 06.3	94 16	11.6	8 34.4	94 16	11.4	9 02.4	93 16	11.2	14 38.6	93 13	09.0	15 06.5	93 12	08.8	19 45.5	93 10	06.9	155
6	6 03.7	94 17	11.8	6 31.9	94 16	11.6	7 56.5	94 16	11.1	8 24.7	94 15	10.9	8 53.0	94 15	10.8	14 30.9	94 12	08.7	14 59.0	94 12	08.5	19 39.7	93 09	06.6	6
7	5 53.7	95 16	11.3	6 22.1	95 16	11.2	7 47.1	95 15	10.7	8 15.5	94 15	10.5	8 43.8	94 15	10.3	14 23.6	94 12	08.3	14 51.8	94 11	08.1	19 34.0	94 09	06.4	7
8	5 44.1	95 15	10.9	6 12.6	95 15	10.7	7 38.1	95 14	10.2	8 06.6	95 14	10.1	8 35.1	95 14	09.9	14 16.5	95 11	08.0	14 44.9	95 11	07.8	19 28.7	94 09	06.1	8
9	5 35.0	95 15	10.4	6 03.6	95 14	10.2	7 29.5	95 14	09.8	7 58.1	95 14	09.6	8 26.7	95 13	09.5	14 09.8	95 11	07.6	14 38.3	95 11	07.5	19 23.5	95 08	05.8	9
160	5 26.2	96 14	09.9	5 55.0	96 14	09.7	7 21.2	96 13	09.3	7 50.0	96 13	09.2	8 18.7	96 13	09.0	14 03.4	96 10	07.3	14 32.0	96 10	07.1	19 18.6	95 08	05.6	160
1	5 17.9	96 13	09.4	5 46.8	96 13	09.3	7 13.4	96 12	08.9	7 42.3	96 12	08.7	8 11.1	96 12	08.6	13 57.2	96 10	06.9	14 26.0	96 10	06.8	19 13.9	96 07	05.3	1
2	5 10.0	97 12	08.9	5 39.0	97 12	08.8	7 05.9	97 12	08.4	7 34.9	97 12	08.3	8 03.9	97 11	08.1	13 51.4	96 09	06.5	14 20.3	96 09	06.4	19 09.4	96 07	05.0	2
3	5 02.5	97 12	08.4	5 31.6	97 12	08.3	6 58.8	97 11	07.9	7 27.9	97 11	07.8	7 57.0	97 11	07.7	13 45.9	97 09	06.2	14 14.9	97 08	06.1	19 05.2	97 07	04.7	3
4				5 24.6	97 11	07.8	6 52.2	97 10	07.5	7 21.4	97 10	07.4	7 50.5	97 10	07.3	13 40.7	97 08	05.8	14 09.8	97 08	05.7	19 01.2	97 06	04.5	4
165				5 18.0	98 10	07.4	6 45.9	98 10	07.0	7 15.2	98 10	06.9	7 44.5	98 10	06.8	13 35.8	98 08	05.5	14 05.0	98 08	05.4	18 57.4	97 06	04.2	165
6				5 11.8	98 10	06.9	6 40.0	98 09	06.6	7 09.4	98 09	06.5	7 38.7	98 09	06.4	13 31.2	98 07	05.1	14 00.5	98 07	05.1	18 53.9	98 05	03.9	6
7				5 06.1	98 09	06.4	6 34.5	98 08	06.1	7 04.0	98 08	06.0	7 33.4	98 08	05.9	13 26.9	98 07	04.8	13 56.3	98 06	04.7	18 50.6	98 05	03.6	7
8				5 00.8	98 08	05.9	6 29.4	98 08	05.6	6 59.0	98 08	05.6	7 28.5	98 08	05.5	13 22.9	98 06	04.4	13 52.4	98 06	04.3	18 47.6	98 05	03.4	8
9							6 24.7	99 07	05.2	6 54.3	99 07	05.1	7 24.0	99 07	05.0	13 19.3	99 06	04.0	13 48.9	99 05	03.9	18 44.8	99 04	03.1	9
170							6 20.4	99 06	04.6	6 50.1	99 06	04.6	7 19.8	99 06	04.6	13 15.9	99 05	03.7	13 45.6	99 05	03.6	18 42.2	99 04	02.8	170
1							6 16.6	99 06	04.2	6 46.3	99 06	04.2	7 16.1	99 06	04.1	13 12.9	99 05	03.3	13 42.6	99 04	03.2	18 39.9	99 03	02.5	1
2							6 13.1	99 05	03.8	6 42.9	99 05	03.7	7 12.7	99 05	03.7	13 10.2	99 04	02.9	13 40.0	99 04	02.9	18 37.8	99 03	02.2	2
3							6 10.0	99 04	03.3	6 39.9	99 04	03.2	7 09.7	99 04	03.2	13 07.8	99 03	02.6	13 37.7	99 03	02.5	18 36.0	99 03	02.0	3
4							6 07.4	1.0 04	02.8	6 37.3	1.0 04	02.8	7 07.1	1.0 04	02.7	13 05.7	1.0 03	02.2	13 35.5	1.0 03	02.2	18 34.4	1.0 02	01.7	4
175							6 05.1	1.003	02.4	6 35.0	1.003	02.3	7 05.0	1.003	02.3	13 04.0	1.002	01.8	13 33.9	1.002	01.8	18 33.1	1.002	01.4	175
6							6 03.2	1.002	01.9	6 33.2	1.002	01.9	7 03.2	1.002	01.9	13 02.6	1.002	01.4	13 32.6	1.002	01.4	18 32.0	1.001	01.1	6
7							6 01.8	1.002	01.4	6 31.8	1.001	01.4	7 01.8	1.001	01.4	13 01.4	1.001	01.1	13 31.4	1.001	01.1	18 31.1	1.001	00.8	7
8							6 00.8	1.001	00.9	6 30.8	1.001	00.9	7 00.8	1.001	00.9	13 00.6	1.001	00.7	13 30.6	1.001	00.7	18 30.5	1.001	00.6	8
9							6 00.2	1.000	00.5	6 30.2	1.000	00.5	7 00.2	1.000	00.5	13 00.2	1.000	00.4	13 30.2	1.000	00.4	18 30.2	1.000	00.3	9
180							6 00.0	1.000	00.0	6 30.0	1.000	00.0	7 00.0	1.000	00.0	13 00.0	1.000	00.0	13 30.0	1.000	00.0	18 30.0	1.000	00.0	180

Lat. 34°
Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 34° AZ.	4° Dec.	4° H.A.	8° Dec.	8° H.A.	12° Dec.	12° H.A.	16° Dec.	16° H.A.	20° Dec.	20° H.A.	24° Dec.	24° H.A.	28° Dec.	28° H.A.	32° Dec.	32° H.A.	36° Dec.	36° H.A.	40° Dec.	40° H.A.	44° Dec.	44° H.A.	AZ.
00	60	180	64	180	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	80	00	00
4	60	172	64	171	68	170	72	168	76	165	79	160	83	149	86	120	86	57	83	27	80	16	4
8	59	164	63	162	67	160	71	156	74	151	78	143	81	129	83	104	83	71	81	44	78	29	8
12	58	157	62	154	65	151	69	146	72	140	76	131	78	117	80	98	80	75	79	54	76	39	12
16	57	150	60	147	64	143	67	137	70	131	73	121	75	109	76	94	77	77	76	60	74	46	16
20	55	144	58	140	61	136	65	130	67	123	70	115	72	104	73	91	74	77	73	64	72	51	20
24	53	138	56	134	59	129	62	124	65	117	67	109	69	100	70	89	70	77	70	66	69	55	24
28	50	133	53	129	56	124	59	119	62	112	64	105	65	96	67	87	67	77	67	67	66	57	28
32	48	128	51	124	54	119	56	114	58	108	60	101	62	94	63	85	64	76	64	67	63	58	32
36	45	124	48	120	51	115	53	110	55	104	57	98	59	91	60	84	61	76	61	68	61	59	36
40	42	120	45	116	48	111	50	107	52	101	54	95	55	89	57	82	57	75	58	67	58	60	40
44	39	116	42	112	44	108	47	103	49	98	51	93	52	87	53	81	54	74	55	67	55	60	44
48	36	113	39	109	41	105	43	100	45	96	47	90	49	85	50	79	51	73	52	67	52	60	48
52	33	110	36	106	38	102	40	98	42	93	44	88	45	83	47	78	48	72	49	66	49	60	52
56	30	107	32	103	35	99	37	95	39	91	41	86	42	81	44	76	45	71	46	65	46	60	56
60	27	104	29	101	31	97	34	93	36	89	37	84	39	79	40	75	42	70	43	64	43	59	60
64	24	102	26	98	28	94	30	90	32	86	34	82	36	78	37	73	39	68	40	63	41	58	64
68	22	99	23	96	25	92	27	88	29	84	31	80	32	76	34	72	35	67	37	62	38	57	68
72	17	97	19	93	22	90	24	86	26	82	27	78	29	74	31	70	32	66	34	61	35	57	72
76	14	95	16	91	18	88	20	84	22	80	24	76	26	73	28	68	29	64	31	60	32	56	76
80	11	92	13	89	15	85	17	82	19	78	21	75	23	71	25	67	26	63	28	59	29	54	80
84	07	90	09	87	12	83	14	80	16	76	18	73	20	69	22	65	24	61	25	57	27	53	84
88	04	88	06	84	08	81	10	78	13	74	15	71	17	67	19	63	21	60	22	56	24	52	88
92	01	86	03	82	05	79	07	76	09	72	12	69	14	65	16	62	18	58	20	54	22	51	92
96	*03*	83	*00*	80	*02*	77	04	73	06	70	09	67	11	63	13	60	15	56	17	53	19	49	96
100	*06*	81	*04*	78	*01*	74	*01*	71	03	68	06	65	08	61	10	58	12	55	14	51	17	48	100
104	*09*	79	*07*	75	*05*	72	*02*	69	00	66	03	63	05	59	07	56	10	53	12	49	14	46	104
108	*13*	76	*10*	73	*08*	70	*05*	67	*03*	63	00	60	02	57	05	54	07	51	09	48	12	44	108
112	*16*	74	*13*	71	*11*	67	*08*	64	*06*	61	*03*	58	01	55	02	52	04	49	07	46	10	43	112
116	*19*	71	*16*	68	*14*	65	*11*	62	*09*	59	*06*	56	*03*	53	01	50	02	47	05	44	07	41	116
120	*22*	69	*19*	65	*17*	62	*14*	59	*11*	56	*09*	53	*06*	50	*03*	47	*00*	44	02	42	*05*	39	120
124	*25*	66	*22*	63	*20*	59	*17*	56	*14*	53	*11*	51	*08*	48	*06*	45	*03*	42	*00*	39	03	37	124
128	*28*	63	*25*	60	*23*	57	*20*	54	*17*	51	*14*	48	*11*	45	*08*	42	*05*	40	*02*	37	01	35	128
132	*31*	60	*28*	57	*25*	53	*22*	51	*19*	48	*16*	45	*13*	42	*10*	40	*07*	37	*04*	35	*01*	32	132
136	*34*	56	*31*	53	*28*	50	*25*	47	*22*	45	*19*	42	*15*	39	*12*	37	*09*	35	*06*	32	*02*	30	136
140	*36*	53	*33*	50	*30*	47	*27*	44	*24*	41	*21*	39	*17*	36	*14*	34	*11*	32	*07*	30	*04*	28	140
144	*39*	49	*36*	46	*33*	43	*29*	40	*26*	38	*23*	36	*19*	33	*16*	31	*12*	29	*09*	27	*05*	25	144
148	*41*	45	*38*	42	*35*	39	*31*	37	*28*	34	*25*	32	*21*	30	*17*	28	*14*	26	*10*	24	*07*	23	148
152	*44*	40	*40*	38	*37*	35	*33*	33	*30*	31	*26*	29	*23*	27	*19*	25	*15*	23	*12*	22	*08*	20	152
156	*46*	36	*42*	33	*39*	31	*35*	29	*31*	27	*28*	25	*24*	23	*20*	22	*17*	20	*13*	19	*09*	17	156
160	*48*	30	*44*	28	*40*	26	*36*	24	*33*	22	*29*	21	*25*	19	*21*	18	*18*	17	*14*	16	*10*	14	160
164	*49*	25	*45*	23	*42*	21	*38*	20	*34*	18	*30*	17	*26*	16	*22*	15	*18*	14	*15*	13	*11*	12	164
168	*50*	19	*46*	17	*43*	16	*39*	15	*35*	14	*31*	13	*27*	12	*23*	11	*19*	10	*15*	09	*11*	09	168
172	*51*	13	*47*	12	*43*	11	*39*	10	*35*	09	*32*	09	*28*	08	*24*	07	*20*	07	*16*	06	*12*	06	172
176	*52*	06	*48*	06	*44*	05	*40*	05	*36*	05	*32*	04	*28*	04	*24*	04	*20*	03	*16*	03	*12*	03	176
180	*52*	00	*48*	00	*44*	00	*40*	00	*36*	00	*32*	00	*28*	00	*24*	00	*20*	00	*16*	00	*12*	00	180
	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		

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

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 34°

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	76	00	72	00	68	00	64	00	60	00	56	00	52	00	48	00	44	00	40	00	36	00	00
4	76	11	72	08	68	06	64	05	60	03	56	03	52	02	48	01	44	01	40	01	36	00	4
8	75	21	71	15	67	13	63	09	60	07	56	05	52	04	48	03	44	02	40	01	36	00	8
12	73	29	70	22	66	17	63	13	59	10	55	08	51	06	48	04	44	03	40	01	36	01	12
16	72	36	69	28	65	22	62	17	58	13	55	10	51	08	47	06	44	04	40	02	36	01	16
20	70	41	67	33	64	26	61	21	58	16	54	13	51	10	47	07	43	05	40	03	36	01	20
24	67	45	65	36	63	30	60	24	57	19	53	15	50	11	47	08	43	06	39	03	36	01	24
28	65	48	63	40	61	33	58	26	55	21	52	17	49	13	46	09	43	06	39	04	36	01	28
32	62	50	61	42	59	35	57	29	54	23	51	19	49	14	45	11	42	07	39	04	36	01	32
36	60	51	59	44	57	37	55	31	53	25	50	20	48	16	45	12	42	08	39	05	36	01	36
40	57	53	56	45	55	39	53	33	51	27	49	22	47	17	44	13	41	09	39	05	36	02	40
44	55	53	54	47	53	40	51	34	50	28	48	23	46	18	43	14	41	09	38	05	35	02	44
48	52	54	51	47	51	41	50	35	48	29	47	24	45	19	42	14	40	10	38	06	35	02	48
52	49	54	49	48	49	42	48	36	47	30	45	25	44	20	42	15	40	10	38	06	35	02	52
56	47	54	47	48	46	42	46	36	45	31	44	25	42	20	41	15	39	11	37	06	35	02	56
60	44	53	44	48	44	42	44	37	43	31	42	26	41	21	40	16	39	11	37	06	35	02	60
64	41	53	42	48	42	42	42	37	41	32	41	26	40	21	39	16	38	11	36	07	35	02	64
68	39	53	39	47	40	42	40	37	40	32	39	27	39	22	38	17	37	12	36	07	35	02	68
72	36	52	37	47	37	42	38	37	38	32	38	27	38	22	37	17	37	12	36	07	35	02	72
76	33	51	34	46	35	42	36	37	36	32	36	27	36	22	36	17	36	12	35	07	34	02	76
80	31	50	32	46	33	41	34	36	34	32	35	27	35	22	35	17	35	12	35	07	34	02	80
84	28	49	30	45	31	40	32	36	33	31	33	27	34	22	34	17	34	12	34	07	34	02	84
88	26	48	27	44	29	40	30	35	31	31	32	26	33	22	33	17	34	12	34	07	34	02	88
92	23	47	25	43	27	39	28	34	29	30	31	26	32	21	32	17	33	12	34	07	34	02	92
96	21	45	23	42	25	38	26	34	28	29	29	25	30	21	31	16	32	12	33	07	34	02	96
100	19	44	21	40	23	37	24	33	26	29	28	25	29	20	31	16	32	12	33	07	34	02	100
104	16	43	18	39	21	35	23	32	24	28	26	24	28	20	30	16	31	11	32	07	33	02	104
108	14	41	16	38	19	34	21	31	23	27	25	23	27	19	29	15	30	11	32	07	33	02	108
112	12	39	14	36	17	33	19	29	21	26	24	22	26	19	28	15	30	11	32	07	33	02	112
116	10	38	13	35	15	31	18	28	20	25	22	21	25	18	27	14	29	10	31	06	33	02	116
120	08	36	11	33	13	30	16	27	19	24	21	20	24	17	26	14	29	10	31	06	33	02	120
124	06	34	09	31	12	28	15	25	17	22	20	19	23	16	25	13	28	09	31	06	33	02	124
128	04	32	07	29	10	27	13	24	16	21	19	18	22	15	25	12	28	09	30	05	33	02	128
132	03	30	06	27	09	25	12	22	15	20	18	17	21	14	24	11	27	08	30	05	33	02	132
136	01	28	04	25	07	23	11	21	14	18	17	16	20	13	23	11	27	08	30	05	33	02	136
140	*01*	25	03	23	06	21	10	19	13	17	16	15	20	12	23	10	26	07	29	04	32	02	140
144	*02*	23	02	21	05	19	09	17	12	15	15	13	19	11	22	09	26	07	29	04	32	01	144
148	*03*	21	00	19	04	17	08	16	11	14	15	12	18	10	22	08	25	06	29	04	32	01	148
152	*04*	18	*01*	17	03	15	07	14	10	12	14	10	18	09	21	07	25	05	29	03	32	01	152
156	*05*	16	*01*	15	02	13	06	12	10	10	14	09	17	08	21	06	25	04	28	03	32	01	156
160	*06*	13	*02*	12	02	11	05	10	09	09	13	08	17	06	21	05	25	04	28	02	32	01	160
164	*07*	11	*03*	10	01	09	05	08	09	07	13	06	17	05	20	04	24	03	28	02	32	01	164
168	*07*	08	*03*	07	01	07	05	06	08	05	12	05	16	04	20	03	24	02	28	01	32	00	168
172	*08*	05	*04*	05	00	04	04	04	08	04	12	03	16	03	20	02	24	02	28	01	32	00	172
176	*08*	03	*04*	02	00	02	04	02	08	02	12	02	16	01	20	01	24	01	28	00	32	00	176
180	*08*	00	*04*	00	00	00	04	00	08	00	12	00	16	00	20	00	24	00	28	00	32	00	180

Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

48°	52°	56°	60°	64°	68°	72°	76°	80°	84°	88°

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

Lat. 35°

H.A.	0° 00′ Alt · Δd Δt · Az.	0° 30′ Alt · Δd Δt · Az.	1° 00′ Alt · Δd Δt · Az.	1° 30′ Alt · Δd Δt · Az.	2° 00′ Alt · Δd Δt · Az.	2° 30′ Alt · Δd Δt · Az.	3° 00′ Alt · Δd Δt · Az.	3° 30′ Alt · Δd Δt · Az.	H.A.
00	55 00.0 1.00 1 180.0	55 30.0 1.00 1 180.0	56 00.0 1.00 1 180.0	56 30.0 1.00 1 180.0	57 00.0 1.00 1 180.0	57 30.0 1.00 1 180.0	58 00.0 1.00 1 180.0	58 30.0 1.00 1 180.0	00
1	54 59.3 1.04 178.3	55 29.2 1.04 178.2	55 59.2 1.04 178.2	56 29.2 1.04 178.2	56 59.2 1.04 178.2	57 29.2 1.04 178.1	57 59.2 1.04 178.1	58 29.2 1.04 178.1	1
2	54 57.0 1.06 176.5	55 27.0 1.06 176.5	55 56.9 1.06 176.4	56 26.9 1.06 176.4	56 56.9 1.07 176.3	57 26.8 1.07 176.3	57 56.8 1.07 176.2	58 26.7 1.07 176.2	2
3	54 53.3 1.09 174.8	55 23.2 1.09 174.7	55 53.1 1.09 174.6	56 23.0 1.09 174.6	56 52.9 1.09 174.5	57 22.8 1.09 174.4	57 52.7 1.010 174.4	58 22.6 1.010 174.3	3
4	54 48.1 1.011 173.0	55 17.9 99 11 173.0	55 47.8 99 11 172.9	56 17.6 99 12 172.8	56 47.4 99 12 172.7	57 17.3 99 12 172.6	57 47.1 99 12 172.5	58 16.9 99 12 172.4	4
05	54 41.4 99 14 171.3	55 11.2 99 14 171.2	55 40.9 99 14 171.1	56 10.7 99 14 171.0	56 40.4 99 14 170.9	57 10.2 99 14 170.8	57 39.9 99 15 170.6	58 09.6 99 15 170.5	05
6	54 33.3 99 16 169.6	55 02.9 99 16 169.5	55 32.6 99 16 169.4	56 02.2 99 17 169.2	56 31.9 99 17 169.1	57 01.5 99 17 168.9	57 31.1 99 17 168.8	58 00.7 99 17 168.6	6
7	54 23.7 99 18 167.9	54 53.2 98 19 167.8	55 22.8 98 19 167.6	55 52.3 98 19 167.5	56 21.8 98 19 167.3	56 51.3 98 20 167.1	57 20.8 98 20 167.0	57 50.3 98 20 166.8	7
8	54 12.7 98 21 166.2	54 42.1 98 21 166.1	55 11.5 98 21 165.9	55 40.9 98 21 165.7	56 10.3 98 22 165.5	56 39.6 98 22 165.3	57 09.0 98 22 165.2	57 38.3 98 22 165.0	8
9	54 00.3 98 23 164.6	54 29.6 98 23 164.4	54 58.8 97 24 164.2	55 28.0 97 24 164.0	55 57.3 97 24 163.8	56 26.5 97 24 163.6	56 55.6 97 25 163.4	57 24.8 97 25 163.1	9
10	53 46.5 97 25 162.9	54 15.6 97 25 162.7	54 44.7 97 26 162.5	55 13.8 97 26 162.3	55 42.8 97 26 162.1	56 11.8 97 27 161.8	56 40.8 97 27 161.6	57 09.8 97 27 161.4	10
1	53 31.4 96 27 161.3	54 00.4 96 28 161.1	54 29.3 96 28 160.8	54 58.1 96 28 160.6	55 27.0 96 29 160.4	55 55.8 96 29 160.1	56 24.6 96 29 159.9	56 53.4 96 30 159.6	1
2	53 15.0 96 30 159.7	53 43.7 96 30 159.4	54 12.4 96 30 159.2	54 41.1 96 31 158.9	55 09.8 95 31 158.7	55 38.4 95 31 158.4	56 07.0 95 32 158.1	56 35.5 95 32 157.9	2
3	52 57.3 95 32 158.1	53 25.8 95 32 157.8	53 54.3 95 32 157.6	54 22.8 95 33 157.3	54 51.2 95 33 157.0	55 19.6 95 33 156.7	55 48.0 94 34 156.4	56 16.3 94 34 156.1	3
4	52 38.3 95 34 156.5	53 06.6 94 34 156.2	53 34.9 94 34 156.0	54 03.2 94 35 155.7	54 31.4 94 35 155.4	54 59.6 94 36 155.1	55 27.7 94 36 154.8	55 55.8 94 36 154.5	4
15	52 18.1 94 36 155.0	52 46.2 94 36 154.7	53 14.3 94 36 154.4	53 42.3 93 37 154.1	54 10.3 93 37 153.8	54 38.2 93 38 153.5	55 06.1 93 38 153.1	55 34.0 93 38 152.8	15
6	51 56.7 93 38 153.4	52 24.6 93 38 153.1	52 52.4 93 38 152.8	53 20.2 93 39 152.5	53 48.0 92 39 152.2	54 15.7 92 40 151.9	54 43.3 92 40 151.5	55 10.9 92 40 151.2	6
7	51 34.1 92 39 151.9	52 01.8 92 40 151.6	52 29.4 92 40 151.3	52 57.0 92 41 151.0	53 24.5 92 41 150.6	53 51.9 91 42 150.3	54 19.3 91 42 149.9	54 46.6 91 42 149.6	7
8	51 10.5 91 41 150.5	51 37.9 91 42 150.1	52 05.3 91 42 149.8	52 32.6 91 43 149.5	52 59.8 91 43 149.1	53 27.0 91 43 148.8	53 54.1 90 44 148.4	54 21.2 90 44 148.0	8
9	50 45.7 91 43 149.0	51 12.9 90 43 148.7	51 40.0 90 44 148.3	52 07.1 90 44 148.0	52 34.0 90 45 147.6	53 01.0 90 45 147.3	53 27.8 89 46 146.9	53 54.6 89 46 146.5	9
20	50 19.9 90 45 147.6	50 46.8 90 45 147.3	51 13.7 89 46 146.9	51 40.5 89 46 146.5	52 07.2 89 46 146.2	52 33.9 89 47 145.8	53 00.5 88 47 145.4	53 27.0 88 48 145.0	20
1	49 53.1 89 46 146.2	50 19.7 89 47 145.9	50 46.3 89 47 145.5	51 12.9 88 48 145.1	51 39.3 88 48 144.7	52 05.7 88 49 144.4	52 32.0 88 49 144.0	52 58.3 87 49 143.6	1
2	49 25.2 88 48 144.8	49 51.7 88 48 144.5	50 18.0 88 49 144.1	50 44.3 87 49 143.7	51 10.5 87 50 143.3	51 36.6 87 50 142.9	52 02.6 87 51 142.5	52 28.6 86 51 142.1	2
3	48 56.5 87 50 143.5	49 22.6 87 50 143.1	49 48.7 87 50 142.7	50 14.7 87 51 142.4	50 40.7 86 51 142.0	51 06.5 86 52 141.6	51 32.3 86 52 141.1	51 57.9 85 53 140.7	3
4	48 26.8 86 51 142.2	48 52.7 86 51 141.8	49 18.5 86 52 141.4	49 44.2 86 52 141.0	50 09.9 85 53 140.6	50 35.5 85 53 140.2	51 01.0 85 54 139.8	51 26.4 85 54 139.4	4
25	47 56.2 86 52 140.9	48 21.8 85 53 140.5	48 47.4 85 53 140.1	49 12.9 85 54 139.7	49 38.3 85 54 139.3	50 03.6 84 55 138.9	50 28.8 84 55 138.5	50 53.9 84 55 138.0	25
6	47 24.8 85 54 139.6	47 50.2 84 54 139.2	48 15.5 84 55 138.8	48 40.7 84 55 138.4	49 05.8 84 55 138.0	49 30.9 83 56 137.6	49 55.8 83 56 137.2	50 20.7 83 57 136.7	6
7	46 52.5 84 55 138.4	47 17.7 84 55 138.0	47 42.7 83 56 137.6	48 07.7 83 56 137.2	48 32.5 83 57 136.7	48 57.3 82 57 136.3	49 22.0 82 58 135.9	49 46.6 82 58 135.4	7
8	46 19.5 83 56 137.2	46 44.4 83 57 136.8	47 09.2 82 57 136.4	47 33.9 82 58 135.9	47 58.5 82 58 135.5	48 23.0 82 58 135.1	48 47.4 81 59 134.6	49 11.7 81 59 134.2	8
9	45 45.7 82 58 136.0	46 10.3 82 58 135.6	46 34.9 82 58 135.2	46 59.3 81 59 134.7	47 23.6 81 59 134.3	47 47.9 81 60 133.9	48 12.0 80 60 133.4	48 36.1 80 61 133.0	9
30	45 11.2 81 59 134.8	45 35.6 81 59 134.4	45 59.8 81 60 134.0	46 24.0 80 60 133.5	46 48.1 80 60 133.1	47 12.1 80 61 132.7	47 36.0 79 61 132.2	47 59.8 79 62 131.8	30
1	44 36.0 81 60 133.7	45 00.1 80 60 133.2	45 24.1 80 61 132.8	45 48.1 80 61 132.4	46 11.9 79 61 132.0	46 35.6 79 62 131.5	46 59.3 79 62 131.1	47 22.8 78 63 130.6	1
2	44 00.1 80 61 132.5	44 24.0 79 61 132.1	44 47.8 79 62 131.7	45 11.4 79 62 131.3	45 35.0 78 62 130.8	45 58.5 78 63 130.4	46 21.9 78 63 129.9	46 45.1 77 64 129.5	2
3	43 23.6 79 62 131.5	43 47.2 79 62 131.0	44 10.8 78 63 130.6	44 34.2 78 63 130.2	44 57.5 78 64 129.7	45 20.8 77 64 129.3	45 43.9 77 64 128.8	46 06.9 77 65 128.4	3
4	42 46.4 78 63 130.4	43 09.8 78 63 129.9	43 33.1 77 64 129.5	43 56.3 77 64 129.1	44 19.9 77 64 128.6	44 42.4 76 65 128.2	45 05.3 76 65 127.7	45 28.1 76 66 127.3	4
35	42 08.7 77 64 129.3	42 31.9 77 65 128.8	42 54.9 77 65 128.5	43 17.9 76 65 128.0	43 40.7 76 66 127.6	44 03.5 76 66 127.1	44 26.1 75 66 126.7	44 48.7 75 67 126.2	35
6	41 30.4 77 65 128.3	41 53.3 76 65 127.9	42 16.2 76 66 127.4	42 38.9 76 66 127.0	43 01.5 75 66 126.5	43 24.0 75 67 126.1	43 46.5 75 67 125.6	44 08.8 74 67 125.2	6
7	40 51.6 76 66 127.3	41 14.3 76 66 126.8	41 36.9 75 66 126.4	41 59.4 75 67 126.0	42 21.8 74 67 125.5	42 44.1 74 67 125.1	43 06.2 74 68 124.6	43 28.3 73 68 124.1	7
8	40 12.2 75 66 126.3	40 34.7 75 67 125.8	40 57.1 74 67 125.4	41 19.3 74 68 125.0	41 41.5 74 68 124.5	42 03.6 73 68 124.1	42 25.5 73 69 123.6	42 47.4 73 69 123.1	8
9	39 32.3 74 67 125.3	39 54.6 74 68 124.9	40 16.8 74 68 124.4	40 38.8 73 68 124.0	41 00.8 73 69 123.5	41 22.5 73 69 123.0	41 44.4 72 69 122.6	42 05.8 72 70 122.2	9
40	38 52.0 74 68 124.4	39 14.0 73 68 123.9	39 36.0 73 69 123.5	39 57.8 73 69 123.0	40 19.6 72 69 122.6	40 41.2 72 70 122.1	41 02.8 72 70 121.7	41 24.2 71 70 121.2	40
1	38 11.2 73 69 123.4	38 33.0 73 69 123.0	38 54.8 72 69 122.5	39 16.4 72 70 122.1	39 38.0 72 70 121.6	39 59.4 71 70 121.2	40 20.7 71 71 120.7	40 41.9 71 71 120.3	1
2	37 29.9 72 69 122.5	37 51.6 72 70 122.1	38 13.1 72 70 121.6	38 34.6 71 70 121.2	38 55.9 71 71 120.7	39 17.1 71 71 120.3	39 38.3 70 71 119.8	39 59.3 70 72 119.3	2
3	36 48.3 72 70 121.6	37 09.7 71 70 121.2	37 31.1 71 71 120.7	37 52.3 71 71 120.3	38 13.5 70 71 119.8	38 34.5 70 72 119.4	38 55.4 70 72 118.9	39 16.3 69 72 118.4	3
4	36 06.2 71 71 120.7	36 27.5 71 71 120.3	36 48.6 71 71 119.8	37 09.7 70 72 119.4	37 30.6 70 72 118.9	37 51.5 69 72 118.5	38 12.2 69 73 118.0	38 32.8 69 73 117.6	4
45	35 23.8 70 71 119.8	35 44.8 70 72 119.4	36 05.8 70 72 119.0	36 26.7 69 72 118.5	36 47.4 69 73 118.1	37 08.1 69 73 117.6	37 28.7 68 73 117.2	37 49.1 68 73 116.7	45
6	34 41.0 70 72 119.0	35 01.8 69 72 118.5	35 22.6 69 73 118.1	35 43.3 69 73 117.7	36 03.9 68 73 117.2	36 24.4 68 73 116.8	36 44.8 68 74 116.3	37 05.0 67 74 115.8	6
7	33 57.8 69 73 118.1	34 18.5 69 73 117.7	34 39.1 69 73 117.3	34 59.6 68 73 116.8	35 20.0 68 74 116.4	35 40.3 68 74 115.9	36 00.5 67 74 115.5	36 20.6 67 74 115.0	7
8	33 14.3 69 73 117.3	33 34.8 68 73 116.9	33 55.2 68 74 116.4	34 15.6 68 74 116.0	34 35.8 67 74 115.5	34 56.0 67 74 115.1	35 16.0 67 75 114.6	35 36.0 66 75 114.2	8
9	32 30.5 68 74 116.5	32 50.8 68 74 116.1	33 11.1 67 74 115.6	33 31.3 67 74 115.2	33 51.3 67 75 114.7	34 11.3 66 75 114.3	34 31.2 66 75 113.8	34 51.2 66 75 113.4	9
50	31 46.3 67 74 115.7	32 06.5 67 74 115.3	32 26.6 67 75 114.8	32 46.6 67 75 114.4	33 06.6 66 75 113.9	33 26.4 66 75 113.5	33 46.1 66 76 113.0	34 05.7 65 76 112.6	50
1	31 01.9 67 75 114.9	31 21.9 67 75 114.5	31 41.9 66 75 114.0	32 01.7 66 75 113.6	32 21.5 66 76 113.2	32 41.2 65 76 112.7	33 00.7 65 76 112.3	33 20.2 65 76 111.8	1
2	30 17.2 66 75 114.1	30 37.1 66 75 113.7	30 56.9 66 75 113.3	31 16.6 66 76 112.8	31 36.2 65 76 112.4	31 55.7 65 76 111.9	32 15.1 65 76 111.5	32 34.5 64 77 111.0	2
3	29 32.2 66 75 113.4	29 51.9 66 76 112.9	30 11.6 65 76 112.5	30 31.1 65 76 112.1	30 50.6 65 76 111.6	31 10.0 64 77 111.1	31 29.3 64 77 110.7	31 48.5 64 77 110.3	3
4	28 46.9 65 76 112.6	29 06.5 65 76 112.2	29 26.0 65 76 111.8	29 45.5 65 76 111.3	30 04.8 64 77 110.9	30 24.0 64 77 110.4	30 43.2 64 77 110.0	31 02.3 63 77 109.5	4
55	28 01.5 65 76 111.9	28 20.9 65 76 111.4	28 40.3 64 77 111.0	28 59.6 64 77 110.6	29 18.8 64 77 110.1	29 37.9 64 77 109.7	29 56.9 63 78 109.2	30 15.8 63 78 108.8	55
6	27 15.7 65 77 111.2	27 35.1 64 77 110.7	27 54.3 64 77 110.3	28 13.4 64 77 109.9	28 32.5 63 77 109.4	28 51.5 63 78 109.0	29 10.4 63 78 108.5	29 29.2 62 78 108.1	6
7	26 29.8 64 77 110.4	26 49.0 64 77 110.0	27 08.1 63 78 109.6	27 27.1 63 78 109.1	27 46.1 63 78 108.7	28 04.9 63 78 108.3	28 23.7 62 78 107.8	28 42.4 62 78 107.4	7
8	25 43.6 64 77 109.7	26 02.7 63 77 109.3	26 21.7 63 78 108.9	26 40.6 63 78 108.4	26 59.4 62 78 108.0	27 18.2 62 78 107.5	27 36.8 62 78 107.1	27 55.4 62 79 106.7	8
9	24 57.3 63 78 109.0	25 16.2 63 78 108.6	25 35.1 63 78 108.2	25 53.9 63 78 107.7	26 12.6 62 78 107.3	26 31.2 62 79 106.9	26 49.8 62 79 106.4	27 08.2 61 79 106.0	9
60	24 10.7 63 78 108.3	24 29.5 63 78 107.9	24 48.3 62 78 107.5	25 07.0 62 78 107.0	25 25.6 62 79 106.6	25 44.1 62 79 106.2	26 02.5 61 79 105.7	26 20.9 61 79 105.3	60
1	23 23.9 62 78 107.6	23 42.7 62 78 107.2	24 01.3 62 79 106.8	24 19.9 62 79 106.4	24 38.4 62 79 105.9	24 56.8 61 79 105.5	25 15.1 61 79 105.0	25 33.4 61 79 104.6	1
2	22 37.0 62 78 107.0	22 55.6 62 79 106.5	23 14.2 62 79 106.1	23 32.6 61 79 105.7	23 51.0 61 79 105.2	24 09.4 61 79 104.8	24 27.6 61 79 104.4	24 45.8 60 80 103.9	2
3	21 49.9 62 79 106.3	22 08.4 61 79 105.9	22 26.9 61 79 105.4	22 45.2 61 79 105.0	23 03.5 61 79 104.6	23 21.8 60 80 104.2	23 39.9 60 80 103.7	23 58.0 60 80 103.3	3
4	21 02.7 61 79 105.6	21 21.1 61 79 105.2	21 39.4 61 79 104.8	21 57.7 61 80 104.4	22 15.9 61 80 103.9	22 34.0 60 80 103.5	22 52.1 60 80 103.1	23 10.1 60 80 102.6	4
65	20 15.3 61 79 105.0	20 33.6 61 79 104.6	20 51.8 61 80 104.1	21 10.0 61 80 103.7	21 28.1 60 80 103.3	21 46.2 60 80 102.8	22 04.2 60 80 102.4	22 22.1 60 80 102.0	65
6	19 27.7 61 80 104.3	19 45.9 61 80 103.9	20 04.1 60 80 103.5	20 22.2 60 80 103.1	20 40.2 60 80 102.6	20 58.2 60 80 102.2	21 16.1 59 80 101.8	21 34.0 59 80 101.3	6
7	18 40.0 61 80 103.7	18 58.2 60 80 103.3	19 16.2 60 80 102.8	19 34.3 60 80 102.4	19 52.2 60 80 102.0	20 10.1 59 80 101.5	20 27.9 59 80 101.1	20 45.7 59 80 100.7	7
8	17 52.2 60 80 103.0	18 10.3 60 80 102.6	18 28.3 60 80 102.2	18 46.2 60 80 101.8	19 04.1 60 80 101.4	19 21.9 59 80 100.9	19 39.7 59 81 100.5	19 57.4 59 81 100.1	8
9	17 04.3 60 80 102.4	17 22.2 60 80 102.0	17 40.2 60 80 101.6	17 58.0 59 80 101.2	18 15.8 59 81 100.7	18 33.6 59 81 100.3	18 51.3 59 81 99.9	19 08.9 59 81 99.5	9
70	16 16.2 60 80 101.8	16 34.1 60 80 101.4	16 52.0 59 81 101.0	17 09.8 59 81 100.5	17 27.5 59 81 100.1	17 45.2 59 81 99.7	18 02.8 59 81 99.3	18 20.4 59 81 98.8	70
1	15 28.0 60 80 101.2	15 45.9 59 81 100.8	16 03.7 59 81 100.3	16 21.4 59 81 99.9	16 39.1 59 81 99.5	16 56.7 59 81 99.1	17 14.3 59 81 98.6	17 31.8 58 81 98.2	1
2	14 39.8 59 81 100.6	14 57.5 59 81 100.1	15 15.3 59 81 99.7	15 32.9 59 81 99.3	15 50.6 59 81 98.9	16 08.1 59 81 98.5	16 25.7 58 81 98.0	16 43.1 58 81 97.6	2
3	13 51.4 59 81 99.9	14 09.1 59 81 99.5	14 26.8 59 81 99.1	14 44.4 59 81 98.7	15 02.0 58 81 98.3	15 19.5 58 81 97.9	15 37.0 58 81 97.4	15 54.4 58 81 97.0	3
4	13 03.0 59 81 99.3	13 20.6 59 81 98.9	13 38.2 59 81 98.5	13 55.8 58 81 98.1	14 13.3 58 81 97.7	14 30.8 58 81 97.3	14 48.2 58 81 96.8	15 05.6 58 81 96.4	4
75	12 14.4 59 81 98.7	12 32.0 59 81 98.3	12 49.6 58 81 97.9	13 07.1 58 81 97.5	13 24.5 58 81 97.1	13 42.0 58 81 96.7	13 59.4 58 81 96.2	14 16.7 58 82 95.8	75
6	11 25.8 59 81 98.1	11 43.3 58 81 97.7	12 00.8 58 81 97.3	12 18.3 58 81 96.9	12 35.7 58 81 96.5	12 53.1 58 81 96.1	13 10.5 58 82 95.6	13 27.8 58 82 95.2	6
7	10 37.1 58 81 97.5	10 54.6 58 81 97.1	11 12.1 58 81 96.7	11 29.5 58 81 96.3	11 46.9 58 82 95.9	12 04.2 58 82 95.5	12 21.5 58 82 95.0	12 38.8 58 82 94.6	7
8	9 48.4 58 81 97.0	10 05.8 58 81 96.5	10 23.2 58 82 96.1	10 40.6 58 82 95.7	10 58.0 58 82 95.3	11 15.3 58 82 94.9	11 32.6 58 82 94.4	11 49.8 57 82 94.0	8
9	8 59.5 58 81 96.4	9 16.9 58 82 95.9	9 34.3 58 82 95.5	9 51.7 58 82 95.1	10 09.0 58 82 94.7	10 26.3 58 82 94.3	10 43.5 57 82 93.9	11 00.8 57 82 93.5	9
80	8 10.7 58 82 95.8	8 28.0 58 82 95.4	8 45.4 58 82 95.0	9 02.7 58 82 94.5	9 20.0 58 82 94.1	9 37.3 57 82 93.7	9 54.5 57 82 93.3	10 11.7 57 82 92.9	80
1	7 21.7 58 82 95.2	7 39.1 58 82 94.8	7 56.4 58 82 94.4	8 13.7 58 82 94.0	8 31.0 58 82 93.5	8 48.2 57 82 93.1	9 05.4 57 82 92.7	9 22.6 57 82 92.3	1
2	6 32.8 58 82 94.6	6 50.1 58 82 94.2	7 07.4 58 82 93.8	7 24.6 58 82 93.4	7 41.9 57 82 93.0	7 59.1 57 82 92.5	8 16.3 57 82 92.1	8 33.5 57 82 91.7	2
3	5 43.8 58 82 94.0	6 01.0 58 82 93.6	6 18.3 58 82 93.2	6 35.6 57 82 92.8	6 52.8 57 82 92.4	7 10.0 57 82 92.0	7 27.2 57 82 91.6	7 44.3 57 82 91.1	3
4		5 12.0 58 82 93.0	5 29.2 57 82 92.6	5 46.5 57 82 92.2	6 03.7 57 82 91.8	6 20.9 57 82 91.4	6 38.0 57 82 91.0	6 55.2 57 82 90.6	4
85					5 14.5 57 82 91.2	5 31.7 57 82 90.8	5 48.9 57 82 90.4	6 06.0 57 82 90.0	85
6								5 16.9 57 82 89.4	6

Lat. 35°

H.A.	0° 00' (Alt. / Δd Δt / Az.)	0° 30'	1° 00'	1° 30'	2° 00'	2° 30'	3° 00'	3° 30'	H.A.
00	55 00.0 1.00 1.01 180.0	54 30.0 1.00 1.01 180.0	54 00.0 1.00 1.01 180.0	53 30.0 1.00 1.01 180.0	53 00.0 1.00 1.01 180.0	52 30.0 1.00 1.01 180.0	52 00.0 1.00 1.01 180.0	51 30.0 1.00 1.01 180.0	00
1	54 59.3 1.00 1.04 178.3	54 29.3 1.00 1.04 178.3	53 59.3 1.00 1.04 178.3	53 29.3 1.00 1.04 178.3	52 59.3 1.00 1.04 178.3	52 29.3 1.00 1.04 178.4	51 59.3 1.00 1.03 178.4	51 29.3 1.00 1.03 178.4	1
2	54 57.0 1.00 1.06 176.5	54 27.0 1.00 1.06 176.6	53 57.1 1.00 1.06 176.6	53 27.1 1.00 1.06 176.6	52 57.2 1.00 1.06 176.7	52 27.2 1.00 1.06 176.7	51 57.2 1.00 1.06 176.8	51 27.2 1.00 1.06 176.8	2
3	54 53.3 1.00 1.09 174.8	54 23.4 1.00 1.09 174.8	53 53.4 1.00 1.08 174.9	53 23.5 1.00 1.08 175.0	52 53.6 1.00 1.08 175.0	52 23.7 1.00 1.08 175.1	51 53.7 1.00 1.08 175.1	51 23.7 1.00 1.08 175.2	3
4	54 48.1 1.00 1.11 173.0	54 18.2 1.00 1.11 173.1	53 48.4 1.00 1.11 173.2	53 18.5 1.00 1.11 173.3	52 48.6 1.00 1.10 173.4	52 18.8 1.00 1.10 173.5	51 48.9 1.00 1.10 173.5	51 19.0 1.00 1.10 173.6	4
05	54 41.4 99 14 171.3	54 11.6 99 13 171.4	53 41.8 99 13 171.5	53 12.1 99 13 171.6	52 42.3 99 13 171.7	52 12.5 99 13 171.8	51 42.7 99 13 171.9	51 12.9 99 12 172.0	05
6	54 33.3 99 16 169.6	54 03.6 99 16 169.7	53 33.9 99 16 169.9	53 04.2 99 15 170.0	52 34.5 99 15 170.1	52 04.8 99 15 170.2	51 35.1 99 15 170.3	51 05.4 99 15 170.4	6
7	54 23.7 99 18 167.9	53 54.1 99 18 168.1	53 24.5 99 18 168.2	52 55.0 99 18 168.3	52 25.4 99 17 168.5	51 55.8 99 17 168.6	51 26.2 99 17 168.7	50 56.5 99 17 168.9	7
8	54 12.7 98 21 166.2	53 43.3 98 21 166.4	53 13.8 98 20 166.6	52 44.4 98 20 166.7	52 14.9 98 20 166.9	51 45.4 98 20 167.0	51 15.9 98 19 167.2	50 46.4 98 19 167.3	8
9	54 00.3 98 23 164.6	53 31.0 98 23 164.7	53 01.7 98 22 164.9	52 32.4 98 22 165.1	52 03.0 98 22 165.3	51 33.7 98 22 165.4	51 04.3 98 21 165.6	50 35.0 98 21 165.8	9
10	53 46.5 97 25 162.9	53 17.4 97 25 163.1	52 48.3 97 25 163.3	52 19.1 97 24 163.5	51 49.9 97 24 163.7	51 20.7 97 24 163.9	50 51.5 97 24 164.1	50 22.2 97 23 164.2	10
1	53 31.4 96 27 161.3	53 02.5 97 27 161.5	52 33.5 97 27 161.7	52 04.5 97 26 161.9	51 35.5 97 26 162.1	51 06.4 97 26 162.3	50 37.3 97 26 162.5	50 08.3 97 26 162.7	1
2	53 15.0 96 29 159.9	52 46.2 96 29 159.9	52 17.4 96 29 160.1	51 48.6 96 29 160.4	51 19.7 96 28 160.6	50 50.9 96 28 160.8	50 22.0 96 28 161.0	49 53.0 96 27 161.2	2
3	52 57.3 95 32 158.1	52 28.7 95 31 158.3	52 00.1 95 31 158.6	51 31.4 95 31 158.8	51 02.8 95 30 159.0	50 34.1 95 30 159.3	50 05.4 95 30 159.5	49 36.6 95 29 159.7	3
4	52 38.3 95 34 156.5	52 09.9 95 33 156.8	51 41.5 95 33 157.0	51 13.1 95 33 157.3	50 44.6 95 32 157.5	50 16.1 95 32 157.8	49 47.6 95 32 158.0	49 19.0 95 31 158.3	4
15	52 18.1 94 36 155.0	51 49.9 94 35 155.2	51 21.7 94 35 155.5	50 53.5 94 35 155.8	50 25.2 94 34 156.0	49 56.9 94 34 156.3	49 28.6 94 34 156.6	49 00.2 94 33 156.8	15
6	51 56.7 93 38 153.4	51 28.8 93 37 153.7	51 00.8 93 37 154.0	50 32.8 93 36 154.3	50 04.7 94 36 154.6	49 36.6 94 36 154.9	49 08.5 94 35 155.1	48 40.3 94 35 155.4	6
7	51 34.1 92 39 151.9	51 06.4 92 39 152.2	50 38.7 93 39 152.5	50 10.9 93 38 152.8	49 43.0 93 38 153.1	49 15.2 93 38 153.4	48 47.2 93 37 153.7	48 19.3 93 37 154.0	7
8	51 10.5 91 41 150.5	50 43.0 92 41 150.8	50 15.5 92 40 151.1	49 47.9 92 40 151.4	49 20.3 92 40 151.7	48 52.6 92 39 152.0	48 24.9 92 39 152.3	47 57.2 93 39 152.6	8
9	50 45.7 91 43 149.0	50 18.5 91 43 149.4	49 51.2 91 42 149.7	49 23.9 91 42 150.0	48 56.5 91 41 150.3	48 29.0 92 41 150.6	48 01.5 92 40 150.9	47 34.0 92 40 151.2	9
20	50 19.9 90 45 147.6	49 52.9 90 44 147.9	49 25.9 90 44 148.3	48 58.8 90 44 148.6	48 31.6 91 43 148.9	48 04.4 91 43 149.2	47 37.1 91 42 149.6	47 09.8 91 42 149.9	20
1	49 53.1 90 46 146.2	49 26.3 89 46 146.6	48 59.5 89 46 146.9	48 32.7 90 45 147.2	48 05.7 90 45 147.6	47 38.8 90 44 147.9	47 11.7 90 44 148.2	46 44.7 90 44 148.5	1
2	49 25.2 88 48 144.8	48 58.7 88 48 145.2	48 32.2 89 47 145.6	48 05.6 89 47 145.9	47 38.9 89 46 146.2	47 12.2 89 46 146.6	46 45.4 89 46 146.9	46 18.5 90 45 147.2	2
3	48 56.5 87 50 143.5	48 30.2 88 49 143.9	48 03.9 88 49 144.2	47 37.6 88 48 144.6	47 11.1 88 48 144.9	46 44.6 88 47 145.3	46 18.1 89 47 145.6	45 51.5 89 47 145.9	3
4	48 26.8 86 51 142.2	48 00.8 87 51 142.6	47 34.7 87 50 142.9	47 08.6 87 50 143.3	46 42.4 87 49 143.6	46 16.2 88 49 144.0	45 49.9 88 48 144.3	45 23.5 88 48 144.7	4
25	47 56.2 86 52 140.8	47 30.5 86 52 141.3	47 04.7 86 52 141.6	46 38.8 86 51 142.0	46 12.9 87 51 142.4	45 46.9 87 50 142.7	45 20.8 87 50 143.1	44 54.6 87 49 143.4	25
6	47 24.7 85 54 139.6	46 59.3 85 53 140.0	46 33.8 85 53 140.4	46 08.1 86 52 140.8	45 42.4 86 52 141.1	45 16.7 86 52 141.5	44 50.8 86 51 141.9	44 24.9 86 51 142.2	6
7	46 52.5 84 55 138.4	46 27.3 84 55 138.8	46 02.0 84 54 139.2	45 36.7 85 54 139.6	45 11.2 85 53 139.9	44 45.7 85 53 140.3	44 20.1 85 53 140.7	43 54.4 86 52 141.0	7
8	46 19.5 83 56 137.2	45 54.5 83 56 137.6	45 29.5 84 55 138.0	45 04.4 84 55 138.4	44 39.2 84 55 138.7	44 13.9 84 54 139.1	43 48.5 85 54 139.5	43 23.1 85 53 139.9	8
9	45 45.7 82 58 136.0	45 21.0 83 57 136.4	44 56.2 83 57 136.8	44 31.3 83 56 137.2	44 06.4 83 56 137.6	43 41.3 84 55 137.9	43 16.2 84 55 138.3	42 51.1 84 55 138.7	9
30	45 11.2 81 59 134.8	44 46.7 82 58 135.2	44 22.2 82 58 135.6	43 57.6 82 57 136.0	43 32.9 83 57 136.4	43 08.1 83 57 136.8	42 43.2 83 56 137.2	42 18.3 83 56 137.6	30
1	44 36.0 81 60 133.7	44 11.8 81 59 134.1	43 47.5 81 59 134.5	43 23.1 81 59 134.9	42 58.6 82 58 135.3	42 34.1 82 58 135.7	42 09.4 82 57 136.1	41 44.7 82 57 136.4	1
2	44 00.1 80 61 132.5	43 36.1 80 60 133.0	43 12.1 80 60 133.4	42 47.9 81 60 133.8	42 23.7 81 59 134.2	41 59.4 81 59 134.6	41 35.0 81 58 135.0	41 10.5 82 58 135.4	2
3	43 23.6 79 62 131.5	42 59.9 79 62 131.9	42 36.0 80 61 132.3	42 12.1 80 61 132.7	41 48.1 80 60 133.1	41 24.1 80 60 133.5	40 59.9 81 60 133.9	40 35.7 81 59 134.3	3
4	42 46.4 78 63 130.4	42 22.9 78 63 130.8	41 59.4 79 62 131.2	41 35.7 79 62 131.6	41 11.9 79 62 132.0	40 48.0 80 61 132.4	40 24.2 80 61 132.8	40 00.2 80 60 133.2	4
35	42 08.7 77 64 129.3	41 45.4 78 63 129.7	41 22.1 78 63 130.2	40 58.7 78 63 130.6	40 35.1 79 62 131.0	40 11.5 79 62 131.4	39 47.8 79 62 131.8	39 24.1 79 61 132.2	35
6	41 30.4 77 65 128.3	41 07.4 77 64 128.7	40 44.3 77 64 129.1	40 21.1 78 64 129.6	39 57.8 78 63 130.0	39 34.4 78 63 130.4	39 10.9 78 62 130.8	38 47.3 79 62 131.2	6
7	40 51.6 76 66 127.3	40 28.8 76 65 127.7	40 05.9 76 65 128.1	39 42.9 77 64 128.5	39 19.8 77 64 129.0	38 56.6 77 64 129.4	38 33.4 78 63 129.8	38 10.1 78 63 130.2	7
8	40 12.2 75 66 126.3	39 49.6 75 66 126.7	39 26.9 76 66 127.1	39 04.2 76 65 127.6	38 41.3 76 65 128.0	38 18.4 77 65 128.4	37 55.4 77 64 128.8	37 32.2 77 64 129.2	8
9	39 32.3 74 67 125.3	39 10.0 75 67 125.7	38 47.5 75 67 126.2	38 25.0 75 66 126.6	38 02.3 76 66 127.0	37 39.6 76 65 127.4	37 16.8 76 65 127.8	36 53.9 76 65 128.2	9
40	38 52.0 74 68 124.4	38 29.8 74 68 124.8	38 07.6 74 67 125.2	37 45.3 75 67 125.6	37 22.8 75 67 126.1	37 00.0 75 66 126.5	36 37.7 75 66 126.9	36 15.0 76 66 127.3	40
1	38 11.2 73 69 123.4	37 49.2 73 68 123.9	37 27.2 74 68 124.3	37 05.1 74 68 124.7	36 42.9 74 67 125.1	36 20.6 74 67 125.5	35 58.2 75 67 126.0	35 35.7 75 66 126.4	1
2	37 29.9 72 69 122.5	37 08.2 73 69 122.9	36 46.4 73 69 123.4	36 24.5 73 68 123.8	36 02.4 74 68 124.2	35 40.3 74 68 124.6	35 18.2 74 67 125.0	34 55.9 74 67 125.4	2
3	36 48.3 72 70 121.6	36 26.7 72 70 122.0	36 05.1 72 69 122.5	35 43.4 73 69 122.9	35 21.6 73 69 123.3	34 59.7 73 68 123.7	34 37.7 73 68 124.1	34 15.6 74 68 124.5	3
4	36 06.2 71 71 120.7	35 44.9 71 70 121.1	35 23.4 72 70 121.6	35 01.9 72 70 122.0	34 40.3 72 69 122.4	34 18.6 72 69 122.8	33 56.8 73 69 123.3	33 34.9 73 69 123.7	4
45	35 23.8 70 71 119.8	35 02.6 71 71 120.3	34 41.4 71 71 120.7	34 20.0 71 70 121.1	33 58.6 72 70 121.6	33 37.1 72 70 122.0	33 15.5 72 70 122.4	32 53.8 72 69 122.8	45
6	34 41.0 70 72 119.0	34 20.0 70 72 119.4	33 58.9 70 71 119.8	33 37.8 71 71 120.3	33 16.5 71 71 120.7	32 55.2 71 70 121.1	32 33.8 71 70 121.5	32 12.3 72 70 121.9	6
7	33 57.8 69 73 118.1	33 37.0 69 72 118.5	33 16.1 70 72 119.0	32 55.1 70 72 119.4	32 34.1 70 71 119.9	32 12.9 71 71 120.3	31 51.7 71 71 120.7	31 30.4 71 70 121.1	7
8	33 14.3 69 73 117.3	32 53.7 69 73 117.7	32 33.0 69 72 118.2	32 12.2 69 72 118.6	31 51.3 70 72 119.0	31 30.3 70 72 119.4	31 09.3 70 71 119.9	30 48.2 71 71 120.3	8
9	32 30.5 68 74 116.5	32 10.0 68 73 116.9	31 49.5 69 73 117.4	31 28.8 69 73 117.8	31 08.1 69 72 118.2	30 47.4 69 72 118.6	30 26.5 70 72 119.1	30 05.5 70 72 119.5	9
50	31 46.3 67 74 115.7	31 26.0 68 74 116.1	31 05.7 68 74 116.6	30 45.2 68 73 117.0	30 24.7 69 73 117.4	30 04.1 69 73 117.8	29 43.4 69 72 118.3	29 22.6 69 72 118.7	50
1	31 01.9 67 75 114.9	30 41.8 67 74 115.3	30 21.6 68 74 115.8	30 01.3 68 74 116.2	29 40.9 68 73 116.6	29 20.4 68 73 117.0	28 59.9 69 73 117.5	28 39.3 69 73 117.9	1
2	30 17.2 66 75 114.1	29 57.2 67 75 114.6	29 37.2 67 74 115.0	29 17.0 67 74 115.4	28 56.8 68 74 115.8	28 36.5 68 74 116.3	28 16.1 68 73 116.7	27 55.7 68 73 117.1	2
3	29 32.2 66 75 113.4	29 12.4 66 75 113.8	28 52.5 67 75 114.2	28 32.5 67 74 114.7	28 12.4 67 74 115.1	27 52.3 67 74 115.5	27 32.1 68 74 115.9	27 11.8 68 74 116.3	3
4	28 46.9 65 76 112.6	28 27.3 66 76 113.1	28 07.5 66 75 113.5	27 47.7 66 75 113.9	27 27.8 66 75 114.3	27 07.8 67 75 114.7	26 47.7 67 74 115.2	26 27.6 67 74 115.6	4
55	28 01.5 65 76 111.9	27 41.9 65 76 112.3	27 22.3 66 76 112.7	27 02.6 66 75 113.2	26 42.9 66 75 113.6	26 23.0 66 75 114.0	26 03.1 66 75 114.4	25 43.1 67 75 114.8	55
6	27 15.7 64 77 111.2	26 56.3 65 76 111.6	26 36.9 65 76 112.0	26 17.3 65 76 112.4	25 57.7 66 76 112.8	25 38.0 66 75 113.3	25 18.2 66 75 113.7	24 58.4 66 75 114.1	6
7	26 29.8 64 77 110.4	26 10.5 64 77 110.9	25 51.2 65 77 111.3	25 31.8 65 76 111.7	25 12.3 65 76 112.1	24 52.7 65 76 112.5	24 33.1 66 76 113.0	24 13.4 66 75 113.4	7
8	25 43.6 64 77 109.7	25 24.5 64 77 110.1	25 05.3 64 77 110.6	24 46.0 64 77 111.0	24 26.6 65 76 111.4	24 07.2 65 76 111.8	23 47.7 65 76 112.2	23 28.2 65 76 112.7	8
9	24 57.3 63 78 109.0	24 38.2 64 77 109.4	24 19.2 64 77 109.9	24 00.0 64 77 110.3	23 40.8 64 77 110.7	23 21.5 64 77 111.1	23 02.1 65 76 111.5	22 42.7 65 76 112.0	9
60	24 10.7 63 78 108.3	23 51.8 63 78 108.7	23 32.8 63 78 109.2	23 13.8 64 77 109.6	22 54.7 64 77 110.0	22 35.5 64 77 110.4	22 16.3 64 77 110.8	21 57.0 64 77 111.3	60
1	23 23.9 62 78 107.6	23 05.2 63 78 108.1	22 46.3 63 78 108.5	22 27.4 63 78 108.9	22 08.4 63 77 109.3	21 49.4 64 77 109.7	21 30.3 64 77 110.2	21 11.1 64 77 110.6	1
2	22 37.0 62 78 107.0	22 18.3 62 78 107.4	21 59.6 62 78 107.8	21 40.8 63 78 108.2	21 21.9 63 78 108.6	21 03.0 63 78 109.1	20 44.0 63 77 109.5	20 25.0 64 77 109.9	2
3	21 49.9 62 79 106.3	21 31.4 62 79 106.7	21 12.7 62 78 107.1	20 54.0 62 78 107.6	20 35.3 63 78 108.0	20 16.5 63 78 108.4	19 57.6 63 78 108.8	19 38.7 63 78 109.2	3
4	21 02.7 61 79 105.6	20 44.2 62 79 106.1	20 25.7 62 79 106.5	20 07.1 62 79 106.9	19 48.4 62 78 107.3	19 29.7 62 78 107.7	19 11.0 63 78 108.1	18 52.1 63 78 108.5	4
65	20 15.3 61 79 105.0	19 56.9 61 79 105.4	19 38.5 62 79 105.8	19 20.0 62 79 106.2	19 01.4 62 79 106.6	18 42.8 62 78 107.1	18 24.2 62 78 107.5	18 05.5 62 78 107.9	65
6	19 27.7 61 80 104.3	19 09.4 61 79 104.7	18 51.1 61 79 105.1	18 32.7 61 79 105.6	18 14.3 62 79 106.0	17 55.8 62 79 106.4	17 37.2 62 79 106.8	17 18.6 62 78 107.2	6
7	18 40.0 61 80 103.7	18 21.8 61 80 104.1	18 03.6 61 79 104.5	17 45.3 61 79 104.9	17 26.9 61 79 105.4	17 08.5 61 79 105.8	16 50.1 62 79 106.2	16 31.6 62 79 106.6	7
8	17 52.2 60 80 103.0	17 34.1 60 80 103.5	17 15.9 61 80 103.9	16 57.7 61 80 104.3	16 39.5 61 79 104.7	16 21.2 61 79 105.1	16 02.8 61 79 105.5	15 44.4 61 79 105.9	8
9	17 04.3 60 80 102.4	16 46.2 60 80 102.8	16 28.2 60 80 103.2	16 10.0 60 80 103.7	15 51.9 61 80 104.1	15 33.6 61 79 104.5	15 15.4 61 79 104.9	14 57.1 61 79 105.3	9
70	16 16.2 60 80 101.8	15 58.3 60 80 102.2	15 40.3 60 80 102.6	15 22.2 60 80 103.0	15 04.1 60 80 103.5	14 46.0 61 80 103.9	14 27.8 61 80 104.3	14 09.6 61 79 104.7	70
1	15 28.0 60 80 101.2	15 10.2 60 80 101.6	14 52.2 60 80 102.0	14 34.3 60 80 102.4	14 16.3 60 80 102.8	13 58.2 60 80 103.2	13 40.1 60 80 103.7	13 22.0 61 80 104.1	1
2	14 39.8 59 80 100.6	14 22.0 59 80 101.0	14 04.1 59 80 101.4	13 46.2 60 80 101.8	13 28.3 60 80 102.2	13 10.3 60 80 102.6	12 52.3 60 80 103.0	12 34.2 60 80 103.4	2
3	13 51.4 59 81 99.9	13 33.7 59 81 100.4	13 15.9 59 80 100.8	12 58.1 59 80 101.2	12 40.2 60 80 101.6	12 22.3 60 80 102.0	12 04.4 60 80 102.4	11 46.4 60 80 102.8	3
4	13 03.0 59 81 99.3	12 45.3 59 81 99.8	12 27.6 59 81 100.2	12 09.8 59 81 100.6	11 52.0 59 80 101.0	11 34.2 59 80 101.4	11 16.3 60 80 101.8	10 58.4 60 80 102.2	4
75	12 14.4 59 81 98.7	11 56.8 59 81 99.2	11 39.1 59 81 99.6	11 21.4 59 81 100.0	11 03.7 59 81 100.4	10 45.9 59 81 100.8	10 28.1 59 80 101.2	10 10.3 59 80 101.6	75
6	11 25.8 59 81 98.1	11 08.2 59 81 98.6	10 50.6 59 81 99.0	10 33.0 59 81 99.4	10 15.3 59 81 99.8	9 57.6 59 81 100.2	9 39.9 59 81 100.6	9 22.1 59 80 101.0	6
7	10 37.1 58 81 97.5	10 19.6 58 81 98.0	10 02.0 59 81 98.4	9 44.4 59 81 98.8	9 26.8 59 81 99.2	9 09.2 59 81 99.6	8 51.5 59 81 100.0	8 33.8 59 81 100.4	7
8	9 48.4 58 81 97.0	9 30.9 58 81 97.4	9 13.4 58 81 97.8	8 55.8 58 81 98.2	8 38.3 59 81 98.6	8 20.7 59 81 99.0	8 03.1 59 81 99.4	7 45.4 59 81 99.8	8
9	8 59.5 58 81 96.4	8 42.1 58 81 96.8	8 24.6 58 81 97.2	8 07.2 58 81 97.6	7 49.6 58 81 98.0	7 32.1 59 81 98.4	7 14.5 59 81 98.8	6 57.0 59 81 99.2	9
80	8 10.7 58 82 95.8	7 53.3 58 81 96.2	7 35.8 58 81 96.6	7 18.4 58 81 97.0	7 00.9 58 81 97.4	6 43.5 58 81 97.8	6 25.9 58 81 98.2	6 08.4 58 81 98.6	80
1	7 21.7 58 82 95.2	7 04.4 58 82 95.6	6 47.0 58 82 96.0	6 29.6 58 81 96.4	6 12.2 58 81 96.8	5 54.7 58 81 97.2	5 37.3 58 81 97.6	5 19.8 58 81 98.1	1
2	6 32.8 58 82 94.6	6 15.4 58 82 95.0	5 58.1 58 82 95.4	5 40.7 58 82 95.8	5 23.3 58 82 96.2	5 05.9 58 81 96.7			2
3	5 43.8 58 82 94.0	5 26.5 58 82 94.4	5 09.1 58 82 94.8						3

Lat. 35°

Lat. 35°

Lat. 36°

Lat. 37°

Lat. 38°

Lat. 35°

H.A.	4° 00' Alt	Δd Δt	Az.	4° 30' Alt	Δd Δt	Az.	5° 00' Alt	Δd Δt	Az.	5° 30' Alt	Δd Δt	Az.	6° 00' Alt	Δd Δt	Az.	6° 30' Alt	Δd Δt	Az.	7° 00' Alt	Δd Δt	Az.	7° 30' Alt	Δd Δt	Az.	H.A.
00	59 00.0	1.00 1	180.0	59 30.0	1.00 1	180.0	60 00.0	1.00 1	180.0	60 30.0	1.00 1	180.0	61 00.0	1.00 1	180.0	61 30.0	1.00 1	180.0	62 00.0	1.00 2	180.0	62 30.0	1.00 2	180.0	00
1	58 59.2	1.00 4	178.1	59 29.2	1.00 4	178.0	59 59.1	1.00 4	178.0	60 29.1	1.00 4	178.0	60 59.1	1.00 4	177.9	61 29.1	1.00 4	177.9	61 59.1	1.00 5	177.9	62 29.1	1.00 5	177.9	1
2	58 56.7	1.00 7	176.1	59 26.6	1.00 7	176.1	59 56.6	1.00 7	176.0	60 26.5	1.00 7	176.0	60 56.5	1.00 7	175.9	61 26.4	1.00 7	175.8	61 56.4	1.00 8	175.8	62 26.3	1.00 8	175.7	2
3	58 52.5	1.0 10	174.2	59 22.4	1.0 10	174.1	59 52.3	1.0 10	174.0	60 22.2	1.0 10	174.0	60 52.1	1.0 10	173.9	61 22.0	1.0 10	173.8	61 51.9	1.0 11	173.7	62 21.7	1.0 11	173.6	3
4	58 46.8	99 12	172.3	59 16.6	99 12	172.2	59 46.4	99 13	172.1	60 16.2	99 13	172.0	60 46.0	99 13	171.8	61 15.8	99 13	171.7	61 45.6	99 15	171.6	62 15.3	99 14	171.5	4
05	58 39.3	99 15	170.4	59 09.1	99 15	170.3	59 38.8	99 15	170.1	60 08.5	99 16	170.0	60 38.1	99 16	169.8	61 07.8	99 16	169.7	61 37.5	99 16	169.5	62 07.1	99 17	169.4	05
6	58 30.3	99 18	168.5	58 59.9	99 18	168.3	59 29.5	99 18	168.2	59 59.1	99 18	168.0	60 28.6	98 19	167.8	60 58.1	98 19	167.6	61 27.7	98 19	167.5	61 57.2	98 20	167.3	6
7	58 19.7	98 20	166.6	58 49.2	98 21	166.4	59 18.6	98 21	166.0	59 48.0	98 21	166.0	60 17.4	98 21	165.8	60 46.8	98 22	165.6	61 16.1	98 22	165.4	61 45.5	98 22	165.2	7
8	58 07.6	98 23	164.8	58 36.9	98 23	164.5	59 06.1	98 23	164.3	59 35.4	97 24	164.1	60 04.6	97 24	163.9	60 33.8	97 24	163.7	61 03.0	97 25	163.4	61 32.1	97 25	163.2	8
9	57 53.9	97 26	162.9	58 23.0	97 26	162.7	58 52.1	97 26	162.5	59 21.1	97 26	162.2	59 50.2	97 27	162.0	60 19.1	97 27	161.7	60 48.1	97 27	161.4	61 17.0	96 28	161.2	9
10	57 38.7	96 28	161.1	58 07.6	96 28	160.9	58 36.5	96 28	160.6	59 05.4	96 29	160.3	59 34.2	96 29	160.1	60 02.9	96 30	159.8	60 31.7	96 30	159.5	61 00.4	96 30	159.2	10
1	57 22.1	96 30	159.3	57 50.8	96 30	159.1	58 19.5	95 31	158.8	58 48.1	95 31	158.5	59 16.7	95 32	158.2	59 45.2	95 32	157.9	60 13.7	95 32	157.6	60 42.1	95 33	157.3	1
2	57 04.0	95 32	157.6	57 32.5	95 33	157.3	58 00.9	95 33	157.0	58 29.3	95 34	156.7	58 57.7	94 34	156.4	59 26.0	94 34	156.0	59 54.2	94 35	155.7	60 22.4	94 35	155.4	2
3	56 44.6	94 35	155.8	57 12.8	94 35	155.5	57 41.0	94 35	155.2	58 09.2	94 36	154.9	58 37.2	94 36	154.6	59 05.3	93 37	154.2	59 33.3	93 37	153.9	60 01.2	93 38	153.5	3
4	56 23.8	93 37	154.1	56 51.8	93 37	153.8	57 19.8	93 38	153.5	57 47.6	93 38	153.1	58 15.4	93 39	152.8	58 43.2	92 39	152.4	59 10.9	92 40	152.0	59 38.5	92 40	151.7	4
15	56 01.8	93 39	152.5	56 29.5	92 39	152.1	56 57.2	92 40	151.8	57 24.8	92 40	151.4	57 52.3	92 41	151.1	58 19.8	91 41	150.7	58 47.2	91 42	150.3	59 14.5	91 42	149.9	15
6	55 38.4	92 41	150.8	56 05.9	91 41	150.5	56 33.3	91 42	150.1	57 00.6	91 42	149.7	57 27.9	91 43	149.4	57 55.1	91 43	149.0	58 22.2	90 44	148.6	58 49.2	90 44	148.1	6
7	55 13.9	91 43	149.2	55 41.1	91 43	148.9	56 08.2	90 44	148.5	56 35.2	90 44	148.1	57 02.2	90 45	147.7	57 29.1	90 45	147.3	57 55.9	89 46	146.9	58 22.7	89 46	146.4	7
8	54 48.2	90 45	147.7	55 15.1	90 45	147.3	55 41.9	89 46	146.9	56 08.7	89 46	146.5	56 35.4	89 47	146.1	57 02.0	89 47	145.7	57 28.5	88 48	145.2	57 54.9	88 48	144.8	8
9	54 21.3	89 47	146.1	54 48.0	89 47	145.7	55 14.5	88 48	145.3	55 41.0	88 48	144.9	56 07.4	88 49	144.5	56 33.7	88 49	144.0	56 59.9	87 50	143.6	57 26.0	87 50	143.2	9
20	53 53.4	88 48	144.6	54 19.8	88 49	144.2	54 46.0	87 49	143.8	55 12.2	87 50	143.4	55 38.3	87 50	142.9	56 04.3	86 51	142.5	56 30.2	86 51	142.0	56 56.0	86 52	141.6	20
1	53 24.4	87 50	143.2	53 50.5	87 50	142.7	54 16.5	86 51	142.3	54 42.4	86 51	141.9	55 08.2	86 52	141.4	55 33.8	85 52	141.0	55 59.4	85 53	140.5	56 24.9	85 53	140.0	1
2	52 54.5	86 52	141.7	53 20.2	86 52	141.3	53 45.9	85 52	140.9	54 11.5	85 53	140.4	54 37.0	85 54	140.0	55 02.4	84 54	139.5	55 27.7	84 54	139.0	55 52.9	84 55	138.5	2
3	52 23.5	85 53	140.3	52 49.0	85 53	139.8	53 14.4	84 54	139.4	53 39.7	84 54	139.0	54 04.9	84 55	138.5	54 30.0	83 56	138.0	54 55.0	83 56	137.6	55 19.8	83 57	137.1	3
4	51 51.7	84 55	138.9	52 16.9	84 55	138.5	52 42.0	84 55	138.0	53 07.0	83 56	137.6	53 31.9	83 56	137.1	53 56.7	83 57	136.6	54 21.4	82 57	136.2	54 45.9	82 58	135.7	4
25	51 19.0	83 56	137.6	51 43.9	83 56	137.1	52 08.7	83 57	136.7	52 33.4	82 57	136.2	52 58.0	82 58	135.7	53 22.5	81 58	135.3	53 46.9	81 59	134.8	54 11.2	81 59	134.3	25
6	50 45.4	82 57	136.3	51 10.0	82 58	135.8	51 34.6	82 58	135.4	51 59.0	81 59	134.9	52 23.3	81 59	134.4	52 47.5	80 60	133.9	53 11.6	80 60	133.4	53 35.6	80 61	132.9	6
7	50 11.0	81 59	135.0	50 35.4	81 59	134.5	50 59.7	81 59	134.1	51 23.8	80 60	133.6	51 47.8	80 60	133.1	52 11.7	79 61	132.6	52 35.5	79 61	132.1	52 59.2	79 62	131.6	7
8	49 35.9	80 60	133.7	50 00.0	80 60	133.2	50 24.0	80 61	132.8	50 47.8	79 61	132.3	51 11.6	79 62	131.8	51 35.2	79 62	131.3	51 58.7	78 63	130.8	52 22.1	78 63	130.3	8
9	49 00.0	80 61	132.5	49 23.8	79 61	132.0	49 47.5	79 62	131.6	50 11.1	78 62	131.1	50 34.6	78 63	130.6	50 58.0	78 63	130.1	51 21.2	77 64	129.6	51 44.3	77 64	129.1	9
30	48 23.4	79 62	131.3	48 47.0	78 63	130.8	49 10.4	78 63	130.4	49 33.8	78 63	129.9	49 57.0	77 64	129.4	50 20.0	77 64	128.9	50 43.0	76 65	128.4	51 05.8	76 65	127.9	30
1	47 46.2	78 63	130.1	48 09.5	77 64	129.7	48 32.7	77 64	129.2	48 55.7	77 64	128.7	49 18.7	76 65	128.2	49 41.5	76 65	127.7	50 04.1	75 66	127.2	50 26.7	75 66	126.7	1
2	47 08.3	77 64	129.0	47 31.3	77 65	128.5	47 54.3	76 65	128.0	48 17.1	76 65	127.6	48 39.7	75 66	127.1	49 02.2	75 66	126.6	49 24.7	74 67	126.1	49 47.0	74 67	125.5	2
3	46 29.8	76 65	127.9	46 52.6	76 66	127.4	47 15.3	75 66	126.9	47 37.8	75 66	126.4	48 00.2	75 67	125.9	48 22.5	74 67	125.4	48 44.7	74 67	124.9	49 06.7	73 68	124.4	3
4	45 50.7	75 66	126.8	46 13.3	75 66	126.3	46 35.7	75 67	125.8	46 58.0	74 67	125.3	47 20.2	74 68	124.9	47 42.2	73 68	124.4	48 04.1	73 68	123.8	48 25.9	72 69	123.3	4
35	45 11.1	75 67	125.7	45 33.4	74 67	125.3	45 55.6	74 68	124.8	46 17.6	73 68	124.3	46 39.6	73 68	123.8	47 01.4	72 69	123.3	47 23.0	72 69	122.8	47 44.6	72 70	122.3	35
6	44 30.9	74 68	124.7	44 53.0	73 68	124.2	45 15.0	73 69	123.7	45 36.8	73 69	123.2	45 58.5	72 69	122.7	46 20.0	72 70	122.2	46 41.5	71 70	121.7	47 02.8	71 70	121.2	6
7	43 50.9	73 69	123.7	44 12.1	73 69	123.2	44 33.8	72 69	122.7	44 55.4	72 70	122.2	45 16.9	71 70	121.7	45 38.2	71 70	121.2	45 59.5	70 71	120.7	46 20.5	70 71	120.2	7
8	43 09.1	72 69	122.7	43 30.8	72 70	122.2	43 52.2	71 70	121.7	44 13.6	71 70	121.2	44 34.9	71 71	120.7	44 56.0	70 71	120.2	45 17.0	70 72	119.7	45 37.8	69 72	119.2	8
9	42 27.5	72 70	121.7	42 48.9	71 70	121.2	43 10.2	71 71	120.7	43 31.4	70 71	120.2	43 52.4	70 71	119.7	44 13.3	69 72	119.2	44 34.1	69 72	118.7	44 54.7	69 72	118.2	9
40	41 45.5	71 71	120.7	42 06.7	70 71	120.3	42 27.8	70 71	119.8	42 48.7	70 72	119.3	43 09.5	69 72	118.8	43 30.2	69 72	118.3	43 50.8	68 73	117.8	44 11.2	68 73	117.3	40
1	41 03.0	70 71	119.8	41 24.0	70 72	119.3	41 44.9	69 72	118.8	42 05.6	69 72	118.4	42 26.3	69 73	117.9	42 46.8	68 73	117.4	43 07.1	68 73	116.9	43 27.4	67 74	116.4	1
2	40 20.2	69 72	118.9	40 41.0	69 72	118.4	41 01.7	69 73	117.9	41 22.2	68 73	117.4	41 42.6	68 73	116.9	42 02.9	67 74	116.5	42 23.1	67 74	116.0	42 43.2	67 74	115.4	2
3	39 37.0	69 73	118.0	39 57.6	68 73	117.5	40 18.0	68 73	117.0	40 38.4	67 74	116.5	40 58.7	67 74	116.1	41 18.8	67 74	115.5	41 38.8	66 75	115.1	41 58.6	66 75	114.6	3
4	38 53.4	68 73	117.1	39 13.8	68 74	116.6	39 34.1	67 74	116.1	39 54.3	67 74	115.7	40 14.3	67 75	115.2	40 34.3	66 75	114.7	40 54.1	66 75	114.2	41 13.8	65 75	113.7	4
45	38 09.5	68 74	116.2	38 29.7	67 74	115.8	38 49.8	67 74	115.3	39 09.8	66 75	114.8	39 29.7	66 75	114.3	39 49.5	66 75	113.8	40 09.1	65 75	113.3	40 28.6	65 76	112.8	45
6	37 25.2	67 74	115.4	37 45.3	67 75	114.9	38 05.2	66 75	114.4	38 25.0	66 75	114.0	38 44.8	66 76	113.5	39 04.4	65 76	113.0	39 23.8	65 76	112.5	39 43.2	64 76	112.0	6
7	36 40.6	66 75	114.5	37 00.5	66 75	114.1	37 20.3	66 75	113.6	37 40.0	65 76	113.1	37 59.5	65 76	112.6	38 19.0	65 76	112.2	38 38.3	64 76	111.7	38 57.5	64 77	111.2	7
8	35 55.6	66 75	113.7	36 15.5	65 76	113.2	36 35.1	65 76	112.8	36 54.6	65 76	112.3	37 14.0	64 76	111.8	37 33.3	64 77	111.3	37 52.5	64 77	110.9	38 11.5	63 77	110.3	8
9	35 10.7	65 76	112.9	35 30.2	65 76	112.4	35 49.7	65 76	112.0	36 09.0	64 76	111.5	36 28.3	64 77	111.0	36 47.4	64 77	110.6	37 06.4	63 77	110.1	37 25.3	63 77	109.6	9
50	34 25.3	65 76	112.1	34 44.7	65 76	111.7	35 04.0	64 77	111.2	35 23.2	64 77	110.7	35 42.3	63 77	110.2	36 01.3	63 77	109.8	36 20.2	63 78	109.3	36 38.9	62 78	108.8	50
1	33 39.6	64 76	111.3	33 58.9	64 77	110.9	34 18.0	64 77	110.4	34 37.1	63 77	109.9	34 56.1	63 77	109.5	35 14.9	63 78	109.0	35 33.7	62 78	108.5	35 52.3	62 78	108.0	1
2	32 53.7	64 77	110.6	33 12.8	64 77	110.1	33 31.9	63 77	109.7	33 50.8	63 78	109.2	34 09.6	63 78	108.7	34 28.3	62 78	108.2	34 46.9	62 78	107.8	35 05.4	61 78	107.3	2
3	32 07.6	64 77	109.8	32 26.6	63 77	109.4	32 45.6	63 78	108.9	33 04.2	63 78	108.4	33 23.0	62 78	108.0	33 41.6	62 78	107.5	34 00.0	61 79	107.0	34 18.4	61 79	106.6	3
4	31 21.2	63 78	109.1	31 40.1	63 78	108.6	31 58.9	62 78	108.2	32 17.6	62 78	107.7	32 36.1	62 79	107.2	32 54.6	61 79	106.8	33 13.0	61 79	106.3	33 31.2	61 79	105.8	4
55	30 34.7	63 78	108.4	30 53.4	62 78	107.9	31 12.1	62 78	107.4	31 30.6	62 78	107.0	31 49.1	61 79	106.5	32 07.5	61 79	106.0	32 25.7	61 79	105.6	32 43.9	60 79	105.1	55
6	29 47.9	62 78	107.6	30 06.6	62 78	107.2	30 25.1	62 79	106.7	30 43.5	61 79	106.3	31 01.9	61 79	105.8	31 20.1	61 79	105.3	31 38.3	60 79	104.9	31 56.3	60 79	104.4	6
7	29 01.0	62 78	106.9	29 19.5	62 78	106.5	29 37.9	61 79	106.0	29 56.3	61 79	105.6	30 14.5	61 79	105.1	30 32.7	60 79	104.6	30 50.7	60 80	104.2	31 08.6	60 80	103.7	7
8	28 13.9	62 78	106.2	28 32.3	61 79	105.8	28 50.6	61 79	105.3	29 08.9	61 79	104.9	29 27.0	60 79	104.4	29 45.0	60 80	103.9	30 02.8	60 80	103.5	30 20.8	59 80	103.0	8
9	27 26.6	61 79	105.5	27 44.9	61 79	105.1	28 03.1	61 79	104.6	28 21.3	60 80	104.2	28 39.3	60 80	103.7	28 57.3	60 80	103.3	29 15.1	59 80	102.8	29 32.9	59 80	102.3	9
60	26 39.2	61 79	104.8	26 57.4	61 79	104.4	27 15.5	60 80	104.0	27 33.6	60 80	103.5	27 51.5	60 80	103.0	28 09.4	59 80	102.6	28 27.1	59 80	102.1	28 44.8	59 80	101.7	60
1	25 51.6	61 80	104.2	26 09.7	60 80	103.7	26 27.8	60 80	103.3	26 45.7	60 80	102.8	27 03.6	59 80	102.4	27 21.3	59 80	101.9	27 39.0	59 80	101.5	27 56.6	59 81	101.0	1
2	25 03.9	60 80	103.5	25 21.9	60 80	103.1	25 39.9	60 80	102.6	25 57.7	59 80	102.2	26 15.5	59 80	101.7	26 33.2	59 81	101.3	26 50.8	58 81	100.8	27 08.3	58 81	100.4	2
3	24 16.0	60 80	102.8	24 34.0	60 80	102.4	24 51.8	59 80	102.0	25 09.6	59 81	101.5	25 27.3	59 81	101.1	25 44.9	58 81	100.6	26 02.5	58 81	100.2	26 19.9	58 81	99.7	3
4	23 28.0	60 80	102.2	23 45.9	59 80	101.8	24 03.7	59 81	101.3	24 21.4	59 81	100.9	24 39.0	58 81	100.4	24 56.6	58 81	100.0	25 14.0	58 81	99.5	25 31.4	58 81	99.1	4
65	22 40.0	59 80	101.5	22 57.7	59 80	101.1	23 15.4	59 81	100.7	23 33.1	59 81	100.2	23 50.6	58 81	99.8	24 08.1	58 81	99.3	24 25.5	58 81	98.9	24 42.9	58 81	98.4	65
6	21 51.7	59 80	100.9	22 09.5	59 81	100.5	22 27.1	59 81	100.0	22 44.7	58 81	99.6	23 02.2	58 81	99.2	23 19.6	58 81	98.7	23 36.9	58 81	98.3	23 54.2	57 81	97.8	6
7	21 03.4	59 81	100.3	21 21.1	59 81	99.8	21 38.6	58 81	99.4	21 56.2	58 81	99.0	22 13.6	58 81	98.5	22 31.0	58 81	98.1	22 48.3	57 81	97.6	23 05.5	57 81	97.2	7
8	20 15.0	59 81	99.6	20 32.6	58 81	99.2	20 50.1	58 81	98.8	21 07.6	58 81	98.3	21 24.9	58 81	97.9	21 42.3	58 81	97.5	21 59.5	57 81	97.0	22 16.7	57 81	96.6	8
9	19 26.5	59 81	99.0	19 44.0	58 81	98.6	20 01.5	58 81	98.2	20 18.9	58 81	97.7	20 36.2	58 81	97.3	20 53.5	57 81	96.9	21 10.7	57 81	96.4	21 27.8	57 82	96.0	9
70	18 37.9	58 81	98.4	18 55.4	58 81	98.0	19 12.8	58 81	97.5	19 30.2	58 81	97.1	19 47.4	58 81	96.7	20 04.7	58 81	96.2	20 21.8	57 82	95.8	20 38.9	57 82	95.4	70
1	17 49.3	58 81	97.8	18 06.7	58 81	97.4	18 24.1	58 81	96.9	18 41.4	58 81	96.5	18 58.6	57 82	96.1	19 15.8	57 82	95.6	19 32.9	57 82	95.2	19 50.0	57 82	94.8	1
2	17 00.6	58 81	97.2	17 17.9	58 81	96.8	17 35.2	58 81	96.3	17 52.5	57 82	95.9	18 09.7	57 82	95.5	18 26.8	57 82	95.0	18 43.9	57 82	94.6	19 01.0	57 82	94.2	2
3	16 11.8	58 81	96.6	16 29.1	58 81	96.2	16 46.4	57 82	95.7	17 03.6	57 82	95.3	17 20.8	57 82	94.9	17 37.9	57 82	94.4	17 54.9	57 82	94.0	18 11.9	57 82	93.6	3
4	15 22.9	58 82	96.0	15 40.2	58 82	95.6	15 57.4	57 82	95.1	16 14.6	57 82	94.7	16 31.8	57 82	94.3	16 48.8	57 82	93.8	17 05.9	57 82	93.4	17 22.9	56 82	93.0	4
75	14 34.0	58 82	95.4	14 51.3	57 82	95.0	15 08.4	57 82	94.5	15 25.6	57 82	94.1	15 42.7	57 82	93.7	15 59.8	57 82	93.3	16 16.8	57 82	92.8	16 33.8	56 82	92.4	75
6	13 45.0	57 82	94.8	14 02.3	57 82	94.4	14 19.4	57 82	94.0	14 36.6	57 82	93.5	14 53.7	57 82	93.1	15 10.7	57 82	92.7	15 27.7	57 82	92.3	15 44.6	56 82	91.8	6
7	12 56.0	57 82	94.2	13 13.2	57 82	93.8	13 30.4	57 82	93.4	13 47.5	57 82	92.9	14 04.6	57 82	92.5	14 21.6	57 82	92.1	14 38.6	57 82	91.7	14 55.5	56 82	91.2	7
8	12 07.0	57 82	93.6	12 24.2	57 82	93.2	12 41.3	57 82	92.8	12 58.4	57 82	92.4	13 15.5	57 82	91.9	13 32.5	57 82	91.5	13 49.5	56 82	91.1	14 06.4	56 82	90.7	8
9	11 17.9	57 82	93.0	11 35.1	57 82	92.6	11 52.2	57 82	92.2	12 09.3	57 82	91.8	12 26.3	57 82	91.4	12 43.3	57 82	90.9	13 00.3	56 82	90.5	13 17.2	56 82	90.1	9
80	10 28.9	57 82	92.5	10 46.0	57 82	92.0	11 03.1	57 82	91.6	11 20.2	57 82	91.2	11 37.2	57 82	90.8	11 54.2	57 82	90.4	12 11.2	56 82	89.9	12 28.1	56 82	89.5	80
1	9 39.7	57 82	91.9	9 56.9	57 82	91.5	10 14.0	57 82	91.0	10 31.0	57 82	90.6	10 48.1	57 82	90.2	11 05.0	57 82	89.8	11 22.0	56 82	89.4	11 38.9	56 82	88.9	1
2	8 50.6	57 82	91.3	9 07.7	57 82	90.9	9 24.8	57 82	90.5	9 41.9	57 82	90.1	9 58.9	57 82	89.6	10 15.9	57 82	89.2	10 32.9	56 82	88.8	10 49.8	56 82	88.4	2
3	8 01.5	57 82	90.7	8 18.6	57 82	90.3	8 35.7	57 82	89.9	8 52.7	57 82	89.5	9 09.8	57 82	89.1	9 26.8	57 82	88.5	9 43.7	57 82	88.1	10 00.7	56 82	87.8	3
4	7 12.3	57 82	90.2	7 29.4	57 82	89.7	7 46.5	57 82	89.3	8 03.6	57 82	88.9	8 20.6	57 82	88.5	8 37.6	57 82	88.1	8 54.6	57 82	87.7	9 11.6	56 82	87.2	4
85	6 23.2	57 82	89.6	6 40.3	57 82	89.2	6 57.4	57 82	88.8	7 14.4	57 82	88.3	7 31.5	57 82	87.9	7 48.5	57 82	87.5	8 05.5	57 82	87.1	8 22.5	57 82	86.7	85
6	5 34.0	57 82	89.0	5 51.1	57 82	88.6	6 08.2	57 82	88.2	6 25.3	57 82	87.8	6 42.4	57 82	87.4	6 59.4	57 82	86.9	7 16.4	57 82	86.5	7 33.4	57 82	86.1	6
7				5 02.0	57 82	88.0	5 19.1	57 82	87.6	5 36.2	57 82	87.2	5 53.3	57 82	86.8	6 10.4	57 82	86.4	6 27.4	57 82	86.0	6 44.4	57 82	85.5	7
8													5 04.2	57 82	86.2	5 21.3	57 82	85.8	5 38.4	57 82	85.4	5 55.4	57 82	85.0	8
9																						5 06.5	57 82	84.4	9

Lat. 35°

Each cell format: Alt.   Δd   Δt   Az.

H.A.	4° 00'	4° 30'	5° 00'	5° 30'	6° 00'	6° 30'	7° 00'	7° 30'	H.A.
00	51 00.0 1.0 01 180.0	50 30.0 1.0 01 180.0	50 00.0 1.0 01 180.0	49 30.0 1.0 01 180.0	49 00.0 1.0 01 180.0	48 30.0 1.0 01 180.0	48 00.0 1.0 01 180.0	47 30.0 1.0 01 180.0	00
1	50 59.3 1.0 03 178.4	50 29.3 1.0 03 178.4	49 59.3 1.0 03 178.5	49 29.3 1.0 03 178.5	48 59.3 1.0 03 178.5	48 29.4 1.0 03 178.5	47 59.4 1.0 03 178.5	47 29.4 1.0 03 178.5	1
2	50 57.3 1.0 06 176.8	50 27.3 1.0 06 176.9	49 57.3 1.0 05 176.9	49 27.4 1.0 05 176.9	48 57.4 1.0 05 177.0	48 27.4 1.0 05 177.0	47 57.5 1.0 05 177.0	47 27.5 1.0 05 177.1	2
3	50 53.9 1.0 08 175.3	50 24.0 1.0 08 175.3	49 54.0 1.0 08 175.4	49 24.1 1.0 05 175.4	48 54.2 1.0 08 175.5	48 24.2 1.0 07 175.5	47 54.3 1.0 07 175.6	47 24.3 1.0 07 175.6	3
4	50 49.1 1.0 10 173.7	50 19.3 1.0 10 173.7	49 49.4 1.0 10 173.8	49 19.5 1.0 10 173.9	48 49.6 1.0 10 174.0	48 19.7 1.0 10 174.0	47 49.8 1.0 09 174.1	47 19.9 1.0 09 174.1	4
05	50 43.1 99 12 172.1	50 13.3 99 12 172.2	49 43.4 99 12 172.3	49 13.6 99 12 172.4	48 43.8 99 12 172.4	48 14.0 99 12 172.5	47 44.1 99 12 172.6	47 14.3 99 11 172.7	05
6	50 35.7 99 15 170.5	50 05.9 99 14 170.7	49 36.2 99 14 170.7	49 06.4 99 14 170.9	48 36.7 99 14 171.0	48 07.0 99 14 171.1	47 37.2 99 14 171.1	47 07.4 99 13 171.2	6
7	50 26.9 99 17 169.0	49 57.3 99 17 169.1	49 27.6 99 16 169.2	48 58.0 99 16 169.4	48 28.3 99 16 169.5	47 58.7 99 16 169.6	47 29.0 99 16 169.7	46 59.3 99 16 169.8	7
8	50 16.9 98 19 167.5	49 47.4 98 19 167.6	49 17.8 98 18 167.7	48 48.3 98 18 167.9	48 18.7 98 18 168.0	47 49.2 98 18 168.1	47 19.6 98 18 168.2	46 50.0 98 18 168.4	8
9	50 05.6 98 21 165.9	49 36.2 98 21 166.1	49 06.8 98 21 166.2	48 37.3 98 20 166.4	48 07.9 98 20 166.5	47 38.4 98 20 166.7	47 09.0 98 20 166.8	46 39.5 98 19 166.9	9
10	49 53.0 98 23 164.4	49 23.7 98 23 164.6	48 54.4 98 23 164.7	48 25.1 98 22 164.9	47 55.8 98 22 165.1	47 26.5 98 22 165.2	46 57.2 98 22 165.4	46 27.8 98 21 165.5	10
1	49 39.2 97 25 162.9	49 10.0 97 25 163.1	48 40.9 97 25 163.3	48 11.7 97 24 163.4	47 42.6 97 24 163.6	47 13.4 97 24 163.8	46 44.2 97 24 164.0	46 15.0 97 23 164.1	1
2	49 24.1 97 27 161.4	48 55.1 97 27 161.6	48 26.1 97 27 161.8	47 57.1 97 26 162.0	47 28.1 97 26 162.2	46 59.1 97 26 162.4	46 30.0 97 26 162.6	46 00.9 97 25 162.7	2
3	49 07.8 96 29 159.9	48 39.0 96 29 160.2	48 10.2 96 28 160.4	47 41.4 96 28 160.6	47 12.5 96 28 160.8	46 43.6 96 28 161.0	46 14.7 96 27 161.2	45 45.8 96 27 161.4	3
4	48 50.4 95 31 158.5	48 21.8 95 31 158.7	47 53.1 96 30 158.9	47 24.4 96 30 159.2	46 55.8 96 30 159.4	46 27.0 96 30 159.6	45 58.3 96 29 159.8	45 29.5 96 29 160.0	4
15	48 31.8 95 33 157.1	48 03.4 95 33 157.3	47 34.9 95 32 157.5	47 06.4 95 32 157.8	46 37.9 95 32 158.0	46 09.3 95 31 158.2	45 40.8 95 31 158.4	45 12.2 95 31 158.6	15
6	48 12.1 94 35 155.6	47 43.8 94 34 155.9	47 15.6 94 34 156.1	46 47.3 94 34 156.4	46 18.9 94 33 156.6	45 50.5 95 33 156.9	45 22.2 95 33 157.1	44 53.7 95 32 157.3	6
7	47 51.3 93 36 154.2	47 23.2 94 36 154.5	46 55.1 94 36 154.8	46 27.0 94 35 155.0	45 58.9 94 35 155.3	45 30.7 94 35 155.5	45 02.5 94 34 155.8	44 34.2 94 34 156.0	7
8	47 29.4 93 38 152.9	47 01.5 93 38 153.1	46 33.6 93 38 153.4	46 05.7 93 37 153.7	45 37.8 93 37 153.9	45 09.8 93 36 154.2	44 41.8 93 36 154.4	44 13.7 94 36 154.7	8
9	47 06.4 92 40 151.5	46 38.8 92 40 151.8	46 11.1 92 39 152.1	45 43.4 92 39 152.3	45 15.7 92 38 152.6	44 47.9 93 38 152.9	44 20.1 93 38 153.1	43 52.2 93 38 153.4	9
20	46 42.5 91 42 150.2	46 15.1 91 41 150.5	45 47.6 92 41 150.7	45 20.1 92 40 151.0	44 52.6 92 40 151.3	44 25.0 92 40 151.6	43 57.4 92 39 151.9	43 29.7 92 39 152.2	20
1	46 17.5 91 43 148.8	45 50.3 91 43 149.1	45 23.1 91 42 149.4	44 55.8 91 42 149.7	44 28.5 91 42 150.0	44 01.1 91 41 150.3	43 33.7 91 41 150.6	43 06.3 92 41 150.9	1
2	45 51.6 90 45 147.5	45 24.7 90 44 147.9	44 57.7 90 44 148.2	44 30.6 90 44 148.5	44 03.5 90 43 148.8	43 36.3 91 43 149.1	43 09.1 91 42 149.4	42 41.9 91 42 149.6	2
3	45 24.8 89 46 146.3	44 58.1 89 46 146.6	44 31.3 89 45 146.9	44 04.4 90 45 147.2	43 37.4 90 45 147.6	43 10.6 90 44 147.8	42 43.6 90 44 148.1	42 16.6 90 44 148.4	3
4	44 57.0 88 48 145.0	44 30.6 88 47 145.3	44 04.0 89 47 145.7	43 37.4 89 47 146.0	43 10.7 89 46 146.3	42 44.0 89 46 146.6	42 17.3 89 45 146.9	41 50.5 89 45 147.2	4
25	44 28.4 87 49 143.8	44 02.2 88 49 144.1	43 35.9 88 48 144.5	43 09.5 88 48 144.8	42 43.0 88 48 145.1	42 16.6 88 47 145.4	41 50.0 89 47 145.7	41 23.4 89 46 146.0	25
6	43 59.0 87 50 142.6	43 33.0 87 50 142.9	43 06.9 87 50 143.3	42 40.7 87 49 143.6	42 14.5 87 49 143.9	41 48.2 88 49 144.2	41 21.9 88 48 144.6	40 55.6 88 48 144.9	6
7	43 28.7 86 52 141.4	43 02.9 86 51 141.7	42 37.1 86 51 142.1	42 11.1 86 51 142.4	41 45.2 87 50 142.8	41 19.1 87 50 143.1	40 53.0 87 49 143.4	40 26.9 87 49 143.7	7
8	42 57.6 85 53 140.2	42 32.1 85 53 140.6	42 06.5 86 52 140.9	41 40.8 86 52 141.3	41 15.0 86 52 141.6	40 49.2 86 51 141.9	40 23.4 86 51 142.3	39 57.4 87 50 142.6	8
9	42 25.8 84 54 139.1	42 00.5 85 54 139.4	41 35.1 85 54 139.8	41 09.6 85 53 140.1	40 44.1 85 53 140.5	40 18.5 85 52 140.8	39 52.9 86 52 141.2	39 27.2 86 52 141.5	9
30	41 53.2 84 55 137.9	41 28.2 84 55 138.3	41 03.0 84 55 138.7	40 37.8 84 54 139.0	40 12.5 84 54 139.4	39 47.1 85 54 139.7	39 21.7 85 53 140.1	38 56.2 85 53 140.4	30
1	41 20.0 83 57 136.8	40 55.1 83 56 137.2	40 30.2 83 56 137.6	40 05.2 83 55 137.9	39 40.1 84 55 138.3	39 15.0 84 55 138.6	38 49.8 84 54 139.0	38 24.6 84 54 139.3	1
2	40 46.0 82 58 135.7	40 21.4 82 57 136.1	39 56.7 82 57 136.5	39 31.9 83 57 136.8	39 07.1 83 56 137.2	38 42.2 83 56 137.6	38 17.2 83 55 137.9	37 52.2 84 55 138.3	2
3	40 11.4 81 59 134.7	39 47.0 81 59 135.0	39 22.5 82 58 135.4	38 58.0 82 58 135.8	38 33.4 82 57 136.2	38 08.7 82 57 136.5	37 44.0 83 56 136.9	37 19.2 83 56 137.2	3
4	39 36.1 80 60 133.6	39 11.9 81 59 134.0	38 47.7 81 59 134.4	38 23.4 81 59 134.8	37 59.0 81 58 135.1	37 34.6 82 58 135.5	37 10.0 82 58 135.9	36 45.5 82 57 136.2	4
35	39 00.2 80 61 132.6	38 36.3 80 60 133.0	38 12.3 80 60 133.4	37 48.2 80 60 133.7	37 24.0 81 59 134.1	36 59.8 81 59 134.5	36 35.5 81 59 134.8	36 11.1 81 58 135.2	35
6	38 23.7 79 62 131.6	38 00.0 79 61 132.0	37 36.2 79 61 132.3	37 12.4 80 61 132.7	36 48.4 80 60 133.1	36 24.4 80 60 133.5	36 00.3 80 60 133.8	35 36.2 81 59 134.2	6
7	37 46.7 78 63 130.6	37 23.2 78 62 131.0	36 59.6 79 62 131.4	36 36.0 79 62 131.7	36 12.3 79 61 132.1	35 48.5 79 61 132.5	35 24.6 80 60 132.9	35 00.7 80 60 133.2	7
8	37 09.1 77 64 129.6	36 45.8 78 63 130.0	36 22.4 78 63 130.4	35 59.0 78 62 130.8	35 35.5 78 62 131.1	35 12.0 79 62 131.5	34 48.3 79 61 131.9	34 24.6 79 61 132.3	8
9	36 30.9 77 64 128.6	36 07.9 77 64 129.0	35 44.7 77 64 129.4	35 21.5 77 63 129.8	34 58.2 78 63 130.2	34 34.9 78 63 130.6	34 11.5 78 62 131.0	33 48.0 78 62 131.3	9
40	35 52.3 76 65 127.7	35 29.4 76 65 128.1	35 06.5 77 65 128.5	34 43.5 77 64 128.9	34 20.4 77 64 129.3	33 57.3 77 63 129.7	33 34.1 78 63 130.0	33 10.8 78 63 130.4	40
1	35 13.1 75 66 126.8	34 50.5 76 66 127.2	34 27.8 76 65 127.6	34 05.0 76 65 128.0	33 42.1 76 65 128.3	33 19.2 77 64 128.7	32 56.2 77 64 129.1	32 33.1 77 64 129.5	1
2	34 33.5 75 67 125.9	34 11.1 75 66 126.3	33 48.6 75 66 126.7	33 26.0 76 65 127.0	33 03.4 76 65 127.4	32 40.6 76 65 127.8	32 17.6 76 65 128.2	31 55.0 76 64 128.6	2
3	33 53.5 74 68 125.0	33 31.3 74 67 125.4	33 08.9 74 67 125.8	32 46.6 75 66 126.2	32 24.1 75 66 126.6	32 01.6 75 66 127.0	31 39.0 75 65 127.3	31 16.3 76 65 127.7	3
4	33 13.0 73 68 124.1	32 51.0 74 68 124.5	32 28.8 74 68 124.9	32 06.7 74 67 125.3	31 44.4 74 67 125.7	31 22.1 75 67 126.1	30 59.7 75 66 126.5	30 37.2 75 66 126.8	4
45	32 32.1 73 69 123.2	32 10.2 73 69 123.6	31 48.3 73 68 124.0	31 26.3 73 68 124.4	31 04.3 74 68 124.8	30 42.1 74 67 125.2	30 19.9 74 67 125.6	29 57.6 74 67 126.0	45
6	31 50.7 72 70 122.4	31 29.1 72 69 122.8	31 07.4 73 69 123.2	30 45.6 73 69 123.6	30 23.7 73 68 124.0	30 01.8 73 68 124.4	29 39.7 73 68 124.8	29 17.7 74 67 125.1	6
7	31 09.0 71 71 121.5	30 47.6 72 70 121.9	30 26.0 72 70 122.3	30 04.4 72 69 122.7	29 42.7 72 69 123.1	29 21.0 73 69 123.5	28 59.2 73 68 123.9	28 37.3 73 68 124.3	7
8	30 27.0 71 71 120.7	30 05.7 71 70 121.1	29 44.3 71 70 121.5	29 22.9 72 70 121.9	29 01.4 72 70 122.3	28 39.8 72 69 122.7	28 18.2 72 69 123.1	27 56.5 72 69 123.5	8
9	29 44.5 70 71 119.9	29 23.4 70 71 120.3	29 02.5 71 71 120.7	28 41.0 71 70 121.1	28 19.7 71 70 121.5	27 58.3 71 70 121.9	27 36.8 72 70 122.3	27 15.3 72 69 122.7	9
50	29 01.7 70 72 119.1	28 40.8 70 72 119.5	28 19.8 70 71 119.9	27 58.7 70 71 120.3	27 37.6 71 71 120.7	27 16.4 71 70 121.1	26 55.1 71 70 121.5	26 33.7 71 70 121.9	50
1	28 18.6 69 72 118.3	27 57.8 69 72 118.7	27 37.0 70 72 119.1	27 16.1 70 72 119.5	26 55.1 70 71 119.9	26 34.1 70 71 120.3	26 13.0 70 71 120.7	25 51.8 71 70 121.1	1
2	27 35.2 69 73 117.5	27 14.6 69 73 117.9	26 53.9 69 72 118.3	26 33.2 69 72 118.7	26 12.4 70 72 119.1	25 51.5 70 72 119.5	25 30.6 70 71 119.9	25 09.6 70 71 120.3	2
3	26 51.4 68 73 116.7	26 31.0 68 73 117.2	26 10.5 69 73 117.6	25 49.9 69 73 118.0	25 29.3 69 72 118.4	25 08.6 69 72 118.8	24 47.8 69 72 119.2	24 27.0 70 72 119.6	3
4	26 07.4 67 74 116.0	25 47.1 68 74 116.4	25 26.8 68 73 116.8	25 06.4 68 73 117.2	24 45.9 69 73 117.6	24 25.3 69 73 118.0	24 04.7 69 72 118.4	23 44.1 69 72 118.8	4
55	25 23.1 67 74 115.2	25 02.9 67 74 115.7	24 42.8 67 74 116.1	24 22.5 68 74 116.5	24 02.2 68 73 116.9	23 41.8 68 73 117.3	23 21.4 68 73 117.7	23 00.9 68 73 118.1	55
6	24 38.5 66 75 114.5	24 18.5 67 75 114.9	23 58.5 67 74 115.3	23 38.4 67 74 115.7	23 18.2 67 74 116.1	22 58.0 68 74 116.5	22 37.7 68 73 116.9	22 17.3 68 73 117.3	6
7	23 53.6 66 75 113.8	23 33.8 66 75 114.2	23 13.9 66 75 114.6	22 54.0 67 74 115.0	22 33.9 67 74 115.4	22 13.9 67 74 115.8	21 53.7 67 74 116.2	21 33.5 67 73 116.6	7
8	23 08.6 66 76 113.1	22 48.9 66 75 113.5	22 29.1 66 75 113.9	22 09.3 66 75 114.3	21 49.4 66 75 114.7	21 29.5 67 74 115.1	21 09.5 67 74 115.5	20 49.5 67 74 115.9	8
9	22 23.2 65 76 112.4	22 03.7 65 76 112.8	21 44.0 65 76 113.2	21 24.4 66 75 113.6	21 04.6 66 75 114.0	20 44.9 66 75 114.4	20 25.0 66 75 114.8	20 05.1 66 74 115.2	9
60	21 37.6 65 76 111.7	21 18.2 65 76 112.1	20 58.7 65 76 112.5	20 39.2 65 76 112.9	20 19.6 65 75 113.3	20 00.0 66 75 113.7	19 40.3 66 75 114.1	19 20.5 66 75 114.5	60
1	20 51.9 64 77 111.0	20 32.6 64 76 111.4	20 13.2 65 76 111.8	19 53.8 65 76 112.2	19 34.4 65 76 112.6	19 14.8 65 76 113.0	18 55.3 65 75 113.4	18 35.7 65 75 113.8	1
2	20 05.9 64 77 110.3	19 46.7 64 77 110.7	19 27.5 64 77 111.1	19 08.2 64 76 111.5	18 48.9 65 76 111.9	18 29.5 65 76 112.3	18 10.1 65 76 112.7	17 50.6 65 76 113.1	2
3	19 19.7 63 77 109.6	19 00.6 64 77 110.0	18 41.5 64 77 110.4	18 22.4 64 77 110.8	18 03.2 64 76 111.3	17 43.9 64 76 111.7	17 24.6 64 76 112.1	17 05.3 65 76 112.5	3
4	18 33.3 63 78 109.0	18 14.3 63 77 109.4	17 55.4 63 77 109.8	17 36.3 64 77 110.2	17 17.3 64 77 110.6	16 58.1 64 77 111.0	16 39.0 64 76 111.4	16 19.7 64 76 111.8	4
65	17 46.7 63 78 108.3	17 27.9 63 78 108.7	17 09.0 63 78 109.1	16 50.1 63 77 109.5	16 31.2 63 77 109.9	16 12.1 63 77 110.3	15 53.1 64 77 110.7	15 34.0 64 77 111.1	65
6	16 59.9 62 78 107.6	16 41.2 62 78 108.1	16 22.5 63 78 108.5	16 03.7 63 78 108.9	15 44.9 63 77 109.3	15 26.0 63 77 109.7	15 07.0 63 77 110.1	14 48.1 63 77 110.5	6
7	16 13.0 62 78 107.0	15 54.4 62 78 107.4	15 35.8 62 78 107.8	15 17.1 62 78 108.2	14 58.4 63 78 108.6	14 39.6 63 78 109.0	14 20.8 63 77 109.4	14 01.9 63 77 109.8	7
8	15 25.9 62 79 106.4	15 07.4 62 79 106.8	14 48.9 62 78 107.2	14 30.3 62 78 107.6	14 11.7 62 78 108.0	13 53.0 62 78 108.4	13 34.3 62 78 108.8	13 15.6 63 78 109.2	8
9	14 38.7 61 79 105.7	14 20.3 61 79 106.1	14 01.9 62 79 106.5	13 43.4 62 78 106.9	13 24.9 62 78 107.3	13 06.3 62 78 107.8	12 47.7 62 78 108.2	12 29.1 62 78 108.6	9
70	13 51.3 61 79 105.1	13 33.0 61 79 105.5	13 14.7 61 79 105.9	12 56.3 61 79 106.3	12 37.9 61 79 106.7	12 19.4 62 78 107.1	12 00.9 62 78 107.5	11 42.4 62 78 107.9	70
1	13 03.8 61 79 104.5	12 45.6 61 79 104.9	12 27.3 61 79 105.3	12 09.1 61 79 105.7	11 50.7 61 79 106.1	11 32.4 61 79 106.5	11 14.0 61 78 106.9	10 55.6 61 78 107.3	1
2	12 16.2 60 80 103.9	11 58.0 60 80 104.3	11 39.8 61 79 104.7	11 21.7 61 79 105.1	11 03.4 61 79 105.5	10 45.2 61 79 105.9	10 26.9 61 79 106.3	10 08.6 61 79 106.7	2
3	11 28.4 60 80 103.2	11 10.3 60 80 103.6	10 52.2 60 80 104.1	10 34.1 60 79 104.5	10 16.0 61 79 104.9	9 57.8 61 79 105.3	9 39.6 61 79 105.7	9 21.4 61 79 106.1	3
4	10 40.5 60 80 102.6	10 22.5 60 80 103.0	10 04.5 60 80 103.4	9 46.5 60 80 103.8	9 28.4 60 80 104.3	9 10.3 60 79 104.7	8 52.2 60 79 105.1	8 34.1 60 79 105.5	4
75	9 52.5 60 80 102.0	9 34.6 60 80 102.4	9 16.6 60 80 102.8	8 58.7 60 80 103.2	8 40.7 60 80 103.6	8 22.7 60 80 104.1	8 04.7 60 79 104.5	7 46.7 60 79 104.9	75
6	9 04.3 59 80 101.4	8 46.5 60 80 101.8	8 28.7 60 80 102.2	8 10.8 60 80 102.6	7 52.9 60 80 103.0	7 35.0 60 80 103.5	7 17.1 60 80 103.9	6 59.1 60 80 104.3	6
7	8 16.1 59 81 100.8	7 58.4 59 80 101.2	7 40.6 59 80 101.6	7 22.8 59 80 102.0	7 05.0 59 80 102.4	6 47.1 60 80 102.9	6 29.3 60 80 103.3	6 11.4 60 80 103.7	7
8	7 27.8 59 81 100.2	7 10.1 59 81 100.6	6 52.4 59 80 101.0	6 34.7 59 80 101.5	6 16.9 59 80 101.9	5 59.2 59 80 102.3	5 41.4 59 80 102.7	5 23.6 59 80 103.1	8
9	6 39.4 59 81 99.6	6 21.7 59 81 100.0	6 04.1 59 81 100.5	5 46.4 59 81 100.9	5 28.8 59 80 101.3	5 11.1 59 80 101.7			9
80	5 50.9 59 81 99.1	5 33.3 59 81 99.5	5 15.7 59 81 99.9						80
1	5 02.3 58 81 98.5								1

Lat. 35°   Lat. 36°   Lat. 37°   Lat. 38°

Lat. 35°

H.A.	8° 00' Alt. / Az.	8° 30' Alt. / Az.	9° 00' Alt. / Az.	9° 30' Alt. / Az.	10° 00' Alt. / Az.	10° 30' Alt. / Az.	11° 00' Alt. / Az.	11° 30' Alt. / Az.	H.A.
00	63 00.0 1.0 02 180.0	63 30.0 1.0 02 180.0	64 00.0 1.0 02 180.0	64 30.0 1.0 02 180.0	65 00.0 1.0 02 180.0	65 30.0 1.0 02 180.0	66 00.0 1.0 02 180.0	66 30.0 1.0 02 180.0	00
1	62 59.1 1.0 05 177.8	63 29.1 1.0 05 177.8	63 59.0 1.0 05 177.7	64 29.0 1.0 05 177.7	64 59.0 1.0 05 177.6	65 29.0 1.0 05 177.6	65 59.0 1.0 05 177.5	66 28.9 1.0 05 177.5	1
2	62 56.3 1.0 08 175.6	63 26.2 1.0 08 175.6	63 56.1 1.0 08 175.5	64 26.1 1.0 08 175.4	64 56.0 1.0 08 175.3	65 25.9 1.0 08 175.3	65 55.9 1.0 09 175.2	66 25.8 1.0 09 175.1	2
3	62 51.6 1.0 11 173.5	63 21.5 1.0 11 173.4	63 51.3 1.0 11 173.3	64 21.2 1.0 11 173.2	64 51.0 99 12 173.0	65 20.9 99 12 172.9	65 50.7 99 12 172.8	66 20.5 99 12 172.7	3
4	62 45.1 99 14 171.3	63 14.9 99 14 171.2	63 44.6 99 14 171.0	64 14.4 99 15 170.9	64 44.1 99 15 170.7	65 13.8 99 15 170.6	65 43.5 99 15 170.4	66 13.2 99 16 170.2	4
05	62 36.8 99 17 169.2	63 06.4 99 17 168.9	63 36.0 99 17 168.8	64 05.6 99 18 168.7	64 35.2 99 18 168.5	65 04.8 99 18 168.3	65 34.4 98 19 168.1	66 03.9 98 19 167.8	05
6	62 26.7 98 20 167.1	62 56.1 98 20 166.9	63 25.6 98 20 166.7	63 55.0 98 21 166.4	64 24.4 98 21 166.2	64 53.8 98 21 166.0	65 23.2 98 22 165.7	65 52.6 98 21 165.5	6
7	62 14.8 98 23 165.0	62 44.1 98 23 164.7	63 13.4 98 23 164.5	63 42.6 97 24 164.3	64 11.8 97 24 164.0	64 41.0 97 24 163.7	65 10.2 97 25 163.4	65 39.3 97 25 163.2	7
8	62 01.2 97 25 162.9	62 30.3 97 26 162.7	62 59.3 97 26 162.4	63 28.4 97 27 162.1	63 57.4 97 27 161.8	64 26.3 96 27 161.5	64 55.2 96 28 161.2	65 24.1 96 28 160.9	8
9	61 45.9 96 28 160.9	62 14.8 96 29 160.6	62 43.6 96 29 160.3	63 12.4 96 29 160.0	63 41.1 96 30 159.7	64 09.8 96 30 159.3	64 38.5 95 31 159.0	65 07.1 95 31 158.6	9
10	61 29.0 95 31 158.6	61 57.6 95 31 158.2	62 26.2 95 32 157.9	62 54.7 95 32 157.9	63 23.2 95 33 157.6	63 51.6 95 33 157.2	64 20.0 94 34 156.8	64 48.3 94 34 156.4	10
1	61 10.5 95 33 156.9	61 38.9 94 34 156.6	62 07.2 94 34 156.2	62 35.4 94 35 155.9	63 03.6 94 35 155.5	63 31.8 94 36 155.1	63 59.8 93 36 154.7	64 27.8 93 37 154.3	1
2	60 50.5 94 36 155.0	61 18.6 93 36 154.6	61 46.6 93 37 154.3	62 14.6 93 37 153.9	62 42.5 93 38 153.5	63 10.3 93 38 153.1	63 38.0 92 39 152.6	64 05.7 92 40 152.2	2
3	60 29.0 93 38 153.1	60 56.8 93 39 152.7	61 24.5 92 39 152.3	61 52.2 92 40 151.9	62 19.8 92 40 151.5	62 47.3 92 41 151.1	63 14.7 91 41 150.6	63 42.0 91 42 150.2	3
4	60 06.1 93 41 151.3	60 33.6 92 41 150.9	61 01.0 91 42 150.5	61 28.3 91 42 150.0	61 55.6 91 43 149.6	62 22.8 90 43 149.1	62 49.8 90 44 148.7	63 16.8 90 44 148.2	4
15	59 41.8 91 43 149.5	60 09.0 90 44 148.6	60 36.1 90 44 148.6	61 03.1 89 45 147.9	61 30.0 89 45 147.2	61 56.8 89 46 145.8	62 23.6 89 45 146.8	62 50.2 89 47 146.3	15
6	59 16.2 90 45 147.7	59 43.1 89 45 147.3	60 09.8 89 46 146.8	60 36.5 88 47 146.3	61 03.1 88 47 145.9	61 29.6 88 48 145.4	61 56.0 88 48 144.9	62 22.2 87 49 144.4	6
7	58 49.3 89 47 146.0	59 15.9 88 47 145.5	59 42.3 88 48 145.1	60 08.7 88 48 144.6	60 34.9 87 49 144.1	61 01.0 87 50 143.6	61 27.1 87 50 143.1	61 53.0 86 51 142.6	7
8	58 21.2 88 49 144.3	58 47.5 87 49 143.9	59 13.6 87 50 143.4	59 39.6 87 50 142.9	60 05.5 86 51 142.4	60 31.5 86 52 141.9	60 57.0 85 52 141.3	61 22.5 85 53 140.8	8
9	57 52.0 87 51 142.7	58 17.9 86 51 142.3	58 43.4 86 52 141.9	59 09.4 85 52 141.2	59 34.9 85 53 140.7	60 00.4 85 53 140.6	60 25.7 84 54 139.6	60 50.9 84 55 139.1	9
20	57 21.7 85 52 141.1	57 47.2 85 53 140.6	58 12.7 85 53 140.1	58 38.1 84 54 139.6	59 03.3 84 54 139.1	59 28.4 83 55 138.5	59 53.3 83 56 138.0	60 18.1 82 56 137.4	20
1	56 50.5 84 54 139.6	57 15.5 84 54 139.1	57 40.7 84 55 138.5	58 05.7 83 56 138.0	58 30.6 83 56 137.5	58 55.3 82 57 137.0	59 19.9 82 57 136.4	59 44.4 81 58 135.8	1
2	56 17.9 83 56 138.0	56 42.8 83 56 137.5	57 07.7 82 57 137.0	57 32.3 82 57 136.5	57 56.9 82 58 136.0	58 21.3 81 58 135.4	58 45.5 81 59 134.8	59 09.7 80 59 134.3	2
3	55 44.6 83 57 136.6	56 09.2 82 58 136.1	56 33.7 81 58 135.5	56 58.0 81 59 135.0	57 22.3 80 59 134.5	57 46.3 80 60 133.9	58 10.2 79 60 133.3	58 34.0 79 61 132.8	3
4	55 10.4 81 58 135.2	55 34.7 81 59 134.6	55 58.8 80 60 134.1	56 22.9 80 60 133.6	56 46.7 79 61 133.0	57 10.5 79 61 132.5	57 34.1 78 62 131.9	57 57.5 78 62 131.3	4
25	54 35.3 80 60 133.8	54 59.3 80 60 133.2	55 23.1 79 61 132.7	55 46.8 79 61 132.2	56 10.4 78 62 131.6	56 33.8 78 62 131.0	56 57.1 77 63 130.5	57 20.2 77 64 129.9	25
6	53 59.4 79 61 132.4	54 23.1 79 62 131.9	54 46.6 78 62 131.3	55 10.0 78 63 130.8	55 33.3 77 63 130.2	55 56.4 77 64 129.7	56 19.3 76 64 129.1	56 42.1 76 65 128.5	6
7	53 22.7 78 62 131.1	53 46.1 78 63 130.6	54 09.3 77 63 130.0	54 32.4 77 64 129.5	54 55.4 76 64 128.9	55 18.2 76 65 128.4	55 40.8 75 65 127.8	56 03.3 75 66 127.2	7
8	52 45.3 77 63 129.8	53 08.4 77 64 129.3	53 31.4 76 64 128.7	53 54.2 76 65 128.2	54 16.8 75 65 127.6	54 39.3 75 66 127.1	55 01.6 74 66 126.5	55 23.8 74 67 125.9	8
9	52 07.2 76 65 128.6	52 30.0 76 65 128.0	52 52.7 75 66 127.5	53 15.2 75 66 126.9	53 37.6 74 66 126.4	53 59.9 74 67 125.8	54 21.8 73 67 125.2	54 43.7 73 68 124.6	9
30	51 28.5 75 66 127.4	51 51.0 75 66 126.8	52 13.4 74 67 126.3	52 35.6 74 67 125.7	52 57.7 73 67 125.2	53 19.6 73 68 124.6	53 41.3 72 68 124.0	54 02.9 72 69 123.4	30
1	50 49.1 74 67 126.2	51 11.3 74 67 125.6	51 33.5 73 68 125.1	51 55.4 73 68 124.5	52 17.2 72 68 124.0	52 38.9 72 69 123.4	53 00.3 71 69 122.8	53 21.6 71 70 122.3	1
2	50 09.1 74 68 125.0	50 31.1 73 68 124.5	50 53.0 73 68 123.9	51 14.6 72 69 123.4	51 36.2 72 69 122.8	51 57.6 71 70 122.3	52 18.8 70 70 121.7	52 39.8 70 71 121.1	2
3	49 28.6 73 68 123.9	49 50.3 72 69 123.3	50 11.9 72 69 122.8	50 33.4 71 70 122.3	50 54.4 71 70 121.7	51 15.7 70 70 121.2	51 36.7 70 71 120.6	51 57.5 69 71 120.0	3
4	48 47.5 72 69 122.8	49 09.0 71 70 122.3	49 30.4 71 70 121.7	49 51.5 70 70 121.2	50 12.6 70 71 120.6	50 33.4 69 71 120.1	50 54.2 69 72 119.5	51 14.7 68 72 118.9	4
35	48 06.0 71 70 121.7	48 27.2 71 70 121.2	48 48.3 70 71 120.7	49 09.3 70 71 120.1	49 30.1 69 72 119.6	49 50.7 68 72 119.0	50 11.2 68 72 118.4	50 31.4 67 73 117.9	35
6	47 23.9 70 71 120.7	47 45.0 70 71 120.2	48 05.8 69 72 119.6	48 26.5 69 72 119.1	48 47.1 68 72 118.5	49 07.5 68 73 118.0	49 27.7 67 73 117.4	49 47.8 67 73 116.8	6
7	46 41.5 70 72 119.7	47 02.2 69 72 119.2	47 22.9 69 72 118.6	47 43.4 68 73 118.1	48 03.7 68 73 117.5	48 23.9 67 73 117.0	48 43.9 66 74 116.4	49 03.7 66 74 115.8	7
8	45 58.5 69 72 118.7	46 19.1 68 73 118.2	46 39.5 68 73 117.1	46 59.8 67 73 117.1	47 19.9 67 74 116.5	47 39.9 66 74 116.0	47 59.7 66 74 115.4	48 19.3 65 75 114.9	8
9	45 15.2 68 73 117.7	45 35.6 68 73 117.2	45 55.8 67 74 116.7	46 15.9 67 74 116.1	46 35.8 66 74 115.6	46 55.5 66 74 115.0	47 15.1 65 75 114.5	47 34.6 65 75 113.9	9
40	44 31.5 67 73 116.8	44 51.7 67 74 116.2	45 11.7 66 74 115.7	45 31.6 66 74 115.2	45 51.3 65 75 114.6	46 10.8 65 75 114.1	46 30.2 64 75 113.5	46 49.5 64 76 113.0	40
1	43 47.5 67 74 115.8	44 07.4 66 75 115.3	44 27.2 66 75 114.8	44 46.9 65 75 114.3	45 06.4 65 75 113.7	45 25.8 64 76 113.2	45 45.0 64 76 112.6	46 04.1 63 76 112.1	1
2	43 03.1 66 75 114.9	43 22.8 66 75 114.4	43 42.5 65 75 113.9	44 02.0 65 75 113.4	44 21.3 64 76 112.8	44 40.5 64 76 112.3	44 59.5 63 76 111.8	45 18.4 63 77 111.2	2
3	42 18.3 66 75 114.1	42 37.9 65 75 113.5	42 57.4 65 76 113.0	43 16.7 64 76 112.5	43 35.9 64 76 112.0	43 54.9 63 76 111.4	44 13.7 63 77 110.9	44 32.4 62 77 110.3	3
4	41 33.3 65 76 113.2	41 52.7 64 76 112.7	42 12.0 64 76 112.2	42 31.1 64 76 111.6	42 50.1 63 77 111.1	43 09.0 63 77 110.6	43 27.7 62 77 110.0	43 46.2 62 77 109.5	4
45	40 48.0 64 76 112.3	41 07.2 64 76 111.8	41 26.3 63 77 111.3	41 45.3 63 77 110.8	42 04.2 63 77 110.3	42 22.8 62 77 109.7	42 41.4 62 78 109.2	42 59.8 61 78 108.7	45
6	40 02.4 64 76 111.5	40 21.5 63 77 111.0	40 40.4 63 77 110.5	40 59.2 63 77 110.0	41 17.9 62 77 109.4	41 36.5 62 78 108.9	41 54.9 61 78 108.4	42 13.1 61 78 107.9	6
7	39 16.5 63 77 110.7	39 35.5 63 77 110.2	39 54.3 62 77 109.7	40 12.9 62 78 109.2	40 31.4 62 78 108.6	40 49.9 61 78 108.1	41 08.1 61 78 107.6	41 26.2 60 79 107.1	7
8	38 30.4 63 77 109.9	38 49.2 62 77 109.4	39 07.9 62 78 108.9	39 26.4 62 78 108.4	39 44.8 61 78 107.9	40 03.1 61 78 107.3	40 21.2 60 79 106.8	40 39.1 60 79 106.3	8
9	37 44.1 62 78 109.1	38 02.7 62 78 108.6	38 21.3 62 78 108.1	38 39.6 61 78 107.6	38 57.9 61 78 107.1	39 16.0 60 79 106.6	39 34.0 60 79 106.0	39 51.9 59 79 105.5	9
50	36 57.5 62 78 108.3	37 16.0 62 78 107.8	37 34.4 61 78 107.3	37 52.7 61 79 106.8	38 10.8 60 79 106.3	38 28.8 60 79 105.8	38 46.7 59 79 105.3	39 04.4 59 79 104.8	50
1	36 10.8 61 78 107.6	36 29.2 61 78 107.1	36 47.4 61 79 106.6	37 05.6 60 79 106.1	37 23.6 60 79 105.6	37 41.5 59 79 105.1	37 59.2 59 79 104.6	38 16.8 59 80 104.0	1
2	35 23.8 61 78 106.8	35 42.1 61 79 106.3	36 00.2 60 79 105.8	36 18.2 60 79 105.3	36 36.1 59 80 104.8	36 53.9 59 80 104.3	37 11.6 59 80 103.8	37 29.1 58 80 103.3	2
3	34 36.7 61 79 106.1	34 54.8 60 79 105.6	35 12.9 60 79 105.1	35 30.8 60 79 104.6	35 48.6 59 80 104.1	36 06.2 59 80 103.6	36 23.8 58 80 103.1	36 41.2 58 80 102.6	3
4	33 49.4 60 79 105.3	34 07.4 60 79 104.9	34 25.3 60 79 104.4	34 43.1 59 80 103.9	35 00.8 59 80 103.4	35 18.4 58 80 102.9	35 35.8 58 80 102.4	35 53.2 58 80 101.9	4
55	33 01.9 60 79 104.6	33 19.8 60 80 104.2	33 37.6 59 80 103.7	33 55.3 59 80 103.2	34 12.9 58 80 102.7	34 30.4 58 80 102.2	34 47.8 58 80 101.7	35 05.0 57 80 101.2	55
6	32 14.3 60 80 103.9	32 32.1 59 80 103.5	32 49.8 59 80 103.0	33 07.4 59 80 102.5	33 24.9 58 80 102.0	33 42.3 58 80 101.5	33 59.6 57 80 101.0	34 16.7 57 81 100.5	6
7	31 26.5 59 80 103.2	31 44.2 59 80 102.8	32 01.9 59 80 102.3	32 19.4 58 80 101.8	32 36.8 58 80 101.3	32 54.1 57 81 100.8	33 11.3 57 81 100.4	33 28.4 57 81 99.9	7
8	30 38.6 59 80 102.6	30 56.2 59 80 102.1	31 13.8 58 80 101.6	31 31.2 58 80 101.1	31 48.5 58 81 100.7	32 05.8 57 81 100.2	32 22.9 57 81 99.7	32 39.9 56 81 99.2	8
9	29 50.5 59 80 101.9	30 08.1 58 80 101.4	30 25.6 58 80 100.9	30 42.9 58 81 100.5	31 00.2 57 81 100.0	31 17.3 57 81 99.5	31 34.4 57 81 99.0	31 51.3 56 81 98.5	9
60	29 02.4 58 80 101.2	29 19.9 58 81 100.7	29 37.3 58 81 100.3	29 54.5 57 81 99.8	30 11.7 57 81 99.3	30 28.8 57 81 98.9	30 45.8 56 81 98.4	31 02.7 56 81 97.9	60
1	28 14.1 58 81 100.6	28 31.5 58 81 100.1	28 48.9 58 81 99.6	29 06.1 57 81 99.2	29 23.2 57 81 98.7	29 40.2 57 81 98.2	29 57.1 56 81 97.7	30 14.0 56 81 97.3	1
2	27 25.8 58 81 99.9	27 43.1 58 81 99.4	28 00.3 57 81 99.0	28 17.5 57 81 98.5	28 34.6 57 81 98.0	28 51.5 56 81 97.6	29 08.4 56 81 97.1	29 25.2 56 81 96.6	2
3	26 37.3 58 81 99.3	26 54.6 57 81 98.8	27 11.8 57 81 98.3	27 28.9 57 81 97.9	27 45.9 56 81 97.4	28 02.8 56 81 96.9	28 19.6 56 81 96.5	28 36.3 56 82 96.0	3
4	25 48.7 58 81 98.6	26 06.0 57 81 98.2	26 23.1 57 81 97.7	26 40.1 56 81 97.3	26 57.1 56 81 96.8	27 14.0 56 81 96.3	27 30.7 56 82 95.9	27 47.4 56 82 95.4	4
65	25 00.1 57 81 98.0	25 17.3 57 81 97.5	25 34.4 57 81 97.1	25 51.4 56 81 96.6	26 08.3 56 82 96.2	26 25.1 56 82 95.7	26 41.8 56 82 95.2	26 58.5 55 82 94.8	65
6	24 11.4 57 81 97.4	24 28.5 57 81 96.9	24 45.5 57 82 96.5	25 02.5 56 82 96.0	25 19.4 56 82 95.6	25 36.2 56 82 95.1	25 52.9 55 82 94.6	26 09.5 55 82 94.2	6
7	23 22.6 57 81 96.8	23 39.7 57 82 96.3	23 56.7 57 82 95.9	24 13.6 56 82 95.4	24 30.4 56 82 94.9	24 47.2 55 82 94.5	25 03.8 55 82 94.0	25 20.4 55 82 93.6	7
8	22 33.8 57 81 96.1	22 50.8 57 82 95.7	23 07.8 56 82 95.2	23 24.6 56 82 94.8	23 41.4 56 82 94.3	23 58.2 55 82 93.9	24 14.8 55 82 93.4	24 31.4 55 82 93.0	8
9	21 44.9 57 82 95.5	22 01.9 57 82 95.1	22 18.8 56 82 94.6	22 35.6 56 82 94.2	22 52.4 56 82 93.7	23 09.1 55 82 93.3	23 25.7 55 82 92.8	23 42.3 55 82 92.4	9
70	20 55.9 57 82 94.9	21 12.9 56 82 94.5	21 29.8 56 82 94.0	21 46.6 56 82 93.6	22 03.4 56 82 93.2	22 20.0 55 82 92.7	22 36.6 55 82 92.3	22 53.1 55 82 91.8	70
1	20 07.0 57 82 94.3	20 23.9 56 82 93.9	20 40.7 56 82 93.4	20 57.5 56 82 93.0	21 14.3 56 82 92.6	21 30.9 55 82 92.1	21 47.5 55 82 91.7	22 04.0 55 82 91.2	1
2	19 17.9 56 82 93.7	19 34.8 56 82 93.3	19 51.7 56 82 92.9	20 08.4 56 82 92.4	20 25.2 55 82 92.0	20 41.8 55 82 91.5	20 58.4 55 82 91.1	21 14.9 55 82 90.6	2
3	18 28.9 56 82 93.1	18 45.8 56 82 92.7	19 02.6 56 82 92.3	19 19.3 56 82 91.8	19 36.0 55 82 91.4	19 52.7 55 82 91.0	20 09.2 55 82 90.5	20 25.7 55 82 90.1	3
4	17 39.8 56 82 92.6	17 56.6 56 82 92.1	18 13.5 56 82 91.7	18 30.2 56 82 91.3	18 46.9 56 82 90.8	19 03.5 55 82 90.4	19 20.1 55 82 89.9	19 36.6 55 82 89.5	4
75	16 50.7 56 82 92.0	17 07.5 56 82 91.5	17 24.3 56 82 91.1	17 41.1 56 82 90.7	17 57.7 56 82 90.2	18 14.4 55 82 89.8	18 30.9 55 82 89.4	18 47.4 55 82 88.9	75
6	16 01.5 56 82 91.4	16 18.4 56 82 91.0	16 35.2 56 82 90.5	16 51.9 56 82 90.1	17 08.6 56 82 89.7	17 25.2 56 82 89.2	17 41.8 55 82 88.8	17 58.3 55 82 88.4	6
7	15 12.4 56 82 90.8	15 29.2 56 82 90.4	15 46.0 56 82 90.0	16 02.8 56 82 89.5	16 19.4 56 82 89.1	16 36.1 55 82 88.7	16 52.7 55 82 88.2	17 09.2 55 82 87.8	7
8	14 23.3 56 82 90.2	14 40.1 56 82 89.8	14 56.9 56 82 89.4	15 13.6 56 82 89.0	15 30.3 56 82 88.5	15 46.9 55 82 88.1	16 03.5 55 82 87.7	16 20.1 55 82 87.2	8
9	13 34.1 56 82 89.7	13 50.9 56 82 89.2	14 07.7 56 82 88.8	14 24.5 56 82 88.4	14 41.2 56 82 88.0	14 57.8 55 82 87.5	15 14.4 55 82 87.1	15 31.0 55 82 86.7	9
80	12 45.0 56 82 89.1	13 01.8 56 82 88.7	13 18.6 56 82 88.3	13 35.4 56 82 87.8	13 52.1 56 82 87.4	14 08.7 56 82 87.0	14 25.4 55 82 86.5	14 41.9 55 82 86.1	80
1	11 55.8 56 82 88.5	12 12.7 56 82 88.1	12 29.5 56 82 87.7	12 46.3 56 82 87.3	13 03.0 56 82 86.8	13 19.7 56 82 86.4	13 36.3 55 82 86.0	13 52.9 55 82 85.5	1
2	11 06.7 56 82 88.0	11 23.6 56 82 87.5	11 40.4 56 82 87.1	11 57.2 56 82 86.7	12 13.9 56 82 86.3	12 30.6 56 82 85.8	12 47.3 55 82 85.4	13 03.9 55 82 85.0	2
3	10 17.6 56 82 87.4	10 34.5 56 82 87.0	10 51.3 56 82 86.5	11 08.1 56 82 86.1	11 24.9 56 82 85.7	11 41.6 56 82 85.3	11 58.3 56 82 84.9	12 15.0 55 82 84.4	3
4	9 28.5 56 82 86.8	9 45.4 56 82 86.4	10 02.3 56 82 86.0	10 19.1 56 82 85.6	10 35.9 56 82 85.1	10 52.7 56 82 84.7	11 09.4 56 81 84.3	11 26.1 56 81 83.9	4
85	8 39.4 56 82 86.3	8 56.4 56 82 85.8	9 13.3 56 82 85.4	9 30.1 56 82 85.0	9 47.0 56 82 84.6	10 03.8 56 81 84.1	10 20.5 56 81 83.7	10 37.3 56 81 83.3	85
6	7 50.4 57 82 85.7	8 07.4 56 82 85.3	8 24.3 56 82 84.9	8 41.2 56 81 84.4	8 58.0 56 81 84.0	9 14.9 56 81 83.6	9 31.7 56 81 83.2	9 48.5 56 81 82.8	6
7	7 01.4 57 82 85.1	7 18.4 57 82 84.7	7 35.4 56 81 84.3	7 52.3 56 81 83.9	8 09.2 56 81 83.5	8 26.1 56 81 83.0	8 42.9 56 81 82.6	8 59.8 56 81 82.2	7
8	6 12.5 57 82 84.6	6 29.5 57 81 84.1	6 46.5 57 81 83.7	7 03.4 56 81 83.3	7 20.4 56 81 82.9	7 37.3 56 81 82.5	7 54.2 56 81 82.1	8 11.1 56 81 81.7	8
9	5 23.6 57 81 84.0	5 40.6 57 81 83.6	5 57.6 57 81 83.2	6 14.7 57 81 82.8	6 31.6 56 81 82.3	6 48.6 56 81 81.9	7 05.6 56 81 81.5	7 22.5 56 81 81.1	9
90			5 08.9 57 81 82.2	5 25.9 57 81 82.2	5 43.0 57 81 81.8	6 00.0 57 81 81.4	6 17.0 57 81 81.0	6 34.0 57 81 80.5	90

H.A.	8° 00' Alt. Δd Δt Az.	8° 30' Alt. Δd Δt Az.	9° 00' Alt. Δd Δt Az.	9° 30' Alt. Δd Δt Az.	10° 00' Alt. Δd Δt Az.	10° 30' Alt. Δd Δt Az.	11° 00' Alt. Δd Δt Az.	11° 30' Alt. Δd Δt Az.	H.A.
00	47 00.0 1.0 01 180.0	46 30.0 1.0 01 180.0	46 00.0 1.0 01 180.0	45 30.0 1.0 01 180.0	45 00.0 1.0 01 180.0	44 30.0 1.0 01 180.0	44 00.0 1.0 01 180.0	43 30.0 1.0 01 180.0	00
1	46 59.4 1.0 03 178.5	46 29.4 1.0 03 178.6	45 59.4 1.0 03 178.6	45 29.4 1.0 03 178.6	44 59.4 1.0 03 178.6	44 29.4 1.0 03 178.6	43 59.4 1.0 03 178.6	43 29.4 1.0 03 178.6	1
2	46 57.5 1.0 05 177.1	46 27.5 1.0 05 177.1	45 57.6 1.0 05 177.2	45 27.6 1.0 05 177.2	44 57.6 1.0 05 177.2	44 27.6 1.0 05 177.2	43 57.7 1.0 05 177.3	43 27.7 1.0 05 177.3	2
3	46 54.4 1.0 07 175.6	46 24.5 1.0 07 175.7	45 54.5 1.0 07 175.7	45 24.6 1.0 07 175.8	44 54.6 1.0 07 175.8	44 24.7 1.0 07 175.9	43 54.7 1.0 07 175.9	43 24.8 1.0 07 176.0	3
4	46 50.1 1.0 09 174.2	46 20.2 1.0 09 174.3	45 50.3 1.0 09 174.3	45 20.4 1.0 09 174.4	44 50.5 1.0 09 174.4	44 20.6 1.0 09 174.5	43 50.6 1.0 09 174.6	43 20.7 1.0 09 174.6	4
05	46 44.5 99 11 172.8	46 14.6 99 11 172.8	45 44.8 99 11 172.9	45 15.0 99 11 173.0	44 45.1 99 11 173.1	44 15.3 1.0 11 173.1	43 45.4 1.0 11 173.2	43 15.6 1.0 11 173.3	05
6	46 37.7 99 13 171.3	46 07.9 99 13 171.4	45 38.1 99 13 171.5	45 08.4 99 13 171.6	44 38.6 99 13 171.7	44 08.8 99 13 171.8	43 39.0 99 12 171.8	43 09.2 99 12 171.9	6
7	46 29.7 99 15 169.9	46 00.0 99 15 170.0	45 30.3 99 15 170.1	45 00.6 99 15 170.2	44 30.9 99 15 170.3	44 01.2 99 15 170.4	43 31.5 99 14 170.5	43 01.8 99 14 170.6	7
8	46 20.5 99 17 168.5	45 50.9 99 17 168.6	45 21.3 99 17 168.7	44 51.7 99 17 168.8	44 22.0 99 17 168.9	43 52.4 99 16 169.1	43 22.8 99 16 169.2	42 53.2 99 16 169.3	8
9	46 10.0 98 19 167.1	45 40.6 98 19 167.2	45 11.1 98 19 167.3	44 41.6 98 19 167.5	44 12.0 98 19 167.6	43 42.5 98 18 167.7	43 13.0 98 18 167.8	42 43.5 98 18 168.0	9
10	45 58.5 98 21 165.7	45 29.1 98 21 165.8	44 59.7 98 21 166.0	44 30.3 98 21 166.1	44 00.9 98 20 166.2	43 31.5 98 20 166.4	43 02.1 98 20 166.5	42 32.7 98 20 166.6	10
1	45 45.7 97 23 164.3	45 16.5 98 23 164.4	44 47.2 98 23 164.6	44 18.0 98 22 164.8	43 48.7 98 22 164.9	43 19.4 98 22 165.1	42 50.1 98 22 165.2	42 20.8 98 21 165.3	1
2	45 31.8 97 25 162.9	45 02.7 97 25 163.1	44 33.6 97 25 163.2	44 04.5 97 24 163.4	43 35.3 97 24 163.6	43 06.2 97 24 163.7	42 37.0 97 24 163.9	42 07.8 97 23 164.1	2
3	45 16.8 97 27 161.5	44 47.9 97 27 161.7	44 18.9 97 26 161.9	43 49.9 97 26 162.1	43 20.9 97 26 162.3	42 51.9 97 26 162.4	42 22.8 97 25 162.6	41 53.8 97 25 162.8	3
4	45 00.7 96 29 160.2	44 31.9 96 28 160.4	44 03.1 96 28 160.6	43 34.3 96 28 160.8	43 05.4 96 28 161.0	42 36.5 96 27 161.1	42 07.6 96 27 161.3	41 38.7 96 27 161.5	4
15	44 43.5 95 30 158.9	44 14.9 96 30 159.1	43 46.2 96 30 159.3	43 17.5 96 30 159.5	42 48.8 96 29 159.7	42 20.1 96 29 159.9	41 51.4 96 29 160.1	41 22.6 96 29 160.2	15
6	44 25.3 95 32 157.5	43 56.8 95 32 157.8	43 28.3 95 32 158.0	42 59.8 95 31 158.2	42 31.2 95 31 158.4	42 02.7 95 31 158.6	41 34.1 95 30 158.8	41 05.5 95 30 159.0	6
7	44 06.0 94 34 156.2	43 37.7 94 34 156.5	43 09.4 94 33 156.7	42 41.0 95 33 156.9	42 12.6 95 33 157.1	41 44.2 95 32 157.3	41 15.8 95 32 157.6	40 47.4 95 32 157.8	7
8	43 45.7 94 36 154.9	43 17.5 94 35 155.2	42 49.4 94 35 155.4	42 21.2 94 35 155.6	41 53.0 94 34 155.9	41 24.8 94 34 156.1	40 56.6 94 34 156.3	40 28.3 94 33 156.5	8
9	43 24.3 93 37 153.7	42 56.4 93 37 153.9	42 28.5 93 36 154.2	42 00.5 93 36 154.4	41 32.5 93 36 154.6	41 04.4 94 36 154.9	40 36.3 94 35 155.1	40 08.2 94 35 155.3	9
20	43 02.0 92 39 152.4	42 34.3 92 38 152.7	42 06.6 93 38 152.9	41 38.8 93 38 153.2	41 10.9 93 37 153.4	40 43.1 93 37 153.7	40 15.2 93 37 153.9	39 47.3 93 36 154.1	20
1	42 38.8 92 40 151.2	42 11.3 92 40 151.4	41 43.7 92 40 151.7	41 16.1 92 39 151.9	40 48.5 92 39 152.2	40 20.8 92 39 152.5	39 53.1 92 38 152.7	39 25.4 92 38 153.0	1
2	42 14.6 91 42 149.9	41 47.3 91 41 150.2	41 19.9 91 41 150.5	40 52.5 91 41 150.7	40 25.1 92 40 151.0	39 57.6 92 40 151.3	39 30.1 92 40 151.5	39 02.6 92 39 151.8	2
3	41 49.6 90 43 148.7	41 22.4 90 43 149.0	40 55.3 91 43 149.3	40 28.1 91 42 149.6	40 00.9 91 42 149.8	39 33.6 91 42 150.1	39 06.3 91 41 150.4	38 38.9 91 41 150.6	3
4	41 23.6 90 45 147.5	40 56.7 90 44 147.8	40 29.7 90 44 148.1	40 02.8 90 44 148.4	39 35.7 90 43 148.7	39 08.7 90 43 149.0	38 41.5 90 43 149.2	38 14.4 91 42 149.5	4
25	40 56.8 89 46 146.4	40 30.1 89 46 146.7	40 03.4 89 45 147.0	39 36.6 89 45 147.2	39 09.8 89 45 147.5	38 42.9 89 44 147.8	38 16.0 90 44 148.1	37 49.0 90 44 148.4	25
6	40 29.1 88 47 145.2	40 02.7 88 47 145.5	39 36.2 88 47 145.8	39 09.6 89 46 146.1	38 43.0 89 46 146.4	38 16.3 89 46 146.7	37 49.6 89 45 147.0	37 22.9 89 45 147.3	6
7	40 00.7 87 49 144.1	39 34.4 88 48 144.4	39 08.1 88 48 144.7	38 41.8 88 48 145.0	38 15.4 88 47 145.3	37 48.9 88 47 145.6	37 22.4 88 47 145.9	36 55.9 89 46 146.2	7
8	39 31.4 87 50 142.9	39 05.4 87 50 143.3	38 39.3 87 49 143.6	38 13.2 87 49 143.9	37 47.0 87 49 144.2	37 20.8 88 48 144.5	36 54.5 88 48 144.8	36 28.2 88 47 145.1	8
9	39 01.4 86 51 141.8	38 35.6 86 51 142.2	38 09.8 86 50 142.5	37 43.9 86 50 142.8	37 17.9 87 50 143.1	36 51.9 87 49 143.4	36 25.8 87 49 143.7	35 59.7 87 49 144.0	9
30	38 30.7 85 52 140.7	38 05.1 85 52 141.1	37 39.5 86 52 141.4	37 13.8 86 51 141.7	36 48.0 86 51 142.1	36 22.2 86 51 142.4	35 56.4 86 50 142.7	35 30.5 86 50 143.0	30
1	37 59.3 84 54 139.7	37 33.9 85 53 140.0	37 08.5 85 53 140.3	36 43.0 85 52 140.7	36 17.4 85 52 141.0	35 51.9 85 52 141.3	35 26.2 86 51 141.6	35 00.5 86 51 142.0	1
2	37 27.1 84 55 138.6	37 02.0 84 54 139.0	36 36.8 84 54 139.3	36 11.5 84 54 139.6	35 46.2 84 53 140.0	35 20.8 85 53 140.3	34 55.4 85 52 140.6	34 29.9 85 52 140.9	2
3	36 54.3 83 56 137.6	36 29.4 83 55 137.9	36 04.4 83 55 138.3	35 39.3 84 55 138.6	35 14.2 84 54 139.0	34 49.1 84 54 139.3	34 23.9 84 54 139.6	33 58.6 84 53 139.9	3
4	36 20.8 82 57 136.6	35 56.1 82 56 136.9	35 31.3 83 56 137.3	35 06.5 83 56 137.6	34 41.6 83 55 138.0	34 16.7 83 55 138.3	33 51.7 83 55 138.6	33 26.6 84 54 139.0	4
35	35 46.7 82 58 135.6	35 22.2 82 57 135.9	34 57.7 82 57 136.3	34 33.1 82 57 136.6	34 08.4 82 56 137.0	33 43.7 83 56 137.3	33 18.9 83 56 137.6	32 54.1 83 55 138.0	35
6	35 12.0 81 59 134.6	34 47.7 81 58 134.9	34 23.4 81 58 135.3	33 59.0 81 58 135.6	33 34.5 82 57 136.0	33 10.0 82 57 136.3	32 45.5 82 57 136.7	32 20.8 82 56 137.0	6
7	34 36.7 80 60 133.6	34 12.6 80 59 134.0	33 48.5 80 59 134.3	33 24.3 81 59 134.7	33 00.1 81 58 135.0	32 35.8 81 58 135.4	32 11.4 81 58 135.7	31 47.0 81 57 136.1	7
8	34 00.8 79 61 132.6	33 37.0 80 60 133.0	33 13.1 80 60 133.4	32 49.1 80 60 133.7	32 25.1 80 59 134.1	32 01.0 80 59 134.4	31 36.9 81 59 134.8	31 12.7 81 58 135.1	8
9	33 24.4 79 62 131.7	33 00.8 79 61 132.1	32 37.1 79 61 132.4	32 13.3 79 61 132.8	31 49.5 79 60 133.2	31 25.6 80 60 133.5	31 01.7 80 60 133.9	30 37.7 80 59 134.2	9
40	32 47.4 78 62 130.8	32 24.0 78 62 131.2	32 00.5 78 62 131.5	31 37.0 79 61 131.9	31 13.4 79 61 132.2	30 49.7 79 61 132.6	30 26.0 79 60 133.0	30 02.2 79 60 133.3	40
1	32 10.0 77 63 129.9	31 46.8 77 63 130.2	31 23.5 78 63 130.6	31 00.2 78 62 131.0	30 36.8 78 62 131.3	30 13.3 78 62 131.7	29 49.8 79 61 132.1	29 26.2 79 61 132.4	1
2	31 32.0 77 64 129.0	31 09.0 77 64 129.4	30 45.9 77 63 129.7	30 22.8 77 63 130.1	29 59.6 77 63 130.5	29 36.3 78 62 130.8	29 13.0 78 62 131.2	28 49.7 78 62 131.5	2
3	30 53.6 76 65 128.1	30 30.8 76 65 128.5	30 07.9 76 64 128.8	29 45.0 77 64 129.2	29 22.0 77 64 129.6	28 58.9 77 63 130.0	28 35.8 77 63 130.3	28 12.6 77 63 130.7	3
4	30 14.7 75 66 127.2	29 52.1 75 65 127.6	29 29.4 76 65 128.0	29 06.6 76 65 128.4	28 43.9 76 64 128.7	28 21.0 76 64 129.1	27 58.1 76 64 129.5	27 35.1 77 63 129.8	4
45	29 35.3 75 66 126.4	29 12.9 75 66 126.7	28 50.4 75 66 127.1	28 27.9 75 65 127.5	28 05.3 75 65 127.9	27 42.6 76 65 128.2	27 19.9 76 64 128.6	26 57.1 76 64 129.0	45
6	28 55.5 74 67 125.5	28 33.3 74 67 125.9	28 11.0 74 66 126.3	27 48.7 75 66 126.7	27 26.3 75 66 127.0	27 03.8 75 65 127.4	26 41.3 75 65 127.8	26 18.7 75 65 128.2	6
7	28 15.3 73 68 124.7	27 53.3 74 67 125.1	27 31.2 74 67 125.5	27 09.0 74 67 125.8	26 46.8 74 67 125.8	26 24.6 74 66 126.6	26 02.2 75 66 127.0	25 39.8 75 66 127.3	7
8	27 34.7 73 68 123.9	27 12.9 73 68 124.3	26 51.0 73 68 124.6	26 29.0 74 67 125.0	26 07.0 74 67 125.4	25 44.9 74 67 125.8	25 22.7 74 66 126.2	25 00.6 74 66 126.5	8
9	26 53.7 72 69 123.1	26 32.0 72 69 123.5	26 10.3 73 68 123.8	25 48.5 73 68 124.2	25 26.7 73 68 124.6	25 04.8 73 67 125.0	24 42.9 73 67 125.4	24 20.9 73 67 125.7	9
50	26 12.3 71 70 122.3	25 50.8 72 69 122.7	25 29.3 72 69 123.1	25 07.7 72 69 123.4	24 46.1 72 68 123.8	24 24.4 72 68 124.2	24 02.6 73 68 124.6	23 40.8 73 67 124.9	50
1	25 30.6 71 70 121.5	25 09.3 71 70 121.9	24 47.9 71 70 122.3	24 26.5 71 69 122.7	24 05.0 72 69 123.0	23 43.5 72 69 123.4	23 21.9 72 68 123.8	23 00.3 72 68 124.2	1
2	24 48.5 70 71 120.7	24 27.4 71 70 121.1	24 06.2 71 70 121.5	23 45.0 71 70 121.9	23 23.7 71 70 122.3	23 02.3 71 69 122.7	22 40.9 71 69 123.0	22 19.4 72 69 123.4	2
3	24 06.1 70 71 120.0	23 45.1 70 71 120.3	23 24.1 70 71 120.7	23 03.1 70 70 121.1	22 41.9 71 70 121.5	22 20.8 71 70 121.9	21 59.5 71 70 122.3	21 38.2 71 69 122.7	3
4	23 23.3 69 72 119.2	23 02.6 69 72 119.6	22 41.7 70 71 120.0	22 20.8 70 71 120.4	21 59.9 70 71 120.8	21 38.9 70 70 121.1	21 17.8 70 70 121.5	20 56.7 70 70 121.9	4
55	22 40.3 69 72 118.5	22 19.7 69 72 118.9	21 59.0 69 72 119.2	21 38.3 69 71 119.6	21 17.5 69 71 120.0	20 56.6 70 71 120.4	20 35.7 70 71 120.8	20 14.8 70 70 121.2	55
6	21 56.9 68 73 117.7	21 36.5 68 72 118.1	21 16.0 68 72 118.5	20 55.4 69 72 118.9	20 34.8 69 72 119.3	20 14.1 69 71 119.7	19 53.4 69 71 120.1	19 32.6 69 71 120.5	6
7	21 13.3 68 73 117.0	20 53.0 68 73 117.4	20 32.6 68 73 117.8	20 12.2 68 72 118.2	19 51.7 68 72 118.6	19 31.2 68 72 119.0	19 10.7 69 72 119.4	18 50.1 69 71 119.7	7
8	20 29.4 67 74 116.3	20 09.2 67 73 116.7	19 49.0 67 73 117.1	19 28.7 68 73 117.5	19 08.4 68 73 117.9	18 48.1 68 72 118.3	18 27.7 68 72 118.6	18 07.2 68 72 119.0	8
9	19 45.2 67 74 115.6	19 25.2 67 74 116.0	19 05.1 67 74 116.4	18 45.0 67 73 116.8	18 24.9 67 73 117.2	18 04.7 67 73 117.6	17 44.4 68 73 117.9	17 24.1 68 72 118.3	9
60	19 00.7 66 75 114.9	18 40.9 66 74 115.3	18 20.9 66 74 115.7	18 01.0 67 74 116.1	17 41.0 67 74 116.5	17 20.9 67 73 116.9	17 00.8 67 73 117.2	16 40.7 67 73 117.6	60
1	18 16.0 66 75 114.2	17 56.3 66 75 114.6	17 36.5 66 74 115.0	17 16.7 66 74 115.4	16 56.9 66 74 115.8	16 37.0 66 74 116.2	16 17.0 67 73 116.6	15 57.0 67 73 117.0	1
2	17 31.1 65 75 113.5	17 11.5 65 75 113.9	16 51.9 65 75 114.3	16 32.2 66 75 114.7	16 12.5 66 74 115.1	15 52.7 66 74 115.5	15 32.9 66 74 115.9	15 13.1 66 74 116.3	2
3	16 45.9 65 76 112.9	16 26.4 65 75 113.3	16 07.0 65 75 113.6	15 47.4 65 75 114.0	15 27.9 65 75 114.4	15 08.2 65 75 114.8	14 48.6 66 74 115.2	14 28.9 66 74 115.6	3
4	16 00.5 64 76 112.2	15 41.2 64 76 112.6	15 21.8 65 76 113.0	15 02.4 65 75 113.4	14 43.0 65 75 113.8	14 23.5 65 75 114.2	14 04.0 65 75 114.6	13 44.5 65 74 114.9	4
65	15 14.9 64 76 111.5	14 55.7 64 76 111.9	14 36.5 64 76 112.3	14 17.2 64 76 112.7	13 57.9 64 75 113.1	13 38.6 65 75 113.5	13 19.2 65 75 113.9	12 59.8 65 75 114.3	65
6	14 29.0 63 77 110.9	14 10.0 64 76 111.3	13 50.9 64 76 111.7	13 31.8 64 76 112.1	13 12.6 64 76 112.5	12 53.4 64 76 112.9	12 34.1 64 76 113.3	12 14.9 64 76 113.6	6
7	13 43.0 63 77 110.2	13 24.1 63 77 110.6	13 05.1 63 77 111.0	12 46.1 63 76 111.4	12 27.1 64 76 111.8	12 08.0 64 76 112.2	11 48.9 64 76 112.6	11 29.7 64 76 113.0	7
8	12 56.8 63 77 109.6	12 38.0 62 77 110.0	12 19.1 63 77 110.4	12 00.0 63 77 110.8	11 41.3 63 77 111.2	11 22.4 63 76 111.6	11 03.4 63 76 112.0	10 44.4 63 76 112.4	8
9	12 10.4 62 78 109.0	11 51.7 62 77 109.4	11 33.0 63 77 109.8	11 14.2 63 77 110.2	10 55.4 63 77 110.6	10 36.6 63 77 110.9	10 17.7 63 76 111.3	9 58.8 63 76 111.7	9
70	11 23.8 62 78 108.3	11 05.3 62 78 108.7	10 46.6 62 78 109.1	10 28.0 62 77 109.5	10 09.3 62 77 109.9	9 50.6 62 77 110.3	9 31.8 63 77 110.7	9 13.1 63 77 111.1	70
1	10 37.1 62 78 107.7	10 18.6 62 78 108.1	10 00.1 62 78 108.5	9 41.6 62 78 108.9	9 23.0 62 77 109.3	9 04.4 62 77 109.7	8 45.8 62 77 110.1	8 27.1 62 77 110.5	1
2	9 50.2 61 79 107.1	9 31.8 61 78 107.5	9 13.4 61 78 107.9	8 55.0 61 78 108.3	8 36.5 62 78 108.7	8 18.0 62 78 109.1	7 59.5 62 77 109.5	7 41.0 62 77 109.9	2
3	9 03.2 61 79 106.5	8 44.9 61 78 106.9	8 26.6 61 78 107.3	8 08.2 61 78 107.7	7 49.9 61 78 108.1	7 31.5 61 78 108.5	7 13.1 61 78 108.9	6 54.7 61 77 109.3	3
4	8 15.9 61 79 105.9	7 57.8 61 79 106.3	7 39.6 61 78 106.7	7 21.3 61 78 107.1	7 03.1 61 78 107.5	6 44.8 61 78 107.9	6 26.5 61 78 108.3	6 08.2 61 78 108.7	4
75	7 28.6 60 79 105.3	7 10.5 60 79 105.7	6 52.4 60 79 106.1	6 34.3 60 79 106.5	6 16.1 61 78 106.9	5 58.0 61 78 107.3	5 39.8 61 78 107.7	5 21.6 61 78 108.1	75
6	6 41.1 60 79 104.7	6 23.1 60 79 105.1	6 05.1 60 79 105.5	5 47.1 60 79 105.9	5 29.0 60 79 106.3	5 10.9 60 79 106.7			6
7	5 53.5 60 80 104.1	5 35.6 60 79 104.5	5 17.7 60 79 104.9						7
8	5 05.8 59 80 103.5								8

DECLINATION **SAME** NAME AS LATITUDE

H.A.	8° 00' Alt. Δd Δt Az.	8° 30' Alt. Δd Δt Az.	9° 00' Alt. Δd Δt Az.	9° 30' Alt. Δd Δt Az.	10° 00' Alt. Δd Δt Az.	10° 30' Alt. Δd Δt Az.	11° 00' Alt. Δd Δt Az.	11° 30' Alt. Δd Δt Az.	H.A.
91						5 11.4 57 81 80.8	5 28.5 57 81 80.4	5 45.5 57 81 80.0	91

Lat. 35°

H.A.	12° 00′ Alt.	Δd Δt	Az.	12° 30′ Alt.	Δd Δt	Az.	13° 00′ Alt.	Δd Δt	Az.	13° 30′ Alt.	Δd Δt	Az.	14° 00′ Alt.	Δd Δt	Az.	14° 30′ Alt.	Δd Δt	Az.	15° 00′ Alt.	Δd Δt	Az.	15° 30′ Alt.	Δd Δt	Az.	H.A.
00	67 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0	68 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	00
1	66 58.9	1.0 05	177.5	67 28.9	1.0 05	177.4	67 58.9	1.0 06	177.4	68 28.9	1.0 06	177.3	68 58.8	1.0 06	177.3	69 28.8	1.0 06	177.2	69 58.8	1.0 06	177.2	70 28.8	1.0 06	177.1	1
2	66 55.7	1.0 09	175.0	67 25.6	1.0 09	174.9	67 55.5	1.0 09	174.9	68 25.5	1.0 10	174.6	68 55.4	1.0 10	174.6	69 25.3	1.0 10	174.4	69 55.2	1.0 10	174.4	70 25.1	1.0 10	174.2	2
3	66 50.4	99 13	172.5	67 20.2	99 13	172.4	67 50.0	99 13	172.2	68 19.9	99 13	172.1	68 49.6	99 14	171.9	69 19.4	99 14	171.7	69 49.1	99 14	171.6	70 18.9	99 14	171.4	3
4	66 42.9	99 16	170.1	67 12.6	99 16	169.9	67 42.3	99 16	169.7	68 11.9	99 17	169.5	68 41.6	99 17	169.3	69 11.2	99 17	169.0	69 40.8	99 18	168.8	70 10.4	99 18	168.6	4
05	66 33.4	98 19	167.6	67 02.9	98 20	167.4	67 32.4	98 20	167.2	68 01.9	98 20	166.9	68 31.3	98 21	166.6	69 00.7	98 21	166.4	69 30.1	98 22	166.1	69 59.4	98 22	165.8	05
6	66 21.9	98 23	165.2	66 51.2	98 23	165.0	67 20.4	97 23	164.7	67 49.7	97 24	164.4	68 18.9	97 24	164.1	68 48.0	97 25	163.7	69 17.2	97 25	163.4	69 46.3	97 26	163.1	6
7	66 08.4	97 26	162.9	66 37.4	97 26	162.6	67 06.4	97 27	162.2	67 35.4	97 27	161.9	68 04.3	96 28	161.5	68 33.2	96 28	161.2	69 02.1	96 29	160.8	69 30.8	96 29	160.4	7
8	65 52.9	96 29	160.5	66 21.7	96 29	160.2	66 50.5	96 30	159.8	67 19.1	96 30	159.5	67 47.8	95 31	159.1	68 16.3	95 31	158.7	68 44.9	95 32	158.2	69 13.3	95 33	157.8	8
9	65 35.6	95 32	158.3	66 04.1	95 32	157.9	66 32.6	95 33	157.5	67 00.9	94 33	157.1	67 29.2	94 34	156.6	67 57.5	94 35	156.2	68 25.6	94 35	155.7	68 53.7	93 36	155.3	9
10	65 16.6	94 35	156.0	65 44.7	94 35	155.6	66 12.8	94 36	155.2	66 40.9	93 36	154.8	67 08.8	93 37	154.3	67 36.7	93 38	153.8	68 04.5	92 38	153.3	68 32.2	92 39	152.8	10
1	64 55.7	93 37	153.9	65 23.6	93 38	153.4	65 51.4	92 39	153.0	66 19.0	92 39	152.5	66 46.6	92 40	152.0	67 14.1	91 41	151.5	67 41.5	91 41	151.0	68 08.8	91 42	150.4	1
2	64 33.3	92 40	151.7	65 01.0	92 41	151.2	65 28.2	91 41	150.8	65 55.5	91 42	150.3	66 22.7	91 43	149.8	66 49.8	90 43	149.2	67 16.8	90 44	148.7	67 43.7	89 45	148.1	2
3	64 09.2	91 43	149.7	64 36.4	90 43	149.2	65 03.4	90 44	148.7	65 30.3	90 44	148.2	65 57.2	89 45	147.6	66 23.9	89 46	147.0	66 50.4	88 47	146.5	67 16.9	88 47	145.9	3
4	63 43.7	90 45	147.7	64 10.5	90 45	147.2	64 37.1	89 46	146.6	65 03.7	88 47	146.1	65 30.1	88 48	145.5	65 56.4	87 48	144.9	66 22.5	87 49	144.3	66 48.5	86 50	143.7	4
15	63 16.7	88 47	145.7	63 43.1	88 48	145.2	64 09.4	87 48	144.7	64 35.5	87 49	144.1	65 01.5	86 50	143.5	65 27.4	86 51	142.9	65 53.1	85 51	142.3	66 18.7	85 52	141.6	15
6	62 48.4	87 49	143.8	63 14.4	87 50	143.3	63 40.3	86 51	142.7	64 06.0	86 51	142.1	64 31.6	85 52	141.5	64 57.1	85 53	140.9	65 22.4	84 53	140.3	65 47.5	83 54	139.6	6
7	62 18.7	86 51	142.0	62 44.4	85 52	141.5	63 09.9	85 53	140.9	63 35.2	84 53	140.3	64 00.4	84 54	139.7	64 25.5	83 55	139.0	64 50.4	83 55	138.4	65 15.1	82 56	137.7	7
8	61 47.9	84 53	140.2	62 13.2	84 54	139.7	62 38.3	83 55	139.1	63 03.2	83 55	138.5	63 28.0	82 56	137.8	63 52.7	82 57	137.2	64 17.1	81 57	136.5	64 41.4	81 58	135.9	8
9	61 15.9	83 55	138.5	61 40.8	83 56	137.9	62 05.5	82 56	137.3	62 30.1	82 57	136.7	62 54.5	81 58	136.1	63 18.7	80 58	135.4	63 42.8	80 59	134.7	64 06.6	79 60	134.1	9
20	60 42.8	82 57	136.9	61 07.3	81 57	136.3	61 31.7	81 58	135.6	61 55.9	80 59	135.0	62 19.9	80 59	134.4	62 43.7	79 60	133.7	63 07.4	78 61	133.0	63 30.8	78 61	132.4	20
1	60 08.7	81 58	135.2	60 32.8	80 59	134.6	60 56.8	80 60	134.0	61 20.6	79 60	133.4	61 44.3	78 61	132.7	62 07.8	78 62	132.1	62 31.0	77 62	131.4	62 54.4	76 63	130.7	1
2	59 33.6	80 60	133.7	59 57.4	79 61	133.1	60 21.0	78 61	132.5	60 44.5	78 62	131.8	61 07.7	77 62	131.2	61 30.8	77 63	130.5	61 53.6	76 64	129.8	62 16.3	75 64	129.1	2
3	58 57.6	78 61	132.2	59 21.0	78 62	131.6	59 44.3	77 63	130.9	60 07.4	77 63	130.3	60 30.3	76 64	129.6	60 53.0	76 64	129.0	61 15.5	75 65	128.3	61 37.8	74 66	127.6	3
4	58 20.8	77 63	130.7	58 43.9	77 63	130.1	59 06.8	76 64	129.5	59 29.5	75 64	128.8	59 52.0	75 65	128.2	60 14.4	74 66	127.5	60 36.5	73 66	126.8	60 58.4	73 67	126.1	4
25	57 43.1	76 64	129.3	58 05.9	76 65	128.7	58 28.4	75 65	128.0	58 50.8	74 66	127.4	59 13.0	74 66	126.8	59 35.0	73 67	126.1	59 56.8	72 67	125.4	60 18.4	72 68	124.7	25
6	57 04.7	75 65	127.9	57 27.1	74 66	127.2	57 49.4	74 66	126.7	58 11.4	73 67	125.9	58 33.3	73 67	125.4	58 55.2	72 68	124.7	59 16.4	71 68	124.0	59 37.6	70 69	123.3	6
7	56 25.6	74 66	126.5	56 47.7	73 67	126.0	57 09.6	73 67	125.3	57 31.3	72 68	124.7	57 52.9	71 68	124.1	58 14.2	71 69	123.4	58 35.4	70 69	122.7	58 56.3	69 70	122.0	7
8	55 45.8	73 67	125.3	56 07.6	72 68	124.7	56 29.2	72 68	124.1	56 50.6	71 69	123.4	57 11.9	70 69	122.8	57 32.9	70 70	122.1	57 53.7	69 70	121.4	58 14.3	68 71	120.7	8
9	55 05.4	72 68	124.0	55 26.9	71 69	123.4	55 48.2	71 69	122.8	56 09.3	70 70	122.2	56 30.2	69 70	121.5	56 51.0	69 71	120.9	57 11.5	68 71	120.2	57 31.8	67 72	119.5	9
30	54 24.3	71 69	122.8	54 45.6	70 70	122.2	55 06.6	70 70	121.6	55 27.4	69 71	121.0	55 48.1	68 71	120.3	56 08.5	68 72	119.7	56 28.8	67 72	119.0	56 48.8	66 72	118.3	30
1	53 42.8	70 70	121.7	54 03.7	70 70	121.0	54 24.5	69 71	120.4	54 45.0	68 72	119.8	55 05.3	68 72	119.2	55 25.6	67 73	118.6	55 45.5	66 73	117.9	56 05.3	65 73	117.2	1
2	53 00.7	69 71	120.5	53 21.4	69 71	119.9	53 41.8	68 72	119.3	54 02.2	67 72	118.7	54 22.3	67 73	118.0	54 42.2	66 73	117.4	55 01.9	66 74	116.7	55 21.3	65 74	116.1	2
3	52 18.1	68 72	119.4	52 38.5	68 72	118.8	52 58.8	67 73	118.2	53 18.8	67 73	117.6	53 38.7	66 73	116.9	53 58.3	65 74	116.3	54 17.8	64 74	115.7	54 37.0	64 75	115.0	3
4	51 35.0	68 72	118.3	51 55.2	67 73	117.7	52 15.2	66 73	117.1	52 35.0	66 74	116.5	52 54.6	65 74	115.9	53 14.1	64 74	115.2	53 33.3	64 75	114.6	53 52.3	63 75	113.9	4
35	50 51.6	67 73	117.3	51 11.5	66 74	116.7	51 31.3	66 74	116.1	51 50.8	65 75	115.5	52 10.2	64 75	114.8	52 29.4	64 75	114.2	52 48.4	63 75	113.6	53 07.2	62 76	112.9	35
6	50 07.7	66 74	116.3	50 27.2	66 74	115.7	50 46.9	65 74	115.1	51 06.3	64 75	114.5	51 25.4	64 75	113.8	51 44.4	63 75	113.2	52 03.2	62 76	112.6	52 21.7	62 76	111.9	6
7	49 23.4	65 74	115.3	49 42.9	65 75	114.7	50 02.5	64 75	114.1	50 21.4	63 75	113.5	50 40.3	63 76	112.9	50 59.1	62 76	112.3	51 17.6	62 76	111.6	51 36.0	61 77	111.0	7
8	48 38.8	65 75	114.3	48 58.1	64 75	113.7	49 17.2	63 76	113.1	49 36.1	63 76	112.5	49 54.9	62 76	111.9	50 13.4	62 77	111.3	50 31.8	61 77	110.7	50 50.9	60 77	110.1	8
9	47 53.8	64 75	113.3	48 12.9	63 76	112.8	48 31.8	63 76	112.2	48 50.6	62 77	111.6	49 09.1	62 77	111.0	49 27.5	61 77	110.4	49 45.7	60 77	109.8	50 03.7	60 78	109.2	9
40	47 08.6	63 76	112.4	47 27.5	63 77	111.9	47 46.2	62 77	111.3	48 04.7	62 77	110.7	48 23.1	61 77	110.1	48 41.3	60 77	109.5	48 59.3	60 78	108.9	49 17.1	59 78	108.3	40
1	46 23.0	63 76	111.5	46 41.7	62 77	111.0	47 00.3	62 77	110.4	47 18.6	61 77	109.8	47 36.8	60 78	109.2	47 54.9	60 78	108.6	48 12.7	59 78	108.0	48 30.3	58 78	107.4	1
2	45 37.1	62 77	110.6	45 55.7	62 77	110.1	46 14.1	61 77	109.5	46 32.3	60 78	108.9	46 50.3	60 78	108.4	47 08.2	59 78	107.8	47 25.8	59 78	107.2	47 43.3	58 79	106.6	2
3	44 51.0	62 77	109.8	45 09.4	61 78	109.2	45 27.6	60 78	108.7	45 45.7	60 78	108.1	46 03.5	59 78	107.5	46 21.2	59 79	106.9	46 38.8	58 79	106.3	46 56.1	57 79	105.7	3
4	44 04.6	61 78	108.9	44 22.9	61 78	108.4	44 40.9	60 78	107.8	44 58.8	59 78	107.3	45 16.6	59 79	106.7	45 34.1	58 79	106.1	45 51.5	57 79	105.5	46 08.7	57 79	104.9	4
45	43 18.0	60 79	108.1	43 36.1	60 79	107.6	43 54.0	59 79	107.0	44 11.1	58 79	106.5	44 29.4	58 79	105.9	44 46.8	58 79	105.3	45 04.1	57 80	104.7	45 21.1	57 80	104.2	45
6	42 31.2	60 78	107.3	42 49.2	60 79	106.8	43 06.9	59 79	106.2	43 24.6	58 79	105.7	43 42.0	58 80	105.1	43 59.3	57 79	104.5	44 16.5	57 80	104.0	44 33.4	56 80	103.4	6
7	41 44.2	60 79	106.5	42 02.0	59 79	106.0	42 19.7	59 79	105.4	42 37.2	58 79	104.9	42 54.5	58 80	104.3	43 11.7	57 80	103.8	43 28.7	56 80	103.2	43 45.5	56 80	102.6	7
8	40 57.0	59 79	105.8	41 14.7	59 79	105.2	41 32.2	58 79	104.7	41 49.6	58 80	104.1	42 06.8	57 80	103.6	42 23.9	57 80	103.0	42 40.8	56 80	102.5	42 57.5	56 80	101.9	8
9	40 09.6	59 79	105.0	40 27.2	58 79	104.5	40 44.6	58 80	103.9	41 01.8	57 80	103.4	41 18.9	57 80	102.8	41 35.9	56 80	102.3	41 52.7	56 80	101.7	42 09.3	56 80	101.2	9
50	39 22.0	58 80	104.3	39 39.5	58 80	103.7	39 56.8	57 80	103.2	40 14.0	57 80	102.7	40 31.0	56 80	102.1	40 47.8	56 80	101.6	41 04.5	55 80	101.0	41 21.1	55 81	100.5	50
1	38 34.3	58 80	103.5	38 51.7	58 80	103.0	39 08.9	57 80	102.5	39 25.9	57 80	101.9	39 42.8	56 80	101.4	39 59.6	56 81	100.9	40 16.2	55 81	100.3	40 32.7	55 81	99.8	1
2	37 46.5	58 80	102.8	38 03.7	57 80	102.3	38 20.8	57 80	101.8	38 37.8	56 80	101.2	38 54.6	56 81	100.7	39 11.3	55 81	100.2	39 27.8	55 81	99.6	39 44.2	54 81	99.1	2
3	36 58.5	57 80	102.1	37 15.6	57 80	101.6	37 32.6	56 80	101.1	37 49.5	56 81	100.5	38 06.2	55 81	100.0	38 22.9	55 81	99.5	38 39.3	55 81	98.9	38 55.6	54 81	98.4	3
4	36 10.3	57 80	101.4	36 27.3	57 80	100.9	36 44.3	56 80	100.4	37 01.1	56 81	99.9	37 17.8	55 81	99.3	37 34.3	55 81	98.8	37 50.7	54 81	98.3	38 06.9	54 81	97.7	4
55	35 22.1	57 81	100.7	35 39.1	56 81	100.2	35 55.9	56 81	99.7	36 12.7	56 81	99.2	36 29.3	55 81	98.7	36 45.7	55 81	98.1	37 02.0	54 81	97.6	37 18.2	54 81	97.1	55
6	34 33.8	57 81	100.0	34 50.7	56 81	99.5	35 07.5	56 81	99.0	35 24.1	55 81	98.5	35 40.6	55 81	98.0	35 57.0	54 81	97.5	36 13.3	54 81	97.0	36 29.4	54 81	96.4	6
7	33 45.3	56 81	99.4	34 02.2	56 81	98.9	34 18.9	55 81	98.4	34 35.5	55 81	97.9	34 51.9	55 81	97.3	35 08.3	54 81	96.8	35 24.5	54 81	96.3	35 40.5	53 82	95.8	7
8	32 56.8	56 81	98.7	33 13.5	56 81	98.2	33 30.2	55 81	97.7	33 46.7	55 81	97.2	34 03.1	54 81	96.7	34 19.4	54 82	96.2	34 35.6	54 82	95.7	34 51.6	53 82	95.2	8
9	32 08.2	56 81	98.1	32 24.9	55 81	97.6	32 41.5	55 81	97.1	32 57.9	55 81	96.6	33 14.3	54 81	96.1	33 30.5	54 82	95.6	33 46.7	54 82	95.1	34 02.7	53 82	94.6	9
60	31 19.4	56 81	97.4	31 36.1	55 81	96.9	31 52.7	55 81	96.4	32 09.1	55 81	95.9	32 25.4	54 81	95.4	32 41.6	54 82	94.9	32 57.7	53 82	94.4	33 13.6	53 82	93.9	60
1	30 30.7	56 81	96.8	30 47.3	55 81	96.3	31 03.8	55 82	95.8	31 20.2	54 81	95.3	31 36.4	54 82	94.8	31 52.6	54 82	94.3	32 08.7	53 82	93.8	32 24.6	53 82	93.3	1
2	29 41.8	55 81	96.2	29 58.4	55 82	95.7	30 14.9	55 82	95.2	30 31.2	54 82	94.7	30 47.5	54 82	94.2	31 03.6	54 82	93.7	31 19.6	53 82	93.2	31 35.5	53 82	92.7	2
3	28 52.9	55 82	95.5	29 09.5	55 82	95.1	29 25.9	55 82	94.6	29 42.2	54 82	94.1	29 58.4	54 82	93.6	30 14.5	54 82	93.1	30 30.5	53 82	92.6	30 46.4	53 82	92.1	3
4	28 04.0	55 82	94.9	28 20.5	55 82	94.4	28 36.9	54 82	94.0	28 53.2	54 82	93.5	29 09.4	54 82	93.0	29 25.4	53 82	92.5	29 41.4	53 82	92.0	29 57.3	53 82	91.5	4
65	27 15.0	55 82	94.3	27 31.5	55 82	93.8	27 47.8	54 82	93.4	28 04.1	54 82	92.9	28 20.3	54 82	92.4	28 36.3	53 82	91.9	28 52.3	53 82	91.4	29 08.1	53 82	91.0	65
6	26 26.0	55 82	93.7	26 42.4	55 82	93.2	26 58.7	54 82	92.8	27 15.0	54 82	92.3	27 31.1	54 82	91.8	27 47.2	53 82	91.3	28 03.1	53 82	90.9	28 19.0	53 82	90.4	6
7	25 36.9	55 82	93.1	25 53.3	55 82	92.6	26 09.6	54 82	92.2	26 25.9	54 82	91.7	26 42.0	54 82	91.2	26 58.1	53 82	90.8	27 14.0	53 82	90.3	27 29.8	53 82	89.8	7
8	24 47.8	55 82	92.5	25 04.2	54 82	92.1	25 20.5	54 82	91.6	25 36.7	54 82	91.1	25 52.9	54 82	90.7	26 08.9	53 82	90.2	26 24.8	53 82	89.7	26 40.7	53 82	89.2	8
9	23 58.7	55 82	91.9	24 15.1	54 82	91.5	24 31.4	54 82	91.0	24 47.6	54 82	90.5	25 03.7	54 82	90.1	25 19.8	53 82	89.6	25 35.7	53 82	89.1	25 51.6	53 82	88.7	9
70	23 09.6	55 82	91.3	23 26.0	54 82	90.9	23 42.2	54 82	90.4	23 58.4	54 82	90.0	24 14.6	54 82	89.5	24 30.6	54 82	89.0	24 46.6	53 82	88.6	25 02.4	53 82	88.1	70
1	22 20.4	55 82	90.8	22 36.8	54 82	90.3	22 53.1	54 82	89.9	23 09.3	54 82	89.4	23 25.4	54 82	88.9	23 41.5	53 82	88.5	23 57.4	53 82	88.0	24 13.3	53 82	87.6	1
2	21 31.3	55 82	90.2	21 47.7	54 82	89.7	22 03.9	54 82	89.3	22 20.2	54 82	88.8	22 36.3	54 82	88.4	22 52.3	53 82	87.9	23 08.3	53 82	87.5	23 24.2	53 82	87.0	2
3	20 42.2	55 82	89.6	20 58.5	54 82	89.2	21 14.8	54 82	88.7	21 31.0	54 82	88.3	21 47.2	54 82	87.8	22 03.2	53 82	87.4	22 19.2	53 82	86.9	22 35.2	53 82	86.4	3
4	19 53.0	55 82	89.0	20 09.4	54 82	88.6	20 25.7	54 82	88.2	20 41.9	54 82	87.7	20 58.1	54 82	87.3	21 14.2	53 82	86.8	21 30.2	53 82	86.3	21 46.1	53 82	85.9	4
75	19 03.9	55 82	88.5	19 20.2	54 82	88.0	19 36.6	54 82	87.6	19 52.8	54 82	87.1	20 09.0	54 82	86.7	20 25.1	54 81	86.2	20 41.0	53 82	85.8	20 57.1	53 82	85.3	75
6	18 14.7	55 82	87.9	18 31.1	55 82	87.5	18 47.5	54 82	87.0	19 03.7	54 82	86.6	19 19.9	54 82	86.1	19 36.1	54 82	85.7	19 52.1	53 82	85.2	20 08.1	53 82	84.8	6
7	17 25.6	55 82	87.4	17 42.0	55 82	86.9	17 58.4	54 82	86.5	18 14.7	54 82	86.0	18 30.9	54 82	85.6	18 47.1	54 81	85.1	19 03.2	54 82	84.7	19 19.2	53 81	84.2	7
8	16 36.5	55 82	86.8	16 52.9	55 82	86.4	17 09.3	55 82	85.9	17 25.7	54 82	85.5	17 41.9	54 82	85.0	17 58.1	54 81	84.6	18 14.3	54 81	84.1	18 30.3	53 81	83.7	8
9	15 47.5	55 82	86.2	16 03.9	55 82	85.8	16 20.3	55 82	85.4	16 36.7	54 82	84.9	16 53.0	54 82	84.5	17 09.2	54 81	84.0	17 25.4	54 81	83.6	17 41.5	54 81	83.2	9
80	14 58.5	55 82	85.7	15 14.9	55 82	85.2	15 31.4	55 82	84.8	15 47.8	55 82	84.4	16 04.1	54 82	83.9	16 20.4	54 81	83.5	16 36.6	54 81	83.1	16 52.7	54 81	82.6	80
1	14 09.5	55 82	85.1	14 26.0	55 82	84.7	14 42.5	55 81	84.3	14 58.9	55 81	83.8	15 15.2	54 81	83.4	15 31.6	54 81	83.0	15 47.8	54 82	82.5	16 04.0	54 81	82.1	1
2	13 20.5	55 82	84.6	13 37.1	55 81	84.1	13 53.6	55 81	83.7	14 10.0	55 81	83.3	14 26.4	54 81	82.8	14 42.8	54 81	82.4	14 59.1	54 81	82.0	15 15.4	54 81	81.5	2
3	12 31.6	55 81	84.0	12 48.2	55 81	83.6	13 04.8	55 81	83.1	13 21.3	55 81	82.7	13 37.7	54 81	82.3	13 54.1	54 81	81.9	14 10.5	54 81	81.4	14 26.8	54 81	81.0	3
4	11 42.8	55 81	83.5	11 59.4	55 81	83.0	12 16.0	55 81	82.6	12 32.5	55 81	82.2	12 49.0	55 81	81.7	13 05.5	54 81	81.3	13 21.9	54 81	80.9	13 38.3	54 81	80.5	4
85	10 54.0	56 81	82.9	11 10.6	56 81	82.5	11 27.3	55 81	82.0	11 43.9	55 81	81.6	12 00.4	55 81	81.2	12 16.9	55 81	80.8	12 33.4	55 81	80.3	12 49.9	55 80	79.9	85
6	10 05.2	56 81	82.3	10 21.9	56 81	81.9	10 38.6	56 81	81.5	10 55.3	55 81	81.1	11 11.9	55 81	80.7	11 28.5	55 81	80.2	11 45.0	55 81	79.8	12 01.5	55 80	79.4	6
7	9 16.5	56 81	81.8	9 33.3	56 81	81.4	9 50.1	56 81	80.9	10 06.8	55 81	80.5	10 23.4	56 81	80.1	10 40.1	55 81	79.7	10 56.7	55 80	79.3	11 13.3	55 80	78.8	7
8	8 27.5	56 81	81.2	8 44.8	56 81	80.8	9 01.6	56 81	80.4	9 18.3	56 81	80.0	9 35.1	56 81	79.6	9 51.8	55 80	79.2	10 08.4	55 80	78.7	10 25.1	55 80	78.3	8
9	7 39.4	56 81	80.7	7 56.3	56 81	80.3	8 13.1	56 81	79.8	8 30.0	56 81	79.4	8 46.8	56 80	79.0	9 03.5	55 80	78.6	9 20.3	55 80	78.2	9 37.0	55 80	77.7	9
90	6 50.9	57 81	80.1	7 07.9	56 81	79.7	7 24.8	56 80	79.3	7 41.7	56 80	78.9	7 58.6	56 80	78.5	8 15.4	56 80	78.0	8 32.2	56 80	77.6	8 49.0	56 80	77.2	90

H.A.	12° 00'	12° 30'	13° 00'	13° 30'	14° 00'	14° 30'	15° 00'	15° 30'	H.A.
	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	
00	43 00.0 1.00 01 180.0	42 30.0 1.00 01 180.0	42 00.0 1.00 01 180.0	41 30.0 1.00 01 180.0	41 00.0 1.00 01 180.0	40 30.0 1.00 01 180.0	40 00.0 1.00 01 180.0	39 30.0 1.00 01 180.0	00
1	42 59.4 1.00 03 178.7	42 29.4 1.00 03 178.7	41 59.4 1.00 03 178.7	41 29.4 1.00 03 178.7	40 59.4 1.00 03 178.7	40 29.5 1.00 03 178.7	39 59.5 1.00 03 178.7	39 29.5 1.00 03 178.8	1
2	42 57.1 1.00 05 177.3	42 27.1 1.00 05 177.4	41 57.1 1.00 05 177.4	41 27.1 1.00 05 177.4	40 57.1 1.00 05 177.4	40 27.1 1.00 05 177.5	39 57.1 1.00 04 177.5	39 27.1 1.00 04 177.5	2
3	42 54.8 1.00 07 176.0	42 24.9 1.00 07 176.0	41 54.9 1.00 07 176.1	41 25.0 1.00 07 176.1	40 55.0 1.00 06 176.1	40 25.1 1.00 06 176.2	39 55.1 1.00 06 176.2	39 25.2 1.00 06 176.3	3
4	42 50.8 1.00 09 174.7	42 20.9 1.00 08 174.7	41 51.0 1.00 08 174.8	41 21.1 1.00 08 174.8	40 51.2 1.00 08 174.9	40 21.3 1.00 08 174.9	39 51.4 1.00 08 175.0	39 21.4 1.00 08 175.0	4
05	42 45.7 1.00 10 173.3	42 15.8 1.00 10 173.4	41 46.0 1.00 10 173.5	41 16.1 1.00 10 173.5	40 46.2 1.00 10 173.6	40 16.4 1.00 10 173.7	39 46.5 1.00 10 173.7	39 16.6 1.00 10 173.8	05
6	42 39.4 99 12 172.0	42 09.6 99 12 172.1	41 39.8 99 12 172.2	41 10.0 99 12 172.2	40 40.2 99 12 172.3	40 10.4 99 12 172.4	39 40.6 99 12 172.5	39 10.8 99 12 172.5	6
7	42 32.0 99 14 170.7	42 02.3 99 14 170.8	41 32.6 99 14 170.9	41 02.8 99 14 171.0	40 33.1 99 14 171.0	40 03.4 99 14 171.1	39 33.6 99 13 171.2	39 03.9 99 13 171.3	7
8	42 23.5 99 16 169.4	41 53.9 99 16 169.5	41 24.2 99 16 169.6	40 54.6 99 16 169.7	40 24.9 99 15 169.8	39 55.3 99 15 169.9	39 25.6 99 15 170.0	38 55.9 99 15 170.1	8
9	42 13.9 98 18 168.1	41 44.4 99 18 168.2	41 14.8 99 18 168.3	40 45.2 99 17 168.4	40 15.7 99 17 168.5	39 46.1 99 17 168.6	39 16.5 99 17 168.7	38 46.9 99 17 168.9	9
10	42 03.2 98 20 166.8	41 33.8 98 19 166.9	41 04.3 98 19 167.0	40 34.8 98 19 167.2	40 05.4 98 19 167.4	39 35.9 98 19 167.4	39 06.4 98 19 167.5	38 36.9 98 18 167.6	10
1	41 51.4 98 21 165.5	41 22.1 98 21 165.6	40 52.8 98 21 165.8	40 23.4 98 21 165.9	39 54.0 98 21 166.0	39 24.7 98 20 166.2	38 55.3 98 20 166.3	38 25.9 98 20 166.4	1
2	41 38.6 97 23 164.2	41 09.4 97 23 164.4	40 40.1 97 23 164.5	40 10.9 97 23 164.7	39 41.7 98 22 164.8	39 12.4 98 22 164.9	38 43.1 98 22 165.1	38 13.8 98 22 165.2	2
3	41 24.7 97 25 162.9	40 55.6 97 25 163.1	40 26.5 97 24 163.3	39 57.4 97 24 163.4	39 28.3 97 24 163.6	38 59.1 97 24 163.7	38 30.0 97 24 163.9	38 00.8 97 23 164.0	3
4	41 09.8 96 27 161.7	40 40.8 97 26 161.9	40 11.8 97 26 162.0	39 42.9 97 26 162.2	39 13.9 97 26 162.4	38 44.9 97 25 162.5	38 15.8 97 25 162.7	37 46.5 97 25 162.8	4
15	40 53.8 96 28 160.4	40 25.0 96 28 160.6	39 56.2 96 28 160.8	39 27.3 96 28 161.0	38 58.5 96 27 161.3	38 29.6 96 27 161.3	38 00.7 96 27 161.5	37 31.8 96 27 161.7	15
6	40 36.8 95 30 159.2	40 08.2 96 30 159.4	39 39.5 96 29 159.6	39 10.8 96 29 159.8	38 42.1 96 29 160.0	38 13.4 96 29 160.1	37 44.6 96 28 160.3	37 15.9 96 28 160.5	6
7	40 18.9 95 32 158.0	39 50.4 95 31 158.2	39 21.9 95 31 158.4	38 53.4 95 31 158.6	38 24.8 95 30 158.8	37 56.2 95 30 159.0	37 27.6 95 30 159.2	36 59.0 95 30 159.3	7
8	40 00.0 94 33 156.8	39 31.6 94 33 157.0	39 03.3 95 33 157.2	38 34.9 95 32 157.4	38 06.5 95 32 157.6	37 38.1 95 32 157.8	37 09.7 95 31 158.0	36 41.2 95 31 158.2	8
9	39 40.1 94 35 155.6	39 12.0 94 34 155.8	38 43.8 94 34 156.0	38 15.6 94 34 156.2	37 47.3 94 34 156.4	37 19.1 94 33 156.7	36 50.8 94 33 156.9	36 22.5 94 33 157.1	9
20	39 19.3 93 36 154.4	38 51.3 93 36 154.6	38 23.3 93 36 154.8	37 55.3 93 35 155.1	37 27.2 94 35 155.3	36 59.2 94 35 155.5	36 31.1 94 34 155.7	36 02.9 94 34 155.9	20
1	38 57.6 93 38 153.2	38 29.8 93 37 153.4	38 02.0 93 37 153.7	37 34.1 93 37 153.9	37 06.3 93 36 154.2	36 38.3 93 36 154.4	36 10.4 93 36 154.6	35 42.5 93 36 154.8	1
2	38 35.0 92 39 152.0	38 07.4 92 39 152.3	37 39.8 92 38 152.5	37 12.1 92 38 152.8	36 44.4 92 38 153.0	36 16.7 92 38 153.3	35 48.9 93 37 153.5	35 21.1 93 37 153.7	2
3	38 11.5 91 41 150.9	37 44.1 91 40 151.2	37 16.7 92 40 151.4	36 49.2 92 40 151.7	36 21.7 92 39 151.9	35 54.1 92 39 152.2	35 26.6 92 39 152.4	34 59.0 92 38 152.6	3
4	37 47.2 91 42 149.8	37 20.0 91 42 150.0	36 52.7 91 41 150.3	36 25.4 91 41 150.6	35 58.1 91 41 150.8	35 30.8 91 40 151.1	35 03.4 91 40 151.3	34 36.0 91 40 151.6	4
25	37 22.1 90 43 148.7	36 55.0 90 43 148.9	36 28.0 90 43 149.2	36 00.9 90 42 149.5	35 33.8 90 42 149.7	35 06.6 91 42 150.0	34 39.4 91 41 150.2	34 12.2 91 41 150.5	25
6	36 56.1 89 45 147.6	36 29.3 89 44 147.8	36 02.4 89 44 148.1	35 35.5 90 44 148.4	35 08.6 90 43 148.7	34 41.6 90 43 148.9	34 14.6 90 43 149.2	33 47.6 90 42 149.4	6
7	36 29.3 89 46 146.5	36 02.7 89 46 146.8	35 36.1 89 45 147.0	35 09.4 89 45 147.3	34 42.6 89 44 147.6	34 15.9 89 44 147.9	33 49.0 89 44 148.1	33 22.2 90 44 148.4	7
8	36 01.8 88 47 145.4	35 35.4 88 47 145.7	35 09.5 88 46 146.0	34 42.4 88 46 146.3	34 15.9 89 46 146.6	33 49.3 89 45 146.8	33 22.7 89 45 147.1	32 56.1 89 45 147.4	8
9	35 33.5 87 48 144.3	35 07.3 87 48 144.6	34 41.1 88 48 144.9	34 14.8 88 47 145.2	33 48.4 88 47 145.5	33 22.1 88 47 145.7	32 55.7 88 46 146.1	32 29.2 88 46 146.4	9
30	35 04.5 87 50 143.3	34 38.5 87 49 143.6	34 12.5 87 49 143.9	33 46.4 87 48 144.2	33 20.3 87 48 144.5	32 54.1 87 48 144.8	32 27.9 87 47 145.1	32 01.6 88 47 145.4	30
1	34 34.8 86 51 142.3	34 09.0 86 50 142.6	33 43.2 86 50 142.9	33 17.3 86 50 143.2	32 51.4 86 49 143.5	32 25.4 87 49 143.8	31 59.4 87 49 144.1	31 33.4 87 48 144.4	1
2	34 04.4 85 52 141.3	33 38.8 85 51 141.6	33 13.2 85 51 141.9	32 47.5 86 51 142.2	32 21.8 86 50 142.5	31 56.0 86 50 142.8	31 30.2 86 50 143.1	31 04.4 86 49 143.4	2
3	33 33.3 84 53 140.3	33 07.9 85 53 140.6	32 42.5 85 52 140.9	32 17.0 85 52 141.2	31 51.5 85 51 141.5	31 26.0 85 51 141.8	31 00.4 85 51 142.1	30 34.8 86 50 142.4	3
4	33 01.5 84 54 139.3	32 36.4 84 54 139.6	32 11.2 84 53 139.9	31 45.9 84 53 140.2	31 20.6 84 53 140.6	30 55.3 85 52 140.9	30 29.9 85 52 141.2	30 04.5 85 52 141.5	4
35	32 29.2 83 55 138.3	32 04.2 83 55 138.6	31 39.2 83 54 139.0	31 14.2 84 54 139.3	30 49.1 84 54 139.6	30 24.0 84 53 139.9	29 58.8 84 53 140.2	29 33.6 84 53 140.5	35
6	31 56.2 82 56 137.4	31 31.4 83 56 137.7	31 06.7 83 55 138.0	30 41.8 83 55 138.3	30 16.9 83 55 138.7	29 52.0 83 54 139.0	29 27.0 83 54 139.3	29 02.0 83 54 139.6	6
7	31 22.6 82 57 136.4	30 58.0 82 57 136.7	30 33.5 82 56 137.1	30 08.9 82 56 137.4	29 44.2 82 56 137.7	29 19.5 82 55 138.1	28 54.7 83 55 138.4	28 29.9 83 55 138.7	7
8	30 48.4 81 58 135.5	30 24.1 81 58 135.8	29 59.7 81 57 136.2	29 35.3 81 57 136.5	29 10.8 82 57 136.8	28 46.3 82 56 137.2	28 21.8 82 56 137.5	27 57.2 82 56 137.8	8
9	30 13.7 80 59 134.6	29 49.6 80 58 134.9	29 25.4 80 58 135.3	29 01.2 81 58 135.6	28 36.9 81 57 135.9	28 12.6 81 57 136.3	27 48.3 81 57 136.6	27 23.9 81 56 136.9	9
40	29 38.4 80 60 133.7	29 14.5 80 59 134.0	28 50.5 80 59 134.4	28 26.5 80 59 134.7	28 02.5 80 58 135.0	27 38.4 80 58 135.4	27 14.2 81 58 135.7	26 50.0 81 57 136.0	40
1	29 02.6 79 61 132.8	28 38.9 79 60 133.1	28 15.1 79 60 133.5	27 51.3 79 60 133.8	27 27.5 80 59 134.2	27 03.6 80 59 134.5	26 39.6 80 59 134.8	26 15.6 80 58 135.2	1
2	28 26.2 78 61 131.9	28 02.7 78 61 132.3	27 39.2 79 61 132.6	27 15.6 79 60 133.0	26 52.0 79 60 133.3	26 28.3 79 60 133.6	26 04.5 79 60 134.0	25 40.7 79 59 134.3	2
3	27 49.4 78 62 131.0	27 26.1 78 62 131.4	27 02.8 78 62 131.7	26 39.4 78 61 132.1	26 15.9 78 61 132.4	25 52.4 78 61 132.8	25 28.9 79 60 133.1	25 05.3 79 60 133.5	3
4	27 12.1 77 63 130.2	26 49.0 77 63 130.5	26 25.9 77 62 130.9	26 02.7 77 62 131.3	25 39.4 78 62 131.6	25 16.1 78 61 132.0	24 52.8 78 61 132.3	24 29.4 78 61 132.6	4
45	26 34.3 76 64 129.3	26 11.4 76 63 129.7	25 48.5 77 63 130.1	25 25.5 77 63 130.4	25 02.4 77 62 130.8	24 39.3 77 62 131.1	24 16.2 77 62 131.5	23 53.0 77 61 131.8	45
6	25 56.1 76 64 128.5	25 33.4 76 64 128.9	25 10.6 76 64 129.2	24 47.8 76 63 129.6	24 25.0 76 63 130.0	24 02.1 76 63 130.3	23 39.2 77 62 130.7	23 16.2 77 62 131.0	6
7	25 17.4 75 65 127.7	24 54.9 75 65 128.1	24 32.4 75 65 128.4	24 09.7 76 64 128.8	23 47.0 76 64 129.2	23 24.4 76 64 129.5	23 01.6 76 63 129.9	22 38.8 76 63 130.2	7
8	24 38.3 74 66 126.9	24 16.0 74 66 127.3	23 53.6 75 65 127.6	23 31.2 75 65 128.0	23 08.8 75 65 128.4	22 46.3 75 64 128.7	22 23.7 75 64 129.1	22 01.1 75 64 129.4	8
9	23 58.8 74 66 126.1	23 36.7 74 66 126.5	23 14.5 74 66 126.8	22 52.3 74 66 127.2	22 30.0 74 65 127.6	22 07.7 74 65 127.9	21 45.3 75 65 128.3	21 22.9 75 64 128.6	9
50	23 18.9 73 67 125.3	22 57.0 73 67 125.7	22 35.0 73 67 126.1	22 12.9 74 66 126.4	21 50.9 74 66 126.8	21 28.7 74 66 127.2	21 06.6 74 65 127.5	20 44.3 74 65 127.9	50
1	22 38.6 72 68 124.5	22 16.8 73 68 124.9	21 55.0 73 67 125.3	21 33.2 73 67 125.7	21 11.3 73 67 126.0	20 49.4 73 66 126.4	20 27.4 73 66 126.8	20 05.3 74 66 127.1	1
2	21 57.9 72 68 123.8	21 36.4 72 68 124.2	21 14.7 72 68 124.5	20 53.1 72 68 124.9	20 31.4 72 67 125.3	20 09.6 73 67 125.6	19 47.8 73 66 126.0	19 26.0 73 66 126.4	2
3	21 16.9 71 69 123.0	20 55.5 71 69 123.4	20 34.1 72 68 123.8	20 12.6 72 68 124.2	19 51.1 72 68 124.5	19 29.5 72 68 124.9	19 07.9 72 67 125.3	18 46.2 72 67 125.6	3
4	20 35.5 71 70 122.3	20 14.3 71 69 122.7	19 53.0 71 69 123.0	19 31.7 71 69 123.4	19 10.4 71 68 123.8	18 49.0 71 68 124.2	18 27.5 72 68 124.5	18 06.1 72 67 124.9	4
55	19 53.8 70 70 121.6	19 32.8 70 70 121.9	19 11.7 70 70 122.3	18 50.5 71 69 122.7	18 29.4 71 69 123.1	18 08.1 71 68 123.4	17 46.9 71 68 123.8	17 25.6 71 68 124.2	55
6	19 11.8 69 71 120.8	18 50.9 70 70 121.2	18 30.0 70 70 121.6	18 09.0 70 70 122.0	17 47.8 70 69 122.3	17 27.0 70 69 122.7	17 05.9 70 69 123.1	16 44.7 71 68 123.5	6
7	18 29.4 69 71 120.1	18 08.7 69 71 120.5	17 47.9 69 71 120.9	17 27.2 69 70 121.3	17 06.3 70 70 121.6	16 45.4 70 70 122.0	16 24.5 70 69 122.4	16 03.6 70 69 122.8	7
8	17 46.7 68 72 119.4	17 26.2 69 71 119.8	17 05.6 69 71 120.2	16 45.0 69 71 120.6	16 24.3 69 70 120.9	16 03.6 69 70 121.3	15 42.9 69 70 121.7	15 22.1 69 70 122.1	8
9	17 03.8 68 72 118.7	16 43.4 68 72 119.1	16 23.0 68 71 119.5	16 02.5 68 71 119.9	15 42.0 68 71 120.2	15 21.5 69 71 120.6	15 00.9 69 70 121.0	14 40.3 69 70 121.4	9
60	16 20.5 67 73 118.0	16 00.3 67 72 118.4	15 40.0 68 72 118.8	15 19.7 68 72 119.2	14 59.4 68 72 119.6	14 39.0 68 71 119.9	14 18.6 68 71 120.3	13 58.1 68 71 120.7	60
1	15 37.0 67 73 117.3	15 16.9 67 73 117.7	14 56.8 67 72 118.1	14 36.7 67 72 118.5	14 16.5 67 72 118.9	13 56.3 67 72 119.3	13 36.0 68 71 119.6	13 15.7 68 71 120.0	1
2	14 53.2 66 73 116.7	14 33.3 66 73 117.1	14 13.3 67 73 117.4	13 53.3 67 73 117.8	13 33.3 67 72 118.2	13 13.3 67 72 118.6	12 53.2 67 72 119.0	12 33.3 67 72 119.3	2
3	14 09.2 66 74 116.0	13 49.4 66 74 116.4	13 29.6 66 73 116.8	13 09.7 66 73 117.2	12 49.9 66 73 117.5	12 30.0 67 72 117.9	12 10.0 67 72 118.3	11 50.1 67 72 118.7	3
4	13 24.9 65 74 115.3	13 05.2 65 74 115.7	12 45.6 66 74 116.1	12 25.9 66 74 116.5	12 06.2 66 73 116.9	11 46.4 66 73 117.3	11 26.6 66 73 117.7	11 06.8 66 73 118.0	4
65	12 40.3 65 75 114.7	12 20.8 65 74 115.1	12 01.3 65 74 115.5	11 41.8 65 74 115.8	11 22.2 65 74 116.2	11 02.6 65 73 116.6	10 43.0 66 73 117.0	10 23.3 66 73 117.4	65
6	11 55.5 64 75 114.0	11 36.2 64 75 114.4	11 16.8 65 75 114.8	10 57.4 65 74 115.2	10 38.0 65 74 115.6	10 18.5 65 74 116.0	9 59.0 65 74 116.4	9 39.5 65 73 116.8	6
7	11 10.6 64 75 113.4	10 51.3 64 75 113.8	10 32.1 64 75 114.2	10 12.8 64 75 114.6	9 53.5 64 74 115.0	9 34.2 64 74 115.3	9 14.9 65 74 115.7	8 55.5 65 74 116.1	7
8	10 25.3 64 76 112.8	10 06.3 64 76 113.2	9 47.2 64 75 113.5	9 28.0 64 75 113.9	9 08.9 64 75 114.3	8 49.7 64 74 114.7	8 30.5 64 74 115.1	8 11.3 64 74 115.5	8
9	9 39.9 63 76 112.1	9 21.0 63 76 112.5	9 02.0 63 76 112.9	8 43.0 63 75 113.3	8 24.0 63 75 113.7	8 04.9 64 75 114.1	7 45.9 64 75 114.5	7 26.8 64 74 114.9	9
70	8 54.3 63 76 111.5	8 35.5 63 76 111.9	8 16.6 63 76 112.3	7 57.8 63 76 112.7	7 38.9 63 76 113.1	7 20.0 63 75 113.5	7 01.0 63 75 113.9	6 42.1 63 75 114.3	70
1	8 08.5 62 77 110.9	7 49.8 62 76 111.3	7 31.0 62 76 111.7	7 12.3 62 76 112.1	6 53.4 63 76 112.5	6 34.8 63 76 112.9	6 16.0 63 75 113.3	5 57.2 63 75 113.6	1
2	7 22.4 62 77 110.3	7 03.9 62 77 110.7	6 45.3 62 77 111.1	6 26.7 62 76 111.5	6 08.0 62 76 111.9	5 49.4 62 76 112.3	5 30.7 62 76 112.6	5 12.0 62 76 113.0	2
3	6 36.3 61 77 109.7	6 17.8 62 77 110.1	5 59.3 62 77 110.5	5 40.8 62 77 110.9	5 22.3 62 77 111.3	5 03.8 62 76 111.6			3
4	5 49.9 61 78 109.1	5 31.5 61 77 109.5	5 13.2 61 77 109.9						4
75	5 03.3 61 78 108.5								75

                                                           Lat. 36°   **Lat. 37°**   **Lat. 38°**

DECLINATION **SAME** NAME AS LATITUDE

H.A.	12° 00'	12° 30'	13° 00'	13° 30'	14° 00'	14° 30'	15° 00'	15° 30'	H.A.
	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	
91	6 02.6 57 80 79.6	6 19.6 57 80 79.2	6 36.6 57 80 78.7	6 53.5 57 80 78.3	7 10.5 56 80 77.9	7 27.4 56 80 77.5	7 44.3 56 80 77.1	8 01.2 56 80 76.7	91
2	5 14.3 57 80 79.0	5 31.3 57 80 78.6	5 48.4 57 80 78.2	6 05.4 57 80 77.8	6 22.5 57 80 77.4	6 39.5 57 80 76.9	6 56.4 57 80 76.5	7 13.4 56 79 76.1	2
3			5 00.3 57 80 77.6	5 17.5 57 80 77.2	5 34.6 57 80 76.8	5 51.6 57 80 76.4	6 08.7 57 79 76.0	6 25.7 57 79 75.6	3
4						5 03.9 57 79 75.8	5 21.1 57 79 75.4	5 38.2 57 79 75.0	4

Lat. 35°

H.A.	16°00' Alt.	Δd	Δt	Az.	16°30' Alt.	Δd	Δt	Az.	17°00' Alt.	Δd	Δt	Az.	17°30' Alt.	Δd	Δt	Az.	18°00' Alt.	Δd	Δt	Az.	18°30' Alt.	Δd	Δt	Az.	19°00' Alt.	Δd	Δt	Az.	19°30' Alt.	Δd	Δt	Az.	H.A.
00	71 00.0	1.00	02	180.0	71 30.0	1.00	02	180.0	72 00.0	1.00	02	180.0	72 30.0	1.00	02	180.0	73 00.0	1.00	02	180.0	73 30.0	1.00	02	180.0	74 00.0	1.00	02	180.0	74 30.0	1.00	03	180.0	00
1	70 58.7	1.0	06	177.0	71 28.7	1.0	06	176.9	71 58.7	1.0	07	176.8	72 28.6	1.0	07	176.8	72 58.6	1.0	07	176.7	73 28.6	1.0	07	176.7	73 58.5	1.0	07	176.6	74 28.5	1.0	08	176.5	1
2	70 54.9	1.0	10	174.1	71 24.8	1.0	11	174.0	71 54.7	1.0	11	173.9	72 24.6	1.0	11	173.8	72 54.4	1.0	12	173.5	73 24.3	99	12	173.3	73 54.1	99	12	173.2	74 24.0	99	12	173.0	2
3	70 48.7	99	15	171.2	71 18.4	99	15	171.0	71 48.1	98	15	170.8	72 17.8	98	16	170.6	72 47.5	99	16	170.3	73 17.2	98	16	170.1	73 46.8	98	17	169.8	74 16.5	99	17	169.5	3
4	70 39.9	99	19	168.3	71 09.5	98	19	168.0	71 39.0	98	19	167.8	72 08.5	98	20	167.5	72 37.9	98	20	167.2	73 07.3	98	21	166.8	73 36.7	98	21	166.5	74 06.1	98	22	166.1	4
05	70 28.8	98	22	165.5	70 58.1	98	23	165.2	71 27.3	97	23	164.8	71 56.5	97	24	164.4	72 25.7	97	25	164.1	72 54.8	97	25	163.7	73 23.9	97	26	163.2	73 52.9	97	26	162.8	05
6	70 15.3	97	26	162.7	70 44.3	97	27	162.3	71 13.2	96	27	161.9	71 42.1	96	28	161.5	72 11.0	96	29	161.0	72 39.7	96	29	160.6	73 08.4	96	30	160.1	73 37.1	95	31	159.6	6
7	69 59.6	96	30	160.0	70 28.2	95	30	159.5	70 56.8	95	31	159.1	71 25.4	95	32	158.6	71 53.8	95	32	158.1	72 22.2	94	33	157.6	72 50.4	94	34	157.0	73 18.6	94	35	156.4	7
8	69 41.7	94	33	157.3	70 10.0	94	34	156.8	70 38.2	94	35	156.3	71 06.3	94	35	155.8	71 34.3	93	36	155.2	72 02.3	93	37	154.7	72 30.1	93	38	154.0	72 57.8	92	39	153.4	8
9	69 21.7	93	37	154.7	69 49.6	93	37	154.2	70 17.4	93	38	153.7	70 45.1	92	39	153.1	71 12.7	92	40	152.5	71 40.1	91	40	151.9	72 07.5	91	41	151.2	72 34.7	90	42	150.5	9
10	68 59.8	92	40	152.2	69 27.2	91	40	151.7	69 54.6	91	41	151.1	70 21.9	91	42	150.5	70 49.0	90	43	149.8	71 15.9	90	44	149.2	71 42.8	89	44	148.4	72 09.4	89	45	147.7	10
1	68 36.0	90	43	149.8	69 03.0	90	43	149.2	69 29.9	89	44	148.6	69 56.7	89	45	147.9	70 23.3	89	46	147.3	70 49.8	88	47	146.5	71 16.1	87	48	145.8	71 42.2	87	48	145.0	1
2	68 10.4	89	45	147.5	68 37.0	88	46	146.9	69 03.4	88	47	146.2	69 29.7	87	48	145.5	69 55.9	87	49	144.8	70 21.8	86	49	144.1	70 47.6	86	50	143.3	71 13.2	85	51	142.5	2
3	67 43.2	87	48	145.2	68 09.3	87	49	144.6	68 35.3	86	50	143.9	69 01.1	86	50	143.2	69 26.7	85	51	142.5	69 52.2	84	52	141.7	70 17.4	84	53	140.9	70 42.4	83	54	140.1	3
4	67 14.4	86	50	143.1	67 40.0	85	51	142.4	68 05.5	85	52	141.7	68 30.9	84	53	141.0	68 56.0	83	54	140.2	69 20.9	83	54	139.4	69 45.6	82	55	138.6	70 10.1	81	56	137.8	4
15	66 44.1	84	53	141.0	67 09.3	84	53	140.3	67 34.4	83	54	139.6	67 59.2	82	55	138.8	68 23.8	82	56	138.0	68 48.3	81	57	137.2	69 12.4	80	58	136.4	69 36.4	79	58	135.6	15
6	66 12.5	83	55	138.9	66 37.2	82	56	138.2	67 01.8	82	56	137.5	67 26.2	81	57	136.8	67 50.3	80	58	136.0	68 14.2	79	59	135.2	68 37.9	78	60	134.3	69 01.3	78	60	133.5	6
7	65 39.6	81	57	137.0	66 03.9	81	58	136.3	66 28.0	80	58	135.6	66 51.9	79	59	134.8	67 15.6	78	60	134.0	67 39.0	78	61	133.2	68 02.2	77	61	132.3	68 25.1	76	62	131.5	7
8	65 05.5	80	59	135.1	65 29.3	79	59	134.4	65 53.0	78	60	133.7	66 16.4	78	61	132.9	66 39.6	77	62	132.1	67 02.6	76	62	131.3	67 25.3	75	63	130.4	67 47.7	74	64	129.6	8
9	64 30.3	78	60	133.4	64 53.7	78	61	132.6	65 16.9	77	62	131.9	65 39.9	76	63	131.1	66 02.7	75	63	130.3	66 25.2	75	64	129.5	66 47.4	74	65	128.6	67 09.3	73	66	127.8	9
20	63 54.0	77	62	131.6	64 17.1	76	63	130.9	64 39.9	76	63	130.2	65 02.4	75	64	129.4	65 24.7	74	65	128.6	65 46.8	73	65	127.8	66 08.5	72	66	126.9	66 30.0	71	67	126.0	20
1	63 16.8	76	64	130.0	63 39.4	76	64	129.3	64 01.8	74	65	128.5	64 24.0	73	66	127.7	64 45.8	73	66	126.9	65 07.5	72	67	126.1	65 28.8	71	68	125.3	65 49.9	70	68	124.4	1
2	62 38.7	74	65	128.4	63 01.0	74	66	127.7	63 22.9	73	66	126.9	63 44.7	72	67	126.1	64 06.1	71	67	125.3	64 27.4	70	68	124.5	64 48.3	69	69	123.7	65 08.9	68	69	122.8	2
3	61 59.8	73	66	126.9	62 21.6	72	67	126.1	62 43.2	72	67	125.4	63 04.6	71	68	124.6	63 25.7	70	69	123.8	63 46.5	69	69	123.0	64 07.0	68	70	122.2	64 27.3	67	70	121.3	3
4	61 20.1	72	67	125.4	61 41.6	71	68	124.7	62 02.8	70	69	123.9	62 23.8	69	69	123.2	62 44.5	69	70	122.4	63 05.0	68	70	121.6	63 25.1	67	71	120.7	63 45.0	66	72	119.9	4
25	60 39.7	71	68	124.0	61 00.8	70	70	123.2	61 21.7	69	70	122.5	61 42.3	68	70	121.6	62 02.7	67	71	121.0	62 22.8	67	71	119.9	62 42.6	66	72	119.4	63 02.1	65	72	118.5	25
6	59 58.6	70	70	122.6	60 19.4	69	70	121.9	60 39.9	68	71	121.2	61 00.2	67	71	120.4	61 20.2	66	72	119.6	61 40.0	65	72	118.8	61 59.5	64	73	118.0	62 18.7	63	73	117.2	6
7	59 16.9	69	70	121.3	59 37.4	68	71	120.6	59 57.6	67	72	119.9	60 17.6	66	72	119.1	60 37.2	65	72	118.3	60 56.7	64	73	117.6	61 15.8	63	74	116.8	61 34.7	62	74	116.0	7
8	58 34.7	68	71	120.0	58 54.8	67	72	119.3	59 14.7	66	72	118.6	59 34.4	65	73	117.9	59 53.7	64	73	117.1	60 12.9	63	74	116.3	60 31.7	62	74	115.5	60 50.3	61	75	114.7	8
9	57 51.9	67	72	118.8	58 11.7	66	73	118.1	58 31.3	65	73	117.4	58 50.7	64	74	116.7	59 09.8	63	74	115.9	59 28.6	62	74	115.1	59 47.2	61	75	114.4	60 05.4	60	75	113.6	9
30	57 08.6	66	73	117.6	57 28.1	65	74	116.9	57 47.4	64	74	116.2	58 06.5	63	74	115.5	58 25.3	62	75	114.8	58 43.9	61	75	114.0	59 02.2	61	76	113.2	59 20.2	60	76	112.5	30
1	56 24.8	65	74	116.5	56 44.1	64	74	115.8	57 03.1	63	74	115.1	57 21.9	62	75	114.4	57 40.5	61	75	113.6	57 58.8	61	76	112.9	58 16.8	60	76	112.1	58 34.6	59	77	111.4	1
2	55 40.6	64	74	115.4	55 59.6	63	75	114.7	56 18.4	62	75	114.0	56 37.0	61	76	113.3	56 55.3	61	76	112.6	57 13.4	60	76	111.8	57 31.2	59	77	111.1	57 48.7	58	77	110.3	2
3	54 56.0	63	75	114.3	55 14.8	62	75	113.6	55 33.3	61	76	112.9	55 51.7	61	76	112.2	56 09.7	60	76	111.5	56 27.6	59	77	110.8	56 45.1	58	77	110.1	57 02.4	57	78	109.3	3
4	54 11.0	62	76	113.3	54 29.6	61	76	112.6	54 47.9	61	76	111.9	55 06.0	60	77	111.2	55 23.9	59	77	110.5	55 41.5	58	77	109.8	55 58.8	57	78	109.1	56 15.9	57	78	108.3	4
35	53 25.7	61	76	112.3	53 44.1	61	76	111.6	54 02.2	60	77	110.9	54 20.1	59	77	110.2	54 37.7	59	78	109.6	54 55.1	58	78	108.9	55 12.3	57	78	108.1	55 29.1	56	78	107.4	35
6	52 40.1	61	77	111.3	52 58.2	60	77	110.6	53 16.1	59	77	110.0	53 33.8	59	78	109.3	53 51.2	58	78	108.6	54 08.5	57	78	107.9	54 25.4	56	78	107.2	54 42.1	55	79	106.5	6
7	51 54.1	60	77	110.3	52 12.1	59	77	109.7	52 29.8	59	78	109.0	52 47.3	58	78	108.4	53 04.5	57	78	107.7	53 21.6	56	79	107.0	53 38.4	56	79	106.3	53 54.9	55	79	105.6	7
8	51 07.9	60	77	109.4	51 25.7	59	78	108.8	51 43.2	58	78	108.1	52 00.5	57	78	107.5	52 17.6	57	79	106.8	52 34.5	56	79	106.1	52 51.1	55	79	105.4	53 07.5	54	79	104.7	8
9	50 21.4	59	78	108.5	50 39.0	58	78	107.9	50 56.4	58	78	107.2	51 13.5	57	79	106.6	51 30.4	56	79	105.9	51 47.1	55	79	105.3	52 03.6	54	79	104.6	52 19.8	54	80	103.9	9
40	49 34.7	58	78	107.6	49 52.1	58	79	107.0	50 09.3	57	79	106.4	50 26.3	56	79	105.7	50 43.0	55	80	105.1	50 59.6	55	80	104.4	51 16.0	54	80	103.8	51 32.0	53	80	103.1	40
1	48 47.8	58	79	106.8	49 05.0	57	79	106.2	49 22.1	56	79	105.5	49 38.9	56	79	104.9	49 55.5	55	80	104.3	50 11.9	54	80	103.6	50 28.1	54	80	102.9	50 44.1	53	80	102.3	1
2	48 00.6	57	79	106.0	48 17.7	57	79	105.3	48 34.6	56	79	104.7	48 51.3	55	80	104.1	49 07.8	55	80	103.5	49 24.1	54	80	102.8	49 40.2	53	80	102.2	49 56.0	52	80	101.5	2
3	47 13.3	57	79	105.1	47 30.2	56	79	104.5	47 47.0	56	80	103.9	48 03.6	55	80	103.3	48 19.9	54	80	102.7	48 36.1	54	80	102.0	48 52.0	53	80	101.4	49 07.8	52	81	100.7	3
4	46 25.7	56	79	104.3	46 42.6	56	80	103.7	46 59.2	55	80	103.1	47 15.7	54	80	102.5	47 31.9	54	80	101.9	47 48.0	53	80	101.2	48 03.8	52	81	100.6	48 19.4	51	81	100.0	4
45	45 38.0	56	80	103.6	45 54.8	55	80	103.0	46 11.3	54	80	102.4	46 27.6	54	80	101.8	46 43.8	53	80	101.2	46 59.7	53	81	100.5	47 15.4	52	81	99.9	47 31.0	51	81	99.3	45
6	44 50.2	56	80	102.8	45 06.8	55	80	102.2	45 23.2	54	80	101.6	45 39.4	54	80	101.0	45 55.5	53	81	100.4	46 11.3	52	81	99.8	46 27.0	52	81	99.2	46 42.4	51	81	98.6	6
7	44 02.2	55	80	102.1	44 18.7	55	80	101.5	44 35.0	54	81	100.9	44 51.1	53	81	100.3	45 07.1	53	81	99.7	45 22.8	52	81	99.1	45 38.4	51	81	98.5	45 53.8	51	81	97.9	7
8	43 14.1	55	80	101.3	43 30.5	54	81	100.8	43 46.7	54	81	100.2	44 02.7	53	81	99.6	44 18.6	53	81	99.0	44 34.3	52	81	98.4	44 49.8	51	81	97.8	45 05.0	51	81	97.2	8
9	42 25.8	55	80	100.6	42 42.1	54	81	100.0	42 58.3	53	81	99.5	43 14.2	53	81	98.9	43 30.0	52	81	98.3	43 45.6	52	81	97.7	44 01.0	51	81	97.1	44 16.2	50	81	96.5	9
50	41 37.5	54	81	99.9	41 53.7	54	81	99.3	42 09.7	53	81	98.8	42 25.6	53	81	98.2	42 41.3	52	81	97.6	42 56.9	51	81	97.0	43 12.2	51	81	96.4	43 27.4	50	82	95.9	50
1	40 49.0	54	81	99.2	41 05.1	53	81	98.7	41 21.1	53	81	98.1	41 36.9	52	81	97.5	41 52.6	52	81	97.0	42 08.0	51	81	96.4	42 23.3	51	82	95.8	42 38.5	50	82	95.2	1
2	40 00.4	54	81	98.5	40 16.5	53	81	98.0	40 32.4	53	81	97.4	40 48.2	52	81	96.9	41 03.8	52	81	96.3	41 19.2	51	81	95.7	41 34.4	51	82	95.2	41 49.5	50	82	94.6	2
3	39 11.8	54	81	97.9	39 27.8	53	81	97.3	39 43.9	53	81	96.8	39 59.3	52	81	96.2	40 14.9	52	82	95.7	40 30.2	51	82	95.1	40 45.4	50	82	94.5	41 00.5	50	82	93.9	3
4	38 23.1	54	81	97.2	38 39.0	53	81	96.7	38 54.8	52	81	96.1	39 10.4	52	82	95.6	39 25.9	51	82	95.0	39 41.3	51	82	94.5	39 56.4	50	82	93.9	40 11.4	50	82	93.3	4
55	37 34.3	53	81	96.6	37 50.2	53	82	96.0	38 05.9	52	82	95.5	38 21.5	52	82	94.9	38 36.9	51	82	94.4	38 52.2	51	82	93.8	39 07.4	50	82	93.3	39 22.4	50	82	92.7	55
6	36 45.4	53	82	95.9	37 01.2	52	82	95.4	37 17.0	52	82	94.8	37 32.5	52	82	94.3	37 47.9	51	82	93.8	38 03.2	51	82	93.2	38 18.3	50	82	92.7	38 33.2	50	82	92.1	6
7	35 56.5	53	82	95.3	36 12.3	52	82	94.8	36 28.0	52	82	94.2	36 43.5	51	82	93.7	36 58.9	51	82	93.2	37 14.1	50	82	92.6	37 29.2	50	82	92.1	37 44.1	50	82	91.5	7
8	35 07.5	53	82	94.7	35 23.3	52	82	94.1	35 38.9	52	82	93.6	35 54.4	51	82	93.1	36 09.8	51	82	92.6	36 25.0	50	82	92.0	36 40.1	50	82	91.5	36 55.0	49	82	90.9	8
9	34 18.5	53	82	94.0	34 34.3	52	82	93.5	34 49.9	52	82	93.0	35 05.3	51	82	92.5	35 20.7	51	82	92.0	35 35.9	50	82	91.4	35 50.9	50	82	90.9	36 05.8	49	82	90.4	9
60	33 29.5	53	82	93.4	33 45.2	52	82	92.9	34 00.8	52	82	92.4	34 16.2	51	82	91.9	34 31.5	51	82	91.4	34 46.7	50	82	90.8	35 01.8	50	82	90.3	35 16.7	49	82	89.8	60
1	32 40.4	52	82	92.8	32 56.1	52	82	92.3	33 11.6	52	82	91.8	33 27.1	51	82	91.3	33 42.4	51	82	90.8	33 57.6	50	82	90.3	34 12.6	50	82	89.7	34 27.5	49	82	89.2	1
2	31 51.3	52	82	92.2	32 07.0	52	82	91.7	32 22.5	51	82	91.2	32 37.9	51	82	90.7	32 53.3	51	82	90.2	33 08.4	50	82	89.7	33 23.5	50	82	89.2	33 38.4	50	82	88.7	2
3	31 02.2	52	82	91.6	31 17.8	52	82	91.1	31 33.4	51	82	90.6	31 48.8	51	82	90.1	32 04.1	51	82	89.6	32 19.3	50	82	89.1	32 34.3	50	82	88.6	32 49.3	50	82	88.1	3
4	30 13.0	52	82	91.1	30 28.7	52	82	90.6	30 44.2	51	82	90.1	30 59.6	51	82	89.6	31 15.0	51	82	89.1	31 30.1	50	82	88.6	31 45.2	50	82	88.1	32 00.2	50	82	87.5	4
65	29 23.9	52	82	90.5	29 39.5	52	82	90.0	29 55.1	52	82	89.5	30 10.5	51	82	89.0	30 25.8	51	82	88.5	30 41.0	50	82	88.0	30 56.1	50	82	87.5	31 11.1	50	82	87.0	65
6	28 34.7	52	82	89.9	28 50.4	52	82	89.4	29 05.9	52	82	88.9	29 21.4	51	82	88.4	29 36.7	51	82	87.9	29 51.9	50	82	87.4	30 07.0	50	82	86.9	30 22.0	50	82	86.4	6
7	27 45.6	52	82	89.3	28 01.2	52	82	88.8	28 16.8	52	82	88.4	28 32.2	51	82	87.9	28 47.6	51	82	87.4	29 02.8	51	82	86.9	29 17.9	50	82	86.4	29 33.0	50	82.	85.9	7
8	26 56.5	52	82	88.8	27 12.1	52	82	88.3	27 27.7	52	82	87.8	27 43.1	51	82	87.3	27 58.5	51	82	86.8	28 13.8	51	82	86.3	28 28.9	50	82	85.9	28 44.0	50	82	85.4	8
9	26 07.3	52	82	88.2	26 23.0	52	82	87.7	26 38.6	52	82	87.2	26 54.1	51	82	86.7	27 09.4	51	82	86.3	27 24.7	51	82	85.8	27 39.9	50	82	85.3	27 55.0	50	82	84.8	9
70	25 18.2	52	82	87.6	25 33.9	52	82	87.2	25 49.5	52	82	86.7	26 05.0	52	82	86.2	26 20.4	52	82	85.7	26 35.7	52	82	85.3	26 50.9	51	82	84.8	27 06.1	50	81	84.3	70
1	24 29.1	52	82	87.1	24 44.8	52	82	86.6	25 00.4	52	82	86.1	25 16.0	52	82	85.7	25 31.4	52	82	85.2	25 46.8	51	82	84.7	26 02.0	51	81	84.2	26 17.2	50	81	83.8	1
2	23 40.0	53	82	86.5	23 55.8	52	82	86.1	24 11.4	52	82	85.6	24 27.0	52	82	85.1	24 42.5	51	82	84.7	24 57.8	51	82	84.2	25 13.1	51	81	83.7	25 28.3	51	81	83.2	2
3	22 51.0	53	82	86.0	23 06.8	52	82	85.5	23 22.4	52	82	85.1	23 38.0	52	82	84.6	23 53.5	51	82	84.1	24 09.0	51	81	83.7	24 24.3	51	81	83.2	24 39.6	51	81	82.7	3
4	22 02.0	53	82	85.4	22 17.8	53	82	85.0	22 33.5	52	82	84.5	22 49.1	52	81	84.1	23 04.7	51	81	83.6	23 20.1	51	81	83.1	23 35.5	51	81	82.7	23 50.8	51	81	82.2	4
75	21 13.0	53	82	84.9	21 28.8	53	82	84.4	21 44.6	52	81	84.0	22 00.3	52	81	83.5	22 15.9	52	81	83.1	22 31.4	51	81	82.6	22 46.8	51	81	82.1	23 02.2	51	81	81.7	75
6	20 24.1	53	82	84.3	20 39.9	53	81	83.9	20 55.7	52	81	83.4	21 11.5	52	81	83.0	21 27.1	52	81	82.5	21 42.7	51	81	82.1	21 58.2	51	81	81.6	22 13.6	51	81	81.1	6
7	19 35.2	53	81	83.8	19 51.1	53	81	83.3	20 06.9	53	81	82.9	20 22.7	52	81	82.4	20 38.4	52	81	82.0	20 54.0	51	81	81.5	21 09.6	52	81	81.1	21 25.1	51	81	80.6	7
8	18 46.4	53	81	83.2	19 02.3	53	81	82.8	19 18.2	53	81	82.4	19 34.0	52	81	81.9	19 49.8	52	81	81.5	20 05.4	52	81	81.0	20 21.1	51	81	80.6	20 36.6	51	81	80.1	8
9	17 57.6	53	81	82.7	18 13.5	53	81	82.3	18 29.5	53	81	81.8	18 45.4	53	81	81.4	19 01.2	52	81	80.9	19 16.9	52	81	80.5	19 32.6	52	81	80.0	19 48.2	52	80	79.6	9
80	17 08.9	54	81	82.2	17 24.9	53	81	81.7	17 40.9	53	81	81.3	17 56.8	53	81	80.8	18 12.7	53	81	80.4	18 28.5	53	81	80.0	18 44.2	52	80	79.5	18 59.9	52	80	79.1	80
1	16 20.2	54	81	81.6	16 36.3	54	81	81.2	16 52.3	53	81	80.8	17 08.3	53	81	80.3	17 24.3	53	81	79.9	17 40.1	53	80	79.4	17 56.0	53	80	79.0	18 11.7	52	80	78.5	1
2	15 31.6	54	81	81.1	15 47.8	54	81	80.7	16 03.9	54	81	80.2	16 19.9	53	80	79.8	16 35.9	53	80	79.3	16 51.8	53	80	78.9	17 07.8	53	80	78.5	17 23.6	53	80	78.0	2
3	14 43.1	54	81	80.6	14 59.3	54	81	80.1	15 15.5	54	81	79.7	15 31.6	54	80	79.3	15 47.7	53	80	78.8	16 03.7	53	80	78.4	16 19.7	53	80	77.9	16 35.6	53	80	77.5	3
4	13 54.6	54	81	80.0	14 10.9	54	81	79.6	14 27.2	54	81	79.2	14 43.4	54	80	78.7	14 59.5	54	80	78.3	15 15.6	53	80	77.8	15 31.6	53	80	77.4	15 47.6	53	80	77.0	4
85	13 06.1	55	80	79.5	13 22.6	54	80	79.1	13 38.9	54	80	78.6	13 55.2	54	80	78.2	14 11.4	54	80	77.8	14 27.6	54	80	77.3	14 43.7	54	80	76.9	14 59.8	54	80	76.4	85
6	12 18.0	55	80	78.9	12 34.4	55	80	78.5	12 50.8	54	80	78.1	13 07.1	54	80	77.7	13 23.4	54	80	77.2	13 39.7	54	80	76.8	13 55.9	54	79	76.4	14 12.1	54	79	75.9	6
7	11 29.8	55	80	78.4	11 46.3	55	80	78.0	12 02.8	55	80	77.6	12 19.2	54	80	77.1	12 35.6	54	80	76.7	12 51.9	54	79	76.3	13 08.2	54	79	75.8	13 24.5	54	79	75.4	7
8	10 41.7	55	80	77.9	10 58.3	55	80	77.4	11 14.8	55	80	77.0	11 31.3	55	80	76.6	11 47.8	55	79	76.2	12 04.2	55	79	75.7	12 20.6	54	79	75.3	12 36.9	54	79	74.9	8
9	9 53.7	56	80	77.3	10 10.3	55	80	76.9	10 27.0	55	80	76.5	10 43.6	55	79	76.1	11 00.1	55	79	75.6	11 16.6	55	79	75.2	11 33.1	55	79	74.8	11 49.6	54	79	74.4	9
90	9 05.8	56	80	76.8	9 22.5	56	80	76.4	9 39.2	56	79	75.9	9 55.9	56	79	75.5	10 12.6	55	79	75.1	10 29.2	55	79	74.7	10 45.7	55	79	74.2	11 02.3	55	79	73.8	90

Lat. 35°

H.A.	16° 00' Alt. / Az.	16° 30' Alt. / Az.	17° 00' Alt. / Az.	17° 30' Alt. / Az.	18° 00' Alt. / Az.	18° 30' Alt. / Az.	19° 00' Alt. / Az.	19° 30' Alt. / Az.	H.A.
00	39 00.0 1.0 01 180.0	38 30.0 1.0 01 180.0	38 00.0 1.0 01 180.0	37 30.0 1.0 01 180.0	37 00.0 1.0 01 180.0	36 30.0 1.0 01 180.0	36 00.0 1.0 01 180.0	35 30.0 1.0 01 180.0	00
1	38 59.5 1.0 03 178.8	38 29.5 1.0 03 178.8	37 59.5 1.0 03 178.8	37 29.5 1.0 03 178.8	36 59.5 1.0 03 178.8	36 29.5 1.0 03 178.8	35 59.5 1.0 02 178.8	35 29.5 1.0 02 178.8	1
2	38 57.9 1.0 04 177.6	38 27.9 1.0 04 177.6	37 57.9 1.0 04 177.6	37 27.9 1.0 04 177.6	36 58.0 1.0 04 177.6	36 28.0 1.0 04 177.6	35 58.0 1.0 04 177.7	35 28.0 1.0 04 177.7	2
3	38 55.2 1.0 06 176.3	38 25.3 1.0 06 176.3	37 55.3 1.0 06 176.4	37 25.4 1.0 06 176.4	36 55.4 1.0 06 176.4	36 25.4 1.0 06 176.5	35 55.5 1.0 06 176.5	35 25.5 1.0 06 176.5	3
4	38 51.5 1.0 08 175.1	38 21.6 1.0 08 175.1	37 51.7 1.0 08 175.2	37 21.8 1.0 08 175.2	36 51.8 1.0 08 175.2	36 21.9 1.0 08 175.3	35 52.0 1.0 07 175.3	35 22.1 1.0 07 175.4	4
05	38 46.8 1.0 10 173.8	38 16.9 1.0 10 173.9	37 47.0 1.0 10 173.9	37 17.1 1.0 09 174.0	36 47.3 1.0 09 174.1	36 17.4 1.0 09 174.1	35 47.5 1.0 09 174.2	35 17.6 1.0 09 174.2	05
6	38 41.0 99 11 172.6	38 11.1 99 11 172.7	37 41.3 99 11 172.7	37 11.5 99 11 172.8	36 41.7 99 11 172.9	36 11.8 99 11 172.9	35 42.0 99 11 173.0	35 12.2 99 11 173.1	6
7	38 34.1 99 13 171.4	38 04.4 99 13 171.5	37 34.6 99 13 171.5	37 04.8 99 13 171.6	36 35.1 99 13 171.7	36 05.3 99 13 171.8	35 35.5 99 12 171.9	35 05.8 99 12 171.9	7
8	38 26.2 99 15 170.2	37 56.6 99 15 170.3	37 26.7 99 15 170.3	36 57.2 99 14 170.4	36 27.5 99 14 170.5	35 57.8 99 14 170.6	35 28.1 99 14 170.7	34 58.4 99 14 170.8	8
9	38 17.3 99 17 169.0	37 47.7 99 16 169.1	37 18.1 99 16 169.1	36 48.5 99 16 169.3	36 18.9 99 16 169.4	35 49.3 99 16 169.5	35 19.7 99 16 169.6	34 50.0 99 16 169.7	9
10	38 07.4 98 18 167.7	37 37.9 98 18 167.9	37 08.4 98 18 168.0	36 38.9 98 18 168.1	36 09.3 98 18 168.2	35 39.8 98 17 168.3	35 10.3 98 17 168.4	34 40.7 98 17 168.5	10
1	37 56.5 98 20 166.6	37 27.1 98 20 166.7	36 57.7 98 20 166.8	36 28.2 98 19 166.9	35 58.8 98 19 167.0	35 29.4 98 19 167.2	34 59.9 98 19 167.3	34 30.5 98 19 167.4	1
2	37 44.5 98 22 165.4	37 15.2 98 21 165.5	36 45.9 98 21 165.6	36 16.6 98 21 165.8	35 47.3 98 21 165.9	35 18.0 98 21 166.0	34 48.6 98 20 166.1	34 19.3 98 20 166.3	2
3	37 31.6 97 23 164.2	37 02.5 97 23 164.3	36 33.3 97 23 164.5	36 04.1 97 23 164.6	35 34.8 97 22 164.7	35 05.6 97 22 164.9	34 36.4 97 22 165.0	34 07.1 97 22 165.2	3
4	37 17.8 97 25 163.0	36 48.7 97 24 163.2	36 19.6 97 24 163.3	35 50.5 97 24 163.5	35 21.4 97 24 163.6	34 52.3 97 24 163.8	34 23.2 97 23 163.9	33 54.1 97 23 164.1	4
15	37 02.9 96 26 161.8	36 34.0 96 26 162.0	36 05.0 96 26 162.2	35 36.1 96 26 162.3	35 07.1 97 25 162.5	34 38.1 96 25 162.6	34 09.1 97 25 162.8	33 40.1 97 25 163.0	15
6	36 47.1 96 28 160.7	36 18.3 96 28 160.9	35 49.5 96 27 161.0	35 20.7 96 27 161.2	34 51.9 96 27 161.4	34 23.0 96 27 161.5	33 54.2 96 26 161.7	33 25.3 96 26 161.9	6
7	36 30.4 95 29 159.5	36 01.7 96 29 159.7	35 33.1 96 29 159.9	35 04.4 96 29 160.1	34 35.7 96 28 160.3	34 07.0 96 28 160.4	33 38.3 96 28 160.6	33 09.5 96 28 160.8	7
8	36 12.7 95 31 158.4	35 44.3 95 31 158.6	35 15.7 95 30 158.8	34 47.2 95 30 159.0	34 18.7 95 30 159.2	33 50.1 95 30 159.3	33 21.5 95 29 159.5	32 52.9 95 29 159.7	8
9	35 54.2 94 32 157.3	35 25.9 94 32 157.5	34 57.5 95 32 157.7	34 29.1 95 32 157.9	34 00.7 95 31 158.1	33 32.3 95 31 158.3	33 03.9 95 31 158.6	32 35.4 95 31 158.6	9
20	35 34.8 94 34 156.2	35 06.6 94 34 156.4	34 38.4 94 33 156.6	34 10.2 94 33 156.8	33 41.9 94 33 157.0	33 13.7 94 32 157.2	32 45.4 94 32 157.4	32 17.1 94 32 157.6	20
1	35 14.5 93 35 155.1	34 46.5 93 35 155.3	34 18.4 93 35 155.5	33 50.4 94 34 155.7	33 22.3 94 34 155.9	32 54.2 94 34 156.1	32 26.1 94 34 156.3	31 58.0 94 33 156.5	1
2	34 53.3 93 37 154.0	34 25.5 93 36 154.2	33 57.6 93 36 154.4	33 29.7 93 36 154.6	33 01.8 93 35 154.9	32 33.9 93 35 155.1	32 06.0 93 35 155.3	31 38.0 93 35 155.5	2
3	34 31.3 92 38 152.9	34 03.7 92 38 153.1	33 36.0 92 37 153.3	33 08.3 92 37 153.6	32 40.5 92 37 153.8	32 12.8 93 37 154.0	31 45.0 93 36 154.2	31 17.2 93 36 154.5	3
4	34 08.5 92 39 151.8	33 41.0 92 39 152.1	33 13.5 92 39 152.3	32 46.0 92 38 152.5	32 18.4 92 38 152.8	31 50.9 92 38 153.0	31 23.3 92 38 153.2	30 55.6 92 37 153.5	4
25	33 44.9 91 41 150.8	33 17.6 91 40 151.0	32 50.3 91 40 151.2	32 22.9 91 40 151.5	31 55.6 91 39 151.7	31 28.2 91 39 152.0	31 00.7 91 39 152.2	30 33.3 92 39 152.4	25
6	33 20.5 90 42 149.7	32 53.4 90 42 150.0	32 26.3 90 41 150.2	31 59.1 91 41 150.5	31 31.9 91 41 150.7	31 04.7 91 40 151.0	30 37.4 91 40 151.2	30 10.2 91 40 151.4	6
7	32 55.3 90 43 148.7	32 28.4 90 43 148.9	32 01.5 90 43 149.2	31 34.5 90 42 149.5	31 07.5 90 42 149.7	30 40.4 90 42 150.0	30 13.4 90 41 150.2	29 46.3 90 41 150.5	7
8	32 29.4 89 44 147.7	32 02.7 89 44 147.9	31 35.9 89 44 148.2	31 09.1 89 43 148.5	30 42.3 89 43 148.8	30 15.5 90 43 149.0	29 48.6 90 42 149.2	29 21.7 90 42 149.5	8
9	32 02.7 88 46 146.6	31 36.2 88 45 146.9	31 09.7 89 45 147.2	30 43.1 89 45 147.5	30 16.4 89 44 147.7	29 49.8 89 44 148.0	29 23.1 89 44 148.3	28 56.4 89 43 148.5	9
30	31 35.4 88 47 145.7	31 09.0 88 46 145.9	30 42.7 88 46 146.2	30 16.3 88 46 146.5	29 49.8 88 45 146.8	29 23.4 88 45 147.0	28 56.9 88 45 147.3	28 30.4 88 44 147.6	30
1	31 07.3 87 48 144.7	30 41.2 87 48 145.0	30 15.0 87 47 145.2	29 48.8 87 47 145.5	29 22.6 87 47 145.8	28 56.3 88 46 146.1	28 30.0 88 46 146.3	28 03.7 88 46 146.6	1
2	30 38.5 86 49 143.7	30 12.6 86 49 144.0	29 46.6 87 48 144.3	29 20.6 87 48 144.6	28 54.6 87 48 144.8	28 28.5 87 47 145.1	28 02.4 87 47 145.4	27 36.3 87 47 145.7	2
3	30 09.1 86 50 142.7	29 43.4 86 50 143.0	29 17.6 86 49 143.3	28 51.8 86 49 143.6	28 26.0 86 49 143.9	28 00.1 86 48 144.2	27 34.2 86 48 144.5	27 08.3 87 48 144.8	3
4	29 39.0 85 51 141.8	29 13.5 85 51 142.1	28 47.9 85 50 142.4	28 22.3 85 50 142.7	27 56.7 86 50 143.0	27 31.0 86 50 143.3	27 05.3 86 49 143.6	26 39.6 86 49 143.9	4
35	29 08.3 84 52 140.9	28 43.0 84 52 141.2	28 17.6 85 52 141.5	27 52.2 85 51 141.8	27 26.8 85 51 142.1	27 01.3 85 51 142.4	26 35.8 85 50 142.7	26 10.3 85 50 143.0	35
6	28 37.0 84 53 139.9	28 11.9 84 53 140.2	27 46.7 84 53 140.6	27 21.5 84 52 140.9	26 56.3 84 52 141.2	26 31.0 84 52 141.5	26 05.7 84 51 141.8	25 40.4 85 51 142.1	6
7	28 05.0 83 54 139.0	27 40.1 83 54 139.3	27 15.2 83 54 139.7	26 50.2 83 53 140.0	26 25.2 83 53 140.4	26 00.1 84 52 140.6	25 35.0 84 52 140.9	25 09.9 84 52 141.2	7
8	27 32.5 82 55 138.1	27 07.8 82 55 138.4	26 43.1 83 54 138.8	26 18.3 83 54 139.1	25 53.5 83 54 139.4	25 28.6 83 53 139.7	25 03.7 83 53 140.0	24 38.8 83 53 140.3	8
9	26 59.4 82 56 137.2	26 34.9 82 56 137.6	26 10.4 82 55 137.9	25 45.8 82 55 138.2	25 21.2 82 55 138.5	24 56.5 82 54 138.8	24 31.8 82 54 139.2	24 07.1 83 54 139.5	9
40	26 25.8 81 57 136.4	26 01.5 81 57 136.7	25 37.2 81 56 137.0	25 12.8 81 56 137.3	24 48.4 81 56 137.7	24 23.9 82 55 138.0	23 59.4 82 55 138.3	23 34.9 82 55 138.6	40
1	25 51.6 80 58 135.5	25 27.5 80 58 135.8	25 03.4 81 57 136.2	24 39.2 81 57 136.5	24 15.0 81 56 136.8	23 50.7 81 56 137.1	23 26.5 81 56 137.5	23 02.1 81 55 137.8	1
2	25 16.9 80 59 134.7	24 53.0 80 58 135.0	24 29.1 80 58 135.3	24 05.1 80 58 135.7	23 41.1 80 57 136.0	23 17.1 80 57 136.3	22 53.0 80 57 136.6	22 28.8 81 56 137.0	2
3	24 41.7 79 60 133.8	24 18.0 79 59 134.2	23 54.3 79 59 134.5	23 30.5 79 59 134.8	23 06.7 79 58 135.2	22 42.8 80 58 135.5	22 19.0 80 58 135.8	21 55.0 80 57 136.1	3
4	24 06.0 78 60 133.0	23 42.5 78 60 133.3	23 19.0 78 60 133.7	22 55.4 79 59 134.0	22 31.8 79 59 134.3	22 08.1 79 59 134.7	21 44.4 79 58 135.0	21 20.7 79 58 135.3	4
45	23 29.8 78 61 132.2	23 06.5 78 61 132.5	22 43.2 78 60 132.9	22 19.8 78 60 133.2	21 56.4 78 60 133.5	21 32.9 78 59 133.9	21 09.4 78 59 134.2	20 45.9 79 59 134.5	45
6	22 53.1 77 62 131.4	22 30.0 77 62 131.7	22 06.9 77 62 132.1	21 43.7 77 61 132.4	21 20.5 77 61 132.7	20 57.3 78 60 133.0	20 34.0 78 60 133.4	20 10.6 78 60 133.7	6
7	22 16.0 76 63 130.6	21 53.1 76 62 130.9	21 30.2 77 62 131.3	21 07.2 77 62 131.6	20 44.2 77 61 131.9	20 21.1 77 61 132.3	19 58.0 77 61 132.6	19 34.9 77 60 133.0	7
8	21 38.5 76 63 129.8	21 15.8 76 63 130.1	20 53.0 76 63 130.5	20 30.2 76 62 130.8	20 07.4 76 62 131.2	19 44.6 76 62 131.5	19 21.7 76 61 131.9	18 58.7 77 61 132.2	8
9	21 00.5 75 64 129.0	20 38.0 75 64 129.4	20 15.4 75 63 129.7	19 52.8 75 63 130.1	19 30.2 75 63 130.4	19 07.5 76 62 130.8	18 44.8 76 62 131.1	18 22.1 76 62 131.4	9
50	20 22.1 74 65 128.2	19 59.8 74 64 128.6	19 37.4 75 64 128.9	19 15.0 75 64 129.3	18 52.6 75 63 129.7	18 30.1 75 63 130.0	18 07.6 75 63 130.3	17 45.0 75 62 130.7	50
1	19 43.3 74 65 127.5	19 21.1 74 65 127.8	18 59.0 74 65 128.2	18 36.8 74 64 128.5	18 14.5 74 64 128.9	17 52.2 74 64 129.3	17 29.9 74 63 129.6	17 07.6 75 63 130.0	1
2	19 04.1 73 66 126.7	18 42.1 73 66 127.1	18 20.2 73 65 127.4	17 58.1 73 65 127.8	17 36.1 74 65 128.2	17 14.0 74 64 128.5	16 51.9 74 64 128.9	16 29.7 74 64 129.2	2
3	18 24.5 72 67 126.0	18 02.7 73 66 126.4	17 40.9 73 66 126.7	17 19.1 73 66 127.1	16 57.2 73 65 127.4	16 35.3 73 65 127.8	16 13.4 73 65 128.1	15 51.4 73 64 128.5	3
4	17 44.5 72 67 125.3	17 23.0 72 67 125.6	17 01.4 72 67 126.0	16 39.7 72 66 126.4	16 18.0 72 66 126.7	15 56.3 72 66 127.1	15 34.6 73 65 127.4	15 12.8 73 65 127.8	4
55	17 04.2 71 68 124.5	16 42.8 71 67 124.9	16 21.4 71 67 125.3	15 59.7 72 67 125.6	15 38.4 72 67 126.0	15 16.9 72 66 126.4	14 55.3 72 66 126.7	14 33.7 72 66 127.1	55
6	16 23.6 71 68 123.8	16 02.4 71 68 124.2	15 41.1 71 68 124.6	15 19.8 71 67 124.9	14 58.5 71 67 125.3	14 37.2 71 67 125.7	14 15.8 71 67 126.0	13 54.3 71 66 126.4	6
7	15 42.6 70 69 123.1	15 21.5 70 69 123.5	15 00.5 70 68 123.9	14 39.4 70 68 124.2	14 18.2 71 68 124.6	13 57.0 71 67 125.0	13 35.8 71 67 125.3	13 14.6 71 67 125.7	7
8	15 01.2 69 69 122.4	14 40.4 70 69 122.8	14 19.5 70 69 123.2	13 58.6 70 69 123.5	13 37.6 70 68 123.9	13 16.6 70 68 124.3	12 55.6 70 68 124.6	12 34.5 70 67 125.0	8
9	14 19.6 69 70 121.7	13 58.9 69 70 122.1	13 38.2 69 69 122.5	13 17.4 69 69 122.9	12 56.6 69 69 123.2	12 35.8 69 68 123.6	12 15.0 70 68 124.0	11 54.1 70 68 124.3	9
60	13 37.7 68 71 121.0	13 17.1 68 70 121.4	12 56.6 69 70 121.8	12 36.0 69 70 122.2	12 15.4 69 69 122.6	11 54.7 69 69 122.9	11 34.1 69 69 123.3	11 13.3 69 68 123.7	60
1	12 55.4 68 71 120.4	12 35.1 68 71 120.8	12 14.7 68 70 121.1	11 54.2 68 70 121.5	11 33.8 68 70 121.9	11 13.3 68 69 122.3	10 52.8 68 69 122.6	10 32.3 68 69 123.0	1
2	12 12.9 67 71 119.7	11 52.7 67 71 120.1	11 32.5 67 71 120.5	11 12.2 68 71 120.9	10 51.9 68 70 121.2	10 31.6 68 70 121.6	10 11.3 68 70 122.0	9 50.9 68 69 122.4	2
3	11 30.0 67 72 119.1	11 10.0 67 72 119.4	10 50.0 67 71 119.8	10 29.9 67 71 120.2	10 09.8 67 71 120.6	9 49.6 67 70 121.0	9 29.4 67 70 121.3	9 09.3 67 70 121.7	3
4	10 47.0 66 72 118.4	10 27.1 66 72 118.8	10 07.2 66 72 119.2	9 47.3 66 71 119.6	9 27.3 67 71 119.9	9 07.3 67 71 120.3	8 47.3 67 71 120.7	8 27.3 67 70 121.1	4
65	10 03.6 66 73 117.8	9 43.9 66 72 118.2	9 24.1 66 72 118.5	9 04.4 66 72 118.9	8 44.6 66 71 119.3	8 24.8 66 71 119.7	8 04.9 66 71 120.1	7 45.1 66 71 120.4	65
6	9 20.0 65 73 117.1	9 00.4 65 73 117.5	8 40.8 65 73 117.9	8 21.2 65 72 118.3	8 01.6 65 72 118.7	7 41.9 66 72 119.0	7 22.2 66 72 119.4	7 02.5 66 71 119.8	6
7	8 36.1 65 74 116.5	8 16.7 65 73 116.9	7 57.3 65 73 117.3	7 37.8 65 73 117.7	7 18.3 65 72 118.0	6 58.8 65 72 118.4	6 39.3 65 72 118.8	6 19.8 65 72 119.2	7
8	7 52.0 64 74 115.9	7 32.7 64 74 116.3	7 13.5 64 73 116.6	6 54.1 64 73 117.0	6 34.8 64 73 117.4	6 15.5 65 73 117.8	5 56.1 65 72 118.2	5 36.7 65 72 118.6	8
9	7 07.7 64 74 115.3	6 48.6 64 74 115.6	6 29.4 64 74 116.0	6 10.2 64 74 116.4	5 51.1 64 73 116.8	5 31.9 64 73 117.2	5 12.7 64 73 117.6		9
70	6 23.1 63 75 114.6	6 04.1 63 74 115.0	5 45.1 63 74 115.4	5 26.1 63 74 115.8	5 07.1 63 74 116.2				70
1	5 38.3 63 75 114.0	5 19.5 63 75 114.4	5 00.6 63 75 114.8						1

Lat. 36°   **Lat. 37°**   **Lat. 38°**

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00' Alt. / Az.	16° 30' Alt. / Az.	17° 00' Alt. / Az.	17° 30' Alt. / Az.	18° 00' Alt. / Az.	18° 30' Alt. / Az.	19° 00' Alt. / Az.	19° 30' Alt. / Az.	H.A.
91	8 18.0 56 79 76.2	8 34.8 56 79 75.8	8 51.6 56 79 75.4	9 08.4 56 79 75.0	9 25.1 56 79 74.6	9 41.8 56 79 74.1	9 58.5 56 79 73.7	10 15.2 55 78 73.3	91
2	7 30.3 56 79 75.7	7 47.2 56 79 75.3	8 04.1 56 79 74.9	8 21.0 56 79 74.4	8 37.8 56 79 74.0	8 54.6 56 78 73.6	9 11.4 56 78 73.2	9 28.1 56 78 72.8	2
3	6 42.8 57 79 75.1	7 00.0 57 79 74.7	7 16.7 57 79 74.3	7 33.7 56 79 73.9	7 50.6 56 79 73.5	8 07.5 56 78 73.1	8 24.4 56 78 72.6	8 41.3 56 78 72.2	3
4	5 55.3 57 79 74.6	6 12.4 57 79 74.2	6 29.5 57 79 73.8	6 46.5 57 79 73.4	7 03.6 57 78 72.9	7 20.6 57 78 72.5	7 37.6 57 78 72.1	7 54.5 57 78 71.7	4
95	5 08.0 57 79 74.0	5 25.2 57 79 73.6	5 42.4 57 79 73.2	5 59.5 57 78 72.8	6 16.7 57 78 72.4	6 33.8 57 78 72.0	6 50.9 57 78 71.6	7 08.0 57 77 71.2	95
6				5 12.6 58 78 72.3	5 29.9 57 78 71.8	5 47.1 57 78 71.4	6 04.3 57 77 71.0	6 21.5 57 77 70.6	6
7						5 00.6 58 77 70.9	5 17.9 58 77 70.5	5 35.2 58 77 70.1	7

Lat. 35°

H.A.	20° 00' Alt.	Δd Δt	Az.	20° 30' Alt.	Δd Δt	Az.	21° 00' Alt.	Δd Δt	Az.	21° 30' Alt.	Δd Δt	Az.	22° 00' Alt.	Δd Δt	Az.	22° 30' Alt.	Δd Δt	Az.	23° 00' Alt.	Δd Δt	Az.	23° 30' Alt.	Δd Δt	Az.	H.A.
00	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	77 00.0	1.0 03	180.0	77 30.0	1.0 03	180.0	78 00.0	1.0 03	180.0	78 30.0	1.0 03	180.0	00
1	74 58.4	1.0 08	176.4	75 28.4	1.0 08	176.3	75 58.3	1.0 08	176.1	76 28.3	1.0 08	176.0	76 58.2	1.0 09	175.7	77 28.2	1.0 09	175.7	77 58.1	1.0 09	175.6	78 28.0	1.0 10	175.4	1
2	74 53.8	99 13	172.6	75 23.6	99 13	172.6	75 53.4	99 14	172.3	76 23.2	99 14	172.1	76 53.0	99 15	171.8	77 22.7	99 15	171.5	77 52.4	99 16	171.2	78 22.2	99 16	170.9	2
3	74 46.1	99 18	169.2	75 15.7	99 18	168.9	75 45.2	98 19	168.5	76 14.8	98 20	168.2	76 44.2	98 20	167.8	77 13.7	98 21	167.4	77 43.1	98 21	166.9	78 12.5	98 22	166.4	3
4	74 35.4	98 23	165.7	75 04.7	98 23	165.3	75 33.9	97 24	164.9	76 03.1	97 25	164.4	76 32.2	97 25	163.9	77 01.3	97 26	163.3	77 30.2	96 27	162.7	77 59.1	96 28	162.1	4
05	74 21.9	96 27	162.3	74 50.8	96 28	161.8	75 19.6	96 29	161.3	75 48.3	96 30	160.7	76 17.0	95 30	160.1	76 45.6	95 31	159.4	77 14.0	95 32	158.7	77 42.3	94 33	158.0	05
6	74 05.6	95 32	159.0	74 34.0	95 32	158.4	75 02.4	94 33	157.8	75 30.6	94 34	157.1	75 58.8	94 34	156.4	76 26.8	93 36	155.7	76 54.6	93 37	154.9	77 22.3	92 38	154.0	6
7	73 46.7	93 36	155.8	74 14.7	93 37	155.1	74 42.5	93 37	154.4	75 10.2	92 39	153.7	75 37.7	92 39	152.9	76 05.1	91 40	152.1	76 32.3	90 42	151.2	76 59.3	90 43	150.2	7
8	73 25.4	92 39	152.7	73 52.8	91 40	152.0	74 20.1	91 40	151.2	74 47.2	90 42	150.4	75 14.1	89 43	149.6	75 40.8	89 45	148.7	76 07.3	88 46	147.7	76 33.6	87 47	146.7	8
9	73 01.7	90 43	149.8	73 28.6	89 44	149.0	73 55.3	89 45	148.2	74 21.8	88 46	147.3	74 48.0	87 47	146.4	75 14.1	86 48	145.5	75 39.9	86 49	144.4	76 05.4	85 51	143.4	9
10	72 35.9	88 46	146.9	73 02.2	87 47	146.1	73 28.3	87 48	145.3	73 54.2	86 49	144.4	74 19.8	85 50	143.4	74 45.1	84 52	142.4	75 10.2	83 53	141.4	75 35.0	82 54	140.2	10
1	72 08.1	86 49	144.2	72 33.8	85 50	143.4	72 59.3	85 51	142.5	73 24.5	84 54	141.6	73 49.5	83 54	140.6	74 14.2	82 55	139.5	74 38.6	81 56	138.5	75 02.6	80 57	137.3	1
2	71 38.5	84 52	141.7	72 03.6	83 53	140.8	72 28.5	82 54	139.9	72 53.1	82 55	138.9	73 17.4	81 56	137.9	73 41.4	80 57	136.8	74 05.1	78 58	135.7	74 28.4	77 60	134.6	2
3	71 07.2	82 55	139.2	71 31.7	81 56	138.3	71 56.0	80 57	137.4	72 20.0	79 58	136.4	72 43.7	78 59	135.4	73 07.0	77 60	134.3	73 30.0	76 61	133.2	73 52.7	75 62	132.0	3
4	70 34.3	80 57	136.9	70 58.3	79 58	136.0	71 22.0	78 59	135.0	71 45.3	77 60	134.0	72 08.4	76 61	133.0	72 31.1	75 62	131.9	72 53.5	74 63	130.8	73 15.5	73 64	129.6	4
15	70 00.0	78 59	134.7	70 23.4	78 60	133.7	70 46.6	77 61	132.8	71 09.3	75 62	131.8	71 31.8	74 63	130.8	71 53.9	73 64	129.7	72 15.7	72 65	128.6	72 37.0	70 66	127.4	15
6	69 24.5	77 61	132.6	69 47.3	76 62	131.6	70 09.9	75 63	130.7	70 32.1	74 64	129.7	70 54.0	73 65	128.6	71 15.5	71 66	127.6	71 36.7	70 67	126.5	71 57.4	68 68	125.3	6
7	68 47.7	75 63	130.6	69 10.0	74 64	129.6	69 32.0	73 65	128.7	69 53.7	72 66	127.7	70 15.1	71 66	126.7	70 36.0	69 67	125.6	70 56.6	68 68	124.5	71 16.8	67 69	123.3	7
8	68 09.8	73 65	128.7	68 31.7	72 66	127.7	68 53.2	71 66	126.8	69 14.3	70 67	125.8	69 35.2	69 68	124.8	69 55.6	68 69	123.7	70 15.7	66 70	122.6	70 35.3	65 70	121.5	8
9	67 31.0	72 66	126.9	67 52.3	71 67	125.9	68 13.3	70 68	125.0	68 34.0	68 69	124.0	68 54.4	67 69	123.0	69 14.3	66 70	121.9	69 33.9	65 71	120.9	69 53.0	63 72	119.8	9
20	66 51.2	70 68	125.2	67 12.1	69 68	124.2	67 32.7	68 69	123.3	67 52.9	67 70	122.3	68 12.7	66 71	121.3	68 32.2	64 71	120.3	68 51.3	63 72	119.2	69 10.0	62 73	118.1	20
1	66 10.6	69 69	123.5	66 31.1	68 70	122.6	66 51.2	67 70	121.7	67 11.0	65 71	120.7	67 30.4	64 72	119.7	67 49.4	63 72	118.7	68 07.8	62 73	117.7	68 26.4	60 74	116.6	1
2	65 29.3	67 70	122.0	65 49.3	66 71	121.1	66 09.0	65 71	120.1	66 28.4	64 72	119.2	66 47.4	63 73	118.2	67 06.0	61 73	117.2	67 24.3	60 74	116.2	67 42.1	59 75	115.1	2
3	64 47.3	66 71	120.5	65 06.9	65 72	119.6	65 26.2	64 72	118.7	65 45.2	63 73	117.7	66 03.8	61 74	116.8	66 22.0	60 74	115.8	66 39.9	59 75	114.8	66 57.4	58 75	113.7	3
4	64 04.6	65 72	119.0	64 23.8	64 73	118.2	64 42.8	63 73	117.3	65 01.4	61 74	116.3	65 19.6	60 74	115.4	65 37.5	59 75	114.4	65 55.0	58 76	113.4	66 12.2	56 76	112.4	4
25	63 21.3	64 73	117.7	63 40.2	63 74	116.8	63 58.8	61 74	115.9	64 17.1	60 75	115.0	64 35.0	59 75	114.1	64 52.6	58 76	113.1	65 09.7	57 76	112.2	65 26.5	55 77	111.2	25
6	62 37.5	62 74	116.4	62 56.1	61 74	115.5	63 14.4	60 75	114.6	63 32.3	59 75	113.7	63 49.9	58 76	112.8	64 07.1	57 76	111.9	64 24.0	56 77	110.9	64 40.5	54 77	110.0	6
7	61 53.3	61 75	115.1	62 11.5	60 75	114.3	62 29.5	59 76	113.4	62 47.1	58 76	112.5	63 04.4	57 76	111.6	63 21.4	56 77	110.7	63 37.9	55 77	109.8	63 54.2	53 78	108.8	7
8	61 08.6	60 75	113.9	61 26.5	59 76	113.1	61 44.2	58 76	112.2	62 01.5	57 77	111.4	62 18.6	56 77	110.5	62 35.2	55 77	109.6	62 51.5	54 78	108.7	63 07.5	53 78	107.7	8
9	60 23.4	59 76	112.8	60 41.1	58 76	112.0	60 58.5	57 77	111.1	61 15.6	56 77	110.3	61 32.4	55 78	109.4	61 48.8	54 78	108.5	62 04.8	53 78	107.6	62 20.5	52 79	106.7	9
30	59 37.9	59 76	111.7	59 55.4	58 77	110.9	60 12.5	57 77	110.0	60 29.3	56 78	109.2	60 45.8	54 78	108.3	61 02.0	53 78	107.5	61 17.9	52 79	106.6	61 33.3	51 79	105.7	30
1	58 52.1	58 77	110.6	59 09.3	57 77	109.8	59 26.2	56 78	109.0	59 42.8	55 78	108.2	59 59.1	54 78	107.3	60 15.0	53 79	106.5	60 30.6	52 79	105.6	60 45.9	50 79	104.7	1
2	58 05.9	57 77	109.6	58 22.9	56 78	108.8	58 39.6	55 78	108.0	58 55.9	54 78	107.2	59 12.0	53 79	106.3	59 27.8	52 79	105.5	59 43.2	51 79	104.7	59 58.3	50 80	103.8	2
3	57 19.5	56 78	108.6	57 36.2	55 79	107.8	57 52.7	54 79	107.0	58 08.9	53 79	106.2	58 24.7	52 79	105.4	58 40.3	51 79	104.6	58 55.5	50 80	103.8	59 10.5	49 80	102.9	3
4	56 32.8	56 78	107.6	56 49.3	54 79	106.8	57 05.6	54 79	106.1	57 21.6	53 79	105.3	57 37.3	52 79	104.5	57 52.6	51 80	103.7	58 07.7	50 80	102.9	58 22.5	49 80	102.0	4
35	55 45.8	55 79	106.7	56 02.5	54 79	105.9	56 18.2	53 79	105.2	56 34.1	52 80	104.4	56 49.6	51 80	103.6	57 04.8	50 80	102.8	57 19.7	49 80	102.0	57 34.3	48 80	101.2	35
6	54 58.6	54 79	105.8	55 14.8	54 79	105.0	55 30.7	53 80	104.3	55 46.4	52 80	103.5	56 01.7	51 80	102.8	56 16.8	50 80	102.0	56 31.6	49 80	101.2	56 46.1	48 81	100.4	6
7	54 11.2	54 79	104.9	54 27.2	53 80	104.2	54 43.0	52 80	103.4	54 58.5	51 80	102.7	55 13.7	50 80	101.9	55 28.6	49 81	101.2	55 43.3	48 81	100.4	55 57.7	47 81	99.6	7
8	53 23.6	53 80	104.0	53 39.5	53 80	103.3	53 55.1	52 80	102.6	54 10.5	51 80	101.9	54 25.6	50 80	101.1	54 40.4	49 81	100.4	54 54.9	48 81	99.6	55 09.2	47 81	98.8	8
9	52 35.8	53 80	103.2	52 51.6	52 80	102.5	53 07.1	51 80	101.8	53 22.3	50 80	101.1	53 37.3	49 81	100.3	53 52.0	49 81	99.6	54 06.4	48 81	98.9	54 20.5	47 81	98.1	9
40	51 47.9	52 80	102.4	52 03.5	52 80	101.7	52 18.9	51 81	101.0	52 34.0	50 81	100.3	52 48.9	49 81	99.6	53 03.4	48 81	98.9	53 17.8	47 81	98.1	53 31.8	46 81	97.4	40
1	50 59.8	52 80	101.6	51 15.3	51 81	100.9	51 30.6	50 81	100.2	51 45.6	50 81	99.5	52 00.3	49 81	98.8	52 14.8	48 81	98.1	52 29.1	47 81	97.4	52 43.1	46 81	96.7	1
2	50 11.6	52 81	100.8	50 27.0	51 81	100.2	50 42.1	50 81	99.5	50 57.1	49 81	98.8	51 11.7	48 81	98.1	51 26.1	48 81	97.4	51 40.3	47 81	96.7	51 54.2	46 82	96.0	2
3	49 23.3	51 81	100.1	49 38.6	51 81	99.4	49 53.6	50 81	98.8	50 08.4	49 81	98.1	50 23.0	48 81	97.4	50 37.4	47 81	96.7	50 51.5	47 82	96.0	51 05.3	46 82	95.3	3
4	48 34.8	51 81	99.4	48 50.0	50 81	98.7	49 05.0	50 81	98.0	49 19.7	49 81	97.4	49 34.2	48 81	96.7	49 48.5	47 82	96.0	50 02.5	46 82	95.3	50 16.3	46 82	94.6	4
45	47 46.3	51 81	98.6	48 01.4	50 81	98.0	48 16.3	49 81	97.3	48 31.0	49 81	96.7	48 45.4	48 82	96.0	48 59.6	47 82	95.4	49 13.6	46 82	94.7	49 27.3	45 82	94.0	45
6	46 57.7	50 81	97.9	47 12.7	50 81	97.3	47 27.5	49 81	96.7	47 42.1	48 82	96.0	47 56.5	48 82	95.4	48 10.6	47 82	94.7	48 24.6	46 82	94.0	48 38.3	45 82	93.4	6
7	46 08.9	50 81	97.2	46 23.9	50 81	96.6	46 38.7	49 82	96.0	46 53.2	48 82	95.4	47 07.5	47 82	94.7	47 21.6	46 82	94.1	47 35.5	46 82	93.4	47 49.2	45 82	92.7	7
8	45 20.1	50 81	96.6	45 35.0	49 82	96.0	45 49.7	49 82	95.3	46 04.2	48 82	94.7	46 18.5	47 82	94.1	46 32.6	47 82	93.4	46 46.5	46 82	92.8	47 00.1	45 82	92.1	8
9	44 31.3	50 82	95.9	44 46.1	49 82	95.3	45 00.8	49 82	94.7	45 15.2	48 82	94.1	45 29.5	47 82	93.4	45 43.5	46 82	92.8	45 57.4	46 82	92.2	46 11.0	45 82	91.5	9
50	43 42.4	50 82	95.3	43 57.2	49 82	94.7	44 11.8	48 82	94.1	44 26.2	48 82	93.4	44 40.4	47 82	92.8	44 54.4	46 82	92.2	45 08.2	45 82	91.6	45 21.8	45 82	90.9	50
1	42 53.4	49 82	94.6	43 08.2	49 82	94.0	43 22.7	48 82	93.4	43 37.1	48 82	92.8	43 51.3	47 82	92.2	44 05.3	46 82	91.6	44 19.1	46 82	91.0	44 32.7	45 82	90.4	1
2	42 04.4	49 82	94.0	42 19.1	49 82	93.4	42 33.7	48 82	92.8	42 48.0	48 82	92.2	43 02.2	47 82	91.6	43 16.2	46 82	91.0	43 29.9	46 82	90.4	43 43.5	45 82	89.8	2
3	41 15.4	49 82	93.4	41 30.0	49 82	92.8	41 44.6	48 82	92.2	41 58.9	47 82	91.6	42 13.0	47 82	91.0	42 27.0	46 82	90.4	42 40.8	46 82	89.8	42 54.4	45 82	89.2	3
4	40 26.3	49 82	92.8	40 40.9	49 82	92.2	40 55.4	48 82	91.6	41 09.8	47 82	91.0	41 23.9	47 82	90.4	41 37.9	46 82	89.8	41 51.7	46 82	89.3	42 05.2	45 82	88.7	4
55	39 37.2	49 82	92.2	39 51.8	49 82	91.6	40 06.3	48 82	91.0	40 20.6	47 82	90.4	40 34.8	47 82	89.9	40 48.7	46 82	89.3	41 02.5	46 82	88.7	41 16.1	45 82	88.1	55
6	38 48.0	49 82	91.6	39 02.7	49 82	91.0	39 17.2	48 82	90.4	39 31.5	47 82	89.9	39 45.6	47 82	89.3	39 59.6	46 82	88.7	40 13.4	46 82	88.1	40 27.0	45 82	87.6	6
7	37 58.9	49 82	91.0	38 13.5	49 82	90.4	38 28.0	48 82	89.9	38 42.3	47 82	89.3	38 56.5	47 82	88.7	39 10.4	46 82	88.2	39 24.3	46 82	87.6	39 37.9	45 82	87.0	7
8	37 09.8	49 82	90.4	37 24.4	48 82	89.8	37 38.9	48 82	89.3	37 53.2	47 82	88.7	38 07.3	47 82	88.2	38 21.3	46 82	87.6	38 35.2	46 82	87.0	38 48.8	45 82	86.5	8
9	36 20.6	49 82	89.8	36 35.4	49 82	89.3	36 49.7	48 82	88.7	37 04.0	48 82	88.2	37 18.2	47 82	87.6	37 32.2	46 82	87.1	37 46.1	46 82	86.5	37 59.8	45 82	85.9	9
60	35 31.5	49 82	89.2	35 46.1	49 82	88.7	36 00.6	48 82	88.2	36 14.9	48 82	87.6	36 29.1	47 82	87.1	36 43.2	47 82	86.5	36 57.1	46 82	86.0	37 10.8	46 82	85.4	60
1	34 42.3	49 82	88.7	34 57.0	49 82	88.2	35 11.5	48 82	87.6	35 25.8	48 82	87.1	35 40.0	47 82	86.5	35 54.1	47 82	86.0	36 08.0	46 82	85.4	36 21.8	46 82	84.9	1
2	33 53.2	49 82	88.1	34 07.9	49 82	87.6	34 22.4	48 82	87.1	34 36.8	48 82	86.5	34 51.0	47 82	86.0	35 05.1	47 82	85.5	35 19.1	46 82	84.9	35 32.9	46 81	84.4	2
3	33 04.1	49 82	87.6	33 18.8	49 82	87.1	33 33.3	48 82	86.5	33 47.7	48 82	86.0	34 02.0	47 82	85.5	34 16.1	47 82	84.9	34 30.1	46 82	84.4	34 44.0	46 81	83.9	3
4	32 15.0	49 82	87.0	32 29.7	49 82	86.5	32 44.3	48 82	86.0	32 58.7	48 82	85.5	33 13.0	47 82	84.9	33 27.2	47 82	84.4	33 41.2	47 81	83.9	33 55.2	46 81	83.4	4
65	31 25.9	49 82	86.5	31 40.6	49 82	86.0	31 55.2	48 82	85.5	32 09.7	48 82	84.9	32 24.1	48 81	84.4	32 38.3	47 81	83.9	32 52.4	47 81	83.4	33 06.4	46 81	82.8	65
6	30 36.9	49 82	85.9	30 51.6	49 82	85.4	31 06.3	49 82	84.9	31 20.8	48 81	84.4	31 35.2	48 81	83.9	31 49.5	47 81	83.4	32 03.6	47 81	82.9	32 17.6	47 81	82.3	6
7	29 47.9	49 82	85.4	30 02.7	49 82	84.9	30 17.3	49 81	84.4	30 31.9	48 81	83.9	30 46.3	48 81	83.4	31 00.7	47 81	82.9	31 14.9	47 81	82.4	31 28.9	47 81	81.8	7
8	28 58.9	50 82	84.9	29 13.7	49 82	84.4	29 28.4	49 81	83.9	29 43.1	48 81	83.4	29 57.5	48 81	82.9	30 11.9	48 81	82.4	30 26.2	47 81	81.8	30 40.3	47 81	81.3	8
9	28 10.0	50 81	84.3	28 24.8	49 81	83.8	28 39.6	49 81	83.3	28 54.3	49 81	82.9	29 08.8	48 81	82.3	29 23.2	48 81	81.8	29 37.6	48 80	81.3	29 51.8	47 81	80.8	9
70	27 21.1	50 81	83.8	27 36.0	50 81	83.3	27 50.9	49 81	82.8	28 05.5	49 81	82.3	28 20.1	48 81	81.8	28 34.6	48 81	81.3	28 49.0	48 80	80.8	29 03.3	47 80	80.3	70
1	26 32.2	50 81	83.3	26 47.2	50 81	82.8	27 02.1	49 81	82.3	27 16.8	49 81	81.8	27 31.5	49 81	81.3	27 46.1	48 81	80.8	28 00.5	48 80	80.3	28 14.9	48 80	79.8	1
2	25 43.5	50 81	82.8	25 58.5	50 81	82.3	26 13.4	50 81	81.8	26 28.2	49 81	81.3	26 42.9	49 81	80.8	26 57.6	48 81	80.3	27 12.1	48 81	79.8	27 26.5	48 80	79.3	2
3	24 54.7	50 81	82.2	25 09.8	50 81	81.8	25 24.8	50 81	81.3	25 39.7	49 81	80.8	25 54.5	49 81	80.3	26 09.2	49 81	79.8	26 23.8	48 80	79.3	26 38.3	48 80	78.9	3
4	24 06.1	51 81	81.7	24 21.2	50 81	81.2	24 36.2	50 81	80.8	24 51.2	50 81	80.3	25 06.1	49 81	79.8	25 20.8	49 80	79.3	25 35.5	49 80	78.8	25 50.1	48 80	78.4	4
75	23 17.5	51 81	81.2	23 32.7	51 81	80.7	23 47.8	50 81	80.2	24 02.8	50 81	79.8	24 17.7	50 81	79.3	24 32.6	49 80	78.8	24 47.3	49 80	78.3	25 02.0	49 80	77.9	75
6	22 28.9	51 81	80.7	22 44.2	51 81	80.2	22 59.4	50 80	79.7	23 14.5	50 80	79.3	23 29.5	50 80	78.8	23 44.4	50 80	78.3	23 59.2	49 80	77.8	24 14.0	49 80	77.4	6
7	21 40.5	51 81	80.2	21 55.8	51 81	79.7	22 11.0	51 80	79.2	22 26.2	50 80	78.8	22 41.3	50 80	78.3	22 56.3	50 80	77.8	23 11.2	50 80	77.4	23 26.1	49 80	76.9	7
8	20 52.1	51 81	79.6	21 07.5	51 80	79.2	21 22.8	51 80	78.7	21 38.0	51 80	78.3	21 53.2	50 80	77.8	22 08.3	50 80	77.3	22 23.3	50 80	76.9	22 38.2	50 80	76.4	8
9	20 03.8	52 80	79.1	20 19.2	51 80	78.7	20 34.6	51 80	78.2	20 50.0	51 80	77.7	21 05.2	51 80	77.3	21 20.4	50 80	76.8	21 35.5	50 80	76.4	21 50.5	50 79	75.9	9
80	19 15.5	52 80	78.6	19 31.1	52 80	78.1	19 46.5	51 80	77.7	20 02.0	51 80	77.2	20 17.3	51 80	76.8	20 32.6	51 80	76.3	20 47.8	51 79	75.9	21 02.9	50 79	75.4	80
1	18 27.4	52 80	78.1	18 43.0	52 80	77.6	18 58.6	52 80	77.2	19 14.1	52 80	76.7	19 29.5	51 80	76.3	19 44.9	51 79	75.8	20 00.2	51 79	75.4	20 15.4	51 79	74.9	1
2	17 39.4	52 80	77.6	17 55.1	52 80	77.1	18 10.7	52 80	76.7	18 26.3	52 79	76.2	18 41.8	52 79	75.8	18 57.3	51 79	75.3	19 12.7	51 79	74.9	19 28.0	51 79	74.4	2
3	16 51.4	53 80	77.0	17 07.2	53 80	76.6	17 23.0	52 80	76.2	17 38.6	52 79	75.7	17 54.2	52 79	75.3	18 09.8	52 79	74.8	18 25.3	52 79	74.4	18 40.7	51 79	73.9	3
4	16 03.6	53 80	76.5	16 19.5	53 79	76.1	16 35.3	53 79	75.6	16 51.1	52 79	75.2	17 06.8	52 79	74.8	17 22.4	52 79	74.3	17 38.0	52 79	73.9	17 53.6	52 78	73.4	4
85	15 15.8	53 79	76.0	15 31.8	53 79	75.6	15 47.7	53 79	75.1	16 03.6	53 79	74.7	16 19.4	53 79	74.2	16 35.2	53 79	73.7	16 50.9	52 78	73.4	17 06.5	52 78	72.9	85
6	14 28.2	54 79	75.5	14 44.3	53 79	75.1	15 00.3	53 79	74.6	15 16.2	53 79	74.2	15 32.2	53 79	73.7	15 48.0	53 78	73.3	16 03.8	52 78	72.9	16 19.6	52 78	72.4	6
7	13 40.7	54 79	75.0	13 56.8	54 79	74.5	14 12.9	54 79	74.1	14 29.0	53 78	73.7	14 45.0	53 78	73.2	15 01.0	53 78	72.8	15 16.9	53 78	72.4	15 32.8	53 78	71.9	7
8	12 53.3	54 79	74.4	13 09.5	54 79	74.0	13 25.7	54 78	73.6	13 41.9	54 78	73.2	13 58.1	54 78	72.7	14 14.1	54 78	72.3	14 30.2	53 78	71.8	14 46.2	53 78	71.4	8
9	12 06.0	55 79	73.9	12 22.3	54 79	73.5	12 38.7	54 78	73.1	12 54.9	54 78	72.6	13 11.2	54 78	72.2	13 27.4	54 78	71.8	13 43.6	53 78	71.3	13 59.7	53 77	70.9	9
90	11 18.8	55 78	73.4	11 35.3	55 78	73.0	11 51.7	54 78	72.5	12 08.1	55 78	72.1	12 24.5	54 78	71.7	12 40.8	54 78	71.3	12 57.0	54 77	70.8	13 13.3	54 77	70.4	90

Lat. 35°

H.A.	20° 00' (Alt. Δd Δt / Az.)	20° 30'	21° 00'	21° 30'	22° 00'	22° 30'	23° 00'	23° 30'	H.A.
00	35 00.0 1.00 01 180.0	34 30.0 1.00 01 180.0	34 00.0 1.00 01 180.0	33 30.0 1.00 01 180.0	33 00.0 1.00 01 180.0	32 30.0 1.00 01 180.0	32 00.0 1.00 01 180.0	31 30.0 1.00 01 180.0	00
1	34 59.5 1.02 02 178.9	34 29.5 1.02 02 178.9	33 59.5 1.02 02 178.9	33 29.5 1.02 02 178.9	32 59.5 1.02 02 178.9	32 29.5 1.02 02 178.9	31 59.5 1.02 02 178.9	31 29.5 1.02 02 178.9	1
2	34 58.0 1.04 04 177.7	34 28.0 1.04 04 177.7	33 58.1 1.04 04 177.7	33 28.1 1.04 04 177.8	32 58.1 1.04 04 177.8	32 28.1 1.04 04 177.8	31 58.1 1.04 04 177.8	31 28.2 1.04 04 177.8	2
3	34 55.6 1.06 06 176.6	34 25.6 1.06 06 176.6	33 55.7 1.06 06 176.6	33 25.7 1.06 06 176.7	32 55.7 1.06 06 176.7	32 25.8 1.05 06 176.7	31 55.8 1.06 06 176.7	31 25.9 1.05 06 176.8	3
4	34 52.1 1.07 07 175.4	34 22.2 1.07 07 175.5	33 52.3 1.07 07 175.5	33 22.4 1.07 07 175.5	32 52.4 1.07 07 175.6	32 22.5 1.07 07 175.6	31 52.6 1.07 07 175.7	31 22.6 1.07 07 175.7	4
05	34 47.7 1.00 09 174.3	34 17.8 1.00 09 174.3	33 47.9 1.00 09 174.4	33 18.1 1.00 09 174.4	32 48.2 1.00 09 174.5	32 18.3 1.00 09 174.5	31 48.4 1.00 08 174.6	31 18.5 1.00 08 174.6	05
6	34 42.3 99 11 173.1	34 12.5 99 10 173.2	33 42.7 99 10 173.3	33 12.8 99 10 173.3	32 43.0 99 10 173.4	32 13.1 99 10 173.5	31 43.3 99 10 173.5	31 13.4 99 10 173.6	6
7	34 36.0 99 12 172.0	34 06.2 99 12 172.1	33 36.4 99 12 172.1	33 06.6 99 12 172.2	32 36.8 99 12 172.3	32 07.1 99 12 172.4	31 37.3 99 12 172.4	31 07.5 99 11 172.5	7
8	34 28.7 99 14 170.9	33 58.9 99 14 171.0	33 29.2 99 14 171.0	32 59.5 99 13 171.1	32 29.8 99 13 171.2	32 00.1 99 13 171.3	31 30.3 99 13 171.4	31 00.6 99 13 171.4	8
9	34 20.4 99 15 169.7	33 50.7 99 15 169.8	33 21.1 99 15 169.9	32 51.5 99 15 170.0	32 21.8 99 15 170.1	31 52.2 99 15 170.2	31 22.5 99 15 170.3	30 52.8 99 14 170.4	9
10	34 11.2 99 17 168.6	33 41.6 99 17 168.7	33 12.0 99 16 168.8	32 42.5 99 16 168.9	32 12.9 99 16 169.0	31 43.3 99 16 169.1	31 13.8 99 16 169.2	30 44.2 99 16 169.3	10
1	34 01.0 98 18 167.5	33 31.5 98 18 167.6	33 02.1 98 18 167.7	32 32.6 98 18 167.8	32 03.1 98 18 168.0	31 33.6 98 18 168.1	31 04.1 98 18 168.2	30 34.6 98 17 168.3	1
2	33 49.9 98 20 166.4	33 20.5 98 20 166.5	32 51.0 98 20 166.6	32 21.8 98 20 166.8	31 52.4 98 19 166.9	31 23.0 98 19 167.0	30 53.6 98 19 167.1	30 24.5 98 19 167.2	2
3	33 37.9 98 22 165.3	33 08.6 98 21 165.4	32 39.4 98 21 165.6	32 10.1 98 21 165.7	31 40.8 98 21 165.8	31 11.5 98 21 165.9	30 42.2 98 20 166.1	30 12.9 98 20 166.2	3
4	33 25.0 97 23 164.2	32 55.8 97 23 164.3	32 26.6 97 23 164.5	31 57.5 97 22 164.6	31 28.3 97 22 164.8	30 59.1 97 22 164.9	30 29.9 97 22 165.0	30 00.7 97 22 165.2	4
15	33 11.1 97 25 163.1	32 42.1 97 24 163.3	32 13.1 97 24 163.4	31 44.0 97 24 163.5	31 14.9 97 24 163.7	30 45.9 97 24 163.8	30 16.8 97 23 164.0	29 47.7 97 23 164.1	15
6	32 56.4 96 26 162.0	32 27.5 96 26 162.2	31 58.6 96 26 162.3	31 29.7 96 25 162.5	31 00.7 96 25 162.7	30 31.8 96 25 162.8	30 02.8 97 25 163.0	29 33.8 97 24 163.1	6
7	32 40.8 96 27 160.9	32 12.0 96 27 161.1	31 43.2 96 27 161.3	31 14.4 96 27 161.4	30 45.6 96 27 161.6	30 16.8 96 26 161.8	29 48.0 96 26 161.9	29 19.2 96 26 162.1	7
8	32 24.3 95 29 159.9	31 55.7 95 29 160.1	31 27.0 95 28 160.2	30 58.4 95 28 160.4	30 29.7 95 28 160.6	30 01.0 95 28 160.7	29 32.3 96 27 160.9	29 03.6 96 27 161.1	8
9	32 07.0 95 30 158.8	31 38.5 95 30 159.0	31 10.0 95 30 159.2	30 41.5 95 30 159.3	30 13.0 95 29 159.5	29 44.4 95 29 159.7	29 15.9 95 29 159.9	28 47.3 95 29 160.1	9
20	31 48.8 94 32 157.8	31 20.5 94 31 158.0	30 52.1 95 31 158.2	30 23.8 95 31 158.4	29 55.4 95 31 158.5	29 27.0 95 30 158.8	28 58.6 95 30 158.9	28 30.1 95 30 159.1	20
1	31 29.8 94 33 156.7	31 01.6 94 33 156.9	30 33.4 94 32 157.1	30 05.2 94 32 157.3	29 37.0 94 32 157.5	29 08.7 94 32 157.7	28 40.5 94 31 157.9	28 12.2 94 31 158.1	1
2	31 10.0 93 34 155.7	30 42.0 93 34 155.9	30 13.9 93 34 156.1	29 45.9 94 34 156.3	29 17.8 94 34 156.5	28 49.7 94 33 156.7	28 21.6 94 33 156.9	27 53.5 94 32 157.1	2
3	30 49.4 93 36 154.7	30 21.5 93 35 154.9	29 53.6 93 35 155.1	29 25.8 93 35 155.3	28 57.8 93 35 155.5	28 29.9 93 34 155.7	28 02.0 93 34 156.0	27 34.0 93 34 156.2	3
4	30 28.0 92 37 153.7	30 00.3 92 37 153.9	29 32.6 92 36 154.1	29 04.9 92 36 154.3	28 37.1 92 36 154.5	28 09.3 93 36 154.8	27 41.6 93 35 155.0	27 13.8 93 35 155.2	4
25	30 05.8 92 38 152.7	29 38.3 92 38 152.9	29 10.8 92 38 153.1	28 43.2 92 37 153.4	28 15.6 92 37 153.6	27 48.0 92 37 153.8	27 20.4 92 36 154.0	26 52.8 92 36 154.2	25
6	29 42.8 91 39 151.7	29 15.5 91 39 151.9	28 48.2 91 39 152.2	28 20.8 91 39 152.4	27 53.4 91 38 152.6	27 26.0 91 38 152.9	26 58.5 92 38 153.1	26 31.1 92 37 153.3	6
7	29 19.2 90 41 150.7	28 52.0 91 40 151.0	28 24.8 91 40 151.2	27 57.6 91 40 151.4	27 30.4 91 39 151.7	27 03.2 91 39 151.9	26 35.9 91 39 152.1	26 08.6 91 39 152.4	7
8	28 54.8 90 42 149.7	28 27.8 90 42 150.0	28 00.8 90 41 150.2	27 33.8 90 41 150.4	27 06.7 90 41 150.7	26 39.7 90 40 151.0	26 12.6 90 40 151.2	25 45.5 90 40 151.4	8
9	28 29.6 89 43 148.8	28 02.9 89 43 149.0	27 36.1 89 42 149.3	27 09.2 89 42 149.5	26 42.4 89 42 149.8	26 15.5 90 41 150.0	25 48.6 90 41 150.3	25 21.6 90 41 150.5	9
30	28 03.8 89 44 147.8	27 37.2 89 44 148.1	27 10.6 89 44 148.4	26 44.0 89 43 148.6	26 17.3 89 43 148.9	25 50.6 89 43 149.1	25 23.9 89 42 149.4	24 57.1 89 42 149.6	30
1	27 37.3 88 45 146.9	27 10.9 88 45 147.2	26 44.5 88 45 147.4	26 18.0 88 44 147.7	25 51.5 88 44 147.9	25 25.0 88 44 148.2	24 58.5 89 43 148.5	24 31.9 89 43 148.7	1
2	27 10.1 87 46 146.0	26 43.9 87 46 146.2	26 17.7 87 46 146.5	25 51.4 87 46 146.8	25 25.1 88 45 147.0	24 58.8 88 45 147.3	24 32.5 88 44 147.6	24 06.1 88 44 147.8	2
3	26 42.3 87 47 145.0	26 16.3 87 47 145.3	25 50.2 87 47 145.6	25 24.2 87 46 145.8	24 58.1 87 46 146.1	24 31.9 87 46 146.4	24 05.8 87 46 146.7	23 39.6 87 46 147.0	3
4	26 13.8 86 49 144.1	25 48.0 86 48 144.4	25 22.2 86 48 144.7	24 56.3 86 48 145.0	24 30.4 86 47 145.3	24 04.4 87 47 145.5	23 38.5 87 47 145.8	23 12.5 87 46 146.1	4
35	25 44.7 85 50 143.2	25 19.1 85 49 143.5	24 53.4 86 49 143.8	24 27.8 86 49 144.1	24 02.1 86 48 144.4	23 36.3 86 48 144.7	23 10.5 86 48 144.9	22 44.7 86 47 145.2	35
6	25 15.0 85 51 142.4	24 49.6 85 50 142.7	24 24.1 85 50 142.9	23 58.7 85 50 143.2	23 33.1 85 49 143.5	23 07.6 85 49 143.8	22 42.0 85 49 144.1	22 16.4 85 48 144.4	6
7	24 44.7 84 52 141.5	24 19.5 84 51 141.8	23 54.2 84 51 142.1	23 28.9 84 50 142.4	23 03.6 84 50 142.7	22 38.3 85 50 143.0	22 12.9 85 50 143.2	21 47.5 85 49 143.5	7
8	24 13.8 83 52 140.6	23 48.8 83 52 140.9	23 23.7 84 52 141.2	22 58.6 84 51 141.5	22 33.5 84 51 141.8	22 08.3 84 51 142.1	21 43.2 84 50 142.4	21 18.0 84 50 142.6	8
9	23 42.3 83 53 139.8	23 17.5 83 53 140.1	22 52.7 83 53 140.4	22 27.8 83 52 140.7	22 02.9 83 52 141.0	21 37.9 83 52 141.3	21 12.9 83 51 141.6	20 47.9 83 51 141.9	9
40	23 10.3 82 54 138.9	22 45.7 82 54 139.2	22 21.0 82 54 139.5	21 56.4 82 53 139.9	21 31.7 82 53 140.2	21 06.9 83 53 140.5	20 42.1 83 52 140.8	20 17.3 83 52 141.1	40
1	22 37.7 81 55 138.1	22 13.3 81 55 138.4	21 48.9 82 54 138.7	21 24.4 82 54 139.0	20 59.9 82 54 139.3	20 35.3 82 53 139.6	20 10.8 82 53 140.0	19 46.2 82 53 140.3	1
2	22 04.7 81 56 137.2	21 40.7 81 56 137.6	21 16.2 81 55 137.9	20 51.9 81 55 138.2	20 27.6 81 55 138.5	20 03.3 81 54 138.8	19 38.9 81 54 139.2	19 14.5 81 54 139.5	2
3	21 31.1 80 57 136.5	21 07.0 80 57 136.8	20 43.0 80 56 137.1	20 18.9 80 56 137.4	19 54.8 80 56 137.7	19 30.7 81 55 138.1	19 06.5 81 55 138.4	18 42.3 81 54 138.7	3
4	20 56.9 79 58 135.7	20 33.1 79 57 136.0	20 09.3 80 57 136.3	19 45.4 80 57 136.6	19 21.5 80 56 136.9	18 57.6 80 56 137.3	18 33.6 80 56 137.6	18 09.6 80 55 137.9	4
45	20 22.3 79 58 134.9	19 58.7 79 58 135.2	19 35.1 79 58 135.5	19 11.4 79 57 135.8	18 47.7 79 57 136.2	18 24.0 79 57 136.5	18 00.2 79 56 136.8	17 36.4 79 56 137.1	45
6	19 47.3 78 59 134.1	19 23.9 78 59 134.4	19 00.4 78 59 134.7	18 36.9 78 58 135.1	18 13.4 78 58 135.4	17 49.9 79 58 135.7	17 26.3 79 57 136.0	17 02.7 79 57 136.4	6
7	19 11.7 77 60 133.3	18 48.5 77 60 133.6	18 25.3 78 59 134.0	18 02.0 78 59 134.3	17 38.7 78 59 134.6	17 15.3 78 58 135.0	16 52.0 78 58 135.3	16 28.6 78 58 135.6	7
8	18 35.7 77 61 132.5	18 12.7 77 60 132.9	17 49.7 77 60 133.2	17 26.6 77 60 133.6	17 03.5 77 59 133.9	16 40.3 77 59 134.2	16 17.2 77 59 134.5	15 54.0 78 58 134.9	8
9	17 59.3 76 61 131.8	17 36.5 76 61 132.1	17 13.6 76 61 132.5	16 50.8 76 60 132.8	16 27.8 76 60 133.1	16 04.9 77 60 133.5	15 41.9 77 59 133.8	15 18.9 77 59 134.1	9
50	17 22.5 75 62 131.0	16 59.8 75 62 131.4	16 37.2 76 62 131.7	16 14.5 76 61 132.1	15 51.8 76 61 132.4	15 29.0 76 60 132.7	15 06.2 76 60 133.1	14 43.4 76 60 133.4	50
1	16 45.2 75 63 130.3	16 22.7 75 62 130.6	16 00.3 75 62 131.0	15 37.8 75 62 131.3	15 15.3 75 62 131.7	14 52.7 75 61 132.0	14 30.1 75 61 132.4	14 07.5 75 61 132.7	1
2	16 07.5 74 63 129.6	15 45.3 74 63 129.9	15 23.0 74 63 130.3	15 00.7 74 62 130.6	14 38.4 74 62 131.0	14 16.0 75 62 131.3	13 53.6 75 62 131.6	13 31.2 75 61 132.0	2
3	15 29.4 74 64 128.9	15 07.4 74 64 129.2	14 45.3 74 63 129.6	14 23.2 74 63 129.9	14 01.0 74 63 130.3	13 38.9 74 62 130.6	13 16.7 74 62 130.9	12 54.4 74 62 131.3	3
4	14 50.9 73 65 128.1	14 29.1 73 64 128.5	14 07.2 73 64 128.8	13 45.3 73 64 129.2	13 23.3 73 63 129.5	13 01.4 73 63 129.9	12 39.4 73 63 130.2	12 17.3 73 62 130.6	4
55	14 12.1 72 65 127.4	13 50.4 72 65 127.8	13 28.7 72 65 128.1	13 07.0 72 64 128.5	12 45.3 73 64 128.9	12 23.5 73 64 129.2	12 01.7 73 63 129.6	11 39.8 73 63 129.9	55
6	13 32.9 72 66 126.7	13 11.4 72 66 127.1	12 49.9 72 65 127.5	12 28.4 72 65 127.8	12 06.8 72 65 128.2	11 45.2 72 64 128.5	11 23.6 72 64 128.9	11 01.9 72 64 129.2	6
7	12 53.3 71 66 126.1	12 32.0 71 66 126.4	12 10.7 71 66 126.8	11 49.4 71 66 127.1	11 28.0 71 65 127.5	11 06.6 71 65 127.8	10 45.1 71 65 128.2	10 23.7 72 64 128.6	7
8	12 13.4 70 67 125.4	11 52.3 70 67 125.7	11 31.2 71 66 126.1	11 10.0 71 66 126.5	10 48.8 71 66 126.8	10 27.6 71 66 127.2	10 06.3 71 65 127.5	9 45.1 71 65 127.9	8
9	11 33.2 70 68 124.7	11 12.3 70 67 125.1	10 51.3 70 67 125.4	10 30.3 70 67 125.8	10 09.3 70 66 126.2	9 48.3 70 66 126.5	9 27.2 70 66 126.9	9 06.1 70 66 127.2	9
60	10 52.6 69 68 124.0	10 31.9 69 68 124.4	10 11.1 69 68 124.8	9 50.3 69 67 125.1	9 29.4 69 67 125.5	9 08.6 70 67 125.9	8 47.7 70 66 126.2	8 26.8 70 66 126.6	60
1	10 11.7 69 69 123.4	9 51.2 69 68 123.7	9 30.5 69 68 124.1	9 09.9 69 68 124.5	8 49.3 69 68 124.8	8 28.6 69 67 125.2	8 07.9 69 67 125.6	7 47.2 69 67 125.9	1
2	9 30.5 68 69 122.7	9 10.1 68 69 123.1	8 49.7 68 69 123.5	8 29.2 68 68 123.8	8 08.8 68 68 124.2	7 48.3 68 68 124.6	7 27.8 68 67 124.9	7 07.2 68 67 125.3	2
3	8 49.0 67 70 122.1	8 28.8 67 70 122.5	8 08.5 68 69 122.8	7 48.3 68 69 123.2	7 28.0 68 68 123.6	7 07.7 68 68 123.9	6 47.3 68 68 124.3	6 27.0 68 68 124.7	3
4	8 07.3 67 70 121.4	7 47.2 67 70 121.8	7 27.1 67 70 122.2	7 07.0 67 69 122.6	6 46.9 67 69 122.9	6 26.7 67 69 123.3	6 06.6 67 68 123.7	5 46.4 67 68 124.1	4
65	7 25.2 66 71 120.8	7 05.3 66 70 121.2	6 45.4 66 70 121.6	6 25.4 66 70 121.9	6 05.5 67 69 122.3	5 45.5 67 69 122.7	5 25.5 67 69 123.1	5 05.5 67 69 123.4	65
6	6 42.8 66 71 120.2	6 23.1 66 71 120.6	6 03.4 66 70 120.9	5 43.6 66 70 121.3	5 23.8 66 70 121.7	5 04.0 66 70 122.1			6
7	6 00.2 65 71 119.6	5 40.6 65 71 120.0	5 21.1 65 71 120.3	5 01.5 65 71 120.7					7
8	5 17.3 65 72 119.0								8

Lat. 36°

Lat. 37°

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00' (Alt. Δd Δt / Az.)	20° 30'	21° 00'	21° 30'	22° 00'	22° 30'	23° 00'	23° 30'	H.A.
91	10 31.8 55 78 72.9	10 48.3 55 78 72.4	11 04.9 55 78 72.0	11 21.4 55 78 71.6	11 37.9 55 77 71.2	11 54.3 55 77 70.7	12 10.7 55 77 70.3	12 27.1 54 77 69.9	91
2	9 44.9 56 78 72.3	10 01.6 56 78 71.9	10 18.2 55 78 71.5	10 34.8 55 77 71.1	10 51.4 55 77 70.6	11 08.0 55 77 70.2	11 24.5 55 77 69.8	11 41.0 55 77 69.4	2
3	8 58.1 56 78 71.8	9 14.9 56 78 71.4	9 31.7 56 77 71.0	9 48.4 56 77 70.5	10 05.1 56 77 70.1	10 21.8 56 77 69.7	10 38.4 55 76 69.3	10 55.1 55 76 68.9	3
4	8 11.5 56 77 71.3	8 28.4 56 77 70.9	8 45.3 56 77 70.4	9 02.1 56 77 70.0	9 19.0 56 77 69.6	9 35.8 56 76 69.2	9 52.6 56 76 68.8	10 09.3 56 76 68.3	4
95	7 25.0 57 77 70.7	7 42.0 57 77 70.3	7 59.1 57 77 69.9	8 16.0 57 77 69.5	8 33.0 56 76 69.0	8 49.9 56 76 68.5	9 06.8 56 76 68.2	9 23.7 56 76 67.8	95
6	6 38.7 57 77 70.1	6 55.8 57 77 69.8	7 13.0 57 77 69.4	7 30.1 57 76 69.0	7 47.2 57 76 68.5	8 04.2 57 76 68.1	8 21.3 57 76 67.7	8 38.3 57 75 67.3	6
7	5 52.5 58 77 69.7	6 09.8 58 76 69.2	6 27.1 58 76 68.8	6 44.3 58 76 68.4	7 01.5 57 76 68.0	7 18.7 57 76 67.6	7 35.9 57 75 67.2	7 53.0 57 75 66.8	7
8	5 06.5 58 76 69.1	5 23.9 58 76 68.7	5 41.3 58 76 68.3	5 58.7 58 76 67.9	6 16.0 58 76 67.5	6 33.4 58 75 67.1	6 50.7 58 75 66.6	7 08.0 57 75 66.2	8
9				5 13.2 58 75 67.3	5 30.7 58 75 66.9	5 48.2 58 75 66.5	6 05.6 58 75 66.1	6 23.1 58 74 65.7	9
100					5 03.2 59 75 66.0	5 20.8 59 74 65.6	5 38.4 59 74 65.2		100

Lat. 38°

Lat. 35°

Each cell lists: Alt. (° ′), Δd, Δt, Az. (°)

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
00	79 00.0 1.0 03 180.0	79 30.0 1.0 04 180.0	80 00.0 1.0 04 180.0	80 30.0 1.0 04 180.0	81 00.0 1.0 04 180.0	81 30.0 1.0 04 180.0	82 00.0 1.0 05 180.0	82 30.0 1.0 05 180.0	00
1	78 57.9 1.0 10 175.2	79 27.9 1.0 11 175.0	79 57.8 1.0 11 174.8	80 27.7 1.0 12 174.3	80 57.5 1.0 12 174.0	81 27.4 1.0 13 174.0	81 57.3 99 14 173.2	82 27.1 99 14 173.2	1
2	78 51.8 99 17 170.5	79 21.5 99 18 170.1	79 51.1 99 18 169.7	80 20.7 99 19 169.2	80 50.2 98 20 168.6	81 19.7 98 21 168.0	81 49.1 98 22 167.4	82 18.5 98 23 166.6	2
3	78 41.8 98 23 165.9	79 11.0 97 24 165.3	79 40.2 97 25 164.7	80 09.3 97 26 164.0	80 38.3 96 27 163.2	81 07.1 96 29 162.3	81 35.9 96 30 161.4	82 04.5 95 32 160.3	3
4	78 27.9 96 29 161.4	78 56.6 95 30 160.7	79 25.2 95 31 159.9	79 53.6 95 33 159.0	80 21.9 94 34 158.0	80 50.0 93 35 156.9	81 17.9 93 37 155.7	81 45.6 92 39 154.4	4
05	78 10.5 94 35 157.1	78 38.6 93 36 156.3	79 06.4 93 37 155.3	79 34.1 92 38 154.2	80 01.6 91 40 153.1	80 28.8 90 42 151.9	80 55.7 89 43 150.5	81 22.2 88 45 149.0	05
6	77 49.8 91 40 153.1	78 17.1 91 41 152.1	78 44.4 90 42 151.0	79 11.0 89 44 149.8	79 37.6 88 45 148.5	80 03.8 87 47 147.2	80 29.7 86 49 145.7	80 55.1 84 51 144.0	6
7	77 26.1 89 44 149.2	77 52.6 88 45 148.1	78 18.9 87 47 147.0	78 44.8 86 48 145.7	79 10.4 85 50 144.3	79 35.6 83 52 142.9	80 00.4 82 54 141.3	80 24.7 80 55 139.5	7
8	76 59.6 86 48 145.6	77 25.3 85 50 144.4	77 50.7 84 51 143.2	78 15.8 83 53 141.9	78 40.4 81 54 140.4	79 04.6 80 56 138.9	79 28.3 78 57 137.3	79 51.5 76 59 135.5	8
9	76 30.6 84 52 142.2	76 55.5 82 53 141.0	77 20.1 81 55 139.7	77 44.2 80 56 138.3	78 07.9 78 58 136.9	78 31.1 77 59 135.3	78 53.8 75 61 133.6	79 15.9 73 63 131.8	9
10	75 59.5 81 55 139.1	76 23.6 80 57 137.8	76 47.2 78 58 136.5	77 10.5 77 59 135.1	77 33.3 75 61 133.6	77 55.6 73 62 132.0	78 17.3 71 64 130.3	78 38.4 69 65 128.6	10
1	75 26.3 78 58 136.1	75 49.6 77 59 134.8	76 12.5 76 61 133.5	76 34.9 74 62 132.1	76 56.8 72 63 130.6	77 18.3 70 66 129.0	77 39.0 67 67 127.4	77 59.1 66 68 125.6	1
2	74 51.4 76 61 133.4	75 13.9 74 62 132.1	75 36.0 73 63 130.7	75 57.6 71 64 129.3	76 18.7 69 66 127.8	76 39.3 67 67 126.3	76 59.2 65 68 124.6	77 18.5 63 70 122.9	2
3	74 14.9 73 63 130.8	74 36.7 72 64 129.5	74 58.1 70 65 128.2	75 18.9 69 67 126.8	75 39.3 67 68 125.3	75 59.0 65 69 123.8	76 18.2 63 70 122.2	76 36.7 61 71 120.5	3
4	73 37.0 71 65 128.4	73 58.2 70 66 127.1	74 18.8 68 67 125.8	74 39.0 66 68 124.4	74 58.6 64 70 123.0	75 17.6 63 71 121.5	75 36.1 60 72 119.9	75 53.9 58 73 118.3	4
15	72 57.9 69 67 126.2	73 18.4 67 68 124.9	73 38.4 66 69 123.6	73 57.9 64 70 122.3	74 16.9 62 71 120.8	74 35.2 60 72 119.4	74 53.0 58 73 117.8	75 10.2 56 74 116.2	15
6	72 17.7 67 69 124.1	72 37.6 65 70 122.6	72 57.0 64 70 121.6	73 15.9 62 71 120.2	73 34.2 60 72 118.8	73 52.0 58 73 117.4	74 09.2 56 74 115.9	74 25.7 54 75 114.4	6
7	71 36.6 65 70 122.2	71 55.9 64 71 120.9	72 14.7 62 72 119.7	72 33.0 60 73 118.4	72 50.8 58 74 117.0	73 08.0 56 74 115.6	73 24.6 54 75 114.2	73 40.7 52 76 112.7	7
8	70 54.5 63 71 120.3	71 13.3 62 72 119.1	71 31.6 60 73 117.9	71 49.4 58 74 116.6	72 06.7 57 75 115.3	72 23.4 55 75 113.9	72 39.5 53 76 112.5	72 55.0 51 77 111.1	8
9	70 11.8 62 72 118.6	70 30.0 60 73 117.4	70 47.8 59 74 116.2	71 05.1 57 75 115.0	71 21.9 55 75 113.7	71 38.2 53 76 112.4	71 53.9 51 77 111.0	72 09.0 49 78 109.6	9
20	69 28.3 60 73 117.0	69 46.1 59 74 115.8	70 03.4 57 75 114.7	70 20.3 55 76 113.4	70 36.7 54 76 112.2	70 52.5 52 77 110.9	71 07.8 50 78 109.5	71 22.5 48 78 108.2	20
1	68 44.2 59 74 115.5	69 01.6 57 75 114.3	69 18.5 56 75 113.2	69 35.0 54 76 112.0	69 50.9 52 77 110.8	70 06.4 51 78 109.5	70 21.3 49 78 108.2	70 35.6 47 79 106.9	1
2	67 59.6 57 75 114.0	68 16.6 56 76 112.9	68 33.1 54 76 111.8	68 49.2 53 77 110.6	69 04.8 51 78 109.4	69 19.9 49 78 108.2	69 34.4 48 79 107.0	69 48.4 47 79 105.7	2
3	67 14.4 56 76 112.7	67 31.1 55 76 111.6	67 47.3 53 77 110.5	68 03.0 52 78 109.4	68 18.3 50 78 108.2	68 33.0 48 79 107.0	68 47.3 47 79 105.8	69 01.0 45 79 104.6	3
4	66 28.9 55 77 111.4	66 45.2 54 77 110.3	67 01.0 52 78 109.2	67 16.5 51 78 108.1	67 31.4 49 79 107.0	67 45.9 47 79 105.9	67 59.8 46 79 104.7	68 13.3 44 80 103.5	4
25	65 42.9 54 77 110.2	65 58.9 53 78 109.1	66 14.5 51 78 108.1	66 29.6 50 79 107.0	66 44.3 48 79 105.9	66 58.5 47 79 104.8	67 12.2 45 80 103.6	67 25.4 43 80 102.5	25
6	64 56.6 53 78 109.0	65 12.3 52 78 108.0	65 27.6 50 79 106.9	65 42.5 49 79 105.9	65 56.9 47 79 104.8	66 10.8 46 80 103.7	66 23.4 44 80 102.6	66 37.3 43 80 101.5	6
7	64 10.0 52 78 107.9	64 25.4 51 79 106.9	64 40.5 49 79 105.9	64 55.1 48 80 104.8	65 09.3 47 80 103.8	65 23.0 45 80 102.7	65 36.3 44 80 101.7	65 49.1 42 81 100.6	7
8	63 23.1 51 79 106.8	63 38.5 50 79 105.8	63 53.1 49 79 104.8	64 07.5 47 80 103.8	64 21.4 46 80 102.8	64 35.0 44 80 101.8	64 48.1 43 81 100.7	65 00.7 41 81 99.7	8
9	62 35.9 51 79 105.8	62 50.9 49 79 104.8	63 05.4 48 80 103.9	63 19.6 47 80 102.8	63 33.4 45 80 101.9	63 46.8 44 81 100.9	63 59.7 42 81 99.9	64 12.2 41 81 98.8	9
30	61 48.5 50 79 104.8	62 03.2 49 80 103.9	62 17.6 47 80 102.9	62 31.3 46 80 102.0	62 45.2 45 81 101.0	62 58.4 43 81 100.0	63 11.2 42 81 99.0	63 23.6 40 81 98.0	30
1	61 00.9 49 80 103.8	61 15.4 48 80 102.9	61 29.6 47 80 102.0	61 43.5 45 81 101.1	61 56.9 44 81 100.1	62 10.0 43 81 99.2	62 22.6 41 81 98.2	62 34.9 40 81 97.2	1
2	60 13.0 49 80 102.9	60 27.5 47 80 102.0	60 41.5 46 80 101.1	60 55.2 45 81 100.2	61 08.5 44 81 99.3	61 21.4 42 81 98.4	61 33.9 41 81 97.4	61 46.1 40 81 96.5	2
3	59 25.1 48 80 102.1	59 39.3 47 80 101.2	59 53.2 46 81 100.3	60 06.8 44 81 99.4	60 19.9 43 81 98.5	60 32.7 42 81 97.6	60 45.2 41 81 96.7	60 57.2 39 82 95.7	3
4	58 36.9 48 80 101.2	58 51.0 46 81 100.4	59 04.8 45 81 99.5	59 18.2 44 81 98.6	59 31.3 43 81 97.7	59 44.0 41 81 96.8	59 56.3 40 82 95.9	60 08.3 39 82 95.0	4
35	57 48.6 47 81 100.4	58 02.6 46 81 99.6	58 16.3 45 81 98.7	58 29.6 44 81 97.9	58 42.5 43 82 97.0	58 55.1 41 82 96.1	59 07.4 40 82 95.2	59 19.3 39 82 94.3	35
6	57 00.2 47 81 99.6	57 14.1 46 81 98.8	57 27.6 45 81 97.9	57 40.8 43 82 97.1	57 53.7 42 82 96.3	58 06.2 41 82 95.4	58 18.4 40 82 94.5	58 30.2 39 82 93.6	6
7	56 11.7 46 81 98.8	56 25.5 45 81 98.0	56 38.9 44 82 97.2	56 52.0 43 82 96.4	57 04.8 42 82 95.6	57 17.3 41 82 94.7	57 29.4 40 82 93.9	57 41.2 39 82 93.0	7
8	55 23.1 46 81 98.1	55 36.8 45 81 97.3	55 50.1 44 81 96.5	56 03.2 43 82 95.7	56 15.9 42 82 94.9	56 28.3 41 82 94.0	56 40.3 40 82 93.2	56 52.1 39 82 92.4	8
9	54 34.4 46 81 97.3	54 48.0 45 81 96.6	55 01.2 44 82 95.8	55 14.2 43 82 95.0	55 26.9 42 82 94.2	55 39.2 41 82 93.4	55 51.3 40 82 92.6	56 03.0 38 82 91.8	9
40	53 45.6 45 82 96.6	53 59.1 45 82 95.9	54 12.3 44 82 95.1	54 25.2 43 82 94.3	54 37.8 42 82 93.5	54 50.2 41 82 92.8	55 02.2 40 82 92.0	55 13.8 38 82 91.2	40
1	52 56.8 45 82 95.9	53 10.2 44 82 95.2	53 23.3 44 82 94.4	53 36.2 42 82 93.7	53 48.8 41 82 92.9	54 01.0 40 82 92.1	54 13.0 39 82 91.4	54 24.7 38 82 90.6	1
2	52 07.8 45 82 95.3	52 21.2 44 82 94.5	52 34.3 43 82 93.8	52 47.1 42 82 93.0	52 59.7 41 82 92.3	53 11.9 40 82 91.5	53 23.9 39 82 90.8	53 35.5 38 82 90.0	2
3	51 18.9 45 82 94.6	51 32.2 44 82 93.9	51 45.3 43 82 93.1	51 58.0 42 82 92.4	52 10.6 41 82 91.7	52 22.8 40 82 90.9	52 34.7 39 82 90.2	52 46.4 38 82 89.4	3
4	50 29.9 45 82 93.9	50 43.1 44 82 93.2	50 56.2 43 82 92.5	51 08.8 42 82 91.8	51 21.4 41 82 91.1	51 33.6 40 82 90.3	51 45.5 39 82 89.6	51 57.2 38 82 88.9	4
45	49 40.8 45 82 93.3	49 54.1 44 82 92.6	50 07.1 43 82 91.9	50 19.8 42 82 91.2	50 32.3 41 82 90.5	50 44.5 40 82 89.8	50 56.4 39 82 89.0	51 08.1 38 82 88.3	45
6	48 51.7 44 82 92.7	49 05.0 44 82 92.0	49 17.9 43 82 91.3	49 30.7 42 82 90.6	49 43.1 41 82 89.9	49 55.3 40 82 89.2	50 07.3 39 82 88.5	50 19.0 38 82 87.8	6
7	48 02.6 44 82 92.1	48 15.8 44 82 91.4	48 28.8 43 82 90.7	48 41.5 42 82 90.0	48 54.0 41 82 89.3	49 06.2 40 82 88.6	49 18.2 39 82 87.9	49 29.9 38 82 87.2	7
8	47 13.5 44 82 91.5	47 26.7 44 82 90.8	47 39.6 43 82 90.1	47 52.4 42 82 89.5	48 04.8 41 82 88.8	48 17.1 40 82 88.1	48 29.1 40 82 87.4	48 40.8 39 82 86.7	8
9	46 24.4 44 82 90.9	46 37.6 44 82 90.2	46 50.5 43 82 89.6	47 03.2 42 82 88.9	47 15.7 41 82 88.2	47 28.0 40 82 87.6	47 40.0 40 82 86.9	47 51.6 38 82 86.2	9
50	45 35.2 44 82 90.3	45 48.4 44 82 89.7	46 01.3 43 82 89.0	46 14.1 42 82 88.4	46 26.4 41 82 87.7	46 38.9 41 82 87.0	46 50.9 40 82 86.4	47 02.7 39 82 85.7	50
1	44 46.1 44 82 89.7	44 59.2 44 82 89.1	45 12.2 43 82 88.5	45 25.0 42 82 87.8	45 37.5 42 82 87.2	45 49.8 40 82 86.5	46 01.9 40 82 85.8	46 13.7 39 82 85.2	1
2	43 56.9 44 82 89.2	44 10.1 44 82 88.5	44 23.1 43 82 87.9	44 35.9 42 82 87.3	44 48.4 42 82 86.6	45 00.8 41 82 86.0	45 12.9 40 82 85.3	45 24.8 39 82 84.7	2
3	43 07.8 44 82 88.6	43 21.0 44 82 88.0	43 34.0 43 82 87.4	43 46.8 42 82 86.7	43 59.4 42 82 86.1	44 11.7 41 82 85.5	44 23.9 40 82 84.8	44 35.9 39 81 84.2	3
4	42 18.7 44 82 88.0	42 31.9 44 82 87.4	42 44.9 43 82 86.8	42 57.7 42 82 86.2	43 10.3 42 82 85.5	43 22.6 41 82 85.0	43 35.0 40 82 84.3	43 47.0 39 81 83.7	4
55	41 29.5 44 82 87.5	41 42.8 44 82 86.9	41 55.8 43 82 86.3	42 08.7 43 82 85.7	42 21.4 42 82 85.1	42 33.8 41 82 84.5	42 46.1 41 81 83.8	42 58.2 40 81 83.2	55
6	40 40.5 45 82 87.0	40 53.7 44 82 86.4	41 06.8 43 82 85.8	41 19.7 43 82 85.2	41 32.4 42 82 84.6	41 44.9 41 82 84.0	41 57.3 41 81 83.4	42 09.4 40 81 82.7	6
7	39 51.4 45 82 86.4	40 04.7 44 82 85.8	40 17.8 43 82 85.3	40 30.7 43 82 84.7	40 43.5 42 81 84.1	40 56.1 42 81 83.5	41 08.5 41 81 82.9	41 20.7 40 81 82.3	7
8	39 02.3 45 82 85.9	39 15.7 44 82 85.3	39 28.8 44 82 84.7	39 41.8 43 81 84.2	39 54.6 42 81 83.6	40 07.3 42 81 83.0	40 19.7 41 81 82.4	40 32.0 41 81 81.8	8
9	38 13.3 45 82 85.4	38 26.7 44 82 84.8	38 39.9 44 81 84.2	38 53.0 43 81 83.7	39 05.8 43 81 83.1	39 18.5 42 81 82.5	39 31.0 41 81 81.9	39 43.4 41 81 81.3	9
60	37 24.4 45 82 84.9	37 37.8 44 81 84.3	37 51.0 44 81 83.7	38 04.1 43 81 83.2	38 17.1 43 81 82.6	38 29.8 42 81 82.0	38 42.4 42 81 81.4	38 54.8 41 81 80.8	60
1	36 35.4 45 81 84.3	36 48.9 45 81 83.8	37 02.2 44 81 83.2	37 15.4 44 81 82.7	37 28.3 43 81 82.1	37 41.2 42 81 81.5	37 53.8 42 81 81.0	38 06.3 41 81 80.4	1
2	35 46.6 45 81 83.8	36 00.1 45 81 83.3	36 13.4 44 81 82.7	36 26.6 44 81 82.2	36 39.7 43 81 81.6	36 52.6 43 81 81.0	37 05.3 42 81 80.5	37 17.9 42 81 79.9	2
3	34 57.7 45 81 83.3	35 11.3 45 81 82.8	35 24.7 44 81 82.2	35 38.0 44 81 81.7	35 51.1 43 81 81.1	36 04.1 43 81 80.6	36 16.9 42 81 80.0	36 29.5 42 80 79.4	3
4	34 08.9 46 81 82.8	34 22.5 45 81 82.3	34 36.0 45 81 81.7	34 49.4 44 81 81.2	35 02.6 44 81 80.6	35 15.6 43 81 80.1	35 28.5 43 80 79.5	35 41.3 42 80 79.0	4
65	33 20.2 46 81 82.3	33 33.9 45 81 81.8	33 47.4 45 81 81.2	34 00.8 44 81 80.7	34 14.1 44 81 80.2	34 27.2 44 80 79.6	34 40.2 43 80 79.1	34 53.1 43 80 78.5	65
6	32 31.5 46 81 81.8	32 45.3 45 81 81.3	32 58.9 45 81 80.8	33 12.4 45 81 80.2	33 25.7 44 81 79.7	33 38.9 44 80 79.1	33 52.0 43 80 78.6	34 04.9 43 80 78.1	6
7	31 42.9 46 81 81.3	31 56.7 46 81 80.8	32 10.4 45 81 80.3	32 24.0 45 81 79.7	32 37.4 45 81 79.2	32 50.7 44 80 78.7	33 03.9 44 80 78.1	33 16.9 43 80 77.6	7
8	30 54.3 47 81 80.8	31 08.2 46 81 80.3	31 22.0 46 81 79.8	31 35.6 45 81 79.3	31 49.2 45 80 78.7	32 02.5 44 80 78.2	32 15.8 44 80 77.7	32 28.9 44 80 77.1	8
9	30 05.9 47 81 80.3	30 19.8 46 81 79.8	30 33.7 46 80 79.3	30 47.4 46 80 78.8	31 01.0 45 80 78.3	31 14.5 45 80 77.7	31 27.8 44 80 77.2	31 41.1 44 80 76.7	9
70	29 17.4 47 81 79.8	29 31.5 47 80 79.3	29 45.4 46 80 78.8	29 59.2 46 80 78.3	30 12.9 46 80 77.8	30 26.5 45 80 77.3	30 39.9 45 80 76.8	30 53.3 44 79 76.2	70
1	28 29.1 47 80 79.3	28 43.2 47 80 78.8	28 57.2 47 80 78.3	29 11.1 46 80 77.8	29 24.9 46 80 77.3	29 38.6 45 80 76.8	29 52.1 45 79 76.3	30 05.6 45 79 75.8	1
2	27 40.8 48 80 78.8	27 55.0 47 80 78.4	28 09.1 47 80 77.9	28 23.1 47 80 77.3	28 37.0 46 80 76.8	28 50.8 46 80 76.3	29 04.4 45 79 75.8	29 18.0 45 79 75.3	2
3	26 52.7 48 80 78.4	27 07.0 47 80 77.9	27 21.1 47 80 77.4	27 35.2 47 80 76.9	27 49.2 46 80 76.4	28 03.1 46 79 75.9	28 16.8 46 79 75.4	28 30.5 45 79 74.9	3
4	26 04.6 48 80 77.9	26 18.9 48 80 77.4	26 33.2 47 80 76.9	26 47.4 47 80 76.4	27 01.5 47 79 75.9	27 15.5 46 79 75.4	27 29.3 46 79 74.9	27 43.1 46 79 74.4	4
75	25 16.6 48 80 77.4	25 31.0 48 80 76.9	25 45.4 48 80 76.4	25 59.7 47 79 75.9	26 13.9 47 79 75.4	26 28.0 47 79 74.9	26 41.9 46 78 74.4	26 55.8 46 78 73.9	75
6	24 28.6 49 80 76.9	24 43.2 48 80 76.4	24 57.7 48 79 75.9	25 12.1 48 79 75.4	25 26.4 47 79 75.0	25 40.5 47 79 74.5	25 54.6 47 78 74.0	26 08.6 46 78 73.5	6
7	23 40.8 49 80 76.4	23 55.5 49 79 75.9	24 10.1 48 79 75.4	24 24.5 48 79 75.0	24 38.9 48 79 74.5	24 53.2 47 79 74.0	25 07.5 47 78 73.5	25 21.6 47 78 73.0	7
8	22 52.9 49 80 75.9	23 07.9 49 79 75.4	23 22.4 49 79 75.0	23 36.8 48 79 74.5	23 51.2 48 79 74.0	24 05.6 48 78 73.5	24 20.4 47 78 73.0	24 34.4 47 78 72.5	8
9	22 05.5 50 79 75.4	22 20.3 49 79 75.0	22 35.1 49 79 74.5	22 49.8 49 79 74.0	23 04.4 48 78 73.5	23 19.0 48 78 73.1	23 33.4 47 78 72.6	23 47.8 47 78 72.1	9
80	21 18.0 50 79 74.9	21 32.9 50 79 74.5	21 47.8 50 79 74.0	22 02.6 49 79 73.5	22 17.4 49 79 73.1	22 32.0 49 78 72.6	22 46.6 48 78 72.1	23 01.1 48 78 71.6	80
1	20 30.6 50 79 74.4	20 45.6 50 79 74.0	21 00.6 50 79 73.5	21 15.6 50 78 73.1	21 30.4 49 78 72.6	21 45.2 49 78 72.1	21 59.9 49 78 71.6	22 14.5 48 77 71.2	1
2	19 43.3 51 79 74.0	19 58.5 51 78 73.5	20 13.6 50 78 73.0	20 28.6 50 78 72.6	20 43.6 50 78 72.1	20 58.5 50 78 71.6	21 13.3 49 77 71.2	21 28.0 49 77 70.7	2
3	18 56.1 51 79 73.5	19 11.4 51 78 73.0	19 26.6 51 78 72.5	19 41.8 50 78 72.1	19 56.9 50 78 71.6	20 11.9 50 78 71.2	20 26.8 50 77 70.7	20 41.7 49 77 70.2	3
4	18 09.0 51 78 73.0	18 24.5 51 78 72.5	18 39.8 51 78 72.1	18 55.1 51 78 71.6	19 10.3 51 77 71.1	19 25.4 50 77 70.7	19 40.5 50 77 70.2	19 55.5 49 77 69.8	4
85	17 22.1 52 78 72.5	17 37.6 52 78 72.0	17 53.1 51 78 71.6	18 08.5 51 77 71.1	18 23.9 51 77 70.7	18 39.1 51 77 70.2	18 54.3 51 77 69.8	19 09.5 50 76 69.3	85
6	16 35.3 52 78 72.0	16 51.0 52 78 71.5	17 06.5 52 77 71.1	17 22.1 51 77 70.6	17 37.5 51 77 70.2	17 53.0 51 77 69.7	18 08.3 51 76 69.3	18 23.6 51 76 68.8	6
7	15 48.6 53 78 71.5	16 04.4 52 77 71.0	16 20.1 52 77 70.6	16 35.8 52 77 70.1	16 51.4 52 77 69.7	17 06.9 52 76 69.2	17 22.4 52 76 68.8	17 37.8 51 76 68.8	7
8	15 02.1 53 78 71.0	15 18.0 53 77 70.5	15 33.8 53 77 70.1	15 49.7 52 76 69.6	16 05.4 52 76 69.2	16 21.0 52 76 68.8	16 36.7 52 76 68.3	16 52.2 52 75 67.9	8
9	14 15.7 53 77 70.5	14 31.7 53 77 70.0	14 47.7 53 77 69.6	15 03.6 53 76 69.2	15 19.5 53 76 68.7	15 35.3 53 76 68.3	15 51.1 52 76 67.8	16 06.8 52 75 67.4	9
90	13 29.5 54 77 70.0	13 45.6 54 77 69.5	14 01.7 54 76 69.1	14 17.8 53 76 68.7	14 33.8 53 76 68.2	14 49.7 53 76 67.8	15 05.6 53 75 67.3	15 21.5 53 75 66.9	90

Lat. 35°

Each cell: Alt (° ′)   Δd Δt   Az (°)

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
00	31 00.0 1.0 01 180.0	30 30.0 1.0 01 180.0	30 00.0 1.0 01 180.0	29 30.0 1.0 01 180.0	29 00.0 1.0 01 180.0	28 30.0 1.0 01 180.0	28 00.0 1.0 01 180.0	27 30.0 1.0 01 180.0	00
1	30 59.5 1.0 02 178.9	30 29.5 1.0 02 178.9	29 59.6 1.0 02 179.0	29 29.6 1.0 02 179.0	28 59.6 1.0 02 179.0	28 29.6 1.0 02 179.0	27 59.6 1.0 02 179.0	27 29.6 1.0 02 179.0	1
2	30 58.2 1.0 04 177.9	30 28.2 1.0 04 177.9	29 58.2 1.0 04 177.9	29 28.2 1.0 04 177.9	28 58.2 1.0 04 177.9	28 28.3 1.0 04 178.0	27 58.3 1.0 04 178.0	27 28.3 1.0 04 178.0	2
3	30 55.9 1.0 05 176.8	30 25.9 1.0 05 176.8	29 56.0 1.0 05 176.9	29 26.0 1.0 05 176.9	28 56.0 1.0 05 176.9	28 26.1 1.0 05 176.9	27 56.1 1.0 05 177.0	27 26.1 1.0 05 177.0	3
4	30 52.7 1.0 07 175.7	30 22.8 1.0 07 175.8	29 52.8 1.0 07 175.8	29 22.9 1.0 07 175.9	28 53.0 1.0 07 175.9	28 23.0 1.0 07 175.9	27 53.1 1.0 06 176.0	27 23.1 1.0 06 176.0	4
05	30 48.6 1.0 08 174.7	30 18.7 1.0 08 174.7	29 48.8 1.0 08 174.8	29 18.9 1.0 08 174.8	28 49.0 1.0 08 174.9	28 19.1 1.0 08 174.9	27 49.2 1.0 08 175.0	27 19.3 1.0 08 175.0	05
6	30 43.6 1.0 10 173.6	30 13.7 1.0 10 173.7	29 43.9 1.0 10 173.7	29 14.0 1.0 10 173.8	28 44.2 1.0 10 173.9	28 14.3 1.0 09 173.9	27 44.5 1.0 09 174.0	27 14.6 1.0 09 174.0	6
7	30 37.7 99 11 172.6	30 07.9 99 11 172.6	29 38.1 99 11 172.7	29 08.3 99 11 172.8	28 38.5 99 11 172.8	28 08.7 99 11 172.9	27 38.9 99 11 173.0	27 09.0 99 11 173.0	7
8	30 30.9 99 13 171.5	30 01.1 99 13 171.6	29 31.4 99 13 171.7	29 01.6 99 12 171.7	28 31.9 99 12 171.8	28 02.2 99 12 171.9	27 32.4 99 12 172.0	27 02.7 99 12 172.0	8
9	30 23.2 99 14 170.5	29 53.5 99 14 170.5	29 23.8 99 14 170.6	28 54.2 99 14 170.7	28 24.5 99 14 170.8	27 54.8 99 14 170.9	27 25.1 99 14 171.0	26 55.4 99 13 171.0	9
10	30 14.6 99 16 169.4	29 45.0 99 16 169.5	29 15.4 99 16 169.6	28 45.8 99 15 169.7	28 16.2 99 15 169.8	27 46.6 99 15 169.9	27 17.0 99 15 170.0	26 47.4 99 15 170.1	10
1	30 05.1 98 17 168.4	29 35.6 98 17 168.5	29 06.1 98 17 168.7	28 36.6 98 17 168.7	28 07.1 98 17 168.8	27 37.5 98 16 168.9	27 08.0 98 16 169.0	26 38.5 98 16 169.1	1
2	29 54.8 98 19 167.3	29 25.4 98 18 167.5	28 55.9 98 18 167.6	28 26.5 98 18 167.7	27 57.1 98 18 167.8	27 27.6 98 18 167.9	26 58.2 98 18 168.0	26 28.7 98 18 168.1	2
3	29 43.6 98 20 166.3	29 14.3 98 20 166.4	28 44.9 98 20 166.6	28 15.6 98 20 166.7	27 46.3 98 19 166.8	27 16.9 98 19 166.9	26 47.6 98 19 167.0	26 18.2 98 19 167.1	3
4	29 31.5 97 22 165.3	29 02.3 97 21 165.4	28 33.1 97 21 165.5	28 03.9 97 21 165.7	27 34.6 97 21 165.8	27 05.4 97 21 165.9	26 36.1 98 20 166.1	26 06.9 98 20 166.2	4
15	29 18.6 97 23 164.3	28 49.5 97 23 164.4	28 20.4 97 23 164.5	27 51.3 97 22 164.7	27 22.2 97 22 164.8	26 53.0 97 22 164.9	26 23.9 97 22 165.1	25 54.7 97 22 165.2	15
6	29 04.9 97 24 163.3	28 35.9 97 24 163.5	28 06.9 97 24 163.7	27 37.9 97 24 163.7	27 08.9 97 23 163.8	26 39.8 97 23 164.0	26 10.8 97 23 164.1	25 41.8 97 23 164.3	6
7	28 50.3 96 25 162.2	28 21.4 96 25 162.4	27 52.6 96 25 162.6	27 23.7 96 25 162.7	26 54.8 96 25 162.9	26 25.9 96 25 163.0	25 57.0 96 24 163.2	25 28.1 96 24 163.3	7
8	28 34.9 96 27 161.2	28 06.2 96 27 161.4	27 37.4 96 27 161.6	27 08.7 96 26 161.7	26 39.9 96 26 161.9	26 11.1 96 26 162.1	25 42.3 96 26 162.2	25 13.5 96 25 162.4	8
9	28 18.7 95 28 160.3	27 50.1 95 28 160.4	27 21.5 95 28 160.6	26 52.9 95 28 160.8	26 24.2 95 27 160.9	25 55.6 96 27 161.1	25 26.9 96 27 161.3	24 58.3 96 27 161.4	9
20	28 01.7 95 30 159.4	27 33.2 95 29 159.6	27 04.8 95 29 159.6	26 36.3 95 29 159.8	26 07.8 95 29 160.0	25 39.3 95 28 160.2	25 10.8 95 28 160.3	24 42.2 95 28 160.5	20
1	27 43.9 94 31 158.3	27 15.6 94 31 158.5	26 47.3 94 30 158.7	26 18.9 94 30 158.8	25 50.6 95 30 159.0	25 22.2 95 30 159.2	24 53.8 95 29 159.4	24 25.4 95 29 159.6	1
2	27 25.3 94 32 157.3	26 57.2 94 32 157.5	26 29.0 94 32 157.7	26 00.8 94 31 157.9	25 32.6 94 31 158.1	25 04.4 94 31 158.3	24 36.2 94 31 158.5	24 07.9 94 30 158.6	2
3	27 06.0 93 33 156.4	26 38.0 93 33 156.6	26 10.0 93 33 156.8	25 42.0 93 33 157.0	25 13.9 94 32 157.2	24 45.8 94 32 157.4	24 17.8 94 32 157.5	23 49.7 94 32 157.7	3
4	26 45.9 93 35 155.4	26 18.1 93 34 155.6	25 50.2 93 34 155.8	25 22.4 93 34 156.0	24 54.5 93 34 156.2	24 26.6 93 33 156.4	23 58.6 93 33 156.6	23 30.7 93 33 156.8	4
25	26 25.1 92 36 154.5	25 57.4 92 36 154.7	25 29.7 92 35 154.9	25 02.0 92 35 155.1	24 34.3 92 35 155.3	24 06.5 93 35 155.5	23 38.8 93 34 155.7	23 11.0 93 34 155.9	25
6	26 03.6 92 37 153.5	25 36.1 92 37 153.7	25 08.5 92 37 154.0	24 41.0 92 36 154.2	24 13.4 92 36 154.4	23 45.8 92 36 154.6	23 18.2 92 35 154.8	22 50.6 92 35 155.0	6
7	25 41.3 91 38 152.6	25 14.0 91 38 152.8	24 46.6 91 38 153.1	24 19.2 91 37 153.3	23 51.8 91 37 153.5	23 24.4 91 37 153.7	22 57.0 91 37 153.9	22 29.5 92 36 154.2	7
8	25 18.3 91 39 151.7	24 51.2 91 39 151.9	24 24.0 91 39 152.1	23 56.8 91 39 152.4	23 29.6 91 38 152.6	23 02.3 91 38 152.8	22 35.0 91 38 153.1	22 07.8 91 37 153.3	8
9	24 54.7 90 41 150.8	24 27.7 90 40 151.0	24 00.7 90 40 151.2	23 33.7 90 40 151.5	23 06.6 90 39 151.7	22 39.5 90 39 152.0	22 12.4 90 39 152.2	21 45.3 90 38 152.4	9
30	24 30.3 89 42 149.9	24 03.5 89 41 150.4	23 36.7 89 41 150.4	23 09.9 90 41 150.6	22 43.0 90 40 150.8	22 16.1 90 40 151.1	21 49.2 90 40 151.3	21 22.3 90 40 151.6	30
1	24 05.3 89 43 149.0	23 38.7 89 42 149.2	23 12.1 89 42 149.5	22 45.4 89 42 149.7	22 18.7 89 41 150.0	21 52.0 89 41 150.2	21 25.3 89 41 150.5	20 58.5 89 41 150.7	1
2	23 39.7 88 44 148.1	23 13.2 88 44 148.4	22 46.8 88 43 148.6	22 20.3 88 43 148.9	21 53.8 88 43 149.1	21 27.3 88 42 149.4	21 00.7 89 42 149.6	20 34.2 89 42 149.9	2
3	23 13.4 87 45 147.2	22 47.1 88 45 147.5	22 20.9 88 44 147.7	21 54.6 88 44 148.0	21 28.3 88 44 148.3	21 01.9 88 43 148.5	20 35.6 88 43 148.8	20 09.2 88 43 149.0	3
4	22 46.5 87 46 146.4	22 20.4 87 46 146.6	21 54.3 87 45 146.9	21 28.2 87 45 147.2	21 02.1 87 45 147.4	20 36.0 87 44 147.7	20 09.8 87 44 147.9	19 43.6 87 44 148.2	4
35	22 18.9 86 47 145.5	21 53.1 86 47 145.8	21 27.2 86 46 146.0	21 01.3 86 46 146.3	20 35.3 86 46 146.6	20 09.4 87 45 146.9	19 43.4 87 45 147.1	19 17.4 87 45 147.4	35
6	21 50.8 85 48 144.7	21 25.1 86 48 144.9	20 59.4 86 47 145.2	20 33.7 86 47 145.5	20 08.0 86 47 145.8	19 42.2 86 46 146.0	19 16.4 86 46 146.3	18 50.6 86 46 146.6	6
7	21 22.1 85 49 143.8	20 56.6 85 48 144.1	20 31.1 85 48 144.4	20 05.6 85 48 144.7	19 40.0 85 48 144.9	19 14.5 85 47 145.2	18 48.9 85 47 145.5	18 23.2 85 47 145.8	7
8	20 52.8 84 50 143.0	20 27.5 84 49 143.3	20 02.2 84 49 143.6	19 36.9 84 49 143.8	19 11.5 85 48 144.1	18 46.1 85 48 144.4	18 21.1 85 47 145.0	17 55.3 85 47 145.0	8
9	20 22.9 84 51 142.2	19 57.8 84 50 142.5	19 32.7 84 50 142.8	19 07.6 84 50 143.0	18 42.4 84 49 143.3	18 17.3 84 49 143.6	17 52.1 84 49 143.9	17 26.8 84 48 144.2	9
40	19 52.5 83 52 141.4	19 27.6 83 51 141.7	19 02.7 83 51 142.0	18 37.8 83 51 142.2	18 12.8 83 50 142.5	17 47.8 83 50 142.8	17 22.8 83 50 143.1	16 57.8 83 49 143.4	40
1	19 21.5 82 52 140.6	18 56.8 82 52 140.9	18 32.1 82 52 141.2	18 07.4 82 51 141.5	17 42.7 83 51 141.8	17 17.9 83 51 142.1	16 53.1 83 50 142.3	16 28.2 83 50 142.6	1
2	18 50.0 82 53 139.8	18 25.6 82 53 140.1	18 01.1 82 53 140.4	17 36.5 82 52 140.7	17 12.0 82 52 141.0	16 47.4 82 52 141.3	16 22.8 82 51 141.6	15 58.1 82 51 141.9	2
3	18 18.0 81 54 139.0	17 53.8 81 54 139.3	17 29.5 81 54 139.6	17 05.1 81 53 139.9	16 40.8 81 53 140.2	16 16.4 81 52 140.5	15 51.9 82 52 140.8	15 27.5 82 52 141.1	3
4	17 45.5 80 55 138.2	17 21.5 80 55 138.5	16 57.4 80 54 138.8	16 33.2 80 54 139.1	16 09.1 81 54 139.5	15 44.9 81 53 139.8	15 20.7 81 53 140.1	14 56.5 81 53 140.4	4
45	17 12.5 80 56 137.4	16 48.7 80 55 137.8	16 24.8 80 55 138.1	16 00.8 80 55 138.4	15 36.9 80 54 138.7	15 12.9 80 54 139.0	14 48.9 80 54 139.3	14 24.9 80 53 139.6	45
6	16 39.1 79 56 136.7	16 15.4 79 56 137.0	15 51.7 79 56 137.3	15 28.0 79 56 137.6	15 04.2 79 55 138.0	14 40.4 79 55 138.3	14 16.6 79 55 138.6	13 52.8 79 54 138.9	6
7	16 05.1 78 57 135.9	15 41.6 78 57 136.3	15 18.1 78 57 136.6	14 54.6 78 56 136.9	14 31.1 79 56 137.2	14 07.5 79 56 137.6	13 43.9 79 55 137.9	13 20.3 79 55 138.2	7
8	15 30.7 78 58 135.0	15 07.4 78 58 135.5	14 44.1 78 57 135.9	14 20.8 78 57 136.2	13 57.5 78 57 136.5	13 34.1 78 56 136.8	13 10.7 78 56 137.2	12 47.3 78 56 137.5	8
9	14 55.9 77 59 134.5	14 32.8 77 58 134.8	14 09.7 77 58 135.1	13 46.6 77 58 135.5	13 23.4 77 57 135.8	13 00.2 77 57 136.1	12 37.0 77 57 136.4	12 13.8 77 56 136.8	9
50	14 20.6 76 60 133.8	13 57.7 76 59 134.1	13 34.8 76 59 134.4	13 11.9 76 59 134.8	12 48.9 77 58 135.1	12 26.0 77 58 135.4	12 03.0 77 58 135.7	11 39.9 77 57 136.1	50
1	13 44.9 76 60 133.0	13 22.2 76 60 133.4	12 59.5 76 59 133.7	12 36.8 76 59 134.0	12 14.0 76 59 134.4	11 51.2 76 59 134.7	11 28.4 76 58 135.0	11 05.6 76 58 135.4	1
2	13 08.7 75 61 132.3	12 46.3 75 61 132.7	12 23.8 75 60 133.0	12 01.2 75 60 133.3	11 38.7 76 60 133.7	11 16.1 76 59 134.0	10 53.5 76 59 134.4	10 30.9 76 59 134.7	2
3	12 32.2 74 62 131.6	12 09.9 74 61 132.0	11 47.6 74 61 132.3	11 25.3 74 61 132.7	11 02.9 75 60 133.0	10 40.6 75 60 133.3	10 18.2 75 60 133.7	9 55.7 75 59 134.0	3
4	11 55.3 74 62 130.9	11 33.2 74 62 131.3	11 11.1 74 62 131.6	10 48.9 74 61 132.0	10 26.8 74 61 132.3	10 04.6 74 61 132.7	9 42.4 74 60 133.0	9 20.2 74 60 133.3	4
55	11 17.9 73 63 130.3	10 56.1 73 62 130.6	10 34.1 73 62 131.0	10 12.2 73 62 131.3	9 50.3 73 62 131.6	9 28.3 73 61 132.0	9 06.3 73 61 132.3	8 44.3 73 61 132.7	55
6	10 40.3 72 63 129.6	10 18.6 72 63 129.9	9 56.8 72 63 130.3	9 35.1 73 62 130.6	9 13.3 73 62 131.0	8 51.6 73 62 131.3	8 29.8 73 61 131.7	8 07.9 73 61 132.0	6
7	10 02.2 72 64 128.9	9 40.7 72 64 129.3	9 19.2 72 63 129.6	8 57.6 72 63 130.0	8 36.1 72 63 130.3	8 14.5 72 62 130.7	7 52.9 72 62 131.1	7 31.2 72 62 131.4	7
8	9 23.8 71 65 128.3	9 02.5 71 64 128.6	8 41.1 71 64 129.0	8 19.8 71 64 129.3	7 58.4 71 63 129.7	7 37.0 71 63 130.0	7 15.6 71 63 130.4	6 54.2 71 62 130.8	8
9	8 45.0 70 65 127.6	8 23.9 70 65 128.0	8 02.7 71 65 128.3	7 41.6 71 64 128.7	7 20.4 71 64 129.0	6 59.2 71 64 129.4	6 38.0 71 63 129.7	6 16.8 71 63 130.1	9
60	8 05.9 70 66 127.0	7 45.0 70 65 127.3	7 24.0 70 65 127.7	7 03.0 70 65 128.0	6 42.0 70 64 128.4	6 21.0 70 64 128.8	6 00.0 70 64 129.1	5 39.0 70 64 129.5	60
1	7 26.5 69 66 126.3	7 05.7 69 66 126.7	6 44.9 69 66 127.0	6 24.2 69 65 127.4	6 03.4 69 65 127.8	5 42.6 69 65 128.1	5 21.7 69 64 128.5	5 00.9 69 64 128.9	1
2	6 46.7 68 67 125.7	6 26.1 69 66 126.0	6 05.5 69 66 126.4	5 45.0 69 66 126.8	5 24.3 69 66 127.1	5 03.7 69 65 127.5			2
3	6 06.6 68 67 125.1	5 46.2 68 67 125.4	5 25.8 68 67 125.8	5 05.4 68 66 126.2					3
4	5 26.2 67 68 124.4	5 06.0 67 68 124.8							4

Lat. 36°

DECLINATION **SAME** NAME AS LATITUDE

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
91	12 43.4 54 77 69.5	12 59.6 54 76 69.0	13 15.9 54 76 68.6	13 32.1 54 76 68.2	13 48.2 54 76 67.7	14 04.4 54 76 67.3	14 20.3 53 75 66.9	14 36.3 53 75 66.4	91
2	11 57.4 55 76 68.9	12 13.8 55 76 68.5	12 30.2 54 76 68.1	12 46.5 54 76 67.7	13 02.8 54 75 67.2	13 19.0 54 75 66.8	13 35.2 54 75 66.4	13 51.4 54 75 65.9	2
3	11 11.6 55 76 68.4	11 28.2 55 76 68.0	11 44.7 55 76 67.6	12 01.1 55 75 67.2	12 17.6 55 75 66.7	12 34.0 54 75 66.3	12 50.3 54 75 65.9	13 06.6 54 74 65.4	3
4	10 26.0 56 76 67.9	10 42.7 56 76 67.5	10 59.3 55 75 67.1	11 15.9 55 75 66.6	11 32.5 55 75 66.2	11 49.0 55 75 65.8	12 05.5 54 74 65.4	12 22.0 54 74 64.9	4
95	9 40.5 56 75 67.4	9 57.4 56 75 67.0	10 14.1 56 75 66.6	10 30.9 56 75 66.1	10 47.6 56 75 65.7	11 04.3 56 74 65.3	11 20.9 55 74 64.9	11 37.6 55 74 64.4	95
6	8 55.3 57 75 66.9	9 12.2 56 75 66.5	9 29.1 56 75 66.0	9 46.0 56 75 65.6	10 02.9 56 74 65.2	10 19.7 56 74 64.8	10 36.5 56 74 64.4	10 53.3 56 73 63.9	6
7	8 10.1 57 75 66.4	8 27.2 57 75 65.9	8 44.3 57 74 65.5	9 01.4 57 74 65.1	9 18.4 57 74 64.7	9 35.4 57 74 64.3	9 52.3 56 73 63.9	10 09.3 56 73 63.4	7
8	7 25.2 58 75 65.8	7 42.5 57 74 65.4	7 59.7 57 74 65.0	8 16.9 57 74 64.6	8 34.0 57 74 64.2	8 51.2 57 73 63.8	9 08.3 57 73 63.3	9 25.4 57 73 62.9	8
9	6 40.5 58 74 65.3	6 57.9 58 74 64.9	7 15.2 58 74 64.5	7 32.6 58 74 64.1	7 49.9 58 73 63.6	8 07.2 58 73 63.2	8 24.5 57 72 62.8	8 41.7 57 72 62.4	9
100	5 55.9 58 74 64.8	6 13.5 58 74 64.3	6 31.0 58 73 63.9	6 48.5 58 73 63.5	7 06.0 58 73 63.1	7 23.4 58 73 62.7	7 40.9 58 72 62.3	7 58.3 58 72 61.9	100
1	5 11.6 59 74 64.2	5 29.3 59 73 63.8	5 46.9 59 73 63.4	6 04.6 59 73 63.0	6 22.2 59 73 62.6	6 39.8 59 72 62.2	6 57.4 59 72 61.8	7 15.0 59 72 61.4	1
2			5 03.1 59 73 62.9	5 20.9 59 73 62.5	5 38.7 59 72 62.1	5 56.5 59 72 61.7	6 14.2 59 72 61.2	6 32.0 59 71 60.8	2
3						5 13.3 60 72 61.1	5 31.3 60 71 60.7	5 49.2 60 71 60.3	3
4								5 06.6 60 71 59.8	4

Lat. 37°

Lat. 38°

Lat. 35°

H.A.	28°00' Alt.	Δd Δt	Az.	28°30' Alt.	Δd Δt	Az.	29°00' Alt.	Δd Δt	Az.	30°00' Alt.	Δd Δt	Az.	32°00' Alt.	Δd Δt	Az.	34°00' Alt.	Δd Δt	Az.	34°30' Alt.	Δd Δt	Az.	35°30' Alt.	Δd Δt	Az.	H.A.
00	83 00.0	1.0 05	180.0	83 30.0	1.0 06	180.0	84 00.0	1.0 06	180.0	85 00.0	1.0 07	180.0	87 00.0	1.0 11	180.0	89 00.0	1.0 30	180.0	89 30.0	1.0 46	180.0	89 30.0	1.0 46	00.0	00
1	82 56.9	99 15	172.8	83 26.7	99 16	172.3	83 56.4	99 17	171.7	84 55.8	99 21	170.2	86 53.2	96 32	164.2	88 42.2	77 63	140.2	89 02.3	52 76	121.0	89 02.5	52 75	58.2	1
2	82 47.8	97 25	165.8	83 16.9	97 26	164.8	83 45.9	96 28	163.7	84 43.4	95 33	160.8	86 34.1	88 47	150.4	88 04.4	53 74	120.7	88 17.0	30 80	106.4	88 17.5	29 80	72.4	2
3	82 32.9	94 33	159.1	83 01.1	94 35	157.8	83 29.0	93 37	156.2	84 23.8	90 43	152.3	86 05.6	78 58	139.3	87 20.0	39 78	111.2	87 29.1	21 81	100.6	87 30.9	19 80	77.6	3
4	82 12.9	91 41	153.0	82 39.9	89 43	151.3	83 06.6	88 45	149.4	83 58.2	84 51	144.9	85 30.9	68 65	130.8	86 33.3	31 80	105.7	86 40.5	17 81	97.5	86 41.7	13 81	80.1	4
05	81 48.4	87 47	147.3	82 14.2	85 50	145.5	82 39.3	83 52	143.4	83 27.7	78 57	138.5	84 51.9	60 70	124.3	85 45.6	26 80	102.2	85 51.7	15 82	95.5	85 53.2	10 81	81.6	05
6	81 20.0	82 53	142.2	81 44.4	80 55	140.2	82 08.2	78 57	138.1	82 53.4	72 62	133.0	84 10.1	54 73	119.3	84 57.4	23 81	99.7	85 02.7	13 82	94.1	85 04.5	07 81	82.4	6
7	80 48.4	78 57	137.7	81 11.5	76 59	135.6	81 33.9	73 62	133.4	82 16.0	67 66	128.3	83 26.4	49 75	115.0	84 08.8	20 81	97.8	84 13.7	12 82	93.0	84 15.3	05 81	83.3	7
8	80 14.0	74 61	133.6	80 35.9	72 63	131.5	80 57.0	69 65	129.3	81 36.4	62 69	124.3	82 41.3	44 77	112.0	83 20.0	19 82	96.3	83 24.6	12 82	92.1	83 27.0	04 81	83.3	8
9	79 37.3	70 64	129.9	79 58.0	68 66	127.9	80 18.0	65 68	125.7	80 55.0	58 71	120.9	81 55.3	41 78	109.3	82 31.1	18 82	95.1	82 35.4	11 82	91.3	82 38.2	02 81	83.5	9
10	78 58.8	67 67	126.7	79 18.4	64 69	124.7	79 37.3	61 70	122.5	80 12.2	55 73	117.9	81 08.6	38 79	107.0	81 42.1	17 82	94.1	81 46.3	11 82	90.6	81 49.3	01 81	83.6	10
1	78 18.6	64 69	123.7	78 37.3	61 71	121.8	78 55.2	58 72	119.7	79 28.2	52 75	115.3	80 21.3	36 79	105.0	80 53.1	16 82	93.2	80 57.2	11 82	90.0	81 00.5	00 81	83.6	1
2	77 37.1	61 71	121.1	77 54.9	58 72	119.2	78 12.0	55 74	117.2	78 43.4	49 76	113.0	79 33.7	34 80	103.3	80 04.0	16 82	92.3	80 11.6	16 82	89.5	80 11.6	01 81	83.6	2
3	76 54.5	58 73	118.7	77 11.6	56 74	116.9	77 27.8	53 75	115.0	77 57.8	47 77	110.9	78 45.7	34 80	101.8	79 14.9	16 82	91.6	79 18.9	11 82	89.0	79 22.8	01 81	83.6	3
4	76 11.0	56 74	116.6	76 27.3	53 75	114.8	76 42.9	51 76	113.0	77 11.6	45 78	109.1	77 57.5	31 81	100.5	78 25.7	15 82	91.0	78 29.7	11 82	88.5	78 33.9	03 81	83.5	4
15	75 26.6	54 75	114.6	75 42.4	51 76	112.9	75 57.4	49 77	111.1	76 24.9	43 78	107.4	77 09.1	30 81	99.3	77 36.6	15 82	90.3	77 40.6	11 82	88.0	77 45.1	04 81	83.3	15
6	74 41.6	52 76	112.8	74 56.8	49 77	111.1	75 11.3	47 78	109.4	75 37.8	42 79	105.9	76 20.5	29 81	98.2	76 47.4	15 82	89.8	76 51.5	12 82	87.6	76 56.3	04 81	83.2	6
7	73 56.0	50 77	111.1	74 10.7	48 78	109.5	74 24.7	45 78	107.9	74 50.4	40 80	104.5	75 31.8	29 81	97.1	75 58.3	15 82	89.2	76 02.4	12 82	87.2	76 07.5	05 81	83.0	7
8	73 10.0	49 78	109.6	73 24.2	46 78	108.1	73 37.7	44 79	106.5	74 02.6	39 80	103.2	74 42.9	28 82	96.2	75 09.1	16 82	88.7	75 13.3	12 82	86.8	75 18.7	06 81	82.8	8
9	72 23.4	47 78	108.2	72 37.3	45 79	106.7	72 50.4	43 79	105.2	73 14.7	38 80	102.0	73 54.0	27 82	95.3	74 20.0	16 82	88.2	74 24.3	13 82	86.4	74 30.0	06 81	82.7	9
20	71 36.6	46 79	106.8	71 50.0	44 79	105.4	72 02.9	42 80	103.9	72 26.5	37 81	100.9	73 05.1	27 82	94.5	73 30.9	16 82	87.7	73 35.2	13 82	86.0	73 41.2	07 81	82.5	20
1	70 49.4	45 79	105.6	71 02.5	43 80	104.2	71 15.1	41 80	102.8	71 38.2	36 81	99.9	72 16.1	27 82	93.8	72 41.8	16 82	87.3	72 46.2	13 82	85.6	72 52.5	08 81	82.2	1
2	70 01.9	44 80	104.4	70 14.8	42 80	103.1	70 27.0	40 80	101.7	70 49.6	36 81	98.9	71 27.0	26 82	93.0	71 52.7	16 82	86.9	71 57.2	14 82	85.2	72 03.8	08 81	82.0	2
3	69 14.2	43 80	103.3	69 26.8	41 80	102.0	69 38.8	39 81	100.7	70 01.1	35 81	98.0	70 37.9	26 82	92.4	71 03.6	17 82	86.4	71 08.2	14 82	84.9	71 15.2	09 81	81.8	3
4	68 26.2	42 80	102.3	68 38.6	40 81	101.0	68 50.5	38 81	99.8	69 12.4	35 81	97.2	69 48.8	26 82	91.7	70 14.6	17 82	86.0	70 19.3	15 82	84.5	70 26.6	10 81	81.6	4
25	67 38.1	41 80	101.3	67 50.3	40 81	100.1	68 02.0	38 81	98.8	68 23.6	34 81	96.3	68 59.6	26 82	91.1	69 25.6	17 82	85.6	69 30.4	15 81	84.2	69 38.0	10 81	81.3	25
6	66 49.8	41 81	100.3	67 01.9	39 81	99.2	67 13.3	37 81	98.0	67 34.7	34 82	95.5	68 10.5	26 82	90.5	68 36.6	17 82	85.2	68 41.5	15 81	83.8	68 49.4	11 81	81.1	6
7	66 01.4	40 81	99.4	66 13.3	39 81	98.2	66 24.6	37 81	97.2	66 45.7	33 82	94.8	67 21.4	26 82	89.9	67 47.6	18 82	84.8	67 52.7	16 81	83.5	68 00.8	12 81	80.8	7
8	65 12.9	40 81	98.6	65 24.6	38 81	97.5	65 35.8	37 81	96.4	65 56.7	33 82	94.1	66 32.2	26 82	89.3	66 58.7	18 82	84.4	67 03.8	16 81	83.1	67 12.3	12 81	80.6	8
9	64 24.2	39 81	97.8	64 35.8	38 81	96.7	64 46.9	36 82	95.6	65 07.7	33 82	93.4	65 43.1	26 82	88.8	66 09.8	19 82	84.0	66 15.1	17 81	82.8	66 23.9	13 81	80.3	9
30	63 35.5	39 81	97.0	63 47.0	37 82	95.9	63 58.0	36 82	94.9	64 18.6	33 82	92.7	64 53.9	26 82	88.3	65 20.9	19 81	83.6	65 26.3	17 81	82.5	65 35.4	13 81	80.1	30
1	62 46.7	39 81	96.2	62 58.0	37 82	95.2	63 09.0	36 82	94.2	63 29.5	33 82	92.1	64 04.4	26 82	87.8	64 32.1	19 81	83.3	64 37.6	18 81	82.1	64 47.0	14 81	79.8	1
2	61 57.8	38 82	95.5	62 09.1	37 82	94.5	62 19.9	36 82	93.5	62 40.4	32 82	91.5	63 15.7	26 82	87.3	63 43.3	20 81	82.9	63 49.0	18 81	81.8	63 58.7	14 81	79.5	2
3	61 08.8	38 82	94.8	61 20.1	37 82	93.8	61 30.9	35 82	92.8	61 51.2	32 82	90.9	62 26.6	26 82	86.8	62 54.6	20 81	82.5	63 00.3	18 81	81.4	63 10.4	15 80	79.3	3
4	60 19.8	38 82	94.1	60 31.0	37 82	93.1	60 41.8	35 82	92.2	61 02.1	32 82	90.3	61 37.6	27 82	86.3	62 05.9	20 81'	82.2	62 11.8	19 81	81.1	62 22.1	16 80	79.0	4
35	59 30.8	38 82	93.4	59 41.9	36 82	92.5	59 52.6	35 82	91.6	60 12.9	32 82	89.7	60 48.5	27 82	85.8	61 17.2	21 81	81.8	61 23.2	19 81	80.8	61 33.9	16 80	78.7	35
6	58 41.7	38 82	92.8	58 52.8	36 82	91.9	59 03.5	35 82	91.0	59 23.8	32 82	89.1	59 59.5	27 82	85.3	60 28.6	21 81	81.4	60 34.7	20 81	80.4	60 45.7	17 80	78.4	6
7	57 52.6	37 82	92.1	58 03.7	36 82	91.3	58 14.4	35 82	90.4	58 34.6	33 82	88.6	59 10.6	27 82	84.9	59 40.0	22 81	81.1	59 46.3	20 81	80.1	59 57.6	17 80	78.2	7
8	57 03.5	37 82	91.5	57 14.5	36 82	90.7	57 25.2	35 82	89.8	57 45.5	33 82	88.1	58 21.6	28 82	84.4	58 51.5	22 81	80.7	58 57.9	21 81	79.8	59 09.5	18 80	77.9	8
9	56 14.3	37 82	90.9	56 25.4	36 82	90.1	56 36.1	35 82	89.2	56 56.4	33 82	87.5	57 32.7	28 81	84.0	58 03.0	23 81	80.4	58 09.5	21 80	79.4	58 21.5	19 80	77.6	9
40	55 25.2	37 82	90.3	55 36.2	36 82	89.5	55 46.9	35 82	88.7	56 07.3	33 82	87.0	56 43.9	28 81	83.6	57 14.5	23 81	80.0	57 21.3	22 80	79.1	57 33.5	19 80	77.3	40
1	54 36.0	37 82	89.8	54 47.1	36 82	89.0	54 57.8	35 82	88.2	55 18.2	33 82	86.5	55 55.0	29 81	83.1	56 26.2	23 81	79.7	56 33.0	22 80	78.8	56 45.6	20 80	77.0	1
2	53 46.9	37 82	89.2	53 57.9	36 82	88.4	54 08.7	35 82	87.6	54 29.2	33 82	86.0	55 06.3	29 81	82.7	55 37.8	24 80	79.3	55 44.8	23 80	78.5	55 57.7	20 80	76.7	2
3	52 57.8	37 82	88.7	53 08.8	36 82	87.9	53 19.6	35 82	87.1	53 40.2	33 82	85.5	54 17.5	29 81	82.3	54 49.6	24 80	79.0	54 56.7	23 80	78.1	55 09.9	21 80	76.4	3
4	52 08.6	37 82	88.1	52 19.7	36 82	87.3	52 30.5	35 82	86.6	52 51.2	33 82	85.0	53 28.9	29 81	81.9	54 01.4	25 80	78.6	54 08.6	24 80	77.8	54 22.2	21 79	76.1	4
45	51 19.5	38 82	87.6	51 30.6	37 82	86.8	51 41.5	36 82	86.1	52 03.5	34 82	84.6	52 40.2	30 81	81.5	53 13.2	25 80	78.3	53 20.6	24 80	77.5	53 34.5	22 79	75.8	45
6	50 30.4	38 82	87.0	50 41.6	37 82	86.3	50 52.4	36 82	85.6	51 13.3	34 81	84.1	51 51.7	30 81	81.0	52 25.1	26 80	77.9	52 32.7	24 80	77.1	52 46.9	23 79	75.5	6
7	49 41.3	38 82	86.5	49 52.5	37 82	85.8	50 03.5	36 81	85.1	50 24.5	34 81	83.6	51 03.1	30 81	80.6	51 37.1	26 80	77.6	51 44.8	25 80	76.8	51 59.3	23 79	75.2	7
8	48 52.3	38 82	86.0	49 03.5	37 82	85.3	49 14.5	36 82	84.6	49 35.7	34 81	83.2	50 14.7	31 81	80.2	50 49.1	27 80	77.2	50 57.0	26 80	76.4	51 11.8	24 79	74.9	8
9	48 03.3	38 82	85.5	48 14.6	37 82	84.8	48 25.6	36 81	84.1	48 46.9	35 81	82.7	49 26.3	31 81	79.8	50 01.2	27 80	76.9	50 09.3	26 79	76.1	50 24.4	24 79	74.6	9
50	47 14.3	38 82	85.0	47 25.6	37 81	84.3	47 36.7	37 81	83.6	47 58.2	35 81	82.3	48 37.9	31 80	79.4	49 13.4	28 80	76.5	49 21.6	27 79	75.8	49 37.1	25 79	74.3	50
1	46 25.4	38 82	84.5	46 36.8	38 81	83.8	46 47.9	37 81	83.1	47 09.5	35 81	81.8	47 49.6	32 80	79.0	48 25.6	28 79	76.2	48 34.0	27 79	75.4	48 49.8	25 79	74.0	1
2	45 36.5	39 81	84.0	45 47.9	38 81	83.4	45 59.1	37 81	82.7	46 20.9	35 81	81.4	47 01.4	32 80	78.6	47 38.0	29 79	75.8	47 46.4	28 79	75.1	48 02.6	26 79	73.7	2
3	44 47.6	39 81	83.5	44 59.1	38 81	82.9	45 10.4	37 81	82.2	45 32.3	36 81	80.9	46 13.3	33 80	78.2	46 50.4	29 79	75.4	46 59.0	28 79	74.7	47 15.5	27 78	73.3	3
4	43 58.8	39 81	83.1	44 10.4	38 81	82.4	44 21.7	38 81	81.8	44 43.8	36 81	80.5	45 25.2	33 80	77.8	46 02.8	30 79	75.1	46 11.6	29 79	74.4	46 28.4	27 78	73.0	4
55	43 10.0	39 81	82.6	43 21.7	38 81	82.0	43 33.1	38 81	81.3	43 55.4	36 81	80.0	44 37.2	33 80	77.4	45 15.4	30 79	74.7	45 24.3	29 79	74.1	45 41.5	28 78	72.7	55
6	42 21.3	39 81	82.1	42 33.0	39 81	81.5	42 44.6	38 81	80.9	43 07.0	37 80	79.6	43 49.3	34 80	77.0	44 28.0	31 79	74.4	44 37.1	30 79	73.7	44 54.6	28 78	72.4	6
7	41 32.7	40 81	81.6	41 44.5	39 81	81.0	41 56.1	38 81	80.4	42 18.7	37 80	79.2	43 01.4	34 80	76.6	43 40.7	31 79	74.0	43 50.0	30 78	73.4	44 07.8	29 78	72.0	7
8	40 44.1	40 81	81.2	40 55.9	39 81	80.6	41 07.6	39 81	80.0	41 30.4	37 80	78.7	42 13.6	35 79	76.2	42 53.5	32 79	73.7	43 02.9	31 78	73.0	43 21.1	30 78	71.7	8
9	39 55.5	40 81	80.7	40 07.5	40 81	80.1	40 19.3	39 80	79.5	40 42.3	38 80	78.3	41 25.9	35 79	75.8	42 06.4	32 78	73.3	42 16.0	32 78	72.7	42 34.5	30 78	71.4	9
60	39 07.0	40 81	80.3	39 19.1	40 81	79.7	39 31.0	39 80	79.1	39 54.2	38 80	77.9	40 38.3	35 78	75.4	41 19.3	33 78	72.9	41 29.1	32 78	72.3	41 47.9	31 77	71.0	60
1	38 18.4	41 81	79.8	38 30.3	40 80	79.2	38 42.8	40 80	78.6	39 06.2	38 80	77.4	39 50.6	36 79	75.0	40 32.4	33 78	72.6	40 42.3	33 78	72.0	41 01.5	31 77	70.7	1
2	37 30.3	41 80	79.3	37 42.5	41 80	78.8	37 54.6	40 80	78.2	38 18.2	39 80	77.0	39 03.4	36 79	74.6	39 45.5	34 78	72.2	39 55.6	33 78	71.6	40 15.2	32 77	70.4	2
3	36 42.0	41 80	78.9	36 54.4	41 80	78.3	37 06.5	40 80	77.7	37 30.4	39 80	76.6	38 16.0	37 79	74.2	38 58.8	34 78	71.8	39 09.0	34 78	71.2	39 28.9	33 77	70.0	3
4	35 53.9	42 80	78.4	36 06.3	41 80	77.9	36 18.6	41 80	77.3	36 42.6	40 79	76.2	37 28.8	37 79	73.8	38 12.1	35 78	71.5	38 22.5	34 77	70.9	38 42.8	33 77	69.7	4
65	35 05.7	42 80	78.0	35 18.3	42 80	77.4	35 30.7	41 80	76.9	35 55.0	40 79	75.7	36 41.6	38 78	73.4	37 25.6	36 77	71.1	37 36.2	35 77	70.5	37 56.7	34 77	69.3	65
6	34 17.7	42 80	77.5	34 30.4	42 80	77.0	34 42.8	41 80	76.4	35 07.4	40 79	75.3	35 54.5	38 78	73.0	36 39.1	36 77	70.7	36 49.7	36 77	70.2	37 10.8	34 76	69.0	6
7	33 29.8	43 80	77.1	33 42.5	42 80	76.5	33 55.1	42 79	76.0	34 19.9	41 79	74.9	35 07.6	39 78	72.6	35 52.8	37 77	70.4	36 03.7	36 77	69.8	36 25.0	35 76	68.6	7
8	32 41.9	43 80	76.6	32 54.8	43 79	76.1	33 07.5	42 79	75.5	33 32.5	41 79	74.4	34 20.7	39 78	72.2	35 06.2	37 77	70.0	35 17.6	37 77	69.4	35 39.3	36 76	68.3	8
9	31 54.1	43 79	76.2	32 07.1	43 79	75.6	32 19.9	43 79	75.1	32 45.2	42 79	74.0	33 34.0	40 78	71.8	34 20.4	38 77	69.6	34 31.7	37 76	69.1	34 53.7	36 76	67.9	9
70	31 06.5	44 79	75.7	31 19.5	44 79	75.2	31 32.0	43 79	74.7	31 58.0	43 78	73.6	32 47.3	40 78	71.4	33 34.4	38 76	69.2	33 45.8	38 76	68.7	34 08.2	37 76	67.6	70
1	30 18.9	44 79	75.3	30 32.1	44 79	74.7	30 45.1	43 78	74.2	31 10.9	42 78	73.2	32 00.8	41 77	71.0	32 48.5	39 76	68.9	33 00.1	38 76	68.3	33 22.8	37 75	67.2	1
2	29 31.4	45 79	74.8	29 44.7	44 79	74.3	29 57.9	43 78	73.8	30 23.9	43 78	72.7	31 14.4	41 77	70.6	32 02.7	39 76	68.5	32 14.5	39 76	67.9	32 37.6	38 75	66.8	2
3	28 44.0	45 79	74.4	28 57.5	45 78	73.8	29 10.8	44 78	73.3	29 37.0	43 78	72.3	30 28.1	42 77	70.2	31 17.1	40 76	68.1	31 29.0	40 75	67.5	31 52.4	39 75	66.5	3
4	27 56.8	45 79	73.9	28 10.3	45 78	73.4	28 23.7	45 78	72.9	28 50.3	44 78	71.9	29 41.9	42 77	69.8	30 31.6	41 76	67.7	30 43.7	40 75	67.2	31 07.5	39 75	66.1	4
75	27 09.6	46 78	73.4	27 23.3	46 78	72.9	27 36.8	45 78	72.4	28 03.6	44 78	71.4	28 55.8	43 77	69.4	29 46.1	41 75	67.3	29 58.4	41 75	66.8	30 22.6	40 75	65.7	75
6	26 22.5	46 78	73.0	26 36.2	46 78	72.5	26 50.0	46 78	72.0	27 17.1	45 77	71.0	28 09.9	43 76	69.0	29 00.9	42 75	66.9	29 13.3	42 75	66.4	29 37.9	40 74	65.3	6
7	25 35.6	47 78	72.5	25 49.5	46 78	72.0	26 03.3	46 78	71.6	26 30.7	45 77	70.6	27 24.1	44 76	68.5	28 15.7	42 75	66.5	28 28.4	42 75	66.0	28 53.3	41 74	65.0	7
8	24 48.8	47 78	72.1	25 02.8	47 78	71.6	25 16.8	46 77	71.1	25 44.4	46 77	70.1	26 38.4	44 76	68.1	27 30.7	43 74	66.1	27 43.5	43 74	65.6	28 08.8	42 74	64.6	8
9	24 02.1	47 78	71.6	24 16.2	47 77	71.1	24 30.3	47 77	70.7	24 58.2	46 77	69.7	25 52.8	45 76	67.7	26 45.9	43 75	65.7	26 58.8	43 74	65.2	27 24.5	42 74	64.2	9
80	23 15.5	48 77	71.2	23 29.8	48 77	70.7	23 44.0	47 77	70.2	24 12.2	47 76	69.2	25 07.4	45 75	67.3	26 01.1	44 74	65.3	26 14.3	44 74	64.8	26 40.3	43 73	63.8	80
1	22 29.0	48 77	70.7	22 43.5	48 77	70.2	22 57.8	47 77	69.8	23 26.3	47 76	68.8	24 22.2	46 75	66.9	25 16.5	45 74	64.9	25 29.4	44 74	64.4	25 56.3	44 73	63.4	1
2	21 42.7	49 77	70.2	21 57.3	48 77	69.8	22 11.8	48 76	69.3	22 40.6	48 76	68.3	23 37.1	46 75	66.4	24 32.1	45 74	64.5	24 45.6	45 74	64.0	25 12.4	44 73	63.0	2
3	20 56.5	49 77	69.8	21 11.2	49 77	69.3	21 25.9	49 76	68.8	21 54.9	48 76	67.9	22 52.1	47 75	66.0	23 47.8	46 74	64.1	24 01.6	46 73	63.6	24 28.7	45 73	62.6	3
4	20 10.5	50 76	69.3	20 25.3	49 76	68.8	20 40.1	49 76	68.4	21 09.5	49 76	67.4	22 07.3	48 74	65.6	23 03.7	46 73	63.7	23 17.6	46 73	63.2	23 45.1	46 72	62.2	4
85	19 24.6	50 76	68.8	19 39.4	50 76	68.4	19 54.4	50 76	67.9	20 24.2	49 75	67.0	21 22.6	48 74	65.1	22 19.8	47 73	63.3	22 33.8	47 73	62.8	23 01.8	46 72	61.8	85
6	18 38.8	51 76	68.4	18 54.0	50 76	67.9	19 09.0	50 76	67.5	19 39.0	50 75	66.5	20 38.1	49 74	64.7	21 36.0	48 73	62.8	21 50.2	47 72	62.4	22 18.5	47 72	61.4	6
7	17 53.1	51 76	67.9	18 08.5	51 75	67.4	18 23.7	51 75	67.0	18 54.0	50 75	66.1	19 53.7	49 74	64.2	20 52.3	48 72	62.4	21 06.8	48 72	61.9	21 35.5	48 71	61.0	7
8	17 07.7	52 76	67.4	17 23.2	51 75	67.0	17 38.6	51 75	66.5	18 09.1	51 74	65.6	19 09.4	50 73	63.8	20 08.9	49 72	61.9	20 23.5	49 72	61.5	20 52.6	48 71	60.5	8
9	16 22.4	52 75	66.9	16 38.0	52 75	66.5	16 53.6	52 75	66.1	17 24.5	51 74	65.2	18 25.5	50 73	63.3	19 25.9	49 71	61.5	19 40.6	49 71	61.1	20 09.9	49 71	60.1	9
90	15 37.3	53 75	66.5	15 53.0	52 75	66.0	16 08.7	52 74	65.6	16 39.9	52 74	64.7	17 41.7	51 72	62.9	18 42.5	50 71	61.1	18 57.5	50 71	60.6	19 27.3	50 71	59.7	90

H.A.	28° 00' Alt. Δd Δt Az.	28° 30' Alt. Δd Δt Az.	29° 00' Alt. Δd Δt Az.	30° 00' Alt. Δd Δt Az.	32° 00' Alt. Δd Δt Az.	34° 00' Alt. Δd Δt Az.	34° 30' Alt. Δd Δt Az.	35° 30' Alt. Δd Δt Az.	H.A.
00	27 00.0 1.00 01 180.0	26 30.0 1.00 01 180.0	26 00.0 1.00 01 180.0	25 00.0 1.00 01 180.0	23 00.0 1.00 01 180.0	21 00.0 1.00 01 180.0	20 30.0 1.00 01 180.0	19 30.0 1.00 01 180.0	00
1	26 59.6 1.00 02 179.0	26 29.6 1.00 02 179.0	25 59.6 1.00 02 179.0	24 59.6 1.00 02 179.1	22 59.6 1.00 02 179.1	20 59.6 1.00 02 179.1	20 29.6 1.00 02 179.1	19 29.6 1.00 02 179.1	1
2	26 58.3 1.00 04 178.0	26 28.3 1.00 04 178.0	25 58.3 1.00 03 178.1	24 58.4 1.00 03 178.1	22 58.4 1.00 03 178.2	20 58.5 1.00 03 178.2	20 28.5 1.00 03 178.2	19 28.5 1.00 03 178.3	2
3	26 56.2 1.00 05 177.0	26 26.2 1.00 05 177.1	25 56.2 1.00 05 177.1	24 56.3 1.00 05 177.1	22 56.4 1.00 05 177.2	20 56.6 1.00 04 177.3	20 26.6 1.00 04 177.4	19 26.7 1.00 04 177.4	3
4	26 53.2 1.00 06 176.0	26 23.3 1.00 06 176.1	25 53.3 1.00 06 176.1	24 53.4 1.00 06 176.2	22 53.7 1.00 06 176.3	20 53.9 1.00 06 176.5	20 24.0 1.00 06 176.5	19 24.1 1.00 06 176.5	4
05	26 49.4 1.00 08 175.1	26 19.5 1.00 08 175.1	25 49.6 1.00 08 175.1	24 49.8 1.00 08 175.2	22 50.1 1.00 07 175.4	20 50.5 1.00 07 175.6	20 20.6 1.00 07 175.6	19 20.8 1.00 07 175.7	05
6	26 44.7 1.00 09 174.1	26 14.9 1.00 09 174.1	25 45.0 1.00 09 174.2	24 45.3 1.00 09 174.2	22 45.8 1.00 08 174.7	20 46.1 1.00 08 174.7	20 16.4 1.00 08 174.8	19 16.7 1.00 08 174.8	6
7	26 39.2 99 11 173.1	26 09.4 99 10 173.1	25 39.6 99 10 173.2	24 40.0 99 10 173.3	22 40.7 99 10 173.6	20 41.4 99 09 173.8	20 11.6 99 09 173.9	19 11.9 99 09 174.0	7
8	26 32.9 99 12 172.1	26 03.2 99 12 172.2	25 33.4 99 12 172.2	24 33.9 99 12 172.4	22 34.8 99 11 172.7	20 35.7 99 11 172.9	20 05.9 99 11 173.0	19 06.4 99 10 173.1	8
9	26 25.7 99 13 171.1	25 56.0 99 13 171.2	25 26.3 99 13 171.3	24 26.9 99 13 171.4	22 28.1 99 12 171.7	20 29.3 99 12 172.0	19 59.5 99 12 172.1	19 00.1 99 12 172.3	9
10	26 17.7 99 15 170.2	25 48.1 99 15 170.2	25 18.5 99 14 170.3	24 19.2 99 14 170.5	22 20.7 99 14 170.8	20 22.1 99 13 171.2	19 52.4 99 13 171.2	18 53.1 99 13 171.4	10
1	26 08.9 98 16 169.2	25 39.4 98 16 169.3	25 09.8 98 16 169.4	24 10.7 99 15 169.6	22 12.5 99 15 170.0	20 14.2 99 14 170.3	19 44.6 99 14 170.4	18 45.4 99 14 170.6	1
2	25 59.3 98 17 168.2	25 29.8 98 17 168.3	25 00.4 98 17 168.4	24 01.4 98 16 168.6	22 03.5 98 16 169.0	20 05.5 98 16 169.4	19 36.0 98 16 169.5	18 37.0 98 15 169.7	2
3	25 48.8 98 19 167.3	25 19.5 98 19 167.4	24 50.1 98 18 167.5	23 51.3 98 18 167.7	21 53.8 98 17 168.1	19 56.1 98 17 168.6	19 26.7 98 17 168.7	18 27.9 98 16 168.9	3
4	25 37.6 98 20 166.3	25 08.3 98 20 166.4	24 39.1 98 20 166.5	23 40.5 98 19 166.8	21 43.3 98 19 167.2	19 46.0 98 18 167.7	19 16.7 98 18 167.8	18 18.0 98 18 168.0	4
15	25 25.6 97 21 165.3	24 56.4 97 21 165.5	24 27.2 97 21 165.6	23 28.9 97 21 165.9	21 32.1 97 20 166.4	19 35.2 97 19 166.8	19 06.0 97 19 167.0	18 07.5 97 19 167.2	15
6	25 12.7 97 23 164.4	24 43.7 97 22 164.5	24 14.6 97 22 164.7	23 16.5 97 22 164.9	21 20.1 97 21 165.6	19 23.6 97 20 166.1	18 54.5 97 20 166.1	17 56.2 97 20 166.4	6
7	24 59.1 96 24 163.5	24 30.2 96 24 163.6	24 01.2 97 24 163.7	23 03.3 97 23 164.0	21 07.4 97 22 164.6	19 11.4 97 22 165.1	18 42.3 97 21 165.3	17 44.3 97 21 165.5	7
8	24 44.7 96 25 162.5	24 15.9 96 25 162.7	23 47.1 96 25 162.8	22 49.4 96 24 163.1	20 54.0 96 24 163.7	18 58.4 96 23 164.3	18 29.5 96 23 164.4	17 31.7 96 22 164.7	8
9	24 29.6 96 26 161.6	24 00.9 96 26 161.7	23 32.2 96 26 161.9	22 34.8 96 26 162.2	20 39.8 96 25 162.8	18 44.7 96 24 163.4	18 16.0 96 24 163.6	17 18.4 96 23 163.9	9
20	24 13.7 95 28 160.7	23 45.1 95 28 160.8	23 16.6 95 27 161.0	22 19.4 95 27 161.3	20 25.0 95 26 162.0	18 30.4 95 25 162.6	18 01.7 95 25 162.8	17 04.4 95 24 163.1	20
1	23 57.0 94 29 159.7	23 28.6 95 29 159.9	23 00.2 95 28 160.1	22 03.3 95 28 160.4	20 09.4 95 27 161.1	18 15.4 95 26 161.9	17 46.8 95 26 162.3	16 49.7 95 26 162.3	1
2	23 39.7 94 30 158.8	23 11.4 94 30 159.0	22 43.1 94 30 159.2	21 46.5 94 29 159.6	19 53.2 94 28 160.3	17 59.6 95 27 160.9	17 31.2 95 27 161.1	16 34.4 95 27 161.4	2
3	23 21.6 94 31 157.9	22 53.4 94 31 158.1	22 25.3 94 31 158.3	21 29.0 94 30 158.7	19 36.2 94 29 159.4	17 43.3 94 28 160.1	17 15.0 94 28 160.3	16 18.5 94 28 160.6	3
4	23 02.7 93 33 157.0	22 34.8 93 32 157.2	22 06.8 93 32 157.4	21 10.8 93 32 157.8	19 18.6 94 30 158.6	17 26.2 94 30 159.3	16 58.1 94 29 159.5	16 01.8 94 29 159.8	4
25	22 43.2 93 34 156.1	22 15.4 93 33 156.3	21 47.5 93 33 156.5	20 51.8 93 33 156.9	19 00.3 93 32 157.7	17 08.5 93 31 158.5	16 40.6 93 30 158.7	15 44.6 93 30 159.1	25
6	22 23.0 93 34 155.3	21 55.3 92 35 155.5	21 27.6 92 34 155.7	20 32.3 92 34 156.1	18 41.3 93 33 156.9	16 50.2 93 32 157.7	16 22.4 93 32 157.9	15 26.7 93 31 158.3	6
7	22 02.0 92 36 154.4	21 34.6 92 36 154.6	21 07.1 92 35 154.8	20 12.0 92 35 155.2	18 21.7 92 34 156.1	16 31.2 92 33 156.9	16 03.5 92 32 157.1	15 08.2 92 32 157.5	7
8	21 40.5 91 37 153.5	21 13.1 91 37 153.7	20 45.8 91 36 154.0	19 51.1 91 36 154.4	18 01.4 91 35 155.2	16 11.6 92 34 156.1	15 44.1 92 33 156.3	14 49.1 92 33 156.7	8
9	21 18.2 90 38 152.6	20 51.1 91 38 152.9	20 23.9 91 38 153.1	19 29.5 91 37 153.6	17 40.6 91 36 154.4	15 51.4 91 35 155.3	15 24.0 91 34 155.5	14 29.3 91 34 155.9	9
30	20 55.3 90 39 151.8	20 28.3 90 39 152.0	20 01.3 90 39 152.3	19 07.3 90 38 152.7	17 19.0 90 37 153.6	15 30.5 91 36 154.5	15 03.4 90 35 154.7	14 09.0 91 35 155.2	30
1	20 31.8 89 40 150.9	20 05.0 89 40 151.2	19 38.1 89 40 151.4	18 44.5 90 39 151.9	16 56.9 90 38 152.8	15 09.1 90 37 153.7	14 42.1 90 36 154.0	13 48.1 90 36 154.4	1
2	20 07.6 89 41 150.1	19 41.0 89 41 150.4	19 14.3 89 41 150.6	18 21.0 89 40 151.1	16 34.2 89 39 152.0	14 47.0 89 38 153.0	14 20.2 89 37 153.2	13 26.6 89 37 153.7	2
3	19 42.8 88 42 149.3	19 16.3 88 42 149.5	18 49.9 88 42 149.8	17 56.9 89 41 150.3	16 10.8 89 40 151.3	14 24.4 89 39 152.2	13 57.8 89 38 152.5	13 04.5 89 38 152.9	3
4	19 17.4 87 43 148.5	18 51.1 88 43 148.7	18 24.9 88 43 149.0	17 32.3 88 42 149.5	15 46.9 88 41 150.5	14 01.2 88 40 151.5	13 34.8 88 39 151.7	12 41.8 88 39 152.2	4
35	18 51.4 87 44 147.6	18 25.3 87 44 147.9	17 59.2 87 44 148.2	17 07.0 87 43 148.7	15 22.4 87 42 149.7	13 37.5 88 40 150.7	13 11.2 88 40 151.0	12 18.6 88 40 151.4	35
6	18 24.8 86 45 146.8	17 58.9 86 45 147.1	17 33.0 86 45 147.4	16 41.2 86 44 147.9	14 57.3 87 43 148.9	13 13.1 87 41 150.0	12 47.0 87 41 150.2	11 54.8 87 40 150.7	6
7	17 57.6 86 46 146.0	17 31.9 86 46 146.3	17 06.2 86 46 146.6	16 14.8 86 45 147.1	14 31.7 86 44 148.2	12 48.3 86 42 149.2	12 22.4 86 42 149.5	11 30.5 86 41 150.0	7
8	17 29.9 85 47 145.3	17 04.4 85 47 145.5	16 38.9 85 46 145.8	15 47.8 85 45 146.4	14 05.5 85 45 147.4	12 22.8 86 43 148.5	11 57.1 86 43 148.8	11 05.7 86 42 149.3	8
9	17 01.6 84 48 144.5	16 36.3 84 48 144.8	16 11.0 84 47 145.0	15 20.3 85 47 145.6	13 38.7 85 46 146.7	11 56.9 85 44 147.8	11 31.4 86 44 148.1	10 40.3 85 43 148.6	9
40	16 32.7 84 49 143.7	16 07.7 84 49 144.0	15 42.6 84 48 144.3	14 52.3 84 48 144.8	13 11.5 84 46 146.0	11 30.4 84 45 147.1	11 05.1 84 45 147.3	10 14.4 84 44 147.9	40
1	16 03.4 83 50 142.9	15 38.5 83 49 143.2	15 13.6 83 49 143.5	14 23.7 83 48 144.1	12 43.7 84 47 145.2	11 03.4 84 46 146.3	10 38.3 84 45 146.6	9 48.1 84 45 147.2	1
2	15 33.5 82 51 142.2	15 08.8 82 50 142.5	14 44.1 82 50 142.8	13 54.6 83 49 143.3	12 15.4 83 48 144.5	10 35.9 83 47 145.6	10 11.0 83 46 145.9	9 21.2 83 46 146.5	2
3	15 03.1 82 51 141.4	14 38.6 82 51 141.7	14 14.1 82 51 142.0	13 25.0 82 50 142.6	11 46.6 82 49 143.8	10 06.0 82 47 144.9	9 43.3 82 47 145.2	8 53.8 82 46 145.8	3
4	14 32.2 81 52 140.7	14 07.9 81 52 141.0	13 43.5 81 51 141.3	12 54.9 81 51 141.9	11 17.4 81 50 143.1	9 39.5 82 48 144.3	9 15.0 82 48 144.5	8 25.9 82 47 145.1	4
45	14 00.8 80 53 139.9	13 36.7 80 53 140.3	13 12.6 80 52 140.6	12 24.4 81 52 141.2	10 47.6 81 50 142.4	9 10.5 81 49 143.6	8 46.2 81 49 143.9	7 57.6 81 48 144.5	45
6	13 28.9 80 54 139.2	13 05.1 80 54 139.5	12 41.2 80 53 139.8	11 53.3 80 53 140.5	10 17.4 80 51 141.7	8 41.1 80 50 142.9	8 17.0 80 49 143.2	7 28.8 80 49 143.8	6
7	12 56.6 79 55 138.5	12 32.9 79 54 138.8	12 09.2 79 54 139.1	11 21.8 79 53 139.8	9 46.6 79 52 141.0	8 11.2 80 51 142.2	7 47.4 80 50 142.5	6 59.5 80 50 143.1	7
8	12 23.8 78 55 137.8	12 00.3 78 55 138.1	11 36.9 78 55 138.4	10 49.8 78 54 139.1	9 15.5 79 53 140.3	7 40.9 79 51 141.6	7 17.2 79 51 141.9	6 29.8 79 50 142.5	8
9	11 50.6 78 56 137.1	11 27.3 78 56 137.4	11 04.3 78 55 137.7	10 17.4 78 55 138.4	8 43.9 78 53 139.6	7 10.1 78 52 140.9	6 46.7 78 52 141.2	5 59.7 78 51 141.8	9
50	11 16.9 77 57 136.4	10 53.8 77 57 136.7	10 30.7 77 56 137.0	9 44.5 77 56 137.7	8 11.8 77 54 139.0	6 38.9 78 53 140.3	6 15.7 78 52 140.6	5 29.1 78 52 141.2	50
1	10 42.8 76 58 135.7	10 19.9 76 57 136.0	9 57.0 76 57 136.4	9 11.2 76 56 137.0	7 39.4 77 55 138.3	6 07.3 77 53 139.6	5 44.2 77 53 139.9		1
2	10 08.2 75 58 135.0	9 45.6 76 58 135.4	9 22.9 76 58 135.7	8 37.5 76 57 136.4	7 06.5 76 56 137.7	5 35.2 76 54 139.0	5 12.4 76 54 139.3		2
3	9 33.3 75 59 134.4	9 10.8 75 59 134.7	8 48.4 75 58 135.0	8 03.4 75 58 135.7	6 33.2 75 56 137.0	5 02.8 75 55 138.3			3
4	8 58.0 74 60 133.7	8 35.7 74 60 134.0	8 13.4 74 59 134.4	7 28.8 74 58 135.0	5 59.5 75 57 136.4				4
55	8 22.2 73 60 133.0	8 00.2 74 60 133.4	7 38.1 74 60 133.7	6 53.9 74 59 134.4	5 25.4 74 58 135.7				55
6	7 46.1 73 61 132.4	7 24.2 73 60 132.7	7 02.4 73 60 133.1	6 18.6 73 60 133.8					6
7	7 09.6 72 61 131.7	6 48.0 72 61 132.1	6 26.3 72 61 132.4	5 42.9 72 60 133.1					7
8	6 32.7 71 62 131.1	6 11.3 72 62 131.4	5 49.8 72 61 131.8	5 06.8 72 61 132.5					8
9	5 55.5 71 62 130.5	5 34.3 71 62 130.8	5 13.0 71 62 131.2						9
60	5 18.0 70 63 129.8								60

Lat. 36°

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00' Alt. Δd Δt Az.	28° 30' Alt. Δd Δt Az.	29° 00' Alt. Δd Δt Az.	30° 00' Alt. Δd Δt Az.	32° 00' Alt. Δd Δt Az.	34° 00' Alt. Δd Δt Az.	34° 30' Alt. Δd Δt Az.	35° 30' Alt. Δd Δt Az.	H.A.
91	14 52.3 53 75 66.0	15 06.2 53 74 65.5	15 24.1 53 74 65.1	15 55.6 52 74 64.2	16 58.0 52 72 62.4	17 59.5 51 71 60.6	18 14.8 51 71 60.2	18 45.0 50 70 59.3	91
2	14 07.5 54 74 65.5	14 23.6 53 74 65.1	14 39.6 53 74 64.6	15 11.4 53 73 63.7	16 14.6 52 72 62.0	17 16.3 51 71 60.2	17 32.2 51 71 59.7	18 02.8 51 70 58.8	2
3	13 22.9 54 74 65.0	13 39.1 54 74 64.6	13 55.4 54 74 64.1	14 27.4 54 73 63.3	15 31.3 52 72 61.5	16 34.2 52 71 59.7	16 49.8 52 70 59.3	17 20.9 52 70 58.4	3
4	12 38.4 55 74 64.5	12 54.8 55 74 64.1	13 11.1 54 73 63.7	13 43.6 54 73 62.8	14 48.2 53 72 61.0	15 51.9 53 70 59.3	16 07.7 53 70 58.8	16 39.1 52 69 58.0	4
95	11 54.1 55 73 64.0	12 10.7 55 73 63.6	12 27.2 55 73 63.2	13 00.0 55 72 62.3	14 05.3 54 71 60.6	15 09.7 53 70 58.8	15 25.7 53 70 58.4	15 57.6 53 69 57.5	95
6	11 10.0 56 73 63.5	11 26.7 56 73 63.1	11 43.4 55 73 62.7	12 16.6 55 72 61.8	13 22.5 55 71 60.1	14 27.8 54 70 58.4	14 44.0 54 69 57.9	15 16.2 54 69 57.1	6
7	10 25.1 56 73 63.0	10 43.0 56 73 62.6	10 59.8 56 72 62.2	11 33.4 56 72 61.3	12 40.0 55 70 59.6	13 46.0 55 69 57.9	14 02.4 54 69 57.5	14 35.1 54 68 56.6	7
8	9 42.4 57 72 62.5	9 59.5 57 72 62.1	10 16.5 57 72 61.7	10 50.4 56 71 60.8	11 57.7 56 70 59.1	13 04.5 55 69 57.4	13 21.1 55 69 57.0	13 54.1 54 68 56.2	8
9	8 59.0 57 72 62.0	9 16.1 57 72 61.6	9 33.3 57 72 61.2	10 07.6 57 71 60.3	11 15.7 57 70 58.7	12 23.2 56 68 57.0	12 40.0 56 68 56.5	13 13.4 56 67 55.7	9
100	8 15.7 58 72 61.5	8 33.0 58 72 61.1	8 50.4 58 71 60.7	9 25.0 58 71 59.8	10 33.8 57 69 58.2	11 42.1 57 68 56.5	11 59.1 57 68 56.1	12 32.9 56 67 55.2	100
1	7 32.6 58 71 61.0	7 50.1 58 71 60.6	8 07.6 58 71 60.1	8 42.6 58 70 59.3	9 52.1 58 69 57.7	11 01.2 57 68 56.0	11 18.4 57 67 55.6	11 52.7 57 67 54.8	1
2	6 49.7 59 71 60.4	7 07.4 59 71 60.0	7 25.1 59 70 59.6	8 00.4 59 70 58.8	9 10.7 58 69 57.2	10 20.6 58 67 55.5	10 38.0 58 67 55.1	11 12.7 58 66 54.3	2
3	6 07.1 60 71 59.9	6 25.0 60 70 59.5	6 42.8 60 70 59.1	7 18.5 59 70 58.3	8 29.6 59 68 56.7	9 40.2 59 67 55.0	9 57.8 59 67 54.6	10 32.9 58 66 53.8	3
4	5 24.7 60 70 59.4	5 42.7 60 70 59.0	6 00.8 60 70 58.6	6 36.8 60 69 57.8	7 48.6 60 68 56.2	9 00.0 59 66 54.5	9 17.8 59 66 54.1	9 53.4 59 65 53.3	4
105		5 00.7 61 70 58.4	5 18.9 61 69 58.0	5 55.3 61 69 57.2	7 07.9 60 67 55.6	8 20.1 60 66 54.0	8 38.1 60 66 53.6	9 14.1 60 65 52.8	105
6				5 14.1 61 68 56.7	6 27.5 61 67 55.1	7 40.5 61 66 53.5	7 58.7 61 65 53.1	8 35.0 60 65 52.3	6
7					5 47.3 62 67 54.6	7 01.1 61 65 53.0	7 19.5 61 65 52.6	7 56.3 61 64 51.8	7
8					5 07.3 62 66 54.1	6 22.0 62 65 52.5	6 40.6 62 64 52.1	7 17.8 62 64 51.3	8
9						5 43.1 63 64 52.0	6 01.9 63 64 51.6	6 39.5 63 63 50.8	9
110						5 04.5 63 64 51.5	5 23.6 63 64 51.1	6 01.6 63 63 50.3	110
1								5 23.9 64 62 49.8	1

Lat. 37°

Lat. 38°

Lat. 35°

H.A.	36° 00′			37° 00′			38° 30′			40° 00′			42° 00′			42° 30′			43° 00′			45° 00′			H.A.
	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	Alt.		Az.	
°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	° ′	Δd Δt	°	°
00	89 00.0	1.0 29	00.0	88 00.0	1.0 16	00.0	86 30.0	1.0 09	00.0	85 00.0	1.0 06	00.0	83 00.0	1.0 04	00.0	82 30.0	1.0 04	00.0	82 00.0	1.0 04	00.0	80 00.0	1.0 03	00.0	00
1	88 42.6	77 62	38.9	87 50.6	93 42	21.7	86 24.6	97 26	12.6	84 56.3	99 18	08.7	82 57.4	99 13	06.1	82 27.6	99 12	05.6	81 57.8	99 11	05.2	79 58.3	1.0 09	04.1	1
2	88 05.4	51 73	57.9	87 25.7	77 57	38.4	86 09.1	90 40	24.0	84 45.3	95 29	17.0	82 49.7	97 21	12.0	82 20.4	98 20	11.1	81 51.1	98 18	10.4	79 53.1	99 14	08.1	2
3	87 21.6	36 77	66.9	86 51.3	62 66	49.6	85 45.3	82 50	33.6	84 27.8	90 38	24.6	82 37.1	94 28	17.6	82 08.7	95 27	16.4	81 40.1	96 26	15.3	79 44.5	97 20	12.0	3
4	86 35.6	27 78	71.8	86 11.8	51 71	57.1	85 15.3	72 57	41.3	84 04.8	83 46	31.2	82 20.1	90 35	22.9	81 52.8	91 33	21.4	81 25.2	92 31	20.0	79 32.7	95 25	15.8	4
05	85 48.5	21 79	74.8	85 29.3	42 74	62.2	84 40.9	64 63	47.4	83 37.2	77 52	36.9	81 59.1	86 41	27.7	81 33.0	87 39	25.9	81 06.6	89 36	24.4	79 17.8	92 30	19.4	05
6	85 00.9	17 80	76.7	84 45.1	35 76	65.9	84 03.3	56 66	52.2	83 06.0	70 57	41.8	81 34.6	81 46	32.0	81 09.9	83 43	30.1	80 44.8	85 41	28.4	79 00.1	89 34	22.8	6
7	84 12.9	14 80	78.0	83 59.8	30 77	68.5	83 23.5	50 69	56.0	82 31.9	64 61	45.9	81 07.1	76 50	35.9	80 43.9	78 48	33.9	80 20.0	80 46	32.1	78 39.8	86 38	26.0	7
8	83 24.8	11 80	79.0	83 13.7	26 78	70.5	82 42.0	44 71	59.0	81 55.6	58 64	49.4	80 37.0	71 54	39.4	80 15.2	74 51	37.3	79 52.7	76 49	35.4	78 17.1	83 41	29.0	8
9	82 36.5	09 81	79.6	82 27.2	22 78	72.0	81 59.4	39 73	61.5	81 17.4	53 66	52.3	80 04.8	67 57	42.4	79 44.4	69 55	40.4	79 23.2	72 52	38.4	77 52.3	79 45	31.8	9
10	81 48.1	07 81	80.1	81 40.2	19 79	73.2	81 15.8	35 74	63.5	80 37.9	49 68	54.8	79 30.8	62 59	45.2	79 11.7	65 57	43.1	78 51.8	68 55	41.1	77 25.4	76 48	34.3	10
1	80 59.6	05 81	80.4	80 53.1	16 79	74.1	80 31.5	31 75	65.1	79 57.2	44 69	56.9	78 55.2	58 61	47.6	78 37.4	61 60	45.5	78 18.6	64 58	43.5	76 56.9	72 50	36.7	1
2	80 11.2	04 81	80.7	80 05.7	14 79	74.9	79 46.6	28 75	66.5	79 15.6	41 71	58.7	78 18.4	54 63	49.7	78 01.7	57 61	47.6	77 44.1	60 60	45.7	76 26.8	69 52	38.9	2
3	79 22.6	03 81	80.8	79 18.2	12 79	75.4	79 01.4	25 76	67.6	78 33.2	37 72	60.3	77 40.4	51 65	51.5	77 24.8	53 63	49.6	77 08.4	56 61	47.7	75 55.3	65 55	40.8	3
4	78 34.1	02 81	80.9	78 30.6	10 80	75.9	78 15.8	23 76	68.6	77 50.3	34 72	61.6	77 01.4	47 66	53.2	76 46.9	50 65	51.3	76 31.5	53 63	49.4	75 22.5	62 56	42.7	4
15	77 45.6	00 81	81.0	77 42.9	09 80	76.3	77 29.9	20 77	69.3	77 06.8	31 73	62.7	76 21.7	44 67	54.7	76 08.1	47 66	52.8	75 53.8	49 64	51.0	74 48.7	59 58	44.3	15
6	76 57.0	01 81	81.0	76 55.1	07 80	76.6	76 43.8	18 77	70.0	76 22.9	28 74	63.7	75 41.3	41 68	56.0	75 28.6	44 67	54.1	75 15.2	46 65	52.4	74 13.9	56 59	45.8	6
7	76 08.5	01 81	80.9	76 07.3	06 80	76.8	75 57.5	16 77	70.6	75 38.7	26 74	64.6	75 00.3	38 69	57.1	74 48.5	41 68	55.3	74 35.9	43 66	53.6	73 38.2	53 61	47.2	7
8	75 20.0	02 81	80.9	75 19.4	04 80	76.9	75 11.1	14 78	71.1	74 54.1	24 75	65.3	74 18.8	35 70	58.1	74 07.8	38 69	56.4	73 56.1	40 67	54.8	73 01.8	50 62	48.5	8
9	74 31.4	03 81	80.8	74 31.5	03 80	77.0	74 24.6	12 78	71.4	74 09.3	21 75	66.0	73 36.8	33 71	59.0	73 26.6	35 69	57.4	73 15.7	38 68	55.8	72 24.7	47 63	49.6	9
20	73 42.9	04 81	80.7	73 43.6	02 80	77.1	73 37.9	11 78	71.8	73 24.3	19 75	66.5	72 54.5	30 71	59.9	72 45.0	33 70	58.3	72 34.8	35 69	56.7	71 46.9	44 64	50.7	20
1	72 54.4	05 81	80.5	72 55.7	01 80	77.1	72 51.2	09 78	72.0	72 39.2	18 76	67.0	72 11.8	28 72	60.6	72 03.1	30 70	59.0	71 53.6	33 69	57.5	71 08.7	42 65	51.6	1
2	72 06.0	06 81	80.4	72 07.8	00 80	77.1	72 04.4	08 78	72.3	71 53.8	16 76	67.5	71 28.9	26 72	61.2	71 20.8	28 71	59.7	71 12.0	31 70	58.2	70 29.9	39 65	52.5	2
3	71 17.5	06 81	80.2	71 19.9	01 80	77.1	71 17.6	06 78	72.4	71 08.4	14 76	67.8	70 45.7	24 72	61.8	70 38.2	26 71	60.3	70 30.0	28 70	58.9	69 50.7	37 66	53.3	3
4	70 29.1	07 81	80.1	70 32.0	02 80	77.1	70 30.7	05 78	72.6	70 22.8	12 76	68.1	70 02.3	22 73	62.3	69 55.4	24 72	60.9	69 47.8	26 71	59.5	69 11.1	35 67	54.0	4
25	69 40.7	08 81	79.9	69 44.1	03 80	77.0	69 43.8	04 78	72.7	69 37.2	11 76	68.4	69 18.7	20 73	62.7	69 12.3	22 72	61.4	69 05.4	24 71	60.0	68 31.1	33 67	54.7	25
6	68 52.3	09 81	79.7	68 56.2	04 80	76.9	68 56.9	03 78	72.8	68 51.5	09 76	68.6	68 34.9	18 73	63.1	68 29.1	20 72	61.8	68 22.7	22 71	60.5	67 50.9	31 68	55.3	6
7	68 04.0	09 81	79.5	68 08.3	05 80	76.8	68 09.9	01 78	72.8	68 05.7	08 76	68.8	67 51.0	16 73	63.5	67 45.7	19 73	62.2	67 39.8	21 72	60.9	67 10.3	28 68	55.8	7
8	67 15.7	10 80	79.3	67 20.5	06 80	76.7	67 23.0	00 78	72.8	67 19.8	07 76	68.9	67 06.9	15 74	63.8	67 02.2	17 73	62.5	66 56.8	19 72	61.3	66 29.5	27 68	56.3	8
9	66 27.4	11 80	79.1	66 32.6	07 80	76.6	66 36.0	01 78	72.8	66 34.0	05 77	69.0	66 22.8	13 74	64.1	66 18.5	15 73	62.8	66 13.7	17 72	61.6	65 48.5	25 69	56.8	9
30	65 39.1	11 80	78.9	65 44.8	08 80	76.4	65 49.1	02 78	72.8	65 48.0	04 77	69.1	65 38.5	12 74	64.3	65 34.7	14 73	63.1	65 30.4	16 72	61.9	65 07.3	23 69	57.2	30
1	64 50.9	12 80	78.6	64 57.1	08 80	76.3	65 02.1	03 78	72.7	65 02.1	03 77	69.2	64 54.2	10 74	64.5	64 50.9	12 73	63.3	64 47.0	14 72	62.1	64 25.9	21 69	57.5	1
2	64 02.8	13 80	78.4	64 09.4	09 80	76.1	64 15.2	04 78	72.7	64 16.2	02 77	69.2	64 09.8	09 74	64.6	64 06.9	11 73	63.5	64 03.5	12 73	62.4	63 44.4	19 70	57.9	2
3	63 14.7	13 80	78.2	63 21.7	10 79	76.0	63 28.3	05 78	72.6	63 30.2	00 77	69.3	63 25.4	07 74	64.8	63 22.9	09 73	63.7	63 19.9	11 73	62.6	63 02.7	18 70	58.2	3
4	62 26.6	14 80	77.9	62 34.0	11 79	75.8	62 41.4	06 78	72.5	62 44.2	01 77	69.3	62 40.9	06 74	64.9	62 38.8	08 74	63.8	62 36.2	09 73	62.7	62 20.9	16 70	58.4	4
35	61 38.5	15 80	77.7	61 46.4	11 79	75.6	61 54.5	07 78	72.4	61 58.3	02 77	69.2	61 56.4	05 74	65.0	61 54.7	06 74	63.9	61 52.5	08 73	62.9	61 38.9	15 70	58.7	35
6	60 50.5	15 80	77.4	60 58.8	12 79	75.4	61 07.7	08 78	72.3	61 12.3	03 77	69.2	61 11.8	04 74	65.0	61 10.5	05 74	64.0	61 08.8	07 73	63.0	60 56.9	13 70	58.9	6
7	60 02.6	16 80	77.2	60 11.3	13 79	75.2	60 20.9	08 78	72.2	60 26.4	04 77	69.1	60 27.3	02 74	65.1	60 26.3	04 74	64.1	60 25.0	05 73	63.1	60 14.8	11 70	59.0	7
8	59 14.7	17 80	76.9	59 23.8	14 79	75.0	59 34.1	09 78	72.0	59 40.5	05 76	69.1	59 42.7	01 74	65.1	59 42.1	03 74	64.1	59 41.1	04 73	63.1	59 32.6	10 70	59.2	8
9	58 26.8	17 80	76.6	58 36.3	14 79	74.8	58 47.4	10 78	71.9	58 54.6	06 76	69.0	58 58.1	00 74	65.1	58 57.9	01 74	64.2	58 57.3	03 73	63.2	58 50.4	09 70	59.3	9
40	57 39.1	18 80	76.4	57 48.9	15 79	74.5	58 00.7	11 78	71.7	58 08.7	07 76	68.9	58 13.5	01 74	65.1	58 13.7	00 74	64.2	58 13.4	02 73	63.2	58 08.1	07 71	59.4	40
1	56 51.3	18 79	76.1	57 01.6	16 79	74.3	57 14.0	12 78	71.6	57 22.9	08 76	68.8	57 28.9	02 74	65.1	57 29.4	01 74	64.2	57 29.5	00 73	63.2	57 25.8	06 71	59.5	1
2	56 03.6	19 79	75.8	56 14.3	17 79	74.1	56 27.4	13 78	71.4	56 37.1	09 76	68.7	56 44.4	03 74	65.0	56 45.2	02 74	64.1	56 45.6	01 73	63.2	56 43.4	05 71	59.6	2
3	55 16.0	20 79	75.6	55 27.1	17 79	73.8	55 40.9	13 78	71.2	55 51.3	10 76	68.6	55 59.8	05 74	65.0	56 01.0	03 74	64.1	56 01.8	02 73	63.2	56 01.0	03 71	59.6	3
4	54 28.4	20 79	75.3	54 39.9	18 79	73.6	54 54.4	14 77	71.0	55 05.6	11 76	68.4	55 15.3	06 74	64.9	55 16.8	04 74	64.1	55 17.9	03 73	63.2	55 18.6	02 71	59.7	4
45	53 40.9	21 79	75.0	53 52.8	19 78	73.3	54 07.9	15 77	70.8	54 19.9	12 76	68.3	54 30.8	07 74	64.8	54 32.6	05 74	64.0	54 34.0	04 73	63.1	54 36.2	01 71	59.7	45
6	52 53.5	21 79	74.7	53 05.7	19 78	73.1	53 21.5	16 77	70.6	53 34.2	12 76	68.1	53 46.3	08 74	64.8	53 48.4	07 74	63.9	53 50.2	05 73	63.1	53 53.7	01 71	59.7	6
7	52 06.1	22 79	74.4	52 18.7	20 78	72.8	52 35.2	17 77	70.4	52 48.7	13 76	68.0	53 01.9	09 74	64.7	53 04.3	08 74	63.8	53 06.4	06 73	63.0	53 11.3	02 71	59.7	7
8	51 18.8	23 79	74.1	51 31.8	21 78	72.6	51 48.9	17 77	70.2	52 03.1	14 76	67.8	52 17.5	10 74	64.5	52 20.2	09 73	63.7	52 22.6	07 73	62.9	52 28.9	03 71	59.6	8
9	50 31.6	23 79	73.8	50 44.9	21 78	72.3	51 02.7	18 77	70.0	51 17.7	15 76	67.6	51 33.1	11 74	64.4	51 36.2	10 73	63.6	51 38.9	09 73	62.8	51 46.5	04 71	59.6	9
50	49 44.4	24 78	73.5	49 58.2	22 78	72.0	50 16.6	19 77	69.7	50 32.3	16 76	67.4	50 48.8	12 74	64.3	50 52.2	11 73	63.5	50 55.2	10 73	62.7	51 04.1	05 71	59.5	50
1	48 57.3	25 78	73.2	49 11.5	23 78	71.7	49 30.5	20 77	69.5	49 46.9	17 75	67.2	50 04.6	13 74	64.1	50 08.2	12 73	63.4	50 11.5	11 73	62.6	50 21.8	06 71	59.5	1
2	48 10.3	25 78	72.9	48 24.8	23 78	71.5	48 44.5	20 77	69.3	49 01.6	18 75	67.0	49 20.4	14 74	64.0	49 24.3	13 73	63.2	49 27.9	12 73	62.5	49 39.4	08 70	59.4	2
3	47 23.3	26 78	72.6	47 38.3	24 77	71.2	47 58.6	21 76	69.0	48 16.4	18 75	66.8	48 36.2	15 73	63.8	48 40.4	14 73	63.1	48 44.4	13 72	62.3	48 57.2	09 70	59.3	3
4	46 36.5	26 78	72.3	46 51.8	25 77	70.9	47 12.7	22 76	68.8	47 31.3	19 75	66.6	47 52.1	16 73	63.7	47 56.6	15 73	62.9	48 00.9	14 72	62.2	48 14.9	10 70	59.2	4
55	45 49.7	27 78	72.0	46 05.4	25 77	70.6	46 27.0	23 76	68.5	46 46.2	20 75	66.4	47 08.1	16 73	63.5	47 12.9	16 73	62.8	47 17.4	15 72	62.0	47 32.7	11 70	59.1	55
6	45 03.0	28 78	71.7	45 19.0	26 77	70.3	45 41.3	23 76	68.2	46 01.2	21 75	66.1	46 24.2	17 73	63.3	46 29.2	16 73	62.6	46 34.1	16 72	61.9	46 50.6	12 70	59.0	6
7	44 16.4	28 78	71.4	44 32.8	27 77	70.0	44 55.7	24 76	68.0	45 16.3	22 75	65.9	45 40.3	18 73	63.1	45 45.6	17 73	62.4	45 50.7	17 72	61.7	46 08.5	13 70	58.9	7
8	43 29.8	29 77	71.0	43 46.7	27 77	69.7	44 10.1	25 76	67.7	44 31.5	22 75	65.7	44 56.5	19 73	62.9	45 02.1	18 72	62.2	45 07.5	17 72	61.5	45 26.4	14 70	58.7	8
9	42 43.4	29 77	70.7	43 00.6	28 77	69.4	43 24.7	26 76	67.4	43 46.7	23 74	65.4	44 12.8	20 73	62.7	44 18.7	19 72	62.0	44 24.3	18 72	61.3	44 44.5	15 70	58.6	9
60	41 57.1	30 77	70.4	42 14.6	29 76	69.1	42 39.4	26 75	67.2	43 02.1	24 74	65.2	43 29.1	21 73	62.5	43 35.3	20 72	61.8	43 41.2	19 72	61.2	44 02.6	16 70	58.4	60
1	41 10.8	31 77	70.1	41 28.8	29 76	68.8	41 54.1	27 75	66.9	42 17.5	25 74	64.9	42 45.6	22 72	62.3	42 52.0	21 72	61.6	42 58.2	20 72	61.0	43 20.7	17 70	58.3	1
2	40 24.6	31 77	69.7	40 43.0	30 76	68.5	41 09.0	28 75	66.6	41 33.1	26 74	64.7	42 02.1	23 72	62.1	42 08.8	22 72	61.4	42 15.3	21 71	60.7	42 39.0	18 69	58.1	2
3	39 38.6	32 77	69.4	39 57.3	31 76	68.2	40 23.9	29 75	66.3	40 48.7	26 74	64.4	41 18.7	24 72	61.8	41 25.7	23 72	61.2	41 32.5	22 71	60.5	41 57.3	19 69	57.9	3
4	38 52.6	32 76	69.1	39 11.7	31 76	67.9	39 39.0	29 75	66.0	40 04.4	27 74	64.1	40 35.5	24 72	61.6	40 42.7	24 72	61.0	40 49.7	23 71	60.3	41 15.7	20 69	57.7	4
65	38 06.8	33 76	68.7	38 26.3	32 76	67.5	38 54.1	30 75	65.7	39 20.2	28 73	63.9	39 52.3	25 72	61.3	39 59.8	25 71	60.7	40 07.1	24 71	60.1	40 34.2	21 69	57.5	65
6	37 21.0	34 76	68.4	37 40.9	33 75	67.2	38 09.4	31 74	65.4	38 36.2	29 73	63.6	39 09.2	26 72	61.1	39 17.0	26 71	60.5	39 24.5	25 71	59.9	39 52.8	22 69	57.3	6
7	36 35.4	34 76	68.0	36 55.7	33 75	66.9	37 24.7	31 74	65.1	37 52.2	30 73	63.3	38 26.2	27 71	60.8	38 34.2	26 71	60.2	38 42.1	26 71	59.6	39 11.4	23 69	57.1	7
8	35 49.9	35 76	67.7	36 10.5	34 75	66.5	36 40.2	32 74	64.8	37 08.4	30 73	63.0	37 43.4	28 71	60.6	37 51.6	27 71	60.0	37 59.7	27 70	59.4	38 30.2	24 69	56.9	8
9	35 04.4	36 76	67.3	35 25.5	35 75	66.2	35 55.8	33 74	64.5	36 24.6	31 73	62.7	37 00.6	29 71	60.3	37 09.1	28 71	59.7	37 17.5	28 70	59.1	37 49.1	25 68	56.7	9
70	34 19.1	36 75	67.0	34 40.6	35 75	65.9	35 11.5	34 74	64.1	35 41.0	32 72	62.4	36 18.0	30 71	60.1	36 26.8	29 70	59.5	36 35.4	28 70	58.9	37 08.1	26 68	56.5	70
1	33 34.0	37 75	66.6	33 55.8	36 74	65.5	34 27.4	34 73	63.8	34 57.5	33 72	62.1	35 35.4	30 71	59.8	35 44.5	30 70	59.2	35 53.4	29 70	58.6	36 27.2	27 68	56.2	1
2	32 48.9	38 75	66.3	33 11.1	37 74	65.2	33 43.3	35 73	63.5	34 14.1	33 72	61.8	34 53.0	31 70	59.5	35 02.3	31 70	58.9	35 11.5	30 70	58.3	35 46.4	28 68	56.0	2
3	32 04.0	38 75	65.9	32 26.6	37 74	64.8	32 59.4	36 73	63.2	33 30.9	34 72	61.5	34 10.7	32 70	59.2	34 20.3	32 70	58.6	34 29.7	31 69	58.1	35 05.7	29 68	55.7	3
4	31 19.2	39 74	65.6	31 42.2	38 74	64.5	32 15.6	36 73	62.8	32 47.8	35 72	61.2	33 28.6	33 70	58.9	33 38.4	32 70	58.4	33 48.1	32 69	57.8	34 25.1	30 67	55.5	4
75	30 34.5	39 74	65.2	30 57.9	39 74	64.1	31 32.0	37 73	62.5	32 04.8	36 71	60.8	32 46.5	34 70	58.6	32 56.6	33 69	58.1	33 06.5	33 69	57.5	33 44.7	31 67	55.2	75
6	29 49.9	40 74	64.8	30 13.7	39 73	63.7	30 48.4	38 72	62.1	31 21.9	37 71	60.5	32 04.7	35 70	58.3	32 15.0	34 69	57.8	32 25.2	34 69	57.2	33 04.4	32 67	55.0	6
7	29 05.5	41 74	64.4	29 29.7	40 73	63.4	30 05.0	39 72	61.8	30 39.2	37 71	60.2	31 22.9	35 69	58.0	31 33.5	35 69	57.5	31 43.9	35 69	56.9	32 24.2	33 67	54.7	7
8	28 21.3	41 74	64.1	28 45.8	41 73	63.0	29 21.8	39 72	61.4	29 56.6	38 71	59.9	30 41.3	36 69	57.7	30 52.1	36 69	57.2	31 02.8	35 68	56.6	31 44.2	34 66	54.4	8
9	27 37.1	42 73	63.7	28 02.1	41 73	62.6	28 38.7	40 72	61.1	29 14.2	39 70	59.5	29 59.8	37 69	57.4	30 10.9	37 68	56.8	30 21.8	36 68	56.3	31 04.3	34 66	54.1	9
80	26 53.2	43 73	63.3	27 18.5	42 72	62.3	27 55.8	41 71	60.7	28 31.9	40 70	59.2	29 18.5	38 69	57.1	29 29.8	38 68	56.5	29 41.0	37 68	56.0	30 24.5	35 66	53.8	80
1	26 09.3	43 73	62.9	26 35.1	43 72	61.9	27 13.0	42 71	60.4	27 49.8	40 70	58.8	28 37.3	39 68	56.7	28 48.9	38 68	56.2	29 00.3	38 68	55.7	29 44.9	36 66	53.6	1
2	25 25.7	44 73	62.5	25 51.8	43 72	61.5	26 30.3	42 71	60.0	27 07.8	41 70	58.5	27 56.3	40 68	56.4	28 08.1	39 68	55.9	28 19.8	39 67	55.4	29 05.4	37 66	53.3	2
3	24 42.1	45 72	62.1	25 08.7	44 72	61.1	25 47.8	43 71	59.6	26 26.0	42 69	58.1	27 15.4	40 68	56.1	27 27.5	40 67	55.6	27 39.5	40 67	55.0	28 26.1	38 65	53.0	3
4	23 58.8	45 72	61.7	24 25.8	45 71	60.7	25 05.5	44 70	59.3	25 44.4	43 69	57.8	26 34.7	41 68	55.7	26 47.1	41 67	55.2	26 59.3	41 67	54.7	27 47.0	39 65	52.6	4
85	23 15.6	46 72	61.3	23 43.0	45 71	60.3	24 23.4	44 70	58.9	25 02.9	43 69	57.4	25 54.2	42 67	55.4	26 06.8	42 67	54.9	26 19.2	41 66	54.4	27 08.0	40 65	52.3	85
6	22 32.5	47 71	60.9	23 00.3	46 71	59.9	23 41.4	45 70	58.5	24 21.6	44 69	57.0	25 13.8	43 67	55.0	25 26.7	43 67	54.5	25 39.4	42 66	54.0	26 29.2	41 64	52.0	6
7	21 49.7	47 71	60.5	22 17.9	47 70	59.5	22 59.6	46 69	58.1	23 40.4	45 68	56.6	24 33.6	44 67	54.7	24 46.7	43 66	54.2	24 59.7	43 66	53.7	25 50.5	42 64	51.7	7
8	21 07.0	48 71	60.1	21 35.6	47 70	59.1	22 17.9	47 69	57.7	22 59.5	46 68	56.3	23 53.6	45 66	54.3	24 06.9	44 66	53.8	24 20.2	44 66	53.3	25 12.1	43 64	51.4	8
9	20 24.5	49 71	59.7	20 53.5	48 70	58.7	21 36.5	47 69	57.3	22 18.7	47 68	55.9	23 13.8	45 66	54.0	23 27.4	45 66	53.5	23 40.8	45 65	53.0	24 33.8	43 64	51.0	9
90	19 42.2	49 70	59.2	20 11.6	49 70	58.3	20 55.2	48 68	56.9	21 38.1	47 67	55.5	22 34.1	46 66	53.6	22 48.0	46 65	53.1	23 01.7	46 65	52.6	23 55.6	44 63	50.7	90

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DECLINATION CONTRARY NAME TO LATITUDE

Lat. 35°

H.A.	36° 00' Alt. Δd Δt Az.	37° 00' Alt. Δd Δt Az.	38° 30' Alt. Δd Δt Az.	40° 00' Alt. Δd Δt Az.	42° 00' Alt. Δd Δt Az.	42° 30' Alt. Δd Δt Az.	43° 00' Alt. Δd Δt Az.	45° 00' Alt. Δd Δt Az.	H.A.
00	19 00.0 1.00 1 180.0	18 00.0 1.00 1 180.0	16 30.0 1.00 1 180.0	15 00.0 1.00 1 180.0	13 00.0 1.00 1 180.0	12 30.0 1.00 1 180.0	12 00.0 1.00 1 180.0	10 00.0 1.00 1 180.0	00
1	18 59.6 1.00 2 179.1	17 59.6 1.00 2 179.2	16 29.6 1.00 2 179.2	14 59.7 1.00 2 179.2	12 59.7 1.00 2 179.2	12 29.7 1.00 2 179.2	11 59.7 1.00 2 179.3	9 59.7 1.00 2 179.3	1
2	18 58.5 1.00 3 178.3	17 58.6 1.00 3 178.3	16 28.6 1.00 3 178.4	14 58.6 1.00 3 178.4	12 58.7 1.00 3 178.5	12 28.7 1.00 3 178.5	11 58.7 1.00 3 178.5	9 58.8 1.00 3 178.6	2
3	18 56.7 1.00 4 177.4	17 56.8 1.00 4 177.5	16 26.9 1.00 4 177.6	14 56.9 1.00 4 177.6	12 57.1 1.00 4 177.7	12 27.1 1.00 4 177.7	11 57.1 1.00 4 177.8	9 57.2 1.00 4 177.8	3
4	18 54.1 1.00 5 176.6	17 54.2 1.00 5 176.6	16 24.4 1.00 5 176.7	14 54.6 1.00 5 176.8	12 54.6 1.00 5 177.0	12 24.8 1.00 5 177.0	11 54.9 1.00 5 177.0	9 55.1 1.00 5 177.1	4
05	18 50.8 1.00 7 175.7	17 51.0 1.00 7 175.8	16 21.3 1.00 6 175.9	14 51.5 1.00 6 176.0	12 51.8 1.00 6 176.2	12 21.9 1.00 6 176.2	11 52.0 1.00 6 176.3	9 52.3 1.00 6 176.4	05
6	18 46.8 1.00 8 174.9	17 47.1 1.00 8 175.0	16 17.4 1.00 8 175.1	14 47.8 1.00 7 175.2	12 48.2 1.00 7 175.4	12 18.4 1.00 7 175.5	11 48.5 1.00 7 175.5	9 48.9 1.00 7 175.7	6
7	18 42.1 99 09 174.0	17 42.4 99 09 174.1	16 12.9 99 09 174.3	14 43.3 99 09 174.5	12 44.0 99 09 174.7	12 14.2 99 09 174.7	11 44.3 99 08 174.8	9 44.9 99 08 175.0	7
8	18 36.6 99 10 173.2	17 37.0 99 10 173.3	16 07.7 99 10 173.5	14 38.3 99 10 173.7	12 39.1 99 09 173.9	12 09.3 99 09 174.0	11 39.5 99 09 174.0	9 40.3 99 09 174.3	8
9	18 30.4 99 12 172.3	17 30.9 99 11 172.5	16 01.7 99 11 172.7	14 32.5 99 11 172.9	12 33.6 99 10 173.2	12 03.8 99 10 173.2	11 34.1 99 10 173.3	9 35.1 99 10 173.6	9
10	18 23.5 99 13 171.5	17 24.1 99 12 171.6	15 55.1 99 12 171.9	14 26.1 99 12 172.1	12 27.4 99 11 172.4	11 57.7 99 11 172.5	11 28.0 99 11 172.6	9 29.3 99 11 172.8	10
1	18 15.8 99 14 170.6	17 16.6 99 14 170.8	15 47.8 99 13 171.1	14 19.0 99 13 171.3	12 20.6 99 12 171.7	11 51.0 99 12 171.7	11 21.4 99 12 171.8	9 22.9 99 12 172.1	1
2	18 07.5 98 15 169.8	17 08.4 98 15 170.0	15 39.9 98 15 170.3	14 11.3 98 14 170.5	12 13.1 98 13 170.9	11 43.6 98 13 171.0	11 14.1 98 13 171.1	9 15.9 98 13 171.4	2
3	17 58.4 98 16 169.0	16 59.6 98 16 169.2	15 31.2 98 15 169.5	14 02.9 98 15 169.8	12 05.1 98 14 170.2	11 35.6 98 14 170.3	11 06.1 98 14 170.3	9 08.2 98 14 170.7	3
4	17 48.7 98 17 168.1	16 50.0 98 17 168.4	15 21.9 98 17 168.7	13 53.8 98 16 169.0	11 56.3 98 16 169.4	11 27.0 98 15 169.5	10 57.6 98 15 169.6	9 00.0 98 15 170.0	4
15	17 38.2 97 19 167.3	16 39.7 98 18 167.5	15 11.9 98 18 167.9	13 44.1 98 17 168.2	11 47.0 98 17 168.7	11 17.7 98 16 168.8	10 48.4 98 16 168.9	8 51.2 98 16 169.3	15
6	17 27.1 97 20 166.5	16 28.8 97 19 166.7	15 01.3 97 19 167.1	13 33.8 97 18 167.5	11 37.0 97 18 167.9	11 07.8 97 17 168.0	10 38.6 97 17 168.2	8 41.8 97 17 168.6	6
7	17 15.2 97 21 165.7	16 17.2 97 20 166.0	14 50.0 97 20 166.3	13 22.8 97 19 166.7	11 26.4 97 19 167.2	10 57.3 97 18 167.3	10 28.2 97 18 167.4	8 31.8 97 18 167.9	7
8	17 02.7 96 22 164.8	16 04.9 96 22 165.1	14 38.0 97 21 165.5	13 11.1 97 20 165.9	11 15.2 97 20 166.5	10 46.2 97 20 166.6	10 17.3 97 19 166.7	8 21.3 97 19 167.2	8
9	16 49.5 96 23 164.0	15 51.9 96 23 164.3	14 25.4 96 22 164.7	12 58.9 96 21 165.2	11 03.4 96 21 165.7	10 34.5 96 20 165.9	10 05.7 96 20 166.0	8 10.1 96 20 166.6	9
20	16 35.7 96 24 163.2	15 38.3 96 24 163.5	14 12.2 96 23 164.0	12 46.0 96 23 164.4	10 51.0 96 22 165.0	10 22.2 96 22 165.1	9 53.5 96 21 165.3	7 58.4 96 20 165.9	20
1	16 21.2 95 26 162.4	15 24.0 95 26 162.7	13 58.3 95 24 163.2	12 32.5 95 24 163.7	10 38.0 95 23 164.3	10 09.3 95 22 164.4	9 40.7 95 22 164.6	7 46.1 95 21 165.2	1
2	16 06.0 95 26 161.6	15 09.1 95 26 161.9	13 43.8 95 25 162.4	12 18.3 95 25 162.9	10 24.4 95 24 163.6	9 55.9 95 23 163.7	9 27.4 95 23 163.9	7 33.3 95 22 164.5	2
3	15 50.2 94 27 160.8	14 53.6 94 27 161.2	13 28.6 94 26 161.7	12 03.6 94 26 162.2	10 10.2 94 25 162.8	9 41.8 95 24 163.0	9 13.4 95 24 163.2	7 19.9 95 23 163.8	3
4	15 33.7 94 29 160.0	14 37.4 94 28 160.4	13 12.9 94 27 160.9	11 48.3 94 27 161.4	9 55.4 94 26 162.1	9 27.1 94 25 162.3	8 58.9 94 25 162.5	7 05.9 94 24 163.2	4
25	15 16.6 93 30 159.2	14 20.6 93 29 159.6	12 56.5 93 28 160.2	11 32.3 94 28 160.7	9 40.0 94 27 161.4	9 11.9 94 26 161.6	8 43.8 94 26 161.8	6 51.4 94 25 162.5	25
6	14 58.9 93 31 158.5	14 03.1 93 30 158.9	12 39.5 93 29 159.4	11 15.8 93 29 160.0	9 24.1 93 28 160.7	8 56.1 93 27 160.9	8 28.2 93 27 161.1	6 36.3 93 26 161.8	6
7	14 40.5 92 32 157.7	13 45.1 92 31 158.1	12 21.9 92 30 158.7	10 58.7 93 30 159.3	9 07.5 93 28 160.0	8 39.7 93 28 160.2	8 12.0 93 28 160.4	6 20.7 93 27 161.2	7
8	14 21.5 92 33 156.9	13 26.4 92 32 157.3	12 03.7 92 31 157.9	10 41.0 92 30 158.5	8 50.5 92 29 159.3	8 22.8 92 29 159.5	7 55.2 92 29 159.7	6 04.6 92 28 160.5	8
9	14 02.0 91 34 156.2	13 07.2 91 33 156.6	11 45.0 91 32 157.2	10 22.7 91 31 157.8	8 32.8 92 30 158.6	8 05.4 92 30 158.8	7 37.9 92 30 159.0	5 47.9 92 29 159.8	9
30	13 41.8 91 35 155.4	12 47.4 91 34 155.8	11 25.6 91 33 156.5	10 03.8 91 32 157.1	8 14.7 91 31 157.9	7 47.3 91 31 158.2	7 20.0 91 31 158.4	5 30.7 91 30 159.2	30
1	13 21.0 90 36 154.6	12 27.0 90 35 155.1	11 05.7 90 34 155.7	9 44.4 90 33 156.4	7 55.9 90 32 157.3	7 28.8 90 32 157.7	7 01.6 91 32 157.7	5 13.0 91 30 158.5	1
2	12 59.7 90 37 153.9	12 06.0 90 36 154.4	10 45.3 90 35 155.0	9 24.5 90 34 155.7	7 36.7 90 33 156.6	7 09.7 90 33 156.8	6 42.7 90 32 157.0		2
3	12 37.8 89 37 153.2	11 44.4 89 37 153.6	10 24.3 89 36 154.3	9 04.0 89 35 155.0	7 16.9 89 34 155.9	6 50.1 89 34 156.1	6 23.3 89 33 156.4		3
4	12 15.3 88 38 152.4	11 22.3 88 38 152.9	10 02.7 89 37 153.6	8 43.0 89 36 154.3	6 56.6 89 35 155.3	6 29.9 89 34 155.5	6 03.3 89 34 155.7		4
35	11 52.3 88 39 151.7	10 59.6 88 39 152.2	9 40.6 88 38 152.9	8 21.4 88 37 153.6	6 35.7 88 36 154.6	6 09.3 88 35 154.8	5 42.9 88 35 155.1		35
6	11 28.7 87 40 151.0	10 36.4 87 40 151.5	9 17.9 87 39 152.2	7 59.3 87 38 153.0	6 14.4 87 36 153.9	5 48.1 88 36 154.2	5 21.9 88 36 154.4		6
7	11 04.6 86 41 150.3	10 12.7 87 40 150.8	8 54.7 87 39 151.5	7 36.7 87 39 152.3	5 52.5 87 37 153.3	5 26.5 87 37 153.5	5 00.4 87 37 153.8		7
8	10 40.0 86 42 149.5	9 48.4 86 41 150.1	8 31.1 86 40 150.8	7 13.6 86 39 151.6	5 30.2 86 38 152.6	5 04.3 86 38 152.9			8
9	10 14.8 85 43 148.8	9 23.6 85 42 149.4	8 06.9 85 41 150.2	6 50.0 85 40 151.0	5 07.4 86 39 152.0				9
40	9 49.1 85 44 148.1	8 58.4 85 43 148.7	7 42.2 85 42 149.5	6 25.9 85 41 150.3					40
1	9 22.9 84 44 147.5	8 32.6 84 44 148.0	7 17.0 84 43 148.8	6 01.3 84 42 149.6					1
2	8 56.2 83 45 146.8	8 06.3 83 45 147.3	6 51.3 83 44 148.2	5 36.2 83 43 149.0					2
3	8 29.0 83 46 146.1	7 39.5 83 45 146.7	6 25.1 83 44 147.5	5 10.7 83 43 148.4					3
4	8 01.4 82 47 145.4	7 12.3 82 46 146.0	5 58.5 82 45 146.9						4
45	7 33.3 81 48 144.8	6 44.5 81 47 145.3	5 31.4 81 46 146.2						45
6	7 04.7 80 48 144.1	6 16.4 81 48 144.7	5 03.8 81 47 145.6						6
7	6 35.6 80 49 143.4	5 47.7 80 48 144.0							7
8	6 06.1 79 50 142.8	5 18.7 79 49 143.4							8
9	5 36.2 78 51 142.2								9
50	5 05.8 78 51 141.5								50

DECLINATION SAME NAME AS LATITUDE

Lat. 36°
Lat. 37°
Lat. 38°

H.A.	36° 00' Alt. Δd Δt Az.	37° 00' Alt. Δd Δt Az.	38° 30' Alt. Δd Δt Az.	40° 00' Alt. Δd Δt Az.	42° 00' Alt. Δd Δt Az.	42° 30' Alt. Δd Δt Az.	43° 00' Alt. Δd Δt Az.	45° 00' Alt. Δd Δt Az.	H.A.
91	19 00.0 50 70 58.8	19 29.9 49 68 57.9	20 14.1 49 68 56.5	20 57.7 48 67 55.1	21 54.7 47 65 53.2	22 08.7 47 65 52.7	22 22.7 46 65 52.3	23 17.7 45 63 50.3	91
2	18 18.1 51 70 58.4	18 48.3 50 69 57.5	19 33.2 50 68 56.1	20 17.5 49 67 54.7	21 15.4 48 65 52.8	21 29.7 48 65 52.4	21 43.9 47 64 51.9	22 40.0 46 63 50.0	2
3	17 36.3 51 69 58.0	18 07.0 51 69 57.0	18 52.5 50 68 55.7	19 37.4 50 66 54.3	20 36.4 49 65 52.5	20 50.9 48 64 52.0	21 05.4 48 64 51.5	22 02.4 47 62 49.6	3
4	16 54.8 52 69 57.5	17 25.8 52 68 56.6	18 12.0 51 67 55.3	18 57.6 50 66 53.9	19 57.5 49 64 52.1	20 12.3 49 64 51.6	20 27.0 49 64 51.1	21 25.1 48 62 49.3	4
95	16 13.4 53 69 57.1	16 44.9 52 68 56.2	17 31.7 52 67 54.8	18 18.0 51 66 53.5	19 18.8 50 64 51.7	19 33.9 50 64 51.2	19 48.8 50 63 50.8	20 48.0 49 62 48.9	95
6	15 32.2 53 68 56.6	16 04.2 53 68 55.7	16 51.7 52 66 54.4	17 38.6 52 65 53.1	18 40.4 51 64 51.3	18 55.7 51 63 50.8	19 10.9 51 63 50.4	20 11.0 50 61 48.5	6
7	14 51.3 54 68 56.2	15 23.7 54 67 55.3	16 11.8 53 66 54.0	16 59.4 53 65 52.7	18 02.1 52 63 50.9	18 17.7 52 63 50.4	18 33.1 51 63 50.0	19 34.3 51 61 48.1	7
8	14 10.6 55 68 55.7	14 43.4 54 67 54.9	15 32.1 54 66 53.6	16 20.5 53 65 52.2	17 24.1 53 63 50.5	17 39.9 52 63 50.0	17 55.6 52 62 49.6	18 57.8 51 60 47.8	8
9	13 30.1 55 67 55.3	14 03.3 55 66 54.4	14 52.7 55 65 53.1	15 41.7 54 64 51.8	16 46.3 53 63 50.1	17 02.4 53 62 49.6	17 18.3 53 62 49.2	18 21.5 52 60 47.4	9
100	12 49.8 56 67 54.8	13 23.4 56 66 53.9	14 13.5 55 65 52.7	15 03.2 55 64 51.4	16 08.8 54 62 49.6	16 25.0 54 62 49.2	16 41.2 54 61 48.8	17 45.5 53 59 47.0	100
1	12 09.8 57 66 54.3	12 43.8 57 65 53.5	13 34.4 56 65 52.3	14 24.9 56 63 50.9	15 31.4 55 62 49.2	15 47.9 55 61 48.8	16 04.4 55 61 48.3	17 09.7 54 59 46.6	1
2	11 30.0 58 66 53.9	12 04.4 57 65 53.0	12 55.8 57 64 51.8	13 46.9 57 63 50.5	14 54.0 56 61 48.8	15 11.1 56 61 48.4	15 27.8 56 61 47.9	16 34.1 55 59 46.2	2
3	10 50.4 58 66 53.4	11 25.3 58 65 52.6	12 17.4 58 64 51.3	13 09.1 57 63 50.0	14 17.5 57 61 48.4	14 34.5 57 61 47.9	14 51.4 56 60 47.5	15 58.7 56 58 45.8	3
4	10 11.1 59 65 52.9	10 46.4 59 64 52.1	11 39.1 58 63 50.8	12 31.6 58 62 49.6	13 40.9 58 61 47.9	13 58.1 57 60 47.5	14 15.3 57 60 47.1	15 23.6 57 58 45.4	4
105	9 32.0 60 65 52.4	10 07.7 59 64 51.6	11 01.1 59 63 50.4	11 54.3 59 62 49.1	13 04.6 59 60 47.5	13 22.0 58 60 47.1	13 39.5 58 59 46.6	14 48.8 57 58 44.9	105
6	8 53.2 60 64 51.9	9 29.4 60 64 51.1	10 23.4 60 62 49.9	11 17.2 60 61 48.7	12 28.5 59 60 47.0	12 46.2 59 59 46.6	13 03.9 59 59 46.2	14 14.2 58 57 44.5	6
7	8 14.6 61 64 51.4	8 51.2 61 63 50.6	9 46.0 61 62 49.4	10 40.4 60 61 48.2	11 52.6 60 59 46.6	12 10.6 60 59 46.2	12 28.5 60 58 45.8	13 39.8 59 57 44.1	7
8	7 36.3 62 63 50.9	8 13.4 62 63 50.1	9 08.8 61 62 48.9	10 03.9 61 60 47.7	11 17.1 61 59 46.1	11 35.3 61 58 45.7	11 53.5 61 58 45.3	13 05.8 60 56 43.7	8
9	6 58.3 62 63 50.4	7 35.8 62 62 49.6	8 31.9 62 61 48.4	9 27.7 62 60 47.2	10 41.8 62 58 45.6	11 00.2 61 58 45.2	11 18.7 61 58 44.8	12 32.0 61 56 43.2	9
110	6 20.6 63 62 49.9	6 58.5 63 62 49.1	7 55.2 63 61 47.9	8 51.8 63 59 46.8	10 06.8 62 58 45.2	10 25.5 62 57 44.8	10 44.1 62 57 44.4	11 58.5 62 55 42.8	110
1	5 43.1 64 62 49.4	6 21.5 64 61 48.6	7 18.9 64 60 47.4	8 16.1 63 59 46.3	9 32.1 63 57 44.7	9 51.0 63 57 44.3	10 09.9 63 57 43.9	11 25.2 63 55 42.3	1
2	5 06.0 65 61 48.9	5 44.8 65 61 48.1	6 42.8 64 60 46.9	7 40.7 64 58 45.8	8 57.6 64 57 44.2	9 16.8 64 56 43.8	9 36.0 64 56 43.5	10 52.3 63 54 41.9	2
3		5 08.3 65 60 47.6	6 07.1 65 59 46.4	7 05.7 65 58 45.3	8 23.5 65 56 43.7	8 42.9 65 56 43.4	9 02.3 65 55 43.0	10 19.6 64 54 41.4	3
4			5 31.6 66 59 45.9	6 30.9 66 57 44.8	7 49.7 66 55 43.3	8 09.3 65 55 42.9	8 28.9 65 55 42.5	9 47.2 65 53 41.0	4
115			5 56.4 67 57 44.3		7 16.1 66 55 42.8	7 36.0 66 55 42.4	7 55.9 66 55 42.0	9 15.2 66 53 40.5	115
6			5 22.3 67 56 43.8		6 42.9 67 55 42.3	7 03.1 67 54 41.9	7 23.2 67 54 41.5	8 43.4 67 52 40.0	6
7					6 10.0 68 54 41.8	6 30.4 68 54 41.4	6 50.7 68 54 41.0	8 12.0 68 52 39.5	7
8					5 37.5 69 54 41.2	5 58.1 69 53 40.9	6 18.7 69 53 40.5	7 40.8 68 51 39.0	8
9					5 05.2 69 53 40.7	5 26.1 69 53 40.4	5 46.9 69 52 40.0	7 10.0 69 51 38.6	9
120							5 15.5 70 52 39.5	6 39.6 70 50 38.1	120
1								6 09.4 71 50 37.6	1
2								5 39.6 72 49 37.1	2
3								5 10.2 72 48 36.5	3

Lat. 35°

Each cell shows: Alt. / Δd Δt / Az.

H.A.	46° 00'	47° 00'	48° 30'	49° 30'	50° 30'	51° 30'	52° 30'	54° 00'	H.A.
00	79 00.0 / 1.00 8 / 00.0	78 00.0 / 1.00 2 / 00.0	76 30.9 / 1.00 2 / 00.0	75 30.0 / 1.00 2 / 00.0	74 30.0 / 1.00 2 / 00.0	73 30.0 / 1.00 2 / 00.0	72 30.9 / 1.00 1 / 00.0	71 00.0 / 1.00 1 / 00.0	00
1	78 58.4 / 1.00 8 / 03.6	77 58.6 / 1.00 7 / 03.3	76 28.8 / 1.00 6 / 02.8	75 28.9 / 1.00 6 / 02.6	74 29.0 / 1.00 6 / 02.4	73 29.1 / 1.00 5 / 02.2	72 29.1 / 1.00 4 / 02.0	70 59.2 / 1.00 4 / 01.8	1
2	78 53.8 / 99 13 / 07.2	77 54.4 / 99 12 / 06.5	76 25.1 / 99 10 / 05.7	75 25.6 / 99 09 / 05.2	74 25.9 / 99 08 / 04.7	73 26.2 / 99 08 / 04.4	72 26.5 / 1.00 7 / 04.0	70 56.9 / 1.00 6 / 03.6	2
3	78 46.1 / 98 18 / 10.8	77 47.4 / 98 16 / 09.7	76 19.1 / 98 14 / 08.4	75 20.0 / 98 13 / 07.7	74 20.9 / 99 12 / 07.1	73 21.6 / 99 10 / 06.5	72 22.2 / 99 10 / 06.0	70 53.0 / 99 09 / 05.4	3
4	78 35.5 / 96 22 / 14.2	77 37.8 / 96 20 / 12.8	76 10.3 / 97 18 / 11.2	75 12.4 / 97 16 / 10.2	74 13.8 / 98 15 / 09.4	73 15.1 / 98 14 / 08.7	72 16.2 / 98 13 / 08.0	70 47.7 / 98 11 / 07.2	4
05	78 22.1 / 94 27 / 17.5	77 25.7 / 94 24 / 15.8	76 00.1 / 96 21 / 13.8	75 02.6 / 96 20 / 12.7	74 04.8 / 97 18 / 11.7	73 06.8 / 97 17 / 10.8	72 08.5 / 97 16 / 10.0	70 40.8 / 98 14 / 08.9	05
6	78 06.0 / 91 31 / 20.6	77 11.0 / 92 28 / 18.7	75 47.3 / 94 25 / 16.4	74 50.8 / 94 23 / 15.1	73 54.0 / 95 21 / 13.9	72 56.7 / 96 20 / 12.8	71 59.2 / 96 18 / 11.9	70 32.5 / 97 16 / 10.6	6
7	77 47.5 / 88 35 / 23.6	76 54.1 / 90 32 / 21.5	75 32.4 / 92 28 / 18.9	74 37.1 / 93 26 / 17.4	73 41.3 / 93 24 / 16.0	72 45.0 / 94 22 / 14.8	71 48.3 / 95 21 / 13.7	70 22.7 / 96 19 / 12.3	7
8	77 26.7 / 86 39 / 26.4	76 35.0 / 87 35 / 24.1	75 15.6 / 89 31 / 21.2	74 21.5 / 90 29 / 19.6	73 26.9 / 92 27 / 18.1	72 31.6 / 93 25 / 16.8	71 36.3 / 94 23 / 15.6	70 11.5 / 94 21 / 14.0	8
9	77 03.9 / 82 41 / 29.0	76 14.0 / 84 38 / 26.6	74 56.8 / 87 34 / 23.5	74 04.2 / 88 32 / 21.7	73 10.8 / 90 29 / 20.1	72 16.6 / 91 27 / 18.7	71 21.9 / 92 26 / 17.3	69 59.0 / 93 20 / 15.6	9
10	76 39.1 / 79 44 / 31.5	75 51.0 / 81 41 / 29.0	74 36.4 / 84 37 / 25.7	73 45.2 / 86 34 / 23.8	72 53.1 / 88 32 / 22.0	72 00.2 / 89 30 / 20.5	71 06.6 / 90 28 / 19.1	69 45.1 / 91 25 / 17.2	10
1	76 12.6 / 76 47 / 33.8	75 26.4 / 78 44 / 31.2	74 14.3 / 82 39 / 27.7	73 24.6 / 84 37 / 25.7	72 33.9 / 85 34 / 23.9	71 42.3 / 87 32 / 22.2	70 49.9 / 88 30 / 20.7	69 30.0 / 89 27 / 18.7	1
2	75 44.5 / 72 49 / 35.9	75 00.2 / 75 46 / 33.2	73 50.7 / 79 42 / 29.7	73 02.6 / 81 39 / 27.6	72 13.3 / 83 37 / 25.7	71 23.0 / 85 34 / 23.9	70 31.8 / 86 32 / 22.3	69 13.7 / 88 29 / 20.2	2
3	75 15.0 / 69 51 / 37.9	74 32.6 / 72 48 / 35.1	73 25.6 / 76 44 / 31.5	72 39.1 / 79 41 / 29.3	71 51.4 / 81 39 / 27.4	71 01.2 / 82 36 / 25.6	70 11.7 / 84 30 / 23.9	68 56.1 / 86 31 / 21.6	3
4	74 44.2 / 66 53 / 39.7	74 03.6 / 69 50 / 36.9	72 59.3 / 74 46 / 33.2	72 14.4 / 76 43 / 31.0	71 28.2 / 78 41 / 29.0	70 40.7 / 80 38 / 27.1	69 52.1 / 82 36 / 25.3	68 37.5 / 84 33 / 23.0	4
15	74 12.3 / 63 55 / 41.3	73 33.5 / 66 52 / 38.6	72 31.8 / 71 48 / 34.8	71 48.5 / 73 45 / 32.6	71 03.8 / 76 42 / 30.5	70 17.7 / 78 40 / 28.5	69 30.5 / 80 38 / 26.7	68 17.8 / 82 35 / 24.3	15
6	73 39.3 / 60 56 / 42.9	73 02.4 / 63 54 / 40.1	72 03.2 / 68 49 / 36.4	71 21.5 / 71 47 / 34.1	70 38.3 / 73 44 / 31.9	69 53.7 / 75 42 / 29.9	69 07.9 / 77 39 / 28.1	67 57.1 / 80 36 / 25.6	6
7	73 05.4 / 57 58 / 44.3	72 30.2 / 60 55 / 41.5	71 33.6 / 65 51 / 37.8	70 53.5 / 68 48 / 35.5	70 11.8 / 71 46 / 33.3	69 28.7 / 73 43 / 31.3	68 44.2 / 75 41 / 29.4	67 35.4 / 78 38 / 26.8	7
8	72 30.7 / 54 59 / 45.6	71 57.2 / 58 56 / 42.9	71 03.0 / 63 52 / 39.1	70 24.5 / 66 49 / 36.8	69 44.4 / 68 47 / 34.6	69 02.7 / 71 45 / 32.5	68 19.2 / 73 40 / 30.6	67 12.8 / 76 38 / 28.0	8
9	71 55.2 / 51 60 / 46.8	71 23.4 / 55 58 / 44.1	70 31.6 / 60 54 / 40.3	69 54.7 / 63 51 / 38.0	69 16.0 / 66 49 / 35.8	68 35.8 / 68 46 / 33.7	67 54.2 / 71 44 / 31.8	66 49.3 / 74 40 / 29.1	9
20	71 19.1 / 48 61 / 47.9	70 48.8 / 52 59 / 45.2	69 59.4 / 57 55 / 41.5	69 24.0 / 60 52 / 39.1	68 46.9 / 63 50 / 36.9	68 06.1 / 66 47 / 34.9	67 27.9 / 68 45 / 32.9	66 25.0 / 71 42 / 30.2	20
1	70 42.3 / 46 62 / 48.9	70 13.6 / 50 60 / 46.3	69 26.5 / 55 56 / 42.6	68 52.7 / 58 53 / 40.2	68 17.0 / 61 51 / 38.0	67 39.6 / 64 49 / 35.9	67 00.8 / 66 46 / 34.0	65 59.9 / 69 43 / 31.2	1
2	70 05.0 / 43 63 / 49.8	69 37.8 / 47 61 / 47.2	68 53.0 / 53 57 / 43.5	68 20.6 / 56 55 / 41.2	67 46.4 / 58 52 / 39.0	67 10.4 / 61 50 / 37.0	66 33.0 / 64 44 / 35.0	65 34.1 / 67 44 / 32.2	2
3	69 27.3 / 41 64 / 50.7	69 01.5 / 45 61 / 48.1	68 18.8 / 50 58 / 44.5	67 47.9 / 53 53 / 42.2	67 15.1 / 56 53 / 40.0	66 40.6 / 59 51 / 38.0	66 04.5 / 61 49 / 35.9	65 07.6 / 65 45 / 33.1	3
4	68 49.0 / 39 64 / 51.4	68 24.7 / 42 62 / 48.9	67 44.1 / 48 59 / 45.3	67 14.6 / 51 56 / 43.1	66 43.2 / 54 54 / 40.9	66 10.1 / 57 52 / 38.8	65 35.3 / 59 50 / 36.8	64 40.5 / 63 46 / 34.0	4
25	68 10.4 / 36 65 / 52.1	67 47.4 / 40 63 / 49.7	67 08.9 / 45 59 / 46.1	66 40.8 / 49 57 / 43.9	66 10.7 / 52 55 / 41.7	65 39.0 / 54 53 / 39.6	65 05.6 / 57 50 / 37.7	64 12.7 / 61 47 / 34.8	25
6	67 31.4 / 34 66 / 52.8	67 09.7 / 38 63 / 50.4	66 33.2 / 43 60 / 46.9	66 06.4 / 46 58 / 44.7	65 37.8 / 49 56 / 42.5	65 07.4 / 52 54 / 40.4	64 35.3 / 55 51 / 38.5	63 44.4 / 58 48 / 35.6	6
7	66 52.1 / 32 66 / 53.4	66 31.7 / 36 64 / 51.0	65 57.2 / 41 61 / 47.6	65 31.1 / 44 59 / 45.4	65 04.3 / 47 56 / 43.2	64 35.2 / 50 54 / 41.2	64 04.5 / 52 52 / 39.2	63 15.5 / 56 49 / 36.4	7
8	66 12.5 / 30 66 / 54.0	65 53.3 / 34 64 / 51.6	65 20.7 / 39 61 / 48.2	64 56.5 / 42 59 / 46.0	64 30.4 / 45 57 / 43.9	64 02.6 / 48 55 / 41.9	63 33.2 / 50 53 / 39.9	62 46.1 / 54 50 / 37.1	8
9	65 32.7 / 28 67 / 54.4	65 14.7 / 32 65 / 52.1	64 43.9 / 37 62 / 48.8	64 20.9 / 40 60 / 46.7	63 56.1 / 43 56 / 44.6	63 29.6 / 46 56 / 42.5	63 01.4 / 48 54 / 40.6	62 16.2 / 52 51 / 37.8	9
30	64 52.6 / 26 67 / 54.9	64 35.7 / 30 65 / 52.6	64 06.7 / 35 62 / 49.4	63 45.0 / 38 60 / 47.2	63 21.5 / 41 58 / 45.2	62 56.2 / 44 58 / 43.2	62 29.2 / 46 54 / 41.2	61 45.9 / 50 51 / 38.4	30
1	64 12.3 / 25 68 / 55.3	63 56.5 / 28 66 / 53.1	63 29.3 / 33 63 / 49.9	63 08.8 / 36 61 / 47.8	62 46.4 / 39 59 / 45.7	62 22.4 / 42 57 / 43.7	61 56.7 / 44 55 / 41.8	61 15.1 / 48 52 / 39.0	1
2	63 31.8 / 23 68 / 55.7	63 17.1 / 26 66 / 53.5	62 51.6 / 31 63 / 50.3	62 32.2 / 34 61 / 48.3	62 11.1 / 37 59 / 46.3	61 48.2 / 39 57 / 44.3	61 23.7 / 42 55 / 42.4	60 44.0 / 46 52 / 39.6	2
3	62 51.1 / 21 68 / 56.0	62 37.5 / 24 66 / 53.9	62 13.6 / 29 64 / 50.8	61 55.4 / 32 61 / 48.7	61 35.4 / 35 60 / 46.7	61 13.8 / 38 58 / 44.8	60 50.4 / 40 56 / 42.9	60 12.5 / 44 53 / 40.1	3
4	62 10.3 / 19 68 / 56.3	61 57.7 / 22 67 / 54.2	61 35.5 / 27 64 / 51.2	61 18.4 / 30 62 / 49.1	60 59.5 / 33 60 / 47.2	60 39.0 / 36 58 / 45.3	60 16.8 / 38 56 / 43.4	59 40.7 / 42 54 / 40.6	4
35	61 29.3 / 18 68 / 56.6	61 17.8 / 21 67 / 54.5	60 57.1 / 25 64 / 51.5	60 41.1 / 28 62 / 49.5	60 23.3 / 31 61 / 47.6	60 03.9 / 34 59 / 45.7	59 42.9 / 36 57 / 43.8	59 08.5 / 40 54 / 41.1	35
6	60 48.2 / 16 69 / 56.8	60 37.9 / 19 67 / 54.8	60 18.5 / 23 65 / 51.8	60 03.6 / 26 63 / 49.9	59 46.9 / 29 61 / 48.0	59 28.7 / 32 59 / 46.1	59 08.8 / 34 57 / 44.2	58 36.1 / 38 55 / 41.5	6
7	60 07.0 / 14 69 / 57.0	59 57.4 / 17 67 / 55.1	59 39.8 / 22 65 / 52.1	59 25.9 / 25 63 / 50.3	59 10.3 / 27 61 / 48.3	58 53.1 / 30 60 / 46.5	58 34.4 / 32 58 / 44.6	58 03.4 / 36 55 / 42.0	7
8	59 25.7 / 13 69 / 57.2	59 17.1 / 16 67 / 55.3	59 00.9 / 20 65 / 52.4	58 48.0 / 23 63 / 50.5	58 33.5 / 26 62 / 48.7	58 17.4 / 28 60 / 46.8	57 59.7 / 31 58 / 45.0	57 30.4 / 34 55 / 42.3	8
9	58 44.4 / 11 69 / 57.4	58 36.6 / 14 68 / 55.5	58 21.9 / 18 65 / 52.7	58 10.0 / 21 64 / 50.8	57 56.5 / 24 62 / 49.0	57 41.5 / 26 60 / 47.1	57 24.9 / 29 58 / 45.3	56 57.1 / 33 56 / 42.7	9
40	58 02.9 / 10 69 / 57.5	57 56.1 / 13 68 / 55.7	57 42.8 / 17 65 / 52.9	57 31.9 / 19 64 / 51.0	57 19.4 / 22 62 / 49.2	57 05.4 / 25 60 / 47.4	56 49.8 / 27 59 / 45.7	56 23.7 / 31 56 / 43.1	40
1	57 21.4 / 09 69 / 57.7	57 15.5 / 11 68 / 55.8	57 03.5 / 15 66 / 53.1	56 53.6 / 18 64 / 51.3	56 42.1 / 20 62 / 49.5	56 29.1 / 23 61 / 47.7	56 14.6 / 25 59 / 46.0	55 50.0 / 29 56 / 43.4	1
2	56 39.9 / 07 69 / 57.8	56 34.8 / 10 68 / 56.0	56 24.2 / 14 66 / 53.3	56 15.2 / 16 64 / 51.5	56 04.7 / 19 63 / 49.7	55 52.7 / 21 61 / 47.9	55 39.2 / 24 60 / 46.3	55 16.2 / 27 57 / 43.7	2
3	55 58.3 / 06 69 / 57.8	55 54.0 / 08 68 / 56.1	55 44.8 / 12 66 / 53.4	55 36.7 / 15 64 / 51.7	55 27.1 / 17 63 / 50.0	55 16.1 / 20 61 / 48.2	55 03.6 / 22 60 / 46.5	54 42.2 / 26 57 / 43.9	3
4	55 16.7 / 04 69 / 57.9	55 13.2 / 07 68 / 56.2	55 05.3 / 11 66 / 53.5	54 58.1 / 13 64 / 51.8	54 49.5 / 16 63 / 50.1	54 39.4 / 18 61 / 48.4	54 27.9 / 20 60 / 46.7	54 08.0 / 24 57 / 44.2	4
45	54 35.0 / 03 69 / 58.0	54 32.4 / 06 68 / 56.2	54 25.7 / 09 66 / 53.7	54 19.4 / 12 65 / 51.9	54 11.7 / 14 63 / 50.2	54 02.6 / 16 62 / 48.6	53 52.1 / 19 60 / 46.9	53 33.7 / 22 57 / 44.4	45
6	53 53.4 / 02 69 / 58.0	53 51.5 / 04 68 / 56.3	53 46.1 / 08 66 / 53.7	53 40.7 / 10 65 / 52.1	53 33.9 / 12 63 / 50.4	53 25.7 / 15 62 / 48.7	53 16.1 / 17 60 / 47.1	52 59.2 / 20 58 / 44.6	6
7	53 11.7 / 01 69 / 58.0	53 10.6 / 03 68 / 56.3	53 06.4 / 06 66 / 53.8	53 01.9 / 09 65 / 52.1	52 56.0 / 11 63 / 50.5	52 48.7 / 13 62 / 48.9	52 40.1 / 16 60 / 47.2	52 24.7 / 19 58 / 44.8	7
8	52 30.0 / 01 69 / 58.0	52 29.7 / 02 68 / 56.4	52 26.8 / 05 66 / 53.9	52 23.1 / 07 65 / 52.3	52 18.1 / 10 63 / 50.6	52 11.7 / 12 62 / 49.0	52 04.0 / 14 60 / 47.4	51 50.0 / 17 58 / 45.0	8
9	51 48.3 / 02 69 / 58.0	51 48.8 / 00 68 / 56.4	51 47.0 / 04 66 / 53.9	51 44.2 / 06 65 / 52.3	51 40.0 / 08 63 / 50.7	51 34.6 / 10 62 / 49.1	51 27.8 / 12 60 / 47.5	51 15.2 / 16 58 / 45.1	9
50	51 06.7 / 03 69 / 58.0	51 07.9 / 01 68 / 56.4	51 07.3 / 02 66 / 54.0	51 05.3 / 04 65 / 52.4	51 02.0 / 07 64 / 50.8	50 57.4 / 09 62 / 49.2	50 51.5 / 11 61 / 47.6	50 40.3 / 14 58 / 45.3	50
1	50 25.0 / 04 69 / 57.9	50 27.0 / 01 68 / 56.3	50 27.5 / 01 66 / 54.0	50 26.3 / 03 65 / 52.4	50 23.9 / 05 64 / 50.8	50 20.1 / 07 62 / 49.3	50 15.2 / 09 61 / 47.7	50 05.3 / 12 58 / 45.4	1
2	49 43.4 / 06 69 / 57.8	49 46.1 / 03 68 / 56.3	49 47.8 / 00 66 / 54.0	49 47.4 / 02 65 / 52.4	49 45.7 / 04 64 / 50.9	49 42.9 / 06 63 / 49.3	49 38.8 / 08 61 / 47.8	49 30.3 / 11 58 / 45.5	2
3	49 01.8 / 07 69 / 57.8	49 05.2 / 03 68 / 56.3	49 08.0 / 01 66 / 54.0	49 08.4 / 01 65 / 52.4	49 07.6 / 02 64 / 50.9	49 05.6 / 04 61 / 49.4	49 02.3 / 06 61 / 47.9	48 55.2 / 09 59 / 45.6	3
4	48 20.2 / 08 69 / 57.7	48 24.3 / 06 68 / 56.2	48 28.3 / 03 66 / 54.0	48 29.5 / 01 65 / 52.4	48 29.4 / 01 64 / 50.9	48 28.2 / 03 62 / 49.4	48 25.9 / 05 61 / 47.9	48 20.1 / 08 59 / 45.7	4
55	47 38.7 / 00 69 / 57.6	47 43.5 / 07 68 / 56.1	47 48.6 / 04 66 / 53.9	47 50.5 / 02 65 / 52.4	47 51.3 / 00 64 / 50.9	47 50.9 / 02 62 / 49.5	47 49.4 / 04 61 / 48.0	47 44.9 / 06 59 / 45.7	55
6	46 57.2 / 10 69 / 57.5	47 02.7 / 08 68 / 56.1	47 08.8 / 05 66 / 53.9	47 11.5 / 04 65 / 52.4	47 13.1 / 02 64 / 50.9	47 13.6 / 00 62 / 49.5	47 12.9 / 02 61 / 48.0	47 09.7 / 05 59 / 45.8	6
7	46 15.7 / 11 69 / 57.4	46 21.9 / 09 68 / 56.0	46 29.2 / 07 66 / 53.8	46 32.6 / 05 65 / 52.3	46 35.0 / 03 64 / 50.9	46 36.3 / 01 62 / 49.5	46 36.3 / 01 61 / 48.0	46 34.5 / 03 59 / 45.8	7
8	45 34.4 / 12 69 / 57.3	45 41.2 / 11 68 / 55.9	45 49.5 / 08 66 / 53.7	45 53.7 / 06 65 / 52.3	45 56.8 / 04 64 / 50.9	45 58.9 / 02 62 / 49.4	45 59.8 / 01 61 / 48.0	45 59.2 / 02 59 / 45.8	8
9	44 53.0 / 13 69 / 57.2	45 00.5 / 12 68 / 55.8	45 09.9 / 09 66 / 53.7	45 14.8 / 07 65 / 52.2	45 18.7 / 06 63 / 50.8	45 21.5 / 04 62 / 49.4	45 23.3 / 02 61 / 48.0	45 24.0 / 01 59 / 45.9	9
60	44 11.7 / 14 69 / 57.0	44 19.9 / 13 68 / 55.7	44 30.3 / 10 66 / 53.6	44 36.0 / 09 65 / 52.2	44 40.6 / 07 63 / 50.8	44 44.2 / 05 62 / 49.4	44 46.8 / 03 61 / 48.0	44 48.7 / 01 59 / 45.9	60
1	43 30.5 / 16 69 / 56.9	43 39.4 / 14 68 / 55.5	43 50.8 / 11 66 / 53.5	43 57.2 / 10 65 / 52.1	44 02.5 / 08 63 / 50.7	44 06.9 / 06 62 / 49.3	44 10.3 / 04 61 / 47.9	44 13.4 / 02 59 / 45.8	1
2	42 49.4 / 17 68 / 56.8	42 58.9 / 15 67 / 55.4	43 11.3 / 13 66 / 53.4	43 18.4 / 11 64 / 52.0	43 24.5 / 09 63 / 50.6	43 29.7 / 07 62 / 49.3	43 33.8 / 06 61 / 47.9	43 37.9 / 04 59 / 45.8	2
3	42 08.3 / 18 68 / 56.6	42 18.5 / 16 67 / 55.3	42 31.9 / 14 66 / 53.2	42 39.7 / 12 64 / 51.9	42 46.5 / 11 63 / 50.5	42 52.5 / 09 62 / 49.2	42 57.4 / 07 61 / 47.8	43 02.0 / 05 59 / 45.8	3
4	41 27.4 / 19 68 / 56.4	41 38.1 / 17 67 / 55.1	41 52.6 / 15 65 / 53.1	42 01.1 / 13 64 / 51.8	42 08.6 / 12 63 / 50.4	42 15.3 / 10 62 / 49.1	42 21.0 / 09 61 / 47.8	42 27.7 / 06 59 / 45.7	4
65	40 46.4 / 20 68 / 56.2	40 57.9 / 18 67 / 54.9	41 13.3 / 16 65 / 53.0	41 22.5 / 15 64 / 51.7	41 30.8 / 13 63 / 50.3	41 38.1 / 12 62 / 49.0	41 44.6 / 10 61 / 47.7	41 52.5 / 08 59 / 45.7	65
6	40 05.6 / 21 68 / 56.1	40 17.7 / 19 67 / 54.8	40 34.1 / 17 65 / 52.8	40 44.0 / 16 64 / 51.5	40 53.0 / 14 63 / 50.2	41 01.1 / 13 62 / 48.9	41 08.3 / 11 61 / 47.6	41 17.4 / 09 58 / 45.6	6
7	39 24.9 / 22 68 / 55.9	39 37.5 / 20 67 / 54.6	39 54.9 / 18 65 / 52.7	40 05.5 / 17 64 / 51.4	40 15.2 / 15 63 / 50.1	40 24.1 / 14 62 / 48.8	40 32.0 / 13 60 / 47.5	40 42.3 / 10 58 / 45.5	7
8	38 44.3 / 23 68 / 55.7	38 57.5 / 21 67 / 54.4	39 15.9 / 19 65 / 52.5	39 27.2 / 18 64 / 51.2	39 37.6 / 17 63 / 50.0	39 47.1 / 15 61 / 48.7	39 55.8 / 14 60 / 47.4	40 07.2 / 12 58 / 45.5	8
9	38 03.7 / 24 67 / 55.5	38 17.6 / 22 66 / 54.2	38 37.0 / 21 65 / 52.3	38 48.9 / 19 64 / 51.1	39 00.0 / 18 63 / 49.8	39 10.2 / 16 61 / 48.6	39 19.7 / 15 60 / 47.3	39 32.2 / 13 58 / 45.4	9
70	37 23.3 / 25 67 / 55.2	37 37.8 / 24 66 / 54.0	37 58.1 / 22 65 / 52.2	38 10.7 / 20 64 / 50.9	38 22.4 / 19 62 / 49.7	38 33.4 / 18 61 / 48.4	38 43.6 / 16 60 / 47.2	38 57.3 / 14 58 / 45.3	70
1	36 43.0 / 26 67 / 55.0	36 58.1 / 25 66 / 53.8	37 19.3 / 23 64 / 52.0	37 32.6 / 21 63 / 50.8	37 45.0 / 20 62 / 49.5	37 56.7 / 19 61 / 48.3	38 07.6 / 17 60 / 47.0	38 22.4 / 15 58 / 45.1	1
2	36 02.8 / 27 67 / 54.8	36 18.5 / 26 66 / 53.6	36 40.7 / 24 64 / 51.8	36 54.5 / 23 63 / 50.6	37 07.7 / 21 62 / 49.4	37 20.1 / 20 61 / 48.1	37 31.7 / 19 60 / 46.9	37 47.6 / 17 58 / 45.0	2
3	35 22.7 / 28 67 / 54.6	35 39.0 / 27 66 / 53.4	36 02.1 / 25 64 / 51.6	36 16.6 / 24 63 / 50.4	36 30.4 / 22 62 / 49.2	36 43.5 / 21 60 / 48.0	36 55.8 / 20 60 / 46.7	37 12.9 / 18 58 / 44.9	3
4	34 42.7 / 29 66 / 54.3	34 59.6 / 28 65 / 53.2	35 23.6 / 26 64 / 51.4	35 38.8 / 25 63 / 50.2	35 53.3 / 24 62 / 49.0	36 07.0 / 22 61 / 47.8	36 20.1 / 21 59 / 46.6	36 38.2 / 19 58 / 44.8	4
75	34 02.8 / 30 66 / 54.1	34 20.3 / 29 65 / 52.9	34 45.3 / 27 64 / 51.2	35 01.1 / 26 63 / 50.0	35 16.2 / 25 62 / 48.8	35 30.7 / 23 60 / 47.6	35 44.4 / 22 59 / 46.4	36 03.7 / 20 57 / 44.6	75
6	33 23.1 / 31 66 / 53.8	33 41.2 / 30 65 / 52.7	34 07.1 / 28 64 / 51.0	34 23.3 / 27 63 / 49.8	34 39.3 / 26 61 / 48.6	34 54.4 / 25 60 / 47.4	35 08.9 / 23 59 / 46.3	35 29.2 / 22 57 / 44.5	6
7	32 43.5 / 33 66 / 53.6	33 02.1 / 31 65 / 52.4	33 29.0 / 29 63 / 50.7	33 46.0 / 28 62 / 49.6	34 02.5 / 27 61 / 48.4	34 18.3 / 26 60 / 47.2	34 33.4 / 25 59 / 46.1	34 54.8 / 23 57 / 44.3	7
8	32 04.0 / 34 66 / 53.3	32 23.2 / 32 65 / 52.2	32 51.0 / 30 63 / 50.5	33 08.7 / 29 62 / 49.3	33 25.8 / 28 61 / 48.2	33 42.3 / 27 60 / 47.0	33 58.1 / 26 58 / 45.9	34 20.6 / 24 57 / 44.1	8
9	31 24.7 / 34 65 / 53.0	31 44.5 / 33 64 / 51.9	32 13.1 / 31 63 / 50.2	32 31.5 / 30 62 / 49.1	32 49.2 / 29 61 / 48.0	33 06.3 / 28 60 / 46.8	33 22.8 / 27 58 / 45.7	33 46.4 / 25 57 / 44.0	9
80	30 45.5 / 34 65 / 52.8	31 05.9 / 34 64 / 51.7	31 35.4 / 32 63 / 50.0	31 54.4 / 31 62 / 48.9	32 12.8 / 30 61 / 47.8	32 30.6 / 29 59 / 46.6	32 47.7 / 28 58 / 45.5	33 12.3 / 27 57 / 43.8	80
1	30 06.4 / 35 65 / 52.5	30 27.4 / 34 64 / 51.4	30 57.8 / 32 63 / 49.7	31 17.4 / 32 61 / 48.7	31 36.4 / 31 60 / 47.5	31 54.9 / 30 59 / 46.4	32 12.7 / 29 58 / 45.3	32 38.4 / 26 56 / 43.6	1
2	29 27.5 / 36 65 / 52.2	29 49.0 / 35 64 / 51.1	30 20.4 / 34 62 / 49.5	30 40.6 / 33 61 / 48.4	31 00.3 / 32 60 / 47.3	31 19.4 / 31 59 / 46.2	31 37.9 / 30 58 / 45.0	32 04.5 / 28 56 / 43.4	2
3	28 48.7 / 37 64 / 51.9	29 10.9 / 36 63 / 50.8	29 43.1 / 35 62 / 49.2	30 03.9 / 34 61 / 48.1	30 24.2 / 33 60 / 47.1	30 44.0 / 32 59 / 46.0	31 03.1 / 32 58 / 44.9	31 30.9 / 30 56 / 43.2	3
4	28 10.1 / 38 64 / 51.6	28 32.8 / 37 63 / 50.5	29 05.9 / 36 62 / 49.0	29 27.4 / 35 61 / 47.9	29 48.3 / 34 60 / 46.8	30 08.7 / 34 59 / 45.7	30 28.5 / 33 57 / 44.6	30 57.3 / 31 56 / 43.0	4
85	27 31.7 / 39 64 / 51.3	27 55.0 / 38 63 / 50.3	28 29.0 / 37 61 / 48.7	28 51.0 / 36 60 / 47.6	29 12.5 / 35 59 / 46.5	29 33.6 / 35 58 / 45.5	29 54.1 / 34 57 / 44.4	30 23.9 / 32 55 / 42.8	85
6	26 53.4 / 40 64 / 51.0	27 17.3 / 39 63 / 50.0	27 52.1 / 38 61 / 48.4	28 14.8 / 37 60 / 47.3	28 36.9 / 37 59 / 46.3	28 58.6 / 36 58 / 45.2	29 19.8 / 35 56 / 44.2	29 50.6 / 34 55 / 42.5	6
7	26 15.3 / 41 63 / 50.6	26 39.6 / 40 62 / 49.6	27 15.5 / 39 61 / 48.1	27 38.7 / 38 60 / 47.0	28 01.3 / 38 58 / 46.0	28 23.8 / 37 57 / 45.0	28 45.6 / 36 57 / 43.9	29 17.4 / 35 55 / 42.2	7
8	25 37.4 / 42 63 / 50.4	26 02.3 / 41 62 / 49.3	26 39.0 / 40 61 / 47.8	27 02.6 / 39 60 / 46.8	27 26.2 / 39 58 / 45.7	27 49.1 / 38 58 / 44.7	28 11.6 / 37 56 / 43.7	28 44.4 / 36 55 / 42.1	8
9	24 59.7 / 43 63 / 50.0	25 25.2 / 42 62 / 49.0	26 02.6 / 41 60 / 47.5	26 27.1 / 40 59 / 46.5	26 51.1 / 40 58 / 45.4	27 14.7 / 39 57 / 44.4	27 37.8 / 38 56 / 43.4	28 11.6 / 37 54 / 41.8	9
90	24 22.1 / 44 62 / 49.7	24 48.1 / 43 61 / 48.7	25 26.5 / 42 60 / 47.2	25 51.5 / 41 59 / 46.2	26 16.1 / 41 58 / 45.2	26 40.3 / 40 57 / 44.2	27 04.1 / 39 54 / 43.1	27 38.9 / 38 54 / 41.6	90

DECLINATION CONTRARY NAME TO LATITUDE — Lat. 35°

H.A.	46° 00' Alt. Δd Δt Az.	47° 00' Alt. Δd Δt Az.	48° 30' Alt. Δd Δt Az.	49° 30' Alt. Δd Δt Az.	50° 30'	51° 30'	52° 30'	54° 00'	H.A.
00	9 00.0 1.00 00 180.0	8 00.0 1.00 00 180.0	6 30.0 1.00 00 180.0	5 30.0 1.00 00 180.0					00
1	8 59.7 1.00 02 179.3	7 59.7 1.00 01 179.3	6 29.7 1.00 01 179.3	5 29.7 1.00 01 179.3					1
2	8 58.8 1.00 03 178.6	7 58.8 1.00 02 178.6	6 28.9 1.00 02 178.7	5 28.9 1.00 02 178.7					2
3	8 57.3 1.00 04 177.9	7 57.3 1.00 03 177.9	6 27.4 1.00 03 178.0	5 27.5 1.00 03 178.0					3
4	8 55.2 1.00 05 177.2	7 55.3 1.00 04 177.2	6 25.4 1.00 04 177.3	5 25.5 1.00 04 177.4					4
05	8 52.5 1.00 06 176.5	7 52.6 1.00 05 176.6	6 22.9 1.00 05 176.7	5 23.0 1.00 05 176.7					05
6	8 49.2 1.00 06 175.8	7 49.4 1.00 06 175.9	6 19.7 1.00 06 176.1	5 19.9 1.00 06 176.1					6
7	8 45.2 99 08 175.1	7 45.5 99 07 175.2	6 16.0 99 07 175.3	5 16.3 99 07 175.4					7
8	8 40.7 99 08 174.4	7 41.1 99 08 174.5	6 11.7 99 08 174.7	5 12.1 99 08 174.8					8
9	8 35.6 99 10 173.7	7 36.1 99 09 173.8	6 06.9 99 09 174.0	5 07.4 99 09 174.1					9
10	8 29.9 99 10 173.0	7 30.6 99 10 173.1	6 01.5 99 10 173.4	5 02.1 99 10 173.5					10
1	8 23.6 99 11 172.3	7 24.4 99 11 172.5	5 55.5 99 11 172.7						1
2	8 16.8 99 12 171.6	7 17.7 99 12 171.8	5 49.0 99 12 172.0						2
3	8 09.3 98 13 170.9	7 10.3 98 13 171.1	5 41.9 98 13 171.4						3
4	8 01.2 98 14 170.2	7 02.5 98 14 170.4	5 34.3 98 14 170.7						4
15	7 52.6 98 15 169.5	6 54.0 98 15 169.8	5 26.1 98 15 170.1						15
6	7 43.4 97 16 168.9	6 45.0 97 16 169.1	5 17.3 97 15 169.4						6
7	7 33.6 97 17 168.2	6 35.4 97 17 168.4	5 08.0 97 16 168.8						7
8	7 23.3 97 18 167.5	6 25.2 97 18 167.8							8
9	7 12.3 96 19 166.8	6 14.5 96 19 167.1							9
20	7 00.9 96 20 166.1	6 03.3 96 20 166.4							20
1	6 48.8 96 21 165.5	5 51.5 96 21 165.8							1
2	6 36.2 96 22 164.8	5 39.1 96 22 165.1							2
3	6 23.1 96 23 164.2	5 26.3 95 22 164.5							3
4	6 09.4 94 24 163.5	5 12.8 94 23 163.8							4
25	5 55.1 94 25 162.8								25
6	5 40.4 93 26 162.2								6
7	5 25.1 93 26 161.5								7
8	5 09.2 92 27 160.9								8

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00' Alt. Δd Δt Az.	47° 00' Alt. Δd Δt Az.	48° 30' Alt. Δd Δt Az.	49° 30' Alt. Δd Δt Az.	50° 30' Alt. Δd Δt Az.	51° 30' Alt. Δd Δt Az.	52° 30' Alt. Δd Δt Az.	54° 00' Alt. Δd Δt Az.	H.A.
91	23 44.7 45 62 49.4	24 11.3 44 61 48.4	24 50.5 43 60 46.9	25 16.1 42 59 45.9	25 41.4 42 58 44.9	26 06.2 41 57 43.9	26 30.6 40 56 42.9	27 06.3 39 54 41.3	91
2	23 07.5 46 62 49.0	23 34.7 45 61 48.0	24 14.7 44 59 46.6	24 40.9 43 58 45.6	25 06.8 43 57 44.6	25 32.2 42 56 43.6	25 57.2 41 55 42.6	26 34.0 40 54 41.1	2
3	22 30.5 46 61 48.7	22 58.2 46 60 47.7	23 39.1 45 59 46.3	24 05.9 44 58 45.3	24 32.4 44 57 44.3	24 58.4 43 56 43.3	25 24.1 42 55 42.3	26 01.8 41 53 40.8	3
4	21 53.7 47 61 48.3	22 21.9 47 60 47.4	23 03.7 46 59 45.9	23 31.1 45 58 45.0	23 58.1 45 57 44.0	24 24.8 44 56 43.0	24 51.1 43 55 42.0	25 29.8 42 53 40.5	4
95	21 17.1 48 61 48.0	21 45.9 48 60 47.0	22 28.5 47 58 45.6	22 56.5 46 57 44.6	23 24.1 46 56 43.7	23 51.4 45 55 42.7	24 18.3 45 54 41.7	24 57.9 44 53 40.2	95
6	20 40.7 49 60 47.6	21 10.0 49 59 46.7	21 53.5 48 58 45.3	22 22.0 47 57 44.3	22 50.3 47 56 43.3	23 18.1 46 55 42.4	23 45.7 46 54 41.4	24 26.3 45 52 39.9	6
7	20 04.5 50 60 47.2	20 34.4 50 59 46.3	21 18.7 49 58 44.9	21 47.8 48 57 44.0	22 16.6 48 56 43.0	22 45.1 47 55 42.1	23 13.3 47 54 41.1	23 54.8 46 52 39.7	7
8	19 28.5 51 60 46.9	19 59.0 50 59 45.9	20 44.1 50 57 44.6	21 13.8 49 56 43.6	21 43.2 49 55 42.7	22 12.3 48 54 41.7	22 41.0 48 53 40.8	23 23.5 47 52 39.4	8
9	18 52.8 52 59 46.5	19 23.8 51 58 45.6	20 09.7 51 57 44.2	20 40.0 50 56 43.3	21 10.0 50 55 42.4	21 39.7 49 54 41.4	22 09.0 49 53 40.5	22 52.5 48 51 39.1	9
100	18 17.2 53 59 46.1	18 48.8 52 58 45.2	19 35.6 52 57 43.8	20 06.4 51 56 42.9	20 37.0 51 55 42.0	21 07.3 50 54 41.1	21 37.2 50 53 40.2	22 21.6 49 51 38.7	100
1	17 42.0 54 58 45.7	18 14.0 53 58 44.8	19 01.6 53 56 43.5	19 33.0 52 55 42.6	20 04.2 52 54 41.7	20 35.1 51 53 40.7	21 05.6 51 52 39.8	21 50.9 50 51 38.4	1
2	17 06.9 55 58 45.3	17 39.5 54 57 44.4	18 27.9 54 56 43.1	18 59.9 53 55 42.2	19 31.6 53 54 41.3	20 03.1 52 53 40.4	20 34.3 52 52 39.5	21 20.5 51 50 38.1	2
3	16 32.1 55 58 44.9	17 05.2 55 57 44.1	17 54.5 54 55 42.7	18 27.0 54 54 41.8	18 59.3 54 54 41.0	19 31.3 53 53 40.1	20 03.1 53 52 39.2	20 50.3 52 50 37.8	3
4	15 57.5 56 57 44.5	16 31.1 56 56 43.6	17 21.2 55 55 42.3	17 54.3 55 54 41.5	18 27.2 55 53 40.6	18 59.5 54 52 39.7	19 32.2 54 51 38.8	20 20.3 53 50 37.5	4
105	15 23.2 57 57 44.1	15 57.3 57 56 43.2	16 48.2 56 55 42.0	17 21.9 56 54 41.1	17 55.3 56 53 40.2	18 28.6 55 52 39.3	19 01.5 55 51 38.5	19 50.5 54 49 37.1	105
6	14 49.1 58 56 43.7	15 23.8 58 56 42.8	16 15.5 57 54 41.6	16 49.7 57 53 40.7	17 23.7 56 52 39.8	17 57.5 56 51 39.0	18 31.1 56 50 38.1	19 20.9 55 49 36.8	6
7	14 15.3 59 56 43.3	14 50.5 59 55 42.5	15 43.0 58 54 41.2	16 17.8 58 53 40.3	16 52.4 57 52 39.5	17 26.7 57 51 38.6	18 00.9 57 50 37.7	18 51.6 56 48 36.4	7
8	13 41.7 60 56 42.8	14 17.5 60 55 42.0	15 10.8 60 53 40.8	15 46.1 59 52 39.9	16 21.3 58 51 39.1	16 56.2 58 50 38.2	17 30.9 58 50 37.4	18 22.5 57 48 36.1	8
9	13 08.4 61 55 42.4	13 44.7 60 54 41.6	14 38.8 60 53 40.4	15 14.7 60 52 39.5	15 50.4 59 51 38.7	16 25.9 59 50 37.9	17 01.2 59 49 37.0	17 53.7 58 48 35.7	9
110	12 35.4 61 55 42.0	13 12.2 61 54 41.2	14 07.2 61 52 39.9	14 43.6 61 51 39.1	15 19.8 60 51 38.3	15 55.9 60 50 37.5	16 31.7 60 49 36.6	17 25.1 59 47 35.4	110
1	12 02.7 62 54 41.5	12 40.0 62 53 40.7	13 35.7 62 52 39.5	14 12.7 61 51 38.7	14 49.5 61 50 37.9	15 26.1 61 49 37.1	16 02.5 61 48 36.3	16 56.8 60 47 35.0	1
2	11 30.2 63 54 41.1	12 08.1 63 53 40.3	13 04.6 63 51 39.1	13 42.1 62 51 38.3	14 19.4 62 50 37.5	14 56.6 62 49 36.7	15 33.6 62 48 35.9	16 28.7 61 46 34.6	2
3	10 58.1 64 53 40.6	11 36.4 64 52 39.9	12 33.7 63 51 38.7	13 11.8 63 50 37.9	13 49.6 63 49 37.1	14 27.4 63 48 36.3	15 04.9 63 47 35.5	16 00.9 62 46 34.3	3
4	10 26.2 65 53 40.2	11 05.1 65 52 39.4	12 03.2 64 50 38.2	12 41.7 64 50 37.5	13 20.1 64 49 36.7	13 58.4 64 48 35.9	14 36.5 63 47 35.1	15 33.4 63 45 33.9	4
115	9 54.6 66 52 39.7	10 34.0 66 51 39.0	11 32.9 65 50 37.8	12 12.0 65 49 37.0	12 50.9 65 48 36.2	13 29.8 65 47 35.5	14 08.4 64 46 34.7	15 06.2 64 45 33.5	115
6	9 23.4 67 52 39.3	10 03.3 66 51 38.5	11 02.9 66 49 37.4	11 42.5 66 49 36.6	12 22.0 66 48 35.8	13 01.4 65 47 35.0	13 40.6 65 46 34.3	14 39.2 65 44 33.1	6
7	8 52.4 67 51 38.8	9 32.8 67 50 38.0	10 33.2 67 49 36.9	11 13.4 67 48 36.2	11 53.4 67 47 35.4	12 33.3 66 46 34.6	13 13.1 66 45 33.9	14 12.5 66 44 32.7	7
8	8 21.8 68 51 38.3	9 02.7 68 50 37.6	10 03.9 68 48 36.5	10 44.5 68 48 35.7	11 25.1 67 47 35.0	12 05.5 67 46 34.2	12 45.8 67 45 33.4	13 46.1 67 44 32.3	8
9	7 51.5 69 50 37.8	8 32.9 69 49 37.1	9 34.8 69 48 36.0	10 16.0 69 47 35.3	10 57.1 68 46 34.5	11 38.1 68 45 33.8	12 18.9 68 44 33.0	13 20.0 68 43 31.9	9
120	7 21.5 70 49 37.3	8 03.4 70 49 36.6	9 06.1 70 47 35.5	9 47.8 69 46 34.8	10 29.4 69 46 34.1	11 10.9 69 45 33.3	11 52.3 69 44 32.6	12 54.1 69 43 31.5	120
1	6 51.9 71 49 36.9	7 34.3 71 48 36.1	8 37.7 70 47 35.1	9 19.9 70 46 34.3	10 02.0 70 45 33.6	10 44.0 70 44 32.9	11 26.0 70 43 32.2	12 28.6 69 42 31.1	1
2	6 22.6 72 48 36.4	7 05.4 71 47 35.6	8 09.6 71 46 34.6	8 52.3 71 45 33.9	9 35.0 71 45 33.2	10 17.5 71 44 32.4	11 00.0 71 43 31.7	12 03.4 70 41 30.6	2
3	5 53.6 72 48 35.9	6 37.0 72 47 35.2	7 41.9 72 46 34.1	8 25.1 72 45 33.4	9 08.3 72 44 32.7	9 51.3 72 43 32.0	10 34.3 72 42 31.3	11 38.5 71 41 30.2	3
4	5 25.0 73 47 35.3	6 08.8 73 46 34.7	7 14.5 73 45 33.6	7 58.2 73 44 32.9	8 41.9 73 43 32.2	9 25.4 73 43 31.5	10 08.9 72 42 30.8	11 13.9 72 40 29.8	4
125		5 41.1 74 46 34.2	6 47.5 74 44 33.1	7 31.7 74 44 32.5	8 15.8 74 43 31.8	8 59.9 73 42 31.1	9 43.9 73 41 30.4	10 49.7 73 40 29.4	125
6		5 13.7 75 45 33.6	6 20.8 75 44 32.6	7 05.5 74 43 32.0	7 50.1 74 42 31.3	8 34.7 74 41 30.6	9 19.2 74 41 29.9	10 25.8 74 39 28.9	6
7			5 54.5 75 43 32.1	6 39.6 75 42 31.5	7 24.8 74 42 30.8	8 09.8 75 41 30.1	8 54.8 75 40 29.5	10 02.2 75 39 28.5	7
8			5 28.5 76 43 31.6	6 14.2 76 42 31.0	6 59.9 76 41 30.3	7 45.3 76 40 29.7	8 30.8 76 39 29.0	9 38.9 76 38 28.0	8
9			5 02.9 77 42 31.1	5 49.0 77 41 30.5	6 35.1 77 40 29.8	7 21.2 77 40 29.2	8 07.1 77 39 28.5	9 16.0 76 38 27.6	9
130				5 24.3 78 41 30.0	6 10.8 78 40 29.3	6 57.4 77 39 28.7	7 43.8 77 38 28.1	8 53.4 77 37 27.1	130
1					5 46.9 78 39 28.8	6 33.9 78 38 28.2	7 20.9 78 38 27.6	8 31.2 78 36 26.7	1
2					5 23.4 79 39 28.3	6 10.9 79 38 27.7	6 58.3 79 37 27.1	8 09.3 79 36 26.2	2
3					5 00.3 80 38 27.8	5 48.2 80 37 27.2	6 36.1 80 36 26.6	7 47.8 80 35 25.7	3
4						5 25.9 81 36 26.7	6 14.2 81 36 26.1	7 26.7 80 35 25.2	4
135						5 04.0 81 36 26.2	5 52.8 81 35 25.6	7 05.9 81 34 24.8	135
6							5 31.7 82 34 25.1	6 45.5 82 33 24.3	6
7							5 11.0 83 34 24.6	6 25.5 82 33 23.8	7
8								6 05.8 83 32 23.3	8
9								5 46.6 84 31 22.8	9
140								5 27.7 85 31 22.3	140
1								5 09.3 86 30 21.8	1

Lat. 35°
Lat. 36°
Lat. 37°
Lat. 38°

Lat. 35°

H.A.	54° 30' Alt.	Δd	Δt	Az.	55° 00' Alt.	Δd	Δt	Az.	56° 00' Alt.	Δd	Δt	Az.	56° 30' Alt.	Δd	Δt	Az.	57° 00' Alt.	Δd	Δt	Az.	57° 30' Alt.	Δd	Δt	Az.	59° 00' Alt.	Δd	Δt	Az.	59° 30' Alt.	Δd	Δt	Az.	H.A.
00	70 30.0	1.00	1	00.0	70 00.0	1.00	1	00.0	69 00.0	1.00	1	00.0	68 30.0	1.00	1	00.0	68 00.0	1.00	1	00.0	67 30.0	1.00	1	00.0	66 00.0	1.00	1	00.0	65 30.0	1.00	1	00.0	00
1	70 29.3	1.00	4	01.7	69 59.3	1.00	4	01.7	68 59.3	1.00	3	01.6	68 29.4	1.00	3	01.5	67 59.4	1.00	3	01.5	67 29.4	1.00	3	01.4	65 59.5	1.00	3	01.3	65 29.5	1.00	3	01.2	1
2	70 27.0	1.00	6	03.5	69 57.1	1.00	6	03.3	68 57.3	1.00	5	03.1	68 27.4	1.00	5	02.9	67 57.5	1.00	5	02.9	67 27.5	1.00	5	02.8	65 57.8	1.00	4	02.5	65 27.9	1.00	4	02.4	2
3	70 23.3	99	09	05.2	69 53.5	99	08	05.0	68 54.0	99	08	04.7	68 24.2	99	08	04.5	67 54.4	99	07	04.3	67 24.6	99	07	04.2	65 55.1	99	06	03.8	65 25.3	99	06	03.7	3
4	70 18.1	99	11	06.9	69 48.5	99	11	06.7	68 49.3	99	10	06.2	68 19.7	99	10	06.0	67 50.1	99	09	05.8	67 20.4	99	09	05.6	65 51.3	99	08	05.0	65 21.6	99	08	04.9	4
05	70 11.5	98	13	08.6	69 42.2	98	13	08.3	68 43.4	98	12	07.7	68 14.0	98	12	07.5	67 44.5	98	11	07.2	67 15.0	98	11	07.0	65 46.5	98	10	06.3	65 16.9	98	10	06.1	05
6	70 03.5	97	16	10.3	69 34.4	97	16	09.9	68 36.6	97	14	09.2	68 07.0	97	14	08.9	67 37.8	97	13	08.6	67 08.5	97	13	08.5	65 40.6	97	13	07.5	65 11.2	96	15	07.3	6
7	69 54.0	96	18	11.9	69 23.5	96	17	11.5	68 27.6	96	16	10.7	67 58.8	96	16	10.3	67 30.9	97	15	10.0	67 00.8	97	15	09.7	65 33.6	97	13	08.7	65 04.5	97	13	08.4	7
8	69 43.2	94	20	13.5	69 14.9	95	20	13.0	68 17.9	95	18	12.1	67 49.3	95	18	11.7	67 20.7	96	17	11.3	66 52.0	96	16	11.0	65 25.7	96	15	09.9	64 56.8	96	14	09.6	8
9	69 31.1	93	22	15.0	69 03.1	93	22	14.5	68 07.0	94	20	13.6	67 38.8	94	20	13.1	67 10.5	94	19	12.7	66 42.1	95	18	12.3	65 16.7	95	17	11.1	64 48.1	95	16	10.7	9
10	69 17.7	92	24	16.6	68 50.2	92	24	16.0	67 54.8	93	22	15.0	67 27.0	93	21	14.5	66 59.1	93	21	14.0	66 31.1	93	20	13.5	65 06.8	94	18	12.3	64 38.5	94	18	11.9	10
1	69 03.1	90	26	18.1	68 36.0	90	26	17.5	67 41.6	91	24	16.5	67 14.2	91	23	15.8	66 46.7	92	22	15.3	66 19.1	92	22	14.7	64 55.8	93	20	13.4	64 27.9	93	20	13.0	1
2	68 47.3	88	28	19.5	68 20.7	89	27	18.9	67 27.2	90	26	17.7	67 00.3	90	25	17.1	66 33.2	90	24	16.5	66 06.1	91	23	16.0	64 44.0	92	21	14.5	64 16.4	92	21	14.1	2
3	68 30.3	86	30	20.9	68 04.3	87	29	20.2	67 11.8	88	27	18.9	66 45.3	88	27	18.3	66 18.7	89	26	17.8	65 52.0	89	25	17.2	64 31.2	90	23	15.6	64 04.0	91	22	15.1	3
4	68 12.2	85	32	22.2	67 46.8	85	31	21.5	66 55.3	86	29	20.2	66 29.4	87	28	19.6	66 03.3	87	27	18.9	65 37.0	88	27	18.4	64 17.5	89	24	16.7	63 50.8	89	24	16.2	4
15	67 53.1	83	34	23.5	67 28.2	83	33	22.8	66 37.9	85	31	21.4	66 12.4	85	30	20.7	65 46.8	86	29	20.1	65 21.1	86	28	19.5	64 03.0	87	26	17.7	63 36.6	88	25	17.2	15
6	67 33.0	81	35	24.8	67 08.7	81	34	23.9	66 19.5	83	31	22.6	65 54.6	83	31	21.9	65 29.5	84	30	21.2	65 04.2	84	30	20.6	63 47.6	86	27	18.8	63 21.7	86	26	18.2	6
7	67 11.9	79	37	26.0	66 48.7	79	36	25.2	66 00.2	81	34	23.7	65 35.8	81	33	23.0	65 11.3	82	32	22.3	64 46.6	83	31	21.6	63 31.4	84	28	19.7	63 06.0	85	28	19.1	7
8	66 50.0	77	38	27.1	66 26.9	77	37	26.3	65 40.0	79	35	24.8	65 16.2	80	34	24.1	64 52.2	80	33	23.3	64 28.0	81	32	22.7	63 14.4	83	30	20.7	62 49.5	83	29	20.1	8
9	66 27.1	74	39	28.2	66 04.6	75	38	27.4	65 19.0	77	36	25.8	64 55.8	78	35	25.1	64 32.3	78	34	24.4	64 08.7	79	34	23.6	62 56.6	81	31	21.6	62 32.2	82	30	21.0	9
20	66 03.5	72	41	29.3	65 41.6	73	40	28.5	64 57.1	75	38	26.9	64 34.5	76	37	26.1	64 11.7	77	36	25.3	63 48.6	77	35	24.6	62 38.1	79	32	22.5	62 14.3	80	31	21.9	20
1	65 39.0	70	42	30.3	65 17.8	71	41	29.5	64 34.6	73	39	27.8	64 12.5	74	38	27.0	63 50.3	75	37	26.3	63 27.8	75	36	25.5	62 19.0	78	33	23.4	61 55.6	78	32	22.7	1
2	65 13.9	68	43	31.3	64 53.3	69	42	30.4	64 11.3	71	40	28.8	63 49.8	72	39	28.0	63 28.2	73	38	27.2	63 06.3	73	37	26.4	61 59.1	76	34	24.3	61 36.3	76	33	23.6	2
3	64 48.0	66	44	32.2	64 28.1	67	43	31.3	63 47.3	69	41	29.6	63 26.5	70	40	28.8	63 05.4	71	39	28.0	62 44.1	72	38	27.3	61 38.6	74	35	25.1	61 16.3	75	34	24.4	3
4	64 21.5	64	45	33.1	64 02.2	65	44	32.2	63 22.7	67	42	30.5	63 02.4	68	41	29.7	62 42.0	69	40	28.9	62 21.2	70	39	28.1	61 17.5	72	36	25.9	60 55.7	73	35	25.1	4
25	63 54.4	62	46	33.9	63 35.7	63	45	33.0	62 57.4	65	43	31.3	62 37.8	66	42	30.5	62 17.9	67	41	29.7	61 57.8	68	40	28.9	60 55.7	70	37	26.6	60 34.6	71	36	25.9	25
6	63 26.7	60	47	34.7	63 08.6	61	46	33.8	62 31.6	63	45	31.3	62 12.6	64	43	31.3	61 53.5	66	42	30.4	61 33.7	66	42	29.6	60 33.4	68	38	27.3	60 12.8	69	37	26.6	6
7	62 58.4	57	48	35.5	62 41.0	59	47	34.6	62 05.2	61	45	32.8	61 46.8	62	44	32.0	61 28.1	63	43	31.2	61 09.2	64	42	30.4	60 10.6	66	39	28.0	59 50.5	67	38	27.3	7
8	62 29.6	55	49	36.2	62 12.8	57	48	35.3	61 38.3	59	46	33.5	61 20.5	60	45	32.7	61 02.4	61	44	31.9	60 44.1	62	43	31.1	59 47.2	64	40	28.7	59 27.8	65	39	28.0	8
9	62 00.4	53	50	36.9	61 44.2	54	48	36.0	61 10.9	57	46	34.2	60 53.7	58	45	33.4	60 36.2	59	44	32.5	60 18.4	60	43	31.7	59 23.4	63	41	29.4	59 04.5	63	40	28.6	9
30	61 30.7	51	50	37.5	61 15.1	52	49	36.6	60 43.0	55	47	34.9	60 26.4	56	46	34.0	60 09.6	57	45	33.2	59 52.4	58	44	32.4	58 59.0	61	41	30.0	58 40.7	62	40	29.2	30
1	61 00.6	49	51	38.1	60 44.6	50	50	37.2	60 14.7	53	48	35.7	59 59.2	54	46	34.6	59 42.4	55	46	33.8	59 25.8	56	45	33.0	58 34.2	59	42	30.6	58 16.5	60	41	29.8	1
2	60 30.0	47	52	38.7	60 15.7	48	51	37.8	59 46.0	51	49	36.1	59 30.6	52	48	35.2	59 14.9	53	47	34.4	58 58.9	54	46	33.5	58 09.0	57	43	31.1	57 51.8	58	42	30.4	2
3	59 59.1	45	52	39.2	59 45.4	46	51	38.3	59 16.8	49	49	36.6	59 02.1	50	48	35.8	58 47.0	51	47	34.9	58 31.5	52	46	34.1	57 43.4	55	43	31.7	57 26.8	56	42	30.9	3
4	59 27.9	43	53	39.7	59 14.7	44	52	38.8	58 47.4	47	50	37.1	58 33.2	48	49	36.3	58 18.6	49	48	35.4	58 03.8	50	47	34.6	57 17.4	53	44	32.2	57 01.3	54	43	31.4	4
35	58 56.3	41	53	40.2	58 43.7	42	52	39.3	58 17.5	45	50	37.6	58 03.9	46	49	36.8	57 50.0	47	48	35.9	57 35.7	48	47	35.1	56 51.0	51	45	32.7	56 35.5	52	44	31.9	35
6	58 24.4	39	54	40.7	58 12.4	41	53	39.8	57 47.4	43	51	38.2	57 34.3	44	50	37.2	57 21.6	45	49	36.4	57 07.3	46	48	35.6	56 24.3	49	45	33.2	56 09.4	50	44	32.4	6
7	57 52.3	38	54	41.1	57 40.8	39	53	40.2	57 16.9	41	51	38.5	57 04.5	42	50	37.7	56 51.7	43	49	36.8	56 38.5	44	48	36.0	55 57.3	47	46	33.6	55 42.9	48	45	32.8	7
8	57 19.9	36	54	41.5	57 09.0	37	54	40.6	56 46.2	39	52	38.9	56 34.3	40	51	38.1	56 22.0	41	50	37.3	56 09.5	42	49	36.4	55 29.9	46	46	34.0	55 16.1	47	45	33.3	8
9	56 47.2	34	55	41.8	56 36.9	35	54	41.0	56 15.2	37	52	39.3	56 03.8	38	51	38.5	55 52.2	39	50	37.7	55 40.1	41	49	36.8	55 02.2	44	47	34.4	54 49.0	45	46	33.7	9
40	56 14.3	32	55	42.2	56 04.5	33	54	41.3	55 43.9	35	53	39.7	55 33.1	37	52	38.8	55 22.0	38	51	38.0	55 10.6	39	50	37.2	54 34.3	42	47	34.8	54 21.6	43	46	34.0	40
1	55 41.2	30	56	42.5	55 31.9	31	55	41.7	55 12.4	34	53	40.0	55 02.2	35	52	39.2	54 51.6	36	51	38.7	54 40.7	37	50	37.5	54 06.1	40	47	35.2	53 54.0	41	46	34.4	1
2	55 07.8	28	56	42.8	54 59.2	30	55	42.0	54 40.7	32	53	40.3	54 31.0	33	52	39.5	54 21.0	34	51	38.7	54 10.6	35	50	37.9	53 37.7	38	48	35.5	53 26.1	39	47	34.8	2
3	54 34.4	27	56	43.1	54 26.2	28	55	42.3	54 08.8	30	53	40.6	53 59.6	31	53	39.8	53 50.1	32	52	39.0	53 40.3	33	51	38.2	53 09.0	36	48	35.9	52 57.9	37	47	35.1	3
4	54 00.7	25	56	43.4	53 53.0	26	56	42.5	53 36.7	28	54	40.9	53 28.1	29	53	40.1	53 19.1	30	52	39.3	53 09.8	31	51	38.5	52 40.1	35	48	36.2	52 29.6	36	48	35.4	4
45	53 26.9	23	57	43.6	53 19.7	24	56	42.8	53 04.5	27	54	41.2	52 56.3	28	53	40.4	52 47.9	29	52	39.6	52 39.1	30	51	38.8	52 11.0	33	49	36.4	52 01.0	34	48	35.7	45
6	52 52.9	22	57	43.8	52 46.3	23	56	43.0	52 32.0	25	54	41.4	52 24.4	26	53	40.6	52 16.5	27	53	39.8	52 08.3	28	52	39.0	51 41.7	31	49	36.7	51 32.2	32	48	35.9	6
7	52 18.8	20	57	44.0	52 12.7	21	56	43.2	51 59.5	23	54	41.6	51 52.4	24	54	40.8	51 45.0	25	53	40.0	51 37.2	26	52	39.3	51 12.2	29	49	37.0	51 03.3	30	49	36.2	7
8	51 44.6	18	57	44.2	51 39.0	19	56	43.4	51 26.8	21	55	41.8	51 20.2	22	54	41.0	51 13.3	24	53	40.3	51 06.1	25	52	39.5	50 42.6	28	50	37.2	50 34.2	29	49	36.4	8
9	51 10.3	17	57	44.3	51 05.2	18	57	43.6	50 53.9	20	55	42.0	50 47.8	21	54	41.2	50 41.4	22	53	40.5	50 34.7	23	52	39.7	50 12.8	26	50	37.4	50 04.9	27	49	36.7	9
50	50 35.9	15	57	44.5	50 31.3	16	57	43.7	50 21.1	18	55	42.2	50 15.4	19	54	41.4	50 09.5	20	53	40.6	50 03.0	21	53	39.9	49 42.9	24	50	37.6	49 35.5	26	49	36.9	50
1	50 01.4	13	58	44.6	49 57.3	14	57	43.9	49 47.9	17	55	42.3	49 42.8	18	54	41.6	49 37.4	19	54	40.9	49 31.7	20	53	40.0	49 12.9	22	50	37.8	49 06.0	23	49	37.0	1
2	49 26.9	12	58	44.7	49 23.2	13	57	44.0	49 14.8	15	55	42.5	49 10.2	16	55	41.7	49 05.3	17	54	41.0	49 00.0	18	53	40.2	48 42.7	21	50	38.0	48 36.3	22	50	37.2	2
3	48 52.3	10	58	44.8	48 49.0	11	57	44.1	48 41.6	13	56	42.6	48 37.5	14	55	41.8	48 33.0	15	54	41.1	48 28.3	16	53	40.3	48 12.4	19	51	38.1	48 06.5	20	50	37.4	3
4	48 17.6	09	58	44.9	48 14.8	10	57	44.2	48 08.3	12	56	42.7	48 04.6	13	55	41.9	48 00.7	14	54	41.2	47 56.4	15	53	40.5	47 42.0	17	51	38.3	47 36.6	18	50	37.5	4
55	47 42.9	07	58	45.0	47 40.5	08	57	44.2	47 35.0	10	56	42.0	47 31.8	11	55	42.0	47 28.5	11	55	41.3	47 24.5	13	53	40.7	47 11.5	16	51	38.4	47 06.7	17	50	37.7	55
6	47 08.1	06	58	45.0	47 06.0	07	57	44.3	47 01.6	08	56	42.9	46 58.6	10	55	42.1	46 55.8	11	54	41.4	46 52.5	11	53	40.7	46 41.0	14	51	38.5	46 36.3	15	50	37.8	6
7	46 33.3	04	58	45.1	46 31.8	05	57	44.4	46 28.1	07	56	42.9	46 25.8	08	55	42.2	46 23.0	09	54	41.5	46 20.5	10	54	40.7	46 10.4	13	51	38.6	46 06.5	13	50	37.9	7
8	45 58.5	03	58	45.1	45 57.5	04	57	44.4	45 54.6	06	56	43.0	45 52.8	07	55	42.2	45 50.7	07	54	41.5	45 48.4	08	54	40.8	45 39.7	11	51	38.7	45 36.3	12	50	38.0	8
9	45 23.6	01	58	45.1	45 23.1	02	57	44.4	45 21.1	04	56	43.0	45 19.7	05	55	42.3	45 18.1	06	55	41.6	45 16.2	07	54	40.9	45 08.9	09	51	38.8	45 06.0	10	51	38.0	9
60	44 48.8	00	58	45.1	44 48.7	01	57	44.4	44 47.6	03	56	43.0	44 46.4	04	55	42.3	44 44.0	05	54	41.6	44 41.8	05	54	41.0	44 38.2	07	52	38.8	44 35.7	08	51	38.1	60
1	44 14.0	01	58	45.1	44 14.2	01	57	44.4	44 14.0	03	57	43.0	44 13.6	02	55	42.4	44 13.0	02	54	41.7	44 11.8	03	54	41.0	44 11.3	04	54	38.9	44 07.3	06	51	38.2	1
2	43 39.1	03	58	45.1	43 39.8	02	57	44.4	43 40.5	00	56	43.1	43 40.4	01	55	42.4	43 40.1	01	54	41.7	43 39.6	02	54	41.0	43 36.5	05	51	38.9	43 34.9	06	51	38.2	2
3	43 04.3	04	58	45.1	43 05.4	02	57	44.4	43 06.9	02	57	43.0	43 07.3	01	55	42.4	43 07.5	00	54	41.7	43 07.4	01	54	41.0	43 05.6	03	52	38.9	43 04.5	04	51	38.2	3
4	42 29.5	06	58	45.1	42 31.0	05	57	44.4	42 33.4	03	56	43.0	42 34.2	02	55	42.3	42 34.8	02	55	41.7	42 35.1	01	54	41.0	42 34.7	02	52	38.9	42 34.1	02	51	38.3	4
65	41 54.9	07	58	45.0	41 56.7	06	57	44.3	41 59.9	04	56	43.0	42 01.4	05	55	42.3	42 02.1	04	55	41.7	42 02.7	02	54	41.0	42 03.8	00	52	39.0	42 03.6	00	51	38.3	65
6	41 20.0	08	58	45.0	41 22.3	07	57	44.3	41 26.4	06	56	43.0	41 28.0	05	56	42.3	41 29.3	04	55	41.6	41 30.7	04	54	41.0	41 32.9	01	52	39.0	41 33.2	01	51	38.3	6
7	40 45.3	10	58	44.9	40 48.0	09	57	44.2	40 52.9	07	56	42.9	40 55.0	07	55	42.2	40 56.8	06	54	41.6	40 58.5	05	54	40.9	41 02.0	02	52	38.9	41 02.7	02	51	38.3	7
8	40 10.6	11	58	44.8	40 13.8	10	57	44.2	40 19.4	09	57	42.8	40 21.9	08	55	42.2	40 24.2	07	54	41.5	40 26.3	06	54	40.9	40 31.1	04	51	38.9	40 32.3	04	51	38.3	8
9	39 36.0	12	58	44.7	39 39.6	11	57	44.1	39 46.0	10	56	42.8	39 49.0	09	55	42.1	39 51.6	09	55	41.5	39 54.1	08	54	40.8	40 00.3	06	51	38.9	40 01.9	05	51	38.2	9
70	39 01.5	14	58	44.5	39 05.4	13	57	44.0	39 12.7	11	56	42.7	39 16.0	11	55	42.1	39 19.2	09	54	41.4	39 22.0	09	53	40.7	39 29.4	07	51	38.8	39 31.5	06	51	38.2	70
1	38 27.0	15	57	44.5	38 31.3	14	57	43.9	38 39.4	13	56	42.6	38 43.1	12	55	42.0	38 46.6	11	54	41.3	38 49.9	11	53	40.7	38 58.6	09	51	38.8	39 01.1	08	51	38.1	1
2	37 52.5	16	57	44.4	37 57.3	15	57	43.8	38 06.1	14	55	42.5	38 10.3	13	55	41.9	38 14.2	13	54	41.3	38 17.9	12	53	40.6	38 27.8	10	51	38.7	38 30.7	09	50	38.1	2
3	37 18.2	17	57	44.3	37 23.3	17	56	43.7	37 32.9	15	55	42.4	37 37.5	15	55	41.8	37 41.8	14	54	41.2	37 45.9	13	53	40.5	37 57.1	11	51	38.7	38 00.4	11	50	38.0	3
4	36 43.9	19	57	44.1	36 49.3	18	56	43.5	36 59.4	16	55	42.4	37 04.8	16	54	41.7	37 09.5	15	54	41.1	37 14.0	15	53	40.4	37 26.4	13	51	38.6	37 30.2	12	50	38.0	4
75	36 09.7	20	57	44.0	36 15.6	19	56	43.4	36 26.8	18	55	42.2	36 32.1	17	54	41.6	36 37.2	17	54	41.0	36 42.2	16	53	40.3	36 55.8	14	51	38.4	37 00.0	14	50	37.9	75
6	35 35.6	21	57	43.9	35 41.9	21	56	43.3	35 53.8	19	55	42.1	35 59.5	19	54	41.4	36 05.1	18	54	40.8	36 10.4	17	53	40.2	36 25.3	16	51	38.4	36 29.9	15	50	37.8	6
7	35 01.6	22	56	43.7	35 08.2	22	56	43.1	35 21.0	21	55	41.9	35 27.0	20	54	41.3	35 33.0	19	53	40.7	35 38.7	19	53	40.1	35 54.8	17	51	38.3	35 59.8	16	50	37.7	7
8	34 27.7	24	56	43.5	34 34.7	23	56	43.0	34 48.2	22	54	41.7	34 54.6	21	54	41.2	35 00.9	21	53	40.6	35 07.1	20	53	40.0	35 24.4	18	51	38.2	35 29.8	18	50	37.6	8
9	33 53.9	25	56	43.2	34 01.2	24	56	42.8	34 15.3	23	54	41.5	34 22.1	23	54	40.8	34 29.0	22	53	40.4	34 35.5	21	52	39.8	34 53.9	20	50	38.1	34 59.8	19	50	37.5	9
80	33 20.2	26	56	43.2	33 27.9	25	55	42.6	33 42.9	24	54	41.5	33 50.1	24	54	40.9	33 57.2	23	53	40.3	34 04.1	23	52	39.5	34 23.8	21	50	37.8	34 30.0	20	50	37.3	80
1	32 46.6	27	56	43.0	32 54.7	27	55	42.4	33 10.4	26	54	41.3	33 18.0	25	53	40.7	33 25.5	25	53	40.1	33 32.7	24	52	39.5	33 53.6	22	50	37.8	34 00.2	22	49	37.2	1
2	32 13.2	28	56	42.8	32 21.6	28	55	42.3	32 38.0	27	54	41.1	32 46.0	26	53	40.5	32 53.8	26	53	40.0	33 01.5	25	52	39.4	33 23.5	24	49	37.7	33 30.6	23	49	37.1	2
3	31 39.8	30	55	42.6	31 48.5	29	55	42.1	32 05.6	28	54	40.9	32 14.1	28	53	40.4	32 22.3	27	52	39.8	32 30.4	27	52	39.2	32 53.6	25	50	37.5	33 01.0	24	49	36.9	3
4	31 06.6	31	55	42.4	31 15.7	30	55	41.9	31 33.3	29	53	40.7	31 42.3	29	53	40.2	31 50.9	28	53	39.6	31 59.4	28	52	39.1	32 23.7	26	50	37.3	32 31.3	26	50	36.8	4
85	30 33.5	32	55	42.2	30 43.0	31	54	41.7	31 01.6	31	53	40.5	31 10.7	30	53	40.0	31 19.6	30	52	39.4	31 28.4	29	51	38.7	31 53.9	28	49	36.6	32 02.1	27	49	36.6	85
6	30 00.6	33	55	42.0	30 10.4	33	54	41.4	30 29.7	32	53	40.3	30 39.2	31	52	39.8	30 48.5	31	52	39.2	30 57.6	30	51	38.7	31 24.3	29	49	37.0	31 32.9	28	49	36.4	6
7	29 27.7	34	54	41.8	29 38.0	34	54	41.2	29 58.0	33	53	40.1	30 07.8	32	52	39.6	30 17.5	32	51	39.0	30 27.0	32	51	38.5	30 54.8	30	49	36.8	31 03.7	30	48	36.3	7
8	28 55.1	35	54	41.5	29 05.6	35	54	41.0	29 26.4	34	52	39.9	29 36.5	34	52	39.4	29 46.6	33	51	38.8	29 56.5	33	51	38.3	30 25.4	31	49	36.6	30 34.7	31	48	36.1	8
9	28 22.6	37	54	41.3	28 33.5	36	53	40.8	28 54.9	35	52	39.7	29 05.3	35	52	39.2	29 15.8	34	51	38.6	29 26.1	34	50	38.1	29 56.0	33	48	36.5	30 05.8	32	48	35.9	9
90	27 50.2	38	54	41.0	28 01.5	37	53	40.5	28 23.6	36	52	39.5	28 34.5	36	51	39.0	28 45.2	36	51	38.4	28 55.8	35	50	37.9	29 26.9	34	48	36.3	29 37.1	33	48	35.7	90

16-59198-1

Lat. 35°

H.A.	54° 30' Alt. ° '	Δd Δt	Az. °	55° 00' Alt. ° '	Δd Δt	Az. °	56° 00' Alt. ° '	Δd Δt	Az. °	56° 30' Alt. ° '	Δd Δt	Az. °	57° 00' Alt. ° '	Δd Δt	Az. °	57° 30' Alt. ° '	Δd Δt	Az. °	59° 00' Alt. ° '	Δd Δt	Az. °	59° 30' Alt. ° '	Δd Δt	Az. °	H.A.
91	27 18.0	39 53	40.8	27 29.6	38 53	40.3	27 52.4	38 52	39.2	28 03.6	37 51	38.7	28 14.7	37 50	38.2	28 25.7	36 50	37.7	28 58.0	35 48	36.1	29 08.4	35 47	35.5	91
2	26 46.0	40 53	40.5	26 57.9	40 53	40.0	27 21.4	39 51	39.0	27 33.0	38 51	38.5	27 44.4	38 50	38.0	27 55.8	38 50	37.4	28 29.1	36 48	35.8	28 40.0	36 47	35.3	2
3	26 14.1	41 53	40.3	26 26.4	41 52	39.8	26 50.6	40 51	38.7	27 02.5	40 51	38.2	27 14.3	39 50	37.7	27 26.0	39 49	37.2	28 00.4	38 48	35.6	28 11.6	37 47	35.1	3
4	25 42.4	42 53	40.0	25 55.0	42 52	39.5	26 19.9	41 51	38.5	26 32.2	41 50	38.0	26 44.3	40 50	37.5	26 56.4	40 49	37.0	27 31.8	39 47	35.4	27 43.4	38 47	34.9	4
95	25 10.9	43 52	39.7	25 23.9	43 52	39.2	25 49.4	42 51	38.2	26 02.0	42 50	37.7	26 14.5	42 49	37.2	26 26.9	41 49	36.7	27 03.4	40 47	35.2	27 15.4	40 46	34.7	95
6	24 39.6	44 52	39.5	24 52.9	44 51	39.0	25 19.1	43 50	38.0	25 32.0	43 50	37.5	25 44.9	43 49	37.0	25 57.6	42 49	36.5	26 35.2	41 47	34.9	26 47.5	41 46	34.4	6
7	24 08.5	45 52	39.2	24 22.0	45 51	38.7	24 48.9	44 50	37.7	25 02.2	44 49	37.2	25 15.4	44 49	36.7	25 28.5	43 48	36.2	26 07.1	42 46	34.7	26 19.8	42 46	34.2	7
8	23 37.5	46 51	38.9	23 51.4	46 51	38.4	24 19.0	46 50	37.4	24 32.6	45 49	36.9	24 46.1	45 48	36.4	24 59.5	45 48	35.9	25 39.2	44 46	34.5	25 52.3	43 46	34.0	8
9	23 06.8	48 51	38.6	23 21.0	47 50	38.1	23 49.2	47 49	37.1	24 03.1	46 49	36.7	24 17.0	46 48	36.2	24 30.8	46 48	35.7	25 11.5	45 46	34.2	25 24.9	44 45	33.7	9
100	22 36.2	49 51	38.3	22 50.8	48 50	37.8	23 19.6	48 49	36.8	23 33.9	47 48	36.4	23 48.1	47 48	35.9	24 02.2	47 47	35.4	24 44.0	46 46	33.9	24 57.7	46 45	33.5	100
1	22 05.9	50 50	38.0	22 20.7	49 50	37.5	22 50.2	49 49	36.6	23 04.8	49 48	36.1	23 19.4	48 48	35.6	23 33.8	48 47	35.1	24 16.6	47 45	33.7	24 30.7	47 45	33.2	1
2	21 35.8	51 50	37.7	21 50.9	50 49	37.2	22 21.1	50 48	36.3	22 36.0	50 48	35.8	22 50.9	49 47	35.3	23 05.6	49 47	34.8	23 49.5	48 45	33.4	24 03.9	48 44	32.9	2
3	21 05.8	52 50	37.3	21 21.3	51 49	36.9	21 52.1	51 48	36.0	22 07.4	51 47	35.5	22 22.6	50 47	35.0	22 37.7	50 46	34.6	23 22.5	49 45	33.1	23 37.3	49 44	32.7	3
4	20 36.1	53 49	37.0	20 51.9	53 49	36.6	21 23.3	52 48	35.6	21 38.9	52 47	35.2	21 54.5	52 46	34.7	22 09.9	51 46	34.3	22 55.7	51 44	32.9	23 10.8	50 44	32.4	4
105	20 06.7	54 49	36.7	20 22.8	54 48	36.2	20 54.8	53 47	35.3	21 10.7	53 47	34.9	21 26.6	53 46	34.4	21 42.3	52 46	34.0	22 29.2	52 44	32.6	22 44.6	51 43	32.1	105
6	19 37.4	55 48	36.3	19 53.9	55 48	35.9	20 26.5	54 47	35.0	20 42.7	54 46	34.6	20 58.9	54 46	34.1	21 15.0	53 45	33.7	22 02.8	53 44	32.3	22 18.6	52 43	31.8	6
7	19 08.4	56 48	35.9	19 25.2	56 47	35.6	19 58.4	55 46	34.7	20 15.0	55 46	34.2	20 31.4	55 45	33.8	20 47.9	55 45	33.3	21 36.7	54 43	32.0	21 52.8	54 43	31.5	7
8	18 39.6	57 48	35.7	18 56.7	57 47	35.2	19 30.6	56 46	34.3	19 47.4	56 46	33.9	20 04.2	56 45	33.5	20 21.0	56 44	33.0	21 10.7	55 43	31.7	21 27.2	55 42	31.2	8
9	18 11.1	58 47	35.3	18 28.5	58 47	34.9	19 03.0	57 46	34.0	19 20.1	57 45	33.6	19 37.2	57 45	33.1	19 54.3	57 44	32.7	20 45.0	56 42	31.4	21 01.8	56 42	30.9	9
110	17 42.8	59 47	34.9	18 00.5	59 46	34.5	18 35.6	58 45	33.7	18 53.1	58 45	33.2	19 10.5	58 44	32.8	19 27.8	58 44	32.4	20 19.5	57 42	31.1	20 36.6	57 42	30.6	110
1	17 14.8	60 46	34.6	17 32.7	60 46	34.2	18 08.5	59 45	33.3	18 26.3	59 44	32.9	18 44.0	59 44	32.5	19 01.6	59 43	32.0	19 54.3	58 42	30.8	20 11.7	58 41	30.3	1
2	16 47.0	61 46	34.2	17 05.3	61 45	33.8	17 41.6	60 44	33.0	17 59.7	60 44	32.6	18 17.7	60 43	32.1	18 35.7	60 43	31.7	19 29.3	59 41	30.4	19 47.0	59 41	30.0	2
3	16 19.5	62 45	33.8	16 38.1	62 45	33.4	17 15.0	61 44	32.6	17 33.4	61 43	32.2	17 51.7	61 43	31.8	18 10.0	61 42	31.3	19 04.5	60 41	30.1	19 22.6	60 40	29.7	3
4	15 52.3	63 45	33.5	16 11.1	63 44	33.1	16 48.6	62 43	32.3	17 07.3	62 43	31.8	17 25.9	62 42	31.4	17 44.5	62 42	31.0	18 40.0	61 40	29.8	18 58.3	61 40	29.4	4
115	15 25.3	64 44	33.1	15 44.4	64 44	32.7	16 22.5	63 43	31.9	16 41.5	63 43	31.5	17 00.4	63 42	31.1	17 19.3	63 42	30.7	18 15.7	62 40	29.4	18 34.4	62 40	29.0	115
6	14 58.6	65 44	32.7	15 18.0	65 44	32.3	15 56.7	64 43	31.5	16 16.0	64 42	31.1	16 35.2	64 42	30.7	16 54.4	64 41	30.3	17 51.6	63 40	29.1	18 10.6	63 39	28.7	6
7	14 32.2	66 44	32.3	14 51.9	66 43	31.9	15 31.1	65 42	31.1	15 50.7	65 42	30.7	16 10.2	65 41	30.3	16 29.7	65 41	30.0	17 27.9	64 39	28.8	17 47.2	64 39	28.4	7
8	14 06.1	67 43	31.9	14 26.0	67 43	31.5	15 05.9	66 42	30.8	15 25.7	66 41	30.4	15 45.5	66 41	30.0	16 05.3	66 40	29.6	17 04.4	65 39	28.4	17 23.9	65 38	28.0	8
9	13 40.2	68 43	31.5	14 00.5	67 42	31.1	14 40.9	67 41	30.4	15 01.0	67 41	30.0	15 21.1	67 40	29.6	15 41.2	67 40	29.2	16 41.1	66 38	28.1	17 01.0	66 38	27.7	9
120	13 14.7	68 42	31.1	13 35.2	68 42	30.7	14 16.2	68 41	30.0	14 36.6	68 40	29.6	14 57.0	68 40	29.2	15 17.3	68 39	28.8	16 18.1	67 38	27.7	16 38.3	67 37	27.3	120
1	12 49.5	69 42	30.7	13 10.3	69 41	30.3	13 51.8	69 40	29.6	14 12.5	69 40	29.2	14 33.1	69 39	28.8	14 53.8	69 39	28.5	15 55.4	68 37	27.3	16 15.9	68 37	26.9	1
2	12 24.5	70 41	30.3	12 45.6	70 41	29.9	13 27.6	70 40	29.2	13 48.6	70 39	28.8	14 09.6	70 39	28.4	14 30.5	70 38	28.1	15 33.0	69 37	27.0	15 53.8	69 36	26.6	2
3	11 59.9	71 41	29.9	12 21.2	71 40	29.5	13 03.8	71 39	28.8	13 25.1	71 39	28.4	13 46.3	71 38	28.1	14 07.5	71 38	27.7	15 10.9	70 36	26.6	15 31.9	70 36	26.2	3
4	11 35.6	72 40	29.4	11 57.2	72 40	29.1	12 40.3	72 39	28.4	13 01.8	72 38	28.0	13 23.3	72 38	27.7	13 44.8	71 37	27.3	14 49.0	71 36	26.2	15 10.3	71 35	25.8	4
125	11 11.6	73 39	29.0	11 33.5	73 39	28.7	12 17.1	73 38	28.0	12 38.9	73 38	27.6	13 00.7	73 37	27.3	13 22.4	72 37	26.9	14 27.5	72 35	25.8	14 49.1	72 35	25.5	125
6	10 47.9	74 39	28.6	11 10.0	74 38	28.2	11 54.2	74 38	27.5	12 16.3	74 37	27.2	12 38.3	74 37	26.8	13 00.3	73 36	26.5	14 06.2	73 35	25.4	14 28.1	73 34	25.1	6
7	10 24.6	75 38	28.1	10 47.0	75 38	27.8	11 31.7	74 37	27.1	11 54.0	74 37	26.8	12 16.3	74 36	26.4	12 38.6	74 36	26.1	13 45.2	74 34	25.1	14 07.4	74 34	24.7	7
8	10 01.6	76 38	27.7	10 24.2	75 37	27.4	11 09.4	75 36	26.7	11 32.0	75 36	26.4	11 54.6	75 36	26.0	12 17.1	75 35	25.7	13 24.6	75 34	24.7	13 47.0	75 33	24.3	8
9	9 38.9	76 37	27.2	10 01.8	76 37	26.9	10 47.5	76 36	26.3	11 10.4	76 36	25.9	11 33.2	76 35	25.6	11 56.0	76 35	25.3	13 04.2	76 33	24.3	13 26.9	76 33	23.9	9
130	9 16.6	77 37	26.8	9 39.7	77 36	26.5	10 26.0	77 35	25.8	10 49.0	77 35	25.5	11 12.1	77 35	25.2	11 35.2	77 34	24.8	12 44.2	77 33	23.9	13 07.1	76 32	23.5	130
1	8 54.6	78 36	26.3	9 18.0	78 36	26.0	10 04.7	78 35	25.4	10 28.1	78 34	25.1	10 51.4	78 34	24.7	11 14.7	78 34	24.4	12 24.5	77 32	23.5	12 47.7	77 32	23.1	1
2	8 33.0	79 35	25.9	8 56.6	79 35	25.6	9 43.8	79 34	24.9	10 07.4	79 34	24.6	10 31.0	79 33	24.3	10 54.5	78 33	24.0	12 05.0	78 32	23.0	12 28.5	78 31	22.7	2
3	8 11.7	80 35	25.4	8 35.6	80 34	25.1	9 23.3	79 34	24.5	9 47.1	79 33	24.2	10 10.9	79 33	23.9	10 34.7	79 32	23.6	11 46.0	79 31	22.6	12 09.7	79 31	22.3	3
4	7 50.8	80 34	24.9	8 14.9	80 34	24.6	9 03.1	80 33	24.0	9 27.1	80 33	23.7	9 51.2	80 32	23.4	10 15.2	80 32	23.1	11 27.2	80 31	22.2	11 51.2	80 30	21.9	4
135	7 30.2	81 34	24.5	7 54.6	81 33	24.2	8 43.2	81 32	23.6	9 07.5	81 32	23.3	9 31.8	81 32	23.0	9 56.1	81 31	22.7	11 08.8	81 30	21.8	11 33.0	81 30	21.5	135
6	7 10.1	82 33	24.0	7 34.7	82 33	23.7	8 23.8	82 32	23.1	8 48.3	82 31	22.8	9 12.8	82 31	22.5	9 37.3	82 31	22.2	10 50.7	82 30	21.4	11 15.2	81 29	21.1	6
7	6 50.3	83 32	23.5	7 15.1	83 32	23.2	8 04.6	83 31	22.7	8 29.4	83 31	22.4	8 54.2	82 30	22.1	9 18.9	82 30	21.8	10 33.0	82 29	20.9	10 57.7	82 29	20.6	7
8	6 30.9	83 32	23.0	6 55.9	83 31	22.7	7 45.9	83 31	22.2	8 10.9	83 30	21.9	8 35.9	83 30	21.6	9 00.8	83 30	21.3	10 15.6	83 28	20.5	10 40.5	83 28	20.2	8
9	6 11.8	84 31	22.5	6 37.1	84 31	22.3	7 27.5	84 30	21.7	7 52.7	84 30	21.4	8 17.9	84 29	21.2	8 43.1	84 29	20.9	9 58.6	84 28	20.1	10 23.7	84 27	19.8	9
140	5 53.2	85 30	22.0	6 18.7	85 30	21.8	7 09.5	85 29	21.2	7 34.9	85 29	21.0	8 00.4	85 29	20.7	8 25.8	85 28	20.4	9 41.9	85 27	19.6	10 07.3	84 27	19.4	140
1	5 35.0	86 30	21.5	6 00.6	86 29	21.3	6 51.9	85 29	20.8	7 17.5	85 28	20.5	7 43.2	85 28	20.2	8 08.8	85 28	20.0	9 25.6	85 27	19.2	9 51.1	85 26	18.9	1
2	5 17.1	86 29	21.0	5 43.0	86 29	20.8	6 34.7	86 28	20.3	7 00.5	86 28	20.0	7 26.4	86 27	19.8	7 52.2	86 27	19.5	9 09.6	86 26	18.7	9 35.4	86 26	18.5	2
3				5 25.7	87 28	20.3	6 17.8	87 27	19.8	6 43.9	87 27	19.5	7 09.9	87 27	19.3	7 36.0	87 26	19.0	8 54.0	87 25	18.3	9 20.0	87 25	18.0	3
4				5 08.9	88 27	19.8	6 01.4	87 27	19.3	6 27.7	87 26	19.1	6 53.9	87 26	18.8	7 20.1	87 26	18.6	8 38.8	87 25	17.8	9 05.0	87 24	17.6	4
145							5 45.4	88 26	18.8	6 11.8	88 26	18.6	6 38.2	88 25	18.3	7 04.7	88 25	18.1	8 23.9	88 24	17.4	8 50.3	88 24	17.1	145
6							5 29.7	89 25	18.3	5 56.3	89 25	18.1	6 23.0	89 25	17.8	6 49.6	89 24	17.6	8 09.4	89 24	16.9	8 36.0	89 23	16.7	6
7							5 14.5	89 25	17.8	5 41.3	89 24	17.6	6 08.1	89 24	17.4	6 34.9	89 24	17.1	7 55.3	89 23	16.5	8 22.1	89 23	16.2	7
8										5 26.7	90 24	17.1	5 53.7	90 23	16.9	6 20.6	90 23	16.6	7 41.6	90 22	16.0	8 05.5	90 22	15.8	8
9										5 12.4	91 23	16.6	5 39.6	91 23	16.4	6 06.8	91 22	16.2	7 28.2	90 22	15.5	7 55.4	90 21	15.3	9
150													5 25.9	91 22	15.9	5 53.3	91 22	15.7	7 15.3	91 21	15.0	7 42.6	91 21	14.8	150
1													5 12.7	92 21	15.4	5 40.2	92 21	15.2	7 02.7	92 20	14.6	7 30.2	92 20	14.4	1
2																5 27.6	92 20	14.7	6 50.5	92 20	14.1	7 18.2	92 19	13.9	2
3																5 15.3	93 20	14.2	6 38.8	93 19	13.6	7 06.6	93 19	13.4	3
4																5 03.5	93 19	13.7	6 27.4	93 18	13.1	6 55.4	93 18	13.0	4
155																			6 16.4	94 18	12.6	6 44.5	94 17	12.5	155
6																			6 05.9	94 17	12.2	6 34.1	94 17	12.0	6
7																			5 55.7	95 16	11.7	6 24.1	95 16	11.5	7
8																			5 46.0	95 16	11.2	6 14.5	95 15	11.0	8
9																			5 36.7	96 15	10.7	6 05.3	96 15	10.5	9
160																			5 27.8	96 14	10.2	5 56.6	96 14	10.1	160
1																			5 19.3	96 13	09.7	5 48.2	96 13	09.6	1
2																			5 11.2	97 13	09.2	5 40.2	97 13	09.1	2
3																			5 03.6	97 12	08.7	5 32.7	97 12	08.6	3
4																						5 25.6	97 11	08.1	4
165																						5 18.9	98 10	07.6	165
6																						5 12.6	98 10	07.1	6
7																						5 06.8	98 09	06.6	7
8																						5 01.3	99 08	06.1	8

Lat. 36°

Lat. 37°

Lat. 38°

16—68

Lat. 35°

H.A.	60° 00' Alt. (Δd Δt)	Az.	60° 30' Alt. (Δd Δt)	Az.	62° 00' Alt. (Δd Δt)	Az.	62° 30' Alt. (Δd Δt)	Az.	63° 00' Alt. (Δd Δt)	Az.	69° 00' Alt. (Δd Δt)	Az.	69° 30' Alt. (Δd Δt)	Az.	74° 30' Alt. (Δd Δt)	Az.	H.A.
00	65 00.0 1.001	00.0	64 30.0 1.001	00.0	63 00.0 1.001	00.0	62 30.0 1.001	00.0	62 00.0 1.001	00.0	56 00.0 1.000	00.0	55 30.0 1.000	00.0	50 30.0 1.000	00.0	00
1	64 59.5 1.003	01.2	64 29.5 1.002	01.1	62 59.6 1.002	01.0	62 29.6 1.002	01.0	61 59.6 1.002	00.6	55 59.7 1.001	00.6	55 29.7 1.001	00.6	50 29.8 1.001	00.4	1
2	64 58.0 1.004	02.4	64 25.6 1.004	02.3	62 58.2 1.004	02.1	62 28.3 1.004	02.0	61 56.3 1.005	02.9	55 58.9 1.003	01.9	55 27.6 1.003	01.2	50 29.4 1.002	00.8	2
3	64 55.4 99 06	03.5	64 25.6 1.006	03.4	62 56.0 1.005	03.1	62 26.1 1.005	03.0	61 53.4 99 06	03.9	55 57.5 1.003	01.9	55 27.6 1.003	01.9	50 28.4 1.002	01.3	3
4	64 51.9 99 08	04.7	64 22.2 99 07	04.6	62 52.9 99 07	04.1	62 23.2 99 06	04.0	61 53.4 99 06	03.9	55 55.6 99 04	02.6	55 25.8 99 04	02.5	50 27.1 1.003	01.7	4
05	64 47.4 99 09	05.9	64 17.8 99 09	05.7	62 49.0 99 08	05.1	62 19.3 99 08	05.0	61 49.7 99 08	04.8	55 53.1 99 05	03.2	55 23.4 99 05	03.1	50 25.5 99 08	02.1	05
6	64 41.9 98 11	07.0	64 12.4 98 10	06.8	62 44.1 98 09	06.1	62 14.6 98 09	06.0	61 45.1 98 09	05.9	55 50.1 98 06	03.8	55 20.5 99 06	03.7	50 23.5 99 04	02.5	6
7	64 35.4 97 12	08.2	64 06.2 97 12	07.9	62 38.4 98 11	07.2	62 09.1 98 11	06.9	61 39.8 98 10	06.7	55 46.6 98 07	04.5	55 17.1 98 07	04.3	50 21.2 99 04	02.9	7
8	64 27.9 96 14	09.3	63 58.9 97 14	09.0	62 31.9 97 12	08.1	62 02.8 97 12	07.9	61 33.7 97 12	07.6	55 42.5 98 08	05.1	55 13.1 98 07	04.9	50 18.5 98 05	03.3	8
9	64 19.5 96 16	10.4	63 50.8 96 15	10.1	62 24.5 96 14	09.1	61 55.7 96 13	08.8	61 26.8 96 13	08.5	55 37.9 97 09	05.7	55 08.7 97 08	05.5	50 15.5 98 05	03.7	9
10	64 10.2 95 17	11.5	63 41.8 95 17	11.1	62 16.3 95 15	10.1	61 47.7 95 15	09.8	61 19.1 96 14	09.5	55 32.7 97 09	06.3	55 03.7 97 09	06.1	50 12.1 97 06	04.2	10
1	63 59.9 93 19	12.6	63 31.8 94 18	12.2	62 07.3 94 16	11.0	61 39.0 94 16	10.7	61 10.6 95 15	10.4	55 27.1 96 10	06.9	54 58.2 96 10	06.7	50 08.8 97 07	04.6	1
2	63 48.8 92 20	13.6	63 21.1 93 19	13.2	61 57.5 93 18	12.0	61 29.5 93 17	11.6	61 01.4 94 17	11.2	55 20.9 95 11	07.5	54 52.3 96 11	07.3	50 04.5 96 07	05.0	2
3	63 36.8 91 21	14.7	63 09.4 91 21	14.2	61 46.9 92 19	12.9	61 19.2 92 18	12.5	60 51.5 93 18	12.1	55 14.2 95 12	08.1	54 45.8 95 12	07.8	49 59.8 96 08	05.4	3
4	63 23.9 90 23	15.7	62 57.0 90 22	15.2	61 35.5 91 20	13.8	61 08.2 91 20	13.4	60 40.8 91 19	13.0	55 07.0 94 13	08.7	54 38.8 94 12	08.4	49 55.1 95 08	05.8	4
15	63 10.2 88 24	16.7	62 43.7 89 23	16.1	61 23.4 90 21	14.7	60 56.5 90 21	14.2	60 29.4 90 20	13.8	54 59.3 93 14	09.3	54 31.4 93 13	09.0	49 50.0 94 09	06.2	15
6	62 55.7 87 25	17.6	62 29.6 87 25	17.1	61 10.6 88 23	15.6	60 44.0 89 22	15.1	60 17.4 89 21	14.6	54 51.1 92 14	09.9	54 23.5 92 14	09.5	49 44.5 94 10	06.6	6
7	62 40.5 85 27	18.6	62 14.8 86 26	18.0	60 57.0 87 24	16.4	60 30.9 87 23	15.9	60 04.6 88 22	15.4	54 42.4 91 15	10.4	54 15.1 91 15	10.1	49 38.5 93 10	06.9	7
8	62 24.4 84 28	19.5	61 59.2 84 27	18.9	60 42.8 86 25	17.3	60 17.1 86 24	16.7	59 51.2 86 23	16.2	54 33.3 90 16	11.0	54 06.3 90 15	10.6	49 32.7 93 11	07.3	8
9	62 07.7 82 29	20.4	61 43.0 83 28	19.8	60 27.9 84 26	18.1	60 02.6 85 25	17.5	59 37.2 85 24	17.0	54 23.7 89 17	11.6	53 57.0 89 16	11.2	49 26.3 91 11	07.7	9
20	61 50.2 80 30	21.2	61 26.0 81 29	20.6	60 12.3 83 27	18.9	59 47.5 83 26	18.3	59 22.5 84 25	17.7	54 13.6 88 18	12.1	53 47.2 88 17	11.7	49 19.5 90 12	08.1	20
1	61 32.1 79 31	22.1	61 08.3 79 30	21.4	59 56.1 81 28	19.6	59 31.8 82 27	19.0	59 07.2 82 26	18.5	54 03.1 87 18	12.6	53 37.0 87 18	12.2	49 12.5 89 12	08.4	1
2	61 13.3 77 32	22.9	60 50.1 78 32	22.2	59 39.3 79 29	20.4	59 15.4 80 28	19.8	58 51.3 80 27	19.2	53 52.1 85 19	13.2	53 26.4 86 18	12.7	49 05.1 88 13	08.8	2
3	60 53.8 75 33	23.7	60 31.1 76 33	23.0	59 21.9 78 30	21.1	58 58.5 78 29	20.5	58 34.9 79 28	19.9	53 40.7 84 20	13.7	53 15.4 84 19	13.2	48 57.4 87 13	09.2	3
4	60 33.8 74 34	24.4	60 11.6 74 33	23.8	59 04.0 76 31	21.8	58 41.0 77 30	21.2	58 17.9 77 29	20.6	53 28.9 83 20	14.2	53 03.9 83 20	13.7	48 49.5 86 14	09.5	4
25	60 13.3 72 35	25.2	59 51.5 72 34	24.5	58 45.4 74 32	22.5	58 23.0 75 31	21.9	58 00.4 76 30	21.2	53 16.6 82 21	14.7	52 52.1 82 20	14.2	48 41.2 85 14	09.9	25
6	59 52.0 70 36	25.9	59 30.9 71 35	25.2	58 26.4 73 33	23.2	58 04.4 73 32	22.5	57 42.3 74 31	21.9	53 04.0 80 22	15.2	52 39.8 81 21	14.7	48 32.7 84 15	10.2	6
7	59 30.5 68 37	26.6	59 09.9 69 36	25.9	58 06.8 71 33	23.8	57 45.4 72 33	23.1	57 23.8 72 32	22.5	52 50.9 79 22	15.6	52 27.2 79 22	15.1	48 23.8 83 15	10.5	7
8	59 08.0 66 38	27.2	58 48.0 67 37	26.5	57 46.7 69 36	24.4	57 25.8 70 33	23.7	57 04.7 71 32	23.1	52 37.5 77 23	16.1	52 14.2 78 22	15.6	48 14.7 82 16	10.9	8
9	58 45.3 64 39	27.9	58 25.9 65 38	27.1	57 26.2 67 35	25.0	57 05.8 68 34	24.3	56 45.2 69 33	23.7	52 23.7 76 24	16.5	52 00.8 76 23	16.0	48 05.3 80 16	11.2	9
30	58 22.1 62 39	28.5	58 03.2 63 38	27.7	57 05.1 66 36	25.6	56 45.3 66 35	24.9	56 25.3 67 34	24.2	52 09.5 74 24	17.0	51 47.1 75 23	16.4	47 55.6 79 17	11.5	30
1	57 58.4 61 40	29.1	57 40.1 61 39	28.4	56 43.7 64 36	26.2	56 24.1 64 36	25.5	56 04.9 65 35	24.8	51 55.0 73 25	17.4	51 33.0 73 24	16.9	47 45.7 78 17	11.8	1
2	57 34.4 59 41	29.6	57 16.6 60 40	28.9	56 21.8 62 37	26.7	56 03.1 63 36	26.0	55 44.1 64 35	25.3	51 40.1 72 25	17.8	51 18.6 72 25	17.3	47 35.5 77 17	12.1	2
3	57 09.9 57 41	30.1	56 52.7 58 41	29.4	55 59.5 60 38	27.2	55 41.3 61 37	26.5	55 22.9 62 36	25.8	51 24.9 70 26	18.2	51 03.8 70 25	17.7	47 25.1 75 18	12.4	3
4	56 45.0 55 42	30.7	56 28.4 56 41	29.9	55 36.9 58 38	27.7	55 19.2 59 37	27.0	55 01.3 60 37	26.3	51 09.3 68 26	18.6	50 48.7 69 26	18.1	47 14.4 74 18	12.7	4
35	56 19.8 53 43	31.1	56 03.7 54 42	30.4	55 13.9 57 39	28.2	54 56.7 58 38	27.5	54 39.4 58 37	26.8	50 53.5 67 27	19.0	50 33.4 67 26	18.4	47 03.4 72 19	13.0	35
6	55 54.2 51 43	31.6	55 38.6 52 43	30.9	54 50.5 55 40	28.6	54 33.9 56 39	27.9	54 17.1 57 38	27.2	50 37.3 65 27	19.4	50 17.7 65 27	18.8	46 52.3 71 19	13.3	6
7	55 28.2 49 44	32.1	55 13.3 50 43	31.3	54 26.8 53 40	29.1	54 10.7 54 39	28.3	53 54.4 55 38	27.6	50 20.8 63 28	19.8	50 01.7 64 27	19.2	46 40.9 70 19	13.6	7
8	55 02.0 48 44	32.5	54 47.6 48 43	31.7	54 02.7 51 41	29.5	53 47.2 52 40	28.8	53 31.5 53 39	28.0	50 04.1 62 28	20.1	49 45.4 62 28	19.5	46 29.2 68 20	13.8	8
9	54 35.4 46 45	32.9	54 21.6 47 44	32.1	53 38.4 49 41	29.9	53 23.4 50 40	29.2	53 08.2 51 39	28.4	49 47.0 60 29	20.4	49 28.9 61 28	19.8	46 17.4 67 20	14.1	9
40	54 08.6 44 45	33.3	53 55.3 45 44	32.5	53 13.7 48 42	30.3	52 59.3 48 41	29.5	52 44.7 49 40	28.8	49 29.7 59 29	20.8	49 12.1 59 28	20.2	46 05.3 65 20	14.3	40
1	53 41.5 43 46	33.6	53 28.8 43 45	32.8	52 48.8 46 42	30.6	52 35.0 47 41	29.9	52 20.8 48 40	29.2	49 12.2 57 30	21.1	48 55.0 58 29	20.5	45 53.0 64 21	14.6	1
2	53 14.2 40 46	34.0	53 02.0 41 45	33.2	52 23.7 44 42	31.0	52 10.3 45 41	30.3	51 56.7 46 41	29.5	48 54.4 56 30	21.4	48 37.7 56 29	20.8	45 40.5 62 21	14.8	2
3	52 46.6 38 46	34.3	52 34.9 39 45	33.6	51 58.2 42 42	31.3	51 45.4 43 42	30.6	51 32.4 44 41	29.9	48 36.3 53 30	21.7	48 20.2 54 30	21.1	45 27.9 60 21	15.1	3
4	52 18.7 37 47	34.6	52 07.6 38 46	33.9	51 32.6 40 43	31.6	51 20.3 41 42	30.9	51 07.8 42 41	30.2	48 18.0 52 31	22.0	48 02.4 53 30	21.3	45 15.0 59 22	15.3	4
45	51 50.7 35 47	34.9	51 40.1 36 46	34.2	51 06.7 39 43	31.9	50 55.0 39 43	31.2	50 43.0 40 42	30.5	47 59.5 50 31	22.2	47 44.4 51 30	21.6	45 01.9 57 22	15.5	45
6	51 22.5 33 47	35.2	51 12.4 34 46	34.5	50 40.6 37 44	32.2	50 29.4 38 43	31.5	50 18.0 39 42	30.8	47 40.8 48 32	22.5	47 26.2 49 31	21.9	44 48.7 56 22	15.7	6
7	50 54.1 31 48	35.4	50 44.6 32 47	34.7	50 14.3 35 44	32.5	50 03.7 36 43	31.7	49 52.7 37 42	31.0	47 21.9 47 32	22.7	47 07.8 47 31	22.1	44 35.3 54 23	15.9	7
8	50 25.5 29 48	35.7	50 16.5 30 47	34.9	49 47.8 34 45	32.7	49 37.7 34 44	32.0	49 27.3 35 43	31.3	47 02.8 45 32	23.0	46 49.2 46 31	22.4	44 21.7 52 23	16.1	8
9	49 56.8 28 48	35.9	49 48.3 29 47	35.2	49 21.2 32 45	33.0	49 11.6 32 44	32.2	49 01.7 33 43	31.5	46 43.5 43 32	23.2	46 30.4 44 32	22.6	44 08.0 51 23	16.3	9
50	49 27.9 26 48	36.1	49 19.9 27 48	35.4	48 54.4 30 45	33.2	48 45.3 31 44	32.4	48 36.0 32 43	31.7	46 24.0 41 33	23.5	46 11.5 42 32	22.8	43 54.1 49 23	16.5	50
1	48 58.8 24 49	36.3	48 51.4 25 48	35.6	48 27.4 28 45	33.4	48 18.9 29 44	32.7	48 10.0 30 43	31.9	46 04.4 40 33	23.7	45 52.3 41 32	23.0	43 40.1 47 24	16.7	1
2	48 29.7 23 49	36.5	48 22.7 24 48	35.7	48 00.3 26 45	33.6	47 52.3 27 45	32.8	47 44.0 28 44	32.1	45 44.6 38 33	23.9	45 33.0 39 32	23.2	43 25.9 46 24	16.9	2
3	48 00.4 21 49	36.6	47 54.0 22 48	35.9	47 33.1 25 46	33.7	47 25.5 26 45	33.0	47 17.8 26 44	32.3	45 24.6 36 34	24.1	45 13.6 37 33	23.4	43 11.6 44 24	17.0	3
4	47 31.0 19 49	36.8	47 25.1 20 48	36.1	47 05.7 23 46	33.9	46 58.7 24 45	33.2	46 51.4 25 44	32.5	45 04.5 35 34	24.2	44 54.0 35 33	23.6	42 57.1 42 24	17.2	4
55	47 01.5 18 49	36.9	46 56.1 19 48	36.2	46 38.2 21 46	34.1	46 31.7 22 45	33.4	46 25.0 23 44	32.6	44 44.2 33 34	24.4	44 34.3 34 33	23.7	42 42.5 41 24	17.3	55
6	46 31.9 16 49	37.1	46 27.0 17 49	36.3	46 10.6 20 46	34.2	46 04.7 20 45	33.5	45 58.4 21 44	32.8	44 23.9 31 34	24.6	44 14.4 32 33	23.9	42 27.8 39 25	17.5	6
7	46 02.3 14 50	37.2	45 57.9 15 49	36.5	45 43.0 18 46	34.3	45 37.5 19 45	33.6	45 31.7 20 45	33.0	44 03.4 29 34	24.7	43 54.4 30 34	24.1	42 13.0 37 25	17.6	7
8	45 32.6 13 50	37.3	45 28.6 14 49	36.6	45 15.2 16 46	34.4	45 10.2 17 46	33.7	45 05.0 18 45	33.0	43 42.8 28 35	24.9	43 34.4 28 34	24.2	41 58.1 36 25	17.7	8
9	45 02.8 11 50	37.3	44 59.3 12 49	36.6	44 47.4 15 47	34.5	44 42.9 15 46	33.8	44 38.1 16 45	33.2	43 22.0 26 35	25.0	43 14.2 27 34	24.3	41 43.1 34 25	17.9	9
60	44 32.9 10 50	37.4	44 30.0 10 49	36.7	44 19.5 13 47	34.6	44 15.5 14 46	33.9	44 11.2 15 45	33.2	43 01.2 24 35	25.1	42 53.9 25 34	24.5	41 27.9 32 25	18.0	60
1	44 03.1 08 50	37.5	44 00.5 09 49	36.8	43 51.5 11 47	34.7	43 48.0 12 46	34.0	43 44.2 13 45	33.3	42 40.3 22 35	25.2	42 33.5 23 34	24.6	41 12.7 30 25	18.1	1
2	43 33.1 06 50	37.5	43 31.1 07 49	36.8	43 23.5 10 47	34.8	43 20.5 10 46	34.1	43 17.2 11 45	33.4	42 19.3 21 35	25.4	42 13.0 22 34	24.7	40 57.4 29 26	18.2	2
3	43 03.2 05 50	37.6	43 01.6 06 49	36.9	42 55.4 08 47	34.8	42 52.9 09 46	34.2	42 50.1 10 45	33.5	41 58.3 19 35	25.4	41 52.4 20 34	24.8	40 42.0 27 26	18.3	3
4	42 33.2 03 50	37.6	42 32.1 04 49	36.9	42 27.4 06 47	34.9	42 25.3 07 46	34.2	42 23.0 08 45	33.5	41 37.1 17 35	25.5	41 31.8 18 34	24.9	40 26.5 26 26	18.4	4
65	42 03.2 02 50	37.6	42 02.6 03 49	36.9	41 59.2 05 47	34.9	41 57.6 06 46	34.2	41 55.8 06 45	33.6	41 15.9 16 35	25.6	41 11.1 16 35	24.9	40 11.0 24 26	18.5	65
6	41 33.2 00 50	37.6	41 33.0 01 49	36.9	41 31.1 03 47	35.0	41 30.0 04 46	34.3	41 28.6 05 45	33.6	40 54.6 14 35	25.7	40 50.3 15 35	25.0	39 55.4 22 26	18.6	6
7	41 03.2 01 50	37.6	41 03.5 01 49	37.0	41 02.9 02 47	35.0	41 02.3 03 46	34.3	41 01.4 03 45	33.6	40 33.3 12 35	25.7	40 29.5 13 35	25.1	39 39.7 20 26	18.6	7
8	40 33.2 03 50	37.6	40 33.9 02 49	36.9	40 34.8 00 47	35.0	40 34.6 01 46	34.3	40 34.2 02 45	33.7	40 12.0 11 35	25.8	40 08.7 11 35	25.1	39 24.0 18 26	18.7	8
9	40 03.2 04 50	37.6	40 04.4 04 49	36.9	40 06.6 01 47	35.0	40 06.9 01 46	34.3	40 06.9 00 45	33.7	39 50.6 09 36	25.8	39 47.8 10 35	25.2	39 08.2 17 26	18.8	9
70	39 33.1 06 50	37.5	39 34.9 06 49	36.9	39 38.4 03 47	35.0	39 39.2 02 46	34.3	39 39.7 01 45	33.7	39 29.1 07 36	25.9	39 26.8 08 35	25.2	38 52.3 15 26	18.8	70
1	39 03.3 07 50	37.5	39 05.4 06 49	36.9	39 10.3 04 47	34.9	39 11.5 04 46	34.3	39 12.5 03 45	33.6	39 07.7 06 36	25.9	39 05.9 06 35	25.3	38 36.5 13 27	18.9	1
2	38 33.4 09 50	37.5	38 35.9 08 49	36.8	38 42.1 06 47	34.9	38 43.8 05 46	34.3	38 45.2 04 45	33.6	38 46.2 04 36	25.9	38 44.9 05 35	25.3	38 20.6 12 27	18.9	2
3	38 03.6 10 50	37.4	38 06.5 09 49	36.8	38 14.0 07 47	34.9	38 16.1 07 46	34.2	38 18.0 06 45	33.6	38 24.7 02 36	25.9	38 23.9 03 35	25.3	38 04.6 10 27	18.9	3
4	37 33.7 12 50	37.3	37 37.1 11 49	36.7	37 46.0 09 47	34.9	37 48.5 08 46	34.2	37 50.9 07 45	33.5	38 03.2 01 36	25.9	38 02.9 01 35	25.3	37 48.6 08 27	19.0	4
75	37 04.0 13 50	37.2	37 07.8 12 49	36.6	37 17.9 10 47	34.8	37 20.9 10 46	34.1	37 23.7 10 45	33.5	37 41.7 01 35	25.9	37 41.9 00 35	25.3	37 32.7 06 27	19.0	75
6	36 34.3 14 50	37.2	36 38.5 14 49	36.5	36 49.9 12 47	34.7	36 53.4 11 46	34.0	36 56.6 10 45	33.4	37 20.2 03 36	25.9	37 20.9 02 35	25.3	37 16.6 05 27	19.0	6
7	36 04.6 16 49	37.1	36 09.2 15 49	36.5	36 22.0 13 46	34.6	36 25.9 13 46	34.0	36 29.5 12 45	33.4	36 58.7 04 36	25.9	36 59.9 04 35	25.3	37 00.6 03 27	19.0	7
8	35 35.0 17 49	37.0	35 40.1 17 48	36.4	35 54.1 14 46	34.5	35 58.4 14 46	33.9	36 02.5 13 45	33.3	36 37.2 06 36	25.9	36 38.9 05 35	25.3	36 44.6 01 27	19.0	8
9	35 05.5 19 49	36.9	35 10.9 18 48	36.3	35 26.2 16 46	34.4	35 31.0 16 45	33.8	35 35.6 15 45	33.2	36 15.8 07 36	25.9	36 17.9 07 35	25.2	36 28.6 00 27	19.0	9
80	34 36.0 20 50	36.7	34 41.9 20 48	36.1	34 58.5 15 46	33.7	35 03.7 17 45	33.7	35 08.7 16 45	33.1	35 54.4 09 36	25.8	35 57.0 08 35	25.2	36 12.5 02 27	19.0	80
1	34 06.7 21 49	36.6	34 13.0 21 48	36.0	34 30.8 19 46	34.2	34 36.4 18 45	33.6	34 41.8 18 45	33.1	35 33.0 11 36	25.8	35 36.0 10 35	25.2	35 56.5 04 27	19.0	1
2	33 37.4 23 49	36.5	33 44.1 22 48	35.9	34 03.2 20 46	34.1	34 09.2 20 45	33.5	34 15.0 19 44	32.9	35 11.6 12 36	25.7	35 15.1 12 35	25.1	35 40.5 06 27	19.0	2
3	33 08.2 24 48	36.3	33 15.3 24 48	35.8	33 35.6 22 46	34.0	33 42.1 21 45	33.4	33 48.4 21 44	32.8	34 50.3 14 35	25.7	34 54.3 13 35	25.1	35 24.5 07 27	19.0	3
4	32 39.2 26 48	36.2	32 46.7 26 48	35.6	33 08.2 23 46	34.0	33 15.1 22 44	33.3	33 21.7 22 44	32.7	34 29.0 15 35	25.6	34 33.5 15 35	25.0	35 08.5 09 27	19.0	4
85	32 10.2 27 48	36.0	32 18.1 26 47	35.5	32 40.8 25 45	33.8	32 48.1 24 45	33.2	32 55.2 23 44	32.6	34 07.8 17 35	25.5	34 12.7 16 34	25.0	34 52.5 10 27	18.9	85
6	31 41.3 28 48	35.9	31 49.6 27 47	35.3	32 13.6 26 45	33.6	32 21.3 25 45	33.0	32 28.8 24 44	32.5	33 46.6 18 35	25.5	33 52.0 18 34	24.9	34 36.6 12 27	18.9	6
7	31 12.6 29 48	35.7	31 21.2 29 47	35.2	31 46.4 27 45	33.5	31 54.5 27 44	32.9	32 02.4 26 44	32.3	33 25.5 20 35	25.4	33 31.4 19 34	24.8	34 20.7 14 26	18.9	7
8	30 43.9 30 48	35.5	30 53.0 30 47	35.0	31 19.4 29 45	33.3	31 27.9 28 44	32.8	31 36.2 28 44	32.2	33 04.5 21 35	25.3	33 10.8 21 34	24.7	34 04.8 15 26	18.8	8
9	30 15.4 32 47	35.4	30 24.9 31 47	34.8	30 52.4 30 45	33.2	31 01.3 29 44	32.6	31 10.1 29 43	32.0	32 43.5 23 35	25.2	32 50.3 22 34	24.6	33 49.0 17 26	18.8	9
90	29 47.0 33 47	35.2	29 56.9 33 46	34.6	30 25.6 31 44	33.0	30 34.9 31 44	32.4	30 44.1 30 43	31.9	32 22.6 24 35	25.1	32 29.5 24 34	24.5	33 33.2 18 26	18.8	90

Lat. 35°

H.A.	60° 00' Alt	Δd Δt	Az	60° 30' Alt	Δd Δt	Az	62° 00' Alt	Δd Δt	Az	62° 30' Alt	Δd Δt	Az	63° 00' Alt	Δd Δt	Az	69° 00' Alt	Δd Δt	Az	69° 30' Alt	Δd Δt	Az	74° 30' Alt	Δd Δt	Az	H.A.
91	29 18.8	34 47	35.0	29 29.0	34 46	34.4	29 58.9	33 44	32.8	30 08.6	32 44	32.3	30 18.2	32 43	31.7	32 01.8	26 35	25.0	32 09.4	25 34	24.4	33 17.5	20 26	18.6	91
2	28 50.7	34 47	34.8	29 01.3	35 46	34.2	29 32.3	34 44	32.6	29 42.4	38 43	32.1	29 52.4	33 43	31.5	31 41.0	27 34	24.9	31 49.2	27 34	24.3	33 01.8	22 26	18.6	2
3	28 22.7	37 46	34.6	28 33.7	38 46	34.0	29 05.9	34 43	32.4	29 16.4	35 43	31.9	29 26.7	34 43	31.4	31 20.4	29 34	24.8	31 29.0	28 34	24.2	32 46.2	23 26	18.5	3
4	27 54.9	38 46	34.4	28 06.3	38 45	33.8	28 39.6	36 44	32.3	28 50.5	36 43	31.7	29 01.2	36 42	31.2	30 59.9	30 34	24.6	31 08.8	30 33	24.1	32 30.6	25 26	18.4	4
95	27 27.2	39 46	34.1	27 39.0	39 45	33.6	28 13.4	38 43	32.1	28 24.7	37 43	31.5	28 35.8	37 42	31.0	30 39.4	32 34	24.5	30 48.8	31 33	23.8	32 15.1	26 26	18.3	95
6	26 59.7	41 46	33.9	27 11.8	40 45	33.4	27 47.4	39 43	31.9	27 59.1	39 42	31.3	28 10.6	38 42	30.8	30 19.1	33 34	24.4	30 28.9	33 33	23.8	31 59.7	28 26	18.3	6
7	26 32.4	42 45	33.7	26 44.8	41 45	33.2	27 21.6	40 43	31.6	27 33.6	40 42	31.1	27 45.5	39 42	30.6	29 58.8	34 34	24.2	30 09.1	34 33	23.7	31 44.3	29 25	18.2	7
8	26 05.2	43 45	33.5	26 18.0	43 44	33.0	26 55.9	41 43	31.4	27 08.2	41 42	30.9	27 20.5	41 41	30.4	29 38.7	36 33	24.1	29 49.4	35 33	23.6	31 29.0	31 25	18.1	8
9	25 38.2	44 45	33.3	25 51.4	44 44	32.7	26 30.3	43 42	31.2	26 43.1	42 42	30.7	26 55.7	42 41	30.2	29 18.7	37 33	23.9	29 29.8	37 32	23.3	31 13.8	32 25	18.0	9
100	25 11.4	45 44	33.0	25 24.9	45 44	32.5	26 04.9	44 42	31.0	26 18.1	44 41	30.5	26 31.1	43 41	30.0	28 58.8	39 33	23.8	29 10.3	38 32	23.3	30 58.7	34 25	17.9	100
1	24 44.7	46 44	32.7	24 58.6	46 44	32.2	25 39.7	45 42	30.7	25 53.2	45 41	30.3	26 06.6	45 40	29.8	28 39.0	40 33	23.6	28 51.0	40 32	23.1	30 43.6	35 25	17.8	1
2	24 18.2	48 44	32.5	24 32.5	47 43	32.0	25 14.7	46 41	30.5	25 28.5	46 41	30.0	25 42.3	46 40	29.5	28 19.4	41 33	23.5	28 31.8	41 32	22.9	30 28.7	37 25	17.7	2
3	23 52.0	49 43	32.2	24 06.6	49 43	31.7	24 49.8	48 41	30.2	25 04.0	47 41	29.8	25 18.2	47 40	29.3	27 59.9	43 32	23.3	28 12.7	42 32	22.8	30 13.8	38 25	17.5	3
4	23 25.9	50 43	31.9	23 40.8	50 43	31.4	24 25.1	49 41	30.0	24 39.7	48 40	29.5	24 54.2	48 40	29.1	27 40.5	44 32	23.1	27 53.7	44 31	22.6	29 59.0	40 24	17.4	4
105	23 00.0	51 43	31.6	23 15.3	51 42	31.2	24 00.6	50 40	29.8	24 15.6	50 40	29.3	24 30.4	49 39	28.8	27 21.3	45 32	22.9	27 34.9	45 31	22.4	29 44.4	41 24	17.3	105
6	22 34.3	52 42	31.4	22 49.9	52 42	30.9	23 36.3	51 40	29.5	23 51.6	51 40	29.0	24 06.8	51 39	28.6	27 02.2	47 32	22.8	27 16.2	46 31	22.3	29 29.8	43 24	17.2	6
7	22 08.8	53 42	31.1	22 24.8	53 42	30.6	23 12.2	52 40	29.2	23 27.9	52 39	28.8	23 43.4	52 39	28.3	26 43.3	48 31	22.6	26 57.6	48 31	22.1	29 15.4	44 24	17.0	7
8	21 43.6	54 42	30.8	21 59.9	54 41	30.3	22 48.3	53 40	28.9	23 04.3	53 39	28.5	23 20.2	53 38	28.0	26 24.5	49 31	22.4	26 39.3	49 30	21.9	29 01.0	45 24	16.9	8
9	21 18.5	56 41	30.5	21 35.1	55 41	30.0	22 24.6	55 39	28.7	22 41.0	54 39	28.2	22 57.2	54 38	27.8	26 05.9	51 31	22.2	26 21.0	50 30	21.7	28 46.8	47 24	16.8	9
110	20 53.7	57 41	30.2	21 10.6	56 40	29.8	22 01.1	56 39	28.4	22 17.8	55 38	28.0	22 34.4	55 38	27.5	25 47.4	52 30	22.0	26 02.9	52 30	21.5	28 32.7	48 23	16.6	110
1	20 29.1	58 41	29.9	20 46.4	58 40	29.5	21 37.8	57 38	28.1	21 54.9	57 38	27.7	22 11.8	56 37	27.2	25 29.1	53 30	21.8	25 45.0	53 30	21.3	28 18.7	50 23	16.5	1
2	20 04.7	59 40	29.6	20 22.3	59 40	29.1	21 14.8	58 38	27.8	21 32.1	58 38	27.4	21 49.4	58 37	27.0	25 11.0	54 30	21.5	25 27.2	54 29	21.1	28 04.8	51 23	16.3	2
3	19 40.5	60 40	29.3	19 58.5	60 40	28.8	20 51.9	59 37	27.5	21 09.4	59 37	27.1	21 27.2	59 37	26.7	24 53.0	56 30	21.3	25 09.7	55 29	20.9	27 51.1	52 23	16.2	3
4	19 16.6	61 39	28.9	19 34.9	61 39	28.5	20 29.3	60 37	27.2	20 47.3	60 37	26.8	21 05.3	60 36	26.4	24 35.2	57 29	21.1	24 52.2	57 29	20.6	27 37.5	54 22	16.0	4
115	18 53.0	62 39	28.6	19 11.6	62 38	28.2	20 06.9	61 37	26.9	20 25.3	61 36	26.5	20 43.5	61 36	26.1	24 17.6	58 29	20.9	24 35.0	58 28	20.4	27 24.0	55 22	15.8	115
6	18 29.6	63 39	28.3	18 48.5	63 38	27.9	19 44.8	62 37	26.6	20 03.4	62 36	26.2	20 22.0	62 35	25.8	24 00.2	59 29	20.6	24 17.9	59 28	20.2	27 10.7	56 22	15.7	6
7	18 06.4	64 38	28.0	18 25.6	64 38	27.5	19 22.9	63 36	26.3	19 41.8	63 36	25.9	20 00.8	63 35	25.5	23 43.0	60 28	20.4	24 01.0	60 28	20.0	26 57.5	57 22	15.5	7
8	17 43.5	65 38	27.6	18 03.0	65 37	27.2	19 01.2	64 36	25.9	19 20.5	64 35	25.6	19 39.7	64 35	25.2	23 25.9	62 28	20.2	23 44.4	61 28	19.7	26 44.4	59 22	15.3	8
9	17 20.8	66 37	27.3	17 40.6	66 37	26.9	18 39.8	65 35	25.7	18 59.4	65 35	25.3	19 18.9	65 34	24.9	23 09.1	63 28	19.9	23 27.8	62 27	19.5	26 31.5	60 21	15.1	9
120	16 58.5	67 37	26.9	17 18.6	67 36	26.5	18 18.6	66 34	25.4	18 38.5	66 34	25.0	18 58.4	66 34	24.6	22 52.4	64 27	19.7	23 11.5	64 27	19.3	26 18.7	61 21	15.0	120
1	16 36.3	68 36	26.6	16 56.7	68 36	26.2	17 57.7	67 34	25.0	18 17.9	67 33	24.6	18 38.0	67 33	24.2	22 36.0	65 27	19.4	22 55.4	65 27	19.0	26 06.1	62 21	14.8	1
2	16 14.5	69 36	26.2	16 35.2	69 35	25.8	17 37.0	68 34	24.7	17 57.5	68 34	24.3	18 18.0	68 33	23.9	22 19.7	66 27	19.2	22 39.5	66 26	18.8	25 53.7	64 20	14.6	2
3	15 52.9	70 35	25.8	16 13.9	70 35	25.5	17 16.6	69 34	24.4	17 37.4	69 33	24.0	17 58.2	69 33	23.6	22 03.7	67 26	18.9	22 23.8	67 26	18.5	25 41.4	65 20	14.4	3
4	15 31.6	71 35	25.5	15 52.9	71 35	25.1	16 56.5	70 33	24.0	17 17.6	70 33	23.6	17 38.6	70 32	23.3	21 47.8	68 26	18.7	22 08.3	68 26	18.3	25 29.2	66 20	14.2	4
125	15 10.6	72 35	25.1	15 32.2	72 34	24.8	16 36.6	71 33	23.7	16 58.0	71 32	23.3	17 19.4	71 32	22.9	21 32.2	69 26	18.4	21 53.0	69 25	18.0	25 17.2	67 20	14.0	125
6	14 49.9	73 34	24.7	15 11.8	73 34	24.4	16 17.0	72 32	23.3	16 38.7	72 32	22.9	17 00.4	72 31	22.6	21 16.8	70 25	18.1	21 37.9	70 25	17.7	25 05.4	68 19	13.8	6
7	14 29.5	74 34	24.4	14 51.6	74 33	24.0	15 57.7	73 32	23.0	16 19.7	73 31	22.6	16 41.6	73 31	22.2	21 01.6	71 25	17.9	21 23.0	71 24	17.5	24 53.8	69 19	13.6	7
8	14 09.4	75 33	24.0	14 31.8	75 33	23.6	15 38.7	74 31	22.6	16 00.9	74 31	22.2	16 23.1	74 30	21.9	20 46.7	72 25	17.6	21 08.4	72 24	17.2	24 42.3	70 19	13.4	8
9	13 49.6	76 33	23.6	14 12.2	75 32	23.3	15 20.0	75 31	22.2	15 42.5	75 30	21.9	16 05.0	75 30	21.5	20 31.9	73 24	17.3	20 53.9	73 24	16.9	24 31.0	71 19	13.2	9
130	13 30.1	76 32	23.2	13 53.0	76 32	22.9	15 01.5	76 30	21.9	15 24.3	76 30	21.5	15 47.1	76 29	21.2	20 17.4	74 24	17.0	20 39.7	74 23	16.7	24 19.8	73 18	13.0	130
1	13 10.9	77 31	22.8	13 34.0	77 31	22.5	14 43.4	77 30	21.5	15 06.4	77 29	21.2	15 29.4	77 29	20.8	20 03.2	75 23	16.7	20 25.7	75 23	16.4	24 08.9	74 18	12.8	1
2	12 52.0	78 31	22.4	13 15.1	78 30	22.1	14 25.5	78 29	21.1	14 48.8	78 29	20.8	15 12.1	78 28	20.5	19 49.1	76 23	16.4	20 12.0	76 23	16.1	23 58.1	75 18	12.6	2
3	12 33.4	79 30	22.0	12 57.1	79 30	21.7	14 07.9	79 29	20.7	14 31.5	79 28	20.4	14 55.1	79 28	20.1	19 35.4	77 22	16.2	19 58.5	77 22	15.9	23 47.5	76 17	12.3	3
4	12 15.1	80 30	21.6	12 39.1	80 29	21.3	13 50.7	79 28	20.4	14 14.5	79 28	20.0	14 38.3	79 27	19.7	19 21.8	78 22	15.9	19 45.2	78 22	15.5	23 37.1	77 17	12.1	4
135	11 57.2	81 29	21.2	12 21.4	81 29	20.9	13 33.8	80 28	20.0	13 57.8	80 27	19.7	14 21.9	80 27	19.4	19 08.5	79 22	15.6	19 32.2	79 21	15.2	23 26.9	78 17	11.9	135
6	11 39.6	81 29	20.8	12 04.0	81 28	20.5	13 17.1	81 27	19.6	13 41.5	81 27	19.3	14 05.8	81 26	19.0	18 55.4	80 21	15.3	19 19.4	80 21	14.9	23 16.9	79 16	11.7	6
7	11 22.3	82 28	20.4	11 47.0	82 28	20.1	13 00.8	82 27	19.2	13 25.4	82 26	18.9	13 49.8	81 26	18.6	18 42.6	81 21	15.0	19 06.8	81 20	14.6	23 07.0	79 16	11.4	7
8	11 05.4	83 28	19.9	11 30.3	83 27	19.6	12 44.8	83 26	18.8	13 09.6	83 26	18.5	13 34.4	83 25	18.2	18 30.1	82 20	14.6	18 54.5	82 20	14.3	22 57.4	80 16	11.2	8
9	10 48.8	84 27	19.5	11 13.9	84 27	19.2	12 29.2	83 25	18.4	12 54.2	83 25	18.1	13 19.2	83 25	17.8	18 17.8	82 20	14.3	18 42.5	82 20	14.0	22 48.0	81 15	11.0	9
140	10 32.6	84 26	19.1	10 57.9	84 26	18.8	12 13.8	84 25	18.0	12 39.1	84 25	17.7	13 04.3	84 24	17.4	18 05.7	83 20	14.0	18 30.7	83 19	13.7	22 38.7	82 15	10.7	140
1	10 16.7	85 26	18.7	10 42.3	85 26	18.4	11 58.8	85 24	17.6	12 24.3	85 24	17.3	12 49.8	85 24	17.0	17 53.9	84 19	13.7	18 19.2	84 19	13.4	22 29.7	83 15	10.5	1
2	10 01.2	86 25	18.2	10 26.9	86 25	18.0	11 44.1	86 24	17.2	12 09.8	86 24	16.9	12 35.5	86 23	16.6	17 42.4	85 19	13.4	18 07.9	85 18	13.1	22 20.8	84 14	10.2	2
3	9 46.0	87 25	17.8	10 11.9	87 24	17.5	11 29.8	86 23	16.8	11 55.7	86 23	16.5	12 21.6	86 23	16.2	17 31.2	86 18	13.1	17 56.9	86 18	12.8	22 12.2	85 14	10.0	3
4	9 31.2	87 24	17.3	9 57.3	87 24	17.1	11 15.8	87 23	16.3	11 41.9	87 22	16.1	12 08.0	87 22	15.8	17 20.2	86 18	12.7	17 46.1	86 18	12.5	22 03.7	85 14	09.8	4
145	9 16.7	88 24	16.9	9 43.1	88 23	16.7	11 02.1	88 22	15.9	11 28.5	88 22	15.7	11 54.8	88 22	15.4	17 09.5	87 17	12.4	17 35.6	87 17	12.2	21 55.5	86 13	09.5	145
6	9 02.6	89 23	16.4	9 29.2	89 23	16.2	10 48.8	89 22	15.5	11 15.4	88 21	15.3	11 41.9	88 21	15.0	16 59.1	88 17	12.1	17 25.4	88 17	11.8	21 47.5	87 13	09.3	6
7	8 48.9	89 22	16.0	9 15.6	89 22	15.8	10 35.9	89 21	15.1	11 02.6	89 21	14.8	11 29.3	89 20	14.6	16 48.9	88 16	11.8	17 15.4	88 16	11.5	21 39.7	88 13	09.0	7
8	8 35.5	90 22	15.5	9 02.5	90 21	15.3	10 23.3	90 20	14.7	10 50.2	90 20	14.4	11 17.1	90 20	14.2	16 39.0	89 16	11.4	17 05.8	89 16	11.2	21 32.1	88 12	08.8	8
9	8 22.5	90 21	15.1	8 49.6	90 21	14.9	10 11.0	90 20	14.2	10 38.1	90 20	14.0	11 05.2	90 19	13.8	16 29.4	90 16	11.1	16 56.3	90 15	10.9	21 24.7	89 12	08.5	9
150	8 09.9	91 20	14.6	8 37.2	91 20	14.4	9 59.1	91 19	13.8	10 26.4	91 19	13.6	10 53.7	91 19	13.4	16 20.1	90 15	10.8	16 47.2	90 15	10.5	21 17.6	90 12	08.2	150
1	7 57.7	92 20	14.2	8 25.2	92 19	14.0	9 47.6	91 19	13.4	10 15.0	91 18	13.1	10 42.5	91 18	12.9	16 11.1	91 15	10.4	16 38.4	91 14	10.2	21 10.6	90 11	08.0	1
2	7 45.9	92 19	13.7	8 13.5	92 19	13.5	9 36.4	92 18	12.9	10 04.0	92 18	12.7	10 31.5	92 18	12.5	16 02.3	92 14	10.1	16 29.8	92 14	09.9	21 03.9	91 11	07.7	2
3	7 34.4	93 18	13.2	8 02.2	93 18	13.0	9 25.6	93 17	12.5	9 53.4	93 17	12.3	10 21.2	93 17	12.1	15 53.9	93 14	09.7	16 21.5	93 13	09.5	20 57.4	92 10	07.5	3
4	7 23.3	93 18	12.8	7 51.3	93 18	12.6	9 15.2	93 17	12.0	9 43.1	93 16	11.9	10 11.0	93 16	11.7	15 45.7	93 13	09.4	16 13.5	93 13	09.2	20 51.1	92 10	07.2	4
155	7 12.7	94 17	12.3	7 40.8	94 17	12.1	9 05.1	94 16	11.6	9 33.2	94 16	11.4	10 01.3	94 16	11.2	15 37.8	94 13	09.0	16 05.8	94 12	08.9	20 45.1	93 10	06.9	155
6	7 02.4	94 16	11.8	7 30.7	94 16	11.7	8 55.4	94 16	11.1	9 23.7	94 15	11.0	9 51.9	94 15	10.8	15 30.2	94 12	08.7	15 58.4	94 12	08.5	20 39.3	93 09	06.7	6
7	6 52.5	95 16	11.3	7 20.9	95 16	11.2	8 46.1	95 15	10.7	9 14.5	95 15	10.5	9 42.9	95 15	10.4	15 22.9	95 11	08.2	15 51.2	94 11	08.2	20 33.7	94 09	06.4	7
8	6 43.1	95 15	10.7	7 11.6	95 15	10.7	8 37.2	95 14	10.1	9 05.7	95 14	10.1	9 34.2	95 14	09.9	15 15.9	95 11	08.0	15 44.4	95 11	07.9	20 28.3	94 09	06.1	8
9	6 34.0	96 14	10.4	7 02.7	96 14	10.2	8 28.6	95 14	09.8	8 57.3	95 14	09.6	9 25.9	95 13	09.5	15 09.3	95 11	07.6	15 37.8	95 11	07.5	20 23.2	94 08	06.1	9
160	6 25.3	96 14	09.9	6 54.1	96 14	09.8	8 20.5	96 13	09.3	8 49.2	96 13	09.2	9 18.0	96 13	09.1	15 02.9	96 10	07.3	15 31.6	96 10	07.1	20 18.3	95 08	05.6	160
1	6 17.1	96 13	09.4	6 46.0	96 13	09.3	8 12.7	96 12	08.9	8 41.6	96 12	08.7	9 10.4	96 12	08.6	14 56.9	96 10	06.9	15 25.6	96 09	06.8	20 13.6	96 07	05.3	1
2	6 09.2	97 12	08.9	6 38.3	97 12	08.8	8 05.3	97 12	08.4	8 34.3	97 12	08.3	9 03.3	97 11	08.2	14 51.0	97 09	06.6	15 20.0	96 09	06.4	20 09.2	96 07	05.0	2
3	6 01.8	97 12	08.3	6 30.9	97 12	08.3	7 58.3	97 11	07.8	8 27.4	97 11	07.8	8 56.5	97 11	07.7	14 45.3	97 08	06.1	15 14.6	97 08	06.1	20 04.9	97 06	04.8	3
4	5 54.8	97 11	08.0	6 24.0	97 11	07.9	7 51.6	97 10	07.5	8 20.9	97 10	07.4	8 50.1	97 10	07.3	14 40.4	97 08	05.9	15 09.5	97 08	05.7	20 01.0	97 06	04.5	4
165	5 48.2	98 10	07.5	6 17.5	98 10	07.4	7 45.4	98 10	07.0	8 14.7	98 10	06.9	8 44.0	98 09	06.8	14 35.5	98 08	05.5	15 04.8	98 07	05.4	19 57.2	97 06	04.2	165
6	5 42.0	98 10	07.0	6 11.4	98 09	06.9	7 39.6	98 09	06.6	8 09.0	98 09	06.5	8 38.4	98 09	06.4	14 30.9	98 07	05.1	15 00.3	98 07	05.0	19 53.7	98 05	03.9	6
7	5 36.2	98 09	06.5	6 05.7	98 09	06.4	7 34.2	98 08	06.1	8 03.6	98 08	06.0	8 33.1	98 08	05.9	14 26.7	98 07	04.8	14 56.1	98 06	04.7	19 50.5	98 05	03.7	7
8	5 30.6	99 08	06.0	6 00.5	99 08	05.9	7 29.1	99 08	05.6	7 58.6	99 08	05.5	8 28.2	99 08	05.5	14 22.9	99 06	04.3	14 52.3	98 06	04.3	19 47.4	98 05	03.4	8
9	5 26.0	99 08	05.5	5 55.6	99 07	05.4	7 24.5	99 07	05.2	7 54.1	99 07	05.1	8 23.7	99 07	05.0	14 19.1	99 06	04.0	14 48.7	99 05	04.0	19 44.7	99 04	03.1	9
170	5 21.5	99 07	05.0	5 51.2	99 07	04.9	7 20.2	99 06	04.7	7 49.9	99 06	04.6	8 19.6	99 06	04.6	14 15.8	99 05	03.7	14 45.5	99 05	03.6	19 42.1	99 04	02.8	170
1	5 17.4	99 06	04.5	5 47.2	99 06	04.4	7 16.4	99 06	04.2	7 46.2	99 06	04.2	8 15.9	99 06	04.1	14 12.8	99 04	03.3	14 42.5	99 04	03.2	19 39.8	99 03	02.5	1
2	5 13.8	99 05	04.0	5 43.6	99 05	03.9	7 13.0	99 05	03.8	7 42.8	99 05	03.7	8 12.6	99 05	03.7	14 10.1	99 04	02.9	14 39.9	99 04	02.9	19 37.8	99 03	02.3	2
3	5 07.7	1.00 04	03.5	5 40.4	99 05	03.5	7 09.9	99 04	03.3	7 39.8	99 04	03.3	8 09.6	99 04	03.2	14 07.8	99 03	02.6	14 37.6	99 03	02.5	19 35.8	99 03	02.0	3
4	5 07.7	1.00 04	03.0	5 37.6	99 04	03.0	7 07.3	99 04	02.8	7 37.2	99 04	02.7	8 07.1	1.00 04	02.7	14 05.7	1.00 03	02.2	14 35.6	1.00 03	02.2	19 34.4	1.00 02	01.7	4
175	5 05.4	1.00 03	02.5	5 35.3	1.00 03	02.5	7 05.1	1.00 03	02.4	7 35.0	1.00 03	02.3	8 04.9	1.00 02	02.3	14 04.0	1.00 02	01.8	14 33.9	1.00 02	01.8	19 33.0	1.00 01	01.4	175
6	5 03.4	1.00 03	02.0	5 33.4	1.00 02	02.0	7 03.2	1.00 02	01.9	7 33.2	1.00 02	01.9	8 03.1	1.00 02	01.8	14 02.5	1.00 02	01.5	14 32.5	1.00 02	01.4	19 31.9	1.00 01	01.1	6
7	5 01.9	1.00 02	01.5	5 31.9	1.00 02	01.5	7 01.8	1.00 02	01.4	7 31.8	1.00 02	01.4	8 01.8	1.00 01	01.4	14 01.4	1.00 01	01.1	14 31.4	1.00 01	01.1	19 31.1	1.00 01	00.9	7
8	5 00.9	1.00 01	01.0	5 30.8	1.00 01	01.0	7 00.8	1.00 01	00.9	7 30.8	1.00 01	00.9	8 00.8	1.00 01	00.9	14 00.6	1.00 01	00.7	14 30.6	1.00 01	00.7	19 30.5	1.00 01	00.6	8
9	5 00.2	1.00 00	00.5	5 30.2	1.00 00	00.5	7 00.2	1.00 00	00.5	7 30.2	1.00 00	00.5	8 00.2	1.00 00	00.5	14 00.1	1.00 00	00.4	14 30.1	1.00 00	00.4	19 30.1	1.00 00	00.3	9
180	5 00.0	1.00 00	00.0	5 30.0	1.00 00	00.0	7 00.0	1.00 00	00.0	7 30.0	1.00 00	00.0	8 00.0	1.00 00	00.0	14 00.0	1.00 00	00.0	14 30.0	1.00 00	00.0	19 30.0	1.00 00	00.0	180

Right margin latitude markings: Lat. 35° (top), Lat. 36° (at H.A. 150), Lat. 37° (at H.A. 160), Lat. 38° (at H.A. 170).

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 35°

AZ.	4° Dec.	4° H.A.	8° Dec.	8° H.A.	12° Dec.	12° H.A.	16° Dec.	16° H.A.	20° Dec.	20° H.A.	24° Dec.	24° H.A.	28° Dec.	28° H.A.	32° Dec.	32° H.A.	36° Dec.	36° H.A.	40° Dec.	40° H.A.	44° Dec.	44° H.A.	AZ.
00	59	180	63	180	67	180	71	180	75	180	79	180	83	180	87	180	89	00	85	00	81	00	00
4	59	172	63	171	67	170	71	168	75	166	78	161	82	153	86	131	87	72	84	31	80	18	4
8	58	165	62	163	66	161	70	157	73	153	77	146	80	134	83	112	83	79	82	49	79	32	8
12	57	158	61	155	65	152	68	147	72	142	75	133	78	121	80	103	80	81	79	59	77	42	12
16	56	151	59	148	63	144	66	139	69	133	72	124	75	113	76	98	77	81	76	64	75	49	16
20	54	145	57	141	61	137	64	132	67	125	69	117	72	107	73	95	74	81	73	67	72	54	20
24	52	139	55	135	58	131	61	125	64	119	66	111	68	102	70	92	70	80	70	68	70	57	24
28	50	134	53	130	56	125	59	120	61	114	63	107	65	99	67	89	67	79	67	69	67	59	28
32	47	129	50	125	53	121	56	115	58	110	60	103	62	95	63	87	64	78	64	69	64	60	32
36	45	125	47	121	50	116	53	111	55	106	57	100	59	93	60	85	61	77	61	69	61	61	36
40	42	121	45	117	47	112	50	108	52	102	54	97	55	90	57	84	58	76	58	69	58	61	40
44	39	117	42	113	44	109	46	104	49	99	50	94	52	88	53	82	54	75	55	68	55	61	44
48	36	114	39	110	42	106	43	101	45	97	47	91	49	86	50	80	51	74	52	68	52	61	48
52	33	111	35	107	38	103	40	99	42	94	44	89	46	84	47	79	48	73	49	67	50	61	52
56	30	108	32	104	35	100	37	96	39	92	41	87	42	82	44	77	45	72	46	66	47	60	56
60	27	105	29	101	31	97	33	93	36	89	37	85	39	80	41	75	42	70	43	65	44	60	60
64	23	102	26	99	28	95	30	91	32	87	34	83	36	78	37	74	39	69	40	64	41	59	64
68	20	100	23	96	25	93	27	89	29	85	31	81	33	77	34	73	36	68	37	63	38	58	68
72	17	97	19	94	22	90	24	87	26	83	28	79	30	75	31	71	33	66	34	62	35	57	72
76	14	95	16	91	18	88	20	84	22	81	24	77	26	73	28	69	30	65	31	61	33	56	76
80	10	92	13	89	15	86	17	82	19	79	21	75	23	71	25	67	27	63	29	59	30	55	80
84	07	90	09	87	12	83	14	80	16	77	18	73	20	69	22	66	24	62	26	58	27	54	84
88	04	88	06	85	08	81	11	78	13	74	15	71	17	67	19	64	21	60	23	56	25	52	88
92	01	86	03	82	05	79	08	76	10	72	12	69	14	65	16	62	18	58	20	55	22	51	92
96	*03*	83	*00*	80	02	77	04	73	07	70	09	67	11	64	13	60	16	57	18	53	20	49	96
100	*06*	81	*03*	78	*01*	74	*01*	71	04	68	06	65	08	61	11	58	13	55	15	51	17	48	100
104	*09*	79	*07*	75	*04*	72	*02*	69	*01*	66	03	63	05	59	08	56	10	53	13	50	15	46	104
108	*12*	76	*10*	73	*07*	70	*05*	67	*02*	63	00	60	03	57	05	54	08	51	10	48	12	44	108
112	*15*	73	*13*	70	*10*	67	*08*	64	*05*	61	*03*	58	00	55	03	52	05	49	08	46	10	43	112
116	*19*	71	*16*	68	*13*	65	*11*	62	*08*	59	*05*	56	03	53	*00*	50	03	47	05	44	08	41	116
120	*22*	68	*19*	65	*16*	62	*14*	59	*11*	56	*08*	53	05	50	*02*	47	00	44	03	42	06	39	120
124	*25*	65	*22*	62	*19*	59	*16*	56	*14*	53	*11*	50	08	48	*05*	45	*02*	42	01	39	04	37	124
128	*28*	62	*25*	59	*22*	56	*19*	53	*16*	50	*13*	48	10	45	*07*	42	*04*	40	*01*	37	02	35	128
132	*30*	59	*28*	56	*25*	53	*22*	50	*19*	47	*16*	45	12	42	*09*	40	*06*	37	03	35	00	32	132
136	*33*	56	*30*	53	27	50	*24*	47	*21*	44	18	42	15	39	*11*	37	08	35	05	32	*01*	30	136
140	*36*	52	*33*	49	*30*	46	26	44	*23*	41	20	39	17	36	*13*	34	*10*	32	*06*	30	03	28	140
144	*38*	48	*35*	45	*32*	43	29	40	*25*	38	22	35	18	33	*15*	31	*11*	29	*08*	27	04	25	144
148	*41*	44	*37*	41	*34*	39	*31*	36	27	34	24	32	20	30	*17*	28	*13*	26	*09*	24	06	23	148
152	*43*	40	*40*	37	*36*	35	*32*	32	29	30	25	28	22	26	*18*	25	*14*	23	*11*	21	07	20	152
156	*45*	35	*41*	32	*38*	30	*34*	28	*30*	26	27	25	23	23	*19*	21	*16*	20	*12*	19	08	17	156
160	*47*	30	*43*	28	*39*	26	*36*	24	*32*	22	28	21	24	19	*20*	18	*17*	17	*13*	16	09	14	160
164	*48*	24	*44*	22	*41*	21	*37*	19	*33*	18	29	17	25	16	*21*	15	*17*	14	*14*	13	10	12	164
168	*49*	19	*46*	17	*42*	16	*38*	15	*34*	14	*30*	13	26	12	*22*	11	*18*	10	*14*	09	10	09	168
172	*50*	13	*46*	12	*42*	11	*38*	10	*34*	09	*31*	08	27	08	*23*	07	*19*	07	*15*	06	11	06	172
176	*51*	06	*47*	06	*43*	05	*39*	05	*35*	05	*31*	04	27	04	*23*	04	*19*	03	*15*	03	11	03	176
180	*51*	00	*47*	00	*43*	00	*39*	00	*35*	00	*31*	00	27	00	*23*	00	*19*	00	*15*	00	11	00	180

Altitude footer: 4° 8° 12° 16° 20° 24° 28° 32° 36° 40° 44°

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

Lat. 35°

AZ.	48° Dec.	H. A.	52° Dec.	H. A.	56° Dec.	H. A.	60° Dec.	H. A.	64° Dec.	H. A.	68° Dec.	H. A.	72° Dec.	H. A.	76° Dec.	H. A.	80° Dec.	H. A.	84° Dec.	H. A.	88° Dec.	H. A.	AZ.
00	77	00	73	00	69	00	65	00	61	00	57	00	53	00	49	00	45	00	41	00	37	00	00
4	77	12	73	08	69	06	65	05	61	04	57	03	53	02	49	01	45	01	41	01	37	00	4
8	76	22	72	16	68	12	64	09	61	07	57	05	53	04	49	03	45	02	41	01	37	00	8
12	74	31	71	23	67	18	64	14	60	11	56	08	52	06	49	04	45	03	41	02	37	01	12
16	72	38	70	29	66	23	63	18	59	14	56	11	52	08	48	06	45	04	41	02	37	01	16
20	70	43	68	34	65	27	62	21	59	17	55	13	52	10	48	07	44	05	41	03	37	01	20
24	68	47	66	38	63	31	61	24	58	19	54	15	51	12	48	08	44	06	40	03	37	01	24
28	66	49	64	41	62	34	59	27	56	22	53	17	50	13	47	10	44	06	40	04	37	01	28
32	63	51	62	43	60	36	58	30	55	24	52	19	49	15	46	11	43	07	40	04	37	01	32
36	60	53	59	45	58	38	56	32	54	26	51	21	49	16	46	12	43	08	40	05	37	01	36
40	58	54	57	47	56	40	54	33	52	27	50	22	48	17	45	13	42	09	39	05	37	02	40
44	55	54	55	48	54	41	52	35	51	29	49	23	47	18	44	14	42	09	39	05	36	02	44
48	52	55	52	48	51	42	50	36	49	30	47	24	46	19	44	14	41	10	39	06	36	02	48
52	50	55	50	49	49	42	48	36	47	31	46	25	45	20	43	15	41	10	39	06	36	02	52
56	47	55	47	49	47	43	47	37	46	31	45	26	43	21	42	16	40	11	38	06	36	02	56
60	45	54	45	49	45	43	45	37	44	32	43	26	42	21	41	16	39	11	38	07	36	02	60
64	42	54	42	48	43	43	43	38	42	32	42	27	41	22	40	17	39	12	37	07	36	02	64
68	39	53	40	48	40	43	41	38	41	32	40	27	40	22	39	17	38	12	37	07	36	02	68
72	37	52	37	48	38	43	39	37	39	32	39	27	39	22	38	17	38	12	37	07	36	02	72
76	34	52	35	47	36	42	37	37	37	32	37	27	37	22	37	17	37	12	36	07	35	02	76
80	31	51	33	46	34	41	35	37	35	32	36	27	36	22	36	17	36	12	36	07	35	02	80
84	29	49	30	45	32	41	33	36	34	32	34	27	35	22	35	17	35	12	35	07	35	02	84
88	26	48	28	44	29	40	31	36	32	31	33	26	34	22	34	17	35	12	35	07	35	02	88
92	24	47	26	43	27	39	29	35	30	30	31	26	32	21	33	17	34	12	35	07	35	02	92
96	22	46	24	42	25	38	27	34	29	30	30	25	31	21	32	17	33	12	34	07	35	02	96
100	19	44	21	41	23	37	25	33	27	29	29	25	30	21	31	16	33	12	34	07	35	02	100
104	17	43	19	39	21	36	23	32	25	28	27	24	29	20	31	16	32	11	33	07	34	02	104
108	15	41	17	38	20	34	22	31	24	27	26	23	28	19	30	15	31	11	33	07	34	02	108
112	13	39	15	36	18	33	20	30	22	26	25	22	27	19	29	15	31	11	33	07	34	02	112
116	11	38	13	35	16	32	18	28	21	25	23	22	26	18	28	14	30	10	32	06	34	02	116
120	09	36	12	33	14	30	17	27	20	24	22	21	25	17	27	14	30	10	32	06	34	02	120
124	07	34	10	31	13	28	16	25	18	23	21	19	24	16	26	13	29	09	32	06	34	02	124
128	05	32	08	29	11	27	14	24	17	21	20	18	23	15	26	12	29	09	31	06	34	02	128
132	03	30	07	27	10	25	13	22	16	20	19	17	22	14	25	11	28	08	31	05	34	02	132
136	02	28	05	25	08	23	12	21	15	18	18	16	21	13	24	11	28	08	31	05	34	02	136
140	00	25	04	23	07	21	11	19	14	17	17	15	21	12	24	10	27	07	30	04	33	02	140
144	*01*	23	03	21	06	19	10	17	13	15	16	13	20	11	23	09	27	07	30	04	33	01	144
148	*02*	21	01	19	05	17	09	16	12	14	16	12	19	10	23	08	26	06	30	04	33	01	148
152	*03*	18	00	17	04	15	08	14	11	12	15	10	19	09	22	07	26	05	30	03	33	01	152
156	*04*	16	*01*	15	03	13	07	12	11	10	15	09	18	08	22	06	26	04	29	03	33	01	156
160	*05*	13	*01*	12	03	11	06	10	10	09	14	08	18	06	22	05	26	04	29	02	33	01	160
164	*06*	11	*02*	10	02	09	06	08	10	07	14	06	18	05	21	04	25	03	29	02	33	01	164
168	*06*	08	*02*	07	02	07	06	06	09	05	13	05	17	04	21	03	25	02	29	01	33	00	168
172	*07*	05	*03*	05	01	04	05	04	09	04	13	03	17	03	21	02	25	02	29	01	33	00	172
176	*07*	03	*03*	02	01	02	05	02	09	02	13	02	17	01	21	01	25	01	29	00	33	00	176
180	*07*	00	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	25	00	29	00	33	00	180
	48°		52°		56°		60°		64°		68°		72°		76°		80°		84°		88°		

Lat. 36°

Lat. 37°

Lat. 38°

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

Lat. 36°

Each declination column below lists three values in order: **Alt.** | **Δd Δt** | **Az.**

H.A.	0° 00'	0° 30'	1° 00'	1° 30'	2° 00'	2° 30'	3° 00'	3° 30'	H.A.
00	54 00.0 1.00 1 180.0	54 30.0 1.00 1 180.0	55 00.0 1.00 1 180.0	55 30.0 1.00 1 180.0	56 00.0 1.00 1 180.0	56 30.0 1.00 1 180.0	57 00.0 1.00 1 180.0	57 30.0 1.00 1 180.0	00
1	53 59.3 1.00 4 178.3	54 29.3 1.00 4 178.3	54 59.3 1.00 4 178.3	55 29.3 1.00 4 178.2	55 59.2 1.00 4 178.2	56 29.2 1.00 4 178.2	56 59.2 1.00 4 178.2	57 29.2 1.00 4 178.1	1
2	53 57.1 1.00 6 176.6	54 27.1 1.00 6 176.6	54 57.0 1.00 6 176.5	55 27.0 1.00 6 176.5	55 57.0 1.00 6 176.4	56 26.9 1.00 6 176.4	56 56.9 1.00 6 176.3	57 26.9 1.00 7 176.3	2
3	53 53.5 1.00 8 174.9	54 23.4 1.00 8 174.8	54 53.4 1.00 9 174.8	55 23.3 1.00 9 174.7	55 53.2 1.00 9 174.6	56 23.1 1.00 9 174.5	56 53.0 1.00 9 174.5	57 22.9 1.00 9 174.4	3
4	53 48.5 1.01 1 173.2	54 18.4 1.01 1 173.1	54 48.2 1.01 1 173.0	55 18.1 1.01 1 173.0	55 47.9 99 11 172.9	56 17.8 99 11 172.8	56 47.6 99 12 172.7	57 17.4 99 12 172.6	4
05	53 42.1 99 13 171.5	54 11.8 99 13 171.4	54 41.6 99 13 171.3	55 11.4 99 14 171.2	55 41.2 99 14 171.1	56 10.9 99 14 171.0	56 40.7 99 14 170.9	57 10.4 99 14 170.8	05
6	53 34.2 99 15 169.9	54 03.9 99 16 169.7	54 33.6 99 16 169.6	55 03.3 99 16 169.5	55 32.9 99 16 169.4	56 02.6 99 16 169.2	56 32.2 99 17 169.1	57 01.9 99 17 168.9	6
7	53 25.0 99 18 168.2	53 54.6 99 18 168.1	54 24.1 99 18 167.8	54 53.7 99 18 167.8	55 23.2 98 19 167.6	55 52.8 98 19 167.5	56 22.3 98 19 167.3	56 51.8 98 19 167.1	7
8	53 14.4 98 20 166.6	53 43.8 98 20 166.4	54 13.3 98 20 166.2	54 42.7 98 21 166.1	55 12.1 98 21 165.9	55 41.5 98 21 165.5	56 10.9 98 21 165.5	56 40.3 98 21 165.4	8
9	53 02.4 98 22 164.9	53 31.7 98 22 164.7	54 01.0 98 23 164.6	54 30.3 98 23 164.4	54 59.6 98 23 164.2	55 28.8 97 23 164.0	55 58.1 97 24 163.8	56 27.3 97 24 163.6	9
10	52 49.1 97 24 163.3	53 18.3 97 25 163.1	53 47.4 97 25 162.9	54 16.6 97 25 162.7	54 45.7 97 25 162.5	55 14.8 97 26 162.3	55 43.8 97 26 162.1	56 12.9 97 26 161.8	10
1	52 34.5 97 26 161.7	53 03.5 97 27 161.5	53 32.5 97 27 161.3	54 01.5 96 27 161.1	54 30.4 96 28 160.8	54 59.3 96 28 160.6	55 28.2 96 28 160.4	55 57.0 96 29 160.1	1
2	52 18.6 96 29 160.1	52 47.5 96 29 159.9	53 16.3 96 29 159.7	53 45.1 96 30 159.4	54 13.8 96 30 159.2	54 42.5 96 30 158.9	55 11.2 96 31 158.7	55 39.8 95 31 158.4	2
3	52 01.5 96 31 158.6	52 30.2 95 31 158.3	52 58.8 95 31 158.1	53 27.4 95 32 157.8	53 55.9 95 32 157.6	54 24.4 95 32 157.3	54 52.9 95 33 157.0	55 21.3 95 33 156.7	3
4	51 43.2 95 33 157.0	52 11.6 95 33 156.8	52 40.0 95 33 156.5	53 08.4 95 34 156.2	53 36.7 94 34 155.9	54 05.0 94 34 155.7	54 33.3 94 35 155.4	55 01.5 94 35 155.1	4
15	51 23.6 94 35 155.5	51 51.9 94 35 155.2	52 20.1 94 35 154.9	52 48.2 94 36 154.7	53 16.3 94 36 154.4	53 44.4 94 36 154.1	54 12.5 93 37 153.8	54 40.4 93 37 153.5	15
6	51 02.9 93 36 154.0	51 30.9 93 37 153.7	51 58.9 93 37 153.4	52 26.9 93 38 153.1	52 54.8 93 38 152.8	53 22.6 93 38 152.5	53 50.4 93 39 152.2	54 18.2 93 39 151.9	6
7	50 41.1 93 38 152.5	51 08.9 93 39 152.2	51 36.6 92 39 151.9	52 04.3 92 39 151.6	52 32.0 92 40 151.3	52 59.6 92 40 151.0	53 27.2 92 41 150.6	53 54.7 92 41 150.3	7
8	50 18.1 92 40 151.1	50 45.7 92 40 150.8	51 13.2 92 41 150.4	51 40.7 92 41 150.1	52 08.1 91 42 149.8	52 35.5 91 42 149.5	53 02.8 91 42 149.1	53 30.1 91 43 148.8	8
9	49 54.1 91 42 149.6	50 21.5 91 42 149.3	50 48.8 91 43 149.0	51 16.0 91 43 148.7	51 43.2 91 43 148.3	52 10.3 90 44 148.0	52 37.4 90 44 147.6	53 04.4 90 45 147.3	9
20	49 29.1 90 43 148.2	49 56.2 90 44 147.9	50 23.2 90 44 147.6	50 50.2 90 45 147.2	51 17.2 90 45 146.9	51 44.0 89 45 146.5	52 10.8 89 46 146.1	52 37.6 89 46 145.8	20
1	49 03.0 90 45 146.9	49 29.9 89 45 146.5	49 56.7 89 46 146.2	50 23.4 89 46 145.8	50 50.1 89 47 145.5	51 16.7 89 47 145.1	51 43.3 88 48 144.7	52 09.8 88 48 144.3	1
2	48 36.0 89 47 145.5	49 02.6 89 47 145.1	49 29.2 88 47 144.8	49 55.7 88 48 144.4	50 22.1 88 48 144.1	50 48.5 88 49 143.7	51 14.8 87 49 143.3	51 41.0 87 50 142.9	2
3	48 08.0 88 49 144.1	48 34.4 88 49 143.8	49 00.7 88 49 143.4	49 27.0 87 49 143.1	49 53.2 87 50 142.7	50 19.3 87 50 142.3	50 45.3 87 51 141.9	51 11.2 86 51 141.5	3
4	47 39.2 87 50 142.9	48 05.3 87 50 142.5	48 31.4 87 50 142.1	48 57.4 87 51 141.7	49 23.3 86 51 141.4	49 49.1 86 52 141.0	50 14.9 86 52 140.6	50 40.6 85 53 140.2	4
25	47 09.4 86 51 141.6	47 35.3 86 51 141.2	48 01.1 86 52 140.8	48 26.9 86 52 140.4	48 52.5 85 53 140.0	49 18.1 85 53 139.6	49 43.6 85 54 139.2	50 09.1 85 54 138.8	25
6	46 38.8 86 52 140.3	47 04.5 85 53 139.9	47 30.0 85 53 139.6	47 55.5 85 54 139.2	48 21.0 85 54 138.8	48 46.3 84 54 138.4	49 11.5 84 55 137.9	49 36.7 84 55 137.5	6
7	46 07.4 85 54 139.1	46 32.8 85 54 138.7	46 58.2 84 54 138.3	47 23.4 84 55 137.9	47 48.6 84 55 137.5	48 13.6 84 56 137.1	48 38.6 83 56 136.7	49 03.5 83 57 136.2	7
8	45 35.2 84 55 137.8	46 00.4 84 55 137.5	46 25.5 83 56 137.1	46 50.5 83 56 136.7	47 15.4 83 57 136.3	47 40.2 83 57 135.9	48 04.9 82 57 135.4	48 29.6 82 58 135.0	8
9	45 02.3 83 56 136.5	45 27.2 83 57 136.3	45 52.1 83 57 135.9	46 16.8 82 57 135.5	46 41.5 82 58 135.1	47 06.0 82 58 134.6	47 30.5 81 59 134.2	47 54.9 81 59 133.8	9
30	44 28.6 82 57 135.5	44 53.3 82 58 135.1	45 17.9 82 58 134.7	45 42.4 82 58 134.3	46 06.8 81 59 133.9	46 31.1 81 59 133.5	46 55.4 81 60 133.0	47 19.5 80 60 132.6	30
1	43 54.3 82 58 134.4	44 18.7 81 59 134.0	44 43.1 81 59 133.6	45 07.3 81 60 133.1	45 31.5 80 60 132.7	45 55.6 80 60 132.3	46 19.5 79 61 131.9	46 43.4 79 61 131.4	1
2	43 19.3 81 59 133.2	43 43.5 81 60 132.8	44 07.6 80 60 132.4	44 31.6 80 61 132.0	44 55.5 80 61 131.6	45 19.3 79 61 131.2	45 43.1 79 62 130.7	46 06.7 79 62 130.3	2
3	42 43.6 80 60 132.1	43 07.5 80 61 131.7	43 31.4 79 61 131.3	43 55.2 79 62 130.9	44 18.9 79 62 130.5	44 42.5 78 62 130.0	45 06.0 78 63 129.6	45 29.3 78 63 129.2	3
4	42 07.3 79 62 131.1	42 31.0 79 62 130.7	42 54.7 79 62 130.2	43 18.2 78 63 129.8	43 41.7 78 63 129.4	44 05.0 78 63 128.9	44 28.3 77 64 128.5	44 51.4 77 64 128.1	4
35	41 30.4 78 62 130.0	41 53.9 78 63 129.6	42 17.3 78 63 129.2	42 40.6 78 64 128.7	43 03.9 77 64 128.3	43 27.0 77 64 127.9	43 50.0 77 65 127.4	44 12.9 76 65 127.0	35
6	40 52.9 78 63 129.0	41 16.2 77 64 128.6	41 39.4 77 64 128.1	42 02.5 77 64 127.7	42 25.5 76 65 127.3	42 48.4 76 65 126.8	43 11.2 76 66 126.4	43 33.9 76 66 125.9	6
7	40 14.9 77 64 128.0	40 38.0 77 65 127.5	41 01.0 76 65 127.1	41 23.8 76 65 126.7	41 46.6 76 66 126.2	42 09.3 75 66 125.8	42 31.8 75 66 125.4	42 54.3 75 67 124.9	7
8	39 36.4 76 65 127.0	39 59.2 76 65 126.5	40 22.0 76 66 126.1	40 44.6 75 66 125.7	41 07.2 75 66 125.2	41 29.7 74 67 124.8	41 52.0 74 67 124.4	42 14.3 73 68 123.9	8
9	38 57.4 76 66 126.0	39 20.0 75 66 125.6	39 42.5 75 67 125.1	40 05.0 75 67 124.7	40 27.3 74 67 124.2	40 49.6 74 68 123.8	41 11.7 73 68 123.4	41 33.7 73 68 122.9	9
40	38 17.8 75 67 125.0	38 40.3 75 67 124.6	39 02.6 74 67 124.2	39 24.8 74 68 123.7	39 47.0 74 68 123.3	40 09.0 73 68 122.8	40 30.9 73 69 122.4	40 52.8 73 69 121.9	40
1	37 37.9 74 67 124.1	38 00.1 74 68 123.6	38 22.2 74 68 123.2	38 44.2 73 68 122.8	39 06.2 73 69 122.3	39 28.0 73 69 121.9	39 49.7 72 69 121.4	40 11.4 72 70 121.0	1
2	36 57.4 74 68 123.1	37 19.4 73 68 122.7	37 41.4 73 69 122.3	38 03.2 73 69 121.8	38 24.9 72 69 121.4	38 46.6 72 70 121.0	39 08.1 72 70 120.5	39 29.6 71 70 120.1	2
3	36 16.6 73 69 122.2	36 38.4 73 69 121.8	37 00.1 72 69 121.4	37 21.8 72 70 120.9	37 43.3 72 70 120.5	38 04.8 71 70 120.1	38 26.1 71 71 119.6	38 47.4 71 71 119.2	3
4	35 35.3 72 69 121.3	35 56.9 72 70 120.9	36 18.5 72 70 120.5	36 39.9 71 70 120.0	37 01.3 71 71 119.6	37 22.6 71 71 119.2	37 43.7 71 71 118.7	38 04.8 70 72 118.3	4
45	34 53.6 72 70 120.4	35 15.1 71 70 120.0	35 36.5 71 71 119.6	35 57.7 71 71 119.2	36 18.9 70 71 118.7	36 40.0 70 72 118.3	37 01.0 70 72 117.8	37 21.8 69 72 117.4	45
6	34 11.6 71 71 119.6	34 32.9 71 71 119.2	34 54.1 70 71 118.7	35 15.2 70 72 118.3	35 36.2 70 72 117.8	35 57.1 70 72 117.4	36 17.9 69 72 117.0	36 38.6 69 73 116.5	6
7	33 29.2 70 71 118.7	33 50.3 70 72 118.3	34 11.3 70 72 117.9	34 32.3 70 72 117.4	34 53.1 69 72 117.0	35 13.8 69 73 116.6	35 34.4 69 73 116.1	35 55.0 68 73 115.7	7
8	32 46.5 70 72 117.8	33 07.4 70 72 117.5	33 28.3 69 73 117.0	33 49.0 69 73 116.6	34 09.7 69 73 116.2	34 30.2 68 73 115.7	34 50.7 68 73 115.3	35 11.1 68 74 114.8	8
9	32 03.4 69 72 117.1	32 24.2 69 73 116.6	32 44.9 69 73 116.2	33 05.4 68 73 115.8	33 25.9 68 73 115.3	33 46.3 68 74 114.9	34 06.7 68 74 114.5	34 26.9 67 74 114.0	9
50	31 20.0 69 73 116.3	31 40.6 69 73 115.8	32 01.2 68 73 115.4	32 21.6 68 74 115.0	32 41.9 68 74 114.5	33 02.2 67 74 114.1	33 22.3 67 74 113.6	33 42.4 67 75 113.2	50
1	30 36.4 68 73 115.5	30 56.8 68 74 115.0	31 17.2 68 74 114.6	31 37.4 67 74 114.2	31 57.6 67 74 113.7	32 17.7 67 75 113.3	32 37.7 67 75 112.9	32 57.6 66 75 112.4	1
2	29 52.4 68 74 114.7	30 12.7 68 74 114.2	30 32.9 67 74 113.8	30 53.0 67 74 113.4	31 13.1 67 75 112.9	31 33.0 66 75 112.5	31 52.9 66 75 112.1	32 12.6 66 75 111.6	2
3	29 08.1 67 74 113.9	29 28.3 67 74 113.4	29 48.4 67 75 113.0	30 08.3 66 75 112.6	30 28.2 66 75 112.2	30 48.0 66 76 111.7	31 07.8 66 76 111.3	31 27.4 65 76 110.9	3
4	28 23.6 67 75 113.1	28 43.6 67 75 112.7	29 03.6 66 75 112.3	29 23.4 66 75 111.8	29 43.2 66 76 111.4	30 02.8 65 76 111.0	30 22.4 65 76 110.5	30 41.9 65 76 110.1	4
55	27 38.9 66 75 112.4	27 58.7 66 75 111.9	28 18.5 66 75 111.5	28 38.2 66 76 111.1	28 57.9 65 76 110.7	29 17.4 65 76 110.2	29 36.9 65 76 109.8	29 56.2 64 76 109.3	55
6	26 53.9 66 75 111.6	27 13.6 66 76 111.2	27 33.2 65 76 110.8	27 52.8 65 76 110.4	28 12.3 65 76 109.9	28 31.7 65 76 109.5	28 51.1 64 77 109.1	29 10.3 64 77 108.6	6
7	26 08.6 65 76 110.9	26 28.2 65 76 110.5	26 47.8 65 76 110.0	27 07.2 65 76 109.6	27 26.6 64 77 109.2	27 45.9 64 77 108.8	28 05.1 64 77 108.3	28 24.2 64 77 107.9	7
8	25 23.2 65 76 110.2	25 42.6 65 76 109.7	26 02.0 64 77 109.3	26 21.4 64 77 108.9	26 40.6 64 77 108.5	26 59.8 64 77 108.0	27 18.9 64 77 107.6	27 37.9 63 77 107.2	8
9	24 37.5 65 76 109.5	24 56.9 64 77 109.0	25 16.1 64 77 108.6	25 35.4 64 77 108.2	25 54.5 64 77 107.8	26 13.6 63 77 107.3	26 32.6 63 78 106.9	26 51.5 63 78 106.5	9
60	23 51.6 64 77 108.7	24 10.9 64 77 108.3	24 30.0 64 77 107.9	24 49.2 64 77 107.5	25 08.2 63 77 107.1	25 27.1 63 78 106.6	25 46.0 63 78 106.2	26 04.8 63 78 105.8	60
1	23 05.6 64 77 108.0	23 24.7 64 77 107.6	23 43.8 63 77 107.2	24 02.8 63 78 106.8	24 21.7 63 78 106.4	24 40.6 63 78 105.9	24 59.3 62 78 105.5	25 18.1 62 78 105.1	1
2	22 19.3 64 77 107.4	22 38.3 63 78 106.9	22 57.3 63 78 106.5	23 16.2 63 78 106.1	23 35.0 63 78 105.7	23 53.8 62 78 105.2	24 12.5 62 78 104.8	24 31.1 62 78 104.4	2
3	21 32.9 63 78 106.7	21 51.8 63 78 106.3	22 10.7 63 78 105.8	22 29.5 62 78 105.4	22 48.2 62 78 105.0	23 06.9 62 78 104.6	23 25.5 62 79 104.1	23 44.0 62 79 103.7	3
4	20 46.3 63 78 106.0	21 05.1 63 78 105.6	21 23.9 62 78 105.2	21 42.6 62 78 104.7	22 01.3 62 79 104.3	22 19.8 62 79 103.9	22 38.3 61 79 103.5	22 56.8 61 79 103.0	4
65	19 59.6 63 78 105.3	20 18.3 62 78 104.9	20 37.0 62 78 104.5	20 55.6 62 79 104.1	21 14.2 62 79 103.7	21 32.7 61 79 103.2	21 51.1 61 79 102.8	22 09.4 61 79 102.4	65
6	19 12.7 62 78 104.7	19 31.3 62 79 104.3	19 49.9 62 79 103.8	20 08.5 62 79 103.4	20 26.9 61 79 103.0	20 45.3 61 79 102.6	21 03.7 61 79 102.1	21 22.0 61 79 101.7	6
7	18 25.7 62 79 104.0	18 44.2 62 79 103.6	19 02.7 61 79 103.2	19 21.2 61 79 102.8	19 39.6 61 79 102.3	19 57.9 61 79 101.9	20 16.2 61 79 101.5	20 34.4 61 79 101.1	7
8	17 38.5 62 79 103.4	17 57.0 61 79 102.9	18 15.4 61 79 102.5	18 33.8 61 79 102.1	18 52.1 61 79 101.7	19 10.4 61 79 101.2	19 28.6 60 80 100.8	19 46.7 60 80 100.4	8
9	16 51.2 61 79 102.7	17 09.6 61 79 102.3	17 28.0 61 79 101.9	17 46.3 61 79 101.5	18 04.5 61 79 101.1	18 22.7 61 80 100.6	18 40.8 60 80 100.2	18 58.9 60 80 99.8	9
70	16 03.8 61 79 102.1	16 22.1 61 79 101.7	16 40.4 61 79 101.2	16 58.6 61 80 100.8	17 16.8 61 80 100.4	17 34.9 60 80 100.0	17 53.0 60 80 99.6	18 11.0 60 80 99.2	70
1	15 16.3 61 79 101.4	15 34.5 61 80 101.0	15 52.7 61 80 100.6	16 10.9 60 80 100.2	16 29.0 60 80 99.8	16 47.1 60 80 99.4	17 05.1 60 80 99.0	17 23.1 60 80 98.5	1
2	14 28.7 61 80 100.8	14 46.8 61 80 100.4	15 05.0 60 80 100.0	15 23.1 60 80 99.6	15 41.1 60 80 99.2	15 59.2 60 80 98.7	16 17.1 60 80 98.3	16 35.0 60 80 97.9	2
3	13 40.9 60 80 100.2	13 59.1 60 80 99.8	14 17.1 60 80 99.4	14 35.2 60 80 99.0	14 53.2 60 80 98.5	15 11.1 60 80 98.1	15 29.0 60 80 97.7	15 46.9 59 80 97.1	3
4	12 53.1 60 80 99.6	13 11.2 60 80 99.2	13 29.2 60 80 98.7	13 47.2 60 80 98.3	14 05.1 60 80 97.9	14 23.0 60 80 97.5	14 40.9 59 80 97.1	14 58.7 59 80 96.7	4
75	12 05.2 60 80 99.0	12 23.2 60 80 98.5	12 41.2 60 80 98.1	12 59.1 60 80 97.7	13 17.0 60 80 97.3	13 34.9 59 80 96.9	13 52.7 59 80 96.5	14 10.5 59 80 96.1	75
6	11 17.2 60 80 98.3	11 35.2 60 80 97.9	11 53.1 60 80 97.5	12 11.0 60 80 97.1	12 28.9 59 80 96.7	12 46.7 59 80 96.3	13 04.5 59 81 95.9	13 22.2 59 81 95.5	6
7	10 29.1 60 80 97.7	10 47.1 60 80 97.3	11 05.0 59 80 96.9	11 22.9 59 80 96.5	11 40.6 59 80 96.1	11 58.4 59 81 95.7	12 16.1 59 81 95.3	12 33.9 59 81 94.9	7
8	9 41.0 60 80 97.1	9 58.9 60 80 96.7	10 16.7 59 80 96.3	10 34.5 59 80 95.9	10 52.3 59 81 95.5	11 10.0 59 81 95.1	11 27.8 59 81 94.7	11 45.5 59 81 94.3	8
9	8 52.8 59 80 96.5	9 10.6 59 80 96.1	9 28.4 59 80 95.7	9 46.2 59 81 95.3	10 04.0 59 81 94.9	10 21.7 59 81 94.5	10 39.4 59 81 94.1	10 57.0 59 81 93.7	9
80	8 04.6 59 80 95.9	8 22.4 59 81 95.5	8 40.1 59 81 95.1	8 57.9 59 81 94.7	9 15.6 59 81 94.3	9 33.3 59 81 93.9	9 50.9 59 81 93.5	10 08.6 59 81 93.1	80
1	7 16.2 59 81 95.3	7 34.0 59 81 94.9	7 51.8 59 81 94.5	8 09.5 59 81 94.1	8 27.2 59 81 93.7	8 44.8 59 81 93.3	9 02.5 59 81 92.9	9 20.1 59 81 92.5	1
2	6 27.9 59 81 94.7	6 45.6 59 81 94.3	7 03.3 59 81 93.9	7 21.0 59 81 93.5	7 38.7 59 81 93.1	7 56.4 59 81 92.7	8 14.0 59 81 92.3	8 31.6 59 81 91.9	2
3	5 39.5 59 81 94.1	5 57.2 59 81 93.7	6 14.9 59 81 93.3	6 32.6 59 81 92.9	6 50.2 59 81 92.5	7 07.9 59 81 92.1	7 25.5 59 81 91.7	7 43.1 59 81 91.3	3
4		5 08.8 59 81 93.1	5 26.4 59 81 92.7	5 44.1 59 81 92.3	6 01.7 59 81 91.9	6 19.3 59 81 91.5	6 36.9 59 81 91.1	6 54.5 59 81 90.7	4
85					5 13.2 59 81 91.3	5 30.8 59 81 90.9	5 48.4 59 81 90.5	6 06.0 59 81 90.1	85
6								5 17.5 59 81 89.5	6

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H.A.	0° 00'			0° 30'			1° 00'			1° 30'			2° 00'			2° 30'			3° 00'			3° 30'			H.A.
°	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	°
00	54 00.0	1.0 01	180.0	53 30.0	1.0 01	180.0	53 00.0	1.0 01	180.0	52 30.0	1.0 01	180.0	52 00.0	1.0 01	180.0	51 30.0	1.0 01	180.0	51 00.0	1.0 01	180.0	50 30.0	1.0 01	180.0	00
1	53 59.3	1.0 04	178.3	53 29.3	1.0 04	178.3	52 59.3	1.0 04	178.4	52 29.3	1.0 03	178.4	51 59.3	1.0 03	178.4	51 29.3	1.0 03	178.4	50 59.3	1.0 03	178.4	50 29.3	1.0 03	178.4	1
2	53 57.1	1.0 06	176.6	53 27.2	1.0 06	176.6	52 57.2	1.0 06	176.7	52 27.2	1.0 06	176.7	51 57.3	1.0 06	176.8	51 27.3	1.0 06	176.8	50 57.3	1.0 06	176.8	50 27.3	1.0 06	176.9	2
3	53 53.5	1.0 08	174.9	53 23.6	1.0 08	175.0	52 53.7	1.0 08	175.0	52 23.7	1.0 08	175.1	51 53.8	1.0 08	175.1	51 23.9	1.0 08	175.2	50 54.0	1.0 08	175.2	50 24.0	1.0 08	175.3	3
4	53 48.5	1.0 11	173.2	53 18.6	1.0 11	173.3	52 48.8	1.0 10	173.4	52 18.9	1.0 10	173.4	51 49.0	1.0 10	173.5	51 19.1	1.0 10	173.6	50 49.3	1.0 10	173.7	50 19.4	1.0 10	173.7	4
05	53 42.1	99 13	171.5	53 12.3	99 13	171.6	52 42.5	99 13	171.7	52 12.7	99 13	171.8	51 42.9	99 12	171.9	51 13.1	99 12	172.0	50 43.3	99 12	172.1	50 13.4	99 12	172.2	05
6	53 34.2	99 15	169.9	53 04.5	99 15	170.0	52 34.8	99 15	170.2	52 05.1	99 15	170.2	51 35.4	99 15	170.3	51 05.7	99 14	170.5	50 35.9	99 14	170.6	50 06.2	99 14	170.6	6
7	53 25.0	99 18	168.2	52 55.4	99 17	168.3	52 25.8	99 17	168.5	51 56.2	99 17	168.6	51 26.6	99 17	168.7	50 56.9	99 17	168.9	50 27.3	99 17	169.0	49 57.7	99 16	169.1	7
8	53 14.4	98 20	166.6	52 44.9	98 20	166.7	52 15.4	98 20	166.9	51 45.9	98 19	167.0	51 16.4	98 19	167.2	50 46.9	98 19	167.3	50 17.4	98 19	167.4	49 47.8	98 18	167.6	8
9	53 02.4	98 22	164.9	52 33.1	98 22	165.1	52 03.7	98 22	165.3	51 34.4	98 21	165.4	51 05.0	98 21	165.6	50 35.6	98 21	165.7	50 06.2	98 21	165.9	49 36.8	98 21	166.1	9
10	52 49.1	97 24	163.3	52 19.9	97 24	163.5	51 50.7	97 24	163.7	51 21.5	97 24	163.9	50 52.3	97 23	164.0	50 23.0	98 23	164.2	49 53.7	98 23	164.4	49 24.5	98 23	164.6	10
1	52 34.5	97 26	161.7	52 05.5	97 26	161.9	51 36.4	97 26	162.1	51 07.4	97 26	162.3	50 38.3	97 25	162.5	50 09.2	97 25	162.7	49 40.1	97 25	162.9	49 10.9	97 25	163.1	1
2	52 18.6	96 28	160.1	51 49.8	96 28	160.3	51 20.9	96 28	160.6	50 52.0	96 28	160.8	50 23.1	96 27	161.0	49 54.1	97 27	161.2	49 25.2	97 27	161.4	48 56.2	97 27	161.6	2
3	52 01.5	96 31	158.6	51 32.8	96 30	158.8	51 04.1	96 30	159.0	50 35.4	96 30	159.3	50 06.7	96 29	159.5	49 37.9	96 29	159.7	49 09.1	96 29	159.9	48 40.2	96 28	160.1	3
4	51 43.2	95 33	157.0	51 14.7	95 32	157.3	50 46.2	95 32	157.5	50 17.6	95 32	157.8	49 49.1	95 31	158.0	49 20.5	95 31	158.2	48 51.8	95 31	158.5	48 23.2	96 30	158.7	4
15	51 23.6	94 35	155.5	50 55.3	94 34	155.8	50 27.0	94 34	156.0	49 58.7	94 33	156.3	49 30.3	95 33	156.5	49 01.9	95 33	156.8	48 33.4	95 33	157.0	48 05.0	95 32	157.3	15
6	51 02.9	93 36	154.0	50 34.8	94 36	154.3	50 06.7	94 35	154.5	49 38.6	94 35	154.8	49 10.4	94 35	155.1	48 42.2	94 35	155.3	48 13.9	94 34	155.6	47 45.6	94 34	155.8	6
7	50 41.1	93 38	152.5	50 13.2	93 38	152.8	49 45.3	93 38	153.1	49 17.4	93 37	153.4	48 49.4	93 37	153.7	48 21.4	93 36	153.9	47 53.3	94 36	154.2	47 25.2	94 36	154.4	7
8	50 18.1	92 40	151.1	49 50.5	92 40	151.4	49 22.8	92 39	151.7	48 55.1	92 39	152.0	48 27.3	93 39	152.2	47 59.5	93 38	152.5	47 31.7	93 38	152.8	47 03.8	93 38	153.1	8
9	49 54.1	91 42	149.6	49 26.7	91 41	150.0	48 59.2	92 41	150.3	48 31.7	92 41	150.6	48 04.2	92 40	150.9	47 36.6	92 40	151.2	47 09.0	92 40	151.4	46 41.3	92 39	151.7	9
20	49 29.1	90 43	148.2	49 01.9	91 43	148.6	48 34.7	91 43	148.9	48 07.4	91 42	149.2	47 40.1	91 42	149.5	47 12.7	91 42	149.8	46 45.3	91 41	150.1	46 17.8	92 41	150.4	20
1	49 03.0	90 45	146.9	48 36.1	90 45	147.2	48 09.3	90 44	147.5	47 42.0	90 44	147.8	47 15.7	90 44	148.2	46 47.8	91 43	148.5	46 20.6	91 43	148.8	45 53.3	91 42	149.1	1
2	48 36.0	89 47	145.6	48 09.3	89 46	145.9	47 42.5	89 46	146.2	47 15.7	89 46	146.6	46 48.8	90 45	146.8	46 21.9	90 45	147.2	45 54.9	90 44	147.5	45 27.9	90 44	147.8	2
3	48 08.0	88 48	144.2	47 41.6	88 48	144.5	47 15.0	88 47	144.9	46 48.5	89 47	145.2	46 21.8	89 47	145.5	45 55.1	89 46	145.9	45 28.4	89 46	146.2	45 01.6	89 45	146.5	3
4	47 39.2	87 50	142.9	47 12.9	87 49	143.2	46 46.7	88 49	143.6	46 20.3	88 48	143.9	45 53.9	88 48	144.3	45 27.5	88 48	144.6	45 00.9	89 47	144.9	44 34.4	89 47	145.3	4
25	47 09.4	86 51	141.6	46 43.4	87 51	141.9	46 17.4	87 50	142.3	45 51.3	87 50	142.7	45 25.1	87 49	143.0	44 58.9	88 49	143.4	44 32.6	88 49	143.7	44 06.3	88 48	144.0	25
6	46 38.8	86 52	140.3	46 13.1	86 52	140.7	45 47.3	86 52	141.1	45 21.4	86 51	141.4	44 55.5	87 51	141.8	44 29.5	87 50	142.1	44 03.5	87 50	142.5	43 37.3	87 50	142.8	6
7	46 07.4	85 54	139.1	45 42.0	85 53	139.5	45 16.4	85 53	139.8	44 50.8	86 53	140.2	44 25.1	86 52	140.6	43 59.3	86 51	141.0	43 33.5	86 51	141.3	43 07.6	86 51	141.6	7
8	45 35.2	84 55	137.9	45 10.0	84 54	138.3	44 44.7	84 54	138.6	44 19.3	85 54	139.0	43 53.9	85 53	139.4	43 28.3	85 53	139.7	43 02.7	85 53	140.1	42 37.1	86 52	140.4	8
9	45 02.3	83 56	136.7	44 37.3	83 56	137.1	44 12.2	84 55	137.5	43 47.1	84 55	137.8	43 21.9	84 54	138.2	42 56.6	84 54	138.6	42 31.2	85 54	138.9	42 05.8	85 53	139.3	9
30	44 28.6	82 57	135.5	44 03.9	83 57	135.9	43 39.1	83 56	136.3	43 14.1	83 56	136.7	42 49.2	83 56	137.1	42 24.1	84 55	137.4	41 59.0	84 55	137.8	41 33.8	84 55	138.2	30
1	43 54.3	82 58	134.4	43 29.8	82 58	134.8	43 05.2	82 58	135.2	42 40.5	82 57	135.5	42 15.7	83 57	135.9	41 50.9	83 56	136.3	41 26.0	83 56	136.7	41 01.0	83 56	137.1	1
2	43 19.3	81 59	133.2	42 55.0	81 59	133.7	42 30.6	81 59	134.0	42 06.2	82 58	134.4	41 41.6	82 58	134.8	41 17.0	82 58	135.2	40 52.4	82 57	135.6	40 27.6	83 57	136.0	2
3	42 43.6	80 60	132.1	42 19.5	80 60	132.6	41 55.4	81 60	133.0	41 31.2	81 59	133.4	41 06.9	81 59	133.7	40 42.5	81 59	134.1	40 18.1	82 58	134.5	39 53.6	82 58	134.9	3
4	42 07.3	79 62	131.1	41 43.5	80 61	131.5	41 19.6	80 61	131.9	40 55.6	80 60	132.3	40 31.5	80 60	132.7	40 07.4	81 60	133.1	39 43.1	81 59	133.4	39 18.8	81 59	133.8	4
35	41 30.4	78 62	130.0	41 06.8	79 62	130.4	40 43.1	79 62	130.8	40 19.4	79 61	131.2	39 55.5	80 61	131.6	39 31.6	80 61	132.0	39 07.6	80 60	132.4	38 43.5	80 60	132.8	35
6	40 52.9	78 63	129.0	40 29.6	78 63	129.4	40 06.1	78 63	129.8	39 42.6	79 62	130.2	39 19.0	79 62	130.6	38 55.3	79 62	131.0	38 31.5	79 61	131.4	38 07.6	80 61	131.8	6
7	40 14.9	77 64	128.0	39 51.8	77 64	128.4	39 28.6	78 64	128.8	39 05.2	78 63	129.2	38 41.8	78 63	129.6	38 18.3	78 63	130.0	37 54.8	79 62	130.4	37 31.1	79 62	130.8	7
8	39 36.4	76 65	127.0	39 13.5	77 65	127.4	38 50.4	77 64	127.8	38 27.3	77 64	128.2	38 04.1	77 64	128.6	37 40.9	78 63	129.0	37 17.5	78 63	129.4	36 54.1	78 63	129.8	8
9	38 57.4	76 66	126.0	38 34.6	76 66	126.4	38 11.8	76 65	126.8	37 48.9	76 65	127.2	37 26.0	77 64	127.6	37 02.9	77 64	128.0	36 39.8	77 64	128.4	36 16.5	78 63	128.8	9
40	38 17.8	75 67	125.0	37 55.3	75 66	125.4	37 32.7	75 66	125.8	37 10.0	76 66	126.3	36 47.3	76 65	126.7	36 24.4	76 65	127.1	36 01.5	77 65	127.5	35 38.5	77 64	127.9	40
1	37 37.9	74 67	124.1	37 15.5	75 67	124.5	36 53.1	75 67	124.9	36 30.7	75 66	125.3	36 08.1	75 66	125.7	35 45.4	76 66	126.1	35 22.7	76 65	126.5	34 59.9	76 65	126.9	1
2	36 57.4	74 68	123.1	36 35.3	74 68	123.6	36 13.1	74 67	124.0	35 50.8	74 67	124.4	35 28.5	75 67	124.8	35 06.0	75 66	125.2	34 43.5	75 66	125.6	34 20.9	76 66	126.0	2
3	36 16.6	73 69	122.2	35 54.7	73 68	122.6	35 32.6	73 68	123.1	35 10.6	74 68	123.5	34 48.4	74 68	123.9	34 26.1	74 67	124.3	34 03.8	75 67	124.7	33 41.4	75 67	125.1	3
4	35 35.3	72 69	121.3	35 13.6	73 69	121.8	34 51.8	73 69	122.2	34 29.9	73 68	122.6	34 07.9	74 68	123.0	33 45.8	74 68	123.4	33 23.7	74 68	123.8	33 01.4	74 67	124.2	4
45	34 53.6	72 70	120.4	34 32.1	72 70	120.9	34 10.5	72 69	121.3	33 48.8	73 69	121.7	33 27.0	73 69	122.1	33 05.1	73 69	122.5	32 43.1	73 68	122.9	32 21.1	74 68	123.3	45
6	34 11.6	71 71	119.6	33 50.3	71 70	120.0	33 28.8	72 70	120.4	33 07.3	72 70	120.8	32 45.7	72 69	121.3	32 24.0	72 69	121.7	32 02.2	73 69	122.1	31 40.6	73 69	122.5	6
7	33 29.2	70 71	118.7	33 08.0	71 71	119.2	32 46.8	71 71	119.6	32 25.4	71 71	120.0	32 04.0	72 70	120.4	31 42.5	72 70	120.8	31 20.9	72 70	121.2	30 59.2	72 70	121.6	7
8	32 46.5	70 72	117.9	32 25.5	70 72	118.3	32 04.4	71 71	118.7	31 43.2	71 71	119.2	31 21.9	71 71	119.6	31 00.6	71 70	120.0	30 39.2	72 70	120.4	30 17.7	72 70	120.8	8
9	32 03.4	69 72	117.1	31 42.6	70 72	117.5	31 21.6	70 72	117.9	31 00.6	70 72	118.3	30 39.5	70 71	118.7	30 18.4	71 71	119.2	29 57.1	71 71	119.6	29 35.8	71 70	120.0	9
50	31 20.0	69 73	116.3	30 59.4	69 73	116.7	30 38.6	69 72	117.1	30 17.7	70 72	117.5	29 56.8	70 72	117.9	29 35.8	70 71	118.3	29 14.7	70 71	118.7	28 53.6	71 71	119.2	50
1	30 36.4	68 73	115.5	30 15.6	68 73	115.9	29 55.2	69 73	116.3	29 34.5	69 72	116.7	29 13.8	69 72	117.1	28 52.9	70 72	117.5	28 32.0	70 72	117.9	28 11.0	70 71	118.4	1
2	29 52.6	68 74	114.7	29 32.0	68 74	115.1	29 11.6	68 73	115.5	28 51.0	69 73	115.9	28 30.4	69 73	116.3	28 09.7	69 72	116.8	27 49.0	69 72	117.2	27 28.1	70 72	117.6	2
3	29 08.1	67 74	113.9	28 47.9	68 74	114.3	28 27.6	68 74	114.7	28 07.2	68 73	115.1	27 46.8	68 73	115.6	27 26.2	69 73	116.0	27 05.6	69 72	116.4	26 45.0	69 72	116.8	3
4	28 23.6	67 75	113.1	28 03.5	67 74	113.5	27 43.4	67 74	114.0	27 23.1	68 74	114.4	27 02.8	68 74	114.8	26 42.5	68 73	115.2	26 22.0	68 73	115.6	26 01.5	69 73	116.0	4
55	27 38.9	66 75	112.4	27 18.9	67 75	112.8	26 58.9	67 75	113.2	26 38.8	67 74	113.6	26 18.6	67 74	114.0	25 58.4	68 74	114.5	25 38.1	68 74	114.9	25 17.7	68 73	115.3	55
6	26 53.9	66 75	111.6	26 34.0	66 75	112.0	26 14.2	66 75	112.5	25 54.2	67 75	112.9	25 34.2	67 75	113.3	25 14.1	67 74	113.7	24 53.9	67 74	114.1	24 33.7	68 74	114.5	6
7	26 08.6	65 76	110.9	25 48.9	66 76	111.3	25 29.2	66 75	111.7	25 09.4	66 75	112.1	24 49.5	66 75	112.5	24 29.5	67 75	113.0	24 09.5	67 74	113.4	23 49.4	67 74	113.8	7
8	25 23.2	65 76	110.2	25 03.6	65 76	110.6	24 44.0	66 76	111.0	24 24.3	66 75	111.4	24 04.5	66 75	111.8	23 44.7	66 75	112.2	23 24.8	67 75	112.7	23 04.9	67 75	113.1	8
9	24 37.5	65 76	109.5	24 18.1	65 76	109.9	23 58.6	65 76	110.3	23 39.0	65 76	110.7	23 19.4	66 76	111.1	22 59.7	66 75	111.5	22 39.9	66 75	111.9	22 20.1	66 75	112.3	9
60	23 51.6	64 77	108.7	23 32.3	64 77	109.2	23 12.9	65 76	109.6	22 53.5	65 76	110.0	22 34.0	65 76	110.4	22 14.4	65 76	110.8	21 54.8	66 76	111.2	21 35.1	66 75	111.6	60
1	23 05.6	64 77	108.0	22 46.4	64 77	108.5	22 27.1	64 77	108.9	22 07.8	65 77	109.3	21 48.4	65 76	109.7	21 28.9	65 76	110.1	21 09.4	65 76	110.5	20 49.8	66 76	110.9	1
2	22 19.3	64 77	107.4	22 00.2	64 77	107.8	21 41.1	64 77	108.2	21 21.8	64 77	108.6	21 02.6	64 77	109.0	20 43.2	65 76	109.4	20 23.8	65 76	109.8	20 04.4	65 76	110.2	2
3	21 32.9	63 78	106.7	21 13.9	63 78	107.1	20 54.9	64 77	107.5	20 35.8	64 77	107.9	20 16.6	64 77	108.3	19 57.4	64 77	108.7	19 38.1	64 77	109.1	19 18.7	65 76	109.5	3
4	20 46.3	63 78	106.0	20 27.4	63 78	106.4	20 08.5	63 78	106.8	19 49.5	63 77	107.2	19 30.4	64 77	107.6	19 11.3	64 77	108.1	18 52.1	64 77	108.5	18 32.9	64 77	108.9	4
65	19 59.6	63 78	105.3	19 40.8	63 78	105.7	19 21.9	63 78	106.2	19 03.0	63 78	106.6	18 44.1	63 78	107.0	18 25.1	63 77	107.4	18 06.0	64 77	107.8	17 46.9	64 77	108.2	65
6	19 12.7	62 78	104.7	18 54.0	63 78	105.1	18 35.2	63 78	105.5	18 16.4	63 78	105.9	17 57.6	63 78	106.3	17 38.7	63 78	106.7	17 19.7	63 77	107.1	17 00.7	63 77	107.5	6
7	18 25.7	62 78	104.0	18 07.1	62 78	104.4	17 48.4	62 78	104.8	17 29.7	62 78	105.2	17 10.9	63 78	105.7	16 52.1	63 78	106.1	16 33.2	63 78	106.5	16 14.3	63 78	106.9	7
8	17 38.5	62 79	103.4	17 20.0	62 79	103.8	17 01.4	62 79	104.2	16 42.8	62 78	104.6	16 24.1	62 78	105.0	16 05.4	62 78	105.4	15 46.6	63 78	105.8	15 27.8	63 78	106.2	8
9	16 51.2	61 79	102.7	16 32.8	62 79	103.1	16 14.3	62 79	103.5	15 55.7	62 79	103.9	15 37.1	62 78	104.4	15 18.5	62 78	104.8	14 59.8	62 78	105.2	14 41.1	62 78	105.6	9
70	16 03.8	61 79	102.1	15 45.4	61 79	102.5	15 27.0	61 79	102.9	15 08.5	62 79	103.3	14 50.0	62 79	103.7	14 31.5	62 78	104.1	14 12.9	62 78	104.5	13 54.3	62 78	104.9	70
1	15 16.3	61 79	101.4	14 58.0	61 79	101.9	14 39.6	61 79	102.3	14 21.2	61 79	102.7	14 02.8	62 79	103.1	13 44.3	62 79	103.5	13 25.8	62 78	103.9	13 07.3	62 78	104.3	1
2	14 28.7	61 80	100.8	14 10.4	61 79	101.2	13 52.1	61 79	101.6	13 33.8	61 79	102.0	13 15.5	61 79	102.4	12 57.1	61 79	102.9	12 38.6	61 79	103.3	12 20.2	62 79	103.7	2
3	13 40.9	60 80	100.2	13 22.8	61 80	100.6	13 04.5	61 80	101.0	12 46.3	61 79	101.4	12 28.0	61 79	101.8	12 09.7	61 79	102.2	11 51.3	61 79	102.6	11 33.0	61 79	103.0	3
4	12 53.1	60 80	99.6	12 35.0	60 80	100.0	12 16.8	61 80	100.4	11 58.7	61 80	100.8	11 40.5	61 79	101.2	11 22.2	61 79	101.6	11 03.9	61 79	102.0	10 45.6	61 79	102.4	4
75	12 05.2	60 80	99.0	11 47.1	60 80	99.4	11 29.1	60 80	99.8	11 10.9	60 80	100.2	10 52.8	61 80	100.6	10 34.6	61 80	101.0	10 16.4	61 79	101.4	9 58.1	61 79	101.8	75
6	11 17.2	60 80	98.3	10 59.2	60 80	98.7	10 41.2	60 80	99.2	10 23.1	60 80	99.6	10 05.0	60 80	100.0	9 46.9	60 80	100.4	9 28.7	61 80	100.8	9 10.6	61 79	101.2	6
7	10 29.1	60 80	97.7	10 11.2	60 80	98.1	9 53.2	60 80	98.5	9 35.2	60 80	98.9	9 17.2	60 80	99.4	8 59.1	60 80	99.8	8 41.0	60 80	100.2	8 22.9	60 80	100.6	7
8	9 41.0	60 80	97.1	9 23.1	60 80	97.5	9 05.2	60 80	97.9	8 47.2	60 80	98.3	8 29.2	60 80	98.7	8 11.2	60 80	99.1	7 53.2	60 80	99.5	7 35.1	60 80	99.9	8
9	8 52.8	59 80	96.5	8 34.9	60 80	96.9	8 17.1	60 80	97.3	7 59.2	60 80	97.7	7 41.2	60 80	98.1	7 23.3	60 80	98.5	7 05.3	60 80	98.9	6 47.3	60 80	99.4	9
80	8 04.6	59 80	95.9	7 46.7	59 80	96.3	7 28.9	60 80	96.7	7 11.0	60 80	97.1	6 53.1	60 80	97.5	6 35.2	60 80	97.9	6 17.3	60 80	98.3	5 59.3	60 80	98.7	80
1	7 16.2	59 81	95.3	6 58.5	59 81	95.7	6 40.6	59 80	96.1	6 22.8	59 80	96.5	6 05.0	60 80	96.9	5 47.1	60 80	97.3	5 29.2	60 80	97.7	5 11.3	60 80	98.1	1
2	6 27.9	59 81	94.7	6 10.1	59 81	95.1	5 52.4	59 81	95.5	5 34.6	59 80	95.9	5 16.8	59 80	96.3										2
3	5 39.5	59 81	94.1	5 21.8	59 81	94.5	5 04.0	59 81	94.9														3

DECLINATION SAME NAME AS LATITUDE

Lat. 36°

H.A.	4° 00' (Alt. — Δd Δt — Az.)	4° 30'	5° 00'	5° 30'	6° 00'	6° 30'	7° 00'	7° 30'	H.A.
00	58 00.0 1.00 01 180.0	58 30.0 1.00 01 180.0	59 00.0 1.00 01 180.0	59 30.0 1.00 01 180.0	60 00.0 1.00 01 180.0	60 30.0 1.00 01 180.0	61 00.0 1.00 01 180.0	61 30.0 1.00 01 180.0	00
1	57 59.2 1.00 04 178.1	58 29.2 1.00 04 178.1	58 59.2 1.00 04 178.1	59 29.2 1.00 04 178.0	59 59.1 1.00 04 178.0	60 29.1 1.00 04 178.0	60 59.1 1.00 04 178.0	61 29.1 1.00 04 177.9	1
2	57 56.8 1.00 07 176.2	58 26.8 1.00 07 176.2	58 56.7 1.00 07 176.1	59 26.7 1.00 07 176.1	59 56.6 1.00 07 176.0	60 26.6 1.00 07 176.0	60 56.5 1.00 07 175.9	61 26.5 1.00 07 175.8	2
3	57 52.8 1.00 09 174.4	58 22.7 1.00 09 174.3	58 52.6 1.0 10 174.2	59 22.5 1.0 10 174.1	59 52.4 1.0 10 174.0	60 22.3 1.0 10 174.0	60 52.2 1.0 10 173.9	61 22.1 1.0 10 173.8	3
4	57 47.3 99 12 172.5	58 17.1 99 12 172.4	58 46.9 99 12 172.3	59 16.8 99 12 172.2	59 46.6 99 12 172.1	60 16.4 99 13 172.0	60 46.2 99 13 171.8	61 16.0 99 13 171.7	4
05	57 40.2 99 14 170.6	58 09.9 99 15 170.5	58 39.6 99 15 170.4	59 09.3 99 15 170.3	59 39.1 99 15 170.1	60 08.8 99 16 170.0	60 38.5 99 16 169.8	61 08.1 99 16 169.7	05
6	57 31.5 99 17 168.8	58 01.1 99 17 168.7	58 30.7 99 17 168.5	59 00.3 99 17 168.3	59 29.9 99 18 168.2	59 59.5 99 18 168.0	60 29.1 99 18 167.8	60 58.6 99 19 167.7	6
7	57 21.3 98 19 167.0	57 50.8 98 20 166.8	58 20.3 98 20 166.6	58 49.7 98 20 166.4	59 19.2 98 21 166.3	59 48.6 98 21 166.1	60 18.0 98 21 165.9	60 47.4 98 21 165.7	7
8	57 09.6 98 22 165.2	57 39.0 98 22 165.0	58 08.3 98 22 164.8	58 37.6 98 23 164.6	59 06.9 98 23 164.4	59 36.1 97 23 164.1	60 05.4 97 24 163.9	60 34.6 97 24 163.7	8
9	56 56.5 97 24 163.4	57 25.6 97 25 163.2	57 54.8 97 25 162.9	58 23.9 97 25 162.7	58 53.0 97 26 162.5	59 22.1 97 26 162.2	59 51.1 97 26 162.0	60 20.2 97 27 161.7	9
10	56 41.9 97 27 161.6	57 10.9 97 27 161.3	57 39.8 96 27 161.1	58 08.8 96 28 160.9	58 37.7 96 28 160.6	59 06.5 96 28 160.4	59 35.4 96 29 160.1	60 04.2 96 29 159.8	10
1	56 25.9 96 29 159.9	56 54.7 96 29 159.6	57 23.4 96 30 159.1	57 52.1 96 30 159.1	58 20.8 96 30 158.8	58 49.5 95 31 158.5	59 18.1 95 31 158.2	59 46.7 95 31 157.9	1
2	56 08.5 95 31 158.1	56 37.0 95 32 157.9	57 05.6 95 32 157.6	57 34.1 95 32 157.3	58 02.6 95 33 157.0	58 31.0 95 33 156.7	58 59.4 95 34 156.4	59 27.7 95 34 156.1	2
3	55 49.7 95 33 156.5	56 18.1 94 34 156.2	56 46.4 94 34 155.9	57 14.7 94 35 155.6	57 42.9 94 35 155.2	58 11.1 94 35 154.9	58 39.2 94 36 154.6	59 07.3 94 36 154.2	3
4	55 29.7 94 36 154.8	55 57.8 94 36 154.5	56 25.9 94 36 154.2	56 53.9 94 37 153.8	57 21.9 93 37 153.5	57 49.8 93 38 153.2	58 17.7 93 38 152.8	58 45.5 93 39 152.5	4
15	55 08.4 93 38 153.1	55 36.3 93 38 152.8	56 04.1 93 38 152.5	56 31.9 93 39 152.2	56 59.6 93 39 151.8	57 27.3 92 40 151.4	57 54.9 92 40 151.1	58 22.4 92 41 150.7	15
6	54 45.9 92 40 151.5	55 13.5 92 40 151.2	55 41.1 92 40 150.9	56 08.6 92 41 150.5	56 36.1 91 41 150.1	57 03.5 91 42 149.8	57 30.9 91 42 149.4	57 58.0 91 43 149.0	6
7	54 22.1 91 41 150.0	54 49.5 91 42 149.6	55 16.8 91 42 149.2	55 44.1 91 43 148.9	56 11.3 91 43 148.5	56 38.4 90 44 148.1	57 05.5 90 44 147.7	57 32.4 90 45 147.3	7
8	53 57.3 91 43 148.4	54 24.4 90 44 148.0	54 51.4 90 44 147.7	55 18.4 90 45 147.3	55 45.3 90 45 146.9	56 12.2 89 46 146.5	56 38.9 89 46 146.1	57 05.6 89 47 145.7	8
9	53 31.3 90 45 146.9	53 58.1 89 46 146.5	54 24.8 89 46 146.1	54 51.6 89 46 145.7	55 18.3 89 47 145.3	55 44.8 88 47 144.9	56 11.3 88 48 144.5	56 37.7 88 48 144.1	9
20	53 04.2 89 47 145.4	53 30.8 89 47 145.0	53 57.3 88 48 144.6	54 23.8 88 48 144.2	54 50.1 88 49 143.8	55 16.4 87 49 143.4	55 42.6 87 50 142.9	56 08.7 87 50 142.5	20
1	52 36.2 88 48 143.9	53 02.5 88 49 143.5	53 28.7 87 49 143.1	53 54.9 87 50 142.7	54 21.0 87 50 142.3	54 46.9 86 51 141.9	55 12.8 86 51 141.4	55 38.6 86 51 141.0	1
2	52 07.1 87 50 142.5	52 33.2 87 50 142.1	52 59.1 86 51 141.7	53 25.0 86 51 141.3	53 50.8 86 52 140.8	54 16.5 85 52 140.4	54 42.1 85 53 140.0	55 07.6 85 53 139.5	2
3	51 37.1 86 52 141.1	52 02.9 86 52 140.7	52 28.6 85 52 140.3	52 54.2 85 53 139.8	53 19.7 85 53 139.4	53 45.1 85 54 139.0	54 10.4 84 54 138.5	54 35.6 84 55 138.0	3
4	51 06.2 85 53 139.7	51 31.7 85 53 139.3	51 57.1 85 54 138.9	52 22.4 84 54 138.5	52 47.6 84 55 138.0	53 12.8 84 55 137.6	53 37.8 84 56 137.1	54 02.7 83 56 136.6	4
25	50 34.4 84 54 138.4	50 59.6 84 55 138.0	51 24.8 84 55 137.5	51 49.8 83 56 137.1	52 14.7 83 56 136.6	52 39.6 83 57 136.2	53 04.3 83 57 135.7	53 28.9 82 58 135.2	25
6	50 01.7 83 56 137.1	50 26.7 83 56 136.7	50 51.6 83 57 136.2	51 16.3 83 57 135.8	51 41.0 82 58 135.3	52 05.6 82 58 134.9	52 30.0 82 58 134.4	52 54.3 81 59 133.9	6
7	49 28.3 82 57 135.8	49 53.0 82 57 135.4	50 17.6 82 58 134.9	50 42.1 81 58 134.5	51 06.5 81 59 134.0	51 30.8 81 59 133.5	51 54.9 80 60 133.1	52 19.0 80 60 132.6	7
8	48 54.1 82 58 134.6	49 18.5 81 59 134.1	49 42.9 81 59 133.7	50 07.1 81 60 133.2	50 31.2 80 60 132.7	50 55.2 80 60 132.3	51 19.1 79 61 131.8	51 42.9 79 61 131.3	8
9	48 19.1 81 59 133.3	48 43.3 80 60 132.9	49 07.4 80 60 132.4	49 31.4 80 61 132.0	49 55.2 79 61 131.5	50 18.9 79 62 131.0	50 42.5 79 62 130.5	51 06.0 78 62 130.1	9
30	47 43.5 80 61 132.1	48 07.4 80 61 131.7	48 31.2 79 61 131.2	48 54.9 79 62 130.8	49 18.5 78 62 130.3	49 42.0 78 63 129.8	50 05.3 78 63 129.3	50 28.6 77 64 128.8	30
1	47 07.2 79 62 131.0	47 30.8 79 62 130.5	47 54.4 78 62 130.1	48 17.8 78 63 129.6	48 41.2 78 63 129.1	49 04.4 77 64 128.6	49 27.5 77 64 128.1	49 50.4 76 65 127.6	1
2	46 30.2 78 63 129.8	46 53.6 78 63 129.4	47 16.9 78 63 128.9	47 40.1 77 64 128.4	48 03.2 77 64 128.0	48 26.2 76 65 127.5	48 49.0 76 65 127.0	49 11.7 75 66 126.5	2
3	45 52.6 77 64 128.7	46 15.8 77 64 128.2	46 38.9 77 64 127.8	47 01.8 76 65 127.3	47 24.6 76 65 126.8	47 47.3 75 66 126.3	48 09.9 75 66 125.9	48 32.4 75 66 125.4	3
4	45 14.5 77 65 127.6	45 37.4 76 65 127.1	46 00.2 76 65 126.7	46 22.9 76 65 126.2	46 45.5 75 66 125.7	47 08.0 75 66 125.2	47 30.3 74 67 124.8	47 52.5 74 67 124.3	4
35	44 35.7 76 65 126.5	44 58.4 76 65 126.1	45 21.0 75 66 125.6	45 43.5 75 67 125.1	46 05.8 74 67 124.6	46 28.1 74 67 124.1	46 50.2 73 68 123.7	47 12.2 73 68 123.2	35
6	43 56.5 75 66 125.5	44 18.9 75 66 125.0	44 41.3 74 67 124.6	45 03.5 74 67 124.1	45 25.7 74 68 123.6	45 47.7 73 68 123.1	46 09.5 73 69 122.6	46 31.3 72 69 122.1	6
7	43 16.7 74 67 124.5	43 38.9 74 67 124.0	44 01.1 74 68 123.5	44 23.1 73 68 123.0	44 45.0 73 69 122.6	45 06.8 73 69 122.1	45 28.4 72 69 121.6	45 49.9 72 70 121.1	7
8	42 36.4 74 68 123.4	42 58.4 73 68 123.0	43 20.4 73 69 122.5	43 42.2 73 69 122.0	44 03.8 72 69 121.6	44 25.4 72 70 121.1	44 46.8 71 70 120.6	45 08.2 71 70 120.1	8
9	41 55.7 73 69 122.5	42 17.5 73 69 122.0	42 39.2 72 69 121.5	43 00.8 72 70 121.1	43 22.3 71 70 120.6	43 43.6 71 70 120.1	44 04.8 71 71 119.6	44 25.9 70 71 119.1	9
40	41 14.5 72 69 121.5	41 36.1 72 70 121.0	41 57.6 71 70 120.6	42 19.0 71 70 120.1	42 40.3 71 71 119.6	43 01.5 70 71 119.1	43 22.6 70 71 118.6	43 43.3 69 72 118.1	40
1	40 32.9 72 70 120.5	40 54.3 71 70 120.1	41 15.6 71 71 119.6	41 36.8 70 71 119.1	41 57.9 70 71 118.7	42 18.8 70 72 118.2	42 39.6 69 72 117.7	43 00.3 69 72 117.2	1
2	39 50.9 71 71 119.6	40 12.1 71 71 119.1	40 33.2 70 71 118.7	40 54.2 70 72 118.2	41 15.1 69 72 117.7	41 35.8 69 72 117.3	41 56.5 69 72 116.8	42 17.0 68 73 116.3	2
3	39 08.5 70 71 118.7	39 29.5 70 72 118.2	39 50.4 70 72 117.8	40 11.2 69 72 117.3	40 31.9 69 72 116.8	40 52.5 68 73 116.3	41 13.0 68 73 115.9	41 33.3 68 73 115.4	3
4	38 25.7 70 72 117.8	38 46.6 69 72 117.3	39 07.3 69 73 116.9	39 27.9 69 73 116.4	39 48.5 68 73 115.9	40 08.8 68 73 115.5	40 29.1 67 74 115.0	40 49.3 67 74 114.5	4
45	37 42.6 69 72 116.9	38 03.3 69 73 116.5	38 23.8 68 73 116.0	38 44.3 68 73 115.5	39 04.6 68 74 115.0	39 24.9 67 74 114.6	39 45.0 67 74 114.1	40 04.9 66 75 113.6	45
6	36 59.2 68 73 116.1	37 19.7 68 73 115.6	37 40.1 68 74 115.1	38 00.3 67 74 114.7	38 20.5 67 74 114.2	38 40.6 66 75 113.7	39 00.5 66 75 113.2	39 20.3 66 75 112.8	6
7	36 15.4 68 73 115.2	36 35.7 68 74 114.8	36 56.0 67 74 114.3	37 16.1 67 74 113.8	37 36.1 67 74 113.4	37 56.0 66 75 112.9	38 15.8 66 75 112.4	38 35.4 65 75 111.9	7
8	35 31.3 67 74 114.4	35 51.5 67 74 113.9	36 11.6 67 74 113.5	36 31.5 66 75 113.0	36 51.4 66 75 112.5	37 11.1 66 75 112.1	37 30.8 65 75 111.6	37 50.3 65 76 111.1	8
9	34 47.0 67 74 113.6	35 07.0 67 74 113.1	35 26.9 66 75 112.6	35 46.7 66 75 112.2	36 06.4 65 76 111.7	36 26.0 65 76 111.2	36 45.5 65 76 110.8	37 04.9 64 76 110.3	9
50	34 02.4 66 75 112.8	34 22.2 66 75 112.3	34 42.0 66 75 111.8	35 01.6 65 76 111.4	35 21.2 65 76 110.9	35 40.7 65 76 110.4	36 00.0 64 76 109.9	36 19.2 64 76 109.5	50
1	33 17.5 66 75 112.0	33 37.2 66 75 111.5	33 56.8 65 76 111.1	34 16.3 65 76 110.6	34 35.7 65 76 110.1	34 55.1 64 76 109.7	35 14.3 64 77 109.2	35 33.4 63 77 108.7	1
2	32 32.3 65 76 111.2	32 51.9 65 76 110.7	33 11.4 65 76 110.3	33 30.8 64 76 109.8	33 50.1 64 76 109.4	34 09.2 64 77 108.9	34 28.3 63 77 108.4	34 47.3 63 77 108.0	2
3	31 46.9 65 76 110.4	32 06.4 65 76 110.0	32 25.7 64 76 109.5	32 45.0 64 77 109.1	33 04.2 64 77 108.6	33 23.3 63 77 108.1	33 42.2 63 77 107.7	34 01.0 63 77 107.2	3
4	31 01.3 64 76 109.7	31 20.7 64 77 109.2	31 39.9 64 77 108.7	31 59.0 64 77 108.3	32 18.0 63 77 107.8	32 37.0 63 77 107.4	32 55.8 63 78 106.9	33 14.5 62 78 106.5	4
55	30 15.5 64 77 108.9	30 34.7 64 77 108.5	30 53.8 64 77 108.0	31 12.8 63 77 107.6	31 31.7 63 77 107.1	31 50.6 63 78 106.6	32 09.3 62 78 106.2	32 27.9 62 78 105.7	55
6	29 29.5 64 77 108.2	29 48.6 63 77 107.7	30 07.6 63 77 107.3	30 26.5 63 78 106.8	30 45.3 63 78 106.4	31 04.0 62 78 105.9	31 22.6 62 78 105.5	31 41.1 62 79 105.0	6
7	28 43.3 63 77 107.4	29 02.2 63 78 107.0	29 21.1 63 78 106.6	29 39.9 62 78 106.1	29 58.6 62 78 105.7	30 17.2 62 78 105.2	30 35.7 62 78 104.7	30 54.1 61 79 104.3	7
8	27 56.9 63 78 106.7	28 15.7 63 78 106.3	28 34.5 62 78 105.8	28 53.2 62 78 105.4	29 11.8 62 78 105.0	29 30.3 62 78 104.5	29 48.7 61 79 104.0	30 07.0 61 79 103.6	8
9	27 10.3 63 78 106.0	27 29.1 62 78 105.6	27 47.7 62 78 105.1	28 06.3 62 78 104.7	28 24.8 62 79 104.3	28 43.2 61 79 103.8	29 01.5 61 79 103.3	29 19.8 60 79 102.9	9
60	26 23.6 62 78 105.3	26 42.2 62 78 104.9	27 00.8 62 79 104.4	27 19.3 61 79 104.0	27 37.7 61 79 103.6	27 56.0 61 79 103.1	28 14.2 61 79 102.7	28 32.4 60 79 102.2	60
1	25 36.7 62 78 104.6	25 55.2 62 79 104.2	26 13.7 61 79 103.8	26 32.1 61 79 103.3	26 50.4 61 79 102.9	27 08.7 60 79 102.4	27 26.8 60 79 102.0	27 44.9 60 79 101.5	1
2	24 49.6 62 79 104.0	25 08.1 61 79 103.5	25 26.5 61 79 103.1	25 44.8 61 79 102.6	26 03.1 61 79 102.2	26 21.2 60 79 101.8	26 39.3 60 79 101.3	26 57.3 60 80 100.9	2
3	24 02.5 61 79 103.3	24 20.9 61 79 102.8	24 39.2 61 79 102.4	24 57.4 61 79 102.0	25 15.6 60 79 101.5	25 33.6 60 79 101.1	25 51.6 60 80 100.6	26 09.5 60 80 100.2	3
4	23 15.2 61 79 102.6	23 33.5 61 79 102.2	23 51.7 61 79 101.7	24 09.9 60 79 101.3	24 27.9 60 80 100.9	24 45.9 60 80 100.4	25 03.9 60 80 100.0	25 21.7 59 80 99.5	4
65	22 27.7 61 79 102.0	22 46.0 61 79 101.5	23 04.1 60 79 101.1	23 22.2 60 80 100.7	23 40.2 60 80 100.2	23 58.2 60 80 99.8	24 16.0 59 80 99.3	24 33.8 59 80 98.9	65
6	21 40.2 61 79 101.3	21 58.3 60 80 100.9	22 16.4 60 80 100.4	22 34.4 60 80 100.0	22 52.4 60 80 99.6	23 10.3 59 80 99.1	23 28.1 59 80 98.7	23 45.8 59 80 98.3	6
7	20 52.5 60 80 100.6	21 10.6 60 80 100.2	21 28.6 60 80 99.8	21 46.6 60 80 99.4	22 04.5 59 80 98.9	22 22.3 59 80 98.5	22 40.1 59 80 98.1	22 57.7 59 80 97.6	7
8	20 04.8 60 80 100.0	20 22.8 60 80 99.6	20 40.8 60 80 99.2	20 58.7 60 80 98.7	21 16.5 59 80 98.3	21 34.3 59 80 97.9	21 52.0 59 80 97.4	22 09.6 59 80 97.0	8
9	19 16.9 60 80 99.4	19 34.9 60 80 98.9	19 52.8 60 80 98.5	20 10.7 59 80 98.1	20 28.4 59 80 97.7	20 46.1 59 80 97.2	21 03.8 59 80 96.8	21 21.4 59 80 96.4	9
70	18 29.0 60 80 98.7	18 46.9 60 80 98.3	19 04.8 59 80 97.9	19 22.5 59 80 97.5	19 40.3 59 80 97.0	19 58.0 59 80 96.6	20 15.6 59 80 96.2	20 33.1 58 81 95.7	70
1	17 41.0 60 80 98.1	17 58.8 59 80 97.7	18 16.6 59 80 97.3	18 34.4 59 80 96.8	18 52.1 59 80 96.4	19 09.7 59 80 96.0	19 27.3 58 81 95.6	19 44.8 58 81 95.1	1
2	16 52.9 59 80 97.5	17 10.7 59 80 97.1	17 28.5 59 80 96.6	17 46.2 59 80 96.2	18 03.8 59 81 95.8	18 21.4 58 81 95.4	18 38.9 58 81 94.9	18 56.4 58 81 94.5	2
3	16 04.7 59 80 96.9	16 22.5 59 80 96.5	16 40.2 59 80 96.0	16 57.9 59 81 95.6	17 15.5 59 81 95.2	17 33.1 58 81 94.8	17 50.6 58 81 94.3	18 08.0 58 81 93.9	3
4	15 16.5 59 80 96.3	15 34.2 59 81 95.8	15 51.9 59 81 95.4	16 09.6 59 81 95.0	16 27.1 58 81 94.6	16 44.7 58 81 94.2	17 02.1 58 81 93.7	17 19.6 58 81 93.3	4
75	14 28.2 59 81 95.6	14 45.9 59 81 95.2	15 03.6 59 81 94.8	15 21.2 58 81 94.4	15 38.7 58 81 94.0	15 56.2 58 81 93.6	16 13.7 58 81 93.1	16 31.1 58 81 92.7	75
6	13 39.9 59 81 95.0	13 57.6 59 81 94.6	14 15.2 59 81 94.2	14 32.8 58 81 93.8	14 50.3 58 81 93.4	15 07.8 58 81 93.0	15 25.2 58 81 92.5	15 42.6 58 81 92.1	6
7	12 51.5 59 81 94.4	13 09.2 59 81 94.0	13 26.7 58 81 93.6	13 44.3 58 81 93.2	14 01.8 58 81 92.8	14 19.3 58 81 92.4	14 36.7 58 81 91.9	14 54.1 58 81 91.5	7
8	12 03.1 59 81 93.8	12 20.7 59 81 93.4	12 38.3 58 81 93.0	12 55.8 58 81 92.6	13 13.3 58 81 92.2	13 30.8 58 81 91.8	13 48.2 58 81 91.3	14 05.5 58 81 90.9	8
9	11 14.7 59 81 93.2	11 32.2 59 81 92.8	11 49.8 58 81 92.4	12 07.3 58 81 92.0	12 24.8 58 81 91.6	12 42.2 58 81 91.2	12 59.6 58 81 90.7	13 17.0 58 81 90.3	9
80	10 26.2 59 81 92.6	10 43.8 59 81 92.2	11 01.3 58 81 91.8	11 18.8 58 81 91.4	11 36.3 58 81 91.0	11 53.7 58 81 90.6	12 11.1 58 81 90.2	12 28.5 58 81 89.7	80
1	9 37.7 59 81 92.1	9 55.2 58 81 91.6	10 12.8 58 81 91.2	10 30.3 58 81 90.8	10 47.7 58 81 90.4	11 05.2 58 81 90.0	11 22.6 58 81 89.6	11 39.9 58 81 89.2	1
2	8 49.2 59 81 91.5	9 06.7 58 81 91.0	9 24.2 58 81 90.6	9 41.7 58 81 90.2	9 59.2 58 81 89.8	10 16.6 58 81 89.4	10 34.0 58 81 89.0	10 51.4 58 81 88.6	2
3	8 00.6 59 81 90.9	8 18.2 58 81 90.5	8 35.7 58 81 90.0	8 53.2 58 81 89.6	9 10.7 58 81 89.2	9 28.1 58 81 88.8	9 45.5 58 81 88.4	10 02.9 58 81 88.0	3
4	7 12.1 59 81 90.3	7 29.6 58 81 89.9	7 47.2 58 81 89.5	8 04.7 58 81 89.1	8 22.1 58 81 88.6	8 39.6 58 81 88.2	8 57.0 58 81 87.8	9 14.4 58 81 87.4	4
85	6 23.6 59 81 89.7	6 41.1 58 81 89.3	6 58.6 58 81 88.9	7 16.1 58 81 88.5	7 33.6 58 81 88.1	7 51.1 58 81 87.7	8 08.5 58 81 87.2	8 25.9 58 80 86.8	85
6	5 35.0 59 81 89.1	5 52.6 58 81 88.7	6 10.1 58 81 88.3	6 27.6 58 81 87.9	6 45.1 58 81 87.5	7 02.6 58 81 87.1	7 20.0 58 81 86.7	7 37.4 58 81 86.2	6
7		5 04.0 58 81 88.1	5 21.6 58 81 87.7	5 39.1 58 81 87.3	5 56.6 58 81 86.9	6 14.1 58 81 86.5	6 31.6 58 81 86.1	6 49.0 58 81 85.7	7
8				5 08.2 58 81 86.3	5 25.7 58 81 85.9	5 43.2 58 81 85.5	6 00.6 58 80 85.1		8
9								5 12.3 58 80 84.5	9

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H.A.	4°00′ Alt	Δd	Δt	Az	4°30′ Alt	Δd	Δt	Az	5°00′ Alt	Δd	Δt	Az	5°30′ Alt	Δd	Δt	Az	6°00′ Alt	Δd	Δt	Az	6°30′ Alt	Δd	Δt	Az	7°00′ Alt	Δd	Δt	Az	7°30′ Alt	Δd	Δt	Az	H.A.
00	50 00.0	1.0	01	180.0	49 30.0	1.0	01	180.0	49 00.0	1.0	01	180.0	48 30.0	1.0	01	180.0	48 00.0	1.0	01	180.0	47 30.0	1.0	01	180.0	47 00.0	1.0	01	180.0	46 30.0	1.0	01	180.0	00
1	49 59.3	1.00	03	178.4	49 29.4	1.00	03	178.5	48 59.4	1.00	03	178.5	48 29.4	1.00	03	178.5	47 59.4	1.00	03	178.5	47 29.4	1.00	03	178.5	46 59.4	1.00	03	178.6	46 29.4	1.00	03	178.6	1
2	49 57.4	1.0	05	176.9	49 27.4	1.0	05	176.9	48 57.4	1.0	05	177.0	48 27.5	1.0	05	177.0	47 57.5	1.0	05	177.1	47 27.5	1.0	05	177.1	46 57.5	1.0	05	177.1	46 27.5	1.0	05	177.1	2
3	49 54.1	1.0	08	175.4	49 24.2	1.0	08	175.4	48 54.2	1.0	07	175.5	48 24.3	1.0	07	175.5	47 54.3	1.0	07	175.5	47 24.3	1.0	07	175.5	46 54.3	1.0	07	175.6	46 24.5	1.0	07	175.7	3
4	49 49.5	1.0	10	173.8	49 19.6	1.0	10	173.9	48 49.7	1.0	10	173.9	48 19.8	1.0	09	174.0	47 49.9	1.0	09	174.1	47 20.1	1.0	09	174.1	46 50.2	1.0	09	174.2	46 20.3	1.0	09	174.3	4
05	49 43.6	99	12	172.3	49 13.8	99	12	172.4	48 44.0	99	12	172.4	48 14.1	99	12	172.5	47 44.3	99	11	172.6	47 14.5	99	11	172.7	46 44.6	99	11	172.7	46 14.8	99	11	172.8	05
6	49 36.4	99	14	170.7	49 06.7	99	14	170.8	48 37.0	99	14	170.9	48 07.2	99	14	171.0	47 37.4	99	14	171.1	47 07.9	99	13	171.2	46 37.9	99	13	171.3	46 08.1	99	13	171.4	6
7	49 28.0	99	16	169.2	48 58.3	99	16	169.4	48 28.7	99	16	169.4	47 59.0	99	16	169.6	47 29.3	99	16	169.7	46 59.7	99	15	169.8	46 30.0	99	15	169.9	46 00.3	99	15	170.0	7
8	49 18.3	98	18	167.7	48 48.7	98	18	167.8	48 19.2	99	16	168.0	47 49.6	99	16	168.1	47 20.0	99	16	168.2	46 50.4	99	17	168.3	46 20.8	99	17	168.5	45 51.2	99	17	168.6	8
9	49 07.3	98	20	166.2	48 37.9	98	20	166.4	48 08.4	98	20	166.5	47 39.0	98	20	166.6	47 09.5	98	20	166.8	46 40.0	98	19	166.9	46 10.5	98	19	167.0	45 41.0	98	19	167.2	9
10	48 55.2	98	22	164.7	48 25.8	98	22	164.9	47 56.5	98	22	165.0	47 27.2	98	22	165.2	46 57.8	98	21	165.3	46 28.5	98	21	165.5	45 59.1	98	21	165.6	45 29.7	98	21	165.8	10
1	48 41.8	97	24	163.2	48 12.6	97	24	163.4	47 43.4	97	24	163.6	47 14.2	97	24	163.8	46 45.0	97	23	163.9	46 15.7	97	23	164.1	45 46.5	98	23	164.2	45 17.2	98	23	164.4	1
2	48 27.2	97	26	161.8	47 58.1	97	26	162.0	47 29.1	97	26	162.2	47 00.0	97	26	162.3	46 30.9	97	25	162.5	46 01.8	97	25	162.7	45 32.7	97	25	162.9	45 03.6	97	25	163.0	2
3	48 11.4	96	28	160.3	47 42.5	96	28	160.5	47 13.6	96	28	160.7	46 44.7	96	27	160.9	46 15.8	96	27	161.1	45 46.8	97	27	161.3	45 17.9	97	27	161.5	44 48.9	97	26	161.7	3
4	47 54.5	96	30	158.9	47 25.8	96	30	159.1	46 57.1	96	30	159.3	46 28.3	96	29	159.5	45 59.5	96	29	159.7	45 30.7	96	29	159.9	45 01.9	96	28	160.1	44 33.1	96	28	160.3	4
15	47 36.5	95	32	157.5	47 07.9	95	32	157.7	46 39.4	95	31	157.9	46 10.8	95	31	158.2	45 42.2	95	31	158.4	45 13.5	95	30	158.6	44 44.9	96	30	158.8	44 16.2	96	30	159.0	15
6	47 17.3	94	34	156.1	46 49.0	95	33	156.3	46 20.6	95	33	156.6	45 52.2	95	33	156.8	45 23.8	95	32	157.0	44 55.3	95	32	157.2	44 26.8	95	32	157.5	43 58.3	95	32	157.7	6
7	46 57.1	94	35	154.7	46 29.0	94	35	155.0	46 00.8	94	35	155.2	45 32.5	94	34	155.4	45 04.3	94	34	155.7	44 36.0	94	34	155.9	44 07.7	94	34	156.2	43 39.4	95	33	156.4	7
8	46 35.9	93	37	153.3	46 07.9	93	37	153.6	45 39.9	93	36	153.9	45 11.9	93	36	154.1	44 43.8	94	36	154.4	44 15.7	94	36	154.6	43 47.6	94	35	154.9	43 19.4	94	35	155.1	8
9	46 13.6	92	39	152.0	45 45.8	93	38	152.3	45 18.0	93	38	152.5	44 50.0	93	38	152.8	44 22.3	93	37	153.1	43 54.4	93	37	153.3	43 26.5	93	37	153.6	42 58.5	93	36	153.8	9
20	45 50.3	92	40	150.7	45 22.7	92	40	151.0	44 55.1	92	40	151.2	44 27.5	92	39	151.5	43 59.8	92	39	151.8	43 32.1	92	39	152.0	43 04.4	93	38	152.3	42 36.6	93	38	152.6	20
1	45 26.0	91	42	149.4	44 58.7	91	42	149.7	44 31.3	91	41	150.0	44 03.9	91	41	150.2	43 36.4	92	41	150.5	43 08.9	92	40	150.8	42 41.3	92	40	151.1	42 13.8	92	40	151.3	1
2	45 00.8	90	44	148.1	44 33.7	91	43	148.4	44 06.5	91	43	148.7	43 39.3	91	42	149.0	43 12.1	91	42	149.3	42 44.7	91	42	149.5	42 17.4	91	41	149.8	41 50.0	91	41	150.1	2
3	44 34.7	90	45	146.8	44 07.8	90	45	147.1	43 40.9	90	44	147.4	43 13.8	90	44	147.7	42 46.8	90	44	148.0	42 19.7	90	43	148.3	41 52.6	91	43	148.6	41 25.4	91	42	148.9	3
4	44 07.7	89	46	145.6	43 41.0	89	46	145.9	43 14.3	89	46	146.2	42 47.5	89	45	146.5	42 20.7	90	45	146.8	41 53.8	90	45	147.1	41 26.8	90	44	147.4	40 59.9	90	44	147.7	4
25	43 39.9	88	48	144.4	43 13.4	88	47	144.7	42 46.9	88	47	145.0	42 20.3	89	47	145.3	41 53.7	89	46	145.6	41 27.0	89	46	145.9	41 00.3	89	46	146.2	40 33.5	89	45	146.5	25
6	43 11.1	87	49	143.1	42 44.9	88	49	143.5	42 18.6	88	48	143.8	41 52.3	88	48	144.1	41 25.9	88	48	144.4	40 59.4	88	47	144.8	40 32.9	88	47	145.1	40 06.3	89	47	145.4	6
7	42 41.6	87	50	142.0	42 15.6	87	50	142.3	41 49.5	87	50	142.6	41 23.4	87	49	143.0	40 57.2	87	49	143.3	40 31.0	88	49	143.6	40 04.7	88	48	143.9	39 38.4	88	48	144.2	7
8	42 11.3	86	51	140.8	41 45.5	86	51	141.1	41 19.7	86	51	141.5	40 53.8	86	51	141.8	40 27.8	87	50	142.1	40 01.8	87	50	142.5	39 35.7	87	50	142.8	39 09.6	87	49	143.1	8
9	41 40.3	85	53	139.7	41 14.7	85	53	140.0	40 49.1	86	52	140.3	40 23.4	86	52	140.7	39 57.7	86	52	141.0	39 31.9	86	51	141.4	39 06.0	86	51	141.7	38 40.1	86	50	142.0	9
30	41 08.5	84	54	138.5	40 43.2	85	54	138.9	40 17.8	85	53	139.2	39 52.3	85	53	139.6	39 26.8	85	53	139.9	39 01.2	85	52	140.3	38 35.5	86	52	140.6	38 09.8	86	52	140.9	30
1	40 36.0	84	55	137.4	40 10.9	84	55	137.8	39 45.7	84	55	138.1	39 20.5	84	54	138.5	38 55.2	84	54	138.8	38 29.8	85	53	139.2	38 04.4	85	53	139.5	37 38.9	85	53	139.8	1
2	40 02.8	83	56	136.3	39 37.9	83	56	136.7	39 13.0	83	56	137.0	38 47.9	84	55	137.4	38 22.7	84	55	137.8	37 57.7	84	55	138.1	37 32.5	84	54	138.4	37 07.2	84	54	138.8	2
3	39 29.0	82	57	135.3	39 04.3	82	57	135.6	38 39.6	83	57	136.0	38 14.8	83	56	136.3	37 49.9	83	56	136.7	37 25.0	83	56	137.1	37 00.0	83	55	137.4	36 34.9	84	55	137.7	3
4	38 54.5	81	58	134.2	38 30.0	82	58	134.6	38 05.5	82	58	134.9	37 40.9	82	57	135.3	37 16.3	82	57	135.7	36 51.6	83	57	136.0	36 26.8	83	56	136.4	36 02.0	83	56	136.7	4
35	38 19.4	81	60	133.2	37 55.1	81	59	133.5	37 30.8	81	59	133.9	37 06.5	81	58	134.3	36 42.1	82	58	134.6	36 17.6	82	58	135.0	35 53.0	82	57	135.4	35 28.4	82	57	135.7	35
6	37 43.7	80	60	132.2	37 19.7	80	60	132.5	36 55.6	80	60	132.9	36 31.4	81	59	133.3	36 07.2	81	59	133.6	35 42.9	81	59	134.0	35 18.6	81	58	134.4	34 54.2	81	58	134.7	6
7	37 07.4	79	61	131.2	36 43.6	79	61	131.5	36 19.7	80	61	131.9	35 55.8	80	60	132.3	35 31.8	80	60	132.7	35 07.7	80	60	133.0	34 43.6	81	59	133.4	34 19.4	81	59	133.7	7
8	36 30.6	78	62	130.2	36 07.0	79	62	130.6	35 43.2	79	62	130.9	35 19.3	79	61	131.3	34 55.3	79	61	131.7	34 32.0	80	61	132.1	34 06.9	80	60	132.4	33 44.0	80	60	132.8	8
9	35 53.2	78	63	129.2	35 29.9	78	63	129.6	35 06.4	78	62	130.0	34 42.9	79	62	130.4	34 19.3	79	62	130.7	33 55.7	79	61	131.1	33 31.9	79	61	131.5	33 08.1	79	61	131.8	9
40	35 15.4	77	64	128.3	34 52.2	77	64	128.6	34 29.0	78	63	129.0	34 05.6	78	63	129.4	33 42.3	78	63	129.8	33 18.8	78	62	130.2	32 55.3	78	62	130.5	32 31.7	79	62	130.9	40
1	34 37.0	76	65	127.3	34 14.0	77	64	127.7	33 51.0	77	64	128.1	33 27.9	77	64	128.5	33 04.7	77	63	128.9	32 41.5	78	63	129.2	32 18.1	78	63	129.6	31 54.8	78	62	130.0	1
2	33 58.2	76	66	126.4	33 35.4	76	65	126.8	33 12.6	76	65	127.2	32 49.7	76	64	127.6	32 26.7	77	64	128.0	32 03.6	77	64	128.3	31 40.5	77	63	128.7	31 17.3	77	63	129.1	2
3	33 18.9	75	66	125.5	32 56.3	75	66	125.9	32 33.7	76	66	126.3	32 10.9	76	65	126.7	31 48.2	76	65	127.1	31 25.3	76	65	127.4	31 02.4	77	64	127.8	30 39.4	77	64	128.2	3
4	32 39.1	74	67	124.6	32 16.8	75	67	125.0	31 54.3	75	66	125.4	31 31.8	75	66	125.8	31 09.2	75	66	126.2	30 46.5	76	65	126.6	30 23.8	76	65	126.9	30 01.0	76	65	127.3	4
45	31 59.0	74	68	123.7	31 36.8	74	67	124.1	31 14.5	74	67	124.5	30 52.2	75	67	124.9	30 29.8	75	66	125.3	30 07.3	75	66	125.7	29 44.8	75	66	126.1	29 22.2	75	65	126.4	45
6	31 18.4	73	68	122.9	30 56.4	73	68	123.3	30 34.3	74	68	123.7	30 12.2	74	67	124.1	29 50.0	74	67	124.4	29 27.7	74	67	124.8	29 05.3	75	66	125.2	28 42.9	75	66	125.6	6
7	30 37.4	72	69	122.0	30 15.6	72	69	122.4	29 53.7	73	68	122.8	29 31.8	73	68	123.2	29 09.7	73	68	123.6	28 47.6	74	67	124.0	28 25.5	74	67	124.4	28 03.3	74	67	124.8	7
8	29 56.1	72	70	121.2	29 34.5	72	69	121.6	29 12.7	72	69	122.0	28 51.0	73	69	122.4	28 29.1	73	68	122.8	28 07.2	73	68	123.2	27 45.2	73	68	123.5	27 23.2	74	67	123.9	8
9	29 14.4	71	70	120.4	28 52.9	72	70	120.8	28 31.4	72	70	121.2	28 09.8	72	69	121.6	27 48.1	72	69	121.9	27 26.4	73	69	122.3	27 04.6	73	68	122.7	26 42.7	73	68	123.1	9
50	28 32.3	71	71	119.6	28 11.0	71	70	120.0	27 49.7	71	70	120.4	27 28.2	72	70	120.7	27 06.7	72	69	121.1	26 45.2	72	69	121.5	26 23.5	72	69	121.9	26 01.9	72	69	122.3	50
1	27 50.0	70	71	118.8	27 28.8	71	71	119.2	27 07.6	71	71	119.6	26 46.4	71	70	120.0	26 25.0	71	70	120.3	26 03.6	71	70	120.7	25 42.2	72	70	121.1	25 20.6	72	69	121.5	1
2	27 07.2	70	72	118.0	26 46.3	70	71	118.4	26 25.2	70	71	118.8	26 04.1	70	71	119.2	25 43.0	71	71	119.6	25 21.7	71	70	120.0	25 00.4	71	70	120.3	24 39.1	71	70	120.7	2
3	26 24.2	69	72	117.2	26 03.4	69	72	117.6	25 42.5	70	72	118.0	25 21.6	70	71	118.4	25 00.6	70	71	118.8	24 39.5	70	71	119.2	24 18.4	71	71	119.6	23 57.2	71	70	120.0	3
4	25 40.9	69	73	116.4	25 20.2	69	72	116.8	24 59.5	69	72	117.2	24 38.7	69	72	117.6	24 17.9	70	72	118.0	23 57.0	70	71	118.4	23 36.0	70	71	118.8	23 15.0	70	71	119.2	4
55	24 57.3	68	73	115.7	24 36.8	68	73	116.1	24 16.2	69	72	116.5	23 55.6	69	72	116.9	23 34.9	69	72	117.3	23 14.1	69	72	117.7	22 53.3	69	72	118.1	22 32.5	70	71	118.4	55
6	24 13.4	68	74	114.9	23 53.0	68	73	115.3	23 32.6	68	73	115.7	23 12.1	68	73	116.1	22 51.6	69	73	116.5	22 31.0	69	72	116.9	22 10.3	69	72	117.3	21 49.6	69	72	117.7	6
7	23 29.2	67	74	114.2	23 09.0	67	74	114.6	22 48.8	68	74	115.0	22 28.5	68	73	115.4	22 08.0	68	73	115.8	21 47.6	68	73	116.2	21 27.1	68	73	116.6	21 06.5	69	72	117.0	7
8	22 44.8	67	74	113.5	22 24.8	67	74	113.9	22 04.6	67	74	114.3	21 44.4	67	74	114.7	21 24.2	68	73	115.1	21 03.9	68	73	115.5	20 43.5	68	73	115.9	20 23.1	68	73	116.3	8
9	22 00.2	66	75	112.7	21 40.2	67	75	113.1	21 20.2	67	74	113.5	21 00.2	67	74	113.9	20 40.1	67	74	114.3	20 19.9	67	74	114.7	19 59.7	67	73	115.1	19 39.4	68	73	115.5	9
60	21 15.3	66	75	112.0	20 55.5	66	75	112.4	20 35.6	66	75	112.8	20 15.7	67	75	113.2	19 55.7	67	74	113.6	19 35.7	67	74	114.0	19 15.6	67	74	114.4	18 55.5	67	74	114.8	60
1	20 30.2	66	76	111.3	20 10.5	66	75	111.7	19 50.8	66	75	112.1	19 31.0	66	75	112.5	19 11.1	66	75	112.9	18 51.2	66	74	113.3	18 31.3	67	74	113.7	18 11.3	67	74	114.1	1
2	19 44.9	65	76	110.6	19 25.3	65	76	111.0	19 05.7	65	75	111.4	18 46.0	66	75	111.8	18 26.3	66	75	112.2	18 06.6	66	75	112.6	17 46.7	66	75	113.0	17 26.9	66	74	113.4	2
3	18 59.4	65	76	109.9	18 39.9	65	76	110.4	18 20.3	65	76	110.7	18 00.9	65	76	111.2	17 41.3	65	75	111.6	17 21.6	66	75	112.0	17 02.0	66	75	112.3	16 42.2	66	75	112.7	3
4	18 13.6	64	77	109.3	17 54.3	65	76	109.7	17 34.9	65	76	110.1	17 15.5	65	76	110.5	16 56.0	65	76	110.9	16 36.5	65	76	111.3	16 16.9	65	75	111.7	15 57.3	65	75	112.1	4
65	17 27.7	64	77	108.6	17 08.5	64	77	109.0	16 49.2	64	76	109.4	16 29.9	64	76	109.8	16 10.6	65	76	110.2	15 51.2	65	76	110.6	15 31.7	65	76	111.0	15 12.2	65	76	111.4	65
6	16 41.6	64	77	107.9	16 22.5	64	77	108.3	16 03.4	64	77	108.7	15 44.2	64	77	109.1	15 24.9	64	76	109.5	15 05.6	64	76	109.9	14 46.3	64	76	110.3	14 26.9	65	76	110.7	6
7	15 55.3	63	77	107.3	15 36.3	63	77	107.7	15 17.3	64	77	108.1	14 58.2	64	77	108.5	14 39.1	64	77	108.9	14 19.9	64	77	109.3	14 00.7	64	76	109.7	13 41.4	64	76	110.1	7
8	15 08.9	63	78	106.6	14 50.0	63	78	107.0	14 31.0	63	77	107.4	14 12.1	63	77	107.8	13 53.1	63	77	108.2	13 34.0	64	77	108.6	13 14.9	64	77	109.0	12 55.8	64	76	109.4	8
9	14 22.3	63	78	106.0	14 03.5	63	78	106.4	13 44.7	63	78	106.8	13 25.8	63	77	107.2	13 06.9	63	77	107.6	12 47.9	63	77	108.0	12 28.9	63	77	108.4	12 09.9	63	77	108.8	9
70	13 35.6	62	78	105.3	13 16.9	62	78	105.7	12 58.1	63	78	106.1	12 39.3	63	78	106.5	12 20.5	63	78	106.9	12 01.7	63	77	107.3	11 42.8	63	77	107.7	11 23.8	63	77	108.1	70
1	12 48.7	62	78	104.7	12 30.1	62	78	105.1	12 11.4	62	78	105.5	11 52.7	62	78	105.9	11 34.0	62	78	106.3	11 15.2	63	78	106.7	10 56.4	63	77	107.1	10 37.6	63	77	107.5	1
2	12 01.7	62	79	104.1	11 43.1	62	78	104.5	11 24.6	62	78	104.9	11 06.0	62	78	105.3	10 47.3	62	78	105.7	10 28.7	62	78	106.1	10 10.0	62	78	106.5	9 51.2	62	78	106.9	2
3	11 14.5	61	79	103.4	10 56.1	62	79	103.8	10 37.6	62	79	104.2	10 19.1	62	79	104.6	10 00.5	62	78	105.0	9 41.9	62	78	105.4	9 23.3	62	78	105.8	9 04.7	62	78	106.2	3
4	10 27.3	61	79	102.8	10 08.9	61	79	103.2	9 50.5	61	79	103.6	9 32.0	61	79	104.0	9 13.6	62	78	104.4	8 55.1	62	78	104.8	8 36.6	62	78	105.2	8 18.0	62	78	105.6	4
75	9 39.9	61	79	102.2	9 21.6	61	79	102.6	9 03.2	61	79	103.0	8 44.9	61	79	103.4	8 26.5	61	79	103.8	8 06.1	61	79	104.2	7 49.7	61	78	104.6	7 31.2	62	78	105.0	75
6	8 52.4	61	79	101.6	8 34.1	61	79	102.0	8 15.9	61	79	102.4	7 57.6	61	79	102.8	7 39.3	61	79	103.2	7 21.0	61	79	103.6	7 02.6	61	79	104.0	6 44.3	61	78	104.4	6
7	8 04.8	60	80	101.0	7 46.6	61	79	101.4	7 28.4	61	79	101.8	7 10.2	61	79	102.2	6 52.0	61	79	102.6	6 33.7	61	79	103.0	6 15.5	61	79	103.4	5 57.2	61	79	103.8	7
8	7 17.1	60	80	100.4	6 59.0	60	80	100.8	6 40.8	60	79	101.2	6 22.7	60	79	101.6	6 04.5	61	79	102.0	5 46.4	61	79	102.4	5 28.2	61	79	102.8	5 10.0	61	79	103.2	8
9	6 29.3	60	80	99.8	6 11.2	60	80	100.2	5 53.2	60	80	100.6	5 35.1	60	80	101.0	5 17.0	60	79	101.4													9
80	5 41.4	60	80	99.2	5 23.4	60	80	99.6	5 05.4	60	80	100.0																						80

Lat. 36°

Each cell: Alt (° ′) · Δd Δt · Az (°)

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
00	62 00.0 1.0 02 180.0	62 30.0 1.0 02 180.0	63 00.0 1.0 02 180.0	63 30.0 1.0 02 180.0	64 00.0 1.0 02 180.0	64 30.0 1.0 02 180.0	65 00.0 1.0 02 180.0	65 30.0 1.0 02 180.0	00
1	61 59.1 1.0 04 177.9	62 29.1 1.0 04 177.9	62 59.1 1.0 05 177.8	63 29.1 1.0 05 177.8	63 59.0 1.0 05 177.8	64 29.0 1.0 05 177.7	64 59.0 1.0 05 177.7	65 29.0 1.0 05 177.6	1
2	61 56.4 1.0 07 175.8	62 26.4 1.0 08 175.7	62 56.3 1.0 08 175.7	63 26.3 1.0 08 175.7	63 56.2 1.0 08 175.5	64 26.1 1.0 08 175.4	64 56.1 1.0 08 175.4	65 26.0 1.0 08 175.3	2
3	61 52.0 1.0 10 173.7	62 21.9 1.0 10 173.6	62 51.7 1.0 11 173.5	63 21.6 1.0 11 173.4	63 51.5 1.0 11 173.3	64 21.3 1.0 11 173.2	64 51.2 1.0 11 173.1	65 21.0 99 12 172.9	3
4	61 45.8 99 13 171.6	62 15.5 99 13 171.5	62 45.3 99 14 171.3	63 15.1 99 14 171.2	63 44.8 99 14 171.1	64 14.6 99 14 170.9	64 44.3 99 15 170.8	65 14.1 99 15 170.6	4
05	61 37.8 99 16 169.5	62 07.5 99 16 169.4	62 37.1 99 17 169.2	63 06.8 99 17 169.0	63 36.4 99 17 168.9	64 06.0 99 17 168.7	64 35.6 99 18 168.5	65 05.2 99 18 168.3	05
6	61 28.1 98 19 167.5	61 57.7 98 20 167.3	62 27.2 98 20 167.1	62 56.6 98 20 166.9	63 26.1 98 20 166.7	63 55.6 98 21 166.5	64 25.0 98 21 166.3	64 54.4 98 21 166.1	6
7	61 16.8 98 22 165.5	61 46.1 98 22 165.2	62 15.5 98 22 165.0	62 44.8 98 22 164.8	63 14.1 98 24 164.5	63 43.3 97 24 164.3	64 12.6 97 24 164.0	64 41.8 97 24 163.8	7
8	61 03.8 97 24 163.5	61 32.9 97 25 163.2	62 02.1 97 25 163.0	62 31.2 97 25 162.7	63 00.3 97 26 162.4	63 29.3 97 26 162.1	63 58.3 97 27 161.9	64 27.3 97 27 161.6	8
9	60 49.1 97 27 161.5	61 18.1 96 27 161.2	61 47.0 96 28 160.9	62 15.9 96 28 160.6	62 44.8 96 29 160.3	63 13.6 96 29 160.0	63 42.3 96 29 159.7	64 11.1 96 30 159.4	9
10	60 32.9 96 30 159.5	61 01.7 96 30 159.2	61 30.4 96 30 158.9	61 59.0 95 31 158.6	62 27.6 95 31 158.3	62 56.2 95 32 158.0	63 24.7 95 32 157.6	63 53.1 95 33 157.3	10
1	60 15.2 95 32 157.6	60 43.7 95 32 157.3	61 12.1 95 33 157.0	61 40.5 95 33 156.6	62 08.9 94 34 156.3	62 37.2 94 34 155.9	63 05.4 94 34 155.6	63 33.6 94 35 155.2	1
2	59 56.0 94 34 155.7	60 24.2 94 35 155.4	60 52.4 94 35 155.0	61 20.5 94 35 154.7	61 48.6 94 36 154.4	62 16.6 93 37 153.9	62 44.5 93 37 153.5	63 12.4 93 38 153.1	2
3	59 35.3 93 37 153.9	60 03.3 93 37 153.5	60 31.2 93 38 153.2	60 59.0 93 38 152.8	61 26.8 93 38 152.4	61 54.5 92 39 152.0	62 22.1 92 40 151.6	62 49.7 92 40 151.1	3
4	59 13.3 92 39 152.1	59 41.0 92 39 151.7	60 08.6 92 40 151.3	60 36.1 92 40 150.9	61 03.6 91 41 150.5	61 31.0 91 41 150.1	61 58.3 91 42 149.6	62 25.6 91 43 149.2	4
15	58 49.9 91 41 150.3	59 17.3 91 42 149.9	59 44.6 91 42 149.5	60 11.9 91 43 149.1	60 39.0 90 43 148.7	61 06.1 90 44 148.2	61 33.1 90 44 147.8	62 00.0 90 45 147.3	15
6	58 25.2 90 43 148.5	58 52.3 90 44 148.2	59 19.3 90 44 147.8	59 46.3 90 45 147.3	60 13.1 90 46 146.9	60 40.0 89 46 146.4	61 06.6 89 46 146.0	61 33.2 88 47 145.5	6
7	57 59.3 89 45 146.9	58 26.1 89 46 146.5	58 52.8 89 46 146.0	59 19.5 89 47 145.6	59 46.0 89 47 145.1	60 12.4 88 48 144.6	60 38.8 88 48 144.2	61 05.0 87 49 143.7	7
8	57 32.2 88 47 145.2	57 58.7 88 48 144.8	58 25.1 88 48 144.4	58 51.4 88 49 143.9	59 17.6 88 49 143.4	59 43.8 87 50 142.9	60 09.7 86 50 142.4	60 35.6 86 51 141.9	8
9	57 04.0 87 49 143.6	57 30.2 87 49 143.2	57 56.3 87 50 142.7	58 22.3 86 50 142.2	58 48.2 86 51 141.8	59 13.9 85 52 141.3	59 39.6 85 52 140.8	60 05.1 85 53 140.2	9
20	56 34.7 86 51 142.1	57 00.5 86 51 141.6	57 26.3 86 52 141.1	57 52.0 85 52 140.6	58 17.6 85 53 140.1	58 43.0 85 53 139.6	59 08.3 84 54 139.1	59 33.5 84 54 138.6	20
1	56 04.3 85 53 140.5	56 29.9 85 53 140.0	56 55.4 85 53 139.6	57 20.7 84 54 139.1	57 46.0 84 54 138.6	58 11.1 84 54 138.1	58 36.1 83 55 137.5	59 00.9 83 56 137.0	1
2	55 32.9 84 54 139.0	55 58.2 84 54 138.5	56 23.4 84 55 138.1	56 48.4 84 55 137.6	57 13.4 83 55 137.0	57 38.1 82 56 136.5	58 02.8 82 56 136.0	58 27.3 82 58 135.4	2
3	55 00.7 83 56 137.6	55 25.6 83 56 137.1	55 50.5 83 56 136.6	56 15.2 82 57 136.1	56 39.8 82 57 135.6	57 04.3 81 58 135.0	57 28.6 81 58 134.5	57 52.8 80 59 133.9	3
4	54 27.5 82 57 136.1	54 52.1 82 57 135.6	55 16.7 82 58 135.1	55 41.1 81 58 134.6	56 05.4 81 59 134.1	56 29.5 80 59 133.6	56 53.6 80 60 133.0	57 17.4 79 60 132.5	4
25	53 53.4 81 58 134.8	54 17.8 81 59 134.3	54 42.0 81 59 133.8	55 06.1 80 60 133.2	55 30.1 80 60 132.7	55 54.0 79 61 132.2	56 17.7 79 61 131.6	56 41.2 78 62 131.1	25
6	53 18.5 80 60 133.4	53 42.6 80 60 132.4	54 06.6 80 60 132.4	54 30.4 79 61 131.9	54 54.1 79 61 131.3	55 17.6 78 62 130.8	55 41.0 78 62 130.2	56 04.3 77 63 129.7	6
7	52 42.9 80 61 132.1	53 06.7 79 61 131.6	53 30.3 79 62 131.1	53 53.9 79 62 130.5	54 17.2 78 63 130.0	54 40.5 77 63 129.5	55 03.6 77 64 128.9	55 26.5 77 64 128.3	7
8	52 06.5 79 62 130.8	52 30.0 78 62 130.3	52 53.4 78 63 129.8	53 16.6 77 63 129.3	53 39.7 77 64 128.7	54 02.7 76 64 128.2	54 25.5 76 65 127.6	54 48.1 75 65 127.0	8
9	51 29.4 78 63 129.6	51 52.6 77 63 129.0	52 15.7 77 64 128.5	52 38.7 76 64 128.0	53 01.5 76 65 127.5	53 24.2 75 65 126.9	53 46.7 75 66 126.4	54 09.1 74 66 125.8	9
30	50 51.6 77 64 128.3	51 14.6 76 64 127.8	51 37.4 76 65 127.3	52 00.1 75 65 126.8	52 22.7 75 66 126.2	52 45.1 74 66 125.7	53 07.3 74 67 125.1	53 29.4 73 67 124.6	30
1	50 13.3 76 65 127.1	50 36.0 75 65 126.6	50 58.6 75 65 126.1	51 20.9 74 66 125.6	51 43.2 74 67 125.0	52 05.3 73 68 124.5	52 27.3 73 68 123.8	52 49.1 73 67 123.4	1
2	49 34.3 75 66 126.0	49 56.7 75 66 125.5	50 19.0 74 67 124.9	50 41.2 74 67 124.4	51 03.2 73 68 123.9	51 25.1 73 68 123.3	51 46.8 73 68 122.8	52 08.3 72 68 122.2	2
3	48 54.7 74 67 124.9	49 16.9 74 67 124.3	49 39.0 73 68 123.8	50 00.9 73 68 123.3	50 22.6 72 68 122.7	50 44.2 72 69 122.2	51 05.7 71 69 121.6	51 27.0 71 68 121.1	3
4	48 14.6 73 68 123.7	48 36.6 73 68 123.2	48 58.4 73 68 122.7	49 20.0 72 68 122.2	49 41.6 72 69 121.6	50 02.9 71 70 121.1	50 24.1 70 70 120.5	50 45.2 70 70 120.0	4
35	47 34.0 73 68 122.7	47 55.7 72 69 122.2	48 17.3 72 69 121.6	48 38.7 71 70 121.1	49 00.0 71 70 120.6	49 21.1 70 70 120.0	49 42.1 70 71 119.5	50 02.9 69 71 118.9	35
6	46 52.9 72 69 121.6	47 14.4 71 70 121.1	46 53.7 71 70 120.6	47 56.9 71 70 120.1	48 18.0 71 70 119.5	48 38.9 69 71 119.0	48 59.6 69 72 118.5	49 20.2 68 72 117.9	6
7	46 11.3 71 70 120.6	46 32.6 71 70 120.1	46 53.7 70 71 119.6	47 14.7 70 71 119.0	47 35.5 70 71 118.5	47 56.2 69 72 118.0	48 16.7 68 72 117.4	48 37.1 68 72 116.9	7
8	45 29.3 70 71 119.6	45 50.4 70 71 119.1	46 11.3 69 71 118.6	46 32.0 69 72 118.0	46 52.7 69 72 117.5	47 13.1 68 72 117.0	47 33.5 67 73 116.4	47 53.6 67 73 115.9	8
9	44 46.9 70 71 118.6	45 07.7 69 72 118.1	45 28.4 69 72 117.6	45 49.0 69 72 117.1	46 09.4 68 73 116.5	46 29.7 67 73 116.0	46 49.8 67 73 115.4	47 09.8 66 74 114.9	9
40	44 04.1 69 72 117.6	44 24.7 69 72 117.1	44 45.2 68 73 116.6	45 05.6 68 73 116.1	45 25.8 68 73 115.6	45 45.9 66 74 115.0	46 05.8 66 74 114.5	46 25.6 65 75 114.0	40
1	43 20.9 68 73 116.7	43 41.4 68 73 116.2	44 01.7 67 73 115.7	44 21.8 67 74 115.2	44 41.9 67 74 114.6	45 01.7 66 75 114.1	45 21.5 65 75 113.6	45 41.1 64 75 113.0	1
2	42 37.4 68 73 115.7	42 57.6 67 73 115.3	43 17.7 67 74 114.8	43 37.7 66 74 114.3	43 57.6 66 74 113.7	44 17.3 65 75 113.2	44 36.8 65 75 112.7	44 56.2 64 75 112.1	2
3	41 53.5 67 74 114.9	42 13.6 67 74 114.4	42 33.5 66 74 113.9	42 53.3 66 74 113.4	43 13.0 66 75 112.8	43 32.5 65 75 112.3	43 51.9 64 76 111.8	44 11.1 63 76 111.3	3
4	41 09.3 67 74 114.0	41 29.2 66 74 113.5	41 49.0 66 75 113.0	42 08.6 65 75 112.5	42 28.1 65 75 112.0	42 47.5 64 76 111.4	43 06.7 64 76 110.9	43 25.8 63 76 110.4	4
45	40 24.8 66 75 113.1	40 44.5 66 75 112.6	41 04.1 65 75 112.1	41 23.6 65 75 111.6	41 42.9 64 76 111.1	42 02.0 64 76 110.6	42 21.2 63 76 110.1	42 40.4 63 76 109.5	45
6	39 40.0 66 75 112.3	39 59.6 65 75 111.8	40 18.4 65 76 111.3	40 38.4 64 76 110.8	40 57.5 64 76 110.3	41 16.6 63 77 109.8	41 35.5 63 77 109.3	41 54.3 62 77 108.7	6
7	38 55.0 65 76 111.4	39 14.4 65 76 110.9	39 33.7 64 76 110.5	39 52.9 64 76 110.0	40 11.9 63 77 109.4	40 30.8 63 77 108.9	40 49.6 62 77 108.4	41 08.2 62 77 107.9	7
8	38 09.7 64 76 110.6	38 28.9 64 76 110.1	38 48.1 64 76 109.6	39 07.1 63 77 109.1	39 26.5 63 77 108.6	39 44.8 62 77 108.1	40 03.4 62 77 107.6	40 21.9 61 77 107.1	8
9	37 24.1 64 76 109.8	37 43.2 64 77 109.3	38 02.3 63 77 108.8	38 21.1 63 77 108.3	38 39.9 62 77 107.8	38 58.5 62 77 107.3	39 17.0 61 78 106.8	39 35.4 61 78 106.3	9
50	36 38.3 64 77 109.0	36 57.3 63 77 108.5	37 16.2 62 77 108.1	37 35.0 62 77 107.6	37 53.6 62 77 107.1	38 12.1 61 78 106.6	38 30.5 61 78 106.1	38 48.7 61 78 105.6	50
1	35 52.3 63 77 108.2	36 11.2 63 77 107.8	36 30.0 62 78 107.3	36 48.6 62 78 106.8	37 07.1 62 78 106.3	37 25.5 61 78 105.8	37 43.8 61 78 105.3	38 01.9 60 78 104.8	1
2	35 06.1 63 77 107.5	35 24.9 62 78 107.0	35 43.5 62 78 106.5	36 02.0 62 78 106.0	36 20.4 61 78 105.5	36 38.7 61 78 105.1	36 56.9 60 79 104.6	37 14.9 59 79 104.1	2
3	34 19.7 62 78 106.7	34 38.4 62 78 106.3	34 56.9 62 78 105.8	35 15.3 61 78 105.3	35 33.6 61 78 104.8	35 51.7 60 79 104.3	36 09.8 60 79 103.8	36 27.7 59 79 103.3	3
4	33 33.2 62 78 106.0	33 51.7 62 78 105.5	34 10.1 61 78 105.0	34 28.4 61 78 104.6	34 46.6 61 79 104.1	35 04.6 60 79 103.6	35 22.6 59 79 103.1	35 40.4 59 79 102.6	4
55	32 46.4 62 78 105.3	33 04.8 61 78 104.8	33 23.1 61 79 104.3	33 41.3 60 79 103.8	33 59.4 60 79 103.4	34 17.4 59 79 102.9	34 35.2 59 80 102.4	34 53.0 58 80 101.9	55
6	31 59.5 61 78 104.5	32 17.8 61 79 104.1	32 36.0 60 79 103.6	32 54.1 60 79 103.1	33 12.1 59 79 102.6	33 30.0 59 80 102.2	33 47.8 59 80 101.7	34 05.4 58 80 101.2	6
7	31 12.4 61 79 103.8	31 30.7 61 79 103.4	31 48.8 60 79 102.9	32 06.8 60 79 102.4	32 24.7 59 79 101.9	32 42.5 59 80 101.5	33 00.2 59 80 101.0	33 17.8 58 80 100.5	7
8	30 25.2 61 79 103.1	30 43.4 60 79 102.7	31 01.4 60 79 102.2	31 19.3 59 79 101.7	31 37.1 59 80 101.2	31 54.9 59 80 100.8	32 12.5 58 80 100.3	32 30.0 58 80 99.8	8
9	29 37.9 60 79 102.4	29 55.9 60 79 102.0	30 13.9 59 79 101.5	30 31.7 59 80 101.0	30 49.5 59 80 100.6	31 07.1 58 80 100.1	31 24.7 58 80 99.6	31 42.1 58 80 99.2	9
60	28 50.4 60 79 101.8	29 08.4 60 79 101.3	29 26.3 59 80 100.8	29 44.0 59 80 100.4	30 01.7 59 80 99.9	30 19.3 58 80 99.4	30 36.8 58 80 99.0	30 54.1 58 80 98.5	60
1	28 02.9 60 79 101.1	28 20.7 59 80 100.6	28 38.5 59 80 100.2	28 56.2 59 80 99.7	29 13.8 59 80 99.3	29 31.4 58 80 98.8	29 48.8 58 80 98.3	30 06.1 57 80 97.8	1
2	27 15.2 60 80 100.4	27 33.0 59 80 100.0	27 50.7 59 80 99.5	28 08.3 58 80 99.0	28 25.9 58 80 98.6	28 43.3 58 80 98.1	29 00.7 57 80 97.7	29 18.0 57 80 97.2	2
3	26 27.4 59 80 99.8	26 45.1 59 80 99.3	27 02.8 59 80 98.8	27 20.4 58 80 98.4	27 37.9 58 80 97.9	27 55.3 58 80 97.5	28 12.6 57 81 97.0	28 29.8 57 81 96.5	3
4	25 39.5 59 80 99.1	25 57.2 59 80 98.7	26 14.8 58 80 98.2	26 32.3 58 80 97.7	26 49.7 58 80 97.3	27 07.1 57 81 96.8	27 24.3 57 81 96.4	27 41.5 57 81 95.9	4
65	24 51.5 59 80 98.5	25 09.0 58 80 97.4	25 26.7 58 80 97.6	25 44.2 58 80 97.1	26 01.6 58 80 96.7	26 18.9 57 81 96.2	26 36.1 57 81 95.8	26 53.2 57 81 95.3	65
6	24 03.5 59 80 97.8	24 21.0 58 80 97.4	24 38.6 58 80 96.9	24 56.0 58 81 96.5	25 13.3 58 80 96.1	25 30.6 57 81 95.6	25 47.8 57 81 95.1	26 04.8 57 81 94.7	6
7	23 15.3 59 80 97.2	23 32.9 58 80 96.7	23 50.3 58 80 96.3	24 07.7 57 81 95.8	24 25.0 58 81 95.4	24 42.2 57 81 95.0	24 59.4 57 81 94.5	25 16.4 57 81 94.0	7
8	22 27.2 58 80 96.6	22 44.6 58 81 96.1	23 02.1 58 81 95.7	23 19.4 57 81 95.2	23 36.7 57 81 94.8	23 53.9 57 81 94.3	24 11.0 57 81 93.9	24 28.0 57 81 93.4	8
9	21 38.9 58 81 95.9	21 56.3 58 81 95.5	22 13.7 58 81 95.1	22 31.0 57 81 94.6	22 48.3 57 81 94.2	23 05.4 57 81 93.7	23 22.5 57 81 93.3	23 39.5 57 81 92.8	9
70	20 50.6 58 81 95.3	21 08.0 58 81 94.9	21 25.4 58 81 94.4	21 42.6 57 81 94.0	21 59.8 57 81 93.6	22 17.0 57 81 93.1	22 34.0 57 81 92.7	22 51.0 57 81 92.2	70
1	20 02.2 58 81 94.7	20 19.6 58 81 94.3	20 36.9 58 81 93.8	20 54.2 57 81 93.4	21 11.4 57 81 92.9	21 28.5 57 81 92.5	21 45.5 57 81 92.1	22 02.5 57 81 91.6	1
2	19 13.8 58 81 94.1	19 31.2 58 81 93.7	19 48.5 58 81 93.2	20 05.7 57 81 92.8	20 22.9 57 81 92.3	20 40.0 57 81 91.9	20 57.0 57 81 91.5	21 14.0 57 81 91.0	2
3	18 25.4 58 81 93.5	18 42.7 58 81 93.0	19 00.0 58 81 92.6	19 17.2 57 81 92.2	19 34.4 57 81 91.7	19 51.5 57 81 91.3	20 08.5 57 81 90.9	20 25.5 57 81 90.4	3
4	17 36.9 58 81 92.9	17 54.2 58 81 92.4	18 11.5 57 81 92.0	18 28.7 57 81 91.6	18 45.9 57 81 91.2	19 02.9 57 81 90.7	19 20.0 57 81 90.3	19 36.9 57 81 89.8	4
75	16 48.4 58 81 92.3	17 05.7 58 81 91.9	17 23.0 57 81 91.4	17 40.2 57 81 91.0	17 57.3 57 81 90.6	18 14.4 57 81 90.1	18 31.4 57 81 89.7	18 48.4 58 81 89.3	75
6	15 59.9 58 81 91.7	16 17.2 58 81 91.3	16 34.5 57 81 90.8	16 51.6 57 81 90.4	17 08.8 57 81 90.0	17 25.9 57 81 89.5	17 42.9 57 81 89.1	17 59.8 58 81 88.7	6
7	15 11.4 58 81 91.1	15 28.7 58 81 90.7	15 45.9 57 81 90.2	16 03.1 57 81 89.8	16 20.2 57 81 89.4	16 37.3 57 81 89.0	16 54.4 57 81 88.5	17 11.3 58 81 88.1	7
⋅	14 22.9 58 81 90.5	14 40.1 58 81 90.1	14 57.4 57 81 89.7	15 14.6 57 81 89.3	15 31.7 57 81 88.8	15 48.8 57 81 88.4	16 05.8 57 80 87.9	16 22.8 57 81 87.5	⋅
	13 34.3 58 81 89.9	13 51.5 58 81 89.5	14 08.8 57 81 89.1	14 26.0 57 81 88.7	14 43.2 57 81 88.2	15 00.3 57 81 87.8	15 17.3 57 80 87.4	15 34.3 57 81 86.9	
0	12 45.8 58 81 89.3	13 03.1 58 81 88.9	13 20.3 57 81 88.5	13 37.5 57 81 88.1	13 54.7 57 81 87.6	14 11.8 57 81 87.2	14 28.9 57 81 86.8	14 45.9 57 81 86.4	80
1	11 57.3 58 81 88.7	12 14.5 58 81 88.3	12 31.8 57 81 87.9	12 49.0 57 81 87.5	13 06.2 57 81 87.1	13 23.3 57 81 86.6	13 40.4 57 81 86.2	13 57.5 57 81 85.8	1
2	11 08.7 58 81 88.2	11 26.0 58 81 87.7	11 43.3 57 81 87.3	12 00.5 57 81 86.9	12 17.7 57 81 86.5	12 34.9 57 81 86.1	12 52.0 57 81 85.6	13 09.1 57 81 85.2	2
3	10 20.2 58 81 87.6	10 37.5 58 81 87.2	10 54.8 58 81 86.7	11 12.1 57 81 86.3	11 29.3 57 81 85.9	11 46.5 57 81 85.5	12 03.6 57 81 85.1	12 20.7 57 81 84.6	3
4	9 31.7 58 81 87.0	9 49.1 58 81 86.6	10 06.4 58 81 86.2	10 23.6 57 81 85.7	10 40.9 57 81 85.3	10 58.1 57 80 84.9	11 15.3 57 80 84.5	11 32.4 57 80 84.1	4
85	8 43.3 58 81 86.4	9 00.6 58 81 86.0	9 18.0 58 81 85.6	9 35.1 58 81 85.1	9 52.5 58 81 84.7	10 09.8 57 80 84.3	10 27.0 57 80 83.9	10 44.1 57 80 83.5	85
6	7 54.8 58 81 85.8	8 12.2 58 81 85.4	8 29.6 58 81 85.0	8 46.9 58 81 84.6	9 04.2 58 81 84.2	9 21.5 58 80 83.8	9 38.7 57 80 83.4	9 55.9 57 80 82.9	6
7	7 06.5 58 81 85.3	7 23.8 58 81 84.8	7 41.2 58 80 84.4	7 58.6 58 80 84.0	8 15.9 58 81 83.6	8 33.3 58 80 83.2	8 50.5 58 80 82.8	9 07.8 57 80 82.4	7
8	6 18.1 58 80 84.7	6 35.5 58 80 84.3	6 53.0 58 80 83.9	7 10.4 58 80 83.4	7 27.7 58 80 83.0	7 45.1 58 80 82.6	8 02.4 58 80 82.2	8 19.7 58 80 81.8	8
9	5 29.8 58 80 84.1	5 47.3 58 80 83.7	6 04.7 58 80 83.3	6 22.2 58 80 82.9	6 39.6 58 80 82.5	6 57.0 58 80 82.0	7 14.4 58 80 81.6	7 31.7 58 80 81.2	9
90	4 41.5 58 80 83.5	4 59.0 58 80 83.1	5 16.5 58 80 82.7	5 34.0 58 80 82.3	5 51.5 58 80 81.9	6 08.9 58 80 81.5	6 26.4 58 80 81.1	6 43.8 58 80 80.7	90

Each cell is formatted: Alt (° ') · Δd Δt · Az (°)

H.A.	8° 00'	8° 30'	9° 00'	9° 30'	10° 00'	10° 30'	11° 00'	11° 30'	H.A.
00	46 00.0 1.0 01 180.0	45 30.0 1.0 01 180.0	45 00.0 1.0 01 180.0	44 30.0 1.0 01 180.0	44 00.0 1.0 01 180.0	43 30.0 1.0 01 180.0	43 00.0 1.0 01 180.0	42 30.0 1.0 01 180.0	00
1	45 59.4 1.0 03 178.6	45 29.4 1.0 03 178.6	44 59.4 1.0 03 178.6	44 29.4 1.0 03 178.6	43 59.4 1.0 03 178.6	43 29.4 1.0 03 178.6	42 59.4 1.0 03 178.7	42 29.4 1.0 03 178.7	1
2	45 57.6 1.0 05 177.2	45 27.6 1.0 05 177.2	44 57.6 1.0 05 177.2	44 27.7 1.0 05 177.2	43 57.7 1.0 05 177.3	43 27.7 1.0 05 177.3	42 57.7 1.0 05 177.3	42 27.7 1.0 05 177.3	2
3	45 54.6 1.0 07 175.7	45 24.6 1.0 07 175.8	44 54.7 1.0 07 175.8	44 24.7 1.0 07 175.9	43 54.8 1.0 07 175.9	43 24.8 1.0 07 175.9	42 54.9 1.0 07 176.0	42 24.9 1.0 07 176.0	3
4	45 50.4 1.0 09 174.3	45 20.5 1.0 09 174.4	44 50.6 1.0 09 174.4	44 20.6 1.0 09 174.5	43 50.7 1.0 09 174.5	43 20.8 1.0 09 174.6	42 50.9 1.0 08 174.6	42 21.0 1.0 08 174.7	4
05	45 44.9 99 11 172.9	45 15.1 99 11 173.0	44 45.2 1.0 11 173.0	44 15.4 1.0 11 173.1	43 45.5 1.0 11 173.2	43 15.7 1.0 10 173.2	42 45.8 1.0 10 173.3	42 16.0 1.0 10 173.4	05
6	45 38.4 99 13 171.5	45 08.6 99 13 171.6	44 38.8 99 13 171.7	44 09.0 99 13 171.7	43 39.2 99 12 171.8	43 09.4 99 12 171.9	42 39.6 99 12 172.0	42 09.8 99 12 172.1	6
7	45 30.6 99 15 170.1	45 00.9 99 15 170.2	44 31.2 99 15 170.3	44 01.4 99 14 170.4	43 31.7 99 14 170.5	43 02.0 99 14 170.6	42 32.3 99 14 170.7	42 02.5 99 14 170.7	7
8	45 21.6 99 17 168.7	44 52.0 99 17 168.8	44 22.4 99 16 168.9	43 52.8 99 16 169.0	43 23.1 99 16 169.1	42 53.5 99 16 169.2	42 23.8 99 16 169.3	41 54.2 99 16 169.4	8
9	45 11.5 99 19 167.3	44 42.0 99 19 167.4	44 12.5 98 18 167.6	43 43.0 98 18 167.7	43 13.4 98 18 167.8	42 43.9 98 18 167.9	42 14.3 98 18 168.0	41 44.8 98 18 168.1	9
10	45 00.3 98 21 165.9	44 30.9 98 20 166.1	44 01.5 98 20 166.2	43 32.1 98 20 166.3	43 02.6 98 20 166.5	42 33.2 98 20 166.6	42 03.7 98 19 166.7	41 34.3 98 19 166.9	10
1	44 47.9 98 22 164.6	44 18.6 98 22 164.7	43 49.3 98 22 164.9	43 20.0 98 22 165.0	42 50.7 98 22 165.2	42 21.4 98 21 165.3	41 52.0 98 21 165.4	41 22.7 98 21 165.6	1
2	44 34.5 97 24 163.2	44 05.3 97 24 163.4	43 36.1 97 24 163.5	43 06.9 97 24 163.7	42 37.7 97 23 163.8	42 08.5 97 23 164.0	41 39.3 97 23 164.1	41 10.1 97 23 164.3	2
3	44 19.9 97 26 161.9	43 50.9 97 26 162.0	43 21.8 97 25 162.2	42 52.8 97 25 162.4	42 23.7 97 25 162.5	41 54.6 97 25 162.7	41 25.5 97 25 162.9	40 56.4 97 24 163.0	3
4	44 04.2 96 28 160.5	43 35.4 96 28 160.7	43 06.5 96 27 160.9	42 37.5 96 27 161.1	42 08.6 96 27 161.3	41 39.7 97 27 161.4	41 10.7 97 26 161.6	40 41.7 97 26 161.8	4
15	43 47.5 96 30 159.2	43 18.8 96 29 159.4	42 50.1 96 29 159.6	42 21.3 96 29 159.8	41 52.5 96 29 160.0	41 23.7 96 28 160.2	40 54.9 96 28 160.4	40 26.1 96 28 160.5	15
6	43 29.8 95 31 157.9	43 01.2 95 31 158.1	42 32.5 95 31 158.3	42 04.0 95 30 158.5	41 35.4 95 30 158.7	41 06.7 96 30 158.9	40 38.1 96 30 159.1	40 09.4 96 29 159.3	6
7	43 11.0 95 33 156.6	42 42.6 95 33 156.8	42 14.2 95 32 157.0	41 45.7 95 32 157.3	41 17.3 95 32 157.5	40 48.8 95 32 157.7	40 20.3 95 31 157.9	39 51.8 95 31 158.1	7
8	42 51.2 94 35 155.3	42 23.0 94 35 155.6	41 54.8 94 34 155.8	41 26.5 94 34 156.0	40 58.2 94 34 156.2	40 29.9 94 33 156.4	40 01.5 95 33 156.7	39 33.2 95 33 156.9	8
9	42 30.5 94 36 154.1	42 02.4 94 36 154.3	41 34.4 94 36 154.5	41 06.3 94 35 154.8	40 38.2 94 35 155.0	40 10.0 94 35 155.2	39 41.8 94 34 155.5	39 13.6 94 34 155.7	9
20	42 08.8 93 38 152.8	41 40.9 93 37 153.1	41 13.0 93 37 153.3	40 45.1 93 37 153.6	40 17.0 93 36 153.8	39 49.2 93 36 154.0	39 21.2 93 36 154.3	38 53.2 93 36 154.5	20
1	41 46.1 92 39 151.6	41 18.5 92 39 151.8	40 50.8 92 39 152.1	40 23.1 92 38 152.4	39 55.3 92 38 152.6	39 27.5 93 38 152.8	38 59.7 93 37 153.1	38 31.8 93 37 153.3	1
2	41 21.6 91 41 150.4	40 55.1 92 40 150.6	40 27.6 92 40 150.9	40 00.1 92 40 151.2	39 32.5 92 39 151.4	39 04.9 92 39 151.7	38 37.3 92 39 151.9	38 09.6 92 38 152.2	2
3	40 58.1 91 42 149.2	40 30.9 91 42 149.4	40 03.6 91 42 149.7	39 36.2 91 41 150.0	39 08.9 91 41 150.3	38 41.5 91 41 150.5	38 14.0 92 40 150.8	37 46.5 92 40 151.0	3
4	40 32.8 90 44 148.0	40 05.8 90 43 148.3	39 38.7 90 43 148.6	39 11.5 91 43 148.8	38 44.4 91 42 149.1	38 17.1 91 42 149.4	37 49.9 91 42 149.6	37 22.6 91 41 149.9	4
25	40 06.7 90 45 146.8	39 39.8 90 45 147.1	39 12.9 90 44 147.4	38 46.0 90 44 147.7	38 19.0 90 44 148.0	37 52.0 90 43 148.2	37 24.9 90 43 148.5	36 57.8 90 43 148.8	25
6	39 39.7 89 46 145.7	39 13.1 89 46 146.0	38 46.4 89 46 146.3	38 19.6 89 45 146.6	37 52.9 89 45 146.8	37 26.0 89 45 147.1	36 59.2 90 44 147.4	36 32.3 90 44 147.7	6
7	39 12.0 88 48 144.5	38 45.5 88 48 144.8	38 19.0 88 47 145.1	37 52.5 89 47 145.4	37 25.9 89 46 145.7	36 59.3 89 46 146.0	36 32.6 89 46 146.3	36 05.9 89 45 146.6	7
8	38 43.4 87 49 143.4	38 17.2 88 48 143.7	37 50.9 88 48 144.0	37 24.6 88 48 144.3	36 58.2 88 47 144.6	36 31.8 88 47 144.9	36 05.3 88 47 145.2	35 38.8 88 46 145.5	8
9	38 14.1 87 50 142.3	37 48.1 87 50 142.6	37 22.0 87 49 143.0	36 55.9 87 49 143.3	36 29.6 87 49 143.6	36 03.5 87 48 143.9	35 37.3 88 48 144.2	35 11.0 88 48 144.5	9
30	37 44.1 86 51 141.2	37 18.3 86 51 141.6	36 52.4 86 51 141.9	36 26.5 86 50 142.2	36 00.6 87 50 142.5	35 34.6 87 49 142.8	35 08.5 87 49 143.1	34 42.4 87 49 143.4	30
1	37 13.3 85 52 140.2	36 47.5 85 52 140.5	36 22.1 86 52 140.8	35 56.4 86 51 141.1	35 30.7 86 51 141.5	35 04.9 86 51 141.8	34 39.0 86 50 142.1	34 13.1 86 50 142.4	1
2	36 41.9 85 54 139.1	36 16.5 85 53 139.5	35 51.1 85 53 139.8	35 25.6 85 52 140.1	35 00.1 85 52 140.4	34 34.5 85 52 140.7	34 08.8 86 51 141.1	33 43.2 86 51 141.4	2
3	36 09.8 84 55 138.1	35 44.6 84 54 138.4	35 19.4 84 54 138.8	34 54.1 84 54 139.1	34 28.8 85 53 139.4	34 03.4 85 53 139.7	33 38.0 85 52 140.0	33 12.5 85 52 140.4	3
4	35 37.1 83 56 137.1	35 12.1 83 56 137.4	34 47.1 83 55 137.7	34 22.0 84 55 138.1	33 56.9 84 54 138.4	33 31.7 84 54 138.7	33 06.5 84 54 139.1	32 41.2 84 53 139.4	4
35	35 03.7 82 57 136.1	34 38.9 83 56 136.4	34 14.1 83 56 136.7	33 49.3 83 56 137.1	33 24.4 83 55 137.4	32 59.4 83 55 137.7	32 34.4 83 55 138.1	32 09.3 84 54 138.4	35
6	34 29.7 82 58 135.1	34 05.2 82 57 135.4	33 40.6 82 57 135.8	33 15.9 82 57 136.1	32 51.2 82 56 136.4	32 26.5 83 56 136.8	32 01.7 83 56 137.1	31 36.8 83 55 137.4	6
7	33 55.1 81 59 134.1	33 30.8 81 58 134.4	33 06.4 81 58 134.8	32 42.0 82 58 135.1	32 17.5 82 57 135.5	31 52.9 82 57 135.8	31 28.3 82 57 136.2	31 03.7 82 56 136.5	7
8	33 20.0 80 59 133.1	32 55.9 80 59 133.5	32 31.7 81 59 133.8	32 07.5 81 58 134.2	31 43.2 81 58 134.5	31 18.5 81 58 134.9	30 54.4 81 57 135.2	30 30.0 82 57 135.6	8
9	32 44.3 80 60 132.2	32 20.4 80 60 132.6	31 56.4 80 60 132.9	31 32.4 80 59 133.3	31 08.3 80 59 133.6	30 44.2 81 59 134.0	30 20.0 81 58 134.3	29 55.7 81 58 134.6	9
40	32 08.1 79 61 131.3	31 44.4 79 61 131.6	31 20.6 79 61 132.0	30 56.8 80 60 132.3	30 32.9 80 60 132.7	30 08.9 80 60 133.0	29 44.9 80 59 133.4	29 20.9 80 59 133.7	40
1	31 31.3 78 62 130.3	31 07.8 78 62 130.7	30 44.1 79 61 131.1	30 20.6 79 61 131.4	29 56.9 79 61 131.8	29 33.2 79 60 132.1	29 09.4 79 60 132.5	28 45.6 80 60 132.8	1
2	30 54.1 78 63 129.4	30 30.8 78 63 129.8	30 07.4 78 62 130.2	29 44.0 78 62 130.5	29 20.5 78 62 130.8	28 57.0 79 61 131.2	28 33.4 79 61 131.6	28 09.7 79 61 131.9	2
3	30 16.4 77 64 128.6	29 53.2 77 63 128.9	29 30.1 78 63 129.3	29 06.8 78 62 129.7	28 43.6 78 62 130.0	28 20.2 78 62 130.4	27 56.8 78 62 130.7	27 33.4 78 61 131.1	3
4	29 38.2 76 64 127.7	29 15.3 76 64 128.1	28 52.3 77 64 128.4	28 29.2 77 63 128.8	28 06.1 77 63 129.1	27 43.0 77 63 129.5	27 19.8 77 62 129.9	26 56.5 78 62 130.2	4
45	28 59.5 76 65 126.8	28 36.8 76 65 127.2	28 14.0 76 64 127.6	27 51.2 76 64 127.9	27 28.3 76 64 128.3	27 05.3 77 64 128.7	26 42.3 77 63 129.0	26 19.2 77 63 129.4	45
6	28 20.5 75 66 126.0	27 57.9 75 66 126.3	27 35.3 75 65 126.7	27 12.7 76 65 127.1	26 50.0 76 65 127.4	26 27.2 76 64 127.8	26 04.3 76 64 128.2	25 41.5 76 64 128.5	6
7	27 41.0 74 67 125.1	27 18.6 75 66 125.5	26 56.2 75 66 125.9	26 33.7 75 66 126.3	26 11.2 76 65 126.6	25 48.6 76 65 127.0	25 26.0 76 65 127.3	25 03.3 76 64 127.7	7
8	27 01.1 74 67 124.3	26 38.9 74 67 124.7	26 16.7 74 67 125.1	25 54.4 74 66 125.4	25 32.0 75 66 125.8	25 09.6 75 66 126.2	24 47.2 75 65 126.5	24 24.7 75 65 126.9	8
9	26 20.8 73 68 123.5	25 58.8 73 68 123.9	25 36.7 74 67 124.2	25 14.6 74 67 124.6	24 52.5 74 67 125.0	24 30.3 74 66 125.4	24 08.0 74 66 125.7	23 45.7 74 66 126.1	9
50	25 40.1 73 68 122.7	25 18.3 73 68 123.1	24 56.4 73 68 123.4	24 34.5 73 68 123.8	24 12.5 73 67 124.2	23 50.5 74 67 124.6	23 28.4 74 67 124.9	23 06.2 74 66 125.3	50
1	24 59.1 72 69 121.9	24 37.4 72 69 122.3	24 15.7 72 68 122.7	23 54.0 73 68 123.0	23 32.2 73 68 123.4	23 10.3 73 68 123.8	22 48.4 73 67 124.2	22 26.4 73 67 124.5	1
2	24 17.7 71 70 121.1	23 56.2 72 69 121.5	23 34.7 72 69 121.9	23 13.1 72 69 122.3	22 51.5 72 68 122.6	22 29.8 72 68 123.0	22 08.0 73 68 123.4	21 46.3 73 68 123.8	2
3	23 36.0 71 70 120.3	23 14.7 71 70 120.7	22 53.3 71 70 121.1	22 31.9 71 69 121.5	22 10.4 72 69 121.9	21 48.9 72 69 122.2	21 27.3 72 68 122.6	21 05.7 72 68 123.0	3
4	22 53.9 70 71 119.6	22 32.8 71 70 120.0	22 11.6 71 70 120.3	21 50.3 71 70 120.7	21 29.0 71 70 121.1	21 07.7 71 69 121.5	20 46.3 71 69 121.9	20 24.8 72 69 122.2	4
55	22 11.5 70 71 118.8	21 50.5 70 71 119.2	21 29.5 70 70 119.6	21 08.4 70 70 120.0	20 47.3 71 70 120.4	20 26.1 71 70 120.7	20 04.9 71 70 121.1	19 43.6 71 69 121.5	55
6	21 28.6 69 72 118.1	21 08.0 69 71 118.5	20 47.2 70 71 118.9	20 26.2 70 71 119.2	20 05.3 70 71 119.6	19 44.2 70 70 120.0	19 23.2 70 70 120.4	19 02.0 70 70 120.8	6
7	20 45.9 68 73 117.4	20 25.2 69 72 117.7	20 04.5 69 72 118.1	19 43.7 69 71 118.5	19 22.9 69 71 118.9	19 02.0 70 71 119.3	18 41.1 70 71 119.6	18 20.2 70 70 120.0	7
8	20 02.6 68 73 116.6	19 42.1 68 72 117.0	19 21.5 69 72 117.4	19 00.9 69 72 117.8	18 40.3 69 72 118.2	18 19.5 69 71 118.6	17 58.8 69 71 118.9	17 38.0 69 71 119.3	8
9	19 19.1 68 73 115.9	18 58.7 68 73 116.3	18 38.3 68 72 116.7	18 17.8 68 72 117.1	17 57.3 68 72 117.5	17 36.8 69 72 117.8	17 16.2 69 72 118.2	16 55.5 69 71 118.6	9
60	18 35.3 67 73 115.2	18 15.1 68 73 115.6	17 54.8 68 73 116.0	17 34.5 68 73 116.4	17 14.1 68 72 116.8	16 53.7 68 72 117.1	16 33.3 68 72 117.5	16 12.8 68 72 117.9	60
1	17 51.3 67 74 114.5	17 31.2 67 74 114.9	17 11.0 67 73 115.3	16 50.9 67 73 115.7	16 30.6 67 73 116.1	16 10.4 68 73 116.4	15 50.1 68 72 116.8	15 29.7 68 72 117.2	1
2	17 07.0 66 74 113.8	16 47.0 67 74 114.2	16 27.0 67 74 114.6	16 07.0 67 74 115.0	15 46.9 67 73 115.4	15 26.8 67 73 115.8	15 06.6 67 73 116.1	14 46.4 67 73 116.5	2
3	16 22.4 66 75 113.1	16 02.6 66 75 113.5	15 42.8 66 74 113.9	15 22.9 66 74 114.3	15 02.9 67 74 114.7	14 42.9 67 73 115.1	14 22.9 67 73 115.4	14 02.8 67 73 115.8	3
4	15 37.7 66 75 112.4	15 18.0 66 75 112.8	14 58.3 66 75 113.2	14 38.5 66 74 113.6	14 18.7 66 74 114.0	13 58.8 66 74 114.4	13 39.0 66 74 114.8	13 19.0 66 73 115.2	4
65	14 52.7 65 76 111.8	14 33.2 65 75 112.2	14 13.6 65 75 112.6	13 53.9 65 75 113.0	13 34.2 66 74 113.3	13 14.5 66 74 113.7	12 54.8 66 74 114.1	12 35.0 66 74 114.5	65
6	14 07.5 65 76 111.1	13 48.1 65 75 111.5	13 28.6 65 75 111.9	13 09.1 65 75 112.3	12 49.6 65 75 112.7	12 30.0 65 75 113.1	12 10.4 65 74 113.5	11 50.7 66 74 113.8	6
7	13 22.2 64 76 110.5	13 02.8 64 76 110.8	12 43.5 65 76 111.2	12 24.1 65 75 111.6	12 04.7 65 75 112.0	11 45.2 65 75 112.4	11 25.7 65 75 112.8	11 06.2 65 75 113.2	7
8	12 36.6 64 76 109.8	12 17.4 64 76 110.2	11 58.1 64 76 110.6	11 38.8 64 76 111.0	11 19.6 64 75 111.4	11 00.2 64 75 111.8	10 40.8 65 75 112.2	10 21.5 65 75 112.6	8
9	11 50.8 63 77 109.2	11 31.7 64 76 109.6	11 12.6 64 76 109.9	10 53.4 64 76 110.3	10 34.3 64 76 110.7	10 15.0 64 76 111.1	9 55.8 64 75 111.5	9 36.5 64 75 111.9	9
70	11 04.9 63 77 108.5	10 45.9 63 77 108.9	10 26.9 63 76 109.3	10 07.8 64 76 109.7	9 48.8 64 76 110.1	9 29.7 64 76 110.5	9 10.5 64 76 110.9	8 51.4 64 76 111.3	70
1	10 18.8 63 77 107.9	9 59.9 63 77 108.3	9 41.0 63 77 108.7	9 22.0 63 76 109.1	9 03.1 63 76 109.5	8 44.1 63 76 109.8	8 25.1 63 76 110.2	8 06.1 63 76 110.6	1
2	9 32.5 62 78 107.3	9 13.7 62 78 107.6	8 54.9 63 77 108.0	8 36.1 63 77 108.4	8 17.2 63 77 108.8	7 58.4 63 77 109.2	7 39.5 63 76 109.6	7 20.5 63 76 110.0	2
3	8 46.1 62 78 106.6	8 27.4 62 78 107.0	8 08.7 62 77 107.4	7 49.9 62 77 107.8	7 31.2 62 77 108.2	7 12.4 62 77 108.6	6 53.6 62 76 109.0	6 34.8 62 76 109.4	3
4	7 59.5 62 78 106.0	7 40.9 62 78 106.4	7 22.3 62 78 106.8	7 03.7 62 77 107.2	6 45.0 62 77 107.6	6 26.3 62 77 108.0	6 07.7 62 77 108.4	5 49.0 62 77 108.8	4
75	7 12.7 62 78 105.4	6 54.2 62 78 105.8	6 35.7 62 78 106.2	6 17.2 62 78 106.6	5 58.7 62 78 107.0	5 40.1 62 77 107.4	5 21.5 62 77 107.8	5 02.9 62 77 108.2	75
6	6 25.9 61 78 104.8	6 07.5 61 78 105.2	5 49.0 61 78 105.6	5 30.6 61 78 106.0	5 12.2 62 78 106.4				6
7	5 38.9 61 78 104.2	5 20.6 61 78 104.6	5 02.2 61 78 105.0						7

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00'	8° 30'	9° 00'	9° 30'	10° 00'	10° 30'	11° 00'	11° 30'	H.A.
	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	Alt. Az.	
91					5 03.5 58 80 81.3	5 21.0 58 80 80.9	5 38.5 58 80 80.5	5 55.9 58 80 80.1	91
2								5 08.2 58 80	2

Lat. 36°

H.A.	12° 00' Alt.	Δd Δt	Az.	12° 30' Alt.	Δd Δt	Az.	13° 00' Alt.	Δd Δt	Az.	13° 30' Alt.	Δd Δt	Az.	14° 00' Alt.	Δd Δt	Az.	14° 30' Alt.	Δd Δt	Az.	15° 00' Alt.	Δd Δt	Az.	15° 30' Alt.	Δd Δt	Az.	H.A.
00	66 00.0	1.0 02	180.0	66 30.0	1.0 02	180.0	67 00.0	1.0 02	180.0	67 30.0	1.0 02	180.0	68 00.0	1.0 02	180.0	68 30.0	1.0 02	180.0	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	00
1	65 59.0	1.0 05	177.6	66 29.0	1.0 05	177.6	66 58.9	1.0 05	177.5	67 28.9	1.0 05	177.5	67 58.9	1.0 05	177.4	68 28.9	1.0 06	177.4	68 58.9	1.0 06	177.3	69 28.8	1.0 06	177.2	1
2	65 55.9	1.0 08	175.2	66 25.9	1.0 08	175.1	66 55.8	1.0 09	175.0	67 25.7	1.0 09	174.8	67 55.6	1.0 09	174.6	68 25.5	1.0 09	174.6	68 55.4	1.0 10	174.5	69 25.3	1.0 10	174.5	2
3	65 50.9	99 12	172.8	66 20.7	99 12	172.7	66 50.5	99 12	172.5	67 20.4	99 12	172.4	67 50.2	99 13	172.3	68 19.9	99 13	172.0	68 49.8	99 13	172.0	69 19.6	99 13	171.8	3
4	65 43.8	99 15	170.4	66 13.5	99 15	170.3	66 43.2	99 16	170.1	67 12.9	99 16	169.9	67 42.6	99 16	169.7	68 12.2	99 16	169.5	68 41.9	99 17	169.3	69 11.5	99 17	169.1	4
05	65 34.8	99 18	168.1	66 04.3	98 19	167.9	66 33.8	98 19	167.7	67 03.4	98 19	167.4	67 32.9	98 20	167.2	68 02.3	98 20	167.0	68 31.8	98 20	166.7	69 01.2	98 21	166.4	05
6	65 23.8	98 21	165.8	65 53.2	98 22	165.5	66 22.5	98 22	165.3	66 51.8	98 23	165.0	67 21.1	98 23	164.7	67 50.3	97 23	164.4	68 19.6	97 24	164.1	68 48.7	97 24	163.8	6
7	65 10.9	97 24	163.5	65 40.1	97 25	163.2	66 09.2	97 26	162.9	66 38.3	97 26	162.3	67 07.3	97 26	162.3	67 36.3	97 27	161.9	68 05.3	96 27	161.6	68 34.2	96 28	161.3	7
8	64 56.2	96 27	161.3	65 25.1	96 28	160.9	65 54.0	96 28	160.6	66 22.8	96 29	160.3	66 51.6	96 29	159.9	67 20.3	96 30	159.5	67 49.0	95 30	159.1	68 17.6	95 31	158.7	8
9	64 39.8	96 30	159.0	65 08.4	95 31	158.7	65 37.0	95 31	158.6	66 05.5	95 32	158.0	66 34.0	95 32	157.7	67 02.4	95 33	157.2	67 30.7	94 33	156.7	67 59.0	94 34	156.3	9
10	64 21.5	95 33	156.9	64 49.9	94 34	156.5	65 18.2	94 34	156.1	65 46.4	94 35	155.7	66 14.5	93 36	155.3	66 42.6	93 36	154.8	67 10.6	93 36	154.4	67 38.6	93 37	153.9	10
1	64 01.7	94 36	154.8	64 29.7	93 36	154.4	64 57.7	93 37	153.9	65 25.6	93 37	153.5	65 53.4	93 38	153.0	66 21.1	92 39	152.6	66 48.8	92 39	152.1	67 16.3	92 40	151.6	1
2	63 40.2	93 38	152.7	64 07.9	92 39	152.3	64 35.4	92 39	151.8	65 03.1	92 40	151.5	65 30.6	91 41	150.9	65 57.9	91 41	150.6	66 25.2	91 42	149.9	66 52.4	90 43	149.3	2
3	63 17.2	91 41	150.7	63 44.6	91 41	150.2	64 11.9	91 42	149.8	64 39.1	91 43	149.3	65 06.2	90 43	148.8	65 33.2	90 44	148.2	66 00.1	89 44	147.7	66 26.8	89 45	147.1	3
4	62 52.7	90 43	148.7	63 19.7	90 44	148.3	63 46.7	90 44	147.8	64 13.5	89 45	147.2	64 40.3	89 46	146.7	65 06.9	89 46	146.2	65 33.4	88 47	145.6	65 59.7	88 48	145.0	4
15	62 26.8	89 45	146.8	62 53.5	89 46	146.3	63 20.1	88 47	145.8	63 46.6	88 47	145.3	64 12.9	88 48	144.7	64 39.2	87 48	144.2	65 05.3	87 49	143.6	65 31.2	86 50	143.0	15
6	61 59.6	88 48	145.0	62 25.9	88 48	144.4	62 52.2	87 49	143.9	63 18.3	87 49	143.4	63 44.2	86 50	142.8	64 10.1	86 51	142.2	64 35.8	85 51	141.6	65 01.3	85 52	141.0	6
7	61 31.1	87 50	143.2	61 57.1	86 50	142.6	62 22.9	86 51	142.1	62 48.7	86 51	141.5	63 14.3	85 52	140.9	63 39.7	85 53	140.3	64 05.0	84 53	139.7	64 30.2	84 54	139.1	7
8	61 01.4	86 51	141.4	61 27.0	85 52	140.9	61 52.5	85 53	140.3	62 17.9	84 53	139.7	62 43.1	84 54	139.1	63 08.2	83 54	138.5	63 33.1	83 55	137.9	63 57.8	82 55	137.3	8
9	60 30.5	84 53	139.7	60 55.8	84 54	139.1	61 21.0	84 54	138.6	61 45.9	83 55	138.0	62 10.8	83 56	137.4	62 35.5	82 56	136.8	63 00.0	81 57	136.2	63 24.3	81 58	135.5	9
20	59 58.6	83 55	138.0	60 23.5	83 56	137.5	60 48.3	82 56	136.9	61 12.9	82 57	136.3	61 37.4	81 57	135.7	62 01.7	81 58	135.1	62 25.9	80 59	134.5	62 49.8	80 59	133.8	20
1	59 25.6	82 57	136.4	59 50.2	82 57	135.9	60 14.6	81 58	135.3	60 38.9	81 58	134.7	61 03.0	80 59	134.1	61 27.0	79 59	133.5	61 50.7	79 60	132.8	62 14.3	78 61	132.2	1
2	58 51.7	81 59	134.3	59 15.9	81 59	133.7	59 40.0	80 59	133.1	60 03.9	79 60	132.5	60 27.7	79 60	131.9	60 51.3	79 60	131.3	61 14.7	78 62	130.6	61 37.9	77 62	130.0	2
3	58 16.9	80 60	133.3	58 40.8	79 60	132.8	59 04.5	79 61	132.2	59 28.1	78 61	131.6	59 51.5	78 62	131.0	60 14.7	77 62	130.3	60 37.7	76 63	129.7	61 00.6	76 64	129.0	3
4	57 41.2	79 61	131.9	58 04.7	78 61	131.3	58 28.1	78 62	130.7	58 51.4	77 62	130.1	59 14.4	77 63	129.5	59 37.3	76 64	128.9	60 00.0	75 64	128.2	60 22.5	75 65	127.5	4
25	57 04.6	78 62	130.5	57 27.9	77 63	129.9	57 50.9	77 63	129.3	58 13.8	76 64	128.7	58 36.6	75 64	128.1	58 59.1	75 65	127.4	59 21.5	74 65	126.8	59 43.6	73 66	126.1	25
6	56 27.3	77 63	129.1	56 50.3	76 64	128.5	57 13.0	76 64	127.9	57 35.6	75 65	127.3	57 58.0	74 65	126.7	58 20.2	74 66	126.0	58 42.2	73 66	125.4	59 04.0	72 67	124.7	6
7	55 49.3	76 65	127.8	56 11.9	75 65	127.2	56 34.4	75 66	126.6	56 56.6	74 66	126.0	57 18.7	73 67	125.3	57 40.6	73 67	124.7	58 02.3	72 68	124.1	58 23.8	71 68	123.4	7
8	55 10.6	75 66	126.5	55 32.9	74 66	125.9	55 55.1	74 67	125.3	56 17.0	73 67	124.7	56 38.8	72 68	124.1	57 00.4	72 68	123.4	57 21.8	71 68	122.8	57 43.0	70 69	122.1	8
9	54 31.3	74 67	125.2	54 53.3	73 67	124.6	55 15.1	73 68	124.0	55 36.8	72 68	123.4	55 58.3	71 68	122.8	56 19.6	71 69	122.2	56 40.7	70 69	121.5	57 01.6	69 70	120.9	9
30	53 51.3	73 68	124.0	54 13.0	72 68	123.4	54 34.6	72 68	122.8	54 56.0	71 69	122.2	55 17.2	70 69	121.6	55 38.2	70 70	120.9	55 59.1	69 70	120.3	56 19.7	68 71	119.7	30
1	53 10.8	72 68	122.8	53 32.2	71 69	122.2	53 53.5	71 69	121.6	54 14.7	70 70	121.0	54 35.6	69 70	120.4	54 56.4	69 71	119.8	55 16.9	68 71	119.1	55 37.3	67 72	118.5	1
2	52 29.7	71 69	121.6	52 50.9	70 70	121.0	53 12.0	70 70	120.5	53 32.8	69 71	119.9	53 53.5	69 71	119.2	54 14.0	68 71	118.6	54 34.3	67 72	118.0	54 54.4	67 72	117.4	2
3	51 48.1	70 70	120.5	52 09.1	70 70	119.9	52 29.9	69 71	119.3	52 50.5	68 71	118.7	53 10.9	68 72	118.1	53 31.2	67 72	117.5	53 51.2	66 73	116.9	54 11.0	66 73	116.3	3
4	51 06.1	69 71	119.4	51 26.8	69 71	118.8	51 47.3	68 72	118.3	52 07.7	68 72	117.7	52 27.9	67 72	117.1	52 47.9	66 73	116.4	53 07.7	66 73	115.8	53 27.3	65 74	115.2	4
35	50 23.6	69 72	118.4	50 44.1	68 72	117.8	51 04.4	67 72	117.2	51 24.5	67 73	116.6	51 44.5	66 73	116.0	52 04.2	66 73	115.4	52 23.8	65 74	114.8	52 43.2	64 74	114.1	35
6	49 40.6	68 72	117.3	50 00.9	67 73	116.7	50 21.0	67 73	116.2	50 40.9	66 73	115.6	51 00.6	65 74	115.0	51 20.2	65 74	114.4	51 39.6	64 74	113.8	51 58.7	64 75	113.1	6
7	48 57.3	67 73	116.3	49 17.4	67 73	115.7	49 37.2	66 74	115.2	49 56.9	65 74	114.6	50 16.5	65 74	114.0	50 35.8	64 75	113.4	50 55.0	64 75	112.8	51 13.9	63 75	112.2	7
8	48 13.6	66 73	115.3	48 33.5	66 74	114.8	48 53.1	65 74	114.2	49 12.6	65 74	113.6	49 32.0	64 75	113.0	49 51.1	64 75	112.4	50 10.1	63 75	111.8	50 28.8	62 76	111.2	8
9	47 29.6	66 74	114.4	47 49.2	65 74	113.8	48 08.7	65 75	113.2	48 28.0	64 75	112.6	48 47.1	63 75	112.1	49 06.1	63 76	111.5	49 24.8	62 76	110.9	49 43.4	62 76	110.3	9
40	46 45.2	65 74	113.4	47 04.6	65 75	112.9	47 23.9	64 75	112.3	47 43.0	63 75	111.7	48 02.0	63 76	111.1	48 20.8	62 76	110.6	48 39.4	62 76	110.0	48 57.8	61 77	109.4	40
1	46 00.5	65 75	112.5	46 19.8	64 75	111.9	46 38.9	63 76	111.4	46 57.8	63 76	110.8	47 16.6	62 76	110.2	47 35.2	62 76	109.7	47 53.6	61 77	109.1	48 11.8	60 77	108.5	1
2	45 15.5	64 75	111.6	45 34.6	63 76	111.0	45 53.5	63 76	110.5	46 12.3	62 76	109.9	46 30.9	62 76	109.4	46 49.3	61 77	108.8	47 07.6	61 77	108.2	47 25.7	60 77	107.6	2
3	44 30.2	63 76	110.7	44 49.2	63 76	110.2	45 07.9	62 76	109.6	45 26.5	62 77	109.1	45 45.0	61 77	108.5	46 03.3	61 77	107.9	46 21.4	60 77	107.4	46 39.3	59 78	106.8	3
4	43 44.7	63 76	109.9	44 03.5	62 77	109.3	44 22.1	62 77	108.8	44 40.5	61 77	108.2	44 58.8	61 77	107.7	45 17.0	60 78	107.1	45 34.9	60 78	106.5	45 52.7	59 78	105.9	4
45	42 58.9	62 77	109.0	43 17.5	62 77	108.5	43 36.0	61 77	107.9	43 54.3	61 77	107.4	44 12.5	60 78	106.8	44 30.5	60 78	106.3	44 48.3	59 78	105.7	45 06.0	59 78	105.1	45
6	42 12.9	62 77	108.2	42 31.4	61 77	107.7	42 49.7	61 78	107.1	43 07.9	60 78	106.6	43 25.9	60 78	106.0	43 43.8	59 78	105.5	44 01.5	59 79	104.9	44 19.0	58 79	104.3	6
7	41 26.7	61 77	107.4	41 45.0	61 78	106.9	42 03.2	60 78	106.3	42 21.3	60 78	105.8	42 39.2	59 78	105.2	42 56.9	59 79	104.7	43 14.5	58 79	104.1	43 31.9	58 79	103.6	7
8	40 40.3	61 78	106.6	40 58.5	60 78	106.1	41 16.6	60 78	105.5	41 34.5	60 78	105.0	41 52.3	59 79	104.5	42 09.9	58 79	103.9	42 27.4	58 79	103.4	42 44.7	57 79	102.8	8
9	39 53.7	61 78	105.8	40 11.7	60 78	105.3	40 29.7	60 78	104.8	40 47.5	59 79	104.2	41 05.2	59 79	103.7	41 22.7	58 79	103.2	41 40.1	58 79	102.6	41 57.3	57 79	102.1	9
50	39 06.9	60 78	105.0	39 24.8	60 78	104.5	39 42.7	59 79	104.0	40 00.4	59 79	103.5	40 17.9	58 79	102.9	40 35.4	58 79	102.4	40 52.6	57 79	101.9	41 09.7	57 79	101.3	50
1	38 19.9	60 79	104.3	38 37.8	59 79	103.8	38 55.5	59 79	103.3	39 13.1	58 79	102.7	39 30.6	58 79	102.2	39 47.9	57 79	101.7	40 05.1	57 79	101.1	40 22.1	56 80	100.6	1
2	37 32.8	59 79	103.6	37 50.6	59 79	103.1	38 08.2	59 79	102.5	38 25.7	58 79	102.0	38 43.1	58 79	101.5	39 00.3	57 80	101.0	39 17.4	57 80	100.4	39 34.3	56 80	99.9	2
3	36 45.5	59 79	102.8	37 03.2	59 79	102.3	37 20.7	58 79	101.8	37 38.2	58 79	101.3	37 55.4	57 80	100.8	38 12.6	57 80	100.3	38 29.6	56 80	99.7	38 46.4	56 80	99.2	3
4	35 58.1	59 79	102.1	36 15.7	58 79	101.6	36 33.2	58 79	101.1	36 50.5	58 80	100.6	37 07.7	57 80	100.1	37 24.8	57 80	99.6	37 41.7	56 80	99.0	37 58.5	56 80	98.5	4
55	35 10.6	59 79	101.4	35 28.1	58 80	100.9	35 45.5	58 80	100.4	36 02.7	57 80	99.9	36 19.9	57 80	99.4	36 36.8	56 80	98.9	36 53.7	56 80	98.4	37 10.4	56 80	97.8	55
6	34 23.0	58 80	100.7	34 40.4	58 80	100.2	34 57.7	57 80	99.7	35 14.9	57 80	99.2	35 31.9	57 80	98.7	35 48.8	56 80	98.2	36 05.6	56 80	97.7	36 22.3	55 80	97.2	6
7	33 35.2	58 80	100.0	33 52.6	58 80	99.5	34 09.8	57 80	99.0	34 26.9	57 80	98.5	34 43.9	56 80	98.0	35 00.8	56 80	97.5	35 17.5	56 80	97.0	35 34.1	55 80	96.5	7
8	32 47.4	58 80	99.3	33 04.6	57 80	98.9	33 21.8	57 80	98.4	33 38.9	56 80	97.9	33 55.8	56 80	97.4	34 12.6	56 80	96.9	34 29.3	55 80	96.4	34 45.9	55 81	95.9	8
9	31 59.4	58 80	98.7	32 16.6	57 80	98.2	32 33.7	56 80	97.7	32 50.7	56 80	97.2	33 07.6	56 80	96.7	33 24.4	55 80	96.2	33 41.0	55 81	95.7	33 57.5	55 81	95.2	9
60	31 11.4	57 80	98.0	31 28.6	57 80	97.5	31 45.6	56 80	97.1	32 02.5	56 80	96.6	32 19.4	56 81	96.1	32 36.1	55 81	95.6	32 52.7	55 81	95.1	33 09.2	55 81	94.6	60
1	30 23.3	57 80	97.4	30 40.4	56 80	96.9	30 57.4	56 80	96.4	31 14.3	56 81	95.9	31 31.1	55 81	95.4	31 47.8	55 81	94.9	32 04.3	55 81	94.5	32 20.8	55 81	94.0	1
2	29 35.1	57 80	96.7	29 52.2	56 80	96.3	30 09.1	56 81	95.8	30 25.9	56 81	95.3	30 42.7	55 81	94.8	30 59.4	55 81	94.3	31 15.9	55 81	93.8	31 32.3	55 81	93.3	2
3	28 46.9	57 80	96.1	29 03.9	56 81	95.6	29 20.8	56 81	95.1	29 37.6	56 81	94.7	29 54.3	55 81	94.2	30 11.0	55 81	93.7	30 27.5	54 81	93.2	30 43.9	54 81	92.7	3
4	27 58.6	57 81	95.4	28 15.6	56 81	95.0	28 32.4	56 81	94.5	28 49.2	56 81	94.0	29 05.9	55 81	93.6	29 22.5	55 81	93.1	29 39.0	54 81	92.6	29 55.4	54 81	92.1	4
65	27 10.2	57 81	94.8	27 27.2	56 81	94.4	27 44.0	56 81	93.9	28 00.8	56 81	93.4	28 17.5	55 81	92.9	28 34.0	55 81	92.5	28 50.5	54 81	92.0	29 06.8	54 81	91.5	65
6	26 21.8	57 81	94.2	26 38.8	56 81	93.7	26 55.6	56 81	93.3	27 12.3	56 81	92.8	27 29.0	55 81	92.3	27 45.5	55 81	91.9	28 02.0	55 81	91.4	28 18.3	54 81	90.9	6
7	25 33.4	56 81	93.6	25 50.3	56 81	93.1	26 07.1	56 81	92.7	26 23.8	56 81	92.2	26 40.5	55 81	91.7	26 57.0	55 81	91.3	27 13.4	55 81	90.8	27 29.8	54 81	90.3	7
8	24 45.0	56 81	93.0	25 01.8	56 81	92.5	25 18.6	56 81	92.1	25 35.3	55 81	91.6	25 51.9	55 81	91.1	26 08.5	55 81	90.7	26 24.9	55 81	90.2	26 41.2	54 81	89.7	8
9	23 56.5	56 81	92.4	24 13.3	56 81	91.9	24 30.1	56 81	91.5	24 46.8	55 81	91.0	25 03.4	55 81	90.5	25 19.9	55 81	90.1	25 36.3	55 81	89.6	25 52.7	54 81	89.2	9
70	23 08.0	56 81	91.8	23 24.8	56 81	91.3	23 41.6	56 81	90.9	23 58.2	55 81	90.4	24 14.8	55 81	90.0	24 31.4	55 81	89.5	24 47.8	55 81	89.0	25 04.2	54 81	88.6	70
1	22 19.4	56 81	91.2	22 36.3	56 81	90.7	22 53.0	56 81	90.3	23 09.7	55 81	89.8	23 26.3	55 81	89.4	23 42.8	55 81	88.9	23 59.3	55 81	88.5	24 15.6	54 81	88.0	1
2	21 30.9	56 81	90.6	21 47.7	56 81	90.1	22 04.5	56 81	89.7	22 21.2	55 81	89.2	22 37.8	55 81	88.8	22 54.3	55 81	88.3	23 10.8	55 81	87.9	23 27.1	54 81	87.4	2
3	20 42.4	56 81	90.0	20 59.2	56 81	89.6	21 15.9	55 81	89.1	21 32.6	55 81	88.7	21 49.3	55 81	88.2	22 05.8	55 81	87.8	22 22.3	55 81	87.3	22 38.7	55 81	86.8	3
4	19 53.8	56 81	89.4	20 10.6	56 81	89.0	20 27.4	55 81	88.5	20 44.1	55 81	88.1	21 00.7	55 81	87.6	21 17.3	55 81	87.2	21 33.8	55 81	86.7	21 50.2	55 81	86.3	4
75	19 05.3	56 81	88.8	19 22.1	56 81	88.4	19 38.9	55 81	87.9	19 55.6	55 81	87.5	20 12.3	55 81	87.1	20 28.8	55 81	86.6	20 45.3	55 81	86.2	21 01.8	55 81	85.7	75
6	18 16.8	56 81	88.2	18 33.6	56 81	87.8	18 50.4	55 81	87.4	19 07.1	55 81	86.9	19 23.8	55 81	86.5	19 40.4	55 81	86.0	19 56.9	55 81	85.6	20 13.4	55 80	85.2	6
7	17 28.2	56 81	87.7	17 45.1	56 81	87.2	18 01.9	55 81	86.8	18 18.7	55 81	86.4	18 35.4	55 81	85.9	18 52.0	55 81	85.5	19 08.5	55 81	85.0	19 25.0	55 80	84.6	7
8	16 39.6	56 81	87.1	16 56.6	56 81	86.7	17 13.5	55 81	86.2	17 30.2	55 81	85.8	17 47.0	55 81	85.4	18 03.6	55 81	84.9	18 20.2	55 80	84.5	18 36.7	55 80	84.0	8
9	15 51.3	56 81	86.5	16 08.2	56 81	86.1	16 25.0	55 81	85.7	16 41.8	55 81	85.2	16 58.5	55 81	84.8	17 15.3	55 80	84.4	17 31.9	55 80	83.9	17 48.5	55 80	83.5	9
80	15 02.9	57 81	85.9	15 19.8	56 81	85.5	15 36.7	56 81	85.1	15 53.5	56 81	84.7	16 10.3	55 80	84.2	16 27.0	55 80	83.8	16 43.7	55 80	83.4	17 00.3	55 80	82.9	80
1	14 14.5	57 81	85.4	14 31.4	56 81	84.9	14 48.3	56 80	84.5	15 05.2	56 80	84.1	15 22.0	55 80	83.7	15 38.8	55 80	83.2	15 55.5	55 80	82.8	16 12.2	55 80	82.4	1
2	13 26.1	57 81	84.8	13 43.1	57 80	84.4	14 00.0	56 80	83.9	14 16.9	56 80	83.5	14 33.8	56 80	83.1	14 50.6	56 80	82.7	15 07.4	56 80	82.2	15 24.1	55 80	81.8	2
3	12 37.8	57 80	84.2	12 54.8	57 80	83.8	13 11.8	56 80	83.4	13 28.7	56 80	83.0	13 45.6	56 80	82.5	14 02.5	56 80	82.1	14 19.3	56 80	81.7	14 36.1	56 80	81.3	3
4	11 49.5	57 80	83.7	12 06.6	57 80	83.2	12 23.6	57 80	82.8	12 40.6	56 80	82.4	12 57.5	56 80	82.0	13 14.4	56 80	81.5	13 31.3	56 80	81.1	13 48.1	56 80	80.7	4
85	11 01.3	57 80	83.1	11 18.4	57 80	82.7	11 35.5	57 80	82.3	11 52.5	57 80	81.8	12 09.5	57 80	81.4	12 26.5	56 80	81.0	12 43.4	56 80	80.6	13 00.3	56 80	80.1	85
6	10 13.1	57 80	82.5	10 30.3	57 80	82.1	10 47.4	57 80	81.7	11 04.5	57 80	81.3	11 21.5	57 80	80.8	11 38.6	57 80	80.4	11 55.5	57 80	80.0	12 12.5	56 80	79.6	6
7	9 25.0	57 80	82.0	9 42.2	57 80	81.5	9 59.4	57 80	81.1	10 16.5	57 80	80.7	10 33.7	57 80	80.3	10 50.7	57 80	79.9	11 07.8	57 79	79.4	11 24.8	57 79	79.0	7
8	8 37.0	58 80	81.4	8 54.3	57 80	81.0	9 11.5	57 80	80.6	9 28.7	57 80	80.1	9 45.9	57 80	79.7	10 03.0	57 79	79.3	10 20.1	57 79	78.9	10 37.2	57 79	78.5	8
9	7 49.1	58 80	80.8	8 06.4	58 80	80.4	8 23.6	58 80	80.0	8 40.9	57 80	79.6	8 58.1	57 79	79.2	9 15.3	57 79	78.7	9 32.5	57 79	78.3	9 49.7	57 79	77.9	9
90	7 01.2	58 80	80.2	7 18.5	58 80	79.8	7 35.9	58 79	79.4	7 53.2	58 79	79.0	8 10.5	58 79	78.6	8 27.8	58 79	78.2	8 45.0	57 79	77.8	9 02.2	57 79	77.4	90

H.A.	12° 00' Alt. (Δd Δt)	Az.	12° 30' Alt. (Δd Δt)	Az.	13° 00' Alt. (Δd Δt)	Az.	13° 30' Alt. (Δd Δt)	Az.	14° 00' Alt. (Δd Δt)	Az.	14° 30' Alt. (Δd Δt)	Az.	15° 00' Alt. (Δd Δt)	Az.	15° 30' Alt. (Δd Δt)	Az.	H.A.
00	42 00.0 1.0 01	180.0	41 30.0 1.0 01	180.0	41 00.0 1.0 01	180.0	40 30.0 1.0 01	180.0	40 00.0 1.0 01	180.0	39 30.0 1.0 01	180.0	39 00.0 1.0 01	180.0	38 30.0 1.0 01	180.0	00
1	41 59.4 1.0 03	178.7	41 29.4 1.0 03	178.7	40 59.5 1.0 03	178.7	40 29.5 1.0 03	178.7	39 59.5 1.0 03	178.7	39 29.5 1.0 03	178.7	38 59.5 1.0 03	178.8	38 29.5 1.0 03	178.8	1
2	41 57.8 1.0 05	177.4	41 27.8 1.0 05	177.4	40 57.8 1.0 05	177.4	40 27.8 1.0 04	177.4	39 57.9 1.0 04	177.5	39 27.9 1.0 04	177.5	38 57.9 1.0 04	177.5	38 27.9 1.0 04	177.5	2
3	41 55.0 1.0 06	176.1	41 25.0 1.0 06	176.1	40 55.1 1.0 06	176.1	40 25.1 1.0 06	176.2	39 55.2 1.0 06	176.2	39 25.2 1.0 06	176.2	38 55.3 1.0 06	176.3	38 25.3 1.0 06	176.3	3
4	41 51.1 1.0 08	174.7	41 21.2 1.0 08	174.8	40 51.3 1.0 08	174.8	40 21.3 1.0 08	174.9	39 51.4 1.0 08	174.9	39 21.5 1.0 08	175.0	38 51.6 1.0 08	175.0	38 21.7 1.0 08	175.1	4
05	41 46.1 1.0 10	173.4	41 16.2 1.0 10	173.5	40 46.4 1.0 10	173.6	40 16.5 1.0 10	173.6	39 46.6 1.0 10	173.7	39 16.7 1.0 10	173.7	38 46.9 1.0 10	173.8	38 17.0 1.0 10	173.9	05
6	41 40.0 99 12	172.1	41 10.2 99 12	172.2	40 40.4 99 12	172.3	40 10.6 99 12	172.4	39 40.7 99 12	172.4	39 10.9 99 11	172.5	38 41.1 99 11	172.6	38 11.3 99 11	172.6	6
7	41 32.8 99 14	170.8	41 03.1 99 14	170.9	40 33.3 99 14	171.0	40 03.5 99 13	171.2	39 33.8 99 13	171.2	39 04.1 99 13	171.3	38 34.3 99 13	171.4	38 04.5 99 13	171.4	7
8	41 24.5 99 16	169.5	40 54.9 99 15	169.6	40 25.2 99 15	169.7	39 55.5 99 15	169.8	39 25.9 99 15	169.9	38 56.2 99 15	170.0	38 26.5 99 15	170.1	37 56.8 99 15	170.2	8
9	41 15.2 99 17	168.3	40 45.6 99 17	168.4	40 16.0 99 17	168.5	39 46.4 99 17	168.6	39 16.9 99 17	168.7	38 47.3 99 17	168.8	38 17.7 99 16	168.9	37 48.0 99 16	169.0	9
10	41 04.8 98 19	167.0	40 35.3 98 19	167.1	40 05.8 98 19	167.2	39 36.3 98 18	167.3	39 06.8 98 18	167.5	38 37.3 98 18	167.6	38 07.8 98 18	167.7	37 38.3 98 18	167.8	10
1	40 53.3 98 21	165.7	40 23.9 98 21	165.8	39 54.6 98 20	166.0	39 25.2 98 20	166.1	38 55.8 98 20	166.2	38 26.4 98 20	166.4	37 57.0 98 20	166.5	37 27.5 98 20	166.6	1
2	40 40.8 98 23	164.4	40 11.6 98 22	164.6	39 42.3 98 22	164.7	39 13.0 98 22	164.9	38 43.7 98 22	165.0	38 14.4 98 22	165.2	37 45.1 98 21	165.3	37 15.8 98 21	165.4	2
3	40 27.3 97 24	163.2	39 58.2 97 24	163.3	39 29.0 97 24	163.5	38 59.8 97 24	163.7	38 30.7 97 23	163.8	38 01.5 97 23	164.0	37 32.3 97 23	164.1	37 03.1 97 23	164.2	3
4	40 12.8 97 26	161.9	39 43.7 97 26	162.1	39 14.7 97 25	162.3	38 45.7 97 25	162.4	38 16.6 97 25	162.6	37 47.6 97 25	162.8	37 18.5 97 25	162.9	36 49.4 97 24	163.1	4
15	39 57.2 96 26	160.7	39 28.3 96 27	160.9	38 59.5 96 27	161.1	38 30.6 96 27	161.2	38 01.7 96 26	161.4	37 32.7 96 26	161.6	37 03.8 96 26	161.7	36 34.8 97 26	161.9	15
6	39 40.7 96 29	159.5	39 12.0 96 29	159.7	38 43.2 96 29	159.9	38 14.5 96 28	160.0	37 45.7 96 28	160.2	37 16.9 96 28	160.4	36 48.1 96 28	160.6	36 19.3 96 27	160.8	6
7	39 23.2 95 31	158.3	38 54.6 95 30	158.5	38 26.0 95 30	158.7	37 57.4 95 30	158.9	37 28.8 95 30	159.1	37 00.2 96 29	159.2	36 31.5 96 29	159.4	36 02.8 96 29	159.6	7
8	39 04.8 95 32	157.1	38 36.4 95 32	157.3	38 07.9 95 32	157.5	37 39.3 95 31	157.7	37 11.0 95 31	157.9	36 42.4 95 31	158.1	36 14.0 95 31	158.3	35 45.5 95 30	158.5	8
9	38 45.4 94 34	155.9	38 17.2 94 34	156.1	37 48.9 94 33	156.3	37 20.6 94 33	156.5	36 52.3 94 33	156.7	36 23.9 94 32	156.9	35 55.6 94 32	157.1	35 27.2 95 32	157.3	9
20	38 25.1 94 35	154.7	37 57.1 94 35	154.9	37 29.0 94 35	155.2	37 00.8 94 34	155.4	36 32.7 94 34	155.6	36 04.5 94 34	155.8	35 36.3 94 34	156.0	35 08.1 94 33	156.2	20
1	38 04.0 93 37	153.6	37 36.1 93 36	153.8	37 08.1 93 36	154.0	36 40.2 93 36	154.2	36 12.2 93 36	154.5	35 44.2 93 35	154.7	35 16.1 93 35	154.9	34 48.1 94 35	155.1	1
2	37 41.9 92 38	152.4	37 14.2 92 38	152.7	36 46.4 93 38	152.9	36 18.7 93 37	153.1	35 50.8 93 37	153.4	35 23.0 93 37	153.6	34 55.1 93 36	153.8	34 27.3 93 36	154.0	2
3	37 19.0 92 40	151.3	36 51.5 92 39	151.5	36 23.9 92 39	151.7	35 56.3 92 39	152.0	35 28.7 92 38	152.3	35 01.0 92 38	152.5	34 33.3 92 38	152.7	34 05.6 92 37	153.0	3
4	36 55.3 91 41	150.2	36 27.9 91 41	150.4	36 00.5 91 40	150.7	35 33.1 91 40	150.9	35 05.6 92 40	151.2	34 38.2 92 39	151.4	34 10.7 92 39	151.6	33 43.1 92 39	151.9	4
25	36 30.7 91 42	149.0	36 03.5 91 42	149.3	35 36.3 91 42	149.6	35 09.1 91 41	149.8	34 41.8 91 41	150.1	34 14.5 91 41	150.3	33 47.2 91 40	150.6	33 19.9 91 40	150.8	25
6	36 05.3 90 44	148.0	35 38.4 90 43	148.2	35 11.4 90 43	148.5	34 44.3 90 43	148.8	34 17.2 90 42	149.0	33 50.1 90 42	149.3	33 23.0 91 42	149.5	32 55.8 91 41	149.8	6
7	35 39.2 89 45	146.9	35 12.4 89 44	147.1	34 45.6 89 44	147.4	34 18.8 90 44	147.7	33 51.9 90 44	148.0	33 24.9 90 43	148.2	32 58.0 90 43	148.5	32 31.0 90 43	148.7	7
8	35 12.3 89 46	145.8	34 45.7 89 46	146.1	34 19.1 89 45	146.4	33 52.4 89 45	146.6	33 25.7 89 45	146.9	32 59.0 89 44	147.2	32 32.3 89 44	147.5	32 05.4 89 44	147.7	8
9	34 44.6 88 47	144.8	34 18.3 88 47	145.0	33 51.8 88 47	145.3	33 25.4 88 46	145.6	32 58.9 88 46	145.9	32 32.3 89 46	146.2	32 05.8 89 45	146.4	31 39.2 89 45	146.7	9
30	34 16.3 87 48	143.7	33 50.1 87 48	144.0	33 23.9 87 48	144.3	32 57.6 88 47	144.6	32 31.3 88 47	144.9	32 05.0 88 47	145.2	31 38.6 88 46	145.4	31 12.2 88 46	145.7	30
1	33 47.2 87 50	142.7	33 21.2 87 49	143.0	32 55.2 87 49	143.3	32 29.1 87 49	143.6	32 03.0 87 48	143.9	31 36.9 87 48	144.2	31 10.7 88 48	144.4	30 44.5 87 47	144.7	1
2	33 17.4 86 51	141.7	32 51.7 86 50	142.0	32 25.8 86 50	142.3	31 59.8 86 50	142.6	31 34.1 86 49	142.9	31 08.1 87 49	143.2	30 42.1 87 49	143.5	30 16.1 87 48	143.8	2
3	32 47.0 85 52	140.7	32 21.4 85 51	141.0	31 55.8 85 51	141.3	31 30.2 86 51	141.6	31 04.4 86 50	141.9	30 38.7 86 50	142.2	30 12.9 86 50	142.5	29 47.1 86 49	142.8	3
4	32 15.9 84 53	139.7	31 50.6 85 52	140.0	31 25.1 85 52	140.3	30 59.7 85 52	140.6	30 34.2 85 52	140.9	30 08.6 85 51	141.2	29 43.0 85 51	141.5	29 17.4 85 50	141.8	4
35	31 44.2 84 54	138.7	31 19.0 84 54	139.0	30 53.8 84 53	139.4	30 28.6 84 53	139.7	30 03.3 84 52	140.0	29 37.9 85 52	140.3	29 12.5 85 52	140.6	28 47.1 85 52	140.9	35
6	31 11.9 83 55	137.8	30 46.9 83 55	138.1	30 21.9 83 54	138.4	29 56.9 84 54	138.7	29 31.8 84 54	139.0	29 06.6 84 53	139.4	28 41.4 84 53	139.7	28 16.2 84 53	140.0	6
7	30 39.0 82 56	136.8	30 14.2 83 56	137.2	29 49.4 83 55	137.5	29 24.5 83 55	137.8	28 59.6 83 54	138.1	28 34.7 83 54	138.4	28 09.7 83 54	138.7	27 44.7 84 54	139.1	7
8	30 05.5 82 57	135.9	29 40.9 82 56	136.2	29 16.3 82 56	136.6	28 51.7 82 56	136.9	28 27.0 82 55	137.2	28 02.2 83 55	137.5	27 37.4 83 55	137.8	27 12.6 83 54	138.2	8
9	29 31.4 81 58	135.0	29 07.0 81 57	135.3	28 42.6 81 57	135.6	28 18.2 82 57	136.0	27 53.7 82 56	136.3	27 29.1 82 56	136.6	27 04.6 82 56	136.9	26 39.9 82 55	137.3	9
40	28 56.8 80 59	134.1	28 32.6 81 58	134.4	28 08.4 81 58	134.7	27 44.2 81 58	135.1	27 19.9 81 57	135.4	26 55.5 81 57	135.7	26 31.1 81 57	136.1	26 06.7 82 56	136.4	40
1	28 21.7 80 59	133.2	27 57.7 80 59	133.5	27 33.7 80 59	133.9	27 09.6 80 58	134.2	26 45.5 80 58	134.5	26 21.4 81 58	134.9	25 57.2 81 57	135.2	25 33.0 81 57	135.5	1
2	27 46.0 79 60	132.3	27 22.2 79 60	132.6	26 58.4 79 60	133.0	26 34.6 80 59	133.3	26 10.7 80 59	133.7	25 46.7 80 59	134.0	25 22.7 80 58	134.3	24 58.7 80 58	134.7	2
3	27 09.9 78 61	131.4	26 46.3 79 61	131.8	26 22.7 79 60	132.1	25 59.0 79 60	132.5	25 35.3 79 60	132.8	25 11.6 79 59	133.1	24 47.8 79 59	133.5	24 23.9 80 59	133.8	3
4	26 33.2 78 62	130.6	26 09.8 78 62	130.9	25 46.4 78 61	131.3	25 23.0 78 61	131.6	24 59.4 78 61	132.0	24 35.9 79 60	132.3	24 12.3 79 60	132.7	23 48.6 79 60	133.0	4
45	25 56.1 77 63	129.7	25 32.9 77 62	130.1	25 09.7 77 62	130.4	24 46.4 78 62	130.8	24 23.1 78 61	131.1	23 59.8 78 61	131.5	23 36.3 78 61	131.8	23 12.9 78 60	132.1	45
6	25 18.5 77 63	128.9	24 55.6 77 63	129.2	24 32.5 77 63	129.6	24 09.5 77 62	130.0	23 46.3 77 62	130.3	23 23.1 77 62	130.6	22 59.9 77 61	131.0	22 36.7 78 61	131.3	6
7	24 40.5 76 64	128.1	24 17.8 76 64	128.4	23 54.9 76 63	128.8	23 32.0 76 63	129.1	23 09.1 77 63	129.5	22 46.1 77 62	129.8	22 23.1 77 62	130.2	22 00.0 77 62	130.5	7
8	24 02.1 75 65	127.3	23 39.5 75 64	127.6	23 16.9 76 64	128.0	22 54.2 76 64	128.3	22 31.4 76 64	128.7	22 08.6 76 63	129.0	21 45.8 76 63	129.4	21 22.9 76 63	129.7	8
9	23 23.3 75 65	126.5	23 00.9 75 65	126.8	22 38.4 75 65	127.2	22 15.9 75 64	127.5	21 53.3 75 64	127.9	21 30.7 76 64	128.2	21 08.0 76 63	128.6	20 45.3 76 63	128.9	9
50	22 44.0 74 66	125.7	22 21.8 74 66	126.0	21 59.5 74 65	126.4	21 37.2 75 65	126.8	21 14.8 75 65	127.1	20 52.4 75 65	127.5	20 29.9 75 64	127.8	20 07.4 75 64	128.2	50
1	22 04.4 73 67	124.9	21 42.4 74 66	125.3	21 20.2 74 66	125.6	20 58.1 74 66	126.0	20 35.9 74 66	126.3	20 13.6 75 65	126.7	19 51.3 75 65	127.0	19 29.0 75 65	127.4	1
2	21 24.4 73 67	124.1	21 02.5 73 67	124.5	20 40.6 73 67	124.8	20 18.6 73 66	125.2	19 56.6 73 66	125.6	19 34.5 74 66	125.9	19 12.4 74 66	126.3	18 50.3 74 65	126.6	2
3	20 44.0 72 68	123.4	20 22.3 72 68	123.7	20 00.6 73 67	124.1	19 38.8 73 67	124.5	19 16.9 73 67	124.8	18 55.0 73 66	125.2	18 33.1 73 66	125.5	18 11.1 73 66	125.9	3
4	20 03.3 72 68	122.6	19 41.8 72 68	123.0	19 20.2 72 68	123.3	18 58.6 72 67	123.7	18 36.9 72 67	124.1	18 15.2 72 67	124.4	17 53.4 73 67	124.8	17 31.6 73 66	125.2	4
55	19 22.3 71 69	121.9	19 00.9 71 69	122.2	18 39.5 71 68	122.6	18 18.0 72 68	123.0	17 56.5 72 68	123.3	17 35.0 72 68	123.7	17 13.4 72 67	124.1	16 51.8 72 67	124.4	55
6	18 40.9 71 70	121.1	18 19.7 71 69	121.5	17 58.4 71 69	121.9	17 37.1 71 69	122.2	17 15.8 71 68	122.6	16 54.4 71 68	123.0	16 33.0 72 68	123.3	16 11.5 72 68	123.7	6
7	17 59.2 70 70	120.4	17 38.1 70 70	120.8	17 17.0 70 70	121.1	16 55.9 70 69	121.5	16 34.7 71 69	121.9	16 13.5 71 69	122.3	15 52.3 71 68	122.6	15 31.0 71 68	123.0	7
8	17 17.1 70 71	119.7	16 56.3 70 70	120.1	16 35.3 70 70	120.4	16 14.4 70 70	120.8	15 53.4 70 69	121.2	15 32.3 70 69	121.6	15 11.2 70 69	121.9	14 50.1 70 69	122.3	8
9	16 34.8 69 71	119.0	16 14.1 69 71	119.4	15 53.6 70 71	119.7	15 32.5 70 70	120.1	15 11.7 70 70	120.5	14 50.8 70 70	120.8	14 29.9 70 69	121.2	14 08.9 70 69	121.6	9
60	15 52.2 69 71	118.3	15 31.6 69 71	118.7	15 11.0 69 71	119.0	14 50.4 69 71	119.4	14 29.7 69 70	119.8	14 09.0 69 70	120.2	13 48.2 69 70	120.5	13 27.4 69 70	120.9	60
1	15 09.3 68 72	117.6	14 48.9 68 72	118.0	14 28.5 68 71	118.3	14 08.0 69 71	118.7	13 47.4 69 71	119.1	13 26.9 69 71	119.5	13 06.3 69 70	119.8	12 45.6 69 70	120.2	1
2	14 26.2 68 72	116.9	14 05.9 68 72	117.3	13 45.6 68 72	117.7	13 25.2 68 72	118.0	13 04.9 68 71	118.4	12 44.5 68 71	118.8	12 24.0 68 71	119.2	12 03.5 68 71	119.5	2
3	13 42.8 67 73	116.2	13 22.6 67 73	116.6	13 02.5 67 72	117.0	12 42.3 67 72	117.4	12 22.0 67 72	117.7	12 01.8 68 72	118.1	11 41.5 68 71	118.5	11 21.2 68 71	118.9	3
4	12 59.1 67 73	115.5	12 39.1 67 73	115.9	12 19.1 67 73	116.3	11 59.0 67 72	116.7	11 38.9 67 72	117.1	11 18.8 67 72	117.5	10 58.7 67 72	117.8	10 38.5 67 72	118.2	4
65	12 15.2 66 74	114.9	11 55.3 66 73	115.3	11 35.4 66 73	115.6	11 15.5 66 73	116.0	10 55.6 67 73	116.4	10 35.6 67 72	116.8	10 15.6 67 72	117.2	9 55.6 67 72	117.5	65
6	11 31.0 66 74	114.2	11 11.3 66 74	114.6	10 51.6 66 73	115.0	10 31.8 66 73	115.4	10 12.0 66 73	115.8	9 52.2 66 73	116.1	9 32.3 66 73	116.5	9 12.5 66 72	116.9	6
7	10 46.6 65 74	113.6	10 27.1 65 74	114.0	10 07.5 65 74	114.3	9 47.8 65 74	114.7	9 28.2 65 73	115.1	9 08.5 66 73	115.5	8 48.8 66 73	115.9	8 29.0 66 73	116.3	7
8	10 02.0 65 75	112.9	9 42.6 65 74	113.3	9 23.1 65 74	113.7	9 03.6 65 74	114.1	8 44.1 65 74	114.5	8 24.5 65 74	114.9	8 05.0 65 73	115.2	7 45.4 65 73	115.6	8
9	9 17.2 64 75	112.3	8 57.9 64 75	112.7	8 38.6 65 75	113.1	8 19.2 65 75	113.4	7 59.8 65 74	113.8	7 40.4 65 74	114.2	7 21.0 65 74	114.6	7 01.5 65 74	115.0	9
70	8 32.2 64 75	111.6	8 13.0 64 75	112.0	7 53.8 64 75	112.4	7 34.6 64 75	112.8	7 15.3 64 75	113.2	6 56.0 64 74	113.6	6 36.7 64 74	114.0	6 17.4 64 74	114.4	70
1	7 47.0 64 75	111.0	7 27.9 64 75	111.4	7 08.8 64 75	111.8	6 49.7 64 75	112.2	6 30.6 64 75	112.6	6 11.4 64 75	113.0	5 52.2 64 74	113.3	5 33.1 64 74	113.7	1
2	7 01.6 63 76	110.4	6 42.6 63 76	110.8	6 23.7 63 76	111.2	6 04.7 63 76	111.6	5 45.6 63 75	112.0	5 26.6 63 75	112.3	5 07.6 63 75	112.7			2
3	6 16.0 63 76	109.8	5 57.2 63 76	110.2	5 38.3 63 76	110.6	5 19.4 63 76	110.9	5 00.5 63 76	111.3							3
4	5 30.2 62 77	109.2	5 11.5 62 76	109.6													4

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00' Alt. (Δd Δt)	Az.	12° 30' Alt. (Δd Δt)	Az.	13° 00' Alt. (Δd Δt)	Az.	13° 30' Alt. (Δd Δt)	Az.	14° 00' Alt. (Δd Δt)	Az.	14° 30' Alt. (Δd Δt)	Az.	15° 00' Alt. (Δd Δt)	Az.	15° 30' Alt. (Δd Δt)	Az.	H.A.
91	6 13.4 58 80	79.7	6 30.8 58 79	79.3	6 48.2 58 79	78.9	7 05.6 58 79	78.4	7 23.0 58 79	78.0	7 40.3 58 79	77.6	7 57.6 58 79	77.2	8 14.9 58 79	76.8	91
2	5 25.7 58 79	79.1	5 43.2 58 79	78.7	6 00.6 58 79	78.3	6 18.1 58 79	77.9	6 35.5 58 79	77.5	6 53.0 58 79	77.1	7 10.4 58 79	76.6	7 27.7 58 78	76.2	2
3					5 13.2 58 79	77.7	5 30.7 58 79	77.3	5 48.2 58 79	76.9	6 05.7 58 79	76.5	6 23.2 58 78	76.1	6 40.6 58 78	75.7	3
4									5 01.0 59 79	76.3	5 18.6 58 79	75.9	5 36.1 58 78	75.5	5 53.7 58 78	75.1	4
95															5 06.8 59 78	74.5	95

Lat. 36° — Declination Same Name as Latitude

Each declination cell lists: Alt (° ′), Δd Δt, Az (°).

H.A.	16° 00′	16° 30′	17° 00′	17° 30′	18° 00′	18° 30′	19° 00′	19° 30′	H.A.
00	70 00.0 1.0 02 180.0	70 30.0 1.0 02 180.0	71 00.0 1.0 02 180.0	71 30.0 1.0 02 180.0	72 00.0 1.0 02 180.0	72 30.0 1.0 02 180.0	73 00.0 1.0 02 180.0	73 30.0 1.0 02 180.0	00
1	69 58.8 1.0 06 177.2	70 28.8 1.0 06 177.1	70 58.8 1.0 06 177.1	71 28.7 1.0 06 176.9	71 58.7 1.0 06 176.9	72 28.7 1.0 07 176.8	72 58.6 1.0 07 176.8	73 28.6 1.0 07 176.7	1
2	69 55.2 1.0 10 174.4	70 25.1 1.0 10 174.3	70 55.0 1.0 10 174.1	71 24.9 1.0 11 174.0	71 54.8 1.0 11 173.9	72 24.7 1.0 11 173.7	72 54.5 1.0 11 173.6	73 24.4 1.0 12 173.4	2
3	69 49.3 99 14 171.6	70 19.1 99 14 171.4	70 48.9 99 14 171.2	71 18.6 99 15 171.0	71 48.3 99 15 170.8	72 18.0 99 15 170.6	72 47.7 99 16 170.4	73 17.4 99 16 170.1	3
4	69 41.1 99 18 168.9	70 10.7 99 18 168.6	70 40.3 99 18 168.4	71 09.8 98 19 168.1	71 39.3 98 19 167.8	72 08.8 98 20 167.5	72 38.3 98 20 167.2	73 07.8 98 20 166.9	4
05	69 30.6 98 21 166.2	70 00.0 98 22 165.9	70 29.3 98 22 165.5	70 58.6 98 23 165.2	71 27.9 98 23 164.9	71 57.1 97 24 164.5	72 26.3 97 24 164.2	72 55.5 97 25 163.8	05
6	69 17.9 97 25 163.5	69 47.0 97 25 163.1	70 16.1 97 26 162.8	70 45.1 97 26 162.4	71 14.1 96 27 162.0	71 43.0 96 27 161.6	72 11.8 96 28 161.1	72 40.6 96 29 160.7	6
7	69 03.0 96 28 160.9	69 31.8 96 28 160.5	70 00.6 96 29 160.1	70 29.3 96 30 159.6	70 57.9 95 31 159.2	71 26.5 95 31 158.7	71 55.0 95 32 158.2	72 23.4 95 33 157.7	7
8	68 46.1 95 32 158.3	69 14.6 95 32 157.9	69 43.0 95 33 157.4	70 11.3 94 33 156.9	70 39.6 94 34 156.4	71 07.8 94 35 155.9	71 35.8 93 36 155.4	72 03.8 93 36 154.8	8
9	68 27.2 94 35 155.8	68 55.3 94 35 155.4	69 23.4 93 36 154.9	69 51.3 93 37 154.3	70 19.2 93 37 153.8	70 46.9 92 38 153.2	71 14.5 92 39 152.6	71 42.1 92 40 152.0	9
10	68 06.4 93 38 153.4	68 34.1 92 38 152.9	69 01.8 92 39 152.4	69 29.3 92 40 151.8	69 56.7 91 40 151.2	70 24.0 91 41 150.6	70 51.2 90 42 150.0	71 18.3 90 43 149.3	10
1	67 43.8 91 41 151.1	68 11.1 91 41 150.5	68 38.3 91 42 149.9	69 05.5 90 43 149.3	69 32.4 90 43 148.7	69 59.3 89 44 148.1	70 26.0 89 45 147.4	70 52.5 88 46 146.7	1
2	67 19.4 90 44 148.8	67 46.4 90 44 148.2	68 13.2 89 45 147.6	68 39.8 89 45 147.0	69 06.4 88 46 146.3	69 32.7 88 47 145.7	69 59.0 87 48 144.9	70 25.0 86 49 144.2	2
3	66 53.5 89 46 146.6	67 20.0 88 47 146.0	67 46.4 88 47 145.3	68 12.6 87 48 144.7	68 38.6 87 49 144.0	69 04.5 86 50 143.3	69 30.3 85 50 142.6	69 55.8 85 51 141.8	3
4	66 26.0 87 48 144.4	66 52.1 87 49 143.8	67 18.0 86 50 143.2	67 43.8 86 50 142.5	68 09.4 85 51 141.8	68 34.8 84 52 141.1	69 00.0 84 53 140.3	69 25.0 83 54 139.6	4
15	65 57.0 86 50 142.4	66 22.7 85 51 141.7	66 48.2 85 52 141.1	67 13.5 84 53 140.4	67 38.6 83 53 139.7	68 03.6 83 54 138.9	68 28.3 82 55 138.2	68 52.9 81 56 137.4	15
6	65 26.7 84 53 140.4	65 52.0 84 53 139.7	66 16.9 83 54 139.0	66 41.9 82 54 138.4	67 06.6 82 55 137.6	67 31.0 81 56 136.9	67 55.3 80 57 136.0	68 19.3 80 58 135.3	6
7	64 55.2 83 55 138.5	65 20.0 82 55 137.8	65 44.6 82 56 137.1	66 09.0 81 57 136.4	66 33.2 80 57 135.7	66 57.3 80 58 134.9	67 21.1 79 59 134.1	67 44.6 78 60 133.3	7
8	64 22.4 82 56 136.6	64 46.8 81 57 135.9	65 11.0 80 58 135.2	65 35.0 80 59 134.5	65 58.8 79 59 133.8	66 22.3 78 60 133.0	66 45.6 77 61 132.2	67 08.7 77 62 131.4	8
9	63 48.5 80 58 134.8	64 12.5 80 59 134.2	64 36.3 79 60 133.5	64 59.8 78 60 132.7	65 23.2 77 61 132.0	65 46.3 77 62 131.2	66 09.2 76 62 130.4	66 31.8 75 63 129.6	9
20	63 13.6 79 60 133.1	63 37.2 78 60 132.4	64 00.5 78 61 131.7	64 23.7 77 62 131.0	64 46.6 76 63 130.2	65 09.3 75 63 129.5	65 31.8 74 64 128.7	65 54.0 74 65 127.9	20
1	62 37.7 78 61 131.5	63 01.0 77 62 130.8	63 23.8 76 63 130.1	63 46.6 75 63 129.3	64 09.1 75 64 128.6	64 31.4 74 65 127.8	64 53.4 73 65 127.0	65 15.2 72 66 126.2	1
2	62 00.9 76 63 129.9	62 23.7 76 63 129.2	62 46.2 75 64 128.5	63 08.6 74 65 127.7	63 30.7 73 65 127.0	63 52.6 73 66 126.2	64 14.3 72 67 125.4	64 35.6 71 67 124.6	2
3	61 23.2 75 64 128.3	61 45.6 74 65 127.6	62 07.8 74 65 126.9	62 29.8 73 66 126.2	62 51.6 72 66 125.5	63 13.1 71 67 124.7	63 34.3 70 68 123.9	63 55.3 69 68 123.1	3
4	60 44.7 74 65 126.9	61 06.8 73 66 126.2	61 28.7 72 66 125.5	61 50.3 72 67 124.7	62 11.7 71 68 124.0	62 32.8 70 68 123.2	62 53.7 69 69 122.4	63 14.3 68 69 121.6	4
25	60 05.5 73 66 125.4	60 27.3 72 67 124.7	60 48.8 71 68 124.0	61 10.0 71 68 123.3	61 31.1 70 69 122.6	61 51.9 69 69 121.8	62 12.4 68 70 121.0	62 32.7 67 70 120.2	25
6	59 25.7 72 67 124.1	59 47.1 71 68 123.4	60 08.2 70 69 122.7	60 29.2 69 69 121.9	60 49.9 69 70 121.2	61 10.3 68 70 120.4	61 30.5 67 71 119.7	61 50.4 66 71 118.9	6
7	58 45.1 71 68 122.7	59 06.2 70 69 122.0	59 27.1 69 70 121.3	59 47.7 68 70 120.6	60 08.1 68 71 119.9	60 28.2 67 71 119.1	60 48.1 66 72 118.4	61 07.7 65 72 117.6	7
8	58 04.0 70 70 121.4	58 24.8 69 70 120.8	58 45.3 68 70 120.1	59 05.6 67 71 119.3	59 25.7 67 71 118.6	59 45.5 66 72 117.9	60 05.1 65 72 117.1	60 24.4 64 73 116.3	8
9	57 22.3 69 70 120.2	57 42.8 68 71 119.5	58 03.0 67 71 118.8	58 23.1 66 72 118.1	58 42.8 66 72 117.4	59 02.4 65 73 116.7	59 21.7 64 73 115.9	59 40.7 63 74 115.1	9
30	56 40.1 68 71 119.0	57 00.3 67 72 118.3	57 20.3 66 72 117.6	57 40.0 65 72 116.9	57 59.5 65 73 116.2	58 18.8 64 73 115.5	58 37.8 63 74 114.7	58 56.5 62 74 114.0	30
1	55 57.4 67 72 117.8	56 17.3 66 72 117.2	56 37.0 65 73 116.5	56 56.5 64 74 115.8	57 15.8 64 74 115.1	57 34.8 63 74 114.4	57 53.5 62 75 113.7	58 12.0 61 75 112.9	1
2	55 14.3 66 73 116.7	55 33.9 65 73 116.0	55 53.4 64 73 115.4	56 12.6 64 74 114.7	56 31.6 63 74 114.0	56 50.3 62 75 113.3	57 08.9 61 75 112.5	57 27.1 60 75 111.8	2
3	54 30.7 65 73 115.6	54 50.1 64 74 114.9	55 09.3 64 74 114.3	55 28.3 63 74 113.6	55 47.1 62 75 112.9	56 05.6 61 75 112.2	56 23.9 61 76 111.5	56 41.9 60 76 110.8	3
4	53 46.7 64 74 114.5	54 05.9 64 74 113.9	54 24.9 63 75 113.2	54 43.6 62 75 112.6	55 02.2 61 75 111.9	55 20.5 61 76 111.2	55 38.5 60 76 110.5	55 56.3 59 76 109.8	4
35	53 02.4 64 74 113.5	53 21.3 63 75 112.9	53 40.1 62 75 112.2	53 58.6 61 76 111.5	54 17.0 61 76 110.9	54 35.1 60 76 110.2	54 52.9 59 76 109.5	55 10.5 58 77 108.8	35
6	52 17.7 63 75 112.5	52 36.5 62 75 111.9	52 55.0 61 76 111.2	53 13.3 61 76 110.6	53 31.5 60 76 109.9	53 49.4 59 77 109.2	54 07.0 58 77 108.5	54 24.4 57 77 107.8	6
7	51 32.7 62 75 111.5	51 51.3 62 76 110.9	52 09.6 61 76 110.3	52 27.7 60 76 109.6	52 45.7 59 77 108.9	53 03.4 59 77 108.3	53 20.9 58 77 107.6	53 38.1 57 78 106.9	7
8	50 47.4 62 76 110.6	51 05.8 61 76 110.0	51 23.9 60 77 109.3	51 41.9 60 77 108.7	51 59.6 59 77 108.0	52 17.2 58 77 107.4	52 34.5 57 78 106.7	52 51.6 56 78 106.0	8
9	50 01.8 61 76 109.7	50 20.0 60 77 109.0	50 38.0 60 77 108.4	50 55.8 59 77 107.8	51 13.4 58 77 107.1	51 30.7 58 78 106.5	51 47.9 57 78 105.8	52 04.8 56 78 105.1	9
40	49 16.0 60 77 108.8	49 34.0 60 77 108.1	49 51.8 59 77 107.5	50 09.5 58 78 106.9	50 26.9 58 78 106.3	50 44.1 57 78 105.6	51 01.1 56 78 105.0	51 17.8 56 79 104.3	40
1	48 29.9 60 77 107.9	48 47.8 59 77 107.3	49 05.4 59 78 106.7	49 22.9 58 78 106.0	49 40.2 57 78 105.4	49 57.2 57 78 104.8	50 14.1 56 79 104.1	50 30.7 55 79 103.5	1
2	47 43.6 59 78 107.0	48 01.3 58 78 106.4	48 18.8 58 78 105.8	48 36.2 57 78 105.2	48 53.3 57 79 104.6	49 10.2 56 79 103.9	49 26.9 55 79 103.3	49 43.4 55 79 102.7	2
3	46 57.1 59 78 106.2	47 14.6 58 78 105.6	47 32.0 58 78 105.0	47 49.2 57 79 104.4	48 06.2 56 79 103.8	48 23.0 56 79 103.1	48 39.6 55 79 102.5	48 56.0 54 79 101.9	3
4	46 10.4 58 78 105.4	46 27.8 58 78 104.8	46 45.1 57 79 104.2	47 02.1 57 79 103.6	47 19.0 56 79 103.0	47 35.7 55 79 102.4	47 52.2 55 79 101.7	48 08.4 54 79 101.1	4
45	45 23.5 58 79 104.6	45 40.8 57 79 104.0	45 57.9 57 79 103.4	46 14.9 56 79 102.8	46 31.6 56 79 102.2	46 48.2 55 79 101.6	47 04.6 54 80 101.0	47 20.7 54 80 100.3	45
6	44 36.4 57 79 103.8	44 53.6 57 79 103.2	45 10.6 56 79 102.6	45 27.4 56 79 102.0	45 44.1 55 79 101.4	46 00.6 55 80 100.8	46 16.9 54 80 100.2	46 32.9 53 80 99.6	6
7	43 49.2 57 79 103.0	44 06.3 56 79 102.4	44 23.2 56 79 101.9	44 39.9 55 79 101.3	44 56.5 55 80 100.7	45 12.8 54 80 100.1	45 29.0 54 80 99.5	45 45.0 53 80 98.9	7
8	43 01.8 57 79 102.2	43 18.8 56 79 101.7	43 35.6 56 79 101.1	43 52.2 55 80 100.5	44 08.7 55 80 100.0	44 25.0 54 80 99.4	44 41.1 53 80 98.8	44 57.0 53 80 98.2	8
9	42 14.3 57 79 101.5	42 31.2 56 80 100.9	42 47.9 55 80 100.4	43 04.5 55 80 99.8	43 20.8 54 80 99.2	43 37.1 54 80 98.7	43 53.1 53 80 98.1	44 08.9 53 80 97.5	9
50	41 26.7 56 80 100.8	41 43.5 56 80 100.2	42 00.1 55 80 99.7	42 16.6 55 80 99.1	42 32.9 54 80 98.5	42 49.0 53 80 98.0	43 05.0 53 80 97.4	43 20.8 52 80 96.8	50
1	40 38.9 56 80 100.1	40 55.7 55 80 99.5	41 12.2 55 80 99.0	41 28.6 54 80 98.4	41 44.8 54 80 97.8	42 00.8 53 80 97.3	42 16.8 53 80 96.7	42 32.5 52 80 96.1	1
2	39 51.1 56 80 99.4	40 07.7 55 80 98.8	40 24.2 54 80 98.3	40 40.5 54 80 97.7	40 56.7 54 80 97.2	41 12.7 53 80 96.6	41 28.6 52 81 96.0	41 44.2 52 81 95.5	2
3	39 03.2 55 80 98.7	39 19.7 55 80 98.1	39 36.1 54 80 97.6	39 52.4 54 80 97.0	40 08.5 53 80 96.5	40 24.5 53 81 95.9	40 40.3 52 81 95.4	40 55.9 52 81 94.8	3
4	38 15.1 55 80 98.0	38 31.6 55 80 97.5	38 48.0 54 80 96.9	39 04.2 54 80 96.4	39 20.3 53 81 95.8	39 36.2 53 81 95.3	39 51.9 52 81 94.7	40 07.5 52 81 94.2	4
55	37 27.0 55 80 97.3	37 43.5 55 80 96.8	37 59.8 54 80 96.3	38 15.9 54 81 95.7	38 31.9 53 81 95.2	38 47.8 53 81 94.6	39 03.5 52 81 94.1	39 19.1 52 81 93.5	55
6	36 38.8 55 80 96.7	36 55.2 54 80 96.1	37 11.5 54 81 95.6	37 27.6 53 81 95.1	37 43.6 53 81 94.5	37 59.4 53 81 94.0	38 15.1 52 81 93.5	38 30.6 52 81 92.9	6
7	35 50.6 55 80 96.0	36 06.9 54 81 95.5	36 23.2 54 81 95.0	36 39.2 53 81 94.4	36 55.2 53 81 93.9	37 11.0 52 81 93.4	37 26.6 52 81 92.8	37 42.1 51 81 92.3	7
8	35 02.3 55 81 95.4	35 18.6 54 81 94.8	35 34.8 54 81 94.3	35 50.8 53 81 93.8	36 06.7 53 81 93.3	36 22.5 52 81 92.8	36 38.1 52 81 92.2	36 53.6 51 81 91.7	8
9	34 13.9 54 81 94.7	34 30.2 54 81 94.2	34 46.4 53 81 93.7	35 02.4 53 81 93.2	35 18.2 52 81 92.7	35 34.0 52 81 92.1	35 49.6 51 81 91.6	36 05.1 51 81 91.1	9
60	33 25.5 54 81 94.1	33 41.8 54 81 93.6	33 57.9 53 81 93.1	34 13.9 53 81 92.6	34 29.7 52 81 92.1	34 45.5 52 81 91.5	35 01.1 52 81 91.0	35 16.5 51 81 90.5	60
1	32 37.1 54 81 93.5	32 53.3 54 81 93.0	33 09.4 53 81 92.5	33 25.4 53 81 92.0	33 41.2 52 81 91.4	33 57.0 52 81 90.9	34 12.5 51 81 90.4	34 28.0 51 81 89.9	1
2	31 48.6 54 81 92.9	32 04.8 54 81 92.4	32 20.9 53 81 91.9	32 36.9 53 81 91.4	32 52.7 52 81 90.8	33 08.4 52 81 90.3	33 24.0 51 81 89.8	33 39.5 51 81 89.3	2
3	31 00.1 54 81 92.2	31 16.3 54 81 91.7	31 32.4 53 81 91.3	31 48.3 53 81 90.8	32 04.2 52 81 90.3	32 19.9 52 81 89.8	32 35.5 51 81 89.2	32 50.9 51 81 88.7	3
4	30 11.6 54 81 91.6	30 27.8 54 81 91.1	30 43.8 53 81 90.7	30 59.8 53 81 90.2	31 15.6 52 81 89.7	31 31.3 52 81 89.2	31 46.9 51 81 88.7	32 02.4 51 81 88.2	4
65	29 23.1 54 81 91.0	29 39.3 54 81 90.6	29 55.3 53 81 90.1	30 11.2 53 81 89.6	30 27.1 52 81 89.1	30 42.8 52 81 88.6	30 58.4 52 81 88.1	31 13.9 51 81 87.6	65
6	28 34.6 54 81 90.4	28 50.7 54 81 90.0	29 06.8 53 81 89.5	29 22.7 53 81 89.0	29 38.6 53 81 88.5	29 54.3 52 81 88.0	30 09.9 52 81 87.5	30 25.4 51 81 87.0	6
7	27 46.0 54 81 89.9	28 02.2 54 81 89.4	28 18.2 53 81 88.9	28 34.2 53 81 88.4	28 50.0 52 81 87.9	29 05.8 52 81 87.4	29 21.4 52 81 87.0	29 37.0 51 81 86.5	7
8	26 57.5 54 81 89.3	27 13.6 54 81 88.8	27 29.7 53 81 88.3	27 45.7 53 81 87.8	28 01.5 52 81 87.4	28 17.3 52 81 86.9	28 33.0 52 81 86.4	28 48.5 51 81 85.9	8
9	26 09.0 54 81 88.7	26 25.1 54 81 88.2	26 41.2 53 81 87.7	26 57.2 53 81 87.3	27 13.1 53 81 86.8	27 28.8 52 81 86.3	27 44.5 52 81 85.8	28 00.1 52 81 85.4	9
70	25 20.4 54 81 88.1	25 36.6 54 81 87.7	25 52.7 53 81 87.2	26 08.7 53 81 86.7	26 24.7 53 81 86.2	26 40.4 53 81 85.8	26 56.1 52 81 85.3	27 11.8 52 81 84.8	70
1	24 31.9 54 81 87.5	24 48.1 54 81 87.1	25 04.2 54 81 86.6	25 20.2 53 81 86.1	25 36.2 53 81 85.7	25 52.0 53 81 85.2	26 07.8 52 81 84.7	26 23.4 52 80 84.3	1
2	23 43.4 54 81 87.0	23 59.7 54 81 86.5	24 15.8 54 81 86.0	24 31.8 53 81 85.6	24 47.8 53 81 85.1	25 03.7 53 81 84.7	25 19.5 52 80 84.2	25 35.2 52 80 83.7	2
3	22 55.0 54 81 86.4	23 11.2 54 81 85.9	23 27.4 54 81 85.5	23 43.5 53 81 85.0	23 59.5 53 81 84.6	24 15.4 53 80 84.1	24 31.2 53 80 83.6	24 46.9 52 80 83.2	3
4	22 06.5 54 81 85.8	22 22.8 54 81 85.4	22 39.0 54 81 84.9	22 55.1 54 80 84.5	23 11.2 53 80 84.0	23 27.1 53 80 83.6	23 43.0 53 80 83.1	23 58.8 52 80 82.6	4
75	21 18.2 54 81 85.3	21 34.5 54 81 84.8	21 50.7 54 80 84.4	22 06.8 54 80 83.9	22 22.9 53 80 83.5	22 38.9 53 80 83.0	22 54.8 53 80 82.5	23 10.7 52 80 82.1	75
6	20 29.8 55 81 84.7	20 46.1 54 81 84.3	21 02.4 54 80 83.8	21 18.6 54 80 83.4	21 34.7 53 80 82.9	21 50.8 53 80 82.5	22 06.7 53 80 82.0	22 22.6 52 80 81.5	6
7	19 41.5 55 80 84.2	19 57.9 54 81 83.7	20 14.2 54 80 83.3	20 30.4 54 80 82.8	20 46.6 54 80 82.4	21 02.7 53 80 81.9	21 18.7 53 80 81.5	21 34.6 53 80 81.0	7
8	18 53.2 55 80 83.6	19 09.6 55 80 83.2	19 26.0 54 80 82.7	19 42.3 54 80 82.3	19 58.5 54 80 81.8	20 14.6 54 80 81.4	20 30.7 53 80 80.9	20 46.7 53 80 80.5	8
9	18 05.0 55 80 83.0	18 21.5 55 80 82.6	18 37.9 54 80 82.2	18 54.2 54 80 81.7	19 10.5 54 80 81.3	19 26.7 54 80 80.8	19 42.8 54 80 80.4	19 58.9 53 80 79.9	9
80	17 16.9 55 80 82.5	17 33.4 55 80 82.0	17 49.8 55 80 81.6	18 06.2 55 80 81.2	18 22.5 54 80 80.7	18 38.8 54 80 80.3	18 55.0 54 79 79.8	19 11.2 54 79 79.4	80
1	16 28.5 55 80 81.9	16 45.3 55 80 81.5	17 01.8 55 80 81.1	17 18.3 55 80 80.6	17 34.7 55 80 80.2	17 51.0 54 80 79.7	18 07.3 54 79 79.3	18 23.5 54 79 78.9	1
2	15 40.7 55 80 81.4	15 57.4 55 80 80.9	16 13.9 55 80 80.5	16 30.4 55 80 80.1	16 46.9 55 80 79.6	17 03.3 55 79 79.2	17 19.6 54 79 78.8	17 35.9 54 79 78.3	2
3	14 52.8 56 80 80.8	15 09.5 55 80 80.4	15 26.1 55 80 80.0	15 42.6 55 80 79.5	15 59.2 55 80 79.1	16 15.6 55 79 78.7	16 32.0 55 79 78.2	16 48.4 54 79 77.8	3
4	14 04.9 56 80 80.3	14 21.6 56 80 79.8	14 38.3 56 80 79.4	14 55.0 55 79 79.0	15 11.5 55 79 78.6	15 28.1 55 79 78.1	15 44.6 55 79 77.7	16 01.0 54 79 77.2	4
85	13 17.1 56 80 79.7	13 33.9 56 79 79.3	13 50.6 56 79 78.9	14 07.4 56 79 78.4	14 24.0 55 79 78.0	14 40.6 55 79 77.6	14 57.2 55 79 77.1	15 13.7 55 79 76.7	85
6	12 29.4 56 79 79.2	12 46.2 56 79 78.7	13 03.1 56 79 78.3	13 19.8 56 79 77.9	13 36.5 56 79 77.5	13 53.3 55 79 77.0	14 09.8 55 79 76.6	14 26.5 55 78 76.2	6
7	11 41.7 57 79 78.6	11 58.7 56 79 78.2	12 15.6 56 79 77.8	12 32.4 56 79 77.3	12 49.3 56 79 76.9	13 06.0 56 79 76.5	13 22.8 56 78 76.1	13 39.5 55 78 75.6	7
8	10 54.2 57 79 78.1	11 11.2 57 79 77.6	11 28.2 57 79 77.2	11 45.1 56 79 76.8	12 02.0 56 79 76.4	12 18.9 56 78 75.9	12 35.7 56 78 75.5	12 52.5 56 78 75.1	8
9	10 06.8 57 79 77.5	10 23.9 57 79 77.1	10 40.9 57 79 76.7	10 57.9 57 79 76.2	11 14.9 57 78 75.8	11 31.9 56 78 75.4	11 48.8 56 78 75.0	12 05.7 56 78 74.6	9
90	9 19.4 57 79 76.9	9 36.6 57 79 76.5	9 53.7 57 78 76.1	10 10.8 57 78 75.7	10 27.9 57 78 75.3	10 44.9 57 78 74.9	11 01.9 57 78 74.4	11 18.9 57 78 74.0	90

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
00	38 00.0	1.0 01	180.0	37 30.0	1.0 01	180.0	37 00.0	1.0 01	180.0	36 30.0	1.0 01	180.0	36 00.0	1.0 01	180.0	35 30.0	1.0 01	180.0	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	00
1	37 59.5	1.0 03	178.8	37 29.5	1.0 03	178.8	36 59.5	1.0 03	178.8	36 29.5	1.0 03	178.8	35 59.5	1.0 02	178.8	35 29.5	1.0 02	178.8	34 59.5	1.0 02	178.9	34 29.5	1.0 02	178.9	1
2	37 57.9	1.0 04	177.6	37 28.0	1.0 04	177.6	36 58.0	1.0 04	177.6	36 28.0	1.0 04	177.6	35 58.0	1.0 04	177.7	35 28.0	1.0 04	177.7	34 58.0	1.0 04	177.7	34 28.1	1.0 04	177.7	2
3	37 55.4	1.0 06	176.3	37 25.4	1.0 06	176.4	36 55.4	1.0 06	176.4	36 25.5	1.0 06	176.4	35 55.5	1.0 06	176.5	35 25.6	1.0 06	176.5	34 55.6	1.0 06	176.6	34 25.6	1.0 06	176.6	3
4	37 51.7	1.0 08	175.1	37 21.8	1.0 08	175.2	36 51.9	1.0 08	175.2	36 22.0	1.0 08	175.3	35 52.0	1.0 07	175.3	35 22.1	1.0 07	175.3	34 52.2	1.0 07	175.4	34 22.3	1.0 07	175.4	4
05	37 47.1	1.0 09	173.9	37 17.2	1.0 09	174.0	36 47.3	1.0 09	174.0	36 17.5	1.0 09	174.1	35 47.6	1.0 09	174.1	35 17.7	1.0 09	174.2	34 47.8	1.0 09	174.2	34 17.9	1.0 09	174.3	05
6	37 41.5	99 11	172.7	37 11.6	99 11	172.8	36 41.8	99 11	172.8	36 12.0	99 11	172.9	35 42.1	99 11	173.0	35 12.3	99 11	173.0	34 42.4	99 11	173.1	34 12.6	99 10	173.2	6
7	37 34.8	99 13	171.5	37 05.0	99 13	171.6	36 35.2	99 13	171.7	36 05.5	99 12	171.7	35 35.7	99 12	171.8	35 05.9	99 12	171.9	34 36.1	99 12	172.0	34 06.3	99 12	172.0	7
8	37 27.1	99 14	170.4	36 57.4	99 14	170.4	36 27.7	99 14	170.5	35 58.0	99 14	170.6	35 28.3	99 14	170.7	34 58.6	99 14	170.7	34 28.9	99 14	170.8	33 59.1	99 14	170.9	8
9	37 18.4	99 16	169.1	36 48.8	99 16	169.2	36 19.2	99 16	169.3	35 49.6	99 16	169.4	35 19.9	99 16	169.5	34 50.3	99 15	169.6	34 20.6	99 15	169.7	33 51.0	99 15	169.8	9
10	37 08.8	98 18	167.9	36 39.2	98 18	168.0	36 09.7	98 17	168.1	35 40.1	98 17	168.2	35 10.6	99 17	168.3	34 41.0	99 17	168.4	34 11.5	99 17	168.6	33 41.9	99 17	168.7	10
1	36 58.1	98 19	166.7	36 28.7	98 19	166.8	35 59.2	98 19	167.0	35 29.8	98 19	167.1	35 00.3	98 19	167.2	34 30.8	98 19	167.3	34 01.4	98 18	167.4	33 31.9	98 18	167.5	1
2	36 46.5	98 21	165.6	36 17.1	98 21	165.7	35 47.8	98 21	165.8	35 18.4	98 20	165.9	34 49.1	98 20	166.1	34 19.7	98 20	166.2	33 50.3	98 20	166.3	33 21.0	98 20	166.4	2
3	36 33.9	97 22	164.4	36 04.7	97 22	164.5	35 35.4	97 22	164.7	35 06.2	97 22	164.8	34 36.9	98 22	164.9	34 07.7	98 21	165.1	33 38.4	98 21	165.2	33 09.1	98 21	165.3	3
4	36 20.3	97 24	163.2	35 51.2	97 24	163.4	35 22.1	97 24	163.5	34 53.0	97 24	163.7	34 23.8	97 23	163.8	33 54.7	97 23	164.0	33 25.5	97 23	164.1	32 56.4	97 23	164.2	4
15	36 05.9	97 26	162.1	35 36.9	97 25	162.2	35 07.9	97 25	162.4	34 38.9	97 25	162.5	34 09.9	97 25	162.7	33 40.8	97 25	162.8	33 11.8	97 24	163.0	32 42.7	97 24	163.1	15
6	35 50.5	96 27	160.9	35 21.6	96 27	161.1	34 52.7	96 27	161.3	34 23.9	96 27	161.4	33 55.0	96 26	161.6	33 26.1	96 26	161.7	32 57.2	96 26	161.9	32 28.2	96 26	162.1	6
7	35 34.1	96 29	159.8	35 05.4	96 28	160.0	34 36.7	96 28	160.1	34 08.0	96 28	160.3	33 39.2	96 28	160.5	33 10.4	96 28	160.7	32 41.6	96 27	160.8	32 12.8	96 27	161.0	7
8	35 16.9	95 30	158.7	34 48.3	95 30	158.8	34 19.7	95 30	159.0	33 51.2	95 30	159.2	33 22.5	95 29	159.4	32 53.9	95 29	159.6	32 25.3	95 29	159.7	31 56.6	95 29	159.9	8
9	34 58.8	95 32	157.5	34 30.4	95 31	157.7	34 02.0	95 31	157.9	33 33.5	95 31	158.1	33 05.0	95 31	158.3	32 36.5	95 30	158.5	32 08.0	95 30	158.7	31 39.5	95 30	158.9	9
20	34 39.8	94 33	156.4	34 11.6	94 33	156.6	33 43.3	94 33	156.8	33 15.0	94 32	157.0	32 46.7	94 32	157.2	32 18.3	94 32	157.4	31 50.0	95 31	157.6	31 21.6	95 31	157.8	20
1	34 20.0	94 34	155.3	33 51.9	94 34	155.6	33 23.8	94 34	155.8	32 55.6	94 34	156.0	32 27.5	94 33	156.2	31 59.3	94 33	156.4	31 31.1	94 33	156.6	31 02.9	94 33	156.8	1
2	33 59.3	93 36	154.3	33 31.4	93 36	154.5	33 03.4	93 35	154.7	32 35.5	93 35	154.9	32 07.5	93 35	155.1	31 39.4	93 34	155.3	31 11.4	94 34	155.5	30 43.3	94 34	155.7	2
3	33 37.9	93 37	153.2	33 10.1	93 37	153.4	32 42.3	93 37	153.6	32 14.5	93 36	153.8	31 46.6	93 36	154.1	31 18.8	93 36	154.3	30 50.9	93 35	154.5	30 23.0	93 35	154.7	3
4	33 15.6	92 38	152.1	32 48.0	92 38	152.4	32 20.3	92 38	152.6	31 52.7	92 38	152.8	31 25.0	92 37	153.0	30 57.3	92 37	153.3	30 29.6	92 37	153.5	30 01.9	92 36	153.7	4
25	32 52.5	91 40	151.1	32 25.0	91 39	151.3	31 57.6	92 39	151.6	31 30.1	92 39	151.8	31 02.6	92 39	152.0	30 35.1	92 38	152.3	30 07.6	92 38	152.5	29 40.0	92 38	152.7	25
6	32 28.6	91 41	150.0	32 01.4	91 41	150.3	31 34.1	91 40	150.5	31 06.8	91 40	150.8	30 39.5	91 40	151.0	30 12.1	91 40	151.2	29 44.8	91 39	151.5	29 17.4	91 39	151.7	6
7	32 04.0	90 42	149.0	31 36.9	90 42	149.3	31 09.8	90 42	149.5	30 42.7	90 41	149.8	30 15.6	91 41	150.0	29 48.4	91 41	150.3	29 21.2	91 40	150.5	28 54.0	91 40	150.7	7
8	31 38.6	89 44	148.0	31 11.7	90 43	148.2	30 44.6	90 43	148.5	30 17.9	90 43	148.7	29 51.0	90 42	149.0	29 24.0	90 42	149.3	28 57.0	90 42	149.5	28 29.9	90 41	149.8	8
9	31 12.5	89 44	147.0	30 45.8	89 44	147.3	30 19.1	89 44	147.5	29 52.4	89 44	147.8	29 25.6	89 44	148.0	28 58.8	89 43	148.3	28 32.0	89 43	148.5	28 05.1	89 42	148.8	9
30	30 45.7	88 46	146.0	30 19.2	88 46	146.3	29 52.7	88 45	146.5	29 26.2	89 45	146.8	28 59.6	89 45	147.1	28 33.0	89 44	147.3	28 06.3	89 44	147.6	27 39.6	89 44	147.9	30
1	30 18.2	88 47	145.0	29 51.9	88 47	145.3	29 25.6	88 46	145.6	28 59.2	88 46	145.8	28 32.8	88 46	146.1	28 06.4	88 45	146.4	27 40.0	88 45	146.6	27 13.5	88 45	146.9	1
2	29 50.1	87 48	144.0	29 24.0	87 48	144.3	28 57.8	87 47	144.6	28 31.7	87 47	144.9	28 05.4	87 47	145.2	27 39.2	88 46	145.4	27 12.9	88 46	145.7	26 46.6	88 46	146.0	2
3	29 21.2	86 49	143.1	28 55.3	86 49	143.4	28 29.4	87 48	143.7	28 03.4	87 48	143.9	27 37.4	87 48	144.2	27 11.3	87 48	144.5	26 45.3	87 47	144.8	26 19.2	87 47	145.1	3
4	28 51.7	86 50	142.1	28 26.0	86 50	142.4	28 00.3	86 50	142.7	27 34.5	86 49	143.0	27 08.7	86 49	143.3	26 42.8	86 49	143.6	26 17.0	86 48	143.9	25 51.0	86 48	144.1	4′
35	28 21.6	85 51	141.2	27 56.1	85 51	141.5	27 30.6	85 51	141.8	27 05.0	85 50	142.1	26 39.4	85 50	142.4	26 13.7	86 50	142.7	25 48.0	86 49	143.0	25 22.3	86 49	143.2	35
6	27 50.9	84 52	140.3	27 25.6	84 52	140.6	27 00.3	85 52	140.9	26 34.9	85 51	141.2	26 09.4	85 51	141.5	25 44.0	85 51	141.8	25 18.5	85 50	142.1	24 53.0	85 50	142.4	6
7	27 19.6	84 53	139.4	26 54.5	84 53	139.7	26 29.3	84 52	140.0	26 04.1	84 52	140.3	25 38.9	84 52	140.6	25 13.7	84 52	140.9	24 48.3	84 51	141.2	24 23.0	85 51	141.5	7
8	26 47.7	83 54	138.5	26 22.8	83 54	138.8	25 57.8	83 53	139.1	25 32.8	83 53	139.4	25 07.8	84 53	139.7	24 42.7	84 52	140.0	24 17.6	84 52	140.3	23 52.5	84 52	140.6	8
9	26 15.2	82 55	137.6	25 50.5	82 55	137.9	25 25.8	83 55	138.2	25 01.0	83 54	138.5	24 36.1	83 54	138.8	24 11.3	83 53	139.1	23 46.4	83 53	139.4	23 21.4	83 53	139.7	9
40	25 42.2	82 56	136.7	25 17.7	82 56	137.0	24 53.2	82 55	137.3	24 28.5	82 55	137.7	24 03.9	82 55	138.0	23 39.2	82 54	138.3	23 14.5	82 54	138.6	22 49.8	83 54	138.9	40
1	25 08.7	81 57	135.8	24 44.4	81 56	136.2	24 20.0	81 56	136.5	23 55.6	81 56	136.8	23 31.1	82 56	137.1	23 06.7	82 55	137.4	22 42.1	82 55	137.7	22 17.6	82 54	138.1	1
2	24 34.6	80 58	135.0	24 10.5	80 57	135.3	23 46.3	81 57	135.6	23 22.1	81 57	136.0	22 57.9	81 56	136.3	22 33.6	81 56	136.6	22 09.2	81 56	136.9	21 44.9	81 55	137.2	2
3	24 00.0	80 58	134.1	23 36.1	80 58	134.5	23 12.1	80 58	134.8	22 48.1	80 58	135.1	22 24.0	80 57	135.4	22 00.0	80 57	135.8	21 35.8	80 57	136.1	21 11.7	81 56	136.4	3
4	23 24.9	79 59	133.3	23 01.2	79 59	133.6	22 37.4	79 59	134.0	22 13.6	79 58	134.3	21 49.7	80 58	134.6	21 25.8	80 58	135.0	21 01.9	80 57	135.3	20 37.9	80 57	135.6	4
45	22 49.4	78 60	132.5	22 25.8	79 60	132.8	22 02.2	79 59	133.2	21 38.6	79 59	133.5	21 15.0	79 59	133.8	20 51.3	79 58	134.1	20 27.5	79 58	134.5	20 03.7	79 58	134.8	45
6	22 13.3	78 61	131.7	21 50.0	78 60	132.0	21 26.6	78 60	132.3	21 03.2	78 60	132.7	20 39.7	78 60	133.0	20 16.2	78 59	133.3	19 52.6	79 59	133.7	19 29.1	79 59	134.0	6
7	21 36.9	77 62	130.9	21 13.7	77 61	131.2	20 50.5	77 61	131.6	20 27.3	78 61	131.9	20 04.0	78 60	132.2	19 40.7	78 60	132.6	19 17.3	78 60	132.9	18 53.9	78 59	133.2	7
8	20 59.9	77 62	130.1	20 37.0	77 62	130.4	20 14.0	77 62	130.8	19 50.9	77 61	131.1	19 27.8	77 61	131.4	19 04.7	77 61	131.8	18 41.5	77 60	132.1	18 18.3	77 60	132.5	8
9	20 22.6	76 63	129.3	19 59.8	76 63	129.6	19 37.0	76 62	130.0	19 14.1	76 62	130.3	18 51.2	76 62	130.7	18 28.3	77 61	131.0	18 05.3	77 61	131.4	17 42.3	77 61	131.7	9
50	19 44.8	75 64	128.5	19 22.2	75 63	128.9	18 59.6	76 63	129.2	18 36.9	76 63	129.6	18 14.2	76 62	129.9	17 51.4	76 62	130.3	17 28.6	76 62	130.6	17 05.8	76 61	130.9	50
1	19 06.6	75 64	127.8	18 44.2	75 64	128.1	18 21.8	75 64	128.5	17 59.3	75 63	128.8	17 36.7	75 63	129.2	17 14.2	75 63	129.5	16 51.6	75 62	129.8	16 28.9	76 62	130.2	1
2	18 28.1	74 65	127.0	18 05.8	74 65	127.4	17 43.6	74 64	127.7	17 21.2	74 64	128.1	16 58.9	75 64	128.4	16 36.5	75 63	128.8	16 14.1	75 63	129.1	15 51.7	75 63	129.4	2
3	17 49.1	73 66	126.3	17 27.1	74 65	126.6	17 05.0	74 65	127.0	16 42.8	74 65	127.3	16 20.7	74 64	127.7	15 58.5	74 64	128.0	15 36.2	74 64	128.4	15 14.0	74 63	128.7	3
4	17 09.8	73 66	125.5	16 47.9	73 66	125.9	16 26.0	73 66	126.2	16 04.0	73 65	126.6	15 42.1	73 65	126.9	15 20.0	73 65	127.3	14 58.0	74 64	127.6	14 35.9	74 64	128.0	4
55	16 30.1	72 67	124.8	16 08.4	72 66	125.1	15 46.7	73 66	125.5	15 24.9	73 66	125.8	15 03.1	73 66	126.2	14 41.2	73 65	126.6	14 19.4	73 65	126.9	13 57.5	73 65	127.3	55
6	15 50.1	72 67	124.1	15 28.5	72 67	124.4	15 07.0	72 67	124.8	14 45.4	72 66	125.2	14 23.7	72 66	125.5	14 02.1	72 66	125.9	13 40.4	72 66	126.2	13 18.7	72 65	126.6	6
7	15 09.7	71 68	123.4	14 48.3	71 68	123.7	14 26.9	71 67	124.1	14 05.3	71 67	124.4	13 44.1	71 67	124.8	13 22.6	72 66	125.2	13 01.1	72 66	125.5	12 39.5	72 66	125.9	7
8	14 29.0	71 68	122.7	14 07.8	71 68	123.0	13 46.6	71 68	123.4	13 25.3	71 68	123.7	13 04.0	71 67	124.1	12 42.7	71 67	124.5	12 21.4	71 67	124.8	12 00.0	71 66	125.2	8
9	13 47.9	70 69	122.0	13 26.9	70 69	122.3	13 05.9	70 68	122.7	12 44.8	70 68	123.1	12 23.7	70 68	123.4	12 02.5	71 68	123.8	11 41.4	71 67	124.1	11 20.2	71 67	124.5	9
60	13 06.6	70 69	121.3	12 45.8	70 69	121.6	12 24.7	70 69	122.0	12 04.0	70 69	122.3	11 43.0	70 68	122.7	11 22.0	70 68	123.1	11 01.0	70 68	123.5	10 40.0	70 67	123.8	60
1	12 25.0	69 70	120.6	12 04.3	69 70	121.0	11 43.6	69 69	121.3	11 22.8	69 69	121.7	11 02.0	69 69	122.1	10 41.2	69 69	122.4	10 20.4	69 69	122.8	9 59.5	70 68	123.2	1
2	11 43.0	68 70	119.9	11 22.5	68 70	120.3	11 01.9	69 70	120.7	10 41.4	69 70	121.0	10 20.7	69 69	121.4	10 00.1	69 69	121.8	9 39.4	69 69	122.1	9 18.7	69 68	122.5	2
3	11 00.8	68 71	119.2	10 40.4	68 70	119.6	10 20.0	68 70	120.0	9 59.6	68 70	120.4	9 39.2	68 70	120.7	9 18.7	68 70	121.1	8 58.2	68 69	121.5	8 37.7	68 69	121.8	3
4	10 18.3	67 71	118.6	9 58.1	67 71	119.0	9 37.9	68 71	119.3	9 17.6	68 71	119.7	8 57.3	68 70	120.1	8 37.0	68 70	120.4	8 16.6	68 70	120.8	7 56.3	68 69	121.2	4
65	9 35.6	67 72	117.9	9 15.5	67 71	118.3	8 55.4	67 71	118.7	8 35.3	67 71	119.1	8 15.1	67 71	119.4	7 55.0	67 70	119.8	7 34.8	67 70	120.2	7 14.6	67 70	120.5	65
6	8 52.6	66 72	117.3	8 32.6	66 72	117.7	8 12.7	67 72	118.0	7 52.7	67 72	118.4	7 32.7	67 71	118.8	7 12.7	67 71	119.2	6 52.7	67 71	119.5	6 32.7	67 70	119.9	6
7	8 09.3	66 73	116.6	7 49.5	66 72	117.0	7 29.7	66 72	117.4	7 09.9	66 72	117.8	6 50.1	66 72	118.2	6 30.2	66 71	118.5	6 10.3	66 71	118.9	5 50.5	66 71	119.3	7
8	7 25.8	65 73	116.0	7 06.1	65 73	116.4	6 46.5	66 72	116.8	6 26.8	66 72	117.1	6 07.1	66 72	117.5	5 47.4	66 72	117.9	5 27.7	66 71	118.3	5 08.0	66 71	118.7	8
9	6 42.0	65 73	115.4	6 22.5	65 73	115.7	6 03.0	65 73	116.1	5 43.5	65 73	116.5	5 24.0	65 72	116.9	5 04.4	65 72	117.3							9
70	5 58.1	64 74	114.7	5 38.7	65 73	115.1	5 19.3	65 73	115.5	5 00.0	65 73	115.9													70
1	5 13.9	64 74	114.1																						1

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
91	8 32.2	58 79	76.4	8 49.4	57 78	76.0	9 06.7	57 78	75.6	9 23.9	57 78	75.1	9 41.0	57 78	74.7	9 58.1	57 78	74.3	10 15.2	57 78	73.9	10 32.3	57 77	73.5	91
2	7 45.1	58 79	75.8	8 02.4	58 78	75.4	8 19.7	58 78	75.0	8 37.0	58 78	74.6	8 54.3	57 78	74.2	9 11.5	57 78	73.8	9 28.7	57 77	73.3	9 45.8	57 77	72.9	2
3	6 58.1	58 79	75.3	7 15.5	58 78	74.8	7 32.9	58 78	74.4	7 50.3	58 78	73.9	8 07.6	58 78	73.6	8 24.9	58 77	73.2	8 42.2	58 77	72.8	8 59.5	57 77	72.4	3
4	6 11.2	58 79	74.7	6 28.7	58 78	74.3	6 46.2	58 78	73.9	7 03.7	58 77	73.5	7 21.1	58 77	73.1	7 38.5	58 77	72.6	7 55.9	58 77	72.2	8 13.3	58 77	71.8	4
95	5 24.4	59 78	74.1	5 42.0	59 78	73.7	5 59.6	59 77	73.3	6 17.2	59 77	72.9	6 34.8	59 77	72.5	6 52.3	58 77	72.1	7 09.8	58 77	71.7	7 27.3	58 76	71.3	95
6							5 13.2	59 77	72.8	5 30.9	59 77	72.3	5 48.5	59 77	71.9	6 06.2	59 77	71.5	6 23.8	58 76	71.1	6 41.4	59 76	70.7	6
7													5 02.5	59 77	71.4	5 20.2	59 76	71.0	5 37.9	59 76	70.6	5 55.6	59 76	70.2	7
8																						5 10.1	59 76	69.6	8

16—68158-1

Lat. 36°

Each declination group below gives **Alt.** (° ′), the small **Δd Δt** values, and **Az.** (°).

H.A.	20°00′ Alt.	Δd Δt	Az.	20°30′ Alt.	Δd Δt	Az.	21°00′ Alt.	Δd Δt	Az.	21°30′ Alt.	Δd Δt	Az.	22°00′ Alt.	Δd Δt	Az.	22°30′ Alt.	Δd Δt	Az.	23°00′ Alt.	Δd Δt	Az.	23°30′ Alt.	Δd Δt	Az.	H.A.
00	74 00.0	1.0 02	180.0	74 30.0	1.0 02	180.0	75 00.0	1.0 03	180.0	75 30.0	1.0 03	180.0	76 00.0	1.0 03	180.0	76 30.0	1.0 03	180.0	77 00.0	1.0 03	180.0	77 30.0	1.0 03	180.0	00
1	73 58.6	1.0 07	176.6	74 28.5	1.0 07	176.5	74 58.5	1.0 08	176.4	75 28.4	1.0 08	176.3	75 58.4	1.0 08	176.2	76 28.3	1.0 08	176.0	76 58.3	1.0 09	175.9	77 28.2	1.0 09	175.8	1
2	73 54.2	99 12	173.2	74 24.1	99 12	173.0	74 53.9	99 13	172.6	75 23.7	99 13	172.2	75 53.5	99 13	171.9	76 23.3	99 13	171.9	76 53.0	99 14	171.7	77 22.9	99 15	171.6	2
3	73 47.1	99 17	169.9	74 16.7	99 17	169.6	74 46.4	99 18	169.3	75 15.9	99 18	169.0	75 45.5	99 18	168.6	76 15.1	99 19	168.3	76 44.6	98 20	167.9	77 14.0	98 20	167.5	3
4	73 37.2	98 21	166.6	74 06.5	98 22	166.2	74 35.9	98 22	165.8	75 05.2	98 23	165.4	75 34.4	97 24	165.0	76 03.6	97 24	164.5	76 32.7	97 25	164.0	77 01.8	97 26	163.4	4
05	73 24.6	97 25	163.3	73 53.6	97 26	162.9	74 22.6	97 27	162.4	74 51.5	96 27	161.9	75 20.4	96 28	161.4	75 49.1	96 29	160.8	76 17.8	95 30	160.2	76 46.4	95 31	159.6	05
6	73 09.4	96 29	160.2	73 38.0	96 30	159.7	74 06.6	95 31	159.1	74 35.1	95 32	158.5	75 03.5	94 33	157.9	75 31.8	94 34	157.3	75 59.9	94 34	156.6	76 28.0	93 35	155.8	6
7	72 51.7	94 33	157.1	73 19.9	94 34	156.5	73 48.0	94 35	155.9	74 16.0	93 36	155.3	74 43.9	93 37	154.6	75 11.7	92 38	153.7	75 39.3	92 39	153.1	76 06.7	91 40	152.2	7
8	72 31.7	93 37	154.2	72 59.4	92 38	153.5	73 27.0	92 39	152.8	73 54.5	91 40	152.1	74 21.9	91 41	151.4	74 49.0	90 42	150.6	75 16.0	90 43	149.8	75 42.8	89 44	148.9	8
9	72 09.4	91 40	151.3	72 36.7	91 41	150.6	73 03.8	90 42	149.9	73 30.7	90 43	149.1	73 57.5	89 44	148.3	74 24.1	88 45	147.5	74 50.4	88 46	146.6	75 16.6	87 47	145.6	9
10	71 45.1	89 44	148.6	72 11.9	89 45	147.9	72 38.4	88 46	147.1	73 04.8	88 46	146.3	73 31.0	87 48	145.4	73 56.9	86 49	144.5	74 22.6	85 50	143.6	74 48.1	84 51	142.6	10
1	71 18.9	88 47	146.0	71 45.1	87 48	145.2	72 11.1	86 48	144.4	72 36.9	86 50	143.5	73 02.5	85 50	142.7	73 27.8	84 51	141.7	73 52.9	83 53	140.8	74 17.7	82 54	139.7	1
2	70 50.9	86 50	143.5	71 16.5	85 50	142.7	71 42.0	84 52	141.8	72 07.2	84 52	140.9	72 32.1	83 53	140.0	72 56.9	82 54	139.1	73 21.3	81 55	138.1	73 45.4	80 56	137.0	2
3	70 21.1	84 52	141.0	70 46.2	83 53	140.2	71 11.1	83 54	139.4	71 35.8	82 55	138.5	72 00.2	81 56	137.5	72 24.3	80 57	136.6	72 48.1	79 58	135.6	73 11.5	78 59	134.5	3
4	69 49.9	82 54	138.8	70 14.4	82 55	137.9	70 38.8	81 56	137.0	71 02.9	80 57	136.1	71 26.7	79 58	135.2	71 50.2	78 59	134.2	72 13.4	77 60	133.2	72 36.2	76 61	132.1	4
15	69 17.2	81 57	136.6	69 41.2	80 58	135.7	70 05.0	79 58	134.8	70 28.5	78 59	133.9	70 51.8	77 60	132.9	71 14.7	76 61	132.0	71 37.3	75 62	130.9	71 59.5	74 63	129.8	15
6	68 43.1	79 60	134.5	69 06.7	78 60	133.6	69 30.0	77 60	132.7	69 52.9	76 61	131.8	70 15.5	75 62	130.8	70 38.0	74 63	129.8	71 00.0	73 64	128.8	71 21.7	72 65	127.7	6
7	68 07.9	77 61	132.5	68 31.0	76 61	131.6	68 53.7	75 62	130.7	69 16.2	74 63	129.8	69 38.3	73 64	128.8	70 00.2	72 65	127.8	70 21.7	71 66	126.8	70 42.8	70 66	125.7	7
8	67 31.6	76 62	130.6	67 54.1	75 63	129.7	68 16.4	74 64	128.8	68 38.4	73 65	127.9	69 00.0	72 65	126.9	69 21.3	71 66	125.9	69 42.3	70 67	124.9	70 02.9	68 68	123.8	8
9	66 54.2	74 64	128.8	67 16.3	73 65	127.9	67 38.1	72 65	127.0	67 59.6	71 66	126.1	68 20.8	70 67	125.1	68 41.6	69 68	124.1	69 02.1	68 68	123.1	69 22.2	66 69	122.1	9
20	66 15.9	73 65	127.0	66 37.5	72 66	126.1	66 58.9	71 67	125.3	67 19.9	70 67	124.3	67 40.6	69 68	123.4	68 01.0	67 69	122.4	68 21.0	66 70	121.4	68 40.7	65 70	120.4	20
1	65 36.7	71 67	125.4	65 57.9	70 67	124.5	66 18.8	69 68	123.6	66 39.4	68 69	122.7	66 59.7	67 69	121.8	67 19.7	66 70	120.8	67 39.3	65 71	119.8	67 58.5	63 71	118.8	1
2	64 56.7	70 68	123.8	65 17.5	69 68	122.9	65 38.0	68 69	122.0	65 58.2	67 70	121.1	66 18.1	66 70	120.2	66 37.6	65 71	119.3	66 56.8	63 72	118.3	67 15.6	62 73	117.3	2
3	64 16.0	69 69	122.3	64 36.4	68 70	121.4	64 56.6	67 70	120.5	65 16.4	65 71	119.6	65 35.8	64 71	118.7	65 55.0	63 72	117.8	66 13.8	62 73	116.8	66 32.2	61 73	115.8	3
4	63 34.6	67 70	120.8	63 54.7	66 71	120.0	64 14.4	65 71	119.1	64 33.9	64 72	118.2	64 53.0	63 72	117.3	65 11.8	62 73	116.4	65 30.2	61 74	115.4	65 48.3	60 74	114.5	4
25	62 52.7	66 71	119.4	63 12.4	65 71	118.6	63 31.8	64 72	117.7	63 50.8	63 73	116.9	64 09.6	62 73	116.0	64 28.0	61 74	115.1	64 46.1	60 74	114.1	65 03.9	59 75	113.2	25
6	62 10.1	65 72	118.1	62 29.5	64 72	117.3	62 48.5	63 73	116.4	63 07.3	62 73	115.6	63 25.7	61 74	114.7	63 43.9	60 74	113.8	64 01.6	59 75	112.9	64 19.1	57 75	111.9	6
7	61 27.0	64 72	116.8	61 46.1	63 73	116.0	62 04.8	62 74	115.2	62 23.3	61 74	114.3	62 41.4	60 74	113.4	62 59.2	59 75	112.6	63 16.7	58 76	111.7	63 33.8	57 76	110.7	7
8	60 43.4	63 73	115.6	61 02.2	62 74	114.8	61 20.7	61 74	113.9	61 38.8	60 75	113.1	61 56.7	59 75	112.3	62 14.2	58 76	111.4	62 31.4	57 76	110.5	62 48.3	56 76	109.6	8
9	59 59.4	62 74	114.4	60 17.9	61 74	113.6	60 36.1	60 75	112.8	60 54.0	59 75	112.0	61 11.6	58 76	111.1	61 28.8	57 76	110.3	61 45.8	56 76	109.4	62 02.4	55 77	108.5	9
30	59 15.0	61 75	113.2	59 33.2	60 75	112.4	59 51.2	59 76	111.7	60 08.8	58 76	110.8	60 26.1	57 76	110.0	60 43.1	56 77	109.2	60 59.9	55 77	108.3	61 16.2	54 77	107.5	30
1	58 30.2	60 75	112.1	58 48.2	59 76	111.4	59 05.9	58 76	110.6	59 23.3	57 77	109.8	59 40.4	56 77	109.0	59 57.2	55 77	108.2	60 13.6	54 78	107.3	60 29.8	53 78	106.4	1
2	57 45.1	60 75	111.1	58 02.8	59 76	110.3	58 20.3	58 76	109.5	58 37.4	57 77	108.7	58 54.3	56 77	107.9	59 10.9	55 78	107.1	59 27.2	54 78	106.3	59 43.1	53 78	105.5	2
3	56 59.6	59 76	110.0	57 17.2	58 77	109.3	57 34.4	57 77	108.5	57 51.3	56 77	107.7	58 08.0	55 78	107.0	58 24.4	54 78	106.2	58 40.5	53 78	105.4	58 56.2	52 79	104.5	3
4	56 13.9	58 77	109.0	56 31.2	57 77	108.3	56 48.2	56 77	107.5	57 05.0	55 78	106.8	57 21.5	54 78	106.0	57 37.7	53 78	105.2	57 53.6	52 78	104.4	58 09.2	51 79	103.6	4
35	55 27.9	57 77	108.1	55 45.0	57 77	107.3	56 01.8	56 78	106.6	56 18.4	55 78	105.8	56 34.7	53 79	105.1	56 50.7	52 79	104.3	57 06.5	51 79	103.5	57 21.9	51 79	102.7	35
6	54 41.6	56 78	107.1	54 58.5	56 78	106.4	55 15.2	55 78	105.7	55 31.6	54 79	104.9	55 47.7	53 79	104.2	56 03.6	52 79	103.4	56 19.2	51 79	102.7	56 34.5	50 80	101.9	6
7	53 55.1	56 78	106.2	54 11.9	55 78	105.5	54 28.4	54 79	104.8	54 44.6	54 79	104.1	55 00.6	53 79	103.3	55 16.3	52 79	102.6	55 31.7	51 79	101.8	55 46.9	50 80	101.1	7
8	53 08.4	56 78	105.3	53 25.0	55 78	104.6	53 41.3	54 79	103.9	53 57.4	53 79	103.2	54 13.3	52 79	102.5	54 28.9	51 79	101.8	54 44.2	51 80	101.0	54 59.2	50 80	100.3	8
9	52 21.5	55 78	104.5	52 37.9	54 79	103.8	52 54.1	53 79	103.1	53 10.1	53 79	102.4	53 25.8	52 79	101.7	53 41.3	51 80	100.9	53 56.4	50 80	100.2	54 11.4	49 80	99.5	9
40	51 34.6	54 79	103.6	51 50.7	54 79	102.9	52 06.8	54 79	102.3	52 22.6	52 79	101.6	52 38.2	52 80	100.9	52 53.5	51 80	100.1	53 08.6	50 80	99.4	53 23.4	49 80	98.7	40
1	50 47.1	54 79	102.8	51 03.3	53 79	102.1	51 19.3	53 80	101.5	51 35.0	52 80	100.8	51 50.5	51 80	100.1	52 05.7	50 80	99.4	52 20.7	50 80	98.7	52 35.4	49 80	98.0	1
2	49 59.7	54 79	102.0	50 15.8	53 79	101.4	50 31.6	52 80	100.7	50 47.3	52 80	100.0	51 02.6	51 80	99.3	51 17.8	50 80	98.6	51 32.7	49 80	97.9	51 47.3	48 80	97.2	2
3	49 12.2	54 79	101.2	49 28.1	53 80	100.6	49 43.9	52 80	99.9	49 59.4	51 80	99.3	50 14.7	51 80	98.6	50 29.7	50 80	97.9	50 44.5	49 80	97.2	50 59.1	48 80	96.5	3
4	48 24.5	53 80	100.5	48 40.4	53 80	99.8	48 56.0	52 80	99.2	49 11.4	51 80	98.5	49 26.6	50 80	97.9	49 41.6	50 80	97.2	49 56.3	49 81	96.5	50 10.9	48 81	95.8	4
45	47 36.7	53 80	99.7	47 52.5	52 80	99.1	48 08.0	52 80	98.5	48 23.4	51 80	97.8	48 38.5	50 80	97.2	48 53.4	49 80	96.5	49 08.1	49 80	95.8	49 22.5	48 81	95.2	45
6	46 48.8	53 80	99.0	47 04.5	52 80	98.4	47 20.0	51 80	97.7	47 35.3	51 80	97.1	47 50.3	50 80	96.5	48 05.2	49 81	95.8	48 19.8	48 81	95.2	48 34.2	48 81	94.5	6
7	46 00.8	52 80	98.3	46 16.4	52 80	97.7	46 31.9	51 80	97.0	46 47.1	50 80	96.4	47 02.0	50 80	95.8	47 16.8	49 81	95.1	47 31.4	48 81	94.5	47 45.8	47 81	93.8	7
8	45 12.8	52 80	97.6	45 28.3	51 80	97.0	45 43.6	51 80	96.4	45 58.8	50 81	95.7	46 13.7	49 81	95.1	46 28.5	49 81	94.5	46 43.0	48 81	93.8	46 57.3	47 81	93.2	8
9	44 24.6	52 80	96.9	44 40.1	51 80	96.3	44 55.4	50 81	95.7	45 10.5	50 81	95.1	45 25.4	49 81	94.5	45 40.1	48 81	93.8	45 54.5	48 81	93.2	46 08.8	47 81	92.6	9
50	43 36.4	52 80	96.2	43 51.8	51 81	95.6	44 07.0	50 81	95.0	44 22.1	50 81	94.4	44 36.9	49 81	93.8	44 51.6	48 81	93.2	45 06.1	48 81	92.6	45 19.7	47 81	91.9	50
1	42 48.1	52 81	95.5	43 03.5	51 81	95.0	43 18.7	50 81	94.4	43 33.7	50 81	93.8	43 48.5	49 81	93.2	44 03.1	48 81	92.6	44 17.6	48 81	92.0	44 31.8	47 81	91.3	1
2	41 59.8	51 81	94.9	42 15.1	51 81	94.3	42 30.2	50 81	93.7	42 45.2	50 81	93.1	43 00.0	49 81	92.5	43 14.6	48 81	91.9	43 29.0	48 81	91.3	43 43.3	47 81	90.7	2
3	41 11.4	51 81	94.2	41 26.7	51 81	93.7	41 41.8	50 81	93.1	41 56.7	50 81	92.5	42 11.5	49 81	91.9	42 26.1	48 81	91.3	42 40.5	47 81	90.7	42 54.7	47 81	90.1	3
4	40 22.9	51 81	93.6	40 38.2	51 81	93.0	40 53.3	50 81	92.5	41 08.2	49 81	91.9	41 23.0	49 81	91.3	41 37.5	48 81	90.7	41 52.0	48 81	90.1	42 06.0	47 81	89.6	4
55	39 34.5	51 81	93.0	39 49.7	51 81	92.4	40 04.8	50 81	91.9	40 19.7	49 81	91.3	40 34.5	49 81	90.7	40 49.0	48 81	90.1	41 03.4	48 81	89.6	41 17.6	47 81	89.0	55
6	38 46.0	51 81	92.4	39 01.2	50 81	91.8	39 16.3	50 81	91.3	39 31.2	49 81	90.7	39 45.9	48 81	90.1	40 00.5	48 81	89.6	40 14.9	48 81	89.0	40 29.1	47 81	88.4	6
7	37 57.5	51 81	91.8	38 12.7	50 81	91.2	38 27.7	50 81	90.7	38 42.6	49 81	90.1	38 57.4	49 81	89.5	39 11.9	48 81	89.0	39 26.4	48 81	88.4	39 40.6	47 81	87.8	7
8	37 09.0	51 81	91.2	37 24.2	50 81	90.6	37 39.2	50 81	90.1	37 54.1	49 81	89.5	38 08.8	49 81	89.0	38 23.3	48 81	88.4	38 37.8	48 81	87.8	38 52.1	47 81	87.3	8
9	36 20.4	51 81	90.6	36 35.6	50 81	90.0	36 50.7	50 81	89.5	37 05.6	49 81	88.9	37 20.3	49 81	88.4	37 34.9	48 81	87.8	37 49.3	48 81	87.3	38 03.6	47 81	86.7	9
60	35 31.9	51 81	90.0	35 47.1	50 81	89.4	36 02.1	50 81	88.9	36 17.0	49 81	88.4	36 31.8	49 81	87.8	36 46.4	48 81	87.3	37 00.9	48 81	86.7	37 15.2	47 81	86.2	60
1	34 43.3	51 81	89.4	34 58.5	50 81	88.9	35 13.6	50 81	88.3	35 28.5	50 81	87.8	35 43.3	49 81	87.3	35 57.9	49 81	86.7	36 12.4	48 81	86.2	36 26.8	48 81	85.6	1
2	33 54.8	51 81	88.8	34 10.0	50 81	88.3	34 25.1	50 81	87.8	34 40.0	50 81	87.2	34 54.8	49 81	86.7	35 09.5	49 81	86.2	35 24.0	48 81	85.6	35 38.4	48 81	85.1	2
3	33 06.3	51 81	88.2	33 21.5	51 81	87.7	33 36.6	50 81	87.2	33 51.6	50 81	86.7	34 06.4	49 81	86.1	34 21.1	49 81	85.6	34 35.6	48 80	85.1	34 50.0	48 80	84.6	3
4	32 17.8	51 81	87.7	32 33.0	51 81	87.1	32 48.1	50 81	86.6	33 03.1	50 81	86.1	33 18.0	49 81	85.6	33 32.7	49 81	85.1	33 47.3	48 80	84.6	34 01.7	48 80	84.0	4
65	31 29.3	51 81	87.1	31 44.5	51 81	86.6	31 59.7	50 81	86.1	32 14.7	50 81	85.6	32 29.6	49 81	85.1	32 44.3	49 80	84.5	32 59.0	49 80	84.0	33 13.5	48 80	83.5	65
6	30 40.8	51 81	86.5	30 56.1	51 81	86.0	31 11.3	50 81	85.5	31 26.3	50 81	85.0	31 41.2	50 81	84.5	31 56.1	49 80	84.0	32 10.7	49 80	83.5	32 25.3	48 80	83.0	6
7	29 52.4	51 81	86.0	30 07.7	51 81	85.5	30 22.9	50 81	85.0	30 38.0	50 80	84.5	30 52.9	50 80	84.0	31 07.8	49 80	83.5	31 22.5	49 80	83.0	31 37.1	48 80	82.4	7
8	29 04.0	51 81	85.4	29 19.3	51 81	84.9	29 34.6	51 80	84.4	29 49.7	50 80	83.9	30 04.7	50 80	83.4	30 19.6	49 80	82.9	30 34.4	49 80	82.4	30 49.1	48 80	81.9	8
9	28 15.6	51 81	84.9	28 31.0	51 80	84.4	28 46.3	51 80	83.9	29 01.4	50 80	83.4	29 16.5	50 80	82.9	29 31.5	50 80	82.4	29 46.3	49 80	81.9	30 01.0	49 80	81.4	9
70	27 27.3	52 80	84.3	27 42.7	51 80	83.8	27 58.0	51 80	83.4	28 13.2	50 80	82.9	28 28.4	50 80	82.4	28 43.4	50 80	81.9	28 58.3	49 80	81.4	29 13.1	49 80	80.9	70
1	26 39.0	52 80	83.8	26 54.5	51 80	83.3	27 09.8	51 80	82.8	27 25.1	51 80	82.3	27 40.3	50 80	81.8	27 55.3	50 80	81.4	28 10.3	49 80	80.9	28 25.2	49 80	80.4	1
2	25 50.8	52 80	83.2	26 06.3	52 80	82.8	26 21.7	51 80	82.3	26 37.0	51 80	81.8	26 52.3	50 80	81.3	27 07.4	50 80	80.8	27 22.4	50 80	80.3	27 37.3	50 80	79.9	2
3	25 02.6	52 80	82.7	25 18.2	52 80	82.2	25 33.6	51 80	81.8	25 49.0	51 80	81.3	26 04.3	51 80	80.8	26 19.5	50 80	80.3	26 34.6	50 80	79.8	26 49.6	50 79	79.3	3
4	24 14.5	52 80	82.2	24 30.1	52 80	81.7	24 45.6	52 80	81.2	25 01.1	51 80	80.7	25 16.4	51 80	80.3	25 31.7	51 80	79.8	25 46.9	50 80	79.3	26 01.9	50 79	78.8	4
75	23 26.4	52 80	81.6	23 42.1	52 80	81.2	23 57.7	52 80	80.7	24 13.2	52 80	80.2	24 28.6	51 80	79.7	24 44.0	51 79	79.3	24 59.2	51 79	78.8	25 14.4	50 79	78.3	75
6	22 38.4	53 80	81.1	22 54.2	52 80	80.6	23 09.8	52 80	80.2	23 25.4	52 80	79.7	23 40.9	52 79	79.2	23 56.3	51 79	78.8	24 11.6	51 79	78.3	24 26.9	51 79	77.8	6
7	21 50.5	53 80	80.5	22 06.3	53 80	80.1	22 22.0	52 80	79.7	22 37.7	52 79	79.2	22 53.3	52 79	78.7	23 08.7	51 79	78.2	23 24.2	51 79	77.8	23 39.5	51 79	77.3	7
8	21 02.7	53 80	80.0	21 18.5	53 80	79.6	21 34.3	52 79	79.1	21 50.1	52 79	78.6	22 05.7	52 79	78.2	22 21.3	52 79	77.7	22 36.7	51 79	77.2	22 52.1	51 78	76.7	8
9	20 14.9	53 79	79.5	20 30.8	53 79	79.0	20 46.7	53 79	78.6	21 02.5	52 79	78.1	21 18.2	52 79	77.7	21 33.9	52 79	77.2	21 49.5	52 79	76.7	22 05.0	51 78	76.3	9
80	19 27.2	53 79	78.9	19 43.2	53 79	78.5	19 59.2	53 79	78.0	20 15.1	53 79	77.6	20 30.9	52 79	77.1	20 46.6	52 78	76.7	21 02.3	52 78	76.2	21 17.9	52 78	75.8	80
1	18 39.6	54 79	78.4	18 55.7	54 79	78.0	19 11.7	53 79	77.5	19 27.7	53 79	77.1	19 43.6	53 78	76.6	19 59.4	53 78	76.2	20 15.2	52 78	75.7	20 30.9	52 78	75.3	1
2	17 52.1	54 79	77.9	18 08.3	54 79	77.4	18 24.4	54 79	77.0	18 40.4	53 79	76.5	18 56.4	53 78	76.1	19 12.3	53 78	75.7	19 28.2	53 78	75.2	19 44.0	52 78	74.8	2
3	17 04.7	54 79	77.3	17 21.0	54 79	76.9	17 37.2	54 79	76.5	17 53.3	54 78	76.0	18 09.4	53 78	75.6	18 25.4	53 78	75.1	18 41.3	53 78	74.7	18 57.2	52 78	74.3	3
4	16 17.4	55 79	76.8	16 33.7	54 79	76.4	16 50.0	54 78	75.9	17 06.2	54 78	75.5	17 22.4	54 78	75.1	17 38.5	54 78	74.6	17 54.6	53 78	74.2	18 10.5	53 78	73.7	4
85	15 30.2	55 78	76.3	15 46.6	55 78	75.8	16 03.0	54 78	75.4	16 19.3	54 78	75.0	16 35.6	54 78	74.5	16 51.8	54 78	74.1	17 07.9	54 77	73.7	17 24.0	53 78	73.2	85
6	14 43.1	55 78	75.7	14 59.6	55 78	75.3	15 16.1	54 78	74.9	15 32.5	55 78	74.4	15 48.8	54 78	74.0	16 05.1	54 77	73.6	16 21.4	54 77	73.1	16 37.6	54 77	72.7	6
7	13 56.1	55 78	75.2	14 12.7	55 78	74.8	14 29.3	55 78	74.3	14 45.8	55 78	73.9	15 02.2	55 78	73.5	15 18.6	54 77	73.1	15 35.0	54 77	72.6	15 51.3	54 77	72.2	7
8	13 09.2	56 78	74.7	13 25.9	55 78	74.2	13 42.6	55 78	73.8	13 59.2	55 77	73.4	14 15.8	55 77	73.0	14 32.3	55 77	72.5	14 48.7	54 77	72.1	15 05.2	54 76	71.7	8
9	12 22.5	56 78	74.1	12 39.3	56 78	73.7	12 56.0	55 78	73.3	13 12.7	55 77	72.9	13 29.4	55 77	72.4	13 46.0	55 77	72.0	14 02.6	55 77	71.6	14 19.2	54 76	71.1	9
90	11 35.8	56 78	73.6	11 52.7	56 77	73.2	12 09.6	56 77	72.7	12 26.4	56 77	72.3	12 43.2	55 77	71.9	12 59.9	55 77	71.5	13 16.6	55 76	71.0	13 33.5	55 76	70.6	90

Each cell below gives: Alt. ° ′ — Δd Δt — Az. °

H.A.	20° 00′	20° 30′	21° 00′	21° 30′	22° 00′	22° 30′	23° 00′	23° 30′	H.A.
00	34 00.0 1.0 01 180.0	33 30.0 1.0 01 180.0	33 60.0 1.0 01 180.0	32 30.0 1.0 01 180.0	32 00.0 1.0 01 180.0	31 30.0 1.0 01 180.0	31 60.0 1.0 01 180.0	30 30.0 1.0 01 180.0	00
1	33 59.5 1.0 02 178.9	33 29.5 1.0 02 178.9	32 59.5 1.0 02 178.9	32 29.5 1.0 02 178.9	31 59.5 1.0 02 178.9	31 29.5 1.0 02 178.9	30 59.5 1.0 02 178.9	30 29.6 1.0 02 178.9	1
2	33 58.1 1.0 04 177.7	33 28.1 1.0 04 177.8	32 58.1 1.0 04 177.8	32 28.1 1.0 04 177.8	31 58.1 1.0 04 177.8	31 28.1 1.0 04 177.8	30 58.2 1.0 04 177.9	30 28.2 1.0 04 177.9	2
3	33 55.7 1.0 06 176.6	33 25.7 1.0 06 176.6	32 55.8 1.0 06 176.7	32 25.8 1.0 06 176.7	31 55.8 1.0 06 176.7	31 25.9 1.0 06 176.8	30 55.9 1.0 06 176.8	30 25.9 1.0 05 176.8	3
4	33 52.3 1.0 07 175.5	33 22.4 1.0 07 175.5	32 52.5 1.0 07 175.6	32 22.5 1.0 07 175.6	31 52.6 1.0 07 175.6	31 22.7 1.0 07 175.7	30 52.7 1.0 07 175.7	30 22.8 1.0 07 175.7	4
05	33 48.0 1.0 09 174.3	33 18.1 1.0 09 174.4	32 48.2 1.0 08 174.4	32 18.3 1.0 09 174.5	31 48.4 1.0 08 174.5	31 18.5 1.0 08 174.6	30 48.6 1.0 08 174.6	30 18.7 1.0 08 174.7	05
6	33 42.8 99 10 173.2	33 12.9 99 10 173.3	32 43.1 99 10 173.3	32 13.2 99 10 173.4	31 43.4 1.0 10 173.5	31 13.5 1.0 10 173.5	30 43.7 1.0 10 173.6	30 13.8 1.0 10 173.6	6
7	33 36.6 99 12 172.1	33 06.8 99 12 172.2	32 37.0 99 12 172.2	32 07.2 99 12 172.3	31 37.4 99 12 172.4	31 07.6 99 11 172.4	30 37.8 99 11 172.5	30 08.0 99 11 172.6	7
8	33 29.4 99 13 171.0	32 59.7 99 13 171.1	32 30.0 99 13 171.1	32 00.2 99 13 171.2	31 30.5 99 13 171.3	31 00.7 99 13 171.4	30 31.0 99 13 171.4	30 01.3 99 13 171.5	8
9	33 21.3 99 15 169.9	32 51.7 99 15 170.0	32 22.0 99 15 170.0	31 52.4 99 15 170.1	31 22.7 99 14 170.2	30 53.0 99 14 170.3	30 23.3 99 14 170.4	29 53.7 99 14 170.4	9
10	33 12.3 99 17 168.8	32 42.8 99 16 168.9	32 13.2 99 16 169.0	31 43.6 99 16 169.1	31 14.0 99 16 169.1	30 44.4 99 16 169.2	30 14.8 99 16 169.3	29 45.2 99 16 169.4	10
1	33 02.4 98 18 167.8	32 32.9 98 18 167.8	32 03.4 98 18 167.9	31 33.9 98 18 168.0	31 04.4 98 18 168.1	30 34.9 98 17 168.3	30 05.4 98 17 168.3	29 35.9 98 17 168.4	1
2	32 51.6 98 19 166.6	32 22.2 98 19 166.7	31 52.8 98 19 166.8	31 23.4 98 19 166.9	30 53.9 98 19 167.0	30 24.5 98 19 167.1	29 55.1 98 19 167.2	29 25.7 98 18 167.4	2
3	32 39.8 98 21 165.5	32 10.5 98 21 165.6	31 41.2 98 21 165.7	31 11.9 98 20 165.8	30 42.6 98 20 166.0	30 13.3 98 20 166.1	29 43.9 98 20 166.2	29 14.6 98 20 166.3	3
4	32 27.2 97 23 164.4	31 58.0 97 22 164.5	31 28.8 97 22 164.6	30 59.6 97 22 164.8	30 30.4 97 22 164.9	30 01.2 97 22 165.0	29 31.9 97 21 165.2	29 02.7 97 21 165.3	4
15	32 13.7 97 24 163.3	31 44.6 97 24 163.4	31 15.5 97 24 163.6	30 46.4 97 23 163.7	30 17.3 97 23 163.9	29 48.2 97 23 164.0	29 19.1 97 23 164.1	28 50.0 97 23 164.3	15
6	31 59.3 96 25 162.2	31 30.3 97 25 162.4	31 01.4 97 25 162.5	30 32.4 97 25 162.8	30 03.4 97 25 162.8	29 34.4 97 24 163.1	29 05.4 97 24 163.1	28 36.4 97 24 163.3	6
7	31 44.0 96 27 161.2	31 15.2 96 27 161.3	30 46.4 96 26 161.5	30 17.5 96 26 161.6	29 48.7 96 26 161.8	29 19.8 96 26 162.0	28 50.9 96 26 162.1	28 22.0 96 25 162.3	7
8	31 27.9 96 28 160.1	30 59.2 96 28 160.3	30 30.5 96 28 160.4	30 01.8 96 28 160.6	29 33.1 96 27 160.8	29 04.4 96 27 160.9	28 35.6 96 27 161.1	28 06.8 96 27 161.3	8
9	31 11.0 96 30 159.0	30 42.4 95 29 159.2	30 13.9 95 29 159.4	29 45.3 95 29 159.6	29 16.7 95 29 159.8	28 48.1 95 28 159.9	28 19.5 95 28 160.1	27 50.8 95 28 160.3	9
20	30 53.2 95 31 158.0	30 24.8 95 31 158.2	29 56.4 95 30 158.4	29 28.0 95 30 158.6	28 59.5 95 30 158.7	28 31.0 95 30 158.9	28 02.6 95 30 159.1	27 34.1 95 29 159.3	20
1	30 34.6 94 32 157.0	30 06.4 94 32 157.2	29 38.1 94 32 157.4	29 09.8 94 32 157.6	28 41.5 94 31 157.7	28 13.2 94 31 158.1	27 44.8 94 31 158.1	27 16.5 94 31 158.3	1
2	30 15.2 94 34 156.0	29 47.1 94 33 156.2	29 19.0 94 33 156.4	28 50.9 94 33 156.6	28 22.7 94 33 156.7	27 54.6 94 32 156.9	27 26.4 94 32 157.1	26 58.2 94 32 157.3	2
3	29 55.1 93 35 154.9	29 27.1 93 35 155.1	28 59.2 93 34 155.4	28 31.2 93 34 155.6	28 03.2 93 34 155.8	27 35.2 93 34 156.0	27 07.1 93 33 156.2	26 39.1 93 33 156.4	3
4	29 34.1 93 36 153.9	29 06.3 93 36 154.1	28 38.5 93 36 154.4	28 10.7 93 35 154.6	27 42.9 93 35 154.8	27 15.0 93 35 155.0	26 47.1 93 34 155.2	26 19.2 93 34 155.4	4
25	29 12.4 92 37 152.9	28 44.8 92 37 153.2	28 17.2 92 37 153.4	27 49.5 92 37 153.6	27 21.8 92 36 153.8	26 54.1 92 36 154.0	26 26.4 92 36 154.2	25 58.7 92 35 154.5	25
6	28 50.0 91 39 152.2	28 22.5 92 38 152.2	27 55.1 92 38 152.6	27 27.6 92 38 152.9	27 00.1 92 38 152.9	26 32.5 92 37 153.3	26 05.0 92 37 153.3	25 37.4 92 37 153.5	6
7	28 26.8 91 40 151.2	27 59.5 91 40 151.2	27 32.2 91 39 151.4	27 04.9 91 39 151.7	26 37.6 91 39 151.7	26 10.2 91 38 152.1	25 42.8 91 38 152.2	25 15.4 91 38 152.6	7
8	28 02.9 90 41 150.0	27 35.8 90 41 150.3	27 08.7 90 40 150.5	26 41.5 91 40 150.7	26 14.3 91 40 151.0	25 47.2 91 40 151.2	25 19.9 91 39 151.4	24 52.7 91 39 151.7	8
9	27 38.2 90 42 149.1	27 11.3 90 42 149.3	26 44.4 90 42 149.5	26 17.4 90 41 149.8	25 50.4 90 41 150.0	25 23.4 90 41 150.3	24 56.4 90 40 150.5	24 29.3 90 40 150.8	9
30	27 12.9 89 43 148.1	26 46.2 89 43 148.4	26 19.5 89 43 148.6	25 52.7 89 42 148.9	25 25.9 89 42 149.1	24 59.0 89 42 149.4	24 32.2 90 42 149.6	24 05.3 90 41 149.8	30
1	26 47.0 88 44 147.2	26 20.4 89 44 147.4	25 53.8 89 44 147.7	25 27.2 89 43 147.9	25 00.6 89 43 148.2	24 34.0 89 43 148.5	24 07.3 89 43 148.7	23 40.6 89 42 149.0	1
2	26 20.3 88 46 146.2	25 54.0 88 45 146.5	25 27.6 88 45 146.8	25 01.2 88 45 147.0	24 34.7 88 44 147.3	24 08.2 88 44 147.7	23 41.7 88 45 147.8	23 15.2 88 43 148.1	2
3	25 53.0 87 47 145.3	25 26.9 87 46 145.6	25 00.7 87 46 145.9	24 34.4 87 46 146.1	24 08.0 88 45 146.4	23 41.9 88 45 146.7	23 15.6 88 45 146.9	22 49.2 88 44 147.2	3
4	25 25.1 87 48 144.4	24 59.1 87 47 144.7	24 33.1 87 47 145.0	24 07.1 87 47 145.2	23 41.0 87 46 145.5	23 14.9 87 46 145.8	22 48.8 87 46 146.1	22 22.6 87 45 146.3	4
35	24 56.5 86 49 143.5	24 30.8 86 48 143.8	24 04.9 86 48 144.1	23 39.1 86 48 144.4	23 13.2 86 47 144.6	22 47.3 86 47 144.9	22 21.4 87 47 145.2	21 55.4 87 46 145.5	35
6	24 27.4 85 50 142.6	24 01.8 85 49 142.9	23 36.2 85 49 143.2	23 10.5 86 49 143.5	22 44.8 86 48 143.8	22 19.1 86 48 144.1	21 53.3 86 48 144.3	21 27.6 86 47 144.6	6
7	23 57.6 85 51 141.8	23 32.2 85 51 142.1	23 06.8 85 50 142.3	22 41.3 85 50 142.6	22 15.8 85 49 142.9	21 50.3 85 49 143.3	21 24.8 85 49 143.5	20 59.2 85 48 143.9	7
8	23 27.3 84 52 140.9	23 02.1 84 51 141.2	22 36.9 84 51 141.5	22 11.6 84 50 141.8	21 46.3 84 50 142.1	21 21.0 84 50 142.4	20 55.6 85 50 142.6	20 30.2 85 49 142.9	8
9	22 56.4 83 52 140.0	22 31.4 83 52 140.3	22 06.4 84 52 140.6	21 41.3 84 51 140.9	21 16.2 84 51 141.2	20 51.0 84 51 141.5	20 25.9 84 50 141.8	20 00.7 84 50 142.1	9
40	22 25.0 83 53 139.2	22 00.2 83 53 139.5	21 35.3 83 53 139.8	21 10.4 83 52 140.1	20 45.5 83 52 140.4	20 20.6 83 52 140.7	19 55.6 83 51 141.0	19 30.6 83 51 141.3	40
1	21 53.0 82 54 138.4	21 28.4 82 54 138.7	21 03.7 82 54 139.0	20 39.0 82 53 139.3	20 14.3 82 53 139.6	19 49.5 83 53 139.9	19 24.8 83 52 140.2	18 59.9 83 52 140.5	1
2	21 20.5 81 55 137.5	20 56.1 81 55 137.9	20 31.6 82 54 138.2	20 07.1 82 54 138.5	19 42.6 82 54 138.8	19 18.0 82 53 139.1	18 53.4 82 53 139.4	18 28.8 82 53 139.7	2
3	20 47.5 81 56 136.7	20 23.2 81 56 137.0	19 59.0 81 55 137.3	19 34.7 81 55 137.7	19 10.3 81 54 138.0	18 46.0 81 54 138.3	18 21.6 81 54 138.6	17 57.1 81 54 138.9	3
4	20 13.9 80 57 135.9	19 49.9 80 56 136.2	19 25.8 80 56 136.6	19 01.7 80 56 136.9	18 37.6 81 55 137.2	18 13.4 81 55 137.5	17 49.2 81 55 137.8	17 25.0 81 54 138.1	4
45	19 39.9 79 58 135.1	19 16.1 80 57 135.4	18 52.2 80 57 135.8	18 28.3 80 56 136.1	18 04.3 80 56 136.4	17 40.4 80 56 136.7	17 16.4 80 56 137.0	16 52.3 80 55 137.3	45
6	19 05.4 79 58 134.3	18 41.8 79 58 134.7	18 18.1 79 58 135.0	17 54.4 79 57 135.3	17 30.6 79 57 135.6	17 06.8 79 57 135.9	16 43.0 79 56 136.3	16 19.2 80 56 136.6	6
7	18 30.5 78 59 133.5	18 07.0 78 59 133.9	17 43.5 78 58 134.2	17 20.0 78 58 134.5	16 56.4 79 58 134.9	16 32.9 79 57 135.2	16 09.2 79 57 135.5	15 45.6 79 57 135.8	7
8	17 55.1 78 60 132.8	17 31.8 78 59 133.1	17 08.5 78 59 133.8	16 45.2 78 59 133.8	16 21.8 78 58 134.1	15 58.4 78 58 134.4	15 35.0 78 58 134.8	15 11.5 78 58 135.1	8
9	17 19.2 77 60 132.0	16 56.2 77 60 132.4	16 33.1 77 60 132.7	16 09.9 77 60 133.0	15 46.7 77 59 133.4	15 23.5 77 59 133.7	15 00.3 78 58 134.0	14 37.0 78 58 134.3	9
50	16 43.0 76 61 131.3	16 20.1 76 61 131.6	15 57.2 76 61 131.9	15 34.2 77 60 132.3	15 11.2 77 60 132.6	14 48.2 77 60 132.9	14 25.2 77 59 133.3	14 02.1 77 59 133.6	50
1	16 06.3 76 62 130.5	15 43.6 76 62 130.9	15 20.8 76 61 131.2	14 58.1 76 61 131.5	14 35.3 76 60 131.9	14 12.5 76 60 132.2	13 49.6 76 60 132.5	13 26.7 76 60 132.9	1
2	15 29.2 75 62 129.7	15 06.7 75 62 130.1	14 44.1 75 62 130.4	14 21.5 75 62 130.8	13 58.9 76 61 131.2	13 36.3 76 61 131.5	13 13.7 76 61 131.8	12 51.0 76 60 132.2	2
3	14 51.7 74 63 129.1	14 29.4 74 63 129.4	14 07.0 75 62 129.8	13 44.6 75 62 130.1	13 22.2 75 62 130.4	12 59.8 75 62 130.8	12 37.3 75 61 131.1	12 14.8 75 61 131.5	3
4	14 13.8 74 64 128.3	13 51.7 74 63 128.7	13 29.5 74 63 129.0	13 07.3 74 63 129.4	12 45.1 74 62 129.7	12 22.8 74 62 130.1	12 00.5 74 62 130.4	11 38.2 74 62 130.8	4
55	13 35.5 73 64 127.6	13 13.6 73 64 128.0	12 51.6 73 64 128.3	12 29.6 73 63 128.7	12 07.5 74 63 129.0	11 45.5 74 63 129.4	11 23.4 74 62 129.7	11 01.3 74 62 130.1	55
6	12 56.9 73 65 126.9	12 35.1 73 65 127.3	12 13.3 73 64 127.6	11 51.5 73 64 128.0	11 29.6 73 64 128.3	11 07.8 73 63 128.7	10 45.9 73 63 129.0	10 23.9 73 63 129.4	6
7	12 17.9 72 65 126.2	11 56.3 72 65 126.6	11 34.7 72 65 126.9	11 13.1 72 65 127.3	10 51.4 72 64 127.6	10 29.7 72 64 128.0	10 08.0 72 64 128.4	9 46.2 73 63 128.7	7
8	11 38.6 71 66 125.5	11 17.2 71 66 125.9	10 55.7 71 66 126.3	10 34.3 72 65 126.6	10 12.8 72 65 127.0	9 51.3 72 65 127.3	9 29.7 72 64 127.7	9 08.2 72 64 128.0	8
9	10 59.0 71 67 124.9	10 37.7 71 66 125.2	10 16.4 71 66 125.6	9 55.1 71 66 125.9	9 33.8 71 66 126.3	9 12.5 71 65 126.7	8 51.1 71 65 127.0	8 29.7 71 65 127.4	9
60	10 19.0 70 67 124.2	9 57.9 70 67 124.6	9 36.8 70 67 124.9	9 15.7 70 66 125.3	8 54.5 71 66 125.6	8 33.4 71 66 126.0	8 12.2 71 66 126.3	7 51.0 71 66 126.7	60
1	9 38.7 70 68 123.5	9 17.8 70 67 123.9	8 56.8 70 67 124.2	8 35.9 70 67 124.6	8 14.9 70 67 125.0	7 53.9 70 66 125.3	7 32.9 70 66 125.7	7 11.9 70 66 126.1	1
2	8 58.0 69 68 122.9	8 37.3 69 68 123.2	8 16.6 69 68 123.6	7 55.8 69 67 124.0	7 35.0 69 67 124.3	7 14.2 69 67 124.7	6 53.4 69 66 125.0	6 32.5 70 66 125.4	2
3	8 17.1 69 69 122.2	7 56.6 69 68 122.6	7 36.0 69 68 122.9	7 15.4 69 68 123.3	6 54.7 69 68 123.7	6 34.1 69 67 124.0	6 13.5 69 67 124.4	5 52.8 69 67 124.8	3
4	7 35.9 68 69 121.6	7 15.5 68 69 121.9	6 55.1 68 69 122.3	6 34.7 68 68 122.7	6 14.2 68 68 123.0	5 53.7 68 68 123.4	5 33.3 69 67 123.8	5 12.8 68 67 124.1	4
65	6 54.4 67 70 120.9	6 34.2 67 69 121.3	6 13.9 68 69 121.7	5 53.6 68 69 122.0	5 33.4 68 68 122.4	5 13.1 68 68 122.8			65
6	6 12.6 67 70 120.3	5 52.5 67 70 120.7	5 32.5 67 69 121.0	5 12.4 67 69 121.4					6
7	5 30.6 66 71 119.7	5 10.7 66 70 120.0							7

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′	20° 30′	21° 00′	21° 30′	22° 00′	22° 30′	23° 00′	23° 30′	H.A.
91	10 49.3 57 77 73.1	11 06.3 57 77 72.6	11 23.3 56 77 72.2	11 40.2 56 77 71.8	11 57.1 56 76 71.4	12 14.0 56 76 70.9	12 30.8 56 76 70.5	12 47.6 56 76 70.1	91
2	10 03.0 57 77 72.5	10 20.1 57 77 72.1	10 37.2 57 77 71.7	10 54.2 57 76 71.3	11 11.2 57 76 70.8	11 28.2 57 76 70.4	11 45.1 56 76 70.0	12 02.0 56 76 69.6	2
3	9 16.8 57 77 72.0	9 34.0 57 77 71.5	9 51.2 57 76 71.1	10 08.3 57 76 70.7	10 25.4 57 76 70.3	10 42.5 57 76 69.9	10 59.6 57 76 69.5	11 16.6 57 75 69.1	3
4	8 30.7 58 77 71.4	8 48.0 58 76 71.0	9 05.3 58 76 70.6	9 22.6 58 76 70.2	9 39.8 57 76 69.8	9 57.0 57 76 69.3	10 14.2 57 75 68.9	10 31.4 57 75 68.5	4
95	7 44.7 58 76 70.9	8 02.2 58 76 70.5	8 19.6 58 76 70.0	8 37.0 58 76 69.6	8 54.4 58 76 69.2	9 11.7 58 75 68.8	9 29.0 58 75 68.4	9 46.3 58 75 68.0	95
6	6 59.0 59 76 70.3	7 16.5 58 76 69.9	7 34.1 58 76 69.5	7 51.6 58 75 69.1	8 09.1 58 75 68.7	8 26.5 58 75 68.3	8 44.0 58 75 67.8	9 01.4 58 75 67.4	6
7	6 13.3 59 76 69.8	6 31.0 59 76 69.3	6 48.7 59 75 68.9	7 06.3 59 75 68.5	7 23.9 59 75 68.1	7 41.5 59 75 67.7	7 59.1 59 74 67.3	8 16.6 58 74 66.9	7
8	5 27.9 59 75 69.2	5 45.7 59 75 68.8	6 03.5 59 75 68.4	6 21.2 59 75 68.0	6 39.0 59 75 67.6	6 56.7 59 74 67.2	7 14.4 59 74 66.8	7 32.1 59 74 66.4	8
9		5 00.5 60 75 68.2	5 18.4 60 75 67.8	5 36.3 60 75 67.4	5 54.2 60 74 67.0	6 12.0 59 74 66.6	6 29.9 59 74 66.2	6 47.7 59 74 65.8	9
100					5 09.6 60 74 66.5	5 27.6 60 74 66.1	5 45.6 60 74 65.7	6 03.5 60 73 65.3	100
1							5 01.4 60 73 65.1	5 19.5 60 73 64.7	1

16—65158-1

Lat. 36°

Values in each cell: Alt. (° ′) · Δd Δt · Az. (°)

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
00	78 00.0 1.0 03 180.0	78 30.0 1.0 03 180.0	79 00.0 1.0 03 180.0	79 30.0 1.0 04 180.0	80 00.0 1.0 04 180.0	80 30.0 1.0 04 180.0	81 00.0 1.0 04 180.0	81 30.0 1.0 04 180.0	00
1	77 58.1 1.0 09 175.6	78 28.1 1.0 10 175.4	78 58.0 1.0 10 175.3	79 27.9 1.0 10 175.1	79 57.8 1.0 11 174.8	80 27.7 1.0 11 174.6	80 57.6 1.0 12 174.3	81 27.5 1.0 13 174.0	1
2	77 52.6 99 15 171.3	78 22.3 99 16 170.7	78 52.0 99 16 170.6	79 21.7 99 17 170.2	79 51.3 99 18 169.3	80 20.9 99 19 169.3	80 50.8 98 21 168.7	81 19.9 98 21 168.1	2
3	77 43.4 98 21 167.0	78 12.8 98 22 166.5	78 42.1 98 23 166.0	79 11.4 97 24 165.4	79 40.6 97 24 164.8	80 09.7 97 27 164.1	80 38.7 97 27 163.3	81 07.6 96 28 162.5	3
4	77 30.8 97 26 162.9	77 59.7 96 27 162.2	78 28.6 96 28 161.6	78 57.3 96 30 160.8	79 25.9 95 31 160.0	79 54.4 95 32 159.1	80 22.7 94 33 158.2	80 50.8 93 35 157.1	4
05	77 14.9 95 32 158.9	77 43.3 94 33 158.1	78 11.5 94 34 157.3	78 39.6 93 35 156.4	79 07.5 93 36 155.5	79 35.2 92 38 154.4	80 02.7 91 39 153.3	80 30.0 90 41 152.1	05
6	76 55.9 93 36 155.0	77 23.6 92 38 154.2	77 51.2 92 39 153.2	78 18.5 91 40 152.3	78 45.7 90 42 151.0	79 12.6 89 43 150.0	79 39.2 88 44 148.8	80 05.5 87 46 147.4	6
7	76 34.0 91 41 151.4	77 01.0 90 42 150.4	77 27.9 89 43 149.4	77 54.5 88 45 148.3	78 20.8 86 48 147.2	78 46.8 84 50 145.9	79 12.5 85 49 144.6	79 37.8 84 51 143.1	7
8	76 09.4 88 45 147.9	76 35.8 87 46 146.9	77 01.9 87 48 145.8	77 27.7 86 49 144.6	77 53.1 84 50 143.4	78 18.3 83 52 142.1	78 43.0 82 53 140.7	79 07.3 80 55 139.1	8
9	75 42.5 86 49 144.6	76 08.1 85 50 143.6	76 33.4 84 51 142.4	76 58.4 83 52 141.2	77 23.0 82 54 139.9	77 47.3 80 55 138.6	78 11.1 79 57 137.1	78 34.4 77 58 135.5	9
10	75 13.3 83 52 141.5	75 38.2 82 53 140.4	76 02.7 81 54 139.3	76 26.9 80 56 138.0	76 50.7 79 57 136.7	77 14.1 77 58 135.3	77 37.0 76 60 133.8	77 59.4 74 61 132.2	10
1	74 42.1 81 55 138.6	75 06.3 80 56 137.5	75 30.1 79 57 136.3	75 53.5 77 59 135.0	76 16.5 76 60 133.7	76 39.1 74 61 132.3	77 01.1 73 62 130.8	77 22.7 71 64 129.2	1
2	74 09.2 79 58 135.9	74 32.7 78 60 134.8	74 55.7 76 60 133.6	75 18.4 75 61 132.3	75 40.6 73 62 130.9	76 02.4 72 64 129.6	76 23.6 70 65 128.0	76 44.3 68 66 126.5	2
3	73 34.7 77 60 133.4	73 57.4 75 61 132.2	74 19.8 74 62 131.0	74 41.8 72 63 129.7	75 03.3 71 64 128.4	75 24.3 69 66 127.0	75 44.8 67 67 125.5	76 04.7 65 68 124.0	3
4	72 58.7 74 62 131.0	73 20.8 73 63 129.8	73 42.5 72 64 128.6	74 03.8 70 65 127.3	74 24.6 69 66 126.0	74 44.9 67 67 124.6	75 04.7 65 68 123.2	75 23.9 63 70 121.7	4
15	72 21.4 72 64 128.7	72 42.9 71 65 127.6	73 04.0 70 66 126.4	73 24.6 68 67 125.1	73 44.8 66 68 123.8	74 04.4 65 69 122.4	74 23.5 63 70 121.0	74 42.1 61 71 119.5	15
6	71 43.0 70 66 126.6	72 03.9 69 67 125.5	72 24.4 68 68 124.3	72 44.4 66 69 123.0	73 03.9 64 70 121.7	73 23.8 63 70 120.4	73 41.5 61 71 119.0	73 59.4 59 72 117.6	6
7	71 03.6 68 67 124.6	71 23.9 67 68 123.5	71 43.8 66 69 122.1	72 03.5 64 70 120.8	72 22.2 62 71 119.8	72 40.7 61 72 118.5	72 58.7 59 72 117.1	73 16.1 57 73 115.7	7
8	70 23.2 67 69 122.8	70 43.0 65 70 121.6	71 02.4 64 70 120.5	71 21.3 62 71 119.3	71 39.7 61 72 118.0	71 57.7 59 73 116.7	72 15.1 57 74 115.4	72 32.0 55 74 114.0	8
9	69 41.9 65 70 121.0	70 01.2 64 71 119.9	70 20.1 62 72 118.7	70 38.6 61 72 117.6	70 56.6 59 73 116.3	71 14.0 57 74 115.1	71 31.0 56 74 113.8	71 47.4 54 75 112.5	9
20	69 00.0 64 71 119.3	69 18.8 62 72 118.2	69 37.2 61 72 117.1	69 55.2 59 73 116.0	70 12.8 58 74 114.8	70 29.8 56 75 113.5	70 46.3 54 75 112.3	71 02.3 52 76 111.0	20
1	68 17.3 62 72 117.7	68 35.7 61 73 116.6	68 53.8 59 73 115.6	69 11.3 58 74 114.4	69 28.4 56 75 113.3	69 45.1 55 75 112.1	70 01.2 53 76 110.9	70 16.8 51 77 109.6	1
2	67 34.1 61 73 116.3	67 52.1 59 74 115.2	68 09.7 58 74 114.1	68 26.9 56 75 113.0	68 43.6 55 76 111.9	68 59.9 53 76 110.7	69 15.6 52 76 109.5	69 30.9 50 77 108.3	2
3	66 50.3 60 74 114.8	67 07.9 58 74 113.8	67 25.2 57 75 112.7	67 42.0 55 76 111.7	67 58.3 54 76 110.5	68 14.3 52 77 109.4	68 29.7 51 77 108.2	68 44.6 49 78 107.1	3
4	66 06.0 58 74 113.5	66 23.3 57 75 112.5	66 40.2 56 76 111.4	66 56.7 54 76 110.4	67 12.7 53 77 109.3	67 28.3 51 77 108.2	67 43.4 50 78 107.1	67 58.1 48 78 105.9	4
25	65 21.2 57 75 112.2	65 38.2 56 76 111.2	65 54.8 55 76 110.2	66 11.0 53 77 109.2	66 26.7 52 77 108.1	66 42.0 50 78 107.0	66 56.9 49 78 105.9	67 11.3 47 78 104.8	25
6	64 36.1 56 76 111.0	64 52.8 55 76 110.0	65 09.1 54 77 109.0	65 25.0 52 77 108.0	65 40.4 51 78 107.0	65 55.5 49 78 105.9	66 10.1 48 78 104.8	66 24.2 46 79 103.7	6
7	63 50.6 55 76 109.8	64 07.0 54 77 108.9	64 23.0 53 77 107.9	64 38.7 51 78 106.9	64 53.9 50 78 105.9	65 08.7 49 78 104.8	65 23.1 47 79 103.8	65 37.0 46 79 102.7	7
8	63 04.8 54 77 108.7	63 20.9 53 77 107.8	63 36.7 52 78 106.8	63 52.1 51 78 105.8	64 07.1 49 79 104.8	64 21.7 48 79 103.8	64 35.8 46 79 102.8	64 49.5 45 79 101.8	8
9	62 18.7 54 77 107.6	62 34.6 52 78 106.7	62 50.1 51 78 105.8	63 05.3 50 78 104.8	63 20.0 49 79 103.8	63 34.4 47 79 102.9	63 48.4 46 79 101.9	64 01.9 44 80 100.9	9
30	61 32.3 53 78 106.6	61 47.9 52 78 105.7	62 03.3 50 78 104.8	62 18.2 49 79 103.8	62 32.8 48 79 102.9	62 47.0 47 79 101.9	63 00.8 45 80 101.0	63 14.2 44 80 100.0	30
1	60 45.6 52 78 105.6	61 01.1 51 78 104.7	61 16.2 50 79 103.8	61 31.0 49 79 102.9	61 45.4 47 79 102.0	61 59.3 46 80 101.0	62 13.1 45 80 100.1	62 26.3 43 80 99.1	1
2	59 58.8 52 78 104.6	60 14.0 50 79 103.8	60 29.0 49 79 102.9	60 43.6 48 79 102.0	60 57.9 47 80 101.1	61 11.7 46 80 100.2	61 25.2 44 80 99.2	61 38.4 43 80 98.3	2
3	59 11.7 51 79 103.7	59 26.8 50 79 102.9	59 41.6 49 79 102.0	59 56.1 48 79 101.1	60 10.2 46 80 100.2	60 23.9 45 80 99.3	60 37.3 44 80 98.4	60 50.3 43 80 97.5	3
4	58 24.4 50 79 102.8	58 39.4 49 79 102.0	58 54.0 48 80 101.1	59 08.4 47 80 100.3	59 22.3 46 80 99.4	59 35.9 45 80 98.5	59 49.2 44 80 97.6	60 02.1 42 80 96.7	4
35	57 37.0 50 79 101.9	57 51.8 49 80 101.1	58 06.4 48 80 100.3	58 20.5 47 80 99.5	58 34.4 46 80 98.6	58 47.9 44 80 97.8	59 01.1 43 80 96.9	59 13.9 42 80 96.0	35
6	56 49.5 49 80 101.1	57 04.2 48 80 100.3	57 18.5 47 80 99.5	57 32.6 45 80 98.7	57 46.3 45 80 97.8	57 59.4 44 80 97.0	58 12.4 43 80 96.1	58 25.6 41 80 95.3	6
7	56 01.8 49 80 100.3	56 16.3 48 80 99.5	56 30.6 47 80 98.7	56 44.6 46 80 97.9	56 58.2 45 80 97.1	57 11.5 44 80 96.3	57 24.5 43 80 95.4	57 37.2 42 81 94.6	7
8	55 13.9 49 80 99.5	55 28.4 48 80 98.7	55 42.6 47 80 97.9	55 56.4 46 80 97.2	56 10.0 45 80 96.4	56 23.3 44 81 95.5	56 36.2 43 81 94.7	56 48.8 41 81 93.9	8
9	54 26.0 48 80 98.7	54 40.4 47 80 98.0	54 54.5 46 80 97.2	55 08.2 45 80 96.4	55 21.7 44 80 95.6	55 34.9 43 81 94.9	55 47.8 42 81 94.1	56 00.3 41 81 93.2	9
40	53 38.0 48 80 98.0	53 52.3 47 80 97.2	54 06.3 46 80 96.5	54 20.0 45 81 95.7	54 33.4 44 81 95.0	54 46.5 43 81 94.2	54 59.4 42 81 93.4	55 11.9 41 81 92.6	40
1	52 49.9 48 80 97.2	53 04.1 47 80 96.5	53 18.0 46 80 95.8	53 31.6 45 81 95.0	53 45.0 44 81 94.3	53 58.1 43 81 93.5	54 10.9 42 81 92.7	54 23.4 41 81 92.0	1
2	52 01.7 48 80 96.5	52 15.8 47 81 95.8	52 29.7 46 81 95.1	52 43.3 45 81 94.4	52 56.6 44 81 93.6	53 09.6 43 81 92.9	53 22.1 42 81 92.1	53 34.8 41 81 91.3	2
3	51 13.4 47 80 95.8	51 27.5 46 81 95.1	51 41.3 46 81 94.4	51 54.8 45 81 93.7	52 08.1 44 81 93.0	52 21.1 43 81 92.2	52 33.9 42 81 91.5	52 46.3 41 81 90.7	3
4	50 25.1 47 81 95.2	50 39.1 46 81 94.5	50 52.9 45 81 93.8	51 06.4 45 81 93.0	51 19.6 44 81 92.3	51 32.6 43 81 91.6	51 45.3 42 81 90.9	51 57.8 41 81 90.1	4
45	49 36.7 47 81 94.5	49 50.7 46 81 93.8	50 04.4 45 81 93.1	50 17.9 44 81 92.4	50 31.1 44 81 91.7	50 44.1 43 81 91.0	50 56.8 42 81 90.3	51 09.2 41 81 89.6	45
6	48 48.3 47 81 93.8	49 02.3 46 81 93.2	49 15.9 45 81 92.5	49 29.4 44 81 91.8	49 42.6 44 81 91.1	49 55.6 43 81 90.4	50 08.3 42 81 89.7	50 20.7 41 81 89.0	6
7	47 59.9 47 81 93.2	48 13.8 46 81 92.5	48 27.4 45 81 91.9	48 40.9 44 81 91.2	48 54.1 44 81 90.5	49 07.0 43 81 89.8	49 19.7 42 81 89.1	49 32.2 41 81 88.4	7
8	47 11.4 47 81 92.6	47 25.3 46 81 91.9	47 38.9 45 81 91.2	47 52.3 44 81 90.6	48 05.5 44 81 89.9	48 18.5 43 81 89.2	48 31.2 42 81 88.5	48 43.7 41 81 87.9	8
9	46 22.9 47 81 91.9	46 36.7 46 81 91.3	46 50.4 45 81 90.6	47 03.8 44 81 90.0	47 17.0 44 81 89.3	47 29.9 43 81 88.7	47 42.7 42 81 88.0	47 55.2 41 81 87.3	9
50	45 34.4 46 81 91.3	45 48.2 46 81 90.7	46 01.8 45 81 90.0	46 15.3 44 81 89.4	46 28.5 44 81 88.7	46 41.4 43 81 88.1	46 54.2 42 81 87.4	47 06.7 41 81 86.8	50
1	44 45.8 46 81 90.7	44 59.7 46 81 90.1	45 13.3 45 81 89.5	45 26.7 44 81 88.8	45 39.9 44 81 88.2	45 52.9 43 81 87.5	46 05.7 42 81 86.9	46 18.2 41 81 86.2	1
2	43 57.3 46 81 90.1	44 11.1 46 81 89.5	44 24.8 45 81 88.8	44 38.2 44 81 88.3	44 51.4 44 81 87.6	45 04.4 43 81 87.0	45 17.2 42 81 86.3	45 29.8 41 81 85.7	2
3	43 08.8 46 81 89.5	43 22.6 46 81 88.9	43 36.2 45 81 88.3	43 49.7 44 81 87.7	44 02.9 44 81 87.1	44 16.0 43 81 86.4	44 28.8 42 81 85.8	44 41.4 42 80 85.2	3
4	42 20.2 46 81 89.0	42 34.1 46 81 88.4	42 47.7 45 81 87.8	43 01.2 45 81 87.1	43 14.5 44 81 86.5	43 27.5 43 81 85.9	43 40.4 42 81 85.3	43 53.1 42 80 84.7	4
55	41 31.7 47 81 88.4	41 45.6 46 81 87.8	41 59.2 45 81 87.2	42 12.7 45 81 86.6	42 26.0 44 81 86.0	42 39.1 44 81 85.4	42 52.1 43 80 84.8	43 04.8 42 80 84.1	55
6	40 43.2 47 81 87.8	40 57.1 46 81 87.2	41 10.8 45 81 86.6	41 24.3 45 81 86.1	41 37.6 44 81 85.5	41 50.8 44 81 84.9	42 03.6 43 80 84.2	42 16.5 42 80 83.6	6
7	39 54.7 47 81 87.3	40 08.6 46 81 86.7	40 22.3 45 81 86.1	40 35.9 45 81 85.5	40 49.3 44 81 84.9	41 02.4 44 80 84.3	41 15.5 43 80 83.7	41 28.3 42 80 83.1	7
8	39 06.2 47 81 86.7	39 20.1 46 81 86.1	39 33.9 45 81 85.6	39 47.5 45 81 85.0	40 00.9 44 81 84.4	40 14.2 44 80 83.8	40 27.2 43 80 83.2	40 40.1 43 80 82.6	8
9	38 17.8 47 81 86.2	38 31.7 46 81 85.6	38 45.5 46 80 85.0	38 59.2 45 81 84.5	39 12.6 45 80 83.9	39 25.9 44 80 83.3	39 39.1 43 80 82.7	39 52.0 43 80 82.1	9
60	37 29.3 47 81 85.6	37 43.4 46 81 85.1	37 57.2 46 80 84.5	38 10.9 45 81 83.9	38 24.4 45 80 83.4	38 37.7 44 80 82.8	38 50.9 44 80 82.2	39 03.9 43 80 81.6	60
1	36 41.0 47 81 85.1	36 55.0 47 80 84.5	37 08.9 46 80 84.0	37 22.6 46 80 83.4	37 36.2 45 80 82.9	37 49.6 44 80 82.3	38 02.9 44 80 81.7	38 16.9 43 80 81.1	1
2	35 52.6 47 80 84.5	36 06.7 47 80 84.0	36 20.6 46 80 83.5	36 34.4 46 80 82.9	36 48.1 45 80 82.3	37 01.5 45 80 81.8	37 14.9 44 80 81.2	37 28.0 44 80 80.7	2
3	35 04.3 47 80 84.0	35 18.5 47 80 83.5	35 32.4 46 80 82.9	35 46.3 46 80 82.4	36 00.0 45 80 81.8	36 13.5 45 80 81.3	36 26.9 44 80 80.7	36 40.2 44 80 80.2	3
4	34 16.1 48 80 83.5	34 30.3 47 80 83.0	34 44.3 47 80 82.4	34 58.2 46 80 81.9	35 12.0 46 80 81.3	35 25.6 45 80 80.8	35 39.0 45 80 80.2	35 52.4 44 80 79.7	4
65	33 27.9 48 80 83.0	33 42.1 47 80 82.4	33 56.2 47 80 81.9	34 10.2 46 80 81.4	34 24.0 46 80 80.8	34 37.7 45 80 80.3	34 51.2 45 80 79.8	35 04.6 44 79 79.2	65
6	32 39.7 48 80 82.4	32 54.0 47 80 81.9	33 08.2 47 80 81.4	33 22.2 47 80 80.9	33 36.1 46 80 80.3	33 49.9 46 80 79.8	34 03.5 45 79 79.3	34 17.0 45 79 78.7	6
7	31 51.6 48 80 81.9	32 06.0 48 80 81.4	32 20.2 47 80 80.9	32 34.3 47 80 80.4	32 48.3 46 80 79.8	33 02.2 46 79 79.3	33 15.9 45 79 78.8	33 29.4 45 79 78.2	7
8	31 03.6 48 80 81.4	31 18.0 48 80 80.9	31 32.3 47 80 80.4	31 46.5 47 80 79.9	32 00.6 47 80 79.3	32 14.5 46 79 78.8	32 28.3 46 79 78.3	32 42.0 45 79 77.8	8
9	30 15.6 49 80 80.9	30 30.1 48 80 80.4	30 44.5 48 80 79.9	30 58.8 47 79 79.4	31 12.9 47 79 78.9	31 26.9 46 79 78.3	31 40.8 46 79 77.8	31 54.6 45 79 77.3	9
70	29 27.4 49 80 80.4	29 42.3 48 80 79.9	29 56.8 48 80 79.4	30 11.1 48 79 78.9	30 25.3 47 79 78.4	30 39.4 47 79 77.8	30 53.4 46 79 77.3	31 07.3 46 79 76.8	70
1	28 39.4 49 80 79.9	28 54.6 49 80 79.4	29 09.1 48 80 78.9	29 23.5 48 79 78.4	29 37.6 47 79 77.9	29 52.0 47 79 77.4	30 06.1 47 79 76.9	30 20.8 46 79 76.3	1
2	27 52.2 49 80 79.4	28 06.9 49 80 78.9	28 21.5 49 80 78.4	28 36.0 48 79 77.9	28 50.4 48 79 77.4	29 04.7 47 79 76.9	29 18.9 47 78 76.4	29 32.9 47 78 75.9	2
3	27 04.5 50 79 78.9	27 19.3 49 80 78.4	27 34.0 49 79 77.9	27 48.6 49 79 77.4	28 03.1 48 79 76.9	28 17.5 48 79 76.4	28 31.7 47 78 75.9	28 45.9 47 78 75.4	3
4	26 16.9 50 79 78.4	26 31.8 49 79 77.9	26 46.6 49 79 77.4	27 01.3 49 79 76.9	27 15.9 48 79 76.4	27 30.3 48 78 75.9	27 44.7 48 78 75.4	27 59.0 47 78 74.9	4
75	25 29.4 50 79 77.8	25 44.4 50 79 77.4	25 59.3 49 79 76.9	26 14.0 49 79 76.4	26 28.7 49 79 75.9	26 43.3 48 78 75.4	26 57.8 48 78 74.9	27 12.2 48 78 74.4	75
6	24 42.0 50 79 77.3	24 57.1 50 79 76.9	25 12.0 50 78 76.4	25 26.9 49 79 75.9	25 41.7 49 78 75.4	25 56.4 49 78 74.9	26 11.0 48 78 74.4	26 25.5 48 78 74.0	6
7	23 54.7 51 79 76.8	24 09.9 50 79 76.4	24 24.9 50 78 75.9	24 39.9 50 78 75.4	24 54.8 49 78 74.9	25 09.6 49 78 74.4	25 24.3 49 78 74.0	25 38.9 47 77 73.5	7
8	23 07.5 51 79 76.3	23 22.7 51 78 75.9	23 37.9 50 78 75.4	23 53.0 50 78 74.9	24 08.0 50 78 74.4	24 22.9 50 78 74.0	24 37.7 49 78 73.5	24 52.4 49 77 73.0	8
9	22 20.4 51 79 75.8	22 35.7 51 78 75.4	22 51.0 51 78 74.9	23 06.2 50 78 74.4	23 21.2 50 78 73.9	23 36.3 50 77 73.5	23 51.2 50 77 73.0	24 06.0 49 77 72.5	9
80	21 33.4 52 78 75.3	21 48.8 51 78 74.9	22 04.2 51 78 74.4	22 19.5 51 78 73.9	22 34.7 50 78 73.5	22 49.8 50 77 73.0	23 04.8 50 77 72.5	23 19.8 50 77 72.0	80
1	20 46.5 52 78 74.8	21 02.0 52 78 74.3	21 17.5 51 78 73.9	21 32.9 51 78 73.4	21 48.2 51 77 73.0	22 03.4 50 77 72.5	22 18.6 50 77 72.0	22 33.7 50 77 71.6	1
2	19 59.7 52 78 74.3	20 15.3 52 78 73.8	20 30.9 52 77 73.4	20 46.4 51 77 72.9	21 01.8 51 77 72.5	21 17.2 51 77 72.0	21 32.5 51 77 71.5	21 47.7 51 76 71.1	2
3	19 13.0 53 78 73.8	19 28.8 52 77 73.3	19 44.4 52 77 72.9	20 00.1 52 77 72.4	20 15.6 52 77 72.0	20 31.1 51 77 71.5	20 46.5 51 76 71.1	21 01.8 51 76 70.6	3
4	18 26.5 53 77 73.3	18 42.3 53 77 72.8	18 58.1 53 77 72.4	19 13.9 52 77 71.9	19 29.5 52 76 71.5	19 45.1 52 76 71.0	20 00.6 52 76 70.6	20 16.1 51 76 70.1	4
85	17 40.0 53 77 72.8	17 56.0 53 77 72.3	18 11.9 53 77 71.9	18 27.8 53 77 71.4	18 43.6 53 76 71.0	18 59.3 52 76 70.5	19 14.9 52 76 70.1	19 30.5 52 76 69.6	85
6	16 53.7 54 77 72.3	17 09.8 54 77 71.8	17 25.9 53 77 71.4	17 41.8 53 76 70.9	17 57.7 53 76 70.5	18 13.6 53 76 70.0	18 29.4 52 76 69.6	18 45.1 52 75 69.1	6
7	16 07.6 54 77 71.7	16 23.8 54 77 71.3	16 39.9 54 76 70.9	16 56.0 54 76 70.4	17 12.1 53 76 70.0	17 28.0 53 76 69.5	17 44.0 53 76 69.1	17 59.8 53 75 68.6	7
8	15 21.5 54 76 71.2	15 37.9 54 76 70.8	15 54.1 54 76 70.4	16 10.4 54 76 69.9	16 26.5 54 75 69.5	16 42.6 54 75 69.0	16 58.7 53 75 68.6	17 14.7 53 75 68.2	8
9	14 35.7 55 76 70.7	14 52.1 55 76 70.3	15 08.5 55 76 69.8	15 24.8 54 76 69.4	15 41.1 54 75 69.0	15 57.4 54 75 68.5	16 13.6 54 75 68.1	16 29.7 54 75 67.7	9
90	13 49.9 55 76 70.2	14 06.5 55 76 69.8	14 23.0 55 75 69.3	14 39.5 55 75 68.9	14 55.9 55 75 68.5	15 12.3 55 75 68.0	15 28.5 55 75 67.6	15 44.9 54 74 67.2	90

L 30

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	24°00′ Alt	Δd	Δt	Az	24°30′ Alt	Δd	Δt	Az	25°00′ Alt	Δd	Δt	Az	25°30′ Alt	Δd	Δt	Az	26°00′ Alt	Δd	Δt	Az	26°30′ Alt	Δd	Δt	Az	27°00′ Alt	Δd	Δt	Az	27°30′ Alt	Δd	Δt	Az	H.A.
00	30 00.0	1.00	01	180.0	29 30.0	1.00	01	180.0	29 00.0	1.00	01	180.0	28 30.0	1.00	01	180.0	28 00.0	1.00	01	180.0	27 30.0	1.00	01	180.0	27 00.0	1.00	01	180.0	26 30.0	1.00	01	180.0	00
1	29 59.6	1.00	02	178.9	29 29.6	1.00	02	179.0	28 59.6	1.00	02	179.0	28 29.6	1.00	02	179.0	27 59.6	1.00	02	179.0	27 29.6	1.00	02	179.0	26 59.6	1.00	02	179.0	26 29.6	1.00	02	179.0	1
2	29 58.2	1.00	04	177.9	29 28.2	1.00	04	177.9	28 58.2	1.00	04	177.9	28 28.3	1.00	04	178.0	27 58.3	1.00	04	178.0	27 28.3	1.00	04	178.0	26 58.3	1.00	04	178.0	26 28.3	1.00	04	178.0	2
3	29 56.0	1.00	05	176.8	29 26.0	1.00	05	176.9	28 56.1	1.00	05	176.9	28 26.1	1.00	05	176.9	27 56.1	1.00	05	176.9	27 26.2	1.00	05	177.0	26 56.2	1.00	05	177.0	26 26.2	1.00	05	177.0	3
4	29 52.9	1.00	07	175.8	29 22.9	1.00	07	175.8	28 53.0	1.00	06	175.9	28 23.0	1.00	07	175.9	27 53.1	1.00	07	175.9	27 23.2	1.00	06	176.0	26 53.2	1.00	06	176.0	26 23.3	1.00	06	176.0	4
05	29 48.8	1.00	08	174.7	29 18.9	1.00	08	174.8	28 49.0	1.00	08	174.8	28 19.1	1.00	08	174.9	27 49.2	1.00	08	174.9	27 19.3	1.00	08	175.0	26 49.4	1.00	08	175.0	26 19.5	1.00	08	175.1	05
6	29 44.0	1.00	10	173.7	29 14.1	1.00	10	173.7	28 44.2	1.00	10	173.8	28 14.4	1.00	10	173.9	27 44.5	1.00	09	173.9	27 14.6	1.00	09	174.0	26 44.8	1.00	09	174.0	26 14.9	1.00	09	174.1	6
7	29 38.2	99	11	172.7	29 08.4	99	11	172.7	28 38.6	99	11	172.8	28 08.7	99	11	172.8	27 38.9	99	11	172.9	27 09.1	99	11	173.0	26 39.3	99	10	173.0	26 09.5	99	10	173.1	7
8	29 31.5	99	12	171.6	29 01.8	99	12	171.7	28 32.0	99	12	171.7	28 02.3	99	12	171.8	27 32.5	99	12	171.9	27 02.7	99	12	172.0	26 33.0	99	12	172.0	26 03.2	99	12	172.1	8
9	29 24.0	99	14	170.6	28 54.3	99	14	170.6	28 24.6	99	14	170.7	27 54.9	99	14	170.8	27 25.2	99	14	170.9	26 55.5	99	13	171.0	26 25.8	99	13	171.0	25 56.1	99	13	171.1	9
10	29 15.6	99	16	169.5	28 46.0	99	15	169.6	28 16.4	99	15	169.7	27 46.8	99	15	169.8	27 17.1	99	15	169.9	26 47.5	99	15	170.0	26 17.9	99	15	170.1	25 48.2	99	15	170.1	10
1	29 06.3	98	17	168.5	28 36.8	98	17	168.6	28 07.3	98	16	168.7	27 37.7	98	16	168.8	27 08.2	98	16	168.9	26 38.6	99	16	169.0	26 09.1	99	16	169.1	25 39.5	99	16	169.2	1
2	28 56.2	98	18	167.5	28 26.8	98	18	167.6	27 57.3	98	18	167.7	27 27.9	98	18	167.9	26 58.4	98	18	167.9	26 29.0	98	18	168.0	25 59.5	98	17	168.1	25 30.0	98	17	168.2	2
3	28 45.3	98	19	166.6	28 15.9	98	20	166.6	27 46.6	98	19	166.7	27 17.2	98	19	166.8	26 47.8	98	19	166.9	26 18.5	98	19	167.0	25 49.1	98	19	167.1	25 19.7	98	19	167.2	3
4	28 33.5	97	21	165.4	28 04.2	98	21	165.6	27 35.0	98	21	165.7	27 05.7	98	20	165.8	26 36.4	98	20	165.9	26 07.2	98	20	166.0	25 37.9	98	20	166.2	25 08.6	98	20	166.3	4
15	28 20.8	97	22	164.4	27 51.7	97	22	164.6	27 22.6	97	22	164.7	26 53.4	97	22	164.8	26 24.2	97	22	164.9	25 55.1	97	21	165.1	25 25.9	97	21	165.2	24 56.7	97	21	165.3	15
6	28 07.4	97	24	163.4	27 38.4	97	24	163.6	27 09.3	97	23	163.7	26 40.3	97	23	163.8	26 11.2	97	23	164.0	25 42.2	97	23	164.1	25 13.1	97	23	164.2	24 44.0	97	22	164.4	6
7	27 53.1	96	25	162.4	27 24.2	96	25	162.6	26 55.3	96	24	162.7	26 26.4	96	24	162.9	25 57.4	96	24	163.0	25 28.5	97	24	163.2	24 59.5	97	24	163.3	24 30.6	97	24	163.4	7
8	27 38.1	96	26	161.4	27 09.3	96	26	161.6	26 40.5	96	26	161.7	26 11.7	96	26	161.9	25 42.9	96	26	162.0	25 14.0	96	26	162.2	24 45.2	96	25	162.4	24 16.3	96	25	162.5	8
9	27 22.2	96	28	160.4	26 53.5	96	28	160.6	26 24.9	96	27	160.8	25 56.2	96	27	160.9	25 27.5	96	27	161.1	24 58.8	96	27	161.3	24 30.1	96	26	161.4	24 01.4	96	26	161.6	9
20	27 05.6	95	29	159.5	26 37.0	95	29	159.6	26 08.5	95	29	159.8	25 40.0	95	28	160.0	25 11.4	95	28	160.1	24 42.8	95	28	160.3	24 14.2	95	28	160.5	23 45.7	95	27	160.6	20
1	26 48.1	95	30	158.5	26 19.7	95	30	158.7	25 51.4	95	30	158.8	25 22.9	95	30	159.0	24 54.5	95	29	159.2	24 26.1	95	29	159.4	23 57.7	95	29	159.5	23 29.2	95	29	159.7	1
2	26 29.9	94	32	157.5	26 01.7	94	31	157.7	25 33.5	94	31	157.9	25 05.2	94	31	158.1	24 36.9	94	30	158.3	24 08.6	94	30	158.4	23 40.3	94	30	158.6	23 12.0	94	30	158.8	2
3	26 11.0	94	33	156.6	25 42.9	94	33	156.8	25 14.8	94	32	157.0	24 46.7	94	32	157.1	24 18.6	94	32	157.3	23 50.4	94	32	157.5	23 22.3	94	31	157.7	22 54.1	94	31	157.9	3
4	25 51.3	93	34	155.6	25 23.4	93	34	155.8	24 55.5	93	34	156.0	24 27.5	93	33	156.2	23 59.5	93	33	156.4	23 31.5	93	33	156.6	23 03.5	93	32	156.8	22 35.5	93	32	157.0	4
25	25 30.9	93	35	154.7	25 03.2	93	35	154.9	24 35.4	93	35	155.1	24 07.6	93	34	155.3	23 39.7	93	34	155.5	23 11.9	93	34	155.7	22 44.0	93	34	155.9	22 16.2	93	33	156.1	25
6	25 09.8	92	36	153.7	24 42.2	92	36	154.0	24 14.6	92	36	154.2	23 46.9	92	36	154.4	23 19.3	92	35	154.6	22 51.6	92	35	154.8	22 23.9	92	35	155.0	21 56.2	92	34	155.2	6
7	24 48.0	91	38	152.8	24 20.5	91	38	153.0	23 53.1	92	37	153.3	23 25.5	92	37	153.5	22 58.1	92	36	153.7	22 30.6	92	36	154.0	22 03.0	92	36	154.1	21 35.5	92	36	154.3	7
8	24 25.5	91	39	151.9	23 58.2	91	39	152.1	23 30.9	91	38	152.4	23 03.6	91	38	152.6	22 36.2	91	38	152.8	22 08.9	91	37	153.0	21 41.5	91	37	153.2	21 14.1	91	37	153.5	8
9	24 02.3	90	40	151.0	23 35.1	90	40	151.2	23 08.0	90	39	151.5	22 40.9	91	39	151.7	22 13.7	91	39	151.9	21 46.5	91	38	152.1	21 19.3	91	38	152.4	20 52.1	91	38	152.6	9
30	23 38.4	90	41	150.1	23 11.4	90	41	150.3	22 44.5	90	40	150.6	22 17.5	90	40	150.8	21 50.5	90	40	151.0	21 23.5	90	39	151.3	20 56.5	90	39	151.5	20 29.4	90	39	151.7	30
1	23 13.8	89	42	149.2	22 47.1	89	42	149.4	22 20.3	89	41	149.7	21 53.5	89	41	149.9	21 26.7	89	41	150.2	20 59.9	89	40	150.4	20 33.0	89	40	150.7	20 06.1	89	40	150.9	1
2	22 48.7	89	43	148.3	22 22.1	89	43	148.6	21 55.5	89	42	148.8	21 28.9	89	42	149.1	21 02.3	89	42	149.3	20 35.6	89	42	149.6	20 08.9	89	41	149.8	19 42.2	89	41	150.0	2
3	22 22.9	88	44	147.4	21 56.5	88	44	147.7	21 30.1	88	43	148.0	21 03.6	88	43	148.2	20 37.2	88	43	148.5	20 10.7	88	43	148.7	19 44.2	88	42	149.0	19 17.7	88	42	149.2	3
4	21 56.4	87	45	146.6	21 30.2	87	45	146.8	21 04.0	87	44	147.1	20 37.8	88	44	147.4	20 11.5	88	44	147.6	19 45.2	88	44	147.9	19 18.9	88	43	148.1	18 52.5	88	43	148.4	4
35	21 29.4	87	46	145.7	21 03.4	87	46	146.0	20 37.3	87	45	146.3	20 11.3	87	45	146.5	19 45.2	87	45	146.8	19 19.1	87	44	147.0	18 52.9	87	44	147.3	18 26.8	87	44	147.6	35
6	21 01.8	86	47	144.9	20 35.9	86	47	145.2	20 10.1	86	46	145.4	19 44.2	86	46	145.7	19 18.3	86	46	146.0	18 52.4	86	45	146.2	18 26.4	87	45	146.5	18 00.5	87	45	146.8	6
7	20 33.6	85	48	144.0	20 07.9	86	48	144.3	19 42.3	86	47	144.6	19 16.6	86	47	144.9	18 50.9	86	47	145.1	18 25.1	86	46	145.4	17 59.4	86	46	145.7	17 33.6	86	46	146.0	7
8	20 04.8	85	49	143.2	19 39.3	85	49	143.5	19 13.9	85	48	143.8	18 48.4	85	48	144.1	18 22.8	85	48	144.3	17 57.3	85	47	144.6	17 31.7	85	47	144.9	17 06.1	85	47	145.2	8
9	19 35.4	84	50	142.4	19 10.2	84	50	142.7	18 44.9	84	49	143.0	18 19.6	84	49	143.2	17 54.2	84	48	143.5	17 28.9	85	48	143.8	17 03.5	85	48	144.1	16 38.1	85	48	144.4	9
40	19 05.5	83	51	141.6	18 40.5	84	50	141.9	18 15.4	84	50	142.2	17 50.3	84	50	142.4	17 25.1	84	49	142.7	17 00.0	84	49	143.0	16 34.8	84	49	143.3	16 09.6	84	48	143.6	40
1	18 35.1	83	52	140.8	18 10.2	83	51	141.1	17 45.3	83	51	141.4	17 20.4	83	51	141.7	16 55.5	83	50	141.9	16 30.5	83	50	142.2	16 05.5	83	50	142.5	15 40.5	83	49	142.8	1
2	18 04.2	82	52	140.0	17 39.5	82	52	140.3	17 14.8	82	52	140.6	16 50.0	82	51	140.9	16 25.3	83	51	141.2	16 00.5	83	51	141.5	15 35.7	83	50	141.8	15 10.9	83	50	142.0	2
3	17 32.7	82	53	139.2	17 08.2	82	53	139.5	16 43.7	82	53	139.8	16 19.2	82	52	140.1	15 54.6	82	52	140.4	15 30.0	82	52	140.7	15 05.4	82	51	141.0	14 40.8	82	51	141.3	3
4	17 00.7	81	54	138.4	16 36.4	81	54	138.7	16 12.1	81	54	139.0	15 47.8	81	53	139.3	15 23.4	81	53	139.6	14 59.0	81	52	139.9	14 34.6	81	52	140.2	14 10.2	81	52	140.5	4
45	16 28.3	80	55	137.7	16 04.2	80	55	138.0	15 40.1	80	54	138.3	15 15.9	81	54	138.6	14 51.7	81	54	138.9	14 27.5	81	53	139.2	14 03.3	81	53	139.5	13 39.1	81	53	139.8	45
6	15 55.3	80	56	136.9	15 31.4	80	55	137.2	15 07.5	80	55	137.5	14 43.6	80	55	137.8	14 19.6	80	54	138.1	13 55.6	80	54	138.5	13 31.6	80	54	138.8	13 07.5	80	53	139.1	6
7	15 21.9	79	56	136.1	14 58.2	79	56	136.5	14 34.5	79	56	136.8	14 10.7	79	55	137.1	13 47.0	79	55	137.4	13 23.2	79	55	137.7	12 59.3	79	54	138.0	12 35.5	80	54	138.3	7
8	14 48.1	78	57	135.4	14 24.6	78	57	135.7	14 01.0	79	56	136.0	13 37.5	79	56	136.4	13 13.7	79	55	136.7	12 50.3	79	55	137.0	12 26.6	79	55	137.3	12 03.0	79	55	137.6	8
9	14 13.8	78	58	134.7	13 50.4	78	58	135.0	13 27.1	78	57	135.3	13 03.7	78	57	135.6	12 40.4	78	57	136.0	12 16.9	78	56	136.3	11 53.5	78	56	136.6	11 30.1	78	56	136.9	9
50	13 39.0	77	59	133.9	13 15.9	77	59	134.3	12 52.7	77	58	134.6	12 29.6	77	58	134.9	12 06.4	77	57	135.2	11 43.2	77	57	135.6	11 19.9	77	57	135.9	10 56.7	78	56	136.2	50
1	13 03.8	76	59	133.2	12 40.9	76	59	133.5	12 18.0	77	59	133.9	11 55.0	77	58	134.2	11 32.0	77	58	134.5	11 09.0	77	58	134.9	10 45.9	77	57	135.2	10 22.9	77	57	135.5	1
2	12 28.3	76	60	132.5	12 05.5	76	60	132.8	11 42.8	76	59	133.2	11 20.0	76	59	133.5	10 57.2	76	59	133.8	10 34.4	76	58	134.2	10 11.5	76	58	134.5	9 48.6	76	58	134.8	2
3	11 52.3	75	60	131.8	11 29.9	75	60	132.1	11 07.2	75	60	132.5	10 44.6	76	59	132.8	10 22.0	76	59	133.1	9 59.3	76	59	133.4	9 36.7	76	59	133.8	9 14.0	76	58	134.1	3
4	11 15.9	74	61	131.1	10 53.5	75	61	131.4	10 31.2	75	60	131.8	10 08.8	75	60	132.1	9 46.3	75	60	132.5	9 23.9	75	60	132.8	9 01.4	75	59	133.1	8 39.0	75	59	133.5	4
55	10 39.1	74	62	130.4	10 16.9	74	62	130.8	9 54.8	74	61	131.1	9 32.6	74	61	131.4	9 10.3	74	61	131.8	8 48.1	74	60	132.1	8 25.8	74	60	132.5	8 03.5	74	60	132.8	55
6	10 02.0	73	62	129.7	9 40.0	73	62	130.1	9 18.0	73	62	130.4	8 56.0	73	61	130.8	8 33.9	73	61	131.1	8 11.9	74	61	131.4	7 49.8	74	61	131.8	7 27.7	74	60	132.1	6
7	9 24.4	73	63	129.0	9 02.7	73	63	129.4	8 40.9	73	62	129.7	8 19.0	73	62	130.1	7 57.2	73	62	130.4	7 35.3	73	62	130.8	7 13.4	73	61	131.1	6 51.5	73	61	131.5	7
8	8 46.5	72	63	128.4	8 25.3	72	63	128.7	8 03.3	72	63	129.1	7 41.7	72	63	129.4	7 20.1	72	63	129.8	6 58.4	72	62	130.1	6 36.7	72	62	130.5	6 15.0	72	62	130.8	8
9	8 08.3	71	64	127.7	7 46.9	71	64	128.1	7 25.5	71	64	128.4	7 04.0	71	63	128.8	6 42.6	72	63	129.1	6 21.1	72	63	129.5	5 59.6	72	62	129.8	5 38.1	72	62	130.2	9
60	7 29.8	71	65	127.1	7 08.5	71	65	127.4	6 47.3	71	64	127.8	6 26.0	71	64	128.1	6 04.7	71	64	128.5	5 43.5	71	63	128.8	5 22.1	71	63	129.2	5 00.8	71	63	129.5	60
1	6 50.9	70	65	126.4	6 29.8	70	65	126.8	6 08.8	70	65	127.1	5 47.7	70	64	127.5	5 26.6	70	64	127.8	5 05.5	70	64	128.2									1
2	6 11.7	70	66	125.8	5 50.8	70	66	126.1	5 29.9	70	65	126.5	5 09.0	70	65	126.9																	2
3	5 32.1	69	66	125.1	5 11.4	69	66	125.5																									3

DECLINATION SAME NAME AS LATITUDE

H.A.	24°00′ Alt	Δd	Δt	Az	24°30′ Alt	Δd	Δt	Az	25°00′ Alt	Δd	Δt	Az	25°30′ Alt	Δd	Δt	Az	26°00′ Alt	Δd	Δt	Az	26°30′ Alt	Δd	Δt	Az	27°00′ Alt	Δd	Δt	Az	27°30′ Alt	Δd	Δt	Az	H.A.
91	13 04.3	56	76	69.7	13 21.0	56	76	69.2	13 37.7	55	75	68.8	13 54.3	55	75	68.4	14 10.8	55	75	68.0	14 27.3	55	75	67.5	14 43.8	55	74	67.1	15 00.2	55	74	66.7	91
2	12 18.9	56	76	69.1	12 35.7	56	75	68.7	12 52.5	56	75	68.3	13 09.2	56	75	67.9	13 25.9	56	74	67.4	13 42.6	56	74	67.0	13 59.2	55	74	66.6	14 15.8	55	74	66.2	2
3	11 33.6	57	75	68.6	11 50.6	57	75	68.2	12 07.5	56	75	67.8	12 24.3	56	74	67.4	12 41.2	56	74	66.9	12 58.0	56	74	66.5	13 14.7	56	74	66.1	13 31.4	56	74	65.7	3
4	10 48.5	57	75	68.1	11 05.6	57	75	67.7	11 22.6	57	74	67.3	11 39.6	57	74	66.8	11 56.6	57	74	66.4	12 13.5	56	74	66.0	12 30.4	56	74	65.6	12 47.3	56	73	65.1	4
95	10 03.5	57	75	67.6	10 20.7	57	74	67.1	10 37.9	57	74	66.7	10 55.1	57	74	66.3	11 12.2	57	74	65.9	11 29.3	57	73	65.5	11 46.3	57	73	65.1	12 03.4	57	73	64.6	95
6	9 18.5	58	74	67.0	9 36.1	58	74	66.6	9 53.4	58	74	66.2	10 10.7	58	74	65.8	10 28.1	57	74	65.4	10 45.2	57	73	65.0	11 02.4	57	73	64.5	11 19.6	57	73	64.1	6
7	8 34.1	58	74	66.5	8 51.6	58	74	66.1	9 09.1	58	74	65.7	9 26.6	58	73	65.3	9 44.0	58	73	64.8	10 01.3	58	73	64.4	10 18.7	58	72	64.0	10 36.0	58	72	63.6	7
8	7 49.7	59	74	65.9	8 07.4	59	73	65.5	8 25.0	59	73	65.1	8 42.6	59	73	64.7	9 00.1	58	73	64.3	9 17.7	58	72	63.9	9 35.2	58	72	63.5	9 52.6	58	72	63.1	8
9	7 05.5	59	73	65.4	7 23.3	59	73	65.0	7 41.0	59	73	64.6	7 58.8	59	73	64.2	8 16.5	59	72	63.8	8 34.2	59	72	63.4	8 51.8	59	72	63.0	9 09.5	59	72	62.5	9
100	6 21.5	60	73	64.9	6 39.4	60	73	64.5	6 57.3	60	72	64.0	7 15.2	60	72	63.6	7 33.0	60	72	63.2	7 50.9	59	72	62.8	8 08.7	59	72	62.4	8 26.5	59	71	62.0	100
1	5 37.6	60	73	64.3	5 55.7	60	72	63.9	6 13.7	60	72	63.5	6 31.8	60	72	63.1	6 49.8	60	72	62.7	7 07.8	60	71	62.3	7 25.8	60	71	61.9	7 43.7	60	71	61.5	1
2					5 12.2	61	72	63.3	5 30.4	61	72	63.0	5 48.6	61	72	62.6	6 06.8	61	71	62.2	6 24.9	60	71	61.8	6 43.1	60	71	61.3	7 01.2	60	71	60.9	2
3													5 05.6	61	71	62.0	5 24.0	61	71	61.6	5 42.3	61	71	61.2	6 00.6	61	70	60.8	6 18.9	61	70	60.4	3
4																					5 05.6	61	71	62.0	5 24.0	61	71	61.6	5 36.8	61	70	59.9	4

16—65156-1

Lat. 36°

H.A.	28° 00' Alt. · Δd Δt · Az.	28° 30' Alt. · Δd Δt · Az.	29° 00' Alt. · Δd Δt · Az.	30° 00' Alt. · Δd Δt · Az.	32° 00' Alt. · Δd Δt · Az.	34° 00' Alt. · Δd Δt · Az.	34° 30' Alt. · Δd Δt · Az.	35° 30' Alt. · Δd Δt · Az.	H.A.
00	82 00.0 1.0 04 180.0	82 30.0 1.0 05 180.0	83 00.0 1.0 05 180.0	84 00.0 1.0 06 180.0	86 00.0 1.0 08 180.0	88 00.0 1.0 16 180.0	88 30.0 1.0 21 180.0	89 30.0 1.0 45 180.0	00
1	81 57.3 99 13 173.7	82 27.2 99 14 173.3	82 57.0 99 15 172.9	83 56.5 99 17 171.8	85 54.9 98 24 168.0	87 50.3 93 42 157.4	88 17.5 88 51 151.1	89 02.8 53 75 121.3	1
2	81 49.4 98 22 167.5	82 18.7 98 23 166.7	82 48.0 97 24 165.9	83 46.2 97 28 163.8	85 40.2 97 28 156.9	87 24.9 78 58 134.1	87 45.4 78 58 134.1	88 18.1 30 79 106.5	2
3	81 36.4 96 29 161.5	82 05.0 95 31 160.5	82 33.5 95 33 159.3	83 29.7 93 37 156.4	85 17.4 89 37 147.3	86 49.9 64 67 128.3	87 07.6 58 72 120.6	87 30.9 22 80 100.7	3
4	81 18.8 93 36 155.9	81 46.5 92 38 154.6	82 13.9 91 40 153.2	83 07.7 88 44 149.7	84 48.3 78 56 139.2	86 09.1 54 72 120.2	86 24.4 44 76 113.5	86 42.9 17 80 97.6	4
05	80 57.0 89 42 150.7	81 23.6 88 44 149.2	81 49.9 87 46 147.6	82 41.0 83 51 143.7	84 14.5 71 62 132.6	85 26.6 46 75 114.6	85 39.0 37 77 108.7	85 54.7 15 81 95.6	05
6	80 31.4 86 48 145.9	80 57.0 84 50 144.3	81 22.0 83 52 142.5	82 10.4 78 56 138.3	83 37.2 65 66 127.1	84 41.1 40 77 110.4	84 52.6 32 78 105.3	85 06.3 13 81 94.1	6
7	80 02.7 82 52 141.5	80 27.1 80 54 139.8	80 50.9 78 56 137.9	81 36.6 74 60 133.7	82 57.3 59 70 122.6	83 55.7 36 78 107.2	84 05.1 29 79 102.7	84 17.9 12 81 93.0	7
8	79 31.2 79 56 137.5	79 54.4 77 58 135.7	80 17.1 74 60 133.3	81 00.3 69 64 129.6	82 15.5 55 72 118.8	83 09.0 33 79 104.6	83 18.0 26 80 100.6	83 29.4 12 81 92.1	8
9	78 57.2 75 60 133.9	79 19.5 73 62 132.1	79 41.0 71 63 130.2	80 21.9 65 67 126.0	81 32.4 51 74 115.5	82 21.9 30 79 102.6	82 30.1 22 80 98.9	82 40.9 11 81 91.3	9
10	78 21.3 72 63 130.6	78 42.5 70 64 128.8	79 03.1 67 66 126.9	79 41.9 62 69 122.8	80 48.1 48 75 112.9	81 34.3 29 80 100.8	81 42.1 23 80 97.5	81 52.3 11 81 90.6	10
1	77 43.6 69 65 127.6	78 03.9 67 67 125.8	78 23.5 64 68 124.0	79 00.4 59 71 119.9	80 03.0 45 76 110.5	80 46.5 27 80 98.0	80 53.9 22 80 96.3	81 03.8 11 81 90.0	1
2	77 04.4 66 67 124.9	77 23.5 64 69 123.1	77 42.6 61 70 121.3	78 17.8 56 73 117.4	79 17.2 43 77 108.5	79 58.5 26 80 98.0	80 05.6 21 81 95.2	80 15.3 11 81 89.4	2
3	76 24.0 63 69 122.4	76 42.7 61 70 120.7	77 00.6 59 72 118.9	77 34.3 53 74 115.2	78 31.0 41 78 106.6	79 10.4 25 80 96.9	79 17.2 20 81 94.2	79 26.7 11 81 88.9	3
4	75 42.5 61 71 120.1	76 00.4 59 72 118.4	76 17.7 56 73 116.7	76 50.0 51 75 113.1	77 44.2 39 78 105.0	78 22.2 24 81 95.8	78 28.8 20 81 93.4	78 38.2 12 81 88.4	4
15	75 00.0 59 72 118.0	75 17.3 57 73 116.4	75 34.0 54 74 114.7	76 05.0 49 76 111.3	76 57.2 37 79 103.5	77 33.8 23 81 94.9	77 40.3 20 81 92.6	77 49.7 12 81 87.9	15
6	74 16.8 57 73 116.1	74 33.5 55 74 114.5	74 49.6 52 75 112.9	75 19.5 47 77 109.6	76 10.9 36 79 102.2	76 45.4 23 81 94.0	76 51.8 19 81 91.9	77 01.2 12 81 87.5	6
7	73 32.9 55 74 114.3	73 49.0 53 75 112.8	74 04.6 51 76 111.2	74 33.6 46 77 108.0	75 23.3 35 80 101.0	75 57.0 23 81 93.2	76 03.3 19 81 91.2	76 12.7 12 81 87.1	7
8	72 48.3 54 75 112.6	73 04.0 51 76 111.2	73 19.1 49 76 109.7	73 47.2 45 78 106.6	74 34.6 34 80 99.8	75 08.5 22 81 92.5	75 14.7 19 81 90.6	75 24.2 13 81 86.7	8
9	72 03.3 52 76 111.1	72 18.5 50 76 109.7	72 33.2 48 77 108.2	73 00.5 43 78 105.2	73 46.7 33 80 98.8	74 20.0 22 81 91.8	74 26.2 19 81 90.0	74 35.8 13 81 86.3	9
20	71 17.8 51 76 109.7	71 32.6 49 77 108.3	71 46.9 47 78 106.9	72 13.6 42 79 104.0	72 58.6 33 80 97.8	73 31.5 22 81 91.1	73 37.6 19 81 89.4	73 47.4 13 81 85.9	20
1	70 31.9 49 77 108.3	70 46.4 47 78 107.0	71 00.3 45 78 105.6	71 26.4 41 79 102.8	72 10.5 32 80 96.9	72 43.0 22 81 90.5	72 49.1 19 81 88.8	72 59.0 14 81 85.5	1
2	69 45.6 48 78 107.0	69 59.8 46 78 105.8	70 13.4 44 78 104.5	70 38.9 40 79 101.7	71 22.3 32 80 96.0	71 54.4 22 81 89.9	72 00.6 19 81 88.3	72 10.6 14 81 85.1	2
3	68 59.1 47 78 105.8	69 13.0 45 78 104.6	69 26.3 44 79 103.3	69 51.3 40 80 100.7	70 33.9 31 81 95.2	71 05.9 22 81 89.3	71 12.1 19 81 87.8	71 22.2 14 81 84.7	3
4	68 12.2 46 78 104.7	68 25.9 45 79 103.5	68 39.0 43 79 102.3	69 03.5 39 80 99.7	69 45.4 31 81 94.4	70 17.3 22 81 88.8	70 23.6 20 81 87.3	70 33.9 15 80 84.4	4
25	67 25.2 46 79 103.6	67 38.6 44 79 102.5	67 51.5 42 80 101.3	68 15.6 38 80 98.8	68 57.2 31 81 93.7	69 28.8 22 81 88.2	69 35.1 20 81 86.8	69 45.6 15 80 84.0	25
6	66 37.9 45 79 102.6	66 51.1 43 79 101.5	67 03.8 41 80 100.3	67 27.6 38 80 97.9	68 08.7 30 81 93.0	68 40.2 21 81 87.7	68 46.6 20 81 86.4	68 57.0 16 80 83.7	6
7	65 50.4 44 79 101.6	66 03.4 43 80 100.5	66 16.0 41 80 99.4	66 39.5 38 80 97.1	67 20.2 30 81 92.3	67 51.8 22 81 87.2	67 58.2 20 81 85.9	68 09.1 16 80 83.3	7
8	65 02.8 44 80 100.7	65 15.7 42 80 99.6	65 28.0 40 80 98.5	65 51.3 37 80 96.3	66 31.7 30 81 91.6	67 03.3 21 81 86.7	67 09.8 21 81 85.5	67 20.9 17 80 82.9	8
9	64 15.1 43 80 99.8	64 27.7 42 80 98.8	64 40.0 40 80 97.7	65 03.0 37 81 95.5	65 43.2 30 81 91.0	66 14.9 22 81 86.3	66 21.4 21 81 85.1	66 32.8 17 80 82.6	9
30	63 27.2 43 80 99.0	63 39.7 41 80 97.9	63 51.8 40 80 96.9	64 14.7 37 81 94.8	64 54.6 30 81 90.4	65 26.5 23 81 85.8	65 33.1 21 81 84.6	65 44.7 17 80 82.3	30
1	62 39.2 42 80 98.1	62 51.6 41 80 97.1	63 03.6 39 80 96.1	63 26.3 36 81 94.1	64 06.1 30 81 89.8	64 38.1 23 81 85.4	64 44.8 21 80 84.2	64 56.3 18 80 81.9	1
2	61 51.1 42 80 97.3	62 03.4 40 80 96.4	62 15.3 39 80 95.4	62 37.8 36 81 93.4	63 17.5 39 81 89.2	63 49.7 23 81 84.9	63 56.5 21 80 83.8	64 08.5 18 80 81.6	2
3	61 02.9 41 80 96.6	61 15.1 40 81 95.6	61 26.9 39 81 94.7	61 49.4 36 81 92.7	62 29.0 39 81 88.7	63 01.4 24 80 84.5	63 08.3 22 80 83.4	63 20.6 19 80 81.2	3
4	60 14.6 41 80 95.8	60 26.8 40 81 94.9	60 38.5 39 81 94.0	61 00.9 36 81 92.1	61 40.5 30 81 88.1	62 13.1 24 80 84.0	62 20.1 23 80 83.0	62 32.6 19 80 80.9	4
35	59 26.3 41 81 95.1	59 38.4 40 81 94.2	59 50.1 38 81 93.3	60 12.3 36 81 91.4	60 52.0 36 81 87.6	61 24.8 23 80 83.6	61 31.9 23 80 82.6	60 52.8 20 80 80.5	35
6	58 37.9 41 81 94.4	58 50.0 39 81 93.5	59 01.6 38 81 92.6	59 23.8 36 81 90.8	60 03.5 36 81 87.1	60 36.6 25 80 83.2	60 43.8 23 80 82.2	60 56.8 20 80 80.1	6
7	57 49.5 40 81 93.7	58 01.5 39 81 92.9	58 13.1 38 81 92.0	58 35.3 36 81 90.2	59 15.0 31 81 86.6	59 48.4 25 80 82.8	59 55.7 24 80 81.8	60 09.0 21 80 79.9	7
8	57 01.1 40 81 93.1	57 13.0 39 81 92.2	57 24.6 38 81 91.4	57 46.7 36 81 89.6	58 26.6 36 81 86.1	59 00.3 25 80 82.4	59 07.7 24 80 81.4	59 21.3 21 80 79.5	8
9	56 12.6 40 81 92.4	56 24.5 39 81 91.6	56 36.1 38 81 90.8	56 58.2 36 81 89.1	57 38.2 31 81 85.6	58 12.2 26 80 82.0	58 19.7 24 80 81.0	58 33.6 22 79 79.2	9
40	55 24.1 40 81 91.8	55 36.0 39 81 91.0	55 47.5 38 81 90.2	56 09.7 36 81 88.5	56 49.8 36 81 85.1	57 24.1 26 80 81.6	57 31.8 25 80 80.7	57 45.9 22 79 78.8	40
1	54 35.6 40 81 91.2	54 47.4 39 81 90.4	54 59.0 38 81 89.6	55 21.1 36 81 88.0	56 01.5 31 80 84.6	56 36.2 27 80 81.2	56 43.9 26 80 80.3	56 58.3 23 79 78.5	1
2	53 47.0 40 81 90.6	53 58.9 39 81 89.8	54 10.4 38 81 89.0	54 32.6 36 81 87.4	55 13.1 32 80 84.1	55 48.2 27 80 80.8	55 56.1 26 80 79.9	56 10.8 23 79 78.2	2
3	52 58.5 40 81 90.0	53 10.3 39 81 89.2	53 21.9 38 81 88.4	53 44.2 36 81 86.9	54 24.9 32 80 83.7	55 00.3 27 80 80.4	55 08.3 26 80 79.5	55 23.3 24 79 77.8	3
4	52 09.9 40 81 89.4	52 21.8 39 81 88.6	52 33.4 38 81 87.9	52 55.7 36 81 86.4	53 36.7 32 80 83.2	54 12.5 28 80 80.0	54 20.6 27 79 79.1	54 35.9 24 79 77.5	4
45	51 21.4 40 81 88.8	51 33.3 39 81 88.1	51 44.9 38 81 87.3	52 07.3 35 81 85.8	52 48.0 32 80 82.8	53 24.7 28 80 79.6	53 33.3 27 79 78.7	53 48.5 25 79 77.1	45
6	50 32.9 40 81 88.3	50 44.8 39 81 87.5	50 56.4 38 81 86.8	51 18.9 36 81 85.3	52 00.4 33 80 82.3	52 37.0 29 79 79.2	52 45.4 27 79 78.4	53 01.2 26 79 76.8	6
7	49 44.4 40 81 87.7	49 56.3 39 81 87.0	50 08.0 38 81 86.3	50 30.5 37 81 84.8	51 12.3 34 80 81.9	51 49.4 29 79 78.8	51 57.9 28 79 78.0	52 14.0 26 79 76.5	7
8	48 55.9 40 81 87.2	49 07.8 39 81 86.5	49 19.6 39 81 85.8	49 42.2 37 80 84.3	50 24.2 33 80 81.4	51 01.8 29 79 78.4	51 10.5 28 79 77.6	51 26.9 26 78 76.1	8
9	48 07.4 40 81 86.6	48 19.4 40 81 85.9	48 31.2 39 81 85.2	48 53.9 37 80 83.8	49 36.3 34 80 81.0	50 14.3 30 79 78.0	50 23.1 29 79 77.3	50 39.8 27 78 75.8	9
50	47 19.0 41 81 86.1	47 31.0 40 81 85.4	47 42.8 39 80 84.7	48 05.7 37 80 83.4	48 48.4 34 80 80.5	49 26.6 30 79 77.6	49 35.5 29 79 76.9	49 52.8 27 78 75.4	50
1	46 30.6 41 81 85.4	46 42.6 40 81 84.9	46 54.5 39 80 84.2	47 17.5 38 80 82.9	48 00.5 34 80 80.1	48 39.4 31 79 77.3	48 48.5 30 79 76.5	49 05.8 28 78 75.1	1
2	45 42.2 41 80 85.0	45 54.3 40 80 84.4	46 06.2 39 80 83.7	46 29.3 38 80 82.4	47 12.7 35 80 79.7	47 52.1 31 79 76.9	48 01.3 30 78 76.2	48 19.0 28 78 74.7	2
3	44 53.8 41 80 84.5	45 06.0 40 80 83.9	45 18.0 40 80 83.2	45 41.3 38 80 81.9	46 25.0 35 79 79.2	47 04.9 32 79 76.5	47 14.3 31 78 75.8	47 32.2 29 78 74.4	3
4	44 05.5 41 80 84.0	44 17.8 40 80 83.4	44 29.8 40 80 82.7	45 37.4 38 80 81.5	45 37.4 35 79 78.8	46 17.7 32 78 76.1	46 27.2 31 78 75.4	46 45.5 30 78 74.0	4
55	43 17.3 41 80 83.4	43 29.6 41 80 82.9	43 41.7 40 80 82.3	44 05.3 39 80 81.0	44 49.8 36 79 78.4	45 30.7 33 78 75.7	45 40.3 32 78 75.0	45 58.8 30 78 73.7	55
6	42 29.1 42 80 83.0	42 41.4 41 80 82.4	42 53.6 40 80 81.8	43 17.3 39 80 80.5	44 02.3 36 79 78.0	44 43.7 33 78 75.3	44 53.4 32 78 74.7	45 12.3 31 77 73.3	6
7	41 40.9 42 80 82.5	41 53.4 41 80 81.9	42 05.6 40 80 81.3	42 29.5 39 80 80.1	43 14.8 36 79 77.5	43 56.7 33 78 74.9	44 06.7 33 78 74.3	44 25.8 31 77 73.0	7
8	40 52.8 42 80 82.0	41 05.3 41 80 81.4	41 17.6 41 80 80.8	41 41.7 39 80 79.6	42 27.5 37 79 77.1	43 09.9 34 78 74.6	43 20.0 33 78 73.9	43 39.5 32 77 72.6	8
9	40 04.8 42 80 81.5	40 17.4 42 80 81.0	40 29.7 41 80 80.4	40 54.0 40 79 79.1	41 40.4 37 79 76.7	42 23.1 34 78 74.2	42 33.4 34 78 73.5	42 53.2 32 77 72.3	9
60	39 16.8 43 80 81.1	39 29.5 42 80 80.5	39 41.9 41 80 79.9	40 06.4 40 79 78.7	40 53.0 37 79 76.2	41 36.5 34 77 73.8	41 46.9 34 77 73.2	42 07.0 33 77 71.9	60
1	38 28.9 43 80 80.6	38 41.6 42 80 80.0	38 54.2 42 80 79.4	39 18.8 40 79 78.2	40 05.9 38 78 75.8	40 49.9 35 77 73.4	41 00.5 35 77 72.8	41 20.9 33 77 71.5	1
2	37 41.0 43 80 80.1	37 53.8 42 80 79.5	38 06.5 42 79 78.9	38 31.3 41 79 77.8	39 18.9 38 78 75.4	40 03.5 36 77 73.0	40 14.2 35 77 72.4	40 34.9 34 76 71.2	2
3	36 53.2 43 80 79.6	37 06.2 42 79 79.0	37 18.9 42 79 78.5	37 43.9 41 79 77.3	38 31.9 39 78 75.0	39 17.1 36 77 72.6	39 27.9 36 77 72.0	39 49.0 35 76 70.8	3
4	36 05.5 43 79 79.1	36 18.5 43 79 78.5	36 31.4 42 79 78.0	36 56.4 42 79 76.9	37 45.1 39 78 74.6	38 30.8 37 77 72.2	38 41.8 36 77 71.6	39 03.2 35 76 70.4	4
65	35 17.9 44 79 78.7	35 31.0 43 79 78.1	35 43.9 43 79 77.6	36 09.0 42 79 76.4	36 58.3 40 78 74.2	37 44.7 37 77 71.8	37 55.8 37 77 71.3	38 17.6 36 76 70.1	65
6	34 30.3 44 79 78.2	34 43.5 44 79 77.6	34 56.6 43 79 77.1	35 22.2 42 79 76.0	36 11.7 40 78 73.7	36 58.6 38 77 71.4	37 09.9 37 76 70.9	37 32.0 36 76 69.7	6
7	33 42.9 45 79 77.7	33 56.1 44 79 77.2	34 09.3 44 79 76.6	34 35.2 43 78 75.5	35 25.1 41 77 73.3	36 12.6 38 76 71.1	36 24.1 38 76 70.5	36 46.5 37 76 69.3	7
8	32 55.5 45 79 77.2	33 08.9 44 79 76.7	33 22.1 44 78 76.2	33 48.2 43 78 75.1	34 38.7 41 77 72.9	35 26.8 39 76 70.7	35 38.4 38 76 70.1	36 01.2 37 75 68.9	8
9	32 08.2 45 79 76.7	32 21.7 45 79 76.2	32 35.1 44 78 75.7	33 01.4 43 78 74.6	33 52.4 42 77 72.5	34 41.0 40 76 70.3	34 52.3 39 76 69.7	35 15.9 38 75 68.6	9
70	31 21.0 46 78 76.3	31 34.6 45 78 75.8	31 48.1 45 78 75.2	32 14.6 44 78 74.2	33 06.1 42 77 72.0	33 55.4 40 76 69.9	34 07.3 40 76 69.3	34 30.8 39 75 68.2	70
1	30 33.9 46 78 75.8	30 47.6 46 78 75.3	31 01.2 45 78 74.8	31 28.0 44 78 73.7	32 20.0 43 77 71.6	33 09.9 41 76 69.5	33 22.0 40 75 68.9	33 45.8 39 75 67.8	1
2	29 46.9 46 78 75.4	30 00.7 46 78 74.8	30 14.4 45 78 74.3	30 41.4 45 77 73.3	31 34.0 43 76 71.2	32 24.5 41 75 69.1	32 36.8 41 75 68.5	33 00.9 40 75 67.4	2
3	28 59.9 47 78 74.9	29 13.9 46 78 74.4	29 27.7 46 78 73.9	29 55.0 45 77 72.8	30 48.1 43 76 70.8	31 39.2 42 75 68.6	31 51.7 41 75 68.1	32 16.1 40 74 67.0	3
4	28 13.1 47 78 74.4	28 27.2 47 78 73.9	28 41.1 46 77 73.4	29 08.7 46 77 72.4	30 02.3 44 76 70.3	30 54.1 42 75 68.2	31 06.7 42 74 67.7	31 31.5 41 74 66.6	4
75	27 26.4 47 78 73.9	27 40.6 47 77 73.4	27 54.7 47 77 72.9	28 22.5 46 77 71.9	29 16.7 44 76 69.9	30 09.0 43 75 67.8	30 21.8 42 75 67.3	30 47.0 42 74 66.3	75
6	26 39.8 48 78 73.5	26 54.1 47 77 73.0	27 08.3 47 77 72.5	27 36.4 47 77 71.5	28 31.2 45 76 69.5	29 24.2 43 75 67.4	29 37.1 43 74 66.9	30 02.6 42 74 65.9	6
7	25 53.4 48 77 73.0	26 07.8 48 77 72.5	26 22.1 48 77 72.0	26 50.4 47 77 71.0	27 45.8 45 75 69.0	28 39.4 44 74 67.0	28 52.5 44 74 66.5	29 18.4 43 73 65.5	7
8	25 07.0 48 77 72.5	25 21.5 48 77 72.0	25 36.0 48 77 71.6	26 04.4 47 76 70.6	27 00.2 46 75 68.6	27 54.8 44 74 66.6	28 08.1 44 74 66.1	28 34.3 43 73 65.1	8
9	24 20.8 49 77 72.0	24 35.4 49 77 71.6	24 50.0 48 76 71.1	25 18.6 48 76 70.1	26 15.4 46 75 68.2	27 10.2 45 74 66.1	27 23.8 45 73 65.7	27 50.4 44 73 64.7	9
80	23 34.6 49 77 71.6	23 49.4 49 76 71.1	24 04.1 49 76 70.6	24 33.3 48 76 69.7	25 30.4 47 75 67.7	26 26.0 46 74 65.8	26 39.6 45 73 65.3	27 06.6 45 73 64.3	80
1	22 48.7 50 76 71.1	23 03.6 50 76 70.6	23 18.4 49 76 70.2	23 47.8 49 76 69.2	24 45.6 48 74 67.3	25 41.8 46 73 65.3	25 55.6 46 73 64.8	26 23.0 45 72 63.8	1
2	22 02.8 50 76 70.6	22 17.9 50 76 70.2	22 32.8 50 76 69.7	23 02.5 49 75 68.7	24 00.9 48 74 66.8	24 57.8 47 73 64.9	25 11.8 46 73 64.4	25 39.5 46 72 63.4	2
3	21 17.1 51 76 70.1	21 32.3 50 76 69.7	21 47.4 50 75 69.2	22 17.3 50 75 68.3	23 16.3 49 74 66.4	24 13.9 47 73 64.5	24 28.1 47 73 64.0	24 56.1 46 72 63.0	3
4	20 31.5 51 76 69.7	20 46.8 51 76 69.2	21 02.1 51 75 68.7	21 32.3 50 75 67.8	22 31.9 49 74 65.9	23 30.2 48 73 64.0	23 44.4 47 73 63.6	24 12.9 47 72 62.6	4
85	19 46.1 52 76 69.2	20 01.5 51 75 68.7	20 16.9 51 75 68.3	20 47.4 51 75 67.3	21 47.7 50 73 65.5	22 46.6 48 72 63.6	23 01.1 48 72 63.1	23 29.9 48 71 62.2	85
6	19 00.8 52 75 68.7	19 16.4 52 75 68.2	19 31.9 52 75 67.8	20 02.7 51 74 66.9	21 03.6 50 73 65.0	22 03.2 49 72 63.2	22 17.9 49 72 62.7	22 47.1 48 71 61.7	6
7	18 15.6 53 75 68.2	18 31.3 52 75 67.8	18 47.0 52 74 67.3	19 18.2 52 74 66.4	20 19.6 51 73 64.6	21 20.0 50 72 62.7	21 34.9 50 71 62.3	22 04.4 49 71 61.3	7
8	17 30.6 53 75 67.7	17 46.5 53 74 67.3	18 02.3 53 74 66.8	18 33.8 52 74 65.9	19 35.9 51 73 64.1	20 36.9 50 71 62.3	20 52.0 50 71 61.8	21 21.9 50 71 60.9	8
9	16 45.8 54 74 67.2	17 01.8 53 74 66.8	17 17.8 53 74 66.3	17 49.5 53 73 65.4	18 52.3 52 72 63.6	19 54.0 51 71 61.8	20 09.3 51 70 61.4	20 39.6 50 70 60.5	9
90	16 01.1 54 74 66.7	16 17.3 54 74 66.3	16 33.4 54 74 65.8	17 05.5 53 73 65.0	18 08.9 52 72 63.2	19 11.2 52 71 61.4	19 26.8 51 70 60.9	19 57.5 51 70 60.0	90

DECLINATION CONTRARY NAME TO LATITUDE

Each cell: Alt (° ′), Δd, Δt, Az (°)

H.A.	28° 00′	28° 30′	29° 00′	30° 00′	32° 00′	34° 00′	34° 30′	35° 30′	H.A.
00	26 00.0 1.0 01 180.0	25 30.0 1.0 01 180.0	25 00.0 1.0 01 180.0	24 00.0 1.0 01 180.0	22 00.0 1.0 01 180.0	20 00.0 1.0 01 180.0	19 30.0 1.0 01 180.0	18 30.0 1.0 01 180.0	00
1	25 59.6 1.0 02 179.0	25 29.6 1.0 02 179.0	24 59.6 1.0 02 179.0	23 59.6 1.0 02 179.1	21 59.6 1.0 02 179.1	19 59.6 1.0 02 179.1	19 29.6 1.0 02 179.1	18 29.6 1.0 02 179.1	1
2	25 58.3 1.0 04 178.0	25 28.4 1.0 03 178.1	24 58.4 1.0 03 178.1	23 58.4 1.0 03 178.1	21 58.5 1.0 03 178.2	19 58.5 1.0 03 178.2	19 28.5 1.0 03 178.3	18 28.5 1.0 03 178.3	2
3	25 56.3 1.0 05 177.1	25 26.3 1.0 05 177.1	24 56.3 1.0 05 177.1	23 56.4 1.0 05 177.2	21 56.5 1.0 05 177.3	19 56.6 1.0 04 177.4	19 26.7 1.0 04 177.4	18 26.7 1.0 04 177.4	3
4	25 53.3 1.0 06 176.1	25 23.4 1.0 06 176.1	24 53.5 1.0 06 176.1	23 53.6 1.0 06 176.2	21 53.8 1.0 06 176.3	19 54.0 1.0 06 176.5	19 24.1 1.0 06 176.5	18 24.2 1.0 05 176.6	4
05	25 49.6 1.0 08 175.1	25 19.7 1.0 08 175.1	24 49.8 1.0 08 175.2	23 50.0 1.0 07 175.3	21 50.3 1.0 07 175.4	19 50.7 1.0 07 175.6	19 20.8 1.0 07 175.6	18 20.9 1.0 07 175.7	05
6	25 45.0 1.0 09 174.1	25 15.2 1.0 09 174.2	24 45.3 1.0 09 174.2	23 45.6 1.0 09 174.3	21 46.1 1.0 08 174.5	19 46.6 1.0 08 174.7	19 16.7 1.0 08 174.8	18 16.9 1.0 08 174.9	6
7	25 39.7 99 10 173.2	25 09.8 99 10 173.2	24 40.0 99 10 173.2	23 40.4 99 10 173.4	21 41.1 99 10 173.5	19 41.7 99 09 173.8	19 11.9 99 09 173.9	18 12.2 99 09 174.0	7
8	25 33.5 99 12 172.2	25 03.7 99 12 172.2	24 33.9 99 12 172.3	23 34.4 99 11 172.4	21 35.3 99 11 172.7	19 36.2 99 11 173.0	19 06.4 99 10 173.0	18 06.8 99 10 173.2	8
9	25 26.4 99 13 171.2	24 56.7 99 13 171.3	24 27.0 99 13 171.4	23 27.6 99 13 171.5	21 28.7 99 12 171.7	19 29.8 99 12 172.1	19 00.1 99 12 172.2	18 00.6 99 11 172.3	9
10	25 18.6 99 14 170.2	24 49.0 99 14 170.3	24 19.3 99 14 170.4	23 20.0 99 14 170.6	21 21.4 99 13 170.9	19 22.8 99 13 171.2	18 53.1 99 13 171.3	17 53.8 99 13 171.5	10
1	25 10.0 99 16 169.3	24 40.4 99 16 169.4	24 10.8 99 15 169.5	23 11.7 99 15 169.6	21 13.4 99 15 170.0	19 15.0 99 14 170.4	18 45.4 99 14 170.4	17 46.2 99 14 170.6	1
2	25 00.5 98 17 168.3	24 31.1 98 17 168.4	24 01.6 98 17 168.5	23 02.6 98 16 168.7	21 04.6 98 16 169.1	19 06.5 98 16 169.6	18 37.0 98 15 169.6	17 38.0 98 15 169.8	2
3	24 50.3 98 18 167.4	24 20.9 98 18 167.5	23 51.5 98 18 167.6	22 52.7 98 18 167.8	20 55.0 98 17 168.2	18 57.3 98 17 168.6	18 27.9 98 16 168.7	17 29.0 98 16 168.9	3
4	24 39.3 98 20 166.4	24 10.0 98 20 166.5	23 40.7 98 19 166.6	22 42.1 98 19 166.9	20 44.8 98 18 167.3	18 47.4 98 18 167.8	18 18.0 98 18 167.9	17 19.3 98 17 168.1	4
15	24 27.5 97 21 165.5	23 58.3 97 21 165.6	23 29.1 97 21 165.7	22 30.7 97 20 166.0	20 33.7 97 20 166.4	18 36.8 98 19 166.9	18 07.5 98 19 167.0	17 09.0 98 18 167.3	15
6	24 14.9 97 22 164.5	23 45.8 97 22 164.7	23 16.7 97 22 164.8	22 18.5 97 22 165.0	20 22.0 97 21 165.6	18 25.4 97 20 166.1	17 56.2 97 20 166.2	16 57.9 97 20 166.4	6
7	24 01.6 97 24 163.6	23 32.6 97 23 163.7	23 03.6 97 23 163.9	22 05.6 97 23 164.1	20 09.5 97 22 164.7	18 13.4 97 21 165.2	17 44.3 97 21 165.3	16 46.2 97 21 165.6	7
8	23 47.5 96 25 162.7	23 18.6 96 25 162.8	22 49.8 96 24 162.9	21 52.0 96 24 163.2	19 56.4 96 23 163.8	18 00.6 96 22 164.4	17 31.7 96 22 164.5	16 33.8 97 22 164.8	8
9	23 32.6 96 26 161.7	23 03.9 96 26 161.9	22 35.2 96 26 162.0	21 37.6 96 25 162.3	19 42.5 96 24 162.9	17 47.2 96 24 163.5	17 18.4 96 23 163.7	16 20.7 96 23 164.0	9
20	23 17.1 95 27 160.8	22 48.4 95 27 161.0	22 19.8 95 27 161.1	21 22.5 95 26 161.5	19 27.9 96 25 162.1	17 33.1 96 25 162.7	17 04.6 96 24 162.9	16 07.0 96 24 163.2	20
1	23 00.7 95 28 159.9	22 32.3 95 28 160.1	22 03.8 95 28 160.2	21 06.8 95 28 160.6	19 12.6 95 27 161.2	17 18.4 95 26 161.9	16 49.8 95 26 162.0	15 52.6 95 25 162.3	1
2	22 43.7 94 30 159.0	22 15.3 94 29 159.2	21 47.0 95 29 159.3	20 50.3 95 29 159.7	18 56.7 95 28 160.4	17 02.9 95 27 161.0	16 34.5 95 27 161.2	15 37.5 95 26 161.5	2
3	22 25.9 94 31 158.1	21 57.7 94 31 158.3	21 29.5 94 30 158.5	20 33.1 94 30 158.8	18 40.0 94 29 159.5	16 46.8 94 29 160.2	16 18.5 94 28 160.4	15 21.8 94 27 160.7	3
4	22 07.5 93 32 157.2	21 39.4 94 32 157.4	21 11.3 94 31 157.6	20 15.2 94 31 157.9	18 22.7 94 30 158.7	16 30.1 94 29 159.4	16 01.9 94 29 159.6	15 05.5 94 28 159.9	4
25	21 48.3 93 33 156.3	21 20.4 93 33 156.5	20 52.5 93 32 156.7	19 56.6 93 32 157.1	18 04.7 93 31 157.9	16 12.7 93 30 158.6	15 44.6 93 30 158.8	14 48.5 94 29 159.2	25
6	21 28.5 92 34 155.4	21 00.7 93 34 155.6	20 32.9 93 34 155.8	19 37.4 93 33 156.2	17 46.1 93 32 157.0	15 54.6 93 31 157.8	15 26.8 93 31 158.0	14 30.9 93 30 158.4	6
7	21 07.9 92 35 154.5	20 39.9 92 35 154.8	20 12.7 92 35 155.0	19 17.5 92 34 155.4	17 26.8 92 33 156.2	15 36.0 92 32 157.0	15 08.3 92 32 157.2	14 12.7 93 31 157.6	7
8	20 46.7 91 36 153.7	20 19.3 91 36 154.1	19 51.9 91 36 154.1	18 56.9 91 35 154.5	17 06.9 92 34 155.4	15 16.7 92 33 156.2	14 49.1 92 33 156.4	13 53.9 92 32 156.8	8
9	20 24.9 91 38 152.8	19 57.6 91 37 153.0	19 30.3 91 37 153.3	18 35.8 91 36 153.7	16 46.4 91 35 154.6	14 56.8 91 34 155.4	14 29.4 91 34 155.6	13 34.5 91 33 156.0	9
30	20 02.4 90 38 152.0	19 35.3 90 38 152.2	19 08.2 90 38 152.4	18 13.9 90 37 152.9	16 25.2 91 36 153.8	14 36.3 91 35 154.6	14 09.1 91 35 154.9	13 14.5 91 34 155.3	30
1	19 39.3 90 40 151.1	19 12.3 90 39 151.4	18 45.4 90 39 151.6	17 51.5 90 38 152.1	16 03.5 90 37 153.0	14 15.2 90 36 153.9	13 48.2 90 36 154.1	12 53.9 90 35 154.5	1
2	19 15.5 89 41 150.3	18 48.8 89 40 150.5	18 22.0 89 40 150.8	17 28.4 89 39 151.2	15 41.1 90 38 152.2	13 53.5 90 37 153.1	13 26.6 90 37 153.3	12 32.8 90 36 153.8	2
3	18 51.1 88 42 149.5	18 24.6 89 41 149.7	17 58.0 89 41 149.9	17 04.8 89 40 150.4	15 18.2 89 39 151.4	13 31.3 89 38 152.3	13 04.6 89 38 152.6	12 11.0 89 37 153.0	3
4	18 26.2 88 43 148.6	17 59.8 88 42 148.9	17 33.4 88 42 149.1	16 40.5 88 41 149.6	14 54.6 88 40 150.6	13 08.5 89 39 151.6	12 41.9 89 39 151.8	11 48.7 89 38 152.3	4
35	18 00.6 87 44 147.8	17 34.4 87 43 148.1	17 08.2 87 43 148.3	16 15.7 88 41 148.8	14 30.5 88 41 149.8	12 45.1 88 40 150.8	12 18.7 88 40 151.1	11 25.9 88 39 151.5	35
6	17 34.5 87 44 147.0	17 08.5 87 44 147.3	16 42.4 87 44 147.5	15 50.3 87 43 148.1	14 05.9 87 42 149.1	12 21.2 87 41 150.1	11 54.9 87 41 150.3	11 02.5 87 40 150.8	6
7	17 07.8 86 46 146.2	16 41.9 86 45 146.5	16 16.1 86 45 146.7	15 24.4 86 44 147.3	13 40.6 87 42 148.3	11 56.7 87 42 149.3	11 30.6 87 41 149.6	10 38.5 87 41 150.1	7
8	16 40.5 86 46 145.4	16 14.9 86 46 145.7	15 49.2 86 46 146.0	14 57.8 86 45 146.5	13 14.9 86 44 147.6	11 31.6 86 43 148.6	11 05.8 86 42 148.9	10 14.1 86 42 149.4	8
9	16 12.7 85 47 144.6	15 47.2 85 47 144.9	15 21.8 85 47 145.2	14 30.8 85 46 145.7	12 48.6 85 45 146.8	11 06.1 85 43 147.9	10 40.4 86 43 148.1	9 49.1 86 42 148.7	9
40	15 44.3 84 48 143.9	15 19.1 84 48 144.1	14 53.8 84 48 144.4	14 03.2 84 47 145.0	12 21.7 85 46 146.1	10 40.0 85 44 147.2	10 14.6 85 44 147.4	9 23.6 85 43 148.0	40
1	15 15.4 84 49 143.1	14 50.4 84 49 143.4	14 25.3 84 48 143.7	13 35.1 84 48 144.2	11 54.4 84 46 145.3	10 13.5 84 45 146.4	9 48.2 84 45 146.7	8 57.6 84 44 147.3	1
2	14 46.0 83 50 142.3	14 21.2 83 50 142.6	13 56.3 83 49 142.9	13 06.4 83 49 143.5	11 26.5 83 47 144.6	9 46.4 84 46 145.7	9 21.3 84 46 146.0	8 31.1 84 45 146.6	2
3	14 16.1 82 51 141.6	13 51.5 82 50 141.9	13 26.8 82 50 142.2	12 37.3 82 49 142.8	10 58.2 83 48 143.9	9 18.8 83 47 145.0	8 53.9 83 46 145.3	8 04.1 83 46 145.9	3
4	13 45.7 82 52 140.8	13 21.2 82 51 141.1	12 56.7 82 51 141.4	12 07.7 82 50 142.0	10 29.4 82 49 143.2	8 50.8 82 48 144.4	8 26.1 82 47 144.6	7 36.7 82 47 145.2	4
45	13 14.8 81 52 140.1	12 50.5 81 52 140.4	12 26.2 81 52 140.7	11 37.6 81 51 141.3	10 00.0 81 50 142.5	8 22.2 82 48 143.7	7 57.8 82 48 144.0	7 08.8 82 47 144.5	45
6	12 43.5 80 53 139.4	12 19.4 80 53 139.7	11 55.3 80 52 140.0	11 07.0 81 52 140.6	9 30.2 81 50 141.8	7 53.2 81 49 143.0	7 29.0 81 49 143.3	6 40.4 81 48 143.9	6
7	12 11.6 80 54 138.7	11 47.7 80 54 139.0	11 23.8 80 53 139.3	10 35.9 80 53 139.9	9 00.0 80 51 141.1	7 23.8 80 50 142.3	6 59.7 80 50 142.6	6 11.5 80 49 143.2	7
8	11 39.3 79 54 137.9	11 15.6 79 54 138.2	10 51.9 79 54 138.6	10 04.4 79 53 139.2	8 29.3 79 52 140.4	6 53.9 80 51 141.6	6 30.0 80 50 141.9	5 42.2 80 50 142.6	8
9	11 06.6 78 55 137.2	10 43.1 78 55 137.5	10 19.6 78 55 137.9	9 32.5 79 54 138.5	7 58.1 79 53 139.7	6 23.5 79 51 141.0	5 59.9 79 51 141.3	5 12.5 79 50 141.9	9
50	10 33.4 78 56 136.5	10 10.1 78 56 136.8	9 46.8 78 55 137.2	9 00.1 78 55 137.8	7 26.5 78 53 139.1	5 52.8 78 52 140.3	5 29.3 78 52 140.6		50
1	9 59.8 77 57 135.8	9 36.7 77 56 136.2	9 13.6 77 56 136.5	8 27.3 77 55 137.1	6 54.5 77 54 138.4	5 21.6 78 53 139.7			1
2	9 25.8 76 57 135.1	9 02.9 76 57 135.5	8 39.9 76 57 135.8	7 54.0 77 56 136.5	6 22.1 77 55 137.7				2
3	8 51.3 76 58 134.5	8 28.6 76 57 134.8	8 05.9 76 57 135.1	7 20.4 76 57 135.8	5 49.2 76 55 137.1				3
4	8 16.5 75 59 133.8	7 54.0 75 58 134.1	7 31.4 75 58 134.5	6 46.3 75 57 135.1	5 16.0 75 56 136.4				4
55	7 41.2 74 59 133.1	7 18.9 74 59 133.5	6 56.6 74 59 133.8	6 11.9 75 58 134.5					55
6	7 05.6 74 60 132.5	6 43.5 74 60 132.8	6 21.4 74 59 133.1	5 37.1 74 59 133.8					6
7	6 29.6 73 61 131.8	6 07.7 73 60 132.2	5 45.8 73 60 132.5	5 01.9 73 59 133.2					7
8	5 53.3 72 61 131.2	5 31.5 72 61 131.5	5 09.8 72 61 131.9						8
9	5 16.6 72 62 130.5								9

DECLINATION SAME NAME AS LATITUDE

Each cell: Alt (° ′), Δd, Δt, Az (°)

H.A.	28° 00′	28° 30′	29° 00′	30° 00′	32° 00′	34° 00′	34° 30′	35° 30′	H.A.
91	15 16.6 54 74 66.2	15 32.9 54 74 65.8	15 49.2 54 73 65.4	16 21.6 54 73 64.5	17 25.7 53 72 62.7	18 28.8 52 71 60.9	18 44.5 52 70 60.5	19 15.5 52 70 59.6	91
2	14 32.3 55 74 65.7	14 48.7 55 73 65.3	15 05.2 54 73 64.9	15 37.9 54 73 64.0	16 42.6 54 71 62.2	17 46.5 53 70 60.4	18 02.3 53 70 60.0	18 33.8 52 69 59.1	2
3	13 48.1 55 73 65.2	14 04.7 55 73 64.8	14 21.3 55 72 64.4	14 54.3 55 72 63.5	15 59.8 54 71 61.8	17 04.4 53 70 60.0	17 20.4 53 70 59.6	17 52.0 53 69 58.7	3
4	13 04.1 56 73 64.7	13 20.9 56 73 64.3	13 37.6 56 72 63.9	14 11.0 55 72 63.0	15 17.1 55 71 61.3	16 22.4 54 70 59.5	16 38.6 54 69 59.1	17 10.8 54 69 58.2	4
95	12 20.3 57 73 64.2	12 37.3 56 72 63.8	12 54.2 56 72 63.4	13 27.8 56 72 62.5	14 34.6 55 70 60.8	15 40.7 55 69 59.1	15 57.1 55 69 58.6	16 29.7 54 68 57.8	95
6	11 36.7 57 72 63.7	11 53.8 57 72 63.3	12 10.9 57 72 62.9	12 44.9 57 71 62.0	13 52.4 56 70 60.3	14 59.1 55 69 58.6	15 15.7 55 68 58.2	15 48.7 55 68 57.3	6
7	10 53.3 58 72 63.2	11 10.5 57 72 62.8	11 27.8 57 72 62.3	12 02.1 57 71 61.5	13 10.3 57 70 59.8	14 17.8 56 69 58.1	14 34.6 56 68 57.7	15 08.0 56 68 56.8	7
8	10 10.1 58 72 62.7	10 27.5 58 71 62.2	10 44.9 58 71 61.8	11 19.5 58 71 61.0	12 28.4 57 70 59.3	13 36.7 57 68 57.6	13 53.8 56 68 57.2	14 27.5 56 67 56.4	8
9	9 27.1 59 71 62.1	9 44.6 59 71 61.7	10 02.2 58 71 61.3	10 37.2 58 70 60.5	11 46.8 58 69 58.8	12 55.8 57 68 57.2	13 13.0 57 67 56.7	13 47.2 57 67 55.9	9
100	8 44.3 59 71 61.6	9 02.0 59 71 61.2	9 19.7 59 70 60.8	9 55.0 59 70 60.0	11 05.4 58 69 58.3	12 15.1 58 67 56.7	12 32.5 58 67 56.2	13 07.1 58 66 55.4	100
1	8 01.7 60 71 61.1	8 19.6 60 70 60.7	8 37.4 60 70 60.3	9 13.1 59 70 59.5	10 24.2 59 68 57.8	11 34.7 59 67 56.2	11 52.3 58 67 55.8	12 27.5 58 66 54.9	1
2	7 19.3 60 70 60.5	7 37.4 60 70 60.1	7 55.4 60 70 59.7	8 31.4 60 69 58.9	9 43.2 60 68 57.3	10 54.6 59 67 55.7	11 12.2 59 66 55.3	11 47.6 59 66 54.4	2
3	6 37.1 61 70 60.0	6 55.4 61 70 59.6	7 13.6 61 69 59.2	7 50.0 60 69 58.4	9 02.5 60 68 56.8	10 14.5 60 66 55.2	10 32.5 60 66 54.8	11 08.3 60 65 53.9	3
4	5 55.2 61 70 59.5	6 13.6 61 69 59.1	6 32.0 61 69 58.7	7 08.7 61 68 57.9	8 22.0 61 67 56.3	9 34.8 61 66 54.7	9 53.0 60 65 54.3	10 29.1 60 65 53.5	4
105	5 13.5 62 69 58.9	5 32.1 62 69 58.5	5 50.7 62 68 58.1	6 27.8 62 68 57.3	7 41.7 61 67 55.8	8 55.3 61 65 54.2	9 13.7 61 65 53.8	9 50.3 61 64 53.0	105
6			5 09.6 62 68 57.6	5 47.0 62 67 56.8	7 01.7 62 66 55.2	8 16.1 62 65 53.6	8 34.7 62 64 53.2	9 11.7 62 64 52.4	6
7				5 06.5 63 67 56.3	6 22.0 63 66 54.7	7 37.2 63 64 53.1	7 55.9 62 64 52.7	8 33.3 62 63 51.9	7
8					5 42.5 63 65 54.2	6 58.5 63 64 52.6	7 17.4 63 64 52.2	7 55.2 63 63 51.4	8
9					5 03.3 64 65 53.6	6 20.2 64 63 52.1	6 39.4 63 63 51.3	7 17.4 64 63 50.9	9
110						5 41.9 65 63 51.5	6 01.2 64 63 50.4	6 39.4 64 62 50.4	110
1						5 04.0 65 63 51.0	5 23.6 65 62 49.8	6 02.7 65 62 49.8	1
2								5 25.7 66 61 49.3	2

Lat. 36°

H.A.	86° 00' Alt. / Δd Δt	Az.	37° 00' Alt. / Δd Δt	Az.	38° 30' Alt. / Δd Δt	Az.	40° 00' Alt. / Δd Δt	Az.	42° 00' Alt. / Δd Δt	Az.	42° 30' Alt. / Δd Δt	Az.	43° 00' Alt. / Δd Δt	Az.	45° 00' Alt. / Δd Δt	Az.	H.A.
00	90 00.0 ..81	....	89 00.0 1.0 28	00.0	87 30.0 1.0 12	00.0	86 00.0 1.0 08	00.0	84 00.0 1.0 05	00.0	83 30.0 1.0 05	00.0	83 00.0 1.0 04	00.0	81 00.0 1.0 03	00.0	00
1	89 11.5 01 81	89.7	88 43.0 78 61	38.5	87 22.5 96 34	17.4	85 55.4 98 22	10.8	83 57.0 99 15	07.1	83 27.2 99 14	06.5	82 57.5 99 13	06.0	80 58.1 1.0 00	04.5	1
2	88 22.9 01 81	89.4	88 06.4 52 72	57.5	87 02.2 84 49	31.9	85 42.0 93 35	20.9	83 48.2 97 24	13.9	83 19.1 97 22	12.8	82 50.0 97 20	11.8	80 52.4 98 16	09.0	2
3	87 34.4 02 81	89.1	87 23.4 37 76	66.6	86 32.6 71 59	42.8	85 21.3 85 45	29.7	83 33.8 93 32	20.3	83 05.9 94 30	18.7	82 37.7 94 26	17.4	80 43.0 96 21	13.3	3
4	86 45.8 02 81	88.8	86 38.0 28 77	71.5	85 57.1 60 65	50.7	84 54.5 77 52	37.0	83 14.7 88 39	26.1	82 48.1 89 36	24.2	82 21.1 91 34	22.5	80 30.2 94 27	17.4	4
05	85 57.3 03 81	88.5	85 51.5 22 78	74.5	85 18.1 51 69	56.4	84 23.2 69 58	43.1	82 51.3 82 45	31.4	82 26.3 84 42	29.2	82 00.7 86 40	27.3	80 14.1 91 32	21.3	05
6	85 08.8 08 81	88.2	85 04.5 17 79	76.5	84 36.6 44 72	60.6	83 48.6 62 62	48.0	82 24.3 77 50	36.0	82 00.9 79 47	33.7	81 36.8 81 45	31.6	79 55.6 89 36	25.0	6
7	84 20.3 04 81	87.9	84 17.2 14 79	77.9	83 53.7 37 73	63.7	83 11.4 56 65	51.9	81 54.4 71 54	40.0	81 32.6 74 51	37.7	81 09.9 77 49	35.5	79 33.2 84 40	28.4	7
8	83 31.8 04 81	87.6	83 29.6 11 79	78.8	83 09.7 33 75	66.2	82 32.3 50 67	55.2	81 22.0 66 57	43.6	81 01.7 69 54	41.1	80 40.6 72 53	38.9	79 09.0 80 44	31.5	8
9	82 43.3 05 81	87.4	82 42.0 09 80	79.5	82 25.0 28 75	68.1	81 51.8 45 69	57.9	80 47.6 61 60	46.6	80 28.8 64 58	44.2	80 09.1 67 56	42.0	78 42.5 76 47	34.4	9
10	81 54.8 05 81	87.1	81 54.2 07 80	79.9	81 39.7 25 76	69.6	81 10.2 40 71	60.1	80 11.6 57 62	49.3	79 54.1 60 60	46.9	79 35.7 63 58	44.7	78 14.2 72 50	37.0	10
1	81 06.3 06 81	86.8	81 06.4 06 80	80.3	80 54.0 22 77	70.8	80 27.8 36 72	61.9	79 34.2 53 64	51.6	79 18.0 56 62	49.3	79 00.9 59 60	47.1	77 44.1 69 50	39.4	1
2	80 17.9 06 81	86.5	80 18.5 04 80	80.5	80 08.1 19 77	71.7	79 44.6 33 73	63.4	78 55.6 48 66	53.6	78 40.6 52 64	51.3	78 24.7 56 62	49.2	77 12.6 65 55	41.6	2
3	79 29.4 07 81	86.2	79 30.6 03 80	80.7	79 21.9 17 77	72.5	79 01.0 30 74	64.7	78 16.1 45 67	55.3	78 02.3 48 65	53.1	77 47.4 51 64	51.1	76 39.7 61 57	43.6	3
4	78 41.0 07 81	85.9	78 42.7 02 80	80.8	78 35.5 14 78	73.2	78 16.9 27 74	65.8	77 35.8 41 68	56.8	77 23.0 44 67	54.7	77 09.2 47 65	52.7	76 05.7 58 58	45.4	4
15	77 52.6 08 81	85.6	77 54.8 00 80	80.8	77 49.0 13 78	73.7	77 32.4 24 75	66.8	76 54.9 38 69	58.2	76 43.0 41 68	56.2	76 30.2 44 66	54.2	75 30.7 55 60	47.0	15
6	77 04.2 08 81	85.3	77 06.9 01 80	80.8	77 02.3 11 78	74.1	76 47.7 22 75	67.6	76 13.4 35 70	59.3	76 02.4 38 69	57.5	75 50.5 41 67	55.5	74 54.7 52 61	48.5	6
7	76 15.9 09 81	85.0	76 19.0 02 80	80.8	76 15.6 09 78	74.4	76 02.5 20 75	68.2	75 31.4 32 71	60.4	75 21.3 35 69	58.5	75 10.2 38 68	56.7	74 18.0 49 62	49.8	7
8	75 27.5 09 81	84.7	75 31.1 03 80	80.7	75 28.8 08 78	74.7	75 17.5 17 76	68.8	74 49.0 30 71	61.3	74 39.7 33 70	59.5	74 29.4 36 69	57.7	73 40.6 46 63	51.0	8
9	74 39.2 10 80	84.4	74 43.2 08 80	80.6	74 42.0 06 78	74.9	74 32.2 16 76	69.3	74 06.3 27 72	62.1	73 57.7 30 71	60.3	73 48.2 33 69	58.6	73 02.6 43 64	52.1	9
20	73 50.9 10 80	84.1	73 55.3 04 80	80.5	73 55.1 05 78	75.1	73 46.7 14 76	69.7	73 23.3 25 72	62.8	73 15.3 28 71	61.1	73 06.6 30 70	59.4	72 24.0 40 65	53.1	20
1	73 02.6 11 80	83.8	73 07.4 06 80	80.4	73 08.1 04 78	75.2	73 01.1 12 76	70.0	72 40.0 23 72	63.4	72 32.7 26 71	61.7	72 24.6 28 70	60.1	71 44.9 38 66	54.0	1
2	72 14.4 11 80	83.5	72 19.6 06 80	80.2	72 21.2 02 78	75.3	72 15.5 10 76	70.3	71 56.5 21 73	63.9	71 49.8 24 72	62.3	71 42.4 26 71	60.8	71 05.4 36 66	54.8	2
3	71 26.2 12 80	83.2	71 31.8 07 80	80.0	71 34.3 01 78	75.3	71 29.7 09 76	70.6	71 12.8 19 73	64.4	71 06.7 22 72	62.9	70 59.9 24 71	61.4	70 25.6 33 67	55.6	3
4	70 38.0 12 80	82.9	70 44.0 07 80	79.9	70 47.3 00 78	75.3	70 43.9 08 76	70.8	70 29.0 17 73	64.8	70 23.5 20 72	63.3	70 17.2 22 72	61.9	69 45.4 31 68	56.2	4
25	69 49.8 13 80	82.6	69 56.2 08 80	79.7	70 00.4 01 78	75.3	69 58.1 06 77	70.9	69 45.0 16 74	65.1	69 40.0 18 73	63.7	69 34.3 20 72	62.3	69 04.9 29 68	56.8	25
6	69 01.7 13 80	82.3	69 08.4 09 80	79.5	69 13.4 02 78	75.3	69 12.2 05 77	71.0	69 00.9 14 74	65.5	68 56.3 17 73	64.1	68 51.2 18 73	62.7	68 24.1 27 68	57.4	6
7	68 13.6 14 80	82.0	68 20.7 10 79	79.3	68 26.5 03 77	75.2	68 26.2 04 77	71.1	68 16.7 12 74	65.7	68 12.7 14 73	64.4	68 08.0 17 72	63.1	67 43.2 26 69	57.9	7
8	67 25.6 15 80	81.7	67 33.1 10 79	79.1	67 39.5 04 77	75.1	67 40.3 02 77	71.2	67 32.4 11 74	66.0	67 28.9 13 73	64.7	67 24.7 15 72	63.4	67 02.0 23 69	58.3	8
9	66 37.6 15 80	81.4	66 45.4 11 79	78.9	66 52.6 05 77	75.1	66 54.3 01 77	71.2	66 48.1 09 74	66.1	66 45.0 11 73	64.9	66 41.3 13 73	63.6	66 20.6 21 69	58.7	9
30	65 49.6 16 80	81.0	65 57.8 12 79	78.6	66 05.7 06 77	74.9	66 08.4 00 77	71.2	66 03.6 08 74	66.3	66 01.0 10 73	65.1	65 57.7 12 73	63.9	65 39.0 19 69	59.0	30
1	65 01.7 16 80	80.7	65 09.9 13 79	78.4	65 18.9 07 78	74.8	65 22.4 01 77	71.2	65 19.2 07 74	66.4	65 16.9 09 74	65.2	65 14.1 10 73	64.1	64 57.3 18 70	59.4	1
2	64 13.8 17 80	80.4	64 22.7 13 79	78.2	64 32.0 08 78	74.7	64 36.5 02 77	71.2	64 34.6 06 74	66.5	64 32.8 07 74	65.4	64 30.4 09 73	64.2	64 15.5 16 70	59.6	2
3	63 26.0 17 80	80.1	63 35.2 14 79	77.9	63 45.2 09 78	74.5	63 50.5 03 77	71.2	63 50.1 04 74	66.6	63 48.7 06 74	65.5	63 46.7 07 73	64.4	63 33.6 14 70	59.9	3
4	62 38.2 18 80	79.8	62 47.8 14 79	77.7	62 58.5 09 78	74.4	63 04.6 04 77	71.1	63 05.5 04 74	66.7	63 04.7 04 74	65.6	63 02.9 06 73	64.5	62 51.5 13 70	60.1	4
35	61 50.4 18 80	79.5	62 00.4 18 79	77.4	62 11.7 10 78	74.1	62 18.7 05 76	71.0	62 21.0 01 74	66.7	62 20.3 03 74	65.6	62 19.1 05 73	64.6	62 09.4 11 70	60.3	35
6	61 02.7 19 79	79.2	61 13.0 16 79	77.1	61 25.0 11 78	74.0	61 32.8 06 76	70.9	61 36.4 00 74	66.7	61 36.1 01 74	65.7	61 35.3 03 73	64.7	61 27.2 10 70	60.4	6
7	60 15.0 19 79	78.9	60 25.7 16 79	76.9	60 38.4 12 78	73.9	60 46.9 07 76	70.8	60 51.8 01 74	66.7	60 51.8 01 74	65.7	60 51.4 02 73	64.7	60 45.0 08 70	60.6	7
8	59 27.4 20 79	78.6	59 38.5 17 79	76.6	59 51.8 13 78	73.7	60 01.1 08 76	70.7	60 07.2 02 74	66.7	60 07.6 01 74	65.7	60 07.5 01 73	64.7	60 02.7 07 71	60.7	8
9	58 39.9 20 79	78.2	58 51.3 18 79	76.3	59 05.2 13 78	73.5	59 15.3 09 76	70.6	59 22.6 03 74	66.7	59 23.4 02 74	65.7	59 23.6 00 73	64.7	59 20.4 06 71	60.8	9
40	57 52.4 21 79	77.9	58 04.1 18 78	76.1	58 18.7 14 77	73.3	58 29.6 10 76	70.4	58 38.0 04 74	66.6	58 39.1 04 74	65.6	58 39.4 01 73	64.7	58 38.0 04 71	60.8	40
1	57 05.0 21 79	77.6	57 17.1 19 78	75.8	57 32.3 15 77	73.1	57 43.8 11 76	70.3	57 53.5 05 74	66.5	57 54.9 04 74	65.6	57 55.5 03 73	64.7	57 55.6 03 71	60.9	1
2	56 17.6 22 79	77.3	56 30.1 19 78	75.5	56 45.9 16 77	72.8	56 58.2 12 76	70.1	57 09.0 06 74	66.5	57 10.7 05 74	65.5	57 12.0 04 73	64.6	57 13.2 02 71	60.9	2
3	55 30.3 23 79	77.0	55 43.1 20 78	75.2	55 59.5 16 77	72.6	56 12.5 13 76	69.9	56 24.5 07 74	66.4	56 26.6 06 74	65.5	56 28.2 05 73	64.6	56 30.8 00 71	60.9	3
4	54 43.0 23 79	76.6	54 56.2 21 78	74.9	55 13.2 17 77	72.4	55 27.0 13 76	69.8	55 40.1 08 74	66.3	55 42.4 07 74	65.4	55 44.4 06 73	64.5	55 48.3 01 71	60.9	4
45	53 55.8 24 79	76.3	54 09.3 21 78	74.7	54 27.0 18 77	72.1	54 41.5 14 76	69.6	54 55.7 09 74	66.1	54 58.3 09 73	65.3	55 00.6 07 73	64.4	55 05.9 02 71	60.9	45
6	53 08.7 24 79	76.0	53 22.5 22 78	74.4	53 40.8 19 77	71.9	53 56.0 15 76	69.4	54 11.3 10 74	66.0	54 14.2 09 73	65.2	54 16.8 08 73	64.3	54 23.5 03 71	60.9	6
7	52 21.6 25 78	75.7	52 35.8 23 78	74.1	52 54.7 19 77	71.6	53 10.6 16 76	69.2	53 27.0 11 74	65.9	53 30.2 10 73	65.0	53 33.1 09 73	64.2	53 41.1 04 71	60.8	7
8	51 34.6 26 78	75.3	51 49.2 23 78	73.8	52 08.7 20 77	71.4	52 25.2 17 75	69.0	52 42.7 12 74	65.7	52 46.2 11 73	64.9	52 49.4 10 73	64.1	52 58.7 05 71	60.8	8
9	50 47.7 26 78	75.0	51 02.6 24 78	73.5	51 22.7 21 76	71.1	51 39.8 18 75	68.8	51 58.5 13 74	65.6	52 02.3 12 73	64.8	52 05.8 11 73	64.0	52 16.4 07 71	60.7	9
50	50 00.8 26 78	74.7	50 16.1 24 77	73.2	50 36.6 22 76	70.9	50 54.8 18 75	68.5	51 14.3 14 74	65.4	51 18.4 13 73	64.6	51 22.2 12 73	63.8	51 34.0 08 70	60.6	50
1	49 14.1 27 78	74.4	49 29.7 25 77	72.9	49 51.0 22 76	70.6	50 09.6 19 75	68.3	50 30.2 15 73	65.2	50 34.6 14 73	64.5	50 38.7 13 72	63.7	50 51.8 09 70	60.5	1
2	48 27.4 28 78	74.0	48 43.3 26 77	72.5	49 05.2 23 76	70.3	49 24.5 20 75	68.1	49 46.2 16 73	65.1	49 50.8 15 73	64.3	49 55.2 14 72	63.5	50 09.5 10 70	60.4	2
3	47 40.7 28 78	73.7	47 57.1 26 77	72.2	48 19.6 24 76	70.1	48 39.5 21 75	67.8	49 02.2 17 73	64.9	49 07.1 16 73	64.1	49 11.8 15 72	63.4	49 27.3 11 70	60.3	3
4	46 54.2 29 77	73.3	47 10.9 27 77	71.9	47 34.0 24 76	69.8	47 54.6 22 75	67.6	48 18.3 18 73	64.7	48 23.5 17 73	63.9	48 28.4 16 72	63.2	48 45.2 12 70	60.2	4
55	46 07.7 29 77	73.0	46 24.8 28 77	71.6	46 48.5 25 76	69.5	47 09.8 23 75	67.4	47 34.4 19 73	64.5	47 39.9 18 72	63.7	47 45.1 17 72	63.0	48 03.1 13 70	60.1	55
6	45 21.4 30 77	72.6	45 38.8 28 77	71.3	46 03.0 26 76	69.2	46 25.0 23 74	67.1	46 50.7 20 73	64.3	46 56.4 19 72	63.5	47 01.9 18 72	62.8	47 21.1 14 70	59.9	6
7	44 35.1 30 77	72.3	44 52.8 29 76	71.0	45 17.7 26 75	68.9	45 40.3 24 74	66.8	46 07.0 20 73	64.0	46 13.0 20 72	63.3	46 18.8 19 72	62.6	46 39.1 16 70	59.8	7
8	43 48.9 31 77	72.0	44 07.0 29 76	70.6	44 32.5 27 75	68.6	44 55.8 25 74	66.6	45 23.4 21 73	63.8	45 29.7 21 72	63.1	45 35.7 20 72	62.4	45 57.2 16 70	59.6	8
9	43 02.8 31 77	71.6	43 21.3 30 76	70.3	43 47.3 28 75	68.3	44 11.3 25 74	66.3	44 39.9 22 72	63.6	44 46.4 21 72	62.9	44 52.7 21 72	62.2	45 15.4 17 70	59.4	9
60	42 16.8 32 77	71.3	42 35.6 31 76	70.0	43 02.2 28 75	68.0	43 26.9 26 74	66.0	43 56.4 23 72	63.4	44 03.2 23 72	62.7	44 09.8 21 71	62.0	44 33.6 18 69	59.3	60
1	41 30.8 33 76	70.9	41 50.1 31 76	69.6	42 17.3 29 75	67.7	42 42.6 27 74	65.8	43 13.1 24 72	63.1	43 20.2 23 72	62.4	43 27.0 22 71	61.8	43 51.9 19 69	59.1	1
2	40 45.0 33 76	70.5	41 04.6 32 76	69.3	41 32.4 30 75	67.4	41 58.3 28 74	65.5	42 29.9 25 72	62.9	42 37.2 24 72	62.2	42 44.3 23 71	61.5	43 10.3 20 69	58.9	2
3	39 59.3 34 76	70.2	40 19.2 33 75	69.0	40 47.7 31 74	67.1	41 14.2 28 73	65.2	41 46.7 26 72	62.6	41 54.3 25 71	62.0	42 01.6 24 71	61.3	42 28.8 21 69	58.7	3
4	39 13.7 34 76	69.8	39 34.0 33 75	68.6	40 03.0 31 74	66.8	40 30.1 29 73	64.9	41 03.7 26 72	62.4	41 11.5 26 71	61.7	41 19.1 25 71	61.1	41 47.4 22 69	58.5	4
65	38 28.2 35 76	69.5	38 48.8 34 75	68.3	39 18.5 32 74	66.4	39 46.3 30 73	64.6	40 20.7 27 71	62.1	40 28.8 27 71	61.5	40 36.7 26 71	60.8	41 06.1 23 68	58.3	65
6	37 42.8 36 75	69.1	38 03.8 34 75	67.9	38 34.0 33 74	66.1	39 02.5 31 73	64.3	39 37.9 28 71	61.8	39 46.2 27 71	61.2	39 54.3 27 70	60.6	40 24.8 24 69	58.0	6
7	36 57.5 36 75	68.7	37 18.9 35 75	67.6	37 49.7 33 74	65.8	38 18.9 31 72	64.0	38 55.1 29 71	61.5	39 03.7 28 71	60.9	39 12.1 28 70	60.3	39 43.7 25 68	57.8	7
8	36 12.3 37 75	68.4	36 34.1 36 74	67.2	37 05.5 34 74	65.5	37 35.3 32 72	63.7	38 12.5 30 71	61.3	38 21.4 29 70	60.7	38 30.0 29 70	60.1	39 02.7 26 68	57.6	8
9	35 27.2 37 75	68.0	35 49.4 36 74	66.9	36 21.4 35 73	65.1	36 51.8 33 72	63.4	37 30.0 31 71	61.0	37 39.1 30 70	60.4	37 48.0 29 70	59.8	38 21.8 27 68	57.3	9
70	34 42.3 38 75	67.6	35 04.8 37 74	66.5	35 37.4 35 73	64.8	36 08.5 34 72	63.0	36 47.6 31 70	60.7	36 57.0 31 70	60.1	37 06.1 30 70	59.5	37 40.9 28 68	57.1	70
1	33 57.5 39 74	67.3	34 20.4 38 74	66.1	34 53.5 36 73	64.4	35 25.3 34 72	62.7	36 05.2 32 70	60.4	36 14.9 32 70	59.8	36 24.3 31 69	59.2	37 00.2 29 68	56.8	1
2	33 12.8 39 74	66.9	33 36.0 38 73	65.8	34 09.8 37 73	64.1	34 42.2 35 72	62.4	35 23.2 34 70	60.1	35 33.0 33 70	59.5	35 42.7 32 69	58.9	36 19.7 30 67	56.6	2
3	32 28.2 40 74	66.5	32 51.8 39 73	65.4	33 26.2 37 73	63.7	33 59.3 36 71	62.1	34 41.2 34 70	59.8	34 51.3 33 69	59.2	35 01.2 33 69	58.7	35 39.2 31 67	56.3	3
4	31 43.7 40 74	66.1	32 07.8 40 73	65.0	32 42.7 38 72	63.3	33 16.4 37 71	61.7	33 59.3 35 70	59.5	34 09.6 34 69	58.9	34 19.8 34 69	58.4	34 58.9 31 67	56.0	4
75	30 59.4 41 74	65.7	31 23.8 40 73	64.7	31 59.4 39 72	63.0	32 33.8 37 71	61.4	33 17.5 35 69	59.2	33 28.1 35 69	58.6	33 38.5 34 69	58.1	34 18.7 32 67	55.8	75
6	30 15.2 42 73	65.3	30 40.0 41 73	64.3	31 16.2 40 72	62.7	31 51.2 38 71	61.1	32 35.9 36 69	58.9	32 46.7 36 69	58.3	32 57.4 35 68	57.7	33 38.5 33 67	55.5	6
7	29 31.2 42 73	64.9	29 56.4 42 73	63.9	30 33.2 40 72	62.3	31 08.8 39 70	60.7	31 54.4 37 69	58.5	32 05.5 37 68	58.0	32 16.4 36 68	57.4	32 58.7 34 66	55.2	7
8	28 47.3 43 73	64.5	29 12.9 42 73	63.5	30 00.3 41 71	61.9	30 26.5 40 70	60.4	31 13.0 38 69	58.2	31 24.3 38 68	57.7	31 35.5 37 68	57.1	32 18.9 35 66	54.9	8
9	28 03.5 43 73	64.1	28 29.5 43 72	63.1	29 07.5 42 71	61.6	29 44.4 40 70	60.0	30 31.9 39 68	57.9	30 43.5 38 68	57.3	30 54.9 38 68	56.8	31 39.2 36 66	54.6	9
80	27 19.9 44 72	63.7	27 46.2 43 72	62.7	28 24.9 42 71	61.2	29 02.5 41 70	59.6	29 50.9 40 68	57.5	30 02.7 39 68	57.0	30 14.4 39 67	56.5	30 59.7 37 66	54.3	80
1	26 36.5 45 72	63.3	27 03.2 44 72	62.3	27 42.4 43 70	60.8	28 20.7 42 69	59.3	29 10.0 41 68	57.2	29 22.1 40 67	56.7	29 34.0 39 67	56.1	30 20.3 38 65	54.0	1
2	25 53.2 45 72	62.9	26 20.3 45 71	61.9	27 00.1 44 70	60.4	27 39.0 43 69	58.9	28 29.3 41 68	56.9	28 41.6 41 67	56.3	28 53.7 40 67	55.8	29 41.1 38 65	53.7	2
3	25 10.0 46 72	62.5	25 37.5 45 71	61.5	26 18.0 44 70	60.1	26 57.5 43 69	58.5	27 48.7 42 67	56.5	28 01.3 42 67	56.0	28 13.7 41 67	55.5	29 02.1 40 65	53.4	3
4	24 27.0 47 71	62.1	24 54.9 46 71	61.1	25 36.0 45 70	59.7	26 16.2 44 69	58.2	27 08.3 43 67	56.2	27 21.1 42 67	55.6	27 33.7 42 66	55.2	28 23.2 40 65	53.1	4
85	23 44.2 47 71	61.7	24 12.5 47 70	60.7	24 54.2 46 69	59.3	25 35.0 45 68	57.8	26 28.1 44 67	55.8	26 41.1 43 66	55.3	26 54.0 43 66	54.8	27 44.5 41 64	52.7	85
6	23 01.6 48 71	61.3	23 30.2 47 70	60.3	24 12.6 47 69	58.9	24 54.1 46 68	57.4	25 48.0 45 66	55.4	26 01.3 44 66	54.9	26 14.4 44 66	54.4	27 05.9 42 64	52.4	6
7	22 19.1 49 71	60.8	22 48.1 48 70	59.9	23 31.1 47 69	58.5	24 13.3 46 68	57.0	25 08.2 45 66	55.1	25 21.7 45 66	54.6	25 35.0 44 65	54.1	26 27.6 43 64	52.1	7
8	21 36.8 49 70	60.4	22 06.2 49 70	59.5	22 49.8 48 68	58.1	23 32.6 47 67	56.6	24 28.5 46 66	54.7	24 42.2 46 65	54.2	24 55.8 45 65	53.7	25 49.4 44 63	51.7	8
9	20 54.6 50 70	60.0	21 24.5 50 69	59.1	22 08.7 49 68	57.7	22 52.2 47 67	56.2	23 48.9 47 66	54.3	24 02.9 46 65	53.8	24 16.8 46 65	53.3	25 11.4 44 63	51.4	9
90	20 12.7 51 70	59.6	20 43.0 50 69	58.6	21 27.8 49 68	57.2	22 11.9 49 67	55.8	23 09.6 48 65	53.9	23 23.8 47 65	53.4	23 37.9 47 64	53.0	24 33.5 46 63	51.0	90

H.A.	36° 00' Alt. Δd Δt Az.	37° 00' Alt. Δd Δt Az.	38° 30' Alt. Δd Δt Az.	40° 00' Alt. Δd Δt Az.	42° 00' Alt. Δd Δt Az.	42° 30' Alt. Δd Δt Az.	43° 00' Alt. Δd Δt Az.	45° 00' Alt. Δd Δt Az.	H.A.
00	18 09.0 1.00 01 180.0	17 00.0 1.00 01 180.0	15 30.0 1.00 01 180.0	14 00.0 1.00 01 180.0	12 00.0 1.00 01 180.0	11 30.0 1.00 01 180.0	11 00.0 1.00 01 180.0	9 00.0 1.00 01 180.0	00
1	17 59.6 1.00 02 179.1	16 59.6 1.00 02 179.2	15 29.7 1.00 02 179.2	13 59.7 1.00 02 179.2	11 59.7 1.00 02 179.2	11 29.7 1.00 02 179.2	10 59.7 1.00 02 179.3	8 59.7 1.00 02 179.3	1
2	17 58.6 1.00 03 178.3	16 58.6 1.00 03 178.3	15 28.6 1.00 03 178.4	13 58.7 1.00 03 178.4	11 58.7 1.00 03 178.5	11 28.7 1.00 03 178.5	10 58.7 1.00 03 178.5	8 58.8 1.00 03 178.6	2
3	17 56.8 1.00 04 177.4	16 56.8 1.00 04 177.6	15 26.9 1.00 04 177.6	13 57.0 1.00 04 177.7	11 57.1 1.00 04 177.7	11 27.1 1.00 04 177.7	10 57.2 1.00 04 177.9	8 57.3 1.00 04 177.9	3
4	17 54.2 1.00 05 176.6	16 54.3 1.00 05 176.7	15 24.5 1.00 05 176.8	13 54.7 1.00 05 176.8	11 54.9 1.00 05 177.0	11 24.9 1.00 05 177.0	10 55.0 1.00 05 177.0	8 55.2 1.00 05 177.1	4
05	17 51.0 1.00 07 175.8	16 51.2 1.00 06 175.8	15 21.4 1.00 06 175.9	13 51.6 1.00 06 176.1	11 52.0 1.00 06 176.2	11 22.0 1.00 06 176.2	10 52.1 1.00 06 176.3	8 52.4 1.00 06 176.4	05
6	17 47.0 1.00 08 174.9	16 47.3 1.00 08 175.0	15 17.6 1.00 07 175.1	13 48.0 1.00 07 175.3	11 48.4 1.00 07 175.4	11 18.5 1.00 07 175.5	10 48.7 1.00 07 175.5	8 49.1 1.00 07 175.7	6
7	17 42.4 99 09 174.1	16 42.7 99 09 174.2	15 13.2 99 08 174.3	13 43.6 99 08 174.5	11 44.3 99 08 174.7	11 14.4 99 08 174.7	10 44.6 99 08 174.8	8 45.2 1.00 08 175.0	7
8	17 37.0 99 10 173.2	16 37.4 99 10 173.3	15 08.0 99 10 173.5	13 38.6 99 09 173.9	11 39.5 99 09 173.9	11 09.6 99 09 174.0	10 39.8 99 09 174.1	8 40.6 99 09 174.3	8
9	17 30.9 99 11 172.4	16 31.4 99 11 172.5	15 02.2 99 11 172.7	13 33.0 99 11 172.9	11 34.0 99 10 173.2	11 04.3 99 10 173.3	10 34.5 99 10 173.3	8 35.5 99 10 173.6	9
10	17 24.1 99 12 171.5	16 24.8 99 12 171.7	14 55.7 99 12 171.9	13 26.7 99 12 172.1	11 27.9 99 11 172.4	10 58.2 99 11 172.5	10 28.5 99 11 172.6	8 29.8 99 11 172.9	10
1	17 16.6 99 14 170.7	16 17.4 99 13 170.9	14 48.6 99 13 171.1	13 19.7 99 13 171.4	11 21.2 99 12 171.7	10 51.6 99 12 171.8	10 22.0 99 12 171.8	8 23.4 99 12 172.2	1
2	17 08.4 98 15 169.9	16 09.4 98 15 170.0	14 40.7 98 14 170.3	13 12.1 98 14 170.6	11 13.9 98 13 170.9	10 44.3 98 13 171.0	10 14.8 98 13 171.1	8 16.5 99 13 171.5	2
3	16 59.5 98 16 169.0	16 00.6 98 16 169.2	14 32.2 98 15 169.5	13 03.8 98 15 169.8	11 05.9 98 14 170.2	10 36.5 98 14 170.3	10 07.0 98 14 170.4	8 09.0 98 14 170.4	3
4	16 50.0 98 17 168.2	15 51.2 98 17 168.4	14 23.1 98 16 168.7	12 54.9 98 16 169.0	10 57.4 98 15 169.4	10 28.0 98 15 169.5	9 58.6 98 15 169.7	8 00.9 98 14 170.1	4
15	16 39.7 98 18 167.4	15 41.1 98 18 167.6	14 13.3 98 17 167.9	12 45.4 98 17 168.3	10 48.2 98 16 168.7	10 18.8 98 16 168.8	9 49.5 98 16 168.9	7 52.3 98 15 169.4	15
6	16 28.7 97 19 166.6	15 30.4 97 19 166.8	14 02.8 97 19 167.2	12 35.2 97 18 167.5	10 38.3 97 17 168.0	10 09.1 97 17 168.1	9 39.9 97 17 168.2	7 43.0 97 16 168.7	6
7	16 17.1 97 20 165.7	15 19.0 97 20 166.0	13 51.7 97 20 166.4	12 24.4 97 19 166.7	10 27.9 97 18 167.2	9 58.8 97 18 167.4	9 29.7 97 18 167.5	7 33.2 97 17 168.0	7
8	16 04.8 97 22 164.9	15 06.9 97 21 165.2	13 39.9 97 21 165.6	12 12.9 97 20 166.0	10 16.9 97 19 166.5	9 47.9 97 19 166.6	9 18.9 97 19 166.8	7 22.8 97 18 167.3	8
9	15 51.9 96 23 164.1	14 54.1 96 23 164.4	13 27.5 96 22 164.8	12 00.9 96 21 165.2	10 05.3 96 20 165.8	9 36.4 96 20 165.9	9 07.4 96 20 166.0	7 11.8 96 19 166.6	9
20	15 38.2 96 24 163.3	14 40.8 96 24 163.6	13 14.5 96 23 164.0	11 48.2 96 22 164.5	9 53.0 96 21 165.0	9 24.3 96 21 165.2	8 55.4 96 21 165.3	7 00.2 96 20 165.9	20
1	15 24.0 95 25 162.5	14 26.7 95 24 162.8	13 00.8 95 24 163.3	11 34.9 96 23 163.7	9 40.2 96 22 164.3	9 11.5 96 22 164.5	8 42.9 96 22 164.6	6 48.1 96 21 165.2	1
2	15 09.0 95 26 161.7	14 12.1 95 26 162.0	12 46.5 95 25 162.5	11 21.0 95 24 163.0	9 26.8 95 23 163.6	8 58.3 95 23 163.8	8 29.7 95 23 163.9	6 35.5 95 22 164.5	2
3	14 53.5 94 27 160.9	13 56.8 94 27 161.2	12 31.6 95 25 161.7	11 06.5 95 24 162.2	9 12.8 95 24 162.9	8 44.4 95 24 163.1	8 16.0 95 24 163.2	6 22.2 95 23 163.9	3
4	14 37.3 94 28 160.1	13 40.8 94 28 160.5	12 16.1 94 27 161.0	10 51.4 94 26 161.5	8 58.3 94 24 162.2	8 30.0 94 24 162.4	8 01.7 94 25 162.5	6 08.5 94 24 163.2	4
25	14 20.5 94 29 159.3	13 24.3 94 29 159.7	12 00.0 94 28 160.2	10 35.7 94 27 160.8	8 43.1 94 26 161.5	8 15.0 94 26 161.6	7 46.8 94 26 161.8	5 54.2 94 25 162.5	25
6	14 03.0 93 30 158.6	13 07.2 93 30 158.9	11 43.3 93 29 159.5	10 19.4 93 28 160.0	8 27.4 93 27 160.8	7 59.4 93 27 161.0	7 31.4 93 27 161.1	5 39.5 93 26 161.9	6
7	13 45.0 93 31 157.8	12 49.4 93 31 158.2	11 26.0 93 30 158.7	10 02.5 93 29 159.3	8 11.1 93 28 160.1	7 43.3 93 28 160.3	7 15.4 93 28 160.4	5 23.9 93 27 161.2	7
8	13 26.3 92 32 157.0	12 31.1 92 32 157.4	11 08.1 92 31 158.0	9 45.1 92 30 158.6	7 54.3 92 29 159.4	7 26.6 92 29 159.6	6 58.9 92 29 159.8	5 08.0 92 28 160.5	8
9	13 07.1 92 33 156.3	12 12.1 92 33 156.7	10 49.7 92 32 157.3	9 27.1 92 31 157.9	7 37.0 92 30 158.7	7 09.4 92 30 158.9	6 41.8 92 29 159.1		9
30	12 47.2 91 34 155.5	11 52.6 91 34 155.9	10 30.6 91 33 156.5	9 08.6 91 32 157.2	7 19.0 91 31 158.0	6 51.6 91 30 158.2	6 24.2 91 30 158.4		30
1	12 26.8 90 35 154.7	11 32.5 91 34 155.2	10 11.0 91 34 155.8	8 49.4 91 33 156.5	7 00.6 91 32 157.3	6 33.4 91 31 157.5	6 06.1 91 31 157.7		1
2	12 05.8 90 36 154.0	11 11.9 90 35 154.4	9 50.9 90 34 155.1	8 29.8 90 34 155.8	6 41.6 90 32 156.6	6 14.5 90 32 156.9	5 47.5 90 32 157.1		2
3	11 44.2 90 37 153.3	10 50.6 90 36 153.7	9 30.2 89 35 154.4	8 09.6 90 33 155.1	6 22.1 90 33 156.0	5 55.2 90 33 156.2	5 28.3 90 33 156.4		3
4	11 22.1 89 38 152.5	10 28.9 89 37 153.0	9 08.9 89 36 153.7	7 48.9 89 35 154.4	6 02.1 89 34 155.3	5 35.3 89 34 155.5	5 08.6 89 34 155.8		4
35	10 59.4 88 39 151.8	10 06.5 88 38 152.3	8 47.1 88 37 153.0	7 27.6 88 36 153.7	5 41.5 88 35 154.6	5 15.0 88 35 154.9			35
6	10 36.2 88 40 151.1	9 43.7 88 39 151.6	8 24.8 88 38 152.3	7 05.9 88 37 153.0	5 20.5 88 36 154.0				6
7	10 12.5 87 40 150.3	9 20.3 87 40 150.9	8 02.0 87 39 151.6	6 43.6 87 38 152.3					7
8	9 48.2 86 41 149.6	8 56.4 86 41 150.2	7 38.6 86 40 150.9	6 20.8 87 39 151.7					8
9	9 23.4 86 42 148.9	8 32.0 86 42 149.5	7 14.8 86 41 150.2	5 57.5 86 40 151.0					9
40	8 58.1 85 43 148.2	8 07.1 85 42 148.8	6 50.4 85 41 149.6	5 33.7 85 40 150.3					40
1	8 32.3 84 44 147.5	7 41.7 84 43 148.1	6 25.6 85 42 148.9	5 09.5 85 41 149.7					1
2	8 06.0 84 45 146.9	7 15.7 84 44 147.4	6 00.3 84 43 148.2						2
3	7 39.2 83 45 146.2	6 49.4 83 45 146.7	5 34.5 83 44 147.6						3
4	7 12.0 82 46 145.5	6 22.5 82 46 146.1	5 08.2 83 45 146.9						4
45	6 44.2 82 47 144.8	5 55.2 82 46 145.4							45
6	6 16.0 81 48 144.2	5 27.4 81 47 144.8							6
7	5 47.4 80 48 143.5								7
8	5 18.3 80 49 142.9								8

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00' Alt. Δd Δt Az.	37° 00' Alt. Δd Δt Az.	38° 30' Alt. Δd Δt Az.	40° 00' Alt. Δd Δt Az.	42° 00' Alt. Δd Δt Az.	42° 30' Alt. Δd Δt Az.	43° 00' Alt. Δd Δt Az.	45° 00' Alt. Δd Δt Az.	H.A.
91	19 31.0 51 60 59.1	20 01.6 51 60 58.2	20 47.1 50 68 56.8	21 31.9 49 66 55.4	22 30.5 48 65 53.5	22 44.9 48 64 53.1	22 59.3 48 64 52.6	23 55.9 47 62 50.7	91
2	18 49.4 52 60 58.7	19 20.5 52 68 57.8	20 06.5 51 67 56.4	20 52.0 50 66 55.0	21 51.5 49 65 53.2	22 06.2 49 64 52.7	22 20.8 49 64 52.2	23 18.4 47 62 50.3	2
3	18 06.0 53 68 58.2	18 39.5 52 68 57.3	19 26.2 52 67 56.0	20 12.3 51 66 54.6	21 12.8 50 64 53.2	21 27.7 50 64 52.3	21 42.6 49 63 51.8	22 41.2 48 62 49.9	3
4	17 26.9 53 68 57.8	17 58.7 53 68 57.1	18 46.1 52 67 55.5	19 32.9 52 65 54.2	20 34.3 51 64 52.4	20 49.4 50 63 51.9	21 04.5 50 63 51.4	22 04.1 49 61 49.6	4
95	16 45.9 54 68 57.3	17 18.2 54 67 56.4	18 06.2 53 66 55.1	18 53.6 52 65 53.8	19 55.9 51 64 52.0	20 11.3 51 63 51.5	20 26.7 51 63 51.0	21 27.3 50 61 49.2	95
6	16 05.1 55 68 56.9	16 37.8 54 67 56.0	17 25.5 54 66 54.7	18 14.6 53 65 53.3	19 17.8 52 63 51.5	19 33.5 52 63 51.1	19 49.0 52 62 50.6	20 50.7 51 61 48.8	6
7	15 24.6 55 67 56.4	15 57.7 55 67 55.5	16 47.0 54 65 54.2	17 35.7 54 64 52.9	18 39.4 53 63 51.1	18 55.8 53 62 50.7	19 11.6 53 62 50.2	20 14.2 52 60 48.4	7
8	14 44.3 56 67 55.9	15 17.8 56 66 55.1	16 07.7 55 65 53.8	16 57.1 54 64 52.5	18 02.2 54 62 50.7	18 18.4 54 62 50.3	18 34.4 53 62 49.8	19 38.0 53 60 48.0	8
9	14 04.2 57 66 55.5	14 38.1 56 66 54.6	15 28.7 56 65 53.3	16 18.7 55 64 52.0	17 24.8 55 62 50.2	17 41.1 54 62 49.8	17 57.3 54 61 49.3	19 02.1 53 60 47.6	9
100	13 24.3 57 66 55.0	13 58.7 57 65 54.1	14 49.8 57 64 52.9	15 40.6 56 63 51.6	16 47.5 55 62 49.9	17 04.2 55 61 49.4	17 20.7 55 61 49.0	18 26.3 54 59 47.2	100
1	12 44.7 58 66 54.5	13 19.4 58 65 53.7	14 11.2 57 64 52.4	15 02.7 57 63 51.1	16 10.6 56 61 49.4	16 27.4 56 61 49.0	16 44.2 56 60 48.6	17 50.8 55 59 46.8	1
2	12 05.3 59 65 54.0	12 40.4 58 65 53.2	13 32.9 58 64 51.9	14 25.0 58 62 50.7	15 33.8 57 61 49.0	15 50.9 57 60 48.6	16 07.9 57 60 48.1	17 15.5 56 58 46.4	2
3	11 26.1 59 65 53.5	12 01.7 59 64 52.7	12 54.6 59 63 51.5	13 47.6 58 62 50.2	14 57.3 58 60 48.5	15 14.6 58 60 48.1	15 31.9 57 60 47.7	16 40.5 57 58 46.0	3
4	10 47.2 60 64 53.0	11 23.2 60 64 52.2	12 17.0 60 63 51.0	13 10.4 59 62 49.8	14 21.0 59 60 48.1	14 38.6 58 60 47.7	14 56.1 58 59 47.3	16 05.7 58 58 45.6	4
105	10 08.5 61 64 52.5	10 45.0 61 63 51.7	11 39.4 60 62 50.5	12 33.5 60 61 49.3	13 45.0 59 60 47.6	14 02.8 59 59 47.2	14 20.6 59 59 46.8	15 31.2 59 57 45.1	105
6	9 30.1 62 64 52.0	10 07.0 61 63 51.2	11 02.0 61 62 50.0	11 56.5 61 61 48.8	13 09.3 60 59 47.2	13 27.3 60 59 46.8	13 45.3 60 58 46.4	14 56.9 59 57 44.7	6
7	8 52.0 62 63 51.5	9 29.3 62 62 50.7	10 25.0 62 61 49.5	11 20.4 61 60 48.3	12 33.8 61 59 46.7	12 52.1 61 58 46.3	13 10.3 61 58 45.9	14 22.9 60 56 44.3	7
8	8 14.1 63 63 51.0	8 51.8 63 62 50.2	9 48.2 62 61 49.1	10 44.3 62 60 47.9	11 58.6 62 58 46.3	12 17.1 62 58 45.9	12 35.6 62 57 45.5	13 49.1 61 56 43.8	8
9	7 36.5 64 62 50.5	8 14.6 63 62 49.7	9 11.6 63 60 48.6	10 08.4 63 59 47.4	11 23.7 62 58 45.8	11 42.4 62 57 45.4	12 01.1 62 57 45.0	13 15.6 62 55 43.4	9
110	6 59.2 64 62 50.0	7 37.7 64 61 49.2	8 35.4 64 60 48.1	9 32.8 64 59 46.9	10 49.0 63 57 45.3	11 08.0 63 57 44.9	11 27.0 63 56 44.5	12 42.4 63 55 42.9	110
1	6 22.2 65 61 49.5	7 01.1 65 61 48.7	7 59.4 65 59 47.5	8 57.5 64 58 46.4	10 14.7 64 57 44.8	10 33.9 64 56 44.4	10 53.1 64 56 44.1	12 09.5 63 54 42.5	1
2	5 45.4 66 61 48.9	6 24.8 66 60 48.2	7 23.8 65 59 47.0	8 22.5 65 58 45.9	9 40.6 65 56 44.3	10 00.0 65 56 44.0	10 19.5 65 55 43.6	11 36.9 64 54 42.0	2
3	5 09.0 66 60 48.4	5 48.8 66 60 47.6	6 48.4 66 58 46.5	7 47.8 66 57 45.4	9 06.8 66 56 43.9	9 26.5 66 55 43.5	9 46.2 65 55 43.1	11 04.5 65 53 41.5	3
4		5 13.1 67 59 47.1	6 13.3 67 58 46.0	7 13.4 67 57 44.9	8 33.3 66 55 43.4	8 53.3 66 55 43.0	9 13.2 66 54 42.6	10 32.5 66 53 41.1	4
115			5 38.6 68 57 45.5	6 39.4 67 56 44.3	8 00.2 67 55 42.9	8 20.3 67 54 42.5	8 40.4 67 54 42.1	10 00.8 67 52 40.6	115
6			5 04.1 68 57 44.9	6 05.6 68 55 43.8	7 27.3 68 54 42.3	7 47.7 68 54 42.0	8 08.5 68 53 41.6	9 29.3 68 52 40.1	6
7				5 32.1 69 55 43.3	6 54.8 69 54 41.8	7 15.4 69 53 41.5	7 36.0 69 53 41.1	8 58.2 68 51 39.6	7
8					6 22.6 70 53 41.3	6 43.4 69 53 41.0	7 04.2 69 52 40.6	8 27.4 69 51 39.1	8
9					5 50.7 70 53 40.8	6 11.8 70 52 40.4	6 32.8 70 52 40.1	7 56.9 70 50 38.6	9
120					5 19.1 71 52 40.3	5 40.4 71 52 39.9	6 01.7 71 51 39.5	7 26.8 71 50 38.1	120
1						5 09.5 72 51 39.4	5 31.0 72 51 39.0	6 57.0 72 49 37.6	1
2							5 00.6 73 50 38.5	6 27.5 72 49 37.1	2
3								5 58.4 73 48 36.6	3
4								5 29.6 74 47 36.1	4
125								5 01.2 75 47 35.6	125

Lat. 36°

H.A.	46° 00' Alt.	Δd Δt	Az.	47° 00' Alt.	Δd Δt	Az.	48° 30' Alt.	Δd Δt	Az.	49° 30' Alt.	Δd Δt	Az.	50° 30' Alt.	Δd Δt	Az.	51° 30' Alt.	Δd Δt	Az.	52° 30' Alt.	Δd Δt	Az.	54° 00' Alt.	Δd Δt	Az.	H.A.
00	80 00.0	1.0 03	00.0	79 00.0	1.0 03	00.0	77 30.0	1.0 02	00.0	76 30.0	1.0 02	00.0	75 30.0	1.0 02	00.0	74 30.0	1.0 02	00.0	73 30.0	1.0 02	00.0	72 00.0	1.0 01	00.0	00
1	79 58.3	1.0 08	04.0	78 58.5	1.0 08	03.6	77 28.7	1.0 06	03.1	76 28.8	1.0 06	02.8	75 28.9	1.0 05	02.5	74 29.0	1.0 05	02.3	73 29.1	1.0 04	02.1	71 59.2	1.0 04	01.9	1
2	79 53.3	99 14	07.9	78 54.0	99 12	07.1	77 24.8	99 10	06.1	76 25.7	99 10	05.5	75 25.7	99 09	05.1	74 26.1	99 08	04.6	73 26.4	99 08	04.3	71 56.8	1.0 07	03.8	2
3	79 44.9	97 19	11.8	78 46.5	98 17	10.6	77 18.4	98 15	09.1	76 19.5	98 14	08.1	75 20.4	98 12	07.6	74 21.3	98 11	06.9	73 21.9	98 10	06.4	71 52.8	98 12	05.7	3
4	79 33.5	95 24	15.5	78 36.2	96 22	13.9	77 09.5	97 19	12.0	76 11.4	97 17	10.9	75 13.0	98 16	10.0	74 14.3	98 14	09.2	73 15.9	98 13	08.5	71 47.2	98 12	07.5	4
05	79 19.0	92 29	19.1	78 23.2	94 26	17.2	76 58.3	95 23	14.8	76 01.1	96 21	13.5	75 03.5	96 19	12.4	74 05.7	97 18	11.4	73 07.6	97 16	10.5	71 40.0	97 14	09.4	05
6	79 01.8	90 33	22.4	78 07.6	91 30	20.3	76 44.7	93 26	17.6	75 48.6	94 24	16.1	74 52.1	95 22	14.8	73 55.1	95 20	13.6	72 57.5	96 19	12.5	71 31.4	96 17	11.2	6
7	78 42.1	86 37	25.6	77 49.6	88 34	23.2	76 29.0	91 30	20.2	75 34.2	92 27	18.5	74 38.8	93 25	17.0	73 42.4	94 23	15.7	72 46.5	94 22	14.5	71 21.2	95 19	12.9	7
8	78 20.0	83 40	28.6	77 29.4	85 37	26.0	76 11.2	88 32	22.7	75 17.8	90 30	20.9	74 23.9	92 26	19.2	73 28.9	92 26	17.7	72 33.5	93 24	16.4	71 09.6	94 22	14.7	8
9	77 55.7	80 44	31.3	77 07.1	82 40	28.6	75 51.5	86 36	25.1	74 59.7	87 33	23.1	74 06.9	89 31	21.3	73 13.3	90 29	19.7	72 19.1	91 27	18.3	70 56.7	92 24	16.4	9
10	77 29.6	76 46	33.8	76 43.0	79 43	31.0	75 30.1	83 39	27.4	74 39.8	85 36	25.2	73 48.4	86 33	23.3	72 56.2	88 31	21.6	72 03.1	89 29	20.1	70 42.3	91 26	18.0	10
1	77 01.7	73 49	36.2	76 17.1	76 46	33.3	75 06.9	80 41	29.5	74 18.3	82 38	27.3	73 28.5	84 36	25.3	72 37.6	86 33	23.4	71 45.8	87 31	21.8	70 26.7	89 28	19.6	1
2	76 32.3	69 51	38.3	75 49.8	73 43	35.4	74 42.2	77 43	31.5	73 55.4	79 41	29.2	73 07.1	82 38	27.1	72 17.6	83 35	25.2	71 27.1	85 33	23.4	70 09.8	87 30	21.1	2
3	76 01.5	66 53	40.3	75 21.0	69 50	37.3	74 16.3	74 46	33.4	73 31.0	77 43	31.0	72 44.3	79 40	28.8	71 56.3	81 38	26.9	71 07.2	83 35	25.0	69 51.7	85 32	22.6	3
4	75 29.5	62 55	42.1	74 50.9	66 52	39.1	73 49.0	71 47	35.1	73 05.4	74 45	32.7	72 20.3	76 42	30.5	71 33.8	79 39	28.4	70 46.1	80 37	26.6	69 32.5	83 34	24.0	4
15	74 56.4	59 57	43.8	74 19.7	63 54	40.8	73 20.5	68 49	36.7	72 38.6	71 46	34.3	71 55.1	74 44	32.0	71 10.1	76 41	29.9	70 23.8	78 39	28.0	69 12.3	81 36	25.4	15
6	74 22.4	56 58	45.3	73 47.5	60 55	42.3	72 50.9	65 51	38.3	72 10.7	68 48	35.8	71 28.8	71 45	33.5	70 45.3	74 43	31.4	70 00.5	76 41	29.4	68 51.0	79 37	26.7	6
7	73 47.5	53 59	46.7	73 14.4	57 57	43.7	72 20.4	63 52	39.7	71 41.8	66 50	37.2	71 01.5	69 47	34.9	70 19.6	71 44	32.7	69 36.2	73 42	30.7	68 28.7	76 39	27.9	7
8	73 11.8	50 61	47.9	72 40.4	54 58	45.0	71 49.0	60 54	41.0	71 12.0	63 51	38.5	70 33.3	66 48	36.2	69 52.9	69 46	34.0	69 10.9	71 44	32.0	68 05.5	74 40	29.1	8
9	72 35.4	47 62	49.1	72 05.7	52 59	46.2	71 16.7	57 55	42.2	70 41.4	60 52	39.7	70 04.2	63 50	37.4	69 25.3	66 47	35.2	68 44.8	69 45	33.1	67 41.5	72 41	30.3	9
20	71 58.4	45 63	50.2	71 30.3	49 60	47.3	70 43.7	55 56	43.4	70 10.0	58 54	40.9	69 34.3	61 51	38.6	68 56.9	64 49	36.4	68 17.9	66 46	34.3	67 16.6	70 43	31.4	20
1	71 20.9	42 63	51.1	70 54.3	46 61	48.3	70 10.1	52 57	44.4	69 37.9	55 55	42.0	69 03.7	58 52	39.6	68 27.8	61 50	37.4	67 50.2	64 47	35.3	66 50.9	68 44	32.4	1
2	70 42.9	40 64	52.0	70 17.8	44 62	49.3	69 35.8	49 58	45.4	69 05.1	53 56	43.0	68 32.4	56 53	40.6	67 57.9	59 51	38.4	67 21.7	62 48	36.3	66 24.6	65 45	33.4	2
3	70 04.4	37 65	52.8	69 40.8	41 62	50.1	69 01.0	47 59	46.3	68 31.7	50 57	43.9	68 00.5	54 54	41.6	67 27.4	57 52	39.4	66 52.7	59 50	37.3	65 57.5	63 46	34.3	3
4	69 25.6	35 65	53.5	69 03.3	39 63	50.9	68 25.6	45 60	47.1	67 57.8	48 57	44.8	67 28.0	51 55	42.5	66 56.4	54 53	40.3	66 23.0	57 50	38.2	65 29.9	61 47	35.2	4
25	68 46.4	33 66	54.2	68 25.5	37 64	51.6	67 49.8	42 60	47.9	67 23.4	46 58	45.6	66 55.0	49 56	43.3	66 24.7	52 54	41.1	65 52.7	55 51	39.0	65 01.6	59 48	36.0	25
6	68 06.9	31 66	54.7	67 47.2	35 64	52.3	67 13.6	40 61	48.6	66 48.5	43 59	46.3	66 21.5	47 57	44.1	65 52.5	50 54	41.9	65 21.9	53 52	39.8	64 32.8	56 49	36.8	6
7	67 27.1	29 67	55.3	67 08.7	33 65	52.9	66 37.0	38 62	49.3	66 13.2	41 59	47.0	65 47.5	44 57	44.8	65 19.9	47 55	42.6	64 50.5	50 53	40.6	64 03.4	54 50	37.6	7
8	66 47.0	27 67	55.8	66 29.9	30 65	53.4	66 00.0	36 62	49.9	65 37.5	39 60	47.6	65 13.1	42 58	45.4	64 46.8	45 56	43.3	64 18.8	48 54	41.2	63 33.6	52 50	38.3	8
9	66 06.8	25 67	56.3	65 50.8	29 66	53.9	65 22.7	34 63	50.5	65 01.5	37 61	48.2	64 38.3	40 59	46.1	64 13.3	43 56	43.9	63 46.5	46 54	41.9	63 03.2	50 51	39.0	9
30	65 26.3	23 68	56.7	65 11.4	27 66	54.4	64 45.2	32 63	51.0	64 25.2	35 61	48.8	64 03.2	38 59	46.6	63 39.4	41 57	44.5	63 13.9	44 55	42.5	62 32.5	48 52	39.6	30
1	64 45.7	21 68	57.0	64 31.9	25 66	54.8	64 07.3	30 63	51.4	63 48.5	33 61	49.2	63 27.6	36 60	47.2	63 05.2	39 58	45.1	62 40.9	42 56	43.0	62 01.4	46 53	40.2	1
2	64 04.9	19 68	57.4	63 52.1	23 67	55.1	63 29.3	28 64	51.9	63 11.6	31 62	49.7	62 52.0	34 60	47.7	62 30.7	37 58	45.6	62 07.5	40 56	43.6	61 29.9	44 54	40.7	2
3	63 23.9	18 68	57.7	63 12.2	21 67	55.5	62 51.0	26 64	52.3	62 34.4	29 62	50.2	62 16.0	32 60	48.1	61 55.9	35 58	46.1	61 34.0	38 57	44.1	60 58.0	42 54	41.3	3
4	62 42.8	16 69	57.9	62 32.1	19 67	55.8	62 12.5	24 64	52.6	61 57.0	27 63	50.6	61 39.8	30 61	48.5	61 20.7	33 59	46.5	61 00.0	36 57	44.6	60 25.8	40 54	41.8	4
35	62 01.6	15 69	58.2	61 51.9	18 67	56.1	61 33.8	22 65	53.0	61 19.5	25 63	50.9	61 03.2	28 61	48.9	60 45.4	31 59	47.0	60 25.8	34 57	45.0	59 53.4	38 55	42.2	35
6	61 20.4	13 69	58.4	61 11.6	16 67	56.3	60 55.0	21 65	53.3	60 41.7	23 63	51.3	60 26.5	27 61	49.3	60 09.8	29 60	47.3	59 51.3	32 58	45.4	59 20.6	36 55	42.7	6
7	60 39.0	12 69	58.5	60 31.2	15 68	56.5	60 16.0	19 65	53.5	60 03.7	22 63	51.6	59 49.7	25 62	49.6	59 34.0	28 60	47.7	59 16.6	30 58	45.8	58 47.6	34 55	43.1	7
8	59 57.6	10 69	58.7	59 50.7	13 68	56.7	59 37.0	17 66	53.8	59 25.7	20 64	51.8	59 12.7	23 62	49.9	58 58.0	26 60	48.0	58 41.7	28 58	46.2	58 14.3	32 56	43.4	8
9	59 16.1	09 69	58.8	59 10.0	12 68	56.9	58 57.0	16 66	54.0	58 47.4	19 64	52.1	58 35.4	21 62	50.2	58 21.8	24 61	48.3	58 06.6	27 59	46.5	57 40.9	31 56	43.8	9
40	58 34.5	07 69	59.0	58 29.4	10 68	57.0	58 18.0	14 66	54.2	58 09.9	17 64	52.5	57 58.1	20 62	50.4	57 45.5	22 61	48.6	57 31.3	25 59	47.0	57 07.2	29 56	44.1	40
1	57 52.9	06 69	59.0	57 48.6	09 68	57.1	57 39.0	13 66	54.3	57 30.6	15 64	52.5	57 20.6	18 63	50.7	57 09.0	21 61	48.8	56 55.9	23 59	47.0	56 33.3	27 57	44.4	1
2	57 11.3	04 69	59.1	57 07.8	07 68	57.2	56 59.8	11 66	54.5	56 52.1	14 64	52.7	56 43.0	16 63	50.9	56 32.4	19 61	49.1	56 20.3	21 60	47.3	55 59.2	25 57	44.7	2
3	56 29.7	03 69	59.1	56 27.0	06 68	57.3	56 20.0	10 66	54.6	56 13.5	12 64	52.8	56 05.3	15 63	51.0	55 55.7	17 61	49.3	55 44.5	20 60	47.7	55 25.0	23 57	44.9	3
4	55 48.0	02 69	59.1	55 46.1	04 68	57.4	55 40.4	08 67	54.7	55 34.7	11 65	52.9	55 27.5	13 63	51.2	55 18.8	16 62	49.5	55 08.7	18 60	47.7	54 50.7	22 57	45.2	4
45	55 06.3	01 69	59.2	55 05.2	03 68	57.4	55 00.8	07 67	54.8	54 56.0	09 65	53.1	54 49.7	12 63	51.3	54 41.8	14 62	49.6	54 32.7	17 60	48.0	54 16.2	20 58	45.4	45
6	54 24.6	01 69	59.2	54 24.3	02 68	57.4	54 21.1	05 67	54.9	54 17.1	08 65	53.2	54 11.7	10 63	51.5	54 04.9	13 62	49.8	53 56.6	15 60	48.1	53 41.6	18 58	45.6	6
7	53 43.0	02 69	59.1	53 43.4	00 68	57.5	53 41.4	04 67	54.9	53 38.3	06 65	53.2	53 33.7	09 63	51.6	53 27.8	11 62	49.9	53 20.5	13 60	48.3	53 06.9	17 58	45.7	7
8	53 01.3	03 69	59.1	53 02.5	01 68	57.5	53 01.7	03 67	55.0	52 59.4	05 65	53.3	52 55.7	07 63	51.6	52 50.7	10 62	50.0	52 44.2	12 60	48.3	52 32.1	15 58	45.9	8
9	52 19.5	04 69	59.0	52 21.6	02 68	57.4	52 21.9	02 67	55.0	52 20.4	04 65	53.3	52 17.6	06 64	51.7	52 13.4	08 62	50.1	52 07.9	10 61	48.5	51 57.2	14 58	46.0	9
50	51 38.0	06 69	59.0	51 40.7	03 68	57.4	51 42.0	00 67	55.0	51 41.5	02 65	53.4	51 39.5	04 64	51.8	51 36.2	07 62	50.2	51 31.6	09 61	48.6	51 22.2	12 58	46.2	50
1	50 56.4	07 69	59.0	50 59.8	05 68	57.4	51 02.4	01 66	55.0	51 02.5	01 65	53.4	51 01.4	03 64	51.8	50 58.9	05 62	50.2	50 55.2	06 61	48.7	50 47.1	11 58	46.3	1
2	50 14.8	08 69	58.9	50 18.9	06 68	57.3	50 22.7	03 66	55.0	50 23.6	00 65	53.4	50 23.2	02 64	51.9	50 21.6	04 62	50.3	50 18.7	05 61	48.7	50 12.0	09 59	46.4	2
3	49 33.3	09 69	58.8	49 38.1	07 68	57.2	49 42.9	04 66	54.9	49 44.6	02 65	53.4	49 45.1	00 64	51.9	49 44.3	02 62	50.3	49 42.2	04 61	48.7	49 36.9	07 59	46.4	3
4	48 51.8	10 69	58.7	48 57.3	08 68	57.2	49 02.9	05 66	54.9	49 05.7	04 65	53.3	49 06.9	01 64	51.8	49 06.9	01 63	50.3	49 05.7	03 61	48.8	49 01.7	06 59	46.4	4
55	48 10.4	11 69	58.6	48 16.5	09 68	57.1	48 23.5	06 66	54.8	48 26.7	04 65	53.3	48 28.7	02 64	51.8	48 29.6	00 63	50.3	48 29.2	02 61	48.8	48 26.5	05 59	46.5	55
6	47 29.0	12 69	58.4	47 35.8	10 68	57.0	47 43.8	08 66	54.8	47 47.8	06 65	53.3	47 50.6	04 64	51.8	47 52.2	02 63	50.3	47 52.7	00 61	48.8	47 51.3	03 59	46.6	6
7	46 47.7	13 69	58.3	46 55.1	12 68	56.9	47 04.2	09 66	54.7	47 08.9	07 65	53.2	47 12.5	06 64	51.7	47 14.9	03 62	50.3	47 16.2	01 61	48.8	47 16.0	02 59	46.6	7
8	46 06.4	14 69	58.2	46 14.5	13 68	56.7	46 24.5	11 66	54.6	46 30.0	08 65	53.1	46 34.4	06 63	51.7	46 37.6	04 62	50.2	46 39.7	03 61	48.8	46 40.7	00 59	46.6	8
9	45 25.2	15 69	58.0	45 33.9	14 68	56.6	45 45.1	11 66	54.5	45 51.2	09 65	53.1	45 56.3	08 63	51.6	46 00.3	06 62	50.2	46 03.2	04 61	48.9	46 05.5	01 59	46.6	9
60	44 44.0	17 68	57.9	44 53.4	15 67	56.5	45 05.6	12 66	54.4	45 12.4	11 65	53.0	45 18.2	09 63	51.6	45 23.0	07 62	50.1	45 26.7	05 61	48.7	45 30.2	03 59	46.6	60
1	44 03.0	18 68	57.7	44 13.0	16 67	56.3	44 26.2	13 66	54.3	44 33.7	12 64	52.9	44 40.2	10 63	51.5	44 45.7	08 62	50.1	44 50.2	07 61	48.7	44 55.0	04 59	46.5	1
2	43 22.0	19 68	57.5	43 32.6	17 67	56.2	43 46.8	15 66	54.1	43 55.1	13 64	52.8	44 02.3	11 63	51.4	44 08.5	10 62	50.0	44 13.8	08 61	48.6	44 19.7	05 59	46.4	2
3	42 41.0	20 68	57.3	42 52.3	18 67	56.0	43 07.5	16 65	54.0	43 16.4	14 64	52.6	43 24.4	12 63	51.3	43 31.4	11 62	49.9	43 37.4	09 61	48.5	43 44.5	07 59	46.4	3
4	42 00.2	21 68	57.2	42 12.1	19 67	55.8	42 28.3	17 65	53.8	42 37.9	15 64	52.5	42 46.5	14 63	51.2	42 54.3	12 62	49.8	43 01.0	10 60	48.4	43 09.4	08 59	46.4	4
65	41 19.5	22 68	57.0	41 32.0	20 67	55.7	41 49.1	18 65	53.7	41 59.4	16 64	52.4	42 08.8	15 63	51.0	42 17.2	13 62	49.7	42 24.7	12 60	48.4	42 34.2	09 58	46.3	65
6	40 38.8	23 68	56.8	40 52.0	21 67	55.5	41 10.1	19 65	53.5	41 21.0	18 64	52.2	41 31.1	16 63	50.9	41 40.2	15 62	49.6	41 48.5	13 60	48.3	41 59.1	11 58	46.3	6
7	39 58.3	24 67	56.6	40 12.0	22 66	55.3	40 31.1	20 65	53.4	40 42.7	19 64	52.1	40 53.4	17 63	50.8	41 03.3	16 61	49.5	41 12.3	14 60	48.1	41 24.1	12 58	46.2	7
8	39 17.8	25 67	56.2	39 32.2	23 66	55.1	39 52.2	21 65	53.2	40 04.4	20 64	51.9	40 15.9	18 62	50.6	40 26.2	17 61	49.3	40 36.2	16 60	48.0	40 49.1	13 58	46.1	8
9	38 37.5	26 67	56.1	38 52.4	24 66	54.9	39 13.4	22 65	53.0	39 26.3	21 63	51.7	39 38.4	19 62	50.5	39 49.7	18 61	49.2	40 00.1	17 60	47.9	40 14.2	15 58	46.0	9
70	37 57.2	27 67	55.9	38 12.5	25 66	54.7	38 34.6	23 64	52.8	38 48.2	22 63	51.5	39 01.0	21 62	50.3	39 13.0	19 61	49.0	39 24.2	18 60	47.8	39 39.3	16 58	45.8	70
1	37 17.1	28 67	55.6	37 33.2	26 66	54.4	37 56.0	24 64	52.6	38 10.2	23 63	51.4	38 23.7	22 62	50.1	38 36.4	20 61	48.9	38 48.3	19 60	47.6	39 04.5	17 58	45.7	1
2	36 37.1	28 66	55.3	36 53.8	27 66	54.2	37 17.5	25 64	52.4	37 32.2	24 63	51.2	37 46.3	23 62	49.9	37 59.7	22 61	48.7	38 12.5	20 60	47.5	38 29.8	18 58	45.6	2
3	35 57.2	29 66	55.1	36 14.5	28 65	54.0	36 39.1	26 64	52.2	36 54.7	25 63	51.0	37 09.4	24 62	49.7	37 23.5	23 61	48.5	37 36.7	21 60	47.4	37 55.2	20 57	45.3	3
4	35 17.4	30 66	54.9	35 35.3	29 65	53.7	36 00.9	28 64	51.9	36 17.0	26 63	50.8	36 32.4	25 61	49.5	36 47.1	24 60	48.3	37 01.1	23 59	47.1	37 20.7	21 57	45.3	4
75	34 37.8	31 66	54.6	34 56.2	30 65	53.5	35 22.7	29 63	51.7	35 39.5	27 62	50.5	35 55.5	26 61	49.4	36 10.9	25 60	48.2	36 25.6	24 59	47.0	36 46.2	22 57	45.1	75
6	33 58.3	32 66	54.4	34 17.3	31 65	53.2	34 44.6	30 63	51.5	35 02.0	28 62	50.3	35 18.8	27 61	49.1	35 34.8	26 60	48.0	35 50.2	25 59	46.8	36 11.8	23 57	45.0	6
7	33 18.9	33 65	54.2	33 38.5	32 64	53.0	34 06.7	31 63	51.2	34 24.8	29 62	50.1	34 42.1	28 61	48.9	34 58.8	27 60	47.8	35 14.8	26 59	46.6	35 37.4	24 57	44.8	7
8	32 39.6	34 65	53.6	32 59.8	33 64	52.7	33 28.9	32 63	51.0	33 47.6	31 62	49.9	34 05.6	29 61	48.7	34 23.0	28 60	47.6	34 39.7	27 58	46.4	35 03.0	25 57	44.6	8
9	32 00.5	35 65	53.5	32 21.3	34 64	52.4	32 51.3	33 63	50.7	33 10.5	32 62	49.6	33 29.2	31 60	48.5	33 47.2	29 59	47.3	34 04.6	28 58	46.2	34 29.4	27 57	44.4	9
80	31 21.6	36 65	53.2	31 42.9	35 64	52.1	32 13.8	34 62	50.5	32 33.6	33 61	49.4	32 52.9	32 60	48.2	33 11.6	31 59	47.1	33 29.6	30 58	46.0	33 55.5	28 57	44.2	80
1	30 42.8	37 64	52.9	31 04.6	36 64	51.9	31 36.4	35 62	50.2	31 56.9	34 61	49.1	32 16.8	33 60	48.0	32 36.1	32 59	46.9	32 54.8	31 58	45.7	33 21.7	29 56	44.0	1
2	30 04.1	38 64	52.6	30 26.5	37 63	51.6	30 59.1	36 62	49.9	31 20.3	35 61	48.8	31 40.8	34 60	47.7	32 00.6	33 59	46.6	32 20.1	32 58	45.5	32 48.0	30 56	43.8	2
3	29 25.6	39 64	52.3	29 48.6	38 63	51.3	30 22.1	37 62	49.7	30 43.8	36 61	48.6	31 04.9	35 60	47.5	31 25.3	34 58	46.4	31 45.5	33 57	45.3	32 14.5	31 56	43.6	3
4	28 47.2	40 64	52.0	29 10.8	39 63	51.0	29 45.2	38 61	49.4	30 07.5	37 60	48.3	30 29.2	36 59	47.2	30 50.4	35 58	46.1	31 11.1	34 57	45.0	31 41.0	33 55	43.4	4
85	28 09.1	41 63	51.7	28 33.2	40 62	50.7	29 08.4	39 61	49.1	29 31.3	38 60	48.0	29 53.7	37 59	47.0	30 15.5	36 58	45.9	30 36.8	35 57	44.8	31 07.8	34 55	43.2	85
6	27 31.1	41 63	51.4	27 55.7	41 62	50.4	28 31.8	40 61	48.8	28 55.2	39 59	47.7	29 18.3	38 59	46.7	29 40.7	37 58	45.6	30 02.7	36 57	44.6	30 34.6	35 55	42.9	6
7	26 53.2	42 63	51.0	27 18.4	42 62	50.0	27 55.4	41 60	48.5	28 19.4	40 59	47.4	28 43.0	39 58	46.4	29 06.0	38 57	45.3	29 28.7	37 57	44.3	30 01.6	36 55	42.7	7
8	26 15.5	43 62	50.7	26 41.3	43 61	49.7	27 19.1	41 60	48.2	27 43.7	41 59	47.2	28 07.9	40 58	46.1	28 31.7	39 57	45.1	28 54.9	38 56	44.0	29 28.8	37 54	42.4	8
9	25 38.1	44 62	50.4	26 04.4	43 61	49.4	26 43.0	42 60	47.9	27 08.2	42 59	46.9	27 33.0	41 58	45.8	27 57.4	40 57	44.8	28 21.2	39 56	43.8	28 56.1	38 54	42.2	9
90	25 00.8	45 62	50.0	25 27.6	44 61	49.1	26 07.1	43 60	47.6	26 32.9	43 58	46.6	26 58.3	42 58	45.5	27 23.2	41 57	44.5	27 47.7	40 56	43.5	28 23.6	39 54	41.9	90

Each location cell format: Alt. (° ′), Δd, Δt, Az. (°)

H.A.	46° 00′	47° 00′	48° 30′	49° 30′	50° 30′	51° 30′	52° 30′	54° 00′	H.A.
00	8 00.0 1.00 00 180.0	7 00.0 1.00 00 180.0	5 30.0 1.00 00 180.0						00
1	7 59.7 1.00 01 179.3	6 59.7 1.00 01 179.3	5 29.7 1.00 01 179.3						1
2	7 58.8 1.00 02 178.6	6 58.8 1.00 02 178.6	5 28.9 1.00 02 178.7						2
3	7 57.3 1.00 03 177.9	6 57.4 1.00 03 177.9	5 27.5 1.00 03 178.0						3
4	7 55.2 1.00 04 177.2	6 55.3 1.00 04 177.3	5 25.5 1.00 04 177.3						4
05	7 52.6 1.00 05 176.5	6 52.7 1.00 05 176.6	5 23.0 1.00 05 176.7						05
6	7 49.3 1.00 06 175.8	6 49.5 1.00 06 175.9	5 19.9 1.00 06 176.0						6
7	7 45.5 1.00 07 175.1	6 45.8 1.00 07 175.2	5 16.2 1.00 07 175.3						7
8	7 41.0 99 08 174.4	6 41.4 99 08 174.5	5 12.0 99 08 174.7						8
9	7 36.0 99 09 173.7	6 36.5 99 09 173.8	5 07.2 99 09 174.0						9
10	7 30.4 99 10 173.0	6 31.0 99 10 173.2	5 01.9 99 10 173.4						10
1	7 24.2 99 11 172.3	6 24.9 99 11 172.5							1
2	7 17.4 99 12 171.6	6 18.3 99 12 171.8							2
3	7 10.0 98 13 170.9	6 11.1 98 13 171.1							3
4	7 02.1 98 14 170.3	6 03.3 98 14 170.4							4
15	6 53.6 98 15 169.6	5 55.0 98 15 169.8							15
6	6 44.5 97 16 168.9	5 46.1 97 16 169.1							6
7	6 34.9 97 17 168.2	5 36.6 97 17 168.4							7
8	6 24.7 97 18 167.5	5 26.6 97 18 167.8							8
9	6 13.9 96 19 166.8	5 16.1 96 18 167.1							9
20	6 02.6 96 20 166.2	5 05.0 96 19 166.5							20
1	5 50.7 96 21 165.5								1
2	5 38.3 95 22 164.8								2
3	5 25.3 95 23 164.2								3
4	5 11.8 94 24 163.5								4

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00′	47° 00′	48° 30′	49° 30′	50° 30′	51° 30′	52° 30′	54° 00′	H.A.
91	24 23.6 46 62 49.7	24 51.0 45 61 48.7	25 31.4 44 59 47.2	25 57.8 44 58 46.2	26 23.7 43 57 45.2	26 49.3 42 56 44.2	27 14.4 42 56 43.2	27 51.3 40 54 41.7	91
2	23 46.7 47 61 49.3	24 14.5 46 60 48.4	24 55.8 45 59 46.9	25 22.8 45 58 45.9	25 49.4 44 57 44.9	26 15.5 43 56 43.9	26 41.3 43 55 42.9	27 19.1 41 53 41.4	2
3	23 10.0 48 61 49.0	23 38.5 47 60 48.0	24 20.5 46 59 46.6	24 48.0 46 58 45.6	25 15.2 45 57 44.6	25 42.0 44 56 43.6	26 08.3 44 55 42.6	26 47.1 43 53 41.1	3
4	22 33.5 49 61 48.6	23 02.5 48 60 47.7	23 45.3 47 58 46.2	24 13.4 47 57 45.3	24 41.2 46 56 44.3	25 08.6 45 55 43.3	25 35.5 45 54 42.3	26 15.3 44 53 40.8	4
95	21 57.1 49 60 48.3	22 26.7 49 59 47.3	23 10.4 48 58 45.9	23 39.1 48 57 44.9	24 07.4 47 56 44.0	24 35.4 46 55 43.0	25 03.0 46 54 42.0	25 43.6 45 52 40.5	95
6	21 21.0 50 60 47.9	21 51.1 50 59 47.0	22 35.6 49 58 45.5	23 04.9 48 57 44.6	23 33.8 48 56 43.6	24 02.4 47 55 42.7	24 30.6 47 54 41.7	25 12.2 46 52 40.2	6
7	20 45.1 51 59 47.5	21 15.7 51 59 46.6	22 01.1 50 57 45.2	22 30.9 49 56 44.3	23 00.4 49 55 43.3	23 29.6 48 54 42.4	23 58.4 48 53 41.4	24 40.9 47 52 39.9	7
8	20 09.5 52 59 47.1	20 40.6 52 58 46.2	21 26.7 51 57 44.8	21 57.1 50 56 43.9	22 27.2 50 55 43.0	22 57.0 49 54 42.0	23 26.4 49 53 41.1	24 09.8 48 51 39.6	8
9	19 34.0 53 59 46.7	20 05.7 53 58 45.8	20 52.6 52 56 44.5	21 23.6 51 56 43.5	21 54.2 51 55 42.6	22 24.6 50 54 41.7	22 54.6 50 53 40.7	23 39.0 49 51 39.3	9
100	18 58.8 54 58 46.3	19 31.0 53 57 45.4	20 18.7 53 56 44.1	20 50.2 52 55 43.2	21 21.5 52 54 42.3	21 52.4 51 53 41.3	22 23.0 51 52 40.4	23 08.3 50 51 39.0	100
1	18 23.8 55 58 45.9	18 56.5 54 57 45.1	19 45.1 54 55 43.7	20 17.1 53 55 42.8	20 48.9 53 54 41.9	21 20.4 52 53 41.0	21 51.6 52 52 40.1	22 37.9 51 50 38.7	1
2	17 49.0 55 58 45.5	18 22.2 55 57 44.7	19 11.6 55 55 43.3	19 44.3 54 54 42.4	20 16.6 54 53 41.6	20 48.7 53 53 40.6	21 20.5 53 52 39.7	22 07.5 52 50 38.4	2
3	17 14.5 56 57 45.1	17 48.2 56 56 44.3	18 38.5 55 55 43.0	19 11.6 55 54 42.1	19 44.5 55 53 41.2	20 17.2 54 52 40.3	20 49.6 54 51 39.4	21 37.6 53 50 38.0	3
4	16 40.2 57 57 44.7	17 14.5 57 56 43.9	18 05.5 56 55 42.6	18 39.2 56 54 41.7	19 12.7 56 53 40.8	19 45.9 55 52 39.9	20 18.9 55 51 39.0	21 07.8 54 49 37.7	4
105	16 06.2 58 56 44.3	16 41.0 58 55 43.4	17 32.8 57 54 42.2	18 07.1 57 53 41.3	18 41.1 57 52 40.4	19 14.9 56 51 39.6	19 48.4 56 50 38.7	20 38.2 55 49 37.4	105
6	15 32.4 59 56 43.9	16 07.7 59 55 43.0	17 00.3 58 54 41.8	17 35.1 58 53 40.9	18 09.7 57 52 40.1	18 44.1 57 51 39.2	19 18.2 57 50 38.3	20 08.9 56 48 37.0	6
7	14 58.9 60 55 43.4	15 34.7 60 55 42.6	16 28.1 59 53 41.4	17 03.5 59 52 40.5	17 38.6 58 51 39.7	18 13.5 58 50 38.8	18 48.2 58 50 38.0	19 39.8 57 48 36.6	7
8	14 25.6 61 55 43.0	15 02.0 60 54 42.2	15 56.2 60 53 40.9	16 32.1 60 52 40.1	17 07.8 59 51 39.3	17 43.2 59 50 38.4	18 18.5 59 49 37.6	19 11.0 58 48 36.3	8
9	13 52.7 62 54 42.6	14 29.5 61 54 41.8	15 24.5 61 52 40.5	16 00.9 61 51 39.7	16 37.2 60 51 38.9	17 13.2 60 50 38.0	17 49.0 60 49 37.2	18 42.4 59 47 35.9	9
110	13 20.0 62 54 42.1	13 57.3 62 53 41.3	14 53.1 62 52 40.1	15 30.1 61 51 39.3	16 06.8 61 50 38.5	16 43.4 61 49 37.6	17 19.8 60 48 36.8	18 14.0 60 47 35.6	110
1	12 47.5 63 54 41.7	13 25.4 63 53 40.9	14 22.0 63 51 39.7	14 59.4 62 51 38.9	15 36.8 62 50 38.1	16 13.9 62 49 37.2	16 50.9 61 48 36.4	17 45.9 61 46 35.2	1
2	12 15.4 64 53 41.2	12 53.8 64 53 40.4	13 51.1 63 51 39.3	14 29.1 63 50 38.5	15 07.0 63 49 37.7	15 44.7 63 48 36.8	16 22.2 62 47 36.0	17 18.1 62 46 34.8	2
3	11 43.6 65 53 40.8	12 22.4 65 52 40.0	13 20.5 64 50 38.8	13 59.1 64 50 38.0	14 37.5 64 49 37.2	15 15.7 64 48 36.4	15 53.7 63 47 35.6	16 50.5 63 46 34.4	3
4	11 12.0 66 52 40.3	11 51.4 66 51 39.5	12 50.2 65 50 38.4	13 29.3 65 49 37.6	14 08.2 65 48 36.8	14 47.8 64 47 36.0	15 25.6 64 46 35.2	16 23.2 64 45 34.0	4
115	10 40.8 67 52 39.8	11 20.6 66 51 39.1	12 20.3 66 49 37.9	12 59.8 66 49 37.2	13 39.3 66 48 36.4	14 18.6 65 47 35.6	14 57.7 65 46 34.8	15 56.2 65 45 33.6	115
6	10 09.8 67 51 39.4	10 50.2 67 50 38.6	11 50.6 67 49 37.5	12 30.7 67 48 36.7	13 10.6 67 47 36.0	13 50.5 66 46 35.2	14 30.2 66 45 34.4	15 29.4 66 44 33.2	6
7	9 39.2 68 51 38.9	10 20.1 68 50 38.1	11 21.2 68 48 37.0	12 01.8 68 48 36.3	12 42.3 67 47 35.5	13 22.6 67 46 34.8	14 02.9 67 45 34.0	15 02.9 67 44 32.8	7
8	9 08.9 69 50 38.4	9 50.2 69 49 37.7	10 52.1 69 48 36.6	11 33.2 68 47 35.8	12 14.2 68 46 35.1	12 55.1 68 45 34.3	13 35.9 68 44 33.6	14 36.8 67 43 32.4	8
9	8 38.9 70 49 37.9	9 20.7 70 49 37.2	10 23.3 69 47 36.1	11 05.0 69 47 35.4	11 46.5 69 46 34.6	12 27.9 69 45 33.9	13 09.2 69 44 33.1		9
120	8 09.2 71 49 37.4	8 51.5 71 48 36.7	9 54.9 70 47 35.6	10 37.0 70 46 34.9	11 19.1 70 45 34.2	12 01.0 70 44 33.4	12 42.8 70 43 32.7	13 45.3 69 42 31.6	120
1	7 39.9 71 48 36.9	8 22.7 71 48 36.2	9 26.8 71 46 35.2	10 09.4 71 45 34.3	10 52.0 71 45 33.7	11 34.4 71 44 33.0	12 16.7 71 43 32.4	13 20.0 70 42 31.2	1
2	7 10.9 72 48 36.4	7 54.2 72 47 35.7	8 59.0 72 46 34.7	9 42.1 72 45 34.0	10 25.2 72 44 33.3	11 08.1 71 43 32.6	11 51.0 71 42 31.8	12 55.0 71 41 30.8	2
3	6 42.2 73 47 35.9	7 26.0 73 46 35.2	8 31.6 73 45 34.2	9 15.2 73 44 33.5	9 58.7 72 44 32.8	10 42.8 72 43 32.1	11 25.5 72 42 31.4	12 30.3 72 41 30.3	3
4	6 13.9 74 47 35.4	6 58.2 74 46 34.7	8 04.5 74 45 33.7	8 48.6 73 44 33.0	9 32.6 73 43 32.3	10 16.5 73 42 31.6	11 00.4 73 41 30.9	12 06.0 73 40 29.9	4
125	5 46.0 75 46 34.9	6 30.7 75 45 34.2	7 37.7 74 44 33.2	8 22.3 74 43 32.5	9 06.8 74 42 31.9	9 51.2 74 42 31.2	10 35.6 74 41 30.5	11 42.0 74 40 29.5	125
6	5 18.4 75 46 34.4	6 03.6 75 45 33.7	7 11.3 75 43 32.7	7 56.4 75 43 32.0	8 41.4 75 42 31.4	9 26.3 75 41 30.7	10 11.1 75 40 30.0	11 18.3 74 39 29.0	6
7		5 36.8 76 44 33.2	6 45.2 76 43 32.2	7 30.8 76 42 31.5	8 16.3 76 41 30.9	9 01.7 76 40 30.2	9 47.0 76 40 29.6	10 54.9 75 38 28.6	7
8		5 10.5 77 43 32.7	6 19.6 77 42 31.7	7 05.6 77 41 31.0	7 51.5 77 41 30.4	8 37.4 76 40 29.7	9 23.2 76 39 29.1	10 31.8 76 38 28.1	8
9			5 54.2 77 42 31.2	6 40.7 77 41 30.5	7 27.1 77 40 29.9	8 13.5 77 39 29.3	8 59.8 77 38 28.6	10 09.2 77 37 27.6	9
130			5 29.3 78 41 30.7	6 16.2 78 40 30.0	7 03.1 78 39 29.4	7 50.0 78 39 28.8	8 36.7 78 38 28.1	9 46.8 78 37 27.2	130
1			5 04.7 79 40 30.1	5 52.1 79 40 29.5	6 39.5 79 39 28.9	7 26.8 79 38 28.3	8 14.0 79 37 27.7	9 24.8 79 36 26.7	1
2				5 28.4 80 39 29.0	6 16.2 80 38 28.4	7 04.0 80 37 27.8	7 51.7 79 37 27.2	9 03.1 79 36 26.3	2
3				5 05.1 80 38 28.5	5 53.3 80 38 27.9	6 41.5 80 37 27.3	7 29.7 80 36 26.7	8 41.9 80 35 25.8	3
4					5 30.8 81 37 27.4	6 19.5 81 36 26.8	7 08.1 81 35 26.2	8 20.9 81 34 25.3	4
135					5 08.7 82 36 26.8	5 57.8 82 35 26.3	6 46.9 82 35 25.7	8 00.4 82 34 24.8	135
6						5 36.5 83 35 25.8	6 26.0 82 34 25.2	7 40.2 82 33 24.3	6
7						5 15.6 83 34 25.2	6 05.5 83 34 24.7	7 20.4 83 32 23.8	7
8							5 45.5 84 33 24.2	7 00.9 84 32 23.3	8
9							5 25.8 85 32 23.7	6 41.9 85 31 22.8	9
140							5 06.5 85 31 23.1	6 23.3 85 30 22.3	140
1								6 05.0 86 30 21.8	1
2								5 47.1 87 29 21.3	2
3								5 29.7 87 28 20.8	3
4								5 12.6 88 28 20.3	4

Lat. 36°

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
00	71 30.0	1.00 1	00.0	71 00.0	1.00 1	00.0	70 00.0	1.00 1	00.0	69 30.0	1.00 1	00.0	69 00.0	1.00 1	00.0	68 30.0	1.00 1	00.0	67 00.0	1.00 1	00.0	66 30.0	1.00 1	00.0	00
1	71 29.2	1.00 4	01.8	70 59.3	1.00 4	01.8	69 59.3	1.00 3	01.6	69 29.3	1.00 3	01.6	68 59.4	1.00 3	01.5	68 29.4	1.00 3	01.5	66 59.4	1.00 3	01.3	66 29.5	1.00 3	01.3	1
2	71 26.9	1.00 6	03.7	70 57.0	1.00 6	03.5	69 57.2	1.00 5	03.3	69 27.3	1.00 6	03.1	68 57.4	1.00 5	02.9	68 27.5	1.00 5	02.9	66 57.8	1.00 5	02.6	66 27.8	1.00 4	02.5	2
3	71 23.0	99.09	05.5	70 53.3	99.09	05.3	69 53.8	99.08	04.9	69 24.0	99.08	04.7	68 54.2	99.07	04.5	68 24.4	99.07	04.4	66 55.0	99.06	03.9	66 25.2	99.06	03.8	3
4	71 17.7	98.11	07.3	70 48.1	99.11	07.0	69 49.0	99.10	06.5	69 19.4	99.10	06.3	68 49.7	99.10	06.0	68 20.1	99.09	05.8	66 51.1	99.08	05.2	66 21.4	99.08	05.1	4
05	71 10.8	98.14	09.0	70 41.5	98.13	08.7	69 42.8	98.12	08.1	69 13.4	98.12	07.8	68 44.0	98.12	07.5	68 14.6	98.11	07.3	66 46.1	98.10	06.5	66 16.6	98.10	06.3	05
6	71 02.4	97.16	10.8	70 33.5	97.15	10.4	69 35.3	97.15	09.6	69 06.2	97.14	09.3	68 37.0	97.14	09.0	68 07.8	97.13	08.7	66 40.1	98.12	07.8	66 10.7	98.12	07.5	6
7	70 52.7	96.19	12.5	70 24.0	96.18	12.0	69 26.6	96.17	11.2	68 57.7	96.16	10.8	68 28.9	96.16	10.4	67 59.9	96.15	10.1	66 32.9	97.14	09.1	66 03.8	97.13	08.8	7
8	70 41.5	94.21	14.1	70 13.2	94.20	13.6	69 16.5	95.19	12.7	68 48.0	95.18	12.3	68 19.5	95.18	11.8	67 50.9	95.17	11.4	66 24.7	96.15	10.3	65 55.9	96.15	10.0	8
9	70 29.0	93.23	15.8	70 01.1	93.22	15.2	69 05.2	94.21	14.2	68 37.1	94.20	13.7	68 08.9	94.19	13.2	67 40.7	94.19	12.8	66 15.5	95.17	11.5	65 47.0	95.16	11.2	9
10	70 15.1	91.25	17.4	69 47.8	91.24	16.8	68 52.7	92.23	15.6	68 25.0	92.22	15.1	67 57.3	93.21	14.6	67 29.4	93.21	14.1	66 05.3	94.19	12.7	65 37.2	94.18	12.3	10
1	70 00.0	89.27	18.9	69 33.2	90.26	18.3	68 39.1	91.25	17.0	68 11.8	91.24	16.5	67 44.5	91.23	15.9	67 17.0	92.22	15.4	65 54.1	93.20	13.9	65 26.3	93.20	13.5	1
2	69 43.7	87.29	20.4	69 17.4	88.28	19.7	68 24.3	89.26	18.4	67 57.5	89.25	17.8	67 30.6	90.25	17.2	67 03.6	90.24	16.7	65 42.0	91.22	15.1	65 14.5	92.21	14.6	2
3	69 26.2	86.31	21.8	69 00.4	86.30	21.1	68 08.4	87.28	19.7	67 42.2	88.27	19.1	67 15.8	88.26	18.5	66 49.2	89.26	17.9	65 28.9	90.23	16.2	65 01.9	90.23	15.7	3
4	69 07.6	84.33	23.2	68 42.4	84.32	22.5	67 51.5	85.30	21.0	67 25.8	86.29	20.4	66 59.9	87.28	19.7	66 33.8	87.27	19.1	65 14.9	88.25	17.3	64 48.3	89.24	16.8	4
15	68 47.9	82.34	24.6	68 23.4	82.33	23.8	67 33.6	84.31	22.3	67 08.4	84.31	21.6	66 43.0	85.30	20.9	66 17.5	85.29	20.2	65 00.0	87.26	18.4	64 33.9	87.26	17.8	15
6	68 27.3	79.36	25.8	68 03.3	80.35	25.0	67 14.7	82.33	23.5	66 50.1	82.32	22.8	66 25.3	83.31	22.0	66 00.3	84.30	21.4	64 44.3	85.28	19.4	64 18.6	86.27	18.8	6
7	68 05.6	77.38	27.1	67 42.3	78.36	26.2	66 54.9	80.34	24.6	66 30.9	80.33	23.9	66 06.6	81.32	23.2	65 42.2	82.32	22.4	64 27.7	84.29	20.4	64 02.5	84.28	19.8	7
8	67 43.1	75.39	28.2	67 20.4	76.38	27.4	66 34.2	78.36	25.8	66 10.8	79.35	25.0	65 47.1	79.34	24.2	65 23.2	80.33	23.5	64 10.4	82.30	21.4	63 45.7	82.29	20.8	8
9	67 19.7	73.40	29.4	66 57.6	74.39	28.5	66 12.7	76.37	26.8	65 49.9	77.36	26.0	65 26.8	77.35	25.3	65 03.5	78.34	24.5	63 52.3	80.31	22.4	63 28.1	81.31	21.7	9
20	66 55.5	71.42	30.4	66 34.1	72.41	29.6	65 50.4	74.38	27.9	65 28.2	75.37	27.0	65 05.7	75.36	26.3	64 43.0	76.35	25.5	63 33.4	78.33	23.3	63 09.8	79.32	22.6	20
1	66 30.5	69.43	31.5	66 09.8	70.42	30.6	65 27.4	72.40	28.8	65 05.8	73.39	28.0	64 43.9	73.38	27.2	64 21.7	74.37	26.4	63 13.9	77.34	24.2	62 50.8	77.33	23.5	1
2	66 04.8	66.44	32.4	65 44.7	68.43	31.5	65 03.6	70.41	29.8	64 42.6	70.40	28.9	64 21.3	71.39	28.1	63 59.8	72.38	27.3	62 53.6	75.35	25.1	62 31.1	75.34	24.3	2
3	65 38.4	64.45	33.4	65 19.0	65.44	32.5	64 39.2	67.42	30.7	64 18.8	68.41	29.8	63 58.1	69.40	29.0	63 37.2	70.39	28.2	62 32.8	73.36	25.9	62 10.8	74.35	25.1	3
4	65 11.4	62.46	34.3	64 52.6	63.45	33.3	64 14.1	65.43	31.5	63 54.3	66.42	30.7	63 34.3	67.41	29.8	63 13.9	68.40	29.0	62 11.3	71.37	26.7	61 49.9	72.36	25.9	4
25	64 43.8	60.47	35.1	64 25.7	61.46	34.2	63 48.4	63.44	32.4	63 29.2	64.43	31.5	63 09.6	65.42	30.7	62 50.1	66.41	29.8	61 49.2	69.38	27.4	61 28.4	70.37	26.7	25
6	64 15.6	58.48	35.9	63 58.1	59.47	35.0	63 22.1	61.45	33.2	63 03.6	62.44	32.3	62 44.8	63.43	31.4	62 25.6	64.42	30.6	61 26.5	67.39	28.2	61 06.8	68.38	27.4	6
7	63 46.9	56.49	36.6	63 30.1	57.48	35.7	62 55.3	59.46	33.9	62 37.4	60.44	33.0	62 19.2	61.44	32.2	62 00.7	62.42	31.3	61 03.5	65.40	28.9	60 43.7	66.39	28.1	7
8	63 17.7	53.49	37.3	63 01.5	55.48	36.4	62 28.0	57.46	34.6	62 10.7	58.45	33.7	61 53.1	59.44	32.9	61 35.2	60.43	32.0	60 39.6	63.40	29.6	60 20.5	64.39	28.8	8
9	62 48.0	51.50	38.0	62 32.4	53.49	37.1	62 00.0	55.47	35.3	61 43.5	56.46	34.4	61 26.5	57.45	33.5	61 09.2	58.44	32.7	60 15.4	61.41	30.2	59 56.9	62.40	29.4	9
30	62 17.9	49.51	38.7	62 02.9	51.50	37.7	61 31.9	53.48	35.9	61 15.9	54.47	35.0	60 59.5	55.46	34.2	60 42.6	56.45	33.3	59 50.8	59.42	30.8	59 32.8	60.41	30.0	30
1	61 47.4	47.52	39.3	61 33.0	48.50	38.3	61 03.2	51.48	36.5	60 47.8	52.47	35.6	60 32.0	53.46	34.8	60 15.9	54.45	33.9	59 25.7	57.43	31.4	59 08.3	58.41	30.6	1
2	61 16.5	45.52	39.8	61 02.8	46.51	38.9	60 34.2	49.49	37.1	60 19.3	50.48	36.2	60 04.1	51.47	35.3	59 48.6	52.46	34.5	59 00.2	55.43	32.0	58 43.4	56.42	31.2	2
3	60 45.2	43.53	40.3	60 32.1	44.52	39.4	60 04.7	47.50	37.6	59 50.5	48.49	36.8	59 35.9	49.48	35.9	59 21.0	50.47	35.0	58 34.2	53.44	32.5	58 18.0	54.43	31.7	3
4	60 13.7	41.58	40.8	60 01.1	42.52	39.9	59 34.9	45.50	38.1	59 21.2	46.49	37.3	59 07.2	47.48	36.4	58 52.9	48.47	35.5	58 07.9	52.44	33.1	57 52.3	52.43	32.3	4
35	59 41.8	39.54	41.3	59 29.8	41.53	40.4	59 04.7	43.51	38.6	58 51.7	44.50	37.7	58 38.3	45.49	36.9	58 24.5	46.48	36.0	57 41.3	50.45	33.5	57 26.2	51.44	32.7	35
6	59 09.6	37.54	41.7	58 58.2	39.53	40.8	58 34.3	41.51	39.1	58 21.8	42.50	38.2	58 09.0	43.49	37.3	57 55.8	44.48	36.5	57 14.3	48.46	34.0	56 59.8	49.45	33.2	6
7	58 37.1	35.54	42.2	58 26.3	37.54	41.3	58 03.6	39.52	39.5	57 51.6	40.51	38.6	57 39.4	41.50	37.8	57 26.8	43.49	36.9	56 47.0	46.46	34.5	56 33.1	47.45	33.7	7
8	58 04.4	34.55	42.5	57 54.2	35.54	41.7	57 32.5	37.52	39.9	57 21.2	38.51	39.0	57 09.5	40.50	38.2	56 57.5	41.49	37.4	56 19.4	44.46	34.9	56 06.0	45.45	34.1	8
9	57 31.5	32.55	42.9	57 21.8	33.54	42.0	57 01.3	35.52	40.3	56 50.5	37.52	39.4	56 39.4	38.51	38.5	56 27.9	39.50	37.7	55 51.5	42.47	35.3	55 38.7	43.46	34.5	9
40	56 58.4	30.56	43.2	56 49.2	31.55	42.4	56 29.8	34.53	40.6	56 19.6	35.52	39.8	56 09.0	36.51	38.9	55 58.1	37.50	38.1	55 23.3	40.47	35.7	55 11.1	41.46	34.8	40
1	56 25.0	28.56	43.5	56 16.4	29.55	42.7	55 58.1	32.53	41.0	55 48.4	33.52	40.1	55 38.4	34.51	39.3	55 28.0	35.50	38.4	54 54.9	38.48	36.0	54 43.2	39.47	35.2	1
2	55 51.5	26.56	43.8	55 43.4	28.55	43.0	55 26.2	30.54	41.3	55 17.0	31.53	40.4	55 07.5	32.52	39.6	54 57.7	33.51	38.8	54 26.2	37.48	36.3	54 15.1	38.47	35.5	2
3	55 17.8	25.56	44.1	55 10.2	26.56	43.2	54 54.0	28.54	41.5	54 45.4	29.53	40.7	54 36.5	30.52	39.9	54 27.2	32.51	39.1	53 57.4	35.48	36.7	53 46.8	36.48	35.9	3
4	54 44.0	23.57	44.3	54 36.9	24.56	43.5	54 21.6	26.54	41.8	54 13.7	28.53	41.0	54 05.3	29.52	40.2	53 56.2	30.51	39.4	53 28.3	33.49	36.9	53 18.2	34.48	36.2	4
45	54 10.0	21.57	44.5	54 03.4	22.56	43.7	53 49.3	25.54	42.1	53 41.8	26.53	41.2	53 33.9	27.53	40.4	53 25.6	28.52	39.6	52 59.0	31.49	37.2	52 49.5	32.48	36.4	45
6	53 35.9	20.57	44.7	53 29.8	21.56	43.9	53 16.7	23.55	42.3	53 09.7	24.54	41.5	53 02.3	25.53	40.7	52 54.6	26.52	39.9	52 29.6	29.49	37.5	52 20.6	30.48	36.7	6
7	53 01.7	18.57	44.9	52 56.1	19.56	44.1	52 44.0	21.55	42.5	52 37.5	22.54	41.7	52 30.6	23.53	40.9	52 23.4	24.52	40.1	52 00.0	28.50	37.7	51 51.5	29.49	36.9	7
8	52 27.3	16.57	45.1	52 22.3	17.57	44.3	52 11.2	19.55	42.7	52 05.1	21.54	41.9	51 58.8	22.53	41.1	51 52.1	23.52	40.3	51 30.2	26.50	37.9	51 22.2	27.49	37.2	8
9	51 52.9	15.58	45.2	51 48.3	16.57	44.4	51 38.2	18.56	42.8	51 32.7	19.54	42.1	51 26.8	20.53	41.3	51 20.6	21.53	40.5	51 00.3	24.50	38.1	50 52.8	26.49	37.4	9
50	51 18.4	13.58	45.4	51 14.3	14.57	44.6	51 05.2	16.55	43.0	51 00.1	17.54	42.2	50 54.8	18.54	41.4	50 49.1	19.53	40.7	50 30.2	22.50	38.3	50 23.3	23.49	37.6	50
1	50 43.8	12.58	45.5	50 40.2	13.57	44.7	50 32.0	15.55	43.1	50 27.5	16.55	42.4	50 22.6	17.54	41.6	50 17.4	18.53	40.8	50 00.0	21.50	38.5	49 53.7	22.50	37.8	1
2	50 09.2	10.58	45.6	50 06.0	11.57	44.8	49 58.8	13.56	43.3	49 54.7	14.55	42.5	49 50.3	15.54	41.7	49 45.6	16.53	41.0	49 29.8	19.51	38.7	49 23.9	20.50	37.9	2
3	49 34.5	08.58	45.7	49 31.8	10.57	44.9	49 25.5	12.56	43.4	49 21.9	13.55	42.6	49 18.0	14.54	41.8	49 13.8	15.53	41.1	48 59.4	17.51	38.8	48 54.0	18.50	38.1	3
4	48 59.8	07.58	45.8	48 57.5	08.57	45.0	48 52.1	10.56	43.5	48 49.0	11.55	42.7	48 45.6	12.54	41.9	48 41.8	13.53	41.2	48 28.9	16.51	38.9	48 24.0	17.50	38.2	4
55	48 25.0	05.58	45.8	48 23.0	06.57	45.0	48 18.7	08.56	43.5	48 16.1	09.55	42.8	48 13.1	10.54	42.0	48 09.8	11.53	41.3	47 58.4	14.51	39.1	47 54.0	15.50	38.3	55
6	47 50.2	04.58	45.8	47 48.5	05.57	45.1	47 45.3	07.56	43.6	47 43.1	08.55	42.9	47 40.6	09.54	42.1	47 37.8	10.54	41.4	47 27.7	13.51	39.2	47 23.8	14.50	38.4	6
7	47 15.4	03.58	45.9	47 14.5	04.57	45.1	47 11.8	06.56	43.6	47 10.0	06.55	42.9	47 08.0	07.54	42.2	47 05.7	08.54	41.4	46 57.0	11.51	39.3	46 53.6	12.50	38.5	7
8	46 40.5	01.58	45.9	46 40.1	02.57	45.2	46 37.0	05.56	43.6	46 37.0	05.55	43.0	46 35.3	07.54	42.2	46 33.5	07.54	41.5	46 26.3	09.51	39.3	46 23.4	10.51	38.6	8
9	46 05.7	00.58	45.9	46 05.6	01.57	45.2	46 04.4	02.56	43.7	46 03.9	04.55	43.0	46 02.8	04.54	42.3	46 01.3	05.54	41.5	45 55.5	08.51	39.4	45 53.0	09.51	38.6	9
60	45 30.9	02.58	45.9	45 31.2	01.57	45.1	45 31.0	01.56	43.7	45 30.8	02.55	43.0	45 30.1	03.54	42.3	45 29.1	04.54	41.6	45 24.7	06.51	39.4	45 22.7	07.51	38.7	60
1	44 56.0	03.58	45.8	44 56.8	02.57	45.1	44 57.6	00.56	43.7	44 57.7	00.55	43.0	44 57.4	01.54	42.3	44 56.9	02.54	41.6	44 53.8	05.51	39.5	44 52.3	06.51	38.8	1
2	44 21.2	04.58	45.8	44 22.4	04.57	45.1	44 24.1	01.56	43.7	44 24.5	01.55	43.0	44 24.7	00.54	42.3	44 24.7	01.54	41.6	44 23.0	03.52	39.5	44 21.9	04.51	38.8	2
3	43 46.4	06.58	45.8	43 48.0	05.57	45.1	43 50.6	03.56	43.7	43 51.4	03.55	43.0	43 52.1	02.54	42.3	43 52.4	01.54	41.6	43 52.2	01.51	39.5	43 51.4	03.51	38.8	3
4	43 11.6	07.58	45.7	43 13.7	06.57	45.0	43 17.0	05.56	43.7	43 18.3	04.55	43.0	43 19.4	03.54	42.3	43 20.2	02.54	41.6	43 21.2	00.52	39.5	43 21.0	01.51	38.9	4
65	42 36.9	09.58	45.7	42 39.4	08.57	45.0	42 43.5	06.56	43.6	42 45.3	05.55	42.9	42 46.7	04.54	42.3	42 48.0	04.54	41.6	42 50.3	01.52	39.5	42 50.5	01.51	38.9	65
6	42 02.2	10.58	45.6	42 05.1	09.57	44.9	42 10.1	07.56	43.6	42 12.2	07.55	42.9	42 14.1	06.54	42.2	42 15.8	05.54	41.5	42 19.4	03.51	39.5	42 20.1	02.51	38.8	6
7	41 27.6	11.58	45.4	41 30.8	10.57	44.8	41 36.6	09.56	43.5	41 39.2	08.55	42.8	41 41.5	07.54	42.1	41 43.6	07.54	41.5	41 48.5	04.51	39.5	41 49.6	03.51	38.8	7
8	40 53.0	13.58	45.4	40 56.6	12.57	44.8	41 03.2	10.56	43.4	41 06.2	10.55	42.8	41 08.9	09.54	42.1	41 11.4	08.54	41.4	41 17.6	06.51	39.5	41 19.2	05.51	38.8	8
9	40 18.4	14.57	45.3	40 22.5	13.57	44.7	40 29.9	12.56	43.4	40 33.2	11.55	42.7	40 36.4	10.54	42.0	40 39.3	09.53	41.4	40 46.8	07.51	39.4	40 48.8	06.51	38.8	9
70	39 44.0	15.57	45.2	39 48.4	14.57	44.6	39 56.6	13.55	43.3	40 00.4	12.54	42.6	40 03.9	12.54	42.0	40 07.3	11.53	41.3	40 16.0	09.51	39.4	40 18.4	08.51	38.7	70
1	39 09.5	16.57	45.1	39 14.4	16.57	44.4	39 23.3	14.55	43.2	39 27.5	14.55	42.5	39 31.5	13.54	41.9	39 35.2	12.53	41.2	39 45.2	10.51	39.3	39 48.1	09.50	38.7	1
2	38 35.2	17.57	44.9	38 40.4	17.56	44.4	38 50.2	16.55	43.1	38 54.7	15.54	42.4	38 59.1	14.54	41.8	39 03.3	14.53	41.2	39 14.5	11.51	39.2	39 17.8	11.50	38.6	2
3	38 01.0	19.57	44.8	38 06.5	18.56	44.2	38 17.1	17.55	42.9	38 22.0	16.54	42.3	38 26.8	15.53	41.7	38 31.4	15.53	41.1	38 43.9	13.51	39.2	38 47.6	12.50	38.5	3
4	37 26.8	20.57	44.7	37 32.7	19.56	44.1	37 44.0	18.55	42.8	37 49.4	18.54	42.2	37 54.5	17.54	41.6	37 59.5	16.53	40.9	38 13.2	14.51	39.1	38 17.4	14.50	38.4	4
75	36 52.7	21.57	44.5	36 59.0	21.56	43.9	37 11.1	19.55	42.7	37 16.8	19.54	42.1	37 22.4	18.53	41.5	37 27.7	18.53	40.8	37 42.6	16.51	39.0	37 47.2	15.50	38.3	75
6	36 18.7	23.56	44.4	36 25.4	22.56	43.8	36 38.2	21.55	42.5	36 44.3	21.54	41.9	36 50.3	19.53	41.3	36 56.0	19.53	40.7	37 12.1	17.51	38.9	37 17.1	16.50	38.2	6
7	35 44.8	24.56	44.3	35 51.9	23.56	43.6	36 05.4	22.54	42.4	36 11.9	21.54	41.8	36 18.2	21.53	41.2	36 24.4	20.53	40.6	36 41.7	18.51	38.7	36 47.1	18.50	38.0	7
8	35 11.0	25.56	44.0	35 18.4	24.56	43.4	35 32.8	23.54	42.2	35 39.6	23.54	41.6	35 46.4	22.53	41.0	35 52.9	21.52	40.4	36 11.4	20.50	38.6	36 17.2	19.50	38.0	8
9	34 37.3	26.56	43.8	34 45.1	26.55	43.3	35 00.2	24.54	42.1	35 07.4	24.54	41.5	35 14.5	23.52	40.9	35 21.4	23.52	40.3	35 41.1	21.50	38.5	35 47.3	20.50	37.9	9
80	34 03.8	27.56	43.7	34 11.9	27.55	43.1	34 27.7	26.54	41.9	34 35.3	25.53	41.3	34 42.8	25.53	40.7	34 50.1	24.52	40.1	35 11.0	22.50	38.4	35 17.5	22.49	37.8	80
1	33 30.3	29.56	43.5	33 38.8	28.55	42.9	33 55.2	27.54	41.7	34 03.3	26.53	41.1	34 11.2	26.52	40.6	34 19.0	25.52	39.9	34 40.9	24.50	38.2	34 47.9	23.49	37.6	1
2	32 57.0	30.56	43.3	33 05.9	29.55	42.7	33 23.1	28.54	41.5	33 31.5	28.53	41.0	33 39.7	27.52	40.4	33 47.9	27.52	39.8	34 10.9	25.50	38.1	34 18.3	24.49	37.5	2
3	32 23.8	31.55	43.0	32 33.0	30.55	42.5	32 50.9	29.53	41.4	32 59.7	29.53	40.8	33 08.3	28.52	40.2	33 16.7	28.52	39.6	33 41.0	26.50	37.9	33 48.8	26.49	37.3	3
4	31 50.7	32.55	42.8	32 00.3	32.54	42.3	32 18.9	31.53	41.2	32 28.0	30.53	40.6	32 37.0	30.52	40.0	32 45.8	29.51	39.5	33 11.3	28.49	37.7	33 19.4	27.49	37.2	4
85	31 17.8	33.55	42.6	31 27.7	33.54	42.1	31 47.1	32.53	40.9	31 56.5	31.52	40.4	32 05.8	31.52	39.8	32 15.9	30.51	39.3	32 41.6	29.49	37.6	32 50.2	28.49	37.0	85
6	30 45.0	34.54	42.4	30 55.3	34.54	41.8	31 25.1	33.53	40.7	31 25.1	32.51	40.2	31 34.8	32.51	39.6	31 45.9	32.51	39.1	32 11.9	30.48	37.4	32 21.0	30.48	36.8	6
7	30 12.4	35.54	42.1	30 23.0	35.54	41.6	30 43.7	34.52	40.0	30 53.9	34.52	40.0	31 03.9	33.51	38.9	31 13.8	33.51	38.9	31 42.7	31.49	37.2	31 52.0	31.49	36.7	7
8	29 39.9	37.54	41.9	29 50.8	36.54	41.4	30 12.3	35.52	40.3	30 22.8	35.52	39.7	30 33.2	34.50	39.2	30 43.4	34.50	38.7	31 13.4	33.49	37.0	31 23.1	32.48	36.5	8
9	29 07.5	38.54	41.7	29 18.8	37.53	41.1	29 40.9	36.52	40.1	29 51.8	36.51	39.5	30 02.6	36.51	39.0	30 13.2	35.50	38.4	30 44.2	34.48	36.8	30 54.3	33.48	36.3	9
90	28 35.2	39.58	41.4	28 46.9	38.53	40.9	29 09.8	38.52	39.8	29 21.0	37.51	39.3	29 32.1	37.51	38.8	29 43.1	36.50	38.2	30 15.1	35.48	36.6	30 25.7	34.48	36.1	90

H.A.	54° 30' Alt. Δd Δt Az.	55° 00' Alt. Δd Δt Az.	56° 00' Alt. Δd Δt Az.	56° 30' Alt. Δd Δt Az.	57° 00' Alt. Δd Δt Az.	57° 30' Alt. Δd Δt Az.	59° 00' Alt. Δd Δt Az.	59° 30' Alt. Δd Δt Az.	H.A.
91	28 03.3 40 53 41.1	28 15.3 40 53 40.6	28 38.8 39 51 39.6	28 50.4 38 51 39.0	29 01.8 38 50 38.5	29 13.1 38 50 38.0	29 46.4 36 48 36.4	29 57.2 36 47 35.9	91
2	27 31.5 41 53 40.9	27 43.7 41 52 40.4	28 07.9 40 51 39.3	28 19.9 40 51 38.8	28 31.7 39 50 38.3	28 43.3 39 49 37.8	29 17.6 37 48 36.2	29 28.8 37 47 35.6	2
3	26 59.8 42 52 40.6	27 12.4 42 52 40.1	27 37.3 41 51 39.1	27 49.5 41 50 38.6	28 01.7 40 50 38.0	28 13.7 40 49 37.5	28 49.1 39 47 35.9	29 00.6 38 47 35.4	3
4	26 28.3 43 52 40.3	26 41.2 43 52 39.8	27 06.7 42 51 38.8	27 19.3 42 50 38.3	27 31.8 41 49 37.8	27 44.2 41 49 37.3	28 20.6 40 47 35.7	28 32.5 39 46 35.2	4
95	25 57.0 44 52 40.0	26 10.2 44 51 39.5	26 36.4 43 50 38.5	26 49.4 43 50 38.0	27 02.2 43 49 37.5	27 14.9 42 49 37.0	27 52.4 41 47 35.5	28 04.7 41 46 35.0	95
6	25 25.8 45 52 39.8	25 39.4 45 51 39.3	26 06.3 44 50 38.3	26 19.5 44 49 37.8	26 32.7 44 49 37.3	26 45.8 43 48 36.8	27 24.3 42 47 35.2	27 36.9 42 46 34.7	6
7	24 54.9 46 51 39.5	25 08.8 46 51 39.0	25 36.3 46 50 38.0	25 49.9 45 49 37.5	26 03.4 45 49 37.0	26 16.8 44 48 36.5	26 56.4 43 46 35.0	27 09.4 43 46 34.5	7
8	24 24.1 48 51 39.2	24 38.4 47 50 38.7	25 06.5 47 49 37.7	25 20.4 46 49 37.2	25 34.3 46 48 36.7	25 48.0 46 48 36.2	26 28.6 45 46 34.7	26 42.0 44 45 34.2	8
9	23 53.6 49 51 38.9	24 08.1 48 50 38.4	24 36.9 48 49 37.4	24 51.2 47 48 36.9	25 05.4 47 48 36.4	25 19.4 47 47 36.0	26 01.1 46 46 34.5	26 14.7 45 45 34.0	9
100	23 23.2 50 50 38.5	23 38.1 49 50 38.1	24 07.5 49 49 37.1	24 22.1 48 48 36.6	24 36.6 48 48 36.2	24 51.0 48 47 35.7	25 33.7 47 45 34.2	25 47.7 47 45 33.7	100
1	22 53.1 51 50 38.2	23 08.3 50 49 37.8	23 38.3 50 48 36.8	23 53.3 50 48 36.3	24 08.1 49 47 35.9	24 22.8 49 47 35.4	25 06.5 48 45 33.9	25 20.8 48 44 33.5	1
2	22 23.2 52 50 37.9	22 38.7 51 49 37.4	23 09.4 51 48 36.5	23 24.6 51 47 36.0	23 39.7 50 47 35.6	23 54.8 50 46 35.1	24 39.5 49 45 33.7	24 54.2 49 44 33.2	2
3	21 53.5 53 49 37.6	22 09.3 52 49 37.1	22 40.6 52 48 36.2	22 56.1 52 47 35.7	23 11.6 51 47 35.3	23 27.0 51 46 34.8	24 12.7 50 44 33.4	24 27.7 50 44 32.9	3
4	21 24.0 54 49 37.2	21 40.1 54 48 36.8	22 12.0 53 48 35.9	22 27.9 53 47 35.4	22 43.7 53 46 35.0	22 59.4 52 46 34.5	23 46.1 51 44 33.1	24 01.4 51 43 32.6	4
105	20 54.7 55 48 36.9	21 11.1 55 48 36.5	21 43.7 54 47 35.6	21 59.9 54 46 35.1	22 16.0 54 46 34.6	22 32.0 53 45 34.2	23 19.7 53 44 32.8	23 35.4 52 43 32.3	105
6	20 25.7 56 48 36.6	20 42.4 56 47 36.1	21 15.6 55 46 35.2	21 32.1 55 46 34.8	21 48.5 55 45 34.3	22 04.9 54 45 33.9	22 53.5 54 43 32.5	23 09.5 53 43 32.0	6
7	19 56.9 57 48 36.2	20 13.9 57 47 35.8	20 47.7 56 46 34.9	21 04.5 56 46 34.4	21 21.3 56 45 34.0	21 37.9 55 45 33.6	22 27.5 55 43 32.2	22 43.9 54 42 31.8	7
8	19 28.3 58 47 35.9	19 45.6 58 47 35.4	20 20.1 57 46 34.6	20 37.2 57 45 34.1	20 54.2 57 45 33.7	21 11.2 56 44 33.2	22 01.7 56 43 31.9	22 18.4 55 42 31.4	8
9	19 00.0 59 47 35.5	19 17.6 59 46 35.1	19 52.6 58 45 34.2	20 10.1 58 45 33.8	20 27.4 58 44 33.3	20 44.7 58 44 32.9	21 36.2 57 42 31.6	21 53.2 57 42 31.1	9
110	18 32.0 60 46 35.1	18 49.9 60 46 34.7	19 25.5 59 45 33.9	19 43.2 59 44 33.4	20 00.9 59 44 33.0	20 18.5 59 43 32.6	21 10.9 58 42 31.3	21 28.2 58 41 30.8	110
1	18 04.1 61 46 34.8	18 22.3 61 45 34.3	18 58.6 60 44 33.5	19 16.6 60 44 33.1	19 34.5 60 43 32.7	19 52.5 60 43 32.2	20 45.8 59 41 30.9	21 03.4 59 41 30.5	1
2	17 36.6 62 46 34.4	17 55.1 62 45 34.0	18 31.9 61 44 33.1	18 50.0 61 44 32.7	19 08.5 61 43 32.3	19 26.7 61 43 31.9	20 21.0 60 41 30.6	20 38.9 60 40 30.2	2
3	17 09.3 63 45 34.0	17 28.1 62 45 33.6	18 05.5 62 44 32.8	18 24.1 62 43 32.4	18 42.7 62 43 32.0	19 01.2 62 42 31.5	19 56.4 61 41 30.3	20 14.6 61 40 29.9	3
4	16 42.3 64 45 33.6	17 01.3 63 44 33.2	17 39.3 63 43 32.4	17 58.2 63 43 32.0	18 17.1 63 42 31.6	18 35.9 63 42 31.2	19 32.0 62 40 29.9	19 50.6 62 40 29.5	4
115	16 15.5 65 44 33.2	16 34.9 64 44 32.9	17 13.4 64 43 32.0	17 32.6 64 42 31.6	17 51.8 64 42 31.2	18 10.9 64 41 30.8	19 07.9 63 40 29.6	19 26.8 63 39 29.2	115
6	15 49.1 65 44 32.9	16 08.7 65 43 32.5	16 47.8 65 42 31.7	17 07.3 65 42 31.3	17 26.7 65 41 30.9	17 46.1 65 41 30.5	18 44.0 64 39 29.3	19 03.2 64 39 28.9	6
7	15 22.9 66 43 32.5	15 42.8 66 43 32.1	16 22.5 66 42 31.3	16 42.2 66 41 30.9	17 02.0 66 41 30.5	17 21.7 66 40 30.1	18 20.4 65 39 28.9	18 39.9 65 38 28.5	7
8	14 57.0 67 43 32.1	15 17.2 67 42 31.7	15 57.4 67 41 30.9	16 17.5 67 41 30.5	16 37.5 67 40 30.1	16 57.4 67 40 29.7	17 57.1 66 38 28.6	18 16.9 66 38 28.2	8
9	14 31.4 68 42 31.6	14 51.8 68 42 31.3	15 32.6 68 41 30.5	15 52.9 68 40 30.1	16 13.3 68 40 29.7	16 33.5 68 39 29.4	17 34.0 67 38 28.2	17 54.1 67 38 27.8	9
120	14 06.0 69 42 31.2	14 26.8 69 41 30.9	15 08.1 69 40 30.1	15 28.7 69 40 29.7	15 49.3 69 39 29.4	16 09.9 68 39 29.0	17 11.2 68 38 27.8	17 31.6 68 37 27.4	120
1	13 41.0 70 41 30.8	14 02.0 70 41 30.4	14 43.9 70 40 29.7	15 04.8 70 39 29.3	15 25.7 69 39 29.0	15 46.5 69 38 28.6	16 48.7 69 37 27.5	17 09.4 69 37 27.1	1
2	13 16.3 71 41 30.4	13 37.6 71 40 30.0	14 20.0 71 39 29.3	14 41.2 70 39 28.9	15 02.3 70 38 28.6	15 23.4 70 38 28.2	16 26.5 70 37 27.1	16 47.4 70 36 26.7	2
3	12 51.9 72 40 30.0	13 13.4 72 40 29.6	13 56.4 72 39 28.9	14 17.8 71 38 28.5	14 39.2 71 38 28.2	15 00.6 71 38 27.8	16 04.5 71 36 26.7	16 25.7 71 36 26.3	3
4	12 27.8 73 40 29.5	12 49.6 73 39 29.2	13 33.1 72 38 28.5	13 54.8 72 38 28.1	14 16.5 72 37 27.8	14 38.1 72 37 27.4	15 42.8 72 36 26.3	16 04.3 72 35 26.0	4
125	12 04.0 74 39 29.1	12 26.1 73 39 28.8	13 10.1 73 38 28.1	13 32.1 73 37 27.7	13 54.0 73 37 27.4	14 15.9 73 36 27.0	15 21.4 73 35 25.9	15 42.4 73 35 25.6	125
6	11 40.6 74 39 28.7	12 02.9 74 38 28.3	12 47.4 74 37 27.6	13 09.6 74 37 27.3	13 31.8 74 36 26.9	13 54.0 74 36 26.6	15 00.3 74 35 25.5	15 22.4 73 34 25.2	6
7	11 17.5 75 38 28.2	11 40.0 75 38 27.9	12 25.1 75 37 27.2	12 47.5 75 36 26.9	13 10.0 75 36 26.5	13 32.4 75 35 26.2	14 39.6 74 34 25.2	15 01.9 74 34 24.8	7
8	10 54.7 76 37 27.8	11 17.5 76 37 27.4	12 03.0 76 36 26.8	12 25.8 76 36 26.4	12 48.5 76 35 26.1	13 11.2 76 35 25.8	14 19.1 75 34 24.8	14 41.6 75 33 24.4	8
9	10 32.2 77 37 27.3	10 55.3 77 36 27.0	11 41.3 77 36 26.3	12 04.3 77 35 26.0	12 27.3 77 35 25.7	12 50.2 76 34 25.4	13 58.9 76 33 24.4	14 21.7 76 33 24.0	9
130	10 10.1 78 36 26.9	10 33.4 78 36 26.5	11 19.9 78 35 25.9	11 43.2 77 35 25.6	12 06.4 77 34 25.3	12 29.6 77 34 24.9	13 39.0 77 33 24.0	14 02.1 77 32 23.6	130
1	9 48.3 79 36 26.4	10 11.9 78 35 26.1	10 58.9 78 34 25.5	11 22.4 78 34 25.2	11 45.9 78 34 24.8	12 09.3 78 33 24.5	13 19.5 78 32 23.5	13 42.8 78 32 23.2	1
2	9 26.9 79 35 25.9	9 50.7 79 35 25.6	10 38.2 79 34 25.0	11 01.9 79 34 24.7	11 25.6 79 33 24.4	11 49.3 79 33 24.1	13 00.2 79 32 23.1	13 23.8 79 31 22.8	2
3	9 05.9 80 34 25.5	9 29.9 80 34 25.2	10 17.9 80 33 24.6	10 41.8 80 33 24.3	11 05.8 80 33 23.9	11 29.7 80 32 23.6	12 41.3 80 31 22.7	13 05.2 79 31 22.4	3
4	8 45.2 81 34 25.0	9 09.4 81 34 24.7	9 57.9 81 33 24.1	10 22.1 81 32 23.8	10 46.2 81 32 23.5	11 10.4 81 32 23.2	12 22.8 80 30 22.3	12 46.8 80 30 22.0	4
135	8 24.8 82 33 24.5	8 49.3 82 33 24.2	9 38.2 81 32 23.6	10 02.6 81 32 23.4	10 27.0 81 31 23.1	10 51.4 81 31 22.8	12 04.5 81 30 21.9	12 28.8 81 29 21.6	135
6	8 04.9 82 33 24.0	8 29.6 82 32 23.7	9 18.9 82 32 23.2	9 43.6 82 31 22.9	10 08.2 82 31 22.6	10 32.8 82 31 22.3	11 46.6 82 29 21.4	12 11.2 82 29 21.1	6
7	7 45.4 83 32 23.6	8 10.2 83 32 23.3	9 00.0 83 31 22.7	9 24.9 83 31 22.4	9 49.7 83 30 22.1	10 14.6 83 30 21.9	11 29.0 83 28 21.0	11 53.8 83 28 20.7	7
8	7 26.1 84 31 23.1	7 51.2 84 31 22.8	8 41.4 84 30 22.2	9 06.5 84 30 22.0	9 31.6 84 30 21.7	9 56.7 84 29 21.4	11 11.8 84 28 20.6	11 36.8 83 28 20.3	8
9	7 07.3 84 31 22.6	7 32.6 84 30 22.3	8 23.3 84 30 21.8	8 48.6 84 29 21.5	9 13.9 84 29 21.2	9 39.2 84 29 21.0	10 54.9 84 28 20.1	11 20.2 84 27 19.9	9
140	6 48.8 85 30 22.1	7 14.4 85 30 21.8	8 05.4 85 29 21.3	8 31.0 85 29 21.0	8 56.5 85 28 20.8	9 22.0 85 28 20.5	10 38.4 85 27 19.7	11 03.9 85 27 19.4	140
1	6 30.8 86 29 21.6	6 56.5 86 29 21.3	7 48.0 86 28 20.8	8 13.7 86 28 20.5	8 39.5 86 28 20.3	9 05.2 86 27 20.0	10 22.2 86 26 19.2	10 47.9 86 26 19.0	1
2	6 13.1 87 29 21.1	6 39.1 87 28 20.8	7 31.0 86 28 20.3	7 56.9 86 27 20.1	8 22.8 86 27 19.6	8 48.7 86 27 19.6	10 06.4 86 26 18.8	10 32.3 86 25 18.5	2
3	5 55.8 87 28 20.6	6 22.0 87 28 20.3	7 14.3 87 27 19.8	7 40.4 87 27 19.6	8 06.6 87 26 19.3	8 32.7 87 26 19.1	9 51.0 87 25 18.3	10 17.0 87 25 18.1	3
4	5 39.0 88 27 20.1	6 05.3 88 27 19.8	6 58.0 88 26 19.3	7 24.4 88 26 19.1	7 50.7 88 26 18.9	8 17.0 88 26 18.6	9 35.9 88 25 17.9	10 02.2 88 24 17.6	4
145	5 22.6 88 27 19.5	5 49.1 88 26 19.3	6 42.2 88 26 18.8	7 08.7 88 25 18.6	7 35.2 88 25 18.4	8 01.7 88 25 18.1	9 21.2 88 24 17.4	9 47.6 88 24 17.2	145
6	5 06.5 89 26 19.0	5 33.2 89 26 18.8	6 26.7 89 25 18.3	6 53.4 89 25 18.1	7 20.1 89 24 17.9	7 46.8 89 24 17.7	9 06.8 89 23 17.0	9 33.5 89 23 16.7	6
7		5 17.8 90 25 18.3	6 11.6 90 24 17.8	6 38.5 90 24 17.6	7 05.4 90 24 17.4	7 32.3 90 24 17.2	8 52.8 90 22 16.5	9 19.7 89 22 16.3	7
8		5 02.8 90 24 17.8	5 56.9 90 24 17.3	6 24.0 90 23 17.1	6 51.1 90 23 16.9	7 18.1 90 23 16.7	8 39.3 90 22 16.0	9 06.3 90 22 15.8	8
9			5 42.7 91 23 16.8	6 09.9 91 23 16.6	6 37.2 91 22 16.4	7 04.4 91 22 16.2	8 26.0 91 21 15.6	8 53.2 91 21 15.3	9
150			5 28.8 91 22 16.3	5 56.2 91 22 16.1	6 23.7 91 22 15.9	6 51.1 91 22 15.7	8 13.2 91 21 15.1	8 40.6 91 20 14.9	150
1			5 15.4 92 22 15.8	5 43.0 92 21 15.6	6 10.6 92 21 15.4	6 38.1 92 21 15.2	8 00.8 92 20 14.6	8 28.3 92 20 14.4	1
2			5 02.4 92 21 15.3	5 30.1 92 20 14.9	5 57.9 92 20 14.9	6 25.6 92 20 14.7	7 48.7 92 19 14.1	8 16.4 92 19 13.9	2
3				5 17.7 93 20 14.6	5 45.6 93 20 14.2	6 13.5 93 20 14.2	7 37.1 93 19 13.6	8 05.0 93 18 13.5	3
4				5 05.7 93 19 14.1	5 33.7 93 19 13.9	6 01.8 93 19 13.7	7 25.8 93 18 13.2	7 53.9 93 18 13.0	4
155					5 22.3 94 18 13.4	5 50.5 94 18 13.2	7 15.0 94 17 12.7	7 43.1 94 17 12.5	155
6					5 11.3 94 18 12.9	5 39.6 94 17 12.7	7 04.5 94 17 12.2	7 32.8 94 16 12.0	6
7					5 00.7 95 17 12.3	5 29.2 95 17 12.2	6 54.5 95 16 11.7	7 22.9 95 16 11.5	7
8						5 19.1 95 16 11.7	6 44.5 95 15 11.2	7 13.4 95 15 11.0	8
9						5 09.5 96 15 11.1	6 35.6 96 15 10.7	7 04.3 96 14 10.6	9
160						5 00.4 96 15 10.6	6 26.8 96 14 10.2	6 55.6 96 14 10.1	160
1							6 18.4 96 13 09.7	6 47.4 96 13 09.6	1
2							6 10.4 97 13 09.2	6 39.5 97 12 09.1	2
3							6 02.9 97 12 08.7	6 32.0 97 12 08.6	3
4							5 55.7 97 11 08.2	6 25.0 97 11 08.1	4
165							5 49.0 98 10 07.7	6 18.4 98 10 07.6	165
6							5 42.7 98 10 07.2	6 12.1 98 10 07.1	6
7							5 36.9 98 09 06.7	6 06.4 98 09 06.6	7
8							5 31.4 99 08 06.1	6 01.0 99 08 06.1	8
9							5 26.4 99 08 05.7	5 56.1 99 08 05.6	9
170							5 21.9 99 07 05.2	5 51.6 99 07 05.1	170
1							5 17.7 99 06 04.6	5 47.5 99 06 04.6	1
2							5 14.0 99 05 04.1	5 43.8 99 05 04.1	2
3							5 10.7 1.00 05 03.6	5 40.6 1.00 05 03.6	3
4							5 07.9 1.00 04 03.1	5 37.8 1.00 04 03.1	4
175							5 05.5 1.00 03 02.6	5 35.4 1.00 03 02.5	175
6							5 03.5 1.00 03 02.1	5 33.5 1.00 02 02.0	6
7							5 02.0 1.00 02 01.6	5 31.9 1.00 02 01.5	7
8							5 00.9 1.00 01 01.0	5 30.9 1.00 01 01.0	8
9							5 00.2 1.00 00 00.5	5 30.2 1.00 00 00.5	9
180							5 00.0 1.00 00 00.0	5 30.0 1.00 00 00.0	180

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Lat. 36°

H.A.	60° 00' Alt. (° ' Δd Δt)	60° 00' Az.	60° 30' Alt.	60° 30' Az.	62° 00' Alt.	62° 00' Az.	62° 30' Alt.	62° 30' Az.	68° 00' Alt.	68° 00' Az.	69° 00' Alt.	69° 00' Az.	69° 30' Alt.	69° 30' Az.	74° 30' Alt.	74° 30' Az.	H.A.
00	66 00.0 1.00 1	00.0	65 30.0 1.00 1	00.0	64 00.0 1.00 1	00.0	63 30.0 1.00 1	00.0	63 00.0 1.00 1	00.0	57 00.0 1.00 0	00.0	56 30.0 1.00 0	00.0	51 30.0 1.00 0	00.0	00
1	65 59.5 1.00 3	01.2	65 29.5 1.00 3	01.2	63 59.5 1.00 2	01.1	63 29.6 1.00 2	01.0	62 59.6 1.00 2	01.0	56 59.7 1.00 1	00.7	56 29.7 1.00 1	00.6	51 29.8 1.00 1	00.4	1
2	65 57.9 1.00 4	02.5	65 28.0 1.00 4	02.4	63 58.2 1.00 4	02.1	63 28.2 1.00 4	02.0	62 58.3 1.00 4	02.0	56 58.9 1.00 2	01.3	56 28.9 1.00 2	01.3	51 29.3 1.00 2	00.9	2
3	65 55.3 99 06	03.7	65 25.5 99 06	03.6	63 55.9 1.00 5	03.2	63 26.1 1.00 5	03.1	62 56.2 1.00 5	03.0	56 57.5 1.00 3	02.0	56 27.6 1.00 3	01.9	51 28.4 1.00 2	01.3	3
4	65 51.7 99 08	04.9	65 22.0 99 08	04.7	63 52.8 99 07	04.3	63 23.0 99 07	04.1	62 53.2 99 06	04.0	56 55.5 99 04	02.6	56 25.7 99 04	02.5	51 27.1 1.00 3	01.7	4
05	65 47.0 99 09	06.1	65 17.5 99 09	05.9	63 48.7 99 08	05.3	63 19.1 99 08	05.1	62 49.4 99 08	05.0	56 53.0 99 05	03.3	56 23.3 99 05	03.2	51 25.5 99 03	02.1	05
6	65 41.4 98 11	07.3	65 12.0 98 11	07.0	63 43.8 98 10	06.4	63 14.3 98 10	06.2	62 44.8 98 09	05.9	56 50.0 98 07	03.9	56 20.4 99 06	03.8	51 23.5 99 04	02.6	6
7	65 34.7 97 13	08.5	65 05.6 97 12	08.2	63 37.9 98 11	07.4	63 08.7 98 11	07.2	62 39.4 98 10	06.9	56 46.4 98 07	04.6	56 16.9 98 07	04.4	51 21.1 99 05	03.0	7
8	65 27.1 96 14	09.6	64 58.2 96 14	09.3	63 31.3 97 13	08.4	63 02.5 97 12	08.1	62 33.1 97 12	07.9	56 42.3 98 08	05.2	56 12.9 98 08	05.0	51 18.4 98 05	03.4	8
9	65 18.5 95 16	10.8	64 49.9 95 15	10.4	63 23.7 96 14	09.4	62 54.9 96 14	09.1	62 26.1 96 13	08.8	56 37.6 97 09	05.8	56 08.4 97 08	05.6	51 15.3 98 06	03.8	9
10	65 08.9 94 18	11.9	64 40.6 94 17	11.5	63 15.3 95 15	10.4	62 46.8 95 15	10.1	62 18.2 95 14	09.8	56 32.4 97 10	06.5	56 03.3 97 10	06.3	51 11.9 97 06	04.2	10
1	64 58.4 93 18	13.0	64 30.5 93 18	12.6	63 06.1 94 17	11.4	62 37.9 94 16	11.0	62 09.6 94 16	10.7	56 26.6 96 10	07.1	55 57.8 96 10	06.9	51 08.2 97 07	04.7	1
2	64 47.0 92 20	14.1	64 19.4 92 20	13.7	62 56.1 93 18	12.4	62 28.2 93 17	12.0	62 00.2 93 17	11.6	56 20.4 95 11	07.7	55 51.8 95 11	07.5	51 04.0 96 07	05.1	2
3	64 34.7 91 22	15.2	64 07.5 91 21	14.7	62 45.3 92 19	13.3	62 17.8 92 19	12.9	61 50.1 92 18	12.5	56 13.6 94 12	08.3	55 45.2 95 12	08.0	50 59.6 96 08	05.5	3
4	64 21.6 89 23	16.2	63 54.8 90 23	15.7	62 33.7 91 21	14.3	62 06.5 91 20	13.8	61 39.2 91 19	13.4	56 06.3 94 13	08.9	55 38.2 94 13	08.6	50 54.9 95 09	05.9	4
15	64 07.6 88 25	17.3	63 41.2 88 24	16.7	62 21.4 89 22	15.2	61 54.6 90 21	14.7	61 27.7 90 20	14.2	55 58.5 93 14	09.5	55 30.6 93 13	09.2	50 49.6 94 09	06.3	15
6	63 52.8 86 26	18.3	63 26.9 87 25	17.7	62 08.8 88 23	16.1	61 41.9 88 22	15.6	61 15.4 89 22	15.1	55 50.2 92 15	10.1	55 22.6 92 14	09.8	50 44.1 94 10	06.6	6
7	63 37.2 85 27	19.2	63 11.8 85 26	18.6	61 54.5 86 24	16.9	61 28.5 87 23	16.4	61 02.4 87 23	15.7	55 41.4 91 15	10.7	55 14.1 91 15	10.3	50 38.3 93 10	07.1	7
8	63 20.9 83 28	20.1	62 55.9 84 28	19.5	61 40.0 85 25	17.8	61 14.5 85 25	17.3	60 48.8 86 24	16.7	55 32.2 90 16	11.3	55 05.2 90 16	10.9	50 32.2 92 11	07.5	8
9	63 03.8 81 30	21.1	62 39.3 82 29	20.4	61 24.9 83 26	18.6	60 59.7 84 26	18.1	60 34.5 84 24	17.5	55 22.4 89 17	11.8	54 55.8 89 16	11.4	50 25.7 91 11	07.8	9
20	62 46.4 80 31	21.9	62 22.0 80 30	21.3	61 09.0 82 27	19.4	60 44.4 82 27	18.9	60 19.6 83 26	18.3	55 12.6 88 18	12.4	54 45.9 88 17	12.0	50 18.9 90 12	08.2	20
1	62 27.5 78 32	22.8	62 04.1 79 31	22.2	60 52.6 80 28	20.2	60 28.4 81 27	19.6	60 04.0 81 27	19.0	55 01.6 86 18	12.9	54 35.6 87 18	12.5	50 11.8 89 12	08.6	1
2	62 08.4 76 33	23.6	61 45.5 77 32	22.9	60 35.5 79 29	21.0	60 11.8 79 29	20.4	59 47.9 80 28	19.8	54 50.5 85 19	13.5	54 24.9 85 19	13.0	50 04.4 88 13	09.0	2
3	61 48.6 74 34	24.4	61 26.2 75 33	23.7	60 17.8 77 30	21.7	59 54.6 78 30	21.1	59 31.2 78 29	20.5	54 38.9 84 20	14.0	54 13.8 84 19	13.5	49 56.7 87 13	09.3	3
4	61 28.2 72 35	25.2	61 06.4 73 34	24.5	59 59.5 75 31	22.4	59 36.8 76 30	21.8	59 14.0 77 30	21.2	54 27.0 82 21	14.5	54 02.2 83 20	14.0	49 48.6 86 14	09.7	4
25	61 07.3 71 36	25.9	60 46.0 71 35	25.2	59 40.7 74 32	23.1	59 18.6 74 31	22.5	58 56.2 75 30	21.8	54 14.6 81 21	15.0	53 50.2 82 21	14.5	49 40.3 85 14	10.1	25
6	60 45.8 69 37	26.7	60 25.0 70 36	25.9	59 21.4 72 33	23.8	58 59.7 73 32	23.1	58 37.9 73 31	22.5	54 01.8 80 22	15.5	53 37.8 80 21	15.0	49 31.7 84 15	10.4	6
7	60 23.7 67 38	27.4	60 03.5 68 37	26.6	59 01.5 70 34	24.5	58 40.4 71 33	23.8	58 19.1 71 32	23.1	53 48.6 78 23	16.0	53 25.1 79 22	15.5	49 22.8 83 15	10.7	7
8	60 01.2 65 38	28.0	59 41.6 66 37	27.3	58 41.2 68 35	25.1	58 20.6 69 34	24.4	57 59.8 70 34	23.7	53 35.1 77 23	16.5	53 11.9 77 23	15.9	49 13.6 81 16	11.1	8
9	59 38.1 63 39	28.7	59 19.1 64 38	27.9	58 20.4 66 35	25.7	58 00.3 67 35	25.0	57 40.0 68 34	24.3	53 21.1 75 24	16.9	52 58.4 76 23	16.4	49 04.1 80 16	11.4	9
30	59 14.6 61 40	29.3	58 56.1 62 39	28.5	57 59.1 65 36	26.3	57 39.6 65 35	25.6	57 19.6 66 34	24.9	53 06.8 74 24	17.4	52 44.6 74 24	16.8	48 54.4 79 17	11.7	30
1	58 50.7 59 41	29.9	58 32.8 60 40	29.1	57 37.4 63 37	26.8	57 18.4 64 36	26.1	56 59.2 64 35	25.4	52 52.2 72 25	17.8	52 30.4 73 24	17.2	48 44.4 78 17	12.0	1
2	58 26.3 57 41	30.4	58 09.0 58 40	29.6	57 15.3 61 38	27.4	56 56.8 62 37	26.7	56 38.2 63 36	25.9	52 37.1 71 26	18.2	52 15.8 71 25	17.7	48 34.2 76 18	12.4	2
3	58 01.5 55 42	30.9	57 44.8 56 41	30.2	56 52.7 59 38	27.9	56 34.9 60 37	27.2	56 16.3 61 36	26.4	52 21.8 69 26	18.6	52 00.9 70 25	18.1	48 23.6 75 18	12.7	3
4	57 36.4 54 43	31.5	57 20.2 55 42	30.7	56 29.8 57 39	28.4	56 12.5 58 38	27.7	55 54.4 59 37	26.9	52 06.1 68 27	19.0	51 45.7 68 26	18.4	48 12.9 73 18	13.0	4
35	57 10.9 52 43	31.9	56 55.2 53 42	31.2	56 06.6 55 39	28.9	55 49.8 56 38	28.1	55 32.8 57 38	27.4	51 50.1 66 27	19.4	51 30.2 67 26	18.8	48 01.9 72 19	13.3	35
6	56 45.0 50 44	32.4	56 29.9 51 43	31.6	55 43.0 54 40	29.3	55 26.6 55 39	28.6	55 10.3 55 38	27.9	51 33.8 65 28	19.8	51 14.4 65 27	19.2	47 50.6 71 19	13.5	6
7	56 18.9 48 44	32.9	56 04.3 49 43	32.1	55 19.0 52 40	29.8	55 03.4 53 40	29.0	54 47.4 54 39	28.3	51 17.2 63 28	20.2	50 58.3 63 27	19.6	47 39.2 69 20	13.8	7
8	55 52.4 46 45	33.3	55 38.4 47 44	32.5	54 54.8 50 41	30.2	54 39.7 51 40	29.4	54 24.3 52 39	28.7	51 00.3 61 29	20.5	50 41.9 62 28	19.9	47 27.4 68 20	14.1	8
9	55 25.6 44 45	33.7	55 12.2 45 44	32.9	54 30.2 48 41	30.6	54 15.6 49 40	29.8	54 00.8 50 40	29.1	50 43.2 59 29	20.9	50 25.3 60 28	20.2	47 15.5 66 20	14.3	9
40	54 58.5 42 46	34.1	54 45.7 43 45	33.3	54 05.4 46 42	31.0	53 51.4 47 41	30.2	53 37.1 48 40	29.5	50 25.8 58 29	21.2	50 08.3 58 29	20.6	47 03.4 65 21	14.6	40
1	54 31.2 40 46	34.4	54 18.9 41 45	33.6	53 40.3 44 42	31.3	53 26.8 45 41	30.6	53 13.1 46 40	29.8	50 08.1 56 30	21.5	49 51.2 57 29	20.9	46 51.1 63 21	14.9	1
2	54 03.7 39 46	34.8	53 51.9 40 45	34.0	53 14.9 43 43	31.7	53 02.0 44 42	30.9	52 48.8 44 41	30.2	49 50.2 54 30	21.8	49 33.7 55 29	21.2	46 38.5 62 21	15.1	2
3	53 35.9 37 47	35.1	53 24.7 38 46	34.3	52 49.3 41 43	32.0	52 36.9 42 42	31.2	52 24.3 43 41	30.5	49 32.0 53 31	22.1	49 16.1 53 30	21.5	46 25.8 60 22	15.3	3
4	53 07.9 35 47	35.4	52 57.2 36 46	34.6	52 23.5 39 43	32.3	52 11.6 40 42	31.6	51 59.5 41 42	30.8	49 13.6 51 31	22.4	48 58.2 52 30	21.8	46 12.8 58 22	15.6	4
45	52 39.7 33 47	35.7	52 29.6 34 46	34.9	51 57.4 37 44	32.6	51 46.1 38 43	31.8	51 34.5 39 42	31.1	48 55.0 49 31	22.7	48 40.1 50 30	22.0	45 59.7 57 22	15.8	45
6	52 11.3 31 48	35.9	52 01.7 32 47	35.2	51 31.2 35 44	32.9	51 20.4 36 43	32.1	51 09.4 37 42	31.4	48 36.2 47 32	22.9	48 21.8 48 31	22.3	45 46.4 55 22	16.0	6
7	51 42.7 30 48	36.2	51 33.7 31 47	35.4	51 04.7 34 44	33.1	50 54.5 35 43	32.4	50 44.0 36 43	31.6	48 17.2 46 32	23.2	48 03.3 47 31	22.5	45 33.0 53 23	16.2	7
8	51 14.0 28 48	36.4	51 05.5 29 47	35.6	50 38.1 32 45	33.4	50 28.4 33 44	32.6	50 18.4 34 43	31.9	47 58.1 44 32	23.4	47 44.6 45 31	22.8	45 19.4 52 23	16.4	8
9	50 45.1 26 48	36.6	50 37.1 27 48	35.9	50 11.3 30 45	33.6	50 02.2 31 44	32.9	49 52.7 32 43	32.1	47 38.5 42 33	23.7	47 25.7 43 32	23.0	45 05.6 50 23	16.6	9
50	50 16.1 24 49	36.8	50 08.6 25 48	36.1	49 44.4 28 45	33.8	49 35.8 29 44	33.1	49 26.8 30 43	32.3	47 19.0 41 33	23.9	47 06.7 41 32	23.2	44 51.6 49 24	16.8	50
1	49 47.0 23 49	37.0	49 40.0 24 48	36.2	49 17.3 27 45	34.0	49 09.2 28 44	33.3	49 00.8 28 44	32.5	46 59.2 39 33	24.1	46 47.5 40 32	23.4	44 37.5 47 24	17.0	1
2	49 17.7 21 49	37.2	49 11.2 22 48	36.4	48 50.1 25 46	34.2	48 42.5 26 45	33.5	48 34.6 27 44	32.7	46 39.3 37 33	24.3	46 28.1 38 33	23.6	44 23.3 45 24	17.1	2
3	48 48.3 19 49	37.3	48 42.4 20 48	36.6	48 22.8 24 46	34.4	48 15.7 24 45	33.6	48 08.3 25 44	32.9	46 19.3 35 34	24.5	46 08.6 36 33	23.8	44 08.9 43 24	17.3	3
4	48 18.8 18 49	37.5	48 13.4 19 48	36.7	47 55.3 21 46	34.5	47 48.7 22 45	33.8	47 41.9 23 44	33.1	45 59.1 34 34	24.7	45 48.9 34 33	24.0	43 54.4 42 24	17.5	4
55	47 49.3 16 49	37.6	47 44.3 17 49	36.9	47 27.7 20 46	34.7	47 21.7 21 45	33.9	47 15.3 22 45	33.2	45 38.8 32 34	24.8	45 29.1 33 33	24.2	43 39.8 40 25	17.6	55
6	47 19.6 14 50	37.7	47 15.2 15 49	37.0	47 00.1 18 46	34.8	46 54.5 19 45	34.1	46 48.7 20 45	33.4	45 18.3 30 34	25.0	45 09.2 31 33	24.3	43 25.0 38 25	17.8	6
7	46 49.9 13 50	37.8	46 45.9 14 49	37.1	46 32.3 16 46	34.9	46 27.3 17 46	34.2	46 21.9 18 45	33.5	44 57.9 29 34	25.1	44 49.1 29 34	24.5	43 10.2 37 25	17.9	7
8	46 20.1 11 50	37.9	46 16.6 12 49	37.2	46 04.5 15 46	35.0	46 00.0 16 46	34.3	45 55.1 17 45	33.6	44 37.1 27 35	25.3	44 29.0 27 34	24.6	42 55.2 35 25	18.0	8
9	45 50.3 10 50	38.0	45 47.3 10 49	37.3	45 36.6 13 47	35.1	45 32.6 14 46	34.4	45 28.2 15 45	33.7	44 16.3 25 35	25.4	44 08.7 26 34	24.7	42 40.1 33 25	18.2	9
60	45 20.4 08 50	38.0	45 17.9 09 49	37.3	45 08.7 12 47	35.2	45 05.1 12 46	34.5	45 01.2 13 45	33.8	43 55.5 23 35	25.5	43 48.4 24 34	24.9	42 25.0 32 25	18.3	60
1	44 50.5 06 50	38.1	44 48.4 07 49	37.4	44 40.7 10 47	35.3	44 37.6 11 46	34.6	44 34.2 12 45	33.9	43 34.5 21 35	25.6	43 27.9 22 34	25.0	42 09.7 30 26	18.4	1
2	44 20.5 05 50	38.1	44 18.9 06 49	37.4	44 12.6 08 47	35.3	44 10.0 09 46	34.6	44 07.1 10 45	33.9	43 13.5 19 35	25.8	43 07.4 21 34	25.1	41 54.3 28 26	18.5	2
3	43 50.6 03 50	38.1	43 49.4 04 49	37.5	43 44.5 07 47	35.4	43 42.4 08 46	34.7	43 40.0 09 46	34.0	42 52.3 18 35	25.8	42 46.8 19 34	25.2	41 38.9 26 26	18.6	3
4	43 20.6 02 50	38.2	43 19.9 03 49	37.5	43 16.4 05 47	35.4	43 14.8 06 46	34.7	43 12.9 07 45	34.0	42 31.2 16 35	25.9	42 26.1 17 35	25.2	41 23.4 25 26	18.7	4
65	42 50.6 00 50	38.2	42 50.4 01 49	37.5	42 48.3 04 47	35.4	42 47.1 04 46	34.8	42 45.7 05 45	34.1	42 09.9 15 35	26.0	42 05.4 15 35	25.3	41 07.8 23 26	18.8	65
6	42 20.6 01 50	38.2	42 20.8 00 49	37.5	42 19.8 02 47	35.4	42 18.4 04 45	34.8	42 18.1 04 45	34.1	41 48.5 13 36	26.1	41 44.6 14 35	25.4	40 52.2 21 26	18.8	6
7	41 50.6 03 50	38.2	41 51.3 02 49	37.5	41 51.9 00 47	35.5	41 51.7 01 46	34.8	41 51.2 02 45	34.1	41 27.1 11 36	26.1	41 23.8 12 35	25.5	40 36.5 19 26	18.9	7
8	41 20.6 04 50	38.1	41 21.7 03 49	37.5	41 23.8 01 47	35.5	41 24.0 00 46	34.8	41 24.0 00 45	34.1	41 05.9 10 36	26.2	41 02.9 10 35	25.5	40 20.7 18 26	19.0	8
9	40 50.6 06 50	38.1	40 52.2 05 49	37.4	40 55.6 03 47	35.5	40 56.3 02 46	34.8	40 56.7 01 45	34.1	40 44.5 08 36	26.2	40 42.0 09 35	25.5	40 04.9 16 26	19.0	9
70	40 20.7 07 50	38.1	40 22.7 06 49	37.4	40 27.5 04 47	35.4	40 28.6 03 46	34.8	40 29.5 03 46	34.1	40 23.0 06 36	26.2	40 21.0 07 35	25.6	39 49.1 14 26	19.1	70
1	39 50.9 09 50	38.0	39 53.2 08 49	37.3	39 59.3 06 47	35.4	40 00.9 04 46	34.8	40 02.3 04 46	34.1	40 01.6 05 36	26.3	40 01.0 05 36	25.6	39 33.3 12 27	19.1	1
2	39 20.9 10 50	37.9	39 23.8 09 49	37.3	39 31.2 07 47	35.4	39 33.3 06 46	34.7	39 35.1 06 46	34.0	39 40.1 03 36	26.3	39 39.1 04 35	25.6	39 17.3 11 27	19.2	2
3	38 51.1 11 50	37.9	38 54.4 11 49	37.2	39 03.1 09 47	35.3	39 05.6 08 46	34.7	39 07.9 07 46	34.0	39 18.6 01 36	26.3	39 18.1 04 35	25.6	39 01.3 09 27	19.2	3
4	38 21.3 13 50	37.8	38 25.1 12 49	37.2	38 35.1 10 47	35.3	38 38.0 09 46	34.6	38 40.7 09 45	34.0	38 57.1 00 36	26.3	38 57.1 00 35	25.7	38 45.3 07 27	19.2	4
75	37 51.6 14 49	37.7	37 55.8 14 49	37.1	38 07.1 12 47	35.2	38 10.5 11 46	34.6	38 13.6 10 45	33.9	38 35.6 02 36	26.3	38 36.1 01 35	25.6	38 29.3 06 27	19.3	75
6	37 21.9 16 49	37.6	37 26.5 15 49	37.0	37 39.1 13 46	35.1	37 42.9 12 46	34.5	37 46.6 12 45	33.9	38 14.1 04 36	26.3	38 15.0 03 35	25.6	38 13.3 04 27	19.3	6
7	36 52.3 17 49	37.5	36 57.3 16 49	36.9	37 11.2 14 46	35.0	37 15.5 14 46	34.4	37 19.5 13 45	33.8	37 52.6 05 36	26.3	37 54.0 04 35	25.6	37 57.3 02 27	19.3	7
8	36 22.8 18 49	37.4	36 28.2 18 48	36.8	36 43.4 16 46	35.0	36 48.1 15 46	34.3	36 52.6 15 45	33.7	37 31.0 07 36	26.2	37 33.1 05 35	25.6	37 41.3 01 27	19.3	8
9	35 53.4 20 49	37.3	35 59.2 19 48	36.7	36 15.6 17 46	34.9	36 20.7 17 45	34.2	36 25.6 16 45	33.6	37 09.7 08 36	26.2	37 12.1 06 35	25.6	37 25.2 01 27	19.3	9
80	35 24.0 21 49	37.2	35 30.2 21 48	36.6	35 47.9 19 46	34.8	35 53.3 18 45	34.1	35 58.8 18 45	33.5	36 48.3 10 36	26.2	36 51.2 09 35	25.5	37 09.2 03 27	19.3	80
1	34 54.7 22 49	37.0	35 01.4 22 48	36.4	35 20.3 20 46	34.6	35 26.2 20 45	34.0	35 32.0 19 44	33.4	36 26.9 11 36	26.1	36 30.3 11 35	25.5	36 53.2 04 27	19.3	1
2	34 25.5 24 48	36.9	34 32.6 23 48	36.3	34 52.7 22 46	34.5	34 59.1 21 45	33.9	35 05.3 20 44	33.3	36 05.4 13 36	26.1	36 09.4 13 35	25.4	36 37.2 06 27	19.3	2
3	33 56.4 25 48	36.7	34 03.9 25 48	36.2	34 25.3 24 46	34.4	34 32.1 22 45	33.8	34 38.7 22 44	33.2	35 44.3 15 35	26.0	35 48.6 14 35	25.4	36 21.2 08 27	19.2	3
4	33 27.5 26 48	36.6	33 35.3 26 47	36.0	33 57.9 24 45	34.3	34 05.1 24 45	33.7	34 12.1 23 44	33.1	35 23.0 16 35	25.9	35 27.8 16 35	25.3	36 05.2 09 27	19.2	4
85	32 58.6 28 48	36.3	33 06.8 27 47	35.9	33 30.6 26 45	34.1	33 38.2 25 45	33.5	33 45.7 24 44	33.0	35 01.8 18 35	25.8	35 07.1 17 34	25.2	35 49.2 11 27	19.2	85
6	32 29.8 29 48	36.2	32 38.5 29 47	35.7	33 03.4 27 45	34.0	33 11.5 26 44	33.4	33 19.3 26 44	32.8	34 40.7 19 35	25.8	34 46.4 19 34	25.1	35 33.3 12 26	19.1	6
7	32 01.2 30 48	36.1	32 10.2 30 47	35.5	32 36.4 28 45	33.8	32 44.8 28 44	33.2	32 53.1 27 44	32.7	34 19.6 21 35	25.7	34 25.8 20 34	25.1	35 17.4 14 26	19.1	7
8	31 32.6 32 47	35.9	31 42.1 31 47	35.3	32 09.4 30 45	33.7	32 18.2 29 44	33.1	32 26.9 29 43	32.5	33 58.6 22 35	25.6	34 05.2 22 34	25.0	35 01.6 16 26	19.0	8
9	31 04.2 33 47	35.7	31 14.2 32 46	35.2	31 42.6 31 45	33.5	31 51.8 30 44	32.9	32 00.9 30 43	32.4	33 37.7 24 35	25.5	33 44.7 23 34	24.9	34 45.8 17 26	19.0	9
90	30 36.0 34 47	35.5	30 46.2 34 46	35.0	31 15.8 32 44	33.3	31 25.5 32 44	32.8	31 34.9 31 43	32.2	33 16.9 25 35	25.4	33 24.3 25 34	24.8	34 30.0 19 26	18.9	90

H.A.	60° 00' Alt. (° ' Δd Δt)	Az. °	60° 30' Alt.	Az.	62° 00' Alt.	Az.	62° 30' Alt.	Az.	63° 00' Alt.	Az.	69° 00' Alt.	Az.	69° 30' Alt.	Az.	74° 30' Alt.	Az.	H.A.
91	30 07.9 85 47	35.3	30 18.4 35 46	34.8	30 49.2 34 44	33.1	30 59.3 33 43	32.6	31 09.1 33 43	32.0	32 56.1 27 34	25.3	33 04.0 26 34	24.7	34 14.3 21 26	18.9	91
2	29 39.9 37 46	35.1	29 50.8 38 46	34.6	30 22.8 35 44	32.9	30 33.2 34 43	32.4	30 43.4 34 43	31.9	32 35.4 28 34	25.2	32 43.8 28 34	24.6	33 58.6 22 26	18.8	2
3	29 12.0 38 46	34.9	29 23.3 37 46	34.4	29 56.5 36 44	32.7	30 07.2 36 43	32.2	30 17.9 36 43	31.7	32 14.8 30 34	25.0	32 23.3 29 33	24.5	33 43.0 24 26	18.7	3
4	28 44.3 39 46	34.7	28 56.0 39 45	34.1	29 30.3 37 43	32.6	29 41.4 37 43	32.0	29 52.5 37 42	31.5	31 54.3 31 34	24.9	32 03.6 31 33	24.3	33 27.5 25 26	18.6	4
95	28 16.8 40 46	34.4	28 28.8 40 45	33.9	29 04.2 39 43	32.4	29 15.8 38 43	31.8	29 27.2 38 42	31.3	31 33.9 32 34	24.8	31 43.6 32 33	24.2	33 12.0 27 26	18.6	95
6	27 49.4 42 45	34.2	28 01.8 41 45	33.7	28 38.3 40 43	32.1	28 50.2 40 42	31.6	29 02.0 39 42	31.1	31 13.7 34 34	24.6	31 23.7 33 33	24.1	32 56.6 28 26	18.5	6
7	27 22.2 43 45	34.0	27 35.0 42 44	33.5	28 12.6 41 43	31.9	28 24.9 41 42	31.4	28 37.0 40 41	30.9	30 53.5 35 33	24.5	31 04.0 35 33	23.9	32 41.3 30 25	18.4	7
8	26 55.2 44 45	33.7	27 08.3 44 44	33.2	27 47.0 42 42	31.7	27 59.7 42 42	31.2	28 12.2 42 41	30.7	30 33.4 37 33	24.3	30 44.4 36 33	23.8	32 26.0 31 25	18.3	8
9	26 28.3 45 44	33.5	26 41.8 45 44	33.0	27 21.6 44 42	31.5	27 34.6 43 42	31.0	27 47.5 43 41	30.5	30 13.5 38 33	24.2	30 24.8 38 32	23.6	32 10.8 33 25	18.2	9
100	26 01.6 46 44	33.2	26 15.4 46 44	32.7	26 56.3 45 42	31.2	27 09.7 45 41	30.7	27 23.0 44 41	30.2	29 53.7 39 33	24.0	30 05.4 39 32	23.5	31 55.7 34 25	18.1	100
1	25 35.1 47 44	33.0	25 49.3 47 43	32.5	26 31.2 46 42	31.0	26 45.0 46 41	30.5	26 58.6 45 40	30.0	29 34.0 41 33	23.9	29 46.1 40 32	23.3	31 40.7 36 25	18.0	1
2	25 08.8 49 44	32.7	25 23.3 48 43	32.2	26 06.3 47 41	30.8	26 20.4 47 41	30.3	26 34.5 47 40	29.8	29 14.4 42 32	23.7	29 27.0 42 32	23.2	31 25.8 37 25	17.8	2
3	24 42.7 50 43	32.4	24 57.5 49 43	32.0	25 41.6 48 41	30.5	25 56.1 48 40	30.0	26 10.4 48 40	29.5	28 55.0 43 32	23.5	29 07.9 43 31	23.0	31 11.0 39 25	17.7	3
4	24 16.7 51 43	32.2	24 31.9 51 42	31.7	25 17.0 50 41	30.3	25 31.9 49 40	29.8	25 46.6 49 39	29.3	28 35.7 45 32	23.3	28 49.0 44 31	22.9	30 56.3 40 24	17.6	4
105	23 51.0 52 43	31.9	24 06.5 52 42	31.4	24 52.7 51 40	30.0	25 07.9 50 40	29.5	25 23.0 50 39	29.0	28 16.5 46 32	23.1	28 30.3 46 31	22.6	30 41.6 42 24	17.5	105
6	23 25.5 53 42	31.6	23 41.9 53 42	31.1	24 28.5 52 40	29.7	24 44.0 52 39	29.3	24 59.5 51 39	28.8	27 57.5 47 31	23.0	28 11.7 47 31	22.5	30 27.1 43 24	17.3	6
7	23 00.1 54 42	31.3	23 16.4 54 41	30.8	24 04.5 53 40	29.5	24 20.4 53 39	29.0	24 36.2 53 38	28.5	27 38.6 49 31	22.8	27 53.2 48 30	22.3	30 12.7 45 24	17.2	7
8	22 35.0 55 41	31.0	22 51.6 55 41	30.5	23 40.8 54 39	29.2	23 57.0 54 39	28.7	24 13.1 54 38	28.3	27 19.9 50 31	22.6	27 34.9 50 30	22.1	29 58.4 46 24	17.1	8
9	22 10.1 56 41	30.7	22 27.0 56 41	30.3	23 17.2 55 39	28.9	23 33.8 55 38	28.4	23 50.2 55 38	28.0	27 01.4 51 31	22.4	27 16.7 51 30	21.9	29 44.2 47 23	16.9	9
110	21 45.5 57 41	30.4	22 02.7 57 40	29.9	22 53.8 56 39	28.6	23 10.7 56 38	28.2	23 27.6 56 37	27.7	26 43.0 53 30	22.1	26 58.7 52 30	21.7	29 30.2 49 23	16.8	110
1	21 21.0 59 40	30.1	21 38.6 58 40	29.6	22 30.7 58 38	28.3	22 47.9 57 38	27.9	23 05.1 57 37	27.4	26 24.8 54 30	21.9	26 40.9 53 29	21.5	29 16.2 50 23	16.6	1
2	20 56.8 60 40	29.8	21 14.7 59 39	29.3	22 07.8 59 38	28.0	22 25.3 58 37	27.6	22 42.8 58 37	27.2	26 06.8 55 30	21.7	26 23.2 55 29	21.3	29 02.4 51 23	16.5	2
3	20 32.8 61 40	29.4	20 51.0 60 39	29.0	21 45.1 60 37	27.7	22 03.0 60 37	27.3	22 20.8 59 36	26.9	25 48.9 56 30	21.5	26 05.7 56 29	21.0	28 48.7 53 23	16.3	3
4	20 09.1 62 39	29.1	20 27.6 61 39	28.7	21 22.6 61 37	27.4	21 40.8 61 37	27.0	21 59.0 60 36	26.7	25 31.2 57 29	21.3	25 48.4 57 29	20.8	28 35.1 54 22	16.1	4
115	19 45.6 63 39	28.8	20 04.4 62 38	28.4	21 00.4 62 37	27.1	21 18.9 62 36	26.7	21 37.4 61 36	26.3	25 13.7 59 29	21.0	25 31.2 58 28	20.6	28 21.7 55 22	16.0	115
6	19 22.4 64 38	28.4	19 41.4 64 38	28.0	20 38.4 63 36	26.8	20 57.2 63 36	26.4	21 16.0 63 35	26.0	24 56.3 60 29	20.8	25 14.2 59 28	20.4	28 08.4 57 22	15.8	6
7	18 59.4 65 38	28.1	19 18.8 65 37	27.7	20 16.6 64 36	26.5	20 35.8 64 35	26.1	20 54.9 64 35	25.7	24 39.2 61 28	20.6	24 57.4 61 28	20.1	27 55.3 58 22	15.6	7
8	18 36.6 66 37	27.8	18 56.3 66 37	27.4	19 55.1 65 35	26.2	20 14.6 65 35	25.8	20 34.0 65 34	25.3	24 22.2 62 28	20.3	24 40.8 62 27	19.9	27 42.3 59 21	15.5	8
9	18 14.1 67 37	27.4	18 34.1 67 37	27.0	19 33.8 66 35	25.8	19 53.6 66 35	25.4	20 13.3 66 34	25.0	24 05.5 63 28	20.1	24 24.6 63 27	19.7	27 29.4 60 21	15.3	9
120	17 51.9 68 37	27.1	18 12.2 68 36	26.7	19 12.8 67 35	25.5	19 32.9 67 34	25.1	19 52.9 67 34	24.7	23 48.9 64 27	19.8	24 08.1 64 27	19.4	27 16.7 62 21	15.1	120
1	17 30.0 69 36	26.7	17 50.6 69 36	26.3	18 52.0 68 34	25.2	19 12.4 68 34	24.8	19 32.7 68 33	24.4	23 32.5 65 27	19.6	23 52.1 65 26	19.2	27 04.1 63 21	14.9	1
2	17 08.3 70 36	26.3	17 29.2 69 35	26.0	18 31.5 69 34	24.8	18 52.2 69 33	24.4	19 12.8 69 33	24.1	23 16.4 66 27	19.3	23 36.3 66 26	18.9	26 51.7 64 20	14.7	2
3	16 46.9 71 35	26.0	17 08.0 70 35	25.6	18 11.2 70 33	24.5	18 32.2 70 33	24.1	18 53.1 70 32	23.7	23 00.4 68 26	19.1	23 20.6 67 26	18.7	26 39.5 65 20	14.5	3
4	16 25.8 71 35	25.6	16 47.2 71 34	25.2	17 51.3 71 33	24.1	18 12.5 71 32	23.8	18 33.7 71 32	23.4	22 44.7 69 26	18.8	23 05.2 68 26	18.4	26 27.4 66 20	14.3	4
125	16 04.9 72 34	25.2	16 26.7 72 34	24.9	17 31.5 72 32	23.8	17 53.1 72 32	23.4	18 14.6 72 31	23.1	22 29.1 70 26	18.5	22 50.0 69 25	18.1	26 15.4 67 20	14.1	125
6	15 44.3 73 34	24.9	16 06.4 73 33	24.5	17 12.1 73 32	23.4	17 33.9 73 31	23.1	17 55.7 73 31	22.7	22 13.8 71 25	18.3	22 35.0 71 25	17.9	26 03.7 68 19	13.9	6
7	15 24.1 74 33	24.5	15 46.4 74 33	24.1	16 52.9 74 31	23.1	17 15.1 74 31	22.7	17 37.1 74 31	22.4	21 58.7 72 25	18.0	22 20.2 72 24	17.6	25 52.1 70 19	13.7	7
8	15 04.2 75 33	24.1	15 26.7 76 32	23.7	16 34.1 75 31	22.7	16 56.4 75 31	22.4	17 18.8 74 30	22.0	21 43.9 73 24	17.7	22 05.7 73 24	17.3	25 40.6 71 19	13.5	8
9	14 44.5 76 32	23.7	15 07.3 76 32	23.4	16 15.5 76 30	22.3	16 38.1 76 30	22.0	17 00.7 75 30	21.7	21 29.2 74 24	17.4	21 51.3 74 24	17.1	25 29.4 72 18	13.3	9
130	14 25.2 77 32	23.3	14 48.2 77 31	23.0	15 57.2 76 30	22.0	16 20.1 76 30	21.6	16 43.0 76 29	21.3	21 14.8 75 24	17.1	21 37.3 75 23	16.8	25 18.3 73 18	13.1	130
1	14 06.1 78 31	22.9	14 29.4 78 31	22.6	15 39.2 77 30	21.6	16 02.3 77 29	21.3	16 25.5 77 29	20.9	21 00.6 76 23	16.8	21 23.3 75 23	16.5	25 07.4 74 18	12.9	1
2	13 47.4 79 31	22.5	14 11.0 78 30	22.2	15 21.4 78 29	21.2	15 44.9 78 29	20.9	16 08.3 78 28	20.6	20 46.7 77 23	16.5	21 09.6 76 22	16.2	24 56.7 75 18	12.7	2
3	13 29.0 79 30	22.1	13 52.8 79 30	21.8	15 04.0 79 28	20.8	15 27.7 79 28	20.5	15 51.4 79 28	20.2	20 33.0 78 22	16.3	20 56.2 77 22	15.9	24 46.1 76 17	12.4	3
4	13 10.9 80 30	21.7	13 36.7 80 29	21.4	14 46.9 80 28	20.4	15 10.9 80 28	20.1	15 34.8 80 27	19.8	20 19.5 79 22	16.0	20 43.0 78 22	15.6	24 35.7 77 17	12.2	4
135	12 53.1 81 29	21.3	13 17.4 81 29	21.0	14 30.1 81 27	20.1	14 54.3 81 27	19.7	15 18.5 81 27	19.4	20 06.3 79 22	15.7	20 30.1 79 21	15.3	24 25.6 78 17	12.0	135
6	12 35.7 82 29	20.8	13 00.2 82 28	20.6	14 13.6 81 27	19.7	14 38.1 81 27	19.4	15 02.5 81 26	19.1	19 53.3 80 21	15.4	20 17.3 80 21	15.0	24 15.6 79 16	11.7	6
7	12 18.6 83 28	20.4	12 43.3 82 28	20.1	13 57.5 82 26	19.3	14 22.1 82 26	19.0	14 46.8 82 26	18.7	19 40.6 81 21	15.0	20 04.9 81 20	14.7	24 05.8 80 16	11.5	7
8	12 01.8 83 27	20.0	12 26.8 83 27	19.7	13 41.6 83 26	18.9	14 06.5 83 26	18.6	14 31.4 83 25	18.3	19 28.1 82 20	14.7	19 52.7 82 20	14.4	23 56.2 81 16	11.3	8
9	11 45.4 84 27	19.6	12 10.6 84 26	19.3	13 26.1 84 25	18.5	13 51.2 84 25	18.2	14 16.3 84 25	17.9	19 15.9 83 20	14.4	19 40.7 83 20	14.1	23 46.9 81 16	11.0	9
140	11 29.3 85 26	19.1	11 54.7 85 25	18.9	13 10.9 85 25	18.1	13 36.2 84 24	17.8	14 01.6 84 24	17.5	19 03.9 84 20	14.1	19 29.0 83 19	13.8	23 37.6 82 15	10.8	140
1	11 13.5 85 26	18.7	11 39.2 85 25	18.4	12 56.0 85 24	17.6	13 21.6 85 24	17.4	13 47.1 85 24	17.1	18 52.2 84 19	13.8	19 17.5 84 19	13.5	23 28.6 83 15	10.6	1
2	10 58.1 86 25	18.3	11 24.0 86 25	18.0	12 41.4 86 24	17.2	13 07.2 86 23	17.0	13 33.0 86 23	16.7	18 40.8 85 19	13.5	19 06.3 85 18	13.2	23 19.8 84 14	10.3	2
3	10 43.1 87 24	17.8	11 09.2 87 24	17.6	12 27.2 87 23	16.8	12 53.2 87 23	16.6	13 19.2 87 22	16.3	18 29.6 86 18	13.1	18 55.4 86 18	12.9	23 11.3 85 14	10.1	3
4	10 28.4 88 24	17.4	10 54.7 88 24	17.1	12 13.4 87 23	16.4	12 39.6 87 22	16.2	13 05.7 87 22	15.9	18 18.7 87 18	12.8	18 44.7 86 17	12.6	23 02.9 86 14	09.8	4
145	10 14.1 88 23	16.9	10 40.5 88 23	16.7	11 59.8 88 22	16.0	12 26.2 88 22	15.7	12 52.6 88 21	15.5	18 08.1 87 17	12.5	18 34.2 87 17	12.2	22 54.7 86 13	09.6	145
6	10 00.1 89 23	16.5	10 26.8 89 22	16.3	11 46.6 89 21	15.6	12 13.2 89 21	15.3	12 39.8 89 21	15.1	17 57.7 88 17	12.2	18 24.1 88 16	11.9	22 46.7 87 13	09.3	6
7	9 46.5 89 22	16.0	10 13.4 89 22	15.8	11 33.8 89 21	15.1	12 00.6 89 21	14.9	12 27.4 89 20	14.7	17 47.6 89 16	11.8	18 14.2 89 16	11.6	22 38.9 88 13	09.1	7
8	9 33.3 90 21	15.6	10 00.3 90 21	15.4	11 21.3 90 20	14.7	11 48.3 90 20	14.5	12 15.2 90 20	14.3	17 37.8 89 16	11.5	18 04.6 89 16	11.3	22 31.4 89 12	08.8	8
9	9 20.4 91 21	15.1	9 47.6 91 20	14.9	11 09.2 91 20	14.3	11 36.3 91 19	14.1	12 03.5 90 19	13.8	17 28.3 90 15	11.2	17 55.3 90 15	10.9	22 24.1 89 12	08.6	9
150	9 08.0 91 20	14.7	9 35.3 91 20	14.5	10 57.4 91 19	13.8	11 24.7 91 19	13.6	11 52.0 91 18	13.4	17 19.0 91 15	10.8	17 46.2 91 15	10.6	22 16.9 90 12	08.3	150
1	8 55.9 92 20	14.2	9 23.4 92 19	14.0	10 45.9 92 18	13.4	11 13.4 92 18	13.2	11 40.9 92 18	13.0	17 09.8 91 15	10.5	17 37.4 91 14	10.3	22 10.0 91 11	08.0	1
2	8 44.1 92 19	13.7	9 11.8 92 18	13.5	10 34.9 92 18	13.0	11 02.5 92 18	12.8	11 30.2 92 17	12.6	17 01.4 92 14	10.1	17 28.9 92 14	09.9	22 03.4 91 11	07.8	2
3	8 32.8 93 18	13.3	9 00.7 93 18	13.1	10 24.2 93 17	12.5	10 52.0 93 17	12.3	11 19.8 93 17	12.1	16 53.0 92 14	09.8	17 20.7 92 13	09.6	21 56.9 92 10	07.5	3
4	8 21.9 93 18	12.8	8 49.9 93 17	12.6	10 13.8 93 17	12.1	10 41.8 93 16	11.9	11 09.8 93 16	11.7	16 44.9 93 13	09.4	17 12.7 93 13	09.2	21 50.7 92 10	07.3	4
155	8 11.3 94 17	12.3	8 39.5 94 17	12.2	10 03.9 94 16	11.6	10 32.0 94 16	11.4	11 00.1 94 16	11.3	16 37.1 93 13	09.1	17 05.1 93 12	08.9	21 44.7 93 10	07.0	155
6	8 01.1 94 16	11.9	8 29.4 94 16	11.7	9 54.3 94 15	11.2	10 22.6 94 15	11.0	10 50.8 94 15	10.8	16 29.5 94 12	08.7	16 57.7 94 12	08.6	21 38.9 94 09	06.7	6
7	7 51.4 95 16	11.4	8 19.8 95 15	11.2	9 45.1 95 15	10.7	10 13.5 95 15	10.6	10 41.9 95 15	10.4	16 22.3 94 12	08.4	16 50.6 94 11	08.3	21 33.3 94 09	06.4	7
8	7 42.0 95 15	10.9	8 10.6 95 15	10.7	9 36.2 95 14	10.3	10 04.8 95 14	10.1	10 33.3 95 14	10.0	16 15.4 95 11	08.0	16 43.8 95 11	07.9	21 28.0 95 09	06.2	8
9	7 33.0 96 14	10.4	8 01.7 96 14	10.3	9 27.7 96 14	09.8	9 56.4 96 13	09.7	10 25.1 96 13	09.5	16 08.7 95 11	07.7	16 37.3 95 10	07.5	21 22.9 95 08	05.9	9
160	7 24.4 96 14	09.9	7 53.3 96 13	09.8	9 19.7 96 13	09.4	9 48.4 96 13	09.2	10 17.2 96 12	09.1	16 02.4 96 10	07.3	16 31.1 96 10	07.2	21 18.0 95 08	05.6	160
1	7 16.3 96 13	09.4	7 45.2 96 13	09.3	9 11.9 96 12	08.9	9 40.9 96 12	08.8	10 09.8 96 12	08.6	15 56.9 96 10	07.0	16 25.2 96 09	06.8	21 13.3 96 07	05.4	1
2	7 08.5 97 12	09.0	7 37.5 97 12	08.8	9 04.6 97 12	08.4	9 33.6 97 11	08.3	10 02.7 97 11	08.2	15 50.6 97 09	06.6	16 19.6 97 09	06.5	21 08.8 96 07	05.1	2
3	7 01.2 97 12	08.5	7 30.3 97 11	08.4	8 57.7 97 11	08.0	9 26.8 97 11	07.9	9 55.9 97 11	07.7	15 45.2 97 09	06.2	16 14.2 97 08	06.1	21 04.7 97 07	04.8	3
4	6 54.2 97 11	08.0	7 23.4 97 11	07.9	8 51.1 97 10	07.5	9 20.4 97 10	07.4	9 49.6 97 10	07.3	15 40.0 97 08	05.9	16 09.2 97 08	05.8	21 00.8 97 06	04.5	4
165	6 47.7 98 10	07.5	7 17.0 98 10	07.4	8 45.0 98 10	07.1	9 14.3 98 09	07.0	9 43.6 98 09	06.8	15 35.2 98 08	05.5	16 04.5 98 07	05.4	20 57.1 97 06	04.2	165
6	6 41.6 98 10	07.0	7 11.0 98 09	06.9	8 39.2 98 09	06.6	9 08.6 98 09	06.5	9 38.0 98 09	06.4	15 30.7 98 07	05.2	16 00.1 98 07	05.1	20 53.6 98 05	04.0	6
7	6 35.9 98 09	06.5	7 05.3 98 09	06.4	8 33.8 98 08	06.1	9 03.0 98 08	05.9	9 32.8 98 08	05.9	15 26.5 98 07	04.8	15 55.9 98 06	04.7	20 50.4 98 05	03.7	7
8	6 30.6 99 08	06.0	7 00.1 99 08	05.9	8 28.8 99 08	05.6	8 58.4 99 08	05.6	9 28.0 99 07	05.5	15 22.6 98 06	04.4	15 52.1 98 06	04.3	20 47.4 98 05	03.4	8
9	6 25.7 99 07	05.5	6 55.3 99 07	05.4	8 24.2 99 07	05.2	8 53.9 99 07	05.1	9 23.5 99 07	05.0	15 19.0 99 05	04.1	15 48.6 99 05	04.0	20 44.6 99 04	03.1	9
170	6 21.3 99 07	05.0	6 50.9 99 07	04.9	8 20.0 99 06	04.7	8 49.7 99 06	04.7	9 19.4 99 06	04.6	15 15.7 99 05	03.7	15 45.4 99 05	03.6	20 42.1 99 04	02.8	170
1	6 17.2 99 06	04.5	6 47.0 99 06	04.4	8 16.2 99 06	04.3	8 46.0 99 06	04.2	9 15.7 99 06	04.1	15 12.7 99 04	03.3	15 42.5 99 04	03.3	20 39.8 99 03	02.6	1
2	6 13.6 99 05	04.0	6 43.4 99 05	04.0	8 12.8 99 05	03.8	8 42.6 99 05	03.7	9 12.4 99 05	03.7	15 10.0 99 04	03.0	15 39.8 99 04	02.9	20 37.7 99 03	02.3	2
3	6 10.3 99 05	03.5	6 40.3 1.005	03.5	8 09.8 1.005	03.3	8 39.7 1.004	03.3	9 09.5 1.004	03.2	15 07.7 1.003	02.6	15 37.5 99 03	02.5	20 35.9 99 03	02.0	3
4	6 07.7 1.004	03.0	6 37.6 1.004	03.0	8 07.2 1.004	02.8	8 37.1 1.004	02.8	9 07.0 1.004	02.8	15 05.7 1.003	02.2	15 35.5 1.003	02.2	20 34.3 1.002	01.7	4
175	6 05.3 1.003	02.5	6 35.2 1.003	02.5	8 05.0 1.003	02.4	8 34.9 1.003	02.3	9 04.9 1.003	02.3	15 03.9 1.002	01.9	15 33.8 1.002	01.8	20 33.0 1.002	01.4	175
6	6 03.4 1.002	02.0	6 33.4 1.002	02.0	8 03.2 1.002	01.9	8 33.2 1.002	01.9	9 03.1 1.002	01.8	15 02.5 1.002	01.5	15 32.5 1.002	01.5	20 31.9 1.001	01.1	6
7	6 01.9 1.002	01.5	6 31.9 1.002	01.5	8 01.8 1.002	01.4	8 31.8 1.002	01.4	9 01.8 1.002	01.4	15 01.4 1.001	01.1	15 31.4 1.001	01.1	20 31.1 1.001	00.9	7
8	6 00.9 1.001	01.0	6 30.8 1.001	01.0	8 00.8 1.001	00.9	8 30.8 1.001	00.9	9 00.8 1.001	00.9	15 00.6 1.001	00.7	15 30.6 1.001	00.7	20 30.5 1.001	00.6	8
9	6 00.2 1.001	00.5	6 30.2 1.000	00.5	8 00.2 1.000	00.5	8 30.2 1.000	00.5	9 00.2 1.000	00.5	15 00.1 1.000	00.4	15 30.2 1.000	00.4	20 30.1 1.000	00.3	9
180	6 00.0 1.000	00.0	6 30.0 1.000	00.0	8 00.0 1.000	00.0	8 30.0 1.000	00.0	9 00.0 1.000	00.0	15 00.0 1.000	00.0	15 30.0 1.000	00.0	20 30.0 1.000	00.0	180

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 36°

AZ.	4° Dec.	4° H.A.	8° Dec.	8° H.A.	12° Dec.	12° H.A.	16° Dec.	16° H.A.	20° Dec.	20° H.A.	24° Dec.	24° H.A.	28° Dec.	28° H.A.	32° Dec.	32° H.A.	36° Dec.	36° H.A.	40° Dec.	40° H.A.	44° Dec.	44° H.A.	AZ.
00	58	180	62	180	66	180	70	180	74	180	78	180	82	180	86	180	90	...	86	00	82	00	00
4	58	172	62	172	66	170	70	169	74	167	78	163	81	156	85	139	87	89	85	37	81	20	4
8	57	165	61	163	65	161	69	158	73	154	75	148	80	138	82	119	84	88	83	55	80	35	8
12	56	158	60	156	64	153	67	149	71	143	74	136	77	125	79	108	80	86	80	63	78	45	12
16	55	152	58	149	62	145	65	140	69	134	72	127	74	116	76	102	77	85	77	68	75	52	16
20	53	145	57	142	60	138	63	133	66	127	69	119	71	110	73	98	74	84	74	70	73	56	20
24	51	140	54	136	58	132	61	127	64	121	66	113	68	105	70	94	71	83	71	71	70	59	24
28	49	135	52	131	55	126	58	121	61	116	63	109	65	101	67	92	67	82	68	71	67	61	28
32	47	130	50	126	52	122	55	117	58	111	60	105	62	97	63	89	64	80	65	71	64	62	32
36	44	125	47	122	50	117	52	113	55	107	57	101	59	94	60	87	61	79	62	71	62	63	36
40	41	121	44	118	47	113	49	109	52	104	54	98	55	92	57	85	58	78	58	70	59	63	40
44	38	118	41	114	44	110	46	105	48	100	50	95	52	89	54	83	55	77	55	70	56	63	44
48	36	114	38	111	41	107	43	102	45	98	47	93	49	87	50	81	52	75	52	69	53	62	48
52	33	111	35	107	38	104	40	99	42	95	44	90	46	85	47	80	48	74	49	68	50	62	52
56	29	108	32	105	34	101	37	97	39	92	41	88	42	83	44	78	45	73	46	67	47	61	56
60	26	105	29	102	31	98	33	94	36	90	37	86	40	81	41	76	42	71	43	66	44	61	60
64	23	103	26	99	28	95	30	92	32	88	34	83	36	79	38	75	39	70	41	65	42	60	64
68	20	100	22	97	25	93	27	89	29	85	31	81	33	77	35	73	36	68	38	64	39	59	68
72	17	97	19	94	22	91	24	87	26	83	28	79	30	75	32	71	33	67	35	62	36	58	72
76	14	95	16	92	18	88	20	85	23	81	25	77	27	73	29	69	30	65	32	61	33	57	76
80	10	93	13	89	15	86	17	82	19	79	22	75	24	72	26	68	27	64	29	60	31	55	80
84	07	90	10	87	12	84	14	80	16	77	18	73	21	70	23	66	24	62	26	58	28	54	84
88	04	88	06	85	09	81	11	78	13	75	15	71	18	68	20	64	22	60	24	57	25	53	88
92	01	86	03	82	05	79	08	76	10	73	12	69	15	66	17	62	19	59	21	55	23	51	92
96	*02*	83	*00*	80	02	77	05	74	07	70	09	67	12	64	14	60	16	57	18	53	20	50	96
100	*06*	81	*03*	78	*01*	74	*02*	71	*04*	68	*06*	65	*09*	62	11	58	13	55	16	52	18	48	100
104	*09*	78	*06*	75	*04*	72	*01*	69	*01*	66	*03*	63	*06*	59	*08*	56	11	53	13	50	16	46	104
108	*12*	76	*10*	73	*07*	70	*04*	66	*02*	63	*01*	60	*03*	57	*06*	54	*08*	51	11	48	13	45	108
112	*15*	73	*13*	70	*10*	67	*07*	64	*05*	61	*02*	58	*00*	55	*03*	52	*06*	49	08	46	11	43	112
116	*18*	71	*16*	68	*13*	64	*10*	61	*08*	58	*05*	55	*02*	53	*01*	50	*03*	47	06	44	09	41	116
120	*21*	68	*19*	65	*16*	62	*13*	59	*10*	56	*07*	53	*05*	50	*02*	47	*01*	44	*04*	42	07	39	120
124	*24*	65	*21*	62	*19*	59	*16*	56	*13*	53	*10*	50	*07*	48	*04*	45	*01*	42	*02*	39	05	37	124
128	*27*	62	*24*	59	*21*	56	*18*	53	*15*	50	*12*	48	*09*	45	*06*	42	*03*	40	*00*	37	03	35	128
132	*30*	59	*27*	56	*24*	53	*21*	50	*18*	47	*15*	45	*12*	42	*08*	40	*05*	37	*02*	35	01	32	132
136	*33*	55	*30*	52	*27*	49	*23*	47	*20*	44	*17*	42	*14*	39	*10*	37	*07*	35	*04*	32	*01*	30	136
140	*35*	52	*32*	49	*29*	46	*26*	43	*22*	41	*19*	38	*16*	36	*12*	34	*09*	32	*06*	30	*02*	28	140
144	*38*	48	*34*	45	*31*	42	*28*	39	*24*	37	*21*	35	*18*	33	*14*	31	*11*	29	*07*	27	*04*	25	144
148	*40*	44	*37*	41	*33*	38	*30*	36	*26*	34	*23*	32	*19*	30	*16*	28	*12*	26	*08*	24	*05*	22	148
152	*42*	39	*39*	37	*35*	34	*32*	32	*28*	30	*24*	28	*21*	26	*17*	25	*13*	23	*10*	21	*06*	20	152
156	*44*	34	*41*	32	*37*	30	*33*	28	*30*	26	*26*	24	*22*	23	*18*	21	*15*	20	*11*	18	*07*	17	156
160	*46*	29	*42*	27	*38*	25	*35*	24	*31*	22	*27*	21	*23*	19	*19*	18	*16*	17	*12*	16	*08*	14	160
164	*47*	24	*43*	22	*40*	21	*36*	19	*32*	18	*29*	17	*24*	15	*20*	14	*16*	13	*13*	12	*09*	12	164
168	*48*	18	*45*	17	*41*	16	*37*	14	*33*	13	*29*	13	*25*	12	*21*	11	*17*	10	*13*	09	*09*	09	168
172	*49*	12	*45*	11	*41*	10	*37*	10	*33*	09	*30*	08	*26*	08	*22*	07	*18*	07	*14*	06	*10*	06	172
176	*50*	06	*46*	06	*42*	05	*38*	05	*34*	05	*30*	04	*26*	04	*22*	04	*18*	03	*14*	03	*10*	03	176
180	*50*	00	*46*	00	*42*	00	*38*	00	*34*	00	*30*	00	*26*	00	*22*	00	*18*	00	*14*	00	*10*	00	180
	4°		**8°**		**12°**		**16°**		**20°**		**24°**		**28°**		**32°**		**36°**		**40°**		**44°**		

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

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	78	00	74	00	70	00	66	00	62	00	58	00	54	00	50	00	46	00	42	00	38	00	00
4	78	13	74	09	70	06	66	05	62	04	58	03	54	02	50	02	46	01	42	01	38	00	4
8	77	24	73	17	69	13	65	10	62	07	58	06	54	04	50	03	46	02	42	01	38	00	8
12	75	33	72	24	68	18	65	14	61	11	57	09	53	06	50	04	46	03	42	02	38	01	12
16	73	40	70	30	67	23	64	18	60	14	57	11	53	08	49	06	46	04	42	02	38	01	16
20	71	45	69	35	66	28	63	22	59	17	56	13	53	10	49	07	45	05	42	03	38	01	20
24	69	48	67	39	64	32	61	25	58	20	55	16	52	12	49	09	45	06	41	03	38	01	24
28	66	51	65	42	62	35	60	28	57	22	54	18	51	13	48	10	45	07	41	04	38	01	28
32	64	53	62	45	61	37	58	30	56	25	53	19	50	15	47	11	44	07	41	04	38	01	32
36	61	54	60	46	59	39	57	32	55	26	52	21	50	16	47	12	44	08	41	05	38	01	36
40	58	55	58	48	56	41	55	34	53	28	51	22	49	17	46	13	43	09	40	05	38	02	40
44	56	56	55	49	54	42	53	35	52	29	50	24	48	19	45	14	43	09	40	05	37	02	44
48	53	56	53	49	52	43	51	36	50	30	48	25	47	20	45	15	42	10	40	06	37	02	48
52	50	56	50	49	50	43	49	37	48	31	47	26	45	20	44	15	42	11	40	06	37	02	52
56	48	55	48	50	48	44	48	38	47	32	46	26	44	21	43	16	41	11	39	06	37	02	56
60	45	55	45	49	46	44	45	38	45	32	44	27	43	22	42	16	40	11	39	07	37	02	60
64	42	55	43	49	43	44	43	38	43	33	43	27	42	22	41	17	40	12	38	07	37	02	64
68	40	54	41	49	41	43	41	38	41	33	41	27	41	22	40	17	39	12	38	07	37	02	68
72	37	53	38	48	39	43	39	38	40	33	40	28	40	22	39	17	38	12	38	07	37	02	72
76	35	52	36	47	37	43	37	38	38	33	38	28	38	22	38	17	38	12	37	07	36	02	76
80	32	51	33	47	34	42	35	37	36	32	37	27	37	22	37	17	37	12	37	07	36	02	80
84	30	50	31	46	32	41	33	37	34	32	35	27	36	22	36	17	36	12	36	07	36	02	84
88	27	49	29	45	30	40	32	36	33	31	34	27	35	22	35	17	36	12	36	07	36	02	88
92	25	47	26	43	28	39	30	35	31	31	32	26	33	22	34	17	35	12	36	07	36	02	92
96	22	46	24	42	26	38	28	34	29	30	31	26	32	21	33	17	34	12	35	07	36	02	96
100	20	45	22	41	24	37	26	33	28	29	29	25	31	21	32	16	34	12	35	07	36	02	100
104	18	43	20	39	22	36	24	32	26	28	28	24	30	20	32	16	33	12	34	07	35	02	104
108	16	41	18	38	20	35	23	31	25	27	27	24	29	20	31	16	32	11	34	07	35	02	108
112	14	40	16	36	19	33	21	30	23	26	26	23	28	19	30	15	32	11	34	07	35	02	112
116	12	38	14	35	17	32	19	28	22	25	24	22	27	18	29	14	31	11	33	06	35	02	116
120	10	36	12	33	15	30	18	27	21	24	23	21	26	17	28	14	31	10	33	06	35	02	120
124	08	34	11	31	14	28	16	26	19	23	22	20	25	16	27	13	30	10	32	06	35	02	124
128	06	32	09	29	12	27	15	24	18	21	21	18	24	15	27	12	29	09	32	06	35	02	128
132	04	30	07	27	11	25	14	22	17	20	20	17	23	14	26	12	29	08	32	05	35	02	132
136	03	28	06	25	09	23	13	21	16	18	19	16	22	13	25	11	29	08	32	05	35	02	136
140	01	25	05	23	08	21	11	19	15	17	18	15	22	12	25	10	28	07	31	05	34	02	140
144	*00*	23	03	21	07	19	10	17	14	15	17	13	21	11	24	09	28	07	31	04	34	01	144
148	*01*	21	02	19	06	17	10	16	13	14	17	12	20	10	24	08	27	06	31	04	34	01	148
152	*02*	18	01	17	05	15	09	14	12	12	16	11	20	09	23	07	27	05	31	03	34	01	152
156	*03*	16	00	15	04	13	08	12	12	10	16	09	19	08	23	06	27	05	30	03	34	01	156
160	*04*	13	*00*	12	04	11	07	10	11	09	15	08	19	06	23	05	27	04	30	02	34	01	160
164	*05*	11	*01*	10	03	09	07	08	11	07	15	06	19	05	22	04	26	03	30	02	34	01	164
168	*05*	08	*01*	07	03	07	07	06	10	05	14	05	18	04	22	03	26	02	30	01	34	01	168
172	*06*	05	*02*	05	02	04	06	04	10	04	14	03	18	03	22	02	26	02	30	01	34	00	172
176	*06*	03	*02*	02	02	02	06	02	10	02	14	02	18	01	22	01	26	01	30	00	34	00	176
180	*06*	00	*02*	00	02	00	06	00	10	00	14	00	18	00	22	00	26	00	30	00	34	00	180

48°	52°	56°	60°	64°	68°	72°	76°	80°	84°	88°

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

Lat. 37°

H.A.	0° 00' Alt.	Δd Δt	Az.	0° 30' Alt.	Δd Δt	Az.	1° 00' Alt.	Δd Δt	Az.	1° 30' Alt.	Δd Δt	Az.	2° 00' Alt.	Δd Δt	Az.	2° 30' Alt.	Δd Δt	Az.	3° 00' Alt.	Δd Δt	Az.	3° 30' Alt.	Δd Δt	Az.	H.A.
00	53 00.0	1.00 1	180.0	53 30.0	1.00 1	180.0	54 00.0	1.00 1	180.0	54 30.0	1.00 1	180.0	55 00.0	1.00 1	180.0	55 30.0	1.00 1	180.0	56 00.0	1.00 1	180.0	56 30.0	1.00 1	180.0	00
1	52 59.3	1.00 3	178.3	53 29.3	1.00 4	178.3	53 59.3	1.00 4	178.3	54 29.3	1.00 4	178.3	54 59.3	1.00 4	178.3	55 29.3	1.00 4	178.2	55 59.3	1.00 4	178.2	56 29.2	1.00 4	178.2	1
2	52 57.2	1.00 6	176.7	53 27.2	1.00 6	176.6	53 57.2	1.00 6	176.6	54 27.1	1.00 6	176.6	54 57.1	1.00 6	176.5	55 27.1	1.00 6	176.5	55 57.0	1.00 9	176.4	56 27.0	1.00 6	176.4	2
3	52 53.8	1.00 8	175.0	53 23.7	1.00 8	175.0	53 53.6	1.00 8	174.9	54 23.5	1.00 8	174.8	54 53.5	1.00 8	174.8	55 23.4	1.00 9	174.7	55 53.3	1.00 9	174.7	56 23.3	1.00 9	174.6	3
4	52 48.9	1.0 10	173.4	53 18.8	1.0 10	173.3	53 48.6	1.0 11	173.2	54 18.5	1.0 11	173.1	54 48.4	1.0 11	173.1	55 18.2	1.0 11	173.0	55 48.1	1.0 11	172.9	56 17.9	.99 11	172.8	4
05	52 42.7	99 13	171.7	53 12.5	99 13	171.6	53 42.3	99 13	171.5	54 12.1	99 13	171.4	54 41.9	99 13	171.3	55 11.6	99 13	171.2	55 41.4	99 14	171.1	56 11.2	99 14	171.0	05
6	52 35.1	99 15	170.1	53 04.8	99 15	170.0	53 34.5	99 15	169.9	54 04.2	99 15	169.7	54 33.9	99 16	169.6	55 03.6	99 16	169.5	55 33.3	99 16	169.4	56 03.0	99 16	169.2	6
7	52 26.2	99 17	168.5	52 55.8	99 17	168.3	53 25.4	99 17	168.2	53 55.0	99 18	168.1	54 24.6	99 18	167.8	54 54.2	99 18	167.8	55 23.7	99 18	167.6	55 53.3	98 18	167.5	7
8	52 16.0	98 19	166.9	52 45.5	98 19	166.7	53 15.0	98 20	166.6	53 44.4	98 20	166.4	54 13.9	98 20	166.2	54 43.3	98 20	166.1	55 12.8	98 21	165.9	55 42.2	98 21	165.7	8
9	52 04.4	98 21	165.3	52 33.8	98 22	165.1	53 03.1	98 22	164.9	53 32.5	98 22	164.7	54 01.8	98 22	164.6	54 31.1	98 23	164.4	55 00.4	98 23	164.2	55 29.7	98 23	164.0	9
10	51 51.6	97 24	163.7	52 20.8	97 24	163.5	52 50.0	97 24	163.3	53 19.2	97 24	163.1	53 48.4	97 25	162.9	54 17.5	97 25	162.7	54 46.7	97 25	162.5	55 15.8	97 25	162.3	10
1	51 37.5	97 26	162.1	52 06.6	97 26	161.9	52 35.6	97 26	161.7	53 04.6	97 27	161.5	53 33.6	97 27	161.3	54 02.6	97 27	161.1	54 31.6	96 27	160.8	55 00.5	96 28	160.6	1
2	51 22.1	96 28	160.5	51 51.1	96 28	160.3	52 19.9	96 28	160.1	52 48.8	96 29	159.9	53 17.6	96 29	159.4	53 46.4	96 29	159.4	54 15.2	96 29	159.2	54 44.0	96 30	158.9	2
3	51 05.6	96 30	159.0	51 34.3	96 30	158.8	52 03.0	96 30	158.5	52 31.7	96 31	158.3	53 00.3	96 31	158.1	53 29.0	95 31	157.8	53 57.5	95 32	157.6	54 26.1	95 32	157.3	3
4	50 47.8	95 32	157.5	51 16.4	95 32	157.3	51 44.9	95 32	157.0	52 13.4	95 33	156.7	52 41.8	95 33	156.5	53 10.2	95 33	156.2	53 38.6	95 34	155.9	54 07.0	94 34	155.7	4
15	50 28.9	95 33	156.0	50 57.3	94 34	155.7	51 25.6	94 34	155.5	51 53.9	94 34	155.2	52 22.1	94 35	154.9	52 50.3	94 35	154.7	53 18.5	94 36	154.4	53 46.6	94 36	154.1	15
6	50 08.9	94 35	154.5	50 37.0	94 36	154.3	51 05.1	94 36	154.0	51 33.2	94 36	153.7	52 01.2	93 37	153.4	52 29.2	93 37	153.1	52 57.2	93 37	152.8	53 25.1	93 38	152.5	6
7	49 47.7	93 37	153.1	50 15.6	93 37	152.8	50 43.6	93 38	152.5	51 11.4	93 38	152.2	51 39.2	93 39	151.9	52 07.0	93 39	151.6	52 34.7	93 39	151.3	53 02.4	92 40	151.0	7
8	49 25.5	92 39	151.6	49 53.2	92 39	151.3	50 20.9	92 40	151.0	50 48.5	92 40	150.7	51 16.1	92 40	150.4	51 43.7	92 41	150.1	52 11.1	92 41	149.8	52 38.6	91 42	149.4	8
9	49 02.2	92 40	150.2	49 29.7	92 41	149.9	49 57.2	91 41	149.6	50 24.6	91 42	149.3	50 51.9	91 42	149.0	51 19.2	91 42	148.6	51 46.5	91 43	148.3	52 13.7	91 43	148.0	9
20	48 37.9	91 42	148.8	49 05.2	91 43	148.5	49 32.4	91 43	148.2	49 59.6	91 43	147.9	50 26.7	90 44	147.5	50 53.8	90 44	147.2	51 20.8	90 44	146.9	51 47.8	90 45	146.5	20
1	48 12.6	90 44	147.5	48 39.7	90 44	147.1	49 06.7	90 44	146.8	49 33.6	90 45	146.5	50 00.5	89 45	146.1	50 27.3	89 46	145.8	50 54.1	89 46	145.4	51 20.8	89 47	145.1	1
2	47 46.3	90 45	146.1	48 13.2	89 45	145.8	48 40.0	89 46	145.5	49 06.7	89 46	145.1	49 33.3	89 47	144.8	49 59.9	89 47	144.4	50 26.4	88 48	144.0	50 52.9	88 48	143.7	2
3	47 19.2	89 47	144.8	47 45.8	89 47	144.5	48 12.3	88 48	144.1	48 38.8	88 48	143.8	49 05.2	88 48	143.4	49 31.6	88 49	143.0	49 57.8	87 49	142.7	50 24.0	87 50	142.3	3
4	46 51.1	88 48	143.5	47 17.5	88 49	143.2	47 43.8	88 49	142.8	48 10.0	87 49	142.4	48 36.2	87 50	142.1	49 02.3	87 50	141.7	49 28.3	87 51	141.3	49 54.3	86 51	140.9	4
25	46 22.2	87 50	142.2	46 48.3	87 50	141.9	47 14.4	87 50	141.5	47 40.4	87 51	141.1	48 06.3	86 51	140.8	48 32.2	86 52	140.4	48 57.9	86 52	140.0	49 23.6	86 52	139.6	25
6	45 52.4	86 51	141.0	46 18.3	86 51	140.6	46 44.2	86 52	140.2	47 09.9	86 52	139.9	47 35.6	85 53	139.5	48 01.2	85 53	139.1	48 26.7	85 53	138.7	48 52.2	85 54	138.3	6
7	45 21.9	86 52	139.9	45 47.5	85 53	139.4	46 13.1	85 53	139.0	46 38.6	85 54	138.6	47 04.1	85 54	138.2	47 29.4	84 54	137.8	47 54.7	84 55	137.4	48 19.9	84 55	137.0	7
8	44 50.5	85 54	138.5	45 15.9	85 54	138.2	45 41.3	84 54	137.8	46 06.6	84 55	137.4	46 31.8	84 55	137.0	46 56.9	84 55	136.6	47 21.9	83 56	136.2	47 46.8	83 56	135.8	8
9	44 18.4	84 55	137.4	44 43.6	84 55	137.0	45 08.7	84 56	136.6	45 33.8	83 56	136.2	45 58.7	83 56	135.8	46 23.6	83 57	135.4	46 48.4	82 57	135.0	47 13.1	82 58	134.6	9
30	43 45.6	83 56	136.2	44 10.6	83 56	135.8	44 35.4	83 57	135.4	45 00.2	83 57	135.0	45 25.0	82 57	134.6	45 49.6	82 58	134.2	46 14.1	82 58	133.8	46 38.6	81 59	133.4	30
1	43 12.1	83 57	135.0	43 36.8	82 57	134.7	44 01.5	82 58	134.3	44 26.0	82 58	133.9	44 50.5	81 59	133.5	45 14.9	81 59	133.0	45 39.2	81 59	132.6	46 03.4	81 60	132.2	1
2	42 38.0	82 58	133.9	43 02.4	82 58	133.5	43 26.8	81 59	133.1	43 51.1	81 59	132.7	44 15.4	81 60	132.2	44 39.5	80 60	131.9	45 03.6	80 60	131.5	45 27.6	80 61	131.1	2
3	42 03.1	81 59	132.8	42 27.3	81 59	132.4	42 51.5	80 60	132.0	43 15.6	80 60	131.6	43 39.6	80 61	131.2	44 03.3	80 61	130.8	44 27.4	79 61	130.4	44 51.1	79 62	129.9	3
4	41 27.6	80 60	131.7	41 51.7	80 60	131.3	42 15.6	80 61	130.9	42 39.5	79 61	130.5	43 03.3	79 62	130.1	43 27.0	79 62	129.7	43 50.6	79 62	129.3	44 14.1	78 63	128.8	4
35	40 51.6	80 61	130.7	41 15.4	79 61	130.3	41 39.1	79 62	129.9	42 02.8	79 62	129.5	42 26.4	78 62	129.0	42 49.8	78 63	128.6	43 13.2	78 63	128.2	43 36.5	77 64	127.8	35
6	40 14.9	79 62	129.6	40 38.5	79 62	129.2	41 02.1	78 63	128.8	41 25.5	78 63	128.4	41 48.9	78 63	128.0	42 12.1	77 64	127.6	42 35.3	77 64	127.1	42 58.3	77 64	126.7	6
7	39 37.8	78 63	128.6	40 01.2	78 63	128.2	40 24.5	78 64	127.8	40 47.7	77 64	127.4	41 10.8	77 64	127.0	41 33.9	77 65	126.5	41 56.8	76 65	126.1	42 19.7	76 65	125.7	7
8	39 00.1	77 64	127.6	39 23.2	77 64	127.2	39 46.3	77 64	126.8	40 09.4	77 65	126.4	40 32.3	76 65	125.9	40 55.1	76 65	125.5	41 17.8	76 66	125.1	41 40.5	75 66	124.6	8
9	38 21.8	77 64	126.6	38 44.8	76 65	126.2	39 07.7	76 65	125.8	39 30.5	76 66	125.4	39 53.2	76 66	124.9	40 15.9	75 66	124.5	40 38.4	75 67	124.1	41 00.8	75 67	123.6	9
40	37 43.1	76 65	125.6	38 05.9	76 66	125.2	38 28.6	75 66	124.8	38 51.2	75 66	124.4	39 13.7	75 67	124.0	39 36.2	75 67	123.5	39 58.5	74 67	123.1	40 20.7	74 68	122.7	40
1	37 04.0	75 66	124.7	37 26.6	75 66	124.3	37 49.1	75 67	123.9	38 11.5	75 67	123.4	38 33.8	74 67	123.0	38 56.0	74 68	122.6	39 18.1	74 68	122.1	39 40.1	73 68	121.7	1
2	36 24.4	75 67	123.8	36 46.7	74 67	123.4	37 09.0	74 67	122.9	37 31.3	74 68	122.5	37 53.4	74 68	122.1	38 15.4	73 68	121.6	38 37.3	73 69	121.2	38 59.2	73 69	120.8	2
3	35 44.3	74 67	122.8	36 06.5	74 68	122.4	36 28.5	74 68	122.0	36 50.6	73 68	121.6	37 12.6	73 69	121.2	37 34.4	73 69	120.7	37 56.2	72 69	120.3	38 17.8	72 70	119.8	3
4	35 03.8	74 68	121.9	35 25.9	73 68	121.5	35 47.8	73 69	121.1	36 09.6	73 69	120.7	36 31.4	72 69	120.2	36 53.0	72 70	119.8	37 14.6	72 70	119.4	37 36.1	71 70	118.9	4
45	34 23.0	73 69	121.0	34 44.8	73 69	120.6	35 06.6	72 69	120.2	35 28.2	72 70	119.8	35 49.8	72 70	119.4	36 11.3	71 70	118.9	36 32.7	71 71	118.5	36 53.9	71 71	118.0	45
6	33 41.7	72 69	120.2	34 03.4	72 70	119.7	34 25.0	72 70	119.3	34 46.4	71 70	118.9	35 07.8	71 71	118.5	35 29.1	71 71	118.0	35 50.4	71 71	117.6	36 11.5	70 71	117.2	6
7	33 00.1	72 70	119.3	33 21.6	71 70	118.8	33 43.0	71 70	118.5	34 04.3	71 71	118.0	34 25.6	71 71	117.6	34 46.7	70 71	117.2	35 07.7	70 72	116.7	35 28.7	70 72	116.2	7
8	32 18.2	71 70	118.5	32 39.5	71 71	118.0	33 00.7	71 71	117.6	33 21.9	70 71	117.2	33 42.9	70 72	116.8	34 03.9	70 72	116.3	34 24.8	69 72	115.9	34 45.6	69 73	115.5	8
9	31 35.9	71 71	117.6	31 57.0	70 71	117.2	32 18.1	70 72	116.8	32 39.1	70 72	116.4	33 00.0	70 72	115.9	33 20.8	69 72	115.5	33 41.5	69 73	115.1	34 02.2	69 73	114.6	9
50	30 53.2	70 72	116.8	31 14.2	70 72	116.4	31 35.2	70 72	116.0	31 56.0	69 72	115.5	32 16.7	69 73	115.1	32 37.4	69 73	114.7	32 58.0	68 73	114.2	33 18.5	68 73	113.8	50
1	30 10.3	70 72	116.0	30 31.2	69 73	115.5	30 52.1	69 73	115.1	31 12.6	69 73	114.7	31 33.2	69 73	114.3	31 53.7	68 73	113.9	32 14.1	68 74	113.4	32 34.5	68 74	113.0	1
2	29 27.1	69 73	115.2	29 47.8	69 73	114.8	30 08.4	69 73	114.3	30 28.9	68 73	113.9	30 49.4	68 73	113.5	31 09.8	68 74	113.1	31 30.1	67 74	112.6	31 50.2	67 74	112.2	2
3	28 43.6	69 73	114.4	29 04.1	68 73	114.0	29 24.6	68 73	113.6	29 45.0	68 74	113.1	30 05.3	68 74	112.7	30 25.6	67 74	112.3	30 45.7	67 74	111.9	31 05.8	67 75	111.4	3
4	27 59.8	68 73	113.6	28 20.2	68 74	113.2	28 40.6	68 74	112.8	29 00.8	67 74	112.4	29 21.0	67 74	111.9	29 41.1	67 74	111.5	30 01.1	67 75	111.1	30 21.0	66 75	110.6	4
55	27 15.8	68 74	112.9	27 36.1	67 74	112.4	27 56.3	67 74	112.0	28 16.4	67 75	111.6	28 36.4	67 75	111.2	28 56.4	66 75	110.7	29 16.3	66 75	110.3	29 36.1	66 75	109.9	55
6	26 31.5	67 74	112.1	26 51.7	67 74	111.7	27 11.7	67 75	111.3	27 31.7	66 75	110.8	27 51.6	66 75	110.4	28 11.5	66 75	110.0	28 31.2	65 76	109.6	28 50.9	65 76	109.1	6
7	25 47.0	67 75	111.3	26 07.0	66 75	110.9	26 27.0	66 75	110.5	26 46.8	66 76	110.1	27 06.6	66 76	109.7	27 26.3	65 76	109.3	27 46.0	65 76	108.8	28 05.6	65 76	108.4	7
8	25 02.3	66 75	110.6	25 22.1	66 75	110.2	25 42.0	66 76	109.8	26 01.7	66 76	109.4	26 21.4	65 76	108.9	26 41.0	65 76	108.5	27 00.5	65 76	108.1	27 20.0	64 77	107.7	8
9	24 17.3	66 75	109.9	24 37.1	66 75	109.5	24 56.8	66 76	109.1	25 16.4	65 76	108.6	25 36.0	65 76	108.2	25 55.5	65 76	107.8	26 14.9	64 77	107.4	26 34.2	64 77	106.9	9
60	23 32.1	66 76	109.2	23 51.8	65 76	108.7	24 11.4	65 76	108.3	24 30.9	65 76	107.9	24 50.4	65 76	107.5	25 09.8	65 76	107.1	25 29.1	64 77	106.7	25 48.3	64 77	106.2	60
1	22 46.8	65 76	108.4	23 06.3	65 76	108.0	23 25.8	65 76	107.6	23 45.2	64 77	107.2	24 04.6	64 77	106.8	24 23.9	64 77	106.4	24 43.1	64 77	105.9	25 02.2	64 77	105.5	1
2	22 01.2	65 76	107.7	22 20.7	65 76	107.3	22 40.0	64 77	106.9	22 59.4	64 77	106.5	23 18.6	64 77	106.1	23 37.8	64 77	105.7	23 56.9	63 77	105.2	24 16.0	63 77	104.8	2
3	21 15.5	65 76	107.0	21 34.8	64 77	106.6	21 54.1	64 77	106.2	22 13.3	64 77	105.8	22 32.5	64 77	105.4	22 51.6	63 78	105.0	23 10.6	63 78	104.6	23 29.6	63 78	104.1	3
4	20 29.6	64 77	106.4	20 48.8	64 77	105.9	21 08.0	64 77	105.5	21 27.2	64 77	105.1	21 46.2	63 78	104.7	22 05.2	63 78	104.3	22 24.2	63 78	103.9	22 43.0	63 78	103.5	4
65	19 43.5	64 77	105.7	20 02.7	64 77	105.3	20 21.8	64 77	104.9	20 40.8	63 78	104.4	20 59.8	63 78	104.0	21 18.7	63 78	103.6	21 37.6	63 78	103.2	21 56.4	62 78	102.8	65
6	18 57.3	64 77	105.0	19 16.4	63 77	104.6	19 35.4	63 78	104.2	19 54.4	63 78	103.8	20 13.2	63 78	103.4	20 32.1	63 78	102.9	20 50.9	62 78	102.5	21 09.6	62 78	102.1	6
7	18 11.0	63 77	104.3	18 30.0	63 78	103.9	18 48.9	63 78	103.5	19 07.7	63 78	103.1	19 26.5	63 78	102.7	19 45.3	62 78	102.3	20 04.0	62 78	101.9	20 22.7	62 78	101.4	7
8	17 24.5	63 78	103.7	17 43.4	63 78	103.3	18 02.2	63 78	102.8	18 21.0	63 78	102.4	18 39.8	62 78	102.0	18 58.4	62 78	101.6	19 17.1	62 78	101.2	19 35.7	62 79	100.8	8
9	16 37.9	63 78	103.0	16 56.7	63 78	102.6	17 15.4	62 78	102.2	17 34.2	62 78	101.8	17 52.8	62 78	101.4	18 11.5	62 78	101.0	18 30.0	62 79	100.5	18 48.5	62 79	100.1	9
70	15 51.1	63 78	102.4	16 09.8	62 78	101.9	16 28.6	62 78	101.5	16 47.2	62 79	101.1	17 05.8	62 79	100.7	17 24.4	62 79	100.3	17 42.9	62 79	99.9	18 01.3	61 79	99.5	70
1	15 04.2	62 78	101.7	15 22.9	62 78	101.3	15 41.5	62 78	100.9	16 00.1	62 79	100.5	16 18.7	62 79	100.1	16 37.2	62 79	99.7	16 55.6	61 79	99.3	17 14.0	61 79	98.8	1
2	14 17.3	62 78	101.1	14 35.9	62 79	100.7	14 54.4	62 79	100.3	15 13.0	62 79	99.8	15 31.4	62 79	99.4	15 49.9	61 79	99.0	16 08.3	61 79	98.6	16 26.5	61 79	98.2	2
3	13 30.2	62 79	100.4	13 48.7	62 79	100.0	14 07.2	62 79	99.6	14 25.7	62 79	99.2	14 44.1	61 79	98.8	15 02.5	61 79	98.4	15 20.9	61 79	98.0	15 39.2	61 79	97.6	3
4	12 43.0	62 79	99.8	13 01.5	62 79	99.4	13 20.0	61 79	99.0	13 38.4	61 79	98.6	13 56.7	61 79	98.2	14 15.1	61 79	97.8	14 33.4	61 79	97.4	14 51.6	61 79	96.9	4
75	11 55.7	62 79	99.2	12 14.2	61 79	98.8	12 32.6	61 79	98.4	12 50.9	61 79	97.9	13 09.3	61 79	97.5	13 27.6	61 79	97.1	13 45.8	61 79	96.7	14 04.0	60 79	96.3	75
6	11 08.4	61 79	98.5	11 26.8	61 79	98.1	11 45.1	61 79	97.7	12 03.5	61 79	97.3	12 21.7	61 79	96.9	12 40.0	61 79	96.5	12 58.2	60 79	96.1	13 16.4	60 80	95.7	6
7	10 21.0	61 79	97.9	10 39.3	61 79	97.5	10 57.6	61 79	97.1	11 15.9	61 79	96.7	11 34.1	60 79	96.3	11 52.3	60 80	95.9	12 10.5	60 80	95.5	12 28.7	60 80	95.1	7
8	9 33.5	61 79	97.3	9 51.8	61 79	96.9	10 10.0	61 79	96.5	10 28.3	60 79	96.1	10 46.5	60 80	95.7	11 04.7	60 80	95.3	11 22.8	60 80	94.9	11 40.9	60 80	94.5	8
9	8 45.9	61 79	96.7	9 04.2	61 79	96.3	9 22.4	60 80	95.9	9 40.6	60 80	95.5	9 58.8	60 80	95.1	10 16.9	60 80	94.7	10 35.0	60 80	94.3	10 53.1	60 80	93.8	9
80	7 58.3	61 80	96.1	8 16.5	61 80	95.7	8 34.7	61 80	95.3	8 52.9	60 80	94.9	9 11.0	60 80	94.4	9 29.1	60 80	94.0	9 47.2	60 80	93.6	10 05.3	60 80	93.2	80
1	7 10.6	61 80	95.4	7 28.8	61 80	95.0	7 47.0	61 80	94.6	8 05.1	60 80	94.2	8 23.2	60 80	93.8	8 41.3	60 80	93.4	8 59.4	60 80	93.0	9 17.4	60 80	92.6	1
2	6 22.9	61 80	94.8	6 41.0	60 80	94.4	6 59.2	60 80	94.0	7 17.3	60 80	93.6	7 35.4	60 80	93.2	7 53.5	60 80	92.8	8 11.5	60 80	92.4	8 29.6	60 80	92.0	2
3	5 35.1	60 80	94.2	5 53.3	60 80	93.8	6 11.4	60 80	93.4	6 29.5	60 80	93.0	6 47.5	60 80	92.6	7 05.6	60 80	92.2	7 23.6	60 80	91.8	7 41.7	60 80	91.4	3
4				5 05.4	60 80	93.2	5 23.5	60 80	92.8	5 41.6	60 80	92.4	5 59.7	60 80	92.0	6 17.7	60 80	91.6	6 35.7	60 80	91.2	6 53.7	60 80	90.8	4
85													5 11.8	60 80	91.4	5 29.8	60 80	91.0	5 47.8	60 80	90.6	6 05.8	60 80	90.2	85
6																						5 17.9	60 80	89.6	6

H.A.	0° 00' Alt. Δd Δt Az.	0° 30' Alt. Δd Δt Az.	1° 00' Alt. Δd Δt Az.	1° 30' Alt. Δd Δt Az.	2° 00' Alt. Δd Δt Az.	2° 30' Alt. Δd Δt Az.	3° 00' Alt. Δd Δt Az.	3° 30' Alt. Δd Δt Az.	H.A.
00	53 00.0 1.00 01 180.0	52 30.0 1.00 01 180.0	52 00.0 1.00 01 180.0	51 30.0 1.00 01 180.0	51 00.0 1.00 01 180.0	50 30.0 1.00 01 180.0	50 00.0 1.00 01 180.0	49 30.0 1.00 01 180.0	00
1	52 59.3 1.00 03 178.3	52 29.3 1.00 03 178.4	51 59.3 1.00 03 178.4	51 29.3 1.00 03 178.4	50 59.3 1.00 03 178.4	50 29.3 1.00 03 178.4	49 59.4 1.00 03 178.4	49 29.4 1.00 03 178.5	1
2	52 57.2 1.00 06 176.7	52 27.3 1.00 06 176.7	51 57.3 1.00 06 176.8	51 27.3 1.00 06 176.8	50 57.3 1.00 06 176.8	50 27.4 1.00 06 176.9	49 57.4 1.00 05 176.9	49 27.4 1.00 05 176.9	2
3	52 53.8 1.00 08 175.0	52 23.8 1.00 08 175.1	51 53.9 1.00 08 175.1	51 24.0 1.00 08 175.2	50 54.0 1.00 08 175.2	50 24.1 1.00 08 175.3	49 54.2 1.00 08 175.3	49 24.2 1.00 07 175.4	3
4	52 48.9 1.0 10 173.4	52 19.0 1.0 10 173.4	51 49.2 1.0 10 173.5	51 19.3 1.0 10 173.6	50 49.4 1.0 10 173.7	50 19.5 1.0 10 173.7	49 49.6 1.0 10 173.8	49 19.7 1.0 10 173.9	4
05	52 42.7 99 13 171.7	52 12.9 99 15 171.8	51 43.1 99 12 171.9	51 13.3 99 12 172.1	50 43.5 99 12 172.1	50 13.6 99 12 172.2	49 43.8 99 12 172.3	49 14.0 99 12 172.3	05
6	52 35.1 99 15 170.1	52 05.4 99 15 170.1	51 35.7 99 15 170.3	51 06.0 99 14 170.4	50 36.2 99 14 170.5	50 06.5 99 14 170.5	49 36.7 99 14 170.7	49 07.0 99 14 170.8	6
7	52 26.2 99 17 168.5	51 56.6 99 17 168.6	51 27.0 99 17 168.7	50 57.3 99 17 168.7	50 27.7 99 16 169.0	49 58.0 99 16 169.1	49 28.4 99 16 169.2	48 58.7 99 16 169.3	7
8	52 16.0 98 19 166.9	51 46.5 98 19 167.0	51 17.0 98 19 167.1	50 47.4 98 19 167.3	50 17.9 98 18 167.4	49 48.3 98 18 167.6	49 18.8 98 18 167.7	48 49.2 98 18 167.8	8
9	52 04.4 98 21 165.3	51 35.0 98 21 165.4	51 05.7 98 21 165.6	50 36.2 98 21 165.7	50 06.8 98 20 165.9	49 37.4 98 20 166.0	49 08.0 98 20 166.2	48 38.5 98 20 166.3	9
10	51 51.6 97 24 163.7	51 22.3 98 23 163.8	50 53.1 98 23 164.0	50 23.8 98 23 164.2	49 54.5 98 23 164.4	49 25.2 98 22 164.5	48 55.9 98 22 164.7	48 26.6 98 22 164.9	10
1	51 37.5 97 26 162.1	51 08.4 97 25 162.2	50 39.3 97 25 162.5	50 10.2 97 25 162.7	49 41.0 97 25 162.9	49 11.8 97 24 163.0	48 42.7 97 24 163.2	48 13.5 97 24 163.4	1
2	51 22.1 96 28 160.5	50 53.2 96 27 160.8	50 24.3 97 27 161.0	49 55.3 97 27 161.2	49 26.3 97 26 161.4	48 57.3 97 26 161.6	48 28.2 97 26 161.8	47 59.2 97 26 161.9	2
3	51 05.6 96 30 159.0	50 36.8 96 29 159.2	50 08.0 96 29 159.5	49 39.2 96 29 159.7	49 10.4 96 28 159.9	48 41.5 96 28 160.1	48 12.7 96 28 160.3	47 43.8 96 28 160.5	3
4	50 47.8 95 32 157.5	50 19.2 95 31 157.7	49 50.6 95 31 158.0	49 22.0 95 31 158.2	48 53.3 96 30 158.4	48 24.7 96 30 158.6	47 55.9 96 30 158.9	47 27.2 96 29 159.1	4
15	50 28.9 95 33 156.0	50 00.5 95 33 156.3	49 32.1 95 33 156.5	49 03.6 95 32 156.7	48 35.2 95 32 157.0	48 06.6 95 32 157.2	47 38.1 95 32 157.4	47 09.5 95 31 157.7	15
6	50 08.9 94 35 154.5	49 40.7 94 35 154.8	49 12.4 94 35 155.0	48 44.2 94 34 155.3	48 15.9 94 34 155.5	47 47.5 94 34 155.8	47 19.2 94 33 156.0	46 50.8 94 33 156.3	6
7	49 47.7 93 37 153.1	49 19.7 93 37 153.3	48 51.7 93 36 153.6	48 23.6 94 36 153.9	47 55.5 94 36 154.1	47 27.4 94 35 154.4	46 59.2 94 35 154.7	46 31.0 94 35 154.9	7
8	49 25.5 93 39 151.6	48 57.7 93 38 151.9	48 29.9 93 38 152.2	48 02.0 93 38 152.5	47 34.1 93 37 152.8	47 06.2 93 37 153.0	46 38.2 93 37 153.3	46 10.2 93 36 153.6	8
9	49 02.2 92 40 150.2	48 34.6 92 40 150.5	48 07.0 92 40 150.8	47 39.4 92 39 151.1	47 11.7 92 39 151.4	46 43.9 93 39 151.7	46 16.1 93 38 151.9	45 48.3 93 38 152.2	9
20	48 37.9 91 42 148.8	48 10.5 91 42 149.1	47 43.1 91 41 149.4	47 15.7 92 41 149.7	46 48.2 92 41 150.0	46 20.7 92 40 150.3	45 53.1 92 40 150.6	45 25.5 92 40 150.9	20
1	48 12.6 90 44 147.5	47 45.5 90 43 147.8	47 18.3 91 43 148.1	46 51.1 91 43 148.4	46 23.8 91 42 148.7	45 56.5 91 42 149.0	45 29.1 91 42 149.3	45 01.7 91 41 149.6	1
2	47 46.3 90 45 146.1	47 19.5 90 45 146.5	46 52.5 90 45 146.8	46 25.5 90 44 147.1	45 58.5 90 44 147.4	45 31.4 90 43 147.7	45 04.2 91 43 148.0	44 37.0 91 43 148.3	2
3	47 19.2 89 47 144.8	46 52.5 89 46 145.1	46 25.8 89 46 145.5	45 59.0 89 46 145.8	45 32.2 90 45 146.1	45 05.3 90 45 146.4	44 38.4 90 45 146.7	44 11.4 90 44 147.0	3
4	46 51.1 88 48 143.5	46 24.7 88 48 143.9	45 58.2 88 47 144.2	45 31.6 89 47 144.5	45 05.0 89 47 144.9	44 38.4 89 46 145.2	44 11.7 89 46 145.5	43 44.9 89 46 145.8	4
25	46 22.7 87 50 142.2	45 56.0 87 49 142.6	45 29.7 88 49 142.9	45 03.4 88 48 143.3	44 37.0 88 48 143.6	44 10.6 88 48 143.9	43 44.1 88 47 144.3	43 17.5 89 47 144.6	25
6	45 52.4 86 51 141.0	45 26.5 87 51 141.3	45 00.4 87 50 141.7	44 34.3 87 50 142.0	44 08.2 87 49 142.4	43 42.0 87 49 142.7	43 15.7 88 49 143.0	42 49.4 88 48 143.4	6
7	45 21.9 86 52 139.7	44 56.1 86 52 140.1	44 30.3 86 51 140.5	44 04.5 86 51 140.8	43 38.5 87 51 141.2	43 12.5 87 50 141.5	42 46.5 87 50 141.9	42 20.4 87 50 142.2	7
8	44 50.5 85 54 138.5	44 25.0 85 53 138.9	43 59.4 85 53 139.3	43 33.8 86 52 139.6	43 08.1 86 52 140.0	42 42.3 86 52 140.3	42 16.5 86 51 140.7	41 50.6 86 51 141.0	8
9	44 18.4 84 55 137.4	43 53.2 84 54 137.7	43 27.8 85 54 138.1	43 02.4 85 54 138.5	42 36.9 85 53 138.8	42 11.4 85 53 139.2	41 45.8 85 52 139.5	41 20.1 86 52 139.9	9
30	43 45.6 83 56 136.2	43 20.6 84 56 136.6	42 55.5 84 55 136.9	42 30.3 84 55 137.3	42 05.0 84 54 137.7	41 39.7 85 54 138.0	41 14.3 85 54 138.4	40 48.9 85 53 138.7	30
1	43 12.1 82 57 135.0	42 47.3 83 57 135.4	42 22.4 83 56 135.8	41 57.4 83 56 136.2	41 32.4 84 55 136.6	41 07.3 84 55 136.9	40 42.1 84 55 137.3	40 16.9 84 54 137.6	1
2	42 37.9 82 58 133.9	42 13.3 82 58 134.3	41 48.7 82 57 134.7	41 23.9 83 57 135.1	40 59.1 83 57 135.4	40 34.2 83 56 135.8	40 09.3 83 56 136.2	39 44.3 83 55 136.5	2
3	42 03.1 81 59 132.8	41 38.7 81 59 133.2	41 14.3 82 58 133.6	40 49.8 82 58 134.0	40 25.2 82 58 134.4	40 00.5 82 57 134.7	39 35.8 83 57 135.1	39 11.0 83 57 135.5	3
4	41 27.6 80 60 131.7	41 03.5 81 60 132.1	40 39.3 81 59 132.5	40 15.0 81 59 132.9	39 50.6 81 59 133.3	39 26.2 82 58 133.7	39 01.7 82 58 134.0	38 37.1 82 58 134.4	4
35	40 51.4 80 61 130.7	40 27.6 80 61 131.1	40 03.7 80 60 131.5	39 39.6 80 60 131.9	39 15.4 81 60 132.2	38 51.2 81 59 132.6	38 26.9 81 59 133.0	38 02.5 81 59 133.4	35
6	40 14.9 79 62 129.6	39 51.2 79 62 130.0	39 27.5 79 61 130.4	39 03.6 80 61 130.8	38 39.7 80 61 131.2	38 15.7 80 60 131.6	37 51.6 80 60 132.0	37 27.4 81 60 132.3	6
7	39 37.8 78 63 128.6	39 14.3 78 62 129.0	38 50.7 79 62 129.4	38 27.1 79 62 129.8	38 03.3 79 61 130.2	37 39.5 79 61 130.6	37 15.7 80 61 131.0	36 51.7 80 60 131.3	7
8	39 00.1 77 64 127.6	38 36.8 78 63 128.0	38 13.4 78 63 128.4	37 50.0 78 63 128.8	37 26.5 79 62 129.2	37 02.9 79 62 129.6	36 39.2 79 62 130.0	36 15.5 79 61 130.4	8
9	38 21.8 77 64 126.6	37 58.8 77 64 127.0	37 35.6 77 64 127.4	37 12.4 78 64 127.8	36 49.1 78 63 128.2	36 25.7 78 63 128.6	36 02.2 78 62 129.0	35 38.7 79 62 129.4	9
40	37 43.1 77 65 125.6	37 20.3 76 65 126.1	36 57.3 77 65 126.5	36 34.3 77 64 126.9	36 11.2 77 64 127.3	35 48.0 77 64 127.6	35 24.7 78 63 128.0	35 01.4 78 63 128.4	40
1	37 04.0 75 66 124.7	36 41.3 76 66 125.1	36 18.6 76 65 125.5	35 55.7 77 65 125.9	35 32.8 77 65 126.3	35 09.8 77 64 126.7	34 46.8 77 64 127.1	34 23.6 77 64 127.5	1
2	36 24.4 75 67 123.8	36 01.9 75 66 124.2	35 39.3 75 66 124.6	35 16.7 76 66 125.0	34 54.0 76 66 125.4	34 31.2 76 65 125.8	34 08.3 76 65 126.2	33 45.4 77 65 126.6	2
3	35 44.3 74 67 122.8	35 22.0 74 67 123.2	34 59.7 75 67 123.7	34 37.2 75 66 124.1	34 14.7 75 66 124.5	33 52.1 75 66 124.9	33 29.4 76 66 125.3	33 06.6 76 65 125.6	3
4	35 03.8 74 68 121.9	34 41.7 74 68 122.3	34 19.6 74 68 122.8	33 57.3 74 67 123.2	33 35.0 75 67 123.6	33 12.5 75 67 124.0	32 50.0 75 66 124.4	32 27.5 75 66 124.7	4
45	34 23.0 73 69 121.0	34 01.1 73 68 121.5	33 39.1 73 68 121.9	33 17.0 74 68 122.3	32 54.8 74 68 122.7	32 32.6 74 67 123.1	32 10.3 74 67 123.5	31 47.9 75 67 123.9	45
6	33 41.7 72 69 120.2	33 20.0 73 69 120.6	32 58.2 73 69 121.0	32 36.3 73 68 121.4	32 14.3 73 68 121.8	31 52.1 74 68 122.2	31 30.1 74 68 122.6	31 07.9 74 67 123.0	6
7	33 00.1 72 70 119.3	32 38.5 72 70 119.7	32 16.9 72 69 120.1	31 55.2 73 69 120.5	31 33.4 73 69 120.9	31 11.5 73 69 121.3	30 49.5 73 68 121.7	30 27.5 74 68 122.1	7
8	32 18.2 71 70 118.5	31 56.8 71 70 118.9	31 35.3 72 70 119.3	31 13.7 72 70 119.7	30 52.1 72 69 120.1	30 30.4 72 69 120.5	30 08.6 73 69 120.9	29 46.7 73 69 121.3	8
9	31 35.9 71 71 117.6	31 14.6 71 71 118.0	30 53.3 71 70 118.4	30 31.9 71 70 118.8	30 10.4 72 70 119.3	29 48.9 72 70 119.7	29 27.3 72 69 120.1	29 05.6 72 69 120.5	9
50	30 53.2 70 72 116.8	30 32.2 70 71 117.2	30 11.0 71 71 117.6	29 49.8 71 71 118.0	29 28.5 71 70 118.4	29 07.1 71 70 118.8	28 45.6 72 70 119.2	28 24.1 72 70 119.6	50
1	30 10.3 70 72 116.0	29 49.4 70 72 116.4	29 28.4 70 72 116.8	29 07.3 70 71 117.2	28 46.2 71 71 117.6	28 25.0 71 71 118.0	28 03.7 71 70 118.4	27 42.4 71 70 118.8	1
2	29 27.1 69 72 115.2	29 06.2 69 72 115.6	28 45.5 70 72 116.0	28 24.6 70 72 116.4	28 03.6 70 72 116.8	27 42.5 70 71 117.2	27 21.4 71 71 117.6	27 00.2 71 71 118.0	2
3	28 43.6 69 73 114.4	28 23.0 69 73 114.8	28 02.3 69 72 115.2	27 41.5 69 72 115.6	27 20.7 70 72 116.0	26 59.7 70 72 116.4	26 38.8 70 72 116.8	26 17.7 70 71 117.2	3
4	27 59.8 68 73 113.6	27 39.3 68 73 114.0	27 18.8 69 73 114.4	26 58.2 69 73 114.8	26 37.5 69 72 115.2	26 16.7 69 72 115.7	25 55.9 70 72 116.1	25 35.0 70 72 116.5	4
55	27 15.8 68 74 112.9	26 55.4 68 74 113.3	26 35.0 68 73 113.7	26 14.5 68 73 114.1	25 54.0 69 73 114.5	25 33.4 69 73 114.9	25 12.7 69 72 115.3	24 51.9 69 72 115.7	55
6	26 31.5 67 74 112.1	26 11.3 67 74 112.5	25 51.0 68 74 112.9	25 30.7 68 73 113.3	25 10.2 68 73 113.7	24 49.8 68 73 114.1	24 29.2 69 73 114.5	24 08.6 69 73 114.9	6
7	25 47.0 67 75 111.3	25 26.9 67 74 111.8	25 06.8 67 74 112.2	24 46.5 68 74 112.6	24 26.2 68 74 113.0	24 05.9 68 74 113.4	23 45.5 68 73 113.8	23 25.0 68 73 114.2	7
8	25 02.3 66 75 110.6	24 42.3 67 75 111.0	24 22.3 67 75 111.4	24 02.2 67 74 111.8	23 42.0 67 74 112.2	23 21.8 68 74 112.6	23 01.5 68 74 113.0	22 41.2 68 73 113.4	8
9	24 17.3 66 75 109.9	23 57.5 66 75 110.3	23 37.5 66 75 110.7	23 17.6 67 75 111.1	22 57.5 67 74 111.5	22 37.5 67 74 111.9	22 17.3 67 74 112.3	21 57.1 67 74 112.7	9
60	23 32.1 66 76 109.2	23 12.4 66 75 109.6	22 52.6 66 75 110.0	22 32.8 66 75 110.4	22 12.9 66 75 110.8	21 52.9 67 75 111.2	21 32.9 67 74 111.6	21 12.8 67 74 112.0	60
1	22 46.8 65 76 108.4	22 27.2 65 76 108.9	22 07.5 66 76 109.3	21 47.7 66 75 109.7	21 28.0 66 75 110.1	21 08.1 66 75 110.5	20 48.2 66 75 110.9	20 28.2 67 75 111.3	1
2	22 01.2 65 76 107.7	21 41.7 65 76 108.2	21 22.2 65 76 108.6	21 02.5 66 76 109.0	20 42.8 66 76 109.4	20 23.1 66 75 109.8	20 03.3 66 75 110.2	19 43.5 66 75 110.6	2
3	21 15.5 65 76 107.0	20 56.1 65 76 107.5	20 36.6 65 76 107.9	20 17.1 65 76 108.3	19 57.5 66 76 108.7	19 37.9 66 76 109.1	19 18.2 66 75 109.5	18 58.5 66 75 109.9	3
4	20 29.6 64 77 106.4	20 10.3 64 77 106.8	19 50.9 65 76 107.2	19 31.5 65 76 107.6	19 12.1 65 76 108.0	18 52.5 65 76 108.4	18 33.0 65 76 108.8	18 13.3 65 76 109.2	4
65	19 43.5 64 77 105.7	19 24.3 64 77 106.1	19 05.1 64 77 106.5	18 45.8 64 77 106.9	18 26.4 65 76 107.3	18 07.0 65 76 107.7	17 47.5 65 76 108.1	17 28.0 65 76 108.5	65
6	18 57.3 64 77 105.0	18 38.2 64 77 105.4	18 19.0 64 77 105.8	17 59.8 64 77 106.2	17 40.6 64 77 106.6	17 21.2 64 77 107.0	17 01.9 65 76 107.4	16 42.5 65 76 107.8	6
7	18 11.0 63 77 104.3	17 51.9 64 77 104.7	17 32.9 64 77 105.1	17 13.7 64 77 105.5	16 54.6 64 77 105.9	16 35.3 64 77 106.3	16 16.1 64 76 106.7	15 56.8 64 76 107.1	7
8	17 24.5 63 78 103.7	17 05.0 63 78 104.1	16 46.5 63 77 104.5	16 27.5 64 77 104.9	16 08.4 64 77 105.3	15 49.3 64 77 105.7	15 30.1 64 77 106.1	15 10.9 64 77 106.5	8
9	16 37.9 63 78 103.0	16 19.0 63 78 103.4	16 00.1 63 78 103.8	15 41.1 63 78 104.2	15 22.1 63 77 104.6	15 03.1 64 77 105.0	14 44.0 64 77 105.4	14 24.9 64 77 105.8	9
70	15 51.1 63 78 102.4	15 32.3 63 78 102.8	15 13.5 63 78 103.2	14 54.6 63 78 103.6	14 35.7 63 78 104.0	14 16.7 63 77 104.4	13 57.7 63 77 104.8	13 38.7 64 77 105.2	70
1	15 04.2 62 78 101.7	14 45.5 62 78 102.1	14 26.8 63 78 102.5	14 08.0 63 78 102.9	13 49.1 63 78 103.3	13 30.2 63 78 103.7	13 11.3 63 78 104.1	12 52.4 63 77 104.5	1
2	14 17.3 62 78 101.1	13 58.6 62 78 101.5	13 39.9 62 78 101.9	13 21.2 62 78 102.3	13 02.4 63 78 102.7	12 43.6 63 78 103.1	12 24.8 63 78 103.5	12 05.9 63 78 103.9	2
3	13 30.2 62 79 100.4	13 11.6 62 79 100.8	12 53.0 62 78 101.2	12 34.3 62 78 101.6	12 15.6 62 78 102.0	11 56.9 62 78 102.4	11 38.1 63 78 102.8	11 19.3 63 78 103.2	3
4	12 43.0 62 79 99.8	12 24.5 62 79 100.2	12 05.9 62 79 100.6	11 47.3 62 79 101.0	11 28.7 62 78 101.4	11 10.0 62 78 101.8	10 51.3 62 78 102.2	10 32.6 62 78 102.6	4
75	11 55.7 62 79 99.2	11 37.3 62 79 99.6	11 18.8 62 79 100.0	11 00.2 62 79 100.4	10 41.7 62 79 100.8	10 23.1 62 78 101.2	10 04.4 62 78 101.6	9 45.8 62 78 102.0	75
6	11 08.4 61 79 98.5	10 50.0 61 79 98.9	10 31.5 62 79 99.3	10 13.1 62 79 99.7	9 54.6 62 79 100.1	9 36.0 62 79 100.5	9 17.5 62 78 100.9	8 58.9 62 78 101.3	6
7	10 21.0 61 79 97.9	10 02.6 61 79 98.3	9 44.2 61 79 98.7	9 25.8 61 79 99.1	9 07.3 62 79 99.5	8 48.9 62 79 99.9	8 30.4 62 79 100.3	8 11.8 62 79 100.7	7
8	9 33.5 61 79 97.3	9 15.2 61 79 97.7	8 56.8 61 79 98.1	8 38.4 61 79 98.5	8 20.0 61 79 98.9	8 01.6 61 79 99.3	7 43.2 62 79 99.7	7 24.7 62 79 100.1	8
9	8 45.9 61 79 96.7	8 27.6 61 79 97.1	8 09.3 61 79 97.5	7 51.0 61 79 97.9	7 32.7 61 79 98.3	7 14.3 61 79 98.7	6 55.9 62 79 99.1	6 37.5 62 79 99.5	9
80	7 58.3 61 79 96.1	7 40.1 61 79 96.5	7 21.8 61 79 96.9	7 03.5 61 79 97.3	6 45.2 61 79 97.7	6 26.9 61 79 98.1	6 08.5 61 79 98.5	5 50.2 61 79 98.9	80
1	7 10.6 61 80 95.4	6 52.4 61 79 95.8	6 34.2 61 79 96.2	6 15.9 61 79 96.6	5 57.7 61 79 97.0	5 39.4 61 79 97.4	5 21.1 61 79 97.8	5 02.8 61 79 98.2	1
2	6 22.9 61 80 94.8	6 04.7 61 80 95.2	5 46.5 61 80 95.6	5 28.3 61 79 96.0	5 10.1 61 79 96.4				2
3	5 35.1 60 80 94.2	5 17.0 61 80 94.6							3

16—65153-1

Lat. 37°

Each declination cell is formatted: Alt (° ′) · Δd · Δt · Az (°)

H.A.	4° 00′	4° 30′	5° 00′	5° 30′	6° 00′	6° 30′	7° 00′	7° 30′	H.A.
00	57 00.0 1.0 01 180.0	57 30.0 1.0 01 180.0	58 00.0 1.0 01 180.0	58 30.0 1.0 01 180.0	59 00.0 1.0 01 180.0	59 30.0 1.0 01 180.0	60 00.0 1.0 01 180.0	60 30.0 1.0 01 180.0	00
1	56 59.2 1.0 04 178.2	57 29.2 1.0 04 178.1	57 59.2 1.0 04 178.1	58 29.2 1.0 04 178.1	58 59.2 1.0 04 178.1	59 29.2 1.0 04 178.0	59 59.2 1.0 04 178.0	60 29.2 1.0 04 178.0	1
2	56 56.9 1.0 06 176.3	57 26.9 1.0 06 176.3	57 56.9 1.0 07 176.2	58 26.8 1.0 07 176.2	58 56.8 1.0 07 176.1	59 26.7 1.0 07 176.1	59 56.7 1.0 07 176.0	60 26.6 1.0 07 176.0	2
3	56 53.1 1.0 09 174.5	57 23.0 1.0 09 174.4	57 52.9 1.0 09 174.4	58 22.8 1.0 09 174.3	58 52.7 1.0 09 174.2	59 22.6 1.0 10 174.1	59 52.5 1.0 10 174.1	60 22.4 1.0 10 174.0	3
4	56 47.8 99 11 172.7	57 17.6 99 12 172.6	57 47.5 99 12 172.5	58 17.3 99 12 172.4	58 47.1 99 12 172.3	59 16.9 99 12 172.2	59 46.8 99 12 172.1	60 16.6 99 12 172.0	4
05	56 40.9 99 14 170.9	57 10.7 99 14 170.8	57 40.4 99 14 170.7	58 10.2 99 14 170.5	58 39.9 99 15 170.4	59 09.6 99 15 170.3	59 39.4 99 15 170.1	60 09.1 99 15 170.0	05
6	56 32.6 99 16 169.1	57 02.3 99 17 169.0	57 31.9 99 17 168.8	58 01.5 99 17 168.7	58 31.2 99 17 168.5	59 00.8 99 17 168.4	59 30.4 99 18 168.2	59 59.9 99 18 168.0	6
7	56 22.8 98 19 167.3	56 52.4 98 19 167.2	57 21.9 98 19 166.8	57 51.4 98 19 166.6	58 20.9 98 20 166.5	58 50.3 98 20 166.3	59 19.8 98 20 166.3	59 49.2 98 20 166.1	7
8	56 11.6 98 21 165.6	56 41.0 98 21 165.4	57 10.3 98 22 165.2	57 39.7 98 22 165.0	58 09.0 98 22 164.8	58 38.4 98 22 164.6	59 07.6 98 23 164.4	59 36.9 98 23 164.2	8
9	55 58.9 97 23 163.8	56 28.2 97 24 163.6	56 57.4 97 24 163.4	57 26.6 97 24 163.2	57 55.7 97 25 163.0	58 24.9 97 25 162.7	58 54.0 97 25 162.5	59 23.1 97 26 162.3	9
10	55 44.9 97 26 162.1	56 13.9 97 26 161.8	56 43.0 97 26 161.6	57 12.0 97 27 161.4	57 41.0 97 27 161.2	58 09.9 96 27 160.9	58 38.8 96 28 160.7	59 07.8 96 28 160.4	10
1	55 29.4 96 28 160.4	55 58.3 96 28 160.1	56 27.2 96 29 159.9	56 56.0 96 29 159.6	57 24.8 96 30 159.4	57 53.5 96 30 159.1	58 22.3 96 30 158.8	58 50.9 96 30 158.5	1
2	55 12.7 96 30 158.7	55 41.4 96 30 158.4	56 10.0 96 31 158.2	56 38.6 96 31 157.9	57 07.2 95 32 157.6	57 35.8 96 32 157.3	58 04.3 95 32 157.0	58 32.7 95 33 156.7	2
3	54 54.6 95 32 157.0	55 23.1 95 33 156.7	55 51.5 95 33 156.5	56 19.9 95 33 156.2	56 48.3 94 34 155.9	57 16.6 94 34 155.6	57 44.9 94 35 155.3	58 13.1 94 35 154.9	3
4	54 35.3 94 34 155.4	55 03.5 94 35 155.1	55 31.8 94 35 154.8	55 59.9 94 35 154.5	56 28.1 94 36 154.2	56 56.1 94 36 153.9	57 24.2 93 37 153.5	57 52.1 93 37 153.2	4
15	54 14.7 94 36 153.8	54 42.7 93 37 153.5	55 10.7 93 37 153.2	55 38.7 93 37 152.8	56 06.6 93 38 152.5	56 34.4 93 38 152.2	57 02.2 93 39 151.8	57 29.9 92 39 151.5	15
6	53 52.9 93 38 152.2	54 20.7 93 39 151.9	54 48.5 92 39 151.5	55 16.2 92 39 151.2	55 43.8 92 40 150.9	56 11.4 92 40 150.5	56 38.9 91 41 150.2	57 06.4 91 41 149.8	6
7	53 30.0 92 40 150.6	53 57.6 92 40 150.3	54 25.1 92 41 150.0	54 52.5 91 41 149.6	55 19.9 91 42 149.3	55 47.2 91 42 148.9	56 14.5 91 43 148.5	56 41.7 91 43 148.1	7
8	53 06.0 91 42 149.1	53 33.3 91 42 148.8	54 00.5 91 43 148.4	54 27.7 91 43 148.0	54 54.9 90 44 147.7	55 21.9 90 44 147.3	55 48.9 90 44 146.9	56 15.8 90 45 146.5	8
9	52 40.8 90 44 147.6	53 07.9 90 44 147.2	53 34.9 90 44 146.9	54 01.8 90 45 146.5	54 28.7 89 45 146.1	54 55.5 89 46 145.7	55 22.2 89 46 145.3	55 48.8 89 47 144.9	9
20	52 14.6 89 45 146.1	52 41.4 89 46 145.8	53 08.2 89 46 145.4	53 34.9 89 47 145.0	54 01.5 89 47 144.6	54 28.0 88 48 144.2	54 54.4 88 48 143.8	55 20.8 88 48 143.4	20
1	51 47.4 89 47 144.7	52 14.0 88 47 144.3	52 40.5 88 48 143.9	53 06.9 88 48 143.5	53 33.2 88 49 143.1	53 59.5 87 49 142.7	54 25.6 87 50 142.3	54 51.7 87 50 141.9	1
2	51 19.3 88 49 143.3	51 45.6 88 49 142.9	52 11.8 87 49 142.5	52 37.9 87 50 142.1	53 04.0 87 50 141.7	53 30.0 86 51 141.3	53 55.8 86 51 140.8	54 21.6 86 52 140.4	2
3	50 50.1 87 50 141.9	51 16.2 87 50 141.5	51 42.1 86 51 141.1	52 08.0 86 51 140.7	52 33.8 86 52 140.3	52 59.5 86 52 139.8	53 25.1 85 53 139.4	53 50.6 85 53 139.0	3
4	50 20.1 86 51 140.5	50 45.9 86 52 140.1	51 11.6 86 52 139.7	51 37.3 85 53 139.3	52 02.7 85 53 138.9	52 28.2 85 54 138.4	52 53.5 84 54 138.0	53 18.7 84 54 137.5	4
25	49 49.2 85 53 139.2	50 14.8 85 53 138.8	50 40.2 85 54 138.4	51 05.5 84 54 137.9	51 30.8 84 55 137.5	51 55.9 84 55 137.1	52 21.0 83 56 136.6	52 46.0 83 56 136.2	25
6	49 17.5 84 54 137.9	49 42.8 84 55 137.5	50 08.0 84 55 137.1	50 33.0 83 56 136.6	50 58.0 83 56 136.2	51 22.9 83 56 135.7	51 47.7 82 57 135.3	52 12.4 82 57 134.8	6
7	48 45.0 84 56 136.6	49 10.0 83 56 136.2	49 34.9 83 56 135.8	49 59.7 83 57 135.3	50 24.5 82 57 134.9	50 49.1 82 58 134.4	51 13.6 82 58 134.0	51 38.0 81 59 133.5	7
8	48 11.7 83 57 135.4	48 36.4 82 57 135.0	49 01.1 82 58 134.5	49 25.7 82 58 134.1	49 50.1 81 58 133.6	50 14.5 81 59 133.2	50 38.7 81 59 132.7	51 02.9 80 60 132.3	8
9	47 37.7 82 58 134.1	48 02.2 82 58 133.7	48 26.6 81 59 133.3	48 50.9 81 59 132.8	49 15.1 81 60 132.4	49 39.2 80 60 131.9	50 03.2 80 60 131.5	50 27.1 79 61 131.0	9
30	47 02.9 81 59 132.9	47 27.2 81 59 132.5	47 51.3 80 60 132.1	48 15.4 80 60 131.6	48 39.4 80 61 131.2	49 03.2 79 61 130.7	49 26.9 79 62 130.2	49 50.5 79 62 129.8	30
1	46 27.5 80 60 131.8	46 51.5 80 60 131.3	47 15.4 80 61 130.9	47 39.3 79 61 130.4	48 03.0 79 62 130.0	48 26.6 78 62 129.5	48 50.0 78 63 129.0	49 13.4 78 63 128.6	1
2	45 51.5 79 61 130.6	46 15.2 79 62 130.2	46 38.9 79 62 129.7	47 02.5 78 62 129.3	47 25.9 78 63 128.8	47 49.3 78 63 128.4	48 12.5 77 64 127.9	48 35.6 77 64 127.4	2
3	45 14.8 79 62 129.5	45 38.3 78 62 129.1	46 01.8 78 63 128.6	46 25.1 77 63 128.2	46 48.3 77 64 127.7	47 11.4 77 64 127.2	47 34.4 76 64 126.7	47 57.3 76 65 126.3	3
4	44 37.5 78 63 128.4	45 00.8 78 63 127.9	45 24.0 77 64 127.5	45 47.1 77 64 127.0	46 10.1 76 65 126.6	46 33.0 76 65 126.1	46 55.7 76 65 125.6	47 18.4 75 66 125.2	4
35	43 59.7 77 64 127.3	44 22.8 77 64 126.9	44 45.7 76 65 126.4	45 08.6 76 65 126.0	45 31.4 76 65 125.5	45 54.0 75 66 125.0	46 16.5 75 66 124.5	46 38.9 74 67 124.1	35
6	43 21.3 76 65 126.3	43 44.2 76 65 125.8	44 06.9 76 66 125.4	44 29.6 75 66 124.9	44 52.1 75 66 124.4	45 14.5 75 67 124.0	45 36.8 74 67 123.5	45 59.0 74 67 123.0	6
7	42 42.4 76 66 125.2	43 05.0 75 66 124.8	43 27.6 75 66 124.3	43 50.0 75 67 123.9	44 12.3 74 67 123.4	44 34.5 74 67 122.9	44 56.6 73 68 122.4	45 18.5 73 68 122.0	7
8	42 03.0 75 66 124.3	42 25.4 74 67 123.8	42 47.8 74 67 123.3	43 10.0 74 67 122.9	43 32.1 73 68 122.4	43 54.1 73 68 121.9	44 15.9 73 68 121.4	44 37.7 72 69 120.9	8
9	41 23.1 74 67 123.2	41 45.4 74 68 122.8	42 07.5 73 68 122.3	42 29.5 73 68 121.8	42 51.4 73 69 121.3	43 13.2 72 69 120.9	43 34.8 72 69 120.4	43 56.4 72 70 119.9	9
40	40 42.8 74 68 122.2	41 04.8 73 68 121.8	41 26.8 73 69 121.3	41 48.6 73 69 120.9	42 10.3 72 69 120.4	42 31.8 72 70 119.9	42 53.3 71 70 119.5	43 14.6 71 70 119.0	40
1	40 02.1 73 69 121.3	40 23.9 73 69 120.8	40 45.6 72 69 120.4	41 07.2 72 70 119.9	41 28.7 71 70 119.4	41 50.1 71 70 119.0	42 11.4 71 70 118.5	42 32.5 70 71 118.0	1
2	39 20.9 73 70 120.3	39 42.5 72 70 119.8	40 04.1 72 70 119.4	40 25.5 71 70 118.9	40 46.8 71 70 118.4	41 08.0 70 71 118.0	41 29.1 70 71 117.6	41 50.1 70 71 117.1	2
3	38 39.4 72 70 119.4	39 00.8 71 70 118.9	39 22.1 71 70 118.5	39 43.4 71 71 118.0	40 04.5 70 71 117.6	40 25.5 70 71 117.1	40 46.4 69 72 116.6	41 07.2 69 72 116.2	3
4	37 57.4 71 70 118.5	38 18.7 71 71 118.0	38 39.9 70 71 117.6	39 00.9 70 71 117.1	39 21.9 70 72 116.7	39 42.7 69 72 116.2	40 03.4 69 72 115.7	40 24.0 69 72 115.3	4
45	37 15.1 70 71 117.6	37 36.2 70 71 117.2	37 57.2 70 72 116.7	38 18.1 69 72 116.2	38 38.9 69 72 115.8	38 59.5 69 72 115.3	39 20.1 68 73 114.9	39 40.5 68 73 114.4	45
6	36 32.5 70 72 116.7	36 53.4 70 72 116.3	37 14.2 69 72 115.8	37 35.0 69 72 115.4	37 55.6 69 73 114.9	38 16.1 68 73 114.4	38 36.5 68 73 114.0	38 56.7 67 73 113.5	6
7	35 49.5 70 72 115.9	36 10.3 69 73 115.4	36 31.0 69 73 115.0	36 51.5 68 73 114.5	37 12.0 68 73 114.0	37 32.3 68 73 113.6	37 52.5 67 74 113.1	38 12.7 67 74 112.7	7
8	35 06.3 69 73 115.0	35 26.9 69 73 114.6	35 47.4 68 73 114.1	36 07.8 68 73 113.7	36 28.1 67 74 113.2	36 48.3 67 74 112.8	37 08.3 67 74 112.3	37 28.3 66 74 111.8	8
9	34 22.7 68 73 114.2	34 43.2 68 73 113.7	35 03.5 68 74 113.3	35 23.7 67 74 112.8	35 43.9 67 74 112.4	36 03.9 67 74 111.9	36 23.9 66 75 111.5	36 43.7 66 75 111.0	9
50	33 38.9 68 74 113.4	33 59.2 67 74 112.9	34 19.4 67 74 112.5	34 39.5 67 74 112.0	34 59.5 67 74 111.6	35 19.4 66 75 111.1	35 39.2 66 75 110.7	35 58.8 65 75 110.2	50
1	32 54.7 67 74 112.6	33 14.9 67 74 112.1	33 34.9 67 75 111.7	33 54.4 66 75 111.2	34 14.4 66 75 110.8	34 34.5 66 75 110.3	34 54.2 65 75 109.9	35 13.8 65 76 109.4	1
2	32 10.4 67 75 111.8	32 30.4 66 75 111.3	32 50.3 66 75 110.9	33 10.1 66 75 110.4	33 29.9 65 75 110.0	33 49.5 65 75 109.5	34 09.0 65 76 109.1	34 28.5 64 76 108.6	2
3	31 25.7 66 75 111.0	31 45.6 66 75 110.5	32 05.4 66 75 110.1	32 25.1 65 75 109.7	32 44.7 65 76 109.2	33 04.2 65 76 108.8	33 23.6 64 76 108.3	33 42.9 64 76 107.8	3
4	30 40.9 66 75 110.2	31 00.6 66 75 109.8	31 20.3 65 76 109.3	31 39.9 65 76 108.9	31 59.4 65 76 108.4	32 18.7 64 76 108.0	32 38.0 64 76 107.5	32 57.2 64 76 107.1	4
55	29 55.8 66 75 109.5	30 15.4 65 76 109.0	30 35.0 65 76 108.6	30 54.4 65 76 108.1	31 13.8 64 76 107.7	31 33.1 64 76 107.2	31 52.3 63 77 106.8	32 11.3 63 77 106.3	55
6	29 10.5 65 76 108.7	29 30.0 65 76 108.3	29 49.5 65 76 107.8	30 08.8 64 76 107.4	30 28.1 64 77 106.9	30 47.2 64 77 106.5	31 06.3 63 77 106.0	31 25.3 63 77 105.6	6
7	28 25.0 65 76 108.0	28 44.4 65 76 107.5	29 03.8 64 76 107.1	29 23.0 64 77 106.7	29 42.1 64 77 106.2	30 01.2 63 77 105.8	30 20.2 63 77 105.3	30 39.0 63 77 104.9	7
8	27 39.4 64 76 107.2	27 58.7 64 77 106.8	28 17.9 64 77 106.4	28 37.0 64 77 105.9	28 56.0 63 77 105.5	29 15.0 63 77 105.0	29 33.9 63 77 104.6	29 52.6 62 78 104.1	8
9	26 53.5 64 77 106.5	27 12.7 64 77 106.1	27 31.8 64 77 105.6	27 50.8 63 77 105.2	28 09.8 63 77 104.8	28 28.6 63 78 104.3	28 47.4 62 78 103.9	29 06.1 62 78 103.4	9
60	26 07.5 64 77 105.8	26 26.6 64 77 105.4	26 45.6 63 77 104.9	27 04.5 63 77 104.5	27 23.4 63 78 104.1	27 42.1 62 78 103.6	28 00.8 62 78 103.2	28 19.4 62 78 102.7	60
1	25 21.3 63 77 105.1	25 40.3 63 77 104.7	25 59.2 63 78 104.2	26 18.1 63 78 103.8	26 36.8 62 78 103.4	26 55.5 62 78 102.9	27 14.1 62 78 102.5	27 32.6 62 78 102.0	1
2	24 35.0 63 78 104.4	24 53.9 63 78 104.0	25 12.7 63 78 103.5	25 31.4 62 78 103.1	25 50.1 62 78 102.7	26 08.7 62 78 102.2	26 27.3 62 78 101.8	26 45.7 61 78 101.4	2
3	23 48.5 63 78 103.7	24 07.3 63 78 103.3	24 26.0 62 78 102.9	24 44.7 62 78 102.4	25 03.2 62 78 102.0	25 21.8 62 78 101.6	25 40.3 61 78 101.1	25 58.7 61 79 100.7	3
4	23 01.8 63 78 103.0	23 20.6 62 78 102.6	23 39.3 62 78 102.2	23 57.9 62 78 101.7	24 16.4 62 78 101.3	24 34.8 61 79 100.9	24 53.2 61 79 100.4	25 11.5 61 79 100.0	4
65	22 15.1 62 78 102.4	22 33.8 62 78 101.9	22 52.4 62 78 101.5	23 10.9 62 78 101.1	23 29.4 61 79 100.6	23 47.7 61 79 100.2	24 06.1 61 79 99.8	24 24.3 61 79 99.3	65
6	21 28.2 62 78 101.7	21 46.8 62 79 101.3	22 05.4 62 79 100.8	22 23.8 61 79 100.4	22 42.2 61 79 100.0	23 00.5 61 79 99.6	23 18.8 61 79 99.1	23 37.0 60 79 98.7	6
7	20 41.3 62 78 101.0	20 59.8 62 79 100.6	21 18.2 61 79 100.2	21 36.6 61 79 99.8	21 55.0 61 79 99.3	22 13.2 61 79 98.9	22 31.4 61 79 98.5	22 49.6 60 79 98.0	7
8	19 54.2 62 79 100.4	20 12.6 61 79 99.9	20 31.0 61 79 99.5	20 49.4 61 79 99.1	21 07.6 61 79 98.7	21 25.9 60 79 98.3	21 44.0 60 79 97.8	22 02.1 60 79 97.4	8
9	19 07.0 61 79 99.7	19 25.4 61 79 99.3	19 43.7 61 79 98.9	20 02.0 61 79 98.5	20 20.2 60 79 98.0	20 38.4 60 79 97.6	20 56.5 60 79 97.2	21 14.5 60 79 96.8	9
70	18 19.7 61 79 99.1	18 38.1 61 79 98.7	18 56.3 61 79 98.2	19 14.6 61 79 97.8	19 32.7 60 79 97.4	19 50.9 60 79 97.0	20 08.9 60 79 96.5	20 26.9 60 79 96.1	70
1	17 32.3 61 79 98.4	17 50.6 61 79 98.0	18 08.9 61 79 97.6	18 27.1 60 79 97.2	18 45.2 60 79 96.8	19 03.3 60 79 96.3	19 21.3 60 80 95.9	19 39.2 60 80 95.5	1
2	16 44.9 61 79 97.8	17 03.2 61 79 97.4	17 21.3 61 79 97.0	17 39.5 60 79 96.5	17 57.6 60 79 96.1	18 15.6 60 80 95.7	18 33.6 60 80 95.3	18 51.5 60 80 94.9	2
3	15 57.4 61 79 97.2	16 15.6 61 79 96.7	16 33.8 60 79 96.3	16 51.9 60 79 95.9	17 09.9 60 80 95.5	17 27.9 60 80 95.1	17 45.9 60 80 94.7	18 03.7 60 80 94.2	3
4	15 09.8 61 79 96.5	15 28.0 60 79 96.1	15 46.1 60 79 95.7	16 04.2 60 80 95.3	16 22.2 60 80 94.9	16 40.2 60 80 94.5	16 58.1 60 80 94.0	17 15.9 59 80 93.6	4
75	14 22.2 60 79 95.9	14 40.3 60 80 95.5	14 58.4 60 80 95.1	15 16.4 60 80 94.7	15 34.4 60 80 94.3	15 52.4 60 80 93.8	16 10.3 60 80 93.4	16 28.1 59 80 93.0	75
6	13 34.5 60 80 95.3	13 52.6 60 80 94.9	14 10.6 60 80 94.5	14 28.6 60 80 94.0	14 46.6 60 80 93.6	15 04.5 60 80 93.2	15 22.4 60 80 92.8	15 40.2 59 80 92.4	6
7	12 46.8 60 80 94.7	13 04.8 60 80 94.3	13 22.8 60 80 93.8	13 40.8 60 80 93.4	13 58.8 60 80 93.0	14 16.7 60 80 92.6	14 34.5 59 80 92.2	14 52.4 59 80 91.8	7
8	11 59.0 60 80 94.1	12 17.0 60 80 93.6	12 35.0 60 80 93.2	12 53.0 60 80 92.8	13 10.9 60 80 92.4	13 28.8 60 80 92.0	13 46.6 59 80 91.6	14 04.4 59 80 91.2	8
9	11 11.2 60 80 93.4	11 29.2 60 80 93.0	11 47.2 60 80 92.6	12 05.1 60 80 92.2	12 23.0 60 80 91.8	12 40.9 59 80 91.4	12 58.7 59 80 91.0	13 16.5 59 80 90.6	9
80	10 23.3 60 80 92.8	10 41.3 60 80 92.4	10 59.3 60 80 92.0	11 17.2 60 80 91.6	11 35.1 60 80 91.2	11 53.0 59 80 90.8	12 10.9 59 80 90.4	12 28.6 59 80 90.0	80
1	9 35.4 60 80 92.2	9 53.4 60 80 91.8	10 11.4 60 80 91.4	10 29.3 60 80 91.0	10 47.2 60 80 90.6	11 05.1 59 80 90.2	11 22.9 59 80 89.8	11 40.7 59 80 89.4	1
2	8 47.6 60 80 91.6	9 05.5 60 80 91.2	9 23.5 60 80 90.8	9 41.4 60 80 90.4	9 59.3 60 80 90.0	10 17.2 59 80 89.6	10 35.0 59 80 89.2	10 52.8 59 80 88.8	2
3	7 59.7 60 80 91.0	8 17.6 60 80 90.6	8 35.6 60 80 90.2	8 53.5 60 80 89.8	9 11.4 60 80 89.4	9 29.2 59 80 89.0	9 47.1 59 80 88.6	10 04.9 59 80 88.2	3
4	7 11.7 60 80 90.4	7 29.7 60 80 90.0	7 47.6 60 80 89.6	8 05.6 60 80 89.2	8 23.5 60 80 88.8	8 41.3 60 80 88.4	8 59.2 59 80 88.0	9 17.0 59 80 87.6	4
85	6 23.8 60 80 89.8	6 41.8 60 80 89.4	6 59.7 60 80 89.0	7 17.7 60 80 88.6	7 35.6 60 80 88.2	7 53.4 60 80 87.8	8 11.3 60 80 87.4	8 29.1 59 80 87.0	85
6	5 35.9 60 80 89.2	5 53.9 60 80 88.8	6 11.8 60 80 88.4	6 29.8 60 80 88.0	6 47.7 60 80 87.6	7 05.6 60 80 87.2	7 23.5 59 80 86.8	7 41.3 59 80 86.4	6
7		5 06.0 60 80 88.2	5 23.9 60 80 87.8	5 41.9 60 80 87.4	5 59.7 60 80 87.0	6 17.7 60 80 86.6	6 35.6 60 80 86.2	6 53.5 60 80 85.8	7
8					5 12.0 60 80 86.4	5 29.9 60 80 86.0	5 47.8 60 80 85.6	6 05.7 60 80 85.2	8
9							5 00.1 60 79 85.0	5 18.0 60 79 84.6	9

Lat. 37°

H.A.	4° 00' Alt.	Δd Δt	Az.	4° 30' Alt.	Δd Δt	Az.	5° 00' Alt.	Δd Δt	Az.	5° 30' Alt.	Δd Δt	Az.	6° 00' Alt.	Δd Δt	Az.	6° 30' Alt.	Δd Δt	Az.	7° 00' Alt.	Δd Δt	Az.	7° 30' Alt.	Δd Δt	Az.	H.A.
00	49 00.0	1.00 1	180.0	48 30.0	1.00 1	180.0	48 00.0	1.00 1	180.0	47 30.0	1.00 1	180.0	47 00.0	1.00 1	180.0	46 30.0	1.00 1	180.0	46 00.0	1.00 1	180.0	45 30.0	1.00 1	180.0	00
1	48 59.4	1.00 3	178.5	48 29.4	1.00 3	178.5	47 59.4	1.00 3	178.5	47 29.4	1.00 3	178.5	46 59.4	1.00 3	178.5	46 29.4	1.00 3	178.6	45 59.4	1.00 3	178.6	45 29.4	1.00 3	178.6	1
2	48 57.5	1.00 5	177.0	48 27.5	1.00 5	177.0	47 57.5	1.00 5	177.0	47 27.5	1.00 5	177.1	46 57.5	1.00 5	177.1	46 27.5	1.00 5	177.1	45 57.6	1.00 5	177.1	45 27.6	1.00 5	177.2	2
3	48 54.3	1.00 7	175.4	48 24.3	1.00 7	175.5	47 54.4	1.00 7	175.5	47 24.5	1.00 7	175.6	46 54.5	1.00 7	175.6	46 24.6	1.00 7	175.7	45 54.6	1.00 7	175.7	45 24.7	1.00 7	175.8	3
4	48 49.8	1.01 0	173.9	48 20.0	1.00 9	174.0	47 50.1	1.00 9	174.1	47 20.2	1.00 9	174.1	46 50.3	1.00 9	174.2	46 20.4	1.00 9	174.2	45 50.5	1.00 9	174.3	45 20.6	1.00 9	174.4	4
05	48 44.2	99 11	172.4	48 14.3	99 11	172.5	47 44.5	99 11	172.6	47 14.6	99 11	172.7	46 44.8	99 11	172.7	46 15.0	99 11	172.8	45 45.1	1.0 11	172.9	45 15.3	1.0 11	172.9	05
6	48 37.2	99 14	170.9	48 07.5	99 13	171.0	47 37.7	99 13	171.1	47 07.9	99 13	171.2	46 38.1	99 13	171.3	46 08.4	99 13	171.4	45 38.6	99 13	171.5	45 08.8	99 13	171.6	6
7	48 29.0	99 16	169.4	47 59.4	99 16	169.5	47 29.7	99 15	169.6	47 00.0	99 15	169.8	46 30.3	99 15	169.9	46 00.6	99 15	170.0	45 30.9	99 15	170.1	45 01.2	99 15	170.2	7
8	48 19.6	99 18	167.9	47 50.1	99 18	168.1	47 20.5	99 17	168.2	46 50.9	99 17	168.3	46 21.3	99 17	168.4	45 51.7	99 17	168.5	45 22.0	99 17	168.7	44 52.4	99 16	168.8	8
9	48 09.0	98 20	166.5	47 39.6	98 19	166.6	47 10.1	98 19	166.7	46 40.6	98 19	166.9	46 11.1	98 19	167.0	45 41.6	98 19	167.1	45 12.0	98 18	167.3	44 42.5	98 18	167.4	9
10	47 57.2	98 22	165.0	47 27.9	98 21	165.2	46 58.5	98 21	165.3	46 29.1	98 21	165.5	45 59.7	98 21	165.6	45 30.3	98 21	165.7	45 00.9	98 20	165.9	44 31.5	98 20	166.0	10
1	47 44.3	97 24	163.6	47 15.0	97 23	163.7	46 45.8	97 23	163.9	46 16.5	98 23	164.1	45 47.3	98 23	164.2	45 18.0	98 22	164.4	44 48.7	98 22	164.5	44 19.4	98 22	164.7	1
2	47 30.1	97 25	162.1	47 01.0	97 25	162.3	46 31.9	97 25	162.5	46 02.8	97 25	162.7	45 33.7	97 24	162.8	45 04.3	97 24	163.0	44 35.3	97 24	163.2	44 06.2	97 24	163.3	2
3	47 14.8	96 27	160.7	46 45.9	96 27	160.9	46 16.9	96 27	161.1	45 48.0	96 27	161.3	45 19.0	96 26	161.4	44 50.0	96 26	161.6	44 20.9	96 26	161.8	43 51.9	96 27	162.0	3
4	46 58.4	96 29	159.3	46 29.7	96 29	159.5	46 00.9	96 29	159.7	45 32.0	96 28	159.9	45 03.2	96 28	160.1	44 34.3	96 28	160.3	44 05.4	96 28	160.5	43 36.5	96 27	160.7	4
15	46 40.9	95 31	157.9	46 12.3	95 31	158.1	45 43.7	96 30	158.3	45 15.0	96 30	158.5	44 46.3	96 30	158.7	44 17.6	96 30	158.9	43 48.9	96 29	159.1	43 20.1	96 29	159.3	15
6	46 22.4	95 33	156.5	45 53.9	95 32	156.7	45 25.5	95 32	157.0	44 57.0	95 32	157.2	44 28.4	95 32	157.4	43 59.9	95 31	157.6	43 31.3	95 31	157.8	43 02.7	95 31	158.0	6
7	46 02.8	94 34	155.2	45 34.5	94 34	155.4	45 06.2	94 34	155.6	44 37.9	94 34	155.9	44 09.5	95 33	156.1	43 41.1	95 33	156.3	43 12.7	95 33	156.5	42 44.3	95 32	156.8	7
8	45 42.1	94 36	153.8	45 14.0	94 36	154.1	44 45.9	94 35	154.3	44 17.8	94 35	154.5	43 49.6	94 35	154.8	43 21.4	94 35	155.0	42 53.2	94 34	155.2	42 24.9	94 34	155.5	8
9	45 20.5	93 38	152.5	44 52.6	93 37	152.7	44 24.7	93 37	153.0	43 56.7	93 37	153.2	43 28.7	93 36	153.5	43 00.7	93 36	153.7	42 32.6	94 36	154.0	42 04.5	94 36	154.2	9
20	44 57.8	92 39	151.2	44 30.2	92 39	151.4	44 02.4	92 39	151.7	43 34.7	93 38	152.0	43 06.8	93 38	152.2	42 39.0	93 38	152.5	42 11.1	93 37	152.7	41 43.2	93 37	153.0	20
1	44 34.3	92 41	149.9	44 06.8	92 40	150.2	43 39.2	92 40	150.4	43 11.7	92 40	150.7	42 44.1	92 40	151.0	42 16.4	92 39	151.2	41 48.7	92 39	151.5	41 21.0	92 39	151.8	1
2	44 09.9	91 42	148.6	43 42.5	91 42	148.9	43 15.1	91 42	149.2	42 47.8	91 41	149.5	42 20.4	91 41	149.7	41 52.9	91 41	150.0	41 25.4	92 40	150.3	40 57.9	92 40	150.5	2
3	43 44.4	90 44	147.4	43 17.3	90 43	147.6	42 50.1	90 43	147.9	42 23.0	91 43	148.2	41 55.8	91 42	148.5	41 28.5	91 42	148.8	41 01.2	91 42	149.1	40 33.9	91 41	149.3	3
4	43 18.1	89 45	146.1	42 51.2	90 45	146.4	42 24.3	90 45	146.7	41 57.3	90 44	147.0	41 30.3	90 44	147.3	41 03.3	90 44	147.6	40 36.2	90 43	147.9	40 09.0	91 43	148.2	4
25	42 50.9	89 47	144.9	42 24.3	89 46	145.2	41 57.6	89 46	145.5	41 30.8	89 46	145.8	41 04.0	89 45	146.1	40 37.2	90 45	146.4	40 10.3	90 45	146.7	39 43.3	90 44	147.0	25
6	42 23.0	88 48	143.7	41 56.5	88 48	144.0	41 30.0	88 47	144.3	41 03.5	89 47	144.6	40 36.9	89 47	144.9	40 10.2	89 46	145.3	39 43.6	89 46	145.5	39 16.8	89 46	145.8	6
7	41 54.2	87 49	142.5	41 28.0	88 49	142.8	41 01.7	88 48	143.2	40 35.4	88 48	143.4	40 09.0	88 48	143.8	39 42.5	88 47	144.1	39 16.1	88 47	144.4	38 49.5	89 47	144.7	7
8	41 24.7	87 50	141.4	40 58.6	87 50	141.7	40 32.6	87 50	142.0	40 06.5	87 49	142.3	39 40.3	87 49	142.7	39 14.1	88 49	143.0	38 47.8	88 48	143.3	38 21.5	88 48	143.6	8
9	40 54.4	86 52	140.2	40 28.6	86 51	140.6	40 02.7	86 51	140.9	39 36.8	86 51	141.2	39 10.8	87 50	141.5	38 44.8	87 50	141.9	38 18.8	87 50	142.2	37 52.6	87 49	142.5	9
30	40 23.3	85 53	139.1	39 57.8	85 53	139.4	39 32.1	86 52	139.8	39 06.4	86 52	140.1	38 40.7	86 51	140.4	38 14.9	86 51	140.8	37 49.0	86 51	141.1	37 23.1	86 50	141.4	30
1	39 51.6	84 54	138.0	39 26.2	85 54	138.3	39 00.8	85 53	138.7	38 35.3	85 53	139.0	38 09.8	85 53	139.3	37 44.2	85 52	139.7	37 18.6	86 52	140.0	36 52.9	86 52	140.3	1
2	39 19.2	84 55	136.9	38 54.1	84 55	137.2	38 28.8	84 54	137.6	38 03.6	84 54	137.9	37 38.3	85 54	138.3	37 12.9	85 53	138.6	36 47.4	85 53	139.0	36 21.9	85 53	139.3	2
3	38 46.1	83 56	135.8	38 21.2	83 56	136.2	37 56.2	84 56	136.5	37 31.2	84 55	136.9	37 06.0	84 55	137.2	36 40.9	84 54	137.6	36 15.6	84 54	137.9	35 50.3	84 54	138.2	3
4	38 12.4	82 57	134.8	37 47.7	82 57	135.1	37 22.9	83 56	135.5	36 58.1	83 56	135.8	36 33.2	83 56	136.2	36 08.2	83 55	136.5	35 43.2	84 55	136.9	35 18.1	84 55	137.2	4
35	37 38.1	82 58	133.7	37 13.6	82 58	134.1	36 49.0	82 58	134.5	36 24.4	82 57	134.8	35 59.7	82 57	135.2	35 34.9	83 56	135.5	35 10.1	83 56	135.9	34 45.2	83 56	136.2	35
6	37 03.2	81 59	132.7	36 38.9	81 59	133.1	36 14.5	81 58	133.4	35 50.1	82 58	133.8	35 25.6	82 58	134.2	35 01.1	82 57	134.5	34 36.4	82 57	134.9	34 11.8	82 57	135.2	6
7	36 27.7	80 60	131.7	36 03.6	80 60	132.1	35 39.5	81 59	132.5	35 15.2	81 59	132.9	34 50.9	81 59	133.2	34 26.6	81 58	133.5	34 02.2	81 58	133.9	33 37.7	82 58	134.3	7
8	35 51.7	79 61	130.7	35 27.8	79 61	131.1	35 03.8	80 61	131.5	34 39.8	80 60	131.8	34 15.7	80 60	132.2	33 51.6	81 59	132.6	33 27.4	81 59	132.9	33 03.1	81 59	133.3	8
9	35 15.1	79 62	129.8	34 51.4	79 62	130.1	34 27.7	79 61	130.5	34 03.8	79 61	130.9	33 40.0	80 60	131.2	33 16.0	80 60	131.6	32 52.0	80 60	132.0	32 27.9	80 60	132.3	9
40	34 38.0	78 63	128.8	34 14.5	78 62	129.2	33 51.0	79 62	129.6	33 27.3	79 62	129.9	33 03.7	79 61	130.3	32 39.9	79 61	130.7	32 16.1	79 61	131.0	31 52.2	80 60	131.4	40
1	34 00.4	77 63	127.9	33 37.1	78 63	128.2	33 13.8	78 63	128.6	32 50.3	78 62	129.0	32 26.9	78 62	129.4	32 03.2	79 62	129.7	31 39.7	79 62	130.1	31 16.0	79 61	130.4	1
2	33 22.3	77 64	126.9	32 59.2	77 64	127.3	32 36.1	77 64	127.7	32 12.9	78 63	128.1	31 49.6	78 63	128.4	31 26.2	78 62	128.8	31 02.8	78 62	129.2	30 39.3	78 62	129.5	2
3	32 43.8	76 65	126.0	32 20.9	76 65	126.4	31 57.9	77 64	126.8	31 34.9	77 64	127.2	31 11.8	77 64	127.5	30 48.6	77 63	127.9	30 25.4	78 63	128.3	30 02.1	78 63	128.6	3
4	32 04.8	76 66	125.1	31 42.1	76 65	125.5	31 19.3	76 65	125.9	30 56.5	76 65	126.3	30 33.6	76 64	126.7	30 10.6	77 64	127.0	29 47.6	77 64	127.4	29 24.5	77 64	127.8	4
45	31 25.4	75 66	124.2	31 02.9	75 66	124.6	30 40.3	75 66	125.0	30 17.6	76 65	125.4	29 54.9	76 65	125.8	29 32.1	76 65	126.1	29 09.3	76 65	126.5	28 46.4	76 64	126.9	45
6	30 45.6	74 67	123.4	30 23.3	75 67	123.8	30 00.9	75 66	124.1	29 38.4	75 66	124.5	29 15.8	75 66	124.9	28 53.2	76 66	125.3	28 30.6	76 65	125.7	28 07.8	76 65	126.0	6
7	30 05.4	74 68	122.5	29 43.2	74 67	122.9	29 21.0	74 67	123.3	28 58.7	74 67	123.7	28 36.3	75 66	124.1	28 13.9	75 66	124.4	27 51.4	75 66	124.8	27 28.9	75 66	125.2	7
8	29 24.8	73 68	121.7	29 02.8	73 68	122.1	28 40.8	74 68	122.5	28 18.6	74 67	122.8	27 56.4	74 67	123.2	27 34.2	74 67	123.6	27 11.9	74 67	124.0	26 49.5	75 66	124.3	8
9	28 43.8	73 69	120.8	28 22.0	73 69	121.2	28 00.1	73 68	121.6	27 38.2	73 68	122.0	27 16.2	73 68	122.4	26 54.1	74 67	122.8	26 31.9	74 67	123.1	26 09.7	74 67	123.5	9
50	28 02.5	72 69	120.0	27 40.9	72 69	120.4	27 19.2	73 69	120.8	26 57.4	73 69	121.2	26 35.5	73 68	121.6	26 13.6	73 68	122.0	25 51.6	73 68	122.3	25 29.6	74 68	122.7	50
1	27 20.9	72 70	119.2	26 59.4	72 70	119.6	26 37.8	72 69	120.0	26 16.2	72 69	120.4	25 54.5	72 69	120.8	25 32.8	73 69	121.2	25 11.0	73 68	121.5	24 49.1	73 68	121.9	1
2	26 38.9	71 71	118.3	26 17.6	71 70	118.7	25 56.2	71 70	119.2	25 34.7	72 70	119.6	25 13.2	72 69	120.0	24 51.9	72 69	120.4	24 30.0	72 69	120.7	24 08.3	72 69	121.1	2
3	25 56.6	70 71	117.6	25 35.4	71 71	118.0	25 14.2	71 70	118.4	24 52.9	71 70	118.8	24 31.5	71 70	119.2	24 10.1	72 70	119.6	23 48.6	72 69	120.0	23 27.1	72 69	120.3	3
4	25 14.0	70 71	116.9	24 53.0	70 71	117.2	24 31.9	70 71	117.6	24 10.7	71 71	118.0	23 49.5	71 70	118.4	23 28.2	71 70	118.8	23 06.9	71 70	119.2	22 45.5	71 70	119.6	4
55	24 31.1	69 72	116.1	24 10.2	70 72	116.5	23 49.3	70 71	116.9	23 28.3	70 71	117.3	23 07.2	70 71	117.6	22 46.1	70 71	118.0	22 24.9	71 70	118.4	22 03.7	71 70	118.8	55
6	23 47.9	69 72	115.3	23 27.2	69 72	115.7	23 06.4	69 72	116.1	22 45.5	70 72	116.5	22 24.6	70 71	116.9	22 03.7	70 71	117.3	21 42.6	70 71	117.7	21 21.6	70 71	118.0	6
7	23 04.5	69 73	114.6	22 43.9	69 73	114.9	22 23.2	69 72	115.4	22 02.5	69 72	115.7	21 41.7	69 72	116.1	21 20.9	70 72	116.5	21 00.1	70 71	116.9	20 39.1	70 71	117.3	7
8	22 20.8	68 73	113.8	22 00.3	68 73	114.2	21 39.8	68 73	114.6	21 19.2	69 73	115.0	20 58.6	69 72	115.4	20 37.9	69 72	115.8	20 17.2	69 72	116.2	19 56.4	69 72	116.6	8
9	21 36.8	68 74	113.1	21 16.5	68 73	113.5	20 56.1	68 73	113.9	20 35.7	68 73	114.3	20 15.2	68 73	114.7	19 54.6	69 73	115.1	19 34.1	69 72	115.5	19 13.4	69 72	115.8	9
60	20 52.6	67 74	112.4	20 32.4	67 74	112.8	20 12.2	68 74	113.2	19 51.9	68 73	113.6	19 31.5	68 73	114.0	19 11.1	68 73	114.3	18 50.7	68 73	114.7	18 30.2	68 73	115.1	60
1	20 08.2	67 74	111.7	19 48.1	67 74	112.1	19 28.0	67 74	112.5	19 07.8	67 74	112.9	18 47.6	67 74	113.2	18 27.3	68 73	113.6	18 07.0	68 73	114.0	17 46.6	68 73	114.4	1
2	19 23.6	66 75	111.0	19 03.6	67 75	111.4	18 43.6	67 74	111.8	18 23.6	67 74	112.2	18 03.5	67 74	112.6	17 43.3	67 74	112.9	17 23.1	67 74	113.3	17 02.9	68 73	113.7	2
3	18 38.7	66 75	110.3	18 18.9	66 75	110.7	17 59.0	66 75	111.1	17 39.1	67 75	111.5	17 19.1	67 74	111.8	16 59.1	67 74	112.2	16 39.0	67 74	112.6	16 18.9	67 74	113.0	3
4	17 53.7	66 75	109.6	17 34.0	66 75	110.0	17 14.2	66 75	110.4	16 54.4	66 75	110.8	16 34.5	66 75	111.2	16 14.6	66 74	111.5	15 54.7	67 74	111.9	15 34.7	67 74	112.3	4
65	17 08.4	65 76	108.9	16 48.8	65 76	109.3	16 29.2	66 75	109.7	16 09.5	66 75	110.1	15 49.7	66 75	110.5	15 29.9	66 75	110.9	15 10.1	66 75	111.2	14 50.2	66 74	111.6	65
6	16 23.0	65 76	108.2	16 03.5	65 76	108.6	15 44.0	65 76	109.0	15 24.4	65 76	109.4	15 04.7	66 75	109.8	14 45.1	66 75	110.2	14 25.4	66 75	110.6	14 05.6	66 75	111.0	6
7	15 37.4	65 76	107.5	15 18.0	65 76	107.9	14 58.6	65 76	108.3	14 39.1	65 76	108.7	14 19.5	65 76	109.1	14 00.0	65 75	109.5	13 40.4	65 75	109.9	13 20.8	66 75	110.3	7
8	14 51.6	64 77	106.9	14 32.3	64 76	107.3	14 13.0	65 76	107.7	13 53.6	65 76	108.1	13 34.2	65 76	108.5	13 14.7	65 76	108.8	12 55.2	65 76	109.2	12 35.7	65 75	109.6	8
9	14 05.7	64 77	106.2	13 46.5	64 77	106.6	13 27.2	64 76	107.0	13 08.0	64 76	107.4	12 48.6	64 76	107.8	12 29.3	65 76	108.2	12 09.9	65 76	108.6	11 50.5	65 76	109.0	9
70	13 19.6	64 77	105.6	13 00.5	64 77	106.0	12 41.3	64 77	106.4	12 22.2	64 77	106.7	12 02.9	64 76	107.1	11 43.7	64 76	107.5	11 24.4	64 76	107.9	11 05.1	64 76	108.3	70
1	12 33.4	63 77	104.9	12 14.3	63 77	105.3	11 55.3	64 77	105.7	11 36.2	64 77	106.1	11 17.1	64 77	106.5	10 57.9	64 77	106.9	10 38.7	64 76	107.3	10 19.5	64 76	107.7	1
2	11 47.0	63 78	104.3	11 28.1	63 77	104.7	11 09.1	63 77	105.1	10 50.1	63 77	105.5	10 31.0	63 77	105.9	10 12.0	64 77	106.2	9 52.9	64 77	106.6	9 33.8	64 77	107.0	2
3	11 00.5	63 78	103.6	10 41.6	63 78	104.0	10 22.7	63 77	104.4	10 03.8	63 77	104.8	9 44.9	63 77	105.2	9 25.9	63 77	105.6	9 06.9	63 77	106.0	8 47.9	64 77	106.4	3
4	10 13.9	63 78	103.0	9 55.1	63 78	103.4	9 36.3	63 78	103.8	9 17.4	63 78	104.2	8 58.6	63 77	104.6	8 39.7	63 77	105.0	8 20.8	63 77	105.4	8 01.8	63 77	105.7	4
75	9 27.1	62 78	102.4	9 08.4	62 78	102.8	8 49.7	62 78	103.1	8 30.9	63 78	103.5	8 12.1	63 78	103.9	7 53.3	63 78	104.3	7 34.5	63 77	104.7	7 15.6	63 77	105.1	75
6	8 40.2	62 78	101.7	8 21.6	62 78	102.1	8 02.9	62 78	102.5	7 44.3	62 78	102.9	7 25.5	62 78	103.3	7 06.8	62 78	103.7	6 48.1	63 78	104.1	6 29.3	63 77	104.5	6
7	7 53.3	62 79	101.1	7 34.7	62 78	101.5	7 16.1	62 78	101.9	6 57.5	62 78	102.3	6 38.9	62 78	102.7	6 20.2	62 78	103.1	6 01.5	62 78	103.5	5 42.8	62 78	103.9	7
8	7 06.2	62 79	100.5	6 47.7	62 79	100.9	6 29.2	62 78	101.3	6 10.6	62 78	101.7	5 52.1	62 78	102.1	5 33.5	62 78	102.5	5 14.9	62 78	102.9				8
9	6 19.0	61 79	99.9	6 00.6	62 79	100.3	5 42.1	62 79	100.7	5 23.6	62 79	101.1	5 05.1	62 78	101.4										9
80	5 31.8	61 79	99.2	5 13.4	61 79	99.6																			80

Lat. 37°

H.A.	8° 00' Alt.	Δd Δt	Az.	8° 30' Alt.	Δd Δt	Az.	9° 00' Alt.	Δd Δt	Az.	9° 30' Alt.	Δd Δt	Az.	10° 00' Alt.	Δd Δt	Az.	10° 30' Alt.	Δd Δt	Az.	11° 00' Alt.	Δd Δt	Az.	11° 30' Alt.	Δd Δt	Az.	H.A.
00	61 00.0	1.01	180.0	61 30.0	1.001	180.0	62 00.0	1.01	180.0	62 30.0	1.02	180.0	63 00.0	1.02	180.0	63 30.0	1.02	180.0	64 00.0	1.02	180.0	64 30.0	1.02	180.0	00
1	60 59.1	1.004	178.0	61 29.1	1.004	177.9	61 59.1	1.004	177.9	62 29.1	1.004	177.9	62 59.1	1.004	177.8	63 29.1	1.005	177.8	63 59.1	1.005	177.8	64 29.0	1.005	177.7	1
2	60 56.6	1.007	175.9	61 26.5	1.007	175.8	61 56.5	1.007	175.8	62 26.4	1.007	175.7	62 56.4	1.008	175.7	63 26.3	1.008	175.6	63 56.3	1.008	175.5	64 26.2	1.008	175.5	2
3	60 52.3	1.010	173.9	61 22.2	1.010	173.8	61 52.1	1.010	173.7	62 22.0	1.010	173.6	62 51.9	1.010	173.5	63 21.7	1.011	173.4	63 51.6	1.011	173.3	64 21.5	1.011	173.2	3
4	60 46.4	99 13	171.9	61 16.2	99 13	171.7	61 46.0	99 13	171.6	62 15.8	99 13	171.5	62 45.6	99 14	171.4	63 15.3	99 14	171.2	63 45.1	99 14	171.1	64 14.8	99 14	170.9	4
05	60 38.8	99 15	169.9	61 08.5	99 16	169.7	61 38.2	99 16	169.6	62 07.8	99 16	169.4	62 37.5	99 17	169.2	63 07.1	99 17	169.1	63 36.8	99 17	168.9	64 06.4	99 17	168.7	05
6	60 29.5	99 18	167.9	60 59.1	99 18	167.7	61 28.6	98 19	167.5	61 58.2	98 19	167.3	62 27.7	98 19	167.1	62 57.2	98 20	166.9	63 26.7	98 20	166.7	63 56.1	98 20	166.5	6
7	60 18.6	98 21	165.9	60 48.1	98 21	165.7	61 17.4	98 21	165.5	61 46.8	98 22	165.3	62 16.2	98 22	165.1	62 45.5	98 22	164.9	63 14.8	98 23	164.6	63 44.1	98 23	164.3	7
8	60 06.2	97 23	163.9	60 35.4	97 24	163.7	61 04.6	97 24	163.5	61 33.8	97 24	163.2	62 03.0	97 25	163.0	62 32.1	97 25	162.7	63 01.2	97 25	162.5	63 30.3	97 26	162.2	8
9	59 52.2	97 26	162.0	60 21.2	97 26	161.8	60 50.2	97 27	161.5	61 19.2	97 27	161.2	61 48.1	96 27	161.0	62 17.1	96 27	160.7	62 45.9	96 28	160.4	63 14.8	96 28	160.1	9
10	59 36.6	96 28	160.1	60 05.5	96 29	159.9	60 34.2	96 29	159.6	61 03.0	96 30	159.3	61 31.7	96 30	159.0	62 00.4	96 30	158.7	62 29.1	96 31	158.3	62 57.6	96 31	158.0	10
1	59 19.6	95 31	158.3	59 48.2	95 31	158.0	60 16.8	95 32	157.7	60 45.3	95 32	157.3	61 13.8	95 32	157.0	61 42.2	95 33	156.7	62 10.6	95 33	156.3	62 38.9	94 34	156.0	1
2	59 01.1	95 33	156.4	59 29.8	95 34	156.1	59 57.8	94 34	155.7	60 26.1	94 34	155.3	60 54.3	94 35	155.0	61 22.5	94 35	154.7	61 50.6	94 36	154.4	62 18.7	93 36	154.0	2
3	58 41.3	94 35	154.6	59 09.4	94 36	154.3	59 37.5	93 36	153.9	60 05.5	93 37	153.6	60 33.4	93 37	153.2	61 01.3	93 38	152.8	61 29.2	93 38	152.4	61 56.9	92 39	152.0	3
4	58 20.1	93 38	152.8	58 47.9	93 38	152.5	59 15.7	93 38	152.1	59 43.5	92 39	151.8	60 11.2	92 39	151.4	60 38.8	92 40	151.0	61 06.3	92 40	150.6	61 33.8	91 41	150.1	4
15	57 57.6	92 40	151.1	58 25.2	92 40	150.7	58 52.7	92 41	150.4	59 20.2	91 41	150.0	59 47.5	91 42	149.6	60 14.8	91 42	149.1	60 42.1	91 43	148.7	61 09.2	90 43	148.3	15
6	57 33.8	91 42	149.4	58 01.1	91 42	149.0	58 28.4	91 43	148.6	58 55.5	90 43	148.2	59 22.6	90 44	147.8	59 49.6	90 45	147.4	60 16.6	90 45	146.9	60 43.4	89 45	146.5	6
7	57 08.8	90 44	147.7	57 35.8	90 44	147.3	58 02.8	90 44	146.9	58 29.7	89 45	146.5	58 56.5	89 46	146.1	59 23.2	89 46	145.6	59 49.8	89 47	145.2	60 16.3	88 47	144.7	7
8	56 42.7	89 45	146.1	57 09.4	89 46	145.7	57 36.1	89 46	145.3	58 02.7	88 47	144.8	58 29.2	88 47	144.4	58 55.6	88 48	143.9	59 21.9	87 48	143.5	59 48.0	87 49	143.0	8
9	56 15.4	88 47	144.5	56 41.9	88 48	144.1	57 08.2	88 48	143.7	57 34.5	87 49	143.2	58 00.7	87 49	142.8	58 26.8	87 50	142.3	58 52.8	86 50	141.8	59 18.6	86 51	141.3	9
20	55 47.0	87 49	143.0	56 13.2	87 49	142.5	56 39.3	87 50	142.1	57 05.3	86 50	141.6	57 31.2	86 51	141.2	57 56.9	86 51	140.7	58 22.6	85 52	140.2	58 48.2	85 53	139.7	20
1	55 17.7	86 51	141.4	55 43.8	86 51	141.0	56 09.4	86 52	140.5	56 35.0	85 52	140.1	57 00.6	85 53	139.6	57 26.1	85 53	139.1	57 51.4	84 54	138.6	58 16.7	84 54	138.1	1
2	54 47.3	86 53	140.0	55 12.9	85 53	139.5	55 38.4	85 53	139.0	56 03.8	84 54	138.6	56 29.1	84 54	138.1	56 54.2	84 55	137.6	57 19.3	84 55	137.1	57 44.2	83 56	136.6	2
3	54 16.0	85 54	138.5	54 41.3	85 54	138.0	55 06.5	85 55	137.6	55 31.6	84 55	137.1	55 56.6	83 56	136.6	56 21.4	83 56	136.1	56 46.2	82 57	135.6	57 10.8	82 57	135.1	3
4	53 43.8	84 55	137.1	54 08.9	83 56	136.6	54 33.8	83 56	136.1	54 58.6	82 57	135.7	55 23.2	82 57	135.2	55 47.8	82 58	134.6	56 12.2	81 58	134.1	56 36.5	81 58	133.6	4
25	53 10.8	83 56	135.7	53 35.5	82 57	135.2	54 00.2	82 57	134.7	54 24.7	81 58	134.3	54 49.0	81 58	133.8	55 13.3	81 59	133.2	55 37.4	80 59	132.7	56 01.4	80 60	132.2	25
6	52 36.9	82 58	134.4	53 01.4	81 58	133.9	53 25.7	81 59	133.4	53 49.9	80 59	132.9	54 14.0	80 60	132.4	54 38.0	80 60	131.9	55 01.8	79 61	131.3	55 25.5	79 61	130.8	6
7	52 02.3	81 59	133.0	52 26.5	80 59	132.6	52 50.5	80 60	132.1	53 14.5	80 60	131.6	53 38.3	79 61	131.1	54 01.9	79 61	130.5	54 25.5	78 62	130.0	54 48.8	78 62	129.5	7
8	51 26.9	80 60	131.8	51 50.8	79 61	131.3	52 14.6	79 61	130.8	52 38.2	79 62	130.3	53 01.8	78 62	129.8	53 25.2	78 62	129.2	53 48.4	77 63	128.7	54 11.5	77 63	128.2	8
9	50 50.8	79 61	130.5	51 14.4	79 62	130.0	51 38.0	78 62	129.5	52 01.3	78 63	129.0	52 24.6	77 63	128.5	52 47.7	77 63	128.0	53 10.7	76 64	127.4	53 33.5	76 64	126.9	9
30	50 14.0	78 62	129.3	50 37.4	78 63	128.8	51 00.7	77 63	128.3	51 23.8	77 64	127.8	51 46.8	76 64	127.3	52 09.6	76 64	126.7	52 32.3	75 65	126.2	52 54.9	75 65	125.7	30
1	49 36.6	77 63	128.1	49 59.9	77 64	127.6	50 22.7	76 64	127.1	50 45.6	76 65	126.6	51 08.3	76 65	126.1	51 30.9	75 65	125.5	51 53.4	75 66	125.0	52 15.6	74 66	124.5	1
2	48 58.6	76 64	126.9	49 21.5	76 64	126.4	49 44.2	76 65	125.9	50 06.8	75 66	125.4	50 29.3	75 66	124.9	50 51.6	74 66	124.4	51 13.8	74 67	123.8	51 35.9	73 67	123.3	2
3	48 20.0	76 65	125.8	48 42.6	75 66	125.3	49 05.1	75 66	124.8	49 27.5	74 66	124.3	49 49.7	74 67	123.7	50 11.8	73 67	123.2	50 33.7	73 68	122.7	50 55.5	72 68	122.1	3
4	47 40.9	75 66	124.7	48 03.3	74 66	124.2	48 25.5	74 67	123.7	48 47.6	74 67	123.2	49 09.6	73 68	122.6	49 31.5	73 68	122.1	49 53.2	72 68	121.6	50 14.7	72 69	121.0	4
35	47 01.2	74 67	123.6	47 23.4	74 67	123.1	47 45.4	73 68	122.6	48 07.3	73 68	122.1	48 29.0	72 68	121.5	48 50.6	72 69	121.0	49 12.1	71 69	120.5	49 33.4	71 70	120.0	35
6	46 21.0	73 68	122.5	46 43.0	73 68	122.0	47 04.8	72 69	121.5	47 26.4	72 69	121.0	47 48.0	72 69	120.5	48 09.4	71 70	119.9	48 30.6	71 70	119.4	48 51.7	70 70	118.9	6
7	45 40.4	73 68	121.5	46 02.1	72 69	121.0	46 23.7	72 69	120.5	46 45.1	71 70	120.0	47 06.5	71 70	119.5	47 27.6	70 70	118.9	47 48.7	70 71	118.4	48 09.5	69 71	117.9	7
8	44 59.3	72 69	120.5	45 20.8	71 70	120.0	45 42.2	71 70	119.5	46 03.4	71 70	119.0	46 24.5	70 71	118.4	46 45.5	70 71	117.9	47 06.3	69 71	117.4	47 27.0	69 72	116.9	8
9	44 17.8	71 70	119.5	44 39.1	71 70	119.0	45 00.3	70 71	118.5	45 21.3	70 71	118.0	45 42.2	69 71	117.4	46 02.9	69 72	116.9	46 23.6	68 72	116.4	46 44.0	68 72	115.9	9
40	43 35.9	71 70	118.5	43 57.0	70 71	118.0	44 17.9	70 71	117.5	44 38.8	69 72	117.0	44 59.5	69 72	116.5	45 20.0	68 72	115.9	45 40.5	68 72	115.4	46 00.7	67 73	114.9	40
1	42 53.6	70 71	117.5	43 14.5	70 71	117.0	43 35.3	69 72	116.5	43 55.9	69 72	116.0	44 16.4	68 72	115.5	44 36.8	68 73	115.0	44 57.0	67 73	114.5	45 17.1	67 73	114.0	1
2	42 10.9	69 72	116.6	42 31.6	69 72	116.1	42 52.2	68 72	115.6	43 12.7	68 73	115.1	43 33.0	68 73	114.6	43 53.2	67 73	114.1	44 13.3	67 73	113.6	44 33.2	66 74	113.1	2
3	41 27.9	69 72	115.7	41 48.4	68 73	115.2	42 08.8	68 73	114.7	42 29.1	67 73	114.2	42 49.3	67 73	113.7	43 09.3	67 74	113.2	43 29.2	66 74	112.7	43 48.9	66 74	112.2	3
4	40 44.5	68 73	114.8	41 04.9	68 73	114.3	41 25.1	67 73	113.8	41 45.3	67 74	113.3	42 05.3	66 74	112.8	42 25.1	66 74	112.3	42 44.8	66 74	111.8	43 04.4	65 75	111.3	4
45	40 00.9	68 73	113.9	40 21.1	67 74	113.4	40 41.2	67 74	112.9	41 01.1	66 74	112.4	41 20.9	66 74	111.9	41 40.6	65 75	111.4	42 00.2	65 75	110.9	42 19.6	65 75	110.4	45
6	39 16.9	67 74	113.0	39 37.0	67 74	112.6	39 56.9	66 74	112.1	40 16.7	66 74	111.6	40 36.4	65 75	111.1	40 55.9	65 75	110.6	41 15.3	64 75	110.1	41 34.6	64 75	109.6	6
7	38 32.7	67 74	112.2	38 52.6	66 74	111.7	39 12.3	66 75	111.2	39 32.0	65 75	110.7	39 51.5	65 75	110.2	40 10.9	64 75	109.7	40 30.2	64 76	109.2	40 49.3	64 76	108.7	7
8	37 48.2	66 75	111.3	38 07.9	66 75	110.9	38 27.6	65 75	110.4	38 47.1	65 75	109.9	39 06.4	64 76	109.4	39 25.7	64 76	108.9	39 44.8	64 76	108.4	40 03.9	63 76	107.9	8
9	37 03.4	66 75	110.5	37 23.0	65 75	110.0	37 42.5	65 75	109.6	38 01.9	64 76	109.1	38 21.1	64 76	108.6	38 40.3	64 76	108.1	38 59.3	63 76	107.6	39 18.2	63 76	107.1	9
50	36 18.4	65 75	109.7	36 37.9	65 76	109.2	36 57.3	64 76	108.8	37 16.5	64 76	108.3	37 35.6	64 76	107.8	37 54.6	63 76	107.3	38 13.5	63 77	106.8	38 32.2	62 77	106.3	50
1	35 33.2	65 76	108.9	35 52.6	64 76	108.5	36 11.8	64 76	108.0	36 30.9	64 76	107.5	36 49.9	63 77	107.0	37 08.8	63 77	106.5	37 27.5	62 77	106.0	37 46.2	62 77	105.5	1
2	34 47.8	64 76	108.1	35 07.0	64 76	107.7	35 26.1	64 76	107.2	35 45.1	63 77	106.7	36 04.0	63 77	106.3	36 22.8	62 77	105.8	36 41.4	62 77	105.3	36 59.9	62 77	104.8	2
3	34 02.1	64 76	107.4	34 21.2	63 77	106.9	34 40.2	63 77	106.4	34 59.1	63 77	106.0	35 17.9	62 77	105.5	35 36.6	62 77	105.0	35 55.1	62 77	104.5	36 13.5	61 78	104.0	3
4	33 16.3	63 77	106.6	33 35.3	63 77	106.2	33 54.2	63 77	105.7	34 13.0	62 77	105.2	34 31.6	62 77	104.7	34 50.2	62 78	104.2	35 08.6	61 78	103.8	35 26.9	61 78	103.3	4
55	32 30.3	63 77	105.9	32 49.2	63 77	105.4	33 08.0	62 77	104.9	33 26.7	62 77	104.5	33 45.2	62 78	104.0	34 03.7	61 78	103.5	34 22.0	61 78	103.1	34 40.3	61 78	102.6	55
6	31 44.1	63 77	105.1	32 02.9	62 77	104.7	32 21.6	62 78	104.2	32 40.2	62 78	103.8	32 58.7	61 78	103.3	33 17.0	61 78	102.8	33 35.3	61 78	102.3	33 53.4	60 78	101.9	6
7	30 57.8	62 77	104.4	31 16.5	62 78	104.0	31 35.1	62 78	103.5	31 53.6	61 78	103.0	32 11.9	61 78	102.6	32 30.2	61 78	102.1	32 48.4	60 78	101.6	33 06.5	60 78	101.2	7
8	30 11.3	62 78	103.7	30 29.9	62 78	103.2	30 48.4	61 78	102.8	31 06.8	61 78	102.3	31 25.1	61 79	101.9	31 43.3	60 79	101.4	32 01.4	60 78	100.9	32 19.4	60 79	100.5	8
9	29 24.7	62 78	103.0	29 43.2	62 78	102.5	30 01.6	61 78	102.1	30 19.9	61 78	101.6	30 38.2	61 78	101.2	30 56.3	60 79	100.7	31 14.3	60 79	100.2	31 32.2	60 79	99.8	9
60	28 37.9	62 78	102.3	28 56.4	61 78	101.8	29 14.7	61 78	101.4	29 32.9	61 78	100.9	29 51.1	60 79	100.5	30 09.2	60 79	100.0	30 27.1	60 79	99.5	30 45.0	59 79	99.1	60
1	27 51.1	61 78	101.6	28 09.4	61 78	101.2	28 27.7	61 79	100.7	28 45.8	60 79	100.2	29 03.9	60 79	99.8	29 21.9	60 79	99.3	29 39.8	59 79	98.9	29 57.6	59 79	98.4	1
2	27 04.1	61 79	100.9	27 22.3	61 79	100.5	27 40.5	60 79	100.0	27 58.6	60 79	99.6	28 16.7	60 79	99.1	28 34.6	60 79	98.7	28 52.4	59 79	98.2	29 10.2	59 79	97.7	2
3	26 17.0	61 79	100.2	26 35.3	60 79	99.8	26 53.3	60 79	99.4	27 11.3	60 79	98.9	27 29.3	60 79	98.5	27 47.2	59 79	98.0	28 05.0	59 79	97.5	28 22.6	59 79	97.1	3
4	25 29.8	61 79	99.6	25 47.9	60 79	99.1	26 06.0	60 79	98.7	26 24.0	60 79	98.2	26 41.9	60 79	97.8	26 59.7	59 79	97.3	27 17.4	59 79	96.9	27 35.1	59 79	96.4	4
65	24 42.5	60 79	98.9	25 00.6	60 79	98.5	25 18.6	60 79	98.0	25 36.5	59 79	97.6	25 54.4	59 79	97.1	26 12.1	59 79	96.7	26 29.8	59 79	96.2	26 47.4	59 80	95.8	65
6	23 55.1	60 79	98.3	24 13.1	60 79	97.8	24 31.1	60 79	97.4	24 49.0	59 79	96.9	25 06.8	59 79	96.5	25 24.5	59 79	96.0	25 42.1	59 80	95.6	25 59.7	58 80	95.1	6
7	23 07.6	60 79	97.6	23 25.6	60 79	97.2	23 43.5	60 79	96.7	24 01.4	59 79	96.3	24 19.1	59 79	95.9	24 36.8	59 80	95.4	24 54.4	59 80	95.0	25 12.0	58 80	94.5	7
8	22 20.1	60 79	97.0	22 38.0	60 79	96.5	22 55.9	59 79	96.1	23 13.7	59 80	95.7	23 31.4	59 80	95.2	23 49.1	59 80	94.8	24 06.7	58 80	94.3	24 24.2	58 80	93.9	8
9	21 32.5	60 79	96.3	21 50.4	60 79	95.9	22 08.2	59 80	95.5	22 26.0	59 80	95.0	22 43.7	59 80	94.6	23 01.3	59 80	94.1	23 18.9	58 80	93.7	23 36.3	58 80	93.3	9
70	20 44.8	60 80	95.7	21 02.7	59 80	95.3	21 20.5	59 80	94.8	21 38.2	59 80	94.4	21 55.9	59 80	94.0	22 13.5	59 80	93.5	22 31.0	58 80	93.1	22 48.5	58 80	92.6	70
1	19 57.1	60 80	95.1	20 15.0	59 80	94.6	20 32.7	59 80	94.2	20 50.4	59 80	93.8	21 08.1	59 80	93.3	21 25.7	58 80	92.9	21 43.2	58 80	92.5	22 00.6	58 80	92.0	1
2	19 09.4	59 80	94.4	19 27.2	59 80	94.0	19 44.9	59 80	93.6	20 02.6	59 80	93.1	20 20.2	58 80	92.7	20 37.8	58 80	92.3	20 55.3	58 80	91.9	21 12.7	58 80	91.4	2
3	18 21.6	59 80	93.8	18 39.4	59 80	93.4	18 57.1	59 80	93.0	19 14.8	59 80	92.5	19 32.4	58 80	92.1	19 49.9	58 80	91.7	20 07.4	58 80	91.2	20 24.8	58 80	90.8	3
4	17 33.8	59 80	93.2	17 51.5	59 80	92.8	18 09.2	59 80	92.3	18 26.9	58 80	91.9	18 44.5	58 80	91.5	19 02.0	58 80	91.1	19 19.5	58 80	90.6	19 36.9	58 80	90.2	4
75	16 45.9	59 80	92.6	17 03.6	59 80	92.2	17 21.3	59 80	91.7	17 39.0	59 80	91.3	17 56.6	59 80	90.9	18 14.1	58 80	90.5	18 31.6	58 80	90.0	18 49.0	58 80	89.6	75
6	15 58.0	59 80	92.0	16 15.8	59 80	91.5	16 33.4	59 80	91.1	16 51.1	59 80	90.7	17 08.6	59 80	90.3	17 26.2	58 80	89.9	17 43.6	58 80	89.4	18 01.1	58 80	89.0	6
7	15 10.1	59 80	91.4	15 27.8	59 80	90.9	15 45.5	59 80	90.5	16 03.2	59 80	90.1	16 20.7	58 80	89.7	16 38.3	58 80	89.3	16 55.7	58 80	88.8	17 13.2	58 80	88.4	7
8	14 22.2	59 80	90.8	14 39.9	59 80	90.3	14 57.6	59 80	89.9	15 15.2	59 80	89.5	15 32.8	58 80	89.1	15 50.3	58 80	88.7	16 07.8	58 80	88.2	16 25.3	58 80	87.8	8
9	13 34.3	59 80	90.2	13 52.0	59 80	89.7	14 09.7	59 80	89.3	14 27.3	58 80	88.9	14 44.9	58 80	88.5	15 02.4	58 80	88.1	15 19.9	58 80	87.6	15 37.4	58 80	87.2	9
80	12 46.4	59 80	89.5	13 04.1	59 80	89.1	13 21.8	59 80	88.7	13 39.4	59 80	88.3	13 57.0	59 80	87.9	14 14.6	58 80	87.5	14 32.1	58 80	87.1	14 49.5	58 80	86.6	80
1	11 58.5	59 80	89.0	12 16.2	59 80	88.5	12 33.9	59 80	88.1	12 51.5	59 80	87.7	13 09.1	58 80	87.3	13 26.7	58 80	86.9	13 44.2	58 80	86.5	14 01.7	58 80	86.0	1
2	11 10.6	59 80	88.4	11 28.3	59 80	88.0	11 46.0	59 80	87.5	12 03.7	58 80	87.1	12 21.3	58 80	86.7	12 38.9	58 80	86.3	12 56.4	58 80	85.9	13 13.9	58 80	85.5	2
3	10 22.7	59 80	87.8	10 40.4	59 80	87.3	10 58.1	59 80	86.9	11 15.8	58 80	86.5	11 33.5	58 80	86.1	11 51.1	58 80	85.7	12 08.7	58 80	85.3	12 26.2	58 80	84.9	3
4	9 34.8	59 80	87.2	9 52.6	59 80	86.8	10 10.3	59 80	86.3	10 28.0	59 80	85.9	10 45.7	59 80	85.5	11 03.3	58 80	85.1	11 20.9	58 79	84.7	11 38.5	58 79	84.3	4
85	8 47.0	59 80	86.6	9 04.7	59 80	86.2	9 22.5	59 80	85.7	9 40.2	59 80	85.3	9 57.9	59 80	84.9	10 15.6	59 79	84.5	10 33.2	59 79	84.1	10 50.8	59 79	83.7	85
6	7 59.1	59 80	86.0	8 16.9	59 80	85.6	8 34.7	59 80	85.2	8 52.5	59 80	84.7	9 10.2	59 79	84.3	9 27.9	59 79	83.9	9 45.6	59 79	83.5	10 03.2	59 79	83.1	6
7	7 11.4	59 80	85.4	7 29.2	59 80	85.0	7 47.0	59 80	84.6	8 04.8	59 79	84.2	8 22.6	59 79	83.8	8 40.3	59 79	83.3	8 58.0	59 79	82.9	9 15.7	59 79	82.5	7
8	6 23.6	60 79	84.8	6 41.5	59 80	84.4	6 59.3	59 79	84.0	7 17.1	59 79	83.6	7 34.9	59 79	83.2	7 52.7	59 79	82.8	8 10.5	59 79	82.4	8 28.2	59 79	81.9	8
9	5 35.9	60 79	84.2	5 53.8	60 79	83.8	6 11.7	59 79	83.4	6 29.6	59 79	83.0	6 47.4	59 79	82.6	7 05.2	59 79	82.2	7 23.0	59 79	81.8	7 40.8	59 79	81.4	9
90				5 06.2	60 79	83.2	5 24.1	60 79	82.8	5 42.0	60 79	82.4	5 59.9	60 79	82.0	6 17.8	60 79	81.6	6 35.6	60 79	81.2	6 53.5	60 79	80.9	90

H.A.	8° 00' Alt. / Δd Δt / Az.	8° 30' Alt. / Δd Δt / Az.	9° 00' Alt. / Δd Δt / Az.	9° 30' Alt. / Δd Δt / Az.	10° 00' Alt. / Δd Δt / Az.	10° 30' Alt. / Δd Δt / Az.	11° 00' Alt. / Δd Δt / Az.	11° 30' Alt. / Δd Δt / Az.	H.A.
00	45 00.0 1.00 01 180.0	44 30.0 1.00 01 180.0	44 00.0 1.00 01 180.0	43 30.0 1.00 01 180.0	43 00.0 1.00 01 180.0	42 30.0 1.00 01 180.0	42 00.0 1.00 01 180.0	41 30.0 1.00 01 180.0	00
1	44 59.4 1.00 03 178.6	44 29.4 1.00 03 178.6	43 59.4 1.00 03 178.6	43 29.4 1.00 03 178.6	42 59.4 1.00 03 178.7	42 29.4 1.00 03 178.7	41 59.4 1.00 03 178.7	41 29.5 1.00 03 178.7	1
2	44 57.7 1.00 05 177.2	44 27.7 1.00 05 177.2	43 57.7 1.00 05 177.3	43 27.7 1.00 05 177.3	42 57.7 1.00 05 177.3	42 27.8 1.00 05 177.3	41 57.8 1.00 05 177.4	41 27.8 1.00 05 177.4	2
3	44 54.7 1.00 07 175.8	44 24.8 1.00 07 175.8	43 54.8 1.00 07 175.9	43 24.9 1.00 07 175.9	42 54.9 1.00 07 176.0	42 25.0 1.00 06 176.0	41 55.0 1.00 06 176.0	41 25.1 1.00 06 176.1	3
4	44 50.6 1.00 09 174.4	44 20.7 1.00 09 174.5	43 50.8 1.00 09 174.5	43 20.9 1.00 08 174.6	42 51.0 1.00 08 174.6	42 21.1 1.00 08 174.7	41 51.2 1.00 08 174.7	41 21.3 1.00 08 174.8	4
05	44 45.4 1.00 11 173.0	44 15.5 1.00 11 173.1	43 45.7 1.00 10 173.2	43 15.8 1.00 10 173.2	42 46.0 1.00 10 173.3	42 16.1 1.00 10 173.4	41 46.2 1.00 10 173.4	41 16.4 1.00 10 173.5	05
6	44 39.0 99 13 171.6	44 09.2 99 12 171.7	43 39.4 99 12 171.8	43 09.6 99 12 171.9	42 39.8 99 12 172.0	42 10.0 99 12 172.0	41 40.2 99 12 172.1	41 10.4 99 12 172.2	6
7	44 31.5 99 14 170.3	44 01.7 99 14 170.3	43 32.0 99 14 170.5	43 02.2 99 14 170.6	42 32.5 99 14 170.6	42 02.8 99 14 170.7	41 33.1 99 14 170.9	41 03.3 99 14 170.9	7
8	44 22.8 99 16 168.9	43 53.1 99 16 169.0	43 23.5 99 16 169.1	42 53.8 99 16 169.2	42 24.2 99 16 169.3	41 54.5 99 16 169.4	41 24.9 99 15 169.5	40 55.2 99 15 169.6	8
9	44 13.0 98 18 167.5	43 43.4 98 18 167.6	43 13.9 98 18 167.8	42 44.3 98 18 167.9	42 14.8 98 18 168.0	41 45.2 98 17 168.1	41 15.6 98 17 168.2	40 46.0 98 17 168.3	9
10	44 02.1 98 20 166.2	43 32.6 98 20 166.3	43 03.2 98 20 166.4	42 33.7 98 19 166.6	42 04.3 98 19 166.7	41 34.8 98 19 166.8	41 05.3 98 19 166.9	40 35.8 98 19 167.0	10
1	43 50.1 98 22 164.8	43 20.7 98 22 165.0	42 51.4 98 21 165.1	42 22.0 98 21 165.2	41 52.7 98 21 165.4	41 23.3 98 21 165.5	40 53.9 98 21 165.7	40 24.5 98 20 165.8	1
2	43 37.0 97 24 163.5	43 07.8 97 23 163.6	42 38.5 97 23 163.8	42 09.3 97 23 163.9	41 40.1 97 23 164.1	41 10.8 97 23 164.2	40 41.6 97 24 164.4	40 12.3 97 22 164.5	2
3	43 22.8 97 25 162.2	42 53.7 97 25 162.3	42 24.6 97 25 162.5	41 55.5 97 25 162.7	41 26.4 97 24 162.8	40 57.3 97 24 163.0	40 28.1 97 24 163.1	39 59.0 97 24 163.3	3
4	43 07.6 96 27 160.8	42 38.7 96 27 161.0	42 09.7 97 27 161.2	41 40.7 97 26 161.4	41 11.8 97 26 161.5	40 42.8 97 26 161.7	40 13.7 97 26 161.9	39 44.7 97 25 162.0	4
15	42 51.4 96 29 159.5	42 22.6 96 28 159.7	41 53.8 96 28 159.9	41 24.9 96 28 160.1	40 56.1 96 28 160.3	40 27.2 96 28 160.5	39 58.3 96 27 160.6	39 29.4 96 27 160.8	15
6	42 34.1 95 30 158.2	42 05.5 95 30 158.4	41 36.8 96 30 158.6	41 08.1 96 30 158.8	40 39.4 96 29 159.0	40 10.7 96 29 159.2	39 42.0 96 29 159.4	39 13.2 96 29 159.6	6
7	42 15.8 95 32 157.0	41 47.4 95 32 157.2	41 18.9 95 32 157.4	40 50.3 95 31 157.6	40 21.8 95 31 157.8	39 53.2 95 31 158.0	39 24.6 95 30 158.2	38 56.0 95 30 158.4	7
8	41 56.6 94 34 155.7	41 28.3 94 33 155.9	41 00.0 94 33 156.1	40 31.6 95 33 156.4	40 03.2 95 33 156.6	39 34.8 95 32 156.8	39 06.4 95 32 157.0	38 37.9 95 32 157.2	8
9	41 36.4 94 35 154.5	41 08.3 94 35 154.7	40 40.1 94 35 154.9	40 11.9 94 34 155.1	39 43.7 94 34 155.4	39 15.5 94 34 155.6	38 47.2 94 34 155.8	38 18.9 94 33 156.0	9
20	41 15.3 93 37 153.2	40 47.3 93 36 153.5	40 19.3 93 36 153.7	39 51.3 93 36 153.9	39 23.3 94 36 154.2	38 55.2 94 35 154.4	38 27.1 94 35 154.6	37 59.0 94 35 154.8	20
1	40 53.3 93 38 152.0	40 25.5 93 38 152.3	39 57.7 93 37 152.5	39 29.8 93 37 152.7	39 01.9 93 37 153.0	38 34.0 93 37 153.2	38 06.1 93 36 153.4	37 38.1 93 36 153.7	1
2	40 30.3 92 40 150.8	40 02.7 92 39 151.0	39 35.1 92 39 151.3	39 07.4 93 39 151.6	38 39.7 93 38 151.8	38 12.0 93 38 152.0	37 44.3 93 38 152.3	37 16.5 93 38 152.5	2
3	40 06.5 91 41 149.6	39 39.1 91 41 149.9	39 11.7 92 40 150.1	38 44.2 92 40 150.4	38 16.7 92 40 150.6	37 49.1 92 40 150.9	37 21.5 92 39 151.1	36 53.9 92 39 151.4	3
4	39 41.8 91 42 148.4	39 14.6 91 42 148.7	38 47.4 91 42 149.0	38 20.1 91 42 149.2	37 52.8 91 41 149.5	37 25.4 91 41 149.8	36 58.0 91 41 150.0	36 30.6 91 40 150.3	4
25	39 16.3 90 44 147.3	38 49.3 90 44 147.6	38 22.3 90 43 147.8	37 55.2 90 43 148.1	37 28.0 91 43 148.4	37 00.9 91 42 148.6	36 33.7 91 42 148.9	36 06.4 91 42 149.2	25
6	38 50.0 89 45 146.1	38 23.2 89 45 146.4	37 56.3 89 45 146.7	37 29.5 90 44 147.0	37 02.5 90 44 147.3	36 35.5 90 44 147.5	36 08.5 90 43 147.8	35 41.5 90 43 148.1	6
7	38 22.9 88 46 145.0	37 56.3 89 46 145.3	37 29.7 89 46 145.6	37 03.0 89 46 145.9	36 36.2 89 45 146.2	36 09.1 89 45 146.4	35 42.6 89 44 146.7	35 15.7 90 44 147.0	7
8	37 55.1 88 48 143.9	37 28.7 88 47 144.2	37 02.2 88 47 144.5	36 35.7 88 47 144.8	36 09.1 88 46 145.1	35 42.6 89 46 145.4	35 15.9 89 46 145.6	34 49.3 89 45 145.9	8
9	37 26.5 87 49 142.8	37 00.3 87 49 143.1	36 34.0 88 48 143.4	36 07.7 88 48 143.7	35 41.1 88 48 144.0	35 15.0 88 47 144.3	34 48.5 88 47 144.6	34 22.0 88 47 144.9	9
30	36 57.1 87 50 141.7	36 31.1 87 50 142.0	36 05.1 87 49 142.3	35 39.0 87 49 142.6	35 12.8 87 49 142.9	34 46.6 87 48 143.2	34 20.4 88 48 143.5	33 54.1 88 48 143.8	30
1	36 27.1 86 51 140.6	36 01.3 86 51 141.0	35 35.4 86 51 141.3	35 09.5 86 50 141.6	34 43.6 87 50 141.9	34 17.6 87 50 142.2	33 51.6 87 49 142.5	33 25.5 87 49 142.8	1
2	35 56.4 85 52 139.6	35 30.8 85 52 139.9	35 05.1 86 52 140.2	34 39.4 86 51 140.6	34 13.7 86 51 140.9	33 47.9 86 51 141.2	33 22.0 86 50 141.5	32 56.2 86 50 141.8	2
3	35 25.0 85 53 138.6	34 59.6 85 53 138.9	34 34.2 85 53 139.2	34 08.7 85 52 139.5	33 43.1 85 52 139.8	33 17.5 85 52 140.2	32 51.9 86 51 140.5	32 26.2 86 51 140.8	3
4	34 53.0 84 54 137.5	34 27.8 84 54 137.9	34 02.5 84 54 138.2	33 37.2 84 53 138.5	33 11.9 85 53 138.8	32 46.5 85 53 139.2	32 21.1 85 52 139.5	31 55.6 85 52 139.8	4
35	34 20.3 83 55 136.5	33 55.3 83 55 136.9	33 30.3 84 55 137.2	33 05.2 84 54 137.5	32 40.0 84 54 137.9	32 14.8 84 54 138.2	31 49.6 84 53 138.5	31 24.3 84 53 138.8	35
6	33 47.0 83 56 135.5	33 22.3 83 56 135.9	32 57.4 83 56 136.2	32 32.5 83 55 136.6	32 07.6 83 55 136.9	31 42.6 83 55 137.2	31 17.5 84 54 137.5	30 52.5 84 54 137.8	6
7	33 13.2 82 57 134.6	32 48.6 82 57 134.9	32 24.0 83 57 135.2	31 59.3 83 56 135.6	31 34.5 83 56 135.9	31 09.7 83 56 136.3	30 44.9 83 55 136.6	30 20.0 83 55 136.9	7
8	32 38.8 81 58 133.6	32 14.4 81 58 134.0	31 50.0 82 58 134.3	31 25.5 82 57 134.6	31 00.9 82 57 135.0	30 36.3 82 57 135.3	30 11.7 82 56 135.6	29 47.0 82 56 136.0	8
9	32 03.8 81 59 132.7	31 39.6 81 59 133.0	31 15.4 81 58 133.4	30 51.1 81 58 133.7	30 26.7 81 58 134.0	30 02.3 81 58 134.4	29 37.9 82 57 134.7	29 13.4 82 57 135.0	9
40	31 28.3 80 60 131.7	31 04.3 80 60 132.1	30 40.3 80 59 132.4	30 16.2 80 59 132.8	29 52.0 81 59 133.1	29 27.8 81 58 133.5	29 03.6 81 58 133.8	28 39.3 81 58 134.1	40
1	30 52.3 79 61 130.8	30 28.5 79 61 131.2	30 04.7 80 60 131.5	29 40.8 80 60 131.9	29 16.8 80 60 132.2	28 52.8 80 59 132.5	28 28.7 80 59 132.9	28 04.6 80 59 133.2	1
2	30 15.8 79 62 129.9	29 52.2 79 61 130.3	29 28.5 79 61 130.6	29 04.6 79 61 131.0	28 41.1 79 60 131.3	28 17.2 79 60 131.7	27 53.4 80 60 132.0	27 29.4 80 59 132.3	2
3	29 38.8 78 62 129.0	29 15.4 78 62 129.4	28 51.9 78 62 129.7	28 28.4 79 62 130.1	28 04.9 79 61 130.4	27 41.2 79 61 130.8	27 17.5 79 61 131.1	26 53.8 79 60 131.5	3
4	29 01.3 77 63 128.1	28 38.1 77 63 128.5	28 14.8 78 63 128.8	27 51.5 78 62 129.2	27 28.1 78 62 129.6	27 04.7 78 62 129.9	26 41.2 78 61 130.3	26 17.6 79 61 130.6	4
45	28 23.4 77 64 127.3	28 00.4 77 64 127.6	27 37.3 77 63 128.0	27 14.1 77 63 128.3	26 50.9 77 63 128.7	26 27.7 78 62 129.0	26 04.4 78 62 129.4	25 41.0 78 62 129.7	45
6	27 45.0 76 65 126.4	27 22.2 76 64 126.8	26 59.3 76 64 127.1	26 36.3 77 64 127.5	26 13.3 77 63 127.8	25 50.2 77 63 128.2	25 27.1 77 63 128.6	25 03.9 77 63 128.9	6
7	27 06.3 75 65 125.6	26 43.6 76 65 125.9	26 20.9 76 65 126.3	25 58.1 76 64 126.6	25 35.3 76 64 127.0	25 12.4 76 64 127.4	24 49.4 77 64 127.7	24 26.4 77 63 128.1	7
8	26 27.1 75 66 124.7	26 04.6 75 66 125.1	25 42.0 75 65 125.5	25 19.4 75 65 125.8	24 56.8 76 65 126.2	24 34.1 76 64 126.5	24 11.3 76 64 126.9	23 48.5 76 64 127.3	8
9	25 47.5 74 67 123.9	25 25.2 74 66 124.3	25 02.8 75 66 124.6	24 40.4 75 66 125.0	24 17.9 75 65 125.4	23 55.4 75 65 125.7	23 32.8 75 65 126.1	23 10.2 76 65 126.4	9
50	25 07.5 74 67 123.1	24 45.4 74 67 123.5	24 23.2 74 67 123.8	24 00.9 74 66 124.2	23 38.6 74 66 124.6	23 16.3 75 66 124.9	22 53.9 75 66 125.3	22 31.4 75 65 125.6	50
1	24 27.2 73 68 122.3	24 05.2 73 68 122.7	23 43.2 73 68 123.0	23 21.1 74 67 123.4	22 59.0 74 67 123.8	22 36.8 74 66 124.1	22 14.6 74 66 124.5	21 52.3 74 66 124.9	1
2	23 46.5 73 69 121.5	23 24.7 73 68 121.9	23 02.8 73 68 122.2	22 40.9 73 68 122.6	22 19.0 73 67 123.0	21 56.9 73 67 123.3	21 34.9 74 67 123.7	21 12.8 74 66 124.1	2
3	23 05.5 72 69 120.7	22 43.8 72 69 121.1	22 22.1 72 69 121.4	22 00.4 73 68 121.8	21 38.6 73 68 122.2	21 16.7 73 68 122.6	20 54.8 73 67 122.9	20 32.9 73 67 123.3	3
4	22 24.1 72 69 119.9	22 02.6 72 69 120.3	21 41.1 72 69 120.7	21 19.5 72 69 121.1	20 57.9 72 68 121.4	20 36.2 72 68 121.8	20 14.5 73 68 122.2	19 52.7 73 68 122.5	4
55	21 42.4 71 70 119.2	21 21.1 71 70 119.6	20 59.7 71 69 119.9	20 38.3 72 69 120.3	20 16.8 72 69 120.7	19 55.3 72 69 121.1	19 33.7 72 68 121.4	19 12.1 72 68 121.8	55
6	21 00.6 70 70 118.4	20 39.3 71 70 118.8	20 18.0 71 70 119.2	19 56.8 71 69 119.6	19 35.5 71 69 119.9	19 14.1 71 69 120.3	18 52.7 71 69 120.7	18 31.2 72 69 121.0	6
7	20 18.2 70 71 117.7	19 57.1 70 71 118.1	19 36.1 70 70 118.4	19 14.9 70 70 118.8	18 53.8 71 70 119.2	18 32.6 71 69 119.6	18 11.3 71 69 119.9	17 50.0 71 69 120.3	7
8	19 35.6 70 71 117.0	19 14.7 70 71 117.3	18 53.8 70 71 117.7	18 32.8 70 70 118.1	18 11.8 70 70 118.5	17 50.7 70 70 118.8	17 29.6 70 70 119.2	17 08.5 71 70 119.6	8
9	18 52.7 69 72 116.2	18 32.0 69 72 116.6	18 11.2 70 71 117.0	17 50.4 69 71 117.4	17 29.5 70 71 117.7	17 08.6 70 71 118.1	16 47.7 70 70 118.5	16 26.7 70 70 118.9	9
60	18 09.6 69 72 115.5	17 49.0 69 72 115.9	17 28.4 69 72 116.3	17 07.7 69 72 116.6	16 47.0 69 71 117.0	16 26.2 69 71 117.4	16 05.4 69 71 117.8	15 44.6 70 71 118.1	60
1	17 26.2 68 73 114.8	17 05.8 68 73 115.2	16 45.3 68 72 115.6	16 24.7 69 72 115.9	16 04.2 69 72 116.3	15 43.5 69 72 116.7	15 22.9 69 71 117.1	15 02.2 69 71 117.4	1
2	16 42.6 68 73 114.1	16 22.3 68 73 114.5	16 01.9 68 73 114.9	15 41.5 68 72 115.2	15 21.1 68 72 115.6	15 00.6 68 72 116.0	14 40.1 68 72 116.4	14 19.5 69 72 116.7	2
3	15 58.8 67 74 113.4	15 38.6 67 73 113.8	15 18.3 68 73 114.1	14 58.1 68 73 114.5	14 37.7 68 73 114.9	14 17.4 68 72 115.3	13 57.0 68 72 115.7	13 36.6 68 72 116.0	3
4	15 14.7 67 74 112.7	14 54.6 67 74 113.1	14 34.5 67 73 113.5	14 14.3 67 73 113.9	13 54.2 67 73 114.2	13 34.0 67 73 114.6	13 13.7 68 73 115.0	12 53.4 68 72 115.4	4
65	14 30.3 66 74 112.0	14 10.4 67 74 112.4	13 50.4 67 74 112.8	13 30.4 67 73 113.2	13 10.4 67 73 113.6	12 50.3 67 73 113.9	12 30.2 67 73 114.3	12 10.0 67 73 114.7	65
6	13 45.8 66 75 111.3	13 26.0 66 74 111.7	13 06.1 66 74 112.1	12 46.2 66 74 112.5	12 26.3 66 74 112.9	12 06.4 67 74 113.3	11 46.4 67 73 113.6	11 26.4 67 73 114.0	6
7	13 01.1 66 75 110.7	12 41.4 66 75 111.1	12 21.6 66 75 111.4	12 01.9 66 74 111.8	11 42.1 66 74 112.2	11 22.2 66 74 112.6	11 02.4 66 74 113.0	10 42.5 66 74 113.4	7
8	12 16.2 65 75 110.0	11 56.6 65 75 110.4	11 36.9 65 75 110.8	11 17.3 66 75 111.2	10 57.6 66 74 111.6	10 37.9 66 74 112.0	10 18.2 66 74 112.3	9 58.4 66 74 112.7	8
9	11 31.0 65 76 109.4	11 11.6 65 75 109.7	10 52.0 65 75 110.1	10 32.5 65 75 110.5	10 12.9 65 75 110.9	9 53.3 65 75 111.3	9 33.7 65 74 111.7	9 14.1 66 74 112.1	9
70	10 45.7 65 76 108.7	10 26.4 65 75 109.1	10 07.0 65 75 109.5	9 47.5 65 75 109.9	9 28.1 65 75 110.2	9 08.6 65 75 110.6	8 49.1 65 75 111.0	8 29.6 65 75 111.4	70
1	10 00.3 64 76 108.1	9 41.0 64 76 108.4	9 21.7 64 76 108.8	9 02.4 64 76 109.2	8 43.0 65 76 109.6	8 23.7 65 75 110.0	8 04.3 65 75 110.4	7 44.9 65 75 110.8	1
2	9 14.6 64 76 107.4	8 55.5 64 76 107.8	8 36.4 64 76 108.2	8 17.0 64 76 108.6	7 57.8 64 76 109.0	7 38.5 64 76 109.4	7 19.3 64 75 109.7	7 00.0 64 75 110.1	2
3	8 28.8 63 77 106.7	8 09.7 64 76 107.2	7 50.6 64 76 107.6	7 31.5 64 76 108.0	7 12.4 64 76 108.3	6 53.2 64 76 108.7	6 34.1 64 76 109.1	6 14.9 64 75 109.5	3
4	7 42.9 63 77 106.1	7 23.9 63 77 106.5	7 04.9 63 76 106.9	6 45.9 63 76 107.3	6 26.8 63 76 107.7	6 07.8 64 76 108.1	5 48.7 64 76 108.5	5 29.6 64 76 108.9	4
75	6 56.8 63 77 105.5	6 37.9 63 77 105.9	6 19.0 63 77 106.3	6 00.0 63 77 106.7	5 41.1 63 76 107.1	5 22.1 63 76 107.5	5 03.2 63 76 107.8		75
6	6 10.5 63 77 104.9	5 51.7 63 77 105.3	5 32.9 63 77 105.7	5 14.1 63 77 106.1					6
7	5 24.1 62 78 104.3	5 05.4 62 77 104.7							7

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00' Alt. / Δd Δt / Az.	8° 30' Alt. / Δd Δt / Az.	9° 00' Alt. / Δd Δt / Az.	9° 30' Alt. / Δd Δt / Az.	10° 00' Alt. / Δd Δt / Az.	10° 30' Alt. / Δd Δt / Az.	11° 00' Alt. / Δd Δt / Az.	11° 30' Alt. / Δd Δt / Az.	H.A.
91					5 12.5 60 79 81.4	5 30.4 60 79 81.0	5 48.3 60 79 80.6	6 06.2 60 79 80.2	91
2							5 01.1 60 78 80.0	5 19.0 60 78 79.6	2

16—65188-1

Lat. 37°

H.A.	12°00' Alt	Δd	Δt	Az	12°30' Alt	Δd	Δt	Az	13°00' Alt	Δd	Δt	Az	13°30' Alt	Δd	Δt	Az	14°00' Alt	Δd	Δt	Az	14°30' Alt	Δd	Δt	Az	15°00' Alt	Δd	Δt	Az	15°30' Alt	Δd	Δt	Az	H.A.
00	65 00.0	1.00	02	180.0	65 30.0	1.00	02	180.0	66 00.0	1.00	02	180.0	66 30.0	1.00	02	180.0	67 00.0	1.00	02	180.0	67 30.0	1.00	02	180.0	68 00.0	1.00	02	180.0	68 30.0	1.00	02	180.0	00
1	64 59.0	1.00	05	177.7	65 29.0	1.00	05	177.6	65 59.0	1.00	05	177.6	66 29.0	1.00	05	177.6	66 59.0	1.00	05	177.5	67 28.9	1.00	05	177.5	67 58.9	1.00	05	177.4	68 28.9	1.00	05	177.4	1
2	64 56.1	1.00	08	175.4	65 26.1	1.00	08	175.3	65 56.0	1.00	08	175.2	66 25.9	1.00	09	175.1	66 55.9	1.00	09	175.0	67 25.8	1.00	09	174.9	67 55.7	1.00	09	174.8	68 25.6	1.00	09	174.8	2
3	64 51.3	1.01	11	173.1	65 21.2	99	11	173.0	65 51.0	99	12	172.8	66 20.9	99	12	172.7	66 50.7	99	12	172.6	67 20.5	99	12	172.4	67 50.3	99	12	172.3	68 20.1	99	13	172.1	3
4	64 44.6	99	14	170.8	65 14.3	99	15	170.6	65 44.1	99	15	170.5	66 13.8	99	15	170.3	66 43.5	99	15	170.1	67 13.2	99	16	170.0	67 42.9	99	16	169.8	68 12.5	99	16	169.6	4
05	64 36.0	99	17	168.5	65 05.6	99	18	168.3	65 35.2	99	18	168.1	66 04.7	99	18	167.9	66 34.3	99	19	167.7	67 03.8	98	19	167.5	67 33.3	98	19	167.3	68 02.8	98	20	167.0	05
6	64 25.6	98	20	166.3	64 55.0	98	21	166.1	65 24.4	98	21	165.8	65 53.8	98	21	165.6	66 23.1	98	22	165.3	66 52.4	98	22	165.1	67 21.7	98	23	164.8	67 51.0	98	23	164.5	6
7	64 13.3	97	23	164.1	64 42.5	97	24	163.8	65 11.7	97	24	163.6	65 40.9	97	24	163.3	66 10.0	97	25	163.0	66 39.1	97	25	162.7	67 08.2	97	26	162.4	67 37.2	97	26	162.2	7
8	63 59.3	97	26	161.9	64 28.3	97	27	161.6	64 57.3	97	27	161.3	65 26.2	96	27	161.0	65 55.1	96	28	160.7	66 23.9	96	28	160.3	66 52.7	96	29	160.0	67 21.5	96	29	159.6	8
9	63 43.6	96	29	159.8	64 12.3	96	29	159.5	64 41.1	96	30	159.1	65 09.7	95	30	158.8	65 38.3	95	31	158.4	66 06.9	95	31	158.0	66 35.4	95	32	157.6	67 03.9	95	32	157.2	9
10	63 26.2	95	32	157.7	63 54.7	95	32	157.3	64 23.1	95	33	157.0	64 51.5	95	33	156.6	65 19.8	94	34	156.2	65 48.1	94	34	155.8	66 16.3	94	35	155.4	66 44.4	94	35	154.9	10
1	63 07.2	94	34	155.6	63 35.4	94	35	155.2	64 03.6	94	35	154.8	64 31.7	94	36	154.4	64 59.7	93	36	154.0	65 27.6	93	37	153.5	65 55.5	93	37	153.1	66 23.3	92	38	152.7	1
2	62 46.7	93	37	153.6	63 14.6	93	37	153.2	63 42.4	93	38	152.8	64 10.2	92	38	152.4	64 37.9	92	39	151.9	65 05.5	92	39	151.4	65 33.0	92	40	151.0	66 00.5	91	41	150.5	2
3	62 24.6	92	39	151.6	62 52.2	92	40	151.2	63 19.8	92	40	150.8	63 47.2	91	41	150.3	64 14.6	91	41	149.8	64 41.8	91	42	149.4	65 09.0	90	43	148.9	65 36.1	90	43	148.3	3
4	62 01.1	91	41	149.7	62 28.4	91	42	149.3	62 55.6	91	42	148.8	63 22.8	90	43	148.3	63 49.8	90	44	147.8	64 16.7	90	44	147.3	64 43.5	89	45	146.8	65 10.2	89	46	146.3	4
15	61 36.3	90	44	147.8	62 03.3	90	44	147.4	62 30.1	89	45	146.9	62 56.9	89	45	146.4	63 23.6	89	46	145.9	63 50.1	88	46	145.4	64 16.6	88	47	144.8	64 42.9	88	48	144.3	15
6	61 10.1	89	46	146.0	61 36.8	89	46	145.5	62 03.3	88	47	145.0	62 29.7	88	47	144.5	62 56.1	88	48	144.0	63 22.3	87	49	143.4	63 48.3	87	49	142.9	64 14.3	86	50	142.3	6
7	60 42.7	88	48	144.2	61 09.0	88	48	143.7	61 35.2	87	49	143.2	62 01.3	87	49	142.7	62 27.3	86	50	142.2	62 53.1	86	51	141.6	63 18.8	86	51	141.0	63 44.4	85	52	140.4	7
8	60 14.1	87	50	142.5	60 40.1	86	50	142.0	61 06.0	86	51	141.5	61 31.7	86	51	140.9	61 57.3	85	52	140.4	62 22.8	85	52	139.8	62 48.1	84	53	139.2	63 13.3	84	54	138.6	8
9	59 44.4	86	51	140.8	60 10.0	85	52	140.3	60 35.6	85	52	139.8	61 00.9	84	53	139.2	61 26.2	84	54	138.6	61 51.3	83	54	138.1	62 16.2	83	55	137.5	62 41.0	83	55	136.9	9
20	59 13.6	85	53	139.2	59 38.9	84	54	138.6	60 04.1	84	54	138.1	60 29.1	83	55	137.5	60 54.0	83	55	137.0	61 18.7	82	56	136.4	61 43.3	82	56	135.8	62 07.8	81	57	135.2	20
1	58 41.8	83	55	137.6	59 06.7	83	55	137.0	59 31.6	83	56	136.5	59 56.3	82	56	135.9	60 20.8	82	57	135.3	60 45.2	81	58	134.8	61 09.4	80	59	134.1	61 33.5	80	59	133.5	1
2	58 09.0	82	56	136.0	58 33.6	82	57	135.5	58 58.1	81	57	134.9	59 22.5	81	58	134.4	59 46.7	80	58	133.8	60 10.7	80	59	133.2	60 34.6	79	60	132.6	60 58.3	79	60	131.9	2
3	57 35.2	81	58	134.5	57 59.5	81	58	134.0	58 23.7	80	59	133.4	58 47.8	80	59	132.8	59 11.6	79	60	132.2	59 35.3	79	60	131.6	59 58.9	78	61	131.0	60 22.2	78	61	130.4	3
4	57 00.6	80	59	133.1	57 24.6	80	60	132.5	57 48.5	79	60	131.9	58 12.2	79	61	131.4	58 35.7	78	61	130.8	58 59.1	78	62	130.2	59 22.3	77	62	129.5	59 45.3	76	63	128.9	4
25	56 25.2	79	60	131.6	56 48.9	79	61	131.1	57 12.4	78	61	130.5	57 35.8	78	62	129.9	57 59.0	77	62	129.3	58 22.1	77	63	128.7	58 45.0	76	63	128.1	59 07.7	75	64	127.5	25
6	55 49.0	78	62	130.3	56 12.4	78	62	129.7	56 35.6	77	63	129.1	56 58.7	77	63	128.5	57 21.6	76	64	127.9	57 44.4	76	64	127.3	58 06.9	75	65	126.7	58 29.3	74	65	126.1	6
7	55 12.1	77	63	128.9	55 35.2	77	63	128.3	55 58.1	76	64	127.8	56 20.9	76	64	127.2	56 43.5	75	65	126.6	57 05.9	74	65	126.0	57 28.2	74	66	125.4	57 50.2	73	66	124.7	7
8	54 34.5	76	64	127.6	54 57.3	76	64	127.0	55 19.9	75	65	126.5	55 42.4	75	65	125.9	56 04.7	74	66	125.3	56 26.8	73	66	124.7	56 48.8	73	67	124.1	57 10.5	72	67	123.4	8
9	53 56.2	75	65	126.3	54 18.7	75	65	125.8	54 41.1	74	66	125.2	55 03.2	74	66	124.6	55 25.3	73	67	124.0	55 47.1	73	67	123.4	56 08.8	72	68	122.8	56 30.3	71	68	122.2	9
30	53 17.3	74	66	125.1	53 39.5	74	66	124.5	54 01.6	73	67	124.0	54 23.5	73	67	123.4	54 45.3	72	68	122.8	55 06.8	72	68	122.2	55 28.2	71	68	121.6	55 49.4	70	69	120.9	30
1	52 37.8	73	67	123.9	52 59.8	73	67	123.3	53 21.6	72	68	122.8	53 43.2	72	68	122.2	54 04.7	71	68	121.6	54 26.0	71	69	121.0	54 47.1	70	69	120.4	55 08.1	69	70	119.8	1
2	51 57.7	73	68	122.7	52 19.5	72	68	122.2	52 41.0	72	69	121.6	53 02.4	71	69	121.0	53 23.6	70	69	120.4	53 44.7	70	70	119.8	54 05.5	69	70	119.2	54 26.2	69	70	118.6	2
3	51 17.2	72	68	121.6	51 38.6	71	69	121.0	52 00.0	71	69	120.5	52 21.1	70	70	119.9	52 42.1	70	70	119.3	53 02.9	69	70	118.7	53 23.5	68	71	118.1	53 43.9	68	71	117.5	3
4	50 36.1	71	69	120.5	50 57.4	71	70	119.9	51 18.4	70	70	119.4	51 39.3	69	70	118.8	52 00.1	69	71	118.2	52 20.6	68	71	117.6	52 41.0	68	72	117.0	53 01.2	67	72	116.4	4
35	49 54.6	70	70	119.4	50 15.6	70	70	118.8	50 36.4	69	71	118.3	50 57.1	69	71	117.7	51 17.6	68	71	117.1	51 38.0	67	72	116.5	51 58.1	67	72	115.9	52 18.1	66	72	115.3	35
6	49 12.6	70	71	118.3	49 33.4	69	71	117.8	49 54.0	69	71	117.2	50 14.5	68	72	116.6	50 34.8	67	72	116.0	50 54.9	67	72	115.5	51 14.8	66	73	114.9	51 34.6	66	73	114.3	6
7	48 30.3	69	71	117.3	48 50.8	68	72	116.8	49 11.2	68	72	116.2	49 31.5	67	72	115.6	49 51.6	67	73	115.1	50 11.5	66	73	114.5	50 31.2	65	73	113.9	50 50.7	65	74	113.3	7
8	47 47.5	68	72	116.3	48 07.9	68	72	115.8	48 28.1	67	73	115.2	48 48.1	67	73	114.6	49 08.0	66	73	114.1	49 27.7	65	74	113.5	49 47.2	65	74	112.9	50 06.6	64	74	112.3	8
9	47 04.4	67	72	115.3	47 24.5	67	73	114.8	47 44.5	66	73	114.2	48 04.4	66	73	113.7	48 24.1	66	73	113.1	48 43.6	65	74	112.5	49 02.9	64	74	112.0	49 22.1	64	75	111.4	9
40	46 20.9	67	73	114.4	46 40.9	66	73	113.8	47 00.7	66	74	113.3	47 20.3	65	74	112.7	47 39.8	65	74	112.2	47 59.2	64	75	111.6	48 18.3	64	75	111.0	48 37.3	63	75	110.4	40
1	45 37.1	66	74	113.4	45 56.9	66	74	112.9	46 16.5	65	74	112.4	46 36.0	65	74	111.8	46 55.3	64	75	111.2	47 14.5	64	75	110.7	47 33.5	63	75	110.1	47 52.3	62	75	109.5	1
2	44 53.0	66	74	112.5	45 12.6	65	74	112.0	45 32.1	65	75	111.4	45 51.4	64	75	110.9	46 10.5	64	75	110.3	46 29.5	63	75	109.8	46 48.4	62	76	109.2	47 07.0	62	76	108.6	2
3	44 08.6	65	74	111.6	44 28.0	65	75	111.1	44 47.3	64	75	110.6	45 06.5	64	75	110.0	45 25.5	63	76	109.5	45 44.3	63	76	108.9	46 03.0	62	76	108.3	46 21.5	61	76	107.8	3
4	43 23.9	65	75	110.7	43 43.2	64	75	110.2	44 02.4	64	75	109.7	44 21.3	63	76	109.1	44 40.2	63	76	108.6	44 58.9	62	76	108.0	45 17.4	61	76	107.5	45 35.8	61	77	106.9	4
45	42 38.9	64	75	109.9	42 58.1	64	76	109.4	43 17.1	63	76	108.8	43 35.9	63	76	108.3	43 54.7	62	76	107.8	44 13.2	62	76	107.2	44 31.6	61	77	106.7	44 49.8	60	77	106.1	45
6	41 53.8	64	76	109.0	42 12.8	63	76	108.5	42 31.6	63	76	108.0	42 50.3	62	76	107.5	43 08.9	62	77	106.9	43 27.3	61	77	106.4	43 45.6	61	77	105.8	44 03.7	60	77	105.3	6
7	41 08.4	63	76	108.2	41 27.2	63	76	107.7	41 45.9	62	76	107.2	42 04.5	62	77	106.6	42 23.0	61	77	106.1	42 41.3	61	77	105.6	42 59.4	60	77	105.0	43 17.4	60	77	104.5	7
8	40 22.7	63	76	107.4	40 41.5	62	77	106.9	41 00.1	62	77	106.4	41 18.5	61	77	105.8	41 36.8	61	77	105.3	41 55.0	60	77	104.8	42 13.0	60	78	104.2	42 30.9	59	78	103.7	8
9	39 36.9	62	77	106.6	39 55.5	62	77	106.1	40 14.0	61	77	105.6	40 32.3	61	77	105.1	40 50.5	60	77	104.5	41 08.6	60	78	104.0	41 26.5	59	78	103.5	41 44.3	59	78	102.9	9
50	38 50.9	62	77	105.8	39 09.4	61	77	105.3	39 27.8	61	77	104.8	39 46.0	61	78	104.3	40 04.1	60	78	103.8	40 22.0	60	78	103.2	40 39.8	59	78	102.7	40 57.5	59	78	102.2	50
1	38 04.7	62	77	105.1	38 23.1	61	77	104.5	38 41.3	61	78	104.0	38 59.5	60	78	103.5	39 17.5	60	78	103.0	39 35.3	59	78	102.5	39 53.0	59	78	102.0	40 10.6	58	78	101.4	1
2	37 18.3	61	78	104.3	37 36.6	61	78	103.8	37 54.8	60	78	103.3	38 12.8	60	78	102.8	38 30.7	59	78	102.3	38 48.5	59	78	101.8	39 06.1	59	78	101.2	39 23.6	58	78	100.7	2
3	36 31.8	61	78	103.5	36 50.0	60	78	103.1	37 08.1	60	78	102.6	37 26.0	59	78	102.1	37 43.8	59	78	101.5	38 01.5	59	78	101.0	38 19.0	58	78	100.5	38 36.4	58	79	100.0	3
4	35 45.2	61	78	102.8	36 03.4	60	78	102.3	36 21.2	60	78	101.8	36 39.1	59	78	101.3	36 56.8	59	79	100.8	37 14.4	58	79	100.3	37 31.9	58	79	99.8	37 49.2	58	79	99.3	4
55	34 58.4	60	78	102.1	35 16.4	60	78	101.6	35 34.3	59	78	101.1	35 52.0	59	79	100.6	36 09.7	59	79	100.1	36 27.2	58	79	99.6	36 44.6	58	79	99.1	37 01.9	57	79	98.6	55
6	34 11.5	60	78	101.4	34 29.4	60	79	100.9	34 47.2	59	79	100.4	35 04.9	59	79	99.9	35 22.5	58	79	99.4	35 39.9	58	79	98.9	35 57.2	57	79	98.4	36 14.4	57	79	97.9	6
7	33 24.4	60	79	100.7	33 42.3	59	79	100.2	34 00.0	59	79	99.7	34 17.6	59	79	99.2	34 35.1	58	79	98.7	34 52.5	58	79	98.2	35 09.8	57	79	97.7	35 26.9	57	79	97.2	7
8	32 37.3	59	79	100.0	32 55.1	59	79	99.5	33 12.7	59	79	99.0	33 30.3	58	79	98.5	33 47.7	58	79	98.0	34 05.1	57	79	97.5	34 22.3	57	79	97.1	34 39.4	57	79	96.6	8
9	31 50.1	59	79	99.3	32 07.8	59	79	98.8	32 25.4	59	79	98.3	32 42.9	58	79	97.9	33 00.3	58	79	97.4	33 17.5	57	79	96.9	33 34.7	57	79	96.4	33 51.7	57	80	95.9	9
60	31 02.7	59	79	98.6	31 20.4	59	79	98.1	31 37.9	58	79	97.7	31 55.4	58	79	97.2	32 12.7	58	79	96.7	32 29.9	57	79	96.2	32 47.0	57	80	95.7	33 04.0	56	80	95.2	60
1	30 15.3	59	79	97.9	30 32.9	58	79	97.5	30 50.4	58	79	97.0	31 07.8	58	79	96.5	31 25.1	57	79	96.0	31 42.3	57	80	95.6	31 59.3	57	80	95.1	32 16.3	56	80	94.6	1
2	29 27.8	59	79	97.3	29 45.4	58	79	96.8	30 02.8	58	79	96.3	30 20.2	58	79	95.9	30 37.4	57	80	95.4	30 54.5	57	80	94.9	31 11.6	57	80	94.4	31 28.5	56	80	94.0	2
3	28 40.2	59	79	96.6	28 57.7	58	79	96.2	29 15.1	58	80	95.7	29 32.5	58	80	95.2	29 49.7	57	80	94.8	30 06.8	57	80	94.3	30 23.8	57	80	93.8	30 40.7	56	80	93.3	3
4	27 52.6	58	79	96.0	28 10.1	58	80	95.5	28 27.4	58	80	95.1	28 44.7	57	80	94.6	29 01.9	57	80	94.1	29 19.0	57	80	93.6	29 36.0	56	80	93.2	29 52.8	56	80	92.7	4
65	27 04.9	58	80	95.3	27 22.4	58	80	94.9	27 39.7	58	80	94.4	27 56.9	57	80	94.0	28 14.1	57	80	93.5	28 31.1	57	80	93.0	28 48.1	56	80	92.5	29 05.0	56	80	92.1	65
6	26 17.2	58	80	94.7	26 34.6	58	80	94.2	26 51.9	58	80	93.8	27 09.1	57	80	93.3	27 26.2	57	80	92.9	27 43.3	57	80	92.4	28 00.2	56	80	91.9	28 17.1	56	80	91.5	6
7	25 29.4	58	80	94.1	25 46.8	58	80	93.6	26 04.1	57	80	93.2	26 21.3	57	80	92.7	26 38.4	57	80	92.2	26 55.4	57	80	91.8	27 12.3	56	80	91.3	27 29.2	56	80	90.9	7
8	24 41.6	58	80	93.4	24 58.9	58	80	93.0	25 16.2	57	80	92.5	25 33.4	57	80	92.1	25 50.5	57	80	91.6	26 07.5	57	80	91.2	26 24.4	56	80	90.7	26 41.2	56	80	90.2	8
9	23 53.8	58	80	92.8	24 11.1	58	80	92.4	24 28.3	57	80	91.9	24 45.5	57	80	91.5	25 02.6	57	80	91.0	25 19.6	57	80	90.6	25 36.5	56	80	90.1	25 53.3	56	80	89.6	9
70	23 05.9	58	80	92.2	23 23.2	58	80	91.8	23 40.4	57	80	91.3	23 57.6	57	80	90.9	24 14.7	57	80	90.4	24 31.7	57	80	90.0	24 48.6	56	80	89.5	25 05.4	56	80	89.0	70
1	22 18.0	58	80	91.6	22 35.3	58	80	91.1	22 52.5	57	80	90.7	23 09.7	57	80	90.3	23 26.7	57	80	89.8	23 43.7	57	80	89.4	24 00.7	56	80	88.9	24 17.5	56	80	88.5	1
2	21 30.1	58	80	91.0	21 47.4	58	80	90.5	22 04.6	57	80	90.1	22 21.7	57	80	89.7	22 38.8	57	80	89.2	22 55.8	57	80	88.8	23 12.8	56	80	88.3	23 29.6	56	80	87.9	2
3	20 42.2	58	80	90.4	20 59.5	58	80	89.9	21 16.7	57	80	89.5	21 33.8	57	80	89.1	21 50.9	57	80	88.6	22 07.9	57	80	88.2	22 24.9	56	80	87.7	22 41.7	56	80	87.3	3
4	19 54.2	58	80	89.8	20 11.5	58	80	89.3	20 28.8	57	80	88.9	20 45.9	57	80	88.5	21 03.0	57	80	88.0	21 20.0	57	80	87.6	21 37.0	56	80	87.1	21 53.9	56	80	86.7	4
75	19 06.3	58	80	89.2	19 23.6	58	80	88.7	19 40.9	57	80	88.3	19 58.0	57	80	87.9	20 15.1	57	80	87.4	20 32.2	57	80	87.0	20 49.2	56	80	86.6	21 06.1	56	80	86.1	75
6	18 18.4	58	80	88.6	18 35.7	58	80	88.1	18 53.0	57	80	87.7	19 10.2	57	80	87.3	19 27.3	57	80	86.8	19 44.3	57	80	86.4	20 01.3	57	80	86.0	20 18.3	56	80	85.5	6
7	17 30.5	58	80	88.0	17 47.8	58	80	87.6	18 05.1	57	80	87.1	18 22.3	57	80	86.7	18 39.4	57	80	86.3	18 56.5	57	80	85.8	19 13.6	57	80	85.4	19 30.5	56	80	84.9	7
8	16 42.6	58	80	87.4	17 00.0	58	80	87.0	17 17.3	57	80	86.5	17 34.5	57	80	86.1	17 51.6	57	80	85.7	18 08.8	57	80	85.2	18 25.8	57	80	84.8	18 42.8	57	79	84.4	8
9	15 54.8	58	80	86.8	16 12.1	58	80	86.4	16 29.4	58	80	85.9	16 46.7	57	80	85.5	17 03.9	57	80	85.1	17 21.0	57	80	84.7	17 38.1	57	79	84.2	17 55.1	57	79	83.8	9
80	15 07.0	58	80	86.2	15 24.3	58	80	85.8	15 41.7	58	80	85.4	15 58.9	58	80	84.9	16 16.2	57	79	84.5	16 33.3	57	79	84.1	16 50.5	57	79	83.7	17 07.5	57	79	83.2	80
1	14 19.2	58	80	85.6	14 36.6	58	80	85.2	14 53.9	58	80	84.8	15 11.2	58	79	84.4	15 28.5	57	79	83.9	15 45.7	57	79	83.5	16 02.9	57	79	83.1	16 20.0	57	79	82.7	1
2	13 31.4	58	80	85.0	13 48.8	58	80	84.6	14 06.2	58	79	84.2	14 23.6	58	79	83.8	14 40.9	57	79	83.4	14 58.1	57	79	82.9	15 15.3	57	79	82.5	15 32.5	57	79	82.1	2
3	12 43.7	58	79	84.5	13 01.2	58	79	84.0	13 18.6	58	79	83.6	13 36.0	58	79	83.2	13 53.3	57	79	82.8	14 10.6	57	79	82.4	14 27.8	57	79	81.9	14 45.1	57	79	81.5	3
4	11 56.0	58	79	83.9	12 13.5	58	79	83.5	12 31.0	58	79	83.0	12 48.4	58	79	82.6	13 05.8	58	79	82.2	13 23.1	58	79	81.8	13 40.4	57	79	81.4	13 57.7	57	79	80.9	4
85	11 08.4	59	79	83.3	11 25.9	59	79	82.9	11 43.5	58	79	82.5	12 00.9	58	79	82.0	12 18.4	58	79	81.6	12 35.7	58	79	81.2	12 53.1	58	79	80.8	13 10.4	58	79	80.4	85
6	10 20.8	59	79	82.7	10 38.4	59	79	82.3	10 56.0	59	79	81.9	11 13.5	59	79	81.5	11 31.0	58	79	81.0	11 48.3	58	79	80.6	12 05.8	58	79	80.2	12 23.2	58	79	79.8	6
7	9 33.3	59	79	82.1	9 51.0	59	79	81.7	10 08.6	59	79	81.3	10 26.1	59	79	80.9	10 43.7	59	79	80.5	11 01.2	58	79	80.1	11 18.7	58	78	79.6	11 36.1	58	78	79.2	7
8	8 45.9	59	79	81.5	9 03.6	59	79	81.1	9 21.2	59	79	80.7	9 38.9	59	79	80.3	9 56.5	59	79	79.9	10 14.0	58	78	79.5	10 31.6	58	78	79.1	10 49.1	58	78	78.7	8
9	7 58.6	59	79	81.0	8 16.3	59	79	80.5	8 34.0	59	79	80.1	8 51.7	59	79	79.7	9 09.3	59	79	79.3	9 27.0	58	79	78.9	9 44.6	58	78	78.5	10 02.1	58	78	78.1	9
90	7 11.3	59	79	80.4	7 29.1	59	79	80.0	7 46.8	59	78	79.6	8 04.6	59	78	79.1	8 22.3	59	78	78.7	8 40.0	59	78	78.3	8 57.7	58	78	77.9	9 15.5	58	78	77.5	90

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 37°

H.A.	12° 00' Alt. Δd Δt Az.	12° 30' Alt. Δd Δt Az.	13° 00' Alt. Δd Δt Az.	13° 30' Alt. Δd Δt Az.	14° 00' Alt. Δd Δt Az.	14° 30' Alt. Δd Δt Az.	15° 00' Alt. Δd Δt Az.	15° 30' Alt. Δd Δt Az.	H.A.
00	41 00.0 1.00 01 180.0	40 30.0 1.00 01 180.0	40 00.0 1.00 01 180.0	39 30.0 1.00 01 180.0	39 00.0 1.00 01 180.0	38 30.0 1.00 01 180.0	38 00.0 1.00 01 180.0	37 30.0 1.00 01 180.0	00
1	40 59.5 1.00 03 178.7	40 29.5 1.00 03 178.7	39 59.5 1.00 03 178.7	39 29.5 1.00 03 178.8	38 59.5 1.00 03 178.8	38 29.5 1.00 03 178.8	37 59.5 1.00 03 178.8	37 29.5 1.00 03 178.8	1
2	40 57.8 1.00 04 177.4	40 27.9 1.00 04 177.4	39 57.9 1.00 04 177.5	39 27.9 1.00 04 177.5	38 57.9 1.00 04 177.5	38 27.9 1.00 04 177.5	37 58.0 1.00 04 177.5	37 28.0 1.00 04 177.6	2
3	40 55.1 1.00 06 176.1	40 25.2 1.00 06 176.2	39 55.2 1.00 06 176.2	39 25.3 1.00 06 176.2	38 55.3 1.00 06 176.3	38 25.3 1.00 06 176.3	37 55.4 1.00 06 176.3	37 25.4 1.00 06 176.4	3
4	40 51.3 1.00 08 174.8	40 21.4 1.00 08 174.9	39 51.5 1.00 08 174.9	39 21.6 1.00 08 175.0	38 51.7 1.00 08 175.0	38 21.7 1.00 08 175.1	37 51.8 1.00 08 175.1	37 21.9 1.00 08 175.1	4
05	40 46.5 1.00 10 173.5	40 16.6 1.00 10 173.6	39 46.7 1.00 10 173.7	39 16.9 1.00 10 173.7	38 47.0 1.00 10 173.8	38 17.1 1.00 09 173.8	37 47.2 1.00 09 173.9	37 17.3 1.00 09 173.9	05
6	40 40.6 99 12 172.3	40 10.7 99 12 172.3	39 40.9 99 11 172.5	39 11.1 99 11 172.6	38 41.3 99 11 172.6	38 11.4 99 11 172.7	37 41.6 99 11 172.7	37 11.8 99 11 172.7	6
7	40 33.6 99 13 171.0	40 03.8 99 13 171.1	39 34.1 99 13 171.1	39 04.3 99 13 171.2	38 34.5 99 13 171.3	38 04.8 99 13 171.4	37 35.0 99 13 171.5	37 05.2 99 13 171.5	7
8	40 25.5 99 15 169.7	39 55.8 99 15 169.8	39 26.2 99 15 169.9	38 56.5 99 15 170.0	38 26.8 99 15 170.1	37 57.1 99 14 170.2	37 27.4 99 14 170.2	36 57.7 99 14 170.3	8
9	40 16.4 99 17 168.4	39 46.8 99 17 168.5	39 17.2 99 17 168.6	38 47.6 99 16 168.7	38 18.0 99 16 168.8	37 48.4 99 16 168.9	37 18.8 99 16 169.0	36 49.1 99 16 169.1	9
10	40 06.3 98 19 167.2	39 36.8 98 18 167.3	39 07.3 98 18 167.4	38 37.8 98 18 167.5	38 08.2 98 18 167.6	37 38.7 98 18 167.7	37 09.2 98 18 167.9	36 39.6 98 17 168.0	10
1	39 55.2 98 20 166.0	39 25.7 98 20 166.0	38 56.3 98 20 166.2	38 26.9 98 20 166.3	37 57.5 98 20 166.4	37 28.0 98 19 166.5	36 58.6 98 19 166.7	36 29.1 98 19 166.8	1
2	39 43.0 98 22 164.7	39 13.7 98 22 164.8	38 44.4 98 22 164.9	38 15.1 98 21 165.1	37 45.7 98 21 165.3	37 16.4 98 21 165.3	36 47.1 98 21 165.5	36 17.7 98 21 165.6	2
3	39 29.8 97 24 163.4	39 00.6 97 23 163.6	38 31.4 97 23 163.7	38 02.2 97 23 163.9	37 33.0 97 23 164.0	37 03.8 97 23 164.2	36 34.6 97 22 164.3	36 05.3 97 22 164.4	3
4	39 15.7 97 25 162.2	38 46.6 97 25 162.4	38 17.5 97 25 162.5	37 48.5 97 25 162.7	37 19.4 97 24 162.8	36 50.2 97 24 163.0	36 21.1 97 24 163.1	35 52.0 97 24 163.3	4
15	39 00.5 96 27 161.0	38 31.6 96 27 161.2	38 02.7 96 26 161.3	37 33.7 97 26 161.5	37 04.7 97 26 161.7	36 35.8 97 26 161.8	36 06.8 97 25 162.0	35 37.8 97 25 162.1	15
6	38 44.4 96 28 159.8	38 15.7 96 28 160.0	37 46.9 96 28 160.1	37 18.0 96 28 160.3	36 49.2 96 27 160.5	36 20.3 96 27 160.7	35 51.5 96 27 160.8	35 22.6 96 27 161.0	6
7	38 27.4 95 30 158.6	37 58.8 96 30 158.8	37 30.1 96 29 159.0	37 01.4 96 29 159.3	36 32.7 96 29 159.3	36 04.0 96 29 159.5	35 35.3 96 28 159.7	35 06.5 96 28 159.9	7
8	38 09.4 95 31 157.4	37 41.0 95 31 157.6	37 12.4 95 31 157.8	36 43.9 95 31 158.0	36 15.4 95 30 158.2	35 46.8 95 30 158.4	35 18.2 95 30 158.5	34 49.6 95 30 158.7	8
9	37 50.6 94 33 156.2	37 22.2 94 33 156.4	36 53.9 95 32 156.6	36 25.5 95 32 156.8	35 57.1 95 32 157.0	35 28.7 95 32 157.2	35 00.2 95 31 157.4	34 31.8 95 31 157.6	9
20	37 30.8 94 34 155.1	37 02.6 94 34 155.3	36 34.4 94 34 155.5	36 06.2 94 34 155.7	35 38.0 94 33 155.9	35 09.7 94 33 156.1	34 41.4 94 33 156.3	34 13.1 94 33 156.5	20
1	37 10.2 93 36 153.9	36 42.2 93 36 154.1	36 14.1 93 35 154.3	35 46.1 94 35 154.6	35 17.9 94 35 154.8	34 49.9 94 35 155.0	34 21.7 94 35 155.2	33 53.6 94 35 155.4	1
2	36 48.7 93 37 152.8	36 20.8 93 37 153.0	35 52.9 93 36 153.2	35 25.1 93 36 153.5	34 57.1 93 36 153.7	34 29.2 93 36 153.9	34 01.2 93 36 154.1	33 33.2 93 35 154.3	2
3	36 26.3 92 39 151.6	35 58.6 92 39 151.9	35 30.9 92 38 152.1	35 03.2 92 38 152.3	34 35.5 93 37 152.6	34 07.7 93 37 152.8	33 39.9 93 37 153.0	33 12.1 93 37 153.3	3
4	36 03.1 92 40 150.5	35 35.6 92 40 150.8	35 08.1 92 39 151.0	34 40.6 92 39 151.3	34 13.0 92 39 151.5	33 45.4 92 38 151.7	33 17.8 92 38 152.0	32 50.1 92 38 152.2	4
25	35 39.2 91 41 149.4	35 11.8 91 41 149.7	34 44.5 91 41 149.9	34 17.1 91 40 150.2	33 49.7 91 40 150.4	33 22.3 91 40 150.7	32 54.9 92 39 150.9	32 27.4 92 39 151.1	25
6	35 14.4 90 43 148.3	34 47.3 90 42 148.6	34 20.1 91 42 148.9	33 52.9 91 42 149.1	33 25.7 91 41 149.4	32 58.5 91 41 149.6	32 31.2 91 41 149.9	32 03.9 91 40 150.1	6
7	34 48.8 90 44 147.3	34 21.9 90 44 147.5	33 54.9 90 43 147.8	33 27.9 90 43 148.1	33 00.9 90 43 148.3	32 33.8 90 42 148.6	32 06.7 90 42 148.8	31 39.6 90 42 149.1	7
8	34 22.6 89 45 146.2	33 55.8 89 45 146.5	33 29.0 89 44 146.7	33 02.1 89 44 147.0	32 35.4 90 44 147.3	32 08.5 90 43 147.5	31 41.6 90 43 147.8	31 14.6 90 43 148.1	8
9	33 55.5 88 46 145.1	33 29.0 89 46 145.4	33 02.4 89 46 145.7	32 35.8 89 45 146.0	32 09.1 89 45 146.2	31 42.4 89 45 146.5	31 15.7 89 44 146.8	30 48.9 89 44 147.0	9
30	33 27.8 88 47 144.1	33 01.4 88 47 144.4	32 35.0 88 47 144.7	32 08.6 88 46 145.0	31 42.1 88 46 145.2	31 15.6 88 46 145.5	30 49.1 89 45 145.8	30 22.5 89 45 146.1	30
1	32 59.3 87 49 143.1	32 33.2 87 48 143.4	32 07.0 87 48 143.7	31 40.7 88 48 144.0	31 14.5 88 47 144.2	30 48.1 88 47 144.5	30 21.8 88 47 144.8	29 55.4 88 46 145.1	1
2	32 30.2 86 50 142.1	32 04.3 87 49 142.4	31 38.3 87 49 142.7	31 12.2 87 49 143.0	30 46.1 87 48 143.2	30 20.0 87 48 143.5	29 53.8 87 48 143.8	29 27.6 87 47 144.1	2
3	32 00.5 86 51 141.1	31 34.7 86 50 141.4	31 08.9 86 50 141.7	30 43.0 86 50 142.0	30 17.1 86 49 142.3	29 51.2 87 49 142.6	29 25.2 87 49 142.8	28 59.2 87 48 143.1	3
4	31 30.0 85 52 140.1	31 04.5 85 51 140.4	30 38.8 85 51 140.7	30 13.2 86 51 141.0	29 47.5 86 50 141.3	29 21.7 86 50 141.6	28 55.9 86 50 141.9	28 30.1 86 49 142.2	4
35	30 59.0 85 53 139.1	30 33.6 85 52 139.4	30 08.2 85 52 139.7	29 42.7 85 52 140.0	29 17.2 85 51 140.4	28 51.6 85 51 140.7	28 26.1 85 51 140.9	28 00.4 85 50 141.2	35
6	30 27.3 84 54 138.2	30 02.1 84 53 138.5	29 36.9 84 53 138.8	29 11.6 84 53 139.1	28 46.3 84 52 139.4	28 21.0 85 52 139.7	27 55.6 85 52 140.0	27 30.1 85 52 140.3	6
7	29 55.1 83 55 137.2	29 30.1 83 54 137.5	29 05.0 84 54 137.9	28 40.0 84 54 138.2	28 14.8 84 53 138.5	27 49.7 84 53 138.8	27 24.5 84 53 139.1	26 59.2 84 52 139.4	7
8	29 22.2 83 56 136.3	28 57.4 83 55 136.6	28 32.6 83 55 136.9	28 07.7 83 55 137.2	27 42.8 83 54 137.6	27 17.8 83 54 137.9	26 52.8 83 54 138.2	26 27.8 84 53 138.5	8
9	28 48.8 82 57 135.4	28 24.2 82 56 135.7	27 59.6 82 56 136.0	27 34.9 82 56 136.3	27 10.2 83 55 136.7	26 45.4 83 55 137.0	26 20.6 83 55 137.3	25 55.7 83 54 137.6	9
40	28 14.9 81 57 134.5	27 50.5 81 57 134.8	27 26.1 82 57 135.1	27 01.6 82 56 135.4	26 37.0 82 56 135.8	26 12.4 82 56 136.1	25 47.8 82 56 136.4	25 23.2 82 55 136.7	40
1	27 40.4 81 58 133.6	27 16.2 81 58 133.9	26 52.0 81 58 134.2	26 27.7 81 57 134.6	26 03.3 81 57 134.9	25 38.9 81 57 135.2	25 14.5 82 56 135.5	24 50.0 82 56 135.8	1
2	27 05.5 80 59 132.7	26 41.5 80 59 133.0	26 17.4 80 58 133.3	25 53.3 80 58 133.7	25 29.1 81 58 134.0	25 04.9 81 58 134.3	24 40.7 81 57 134.7	24 16.4 81 57 135.0	2
3	26 30.0 79 60 131.8	26 06.2 80 60 132.1	25 42.3 80 59 132.5	25 18.4 80 59 132.8	24 54.4 80 59 133.1	24 30.4 80 58 133.5	24 06.3 80 58 133.8	23 42.2 80 58 134.1	3
4	25 54.0 79 61 130.9	25 30.4 79 60 131.3	25 06.7 79 60 131.6	24 43.0 79 60 132.0	24 19.2 79 59 132.3	23 55.4 79 59 132.6	23 31.5 80 59 133.0	23 07.6 80 59 133.3	4
45	25 17.6 78 61 130.1	24 54.2 78 61 130.4	24 30.7 78 61 130.8	24 07.1 79 61 131.1	23 43.5 79 60 131.5	23 19.9 79 60 131.8	22 56.2 79 60 132.1	22 32.5 79 59 132.5	45
6	24 40.7 77 62 129.3	24 17.5 78 62 129.6	23 54.1 78 62 129.9	23 30.8 78 61 130.3	23 07.4 78 61 130.6	22 43.9 78 61 131.0	22 20.4 78 60 131.3	21 56.9 79 60 131.6	6
7	24 03.4 77 63 128.4	23 40.3 77 63 128.8	23 17.2 77 62 129.1	22 54.0 77 62 129.5	22 30.8 77 62 129.8	22 07.5 78 61 130.2	21 44.2 78 61 130.5	21 20.9 78 61 130.8	7
8	23 25.7 76 64 127.6	23 02.8 76 63 128.0	22 39.8 77 63 128.3	22 16.8 77 63 128.7	21 53.8 77 62 129.0	21 30.7 77 62 129.3	21 07.6 77 62 129.7	20 44.4 77 62 130.0	8
9	22 47.5 76 64 126.8	22 24.8 76 64 127.2	22 02.0 76 64 127.5	21 39.2 76 63 127.9	21 16.3 76 63 128.2	20 53.4 76 63 128.5	20 30.5 77 62 128.9	20 07.5 77 62 129.2	9
50	22 08.9 75 65 126.0	21 46.4 75 65 126.4	21 23.8 75 64 126.7	21 01.1 76 64 127.1	20 38.5 76 64 127.4	20 15.7 76 63 127.8	19 53.0 76 63 128.1	19 30.2 76 63 128.5	50
1	21 30.0 74 66 125.2	21 07.6 75 65 125.6	20 45.2 75 65 125.9	20 22.7 75 65 126.3	20 00.2 75 64 126.6	19 37.7 75 64 127.0	19 15.1 75 64 127.3	18 52.4 75 64 127.7	1
2	20 50.6 74 66 124.4	20 28.4 74 66 124.8	20 06.2 74 66 125.2	19 43.9 74 65 125.5	19 21.6 75 65 125.9	18 59.2 75 65 126.2	18 36.8 75 64 126.6	18 14.3 75 64 126.9	2
3	20 10.9 73 67 123.7	19 48.9 74 66 124.0	19 26.8 74 66 124.4	19 04.7 74 66 124.7	18 42.5 74 66 125.1	18 20.3 74 65 125.5	17 58.1 74 65 125.8	17 35.8 74 65 126.2	3
4	19 30.9 73 67 122.9	19 09.0 73 67 123.3	18 47.1 73 67 123.6	18 25.1 73 67 124.0	18 03.2 73 66 124.3	17 41.1 73 66 124.7	17 19.1 74 66 125.1	16 57.0 74 65 125.4	4
55	18 50.5 72 68 122.2	18 28.8 72 68 122.5	18 07.0 73 67 122.9	17 45.2 73 67 123.2	17 23.4 73 67 123.6	17 01.6 73 67 124.0	16 39.7 73 66 124.3	16 17.7 73 66 124.7	55
6	18 09.7 72 68 121.4	17 48.2 72 68 121.8	17 26.6 72 68 122.1	17 05.3 72 68 122.5	16 43.3 72 67 122.8	16 21.6 72 67 123.2	15 59.9 72 67 123.6	15 38.1 73 67 123.9	6
7	17 28.7 71 69 120.7	17 07.3 71 69 121.0	16 45.9 71 68 121.4	16 24.4 72 68 121.8	16 02.9 72 68 122.1	15 41.4 72 68 122.5	15 19.8 72 67 122.9	14 58.2 72 67 123.2	7
8	16 47.3 71 69 120.0	16 26.1 71 69 120.3	16 04.8 71 69 120.7	15 43.5 71 68 121.1	15 22.2 71 68 121.4	15 00.8 71 68 121.8	14 39.4 72 68 122.1	14 18.0 72 67 122.5	8
9	16 05.6 70 70 119.2	15 44.6 70 70 119.6	15 23.5 70 69 120.0	15 02.3 71 69 120.3	14 41.1 71 69 120.7	14 19.9 71 69 121.1	13 58.7 71 68 121.4	13 37.4 71 68 121.8	9
60	15 23.7 70 70 118.5	15 02.8 70 70 118.9	14 41.8 70 70 119.3	14 20.8 70 70 119.6	13 59.8 70 69 120.0	13 38.7 70 69 120.4	13 17.6 70 69 120.7	12 56.5 70 69 121.1	60
1	14 41.4 69 71 117.8	14 20.7 69 71 118.2	13 59.9 69 71 118.6	13 39.0 70 70 118.9	13 18.2 70 70 119.3	12 57.2 70 70 119.7	12 36.3 70 69 120.0	12 15.3 70 69 120.4	1
2	13 58.9 69 71 117.1	13 38.3 69 71 117.5	13 17.6 69 71 117.9	12 56.9 69 70 118.2	12 36.2 69 70 118.6	12 15.5 69 70 119.0	11 54.7 69 70 119.4	11 33.9 69 70 119.7	2
3	13 16.1 68 72 116.4	12 55.7 68 72 116.8	12 35.1 68 71 117.2	12 14.6 69 71 117.6	11 54.0 69 71 117.9	11 33.4 69 71 118.3	11 12.8 69 70 118.7	10 52.1 69 70 119.0	3
4	12 33.1 68 72 115.8	12 12.8 68 72 116.1	11 52.4 68 72 116.5	11 32.0 68 71 116.9	11 11.6 68 71 117.3	10 51.1 68 71 117.6	10 30.6 69 70 118.0	10 10.1 69 70 118.4	4
65	11 49.8 67 73 115.1	11 29.6 67 72 115.5	11 09.4 68 72 115.8	10 49.1 68 72 116.2	10 28.8 68 72 116.6	10 08.5 68 71 117.0	9 48.2 68 71 117.3	9 27.8 68 71 117.7	65
6	11 06.3 67 73 114.4	10 46.2 67 73 114.8	10 26.1 67 72 115.2	10 06.0 67 72 115.5	9 45.8 67 72 115.9	9 25.7 67 72 116.3	9 05.5 67 72 116.7	8 45.2 67 71 117.0	6
7	10 22.6 66 73 113.7	10 02.6 67 73 114.1	9 42.6 67 73 114.5	9 22.7 67 73 114.9	9 02.6 67 72 115.2	8 42.6 67 72 115.6	8 22.5 67 72 116.0	8 02.4 67 72 116.4	7
8	9 38.6 66 74 113.1	9 18.8 66 73 113.5	8 58.9 66 73 113.8	8 39.1 66 73 114.2	8 19.2 66 73 114.6	7 59.3 66 72 115.0	7 39.3 66 72 115.4	7 19.4 67 72 115.7	8
9	8 54.4 66 74 112.4	8 34.7 66 74 112.8	8 15.0 66 74 113.2	7 55.3 66 73 113.6	7 35.5 66 73 114.0	7 15.7 66 73 114.3	6 55.9 66 72 114.7	6 36.1 66 72 115.1	9
70	8 10.0 65 74 111.8	7 50.4 65 74 112.2	7 30.8 65 74 112.6	7 11.2 65 74 112.9	6 51.6 65 73 113.3	6 31.9 66 73 113.7	6 12.3 66 73 114.1	5 52.6 66 73 114.5	70
1	7 25.4 65 75 111.1	7 06.0 65 74 111.5	6 46.5 65 74 111.9	6 27.0 65 74 112.3	6 07.5 65 74 112.7	5 48.0 65 74 113.1	5 28.4 65 73 113.4	5 08.9 65 73 113.8	1
2	6 40.6 64 75 110.5	6 21.3 64 75 110.9	6 01.9 65 75 111.3	5 42.6 65 75 111.7	5 23.2 65 74 112.0	5 03.8 65 74 112.4			2
3	5 55.7 64 75 109.9	5 36.4 64 75 110.3	5 17.2 64 75 110.6						3
4	5 10.5 64 76 109.2								4

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00' Alt. Δd Δt Az.	12° 30' Alt. Δd Δt Az.	13° 00' Alt. Δd Δt Az.	13° 30' Alt. Δd Δt Az.	14° 00' Alt. Δd Δt Az.	14° 30' Alt. Δd Δt Az.	15° 00' Alt. Δd Δt Az.	15° 30' Alt. Δd Δt Az.	H.A.
91	6 24.1 60 79 79.8	6 41.9 59 78 79.4	6 59.8 59 78 79.0	7 17.6 59 78 78.6	7 35.3 59 78 78.2	7 53.1 59 78 77.8	8 10.9 59 78 77.3	8 28.6 59 78 76.9	91
2	5 37.0 60 78 79.2	5 54.9 60 78 78.8	6 12.8 60 78 78.4	6 30.6 59 78 78.0	6 48.5 59 78 77.6	7 06.3 59 78 77.2	7 24.2 59 78 76.8	7 41.9 59 78 76.4	2
3		5 07.9 60 78 78.2	5 25.9 60 78 77.8	5 43.8 60 78 77.4	6 01.8 60 78 77.0	6 19.7 59 78 76.6	6 37.6 59 77 76.2	6 55.4 59 77 75.8	3
4					5 15.1 60 78 76.4	5 33.1 60 77 76.0	5 51.1 60 77 75.6	6 09.0 60 77 75.2	4
95							5 04.7 60 77 75.0	5 22.8 60 77 74.6	95

Lat. 37°

H.A.	16° 00' Alt.	Δd Δt	Az.	16° 30' Alt.	Δd Δt	Az.	17° 00' Alt.	Δd Δt	Az.	17° 30' Alt.	Δd Δt	Az.	18° 00' Alt.	Δd Δt	Az.	18° 30' Alt.	Δd Δt	Az.	19° 00' Alt.	Δd Δt	Az.	19° 30' Alt.	Δd Δt	Az.	H.A.
00	69 00.0	1.00 02	180.0	69 30.0	1.00 02	180.0	70 00.0	1.00 02	180.0	70 30.0	1.00 02	180.0	71 00.0	1.00 02	180.0	71 30.0	1.00 02	180.0	72 00.0	1.00 02	180.0	72 30.0	1.00 02	180.0	00
1	68 58.9	1.00 06	177.3	69 28.9	1.00 06	177.3	69 58.8	1.00 06	177.2	70 28.8	1.00 06	177.1	70 58.8	1.00 06	177.1	71 28.8	1.00 06	177.0	71 58.7	1.00 06	176.9	72 28.7	1.00 07	176.9	1
2	68 55.5	1.00 09	174.6	69 25.4	1.00 10	174.5	69 55.3	1.00 10	174.4	70 25.2	1.00 10	174.3	70 55.1	1.00 10	174.2	71 25.0	1.00 10	174.0	71 54.9	1.00 11	173.9	72 24.8	1.00 11	173.7	2
3	68 49.9	99 13	172.0	69 19.7	99 13	171.8	69 49.5	99 14	171.7	70 19.3	99 14	171.5	70 49.1	99 14	171.3	71 18.8	99 14	171.1	71 48.5	99 15	170.7	72 18.3	99 15	170.7	3
4	68 42.2	99 17	169.4	69 11.8	99 17	169.1	69 41.4	99 17	168.9	70 11.0	99 18	168.7	70 40.6	99 18	168.4	71 10.2	99 18	168.2	71 39.7	98 19	167.9	72 09.2	98 19	167.6	4
05	68 32.3	98 20	166.8	69 01.7	98 20	166.5	69 31.1	98 21	166.2	70 00.5	98 21	165.9	70 29.9	98 22	165.6	70 59.2	98 22	165.3	71 28.5	98 23	165.0	71 57.7	97 23	164.6	05
6	68 20.3	97 23	164.2	68 49.5	97 24	163.9	69 18.6	97 24	163.6	69 47.8	97 25	163.2	70 16.8	97 25	162.9	70 45.9	97 26	162.5	71 14.9	97 26	162.1	71 43.8	97 27	161.7	6
7	68 06.2	97 27	161.7	68 35.1	96 27	161.3	69 04.0	96 28	161.0	69 32.9	96 28	160.6	70 01.7	96 29	160.2	70 30.4	96 29	159.7	70 59.0	95 30	159.3	71 27.6	95 31	158.8	7
8	67 50.2	96 30	159.2	68 18.8	95 31	158.8	68 47.4	95 31	158.4	69 15.9	95 32	158.0	69 44.4	95 32	157.5	70 12.7	94 33	157.1	70 41.0	94 33	156.6	71 09.2	94 34	156.0	8
9	67 32.2	95 33	156.8	68 00.6	94 34	156.4	68 28.8	94 34	155.9	68 57.0	94 35	155.5	69 25.1	93 35	155.0	69 53.0	93 36	154.4	70 21.0	93 37	153.9	70 48.8	92 37	153.3	9
10	67 12.5	93 36	154.5	67 40.5	93 36	154.0	68 08.3	93 37	153.5	68 36.1	92 38	153.0	69 03.8	92 38	152.5	69 31.4	92 39	151.9	69 58.9	91 40	151.3	70 26.3	91 41	150.7	10
1	66 51.0	92 39	152.2	67 18.6	92 39	151.7	67 46.1	92 40	151.2	68 13.5	91 41	150.6	68 40.8	91 41	150.1	69 08.0	90 42	149.5	69 35.0	90 43	148.9	70 01.9	89 44	148.2	1
2	66 27.3	91 41	150.0	66 55.0	91 42	149.4	67 22.1	90 43	148.9	67 49.2	90 43	148.3	68 16.0	89 44	147.7	68 42.8	89 45	147.1	69 09.4	88 45	146.5	69 35.8	88 46	145.8	2
3	66 03.0	90 44	147.8	66 29.9	89 44	147.3	66 56.6	89 45	146.7	67 23.2	88 46	146.1	67 49.6	88 47	145.5	68 16.0	87 47	144.8	68 42.1	87 48	144.2	69 08.1	86 49	143.5	3
4	65 36.8	88 46	145.7	66 03.2	88 47	145.1	66 29.5	87 47	144.5	66 55.7	87 48	143.9	67 21.7	86 49	143.3	67 47.6	86 50	142.6	68 13.3	85 50	141.9	68 38.8	85 51	141.2	4
15	65 09.1	87 48	143.7	65 35.1	87 49	143.1	66 01.0	86 50	142.5	66 26.8	86 50	141.9	66 52.4	85 51	141.2	67 17.8	84 52	140.5	67 43.1	84 53	139.8	68 08.1	83 53	139.1	15
6	64 40.1	86 50	141.7	65 05.7	85 51	141.1	65 31.2	85 52	140.5	65 56.5	84 53	139.8	66 21.7	84 53	139.2	66 46.7	83 54	138.5	67 11.5	82 55	137.8	67 36.1	82 55	137.0	6
7	64 09.8	84 52	139.8	64 35.0	84 53	139.2	65 00.1	83 54	138.6	65 25.0	83 54	137.9	65 49.8	82 55	137.2	66 14.3	81 56	136.5	66 38.7	81 57	135.8	67 02.8	80 57	135.0	7
8	63 38.3	83 54	138.0	64 03.1	83 55	137.4	64 27.8	82 56	136.7	64 52.3	81 56	136.0	65 16.6	81 57	135.4	65 40.8	80 58	134.6	66 04.7	79 58	133.9	66 28.4	79 59	133.1	8
9	63 05.7	82 56	136.2	63 30.1	81 57	135.6	63 54.4	81 57	134.9	64 18.5	80 58	134.3	64 42.4	79 59	133.6	65 06.1	79 59	132.8	65 29.6	78 60	132.1	65 52.9	77 61	131.3	9
20	62 32.0	81 58	134.5	62 56.1	80 58	133.9	63 20.0	79 59	133.2	63 43.7	79 60	132.5	64 07.2	78 60	131.8	64 30.5	77 61	131.1	64 53.6	77 62	130.3	65 16.4	76 62	129.6	20
1	61 57.4	79 59	132.9	62 21.1	79 60	132.2	62 44.6	78 60	131.6	63 07.9	77 61	130.9	63 31.0	77 62	130.2	63 53.9	76 62	129.4	64 16.6	75 63	128.7	64 39.0	74 64	127.9	1
2	61 21.8	78 61	131.3	61 45.2	77 61	130.6	62 08.3	77 62	130.0	62 31.3	76 62	129.3	62 54.0	75 63	128.5	63 16.5	75 64	127.7	63 38.8	74 64	127.1	64 00.8	73 65	126.3	2
3	60 45.4	77 62	129.8	61 08.4	76 63	129.1	61 31.2	76 63	128.4	61 53.7	75 64	127.7	62 16.1	74 64	127.0	62 38.3	73 65	126.3	63 00.2	73 66	125.5	63 21.8	72 66	124.8	3
4	60 08.2	76 63	128.3	60 30.8	75 64	127.6	60 53.2	74 64	126.9	61 15.5	74 65	126.2	61 37.5	73 66	125.5	61 59.3	72 66	124.8	62 20.8	71 67	124.0	62 42.1	71 67	123.3	4
25	59 30.2	75 65	126.8	59 52.5	74 65	126.2	60 14.6	73 66	125.5	60 36.5	73 66	124.8	60 58.1	72 67	124.1	61 19.6	71 67	123.4	61 40.8	70 68	122.6	62 01.7	69 68	121.9	25
6	58 51.5	74 66	125.4	59 13.4	73 66	124.8	59 35.2	72 67	124.1	59 56.6	72 67	123.4	60 18.1	71 68	122.7	60 39.2	70 68	122.0	61 00.1	69 69	121.2	61 20.7	68 69	120.5	6
7	58 12.1	73 67	124.1	58 33.8	72 67	123.4	58 55.2	71 68	122.8	59 16.5	70 68	122.1	59 37.5	70 69	121.4	59 58.3	69 69	120.6	60 18.8	68 70	119.9	60 39.2	67 70	119.2	7
8	57 32.1	72 68	122.8	57 53.5	71 68	122.1	58 14.6	70 69	121.5	58 35.6	69 69	120.8	58 56.3	69 70	120.1	59 16.8	68 70	119.4	59 37.0	67 70	118.6	59 57.1	66 71	117.9	8
9	56 51.5	71 69	121.5	57 12.6	70 69	120.9	57 33.5	69 69	120.2	57 54.1	68 70	119.5	58 14.6	68 70	118.8	58 34.8	67 71	118.1	58 54.7	66 71	117.4	59 14.5	65 72	116.7	9
30	56 10.4	70 69	120.3	56 31.2	69 70	119.7	56 51.8	68 70	119.0	57 12.2	68 71	118.3	57 32.3	67 71	117.6	57 52.3	66 72	116.9	58 12.0	65 72	116.2	58 31.4	64 72	115.5	30
1	55 28.8	69 70	119.1	55 49.3	68 71	118.5	56 09.7	67 71	117.8	56 29.8	67 71	117.1	56 49.7	66 72	116.5	57 09.3	65 72	115.7	57 28.8	64 73	115.1	57 48.0	64 73	114.3	1
2	54 46.7	68 71	118.0	55 07.0	67 71	117.3	55 27.1	67 72	116.7	55 46.9	66 72	116.0	56 06.6	65 72	115.3	56 26.0	64 73	114.6	56 45.2	64 73	113.9	57 04.1	63 74	113.2	2
3	54 04.2	67 72	116.9	54 24.2	66 72	116.2	54 44.0	66 72	115.6	55 03.7	65 73	114.9	55 23.1	64 73	114.2	55 42.2	64 74	113.6	56 01.2	63 74	112.9	56 19.9	62 74	112.2	3
4	53 21.2	66 72	115.8	53 41.0	66 73	115.1	54 00.6	65 73	114.5	54 20.0	64 73	113.8	54 39.2	64 74	113.2	54 58.1	63 74	112.5	55 16.9	62 74	111.8	55 35.4	61 75	111.1	4
35	52 37.9	66 73	114.7	52 57.4	65 73	114.1	53 16.8	64 74	113.5	53 36.0	64 74	112.8	53 55.0	63 74	112.1	54 13.7	62 75	111.5	54 32.2	61 75	110.8	54 50.5	61 75	110.1	35
6	51 54.2	65 73	113.7	52 13.5	64 74	113.0	52 32.7	64 74	112.4	52 51.7	63 74	111.8	53 10.4	62 75	111.1	53 29.0	61 75	110.5	53 47.3	61 75	109.8	54 05.4	60 76	109.1	6
7	51 10.1	64 74	112.7	51 29.3	64 74	112.1	51 48.3	63 75	111.5	52 07.0	62 75	110.8	52 25.6	62 75	110.2	52 44.0	61 76	109.5	53 02.1	60 76	108.9	53 20.0	59 76	108.2	7
8	50 25.7	64 74	111.7	50 44.7	63 75	111.1	51 03.5	62 75	110.5	51 22.1	62 75	109.9	51 40.5	61 76	109.2	51 58.7	60 76	108.6	52 16.6	60 76	107.9	52 34.4	59 76	107.3	8
9	49 41.1	63 75	110.8	49 59.9	62 75	110.2	50 18.5	62 75	109.6	50 36.9	61 76	108.9	50 55.1	60 76	108.3	51 13.1	60 76	107.7	51 30.9	59 77	107.0	51 48.5	58 77	106.4	9
40	48 56.1	62 75	109.8	49 14.8	62 76	108.9	49 33.2	61 76	108.6	49 51.5	60 76	108.0	50 09.5	60 76	107.4	50 27.3	59 77	106.8	50 45.0	58 77	106.1	51 02.4	57 77	105.5	40
1	48 10.9	62 76	108.9	48 29.4	61 76	108.4	48 47.7	61 76	107.8	49 05.8	60 76	107.1	49 23.7	59 77	106.5	49 41.4	59 77	105.9	49 58.9	58 77	105.2	50 16.2	57 77	104.6	1
2	47 25.5	61 76	108.1	47 43.8	61 76	107.5	48 01.9	60 77	106.9	48 19.9	59 77	106.3	48 37.6	59 77	105.7	48 55.2	58 78	105.1	49 12.5	58 78	104.4	49 29.7	57 78	103.8	2
3	46 39.8	61 76	107.2	46 58.0	60 77	106.6	47 16.0	60 77	106.0	47 33.8	59 77	105.4	47 51.4	58 77	104.8	48 08.8	58 78	104.2	48 26.1	57 78	103.6	48 43.1	56 78	103.0	3
4	45 54.0	60 77	106.4	46 12.0	60 77	105.8	46 29.8	59 77	105.2	46 47.5	59 77	104.6	47 05.0	58 78	104.0	47 22.3	57 78	103.4	47 39.4	57 78	102.8	47 56.3	56 78	102.2	4
45	45 07.9	60 77	105.5	45 25.8	59 77	104.4	45 43.5	59 77	104.4	46 01.1	58 78	103.8	46 18.4	58 78	103.2	46 35.5	57 78	102.6	46 52.6	56 78	102.0	47 09.6	56 78	101.4	45
6	44 21.6	60 77	104.7	44 39.4	59 78	104.2	44 57.0	58 78	103.6	45 14.4	58 78	103.0	45 31.7	57 78	102.4	45 48.8	57 78	101.8	46 05.7	56 78	101.2	46 22.4	55 79	100.6	6
7	43 35.1	59 78	103.9	43 52.9	59 78	103.4	44 10.4	58 78	102.8	44 27.7	57 78	102.2	44 44.8	57 78	101.7	45 01.8	56 78	101.1	45 18.6	56 79	100.5	45 35.2	55 79	99.9	7
8	42 48.6	59 78	103.2	43 06.2	58 78	102.6	43 23.6	58 78	102.0	43 40.8	57 78	101.5	43 57.8	57 79	100.9	44 14.7	56 79	100.3	44 31.4	55 79	99.8	44 48.0	55 79	99.2	8
9	42 01.9	58 78	102.4	42 19.3	58 78	101.8	42 36.6	57 78	101.3	42 53.8	57 79	100.7	43 10.7	56 79	100.2	43 27.3	55 79	99.6	43 44.2	55 79	99.0	44 00.6	55 79	98.4	9
50	41 15.0	58 78	101.6	41 32.4	58 78	101.1	41 49.6	57 79	100.5	42 06.6	57 79	100.0	42 22.5	56 79	99.4	42 40.2	55 79	98.9	42 56.8	55 79	98.3	43 13.2	54 79	97.7	50
1	40 28.0	58 79	100.9	40 45.3	57 79	100.4	41 02.4	57 79	99.8	41 19.4	56 79	99.3	41 36.2	56 79	98.7	41 52.9	55 79	98.2	42 09.3	55 79	97.6	42 25.7	54 79	97.0	1
2	39 40.9	58 79	100.2	39 58.1	57 79	99.6	40 15.2	57 79	99.1	40 32.0	56 79	98.6	40 48.8	56 79	98.0	41 05.4	55 79	97.5	41 21.8	54 79	96.9	41 38.1	54 79	96.4	2
3	38 53.7	57 79	99.5	39 10.8	57 79	98.9	39 27.8	56 79	98.4	39 44.6	56 79	97.9	40 01.3	55 79	97.3	40 17.8	55 79	96.8	40 34.2	54 79	96.2	40 50.4	54 80	95.7	3
4	38 06.4	57 79	98.8	38 23.4	57 79	98.2	38 40.4	56 79	97.7	38 57.1	56 79	97.2	39 13.7	55 79	96.6	39 30.2	54 79	96.1	39 46.5	54 80	95.6	40 02.7	54 80	95.0	4
55	37 19.0	57 79	98.1	37 36.0	56 79	97.6	37 52.8	56 79	97.0	38 09.5	55 80	96.5	38 26.1	55 80	96.0	38 42.5	55 80	95.4	38 58.8	54 80	94.9	39 14.9	53 80	94.4	55
6	36 31.5	57 79	97.4	36 48.4	56 79	96.9	37 05.2	56 79	96.4	37 21.9	55 80	95.8	37 38.4	55 80	95.3	37 54.8	54 80	94.8	38 11.1	54 80	94.2	38 27.1	53 80	93.7	6
7	35 43.9	56 79	96.7	36 00.8	56 79	96.2	36 17.6	56 80	95.7	36 34.2	55 80	95.2	36 50.7	55 80	94.7	37 07.0	54 80	94.1	37 23.2	54 80	93.6	37 39.3	53 80	93.1	7
8	34 56.3	56 79	96.1	35 13.2	56 80	95.5	35 29.8	55 80	95.0	35 46.5	55 80	94.5	36 02.9	54 80	94.0	36 19.2	54 80	93.5	36 35.4	54 80	93.0	36 51.5	53 80	92.4	8
9	34 08.6	56 80	95.4	34 25.4	56 80	94.9	34 42.1	55 80	94.4	34 58.7	55 80	93.9	35 15.1	54 80	93.4	35 31.4	54 80	92.9	35 47.5	54 80	92.3	36 03.6	53 80	91.8	9
60	33 20.9	56 80	94.7	33 37.7	56 80	94.2	33 54.3	55 80	93.7	34 10.8	55 80	93.2	34 27.2	54 80	92.7	34 43.5	54 80	92.2	34 59.7	54 80	91.7	35 15.7	53 80	91.2	60
1	32 33.1	56 80	94.1	32 49.9	56 80	93.6	33 06.5	55 80	93.1	33 23.0	55 80	92.6	33 39.4	54 80	92.1	33 55.6	54 80	91.6	34 11.8	54 80	91.1	34 27.8	53 80	90.6	1
2	31 45.3	56 80	93.5	32 02.0	56 80	93.0	32 18.6	55 80	92.5	32 35.1	55 80	92.0	32 51.5	54 80	91.5	33 07.7	54 80	91.0	33 23.8	54 80	90.5	33 39.8	53 80	90.0	2
3	30 57.5	56 80	92.8	31 14.2	56 80	92.4	31 30.7	55 80	91.9	31 47.2	55 80	91.4	32 03.5	54 80	90.9	32 19.8	54 80	90.4	32 35.9	54 80	89.9	32 51.9	53 80	89.4	3
4	30 09.6	56 80	92.2	30 26.3	55 80	91.7	30 42.8	55 80	91.3	30 59.3	55 80	90.8	31 15.6	54 80	90.3	31 31.9	54 80	89.8	31 48.0	54 80	89.3	32 04.0	53 80	88.8	4
65	29 21.7	56 80	91.6	29 38.4	55 80	91.1	29 54.9	55 80	90.6	30 11.4	55 80	90.2	30 27.7	54 80	89.7	30 44.0	54 80	89.2	31 00.1	54 80	88.7	31 16.1	53 80	88.2	65
6	28 33.8	56 80	91.0	28 50.5	55 80	90.5	29 07.0	55 80	90.0	29 23.5	55 80	89.6	29 39.8	54 80	89.1	29 56.1	54 80	88.6	30 12.2	54 80	88.1	30 28.2	53 80	87.6	6
7	27 45.9	56 80	90.4	28 02.5	55 80	89.9	28 19.1	55 80	89.4	28 35.6	55 80	89.0	28 51.9	54 80	88.5	29 08.2	54 80	88.0	29 24.3	54 80	87.5	29 40.4	53 80	87.0	7
8	26 58.0	56 80	89.8	27 14.6	55 80	89.3	27 31.2	55 80	88.8	27 47.7	55 80	88.4	28 04.0	54 80	87.9	28 20.3	54 80	87.4	28 36.4	54 80	86.9	28 52.4	53 80	86.5	8
9	26 10.1	56 80	89.2	26 26.7	55 80	88.7	26 43.3	55 80	88.3	26 59.8	55 80	87.8	27 16.1	54 80	87.3	27 32.4	54 80	86.8	27 48.6	54 80	86.4	28 04.7	53 80	85.9	9
70	25 22.2	56 80	88.6	25 38.8	55 80	88.1	25 55.4	55 80	87.7	26 11.9	55 80	87.2	26 28.3	54 80	86.7	26 44.6	54 80	86.3	27 00.8	54 80	85.8	27 16.9	54 79	85.3	70
1	24 34.3	56 80	88.0	24 50.9	55 80	87.5	25 07.5	55 80	87.1	25 24.0	55 80	86.6	25 40.5	54 80	86.2	25 56.8	54 80	85.7	26 13.0	54 80	85.2	26 29.2	54 79	84.8	1
2	23 46.4	56 80	87.4	24 03.1	55 80	87.0	24 19.7	55 80	86.5	24 36.2	55 80	86.0	24 52.7	54 80	85.6	25 09.0	54 80	85.1	25 25.3	54 79	84.7	25 41.5	54 79	84.2	2
3	22 58.5	56 80	86.8	23 15.2	55 80	86.4	23 31.9	55 80	85.9	23 48.4	55 80	85.5	24 04.9	54 80	85.0	24 21.3	55 79	84.5	24 37.6	54 79	84.1	24 53.8	54 79	83.6	3
4	22 10.7	56 80	86.2	22 27.4	55 80	85.8	22 44.1	55 80	85.3	23 00.7	55 80	84.9	23 17.2	55 79	84.4	23 33.6	55 79	84.0	23 50.0	54 79	83.5	24 06.3	54 79	83.1	4
75	21 22.9	56 80	85.7	21 39.7	55 80	85.2	21 56.4	56 79	84.8	22 13.0	55 79	84.3	22 29.5	55 79	83.9	22 46.0	55 79	83.4	23 02.4	55 79	83.0	23 18.7	54 79	82.5	75
6	20 35.1	56 80	85.1	20 51.9	55 80	84.6	21 08.7	56 79	84.2	21 25.3	55 79	83.8	21 41.9	55 79	83.3	21 58.4	55 79	82.9	22 14.9	55 79	82.4	22 31.2	54 79	82.0	6
7	19 47.4	56 79	84.5	20 04.2	56 79	84.1	20 21.0	56 79	83.6	20 37.7	56 79	83.2	20 54.3	55 79	82.7	21 10.9	55 79	82.3	21 27.4	55 79	81.8	21 43.8	55 79	81.4	7
8	18 59.7	56 79	83.9	19 16.6	56 79	83.5	19 33.4	56 79	83.1	19 50.2	56 79	82.6	20 06.8	55 79	82.2	20 23.5	55 79	81.7	20 40.0	55 79	81.3	20 56.5	55 79	80.8	8
9	18 12.1	56 79	83.4	18 29.0	56 79	82.9	18 45.9	56 79	82.5	19 02.7	56 79	82.1	19 19.4	56 79	81.6	19 36.1	55 79	81.2	19 52.7	55 79	80.7	20 09.2	55 79	80.3	9
80	17 24.5	57 79	82.8	17 41.5	56 79	82.4	17 58.4	56 79	81.9	18 15.2	56 79	81.5	18 32.0	56 79	81.1	18 48.8	56 79	80.6	19 05.4	55 79	80.2	19 22.0	55 79	79.7	80
1	16 37.0	57 79	82.2	16 54.0	57 79	81.8	17 11.0	56 79	81.4	17 27.9	56 79	80.9	17 44.7	56 79	80.5	18 01.5	56 79	80.1	18 18.2	56 78	79.6	18 34.9	55 78	79.2	1
2	15 49.6	57 79	81.7	16 06.6	57 79	81.2	16 23.7	57 79	80.8	16 40.6	56 79	80.4	16 57.5	56 79	79.9	17 14.4	56 79	79.5	17 31.2	56 78	79.1	17 47.0	56 78	78.6	2
3	15 02.2	57 79	81.1	15 19.3	57 79	80.7	15 36.4	57 79	80.2	15 53.4	57 79	79.8	16 10.4	56 79	79.4	16 27.3	56 78	78.9	16 44.1	56 78	78.5	17 01.0	56 78	78.1	3
4	14 14.9	57 79	80.5	14 32.1	57 79	80.1	14 49.2	57 78	79.7	15 06.3	57 78	79.2	15 23.3	57 78	78.8	15 40.3	57 78	78.4	15 57.2	56 78	78.0	16 14.1	56 78	77.5	4
85	13 27.7	58 78	80.0	13 44.9	57 78	79.5	14 02.1	57 78	79.1	14 19.3	57 78	78.7	14 36.4	57 78	78.3	14 53.4	57 78	77.8	15 10.4	56 78	77.4	15 27.4	56 78	77.0	85
6	12 40.5	58 78	79.4	12 57.8	58 78	79.0	13 15.1	57 78	78.5	13 32.3	57 78	78.1	13 49.5	57 78	77.7	14 06.6	57 78	77.3	14 23.7	57 78	76.9	14 40.7	57 78	76.4	6
7	11 53.5	58 78	78.8	12 10.9	58 78	78.4	12 28.2	58 78	78.0	12 45.5	58 78	77.6	13 02.7	57 78	77.1	13 19.9	57 78	76.7	13 37.1	57 78	76.3	13 54.2	57 77	75.9	7
8	11 06.5	58 78	78.2	11 24.0	58 78	77.8	11 41.4	58 78	77.4	11 58.7	58 78	77.0	12 16.1	58 78	76.6	12 33.3	58 78	76.2	12 50.6	57 77	75.7	13 07.8	57 77	75.3	8
9	10 19.7	58 78	77.7	10 37.3	58 78	77.3	10 54.7	58 78	76.8	11 12.1	58 78	76.4	11 29.5	58 78	76.0	11 46.9	58 77	75.6	12 04.2	57 77	75.2	12 21.5	57 77	74.8	9
90	9 32.9	59 78	77.1	9 50.5	59 78	76.7	10 08.0	58 78	76.3	10 25.6	58 78	75.9	10 43.1	58 77	75.5	11 00.5	58 77	75.0	11 17.9	58 77	74.6	11 35.3	57 77	74.2	90

Each cell lists: Alt. (° ′) Δd Δt Az. (°)

H.A.	16° 00′	16° 30′	17° 00′	17° 30′	18° 00′	18° 30′	19° 00′	19° 30′	H.A.
00	37 00.0 1.0 01 180.0	36 30.0 1.0 01 180.0	36 00.0 1.0 01 180.0	35 30.0 1.0 01 180.0	35 00.0 1.0 01 180.0	34 30.0 1.0 01 180.0	34 00.0 1.0 01 180.0	33 30.0 1.0 01 180.0	00
1	36 59.5 1.0 03 178.8	36 29.5 1.0 02 178.8	35 59.5 1.0 02 178.8	35 29.5 1.0 02 178.8	34 59.5 1.0 02 178.8	34 29.5 1.0 02 178.8	33 59.5 1.0 02 178.9	33 29.5 1.0 02 178.9	1
2	36 58.0 1.0 04 177.6	36 28.0 1.0 04 177.6	35 58.0 1.0 04 177.6	35 28.0 1.0 04 177.6	34 58.1 1.0 04 177.7	34 28.1 1.0 04 177.7	33 58.1 1.0 04 177.7	33 28.1 1.0 04 177.7	2
3	36 55.5 1.0 06 176.4	36 25.5 1.0 06 176.4	35 55.6 1.0 06 176.5	35 25.6 1.0 06 176.5	34 55.6 1.0 06 176.5	34 25.7 1.0 06 176.6	33 55.7 1.0 06 176.6	33 25.7 1.0 06 176.6	3
4	36 52.0 1.0 07 175.2	36 22.0 1.0 07 175.2	35 52.1 1.0 07 175.3	35 22.2 1.0 07 175.3	34 52.2 1.0 07 175.4	34 22.3 1.0 07 175.4	33 52.4 1.0 07 175.4	33 22.4 1.0 07 175.5	4
05	36 47.4 1.0 09 174.0	36 17.6 1.0 09 174.0	35 47.7 1.0 09 174.1	35 17.8 1.0 09 174.2	34 47.9 1.0 09 174.2	34 18.0 1.0 09 174.3	33 48.1 1.0 09 174.3	33 18.2 1.0 09 174.4	05
6	36 41.9 99 11 172.8	36 12.1 99 11 172.9	35 42.3 99 11 172.9	35 12.4 99 11 173.0	34 42.6 99 10 173.1	34 12.7 99 10 173.1	33 42.9 99 10 173.2	33 13.0 1.0 10 173.2	6
7	36 35.4 99 12 171.6	36 05.7 99 12 171.7	35 35.9 99 12 171.8	35 06.1 99 12 171.8	34 36.3 99 12 171.9	34 06.5 99 12 172.0	33 36.7 99 12 172.0	33 06.9 99 12 172.1	7
8	36 28.0 99 14 170.4	35 58.2 99 14 170.5	35 28.5 99 14 170.6	34 58.8 99 14 170.7	34 29.1 99 14 170.8	33 59.3 99 14 170.8	33 29.6 99 13 170.9	32 59.9 99 13 170.9	8
9	36 19.5 99 16 169.2	35 49.9 99 16 169.3	35 20.2 99 15 169.4	34 50.6 99 15 169.5	34 20.9 99 15 169.6	33 51.3 99 15 169.7	33 21.6 99 15 169.8	32 51.9 99 15 169.9	9
10	36 10.1 99 17 168.1	35 40.5 99 17 168.2	35 10.9 99 17 168.3	34 41.4 99 17 168.4	34 11.8 99 17 168.5	33 42.2 99 17 168.6	33 12.6 99 16 168.7	32 43.1 99 16 168.8	10
1	35 59.7 98 19 166.9	35 30.2 98 19 167.0	35 00.7 98 19 167.1	34 31.3 98 18 167.2	34 01.8 98 18 167.4	33 32.3 98 18 167.5	33 02.8 98 18 167.6	32 33.3 98 18 167.7	1
2	35 48.3 98 20 165.7	35 19.0 98 20 165.9	34 49.6 98 20 166.0	34 20.2 98 20 166.1	33 50.8 98 20 166.2	33 21.4 98 20 166.3	32 52.0 98 19 166.5	32 22.6 98 19 166.6	2
3	35 36.1 98 22 164.6	35 06.8 98 22 164.7	34 37.5 98 22 164.9	34 08.3 98 21 165.0	33 39.0 98 21 165.1	33 09.7 98 21 165.2	32 40.4 98 21 165.4	32 11.0 98 21 165.5	3
4	35 22.9 97 24 163.4	34 53.7 97 23 163.6	34 24.5 97 23 163.7	33 55.4 97 23 163.9	33 26.2 97 23 164.0	32 57.0 97 22 164.1	32 27.8 97 22 164.3	31 58.6 97 22 164.4	4
15	35 08.7 97 25 162.3	34 39.7 97 25 162.4	34 10.7 97 25 162.6	33 41.6 97 24 162.7	33 12.5 97 24 162.9	32 43.5 97 24 163.0	32 14.4 97 24 163.2	31 45.3 97 24 163.3	15
6	34 53.7 96 27 161.2	34 24.8 96 26 161.3	33 55.9 96 26 161.5	33 27.0 96 26 161.6	32 58.0 96 26 161.8	32 29.1 97 25 161.9	32 00.1 97 25 162.1	31 31.1 97 25 162.3	6
7	34 37.8 96 28 160.0	34 09.0 96 28 160.2	33 40.2 96 28 160.4	33 11.4 96 27 160.5	32 42.6 96 27 160.7	32 13.8 96 27 160.9	31 44.9 96 27 161.0	31 16.1 96 26 161.2	7
8	34 21.0 95 29 158.9	33 52.3 95 29 159.2	33 23.7 96 29 159.3	32 55.0 96 29 159.4	32 26.3 96 28 159.6	31 57.6 96 28 159.8	31 28.9 96 28 159.9	31 00.2 96 28 160.1	8
9	34 03.3 95 31 157.8	33 34.8 95 31 158.0	33 06.3 95 30 158.2	32 37.8 95 30 158.4	32 09.2 95 30 158.5	31 40.7 95 30 158.7	31 12.1 95 29 158.9	30 43.5 95 29 159.1	9
20	33 44.8 94 32 156.7	33 16.4 95 32 156.9	32 48.1 95 32 157.1	32 19.7 95 32 157.3	31 51.3 95 31 157.5	31 22.9 95 31 157.7	30 54.4 95 31 157.9	30 26.0 95 31 158.0	20
1	33 25.4 94 34 155.6	32 57.2 94 33 155.8	32 29.0 94 33 156.0	32 00.8 94 33 156.2	31 32.5 94 33 156.4	31 04.3 94 32 156.6	30 36.0 94 32 156.8	30 07.7 94 32 157.0	1
2	33 05.2 93 35 154.5	32 37.2 93 35 154.8	32 09.1 94 34 155.0	31 41.1 94 34 155.2	31 13.0 94 34 155.4	30 44.9 94 34 155.6	30 16.7 94 33 155.8	29 48.6 94 33 156.0	2
3	32 44.2 93 36 153.4	32 16.4 93 36 153.7	31 48.5 93 36 153.9	31 20.6 93 36 154.1	30 52.6 93 35 154.3	30 24.7 93 35 154.6	29 56.7 93 35 154.8	29 28.7 93 34 155.0	3
4	32 22.4 92 38 152.4	31 54.7 92 37 152.7	31 27.0 92 37 152.9	30 59.3 93 37 153.1	30 31.5 93 36 153.3	30 03.7 93 36 153.6	29 35.9 93 36 153.8	29 08.0 93 36 154.0	4
25	31 59.9 92 39 151.4	31 32.3 92 39 151.6	31 04.8 92 38 151.8	30 37.2 92 38 152.1	30 09.6 92 38 152.3	29 42.0 92 37 152.5	29 14.3 92 37 152.7	28 46.6 92 37 153.0	25
6	31 36.5 91 40 150.3	31 09.2 91 40 150.6	30 41.8 91 40 150.8	30 14.4 91 39 151.1	29 46.9 92 39 151.3	29 19.5 92 39 151.5	28 52.0 92 38 151.8	28 24.5 92 38 152.0	6
7	31 12.5 91 41 149.3	30 45.3 91 41 149.6	30 18.1 91 41 149.8	29 50.8 91 40 150.1	29 23.6 91 40 150.3	28 56.3 91 40 150.5	28 28.9 91 40 150.8	28 01.6 91 39 151.0	7
8	30 47.6 90 42 148.3	30 20.6 90 42 148.8	29 53.5 90 42 148.8	29 26.5 90 42 149.1	28 59.4 90 41 149.3	28 32.3 90 41 149.6	28 05.2 90 41 149.8	27 38.0 90 41 150.0	8
9	30 22.1 89 44 147.3	29 55.3 89 43 147.6	29 28.4 90 43 147.8	29 01.6 90 42 148.1	28 34.6 90 42 148.3	28 07.7 90 42 148.6	27 40.7 90 42 148.8	27 13.7 90 42 149.1	9
30	29 55.9 89 45 146.3	29 29.2 89 45 146.6	29 02.6 89 44 146.8	28 35.9 89 44 147.1	28 09.1 89 44 147.4	27 42.4 89 43 147.6	27 15.6 89 43 147.9	26 48.8 89 43 148.1	30
1	29 29.0 88 46 145.3	29 02.5 88 46 145.6	28 36.0 88 45 145.9	28 09.5 88 45 146.1	27 43.0 89 45 146.4	27 16.4 89 44 146.7	26 49.8 89 44 146.9	26 23.1 89 44 147.2	1
2	29 01.4 88 47 144.4	28 35.1 88 47 144.6	28 08.8 88 46 144.9	27 42.5 88 46 145.2	27 16.1 88 46 145.5	26 49.7 88 46 145.7	26 23.3 88 45 146.0	25 56.8 88 45 146.3	2
3	28 33.1 87 48 143.4	28 07.1 87 48 143.7	27 41.0 87 48 144.0	27 14.8 87 48 144.2	26 48.6 87 47 144.5	26 22.4 87 47 144.8	25 56.2 88 46 145.1	25 29.9 88 46 145.3	3
4	28 04.3 86 49 142.5	27 38.4 86 49 142.8	27 12.5 86 49 143.0	26 46.5 87 48 143.3	26 20.5 87 48 143.6	25 54.5 87 48 143.9	25 28.4 87 47 144.2	25 02.3 87 47 144.4	4
35	27 34.8 86 50 141.5	27 09.1 86 50 141.8	26 43.3 86 50 142.1	26 17.6 86 49 142.4	25 51.8 86 49 142.7	25 25.9 86 49 143.0	25 00.0 86 48 143.2	24 34.1 86 48 143.5	35
6	27 04.7 85 51 140.6	26 39.1 85 51 140.9	26 13.6 85 51 141.2	25 48.0 85 50 141.5	25 22.4 85 50 141.8	24 56.8 86 50 142.1	24 31.1 86 49 142.3	24 05.4 86 49 142.6	6
7	26 34.0 84 52 139.7	26 08.6 84 52 140.0	25 43.3 85 52 140.3	25 17.9 85 51 140.6	24 52.5 85 51 140.9	24 27.0 85 51 141.2	24 01.5 85 50 141.5	23 36.0 85 50 141.8	7
8	26 02.7 84 53 138.8	25 37.6 84 53 139.1	25 12.4 84 52 139.4	24 47.2 84 52 139.7	24 21.9 84 52 140.0	23 56.7 84 52 140.3	23 31.4 84 51 140.6	23 06.0 85 51 140.9	8
9	25 30.8 83 54 138.0	25 05.9 83 54 138.2	24 40.9 83 53 138.5	24 15.9 83 53 138.8	23 50.9 84 53 139.1	23 25.8 84 52 139.4	23 00.7 84 52 139.7	22 35.5 84 52 140.0	9
40	24 58.4 82 55 137.0	24 33.7 83 55 137.3	24 08.9 83 54 137.7	23 44.1 83 54 138.0	23 19.2 83 54 138.3	22 54.3 83 53 138.6	22 29.4 83 53 138.9	22 04.5 83 53 139.2	40
1	24 25.5 82 56 136.2	24 01.0 82 55 136.5	23 36.4 83 55 136.8	23 11.7 82 55 137.1	22 47.1 82 54 137.4	22 22.4 82 54 137.7	21 57.6 83 54 138.0	21 32.9 83 54 138.3	1
2	23 52.1 81 57 135.3	23 27.7 81 56 135.6	23 03.3 81 56 135.9	22 38.9 82 56 136.3	22 14.4 82 55 136.6	21 49.9 82 55 136.9	21 25.3 82 55 137.2	21 00.7 82 54 137.5	2
3	23 18.1 81 57 134.5	22 53.9 81 57 134.8	22 29.7 81 57 135.1	22 05.5 81 56 135.4	21 41.2 81 56 135.7	21 16.9 81 56 136.0	20 52.5 81 56 136.4	20 28.1 81 55 136.7	3
4	22 43.7 80 58 133.6	22 19.7 80 58 133.9	21 55.7 80 58 134.2	21 31.6 80 57 134.6	21 07.5 80 57 134.9	20 43.4 81 57 135.2	20 19.2 81 56 135.5	19 54.9 81 56 135.9	4
45	22 08.7 79 59 132.8	21 44.9 79 59 133.1	21 21.1 80 58 133.4	20 57.2 80 58 133.8	20 33.3 80 58 134.1	20 09.4 80 57 134.4	19 45.4 80 57 134.7	19 21.4 80 57 135.1	45
6	21 33.3 79 60 132.0	21 09.7 79 59 132.3	20 46.1 79 59 132.6	20 22.4 79 59 133.0	19 58.7 79 59 133.3	19 34.9 79 58 133.6	19 11.1 79 58 133.9	18 47.3 79 58 134.3	6
7	20 57.5 78 60 131.2	20 34.1 78 60 131.5	20 10.6 78 60 131.8	19 47.1 78 60 132.2	19 23.6 79 59 132.5	19 00.0 79 59 132.8	18 36.4 79 59 133.1	18 12.7 79 58 133.5	7
8	20 21.2 77 61 130.4	19 58.0 78 61 130.7	19 34.7 78 61 131.0	19 11.4 78 60 131.4	18 48.0 78 60 131.7	18 24.6 78 60 132.0	18 01.2 78 59 132.4	17 37.7 78 59 132.7	8
9	19 44.5 77 62 129.6	19 21.4 77 62 129.9	18 58.3 77 61 130.3	18 35.2 77 61 130.6	18 12.0 77 61 130.9	17 48.8 77 61 131.3	17 25.6 78 60 131.6	17 02.3 78 60 131.9	9
50	19 07.3 76 63 128.8	18 44.5 76 62 129.1	18 21.5 76 62 129.5	17 58.6 77 62 129.8	17 35.6 77 61 130.2	17 12.6 77 61 130.5	16 49.5 77 61 130.8	16 26.4 77 60 131.2	50
1	18 29.6 76 63 128.0	18 07.1 76 63 128.4	17 44.3 76 63 128.7	17 21.6 76 62 129.1	16 58.8 76 62 129.4	16 35.9 76 62 129.7	16 13.0 76 61 130.1	15 50.1 76 61 130.4	1
2	17 51.8 75 64 127.3	17 29.3 75 64 127.6	17 06.8 75 63 128.0	16 44.2 75 63 128.3	16 21.5 76 63 128.6	15 58.9 76 62 129.0	15 36.2 76 62 129.3	15 13.5 76 62 129.7	2
3	17 13.5 74 64 126.5	16 51.6 74 64 126.9	16 28.8 75 64 127.2	16 06.4 75 64 127.6	15 43.9 75 63 127.9	15 21.4 75 63 128.2	14 58.9 75 63 128.6	14 36.4 75 62 128.9	3
4	16 34.8 74 65 125.8	16 12.6 74 65 126.1	15 50.4 74 65 126.5	15 28.3 74 64 126.8	15 05.9 74 64 127.2	14 43.6 74 64 127.5	14 21.3 75 63 128.0	13 58.9 75 63 128.2	4
55	15 55.8 73 66 125.0	15 33.8 73 65 125.4	15 11.7 74 65 125.7	14 49.6 74 65 126.1	14 27.5 74 65 126.4	14 05.4 74 64 126.8	13 43.2 74 64 127.1	13 21.1 74 64 127.5	55
6	15 16.3 73 66 124.3	14 54.5 73 66 124.7	14 32.6 73 66 125.0	14 10.7 73 65 125.4	13 48.8 73 65 125.7	13 26.8 73 65 126.1	13 04.9 73 65 126.4	12 42.8 73 64 126.8	6
7	14 36.6 72 67 123.6	14 14.9 72 67 123.9	13 53.2 72 66 124.3	13 31.5 72 66 124.6	13 09.7 73 66 125.0	12 47.9 73 65 125.4	12 26.1 73 65 125.7	12 04.3 73 65 126.1	7
8	13 56.6 72 67 122.9	13 35.0 72 67 123.2	13 13.5 72 67 123.6	12 51.9 72 67 123.9	12 30.3 72 66 124.3	12 08.7 72 66 124.7	11 47.0 72 66 125.0	11 25.4 72 65 125.4	8
9	13 16.1 71 68 122.2	12 54.8 71 68 122.5	12 33.4 71 67 122.9	12 12.0 71 67 123.2	11 50.6 71 67 123.6	11 28.8 72 66 124.0	11 07.6 72 66 124.3	10 46.1 72 66 124.7	9
60	12 35.4 71 68 121.5	12 14.2 71 68 121.8	11 53.0 71 68 122.2	11 31.8 71 68 122.5	11 10.5 71 67 122.9	10 49.2 71 67 123.3	10 27.9 71 67 123.6	10 06.5 71 66 124.0	60
1	11 54.4 70 69 120.8	11 33.3 70 69 121.1	11 12.3 70 68 121.5	10 51.2 70 68 121.9	10 30.1 70 68 122.2	10 09.0 70 68 122.6	9 47.8 71 67 122.9	9 26.7 71 67 123.3	1
2	11 13.0 70 69 120.1	10 52.2 70 69 120.5	10 31.3 70 69 120.8	10 10.4 70 69 121.2	9 49.4 70 68 121.5	9 28.4 70 68 121.9	9 07.5 70 68 122.3	8 46.5 70 68 122.6	2
3	10 31.4 69 70 119.4	10 10.7 69 70 119.8	9 50.0 69 69 120.1	9 29.2 69 69 120.5	9 08.4 69 69 120.9	8 47.6 69 68 121.2	8 26.8 69 68 121.6	8 05.9 70 68 122.0	3
4	9 49.5 69 70 118.7	9 29.0 69 70 119.1	9 08.4 69 70 119.5	8 47.8 69 69 119.8	8 27.2 69 69 120.2	8 06.5 69 69 120.6	7 45.8 69 69 120.9	7 25.2 69 68 121.3	4
65	9 07.4 68 71 118.1	8 47.0 68 70 118.4	8 26.5 68 70 118.8	8 06.1 68 70 119.2	7 45.6 68 70 119.6	7 25.1 68 69 119.9	7 04.6 68 69 120.3	6 44.1 68 69 120.7	65
6	8 25.0 68 71 117.4	8 04.7 68 71 117.8	7 44.4 68 71 118.2	7 24.1 68 70 118.5	7 03.8 68 70 118.9	6 43.4 68 70 119.3	6 23.1 68 69 119.6	6 02.7 68 69 120.0	6
7	7 42.3 67 72 116.8	7 22.2 67 71 117.1	7 02.1 67 71 117.5	6 41.9 67 71 117.9	6 21.7 67 71 118.3	6 01.5 67 70 118.6	5 41.3 67 70 119.0	5 21.1 67 70 119.4	7
8	6 59.4 67 72 116.1	6 39.4 67 72 116.5	6 19.4 67 71 116.9	5 59.4 67 71 117.2	5 39.4 67 71 117.6	5 19.3 67 71 118.0			8
9	6 16.3 66 72 115.5	5 56.4 66 72 115.8	5 36.6 66 72 116.2	5 16.7 66 72 116.6					9
70	5 32.9 66 73 114.8	5 13.2 66 72 115.2							70

DECLINATION **SAME** NAME AS LATITUDE

H.A.	16° 00′	16° 30′	17° 00′	17° 30′	18° 00′	18° 30′	19° 00′	19° 30′	H.A.
91	8 46.3 59 78 76.5	9 03.9 59 77 76.1	9 21.6 59 77 75.7	9 39.2 59 77 75.3	9 56.7 59 77 74.9	10 14.3 58 77 74.5	10 31.8 58 77 74.1	10 49.3 58 77 73.7	91
2	7 59.7 59 77 76.0	8 17.5 59 77 75.5	8 35.2 59 77 75.1	8 52.9 59 77 74.7	9 10.5 59 77 74.3	9 28.2 59 77 73.9	9 45.8 59 76 73.5	10 03.4 59 76 73.1	2
3	7 13.3 59 77 75.4	7 31.1 59 77 75.0	7 48.9 59 77 74.6	8 06.7 59 77 74.2	8 24.5 59 77 73.8	8 42.2 59 76 73.3	8 59.9 59 76 72.9	9 17.6 59 76 72.5	3
4	6 27.0 60 77 74.8	6 44.9 60 77 74.4	7 02.8 60 77 74.0	7 20.7 60 76 73.6	7 38.5 59 76 73.2	7 56.4 59 76 72.8	8 14.2 59 76 72.4	8 32.0 59 76 72.0	4
95	5 40.8 60 77 74.2	5 58.8 60 77 73.8	6 16.8 60 76 73.4	6 34.8 60 76 73.0	6 52.7 60 76 72.6	7 10.7 60 76 72.2	7 28.6 60 76 71.8	7 46.5 60 76 71.4	95
6		5 12.9 60 77 73.2	5 31.0 60 76 72.8	5 49.0 60 76 72.4	6 07.1 60 76 72.0	6 25.1 60 76 71.6	6 43.1 60 75 71.2	7 01.1 60 75 70.8	6
7				5 03.4 61 76 71.9	5 21.6 61 76 71.5	5 39.7 60 75 71.1	5 57.8 60 75 70.7	6 16.0 60 75 70.3	7
8							5 12.7 61 75 70.1	5 30.9 61 75 69.7	8

Lat. 37°

H.A.	20° 00′ Alt. Δd Δt	Az.	20° 30′ Alt. Δd Δt	Az.	21° 00′ Alt. Δd Δt	Az.	21° 30′ Alt. Δd Δt	Az.	22° 00′ Alt. Δd Δt	Az.	22° 30′ Alt. Δd Δt	Az.	23° 00′ Alt. Δd Δt	Az.	23° 30′ Alt. Δd Δt	Az.	H.A.
00	73 00.0 1.0 2	180.0	73 30.0 1.0 2	180.0	74 00.0 1.0 2	180.0	74 30.0 1.0 2	180.0	75 00.0 1.0 2	180.0	75 30.0 1.0 2	180.0	76 00.0 1.0 3	180.0	76 30.0 1.0 3	180.0	00
1	72 58.7 1.0 7	176.8	73 28.6 1.0 7	176.7	73 58.6 1.0 7	176.6	74 28.5 1.0 7	176.5	74 58.5 1.0 8	176.4	75 28.5 1.0 8	176.3	75 58.4 1.0 8	176.2	76 28.4 1.0 8	176.1	1
2	72 54.6 1.0 11	173.6	73 24.5 1.0 11	173.4	73 54.4 99 12	173.3	74 24.2 99 12	173.1	74 54.0 99 12	172.9	75 23.8 99 13	172.7	75 53.7 99 13	172.4	76 23.5 99 14	172.2	2
3	72 48.0 99 15	170.4	73 17.7 99 16	170.2	73 47.3 99 16	169.9	74 17.0 99 17	169.6	74 46.6 99 17	169.4	75 16.2 99 18	169.0	75 45.8 99 18	168.7	76 15.4 98 19	168.3	3
4	72 38.7 98 20	167.3	73 08.2 98 20	167.0	73 37.6 98 21	166.6	74 07.0 98 21	166.3	74 36.3 98 22	165.9	75 05.7 98 22	165.5	75 34.9 97 23	165.1	76 04.1 97 24	164.6	4
05	72 26.9 97 24	164.2	72 56.1 97 24	163.8	73 25.2 97 25	163.4	73 54.3 97 26	163.0	74 23.3 97 26	162.5	74 52.2 97 26	162.0	75 21.1 96 28	161.5	75 49.9 96 28	160.9	05
6	72 12.7 95 28	161.2	72 41.5 96 28	160.8	73 10.3 96 29	160.3	73 39.0 96 30	159.8	74 07.6 95 30	159.2	74 36.1 95 31	158.7	75 04.6 95 32	158.1	75 32.9 94 33	157.4	6
7	71 56.2 95 31	158.3	72 24.5 95 32	157.8	72 53.0 94 33	157.3	73 21.2 94 34	156.7	73 49.4 94 34	156.1	74 17.4 94 35	155.4	74 45.4 94 36	154.7	75 13.2 93 37	154.0	7
8	71 37.4 94 35	155.5	72 05.4 93 36	154.9	72 33.3 93 36	154.3	73 01.1 92 37	153.7	73 28.8 92 38	153.0	73 56.3 92 39	152.3	74 23.7 91 40	151.6	74 51.0 91 41	150.8	8
9	71 16.4 92 38	152.7	71 44.0 92 39	152.1	72 11.5 91 40	151.5	72 38.8 91 41	150.8	73 06.0 90 42	150.1	73 33.0 90 42	149.3	73 59.8 89 43	148.5	74 26.4 88 44	147.7	9
10	70 53.5 91 41	150.1	71 20.6 90 42	149.4	71 47.6 90 43	148.7	72 14.4 89 43	148.0	72 41.4 88 44	147.3	73 07.5 88 45	146.5	73 33.3 88 47	145.6	73 59.8 86 48	144.7	10
1	70 28.7 88 44	147.5	70 55.3 88 45	146.9	71 21.8 88 46	146.1	71 48.1 87 47	145.4	72 14.2 87 48	144.6	72 40.0 86 49	143.7	73 05.7 85 50	142.8	73 31.1 84 51	141.9	1
2	70 02.1 87 47	145.1	70 28.3 87 48	144.4	70 54.2 86 49	143.6	71 20.0 85 50	142.8	71 45.5 85 50	142.0	72 10.8 84 51	141.1	72 35.9 83 52	140.2	73 00.7 82 53	139.3	2
3	69 33.9 86 50	142.7	69 59.5 85 50	142.0	70 25.0 84 51	141.2	70 50.2 84 52	140.4	71 15.2 83 53	139.5	71 39.9 82 54	138.6	72 04.4 81 55	137.7	72 28.6 80 56	136.8	3
4	69 04.2 84 52	140.5	69 29.3 83 53	139.7	69 54.2 83 54	138.9	70 18.9 82 54	138.0	70 43.3 81 56	137.2	71 07.5 80 56	136.3	71 31.5 79 57	135.4	71 55.1 78 58	134.4	4
15	68 33.0 82 54	138.3	68 57.6 82 55	137.5	69 22.0 81 56	136.7	69 46.2 80 57	135.9	70 10.1 79 58	135.0	70 33.8 78 58	134.1	70 57.1 77 59	133.1	71 20.2 76 60	132.1	15
6	68 00.4 81 56	136.2	68 24.6 80 57	135.4	68 48.5 79 58	134.6	69 12.2 78 59	133.8	69 35.6 78 60	132.9	69 58.7 77 60	131.9	70 21.5 76 61	131.0	70 44.1 74 62	130.0	6
7	67 26.7 79 58	134.3	67 50.4 79 59	133.4	68 13.8 78 60	132.6	68 37.0 77 60	131.7	68 59.9 76 61	130.9	69 22.5 75 62	129.9	69 44.8 74 63	129.0	70 06.8 73 64	128.0	7
8	66 51.8 78 60	132.4	67 15.1 77 61	131.5	67 38.0 76 61	130.7	68 00.7 75 62	129.8	68 23.1 74 63	128.9	68 45.3 73 64	128.0	69 07.1 72 64	127.1	69 28.5 71 65	126.1	8
9	66 15.9 76 62	130.5	66 38.4 76 62	129.7	67 01.2 76 63	128.8	67 23.4 74 64	128.0	67 45.4 73 64	127.1	68 07.0 72 65	126.2	68 28.4 71 66	125.2	68 49.4 69 67	124.3	9
20	65 39.0 75 63	128.8	66 01.4 74 64	128.0	66 23.4 73 64	127.1	66 45.2 72 65	126.3	67 06.7 71 66	125.4	67 27.9 70 66	124.5	67 48.8 69 67	123.5	68 09.4 68 68	122.5	20
1	65 01.2 74 64	127.1	65 23.2 73 65	126.3	65 44.8 72 66	125.5	66 06.2 71 66	124.6	66 27.3 70 67	123.7	66 48.0 69 68	122.8	67 08.5 68 68	121.9	67 28.6 66 69	120.9	1
2	64 22.6 72 66	125.5	64 44.1 71 66	124.7	65 05.4 70 67	123.9	65 26.4 69 68	123.0	65 47.0 68 68	122.1	66 07.4 67 69	121.2	66 27.5 66 70	120.3	66 47.2 65 70	119.4	2
3	63 43.2 71 67	124.0	64 04.4 70 67	123.2	64 25.3 69 68	122.3	64 45.8 68 69	121.5	65 06.1 67 69	120.6	65 26.1 66 70	119.7	65 45.8 65 70	118.8	66 05.1 64 71	117.9	3
4	63 03.2 70 68	122.5	63 23.9 69 68	121.7	63 44.4 68 69	120.9	64 04.7 67 70	120.0	64 24.6 66 70	119.2	64 44.2 65 71	118.3	65 03.5 64 71	117.4	65 22.5 63 72	116.5	4
25	62 22.4 69 69	121.1	62 42.9 68 69	120.3	63 03.0 67 70	119.5	63 22.9 66 71	118.6	63 42.5 65 71	117.8	64 01.8 64 72	116.9	64 20.7 63 72	116.0	64 39.3 62 73	115.1	25
6	61 41.6 67 70	119.7	62 01.2 67 70	118.9	62 21.0 66 71	118.1	62 40.6 65 71	117.3	62 59.8 64 72	116.5	63 18.8 63 72	115.6	63 37.4 62 73	114.7	63 55.7 60 73	113.8	6
7	60 59.2 66 71	118.4	61 19.0 66 71	117.6	61 38.5 65 72	116.8	61 57.8 64 72	116.0	62 16.7 63 73	115.2	62 35.3 62 73	114.3	62 53.7 61 74	113.5	63 11.7 59 74	112.6	7
8	60 16.8 65 71	117.1	60 36.3 64 72	116.4	60 55.5 64 72	115.6	61 14.4 63 73	114.8	61 33.1 62 73	114.0	61 51.5 61 74	113.1	62 09.5 60 74	112.3	62 27.2 59 75	111.4	8
9	59 33.9 64 72	115.9	59 53.2 64 73	115.2	60 12.1 63 73	114.4	60 30.8 62 74	113.6	60 49.1 61 74	112.8	61 07.2 60 74	112.0	61 25.0 59 75	111.1	61 42.5 58 75	110.3	9
30	58 50.6 64 73	114.8	59 09.6 63 73	114.0	59 28.3 62 74	113.2	59 46.7 61 74	112.5	60 04.8 60 74	111.7	60 22.6 59 75	110.8	60 40.1 58 75	110.0	60 57.4 57 76	109.2	30
1	58 06.9 63 73	113.6	58 25.6 62 74	112.9	58 44.0 61 74	112.1	59 02.2 60 75	111.3	59 20.1 59 75	110.6	59 37.7 58 75	109.8	59 55.0 57 76	109.0	60 12.0 56 76	108.1	1
2	57 22.8 62 74	112.5	57 41.3 61 74	111.8	57 59.5 60 75	111.0	58 17.4 59 75	110.3	58 35.1 58 76	109.5	58 52.4 57 76	108.7	59 09.5 56 76	107.9	59 26.3 55 77	107.1	2
3	56 38.4 61 75	111.5	56 56.6 60 75	110.7	57 14.6 59 76	110.0	57 32.3 58 76	109.2	57 49.7 58 76	108.5	58 06.9 57 76	107.7	58 23.8 56 77	106.9	58 40.4 55 77	106.1	3
4	55 53.6 60 75	110.4	56 11.7 60 75	109.7	56 29.4 59 76	109.0	56 46.9 58 76	108.2	57 04.2 57 76	107.5	57 21.1 56 77	106.7	57 37.8 55 77	106.0	57 54.2 54 77	105.2	4
35	55 08.6 60 76	109.4	55 26.4 59 76	108.7	55 44.0 58 76	108.0	56 01.3 57 76	107.3	56 18.4 56 77	106.6	56 35.1 56 77	105.8	56 51.7 55 77	105.0	57 07.9 54 77	104.3	35
6	54 23.3 59 76	108.5	54 40.9 58 76	107.8	54 58.3 58 77	107.1	55 15.4 57 77	106.3	55 32.3 56 77	105.6	55 48.9 55 77	104.9	56 05.3 54 78	104.1	56 21.4 53 78	103.4	6
7	53 37.7 58 76	107.5	53 55.2 58 77	106.8	54 12.4 57 77	106.1	54 29.3 56 77	105.4	54 46.1 55 77	104.7	55 02.5 54 78	104.0	55 18.7 54 78	103.2	55 34.6 53 78	102.5	7
8	52 51.9 58 77	106.6	53 09.3 57 77	105.9	53 26.2 56 77	105.2	53 43.0 56 77	104.5	53 59.6 55 78	103.9	54 15.9 54 78	103.1	54 32.0 53 78	102.4	54 47.8 52 79	101.7	8
9	52 05.9 58 77	105.7	52 23.0 57 77	105.0	52 39.9 56 78	104.4	52 56.6 55 78	103.7	53 13.0 54 78	103.0	53 29.2 54 78	102.3	53 45.1 53 78	101.6	54 00.8 52 79	100.8	9
40	51 19.6 57 77	104.8	51 36.6 56 78	104.2	51 53.4 56 78	103.5	52 09.9 55 78	102.8	52 26.2 54 78	102.1	52 42.3 53 78	101.5	52 58.1 52 79	100.7	53 13.7 51 79	100.0	40
1	50 33.2 57 78	104.0	50 50.1 56 78	103.3	51 06.7 55 78	102.7	51 23.1 54 78	102.0	51 39.3 54 78	101.3	51 55.3 53 79	100.7	52 11.0 52 79	100.0	52 26.4 51 79	99.3	1
2	49 46.6 56 78	103.2	50 03.4 55 78	102.5	50 19.9 54 78	101.9	50 36.2 54 78	101.2	50 52.3 53 79	100.5	51 08.1 52 79	99.9	51 23.7 52 79	99.2	51 39.1 51 79	98.5	2
3	48 59.9 56 78	102.4	49 16.5 55 78	101.7	49 32.9 54 78	101.1	49 49.1 54 79	100.4	50 05.1 53 79	99.8	50 20.8 52 79	99.1	50 36.4 51 79	98.4	50 51.6 51 79	97.8	3
4	48 13.0 55 78	101.6	48 29.6 55 78	100.9	48 45.9 54 79	100.3	49 02.0 53 79	99.7	49 17.8 53 79	99.0	49 33.5 52 79	98.4	49 48.9 51 79	97.7	50 04.1 50 79	97.0	4
45	47 26.0 55 79	100.8	47 42.4 54 79	100.2	47 58.7 54 79	99.6	48 14.7 53 79	98.9	48 30.5 52 79	98.3	48 46.0 52 79	97.6	49 01.4 51 79	97.0	49 16.5 50 79	96.3	45
6	46 38.9 55 79	100.0	46 55.2 54 79	99.4	47 11.4 53 79	98.8	47 27.3 53 79	98.2	47 43.0 52 79	97.6	47 58.5 51 79	96.9	48 13.8 51 80	96.3	48 28.9 50 80	95.6	6
7	45 51.7 54 79	99.3	46 07.9 54 79	98.7	46 24.0 53 79	98.1	46 39.8 52 79	97.5	46 55.5 52 79	96.8	47 10.9 51 79	96.2	47 26.1 50 80	95.6	47 41.2 50 80	94.9	7
8	45 04.3 54 79	98.6	45 20.5 54 79	98.0	45 36.5 53 79	97.4	45 52.3 52 79	96.8	46 07.8 52 79	96.1	46 23.2 51 80	95.5	46 38.4 50 80	94.9	46 53.4 50 80	94.3	8
9	44 16.9 54 79	97.9	44 33.0 53 79	97.3	44 48.9 53 79	96.7	45 04.6 52 79	96.1	45 20.2 51 80	95.5	45 35.5 51 80	94.8	45 50.7 50 80	94.2	46 05.4 49 80	93.6	9
50	43 29.4 54 79	97.2	43 45.4 53 79	96.6	44 01.3 53 80	96.0	44 17.0 52 80	95.4	44 32.4 51 80	94.8	44 47.7 51 80	94.2	45 02.8 50 80	93.6	45 17.8 49 80	93.0	50
1	42 41.8 54 79	96.5	42 57.8 53 80	95.9	43 13.6 52 80	95.3	43 29.2 52 80	94.7	43 44.7 51 80	94.1	43 59.9 51 80	93.5	44 15.0 50 80	92.9	44 29.9 49 80	92.3	1
2	41 54.2 53 80	95.8	42 10.1 53 80	95.2	42 25.9 52 80	94.6	42 41.4 51 80	94.1	42 56.9 51 80	93.5	43 12.1 50 80	92.9	43 27.1 50 80	92.3	43 42.0 49 80	91.7	2
3	41 06.5 53 80	95.1	41 22.4 53 80	94.6	41 38.1 52 80	94.0	41 53.6 51 80	93.4	42 09.0 51 80	92.8	42 24.2 50 80	92.2	42 39.2 50 80	91.7	42 54.1 49 80	91.1	3
4	40 18.7 53 80	94.5	40 34.6 53 80	93.9	40 50.3 52 80	93.3	41 05.8 51 80	92.8	41 21.1 51 80	92.2	41 36.3 50 80	91.6	41 51.3 50 80	91.0	42 06.2 49 80	90.5	4
55	39 30.9 53 80	93.8	39 46.7 52 80	93.3	40 02.4 52 80	92.7	40 17.9 51 80	92.1	40 33.3 51 80	91.6	40 48.4 50 80	91.0	41 03.4 50 80	90.4	41 18.3 49 80	89.9	55
6	38 43.1 53 80	93.2	38 58.9 52 80	92.6	39 14.5 52 80	92.1	39 30.0 51 80	91.5	39 45.3 51 80	91.0	40 00.5 50 80	90.4	40 15.5 50 80	89.8	40 30.3 49 80	89.3	6
7	37 55.2 53 80	92.5	38 11.0 52 80	92.0	38 26.6 52 80	91.4	38 42.1 51 80	90.9	38 57.4 51 80	90.3	39 12.6 50 80	89.8	39 27.6 50 80	89.2	39 42.4 49 80	88.7	7
8	37 07.4 53 80	91.9	37 23.1 52 80	91.4	37 38.7 52 80	90.8	37 54.2 51 80	90.3	38 09.5 51 80	89.7	38 24.7 50 80	89.2	38 39.7 50 80	88.6	38 54.5 49 80	88.1	8
9	36 19.5 53 80	91.3	36 35.2 52 80	90.8	36 50.8 52 80	90.2	37 06.3 51 80	89.7	37 21.6 51 80	89.2	37 36.8 50 80	88.6	37 51.8 50 80	88.1	38 06.7 49 80	87.5	9
60	35 31.5 53 80	90.7	35 47.3 52 80	90.2	36 02.9 52 80	89.6	36 18.4 51 80	89.1	36 33.7 51 80	88.6	36 48.9 50 80	88.0	37 03.9 50 80	87.5	37 18.8 49 80	86.9	60
1	34 43.6 53 80	90.1	34 59.4 52 80	89.6	35 15.0 52 80	89.0	35 30.5 51 80	88.5	35 45.8 51 80	88.0	36 01.0 50 80	87.4	36 16.0 50 80	86.9	36 31.0 49 80	86.4	1
2	33 55.7 53 80	89.5	34 11.5 52 80	89.0	34 27.1 52 80	88.4	34 42.6 51 80	87.9	34 57.9 51 80	87.4	35 13.1 50 80	86.9	35 28.2 50 80	86.3	35 43.1 49 80	85.8	2
3	33 07.8 53 80	88.9	33 23.6 52 80	88.4	33 39.2 52 80	87.9	33 54.7 51 80	87.3	34 10.1 51 80	86.8	34 25.3 50 80	86.3	34 40.4 50 80	85.8	34 55.4 49 80	85.2	3
4	32 19.9 53 80	88.3	32 35.7 52 80	87.8	32 51.3 52 80	87.3	33 06.8 51 80	86.8	33 22.2 51 80	86.3	33 37.5 50 80	85.7	33 52.6 50 80	85.2	34 07.6 50 80	84.7	4
65	31 32.0 53 80	87.7	31 47.8 52 80	87.2	32 03.5 52 80	86.7	32 19.0 51 80	86.2	32 34.4 51 80	85.7	32 49.7 51 80	85.2	33 04.9 50 80	84.7	33 20.0 50 79	84.1	65
6	30 44.1 53 80	87.1	30 59.9 52 80	86.6	31 15.6 52 80	86.1	31 31.2 52 80	85.6	31 46.7 51 80	85.1	32 02.0 51 79	84.6	32 17.2 51 79	84.1	32 32.3 50 79	83.6	6
7	29 56.3 53 80	86.5	30 12.1 53 80	86.1	30 27.8 52 80	85.6	30 43.4 52 80	85.1	30 58.9 51 80	84.6	31 14.3 51 79	84.1	31 29.6 51 79	83.6	31 44.7 50 79	83.1	7
8	29 08.5 53 80	86.0	29 24.3 53 80	85.5	29 40.1 52 80	85.0	29 55.7 52 80	84.5	30 11.3 52 80	84.0	30 26.7 51 79	83.5	30 42.0 51 79	83.0	30 57.2 50 79	82.5	8
9	28 20.7 53 80	85.4	28 36.6 53 80	84.9	28 52.4 52 80	84.4	29 08.1 52 79	83.9	29 23.6 52 79	83.5	29 39.1 51 79	83.0	29 54.5 51 79	82.5	30 09.7 51 79	82.0	9
70	27 32.9 53 80	84.8	27 48.9 53 79	84.4	28 04.7 53 79	83.9	28 20.4 52 79	83.4	28 36.0 52 79	82.9	28 51.6 52 79	82.4	29 07.0 51 79	81.9	29 22.3 51 79	81.4	70
1	26 45.2 53 79	84.3	27 01.2 53 79	83.8	27 17.1 53 79	83.3	27 32.9 52 79	82.8	27 48.5 52 79	82.4	28 04.1 52 79	81.9	28 19.6 51 79	81.4	28 34.9 51 79	80.9	1
2	25 57.6 54 79	83.7	26 13.6 53 79	83.2	26 29.5 53 79	82.8	26 45.3 52 79	82.3	27 01.1 52 79	81.8	27 16.7 52 79	81.3	27 32.2 52 79	80.9	27 47.6 51 79	80.4	2
3	25 10.0 54 79	83.2	25 26.0 53 79	82.7	25 42.0 53 79	82.2	25 57.7 53 79	81.8	26 13.7 52 79	81.3	26 29.4 52 79	80.8	26 44.9 52 79	80.3	27 00.4 51 79	79.8	3
4	24 22.4 54 79	82.6	24 38.5 54 79	82.1	24 54.6 53 79	81.7	25 10.5 53 79	81.2	25 26.3 53 79	80.7	25 42.1 52 79	80.3	25 57.7 52 78	79.8	26 13.3 52 78	79.3	4
75	23 35.0 54 79	82.0	23 51.1 54 79	81.6	24 07.2 53 79	81.1	24 23.2 53 79	80.7	24 39.1 53 78	80.2	24 54.9 53 79	79.7	25 10.6 52 79	79.3	25 26.3 52 78	78.8	75
6	22 47.5 54 79	81.5	23 03.7 54 79	81.0	23 19.9 54 79	80.6	23 35.9 53 79	80.1	23 51.9 53 78	79.7	24 07.8 53 78	79.2	24 23.6 53 78	78.7	24 39.3 52 78	78.3	6
7	22 00.2 54 79	80.9	22 16.4 54 79	80.5	22 32.6 54 78	80.0	22 48.8 54 78	79.6	23 04.8 53 78	79.1	23 20.8 53 78	78.7	23 36.6 53 78	78.2	23 52.4 53 78	77.7	7
8	21 12.9 55 79	80.4	21 29.2 54 79	79.9	21 45.5 54 78	79.5	22 01.7 54 78	79.0	22 17.8 54 78	78.6	22 33.8 53 78	78.1	22 49.8 53 78	77.7	23 05.7 53 78	77.2	8
9	20 25.7 55 79	79.8	20 42.1 55 78	79.4	20 58.4 54 78	78.9	21 14.7 54 78	78.5	21 30.9 54 78	78.0	21 47.0 54 78	77.6	22 03.0 53 78	77.1	22 19.0 53 78	76.7	9
80	19 38.6 55 78	79.3	19 55.0 55 78	78.9	20 11.4 55 78	78.4	20 27.8 54 78	78.0	20 44.0 54 78	77.5	21 00.2 54 78	77.1	21 16.4 54 78	76.6	21 32.4 53 77	76.2	80
1	18 51.5 55 78	78.7	19 08.1 55 78	78.3	19 24.5 55 78	77.9	19 40.9 54 78	77.4	19 57.3 54 78	77.0	20 13.6 54 78	76.5	20 29.8 54 77	76.1	20 45.9 54 77	75.6	1
2	18 04.6 55 78	78.2	18 21.2 55 78	77.8	18 37.7 55 78	77.3	18 54.2 55 78	76.9	19 10.7 54 78	76.4	19 27.0 54 77	76.0	19 43.3 54 77	75.5	19 59.6 54 77	75.1	2
3	17 17.7 56 78	77.6	17 34.4 55 78	77.2	17 51.0 55 78	76.8	18 07.6 55 78	76.3	18 24.1 55 77	75.9	18 40.6 55 77	75.5	18 57.0 55 77	75.0	19 13.3 54 77	74.6	3
4	16 30.9 56 78	77.1	16 47.7 56 78	76.7	17 04.4 55 78	76.2	17 21.1 55 77	75.8	17 37.7 55 77	75.4	17 54.3 55 77	74.9	18 10.8 55 77	74.5	18 27.2 55 77	74.0	4
85	15 44.3 56 78	76.6	16 01.1 56 77	76.1	16 18.0 56 77	75.7	16 34.7 55 77	75.3	16 51.4 55 77	74.8	17 08.1 55 77	74.4	17 24.6 55 76	74.0	17 41.2 55 76	73.5	85
6	14 57.7 57 77	76.0	15 14.7 56 77	75.6	15 31.6 56 77	75.1	15 48.4 56 77	74.7	16 05.2 55 77	74.3	16 22.0 55 77	73.9	16 38.7 55 76	73.4	16 55.3 55 76	73.0	6
7	14 11.3 57 77	75.5	14 28.3 57 77	75.0	14 45.3 56 77	74.6	15 02.3 56 77	74.2	15 19.2 56 76	73.7	15 36.0 56 76	73.3	15 52.8 55 76	72.9	16 09.5 55 76	72.5	7
8	13 25.0 57 77	74.9	13 42.1 57 77	74.5	13 59.2 57 76	74.1	14 16.2 56 76	73.6	14 33.2 56 76	73.2	14 50.2 56 76	72.8	15 07.1 56 76	72.3	15 23.9 56 76	71.9	8
9	12 38.8 57 77	74.3	12 56.0 57 77	73.9	13 13.2 57 76	73.5	13 30.3 57 76	73.1	13 47.4 56 76	72.7	14 04.5 56 76	72.2	14 21.5 56 76	71.8	14 38.4 56 76	71.4	9
90	11 52.7 58 77	73.8	12 10.6 58 76	73.4	12 27.3 58 76	73.0	12 44.5 57 76	72.5	13 01.7 57 76	72.1	13 18.9 57 76	71.7	13 36.0 57 76	71.3	13 53.1 57 76	70.8	90

Each cell below lists: Alt. (° ′) · Δd · Δt · Az. (°)

H.A.	20° 00′	20° 30′	21° 00′	21° 30′	22° 00′	22° 30′	23° 00′	23° 30′	H.A.
00	33 00.0 1.0 01 180.0	32 30.0 1.0 01 180.0	32 00.0 1.0 01 180.0	31 30.0 1.0 01 180.0	31 00.0 1.0 01 180.0	30 30.0 1.0 01 180.0	30 00.0 1.0 01 180.0	29 30.0 1.0 01 180.0	00
1	32 59.5 1.0 02 178.9	32 29.5 1.0 02 178.9	31 59.5 1.0 02 178.9	31 29.5 1.0 02 178.9	30 59.5 1.0 02 178.9	30 29.6 1.0 02 178.9	29 59.6 1.0 02 178.9	29 29.6 1.0 02 178.9	1
2	32 58.1 1.0 04 177.8	32 28.1 1.0 04 177.8	31 58.2 1.0 04 177.8	31 28.2 1.0 04 177.8	30 58.2 1.0 04 177.8	30 28.2 1.0 04 177.9	29 58.2 1.0 04 177.9	29 28.2 1.0 04 177.9	2
3	32 55.8 1.0 05 176.6	32 25.8 1.0 05 176.7	31 55.9 1.0 06 176.7	31 25.9 1.0 05 176.7	30 55.9 1.0 05 176.8	30 26.0 1.0 05 176.8	29 56.0 1.0 05 176.8	29 26.0 1.0 05 176.8	3
4	32 52.5 1.0 07 175.5	32 22.6 1.0 07 175.6	31 52.6 1.0 07 175.6	31 22.7 1.0 07 175.6	30 52.8 1.0 07 175.7	30 22.8 1.0 07 175.7	29 52.9 1.0 07 175.8	29 23.0 1.0 07 175.8	4
05	32 48.3 1.0 09 174.4	32 18.4 1.0 08 174.5	31 48.5 1.0 08 174.5	31 18.6 1.0 08 174.6	30 48.7 1.0 08 174.6	30 18.8 1.0 08 174.6	29 48.9 1.0 08 174.7	29 19.0 1.0 09 174.7	05
6	32 43.2 1.0 09 173.3	32 13.3 1.0 10 173.4	31 43.5 1.0 10 173.4	31 13.6 1.0 10 173.5	30 43.8 1.0 10 173.5	30 13.9 1.0 10 173.6	29 44.0 1.0 10 173.6	29 14.2 1.0 09 173.7	6
7	32 37.1 99 12 172.2	32 07.3 99 12 172.3	31 37.5 99 12 172.3	31 07.7 99 11 172.4	30 37.9 99 11 172.5	30 08.1 99 11 172.5	29 38.3 99 11 172.6	29 08.5 99 11 172.6	7
8	32 30.1 99 13 171.1	32 00.4 99 13 171.2	31 30.7 99 13 171.2	31 00.9 99 13 171.3	30 31.2 99 13 171.4	30 01.4 99 13 171.4	29 31.7 99 12 171.5	29 01.9 99 12 171.6	8
9	32 22.3 99 15 170.0	31 52.6 99 15 170.1	31 22.9 99 14 170.2	30 53.2 99 14 170.2	30 23.6 99 14 170.3	29 53.9 99 14 170.4	29 24.2 99 14 170.5	28 54.5 99 15 170.6	9
10	32 13.5 99 16 168.9	31 43.9 99 16 169.0	31 14.3 99 16 169.1	30 44.7 99 16 169.2	30 15.1 99 16 169.3	29 45.4 99 15 169.4	29 15.8 99 15 169.4	28 46.2 99 15 169.5	10
1	32 03.8 98 18 167.8	31 34.3 98 18 167.9	31 04.7 98 17 168.0	30 35.2 98 17 168.1	30 05.7 98 17 168.2	29 36.2 98 17 168.3	29 06.6 98 17 168.4	28 37.1 98 17 168.5	1
2	31 53.2 98 19 166.7	31 23.8 98 19 166.8	30 54.3 98 19 166.9	30 24.9 98 19 167.0	29 55.5 98 18 167.1	29 26.0 98 18 167.3	28 56.5 98 18 167.4	28 27.1 98 18 167.5	2
3	31 41.7 98 21 165.6	31 12.4 98 20 165.7	30 43.1 98 20 165.9	30 13.7 98 20 166.0	29 44.4 98 20 166.1	29 15.0 98 20 166.2	28 45.7 98 20 166.3	28 16.3 98 19 166.5	3
4	31 29.4 97 22 164.5	31 00.2 97 22 164.7	30 30.9 97 22 164.8	30 01.7 97 21 164.9	29 32.4 98 21 165.1	29 03.2 98 21 165.2	28 33.9 98 21 165.3	28 04.7 98 21 165.4	4
15	31 16.2 97 23 163.5	30 47.1 97 23 163.6	30 17.9 97 23 163.7	29 48.8 97 23 163.9	29 19.7 97 23 164.0	28 50.5 97 22 164.2	28 21.4 97 22 164.3	27 52.2 97 22 164.4	15
6	31 02.1 97 25 162.4	30 33.1 97 25 162.6	30 04.1 97 24 162.7	29 35.1 97 24 162.8	29 06.1 97 24 163.0	28 37.0 97 24 163.1	28 08.0 97 24 163.3	27 38.9 97 23 163.4	6
7	30 47.2 96 26 161.3	30 18.3 96 26 161.5	29 49.5 96 26 161.7	29 20.6 96 26 161.8	28 51.6 96 25 162.0	28 22.7 96 25 162.1	27 53.8 96 25 162.3	27 24.9 96 25 162.4	7
8	30 31.5 96 28 160.3	30 02.7 96 27 160.5	29 34.0 96 27 160.6	29 05.2 96 27 160.8	28 36.4 96 27 161.0	28 07.6 96 27 161.1	27 38.8 96 26 161.3	27 10.0 96 26 161.4	8
9	30 14.9 95 29 159.2	29 46.3 95 29 159.4	29 17.7 95 28 159.6	28 49.0 95 28 159.8	28 20.4 95 28 159.9	27 51.7 95 28 160.1	27 23.0 96 28 160.3	26 54.3 96 27 160.4	9
20	29 57.5 95 30 158.2	29 29.1 95 30 158.4	29 00.5 95 30 158.6	28 32.1 95 30 158.8	28 03.5 95 29 158.9	27 35.0 95 29 159.1	27 06.5 95 29 159.3	26 37.9 95 29 159.5	20
1	29 39.4 94 32 157.2	29 11.0 94 31 157.4	28 42.7 95 31 157.6	28 14.3 95 31 157.8	27 45.9 95 31 157.9	27 17.5 95 30 158.1	26 49.1 95 30 158.3	26 20.7 95 30 158.5	1
2	29 20.4 94 33 156.2	28 52.2 94 33 156.4	28 24.0 94 32 156.6	27 55.8 94 32 156.8	27 27.6 94 32 157.0	26 59.3 94 32 157.1	26 31.0 94 31 157.3	26 02.8 94 31 157.5	2
3	29 00.7 93 34 155.2	28 32.6 93 34 155.4	28 04.6 94 34 155.6	27 36.5 94 33 155.8	27 08.4 94 33 156.0	26 40.3 94 33 156.2	26 12.2 94 33 156.4	25 44.1 94 32 156.6	3
4	28 40.2 93 35 154.2	28 12.3 93 35 154.4	27 44.4 93 35 154.6	27 16.5 93 35 154.8	26 48.6 93 34 155.0	26 20.6 93 34 155.2	25 52.6 93 34 155.4	25 24.6 93 34 155.6	4
25	28 18.9 92 37 153.2	27 51.2 92 36 153.4	27 23.5 92 36 153.6	26 55.7 93 36 153.8	26 27.9 93 36 154.0	26 00.1 93 35 154.3	25 32.3 93 35 154.5	25 04.5 93 35 154.7	25
6	27 56.9 92 38 152.2	27 29.4 92 38 152.4	27 01.8 92 37 152.6	26 34.2 92 37 152.9	26 06.6 92 37 153.1	25 39.0 92 36 153.3	25 11.3 92 36 153.5	24 43.6 92 36 153.7	6
7	27 34.2 91 39 151.2	27 06.9 91 39 151.5	26 39.4 91 38 151.7	26 12.0 91 38 151.9	25 44.6 92 38 152.1	25 17.1 92 38 152.4	24 49.6 92 37 152.6	24 22.1 92 37 152.8	7
8	27 10.8 91 40 150.3	26 43.6 91 40 150.5	26 16.4 91 40 150.7	25 49.1 91 39 151.0	25 21.8 91 39 151.2	24 54.5 91 39 151.4	24 27.2 91 38 151.7	23 59.8 91 38 151.9	8
9	26 46.7 90 42 149.3	26 19.7 90 41 149.6	25 52.6 90 41 149.8	25 25.5 90 41 150.0	24 58.4 90 40 150.3	24 31.3 90 40 150.5	24 04.1 91 40 150.7	23 36.9 91 39 151.0	9
30	26 21.9 90 42 148.5	25 55.1 90 42 148.6	25 28.2 90 42 148.9	25 01.2 90 42 149.1	24 34.3 90 41 149.4	24 07.3 90 41 149.6	23 40.4 90 41 149.8	23 13.3 90 40 150.1	30
1	25 56.5 89 44 147.4	25 29.8 89 43 147.7	25 03.1 89 43 147.9	24 36.3 89 43 148.2	24 09.6 89 42 148.4	23 42.8 89 42 148.7	23 15.9 89 42 148.9	22 49.1 89 41 149.2	1
2	25 30.4 88 45 146.5	25 03.8 88 44 146.8	24 37.3 89 44 147.0	24 10.7 89 44 147.3	23 44.1 89 43 147.5	23 17.5 89 43 147.8	22 50.9 89 43 148.0	22 24.2 89 42 148.3	2
3	25 03.6 88 46 145.6	24 37.3 88 45 145.9	24 10.9 88 45 146.1	23 44.5 88 45 146.4	23 18.1 88 44 146.6	22 51.5 88 44 146.9	22 25.2 88 44 147.2	21 58.7 88 44 147.4	3
4	24 36.2 87 47 144.7	24 10.1 87 47 145.0	23 43.9 87 46 145.2	23 17.7 87 46 145.5	22 51.5 87 46 145.8	22 25.2 88 45 146.0	21 58.9 88 45 146.3	21 32.6 88 45 146.5	4
35	24 08.2 86 48 143.8	23 42.3 87 47 144.1	23 16.3 87 47 144.3	22 50.2 87 47 144.6	22 24.2 87 46 144.9	21 58.1 87 46 145.2	21 32.0 87 46 145.4	21 05.9 87 46 145.7	35
6	23 39.6 86 49 142.9	23 13.8 86 48 143.2	22 48.0 86 48 143.5	22 22.2 86 48 143.7	21 56.3 86 47 144.0	21 30.4 86 47 144.3	21 04.5 86 47 144.6	20 38.6 87 46 144.8	6
7	23 10.4 85 50 142.0	22 44.8 85 49 142.3	22 19.2 85 49 142.6	21 53.6 86 49 142.9	21 27.9 86 48 143.2	21 02.2 86 48 143.4	20 36.5 86 48 143.7	20 10.7 86 47 144.0	7
8	22 40.7 85 51 141.2	22 15.3 85 50 141.5	21 49.8 85 50 141.7	21 24.4 85 50 142.0	20 58.9 85 49 142.3	20 33.4 85 49 142.6	20 07.8 85 49 142.9	19 42.2 85 48 143.2	8
9	22 10.3 84 51 140.5	21 45.1 84 51 140.6	21 19.9 84 51 140.9	20 54.6 85 51 141.2	20 29.3 85 50 141.5	20 04.0 85 50 141.8	19 38.6 85 50 142.0	19 13.2 85 49 142.4	9
40	21 39.5 83 52 139.5	21 14.4 83 52 139.8	20 49.4 84 52 140.1	20 24.3 84 51 140.3	19 59.2 84 51 140.6	19 34.0 84 51 140.9	19 08.9 84 50 141.2	18 43.7 84 50 141.5	40
1	21 08.1 83 53 138.6	20 43.2 83 53 138.9	20 18.4 83 53 139.2	19 53.5 83 52 139.5	19 28.5 83 52 139.8	19 03.6 83 52 140.1	18 38.6 84 51 140.4	18 13.6 83 51 140.7	1
2	20 36.1 82 54 137.8	20 11.5 82 54 138.1	19 46.8 82 54 138.4	19 22.1 82 53 138.7	18 57.4 83 53 139.0	18 32.6 83 52 139.3	18 07.8 83 52 139.6	17 43.0 83 52 139.9	2
3	20 03.7 81 55 137.0	19 39.2 82 55 137.3	19 14.7 82 54 137.6	18 50.2 82 54 137.9	18 25.7 82 54 138.2	18 01.1 82 53 138.5	17 36.5 82 53 138.8	17 11.9 82 53 139.1	3
4	19 30.9 81 56 136.2	19 06.5 81 55 136.5	18 42.2 81 55 136.8	18 17.8 81 55 137.1	17 53.5 81 54 137.4	17 29.1 81 54 137.7	17 04.7 81 54 138.0	16 40.2 82 54 138.3	4
45	18 57.3 80 56 135.4	18 33.2 80 56 135.7	18 09.1 80 56 136.0	17 45.0 81 56 136.3	17 20.8 81 55 136.6	16 56.6 81 55 136.9	16 32.4 81 55 137.2	16 08.1 81 54 137.5	45
6	18 23.4 80 57 134.6	17 59.5 80 57 134.9	17 35.6 80 57 135.2	17 11.6 81 56 135.5	16 47.7 80 56 135.8	16 23.7 80 56 136.2	15 59.6 81 56 136.5	15 35.5 80 55 136.8	6
7	17 49.1 79 58 133.8	17 25.3 79 58 134.1	17 01.6 79 57 134.4	16 37.8 79 57 134.8	16 14.0 79 57 135.1	15 50.2 79 56 135.4	15 26.4 80 56 135.7	15 02.5 80 56 136.0	7
8	17 14.2 78 59 133.0	16 50.7 78 58 133.3	16 27.2 79 58 133.7	16 03.6 79 58 134.0	15 40.0 79 58 134.3	15 16.3 79 57 134.6	14 52.7 79 57 134.9	14 29.0 79 57 135.3	8
9	16 39.0 78 59 132.2	16 15.7 78 59 132.6	15 52.3 78 59 132.9	15 29.3 78 58 133.2	15 05.5 78 58 133.6	14 42.0 78 58 133.9	14 18.5 78 58 134.2	13 55.0 78 57 134.5	9
50	16 03.3 77 60 131.5	15 40.2 77 60 131.8	15 17.0 77 60 132.2	14 53.8 77 59 132.5	14 30.5 78 59 132.8	14 07.3 78 59 133.1	13 44.0 78 58 133.5	13 20.7 78 58 133.8	50
1	15 27.2 77 61 130.7	15 04.2 77 61 131.1	14 41.2 77 60 131.4	14 18.2 77 60 131.7	13 55.2 77 60 132.1	13 32.1 77 59 132.4	13 09.0 77 59 132.7	12 45.9 77 59 133.1	1
2	14 50.7 76 62 130.0	14 27.9 76 61 130.3	14 05.1 76 61 130.7	13 42.3 76 61 131.0	13 19.4 76 60 131.3	12 56.5 76 60 131.7	12 33.6 76 60 132.0	12 10.6 77 59 132.3	2
3	14 13.8 75 62 129.3	13 51.2 75 62 129.6	13 28.6 75 62 129.9	13 05.9 76 61 130.3	12 43.2 76 61 130.6	12 20.5 76 61 130.9	11 57.8 76 60 131.3	11 35.0 76 60 131.6	3
4	13 36.5 75 63 128.5	13 14.1 75 62 128.9	12 51.6 75 62 129.2	12 29.1 75 62 129.6	12 06.6 75 61 130.0	11 44.1 75 61 130.3	11 21.6 75 61 130.6	10 59.0 75 61 130.9	4
55	12 58.8 74 63 127.8	12 36.6 74 63 128.1	12 14.3 74 63 128.5	11 52.0 74 62 128.8	11 29.7 74 62 129.2	11 07.3 75 62 129.5	10 45.0 75 62 129.8	10 22.6 75 61 130.2	55
6	12 20.8 74 64 127.1	11 58.7 74 64 127.5	11 36.6 74 63 127.8	11 14.5 74 63 128.1	10 52.4 74 63 128.5	10 30.2 74 63 128.8	10 08.0 74 62 129.2	9 45.8 74 62 129.5	6
7	11 42.4 73 65 126.4	11 20.5 73 64 126.8	10 58.6 73 64 127.1	10 36.6 73 64 127.4	10 14.7 74 64 127.8	9 52.7 74 63 128.1	9 30.7 74 63 128.5	9 08.6 74 63 128.8	7
8	11 03.7 72 65 125.7	10 41.9 72 65 126.1	10 20.2 73 64 126.4	9 58.4 73 64 126.8	9 36.6 73 64 127.1	9 14.8 73 64 127.5	8 53.0 73 63 127.8	8 31.1 73 63 128.2	8
9	10 24.6 72 65 125.0	10 03.0 72 65 125.4	9 41.5 72 65 125.7	9 19.9 72 65 126.1	8 58.3 72 65 126.4	8 36.6 72 64 126.8	8 15.0 72 64 127.1	7 53.3 72 64 127.5	9
60	9 45.2 71 66 124.3	9 23.8 71 66 124.7	9 02.4 71 66 125.0	8 41.0 71 65 125.4	8 19.5 72 65 125.8	7 58.1 72 65 126.1	7 36.6 72 64 126.5	7 15.1 72 64 126.8	60
1	9 05.5 71 67 123.7	8 44.2 71 66 124.0	8 23.0 71 66 124.4	8 01.8 71 66 124.7	7 40.5 71 66 125.1	7 19.2 71 65 125.4	6 57.9 71 65 125.8	6 36.6 71 65 126.2	1
2	8 25.4 70 67 123.0	8 04.4 70 67 123.4	7 43.3 70 67 123.7	7 22.2 70 66 124.1	7 01.1 70 66 124.4	6 40.0 70 66 124.8	6 18.9 71 65 125.1	5 57.7 71 65 125.5	2
3	7 45.1 70 68 122.3	7 24.2 70 67 122.7	7 03.3 70 67 123.1	6 42.4 70 67 123.4	6 21.4 70 67 123.8	6 00.5 70 66 124.1	5 39.5 70 66 124.5	5 18.5 70 66 124.9	3
4	7 04.4 69 68 121.7	6 43.7 69 68 122.0	6 23.0 69 68 122.4	6 02.2 69 67 122.8	5 41.5 69 67 123.1	5 20.7 69 67 123.5			4
65	6 23.5 69 69 121.0	6 03.0 69 68 121.4	5 42.4 69 68 121.8	5 21.8 69 68 122.1	5 01.2 69 68 122.5				65
6	5 42.3 68 69 120.4	5 21.9 68 69 120.7	5 01.5 68 69 121.1						6
7	5 00.8 67 70 119.7								7

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00′	20° 30′	21° 00′	21° 30′	22° 00′	22° 30′	23° 00′	23° 30′	H.A.
91	11 06.7 58 76 73.2	11 24.2 58 76 72.8	11 41.5 58 76 72.4	11 58.9 58 76 72.0	12 16.2 58 75 71.6	12 33.5 58 75 71.2	12 50.7 57 75 70.7	13 07.9 57 75 70.3	91
2	10 20.9 58 76 72.7	10 38.5 58 76 72.3	10 55.9 58 76 71.9	11 13.4 58 76 71.4	11 30.8 58 75 71.0	11 48.2 58 75 70.6	12 05.6 58 75 70.2	12 22.9 58 75 69.8	2
3	9 35.3 59 76 72.1	9 52.9 59 76 71.7	10 10.5 59 76 71.3	10 28.0 58 75 70.9	10 45.6 58 75 70.5	11 03.1 58 75 70.1	11 20.5 58 75 69.6	11 38.0 58 75 69.2	3
4	8 49.7 59 76 71.6	9 07.5 59 75 71.2	9 25.2 59 75 70.7	9 42.8 59 75 70.3	10 00.5 59 75 69.9	10 18.1 59 75 69.5	10 35.7 59 74 69.1	10 53.3 58 74 68.7	4
95	8 04.3 60 75 71.0	8 22.2 59 75 70.6	8 40.0 59 75 70.2	8 57.8 59 75 69.8	9 15.6 59 75 69.4	9 33.3 59 74 69.0	9 51.0 59 74 68.5	10 08.7 59 74 68.1	95
6	7 19.1 60 75 70.4	7 37.1 60 75 70.0	7 55.0 59 75 69.6	8 12.9 59 75 69.2	8 30.8 59 74 68.8	8 48.7 59 74 68.4	9 06.5 59 74 68.0	9 24.3 59 74 67.6	6
7	6 34.0 60 75 69.9	6 52.1 60 75 69.5	7 10.2 60 74 69.1	7 28.2 60 74 68.7	7 46.2 60 74 68.2	8 04.2 60 74 67.8	8 22.2 60 74 67.4	8 40.1 60 73 67.0	7
8	5 49.1 61 75 69.3	6 07.3 61 74 68.9	6 25.5 61 74 68.5	6 43.7 60 74 68.1	7 01.8 60 74 67.7	7 19.9 60 74 67.3	7 38.0 60 73 66.9	7 56.1 60 73 66.5	8
9	5 04.4 61 74 68.7	5 22.7 61 74 68.3	5 41.0 61 74 67.9	5 59.3 61 74 67.5	6 17.6 61 74 67.1	6 35.8 61 73 66.7	6 54.0 61 73 66.3	7 12.2 61 73 65.9	9
100				5 15.1 61 73 66.9	5 33.5 61 73 66.6	5 51.9 61 73 66.2	6 10.2 61 73 65.8	6 28.6 61 72 65.4	100
1						5 08.2 62 73 65.6	5 26.6 62 72 65.2	5 45.1 62 72 64.8	1
2								5 01.9 62 72 64.2	2

16—68158-1

Lat. 37°

H.A.	24° 00' Alt.	Δd Δt	Az.	24° 30' Alt.	Δd Δt	Az.	25° 00' Alt.	Δd Δt	Az.	25° 30' Alt.	Δd Δt	Az.	26° 00' Alt.	Δd Δt	Az.	26° 30' Alt.	Δd Δt	Az.	27° 00' Alt.	Δd Δt	Az.	27° 30' Alt.	Δd Δt	Az.	H.A.
00	77 00.0	1.0 03	180.0	77 30.0	1.0 03	180.0	78 00.0	1.0 03	180.0	78 30.0	1.0 03	180.0	79 00.0	1.0 03	180.0	79 30.0	1.0 03	180.0	80 00.0	1.0 04	180.0	80 30.0	1.0 04	180.0	00
1	76 58.3	1.0 08	175.9	77 28.2	1.0 09	175.8	77 58.2	1.0 09	175.6	78 28.1	1.0 09	175.5	78 58.0	1.0 10	175.3	79 28.0	1.0 10	175.1	79 57.9	1.0 11	174.9	80 27.8	1.0 11	174.6	1
2	76 53.2	99 14	171.9	77 23.0	99 14	171.6	77 52.7	99 15	171.3	78 22.5	99 16	171.0	78 52.2	99 16	170.6	79 21.8	99 17	170.3	79 51.5	99 18	169.8	80 21.1	99 18	169.4	2
3	76 44.9	98 19	168.0	77 14.3	98 20	167.5	77 43.8	98 21	167.1	78 13.2	98 21	166.6	78 42.5	98 22	166.1	79 11.8	97 23	165.5	79 41.0	97 24	164.9	80 10.1	97 25	164.2	3
4	76 33.3	97 24	164.1	77 02.4	97 25	163.6	77 31.4	97 26	163.0	78 00.3	96 27	162.4	78 29.2	96 28	161.7	78 58.0	96 30	161.0	79 26.6	95 30	160.2	79 55.1	95 31	159.3	4
05	76 18.6	96 29	160.3	76 47.3	95 30	159.7	77 15.5	95 31	159.0	77 44.2	94 32	158.3	78 12.5	94 33	157.5	78 40.6	94 34	156.6	79 08.6	93 36	155.7	79 36.4	92 37	154.6	05
6	76 01.1	94 34	156.7	76 29.2	93 35	156.0	76 57.1	93 36	155.2	77 24.9	92 37	154.3	77 52.6	92 38	153.4	78 20.0	91 39	152.4	78 47.2	90 41	151.4	79 14.2	89 42	150.2	6
7	75 40.8	92 38	153.2	76 08.3	91 39	152.4	76 35.6	91 40	151.5	77 02.8	90 41	150.6	77 29.7	89 42	149.6	77 56.4	88 44	148.5	78 22.8	88 45	147.4	78 48.9	87 47	146.1	7
8	75 18.0	90 42	149.9	75 44.9	89 43	149.0	76 11.6	88 44	148.1	76 38.0	88 45	147.1	77 04.2	87 47	146.0	77 30.1	86 48	144.9	77 55.6	85 49	143.5	78 20.9	83 51	142.3	8
9	74 52.9	88 46	146.8	75 19.1	87 47	145.8	75 45.1	86 48	144.8	76 10.8	85 49	143.8	76 36.2	84 50	142.6	77 01.3	83 52	141.4	77 26.1	82 53	140.2	77 50.4	81 54	138.8	9
10	74 25.6	86 49	143.8	74 51.1	85 50	142.8	75 16.4	84 51	141.7	75 41.4	83 52	140.6	76 06.1	82 54	139.5	76 30.4	80 55	138.2	76 54.3	79 56	136.9	77 17.8	78 57	135.5	10
1	73 56.3	83 52	140.9	74 21.2	83 53	139.9	74 45.8	81 54	138.8	75 10.1	80 55	137.7	75 34.0	79 56	136.5	75 57.6	78 58	135.3	76 20.7	76 59	133.9	76 43.4	75 60	132.5	1
2	73 25.3	81 54	138.3	73 49.5	80 56	137.2	74 13.4	79 57	136.1	74 37.0	78 58	135.0	75 00.2	77 59	133.8	75 23.0	76 60	132.5	75 45.4	74 61	131.2	76 07.3	72 63	129.8	2
3	72 52.6	79 57	135.7	73 16.2	78 58	134.7	73 39.4	77 60	133.6	74 02.3	76 60	132.4	74 24.9	74 61	131.2	74 47.0	73 62	129.8	75 08.6	71 64	128.6	75 29.8	70 65	127.2	3
4	72 18.4	77 59	133.3	72 41.4	76 60	132.3	73 04.0	75 61	131.2	73 26.3	74 62	130.0	73 48.1	72 63	128.8	74 09.6	71 64	127.5	74 30.5	69 65	126.2	74 51.0	67 66	124.8	4
15	71 42.9	75 61	131.1	72 05.3	74 62	130.0	72 27.3	73 63	128.9	72 49.0	71 64	127.7	73 10.2	70 65	126.5	73 31.0	69 66	125.3	73 51.3	67 67	124.0	74 11.1	65 68	122.6	15
6	71 06.2	73 63	129.0	71 28.1	72 64	127.9	71 49.5	71 65	126.8	72 10.6	69 66	125.6	72 31.2	68 67	124.4	72 51.4	67 68	123.2	73 11.1	65 68	121.9	73 30.3	63 69	120.6	6
7	70 28.4	72 65	127.0	70 49.7	70 65	125.9	71 10.6	69 66	124.8	71 31.1	68 67	123.6	71 51.2	66 68	122.5	72 10.8	65 69	121.2	72 30.0	63 70	120.0	72 48.6	61 71	118.7	7
8	69 49.7	70 66	125.1	70 10.4	69 67	124.0	70 30.8	68 68	122.9	70 50.8	66 69	121.8	71 10.4	64 70	120.6	71 29.5	63 71	119.3	71 48.1	61 71	118.1	72 06.2	60 72	116.9	8
9	69 10.0	68 68	123.2	69 30.3	67 68	122.2	69 50.2	66 69	121.1	70 09.7	64 70	120.0	70 28.7	63 70	118.9	70 47.4	61 71	117.7	71 05.5	60 72	116.5	71 23.2	58 73	115.2	9
20	68 29.6	67 69	121.5	68 49.4	65 69	120.5	69 08.8	64 70	119.4	69 27.8	63 71	118.4	69 46.5	61 72	117.2	70 04.6	60 72	116.1	70 22.3	58 73	114.9	70 39.5	57 74	113.6	20
1	67 48.4	65 70	119.9	68 07.8	64 70	118.9	68 26.8	63 71	117.9	68 45.4	61 72	116.8	69 03.6	60 72	115.7	69 21.3	58 73	114.5	69 38.6	57 74	113.4	69 55.4	55 74	112.2	1
2	67 06.5	64 71	118.4	67 25.5	63 71	117.4	67 44.1	61 72	116.4	68 02.3	60 73	115.3	68 20.1	59 73	114.2	68 37.5	57 74	113.1	68 54.4	56 74	112.0	69 10.8	54 75	110.8	2
3	66 24.1	63 72	116.9	66 42.7	61 72	115.9	67 00.9	60 73	114.9	67 18.7	59 73	113.8	67 36.2	57 74	112.8	67 53.2	56 74	111.7	68 09.8	55 75	110.6	68 25.8	53 76	109.5	3
4	65 41.1	61 72	115.5	65 59.3	60 73	114.6	66 17.2	59 74	113.6	66 34.7	58 74	112.5	66 51.8	56 75	111.5	67 08.5	55 75	110.4	67 24.7	53 76	109.4	67 40.5	52 76	108.2	4
25	64 57.6	60 73	114.2	65 15.5	59 74	113.2	65 33.1	58 74	112.3	65 50.2	57 75	111.3	66 07.0	55 75	110.2	66 23.4	54 76	109.2	66 39.3	52 76	108.1	66 54.8	51 77	107.1	25
6	64 13.7	59 74	112.9	64 31.3	58 74	112.0	64 48.5	57 75	111.0	65 05.4	56 75	110.0	65 21.9	54 76	109.1	65 38.0	53 76	108.0	65 53.6	52 77	107.0	66 08.9	50 77	105.9	6
7	63 29.3	58 74	111.7	63 46.7	57 75	110.8	64 03.6	56 75	109.8	64 20.2	55 76	108.9	64 36.4	53 76	107.9	64 52.3	52 77	106.9	65 07.7	51 77	105.9	65 22.7	49 77	104.9	7
8	62 44.6	57 75	110.5	63 01.7	56 75	109.6	63 18.4	55 76	108.7	63 34.7	54 76	107.8	63 50.7	53 77	106.8	64 06.3	51 77	105.8	64 21.5	50 77	104.8	64 36.2	49 78	103.8	8
9	61 59.6	55 76	109.4	62 16.4	55 76	108.5	62 32.9	54 76	107.6	62 49.0	53 77	106.7	63 04.7	52 77	105.8	63 20.1	51 77	104.8	63 35.0	49 78	103.8	63 49.6	48 78	102.9	9
30	61 14.3	56 76	108.3	61 30.8	55 76	107.5	61 47.1	54 77	106.6	62 03.0	52 77	105.7	62 18.5	51 78	104.8	62 33.6	50 78	103.8	62 48.4	49 78	102.9	63 02.8	47 78	101.9	30
1	60 28.6	55 76	107.3	60 45.0	54 77	106.4	61 01.0	53 77	105.6	61 16.7	52 77	104.7	61 32.0	51 78	103.8	61 47.0	49 78	102.9	62 01.6	48 78	101.9	62 15.9	47 78	101.0	1
2	59 42.8	54 77	106.3	59 58.9	53 77	105.4	60 14.8	52 78	104.6	60 30.3	51 78	103.7	60 45.4	50 78	102.8	61 00.2	49 78	102.0	61 14.7	48 78	101.0	61 28.7	46 79	100.1	2
3	58 56.7	54 77	105.3	59 12.6	53 78	104.5	59 28.3	52 78	103.7	59 43.6	51 78	102.7	59 58.6	49 78	101.9	60 13.3	48 79	101.1	60 27.6	47 79	100.2	60 41.5	46 79	99.3	3
4	58 10.3	54 78	104.4	58 26.1	52 78	103.6	58 41.6	51 78	102.7	58 56.8	50 78	101.9	59 11.7	49 78	101.1	59 26.2	48 79	100.2	59 40.3	47 79	99.3	59 54.2	45 79	98.5	4
35	57 23.8	53 78	103.5	57 39.5	52 78	102.7	57 54.8	51 78	101.9	58 09.8	50 78	101.1	58 24.6	49 79	100.2	58 39.0	47 79	99.4	58 53.0	46 79	98.5	59 06.7	45 79	97.7	35
6	56 37.1	52 78	102.6	56 52.6	51 78	101.8	57 07.9	50 78	101.0	57 22.8	49 79	100.2	57 37.3	48 79	99.4	57 51.6	47 79	98.6	58 05.6	46 79	97.7	58 19.2	45 79	96.9	6
7	55 50.3	52 78	101.7	56 05.7	51 78	101.0	56 20.8	50 79	100.2	56 35.5	49 79	99.4	56 50.0	48 79	98.6	57 04.2	47 79	97.8	57 18.1	46 79	97.0	57 31.6	45 79	96.2	7
8	55 03.3	51 78	100.9	55 18.6	50 79	100.2	55 33.5	49 79	99.4	55 48.2	48 79	98.6	56 02.6	47 79	97.8	56 16.7	46 79	97.0	56 30.5	45 80	96.2	56 43.9	44 80	95.4	8
9	54 16.2	51 79	100.1	54 31.3	50 79	99.4	54 46.2	49 79	98.6	55 00.8	48 79	97.9	55 15.1	47 79	97.1	55 29.1	46 79	96.3	55 42.8	45 80	95.5	55 56.2	44 80	94.7	9
40	53 29.0	51 79	99.3	53 44.0	50 79	98.6	53 58.8	49 79	97.8	54 13.3	48 79	97.1	54 27.5	47 80	96.3	54 41.4	46 80	95.6	54 55.1	45 80	94.8	55 08.4	44 80	94.0	40
1	52 41.6	50 79	98.5	52 56.6	49 79	97.8	53 11.3	49 79	97.1	53 25.7	48 79	96.4	53 39.8	47 80	95.6	53 53.7	46 80	94.9	54 07.3	45 80	94.1	54 20.6	44 80	93.4	1
2	51 54.2	50 79	97.8	52 09.1	49 79	97.1	52 23.7	48 80	96.4	52 38.0	47 80	95.7	52 52.1	47 80	94.9	53 05.9	46 80	94.2	53 19.5	45 80	93.4	53 32.7	44 80	92.7	2
3	51 06.7	50 79	97.1	51 21.5	49 79	96.4	51 36.0	48 80	95.7	51 50.3	47 80	95.0	52 04.4	46 80	94.2	52 18.1	45 80	93.5	52 31.6	45 80	92.8	52 44.9	44 80	92.0	3
4	50 19.1	50 80	96.4	50 33.8	49 80	95.7	50 48.3	48 80	95.0	51 02.6	47 80	94.3	51 16.6	46 80	93.6	51 30.3	45 80	92.9	51 43.8	44 80	92.1	51 57.0	44 80	91.4	4
45	49 31.4	49 80	95.7	49 46.1	49 80	95.0	50 00.6	48 80	94.3	50 14.8	47 80	93.6	50 28.7	46 80	92.9	50 42.4	45 80	92.2	50 55.9	44 80	91.5	51 09.1	44 80	90.8	45
6	48 43.7	49 80	95.0	48 58.4	48 80	94.3	49 12.8	48 80	93.6	49 26.9	47 80	93.0	49 40.8	46 80	92.3	49 54.5	45 80	91.6	50 08.0	44 80	90.9	50 21.1	44 80	90.2	6
7	47 56.0	49 80	94.3	48 10.6	48 80	93.6	48 24.9	47 80	93.0	48 39.0	47 80	92.3	48 53.0	46 80	91.6	49 06.6	45 80	91.0	49 20.0	44 80	90.3	49 33.2	44 80	89.6	7
8	47 08.2	49 80	93.6	47 22.7	48 80	93.0	47 37.0	47 80	92.3	47 51.2	47 80	91.7	48 05.0	46 80	91.0	48 18.7	45 80	90.3	48 32.1	44 80	89.7	48 45.3	44 80	89.0	8
9	46 20.3	49 80	93.0	46 34.8	48 80	92.3	46 49.2	47 80	91.7	47 03.3	47 80	91.1	47 17.1	46 80	90.4	47 30.8	45 80	89.7	47 44.2	44 80	89.1	47 57.4	44 80	88.4	9
50	45 32.5	49 80	92.3	45 47.0	48 80	91.7	46 01.3	47 80	91.1	46 15.3	47 80	90.4	46 29.2	46 80	89.8	46 42.9	45 80	89.2	46 56.3	44 80	88.5	47 09.5	44 80	87.8	50
1	44 44.6	49 80	91.7	44 59.1	48 80	91.1	45 13.3	47 80	90.5	45 27.4	47 80	89.8	45 41.3	46 80	89.2	45 55.0	45 80	88.6	46 08.4	44 80	87.9	46 21.6	44 80	87.2	1
2	43 56.7	49 80	91.1	44 11.1	48 80	90.5	44 25.4	47 80	89.9	44 39.5	47 80	89.2	44 53.4	46 80	88.6	45 07.1	45 80	88.0	45 20.5	45 80	87.4	45 33.8	44 80	86.7	2
3	43 08.8	49 80	90.5	43 23.2	48 80	89.9	43 37.5	47 80	89.3	43 51.6	47 80	88.7	44 05.5	46 80	88.0	44 19.2	45 80	87.4	44 32.7	45 80	86.8	44 46.0	44 80	86.2	3
4	42 20.8	49 80	89.9	42 35.3	48 80	89.3	42 49.6	47 80	88.7	43 03.7	47 80	88.1	43 17.6	46 80	87.5	43 31.3	45 80	86.9	43 44.8	45 80	86.2	43 58.2	44 80	85.6	4
55	41 32.9	49 80	89.3	41 47.4	48 80	88.7	42 01.7	47 80	88.1	42 15.8	47 80	87.5	42 29.7	46 80	86.9	42 43.5	45 80	86.3	42 57.0	45 80	85.7	43 10.4	44 80	85.1	55
6	40 45.0	49 80	88.7	40 59.5	48 80	88.1	41 13.8	47 80	87.5	41 28.0	47 80	86.9	41 41.9	46 80	86.3	41 55.7	45 80	85.7	42 09.3	45 80	85.1	42 22.7	44 79	84.5	6
7	39 57.1	49 80	88.1	40 11.6	48 80	87.5	40 26.0	48 80	87.0	40 40.1	47 80	86.4	40 54.1	46 80	85.8	41 07.9	46 80	85.2	41 21.6	45 80	84.6	41 35.0	45 79	84.0	7
8	39 09.2	49 80	87.5	39 23.8	48 80	87.0	39 38.1	48 80	86.4	39 52.3	47 80	85.8	40 06.3	46 80	85.2	40 20.2	46 79	84.7	40 33.9	45 79	84.1	40 47.4	45 79	83.5	8
9	38 21.4	49 80	87.0	38 35.9	48 80	86.4	38 50.3	48 80	85.8	39 04.5	47 80	85.3	39 18.6	47 80	84.7	39 32.5	46 79	84.1	39 46.2	45 79	83.5	39 59.8	45 79	83.0	9
60	37 33.5	49 80	86.4	37 48.1	48 80	85.8	38 02.5	48 80	85.3	38 16.8	47 79	84.7	38 30.9	47 79	84.2	38 44.9	46 79	83.6	38 58.6	46 79	83.0	39 12.3	45 79	82.4	60
1	36 45.7	49 80	85.8	37 00.3	48 80	85.3	37 14.8	48 80	84.7	37 29.1	47 79	84.2	37 43.3	47 79	83.6	37 57.3	46 79	83.1	38 11.1	46 79	82.5	38 24.8	45 79	81.9	1
2	35 57.9	49 80	85.3	36 12.6	49 80	84.7	36 27.1	48 79	84.2	36 41.5	47 79	83.6	36 55.7	47 79	83.1	37 09.7	47 79	82.5	37 23.6	46 79	82.0	37 37.4	45 79	81.4	2
3	35 10.2	49 80	84.7	35 24.9	49 79	84.2	35 39.5	48 79	83.6	35 53.9	47 79	83.1	36 08.1	47 79	82.6	36 22.2	47 79	82.0	36 36.2	46 79	81.5	36 50.0	46 79	80.9	3
4	34 22.5	49 79	84.2	34 37.3	49 79	83.6	34 51.9	48 79	83.1	35 06.3	47 79	82.6	35 20.6	47 79	82.0	35 34.8	47 79	81.5	35 48.9	47 79	81.0	36 02.7	46 79	80.4	4
65	33 34.9	50 79	83.6	33 49.7	49 79	83.1	34 04.4	49 79	82.6	34 18.8	48 79	82.0	34 33.2	48 79	81.5	34 47.5	47 79	81.0	35 01.6	47 79	80.4	35 15.5	46 79	79.9	65
6	32 47.3	50 79	83.1	33 02.1	49 79	82.6	33 16.8	49 79	82.0	33 31.4	48 79	81.5	33 45.9	48 79	81.0	34 00.2	47 79	80.5	34 14.3	47 78	79.9	34 28.4	47 78	79.4	6
7	31 59.7	50 79	82.5	32 14.6	50 79	82.0	32 29.4	49 79	81.5	32 44.0	49 79	81.0	32 58.6	48 79	80.5	33 13.0	48 79	80.0	33 27.2	47 78	79.4	33 41.3	47 78	78.9	7
8	31 12.2	50 79	82.0	31 27.2	50 79	81.5	31 42.0	49 79	81.0	31 56.8	49 79	80.5	32 11.3	48 78	80.0	32 25.8	48 78	79.4	32 40.1	48 78	78.9	32 54.3	47 78	78.4	8
9	30 24.8	50 79	81.5	30 39.8	50 79	81.0	30 54.8	49 79	80.5	31 09.5	49 79	80.0	31 24.2	49 78	79.5	31 38.7	48 78	78.9	31 53.2	48 78	78.4	32 07.4	47 78	77.9	9
70	29 37.5	50 79	80.9	29 52.6	50 79	80.4	30 07.5	50 79	79.9	30 22.4	49 79	79.4	30 37.1	49 78	78.9	30 51.8	49 78	78.4	31 06.3	48 78	77.9	31 20.6	48 78	77.4	70
1	28 50.2	51 79	80.4	29 05.3	50 79	79.9	29 20.4	50 79	79.4	29 35.3	49 79	78.9	29 50.1	49 78	78.4	30 04.8	49 78	77.9	30 19.4	48 78	77.4	30 33.9	48 78	76.9	1
2	28 03.0	51 79	79.9	28 18.2	51 78	79.4	28 33.3	50 78	78.9	28 48.3	50 78	78.4	29 03.2	49 78	77.9	29 18.0	49 78	77.4	29 32.7	49 78	76.9	29 47.3	48 78	76.4	2
3	27 15.8	51 78	79.4	27 31.1	51 78	78.9	27 46.3	50 78	78.4	28 01.4	50 78	77.9	28 16.4	50 78	77.4	28 31.3	49 78	76.9	28 46.1	49 78	76.4	29 00.8	49 77	75.9	3
4	26 28.8	51 78	78.8	26 44.0	51 78	78.4	26 59.4	51 78	77.9	27 14.6	50 78	77.4	27 29.7	50 78	76.9	27 44.7	50 78	76.4	27 59.6	49 77	75.9	28 14.3	49 77	75.4	4
75	25 41.8	52 78	78.3	25 57.3	51 78	77.8	26 12.6	51 78	77.4	26 27.9	51 78	76.9	26 43.1	50 78	76.4	26 58.2	50 77	75.9	27 13.1	50 77	75.4	27 28.0	49 77	74.9	75
6	24 54.9	52 78	77.8	25 10.5	52 78	77.3	25 25.9	51 78	76.8	25 41.3	51 78	76.4	25 56.6	51 77	75.9	26 11.7	50 77	75.4	26 26.8	50 77	74.9	26 41.8	50 77	74.4	6
7	24 08.2	52 78	77.3	24 23.8	52 78	76.8	24 39.3	52 78	76.3	24 54.8	51 77	75.9	25 10.1	51 77	75.4	25 25.4	51 77	74.9	25 40.6	50 77	74.4	25 55.7	50 77	73.9	7
8	23 21.5	53 78	76.7	23 37.2	52 78	76.3	23 52.8	52 77	75.8	24 08.4	52 77	75.3	24 23.8	51 77	74.9	24 39.2	51 77	74.4	24 54.5	51 77	73.9	25 09.7	51 76	73.5	8
9	22 34.9	53 77	76.2	22 50.7	52 77	75.8	23 06.4	52 77	75.3	23 22.1	52 77	74.8	23 37.6	52 77	74.4	23 53.1	51 77	73.9	24 08.5	51 76	73.4	24 23.8	51 76	73.0	9
80	21 48.4	53 77	75.7	22 04.3	53 77	75.2	22 20.1	53 77	74.8	22 35.9	52 77	74.3	22 51.5	52 77	73.9	23 07.1	52 76	73.4	23 22.6	52 76	72.9	23 38.1	51 76	72.5	80
1	21 02.0	53 77	75.2	21 18.0	53 77	74.7	21 33.9	53 77	74.3	21 49.8	53 77	73.8	22 05.6	52 76	73.4	22 21.3	52 76	72.9	22 36.9	52 76	72.4	22 52.4	52 76	72.0	1
2	20 15.7	54 77	74.7	20 31.8	54 77	74.2	20 47.9	53 76	73.7	21 03.8	53 76	73.3	21 19.7	53 76	72.8	21 35.5	53 76	72.4	21 51.3	52 76	71.9	22 06.9	52 76	71.5	2
3	19 29.6	54 77	74.1	19 45.8	54 77	73.7	20 01.9	54 76	73.2	20 18.0	53 76	72.7	20 34.0	53 76	72.3	20 49.9	53 76	71.9	21 05.8	53 76	71.4	21 21.6	52 76	71.0	3
4	18 43.6	54 76	73.6	18 59.9	54 76	73.2	19 16.1	54 76	72.7	19 32.3	54 76	72.3	19 48.4	54 76	71.8	20 04.5	54 76	71.4	20 20.4	53 76	71.0	20 36.3	53 76	70.5	4
85	17 57.7	55 76	73.1	18 14.1	55 76	72.6	18 30.4	54 76	72.2	18 46.7	54 76	71.8	19 03.0	54 76	71.3	19 19.2	54 76	70.9	19 35.2	54 75	70.4	19 51.3	53 75	70.0	85
6	17 11.9	55 76	72.5	17 28.4	55 76	72.1	17 44.9	55 76	71.7	18 01.3	55 76	71.2	18 17.6	54 75	70.8	18 33.9	54 75	70.3	18 50.1	54 75	69.9	19 06.3	54 75	69.5	6
7	16 26.2	56 76	72.0	16 42.9	55 76	71.6	16 59.5	55 76	71.2	17 16.0	55 75	70.7	17 32.5	55 75	70.3	17 48.9	55 75	69.8	18 05.2	54 75	69.4	18 21.5	54 74	69.0	7
8	15 40.8	56 76	71.5	15 57.5	56 75	71.1	16 14.2	55 75	70.6	16 30.8	55 75	70.2	16 47.4	55 75	69.8	17 04.0	55 75	69.3	17 20.4	55 74	68.9	17 36.9	55 74	68.4	8
9	14 55.4	56 75	71.0	15 12.2	56 75	70.5	15 29.0	56 75	70.1	15 45.8	56 75	69.7	16 02.5	56 74	69.2	16 19.2	55 74	68.8	16 35.8	55 74	68.4	16 52.4	55 74	67.9	9
90	14 10.1	57 75	70.4	14 27.1	57 75	70.0	14 44.1	56 75	69.6	15 01.0	56 74	69.1	15 17.8	56 74	68.7	15 34.6	56 74	68.3	15 51.4	56 74	67.9	16 08.0	56 74	67.4	90

H.A.	24° 00' Alt.	Az.	24° 30' Alt.	Az.	25° 00' Alt.	Az.	25° 30' Alt.	Az.	26° 00' Alt.	Az.	26° 30' Alt.	Az.	27° 00' Alt.	Az.	27° 30' Alt.	Az.	H.A.
°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	°
00	29 00.0 1.00 01	180.0	28 30.0 1.00 01	180.0	28 00.0 1.00 01	180.0	27 30.0 1.00 01	180.0	27 00.0 1.00 01	180.0	26 30.0 1.00 01	180.0	26 00.0 1.00 01	180.0	25 30.0 1.00 01	180.0	00
1	28 59.6 1.00 02	179.0	28 29.6 1.00 02	179.0	27 59.6 1.00 02	179.0	27 29.6 1.00 02	179.0	26 59.6 1.00 02	179.0	26 29.6 1.00 02	179.0	25 59.6 1.00 02	179.0	25 29.6 1.00 02	179.0	1
2	28 58.3 1.00 04	177.9	28 28.3 1.00 04	177.9	27 58.3 1.00 04	177.9	27 28.3 1.00 04	178.0	26 58.3 1.00 04	178.0	26 28.3 1.00 04	178.0	25 58.3 1.00 04	178.0	25 28.4 1.00 03	178.0	2
3	28 56.1 1.00 05	176.9	28 26.1 1.00 05	176.9	27 56.1 1.00 05	176.9	27 26.2 1.00 05	176.9	26 56.2 1.00 05	177.0	26 26.2 1.00 05	177.0	25 56.3 1.00 05	177.0	25 26.3 1.00 05	177.1	3
4	28 53.0 1.00 06	175.8	28 23.1 1.00 06	175.9	27 53.1 1.00 06	175.9	27 23.2 1.00 06	175.9	26 53.3 1.00 06	176.0	26 23.3 1.00 06	176.0	25 53.4 1.00 06	176.0	25 23.4 1.00 06	176.1	4
05	28 49.1 1.00 08	174.8	28 19.2 1.00 08	174.8	27 49.3 1.00 08	174.9	27 19.4 1.00 08	174.9	26 49.5 1.00 08	175.0	26 19.6 1.00 08	175.0	25 49.6 1.00 08	175.1	25 19.7 1.00 08	175.1	05
6	28 44.3 1.00 10	173.7	28 14.4 1.00 09	173.8	27 44.6 1.00 09	173.9	27 14.7 1.00 09	173.9	26 44.8 1.00 09	174.0	26 15.0 1.00 09	174.0	25 45.1 1.00 09	174.1	25 15.2 1.00 09	174.1	6
7	28 38.7 99 11	172.7	28 08.8 99 11	172.8	27 39.0 99 11	172.8	27 09.2 99 11	172.9	26 39.4 99 10	173.0	26 09.6 99 10	173.0	25 39.7 99 10	173.1	25 09.9 99 10	173.1	7
8	28 32.2 99 12	171.7	28 02.4 99 12	171.8	27 32.6 99 12	171.8	27 02.9 99 12	171.9	26 33.1 99 12	172.0	26 03.3 99 12	172.0	25 33.6 99 12	172.1	25 03.8 99 12	172.2	8
9	28 24.8 99 14	170.6	27 55.1 99 14	170.7	27 25.4 99 14	170.8	26 55.7 99 13	170.9	26 26.0 99 13	171.0	25 56.3 99 13	171.0	25 26.6 99 13	171.1	24 56.9 99 13	171.2	9
10	28 16.6 99 15	169.6	27 47.0 99 15	169.7	27 17.3 99 15	169.8	26 47.7 99 15	169.9	26 18.1 99 15	170.0	25 48.4 99 14	170.1	25 18.8 99 14	170.1	24 49.1 99 14	170.2	10
1	28 07.5 98 16	168.6	27 38.0 99 16	168.7	27 08.4 99 16	168.8	26 38.9 99 16	168.9	26 09.3 99 16	169.0	25 39.7 99 16	169.1	25 10.2 99 16	169.2	24 40.6 99 16	169.3	1
2	27 57.6 98 18	167.6	27 28.2 98 17	167.7	26 58.7 98 18	167.8	26 29.2 98 17	167.9	25 59.7 98 17	168.0	25 30.3 98 17	168.1	25 00.8 98 17	168.2	24 31.3 98 17	168.3	2
3	27 46.9 98 19	166.6	27 17.5 98 19	166.7	26 48.2 98 19	166.8	26 18.8 98 19	166.9	25 49.4 98 19	167.0	25 20.0 98 18	167.1	24 50.6 98 18	167.2	24 21.2 98 18	167.3	3
4	27 35.4 98 20	165.6	27 06.1 98 20	165.7	26 36.8 98 20	165.8	26 07.5 98 20	165.9	25 38.2 98 20	166.0	25 08.9 98 20	166.2	24 39.6 98 20	166.3	24 10.3 98 19	166.4	4
15	27 23.0 97 22	164.6	26 53.9 97 22	164.7	26 24.7 97 22	164.8	25 55.5 97 21	164.9	25 26.3 97 21	165.1	24 57.1 97 21	165.2	24 27.9 97 21	165.3	23 58.6 97 21	165.4	15
6	27 09.9 97 23	163.6	26 40.8 97 23	163.7	26 11.7 97 23	163.8	25 42.6 97 23	164.0	25 13.5 97 22	164.1	24 44.4 97 22	164.2	24 15.3 97 22	164.4	23 46.2 97 22	164.5	6
7	26 55.9 97 25	162.6	26 27.0 97 24	162.7	25 58.0 97 24	162.9	25 29.0 97 24	163.0	25 00.0 97 24	163.1	24 31.0 97 24	163.2	24 02.0 97 23	163.4	23 33.0 97 23	163.6	7
8	26 41.2 96 26	161.6	26 12.3 96 26	161.7	25 43.5 96 26	161.9	25 14.6 96 25	162.0	24 45.8 96 25	162.2	24 16.9 96 25	162.3	23 48.0 96 25	162.5	23 19.1 96 24	162.6	8
9	26 25.6 96 27	160.6	25 56.9 96 27	160.8	25 28.2 96 27	160.9	24 59.5 96 27	161.1	24 30.7 96 26	161.2	24 02.0 96 26	161.4	23 33.2 96 26	161.6	23 04.4 96 26	161.7	9
20	26 09.3 95 28	159.6	25 40.8 95 28	159.8	25 12.2 95 28	160.0	24 43.6 95 28	160.1	24 14.9 95 28	160.3	23 46.3 95 27	160.5	23 17.7 95 27	160.6	22 49.0 95 27	160.8	20
1	25 52.3 95 30	158.7	25 23.8 95 29	158.9	24 55.4 95 29	159.0	24 26.9 95 29	159.2	23 58.4 95 29	159.4	23 29.9 95 29	159.5	23 01.4 95 28	159.7	22 32.9 95 28	159.9	1
2	25 34.5 94 31	157.7	25 06.2 94 31	157.9	24 37.8 94 30	158.1	24 09.5 94 30	158.2	23 41.2 94 30	158.4	23 12.8 94 30	158.6	22 44.4 94 30	158.8	22 16.0 94 29	159.0	2
3	25 15.9 94 32	156.8	24 47.8 94 32	156.9	24 19.6 94 32	157.1	23 51.4 94 31	157.3	23 23.2 94 31	157.5	22 55.0 94 31	157.7	22 26.7 94 31	157.9	21 58.5 94 30	158.1	3
4	24 56.6 93 33	155.8	24 28.6 93 33	156.0	24 00.6 93 33	156.2	23 32.5 93 33	156.4	23 04.5 93 32	156.6	22 36.4 93 32	156.8	22 08.3 93 32	157.0	21 40.2 93 32	157.2	4
25	24 36.6 93 34	154.9	24 08.8 93 34	155.1	23 40.9 93 34	155.3	23 13.0 93 34	155.5	22 45.1 93 34	155.7	22 17.2 93 33	155.9	21 49.2 93 33	156.1	21 21.3 93 33	156.3	25
6	24 16.0 92 36	153.9	23 48.2 92 35	154.2	23 20.5 92 35	154.4	22 52.8 92 35	154.6	22 25.0 92 35	154.8	21 57.2 92 34	155.0	21 29.5 92 34	155.2	21 01.7 92 34	155.4	6
7	23 54.6 92 37	153.0	23 27.0 92 37	153.2	22 59.4 92 36	153.5	22 31.9 92 36	153.7	22 04.3 92 36	153.9	21 36.6 92 35	154.1	21 09.0 92 35	154.3	20 41.4 92 35	154.5	7
8	23 32.5 91 38	152.1	23 05.1 91 38	152.3	22 37.7 91 37	152.6	22 10.3 91 37	152.8	21 42.8 91 37	153.0	21 15.4 91 37	153.2	20 47.9 91 36	153.4	20 20.4 91 36	153.6	8
9	23 09.7 91 39	151.2	22 42.5 91 39	151.4	22 15.3 91 38	151.7	21 48.0 91 38	151.9	21 20.7 91 38	152.1	20 53.4 91 38	152.3	20 26.1 91 37	152.5	19 58.8 91 37	152.8	9
30	22 46.3 90 40	150.3	22 19.3 90 40	150.5	21 52.2 90 40	150.8	21 25.1 90 39	151.0	20 58.0 90 39	151.2	20 30.9 90 39	151.5	20 03.7 91 38	151.7	19 36.6 91 38	151.9	30
1	22 22.3 90 41	149.4	21 55.4 90 41	149.7	21 28.5 90 41	149.9	21 01.6 90 40	150.1	20 34.6 90 40	150.4	20 07.7 90 40	150.6	19 40.7 90 40	150.9	19 13.7 90 39	151.1	1
2	21 57.6 89 42	148.5	21 30.8 89 42	148.8	21 04.1 89 42	149.0	20 37.4 89 41	149.3	20 10.6 89 41	149.5	19 43.8 89 41	149.7	19 17.0 89 40	150.0	18 50.2 89 40	150.2	2
3	21 32.2 88 43	147.7	21 05.7 88 43	147.9	20 39.2 89 43	148.2	20 12.6 89 42	148.4	19 46.0 89 42	148.7	19 19.4 89 42	148.9	18 52.7 89 42	149.1	18 26.1 89 41	149.4	3
4	21 06.3 88 44	146.8	20 39.9 88 44	147.1	20 13.6 88 44	147.3	19 47.2 88 43	147.6	19 20.8 88 43	147.8	18 54.3 88 43	148.1	18 27.9 88 42	148.3	18 01.4 88 42	148.6	4
35	20 39.8 87 45	145.9	20 13.6 87 45	146.2	19 47.4 87 45	146.5	19 21.2 87 44	146.7	18 54.9 87 44	147.0	18 28.7 88 44	147.2	18 02.4 88 43	147.5	17 36.1 88 43	147.7	35
6	20 12.6 87 46	145.1	19 46.6 87 46	145.4	19 20.6 87 46	145.6	18 54.6 87 45	146.2	18 28.5 87 45	146.2	18 02.5 87 45	146.4	17 36.4 87 44	146.7	17 10.2 87 44	146.9	6
7	19 44.9 86 47	144.3	19 19.1 86 47	144.5	18 53.3 86 46	144.8	18 27.4 86 46	145.1	18 01.6 86 46	145.3	17 35.7 86 46	145.6	17 09.7 86 45	145.9	16 43.8 86 45	146.1	7
8	19 16.7 85 48	143.4	18 51.0 85 48	143.7	18 25.4 86 47	144.0	17 59.7 86 47	144.2	17 34.0 86 47	144.5	17 08.3 86 46	144.8	16 42.6 86 46	145.1	16 16.8 86 46	145.3	8
9	18 47.8 85 49	142.6	18 22.4 85 49	142.9	17 56.9 85 48	143.2	17 31.4 85 48	143.4	17 05.9 85 48	143.7	16 40.4 85 47	144.0	16 14.9 85 47	144.3	15 49.3 85 47	144.5	9
40	18 18.5 84 50	141.8	17 53.2 84 50	142.1	17 27.9 84 49	142.4	17 02.6 84 49	142.6	16 37.3 84 49	142.9	16 12.0 85 48	143.2	15 46.6 85 48	143.5	15 21.2 85 48	143.8	40
1	17 48.6 83 51	141.0	17 23.5 84 50	141.3	16 58.4 84 50	141.6	16 33.3 84 50	141.8	16 08.2 84 50	142.1	15 43.0 84 49	142.4	15 17.8 84 49	142.7	14 52.6 84 49	143.0	1
2	17 18.1 83 52	140.2	16 53.3 83 51	140.5	16 28.4 83 51	140.8	16 03.4 83 51	141.1	15 38.5 83 50	141.4	15 13.5 83 50	141.6	14 48.5 83 50	141.9	14 23.5 83 49	142.2	2
3	16 47.2 82 52	139.4	16 22.5 82 52	139.7	15 57.8 82 52	140.0	15 33.1 82 51	140.3	15 08.3 82 51	140.6	14 43.5 83 51	140.9	14 18.7 83 50	141.2	13 53.9 83 50	141.5	3
4	16 15.8 82 53	138.6	15 51.3 82 53	138.9	15 26.7 82 53	139.2	15 02.2 82 52	139.5	14 37.6 82 52	139.8	14 13.0 82 52	140.1	13 48.4 82 51	140.4	13 23.8 82 51	140.7	4
45	15 43.8 81 54	137.8	15 19.5 81 54	138.2	14 55.2 81 53	138.5	14 30.9 81 53	138.8	14 06.5 81 53	139.1	13 42.1 81 52	139.4	13 17.7 81 52	139.7	12 53.2 82 52	140.0	45
6	15 11.5 80 55	137.1	14 47.3 80 54	137.4	14 23.2 81 54	137.7	13 59.0 81 54	138.0	13 34.8 81 54	138.3	13 10.6 81 53	138.6	12 46.4 81 53	138.9	12 22.1 81 53	139.2	6
7	14 38.6 80 56	136.3	14 14.7 80 55	136.6	13 50.7 80 55	136.9	13 26.7 80 55	137.3	13 02.7 80 54	137.6	12 38.7 80 54	137.9	12 14.7 80 54	138.2	11 50.6 80 53	138.5	7
8	14 05.3 79 56	135.6	13 41.5 79 56	135.9	13 17.8 79 56	136.2	12 54.0 79 55	136.5	12 30.2 79 55	136.8	12 06.3 79 55	137.1	11 42.5 80 54	137.5	11 18.6 80 54	137.8	8
9	13 31.5 78 57	134.8	13 08.0 79 57	135.2	12 44.4 79 56	135.5	12 20.8 79 56	135.8	11 57.2 79 56	136.1	11 33.5 79 55	136.4	11 09.9 79 55	136.7	10 46.2 79 55	137.0	9
50	12 57.3 78 58	134.1	12 34.0 78 57	134.4	12 10.6 78 57	134.7	11 47.2 78 57	135.1	11 23.7 78 56	135.4	11 00.3 78 56	135.7	10 36.8 78 56	136.0	10 13.3 78 56	136.3	50
1	12 22.7 77 58	133.4	11 59.5 77 58	133.7	11 36.3 77 58	134.0	11 13.1 77 57	134.3	10 49.9 78 57	134.7	10 26.6 78 57	135.0	10 03.3 78 56	135.3	9 40.0 78 56	135.6	1
2	11 47.7 77 59	132.7	11 24.7 77 59	133.0	11 01.7 77 58	133.3	10 38.6 77 58	133.6	10 15.6 77 58	134.0	9 52.5 77 58	134.3	9 29.4 77 57	134.6	9 06.3 77 57	134.9	2
3	11 12.2 76 60	131.9	10 49.4 76 60	132.3	10 26.5 76 59	132.6	10 03.8 76 59	132.9	9 40.9 76 59	133.3	9 18.0 76 58	133.6	8 55.1 76 58	133.9	8 32.2 76 58	134.2	3
4	10 36.4 75 60	131.2	10 13.8 75 60	131.6	9 51.1 75 60	131.9	9 28.5 76 59	132.2	9 05.8 76 59	132.6	8 43.1 76 59	132.9	8 20.4 76 58	133.2	7 57.7 76 58	133.6	4
55	10 00.2 75 61	130.5	9 37.7 75 61	130.9	9 15.3 75 60	131.2	8 52.8 75 60	131.6	8 30.3 75 60	131.9	8 07.8 75 59	132.2	7 45.3 75 59	132.6	7 22.7 75 59	132.9	55
6	9 23.6 74 62	129.9	9 01.3 74 61	130.2	8 39.0 74 61	130.5	8 16.8 74 61	130.9	7 54.5 74 60	131.2	7 32.1 74 60	131.5	7 09.8 74 60	131.9	6 47.4 75 59	132.2	6
7	8 46.6 74 62	129.2	8 24.5 74 62	129.5	8 02.4 74 62	129.9	7 40.3 74 61	130.2	7 18.2 74 61	130.5	6 56.1 74 61	130.9	6 33.9 74 60	131.2	6 11.8 74 60	131.6	7
8	8 09.3 73 63	128.5	7 47.4 73 62	128.8	7 25.5 73 62	129.2	7 03.6 73 62	129.5	6 41.6 73 62	129.9	6 19.7 73 61	130.2	5 57.7 73 61	130.6	5 35.7 73 61	130.9	8
9	7 31.6 72 63	127.8	7 09.9 72 63	128.2	6 48.2 72 63	128.5	6 26.4 73 62	128.9	6 04.7 73 62	129.2	5 42.9 73 62	129.6					9
60	6 53.6 72 64	127.2	6 32.0 72 64	127.5	6 10.5 72 63	127.9	5 48.9 72 63	128.2	5 27.4 72 63	128.6	5 05.8 72 62	128.9					60
1	6 15.2 71 64	126.5	5 53.9 71 64	126.9	5 32.5 71 64	127.2	5 11.1 71 64	127.6									1
2	5 36.5 71 65	125.9	5 15.4 71 65	126.2													2

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00' Alt.	Az.	24° 30' Alt.	Az.	25° 00' Alt.	Az.	25° 30' Alt.	Az.	26° 00' Alt.	Az.	26° 30' Alt.	Az.	27° 00' Alt.	Az.	27° 30' Alt.	Az.	H.A.
°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	° ' Δd Δt	°	°
91	13 25.1 57 75	69.9	13 42.2 57 75	69.5	13 59.2 57 74	69.0	14 16.3 57 74	68.6	14 33.2 57 74	68.2	14 50.2 56 74	67.8	15 07.0 56 74	67.3	15 23.9 56 73	66.9	91
2	12 40.1 58 75	69.4	12 57.4 57 74	68.9	13 14.6 57 74	68.5	13 31.7 57 74	68.1	13 48.8 57 74	67.7	14 05.9 57 74	67.2	14 22.9 57 73	66.8	14 39.9 57 73	66.4	2
3	11 55.4 58 74	68.8	12 12.7 58 74	68.4	12 30.1 58 74	68.0	12 47.3 58 74	67.6	13 04.6 57 74	67.1	13 21.8 57 73	66.7	13 39.0 57 73	66.3	13 56.1 57 73	65.9	3
4	11 10.8 58 74	68.3	11 28.3 58 74	67.9	11 45.7 58 74	67.4	12 03.1 58 73	67.0	12 20.5 58 73	66.6	12 37.9 58 73	66.2	12 55.2 58 73	65.8	13 12.4 57 72	65.4	4
95	10 26.4 59 74	67.7	10 44.0 59 74	67.3	11 01.6 59 73	66.9	11 19.1 58 73	66.5	11 36.6 58 73	66.1	11 54.1 58 73	65.7	12 11.6 58 72	65.2	12 29.0 58 72	64.8	95
6	9 42.1 59 74	67.2	9 59.9 59 73	66.8	10 17.6 59 73	66.4	10 35.3 59 73	65.9	10 52.9 59 72	65.5	11 10.5 59 72	65.1	11 28.1 59 72	64.7	11 45.7 58 72	64.3	6
7	8 58.0 60 73	66.6	9 15.9 60 73	66.2	9 33.8 60 73	65.8	9 51.6 59 72	65.4	10 09.4 59 72	65.0	10 27.2 59 72	64.6	10 44.9 59 72	64.2	11 02.6 59 71	63.8	7
8	8 14.1 60 73	66.1	8 32.1 60 73	65.7	8 50.1 60 72	65.3	9 08.0 60 72	64.9	9 26.1 60 72	64.5	9 44.0 60 72	64.0	10 01.9 59 71	63.6	10 19.7 59 71	63.2	8
9	7 30.4 61 72	65.5	7 48.6 61 72	65.1	8 06.7 60 72	64.7	8 24.8 60 72	64.3	8 42.9 60 72	63.9	9 01.0 60 71	63.5	9 19.0 60 71	63.1	9 37.0 60 71	62.7	9
100	6 46.9 61 72	65.0	7 05.2 61 72	64.6	7 23.5 61 72	64.2	7 41.8 61 71	63.8	8 00.0 61 71	63.4	8 18.2 61 71	63.0	8 36.4 61 70	62.6	8 54.6 61 70	62.2	100
1	6 03.6 62 72	64.4	6 22.0 61 72	64.0	6 40.5 61 71	63.6	6 58.9 61 71	63.2	7 17.3 61 71	62.8	7 35.6 61 71	62.4	7 54.0 61 70	62.0	8 12.3 61 70	61.6	1
2	5 20.5 62 72	63.8	5 39.1 62 71	63.4	5 57.7 62 71	63.0	6 16.2 62 71	62.6	6 34.8 62 70	62.2	6 53.3 62 70	61.7	7 11.8 62 70	61.5	7 30.3 62 70	61.1	2
3					5 15.1 62 71	62.5	5 33.8 62 70	62.1	5 52.5 62 70	61.7	6 11.1 62 70	61.3	6 29.8 62 70	60.9	6 48.4 62 69	60.5	3
4									5 10.4 63 70	61.1	5 29.2 63 69	60.7	5 48.0 63 69	60.3	6 06.9 63 69	59.9	4
105											5 06.5 63 69	59.8	5 25.5 63 69	59.4	105

Lat. 37°

H.A.	28°00' Alt	Δd Δt	Az	28°30' Alt	Δd Δt	Az	29°00' Alt	Δd Δt	Az	30°00' Alt	Δd Δt	Az	32°00' Alt	Δd Δt	Az	34°00' Alt	Δd Δt	Az	34°30' Alt	Δd Δt	Az	35°30' Alt	Δd Δt	Az	H.A.
00	81 00.0	1.0 04	180.0	81 30.0	1.0 04	180.0	82 00.0	1.0 04	180.0	83 00.0	1.0 05	180.0	85 00.0	1.0 07	180.0	87 00.0	1.0 11	180.0	87 30.0	1.0 13	180.0	88 30.0	1.0 20	180.0	00
1	80 57.6	1.0 12	174.4	81 27.4	1.0 13	174.1	81 57.4	1.0 13	173.7	82 57.0	99 15	172.9	84 56.0	99 20	170.4	86 53.5	98 35	164.3	87 22.3	95 35	161.7	88 15.8	89 48	151.1	1
2	80 50.6	98 19	168.8	81 20.1	98 20	168.3	81 49.6	98 21	167.6	82 48.3	97 24	166.0	84 44.1	95 31	161.2	86 35.2	88 45	150.9	87 01.2	84 51	146.4	87 47.8	74 62	132.3	2
3	80 39.2	97 26	163.5	81 08.1	96 27	162.6	81 36.9	96 29	161.7	82 34.1	95 32	159.5	84 25.4	90 41	152.8	86 07.9	78 56	140.0	86 30.6	73 61	134.9	87 09.2	54 71	120.9	3
4	80 23.5	94 33	158.3	80 51.7	94 34	157.3	81 19.7	93 36	156.1	82 14.9	91 39	153.4	84 00.8	85 49	145.4	85 34.4	69 63	131.5	85 54.2	63 67	126.4	86 26.6	44 74	113.7	4
05	80 03.9	92 38	153.5	80 31.2	91 40	152.3	80 58.3	90 42	150.9	81 51.3	87 46	147.8	83 31.4	79 55	139.1	84 56.7	61 68	124.9	85 14.1	55 71	120.2	85 41.9	37 77	108.9	05
6	79 40.9	88 44	149.0	80 07.2	87 45	147.6	80 33.3	86 47	146.1	81 24.0	83 51	142.7	82 58.3	73 60	133.6	84 16.2	55 71	119.8	84 31.7	48 73	115.4	84 56.1	33 77	105.4	6
7	79 14.7	85 48	144.8	79 40.1	84 50	143.3	80 05.0	83 51	141.8	80 53.5	79 55	138.2	82 22.2	68 64	128.9	83 33.7	50 73	115.7	83 47.1	43 75	111.7	84 09.6	29 78	102.8	7
8	78 45.7	82 52	140.9	79 10.1	81 54	139.4	79 34.1	79 56	137.8	80 20.3	75 59	134.1	81 43.9	63 67	124.9	82 50.0	45 75	112.4	83 02.7	40 76	108.7	83 22.7	27 79	100.7	8
9	78 14.3	79 56	137.3	78 37.8	77 57	135.8	79 00.7	76 59	134.1	79 44.8	71 62	130.4	81 03.7	59 69	121.1	82 05.2	42 76	109.6	82 17.0	37 77	106.2	82 35.5	25 79	99.0	9
10	77 40.9	76 59	134.1	78 03.4	74 60	132.5	78 25.4	72 62	130.8	79 07.5	68 65	127.2	80 22.1	56 71	118.3	81 19.8	39 77	107.3	81 30.8	34 77	104.2	81 48.1	23 79	97.5	10
1	77 05.6	73 62	131.0	77 27.2	71 63	129.5	77 48.3	69 64	127.8	78 28.5	65 67	124.2	79 39.4	53 73	115.5	80 33.7	37 77	105.3	80 44.1	32 78	102.4	81 00.5	21 80	96.3	1
2	76 28.7	70 64	128.3	76 49.5	69 65	126.7	77 09.6	66 66	125.1	77 48.3	62 69	121.5	78 55.8	50 74	113.0	79 47.3	35 78	103.5	79 57.2	31 79	100.8	80 12.8	21 80	95.2	2
3	75 50.4	68 66	125.7	76 10.5	66 67	124.2	76 29.9	64 68	122.6	77 06.9	59 70	119.1	78 11.5	48 75	111.2	79 00.6	33 78	102.0	79 10.0	29 79	99.5	79 25.1	21 80	94.3	3
4	75 10.9	66 68	123.4	75 30.3	64 69	121.9	75 49.0	61 70	120.3	76 24.6	57 72	116.9	77 26.5	46 76	109.3	78 13.6	32 79	100.6	78 22.7	28 79	98.2	78 37.3	20 80	93.4	4
15	74 30.4	63 69	121.2	74 49.1	61 70	119.7	75 07.2	59 71	118.2	75 41.5	53 74	113.1	76 41.1	44 76	107.6	77 26.4	31 79	99.4	77 35.2	27 79	97.1	77 49.4	20 80	92.6	15
6	73 49.0	61 70	119.2	74 07.1	59 71	117.7	74 24.6	57 72	116.2	74 57.7	52 74	111.9	75 55.2	43 77	106.1	76 39.0	30 79	98.2	76 47.6	27 79	96.1	77 01.5	20 80	91.8	6
7	73 06.7	59 71	117.3	73 24.3	58 72	115.9	73 41.3	56 73	114.4	74 13.4	51 75	110.8	75 09.0	41 77	104.7	75 51.6	29 79	97.2	75 59.9	26 80	95.2	76 13.6	20 80	91.1	7
8	72 23.8	58 72	115.5	72 40.9	56 73	114.2	72 57.4	54 74	112.8	73 28.5	50 75	109.6	74 22.5	40 78	103.3	75 04.0	29 79	96.2	75 12.2	26 80	94.3	75 25.7	19 80	90.5	8
9	71 40.3	56 73	113.7	71 56.9	54 74	112.6	72 12.9	52 75	111.2	72 43.4	48 76	108.3	73 35.5	39 78	102.1	74 16.3	28 80	95.3	74 24.4	26 80	93.5	74 37.8	19 80	89.9	9
20	70 56.2	55 74	112.1	71 12.4	53 75	111.1	71 28.0	51 76	109.8	71 57.5	47 77	107.0	72 48.8	38 79	101.0	73 28.6	28 80	94.5	73 36.5	25 80	92.8	73 49.9	19 80	89.3	20
1	70 11.7	54 75	110.9	70 27.5	52 76	109.7	70 42.8	50 76	108.4	71 11.6	46 77	105.7	72 01.7	37 79	99.9	72 40.8	28 80	93.7	72 48.6	25 80	92.1	73 02.0	20 80	88.8	1
2	69 26.8	52 76	109.6	69 42.2	51 76	108.4	69 57.1	49 76	107.1	70 25.3	45 78	104.5	71 14.4	37 79	98.9	71 52.9	27 80	93.0	72 00.7	25 80	91.4	72 14.1	20 80	88.2	2
3	68 41.4	51 76	108.3	68 56.6	50 77	107.1	69 11.2	48 77	105.9	69 38.8	44 78	103.4	70 27.0	36 79	98.0	71 05.0	27 80	92.2	71 12.8	25 80	90.7	71 26.2	20 80	87.7	3
4	67 55.8	50 77	106.9	68 10.6	49 77	105.9	68 25.0	47 78	104.8	68 52.1	43 78	102.3	69 39.5	36 79	97.1	70 17.2	27 80	91.6	70 24.9	26 80	90.1	70 38.3	20 80	87.2	4
25	67 09.9	49 77	106.0	67 24.4	48 77	104.8	67 38.5	46 78	103.7	68 05.2	43 78	101.3	68 52.0	35 79	96.3	69 29.3	27 80	90.9	69 37.0	25 80	89.5	69 50.5	20 80	86.7	25
6	66 23.7	49 77	104.9	66 38.0	47 78	103.8	66 51.8	45 78	102.6	67 18.1	42 79	100.3	68 04.3	35 80	95.5	68 41.3	27 80	90.3	68 49.1	25 80	89.0	69 02.6	20 80	86.2	6
7	65 37.2	48 78	103.8	65 51.3	46 78	102.7	66 05.0	45 78	101.6	66 30.9	42 79	99.4	67 16.6	35 80	94.7	67 53.4	27 80	89.7	68 01.2	25 80	88.4	68 14.8	21 80	85.8	7
8	64 50.6	47 78	102.8	65 04.5	46 78	101.7	65 18.0	44 79	100.7	65 43.5	41 79	98.5	66 28.8	34 80	93.9	67 05.5	27 80	89.1	67 13.3	25 80	87.9	67 27.1	21 80	85.3	8
9	64 03.8	47 78	101.8	64 17.5	45 79	100.8	64 30.8	44 79	99.8	64 56.1	41 79	97.7	65 40.9	34 80	93.2	66 17.6	27 80	88.5	66 25.4	25 80	87.3	66 39.3	21 80	84.9	9
30	63 16.8	46 78	100.9	63 30.4	45 79	99.9	63 43.6	43 79	98.9	64 08.6	40 79	96.9	64 53.1	34 80	92.5	65 29.7	27 80	88.0	65 37.5	25 80	86.8	65 51.6	22 79	84.5	30
1	62 29.7	45 79	100.0	62 43.1	44 79	99.1	62 56.2	43 79	98.1	63 21.0	40 79	96.1	64 05.2	34 80	91.9	64 41.8	27 80	87.5	64 49.7	25 80	86.3	65 03.9	22 79	84.0	1
2	61 42.4	45 79	99.2	61 55.8	44 79	98.2	62 08.7	42 79	97.3	62 33.3	40 80	95.3	63 17.3	34 80	91.2	63 54.0	27 80	86.9	64 01.9	26 80	85.8	64 16.3	22 79	83.6	2
3	60 55.1	45 79	98.4	61 08.4	44 79	97.4	61 21.1	42 79	96.5	61 45.5	40 80	94.6	62 29.4	34 80	90.6	63 06.1	27 80	86.4	63 14.1	26 80	85.4	63 28.7	23 79	83.2	3
4	60 07.6	44 79	97.6	60 20.7	43 79	96.7	60 33.5	42 80	95.7	60 57.7	39 80	93.9	61 41.5	34 80	90.0	62 18.3	28 80	85.9	62 26.4	26 80	84.9	62 41.1	23 79	82.8	4
35	59 20.1	44 79	96.8	59 33.1	43 79	95.9	59 45.7	42 80	95.0	60 09.9	39 80	93.2	60 53.6	34 80	89.4	61 30.5	28 80	85.4	61 38.7	26 79	84.4	61 53.6	23 79	82.4	35
6	58 32.5	44 80	96.0	58 45.4	43 80	95.2	58 58.0	41 80	94.3	59 22.1	39 80	92.5	60 05.6	34 80	88.8	60 42.8	28 80	85.0	60 51.0	27 79	84.0	61 06.1	24 79	82.0	6
7	57 44.8	43 80	95.3	57 57.7	42 80	94.5	58 10.2	41 80	93.6	58 34.2	39 80	91.9	59 17.7	34 80	88.2	59 55.1	28 79	84.5	60 03.4	27 79	83.5	60 18.7	24 79	81.6	7
8	56 57.1	43 80	94.6	57 09.9	42 80	93.8	57 22.3	41 80	92.9	57 46.3	39 80	91.2	58 29.9	34 80	87.7	59 07.4	29 79	84.0	59 15.8	27 79	83.1	59 31.3	25 79	81.2	8
9	56 09.3	43 80	93.9	56 22.0	42 80	93.1	56 34.5	41 80	92.3	56 58.4	39 80	90.6	57 42.0	34 80	87.1	58 19.7	29 79	83.6	58 28.2	28 79	82.6	58 44.0	25 79	80.8	9
40	55 21.4	43 80	93.2	55 34.2	42 80	92.4	55 46.6	41 80	91.6	56 10.4	39 80	90.0	56 54.1	34 80	86.6	57 32.2	29 79	83.1	57 40.7	28 79	82.2	57 56.7	25 79	80.4	40
1	54 33.6	43 80	92.6	54 46.3	42 80	91.8	54 58.7	41 80	91.0	55 22.5	39 80	89.4	56 06.3	34 80	86.1	56 44.6	30 79	82.7	56 53.3	28 79	81.8	57 09.5	26 79	80.0	1
2	53 45.7	43 80	91.9	53 58.4	42 80	91.2	54 10.8	41 80	90.4	54 34.6	41 80	88.8	55 18.5	34 80	85.6	55 57.1	30 79	82.2	56 05.9	29 79	81.4	56 22.3	26 79	79.6	2
3	52 57.8	43 80	91.3	53 10.5	42 80	90.5	53 22.8	41 80	89.8	53 46.7	39 80	88.2	54 30.8	34 80	85.0	55 09.7	30 79	81.8	55 18.5	29 79	80.9	55 35.2	27 78	79.2	3
4	52 09.9	43 80	90.7	52 22.6	42 80	89.9	52 34.9	41 80	89.2	52 58.8	39 80	87.7	53 43.0	35 79	84.6	54 22.3	31 79	81.3	54 31.2	29 79	80.5	54 48.2	27 78	78.9	4
45	51 22.0	43 80	90.1	51 34.6	42 80	89.3	51 47.0	41 80	88.6	52 11.0	39 80	87.1	52 55.4	35 79	84.1	53 34.9	31 79	80.9	53 44.0	30 79	80.1	54 01.2	28 78	78.5	45
6	50 34.1	43 80	89.5	50 46.7	42 80	88.8	50 59.1	41 80	88.0	51 23.1	39 80	86.6	52 07.7	35 79	83.6	52 47.6	31 79	80.5	52 56.8	30 79	79.7	53 14.3	28 78	78.1	6
7	49 46.1	43 80	88.9	49 58.8	42 80	88.2	50 11.2	41 80	87.5	50 35.3	39 80	86.0	51 20.1	35 79	83.1	52 00.4	32 79	80.1	52 09.7	31 78	79.3	52 27.4	28 78	77.7	7
8	48 58.2	43 80	88.3	49 10.9	42 80	87.6	49 23.3	41 80	86.9	49 47.5	40 80	85.5	50 32.6	36 79	82.6	51 13.2	32 78	79.6	51 22.7	31 78	78.9	51 40.6	29 78	77.3	8
9	48 10.4	43 80	87.7	48 23.1	42 80	87.1	48 35.6	41 80	86.4	48 59.8	40 80	85.0	49 45.1	36 79	82.1	50 26.1	32 78	79.2	50 35.7	31 78	78.5	50 53.9	29 78	77.0	9
50	47 22.5	43 80	87.2	47 35.2	42 80	86.5	47 47.7	41 80	85.8	48 12.0	40 79	84.5	48 57.7	36 79	81.7	49 39.1	33 78	78.8	49 48.8	32 78	78.1	50 07.3	30 78	76.6	50
1	46 34.6	43 80	86.6	46 47.4	42 80	86.0	47 00.0	41 80	85.3	47 24.4	40 79	84.0	48 10.3	37 79	81.2	48 52.1	33 78	78.4	49 01.9	32 78	77.6	49 20.7	30 78	76.2	1
2	45 46.8	43 80	86.1	45 59.6	42 80	85.4	46 12.2	42 80	84.8	46 36.7	40 79	83.4	47 22.9	37 79	80.7	48 05.2	34 78	78.0	48 15.1	33 78	77.2	48 34.2	31 77	75.8	2
3	44 59.0	43 80	85.5	45 11.9	42 79	84.9	45 24.5	42 79	84.2	45 49.2	40 79	82.9	46 35.7	37 79	80.3	47 18.4	34 78	77.5	47 28.4	33 78	76.8	47 47.6	31 77	75.4	3
4	44 11.3	43 80	85.0	44 24.2	43 79	84.4	44 36.9	42 79	83.7	45 01.6	41 79	82.4	45 48.5	38 79	79.8	46 31.6	34 78	77.1	46 41.8	34 78	76.4	47 01.5	32 77	75.1	4
55	43 23.6	44 79	84.5	43 36.5	43 79	83.8	43 49.3	42 79	83.2	44 14.2	41 79	81.9	45 01.4	38 78	79.4	45 45.0	35 78	76.7	45 55.3	34 77	76.0	46 15.2	32 77	74.7	55
6	42 35.9	44 79	83.9	42 48.9	43 79	83.3	43 01.7	42 79	82.7	43 26.7	41 79	81.5	44 14.3	38 78	78.9	44 58.4	35 78	76.3	45 08.8	34 77	75.6	45 29.0	33 77	74.3	6
7	41 48.3	44 79	83.4	42 01.3	43 79	82.8	42 14.2	43 79	82.2	42 39.4	41 79	81.0	43 27.3	39 78	78.5	44 11.9	36 77	75.9	44 22.4	35 77	75.2	44 42.9	33 77	73.9	7
8	41 00.7	44 79	82.9	41 13.8	43 79	82.3	41 26.8	43 79	81.7	41 52.1	42 79	80.5	42 40.4	39 78	78.0	43 25.4	36 77	75.5	43 36.2	35 77	74.8	43 56.9	34 77	73.5	8
9	40 13.2	44 79	82.4	40 26.4	44 79	81.8	40 39.4	43 79	81.2	41 04.9	42 79	80.0	41 53.6	39 78	77.6	42 39.1	37 77	75.1	42 50.0	36 77	74.4	43 11.0	34 76	73.1	9
60	39 25.7	45 79	81.9	39 39.0	44 79	81.3	39 52.1	43 79	80.7	40 17.7	42 78	79.5	41 06.8	40 78	77.1	41 52.8	37 77	74.6	42 03.8	36 77	74.0	42 25.2	35 76	72.8	60
1	38 38.3	45 79	81.4	38 51.6	44 79	80.8	39 04.8	44 79	80.2	39 30.6	42 78	79.0	40 20.1	40 78	76.7	41 06.7	37 77	74.2	41 17.8	37 77	73.6	41 39.5	35 76	72.4	1
2	37 50.9	45 79	80.9	38 04.4	44 79	80.3	38 17.6	44 78	79.7	38 43.6	43 78	78.6	39 33.3	40 78	76.3	40 20.6	38 77	73.8	40 31.9	37 76	73.2	40 53.9	36 76	72.0	2
3	37 03.7	45 79	80.4	37 17.2	45 79	79.8	37 30.5	44 78	79.2	37 56.7	43 78	78.1	38 47.1	41 77	75.8	39 34.6	38 76	73.4	39 46.1	38 76	72.8	40 08.4	36 76	71.6	3
4	36 16.5	46 79	79.9	36 30.0	45 79	79.3	36 43.5	44 78	78.7	37 09.9	43 78	77.6	38 00.7	41 77	75.3	38 48.8	39 76	73.0	39 00.3	38 76	72.4	39 23.0	37 76	71.2	4
65	35 29.3	46 78	79.4	35 43.0	45 78	78.8	35 56.5	45 78	78.3	36 23.1	44 77	77.1	37 14.4	42 77	74.9	38 03.0	39 76	72.6	38 14.7	39 76	72.0	38 37.6	38 75	70.8	65
6	34 42.3	46 78	78.9	34 56.0	46 78	78.3	35 09.6	45 78	77.8	35 36.4	44 78	76.7	36 28.1	42 77	74.4	37 17.3	40 76	72.2	37 29.2	39 76	71.6	37 52.4	38 75	70.4	6
7	33 55.3	46 78	78.4	34 09.2	46 78	77.8	34 22.9	46 78	77.3	34 49.8	44 78	76.2	35 42.0	42 77	74.0	36 31.8	40 76	71.7	36 43.8	40 76	71.2	37 07.4	38 75	70.0	7
8	33 08.4	47 78	77.9	33 22.4	46 78	77.3	33 36.2	46 78	76.8	34 03.2	45 77	75.7	34 56.0	43 76	73.6	35 46.3	41 76	71.3	35 58.5	40 75	70.8	36 22.4	39 75	69.6	8
9	32 21.6	47 78	77.4	32 35.6	47 78	76.9	32 49.5	46 78	76.3	33 17.0	45 77	75.3	34 10.1	43 76	73.1	35 01.0	41 75	70.9	35 13.3	41 75	70.4	35 37.5	40 75	69.2	9
70	31 34.9	47 78	76.9	31 49.0	47 78	76.4	32 03.0	46 77	75.9	32 30.7	46 77	74.8	33 24.3	44 76	72.7	34 15.7	42 75	70.5	34 28.2	41 75	69.9	34 52.8	40 74	68.8	70
1	30 48.3	48 78	76.4	31 02.5	47 77	75.9	31 16.6	47 77	75.4	31 44.5	46 77	74.3	32 38.6	44 76	72.2	33 30.6	42 75	70.1	33 43.3	42 75	69.5	34 08.1	41 74	68.4	1
2	30 01.7	48 77	75.9	30 16.1	48 77	75.4	30 30.3	47 77	74.9	30 58.4	46 77	73.9	31 53.1	45 76	71.8	32 45.6	43 75	69.7	32 58.4	43 75	69.1	33 23.6	42 74	68.0	2
3	29 15.3	48 77	75.4	29 29.8	48 77	74.9	29 44.1	48 77	74.4	30 12.4	47 76	73.4	31 07.6	45 75	71.3	32 00.8	43 75	69.2	32 13.7	43 74	68.7	32 39.3	42 74	67.6	3
4	28 29.0	49 77	74.9	28 43.5	48 77	74.4	28 58.0	48 77	73.9	29 26.5	47 76	72.9	30 22.3	45 75	70.9	31 16.0	44 74	68.8	31 29.2	44 74	68.3	31 55.0	43 74	67.2	4
75	27 42.8	49 77	74.4	27 57.4	49 77	74.0	28 12.0	48 76	73.5	28 40.8	48 76	72.5	29 37.0	46 75	70.4	30 31.4	45 74	68.4	30 44.7	44 74	67.9	31 10.9	43 73	66.8	75
6	26 56.7	49 77	74.0	27 11.4	49 76	73.5	27 26.1	49 76	73.0	27 55.2	48 76	72.0	28 52.0	46 75	69.9	29 46.9	45 74	67.9	30 00.4	44 73	67.4	30 26.9	44 73	66.4	6
7	26 10.7	50 76	73.5	26 25.6	50 76	73.0	26 40.4	49 76	72.5	27 09.7	48 76	71.5	28 07.0	47 75	69.5	29 02.6	45 74	67.5	29 16.2	45 73	67.0	29 43.1	44 73	66.0	7
8	25 24.8	50 76	73.0	25 39.8	50 76	72.5	25 54.7	50 76	72.0	26 24.3	49 75	71.0	27 22.2	47 74	69.1	28 18.4	46 73	67.1	28 32.5	46 73	66.6	28 59.4	46 73	65.6	8
9	24 39.0	51 76	72.5	24 54.2	50 76	72.0	25 09.2	50 76	71.5	25 39.0	49 75	70.6	26 37.5	48 74	68.6	27 34.3	47 73	66.6	27 48.3	46 73	66.1	28 15.8	46 72	65.1	9
80	23 53.4	51 76	72.0	24 08.7	51 76	71.5	24 23.8	50 75	71.0	24 53.9	50 75	70.1	25 52.9	49 74	68.2	26 50.4	47 73	66.2	27 04.5	47 73	65.7	27 32.4	46 72	64.7	80
1	23 07.9	52 76	71.5	23 23.3	51 75	71.0	23 38.6	51 75	70.6	24 08.9	50 75	69.6	25 08.5	49 74	67.7	26 06.6	47 73	65.8	26 20.9	47 72	65.3	26 49.2	47 72	64.3	1
2	22 22.5	52 75	71.0	22 38.0	52 75	70.5	22 53.5	51 75	70.1	23 24.1	51 74	69.1	24 24.3	50 74	67.3	25 23.0	48 72	65.3	25 37.5	48 72	64.8	26 06.1	47 72	63.9	2
3	21 37.3	52 75	70.5	21 52.9	52 75	70.0	22 08.5	52 75	69.6	22 39.4	51 74	68.7	23 40.1	50 73	66.8	24 39.6	49 72	64.9	24 54.2	49 72	64.4	25 23.2	48 71	63.4	3
4	20 52.2	53 75	70.0	21 07.9	52 75	69.6	21 23.6	52 74	69.1	21 54.8	52 74	68.2	22 56.2	51 73	66.3	23 56.2	49 72	64.4	24 11.0	49 72	64.0	24 40.4	49 71	63.0	4
85	20 07.2	53 75	69.5	20 23.1	53 74	69.1	20 38.9	53 74	68.6	21 10.4	52 74	67.7	22 12.4	51 73	65.9	23 13.1	50 72	64.0	23 28.1	50 71	63.5	23 57.8	49 71	62.6	85
6	19 22.4	54 74	69.0	19 38.4	53 74	68.6	19 54.4	53 74	68.1	20 26.1	52 73	67.2	21 28.7	52 73	65.5	22 30.1	51 71	63.5	22 45.3	50 71	63.1	23 15.3	50 70	62.1	6
7	18 37.7	54 74	68.5	18 53.9	54 74	68.1	19 10.0	53 74	67.6	19 42.0	53 73	66.7	20 45.3	52 72	65.0	21 47.3	51 71	63.1	22 02.6	51 71	62.6	22 33.1	50 70	61.7	7
8	17 53.2	54 74	68.0	18 09.5	54 74	67.6	18 25.8	54 73	67.1	18 58.1	54 73	66.2	20 01.9	53 72	64.4	21 04.7	52 71	62.6	21 20.2	52 70	62.2	21 51.0	51 70	61.2	8
9	17 08.9	55 74	67.5	17 25.3	55 73	67.1	17 41.7	55 73	66.6	18 14.3	54 73	65.7	19 18.8	53 72	64.0	20 22.2	52 70	62.2	20 37.9	52 70	61.7	21 09.0	52 69	60.8	9
90	16 24.7	55 73	67.0	16 41.3	55 73	66.6	16 57.8	55 73	66.1	17 30.7	55 72	65.2	18 35.8	54 71	63.5	19 39.9	53 70	61.7	19 55.8	53 70	61.2	20 27.3	52 69	60.3	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	28° 00' Alt. °' Δd Δt / Az. °	28° 30' Alt. °' Δd Δt / Az. °	29° 00' Alt. °' Δd Δt / Az. °	30° 00' Alt. °' Δd Δt / Az. °	32° 00' Alt. °' Δd Δt / Az. °	34° 00' Alt. °' Δd Δt / Az. °	34° 30' Alt. °' Δd Δt / Az. °	35° 30' Alt. °' Δd Δt / Az. °	H.A.
00	25 00.0 1.00 01 180.0	24 30.0 1.00 01 180.0	24 00.0 1.00 01 180.0	23 00.0 1.00 01 180.0	21 00.0 1.00 01 180.0	19 00.0 1.00 01 180.0	18 30.0 1.00 01 180.0	17 30.0 1.00 01 180.0	00
1	24 59.6 1.00 02 179.0	24 29.6 1.00 02 179.0	23 59.6 1.00 02 179.0	22 59.6 1.00 02 179.1	20 59.6 1.00 02 179.1	18 59.6 1.00 02 179.1	18 29.6 1.00 02 179.1	17 29.6 1.00 02 179.1	1
2	24 58.4 1.00 03 178.1	24 28.4 1.00 03 178.1	23 58.4 1.00 03 178.1	22 58.4 1.00 03 178.1	20 58.5 1.00 03 178.2	18 58.5 1.00 03 178.2	18 28.5 1.00 03 178.3	17 28.6 1.00 03 178.3	2
3	24 56.3 1.00 05 177.1	24 26.4 1.00 05 177.1	23 56.4 1.00 05 177.1	22 56.5 1.00 05 177.2	20 56.6 1.00 04 177.3	18 56.7 1.00 04 177.4	18 26.7 1.00 04 177.4	17 26.8 1.00 04 177.4	3
4	24 53.5 1.00 06 176.1	24 23.5 1.00 06 176.1	23 53.6 1.00 06 176.2	22 53.7 1.00 06 176.2	20 53.9 1.00 04 176.4	18 54.1 1.00 05 176.5	18 24.2 1.00 05 176.5	17 24.3 1.00 05 176.6	4
05	24 49.8 1.00 08 175.1	24 19.9 1.00 07 175.2	23 50.0 1.00 07 175.2	22 50.2 1.00 07 175.3	20 50.5 1.00 07 175.5	18 50.8 1.00 07 175.6	18 20.9 1.00 07 175.7	17 21.1 1.00 07 175.7	05
6	24 45.4 1.00 09 174.2	24 15.5 1.00 09 174.2	23 45.6 1.00 09 174.3	22 45.9 1.00 08 174.4	20 46.3 1.00 08 174.6	18 46.8 1.00 08 174.7	18 16.9 1.00 08 174.8	17 17.2 1.00 08 174.9	6
7	24 40.1 99 10 173.2	24 10.3 99 10 173.3	23 40.4 99 10 173.3	22 40.8 99 10 173.4	20 41.4 99 09 173.7	18 42.1 99 09 173.9	18 12.2 99 09 173.9	17 12.5 99 09 174.0	7
8	24 34.0 99 12 172.2	24 04.2 99 11 172.3	23 34.5 99 11 172.4	22 34.5 99 11 172.5	20 35.8 99 11 172.8	18 36.6 99 10 173.0	18 06.8 99 10 173.1	17 07.2 99 10 173.2	8
9	24 27.1 99 13 171.3	23 57.4 99 13 171.3	23 27.7 99 12 171.4	22 28.3 99 12 171.6	20 29.3 99 12 171.9	18 30.4 99 12 172.1	18 00.7 99 11 172.2	17 01.2 99 11 172.3	9
10	24 19.5 99 14 170.3	23 49.8 99 14 170.4	23 20.2 99 14 170.5	22 20.9 99 14 170.6	20 22.2 99 13 171.0	18 23.5 99 13 171.3	17 53.8 99 13 171.4	16 54.5 99 12 171.5	10
1	24 11.0 99 15 169.4	23 41.4 99 15 169.4	23 11.9 99 15 169.5	22 12.7 99 15 169.7	20 14.3 99 14 170.1	18 15.9 99 14 170.4	17 46.3 99 14 170.5	16 47.0 99 14 170.7	1
2	24 01.8 98 17 168.4	23 32.3 98 17 168.5	23 02.8 98 16 168.6	22 03.7 98 16 168.8	20 05.7 98 16 169.2	18 07.5 98 15 169.6	17 38.0 98 15 169.6	16 38.9 98 15 169.8	2
3	23 51.8 98 18 167.5	23 22.3 98 18 167.6	22 52.9 98 18 167.7	21 54.1 98 17 167.9	19 56.3 98 17 168.3	17 58.5 98 16 168.7	17 29.0 98 16 168.8	16 30.1 98 16 169.0	3
4	23 41.0 98 19 166.5	23 11.6 98 19 166.6	22 42.3 98 19 166.7	21 43.6 98 19 167.0	19 46.2 98 18 167.4	17 48.7 98 17 167.8	17 19.4 98 17 167.9	16 20.6 98 17 168.2	4
15	23 29.4 97 20 165.6	23 00.2 97 20 165.7	22 30.9 97 20 165.8	21 32.4 97 20 166.1	19 35.4 98 19 166.5	17 38.3 98 19 167.0	17 09.0 98 18 167.1	16 10.4 98 18 167.3	15
6	23 17.1 97 22 164.6	22 48.0 97 22 164.8	22 18.8 97 21 164.9	21 20.5 97 21 165.2	19 23.9 97 20 165.7	17 27.2 97 20 166.1	16 58.0 97 20 166.3	15 59.6 97 19 166.5	6
7	23 04.0 97 23 163.7	22 35.0 97 23 163.8	22 06.0 97 23 164.0	21 07.9 97 22 164.2	19 11.7 97 22 164.8	17 15.3 97 21 165.3	16 46.3 97 21 165.4	15 48.1 97 20 165.7	7
8	22 50.2 96 24 162.8	22 21.3 96 24 162.9	21 52.4 96 24 163.1	20 54.5 96 23 163.4	18 58.7 96 23 163.9	17 02.8 97 22 164.6	16 33.9 97 22 164.6	15 35.9 97 21 164.9	8
9	22 35.6 96 26 161.9	22 06.9 96 25 162.0	21 38.1 96 25 162.2	20 40.4 96 25 162.5	18 45.1 96 24 163.0	16 49.7 96 23 163.6	16 20.8 96 23 163.8	15 23.0 96 22 164.0	9
20	22 20.4 96 27 160.9	21 51.7 96 26 161.1	21 23.0 96 26 161.3	20 25.6 96 26 161.6	18 30.8 96 25 162.2	16 35.8 96 24 162.8	16 07.1 96 24 162.9	15 09.5 96 24 163.2	20
1	22 04.4 95 28 160.0	21 35.8 95 28 160.2	21 07.3 95 27 160.4	20 10.1 95 27 160.7	18 15.5 95 26 161.3	16 21.3 95 25 162.0	15 52.7 95 25 162.1	14 55.4 96 25 162.4	1
2	21 47.6 95 29 159.1	21 19.2 95 29 159.3	20 50.8 95 28 159.5	19 54.0 95 28 159.8	18 00.1 95 27 160.5	16 06.2 95 26 161.1	15 37.6 95 26 161.3	14 40.6 95 26 161.6	2
3	21 30.2 94 30 158.2	21 02.0 94 30 158.4	20 33.7 94 30 158.6	19 37.1 94 29 158.9	17 43.8 94 28 159.6	15 50.3 95 27 160.5	15 22.0 95 27 160.5	14 25.2 95 27 160.8	3
4	21 12.1 94 31 157.3	20 44.0 94 31 157.5	20 15.8 94 31 157.7	19 19.5 94 30 158.1	17 26.8 94 29 158.8	15 33.9 94 28 159.5	15 05.6 94 28 159.7	14 09.1 94 28 160.0	4
25	20 53.3 93 32 156.5	20 25.3 93 32 156.7	19 57.3 93 32 156.8	19 01.3 93 31 157.2	17 09.1 94 30 158.0	15 16.8 94 30 158.7	14 48.7 94 29 158.9	13 52.4 94 29 159.2	25
6	20 33.8 93 34 155.6	20 06.0 93 33 155.8	19 38.2 93 33 156.0	18 42.4 93 33 156.4	16 50.8 93 32 157.1	14 59.1 93 31 157.9	14 31.1 93 30 158.1	13 35.2 93 30 158.5	6
7	20 13.7 92 35 154.7	19 46.0 92 34 154.9	19 18.3 92 34 155.1	18 22.9 92 34 155.5	16 31.9 93 33 156.3	14 40.7 93 32 157.1	14 12.9 93 31 157.3	13 17.3 93 31 157.7	7
8	19 52.9 92 36 153.8	19 25.4 92 35 154.1	18 57.8 92 35 154.3	18 02.7 92 35 154.7	16 12.4 92 34 155.5	14 21.8 92 33 156.3	13 54.1 92 32 156.5	12 58.8 92 32 156.9	8
9	19 31.5 91 37 153.0	19 04.1 91 37 153.2	18 36.7 91 36 153.4	17 41.9 91 36 153.9	15 52.2 92 35 154.7	14 02.2 92 33 155.5	13 34.7 92 33 155.7	12 39.7 92 32 156.1	9
30	19 09.4 91 38 152.1	18 42.2 91 38 152.4	18 15.0 91 37 152.6	17 20.5 91 37 153.0	15 31.4 91 36 153.9	13 42.1 91 35 154.7	13 14.7 91 34 155.0	12 20.0 91 34 155.4	30
1	18 46.7 90 39 151.3	18 19.6 90 39 151.5	17 52.6 90 38 151.8	16 58.5 90 38 152.2	15 10.0 90 37 153.1	13 21.4 91 36 154.0	12 54.2 91 35 154.2	11 59.7 91 35 154.6	1
2	18 23.3 90 40 150.5	17 56.5 90 40 150.7	17 29.6 90 39 150.9	16 35.8 90 39 151.4	14 48.0 90 38 152.3	13 00.0 90 36 153.2	12 33.0 90 36 153.4	11 38.9 90 36 153.9	2
3	17 59.4 89 41 149.6	17 32.7 89 41 149.9	17 06.0 89 40 150.1	16 12.6 89 40 150.6	14 25.5 89 39 151.5	12 38.1 90 37 152.4	12 11.3 90 37 152.7	11 17.5 90 37 153.1	3
4	17 34.9 88 42 148.8	17 08.8 88 42 149.1	16 41.9 88 41 149.3	15 48.7 89 41 149.8	14 02.6 89 40 150.7	12 15.7 89 38 151.7	11 49.0 89 38 151.9	10 55.6 89 37 152.4	4
35	17 09.8 88 43 148.0	16 43.4 88 42 148.3	16 17.1 88 42 148.5	15 24.3 88 42 149.0	13 38.6 88 40 150.0	11 52.7 88 39 150.9	11 26.2 88 39 151.2	10 33.1 88 38 151.6	35
6	16 44.1 87 44 147.2	16 17.9 87 43 147.4	15 51.8 87 43 147.7	14 59.4 87 43 148.2	13 14.4 88 41 149.2	11 29.1 88 40 150.2	11 02.8 88 40 150.4	10 10.1 88 39 150.9	6
7	16 17.9 87 45 146.4	15 51.9 87 44 146.6	15 25.9 87 44 146.9	14 33.8 87 43 147.4	12 49.5 87 42 148.4	11 05.0 87 41 149.4	10 38.9 87 41 149.7	9 46.5 87 40 150.2	7
8	15 51.0 86 46 145.6	15 25.3 86 45 145.9	14 59.4 86 45 146.1	14 07.8 86 44 146.6	12 24.2 86 43 147.7	10 40.4 87 42 148.7	10 14.4 87 42 149.0	9 22.4 87 41 149.5	8
9	15 23.7 86 46 145.1	14 58.1 85 46 145.1	14 32.5 85 46 145.3	13 41.1 86 45 145.9	11 58.3 86 44 146.9	10 15.3 86 43 148.0	9 49.5 86 42 148.2	8 57.8 86 42 148.8	9
40	14 55.8 85 47 144.0	14 30.4 85 47 144.4	14 04.9 85 47 144.6	13 14.0 85 46 145.1	11 31.9 85 45 146.2	9 49.6 85 44 147.3	9 24.0 85 43 147.5	8 32.7 85 43 148.0	40
1	14 27.4 84 48 143.3	14 02.2 84 48 143.5	13 36.9 84 48 143.8	12 46.3 84 47 144.4	11 05.0 85 45 145.5	9 23.4 85 44 146.5	8 58.0 85 44 146.8	8 07.1 85 44 147.3	1
2	13 58.5 83 49 142.5	13 33.4 84 49 142.8	13 08.4 84 48 143.1	12 18.2 84 48 143.6	10 37.6 84 47 144.7	8 56.8 84 45 145.8	8 31.5 84 45 146.1	7 41.0 84 44 146.7	2
3	13 29.1 83 50 141.7	13 04.2 83 50 142.0	12 39.3 83 49 142.3	11 49.5 83 49 142.9	10 09.7 83 47 144.0	8 29.6 83 46 145.1	8 04.6 83 46 145.4	7 14.4 84 45 146.0	3
4	12 59.1 82 51 141.0	12 34.5 82 50 141.3	12 09.8 82 50 141.6	11 20.3 82 49 142.2	9 41.3 82 48 143.3	8 02.0 83 47 144.4	7 37.1 83 47 144.7	6 47.4 83 46 145.3	4
45	12 28.7 82 52 140.2	12 04.3 82 51 140.5	11 39.8 82 51 140.8	10 50.7 82 50 141.4	9 12.4 82 49 142.6	7 33.9 82 48 143.7	7 09.2 82 47 144.0	6 19.9 82 47 144.6	45
6	11 57.9 81 52 139.5	11 33.6 81 52 139.8	11 09.3 81 52 140.1	10 20.6 81 51 140.7	8 43.1 81 50 141.9	7 05.3 82 48 143.1	6 40.8 82 48 143.4	5 51.9 82 47 144.0	6
7	11 26.5 80 53 138.8	11 02.4 80 53 139.1	10 38.3 80 52 139.4	9 50.0 81 52 140.0	8 13.3 81 50 141.2	6 36.3 81 49 142.4	6 12.0 81 49 142.7	5 23.4 81 48 143.3	7
8	10 54.7 80 54 138.1	10 30.8 80 53 138.4	10 06.9 80 53 138.7	9 19.0 80 52 139.3	7 43.0 80 51 140.5	6 06.8 80 50 141.7	5 42.7 80 50 142.0		8
9	10 22.5 79 54 137.4	9 58.8 79 54 137.7	9 35.0 79 54 138.0	8 47.5 79 53 138.6	7 12.3 79 52 139.8	5 36.9 80 51 141.0	5 13.0 80 50 141.4		9
50	9 49.8 78 55 136.6	9 26.3 78 55 137.0	9 02.7 79 54 137.3	8 15.6 79 54 137.9	6 41.2 79 53 139.1	5 06.6 79 51 140.4			50
1	9 16.7 78 56 136.0	8 53.4 78 56 136.3	8 30.0 78 55 136.6	7 43.3 78 55 137.2	6 09.6 78 53 138.5				1
2	8 43.2 77 56 135.3	8 20.0 77 56 135.6	7 56.9 77 56 135.9	7 10.5 77 55 136.5	5 37.7 77 54 137.8				2
3	8 09.2 76 57 134.6	7 46.3 77 57 134.9	7 23.3 77 57 135.2	6 37.4 77 56 135.9	5 05.3 77 55 137.2				3
4	7 34.9 76 58 133.9	7 12.2 76 58 134.2	6 49.4 76 57 134.6	6 03.8 76 57 135.2					4
55	7 00.2 75 58 133.2	6 37.6 75 58 133.6	6 15.0 75 58 133.9	5 29.8 75 57 134.5					55
6	6 25.1 75 59 132.6	6 02.7 75 59 132.9	5 40.3 75 58 133.2						6
7	5 49.6 74 60 131.9	5 27.4 74 59 132.2	5 05.2 74 59 132.6						7
8	5 13.7 73 60 131.2								8

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00' Alt. °' Δd Δt / Az. °	28° 30' Alt. °' Δd Δt / Az. °	29° 00' Alt. °' Δd Δt / Az. °	30° 00' Alt. °' Δd Δt / Az. °	32° 00' Alt. °' Δd Δt / Az. °	34° 00' Alt. °' Δd Δt / Az. °	34° 30' Alt. °' Δd Δt / Az. °	35° 30' Alt. °' Δd Δt / Az. °	H.A.
91	15 40.7 56 73 66.5	15 57.4 56 73 66.0	16 14.1 56 73 65.6	16 47.3 55 72 64.7	17 53.0 54 71 63.0	18 57.8 54 70 61.2	19 13.9 53 70 60.8	19 45.8 53 69 59.9	91
2	14 56.8 56 73 66.0	15 13.7 56 73 65.5	15 30.5 56 72 65.1	16 04.1 56 72 64.2	17 10.4 55 71 62.5	18 15.9 54 70 60.8	18 32.2 54 69 60.3	19 04.4 54 69 59.4	2
3	14 13.1 57 72 65.5	14 30.2 57 72 65.0	14 47.2 57 72 64.6	15 21.0 56 71 63.7	16 28.0 55 70 62.0	17 34.2 55 69 60.3	17 50.6 55 69 59.8	18 23.3 54 68 58.9	3
4	13 29.6 57 72 64.9	13 46.8 57 72 64.5	14 04.0 57 72 64.1	14 38.1 57 71 63.2	15 45.8 56 70 61.5	16 52.7 55 69 59.8	17 09.3 55 69 59.4	17 42.3 55 68 58.5	4
95	12 46.3 58 72 64.4	13 03.7 58 72 64.0	13 21.0 58 71 63.6	13 55.4 57 71 62.7	15 03.8 57 70 61.0	16 11.4 56 68 59.3	16 28.2 56 68 58.9	17 01.6 55 68 58.0	95
6	12 02.2 58 72 63.9	12 20.7 58 71 63.5	12 38.1 58 71 63.1	13 12.9 58 70 62.2	14 22.0 57 69 60.5	15 30.3 57 68 58.8	15 47.3 56 68 58.4	16 21.0 56 67 57.5	6
7	11 20.3 59 71 63.4	11 37.9 59 71 62.9	11 55.5 59 71 62.5	12 30.6 58 70 61.7	13 40.4 58 69 60.0	14 49.4 57 68 58.3	15 06.6 57 67 57.9	15 40.7 57 67 57.1	7
8	10 37.6 59 71 62.8	10 55.4 59 71 62.4	11 13.1 59 70 62.0	11 48.5 59 70 61.2	12 59.0 58 69 59.5	14 08.7 58 67 57.8	14 26.1 58 67 57.4	15 00.6 57 66 56.5	8
9	9 55.0 60 70 62.3	10 13.0 60 70 61.9	10 30.9 60 70 61.5	11 06.7 59 69 60.7	12 17.8 59 68 59.0	13 28.3 58 67 57.4	13 45.8 58 67 56.9	14 20.7 58 66 56.1	9
100	9 12.7 60 70 61.8	9 30.8 60 70 61.3	9 48.9 60 70 60.9	10 25.0 60 69 60.1	11 36.8 60 68 58.5	12 48.0 59 67 56.9	13 05.5 59 66 56.4	13 41.1 59 66 55.6	100
1	8 30.6 61 70 61.2	8 48.9 61 70 60.8	9 07.1 61 69 60.4	9 43.6 61 69 59.6	10 56.1 60 68 58.0	12 08.0 60 66 56.3	12 25.9 60 66 55.9	13 01.6 59 65 55.1	1
2	7 48.7 62 69 60.7	8 07.2 61 69 60.3	8 25.6 61 68 59.9	9 02.3 61 68 59.1	10 15.5 61 67 57.5	11 28.3 60 66 55.8	11 46.4 60 66 55.4	12 22.5 60 65 54.6	2
3	7 07.1 62 69 60.1	7 25.7 62 69 59.7	7 44.3 62 68 59.3	8 21.4 62 68 58.5	9 35.3 61 67 56.9	10 48.7 61 65 55.3	11 07.0 61 65 54.9	11 43.5 61 64 54.1	3
4	6 25.6 63 69 59.6	6 44.4 63 68 59.2	7 03.2 62 68 58.8	7 40.6 62 68 58.0	8 55.2 62 66 56.4	10 09.4 62 65 54.8	10 27.9 62 65 54.4	11 04.8 61 64 53.6	4
105	5 44.4 63 68 59.0	6 03.4 63 68 58.6	6 22.3 63 68 58.2	7 00.1 63 67 57.4	8 15.4 63 66 55.9	9 30.4 62 65 54.3	9 49.1 62 64 53.9	10 26.4 62 64 53.1	105
6	5 03.5 64 68 58.4	5 22.6 64 68 58.0	5 41.7 64 67 57.7	6 19.8 64 67 56.9	7 35.9 63 65 55.3	8 51.6 63 64 53.8	9 10.5 63 64 53.4	9 48.2 63 63 52.6	6
7			5 01.3 64 67 57.1	5 39.8 64 66 56.3	6 56.6 64 65 54.8	8 13.1 64 64 53.2	8 32.2 64 63 52.8	9 10.3 63 63 52.1	7
8				5 00.1 65 66 55.8	6 17.6 65 65 54.2	7 34.9 64 63 52.7	7 54.1 64 63 52.3	8 32.6 64 62 51.5	8
9					5 38.9 65 64 53.7	6 56.9 65 63 52.2	7 16.4 05 62 51.8	7 55.2 65 62 51.0	9
110					5 00.4 66 64 53.1	6 19.2 66 62 51.6	6 38.9 66 62 51.2	7 18.1 65 61 50.5	110
1						5 41.8 66 62 51.1	6 01.6 66 62 50.7	6 41.3 66 61 49.9	1
2						5 04.7 67 61 50.5	5 24.7 67 61 50.1	6 04.8 67 60 49.4	2
3							5 28.6 67 60 48.8		3

16—65155-1

Lat. 37°

H.A.	36°00' Alt.	Δd Δt	Az.	37°00' Alt.	Δd Δt	Az.	38°30' Alt.	Δd Δt	Az.	40°00' Alt.	Δd Δt	Az.	42°00' Alt.	Δd Δt	Az.	42°30' Alt.	Δd Δt	Az.	43°00' Alt.	Δd Δt	Az.	45°00' Alt.	Δd Δt	Az.	H.A.
00	89 00.0	1.0 28	180.0	90 00.0	.. 80	....	88 30.0	1.0 20	00.0	87 00.0	1.0 10	00.0	85 00.0	1.0 05	00.0	84 30.0	1.0 05	00.0	84 00.0	1.0 04	00.0	82 00.0	1.0 04	00.0	00
1	88 43.0	78 61	140.9	89 12.1	01 80	89.7	88 18.3	88 88	27.5	86 54.0	97 28	14.3	84 56.5	99 17	08.5	84 26.8	99 16	07.6	83 57.1	99 14	07.0	81 57.9	1.0 10	05.1	1
2	88 06.4	54 72	121.3	88 24.2	01 80	89.4	87 49.2	68 63	45.9	86 37.0	88 42	26.9	84 46.1	95 28	16.5	84 17.4	96 25	15.0	83 48.5	97 23	13.7	81 51.6	98 17	10.0	2
3	87 23.4	40 76	111.6	87 36.2	02 80	89.1	87 11.6	52 69	56.8	86 11.5	78 53	37.1	84 29.5	90 37	23.9	84 02.2	92 34	21.8	83 34.6	93 31	20.0	81 41.2	96 24	14.8	3
4	86 38.0	32 77	106.1	86 48.3	02 80	88.8	86 30.0	41 73	63.4	85 39.9	68 59	45.0	84 07.6	84 44	30.4	83 42.0	86 41	28.0	83 15.9	88 38	25.8	81 27.1	93 29	19.4	4
05	85 51.5	27 78	102.5	86 00.4	03 80	88.5	85 46.3	33 75	67.7	85 04.2	59 64	51.0	83 41.2	77 50	36.1	83 17.6	80 47	33.4	82 53.1	83 44	31.0	81 09.6	89 35	23.6	05
6	85 04.5	23 79	99.9	85 12.5	03 80	88.2	85 01.5	27 76	70.6	84 25.8	51 67	55.6	83 11.4	71 54	40.9	82 49.5	74 52	38.1	82 26.8	77 49	35.6	80 48.8	85 39	27.6	6
7	84 17.2	21 79	98.0	84 24.6	04 80	87.9	84 16.0	22 77	72.7	83 45.4	45 70	59.1	82 38.7	65 58	45.0	82 18.6	69 55	42.2	81 57.5	72 53	39.6	80 25.3	81 43	31.2	7
8	83 29.6	19 79	96.4	83 36.8	04 80	87.6	83 30.1	19 77	74.2	83 03.7	39 71	61.9	82 03.7	59 61	48.5	81 45.4	63 59	45.7	81 25.9	67 56	43.1	79 59.3	77 47	34.5	8
9	82 42.0	18 80	95.2	82 48.9	05 80	87.3	82 43.8	16 77	75.4	82 20.9	35 72	64.2	81 27.0	54 64	51.4	81 10.2	58 61	48.7	80 52.2	62 59	46.1	79 31.1	73 50	37.5	9
10	81 54.2	17 80	94.1	82 01.0	05 80	87.0	81 57.4	13 78	76.2	81 37.5	31 73	66.0	80 48.9	50 65	53.9	80 33.4	53 63	51.3	80 16.9	57 61	48.8	79 01.1	69 53	40.1	10
1	81 06.4	17 80	93.2	81 13.2	06 80	86.7	81 10.8	11 78	76.9	80 53.5	27 74	67.4	80 09.6	45 67	56.1	79 55.5	49 65	53.5	79 40.2	53 63	51.1	78 29.4	65 55	42.5	1
2	80 18.5	16 80	92.3	80 25.4	06 80	86.4	80 24.1	09 78	77.4	80 09.0	24 75	68.6	79 29.4	41 68	57.9	79 16.4	45 66	55.5	79 02.4	49 65	53.1	77 56.4	61 57	44.7	2
3	79 30.6	16 80	91.6	79 37.6	07 80	86.1	79 37.3	07 78	77.7	79 24.3	21 75	69.6	78 48.5	38 69	59.5	78 36.6	42 68	57.1	78 23.6	45 66	54.6	77 22.1	57 59	46.7	3
4	78 42.7	16 80	90.9	78 49.8	07 80	85.8	78 50.4	06 78	78.0	78 39.2	19 75	70.4	78 06.9	35 70	60.8	77 56.0	38 69	58.6	77 44.0	42 67	56.4	76 46.7	54 60	48.4	4
15	77 54.8	16 80	90.2	78 02.0	08 80	85.5	78 03.5	04 78	78.2	77 54.0	17 76	71.1	77 24.9	32 71	62.0	77 14.8	35 69	59.8	77 03.8	38 68	57.7	76 10.4	50 62	50.0	15
6	77 06.9	16 80	89.6	77 14.2	08 80	85.2	77 16.6	03 78	78.4	77 08.6	15 76	71.6	76 42.4	29 71	63.0	76 33.2	32 70	60.9	76 23.0	35 69	58.9	75 33.4	47 63	51.4	6
7	76 19.0	16 80	89.1	76 26.5	09 80	84.9	76 29.7	02 78	78.5	76 23.1	13 76	72.1	75 59.5	26 72	63.8	75 51.1	30 71	61.9	75 41.8	33 69	59.9	74 55.6	44 64	52.7	7
8	75 31.1	16 80	88.5	75 38.8	09 79	84.6	75 42.7	01 78	78.5	75 37.4	11 76	72.4	75 16.4	24 72	64.6	75 08.7	27 71	62.7	75 00.1	30 70	60.8	74 17.2	41 65	53.8	8
9	74 43.2	16 80	88.0	74 51.1	10 79	84.2	74 55.8	00 78	78.5	74 51.7	09 76	72.7	74 33.0	22 73	65.3	74 26.0	25 72	63.4	74 18.1	28 70	61.6	73 38.3	38 66	54.8	9
20	73 55.3	17 80	87.5	74 03.4	11 79	83.9	74 08.8	01 78	78.5	74 05.9	08 76	73.0	73 49.3	20 73	65.8	73 43.0	23 72	64.1	73 35.8	25 71	62.3	72 58.9	36 66	55.7	20
1	73 07.4	17 80	87.1	73 15.8	11 79	83.6	73 21.8	02 78	78.4	73 20.1	06 76	73.2	73 05.5	18 73	66.3	72 59.8	21 72	64.6	72 53.2	23 71	63.0	72 19.1	33 67	56.5	1
2	72 19.6	17 80	86.6	72 28.2	12 79	83.3	72 34.9	03 78	78.3	72 34.2	05 77	73.3	72 21.6	16 73	66.7	72 16.4	19 73	65.1	72 10.4	21 72	64.0	71 39.0	31 67	57.3	2
3	71 31.8	17 80	86.2	71 40.6	12 79	83.0	71 48.0	04 78	78.2	71 48.3	04 77	73.4	71 37.5	14 74	67.1	71 32.9	17 73	65.5	71 27.5	19 72	64.0	70 58.5	29 68	57.9	3
4	70 44.0	18 80	85.7	70 53.0	13 79	82.7	71 01.1	05 78	78.1	71 02.3	02 77	73.5	70 53.3	13 74	67.4	70 49.2	15 73	65.9	70 44.3	17 72	64.4	70 17.7	27 68	58.5	4
25	69 56.2	18 80	85.3	70 05.5	13 79	82.4	70 14.2	06 78	78.0	70 16.4	01 77	73.6	70 09.0	11 74	67.7	70 05.4	13 73	66.2	70 01.1	16 72	64.8	69 36.8	25 69	59.1	25
6	69 08.4	18 80	84.9	69 18.0	14 79	82.1	69 27.3	07 78	77.9	69 30.4	00 77	73.6	69 24.7	09 74	67.9	69 21.5	12 73	66.5	69 17.7	14 72	65.1	68 55.5	23 69	59.5	6
7	68 20.7	19 80	84.5	68 30.6	14 79	81.8	68 40.5	08 78	77.7	68 44.4	01 77	73.6	68 40.3	08 74	68.1	68 37.5	10 73	66.8	68 34.2	12 73	65.3	68 14.1	21 69	60.0	7
8	67 33.1	19 79	84.1	67 43.2	15 79	81.5	67 53.7	09 78	77.5	67 58.5	02 77	73.6	67 55.8	07 74	68.2	67 53.5	09 74	66.9	67 50.6	11 73	65.5	67 32.6	19 70	60.3	8
9	66 45.4	19 79	83.7	66 55.8	15 79	81.2	67 06.9	09 78	77.3	67 12.5	03 77	73.5	67 11.3	05 74	68.3	67 09.4	07 74	67.0	67 06.9	09 73	65.8	66 50.9	17 70	60.7	9
30	65 57.8	20 79	83.3	66 08.5	16 79	80.8	66 20.2	10 78	77.1	66 26.6	04 77	73.4	66 26.7	04 74	68.4	66 25.3	06 74	67.2	66 23.2	08 73	65.9	66 09.0	16 70	61.0	30
1	65 10.2	20 79	82.9	65 21.2	16 79	80.5	65 33.5	11 78	76.9	65 40.7	05 77	73.3	65 42.2	03 74	68.5	65 41.1	05 74	67.3	65 39.4	06 73	66.0	65 27.1	14 70	61.2	1
2	64 22.7	21 79	82.5	64 34.0	17 79	80.2	64 46.8	12 78	76.7	64 54.8	06 77	73.2	64 57.6	01 74	68.5	64 56.9	04 74	67.3	64 55.6	05 73	66.1	64 45.0	13 70	61.3	2
3	63 35.2	21 79	82.1	63 46.8	18 79	79.9	64 00.2	12 78	76.5	64 08.9	07 76	73.1	64 13.0	00 74	68.5	64 12.7	02 74	67.4	64 11.8	04 73	66.2	64 02.9	11 70	61.6	3
4	62 47.8	21 79	81.7	62 59.6	18 78	79.6	63 13.7	13 78	76.3	63 23.1	08 76	73.0	63 28.4	01 74	68.5	63 28.4	01 74	67.4	63 27.9	03 73	66.3	63 20.7	10 70	61.8	4
35	62 00.4	22 79	81.3	62 12.5	19 78	79.3	62 27.1	14 77	76.1	62 37.3	09 76	72.8	62 43.8	02 74	68.5	62 44.2	00 74	67.4	62 44.1	01 73	66.3	62 38.4	08 70	61.9	35
6	61 13.0	22 79	81.0	61 25.5	19 78	78.9	61 40.6	14 77	75.8	61 51.5	10 76	72.7	61 59.3	03 74	68.4	62 00.0	02 74	67.4	62 00.7	00 73	66.3	61 56.1	07 71	62.1	6
7	60 25.7	23 79	80.6	60 38.5	20 78	78.6	60 54.2	15 77	75.6	61 05.8	11 76	72.5	61 14.7	04 74	68.4	61 15.7	02 74	67.3	61 16.3	01 73	66.3	61 13.8	05 71	62.1	7
8	59 38.5	23 79	80.2	59 51.5	20 78	78.3	60 07.8	16 77	75.3	60 20.1	11 76	72.3	60 30.2	05 74	68.3	60 31.5	04 74	67.3	60 32.4	02 73	66.3	60 31.4	04 71	62.2	8
9	58 51.3	24 79	79.9	59 04.6	21 78	78.0	59 21.5	17 77	75.1	59 34.5	12 76	72.2	59 45.6	06 74	68.2	59 47.3	05 74	67.2	59 48.6	03 73	66.2	59 49.0	03 71	62.3	9
40	58 04.1	24 78	79.5	58 17.8	21 78	77.6	58 35.2	17 77	74.8	58 48.9	13 76	72.0	59 01.2	07 74	68.1	59 03.2	06 74	67.2	59 04.7	04 73	66.2	59 06.6	01 71	62.3	40
1	57 17.1	25 78	79.1	57 31.0	22 78	77.3	57 49.0	18 77	74.6	58 03.3	14 76	71.8	58 16.7	08 74	68.0	58 19.0	06 73	67.1	58 20.9	05 73	66.1	58 24.1	00 71	62.3	1
2	56 30.0	25 78	78.8	56 44.3	23 78	77.0	57 02.8	19 77	74.3	57 17.9	15 76	71.6	57 32.3	09 74	67.9	57 34.9	08 73	67.0	57 37.1	07 73	66.0	57 41.7	01 71	62.3	2
3	55 43.1	26 78	78.4	55 57.6	23 78	76.7	56 16.7	19 77	74.0	56 32.4	16 76	71.4	56 47.9	10 74	67.8	56 50.8	09 73	66.8	56 53.3	08 73	65.9	56 59.3	02 71	62.3	3
4	54 56.2	26 78	78.0	55 11.0	24 78	76.3	55 30.7	20 77	73.8	55 47.0	16 76	71.1	56 03.6	11 74	67.6	56 06.8	10 73	66.7	56 09.6	09 73	65.8	56 16.9	03 71	62.2	4
45	54 09.3	26 78	77.7	54 24.5	24 78	76.0	54 44.7	21 77	73.5	55 01.7	17 75	70.9	55 19.3	12 74	67.5	55 22.8	11 73	66.6	55 25.9	10 73	65.7	55 34.5	05 71	62.2	45
6	53 22.5	27 78	77.3	53 38.0	25 77	75.7	53 58.4	21 76	73.2	54 16.5	18 75	70.7	54 35.1	13 74	67.3	54 38.8	12 73	66.4	54 42.2	11 73	65.6	54 52.1	06 71	62.1	6
7	52 35.8	27 78	76.9	52 51.7	25 77	75.3	53 13.0	22 76	72.9	53 31.3	19 75	70.5	53 50.9	14 74	67.1	53 54.9	13 73	66.3	53 58.6	12 73	65.5	54 09.8	07 71	62.0	7
8	51 49.2	28 78	76.6	52 05.3	26 77	75.0	52 27.2	23 76	72.6	52 46.2	19 75	70.2	53 06.8	15 73	66.9	53 11.1	14 73	66.1	53 15.1	13 72	65.3	53 27.5	08 70	62.0	8
9	51 02.6	28 78	76.2	51 19.1	26 77	74.7	51 41.5	23 76	72.3	52 01.1	20 75	70.0	52 22.7	16 73	66.7	52 27.3	15 73	65.9	52 31.6	14 72	65.1	52 45.2	09 70	61.9	9
50	50 16.1	29 77	75.8	50 32.9	27 77	74.3	50 55.9	24 76	72.0	51 16.1	21 75	69.7	51 38.7	17 73	66.6	51 43.5	16 73	65.8	51 48.1	15 72	65.0	52 03.0	10 70	61.7	50
1	49 29.7	29 77	75.5	49 46.8	28 77	74.0	50 10.3	25 76	71.7	50 31.2	22 75	69.4	50 54.8	18 73	66.3	50 59.9	17 73	65.6	51 04.7	15 72	65.4	51 20.8	11 70	61.6	1
2	48 43.3	30 77	75.1	49 00.8	28 77	73.6	49 24.9	25 76	71.4	49 46.4	22 75	69.2	50 11.0	18 73	66.1	50 16.3	17 73	65.4	50 21.4	16 72	64.6	50 38.7	12 70	61.5	2
3	47 57.1	31 77	74.7	48 14.9	29 76	73.3	48 39.5	26 76	71.1	49 01.6	23 74	68.9	49 27.2	19 73	65.9	49 32.8	18 72	65.2	49 38.2	17 72	64.4	49 56.6	13 70	61.3	3
4	47 10.9	31 77	74.4	47 29.0	29 76	73.0	47 54.2	27 75	70.8	48 17.0	24 74	68.6	48 43.5	20 73	65.7	48 49.4	19 72	65.0	48 55.0	18 72	64.2	49 14.6	14 70	61.2	4
55	46 24.8	32 77	74.0	46 43.2	30 76	72.6	47 09.0	27 75	70.5	47 32.4	25 74	68.4	47 59.8	21 73	65.5	48 06.0	20 72	64.7	48 12.6	19 72	63.8	48 32.6	15 70	61.0	55
6	45 38.8	32 77	73.6	45 57.6	30 76	72.3	46 23.9	28 75	70.2	46 47.9	25 74	68.1	47 16.3	22 72	65.2	47 22.7	21 72	64.5	47 28.9	20 72	63.8	47 50.7	16 70	60.9	6
7	44 52.8	33 76	73.2	45 12.0	31 76	71.9	45 38.8	29 75	69.9	46 03.5	26 74	67.8	46 32.8	23 72	65.0	46 39.5	22 72	64.3	46 45.9	21 71	63.6	47 08.9	17 70	60.7	7
8	44 07.0	33 76	72.9	44 26.5	32 76	71.6	44 53.9	29 75	69.5	45 19.2	27 74	67.5	45 49.4	24 72	64.7	45 56.4	23 72	64.0	46 03.0	22 71	63.3	46 27.2	18 69	60.5	8
9	43 21.3	34 76	72.5	43 41.0	32 76	71.2	44 09.0	30 75	69.2	44 34.9	28 74	67.2	45 05.9	25 72	64.5	45 13.3	24 72	63.8	45 20.3	23 71	63.1	45 45.5	19 69	60.3	9
60	42 35.6	34 76	72.1	42 55.7	33 75	70.8	43 24.3	31 74	68.9	43 50.8	28 73	66.9	44 22.9	25 72	64.2	44 30.4	24 71	63.5	44 37.6	24 71	62.9	45 03.9	20 69	60.1	60
1	41 50.1	35 76	71.7	42 10.5	33 75	70.5	42 39.6	31 74	68.6	43 06.8	29 73	66.6	43 39.8	26 72	64.0	43 47.5	25 71	63.3	43 55.0	24 71	62.6	44 22.4	21 69	59.9	1
2	41 04.6	35 76	71.4	41 25.4	34 75	70.1	41 55.1	32 74	68.2	42 22.9	30 73	66.3	42 56.8	27 71	63.7	43 04.8	26 71	63.0	43 12.5	25 71	62.4	43 41.0	22 69	59.7	2
3	40 19.2	36 75	71.0	40 40.4	35 75	69.8	41 10.6	33 74	67.9	41 39.0	31 73	66.0	42 13.9	28 71	63.4	42 22.1	27 71	62.8	42 30.1	26 70	62.1	42 59.7	23 69	59.5	3
4	39 34.0	36 75	70.6	39 55.5	35 75	69.4	40 26.3	33 73	67.5	40 55.3	31 73	65.7	41 31.1	28 71	63.1	41 39.4	27 71	62.5	41 47.8	27 70	61.8	42 18.4	24 69	59.3	4
65	38 48.8	37 75	70.2	39 10.7	36 74	69.0	39 42.1	34 74	67.2	40 11.7	32 72	65.4	40 48.4	29 71	62.9	40 57.1	29 71	62.2	41 05.6	28 70	61.6	41 37.3	25 68	59.0	65
6	38 03.8	37 75	69.8	38 26.0	36 74	68.7	38 57.9	35 73	66.9	39 28.2	33 72	65.0	40 05.9	30 71	62.6	40 14.8	29 70	61.9	40 23.5	29 70	61.3	40 56.3	26 68	58.8	6
7	37 18.9	38 75	69.4	37 41.4	37 74	68.3	38 13.9	35 73	66.5	38 44.8	33 72	64.7	39 23.4	31 71	62.3	39 32.5	30 70	61.7	39 41.5	30 70	61.0	40 15.3	27 68	58.5	7
8	36 34.1	39 74	69.1	36 57.0	38 74	67.9	37 30.1	36 73	66.2	38 01.6	34 72	64.4	38 41.0	32 70	62.0	38 50.4	31 70	61.4	38 59.6	30 70	60.7	39 34.5	28 68	58.3	8
9	35 49.4	39 74	68.7	36 12.6	38 74	67.5	36 46.3	37 73	65.8	37 18.4	35 72	64.1	37 58.8	32 70	61.7	38 08.4	32 70	61.1	38 17.9	31 69	60.5	38 53.8	29 68	58.0	9
70	35 04.8	40 74	68.3	35 28.4	39 74	67.1	36 02.6	37 73	65.4	36 35.4	36 72	63.7	37 16.7	33 70	61.4	37 26.6	33 70	60.8	37 36.3	32 69	60.2	38 13.2	30 67	57.8	70
1	34 20.4	40 74	67.9	34 44.3	39 73	66.8	35 19.1	38 72	65.1	35 52.5	36 71	63.4	36 34.7	34 70	61.0	36 44.8	33 69	60.5	36 54.8	33 69	59.9	37 32.8	30 67	57.5	1
2	33 36.0	41 74	67.5	34 00.4	40 73	66.4	34 35.7	39 72	64.7	35 09.7	37 71	63.0	35 52.8	35 70	60.7	36 03.2	34 69	60.1	36 13.4	34 69	59.6	36 52.4	31 67	57.2	2
3	32 51.8	42 73	67.1	33 16.5	41 73	66.0	33 52.5	39 72	64.3	34 27.1	38 71	62.7	35 11.1	36 69	60.4	35 21.7	35 69	59.8	35 32.1	35 69	59.3	36 12.1	32 67	56.9	3
4	32 07.8	42 73	66.7	32 32.8	41 73	65.6	33 09.3	40 72	64.0	33 44.6	38 71	62.3	34 29.5	36 69	60.1	34 40.3	36 69	59.5	34 51.0	35 68	58.9	35 32.1	33 67	56.6	4
75	31 23.8	43 73	66.3	31 49.2	42 72	65.2	32 26.4	41 71	63.6	33 02.2	39 70	62.0	33 48.0	37 69	59.7	33 59.1	37 68	59.2	34 10.0	36 68	58.6	34 52.2	34 66	56.4	75
6	30 40.0	43 73	65.9	31 05.8	43 72	64.8	31 43.5	41 71	63.2	32 20.0	40 70	61.6	33 06.7	38 69	59.4	33 18.0	37 68	58.9	33 29.2	37 68	58.3	34 12.3	35 66	56.1	6
7	29 56.4	44 73	65.5	30 22.5	43 72	64.4	31 00.8	42 71	62.8	31 37.9	41 70	61.2	32 25.5	39 68	59.1	32 37.1	38 68	58.5	32 48.5	38 68	58.0	33 32.7	36 66	55.8	7
8	29 12.8	44 72	65.0	29 39.4	44 71	64.0	30 18.2	43 71	62.4	30 55.8	41 70	60.9	31 44.4	40 68	58.7	31 56.3	39 67	58.2	32 07.9	39 67	57.6	32 53.3	37 66	55.5	8
9	28 29.5	45 72	64.6	28 56.4	44 71	63.6	29 35.8	43 70	62.1	30 14.2	42 69	60.5	31 03.6	40 68	58.4	31 15.6	40 67	57.8	31 27.5	39 67	57.3	32 13.7	38 65	55.1	9
80	27 46.2	46 72	64.2	28 13.5	45 71	63.2	28 53.6	44 70	61.7	29 32.6	43 69	60.1	30 22.9	41 68	58.0	30 35.1	41 67	57.5	30 47.3	40 67	57.0	31 34.5	38 65	54.8	80
1	27 03.2	46 72	63.8	27 30.8	46 71	62.8	28 11.5	45 70	61.3	28 51.1	43 69	59.8	29 42.3	42 67	57.7	29 54.8	41 67	57.2	30 07.2	41 67	56.6	30 55.4	39 65	54.5	1
2	26 20.3	47 71	63.4	26 48.3	46 71	62.4	27 29.5	45 70	60.9	28 09.8	44 69	59.4	29 01.9	43 67	57.3	29 14.6	42 67	56.8	29 27.2	42 66	56.3	30 16.5	40 65	54.2	2
3	25 37.5	47 71	62.9	26 05.9	47 70	62.0	26 47.7	46 69	60.5	27 28.6	45 68	59.0	28 21.6	43 67	57.0	28 34.4	43 66	56.5	28 47.1	42 66	55.9	29 37.4	41 64	53.8	3
4	24 54.9	48 71	62.5	25 23.7	48 70	61.5	26 06.1	47 69	60.1	26 47.7	46 68	58.6	27 41.6	44 67	56.6	27 54.8	44 66	56.1	28 07.9	43 66	55.5	28 59.1	42 64	53.5	4
85	24 12.5	49 70	62.1	24 41.6	48 70	61.1	25 24.7	47 69	59.7	26 06.8	46 68	58.2	27 01.7	45 66	56.2	27 15.1	45 66	55.7	27 28.4	44 65	55.2	28 20.6	43 64	53.2	85
6	23 30.2	50 70	61.6	23 59.8	49 70	60.7	24 43.4	48 68	59.3	25 26.2	47 67	57.8	26 21.9	46 66	55.8	26 35.6	45 65	55.3	26 49.2	45 65	54.8	27 42.4	44 63	52.8	6
7	22 48.1	50 70	61.2	23 18.1	50 69	60.3	24 02.2	49 68	58.9	24 45.5	48 67	57.4	25 42.4	47 65	55.5	25 56.3	46 65	55.0	26 10.1	46 65	54.5	27 04.1	44 63	52.5	7
8	22 06.2	51 70	60.8	22 36.5	50 69	59.8	23 21.4	49 68	58.4	24 05.0	48 67	57.0	25 03.0	47 65	55.1	25 17.1	47 65	54.6	25 31.2	46 64	54.1	26 26.4	45 63	52.1	8
9	21 24.5	51 69	60.3	21 55.2	51 69	59.4	22 40.7	50 68	58.0	23 25.4	49 66	56.6	24 23.8	48 65	54.7	24 38.2	48 65	54.2	24 52.5	47 64	53.7	25 48.7	46 63	51.8	9
90	20 43.0	52 69	59.9	21 14.1	52 68	59.0	22 00.1	51 67	57.6	22 45.5	50 66	56.2	23 44.8	49 65	54.3	23 59.4	49 64	53.8	24 13.9	48 64	53.3	25 11.1	47 62	51.4	90

Lat. 37°

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	36° 00' Alt. Δd Δt Az.	37° 00' Alt. Δd Δt Az.	38° 30' Alt. Δd Δt Az.	40° 00' Alt. Δd Δt Az.	42° 00' Alt. Δd Δt Az.	42° 30' Alt. Δd Δt Az.	43° 00' Alt. Δd Δt Az.	45° 00' Alt. Δd Δt Az.	H.A.
00	17 00.0 1.00 01 180.0	16 00.0 1.00 01 180.0	14 30.0 1.00 01 180.0	13 00.0 1.00 01 180.0	11 00.0 1.00 01 180.0	10 30.0 1.00 01 180.0	10 00.0 1.00 01 180.0	8 00.0 1.00 00 180.0	00
1	16 59.6 1.00 02 179.2	15 59.7 1.00 02 179.2	14 29.7 1.00 02 179.2	12 59.7 1.00 02 179.2	10 59.7 1.00 02 179.2	10 29.7 1.00 02 179.3	9 59.7 1.00 02 179.3	7 59.7 1.00 01 179.3	1
2	16 58.6 1.00 03 178.3	15 58.6 1.00 03 178.3	14 28.6 1.00 03 178.4	12 58.7 1.00 03 178.4	10 58.7 1.00 03 178.5	10 28.7 1.00 03 178.5	9 58.8 1.00 03 178.5	7 58.8 1.00 02 178.6	2
3	16 56.8 1.00 04 177.5	15 56.9 1.00 04 177.5	14 27.0 1.00 04 177.6	12 57.0 1.00 04 177.6	10 57.2 1.00 04 177.7	10 27.2 1.00 04 177.7	9 57.2 1.00 04 177.8	7 57.3 1.00 03 177.9	3
4	16 54.3 1.00 05 176.6	15 54.4 1.00 05 176.7	14 24.6 1.00 05 176.8	12 54.7 1.00 05 176.9	10 54.9 1.00 05 177.0	10 25.0 1.00 05 177.0	9 55.0 1.00 05 177.0	7 55.2 1.00 04 177.1	4
05	16 51.2 1.00 06 175.8	15 51.3 1.00 06 175.9	14 21.6 1.00 06 176.0	12 51.8 1.00 06 176.1	10 52.1 1.00 06 176.2	10 22.2 1.00 06 176.3	9 52.2 1.00 06 176.3	7 52.5 1.00 05 176.4	05
6	16 47.3 1.00 08 174.9	15 47.5 1.00 08 175.0	14 17.8 1.00 07 175.2	12 48.2 1.00 07 175.3	10 48.6 1.00 07 175.5	10 18.7 1.00 07 175.5	9 48.8 1.00 07 175.6	7 49.3 1.00 06 175.7	6
7	16 42.7 99 09 174.1	15 43.0 99 09 174.2	14 13.5 99 08 174.4	12 43.9 1.00 08 174.5	10 44.5 1.00 08 174.7	10 14.7 1.00 08 174.8	9 44.8 1.00 08 174.8	7 45.4 1.00 07 175.0	7
8	16 37.4 99 10 173.3	15 37.8 99 10 173.4	14 08.4 99 10 173.6	12 39.0 99 09 173.7	10 39.8 99 09 174.0	10 10.0 99 09 174.0	9 40.2 99 09 174.1	7 40.9 99 08 174.3	8
9	16 31.4 99 11 172.4	15 31.9 99 11 172.5	14 02.7 99 11 172.8	12 33.4 99 10 172.9	10 34.4 99 10 173.2	10 04.7 99 10 173.3	9 34.9 99 10 173.3	7 35.9 99 09 173.6	9
10	16 24.8 99 12 171.6	15 25.4 99 12 171.7	13 56.3 99 12 172.0	12 27.2 99 11 172.2	10 28.5 99 11 172.5	9 58.8 99 11 172.5	9 29.0 99 11 172.6	7 30.2 99 10 172.9	10
1	16 17.4 99 13 170.7	15 18.2 99 13 170.9	13 49.3 99 13 171.2	12 20.4 99 12 171.4	10 21.9 99 12 171.7	9 52.2 99 12 171.8	9 22.6 99 12 171.9	7 24.0 99 11 172.2	1
2	16 09.4 98 15 169.9	15 10.3 99 14 170.1	13 41.6 99 14 170.4	12 12.9 99 14 170.6	10 14.6 98 13 171.0	9 45.1 99 13 171.1	9 15.5 99 13 171.1	7 17.2 99 12 171.5	2
3	16 00.6 98 16 169.1	15 01.7 98 15 169.3	13 33.2 98 15 169.6	12 04.8 98 15 169.8	10 06.8 98 14 170.2	9 37.3 98 14 170.3	9 07.8 98 14 170.4	7 09.8 98 13 170.8	3
4	15 51.1 98 17 168.3	14 52.4 98 17 168.5	13 24.2 98 16 168.8	11 56.0 98 16 169.1	9 58.4 98 15 169.5	9 28.9 98 15 169.6	8 59.5 98 15 169.7	7 01.8 98 14 170.1	4
15	15 41.1 98 18 167.4	14 42.5 98 18 167.7	13 14.6 98 17 168.0	11 46.6 98 17 168.3	9 49.3 98 16 168.7	9 20.0 98 16 168.8	8 50.6 98 16 169.0	6 53.3 98 15 169.4	15
6	15 30.4 97 19 166.6	14 32.0 97 19 166.9	13 04.3 97 18 167.2	11 36.6 97 18 167.6	9 39.7 97 17 168.0	9 10.4 97 17 168.1	8 41.2 97 17 168.2	6 44.2 98 16 168.7	6
7	15 19.0 97 20 165.7	14 20.7 97 20 166.1	12 53.4 97 19 166.4	11 26.0 97 19 166.8	9 29.4 97 18 167.3	9 00.3 97 18 167.4	8 31.1 97 18 167.5	6 34.5 97 17 168.0	7
8	15 06.9 97 21 165.0	14 08.9 97 21 165.3	12 41.8 97 20 165.6	11 14.7 97 20 166.0	9 18.5 97 19 166.5	8 49.5 97 19 166.7	8 20.4 97 19 166.8	6 24.2 97 18 167.3	8
9	14 54.1 96 22 164.2	13 56.3 96 22 164.5	12 29.6 96 21 164.9	11 02.8 96 21 165.3	9 07.1 96 20 165.8	8 38.2 96 20 165.9	8 09.2 96 20 166.1	6 13.4 97 19 166.6	9
20	14 40.8 96 23 163.4	13 43.2 96 23 163.7	12 16.8 96 22 164.1	10 50.4 96 22 164.5	8 55.1 96 21 165.1	8 26.2 96 21 165.2	7 57.4 96 21 165.4	6 02.0 96 20 165.9	20
1	14 26.7 96 24 162.6	13 29.4 96 24 162.9	12 03.4 96 23 163.3	10 37.3 96 23 163.8	8 42.4 96 22 164.4	8 13.7 96 22 164.5	7 45.0 96 22 164.7	5 50.1 96 21 165.2	1
2	14 12.1 95 26 161.8	13 15.0 95 25 162.1	11 49.3 95 24 162.6	10 23.6 95 24 163.0	8 29.2 95 23 163.7	8 00.6 95 23 163.8	7 32.0 95 23 164.0	5 37.6 95 22 164.6	2
3	13 56.8 95 27 161.0	12 59.9 95 26 161.3	11 34.7 95 25 161.8	10 09.3 95 25 162.3	8 15.5 95 24 162.9	7 47.0 95 24 163.1	7 18.5 95 24 163.3	5 24.6 95 23 163.9	3
4	13 40.8 94 28 160.2	12 44.3 94 27 160.5	11 19.4 94 26 161.1	9 54.5 94 26 161.6	8 01.1 94 25 162.2	7 32.8 94 25 162.4	7 04.4 94 24 162.6	5 11.0 95 24 163.2	4
25	13 24.3 94 29 159.4	12 28.0 94 28 159.8	11 03.5 94 27 160.3	9 39.0 94 27 160.8	7 46.2 94 26 161.5	7 18.0 94 26 161.7	6 49.8 94 25 161.9		25
6	13 07.2 93 30 158.6	12 11.2 93 29 159.0	10 47.1 93 29 159.6	9 23.0 93 28 160.1	7 30.8 94 27 160.8	7 02.7 94 26 161.0	6 34.6 94 26 161.2		6
7	12 49.4 93 31 157.9	11 53.7 93 30 158.3	10 30.1 93 29 158.8	9 06.4 93 29 159.4	7 14.7 93 28 160.1	6 46.8 93 27 160.3	6 18.9 93 27 160.5		7
8	12 31.1 92 31 157.1	11 35.7 92 31 157.5	10 12.5 92 30 158.1	8 49.2 92 30 158.7	6 58.2 92 29 159.4	6 30.4 93 28 159.6	6 02.6 93 28 159.8		8
9	12 12.1 92 33 156.3	11 17.0 92 32 156.7	9 54.3 92 31 157.3	8 31.5 92 30 157.9	6 41.0 92 29 158.7	6 13.4 92 29 158.9	5 45.8 92 29 159.1		9
30	11 52.6 91 34 155.6	10 57.8 91 33 156.0	9 35.6 91 32 156.6	8 13.2 91 31 157.2	6 23.4 92 30 158.0	5 55.9 92 30 158.2	5 28.4 92 30 158.4		30
1	11 32.5 91 34 154.8	10 38.0 91 34 155.3	9 16.3 91 33 155.9	7 54.4 91 32 156.5	6 05.2 91 31 157.4	5 37.9 91 31 157.6	5 10.6 91 31 157.8		1
2	11 11.9 90 35 154.1	10 17.7 90 35 154.5	8 56.4 90 34 155.1	7 35.1 90 33 155.8	5 46.5 91 32 156.7	5 19.4 91 32 156.9			2
3	10 50.6 90 36 153.3	9 56.8 90 36 153.8	8 36.0 90 35 154.5	7 15.2 90 34 155.1	5 27.3 90 33 156.0	5 00.3 90 33 156.2			3
4	10 28.9 89 37 152.6	9 35.4 89 37 153.1	8 15.1 89 36 153.8	6 54.8 89 35 154.4	5 07.5 89 34 155.3				4
35	10 06.5 89 38 151.9	9 13.4 89 38 152.3	7 53.7 89 37 153.1	6 33.8 89 36 153.8					35
6	9 43.7 88 39 151.2	8 50.9 88 38 151.6	7 31.7 88 37 152.4	6 12.4 88 37 153.1					6
7	9 20.3 87 40 150.4	8 27.9 87 39 150.9	7 09.2 87 39 151.7	5 50.4 87 37 152.4					7
8	8 56.4 87 41 149.7	8 04.4 87 40 150.2	6 46.2 87 39 151.0	5 28.0 87 38 151.7					8
9	8 32.0 86 42 149.0	7 40.3 86 41 149.5	6 22.7 86 40 150.3	5 05.0 86 39 151.1					9
40	8 07.1 86 42 148.3	7 15.8 86 42 148.8	5 58.7 86 41 149.6						40
1	7 41.7 85 43 147.6	6 50.7 85 43 148.1	5 34.2 85 42 148.9						1
2	7 15.7 84 44 146.9	6 25.2 84 43 147.5	5 09.3 84 42 148.3						2
3	6 49.4 84 45 146.2	5 59.2 84 44 146.8							3
4	6 22.5 83 46 145.6	5 32.7 83 45 146.1							4
45	5 55.2 82 46 144.9	5 05.8 82 46 145.5							45
6	5 27.4 82 47 144.2								6

DECLINATION SAME NAME AS LATITUDE

H.A.	36° 00' Alt. Δd Δt Az.	37° 00' Alt. Δd Δt Az.	38° 30' Alt. Δd Δt Az.	40° 00' Alt. Δd Δt Az.	42° 00' Alt. Δd Δt Az.	42° 30' Alt. Δd Δt Az.	43° 00' Alt. Δd Δt Az.	45° 00' Alt. Δd Δt Az.	H.A.
91	20 01.6 53 69 59.4	20 33.1 52 68 58.5	21 19.8 51 67 57.1	22 05.8 51 66 55.8	23 06.0 50 64 53.9	23 20.8 49 64 53.4	23 35.6 49 64 52.9	24 33.8 48 62 51.0	91
2	19 20.5 53 68 59.0	19 52.3 53 68 58.1	20 39.6 52 67 56.7	21 26.3 51 65 55.3	22 27.4 50 64 53.5	22 42.5 50 64 53.0	22 57.5 50 63 52.5	23 56.6 49 62 50.6	2
3	18 39.5 54 68 58.5	19 11.8 54 67 57.6	19 59.7 53 66 56.3	20 46.9 52 65 54.9	21 49.0 51 64 53.1	22 04.3 51 63 52.6	22 19.5 51 63 52.1	23 19.7 50 61 50.3	3
4	17 58.7 55 68 58.0	18 31.4 54 67 57.2	19 19.9 54 66 55.8	20 07.8 53 65 54.5	21 10.8 52 63 52.7	21 26.3 52 63 52.2	21 41.8 51 63 51.7	22 42.9 50 61 49.9	4
95	17 18.2 55 67 57.6	17 51.2 55 67 56.7	18 40.4 54 66 55.4	19 28.9 54 64 54.0	20 32.8 53 63 52.2	20 48.6 52 63 51.8	21 04.3 52 62 51.3	22 06.4 51 61 49.5	95
6	16 37.8 56 67 57.1	17 11.1 55 66 56.2	18 01.0 55 65 54.9	18 50.3 54 64 53.6	19 55.0 54 63 51.8	20 11.0 53 62 51.4	20 27.0 53 62 50.9	21 30.1 52 60 49.1	6
7	15 57.7 57 67 56.6	16 31.6 56 66 55.8	17 21.9 56 65 54.5	18 11.8 55 64 53.2	19 17.4 54 62 51.4	19 33.7 54 62 51.0	19 49.9 54 61 50.5	20 54.0 53 60 48.7	7
8	15 17.8 57 66 56.2	15 52.1 57 66 55.3	16 43.0 56 64 54.0	17 33.6 56 63 52.7	18 40.1 55 62 51.0	18 56.6 55 61 50.5	19 13.0 55 61 50.1	20 18.1 54 59 48.3	8
9	14 38.1 58 66 55.7	15 12.8 58 65 54.8	16 04.4 57 64 53.6	16 55.6 57 63 52.3	18 03.0 56 61 50.5	18 19.7 56 61 50.1	18 36.4 55 61 49.7	19 42.4 55 59 47.9	9
100	13 58.5 59 65 55.2	14 33.7 58 65 54.4	15 26.0 58 64 53.1	16 17.8 57 63 51.8	17 26.1 57 60 50.1	17 43.1 56 61 49.7	18 00.0 56 60 49.2	19 07.0 55 58 47.5	100
1	13 19.4 59 65 54.7	13 54.9 59 64 53.9	14 47.8 59 63 52.6	15 40.2 58 62 51.4	16 49.5 57 61 49.7	17 06.7 57 60 49.2	17 23.8 57 60 48.8	18 31.8 56 58 47.1	1
2	12 40.4 60 65 54.2	13 16.3 60 64 53.4	14 09.8 59 63 52.1	15 02.9 59 62 50.9	16 13.1 58 60 49.2	16 30.5 58 60 48.8	16 47.9 58 59 48.4	17 56.8 57 58 46.6	2
3	12 01.7 61 64 53.7	12 38.0 60 63 52.9	13 32.1 60 62 51.7	14 25.9 60 61 50.4	15 36.9 59 60 48.8	15 54.6 59 59 48.3	16 12.2 59 59 47.9	17 22.1 58 57 46.2	3
4	11 23.2 61 64 53.2	11 59.9 61 63 52.4	12 54.6 61 62 51.2	13 49.1 60 61 49.9	15 01.0 60 59 48.3	15 18.9 60 59 47.9	15 36.8 59 59 47.5	16 47.6 59 57 45.8	4
105	10 45.0 62 63 52.7	11 22.1 62 63 51.9	12 17.4 61 62 50.7	13 12.5 61 60 49.5	14 25.4 60 59 47.8	14 43.5 60 59 47.4	15 01.6 60 58 47.0	16 13.4 60 57 45.3	105
6	10 07.0 63 63 52.2	10 44.5 62 62 51.4	11 40.5 62 61 50.2	12 36.2 62 60 49.0	13 50.0 61 59 47.4	14 08.4 61 58 47.0	14 26.7 61 58 46.5	15 39.5 60 56 44.9	6
7	9 29.3 63 62 51.7	10 07.2 63 62 50.9	11 03.8 63 61 49.7	12 00.2 62 60 48.5	13 14.9 62 58 46.9	13 33.5 62 58 46.5	13 52.0 62 57 46.1	15 05.8 61 56 44.5	7
8	8 51.8 64 62 51.1	9 30.1 64 61 50.4	10 27.4 64 60 49.2	11 24.4 63 59 48.0	12 40.0 63 58 46.4	12 58.9 63 57 46.0	13 17.6 63 57 45.6	14 32.3 62 55 44.0	8
9	8 14.6 65 62 50.6	8 53.4 64 61 49.8	9 51.3 64 60 48.7	10 49.0 64 59 47.5	12 05.5 64 57 45.9	12 24.5 63 57 45.5	12 43.5 63 56 45.1	13 59.2 63 55 43.6	9
110	7 37.7 65 61 50.1	8 16.9 65 60 49.3	9 15.4 65 59 48.2	10 13.8 65 58 47.0	11 31.2 64 57 45.5	11 50.4 64 56 45.1	12 09.7 64 56 44.7	13 26.3 64 54 43.1	110
1	7 01.1 66 61 49.6	7 40.7 66 60 48.8	8 39.9 66 59 47.7	9 38.9 65 58 46.5	10 57.2 65 56 45.0	11 16.7 65 56 44.6	11 36.1 65 55 44.2	12 53.7 64 54 42.6	1
2	6 24.8 67 60 49.0	7 04.8 66 59 48.3	8 04.5 66 58 47.1	9 04.3 66 57 46.0	10 23.5 66 55 44.5	10 43.2 66 55 44.1	11 02.9 65 55 43.7	12 21.4 65 53 42.2	2
3	5 48.8 67 60 48.5	6 29.2 67 59 47.7	7 29.6 67 58 46.6	8 29.9 67 57 45.5	9 50.0 67 55 44.0	10 10.0 66 55 43.6	10 29.9 66 54 43.2	11 49.4 66 53 41.7	3
4	5 13.1 68 59 47.9	5 53.9 68 58 47.2	6 55.0 68 57 46.1	7 55.9 68 56 45.0	9 16.9 67 55 43.5	9 37.1 67 54 43.1	9 57.3 67 54 42.7	11 17.7 67 52 41.2	4
115		5 18.9 69 58 46.6	6 20.6 69 57 45.5	7 22.2 68 55 44.4	8 44.1 68 54 43.0	9 04.5 68 54 42.6	9 24.9 68 53 42.2	10 46.3 68 52 40.7	115
6			5 46.6 69 56 45.0	6 48.8 69 55 43.9	8 11.6 69 54 42.4	8 32.3 69 53 42.1	8 52.9 69 53 41.7	10 15.2 69 52 40.2	6
7			5 12.9 70 56 44.4	6 15.8 70 55 43.4	7 39.4 70 53 41.9	8 00.3 70 53 41.6	8 21.2 69 52 41.2	9 44.4 69 51 39.7	7
8				5 43.0 71 54 42.8	7 07.6 70 53 41.4	7 28.7 70 52 41.0	7 49.8 70 52 40.7	9 13.9 70 50 39.2	8
9				5 10.6 71 54 42.3	6 36.1 71 52 40.9	6 57.4 71 52 40.5	7 18.7 71 51 40.2	8 43.8 71 50 38.7	9
120					6 04.9 72 51 40.3	6 26.4 72 51 40.0	6 48.0 72 51 39.6	8 13.9 72 49 38.2	120
1					5 34.0 73 51 39.8	5 55.8 73 50 39.4	6 17.6 73 50 39.1	7 44.5 72 49 37.7	1
2					5 03.6 73 50 39.2	5 25.5 73 50 38.9	5 47.5 73 50 38.6	7 15.3 73 48 37.2	2
3							5 17.8 74 49 38.0	6 46.5 74 47 36.7	3
4								6 18.1 75 47 36.1	4
125								5 50.0 75 46 35.6	125
6								5 22.3 76 46 35.1	6

Lat. 37°

H.A.	46°00' Alt.	Δd Δt	Az.	47°00' Alt.	Δd Δt	Az.	48°30' Alt.	Δd Δt	Az.	49°30' Alt.	Δd Δt	Az.	50°30' Alt.	Δd Δt	Az.	51°30' Alt.	Δd Δt	Az.	52°30' Alt.	Δd Δt	Az.	54°00' Alt.	Δd Δt	Az.	H.A.
00	81 00.0	1.0 03	00.0	80 00.0	1.0 03	00.0	78 30.0	1.0 02	00.0	77 30.0	1.0 02	00.0	76 30.0	1.0 02	00.0	75 30.0	1.0 02	00.0	74 30.0	1.0 02	00.0	73 00.0	1.0 01	00.0	00
1	80 58.2	1.0 09	04.4	79 58.4	1.0 08	03.9	78 28.6	1.0 07	03.3	77 28.7	1.0 06	03.0	76 28.9	1.0 06	02.7	75 29.0	1.0 05	02.5	74 29.0	1.0 05	02.3	72 59.2	1.0 04	02.0	1
2	80 52.6	98 15	08.8	79 53.5	99 13	07.8	78 24.5	99 11	06.6	77 25.0	99 10	06.0	76 25.5	99 09	05.4	75 25.8	99 09	05.0	74 26.2	99 08	04.5	72 56.6	1.0 07	04.0	2
3	80 43.5	97 21	13.0	79 45.4	97 19	11.6	78 17.6	98 16	09.8	77 18.8	98 14	08.9	76 19.9	98 13	08.1	75 20.7	98 12	07.4	74 21.5	99 11	06.7	72 52.5	99 10	06.0	3
4	80 31.1	94 26	17.1	79 34.3	95 23	15.2	78 08.1	96 20	13.0	77 10.2	97 18	11.8	76 12.0	97 17	10.7	75 13.5	98 15	09.8	74 14.9	98 14	09.0	72 46.6	98 12	08.0	4
05	80 15.4	91 31	21.0	79 20.3	93 28	18.7	77 56.1	94 24	16.0	76 59.3	95 22	14.6	76 02.0	95 20	13.3	75 04.4	96 18	12.2	74 06.5	97 17	11.2	72 39.2	97 15	09.9	05
6	79 56.9	88 35	24.6	79 03.6	90 32	22.1	77 41.7	92 28	19.0	76 46.1	93 25	17.3	75 50.0	94 23	15.8	74 53.4	95 21	14.5	73 56.3	95 20	13.3	72 30.2	96 18	11.8	6
7	79 35.6	84 39	28.0	78 44.3	87 36	25.2	77 25.0	89 31	21.8	76 30.9	91 29	19.8	75 36.0	92 26	18.2	74 40.5	93 24	16.7	73 44.5	94 22	15.4	72 19.6	95 20	13.6	7
8	79 12.0	81 44	31.1	78 22.8	83 39	28.1	77 06.2	86 35	24.4	76 13.6	88 32	22.3	75 20.2	90 29	20.5	74 25.9	91 27	18.8	73 31.0	92 25	17.4	72 07.6	92 23	15.5	8
9	78 46.3	77 46	33.9	77 59.2	80 42	30.8	76 45.5	84 38	26.9	75 54.5	86 35	24.7	75 02.5	88 32	22.7	74 09.6	89 30	20.9	73 15.9	90 28	19.3	71 54.1	92 25	17.2	9
10	78 18.6	73 49	36.5	77 33.8	77 45	33.4	76 22.9	81 40	29.3	75 33.7	83 37	26.9	74 43.2	85 35	24.8	73 51.7	87 32	22.9	72 59.3	88 30	21.2	71 39.2	90 27	18.9	10
1	77 49.3	69 51	38.9	77 06.6	73 48	35.7	75 58.7	78 43	31.5	75 11.2	80 40	29.0	74 22.4	82 37	26.8	73 32.3	84 35	24.8	72 41.3	86 32	23.0	71 23.0	88 29	20.6	1
2	77 18.5	65 54	41.1	76 37.0	70 50	37.8	75 33.7	75 45	33.5	74 47.3	77 42	31.0	74 00.1	80 39	28.7	73 11.6	82 37	26.6	72 21.9	84 34	24.7	71 05.6	86 31	22.2	2
3	76 46.4	62 55	43.1	76 07.9	66 52	39.8	75 05.8	72 47	35.4	74 22.0	75 44	32.8	73 36.4	77 42	30.5	72 49.5	79 39	28.3	72 01.3	81 36	26.3	70 46.9	84 33	23.7	3
4	76 13.1	59 57	44.9	75 36.6	63 54	41.6	74 37.4	68 49	37.2	73 55.4	72 46	34.6	73 11.5	74 43	32.2	72 26.2	77 41	29.9	71 39.4	79 38	27.9	70 27.1	82 35	25.1	4
15	75 38.8	55 59	46.5	75 04.3	60 55	43.3	74 07.9	65 51	38.8	73 27.6	69 48	36.2	72 45.5	72 45	33.7	72 01.7	74 43	31.5	71 16.4	77 40	29.4	70 06.2	79 37	26.6	15
6	75 03.6	52 60	48.0	74 31.0	57 57	44.8	73 37.4	62 52	40.4	72 58.8	66 50	37.7	72 18.3	69 47	35.2	71 36.1	72 44	32.9	70 52.4	74 42	30.8	69 44.3	77 38	27.9	6
7	74 27.6	49 61	49.3	73 56.8	54 58	46.1	73 05.9	60 54	41.8	72 29.0	63 51	39.1	71 50.2	66 48	36.6	71 09.6	69 46	34.3	70 27.4	72 43	32.1	69 21.4	75 40	29.2	7
8	73 51.0	46 62	50.5	73 21.9	51 59	47.4	72 33.5	57 55	43.1	71 58.4	60 52	40.4	71 21.2	64 50	37.9	70 42.1	67 47	35.6	70 01.4	69 45	33.4	68 57.6	73 41	30.4	8
9	73 13.7	43 63	51.6	72 46.3	48 60	48.6	72 00.4	54 56	44.3	71 26.9	58 54	41.6	70 51.3	61 51	39.2	70 13.8	64 48	36.8	69 34.6	67 46	34.6	68 32.9	70 42	31.6	9
20	72 35.9	41 64	52.6	72 10.1	45 61	49.6	71 26.6	51 57	45.4	70 54.7	55 55	42.8	70 20.7	58 52	40.3	69 44.7	61 50	38.0	69 07.0	64 47	35.7	68 07.5	68 44	32.7	20
1	71 57.6	38 65	53.5	71 33.3	43 62	50.6	70 52.2	49 58	46.4	70 21.8	52 56	43.8	69 49.4	56 53	41.4	69 14.9	59 51	39.0	68 38.7	62 48	36.8	67 41.2	65 45	33.7	1
2	71 18.9	36 65	54.5	70 56.1	40 63	51.5	70 17.2	46 59	47.4	69 48.4	50 57	44.8	69 17.4	53 54	42.4	68 44.4	57 52	40.0	68 09.6	59 49	37.8	67 14.3	63 46	34.7	2
3	70 39.8	33 66	55.1	70 18.4	38 63	52.3	69 41.7	44 60	48.3	69 14.3	47 58	45.7	68 44.8	51 55	43.3	68 13.3	54 53	41.0	67 39.9	57 50	38.8	66 46.7	61 47	35.6	3
4	70 00.3	31 66	55.7	69 40.3	35 64	53.0	69 05.7	41 61	49.1	68 39.8	45 58	46.6	68 11.7	49 56	44.1	67 41.6	52 54	41.8	67 09.7	55 51	39.6	66 18.5	59 48	36.5	4
25	69 20.6	29 67	56.3	69 01.9	33 65	53.7	68 29.3	39 61	49.8	68 04.8	43 59	47.3	67 38.1	46 57	44.9	67 09.4	49 55	42.7	66 38.8	52 52	40.5	65 49.7	57 49	37.3	25
6	68 40.6	27 67	56.9	68 23.1	31 65	54.3	67 52.5	37 62	50.5	67 29.3	40 60	48.0	67 04.0	44 58	45.7	66 36.7	47 55	43.4	66 07.5	50 53	41.2	65 20.4	54 50	38.1	6
7	68 00.3	25 67	57.4	67 44.1	29 65	54.8	67 15.4	35 62	51.1	66 53.5	38 60	48.7	66 29.5	42 58	46.4	66 03.5	45 56	44.1	65 35.6	48 54	42.0	64 50.5	52 51	38.9	7
8	67 19.9	23 68	57.8	67 04.8	27 66	55.3	66 38.0	33 63	51.7	66 17.3	36 61	49.3	65 54.6	40 59	47.0	65 29.9	43 57	44.8	65 03.4	46 54	42.7	64 20.2	50 51	39.6	8
9	66 39.3	21 68	58.2	66 25.3	25 66	55.8	66 00.2	31 63	52.2	65 40.8	34 61	49.9	65 19.4	37 59	47.6	64 56.0	41 57	45.4	64 30.7	44 55	43.3	63 49.5	48 52	40.2	9
30	65 58.5	20 68	58.5	65 45.6	23 66	56.2	65 22.3	29 64	52.7	65 04.1	32 62	50.4	64 43.8	35 60	48.2	64 21.7	39 58	46.0	63 57.7	42 56	43.9	63 18.3	46 53	40.9	30
1	65 17.5	18 68	58.9	65 05.7	21 67	56.5	64 44.1	27 64	53.1	64 27.0	30 62	50.9	64 08.0	33 60	46.5	63 47.1	36 58	46.5	63 24.3	39 56	44.5	62 46.8	44 53	41.4	1
2	64 36.4	16 69	59.1	64 25.7	20 67	56.8	64 05.6	25 64	53.5	63 49.7	28 62	51.3	63 31.9	31 61	49.1	63 12.1	34 59	47.0	62 50.5	37 57	45.0	62 14.9	42 54	42.0	2
3	63 55.2	15 69	59.4	63 45.5	18 67	57.1	63 27.0	23 65	53.8	63 12.3	26 63	51.7	62 55.5	29 61	49.6	62 36.9	32 59	47.5	62 16.5	35 57	45.5	61 42.7	40 54	42.5	3
4	63 14.0	13 69	59.6	63 05.2	16 67	57.4	62 48.3	21 65	54.2	62 34.6	24 63	52.0	62 18.9	28 61	50.0	62 01.5	31 59	47.9	61 42.3	34 58	45.9	61 10.2	38 55	43.0	4
35	62 32.6	11 69	59.8	62 24.8	15 68	57.6	62 09.4	20 65	54.5	61 56.7	23 63	52.4	61 42.2	26 62	50.3	61 25.8	29 60	48.3	61 07.7	32 58	46.3	60 37.4	36 55	43.4	35
6	61 51.1	09 69	60.0	61 44.2	13 68	57.8	61 30.3	18 65	54.7	61 18.7	21 64	52.7	61 05.2	24 62	50.7	60 49.9	27 60	48.7	60 33.0	30 58	46.7	60 04.3	34 56	43.8	6
7	61 09.6	08 69	60.1	61 03.6	12 68	58.0	60 51.1	16 65	55.0	60 40.5	19 64	52.9	60 28.1	22 62	51.0	60 13.9	25 60	49.0	59 58.0	28 59	47.1	59 31.0	34 56	44.2	7
8	60 28.1	07 69	60.2	60 22.9	10 68	58.2	60 11.8	15 66	55.2	60 02.2	18 64	53.2	59 50.8	20 62	51.2	59 37.6	23 61	49.3	59 22.8	26 59	47.4	58 57.5	30 56	44.6	8
9	59 46.5	06 69	60.3	59 42.2	09 68	58.3	59 32.5	13 66	55.3	59 23.8	16 64	53.4	59 13.4	19 63	51.5	59 01.2	22 61	49.6	58 47.5	24 59	47.7	58 23.8	28 57	44.9	9
40	59 04.9	04 69	60.3	59 01.4	07 68	58.4	58 53.0	11 66	55.5	58 45.2	14 64	53.6	58 35.8	17 63	51.7	58 24.7	20 61	49.8	58 12.0	23 59	48.0	57 49.9	27 57	45.2	40
1	58 23.2	03 69	60.4	58 20.6	06 68	58.5	58 13.6	10 66	55.6	58 06.6	13 64	53.8	57 58.2	16 63	50.0	57 48.0	18 61	50.0	57 36.3	21 60	48.2	57 15.8	25 57	45.5	1
2	57 41.5	02 69	60.4	57 39.7	04 68	58.6	57 33.9	09 66	55.8	57 28.0	11 65	53.9	57 20.4	14 63	52.1	57 11.3	17 61	50.2	57 00.5	19 60	48.4	56 41.5	23 57	45.7	2
3	56 59.9	00 69	60.4	56 58.8	03 68	58.6	56 54.3	07 66	55.9	56 49.2	10 65	54.0	56 42.6	12 63	52.3	56 34.4	15 62	50.4	56 24.6	18 60	48.6	56 07.1	21 58	46.0	3
4	56 18.2	01 69	60.4	56 17.9	02 68	58.6	56 14.6	06 66	55.9	56 10.4	08 65	54.1	56 04.7	11 63	52.4	55 57.4	13 62	50.6	55 48.6	16 60	48.8	55 32.6	20 58	46.2	4
45	55 36.5	02 69	60.4	55 37.0	00 68	58.6	55 34.9	04 66	56.0	55 31.5	07 65	54.2	55 26.7	09 63	52.5	55 20.3	12 62	50.7	55 12.5	14 60	49.0	54 58.0	18 58	46.4	45
6	54 54.8	03 69	60.4	54 56.1	01 68	58.6	54 55.1	03 66	56.0	54 52.6	06 65	54.3	54 48.8	07 63	52.6	54 43.2	10 62	50.8	54 36.3	13 60	49.1	54 23.2	16 58	46.6	6
7	54 13.2	04 69	60.3	54 15.2	02 68	58.6	54 15.4	01 66	56.1	54 13.7	04 65	54.3	54 10.6	06 63	52.6	54 06.0	09 62	50.9	54 00.0	11 61	49.2	53 48.4	15 58	46.7	7
8	53 31.6	06 69	60.3	53 34.3	03 68	58.6	53 35.6	00 66	56.1	53 34.8	03 65	54.4	53 32.5	04 63	52.7	53 28.8	07 62	51.0	53 23.7	10 61	49.3	53 13.5	13 58	46.9	8
9	52 50.0	07 69	60.2	52 53.4	05 68	58.5	52 55.9	01 66	56.1	52 55.9	01 65	54.4	52 54.4	02 64	52.7	52 51.5	06 62	51.0	52 47.3	08 61	49.4	52 38.5	12 58	47.0	9
50	52 08.4	08 69	60.1	52 12.5	06 68	58.5	52 16.9	02 65	56.0	52 16.9	00 65	54.4	52 16.2	00 64	52.8	52 14.2	04 62	51.1	52 10.9	07 61	49.5	52 03.4	10 59	47.1	50
1	51 26.9	09 69	60.0	51 31.7	07 68	58.4	51 37.9	01 65	56.0	51 37.9	01 65	54.4	51 38.1	01 64	52.8	51 37.0	03 62	51.2	51 34.5	05 61	49.6	51 28.3	09 59	47.2	1
2	50 45.4	10 69	59.9	50 50.9	08 68	58.3	50 58.9	03 65	56.0	50 58.9	03 65	54.4	50 59.9	02 64	52.8	50 59.6	02 62	51.2	50 58.0	04 61	49.6	50 53.1	07 59	47.2	2
3	50 04.0	11 69	59.8	50 10.1	09 68	58.2	50 17.9	04 65	55.9	50 20.0	04 65	54.3	50 21.7	03 64	52.8	50 22.2	00 62	51.2	50 21.5	02 61	49.6	50 17.9	05 59	47.3	3
4	49 22.6	12 69	59.7	49 29.4	10 68	58.1	49 37.3	06 65	55.8	49 41.1	05 65	54.3	49 43.6	04 64	52.8	49 44.9	01 62	51.2	49 44.9	01 61	49.7	49 42.7	04 59	47.3	4
55	48 41.2	14 69	59.5	48 48.7	11 68	58.0	48 57.7	07 65	55.8	49 02.2	06 65	54.2	49 05.5	04 64	52.7	49 07.5	02 62	51.2	49 08.4	00 61	49.7	49 07.5	03 59	47.4	55
6	48 00.0	14 69	59.4	48 08.1	13 68	57.9	48 18.1	10 65	55.7	48 23.3	08 65	54.1	48 27.3	06 63	52.7	48 30.2	04 62	51.1	48 31.9	02 61	49.7	48 32.3	01 59	47.4	6
7	47 18.8	16 69	59.2	47 27.5	14 68	57.8	47 38.5	11 66	55.6	47 44.5	09 65	54.1	47 49.3	07 63	52.6	47 53.0	05 62	51.1	47 55.4	03 61	49.6	47 56.9	00 59	47.4	7
8	46 37.6	17 69	59.1	46 47.0	15 67	57.6	46 59.0	12 66	55.5	47 05.7	10 65	54.0	47 11.2	08 63	52.5	47 15.6	06 62	51.1	47 18.9	05 61	49.6	47 21.7	02 59	47.4	8
9	45 56.5	18 69	58.9	46 06.6	16 67	57.5	46 19.6	13 66	55.3	46 26.9	11 64	53.9	46 33.2	10 63	52.5	46 38.3	08 62	51.0	46 42.4	06 61	49.5	46 46.4	03 59	47.4	9
60	45 15.6	19 69	58.7	45 26.2	17 67	57.3	45 40.2	14 65	55.2	45 48.2	12 64	53.8	45 55.2	11 63	52.3	46 01.1	09 62	50.9	46 06.0	07 61	49.5	46 11.2	04 59	47.3	60
1	44 34.6	20 69	58.5	44 45.9	18 67	57.2	45 00.9	15 65	55.1	45 09.6	14 64	53.7	45 17.3	12 63	52.3	45 23.9	10 62	50.8	45 29.6	08 61	49.4	45 35.9	06 59	47.2	1
2	43 53.8	21 69	58.3	44 05.7	19 67	57.0	44 21.6	16 65	54.9	44 31.0	15 64	53.5	44 39.4	13 63	52.1	44 46.8	11 62	50.7	44 53.2	10 61	49.3	45 00.7	07 59	47.2	2
3	43 13.1	22 69	58.1	43 25.5	20 67	56.8	43 42.5	18 65	54.8	43 52.5	16 64	53.4	44 01.6	14 63	52.0	44 09.7	13 62	50.6	44 16.8	11 60	49.3	44 25.6	08 59	47.2	3
4	42 32.4	23 69	57.9	42 45.5	21 67	56.6	43 03.4	19 65	54.6	43 14.1	17 64	53.2	43 23.9	16 63	51.9	43 32.7	14 62	50.5	43 40.6	12 60	49.2	43 50.5	10 58	47.1	4
65	41 51.9	24 67	57.7	42 05.5	22 66	56.4	42 24.4	20 65	54.4	42 35.8	18 64	53.1	42 46.2	17 63	51.6	42 55.8	15 61	50.4	43 04.3	13 60	49.0	43 15.4	11 58	47.0	65
6	41 11.4	25 67	57.5	41 25.7	23 66	56.2	41 45.4	21 65	54.2	41 57.5	19 64	52.9	42 08.6	18 63	51.6	42 18.9	16 61	50.3	42 28.2	15 60	48.9	42 40.4	12 58	46.9	6
7	40 31.0	25 67	57.3	40 45.9	24 66	56.0	41 06.6	22 65	54.1	41 19.3	20 64	52.8	41 31.1	19 62	51.4	41 42.1	17 61	50.1	41 52.1	16 60	48.8	42 05.4	14 58	46.8	7
8	39 50.8	26 67	57.0	40 06.2	25 66	55.8	40 27.8	23 64	53.9	40 41.2	22 63	52.6	40 53.7	20 62	51.3	41 05.3	19 61	50.0	41 16.1	17 60	48.7	41 30.5	15 58	46.7	8
9	39 10.6	27 67	56.8	39 26.7	26 66	55.5	39 49.2	24 63	53.7	40 03.2	23 63	52.4	40 16.4	21 62	51.2	40 28.7	20 61	49.8	40 40.1	18 60	48.5	40 55.7	16 58	46.5	9
70	38 30.6	28 67	56.5	38 47.2	27 66	55.3	39 10.7	25 64	53.4	39 25.3	24 63	52.2	39 39.1	22 62	50.9	39 52.1	21 61	49.7	40 04.3	20 60	48.4	40 20.9	17 58	46.4	70
1	37 50.7	29 66	56.3	38 07.9	28 65	55.1	38 32.2	26 64	53.2	38 47.5	25 63	52.0	39 02.0	22 61	50.7	39 15.6	22 61	49.5	39 28.5	21 60	48.2	39 46.2	18 58	46.3	1
2	37 10.9	30 66	56.0	37 28.7	29 65	54.8	37 53.9	27 64	53.0	38 09.8	26 63	51.8	38 24.9	23 61	50.5	38 39.2	23 60	49.3	38 52.8	22 59	48.0	39 11.6	20 58	46.2	2
3	36 31.2	31 66	55.8	36 49.6	30 65	54.6	37 15.7	28 63	52.8	37 32.2	27 63	51.6	37 48.0	24 61	50.3	38 03.0	24 60	49.1	38 17.2	23 59	47.9	38 37.1	21 57	46.0	3
4	35 51.7	32 66	55.5	36 10.6	31 65	54.3	36 37.6	29 63	52.5	36 54.7	28 62	51.3	37 11.1	25 61	50.0	37 26.8	25 60	48.9	37 41.7	24 59	47.7	38 02.7	22 57	45.9	4
75	35 12.3	33 65	55.2	35 31.7	32 65	54.0	35 59.6	30 63	52.3	36 17.4	29 62	51.1	36 34.4	26 61	49.9	36 50.7	27 60	48.7	37 06.3	25 59	47.5	37 28.3	24 57	45.7	75
6	34 33.0	34 65	54.9	34 53.0	33 64	53.8	35 21.8	31 63	52.0	35 40.1	30 62	50.9	35 57.8	27 61	49.6	36 14.8	28 60	48.5	36 31.1	27 59	47.3	36 54.1	25 57	45.5	6
7	33 53.8	35 65	54.6	34 14.4	34 64	53.5	34 44.1	32 63	51.8	35 03.0	31 62	50.6	35 21.3	28 61	49.3	35 39.0	29 60	48.3	35 55.9	28 58	47.1	36 20.0	26 57	45.3	7
8	33 14.8	36 65	54.0	33 36.0	35 64	53.2	34 06.5	33 62	51.5	34 26.1	32 62	50.3	34 45.0	29 60	49.1	35 03.3	30 60	48.1	35 20.8	29 58	46.9	35 46.0	27 56	45.1	8
9	32 36.0	37 65	54.0	32 57.7	36 64	52.9	33 29.1	34 62	51.2	33 49.2	33 61	50.1	34 08.8	30 60	49.0	34 27.7	31 59	47.8	34 45.9	30 58	46.7	35 12.1	28 56	44.9	9
80	31 57.3	38 64	53.7	32 19.5	37 63	52.6	32 51.8	35 62	51.0	33 12.5	34 61	49.9	33 32.7	33 60	48.5	33 52.2	32 59	47.6	34 11.1	31 58	46.4	34 38.3	29 56	44.7	80
1	31 18.7	38 64	53.4	31 41.5	37 63	52.3	32 14.6	36 62	50.7	32 36.0	35 61	49.6	32 56.7	34 60	48.2	33 16.9	33 59	47.3	33 36.5	32 58	46.2	34 04.6	31 56	44.5	1
2	30 40.3	39 64	53.1	31 03.6	38 63	52.0	31 37.6	37 61	50.4	31 59.6	36 60	49.3	32 20.9	35 59	48.2	32 41.7	34 59	47.1	33 02.0	33 57	46.0	33 31.1	32 56	44.3	2
3	30 02.1	40 63	52.8	30 25.9	39 63	51.7	31 00.7	38 61	50.1	31 23.3	37 60	49.0	31 45.3	35 59	48.0	32 06.7	35 58	46.8	32 27.6	34 57	45.7	32 57.7	33 55	44.1	3
4	29 24.0	41 63	52.5	29 48.4	40 62	51.4	30 24.1	39 61	49.8	30 47.2	38 60	48.7	31 09.8	37 59	47.7	31 31.8	36 58	46.6	31 53.3	35 57	45.5	32 24.5	34 55	43.8	4
85	28 46.1	42 63	52.1	29 11.0	41 62	51.1	29 47.5	40 61	49.5	30 11.3	39 60	48.5	30 34.4	38 59	47.4	30 57.1	37 58	46.3	31 19.2	36 57	45.2	31 51.4	35 55	43.6	85
6	28 08.3	43 63	51.8	28 33.8	42 62	50.8	29 11.2	41 60	49.2	29 35.5	40 59	48.2	29 59.3	39 58	47.1	30 22.5	38 57	46.0	30 45.3	37 56	45.0	31 18.4	36 55	43.3	6
7	27 30.8	44 62	51.5	27 56.8	43 61	50.4	28 35.0	42 60	48.9	28 59.9	41 59	47.9	29 24.4	40 58	46.8	29 48.1	39 57	45.8	30 11.5	39 56	44.7	30 45.6	37 54	43.1	7
8	26 53.4	45 62	51.2	27 19.9	44 61	50.1	27 59.1	43 60	48.6	28 24.4	42 58	47.6	28 49.8	41 58	46.5	29 13.9	40 57	45.5	29 37.9	40 56	44.4	30 13.0	38 54	42.8	8
9	26 16.2	46 62	50.8	26 43.3	45 61	49.8	27 23.1	44 59	48.3	27 49.1	43 58	47.2	28 15.3	41 58	46.2	28 39.8	41 56	45.2	29 04.4	41 55	44.1	29 40.5	39 54	42.6	9
90	25 39.1	46 61	50.4	26 06.8	46 60	49.4	26 47.4	45 59	47.9	27 14.0	44 58	46.9	27 40.9	43 57	45.9	28 05.9	42 56	44.9	28 31.1	42 55	43.9	29 08.1	40 54	42.3	90

Lat. 37°

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	46° 00'	47° 00'	48° 30'	49° 30'	50° 30'	51° 30'	52° 30'	54° 00'	H.A.
	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	
00	7 00.0 1.0 00 180.0	6 00.0 1.0 00 180.0							00
1	6 59.7 1.0 01 179.3	5 59.7 1.0 01 179.3							1
2	6 58.8 1.0 02 178.6	5 58.9 1.0 02 178.6							2
3	6 57.4 1.0 03 177.9	5 57.4 1.0 03 177.9							3
4	6 55.3 1.0 04 177.2	5 55.4 1.0 04 177.3							4
05	6 52.7 1.0 05 176.5	5 52.8 1.0 05 176.6							05
6	6 49.5 1.0 06 175.8	5 49.7 1.0 06 175.9							6
7	6 45.7 1.0 07 175.1	5 46.0 1.0 07 175.2							7
8	6 41.3 99 08 174.4	5 41.7 99 08 174.5							8
9	6 36.4 99 09 173.7	5 36.8 99 09 173.8							9
10	6 30.8 99 10 173.0	5 31.4 99 10 173.2							10
1	6 24.7 99 11 172.3	5 25.4 99 11 172.5							1
2	6 18.0 99 12 171.6	5 18.9 99 12 171.8							2
3	6 10.8 98 13 171.0	5 11.8 98 13 171.1							3
4	6 03.0 98 14 170.3	5 04.1 98 14 170.5							4
15	5 54.6 98 15 169.6								15
6	5 45.7 98 16 168.9								6
7	5 36.2 97 17 168.2								7
8	5 26.1 97 18 167.5								8
9	5 15.5 97 19 166.9								9
20	5 04.3 96 20 166.2								20

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00'	47° 00'	48° 30'	49° 30'	50° 30'	51° 30'	52° 30'	54° 00'	H.A.
	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	Alt. / Az.	
91	25 02.3 47 61 50.0	25 30.5 47 60 49.1	26 12.0 46 59 47.6	26 39.1 45 58 46.6	27 05.9 44 57 45.6	27 32.2 43 56 44.6	27 58.0 43 55 43.6	28 36.0 42 53 42.0	91
2	24 25.7 48 61 49.7	24 54.4 47 60 48.7	25 36.7 47 58 47.3	26 04.4 46 58 46.3	26 31.7 45 57 45.3	26 58.6 44 56 44.3	27 25.1 44 55 43.3	28 04.0 43 53 41.7	2
3	23 49.2 49 60 49.3	24 18.5 48 60 48.4	25 01.6 47 58 46.9	25 29.9 47 57 45.9	25 57.8 46 56 45.0	26 25.3 45 55 44.0	26 52.4 45 54 43.0	27 32.2 44 53 41.4	3
4	23 13.0 50 60 48.9	23 42.7 49 59 48.0	24 26.7 48 58 46.6	24 55.5 48 57 45.6	25 24.0 47 56 44.6	25 52.1 46 55 43.6	26 19.8 46 54 42.7	27 00.6 45 52 41.2	4
95	22 37.0 51 60 48.6	23 07.2 50 59 47.6	23 52.0 49 57 46.2	24 21.4 49 57 45.2	24 50.5 48 56 44.3	25 19.1 47 55 43.3	25 47.4 47 54 42.3	26 29.1 46 52 40.9	95
6	22 01.2 52 59 48.2	22 31.9 51 58 47.2	23 17.5 50 57 45.8	23 47.5 50 56 44.9	24 17.1 49 55 43.9	24 46.4 48 54 43.0	25 15.2 48 53 42.0	25 57.9 47 52 40.6	6
7	21 25.6 52 59 47.8	21 56.9 52 58 46.9	22 43.2 51 57 45.5	23 13.8 51 56 44.5	23 43.9 50 55 43.6	24 13.8 49 54 42.7	24 43.3 49 53 41.7	25 26.8 48 51 40.2	7
8	20 50.2 53 59 47.4	21 22.0 53 58 46.5	22 09.2 52 56 45.1	22 40.3 52 56 44.2	23 11.0 51 55 43.3	23 41.4 50 54 42.3	24 11.5 50 53 41.4	24 55.9 49 51 39.9	8
9	20 15.0 54 58 47.0	20 47.4 54 57 46.1	21 35.4 53 56 44.7	22 07.0 52 55 43.8	22 38.3 52 54 42.9	23 09.3 51 53 42.0	23 39.9 51 52 41.0	24 25.3 50 51 39.6	9
100	19 40.1 55 58 46.6	20 13.0 55 57 45.7	21 01.7 54 56 44.4	21 33.9 53 55 43.4	22 05.8 53 54 42.5	22 37.3 52 53 41.6	23 08.6 52 52 40.7	23 54.8 51 50 39.3	100
1	19 05.4 56 57 46.2	19 38.8 55 57 45.3	20 28.4 55 55 44.0	21 01.1 54 54 43.1	21 33.5 54 53 42.2	22 05.6 53 52 41.3	22 37.4 53 52 40.3	23 24.6 52 50 39.0	1
2	18 30.9 57 57 45.8	19 04.8 56 56 44.9	19 55.2 56 55 43.6	20 28.5 55 54 42.7	21 01.4 55 53 41.8	21 34.1 54 52 40.9	22 06.5 54 51 40.0	22 54.6 53 50 38.6	2
3	17 56.7 58 57 45.4	18 31.1 57 56 44.5	19 22.3 57 54 43.2	19 56.1 56 54 42.3	20 29.6 56 53 41.4	21 02.9 55 52 40.5	21 35.9 55 51 39.6	22 24.8 54 49 38.3	3
4	17 22.8 58 56 44.9	17 57.7 58 55 44.1	18 49.6 57 54 42.8	19 23.9 57 53 41.9	19 58.0 57 52 41.0	20 31.8 56 51 40.2	21 05.4 56 50 39.3	21 55.2 55 49 37.9	4
105	16 49.0 59 56 44.5	17 24.5 59 55 43.7	18 17.2 58 54 42.4	18 52.1 58 53 41.5	19 26.7 58 52 40.7	20 01.1 57 51 39.8	20 35.2 57 50 38.9	21 25.9 56 49 37.6	105
6	16 15.6 60 55 44.1	16 51.5 60 54 43.2	17 45.0 59 53 42.0	18 20.4 59 52 41.1	18 55.6 58 51 40.3	19 30.5 58 50 39.4	20 05.2 58 50 38.5	20 56.8 57 48 37.2	6
7	15 42.4 61 55 43.6	16 18.8 61 54 42.8	17 13.1 60 53 41.6	17 49.0 60 52 40.7	18 24.7 59 51 39.9	19 00.2 59 50 39.0	19 35.5 59 49 38.2	20 27.9 58 48 36.9	7
8	15 09.4 62 54 43.2	15 46.4 61 54 42.4	16 41.4 61 52 41.1	17 17.9 61 51 40.3	17 54.1 60 51 39.5	18 30.2 60 50 38.6	19 06.0 59 49 37.8	19 59.3 59 47 36.5	8
9	14 36.8 63 54 42.7	15 14.2 62 53 41.9	16 10.0 62 52 40.7	16 47.0 61 51 39.9	17 23.8 61 50 39.1	18 00.4 61 49 38.2	18 36.8 60 48 37.4	19 30.9 60 47 36.1	9
110	14 04.4 63 54 42.3	14 42.3 63 53 41.5	15 38.9 63 51 40.3	16 16.4 62 51 39.5	16 53.7 62 50 38.7	17 30.9 62 49 37.8	18 07.8 61 48 37.0	19 02.8 61 46 35.8	110
1	13 32.3 64 53 41.8	14 10.7 64 52 41.0	15 08.1 64 51 39.9	15 46.1 63 50 39.1	16 23.9 63 49 38.2	17 01.6 63 48 37.4	17 39.1 62 47 36.6	18 34.9 62 46 35.4	1
2	13 00.5 65 53 41.4	13 39.4 65 52 40.6	14 37.5 64 50 39.4	15 16.0 64 50 38.6	15 54.4 64 49 37.8	16 32.6 64 48 37.0	17 10.6 63 47 36.2	18 07.3 63 46 35.0	2
3	12 28.9 66 52 40.9	13 08.4 66 51 40.1	14 07.2 65 50 39.0	14 46.3 65 49 38.2	15 25.2 65 48 37.4	16 03.9 64 47 36.6	16 42.5 64 46 35.8	17 39.9 64 45 34.6	3
4	11 57.7 67 52 40.4	12 37.6 66 51 39.7	13 37.2 66 50 38.5	14 16.8 66 49 37.8	14 56.2 66 48 37.0	15 35.5 65 47 36.2	16 14.6 65 46 35.4	17 12.9 65 45 34.2	4
115	11 26.8 67 51 40.0	12 07.2 67 50 39.2	13 07.5 67 49 38.1	13 47.6 67 48 37.3	14 27.5 66 47 36.5	15 07.3 66 46 35.8	15 46.9 66 46 35.0	16 46.1 65 44 33.8	115
6	10 56.2 68 51 39.5	11 37.0 68 50 38.7	12 38.1 68 48 37.6	13 18.7 68 48 36.9	13 59.2 67 47 36.1	14 39.5 67 46 35.3	15 19.6 67 45 34.6	16 19.5 66 44 33.4	6
7	10 25.8 69 50 39.0	11 07.2 69 49 38.3	12 09.0 69 48 37.2	12 50.1 68 47 36.4	13 31.1 68 46 35.7	14 11.9 68 45 34.9	14 52.6 68 45 34.1	15 53.3 67 43 33.0	7
8	9 55.8 70 49 38.5	10 37.7 70 49 37.8	11 40.3 69 47 36.7	12 21.8 69 47 35.9	13 03.3 69 46 35.2	13 44.6 69 45 34.5	14 25.8 69 44 33.7	15 27.4 68 43 32.6	8
9	9 26.2 71 49 38.0	10 08.5 70 48 37.3	11 11.8 70 47 36.2	11 53.9 70 46 35.5	12 35.8 70 45 34.8	13 17.7 70 44 34.0	13 59.4 69 44 33.3	15 01.7 69 42 32.2	9
120	8 56.8 71 48 37.5	9 39.6 71 48 36.8	10 43.6 71 46 35.7	11 26.2 71 46 35.0	12 08.7 71 45 34.3	12 51.0 70 44 33.6	13 33.2 70 43 32.8	14 36.3 70 42 31.7	120
1	8 27.8 72 48 37.0	9 11.1 72 47 36.3	10 15.8 72 46 35.3	10 58.9 72 45 34.5	11 41.8 72 44 33.8	12 24.7 71 43 33.1	13 07.4 71 43 32.3	14 11.3 71 41 31.3	1
2	7 59.1 73 47 36.5	8 42.9 73 46 35.8	9 48.3 73 45 34.8	10 31.9 72 44 34.1	11 15.3 72 44 33.4	11 58.7 72 43 32.7	12 41.9 72 42 32.0	13 46.5 72 41 30.8	2
3	7 30.8 74 47 36.0	8 15.0 74 46 35.3	9 21.2 73 45 34.3	10 05.2 73 44 33.6	10 49.1 73 43 32.9	11 33.0 73 42 32.2	12 16.7 72 42 31.5	13 22.1 73 40 30.4	3
4	7 02.8 74 46 35.5	7 47.5 74 45 34.8	8 54.4 74 44 33.8	9 38.8 74 43 33.1	10 23.3 74 43 32.4	11 07.6 74 42 31.7	11 51.8 74 41 31.0	12 58.0 73 40 30.0	4
125	6 35.2 75 45 34.9	7 20.3 75 45 34.3	8 27.9 75 44 33.3	9 12.9 75 43 32.6	9 57.7 75 42 31.9	10 42.6 75 41 31.3	11 27.3 74 40 30.6	12 34.2 74 39 29.6	125
6	6 07.9 76 45 34.4	6 53.5 76 44 33.8	8 01.8 76 43 32.8	8 47.2 76 42 32.1	9 32.6 76 41 31.5	10 17.9 75 41 30.8	11 03.1 75 40 30.1	12 10.7 75 39 29.1	6
7	5 41.0 77 44 33.9	6 27.0 77 43 33.2	7 36.0 76 42 32.3	8 21.9 76 42 31.6	9 07.7 76 41 31.0	9 53.5 76 40 30.3	10 39.2 76 39 29.7	11 47.6 76 38 28.7	7
8	5 14.5 77 44 33.3	6 01.0 77 43 32.7	7 10.6 77 42 31.8	7 57.0 77 41 31.1	8 43.3 77 40 30.5	9 29.5 77 39 29.8	10 15.7 77 39 29.2	11 24.7 77 37 28.2	8
9		5 35.3 78 42 32.2	6 45.6 78 41 31.2	7 32.4 78 40 30.6	8 19.1 78 40 30.0	9 05.8 78 39 29.3	9 52.5 78 38 28.7	11 02.3 77 37 27.7	9
130		5 09.9 79 42 31.6	6 20.9 79 40 30.7	7 08.2 79 40 30.1	7 55.4 79 39 29.5	8 42.5 79 38 28.8	9 29.6 78 37 28.2	10 40.1 78 36 27.3	130
1			5 56.6 80 40 30.2	6 44.3 79 39 29.6	7 32.0 79 38 29.0	8 19.6 79 38 28.3	9 07.2 79 37 27.7	10 18.4 79 36 26.8	1
2			5 32.7 80 39 29.7	6 20.9 80 38 29.1	7 09.0 80 38 28.5	7 57.0 80 37 27.8	8 45.0 80 36 27.2	9 56.9 80 35 26.3	2
3			5 09.2 81 38 29.1	5 57.8 81 38 28.5	6 46.3 81 37 27.9	7 34.8 81 36 27.3	8 23.3 81 36 26.7	9 35.9 81 35 25.8	3
4				5 35.1 82 37 28.0	6 24.1 82 36 27.4	7 13.0 82 36 26.8	8 01.9 81 35 26.2	9 15.2 81 34 25.4	4
135				5 12.8 82 36 27.5	6 02.2 82 36 26.9	6 51.6 82 35 26.3	7 40.9 82 34 25.7	8 54.8 82 33 24.9	135
6					5 40.7 83 35 26.4	6 30.5 83 34 25.8	7 20.3 83 33 25.2	8 34.8 83 33 24.4	6
7					5 19.7 84 34 25.8	6 09.9 84 33 25.3	7 00.0 84 33 24.7	8 15.2 83 32 23.9	7
8						5 49.6 84 33 24.8	6 40.2 84 32 24.2	7 56.0 84 31 23.4	8
9						5 29.7 85 32 24.2	6 20.7 85 32 23.7	7 37.2 85 31 22.9	9
140						5 10.3 86 32 23.7	6 01.7 86 31 23.2	7 18.7 86 30 22.4	140
1							5 43.0 86 30 22.6	7 00.7 86 29 21.9	1
2							5 24.8 87 30 22.1	6 43.0 87 29 21.4	2
3							5 07.0 88 29 21.6	6 25.8 88 28 20.9	3
4								6 08.9 88 27 20.3	4
145								5 52.5 89 27 19.8	145
6								5 36.4 89 26 19.3	6
7								5 20.8 90 25 18.8	7
8								5 05.6 91 25 18.2	8

Lat 38°

16—65158-1

Lat. 37°

H.A.	54° 30' (Alt. Δd Δt / Az.)	55° 00'	56° 00'	56° 30'	57° 00'	57° 30'	59° 00'	59° 30'	H.A.
00	72 30.0 1.00 1 00.0	72 00.0 1.00 1 00.0	71 00.0 1.00 1 00.0	70 30.0 1.00 1 00.0	70 00.0 1.00 1 00.0	69 30.0 1.00 1 00.0	68 00.0 1.00 1 00.0	67 30.0 1.00 1 00.0	00
1	72 29.2 1.00 1 01.9	71 59.2 1.00 1 01.9	70 59.3 1.00 4 01.7	70 29.3 1.00 3 01.7	69 59.3 1.00 3 01.6	69 29.4 1.00 3 01.5	67 59.4 1.00 3 01.4	67 29.4 1.00 3 01.3	1
2	72 26.8 1.00 7 03.9	71 56.9 1.00 6 03.7	70 57.1 1.00 6 03.4	70 27.2 1.00 6 03.3	69 57.3 1.00 6 03.2	69 27.4 1.00 5 03.1	67 57.7 1.00 5 02.7	67 27.8 1.00 5 02.6	2
3	72 22.8 99 09 05.8	71 53.0 99 09 05.5	70 53.6 99 08 05.1	70 23.8 99 08 04.9	69 54.0 99 08 04.8	69 24.2 99 07 04.6	67 54.8 99 07 04.1	67 25.0 99 06 04.0	3
4	72 17.2 98 12 07.7	71 47.7 98 11 07.4	70 48.6 99 11 06.8	70 19.0 99 10 06.6	69 49.4 99 10 06.3	69 19.8 99 10 06.1	67 50.8 99 09 05.5	67 21.2 99 08 05.3	4
05	72 10.0 97 14 09.5	71 40.8 98 14 09.2	70 42.2 98 13 08.5	70 12.8 98 12 08.2	69 43.5 98 12 07.9	69 14.1 98 12 07.6	67 45.7 97 16 06.8	67 16.2 98 10 06.6	05
6	72 01.3 96 17 11.3	71 32.4 96 16 10.9	70 34.4 97 15 10.1	70 05.4 97 15 09.4	69 36.3 97 14 09.4	69 07.1 97 14 09.1	67 39.5 98 12 08.1	67 10.2 97 14 09.1	6
7	71 51.2 95 19 13.1	71 22.6 95 19 12.6	70 25.4 96 17 11.7	69 56.6 96 17 11.3	69 27.8 96 16 10.9	68 59.0 96 16 10.5	67 32.1 97 14 09.5	67 03.1 97 14 09.1	7
8	71 39.6 94 22 14.9	71 11.5 94 21 14.3	70 15.0 94 19 13.3	69 46.6 95 19 12.8	69 18.2 95 18 12.4	68 49.6 95 17 11.9	67 23.7 96 16 10.7	66 55.0 96 15 10.4	8
9	71 26.6 92 24 16.6	70 58.9 92 23 16.0	70 03.3 93 22 14.9	69 35.3 93 21 14.3	69 07.3 94 20 13.8	68 39.1 94 19 13.3	67 14.3 95 18 12.0	66 45.9 95 17 11.6	9
10	71 12.2 90 26 18.2	70 45.1 91 26 17.6	69 50.4 92 23 16.4	69 22.9 92 23 15.8	68 55.3 92 23 15.2	68 27.5 92 21 14.7	67 03.8 93 19 12.8	66 35.7 93 19 12.8	10
1	70 56.6 88 28 19.8	70 30.0 89 27 19.1	69 36.3 90 25 17.8	69 09.3 90 25 17.2	68 42.1 91 24 16.6	68 14.4 91 23 16.1	66 52.3 92 21 14.5	66 24.6 92 20 14.0	1
2	70 39.7 87 30 21.4	70 13.7 87 29 20.6	69 21.1 88 27 19.2	68 54.5 89 26 18.6	68 27.8 89 26 18.0	68 01.0 90 25 17.4	66 39.8 91 22 15.7	66 12.5 91 22 15.2	2
3	70 21.7 85 32 22.9	69 56.2 85 31 22.1	69 04.7 86 29 20.6	68 38.7 87 28 19.9	68 12.5 88 27 19.3	67 46.2 88 26 18.6	66 26.4 89 24 16.8	65 59.5 90 23 16.3	3
4	70 02.5 82 34 24.3	69 37.7 83 34 23.3	68 47.3 85 31 21.2	68 21.9 85 30 21.2	67 56.2 86 29 20.5	67 30.4 86 26 19.9	66 12.1 88 25 17.4	65 45.6 88 25 17.4	4
15	69 42.3 80 35 25.7	69 18.0 81 34 24.8	68 28.9 83 32 23.2	68 04.0 83 31 22.5	67 38.9 84 30 21.8	67 13.7 85 29 21.1	65 56.8 86 27 19.1	65 30.9 87 26 18.5	15
6	69 21.0 78 37 27.0	68 57.4 79 36 26.1	68 09.5 81 34 24.5	67 45.2 81 33 23.7	67 20.7 82 32 22.9	66 56.0 83 31 22.2	65 40.7 85 28 20.2	65 15.3 85 27 19.5	6
7	68 58.8 76 39 28.3	68 35.9 77 37 27.4	67 49.2 79 35 25.7	67 25.5 79 34 24.9	67 01.6 80 33 24.1	66 37.4 81 32 23.3	65 23.8 83 30 21.2	64 58.9 83 29 20.5	7
8	68 35.6 74 40 29.5	68 13.4 75 39 28.5	67 28.0 77 37 26.8	67 05.0 77 36 26.0	66 41.6 78 35 25.2	66 18.1 79 34 24.4	65 06.1 81 31 22.2	64 41.7 82 30 21.5	8
9	68 11.7 71 41 30.6	67 50.1 72 40 29.7	67 06.0 74 38 27.9	66 43.6 75 37 27.1	66 20.8 76 36 26.2	65 57.9 77 35 25.4	64 47.6 79 32 23.2	64 23.7 80 31 22.5	9
20	67 46.9 69 43 31.7	67 26.0 70 41 30.7	66 43.2 72 39 28.9	66 21.4 73 38 28.1	65 59.3 74 37 27.2	65 36.9 75 36 26.4	64 28.3 77 33 24.1	64 05.0 78 32 23.4	20
1	67 21.3 67 44 32.7	67 01.1 68 43 31.8	66 19.7 70 40 29.9	65 58.5 71 39 29.1	65 37.0 72 38 28.2	65 15.2 73 37 27.4	64 08.4 75 34 25.0	63 45.7 76 33 24.3	1
2	66 55.1 65 45 33.7	66 35.5 66 44 32.7	65 55.4 68 42 30.9	65 34.8 69 40 30.0	65 14.0 70 39 29.1	64 52.8 71 38 28.3	63 47.8 74 35 25.9	63 25.6 74 34 25.2	2
3	66 28.2 62 46 34.6	66 09.3 64 43 33.6	65 30.5 66 43 31.8	65 10.6 67 42 30.9	64 50.3 68 40 30.0	64 29.8 69 39 29.2	63 26.5 72 36 26.8	63 04.0 72 35 26.0	3
4	66 00.6 60 47 35.5	65 42.4 61 46 34.5	65 04.9 64 44 32.7	64 45.6 65 43 31.8	64 26.0 66 42 30.9	64 06.1 67 40 30.0	63 04.7 70 37 27.6	62 43.6 71 36 26.8	4
25	65 32.5 58 48 36.4	65 15.0 59 47 35.4	64 38.7 62 45 33.5	64 20.1 63 43 32.6	64 01.1 64 42 31.7	63 41.9 65 41 30.8	62 42.2 68 38 28.3	62 21.8 69 37 27.5	25
6	65 03.9 56 49 37.1	64 46.9 57 48 36.2	64 12.0 59 45 34.3	63 54.0 61 44 33.4	63 35.7 62 43 32.5	63 17.0 63 42 31.6	62 19.2 66 39 29.1	61 59.3 67 38 28.3	6
7	64 34.7 54 49 37.9	64 18.4 55 48 36.9	63 44.8 57 46 35.0	63 27.4 58 45 34.1	63 09.7 60 44 33.2	62 51.7 61 43 32.3	61 55.6 64 40 29.8	61 36.4 65 39 29.0	7
8	64 05.0 51 50 38.6	63 49.4 53 49 37.6	63 16.7 55 47 35.7	63 00.3 56 46 34.8	62 43.3 58 45 33.9	62 25.8 59 44 33.0	61 31.6 62 41 30.5	61 12.9 63 40 29.7	8
9	63 34.9 49 51 39.3	63 19.9 51 50 38.3	62 48.3 53 48 36.4	62 32.7 54 47 35.5	62 16.2 55 46 34.6	61 59.4 57 45 33.7	61 07.0 60 42 31.1	60 49.0 61 41 30.3	9
30	63 04.4 47 52 39.9	62 50.0 48 50 38.9	62 20.2 51 48 37.0	62 04.7 52 47 36.1	61 48.8 53 46 35.2	61 32.6 55 45 34.3	60 42.0 58 42 31.8	60 24.6 59 41 30.9	30
1	62 33.5 45 52 40.5	62 19.7 46 51 39.5	61 51.1 49 49 37.6	61 36.2 50 48 36.7	61 21.0 51 47 35.8	61 05.4 53 46 34.9	60 16.6 56 43 32.3	59 59.7 57 42 31.5	1
2	62 02.2 43 53 41.0	61 49.1 44 52 40.1	61 21.7 47 50 38.2	61 07.4 48 49 37.3	60 52.8 49 48 36.4	60 37.8 51 47 35.5	59 50.8 54 44 32.9	59 34.5 55 43 32.1	2
3	61 30.6 41 54 41.5	61 18.1 42 53 40.6	60 51.9 45 50 38.7	60 38.2 46 49 37.8	60 24.2 47 48 36.9	60 09.8 49 47 36.0	59 24.6 52 44 33.4	59 08.8 53 43 32.6	3
4	60 58.7 39 54 42.0	60 46.7 40 53 41.1	60 21.7 43 51 39.2	60 08.7 44 50 38.3	59 55.2 45 49 37.4	59 41.4 47 48 36.5	58 58.0 50 45 33.9	58 42.8 51 44 33.1	4
35	60 26.4 37 54 42.5	60 15.1 38 53 41.5	59 51.3 41 51 39.7	59 38.8 42 50 38.8	59 25.9 43 49 37.9	59 12.7 45 48 37.0	58 31.0 48 45 34.4	58 16.5 49 44 33.6	35
6	59 54.0 35 55 42.9	59 43.2 37 54 42.0	59 20.5 39 52 40.1	59 08.6 40 51 39.2	58 56.4 41 50 38.4	58 43.7 43 49 37.5	58 03.6 46 46 34.9	57 49.8 47 45 34.1	6
7	59 21.2 33 55 43.3	59 11.0 35 54 42.4	58 49.5 37 52 40.6	58 38.2 38 51 39.7	58 26.5 40 50 38.8	58 14.4 41 49 37.9	57 36.2 44 46 35.3	57 22.8 45 46 34.5	7
8	58 48.3 31 55 43.6	58 38.6 33 54 42.8	58 18.2 35 52 41.3	58 07.5 36 52 40.1	57 56.3 38 51 39.2	57 44.9 39 50 38.7	57 08.3 42 47 35.8	56 55.5 43 46 34.9	8
9	58 15.1 30 56 44.0	58 06.0 31 55 43.1	57 46.7 33 53 41.3	57 36.5 35 52 40.4	57 26.0 36 51 39.5	57 15.0 37 50 38.7	56 40.2 40 47 36.1	56 27.9 42 46 35.3	9
40	57 41.7 28 56 44.3	57 33.2 29 55 43.4	57 15.0 32 53 41.6	57 05.3 33 52 40.8	56 55.3 34 51 39.9	56 45.0 35 50 39.0	56 11.8 39 48 36.5	56 00.1 40 47 35.7	40
1	57 08.1 26 56 44.6	57 00.1 27 55 43.7	56 43.0 30 54 42.0	56 33.9 31 53 41.1	56 24.5 32 52 40.2	56 14.7 33 51 39.4	55 43.2 37 48 36.9	55 32.0 38 47 36.0	1
2	56 34.4 24 56 44.9	56 27.0 26 56 44.0	56 10.9 28 54 42.2	56 02.4 29 53 41.4	55 53.4 30 52 40.5	55 44.2 31 51 39.7	55 14.3 35 48 37.2	55 03.7 36 48 36.4	2
3	56 00.5 23 57 45.1	55 53.5 24 56 44.2	55 38.6 26 54 42.5	55 30.6 27 53 41.7	55 22.2 29 52 40.8	55 13.5 30 51 40.0	54 45.2 33 49 37.5	54 35.2 34 48 36.7	3
4	55 26.5 21 57 45.3	55 20.1 22 56 44.5	55 06.2 24 54 42.8	54 58.7 26 53 41.9	54 50.8 27 53 41.1	54 42.6 28 52 40.2	54 16.0 31 49 37.8	54 06.4 32 48 37.0	4
45	54 52.4 19 57 45.5	54 46.5 20 56 44.7	54 33.6 23 55 43.0	54 26.6 24 54 42.2	54 19.2 25 53 41.3	54 11.6 26 52 40.5	53 46.5 29 49 38.0	53 37.5 31 48 37.2	45
6	54 18.1 18 57 45.7	54 12.7 19 56 44.9	54 00.8 21 55 43.2	53 54.3 22 54 42.4	53 47.5 23 53 41.5	53 40.4 24 52 40.7	53 16.9 28 50 38.3	53 08.5 29 49 37.5	6
7	53 43.8 16 57 45.9	53 38.9 17 57 45.1	53 27.9 19 55 43.4	53 22.0 20 54 42.6	53 15.7 22 53 41.8	53 09.0 23 52 40.9	52 47.2 26 50 38.5	52 39.2 27 49 37.7	7
8	53 09.4 14 58 46.0	53 04.9 15 57 45.2	52 55.0 18 55 43.7	52 49.5 19 54 42.8	52 43.7 20 53 41.9	52 37.6 21 53 41.1	52 17.2 24 50 38.7	52 09.8 25 49 37.9	8
9	52 34.8 13 58 46.2	52 30.9 14 57 45.3	52 21.9 16 55 43.7	52 16.9 17 54 42.9	52 11.6 18 54 42.1	52 06.0 19 53 41.3	51 47.2 22 50 38.9	51 40.3 24 49 38.1	9
50	52 00.2 11 58 46.3	51 56.7 12 57 45.5	51 48.7 14 55 43.9	51 44.3 15 55 43.1	51 39.5 17 54 42.3	51 34.3 18 53 41.5	51 17.0 21 50 39.1	51 10.6 22 50 38.3	50
1	51 25.6 10 58 46.4	51 22.5 11 57 45.6	51 15.5 13 56 44.0	51 11.5 14 55 43.2	51 07.2 15 54 42.4	51 02.5 16 53 41.6	50 46.7 19 51 39.3	50 40.9 20 50 38.5	1
2	50 50.9 08 58 46.4	50 48.3 09 57 45.7	50 42.2 11 56 44.1	50 38.7 12 55 43.3	50 34.8 13 54 42.5	50 30.7 14 53 41.7	50 16.4 17 51 39.4	50 11.0 18 50 38.7	2
3	50 16.1 07 58 46.5	50 14.0 08 57 45.8	50 08.8 10 56 44.2	50 05.8 11 55 43.4	50 02.4 12 54 42.6	49 58.7 13 53 41.9	49 45.9 16 51 39.6	49 41.0 17 50 38.8	3
4	49 41.3 05 58 46.6	49 39.7 06 57 45.8	49 35.4 08 56 44.3	49 32.8 09 55 43.5	49 29.9 10 54 42.7	49 26.7 11 53 42.0	49 15.3 14 51 39.7	49 10.9 15 50 38.9	4
55	49 06.5 04 58 46.6	49 05.3 05 57 45.8	49 01.9 07 56 44.3	48 59.8 08 55 43.6	48 57.4 09 54 42.8	48 54.7 10 54 42.0	48 44.7 13 51 39.8	48 40.8 14 50 39.0	55
6	48 31.7 02 58 46.6	48 30.9 03 57 45.9	48 28.5 05 56 44.4	48 26.8 06 55 43.6	48 24.8 07 54 42.9	48 22.6 08 54 42.1	48 14.0 11 51 39.9	48 10.6 12 50 39.1	6
7	47 56.9 01 58 46.6	47 56.5 02 57 45.9	47 54.9 04 56 44.4	47 53.7 05 55 43.7	47 52.2 06 54 42.9	47 50.4 06 54 42.2	47 43.3 09 51 40.0	47 40.3 10 51 39.2	7
8	47 22.0 01 58 46.6	47 22.1 00 57 45.9	47 21.4 03 55 44.4	47 20.6 03 55 43.7	47 19.6 04 54 43.0	47 18.2 05 54 42.2	47 12.5 08 51 40.0	47 10.0 09 51 39.3	8
9	46 47.2 02 58 46.6	46 47.7 01 57 45.9	46 47.9 01 56 44.4	46 47.5 02 55 43.7	46 46.9 03 54 43.0	46 46.0 03 54 42.3	46 41.7 06 51 40.1	46 39.7 07 51 39.3	9
60	46 12.4 04 58 46.6	46 13.3 03 57 45.9	46 14.3 01 56 44.4	46 14.4 00 54 43.7	46 14.2 01 54 43.0	46 13.8 02 54 42.3	46 10.8 05 51 40.1	46 09.3 06 51 39.4	60
1	45 37.5 05 58 46.6	45 38.9 04 57 45.9	45 40.8 02 56 44.4	45 41.3 01 55 43.7	45 41.5 01 54 43.0	45 41.5 00 54 42.3	45 39.9 03 52 40.1	45 39.0 05 51 39.4	1
2	45 02.8 06 58 46.5	45 04.5 05 57 45.9	45 07.2 04 56 44.4	45 08.2 03 55 43.7	45 08.8 02 54 43.0	45 09.3 01 54 42.3	45 09.0 02 52 40.2	45 08.4 02 51 39.4	2
3	44 28.0 08 58 46.5	44 30.2 07 57 45.8	44 33.7 05 56 44.4	44 35.1 04 55 43.7	44 36.2 03 54 43.0	44 37.1 02 54 42.2	44 38.1 00 52 40.2	44 38.0 01 51 39.5	3
4	43 53.3 09 58 46.4	43 55.8 08 57 45.7	44 00.2 06 56 44.3	44 02.0 06 55 43.6	44 03.6 05 54 42.9	44 04.9 04 54 42.2	44 07.2 01 52 40.2	44 07.5 01 51 39.5	4
65	43 18.6 10 58 46.3	43 21.6 09 57 45.6	43 26.7 08 56 44.3	43 29.0 07 55 43.6	43 30.9 06 54 42.9	43 32.7 05 54 42.2	43 36.3 03 51 40.1	43 37.1 02 51 39.4	65
6	42 44.0 12 58 46.2	42 47.4 11 57 45.6	42 53.3 09 56 43.5	42 55.9 08 55 43.5	42 58.3 07 54 42.8	43 00.5 07 54 42.2	43 05.0 04 51 40.1	43 06.6 04 51 39.4	6
7	42 09.4 13 58 46.1	42 13.1 12 57 45.5	42 19.9 11 56 44.1	42 23.0 10 55 43.5	42 25.8 09 54 42.8	42 28.3 08 54 42.1	42 34.6 06 51 40.1	42 36.2 05 51 39.4	7
8	41 34.9 14 57 46.0	41 39.0 13 57 45.4	41 46.6 12 56 44.0	41 50.0 11 55 43.4	41 53.2 10 54 42.7	41 56.2 10 53 42.0	42 03.8 07 51 40.0	42 05.8 06 51 39.4	8
9	41 00.4 15 57 45.9	41 04.9 15 57 45.3	41 13.3 13 55 44.0	41 17.1 12 55 43.3	41 20.8 12 54 42.6	41 24.1 11 53 42.0	41 33.0 09 51 40.0	41 35.4 08 51 39.3	9
70	40 26.0 17 57 45.8	40 30.9 16 57 45.0	40 40.4 15 55 43.2	40 44.3 14 55 43.2	40 48.3 13 54 42.5	40 52.1 13 54 41.9	41 02.2 10 51 39.9	41 05.1 09 50 39.3	70
1	39 51.4 18 57 45.7	39 57.0 17 56 45.0	40 06.9 16 55 43.8	40 11.5 15 54 43.1	40 16.0 14 54 42.4	40 20.2 14 53 41.8	40 31.5 11 51 39.8	40 34.8 11 50 39.2	1
2	39 17.5 19 57 45.5	39 23.1 19 56 44.9	39 33.8 17 55 43.6	39 38.8 16 54 43.0	39 43.6 16 54 42.3	39 48.3 15 53 41.7	40 00.8 13 51 39.8	40 04.5 12 50 39.1	2
3	38 43.3 20 57 45.4	38 49.3 20 56 44.8	39 00.8 18 55 43.5	39 06.2 18 54 42.9	39 11.4 17 54 42.2	39 16.4 16 53 41.6	39 30.2 14 51 39.7	39 34.3 14 50 39.0	3
4	38 09.2 22 57 45.2	38 15.6 21 56 44.6	38 27.8 20 55 43.4	38 33.6 19 54 42.7	38 39.2 18 53 42.1	38 44.6 18 53 41.5	38 59.6 16 51 39.6	39 04.2 15 50 38.9	4
75	37 35.3 23 56 45.1	37 42.0 22 56 44.4	37 55.0 21 55 43.2	38 01.2 20 54 42.6	38 07.2 20 53 42.0	38 13.0 19 53 41.4	38 29.1 17 51 39.5	38 34.1 16 50 38.8	75
6	37 01.4 24 56 44.9	37 08.5 23 56 44.3	37 22.2 22 54 43.1	37 28.8 22 54 42.4	37 35.2 21 53 41.8	37 41.3 20 53 41.2	37 58.7 18 51 39.4	38 04.1 18 50 38.7	6
7	36 27.6 25 56 44.7	36 35.1 25 56 44.1	36 49.6 23 54 42.9	36 56.5 23 54 42.3	37 03.3 22 53 41.7	37 09.8 22 52 41.1	37 28.4 20 50 39.2	37 34.2 19 50 38.6	7
8	35 54.0 26 56 44.5	36 01.8 26 55 43.9	36 17.0 25 54 42.7	36 24.3 24 54 42.1	36 31.4 23 53 41.5	36 38.4 23 52 40.9	36 58.1 21 50 39.1	37 04.3 20 50 38.5	8
9	35 20.4 28 55 44.3	35 28.3 27 54 43.7	35 44.6 26 54 42.5	35 52.2 25 53 42.0	35 59.7 25 52 41.3	36 07.3 24 52 40.7	36 27.2 22 50 39.0	36 34.5 22 50 38.3	9
80	34 47.0 29 56 44.1	34 55.6 28 55 43.5	35 12.2 27 54 42.4	35 20.2 27 53 41.8	35 28.1 26 52 41.2	35 35.8 25 52 40.6	35 57.9 24 50 38.8	36 04.9 23 49 38.2	80
1	34 13.7 30 55 43.9	34 22.6 29 55 43.3	34 40.0 28 54 42.2	34 48.4 28 53 41.6	34 56.6 27 52 41.0	35 04.7 27 52 40.4	35 27.9 25 50 38.7	35 35.3 24 49 38.1	1
2	33 40.5 31 55 43.7	33 49.8 31 54 43.1	34 07.8 30 53 42.0	34 16.3 29 53 41.4	34 25.2 28 52 40.8	34 33.7 28 52 40.2	34 58.0 26 50 38.5	35 05.8 26 49 37.9	2
3	33 07.5 32 55 43.5	33 17.1 32 54 42.9	33 35.6 31 53 41.8	33 44.4 30 53 41.2	33 54.0 30 52 40.6	34 02.8 29 51 40.1	34 28.2 27 49 38.3	34 36.4 27 49 37.7	3
4	32 34.6 33 55 43.3	32 44.5 33 54 42.7	33 04.0 32 53 41.6	33 13.5 31 52 41.0	33 22.8 31 52 40.4	33 32.0 30 51 39.9	33 58.3 28 49 38.1	34 07.1 28 49 37.6	4
85	32 01.8 35 54 43.0	32 12.1 34 54 42.5	32 32.2 33 53 41.4	32 42.1 33 52 40.8	32 51.8 32 51 40.2	33 01.3 32 51 39.7	33 29.0 30 49 38.0	33 38.0 29 48 37.4	85
6	31 29.2 36 54 42.8	31 39.8 35 54 42.2	32 00.7 34 52 41.1	32 10.9 34 52 40.6	32 20.9 33 51 40.0	32 30.8 33 51 39.5	32 59.6 31 49 37.8	33 08.9 31 48 37.2	6
7	30 56.7 37 54 42.5	31 07.7 36 53 42.0	31 29.2 35 52 40.9	31 39.7 35 52 40.4	31 50.2 34 51 39.8	32 00.4 34 50 39.3	32 30.3 33 49 37.6	32 40.0 32 48 37.0	7
8	30 24.4 38 54 42.3	30 35.7 37 53 41.8	30 57.9 37 52 40.7	31 08.8 36 51 40.1	31 19.6 36 51 39.6	31 30.2 35 50 39.1	32 01.2 34 48 37.4	32 11.2 34 48 36.8	8
9	29 52.2 39 53 42.0	30 03.9 38 53 41.5	30 26.7 38 52 40.5	30 38.0 37 51 39.9	30 49.1 37 51 39.4	31 00.1 36 50 38.8	31 32.2 36 48 37.2	31 42.6 34 48 36.6	9
90	29 20.2 40 53 41.8	29 32.2 40 52 41.2	29 55.7 39 51 40.2	30 07.3 39 51 39.7	30 18.4 38 50 39.1	30 30.1 38 50 38.6	31 03.3 36 48 37.0	31 14.1 36 47 36.4	90

Lat. 37°

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
91	28 48.4	41 53	41.5	29 00.7	41 52	41.0	29 24.9	40 51	39.9	29 36.8	40 51	39.4	29 48.6	39 50	38.9	30 00.3	39 49	38.3	30 34.5	37 48	36.7	30 45.7	37 47	36.2	91
2	28 16.7	42 52	41.2	28 29.3	42 52	40.7	28 54.2	41 51	39.7	29 06.5	41 50	39.1	29 18.6	40 50	38.6	29 30.7	40 49	38.1	30 06.0	39 47	36.5	30 17.5	38 47	36.0	2
3	27 45.2	43 52	40.9	27 58.2	43 52	40.4	28 23.7	42 51	39.4	28 36.3	42 50	38.9	28 48.8	41 49	38.4	29 01.2	41 49	37.8	29 37.5	39 47	36.3	29 49.4	39 47	35.7	3
4	27 13.9	44 52	40.7	27 27.2	44 51	40.2	27 53.4	43 50	39.1	28 06.3	43 50	38.6	28 19.1	43 49	38.1	28 31.9	42 49	37.6	29 09.3	41 47	36.0	29 21.5	41 46	35.5	4
95	26 42.8	45 52	40.4	26 56.4	45 51	39.9	27 23.2	44 50	38.9	27 36.5	44 49	38.4	27 49.7	44 49	37.8	28 02.7	43 48	37.3	28 41.2	42 47	35.8	28 53.7	42 46	35.3	95
6	26 11.9	47 51	40.1	26 25.8	46 51	39.6	26 53.3	45 50	38.6	27 06.9	45 49	38.1	27 20.4	45 49	37.6	27 33.7	44 48	37.1	28 13.2	43 46	35.5	28 26.1	43 46	35.0	6
7	25 41.1	48 51	39.8	25 55.3	47 51	39.3	26 23.5	47 49	38.3	26 37.4	46 49	37.8	26 51.2	46 48	37.3	27 04.9	46 48	36.8	27 45.4	44 45	35.2	27 58.7	44 45	34.8	7
8	25 10.6	49 51	39.5	25 25.1	48 50	39.0	25 53.9	48 49	38.0	26 08.1	47 48	37.5	26 22.3	47 48	37.0	26 36.3	47 47	36.5	27 17.8	46 45	35.0	27 31.5	45 45	34.5	8
9	24 40.2	50 50	39.1	24 55.1	49 50	38.7	25 24.5	49 49	37.7	25 39.1	48 48	37.2	25 53.5	48 48	36.7	26 07.9	48 47	36.2	26 50.4	47 45	34.8	27 04.4	46 45	34.3	9
100	24 10.1	51 50	38.8	24 25.2	50 49	38.3	24 55.3	50 48	37.4	25 10.2	49 48	36.9	25 25.0	49 47	36.4	25 39.7	49 47	35.9	26 23.2	48 45	34.5	26 37.5	48 44	34.0	100
1	23 40.2	52 50	38.5	23 55.6	51 49	38.0	24 26.3	51 48	37.1	24 41.5	51 47	36.6	24 56.6	50 47	36.1	25 11.7	50 46	35.7	25 56.2	49 45	34.2	26 10.8	49 44	33.7	1
2	23 10.4	53 49	38.2	23 26.2	52 49	37.7	23 57.5	52 48	36.8	24 13.0	52 47	36.3	24 28.5	51 46	35.8	24 43.8	51 46	35.4	25 29.3	50 44	33.9	25 44.3	50 44	33.4	2
3	22 40.9	54 49	37.8	22 57.0	53 48	37.4	23 28.9	53 47	36.4	23 44.8	53 47	36.0	24 00.5	52 46	35.5	24 16.2	52 46	35.0	25 02.7	51 44	33.6	25 18.0	51 44	33.3	3
4	22 11.7	55 48	37.5	22 28.0	54 48	37.0	23 00.6	54 47	36.1	23 16.7	54 46	35.7	23 32.8	53 46	35.2	23 48.8	53 45	34.7	24 36.3	52 44	33.3	24 51.9	52 43	32.9	4
105	21 42.6	56 48	37.1	21 59.3	55 48	36.7	22 32.4	55 46	35.8	22 48.9	55 46	35.3	23 05.3	54 45	34.9	23 21.6	54 45	34.4	24 10.0	53 43	33.0	24 26.0	53 43	32.6	105
6	21 13.8	57 48	36.8	21 30.8	56 47	36.3	22 04.5	56 46	35.5	22 21.3	56 46	35.0	22 38.0	56 45	34.6	22 54.6	55 45	34.1	23 44.0	54 43	32.7	24 00.3	54 42	32.3	6
7	20 45.2	58 47	36.4	21 02.5	57 47	36.0	21 36.9	57 46	35.1	21 53.9	57 45	34.7	22 10.9	57 45	34.2	22 27.7	56 44	33.8	23 18.2	56 43	32.4	23 34.8	55 42	32.0	7
8	20 16.9	59 47	36.1	20 34.5	58 46	35.6	21 09.4	58 45	34.8	21 26.8	58 45	34.3	21 44.1	58 44	33.9	22 01.3	57 44	33.5	22 52.6	57 42	32.1	23 09.5	56 42	31.7	8
9	19 48.8	60 46	35.7	20 06.7	59 46	35.3	20 42.2	59 45	34.4	20 59.9	59 44	34.0	21 17.5	59 44	33.6	21 35.0	58 43	33.1	22 27.2	58 42	31.8	22 44.5	57 41	31.4	9
110	19 21.0	61 46	35.3	19 39.1	60 46	34.9	20 15.2	60 45	34.1	20 33.2	60 44	33.6	20 51.1	60 44	33.2	21 09.0	59 43	32.8	22 02.1	59 42	31.5	22 19.7	58 41	31.0	110
1	18 53.4	62 46	35.0	19 11.8	61 45	34.5	19 48.5	61 44	33.7	20 06.8	61 44	33.3	20 25.0	61 43	32.9	20 43.2	60 43	32.4	21 37.2	60 41	31.1	21 55.1	60 41	30.7	1
2	18 26.1	63 45	34.6	18 44.8	62 45	34.2	19 22.1	62 44	33.3	19 40.6	62 43	32.9	19 59.1	62 43	32.5	20 17.6	61 42	32.1	21 12.5	61 41	30.8	21 30.7	61 40	30.4	2
3	17 59.0	63 45	34.2	18 18.0	63 44	33.8	18 55.9	63 43	33.0	19 14.7	63 43	32.6	19 33.5	63 42	32.1	19 52.2	62 42	31.7	20 48.1	62 40	30.5	21 06.6	62 40	30.1	3
4	17 32.2	64 44	33.8	17 51.5	64 44	33.4	18 29.9	64 43	32.6	18 49.1	64 42	32.2	19 08.1	64 42	31.8	19 27.2	63 41	31.4	20 23.9	63 40	30.1	20 42.7	63 39	29.7	4
115	17 05.7	65 44	33.4	17 25.2	65 43	33.0	18 04.2	65 42	32.2	18 23.7	65 42	31.8	18 43.0	64 41	31.4	19 02.4	64 41	31.0	20 00.0	64 39	29.8	20 19.1	64 39	29.4	115
6	16 39.4	66 43	33.0	16 59.3	66 43	32.6	17 38.8	66 42	31.8	17 58.5	66 41	31.4	18 18.2	65 40	31.0	18 37.8	65 40	30.6	19 36.3	65 39	29.4	19 55.7	65 39	29.0	6
7	16 13.5	67 43	32.6	16 33.6	67 42	32.2	17 13.7	67 41	31.4	17 33.7	67 41	31.1	17 53.6	66 40	30.7	18 13.5	66 40	30.3	19 12.9	66 39	29.1	19 32.6	66 38	28.7	7
8	15 47.8	68 42	32.2	16 08.2	68 42	31.8	16 48.8	68 41	31.1	17 09.1	67 40	30.7	17 29.3	67 40	30.3	17 49.5	67 40	29.9	18 49.8	67 38	28.7	19 09.7	67 38	28.3	8
9	15 22.4	69 42	31.8	15 43.1	69 41	31.4	16 24.3	69 40	30.7	16 44.8	69 40	30.3	17 05.3	68 40	29.9	17 25.8	68 39	29.5	18 26.9	68 38	28.4	18 47.1	68 37	28.0	9
120	14 57.3	70 41	31.4	15 18.2	70 41	31.0	16 00.0	69 40	30.3	16 20.8	69 40	29.9	16 41.6	69 39	29.5	17 02.3	69 39	29.1	18 04.2	69 37	28.0	18 24.8	68 37	27.6	120
1	14 32.5	71 41	30.9	14 53.7	71 40	30.6	15 36.0	70 40	29.9	15 57.1	70 39	29.5	16 18.1	70 39	29.1	16 39.1	70 38	28.7	17 41.9	70 37	27.6	18 02.7	69 36	27.2	1
2	14 08.0	72 40	30.5	14 29.5	71 40	30.2	15 12.3	71 39	29.4	15 33.6	71 39	29.1	15 55.0	71 38	28.7	16 16.2	71 38	28.3	17 19.8	71 36	27.2	17 41.0	70 36	26.9	2
3	13 43.8	72 40	30.1	14 05.6	72 39	29.7	14 48.9	72 38	29.0	15 10.5	72 38	28.7	15 32.1	72 38	28.3	15 53.6	72 37	27.9	16 58.1	71 36	26.8	17 19.5	71 35	26.5	3
4	13 20.0	73 39	29.7	13 41.9	73 39	29.3	14 25.8	73 38	28.6	14 47.7	73 38	28.2	15 09.5	73 37	27.9	15 31.3	73 37	27.5	16 36.6	72 35	26.5	16 58.2	72 35	26.1	4
125	12 56.4	74 39	29.2	13 18.7	74 38	28.9	14 03.0	74 37	28.2	14 25.2	74 37	27.8	14 47.3	74 37	27.5	15 09.3	74 36	27.1	16 15.4	73 35	26.1	16 37.3	73 34	25.7	125
6	12 33.2	75 38	28.8	12 55.7	75 38	28.4	13 40.5	75 37	27.7	14 02.9	75 36	27.4	14 25.3	74 36	27.1	14 47.6	74 36	26.7	15 54.4	74 34	25.7	16 16.6	74 34	25.3	6
7	12 10.3	76 38	28.3	12 33.0	76 37	28.0	13 18.4	76 36	27.3	13 41.0	76 36	27.0	14 03.7	75 36	26.6	14 26.2	75 35	26.3	15 33.8	75 34	25.3	15 56.3	75 33	24.9	7
8	11 47.7	77 37	27.9	12 10.7	77 37	27.5	12 56.6	76 36	26.9	13 19.5	76 35	26.5	13 42.3	76 35	26.2	14 05.2	76 35	25.9	15 13.5	76 33	24.9	15 36.3	76 33	24.5	8
9	11 25.5	77 36	27.4	11 48.7	77 36	27.1	12 35.1	77 35	26.4	12 58.2	77 35	26.1	13 21.3	77 34	25.8	13 44.4	77 34	25.5	14 53.5	77 33	24.5	15 16.5	77 32	24.1	9
130	11 03.6	78 36	27.0	11 27.1	78 36	26.6	12 13.9	78 35	26.0	12 37.3	78 34	25.7	13 00.6	78 34	25.4	13 24.0	78 34	25.0	14 33.8	77 32	24.1	14 57.1	77 32	23.7	130
1	10 42.1	79 35	26.5	11 05.8	79 35	26.2	11 53.1	79 34	25.5	12 16.7	79 34	25.2	12 40.3	79 33	24.9	13 03.9	79 33	24.6	14 13.4	78 32	23.6	14 37.9	78 31	23.3	1
2	10 20.9	80 35	26.0	10 44.8	80 34	25.7	11 32.6	80 34	25.1	11 56.4	79 33	24.8	12 20.3	79 33	24.5	12 44.1	79 32	24.2	13 55.4	79 31	23.2	14 19.1	79 31	22.9	2
3	10 00.0	81 34	25.5	10 24.2	80 34	25.2	11 12.4	80 33	24.6	11 36.5	80 33	24.3	12 00.6	80 32	24.0	12 24.6	80 32	23.7	13 36.7	80 31	22.8	14 00.6	80 30	22.5	3
4	9 39.5	81 34	25.1	10 03.9	81 33	24.8	10 52.6	81 32	24.2	11 16.9	81 32	23.9	11 41.2	81 32	23.6	12 05.5	81 31	23.3	13 18.3	81 30	22.4	13 42.5	81 30	22.1	4
135	9 19.4	82 33	24.6	9 44.0	82 33	24.3	10 33.2	82 32	23.7	10 57.7	82 31	23.4	11 22.2	82 31	23.1	11 46.8	82 31	22.8	13 00.2	81 30	21.9	13 24.6	81 29	21.7	135
6	8 59.7	83 32	24.1	9 24.5	83 32	23.8	10 14.1	83 31	23.3	10 38.8	83 31	23.0	11 03.6	83 30	22.7	11 28.3	82 30	22.4	12 42.4	82 29	21.5	13 07.1	82 29	21.2	6
7	8 40.3	84 32	23.6	9 05.3	84 31	23.3	9 55.3	84 31	22.8	10 20.3	84 30	22.5	10 45.3	84 30	22.2	11 10.3	84 30	21.9	12 25.0	84 28	21.1	12 49.9	84 28	20.8	7
8	8 21.3	84 31	23.1	8 46.5	84 31	22.9	9 37.0	84 30	22.3	10 02.2	84 30	22.0	10 27.4	84 29	21.8	10 52.5	84 29	21.5	12 08.0	84 28	20.6	12 33.1	84 28	20.4	8
9	8 02.6	85 30	22.6	8 28.1	85 30	22.4	9 19.0	85 29	21.8	9 44.4	85 29	21.6	10 09.8	85 29	21.3	10 35.2	85 28	21.0	11 51.3	84 27	20.2	12 16.6	84 27	19.9	9
140	7 44.4	86 30	22.1	8 10.1	86 29	21.9	9 01.3	85 29	21.3	9 27.0	85 28	21.1	9 52.6	85 28	20.8	10 18.2	85 28	20.6	11 34.9	85 27	19.8	12 00.4	85 26	19.5	140
1	7 26.5	86 29	21.6	7 52.4	86 29	21.4	8 44.1	86 28	20.8	9 09.9	86 28	20.6	9 35.7	86 27	20.3	10 01.5	86 27	20.1	11 18.9	86 26	19.3	11 44.6	86 26	19.0	1
2	7 09.1	87 28	21.1	7 35.1	87 28	20.9	8 27.2	87 27	20.4	8 53.2	87 27	20.1	9 19.3	87 27	19.9	9 45.3	87 26	19.6	11 03.2	87 26	18.8	11 29.2	87 25	18.6	2
3	6 52.0	88 28	20.6	7 18.3	87 27	20.4	8 10.7	87 27	19.9	8 37.0	87 26	19.6	9 03.2	87 26	19.4	9 29.4	87 26	19.1	10 47.9	87 25	18.4	11 14.1	87 25	18.1	3
4	6 35.3	88 27	20.1	7 01.8	88 27	19.9	7 54.6	88 26	19.4	8 21.0	88 26	19.1	8 47.5	88 26	18.9	9 13.8	88 25	18.7	10 33.0	88 24	17.9	10 59.3	88 24	17.7	4
145	6 19.1	89 26	19.6	6 45.7	89 26	19.3	7 38.9	89 26	18.9	8 05.5	89 25	18.6	8 32.1	89 25	18.4	8 58.7	89 25	18.2	10 18.4	89 24	17.5	10 44.9	89 23	17.2	145
6	6 03.2	89 26	19.1	6 30.0	89 25	18.8	7 23.6	89 25	18.3	7 50.4	89 25	18.2	8 17.2	89 24	17.9	8 43.9	89 24	17.7	10 04.2	89 23	17.0	10 30.9	89 23	16.8	6
7	5 47.8	90 25	18.5	6 14.8	90 25	18.3	7 08.7	90 24	17.9	7 35.7	90 24	17.7	8 02.6	90 24	17.4	8 29.6	90 23	17.2	9 50.4	90 22	16.5	10 17.3	90 22	16.3	7
8	5 32.8	91 24	18.0	5 59.9	90 24	17.8	6 54.2	90 24	17.4	7 21.3	90 23	17.2	7 48.5	90 23	16.9	8 15.6	90 23	16.7	9 36.9	90 22	16.1	10 04.0	90 22	15.9	8
9	5 18.2	91 24	17.5	5 45.5	91 23	17.3	6 40.1	91 23	16.9	7 07.4	91 23	16.6	7 34.7	91 22	16.4	8 02.0	91 22	16.2	9 23.8	91 21	15.6	9 51.1	91 21	15.4	9
150	5 04.0	92 23	16.9	5 31.5	92 23	16.7	6 26.4	92 22	16.3	6 53.9	92 22	16.1	7 21.3	92 21	15.9	7 48.8	92 21	15.7	9 11.1	92 21	15.1	9 38.6	92 20	14.9	150
1				5 17.9	92 22	16.2	6 13.1	92 21	15.6	6 40.8	92 21	15.4	7 08.4	92 21	15.2	7 36.0	92 21	15.2	8 58.8	92 20	14.6	9 26.4	92 20	14.4	1
2				5 04.7	93 21	15.7	6 00.3	93 21	15.3	6 28.1	93 20	15.1	6 55.8	93 20	14.9	7 23.6	93 20	14.7	8 46.9	93 19	14.2	9 14.7	93 19	14.0	2
3							5 47.8	93 20	14.8	6 15.8	93 20	14.6	6 43.7	93 20	14.4	7 11.6	93 19	14.2	8 35.4	93 19	13.7	9 03.3	93 18	13.5	3
4							5 35.8	94 19	14.3	6 03.9	94 19	14.1	6 32.0	94 19	13.9	7 00.1	94 19	13.7	8 24.3	94 18	13.2	8 52.3	94 18	13.0	4
155							5 24.2	94 19	13.7	5 52.5	94 18	13.6	6 20.7	94 18	13.4	6 48.9	94 18	13.2	8 13.5	94 17	12.7	8 41.7	94 16	12.5	155
6							5 13.1	95 18	13.2	5 41.4	95 18	13.0	6 09.8	95 17	12.9	6 38.1	95 17	12.7	8 03.2	95 17	12.2	8 31.5	95 16	12.0	6
7							5 02.4	95 17	12.7	5 30.8	95 17	12.5	5 59.3	95 17	12.4	6 27.8	95 17	12.2	7 53.2	95 16	11.7	8 21.7	95 16	11.6	7
8										5 20.7	95 16	12.0	5 49.3	95 16	11.8	6 17.9	95 16	11.7	7 43.7	95 15	11.2	8 12.3	95 15	11.1	8
9										5 10.9	96 16	11.5	5 39.7	96 15	11.3	6 08.4	96 15	11.2	7 34.6	96 15	10.7	8 03.3	96 14	10.6	9
160										5 01.6	96 15	10.9	5 30.5	96 14	10.6	5 59.9	96 14	10.2	7 25.9	96 14	10.2	7 54.7	96 14	10.1	160
1													5 21.7	97 14	10.3	5 50.7	97 14	10.1	7 17.6	97 14	09.7	7 46.5	97 13	09.6	1
2													5 13.4	97 13	09.7	5 42.5	97 13	09.6	7 09.7	97 13	09.2	7 38.7	97 12	09.1	2
3													5 05.5	97 13	09.2	5 34.7	97 12	09.1	7 02.2	97 12	08.7	7 31.3	97 12	08.6	3
4																5 27.4	98 12	08.6	6 55.1	98 11	08.2	7 24.4	98 11	08.1	4
165																			6 48.5	98 10	07.7	7 17.8	98 10	07.6	165
6																			6 42.3	98 10	07.2	7 11.7	98 10	07.1	6
7																			6 36.5	98 09	06.7	7 06.0	98 09	06.6	7
8																			6 31.1	99 08	06.2	7 00.7	99 08	06.1	8
9																			6 26.1	99 08	05.7	6 55.8	99 07	05.6	9
170																			6 21.6	99 07	05.1	6 51.3	99 07	05.1	170
1																			6 17.5	99 06	04.6	6 47.3	99 06	04.6	1
2																			6 13.8	99 05	04.1	6 43.7	99 05	04.1	2
3																			6 10.6	99 05	03.6	6 40.5	1.00 05	03.6	3
4																			6 07.8	1.00 04	03.1	6 37.7	1.00 04	03.1	4
175																			6 05.4	1.00 03	02.6	6 35.3	1.00 03	02.6	175
6																			6 03.5	1.00 02	02.1	6 33.4	1.00 02	02.1	6
7																			6 01.9	1.00 02	01.6	6 31.9	1.00 02	01.5	7
8																			6 00.9	1.00 01	01.0	6 30.9	1.00 01	01.0	8
9																			6 00.2	1.00 01	00.5	6 30.2	1.00 01	00.5	9
180																			6 00.0	1.00 00	00.0	6 30.0	1.00 00	00.0	180

Lat. 38°

Lat. 39°

Lat. 37°

H.A.	60°00' Alt	Δd Δt	Az.	60°30' Alt	Δd Δt	Az.	62°00' Alt	Δd Δt	Az.	62°30' Alt	Δd Δt	Az.	63°00' Alt	Δd Δt	Az.	69°00' Alt	Δd Δt	Az.	69°30' Alt	Δd Δt	Az.	74°30' Alt	Δd Δt	Az.	H.A.
00	67 00.0	1.0 01	00.0	66 30.0	1.0 01	00.0	65 00.0	1.0 01	00.0	64 30.0	1.0 01	00.0	64 00.0	1.0 01	00.0	58 00.0	1.0 00	00.0	57 30.0	1.0 00	00.0	52 30.0	1.0 00	00.0	00
1	66 59.5	1.0 03	01.3	66 29.5	1.0 03	01.2	64 59.5	1.0 02	01.1	64 29.6	1.0 02	01.1	63 59.6	1.0 02	01.0	57 59.7	1.0 01	00.7	57 29.7	1.0 01	00.7	52 29.8	1.0 01	00.4	1
2	66 57.9	1.0 04	02.6	66 27.9	1.0 04	02.3	64 58.1	1.0 04	02.2	64 28.2	1.0 04	02.1	63 58.3	1.0 04	02.1	57 58.9	1.0 02	01.4	57 28.9	1.0 02	01.3	52 29.3	1.0 02	00.9	2
3	66 55.2	99 06	03.8	66 25.4	99 06	03.7	64 55.8	1.0 05	03.2	64 26.0	1.0 05	03.1	63 56.1	1.0 05	03.1	57 57.5	1.0 03	02.0	57 27.5	1.0 03	02.0	52 28.3	1.0 02	01.3	3
4	66 51.5	99 08	05.1	66 21.8	99 08	04.9	64 52.6	99 07	04.4	64 22.8	99 07	04.3	63 53.1	99 06	04.1	57 55.5	99 04	02.7	57 25.6	99 04	02.6	52 27.1	1.0 03	01.8	4
05	66 46.7	98 10	06.3	66 17.2	98 09	06.1	64 48.4	99 08	05.5	64 18.8	99 08	05.3	63 49.2	99 08	05.1	57 52.9	99 05	03.4	57 23.2	99 05	03.2	52 25.4	99 03	02.2	05
6	66 40.9	98 11	07.6	66 11.5	98 11	07.3	64 43.4	98 10	06.6	64 13.9	98 10	06.4	63 44.5	98 09	06.2	57 49.9	99 06	04.0	57 20.2	99 05	03.9	52 23.4	99 04	02.6	6
7	66 34.0	97 13	08.8	66 04.9	97 13	08.5	64 37.4	97 11	07.7	64 08.2	97 11	07.4	63 38.9	98 11	07.2	57 46.2	98 07	04.7	57 16.7	98 07	04.5	52 21.0	99 05	03.1	7
8	66 26.2	96 15	10.0	65 57.4	96 14	09.7	64 30.6	97 13	08.7	64 01.6	97 12	08.4	63 32.6	97 12	08.2	57 42.0	98 08	05.4	57 12.7	98 08	05.2	52 18.3	98 05	03.5	8
9	66 17.4	95 16	11.2	65 48.8	95 16	10.8	64 22.9	96 14	09.8	63 54.1	96 14	09.5	63 25.4	96 13	09.1	57 37.3	97 09	06.0	57 08.1	97 08	05.8	52 15.2	98 06	03.9	9
10	66 07.6	94 18	12.4	65 39.3	94 17	12.0	64 14.3	95 16	10.8	63 45.9	95 15	10.5	63 17.3	95 15	10.1	57 32.0	97 10	06.7	57 03.0	97 09	06.4	52 11.8	97 06	04.3	10
1	65 56.8	93 19	13.5	65 29.0	93 19	13.1	64 04.9	94 17	11.8	63 36.8	94 16	11.4	63 08.5	94 16	11.1	57 26.2	96 11	07.3	56 57.4	96 10	06.9	52 07.9	97 07	04.8	1
2	65 45.1	91 21	14.7	65 17.7	92 20	14.2	63 54.7	93 18	12.8	63 26.9	93 18	12.4	62 59.0	93 17	12.0	57 19.8	95 11	07.9	56 51.2	95 11	07.7	52 03.8	96 08	05.2	2
3	65 32.6	90 22	15.8	65 05.5	90 22	15.2	63 43.6	91 20	13.8	63 16.2	92 19	13.4	62 48.6	92 18	12.9	57 12.9	94 12	08.6	56 44.6	94 12	08.3	51 59.3	96 08	05.6	3
4	65 19.1	89 24	16.8	64 52.5	89 23	16.3	63 31.8	90 21	14.8	63 04.7	90 20	14.3	62 37.6	91 20	13.8	57 05.5	93 13	09.2	56 37.5	94 13	08.9	51 54.4	95 09	06.0	4
15	65 04.8	87 25	17.9	64 38.6	88 24	17.3	63 19.2	89 20	15.7	62 52.5	89 20	15.2	62 25.8	89 21	14.7	56 57.6	93 14	09.8	56 29.8	93 14	09.5	51 49.2	94 09	06.4	15
6	64 49.7	86 27	18.9	64 23.9	86 27	18.3	63 05.9	87 23	16.6	62 38.9	88 23	16.1	62 13.2	88 22	15.6	56 49.2	92 15	10.4	56 21.7	92 14	10.1	51 43.7	93 10	06.8	6
7	64 33.8	84 28	19.9	64 08.5	84 27	19.3	62 51.8	86 25	17.5	62 26.0	86 24	17.0	62 00.0	87 23	16.4	56 40.3	91 16	11.0	56 13.1	91 15	10.6	51 37.8	93 10	07.2	7
8	64 17.1	82 29	20.9	63 52.3	83 28	20.2	62 37.1	84 26	18.4	62 11.7	85 25	17.8	61 46.1	85 24	17.3	56 31.0	89 16	11.6	56 04.1	90 16	11.2	51 31.7	92 11	07.6	8
9	63 59.6	81 30	21.8	63 35.4	81 29	21.1	62 21.6	83 27	19.2	61 56.7	83 26	18.6	61 31.6	84 25	18.1	56 21.1	88 17	12.2	55 54.6	89 17	11.7	51 25.1	91 11	08.0	9
20	63 41.5	79 31	22.7	63 17.8	78 32	22.0	62 05.5	81 28	20.1	61 41.0	82 27	19.4	61 16.4	82 26	18.8	56 10.8	87 18	12.7	55 44.4	87 17	12.3	51 18.3	90 12	08.4	20
1	63 22.7	77 32	23.6	62 59.5	78 32	22.9	61 48.7	80 29	20.9	61 24.8	80 28	20.2	61 00.7	81 27	19.6	56 00.0	86 18	13.3	55 34.2	86 18	12.8	51 11.1	89 12	08.7	1
2	63 03.2	75 34	24.4	62 40.6	76 33	23.7	61 31.4	78 30	21.6	61 07.9	78 29	21.0	60 44.3	79 28	20.4	55 48.8	85 19	13.8	55 23.3	85 19	13.4	51 03.6	88 13	09.0	2
3	62 43.1	73 35	25.2	62 21.0	74 34	24.5	61 13.4	76 31	22.4	60 50.5	77 30	21.7	60 27.3	77 29	21.1	55 37.1	83 20	14.4	55 12.1	84 20	13.9	50 55.9	87 13	09.5	3
4	62 22.4	71 36	26.0	62 00.8	72 35	25.3	60 54.9	74 32	23.1	60 32.4	75 31	22.4	60 09.8	76 30	21.8	55 25.0	82 21	14.9	55 00.4	82 20	14.4	50 47.8	86 14	09.9	4
25	62 01.1	69 36	26.8	61 40.1	70 35	26.0	60 35.8	73 32	23.1	60 13.9	73 32	23.1	59 51.8	74 31	22.5	55 12.5	81 22	15.4	54 48.1	81 21	15.4	50 39.4	85 14	10.3	25
6	61 39.2	68 37	27.5	61 18.8	68 36	26.7	60 16.1	71 34	24.5	59 54.8	72 33	23.8	59 33.2	72 32	23.1	54 59.6	79 22	15.9	54 35.7	80 22	15.4	50 30.7	83 15	10.6	6
7	61 16.8	66 38	28.2	60 57.0	67 37	27.4	59 56.0	69 34	25.2	59 35.2	70 33	24.5	59 14.1	71 33	23.8	54 46.3	78 23	16.4	54 22.9	78 22	15.8	50 21.7	82 15	11.0	7
8	60 53.9	64 39	28.9	60 34.7	65 38	28.1	59 35.4	67 35	25.8	59 15.1	68 34	25.1	58 54.6	69 33	24.4	54 32.6	76 23	16.9	54 09.6	77 23	16.3	50 12.5	81 16	11.3	8
9	60 30.6	62 40	29.5	60 11.9	63 39	28.7	59 14.3	65 36	26.4	58 54.5	66 35	25.7	58 34.4	67 34	25.0	54 18.5	75 24	17.3	53 56.0	75 23	17.0	50 02.9	80 16	11.6	9
30	60 06.8	60 40	30.1	59 48.7	61 39	29.3	58 52.7	63 37	27.0	58 33.6	64 36	26.3	58 14.1	65 35	25.5	54 04.0	73 25	17.8	53 42.0	74 24	17.2	49 53.1	78 17	12.0	30
1	59 42.5	58 41	30.7	59 25.0	59 40	29.9	58 30.8	62 37	27.6	58 12.1	62 36	26.8	57 53.3	63 35	26.1	53 49.2	72 25	18.2	53 27.6	72 24	17.6	49 43.1	77 17	12.3	1
2	59 17.8	56 42	31.3	59 00.9	57 41	30.5	58 08.4	60 38	28.1	57 50.3	61 37	27.4	57 32.0	62 36	26.6	53 34.1	70 26	18.6	53 12.9	71 25	18.1	49 32.7	76 18	12.6	2
3	58 52.8	54 42	31.8	58 36.4	55 41	31.0	57 45.6	58 39	28.6	57 28.1	59 38	27.9	57 10.3	60 37	27.1	53 18.6	69 26	19.1	52 57.9	69 26	18.5	49 22.2	74 18	12.9	3
4	58 27.3	52 43	32.3	58 11.6	53 42	31.5	57 22.4	56 39	29.1	57 05.5	57 38	28.4	56 48.3	58 37	27.6	53 02.8	67 27	19.5	52 42.6	68 26	18.9	49 11.3	73 18	13.2	4
35	58 01.6	50 44	32.8	57 46.4	51 43	32.0	56 58.9	54 40	29.6	56 42.5	55 39	29.3	56 25.9	56 38	28.1	52 46.6	65 27	19.9	52 26.9	66 27	19.2	49 00.2	72 19	13.5	35
6	57 35.4	48 44	33.3	57 20.8	49 43	32.4	56 35.1	52 40	30.1	56 19.3	53 39	29.3	56 03.1	54 38	28.5	52 30.2	64 28	20.2	52 11.0	64 27	19.6	48 48.9	70 19	13.8	6
7	57 09.0	46 45	33.7	56 55.0	47 44	32.9	56 10.9	50 41	30.5	55 55.6	51 40	29.7	55 40.1	52 39	29.0	52 13.5	62 28	20.6	51 54.8	63 28	20.0	48 37.4	69 20	14.1	7
8	56 42.3	44 45	34.1	56 28.8	45 44	33.3	55 46.4	49 41	30.9	55 31.7	50 40	30.2	55 16.7	50 39	29.4	51 56.5	61 29	20.9	51 38.3	61 28	20.3	48 25.6	67 20	14.4	8
9	56 15.3	43 45	34.5	56 02.3	44 45	33.7	55 21.7	47 42	31.3	55 07.5	48 41	30.5	54 53.1	49 40	29.8	51 39.2	59 29	21.3	51 21.5	59 28	20.7	48 13.6	66 20	14.6	9
40	55 48.0	41 46	34.9	55 35.6	42 45	34.1	54 56.6	45 42	31.7	54 43.0	46 41	30.9	54 29.1	47 40	30.2	51 21.6	57 30	21.6	51 04.4	58 29	21.0	48 01.4	64 21	14.9	40
1	55 20.5	39 46	35.2	55 08.7	40 45	34.4	54 31.3	43 43	32.1	54 18.3	44 42	31.3	54 04.9	45 41	30.5	51 03.8	55 30	22.0	50 47.1	56 29	21.3	47 49.0	63 21	15.1	1
2	54 52.7	37 47	35.6	54 41.5	38 46	34.8	54 05.8	41 43	32.4	53 53.3	42 42	31.6	53 40.5	43 41	30.9	50 45.8	54 30	22.3	50 29.6	54 30	21.6	47 36.4	61 21	15.4	2
3	54 24.8	34 47	35.9	54 14.0	36 46	35.1	53 40.0	39 43	32.7	53 28.0	40 42	31.9	53 15.8	41 42	31.2	50 27.5	52 31	22.6	50 11.8	53 30	21.9	47 23.6	59 22	15.6	3
4	53 56.6	33 47	36.2	53 46.4	34 46	35.4	53 14.0	38 44	33.0	53 02.6	39 43	32.2	52 50.9	40 42	31.5	50 09.0	50 31	22.9	49 53.9	51 30	22.2	47 10.6	58 22	15.8	4
45	53 28.2	32 48	36.4	53 18.6	33 47	35.6	52 47.8	36 44	33.3	52 36.9	37 43	32.5	52 25.7	38 42	31.8	49 50.3	48 32	23.1	49 35.7	49 31	22.5	46 57.4	56 22	16.1	45
6	52 59.7	30 48	36.7	52 50.6	31 47	35.9	52 21.4	34 44	33.6	52 11.0	35 43	32.8	52 00.4	36 43	32.0	49 31.3	47 32	23.4	49 17.2	47 31	22.7	46 44.1	55 23	16.3	6
7	52 30.9	28 48	36.9	52 22.4	29 47	36.1	51 54.8	32 45	33.8	51 45.0	33 44	33.1	51 34.9	34 43	32.3	49 12.2	45 32	23.6	48 58.6	46 31	23.0	46 30.5	53 23	16.5	7
8	52 02.1	26 48	37.2	51 54.0	27 48	36.4	51 28.0	30 45	34.1	51 18.8	31 44	33.3	51 09.2	32 43	32.5	48 52.9	43 32	23.9	48 39.7	44 32	23.2	46 16.7	51 23	16.7	8
9	51 33.1	25 49	37.4	51 25.5	26 48	36.6	51 01.1	29 45	34.3	50 52.4	30 44	33.5	50 43.4	31 43	32.8	48 33.4	41 33	24.1	48 20.9	42 32	23.4	46 03.0	50 23	16.9	9
50	51 03.9	23 49	37.6	50 56.9	24 48	36.8	50 34.1	27 45	34.5	50 25.9	28 44	33.7	50 17.3	29 44	33.0	48 13.7	40 33	24.3	48 01.7	40 32	23.7	45 49.0	48 24	17.1	50
1	50 34.7	21 49	37.7	50 28.2	22 48	37.0	50 06.9	25 46	34.7	49 59.2	26 45	33.9	49 51.2	27 44	33.2	47 53.9	38 33	24.5	47 42.4	39 32	23.9	45 34.9	46 24	17.3	1
2	50 05.3	19 49	37.9	49 59.3	20 48	37.1	49 39.5	23 46	34.9	49 32.4	24 45	34.1	49 24.9	25 44	33.4	47 33.9	36 34	24.7	47 23.0	37 33	24.1	45 20.6	45 24	17.4	2
3	49 35.8	18 49	38.0	49 30.3	19 48	37.3	49 12.1	22 46	35.0	49 05.4	23 45	34.3	48 58.5	24 44	33.5	47 13.8	34 34	24.9	47 03.4	35 33	24.2	45 06.1	43 24	17.6	3
4	49 06.2	16 49	38.2	49 01.3	17 49	37.4	48 44.5	20 46	35.2	48 38.4	21 45	34.4	48 32.0	22 44	33.7	46 53.5	33 34	25.1	46 43.6	33 33	24.4	44 51.6	41 24	17.8	4
55	48 36.6	14 50	38.3	48 32.1	15 49	37.5	48 16.9	18 46	35.3	48 11.3	19 45	34.6	48 05.3	20 45	33.8	46 33.1	31 34	25.3	46 23.8	32 33	24.6	44 36.9	39 25	17.9	55
6	48 06.9	13 50	38.4	48 02.9	14 49	37.6	47 49.2	17 46	35.4	47 44.0	18 46	34.7	47 38.6	19 45	34.0	46 12.6	29 34	25.4	46 03.8	30 34	24.7	44 22.1	38 25	18.1	6
7	47 37.1	11 50	38.5	47 33.6	12 49	37.7	47 21.4	15 46	35.5	47 16.6	16 46	34.8	47 11.8	17 45	34.1	45 52.0	27 35	25.6	45 43.7	28 34	24.9	44 07.2	36 25	18.2	7
8	47 07.3	10 50	38.5	47 04.2	11 49	37.8	46 53.5	13 47	35.6	46 49.3	14 46	34.9	46 44.9	15 45	34.2	45 31.3	25 35	25.6	45 23.5	26 34	25.0	43 52.2	34 25	18.3	8
9	46 37.4	08 50	38.6	46 34.8	09 49	37.9	46 25.5	12 47	35.7	46 21.9	13 46	35.0	46 18.0	14 45	34.3	45 10.4	24 35	25.8	45 03.1	25 34	25.1	43 37.1	33 25	18.4	9
60	46 07.5	06 50	38.7	46 05.4	07 49	37.9	45 57.5	10 47	35.8	45 54.4	11 46	35.1	45 50.9	12 45	34.4	44 49.5	22 35	25.9	44 42.7	23 34	25.3	43 21.9	31 26	18.6	60
1	45 37.5	05 50	38.7	45 35.9	06 49	38.0	45 29.5	08 47	35.9	45 26.8	09 47	35.1	45 23.9	10 46	34.4	44 28.5	20 35	26.1	44 22.2	21 34	25.4	43 06.6	29 26	18.7	1
2	45 07.5	03 50	38.8	45 05.9	04 49	38.0	45 01.4	07 47	36.0	44 59.2	08 46	35.2	44 57.0	08 45	34.5	44 07.7	19 35	26.2	44 01.7	19 35	25.5	42 51.2	27 26	18.9	2
3	44 37.5	02 50	38.8	44 36.9	03 49	38.0	44 33.3	05 47	35.9	44 31.6	06 46	35.2	44 29.6	07 45	34.5	43 46.3	17 35	26.2	43 41.0	18 34	25.6	42 35.7	26 26	18.9	3
4	44 07.6	00 50	38.8	44 07.3	01 49	38.1	44 05.1	04 47	35.9	44 03.9	05 46	35.3	44 02.4	05 45	34.6	43 25.0	15 35	26.3	43 20.3	16 35	25.6	42 20.2	24 26	19.0	4
65	43 37.6	01 50	38.8	43 37.8	00 49	38.1	43 37.0	02 47	36.0	43 36.2	03 46	35.3	43 35.2	04 45	34.6	43 03.8	14 36	26.4	42 59.6	14 35	25.7	42 04.6	22 26	19.0	65
6	43 07.6	03 50	38.7	43 08.2	01 49	38.0	43 08.6	01 47	36.0	43 08.5	01 46	35.3	43 08.0	03 46	34.6	42 42.4	12 36	26.5	42 38.7	13 35	25.8	41 48.9	20 26	19.1	6
7	42 37.6	04 50	38.7	42 38.7	03 49	38.0	42 40.6	01 47	36.0	42 40.8	00 46	35.3	42 40.7	01 45	34.6	42 21.1	10 36	26.5	42 17.9	11 35	25.9	41 33.2	19 26	19.2	7
8	42 07.6	06 50	38.7	42 09.2	05 49	38.0	42 12.5	02 47	36.0	42 13.1	02 46	35.3	42 13.5	01 45	34.6	41 59.7	09 36	26.6	41 57.0	09 35	25.9	41 17.4	17 26	19.3	8
9	41 37.7	07 50	38.6	41 39.7	06 49	38.0	41 44.3	04 47	36.0	41 45.4	03 46	35.3	41 46.3	02 45	34.6	41 38.2	07 36	26.6	41 36.0	08 35	25.9	41 01.6	15 26	19.3	9
70	41 07.8	09 50	38.6	41 10.2	08 49	37.9	41 16.2	06 47	35.9	41 17.7	05 46	35.3	41 19.0	04 45	34.6	41 16.8	05 36	26.6	41 15.1	06 35	26.0	40 45.7	14 27	19.4	70
1	40 37.9	10 50	38.5	40 40.8	09 49	37.9	40 48.1	07 47	35.9	40 50.0	06 46	35.2	40 51.8	05 45	34.6	40 55.3	04 36	26.6	40 54.1	04 35	26.0	40 29.8	12 27	19.4	1
2	40 08.1	11 50	38.5	40 11.4	11 49	37.8	40 20.0	08 47	35.9	40 22.4	08 46	35.2	40 24.6	07 45	34.5	40 33.8	02 36	26.7	40 33.1	04 35	26.0	40 13.9	10 27	19.4	2
3	39 38.3	13 50	38.4	39 42.0	12 49	37.7	39 52.0	10 47	35.8	39 54.8	09 46	35.1	39 57.5	09 45	34.5	40 12.3	00 36	26.7	40 12.1	01 35	26.0	39 57.9	08 27	19.5	3
4	39 08.6	14 49	38.3	39 12.7	14 49	37.7	39 23.9	11 47	35.7	39 27.3	11 46	35.1	39 30.4	10 45	34.4	39 50.8	01 36	26.7	39 51.1	01 35	26.0	39 41.9	07 27	19.5	4
75	38 38.9	16 49	38.2	38 43.5	15 49	37.5	38 56.0	13 46	35.7	38 59.7	13 46	35.0	39 03.3	11 45	34.4	39 29.3	03 36	26.6	39 30.1	02 36	26.0	39 25.9	05 27	19.5	75
6	38 09.3	17 49	38.1	38 14.3	16 49	37.5	38 28.1	14 46	35.5	38 32.3	14 46	34.9	38 36.4	12 45	34.3	39 07.8	04 36	26.6	39 09.0	04 35	26.0	39 10.0	03 27	19.5	6
7	37 39.8	18 49	38.0	37 45.2	18 48	37.4	38 00.2	16 46	35.5	38 04.8	15 46	34.9	38 09.3	14 45	34.2	38 46.3	06 36	26.6	38 48.1	05 35	26.0	38 53.9	02 27	19.5	7
8	37 10.3	20 49	37.9	37 16.1	19 48	37.2	37 32.4	17 46	35.4	37 37.5	16 45	34.8	37 42.3	16 45	34.1	38 24.9	08 36	26.6	38 27.1	07 35	25.9	38 37.9	00 27	19.5	8
9	36 41.0	21 49	37.7	36 47.2	20 48	37.1	37 04.7	18 46	35.4	37 10.2	18 45	34.7	37 15.3	15 45	34.0	38 03.5	09 36	26.5	38 06.2	09 35	25.9	38 21.8	02 27	19.5	9
80	36 11.7	22 49	37.6	36 18.3	23 48	36.9	36 37.1	20 46	34.6	36 43.0	20 45	34.4	36 48.7	19 45	33.9	37 42.1	11 36	26.5	37 45.4	10 35	25.9	38 05.0	07 27	19.5	80
1	35 42.5	24 48	37.5	35 49.5	23 48	36.9	36 09.5	21 46	35.1	36 15.9	21 45	34.4	36 22.0	20 44	33.8	37 20.7	12 36	26.5	37 24.3	12 35	25.8	37 49.8	05 27	19.5	1
2	35 13.4	25 48	37.3	35 20.8	24 48	36.7	35 42.0	23 46	34.9	35 48.8	22 45	34.3	35 55.3	22 44	33.7	36 59.4	14 35	26.4	37 03.5	13 35	25.8	37 33.8	07 27	19.5	2
3	34 44.4	26 48	37.2	34 52.2	26 48	36.6	35 14.7	24 46	34.8	35 21.8	23 45	34.2	35 28.8	23 44	33.6	36 38.1	16 35	26.3	36 42.7	15 35	25.7	37 17.8	06 27	19.4	3
4	34 15.5	27 48	37.0	34 23.7	27 47	36.4	34 47.4	25 45	34.6	34 54.9	25 45	34.1	35 02.3	24 44	33.5	36 16.9	17 35	26.2	36 22.0	16 34	25.6	37 01.8	10 27	19.4	4
85	33 46.7	29 48	36.8	33 55.3	28 47	36.2	34 20.2	27 45	34.5	34 28.1	26 44	33.9	34 35.9	26 44	33.3	35 55.8	19 35	26.2	36 01.3	18 35	25.6	36 45.9	12 27	19.4	85
6	33 18.1	30 48	36.6	33 27.1	30 47	36.1	33 53.1	28 45	34.2	34 01.4	28 44	33.8	34 09.6	28 44	33.2	35 34.7	20 35	26.1	35 40.6	20 34	25.5	36 30.0	13 26	19.3	6
7	32 49.5	32 47	36.5	32 58.9	31 47	35.9	33 26.1	29 45	34.2	33 34.9	29 44	33.6	33 43.5	28 43	33.0	35 13.6	22 35	26.0	35 20.0	21 34	25.4	36 14.1	15 26	19.3	7
8	32 21.1	33 47	36.3	32 30.9	32 46	35.7	32 59.3	31 45	34.0	33 08.4	30 44	33.4	33 17.4	30 43	32.9	34 52.7	23 35	25.9	34 59.5	23 34	25.3	35 58.3	17 26	19.2	8
9	31 52.9	34 47	36.1	32 03.0	34 46	35.5	32 32.4	32 45	33.8	32 42.0	32 44	33.3	32 51.4	31 43	32.7	34 31.8	25 35	25.8	34 39.1	24 34	25.2	35 42.4	18 26	19.1	9
90	31 24.7	35 47	35.9	31 35.2	35 46	35.3	32 05.9	34 44	33.7	32 15.8	33 44	33.1	32 25.6	32 43	32.5	34 11.0	26 35	25.8	34 18.7	26 34	25.1	35 26.7	20 26	19.1	90

DECLINATION SAME NAME AS LATITUDE

Lat. 37°

H.A.	60° 00' Alt.	Δd Δt	Az.	60° 30' Alt.	Δd Δt	Az.	62° 00' Alt.	Δd Δt	Az.	62° 30' Alt.	Δd Δt	Az.	63° 00' Alt.	Δd Δt	Az.	69° 00' Alt.	Δd Δt	Az.	69° 30' Alt.	Δd Δt	Az.	74° 30' Alt.	Δd Δt	Az.	H.A.
91	30 56.7	36 46	35.7	31 07.6	36 46	35.1	31 39.4	35 44	33.5	31 49.7	34 43	32.9	31 59.9	34 43	32.4	33 50.3	28 34	25.6	33 58.5	27 34	25.0	35 11.0	21 26	19.1	91
2	30 28.9	38 46	35.4	30 40.1	37 46	34.9	31 13.0	36 44	33.3	31 23.7	35 43	32.7	31 34.3	35 42	32.2	33 29.7	29 34	25.4	33 38.3	28 33	24.9	34 55.4	23 26	19.0	2
3	30 01.1	39 46	35.2	30 12.8	39 46	34.7	30 46.8	37 43	33.1	30 57.9	37 43	32.5	31 08.9	36 42	32.0	33 09.1	30 34	25.3	33 18.2	30 33	24.7	34 39.8	24 26	18.9	3
4	29 33.6	40 45	35.0	29 45.6	40 45	34.5	30 20.7	38 43	32.9	30 32.2	38 43	32.3	30 43.5	38 42	31.8	32 48.7	32 34	25.2	32 58.2	31 33	24.6	34 24.3	26 24	18.9	4
95	29 06.2	41 45	34.8	29 18.5	41 45	34.2	29 54.8	40 43	32.7	30 06.7	39 42	32.1	30 18.4	39 42	31.6	32 28.4	33 34	25.0	32 38.5	33 33	24.5	34 08.9	28 26	18.8	95
6	28 39.0	43 45	34.5	28 51.7	42 44	34.0	29 29.0	41 43	32.4	29 41.3	41 42	31.9	29 53.3	40 41	31.4	32 08.1	35 34	24.9	32 18.5	34 33	24.3	33 53.5	29 26	18.7	6
7	28 11.9	44 45	34.3	28 24.9	43 44	33.8	29 03.4	42 42	32.2	29 16.0	42 42	31.7	29 28.5	41 41	31.2	31 48.0	36 33	24.7	31 58.8	36 33	24.2	33 38.2	31 25	18.6	7
8	27 45.0	45 45	34.0	27 58.4	45 44	33.5	28 38.0	43 42	32.0	28 50.9	43 42	31.5	29 03.7	43 41	31.0	31 28.0	37 33	24.6	31 39.2	37 32	24.0	33 22.9	32 25	18.5	8
9	27 18.3	46 44	33.8	27 32.0	46 44	33.3	28 12.7	44 41	31.7	28 26.0	44 41	31.2	28 39.2	44 41	30.7	31 08.2	39 33	24.4	31 19.7	38 32	23.9	33 07.8	34 25	18.4	9
100	26 51.7	47 44	33.5	27 05.8	47 43	33.0	27 47.5	46 42	31.5	28 01.2	45 41	31.0	28 14.8	45 40	30.5	30 48.4	40 33	24.3	31 00.4	40 32	23.7	32 52.7	35 25	18.3	100
1	26 25.4	48 44	33.2	26 39.8	48 43	32.7	27 22.6	47 41	31.3	27 36.6	47 41	30.8	27 50.5	46 40	30.3	30 28.8	42 32	24.1	30 41.2	41 32	23.6	32 37.8	37 25	18.1	1
2	25 59.2	49 43	33.0	26 14.0	49 43	32.5	26 57.8	48 41	31.0	27 12.2	48 40	30.5	27 26.5	47 40	30.0	30 09.3	43 32	23.9	30 22.1	42 32	23.4	32 22.9	38 25	18.0	2
3	25 33.2	51 43	32.7	25 48.4	50 42	32.2	26 33.2	49 41	30.8	26 47.9	49 40	30.3	27 02.6	49 40	29.8	29 49.9	44 32	23.7	30 03.1	44 31	23.2	32 08.1	39 24	17.9	3
4	25 07.5	52 43	32.4	25 22.9	51 42	31.9	26 08.8	50 40	30.5	26 23.9	50 40	30.0	26 38.9	50 39	29.5	29 30.7	46 32	23.6	29 44.3	45 31	23.0	31 53.4	41 24	17.8	4
105	24 41.9	53 42	32.1	24 57.7	53 42	31.6	25 44.6	52 40	30.2	26 00.0	51 39	29.8	26 15.4	51 39	29.3	29 11.6	47 32	23.4	29 25.6	46 31	22.9	31 38.8	42 24	17.7	105
6	24 16.5	54 42	31.8	24 32.6	54 41	31.4	25 20.5	53 40	30.0	25 36.3	52 39	29.5	25 52.0	52 39	29.0	28 52.7	48 31	23.2	29 07.1	48 31	22.7	31 24.4	44 24	17.5	6
7	23 51.4	55 42	31.5	24 07.8	55 41	31.1	24 56.7	54 39	29.7	25 12.8	54 39	29.2	25 28.9	53 38	28.7	28 33.9	49 31	23.0	28 48.7	49 30	22.5	31 10.0	45 24	17.4	7
8	23 26.4	56 41	31.2	23 43.2	56 41	30.8	24 33.1	55 39	29.4	24 49.5	55 38	28.9	25 05.9	54 38	28.5	28 15.3	51 31	22.8	28 30.5	50 30	22.3	30 55.7	46 24	17.2	8
9	23 01.7	57 41	30.9	23 18.8	57 40	30.5	24 09.7	56 39	29.1	24 26.5	56 38	28.7	24 43.2	55 38	28.2	27 56.9	52 30	22.6	28 12.4	52 30	22.1	30 41.6	48 23	17.1	9
110	22 37.2	58 40	30.6	22 54.6	58 40	30.2	23 46.5	57 38	28.8	24 03.6	57 37	28.4	24 20.6	57 37	27.9	27 38.6	53 30	22.3	27 54.4	53 30	21.9	30 27.6	49 23	16.9	110
1	22 12.9	59 40	30.3	22 30.7	59 40	29.8	23 23.5	58 38	28.5	23 40.9	58 37	28.1	23 58.3	58 37	27.6	27 20.4	54 30	22.1	27 36.7	54 29	21.7	30 13.7	51 23	16.8	1
2	21 48.9	60 40	30.0	22 06.9	60 39	29.5	23 00.7	59 38	28.2	23 18.5	59 37	27.8	23 36.2	59 36	27.3	27 02.5	56 30	21.9	27 19.1	55 29	21.4	29 59.9	52 23	16.6	2
3	21 25.1	61 39	29.6	21 43.4	61 39	29.2	22 38.1	60 37	27.9	22 56.3	60 37	27.5	23 14.3	60 36	27.1	26 44.7	57 29	21.7	27 01.7	56 29	21.2	29 46.3	53 23	16.5	3
4	21 01.5	62 39	29.3	21 20.2	62 38	28.9	22 15.8	62 37	27.6	22 34.2	61 36	27.2	22 52.6	61 36	26.8	26 27.1	58 29	21.4	26 44.4	58 28	21.0	29 32.7	54 22	16.3	4
115	20 38.2	63 38	29.0	20 57.1	63 38	28.5	21 53.7	63 36	27.3	22 12.5	62 36	26.9	22 31.1	62 35	26.4	26 09.6	59 29	21.2	26 27.3	59 28	20.8	29 19.4	56 22	16.1	115
6	20 15.1	64 38	28.6	20 34.4	64 38	28.2	21 31.9	64 36	27.0	21 50.9	63 36	26.6	22 09.9	63 35	26.1	25 52.4	60 28	21.0	26 10.4	60 28	20.5	29 06.1	57 22	16.0	6
7	19 52.2	65 38	28.3	20 11.8	65 37	27.9	21 10.3	65 36	26.7	21 29.6	64 35	26.2	21 48.9	64 35	25.8	25 35.3	61 28	20.7	25 53.7	61 28	20.3	28 53.0	58 22	15.8	7
8	19 29.7	66 37	27.9	19 49.6	66 37	27.5	20 48.9	66 35	26.3	21 08.6	65 35	25.9	21 28.2	65 34	25.5	25 18.5	63 28	20.5	25 37.2	62 27	20.1	28 40.1	60 21	15.6	8
9	19 07.4	67 37	27.6	19 27.5	67 36	27.2	20 27.8	67 35	26.0	20 47.7	66 34	25.6	21 07.6	66 34	25.2	25 01.8	64 27	20.2	25 20.9	63 27	19.8	28 27.3	61 21	15.4	9
120	18 45.3	68 36	27.2	19 05.8	68 36	26.8	20 06.9	67 34	25.7	20 27.2	67 34	25.3	20 47.4	67 33	24.9	24 45.3	65 27	20.0	25 04.7	65 27	19.6	28 14.6	62 21	15.2	120
1	18 23.5	69 36	26.8	18 44.3	69 35	26.5	19 46.3	69 34	25.3	20 06.8	68 33	24.9	20 27.3	68 33	24.5	24 29.0	66 27	19.7	24 48.8	66 26	19.3	28 02.1	63 21	15.0	1
2	18 02.0	70 35	26.5	18 23.1	70 35	26.1	19 25.9	70 34	25.0	19 46.8	69 33	24.6	20 07.6	69 33	24.2	24 13.0	67 26	19.5	24 33.0	67 26	19.1	27 49.7	64 20	14.8	2
3	17 40.8	71 35	26.1	18 02.1	71 34	25.7	19 05.8	71 33	24.6	19 27.0	70 33	24.2	19 48.0	70 32	23.9	23 57.1	68 26	19.2	24 17.5	68 26	18.8	27 37.5	65 20	14.7	3
4	17 19.9	72 34	25.7	17 41.5	72 34	25.4	18 46.0	71 33	24.3	19 07.4	71 32	23.9	19 28.8	71 32	23.5	23 41.4	69 26	18.9	24 02.1	69 25	18.5	27 25.5	67 20	14.5	4
125	16 59.2	73 34	25.4	17 21.1	73 34	25.0	18 26.4	72 32	23.9	18 48.1	72 32	23.6	19 09.8	72 31	23.2	23 26.0	70 26	18.7	23 47.0	70 25	18.3	27 13.6	68 20	14.3	125
6	16 38.8	74 33	25.0	17 01.0	74 33	24.6	18 07.1	73 32	23.6	18 29.1	73 31	23.2	18 51.1	73 31	22.8	23 10.8	71 25	18.4	23 32.1	71 24	18.0	27 01.9	69 19	14.1	6
7	16 18.7	75 33	24.6	16 41.1	75 33	24.2	17 48.1	74 31	23.2	18 10.4	74 31	22.8	18 32.6	74 30	22.5	22 55.8	72 25	18.1	23 17.4	72 24	17.7	26 50.3	70 19	13.8	7
8	15 58.9	76 32	24.2	16 21.6	76 32	23.9	17 29.4	75 31	22.8	17 51.9	75 30	22.5	18 14.4	75 30	22.1	22 41.0	73 24	17.8	23 02.9	73 24	17.5	26 39.0	71 19	13.6	8
9	15 39.5	76 32	23.8	16 02.4	76 32	23.5	17 10.9	76 30	22.5	17 33.7	76 30	22.1	17 56.5	76 29	21.8	22 26.4	74 24	17.5	22 48.7	74 23	17.2	26 27.8	72 18	13.4	9
130	15 20.3	77 31	23.4	15 43.4	77 31	23.1	16 52.8	77 30	22.1	17 15.9	77 29	21.7	17 38.9	77 28	21.4	22 12.1	75 23	17.2	22 34.6	75 23	16.9	26 16.7	73 18	13.2	130
1	15 01.4	78 31	23.0	15 24.8	78 31	22.7	16 34.9	78 29	21.7	16 58.2	78 29	21.4	17 21.5	78 28	21.0	21 58.0	76 23	17.0	22 20.8	76 23	16.6	26 05.9	74 18	13.0	1
2	14 42.8	79 30	22.6	15 06.3	79 30	22.3	16 17.4	79 29	21.3	16 40.9	78 28	21.0	17 04.5	78 28	20.7	21 44.2	77 23	16.7	22 07.2	77 22	16.3	25 55.2	75 17	12.8	2
3	14 24.6	80 30	22.2	14 48.5	80 30	21.9	16 00.1	79 28	20.9	16 23.9	79 28	20.6	16 47.7	79 27	20.3	21 30.6	78 22	16.4	21 53.9	78 22	16.0	25 44.7	76 17	12.5	3
4	14 06.6	81 29	21.8	14 30.8	80 29	21.5	15 43.1	80 28	20.5	16 07.2	80 27	20.2	16 31.2	80 27	19.9	21 17.2	79 22	16.1	21 40.8	79 21	15.7	25 34.4	77 17	12.3	4
135	13 49.0	81 29	21.4	14 13.4	81 28	21.1	15 26.5	81 27	20.1	15 50.8	81 27	19.8	16 15.1	81 26	19.5	21 04.0	80 21	15.8	21 27.9	79 21	15.4	25 24.3	78 17	12.1	135
6	13 31.8	82 28	20.9	13 56.4	82 28	20.7	15 10.1	82 27	19.7	15 34.7	82 26	19.5	15 59.2	82 26	19.2	20 51.2	81 21	15.4	21 15.3	80 21	15.1	25 14.4	79 16	11.6	6
7	13 14.8	83 28	20.5	13 39.7	83 27	20.2	14 54.1	83 26	19.3	15 18.9	83 26	19.1	15 43.6	82 25	18.8	20 38.5	81 21	15.1	21 02.9	81 20	14.8	25 04.6	80 16	11.6	7
8	12 58.2	84 27	20.1	13 23.3	84 27	19.8	14 38.4	83 26	18.9	15 03.4	83 25	18.7	15 28.4	83 25	18.4	20 26.1	82 20	14.8	20 50.8	82 20	14.5	24 55.1	81 16	11.4	8
9	12 41.9	84 27	19.6	13 07.2	84 26	19.4	14 23.0	84 25	18.5	14 48.2	84 25	18.3	15 13.4	84 24	18.0	20 14.0	83 20	14.5	20 38.9	83 19	14.2	24 45.7	82 15	11.1	9
140	12 26.0	85 26	19.2	12 51.5	85 26	18.9	14 07.9	85 25	18.1	14 33.3	85 24	17.9	14 58.8	85 24	17.6	20 02.1	84 19	14.2	20 27.2	84 19	13.9	24 36.6	83 15	10.9	140
1	12 10.4	86 25	18.8	12 36.1	86 25	18.5	13 53.2	86 24	17.7	14 18.8	85 24	17.5	14 44.5	85 23	17.2	19 50.5	85 19	13.9	20 15.8	85 18	13.6	24 27.6	84 15	10.6	1
2	11 55.1	86 25	18.3	12 21.0	86 24	18.1	13 38.7	86 23	17.3	14 04.6	86 23	17.0	14 30.5	86 23	16.8	19 39.1	85 18	13.5	20 04.7	85 18	13.3	24 18.9	84 14	10.4	2
3	11 40.2	87 24	17.9	12 06.3	87 24	17.6	13 24.7	87 23	16.9	13 50.7	87 23	16.6	14 16.8	87 22	16.4	19 28.0	86 18	13.2	19 53.8	86 18	13.0	24 10.3	85 14	10.2	3
4	11 25.7	88 24	17.4	11 52.0	88 23	17.2	13 10.9	88 22	16.5	13 37.2	88 22	16.2	14 03.4	88 22	16.0	19 17.2	87 18	12.9	19 43.2	87 17	12.6	24 02.0	86 14	09.9	4
145	11 11.5	88 23	17.0	11 38.0	88 23	16.8	12 57.5	88 22	16.0	13 24.0	88 21	15.8	13 50.4	88 21	15.6	19 06.7	87 17	12.6	19 32.9	87 17	12.3	23 53.8	87 13	09.7	145
6	10 57.6	89 22	16.5	11 24.4	89 22	16.3	12 44.4	89 21	15.6	13 11.1	89 21	15.4	13 37.7	89 21	15.1	18 56.4	88 17	12.2	19 22.8	88 16	11.9	23 45.9	87 13	09.4	6
7	10 44.2	90 22	16.1	11 11.1	90 22	15.9	12 31.7	90 21	15.2	12 58.6	90 20	15.0	13 25.4	89 20	14.7	18 46.3	89 16	11.9	19 13.0	89 16	11.7	23 38.2	88 13	09.1	7
8	10 31.1	90 21	15.6	10 58.2	90 21	15.4	12 19.3	90 20	14.8	12 46.4	90 20	14.5	13 13.4	90 19	14.3	18 36.6	89 16	11.6	19 03.4	89 16	11.3	23 30.7	88 12	08.9	8
9	10 18.4	91 21	15.2	10 45.6	91 20	15.0	12 07.3	91 19	14.3	12 34.5	91 19	14.1	13 01.7	91 19	13.9	18 27.1	90 15	11.2	18 54.2	90 15	11.0	23 23.4	89 12	08.6	9
150	10 06.0	91 20	14.7	10 33.4	91 20	14.5	11 55.6	91 19	13.9	12 23.0	91 19	13.7	12 50.4	91 19	13.5	18 18.0	91 15	10.9	18 45.2	91 15	10.7	23 16.3	90 11	08.4	150
1	9 54.0	92 19	14.2	10 21.6	92 19	14.0	11 44.3	92 18	13.4	12 11.9	92 18	13.2	12 39.4	92 18	13.0	18 09.1	91 14	10.5	18 36.4	91 14	10.3	23 09.5	91 11	08.1	1
2	9 42.4	92 19	13.8	10 10.2	92 18	13.6	11 33.3	92 18	13.0	12 01.1	92 17	12.8	12 28.8	92 17	12.6	18 00.4	92 14	10.2	18 28.0	92 14	10.0	23 02.8	92 10	07.8	2
3	9 31.2	93 18	13.3	9 59.1	93 18	13.1	11 22.7	93 17	12.6	11 50.6	93 17	12.4	12 18.5	93 17	12.2	17 52.1	92 13	09.8	18 19.8	92 13	09.6	22 56.4	92 10	07.6	3
4	9 20.4	93 17	12.8	9 48.4	93 17	12.7	11 12.5	93 16	12.1	11 40.5	93 16	11.9	12 08.5	93 16	11.7	17 44.1	93 13	09.5	18 12.0	93 13	09.3	22 50.2	92 10	07.3	4
155	9 09.9	94 17	12.4	9 38.1	94 17	12.2	11 02.6	94 16	11.7	11 30.8	94 15	11.5	11 59.0	94 15	11.3	17 36.3	94 12	09.1	18 04.3	94 11	09.0	22 44.2	93 10	07.0	155
6	8 59.9	94 16	11.9	9 28.2	94 16	11.7	10 53.1	94 15	11.2	11 21.4	94 14	11.0	11 49.8	94 14	10.9	17 28.9	94 12	08.8	17 57.0	94 09	08.8	22 38.4	94 09	06.5	6
7	8 50.2	95 15	11.4	9 18.6	95 15	11.2	10 44.0	95 15	10.8	11 12.5	95 14	10.6	11 40.9	95 14	10.4	17 21.7	95 11	08.4	17 50.0	94 11	08.3	22 32.9	94 09	06.5	7
8	8 40.9	95 15	10.9	9 09.5	95 15	10.8	10 35.2	95 14	10.3	11 03.8	95 14	10.2	11 32.4	95 14	10.0	17 14.8	95 11	08.1	17 43.3	95 11	08.0	22 27.6	95 08	06.2	8
9	8 32.0	96 14	10.4	9 00.7	96 14	10.3	10 26.9	96 13	09.9	10 55.6	96 13	09.7	11 24.3	96 13	09.6	17 08.2	95 10	07.7	17 36.8	95 10	07.6	22 22.5	95 08	05.9	9
160	8 23.5	96 13	10.0	8 52.4	96 13	09.8	10 18.9	96 12	09.4	10 47.7	96 12	09.3	11 16.5	96 12	09.1	17 01.9	96 10	07.4	17 30.6	96 10	07.3	22 17.6	96 08	05.7	160
1	8 15.5	96 13	09.5	8 44.4	96 13	09.3	10 11.2	96 12	08.9	10 40.2	96 12	08.8	11 09.1	96 12	08.7	16 55.9	96 10	07.0	17 24.8	96 09	06.9	22 13.1	96 07	05.4	1
2	8 07.8	97 12	09.0	8 36.8	97 12	08.9	10 04.0	97 11	08.5	10 33.0	97 11	08.3	11 02.0	97 11	08.2	16 50.2	97 09	06.6	17 19.2	97 09	06.5	22 08.7	96 07	05.1	2
3	8 00.5	97 11	08.5	8 29.7	97 11	08.4	9 57.1	97 11	08.0	10 26.2	97 11	07.9	10 55.4	97 10	07.8	16 44.8	97 08	06.3	17 13.9	97 08	06.2	22 04.5	97 07	04.8	3
4	7 53.6	97 11	08.0	8 22.9	97 11	07.9	9 50.6	97 10	07.5	10 19.9	97 10	07.4	10 49.1	97 10	07.3	16 39.7	98 08	05.9	17 08.9	97 08	05.8	22 00.6	97 06	04.6	4
165	7 47.2	98 10	07.5	8 16.5	98 10	07.4	9 44.5	98 10	07.1	10 13.8	98 09	07.0	10 43.2	98 09	06.9	16 34.9	98 07	05.2	16 59.9	98 07	05.1	21 56.9	97 06	04.3	165
6	7 41.1	98 09	06.9	8 10.5	98 09	06.9	9 38.8	98 09	06.6	10 08.2	98 09	06.5	10 37.6	98 08	06.4	16 30.4	98 07	05.2	16 55.7	98 07	04.7	21 53.5	98 05	03.7	6
7	7 35.5	98 09	06.5	8 05.0	98 09	06.4	9 33.5	98 08	06.1	10 03.0	98 08	06.1	10 32.5	98 08	06.0	16 26.3	98 06	04.8	16 51.9	98 06	04.7	21 50.2	98 05	03.7	7
8	7 30.2	99 08	06.0	7 59.8	99 08	05.9	9 28.5	99 08	05.7	9 58.1	99 07	05.6	10 27.7	99 07	05.5	16 22.4	98 06	04.5	16 48.4	99 06	04.4	21 47.2	98 05	03.4	8
9	7 24.4	99 07	05.5	7 55.1	99 07	05.4	9 24.0	99 07	05.1	9 53.6	99 07	05.1	10 23.3	99 07	05.1	16 18.8	99 05	04.1	16 48.4	99 05	04.1	21 44.5	99 04	03.1	9
170	7 21.0	99 07	05.0	7 50.7	99 07	05.0	9 19.5	99 06	04.7	9 49.5	99 06	04.7	10 19.2	99 06	04.6	16 15.6	99 05	03.7	16 45.2	99 05	03.6	21 42.0	99 04	02.9	170
1	7 17.0	99 06	04.5	7 46.8	99 06	04.5	9 16.1	99 06	04.3	9 45.8	99 06	04.2	10 15.6	99 05	04.1	16 12.6	99 04	03.3	16 42.4	99 04	03.3	21 39.7	99 03	02.6	1
2	7 13.5	99 05	04.0	7 43.3	99 05	04.0	9 12.7	99 05	03.8	9 42.5	99 05	03.7	10 12.3	99 05	03.7	16 10.0	99 04	03.0	16 39.8	99 04	02.9	21 37.7	99 03	02.3	2
3	7 10.3	1.00 04	03.5	7 40.2	1.00 04	03.5	9 09.7	1.00 04	03.3	9 39.6	1.00 04	03.3	10 09.4	1.00 04	03.2	16 07.6	99 03	02.6	16 37.5	99 03	02.6	21 35.9	99 03	02.0	3
4	7 07.6	1.00 04	03.0	7 37.5	1.00 04	03.0	9 07.1	1.00 04	02.8	9 37.0	1.00 04	02.8	10 06.9	1.00 04	02.8	16 05.6	1.00 03	02.2	16 35.5	1.00 03	02.2	21 34.3	1.00 02	01.7	4
175	7 05.3	1.00 03	02.5	7 35.2	1.00 03	02.4	9 05.0	1.00 03	02.3	9 34.9	1.00 03	02.3	10 04.8	1.00 03	02.3	16 03.9	1.00 02	01.8	16 33.8	1.00 02	01.8	21 33.0	1.00 02	01.4	175
6	7 03.4	1.00 02	02.0	7 33.3	1.00 02	02.0	9 03.2	1.00 02	01.9	9 33.1	1.00 02	01.9	10 03.1	1.00 02	01.8	16 02.5	1.00 02	01.5	16 32.4	1.00 02	01.5	21 31.9	1.00 01	01.1	6
7	7 01.9	1.00 02	01.5	7 31.9	1.00 02	01.5	9 01.8	1.00 02	01.4	9 31.8	1.00 02	01.4	10 01.7	1.00 02	01.4	16 01.4	1.00 01	01.1	16 31.4	1.00 01	01.1	21 31.1	1.00 01	00.9	7
8	7 00.8	1.00 01	01.0	7 30.8	1.00 01	01.0	9 00.8	1.00 01	00.9	9 30.8	1.00 01	00.9	10 00.8	1.00 01	00.9	16 00.6	1.00 01	00.7	16 30.6	1.00 01	00.7	21 30.5	1.00 01	00.6	8
9	7 00.2	1.00 00	00.5	7 30.2	1.00 00	00.5	9 00.2	1.00 00	00.5	9 30.2	1.00 00	00.5	10 00.2	1.00 00	00.5	16 00.2	1.00 00	00.4	16 30.2	1.00 00	00.4	21 30.2	1.00 00	00.3	9
180	7 00.0	1.00 00	00.0	7 30.0	1.00 00	00.0	9 00.0	1.00 00	00.0	9 30.0	1.00 00	00.0	10 00.0	1.00 00	00.0	16 00.0	1.00 00	00.0	16 30.0	1.00 00	00.0	21 30.0	1.00 00	00.0	180

Lat. 38°

16—55156-1

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 37°

AZ.	4° Dec.	4° H.A.	8° Dec.	8° H.A.	12° Dec.	12° H.A.	16° Dec.	16° H.A.	20° Dec.	20° H.A.	24° Dec.	24° H.A.	28° Dec.	28° H.A.	32° Dec.	32° H.A.	36° Dec.	36° H.A.	40° Dec.	40° H.A.	44° Dec.	44° H.A.	AZ.
00	57	180	61	180	65	180	69	180	73	180	77	180	81	180	85	180	89	180	87	00	83	00	00
4	57	174	61	172	65	171	69	169	73	167	77	164	80	158	84	145	87	106	86	45	82	22	4
8	56	166	60	164	64	162	68	159	72	155	75	150	79	141	82	125	83	96	83	62	81	38	8
12	55	159	59	156	63	154	66	150	70	145	73	138	76	128	79	113	80	92	80	69	79	49	12
16	54	152	58	149	61	146	65	142	68	136	71	129	74	119	76	106	77	90	77	72	76	55	16
20	52	146	56	143	59	139	63	135	66	129	68	122	71	112	73	101	74	88	74	73	73	59	20
24	50	141	54	137	57	133	60	128	63	122	66	116	68	107	70	97	71	86	71	74	71	61	24
28	48	135	51	132	55	128	58	123	60	117	63	111	65	103	66	94	68	84	68	74	68	63	28
32	46	131	49	127	52	123	55	118	57	113	60	106	62	99	63	91	64	82	65	73	65	64	32
36	43	126	46	123	49	118	52	114	54	108	57	103	59	96	60	89	61	81	62	73	62	64	36
40	41	122	44	118	46	114	49	110	51	105	53	99	55	93	57	87	58	79	59	72	59	64	40
44	38	118	41	115	43	111	46	106	48	102	50	96	52	91	54	85	55	78	56	71	56	64	44
48	35	115	38	111	40	107	43	103	45	99	47	94	49	88	51	83	52	77	53	70	53	64	48
52	32	112	35	108	37	104	40	100	42	96	44	91	46	86	47	81	49	75	50	69	51	63	52
56	29	109	32	105	34	101	37	97	39	93	41	89	43	84	44	79	46	74	47	68	48	62	56
60	26	106	29	102	31	99	33	95	36	91	38	86	39	82	41	77	43	72	44	67	45	61	60
64	23	103	25	100	28	96	30	92	32	88	34	84	36	80	38	75	40	71	41	66	42	61	64
68	20	100	22	97	25	93	27	90	29	86	31	82	33	78	35	74	37	69	38	64	39	60	68
72	17	98	19	94	22	91	24	87	26	84	28	80	30	76	32	72	34	67	35	63	37	58	72
76	14	95	16	92	18	89	21	85	23	81	25	78	27	74	29	70	31	66	32	62	34	57	76
80	10	93	13	90	15	86	17	83	20	79	22	76	24	72	26	68	28	64	30	60	31	56	80
84	07	90	10	87	12	84	14	81	17	77	19	74	21	70	23	66	25	63	27	59	29	55	84
88	04	88	06	85	09	82	11	78	13	75	16	71	18	68	20	64	22	61	24	57	26	53	88
92	01	86	03	82	06	79	08	76	10	73	13	69	15	66	17	63	19	59	21	55	23	52	92
96	*02*	83	00	80	02	77	05	74	07	70	10	67	12	64	14	61	17	57	19	54	21	50	96
100	*06*	81	*03*	78	*01*	74	*02*	71	*04*	68	07	65	09	62	12	58	14	55	16	52	19	48	100
104	*09*	78	*06*	75	*04*	72	*01*	69	*01*	66	04	63	06	60	09	56	11	53	14	50	16	47	104
108	*12*	76	*09*	73	*07*	69	*04*	66	*01*	63	*01*	60	04	57	06	54	09	51	11	48	14	45	108
112	*15*	73	*12*	70	*10*	67	*07*	64	*04*	61	*02*	58	01	55	04	52	06	49	09	46	12	43	112
116	*18*	70	*15*	67	*13*	64	*10*	61	*07*	58	*04*	55	*02*	53	01	50	04	47	07	44	10	41	116
120	*21*	68	*18*	64	*15*	61	*13*	59	*10*	56	*07*	53	*04*	50	*01*	47	02	45	05	42	08	39	120
124	*24*	65	*21*	62	*18*	59	*15*	56	*12*	53	*09*	50	*06*	47	*03*	45	00	42	03	39	06	37	124
128	*27*	62	*24*	59	*21*	56	*18*	53	*15*	50	*12*	47	*09*	45	*06*	42	*03*	40	01	37	04	35	128
132	*29*	58	*26*	55	*23*	52	*20*	50	*17*	47	*14*	44	*11*	42	*08*	39	*05*	37	*01*	35	02	32	132
136	*32*	55	*29*	52	*26*	49	*23*	46	*20*	44	*16*	41	*13*	39	*10*	37	*06*	34	*03*	32	01	30	136
140	*35*	51	*31*	48	*28*	46	*25*	43	*22*	41	*18*	38	*15*	36	*12*	34	*08*	32	*05*	30	*01*	28	140
144	*37*	47	*34*	44	*30*	42	*27*	39	*24*	37	*20*	35	*17*	33	*13*	31	*10*	29	*06*	27	*03*	25	144
148	*39*	43	*36*	40	*33*	38	*29*	36	*26*	33	*22*	31	*18*	30	*15*	28	*11*	26	*08*	24	*04*	22	148
152	*41*	39	*38*	36	*34*	34	*31*	32	*27*	30	*24*	28	*20*	26	*16*	24	*13*	23	*09*	21	*05*	20	152
156	*43*	34	*40*	32	*36*	29	*32*	28	*29*	26	*25*	24	*21*	23	*17*	21	*14*	20	*10*	18	*06*	17	156
160	*45*	29	*41*	27	*38*	25	*34*	23	*30*	22	*26*	20	*22*	19	*19*	18	*15*	17	*11*	15	*07*	14	160
164	*46*	23	*43*	22	*39*	20	*35*	19	*31*	18	*27*	16	*23*	15	*19*	14	*16*	13	*12*	12	*08*	12	164
168	*48*	18	*44*	17	*40*	15	*36*	14	*32*	13	*28*	12	*24*	12	*20*	11	*16*	10	*12*	09	*08*	09	168
172	*48*	12	*44*	11	*40*	10	*36*	10	*33*	09	*29*	08	*25*	08	*21*	07	*17*	07	*13*	06	*09*	06	172
176	*49*	06	*45*	06	*41*	05	*37*	05	*33*	04	*29*	04	*25*	04	*21*	04	*17*	03	*13*	03	*09*	03	176
180	*49*	00	*45*	00	*41*	00	*37*	00	*33*	00	*29*	00	*25*	00	*21*	00	*17*	00	*13*	00	*09*	00	180

4°	8°	12°	16°	20°	24°	28°	32°	36°	40°	44°

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

STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	79	00	75	00	71	00	67	00	63	00	59	00	55	00	51	00	47	00	43	00	39	00	00
4	79	14	75	09	71	07	67	05	63	04	59	03	55	02	51	02	47	01	43	01	39	00	4
8	78	26	74	18	70	13	66	10	63	08	59	06	55	04	51	03	47	02	43	01	39	00	8
12	76	35	73	26	69	19	66	15	62	11	58	09	54	06	51	05	47	03	43	02	39	01	12
16	74	42	71	32	68	24	65	19	61	15	58	11	54	08	50	06	47	04	43	02	39	01	16
20	72	47	69	37	67	29	64	23	60	18	57	14	54	10	50	07	46	05	43	03	39	01	20
24	69	50	67	41	65	33	62	26	59	21	56	16	53	12	50	09	46	06	42	03	39	01	24
28	67	53	65	44	63	36	61	29	58	23	55	18	53	14	49	10	46	07	42	04	39	01	28
32	64	55	63	46	61	38	59	31	57	25	54	20	51	15	48	11	45	08	42	04	39	01	32
36	62	56	61	48	59	40	58	33	56	27	53	22	51	17	48	12	45	08	42	05	39	02	36
40	59	56	58	49	57	42	56	35	54	29	52	23	50	18	47	13	44	09	41	05	39	02	40
44	56	57	56	50	55	43	54	36	52	30	51	24	49	19	46	14	44	10	41	06	38	02	44
48	54	57	53	50	53	44	52	37	51	31	49	25	48	20	45	15	43	10	41	06	38	02	48
52	51	57	51	50	51	44	50	38	49	32	48	26	46	21	45	16	43	11	41	06	38	02	52
56	48	56	49	50	48	44	48	38	47	33	46	27	45	21	44	16	42	11	40	07	38	02	56
60	46	56	46	50	46	44	46	39	46	33	45	27	44	22	43	17	41	12	40	07	38	02	60
64	43	55	44	50	44	44	44	39	44	33	44	28	43	22	42	17	41	12	39	07	38	02	64
68	40	54	41	49	42	44	42	39	42	33	42	28	42	23	41	17	40	12	39	07	38	02	68
72	38	54	39	49	40	44	40	38	40	33	41	28	40	23	40	17	39	12	39	07	38	02	72
76	35	53	36	48	37	43	38	38	39	33	39	28	39	23	39	18	39	12	38	07	37	02	76
80	33	52	34	47	35	42	36	38	37	33	38	28	38	23	38	18	38	13	38	07	37	02	80
84	30	50	32	46	33	42	34	37	35	32	36	27	37	23	37	18	37	13	37	08	37	02	84
88	28	49	29	45	31	41	32	36	34	32	35	27	36	22	36	17	37	12	37	08	37	03	88
92	25	48	27	44	29	40	30	35	32	31	33	27	34	22	35	17	36	12	37	07	37	02	92
96	23	46	25	43	27	39	29	35	30	30	32	26	33	22	34	17	35	12	36	07	37	02	96
100	21	45	23	41	25	37	27	34	29	29	30	25	32	21	33	17	35	12	36	07	37	02	100
104	19	43	21	40	23	36	25	32	27	29	29	25	31	20	32	16	34	12	35	07	36	02	104
108	16	42	19	38	21	35	23	31	26	28	28	24	30	20	32	16	33	11	35	07	36	02	108
112	14	40	17	37	19	33	22	30	24	26	26	23	29	19	31	15	33	11	35	07	36	02	112
116	12	38	15	35	18	32	20	29	23	25	25	22	28	18	30	15	32	11	34	07	36	02	116
120	10	36	13	33	16	30	19	27	21	24	24	21	27	17	29	14	32	10	34	06	36	02	120
124	09	34	11	31	14	29	17	26	20	23	23	20	26	17	28	13	31	10	33	06	36	02	124
128	07	32	10	30	13	27	16	24	19	21	22	19	25	16	28	12	30	09	33	06	36	02	128
132	05	30	08	28	12	25	15	23	18	20	21	17	24	15	27	12	30	09	33	05	36	02	132
136	04	28	07	26	10	23	14	21	17	19	20	16	23	14	26	11	30	08	33	05	36	02	136
140	02	25	06	23	09	21	12	19	16	17	19	15	23	12	26	10	29	07	32	05	35	02	140
144	01	23	04	21	08	19	11	17	15	15	18	13	22	11	25	09	29	07	32	04	35	01	144
148	*00*	21	03	19	07	17	11	16	14	14	18	12	21	10	25	08	28	06	32	04	35	01	148
152	*01*	18	02	17	06	15	10	14	13	12	17	11	21	09	24	07	28	05	32	03	35	01	152
156	*02*	16	01	15	05	13	09	12	13	11	17	09	20	08	24	06	28	05	31	03	35	01	156
160	*03*	13	01	12	05	11	08	10	12	09	16	08	20	06	24	05	28	04	31	02	35	01	160
164	*04*	11	*00*	10	04	09	08	08	12	07	16	06	20	05	23	04	27	03	31	02	35	01	164
168	*04*	08	*00*	07	04	07	08	06	11	05	15	05	19	04	23	03	27	02	31	01	35	01	168
172	*05*	05	*01*	05	03	04	07	04	11	04	15	03	19	03	23	02	27	02	31	01	35	00	172
176	*05*	03	*01*	02	03	02	07	02	11	02	15	02	19	01	23	01	27	01	31	00	35	00	176
180	*05*	00	*01*	00	03	00	07	00	11	00	15	00	19	00	23	00	27	00	31	00	35	00	180

48°	52°	56°	60°	64°	68°	72°	76°	80°	84°	88°

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

Lat. 38°

Each declination cell is formatted: Alt. (° ′) · Δd Δt · Az.

H.A.	0° 00'	0° 30'	1° 00'	1° 30'	2° 00'	2° 30'	3° 00'	3° 30'	H.A.
00	52 00.0 1.00 01 180.0	52 30.0 1.00 01 180.0	53 00.0 1.00 01 180.0	53 30.0 1.00 01 180.0	54 00.0 1.00 01 180.0	54 30.0 1.00 01 180.0	55 00.0 1.00 01 180.0	55 30.0 1.00 01 180.0	00
1	51 59.3 1.00 03 178.4	52 29.3 1.00 03 178.4	52 59.3 1.00 03 178.3	53 29.3 1.00 03 178.3	53 59.3 1.00 04 178.3	54 29.3 1.00 04 178.3	54 59.3 1.00 04 178.3	55 29.3 1.00 04 178.2	1
2	51 57.3 1.00 06 176.8	52 27.3 1.00 06 176.7	52 57.3 1.00 06 176.7	53 27.2 1.00 06 176.6	53 57.2 1.00 06 176.6	54 27.2 1.00 06 176.5	54 57.1 1.00 06 176.5	55 27.1 1.00 06 176.5	2
3	51 54.0 1.00 08 175.1	52 23.9 1.00 08 175.1	52 53.8 1.00 08 175.0	53 23.8 1.00 08 175.0	53 53.7 1.00 08 174.9	54 23.6 1.00 08 174.8	54 53.5 1.00 08 174.8	55 23.5 1.00 08 174.7	3
4	51 49.3 1.0 10 173.5	52 19.2 1.0 10 173.4	52 49.1 1.0 10 173.4	53 18.9 1.0 10 173.3	53 48.8 1.0 10 173.2	54 18.7 1.0 11 173.1	54 48.5 1.0 11 173.1	55 18.4 1.0 11 173.0	4
05	51 43.3 99 12 171.9	52 13.1 99 12 171.8	52 42.9 99 12 171.7	53 12.7 99 13 171.6	53 42.5 99 13 171.5	54 12.3 99 13 171.4	54 42.1 99 13 171.3	55 11.9 99 13 171.2	05
6	51 36.0 99 14 170.3	52 05.7 99 14 170.2	52 35.5 99 15 170.1	53 05.2 99 15 170.0	53 34.9 99 15 169.9	54 04.6 99 15 169.7	54 34.3 99 16 169.6	55 04.0 99 16 169.5	6
7	51 27.4 99 16 168.7	51 57.0 99 17 168.6	52 26.7 99 17 168.3	52 56.3 99 17 168.2	53 25.9 99 17 168.2	53 55.5 99 17 168.1	54 25.1 99 18 167.8	54 44.7 99 18 167.8	7
8	51 17.5 98 19 167.1	51 47.0 98 19 167.0	52 16.6 98 19 166.9	52 46.1 98 19 166.7	53 15.6 98 20 166.6	53 45.1 98 20 166.4	54 14.5 98 20 166.2	54 44.0 98 20 166.1	8
9	51 06.4 98 21 165.6	51 35.8 98 21 165.4	52 05.2 98 21 165.3	52 34.6 98 21 165.1	53 03.9 98 22 164.9	53 33.3 98 22 164.7	54 02.6 98 22 164.6	54 31.9 98 22 164.4	9
10	50 54.0 98 23 164.0	51 23.2 98 23 163.8	51 52.5 98 23 163.7	52 21.7 97 23 163.5	52 51.0 97 24 163.3	53 20.2 97 24 163.1	53 49.4 97 24 162.9	54 18.6 97 24 162.7	10
1	50 40.3 97 25 162.5	51 09.5 97 25 162.3	51 38.6 97 25 162.1	52 07.7 97 26 161.9	52 36.8 97 26 161.7	53 05.8 97 26 161.5	53 34.8 97 26 161.3	54 03.9 97 27 161.1	1
2	50 25.5 97 27 161.0	50 54.5 97 27 160.7	51 23.4 96 27 160.5	51 52.4 96 28 160.3	52 21.3 96 28 160.1	52 50.2 96 28 159.9	53 19.0 96 28 159.7	53 47.9 96 29 159.4	2
3	50 09.5 96 29 159.4	50 38.3 96 29 159.2	51 07.1 96 29 159.0	51 35.9 96 30 158.8	52 04.6 96 30 158.5	52 33.3 96 30 158.3	53 02.0 96 30 158.1	53 30.6 96 31 157.8	3
4	49 52.3 96 30 158.0	50 20.9 95 31 157.7	50 49.6 95 31 157.5	51 18.1 95 31 157.2	51 46.7 95 32 157.0	52 15.2 95 32 156.7	52 43.7 95 32 156.5	53 12.2 95 33 156.2	4
15	49 34.0 95 32 156.5	50 02.5 95 33 156.2	50 30.9 95 33 156.0	50 59.3 95 33 155.7	51 27.7 94 34 155.5	51 56.0 94 34 155.2	52 24.3 94 34 154.9	52 52.5 94 35 154.7	15
6	49 14.6 94 34 154.8	49 42.8 94 34 154.5	50 11.1 94 35 154.2	50 39.3 94 35 154.0	51 07.5 94 36 153.7	51 35.6 93 36 153.4	52 03.7 93 37 153.1	52 31.7 93 37 153.1	6
7	48 54.1 94 36 153.6	49 22.2 94 36 153.3	49 50.2 93 37 153.0	50 18.2 93 37 152.8	50 46.2 93 37 152.5	51 14.1 93 38 152.2	51 41.9 93 38 151.9	52 09.8 93 38 151.6	7
8	48 32.5 93 38 152.2	49 00.4 93 38 151.9	49 28.2 93 38 151.6	49 56.0 93 39 151.3	50 23.8 92 39 151.0	50 51.5 92 39 150.7	51 19.1 92 40 150.4	51 46.7 92 40 150.1	8
9	48 10.0 92 39 150.8	48 37.6 92 40 150.5	49 05.2 92 40 150.2	49 32.8 92 40 149.9	50 00.4 92 41 149.6	50 27.8 92 41 149.3	50 55.3 91 41 149.0	51 22.6 91 42 148.6	9
20	47 46.4 92 41 149.4	48 13.8 91 41 149.1	48 41.2 91 42 148.8	49 08.6 91 42 148.5	49 35.9 91 42 148.2	50 03.2 91 43 147.8	50 30.4 90 43 147.5	50 57.5 90 44 147.2	20
1	47 21.8 91 42 148.1	47 49.1 91 43 147.7	48 16.3 91 43 147.4	48 43.4 90 44 147.1	49 10.5 90 44 146.8	49 37.5 90 44 146.4	50 04.5 90 45 146.1	50 31.4 90 45 145.8	1
2	46 56.4 90 44 146.7	47 23.4 90 44 146.4	47 50.4 90 45 146.1	48 17.3 90 45 145.8	48 44.1 89 46 145.4	49 10.9 89 46 145.1	49 37.7 89 46 144.7	50 04.3 89 47 144.4	2
3	46 30.0 89 45 145.4	46 56.8 89 46 145.1	47 23.5 89 46 144.8	47 50.2 89 47 144.4	48 16.8 89 47 144.1	48 43.4 88 47 143.7	49 09.9 88 48 143.4	49 36.3 88 48 143.0	3
4	46 02.7 89 47 144.1	46 29.3 89 46 143.8	46 55.8 88 48 143.5	47 22.3 88 48 143.1	47 48.6 88 49 142.8	48 15.0 88 49 142.4	48 41.2 87 49 142.0	49 07.4 87 50 141.7	4
25	45 34.6 88 48 142.9	46 00.9 88 49 142.6	46 27.2 88 49 142.2	46 53.4 87 49 141.8	47 19.6 87 50 141.5	47 45.7 87 50 141.1	48 11.7 87 51 140.7	48 37.7 86 51 140.3	25
6	45 05.6 87 50 141.6	45 31.7 87 50 141.3	45 57.8 87 50 140.9	46 23.8 87 51 140.5	46 49.7 86 51 140.2	47 15.6 86 52 139.8	47 41.4 86 52 139.4	48 07.1 86 52 139.0	6
7	44 35.9 86 51 140.4	45 01.8 86 51 140.0	45 27.6 86 52 139.7	45 53.4 86 52 139.3	46 19.1 86 52 138.9	46 44.7 85 53 138.6	47 10.2 85 53 138.2	47 35.7 85 54 137.8	7
8	44 05.3 86 52 139.2	44 31.0 85 52 138.8	44 56.6 85 53 138.5	45 22.2 85 53 138.1	45 47.6 85 54 137.7	46 13.0 85 54 137.3	46 38.3 84 54 136.9	47 03.6 84 55 136.5	8
9	43 34.1 85 53 138.0	43 59.5 85 53 137.6	44 24.9 84 54 137.3	44 50.2 84 54 136.9	45 15.4 84 55 136.5	45 40.6 84 55 136.1	46 05.7 83 56 135.7	46 30.7 83 56 135.3	9
30	43 02.1 84 54 136.8	43 27.3 84 55 136.5	43 52.5 84 55 136.1	44 17.5 83 56 135.7	44 42.5 83 56 135.3	45 07.5 83 56 134.9	45 32.3 83 57 134.5	45 57.1 82 57 134.1	30
1	42 29.4 83 56 135.7	42 54.4 83 56 135.3	43 19.3 83 56 134.9	43 44.2 83 57 134.6	44 09.0 82 57 134.2	44 33.7 82 57 133.8	44 58.3 82 58 133.4	45 22.8 82 58 133.0	1
2	41 56.0 83 57 134.6	42 20.8 83 57 134.2	42 45.5 82 57 133.8	43 10.2 82 58 133.4	43 34.7 82 58 133.0	43 59.2 81 58 132.6	44 23.6 81 59 132.2	44 47.9 81 59 131.8	2
3	41 22.0 82 58 133.5	41 46.6 82 58 133.1	42 11.1 82 58 132.7	42 35.5 81 59 132.3	42 59.8 81 59 131.9	43 24.1 81 60 131.5	43 48.3 80 60 131.1	44 12.3 80 60 130.7	3
4	40 47.4 81 59 132.4	41 11.8 81 59 132.0	41 36.0 81 59 131.6	42 00.2 81 60 131.2	42 24.4 80 60 130.8	42 48.4 80 60 130.4	43 12.3 80 61 130.0	43 36.2 79 61 129.6	4
35	40 12.2 81 60 131.3	40 36.3 80 60 130.9	41 00.4 80 60 130.5	41 24.4 80 61 130.1	41 48.3 80 61 129.7	42 12.1 79 61 129.3	42 35.8 79 62 128.9	42 59.5 79 62 128.5	35
6	39 36.4 80 61 130.3	40 00.3 80 61 129.9	40 24.2 79 61 129.5	40 48.0 79 62 129.1	41 11.6 79 62 128.7	41 35.2 79 62 128.3	41 58.8 78 63 127.9	42 22.2 78 63 127.4	6
7	39 00.1 79 61 129.2	39 23.8 79 62 128.8	39 47.4 79 62 128.5	40 11.0 78 62 128.1	40 34.5 78 63 127.6	40 57.9 78 63 127.2	41 21.2 78 64 126.8	41 44.4 77 64 126.4	7
8	38 23.2 79 62 128.2	38 46.7 78 62 127.8	39 10.1 78 63 127.4	39 33.3 78 63 127.0	39 56.8 77 64 126.6	40 20.0 77 64 126.2	40 43.1 77 64 125.8	41 06.1 77 65 125.4	8
9	37 45.8 78 63 127.2	38 09.1 78 63 126.8	38 32.4 77 64 126.4	38 55.5 77 64 126.0	39 18.6 77 64 125.6	39 41.6 76 65 125.2	40 04.5 76 65 124.8	40 27.3 76 65 124.4	9
40	37 07.9 77 64 126.3	37 31.0 77 64 125.9	37 54.1 77 65 125.5	38 17.0 76 65 125.1	38 39.9 76 65 124.6	39 02.7 76 66 124.2	39 25.4 76 66 123.8	39 48.0 75 66 123.4	40
1	36 29.6 77 65 125.3	36 52.5 76 65 124.9	37 15.3 76 65 124.5	37 38.1 76 66 124.1	38 00.8 75 66 123.7	38 23.4 75 66 123.3	38 45.9 75 67 122.8	39 08.3 75 67 122.4	1
2	35 50.8 76 65 124.4	36 13.5 76 66 124.0	36 36.2 75 66 123.6	36 58.7 75 66 123.1	37 21.2 75 67 122.7	37 43.6 75 67 122.3	38 06.0 74 67 121.9	38 28.2 74 68 121.5	2
3	35 11.5 75 66 123.4	35 34.1 75 66 123.0	35 56.6 75 67 122.6	36 18.9 75 67 122.2	36 41.2 74 67 121.8	37 03.5 74 68 121.4	37 25.6 74 68 120.9	37 47.6 73 68 120.5	3
4	34 31.8 75 67 122.5	34 54.2 74 67 122.1	35 16.5 74 67 121.7	35 38.7 74 68 121.3	36 00.9 74 68 120.9	36 22.9 73 68 120.5	36 44.9 73 69 120.0	37 06.7 73 69 119.6	4
45	33 51.8 74 67 121.6	34 14.0 74 68 121.2	34 36.1 74 68 120.8	34 58.1 73 68 120.4	35 20.1 73 69 120.0	35 42.0 73 69 119.6	36 03.7 72 69 119.1	36 25.4 72 69 118.7	45
6	33 11.3 74 68 120.7	33 33.4 73 68 120.3	33 55.3 73 69 119.9	34 17.2 73 69 119.5	34 39.0 72 69 119.1	35 00.7 72 70 118.7	35 22.3 72 70 118.2	35 43.8 72 70 117.8	6
7	32 30.5 73 69 119.9	32 52.4 73 69 119.5	33 14.1 72 69 119.0	33 35.8 72 70 118.6	33 57.5 72 70 118.2	34 19.0 72 70 117.8	34 40.4 71 70 117.4	35 01.8 71 71 116.9	7
8	31 49.3 72 69 119.0	32 11.0 72 69 118.6	32 32.6 72 70 118.2	32 54.2 72 70 117.8	33 15.6 71 70 117.4	33 37.0 71 70 116.9	33 58.3 71 71 116.5	34 19.5 71 71 116.1	8
9	31 07.8 72 70 118.2	31 29.3 72 70 117.7	31 50.8 71 70 117.3	32 12.2 71 71 116.9	32 33.5 71 71 116.5	32 54.7 71 71 116.1	33 15.8 70 71 115.7	33 36.9 70 72 115.2	9
50	30 26.0 71 70 117.3	30 47.3 71 71 116.9	31 08.6 71 71 116.5	31 29.9 71 71 116.1	31 51.0 70 71 115.7	32 12.1 70 72 115.3	32 33.1 70 72 114.8	32 54.0 70 72 114.4	50
1	29 43.8 71 71 116.5	30 05.0 71 71 116.1	30 26.2 70 71 115.7	30 47.3 70 71 115.3	31 08.3 70 72 114.9	31 29.2 70 72 114.4	31 50.0 69 72 114.0	32 10.8 69 73 113.6	1
2	29 01.3 70 71 115.7	29 22.4 70 72 115.3	29 43.4 70 72 114.9	30 04.4 70 72 114.5	30 25.2 69 72 114.0	30 46.0 69 72 113.6	31 06.7 69 73 113.2	31 27.3 68 73 112.8	2
3	28 18.6 70 72 114.9	28 39.5 70 72 114.5	29 00.4 69 72 114.1	29 21.2 69 73 113.7	29 41.9 69 73 113.2	30 02.5 69 72 112.8	30 23.1 68 73 112.4	30 43.6 68 73 112.0	3
4	27 35.6 69 72 114.1	27 56.4 69 72 113.7	28 17.1 69 73 113.3	28 37.7 69 73 112.9	28 58.3 68 73 112.5	29 18.8 68 73 112.0	29 39.3 68 73 111.6	29 59.6 68 74 111.2	4
55	26 52.3 69 73 113.3	27 12.9 69 73 112.9	27 33.5 69 73 112.5	27 54.1 68 73 112.1	28 14.5 68 73 111.7	28 34.9 68 74 111.3	28 55.2 68 74 110.8	29 15.4 67 74 110.4	55
6	26 08.7 68 73 112.6	26 29.3 68 73 112.1	26 49.7 68 73 111.7	27 10.1 68 74 111.3	27 30.5 67 74 110.9	27 50.7 67 74 110.5	28 10.9 67 75 109.9	28 31.0 67 75 109.5	6
7	25 24.9 68 73 111.8	25 45.4 68 74 111.4	26 05.7 68 74 111.0	26 26.0 67 74 110.6	26 46.2 67 74 110.2	27 06.3 67 74 109.7	27 26.4 66 75 109.3	27 46.4 66 75 108.9	7
8	24 40.9 68 74 111.0	25 01.2 68 74 110.6	25 21.4 67 74 110.2	25 41.6 67 74 109.8	26 01.7 67 75 109.4	26 21.7 66 75 109.0	26 41.7 66 75 108.6	27 01.5 66 75 108.2	8
9	23 56.7 67 74 110.3	24 16.9 67 74 109.9	24 37.0 67 74 109.5	24 57.0 67 75 109.1	25 17.0 66 75 108.7	25 36.9 66 75 108.3	25 56.7 66 75 107.8	26 16.5 66 75 107.4	9
60	23 12.2 67 74 109.6	23 32.3 67 75 109.2	23 52.3 67 75 108.8	24 12.2 66 75 108.3	24 32.1 66 75 107.9	24 51.9 66 75 107.5	25 11.6 66 75 107.1	25 31.3 65 76 106.7	60
1	22 27.6 67 75 108.8	22 47.5 66 75 108.4	23 07.4 66 75 108.0	23 27.3 66 75 107.6	23 47.0 66 75 107.2	24 06.7 65 76 106.8	24 26.3 65 76 106.4	24 45.9 65 76 106.0	1
2	21 42.7 66 75 108.1	22 02.6 66 75 107.7	22 22.4 66 75 107.3	22 42.1 65 76 106.9	23 01.8 65 76 106.5	23 21.4 65 76 106.1	23 40.9 65 76 105.7	24 00.4 65 76 105.3	2
3	20 57.7 66 75 107.4	21 17.5 66 75 107.0	21 37.2 65 76 106.6	21 56.8 65 76 106.2	22 16.4 65 76 105.8	22 35.9 65 76 105.4	22 55.3 64 76 105.0	23 14.7 64 76 104.6	3
4	20 12.5 65 76 106.7	20 32.3 65 76 106.3	20 51.8 65 76 105.9	21 11.3 65 76 105.5	21 30.8 64 76 105.1	21 50.2 64 76 104.7	22 09.6 64 76 104.3	22 28.9 64 77 103.9	4
65	19 27.2 65 76 106.0	19 46.7 65 76 105.6	20 06.2 65 76 105.2	20 25.7 64 76 104.8	20 45.1 64 76 104.4	21 04.4 64 77 104.0	21 23.7 64 77 103.6	21 42.9 64 77 103.2	65
6	18 41.6 65 76 105.3	19 01.1 65 76 104.9	19 20.5 64 76 104.5	19 39.9 64 77 104.1	19 59.2 64 77 103.7	20 18.5 64 77 103.3	20 37.6 63 77 102.9	20 56.8 63 77 102.5	6
7	17 56.0 65 76 104.6	18 15.4 64 76 104.2	18 34.7 64 77 103.8	18 54.0 64 77 103.4	19 13.2 64 77 103.0	19 32.4 63 77 102.6	19 51.5 63 77 102.2	20 10.6 63 77 101.8	7
8	17 10.2 64 77 104.0	17 29.5 64 77 103.6	17 48.7 64 77 103.2	18 07.9 64 77 102.8	18 27.1 63 77 102.4	18 46.2 63 77 101.9	19 05.2 63 77 101.5	19 24.2 63 77 101.1	8
9	16 24.2 64 77 103.3	16 43.4 64 77 102.9	17 02.6 64 77 102.5	17 21.8 63 77 102.1	17 40.8 63 77 101.7	17 59.9 63 77 101.3	18 18.9 63 78 100.9	18 37.8 63 78 100.5	9
70	15 38.1 64 77 102.6	15 57.3 64 77 102.2	16 16.4 63 77 101.8	16 35.4 63 77 101.4	16 54.5 63 77 101.0	17 13.5 63 78 100.6	17 32.4 63 78 100.2	17 51.3 63 78 99.8	70
1	14 51.9 64 77 102.0	15 11.0 63 77 101.6	15 30.1 63 77 101.2	15 49.1 63 77 100.8	16 08.0 63 78 100.4	16 26.9 63 78 100.0	16 45.8 63 78 99.6	17 04.6 63 78 99.1	1
2	14 05.6 63 77 101.3	14 24.6 63 77 100.9	14 43.6 63 78 100.5	15 02.6 63 78 100.1	15 21.5 63 78 99.7	15 40.3 63 78 99.3	15 59.1 63 78 98.9	16 17.9 62 78 98.5	2
3	13 19.2 63 78 100.7	13 38.2 63 78 100.3	13 57.1 63 78 99.9	14 16.0 63 78 99.5	14 34.8 63 78 99.1	14 53.6 63 78 98.7	15 12.4 62 78 98.3	15 31.1 62 78 97.8	3
4	12 32.7 63 78 100.0	12 51.6 63 78 99.6	13 10.5 63 78 99.2	13 29.3 63 78 98.8	13 48.1 63 78 98.4	14 06.8 62 78 98.0	14 25.6 62 78 97.6	14 44.2 62 78 97.2	4
75	11 46.1 63 78 99.4	12 04.9 63 78 99.0	12 23.8 63 78 98.6	12 42.5 62 78 98.2	13 01.3 62 78 97.8	13 20.0 62 78 97.4	13 38.7 62 78 97.0	13 57.5 62 78 96.6	75
6	10 59.4 63 78 98.7	11 18.2 63 78 98.3	11 37.0 63 78 97.9	11 55.7 62 78 97.5	12 14.4 62 78 97.1	12 33.1 62 78 96.7	12 51.7 62 78 96.3	13 10.3 62 78 95.9	6
7	10 12.6 63 78 98.1	10 31.4 62 78 97.7	10 50.1 62 78 97.3	11 08.8 62 78 96.9	11 27.5 62 78 96.5	11 46.1 62 78 96.1	12 04.7 62 78 95.7	12 23.2 62 78 95.3	7
8	9 25.8 62 78 97.5	9 44.5 62 78 97.1	10 03.2 62 78 96.7	10 21.8 62 78 96.3	10 40.4 62 78 95.9	10 59.0 62 79 95.5	11 17.6 62 79 95.1	11 36.1 62 79 94.7	8
9	8 38.9 62 78 96.8	8 57.5 62 78 96.4	9 16.2 62 78 96.0	9 34.8 62 78 95.6	9 53.4 62 78 95.2	10 12.0 62 79 94.8	10 30.5 62 79 94.4	10 49.0 62 79 94.0	9
80	7 51.9 62 78 96.2	8 10.5 62 78 95.8	8 29.1 62 78 95.4	8 47.7 62 78 95.0	9 06.3 62 79 94.6	9 24.8 62 79 94.2	9 43.3 62 79 93.8	10 01.8 62 79 93.4	80
1	7 04.9 62 78 95.6	7 23.5 62 79 95.2	7 42.0 62 79 94.8	8 00.6 62 79 94.4	8 19.1 62 79 94.0	8 37.6 62 79 93.6	8 56.1 62 79 93.2	9 14.6 61 79 92.8	1
2	6 17.8 62 79 94.9	6 36.4 62 79 94.5	6 54.9 62 79 94.1	7 13.4 62 79 93.8	7 32.0 62 79 93.4	7 50.4 62 79 93.0	8 08.9 61 79 92.6	8 27.4 61 79 92.2	2
3	5 30.7 62 79 94.3	5 49.2 62 79 93.9	6 07.7 62 79 93.5	6 26.2 62 79 93.1	6 44.7 62 79 92.7	7 03.2 62 79 92.3	7 21.7 61 79 91.9	7 40.1 61 79 91.5	3
4		5 02.0 62 79 93.3	5 20.5 62 79 92.9	5 39.0 62 79 92.5	5 57.5 62 79 92.1	6 16.0 62 79 91.7	6 34.4 61 79 91.3	6 52.8 61 79 90.9	4
85					5 10.2 62 79 91.5	5 28.7 61 79 91.1	5 47.1 61 79 90.7	6 05.6 61 79 90.3	85
6								5 18.3 61 79 89.7	6

Each cell lists: Alt. (° ′) — Δd — Δt — Az. (°)

H.A.	0° 00′	0° 30′	1° 00′	1° 30′	2° 00′	2° 30′	3° 00′	3° 30′	H.A.
00	52 00.0 1.00 1.00 180.0	51 30.0 1.00 1.01 180.0	51 00.0 1.00 1.01 180.0	50 30.0 1.00 1.01 180.0	50 00.0 1.00 1.01 180.0	49 30.0 1.00 1.01 180.0	49 00.0 1.00 1.01 180.0	48 30.0 1.00 1.01 180.0	00
1	51 59.3 1.00 1.03 178.4	51 29.3 1.00 1.03 178.4	50 59.3 1.00 1.03 178.4	50 29.4 1.00 1.03 178.4	49 59.4 1.00 1.03 178.5	49 29.4 1.00 1.03 178.5	48 59.4 1.00 1.03 178.5	48 29.4 1.00 1.03 178.5	1
2	51 57.3 1.00 1.06 176.8	51 27.4 1.00 1.06 176.8	50 57.4 1.00 1.05 176.8	50 27.4 1.00 1.06 176.9	49 57.4 1.00 1.05 176.9	49 27.5 1.00 1.05 176.9	48 57.5 1.00 1.05 177.0	48 27.5 1.00 1.05 177.0	2
3	51 54.0 1.00 1.08 175.1	51 24.0 1.00 1.08 175.2	50 54.1 1.00 1.08 175.2	50 24.2 1.00 1.08 175.3	49 54.2 1.00 1.07 175.3	49 24.3 1.00 1.07 175.4	48 54.4 1.00 1.07 175.4	48 24.4 1.00 1.07 175.5	3
4	51 49.3 1.00 1.10 173.5	51 19.4 1.00 1.10 173.6	50 49.5 1.00 1.10 173.7	50 19.6 1.00 1.10 173.7	49 49.8 1.00 1.10 173.8	49 19.9 1.00 1.09 173.9	48 50.0 1.00 1.09 173.9	48 20.1 1.00 1.09 174.0	4
05	51 43.3 99 12 171.9	51 13.5 99 12 172.0	50 43.7 99 12 172.1	50 13.8 99 12 172.2	49 44.0 99 12 172.3	49 14.2 99 12 172.3	48 44.3 99 11 172.4	48 14.5 99 11 172.5	05
6	51 36.0 99 14 170.3	51 06.3 99 14 170.4	50 36.5 99 14 170.5	50 06.8 99 14 170.6	49 37.0 99 14 170.7	49 07.3 99 14 170.8	48 37.5 99 13 170.9	48 07.7 99 13 171.0	6
7	51 27.4 99 16 168.7	50 57.8 99 16 168.8	50 28.1 99 16 169.0	49 58.4 99 16 169.1	49 28.8 99 16 169.2	48 59.1 99 16 169.3	48 29.4 99 15 169.4	47 59.7 99 15 169.5	7
8	51 17.5 98 19 167.1	50 48.0 98 18 167.3	50 18.4 98 18 167.4	49 48.9 98 18 167.5	49 19.3 98 18 167.7	48 49.7 98 18 167.8	48 20.1 98 17 167.9	47 50.5 98 17 168.1	8
9	51 06.4 98 21 165.6	50 36.9 98 20 165.7	50 07.5 98 20 165.9	49 38.1 98 20 166.0	49 08.6 98 20 166.2	48 39.1 98 20 166.3	48 09.7 98 19 166.5	47 40.2 98 19 166.6	9
10	50 54.0 98 23 164.0	50 24.7 98 22 164.2	49 55.4 98 22 164.4	49 26.0 98 22 164.5	48 56.7 98 22 164.7	48 27.4 98 22 164.8	47 58.0 98 21 165.0	47 28.6 98 21 165.1	10
1	50 40.3 97 25 162.5	50 11.2 97 24 162.7	49 42.0 97 24 162.8	49 12.8 97 24 163.0	48 43.6 97 24 163.2	48 14.4 97 24 163.4	47 45.2 97 23 163.5	47 15.9 97 23 163.7	1
2	50 25.5 97 27 161.0	49 56.5 97 26 161.2	49 27.5 97 26 161.3	48 58.4 97 26 161.5	48 29.4 97 26 161.7	48 00.3 97 25 161.9	47 31.2 97 25 162.1	47 02.1 97 25 162.3	2
3	50 09.5 96 29 159.4	49 40.6 96 28 159.7	49 11.8 96 28 159.9	48 42.9 96 28 160.1	48 14.0 96 28 160.3	47 45.1 96 27 160.5	47 16.1 97 27 160.7	46 47.1 97 27 160.9	3
4	49 52.3 96 30 158.0	49 23.6 96 30 158.2	48 54.9 96 30 158.4	48 26.2 96 30 158.6	47 57.5 96 29 158.8	47 28.7 96 29 159.0	46 59.9 96 29 159.3	46 31.1 96 29 159.5	4
15	49 34.0 95 32 156.5	49 05.5 95 32 156.7	48 37.0 95 31 157.0	48 08.4 95 31 157.2	47 39.8 95 31 157.4	47 11.2 95 31 157.6	46 42.6 95 31 157.9	46 14.0 96 30 158.1	15
6	49 14.6 94 34 155.0	48 46.3 94 34 155.3	48 17.9 94 34 155.5	47 49.6 94 33 155.8	47 21.2 94 33 156.0	46 52.7 94 33 156.2	46 24.3 94 32 156.5	45 55.8 94 32 156.7	6
7	48 54.1 94 36 153.6	48 26.0 94 36 153.9	47 57.8 94 35 154.1	47 29.6 94 35 154.4	47 01.4 94 35 154.6	46 33.2 94 34 154.9	46 04.9 94 34 155.1	45 36.6 94 34 155.3	7
8	48 32.5 93 38 152.2	48 04.6 93 37 152.5	47 36.7 93 37 152.7	47 08.7 93 37 153.0	46 40.6 93 36 153.2	46 12.6 93 36 153.5	45 44.5 94 36 153.8	45 16.3 94 35 154.0	8
9	48 10.0 93 39 150.8	47 42.2 93 39 151.1	47 14.5 93 39 151.3	46 46.7 93 38 151.6	46 18.9 93 38 151.9	45 51.0 93 38 152.2	45 23.1 93 37 152.4	44 55.1 93 37 152.7	9
20	47 46.4 92 41 149.4	47 18.9 92 41 149.7	46 51.3 92 40 150.0	46 23.7 92 40 150.3	45 56.1 92 40 150.6	45 28.4 92 39 150.8	45 00.7 92 39 151.1	44 33.0 93 39 151.4	20
1	47 21.8 91 42 148.1	46 54.5 91 42 148.4	46 27.4 91 42 148.7	45 59.8 91 41 149.0	45 32.4 92 41 149.2	45 04.9 92 41 149.5	44 37.4 92 40 149.8	44 09.8 92 40 150.1	1
2	46 56.4 90 44 146.7	46 29.3 90 44 147.0	46 02.2 91 43 147.3	45 35.0 91 43 147.7	45 07.8 91 43 148.0	44 40.5 91 42 148.2	44 13.2 91 42 148.5	43 45.8 91 42 148.8	2
3	46 30.0 89 45 145.4	46 03.1 90 45 145.7	45 36.2 90 45 146.1	45 09.2 90 44 146.4	44 42.2 90 44 146.7	44 15.2 90 44 147.0	43 48.0 90 43 147.3	43 20.9 91 43 147.6	3
4	46 02.7 89 47 144.1	45 36.1 89 46 144.5	45 09.4 89 46 144.8	44 42.6 89 46 145.1	44 15.8 89 45 145.4	43 49.0 90 45 145.7	43 22.1 90 45 146.0	42 55.1 90 44 146.3	4
25	45 34.6 88 48 142.9	45 08.1 88 48 143.2	44 41.7 88 48 143.5	44 15.1 89 47 143.9	43 48.6 89 47 144.2	43 21.9 89 46 144.5	42 55.2 89 46 144.8	42 28.5 89 46 145.1	25
6	45 05.6 87 50 141.6	44 39.4 87 49 142.0	44 13.2 88 49 142.3	43 46.8 88 48 142.6	43 20.5 88 48 143.0	42 54.0 88 48 143.3	42 27.4 88 47 143.6	42 01.0 89 47 143.9	6
7	44 35.9 86 51 140.4	44 09.9 87 50 140.7	43 43.8 87 50 141.1	43 17.6 87 50 141.4	42 51.6 87 49 141.8	42 25.4 87 49 142.1	41 59.1 88 49 142.4	41 32.8 88 48 142.7	7
8	44 05.3 86 52 139.2	43 39.6 86 52 139.5	43 13.8 86 51 139.9	42 47.9 86 51 140.2	42 22.0 87 51 140.6	41 56.0 87 50 140.9	41 29.9 87 50 141.2	41 03.8 87 50 141.6	8
9	43 34.1 85 53 138.0	43 08.5 85 53 138.4	42 42.9 86 53 138.7	42 17.3 86 52 139.1	41 51.6 86 52 139.4	41 25.8 86 52 139.8	40 59.9 86 51 140.1	40 34.0 86 51 140.4	9
30	43 02.1 84 54 136.8	42 36.8 84 54 137.2	42 11.4 85 54 137.6	41 45.9 85 53 137.9	41 20.4 85 53 138.3	40 54.9 85 53 138.6	40 29.2 86 52 139.0	40 03.6 86 52 139.3	30
1	42 29.4 83 56 135.7	42 04.3 84 55 136.1	41 39.1 84 55 136.4	41 13.9 84 54 136.8	40 48.6 84 54 137.2	40 23.3 85 54 137.5	39 57.9 85 53 137.9	39 32.4 85 53 138.2	1
2	41 56.0 83 57 134.6	41 31.2 83 56 134.9	41 06.2 83 56 135.3	40 41.2 83 56 135.7	40 16.1 84 55 136.0	39 51.0 84 55 136.4	39 25.8 84 55 136.8	39 00.5 84 54 137.1	2
3	41 22.0 82 57 133.4	40 57.4 82 57 133.9	40 32.7 83 57 134.2	40 07.9 83 57 134.6	39 43.0 83 56 135.0	39 18.1 83 56 135.3	38 53.1 84 56 135.7	38 28.0 84 55 136.0	3
4	40 47.4 81 59 132.4	40 23.0 82 58 132.8	39 58.5 82 58 133.1	39 33.9 82 58 133.5	39 09.2 82 57 133.9	38 44.5 83 57 134.3	38 19.7 83 57 134.6	37 54.9 83 56 135.0	4
35	40 12.2 81 60 131.3	39 48.0 81 59 131.7	39 23.7 81 59 132.1	38 59.3 81 59 132.5	38 34.9 82 58 132.8	38 10.4 82 58 133.2	37 45.8 82 58 133.6	37 21.1 82 57 133.9	35
6	39 36.4 80 61 130.3	39 12.4 80 60 130.7	38 48.3 80 60 131.0	38 24.1 81 60 131.4	37 59.9 81 59 131.8	37 35.6 81 59 132.2	37 11.2 81 59 132.5	36 46.8 82 58 132.9	6
7	39 00.1 79 61 129.2	38 36.3 79 61 129.6	38 12.4 80 61 130.0	37 48.4 80 60 130.4	37 24.4 80 60 130.8	37 00.3 80 60 131.2	36 36.1 81 59 131.5	36 11.9 81 59 131.9	7
8	38 23.2 79 62 128.2	37 59.6 79 62 128.6	37 35.9 79 62 129.0	37 12.1 79 61 129.4	36 48.3 80 61 129.8	36 24.4 80 61 130.2	36 00.4 80 60 130.5	35 36.4 80 60 130.9	8
9	37 45.8 78 63 127.2	37 22.4 78 63 127.6	36 58.9 78 62 128.0	36 35.4 79 62 128.4	36 11.7 79 62 128.8	35 48.0 79 62 129.2	35 24.2 79 61 129.6	35 00.4 80 61 129.9	9
40	37 07.9 77 64 126.3	36 44.7 77 64 126.7	36 21.4 78 63 127.1	35 58.1 78 63 127.4	35 34.6 78 63 127.8	35 11.1 78 62 128.2	34 47.5 79 62 128.6	34 23.9 79 62 129.0	40
1	36 29.6 77 65 125.3	36 06.5 77 64 125.7	35 43.5 77 64 126.1	35 20.3 77 64 126.5	34 57.0 78 63 126.9	34 33.7 78 63 127.3	34 10.3 78 63 127.6	33 46.9 78 62 128.0	1
2	35 50.8 76 65 124.4	35 27.9 76 65 124.8	35 05.0 76 65 125.2	34 42.0 77 64 125.5	34 19.0 77 64 125.9	33 55.9 77 64 126.3	33 32.7 77 64 126.7	33 09.4 78 63 127.1	2
3	35 11.5 76 66 123.4	34 48.9 76 66 123.8	34 26.1 76 66 124.2	34 03.4 76 65 124.6	33 40.5 76 65 125.0	33 17.7 77 65 125.4	32 54.5 77 64 125.8	32 31.4 77 64 126.2	3
4	34 31.8 75 67 122.5	34 09.4 75 66 122.9	33 46.8 75 66 123.3	33 24.2 76 66 123.7	33 01.5 76 66 124.1	32 38.8 76 65 124.5	32 16.0 76 65 124.9	31 53.1 76 65 125.3	4
45	33 51.8 74 67 121.6	33 29.5 74 67 122.0	33 07.1 75 67 122.4	32 44.7 75 67 122.8	32 22.2 75 66 123.2	31 59.6 75 66 123.6	31 37.0 76 66 124.0	31 14.2 76 65 124.4	45
6	33 11.3 74 68 120.7	32 49.2 74 68 121.1	32 27.0 74 67 121.5	32 04.8 74 67 121.9	31 42.4 75 67 122.3	31 20.0 75 67 122.7	30 57.5 75 66 123.1	30 35.0 75 66 123.5	6
7	32 30.5 73 69 119.9	32 08.6 73 68 120.3	31 46.5 74 68 120.7	31 24.5 74 68 121.1	31 02.3 74 68 121.5	30 40.1 74 67 121.8	30 17.7 74 67 122.2	29 55.4 75 67 122.6	7
8	31 49.3 73 69 119.0	31 27.5 73 69 119.4	31 05.7 73 69 119.8	30 43.8 73 68 120.2	30 21.8 73 68 120.6	29 59.7 74 68 121.0	29 37.6 74 68 121.4	29 15.4 74 67 121.8	8
9	31 07.8 72 70 118.2	30 46.2 72 69 118.6	30 24.5 72 69 119.0	30 02.7 73 69 119.4	29 40.9 73 69 119.8	29 19.0 73 68 120.1	28 57.0 73 68 120.5	28 35.0 74 68 120.9	9
50	30 26.0 71 70 117.3	30 04.5 72 70 117.7	29 43.0 72 70 118.1	29 21.4 72 70 118.5	28 59.7 72 69 118.9	28 37.9 73 69 119.3	28 16.1 73 69 119.7	27 54.2 73 68 120.1	50
1	29 43.8 71 71 116.5	29 22.5 71 71 116.9	29 01.1 72 70 117.3	28 39.7 72 70 117.7	28 18.1 72 70 118.1	27 56.5 72 70 118.5	27 34.9 72 69 118.9	27 13.2 73 69 119.3	1
2	29 01.3 70 71 115.6	28 40.2 71 71 116.1	28 18.9 71 71 116.5	27 57.6 71 70 116.9	27 36.3 71 70 117.3	27 14.8 72 70 117.7	26 53.3 72 70 118.1	26 31.8 72 70 118.5	2
3	28 18.6 70 72 114.9	27 57.6 70 71 115.3	27 36.5 71 71 115.7	27 15.3 71 71 116.1	26 54.1 71 71 116.5	26 32.8 71 70 116.9	26 11.5 71 70 117.3	25 50.0 71 70 117.7	3
4	27 35.6 69 72 114.1	27 14.7 70 72 114.5	26 53.7 70 72 114.9	26 32.7 70 71 115.3	26 11.6 71 71 115.7	25 50.5 71 71 116.1	25 29.3 71 71 116.5	25 08.0 71 70 116.9	4
55	26 52.3 69 73 113.3	26 31.5 69 72 113.7	26 10.7 69 72 114.1	25 49.8 70 72 114.5	25 28.9 70 72 114.9	25 07.9 70 71 115.3	24 46.8 70 71 115.7	24 25.7 71 71 116.1	55
6	26 08.7 69 73 112.6	25 48.1 69 73 113.0	25 27.4 69 73 113.4	25 06.7 69 72 113.8	24 45.9 70 72 114.2	24 25.0 70 72 114.5	24 04.1 70 72 114.9	23 43.1 70 71 115.3	6
7	25 24.9 68 73 111.8	25 04.5 68 73 112.2	24 43.9 69 73 112.6	24 23.3 69 73 113.0	24 02.6 69 73 113.4	23 41.9 69 72 113.8	23 21.1 69 72 114.2	23 00.2 70 72 114.6	7
8	24 40.9 68 74 111.0	24 20.6 68 74 111.4	24 00.1 68 73 111.8	23 39.7 68 73 112.2	23 19.1 69 73 112.6	22 58.5 69 73 113.0	22 37.8 69 72 113.4	22 17.1 69 72 113.8	8
9	23 56.7 67 74 110.3	23 36.4 68 74 110.7	23 16.1 68 74 111.1	22 55.8 68 74 111.5	22 35.4 68 73 111.9	22 14.9 68 73 112.3	21 54.3 69 73 112.7	21 33.7 69 73 113.1	9
60	23 12.2 67 74 109.6	22 52.1 67 74 110.0	22 31.9 67 74 110.4	22 11.7 68 74 110.8	21 51.4 68 74 111.2	21 31.0 68 73 111.6	21 10.6 68 73 112.0	20 50.1 68 73 112.3	60
1	22 27.6 67 75 108.8	22 07.6 67 75 109.2	21 47.5 67 74 109.6	21 27.4 67 74 110.0	21 07.2 67 74 110.4	20 46.9 67 74 110.8	20 26.6 68 74 111.2	20 06.3 68 73 111.6	1
2	21 42.7 66 75 108.0	21 22.8 66 75 108.5	21 02.9 67 75 108.9	20 42.8 67 74 109.3	20 22.8 67 74 109.7	20 02.6 67 74 110.1	19 42.5 67 74 110.5	19 22.2 67 74 110.9	2
3	20 57.7 66 75 107.4	20 37.9 66 75 107.8	20 18.1 66 75 108.2	19 58.1 66 75 108.6	19 38.2 67 75 109.0	19 18.1 67 74 109.4	18 58.1 67 74 109.8	18 38.0 67 74 110.2	3
4	20 12.5 65 76 106.7	19 52.8 66 75 107.1	19 33.1 66 75 107.5	19 13.2 66 75 107.9	18 53.4 66 75 108.3	18 33.5 66 75 108.7	18 13.5 67 75 109.1	17 53.5 67 74 109.5	4
65	19 27.5 65 76 106.0	19 07.5 65 76 106.4	18 47.9 66 76 106.8	18 28.2 66 75 107.2	18 08.4 66 75 107.6	17 48.6 66 75 108.0	17 28.7 66 75 108.4	17 08.8 66 75 108.8	65
6	18 41.6 65 76 105.3	18 22.1 65 76 105.7	18 02.5 65 76 106.1	17 42.9 65 76 106.5	17 23.2 66 76 106.9	17 03.5 66 75 107.3	16 43.8 66 75 107.7	16 24.0 66 75 108.1	6
7	17 56.0 64 76 104.6	17 36.5 65 76 105.0	17 17.0 65 76 105.4	16 57.5 65 76 105.8	16 37.9 65 76 106.2	16 18.3 65 76 106.6	15 58.6 66 75 107.0	15 38.9 66 75 107.4	7
8	17 10.2 64 77 104.0	16 50.8 64 76 104.4	16 31.4 65 76 104.8	16 11.9 65 76 105.2	15 52.5 65 76 105.6	15 32.9 65 76 106.0	15 13.4 65 76 106.3	14 53.7 65 76 106.7	8
9	16 24.2 64 77 103.3	16 04.9 64 77 103.7	15 45.6 64 77 104.1	15 26.2 65 76 104.5	15 06.8 65 76 104.9	14 47.4 65 76 105.3	14 27.9 65 76 105.7	14 08.4 65 76 106.1	9
70	15 38.1 64 77 102.6	15 18.9 64 77 103.0	14 59.7 64 77 103.4	14 40.4 64 76 103.8	14 21.1 64 76 104.2	14 01.7 65 76 104.6	13 42.3 65 76 105.0	13 22.9 65 76 105.4	70
1	14 51.9 63 77 102.0	14 32.8 64 77 102.4	14 13.6 64 77 102.8	13 54.4 64 77 103.2	13 35.2 64 77 103.6	13 15.9 64 77 103.9	12 56.6 64 76 104.3	12 37.2 65 76 104.7	1
2	14 05.6 63 77 101.3	13 46.6 63 77 101.7	13 27.5 64 77 102.1	13 08.3 64 77 102.5	12 49.1 64 77 102.9	12 29.9 64 77 103.3	12 10.7 64 77 103.7	11 51.4 64 77 104.1	2
3	13 19.2 63 78 100.7	13 00.2 63 77 101.1	12 41.2 63 77 101.5	12 22.1 64 77 101.8	12 03.0 64 77 102.2	11 43.9 64 77 102.6	11 24.7 64 77 103.0	11 05.5 64 77 103.4	3
4	12 32.7 63 78 100.0	12 13.8 63 78 100.4	11 54.8 63 77 100.8	11 35.8 63 77 101.2	11 16.7 64 77 101.6	10 57.7 64 77 102.0	10 38.6 64 77 102.4	10 19.4 64 77 102.8	4
75	11 46.1 63 78 99.4	11 27.2 63 78 99.8	11 08.3 63 78 100.2	10 49.3 63 78 100.6	10 30.4 63 77 100.9	10 11.4 63 77 101.3	9 52.3 64 77 101.7	9 33.3 64 77 102.1	75
6	10 59.4 63 78 98.7	10 40.6 63 78 99.1	10 21.7 63 78 99.5	10 02.8 63 78 99.9	9 43.9 63 78 100.3	9 25.0 63 78 100.7	9 06.0 63 77 101.1	8 47.0 63 77 101.5	6
7	10 12.6 63 78 98.1	9 53.8 63 78 98.5	9 35.0 63 78 98.9	9 16.2 63 78 99.3	8 57.3 63 78 99.7	8 38.5 63 78 100.1	8 19.5 63 78 100.5	8 00.6 63 77 100.8	7
8	9 25.8 62 78 97.5	9 07.0 62 78 97.9	8 48.3 63 78 98.2	8 29.5 63 78 98.6	8 10.7 63 78 99.0	7 51.9 63 78 99.4	7 33.0 63 78 99.8	7 14.1 63 78 100.2	8
9	8 38.9 62 78 96.8	8 20.2 62 78 97.2	8 01.5 62 78 97.6	7 42.7 63 78 98.0	7 24.0 63 78 98.4	7 05.2 63 78 98.8	6 46.4 63 78 99.2	6 27.5 63 78 99.6	9
80	7 51.9 62 78 96.2	7 33.2 62 78 96.6	7 14.6 62 78 97.0	6 55.9 62 78 97.4	6 37.1 62 78 97.8	6 18.4 62 78 98.2	5 59.7 63 78 98.6	5 40.9 63 78 99.0	80
1	7 04.9 62 78 95.6	6 46.2 62 78 96.0	6 27.6 62 78 96.4	6 08.9 62 78 96.8	5 50.3 62 78 97.1	5 31.6 62 78 97.5	5 12.9 62 78 97.9		1
2	6 17.8 62 79 94.9	5 59.2 62 78 95.3	5 40.6 62 78 95.7	5 22.0 62 78 96.1	5 03.3 62 78 96.5				2
3	5 30.7 62 79 94.3	5 12.1 62 78 94.7							3

Lat. 38°

H.A.	4° 00' Alt.	Δd Δt	Az.	4° 30' Alt.	Δd Δt	Az.	5° 00' Alt.	Δd Δt	Az.	5° 30' Alt.	Δd Δt	Az.	6° 00' Alt.	Δd Δt	Az.	6° 30' Alt.	Δd Δt	Az.	7° 00' Alt.	Δd Δt	Az.	7° 30' Alt.	Δd Δt	Az.	H.A.
00	56 00.0	1.00 01	180.0	56 30.0	1.00 01	180.0	57 00.0	1.00 01	180.0	57 30.0	1.00 01	180.0	58 00.0	1.00 01	180.0	58 30.0	1.00 01	180.0	59 00.0	1.00 01	180.0	59 30.0	1.00 01	180.0	00
1	55 59.3	1.00 04	178.2	56 29.3	1.00 04	178.2	56 59.2	1.00 04	178.2	57 29.2	1.00 04	178.1	57 59.2	1.00 04	178.1	58 29.2	1.00 04	178.1	58 59.2	1.00 04	178.0	59 29.2	1.00 04	178.0	1
2	55 57.1	1.00 06	176.4	56 27.0	1.00 06	176.4	56 57.0	1.00 06	176.3	57 26.9	1.00 06	176.3	57 56.9	1.00 06	176.2	58 26.9	1.00 07	176.2	58 56.9	1.00 07	176.1	59 26.8	1.00 07	176.1	2
3	55 53.4	1.00 09	174.7	56 23.3	1.00 09	174.6	56 53.2	1.00 09	174.5	57 23.1	1.00 09	174.5	57 53.0	1.00 09	174.4	58 23.0	1.00 07	174.3	58 52.9	1.00 09	174.2	59 22.8	1.00 09	174.2	3
4	55 48.3	1.00 11	172.9	56 18.1	1.00 11	172.8	56 48.0	99 11	172.7	57 17.8	99 11	172.6	57 47.7	99 12	172.5	58 17.5	99 12	172.4	58 47.3	99 12	172.3	59 17.2	99 12	172.2	4
05	55 41.7	99 13	171.1	56 11.5	99 14	171.0	56 41.2	99 14	170.9	57 11.0	99 14	170.8	57 40.7	99 14	170.7	58 10.5	99 14	170.5	58 40.2	99 14	170.4	59 10.0	99 15	170.3	05
6	55 33.7	99 16	169.4	56 03.4	99 16	169.2	56 33.0	99 16	169.1	57 02.7	99 16	168.9	57 32.3	99 16	168.8	58 01.9	99 17	168.7	58 31.6	99 17	168.5	59 01.2	99 17	168.4	6
7	55 24.3	99 18	167.6	55 53.8	99 18	167.5	56 23.4	98 18	167.3	56 52.9	98 19	167.2	57 22.4	98 19	167.0	57 51.9	98 19	166.8	58 21.4	98 19	166.7	58 50.9	98 20	166.5	7
8	55 13.4	98 20	165.9	55 42.9	98 21	165.7	56 12.3	98 21	165.6	56 41.7	98 21	165.4	57 11.1	98 21	165.2	57 40.4	98 22	165.0	58 09.8	98 22	164.8	58 39.1	98 22	164.6	8
9	55 01.2	98 23	164.2	55 30.5	98 23	164.0	55 59.8	98 23	163.8	56 29.1	97 23	163.6	56 58.3	97 24	163.4	57 27.5	97 24	163.2	57 56.7	97 24	163.0	58 25.9	97 25	162.8	9
10	54 47.7	97 25	162.5	55 16.8	97 25	162.3	55 45.9	97 25	162.1	56 15.0	97 26	161.9	56 44.0	97 26	161.6	57 13.0	97 26	161.4	57 42.1	97 27	161.2	58 11.1	97 27	160.9	10
1	54 32.8	97 27	160.8	55 01.8	96 27	160.6	55 30.7	96 28	160.4	55 59.6	96 28	160.1	56 28.5	96 28	159.9	56 57.4	96 29	159.7	57 26.2	96 29	159.4	57 55.0	96 29	159.1	1
2	54 16.7	96 29	159.2	54 45.5	96 29	158.9	55 14.2	96 30	158.7	55 42.9	96 30	158.4	56 11.6	96 30	158.2	56 40.3	96 31	157.9	57 08.9	95 31	157.6	57 37.5	95 31	157.4	2
3	53 59.3	95 31	157.6	54 27.8	95 31	157.3	54 56.4	95 32	157.0	55 24.9	95 32	156.8	55 53.4	95 32	156.5	56 21.8	95 33	156.2	56 50.2	95 33	155.9	57 18.6	94 34	155.6	3
4	53 40.6	95 33	156.0	54 09.0	95 33	155.7	54 37.3	94 34	155.4	55 05.6	94 34	155.1	55 33.9	94 35	154.8	56 02.1	94 35	154.5	56 30.3	94 35	154.2	56 58.4	94 36	153.9	4
15	53 20.7	94 35	154.4	53 48.9	94 35	154.1	54 17.0	94 36	153.8	54 45.1	94 36	153.5	55 13.2	93 37	153.2	55 41.2	93 37	152.9	56 09.1	93 37	152.5	56 37.0	93 38	152.2	15
6	52 59.7	93 37	152.8	53 27.7	93 37	152.5	53 55.6	93 38	152.2	54 23.4	93 38	151.9	54 51.2	93 38	151.6	55 19.0	92 39	151.2	55 46.7	92 39	150.9	56 14.3	92 40	150.5	6
7	52 37.6	93 39	151.3	53 05.3	92 39	151.0	53 33.0	92 40	150.6	54 00.6	92 40	150.3	54 28.2	92 40	150.0	54 55.7	92 41	149.6	55 23.1	91 41	149.3	55 50.5	91 42	148.9	7
8	52 14.3	92 41	149.8	52 41.8	92 41	149.4	53 09.2	91 41	149.1	53 36.6	91 42	148.8	54 03.9	91 42	148.4	54 31.2	91 43	148.1	54 58.4	91 43	147.7	55 25.5	90 43	147.3	8
9	51 50.0	91 42	148.3	52 17.2	91 43	148.0	52 44.4	91 43	147.6	53 11.6	90 43	147.3	53 38.7	90 44	146.9	54 05.7	90 44	146.5	54 32.6	90 45	146.1	54 59.5	89 45	145.8	9
20	51 24.6	90 44	146.8	51 51.6	90 44	146.5	52 18.6	90 45	146.1	52 45.5	90 45	145.7	53 12.3	89 46	145.4	53 39.1	89 46	145.0	54 05.7	89 46	144.6	54 32.4	89 47	144.2	20
1	50 58.3	89 46	145.4	51 25.0	89 46	145.0	51 51.7	89 46	144.7	52 18.4	89 47	144.3	52 45.0	89 47	143.9	53 11.5	88 48	143.5	53 37.9	88 48	143.1	54 04.2	88 48	142.7	1
2	50 30.9	89 47	144.0	50 57.5	88 47	143.6	51 23.9	88 48	143.3	51 50.3	88 48	142.9	52 16.6	88 49	142.5	52 42.9	87 49	142.1	53 09.0	87 50	141.7	53 35.1	87 50	141.3	2
3	50 02.7	88 49	142.6	50 29.0	88 49	142.3	50 55.2	87 49	141.9	51 21.3	87 50	141.5	51 47.4	87 50	141.1	52 13.4	86 51	140.7	52 39.3	86 51	140.3	53 05.1	86 52	139.8	3
4	49 33.6	87 50	141.3	49 59.6	87 50	140.9	50 25.6	86 51	140.5	50 51.4	86 51	140.1	51 17.3	86 52	139.7	51 43.0	86 52	139.3	52 08.6	85 53	138.9	52 34.1	85 53	138.4	4
25	49 03.6	86 51	140.0	49 29.3	86 52	139.6	49 55.1	86 52	139.2	50 20.7	85 53	138.8	50 46.2	85 53	138.3	51 11.7	85 53	137.9	51 37.1	84 54	137.5	52 02.3	84 54	137.1	25
6	48 32.7	85 53	138.7	48 58.3	85 53	138.3	49 23.7	85 54	137.9	49 49.1	84 54	137.4	50 14.4	84 54	137.0	50 39.6	84 55	136.6	51 04.7	84 55	136.2	51 29.7	83 56	135.7	6
7	48 01.7	84 54	137.4	48 26.4	84 54	137.0	48 51.6	84 55	136.6	49 16.8	84 55	136.2	49 41.8	83 56	135.7	50 06.7	83 56	135.3	50 31.6	83 56	134.9	50 56.3	82 57	134.4	7
8	47 28.7	84 55	136.1	47 53.8	83 56	135.7	48 18.7	83 56	135.3	48 43.6	83 56	134.9	49 08.4	82 57	134.5	49 33.1	82 57	134.0	49 57.7	82 58	133.6	50 22.2	81 58	133.1	8
9	46 55.6	83 56	134.9	47 20.4	83 57	134.5	47 45.1	82 57	134.1	48 09.8	82 58	133.7	48 34.3	82 58	133.2	48 58.8	81 58	132.8	49 23.1	81 59	132.3	49 47.3	81 59	131.9	9
30	46 21.8	82 58	133.7	46 46.3	82 58	133.3	47 10.8	81 58	132.9	47 35.2	81 59	132.4	47 59.5	81 59	132.0	48 23.7	80 60	131.6	48 47.8	80 60	131.1	49 11.8	80 60	130.7	30
1	45 47.2	81 59	132.5	46 11.6	81 59	132.1	46 35.9	81 59	131.7	47 00.0	80 60	131.3	47 24.1	80 60	130.8	47 48.0	80 61	130.4	48 11.9	79 61	129.9	48 35.6	79 61	129.5	1
2	45 12.1	81 60	131.4	45 36.2	80 60	131.0	46 00.2	80 60	130.5	46 24.2	80 61	130.1	46 48.0	79 61	129.7	47 11.7	79 62	129.2	47 35.3	79 62	128.8	47 58.8	78 62	128.3	2
3	44 36.3	80 61	130.3	45 00.2	79 61	129.8	45 24.0	79 61	129.4	45 47.7	79 62	128.9	46 11.3	78 62	128.5	46 34.8	78 62	128.1	46 58.1	77 63	127.6	47 21.4	77 63	127.1	3
4	43 59.9	79 62	129.2	44 23.6	79 62	128.7	44 47.2	78 62	128.3	45 10.6	78 63	127.8	45 34.0	78 63	127.4	45 57.3	77 63	127.0	46 20.4	77 64	126.5	46 43.4	77 64	126.0	4
35	43 23.0	78 62	128.1	43 46.4	78 63	127.6	44 09.8	78 63	127.2	44 33.0	77 64	126.8	44 56.2	77 64	126.3	45 19.2	77 64	125.9	45 42.1	76 65	125.4	46 04.9	76 65	124.9	35
6	42 45.5	78 63	127.0	43 08.7	77 64	126.6	43 31.9	77 64	126.1	43 54.9	77 64	125.7	44 17.8	76 65	125.2	44 40.6	76 65	124.8	45 03.3	76 65	124.3	45 25.9	75 66	123.9	6
7	42 07.5	77 64	126.0	42 30.5	77 65	125.5	42 53.4	76 65	125.1	43 16.2	76 65	124.6	43 38.9	76 66	124.2	44 01.6	75 66	123.7	44 24.0	75 66	123.3	44 46.4	74 67	122.8	7
8	41 29.0	76 65	124.9	41 51.8	76 65	124.4	42 14.5	76 66	124.0	42 37.1	75 66	123.6	42 59.6	75 66	123.2	43 22.0	74 67	122.7	43 44.3	74 67	122.2	44 06.5	74 67	121.8	8
9	40 50.0	76 66	123.9	41 12.6	75 66	123.5	41 35.1	75 66	123.1	41 57.5	75 67	122.6	42 19.8	74 67	122.2	42 42.0	74 67	121.7	43 04.1	73 68	121.2	43 26.0	73 68	120.8	9
40	40 10.5	75 66	122.9	40 32.9	75 67	122.5	40 55.2	74 67	122.1	41 17.4	74 67	121.6	41 39.6	74 68	121.2	42 01.6	73 68	120.7	42 23.4	73 68	120.3	42 45.2	72 69	119.8	40
1	39 30.6	74 67	122.0	39 52.8	74 68	121.5	40 15.0	74 68	121.1	40 37.0	73 68	120.6	40 58.9	73 68	120.2	41 20.7	73 69	119.7	41 42.4	72 69	119.3	42 04.0	72 69	118.8	1
2	38 50.3	74 68	120.8	39 12.3	73 68	120.6	39 34.3	73 68	120.0	39 56.1	73 69	119.7	40 17.8	72 69	119.2	40 39.5	72 69	118.8	41 01.0	72 70	118.3	41 22.4	71 70	117.9	2
3	38 09.6	73 68	120.1	38 31.4	73 69	119.7	38 53.2	72 69	119.2	39 14.8	72 69	118.8	39 36.4	72 70	118.3	39 57.8	71 70	117.9	40 19.2	71 70	117.4	40 40.4	71 71	116.9	3
4	37 28.5	72 69	119.2	37 50.2	72 69	118.7	38 11.7	72 70	118.3	38 33.2	71 70	117.8	38 54.6	71 70	117.4	39 15.9	71 71	116.9	39 37.0	70 71	116.5	39 58.1	70 71	116.0	4
45	36 47.0	72 70	118.3	37 08.5	72 70	117.8	37 29.9	71 70	117.4	37 51.2	71 70	116.9	38 12.4	71 71	116.5	38 33.5	70 71	116.0	38 54.5	70 71	115.6	39 15.4	69 72	115.1	45
6	36 05.2	71 70	117.4	36 26.5	71 71	116.9	36 47.8	71 71	116.5	37 08.9	70 71	116.1	37 30.0	70 71	115.6	37 50.9	70 72	115.2	38 11.7	69 72	114.7	38 32.5	69 72	114.2	6
7	35 23.1	71 71	116.5	35 44.3	71 71	116.1	36 05.3	70 72	115.6	36 26.3	70 72	115.2	36 47.2	69 72	114.7	37 08.0	69 72	114.3	37 28.6	69 73	113.8	37 49.2	68 73	113.4	7
8	34 40.6	70 71	115.7	35 01.6	70 72	115.2	35 22.5	70 72	114.8	35 43.4	69 72	114.3	36 04.1	69 72	113.9	36 24.7	69 73	113.4	36 45.2	68 73	113.0	37 05.7	68 73	112.5	8
9	33 57.8	70 72	114.8	34 18.7	69 72	114.4	34 39.5	69 72	113.9	35 00.1	69 72	113.5	35 20.7	68 73	113.0	35 41.2	68 73	112.6	36 01.6	68 73	112.1	36 21.9	67 73	111.7	9
50	33 14.8	69 72	114.0	33 35.5	69 72	113.5	33 56.1	69 73	113.1	34 16.6	68 73	112.7	34 37.1	68 73	112.2	34 57.4	68 73	111.8	35 17.7	67 74	111.3	35 37.8	67 74	110.9	50
1	32 31.4	69 73	113.2	32 52.0	68 73	112.7	33 12.5	68 73	112.3	33 32.9	68 73	111.8	33 53.2	68 74	111.4	34 13.4	67 74	111.0	34 33.5	67 74	110.5	34 53.5	67 74	110.1	1
2	31 47.8	68 73	112.3	32 08.3	68 73	111.9	32 28.6	68 74	111.5	32 48.9	67 74	111.0	33 09.1	67 74	110.6	33 29.1	67 74	110.1	33 49.1	66 74	109.7	34 09.0	66 75	109.3	2
3	31 04.0	68 73	111.6	31 24.3	68 74	111.1	31 44.5	67 74	110.7	32 04.6	67 74	110.2	32 24.7	67 74	109.8	32 44.6	66 75	109.4	33 04.5	66 75	108.9	33 24.2	66 75	108.5	3
4	30 19.9	67 74	110.8	30 40.1	67 74	110.3	31 00.2	67 74	109.9	31 20.2	67 74	109.5	31 40.1	66 75	109.0	31 59.9	66 75	108.6	32 19.7	65 75	108.1	32 39.3	65 75	107.7	4
55	29 35.6	67 74	110.0	29 55.6	67 74	109.6	30 15.6	66 75	109.1	30 35.5	66 75	108.7	30 55.3	66 75	108.3	31 15.0	65 75	107.8	31 34.6	65 75	107.4	31 54.2	65 76	106.9	55
6	28 51.0	67 75	109.2	29 11.0	66 75	108.8	29 30.8	66 75	108.4	29 50.6	66 75	107.9	30 10.3	65 75	107.5	30 29.9	65 76	107.1	30 49.4	65 76	106.6	31 08.8	65 76	106.2	6
7	28 06.3	66 75	108.5	28 26.1	66 75	108.0	28 45.9	66 75	107.6	29 05.5	65 75	107.2	29 25.1	65 76	106.8	29 44.6	65 76	106.3	30 04.0	65 76	105.9	30 23.3	64 76	105.4	7
8	27 21.3	66 75	107.7	27 41.1	66 75	107.3	28 00.7	65 76	106.9	28 20.3	65 76	106.4	28 39.7	65 76	106.0	28 59.1	65 76	105.6	29 18.5	64 76	105.1	29 37.7	64 76	104.7	8
9	26 36.2	66 76	107.0	26 55.8	65 76	106.6	27 15.4	65 76	106.1	27 34.8	65 76	105.7	27 54.2	64 76	105.3	28 13.5	64 76	104.9	28 32.7	64 76	104.4	28 51.9	64 77	104.0	9
60	25 50.9	65 76	106.3	26 10.4	65 76	105.8	26 29.9	65 76	105.4	26 49.2	64 76	105.0	27 08.5	64 76	104.6	27 27.7	64 77	104.1	27 46.9	63 77	103.7	28 05.9	63 77	103.3	60
1	25 05.4	65 76	105.6	25 24.9	65 76	105.1	25 44.2	64 76	104.7	26 03.5	64 76	104.3	26 22.7	64 77	103.9	26 41.8	64 77	103.4	27 00.9	63 77	103.0	27 19.8	63 77	102.6	1
2	24 19.8	65 76	104.8	24 39.1	64 76	104.4	24 58.4	64 77	104.0	25 17.6	64 77	103.6	25 36.7	63 77	103.1	25 55.8	63 77	102.7	26 14.7	63 77	102.3	26 33.6	63 77	101.9	2
3	23 34.0	64 77	104.1	23 53.3	64 77	103.7	24 12.5	64 77	103.3	24 31.6	63 77	102.9	24 50.6	63 77	102.4	25 09.6	63 77	102.0	25 28.5	63 77	101.6	25 47.3	62 78	101.2	3
4	22 48.1	64 77	103.4	23 07.3	64 77	103.0	23 26.4	64 77	102.6	23 45.4	63 77	102.2	24 04.4	63 77	101.8	24 23.3	63 77	101.3	24 42.1	63 77	100.9	25 00.9	62 78	100.5	4
65	22 02.1	64 77	102.8	22 21.2	64 77	102.4	22 40.2	63 77	101.9	22 59.1	63 77	101.5	23 18.0	63 77	101.1	23 36.9	63 78	100.6	23 55.6	62 78	100.2	24 14.3	62 78	99.8	65
6	21 15.9	64 77	102.1	21 34.9	63 77	101.7	21 53.9	63 77	101.2	22 12.8	63 78	100.8	22 31.6	63 78	100.4	22 50.4	62 78	100.0	23 09.1	62 78	99.5	23 27.7	62 78	99.1	6
7	20 29.6	63 77	101.4	20 48.5	63 77	101.0	21 07.4	63 78	100.6	21 26.3	63 78	100.1	21 45.0	62 78	99.7	22 03.7	62 78	99.3	22 22.4	62 78	98.9	22 41.0	61 78	98.5	7
8	19 43.2	63 78	100.7	20 02.1	63 78	100.3	20 20.9	63 78	99.9	20 39.7	62 78	99.5	20 58.4	62 78	99.1	21 17.0	62 78	98.6	21 35.6	62 78	98.2	21 54.2	61 79	97.8	8
9	18 56.7	63 78	100.1	19 15.5	63 78	99.6	19 34.5	62 78	99.2	19 53.0	62 78	98.8	20 11.7	62 78	98.4	20 30.3	62 78	98.0	20 48.8	62 78	97.6	21 07.3	61 78	97.1	9
70	18 10.1	63 78	99.4	18 29.0	62 78	99.0	18 47.6	62 78	98.6	19 06.2	62 78	98.2	19 24.8	62 78	97.7	19 43.4	62 78	97.3	20 01.9	62 78	96.9	20 20.3	61 78	96.5	70
1	17 23.4	62 78	98.7	17 42.1	62 78	98.3	18 00.8	62 78	97.9	18 19.4	62 78	97.5	18 38.0	62 78	97.1	18 56.5	61 78	96.7	19 14.9	61 78	96.3	19 33.3	61 78	95.8	1
2	16 36.6	62 78	98.1	16 55.3	62 78	97.7	17 13.9	62 78	97.3	17 32.5	62 78	96.9	17 51.0	62 78	96.4	18 09.5	61 78	96.0	18 27.9	61 78	95.6	18 46.3	61 78	95.2	2
3	15 49.8	62 78	97.4	16 08.4	62 78	97.0	16 27.0	62 78	96.6	16 45.5	62 78	96.2	17 04.0	61 78	95.8	17 22.4	61 78	95.4	17 40.8	61 79	95.0	17 59.1	61 79	94.6	3
4	15 02.9	62 78	96.8	15 21.4	62 78	96.4	15 40.0	62 78	96.0	15 58.5	61 79	95.6	16 16.9	61 79	95.2	16 35.3	61 79	94.8	16 53.7	61 79	94.3	17 12.0	61 79	93.9	4
75	14 15.9	62 78	96.2	14 34.4	62 78	95.8	14 52.9	62 79	95.3	15 11.4	61 79	94.9	15 29.8	61 79	94.5	15 48.2	61 79	94.1	16 06.5	61 79	93.7	16 24.8	61 79	93.3	75
6	13 28.8	62 78	95.5	13 47.4	62 79	95.1	14 05.8	62 79	94.7	14 24.3	61 79	94.3	14 42.7	61 79	93.9	15 01.0	61 79	93.5	15 19.3	61 79	93.1	15 37.6	61 79	92.7	6
7	12 41.8	62 79	94.9	13 00.2	62 79	94.5	13 18.7	61 79	94.1	13 37.1	61 79	93.7	13 55.5	61 79	93.3	14 13.8	61 79	92.9	14 32.1	61 79	92.5	14 50.4	61 79	92.0	7
8	11 54.6	62 79	94.3	12 13.1	61 79	93.9	12 31.5	61 79	93.5	12 49.9	61 79	93.1	13 08.3	61 79	92.6	13 26.6	61 79	92.2	13 44.9	61 79	91.8	14 03.1	61 79	91.4	8
9	11 07.5	62 79	93.6	11 26.0	61 79	93.2	11 44.3	61 79	92.8	12 02.7	61 79	92.4	12 21.0	61 79	92.0	12 39.3	61 79	91.6	12 57.6	61 79	91.1	13 15.8	61 79	90.8	9
80	10 20.3	61 79	92.9	10 38.7	61 79	92.6	10 57.1	61 79	92.2	11 15.4	61 79	91.8	11 33.8	61 79	91.4	11 52.1	61 79	91.0	12 10.3	61 79	90.6	12 28.5	61 79	90.2	80
1	9 33.0	61 79	92.4	9 51.4	61 79	92.0	10 09.8	61 79	91.6	10 28.2	61 79	91.2	10 46.5	61 79	90.8	11 04.8	61 79	90.4	11 23.0	61 79	90.0	11 41.3	61 79	89.6	1
2	8 45.8	61 79	91.8	9 04.2	61 79	91.4	9 22.6	61 79	91.0	9 40.9	61 79	90.6	9 59.2	61 79	90.2	10 17.5	61 79	89.8	10 35.8	61 79	89.4	10 54.0	61 79	89.0	2
3	7 58.5	61 79	91.2	8 16.9	61 79	90.8	8 35.3	61 79	90.4	8 53.6	61 79	90.0	9 11.9	61 79	89.6	9 30.2	61 79	89.1	9 48.5	61 79	88.7	10 06.7	61 79	88.3	3
4	7 11.2	61 79	90.5	7 29.6	61 79	90.1	7 48.0	61 79	89.7	8 06.3	61 79	89.3	8 24.7	61 79	88.9	8 43.0	61 79	88.5	9 01.2	61 79	88.1	9 19.5	61 79	87.7	4
85	6 24.0	61 79	89.9	6 42.4	61 79	89.5	7 00.7	61 79	89.1	7 19.1	61 79	88.7	7 37.4	61 79	88.3	7 55.7	61 79	87.9	8 14.0	61 79	87.5	8 32.2	61 79	87.1	85
6	5 36.7	61 79	89.3	5 55.1	61 79	88.9	6 13.4	61 79	88.5	6 31.8	61 79	88.1	6 50.1	61 79	87.7	7 08.5	61 79	87.3	7 26.8	61 79	86.9	7 45.1	61 79	86.5	6
7				5 07.8	61 79	88.3	5 26.2	61 79	87.9	5 44.6	61 79	87.5	6 02.9	61 79	87.1	6 21.2	61 79	86.7	6 39.6	61 79	86.3	6 57.8	61 79	85.9	7
8													5 15.7	61 79	86.5	5 34.1	61 79	86.1	5 52.4	61 79	85.7	6 10.7	61 78	85.3	8
9																			5 05.3	61 78	85.1	5 23.6	61 78	84.7	9

Lat. 38°

H.A.	4° 00'	4° 30'	5° 00'	5° 30'	6° 00'	6° 30'	7° 00'	7° 30'	H.A.
	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	Alt. Δd Δt Az.	
00	48 00.0 1.0 01 180.0	47 30.0 1.0 01 180.0	47 00.0 1.0 01 180.0	46 30.0 1.0 01 180.0	46 00.0 1.0 01 180.0	45 30.0 1.0 01 180.0	45 00.0 1.0 01 180.0	44 30.0 1.0 01 180.0	00
1	47 59.4 1.0 03 178.5	47 29.4 1.0 03 178.5	46 59.4 1.0 03 178.5	46 29.4 1.0 03 178.6	45 59.4 1.0 03 178.6	45 29.4 1.0 03 178.6	44 59.4 1.0 03 178.6	44 29.4 1.0 03 178.6	1
2	47 57.5 1.0 05 177.0	47 27.6 1.0 05 177.1	46 57.6 1.0 05 177.1	46 27.6 1.0 05 177.1	45 57.6 1.0 05 177.1	45 27.7 1.0 05 177.2	44 57.7 1.0 05 177.2	44 27.7 1.0 05 177.2	2
3	47 54.5 1.0 07 175.5	47 24.5 1.0 07 175.6	46 54.6 1.0 07 175.6	46 24.6 1.0 07 175.7	45 54.7 1.0 07 175.7	45 24.7 1.0 07 175.8	44 54.8 1.0 07 175.8	44 24.8 1.0 07 175.8	3
4	47 50.2 1.0 09 174.0	47 20.3 1.0 09 174.1	46 50.4 1.0 09 174.2	46 20.5 1.0 09 174.2	45 50.6 1.0 09 174.3	45 20.7 1.0 09 174.3	44 50.8 1.0 09 174.4	44 20.8 1.0 09 174.5	4
05	47 44.7 99 11 172.6	47 14.8 99 11 172.7	46 45.0 99 11 172.7	46 15.1 1.0 11 172.8	45 45.3 1.0 11 172.9	45 15.4 1.0 11 172.9	44 45.6 1.0 11 173.0	44 15.7 1.0 10 173.1	05
6	47 38.0 99 13 171.1	47 08.2 99 13 171.2	46 38.4 99 13 171.3	46 08.6 99 13 171.4	45 38.8 99 13 171.4	45 09.0 99 13 171.5	44 39.2 99 12 171.6	44 09.4 99 12 171.7	6
7	47 30.0 99 15 169.6	47 00.3 99 15 169.7	46 30.6 99 15 169.8	46 00.9 99 15 169.9	45 31.2 99 15 170.0	45 01.5 99 14 170.1	44 31.8 99 14 170.2	44 02.0 99 14 170.3	7
8	47 20.9 99 17 168.2	46 51.3 99 17 168.3	46 21.7 99 17 168.4	45 52.1 99 17 168.5	45 22.5 99 16 168.6	44 52.8 99 16 168.7	44 23.2 99 16 168.8	43 53.5 99 16 169.0	8
9	47 10.7 99 19 166.7	46 41.2 99 19 166.9	46 11.6 99 19 167.0	45 42.1 99 18 167.1	45 12.5 99 18 167.2	44 42.9 99 18 167.4	44 13.5 99 18 167.5	43 43.9 99 18 167.6	9
10	46 59.2 98 21 165.3	46 29.8 98 21 165.4	46 00.4 98 21 165.6	45 31.0 98 20 165.7	45 01.6 98 20 165.9	44 32.2 98 20 166.0	44 02.7 98 20 166.1	43 33.2 98 20 166.3	10
1	46 46.7 98 23 163.9	46 17.4 98 23 164.0	45 48.1 98 22 164.2	45 18.8 98 22 164.3	44 49.5 98 22 164.5	44 20.2 98 22 164.6	43 50.8 98 22 164.8	43 21.5 98 21 164.9	1
2	46 33.0 97 25 162.4	46 03.8 97 24 162.6	45 34.7 97 24 162.8	45 05.5 97 24 163.0	44 36.3 97 24 163.1	44 07.1 97 24 163.3	43 37.9 97 23 163.4	43 08.7 97 23 163.6	2
3	46 18.2 97 26 161.0	45 49.1 97 26 161.2	45 20.1 97 26 161.4	44 51.1 97 26 161.6	44 22.0 97 26 161.8	43 53.0 97 25 161.9	43 23.9 97 25 162.1	42 54.8 97 25 162.3	3
4	46 02.3 96 28 159.7	45 33.4 96 28 159.9	45 04.5 96 28 160.0	44 35.6 96 28 160.2	44 06.7 96 27 160.4	43 37.8 96 27 160.6	43 08.8 96 27 160.8	42 39.9 96 27 161.0	4
15	45 45.3 96 30 158.3	45 16.6 96 30 158.5	44 47.9 96 30 158.7	44 19.1 96 29 158.9	43 50.3 96 29 159.1	43 21.6 96 29 159.3	42 52.8 96 28 159.5	42 23.9 96 28 159.7	15
6	45 27.3 95 32 156.9	44 58.7 95 31 157.1	44 30.2 95 31 157.4	44 01.6 95 31 157.6	43 33.0 95 31 157.8	43 04.3 95 30 158.0	42 35.7 96 30 158.2	42 07.0 96 30 158.4	6
7	45 08.2 95 33 155.6	44 39.9 95 33 155.8	44 11.5 95 33 156.0	43 43.0 95 33 156.3	43 14.6 95 32 156.5	42 46.1 95 32 156.7	42 17.6 95 32 156.9	41 49.1 95 31 157.1	7
8	44 48.2 94 35 154.2	44 20.0 94 35 154.5	43 51.8 94 34 154.7	43 23.5 94 34 155.0	42 55.2 94 34 155.2	42 26.9 94 34 155.5	41 58.6 94 33 155.6	41 30.2 94 33 155.9	8
9	44 27.1 93 37 152.9	43 59.1 93 36 153.2	43 31.1 94 36 153.4	43 03.0 94 36 153.7	42 34.9 94 35 153.9	42 06.8 94 35 154.1	41 38.6 94 35 154.4	41 10.4 94 35 154.6	9
20	44 05.2 93 38 151.6	43 37.3 93 38 151.9	43 09.5 93 38 152.2	42 41.6 93 37 152.4	42 13.7 93 37 152.7	41 45.7 93 37 152.9	41 17.7 93 36 153.1	40 49.7 93 36 153.4	20
1	43 42.7 92 40 150.3	43 14.6 92 39 150.6	42 46.9 92 39 150.9	42 19.2 92 39 151.2	41 51.5 93 38 151.4	41 23.7 93 38 151.7	40 55.9 93 38 151.9	40 28.1 93 38 152.2	1
2	43 18.4 91 41 149.1	42 51.0 92 41 149.4	42 23.5 92 41 149.6	41 56.0 92 40 149.9	41 28.4 92 40 150.2	41 00.8 92 40 150.4	40 33.2 92 39 150.7	40 05.5 92 39 151.0	2
3	42 53.7 91 43 147.9	42 26.4 91 42 148.1	41 59.2 91 42 148.4	41 31.8 91 42 148.7	41 04.5 91 41 149.0	40 37.1 91 41 149.2	40 09.6 91 41 149.5	39 42.2 92 40 149.8	3
4	42 28.1 90 44 146.6	42 01.1 90 44 146.9	41 34.0 90 43 147.2	41 06.8 90 43 147.5	40 39.7 91 43 147.8	40 12.5 91 42 148.1	39 45.2 91 42 148.3	39 17.9 91 42 148.6	4
25	42 01.7 89 45 145.4	41 34.8 90 45 145.7	41 08.0 90 45 146.0	40 41.0 90 44 146.3	40 14.1 90 44 146.6	39 47.0 90 44 146.9	39 20.0 90 43 147.2	38 52.9 90 43 147.4	25
6	41 34.4 89 47 144.2	41 07.8 89 46 144.5	40 41.1 89 46 144.8	40 13.4 89 46 145.1	39 47.6 89 45 145.4	39 20.8 89 45 145.7	38 53.9 89 45 146.0	38 27.0 89 46 146.3	6
7	41 06.4 88 48 143.1	40 40.0 88 48 143.4	40 13.5 88 47 143.7	39 47.0 89 47 144.0	39 20.4 89 47 144.3	38 53.8 89 46 144.6	38 27.1 89 46 144.9	38 00.4 89 46 145.2	7
8	40 37.6 87 49 141.9	40 11.4 87 49 142.2	39 45.1 88 49 142.5	39 18.8 88 48 142.8	38 52.4 88 48 143.2	38 26.0 88 48 143.5	37 59.5 88 47 143.8	37 33.0 88 47 144.0	8
9	40 08.1 87 50 140.8	39 42.1 87 50 141.1	39 16.0 87 50 141.4	38 49.9 87 49 141.7	38 23.7 87 49 142.0	37 57.5 87 49 142.3	37 31.2 88 48 142.6	37 04.9 88 48 143.0	9
30	39 37.8 86 52 139.6	39 12.0 86 51 140.0	38 46.1 86 51 140.3	38 20.2 86 51 140.6	37 54.3 86 50 140.9	37 28.2 87 50 141.2	37 02.2 87 50 141.6	36 36.1 87 49 141.9	30
1	39 06.8 85 53 138.5	38 41.2 85 52 138.9	38 15.6 86 52 139.2	37 49.9 86 52 139.5	37 24.1 86 51 139.9	36 58.3 86 51 140.2	36 32.4 86 51 140.5	36 06.5 86 50 140.8	1
2	38 35.2 85 54 137.4	38 09.8 85 53 137.8	37 44.4 85 53 138.1	37 18.9 85 53 138.5	36 53.3 85 52 138.8	36 27.7 85 52 139.1	36 02.0 86 52 139.4	35 36.3 86 51 139.7	2
3	38 02.9 84 55 136.4	37 37.7 84 55 136.7	37 12.5 84 54 137.1	36 47.2 84 54 137.4	36 21.8 85 54 137.7	35 56.4 85 53 138.1	35 30.9 85 53 138.4	35 05.4 85 53 138.7	3
4	37 30.0 83 56 135.3	37 05.0 83 56 135.7	36 39.9 84 55 136.0	36 14.8 84 55 136.4	35 49.7 84 55 136.7	35 24.5 84 54 137.0	34 59.2 84 54 137.4	34 33.9 84 54 137.7	4
35	36 56.4 82 57 134.3	36 31.6 83 57 134.6	36 06.8 83 57 134.9	35 41.9 83 56 135.3	35 17.0 83 56 135.7	34 51.9 84 55 136.0	34 26.9 84 55 136.3	34 01.8 84 55 136.7	35
6	36 22.3 82 58 133.3	35 57.7 82 58 133.6	35 33.1 82 57 134.0	35 08.4 82 57 134.3	34 43.6 83 57 134.7	34 18.8 83 56 135.0	33 53.9 83 56 135.3	33 29.0 83 56 135.7	6
7	35 47.6 81 59 132.3	35 23.2 81 58 132.6	34 58.8 82 58 133.0	34 34.3 82 58 133.3	34 09.7 82 57 133.7	33 45.1 82 57 134.0	33 20.4 82 57 134.4	32 55.7 83 56 134.7	7
8	35 12.3 80 60 131.3	34 48.1 81 59 131.6	34 23.8 81 59 132.0	33 59.6 81 59 132.3	33 35.2 81 58 132.7	33 10.8 81 58 133.0	32 46.3 82 58 133.4	32 21.8 82 57 133.7	8
9	34 36.5 80 61 130.3	34 12.5 80 60 130.7	33 48.5 80 60 131.0	33 24.4 80 60 131.4	33 00.2 81 59 131.7	32 36.0 81 59 132.1	32 11.7 81 59 132.4	31 47.4 81 58 132.8	9
40	34 00.2 79 61 129.3	33 36.4 79 61 129.7	33 12.5 80 61 130.1	32 48.6 80 60 130.4	32 24.7 80 60 130.8	32 00.6 80 60 131.1	31 36.5 80 59 131.5	31 12.4 81 59 131.8	40
1	33 23.4 79 62 128.4	32 59.8 79 62 128.8	32 36.1 79 62 129.1	32 12.4 79 61 129.5	31 48.6 79 61 129.8	31 24.8 80 61 130.2	31 00.9 80 60 130.6	30 36.9 80 60 130.9	1
2	32 46.1 78 63 127.5	32 22.7 78 63 127.8	31 59.2 78 62 128.2	31 35.7 79 62 128.6	31 12.1 79 62 128.9	30 48.4 79 61 129.3	30 24.7 79 61 129.6	30 00.9 79 61 130.0	2
3	32 08.3 77 64 126.5	31 45.1 77 63 126.9	31 21.8 78 63 127.3	30 58.5 78 63 127.6	30 35.0 78 62 128.0	30 11.6 78 62 128.4	29 48.1 79 62 128.7	29 24.5 79 62 129.1	3
4	31 30.1 77 64 125.6	31 07.1 77 64 126.0	30 44.0 77 64 126.4	30 20.8 77 64 126.8	29 57.6 78 63 127.1	29 34.3 78 63 127.5	29 10.9 78 63 127.8	28 47.5 78 62 128.2	4
45	30 51.4 76 65 124.7	30 28.6 76 65 125.1	30 05.7 77 64 125.5	29 42.7 77 64 125.9	29 19.7 77 64 126.2	28 56.5 77 64 126.6	28 33.4 77 63 127.0	28 10.2 77 63 127.3	45
6	30 12.4 75 66 123.9	29 49.7 76 65 124.2	29 27.0 76 65 124.6	29 04.2 76 65 125.0	28 41.3 76 65 125.4	28 18.4 77 64 125.7	27 55.4 77 64 126.1	27 32.4 77 64 126.5	6
7	29 32.9 75 66 123.0	29 10.4 75 66 123.4	28 47.9 75 66 123.8	28 25.2 76 66 124.1	28 02.5 76 65 124.5	27 39.8 76 65 124.9	27 17.0 76 65 125.2	26 54.1 76 64 125.6	7
8	28 53.1 74 67 122.1	28 30.8 74 67 122.5	28 08.4 75 66 122.9	27 45.9 75 66 123.3	27 23.4 75 66 123.7	27 00.8 75 66 124.0	26 38.2 76 65 124.4	26 15.5 76 65 124.8	8
9	28 12.9 74 68 121.3	27 50.7 74 67 121.7	27 28.5 74 67 122.1	27 06.2 74 67 122.4	26 43.8 75 67 122.8	26 21.4 75 66 123.2	25 59.0 75 66 123.6	25 36.4 75 66 123.9	9
50	27 32.3 73 68 120.5	27 10.3 73 68 120.9	26 48.2 74 68 121.2	26 26.1 74 67 121.6	26 03.9 74 67 122.0	25 41.7 74 67 122.4	25 19.4 74 67 122.7	24 57.0 75 66 123.1	50
1	26 51.4 73 69 119.7	26 29.5 73 68 120.0	26 07.6 73 68 120.4	25 45.7 73 68 120.8	25 23.6 74 68 121.2	25 01.6 74 67 121.6	24 39.4 74 67 121.9	24 17.2 74 67 122.3	1
2	26 10.1 72 69 118.9	25 48.4 72 69 119.2	25 26.7 73 69 119.6	25 04.9 73 68 120.0	24 43.0 73 68 120.4	24 21.1 73 68 120.8	23 59.1 73 68 121.1	23 37.1 74 67 121.5	2
3	25 28.6 72 70 118.1	25 07.0 72 69 118.4	24 45.4 72 69 118.8	24 23.8 72 69 119.2	24 02.1 73 69 119.6	23 40.3 73 69 120.0	23 18.5 73 68 120.3	22 56.6 73 68 120.7	3
4	24 46.7 71 70 117.3	24 25.3 71 70 117.7	24 03.9 72 70 118.0	23 42.3 72 70 118.4	23 20.8 72 69 118.8	22 59.2 72 69 119.2	22 37.5 72 69 119.5	22 15.8 72 69 119.9	4
55	24 04.5 71 71 116.5	23 43.3 71 71 116.9	23 22.0 71 70 117.3	23 00.6 71 70 117.6	22 39.2 71 70 118.0	22 17.7 72 70 118.4	21 56.2 72 69 118.8	21 34.6 72 69 119.2	55
6	23 22.1 70 71 115.7	23 01.0 70 71 116.1	22 39.8 71 71 116.5	22 18.6 71 71 116.9	21 57.3 71 70 117.3	21 36.0 71 70 117.6	21 14.6 71 70 118.0	20 53.2 71 70 118.4	6
7	22 39.3 70 72 115.0	22 18.4 70 71 115.4	21 57.3 70 71 115.7	21 36.3 71 71 116.1	21 15.1 71 71 116.5	20 54.0 71 71 116.9	20 32.7 71 70 117.3	20 11.5 71 70 117.6	7
8	21 56.3 69 72 114.2	21 35.5 70 72 114.6	21 14.6 70 71 115.0	20 53.7 70 71 115.4	20 32.7 70 71 115.8	20 11.7 70 71 116.1	19 50.6 71 70 116.5	19 29.4 71 71 116.9	8
9	21 13.1 69 72 113.5	20 52.4 69 72 113.9	20 31.6 69 72 114.2	20 10.8 69 72 114.6	19 50.0 70 72 115.0	19 29.1 70 71 115.4	19 08.1 70 71 115.8	18 47.1 70 71 116.1	9
60	20 29.6 68 73 112.7	20 09.0 69 73 113.1	19 48.4 69 72 113.5	19 27.7 69 72 113.9	19 07.0 69 72 114.3	18 46.2 69 72 114.7	18 25.4 69 72 115.0	18 04.5 70 71 115.4	60
1	19 45.9 68 73 112.0	19 25.4 68 73 112.4	19 04.9 68 73 112.8	18 44.4 69 73 113.2	18 23.8 69 73 113.6	18 03.1 69 72 113.9	17 42.4 69 72 114.3	17 21.7 69 72 114.7	1
2	19 01.9 68 74 111.3	18 41.6 68 73 111.7	18 21.2 68 73 112.1	18 00.8 68 73 112.5	17 40.3 68 73 112.8	17 19.8 68 73 113.2	16 59.2 69 72 113.6	16 38.6 69 72 114.0	2
3	18 17.8 67 74 110.6	17 57.6 67 74 111.0	17 37.3 68 74 111.4	17 17.0 68 73 111.7	16 56.6 68 73 112.1	16 36.2 68 73 112.5	16 15.8 68 73 112.9	15 55.3 68 73 113.3	3
4	17 33.4 67 74 109.9	17 13.3 67 74 110.3	16 53.2 67 74 110.7	16 33.0 67 74 111.0	16 12.7 68 74 111.4	15 52.5 68 73 111.8	15 32.1 68 73 112.2	15 11.8 68 73 112.6	4
65	16 48.9 67 75 109.2	16 28.9 67 74 109.6	16 08.8 67 74 110.0	15 48.7 67 74 110.3	15 28.6 67 74 110.7	15 08.4 67 74 111.1	14 48.2 67 74 111.5	14 28.0 67 74 111.9	65
6	16 04.1 66 75 108.5	15 44.2 66 75 108.9	15 24.3 67 75 109.3	15 04.3 67 74 109.7	14 44.3 67 74 110.0	14 24.2 67 74 110.4	14 04.2 67 74 110.8	13 44.0 67 74 111.2	6
7	15 19.2 66 75 107.8	14 59.4 66 75 108.2	14 39.6 66 75 108.6	14 19.7 66 75 109.0	13 59.8 67 74 109.4	13 39.8 67 74 109.7	13 19.9 67 74 110.1	12 59.8 67 74 110.5	7
8	14 34.1 66 75 107.1	14 14.4 66 75 107.5	13 54.7 66 75 107.9	13 34.9 66 75 108.3	13 15.1 66 75 108.7	12 55.2 66 75 109.1	12 35.4 66 74 109.4	12 15.5 66 74 109.8	8
9	13 48.8 65 76 106.5	13 29.2 65 76 106.9	13 09.6 66 75 107.3	12 49.9 66 75 107.6	12 30.0 66 75 108.0	12 10.5 66 75 108.4	11 50.7 66 75 108.8	11 30.9 66 75 109.2	9
70	13 03.4 65 76 105.8	12 43.9 65 76 106.2	12 24.3 65 76 106.6	12 04.8 65 76 107.0	11 45.2 65 75 107.3	11 25.5 66 75 107.7	11 05.8 66 75 108.1	10 46.1 66 75 108.5	70
1	12 17.8 65 76 105.1	11 58.4 65 76 105.5	11 38.9 65 76 105.9	11 19.5 65 76 106.3	10 59.9 65 76 106.7	10 40.4 65 75 107.1	10 20.8 65 75 107.4	10 01.2 65 75 107.8	1
2	11 32.1 64 77 104.5	11 12.8 64 76 104.9	10 53.4 65 76 105.2	10 34.0 65 76 105.6	10 14.6 65 76 106.0	9 55.1 65 76 106.4	9 35.6 65 76 106.8	9 16.1 65 75 107.2	2
3	10 46.3 64 77 103.8	10 27.0 64 76 104.2	10 07.7 64 76 104.5	9 48.4 64 76 105.0	9 29.1 65 76 105.3	9 09.7 65 76 105.8	8 50.3 65 76 106.1	8 30.9 65 76 106.5	3
4	10 00.3 64 77 103.2	9 41.1 64 77 103.6	9 21.9 64 77 103.9	9 02.7 64 76 104.3	8 43.4 64 76 104.7	8 24.1 64 76 105.1	8 04.8 64 76 105.5	7 45.5 64 76 105.9	4
75	9 14.2 64 77 102.5	8 55.1 64 77 102.9	8 35.9 64 77 103.3	8 16.8 64 77 103.7	7 57.6 64 77 104.1	7 38.4 64 76 104.5	7 19.2 64 76 104.8	6 59.9 64 76 105.2	75
6	8 28.0 63 77 101.9	8 08.9 64 77 102.3	7 49.9 64 77 102.7	7 30.8 64 77 103.0	7 11.7 64 77 103.4	6 52.5 64 77 103.8	6 33.4 64 76 104.2	6 14.2 64 76 104.6	6
7	7 41.7 63 77 101.2	7 22.7 63 77 101.6	7 03.7 63 77 102.0	6 44.7 63 77 102.4	6 25.6 63 77 102.8	6 06.6 63 77 103.2	5 47.5 64 77 103.6	5 28.4 64 76 104.0	7
8	6 55.2 63 78 100.5	6 36.3 63 77 100.9	6 17.4 63 77 101.4	5 58.4 63 77 101.8	5 39.5 63 77 102.2	5 20.5 63 77 102.6	5 01.5 63 77 102.9		8
9	6 08.7 63 78 100.0	5 49.9 63 78 100.4	5 31.0 63 77 100.8	5 12.1 63 77 101.1					9
80	5 22.1 63 78 99.3	5 03.3 63 78 99.7							80

Lat. 38°

Lat. 38° — Declination Same Name as Latitude

H.A.	8° 00' Alt.	Δd Δt	Az.	8° 30' Alt.	Δd Δt	Az.	9° 00' Alt.	Δd Δt	Az.	9° 30' Alt.	Δd Δt	Az.	10° 00' Alt.	Δd Δt	Az.	10° 30' Alt.	Δd Δt	Az.	11° 00' Alt.	Δd Δt	Az.	11° 30' Alt.	Δd Δt	Az.	H.A.
00	60 00.0	1.00 1.01	180.0	60 30.0	1.00 1.01	180.0	61 00.0	1.00 1.01	180.0	61 30.0	1.00 1.01	180.0	62 00.0	1.00 1.01	180.0	62 30.0	1.00 1.01	180.0	63 00.0	1.00 1.01	180.0	63 30.0	1.00 1.02	180.0	00
1	59 59.2	1.00 1.04	178.0	60 29.2	1.00 1.04	178.0	60 59.2	1.00 1.04	178.0	61 29.1	1.00 1.04	177.9	61 59.1	1.00 1.04	177.9	62 29.1	1.00 1.04	177.9	62 59.1	1.00 1.04	177.8	63 29.1	1.00 1.05	177.8	1
2	59 56.7	1.00 1.07	176.0	60 26.7	1.00 1.07	176.0	60 56.6	1.00 1.07	175.9	61 26.6	1.00 1.07	175.8	61 56.5	1.00 1.07	175.8	62 26.5	1.00 1.07	175.7	62 56.4	1.00 1.07	175.6	63 26.4	1.00 1.08	175.6	2
3	59 52.7	1.01 1.10	174.1	60 22.6	1.01 1.10	174.0	60 52.5	1.01 1.10	173.9	61 22.3	1.01 1.10	173.8	61 52.2	1.01 1.10	173.6	62 22.1	1.01 1.10	173.6	62 52.0	1.01 1.10	173.5	63 21.9	1.01 1.10	173.4	3
4	59 47.0	99 1.12	172.1	60 16.8	99 1.12	172.0	60 46.6	99 1.12	171.9	61 16.4	99 1.13	171.8	61 46.2	99 1.13	171.6	62 16.0	99 1.13	171.5	62 45.8	99 1.13	171.4	63 15.6	99 1.13	171.3	4
05	59 39.7	99 1.15	170.2	60 09.4	99 1.15	170.0	60 39.1	99 1.15	169.9	61 08.8	99 1.15	169.7	61 38.5	99 1.16	169.6	62 08.2	99 1.16	169.4	62 37.8	99 1.16	169.3	63 07.5	99 1.16	169.1	05
6	59 30.8	99 1.17	168.2	60 00.4	99 1.18	168.1	60 30.0	99 1.18	167.9	60 59.6	99 1.18	167.7	61 29.1	99 1.18	167.5	61 58.7	98 1.19	167.4	62 28.2	98 1.19	167.2	62 57.7	98 1.19	167.0	6
7	59 20.4	98 1.20	166.3	59 49.9	98 1.20	166.1	60 19.3	98 1.20	165.9	60 48.7	98 1.21	165.7	61 18.1	98 1.21	165.5	61 47.5	98 1.21	165.3	62 16.9	97 1.21	165.1	62 46.2	97 1.21	164.9	7
8	59 08.5	98 1.22	164.4	59 37.7	98 1.23	164.2	60 07.0	98 1.23	164.0	60 36.3	97 1.23	163.8	61 05.5	97 1.24	163.5	61 34.7	97 1.24	163.3	62 03.9	97 1.24	163.0	62 33.0	97 1.25	162.8	8
9	58 55.0	97 1.25	162.5	59 24.1	97 1.25	162.3	59 53.2	97 1.26	162.1	60 22.3	97 1.26	161.8	60 51.3	97 1.26	161.6	61 20.3	97 1.27	161.3	61 49.3	97 1.27	161.0	62 18.2	96 1.27	160.7	9
10	58 40.1	96 1.27	160.7	59 09.0	96 1.28	160.4	59 37.9	96 1.28	160.2	60 06.8	96 1.28	159.9	60 35.6	96 1.29	159.6	61 04.4	96 1.29	159.3	61 33.2	96 1.29	159.0	62 01.9	96 1.30	158.7	10
1	58 23.7	96 1.30	158.9	58 52.5	96 1.30	158.6	59 21.2	96 1.30	158.3	59 49.8	96 1.31	158.0	60 18.4	95 1.31	157.7	60 47.0	95 1.32	157.4	61 15.5	95 1.32	157.1	61 44.0	95 1.32	156.7	1
2	58 06.0	95 1.32	157.1	58 34.5	95 1.33	156.8	59 03.0	95 1.33	156.5	59 31.4	95 1.33	156.2	59 59.8	94 1.34	155.8	60 28.1	94 1.34	155.5	60 56.3	94 1.34	155.2	61 24.6	94 1.35	154.8	2
3	57 46.9	94 1.34	155.3	58 15.2	94 1.34	155.0	58 43.4	94 1.35	154.7	59 11.6	94 1.35	154.3	59 39.7	94 1.36	154.0	60 07.8	93 1.36	153.6	60 35.8	93 1.37	153.3	61 03.7	93 1.37	152.9	3
4	57 26.5	93 1.36	153.6	57 54.5	93 1.37	153.2	58 22.5	93 1.37	152.9	58 50.4	93 1.37	152.5	59 18.3	93 1.38	152.2	59 46.1	93 1.38	151.8	60 13.8	92 1.39	151.4	60 41.5	92 1.39	151.0	4
15	57 04.8	92 1.38	151.9	57 32.6	92 1.39	151.5	58 00.3	92 1.39	151.2	58 28.0	92 1.39	150.8	58 55.6	92 1.40	150.4	59 23.1	92 1.40	150.0	59 50.6	91 1.41	149.6	60 17.9	91 1.41	149.2	15
6	56 41.9	92 1.40	150.2	57 09.5	92 1.41	149.8	57 36.9	91 1.41	149.4	58 04.3	91 1.42	149.1	58 31.6	91 1.42	148.7	58 58.9	91 1.42	148.3	59 26.0	90 1.43	147.9	59 53.1	90 1.43	147.4	6
7	56 17.8	91 1.42	148.5	56 45.1	91 1.42	148.2	57 12.3	91 1.43	147.8	57 39.4	90 1.43	147.4	58 06.4	90 1.44	147.0	58 33.4	90 1.44	146.6	59 00.3	89 1.45	146.1	59 27.0	89 1.45	145.7	7
8	55 52.6	90 1.44	146.9	56 19.6	90 1.44	146.5	56 46.5	90 1.45	146.1	57 13.3	89 1.45	145.7	57 40.1	89 1.46	145.3	58 06.8	89 1.46	144.9	58 33.3	88 1.47	144.4	58 59.8	88 1.47	144.0	8
9	55 26.3	89 1.46	145.4	55 53.0	89 1.46	145.0	56 19.6	89 1.47	144.6	56 46.2	88 1.47	144.1	57 12.6	88 1.48	143.7	57 39.0	88 1.48	143.3	58 05.3	87 1.49	142.8	58 31.5	87 1.49	142.3	9
20	54 58.9	88 1.47	143.8	55 25.3	88 1.48	143.4	55 51.7	88 1.48	143.0	56 17.9	87 1.49	142.6	56 44.1	87 1.49	142.1	57 10.2	87 1.50	141.7	57 36.2	86 1.50	141.2	58 02.1	86 1.51	140.7	20
1	54 30.5	87 1.49	142.3	54 56.6	87 1.49	141.9	55 22.7	87 1.50	141.5	55 48.7	86 1.50	141.0	56 14.6	86 1.51	140.6	56 40.4	86 1.51	140.1	57 06.1	85 1.52	139.6	57 31.6	85 1.52	139.1	1
2	54 01.1	86 1.51	140.8	54 27.0	86 1.51	140.4	54 52.8	86 1.51	140.0	55 18.5	85 1.52	139.5	55 44.1	85 1.52	139.1	56 09.6	85 1.53	138.6	56 35.0	84 1.53	138.1	57 00.2	84 1.54	137.6	2
3	53 30.8	86 1.52	139.4	53 56.4	85 1.52	139.0	54 21.9	85 1.53	138.5	54 47.3	85 1.53	138.1	55 12.6	84 1.54	137.6	55 37.8	84 1.54	137.1	56 02.9	83 1.55	136.6	56 27.9	83 1.55	136.1	3
4	52 59.6	85 1.53	138.0	53 24.9	84 1.54	137.6	53 50.2	84 1.54	137.1	54 15.3	84 1.55	136.6	54 40.3	83 1.55	136.2	55 05.2	83 1.56	135.7	55 30.0	82 1.56	135.2	55 54.7	82 1.57	134.7	4
25	52 27.5	84 1.55	136.6	52 52.6	83 1.55	136.2	53 17.6	83 1.56	135.7	53 42.4	83 1.56	135.2	54 07.2	82 1.57	134.8	54 31.8	82 1.57	134.3	54 56.3	81 1.58	133.8	55 20.7	81 1.58	133.3	25
6	51 54.6	83 1.56	135.3	52 19.4	82 1.57	134.8	52 44.1	82 1.57	134.4	53 08.7	82 1.57	133.9	53 33.2	81 1.58	133.4	53 57.5	81 1.58	132.9	54 21.8	80 1.59	132.4	54 45.8	80 1.59	131.9	6
7	51 21.0	82 1.57	134.0	51 45.5	82 1.58	133.5	52 09.9	81 1.58	133.0	52 34.3	81 1.59	132.5	52 58.5	80 1.59	132.1	53 22.5	80 1.60	131.6	53 46.5	80 1.60	131.1	54 10.3	79 1.60	130.5	7
8	50 46.6	81 1.58	132.7	51 10.9	81 1.59	132.2	51 35.0	80 1.59	131.7	51 59.1	80 1.60	131.3	52 23.0	80 1.60	130.8	52 46.8	79 1.61	130.3	53 10.5	79 1.61	129.7	53 34.0	78 1.62	129.2	8
9	50 11.5	80 1.60	131.4	50 35.5	80 1.60	130.9	50 59.4	79 1.60	130.5	51 23.2	79 1.61	130.0	51 46.8	79 1.61	129.5	52 10.4	78 1.62	129.0	52 33.8	78 1.62	128.5	52 57.0	77 1.63	128.0	9
30	49 35.7	79 1.61	130.2	49 59.5	79 1.61	129.7	50 23.1	78 1.62	129.2	50 46.6	78 1.62	128.8	51 10.0	78 1.62	128.3	51 33.3	77 1.63	127.7	51 56.4	77 1.63	127.2	52 19.4	76 1.64	126.7	30
1	48 59.3	79 1.62	129.0	49 22.8	78 1.62	128.5	49 46.2	78 1.63	128.0	50 09.4	77 1.63	127.5	50 32.6	77 1.63	127.0	50 55.5	76 1.64	126.5	51 18.5	76 1.65	126.0	51 41.2	76 1.65	125.4	1
2	48 22.2	78 1.63	127.8	48 45.5	77 1.63	127.3	49 08.6	77 1.64	126.9	49 31.7	77 1.64	126.4	49 54.6	76 1.65	125.9	50 17.3	76 1.65	125.4	50 40.0	75 1.65	124.8	51 02.5	75 1.66	124.3	2
3	47 44.6	77 1.64	126.7	48 07.6	77 1.64	126.2	48 30.5	76 1.65	125.7	48 53.3	76 1.65	125.2	49 16.0	75 1.66	124.7	49 38.7	75 1.66	124.2	50 00.9	74 1.67	123.7	50 23.2	74 1.67	123.2	3
4	47 06.4	76 1.65	125.6	47 29.2	76 1.65	125.1	47 51.9	75 1.66	124.6	48 14.4	75 1.66	124.1	48 36.8	75 1.66	123.6	48 59.1	74 1.66	123.1	49 21.3	74 1.67	122.6	49 43.3	73 1.67	122.0	4
35	46 27.6	75 1.66	124.5	46 50.2	75 1.66	124.0	47 12.7	75 1.66	123.5	47 35.0	74 1.67	123.0	47 57.2	74 1.67	122.5	48 19.3	73 1.67	122.0	48 41.2	73 1.68	121.5	49 03.0	72 1.68	120.9	35
6	45 48.4	75 1.66	123.4	46 10.8	74 1.67	122.9	46 33.0	74 1.67	122.4	46 55.1	73 1.67	121.9	47 17.1	73 1.68	121.4	47 39.0	72 1.68	120.9	48 00.7	72 1.69	120.4	48 22.2	72 1.69	119.9	6
7	45 08.7	74 1.67	122.3	45 30.8	74 1.67	121.9	45 52.9	73 1.68	121.4	46 14.8	73 1.68	120.9	46 36.5	72 1.68	120.4	46 58.2	72 1.69	119.9	47 19.7	71 1.69	119.4	47 41.0	71 1.69	118.8	7
8	44 28.5	73 1.68	121.3	44 50.5	73 1.68	120.8	45 12.3	73 1.68	120.3	45 34.0	72 1.69	119.8	45 55.5	72 1.69	119.4	46 17.0	71 1.69	118.8	46 38.3	71 1.70	118.3	46 59.4	70 1.70	117.8	8
9	43 47.9	73 1.68	120.3	44 09.9	72 1.69	119.8	44 31.3	72 1.69	119.3	44 52.8	71 1.69	118.8	45 14.1	71 1.70	118.3	45 35.3	71 1.70	117.8	45 56.4	70 1.70	117.3	46 17.4	70 1.71	116.8	9
40	43 06.9	72 1.69	119.3	43 28.4	72 1.69	118.8	43 49.8	71 1.70	118.3	44 11.1	71 1.70	117.7	44 32.3	70 1.70	117.4	44 53.4	70 1.71	116.9	45 14.3	69 1.71	116.4	45 35.0	69 1.71	115.8	40
1	42 25.5	71 1.70	118.3	42 46.8	71 1.70	117.7	43 08.0	71 1.70	117.4	43 29.2	70 1.71	116.9	43 50.1	70 1.71	116.4	44 11.0	69 1.71	115.9	44 31.7	69 1.72	115.4	44 52.3	68 1.72	114.9	1
2	41 43.7	71 1.70	117.4	42 04.8	70 1.71	116.9	42 25.9	70 1.71	116.4	42 46.8	70 1.71	116.0	43 07.6	69 1.72	115.5	43 28.3	69 1.72	115.0	43 48.8	68 1.72	114.5	44 09.3	68 1.72	113.9	2
3	41 01.5	70 1.71	116.5	41 22.5	70 1.71	116.0	41 43.4	69 1.71	115.5	42 04.1	69 1.72	115.0	42 24.8	69 1.72	114.5	42 45.3	68 1.72	114.0	43 05.7	68 1.73	113.5	43 25.9	67 1.73	112.9	3
4	40 19.0	70 1.71	115.6	40 39.8	69 1.72	115.1	41 00.5	69 1.72	114.6	41 21.1	69 1.72	114.1	41 41.6	68 1.72	113.6	42 01.9	68 1.73	113.1	42 22.2	67 1.73	112.5	42 42.2	67 1.73	112.1	4
45	39 36.2	69 1.72	114.7	39 56.9	69 1.72	114.2	40 17.4	68 1.72	113.7	40 37.8	68 1.73	113.2	40 58.1	67 1.73	112.7	41 18.3	67 1.73	112.3	41 38.4	67 1.73	111.8	41 58.3	66 1.74	111.3	45
6	38 53.1	69 1.72	113.8	39 13.6	68 1.73	113.3	39 34.0	68 1.73	112.8	39 54.2	67 1.73	112.4	40 14.4	67 1.73	111.9	40 34.4	67 1.74	111.4	40 54.3	66 1.74	110.9	41 14.1	66 1.74	110.4	6
7	38 09.7	68 1.73	112.9	38 30.0	68 1.73	112.4	38 50.3	67 1.73	112.0	39 10.4	67 1.74	111.5	39 30.4	66 1.74	111.0	39 50.3	66 1.74	110.5	40 10.0	66 1.74	110.0	40 29.7	65 1.74	109.5	7
8	37 26.0	68 1.73	112.1	37 46.2	67 1.74	111.6	38 06.3	67 1.74	111.1	38 26.3	66 1.74	110.7	38 46.1	66 1.75	110.2	39 05.9	66 1.75	109.7	39 25.5	65 1.75	109.2	39 45.0	65 1.75	108.7	8
9	36 42.0	67 1.74	111.2	37 02.1	67 1.74	110.8	37 22.1	66 1.74	110.3	37 41.9	66 1.75	109.8	38 01.6	66 1.75	109.3	38 21.2	65 1.75	108.9	38 40.7	65 1.75	108.4	39 00.1	64 1.76	107.9	9
50	35 57.8	67 1.74	110.4	36 17.8	66 1.74	109.9	36 37.6	66 1.75	109.5	36 57.3	66 1.75	109.0	37 16.9	65 1.75	108.5	37 36.4	65 1.75	108.1	37 55.8	64 1.75	107.6	38 15.0	64 1.76	107.1	50
1	35 13.4	66 1.75	109.6	35 33.2	66 1.75	109.1	35 52.9	65 1.75	108.7	36 12.5	65 1.75	108.2	36 32.0	65 1.76	107.7	36 51.3	64 1.76	107.3	37 10.6	64 1.76	106.8	37 29.7	64 1.76	106.3	1
2	34 28.8	66 1.75	108.8	34 48.4	65 1.75	108.3	35 08.0	65 1.75	107.9	35 27.5	65 1.76	107.4	35 46.8	64 1.76	106.9	36 06.1	64 1.76	106.5	36 25.2	64 1.76	106.0	36 44.3	63 1.77	105.5	2
3	33 43.9	65 1.75	108.0	34 03.5	65 1.76	107.6	34 22.9	65 1.76	107.1	34 42.3	64 1.76	106.6	35 01.5	64 1.76	106.2	35 20.7	63 1.76	105.7	35 39.7	63 1.77	105.2	35 58.6	63 1.77	104.7	3
4	32 58.8	65 1.75	107.2	33 18.3	65 1.76	106.8	33 37.6	64 1.76	106.3	33 56.9	64 1.76	105.9	34 16.0	64 1.76	105.4	34 35.1	63 1.77	104.9	34 54.0	63 1.77	104.5	35 12.8	62 1.77	104.0	4
55	32 13.6	65 1.76	106.5	32 32.9	64 1.76	106.0	32 52.2	64 1.76	105.6	33 11.3	64 1.76	105.1	33 30.4	63 1.77	104.7	33 49.3	63 1.77	104.2	34 08.1	63 1.77	103.7	34 26.9	62 1.77	103.2	55
6	31 28.2	64 1.76	105.7	31 47.4	64 1.76	105.3	32 06.6	64 1.76	104.8	32 25.6	63 1.77	104.4	32 44.5	63 1.77	103.9	33 03.4	63 1.77	103.4	33 22.1	62 1.77	103.0	33 40.8	62 1.77	102.5	6
7	30 42.6	64 1.76	105.0	31 01.7	64 1.76	104.5	31 20.8	63 1.77	104.1	31 39.7	63 1.77	103.6	31 58.6	63 1.77	103.2	32 17.3	62 1.77	102.7	32 36.0	62 1.77	102.3	32 54.5	61 1.77	101.8	7
8	29 56.8	64 1.76	104.3	30 15.9	63 1.77	103.8	30 34.8	63 1.77	103.4	30 53.7	63 1.77	102.9	31 12.5	62 1.77	102.5	31 31.2	62 1.77	102.0	31 49.7	61 1.78	101.5	32 08.2	61 1.78	101.1	8
9	29 10.9	63 1.77	103.5	29 29.9	63 1.77	103.1	29 48.8	63 1.77	102.6	30 07.6	62 1.77	102.2	30 26.2	62 1.77	101.7	30 44.8	62 1.78	101.3	31 03.3	61 1.78	100.8	31 21.8	61 1.78	100.4	9
60	28 24.9	63 1.77	102.8	28 43.8	63 1.77	102.4	29 02.6	63 1.77	101.9	29 21.3	62 1.77	101.5	29 39.9	62 1.78	101.0	29 58.4	62 1.78	100.6	30 16.9	61 1.78	100.1	30 35.2	61 1.78	99.7	60
1	27 38.7	63 1.77	102.1	27 57.5	63 1.77	101.7	28 16.3	62 1.77	101.2	28 34.9	62 1.78	100.8	28 53.4	62 1.78	100.3	29 11.9	61 1.78	99.9	29 30.3	61 1.78	99.4	29 48.5	61 1.78	99.0	1
2	26 52.4	63 1.77	101.4	27 11.2	62 1.77	101.0	27 29.8	62 1.78	100.5	27 48.4	62 1.78	100.1	28 06.9	61 1.78	99.6	28 25.3	61 1.78	99.2	28 43.6	61 1.78	98.7	29 01.8	60 1.78	98.3	2
3	26 06.0	62 1.78	100.7	26 24.7	62 1.78	100.3	26 43.3	62 1.78	99.8	27 01.8	62 1.78	99.4	27 20.2	61 1.78	99.0	27 38.6	61 1.78	98.5	27 56.8	61 1.78	98.1	28 15.0	60 1.78	97.6	3
4	25 19.5	62 1.78	100.0	25 38.1	62 1.78	99.6	25 56.7	62 1.78	99.2	26 15.1	61 1.78	98.7	26 33.5	61 1.78	98.3	26 51.8	61 1.78	97.8	27 10.0	60 1.78	97.4	27 28.1	60 1.78	97.0	4
65	24 32.9	62 1.78	99.4	24 51.5	62 1.78	98.9	25 09.9	61 1.78	98.5	25 28.3	61 1.78	98.1	25 46.6	61 1.78	97.6	26 04.9	61 1.78	97.2	26 23.0	60 1.78	96.7	26 41.1	60 1.78	96.3	65
6	23 46.2	62 1.78	98.7	24 04.7	62 1.78	98.3	24 23.1	61 1.78	97.8	24 41.5	61 1.78	97.4	24 59.7	61 1.78	97.0	25 17.9	60 1.78	96.5	25 36.0	60 1.78	96.1	25 54.1	60 1.78	95.6	6
7	22 59.5	62 1.78	98.0	23 17.9	61 1.78	97.6	23 36.3	61 1.78	97.2	23 54.6	61 1.78	96.7	24 12.8	61 1.78	96.3	24 30.9	60 1.78	95.9	24 49.0	60 1.79	95.4	25 07.0	60 1.79	95.0	7
8	22 12.6	61 1.78	97.4	22 31.0	61 1.78	96.9	22 49.3	61 1.78	96.5	23 07.6	61 1.78	96.1	23 25.8	60 1.78	95.6	23 43.9	60 1.79	95.2	24 01.9	60 1.79	94.8	24 19.9	60 1.79	94.3	8
9	21 25.7	61 1.78	96.7	21 44.0	61 1.78	96.3	22 02.3	61 1.79	95.9	22 20.5	60 1.78	95.4	22 38.7	60 1.79	95.0	22 56.8	60 1.79	94.6	23 14.8	60 1.79	94.1	23 32.7	59 1.79	93.7	9
70	20 38.7	61 1.78	96.1	20 57.0	61 1.79	95.6	21 15.3	61 1.79	95.2	21 33.4	60 1.79	94.8	21 51.6	60 1.79	94.4	22 09.6	60 1.79	93.9	22 27.6	60 1.79	93.5	22 45.5	59 1.79	93.1	70
1	19 51.7	61 1.79	95.4	20 09.9	61 1.79	95.0	20 28.2	61 1.79	94.6	20 46.3	60 1.79	94.1	21 04.4	60 1.79	93.7	21 22.4	60 1.79	93.3	21 40.4	60 1.79	92.9	21 58.3	59 1.79	92.4	1
2	19 04.6	61 1.79	94.8	19 22.8	61 1.79	94.4	19 41.0	60 1.79	93.9	19 59.1	60 1.79	93.5	20 17.2	60 1.79	93.1	20 35.2	60 1.79	92.7	20 53.2	59 1.79	92.2	21 11.0	59 1.79	91.8	2
3	18 17.4	61 1.79	94.1	18 35.6	61 1.79	93.7	18 53.8	60 1.79	93.3	19 11.9	60 1.79	92.9	19 30.0	60 1.79	92.5	19 48.0	60 1.79	92.0	20 05.9	59 1.79	91.6	20 23.8	59 1.79	91.2	3
4	17 30.2	61 1.79	93.5	17 48.5	61 1.79	93.1	18 06.6	60 1.79	92.7	18 24.7	60 1.79	92.3	18 42.7	60 1.79	91.8	19 00.7	60 1.79	91.4	19 18.6	59 1.79	91.0	19 36.5	59 1.79	90.6	4
75	16 43.0	61 1.79	92.9	17 01.2	61 1.79	92.5	17 19.4	60 1.79	92.0	17 37.4	60 1.79	91.6	17 55.5	60 1.79	91.2	18 13.4	60 1.79	90.8	18 31.4	60 1.79	90.4	18 49.2	59 1.79	89.9	75
6	15 55.8	61 1.79	92.3	16 14.0	61 1.79	91.8	16 32.1	60 1.79	91.4	16 50.2	60 1.79	91.0	17 08.2	60 1.79	90.6	17 26.2	60 1.79	90.2	17 44.1	60 1.79	89.7	18 01.9	59 1.79	89.3	6
7	15 08.6	61 1.79	91.6	15 26.7	60 1.79	91.2	15 44.8	60 1.79	90.8	16 02.9	60 1.79	90.4	16 20.9	60 1.79	90.0	16 38.9	60 1.79	89.6	16 56.8	59 1.79	89.1	17 14.7	59 1.79	88.7	7
8	14 21.3	61 1.79	91.0	14 39.4	60 1.79	90.6	14 57.5	60 1.79	90.2	15 15.6	60 1.79	89.8	15 33.6	60 1.79	89.4	15 51.6	60 1.79	88.9	16 09.5	60 1.79	88.5	16 27.4	59 1.79	88.1	8
9	13 34.0	61 1.79	90.4	13 52.2	60 1.79	90.0	14 10.3	60 1.79	89.6	14 28.3	60 1.79	89.2	14 46.4	60 1.79	88.7	15 04.3	60 1.79	88.3	15 22.3	60 1.79	87.9	15 40.2	60 1.79	87.5	9
80	12 46.7	61 1.79	89.8	13 04.9	60 1.79	89.4	13 23.0	60 1.79	89.0	13 41.1	60 1.79	88.5	13 59.1	60 1.79	88.1	14 17.1	60 1.79	87.7	14 35.0	60 1.79	87.3	14 52.9	60 1.79	86.9	80
1	11 59.5	61 1.79	89.2	12 17.6	60 1.79	88.8	12 35.7	60 1.79	88.3	12 53.8	60 1.79	87.9	13 11.8	60 1.79	87.5	13 29.9	60 1.79	87.1	13 47.8	60 1.79	86.7	14 05.7	60 1.79	86.3	1
2	11 12.2	61 1.79	88.6	11 30.3	60 1.79	88.1	11 48.5	60 1.79	87.7	12 06.6	60 1.79	87.3	12 24.6	60 1.79	86.9	12 42.6	60 1.79	86.5	13 00.6	60 1.79	86.1	13 18.6	60 1.79	85.7	2
3	10 24.9	61 1.79	87.9	10 43.1	60 1.79	87.5	11 01.2	60 1.79	87.1	11 19.3	60 1.79	86.7	11 37.4	60 1.79	86.3	11 55.5	60 1.79	85.9	12 13.5	60 1.79	85.5	12 31.4	60 1.78	85.1	3
4	9 37.7	61 1.79	87.3	9 55.9	60 1.79	86.9	10 14.0	60 1.79	86.5	10 32.2	60 1.79	86.1	10 50.3	60 1.79	85.7	11 08.3	60 1.79	85.3	11 26.4	60 1.78	84.9	11 44.4	60 1.78	84.5	4
85	8 50.5	61 1.79	86.7	9 08.7	61 1.79	86.3	9 26.9	60 1.78	85.9	9 45.0	60 1.78	85.5	10 03.1	60 1.78	85.1	10 21.2	60 1.78	84.7	10 39.3	60 1.78	84.3	10 57.3	60 1.78	83.9	85
6	8 03.3	61 1.79	86.1	8 21.5	61 1.78	85.7	8 39.7	60 1.78	85.3	8 57.9	60 1.78	84.9	9 16.0	60 1.78	84.5	9 34.2	60 1.78	84.1	9 52.3	60 1.78	83.7	10 10.3	60 1.78	83.3	6
7	7 16.1	61 1.79	85.5	7 34.4	61 1.78	85.1	7 52.6	60 1.78	84.7	8 10.8	60 1.78	84.3	8 29.0	60 1.78	83.9	8 47.2	60 1.78	83.5	9 05.3	60 1.78	83.1	9 23.4	60 1.78	82.7	7
8	6 29.0	61 1.78	84.9	6 47.3	61 1.78	84.5	7 05.6	60 1.78	84.1	7 23.8	60 1.78	83.7	7 42.0	60 1.78	83.3	8 00.2	60 1.78	82.9	8 18.4	60 1.78	82.5	8 36.5	60 1.78	82.1	8
9	5 41.9	61 1.78	84.3	6 00.3	61 1.78	83.9	6 18.6	60 1.78	83.5	6 36.8	60 1.78	83.1	6 55.1	60 1.78	82.7	7 13.3	61 1.78	82.3	7 31.6	61 1.78	81.9	7 49.7	61 1.78	81.5	9
90				5 13.3	61 1.78	83.3	5 31.6	61 1.78	82.9	5 49.7	61 1.78	82.5	6 08.2	61 1.78	82.1	6 26.5	61 1.78	81.7			81.3	7 03.0	61 1.78	80.9	90

Lat. 38°

H.A.	8° 00' Alt. Δd Δt Az.	8° 30' Alt. Δd Δt Az.	9° 00' Alt. Δd Δt Az.	9° 30' Alt. Δd Δt Az.	10° 00' Alt. Δd Δt Az.	10° 30' Alt. Δd Δt Az.	11° 00' Alt. Δd Δt Az.	11° 30' Alt. Δd Δt Az.	H.A.
00	44 00.0 1.0 01 180.0	43 30.0 1.0 01 180.0	43 00.0 1.0 01 180.0	42 30.0 1.0 01 180.0	42 00 0 1.0 01 180.0	41 30 0 1.0 01 180.0	41 00.0 1.0 01 180.0	40 30.0 1.0 01 180.0	00
1	43 59.4 1.0 03 178.6	43 29.4 1.0 03 178.6	42 59.4 1.0 03 178.6	42 29.4 1.0 03 178.7	41 59.5 1.0 03 178.7	41 29.5 1.0 03 178.7	40 59.5 1.0 03 178.7	40 29.5 1.0 03 178.7	1
2	43 57.7 1.0 05 177.3	43 27.8 1.0 05 177.3	42 57.8 1.0 05 177.3	42 27.8 1.0 05 177.3	41 57.8 1.0 05 177.4	41 27.8 1.0 04 177.4	40 57.9 1.0 04 177.4	40 27.9 1.0 04 177.4	2
3	43 54.9 1.0 07 175.9	43 24.9 1.0 07 175.9	42 55.0 1.0 06 176.0	42 25.0 1.0 06 176.0	41 55.1 1.0 06 176.0	41 25.1 1.0 06 176.1	40 55.2 1.0 06 176.1	40 25.2 1.0 06 176.1	3
4	43 50.9 1.0 08 174.5	43 21.0 1.0 08 174.6	42 51.1 1.0 08 174.6	42 21.2 1.0 08 174.7	41 51.3 1.0 08 174.7	41 21.3 1.0 08 174.8	40 51.4 1.0 08 174.8	40 21.5 1.0 08 174.9	4
05	43 45.8 1.0 10 173.1	43 16.0 1.0 10 173.2	42 46.1 1.0 10 173.3	42 16.2 1.0 10 173.3	41 46.4 1.0 10 173.4	41 16.5 1.0 10 173.5	40 46.6 1.0 10 173.5	40 16.7 1.0 10 173.6	05
6	43 39.6 99 12 171.8	43 09.8 99 12 171.9	42 40.0 99 12 171.9	42 10.2 99 12 172.1	41 40.4 99 12 172.1	41 10.6 99 12 172.2	40 40.7 99 12 172.2	40 10.9 99 11 172.3	6
7	43 32.3 99 14 170.4	43 02.6 99 14 170.5	42 32.8 99 14 170.6	42 03.1 99 14 170.7	41 33.3 99 14 170.8	41 03.6 99 13 170.9	40 33.8 99 13 170.9	40 04.1 99 13 171.0	7
8	43 23.9 99 16 169.1	42 54.2 99 16 169.2	42 24.6 99 16 169.3	41 54.9 99 15 169.4	41 25.2 99 15 169.5	40 55.5 99 15 169.6	40 25.9 99 15 169.7	39 56.2 99 15 169.8	8
9	43 14.4 99 18 167.7	42 44.8 99 17 167.8	42 15.2 99 17 168.0	41 45.6 99 17 168.1	41 16.1 99 17 168.2	40 46.5 99 17 168.3	40 16.9 99 17 168.4	39 47.2 99 17 168.5	9
10	43 03.8 98 19 166.4	42 34.3 98 19 166.5	42 04.8 98 19 166.6	41 35.3 98 19 166.8	41 05.8 98 19 166.9	40 36.3 98 19 167.0	40 06.8 98 18 167.1	39 37.3 98 18 167.2	10
1	42 52.1 98 21 165.1	42 22.8 98 21 165.2	41 53.4 98 21 165.5	41 24.0 98 21 165.5	40 54.6 98 20 165.7	40 25.2 98 20 165.7	39 55.8 98 20 165.9	39 26.4 98 20 166.0	1
2	42 39.4 97 23 163.7	42 10.2 98 23 163.9	41 40.9 98 23 164.0	41 11.6 98 22 164.2	40 42.3 98 22 164.3	40 13.0 98 22 164.5	39 43.7 98 22 164.6	39 14.4 98 22 164.7	2
3	42 25.7 97 25 162.4	41 56.5 97 24 162.6	41 27.4 97 24 162.8	40 58.2 97 24 162.9	40 29.1 97 24 163.1	39 59.9 97 24 163.2	39 30.7 97 23 163.4	39 01.5 97 23 163.5	3
4	42 10.9 97 26 161.1	41 41.9 97 26 161.3	41 12.9 97 26 161.5	40 43.8 97 26 161.6	40 14.8 97 25 161.8	39 45.7 97 25 162.0	39 16.7 97 25 162.1	38 47.6 97 25 162.3	4
15	41 55.1 96 28 159.9	41 26.2 96 28 160.0	40 57.4 96 27 160.2	40 28.5 96 27 160.4	39 59.6 96 27 160.6	39 30.6 96 27 160.7	39 01.7 96 27 160.9	38 32.7 97 26 161.1	15
6	41 38.3 96 30 158.6	41 09.6 96 29 158.8	40 40.9 96 29 159.0	40 12.1 96 29 159.1	39 43.3 96 29 159.3	39 14.6 96 28 159.5	38 45.7 96 28 159.7	38 16.9 96 28 159.9	6
7	41 20.6 95 31 157.3	40 52.0 95 31 157.5	40 23.4 95 31 157.7	39 54.8 95 30 157.9	39 26.2 95 30 158.1	38 57.5 96 30 158.3	38 28.9 96 30 158.5	38 00.2 96 29 158.7	7
8	41 01.9 95 33 156.1	40 33.4 95 32 156.3	40 05.0 95 32 156.5	39 36.6 95 32 156.7	39 08.1 95 32 156.9	38 39.6 95 31 157.1	38 11.1 95 31 157.3	37 42.6 95 31 157.5	8
9	40 42.2 94 34 154.8	40 14.0 94 34 155.1	39 45.7 94 34 155.3	39 17.4 94 33 155.5	38 49.1 94 33 155.7	38 20.8 94 33 155.9	37 52.4 95 33 156.1	37 24.0 95 32 156.3	9
20	40 21.6 94 36 153.6	39 53.9 94 35 153.8	39 25.5 94 35 154.1	38 57.3 94 35 154.3	38 29.2 94 35 154.5	38 01.0 94 34 154.7	37 32.8 94 34 154.9	37 04.4 94 34 155.2	20
1	40 00.2 93 37 152.4	39 32.3 93 37 152.6	39 04.4 93 37 152.9	38 36.4 93 36 153.1	38 08.4 93 36 153.3	37 40.4 93 36 153.6	37 12.4 94 36 153.8	36 44.3 94 35 154.0	1
2	39 37.8 92 39 151.2	39 10.1 92 38 151.5	38 42.4 93 38 151.7	38 14.6 93 38 151.9	37 46.8 93 38 152.2	37 18.9 93 37 152.4	36 51.0 93 37 152.6	36 23.2 93 37 152.9	2
3	39 14.6 92 40 150.0	38 47.1 92 40 150.3	38 19.5 92 39 150.5	37 51.9 92 39 150.8	37 24.3 92 39 151.0	36 56.6 92 39 151.3	36 28.9 92 38 151.5	36 01.2 92 38 151.7	3
4	38 50.6 91 41 148.9	38 23.2 91 41 149.1	37 55.9 91 41 149.4	37 28.4 91 40 149.6	37 01.0 92 40 149.9	36 33.5 92 40 150.1	36 05.9 92 40 150.4	35 38.4 92 39 150.6	4
25	38 25.8 91 43 147.7	37 58.6 91 42 148.0	37 31.4 91 42 148.2	37 04.1 91 42 148.5	36 36.8 91 42 148.8	36 09.5 91 41 149.0	35 42.2 91 41 149.3	35 14.8 91 41 149.5	25
6	38 00.1 90 44 146.6	37 33.1 90 44 146.8	37 06.1 90 43 147.1	36 39.0 90 43 147.4	36 11.9 90 43 147.7	35 44.8 90 42 147.9	35 17.6 91 42 148.2	34 50.4 91 42 148.4	6
7	37 33.7 89 45 145.4	37 06.9 89 45 145.7	36 40.0 90 45 146.0	36 13.2 90 44 146.3	35 46.3 90 44 146.6	35 19.3 90 44 146.8	34 52.3 90 43 147.1	34 25.3 90 43 147.4	7
8	37 06.5 89 47 144.3	36 39.9 89 46 144.6	36 13.2 89 46 144.9	35 46.6 89 46 145.2	35 19.8 89 45 145.5	34 53.1 89 45 145.8	34 26.3 89 45 146.0	33 59.5 89 44 146.3	8
9	36 38.5 88 48 143.2	36 12.1 88 47 143.5	35 45.7 88 47 143.8	35 19.2 88 47 144.1	34 52.7 88 46 144.4	34 26.1 89 46 144.7	33 59.5 89 46 145.0	33 32.9 89 46 145.2	9
30	36 09.9 87 49 142.0	35 44.1 87 49 142.3	35 17.4 88 48 142.7	34 51.7 88 48 143.1	34 24.8 88 48 143.4	33 58.4 88 47 143.6	33 32.0 88 47 143.9	33 05.6 88 47 144.2	30
1	35 40.6 87 50 141.1	35 14.5 87 50 141.4	34 48.5 87 49 141.7	34 22.4 87 49 142.0	33 56.2 87 49 142.3	33 30.1 87 48 142.6	33 03.8 87 48 142.9	32 37.6 88 48 143.2	1
2	35 10.5 86 51 140.1	34 44.7 86 51 140.4	34 18.9 86 50 140.7	33 53.0 86 50 141.0	33 27.0 87 50 141.3	33 01.0 87 50 141.6	32 35.0 87 49 141.9	32 08.9 87 49 142.2	2
3	34 39.9 85 52 139.0	34 14.2 85 52 139.3	33 48.6 86 52 139.7	33 22.9 86 51 140.0	32 57.1 86 51 140.3	32 31.3 86 51 140.6	32 05.5 86 50 140.9	31 39.6 86 50 141.2	3
4	34 08.5 85 53 138.0	33 43.1 85 53 138.3	33 17.6 85 53 138.6	32 52.1 85 52 139.0	32 26.6 85 52 139.3	32 01.0 86 52 139.6	31 35.3 86 52 139.9	31 09.6 86 51 140.2	4
35	33 36.6 84 54 137.0	33 11.4 84 54 137.3	32 46.1 84 54 137.6	32 20.8 84 53 138.0	31 55.4 85 53 138.3	31 30.0 85 53 138.6	31 04.5 85 52 139.0	30 39.0 85 52 139.2	35
6	33 04.0 83 55 136.0	32 39.0 84 55 136.3	32 13.9 84 55 136.7	31 48.8 84 54 137.0	31 23.6 84 54 137.3	30 58.4 84 54 137.6	30 33.1 84 53 137.9	30 07.8 84 53 138.2	6
7	32 30.9 83 56 135.0	32 06.1 83 56 135.4	31 41.2 83 56 135.7	31 16.3 83 55 136.0	30 51.3 84 55 136.3	30 26.3 84 55 136.7	30 01.2 84 54 137.0	29 36.1 84 54 137.3	7
8	31 57.2 82 57 134.1	31 32.6 82 57 134.4	31 07.9 82 56 134.7	30 43.2 83 56 135.1	30 18.4 83 56 135.4	29 53.5 83 55 135.7	29 28.6 83 55 136.0	29 03.7 83 55 136.4	8
9	31 23.0 81 58 133.1	30 58.5 82 58 133.5	30 34.0 82 57 133.8	30 09.5 82 57 134.1	29 44.9 82 57 134.5	29 20.2 82 56 134.8	28 55.5 82 56 135.1	28 30.8 83 55 135.4	9
40	30 48.2 81 59 132.2	30 23.9 81 59 132.5	29 59.6 81 58 132.9	29 35.3 81 58 133.2	29 10.9 81 58 133.5	28 46.4 82 57 133.9	28 21.9 82 57 134.2	27 57.3 82 57 134.5	40
1	30 12.9 80 60 131.3	29 48.8 80 59 131.6	29 24.7 80 59 131.9	29 00.5 81 59 132.3	28 36.3 81 58 132.6	28 12.1 81 58 132.9	27 47.7 81 58 133.3	27 23.4 81 57 133.6	1
2	29 37.1 80 60 130.3	29 13.2 80 60 130.7	28 49.3 80 60 131.0	28 25.3 80 60 131.4	28 01.3 80 59 131.7	27 37.2 80 59 132.1	27 13.1 81 59 132.4	26 48.9 81 58 132.7	2
3	29 00.8 79 61 129.4	28 37.1 79 61 129.8	28 13.4 79 61 130.1	27 49.6 79 60 130.5	27 25.7 80 60 130.8	27 01.8 80 60 131.2	26 37.9 80 59 131.5	26 13.9 80 59 131.8	3
4	28 24.1 78 62 128.6	28 00.6 78 62 128.9	27 37.0 79 61 129.3	27 13.4 79 61 129.6	26 49.7 79 61 129.9	26 26.0 79 60 130.3	26 02.2 79 60 130.6	25 38.4 79 60 131.0	4
45	27 46.9 78 63 127.7	27 23.6 78 62 128.0	27 00.2 78 62 128.4	26 36.7 78 62 128.7	26 13.3 78 62 129.1	25 49.7 79 61 129.4	25 26.1 79 61 129.8	25 02.5 79 61 130.1	45
6	27 09.3 77 63 126.8	26 46.1 77 63 127.2	26 22.9 77 63 127.5	25 59.6 78 63 127.9	25 36.3 78 62 128.2	25 13.0 78 62 128.6	24 49.6 78 62 128.9	24 26.1 78 61 129.3	6
7	26 31.4 76 64 126.0	26 08.2 77 64 126.3	25 45.2 77 64 126.7	25 22.1 77 63 127.0	24 59.0 77 63 127.4	24 35.8 77 63 127.7	24 12.6 78 62 128.1	23 49.3 78 62 128.4	7
8	25 52.7 76 65 125.1	25 29.9 76 64 125.5	25 07.1 76 64 125.9	24 44.2 76 64 126.2	24 21.2 77 63 126.6	23 58.2 77 63 126.9	23 35.1 77 63 127.3	23 12.0 77 63 127.6	8
9	25 13.9 75 65 124.3	24 51.2 76 65 124.7	24 28.5 76 65 125.0	24 05.8 76 65 125.4	23 43.0 76 64 125.7	23 20.2 76 64 126.1	22 57.3 76 64 126.4	22 34.4 76 63 126.8	9
50	24 34.6 75 66 123.5	24 12.1 75 66 123.8	23 49.6 75 65 124.2	23 27.1 75 65 124.6	23 04.4 75 65 124.9	22 41.8 76 65 125.3	22 19.1 76 64 125.6	21 56.3 76 64 126.0	50
1	23 55.0 74 67 122.7	23 32.7 74 66 123.0	23 10.3 75 66 123.4	22 47.9 75 66 123.8	22 25.5 75 66 124.1	22 03.0 75 65 124.5	21 40.4 75 65 124.8	21 17.9 75 65 125.2	1
2	23 15.0 74 67 121.9	22 52.9 74 67 122.2	22 30.7 74 67 122.6	22 08.4 74 66 123.0	21 46.2 74 66 123.3	21 23.8 75 66 123.7	21 01.4 75 66 124.0	20 39.0 75 65 124.4	2
3	22 34.7 73 68 121.1	22 12.7 73 68 121.4	21 50.7 74 67 121.8	21 28.5 74 67 122.2	21 06.5 74 67 122.5	20 44.3 74 66 122.9	20 22.1 74 66 123.3	19 59.8 74 66 123.6	3
4	21 54.0 73 68 120.3	21 32.2 73 68 120.7	21 10.3 73 68 121.0	20 48.4 73 68 121.4	20 26.4 73 67 121.8	20 04.4 73 67 122.1	19 42.4 74 67 122.5	19 20.3 74 66 122.8	4
55	21 13.0 72 69 119.5	20 51.4 72 69 119.9	20 29.6 72 68 120.3	20 07.9 73 68 120.6	19 46.1 73 68 121.0	19 24.2 73 68 121.4	19 02.3 73 67 121.7	18 40.4 73 67 122.1	55
6	20 31.7 72 69 118.8	20 10.2 72 69 119.1	19 48.6 72 69 119.5	19 27.0 72 69 119.9	19 05.4 72 68 120.2	18 43.7 72 68 120.6	18 21.9 73 68 121.0	18 00.2 73 68 121.3	6
7	19 50.1 71 70 118.0	19 28.8 71 70 118.4	19 07.3 71 69 118.8	18 45.9 72 69 119.1	18 24.4 72 69 119.5	18 02.8 72 69 119.9	17 41.2 72 68 120.2	17 19.6 72 68 120.6	7
8	19 08.2 71 70 117.3	18 47.0 71 70 117.6	18 25.7 71 70 118.0	18 04.4 71 70 118.4	17 43.1 71 70 118.7	17 21.7 71 69 119.1	17 00.2 72 69 119.5	16 38.8 72 69 119.8	8
9	18 26.1 70 71 116.5	18 05.0 70 70 116.9	17 43.9 71 70 117.3	17 22.7 71 70 117.6	17 01.5 71 70 118.0	16 40.2 71 70 118.4	16 18.9 71 69 118.8	15 57.6 71 69 119.1	9
60	17 43.6 70 71 115.8	17 22.7 70 71 116.2	17 01.7 70 71 116.5	16 40.7 70 70 116.9	16 19.6 70 70 117.3	15 58.5 70 70 117.7	15 37.3 71 70 118.0	15 16.1 71 70 118.4	60
1	17 00.7 69 72 115.1	16 40.1 69 71 115.5	16 19.3 70 71 115.8	15 58.4 70 71 116.2	15 37.4 70 71 116.6	15 16.5 70 70 116.9	14 55.5 70 70 117.3	14 34.4 70 70 117.7	1
2	16 18.0 69 72 114.4	15 57.3 69 72 114.7	15 36.6 69 71 115.1	15 15.8 69 71 115.5	14 55.0 69 71 115.9	14 34.2 70 71 116.2	14 13.3 70 71 116.6	13 52.4 70 70 117.0	2
3	15 34.8 68 72 113.7	15 14.2 69 72 114.0	14 53.6 69 72 114.4	14 33.0 69 72 114.8	14 12.3 69 71 115.2	13 51.6 69 71 115.5	13 30.9 69 71 115.9	13 10.1 69 71 116.3	3
4	14 51.4 68 73 113.0	14 30.9 68 73 113.3	14 10.5 68 72 113.7	13 50.0 68 72 114.1	13 29.4 69 72 114.5	13 08.9 69 72 114.8	12 48.3 69 72 115.2	12 27.6 69 71 115.6	4
65	14 07.7 68 73 112.3	13 47.4 68 73 112.6	13 27.1 68 73 113.0	13 06.7 68 72 113.4	12 46.3 68 72 113.8	12 25.8 68 72 114.1	12 05.4 68 72 114.5	11 44.8 68 72 114.9	65
6	13 23.9 67 73 111.6	13 03.7 67 73 112.0	12 43.4 67 73 112.3	12 23.2 68 73 112.7	12 02.9 68 73 113.1	11 42.6 68 73 113.5	11 22.2 68 72 113.8	11 01.8 68 72 114.2	6
7	12 39.8 67 74 110.9	12 19.7 67 74 111.3	11 59.6 67 73 111.6	11 39.5 67 73 112.0	11 19.3 67 73 112.4	10 59.1 67 73 112.8	10 38.9 67 73 113.2	10 18.6 68 73 113.5	7
8	11 55.5 66 74 110.2	11 35.6 66 74 110.6	11 15.5 67 74 110.9	10 55.5 67 74 111.3	10 35.5 67 73 111.7	10 15.4 67 73 112.1	9 55.3 67 73 112.5	9 35.1 67 73 112.9	8
9	11 11.1 66 74 109.5	10 51.2 66 74 109.9	10 31.3 66 74 110.3	10 11.4 66 74 110.7	9 51.5 67 74 111.1	9 31.5 67 74 111.4	9 11.5 67 73 111.8	8 51.5 67 73 112.2	9
70	10 26.4 66 75 108.9	10 06.7 66 75 109.3	9 46.9 66 74 109.6	9 27.1 66 74 110.0	9 07.2 66 74 110.4	8 47.4 66 74 110.8	8 27.5 66 74 111.2	8 07.6 66 73 111.5	70
1	9 41.6 65 75 108.2	9 21.9 66 75 108.6	9 02.3 66 75 109.0	8 42.6 66 75 109.4	8 22.8 66 74 109.7	8 03.1 66 74 110.1	7 43.3 66 74 110.5	7 23.5 66 74 110.9	1
2	8 56.6 65 75 107.6	8 37.0 65 75 107.9	8 17.5 65 75 108.3	7 57.9 65 75 108.7	7 38.2 65 75 109.1	7 18.6 66 75 109.4	6 58.9 66 74 109.9	6 39.3 66 74 110.2	2
3	8 11.4 65 76 106.9	7 52.0 65 75 107.3	7 32.5 65 75 107.7	7 13.0 65 75 108.1	6 53.5 65 75 108.4	6 33.9 65 75 108.8	6 14.4 65 75 109.2	5 54.8 65 75 109.6	3
4	7 26.1 65 76 106.3	7 06.8 65 76 106.6	6 47.4 65 75 107.0	6 28.0 65 75 107.4	6 08.5 65 75 107.8	5 49.1 65 75 108.2	5 29.6 65 75 108.6	5 10.2 65 75 108.9	4
75	6 40.7 64 76 105.6	6 21.4 64 76 106.0	6 02.1 64 76 106.4	5 42.8 64 75 106.8	5 23.4 64 75 107.2	5 04.1 65 75 107.5			75
6	5 55.1 64 76 105.0	5 35.9 64 76 105.4	5 16.6 64 76 105.8						6
7	5 09.3 64 76 104.3								7

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00' Alt. Δd Δt Az.	8° 30' Alt. Δd Δt Az.	9° 00' Alt. Δd Δt Az.	9° 30' Alt. Δd Δt Az.	10° 00' Alt. Δd Δt Az.	10° 30' Alt. Δd Δt Az.	11° 00' Alt. Δd Δt Az.	11° 30' Alt. Δd Δt Az.	H.A.
91				5 03.1 61 78 81.9	5 21.4 61 78 81.5	5 39.8 61 78 81.1	5 58.1 61 78 80.7	6 16.4 61 78 80.3	91
2							5 11.5 61 78 80.1	5 29.8 61 77 79.7	2

Lat. 38°

H.A.	12° 00' Alt.	Δd Δt	Az.	12° 30' Alt.	Δd Δt	Az.	13° 00' Alt.	Δd Δt	Az.	13° 30' Alt.	Δd Δt	Az.	14° 00' Alt.	Δd Δt	Az.	14° 30' Alt.	Δd Δt	Az.	15° 00' Alt.	Δd Δt	Az.	15° 30' Alt.	Δd Δt	Az.	H.A.
00	64 00.9	1.02	180.0	64 30.0	1.02	180.0	65 00.0	1.02	180.0	65 30.0	1.02	180.0	66 00.0	1.02	180.0	66 30.0	1.02	180.0	67 00.0	1.02	180.0	67 30.0	1.02	180.0	00
1	63 59.1	1.05	177.8	64 29.1	1.05	177.7	64 59.0	1.05	177.7	65 29.0	1.05	177.7	65 59.0	1.05	177.6	66 29.0	1.05	177.6	66 59.0	1.05	177.5	67 29.0	1.05	177.5	1
2	63 56.3	1.08	175.5	64 26.3	1.08	175.5	64 56.2	1.08	175.4	65 26.1	1.08	175.3	65 56.1	1.08	175.2	66 26.0	1.08	175.2	66 55.9	1.08	175.1	67 25.8	1.09	175.0	2
3	63 51.7	1.11	173.3	64 21.6	1.11	173.3	64 51.5	1.11	172.9	65 21.3	1.11	172.9	65 51.2	99 11	172.6	66 21.0	99 12	172.6	66 50.8	99 12	172.5	67 20.7	99 12	172.5	3
4	63 45.3	99 14	171.1	64 15.1	99 14	171.0	64 44.9	99 14	170.7	65 14.6	99 14	170.7	65 44.3	99 15	170.5	66 14.1	99 15	170.4	66 43.8	99 15	170.2	67 13.5	99 15	170.0	4
05	63 37.2	99 17	168.9	64 06.8	99 17	168.8	64 36.4	99 17	168.6	65 06.0	99 17	168.4	65 35.6	99 18	168.2	66 05.2	99 18	168.0	66 34.7	98 18	167.8	67 04.3	98 19	167.6	05
6	63 27.2	98 19	166.8	63 56.7	98 20	166.6	64 26.1	98 20	166.3	64 55.6	98 20	166.1	65 25.0	98 21	165.9	65 54.4	98 21	165.6	66 23.8	98 21	165.4	66 53.1	98 22	165.1	6
7	63 15.5	98 22	164.6	63 44.8	98 23	164.4	64 14.1	98 23	164.1	64 43.3	97 23	163.9	65 12.6	97 24	163.6	65 41.8	97 24	163.3	66 10.9	97 24	163.1	66 40.0	97 25	162.8	7
8	63 02.2	97 25	162.5	63 31.3	97 25	162.3	64 00.3	97 26	162.0	64 29.4	97 26	161.7	64 58.3	97 27	161.4	65 27.2	97 27	161.1	65 56.2	96 27	160.7	66 25.0	96 28	160.4	8
9	62 47.2	96 28	160.5	63 16.0	96 28	160.2	63 44.9	96 29	159.8	64 13.6	96 29	159.5	64 42.4	96 29	159.2	65 11.1	96 30	158.8	65 39.8	95 30	158.5	66 08.3	95 31	158.1	9
10	62 30.5	96 30	158.4	62 59.2	95 31	158.1	63 27.8	95 31	157.7	63 56.3	95 32	157.4	64 24.8	95 32	157.0	64 53.2	95 33	156.7	65 21.6	94 33	156.3	65 49.9	94 34	155.9	10
1	62 12.4	95 33	156.4	62 40.8	94 33	156.1	63 09.1	94 34	155.7	63 37.3	94 34	155.3	64 05.5	94 35	154.9	64 33.7	94 35	154.5	65 01.7	93 36	154.1	65 29.7	93 36	153.7	1
2	61 52.7	94 35	154.4	62 20.8	94 36	154.1	62 48.8	93 36	153.3	63 16.8	93 37	153.3	63 44.7	93 37	152.9	64 12.6	93 38	152.4	64 40.3	92 38	151.5	65 08.0	92 39	151.5	2
3	61 31.6	93 38	152.5	61 59.4	93 38	152.1	62 27.2	92 38	151.7	62 54.8	92 39	151.3	63 22.4	92 40	150.9	63 49.9	92 40	150.4	64 17.4	91 41	149.9	64 44.7	91 41	149.5	3
4	61 09.1	92 40	150.6	61 36.6	92 40	150.2	62 04.1	91 41	149.8	62 31.4	91 41	149.3	62 58.7	91 42	148.9	63 25.9	90 42	148.4	63 53.0	90 43	147.9	64 20.0	90 44	147.4	4
15	60 45.2	91 42	148.8	61 12.5	91 42	148.4	61 39.6	90 43	147.9	62 06.6	90 43	147.5	62 33.6	90 44	147.0	63 00.4	89 45	146.5	63 27.2	89 45	146.0	63 53.8	89 46	145.5	15
6	60 20.1	90 44	147.0	60 47.0	90 44	146.5	61 13.8	89 45	146.1	61 40.6	89 46	145.6	62 07.2	89 46	145.1	62 33.7	88 47	144.6	63 00.1	88 47	144.1	63 26.4	87 48	143.6	6
7	59 53.7	89 46	145.2	60 20.3	89 46	144.8	60 46.8	88 47	144.3	61 13.2	88 48	143.8	61 39.5	87 48	143.2	62 05.7	87 49	142.6	62 31.8	87 49	142.0	62 57.7	86 50	141.3	7
8	59 26.2	88 48	143.5	59 52.5	87 48	143.1	60 18.7	87 49	142.6	60 44.7	87 49	142.1	61 10.7	86 50	141.5	61 36.6	86 50	141.0	62 02.2	85 51	140.5	62 27.8	85 52	139.9	8
9	58 57.6	87 50	141.9	59 23.5	86 50	141.4	59 49.4	86 51	140.9	60 15.1	86 51	140.4	60 40.7	85 52	139.8	61 06.2	85 52	139.3	61 31.6	84 53	138.7	61 56.8	84 53	138.2	9
20	58 27.8	86 51	140.2	58 53.5	85 52	139.7	59 19.0	85 52	139.2	59 44.4	84 53	138.7	60 09.7	84 53	138.2	60 34.9	84 54	137.6	60 59.9	83 54	137.0	61 24.7	83 55	136.5	20
1	57 57.1	85 53	138.7	58 22.4	84 53	138.1	58 47.6	84 54	137.6	59 12.7	83 54	137.1	59 37.7	83 55	136.5	60 02.5	82 56	136.0	60 27.2	82 56	135.4	60 51.7	81 57	134.8	1
2	57 25.4	84 54	137.1	57 50.4	83 55	136.6	58 15.3	83 55	136.1	58 40.1	82 56	135.5	59 04.7	82 56	134.9	59 29.2	81 57	134.4	59 53.5	81 58	133.8	60 17.7	80 58	133.2	2
3	56 52.7	83 56	135.6	57 17.5	82 56	135.1	57 42.1	82 57	134.6	58 06.5	81 57	134.0	58 30.8	81 58	133.5	58 55.0	80 58	132.9	59 19.0	80 59	132.3	59 42.8	79 60	131.7	3
4	56 19.2	82 57	134.2	56 43.7	81 58	133.6	57 07.9	81 58	133.1	57 32.1	80 59	132.5	57 56.1	80 59	132.0	58 19.9	79 60	131.4	58 43.6	79 60	130.8	59 07.1	78 61	130.2	4
25	55 44.9	81 58	132.7	56 09.0	80 59	132.2	56 33.0	80 60	131.7	56 56.8	79 60	131.1	57 20.5	79 60	130.5	57 44.1	78 61	130.0	58 07.4	78 62	129.4	58 30.6	77 62	128.8	25
6	55 09.8	80 60	131.4	55 33.6	79 60	130.8	55 57.3	79 61	130.3	56 20.8	78 61	129.7	56 44.2	78 62	129.1	57 07.4	77 62	128.6	57 30.5	77 63	128.0	57 53.4	76 63	127.4	6
7	54 34.0	79 61	130.0	54 57.5	78 61	129.5	55 20.9	78 62	128.9	55 44.1	77 62	128.4	56 07.2	77 63	127.8	56 30.1	76 63	127.2	56 52.9	75 64	126.6	57 15.5	75 64	126.0	7
8	53 57.4	78 62	128.7	54 20.6	77 62	128.2	54 43.8	77 63	127.6	55 06.7	76 63	127.0	55 29.5	76 64	126.5	55 52.2	75 64	125.9	56 14.6	75 65	125.3	56 36.9	74 65	124.7	8
9	53 20.2	77 63	127.4	53 43.1	76 64	126.9	54 06.0	76 64	126.3	54 28.7	75 64	125.8	54 51.2	75 65	125.2	55 13.5	74 65	124.6	55 35.7	74 66	124.0	55 57.8	73 66	123.4	9
30	52 42.3	76 64	126.2	53 05.0	75 65	125.6	53 27.6	75 65	125.1	53 50.0	74 65	124.5	54 12.3	74 66	124.0	54 34.3	73 66	123.4	54 56.3	73 67	122.8	55 18.0	72 67	122.2	30
1	52 03.9	75 65	125.0	52 26.3	75 66	124.4	52 48.6	74 66	123.9	53 10.8	74 66	123.3	53 32.8	73 67	122.7	53 54.6	72 67	122.2	54 16.2	72 68	121.6	54 37.7	71 68	121.0	1
2	51 24.8	74 66	123.8	51 47.0	74 66	123.2	52 09.1	73 67	122.7	52 31.0	73 67	122.1	52 52.7	72 68	121.6	53 14.3	72 68	121.0	53 35.7	71 68	120.4	53 56.9	70 69	119.8	2
3	50 45.3	73 67	122.6	51 07.2	73 67	122.1	51 29.1	72 68	121.6	51 50.7	72 68	121.0	52 12.2	71 68	120.4	52 33.5	71 69	119.8	52 54.7	70 69	119.3	53 15.7	70 70	118.7	3
4	50 05.2	73 68	121.5	50 26.9	72 68	121.0	50 48.5	72 68	120.4	51 09.9	71 69	119.9	51 31.2	71 69	119.3	51 52.3	70 69	118.7	52 13.2	69 70	118.2	52 34.0	69 70	117.6	4
35	49 24.7	72 68	120.4	49 46.2	71 69	119.9	50 07.5	71 69	119.3	50 28.7	70 69	118.8	50 49.8	70 70	118.2	51 10.6	69 70	117.7	51 31.3	69 70	117.1	51 51.9	68 71	116.5	35
6	48 43.7	71 69	119.4	49 05.0	71 70	118.8	49 26.1	70 70	118.3	49 47.1	70 70	117.7	50 07.9	69 70	117.2	50 28.6	69 71	116.6	50 49.0	68 71	116.1	51 09.4	67 71	115.4	6
7	48 02.3	70 70	118.3	48 23.3	70 70	117.8	48 44.3	69 70	117.2	49 05.0	69 71	116.7	49 25.6	68 71	116.1	49 46.1	68 71	115.6	50 06.4	67 72	115.0	50 26.5	67 72	114.4	7
8	47 20.4	70 70	117.3	47 41.3	69 71	116.8	48 02.0	69 71	116.2	48 22.6	68 71	115.7	48 43.0	68 72	115.1	49 03.3	67 72	114.6	49 23.3	67 72	114.0	49 43.3	66 73	113.4	8
9	46 38.2	69 71	116.3	46 58.9	69 71	115.8	47 19.4	68 72	115.2	47 39.8	68 72	114.7	48 00.0	67 72	114.1	48 20.1	67 73	113.6	48 40.0	66 73	113.0	48 59.7	65 73	112.4	9
40	45 55.7	69 72	115.3	46 16.2	68 72	114.8	46 36.5	68 72	114.3	46 56.7	67 72	113.7	47 16.7	67 73	113.2	47 36.6	66 73	112.6	47 56.3	65 74	112.1	48 15.7	65 74	111.5	40
1	45 12.8	68 72	114.4	45 33.1	67 72	113.9	45 53.2	67 73	113.3	46 13.2	66 73	112.8	46 33.1	66 73	112.2	46 52.8	65 74	111.7	47 12.4	65 74	111.1	47 31.7	64 74	110.6	1
2	44 29.5	67 73	113.4	44 49.7	67 73	112.9	45 09.7	66 73	112.4	45 29.5	66 73	111.9	45 49.2	65 74	111.3	46 08.7	65 74	110.8	46 28.1	64 74	110.2	46 47.3	64 74	109.7	2
3	43 46.0	67 73	112.5	44 06.0	66 73	112.0	44 25.8	66 74	111.5	44 45.5	65 74	110.9	45 05.0	65 74	110.4	45 24.4	64 74	109.9	45 43.6	64 75	109.3	46 02.7	63 75	108.8	3
4	43 02.2	66 73	111.6	43 22.0	66 74	111.1	43 41.7	65 74	110.6	44 01.2	65 74	110.1	44 20.6	64 74	109.5	44 39.8	64 75	109.0	44 58.9	63 75	108.4	45 17.8	63 75	107.9	4
45	42 18.1	66 74	110.7	42 37.8	65 74	110.2	42 57.3	65 74	109.7	43 16.7	64 75	109.2	43 35.9	64 75	108.7	43 55.0	63 75	108.1	44 13.9	63 75	107.6	44 32.7	62 76	107.0	45
6	41 33.8	65 74	109.9	41 53.3	65 75	109.4	42 12.7	64 75	108.9	42 31.9	64 75	108.3	42 51.0	63 75	107.8	43 09.9	63 76	107.3	43 28.8	62 76	106.8	43 47.4	62 76	106.2	6
7	40 49.2	65 75	109.0	41 08.6	64 75	108.5	41 27.8	64 75	108.0	41 46.9	63 75	107.5	42 05.9	63 76	107.0	42 24.7	62 76	106.5	42 43.4	62 76	105.9	43 01.9	61 76	105.4	7
8	40 04.4	64 75	108.2	40 23.6	64 75	107.7	40 42.7	63 75	107.2	41 01.7	63 76	106.7	41 20.6	63 76	106.2	41 39.3	62 76	105.6	41 57.8	62 76	105.1	42 16.2	61 76	104.6	8
9	39 19.4	64 75	107.4	39 38.5	64 76	106.9	39 57.5	63 76	106.4	40 16.4	63 76	105.9	40 35.1	62 76	105.4	40 53.8	62 76	104.9	41 12.1	61 76	104.3	41 30.4	61 77	103.8	9
50	38 34.1	64 76	106.6	38 53.1	63 76	106.1	39 12.0	63 76	105.6	39 30.8	62 76	105.1	39 49.4	62 76	104.6	40 07.9	61 77	104.1	40 26.2	61 77	103.5	40 44.4	60 77	103.0	50
1	37 48.7	63 76	105.8	38 07.6	63 76	105.3	38 26.4	62 76	104.8	38 45.0	62 76	104.3	39 03.6	61 77	103.8	39 21.9	61 77	103.3	39 40.2	61 77	102.8	39 58.3	60 77	102.3	1
2	37 03.2	63 76	105.0	37 21.9	62 76	104.5	37 40.6	62 77	104.0	37 59.2	62 77	103.5	38 17.6	61 77	103.0	38 35.8	61 77	102.5	38 54.0	60 77	102.0	39 12.0	60 77	101.5	2
3	36 17.4	62 76	104.3	36 36.1	62 77	103.8	36 54.7	62 77	103.3	37 13.1	61 77	102.8	37 31.4	61 77	102.3	37 49.6	60 77	101.8	38 07.7	60 77	101.3	38 25.6	60 78	100.8	3
4	35 31.5	62 77	103.5	35 50.1	62 77	103.0	36 08.6	61 77	102.6	36 26.9	61 77	102.1	36 45.2	60 77	101.6	37 03.3	60 77	101.1	37 21.3	60 78	100.6	37 39.1	59 78	100.1	4
55	34 45.5	62 77	102.8	35 04.0	61 77	102.3	35 22.4	61 77	101.8	35 40.6	61 77	101.3	35 58.8	60 77	100.8	36 16.8	60 78	100.3	36 34.7	59 78	99.8	36 52.5	59 78	99.3	55
6	33 59.3	62 77	102.0	34 17.7	61 77	101.6	34 36.0	61 78	101.1	34 54.2	60 78	100.6	35 12.3	60 78	100.1	35 30.3	59 78	99.6	35 48.1	59 78	99.1	36 05.8	59 78	98.6	6
7	33 13.0	61 77	101.3	33 31.3	61 77	100.8	33 49.6	61 78	100.4	34 07.7	60 78	99.9	34 25.7	60 78	99.4	34 43.6	59 78	98.9	35 01.4	59 78	98.4	35 19.0	58 79	97.9	7
8	32 26.6	61 78	100.6	32 44.8	61 78	100.1	33 03.0	60 78	99.7	33 21.1	60 78	99.2	33 39.0	59 78	98.7	33 56.8	59 78	98.2	34 14.6	59 78	97.7	34 32.2	58 78	97.2	8
9	31 40.1	61 78	99.9	31 58.3	60 78	99.4	32 16.4	60 78	98.9	32 34.3	60 78	98.5	32 52.2	59 78	98.0	33 10.0	59 78	97.5	33 27.7	58 78	97.0	33 45.2	58 79	96.6	9
60	30 53.4	61 78	99.2	31 11.6	60 78	98.7	31 29.6	60 78	98.3	31 47.5	60 78	97.8	32 05.4	59 78	97.3	32 23.1	59 78	96.9	32 40.7	58 79	96.4	32 58.2	58 79	95.9	60
1	30 06.7	60 78	98.5	30 24.8	60 78	98.1	30 42.8	59 78	97.6	31 00.7	59 78	97.1	31 18.4	59 78	96.7	31 36.1	58 79	96.2	31 53.7	58 79	95.7	32 11.2	58 79	95.2	1
2	29 19.9	60 78	97.8	29 37.9	60 78	97.4	29 55.9	59 78	96.9	30 13.7	59 78	96.5	30 31.4	58 79	96.0	30 49.1	58 79	95.5	31 06.6	58 79	95.0	31 24.1	58 79	94.6	2
3	28 33.0	60 78	97.2	28 51.0	60 78	96.7	29 08.9	59 78	96.2	29 26.7	59 78	95.8	29 44.4	58 79	95.3	30 02.0	58 79	94.8	30 19.5	58 79	94.4	30 36.9	58 79	93.9	3
4	27 46.1	60 78	96.5	28 04.0	60 78	96.0	28 21.9	59 78	95.6	28 39.6	59 79	95.1	28 57.3	58 79	94.7	29 14.9	58 79	94.2	29 32.3	58 79	93.7	29 49.7	58 79	93.3	4
65	26 59.1	60 78	95.8	27 17.0	60 78	95.4	27 34.8	59 79	94.9	27 52.5	59 79	94.5	28 10.2	59 79	94.0	28 27.7	58 79	93.6	28 45.1	58 79	93.1	29 02.5	58 79	92.6	65
6	26 12.0	60 78	95.2	26 29.9	59 79	94.7	26 47.7	59 79	94.3	27 05.4	59 79	93.8	27 23.0	59 79	93.4	27 40.5	58 79	92.9	27 57.9	58 79	92.5	28 15.3	58 79	92.0	6
7	25 24.9	60 78	94.5	25 42.7	59 79	94.1	26 00.5	59 79	93.6	26 18.2	59 79	93.2	26 35.8	58 79	92.7	26 53.3	58 79	92.3	27 10.7	58 79	91.8	27 28.0	58 79	91.4	7
8	24 37.8	59 79	93.9	24 55.6	59 79	93.5	25 13.3	59 79	93.0	25 31.0	59 79	92.6	25 48.5	58 79	92.1	26 05.9	58 79	91.7	26 23.4	58 79	91.2	26 40.7	58 79	90.7	8
9	23 50.6	59 79	93.3	24 08.4	59 79	92.8	24 26.1	59 79	92.4	24 43.7	59 79	91.9	25 01.3	58 79	91.5	25 18.7	58 79	91.0	25 36.1	58 79	90.6	25 53.4	58 79	90.1	9
70	23 03.4	59 79	92.6	23 21.1	59 79	92.2	23 38.8	59 79	91.7	23 56.4	59 79	91.3	24 14.0	58 79	90.9	24 31.5	58 79	90.4	24 48.9	58 79	90.0	25 06.2	58 79	89.5	70
1	22 16.1	59 79	92.0	22 33.9	59 79	91.6	22 51.6	59 79	91.1	23 09.2	59 79	90.7	23 26.7	58 79	90.2	23 44.2	58 79	89.8	24 01.6	58 79	89.4	24 18.9	58 79	88.9	1
2	21 28.9	59 79	91.4	21 46.6	59 79	90.9	22 04.3	59 79	90.5	22 21.9	59 79	90.1	22 39.4	58 79	89.6	22 56.9	58 79	89.2	23 14.3	58 79	88.7	23 31.6	58 79	88.3	2
3	20 41.6	59 79	90.7	20 59.3	59 79	90.3	21 17.0	59 79	89.9	21 34.6	58 79	89.4	21 52.2	58 79	89.0	22 09.5	58 79	88.5	22 27.0	58 79	88.1	22 44.2	58 79	87.7	3
4	19 54.3	59 79	90.1	20 12.0	59 79	89.7	20 29.7	59 79	89.3	20 47.3	59 79	88.8	21 04.9	58 79	88.4	21 22.4	58 79	88.0	21 39.8	58 79	87.5	21 57.1	58 79	87.1	4
75	19 07.0	59 79	89.5	19 24.8	59 79	89.1	19 42.5	59 79	88.7	20 00.1	59 79	88.2	20 17.6	58 79	87.8	20 35.1	58 79	87.4	20 52.6	58 79	86.9	21 09.9	58 79	86.5	75
6	18 19.7	59 79	88.9	18 37.5	59 79	88.5	18 55.2	59 79	88.1	19 12.8	59 79	87.6	19 30.4	58 79	87.2	19 47.9	58 79	86.8	20 05.4	58 79	86.3	20 22.8	58 79	85.9	6
7	17 32.5	59 79	88.3	17 50.2	59 79	87.9	18 07.9	59 79	87.4	18 25.6	59 79	87.0	18 43.2	59 79	86.6	19 00.7	58 79	86.2	19 18.2	58 79	85.7	19 35.6	58 78	85.3	7
8	16 45.2	59 79	87.7	17 03.0	59 79	87.3	17 20.7	59 79	86.8	17 38.4	59 79	86.4	17 56.0	59 79	86.0	18 13.6	58 79	85.6	18 31.1	58 78	85.1	18 48.5	58 78	84.7	8
9	15 58.0	59 79	87.1	16 15.8	59 79	86.7	16 33.5	59 79	86.2	16 51.2	59 79	85.8	17 08.9	59 79	85.4	17 26.4	58 79	85.0	17 44.0	58 78	84.5	18 01.5	58 78	84.1	9
80	15 10.8	59 79	86.5	15 28.6	59 79	86.1	15 46.4	59 79	85.6	16 04.1	59 79	85.2	16 21.8	59 79	84.8	16 39.4	59 78	84.4	16 56.9	58 78	84.0	17 14.4	58 78	83.5	80
1	14 23.6	60 79	85.9	14 41.5	59 79	85.5	14 59.2	59 78	85.0	15 17.0	59 78	84.6	15 34.7	59 78	84.2	15 52.3	59 78	83.8	16 09.9	58 78	83.4	16 27.5	58 78	82.9	1
2	13 36.4	60 79	85.3	13 54.3	59 78	84.9	14 12.2	59 78	84.4	14 29.9	59 78	84.0	14 47.7	59 78	83.6	15 05.4	59 78	83.2	15 23.0	58 78	82.8	15 40.6	58 78	82.3	2
3	12 49.4	60 79	84.7	13 07.3	60 78	84.3	13 25.1	59 78	83.9	13 42.9	59 78	83.4	14 00.7	59 78	83.0	14 18.4	59 78	82.6	14 36.1	59 78	82.2	14 53.6	58 78	81.8	3
4	12 02.3	60 79	84.1	12 20.3	60 78	83.7	12 38.1	60 78	83.3	12 56.0	59 78	82.8	13 13.8	59 78	82.4	13 31.6	59 78	82.0	13 49.3	59 78	81.6	14 07.0	59 78	81.2	4
85	11 15.3	60 78	83.5	11 33.3	60 78	83.1	11 51.2	60 78	82.7	12 09.1	60 78	82.3	12 27.0	59 78	81.8	12 44.8	59 78	81.4	13 02.6	59 78	81.0	13 20.3	59 78	80.6	85
6	10 28.4	60 78	82.9	10 46.4	60 78	82.5	11 04.4	60 78	82.1	11 22.3	60 78	81.7	11 40.2	60 78	81.3	11 58.1	60 78	80.8	12 15.9	59 78	80.4	12 33.7	59 78	80.0	6
7	9 41.5	60 78	82.3	9 59.5	60 78	81.9	10 17.6	60 78	81.5	10 35.6	60 78	81.1	10 53.5	60 78	80.7	11 11.4	60 78	80.3	11 29.3	60 78	79.8	11 47.2	59 78	79.4	7
8	8 54.7	61 78	81.7	9 12.8	60 78	81.3	9 30.8	60 78	80.9	9 48.9	60 78	80.5	10 06.9	60 78	80.1	10 24.9	60 77	79.7	10 42.8	60 77	79.3	11 00.8	60 77	78.8	8
9	8 07.9	61 78	81.1	8 26.1	60 78	80.7	8 44.2	60 78	80.3	9 02.3	60 78	79.9	9 20.4	60 77	79.5	9 38.4	60 77	79.1	9 56.4	60 77	78.7	10 14.4	60 77	78.3	9
90	7 21.3	61 78	80.5	7 39.5	61 78	80.1	7 57.6	61 77	79.7	8 15.8	60 77	79.3	8 33.9	60 77	78.9	8 52.0	60 77	78.5	9 10.1	60 77	78.1	9 28.2	60 77	77.7	90

Each declination cell is given as: Alt (° ′) · Δd Δt · Az (°)

H.A.	12° 00′	12° 30′	13° 00′	13° 30′	14° 00′	14° 30′	15° 00′	15° 30′	H.A.
00	40 00.0 1.0 01 180.0	39 30.0 1.0 01 180.0	39 00.0 1.0 01 180.0	38 30.0 1.0 01 180.0	38 00.0 1.0 01 180.0	37 30.0 1.0 01 180.0	37 00.0 1.0 01 180.0	36 30.0 1.0 01 180.0	00
1	39 59.5 1.0 03 178.7	39 29.5 1.0 03 178.7	38 59.5 1.0 03 178.7	38 29.5 1.0 03 178.8	37 59.5 1.0 03 178.8	37 29.5 1.0 03 178.8	36 59.5 1.0 02 178.8	36 29.5 1.0 02 178.8	1
2	39 57.9 1.0 04 177.4	39 27.9 1.0 04 177.5	38 57.9 1.0 04 177.5	38 28.0 1.0 04 177.5	37 58.0 1.0 04 177.5	37 28.0 1.0 04 177.6	36 58.0 1.0 04 177.6	36 28.0 1.0 04 177.6	2
3	39 55.3 1.0 06 176.2	39 25.3 1.0 06 176.2	38 55.3 1.0 06 176.3	38 25.4 1.0 06 176.3	37 55.4 1.0 06 176.3	37 25.5 1.0 06 176.3	36 55.5 1.0 06 176.4	36 25.6 1.0 05 176.4	3
4	39 51.6 1.0 08 174.9	39 21.7 1.0 08 174.9	38 51.7 1.0 08 175.0	38 21.8 1.0 08 175.0	37 51.9 1.0 08 175.1	37 22.0 1.0 08 175.1	36 52.0 1.0 07 175.2	36 22.1 1.0 07 175.2	4
05	39 46.9 1.0 10 173.6	39 17.0 1.0 10 173.7	38 47.1 1.0 09 173.7	38 17.2 1.0 09 173.8	37 47.3 1.0 09 173.9	37 17.4 1.0 09 173.9	36 47.5 1.0 09 174.0	36 17.7 1.0 09 174.0	05
6	39 41.1 99 11 172.4	39 11.3 99 11 172.4	38 41.4 99 11 172.5	38 11.6 99 11 172.6	37 41.8 99 11 172.6	37 11.9 99 11 172.7	36 42.1 99 11 172.8	36 12.2 99 11 172.8	6
7	39 34.3 99 13 171.1	39 04.5 99 13 171.2	38 34.8 99 13 171.3	38 05.0 99 13 171.3	37 35.2 99 13 171.4	37 05.4 99 12 171.5	36 35.6 99 12 171.6	36 05.9 99 12 171.6	7
8	39 26.5 99 15 169.8	38 56.8 99 15 169.9	38 27.1 99 14 170.0	37 57.4 99 14 170.1	37 27.7 99 14 170.2	36 57.9 99 14 170.3	36 28.2 99 14 170.4	35 58.5 99 14 170.5	8
9	39 17.6 99 16 168.6	38 48.0 99 16 168.7	38 18.4 99 16 168.8	37 48.8 99 16 168.9	37 19.1 99 16 169.0	36 49.5 99 16 169.1	36 19.8 99 16 169.2	35 50.2 99 15 169.3	9
10	39 07.8 98 18 167.4	38 38.2 98 18 167.5	38 08.7 98 18 167.6	37 39.2 98 18 167.7	37 09.6 99 17 167.8	36 40.1 99 17 167.9	36 10.5 99 17 168.0	35 40.9 99 17 168.1	10
1	38 56.9 98 20 166.1	38 27.5 98 20 166.2	37 58.0 98 19 166.4	37 28.6 98 19 166.5	36 59.1 98 19 166.6	36 29.7 98 19 166.7	36 00.2 98 19 166.8	35 30.7 98 19 166.9	1
2	38 45.1 98 21 164.9	38 15.8 98 21 165.0	37 46.4 98 21 165.1	37 17.1 98 21 165.3	36 47.7 98 21 165.4	36 18.3 98 20 165.5	35 49.0 98 20 165.7	35 19.6 98 20 165.8	2
3	38 32.3 97 23 163.7	38 03.0 97 23 163.8	37 33.8 97 23 163.9	37 04.6 98 22 164.1	36 35.3 98 22 164.2	36 06.0 98 22 164.4	35 36.8 98 22 164.5	35 07.5 98 22 164.6	3
4	38 18.5 97 25 162.4	37 49.4 97 24 162.6	37 20.3 97 24 162.8	36 51.1 97 24 162.9	36 22.0 97 24 163.1	35 52.8 97 24 163.2	35 23.7 97 23 163.3	34 54.5 97 23 163.5	4
15	38 03.8 97 26 161.2	37 34.8 97 26 161.4	37 05.8 97 26 161.6	36 36.8 97 25 161.7	36 07.8 97 25 161.9	35 38.7 97 25 162.0	35 09.7 97 25 162.2	34 40.6 97 23 162.3	15
6	37 48.1 96 28 160.0	37 19.2 96 27 160.2	36 50.4 96 27 160.4	36 21.5 96 27 160.6	35 52.6 96 27 160.7	35 23.7 96 27 160.9	34 54.8 96 26 161.1	34 25.8 96 26 161.2	6
7	37 31.5 96 29 158.9	37 02.8 96 29 159.0	36 34.1 96 29 159.2	36 05.3 96 28 159.4	35 36.5 96 28 159.6	35 07.8 96 28 159.8	34 39.0 96 28 159.9	34 10.2 96 28 160.1	7
8	37 14.0 95 31 157.9	36 45.4 95 30 157.9	36 16.8 95 30 158.1	35 48.2 95 30 158.3	35 19.6 95 30 158.5	34 51.0 95 29 158.7	34 22.3 96 29 158.8	33 53.6 96 29 159.0	8
9	36 55.6 95 32 156.5	36 27.2 95 32 156.7	35 58.7 95 32 156.9	35 30.3 95 31 157.1	35 01.8 95 31 157.3	34 33.3 95 31 157.5	34 04.8 95 31 157.7	33 36.2 95 30 157.9	9
20	36 36.3 94 34 155.4	36 08.1 94 33 155.6	35 39.8 94 33 155.8	35 11.5 94 33 156.0	34 43.1 94 32 156.2	34 14.8 95 32 156.4	33 46.4 95 32 156.6	33 18.0 95 32 156.8	20
1	36 16.2 94 35 154.2	35 48.1 94 35 154.4	35 20.0 94 34 154.7	34 51.8 94 34 154.9	34 23.6 94 34 155.1	33 55.4 94 34 155.3	33 27.2 94 33 155.5	32 59.0 94 33 155.7	1
2	35 55.2 93 36 153.1	35 27.3 93 36 153.3	34 59.3 93 36 153.5	34 31.3 93 36 153.8	34 03.3 93 35 154.0	33 35.2 94 35 154.2	33 07.2 94 35 154.4	32 39.1 94 34 154.6	2
3	35 33.4 93 38 152.0	35 05.6 93 37 152.2	34 37.8 93 37 152.4	34 10.0 93 37 152.7	33 42.1 93 37 152.9	33 14.3 93 36 153.1	32 46.4 93 36 153.3	32 18.4 93 36 153.5	3
4	35 10.8 92 39 150.9	34 43.2 92 39 151.1	34 15.6 92 38 151.3	33 47.9 92 38 151.6	33 20.2 92 38 151.8	32 52.5 92 38 152.0	32 24.7 93 37 152.3	31 57.0 93 37 152.5	4
25	34 47.4 91 40 149.8	34 20.0 92 40 150.0	33 52.5 92 40 150.3	33 25.0 92 39 150.5	32 57.5 92 39 150.7	32 29.9 92 39 151.0	32 02.4 92 39 151.2	31 34.8 92 38 151.4	25
6	34 23.2 91 42 148.7	33 56.0 91 41 148.9	33 28.7 91 41 149.2	33 01.3 91 41 149.4	32 34.0 91 40 149.7	32 06.6 91 40 149.9	31 39.2 91 40 150.2	31 11.8 91 40 150.4	6
7	33 58.3 90 43 147.6	33 31.2 90 43 147.9	33 04.1 90 42 148.1	32 36.9 91 42 148.4	32 09.8 91 42 148.6	31 42.6 91 41 148.9	31 15.3 91 41 149.1	30 48.1 91 41 149.4	7
8	33 32.6 90 44 146.6	33 05.7 90 44 146.8	32 38.8 90 43 147.1	32 11.8 90 43 147.4	31 44.8 90 43 147.6	31 17.8 90 42 147.9	30 50.7 90 42 148.1	30 23.6 90 42 148.4	8
9	33 06.2 89 45 145.5	32 39.5 89 45 145.8	32 12.7 89 45 146.1	31 45.9 89 44 146.3	31 19.1 89 44 146.6	30 52.3 90 44 146.8	30 25.4 90 43 147.1	29 58.5 90 43 147.4	9
30	32 39.1 88 46 144.5	32 12.5 88 46 144.8	31 46.0 89 46 145.0	31 19.4 89 45 145.3	30 52.7 89 45 145.6	30 26.1 89 45 145.8	29 59.4 89 44 146.1	29 32.6 89 44 146.4	30
1	32 11.3 88 47 143.5	31 44.9 88 47 143.8	31 18.5 88 47 144.0	30 52.1 88 47 144.3	30 25.7 88 46 144.6	29 59.2 88 46 144.9	29 32.7 88 46 145.1	29 06.1 88 45 145.4	1
2	31 42.8 87 49 142.5	31 16.6 87 48 142.7	30 50.4 87 48 143.0	30 24.2 87 48 143.3	29 57.9 88 48 143.6	29 31.6 88 47 143.8	29 05.3 88 47 144.1	28 38.7 88 47 144.4	2
3	31 13.6 86 50 141.5	30 47.7 87 49 141.8	30 21.7 87 49 142.0	29 55.6 87 49 142.3	29 29.5 87 48 142.6	29 03.4 87 48 142.9	28 37.3 87 48 143.2	28 11.1 87 47 143.5	3
4	30 43.9 86 51 140.5	30 18.1 86 50 140.8	29 52.3 86 50 141.1	29 26.4 86 50 141.4	29 00.5 86 49 141.7	28 34.6 86 49 141.9	28 08.6 87 49 142.2	27 42.6 87 48 142.5	4
35	30 13.5 85 52 139.5	29 47.9 85 51 139.8	29 22.3 85 51 140.1	28 56.6 86 51 140.4	28 30.9 86 50 140.7	28 05.1 86 50 141.0	27 39.4 86 50 141.3	27 13.5 86 49 141.6	35
6	29 42.5 85 53 138.6	29 17.1 85 52 138.9	28 51.6 85 52 139.2	28 26.2 85 52 139.5	28 00.6 85 51 139.8	27 35.1 85 51 140.1	27 09.5 85 51 140.3	26 43.8 86 50 140.6	6
7	29 10.9 84 54 137.6	28 45.7 84 53 137.9	28 20.4 84 53 138.2	27 55.1 84 53 138.5	27 29.8 85 52 138.8	27 04.4 85 52 139.2	26 39.0 85 52 139.4	26 13.4 85 51 139.7	7
8	28 38.7 84 55 136.7	28 13.7 83 54 137.0	27 48.6 84 54 137.3	27 23.5 84 54 137.6	26 58.4 84 53 137.9	26 33.2 84 53 138.2	26 08.0 84 53 138.5	25 42.7 84 52 138.8	8
9	28 06.0 83 55 135.7	27 41.2 83 55 136.1	27 16.3 83 55 136.4	26 51.4 83 54 136.7	26 26.4 83 54 137.0	26 01.4 84 54 137.3	25 36.4 84 54 137.6	25 11.3 84 53 137.9	9
40	27 32.7 82 56 134.8	27 08.1 82 56 135.2	26 43.4 82 56 135.5	26 18.7 83 55 135.8	25 53.9 83 55 136.1	25 29.1 83 55 136.4	25 04.3 83 54 136.7	24 39.4 83 54 137.0	40
1	26 59.0 81 57 133.9	26 34.5 82 57 134.3	26 10.0 82 57 134.6	25 45.5 82 56 134.9	25 20.9 82 56 135.2	24 56.2 82 56 135.5	24 31.6 82 55 135.8	24 06.9 82 55 136.2	1
2	26 24.7 81 58 133.0	26 00.4 81 58 133.4	25 36.1 81 57 133.7	25 11.7 81 57 134.0	24 47.3 81 57 134.3	24 22.9 82 56 134.7	23 58.4 82 56 135.0	23 33.9 82 56 135.3	2
3	25 49.9 80 59 132.2	25 25.8 80 58 132.5	25 01.6 81 58 132.8	24 37.5 81 58 133.2	24 13.2 81 58 133.5	23 49.0 81 57 133.8	23 24.7 81 57 134.1	23 00.4 81 57 134.4	3
4	25 14.6 80 60 131.3	24 50.7 80 59 131.6	24 26.7 80 59 132.0	24 02.7 80 59 132.3	23 38.7 80 58 132.6	23 14.6 80 58 133.0	22 50.5 80 58 133.3	22 26.4 81 57 133.6	4
45	24 38.8 79 60 130.4	24 15.1 79 60 130.8	23 51.3 79 60 131.1	23 27.5 79 59 131.5	23 03.7 80 59 131.8	22 39.8 80 59 132.1	22 15.8 80 59 132.4	21 51.9 80 58 132.8	45
6	24 02.6 78 61 129.6	23 39.1 79 61 129.9	23 15.5 79 60 130.3	22 51.9 79 60 130.6	22 28.2 79 60 130.9	22 04.5 79 60 131.3	21 40.7 79 59 131.6	21 16.9 79 59 131.9	6
7	23 26.0 78 62 128.8	23 02.6 78 62 129.1	22 39.2 78 61 129.4	22 15.7 78 61 129.8	21 52.1 78 61 130.1	21 28.7 79 61 130.5	21 05.1 79 60 130.8	20 41.2 79 60 131.1	7
8	22 48.9 77 62 127.9	22 25.7 77 62 128.3	22 02.5 78 62 128.6	21 39.2 78 62 129.0	21 15.9 78 61 129.3	20 52.5 78 61 129.6	20 29.1 78 61 130.0	20 05.7 78 60 130.3	8
9	22 11.4 77 63 127.1	21 48.4 77 63 127.5	21 25.3 77 63 127.8	21 02.2 77 62 128.2	20 39.1 77 62 128.5	20 15.9 77 62 128.8	19 52.7 77 61 129.2	19 29.4 78 61 129.5	9
50	21 33.5 76 64 126.3	21 10.7 76 64 126.7	20 47.8 76 63 127.0	20 24.9 76 63 127.4	20 01.9 77 63 127.7	19 38.9 77 62 128.0	19 15.8 77 62 128.4	18 52.7 77 62 128.7	50
1	20 55.2 76 64 125.5	20 32.6 76 64 125.9	20 09.8 76 64 126.2	19 47.1 76 64 126.6	19 24.3 76 63 126.9	19 01.4 76 63 127.3	18 38.6 76 63 127.6	18 15.7 76 62 127.9	1
2	20 16.6 75 65 124.7	19 54.1 75 65 125.1	19 31.5 75 64 125.5	19 08.9 75 64 125.8	18 46.3 76 64 126.1	18 23.6 76 64 126.5	18 00.9 76 63 126.8	17 38.2 76 63 127.2	2
3	19 37.5 74 66 124.0	19 15.2 75 65 124.3	18 52.8 75 65 124.7	18 30.4 75 65 125.0	18 07.9 75 65 125.4	17 45.4 75 64 125.7	17 22.9 75 64 126.1	17 00.3 75 64 126.4	3
4	18 58.1 74 66 123.2	18 36.0 74 66 123.6	18 13.7 74 66 123.9	17 51.5 74 65 124.3	17 29.2 74 65 124.6	17 06.9 75 65 125.0	16 44.5 75 65 125.3	16 22.1 75 64 125.7	4
55	18 18.4 73 67 122.4	17 56.4 73 66 122.8	17 34.3 74 66 123.2	17 12.2 74 66 123.5	16 50.1 74 66 123.9	16 27.9 74 65 124.2	16 05.7 74 65 124.6	15 43.5 74 65 124.9	55
6	17 38.3 73 67 121.6	17 16.5 73 67 122.0	16 54.6 73 67 122.4	16 32.6 73 67 122.8	16 10.7 73 66 123.1	15 48.7 73 66 123.5	15 26.6 74 66 123.8	15 04.5 74 66 124.2	6
7	16 57.9 72 68 120.9	16 36.2 72 68 121.3	16 14.5 73 67 121.7	15 52.7 73 67 122.0	15 30.9 73 67 122.4	15 09.1 73 67 122.7	14 47.2 73 66 123.1	14 25.3 73 66 123.4	7
8	16 17.2 72 68 120.2	15 55.7 72 68 120.6	15 34.1 72 68 120.9	15 12.5 72 68 121.3	14 50.8 72 67 121.6	14 29.1 72 67 122.0	14 07.4 72 67 122.4	13 45.6 73 67 122.7	8
9	15 36.2 71 69 119.5	15 14.8 71 69 119.8	14 53.4 72 68 120.2	14 31.9 72 68 120.6	14 10.4 72 68 120.9	13 48.9 72 68 121.3	13 27.3 72 67 121.6	13 05.7 72 67 122.0	9
60	14 54.9 71 69 118.8	14 33.7 71 69 119.1	14 12.4 71 69 119.5	13 51.1 71 69 119.9	13 29.7 71 68 120.2	13 08.3 71 68 120.6	12 46.9 71 68 120.9	12 25.4 72 68 121.3	60
1	14 13.3 70 70 118.0	13 52.2 70 70 118.4	13 31.1 71 69 118.8	13 09.9 71 69 119.2	12 48.7 71 69 119.5	12 27.5 71 69 119.9	12 06.2 71 68 120.2	11 44.9 71 68 120.6	1
2	13 31.5 70 70 117.3	13 10.5 70 70 117.7	12 49.5 70 70 118.1	12 28.5 70 70 118.4	12 07.4 70 69 118.8	11 46.3 70 69 119.2	11 25.2 70 69 119.5	11 04.1 71 69 119.9	2
3	12 49.3 69 71 116.6	12 28.5 69 70 117.0	12 07.6 70 70 117.4	11 46.8 70 70 117.7	11 25.8 70 70 118.1	11 04.9 70 69 118.5	10 43.9 70 69 118.8	10 22.9 70 69 119.2	3
4	12 07.0 69 71 115.9	11 46.3 69 71 116.3	11 25.5 69 71 116.7	11 04.8 69 70 117.1	10 44.0 70 70 117.4	10 23.2 70 70 117.8	10 02.4 70 69 118.2	9 41.5 70 69 118.5	4
65	11 24.5 68 71 115.3	11 03.8 69 71 115.6	10 43.2 69 71 116.0	10 22.5 69 71 116.4	10 01.9 69 71 116.7	9 41.2 69 70 117.1	9 20.5 69 70 117.5	8 59.8 69 70 117.8	65
6	10 41.4 68 72 114.6	10 21.0 68 72 115.0	10 00.5 69 71 115.3	9 40.1 69 71 115.7	9 19.6 69 71 116.1	8 59.0 69 71 116.4	8 38.5 69 71 116.8	8 17.9 69 70 117.2	6
7	9 58.3 68 72 113.9	9 38.0 68 72 114.3	9 17.7 68 72 114.7	8 57.3 68 72 115.0	8 37.0 68 71 115.4	8 16.6 68 71 115.8	7 56.1 68 71 116.1	7 35.7 68 71 116.5	7
8	9 15.0 67 73 113.2	8 54.8 67 72 113.6	8 34.6 67 72 114.0	8 14.4 67 72 114.4	7 54.1 68 72 114.7	7 33.9 68 72 115.1	7 13.6 68 71 115.5	6 53.3 68 71 115.8	8
9	8 31.4 67 73 112.6	8 11.4 67 73 113.0	7 51.3 67 73 113.3	7 31.2 67 72 113.7	7 11.1 67 72 114.1	6 50.9 67 72 114.4	6 30.8 67 72 114.8	6 10.6 67 72 115.2	9
70	7 47.7 66 73 111.9	7 27.7 67 73 112.3	7 07.8 67 73 112.7	6 47.8 67 73 113.0	6 27.8 67 72 113.4	6 07.8 67 72 113.8	5 47.8 67 72 114.2	5 27.7 67 72 114.5	70
1	7 03.8 66 73 111.3	6 43.9 66 73 111.6	6 24.0 66 73 112.0	6 04.2 66 73 112.4	5 44.3 66 73 112.8	5 24.4 66 73 113.1	5 04.5 66 72 113.5		1
2	6 19.6 66 74 110.6	5 59.8 66 74 111.0	5 40.1 66 74 111.4	5 20.4 66 73 111.8	5 00.6 66 73 112.1				2
3	5 35.2 65 74 110.0	5 15.6 65 74 110.4							3

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′	12° 30′	13° 00′	13° 30′	14° 00′	14° 30′	15° 00′	15° 30′	H.A.
91	6 34.7 61 78 79.9	6 52.9 61 77 79.5	7 11.2 61 77 79.1	7 29.4 61 77 78.7	7 47.6 61 77 78.3	8 05.8 61 77 77.9	8 23.9 60 77 77.5	8 42.1 60 77 77.1	91
2	5 48.2 61 77 79.3	6 06.5 61 77 78.9	6 24.8 61 77 78.5	6 43.1 61 77 78.1	7 01.3 61 77 77.7	7 19.6 61 77 77.3	7 37.8 61 77 76.9	7 56.0 61 77 76.5	2
3	5 01.8 61 77 78.7	5 20.1 61 77 78.3	5 38.5 61 77 77.9	5 56.9 61 77 77.5	6 15.2 61 77 77.1	6 33.5 61 77 76.7	6 51.8 61 76 76.3	7 10.1 61 76 75.9	3
4			5 10.8 61 77 76.9	5 29.2 61 77 76.5	5 47.6 61 76 76.1	6 05.9 61 76 75.7	6 24.3 61 76 75.3		4
95					5 01.7 62 76 75.5	5 20.2 62 76 75.1	5 38.6 61 76 74.7		95

10—65152—1

Lat. 38°

H.A.	16° 00' Alt.	Δd Δt	Az.	16° 30' Alt.	Δd Δt	Az.	17° 00' Alt.	Δd Δt	Az.	17° 30' Alt.	Δd Δt	Az.	18° 00' Alt.	Δd Δt	Az.	18° 30' Alt.	Δd Δt	Az.	19° 00' Alt.	Δd Δt	Az.	19° 30' Alt.	Δd Δt	Az.	H.A.
00	68 00.0	1.0 02	180.0	68 30.9	1.0 02	180.0	69 00.0	1.0 02	180.0	69 30.0	1.0 02	180.0	70 00.0	1.0 02	180.0	70 30.0	1.0 02	180.0	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	00
1	67 58.9	1.0 05	177.4	68 28.9	1.0 05	177.3	68 58.9	1.0 06	177.3	69 28.9	1.0 06	177.3	69 58.9	1.0 06	177.2	70 28.8	1.0 06	177.1	70 58.8	1.0 06	177.1	71 28.8	1.0 06	177.1	1
2	67 55.8	1.0 09	174.9	68 25.7	1.0 09	174.8	68 55.6	1.0 09	174.7	69 25.5	1.0 09	174.6	69 55.4	1.0 10	174.5	70 25.3	1.0 10	174.3	70 55.2	1.0 10	174.2	71 25.1	1.0 10	174.1	2
3	67 50.5	99 12	172.3	68 20.3	99 12	172.2	68 50.1	99 13	172.0	69 19.9	99 13	171.9	69 49.7	99 13	171.7	70 19.5	99 14	171.5	70 49.3	99 14	171.3	71 19.0	99 14	171.1	3
4	67 43.2	99 16	169.8	68 12.8	99 16	169.6	68 42.5	99 16	169.4	69 12.2	99 17	169.2	69 41.8	99 17	169.0	70 11.4	99 17	168.7	70 41.0	99 18	168.5	71 10.6	99 18	168.2	4
05	67 33.8	98 19	167.3	68 03.3	98 20	167.1	68 32.8	98 20	166.8	69 02.2	98 20	166.6	69 31.7	98 20	166.3	70 01.1	98 21	166.0	70 30.4	98 21	165.7	70 59.8	98 22	165.4	05
6	67 22.4	98 22	164.9	67 51.7	98 23	164.6	68 21.0	98 23	164.3	68 50.2	98 23	164.0	69 19.4	98 24	163.7	69 48.5	98 24	163.3	70 17.7	98 25	163.0	70 46.7	98 25	162.6	6
7	67 09.1	97 25	162.4	67 38.2	97 26	162.1	68 07.2	97 26	161.8	68 36.1	96 27	161.4	69 05.1	96 27	161.1	69 33.9	96 28	160.7	70 02.7	96 28	160.3	70 31.5	96 29	159.8	7
8	66 53.9	96 28	160.1	67 22.7	96 29	159.7	67 51.4	96 29	159.3	68 20.1	95 30	158.9	68 48.7	95 30	158.5	69 17.3	95 31	158.1	69 45.8	95 32	157.6	70 14.2	95 32	157.2	8
9	66 36.9	95 31	157.7	67 05.4	95 32	157.3	67 33.8	95 32	156.9	68 02.2	94 33	156.5	68 30.5	94 34	156.0	68 58.7	94 34	155.6	69 26.8	94 35	155.1	69 54.8	93 35	154.6	9
10	66 18.1	94 34	155.5	66 46.3	94 35	155.0	67 14.4	94 35	154.6	67 42.4	93 36	154.1	68 10.3	93 36	153.6	68 38.2	93 37	153.1	69 06.0	92 38	152.6	69 33.6	92 38	152.0	10
1	65 57.6	93 37	153.2	66 25.5	93 37	152.8	66 53.2	92 38	152.3	67 20.9	92 39	151.8	67 48.5	92 39	151.3	68 15.9	91 40	150.7	68 43.3	91 41	150.2	69 10.6	91 41	149.6	1
2	65 35.6	92 39	151.1	66 03.1	91 40	150.6	66 30.5	91 41	150.1	66 57.8	91 41	149.6	67 24.9	90 42	149.0	67 52.0	90 43	148.4	68 19.0	90 43	147.9	68 45.8	89 44	147.2	2
3	65 11.9	91 42	149.0	65 39.1	90 42	148.5	66 06.1	90 43	147.9	66 33.0	90 44	147.4	66 59.8	89 44	146.8	67 26.5	89 45	146.2	67 53.0	88 46	145.6	68 19.4	88 46	145.0	3
4	64 46.8	89 44	146.9	65 13.6	89 45	146.4	65 40.3	89 45	145.8	66 06.8	88 46	145.3	66 33.2	88 47	144.7	66 59.5	87 47	144.1	67 25.6	87 48	143.4	67 51.5	86 49	142.8	4
15	64 20.4	88 46	144.9	64 46.8	88 47	144.4	65 13.0	87 48	143.8	65 39.2	87 48	143.2	66 05.2	86 49	142.6	66 31.0	86 50	142.0	66 56.7	85 50	141.3	67 22.2	85 51	140.6	15
6	63 52.5	87 48	143.0	64 18.6	87 49	142.4	64 44.5	86 50	141.8	65 10.2	86 50	141.2	65 35.8	85 51	140.6	66 01.2	85 52	140.0	66 26.5	84 52	139.3	66 51.6	83 53	138.6	6
7	63 23.5	86 50	141.1	63 49.1	85 51	140.6	64 14.6	85 52	140.0	64 40.0	84 52	139.3	65 05.2	84 53	138.7	65 30.2	83 54	138.0	65 55.1	83 54	137.4	66 19.7	82 55	136.6	7
8	62 53.2	85 52	139.3	63 18.5	84 53	138.7	63 43.6	84 54	138.1	64 08.6	84 54	137.5	64 33.4	82 55	136.8	64 58.0	82 55	136.2	65 22.5	81 56	135.5	65 46.7	80 57	134.8	8
9	62 21.9	83 54	137.6	62 46.8	83 55	137.0	63 11.7	83 55	136.3	63 36.1	82 56	135.7	64 00.5	81 57	135.0	64 24.8	80 57	134.3	64 48.8	80 58	133.7	65 12.6	79 58	133.0	9
20	61 49.4	82 56	135.9	62 14.0	82 56	135.3	62 38.4	81 57	134.6	63 02.6	80 58	134.0	63 26.6	80 58	133.3	63 50.5	79 59	132.6	64 14.1	78 59	131.9	64 37.5	78 60	131.2	20
1	61 16.0	81 57	134.2	61 40.2	80 58	133.6	62 04.3	80 58	133.0	62 28.1	79 59	132.3	62 51.8	79 60	131.6	63 15.2	78 60	131.0	63 38.5	77 61	130.3	64 01.5	76 62	129.5	1
2	60 41.7	80 59	132.6	61 05.5	79 59	132.0	61 29.2	79 60	131.4	61 52.7	78 60	130.7	62 16.0	77 61	130.0	62 39.1	77 62	129.4	63 02.0	76 62	128.6	63 24.6	75 63	127.9	2
3	60 06.5	79 60	131.1	60 30.0	78 61	130.5	60 53.3	77 61	129.8	61 16.4	77 62	129.2	61 39.4	76 62	128.5	62 02.1	75 63	127.8	62 24.6	75 63	127.1	62 46.9	74 64	126.4	3
4	59 30.5	78 61	129.6	59 53.6	77 62	129.0	60 16.6	76 62	128.3	60 39.4	76 63	127.7	61 02.0	75 64	127.0	61 24.4	74 64	126.3	61 46.5	74 65	125.6	62 08.5	73 65	124.9	4
25	58 53.6	76 63	128.2	59 16.5	76 63	127.5	59 39.1	75 64	126.9	60 01.6	75 64	126.2	60 23.9	74 65	125.5	60 45.9	73 65	124.9	61 07.8	72 66	124.1	61 29.4	72 66	123.4	25
6	58 16.1	75 64	126.8	58 38.6	75 64	126.1	59 01.0	74 65	125.5	59 23.1	73 65	124.8	59 45.1	73 66	124.1	60 06.8	72 66	123.5	60 28.3	71 67	122.8	60 49.6	71 67	122.0	6
7	57 37.9	74 65	125.4	58 00.1	74 65	124.8	58 22.2	73 66	124.1	58 44.0	72 66	123.5	59 05.6	72 67	122.8	59 27.0	71 67	122.1	59 48.2	70 68	121.4	60 09.2	70 68	120.7	7
8	56 59.0	73 66	124.1	57 21.0	73 66	123.5	57 42.7	72 67	122.8	58 04.3	71 67	122.2	58 25.6	71 68	121.5	58 46.7	70 68	120.8	59 07.6	69 69	120.1	59 28.3	69 69	119.4	8
9	56 19.6	72 67	122.8	56 41.2	72 67	122.2	57 02.7	71 68	121.5	57 23.9	71 68	120.9	57 45.0	70 69	120.2	58 05.8	69 69	119.5	58 26.5	68 69	118.9	58 46.8	68 70	118.2	9
30	55 39.6	72 68	121.6	56 00.9	71 68	120.9	56 22.1	70 68	120.3	56 43.1	70 69	119.7	57 03.9	69 69	119.0	57 24.5	68 70	118.3	57 44.8	67 70	117.6	58 04.9	67 71	116.9	30
1	54 59.0	71 68	120.4	55 20.1	70 69	119.7	55 41.1	69 69	119.1	56 01.8	69 70	118.5	56 22.3	68 70	117.8	56 42.6	67 70	117.1	57 02.7	67 71	116.5	57 22.6	66 71	115.8	1
2	54 18.0	70 69	119.2	54 38.9	69 70	118.6	54 59.5	69 70	118.0	55 20.0	68 70	117.3	55 40.3	67 71	116.7	56 00.3	66 71	116.0	56 20.2	66 72	115.3	56 39.8	65 72	114.6	2
3	53 36.5	69 70	118.1	53 57.1	68 70	117.4	54 17.5	68 71	116.8	54 37.8	67 71	116.2	54 57.8	67 71	115.6	55 17.6	66 72	114.9	55 37.2	65 72	114.2	55 56.6	64 73	113.5	3
4	52 54.6	68 71	117.0	53 15.0	68 71	116.4	53 35.1	67 71	115.7	53 55.2	66 72	115.1	54 15.0	66 72	114.5	54 34.5	65 72	113.8	54 53.9	64 73	113.1	55 13.1	64 73	112.5	4
35	52 12.1	68 71	115.9	52 32.4	67 72	115.3	52 52.4	66 72	114.7	53 12.2	66 72	114.0	53 31.7	65 73	113.4	53 51.1	64 73	112.8	54 10.3	64 73	112.1	54 29.2	63 74	111.4	35
6	51 29.5	67 72	114.8	51 49.5	66 72	114.2	52 09.2	66 72	113.6	52 28.8	65 73	113.0	52 48.2	64 73	112.4	53 07.4	64 73	111.7	53 26.3	63 74	111.1	53 45.1	62 74	110.4	6
7	50 46.4	66 72	113.8	51 06.2	66 73	113.2	51 25.7	65 73	112.6	51 45.1	64 74	112.0	52 04.3	64 74	111.4	52 23.3	63 74	110.8	52 42.1	62 74	110.1	53 00.6	62 74	109.5	7
8	50 03.0	66 73	112.8	50 22.6	65 73	112.3	50 41.9	64 74	111.6	51 01.1	64 74	111.0	51 20.1	63 74	110.4	51 38.9	62 74	109.8	51 57.5	62 75	109.2	52 15.7	61 75	108.5	8
9	49 19.3	65 73	111.9	49 38.6	64 74	111.3	49 57.9	64 74	110.7	50 16.9	63 74	110.1	50 35.7	62 74	109.5	50 54.3	62 75	108.8	51 12.8	61 75	108.2	51 31.0	60 75	107.6	9
40	48 35.2	64 74	110.9	48 54.5	64 74	110.3	49 13.5	63 74	109.7	49 32.3	63 75	109.1	49 51.0	62 75	108.5	50 09.5	61 75	107.9	50 27.7	61 75	107.3	50 45.8	60 76	106.7	40
1	47 50.9	64 74	110.0	48 10.0	63 74	109.4	48 28.9	63 75	108.8	48 47.5	62 75	108.2	49 06.0	61 75	107.6	49 24.4	61 76	107.0	49 42.5	60 76	106.4	50 00.4	59 76	105.8	1
2	47 06.4	63 75	109.1	47 25.3	63 75	108.5	47 44.0	62 75	107.9	48 02.5	61 76	107.4	48 20.9	61 76	106.8	48 39.0	60 76	106.2	48 57.0	60 76	105.5	49 14.8	59 77	104.9	2
3	46 21.6	63 75	108.2	46 40.3	62 75	107.6	46 58.9	62 76	107.1	47 17.3	61 76	106.5	47 35.5	60 76	105.9	47 53.5	60 76	105.3	48 11.4	59 76	104.7	48 29.0	59 77	104.1	3
4	45 36.5	62 75	107.3	45 55.2	62 76	106.8	46 13.6	61 76	106.2	46 31.9	61 76	105.6	46 49.9	60 76	105.1	47 07.8	59 76	104.5	47 25.6	59 77	103.9	47 43.1	58 77	103.3	4
45	44 51.3	62 76	106.5	45 09.8	61 76	105.9	45 28.1	61 76	105.4	45 46.2	60 76	104.8	46 04.2	60 76	104.2	46 22.0	59 77	103.6	46 39.6	58 77	103.1	46 57.0	58 77	102.5	45
6	44 05.9	61 76	105.7	44 24.2	61 76	105.1	44 42.4	60 76	104.6	45 00.4	60 77	104.0	45 18.3	59 77	103.4	45 36.0	59 77	102.8	45 53.4	58 77	102.3	46 10.8	57 77	101.7	6
7	43 20.3	61 76	104.9	43 38.5	60 76	104.3	43 56.6	60 77	103.8	44 14.5	59 77	103.2	44 32.2	59 77	102.6	44 49.8	58 77	102.1	45 07.2	58 77	101.5	45 24.4	57 77	100.9	7
8	42 34.5	61 77	104.1	42 52.6	60 77	103.5	43 10.6	60 77	103.0	43 28.4	59 77	102.4	43 46.0	59 77	101.8	44 03.5	58 77	101.3	44 20.8	57 78	100.7	44 37.9	57 78	100.1	8
9	41 48.6	60 77	103.3	42 06.6	60 77	102.7	42 24.4	59 77	102.2	42 42.1	59 77	101.6	42 59.7	58 77	101.1	43 17.1	58 78	100.5	43 34.3	57 78	100.0	43 51.3	57 78	99.4	9
50	41 02.5	60 77	102.5	41 20.4	59 77	102.0	41 38.1	59 77	101.4	41 55.8	58 78	100.9	42 13.2	58 78	100.3	42 30.5	57 78	99.8	42 47.7	57 78	99.2	43 04.6	56 78	98.7	50
1	40 16.2	60 77	101.7	40 34.1	59 77	101.2	40 51.7	59 78	100.7	41 09.3	58 78	100.1	41 26.6	58 78	99.6	41 43.9	57 78	99.0	42 00.9	57 78	98.5	42 17.8	56 78	97.9	1
2	39 29.9	59 77	101.0	39 47.6	59 78	100.5	40 05.2	58 78	99.9	40 22.7	58 78	99.4	40 40.0	57 78	98.9	40 57.1	57 78	98.3	41 14.1	56 78	97.8	41 31.0	56 78	97.2	2
3	38 43.4	59 78	100.3	39 01.1	58 78	99.7	39 18.6	58 78	99.2	39 36.0	58 78	98.7	39 53.2	57 78	98.2	40 10.3	56 78	97.6	40 27.2	56 78	97.1	40 44.0	56 78	96.5	3
4	37 56.8	59 78	99.5	38 14.4	58 78	99.0	38 31.9	58 78	98.5	38 49.2	57 78	98.0	39 06.4	57 78	97.5	39 23.4	56 78	96.9	39 40.3	56 78	96.4	39 57.0	55 78	95.8	4
55	37 10.2	59 78	98.8	37 27.7	58 78	98.3	37 45.1	58 78	97.8	38 02.3	57 78	97.3	38 19.5	57 78	96.8	38 36.4	56 78	96.2	38 53.3	56 78	95.7	39 10.0	55 79	95.2	55
6	36 23.4	58 78	98.1	36 40.9	58 78	97.6	36 58.2	58 78	97.1	37 15.4	57 78	96.6	37 32.5	57 78	96.1	37 49.4	56 78	95.6	38 06.2	56 79	95.0	38 22.9	55 79	94.5	6
7	35 36.6	58 78	97.4	35 54.0	58 78	96.9	36 11.3	57 78	96.4	36 28.4	57 78	95.9	36 45.4	56 78	95.4	37 02.3	56 79	94.9	37 19.1	56 79	94.4	37 35.7	55 79	93.8	7
8	34 49.6	58 78	96.7	35 07.0	58 78	96.2	35 24.2	57 78	95.7	35 41.4	57 78	95.2	35 58.3	56 78	94.7	36 15.2	56 79	94.2	36 31.9	56 79	93.7	36 48.5	55 79	93.2	8
9	34 02.7	58 78	96.1	34 20.0	58 78	95.6	34 37.2	57 79	95.1	34 54.2	57 79	94.6	35 11.2	56 79	94.1	35 28.0	56 79	93.6	35 44.7	55 79	93.1	36 01.3	55 79	92.5	9
60	33 15.6	58 78	95.4	33 32.9	58 78	94.9	33 50.1	57 79	94.4	34 07.1	57 79	93.9	34 24.0	56 79	93.4	34 40.8	56 79	92.9	34 57.5	55 79	92.4	35 14.0	55 79	91.9	60
1	32 28.5	58 79	94.7	32 45.8	57 79	94.3	33 02.9	57 79	93.8	33 19.9	57 79	93.3	33 36.8	56 79	92.8	33 53.6	56 79	92.3	34 10.2	55 79	91.8	34 26.8	55 79	91.3	1
2	31 41.4	58 79	94.1	31 58.6	57 79	93.6	32 15.7	57 79	93.1	32 32.7	56 79	92.6	32 49.6	56 79	92.1	33 06.3	55 79	91.6	33 23.0	55 79	91.1	33 39.5	55 79	90.6	2
3	30 54.2	57 79	93.4	31 11.4	57 79	93.0	31 28.5	57 79	92.5	31 45.4	56 79	92.0	32 02.3	56 79	91.5	32 19.1	55 79	91.0	32 35.7	55 79	90.5	32 52.2	55 79	90.0	3
4	30 07.0	57 79	92.8	30 24.2	57 79	92.3	30 41.2	57 79	91.8	30 58.2	56 79	91.4	31 15.0	56 79	90.9	31 31.8	55 79	90.4	31 48.4	55 79	89.9	32 04.9	55 79	89.4	4
65	29 19.7	57 79	92.2	29 36.9	57 79	91.7	29 54.0	57 79	91.2	30 10.9	56 79	90.7	30 27.8	56 79	90.3	30 44.5	56 79	89.8	31 01.1	55 79	89.3	31 17.7	55 79	88.8	65
6	28 32.5	57 79	91.5	28 49.6	57 79	91.1	29 06.7	57 79	90.6	29 23.6	56 79	90.1	29 40.5	56 79	89.7	29 57.2	56 79	89.2	30 13.9	55 79	88.7	30 30.4	55 79	88.2	6
7	27 45.2	57 79	90.9	28 02.4	57 79	90.4	28 19.4	57 79	90.0	28 36.4	56 79	89.5	28 53.2	56 79	89.0	29 10.0	56 79	88.6	29 26.6	55 79	88.1	29 43.2	55 79	87.6	7
8	26 57.9	57 79	90.3	27 15.1	57 79	89.8	27 32.1	57 79	89.4	27 49.1	56 79	88.9	28 05.9	56 79	88.4	28 22.7	56 79	88.0	28 39.4	55 79	87.5	28 55.9	55 79	87.0	8
9	26 10.7	57 79	89.7	26 27.8	57 79	89.2	26 44.9	57 79	88.8	27 01.8	56 79	88.3	27 18.7	56 79	87.8	27 35.5	56 79	87.4	27 52.1	55 79	86.9	28 08.7	55 79	86.4	9
70	25 23.4	57 79	89.1	25 40.5	57 79	88.6	25 57.6	57 79	88.2	26 14.6	56 79	87.7	26 31.4	56 79	87.2	26 48.2	56 79	86.8	27 04.9	56 79	86.3	27 21.6	55 79	85.8	70
1	24 36.1	57 79	88.5	24 53.3	57 79	88.0	25 10.3	57 79	87.5	25 27.3	56 79	87.1	25 44.2	56 79	86.6	26 01.1	56 79	86.2	26 17.8	56 79	85.7	26 34.4	55 79	85.2	1
2	23 48.9	57 79	87.8	24 06.0	57 79	87.4	24 23.1	57 79	87.0	24 40.1	57 79	86.5	24 57.0	56 79	86.0	25 13.9	56 79	85.6	25 30.6	56 78	85.1	25 47.3	55 78	84.7	2
3	23 01.6	57 79	87.2	23 18.8	57 79	86.8	23 35.9	57 79	86.4	23 52.9	57 79	85.9	24 09.9	56 79	85.5	24 26.8	56 78	85.0	24 43.6	56 78	84.5	25 00.3	56 78	84.1	3
4	22 14.4	57 79	86.7	22 31.6	57 79	86.2	22 48.7	57 79	85.8	23 05.8	57 79	85.3	23 22.8	56 78	84.9	23 39.7	56 78	84.4	23 56.5	56 78	84.0	24 13.3	56 78	83.5	4
75	21 27.2	58 79	86.1	21 44.5	57 79	85.6	22 01.6	57 79	85.2	22 18.7	57 78	84.7	22 35.7	57 78	84.3	22 52.7	56 78	83.8	23 09.5	56 78	83.4	23 26.3	56 78	82.9	75
6	20 40.1	58 79	85.5	20 57.3	57 79	85.0	21 14.5	57 78	84.6	21 31.6	57 78	84.1	21 48.7	57 78	83.7	22 05.7	56 78	83.3	22 22.6	56 78	82.8	22 39.4	56 78	82.4	6
7	19 53.0	58 79	84.9	20 10.3	58 78	84.4	20 27.5	57 78	84.0	20 44.6	57 78	83.6	21 01.7	57 78	83.1	21 18.8	56 78	82.7	21 35.7	56 78	82.2	21 52.6	56 78	81.8	7
8	19 05.9	58 78	84.3	19 23.2	58 78	83.8	19 40.5	57 78	83.4	19 57.7	57 78	83.0	20 14.8	57 78	82.5	20 31.9	57 78	82.1	20 48.9	56 78	81.7	21 05.8	56 78	81.2	8
9	18 18.9	58 78	83.7	18 36.2	58 78	83.2	18 53.5	57 78	82.8	19 10.8	57 78	82.4	19 27.9	57 78	81.9	19 45.0	57 78	81.5	20 02.1	57 78	81.1	20 19.1	57 78	80.7	9
80	17 31.9	58 78	83.1	17 49.3	58 78	82.7	18 06.7	58 78	82.3	18 24.0	57 78	81.8	18 41.2	57 78	81.4	18 58.4	57 78	81.0	19 15.5	57 78	80.5	19 32.5	57 78	80.1	80
1	16 45.0	58 78	82.5	17 02.4	58 78	82.1	17 19.8	58 78	81.7	17 37.2	57 78	81.2	17 54.5	57 78	80.8	18 11.7	57 78	80.4	18 28.9	57 78	80.0	18 46.0	57 77	79.5	1
2	15 58.2	58 78	81.9	16 15.7	58 78	81.5	16 33.1	58 78	81.1	16 50.5	58 78	80.7	17 07.8	57 78	80.2	17 25.1	57 78	79.8	17 42.4	57 77	79.4	17 59.5	57 77	79.0	2
3	15 11.4	58 78	81.4	15 28.9	58 78	80.9	15 46.4	58 78	80.5	16 03.9	58 78	80.1	16 21.3	57 77	79.7	16 38.6	57 77	79.2	16 55.9	57 77	78.8	17 13.2	57 77	78.4	3
4	14 24.7	59 78	80.8	14 42.3	59 78	80.4	14 59.8	58 78	79.9	15 17.3	58 77	79.5	15 34.8	58 77	79.1	15 52.2	57 77	78.7	16 09.6	57 77	78.2	16 26.9	58 77	77.8	4
85	13 38.0	59 78	80.2	13 55.7	59 77	79.9	14 13.3	59 77	79.4	14 30.9	59 77	78.9	14 48.4	58 77	78.5	15 05.9	58 77	78.1	15 23.4	58 77	77.7	15 40.8	58 77	77.3	85
6	12 51.5	59 77	79.6	13 09.2	59 77	79.2	13 26.9	59 77	78.8	13 44.5	59 77	78.4	14 02.1	58 77	77.9	14 19.7	58 77	77.5	14 37.2	58 77	77.1	14 54.7	58 77	76.7	6
7	12 05.0	60 77	79.0	12 22.8	59 77	78.6	12 40.6	59 77	78.2	12 58.3	59 77	77.8	13 16.0	59 77	77.4	13 33.6	59 77	77.0	13 51.2	58 76	76.5	14 08.7	58 76	76.1	7
8	11 18.7	60 77	78.4	11 36.5	59 77	78.0	11 54.3	60 77	77.6	12 12.1	59 77	77.2	12 29.9	59 77	76.8	12 47.6	59 76	76.4	13 05.3	59 76	76.0	13 22.9	59 76	75.5	8
9	10 32.4	60 77	77.9	10 50.3	60 77	77.4	11 08.2	60 77	77.0	11 26.0	60 77	76.6	11 43.9	59 76	76.2	12 01.7	59 76	75.8	12 19.5	59 76	75.4	12 37.4	59 76	75.0	9
90	9 46.2	60 77	77.3	10 04.2	60 77	76.9	10 22.2	60 77	76.5	10 40.1	60 76	76.0	10 58.0	60 76	75.6	11 15.9	60 76	75.2	11 33.8	59 76	74.8	11 51.6	59 76	74.4	90

H.A.	16° 00' Alt. Δd Δt Az.	16° 30' Alt. Δd Δt Az.	17° 00' Alt. Δd Δt Az.	17° 30' Alt. Δd Δt Az.	18° 00' Alt. Δd Δt Az.	18° 30' Alt. Δd Δt Az.	19° 00' Alt. Δd Δt Az.	19° 30' Alt. Δd Δt Az.	H.A.
00	36 00.0 1.00 1 180.0	35 30.0 1.00 1 180.0	35 00.0 1.00 1 180.0	34 30.0 1.00 1 180.0	34 00.0 1.00 1 180.0	33 30.0 1.00 1 180.0	33 00.0 1.00 1 180.0	32 30.0 1.00 1 180.0	00
1	35 59.5 1.00 2 178.8	35 29.5 1.00 2 178.8	34 59.5 1.00 2 178.8	34 29.5 1.00 2 178.8	33 59.5 1.00 2 178.9	33 29.5 1.00 2 178.9	32 59.5 1.00 2 178.9	32 29.5 1.00 2 178.9	1
2	35 58.0 1.00 4 177.6	35 28.1 1.00 4 177.6	34 58.1 1.00 4 177.7	34 28.1 1.00 4 177.7	33 58.1 1.00 4 177.7	33 28.1 1.00 4 177.7	32 58.1 1.00 4 177.8	32 28.2 1.00 4 177.8	2
3	35 55.6 1.00 6 176.4	35 25.6 1.00 6 176.5	34 55.7 1.00 6 176.5	34 25.7 1.00 6 176.5	33 55.7 1.00 6 176.6	33 25.8 1.00 6 176.6	32 55.8 1.00 6 176.6	32 25.9 1.00 6 176.6	3
4	35 52.2 1.00 7 175.3	35 22.2 1.00 7 175.3	34 52.3 1.00 7 175.3	34 22.4 1.00 7 175.4	33 52.4 1.00 7 175.4	33 22.5 1.00 7 175.5	32 52.6 1.00 7 175.5	32 22.6 1.00 7 175.5	4
05	35 47.8 1.00 9 174.1	35 17.9 1.00 9 174.1	34 48.0 1.00 9 174.2	34 18.1 1.00 9 174.2	33 48.2 1.00 9 174.3	33 18.3 1.00 9 174.3	32 48.4 1.00 8 174.4	32 18.5 1.00 8 174.4	05
6	35 42.4 99 11 172.9	35 12.6 99 10 173.0	34 42.7 99 10 173.0	34 12.9 99 10 173.1	33 43.0 1.0 10 173.1	33 13.2 1.0 10 173.2	32 43.3 1.0 10 173.3	32 13.4 1.0 10 173.3	6
7	35 36.1 99 12 171.7	35 06.3 99 12 171.8	34 36.5 99 12 171.9	34 06.7 99 12 171.9	33 36.9 99 12 172.0	33 07.1 99 12 172.1	32 37.3 99 12 172.1	32 07.5 99 11 172.2	7
8	35 28.8 99 14 170.5	34 59.0 99 14 170.6	34 29.3 99 14 170.7	33 59.6 99 13 170.8	33 29.8 99 13 170.9	33 00.1 99 13 170.9	32 30.4 99 13 171.0	32 00.6 99 13 171.1	8
9	35 20.5 99 15 169.4	34 50.9 99 15 169.5	34 21.2 99 15 169.6	33 51.6 99 15 169.6	33 21.9 99 15 169.7	32 52.2 99 15 169.8	32 22.5 99 15 169.9	31 52.9 99 14 170.0	9
10	35 11.3 99 17 168.2	34 41.8 99 17 168.3	34 12.2 99 17 168.4	33 42.6 99 16 168.6	33 13.0 99 16 168.6	32 43.4 99 16 168.7	32 13.8 99 16 168.8	31 44.2 99 16 168.9	10
1	35 01.2 98 18 167.1	34 31.7 98 18 167.2	34 02.2 98 18 167.3	33 32.7 98 18 167.5	33 03.2 98 18 167.5	32 33.7 98 18 167.6	32 04.2 98 18 167.7	31 34.7 98 17 167.8	1
2	34 50.2 98 20 165.9	34 20.8 98 20 166.0	33 51.4 98 20 166.1	33 22.0 98 19 166.3	32 52.5 98 19 166.4	32 23.1 98 19 166.5	31 53.7 98 19 166.6	31 24.2 98 19 166.7	2
3	34 38.2 98 21 164.8	34 08.9 98 21 164.9	33 39.6 98 21 165.0	33 10.3 98 21 165.1	32 41.0 98 21 165.3	32 11.6 98 21 165.4	31 42.3 98 20 165.5	31 12.9 98 20 165.6	3
4	34 25.3 97 23 163.6	33 56.1 97 23 163.8	33 26.9 97 23 163.9	32 57.7 97 22 164.0	32 28.5 97 22 164.2	31 59.3 97 22 164.3	31 30.0 97 22 164.4	31 00.8 97 22 164.6	4
15	34 11.5 97 24 162.5	33 42.5 97 24 162.6	33 13.4 97 24 162.8	32 44.3 97 24 162.9	32 15.2 97 24 163.1	31 46.1 97 23 163.2	31 16.9 97 23 163.3	30 47.8 97 23 163.5	15
6	33 56.9 97 26 161.4	33 27.9 97 26 161.5	32 59.0 97 25 161.7	32 30.0 97 25 161.8	32 01.0 97 25 162.0	31 32.0 97 25 162.1	31 03.0 97 25 162.3	30 33.9 97 24 162.4	6
7	33 41.3 96 27 160.3	33 12.5 96 27 160.4	32 43.7 96 27 160.6	32 14.8 96 27 160.8	31 45.9 96 26 160.9	31 17.1 96 26 161.1	30 48.2 96 26 161.2	30 19.3 96 26 161.4	7
8	33 25.0 96 29 159.2	32 56.2 96 29 159.3	32 27.5 96 28 159.5	31 58.8 96 28 159.7	31 30.1 96 28 159.8	31 01.3 96 28 160.0	30 32.5 96 27 160.2	30 03.7 96 27 160.3	8
9	33 07.7 96 30 158.1	32 39.1 95 30 158.2	32 10.6 95 30 158.4	31 42.0 95 29 158.6	31 13.3 95 29 158.8	30 44.7 95 29 158.9	30 16.1 95 29 159.1	29 47.4 96 29 159.3	9
20	32 49.6 95 32 157.0	32 21.2 95 31 157.2	31 52.8 95 31 157.3	31 24.3 95 31 157.5	30 55.8 95 31 157.7	30 27.3 95 30 157.9	29 58.8 95 30 158.1	29 30.3 95 30 158.3	20
1	32 30.7 94 33 155.9	32 02.4 94 33 156.1	31 34.1 94 32 156.3	31 05.8 94 32 156.5	30 37.5 94 32 156.7	30 09.1 95 32 156.9	29 40.8 95 31 157.0	29 12.4 95 31 157.2	1
2	32 11.0 94 34 154.8	31 42.9 94 34 155.0	31 14.7 94 34 155.2	30 46.6 94 33 155.4	30 18.4 94 33 155.6	29 50.2 94 33 155.8	29 22.0 94 33 156.0	28 53.7 94 32 156.2	2
3	31 50.5 93 36 153.8	31 22.5 93 35 154.0	30 54.5 93 35 154.2	30 26.5 93 35 154.4	29 58.5 93 34 154.6	29 30.4 94 34 154.8	29 02.4 94 34 155.0	28 34.3 94 34 155.2	3
4	31 29.2 93 37 152.7	31 01.4 93 36 152.9	30 33.5 93 36 153.1	30 05.7 93 36 153.3	29 37.8 93 36 153.6	29 09.9 93 35 153.8	28 42.0 93 35 154.0	28 14.1 93 35 154.2	4
25	31 07.1 92 38 151.7	30 39.5 92 38 151.9	30 11.8 92 37 152.1	29 44.1 92 37 152.3	29 16.4 92 37 152.6	28 48.7 92 37 152.8	28 20.9 93 36 153.0	27 53.1 93 36 153.2	25
6	30 44.3 92 39 150.6	30 16.8 92 39 150.9	29 49.3 92 39 151.1	29 21.8 92 38 151.3	28 54.2 92 38 151.6	28 26.7 92 38 151.8	27 59.1 92 38 152.0	27 31.5 92 37 152.2	6
7	30 20.8 91 40 149.6	29 53.5 91 40 149.9	29 26.1 91 40 150.1	28 58.6 91 40 150.3	28 31.4 91 39 150.6	28 04.0 91 39 150.8	27 36.5 91 39 151.0	27 09.1 92 38 151.3	7
8	29 56.5 90 42 148.6	29 29.4 91 41 148.9	29 02.2 91 41 149.1	28 35.0 91 41 149.3	28 07.8 91 40 149.6	27 40.5 91 40 149.8	27 13.3 91 40 150.1	26 46.0 91 40 150.3	8
9	29 31.5 90 43 147.6	29 04.6 90 42 147.9	28 37.6 90 42 148.1	28 10.5 90 42 148.4	27 43.3 90 42 148.6	27 16.4 90 41 148.9	26 49.3 90 41 149.2	26 22.2 90 41 149.3	9
30	29 05.9 89 44 146.6	28 39.1 89 44 146.9	28 12.3 89 43 147.1	27 45.4 89 43 147.4	27 18.5 89 43 147.6	26 51.6 90 42 147.9	26 24.7 90 42 148.1	25 57.7 90 42 148.4	30
1	28 39.5 89 45 145.7	28 12.9 89 45 145.9	27 46.3 89 44 146.2	27 19.6 89 44 146.4	26 52.9 89 44 146.7	26 26.2 89 44 146.9	25 59.4 89 43 147.2	25 32.6 89 43 147.4	1
2	28 12.5 88 46 144.7	27 46.1 88 46 145.0	27 19.6 88 45 145.2	26 53.1 88 45 145.5	26 26.6 88 45 145.7	26 00.1 89 45 146.0	25 33.5 89 44 146.3	25 06.9 89 44 146.5	2
3	27 44.9 87 47 143.7	27 18.6 88 47 144.0	26 52.3 88 47 144.3	26 26.0 88 46 144.5	25 59.7 88 46 144.8	25 33.3 88 46 145.1	25 06.9 88 45 145.3	24 40.5 88 45 145.6	3
4	27 16.6 87 48 142.8	26 50.5 87 48 143.1	26 24.4 87 48 143.3	25 58.3 87 47 143.6	25 32.1 87 47 143.9	25 05.9 87 47 144.2	24 39.7 87 46 144.4	24 13.4 88 46 144.7	4
35	26 47.7 86 49 141.8	26 21.8 86 49 142.1	25 55.9 86 49 142.4	25 29.9 87 48 142.7	25 03.9 87 48 143.0	24 37.9 87 48 143.2	24 11.9 87 47 143.5	23 45.8 87 47 143.8	35
6	26 18.2 86 50 140.9	25 52.5 86 50 141.2	25 26.7 86 50 141.5	25 01.0 86 49 141.8	24 35.2 86 49 142.1	24 09.3 86 49 142.3	23 43.5 86 48 142.6	23 17.6 86 48 142.9	6
7	25 48.1 85 51 140.0	25 22.6 85 51 140.3	24 57.0 85 50 140.6	24 31.4 85 50 140.9	24 05.8 85 50 141.2	23 40.2 86 50 141.5	23 14.5 86 49 141.7	22 48.8 86 49 142.0	7
8	25 17.4 84 52 139.1	24 52.1 85 52 139.4	24 26.7 85 51 139.7	24 01.3 85 51 140.0	23 35.9 85 51 140.3	23 10.4 85 50 140.6	22 44.9 85 50 140.9	22 19.4 85 50 141.1	8
9	24 46.2 84 53 138.2	24 21.1 84 53 138.5	23 55.9 84 52 138.8	23 30.7 84 52 139.1	23 05.4 84 52 139.4	22 40.1 84 51 139.7	22 14.8 84 51 140.0	21 49.5 85 51 140.3	9
40	24 14.4 83 54 137.3	23 49.5 83 54 137.6	23 24.5 83 53 137.9	22 59.4 84 53 138.2	22 34.4 84 53 138.5	22 09.3 84 52 138.8	21 44.1 84 52 139.1	21 19.0 84 52 139.4	40
1	23 42.1 83 55 136.5	23 17.3 83 54 136.8	22 52.5 83 54 137.1	22 27.7 83 54 137.4	22 02.8 83 53 137.7	21 37.9 83 53 138.0	21 12.9 83 53 138.3	20 48.0 83 53 138.6	1
2	23 09.3 82 56 135.6	22 44.7 82 55 135.9	22 20.1 82 55 136.2	21 55.4 82 55 136.5	21 30.7 82 54 136.8	21 06.0 82 54 137.1	20 41.2 83 54 137.4	20 16.4 83 53 137.7	2
3	22 36.0 81 56 134.8	22 11.6 82 56 135.1	21 47.1 82 56 135.4	21 22.6 82 55 135.7	20 58.1 82 55 136.0	20 33.6 82 55 136.3	20 09.0 82 54 136.6	19 44.4 82 54 136.9	3
4	22 02.2 81 57 133.9	21 37.9 81 57 134.2	21 13.7 81 57 134.5	20 49.4 81 56 134.8	20 25.0 81 56 135.2	20 00.7 81 56 135.5	19 36.3 81 55 135.8	19 11.8 81 55 136.1	4
45	21 27.9 80 58 133.1	21 03.8 80 58 133.4	20 39.7 80 57 133.7	20 15.6 80 57 134.0	19 51.5 81 57 134.4	19 27.4 81 56 134.7	19 03.1 81 56 135.0	18 38.8 81 56 135.3	45
6	20 53.1 79 59 132.3	20 29.2 80 58 132.6	20 05.3 80 58 132.9	19 41.4 80 58 133.2	19 17.4 80 58 133.5	18 53.4 80 57 133.9	18 29.4 80 57 134.2	18 05.3 80 57 134.5	6
7	20 17.9 79 59 131.4	19 54.2 79 59 131.8	19 30.5 79 59 132.1	19 06.7 79 59 132.4	18 42.9 79 58 132.7	18 19.1 79 58 133.1	17 55.3 80 58 133.4	17 31.4 80 57 133.7	7
8	19 42.2 78 60 130.6	19 18.7 78 60 131.0	18 55.2 79 60 131.3	18 31.6 79 59 131.6	18 08.0 79 59 132.0	17 44.3 79 59 132.3	17 20.7 79 58 132.6	16 57.0 79 58 132.9	8
9	19 06.1 78 61 129.8	18 42.8 78 61 130.2	18 19.4 78 60 130.5	17 56.0 78 60 130.8	17 32.6 78 60 131.2	17 09.1 78 59 131.5	16 45.6 78 59 131.8	16 22.1 78 59 132.1	9
50	18 29.6 77 62 129.1	18 06.5 77 61 129.4	17 43.3 77 61 129.7	17 20.1 77 61 130.1	16 56.8 78 60 130.4	16 33.5 78 60 130.7	16 10.2 78 60 131.0	15 46.8 78 59 131.4	50
1	17 52.7 77 62 128.3	17 29.7 77 62 128.6	17 06.7 77 62 129.0	16 43.7 77 61 129.3	16 20.6 77 61 129.6	15 57.5 77 61 130.0	15 34.3 77 60 130.3	15 11.2 77 60 130.6	1
2	17 15.4 76 63 127.5	16 52.6 76 63 127.9	16 29.8 76 62 128.2	16 06.9 76 62 128.5	15 44.0 76 62 128.9	15 21.0 77 61 129.2	14 58.1 77 61 129.5	14 35.1 77 61 129.9	2
3	16 37.7 75 63 126.8	16 15.1 76 63 127.1	15 52.4 76 63 127.5	15 29.7 76 63 127.8	15 07.0 76 62 128.1	14 44.2 76 62 128.5	14 21.4 76 62 128.8	13 58.6 76 61 129.1	3
4	15 59.6 75 64 126.0	15 37.2 75 64 126.3	15 14.7 75 64 126.7	14 52.1 75 63 127.0	14 29.6 75 63 127.4	14 07.0 75 63 127.7	13 44.4 75 62 128.0	13 21.7 76 62 128.4	4
55	15 21.2 74 65 125.3	14 58.9 74 64 125.6	14 36.6 74 64 125.9	14 14.2 75 64 126.3	13 51.8 75 64 126.6	13 29.4 75 63 127.0	13 06.9 75 63 127.3	12 44.5 75 63 127.7	55
6	14 42.4 74 65 124.5	14 20.3 74 65 124.9	13 58.1 74 65 125.2	13 35.9 74 64 125.6	13 13.7 74 64 125.9	12 51.4 74 64 126.3	12 29.2 74 63 126.6	12 06.9 74 63 126.9	6
7	14 03.2 73 66 123.8	13 41.3 73 66 124.1	13 19.3 73 65 124.5	12 57.3 73 65 124.8	12 35.2 74 65 125.2	12 13.1 74 64 125.5	11 51.0 74 64 125.9	11 28.9 74 64 126.2	7
8	13 23.9 73 66 123.1	13 02.0 73 66 123.4	12 40.2 73 66 123.8	12 18.3 73 66 124.1	11 56.4 73 65 124.5	11 34.5 73 65 124.8	11 12.6 73 65 125.2	10 50.6 73 64 125.5	8
9	12 44.1 72 67 122.4	12 22.4 72 67 122.7	12 00.7 72 66 123.1	11 39.0 72 66 123.4	11 17.3 72 66 123.8	10 55.5 73 66 124.1	10 33.7 73 65 124.5	10 11.9 73 65 124.8	9
60	12 04.0 72 67 121.6	11 42.5 72 67 122.0	11 20.9 72 67 122.4	10 59.4 72 67 122.7	10 37.8 72 66 123.1	10 16.2 72 66 123.4	9 54.6 72 66 123.8	9 32.9 72 66 124.1	60
1	11 23.6 71 68 120.9	11 02.2 71 68 121.3	10 40.9 71 67 121.7	10 19.5 71 67 122.0	9 58.0 71 67 122.4	9 36.6 72 67 122.7	9 15.1 72 66 123.1	8 53.7 72 66 123.4	1
2	10 42.9 71 68 120.3	10 21.7 71 68 120.6	10 00.5 71 68 121.0	9 39.2 71 68 121.3	9 18.0 71 67 121.7	8 56.7 71 67 122.0	8 35.4 71 67 122.4	8 14.0 71 67 122.8	2
3	10 01.9 70 69 119.6	9 40.9 70 69 120.0	9 19.8 70 68 120.3	8 58.7 70 68 120.6	8 37.6 70 68 121.0	8 16.5 70 68 121.4	7 55.3 71 67 121.7	7 34.1 71 67 122.1	3
4	9 20.6 70 69 118.9	8 59.7 70 69 119.2	8 38.8 70 69 119.6	8 17.9 70 69 120.0	7 56.9 70 68 120.3	7 35.9 70 68 120.7	7 14.9 70 68 121.1	6 53.9 70 68 121.4	4
65	8 39.1 69 70 118.2	8 18.3 69 69 118.6	7 57.6 69 69 118.9	7 36.8 69 69 119.3	7 16.0 69 69 119.7	6 55.1 69 68 120.0	6 34.3 70 68 120.4	6 13.4 70 68 120.8	65
6	7 57.5 69 70 117.5	7 36.7 69 70 117.9	7 16.1 69 70 118.3	6 55.4 69 69 118.6	6 34.8 69 69 119.0	6 14.1 69 69 119.4	5 53.4 69 69 119.7	5 32.7 69 68 120.1	6
7	7 15.3 68 70 116.9	6 54.8 68 70 117.2	6 34.3 68 70 117.6	6 13.8 68 70 118.0	5 53.3 68 70 118.3	5 32.7 68 69 118.7			7
8	6 33.0 68 71 116.2	6 12.6 68 71 116.6	5 52.3 68 70 117.0	5 31.9 68 70 117.3	5 11.5 68 70 117.7				8
9	5 50.4 67 71 115.6	5 30.2 67 71 115.9	5 10.0 67 71 116.3						9
70	5 07.7 67 72 114.9								70

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00' Alt. Δd Δt Az.	16° 30' Alt. Δd Δt Az.	17° 00' Alt. Δd Δt Az.	17° 30' Alt. Δd Δt Az.	18° 00' Alt. Δd Δt Az.	18° 30' Alt. Δd Δt Az.	19° 00' Alt. Δd Δt Az.	19° 30' Alt. Δd Δt Az.	H.A.
91	9 00.2 60 76 76.7	9 18.2 60 76 76.3	9 36.3 60 76 75.9	9 54.3 60 76 75.5	10 12.3 60 76 75.1	10 30.3 60 76 74.7	10 48.2 60 76 74.2	11 06.1 60 76 73.8	91
2	8 14.2 61 76 76.1	8 32.4 60 76 75.7	8 50.5 60 76 75.3	9 08.6 60 76 74.9	9 26.7 60 76 74.5	9 44.7 60 76 74.1	10 02.8 60 76 73.7	10 20.7 60 75 73.3	2
3	7 28.4 61 76 75.5	7 46.6 61 76 75.1	8 04.8 61 76 74.7	8 23.0 61 76 74.3	8 41.2 61 76 73.9	8 59.3 61 75 73.5	9 17.4 60 75 73.1	9 35.5 60 75 72.7	3
4	6 42.7 61 76 74.9	7 01.0 61 76 74.5	7 19.3 61 76 74.1	7 37.6 61 76 73.7	7 55.8 61 75 73.3	8 14.1 61 75 72.9	8 32.3 61 75 72.5	8 50.5 61 75 72.1	4
95	5 57.1 61 76 74.3	6 15.5 61 76 73.9	6 33.9 61 75 73.5	6 52.3 61 75 73.1	7 10.6 61 75 72.7	7 28.9 61 75 72.3	7 47.3 61 75 71.9	8 05.6 61 75 71.5	95
6	5 11.6 62 76 73.7	5 38.1 62 75 73.3	5 48.6 62 75 72.9	6 07.1 62 75 72.5	6 25.5 61 75 72.1	6 44.0 61 75 71.7	7 02.4 61 75 71.3	7 20.8 61 74 70.9	6
7			5 03.5 62 75 72.3	5 22.0 62 75 71.9	5 40.6 62 75 71.6	5 59.1 62 74 71.2	6 17.7 62 74 70.8	6 36.2 62 74 70.4	7
8						5 14.5 62 74 70.6	5 33.1 62 74 70.2	5 51.7 62 74 69.8	8
9								5 07.4 62 74 69.2	9

Lat. 38°

Each declination column below lists: Alt. (° ′) Δd Δt Az. (°)

H.A.	20° 00′	20° 30′	21° 00′	21° 30′	22° 00′	22° 30′	23° 00′	23° 30′	H.A.
00	72 00.0 1.0 02 180.0	72 30.0 1.0 02 180.0	73 00.0 1.0 02 180.0	73 30.0 1.0 02 180.0	74 00.0 1.0 02 180.0	74 30.0 1.0 02 180.0	75 00.0 1.0 02 180.0	75 30.0 1.0 03 180.0	00
1	71 58.7 1.0 06 177.0	72 28.7 1.0 06 176.9	72 58.7 1.0 07 176.8	73 28.6 1.0 07 176.7	73 58.6 1.0 07 176.6	74 28.6 1.0 07 176.5	74 58.5 1.0 07 176.4	75 28.5 1.0 08 176.3	1
2	71 55.0 1.0 10 173.9	72 24.9 1.0 11 173.8	72 54.7 1.0 11 173.6	73 24.6 1.0 11 173.5	73 54.5 1.0 11 173.3	74 24.3 99 12 173.1	74 54.1 99 12 172.9	75 24.0 99 12 172.7	2
3	71 48.8 99 14 170.9	72 18.5 99 15 170.7	72 48.2 99 15 170.5	73 17.9 99 16 170.2	73 47.6 99 16 170.0	74 17.2 99 16 169.7	74 46.9 99 17 169.4	75 16.5 99 17 169.1	3
4	71 40.1 98 18 168.0	72 09.6 98 19 167.7	72 39.1 98 19 167.4	73 08.6 98 20 167.1	73 38.0 98 20 166.7	74 07.5 98 21 166.4	74 36.8 98 21 166.0	75 06.2 98 22 165.6	4
05	71 29.1 98 22 165.1	71 58.4 98 23 164.7	72 27.6 97 23 164.3	72 56.8 97 24 163.9	73 25.9 97 24 163.5	73 55.0 97 25 163.1	74 24.0 97 26 162.6	74 53.0 96 26 162.2	05
6	71 15.7 97 26 162.2	71 44.7 96 26 161.8	72 13.6 96 27 161.4	72 42.5 96 28 160.9	73 11.3 96 28 160.4	73 40.0 96 29 159.9	74 08.6 95 30 159.4	74 37.2 95 31 158.8	6
7	71 00.2 96 29 159.4	71 28.8 95 30 158.9	71 57.4 95 31 158.4	72 25.9 95 31 157.9	72 54.3 95 32 157.4	73 22.6 94 34 156.8	73 50.8 94 34 156.2	74 18.9 93 35 155.5	7
8	70 42.5 94 33 156.7	71 10.8 94 34 156.2	71 38.9 94 34 155.6	72 07.0 93 35 155.1	72 35.0 93 37 154.5	73 02.8 93 37 153.8	73 30.6 92 37 153.2	73 58.2 92 38 152.5	8
9	70 22.8 93 36 154.0	70 50.7 93 37 153.5	71 18.4 93 38 152.9	71 46.0 92 38 152.3	72 13.5 91 39 151.6	72 40.9 91 40 151.0	73 08.2 91 41 150.2	73 35.2 90 42 149.5	9
10	70 01.1 92 39 151.5	70 28.6 91 40 150.9	70 55.9 91 41 150.2	71 23.1 90 41 149.6	71 50.1 90 42 148.9	72 17.0 89 43 148.2	72 43.7 89 44 147.4	73 10.2 88 45 146.6	10
1	69 37.7 90 42 149.0	70 04.7 90 43 148.4	70 31.5 89 44 147.7	70 58.2 89 44 147.0	71 24.8 88 45 146.3	71 51.1 88 46 145.5	72 17.3 87 47 144.7	72 43.3 86 48 143.9	1
2	69 12.5 89 45 146.6	69 39.0 88 45 145.9	70 05.4 88 46 145.3	70 31.6 87 47 144.5	70 57.6 86 48 143.8	71 23.5 86 49 143.0	71 49.1 85 50 142.2	72 14.6 85 51 141.3	2
3	68 45.7 87 47 144.3	69 11.7 87 48 143.6	69 37.7 86 49 142.9	70 03.4 85 50 142.1	70 28.9 85 50 141.4	70 54.2 84 51 140.6	71 19.3 83 52 139.7	71 44.2 82 53 138.8	3
4	68 17.3 86 50 142.1	68 43.0 85 50 141.4	69 08.4 84 51 140.6	69 33.6 84 52 139.9	69 58.7 83 53 139.1	70 23.5 82 54 138.2	70 48.0 81 54 137.4	71 12.3 81 55 136.5	4
15	67 47.6 84 52 139.9	68 12.7 84 53 139.2	68 37.7 83 53 138.5	69 02.5 82 54 137.7	69 27.0 81 55 136.9	69 51.3 81 56 136.0	70 15.3 80 57 135.2	70 39.1 79 57 134.2	15
6	67 16.5 83 54 137.9	67 41.2 82 55 137.2	68 05.7 81 55 136.4	68 30.0 81 56 135.6	68 54.0 80 57 134.8	69 17.8 79 58 133.9	69 41.4 78 59 133.0	70 04.6 77 59 132.1	6
7	66 44.2 81 56 135.9	67 08.5 81 56 135.2	67 32.5 80 57 134.4	67 56.3 79 58 133.6	68 19.9 78 59 132.8	68 43.2 77 60 131.9	69 06.3 76 60 131.0	69 29.0 75 61 130.1	7
8	66 10.8 80 58 134.0	66 34.6 79 58 133.3	66 58.2 78 59 132.5	67 21.5 77 60 131.7	67 44.7 77 60 130.8	68 07.5 76 61 130.0	68 30.1 75 62 129.1	68 52.3 74 63 128.2	8
9	65 36.2 78 59 132.2	65 59.6 78 60 131.4	66 22.8 77 61 130.7	66 45.7 76 61 129.8	67 08.4 75 62 129.0	67 30.8 74 63 128.1	67 52.9 73 63 127.3	68 14.7 72 64 126.3	9
20	65 00.7 77 61 130.5	65 23.7 76 61 129.7	65 46.5 75 62 128.9	66 09.0 75 63 128.1	66 31.2 74 63 127.3	66 53.2 73 64 126.4	67 14.8 72 65 125.5	67 36.2 71 66 124.6	20
1	64 24.3 74 62 128.8	64 46.9 75 63 128.0	65 09.3 74 64 127.2	65 31.3 74 64 126.4	65 53.2 72 65 125.6	66 14.7 71 65 124.7	66 35.9 70 66 123.8	66 56.9 69 67 122.9	1
2	63 47.1 74 63 127.2	64 09.3 74 64 126.4	64 31.2 73 65 125.6	64 52.9 72 65 124.8	65 14.3 71 66 124.0	65 35.5 70 67 123.1	65 56.3 69 67 122.2	66 16.8 68 68 121.3	2
3	63 09.0 73 65 125.6	63 30.8 72 65 124.9	63 52.4 71 66 124.1	64 13.7 71 66 123.3	64 34.8 70 67 122.4	64 55.5 69 68 121.6	65 16.0 68 68 120.7	65 36.1 67 69 119.8	3
4	62 30.2 72 66 124.1	62 51.7 71 66 123.3	63 12.9 70 67 122.6	63 33.8 69 68 121.8	63 54.5 68 68 121.0	64 14.9 68 69 120.1	64 35.0 67 69 119.3	64 54.8 65 70 118.4	4
25	61 50.7 71 67 122.7	62 11.9 70 67 121.9	62 32.7 69 68 121.2	62 53.4 68 68 120.4	63 13.7 67 69 119.6	63 33.7 66 70 118.7	63 53.5 65 70 117.9	64 13.0 64 71 117.0	25
6	61 10.6 70 68 121.3	61 31.4 69 68 120.6	61 52.0 68 69 119.8	62 12.3 67 69 119.0	62 32.3 66 70 118.2	62 52.0 65 70 117.4	63 11.5 64 71 116.5	63 30.6 63 71 115.7	6
7	60 29.9 69 69 120.0	60 50.4 68 69 119.2	61 10.7 67 70 118.5	61 30.7 66 70 117.7	61 50.4 65 71 116.9	62 09.8 64 71 116.1	62 28.9 63 72 115.2	62 47.8 62 72 114.4	7
8	59 48.7 68 70 118.7	60 08.9 67 70 117.9	60 28.9 66 70 117.2	60 48.5 65 71 116.4	61 08.0 64 71 115.6	61 27.1 63 72 114.8	61 45.9 62 72 114.0	62 04.5 61 73 113.2	8
9	59 07.0 67 70 117.4	59 26.9 66 71 116.7	59 46.6 65 71 116.0	60 06.0 64 72 115.2	60 25.1 63 72 114.4	60 44.0 62 72 113.6	61 02.5 61 73 112.8	61 20.8 60 73 112.0	9
30	58 24.8 66 71 116.2	58 44.5 65 71 115.5	59 03.8 64 72 114.8	59 23.0 63 72 114.0	59 41.9 62 73 113.2	60 00.5 61 73 112.4	60 18.8 60 74 111.7	60 36.8 60 74 110.9	30
1	57 42.2 65 72 115.1	58 01.6 64 72 114.4	58 20.7 63 72 113.6	58 39.6 63 73 112.9	58 58.2 62 73 112.1	59 16.6 61 74 111.3	59 34.7 60 74 110.6	59 52.5 59 74 109.8	1
2	56 59.2 64 72 113.9	57 18.3 63 73 113.2	57 37.2 63 73 112.5	57 55.9 62 73 111.8	58 14.3 61 74 111.0	58 32.4 60 74 110.3	58 50.3 59 75 109.5	59 07.8 58 75 108.7	2
3	56 15.8 63 73 112.9	56 34.7 63 73 112.2	56 53.4 62 74 111.4	57 11.8 61 74 110.7	57 30.0 60 74 110.0	57 47.9 59 75 109.2	58 05.6 58 75 108.5	58 22.9 57 75 107.7	3
4	55 32.0 63 73 111.8	55 50.9 62 74 111.0	56 09.2 62 74 110.4	56 27.4 60 74 109.7	56 45.4 59 75 109.0	57 03.1 59 75 108.2	57 20.6 58 75 107.5	57 37.8 57 75 106.7	4
35	54 48.0 62 74 110.8	55 06.5 61 74 110.1	55 24.7 61 75 109.4	55 42.8 60 75 108.7	56 00.6 59 76 108.0	56 18.1 58 75 107.2	56 35.4 57 76 106.5	56 52.4 56 76 105.7	35
6	54 03.6 61 74 109.8	54 21.9 61 75 109.1	54 40.0 60 75 108.4	54 57.9 59 75 107.7	55 15.5 58 76 107.0	55 32.8 57 76 106.3	55 49.9 57 76 105.6	56 06.7 56 76 104.8	6
7	53 19.0 61 75 108.8	53 37.1 60 75 108.1	53 55.0 59 75 107.5	54 12.7 59 76 106.8	54 30.1 58 76 106.1	54 47.3 57 76 105.4	55 04.3 56 76 104.6	55 20.9 55 77 103.9	7
8	52 34.1 60 75 107.9	52 52.1 60 75 107.2	53 09.8 59 76 106.5	53 27.3 58 76 105.8	53 44.6 57 76 105.2	54 01.6 56 76 104.5	54 18.4 56 77 103.8	54 35.0 55 77 103.0	8
9	51 49.0 60 76 106.9	52 06.8 59 76 106.3	52 24.4 58 76 105.6	52 41.7 57 76 105.0	52 58.9 57 76 104.3	53 15.8 56 77 103.6	53 32.4 55 77 102.9	53 48.8 54 77 102.2	9
40	51 03.7 59 76 106.0	51 21.3 58 76 105.4	51 38.8 58 76 104.7	51 56.0 57 77 104.1	52 13.0 56 77 103.4	52 29.7 55 77 102.7	52 46.3 55 77 102.0	53 02.5 54 77 101.3	40
1	50 18.1 59 76 105.2	50 35.6 58 76 104.5	50 52.9 57 77 103.9	51 10.0 57 77 103.2	51 26.9 56 77 102.6	51 43.5 55 77 101.9	51 59.9 54 77 101.2	52 16.1 54 78 100.5	1
2	49 32.4 58 76 104.3	49 49.8 58 77 103.7	50 07.0 57 77 103.0	50 23.9 56 77 102.4	50 40.7 55 77 101.7	50 57.2 55 77 101.1	51 13.5 54 78 100.4	51 29.6 53 78 99.7	2
3	48 46.5 58 77 103.5	49 03.8 57 77 102.9	49 20.8 57 77 102.2	49 37.7 56 77 101.6	49 54.3 55 77 100.9	50 10.7 54 78 100.3	50 26.9 54 78 99.6	50 42.9 53 78 99.0	3
4	48 00.4 57 77 102.7	48 17.6 57 77 102.0	48 34.5 56 77 101.4	48 51.3 55 78 100.8	49 07.8 55 78 100.2	49 24.2 54 78 99.5	49 40.3 53 78 98.9	49 56.2 53 78 98.2	4
45	47 14.2 57 77 101.9	47 31.3 56 77 101.3	47 48.1 56 78 100.6	48 04.8 55 78 100.0	48 21.2 54 78 99.4	48 37.5 54 78 98.8	48 53.5 53 78 98.1	49 09.3 52 78 97.5	45
6	46 27.9 57 77 101.1	46 44.9 56 78 100.5	47 01.6 56 78 99.9	47 18.2 55 78 99.3	47 34.5 54 78 98.6	47 50.7 54 78 98.0	48 06.7 53 78 97.4	48 22.4 52 78 96.7	6
7	45 41.4 57 78 100.3	45 58.3 56 78 99.7	46 15.0 55 78 99.1	46 31.5 54 78 98.5	46 47.8 54 78 97.9	47 03.8 53 78 97.3	47 19.7 53 78 96.7	47 35.4 52 78 96.0	7
8	44 54.9 56 78 99.6	45 11.7 56 78 99.0	45 28.2 55 78 98.4	45 44.7 54 78 97.8	46 00.9 54 78 97.2	46 16.9 53 78 96.6	46 32.7 52 78 96.0	46 48.4 52 78 95.3	8
9	44 08.2 56 78 98.8	44 24.9 55 78 98.2	44 41.4 55 78 97.7	44 57.9 54 78 97.1	45 13.9 54 78 96.5	45 29.9 53 78 95.9	45 45.7 52 78 95.3	46 01.3 52 79 94.6	9
50	43 21.4 56 78 98.1	43 38.1 55 78 97.5	43 54.5 55 78 96.9	44 10.8 54 78 96.4	44 26.9 53 78 95.8	44 42.8 52 79 95.2	44 58.6 52 79 94.6	45 14.1 51 79 94.0	50
1	42 34.6 56 78 97.4	42 51.2 55 78 96.8	43 07.6 54 78 96.2	43 23.8 54 78 95.7	43 39.9 53 79 95.1	43 55.7 52 79 94.5	44 11.4 52 79 93.9	44 26.9 51 79 93.3	1
2	41 47.7 55 78 96.7	42 04.2 55 78 96.1	42 20.5 54 78 95.5	42 36.7 54 79 95.0	42 52.7 53 79 94.4	43 08.6 53 79 93.8	43 24.2 52 79 93.2	43 39.7 51 79 92.6	2
3	41 00.7 55 78 96.0	41 17.1 55 78 95.4	41 33.5 54 79 94.9	41 49.6 53 79 94.3	42 05.6 53 79 93.7	42 21.4 52 79 93.1	42 37.0 52 79 92.6	42 52.5 51 79 92.0	3
4	40 13.6 55 78 95.3	40 30.0 55 79 94.8	40 46.3 54 79 94.2	41 02.4 53 79 93.6	41 18.4 53 79 93.1	41 34.2 52 79 92.5	41 49.8 52 79 91.9	42 05.2 51 79 91.4	4
55	39 26.5 55 79 94.6	39 42.9 54 79 94.1	39 59.1 54 79 93.5	40 15.2 53 79 93.0	40 31.2 53 79 92.4	40 46.9 52 79 91.9	41 02.5 52 79 91.3	41 18.0 51 79 90.7	55
6	38 39.4 55 79 94.0	38 55.7 54 79 93.4	39 11.9 54 79 92.9	39 28.0 53 79 92.3	39 43.9 53 79 91.8	39 59.7 52 79 91.2	40 15.2 52 79 90.7	40 30.7 51 79 90.1	6
7	37 52.2 55 79 93.3	38 08.5 54 79 92.8	38 24.7 54 79 92.2	38 40.7 53 79 91.7	38 56.6 53 79 91.2	39 12.4 52 79 90.6	39 28.0 52 79 90.1	39 43.4 51 79 89.5	7
8	37 05.0 55 79 92.7	37 21.3 54 79 92.1	37 37.5 54 79 91.6	37 53.5 53 79 91.1	38 09.4 53 79 90.5	38 25.1 52 79 90.0	38 40.7 51 79 89.4	38 56.1 51 79 88.9	8
9	36 17.7 55 79 92.0	36 34.0 54 79 91.5	36 50.2 54 79 91.0	37 06.2 53 79 90.4	37 22.1 53 79 89.9	37 37.8 52 79 89.4	37 53.4 51 79 88.8	38 08.9 51 79 88.3	9
60	35 30.5 55 79 91.4	35 46.8 54 79 90.9	36 02.9 54 79 90.4	36 18.9 53 79 89.8	36 34.8 53 79 89.3	36 50.5 52 79 88.8	37 06.1 52 79 88.2	37 21.6 51 79 87.7	60
1	34 43.2 54 79 90.8	34 59.5 54 79 90.3	35 15.6 54 79 89.7	35 31.9 53 79 89.2	35 47.5 52 79 88.7	36 03.2 52 79 88.2	36 18.9 52 79 87.6	36 34.4 51 79 87.1	1
2	33 55.9 54 79 90.1	34 12.2 54 79 89.6	34 28.3 54 79 89.1	34 44.4 53 79 88.6	35 00.3 53 79 88.1	35 16.0 52 79 87.6	35 31.7 52 79 87.1	35 47.2 51 79 86.5	2
3	33 08.6 54 79 89.5	33 24.9 54 79 89.0	33 41.1 54 79 88.5	33 57.1 53 79 88.0	34 13.0 53 79 87.5	34 28.8 52 79 87.0	34 44.5 52 79 86.5	35 00.0 52 79 85.9	3
4	32 21.4 54 79 88.9	32 37.6 54 79 88.4	32 53.8 54 79 87.9	33 09.9 53 79 87.4	33 25.8 53 79 86.9	33 41.6 52 79 86.4	33 57.3 52 79 85.9	34 12.8 52 78 85.4	4
65	31 34.1 55 79 88.3	31 50.4 54 79 87.8	32 06.6 54 79 87.3	32 22.7 53 79 86.8	32 38.6 53 79 86.3	32 54.4 53 79 85.8	33 10.1 52 78 85.3	33 25.7 52 78 84.8	65
6	30 46.8 55 79 87.7	31 03.2 54 79 87.2	31 19.4 54 79 86.7	31 35.5 53 79 86.2	31 51.4 53 79 85.7	32 07.3 53 78 85.2	32 23.0 52 78 84.7	32 38.7 52 78 84.2	6
7	29 59.6 55 79 87.1	30 15.9 54 79 86.6	30 32.2 54 79 86.2	30 48.3 54 79 85.7	31 04.3 53 79 85.2	31 20.2 53 78 84.7	31 36.0 52 78 84.2	31 51.6 52 78 83.7	7
8	29 12.4 55 79 86.5	29 28.8 54 79 86.1	29 45.0 54 79 85.6	30 01.2 54 78 85.1	30 17.2 53 78 84.6	30 33.1 53 78 84.1	30 49.0 53 78 83.6	31 04.7 52 78 83.1	8
9	28 25.2 55 79 85.9	28 41.6 54 78 85.5	28 57.9 54 78 85.0	29 14.1 54 78 84.5	29 30.2 53 78 84.0	29 46.1 53 78 83.5	30 02.0 53 78 83.0	30 17.8 52 78 82.6	9
70	27 38.1 55 78 85.4	27 54.5 55 78 84.9	28 10.8 54 78 84.4	28 27.0 54 78 83.9	28 43.2 54 78 83.5	28 59.2 53 78 83.0	29 15.1 53 78 82.5	29 30.9 53 78 82.0	70
1	26 51.0 55 78 84.8	27 07.4 55 78 84.3	27 23.8 54 78 83.8	27 40.1 54 78 83.4	27 56.2 54 78 82.9	28 12.3 53 78 82.4	28 28.3 53 78 81.9	28 44.1 53 78 81.4	1
2	26 03.9 55 78 84.2	26 20.4 55 78 83.7	26 36.8 54 78 83.3	26 53.1 54 78 82.8	27 09.3 54 78 82.3	27 25.5 54 78 81.9	27 41.5 53 78 81.4	27 57.4 53 78 80.9	2
3	25 16.9 55 78 83.6	25 33.4 55 78 83.2	25 49.9 55 78 82.7	26 06.2 54 78 82.2	26 22.5 54 78 81.8	26 38.7 54 78 81.3	26 54.8 53 78 80.8	27 10.8 53 78 80.3	3
4	24 29.9 55 78 83.1	24 46.5 55 78 82.6	25 03.0 55 78 82.1	25 19.4 55 78 81.7	25 35.8 54 78 81.2	25 52.0 54 78 80.7	26 08.1 54 78 80.3	26 24.2 53 77 79.8	4
75	23 43.0 56 78 82.5	23 59.7 55 78 82.0	24 16.2 55 78 81.6	24 32.7 55 78 81.1	24 49.1 54 78 80.7	25 05.4 54 78 80.2	25 21.6 54 77 79.7	25 37.7 54 77 79.3	75
6	22 56.2 56 78 81.9	23 12.9 55 78 81.5	23 29.5 55 78 81.0	23 46.0 55 78 80.6	24 02.4 55 78 80.1	24 18.8 54 77 79.6	24 35.1 54 77 79.2	24 51.3 54 77 78.7	6
7	22 09.4 56 78 81.3	22 26.1 56 78 80.9	22 42.8 55 78 80.4	22 59.4 55 78 80.0	23 15.9 55 77 79.5	23 32.3 55 77 79.1	23 48.7 54 77 78.6	24 05.0 54 77 78.2	7
8	21 22.7 56 78 80.8	21 39.5 56 78 80.3	21 56.2 56 78 79.9	22 12.9 55 77 79.4	22 29.5 55 77 79.0	22 46.0 55 77 78.5	23 02.4 55 77 78.1	23 18.7 54 77 77.6	8
9	20 36.1 56 78 80.2	20 52.9 56 78 79.8	21 09.7 56 77 79.3	21 26.4 55 77 78.9	21 43.1 55 77 78.4	21 59.7 55 77 78.0	22 16.2 55 77 77.5	22 32.6 55 77 77.1	9
80	19 49.5 57 78 79.6	20 06.4 56 77 79.2	20 23.3 56 77 78.8	20 40.1 56 77 78.3	20 56.8 56 77 77.9	21 13.5 55 77 77.4	21 30.1 55 77 77.0	21 46.6 55 76 76.5	80
1	19 03.0 57 77 79.1	19 20.0 57 77 78.6	19 37.0 56 77 78.2	19 53.8 56 77 77.8	20 10.6 56 77 77.3	20 27.4 56 77 76.9	20 44.0 55 77 76.4	21 00.6 55 76 76.0	1
2	18 16.7 57 77 78.5	18 33.7 57 77 78.1	18 50.7 57 77 77.7	19 07.7 56 77 77.2	19 24.6 56 77 76.8	19 41.4 56 76 76.3	19 58.1 56 76 75.9	20 14.8 56 76 75.5	2
3	17 30.4 57 77 78.0	17 47.5 57 77 77.5	18 04.6 57 77 77.1	18 21.6 57 77 76.7	18 38.6 56 76 76.2	18 55.5 56 76 75.8	19 12.3 56 76 75.4	19 29.1 56 76 74.9	3
4	16 44.2 57 77 77.4	17 01.4 57 77 77.0	17 18.6 57 77 76.5	17 35.7 57 76 76.1	17 52.7 57 76 75.7	18 09.7 56 76 75.2	18 26.6 56 76 74.8	18 43.5 56 76 74.4	4
85	15 58.1 58 77 76.9	16 15.4 58 76 76.4	16 32.6 57 76 76.0	16 49.8 57 76 75.5	17 07.0 57 76 75.1	17 24.1 57 76 74.7	17 41.1 56 76 74.3	17 58.1 56 76 73.8	85
6	15 12.1 58 76 76.3	15 29.5 58 76 75.8	15 46.8 57 76 75.4	16 04.1 57 76 75.0	16 21.3 57 76 74.6	16 38.5 57 76 74.1	16 55.6 57 76 73.7	17 12.7 57 75 73.3	6
7	14 26.2 58 76 75.7	14 43.7 58 76 75.3	15 01.1 58 76 74.9	15 18.5 58 76 74.4	15 35.8 58 76 74.0	15 53.1 57 76 73.6	16 10.3 57 75 73.2	16 27.5 57 75 72.7	7
8	13 40.5 59 76 75.1	13 58.0 58 76 74.7	14 15.5 58 76 74.3	14 33.0 58 76 73.9	14 50.4 58 75 73.5	15 07.8 58 75 73.0	15 25.1 58 75 72.6	15 42.4 58 75 72.2	8
9	12 54.9 59 76 74.6	13 12.5 59 76 74.2	13 30.1 59 76 73.7	13 47.7 58 75 73.3	14 05.2 58 75 72.9	14 22.6 58 75 72.5	14 40.1 58 75 72.1	14 57.5 58 75 71.6	9
90	12 09.3 59 76 74.0	12 27.1 59 76 73.6	12 44.8 59 75 73.2	13 02.4 59 75 72.8	13 20.1 59 75 72.3	13 37.6 59 75 71.9	13 55.2 58 75 71.5	14 12.7 58 75 71.1	90

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	20° 00' Alt. Δd Δt	Az.	20° 30' Alt. Δd Δt	Az.	21° 00' Alt. Δd Δt	Az.	21° 30' Alt. Δd Δt	Az.	22° 00' Alt. Δd Δt	Az.	22° 30' Alt. Δd Δt	Az.	23° 00' Alt. Δd Δt	Az.	23° 30' Alt. Δd Δt	Az.	H.A.
00	32 00.0 1.0 01	180.0	31 30.0 1.0 01	180.0	31 00.0 1.0 01	180.0	30 30.0 1.0 01	180.0	30 00.0 1.0 01	180.0	29 30.0 1.0 01	180.0	29 00.0 1.0 01	180.0	28 30.0 1.0 01	180.0	00
1	31 59.5 1.0 02	178.9	31 29.5 1.0 02	178.9	30 59.6 1.0 02	178.9	30 29.6 1.0 02	178.9	29 59.6 1.0 02	178.9	29 29.6 1.0 02	178.9	28 59.6 1.0 02	178.9	28 29.6 1.0 02	179.0	1
2	31 58.1 1.0 04	177.8	31 28.2 1.0 04	177.8	30 58.2 1.0 04	177.8	30 28.2 1.0 04	177.8	29 58.2 1.0 04	177.9	29 28.2 1.0 04	177.9	28 58.3 1.0 04	177.9	28 28.3 1.0 04	177.9	2
3	31 55.9 1.0 05	176.7	31 25.9 1.0 05	176.7	30 56.0 1.0 05	176.7	30 26.0 1.0 05	176.8	29 56.0 1.0 05	176.8	29 26.1 1.0 05	176.8	28 56.1 1.0 05	176.8	28 26.1 1.0 05	176.9	3
4	31 52.7 1.0 07	175.6	31 22.8 1.0 07	175.6	30 52.8 1.0 07	175.6	30 22.9 1.0 07	175.7	29 52.9 1.0 07	175.7	29 23.0 1.0 07	175.8	28 53.1 1.0 06	175.8	28 23.1 1.0 06	175.8	4
05	31 48.6 1.0 08	174.5	31 18.7 1.0 08	174.5	30 48.8 1.0 08	174.6	30 18.9 1.0 08	174.6	29 49.0 1.0 08	174.7	29 19.1 1.0 08	174.7	28 49.2 1.0 08	174.7	28 19.3 1.0 08	174.8	05
6	31 43.6 1.0 10	173.4	31 13.7 1.0 10	173.4	30 43.9 1.0 10	173.5	30 14.0 1.0 10	173.5	29 44.1 1.0 10	173.6	29 14.3 1.0 10	173.6	28 44.4 1.0 09	173.7	28 14.5 1.0 09	173.8	6
7	31 37.7 99 11	172.3	31 07.9 99 11	172.3	30 38.0 99 11	172.4	30 08.2 99 11	172.5	29 38.4 99 11	172.5	29 08.6 99 11	172.6	28 38.8 99 11	172.7	28 09.0 99 11	172.7	7
8	31 30.9 99 13	171.2	31 01.1 99 13	171.3	30 31.4 99 13	171.3	30 01.6 99 12	171.4	29 31.8 99 12	171.5	29 02.1 99 12	171.5	28 32.3 99 12	171.6	28 02.5 99 12	171.7	8
9	31 23.2 99 14	170.1	30 53.5 99 14	170.2	30 23.8 99 14	170.3	29 54.1 99 14	170.3	29 24.4 99 14	170.4	28 54.7 99 14	170.5	28 25.0 99 14	170.6	27 55.3 99 13	170.7	9
10	31 14.6 99 16	169.0	30 45.0 99 16	169.1	30 15.3 99 16	169.2	29 45.7 99 15	169.3	29 16.1 99 15	169.4	28 46.5 99 15	169.5	28 16.8 99 15	169.6	27 47.2 99 15	169.6	10
1	31 05.1 98 17	167.9	30 35.6 98 17	168.0	30 06.0 98 17	168.1	29 36.5 98 17	168.2	29 06.9 98 17	168.3	28 37.3 99 17	168.4	28 07.8 98 16	168.5	27 38.3 99 16	168.6	1
2	30 54.8 98 19	166.8	30 25.3 98 18	166.9	29 55.9 98 18	167.1	29 26.4 98 18	167.2	28 57.0 98 18	167.3	28 27.5 98 18	167.4	27 58.0 98 18	167.5	27 28.5 98 18	167.6	2
3	30 43.6 98 20	165.8	30 14.2 98 20	165.9	29 44.9 98 20	166.0	29 15.5 98 20	166.1	28 46.1 98 19	166.2	28 16.7 98 19	166.4	27 47.3 98 19	166.5	27 18.0 98 19	166.6	3
4	30 31.5 98 22	164.7	30 02.3 98 21	164.8	29 33.0 98 21	165.0	29 03.7 98 21	165.1	28 34.5 98 21	165.2	28 05.2 98 21	165.3	27 35.9 98 20	165.4	27 06.6 98 20	165.6	4
15	30 18.6 97 23	163.6	29 49.5 97 23	163.8	29 20.3 97 23	163.9	28 51.1 97 22	164.0	28 22.0 97 22	164.2	27 52.8 97 22	164.3	27 23.6 97 22	164.4	26 54.4 97 22	164.6	15
6	30 04.9 97 24	162.6	29 35.9 97 24	162.7	29 06.8 97 24	162.9	28 37.7 97 24	163.0	28 08.7 97 24	163.2	27 39.6 97 23	163.3	27 10.5 97 23	163.4	26 41.4 97 23	163.6	6
7	29 50.3 96 26	161.5	29 21.4 96 25	161.7	28 52.5 96 25	161.8	28 23.5 97 25	162.0	27 54.6 97 25	162.1	27 25.6 97 25	162.3	26 56.6 97 24	162.4	26 27.6 97 24	162.6	7
8	29 35.0 96 27	160.5	29 06.1 96 27	160.7	28 37.3 96 26	160.8	28 08.5 96 26	161.0	27 39.7 96 26	161.1	27 10.8 96 26	161.3	26 42.0 96 26	161.4	26 13.1 96 26	161.6	8
9	29 18.8 96 28	159.5	28 50.1 96 28	159.6	28 21.4 96 28	159.8	27 52.7 96 28	160.0	27 24.0 96 27	160.1	26 55.3 96 27	160.3	26 26.5 96 27	160.4	25 57.8 96 27	160.6	9
20	29 01.8 95 30	158.4	28 33.2 95 29	158.6	28 04.7 95 29	158.8	27 36.1 95 29	159.0	27 07.5 95 29	159.1	26 38.9 95 30	159.3	26 10.3 95 28	159.5	25 41.7 95 28	159.6	20
1	28 44.0 95 31	157.4	28 15.6 95 31	157.6	27 47.2 95 30	157.8	27 18.7 95 30	158.0	26 50.3 95 30	158.1	26 21.8 95 30	158.3	25 53.3 95 29	158.5	25 24.9 95 29	158.7	1
2	28 25.5 94 32	156.4	27 57.2 94 32	156.6	27 28.9 94 32	156.8	27 00.6 94 31	157.0	26 32.3 94 31	157.2	26 04.0 94 31	157.3	25 35.6 94 31	157.5	25 07.3 95 30	157.7	2
3	28 06.2 94 33	155.4	27 38.0 94 33	155.6	27 09.9 94 33	155.8	26 41.8 94 33	156.0	26 13.6 94 32	156.2	25 45.4 94 32	156.4	25 17.2 94 32	156.6	24 49.0 94 32	156.7	3
4	27 46.1 93 35	154.4	27 18.1 93 34	154.6	26 50.2 93 34	154.8	26 22.1 93 34	155.0	25 54.1 93 34	155.2	25 26.1 93 33	155.4	24 58.0 94 33	155.6	24 30.0 94 33	155.8	4
25	27 25.3 93 36	153.4	26 57.5 93 36	153.6	26 29.7 93 35	153.8	26 01.8 93 35	154.0	25 33.9 93 35	154.2	25 06.1 93 35	154.5	24 38.1 93 34	154.7	24 10.2 93 34	154.9	25
6	27 03.8 92 37	152.4	26 36.1 92 37	152.7	26 08.5 92 36	152.9	25 40.8 92 36	153.1	25 13.1 92 36	153.3	24 45.3 92 36	153.5	24 17.6 92 35	153.7	23 49.8 93 35	153.9	6
7	26 41.6 92 38	151.5	26 14.1 92 38	151.7	25 46.6 92 38	151.9	25 19.0 92 37	152.1	24 51.5 92 37	152.4	24 23.9 92 37	152.6	23 56.3 92 37	152.8	23 28.7 92 36	153.0	7
8	26 18.7 91 39	150.5	25 51.3 91 39	150.7	25 24.0 91 39	151.0	24 56.6 91 39	151.2	24 29.2 91 38	151.4	24 01.8 91 38	151.6	23 34.3 91 38	151.9	23 06.9 92 37	152.1	8
9	25 55.1 91 40	149.6	25 27.9 91 40	149.8	25 00.7 91 40	150.0	24 33.5 91 40	150.3	24 06.2 91 39	150.5	23 39.0 91 39	150.7	23 11.7 91 39	151.0	22 44.4 91 39	151.2	9
30	25 30.8 90 42	148.6	25 03.8 90 41	148.9	24 36.7 90 41	149.1	24 09.7 90 41	149.3	23 42.6 90 40	149.6	23 15.5 90 40	149.8	22 48.4 90 40	150.0	22 21.3 90 40	150.3	30
1	25 05.8 89 43	147.7	24 39.0 89 42	147.9	24 12.1 90 42	148.2	23 45.3 90 42	148.4	23 18.4 90 42	148.7	22 51.4 90 41	148.9	22 24.5 90 41	149.1	21 57.5 90 41	149.4	1
2	24 40.2 89 44	146.8	24 13.6 89 43	147.0	23 46.9 89 43	147.3	23 20.2 89 43	147.5	22 53.5 89 43	147.8	22 26.7 89 42	148.0	21 59.9 89 42	148.3	21 33.1 89 42	148.5	2
3	24 14.0 88 45	145.9	23 47.5 88 44	146.1	23 21.0 88 44	146.4	22 54.5 88 44	146.6	22 27.9 89 44	146.9	22 01.4 89 43	147.1	21 34.7 89 43	147.4	21 08.1 89 43	147.6	3
4	23 47.2 88 46	145.0	23 20.8 88 45	145.2	22 54.5 88 45	145.5	22 28.2 88 45	145.7	22 01.8 88 45	146.0	21 35.4 88 44	146.2	21 09.0 88 44	146.5	20 42.5 88 44	146.8	4
35	23 19.7 87 47	144.1	22 53.6 87 46	144.3	22 27.4 87 46	144.6	22 01.3 87 46	144.9	21 35.0 87 46	145.1	21 08.8 87 45	145.4	20 42.6 88 45	145.6	20 16.3 88 45	145.9	35
6	22 51.7 86 48	143.2	22 25.7 87 47	143.4	21 59.7 87 47	143.7	21 33.7 87 47	144.0	21 07.7 87 47	144.2	20 41.7 87 46	144.5	20 15.6 87 46	144.8	19 49.5 87 46	145.0	6
7	22 23.0 86 49	142.3	21 57.3 86 48	142.6	21 31.5 86 48	142.8	21 05.7 86 48	143.1	20 39.8 86 47	143.4	20 13.9 86 47	143.7	19 48.0 86 47	143.9	19 22.1 86 47	144.2	7
8	21 53.8 85 50	141.4	21 28.2 85 49	141.7	21 02.6 85 49	142.0	20 37.0 86 49	142.3	20 11.3 86 48	142.5	19 45.6 86 48	142.8	19 19.9 86 48	143.1	18 54.2 86 47	143.4	8
9	21 24.1 85 50	140.6	20 58.7 85 50	140.9	20 33.2 85 50	141.1	20 07.8 85 50	141.4	19 42.3 85 49	141.7	19 16.8 85 49	142.0	18 51.2 85 49	142.3	18 25.7 85 48	142.5	9
40	20 53.8 84 51	139.7	20 28.6 84 51	140.0	20 03.3 84 51	140.3	19 38.0 84 50	140.6	19 12.7 84 50	140.9	18 47.4 84 50	141.2	18 22.0 85 50	141.4	17 56.7 85 49	141.7	40
1	20 22.9 83 52	138.9	19 57.9 84 52	139.2	19 32.8 84 52	139.5	19 07.7 84 51	139.8	18 42.6 84 51	140.0	18 17.5 84 51	140.3	17 52.3 84 50	140.6	17 27.1 84 50	140.9	1
2	19 51.6 83 53	138.0	19 26.7 83 53	138.3	19 01.9 83 52	138.6	18 36.9 83 52	138.9	18 12.0 83 52	139.2	17 47.0 83 52	139.5	17 22.0 83 51	139.8	16 57.0 83 51	140.1	2
3	19 19.7 82 54	137.2	18 55.1 82 54	137.5	18 30.4 82 53	137.8	18 05.6 82 53	138.1	17 40.9 83 53	138.4	17 16.1 83 52	138.7	16 51.3 83 52	139.0	16 26.4 83 52	139.3	3
4	18 47.4 82 55	136.4	18 22.9 82 54	136.7	17 58.4 82 54	137.0	17 33.8 82 54	137.3	17 09.2 82 54	137.6	16 44.6 82 53	137.9	16 20.0 82 53	138.2	15 55.4 82 53	138.5	4
45	18 14.5 81 56	135.6	17 50.2 81 55	135.9	17 25.9 81 55	136.2	17 01.5 81 55	136.5	16 37.1 81 54	136.8	16 12.7 81 54	137.1	15 48.3 81 54	137.4	15 23.8 82 53	137.7	45
6	17 41.2 80 56	134.8	17 17.1 80 56	135.1	16 52.9 81 56	135.4	16 28.8 81 55	135.7	16 04.5 81 55	136.0	15 40.3 81 55	136.4	15 16.0 81 54	136.7	14 51.8 81 54	137.0	6
7	17 07.4 80 57	134.0	16 43.5 80 57	134.3	16 19.5 80 56	134.6	15 55.5 80 56	135.0	15 31.5 80 56	135.3	15 07.4 80 56	135.6	14 43.4 80 55	135.9	14 19.3 80 55	136.2	7
8	16 33.2 79 58	133.2	16 09.5 79 57	133.6	15 45.7 79 57	133.9	15 21.8 79 57	134.2	14 58.0 80 57	134.5	14 34.1 80 56	134.9	14 10.2 80 55	135.1	13 46.3 80 55	135.4	8
9	15 58.6 79 58	132.5	15 35.0 79 58	132.8	15 11.4 79 58	133.1	14 47.7 79 58	133.4	14 24.1 79 57	133.7	14 00.4 79 57	134.1	13 36.6 79 57	134.4	13 12.9 79 56	134.7	9
50	15 23.5 78 60	131.7	15 00.1 78 59	132.0	14 36.6 78 59	132.3	14 13.2 78 58	132.7	13 49.7 78 58	133.0	13 26.2 78 58	133.3	13 02.6 78 57	133.6	12 39.1 79 57	133.9	50
1	14 48.0 77 60	130.9	14 24.7 77 60	131.3	14 01.5 78 59	131.6	13 38.2 78 59	131.9	13 14.9 78 59	132.2	12 51.6 78 58	132.6	12 28.2 78 58	132.9	12 04.8 78 58	133.2	1
2	14 12.0 77 61	130.2	13 49.0 77 60	130.5	13 25.9 77 60	130.9	13 02.8 77 60	131.2	12 39.7 77 59	131.5	12 16.5 77 59	131.8	11 53.4 77 59	132.2	11 30.2 77 58	132.5	2
3	13 35.7 76 61	129.5	13 12.9 76 61	129.8	12 50.0 76 61	130.1	12 27.0 76 60	130.5	12 04.1 77 60	130.8	11 41.1 77 60	131.1	11 18.1 77 59	131.4	10 55.1 77 59	131.8	3
4	12 59.0 76 62	128.7	12 36.3 76 62	129.1	12 13.6 76 61	129.4	11 50.9 76 61	129.7	11 28.1 76 61	130.1	11 05.3 76 60	130.4	10 42.5 76 60	130.7	10 19.6 76 60	131.1	4
55	12 22.0 75 62	128.0	11 59.4 75 62	128.3	11 36.9 75 62	128.7	11 14.3 75 62	129.0	10 51.7 75 61	129.3	10 29.1 75 61	129.7	10 06.5 76 61	130.0	9 43.8 76 60	130.3	55
6	11 44.5 74 63	127.3	11 22.2 75 63	127.6	10 59.8 75 62	128.0	10 37.4 75 62	128.3	10 15.0 75 62	128.6	9 52.5 75 62	129.0	9 30.1 75 61	129.3	9 07.6 75 61	129.6	6
7	11 06.7 74 64	126.6	10 44.5 74 63	126.9	10 22.3 74 63	127.3	10 00.1 74 63	127.6	9 37.8 74 62	127.9	9 15.6 74 62	128.3	8 53.3 74 62	128.6	8 31.0 74 62	129.0	7
8	10 28.6 73 64	125.9	10 06.6 73 64	126.2	9 44.5 74 64	126.6	9 22.5 74 63	126.9	9 00.4 74 63	127.3	8 38.3 74 63	127.6	8 16.2 74 62	127.9	7 54.0 74 62	128.3	8
9	9 50.1 73 65	125.2	9 28.2 73 64	125.5	9 06.4 73 64	125.9	8 44.5 73 64	126.2	8 22.6 73 63	126.6	8 00.6 73 63	126.9	7 38.7 73 63	127.2	7 16.7 73 62	127.6	9
60	9 11.3 72 65	124.5	8 49.6 72 65	124.8	8 27.6 72 65	125.2	8 06.2 72 64	125.5	7 44.4 73 64	125.9	7 22.7 73 64	126.2	7 00.9 73 64	126.6	6 39.1 73 63	126.9	60
1	8 32.1 72 66	123.8	8 10.6 72 65	124.1	7 49.1 72 65	124.5	7 27.5 72 65	124.8	7 05.9 72 65	125.2	6 44.4 72 65	125.5	6 22.7 72 64	125.9	6 01.1 72 64	126.2	1
2	7 52.7 71 66	123.1	7 31.3 71 66	123.5	7 10.0 71 66	123.8	6 48.6 71 65	124.2	6 27.2 71 65	124.5	6 05.7 71 65	124.9	5 44.3 71 65	125.2	5 22.8 72 64	125.6	2
3	7 12.9 71 67	122.4	6 51.7 71 66	122.8	6 30.5 71 66	123.2	6 09.3 71 66	123.5	5 48.0 71 66	123.9	5 26.8 71 65	124.2	5 05.5 71 65	124.6			3
4	6 32.9 70 67	121.7	6 11.9 70 67	122.1	5 50.8 70 67	122.5	5 29.7 70 66	122.8	5 08.6 70 66	123.2							4
65	5 52.6 70 68	121.1	5 31.7 70 67	121.5	5 10.8 70 67	121.8											65
6	5 11.9 69 68	120.5															6

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00' Alt. Δd Δt	Az.	20° 30' Alt. Δd Δt	Az.	21° 00' Alt. Δd Δt	Az.	21° 30' Alt. Δd Δt	Az.	22° 00' Alt. Δd Δt	Az.	22° 30' Alt. Δd Δt	Az.	23° 00' Alt. Δd Δt	Az.	23° 30' Alt. Δd Δt	Az.	H.A.
91	11 24.0 59 75	73.4	11 41.8 59 75	73.0	11 59.6 59 75	72.6	12 17.3 59 75	72.2	12 35.1 59 75	71.8	12 52.8 59 75	71.4	13 10.4 59 74	71.0	13 28.0 59 74	70.5	91
2	10 38.7 60 75	72.9	10 56.6 60 75	72.4	11 14.5 60 75	72.0	11 32.4 59 75	71.6	11 50.2 59 75	71.2	12 08.0 59 74	70.8	12 25.8 59 74	70.4	12 43.5 59 74	70.0	2
3	9 53.6 60 75	72.3	10 11.6 60 75	71.9	10 29.6 60 75	71.5	10 47.6 60 74	71.1	11 05.5 60 74	70.7	11 23.5 60 74	70.2	11 41.3 60 74	69.8	11 59.2 59 74	69.4	3
4	9 08.6 61 75	71.7	9 26.8 60 74	71.3	9 44.9 60 74	70.9	10 03.0 60 74	70.5	10 21.0 60 74	70.1	10 39.0 60 74	69.7	10 57.0 60 74	69.3	11 15.0 60 73	68.9	4
95	8 23.8 61 74	71.1	8 42.1 61 74	70.7	9 00.3 61 74	70.3	9 18.5 61 74	69.9	9 36.6 61 74	69.5	9 54.8 60 74	69.1	10 12.9 60 73	68.7	10 31.0 60 73	68.3	95
6	7 39.2 61 74	70.6	7 57.5 61 74	70.2	8 15.8 61 74	69.8	8 34.1 61 74	69.4	8 52.4 61 73	69.0	9 10.7 61 73	68.5	9 28.9 61 73	68.1	9 47.1 61 73	67.7	6
7	6 54.7 62 74	70.0	7 13.1 62 74	69.6	7 31.6 61 74	69.2	7 50.0 61 73	68.8	8 08.4 61 73	68.4	8 26.8 61 73	68.0	8 45.1 61 73	67.6	9 03.4 61 72	67.2	7
8	6 10.3 62 74	69.4	6 28.9 62 73	69.0	6 47.5 62 73	68.6	7 06.0 62 73	68.2	7 24.5 62 73	67.8	7 43.0 62 73	67.4	8 01.5 62 72	67.0	8 20.0 61 72	66.6	8
9	5 26.1 62 73	68.8	5 44.8 62 73	68.4	6 03.5 62 73	68.0	6 22.2 62 73	67.6	6 40.8 62 72	67.2	6 59.5 62 72	66.8	7 18.1 62 72	66.4	7 36.7 62 72	66.0	9
100			5 01.0 63 73	67.8	5 19.8 63 73	67.4	5 38.6 63 72	67.0	5 57.3 63 72	66.6	6 16.1 62 72	66.2	6 34.8 62 72	65.9	6 53.6 62 72	65.5	100
1							5 14.0 63 72	66.1	5 32.9 63 72	65.7	5 51.8 63 71	65.3	6 10.5 63 71	64.9	1
2									5 08.9 63 71	64.7	5 27.9 63 71	64.3	2

L
3

16-85156-1

Lat. 38°

Each declination cell lists: Alt. (° ′)　Δd Δt　Az. (°)

H.A.	24° 00′	24° 30′	25° 00′	25° 30′	26° 00′	26° 30′	27° 00′	27° 30′	H.A.
00	76 00.0 1.0 08 180.0	76 30.0 1.0 08 180.0	77 00.0 1.0 08 180.0	77 30.0 1.0 08 180.0	78 00.0 1.0 08 180.0	78 30.0 1.0 08 180.0	79 00.0 1.0 08 180.0	79 30.0 1.0 08 180.0	00
1	75 58.4 1.0 08 176.2	76 28.4 1.0 08 176.1	76 58.3 1.0 08 176.0	77 28.3 1.0 09 175.8	77 58.2 1.0 09 175.7	78 28.2 1.0 09 175.5	78 58.1 1.0 10 175.3	79 28.0 1.0 10 175.1	1
2	75 53.8 99 13 172.5	76 23.6 99 13 172.2	76 53.4 99 14 171.7	77 23.1 99 14 171.4	77 52.9 99 15 171.1	78 22.6 99 15 170.7	78 52.3 99 16 170.3	79 22.0 99 16 170.3	2
3	75 46.1 98 18 168.8	76 15.7 98 18 168.4	76 45.2 98 19 168.1	77 14.7 98 20 167.6	77 44.1 98 20 167.2	78 13.5 98 21 166.7	78 42.9 98 23 166.2	79 12.2 98 23 165.7	3
4	75 35.4 98 23 165.2	76 04.7 97 23 164.7	76 33.8 97 24 164.2	77 03.0 97 25 163.7	77 32.0 97 26 163.1	78 01.0 96 26 162.5	78 29.9 96 27 161.8	78 58.7 96 28 161.1	4
05	75 21.9 96 27 161.6	75 50.8 96 28 161.1	76 19.5 96 29 160.5	76 48.2 95 30 159.8	77 16.7 95 30 159.2	77 45.2 95 31 158.4	78 13.5 94 33 157.6	78 41.7 94 34 156.8	05
6	75 05.7 95 31 158.2	75 34.0 94 32 157.6	76 02.3 94 33 156.9	76 30.4 94 34 156.1	76 58.4 93 35 155.4	77 26.3 93 35 154.5	77 53.9 92 37 153.6	78 21.4 91 39 152.6	6
7	74 46.9 93 35 154.9	75 14.7 93 36 154.2	75 42.4 92 37 153.4	76 10.0 92 38 152.6	76 37.4 91 39 151.7	77 04.6 90 41 150.8	77 31.6 90 42 149.8	77 58.3 89 43 148.8	7
8	74 25.6 91 39 151.7	74 52.9 91 40 151.0	75 20.1 90 41 150.1	75 47.0 89 42 149.2	76 13.7 88 43 148.3	76 40.2 88 44 147.3	77 06.5 87 46 146.2	77 32.5 86 47 145.1	8
9	74 02.1 89 43 148.7	74 28.9 89 44 147.9	74 55.4 88 45 147.0	75 21.7 87 46 146.0	75 47.8 86 47 145.0	76 13.6 86 48 144.0	76 39.1 85 49 142.9	77 04.3 83 51 141.7	9
10	73 36.6 87 46 145.8	74 02.7 87 47 144.9	74 28.6 86 48 144.0	74 54.2 85 49 143.0	75 19.6 84 50 142.0	75 44.7 83 51 140.9	76 09.5 82 52 139.7	76 33.9 81 54 138.5	10
1	73 09.0 85 49 143.0	73 34.6 85 50 142.1	73 59.8 84 51 141.1	74 24.8 83 52 140.1	74 49.6 82 53 139.1	75 13.9 81 54 137.9	75 38.0 80 55 136.8	76 01.7 78 57 135.5	1
2	72 39.7 84 52 140.4	73 04.7 83 53 139.5	73 29.3 82 54 138.5	73 53.7 81 55 137.4	74 17.7 80 56 136.3	74 41.4 78 57 135.2	75 04.8 77 58 134.0	75 27.7 76 59 132.7	2
3	72 08.8 82 54 137.9	72 33.1 81 55 136.9	72 57.2 80 56 135.9	73 20.9 79 57 134.9	73 44.3 77 58 133.8	74 07.4 76 59 132.6	74 30.0 75 60 131.4	74 52.3 73 61 130.1	3
4	71 36.4 80 56 135.5	72 00.2 79 57 134.6	72 23.6 78 58 133.5	72 46.7 77 59 132.5	73 09.5 75 60 131.4	73 31.9 74 61 130.2	73 53.9 73 62 129.0	74 15.5 71 63 127.7	4
15	71 02.6 78 59 133.3	71 25.8 77 59 132.3	71 48.7 76 60 131.3	72 11.2 75 61 130.2	72 33.4 73 62 129.1	72 55.2 72 63 127.9	73 16.6 71 64 126.7	73 37.5 69 65 125.5	15
6	70 27.6 76 60 131.2	70 50.3 75 61 130.2	71 12.6 74 62 129.1	71 34.6 73 63 128.1	71 56.2 71 64 127.0	72 17.4 70 65 125.8	72 38.2 69 66 124.6	72 58.5 67 67 123.4	6
7	69 51.5 74 62 129.1	70 13.6 73 63 128.1	70 35.4 72 64 127.1	70 56.8 71 64 126.1	71 17.9 70 65 125.0	71 38.6 68 66 123.8	71 58.8 67 67 122.6	72 18.6 66 68 121.4	7
8	69 14.3 73 64 127.2	69 35.9 72 64 126.2	69 57.2 70 65 125.2	70 18.2 69 66 124.2	70 38.7 68 67 123.1	70 58.8 66 68 121.9	71 18.6 65 68 120.8	71 37.8 63 69 119.6	8
9	68 36.2 71 65 125.4	68 57.3 70 66 124.4	69 18.2 69 66 123.4	69 38.6 68 67 122.4	69 58.7 66 68 121.3	70 18.3 65 69 120.2	70 37.6 63 69 119.0	70 56.4 62 70 117.8	9
20	67 57.2 69 66 123.7	68 17.9 68 67 122.7	68 38.3 67 68 121.7	68 58.3 66 68 120.6	69 17.9 65 69 119.6	69 37.1 63 70 118.5	69 55.9 62 70 117.4	70 14.2 60 71 116.2	20
1	67 17.5 68 67 122.0	67 37.8 67 68 121.0	67 57.7 66 69 120.0	68 17.3 65 69 119.0	68 36.5 63 70 118.0	68 55.3 62 71 116.9	69 13.6 60 71 115.8	69 31.5 59 72 114.7	1
2	66 37.1 67 68 120.4	66 56.9 66 69 119.5	67 16.5 65 70 118.5	67 35.6 63 70 117.5	67 54.4 62 71 116.5	68 12.8 61 72 115.4	68 30.8 59 72 114.3	68 48.3 58 73 113.2	2
3	65 56.0 66 69 118.9	66 15.5 64 70 118.0	66 34.6 63 71 117.0	66 53.4 62 71 116.0	67 11.8 61 72 115.0	67 29.9 59 72 114.0	67 47.5 58 73 112.9	68 04.6 57 73 111.8	3
4	65 14.3 64 70 117.5	65 33.4 63 71 116.5	65 52.2 62 71 115.5	66 10.7 61 72 114.6	66 28.8 60 73 113.6	66 46.4 58 73 112.6	67 03.7 57 74 111.6	67 20.6 55 74 110.5	4
25	64 32.1 63 71 116.1	64 50.9 62 72 115.2	65 09.4 61 72 114.3	65 27.5 60 73 113.3	65 45.2 59 73 112.3	66 02.6 57 74 111.3	66 19.6 56 74 110.3	66 36.1 54 75 109.3	25
6	63 49.4 62 72 114.8	64 07.9 61 72 113.9	64 26.1 60 73 113.0	64 43.9 59 73 112.0	65 01.3 58 74 111.1	65 18.4 56 74 110.1	65 35.0 55 75 109.1	65 51.3 54 75 108.1	6
7	63 06.3 61 73 113.5	63 24.5 60 73 112.7	63 42.3 59 74 111.7	63 59.8 58 74 110.8	64 17.0 57 74 109.9	64 33.8 56 75 108.9	64 50.2 54 75 107.9	65 06.2 53 76 106.9	7
8	62 22.7 60 73 112.3	62 40.6 59 74 111.4	62 58.2 58 74 110.6	63 15.5 57 74 109.7	63 32.4 56 75 108.7	63 48.9 55 75 107.8	64 05.1 53 76 106.8	64 20.9 52 76 105.9	8
9	61 38.8 59 74 111.2	61 56.5 58 75 110.3	62 13.8 57 75 109.4	62 30.8 56 75 108.5	62 47.5 55 76 107.6	63 03.8 54 76 106.7	63 19.7 53 76 105.8	63 35.3 51 76 105.8	9
30	60 54.5 59 74 110.0	61 12.0 58 75 109.2	61 29.1 56 75 108.3	61 45.8 55 75 107.5	62 02.3 54 76 106.6	62 18.4 53 76 105.7	62 34.1 52 76 104.8	62 49.5 51 77 103.8	30
1	60 10.0 58 75 109.0	60 27.2 57 75 108.1	60 44.1 56 75 107.3	61 00.6 55 76 106.4	61 16.8 54 76 105.6	61 32.7 52 76 104.7	61 48.3 51 77 103.8	62 03.5 50 77 102.9	1
2	59 25.1 57 75 107.9	59 42.1 56 75 107.1	59 58.8 55 76 106.3	60 15.2 54 76 105.4	60 31.2 53 76 104.6	60 46.9 52 77 103.7	61 02.3 51 77 102.8	61 17.3 49 77 101.9	2
3	58 40.0 56 75 106.9	58 56.6 55 76 106.1	59 13.3 54 76 105.3	59 29.5 53 77 104.5	59 45.3 52 77 103.6	60 00.9 51 77 102.8	60 16.1 50 77 101.9	60 30.9 49 77 101.0	3
4	57 54.7 56 76 105.9	58 11.3 55 76 105.1	58 27.6 54 76 104.3	58 43.6 53 77 103.5	58 59.3 52 77 102.7	59 14.7 51 77 101.9	59 29.7 50 77 101.0	59 44.5 49 78 100.2	4
35	57 09.1 55 76 105.0	57 25.5 54 77 104.2	57 41.7 53 77 103.4	57 57.5 52 77 102.6	58 13.1 51 77 101.8	58 28.3 50 77 101.0	58 43.3 49 78 100.2	58 57.9 48 78 99.3	35
6	56 23.3 55 77 104.1	56 39.6 54 77 103.3	56 55.6 53 77 102.5	57 11.3 52 77 101.7	57 26.7 51 77 101.0	57 41.9 50 78 100.1	57 56.7 49 78 99.3	58 11.2 48 78 98.5	6
7	55 37.4 54 77 103.2	55 53.5 53 77 102.4	56 09.4 52 77 101.7	56 25.0 51 78 100.9	56 40.3 51 78 100.1	56 55.3 50 78 99.3	57 10.0 48 78 98.5	57 24.3 47 78 97.7	7
8	54 51.2 54 77 102.3	55 07.3 53 78 101.6	55 23.2 52 78 100.9	55 38.5 51 78 100.0	55 53.7 50 78 99.3	56 08.6 49 78 98.5	56 23.2 48 78 97.7	56 37.4 47 78 96.9	8
9	54 05.0 53 77 101.5	54 20.9 53 78 100.7	54 36.5 52 78 100.0	54 51.9 51 78 99.3	55 06.9 50 78 98.5	55 21.7 49 78 97.7	55 36.1 48 78 97.0	55 50.5 47 78 96.2	9
40	53 18.6 53 78 100.6	53 34.4 52 78 99.9	53 49.9 51 78 99.2	54 05.1 50 78 98.5	54 20.1 50 78 97.7	54 34.9 49 78 97.0	54 49.3 48 78 96.2	55 03.4 47 78 95.5	40
1	52 32.0 53 78 99.8	52 47.7 52 78 99.1	53 03.2 51 78 98.4	53 18.3 50 78 97.7	53 33.2 49 78 97.0	53 47.9 48 78 96.2	54 02.3 47 78 95.5	54 16.4 46 79 94.7	1
2	51 45.4 53 78 99.1	52 01.0 52 78 98.4	52 16.3 51 78 97.7	52 31.4 50 78 97.0	52 46.3 49 78 96.2	53 00.9 48 78 95.5	53 15.2 47 79 94.8	53 29.2 46 79 94.0	2
3	50 58.7 52 78 98.3	51 14.2 51 78 97.6	51 29.4 50 78 96.9	51 44.5 50 78 96.2	51 59.2 49 78 95.5	52 13.8 48 79 94.8	52 28.0 47 79 94.1	52 42.9 46 79 93.4	3
4	50 11.8 52 78 97.5	50 27.3 51 78 96.9	50 42.5 50 78 96.2	50 57.4 49 78 95.5	51 12.2 49 78 94.8	51 26.6 48 79 94.1	51 40.9 47 79 93.4	51 54.8 46 79 92.7	4
45	49 24.9 52 78 96.8	49 40.3 51 78 96.2	49 55.4 50 79 95.5	50 10.4 49 79 94.8	50 25.0 49 79 94.1	50 39.5 48 79 93.4	50 53.6 47 79 92.7	51 07.6 46 79 92.0	45
6	48 37.9 51 79 96.1	48 53.3 51 79 95.4	49 08.4 50 79 94.8	49 23.2 49 79 94.1	49 37.8 48 79 93.4	49 52.2 48 79 92.8	50 06.4 47 79 92.1	50 20.3 46 79 91.4	6
7	47 50.9 51 79 95.4	48 06.2 51 79 94.7	48 21.2 50 79 94.1	48 36.0 49 79 93.4	48 50.4 48 79 92.8	49 04.6 48 79 92.1	49 19.1 47 79 91.4	49 33.0 46 79 90.8	7
8	47 03.8 51 79 94.7	47 19.0 50 79 94.1	47 34.0 50 79 93.4	47 48.8 49 79 92.8	48 03.4 48 79 92.1	48 17.7 47 79 91.5	48 31.9 47 79 90.8	48 45.8 46 79 90.1	8
9	46 16.7 51 79 94.0	46 31.8 50 79 93.4	46 46.8 50 79 92.8	47 01.6 49 79 92.1	47 16.1 48 79 91.5	47 30.5 47 79 90.8	47 44.6 47 79 90.2	47 58.5 46 79 89.5	9
50	45 29.5 51 79 93.4	45 44.6 50 79 92.7	45 59.6 50 79 92.1	46 14.3 49 79 91.5	46 28.9 48 79 90.9	46 43.2 47 79 90.2	46 57.3 47 79 89.6	47 11.2 46 79 88.9	50
1	44 42.3 51 79 92.7	44 57.4 50 79 92.1	45 12.3 49 79 91.5	45 27.1 49 79 90.9	45 41.6 48 79 90.2	45 55.9 47 79 89.6	46 10.0 47 79 89.0	46 23.9 46 79 88.3	1
2	43 55.0 51 79 92.0	44 10.1 50 79 91.4	44 25.1 49 79 90.8	44 39.8 49 79 90.2	44 54.3 48 79 89.6	45 08.6 47 79 89.0	45 22.8 47 79 88.4	45 36.7 46 79 87.7	2
3	43 07.8 51 79 91.4	43 22.9 50 79 90.8	43 37.8 49 79 90.2	43 52.5 49 79 89.6	44 07.0 48 79 89.0	44 21.4 47 79 88.4	44 35.5 47 79 87.8	44 49.5 46 79 87.2	3
4	42 20.5 51 79 90.8	42 35.6 50 79 90.2	42 50.5 49 79 89.6	43 05.2 48 79 89.0	43 19.8 48 79 88.4	43 34.1 48 79 87.8	43 48.3 47 79 87.2	44 02.2 46 79 86.6	4
55	41 33.2 51 79 90.2	41 48.3 50 79 89.6	42 03.2 49 79 89.0	42 18.0 49 79 88.4	42 32.5 48 79 87.8	42 46.9 47 79 87.2	43 01.1 47 79 86.6	43 15.1 46 79 86.0	55
6	40 45.9 51 79 89.5	41 01.0 50 79 89.0	41 16.0 49 79 88.4	41 30.7 49 79 87.8	41 45.3 48 79 87.2	41 59.7 47 79 86.6	42 13.9 47 79 86.1	42 27.9 46 79 85.5	6
7	39 58.7 51 79 88.9	40 13.8 50 79 88.4	40 28.7 50 79 87.8	40 43.5 49 79 87.2	40 58.1 48 79 86.7	41 12.5 48 79 86.1	41 26.7 47 79 85.5	41 40.8 47 78 84.9	7
8	39 11.4 51 79 88.3	39 26.5 50 79 87.8	39 41.5 50 79 87.2	39 56.3 49 79 86.7	40 10.9 48 79 86.1	40 25.3 48 78 85.5	40 39.6 47 78 84.9	40 53.7 47 78 84.3	8
9	38 24.1 51 79 87.7	38 39.3 50 79 87.2	38 54.3 50 79 86.6	39 09.1 49 79 86.1	39 23.7 49 79 85.5	39 38.2 48 78 84.9	39 52.5 47 78 84.4	40 06.7 47 78 83.8	9
60	37 36.9 51 79 87.2	37 52.1 50 79 86.6	38 07.1 50 79 86.1	38 21.9 49 79 85.5	38 36.6 49 78 85.0	38 51.1 48 78 84.4	39 05.5 48 78 83.8	39 19.7 47 78 83.3	60
1	36 49.7 51 79 86.6	37 04.9 50 79 86.0	37 19.9 50 79 85.5	37 34.8 49 78 84.9	37 49.5 49 78 84.4	38 04.1 48 78 83.8	38 18.5 48 78 83.3	38 32.8 47 78 82.7	1
2	36 02.5 51 79 86.0	36 17.7 50 79 85.5	36 32.8 50 78 84.9	36 47.7 50 78 84.4	37 02.5 49 78 83.8	37 17.1 49 78 83.3	37 31.6 48 78 82.7	37 45.9 47 78 82.2	2
3	35 15.4 51 79 85.4	35 30.6 51 78 84.9	35 45.7 50 78 84.4	36 00.7 50 78 83.8	36 15.4 49 78 83.3	36 30.2 49 78 82.7	36 44.7 48 78 82.2	36 59.1 48 78 81.7	3
4	34 28.3 51 78 84.9	34 43.5 51 78 84.3	34 58.7 50 78 83.8	35 13.7 50 78 83.3	35 28.6 49 78 82.7	35 43.3 49 78 82.2	35 57.9 48 78 81.7	36 12.4 48 78 81.1	4
65	33 41.2 51 78 84.3	33 56.5 51 78 83.8	34 11.7 50 78 83.2	34 26.8 50 78 82.7	34 41.7 50 78 82.2	34 56.5 49 78 81.7	35 11.2 48 78 81.1	35 25.7 48 78 80.6	65
6	32 54.2 51 78 83.7	33 09.5 51 78 83.2	33 24.8 51 78 82.7	33 39.9 50 78 82.2	33 54.9 50 78 81.7	34 09.8 49 78 81.1	34 24.5 49 78 80.6	34 39.1 48 78 80.1	6
7	32 07.2 52 78 83.2	32 22.6 51 78 82.7	32 37.9 51 78 82.2	32 53.1 50 78 81.6	33 08.2 50 78 81.1	33 23.1 50 78 80.6	33 37.9 49 77 80.1	33 52.5 49 77 79.6	7
8	31 20.3 52 78 82.6	31 35.8 51 78 82.1	31 51.1 51 78 81.6	32 06.4 51 78 81.1	32 21.5 50 78 80.6	32 36.5 50 78 80.1	32 51.3 49 77 79.6	33 06.1 49 77 79.0	8
9	30 33.4 52 78 82.1	30 49.0 51 78 81.6	31 04.4 51 78 81.1	31 19.7 51 78 80.6	31 34.9 50 78 80.1	31 49.9 50 77 79.5	32 04.9 50 77 79.0	32 19.7 49 77 78.5	9
70	29 46.6 52 78 81.5	30 02.3 52 78 81.0	30 17.7 51 78 80.5	30 33.1 51 78 80.0	30 48.3 51 77 79.5	31 03.5 50 77 79.0	31 18.6 50 77 78.5	31 33.4 49 77 78.0	70
1	28 59.9 52 78 81.0	29 15.6 52 78 80.5	29 31.1 52 78 80.0	29 46.6 51 77 79.5	30 01.9 51 77 79.0	30 17.1 51 77 78.5	30 32.2 50 77 78.0	30 47.2 50 77 77.5	1
2	28 13.2 53 78 80.4	28 29.0 52 78 79.9	28 44.6 52 77 79.4	29 00.1 52 77 79.0	29 15.5 51 77 78.5	29 30.8 51 77 78.0	29 46.0 50 77 77.5	30 01.1 50 77 77.0	2
3	27 26.7 53 78 79.9	27 42.5 52 77 79.4	27 58.1 52 77 78.9	28 13.7 52 77 78.4	28 29.2 51 77 77.9	28 44.6 51 77 77.4	28 59.9 51 77 77.0	29 15.1 50 77 76.5	3
4	26 40.2 53 78 79.3	26 56.0 53 77 78.9	27 11.8 52 77 78.4	27 27.5 52 77 77.9	27 43.0 52 77 77.4	27 58.5 51 77 76.9	28 13.9 51 77 76.4	28 29.2 51 76 75.9	4
75	25 53.7 53 77 78.8	26 09.7 53 77 78.3	26 25.5 53 77 77.8	26 41.3 52 77 77.4	26 56.9 52 77 76.9	27 12.5 52 76 76.4	27 28.0 51 76 75.9	27 43.3 51 76 75.4	75
6	25 07.4 54 77 78.2	25 23.4 53 77 77.8	25 39.4 53 77 77.3	25 55.2 52 77 76.8	26 10.9 52 76 76.4	26 26.6 52 76 75.9	26 42.2 51 76 75.4	26 57.6 51 76 74.9	6
7	24 21.2 54 77 77.7	24 37.3 54 77 77.2	24 53.3 53 77 76.8	25 09.2 53 76 76.3	25 25.1 52 76 75.8	25 40.8 52 76 75.4	25 56.5 52 76 74.9	26 12.0 51 76 74.4	7
8	23 35.0 54 77 77.2	23 51.2 54 77 76.7	24 07.3 54 76 76.2	24 23.3 53 76 75.8	24 39.3 53 76 75.3	24 55.1 53 76 74.8	25 10.8 52 76 74.4	25 26.5 52 76 73.9	8
9	22 49.0 54 77 76.6	23 05.2 54 76 76.2	23 21.4 54 76 75.7	23 37.5 53 76 75.3	23 53.6 53 76 74.8	24 09.5 53 76 74.3	24 25.4 52 75 73.9	24 41.2 52 75 73.4	9
80	22 03.0 55 76 76.1	22 19.4 54 76 75.6	22 35.7 54 76 75.2	22 51.9 54 76 74.7	23 08.0 53 76 74.3	23 24.1 53 75 73.8	23 40.0 53 75 73.3	23 55.9 53 75 72.9	80
1	21 17.2 55 76 75.5	21 33.6 55 76 75.1	21 50.0 54 76 74.6	22 06.3 54 76 74.2	22 22.6 54 75 73.7	22 38.7 53 75 73.3	22 54.8 53 75 72.8	23 10.8 53 75 72.4	1
2	20 31.4 55 76 75.0	20 48.0 55 76 74.6	21 04.5 55 76 74.1	21 20.9 54 75 73.7	21 37.2 54 75 73.2	21 53.5 54 75 72.8	22 09.7 54 75 72.3	22 25.8 54 75 71.9	2
3	19 45.6 55 76 74.5	20 02.5 55 76 74.0	20 19.1 55 75 73.6	20 35.6 55 75 73.1	20 52.0 54 75 72.7	21 08.4 54 75 72.2	21 24.7 54 75 71.8	21 41.0 54 74 71.3	3
4	19 00.3 56 76 73.9	19 17.1 56 75 73.5	19 33.8 55 75 73.0	19 50.4 55 75 72.6	20 07.0 55 75 72.2	20 23.4 55 75 71.7	20 39.9 54 74 71.3	20 56.2 54 74 70.8	4
85	18 15.9 56 75 73.4	18 31.8 56 75 73.0	18 48.6 56 75 72.5	19 05.3 55 75 72.1	19 22.0 55 75 71.6	19 38.6 55 74 71.2	19 55.2 55 74 70.8	20 11.6 55 74 70.3	85
6	17 29.7 57 75 72.8	17 46.7 56 75 72.4	18 03.6 56 75 72.0	18 20.4 56 75 71.5	18 37.2 56 74 71.1	18 53.9 56 74 70.7	19 10.6 55 74 70.2	19 27.2 55 74 69.8	6
7	16 44.6 57 75 72.3	17 01.7 57 75 71.9	17 18.7 57 75 71.4	17 35.6 56 74 71.0	17 52.6 56 74 70.6	18 09.4 56 74 70.1	18 26.2 56 74 69.7	18 42.9 56 74 69.3	7
8	15 59.6 57 75 71.8	16 16.8 57 75 71.4	16 33.9 57 74 70.9	16 51.0 57 74 70.5	17 08.0 56 74 70.0	17 25.0 56 74 69.6	17 41.9 56 74 69.2	17 58.8 56 73 68.7	8
9	15 14.8 58 74 71.2	15 32.1 58 74 70.8	15 49.3 57 74 70.4	16 06.5 57 74 69.9	16 23.7 57 74 69.5	16 40.8 57 73 69.1	16 57.8 57 73 68.7	17 14.8 57 73 68.2	9
90	14 30.1 58 74 70.7	14 47.5 58 74 70.2	15 04.9 58 74 69.8	15 22.2 58 74 69.4	15 39.5 57 73 69.0	15 56.7 57 73 68.6	16 13.8 57 73 68.1	16 31.0 57 73 67.7	90

H.A.	24° 00' Alt. / Δd Δt / Az.	24° 30'	25° 00'	25° 30'	26° 00'	26° 30'	27° 00'	27° 30'	H.A.
00	28 00.0 1.00 01 180.0	27 30.0 1.00 01 180.0	27 00.0 1.00 01 180.0	26 30.0 1.00 01 180.0	26 00.0 1.00 01 180.0	25 30.0 1.00 01 180.0	25 00.0 1.00 01 180.0	24 30.0 1.00 01 180.0	00
1	27 59.6 1.00 02 179.0	27 29.6 1.00 02 179.0	26 59.6 1.00 02 179.0	26 29.6 1.00 02 179.0	25 59.6 1.00 02 179.0	25 29.6 1.00 02 179.0	24 59.6 1.00 02 179.0	24 29.6 1.00 02 179.0	1
2	27 58.3 1.00 04 177.9	27 28.3 1.00 04 177.9	26 58.3 1.00 04 178.0	26 28.3 1.00 04 178.0	25 58.3 1.00 04 178.0	25 28.4 1.00 03 178.0	24 58.4 1.00 04 178.0	24 28.4 1.00 03 178.1	2
3	27 56.2 1.00 05 176.9	27 26.2 1.00 05 176.9	26 56.2 1.00 05 177.0	26 26.3 1.00 05 177.0	25 56.3 1.00 05 177.0	25 26.3 1.00 05 177.0	24 56.4 1.00 05 177.1	24 26.4 1.00 05 177.1	3
4	27 53.2 1.00 06 175.9	27 23.2 1.00 06 175.9	26 53.3 1.00 06 175.9	26 23.3 1.00 06 176.0	25 53.4 1.00 06 176.0	25 23.5 1.00 06 176.0	24 53.5 1.00 06 176.1	24 23.6 1.00 06 176.1	4
05	27 49.3 1.00 08 174.8	27 19.4 1.00 08 174.9	26 49.5 1.00 08 174.9	26 19.6 1.00 08 175.0	25 49.7 1.00 08 175.0	25 19.8 1.00 07 175.0	24 49.9 1.00 07 175.1	24 20.0 1.00 07 175.1	05
6	27 44.7 1.00 09 173.8	27 14.8 1.00 09 173.9	26 44.9 1.00 09 174.0	26 15.0 1.00 09 174.0	25 45.2 1.00 09 174.1	25 15.3 1.00 09 174.1	24 45.4 1.00 09 174.1	24 15.5 1.00 09 174.2	6
7	27 39.1 99 11 172.8	27 09.3 99 10 172.8	26 39.5 99 10 172.9	26 09.7 99 10 173.0	25 39.8 99 10 173.0	25 10.0 99 10 173.1	24 40.2 99 10 173.1	24 10.3 99 10 173.2	7
8	27 32.8 99 12 171.8	27 03.0 99 12 171.8	26 33.2 99 12 171.9	26 03.5 99 12 172.0	25 33.7 99 12 172.0	25 03.9 99 12 172.1	24 34.1 99 11 172.2	24 04.3 99 11 172.2	8
9	27 25.6 99 13 170.7	26 55.9 99 13 170.8	26 26.2 99 13 170.9	25 56.4 99 13 171.0	25 26.7 99 13 171.0	24 57.0 99 13 171.1	24 27.3 99 13 171.2	23 57.6 99 13 171.3	9
10	27 17.6 99 15 169.7	26 47.9 99 15 169.8	26 18.3 99 14 169.9	25 48.6 99 14 170.0	25 19.0 99 14 170.1	24 49.3 99 14 170.1	24 19.6 99 14 170.2	23 50.0 99 14 170.3	10
1	27 08.7 99 16 168.7	26 39.1 99 16 168.8	26 09.6 99 16 168.9	25 40.0 99 16 169.1	25 10.4 99 15 169.1	24 40.8 99 15 169.2	24 11.2 99 15 169.3	23 41.6 99 15 169.3	1
2	26 59.0 98 17 167.7	26 29.5 98 17 167.8	26 00.0 98 17 167.9	25 30.6 98 17 168.0	25 01.0 98 17 168.1	24 31.5 98 17 168.2	24 02.0 98 17 168.3	23 32.5 98 16 168.4	2
3	26 48.6 98 19 166.7	26 19.1 98 19 166.8	25 49.7 98 18 166.9	25 20.3 98 18 167.0	24 50.9 98 18 167.1	24 21.5 98 18 167.2	23 52.0 98 18 167.3	23 22.6 98 18 167.4	3
4	26 37.3 98 20 165.7	26 08.0 98 20 165.8	25 38.6 98 20 165.9	25 09.3 98 20 166.0	24 40.0 98 20 166.2	24 10.6 98 19 166.3	23 41.3 98 19 166.4	23 12.0 98 19 166.5	4
15	26 25.2 97 21 164.7	25 56.0 97 21 164.8	25 26.7 97 21 164.9	24 57.5 97 21 165.1	24 28.3 97 21 165.2	23 59.0 97 21 165.3	23 29.8 97 20 165.4	23 00.5 98 20 165.6	15
6	26 12.3 97 23 163.8	25 43.2 97 23 163.8	25 14.1 97 22 164.0	24 44.9 97 22 164.1	24 15.8 97 22 164.2	23 46.7 97 22 164.4	23 17.5 97 22 164.6	22 48.4 97 22 164.6	6
7	25 58.6 97 24 162.7	25 29.6 97 24 162.9	25 00.6 97 24 163.0	24 31.6 97 24 163.1	24 02.6 97 23 163.3	23 33.6 97 23 163.4	23 04.5 97 23 163.6	22 35.5 97 23 163.7	7
8	25 44.2 96 25 161.7	25 15.3 96 25 161.9	24 46.4 96 25 162.0	24 17.5 96 25 162.2	23 48.6 96 25 162.3	23 19.7 96 24 162.5	22 50.8 96 24 162.6	22 21.8 96 24 162.8	8
9	25 29.0 96 27 160.8	25 00.2 96 26 160.9	24 31.5 96 26 161.1	24 02.7 96 26 161.2	23 33.9 96 26 161.4	23 05.1 96 26 161.5	22 36.3 96 25 161.7	22 07.4 96 25 161.8	9
20	25 13.1 95 28 159.8	24 44.4 95 28 160.0	24 15.8 96 27 160.1	23 47.1 96 27 160.3	23 18.4 96 27 160.4	22 49.7 96 27 160.6	22 21.0 96 27 160.8	21 52.3 96 26 160.9	20
1	24 56.4 95 29 158.8	24 27.8 95 29 159.0	23 59.3 95 29 159.2	23 30.8 95 28 159.3	23 02.2 95 28 159.5	22 33.7 95 29 159.7	22 05.1 95 28 159.8	21 36.5 95 28 160.0	1
2	24 38.9 95 30 157.9	24 10.5 95 30 158.1	23 42.1 95 30 158.2	23 13.7 95 30 158.4	22 45.3 95 29 158.6	22 16.9 95 29 158.8	21 48.5 95 29 158.9	21 20.0 95 29 159.1	2
3	24 20.8 94 31 156.9	23 52.5 94 31 157.1	23 24.3 94 31 157.3	22 56.0 94 31 157.5	22 27.7 94 31 157.7	21 59.4 94 30 157.8	21 31.1 94 30 158.0	21 02.8 94 30 158.2	3
4	24 01.9 94 33 156.0	23 33.8 94 32 156.2	23 05.7 94 32 156.4	22 37.5 94 32 156.6	22 09.4 94 32 156.8	21 41.2 94 31 156.9	21 13.1 94 31 157.1	20 44.9 94 31 157.3	4
25	23 42.3 93 34 155.1	23 14.3 93 34 155.3	22 46.4 93 33 155.5	22 18.4 93 33 155.7	21 50.4 93 33 155.8	21 22.4 93 33 156.0	20 54.4 93 32 156.2	20 26.3 93 32 156.4	25
6	23 22.6 93 35 154.1	22 54.8 93 35 154.3	22 26.4 93 34 154.5	21 58.6 93 34 154.7	21 30.7 93 34 154.9	21 02.8 93 34 155.1	20 35.0 93 33 155.3	20 07.1 93 33 155.5	6
7	23 01.0 92 36 153.2	22 33.4 92 36 153.4	22 05.7 92 36 153.6	21 38.0 92 35 153.8	21 10.3 92 35 154.1	20 42.6 92 35 154.3	20 14.9 92 34 154.5	19 47.2 92 34 154.7	7
8	22 39.4 92 37 152.3	22 11.9 92 37 152.5	21 44.4 92 37 152.7	21 16.9 92 36 153.0	20 49.3 92 36 153.2	20 21.8 92 36 153.4	19 54.2 92 36 153.6	19 26.6 92 35 153.8	8
9	22 17.1 91 38 151.4	21 49.8 91 38 151.6	21 22.4 91 38 151.8	20 55.0 91 37 152.1	20 27.7 91 37 152.3	20 00.3 91 37 152.5	19 32.8 91 37 152.7	19 05.4 91 36 152.9	9
30	21 54.1 91 39 150.5	21 27.0 91 39 150.7	20 59.8 91 39 151.0	20 32.6 91 38 151.2	20 05.4 91 38 151.4	19 38.1 91 38 151.6	19 10.9 91 38 151.9	18 43.6 91 37 152.1	30
1	21 30.5 90 40 149.6	21 03.5 90 40 149.9	20 36.5 90 40 150.1	20 09.5 90 40 150.3	19 42.4 90 39 150.5	19 15.3 90 39 150.8	18 48.2 90 39 151.0	18 21.0 90 38 151.2	1
2	21 06.3 89 41 148.7	20 39.5 89 41 149.0	20 12.6 90 41 149.2	19 45.8 90 41 149.5	19 18.9 90 40 149.7	18 51.9 90 40 149.9	18 25.0 90 40 150.2	17 58.1 90 39 150.4	2
3	20 41.5 89 42 147.9	20 14.8 89 42 148.1	19 48.1 89 42 148.4	19 21.4 89 42 148.6	18 54.7 89 41 148.8	18 27.9 89 41 149.1	18 01.2 89 41 149.3	17 34.4 89 40 149.6	3
4	20 16.0 88 43 147.0	19 49.5 88 43 147.3	19 23.0 88 43 147.5	18 56.5 88 43 147.8	18 29.9 89 42 148.0	18 03.4 89 42 148.2	17 36.8 89 42 148.5	17 10.2 89 41 148.7	4
35	19 50.0 88 44 146.1	19 23.7 88 44 146.4	18 57.3 88 44 146.7	18 31.0 88 44 146.9	18 04.6 88 44 147.2	17 38.2 88 43 147.4	17 11.8 88 43 147.7	16 45.3 88 42 147.9	35
6	19 23.4 87 45 145.3	18 57.2 87 45 145.6	18 31.0 87 45 145.8	18 04.9 87 44 146.1	17 38.7 87 44 146.3	17 12.4 87 44 146.6	16 46.2 87 44 146.8	16 19.9 88 43 147.1	6
7	18 56.2 87 46 144.5	18 30.2 87 46 144.7	18 04.2 87 45 145.0	17 38.2 87 45 145.3	17 12.1 87 45 145.5	16 46.1 87 45 145.8	16 20.0 87 44 146.0	15 53.9 87 44 146.3	7
8	18 28.4 86 47 143.6	18 02.6 86 47 143.9	17 36.8 86 47 144.2	17 11.0 86 46 144.4	16 45.1 86 46 144.7	16 19.2 86 46 145.0	15 53.3 86 45 145.2	15 27.4 86 45 145.5	8
9	18 00.1 85 48 142.8	17 34.5 85 48 143.1	17 08.8 85 47 143.4	16 43.2 86 47 143.6	16 17.5 86 47 143.9	15 51.8 86 47 144.2	15 26.1 86 46 144.4	15 00.4 86 46 144.7	9
40	17 31.2 85 49 142.0	17 05.8 85 49 142.3	16 40.4 85 48 142.5	16 14.9 85 48 142.8	15 49.4 85 48 143.1	15 23.9 85 47 143.4	14 58.3 85 47 143.6	14 32.8 85 47 143.9	40
1	17 01.9 84 50 141.2	16 36.6 84 50 141.5	16 11.3 84 49 141.7	15 46.1 84 49 142.0	15 20.7 84 49 142.3	14 55.4 84 48 142.6	14 30.1 84 48 142.9	14 04.7 85 48 143.1	1
2	16 32.0 84 51 140.4	16 06.9 84 50 140.7	15 41.8 84 50 141.0	15 16.7 84 50 141.2	14 51.6 84 49 141.5	14 26.4 84 49 141.8	14 01.2 84 49 142.1	13 36.1 84 49 142.4	2
3	16 01.6 83 51 139.6	15 36.7 83 51 139.9	15 11.8 83 51 140.2	14 46.9 83 51 140.5	14 21.9 83 50 140.7	13 56.9 83 50 141.0	13 31.9 83 50 141.3	13 06.9 83 49 141.6	3
4	15 30.7 82 52 138.8	15 06.0 82 52 139.1	14 41.3 82 52 139.4	14 16.5 83 51 139.7	13 51.7 83 51 140.0	13 27.0 83 51 140.3	13 02.1 83 50 140.6	12 37.3 83 50 140.8	4
45	14 59.3 82 53 138.0	14 34.7 82 53 138.3	14 10.2 82 52 138.6	13 45.7 82 52 138.9	13 21.1 82 52 139.2	12 56.5 82 52 139.5	12 31.9 82 51 139.8	12 07.2 82 51 140.1	45
6	14 27.4 81 54 137.3	14 03.1 81 54 137.6	13 38.8 81 53 137.9	13 14.4 81 53 138.2	12 50.0 81 53 138.5	12 25.6 81 52 138.8	12 01.1 81 52 139.1	11 36.7 82 52 139.4	6
7	13 55.1 80 55 136.5	13 31.0 81 54 136.8	13 06.8 81 54 137.1	12 42.6 81 54 137.4	12 18.4 81 53 137.7	11 54.2 81 53 138.0	11 29.9 81 53 138.3	11 05.6 81 52 138.6	7
8	13 22.4 80 55 135.7	12 58.4 80 55 136.1	12 34.4 80 55 136.4	12 10.4 80 54 136.7	11 46.4 80 54 137.0	11 22.3 80 54 137.3	10 58.2 80 54 137.6	10 34.2 80 53 137.9	8
9	12 49.1 79 56 135.0	12 25.4 79 56 135.3	12 01.6 79 55 135.6	11 37.7 79 55 135.9	11 13.9 80 55 136.2	10 50.0 80 55 136.6	10 26.1 80 54 136.9	10 02.2 80 54 137.2	9
50	12 15.5 79 57 134.3	11 51.9 79 56 134.6	11 28.3 79 56 134.9	11 04.6 79 56 135.2	10 41.0 79 56 135.5	10 17.3 79 55 135.8	9 53.6 79 55 136.1	9 29.9 79 55 136.5	50
1	11 41.4 78 57 133.5	11 18.0 78 57 133.9	10 54.6 78 57 134.2	10 31.1 78 57 134.5	10 07.6 78 56 134.8	9 44.1 78 56 135.1	9 20.6 78 56 135.4	8 57.1 78 55 135.7	1
2	11 06.9 77 58 132.8	10 43.7 77 58 133.1	10 20.5 78 58 133.5	9 57.2 78 57 133.8	9 33.9 78 57 134.1	9 10.6 78 57 134.4	8 47.2 78 56 134.7	8 23.9 78 56 135.0	2
3	10 32.1 77 59 132.1	10 09.0 77 58 132.4	9 45.9 77 58 132.7	9 22.8 77 58 133.1	8 59.7 77 58 133.4	8 36.6 77 57 133.7	8 13.4 77 57 134.0	7 50.3 77 57 134.4	3
4	9 56.8 76 59 131.3	9 33.9 76 59 131.7	9 11.0 76 59 132.0	8 48.1 76 59 132.4	8 25.2 76 59 132.7	8 02.2 77 58 133.0	7 39.2 77 58 133.3	7 16.3 77 57 133.7	4
55	9 21.1 76 60 130.7	8 58.4 76 60 131.0	8 35.7 76 60 131.3	8 13.0 76 59 131.7	7 50.2 76 59 132.0	7 27.4 76 59 132.3	7 04.7 76 58 132.7	6 41.9 76 58 133.0	55
6	8 45.1 75 61 130.0	8 22.5 75 60 130.3	8 00.0 75 60 130.6	7 37.5 75 60 131.0	7 14.9 75 60 131.3	6 52.3 75 59 131.6	6 29.7 75 59 132.0	6 07.1 75 59 132.3	6
7	8 08.7 74 61 129.3	7 46.3 75 61 129.6	7 23.9 75 61 130.0	7 01.6 75 60 130.3	6 39.2 75 60 130.6	6 16.8 75 60 131.0	5 54.4 75 60 131.3	5 31.9 75 59 131.6	7
8	7 31.9 74 62 128.6	7 09.7 74 62 128.9	6 47.5 74 61 129.3	6 25.3 74 61 129.6	6 03.1 74 61 130.0	5 40.9 74 60 130.3	5 18.7 74 60 130.6		8
9	6 54.8 73 62 127.9	6 32.8 73 62 128.3	6 10.8 73 62 128.6	5 48.7 73 62 129.0	5 26.7 73 61 129.3	5 04.7 73 61 129.6			9
60	6 17.3 73 63 127.2	5 55.5 73 63 127.6	5 33.6 73 62 127.9	5 11.8 73 62 128.3					60
1	5 39.5 72 64 126.6	5 17.8 72 63 126.9							1
2	5 01.4 72 64 125.9								2

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00' Alt. / Δd Δt / Az.	24° 30'	25° 00'	25° 30'	26° 00'	26° 30'	27° 00'	27° 30'	H.A.
91	13 45.6 58 74 70.1	14 03.1 58 74 69.7	14 20.6 58 74 69.3	14 38.0 58 73 68.9	14 55.4 58 73 68.4	15 12.7 58 73 68.0	15 30.0 58 73 67.6	15 47.3 57 72 67.2	91
2	13 01.2 59 74 69.6	13 18.8 59 74 69.2	13 36.4 59 73 68.7	13 54.0 59 73 68.3	14 11.5 58 73 67.9	14 29.0 58 73 67.5	14 46.4 58 72 67.1	15 03.8 58 72 66.6	2
3	12 17.0 59 73 69.0	12 34.7 59 73 68.6	12 52.5 59 73 68.2	13 10.1 59 73 67.8	13 27.8 59 73 67.4	13 45.4 59 72 66.9	14 03.0 59 72 66.5	14 20.5 58 72 66.1	3
4	11 32.9 60 73 68.5	11 50.8 60 73 68.0	12 08.6 59 73 67.6	12 26.5 59 73 67.2	12 44.2 59 72 66.8	13 02.0 59 72 66.4	13 19.7 59 72 66.0	13 37.3 59 72 65.6	4
95	10 49.0 60 73 67.9	11 07.0 60 73 67.5	11 25.0 60 72 67.1	11 43.0 60 72 66.7	12 00.9 60 72 66.3	12 18.7 60 72 65.9	12 36.5 59 72 65.4	12 54.4 59 71 65.0	95
6	10 05.3 61 73 67.3	10 23.4 60 72 66.9	10 41.5 60 72 66.5	10 59.6 60 72 66.1	11 17.7 60 72 65.7	11 35.7 60 71 65.3	11 53.7 60 71 64.9	12 11.6 60 71 64.5	6
7	9 21.8 61 72 66.8	9 40.0 61 72 66.4	9 58.3 61 72 66.0	10 16.5 61 72 65.6	10 34.7 61 71 65.2	10 52.8 60 71 64.8	11 11.0 60 71 64.4	11 29.1 60 71 63.9	7
8	8 38.4 61 72 66.2	8 56.8 61 72 65.8	9 15.2 61 72 65.4	9 33.5 61 71 65.0	9 51.9 61 71 64.6	10 10.2 61 71 64.2	10 28.3 61 70 63.8	10 46.7 61 70 63.4	8
9	7 55.2 62 72 65.6	8 13.8 62 71 65.2	8 32.3 62 71 64.8	8 50.8 62 71 64.4	9 09.3 62 71 64.1	9 27.7 61 70 63.7	9 46.1 61 70 63.3	10 04.5 61 70 62.9	9
100	7 12.3 62 71 65.1	7 30.9 62 71 64.7	7 49.6 62 71 64.3	8 08.2 62 71 63.9	8 26.8 62 70 63.5	8 45.4 62 70 63.1	9 04.0 62 70 62.7	9 22.5 62 70 62.3	100
1	6 29.5 63 71 64.5	6 48.3 63 71 64.1	7 07.1 63 70 63.7	7 25.9 63 70 63.3	7 44.6 62 70 62.9	8 03.4 62 70 62.5	8 22.1 62 69 62.1	8 40.8 62 69 61.7	1
2	5 46.9 63 71 63.9	6 05.9 63 70 63.5	6 24.8 63 70 63.1	6 43.7 63 70 62.7	7 02.6 63 70 62.4	7 21.5 63 69 62.0	7 40.4 63 69 61.6	7 59.2 63 69 61.2	2
3	5 04.5 64 70 63.3	5 23.7 64 70 62.9	5 42.7 64 70 62.6	6 01.8 64 70 62.2	6 20.9 63 69 61.8	6 39.9 63 69 61.4	6 58.9 63 69 61.0	7 17.9 63 68 60.6	3
4			5 00.9 64 69 62.0	5 20.1 64 69 61.6	5 39.3 64 69 61.2	5 58.5 64 69 60.8	6 17.7 64 68 60.4	6 36.9 64 68 60.0	4
105						5 17.4 64 68 60.2	5 36.7 64 68 59.9	5 56.0 64 68 59.5	105
6								5 15.4 65 67 58.9	6

Lat. 38°

H.A.	28° 00' Alt.	Δd Δt	Az.	28° 30' Alt.	Δd Δt	Az.	29° 00' Alt.	Δd Δt	Az.	30° 00' Alt.	Δd Δt	Az.	32° 00' Alt.	Δd Δt	Az.	34° 00' Alt.	Δd Δt	Az.	34° 30' Alt.	Δd Δt	Az.	35° 30' Alt.	Δd Δt	Az.	H.A.
00	80 00.0	1.0 04	180.0	80 30.0	1.0 04	180.0	81 00.0	1.0 04	180.0	82 00.0	1.0 04	180.0	84 00.0	1.0 06	180.0	86 00.0	1.0 08	180.0	86 30.0	1.0 09	180.0	87 30.0	1.0 12	180.0	00
1	79 57.9	1.0 10	174.9	80 27.8	1.0 11	174.7	80 57.7	1.0 11	174.4	81 57.4	1.0 13	173.8	83 56.7	99 16	171.9	85 55.2	98 23	168.3	86 24.5	98 26	166.7	87 22.5	95 34	161.9	1
2	79 51.7	99 17	169.9	80 21.3	99 18	169.5	80 50.8	99 19	168.9	81 49.8	98 21	167.7	83 46.8	97 26	164.1	85 41.1	93 36	157.4	86 08.8	91 40	154.7	87 01.8	73 60	146.7	2
3	79 41.4	97 23	165.0	80 10.6	97 24	164.4	80 39.6	97 26	163.6	81 37.4	96 28	161.9	83 31.0	93 35	156.9	85 19.3	86 47	147.9	85 44.8	83 50	144.4	86 32.0	73 60	135.2	3
4	79 27.3	95 29	160.3	79 55.9	95 31	159.5	80 24.3	94 32	158.5	81 20.6	93 35	156.3	83 09.9	89 43	150.2	84 51.4	79 54	139.8	85 14.5	75 58	136.1	85 56.2	63 66	126.7	4
05	79 09.7	93 35	155.5	79 37.5	92 36	154.8	80 05.1	92 38	153.7	80 59.6	90 41	151.2	82 44.3	84 49	144.2	84 18.8	72 60	133.2	84 39.7	67 63	129.5	85 16.7	55 70	120.4	05
6	78 48.7	91 40	151.6	79 15.8	90 41	150.5	79 42.5	89 43	149.2	80 35.1	86 46	146.4	82 14.9	79 54	138.9	83 42.8	66 64	127.7	84 01.8	61 67	124.1	84 35.0	49 72	115.7	6
7	78 24.8	88 44	147.6	78 51.0	87 46	146.4	79 16.9	86 47	145.0	80 07.4	83 51	142.0	81 42.4	75 58	134.2	83 04.2	61 67	123.1	83 21.6	56 70	119.7	83 51.7	44 74	111.9	7
8	77 58.2	85 48	143.9	78 23.5	84 50	142.6	78 48.5	83 51	141.0	79 37.1	79 55	138.0	81 07.3	70 62	130.1	82 23.8	56 70	119.3	82 39.8	51 72	116.1	83 07.4	40 75	108.9	8
9	77 29.1	82 52	140.4	77 53.6	81 53	139.0	78 17.7	79 55	137.6	79 04.3	76 58	134.4	80 30.2	66 65	126.5	81 41.9	52 72	116.1	81 56.8	48 73	113.0	82 22.3	37 76	106.4	9
10	76 58.0	79 55	137.2	77 21.6	78 56	135.8	77 44.8	76 58	134.3	78 29.6	73 61	131.1	79 51.4	63 67	123.3	80 58.9	49 73	113.3	81 12.9	44 74	110.4	81 36.7	35 77	104.3	10
1	76 24.9	77 58	134.2	76 47.8	75 59	132.8	77 10.1	74 60	131.3	77 53.1	70 63	128.1	79 11.2	60 69	120.4	80 15.1	46 74	110.9	80 28.3	42 75	108.2	80 50.7	33 77	102.5	1
2	75 50.2	74 60	131.4	76 12.3	73 62	130.0	76 33.8	71 63	128.5	77 15.2	67 65	125.3	78 29.9	57 70	117.8	79 30.6	44 75	108.8	79 43.1	40 76	106.3	80 04.4	31 78	100.9	2
3	75 14.0	72 62	128.8	75 35.4	70 64	127.4	75 56.1	68 65	125.9	76 36.0	64 67	122.8	77 47.6	52 73	115.5	78 45.6	42 76	106.9	78 57.5	38 77	104.5	79 17.9	29 78	99.5	3
4	74 36.6	70 64	126.4	74 57.2	68 65	125.0	75 17.3	66 66	123.6	75 55.8	62 69	120.5	77 04.6	52 73	113.5	78 00.2	40 76	105.2	78 11.6	36 77	103.0	78 31.2	29 78	98.3	4
15	73 58.0	67 66	124.2	74 18.0	66 67	122.8	74 37.4	64 68	121.4	75 14.6	60 70	118.4	76 20.9	50 74	111.6	77 14.4	38 77	103.7	77 25.4	35 77	101.6	77 44.3	28 78	97.2	15
6	73 18.4	65 67	122.1	73 37.8	64 68	120.7	73 56.6	62 69	119.4	74 32.6	58 71	116.4	75 36.7	49 74	109.8	76 28.3	37 77	102.3	76 39.0	34 78	100.3	76 57.4	27 78	95.2	6
7	72 37.9	64 69	120.1	72 56.7	62 70	118.8	73 15.0	60 70	117.5	73 49.9	56 72	114.6	74 52.0	47 75	108.2	75 42.0	36 77	101.1	75 52.4	33 78	99.2	76 10.2	26 79	95.2	7
8	71 56.6	62 70	118.3	72 15.0	60 71	117.0	72 32.7	58 72	115.7	73 06.6	55 73	112.9	74 06.9	46 76	106.8	74 55.5	35 78	99.9	75 05.7	32 78	98.1	75 23.2	26 79	94.3	8
9	71 14.7	60 71	116.6	71 32.5	59 72	115.4	71 49.8	57 72	114.1	72 22.8	53 74	111.3	73 21.5	44 76	105.4	74 08.9	34 78	98.8	74 18.8	32 78	97.1	74 36.0	26 79	93.5	9
20	70 32.1	59 72	115.0	70 49.5	57 72	113.8	71 06.4	55 73	112.5	71 38.6	52 74	109.9	72 35.8	43 77	104.1	73 22.1	34 78	97.8	73 31.8	31 78	96.2	73 48.8	25 79	92.8	20
1	69 49.0	57 73	113.5	70 06.0	56 73	112.3	70 22.5	54 74	111.1	70 53.9	51 75	108.5	71 49.8	42 77	102.9	72 35.2	33 78	96.3	72 44.4	31 78	95.3	73 01.6	25 79	92.0	1
2	69 05.4	56 73	112.1	69 22.0	55 74	110.9	69 38.2	53 74	109.7	70 08.5	49 76	107.2	71 03.6	42 77	101.8	71 48.2	33 78	96.0	71 57.7	30 79	94.5	72 14.3	25 79	91.3	2
3	68 21.4	55 74	110.7	68 37.7	53 75	109.6	68 53.5	52 75	108.4	69 23.6	48 76	106.0	70 17.3	41 78	100.8	71 01.2	32 79	95.1	71 10.5	30 79	93.7	71 27.0	25 79	90.7	3
4	67 37.0	54 75	109.4	67 53.0	52 75	108.3	68 08.5	51 76	107.2	68 38.0	48 76	104.8	69 30.7	40 78	99.8	70 14.1	32 79	94.3	70 23.3	30 79	92.9	70 39.8	25 79	90.0	4
25	66 52.2	53 75	108.2	67 07.9	52 76	107.1	67 23.1	50 76	106.0	67 52.2	47 77	103.7	68 44.1	40 78	98.8	69 26.9	32 79	93.6	69 36.1	30 79	92.2	69 52.5	25 79	89.4	25
6	66 07.2	52 76	107.0	66 22.6	51 76	106.0	66 37.6	49 76	104.9	67 06.1	46 77	102.7	67 57.3	39 78	97.9	68 48.8	31 79	91.5	69 05.0	29 79	90.9	69 05.2	25 79	88.9	6
7	65 21.8	51 76	105.9	65 37.0	50 76	104.9	65 51.8	48 77	103.8	66 19.9	45 77	101.6	67 10.4	39 78	97.1	67 52.5	31 79	92.1	68 01.5	29 79	90.9	68 17.9	25 79	88.9	7
8	64 36.2	51 76	104.9	64 51.2	49 77	103.8	65 05.8	48 77	102.8	65 33.5	45 78	100.7	66 23.5	38 78	96.2	67 05.2	31 79	91.5	67 14.3	29 79	90.2	67 30.7	25 79	87.7	8
9	63 50.4	50 77	103.8	64 05.2	49 77	102.9	64 19.6	47 77	101.8	64 47.0	44 78	99.8	65 36.4	38 78	95.4	66 17.9	31 79	90.8	66 27.0	29 79	89.6	66 43.4	26 79	87.2	9
30	63 04.4	49 77	102.9	63 19.0	48 77	101.9	63 33.4	46 78	100.9	64 00.4	44 78	98.9	64 49.3	38 79	94.7	65 30.7	31 79	90.0	65 39.7	29 79	89.0	65 56.2	26 79	86.7	30
1	62 18.3	49 77	101.9	62 32.7	47 77	101.0	62 46.7	46 78	100.0	63 13.6	43 78	98.0	64 02.2	37 79	93.9	64 43.4	31 79	89.6	64 52.4	29 79	88.5	65 09.0	26 79	85.7	1
2	61 31.9	48 77	101.0	61 46.2	47 78	100.1	62 00.1	46 78	99.1	62 26.7	43 78	97.2	63 15.0	37 79	93.2	63 56.1	31 79	89.0	64 05.2	29 79	87.9	64 21.9	26 79	85.7	2
3	60 45.4	48 78	100.1	60 59.6	47 78	99.2	61 13.4	45 78	98.3	61 39.8	43 78	96.4	62 27.8	37 79	92.5	63 08.8	31 79	88.4	63 17.9	30 79	87.3	63 34.8	26 78	85.2	3
4	59 58.8	47 78	99.3	60 12.9	46 78	98.4	60 26.5	45 78	97.5	60 52.8	42 78	95.7	61 40.5	37 79	91.8	62 21.6	31 79	87.8	62 30.7	30 79	86.8	62 47.7	27 78	84.7	4
35	59 12.1	47 78	98.5	59 26.0	46 78	97.6	59 39.6	44 78	96.7	60 05.7	42 79	94.9	60 53.4	37 79	91.2	61 34.3	31 79	87.3	61 43.5	30 79	86.3	62 00.6	27 78	84.2	35
6	58 25.3	47 78	97.7	58 39.1	46 78	96.8	58 52.6	44 78	96.0	59 18.6	42 79	94.2	60 06.0	37 79	90.6	60 47.1	31 79	86.7	60 56.4	30 79	85.3	61 13.6	27 78	83.8	6
7	57 38.4	46 78	96.9	57 52.2	45 78	96.1	58 05.6	44 78	95.2	58 31.4	42 79	93.5	59 18.7	37 79	89.9	59 59.9	32 79	86.2	60 09.2	30 78	85.3	60 26.6	28 78	83.3	7
8	56 51.4	46 78	96.1	57 05.1	45 79	95.3	57 18.5	44 79	94.5	57 44.2	42 79	92.8	58 31.4	37 79	89.3	59 12.8	32 79	85.7	59 22.1	31 78	84.8	59 39.6	28 78	82.9	8
9	56 04.4	46 78	95.4	56 18.0	45 79	94.5	56 31.3	44 79	93.8	56 56.9	42 79	92.1	57 44.1	37 79	88.7	58 25.6	32 79	85.2	58 35.1	31 79	84.3	58 52.8	28 78	82.4	9
40	55 17.3	46 79	94.7	55 30.9	45 79	93.9	55 44.1	44 79	93.1	56 09.7	42 79	91.5	56 56.9	37 79	88.1	57 38.5	32 78	84.7	57 48.0	31 78	83.8	58 05.9	29 78	82.0	40
1	54 30.2	46 79	94.0	54 43.7	45 79	93.2	54 56.9	44 79	92.4	55 22.4	42 79	90.8	56 09.6	37 79	87.6	56 51.5	33 78	84.2	57 01.1	31 78	83.3	57 19.1	29 78	81.6	1
2	53 43.0	45 79	93.3	53 56.4	44 79	92.5	54 09.6	43 79	91.8	54 35.1	41 79	90.2	55 22.4	37 79	87.0	56 04.5	33 78	83.7	56 14.1	32 78	82.8	56 32.4	29 78	81.1	2
3	52 55.8	45 79	92.6	53 09.2	44 79	91.9	53 22.4	43 79	91.1	53 47.8	41 79	89.6	54 35.2	37 79	86.5	55 17.5	33 78	83.2	55 27.2	32 78	82.4	55 45.7	30 78	80.7	3
4	52 08.5	45 79	92.0	52 21.9	44 79	91.2	52 35.1	43 79	90.5	53 00.6	42 79	89.0	53 48.0	38 79	85.9	54 30.6	33 78	82.8	54 40.4	32 78	81.9	54 59.1	30 78	80.3	4
45	51 21.2	45 79	91.3	51 34.7	44 79	90.6	51 47.8	43 79	89.9	52 13.3	42 79	88.4	53 00.9	38 79	85.4	53 43.7	34 78	82.3	53 53.6	33 78	81.5	54 12.5	30 78	79.8	45
6	50 34.0	45 79	90.7	50 47.4	45 79	90.0	51 00.5	43 79	89.3	51 26.0	42 79	87.8	52 13.8	38 79	84.9	52 56.9	34 78	81.8	53 06.9	33 78	81.0	53 26.0	31 77	79.4	6
7	49 46.7	45 79	90.1	50 00.1	44 79	89.4	50 13.3	43 79	88.7	50 38.8	42 79	87.3	51 26.7	38 78	84.3	52 10.1	34 78	81.3	52 20.2	33 78	80.6	52 39.5	31 77	79.0	7
8	48 59.4	45 79	89.5	49 12.8	44 79	88.8	49 26.1	43 79	88.1	49 51.6	42 79	86.7	50 39.7	38 78	83.8	51 23.4	35 78	80.9	51 33.6	34 78	80.1	51 53.2	32 77	78.6	8
9	48 12.1	45 79	88.9	48 25.6	44 79	88.2	48 38.8	44 79	87.5	49 04.4	42 79	86.1	49 52.7	39 78	83.3	50 36.7	35 78	80.4	50 47.1	34 77	79.7	51 06.9	32 77	78.2	9
50	47 24.9	45 79	88.3	47 38.3	44 79	87.6	47 51.5	44 79	86.9	48 17.2	42 79	85.6	49 05.8	39 78	82.8	49 50.2	35 78	79.9	50 00.6	34 77	79.2	50 20.6	32 77	77.7	50
1	46 37.6	45 79	87.7	46 51.1	45 79	87.0	47 04.3	44 79	86.4	47 30.1	42 78	85.0	48 18.9	39 78	82.3	49 03.6	36 77	79.5	49 14.2	35 77	78.8	49 34.4	33 77	77.3	1
2	45 50.4	45 79	87.1	46 03.9	45 79	86.5	46 17.2	44 79	85.8	46 43.0	42 78	84.5	47 32.0	39 78	81.8	48 17.2	36 77	79.0	48 27.8	35 77	78.4	48 48.4	33 77	76.9	2
3	45 03.2	45 79	86.5	45 16.7	45 79	85.9	45 30.0	44 78	85.3	45 56.0	43 78	84.0	46 45.3	40 78	81.3	47 30.8	36 77	78.6	47 41.6	35 77	77.9	48 02.3	34 77	76.5	3
4	44 16.0	46 79	86.0	44 29.6	45 78	85.3	44 42.9	44 78	84.7	45 09.0	43 78	83.4	45 58.6	40 78	80.8	46 44.5	37 77	78.2	46 55.4	36 77	77.5	47 16.4	34 76	76.1	4
55	43 28.9	46 79	85.4	43 42.5	45 78	84.8	43 55.9	44 78	84.2	44 22.1	43 78	82.9	45 11.9	40 78	80.4	45 58.2	37 77	77.7	46 09.3	36 77	77.0	46 30.5	35 76	75.7	55
6	42 41.8	46 78	84.9	42 55.4	45 78	84.3	43 08.8	44 78	83.6	43 35.2	43 78	82.4	44 25.3	40 78	79.9	45 12.1	37 77	77.3	45 23.2	37 76	76.6	45 44.8	35 76	75.3	6
7	41 54.7	46 78	84.3	42 08.4	45 78	83.7	42 21.9	45 78	83.1	42 48.3	43 78	81.9	43 38.8	41 77	79.4	44 26.0	38 77	76.9	44 37.3	37 76	76.2	44 59.1	36 76	74.9	7
8	41 07.4	46 78	83.8	41 21.4	46 78	83.2	41 35.0	45 78	82.6	42 01.6	44 78	81.4	42 52.4	41 77	78.9	43 40.0	38 77	76.4	43 51.4	38 76	75.8	44 13.5	36 76	74.5	8
9	40 20.7	46 78	83.2	40 34.5	46 78	82.6	40 48.1	45 78	82.0	41 14.8	44 78	80.9	42 06.0	41 77	78.4	42 54.1	39 76	76.0	43 05.6	38 76	75.3	43 28.0	37 76	74.0	9
60	39 33.8	47 78	82.7	39 47.6	46 78	82.1	40 01.3	45 78	81.5	40 28.2	44 78	80.4	41 19.6	42 77	78.0	42 08.3	39 76	75.5	42 19.9	38 76	74.9	42 42.6	37 76	73.6	60
1	38 46.9	47 78	82.2	39 00.8	46 78	81.6	39 14.6	46 78	81.0	39 41.4	44 78	79.9	40 33.2	42 77	77.5	41 22.5	40 76	75.1	41 34.3	39 76	74.5	41 57.3	38 75	73.2	1
2	38 00.1	47 78	81.6	38 14.1	46 78	81.1	38 27.9	45 78	80.5	38 55.1	45 77	79.4	39 47.4	43 77	77.0	40 36.9	40 76	74.6	40 48.8	39 76	74.0	41 12.0	38 75	72.8	2
3	37 13.3	47 78	81.1	37 27.4	47 78	80.5	37 41.3	46 78	80.0	38 08.7	45 77	78.9	39 01.4	43 77	76.6	39 51.4	40 76	74.2	40 03.4	40 76	73.6	40 26.9	39 75	72.4	3
4	36 26.7	47 78	80.6	36 40.8	47 78	80.0	36 54.8	46 77	79.5	37 22.3	45 77	78.4	38 15.5	43 76	76.1	39 05.9	41 76	73.8	39 18.1	40 75	73.2	39 41.9	39 75	72.0	4
65	35 40.1	48 78	80.1	35 54.3	47 77	79.5	36 08.4	47 77	79.0	36 36.1	46 77	77.9	37 29.6	44 76	75.6	38 20.6	41 75	73.3	38 32.9	41 75	72.8	38 57.0	40 75	71.6	65
6	34 53.5	48 77	79.5	35 07.8	47 77	79.0	35 22.0	47 77	78.5	35 49.9	46 77	77.4	36 43.9	44 76	75.2	37 35.3	42 75	72.9	37 47.8	41 75	72.3	38 12.2	40 74	71.2	6
7	34 07.1	48 77	79.0	34 21.5	48 77	78.5	34 35.7	47 77	78.0	35 03.8	46 77	76.9	35 58.2	44 76	74.7	36 50.2	42 75	72.5	37 02.8	42 75	71.9	37 27.5	41 74	70.7	7
8	33 20.7	48 77	78.5	33 35.2	48 77	78.0	33 49.5	47 77	77.5	34 17.7	47 76	76.4	35 12.7	45 76	74.2	36 05.2	43 75	72.0	36 17.9	42 75	71.5	36 42.9	41 74	70.3	8
9	32 34.4	49 77	78.0	32 49.0	48 77	77.5	33 03.4	47 77	77.0	33 31.9	47 76	75.9	34 27.2	45 76	73.8	35 20.3	43 75	71.6	35 33.1	43 74	71.0	35 58.5	42 74	69.9	9
70	31 48.2	49 77	77.5	32 02.9	49 77	77.0	32 17.4	48 77	76.5	32 46.1	47 76	75.4	33 41.9	46 75	73.3	34 35.4	44 74	71.1	34 48.5	43 74	70.6	35 14.1	42 74	69.5	70
1	31 02.1	49 77	77.0	31 16.8	49 77	76.5	31 31.5	49 76	76.0	32 00.4	48 76	74.9	32 56.6	46 75	72.8	34 04.0	44 74	70.2	34 04.0	44 74	70.2	34 29.9	43 73	69.1	1
2	30 16.1	50 77	76.5	30 30.9	49 76	76.0	30 45.7	49 76	75.5	31 14.8	48 76	74.4	32 11.5	46 75	72.4	33 06.2	45 74	70.3	33 19.5	44 74	69.7	33 45.8	43 73	68.6	2
3	29 30.1	50 76	76.0	29 45.1	50 76	75.5	29 59.9	49 76	75.0	30 29.3	49 75	74.0	31 26.5	47 75	71.9	32 21.8	45 74	69.8	32 35.2	45 74	69.3	33 01.8	44 73	68.2	3
4	28 44.3	50 76	75.5	28 59.4	50 76	75.0	29 14.3	50 76	74.5	29 43.9	49 75	73.5	30 41.6	47 75	71.4	31 37.4	46 74	69.4	31 51.1	45 73	68.9	32 18.0	44 73	67.8	4
75	27 58.6	51 76	74.5	28 13.8	50 76	74.5	28 28.8	50 76	74.0	28 58.6	49 75	73.0	29 56.9	48 74	71.0	30 53.3	46 73	68.9	31 07.1	46 73	68.4	31 34.3	45 73	67.4	75
6	27 13.0	51 76	74.4	27 28.3	51 76	73.5	27 43.4	50 75	73.5	28 13.5	50 75	72.5	29 12.2	48 74	70.5	30 09.2	47 73	68.5	30 23.2	46 73	68.0	30 50.7	45 72	66.9	6
7	26 27.5	51 76	73.9	26 42.9	51 75	73.5	26 58.2	51 75	73.0	27 28.4	50 75	72.0	28 27.7	49 74	70.0	29 25.3	47 73	68.0	29 39.4	47 73	67.5	30 07.3	46 72	66.5	7
8	25 42.1	52 75	73.4	25 57.6	51 75	73.0	26 13.0	51 75	72.5	26 43.5	51 74	71.5	27 43.4	49 74	69.6	28 41.5	48 73	67.6	28 55.8	47 72	67.1	29 24.0	46 72	66.1	8
9	24 56.9	52 75	72.9	25 12.5	52 75	72.5	25 28.0	52 75	72.0	25 58.8	51 74	71.0	26 59.1	50 74	69.1	27 57.9	48 72	67.1	28 12.3	48 72	66.6	28 40.8	47 72	65.6	9
80	24 11.7	53 75	72.4	24 27.5	52 75	72.0	24 43.1	52 75	71.5	25 14.1	51 74	70.5	26 15.0	50 73	68.6	27 14.0	49 72	66.7	27 29.0	49 72	66.2	27 57.8	48 71	65.2	80
1	23 26.7	53 75	71.9	23 42.6	53 75	71.4	23 58.3	52 74	71.0	24 29.6	52 74	70.0	25 31.1	51 73	68.1	26 31.0	49 72	66.2	26 45.8	49 72	65.7	27 15.0	48 71	64.8	1
2	22 41.9	53 75	71.4	22 57.8	53 74	70.9	23 13.7	53 74	70.5	23 45.2	52 74	69.5	24 47.3	51 73	67.7	25 47.9	50 72	65.8	26 02.8	50 71	65.3	26 32.3	49 71	64.3	2
3	21 57.1	54 74	70.9	22 13.2	53 74	70.4	22 29.2	53 74	70.0	23 01.0	53 73	69.1	24 03.6	52 73	67.2	25 04.8	50 71	65.3	25 19.9	50 71	64.8	25 49.8	49 71	63.9	3
4	21 12.5	54 74	70.4	21 28.7	54 74	70.0	21 44.9	54 74	69.5	22 16.9	53 73	68.6	23 20.1	52 72	66.7	24 21.9	51 71	64.8	24 37.2	51 71	64.4	25 07.4	50 70	63.4	4
85	20 28.1	55 74	69.9	20 44.4	54 74	69.4	21 00.7	54 74	69.0	21 33.2	54 73	68.1	22 36.7	53 72	66.2	23 39.2	52 71	64.4	23 54.7	51 71	63.9	24 25.2	51 70	62.9	85
6	19 43.7	55 74	69.3	20 00.2	55 73	68.9	20 16.5	55 73	68.5	20 49.2	54 73	67.6	21 53.6	54 72	65.7	22 56.7	52 71	63.9	23 12.3	52 70	63.4	23 43.2	51 70	62.5	6
7	18 59.6	55 73	68.8	19 16.2	55 73	68.4	19 32.7	55 73	67.9	20 05.6	55 72	67.1	21 10.5	54 71	65.3	22 14.3	53 70	63.4	22 30.1	53 70	63.0	23 01.3	52 69	62.0	7
8	18 15.6	56 73	68.3	18 32.3	56 73	67.9	18 49.0	56 73	67.4	19 22.1	55 72	66.6	20 27.7	54 71	64.8	21 32.1	53 70	63.0	21 48.0	53 70	62.5	22 19.7	52 69	61.6	8
9	17 31.7	56 73	67.8	17 48.6	56 73	67.4	18 05.4	56 73	66.9	18 38.8	56 72	66.1	19 45.0	55 71	64.3	20 50.1	54 70	62.5	21 06.2	54 69	62.0	21 38.2	53 69	61.1	9
90	16 48.0	57 73	67.3	17 05.0	57 72	66.8	17 22.0	56 72	66.4	17 55.7	56 72	65.5	19 02.5	55 71	63.8	20 08.2	54 69	62.0	20 24.5	54 69	61.6	20 56.9	54 69	60.7	90

H.A.	28° 00' Alt.	Δd Δt	Az.	28° 30' Alt.	Δd Δt	Az.	29° 00' Alt.	Δd Δt	Az.	30° 00' Alt.	Δd Δt	Az.	32° 00' Alt.	Δd Δt	Az.	34° 00' Alt.	Δd Δt	Az.	34° 30' Alt.	Δd Δt	Az.	35° 30' Alt.	Δd Δt	Az.	H.A.
00	24 00.0	1.00 01	180.0	23 30.0	1.00 01	180.0	23 00.0	1.00 01	180.0	22 00.0	1.00 01	180.0	20 00.0	1.00 01	180.0	18 00.0	1.00 01	180.0	17 30.0	1.00 01	180.0	16 30.0	1.00 01	180.0	00
1	23 59.6	1.00 02	179.0	23 29.6	1.00 02	179.0	22 59.6	1.00 02	179.0	21 59.6	1.00 02	179.1	19 59.6	1.00 02	179.1	17 59.6	1.00 02	179.1	17 29.6	1.00 02	179.1	16 29.7	1.00 02	179.2	1
2	23 58.4	1.00 03	178.1	23 28.4	1.00 03	178.1	22 58.4	1.00 03	178.1	21 58.5	1.00 03	178.1	19 58.5	1.00 03	178.2	17 58.6	1.00 03	178.3	17 28.6	1.00 03	178.3	16 28.6	1.00 03	178.3	2
3	23 56.4	1.00 05	177.1	23 26.4	1.00 05	177.1	22 56.5	1.00 05	177.2	21 56.5	1.00 04	177.2	19 56.6	1.00 04	177.3	17 56.8	1.00 04	177.4	17 26.8	1.00 04	177.4	16 26.8	1.00 04	177.5	3
4	23 53.6	1.00 06	176.1	23 23.7	1.00 06	176.2	22 53.7	1.00 05	176.2	21 53.8	1.00 06	176.3	19 54.0	1.00 05	176.4	17 54.2	1.00 05	176.5	17 24.3	1.00 05	176.5	16 24.4	1.00 05	176.6	4
05	23 50.0	1.00 07	175.2	23 20.1	1.00 07	175.2	22 50.2	1.00 07	175.3	21 50.4	1.00 07	175.3	19 50.7	1.00 07	175.5	17 51.0	1.00 07	175.6	17 21.1	1.00 07	175.7	16 21.3	1.00 06	175.8	05
6	23 45.7	1.00 09	174.2	23 15.8	1.00 09	174.3	22 45.9	1.00 08	174.3	21 46.1	1.00 08	174.4	19 46.6	1.00 08	174.6	17 47.1	1.00 08	174.8	17 17.2	1.00 08	174.8	16 17.4	1.00 08	174.9	6
7	23 40.5	99 10	173.3	23 10.7	99 10	173.3	22 40.8	99 10	173.4	21 41.2	99 10	173.5	19 41.8	99 09	173.7	17 42.4	99 09	173.9	17 12.6	99 09	174.0	16 12.9	99 09	174.1	7
8	23 34.6	99 11	172.3	23 04.8	99 11	172.4	22 35.0	99 11	172.4	21 35.4	99 11	172.5	19 36.2	99 10	172.8	17 35.0	99 11	173.0	17 07.2	99 10	173.1	16 07.6	99 10	173.2	8
9	23 27.8	99 13	171.3	22 58.1	99 12	171.4	22 28.4	99 12	171.5	21 28.9	99 12	171.6	19 29.9	99 12	171.9	17 31.0	99 11	172.2	17 01.2	99 11	172.3	16 01.7	99 11	172.4	9
10	23 20.3	99 14	170.4	22 50.7	99 14	170.5	22 21.0	99 14	170.5	21 21.6	99 13	170.7	19 22.9	99 13	171.0	17 24.2	99 12	171.3	16 54.5	99 12	171.4	15 55.1	99 12	171.5	10
1	23 12.0	99 15	169.4	22 42.4	99 15	169.5	22 12.8	99 15	169.6	21 13.6	99 15	169.8	19 15.2	99 14	170.1	17 16.7	99 14	170.5	16 47.1	99 14	170.5	15 47.8	99 13	170.7	1
2	23 03.0	98 16	168.5	22 33.5	98 16	168.6	22 03.9	98 16	168.7	21 04.9	98 16	168.9	19 06.7	98 15	169.2	17 08.5	99 15	169.6	16 39.0	99 15	169.7	15 39.8	99 14	169.9	2
3	22 53.2	98 18	167.6	22 23.7	98 17	167.7	21 54.3	98 17	167.8	20 55.4	98 17	168.0	18 57.5	98 16	168.3	16 59.6	98 16	168.8	16 30.2	98 16	168.9	15 31.2	98 16	169.0	3
4	22 42.6	98 19	166.6	22 13.3	98 19	166.7	21 43.9	98 19	166.8	20 45.2	98 18	167.1	18 47.7	98 18	167.5	16 50.1	98 17	167.9	16 20.7	98 17	168.0	15 21.9	98 17	168.2	4
15	22 31.3	98 20	165.7	22 02.0	98 20	165.8	21 32.8	98 20	165.9	20 34.2	98 19	166.1	18 37.1	98 19	166.6	16 39.8	98 18	167.1	16 10.5	98 18	167.2	15 11.9	98 18	167.4	15
6	22 19.2	97 21	164.7	21 50.1	97 21	164.9	21 20.9	97 21	165.0	20 22.5	97 21	165.2	18 25.8	97 20	165.7	16 28.9	97 19	166.2	15 59.7	97 19	166.3	15 01.2	97 19	166.6	6
7	22 06.4	97 23	163.8	21 37.3	97 22	164.0	21 08.3	97 22	164.1	20 10.1	97 22	164.4	18 13.8	97 21	164.9	16 17.3	97 20	165.4	15 48.2	97 20	165.5	14 49.9	97 20	165.7	7
8	21 52.9	96 24	162.9	21 23.7	97 23	163.0	20 55.0	97 23	163.2	19 57.0	97 23	163.5	18 01.1	97 22	164.0	16 05.0	97 22	164.5	15 36.0	97 21	164.7	14 37.9	97 21	164.9	8
9	21 38.6	96 25	162.0	21 09.8	96 25	162.1	20 40.9	96 24	162.3	19 43.2	96 24	162.6	17 47.7	96 23	163.1	15 52.1	96 23	163.7	15 23.2	96 22	163.8	14 25.3	96 22	164.1	9
20	21 23.6	96 26	161.1	20 54.9	96 26	161.2	20 26.2	96 26	161.4	19 28.7	96 25	161.7	17 33.6	96 25	162.3	15 38.5	96 24	162.9	15 09.7	96 24	163.0	14 12.1	96 23	163.3	20
1	21 07.9	96 27	160.2	20 39.3	95 27	160.3	20 10.7	95 27	160.5	19 13.5	95 26	160.8	17 18.9	95 26	161.4	15 24.2	95 25	162.1	14 55.6	95 25	162.2	13 58.2	95 24	162.5	1
2	20 51.6	95 28	159.3	20 23.1	95 28	159.4	19 54.6	95 28	159.6	18 57.6	95 28	159.9	17 03.6	95 27	160.6	15 09.4	95 26	161.2	14 40.8	95 26	161.4	13 43.6	95 25	161.7	2
3	20 34.5	94 30	158.4	20 06.1	94 29	158.6	19 37.8	94 29	158.7	18 41.1	94 29	159.1	16 47.5	95 28	159.8	14 53.8	95 27	160.4	14 25.4	95 27	160.6	13 28.5	96 26	160.9	3
4	20 16.7	94 31	157.5	19 48.5	94 30	157.7	19 20.3	94 30	157.9	18 23.8	94 30	158.2	16 30.8	94 29	158.9	14 37.7	94 28	159.6	14 09.4	94 28	159.8	13 12.7	94 27	160.1	4
25	19 58.3	94 32	156.6	19 30.2	94 32	156.8	19 02.1	94 31	157.0	18 06.0	94 31	157.4	16 13.5	94 30	158.1	14 20.9	94 29	158.8	13 52.7	94 29	159.0	12 56.3	94 28	159.3	25
6	19 39.2	93 33	155.7	19 11.3	93 33	155.9	18 43.3	93 32	156.1	17 47.4	93 32	156.5	15 55.5	93 31	157.3	14 03.5	93 30	158.0	13 35.4	93 30	158.2	12 39.3	94 29	158.5	6
7	19 19.4	93 34	154.9	18 51.6	93 34	155.1	18 23.9	93 34	155.3	17 28.3	93 33	155.7	15 36.9	93 32	156.4	13 45.4	93 31	157.2	13 17.6	93 31	157.4	12 21.7	93 30	157.8	7
8	18 59.0	92 35	154.0	18 31.4	92 35	154.2	18 03.8	92 35	154.4	17 08.5	92 34	154.8	15 17.7	92 33	155.6	13 26.8	92 32	156.4	12 59.1	92 32	156.6	12 03.6	93 31	157.0	8
9	18 38.0	92 36	153.1	18 10.5	92 36	153.4	17 43.0	92 36	153.6	16 48.0	92 35	154.0	14 57.9	92 34	154.8	13 07.6	92 33	155.6	12 40.0	92 33	155.8	11 44.8	92 32	156.2	9
30	18 16.3	91 37	152.3	17 49.0	91 37	152.5	17 21.7	91 37	152.7	16 27.0	91 36	153.2	14 37.5	91 35	154.0	12 47.8	91 34	154.8	12 20.4	92 34	155.1	11 25.4	92 33	155.5	30
1	17 54.0	90 38	151.5	17 26.9	90 38	151.7	16 59.7	91 38	151.9	16 05.3	91 37	152.3	14 16.5	91 36	153.2	12 27.4	91 35	154.1	12 00.1	91 35	154.3	11 05.5	91 34	154.7	1
2	17 31.1	90 39	150.6	17 04.1	90 39	150.8	16 37.1	90 39	151.1	15 43.1	90 38	151.5	13 54.9	90 37	152.4	12 06.5	90 36	153.3	11 39.3	90 36	153.5	10 45.0	91 35	154.0	2
3	17 07.6	89 40	149.8	16 40.8	89 40	150.0	16 14.0	89 40	150.3	15 20.3	89 39	150.7	13 32.7	89 38	151.6	11 44.9	90 37	152.5	11 18.0	90 37	152.8	10 24.0	90 36	153.2	3
4	16 43.5	89 41	149.0	16 16.9	89 41	149.2	15 50.2	89 41	149.4	14 56.9	89 40	149.9	13 10.0	89 39	150.9	11 22.8	89 36	151.8	10 56.0	89 37	152.0	10 02.4	89 37	152.5	4
35	16 18.9	88 42	148.2	15 52.4	88 42	148.4	15 25.9	88 41	148.6	14 32.9	88 41	149.1	12 46.6	89 40	150.1	11 00.2	89 39	151.0	10 33.6	89 38	151.3	9 40.3	89 38	151.7	35
6	15 53.6	88 43	147.3	15 27.3	88 43	147.6	15 01.0	88 42	147.8	14 08.3	88 42	148.3	12 22.8	88 41	149.3	10 37.0	88 40	150.3	10 10.6	88 39	150.5	9 17.6	88 39	151.0	6
7	15 27.8	87 44	146.5	15 01.7	87 44	146.8	14 35.6	87 43	147.1	13 43.2	87 43	147.6	11 58.4	87 42	148.6	10 13.3	88 40	149.5	9 47.0	88 40	149.8	8 54.4	88 40	150.3	7
8	15 01.5	86 46	145.6	14 35.6	86 45	145.9	14 09.6	86 45	146.3	13 17.6	86 44	147.0	11 33.5	86 43	147.8	9 49.1	86 42	148.1	9 23.0	86 41	148.8	8 30.7	87 40	149.5	8
9	14 34.6	86 46	145.0	14 08.8	86 45	145.2	13 43.1	86 45	145.5	12 51.4	86 44	146.0	11 08.0	86 43	147.0	9 24.4	86 42	148.1	8 58.4	86 42	148.3	8 06.5	87 41	148.8	9
40	14 07.2	85 47	144.2	13 41.6	85 46	144.4	13 16.0	85 46	144.7	12 24.7	85 45	145.2	10 42.0	85 44	146.3	8 59.1	86 43	147.3	8 33.3	86 43	147.6	7 41.8	86 42	148.1	40
1	13 39.3	85 47	143.4	13 13.9	85 47	143.7	12 48.4	85 47	144.0	11 57.5	85 46	144.5	10 15.5	85 45	145.6	8 33.3	85 44	146.6	8 07.8	85 43	146.9	7 16.6	85 43	147.4	1
2	13 10.8	84 48	142.6	12 45.6	84 48	142.9	12 20.4	84 48	143.2	11 29.8	84 47	143.7	9 48.6	84 46	144.8	8 07.1	85 45	145.9	7 41.7	85 44	146.2	6 50.9	85 44	146.7	2
3	12 41.9	83 49	141.9	12 16.9	84 49	142.1	11 51.8	84 48	142.4	11 01.6	84 48	143.0	9 21.1	84 47	144.1	7 40.4	84 45	145.2	7 15.1	84 45	145.5	6 24.7	84 44	146.0	3
4	12 12.5	83 50	141.1	11 47.6	83 50	141.4	11 22.7	83 49	141.7	10 32.9	83 49	142.3	8 53.1	83 47	143.4	7 13.1	83 46	144.5	6 48.1	83 46	144.8	5 58.0	83 45	145.3	4
45	11 42.6	82 51	140.4	11 17.9	82 50	140.7	10 53.2	82 50	141.0	10 03.8	82 49	141.5	8 24.7	83 48	142.7	6 45.5	83 47	143.8	6 20.6	83 47	144.1	5 30.9	83 46	144.7	45
6	11 12.2	82 51	139.6	10 47.7	82 51	139.9	10 23.2	82 51	140.2	9 34.1	82 50	140.8	7 55.8	82 49	142.0	6 17.3	82 48	143.1	5 52.7	82 47	143.4	5 03.4	82 47	144.0	6
7	10 41.3	81 52	138.9	10 17.0	81 52	139.2	9 52.7	81 52	139.5	9 04.0	81 51	140.1	7 26.5	81 50	141.3	5 48.7	82 48	142.4	5 24.3	82 48	142.7				7
8	10 10.1	80 53	138.2	9 45.9	80 53	138.5	9 21.8	80 53	138.8	8 33.5	80 52	139.4	6 56.7	80 51	140.6	5 19.7	81 49	141.8							8
9	9 38.3	80 54	137.5	9 14.4	80 53	137.8	8 50.4	80 53	138.1	8 02.5	80 52	138.7	6 26.4	80 51	139.9										9
50	9 06.1	79 54	136.8	8 42.4	79 54	137.1	8 18.6	79 54	137.4	7 31.1	79 53	138.0	5 55.8	79 52	139.2										50
1	8 33.5	79 55	136.1	8 10.0	79 55	136.4	7 46.4	79 54	136.7	6 59.2	79 54	137.3	5 24.7	79 52	138.5										1
2	8 00.5	78 56	135.4	7 37.2	78 55	135.7	7 13.8	78 55	136.0	6 26.9	78 54	136.6													2
3	7 27.1	77 56	134.7	7 03.9	77 56	135.0	6 40.7	77 56	135.3	5 54.3	77 55	135.9													3
4	6 53.3	77 57	134.0	6 30.3	77 57	134.3	6 07.3	77 56	134.6	5 21.2	77 56	135.3													4
55	6 19.1	76 58	133.3	5 56.2	76 57	133.6	5 33.4	76 57	134.0																55
6	5 44.5	75 58	132.6	5 21.8	75 58	133.0																			6
7	5 09.5	75 59	132.0																						7

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00' Alt.	Δd Δt	Az.	28° 30' Alt.	Δd Δt	Az.	29° 00' Alt.	Δd Δt	Az.	30° 00' Alt.	Δd Δt	Az.	32° 00' Alt.	Δd Δt	Az.	34° 00' Alt.	Δd Δt	Az.	34° 30' Alt.	Δd Δt	Az.	35° 30' Alt.	Δd Δt	Az.	H.A.
91	16 04.5	57 72	66.7	16 21.6	57 72	66.3	16 38.7	57 72	65.9	17 12.8	57 71	65.0	18 20.2	56 70	63.3	19 26.6	55 69	61.5	19 43.0	55 69	61.1	20 15.7	54 68	60.2	91
2	15 21.1	58 72	66.2	15 38.4	58 72	65.8	15 55.7	57 71	65.4	16 30.0	57 71	64.5	17 38.0	56 70	62.8	18 45.1	56 69	61.0	19 01.8	55 68	60.6	19 34.8	55 68	59.7	2
3	14 38.0	58 72	65.7	14 55.4	58 71	65.3	15 12.8	58 71	64.8	15 47.4	58 71	64.0	16 56.1	57 70	62.3	18 03.9	56 68	60.6	18 20.7	56 68	60.1	18 54.1	56 68	59.2	3
4	13 55.0	59 71	65.2	14 12.5	59 71	64.7	14 30.1	58 71	64.3	15 05.0	58 70	63.5	16 14.3	57 69	61.8	17 22.8	57 68	60.1	17 39.8	57 68	59.6	18 13.6	56 67	58.8	4
95	13 12.2	59 71	64.6	13 29.9	59 71	64.2	13 47.6	59 71	63.8	14 22.8	59 70	63.0	15 32.7	58 69	61.3	16 41.9	57 68	59.6	16 59.1	57 67	59.1	17 33.2	57 67	58.3	95
6	12 29.5	60 71	64.1	12 47.4	60 70	63.7	13 05.2	59 70	63.3	13 40.8	59 70	62.4	14 51.4	59 69	60.8	16 01.2	58 67	59.1	16 18.6	58 67	58.6	16 53.1	57 66	57.8	6
7	11 47.1	60 70	63.5	12 05.1	60 70	63.1	12 23.1	60 70	62.7	12 59.0	60 69	61.9	14 10.2	59 68	60.2	15 20.8	58 67	58.6	15 38.3	58 67	58.2	16 13.2	58 66	57.3	7
8	11 04.9	61 70	63.0	11 23.1	61 70	62.6	11 41.2	60 70	62.2	12 17.4	60 69	61.4	13 29.3	60 68	59.7	14 40.6	59 67	58.1	14 58.3	59 66	57.6	15 33.5	59 66	56.8	8
9	10 22.9	61 70	62.4	10 41.2	61 69	62.0	10 59.5	61 69	61.6	11 36.0	61 69	60.8	12 48.6	60 68	59.2	14 00.5	60 66	57.6	14 18.4	60 66	57.1	14 54.1	59 65	56.3	9
100	9 41.0	62 69	61.9	9 59.5	62 69	61.5	10 18.0	61 69	61.1	10 54.8	61 68	60.3	12 08.1	61 67	58.7	13 20.8	60 66	57.0	13 38.8	60 66	56.5	14 14.9	60 65	55.8	100
1	8 59.4	62 69	61.3	9 18.1	62 69	60.9	9 36.7	62 68	60.5	10 13.9	62 68	59.8	11 27.8	61 67	58.1	12 41.2	61 66	56.5	12 59.5	61 65	56.1	13 35.9	61 65	55.3	1
2	8 18.1	63 69	60.8	8 36.9	63 68	60.4	8 55.6	63 68	60.0	9 33.1	62 67	59.2	10 47.7	62 66	57.6	12 01.9	62 65	56.0	12 20.3	61 65	55.6	12 57.1	61 64	54.8	2
3	7 36.9	63 68	60.2	7 55.9	63 68	59.8	8 14.8	63 68	59.4	8 52.6	63 67	58.7	10 07.9	63 66	57.1	11 22.8	62 65	55.5	11 41.4	62 64	55.1	12 18.6	62 64	54.3	3
4	6 56.0	64 68	59.7	7 15.1	64 68	59.3	7 34.2	64 67	58.9	8 12.4	63 67	58.1	9 28.4	63 65	56.5	10 44.0	63 64	55.0	11 02.8	63 64	54.6	11 40.3	62 63	53.8	4
105	6 15.3	64 67	59.1	6 34.6	64 67	58.7	6 53.9	64 67	58.3	7 32.3	64 66	57.5	8 49.1	64 65	56.0	10 05.4	63 64	54.4	10 24.4	63 64	54.1	11 02.3	63 63	53.2	105
6	5 34.9	65 67	58.5	5 54.4	65 67	58.1	6 13.8	65 66	57.8	6 52.6	65 66	57.0	8 10.0	64 65	55.4	9 27.1	64 63	53.9	9 46.3	64 63	53.5	10 24.6	64 62	52.7	6
7				5 14.3	65 66	57.6	5 33.9	65 66	57.2	6 13.1	65 65	56.4	7 31.2	65 64	54.9	8 49.0	65 63	53.4	9 08.4	65 63	53.0	9 47.1	64 62	52.2	7
8										5 33.8	66 65	55.8	6 52.6	66 64	54.3	8 11.2	65 63	52.8	8 30.8	65 62	52.4	9 09.9	65 62	51.7	8
9													6 14.4	66 63	53.8	7 33.7	66 62	52.3	7 53.4	66 62	51.9	8 32.9	66 61	51.1	9
110													5 36.4	67 63	53.2	6 56.4	67 62	51.7	7 16.4	67 61	51.3	7 56.3	66 61	50.6	110
1																6 19.5	67 61	51.1	6 39.6	67 61	50.8	7 19.9	67 60	50.0	1
2																5 42.8	68 61	50.6	6 03.1	68 60	50.2	6 43.8	68 60	49.5	2
3																5 06.4	69 60	50.0	5 27.0	68 60	49.6	6 08.0	68 59	48.9	3
4																						5 32.5	69 59	48.4	4

Lat. 38°

H.A.	36°00' Alt.	Δd Δt	Az.	37°00' Alt.	Δd Δt	Az.	38°30' Alt.	Δd Δt	Az.	40°00' Alt.	Δd Δt	Az.	42°00' Alt.	Δd Δt	Az.	42°30' Alt.	Δd Δt	Az.	43°00' Alt.	Δd Δt	Az.	45°00' Alt.	Δd Δt	Az.	H.A.
00	88 00.0	1.0 15	180.0	89 00.0	1.0 28	180.0	89 30.0	1.0 43	00.0	88 00.0	1.0 15	00.0	86 00.0	1.0 07	00.0	85 30.0	1.0 06	00.0	85 00.0	1.0 06	00.0	83 00.0	1.0 04	00.0	00
1	87 50.8	93 41	157.9	88 43.4	79 60	141.3	89 04.1	53 72	57.2	87 51.3	93 39	20.9	85 55.6	98 21	10.5	85 25.1	98 19	09.3	84 56.6	99 17	08.3	82 57.6	99 12	05.8	1
2	87 26.4	79 56	140.8	88 07.5	54 71	121.6	88 27.1	29 76	71.7	87 28.0	78 54	37.2	85 43.0	93 33	20.3	85 14.9	94 30	18.1	84 46.4	95 27	16.3	82 50.5	98 19	11.4	2
3	86 52.8	65 65	128.9	87 25.1	40 75	111.9	87 35.5	19 77	77.1	86 55.7	64 62	48.4	85 23.3	86 43	28.9	84 57.1	88 39	26.0	84 30.3	90 36	23.6	82 39.0	95 26	16.8	3
4	86 13.9	55 70	120.8	86 40.4	32 76	106.3	86 49.2	14 78	79.7	86 18.2	52 67	56.0	84 57.8	78 50	36.2	84 33.8	81 46	32.9	84 09.0	84 43	30.0	82 23.3	91 32	21.9	4
05	85 32.1	47 73	115.1	85 54.6	27 77	102.6	86 02.5	10 78	81.2	85 37.8	43 70	61.2	84 27.8	70 55	42.2	84 06.1	74 52	38.7	83 43.3	78 49	35.6	82 03.9	87 38	26.5	05
6	84 48.5	41 74	110.8	85 08.2	24 78	100.0	85 15.8	07 78	82.1	84 55.7	36 72	64.9	83 54.6	63 60	47.1	83 35.0	68 56	43.6	83 14.1	71 53	40.5	81 41.2	82 43	30.7	6
7	84 03.9	37 76	107.6	84 21.5	21 78	98.1	84 28.9	05 78	82.6	84 12.4	31 73	67.6	83 18.6	57 63	51.1	83 01.1	61 60	47.7	82 42.1	65 57	44.6	81 15.7	77 47	34.6	7
8	83 18.5	34 76	104.9	83 34.6	20 78	96.5	83 42.0	04 78	83.0	83 28.3	26 74	69.7	82 41.2	51 65	54.3	82 25.2	56 63	51.1	82 07.9	60 60	48.0	80 47.7	73 50	38.0	8
9	82 32.6	31 77	102.8	82 47.6	19 79	95.2	82 55.0	02 78	83.2	82 43.8	23 75	71.2	82 02.1	46 67	57.0	81 47.7	50 65	53.9	81 31.9	55 62	51.0	80 17.6	68 53	41.0	9
10	81 46.3	29 78	101.0	82 00.5	18 79	94.1	82 08.1	01 78	83.3	81 58.8	19 75	72.5	81 22.0	41 68	59.3	81 08.9	46 66	56.3	80 54.6	50 64	53.5	79 45.8	64 56	43.7	10
1	80 59.8	28 78	99.5	81 13.3	17 79	93.2	81 21.1	00 78	83.3	81 13.6	17 76	73.4	80 40.9	37 70	61.1	80 29.1	42 68	58.6	80 16.0	46 66	55.6	79 12.4	60 58	46.1	1
2	80 13.0	26 78	98.1	80 26.0	17 79	92.3	80 34.2	01 78	83.3	80 28.2	14 76	74.2	79 59.2	33 70	62.7	79 48.5	38 69	60.0	79 36.6	42 67	57.5	78 37.7	56 60	48.2	2
3	79 26.2	26 78	96.9	79 38.8	16 79	91.5	79 47.2	02 78	83.2	79 42.7	12 76	74.7	79 16.9	30 71	64.0	79 07.2	34 70	61.5	78 56.3	38 68	59.0	78 01.9	52 61	50.1	3
4	78 39.2	25 78	95.9	78 51.5	16 79	90.8	79 00.3	03 78	83.1	78 57.0	10 76	75.2	78 34.2	27 72	65.1	78 25.4	31 70	62.7	78 15.5	35 69	60.4	77 25.2	48 63	51.8	4
15	77 52.1	24 79	94.9	78 04.2	16 79	90.2	78 13.4	04 78	82.9	78 11.2	09 76	75.6	77 51.2	25 72	66.1	77 43.2	28 71	63.8	77 34.2	32 70	61.6	76 47.7	45 64	53.2	15
6	77 05.0	24 79	94.0	77 17.0	16 79	89.6	77 26.4	05 78	82.8	77 25.4	07 76	75.9	77 07.8	23 73	66.9	77 00.6	26 72	64.7	76 52.4	29 70	62.6	76 09.5	42 65	54.6	6
7	76 17.8	24 79	93.2	76 29.7	16 79	89.0	76 39.6	06 78	82.6	76 39.5	06 76	76.1	76 24.2	20 73	67.6	76 17.7	23 72	65.5	76 10.2	27 71	63.5	75 30.7	39 66	55.7	7
8	75 30.6	23 79	92.4	75 42.4	16 79	88.5	75 52.7	06 78	82.4	75 53.6	04 77	76.2	75 40.4	18 73	68.1	75 34.6	21 72	66.2	75 27.8	24 71	64.2	74 51.4	36 66	56.8	8
9	74 43.3	23 79	91.7	74 55.2	17 79	87.9	75 05.8	07 78	82.2	75 07.7	03 77	76.3	74 56.5	16 74	68.6	74 51.3	19 73	66.7	74 45.1	22 72	64.9	74 11.6	34 67	57.7	9
20	73 56.0	23 79	91.0	74 07.9	17 79	87.4	74 19.0	08 78	82.0	74 21.8	02 77	76.4	74 12.4	14 74	69.0	74 07.7	17 73	67.2	74 02.2	20 72	65.4	73 31.5	31 67	58.5	20
1	73 08.8	23 79	90.4	73 20.7	17 79	86.9	73 32.2	08 78	81.7	73 35.8	00 77	76.4	73 28.2	12 74	69.4	73 24.1	15 73	67.7	73 19.1	18 72	65.9	72 51.0	29 68	59.2	1
2	72 21.5	23 79	89.7	72 33.5	17 79	86.5	72 45.4	09 78	81.5	72 49.8	01 77	76.4	72 43.9	11 74	69.7	72 40.3	13 73	68.0	72 35.9	16 72	66.4	72 10.2	27 68	59.9	2
3	71 34.2	23 79	89.1	71 46.3	18 79	86.0	71 58.7	10 78	81.3	72 03.9	02 77	76.4	71 59.5	09 74	69.9	71 56.4	12 73	68.3	71 52.5	14 72	66.7	71 29.2	24 69	60.5	3
4	70 46.9	23 79	88.6	70 59.2	18 79	85.6	71 12.0	10 78	81.0	71 17.9	03 77	76.3	71 15.1	08 74	70.1	71 12.4	10 73	68.6	71 09.0	13 73	67.0	70 48.0	24 69	61.0	4
25	69 59.7	23 79	88.0	70 12.0	18 79	85.2	70 25.3	11 78	80.7	70 32.0	04 77	76.3	70 30.6	06 74	70.3	70 28.4	09 74	68.8	70 25.4	11 73	67.3	70 06.5	20 69	61.4	25
6	69 12.4	23 79	87.5	69 24.9	19 79	84.7	69 38.6	12 78	80.5	69 46.1	05 76	76.2	69 46.1	05 74	70.4	69 44.3	07 74	69.0	69 41.8	09 73	67.5	69 24.9	19 70	61.8	6
7	68 25.2	23 79	87.0	68 37.9	19 78	84.3	68 52.0	12 78	80.2	69 00.2	06 76	76.1	69 01.5	03 74	70.5	69 00.1	06 74	69.1	68 58.1	08 73	67.7	68 43.2	17 70	62.2	7
8	67 38.0	23 79	86.5	67 50.8	19 78	83.9	68 05.4	13 78	79.9	68 14.3	07 76	75.9	68 16.9	02 74	70.5	68 16.0	04 74	69.2	68 14.3	07 73	67.8	68 01.5	15 70	62.5	8
9	66 50.8	24 79	86.0	67 03.8	20 78	83.5	67 18.9	14 77	79.7	67 28.4	07 76	75.8	67 32.3	01 74	70.6	67 31.7	03 74	69.3	67 30.5	04 73	67.9	67 19.3	13 70	62.8	9
30	66 03.7	24 79	85.5	66 16.9	20 78	83.1	66 32.4	14 77	79.4	66 42.6	08 76	75.6	66 47.8	00 74	70.6	66 47.5	02 74	69.3	66 46.7	04 73	68.0	66 37.2	12 70	63.0	30
1	65 16.5	24 79	85.0	65 30.0	21 78	82.7	65 46.0	15 77	79.1	65 56.9	09 76	75.5	66 03.2	01 74	70.6	66 03.3	01 74	69.3	66 02.8	03 73	68.1	65 55.9	10 70	63.2	1
2	64 29.5	24 78	84.6	64 43.1	21 78	82.3	64 59.6	16 77	78.8	65 11.1	10 75	75.3	65 18.6	02 74	70.5	65 19.1	01 74	69.3	65 18.9	01 73	68.1	65 12.8	09 70	63.4	2
3	63 42.4	25 78	84.1	63 56.3	21 78	81.9	64 13.2	16 77	78.5	64 25.4	11 75	75.1	64 34.0	04 74	70.5	64 34.8	02 74	69.3	64 35.1	00 73	68.1	64 30.5	07 71	63.5	3
4	62 55.4	25 78	83.7	63 09.5	22 78	81.5	63 26.9	17 77	78.2	63 39.7	12 75	74.9	63 49.5	03 74	70.4	63 51.2	01 73	69.3	63 51.2	01 73	68.1	63 48.2	06 71	63.6	4
35	62 08.4	25 78	83.2	62 22.7	22 78	81.1	62 40.6	17 77	77.9	62 54.1	12 75	74.7	63 04.9	05 74	70.3	63 06.4	04 74	69.2	63 07.3	02 73	68.1	63 05.8	05 71	63.7	35
6	61 21.5	26 78	82.8	61 36.1	23 78	80.7	61 54.4	18 77	77.6	62 08.5	13 75	74.5	62 20.4	07 74	70.2	62 22.2	05 74	69.1	62 23.4	03 73	68.1	62 23.4	03 71	63.7	6
7	60 34.6	26 78	82.4	60 49.4	23 78	80.4	61 08.2	19 77	77.3	61 23.0	14 75	74.3	61 36.0	08 74	70.1	61 38.0	06 74	69.1	61 39.6	04 73	68.0	61 41.0	02 71	63.8	7
8	59 47.8	26 78	81.9	60 02.8	24 78	80.0	60 21.9	19 77	77.0	60 37.5	15 76	74.0	60 51.5	09 74	69.9	60 53.9	07 74	69.0	60 55.8	05 73	67.9	60 58.6	01 71	63.8	8
9	59 01.0	27 78	81.5	59 16.3	24 77	79.6	59 36.1	20 77	76.7	59 52.0	16 76	73.8	60 07.1	10 74	69.8	60 09.8	08 73	68.8	60 12.0	07 73	67.8	60 16.2	00 71	63.8	9
40	58 14.3	27 78	81.1	58 29.8	25 77	79.2	58 50.1	20 77	76.4	59 06.7	16 76	73.6	59 22.8	11 74	69.7	59 25.7	09 73	68.7	59 28.2	08 73	67.7	59 33.4	02 71	63.8	40
1	57 27.6	28 78	80.7	57 43.4	25 77	78.9	58 04.2	21 76	76.1	58 21.3	17 75	73.3	58 38.4	11 74	69.5	58 41.7	10 73	68.6	58 44.5	00 73	67.6	58 51.3	03 71	63.8	1
2	56 41.0	28 78	80.2	56 57.0	26 77	78.5	57 18.3	22 76	75.8	57 36.1	18 75	73.1	57 54.2	12 74	69.4	57 57.7	11 73	68.4	58 00.8	10 73	67.5	58 08.9	04 71	63.7	2
3	55 54.4	28 78	79.8	56 10.7	26 77	78.1	56 32.5	22 76	75.5	56 50.9	19 75	72.8	57 09.9	13 74	69.2	57 13.7	12 73	68.3	57 17.1	11 73	67.4	57 26.6	05 71	63.7	3
4	55 07.9	29 77	79.4	55 24.5	27 77	77.7	55 46.8	23 76	75.2	56 05.7	19 75	72.6	56 25.8	14 74	69.0	56 29.8	13 73	68.1	56 33.5	12 73	67.2	56 44.2	06 71	63.6	4
45	54 21.4	29 77	79.0	54 38.3	27 77	77.4	55 01.1	24 76	74.8	55 20.7	20 75	72.3	55 41.7	15 73	68.8	55 46.0	14 73	67.9	55 49.9	13 73	67.0	56 01.9	07 71	63.5	45
6	53 35.1	30 77	78.6	53 52.2	28 77	77.0	54 15.5	24 76	74.5	54 35.7	21 75	72.0	54 57.6	16 73	68.6	55 02.2	15 73	67.7	55 06.4	13 72	66.9	55 19.6	08 70	63.4	6
7	52 48.7	30 77	78.2	53 06.2	28 77	76.6	53 30.0	25 76	74.2	53 50.7	21 75	71.7	54 13.6	17 73	68.4	54 18.5	16 73	67.5	54 23.0	14 72	66.7	54 37.3	10 70	63.3	7
8	52 02.5	31 77	77.8	52 20.2	29 76	76.2	52 44.5	25 76	73.9	53 05.9	22 75	71.5	53 29.7	18 73	68.2	53 34.8	16 73	67.3	53 39.6	15 72	66.5	53 55.1	11 70	63.2	8
9	51 16.3	31 77	77.4	51 34.3	29 76	75.9	51 59.1	26 76	73.5	52 21.1	23 75	71.2	52 45.8	18 73	68.0	52 51.2	17 73	67.1	52 56.2	16 72	66.3	53 13.0	12 70	63.0	9
50	50 30.2	32 77	77.0	50 48.5	30 76	75.5	51 13.8	27 75	73.2	51 36.4	24 74	70.9	52 02.1	19 73	67.7	52 07.7	18 72	66.9	52 13.0	17 72	66.1	52 30.9	13 70	62.9	50
1	49 44.2	32 77	76.6	50 02.8	30 76	75.1	50 28.6	27 75	72.9	50 51.7	24 74	70.6	51 18.3	20 73	67.5	51 24.2	19 72	66.7	51 29.8	18 72	65.9	51 48.8	14 70	62.7	1
2	48 58.2	32 76	76.2	49 17.1	31 76	74.8	49 43.4	28 75	72.5	50 07.2	25 74	70.3	50 34.7	21 73	67.3	50 40.8	20 72	66.5	50 46.6	19 72	65.7	51 06.8	15 70	62.6	2
3	48 12.3	33 76	75.8	48 31.6	31 76	74.4	48 58.4	28 75	72.2	49 22.7	26 74	70.0	49 51.1	22 72	67.0	49 57.5	21 72	66.2	50 03.6	20 72	65.5	50 24.7	16 70	62.4	3
4	47 26.5	33 76	75.4	47 46.1	32 76	74.0	48 13.4	29 75	71.9	48 38.3	26 74	69.7	49 07.7	23 72	66.7	49 14.3	22 72	66.0	49 20.6	21 72	65.3	49 43.0	17 70	62.2	4
55	46 40.8	34 76	75.0	47 00.7	32 76	73.6	47 28.5	30 75	71.5	47 54.0	27 74	69.4	48 24.3	23 72	66.5	48 31.1	22 72	65.8	48 37.7	21 71	65.0	49 01.2	18 70	62.0	55
6	45 55.2	34 76	74.6	46 15.3	33 75	73.2	46 43.7	30 75	71.2	47 09.8	28 74	69.1	47 40.9	24 72	66.2	47 48.1	23 72	65.5	47 54.9	22 71	64.8	48 19.5	19 69	61.8	6
7	45 09.7	35 76	74.2	45 30.1	33 75	72.9	45 59.0	31 74	70.8	46 25.7	28 73	68.8	46 57.7	25 72	66.0	47 05.1	24 72	65.2	47 12.2	23 71	64.5	47 37.8	20 69	61.6	7
8	44 24.2	35 76	73.8	44 45.0	34 75	72.5	45 14.4	32 74	70.5	45 41.7	29 73	68.4	46 14.6	26 72	65.7	46 22.2	25 71	65.0	46 29.5	24 71	64.3	46 56.3	21 69	61.4	8
9	43 38.9	36 75	73.4	43 59.9	34 75	72.1	44 29.9	32 74	70.1	44 57.7	30 73	68.1	45 31.6	27 72	65.4	45 39.4	26 71	64.7	45 47.0	25 71	64.0	46 14.8	21 69	61.2	9
60	42 53.6	36 75	73.0	43 15.0	35 75	71.7	43 45.5	33 74	69.8	44 13.9	30 73	67.8	44 48.6	27 71	65.1	44 56.7	27 71	64.4	45 04.5	26 71	63.8	45 33.4	22 69	61.0	60
1	42 08.4	37 75	72.6	42 30.1	36 75	71.3	43 01.1	34 74	69.4	43 30.2	31 73	67.5	44 05.8	28 71	64.8	44 14.1	27 71	64.2	44 22.2	27 70	63.5	44 52.1	23 69	60.8	1
2	41 23.4	37 75	72.2	41 45.4	36 74	71.0	42 16.9	34 74	69.1	42 46.6	32 72	67.1	43 23.0	29 71	64.5	43 31.6	28 71	63.9	43 39.9	27 70	63.2	44 10.9	24 69	60.5	2
3	40 38.4	38 75	71.8	41 00.8	37 74	70.6	41 32.8	35 73	68.7	42 03.1	33 72	66.8	42 40.4	30 71	64.2	42 49.2	29 70	63.6	42 57.8	28 70	62.9	43 29.8	25 68	60.3	3
4	39 53.5	38 75	71.4	40 16.2	37 74	70.2	40 48.8	35 73	68.3	41 19.7	33 72	66.5	41 57.9	30 71	63.9	42 06.9	30 70	63.3	42 15.7	29 70	62.6	42 48.8	26 68	60.0	4
65	39 08.8	39 74	71.0	39 31.8	38 74	69.8	40 04.9	36 73	68.0	40 36.4	34 72	66.1	41 15.5	31 70	63.6	41 24.7	31 70	63.0	41 33.8	30 70	62.4	42 07.8	27 68	59.8	65
6	38 24.1	40 74	70.6	38 47.5	38 74	69.4	39 21.2	37 73	67.6	39 53.2	35 72	65.8	40 33.2	32 70	63.3	40 42.6	31 70	62.7	40 51.9	31 70	62.1	41 27.0	28 68	59.5	6
7	37 39.6	40 74	70.2	38 03.3	39 73	69.0	38 37.5	37 73	67.2	39 10.1	35 72	65.4	39 51.0	33 70	63.0	40 00.7	32 70	62.4	40 10.2	31 69	61.8	40 46.3	29 68	59.3	7
8	36 55.2	41 74	69.8	37 19.2	39 73	68.6	37 54.0	38 72	66.9	38 27.2	36 71	65.1	39 08.9	34 70	62.7	39 18.9	33 70	62.1	39 28.6	32 69	61.5	40 05.8	30 67	59.0	8
9	36 10.9	41 74	69.3	36 35.2	40 73	68.2	37 10.6	38 72	66.5	37 44.4	37 71	64.7	38 27.0	34 70	62.4	38 37.1	34 69	61.8	38 47.2	33 69	61.2	39 25.3	31 67	58.7	9
70	35 26.7	42 73	68.9	35 51.4	41 73	67.8	36 27.3	39 72	66.1	37 01.7	37 71	64.4	37 45.1	35 70	62.0	37 55.6	34 69	61.4	38 05.8	34 69	60.8	38 45.0	31 67	58.4	70
1	34 42.6	42 73	68.5	35 07.7	41 73	67.4	35 44.1	40 72	65.7	36 19.1	38 71	64.0	37 03.4	36 69	61.7	37 14.1	35 69	61.1	37 24.6	35 68	60.5	38 04.7	32 67	58.1	1
2	33 58.7	43 73	68.1	34 24.1	42 72	67.0	35 01.1	40 72	65.3	35 36.7	39 70	63.7	36 21.9	37 69	61.4	36 32.8	36 69	60.8	36 43.5	35 68	60.2	37 24.5	33 67	57.8	2
3	33 14.9	43 73	67.7	33 40.6	42 72	66.6	34 18.2	41 71	65.0	34 54.4	39 70	63.3	35 40.4	37 69	61.0	35 51.6	37 68	60.5	36 02.5	36 68	59.9	36 44.7	34 66	57.6	3
4	32 31.2	43 73	67.3	32 57.3	43 72	66.2	33 35.4	42 71	64.6	34 12.2	40 70	62.9	34 59.1	38 69	60.7	35 10.5	38 68	60.1	35 21.7	37 68	59.5	36 04.8	35 66	57.3	4
75	31 47.7	44 72	66.8	32 14.1	44 72	65.8	32 52.8	42 71	64.2	33 30.2	41 70	62.5	34 18.0	39 69	60.3	34 29.6	38 68	59.8	34 41.0	38 68	59.2	35 25.2	36 66	56.9	75
6	31 04.3	45 72	66.4	31 31.1	44 72	65.4	32 10.3	43 71	63.8	32 48.0	42 70	62.2	33 37.0	40 68	60.0	33 48.8	40 68	59.4	34 00.5	39 67	58.9	34 45.6	37 66	56.6	6
7	30 21.0	45 72	66.0	30 48.2	45 71	65.0	31 27.9	44 70	63.4	32 06.5	42 69	61.8	32 56.1	40 68	59.6	33 08.2	40 67	59.1	33 20.1	39 67	58.5	34 06.1	37 65	56.3	7
8	29 37.9	46 72	65.6	30 05.4	45 71	64.5	30 45.7	44 70	63.0	31 25.0	43 69	61.4	32 15.4	41 68	59.3	32 27.7	41 67	58.7	32 39.8	40 67	58.2	33 26.9	38 65	56.0	8
9	28 54.9	47 71	65.1	29 22.8	46 71	64.1	30 03.6	45 70	62.6	30 43.5	44 69	61.0	31 34.8	42 67	58.9	31 47.3	41 67	58.4	31 59.7	41 67	57.8	32 47.8	39 65	55.7	9
80	28 12.1	47 71	64.7	28 40.3	47 70	63.7	29 21.8	45 70	62.1	30 02.2	44 69	60.6	30 54.4	43 67	58.5	31 07.2	42 67	58.0	31 19.8	42 66	57.5	32 08.8	40 65	55.3	80
1	27 29.4	48 71	64.3	27 58.0	47 70	63.3	28 40.1	46 69	61.8	29 21.1	45 68	60.2	30 14.2	43 67	58.2	30 27.1	43 66	57.6	30 40.0	43 66	57.1	31 30.0	41 64	55.0	1
2	26 46.9	49 71	63.8	27 15.9	48 70	62.8	27 58.5	47 69	61.3	28 40.2	46 68	59.8	29 34.1	44 67	57.8	29 47.3	44 66	57.3	30 00.3	43 66	56.8	30 51.4	42 64	54.7	2
3	26 04.6	49 71	63.4	26 34.0	49 70	62.4	27 17.1	47 69	60.9	27 59.4	46 68	59.4	28 54.2	45 66	57.4	29 07.5	45 66	56.9	29 20.9	44 65	56.4	30 12.9	43 64	54.3	3
4	25 22.4	50 70	62.9	25 52.1	49 69	62.0	26 35.9	48 68	60.5	27 18.7	47 67	59.0	28 14.4	46 66	57.0	28 28.1	45 66	56.5	28 41.6	45 65	56.0	29 34.6	43 64	54.0	4
85	24 40.4	50 70	62.5	25 10.4	50 69	61.5	25 54.8	49 68	60.1	26 38.3	48 67	58.6	27 34.8	46 66	56.6	27 48.7	46 65	56.1	28 02.5	46 65	55.6	28 56.4	44 63	53.6	85
6	23 58.5	51 69	62.0	24 28.9	50 69	61.1	25 13.9	49 68	59.7	25 58.0	49 67	58.2	26 55.4	47 65	56.2	27 09.5	47 65	55.8	27 23.5	46 65	55.3	28 18.5	45 63	53.2	6
7	23 16.9	52 69	61.6	23 47.6	51 68	61.1	24 33.2	50 68	59.2	25 17.9	49 67	57.8	26 16.2	48 65	55.9	26 30.6	48 65	55.4	26 44.8	47 64	54.9	27 40.7	46 63	52.9	7
8	22 35.4	52 69	61.1	23 06.5	52 68	60.2	23 52.6	51 67	58.8	24 38.0	50 66	57.4	25 37.2	49 65	55.5	25 51.7	48 64	55.0	26 06.2	48 64	54.5	27 03.1	47 62	52.5	8
9	21 54.1	53 69	60.7	22 25.6	52 68	59.8	23 12.3	51 67	58.4	23 58.3	51 66	57.0	24 58.3	49 64	55.1	25 12.8	49 64	54.6	25 27.7	49 64	54.1	26 25.6	47 62	52.1	9
90	21 12.9	53 68	60.2	21 44.8	53 68	59.3	22 32.1	52 67	57.9	23 18.7	51 66	56.5	24 19.7	50 64	54.6	24 34.7	50 64	54.2	24 49.6	50 63	53.7	25 48.4	48 62	51.8	90

DECLINATION CONTRARY NAME TO LATITUDE

Lat. 38°

H.A.	36°00' Alt. Δd Δt	Az.	37°00' Alt. Δd Δt	Az.	38°30' Alt. Δd Δt	Az.	40°00' Alt. Δd Δt	Az.	42°00' Alt. Δd Δt	Az.	42°30' Alt. Δd Δt	Az.	43°00' Alt. Δd Δt	Az.	45°00' Alt. Δd Δt	Az.	H.A.
00	16 00.0 1.00 01	180.0	15 00.0 1.00 01	180.0	13 30.0 1.00 01	180.0	12 00.0 1.00 01	180.0	10 00.0 1.00 01	180.0	9 30.0 1.00 00	180.0	9 00.0 1.00 00	180.0	7 00.0 1.00 00	180.0	00
1	15 59.7 1.00 02	179.2	14 59.7 1.00 02	179.2	13 29.7 1.00 01	179.2	11 59.7 1.00 02	179.2	9 59.7 1.00 02	179.3	9 29.7 1.00 02	179.3	8 59.7 1.00 02	179.3	6 59.7 1.00 01	179.3	1
2	15 58.6 1.00 03	178.3	14 58.6 1.00 03	178.3	13 28.7 1.00 03	178.4	11 58.7 1.00 03	178.4	9 58.8 1.00 03	178.5	9 28.8 1.00 03	178.5	8 58.8 1.00 03	178.5	6 58.8 1.00 02	178.6	2
3	15 56.9 1.00 04	177.5	14 56.9 1.00 04	177.5	13 27.0 1.00 04	177.6	11 57.1 1.00 04	177.7	9 57.2 1.00 04	177.7	9 27.2 1.00 04	177.8	8 57.3 1.00 04	177.8	6 57.4 1.00 03	177.9	3
4	15 54.4 1.00 05	176.6	14 54.5 1.00 05	176.7	13 24.7 1.00 05	176.8	11 54.8 1.00 05	176.9	9 55.0 1.00 05	177.0	9 25.1 1.00 05	177.0	8 55.1 1.00 05	177.0	6 55.3 1.00 04	177.2	4
05	15 51.3 1.00 06	175.8	14 51.5 1.00 06	175.9	13 21.7 1.00 06	176.0	11 51.9 1.00 06	176.1	9 52.2 1.00 06	176.2	9 22.3 1.00 06	176.3	8 52.4 1.00 06	176.3	6 52.7 1.00 05	176.4	05
6	15 47.5 1.00 08	175.0	14 47.7 1.00 07	175.0	13 18.1 1.00 08	175.0	11 48.4 1.00 07	175.5	9 48.8 1.00 07	175.5	9 18.9 1.00 07	175.5	8 49.0 1.00 07	175.5	6 49.4 1.00 06	175.7	6
7	15 43.0 1.00 09	174.1	14 43.3 1.00 08	174.2	13 13.8 1.00 08	174.4	11 44.2 1.00 08	174.5	9 44.8 1.00 07	174.7	9 14.9 1.00 08	174.8	8 45.1 1.00 08	174.8	6 45.6 1.00 07	175.0	7
8	15 37.8 99 10	173.3	14 38.2 99 10	173.4	13 08.8 99 09	173.6	11 39.4 99 09	173.8	9 40.1 99 09	174.0	9 10.3 99 09	174.0	8 40.5 99 09	174.1	6 41.2 99 08	174.3	8
9	15 32.0 99 11	172.5	14 32.5 99 11	172.6	13 03.2 99 10	172.8	11 33.9 99 10	173.0	9 34.8 99 10	173.2	9 05.1 99 10	173.3	8 35.3 99 10	173.4	6 36.2 99 09	173.6	9
10	15 25.4 99 12	171.6	14 26.0 99 12	171.8	12 56.9 99 12	172.0	11 27.4 99 11	172.2	9 29.0 99 11	172.4	8 59.3 99 11	172.5	8 29.5 99 11	172.6	6 30.7 99 10	172.9	10
1	15 18.2 99 13	170.8	14 18.9 99 13	171.0	12 50.0 99 13	171.2	11 21.1 99 12	171.4	9 22.5 99 12	171.7	8 52.8 99 12	171.7	8 23.2 99 12	171.9	6 24.6 99 11	172.2	1
2	15 10.3 99 14	170.0	14 11.1 99 14	170.1	12 42.4 99 14	170.4	11 13.7 99 13	170.7	9 15.4 99 13	171.0	8 45.8 99 13	171.1	8 16.2 99 13	171.2	6 17.9 99 12	171.5	2
3	15 01.7 98 15	169.1	14 02.7 98 15	169.3	12 34.2 98 15	169.6	11 05.7 98 14	169.9	9 07.7 98 14	170.3	8 38.2 98 14	170.3	8 08.6 98 14	170.4	6 10.6 98 13	170.8	3
4	14 52.5 98 16	168.3	13 53.6 98 16	168.5	12 25.4 98 16	168.8	10 57.1 98 15	169.1	8 59.4 98 15	169.5	8 29.9 98 15	169.6	8 00.5 98 15	169.7	6 02.7 98 14	170.1	4
15	14 42.6 98 18	167.5	13 43.9 98 17	167.7	12 15.9 98 17	168.0	10 47.9 98 16	168.3	8 50.5 98 16	168.8	8 21.1 98 16	168.9	7 51.8 98 16	168.9	5 54.3 98 16	169.4	15
6	14 32.0 97 19	166.7	13 33.5 98 18	166.9	12 05.8 98 18	167.3	10 38.0 98 17	167.6	8 41.0 98 17	168.0	8 11.7 98 17	168.2	7 42.4 98 17	168.3	5 45.3 98 16	168.7	6
7	14 20.8 97 20	165.9	13 22.5 97 19	166.1	11 55.0 97 19	166.5	10 27.6 97 18	166.8	8 30.9 97 18	167.3	8 01.7 97 18	167.4	7 32.5 97 17	167.5	5 35.8 97 17	168.0	7
8	14 08.9 97 21	165.1	13 10.8 97 20	165.3	11 43.7 97 20	165.7	10 16.5 97 19	166.1	8 20.2 97 19	166.6	7 51.1 97 19	166.7	7 22.0 97 18	166.8	5 25.7 97 18	167.3	8
9	13 56.4 96 22	164.3	12 58.5 96 21	164.5	11 31.7 97 21	164.9	10 04.8 97 20	165.3	8 08.9 97 20	165.8	7 40.0 97 20	165.9	7 11.0 97 19	166.0	5 15.0 97 19	166.6	9
20	13 43.2 96 23	163.5	12 45.6 96 23	163.7	11 19.1 96 22	164.2	9 52.5 96 21	164.6	7 57.1 96 21	165.1	7 28.2 96 21	165.3	6 59.3 96 20	165.4	5 03.8 96 20	165.9	20
1	13 29.5 96 24	162.7	12 32.0 96 24	163.0	11 05.9 96 23	163.4	9 39.7 96 22	163.8	7 44.7 96 22	164.4	7 15.9 96 21	164.6	6 47.1 96 21	164.7			1
2	13 15.1 95 25	161.9	12 17.9 95 25	162.2	10 52.1 95 24	162.6	9 26.2 95 23	163.1	7 31.7 95 23	163.7	7 03.0 95 22	163.8	6 34.4 95 22	164.0			2
3	13 00.0 95 26	161.1	12 03.1 95 26	161.4	10 37.6 95 25	161.9	9 12.2 95 24	162.3	7 18.4 95 24	163.1	6 49.6 95 23	163.1	6 21.1 95 23	163.3			3
4	12 44.4 94 27	160.3	11 47.7 94 27	160.6	10 22.6 95 26	161.1	8 57.5 95 25	161.6	7 04.0 95 24	162.3	6 35.6 95 24	162.4	6 07.2 95 24	162.6			4
25	12 28.1 94 28	159.5	11 31.7 94 28	159.9	10 07.0 94 27	160.4	8 42.3 94 26	160.9	6 49.3 94 25	161.6	6 21.0 94 25	161.7	5 52.8 94 25	161.9			25
6	12 11.3 94 29	158.7	11 15.1 94 29	159.1	9 50.9 94 28	159.6	8 26.6 94 27	160.2	6 34.1 94 26	160.9	6 05.9 94 26	161.0	5 37.8 94 26	161.2			6
7	11 53.8 93 30	158.0	10 58.0 93 30	158.3	9 34.1 93 29	158.9	8 10.2 93 28	159.4	6 18.3 93 27	160.2	5 50.3 93 27	160.3	5 22.3 93 27	160.5			7
8	11 35.8 93 31	157.2	10 40.2 93 31	157.6	9 16.8 93 30	158.1	7 53.3 93 29	158.7	6 02.0 93 28	159.5	5 34.1 93 28	159.6	5 06.3 93 28	159.8			8
9	11 17.2 92 32	156.4	10 21.9 92 32	156.8	8 58.9 92 31	157.4	7 35.9 92 30	158.0	5 45.1 92 29	158.8	5 17.4 92 29	159.0					9
30	10 58.0 92 33	155.7	10 03.0 92 32	156.1	8 40.5 92 32	156.7	7 17.9 92 31	157.3	5 27.7 92 30	158.1	5 00.2 92 30	158.3					30
1	10 38.2 91 34	154.9	9 43.5 91 33	155.3	8 21.5 91 33	156.0	6 59.4 91 32	156.6	5 09.8 91 31	157.4							1
2	10 17.9 91 35	154.2	9 23.5 91 34	154.6	8 02.0 91 34	155.2	6 40.3 91 33	155.9									2
3	9 57.0 90 36	153.4	9 03.0 90 35	153.9	7 41.9 90 34	154.5	6 20.7 90 34	155.2									3
4	9 35.6 90 37	152.7	8 41.9 90 36	153.1	7 21.3 90 35	153.8	6 00.6 90 34	154.5									4
35	9 13.6 89 38	152.0	8 20.3 89 37	152.4	7 00.2 89 36	153.1	5 40.0 89 35	153.8									35
6	8 51.4 88 38	151.2	7 58.1 88 38	151.7	6 38.5 88 37	152.4	5 18.9 89 36	153.1									6
7	8 28.1 88 39	150.5	7 35.4 88 39	151.0	6 16.4 88 38	151.7											7
8	8 04.6 87 40	149.8	7 12.3 87 39	150.3	5 53.7 87 39	151.0											8
9	7 40.5 87 41	149.1	6 48.6 87 40	149.6	5 30.6 87 39	150.3											9
40	7 16.0 86 42	148.4	6 24.4 86 41	148.9	5 06.9 86 40	149.7											40
1	6 51.0 85 43	147.7	5 59.7 85 42	148.2													1
2	6 25.5 85 43	147.0	5 34.6 85 43	147.5													2
3	5 59.5 84 44	146.3	5 09.0 84 44	146.8													3
4	5 33.0 84 45	145.6															4
45	5 06.1 83 46	144.9															45

DECLINATION SAME NAME AS LATITUDE

H.A.	36°00' Alt. Δd Δt	Az.	37°00' Alt. Δd Δt	Az.	38°30' Alt. Δd Δt	Az.	40°00' Alt. Δd Δt	Az.	42°00' Alt. Δd Δt	Az.	42°30' Alt. Δd Δt	Az.	43°00' Alt. Δd Δt	Az.	45°00' Alt. Δd Δt	Az.	H.A.
91	20 32.9 54 68	59.7	21 04.3 54 67	58.8	21 52.2 53 66	57.5	22 39.4 52 65	56.1	23 41.2 51 64	54.2	23 56.5 51 63	53.8	24 11.6 50 63	53.3	25 11.4 49 61	51.4	91
2	19 51.3 55 68	59.3	20 23.9 54 67	58.4	21 12.4 54 66	57.0	22 00.2 53 65	55.7	23 02.9 52 63	53.8	23 18.4 51 63	53.4	23 33.8 51 63	52.9	24 34.5 50 61	51.0	2
3	19 10.7 55 67	58.8	19 43.8 55 67	57.9	20 32.8 54 66	56.6	21 21.3 53 65	55.2	22 24.9 52 63	53.4	22 40.6 52 63	52.9	22 56.2 52 62	52.5	23 57.9 51 61	50.6	3
4	18 30.4 55 67	58.3	19 03.8 55 66	57.4	19 53.5 55 65	56.1	20 42.6 54 64	54.8	21 47.0 53 63	53.0	22 03.0 53 62	52.5	22 18.8 53 62	52.1	23 21.5 52 60	50.2	4
95	17 50.2 57 67	57.8	18 24.1 56 66	57.0	19 14.3 56 65	55.7	20 04.1 55 64	54.3	21 09.4 54 62	52.5	21 25.6 54 62	52.1	21 41.6 53 62	51.6	22 45.2 52 60	49.8	95
6	17 10.3 57 66	57.4	17 44.5 57 66	56.5	18 35.4 56 65	55.2	19 25.7 56 63	53.9	20 32.5 55 62	52.1	20 48.4 55 62	51.7	21 04.7 54 61	51.2	22 09.2 53 60	49.4	6
7	16 30.6 58 66	56.9	17 05.2 57 65	56.0	17 56.7 57 64	54.7	18 47.7 56 63	53.4	19 54.8 55 62	51.7	20 11.4 55 61	51.2	20 27.9 55 61	50.8	21 33.4 54 59	49.0	7
8	15 51.1 58 65	56.4	16 25.1 58 65	55.5	17 18.2 58 64	54.3	18 09.8 57 63	53.0	19 17.8 56 61	51.2	19 34.6 56 61	50.8	19 51.4 56 60	50.4	20 57.9 55 59	48.6	8
9	15 11.9 59 65	55.9	15 47.2 59 64	55.0	16 39.9 58 63	53.8	17 32.2 58 62	52.5	18 41.0 57 61	50.8	18 58.1 57 60	50.4	19 15.1 57 60	49.9	20 22.5 56 59	48.2	9
100	14 32.8 60 65	55.4	15 08.6 59 64	54.6	16 01.9 59 63	53.3	16 54.8 58 62	52.0	18 04.5 58 60	50.3	18 21.8 58 60	49.9	18 39.1 57 60	49.5	19 47.4 57 58	47.7	100
1	13 54.0 60 64	54.9	14 30.2 60 64	54.1	15 24.1 60 63	52.8	16 17.6 59 62	51.6	17 28.2 59 60	49.9	17 45.8 58 60	49.5	18 03.2 58 59	49.0	19 12.6 57 58	47.3	1
2	13 15.5 61 64	54.4	13 52.0 61 63	53.6	14 46.6 60 62	52.3	15 40.7 60 61	51.1	16 52.2 59 60	49.4	17 10.0 59 59	49.0	17 27.7 59 59	48.6	18 37.9 58 57	46.9	2
3	12 37.1 62 63	53.9	13 14.1 61 63	53.1	14 09.2 61 62	51.9	15 04.0 61 61	50.6	16 16.4 60 60	49.0	16 34.4 60 59	48.5	16 52.3 60 58	48.1	18 03.5 59 57	46.4	3
4	11 59.1 62 63	53.4	12 36.4 62 62	52.6	13 32.2 62 61	51.4	14 27.6 61 60	50.1	15 40.9 61 59	48.5	15 59.1 61 58	48.1	16 17.2 60 58	47.7	17 29.4 60 56	46.0	4
105	11 21.3 63 63	52.8	11 59.0 63 62	52.1	12 55.4 62 61	50.9	13 51.4 62 60	49.7	15 05.6 62 58	48.0	15 24.0 61 58	47.6	15 42.4 61 58	47.2	16 55.5 61 56	45.6	105
6	10 43.7 64 62	52.3	11 21.9 63 61	51.5	12 18.8 63 60	50.4	13 15.5 63 59	49.2	14 30.6 62 58	47.6	14 49.2 62 58	47.1	15 07.9 62 57	46.7	16 21.9 61 56	45.1	6
7	10 06.4 64 62	51.8	10 45.0 64 61	51.0	11 42.6 64 60	49.8	12 39.9 64 59	48.7	13 55.8 63 57	47.1	14 14.7 63 57	46.7	14 33.6 63 57	46.3	15 48.5 62 55	44.7	7
8	9 29.4 65 61	51.3	10 08.3 65 61	50.5	11 06.6 65 60	49.3	12 04.4 64 58	48.2	13 21.3 64 57	46.6	13 40.5 64 57	46.2	13 59.5 64 56	45.8	15 15.4 63 55	44.2	8
9	8 52.7 66 61	50.7	9 32.0 66 60	50.0	10 30.9 65 59	48.8	11 29.4 65 58	47.7	12 47.1 65 57	46.1	13 06.5 64 56	45.7	13 25.8 64 56	45.3	14 42.6 64 54	43.7	9
110	8 16.2 66 60	50.2	8 55.9 66 60	49.4	9 55.4 66 59	48.3	10 54.6 66 58	47.1	12 13.2 65 56	45.6	12 32.8 65 56	45.2	12 52.3 65 55	44.8	14 10.1 65 54	43.3	110
1	7 40.0 67 60	49.6	8 20.2 67 59	48.9	9 20.3 67 58	47.8	10 20.1 66 57	46.6	11 39.6 66 56	45.1	11 59.4 66 55	44.7	12 19.1 66 55	44.3	13 37.8 65 53	42.8	1
2	7 04.1 68 59	49.1	7 44.7 68 59	48.4	8 45.4 67 58	47.2	9 45.9 67 57	46.1	11 06.2 67 55	44.6	11 26.2 67 54	44.2	11 46.2 67 54	43.8	13 05.5 66 53	42.3	2
3	6 28.5 68 59	48.5	7 09.5 68 58	47.8	8 10.8 68 57	46.7	9 12.0 68 56	45.6	10 33.2 67 55	44.1	10 53.4 67 54	43.7	11 13.6 67 54	43.3	12 34.2 67 52	41.8	3
4	5 53.3 69 58	48.0	6 34.6 69 58	47.3	7 36.5 69 57	46.2	8 38.4 69 56	45.1	10 00.4 68 54	43.6	10 20.9 68 54	43.2	10 41.3 68 53	42.8	12 02.8 68 52	41.3	4
115	5 18.3 70 58	47.4	6 00.1 70 57	46.7	7 02.6 69 56	45.6	8 05.0 69 55	44.5	9 28.0 69 54	43.1	9 48.7 69 53	42.7	10 09.3 69 53	42.3	11 31.7 69 51	40.8	115
6			5 25.8 70 57	46.1	6 29.0 70 56	45.1	7 32.0 70 54	44.0	8 55.9 70 53	42.5	9 16.8 70 53	42.2	9 37.6 70 52	41.8	11 00.9 69 51	40.4	6
7					5 55.4 71 55	44.5	6 59.0 71 53	43.4	8 24.1 71 52	42.0	8 45.2 70 52	41.7	9 06.3 70 52	41.3	10 30.5 70 50	39.9	7
8					5 22.7 72 54	44.0	6 27.0 71 53	42.9	7 52.6 71 52	41.5	8 13.9 71 52	41.1	8 35.2 71 51	40.8	10 00.3 71 50	39.3	8
9							5 55.0 72 53	42.3	7 21.4 72 51	40.9	7 43.0 72 51	40.6	8 04.5 72 51	40.2	9 30.5 72 49	38.8	9
120							5 23.3 73 52	41.8	6 50.6 73 51	40.4	7 12.4 73 50	40.1	7 34.1 73 50	39.7	9 01.0 72 49	38.3	120
1									6 20.1 73 50	39.9	6 42.1 73 50	39.5	7 04.1 73 50	39.2	8 31.9 73 48	37.8	1
2									5 50.0 74 50	39.3	6 12.2 74 49	39.0	6 34.4 74 49	38.6	8 03.1 74 47	37.3	2
3									5 20.2 75 49	38.8	5 42.7 75 49	38.4	6 05.1 75 48	38.1	7 34.6 75 47	36.7	3
4											5 13.5 75 48	37.9	5 36.1 75 48	37.5	7 06.5 75 46	36.2	4
125													5 07.5 76 47	37.0	6 38.8 76 46	35.7	125
6															6 11.4 77 45	35.1	6
7															5 44.4 77 44	34.6	7
8															5 17.7 78 44	34.0	8

Lat. 39°

Lat. 38° H.A.	46° 00' Alt.	Δd Δt	Az.	47° 00' Alt.	Δd Δt	Az.	48° 30' Alt.	Δd Δt	Az.	49° 30' Alt.	Δd Δt	Az.	50° 30' Alt.	Δd Δt	Az.	51° 30' Alt.	Δd Δt	Az.	52° 30' Alt.	Δd Δt	Az.	54° 00' Alt.	Δd Δt	Az.	H.A.
00	82 00.0	1.0 03	00.0	81 00.0	1.0 03	00.0	79 30.0	1.0 02	00.0	78 30.0	1.0 02	00.0	77 30.0	1.0 02	00.0	76 30.0	1.0 02	00.0	75 30.0	1.0 02	00.0	74 00.0	1.0 01	00.0	00
1	81 57.9	1.0 10	05.0	80 58.2	1.0 09	04.3	79 28.5	1.0 07	03.6	78 28.7	1.0 07	03.3	77 28.8	1.0 06	02.9	76 28.9	1.0 05	02.7	75 29.0	1.0 05	02.4	73 59.1	1.0 04	02.1	1
2	81 51.8	98 17	09.9	80 52.8	98 15	08.6	79 24.0	99 12	07.2	78 24.6	99 11	06.5	77 24.9	99 09	05.8	76 25.2	99 09	05.3	75 26.0	99 08	04.8	73 56.5	1.0 07	04.3	2
3	81 41.8	96 23	14.6	80 44.0	97 20	12.8	79 16.5	98 17	10.7	78 18.0	98 16	09.6	77 19.2	98 14	08.7	76 20.2	98 13	07.9	75 21.0	99 12	07.2	73 52.1	99 10	06.4	3
4	81 28.1	93 28	19.1	80 32.0	94 25	16.8	79 06.4	96 21	14.2	78 08.8	96 19	12.7	77 10.8	97 18	11.5	76 12.6	97 16	10.5	75 14.1	98 15	09.6	73 46.0	98 13	08.4	4
05	81 11.0	89 34	23.3	80 16.8	91 30	20.6	78 53.6	93 26	17.4	77 57.2	94 23	15.7	77 00.3	95 21	14.3	76 03.0	96 19	13.0	75 05.3	96 18	11.9	73 38.3	97 16	10.5	05
6	80 50.9	86 38	27.2	79 58.7	88 34	24.2	78 38.2	91 30	20.6	77 43.2	92 27	18.6	76 47.6	93 25	16.9	75 51.3	94 23	15.4	74 54.6	95 21	14.1	73 28.8	96 18	12.5	6
7	80 28.0	81 42	30.7	79 38.1	85 38	27.5	78 20.4	88 33	23.6	77 27.1	90 30	21.4	76 32.8	91 28	19.5	75 37.8	92 26	17.8	74 42.2	93 24	16.3	73 17.8	94 21	14.4	7
8	80 02.6	77 46	34.0	79 15.1	81 42	30.6	78 00.4	85 37	26.3	77 08.8	87 34	24.0	76 16.1	89 31	21.9	75 22.5	90 28	20.1	74 28.1	91 26	18.4	73 05.3	93 23	16.3	8
9	79 35.2	73 49	37.0	78 50.1	77 45	33.4	77 38.5	82 40	29.0	76 48.7	84 37	26.4	75 57.6	86 34	24.2	75 05.4	88 31	22.2	74 12.3	89 29	20.5	72 51.3	91 26	18.2	9
10	79 05.9	69 52	39.6	78 23.1	73 48	36.0	77 14.7	78 42	31.4	76 26.8	81 39	28.8	75 37.4	83 36	26.4	74 46.7	85 34	24.3	73 55.0	87 31	22.4	72 35.8	89 28	20.0	10
1	78 35.0	65 54	42.0	77 54.5	70 50	38.4	76 49.2	75 45	33.7	76 03.2	78 42	30.9	75 15.6	81 39	28.5	74 26.5	83 36	26.0	73 36.2	85 34	24.3	72 19.0	87 30	21.7	1
2	78 02.6	61 56	44.2	77 24.4	66 52	40.6	76 22.3	72 47	35.8	75 38.2	75 44	33.0	74 52.3	78 41	30.4	74 04.9	80 38	28.2	73 16.1	82 36	26.1	72 00.9	85 32	23.3	2
3	77 29.1	58 58	46.1	76 53.1	62 54	42.5	75 54.0	69 49	37.7	75 11.8	72 46	34.9	74 27.7	75 43	32.3	73 41.9	78 40	29.9	72 54.7	80 38	27.8	71 41.6	83 34	24.9	3
4	76 54.5	54 59	47.9	76 20.6	59 56	44.3	75 24.5	65 51	39.5	74 44.2	69 48	36.6	74 01.8	72 45	34.0	73 17.7	75 42	31.6	72 32.1	77 40	29.4	71 21.1	80 36	26.4	4
15	76 19.0	51 61	49.5	75 46.7	56 57	46.0	74 53.9	62 53	41.2	74 15.4	66 50	38.3	73 34.8	69 47	35.6	72 52.4	72 44	33.2	72 08.3	75 41	30.9	70 59.6	78 38	27.8	15
6	75 42.7	47 62	50.9	75 12.6	53 59	47.4	74 22.3	59 54	42.7	73 45.6	63 51	39.8	73 06.8	66 48	37.1	72 26.0	69 46	34.6	71 43.5	72 43	32.4	70 37.0	76 39	29.2	6
7	75 05.6	44 63	52.1	74 37.4	50 60	48.8	73 49.8	56 55	44.1	73 14.9	60 53	41.2	72 37.8	64 50	38.5	71 58.6	67 47	36.0	71 17.7	70 44	33.7	70 13.4	73 41	30.5	7
8	74 28.0	42 64	53.3	74 01.5	47 61	50.0	73 16.5	53 57	45.4	72 43.3	57 54	42.5	72 07.9	61 51	39.8	71 30.4	64 48	37.3	70 51.1	67 46	35.0	69 49.0	71 42	31.8	8
9	73 49.9	39 64	54.3	73 25.0	44 62	51.1	72 42.5	50 56	46.5	72 11.0	54 55	43.7	71 37.2	58 52	41.1	71 01.3	61 50	38.8	70 23.5	64 47	36.2	69 23.7	68 44	32.9	9
20	73 11.2	36 65	55.2	72 48.0	41 63	52.1	72 07.9	48 59	47.6	71 38.0	52 56	44.8	71 05.8	55 53	42.2	70 31.5	59 51	39.7	69 55.2	62 48	37.3	68 57.6	66 45	34.1	20
1	72 32.2	34 66	56.1	72 10.5	39 63	53.0	71 32.7	45 60	48.6	71 04.4	49 57	45.9	70 33.7	53 54	43.2	70 01.0	56 52	40.8	69 26.2	59 50	38.4	68 30.8	64 46	35.1	1
2	71 52.8	31 66	56.8	71 32.5	36 64	53.8	70 57.0	43 60	49.5	70 30.2	47 58	46.8	70 01.1	50 55	44.2	69 29.8	54 53	41.7	68 56.5	57 50	39.4	68 03.2	61 47	36.1	2
3	71 13.1	29 67	57.5	70 54.2	34 64	54.5	70 20.8	40 61	50.3	69 55.5	44 59	47.7	69 27.8	48 56	45.1	68 58.0	51 54	42.7	68 26.2	55 51	40.3	67 35.1	59 48	37.0	3
4	70 33.1	27 67	58.1	70 15.3	32 65	55.1	69 44.2	38 62	51.1	69 20.3	42 59	48.5	68 54.1	46 57	45.9	68 25.7	49 55	43.5	67 55.3	52 52	41.2	67 06.3	57 49	37.9	4
25	69 52.9	25 67	58.6	69 36.5	29 65	55.8	69 07.2	36 62	51.8	68 44.7	40 60	49.2	68 19.9	43 58	46.7	67 52.9	47 55	44.3	67 23.9	50 53	42.0	66 37.0	54 50	38.7	25
6	69 12.4	23 68	59.1	68 57.3	27 66	56.4	68 29.9	33 63	52.4	68 08.7	37 61	49.9	67 45.2	41 58	47.4	67 19.7	44 56	45.1	66 52.0	48 54	42.8	66 07.1	52 51	39.5	6
7	68 31.8	21 68	59.5	68 17.8	25 66	56.9	67 52.3	31 63	53.0	67 32.4	35 61	50.5	67 10.2	39 59	48.1	66 46.0	42 57	45.8	66 19.7	45 55	43.5	65 36.8	50 51	40.3	7
8	67 50.9	19 68	59.8	67 38.1	23 66	57.3	67 14.4	29 64	53.5	66 55.7	33 62	51.1	66 34.9	37 59	48.7	66 11.9	40 57	46.4	65 47.0	43 55	44.2	65 06.0	48 52	41.0	8
9	67 10.0	18 68	60.2	66 58.3	22 67	57.7	66 36.3	27 64	54.0	66 18.8	31 62	51.6	65 59.2	34 60	49.3	65 37.5	38 58	47.0	65 13.8	41 56	44.8	64 34.8	46 53	41.6	9
30	66 28.9	16 69	60.5	66 18.2	20 67	58.0	65 57.9	25 64	54.4	65 41.6	29 62	52.1	65 23.2	32 60	49.8	65 02.8	36 58	47.5	64 40.4	39 56	45.4	64 03.2	43 53	42.2	30
1	65 47.7	14 69	60.8	65 38.0	18 67	58.4	65 19.4	23 65	54.8	65 04.2	27 63	52.5	64 47.0	30 61	50.3	64 27.8	34 59	48.0	64 06.6	37 57	45.9	63 31.3	41 54	42.8	1
2	65 06.4	13 69	61.0	64 57.7	16 67	58.6	64 40.6	22 65	55.2	64 26.6	25 63	52.9	64 10.5	28 61	50.7	63 52.5	32 59	48.5	63 32.5	35 57	46.4	62 59.0	39 54	43.3	2
3	64 25.0	11 69	61.2	64 17.3	15 68	58.9	64 01.7	20 65	55.5	63 48.8	23 63	53.3	63 33.8	27 61	51.1	63 16.9	30 60	48.9	62 58.1	33 57	46.8	62 26.5	37 55	43.8	3
4	63 43.5	10 69	61.3	63 36.8	13 68	59.1	63 22.7	18 65	55.8	63 10.8	21 64	53.6	62 57.0	25 62	51.5	62 41.2	28 60	49.3	62 23.5	31 58	47.3	61 53.6	35 55	44.2	4
35	63 02.0	08 69	61.5	62 56.1	11 68	59.3	62 43.6	16 65	56.0	62 32.7	20 64	53.9	62 19.9	23 62	51.8	62 05.2	26 60	49.7	61 48.7	29 58	47.7	61 20.5	33 56	44.7	35
6	62 20.4	07 69	61.6	62 15.5	10 68	59.4	62 04.3	15 66	56.3	61 54.4	18 64	54.2	61 42.7	21 62	52.1	61 29.0	24 61	50.0	61 13.6	27 59	48.0	60 47.2	32 56	45.1	6
7	61 38.8	05 69	61.7	61 34.7	08 68	59.6	61 24.9	13 66	56.5	61 16.0	16 64	54.4	61 05.3	19 62	52.3	60 52.7	22 61	50.3	60 38.4	25 59	48.3	60 13.6	30 56	45.4	7
8	60 57.2	04 69	61.8	60 53.9	07 68	59.8	60 45.5	12 66	56.6	60 37.5	15 64	54.6	60 27.8	18 63	52.6	60 16.2	21 61	50.6	60 03.0	24 59	48.7	59 39.8	28 57	45.8	8
9	60 15.6	03 69	61.8	60 13.1	06 68	59.8	60 06.0	10 66	56.8	59 59.0	13 64	54.8	59 50.2	16 63	52.8	59 39.6	19 61	50.9	59 27.4	22 60	48.9	59 05.8	26 57	46.1	9
40	59 33.9	01 69	61.8	59 32.2	04 68	59.8	59 26.4	09 66	56.9	59 20.3	12 65	54.9	59 12.5	14 63	53.0	59 02.9	17 61	51.1	58 51.7	20 60	49.2	58 31.7	24 57	46.4	40
1	58 52.2	00 69	61.8	58 51.3	03 68	59.9	58 46.4	07 66	57.0	58 41.6	10 65	55.1	58 34.7	13 63	53.2	58 26.1	16 62	51.3	58 15.8	18 60	49.4	57 57.4	22 57	46.6	1
2	58 10.5	01 69	61.8	58 10.4	02 68	59.9	58 07.1	06 66	57.1	58 02.8	09 65	55.2	57 56.8	11 63	53.4	57 49.1	14 62	51.5	57 39.9	17 60	49.6	57 23.0	21 58	46.9	2
3	57 28.8	02 69	61.8	57 29.5	00 68	59.9	57 27.4	04 66	57.1	57 23.9	07 65	55.3	57 18.8	10 63	53.4	57 12.1	13 62	51.6	57 03.8	15 60	49.8	56 48.4	19 58	47.1	3
4	56 47.2	04 69	61.8	56 48.6	01 68	59.9	56 47.6	03 66	57.2	56 45.0	06 65	55.4	56 40.8	08 63	53.6	56 35.0	11 62	51.7	56 27.7	14 60	49.9	56 13.7	17 58	47.3	4
45	56 05.5	05 69	61.7	56 07.7	02 68	59.9	56 07.9	02 66	57.2	56 06.1	04 65	55.4	56 02.8	07 64	53.6	55 57.9	09 62	51.9	55 51.4	12 60	50.1	55 39.0	16 58	47.4	45
6	55 23.5	06 69	61.6	55 26.8	03 68	59.9	55 28.1	00 66	57.2	55 27.2	03 65	55.5	55 24.7	05 64	53.7	55 20.7	08 62	52.0	55 15.2	10 61	50.2	55 04.1	14 58	47.6	6
7	54 42.3	07 69	61.5	54 45.9	05 68	59.8	54 48.4	01 66	57.2	54 48.2	02 65	55.5	54 46.6	04 64	53.8	54 43.4	06 62	52.0	54 38.8	09 61	50.3	54 29.1	13 58	47.7	7
8	54 00.8	08 69	61.5	54 05.0	06 68	59.8	54 08.6	02 66	57.2	54 09.2	00 65	55.5	54 08.4	03 64	53.8	54 06.1	05 62	52.1	54 02.4	07 61	50.4	53 54.1	11 58	47.9	8
9	53 19.3	09 69	61.4	53 24.2	07 68	59.7	53 28.9	03 66	57.2	53 30.3	01 65	55.5	53 30.3	01 64	53.8	53 28.8	04 62	52.1	53 25.9	06 61	50.5	53 19.0	09 59	48.0	9
50	52 37.8	10 69	61.2	52 43.4	08 68	59.6	52 49.2	05 66	57.1	52 51.3	02 65	55.5	52 52.1	00 64	53.8	52 51.5	02 62	52.2	52 49.5	04 61	50.5	52 43.9	08 59	48.0	50
1	51 56.4	12 69	61.1	52 02.6	09 68	59.5	52 09.5	06 66	57.1	52 12.4	04 65	55.4	52 13.9	01 64	53.8	52 14.1	01 62	52.2	52 13.0	03 61	50.5	52 08.7	06 59	48.1	1
2	51 15.0	13 69	61.0	51 21.9	10 68	59.4	51 29.8	07 66	57.0	51 33.4	05 65	55.4	51 35.8	03 64	53.8	51 36.8	01 62	52.2	51 36.5	02 61	50.6	51 33.5	04 59	48.2	2
3	50 33.7	14 69	60.8	50 41.2	12 68	59.3	50 50.2	08 66	56.9	50 54.5	06 65	55.3	50 57.6	04 64	53.8	50 59.4	02 62	52.2	50 59.9	00 61	50.6	50 58.3	03 59	48.2	3
4	49 52.4	15 69	60.7	50 00.6	13 68	59.2	50 10.6	10 66	56.8	50 15.7	07 65	55.3	50 19.5	05 63	53.7	50 22.1	03 62	52.1	50 23.4	01 61	50.6	50 23.0	02 59	48.2	4
55	49 11.2	16 69	60.5	49 20.0	14 68	58.9	49 31.0	11 66	56.7	49 36.8	09 65	55.2	49 41.4	07 63	53.7	49 44.4	05 62	52.1	49 46.9	03 61	50.6	49 47.6	00 59	48.2	55
6	48 30.1	17 68	60.4	48 39.5	15 67	58.9	48 51.5	12 66	56.6	48 58.0	10 65	55.1	49 03.3	08 63	53.6	49 07.5	06 62	52.0	49 10.4	04 61	50.5	49 12.5	01 59	48.2	6
7	47 49.0	18 68	60.2	47 59.1	16 67	58.7	48 12.1	13 66	56.5	48 19.3	11 64	55.0	48 25.3	09 63	53.5	48 30.2	07 62	52.0	48 33.9	05 61	50.5	48 37.2	02 59	48.2	7
8	47 08.0	19 68	60.0	47 18.7	17 67	58.5	47 32.7	14 66	56.4	47 40.6	12 64	54.9	47 47.3	10 63	53.4	47 53.0	08 62	51.9	47 57.4	06 61	50.4	48 02.0	04 59	48.2	8
9	46 27.1	20 68	59.8	46 38.4	18 67	58.4	46 52.9	15 66	56.2	47 01.9	13 64	54.8	47 09.4	12 63	53.3	47 15.8	10 62	51.8	47 21.0	08 61	50.4	47 26.7	05 59	48.2	9
60	45 46.3	21 68	59.6	45 58.2	19 67	58.0	46 14.1	16 65	56.0	46 23.3	14 64	54.6	46 31.5	13 63	53.3	46 38.6	11 62	51.7	46 44.6	09 61	50.3	46 51.5	06 59	48.1	60
1	45 05.6	22 68	59.4	45 18.1	20 67	58.0	45 34.9	17 65	55.9	45 44.8	16 64	54.5	45 53.7	14 63	53.1	46 01.5	12 62	51.6	46 08.3	10 60	50.2	46 16.3	08 59	48.0	1
2	44 24.9	23 68	59.2	44 38.0	21 67	57.8	44 55.8	18 65	55.7	45 06.4	17 64	54.3	45 15.9	15 63	52.9	45 24.5	13 62	51.5	45 31.9	12 60	50.1	45 41.2	09 58	48.0	2
3	43 44.4	24 67	58.9	43 58.1	22 66	57.6	44 16.8	20 65	55.6	44 28.0	18 64	54.2	44 38.2	16 63	52.8	44 47.5	15 62	51.4	44 55.7	13 60	50.0	45 06.1	10 58	47.9	3
4	43 03.9	25 67	58.7	43 18.2	23 66	57.4	43 37.8	21 65	55.4	43 49.7	19 64	54.0	44 00.6	17 63	52.6	44 10.6	16 61	51.3	44 19.5	14 60	49.9	44 31.0	12 58	47.8	4
65	42 23.6	25 67	58.5	42 38.4	24 66	57.2	42 58.9	22 65	55.2	43 11.5	20 64	53.8	43 23.1	19 62	52.5	43 33.7	17 61	51.1	43 43.4	15 60	49.8	43 56.0	13 58	47.7	65
6	41 43.3	26 67	58.2	41 58.7	25 66	56.9	42 20.2	23 64	55.0	42 33.4	21 63	53.7	42 45.6	20 62	52.3	42 56.9	18 61	51.0	43 07.3	17 60	49.6	43 21.1	14 58	47.6	6
7	41 03.2	27 67	58.0	41 19.2	26 66	56.7	41 41.5	24 64	54.8	41 55.3	22 63	53.5	42 08.2	21 62	52.1	42 20.2	19 61	50.8	42 31.3	18 60	49.5	42 46.2	15 58	47.5	7
8	40 23.1	28 67	57.7	40 39.7	27 66	56.5	41 02.9	24 64	54.6	41 17.4	23 63	53.3	41 30.9	22 62	52.0	41 43.6	20 61	50.7	41 55.4	19 60	49.3	42 11.4	17 58	47.4	8
9	39 43.2	29 66	57.5	40 00.3	28 65	56.2	40 24.5	26 64	54.3	40 39.5	24 63	53.1	40 53.8	23 62	51.8	41 07.1	22 61	50.5	41 19.6	20 60	49.2	41 36.7	18 58	47.2	9
70	39 03.4	30 66	57.2	39 21.1	29 65	56.0	39 46.1	27 64	54.1	40 01.8	25 63	52.8	40 16.7	24 62	51.6	40 30.7	23 61	50.3	40 43.9	21 59	49.0	41 02.0	19 58	47.1	70
1	38 23.7	31 66	56.9	38 42.0	30 65	55.7	39 07.9	28 64	53.9	39 24.2	26 63	52.6	39 39.7	25 61	51.4	39 54.4	24 60	50.1	40 08.2	22 59	48.8	40 27.4	20 57	46.9	1
2	37 44.2	32 66	56.7	38 03.0	31 65	55.5	38 29.7	29 63	53.6	38 46.7	28 62	52.4	39 02.8	26 61	51.2	39 18.1	25 60	49.9	39 32.7	24 59	48.7	39 52.9	21 57	46.8	2
3	37 04.7	33 66	56.4	37 24.1	32 65	55.3	37 51.7	30 63	53.4	38 09.3	29 62	52.2	38 26.0	27 61	50.9	38 42.0	26 60	49.7	38 57.2	25 59	48.5	39 18.5	23 57	46.6	3
4	36 25.4	34 65	56.1	36 45.3	33 64	54.9	37 13.9	31 63	53.1	37 32.0	30 62	51.9	37 49.4	28 61	50.7	38 06.0	27 59	49.5	38 21.9	26 59	48.3	38 44.2	24 57	46.4	4
75	35 46.3	35 65	55.8	36 06.7	34 64	54.6	36 36.1	32 63	52.9	36 54.8	31 62	51.7	37 12.8	29 61	50.5	37 30.1	28 60	49.3	37 46.6	27 59	48.1	38 10.0	25 57	46.2	75
6	35 07.2	36 65	55.5	35 28.2	34 64	54.3	35 58.5	33 62	52.6	36 17.8	32 62	51.4	36 36.4	30 60	50.2	36 54.3	29 59	49.1	37 11.5	28 58	47.9	37 36.0	26 57	46.0	6
7	34 28.3	36 65	55.2	34 49.9	35 64	54.1	35 21.0	34 62	52.3	35 40.9	33 61	51.2	36 00.1	32 60	50.0	36 18.7	30 59	48.8	36 36.5	29 58	47.6	37 02.0	27 56	45.8	7
8	33 49.6	37 64	54.8	34 11.7	36 63	53.8	34 43.6	35 62	52.1	35 04.1	34 61	50.9	35 24.0	33 60	49.8	35 43.1	31 59	48.6	36 01.7	30 58	47.4	36 28.1	27 56	45.6	8
9	33 11.0	38 64	54.6	33 33.6	37 63	53.5	34 06.4	36 62	51.8	34 27.5	35 61	50.6	34 47.9	34 60	49.5	35 07.8	32 59	48.3	35 26.9	31 58	47.2	35 54.4	30 56	45.4	9
80	32 32.5	39 64	54.2	32 55.7	38 63	53.1	33 29.4	37 62	51.5	33 51.0	36 61	50.4	34 12.1	35 60	49.3	34 32.5	34 59	48.1	34 52.3	32 57	46.9	35 20.8	31 56	45.2	80
1	31 54.3	40 64	53.9	32 17.9	39 63	52.8	32 52.4	38 61	51.2	33 14.7	37 60	50.1	33 36.3	36 59	49.0	33 57.4	35 58	47.8	34 17.8	34 57	46.7	34 47.3	32 56	45.0	1
2	31 16.1	41 63	53.6	31 40.3	40 62	52.5	32 15.6	39 61	50.9	32 38.5	38 60	49.8	33 00.7	37 59	48.7	33 22.4	36 58	47.6	33 43.5	35 57	46.5	34 13.9	33 55	44.8	2
3	30 38.2	42 63	53.3	31 02.9	41 62	52.2	31 39.0	40 61	50.6	32 02.4	39 60	49.5	32 25.3	38 58	48.4	32 47.4	37 58	47.3	33 09.3	36 57	46.2	33 40.7	34 55	44.5	3
4	30 00.4	43 63	52.9	30 25.6	42 62	51.9	31 02.6	40 60	50.3	31 26.4	40 60	49.2	31 50.0	39 58	48.1	32 12.9	38 58	47.0	32 35.2	37 56	45.9	33 07.6	35 55	44.3	4
85	29 22.7	43 62	52.6	29 48.5	43 62	51.5	30 26.3	41 60	50.0	30 50.9	40 59	48.9	31 14.9	40 58	47.8	31 38.4	39 57	46.8	32 01.3	38 56	45.7	32 34.7	36 55	44.0	85
6	28 45.3	44 62	52.2	29 11.6	43 61	51.2	29 50.2	42 60	49.6	30 15.3	41 59	48.6	30 39.9	41 58	47.5	31 04.0	40 57	46.5	31 27.6	39 56	45.4	32 01.9	37 54	43.8	6
7	28 08.0	45 62	51.9	28 34.8	44 61	50.9	29 14.2	43 60	49.3	29 39.9	42 59	48.3	30 05.1	42 58	47.2	30 29.8	41 57	46.2	30 54.0	40 56	45.1	31 29.3	39 54	43.5	7
8	27 30.9	46 62	51.5	27 58.3	45 61	50.5	28 38.5	44 59	49.0	29 04.7	43 58	48.0	29 30.5	43 57	46.9	29 55.5	42 56	45.9	30 20.6	41 55	44.8	30 56.6	40 54	43.2	8
9	26 54.0	47 61	51.2	27 21.9	46 60	50.2	28 02.9	45 59	48.6	28 29.7	44 58	47.6	28 56.1	44 57	46.6	29 21.9	43 56	45.6	29 47.3	42 55	44.5	30 24.5	41 54	43.0	9
90	26 17.2	48 61	50.8	26 45.6	47 60	49.8	27 27.5	46 59	48.3	27 54.9	45 58	47.3	28 21.8	45 57	46.3	28 48.3	44 56	45.3	29 14.3	43 55	44.2	29 52.4	42 53	42.7	90

H.A.	46° 00' Alt. Δd Δt	Az.	47° 00' Alt. Δd Δt	Az.	48° 30' Alt. Δd Δt	Az.	49° 30' Alt. Δd Δt	Az.	50° 30' Alt. Δd Δt	Az.	51° 30' Alt. Δd Δt	Az.	52° 30' Alt. Δd Δt	Az.	54° 00' Alt. Δd Δt	Az.	H.A.
00	6 00.0 1.0 00	180.0	5 00.0 1.0 00	180.0													00
1	5 59.7 1.0 01	179.3															1
2	5 58.8 1.0 02	178.6															2
3	5 57.4 1.0 03	177.9															3
4	5 55.4 1.0 04	177.2															4
05	5 52.8 1.0 05	176.5															05
6	5 49.6 1.0 06	175.8															6
7	5 45.9 1.0 07	175.1															7
8	5 41.6 99 08	174.4															8
9	5 36.7 99 09	173.7															9
10	5 31.3 99 10	173.0															10
1	5 25.3 99 11	172.3															1
2	5 18.7 99 12	171.7															2
3	5 11.5 98 13	171.0															3
4	5 03.8 98 14	170.3															4

DECLINATION SAME NAME AS LATITUDE

H.A.	46° 00' Alt. Δd Δt	Az.	47° 00' Alt. Δd Δt	Az.	48° 30' Alt. Δd Δt	Az.	49° 30' Alt. Δd Δt	Az.	50° 30' Alt. Δd Δt	Az.	51° 30' Alt. Δd Δt	Az.	52° 30' Alt. Δd Δt	Az.	54° 00' Alt. Δd Δt	Az.	H.A.
91	25 40.7 49 61	50.4	26 09.6 48 60	49.4	26 52.3 47 58	48.0	27 20.2 46 57	47.0	27 47.7 45 56	46.0	28 14.8 45 56	45.0	28 41.4 44 55	43.9	29 20.4 43 53	42.4	91
2	25 04.4 49 60	50.0	25 33.8 49 59	49.1	26 17.3 48 58	47.6	26 45.7 47 57	46.6	27 13.8 46 56	45.6	27 41.5 46 55	44.6	28 08.7 45 54	43.6	28 48.6 44 53	42.1	2
3	24 28.2 50 60	49.7	24 58.2 50 59	48.7	25 42.4 49 58	47.3	26 11.5 48 57	46.3	26 40.1 47 56	45.3	27 08.3 47 55	44.3	27 36.1 46 54	43.3	28 17.0 45 52	41.8	3
4	23 52.3 51 60	49.3	24 22.8 51 59	48.3	25 07.8 50 57	46.9	25 37.4 49 56	45.9	26 06.6 48 56	45.0	26 35.4 48 55	44.0	27 03.8 47 54	43.0	27 45.6 46 52	41.5	4
95	23 16.6 52 59	48.9	23 47.6 51 58	47.9	24 33.4 51 57	46.5	25 03.5 50 56	45.6	25 33.3 49 55	44.6	26 02.7 49 54	43.6	26 31.7 48 53	42.7	27 14.4 47 52	41.2	95
6	22 41.0 53 59	48.5	23 12.6 52 58	47.6	23 59.2 51 57	46.2	24 29.9 51 56	45.2	25 00.2 50 55	44.3	25 30.1 50 54	43.3	25 59.7 49 53	42.3	26 43.3 48 51	40.9	6
7	22 05.8 54 58	48.1	22 37.8 53 58	47.2	23 25.2 52 56	45.8	23 56.4 52 55	44.9	24 27.3 51 54	43.9	24 57.8 51 54	43.0	25 28.0 50 53	42.0	26 12.5 49 51	40.6	7
8	21 30.7 54 58	47.7	22 03.2 54 57	46.8	22 51.4 53 56	45.4	23 23.2 53 55	44.5	23 54.6 52 54	43.6	24 25.7 52 53	42.6	24 56.4 51 52	41.7	25 41.8 50 51	40.2	8
9	20 55.8 55 58	47.3	21 28.9 55 57	46.4	22 17.9 54 56	45.0	22 50.2 54 55	44.1	23 22.1 53 54	43.2	23 53.8 52 53	42.3	24 25.1 52 52	41.3	25 11.4 51 50	39.9	9
100	20 21.2 56 57	46.9	20 54.8 56 56	46.0	21 44.5 55 55	44.6	22 17.4 54 54	43.7	22 49.9 54 53	42.8	23 22.1 53 52	41.9	23 54.0 53 52	41.0	24 41.2 52 50	39.6	100
1	19 46.8 57 57	46.4	20 20.9 57 56	45.6	21 11.4 56 55	44.2	21 44.8 55 54	43.3	22 17.9 55 53	42.4	22 50.6 54 52	41.5	23 23.1 54 51	40.6	24 11.2 53 50	39.2	1
2	19 12.7 58 56	46.0	19 47.2 57 56	45.2	20 38.6 57 54	43.8	21 12.5 56 54	43.0	21 46.1 56 53	42.1	22 19.4 55 52	41.2	22 52.4 55 51	40.3	23 41.4 54 49	38.9	2
3	18 38.8 59 56	45.6	19 13.8 58 55	44.7	20 05.9 58 54	43.4	20 40.4 57 53	42.6	21 14.5 57 52	41.7	21 48.4 56 51	40.8	22 22.0 56 50	39.9	23 11.8 55 49	38.5	3
4	18 05.2 59 56	45.2	18 40.7 59 55	44.3	19 33.6 58 54	43.0	20 08.5 58 53	42.2	20 43.2 58 52	41.3	21 17.6 57 51	40.4	21 51.8 57 50	39.5	22 42.5 56 49	38.2	4
105	17 31.8 60 55	44.7	18 07.8 60 54	43.9	19 01.4 59 53	42.6	19 36.9 59 52	41.8	20 12.1 58 51	40.9	20 47.1 58 50	40.0	21 21.8 58 50	39.2	22 13.3 57 48	37.8	105
6	16 58.6 61 55	44.3	17 35.1 61 54	43.4	18 29.5 60 53	42.2	19 05.5 60 52	41.3	19 41.3 59 51	40.5	20 16.8 59 50	39.6	20 52.1 59 49	38.8	21 44.5 58 48	37.5	6
7	16 25.7 62 54	43.8	17 02.8 62 54	43.0	17 57.9 61 52	41.8	18 34.4 61 51	40.9	19 10.7 60 51	40.1	19 46.8 60 50	39.2	20 22.6 59 49	38.4	21 15.8 59 47	37.1	7
8	15 53.1 63 54	43.4	16 30.6 62 53	42.6	17 26.6 62 52	41.3	18 03.6 62 51	40.5	18 40.4 61 50	39.7	19 17.0 61 49	38.8	19 53.3 60 48	38.0	20 47.4 60 47	36.7	8
9	15 20.8 63 53	42.9	15 58.8 63 53	42.1	16 55.5 63 51	40.9	17 33.0 62 51	40.1	18 10.3 62 50	39.3	18 47.5 62 49	38.4	19 24.4 61 48	37.6	20 19.3 61 46	36.3	9
110	14 48.7 64 53	42.5	15 27.2 64 52	41.7	16 24.6 64 51	40.5	17 02.7 63 50	39.7	17 40.5 63 49	38.9	18 18.2 63 48	38.0	18 55.6 62 47	37.2	19 51.4 62 46	36.0	110
1	14 16.9 65 52	42.0	14 55.9 65 52	41.2	15 54.1 64 50	40.0	16 32.6 64 50	39.2	17 11.0 64 49	38.4	17 49.2 63 48	37.6	18 27.2 63 47	36.8	19 23.7 63 46	35.6	1
2	13 45.4 66 52	41.5	14 24.9 66 51	40.8	15 23.8 65 50	39.6	16 02.9 65 49	38.8	16 41.8 65 48	38.0	17 20.5 64 47	37.2	17 59.0 64 47	36.4	18 56.4 64 45	35.2	2
3	13 14.2 67 52	41.1	13 54.2 66 51	40.3	14 53.8 66 50	39.1	15 33.4 66 49	38.4	16 12.8 66 48	37.6	16 52.0 65 47	36.8	17 31.1 65 46	36.0	18 29.3 64 45	34.8	3
4	12 43.3 67 51	40.6	13 23.7 67 50	39.8	14 24.1 67 49	38.7	15 04.2 67 48	37.9	15 44.1 66 47	37.1	16 23.8 66 46	36.4	17 03.4 66 46	35.6	18 02.4 65 44	34.4	4
115	12 12.7 68 50	40.1	12 53.6 68 50	39.4	13 54.7 68 48	38.2	14 35.3 67 48	37.5	15 15.7 67 47	36.7	15 56.0 67 46	35.9	16 36.1 67 45	35.2	17 35.9 66 44	34.0	115
6	11 42.4 69 50	39.6	12 23.8 69 49	38.9	13 25.6 69 48	37.8	14 06.7 68 47	37.0	14 47.6 68 46	36.2	15 28.4 68 46	35.5	16 09.0 68 45	34.7	17 09.6 67 43	33.6	6
7	11 12.4 70 49	39.1	11 54.3 70 49	38.4	12 56.6 69 48	37.3	13 38.4 69 47	36.5	14 19.8 69 46	35.8	15 01.1 69 45	35.0	15 42.2 68 44	34.3	16 43.6 68 43	33.2	7
8	10 42.8 71 49	38.6	11 25.1 70 48	37.9	12 28.3 70 47	36.8	13 10.4 70 46	36.1	13 52.3 70 45	35.3	14 34.1 70 44	34.6	15 15.7 69 44	33.9	16 17.9 69 42	32.7	8
9	10 13.4 71 48	38.1	10 56.2 71 48	37.4	12 00.2 71 46	36.3	12 42.7 71 46	35.6	13 25.1 71 45	34.9	14 07.4 70 44	34.2	14 49.5 70 43	33.4	15 52.5 70 42	32.3	9
120	9 44.4 72 48	37.6	10 27.6 72 47	36.9	11 32.3 72 46	35.9	12 15.3 72 45	35.1	12 58.2 71 44	34.4	13 41.0 71 43	33.7	14 23.6 71 43	33.0	15 27.3 71 41	31.9	120
1	9 15.7 73 47	37.1	9 59.4 73 46	36.4	11 04.8 73 45	35.4	11 48.3 72 45	34.7	12 31.6 72 44	34.0	13 14.9 72 43	33.2	13 58.0 72 42	32.5	15 02.5 71 41	31.4	1
2	8 47.3 74 47	36.6	9 31.5 74 46	35.9	10 37.6 73 45	34.9	11 21.5 73 44	34.2	12 05.4 73 43	33.5	12 49.1 73 42	32.8	13 32.8 73 42	32.1	14 38.0 72 40	31.0	2
3	8 19.3 74 46	36.1	9 03.9 74 45	35.4	10 10.7 74 44	34.4	10 55.1 74 43	33.7	11 39.5 74 43	33.0	12 23.7 74 42	32.3	13 07.8 73 41	31.6	14 13.8 73 40	30.6	3
4	7 51.7 75 46	35.5	8 36.7 75 45	34.9	9 44.2 75 44	33.9	10 29.1 75 43	33.2	11 13.9 75 42	32.5	11 58.6 74 41	31.8	12 43.2 74 40	31.2	13 49.9 74 39	30.1	4
125	7 24.3 76 45	35.0	8 09.9 76 44	34.4	9 18.0 76 43	33.4	10 03.4 76 42	32.7	10 48.6 75 42	32.0	11 33.8 75 41	31.4	12 18.9 75 40	30.7	13 26.3 75 39	29.7	125
6	6 57.4 77 44	34.5	7 43.4 77 44	33.8	8 52.2 76 42	32.9	9 38.0 76 42	32.2	10 23.7 76 41	31.5	11 09.4 76 40	30.9	11 54.9 76 39	30.2	13 03.1 76 38	29.2	6
7	6 30.8 77 44	33.9	7 17.2 77 43	33.3	8 26.7 77 42	32.3	9 13.0 77 41	31.7	9 59.2 77 40	31.1	10 45.3 77 40	30.4	11 31.3 77 39	29.7	12 40.2 76 38	28.8	7
8	6 04.6 78 43	33.4	6 51.4 78 42	32.8	8 01.6 78 41	31.8	8 48.3 78 40	31.2	9 34.9 78 40	30.6	10 21.5 78 39	29.9	11 08.0 77 38	29.3	12 17.6 77 37	28.3	8
9	5 38.8 79 42	32.9	6 26.0 79 42	32.2	7 36.9 79 41	31.3	8 24.0 79 40	30.7	9 11.1 78 39	30.0	9 58.1 78 38	29.4	10 45.1 78 38	28.8	11 55.4 78 36	27.8	9
130	5 13.3 80 42	32.3	6 01.0 79 41	31.7	7 12.5 79 40	30.8	8 00.1 79 39	30.2	8 47.6 79 39	29.5	9 35.1 79 38	28.9	10 22.5 79 37	28.3	11 33.5 79 36	27.4	130
1			5 36.4 80 40	31.1	6 48.5 80 39	30.2	7 36.5 80 39	29.6	8 24.5 80 38	29.0	9 12.4 80 37	28.4	10 00.2 80 36	27.8	11 11.9 80 35	26.9	1
2			5 12.1 81 40	30.6	6 24.9 81 39	29.7	7 13.3 81 38	29.1	8 01.7 81 37	28.5	8 50.1 81 37	27.9	9 38.4 80 36	27.4	10 50.7 80 35	26.4	2
3					6 01.6 81 38	29.2	6 50.5 81 37	28.6	7 39.3 81 37	28.0	8 28.1 81 36	27.4	9 16.9 81 35	26.8	10 29.8 81 34	25.9	3
4					5 38.8 82 37	28.6	6 28.1 82 37	28.0	7 17.3 82 36	27.5	8 06.5 82 35	26.9	8 55.7 82 35	26.3	10 09.4 82 34	25.4	4
135					5 16.3 83 37	28.1	6 06.0 83 36	27.5	6 55.7 83 35	26.9	7 45.4 83 35	26.4	8 34.9 83 34	25.8	9 49.2 83 33	24.9	135
6							5 44.4 84 35	27.0	6 34.5 83 35	26.4	7 24.5 83 34	25.9	8 14.5 83 33	25.3	9 29.5 83 32	24.5	6
7							5 23.2 84 35	26.4	6 13.7 84 34	25.9	7 04.1 84 33	25.3	7 54.5 84 33	24.8	9 10.1 84 32	24.0	7
8							5 02.3 85 34	25.9	5 53.2 85 33	25.3	6 44.1 85 33	24.8	7 34.9 85 32	24.3	8 51.1 85 31	23.5	8
9									5 33.2 85 33	24.8	6 24.5 85 32	24.3	7 15.7 85 31	23.7	8 32.4 85 30	23.0	9
140									5 13.6 86 32	24.2	6 05.2 86 31	23.7	6 56.8 86 31	23.2	8 14.2 86 30	22.4	140
1											5 46.4 87 31	23.2	6 38.4 87 30	22.7	7 56.3 87 29	21.9	1
2											5 28.0 87 30	22.6	6 20.4 87 29	22.2	7 38.9 87 28	21.4	2
3											5 10.0 88 29	22.1	6 02.7 88 29	21.6	7 21.8 88 28	20.9	3
4													5 45.5 89 28	21.1	7 05.2 88 27	20.4	4
145													5 28.7 89 27	20.5	6 48.9 89 26	19.8	145
6													5 12.4 90 27	20.0	6 33.1 90 26	19.3	6
7															6 17.6 90 25	18.8	7
8															6 02.6 91 24	18.3	8
9															5 48.0 91 24	17.7	9
150															5 33.8 92 23	17.2	150
1															5 20.1 92 22	16.6	1
2															5 06.8 93 21	16.1	2

Lat. 38°

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
00	73 30.0	1.00 1	00.0	73 00.0	1.00 1	00.0	72 00.0	1.00 1	00.0	71 30.0	1.00 1	00.0	71 00.0	1.00 1	00.0	70 30.0	1.00 1	00.0	69 00.0	1.00 1	00.0	68 30.0	1.00 1	00.0	00
1	73 29.2	1.04 1	02.0	72 59.2	1.04 1	02.0	71 59.3	1.00 4	01.8	71 29.3	1.00 4	01.7	70 59.3	1.00 3	01.7	70 29.3	1.00 3	01.6	68 59.4	1.00 3	01.4	68 29.4	1.00 3	01.4	1
2	73 26.6	1.00 7	04.1	72 56.8	1.00 7	03.9	71 57.0	1.00 6	03.6	71 27.1	1.00 6	03.5	70 57.2	1.00 6	03.3	70 27.3	1.00 6	03.2	68 57.6	1.00 5	02.9	68 27.7	1.00 5	02.8	2
3	73 22.4	99 10	06.1	72 52.7	99 09	05.9	71 53.3	99 08	05.4	71 23.3	99 08	05.2	70 53.8	99 08	05.0	70 24.0	99 08	04.8	68 54.7	99 07	04.3	68 24.9	99 07	04.1	3
4	73 16.6	98 12	08.1	72 47.1	98 12	07.8	71 48.1	98 11	07.2	71 18.6	99 11	06.9	70 49.0	99 10	06.6	70 19.4	99 10	06.4	68 50.6	99 08	05.7	68 20.9	99 08	05.5	4
05	73 09.1	97 15	10.1	72 40.0	97 14	09.7	71 41.5	98 13	08.9	71 12.2	98 13	08.6	70 42.9	98 12	08.3	70 13.5	98 12	08.0	68 45.3	98 11	07.1	68 15.8	98 10	06.9	05
6	73 00.1	96 18	12.0	72 31.3	96 17	11.5	71 33.5	97 16	10.6	71 04.5	97 15	10.2	70 35.4	97 15	09.9	70 06.3	97 14	09.5	68 38.8	97 13	08.5	68 09.6	98 12	08.2	6
7	72 49.5	95 20	13.9	72 21.1	95 19	13.3	71 24.0	96 17	12.3	70 55.4	96 17	11.9	70 26.7	96 17	11.4	69 57.9	96 16	11.0	68 31.3	96 14	09.9	68 02.3	97 14	09.5	7
8	72 37.4	93 22	15.7	72 09.5	93 22	15.1	71 13.3	94 20	14.0	70 45.0	94 19	13.5	70 16.7	94 19	13.0	69 37.4	94 20	14.0	68 22.6	96 16	11.2	67 54.0	96 16	10.8	8
9	72 23.9	91 25	17.5	71 56.5	92 24	16.8	71 01.2	93 22	15.6	70 33.4	93 21	15.0	70 05.5	93 21	14.5	69 37.4	94 20	14.0	68 12.9	94 18	12.5	67 44.6	95 17	12.1	9
10	72 09.1	89 27	19.2	71 42.1	90 26	18.5	70 47.8	91 24	17.2	70 20.5	91 23	16.6	69 53.0	92 23	16.0	69 25.5	92 22	15.4	68 02.1	93 20	13.8	67 34.2	93 19	13.4	10
1	71 52.9	88 29	20.9	71 26.5	88 28	20.1	70 33.3	89 26	18.7	70 06.5	90 25	18.0	69 39.5	90 24	17.4	69 12.4	91 24	16.8	67 50.3	92 21	15.1	67 22.7	92 21	14.6	1
2	71 35.4	85 31	22.5	71 09.6	86 30	21.7	70 17.6	87 28	20.2	69 51.3	88 27	19.5	69 24.8	88 26	18.8	68 58.2	89 25	18.1	67 37.5	90 22	16.3	67 10.4	91 22	15.8	2
3	71 16.7	83 33	24.0	70 51.6	84 32	23.2	70 00.7	86 30	21.6	69 35.0	86 29	20.8	69 09.0	87 28	20.1	68 42.9	87 27	19.4	67 23.7	89 25	17.5	66 57.0	89 24	17.0	3
4	70 56.9	81 35	25.5	70 32.4	82 34	24.6	69 42.8	84 32	23.0	69 17.6	84 31	22.2	68 52.3	85 30	21.4	68 26.7	85 29	20.7	67 09.0	87 26	18.7	66 42.8	88 25	18.1	4
15	70 36.0	79 36	26.9	70 12.2	80 35	26.0	69 23.8	81 33	24.3	68 59.3	82 32	23.5	68 34.5	83 31	22.7	68 09.5	84 30	21.9	66 53.4	85 27	19.9	66 27.7	86 27	19.2	15
6	70 14.2	77 38	28.3	69 51.0	78 37	27.3	69 03.9	79 35	25.6	68 40.0	80 34	24.7	68 15.8	81 32	23.9	67 51.4	82 32	23.1	66 36.9	84 29	21.0	66 11.7	84 28	20.3	6
7	69 51.3	74 40	29.5	69 28.9	75 38	28.6	68 43.0	77 36	26.8	68 19.7	78 35	25.9	67 56.2	79 34	25.1	67 32.4	80 33	24.3	66 19.6	82 30	22.0	65 54.9	83 29	21.3	7
8	69 27.6	72 41	30.8	69 05.8	73 40	29.8	68 21.3	75 38	27.9	67 58.6	76 37	27.1	67 35.7	77 35	26.2	67 12.5	78 34	25.4	66 01.4	80 32	23.1	65 37.3	81 31	22.3	8
9	69 03.0	70 42	31.9	68 41.9	71 41	30.9	67 58.8	73 39	29.0	67 36.7	74 38	28.2	67 14.4	75 37	27.3	66 51.8	76 36	26.4	65 42.5	78 33	24.1	65 19.0	79 32	23.3	9
20	68 37.6	67 44	33.0	68 17.2	69 42	32.0	67 35.4	71 40	30.1	67 14.1	72 39	29.2	66 52.4	73 38	28.3	66 30.4	74 37	27.5	65 22.9	76 34	25.0	64 59.9	77 33	24.3	20
1	68 11.4	65 45	34.1	67 51.8	66 44	33.1	67 11.6	69 41	31.1	66 50.6	70 40	30.2	66 29.6	71 39	29.3	66 08.3	72 38	28.4	65 02.6	74 35	25.9	64 40.2	75 34	25.2	1
2	67 44.6	63 46	35.1	67 25.6	64 45	34.0	66 46.6	66 42	32.1	66 26.5	67 41	31.2	66 06.1	68 40	30.2	65 45.4	70 39	29.4	64 41.6	72 36	26.8	64 19.7	73 35	26.0	2
3	67 17.2	60 47	36.0	66 58.8	62 46	35.0	66 21.1	64 43	33.0	66 01.7	65 42	32.1	65 42.0	66 41	31.1	65 21.9	67 40	30.2	64 19.9	70 37	27.7	63 58.7	71 36	26.9	3
4	66 49.1	58 48	36.9	66 31.5	59 47	35.8	65 55.1	62 44	33.9	65 36.3	63 43	32.9	65 17.2	64 42	32.0	64 57.8	65 41	31.1	63 57.6	68 38	28.5	63 37.0	69 37	27.7	4
25	66 20.4	56 49	37.7	66 03.5	57 48	36.7	65 28.4	60 45	34.7	65 10.3	61 44	33.7	64 51.9	62 43	32.8	64 33.1	63 42	31.9	63 34.8	66 39	29.3	63 14.7	67 38	28.5	25
6	65 51.3	54 49	38.5	65 35.0	55 48	37.5	65 01.2	58 46	35.5	64 43.8	59 44	34.5	64 26.0	60 44	33.6	64 07.8	61 43	32.7	63 11.4	64 40	30.0	62 51.9	65 39	29.2	6
7	65 21.6	51 50	39.2	65 06.0	53 49	38.2	64 33.5	55 47	36.2	64 16.7	57 46	35.3	63 59.6	58 45	34.3	63 42.1	59 44	33.4	62 47.5	62 41	30.8	62 28.6	63 40	29.9	7
8	64 51.5	49 51	39.9	64 36.5	51 50	38.9	64 05.4	53 48	36.9	63 49.2	54 47	36.0	63 32.7	56 46	35.0	63 15.8	57 45	34.1	62 23.0	60 41	31.4	62 04.8	61 40	30.6	8
9	64 20.9	47 52	40.6	64 06.4	48 50	39.6	63 36.7	51 48	37.6	63 21.2	52 47	36.6	63 05.3	54 46	35.7	62 49.0	55 45	34.8	61 58.1	58 42	32.1	61 40.5	59 41	31.2	9
30	63 50.0	45 52	41.2	63 36.3	46 51	40.2	63 07.7	49 49	38.2	62 52.8	50 48	37.3	62 37.5	52 47	36.3	62 21.9	53 46	35.4	61 32.8	56 43	32.7	61 15.8	57 42	31.9	30
1	63 18.7	43 53	41.8	63 05.6	44 52	40.8	62 38.3	47 50	38.8	62 24.0	48 49	37.9	62 09.3	49 48	36.9	61 54.3	51 47	36.0	61 07.0	54 44	33.3	60 50.6	55 43	32.4	1
2	62 47.0	41 53	42.3	62 34.6	42 52	41.3	62 08.5	45 50	39.4	61 54.8	46 49	38.4	61 40.7	47 48	37.5	61 26.3	49 47	36.6	60 40.9	52 44	33.9	60 25.0	53 43	33.0	2
3	62 15.1	39 54	42.8	62 03.2	40 53	41.8	61 38.3	43 51	39.9	61 25.2	44 50	38.9	61 11.8	45 49	38.0	60 58.0	47 48	37.1	60 14.3	50 45	34.4	59 59.1	51 44	33.5	3
4	61 42.8	37 54	43.3	61 31.6	38 53	42.3	61 07.8	41 51	40.4	60 55.4	42 50	39.4	60 42.5	43 49	38.5	60 29.3	45 48	37.6	59 47.5	48 45	34.9	59 32.8	49 44	34.1	4
35	61 10.3	35 55	43.7	60 59.6	36 54	42.7	60 37.1	39 52	40.8	60 25.2	40 51	39.9	60 12.9	41 50	39.0	60 00.3	43 49	38.1	59 20.2	46 46	35.4	59 06.2	47 45	34.5	35
6	60 37.5	33 55	44.1	60 27.4	34 54	43.1	60 06.0	37 52	41.3	59 54.7	38 51	40.3	59 43.1	40 50	39.4	59 31.0	41 49	38.5	58 52.7	44 46	35.9	58 39.2	46 45	35.0	6
7	60 04.5	31 55	44.5	59 55.0	32 54	43.5	59 34.7	35 53	41.7	59 24.0	36 52	40.7	59 12.9	38 51	39.8	59 01.4	39 50	38.9	58 24.8	42 47	36.3	58 11.9	44 46	35.4	7
8	59 31.2	29 56	44.8	59 22.3	31 55	43.9	59 03.2	34 52	42.0	58 53.0	34 52	41.1	58 42.5	36 51	40.2	58 31.6	37 50	39.3	57 56.7	41 47	36.7	57 44.4	42 46	35.8	8
9	58 57.8	27 56	45.1	58 49.4	29 55	44.2	58 31.4	31 53	42.4	58 21.8	33 52	41.5	58 11.9	34 51	40.6	58 01.5	35 50	39.7	57 28.4	39 48	37.1	57 16.6	40 47	36.2	9
40	58 24.2	26 56	45.4	58 16.4	27 55	44.5	57 59.5	29 54	42.7	57 50.4	31 53	41.8	57 41.0	32 52	40.9	57 31.2	33 51	40.0	56 59.7	37 48	37.4	56 48.5	38 47	36.6	40
1	57 50.5	24 57	45.7	57 43.1	25 55	44.8	57 27.3	28 54	43.0	57 18.8	29 53	42.1	57 10.0	30 52	41.2	57 00.7	31 51	40.3	56 30.9	35 48	37.8	56 20.2	36 48	36.9	1
2	57 16.6	22 57	46.0	57 09.7	23 56	45.1	56 55.0	26 54	43.3	56 47.0	27 53	42.4	56 38.7	28 52	41.5	56 30.0	30 51	40.6	56 01.8	33 49	38.1	55 51.7	34 48	37.2	2
3	56 42.5	20 57	46.2	56 36.2	22 56	45.3	56 22.5	24 54	43.5	56 15.1	25 54	42.7	56 07.3	27 53	41.8	55 59.1	28 52	40.9	55 32.6	31 49	38.4	55 23.0	32 48	37.5	3
4	56 08.3	19 57	46.4	56 02.5	20 56	45.5	55 49.9	22 55	43.8	55 43.0	24 54	42.9	55 35.7	25 53	42.0	55 28.1	26 52	41.2	55 03.1	29 49	38.7	54 54.1	31 48	37.8	4
45	55 34.0	17 57	46.6	55 28.8	18 56	45.7	55 17.1	21 55	44.0	55 10.7	22 54	43.1	55 04.0	23 53	42.3	54 56.9	24 52	41.4	54 33.5	28 50	38.9	54 25.0	29 49	38.1	45
6	54 59.7	15 57	46.7	54 54.9	17 57	45.9	54 44.2	19 55	44.2	54 38.3	20 54	43.3	54 32.1	21 53	42.5	54 25.5	22 52	41.6	54 03.7	26 50	39.1	53 55.8	27 49	38.3	6
7	54 25.2	14 58	46.9	54 20.9	15 57	46.0	54 11.2	17 55	44.3	54 05.8	18 54	43.5	54 00.1	20 53	42.7	53 54.1	21 53	41.8	53 33.8	24 50	39.4	53 26.4	25 49	38.5	7
8	53 50.6	12 58	47.0	53 46.8	13 57	46.2	53 38.1	16 55	44.5	53 33.2	17 54	43.7	53 28.0	18 54	42.9	53 22.5	19 53	42.0	53 03.8	22 50	39.6	52 56.9	23 50	38.8	8
9	53 16.0	11 58	47.1	53 12.7	12 57	46.3	53 04.9	14 55	44.6	53 00.6	15 55	43.8	52 55.8	16 54	43.0	52 50.8	17 53	42.2	52 33.6	21 50	39.7	52 27.2	22 50	38.9	9
50	52 41.4	09 58	47.2	52 38.5	10 57	46.4	52 31.7	12 56	44.8	52 27.8	14 55	43.9	52 23.5	15 54	43.1	52 19.0	16 53	42.3	52 03.3	19 51	39.9	51 57.4	20 50	39.1	50
1	52 06.6	08 58	47.3	52 04.2	09 57	46.5	51 58.4	11 56	44.9	51 54.9	12 55	44.1	51 51.2	13 54	43.3	51 47.1	14 53	42.5	51 32.9	17 51	40.1	51 27.6	18 50	39.3	1
2	51 31.9	06 58	47.4	51 29.9	07 57	46.6	51 25.0	09 56	45.0	51 22.0	10 55	44.2	51 18.8	11 54	43.4	51 15.2	13 53	42.6	51 02.5	16 51	40.2	50 57.6	17 50	39.4	2
3	50 57.1	05 58	47.4	50 55.6	06 57	46.6	50 51.5	08 56	45.0	50 49.1	09 56	44.2	50 46.3	10 54	43.4	50 43.1	11 53	42.7	50 31.9	14 51	40.3	50 27.5	15 50	39.5	3
4	50 22.3	03 58	47.4	50 21.2	04 57	46.7	50 18.1	06 56	45.1	50 16.1	07 55	44.3	50 13.7	08 54	43.5	50 11.1	09 54	42.8	50 01.3	12 51	40.4	49 57.4	13 50	39.7	4
55	49 47.4	02 58	47.5	49 46.8	03 57	46.7	49 44.6	05 56	45.1	49 43.0	06 55	44.4	49 41.1	07 54	43.6	49 39.0	08 54	42.8	49 30.6	11 51	40.5	49 27.2	12 50	39.8	55
6	49 12.6	00 58	47.5	49 12.4	01 57	46.7	49 11.1	03 56	45.3	49 09.9	04 55	44.4	49 08.5	05 54	43.6	49 06.4	06 54	42.9	48 59.8	09 51	40.6	48 56.9	10 51	39.8	6
7	48 37.7	01 58	47.5	48 38.0	00 57	46.7	48 37.5	02 56	45.2	48 36.8	03 55	44.5	48 35.9	04 54	43.7	48 34.6	05 54	43.0	48 29.0	08 51	40.7	48 26.6	09 51	39.9	7
8	48 02.9	03 58	47.4	48 03.6	02 57	46.7	48 04.0	00 56	45.2	48 03.7	01 55	44.5	48 03.2	02 54	43.7	48 02.4	03 54	43.0	47 58.2	06 51	40.7	47 56.2	07 51	40.0	8
9	47 28.1	04 58	47.4	47 29.1	03 57	46.7	47 30.4	01 56	45.2	47 30.6	00 55	44.5	47 30.5	01 54	43.7	47 30.2	02 54	43.0	47 27.3	05 51	40.8	47 25.8	06 51	40.0	9
60	46 53.3	05 58	47.4	46 54.8	04 57	46.6	46 56.9	03 56	45.2	46 57.5	02 55	44.5	46 57.9	01 54	43.7	46 57.9	00 54	43.0	46 56.5	03 52	40.8	46 55.4	04 51	40.1	60
1	46 18.5	07 58	47.3	46 20.4	06 57	46.6	46 23.3	04 56	45.2	46 24.4	03 55	44.5	46 25.2	02 54	43.7	46 25.7	01 54	43.0	46 25.0	02 52	40.8	46 25.0	02 51	40.1	1
2	45 43.8	08 58	47.3	45 46.0	07 57	46.6	45 49.8	05 56	45.1	45 51.3	04 55	44.4	45 52.5	03 54	43.7	45 53.5	03 54	43.0	45 54.7	00 52	40.8	45 54.5	01 51	40.1	2
3	45 09.0	09 58	47.2	45 11.7	09 57	46.5	45 16.3	07 56	45.1	45 18.2	06 55	44.4	45 19.9	05 54	43.7	45 21.2	04 54	42.9	45 23.8	01 51	40.8	45 24.1	01 51	40.1	3
4	44 34.4	11 58	47.1	44 37.5	10 57	46.4	44 42.9	08 56	45.0	44 45.2	07 55	44.3	44 47.2	06 54	43.6	44 49.0	06 54	42.9	44 52.9	03 51	40.8	44 53.6	02 51	40.1	4
65	43 59.8	12 58	47.0	44 03.2	11 57	46.3	44 09.5	10 56	44.9	44 12.2	09 55	44.2	44 14.6	08 54	43.6	44 16.9	07 54	42.9	44 22.0	04 51	40.8	44 23.2	04 51	40.1	65
6	43 25.2	12 58	46.9	43 29.1	12 57	46.2	43 36.1	11 56	44.9	43 39.2	10 55	44.2	43 42.1	09 54	43.5	43 44.7	08 54	42.8	43 51.1	05 51	40.7	43 52.8	05 51	40.0	6
7	42 50.7	15 57	46.8	42 55.0	14 57	46.1	43 02.7	12 56	44.8	43 06.3	11 55	44.1	43 09.6	11 54	43.4	43 12.6	10 53	42.7	43 20.3	07 51	40.7	43 22.4	06 51	40.0	7
8	42 16.3	16 57	46.7	42 20.9	15 57	46.0	42 29.5	14 55	44.7	42 33.4	13 55	44.0	42 37.1	12 54	43.3	42 40.6	11 53	42.7	42 49.5	09 51	40.6	42 52.0	08 51	39.9	8
9	41 41.9	17 57	46.6	41 46.9	16 57	46.0	41 56.3	15 55	44.6	42 00.5	14 55	43.9	42 04.7	13 54	43.2	42 08.5	12 53	42.6	42 18.7	09 51	40.6	42 21.7	08 51	39.9	9
70	41 07.6	18 57	46.4	41 13.0	18 56	45.8	41 23.1	16 55	44.5	41 27.8	15 54	43.8	41 32.3	15 54	43.1	41 36.6	14 53	42.5	41 48.0	12 51	40.5	41 51.4	11 50	39.8	70
1	40 33.4	20 57	46.3	40 39.2	19 56	45.6	40 50.0	17 54	44.3	40 55.1	17 54	43.7	41 00.0	16 54	43.0	41 04.7	15 53	42.4	41 17.3	13 51	40.4	41 21.1	12 50	39.7	1
2	39 59.3	21 57	46.1	40 05.4	20 56	45.5	40 17.0	19 55	44.2	40 22.5	18 54	43.6	40 27.8	17 54	42.9	40 32.9	17 53	42.3	40 46.7	14 51	40.3	40 50.9	14 50	39.7	2
3	39 25.2	22 57	46.0	39 31.7	21 56	45.3	39 44.1	20 55	44.1	39 50.0	19 54	43.4	39 55.6	19 53	42.8	40 01.1	18 53	42.1	40 16.2	16 51	40.2	40 20.8	16 50	39.6	3
4	38 51.3	23 56	45.8	38 58.2	23 56	45.2	39 11.3	21 55	43.9	39 17.5	21 54	43.3	39 23.4	20 53	42.6	39 29.4	19 53	42.0	39 45.7	17 51	40.1	39 50.7	16 50	39.5	4
75	38 17.5	24 56	45.6	38 24.7	24 56	45.0	38 38.5	22 54	43.8	38 45.2	22 54	43.1	38 51.6	21 53	42.5	38 57.8	20 53	41.9	39 15.3	18 51	40.0	39 20.7	18 50	39.3	75
6	37 43.7	26 56	45.4	37 51.3	25 56	44.8	38 05.9	24 54	43.6	38 12.9	23 54	43.0	38 19.7	22 53	42.3	38 26.3	22 52	41.7	38 44.9	20 50	39.8	38 50.8	19 50	39.2	6
7	37 10.1	27 56	45.2	37 18.0	26 55	44.6	37 33.3	25 54	43.4	37 40.7	24 54	42.8	37 47.9	24 53	42.2	37 54.9	23 52	41.6	38 14.7	21 50	39.7	38 20.9	20 50	39.1	7
8	36 36.6	28 55	44.9	36 44.9	27 55	44.4	37 00.9	26 55	43.2	37 08.6	25 53	42.6	37 16.2	25 52	42.0	37 23.6	24 52	41.4	37 44.5	22 50	39.6	37 51.1	22 50	39.0	8
9	36 03.2	29 55	44.8	36 11.8	29 55	44.2	36 28.6	27 54	43.1	36 36.7	27 53	42.5	36 44.6	26 52	41.8	36 52.3	25 52	41.2	37 14.4	24 50	39.4	37 21.4	23 49	38.8	9
80	35 29.9	30 55	44.6	35 38.9	30 55	44.0	35 56.3	29 54	42.9	36 04.8	28 53	42.3	36 13.1	27 52	41.7	36 21.2	27 52	41.1	36 44.5	25 50	39.3	36 51.9	24 49	38.7	80
1	34 56.8	31 55	44.4	35 06.1	31 54	43.8	35 24.2	30 53	42.7	35 33.1	28 53	42.1	35 41.7	29 52	41.5	35 50.2	28 51	40.9	36 14.6	26 50	39.1	36 22.4	26 49	38.5	1
2	34 23.7	33 54	44.3	34 33.4	32 54	43.6	34 52.3	31 53	42.4	35 01.5	30 52	41.9	35 10.5	30 52	41.3	35 19.3	29 51	40.7	35 44.8	27 49	38.9	35 53.0	27 49	38.3	2
3	33 50.9	34 55	43.9	34 00.9	34 54	43.4	34 20.4	32 53	42.2	34 30.0	32 52	41.7	34 39.3	31 52	41.1	34 48.5	30 51	40.5	35 15.2	29 49	38.8	35 23.7	28 49	38.2	3
4	33 18.1	35 54	43.7	33 28.5	34 54	43.1	33 48.7	33 53	42.0	33 58.6	33 52	41.4	34 08.3	32 51	40.9	34 17.9	32 51	40.3	34 45.6	30 49	38.6	34 54.6	29 48	38.0	4
85	32 45.5	36 54	43.5	32 56.2	35 54	42.9	33 17.1	34 52	41.8	33 27.4	34 52	41.2	33 37.4	33 51	40.7	33 47.4	33 51	40.1	34 16.2	31 49	38.4	34 25.5	31 48	37.8	85
6	32 13.1	37 54	43.2	32 24.1	36 53	42.7	32 45.7	36 52	41.6	32 56.3	35 51	41.0	33 06.7	35 51	40.4	33 17.0	34 50	39.9	33 46.9	32 49	38.2	33 56.6	32 48	37.6	6
7	31 40.8	38 53	43.0	31 52.1	38 53	42.5	32 14.4	37 52	41.3	32 25.3	36 51	40.8	32 36.1	36 50	40.2	32 46.7	35 50	39.7	33 17.7	33 48	38.0	33 27.8	33 48	37.4	7
8	31 08.6	39 53	42.7	31 20.3	38 53	42.2	31 43.3	38 52	41.1	31 54.5	37 51	40.5	32 05.7	37 50	40.0	32 16.6	36 50	39.4	32 48.7	35 48	37.7	32 59.1	34 48	37.2	8
9	30 36.7	40 53	42.4	30 48.7	40 52	41.9	31 12.3	39 51	40.8	31 23.9	38 51	40.3	31 35.4	38 50	39.7	31 46.7	38 50	39.2	32 19.9	36 48	37.5	32 30.6	36 47	37.0	9
90	30 04.8	41 52	42.2	30 17.2	41 52	41.6	30 41.5	40 51	40.6	30 53.4	40 51	40.0	31 05.2	39 50	39.5	31 16.9	39 49	39.0	31 51.1	37 48	37.3	32 02.2	37 47	36.8	90

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
91	29 33.2	42 52	41.9	29 45.9	42 52	41.3	30 10.8	41 51	40.3	30 23.1	41 50	39.8	30 35.2	40 50	39.2	30 47.2	40 49	38.7	31 22.5	39 47	37.1	31 34.0	38 47	36.6	91
2	29 01.7	43 52	41.6	29 14.7	43 52	41.1	29 40.3	42 51	40.0	29 52.9	42 50	39.5	30 05.4	41 49	39.0	30 17.8	41 49	38.5	30 54.1	40 47	36.9	31 05.9	39 47	36.3	2
3	28 30.4	45 52	41.3	28 43.7	44 51	40.8	29 10.0	43 50	39.8	29 22.9	43 50	39.2	29 35.7	42 49	38.7	29 48.4	42 49	38.2	30 25.8	41 47	36.6	30 38.0	40 46	36.1	3
4	27 59.3	46 52	41.0	28 12.9	45 51	40.5	28 39.8	44 50	39.5	28 53.1	44 49	39.0	29 06.2	44 49	38.4	29 19.3	43 48	37.9	29 57.7	42 47	36.4	30 10.2	42 46	35.8	4
95	27 28.4	47 51	40.7	27 42.3	46 51	40.2	28 09.9	46 50	39.2	28 23.5	45 49	38.7	28 36.9	45 49	38.2	28 50.3	44 48	37.7	29 29.7	43 46	36.1	29 42.6	43 46	35.6	95
6	26 57.7	48 51	40.4	27 11.9	47 50	39.9	27 40.1	47 49	38.9	27 54.0	46 49	38.4	28 07.8	46 48	37.9	28 21.5	45 48	37.4	29 01.9	44 46	35.9	29 15.2	44 45	35.3	6
7	26 27.1	49 51	40.1	26 41.7	48 50	39.6	27 10.5	48 49	38.6	27 24.7	47 48	38.1	27 38.9	47 48	37.6	27 52.9	47 47	37.1	28 34.3	45 46	35.6	28 47.9	45 45	35.1	7
8	25 56.8	50 50	39.8	26 11.7	49 50	39.3	26 41.1	49 49	38.3	26 55.6	48 48	37.8	27 10.1	48 48	37.3	27 24.5	48 47	36.8	28 06.9	47 45	35.3	28 20.8	46 45	34.8	8
9	25 26.7	51 50	39.4	25 41.8	50 49	39.0	26 11.9	50 48	38.0	26 26.8	49 48	37.5	26 41.5	49 47	37.0	26 56.2	49 47	36.5	27 39.6	48 45	35.1	27 53.9	47 45	34.6	9
100	24 56.7	52 50	39.1	25 12.2	51 49	38.6	25 42.9	51 48	37.7	25 58.1	50 47	37.2	26 13.2	50 47	36.7	26 28.2	50 46	36.2	27 12.6	49 45	34.8	27 27.2	48 44	34.3	100
1	24 27.0	53 49	38.8	24 42.8	52 49	38.3	25 14.1	52 48	37.4	25 29.6	52 47	36.9	25 45.0	51 47	36.4	26 00.3	51 46	35.9	26 45.7	50 44	34.5	27 00.6	50 44	34.0	1
2	23 57.5	54 49	38.4	24 13.6	53 48	38.0	24 45.5	53 47	37.0	25 01.3	52 47	36.6	25 17.0	52 46	36.1	25 32.7	52 46	35.6	26 19.0	51 44	34.2	26 34.3	51 44	33.7	2
3	23 28.2	55 48	38.1	23 44.6	54 48	37.6	24 17.1	54 47	36.7	24 33.2	54 46	36.2	24 49.3	53 46	35.7	25 05.2	53 45	35.3	25 52.6	52 44	33.9	26 08.2	52 43	33.4	3
4	22 59.2	56 48	37.7	23 15.9	55 48	37.3	23 49.0	55 47	36.4	24 05.4	55 46	35.9	24 21.8	54 46	35.5	24 38.0	54 45	35.0	25 26.3	53 43	33.6	25 42.2	53 43	33.1	4
105	22 30.4	57 48	37.4	22 47.3	56 47	36.9	23 21.0	56 46	36.0	23 37.8	56 46	35.6	23 54.4	55 45	35.1	24 11.0	55 45	34.7	25 00.2	54 43	33.3	25 16.5	54 43	32.8	105
6	22 01.8	58 47	37.0	22 19.0	57 47	36.6	22 53.3	57 46	35.7	23 10.4	57 45	35.2	23 27.3	56 45	34.8	23 44.2	56 44	34.3	24 34.4	55 43	33.0	24 51.0	55 42	32.5	6
7	21 33.4	59 47	36.7	21 51.0	58 46	36.2	22 25.9	58 45	35.3	22 43.2	58 45	34.9	23 00.5	57 44	34.5	23 17.7	57 44	34.0	24 08.8	56 42	32.7	24 25.6	56 42	32.2	7
8	21 05.3	60 46	36.3	21 23.2	59 46	35.9	21 58.6	59 45	35.0	22 16.3	59 44	34.6	22 33.8	58 44	34.1	22 51.3	58 44	33.7	23 43.4	57 42	32.4	24 00.5	57 41	31.9	8
9	20 37.5	61 46	35.9	20 55.6	60 46	35.5	21 31.6	60 45	34.6	21 49.6	60 44	34.2	22 07.4	59 44	33.8	22 25.2	59 43	33.3	23 18.2	58 42	32.0	23 35.7	58 41	31.6	9
110	20 09.8	61 46	35.5	20 28.3	61 45	35.1	21 04.9	61 44	34.3	21 23.1	61 44	33.8	21 41.3	60 43	33.4	21 59.4	60 43	33.0	22 53.2	59 41	31.7	23 11.0	59 41	31.3	110
1	19 42.5	62 45	35.2	20 01.2	62 45	34.7	20 38.4	62 44	33.9	20 56.9	62 43	33.5	21 15.3	61 43	33.1	21 33.7	61 42	32.6	22 28.5	61 41	31.4	22 46.6	60 40	30.9	1
2	19 15.4	63 45	34.8	19 34.4	63 44	34.4	20 12.1	63 43	33.5	20 30.9	63 43	33.1	20 49.7	62 42	32.7	21 08.4	62 42	32.3	22 04.0	62 40	31.0	22 22.4	61 40	30.6	2
3	18 48.6	64 44	34.4	19 07.8	64 44	34.0	19 46.1	64 43	33.2	20 05.2	64 42	32.7	20 24.3	63 42	32.3	20 43.2	63 41	31.9	21 39.8	63 40	30.7	21 58.5	62 40	30.3	3
4	18 22.0	65 44	34.0	18 41.5	65 43	33.6	19 20.4	65 42	32.8	19 39.8	65 42	32.4	19 59.1	64 42	32.0	20 18.4	64 41	31.6	21 15.8	64 40	30.3	21 34.8	63 39	29.9	4
115	17 55.7	66 43	33.6	18 15.5	66 43	33.2	18 55.0	66 42	32.4	19 14.6	65 42	32.0	19 34.2	65 41	31.6	19 53.7	65 41	31.2	20 52.0	64 39	30.0	21 11.3	64 39	29.6	115
6	17 29.7	67 43	33.2	17 49.8	67 42	32.8	18 29.8	67 42	32.0	18 49.7	66 41	31.6	19 09.6	66 41	31.2	19 29.4	66 40	30.8	20 28.5	65 39	29.6	20 48.1	65 38	29.2	6
7	17 04.0	68 42	32.8	17 24.3	68 42	32.4	18 04.8	67 41	31.6	18 25.0	67 41	31.2	18 45.2	67 40	30.8	19 05.3	67 40	30.4	20 05.3	66 38	29.3	20 25.2	66 38	28.9	7
8	16 38.5	69 42	32.4	16 59.1	69 41	32.0	17 40.0	68 41	31.2	18 00.7	68 40	30.8	18 21.1	68 40	30.4	18 41.5	68 39	30.1	19 42.3	67 38	28.9	20 02.5	67 37	28.5	8
9	16 13.4	70 41	31.9	16 34.2	69 41	31.6	17 15.8	69 40	30.8	17 36.6	69 40	30.4	17 57.3	69 39	30.0	18 17.9	69 39	29.7	19 19.6	68 37	28.5	19 40.1	68 37	28.1	9
120	15 48.5	70 41	31.5	16 09.6	70 41	31.1	16 51.8	70 40	30.4	17 12.8	70 39	30.0	17 33.8	70 39	29.7	17 54.7	70 38	29.3	18 57.2	69 37	28.1	19 17.9	69 36	27.8	120
1	15 23.9	71 40	31.1	15 45.3	71 40	30.7	16 28.0	71 39	30.0	16 49.3	71 39	29.6	17 10.5	71 38	29.3	17 31.7	71 38	28.9	18 35.0	70 36	27.8	18 56.1	70 36	27.4	1
2	14 59.7	72 40	30.7	15 21.3	72 39	30.3	16 04.5	72 39	29.6	16 26.0	72 38	29.2	16 47.5	72 38	28.8	17 09.0	71 37	28.5	18 13.2	71 36	27.4	18 34.5	71 36	27.0	2
3	14 35.7	73 39	30.2	14 57.6	73 39	29.9	15 41.3	73 38	29.2	16 03.1	73 38	28.8	16 24.9	72 37	28.4	16 46.6	72 37	28.1	17 51.6	72 36	27.0	18 13.1	72 35	26.6	3
4	14 12.1	74 39	29.8	14 34.2	74 38	29.4	15 18.4	74 38	28.7	15 40.5	74 37	28.4	16 02.5	73 37	28.0	16 24.5	73 36	27.7	17 30.2	73 35	26.6	17 52.1	73 35	26.2	4
125	13 48.8	75 38	29.3	14 11.2	75 38	29.0	14 55.9	74 37	28.3	15 18.2	74 37	28.0	15 40.5	74 36	27.6	16 02.7	74 36	27.3	17 09.1	74 35	26.2	17 31.3	74 34	25.8	125
6	13 25.8	76 38	28.9	13 48.4	75 37	28.5	14 33.6	75 37	27.9	14 56.2	75 36	27.5	15 18.7	75 36	27.2	15 41.2	75 35	26.8	16 48.5	75 34	25.8	17 10.9	74 34	25.5	6
7	13 03.1	76 37	28.4	13 26.0	76 37	28.1	14 11.7	76 36	27.4	14 34.5	76 36	27.1	14 57.3	76 35	26.8	15 20.0	76 35	26.4	16 28.1	75 34	25.4	16 50.7	75 33	25.1	7
8	12 40.8	77 37	28.0	13 03.9	77 36	27.6	13 50.1	77 36	27.0	14 13.1	77 35	26.7	14 36.1	77 35	26.3	14 59.1	77 34	26.0	16 07.9	76 33	25.0	16 30.8	76 33	24.7	8
9	12 18.7	78 36	27.5	12 42.1	78 36	27.2	13 28.8	78 35	26.5	13 52.1	78 35	26.2	14 15.3	78 34	25.9	14 38.6	77 34	25.6	15 48.1	77 33	24.6	16 11.2	77 32	24.2	9
130	11 57.1	79 36	27.0	12 20.7	79 35	26.7	13 07.8	78 34	26.1	13 31.3	78 34	25.8	13 54.8	78 34	25.5	14 18.3	78 33	25.1	15 28.6	78 32	24.2	15 52.0	78 32	23.8	130
1	11 35.8	79 35	26.6	11 59.6	79 35	26.3	12 47.2	79 34	25.6	13 10.9	79 33	25.3	13 34.7	79 33	25.0	13 58.4	79 33	24.7	15 09.4	79 31	23.7	15 33.0	79 31	23.4	1
2	11 14.8	80 34	26.1	11 38.8	80 34	25.8	12 26.9	80 33	25.2	12 50.9	80 33	24.9	13 14.9	80 32	24.6	13 38.8	80 32	24.3	14 50.5	80 31	23.3	15 14.4	79 31	23.0	2
3	10 54.1	81 34	25.6	11 18.4	81 33	25.3	12 06.9	81 33	24.7	12 31.2	81 32	24.4	12 55.4	81 32	24.1	13 19.5	81 32	23.8	14 32.0	80 30	22.9	14 56.1	80 30	22.6	3
4	10 33.9	82 33	25.1	10 58.4	82 33	24.9	11 47.3	82 33	24.3	12 11.8	81 32	24.0	12 36.2	81 31	23.7	13 00.6	81 31	23.4	14 13.7	81 30	22.4	14 38.0	81 29	22.2	4
135	10 14.0	82 33	24.7	10 38.7	82 32	24.4	11 28.1	82 32	23.8	11 52.7	82 31	23.5	12 17.4	82 31	23.2	12 42.0	82 30	22.9	13 55.8	82 29	22.0	14 20.4	82 29	21.7	135
6	9 54.4	83 32	24.2	10 19.4	83 32	23.9	11 09.2	83 31	23.3	11 34.1	83 31	23.0	11 58.9	83 30	22.8	12 23.8	83 30	22.5	13 38.2	83 28	21.6	14 03.0	83 28	21.3	6
7	9 35.2	84 31	23.7	10 00.4	84 31	23.4	10 50.6	84 30	22.8	11 15.7	84 30	22.6	11 40.8	84 30	22.3	12 05.9	84 29	22.0	13 21.0	83 28	21.2	13 46.0	83 28	20.9	7
8	9 16.4	85 31	23.2	9 41.8	84 30	22.9	10 32.5	84 30	22.4	10 57.8	84 29	22.1	11 23.1	84 29	21.9	11 48.4	84 29	21.5	13 04.1	84 28	20.7	13 29.3	84 27	20.4	8
9	8 58.0	85 30	22.7	9 23.6	85 30	22.4	10 14.7	85 29	21.9	10 40.2	85 29	21.6	11 05.7	85 28	21.4	11 31.2	85 28	21.1	12 47.6	85 27	20.3	13 13.0	85 27	20.0	9
140	8 40.0	86 29	22.2	9 05.7	86 29	21.9	9 57.2	86 28	21.4	10 22.9	86 28	21.1	10 48.6	86 28	20.9	11 14.3	86 27	20.6	12 31.3	85 26	19.8	12 57.0	85 26	19.6	140
1	8 22.3	87 29	21.7	8 48.3	86 28	21.4	9 40.1	86 28	20.9	10 06.1	86 28	20.7	10 32.0	86 27	20.4	10 57.9	86 27	20.1	12 15.5	86 26	19.4	12 41.3	86 26	19.1	1
2	8 05.0	87 28	21.2	8 31.2	87 28	20.9	9 23.5	87 27	20.4	9 49.6	87 27	20.2	10 15.7	87 27	19.9	10 41.8	87 26	19.7	12 00.0	87 25	18.9	12 26.0	87 25	18.7	2
3	7 48.2	88 27	20.7	8 14.5	88 27	20.4	9 07.1	87 27	19.9	9 33.5	88 26	19.7	9 59.8	88 26	19.5	10 26.0	88 26	19.2	11 44.8	87 24	18.5	12 11.1	87 24	18.2	3
4	7 31.7	88 27	20.1	7 58.2	88 26	19.9	8 51.2	88 26	19.4	9 17.7	88 26	19.2	9 44.2	88 26	19.0	10 10.7	88 25	18.7	11 30.0	88 24	18.0	11 56.5	88 24	17.8	4
145	7 15.6	89 26	19.6	7 42.3	89 26	19.4	8 35.7	89 25	18.9	9 02.4	89 25	18.7	9 29.0	89 25	18.5	9 55.7	89 24	18.2	11 15.6	89 23	17.5	11 42.2	89 23	17.3	145
6	6 59.9	90 25	19.1	7 26.8	90 25	18.9	8 20.6	90 24	18.4	8 47.4	90 24	18.2	9 14.3	89 24	18.0	9 41.1	89 24	17.7	11 01.6	89 23	17.1	11 28.4	89 23	16.8	6
7	6 44.7	90 25	18.6	7 11.7	90 24	18.4	8 05.8	90 24	17.9	8 32.8	90 24	17.7	8 59.9	90 23	17.5	9 26.9	90 23	17.3	10 47.9	90 22	16.6	11 14.9	90 22	16.4	7
8	6 29.8	91 24	18.0	6 57.0	91 24	17.8	7 51.5	91 23	17.4	8 18.7	91 23	17.2	8 45.9	91 23	17.0	9 13.0	91 22	16.8	10 34.6	91 22	16.1	11 01.7	91 21	15.9	8
9	6 15.4	91 23	17.5	6 42.8	91 23	17.3	7 37.5	91 23	16.9	8 04.9	91 22	16.7	8 32.3	91 22	16.5	8 59.6	91 22	16.3	10 21.6	91 21	15.6	10 48.9	91 21	15.4	9
150	6 01.4	92 23	17.0	6 28.9	92 22	16.8	7 24.0	92 22	16.4	7 51.5	92 22	16.2	8 19.0	92 21	16.0	8 46.6	92 21	15.8	10 09.1	92 20	15.2	10 36.6	92 20	15.0	150
1	5 47.8	92 22	16.4	6 15.5	92 22	16.2	7 10.9	92 21	15.9	7 38.5	92 21	15.7	8 06.2	92 21	15.5	8 33.9	92 20	15.3	9 56.9	92 20	14.7	10 24.5	92 19	14.5	1
2	5 34.6	93 21	15.9	6 02.5	93 21	15.7	6 58.2	93 20	15.3	7 26.0	93 20	15.1	7 53.8	93 20	15.0	8 21.6	93 20	14.8	9 45.1	93 19	14.2	10 12.9	93 19	14.0	2
3	5 21.9	93 20	15.4	5 49.9	93 20	15.2	6 45.9	93 20	14.8	7 13.8	93 20	14.6	7 41.8	93 19	14.4	8 09.8	93 19	14.3	9 33.7	93 18	13.7	10 01.6	93 18	13.5	3
4	5 09.6	94 20	14.8	5 37.7	94 20	14.6	6 34.0	94 19	14.3	7 02.1	94 19	14.1	7 30.2	94 19	13.9	7 58.3	94 18	13.8	9 22.7	94 18	13.2	9 50.8	94 17	13.1	4
155				5 26.0	94 19	14.1	6 22.5	94 18	13.8	6 50.8	94 18	13.6	7 19.0	94 18	13.5	7 47.3	94 18	13.2	9 12.0	94 17	12.7	9 40.3	94 17	12.6	155
6				5 14.7	95 18	13.5	6 11.5	95 18	13.2	6 39.9	95 17	13.1	7 08.3	95 17	12.9	7 36.7	95 17	12.7	9 01.8	95 16	12.2	9 30.2	95 16	12.1	6
7				5 03.8	95 17	13.0	6 00.9	95 17	12.7	6 29.4	95 17	12.5	6 57.9	95 17	12.4	7 26.5	95 16	12.2	8 52.0	95 16	11.8	9 20.5	95 16	11.6	7
8							5 50.7	95 16	12.2	6 19.4	95 16	12.0	6 48.0	95 16	11.9	7 16.7	95 16	11.7	8 42.6	95 15	11.3	9 11.2	95 15	11.1	8
9							5 41.0	96 16	11.6	6 09.7	96 16	11.5	6 38.5	96 15	11.3	7 07.3	96 15	11.2	8 33.5	96 14	10.8	9 02.3	96 14	10.6	9
160							5 31.7	96 15	11.1	6 00.6	96 15	10.9	6 29.4	96 14	10.8	6 58.3	96 14	10.7	8 24.9	96 14	10.3	8 53.8	96 14	10.1	160
1							5 22.8	97 14	10.5	5 51.8	97 14	10.4	6 20.8	97 14	10.3	6 49.8	97 14	10.1	8 16.7	97 13	09.8	8 45.7	97 13	09.6	1
2							5 14.4	97 13	10.0	5 43.5	97 13	09.9	6 12.6	97 13	09.7	6 41.6	97 13	09.6	8 08.9	97 12	09.3	8 38.0	97 12	09.3	2
3							5 06.4	97 13	09.4	5 35.6	97 12	09.3	6 04.8	97 12	09.2	6 34.0	97 12	09.1	8 01.5	97 12	08.7	8 30.7	97 11	08.6	3
4										5 28.1	98 12	08.8	5 57.4	98 12	08.7	6 26.7	98 11	08.6	7 54.5	98 11	08.2	8 23.8	98 11	08.1	4
165										5 21.1	98 11	08.2	5 50.5	98 11	08.1	6 19.9	98 11	08.0	7 47.9	98 10	07.7	8 17.3	98 10	07.6	165
6										5 14.6	98 10	07.7	5 44.0	98 10	07.5	6 13.5	98 10	07.5	7 41.8	98 10	07.1	8 11.2	98 09	07.1	6
7										5 08.5	98 09	07.1	5 38.0	98 09	07.0	6 07.5	98 09	07.0	7 36.1	98 09	06.7	8 05.6	98 09	06.6	7
8										5 02.8	98 09	06.6	5 32.4	99 09	06.5	6 02.0	99 08	06.4	7 30.7	99 08	06.2	8 00.0	99 08	06.1	8
9													5 27.2	99 08	06.0	5 56.9	99 08	05.9	7 25.8	99 07	05.7	7 55.5	99 07	05.6	9
170													5 22.5	99 07	05.5	5 52.2	99 07	05.4	7 21.4	99 07	05.2	7 51.1	99 07	05.1	170
1													5 18.2	99 06	04.9	5 48.0	99 06	04.8	7 17.3	99 06	04.7	7 47.1	99 06	04.6	1
2													5 14.4	99 06	04.4	5 44.2	99 06	04.3	7 13.7	99 05	04.1	7 43.5	99 05	04.1	2
3													5 11.0	1.0 05	03.8	5 40.9	1.0 05	03.6	7 10.5	1.0 05	03.6	7 40.3	1.0 04	03.6	3
4													5 08.1	1.0 04	03.3	5 38.0	1.0 04	03.2	7 07.7	1.0 04	03.1	7 37.6	1.0 04	03.1	4
175													5 05.6	1.0 03	02.7	5 35.6	1.0 03	02.7	7 05.3	1.0 03	02.6	7 35.3	1.0 03	02.6	175
6													5 03.6	1.0 03	02.2	5 33.6	1.0 03	02.2	7 03.4	1.0 02	02.1	7 33.4	1.0 02	02.0	6
7													5 02.0	1.0 02	01.6	5 32.0	1.0 02	01.6	7 01.9	1.0 02	01.6	7 31.9	1.0 02	01.5	7
8													5 00.9	1.0 01	01.1	5 30.9	1.0 01	01.1	7 00.9	1.0 01	01.0	7 30.8	1.0 01	01.0	8
9													5 00.2	1.0 00	00.5	5 30.2	1.0 00	00.5	7 00.2	1.0 00	00.5	7 30.2	1.0 00	00.5	9
180													5 00.0	1.0 00	00.0	5 30.0	1.0 00	00.0	7 00.0	1.0 00	00.0	7 30.0	1.0 00	00.0	180

Lat. 38°

H.A.	60° 00′ Alt.	Δd Δt	Az.	60° 30′ Alt.	Δd Δt	Az.	62° 00′ Alt.	Δd Δt	Az.	62° 30′ Alt.	Δd Δt	Az.	63° 00′ Alt.	Δd Δt	Az.	69° 00′ Alt.	Δd Δt	Az.	69° 30′ Alt.	Δd Δt	Az.	74° 30′ Alt.	Δd Δt	Az.	H.A.
00	68 00.0	1.00 1	00.0	67 30.0	1.00 1	00.0	66 00.0	1.00 1	00.0	65 30.0	1.00 1	00.0	65 00.0	1.00 1	00.0	59 00.0	1.00 0	00.0	58 30.0	1.00 0	00.0	53 30.0	1.00 0	00.0	00
1	67 59.4	1.00 3	01.3	67 29.5	1.00 3	01.3	65 59.5	1.00 2	01.2	65 29.5	1.00 2	01.1	64 59.6	1.00 2	01.1	58 59.7	1.00 1	00.7	58 29.7	1.00 1	00.7	53 29.8	1.00 1	00.4	1
2	67 57.8	1.00 5	02.7	67 27.9	1.00 4	02.6	65 58.1	1.00 4	02.3	65 28.2	1.00 4	02.2	64 58.2	1.00 4	02.1	58 58.9	1.00 2	01.4	58 28.9	1.00 2	01.3	53 29.3	1.00 2	00.9	2
3	67 55.1	99 06	04.0	67 25.2	99 06	03.8	65 55.7	99 06	03.5	65 25.7	99 06	03.2	64 56.0	1.00 5	03.2	58 57.4	1.00 3	02.1	58 27.5	1.00 3	02.0	53 28.3	1.00 2	01.3	3
4	67 51.2	99 08	05.3	67 21.5	99 08	05.1	65 52.4	99 07	04.6	65 22.7	99 07	04.4	64 52.9	99 07	04.3	58 55.4	99 04	02.8	58 25.6	99 04	02.7	53 27.0	1.00 3	01.8	4
05	67 46.3	98 10	06.6	67 16.8	98 10	06.4	65 48.1	99 09	05.7	65 18.6	99 08	05.5	64 49.0	99 08	05.3	58 52.8	99 05	03.5	58 23.1	99 05	03.3	53 25.4	99 03	02.2	05
6	67 40.3	98 12	07.9	67 11.0	98 11	07.6	65 43.0	98 10	06.9	65 13.6	98 10	06.6	64 44.1	98 09	06.4	58 49.7	99 06	04.2	58 20.1	99 06	04.0	53 23.3	99 04	02.7	6
7	67 33.3	97 13	09.2	67 04.2	97 13	08.9	65 36.9	97 12	08.0	65 07.7	97 11	07.7	64 38.5	97 11	07.4	58 46.0	98 07	04.8	58 16.5	98 07	04.7	53 20.9	99 05	03.1	7
8	67 25.2	96 15	10.4	66 56.5	96 15	10.1	65 29.9	96 13	09.1	65 00.9	97 13	08.8	64 31.9	97 12	08.5	58 41.7	98 08	05.5	58 12.4	98 08	05.3	53 18.2	98 05	03.6	8
9	67 16.2	95 17	11.7	66 47.7	95 16	11.3	65 22.0	96 15	10.1	64 53.3	96 14	09.8	64 24.6	96 14	09.5	58 36.9	97 09	06.2	58 07.8	97 09	06.0	53 15.1	98 06	04.0	9
10	67 06.1	94 18	12.9	66 38.0	94 18	12.4	65 13.2	95 16	11.2	64 44.8	95 15	10.8	64 16.4	95 15	10.5	58 31.6	97 10	06.8	58 02.6	97 10	06.6	53 11.6	97 06	04.4	10
1	66 55.1	92 20	14.1	66 27.3	93 19	13.6	65 03.6	93 17	12.3	64 35.5	94 17	11.8	64 07.4	94 16	11.4	58 25.7	96 11	07.5	57 56.9	96 10	07.2	53 07.7	97 07	04.9	1
2	66 43.1	91 22	15.2	66 15.8	91 21	14.7	64 53.1	92 19	13.3	64 25.4	93 18	12.8	63 57.6	93 18	12.4	58 19.2	95 12	08.2	57 50.7	95 11	07.9	53 03.5	96 08	05.3	2
3	66 30.2	90 23	16.4	66 03.3	90 22	15.8	64 41.8	91 20	14.3	64 14.5	91 19	13.8	63 47.1	92 19	13.4	58 12.2	94 12	08.8	57 44.0	94 12	08.5	52 59.0	96 08	05.7	3
4	66 16.4	88 24	17.5	65 50.0	88 24	16.9	64 29.8	90 21	15.3	64 02.8	90 21	14.8	63 35.8	90 20	14.3	58 04.7	93 13	09.4	57 36.7	93 13	09.1	52 54.1	95 09	06.2	4
15	66 01.8	86 26	18.6	65 35.8	87 25	18.0	64 16.9	88 23	16.3	63 50.4	89 22	15.7	63 23.7	89 21	15.2	57 56.7	92 14	10.1	57 29.0	93 14	09.7	52 48.9	94 09	06.6	15
6	65 46.3	85 27	19.6	65 20.8	85 26	19.0	64 03.3	87 24	17.2	63 37.2	87 23	16.1	63 10.8	88 22	16.1	57 48.2	91 15	10.7	57 20.8	92 14	10.3	52 43.3	93 10	07.1	6
7	65 30.1	83 28	20.6	65 05.0	84 28	20.0	63 49.0	85 25	18.1	63 23.3	86 24	17.5	62 57.5	86 24	17.0	57 39.2	90 16	11.3	57 12.1	91 15	10.9	52 37.4	93 10	07.4	7
8	65 13.0	81 30	21.6	64 48.5	82 29	20.9	63 33.9	84 26	19.0	63 08.7	84 25	18.4	62 43.4	85 25	17.8	57 29.7	89 17	11.9	57 02.9	89 16	11.5	52 31.1	92 11	07.8	8
9	64 55.2	80 31	22.6	64 31.2	80 30	21.9	63 18.1	82 27	19.9	62 53.4	83 27	19.3	62 28.6	83 26	18.7	57 19.7	88 17	12.5	56 53.3	88 17	12.0	52 24.5	91 12	08.2	9
20	64 36.7	78 32	23.5	64 13.3	78 31	22.8	63 01.7	80 28	20.7	62 37.5	81 28	20.1	62 13.1	82 27	19.5	57 09.3	87 18	13.1	56 43.2	87 18	12.6	52 17.6	90 12	08.6	20
1	64 17.5	76 33	24.4	63 54.6	77 32	23.7	62 44.7	79 29	21.6	62 21.0	79 29	20.9	61 57.1	80 28	20.2	56 58.4	86 19	13.6	56 32.6	86 18	13.2	52 10.4	89 13	09.0	1
2	63 57.6	74 34	25.3	63 35.3	75 33	24.5	62 27.0	77 30	22.3	62 03.8	78 30	21.7	61 40.4	78 29	21.0	56 47.0	84 20	14.2	56 21.7	85 19	13.7	52 02.9	88 13	09.4	2
3	63 37.2	72 35	26.1	63 15.4	73 34	25.3	62 08.7	75 31	23.1	61 46.1	76 31	22.4	61 23.2	77 30	21.7	56 35.2	83 20	14.7	56 10.3	83 20	14.2	51 55.0	87 14	09.7	3
4	63 16.1	70 36	26.9	62 54.9	71 35	26.1	61 49.9	73 32	23.9	61 27.7	74 31	23.1	61 05.4	75 31	22.5	56 23.0	82 21	15.3	55 58.4	82 20	14.7	51 46.9	86 14	10.1	4
25	62 54.4	68 37	27.6	62 33.8	69 36	26.8	61 30.5	72 33	24.6	61 08.9	72 32	23.9	60 47.1	73 31	23.1	56 10.3	80 22	15.8	55 46.2	81 21	15.3	51 38.4	84 15	10.5	25
6	62 32.2	66 38	28.4	62 12.2	67 37	27.6	61 10.6	70 34	25.3	60 49.5	71 33	24.5	60 28.2	71 32	23.8	55 57.2	79 22	16.3	55 33.6	79 22	15.8	51 29.6	83 15	10.8	6
7	62 09.5	64 39	29.1	61 50.1	65 38	28.3	60 50.1	68 35	25.9	60 29.6	69 34	25.2	60 08.9	70 33	24.5	55 43.8	77 23	16.8	55 20.5	78 22	16.2	51 20.6	82 16	11.2	7
8	61 46.3	62 40	29.8	61 27.4	63 38	28.9	60 29.2	66 36	26.6	60 09.3	67 35	25.8	59 49.1	68 34	25.1	55 29.9	76 24	17.3	55 07.1	76 23	16.7	51 11.3	81 16	11.5	8
9	61 22.6	60 40	30.4	61 04.3	61 39	29.6	60 07.8	64 36	27.2	59 48.4	65 35	26.4	59 28.8	66 34	25.7	55 15.7	74 24	17.8	54 53.3	75 24	17.2	51 01.7	79 16	11.9	9
30	60 58.4	58 41	31.0	60 40.8	59 40	30.2	59 46.0	62 37	27.8	59 27.2	63 36	27.0	59 08.1	64 35	26.3	55 01.1	73 25	18.2	54 39.2	73 24	17.6	50 51.8	78 17	12.2	30
1	60 33.9	56 42	31.6	60 16.8	57 41	30.8	59 23.7	60 38	28.4	59 05.5	61 37	27.6	58 47.0	62 36	26.8	54 46.1	71 26	18.7	54 24.7	71 26	18.1	50 41.7	77 17	12.6	1
2	60 08.9	54 42	32.2	59 52.4	55 41	31.3	59 01.1	58 38	28.9	58 43.4	59 37	28.1	58 25.4	60 37	27.4	54 30.8	69 26	19.1	54 09.9	70 25	18.5	50 31.3	75 18	12.9	2
3	59 43.5	52 43	32.7	59 27.6	54 42	31.9	58 38.1	57 39	29.4	58 20.9	58 38	28.6	58 03.5	58 37	27.9	54 15.2	68 27	19.5	53 54.8	68 26	18.9	50 20.6	74 18	13.2	3
4	59 17.8	51 43	33.2	59 02.5	52 42	32.4	58 14.6	55 40	29.9	57 58.1	56 39	29.1	57 41.3	57 38	28.4	53 59.2	66 27	19.9	53 39.3	67 26	19.3	50 09.7	73 19	13.5	4
35	58 51.7	49 44	33.7	58 37.0	50 43	32.8	57 50.9	53 40	30.4	57 34.9	54 39	29.6	57 18.6	55 38	28.8	53 43.0	65 28	20.3	53 23.5	65 27	19.7	49 58.5	71 19	13.9	35
6	58 25.4	47 44	34.1	58 11.2	48 44	33.3	57 26.8	51 41	30.9	57 11.4	52 40	30.1	56 55.7	53 39	29.4	53 26.4	63 28	20.7	53 07.4	64 27	20.1	49 47.2	70 19	14.1	6
7	57 58.7	45 45	34.6	57 45.1	46 44	33.7	57 02.4	49 41	31.3	56 47.5	50 40	30.5	56 32.4	51 39	29.7	53 09.5	61 29	21.1	52 51.1	62 28	20.4	49 35.5	68 20	14.4	7
8	57 31.7	43 45	35.0	57 18.7	44 44	34.1	56 37.7	47 42	31.7	56 23.4	48 41	30.9	56 08.8	49 40	30.1	52 52.4	59 29	21.4	52 34.4	60 28	20.8	49 23.7	67 20	14.6	8
9	57 04.5	41 46	35.4	56 51.9	42 45	34.5	56 12.7	45 42	32.1	55 59.0	46 41	31.3	55 45.0	47 40	30.5	52 35.0	58 29	21.8	52 17.5	59 29	21.1	49 11.6	65 20	14.9	9
40	56 37.0	39 46	35.7	56 25.1	40 45	34.9	55 47.5	43 42	32.5	55 34.3	44 42	31.7	55 20.8	45 41	30.9	52 17.3	56 30	22.1	52 00.4	57 29	21.4	48 59.4	64 21	15.2	40
1	56 09.2	37 47	36.1	55 57.9	38 46	35.3	55 22.0	42 43	32.8	55 09.4	43 42	32.0	54 56.4	44 41	31.2	51 59.4	54 30	22.4	51 43.0	55 29	21.8	48 46.9	62 21	15.4	1
2	55 41.3	35 47	36.4	55 30.5	36 46	35.6	54 56.2	40 43	33.1	54 44.2	41 42	32.4	54 31.8	42 41	31.6	51 41.2	53 31	22.8	51 25.3	53 30	22.1	48 34.2	60 21	15.7	2
3	55 13.1	34 47	36.7	55 02.9	35 46	35.9	54 30.3	38 44	33.5	54 18.8	39 43	32.7	54 06.9	40 42	31.9	51 22.8	51 31	23.1	51 07.4	52 30	22.4	48 21.3	59 22	15.9	3
4	54 44.8	32 48	37.0	54 35.1	33 47	36.2	54 04.1	36 44	33.8	53 53.1	37 43	33.0	53 41.8	38 42	32.2	51 04.2	49 31	23.3	50 49.3	50 30	22.6	48 08.3	57 22	16.2	4
45	54 16.2	30 48	37.3	54 07.1	31 47	36.4	53 37.7	34 44	34.0	53 27.3	35 43	33.3	53 16.6	36 42	32.5	50 45.3	47 32	23.6	50 31.0	48 31	22.9	47 55.0	56 22	16.4	45
6	53 47.5	28 48	37.5	53 38.9	29 47	36.7	53 11.2	32 45	34.3	53 01.3	33 44	33.5	52 51.1	34 43	32.7	50 26.3	46 32	23.9	50 12.5	46 31	23.2	47 41.6	54 23	16.6	6
7	53 18.7	26 48	37.7	53 10.6	27 47	36.9	52 44.4	31 45	34.5	52 35.1	32 44	33.8	52 25.4	33 43	33.0	50 07.1	44 32	24.1	49 53.8	45 31	23.4	47 28.0	52 23	16.8	7
8	52 49.6	24 49	37.9	52 42.1	25 47	37.1	52 17.5	29 45	34.8	52 08.7	30 44	34.0	51 59.6	31 43	33.2	49 47.7	42 33	24.4	49 34.9	43 32	23.7	47 14.3	51 23	17.0	8
9	52 20.5	23 49	38.1	52 13.5	24 48	37.3	51 50.5	27 45	35.0	51 42.2	28 44	34.2	51 33.6	29 44	33.4	49 28.1	41 33	24.6	49 15.8	41 32	23.9	47 00.4	49 23	17.2	9
50	51 51.2	21 49	38.3	51 44.7	22 48	37.5	51 23.3	25 46	35.2	51 15.6	26 45	34.4	51 07.5	27 44	33.6	49 08.3	39 33	24.8	48 56.6	39 32	24.1	46 46.3	47 24	17.4	50
1	51 21.9	19 49	38.5	51 15.9	21 48	37.7	50 56.0	24 46	35.4	50 48.8	25 45	34.6	50 41.2	26 44	33.8	48 48.4	37 33	25.0	48 37.2	38 33	24.3	46 32.1	46 24	17.6	1
2	50 52.4	18 49	38.6	50 46.9	19 48	37.9	50 28.6	22 46	35.5	50 21.9	23 45	34.8	50 14.8	24 44	34.0	48 28.3	35 34	25.2	48 17.7	36 33	24.5	46 17.8	44 24	17.7	2
3	50 22.8	16 49	38.8	50 17.8	17 49	38.0	50 01.0	20 46	35.7	49 54.8	21 45	34.9	49 48.3	22 44	34.2	48 08.1	33 34	25.4	47 58.0	34 33	24.7	46 03.3	42 24	17.9	3
4	49 53.2	14 50	38.9	49 48.7	15 49	38.1	49 33.4	18 46	35.9	49 27.7	19 45	35.1	49 21.7	20 45	34.3	47 47.8	32 34	25.6	47 38.2	32 33	24.9	45 48.7	40 25	18.1	4
55	49 23.5	13 50	39.0	49 19.5	14 49	38.2	49 05.7	17 46	36.0	49 00.5	18 46	35.2	48 55.0	19 45	34.5	47 27.3	30 34	25.7	47 18.2	31 33	25.0	45 34.0	39 25	18.2	55
6	48 53.7	11 50	39.1	48 50.2	12 49	38.3	48 37.9	15 46	36.1	48 33.2	16 46	35.3	48 28.2	17 45	34.6	47 06.7	28 34	25.9	46 58.2	29 34	25.2	45 19.1	37 25	18.4	6
7	48 23.9	10 50	39.2	48 20.8	11 49	38.4	48 10.0	13 47	36.2	48 05.8	14 46	35.4	48 01.3	15 45	34.7	46 46.0	26 35	26.0	46 38.0	27 34	25.3	45 04.2	35 25	18.5	7
8	47 54.0	08 50	39.2	47 51.4	09 49	38.4	47 42.0	12 47	36.3	47 38.4	13 46	35.5	47 34.3	14 46	34.8	46 25.2	25 35	26.2	46 17.7	25 34	25.5	44 49.1	34 26	18.6	8
9	47 24.0	06 50	39.3	47 22.0	07 49	38.5	47 14.0	10 46	36.3	47 10.8	11 46	35.6	47 07.4	12 45	34.9	46 04.3	23 35	26.3	45 57.4	24 34	25.6	44 34.0	32 25	18.8	9
60	46 54.1	05 50	39.3	46 52.5	06 49	38.6	46 46.0	09 47	36.4	46 43.3	10 46	35.7	46 40.3	10 45	35.0	45 43.4	21 35	26.4	45 36.9	22 34	25.7	44 18.7	30 26	18.9	60
1	46 24.1	03 50	39.4	46 23.0	04 49	38.6	46 17.9	07 47	36.5	46 15.7	08 46	35.7	46 13.2	09 45	35.0	45 22.3	19 35	26.5	45 16.4	20 34	25.8	44 03.4	28 26	19.0	1
2	45 54.1	02 50	39.4	45 53.5	03 49	38.6	45 49.8	05 47	36.5	45 48.1	06 46	35.8	45 46.0	07 45	35.1	45 01.2	18 35	26.6	44 55.7	18 34	25.9	43 48.0	27 26	19.1	2
3	45 24.1	00 50	39.4	45 23.9	01 49	38.7	45 21.7	04 47	36.5	45 20.4	05 46	35.8	45 18.8	06 45	35.1	44 40.0	17 35	26.6	44 35.1	17 35	26.1	43 32.5	25 26	19.2	3
4	44 54.1	01 50	39.4	44 54.4	00 49	38.7	44 53.5	02 47	36.6	44 52.7	03 46	35.9	44 51.6	04 45	35.1	44 18.7	14 36	26.8	44 14.3	15 35	26.1	43 16.9	23 26	19.3	4
65	44 24.1	03 50	39.4	44 24.8	02 49	38.7	44 25.4	01 47	36.6	44 25.0	02 46	35.9	44 24.4	02 45	35.2	43 57.4	13 36	26.8	43 53.5	13 35	26.1	43 01.3	21 26	19.3	65
6	43 54.2	04 50	39.3	43 55.3	03 49	38.6	43 57.2	01 47	36.6	43 57.3	00 46	35.9	43 57.2	01 45	35.2	43 36.1	11 36	26.9	43 32.7	12 35	26.2	42 45.6	20 26	19.4	6
7	43 24.2	06 50	39.3	43 25.8	04 49	38.6	43 29.0	02 47	36.6	43 29.6	02 46	35.9	43 29.9	01 45	35.2	43 14.7	09 36	26.9	43 11.8	10 35	26.3	42 29.8	18 26	19.5	7
8	42 54.3	07 50	39.3	42 56.3	06 49	38.6	43 00.9	04 47	36.5	43 01.9	03 46	35.9	43 02.7	02 45	35.2	42 53.2	08 36	27.0	42 50.9	08 36	26.3	42 14.0	16 26	19.6	8
9	42 24.3	09 50	39.2	42 26.8	08 49	38.5	42 32.7	05 47	36.5	42 34.2	05 46	35.8	42 35.5	04 45	35.1	42 31.8	06 36	27.0	42 29.9	07 35	26.3	41 58.2	14 26	19.6	9
70	41 54.5	10 50	39.1	41 57.4	09 49	38.5	42 04.6	07 47	36.5	42 06.6	06 46	35.8	42 08.3	05 45	35.1	42 10.3	04 36	27.0	42 08.9	05 35	26.4	41 42.3	13 27	19.7	70
1	41 24.7	11 50	39.1	41 28.0	11 49	38.4	41 36.5	08 47	36.4	41 38.9	06 46	35.8	41 41.1	07 45	35.1	41 48.8	03 36	27.0	41 47.9	03 35	26.4	41 26.4	11 27	19.7	1
2	40 54.9	13 50	39.0	40 58.6	12 49	38.3	41 08.5	10 47	36.3	41 11.3	09 46	35.7	41 13.9	08 45	35.0	41 27.3	01 36	27.0	41 26.9	02 35	26.4	41 10.4	09 27	19.7	2
3	40 25.2	14 49	38.9	40 29.3	13 49	38.3	40 40.5	11 47	36.3	40 43.7	11 46	35.6	40 46.8	10 45	35.0	41 05.8	01 36	27.0	41 05.9	00 35	26.4	40 54.5	08 27	19.8	3
4	39 55.5	16 49	38.8	40 00.1	15 49	38.2	40 12.5	13 47	36.2	40 16.2	12 46	35.6	40 19.7	11 45	34.9	40 44.3	02 36	27.0	40 44.9	02 35	26.4	40 38.5	06 27	19.8	4
75	39 25.9	17 49	38.7	39 30.9	16 49	38.1	39 44.6	14 46	36.1	39 48.7	13 46	35.5	39 52.7	13 45	34.8	40 22.8	04 36	27.0	40 23.9	03 35	26.4	40 22.4	04 27	19.8	75
6	38 56.4	18 49	38.6	39 01.8	18 48	38.0	39 16.7	16 46	36.0	39 21.3	15 46	35.4	39 25.7	14 45	34.8	40 01.3	06 36	27.0	40 02.9	05 35	26.4	40 06.4	03 27	19.8	6
7	38 26.9	20 49	38.5	38 32.7	19 48	37.8	38 48.9	17 46	36.0	38 53.9	16 46	35.3	38 58.7	16 45	34.7	39 39.9	07 36	27.0	39 41.9	06 35	26.3	39 50.4	01 27	19.8	7
8	37 57.5	21 49	38.3	38 03.8	20 48	37.7	38 21.2	18 46	35.8	38 26.6	18 45	35.2	38 31.9	17 45	34.6	39 18.5	09 36	26.9	39 21.0	08 35	26.3	39 34.3	01 27	19.8	8
9	37 28.3	22 49	38.2	37 34.9	22 48	37.6	37 53.6	20 45	35.7	37 59.4	19 45	35.1	38 05.1	18 45	34.5	38 57.1	10 36	26.9	39 00.0	10 35	26.3	39 18.3	03 27	19.8	9
80	36 59.1	24 48	38.1	37 06.1	23 48	37.4	37 26.0	21 46	35.6	37 32.3	21 45	35.0	37 38.3	20 44	34.4	38 35.7	12 36	26.8	38 39.1	11 35	26.2	39 02.3	04 27	19.8	80
1	36 30.0	25 48	37.9	36 37.4	24 48	37.3	36 58.5	23 46	35.5	37 05.2	22 45	34.9	37 11.7	21 44	34.3	38 14.4	13 35	26.8	38 18.3	13 35	26.2	38 46.3	06 27	19.8	1
2	36 01.0	26 48	37.7	36 08.8	26 48	37.1	36 31.1	24 46	35.3	36 38.2	23 45	34.7	36 45.1	23 44	34.1	37 53.1	15 35	26.7	37 57.5	14 35	26.1	38 30.3	07 27	19.8	2
3	35 32.1	28 48	37.6	35 40.3	27 47	37.0	36 03.8	25 45	35.2	36 11.3	25 45	34.6	36 18.6	24 44	34.0	37 31.8	17 35	26.6	37 36.7	16 35	26.0	38 14.3	09 27	19.7	3
4	35 03.3	29 48	37.4	35 11.9	28 47	36.8	35 36.4	27 45	35.1	35 44.5	26 44	34.5	35 52.2	25 44	33.9	37 10.7	18 35	26.6	37 16.0	17 34	26.0	37 58.3	11 27	19.7	4
85	34 34.6	30 48	37.2	34 43.6	30 47	36.6	35 09.5	28 45	34.9	35 17.8	27 44	34.3	35 25.9	27 43	33.7	36 49.5	20 35	26.5	36 55.3	19 34	25.9	37 42.4	12 26	19.7	85
6	34 06.1	31 47	37.0	34 15.4	31 47	36.5	34 42.5	29 45	34.7	34 51.2	29 44	34.1	34 59.7	28 43	33.6	36 28.5	20 35	26.5	36 34.7	20 34	25.8	37 26.5	14 26	19.6	6
7	33 37.7	33 47	36.8	33 47.4	32 47	36.3	34 15.6	31 45	34.6	34 24.7	30 44	34.0	34 33.7	29 43	33.4	36 07.5	23 35	26.3	36 14.2	22 34	25.7	37 10.7	16 26	19.6	7
8	33 09.4	34 47	36.6	33 19.5	33 46	36.1	33 48.9	32 44	34.4	33 58.4	31 44	33.8	34 07.7	31 43	33.2	35 46.6	24 35	26.2	35 53.7	23 34	25.6	36 54.9	17 26	19.5	8
9	32 41.2	35 47	36.4	32 51.7	35 46	35.9	33 22.1	33 44	34.2	33 32.1	33 44	33.6	33 41.8	32 43	33.1	35 25.8	26 35	26.0	35 33.3	25 34	25.5	36 39.1	19 26	19.5	9
90	32 13.2	36 46	36.2	32 24.1	36 46	35.7	32 55.7	34 44	34.0	33 06.0	34 43	33.4	33 16.1	34 43	32.9	35 05.0	27 34	26.0	35 13.0	26 34	25.4	36 23.4	20 26	19.4	90

Lat. 38°

H.A.	60° 00' Alt	Δd Δt	Az	60° 30' Alt	Δd Δt	Az	62° 00' Alt	Δd Δt	Az	62° 30' Alt	Δd Δt	Az	63° 00' Alt	Δd Δt	Az	69° 00' Alt	Δd Δt	Az	69° 30' Alt	Δd Δt	Az	74° 30' Alt	Δd Δt	Az	H.A.
91	31 45.4	38 46	36.0	31 56.6	37 46	35.5	32 29.4	36 44	33.8	32 40.0	35 43	33.3	32 50.5	35 43	32.7	34 44.3	28 34	25.9	34 52.8	28 34	25.3	36 07.7	22 26	19.3	91
2	31 17.6	38 45	35.8	31 29.2	38 45	35.2	32 03.1	37 44	33.6	32 14.1	36 43	33.1	32 25.0	36 42	32.5	34 23.8	30 34	25.7	34 32.7	29 33	25.1	35 52.1	24 26	19.2	2
3	30 50.1	40 46	35.6	31 02.0	40 45	35.0	31 37.0	38 43	32.9	31 48.4	38 43	32.9	31 59.7	37 42	32.3	34 03.3	31 34	25.5	34 12.6	31 33	24.9	35 36.5	25 26	19.2	3
4	30 22.6	41 45	35.3	30 34.9	41 45	34.8	31 11.0	39 43	33.2	31 22.8	39 42	32.7	31 34.5	39 42	32.1	33 42.9	33 34	25.5	33 52.7	32 33	24.9	35 21.0	27 26	19.1	4
95	29 55.4	42 45	35.1	30 08.0	42 45	34.6	30 45.2	41 43	33.0	30 57.4	40 42	32.4	31 09.4	40 42	31.9	33 22.7	34 34	25.3	33 32.8	34 33	24.7	35 05.6	28 26	19.0	95
6	29 28.3	44 45	34.8	29 41.3	43 44	34.3	30 19.6	42 42	32.7	30 32.1	41 42	32.2	30 44.5	41 41	31.7	33 02.5	35 33	25.2	33 13.1	35 33	24.6	34 50.3	30 25	18.9	6
7	29 01.4	44 45	34.6	29 14.7	44 44	34.1	29 54.1	43 42	32.5	30 07.0	43 42	32.0	30 19.7	42 41	31.5	32 42.5	37 33	25.0	32 53.5	36 33	24.5	34 35.0	31 26	18.8	7
8	28 34.6	46 44	34.3	28 48.3	45 44	33.8	29 28.8	44 42	32.3	29 42.0	44 41	31.8	29 55.1	44 41	31.2	32 22.5	38 33	24.8	32 33.9	38 32	24.3	34 19.8	33 25	18.7	8
9	28 08.1	47 44	34.1	28 22.1	47 43	33.6	29 03.6	46 42	32.3	29 17.2	45 41	31.5	29 30.7	45 40	31.0	32 02.7	40 33	24.7	32 14.5	39 32	24.1	34 04.7	34 25	18.6	9
100	27 41.7	48 44	33.8	27 56.1	48 43	33.3	28 38.6	47 41	31.8	28 52.6	46 41	31.3	29 06.4	46 40	30.8	31 43.1	41 33	24.5	31 55.3	41 32	24.0	33 49.7	36 25	18.5	100
1	27 15.5	49 43	33.5	27 30.2	49 43	33.0	28 13.8	48 41	31.5	28 28.1	48 40	31.0	28 42.3	47 40	30.5	31 23.5	42 32	24.3	31 36.1	42 32	23.8	33 34.7	37 25	18.4	1
2	26 49.5	50 43	33.2	27 04.5	50 42	32.7	27 49.1	49 41	31.3	28 03.8	49 40	30.8	28 18.4	48 40	30.3	31 04.1	44 32	24.2	31 17.1	43 31	23.6	33 19.9	39 25	18.2	2
3	26 23.7	52 43	32.9	26 39.1	51 42	32.5	27 24.7	50 40	31.0	27 39.7	50 40	30.5	27 54.6	50 39	30.0	30 44.8	45 32	24.0	30 58.2	45 31	23.5	33 05.2	40 24	18.1	3
4	25 58.0	53 42	32.7	26 13.8	52 42	32.2	27 00.4	51 40	30.7	27 15.8	51 40	30.3	27 31.0	51 39	29.8	30 25.7	46 32	23.8	30 39.5	46 31	23.3	32 50.5	41 24	18.0	4
105	25 32.6	54 42	32.4	25 48.7	53 41	31.9	26 36.3	52 40	30.5	26 52.0	52 39	30.0	27 07.6	52 39	29.5	30 06.7	48 31	23.6	30 20.9	47 31	23.1	32 36.0	43 24	17.8	105
6	25 07.4	55 42	32.1	25 23.8	54 41	31.6	26 12.5	54 40	30.2	26 28.5	53 39	29.7	26 44.4	53 38	29.3	29 47.8	49 31	23.4	30 02.4	48 30	22.9	32 21.5	44 24	17.7	6
7	24 42.4	56 41	31.8	24 59.2	56 41	31.3	25 48.8	55 39	29.9	26 05.1	54 39	29.4	26 21.4	54 39	29.0	29 29.1	50 31	23.2	29 44.1	50 30	22.7	32 07.2	46 24	17.6	7
8	24 17.7	57 41	31.4	24 34.7	57 40	31.0	25 25.3	56 39	29.6	25 42.0	56 38	29.2	25 58.6	55 38	28.7	29 10.6	51 31	23.0	29 25.9	51 30	22.5	31 53.0	47 24	17.4	8
9	23 53.1	58 41	31.1	24 10.5	58 40	30.7	25 02.0	57 38	29.3	25 19.1	57 38	28.9	25 36.0	56 37	28.4	28 52.2	53 30	22.8	29 07.9	52 30	22.3	31 38.9	48 23	17.3	9
110	23 28.8	59 40	30.8	23 46.4	59 40	30.4	24 39.0	58 38	29.0	24 56.3	58 38	28.6	25 13.6	57 37	28.1	28 34.0	54 30	22.5	28 50.1	53 29	22.1	31 24.9	50 23	17.1	110
1	23 04.7	60 40	30.5	23 22.6	60 39	30.1	24 16.1	59 38	28.7	24 33.8	59 37	28.3	24 51.4	59 37	27.8	28 16.0	55 30	22.3	28 32.4	55 29	21.8	31 11.1	51 23	17.0	1
2	22 40.8	61 39	30.2	22 59.1	61 39	29.7	23 53.5	60 37	28.4	24 11.5	60 37	28.0	24 29.4	60 36	27.5	27 58.1	56 30	22.1	28 14.8	56 29	21.6	30 57.4	52 22	16.8	2
3	22 17.2	62 39	29.8	22 35.7	62 38	29.4	23 31.1	61 37	28.1	23 49.4	61 36	27.7	24 07.7	61 36	27.3	27 40.4	57 29	21.9	27 57.6	57 29	21.4	30 43.8	54 22	16.6	3
4	21 53.8	63 39	29.5	22 12.7	63 38	29.1	23 08.9	62 37	27.8	23 27.6	62 36	27.4	23 46.1	62 36	26.9	27 22.9	59 29	21.6	27 40.4	58 28	21.2	30 30.3	55 22	16.5	4
115	21 30.6	64 38	29.1	21 49.8	64 38	28.7	22 47.0	63 36	27.5	23 05.9	63 36	27.1	23 24.8	63 35	26.6	27 05.5	60 29	21.4	27 23.4	59 28	20.9	30 17.0	56 22	16.3	115
6	21 07.7	65 38	28.8	21 27.2	65 37	28.4	22 25.3	64 36	27.2	22 44.6	64 35	26.7	23 03.7	64 35	26.3	26 48.4	61 28	21.2	27 06.6	61 28	20.7	30 03.8	57 22	16.1	6
7	20 45.0	66 37	28.5	21 04.8	66 37	28.1	22 03.8	65 35	26.8	22 23.4	65 35	26.4	22 42.9	65 34	26.0	26 31.4	62 28	20.9	26 50.0	62 27	20.5	29 50.7	59 22	15.9	7
8	20 22.7	67 37	28.1	20 42.7	67 36	27.7	21 42.6	66 35	26.5	22 02.5	66 34	26.1	22 22.3	66 34	25.7	26 14.6	63 28	20.7	26 33.5	63 27	20.2	29 37.8	60 21	15.8	8
9	20 00.5	68 36	27.7	20 20.9	68 36	27.3	21 21.7	67 35	26.2	21 41.8	67 34	25.8	22 01.9	67 34	25.4	25 58.0	64 27	20.4	26 17.3	64 27	20.0	29 25.1	61 21	15.6	9
120	19 38.6	69 36	27.4	19 59.3	69 36	27.0	21 00.9	68 34	25.8	21 21.4	68 34	25.4	21 41.8	68 33	25.0	25 41.7	65 27	20.1	26 01.2	65 26	19.7	29 12.5	62 21	15.4	120
1	19 17.0	70 36	27.0	19 38.0	70 35	26.6	20 40.5	69 34	25.5	21 02.2	69 33	25.1	21 21.9	69 33	24.7	25 25.5	66 27	19.9	25 45.4	66 26	19.5	29 00.0	64 20	15.2	1
2	18 55.7	71 35	26.6	19 16.9	71 35	26.3	20 20.3	70 33	25.1	20 41.3	70 33	24.7	21 02.3	70 32	24.3	25 09.5	67 26	19.6	25 29.7	67 26	19.2	28 47.7	65 20	15.0	2
3	18 34.7	72 35	26.3	18 56.1	72 34	25.9	20 00.3	71 33	24.8	20 21.6	71 32	24.4	20 42.9	71 32	24.0	24 53.7	68 26	19.4	25 14.2	68 25	18.9	28 35.5	66 20	14.8	3
4	18 13.9	73 34	25.9	18 35.6	73 34	25.5	19 40.6	72 32	24.4	20 02.2	72 32	24.0	20 23.8	72 31	23.7	24 38.2	70 26	19.1	24 59.0	69 25	18.7	28 23.6	67 20	14.6	4
125	17 53.4	73 34	25.5	18 15.4	73 33	25.1	19 21.2	73 32	24.1	19 43.1	73 31	23.7	20 04.9	73 31	23.3	24 22.8	71 25	18.8	24 44.0	70 25	18.4	28 11.7	68 19	14.4	125
6	17 33.2	74 33	25.1	17 55.5	74 33	24.8	19 02.1	74 31	23.7	19 24.2	74 31	23.3	19 46.3	74 31	23.0	24 07.7	72 25	18.5	24 29.1	71 24	18.1	28 00.1	69 19	14.2	6
7	17 13.3	75 33	24.7	17 35.8	75 32	24.4	18 43.2	75 31	23.3	19 05.6	75 31	23.0	19 28.0	74 30	22.6	23 52.8	73 24	18.2	24 14.5	72 24	17.9	27 48.6	70 19	13.7	7
8	16 53.6	76 32	24.3	17 16.5	76 32	24.0	18 24.7	75 30	22.9	18 47.3	75 30	22.6	19 10.0	75 30	22.2	23 38.1	74 24	18.0	24 00.1	73 24	17.6	27 37.3	71 19	13.7	8
9	16 34.3	77 32	23.9	16 57.4	77 31	23.6	18 06.4	76 30	22.6	18 29.3	76 30	22.2	18 52.2	76 29	21.9	23 23.6	74 24	17.7	23 46.0	74 23	17.3	27 26.1	72 18	13.5	9
130	16 15.3	78 31	23.5	16 38.6	78 31	23.2	17 48.4	77 30	22.2	18 11.6	77 29	21.9	18 34.7	77 29	21.5	23 09.4	75 23	17.4	23 32.0	75 23	17.0	27 15.1	73 18	13.3	130
1	15 56.6	79 31	23.1	16 20.2	78 30	22.8	17 30.7	78 29	21.8	17 54.1	78 29	21.5	18 17.5	78 28	21.2	22 55.4	76 23	17.1	23 18.3	76 22	16.7	27 04.3	74 18	13.1	1
2	15 38.2	79 30	22.7	16 02.0	79 30	22.4	17 13.2	79 29	21.4	17 36.9	79 28	21.1	18 00.6	79 28	20.8	22 41.6	77 23	16.8	23 04.8	77 22	16.4	26 53.7	75 17	12.9	2
3	15 20.1	80 30	22.3	15 44.2	80 29	22.0	16 56.1	80 28	20.7	17 20.1	80 28	20.7	17 44.0	80 27	20.4	22 28.1	78 23	16.5	22 51.5	78 22	16.1	26 43.3	76 17	12.6	3
4	15 02.4	81 29	21.9	15 26.6	81 29	21.6	16 39.3	81 28	20.6	17 03.5	81 27	20.3	17 27.6	80 27	20.0	22 14.8	79 22	16.2	22 38.5	79 21	15.8	26 33.0	77 17	12.4	4
135	14 44.9	82 29	21.4	15 09.4	82 28	21.1	16 22.8	81 27	20.2	16 47.2	81 27	19.9	17 11.6	81 26	19.6	22 01.8	80 21	15.9	22 25.7	80 21	15.5	26 23.0	78 16	12.2	135
6	14 27.8	82 28	21.0	14 52.5	82 28	20.7	16 06.6	82 26	19.8	16 31.2	82 26	19.5	16 55.8	82 26	19.2	21 49.0	81 21	15.6	22 13.2	81 20	15.2	26 13.1	79 16	11.9	6
7	14 11.0	83 27	20.6	14 35.9	83 27	20.3	15 50.7	83 26	19.1	16 15.6	83 25	18.9	16 40.4	83 25	18.9	21 36.4	82 20	15.2	22 00.9	81 20	14.9	26 03.4	80 16	11.7	7
8	13 54.5	84 27	20.2	14 19.7	84 27	19.9	15 35.1	84 25	19.0	16 00.2	84 25	18.7	16 25.3	84 25	18.5	21 24.1	83 20	14.9	21 48.8	82 20	14.6	25 53.9	81 16	11.5	8
9	13 38.4	85 26	19.7	14 03.8	85 26	19.5	15 19.9	84 25	18.6	15 45.2	84 25	18.3	16 10.5	84 24	18.1	21 12.1	83 20	14.6	21 37.0	83 19	14.3	25 44.6	82 15	11.2	9
140	13 22.6	85 26	19.3	13 48.2	85 25	19.0	15 04.9	85 24	18.2	15 30.4	85 24	17.9	15 56.0	85 24	17.7	21 00.3	84 19	14.3	21 25.5	84 19	14.0	25 35.5	83 15	11.0	140
1	13 07.2	86 25	18.9	13 33.0	86 25	18.6	14 50.3	86 24	17.8	15 16.0	86 23	17.5	15 41.8	86 23	17.3	20 48.7	85 19	14.0	21 14.1	85 18	13.7	25 26.6	84 14	10.7	1
2	12 52.1	87 24	18.4	13 18.1	87 24	18.2	14 36.0	87 23	17.4	15 02.0	86 23	17.1	15 27.9	86 23	16.9	20 37.5	86 18	13.6	21 03.1	85 18	13.4	25 17.9	84 14	10.5	2
3	12 37.3	87 24	18.0	13 03.5	87 24	17.7	14 22.1	87 23	17.0	14 48.2	87 22	16.7	15 14.3	87 22	16.4	20 26.4	86 18	13.3	20 52.3	86 18	13.0	25 09.4	85 14	10.3	3
4	12 22.9	88 23	17.5	12 49.3	88 23	17.3	14 08.4	88 22	16.5	14 34.8	88 22	16.3	15 01.1	88 22	16.0	20 15.7	87 17	13.0	20 41.8	87 17	12.7	25 01.1	86 14	10.0	4
145	12 08.8	89 23	17.1	12 35.4	89 23	16.8	13 55.2	88 22	16.1	14 21.7	88 21	15.9	14 48.2	88 21	15.6	20 05.2	88 17	12.6	20 31.5	88 17	12.4	24 53.0	87 13	09.7	145
6	11 55.2	89 22	16.6	12 21.9	89 22	16.4	13 42.2	89 21	15.7	14 08.9	89 21	15.4	14 35.6	89 20	15.2	19 55.0	88 17	12.3	20 21.5	88 16	12.1	24 45.1	87 13	09.5	6
7	11 41.8	90 22	16.1	12 08.8	90 21	15.9	13 29.6	90 20	15.0	13 56.5	90 20	14.8	14 23.4	90 20	14.8	19 45.1	89 16	12.0	20 11.7	89 16	11.7	24 37.4	88 12	09.2	7
8	11 28.9	90 21	15.7	11 56.0	90 21	15.5	13 17.3	90 20	14.8	13 44.5	90 20	14.6	14 11.5	90 19	14.4	19 35.4	90 16	11.6	20 02.3	90 15	11.5	24 30.0	89 12	09.0	8
9	11 16.3	91 20	15.2	11 43.6	91 20	15.0	13 05.4	91 19	14.4	13 32.7	91 19	14.2	13 59.9	91 19	13.9	19 26.0	91 15	11.3	19 53.1	90 15	11.1	24 22.7	90 12	08.7	9
150	11 04.0	92 20	14.8	11 31.5	92 20	14.6	12 53.9	91 18	13.9	13 21.3	91 18	13.7	13 48.7	91 18	13.5	19 16.9	91 15	10.9	19 44.1	91 14	10.7	24 15.7	90 11	08.4	150
1	10 52.2	92 19	14.3	11 19.8	92 19	14.1	12 42.7	92 18	13.5	13 10.3	92 18	13.3	13 37.8	92 18	13.1	19 08.0	91 14	10.6	19 35.5	91 14	10.4	24 08.8	91 11	08.2	1
2	10 40.7	93 18	13.8	11 08.5	93 18	13.6	12 31.8	93 18	13.0	12 59.6	93 17	12.9	13 27.4	93 17	12.7	18 59.5	92 14	10.2	19 27.1	92 14	10.0	24 02.2	91 11	07.9	2
3	10 29.6	93 18	13.3	10 57.5	93 18	13.2	12 21.3	93 17	12.6	12 49.3	93 17	12.4	13 17.1	93 16	12.2	18 51.2	93 13	09.9	19 19.0	93 13	09.7	23 55.9	92 10	07.6	3
4	10 18.9	94 17	12.9	10 46.9	94 17	12.7	12 11.2	94 16	12.2	12 39.2	94 16	12.0	13 07.3	93 16	11.8	18 43.2	93 13	09.5	19 11.2	93 13	09.4	23 49.7	93 10	07.4	4
155	10 08.5	94 17	12.4	10 36.7	94 16	12.2	12 01.4	94 16	11.7	12 29.6	94 15	11.5	12 57.8	94 15	11.4	18 35.5	94 13	09.2	19 03.6	94 12	09.0	23 43.7	93 10	07.1	155
6	9 58.6	95 16	11.9	10 26.9	95 16	11.8	11 52.0	94 15	11.3	12 20.3	94 15	11.1	12 48.7	94 15	10.9	18 28.1	94 12	08.8	18 56.4	94 12	08.7	23 38.0	94 09	06.8	6
7	9 49.0	95 15	11.4	10 17.5	95 15	11.3	11 42.9	95 14	10.8	12 11.4	95 14	10.6	12 39.9	95 14	10.5	18 21.0	95 11	08.5	18 49.4	95 11	08.3	23 32.5	94 09	06.5	7
8	9 39.8	96 15	10.8	10 08.4	95 14	10.8	11 34.3	95 14	10.3	12 02.9	95 14	10.0	12 31.5	95 13	10.0	18 14.2	95 11	08.2	18 42.7	95 11	08.0	23 27.3	95 08	06.3	8
9	9 31.0	96 14	10.5	9 59.8	96 14	10.3	11 26.0	96 13	09.9	11 54.7	96 13	09.7	12 23.4	96 13	09.6	18 07.6	95 10	07.8	18 36.3	95 10	07.6	23 22.2	95 08	06.0	9
160	9 22.6	96 13	10.0	9 51.5	96 13	09.8	11 18.0	96 13	09.4	11 46.9	96 12	09.3	12 15.7	96 12	09.1	18 01.4	96 10	07.4	18 30.2	96 10	07.3	23 17.4	96 08	05.7	160
1	9 14.6	97 13	09.5	9 43.6	97 12	09.4	11 10.5	97 12	09.0	11 39.4	97 12	08.8	12 08.4	96 12	08.7	17 55.4	96 09	07.0	18 24.3	96 09	06.9	23 12.8	96 07	05.4	1
2	9 07.0	97 12	09.0	9 36.1	97 12	08.9	11 03.3	97 11	08.5	11 32.4	97 11	08.4	12 01.4	97 11	08.2	17 49.8	97 09	06.7	18 18.8	97 09	06.5	23 08.4	96 07	05.2	2
3	8 59.8	97 11	08.5	9 29.0	97 11	08.4	10 56.5	97 11	07.9	11 25.7	97 11	07.9	11 54.8	97 10	07.8	17 44.4	97 08	06.3	18 13.6	97 08	06.2	23 04.3	97 06	04.9	3
4	8 53.0	98 11	08.0	9 22.3	98 11	07.9	10 50.1	98 10	07.6	11 19.3	98 10	07.4	11 48.6	98 10	07.3	17 39.4	98 08	05.8	18 08.6	97 08	05.8	23 00.4	97 06	04.6	4
165	8 46.7	98 10	07.5	9 16.0	98 10	07.4	10 44.1	98 09	07.1	11 13.4	98 09	07.0	11 42.7	98 09	06.9	17 34.6	98 07	05.6	18 03.9	98 07	05.5	22 56.7	98 06	04.3	165
6	8 40.7	98 09	07.0	9 10.1	98 09	06.9	10 38.4	98 09	06.6	11 07.8	98 09	06.5	11 37.3	98 09	06.4	17 30.2	98 07	05.2	17 59.6	98 07	05.1	22 53.3	98 05	04.0	6
7	8 35.1	99 08	06.5	9 04.6	98 08	06.4	10 33.1	98 08	06.2	11 02.6	98 08	06.1	11 32.1	98 08	06.0	17 26.0	98 06	04.8	17 55.5	98 06	04.7	22 50.1	98 05	03.7	7
8	8 29.9	99 08	06.0	8 59.5	99 08	05.9	10 28.2	99 08	05.7	10 57.8	99 07	05.6	11 27.4	99 07	05.6	17 21.9	99 06	04.4	17 51.8	99 06	04.4	22 47.1	99 05	03.5	8
9	8 25.1	99 07	05.5	8 54.8	99 07	05.5	10 23.7	99 07	05.2	10 53.4	99 07	05.1	11 23.0	99 07	05.1	17 18.7	99 05	04.1	17 48.3	99 05	04.0	22 44.4	99 04	03.2	9
170	8 20.8	99 07	05.0	8 50.5	99 06	05.0	10 19.6	99 06	04.8	10 49.3	99 06	04.7	11 19.0	99 06	04.6	17 15.4	99 05	03.7	17 45.1	99 05	03.7	22 41.9	99 04	02.9	170
1	8 16.8	99 06	04.5	8 46.6	99 06	04.5	10 15.9	99 06	04.3	10 45.7	99 05	04.2	11 15.4	99 05	04.2	17 12.5	99 04	03.4	17 42.3	99 04	03.3	22 39.7	99 03	02.6	1
2	8 13.3	99 05	04.0	8 43.1	99 05	04.0	10 12.6	99 05	03.8	10 42.4	99 05	03.8	11 12.2	99 05	03.7	17 09.9	99 04	03.0	17 39.7	99 04	02.9	22 37.6	99 03	02.3	2
3	8 10.2	1.00 04	03.5	8 40.1	1.00 04	03.5	10 09.5	1.00 04	03.3	10 39.5	1.00 04	03.3	11 09.3	1.00 04	03.2	17 07.6	99 03	02.6	17 37.6	99 03	02.6	22 35.8	99 03	02.0	3
4	8 07.5	1.00 04	03.0	8 37.4	1.00 04	03.0	10 07.1	1.00 04	02.9	10 37.0	1.00 04	02.8	11 06.9	1.00 04	02.8	17 05.6	99 03	02.2	17 35.5	1.00 03	02.2	22 34.3	1.00 02	01.7	4
175	8 05.2	1.00 03	02.5	8 35.1	1.00 03	02.5	10 04.9	1.00 03	02.4	10 34.8	1.00 03	02.3	11 04.8	1.00 03	02.3	17 03.9	1.00 02	01.9	17 33.8	1.00 02	01.8	22 33.0	1.00 02	01.4	175
6	8 03.3	1.00 02	02.0	8 33.3	1.00 02	02.0	10 03.1	1.00 02	01.9	10 33.1	1.00 02	01.9	11 03.1	1.00 02	01.8	17 02.5	1.00 02	01.5	17 32.4	1.00 02	01.5	22 31.9	1.00 01	01.2	6
7	8 01.9	1.00 01	01.5	8 31.8	1.00 02	01.5	10 01.8	1.00 02	01.4	10 31.7	1.00 02	01.4	11 01.7	1.00 01	01.4	17 01.4	1.00 01	01.1	17 31.4	1.00 01	01.1	22 31.1	1.00 01	00.9	7
8	8 00.8	1.00 01	01.0	8 30.8	1.00 01	01.0	10 00.8	1.00 01	00.9	10 30.8	1.00 01	00.9	11 00.8	1.00 01	00.9	17 00.6	1.00 01	00.7	17 30.6	1.00 01	00.7	22 30.5	1.00 01	00.6	8
9	8 00.2	1.00 00	00.5	8 30.2	1.00 00	00.5	10 00.2	1.00 00	00.5	10 30.2	1.00 00	00.5	11 00.2	1.00 00	00.5	17 00.2	1.00 00	00.4	17 30.2	1.00 00	00.4	22 30.1	1.00 00	00.3	9
180	8 00.0	1.00 00	00.0	8 30.0	1.00 00	00.0	10 00.0	1.00 00	00.0	10 30.0	1.00 00	00.0	11 00.0	1.00 00	00.0	17 00.0	1.00 00	00.0	17 30.0	1.00 00	00.0	22 30.0	1.00 00	00.0	180

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STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 38°

AZ.	4°		8°		12°		16°		20°		24°		28°		32°		36°		40°		44°		AZ.
	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	Dec.	H. A.	
00	56	180	60	180	64	180	68	180	72	180	76	180	80	180	84	180	88	180	88	00	84	00	00
4	56	173	60	172	64	171	68	170	72	168	76	165	79	160	83	150	86	121	86	56	83	25	4
8	55	166	59	164	63	163	67	160	71	157	74	152	78	144	81	130	83	105	83	70	81	43	8
12	54	159	58	157	62	154	66	151	69	147	73	140	76	131	78	118	80	98	80	74	79	53	12
16	53	153	57	150	60	147	64	143	67	138	70	131	73	122	76	110	77	94	77	76	77	58	16
20	51	147	55	144	58	140	62	136	65	130	68	124	71	115	73	104	74	91	74	76	74	62	20
24	50	141	53	138	56	134	60	130	63	124	65	117	68	109	70	100	71	89	71	76	71	64	24
28	47	136	51	133	54	129	57	124	60	119	62	112	65	105	66	96	68	86	68	76	68	65	28
32	45	131	48	128	51	124	54	119	57	114	59	108	62	101	63	93	64	85	65	75	65	66	32
36	43	127	46	123	49	119	51	115	54	110	56	104	58	98	60	91	61	83	62	74	62	66	36
40	40	123	43	119	46	115	49	111	51	106	53	101	55	95	57	88	58	81	59	74	60	66	40
44	37	119	40	116	43	112	46	107	48	103	50	98	52	92	54	86	55	79	56	73	57	65	44
48	35	116	37	112	40	108	43	104	45	100	47	95	49	91	51	84	52	78	53	71	54	65	48
52	32	112	34	109	37	105	39	101	42	97	44	92	46	87	48	82	49	76	50	70	51	64	52
56	29	109	31	106	34	102	36	98	39	94	41	90	43	85	44	80	46	75	47	69	48	63	56
60	26	106	28	103	31	99	33	95	36	91	38	87	40	83	41	78	43	73	44	68	45	62	60
64	23	103	25	100	28	96	30	93	32	89	34	85	36	81	38	76	40	71	41	66	43	61	64
68	20	101	22	97	25	94	27	90	29	87	31	83	33	79	35	74	37	70	38	65	40	60	68
72	17	98	19	95	21	91	24	88	26	84	28	80	30	76	32	72	34	68	36	64	37	59	72
76	13	96	16	92	18	89	21	85	23	82	25	78	27	74	29	71	31	66	33	62	34	58	76
80	10	93	13	90	15	86	18	83	20	80	22	76	24	72	26	69	28	65	30	61	32	56	80
84	07	91	10	87	12	84	14	81	17	77	19	74	21	70	23	67	25	63	27	59	29	55	84
88	04	88	06	85	09	82	11	78	14	75	16	72	18	68	20	65	23	61	25	57	27	54	88
92	01	86	03	82	06	79	08	76	11	73	13	70	15	66	18	63	20	59	22	56	24	52	92
96	*02*	83	00	80	03	77	05	74	08	71	10	67	12	64	15	61	17	57	19	54	22	50	96
100	*05*	81	*03*	78	*00*	74	*02*	71	05	68	07	65	10	62	12	59	15	55	17	52	19	49	100
104	*08*	78	*06*	75	*03*	72	*01*	69	02	66	04	63	07	60	09	57	12	53	14	50	17	47	104
108	*12*	76	*09*	72	*06*	69	*04*	66	*01*	63	02	60	04	57	07	54	09	51	12	48	15	45	108
112	*15*	73	*12*	70	*09*	67	*07*	64	*04*	61	*01*	58	02	55	04	52	07	49	10	46	12	43	112
116	*18*	70	*15*	67	*12*	64	*09*	61	*07*	58	*04*	55	*01*	53	02	50	05	47	08	44	10	41	116
120	*20*	67	*18*	64	*15*	61	*12*	58	*09*	56	*06*	53	*03*	50	*00*	47	02	45	05	42	08	39	120
124	*23*	64	*21*	61	*18*	58	*15*	55	*12*	53	*09*	50	*06*	47	*03*	45	*00*	42	03	40	06	37	124
128	*26*	61	*23*	58	*20*	55	*17*	52	*14*	50	*11*	47	*08*	45	*05*	42	*02*	40	01	37	05	35	128
132	*29*	58	*26*	55	*23*	52	*20*	49	*17*	47	*13*	44	*10*	42	*07*	39	*04*	37	*00*	35	03	32	132
136	*32*	54	*28*	51	*25*	49	*22*	46	*19*	44	*16*	41	*12*	39	*09*	37	*06*	34	*02*	32	01	30	136
140	*34*	51	*31*	48	*28*	45	*24*	43	*21*	40	*18*	38	*14*	36	*11*	34	*07*	32	*04*	30	*00*	28	140
144	*36*	47	*33*	44	*30*	41	*26*	39	*23*	37	*19*	35	*16*	33	*12*	31	*09*	29	*05*	27	*02*	25	144
148	*39*	43	*35*	40	*32*	38	*28*	35	*25*	33	*21*	31	*18*	29	*14*	28	*10*	26	*07*	24	*03*	22	148
152	*41*	39	*37*	36	*34*	33	*30*	31	*26*	29	*23*	28	*19*	26	*15*	24	*12*	23	*08*	21	*04*	20	152
156	*42*	33	*39*	31	*35*	29	*31*	27	*28*	26	*24*	24	*20*	23	*17*	21	*13*	20	*09*	18	*05*	17	156
160	*44*	28	*40*	26	*37*	25	*33*	23	*29*	22	*25*	20	*21*	19	*18*	18	*14*	17	*10*	15	*06*	14	160
164	*45*	23	*42*	21	*38*	20	*34*	19	*30*	17	*26*	16	*22*	15	*18*	14	*15*	13	*11*	12	*07*	12	164
168	*47*	18	*43*	16	*39*	15	*35*	14	*31*	13	*27*	12	*23*	12	*19*	11	*15*	10	*11*	09	*07*	09	168
172	*47*	12	*43*	11	*39*	10	*35*	09	*32*	09	*28*	08	*24*	08	*20*	07	*16*	07	*12*	06	*08*	06	172
176	*48*	06	*44*	05	*40*	05	*36*	05	*32*	04	*28*	04	*24*	04	*20*	04	*16*	03	*12*	03	*08*	03	176
180	*48*	00	*44*	00	*40*	00	*36*	00	*32*	00	*28*	00	*24*	00	*20*	00	*16*	00	*12*	00	*08*	00	180

| | 4° | | 8° | | 12° | | 16° | | 20° | | 24° | | 28° | | 32° | | 36° | | 40° | | 44° | | |

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

STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 38°

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	80	00	76	00	72	00	68	00	64	00	60	00	56	00	52	00	48	00	44	00	40	00	00
4	80	15	76	10	72	07	68	05	64	04	60	03	56	02	52	02	48	01	44	01	40	00	4
8	78	28	75	19	71	14	67	10	64	08	60	06	56	04	52	03	48	02	44	01	40	00	8
12	77	37	74	27	70	20	67	15	63	12	59	09	55	07	52	05	48	03	44	02	40	01	12
16	75	44	72	33	69	26	66	20	62	15	59	11	55	09	51	06	48	04	44	02	40	01	16
20	72	49	70	38	68	30	65	24	61	18	58	14	55	10	51	08	47	05	44	03	40	01	20
24	70	52	68	42	66	34	63	27	60	21	57	16	54	12	50	09	47	06	43	03	40	01	24
28	67	55	66	45	64	37	62	30	59	24	56	18	53	14	50	10	47	07	43	04	40	01	28
32	65	56	64	47	62	39	60	32	58	26	55	20	52	16	49	11	46	08	43	04	40	01	32
36	62	57	61	49	60	41	58	34	56	28	54	22	51	17	49	12	46	08	43	05	40	02	36
40	59	58	59	50	58	43	57	36	55	29	53	23	51	18	48	13	45	09	42	05	40	02	40
44	57	58	57	51	56	44	55	37	53	31	52	25	50	19	47	14	45	10	42	06	39	02	44
48	54	58	54	51	54	44	53	38	52	32	50	26	48	20	46	15	44	10	42	06	39	02	48
52	51	58	52	51	51	45	51	39	50	33	49	27	47	21	46	16	44	11	42	06	39	02	52
56	49	57	49	51	49	45	49	39	48	33	47	27	46	22	45	16	43	11	41	07	39	02	56
60	46	57	47	51	47	45	47	39	47	34	46	28	45	22	44	17	42	12	41	07	39	02	60
64	44	56	44	51	45	45	45	39	45	34	44	28	44	23	43	17	42	12	40	07	39	02	64
68	41	55	42	50	42	45	43	39	43	34	43	28	43	23	42	18	41	12	40	07	39	02	68
72	38	54	39	49	40	44	41	39	41	34	41	28	41	23	41	18	40	13	40	07	39	02	72
76	36	53	37	48	38	44	39	39	40	33	40	28	40	23	40	18	40	13	39	08	38	02	76
80	33	52	35	48	36	43	37	38	38	33	38	28	39	23	39	18	39	13	39	08	38	03	80
84	31	51	32	46	34	42	35	37	36	33	37	28	38	23	38	18	38	13	38	08	38	03	84
88	28	49	30	45	32	41	33	37	34	32	36	27	36	23	37	18	38	13	38	08	38	03	88
92	26	48	28	44	30	40	31	36	33	31	34	27	35	22	36	17	37	13	38	08	38	03	92
96	24	47	26	43	28	39	29	35	31	31	33	26	34	22	35	17	36	12	37	07	38	03	96
100	21	45	24	41	26	38	28	34	30	30	31	26	33	21	34	17	36	12	37	07	38	02	100
104	19	43	22	40	24	36	26	33	28	29	30	25	32	21	33	16	35	12	36	07	37	02	104
108	17	42	20	38	22	35	24	31	27	28	29	24	31	20	33	16	34	12	36	07	37	02	108
112	15	40	18	37	20	34	23	30	25	27	27	23	30	19	32	15	34	11	36	07	37	02	112
116	13	38	16	35	18	32	21	29	24	25	26	22	29	18	31	15	33	11	35	07	37	02	116
120	11	36	14	33	17	30	20	27	22	24	25	21	28	18	30	14	33	10	35	06	37	02	120
124	09	34	12	32	15	29	18	26	21	23	24	20	27	17	29	13	32	10	34	06	37	02	124
128	08	32	11	30	14	27	17	24	20	22	23	19	26	16	29	13	31	09	34	06	37	02	128
132	06	30	09	28	12	25	16	23	19	20	22	17	25	15	28	12	31	09	34	05	37	02	132
136	04	28	08	26	11	23	14	21	18	19	21	16	24	14	27	11	31	08	34	05	37	02	136
140	03	26	07	23	10	21	13	19	17	17	20	15	24	13	27	10	30	07	33	05	36	02	140
144	02	23	05	21	09	19	12	18	16	16	19	13	23	11	26	09	30	07	33	04	36	01	144
148	01	21	04	19	08	17	11	16	15	14	19	12	22	10	26	08	29	06	33	04	36	01	148
152	*00*	18	03	17	07	15	11	14	14	12	18	11	22	09	25	07	29	05	33	03	36	01	152
156	*01*	16	02	15	06	13	10	12	14	11	18	09	21	08	25	06	29	05	32	03	36	01	156
160	*02*	13	02	12	06	11	09	10	13	09	17	08	21	06	25	05	29	04	32	02	36	01	160
164	*03*	11	*01*	10	05	09	09	08	13	07	17	06	21	05	24	04	28	03	32	02	36	01	164
168	*03*	08	*01*	07	05	07	08	06	12	05	16	05	20	04	24	03	28	02	32	01	36	01	168
172	*04*	05	*00*	05	04	04	08	04	12	04	16	03	20	03	24	02	28	02	32	01	36	00	172
176	*04*	03	*00*	02	04	02	08	02	12	02	16	02	20	01	24	01	28	01	32	00	36	00	176
180	*04*	00	*00*	00	04	00	08	00	12	00	16	00	20	00	24	00	28	00	32	00	36	00	180

| | 48° | | 52° | | 56° | | 60° | | 64° | | 68° | | 72° | | 76° | | 80° | | 84° | | 88° | |

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

Lat. 39° — Declination Same Name as Latitude

Each cell lists: Alt.   Δd Δt   Az.

H.A.	0° 00'	0° 30'	1° 00'	1° 30'	2° 00'	2° 30'	3° 00'	3° 30'	H.A.
00	51 00.0 1.00 1 180.0	51 30.0 1.00 1 180.0	52 00.0 1.00 1 180.0	52 30.0 1.00 1 180.0	53 00.0 1.00 1 180.0	53 30.0 1.00 1 180.0	54 00.0 1.00 1 180.0	54 30.0 1.00 1 180.0	00
1	50 59.4 1.00 3 178.4	51 29.3 1.00 3 178.4	51 59.3 1.00 3 178.4	52 29.3 1.00 3 178.4	52 59.3 1.00 3 178.3	53 29.3 1.00 3 178.3	53 59.3 1.00 3 178.3	54 29.3 1.00 4 178.3	1
2	50 57.4 1.00 5 176.8	51 27.4 1.00 5 176.8	51 57.4 1.00 5 176.8	52 27.3 1.00 6 176.7	52 57.3 1.00 6 176.7	53 27.3 1.00 6 176.6	53 57.2 1.00 6 176.6	54 27.2 1.00 6 176.6	2
3	50 54.2 1.00 8 175.2	51 24.1 1.00 8 175.2	51 54.1 1.00 8 175.1	52 24.0 1.00 8 175.1	52 53.9 1.00 8 175.0	53 23.9 1.00 8 174.9	53 53.8 1.00 8 174.9	54 23.7 1.00 8 174.9	3
4	50 49.7 1.010 173.7	51 19.6 1.010 173.6	51 49.5 1.010 173.5	52 19.3 1.010 173.4	52 49.2 1.010 173.4	53 19.1 1.010 173.3	53 49.0 1.010 173.2	54 18.8 1.010 173.1	4
05	50 43.9 99 12 172.1	51 13.7 99 12 172.0	51 43.5 99 12 171.9	52 13.4 99 12 171.8	52 43.2 99 12 171.7	53 13.0 99 12 171.6	53 42.8 99 13 171.5	54 12.6 99 13 171.4	05
6	50 36.8 99 14 170.5	51 06.6 99 14 170.4	51 36.3 99 14 170.3	52 06.1 99 14 170.2	52 35.8 99 15 170.1	53 05.5 99 15 170.0	53 35.3 99 15 169.9	54 05.0 99 15 169.8	6
7	50 28.5 99 16 169.0	50 58.2 99 16 168.8	51 27.9 99 16 168.7	51 57.5 99 16 168.6	52 27.1 99 17 168.5	52 56.8 99 17 168.3	53 26.4 99 17 168.2	53 56.0 99 17 168.1	7
8	50 19.0 99 18 167.4	50 48.5 99 18 167.1	51 18.1 98 18 167.1	51 47.6 98 18 166.9	52 17.1 98 19 166.7	52 46.7 98 19 166.6	53 16.2 98 19 166.6	53 45.7 98 19 166.4	8
9	50 08.2 98 20 165.9	50 37.7 98 20 165.7	51 07.1 98 20 165.6	51 36.5 98 21 165.4	52 05.9 98 21 165.3	52 35.3 98 21 165.1	53 04.7 98 21 164.9	53 34.1 98 22 164.8	9
10	49 56.2 98 22 164.3	50 25.6 98 22 164.2	50 54.9 98 22 164.0	51 24.2 98 23 163.8	51 53.4 98 23 163.7	52 22.7 98 23 163.5	52 52.0 97 23 163.3	53 21.2 97 24 163.1	10
1	49 43.1 97 24 162.8	50 12.3 97 24 162.7	50 41.4 97 24 162.5	51 10.6 97 25 162.3	51 39.7 97 25 162.1	52 08.8 97 25 161.9	52 37.9 97 25 161.7	53 07.0 97 26 161.5	1
2	49 28.7 97 26 161.3	49 57.8 97 26 161.1	50 26.8 97 26 160.9	50 55.8 97 27 160.7	51 24.8 97 27 160.5	51 53.8 97 27 160.3	52 22.7 96 27 160.1	52 51.6 96 28 159.9	2
3	49 13.2 96 28 159.7	49 42.1 96 28 159.6	50 11.0 96 28 159.4	50 39.8 96 29 159.2	51 08.7 96 29 159.0	51 37.5 96 29 158.8	52 06.2 96 29 158.5	52 35.0 96 30 158.3	3
4	48 56.6 96 30 158.4	49 25.3 96 30 158.2	49 54.0 96 30 157.9	50 22.7 96 30 157.7	50 51.4 95 31 157.5	51 20.0 95 31 157.2	51 48.6 95 31 157.0	52 17.2 95 32 156.8	4
15	48 38.9 95 31 156.9	49 07.4 95 32 156.7	49 36.0 95 32 156.5	50 04.5 95 32 156.2	50 33.0 95 33 156.0	51 01.4 95 33 155.7	51 29.8 95 33 155.5	51 58.2 95 34 155.2	15
6	48 20.1 95 33 155.5	48 48.5 95 33 155.3	49 16.8 94 34 155.0	49 45.1 94 34 154.8	50 13.4 94 34 154.5	50 41.7 94 35 154.2	51 09.9 94 35 154.0	51 38.1 94 35 153.7	6
7	48 00.2 94 35 154.1	48 28.4 94 35 153.8	48 56.6 94 35 153.6	49 24.7 94 36 153.3	49 52.8 94 36 153.0	50 20.9 94 36 152.8	50 48.9 93 37 152.5	51 16.8 93 37 152.2	7
8	47 39.3 93 36 152.7	48 07.3 93 37 152.4	48 35.3 93 37 152.2	49 03.3 93 37 151.9	49 31.1 93 38 151.6	49 59.0 93 38 151.3	50 26.8 93 38 151.0	50 54.6 93 39 150.7	8
9	47 17.4 93 38 151.3	47 45.3 93 38 151.0	48 13.0 93 39 150.8	48 40.8 92 39 150.5	49 08.5 92 39 150.2	49 36.1 92 40 149.9	50 03.7 92 40 149.6	50 31.2 92 41 149.3	9
20	46 54.6 92 40 150.0	47 22.2 92 40 149.7	47 49.8 92 40 149.4	48 17.3 92 41 149.1	48 44.8 92 41 148.8	49 12.2 91 41 148.5	49 39.6 91 42 148.2	50 06.9 91 42 147.8	20
1	46 30.8 91 41 148.6	46 58.2 91 42 148.3	47 25.5 91 42 148.0	47 52.9 91 42 147.7	48 20.1 91 43 147.4	48 47.3 91 43 147.1	49 14.5 90 43 146.8	49 41.6 90 44 146.4	1
2	46 06.0 91 43 147.2	46 33.2 91 43 147.0	47 00.4 90 43 146.7	47 27.5 90 44 146.4	47 54.5 90 44 146.0	48 21.5 90 45 145.7	48 48.5 90 45 145.4	49 15.4 90 45 145.0	2
3	45 40.4 90 44 146.0	46 07.4 90 45 145.7	46 34.3 90 45 145.4	47 01.2 90 45 145.0	47 28.0 89 46 144.7	47 54.8 89 46 144.4	48 21.5 89 46 144.0	48 48.2 89 47 143.7	3
4	45 13.9 89 46 144.7	45 40.7 89 46 144.4	46 07.4 89 46 144.1	46 34.1 89 47 143.7	47 00.7 89 47 143.4	47 27.2 88 47 143.1	47 53.7 88 48 142.7	48 20.1 88 48 142.4	4
25	44 46.5 89 47 143.5	45 13.1 88 47 143.1	45 39.6 88 48 142.8	46 06.1 88 48 142.5	46 32.5 88 48 142.1	46 58.8 88 49 141.8	47 25.1 87 49 141.4	47 51.2 87 50 141.0	25
6	44 18.4 88 48 142.2	44 44.7 88 49 141.9	45 11.0 88 49 141.5	45 37.3 87 49 141.2	46 03.4 87 50 140.9	46 29.5 87 50 140.5	46 55.6 87 50 140.1	47 21.5 86 51 139.8	6
7	43 49.4 87 50 141.0	44 15.6 87 50 140.7	44 41.6 87 51 140.3	45 07.6 87 51 140.0	45 33.6 86 51 139.6	45 59.5 86 51 139.2	46 25.3 86 52 138.9	46 51.0 86 52 138.5	7
8	43 19.7 87 51 139.8	43 45.6 86 51 139.5	44 11.5 86 51 139.1	44 37.3 86 52 138.7	45 03.0 86 52 138.4	45 28.7 85 53 138.0	45 54.2 85 53 137.6	46 19.7 85 53 137.3	8
9	42 49.2 86 52 138.6	43 15.0 86 52 138.3	43 40.6 85 53 137.9	44 06.2 85 53 137.6	44 31.7 85 53 137.2	44 57.1 85 54 136.8	45 22.5 84 54 136.4	45 47.7 84 55 136.0	9
30	42 18.1 85 53 137.5	42 43.6 85 53 137.1	43 09.0 85 54 136.7	43 34.3 84 54 136.4	43 59.6 84 55 136.0	44 24.8 84 55 135.6	44 50.0 83 55 135.2	45 15.0 83 56 134.9	30
1	41 46.2 84 54 136.3	42 11.5 84 55 136.0	42 36.7 84 55 135.6	43 01.8 84 55 135.2	43 26.9 83 56 134.8	43 51.9 83 56 134.4	44 16.8 83 56 134.1	44 41.6 83 57 133.7	1
2	41 13.7 84 55 135.2	41 38.7 83 56 134.8	42 03.7 83 56 134.5	42 28.7 83 56 134.1	42 53.5 83 57 133.7	43 18.3 82 57 133.3	43 43.0 82 57 132.9	44 07.6 82 58 132.5	2
3	40 40.5 83 56 134.1	41 05.4 83 57 133.7	41 30.2 82 57 133.4	41 54.9 82 57 133.0	42 19.5 82 58 132.6	42 44.1 82 58 132.2	43 08.5 81 58 131.8	43 32.9 81 59 131.4	3
4	40 06.7 82 57 133.0	40 31.4 82 58 132.6	40 55.9 82 58 132.3	41 20.4 82 58 131.9	41 44.9 81 59 131.5	42 09.2 81 59 131.1	42 33.5 81 59 130.7	42 57.7 80 60 130.3	4
35	39 32.3 82 58 131.9	39 56.2 81 59 131.6	40 21.1 81 59 131.2	40 45.4 81 59 130.8	41 09.7 81 60 130.4	41 33.8 80 60 130.0	41 57.8 80 60 129.6	42 21.8 80 61 129.2	35
6	38 57.4 81 59 130.9	39 21.6 81 60 130.5	39 45.8 80 60 130.1	40 09.9 80 60 129.4	40 33.9 80 61 129.4	40 57.8 80 61 128.9	41 21.6 79 61 128.5	41 45.4 79 62 128.1	6
7	38 21.8 80 60 129.9	38 45.9 80 60 129.5	39 09.9 80 61 129.1	39 33.7 79 61 128.7	39 57.5 79 61 128.2	40 21.3 79 62 127.9	40 44.9 79 62 127.5	41 08.5 78 62 127.1	7
8	37 45.8 80 61 128.9	38 09.6 79 61 128.5	38 33.4 79 62 128.1	38 57.1 79 62 127.7	39 20.7 79 62 127.3	39 44.2 78 63 126.9	40 07.7 78 63 126.5	40 31.0 78 63 126.1	8
9	37 09.2 79 62 127.9	37 32.9 79 62 127.5	37 56.4 78 62 127.1	38 19.9 78 63 126.7	38 43.4 78 63 126.3	39 06.7 78 63 125.9	39 29.9 77 64 125.5	39 53.1 77 64 125.1	9
40	36 32.2 78 63 126.9	36 55.6 78 63 126.5	37 19.0 78 63 126.1	37 42.3 78 64 125.7	38 05.7 77 64 125.3	38 28.7 77 64 124.9	38 51.7 77 64 124.5	39 14.7 76 65 124.1	40
1	35 54.6 78 63 125.9	36 17.9 77 64 125.5	36 41.1 77 64 125.1	37 04.2 77 64 124.7	37 27.2 77 65 124.3	37 50.2 76 65 123.9	38 13.1 76 65 123.5	38 35.8 76 65 123.1	1
2	35 16.6 77 64 125.0	35 39.7 77 64 124.6	36 02.7 77 65 124.2	36 25.7 76 65 123.8	36 48.5 76 65 123.4	37 11.3 76 66 123.0	37 34.0 75 66 122.5	37 56.6 75 66 122.1	2
3	34 38.2 76 65 124.0	35 01.1 76 65 123.6	35 23.9 76 65 123.2	35 46.7 76 66 122.8	36 09.4 75 66 122.4	36 31.9 75 66 122.0	36 54.5 75 67 121.6	37 16.9 75 67 121.2	3
4	33 59.3 76 65 123.1	34 22.1 76 66 122.7	34 44.7 75 66 122.3	35 07.3 75 66 121.9	35 29.8 75 67 121.5	35 52.2 75 67 121.1	36 14.5 74 67 120.7	36 36.8 74 67 120.3	4
45	33 20.1 75 66 122.2	33 42.6 75 66 121.8	34 05.1 75 67 121.4	34 27.5 75 67 121.0	34 49.8 74 67 120.6	35 12.1 74 68 120.2	35 34.2 74 68 119.8	35 56.3 73 68 119.3	45
6	32 40.4 75 67 121.3	33 02.8 75 67 120.9	33 25.1 74 67 120.5	33 47.4 74 68 120.1	34 09.5 74 68 119.7	34 31.6 73 68 119.3	34 53.6 73 68 118.9	35 15.5 73 69 118.4	6
7	32 00.4 74 67 120.4	32 22.6 74 68 120.0	32 44.8 74 68 119.6	33 06.8 73 68 119.2	33 28.8 73 68 118.8	33 50.7 73 69 118.4	34 12.6 73 69 118.0	34 34.3 72 69 117.6	7
8	31 20.0 74 68 119.5	31 42.0 73 68 119.1	32 04.0 73 68 118.7	32 26.0 73 69 118.3	32 47.8 73 69 117.9	33 09.6 72 69 117.5	33 31.2 72 69 117.1	33 52.8 72 70 116.7	8
9	30 39.2 73 68 118.7	31 01.2 73 69 118.3	31 23.0 73 69 117.9	31 44.8 72 69 117.5	32 06.6 72 70 117.1	32 28.0 72 70 116.7	32 49.6 72 70 116.2	33 11.0 71 70 115.8	9
50	29 58.2 73 69 117.8	30 19.9 72 69 117.4	30 41.6 72 69 117.0	31 03.2 72 70 116.6	31 24.8 72 70 116.2	31 46.2 71 70 115.8	32 07.6 71 70 115.4	32 28.9 71 71 115.0	50
1	29 16.8 72 70 117.0	29 38.4 72 70 116.6	29 59.9 72 70 116.2	30 21.4 71 70 115.8	30 42.8 71 70 115.4	31 04.1 71 71 115.0	31 25.3 71 71 114.6	31 46.5 70 71 114.2	1
2	28 35.1 72 70 116.2	28 56.6 71 70 115.8	29 17.9 71 71 115.4	29 39.3 71 71 115.0	30 00.5 71 71 114.6	30 21.7 70 71 114.2	30 42.8 70 71 113.7	31 03.8 70 72 113.3	2
3	27 53.1 71 70 115.4	28 14.4 71 71 115.0	28 35.7 71 71 114.6	28 56.9 71 71 114.2	29 18.0 70 71 113.8	29 39.0 70 72 113.4	30 00.0 70 72 112.9	30 20.9 69 72 112.5	3
4	27 10.9 71 71 114.7	27 32.0 71 71 114.2	27 53.1 70 71 113.8	28 14.2 70 72 113.4	28 35.1 70 72 113.0	28 56.1 69 72 112.6	29 16.9 69 72 112.1	29 37.7 69 72 111.7	4
55	26 28.3 70 71 113.8	26 49.3 70 72 113.4	27 10.3 70 72 113.0	27 31.3 70 72 112.6	27 52.1 69 72 112.2	28 12.9 69 73 111.8	28 33.6 69 73 111.4	28 54.2 68 73 110.9	55
6	25 45.5 70 72 113.0	26 06.4 70 72 112.6	26 27.3 69 72 112.2	26 48.1 69 72 111.8	27 08.8 69 73 111.4	27 29.5 69 73 111.0	27 50.1 68 73 110.6	28 10.6 68 73 110.2	6
7	25 02.4 69 72 112.2	25 23.3 69 73 111.8	25 44.0 69 73 111.4	26 04.7 69 73 111.0	26 25.3 69 73 110.6	26 45.8 68 73 110.2	27 06.3 68 73 109.8	27 26.7 68 73 109.4	7
8	24 19.2 69 73 111.5	24 39.9 68 73 111.1	25 00.5 68 73 110.7	25 21.0 68 73 110.3	25 41.5 68 73 109.9	26 02.0 68 73 109.5	26 22.3 68 74 109.0	26 42.6 68 74 108.6	8
9	23 35.7 68 73 110.7	23 56.2 68 73 110.3	24 16.7 68 73 109.9	24 37.2 68 73 109.5	24 57.6 68 74 109.1	25 17.9 68 74 108.7	25 38.1 67 74 108.2	25 58.3 67 74 107.9	9
60	22 51.9 68 73 110.0	23 12.4 68 73 109.6	23 32.8 68 74 109.2	23 53.1 68 74 108.8	24 13.4 67 74 108.4	24 33.6 67 74 108.0	24 53.8 67 74 107.6	25 13.9 67 74 107.1	60
1	22 08.0 68 74 109.2	22 28.4 68 74 108.8	22 48.7 68 74 108.4	23 08.9 67 74 108.0	23 29.1 67 74 107.6	23 49.2 67 74 107.2	24 09.2 67 75 106.8	24 29.2 66 75 106.4	1
2	21 23.9 68 74 108.5	21 44.1 67 74 108.1	22 04.3 67 74 107.7	22 24.5 67 74 107.3	22 44.5 67 74 106.9	23 04.6 67 75 106.5	23 24.5 66 75 106.1	23 44.4 66 75 105.7	2
3	20 39.6 67 74 107.8	20 59.7 67 74 107.4	21 19.8 67 74 107.0	21 39.9 67 75 106.6	21 59.8 67 75 106.2	22 19.8 66 75 105.8	22 39.6 66 75 105.4	22 59.4 66 75 105.0	3
4	19 55.1 67 74 107.1	20 15.1 67 75 106.7	20 35.1 67 75 106.3	20 55.1 66 75 105.9	21 15.0 66 75 105.5	21 34.8 66 75 105.1	21 54.6 66 75 104.7	22 14.3 66 75 104.3	4
65	19 10.4 67 75 106.4	19 30.4 66 75 106.0	19 50.3 66 75 105.6	20 10.2 66 75 105.2	20 30.0 66 75 104.8	20 49.7 66 75 104.4	21 09.4 65 76 104.0	21 29.0 65 76 103.6	65
6	18 25.6 66 75 105.7	18 45.5 66 75 105.3	19 05.3 66 75 104.9	19 25.1 66 75 104.5	19 44.8 66 75 104.1	20 04.5 65 76 103.7	20 24.1 65 76 103.3	20 43.6 65 76 102.9	6
7	17 40.6 66 75 105.0	18 00.4 65 75 104.6	18 20.2 66 75 104.2	18 39.9 66 75 103.8	18 59.5 65 76 103.4	19 19.1 65 76 103.0	19 38.6 65 76 102.6	19 58.1 65 76 102.2	7
8	16 55.5 66 75 104.3	17 15.2 66 76 103.9	17 34.9 65 76 103.5	17 54.5 65 76 103.1	18 14.1 65 76 102.7	18 33.6 65 76 102.3	18 53.1 64 76 101.9	19 12.5 64 76 101.5	8
9	16 10.3 66 76 103.6	16 29.9 65 76 103.2	16 49.5 65 76 102.8	17 09.0 65 76 102.4	17 28.5 65 76 102.0	17 48.0 65 76 101.6	18 07.4 64 76 101.2	18 26.7 64 76 100.8	9
70	15 24.9 65 76 102.9	15 44.4 65 76 102.5	16 04.0 65 76 102.1	16 23.4 65 76 101.7	16 42.9 65 76 101.3	17 02.2 65 76 100.9	17 21.6 64 76 100.5	17 40.9 64 77 100.1	70
1	14 39.4 65 76 102.2	14 58.9 65 76 101.8	15 18.3 65 76 101.4	15 37.7 65 76 101.0	15 57.1 64 76 100.6	16 16.4 64 77 100.2	16 35.7 64 77 99.8	16 54.9 64 77 99.4	1
2	13 53.7 65 76 101.6	14 13.2 65 76 101.2	14 32.5 65 76 100.8	14 51.9 64 77 100.4	15 11.2 64 77 100.0	15 30.5 64 77 99.6	15 49.7 64 77 99.2	16 08.8 64 77 98.8	2
3	13 08.0 65 76 100.9	13 27.4 65 76 100.5	13 46.7 64 77 100.1	14 06.0 64 77 99.7	14 25.2 64 77 99.3	14 44.5 64 77 98.9	15 03.6 64 77 98.5	15 22.8 64 77 98.1	3
4	12 22.2 64 77 100.2	12 41.5 64 77 99.8	13 00.7 64 77 99.4	13 20.0 64 77 99.1	13 39.2 64 77 98.7	13 58.4 64 77 98.3	14 17.5 64 77 97.9	14 36.6 64 77 97.5	4
75	11 36.2 64 77 99.6	11 55.5 64 77 99.2	12 14.7 64 77 98.8	12 33.9 64 77 98.4	12 53.1 64 77 98.0	13 12.2 64 77 97.6	13 31.3 63 77 97.2	13 50.3 63 77 96.8	75
6	10 50.2 64 77 98.9	11 09.4 64 77 98.5	11 28.6 64 77 98.1	11 47.7 64 77 97.7	12 06.8 64 77 97.3	12 25.9 63 77 97.0	12 45.0 63 77 96.6	13 04.0 63 77 96.2	6
7	10 04.1 64 77 98.3	10 23.3 64 77 97.9	10 42.4 64 77 97.5	11 01.5 64 77 97.1	11 20.6 64 77 96.7	11 39.6 63 77 96.3	11 58.6 63 77 95.9	12 17.6 63 77 95.5	7
8	9 17.9 64 77 97.6	9 37.0 64 77 97.2	9 56.1 64 77 96.8	10 15.2 64 77 96.4	10 34.2 63 77 96.1	10 53.2 63 77 95.7	11 12.2 63 77 95.3	11 31.1 63 77 94.9	8
9	8 31.7 64 77 97.0	8 50.7 64 77 96.6	9 09.8 63 77 96.2	9 28.8 63 77 95.8	9 47.8 63 77 95.4	10 06.8 63 77 95.0	10 25.7 63 77 94.6	10 44.7 63 78 94.2	9
80	7 45.3 64 77 96.3	8 04.4 63 77 95.9	8 23.4 63 77 95.6	8 42.4 63 77 95.2	9 01.4 63 77 94.8	9 20.3 63 78 94.4	9 39.3 63 78 94.0	9 58.1 63 78 93.6	80
1	6 59.0 63 77 95.7	7 18.0 63 77 95.3	7 37.0 63 77 94.9	7 55.9 63 78 94.5	8 14.9 63 78 94.1	8 33.8 63 78 93.7	8 52.7 63 78 93.3	9 11.6 63 78 93.0	1
2	6 12.5 63 77 95.1	6 31.5 63 77 94.7	6 50.5 63 78 94.3	7 09.4 63 78 93.9	7 28.4 63 78 93.5	7 47.3 63 78 93.1	8 06.2 63 78 92.7	8 25.0 63 78 92.3	2
3	5 26.1 63 78 94.4	5 45.0 63 78 94.0	6 04.0 63 78 93.6	6 22.9 63 78 93.2	6 41.8 63 78 92.9	7 00.7 63 78 92.5	7 19.6 63 78 92.1	7 38.4 63 78 91.7	3
4			5 17.4 63 78 93.0	5 36.3 63 78 92.6	5 55.2 63 78 92.2	6 14.1 63 78 91.8	6 33.0 63 78 91.4	6 51.8 63 78 91.1	4
85					5 08.6 63 78 91.6	5 27.5 63 78 91.2	5 46.3 63 78 90.8	6 05.2 63 78 90.4	85
6								5 18.5 63 78 89.8	6

Lat. 39°

Each declination column gives: Alt. (° ′), Δd, Δt, Az. (°)

H.A.	0° 00′	0° 30′	1° 00′	1° 30′	2° 00′	2° 30′	3° 00′	3° 30′	H.A.
00	51 00.0 1.00 1 180.0	50 30.0 1.00 1 180.0	50 00.0 1.00 1 180.0	49 30.0 1.00 1 180.0	49 00.0 1.00 1 180.0	48 30.0 1.00 1 180.0	48 00.0 1.00 1 180.0	47 30.0 1.00 1 180.0	00
1	50 59.4 1.00 3 178.4	50 29.4 1.00 3 178.4	49 59.4 1.00 3 178.4	49 29.4 1.00 3 178.5	48 59.4 1.00 3 178.5	48 29.4 1.00 3 178.5	47 59.4 1.00 3 178.5	47 29.4 1.00 3 178.5	1
2	50 57.4 1.00 5 176.8	50 27.4 1.00 5 176.9	49 57.5 1.00 5 176.9	49 27.5 1.00 5 176.9	48 57.5 1.00 5 177.0	48 27.5 1.00 5 177.0	47 57.6 1.00 5 177.0	47 27.6 1.00 5 177.0	2
3	50 54.2 1.00 7 175.2	50 24.2 1.00 7 175.3	49 54.3 1.00 7 175.4	49 24.4 1.00 7 175.4	48 54.4 1.00 7 175.4	48 24.5 1.00 7 175.5	47 54.5 1.00 7 175.5	47 24.6 1.00 7 175.6	3
4	50 49.7 1.00 10 173.7	50 19.8 1.00 10 173.7	49 49.9 1.00 9 173.8	49 20.0 1.00 9 173.9	48 50.1 1.00 9 173.9	48 20.2 1.00 9 174.0	47 50.3 1.00 9 174.0	47 20.4 1.00 9 174.1	4
05	50 43.9 99 12 172.1	50 14.1 99 12 172.2	49 44.2 99 12 172.3	49 14.4 99 11 172.3	48 44.6 99 11 172.4	48 14.7 99 11 172.5	47 44.9 99 11 172.6	47 15.0 99 11 172.6	05
6	50 36.8 99 14 170.5	50 07.1 99 14 170.6	49 37.3 99 14 170.7	49 07.6 99 13 170.9	48 37.8 99 13 170.9	48 08.0 99 13 171.0	47 38.2 99 13 171.1	47 08.4 99 13 171.2	6
7	50 28.5 99 16 169.0	49 58.9 99 16 169.0	49 29.2 99 16 169.2	48 59.5 99 15 169.3	48 29.8 99 15 169.4	48 00.1 99 15 169.5	47 30.4 99 15 169.6	47 00.7 99 15 169.7	7
8	50 19.0 99 18 167.4	49 49.4 99 18 167.5	49 19.8 99 17 167.7	48 50.2 99 17 167.8	48 20.7 99 17 167.9	47 51.0 99 17 168.0	47 21.4 99 17 168.2	46 51.8 99 17 168.3	8
9	50 08.2 98 20 165.9	49 38.8 98 20 166.0	49 09.3 98 20 166.2	48 39.8 98 19 166.3	48 10.3 98 19 166.4	47 40.8 98 19 166.6	47 11.3 98 19 166.7	46 41.8 98 19 166.8	9
10	49 56.2 98 22 164.3	49 26.9 98 22 164.5	48 57.5 98 22 164.7	48 28.2 98 21 164.8	47 58.8 98 21 165.0	47 29.4 98 21 165.1	47 00.0 98 21 165.3	46 30.6 98 21 165.4	10
1	49 43.1 97 24 162.8	49 13.8 97 24 163.0	48 44.6 97 23 163.2	48 15.4 97 23 163.4	47 46.1 98 23 163.5	47 16.9 98 23 163.7	46 47.6 98 23 163.8	46 18.3 98 22 164.0	1
2	49 28.7 97 26 161.5	48 59.4 97 25 161.5	48 30.6 97 25 161.7	48 01.5 97 25 161.7	47 32.3 97 25 162.1	47 03.2 97 25 162.2	46 34.1 97 24 162.4	46 04.9 97 24 162.6	2
3	49 13.2 96 28 159.9	48 44.3 96 27 160.1	48 15.4 96 27 160.3	47 46.4 97 27 160.5	47 17.4 97 27 160.6	46 48.4 97 26 160.8	46 19.4 97 26 161.0	45 50.4 97 26 161.2	3
4	48 56.6 96 30 158.4	48 27.8 96 29 158.6	47 59.1 96 29 158.8	47 30.4 96 29 159.0	47 01.4 96 28 159.2	46 32.6 96 28 159.4	46 03.7 96 28 159.6	45 34.8 96 28 159.8	4
15	48 38.9 95 31 156.9	48 10.3 95 31 157.2	47 41.7 95 31 157.4	47 13.0 96 30 157.6	46 44.4 96 30 157.8	46 15.7 96 30 158.0	45 47.0 96 30 158.2	45 18.2 96 29 158.5	15
6	48 20.1 95 33 155.5	47 51.7 95 33 155.7	47 23.2 95 32 156.0	46 54.7 95 32 156.2	46 26.2 95 32 156.4	45 57.5 95 32 156.7	45 29.2 95 31 156.9	45 00.6 95 31 157.1	6
7	48 00.2 94 35 154.1	47 32.0 94 34 154.3	47 03.7 94 34 154.6	46 35.4 94 34 154.8	46 07.1 94 34 155.0	45 38.7 95 33 155.3	45 10.4 95 33 155.5	44 41.9 95 33 155.8	7
8	47 39.3 93 36 152.7	47 11.3 94 36 153.0	46 43.2 94 36 153.3	46 15.1 94 36 153.5	45 46.9 94 35 153.7	45 18.8 94 35 154.0	44 50.6 94 35 154.2	44 22.3 94 34 154.4	8
9	47 17.4 93 38 151.3	46 49.6 93 38 151.6	46 21.7 93 37 151.9	45 53.8 93 37 152.1	45 25.8 93 37 152.4	44 57.8 93 37 152.6	44 29.8 94 36 152.9	44 01.7 94 36 153.1	9
20	46 54.6 92 40 150.0	46 26.9 92 39 150.2	45 59.2 92 39 150.5	45 31.5 93 39 150.8	45 03.7 93 38 151.1	44 35.9 93 38 151.3	44 08.1 93 38 151.6	43 40.2 93 37 151.8	20
1	46 30.3 91 41 148.6	46 03.3 92 41 148.9	45 35.8 92 41 149.2	45 08.3 92 40 149.5	44 40.7 92 40 149.8	44 13.1 92 40 150.0	43 45.4 92 39 150.3	43 17.7 92 39 150.6	1
2	46 06.0 91 43 147.3	45 38.8 91 42 147.6	45 11.5 91 42 147.9	44 44.1 91 42 148.2	44 16.8 91 41 148.5	43 49.3 91 41 148.8	43 21.9 92 41 149.0	42 54.3 92 40 149.3	2
3	45 40.4 90 44 146.0	45 13.4 90 43 146.3	44 46.3 90 44 146.6	44 19.1 91 43 146.9	43 51.9 91 43 147.2	43 24.7 91 42 147.5	42 57.4 91 42 147.8	42 30.1 91 42 148.1	3
4	45 13.9 89 46 144.7	44 47.1 90 45 145.0	44 20.2 90 45 145.3	43 53.2 90 45 145.7	43 26.2 90 44 146.0	42 59.2 90 44 146.3	42 32.1 90 44 146.5	42 05.0 90 43 146.8	4
25	44 46.5 89 47 143.5	44 19.9 89 47 143.8	43 53.2 89 46 144.1	43 26.5 89 46 144.4	42 59.7 89 46 144.7	42 32.9 90 45 145.0	42 06.0 90 45 145.3	41 39.1 90 45 145.6	25
6	44 18.4 88 48 142.2	43 52.0 88 48 142.6	43 25.5 88 48 142.9	42 59.0 89 47 143.2	42 32.4 89 47 143.5	42 05.8 89 47 143.8	41 39.1 89 46 144.1	41 12.4 89 46 144.4	6
7	43 49.4 87 50 141.1	43 23.2 87 49 141.3	42 57.0 88 49 141.7	42 30.7 88 48 142.0	42 04.3 88 48 142.3	41 37.9 88 48 142.6	41 11.4 88 47 143.0	40 44.9 88 47 143.3	7
8	43 19.7 87 51 139.8	42 53.7 87 50 140.1	42 27.7 87 50 140.5	42 01.6 87 50 140.8	41 35.4 87 49 141.1	41 09.2 87 49 141.5	40 42.9 88 49 141.8	40 16.6 88 48 142.1	8
9	42 49.2 86 52 138.6	42 23.5 86 52 139.0	41 57.6 86 51 139.3	41 31.7 86 51 139.7	41 05.8 87 51 140.0	40 39.8 87 50 140.3	40 13.7 87 50 140.6	39 47.6 87 50 141.0	9
30	42 18.1 85 53 137.5	41 52.5 85 53 137.8	41 26.9 86 52 138.2	41 01.2 86 52 138.5	40 35.5 86 52 138.8	40 09.7 86 51 139.2	39 43.8 86 51 139.5	39 17.9 86 51 139.8	30
1	41 46.2 84 54 136.3	41 20.9 85 54 136.7	40 55.4 85 54 137.0	40 30.0 85 53 137.4	40 04.4 85 53 137.7	39 38.8 85 52 138.1	39 13.2 86 52 138.4	38 47.5 86 52 138.7	1
2	41 13.7 84 55 135.1	40 48.5 84 55 135.6	40 23.3 84 55 135.9	39 58.1 84 54 136.3	39 32.7 85 54 136.6	39 07.3 85 54 137.0	38 41.9 85 53 137.3	38 16.3 85 53 137.6	2
3	40 40.5 83 56 134.1	40 15.6 83 56 134.5	39 50.6 83 56 134.8	39 25.5 84 55 135.2	39 00.4 84 55 135.5	38 35.2 84 54 135.9	38 10.0 84 54 136.2	37 44.6 84 54 136.6	3
4	40 06.7 82 57 133.0	39 42.0 83 57 133.4	39 17.2 83 57 133.7	38 52.3 83 56 134.1	38 27.4 83 56 134.5	38 02.4 83 56 134.8	37 37.4 84 55 135.2	37 12.3 84 55 135.5	4
35	39 32.3 82 58 131.9	39 07.8 82 58 132.3	38 43.2 82 58 132.7	38 18.6 82 57 133.1	37 53.8 83 57 133.4	37 29.1 83 57 133.8	37 04.2 83 56 134.1	36 39.3 83 56 134.5	35
6	38 57.4 81 59 130.9	38 33.0 81 59 131.3	38 08.7 81 59 131.6	37 44.2 82 58 132.0	37 19.7 82 58 132.4	36 55.1 82 58 132.7	36 30.4 82 57 133.1	36 05.7 82 57 133.4	6
7	38 21.8 80 60 129.9	37 57.7 81 60 130.2	37 33.5 81 59 130.6	37 09.3 81 59 131.0	36 45.0 81 59 131.4	36 20.6 81 58 131.7	35 56.1 82 58 132.1	35 31.6 82 58 132.5	7
8	37 45.8 80 61 128.9	37 21.9 80 61 129.2	36 57.9 80 60 129.6	36 33.8 80 60 130.0	36 09.7 81 60 130.4	35 45.5 81 59 130.7	35 21.2 81 59 131.1	34 56.9 81 59 131.4	8
9	37 09.2 79 62 127.9	36 45.5 79 61 128.2	36 21.7 79 61 128.6	35 57.8 80 61 129.0	35 33.9 80 60 129.4	35 09.9 80 60 129.7	34 45.8 80 60 130.1	34 21.7 81 60 130.5	9
40	36 32.2 78 63 126.9	36 08.6 79 62 127.3	35 45.0 79 62 127.6	35 21.3 79 62 128.0	34 57.6 79 61 128.4	34 33.8 80 61 128.8	34 09.9 80 61 129.1	33 45.9 80 60 129.5	40
1	35 54.6 78 63 125.9	35 31.3 78 63 126.3	35 07.9 78 63 126.7	34 44.4 78 62 127.1	34 20.8 79 62 127.4	33 57.2 79 62 127.8	33 33.5 79 61 128.2	33 09.7 79 61 128.5	1
2	35 16.6 77 64 125.0	34 53.5 77 64 125.4	34 30.2 77 64 125.7	34 06.9 78 63 126.1	33 43.5 78 63 126.5	33 20.1 78 63 126.9	32 56.6 78 62 127.2	32 33.0 79 62 127.6	2
3	34 38.2 76 65 124.0	34 15.2 77 64 124.4	33 52.2 77 64 124.8	33 29.0 77 64 125.2	33 05.8 77 64 125.6	32 42.6 78 63 125.9	32 19.2 78 63 126.3	31 55.8 78 63 126.7	3
4	33 59.3 76 65 123.1	33 36.5 76 65 123.5	33 13.6 76 65 123.9	32 50.7 77 65 124.3	32 27.7 77 64 124.6	32 04.6 77 64 125.0	31 41.4 77 64 125.4	31 18.2 78 63 125.8	4
45	33 20.1 75 66 122.2	32 57.4 76 66 122.6	32 34.7 76 66 123.0	32 11.9 76 65 123.3	31 49.1 76 65 123.7	31 26.2 76 65 124.1	31 03.2 77 64 124.5	30 40.2 77 64 124.9	45
6	32 40.4 75 67 121.3	32 17.9 75 66 121.7	31 55.4 75 66 122.1	31 32.8 76 66 122.5	31 10.1 76 66 122.8	30 47.4 76 65 123.2	30 24.6 76 65 123.6	30 01.7 76 65 124.0	6
7	32 00.4 74 67 120.4	31 38.1 74 67 120.8	31 15.7 75 67 121.2	30 53.3 75 67 121.6	30 30.8 75 66 122.0	30 08.2 75 66 122.3	29 45.5 76 66 122.7	29 22.8 76 65 123.1	7
8	31 20.0 74 68 119.5	30 57.8 74 68 119.9	30 35.6 74 68 120.3	30 13.4 74 67 120.7	29 51.0 75 67 121.1	29 28.6 75 67 121.5	29 06.1 75 66 121.9	28 43.6 75 66 122.2	8
9	30 39.2 73 68 118.7	30 17.3 73 68 119.1	29 55.2 74 68 119.5	29 33.1 74 68 119.9	29 10.9 74 67 120.2	28 48.6 74 67 120.6	28 26.3 75 67 121.0	28 03.9 75 67 121.4	9
50	29 58.2 73 69 117.8	29 36.3 73 69 118.2	29 14.4 73 68 118.6	28 52.5 73 68 119.0	28 30.4 74 68 119.4	28 08.3 74 68 119.8	27 46.2 74 67 120.2	27 24.0 74 67 120.5	50
1	29 16.8 72 70 117.0	28 55.1 72 69 117.4	28 33.4 73 69 117.8	28 11.5 73 69 118.2	27 49.7 73 68 118.6	27 27.7 73 68 119.0	27 05.7 73 68 119.3	26 43.6 74 68 119.7	1
2	28 35.1 72 70 116.2	28 13.6 72 70 116.6	27 52.0 72 70 117.0	27 30.3 72 69 117.4	27 08.5 73 69 117.7	26 46.7 73 69 118.1	26 24.9 73 68 118.5	26 03.0 73 68 118.9	2
3	27 53.1 71 70 115.4	27 31.7 71 70 115.8	27 10.2 72 70 116.2	26 48.7 72 70 116.6	26 27.1 72 69 116.9	26 05.5 72 69 117.3	25 43.8 72 69 117.7	25 22.0 73 69 118.1	3
4	27 10.8 71 71 114.6	26 49.6 71 71 115.0	26 28.3 71 70 115.4	26 06.9 71 70 115.8	25 45.4 72 70 116.1	25 23.9 72 70 116.5	25 02.3 72 70 116.9	24 40.7 72 69 117.3	4
55	26 28.3 70 71 113.8	26 07.2 71 71 114.2	25 46.0 71 71 114.6	25 24.7 71 71 115.0	25 03.4 71 70 115.4	24 42.0 71 70 115.7	24 20.6 72 70 116.1	23 59.1 72 70 116.5	55
6	25 45.5 70 72 113.0	25 24.5 70 72 113.4	25 03.4 70 71 113.8	24 42.3 71 71 114.2	24 21.1 71 71 114.6	23 59.9 71 71 115.0	23 38.6 71 70 115.3	23 17.2 71 70 115.7	6
7	25 02.4 69 72 112.2	24 41.6 70 72 112.6	24 20.6 70 72 113.0	23 59.7 70 72 113.4	23 38.6 70 71 113.8	23 17.5 71 71 114.2	22 56.3 71 71 114.6	22 35.1 71 71 114.9	7
8	24 19.2 69 72 111.5	23 58.4 69 72 111.9	23 37.6 69 72 112.3	23 16.7 70 72 112.6	22 55.8 70 72 113.0	22 34.8 70 71 113.4	22 13.8 70 71 113.8	21 52.7 71 71 114.2	8
9	23 35.7 69 73 110.7	23 15.0 69 73 111.1	22 54.3 69 72 111.5	22 33.6 69 72 111.9	22 12.8 69 72 112.3	21 51.9 70 72 112.7	21 31.0 70 72 113.1	21 10.0 70 72 113.4	9
60	22 51.9 68 73 110.0	22 31.4 68 73 110.4	22 10.8 69 73 110.8	21 50.2 69 73 111.1	21 29.5 69 72 111.5	21 08.8 69 72 111.9	20 48.0 69 72 112.3	20 27.1 70 72 112.7	60
1	22 08.0 68 73 109.2	21 47.6 68 73 109.6	21 27.1 68 73 110.0	21 06.6 69 73 110.4	20 46.0 69 73 110.8	20 25.4 69 73 111.2	20 04.7 69 72 111.6	19 44.0 69 72 112.0	1
2	21 23.9 68 74 108.5	21 03.6 68 74 108.9	20 43.2 68 73 109.3	20 22.8 68 73 109.7	20 02.4 68 73 110.1	19 41.8 69 73 110.5	19 21.3 69 73 110.9	19 00.7 69 73 111.2	2
3	20 39.6 67 74 107.8	20 19.4 67 74 108.2	19 59.1 68 74 108.6	19 38.8 68 74 109.0	19 18.5 68 73 109.3	18 58.0 68 73 109.7	18 37.6 68 73 110.1	18 17.1 69 73 110.5	3
4	19 55.1 67 74 107.1	19 35.0 67 74 107.5	19 14.8 67 74 107.9	18 54.6 67 74 108.2	18 34.4 68 74 108.6	18 14.1 68 74 109.0	17 53.7 68 73 109.4	17 33.3 68 73 109.8	4
65	19 10.4 67 75 106.4	18 50.4 67 75 106.7	18 30.4 67 74 107.1	18 10.2 67 74 107.5	17 50.1 67 74 107.9	17 29.9 67 74 108.3	17 09.6 68 74 108.7	16 49.3 68 74 109.1	65
6	18 25.6 66 75 105.7	18 05.7 66 75 106.0	17 45.7 67 75 106.4	17 25.6 67 75 106.8	17 05.6 67 74 107.2	16 45.5 67 74 107.6	16 25.4 67 74 108.0	16 05.2 67 74 108.4	6
7	17 40.6 66 75 105.0	17 20.8 66 75 105.3	17 00.9 66 75 105.7	16 41.0 66 75 106.1	16 21.0 67 75 106.5	16 01.0 67 74 106.9	15 40.9 67 74 107.3	15 20.8 67 74 107.7	7
8	16 55.5 66 75 104.3	16 35.8 66 75 104.7	16 16.0 66 75 105.1	15 56.1 66 75 105.4	15 36.2 66 75 105.8	15 16.3 67 75 106.2	14 56.3 67 75 106.6	14 36.3 67 74 107.0	8
9	16 10.3 66 76 103.6	15 50.6 66 76 104.0	15 30.9 66 75 104.4	15 11.1 66 75 104.8	14 51.3 66 75 105.1	14 31.5 66 75 105.5	14 11.6 66 75 105.9	13 51.7 66 75 106.3	9
70	15 24.9 65 76 102.9	15 05.3 65 76 103.3	14 45.6 66 76 103.7	14 25.9 66 76 104.1	14 06.2 66 76 104.5	13 46.5 66 75 104.9	13 26.7 66 75 105.2	13 06.8 66 75 105.6	70
1	14 39.4 65 76 102.2	14 19.8 65 76 102.6	14 00.2 65 76 103.0	13 40.6 65 76 103.4	13 21.0 66 76 103.8	13 01.3 66 75 104.2	12 41.6 66 75 104.6	12 21.8 66 75 104.9	1
2	13 53.7 65 76 101.6	13 34.3 65 76 101.9	13 14.8 65 76 102.3	12 55.2 65 76 102.7	12 35.6 65 76 103.1	12 16.0 66 76 103.5	11 56.4 66 76 103.9	11 36.7 66 75 104.3	2
3	13 08.0 65 76 100.9	12 48.6 65 76 101.3	12 29.1 65 76 101.7	12 09.7 65 76 102.1	11 50.2 65 76 102.4	11 30.6 65 76 102.8	11 11.1 65 76 103.2	10 51.5 66 75 103.6	3
4	12 22.2 64 77 100.2	12 02.8 65 76 100.6	11 43.4 65 76 101.0	11 24.0 65 76 101.4	11 04.6 65 76 101.8	10 45.1 65 76 102.2	10 25.6 65 76 102.6	10 06.1 65 76 102.9	4
75	11 36.2 64 77 99.6	11 16.9 64 77 100.0	10 57.6 64 77 100.4	10 38.3 65 76 100.7	10 18.9 65 76 101.1	9 59.5 65 76 101.5	9 40.0 65 76 101.9	9 20.6 65 76 102.3	75
6	10 50.2 64 77 98.9	10 31.0 64 77 99.3	10 11.7 64 77 99.7	9 52.4 64 77 100.1	9 33.1 64 76 100.5	9 13.7 65 76 100.9	8 54.4 65 76 101.2	8 35.0 65 76 101.6	6
7	10 04.1 64 77 98.3	9 44.9 64 77 98.7	9 25.7 64 77 99.0	9 06.4 64 77 99.4	8 47.2 64 77 99.8	8 27.9 64 77 100.2	8 08.6 64 76 100.6	7 49.2 64 76 101.0	7
8	9 17.9 64 77 97.6	8 58.8 64 77 98.0	8 39.6 64 77 98.4	8 20.4 64 77 98.8	8 01.2 64 77 99.2	7 42.0 64 77 99.6	7 22.7 64 77 99.9	7 03.4 64 76 100.3	8
9	8 31.7 64 77 97.0	8 12.6 64 77 97.4	7 53.4 64 77 97.8	7 34.3 64 77 98.1	7 15.1 64 77 98.5	6 55.9 64 77 98.9	6 36.7 64 77 99.3	6 17.5 64 77 99.7	9
80	7 45.3 64 77 96.3	7 26.3 64 77 96.7	7 07.2 64 77 97.1	6 48.1 64 77 97.5	6 29.0 64 77 97.9	6 09.8 64 77 98.3	5 50.7 64 77 98.7	5 31.5 64 77 99.0	80
1	6 59.0 63 77 95.7	6 39.9 63 77 96.1	6 20.9 64 77 96.5	6 01.8 64 77 96.9	5 42.7 64 77 97.2	5 23.6 64 77 97.6	5 04.5 64 77 98.0		1
2	6 12.5 63 77 95.1	5 53.5 63 77 95.4	5 34.5 63 77 95.8	5 15.5 63 77 96.2					2
3	5 26.1 63 78 94.4	5 07.1 63 78 94.8							3

16—65155-1

DECLINATION SAME NAME AS LATITUDE

Lat. 39°

H.A.	4° 00' Alt.	Δd Δt	Az.	4° 30' Alt.	Δd Δt	Az.	5° 00' Alt.	Δd Δt	Az.	5° 30' Alt.	Δd Δt	Az.	6° 00' Alt.	Δd Δt	Az.	6° 30' Alt.	Δd Δt	Az.	7° 00' Alt.	Δd Δt	Az.	7° 30' Alt.	Δd Δt	Az.	H.A.
00	55 00.0	1.00 01	180.0	55 30.0	1.00 01	180.0	56 00.0	1.00 01	180.0	56 30.0	1.00 01	180.0	57 00.0	1.00 01	180.0	57 30.0	1.00 01	180.0	58 00.0	1.00 01	180.0	58 30.0	1.00 01	180.0	00
1	54 59.3	1.00 04	178.3	55 29.3	1.00 04	178.2	55 59.3	1.00 04	178.2	56 29.3	1.00 04	178.2	56 59.3	1.00 04	178.2	57 29.2	1.00 04	178.2	57 59.2	1.00 04	178.1	58 29.2	1.00 04	178.1	1
2	54 57.2	1.00 06	176.5	55 27.1	1.00 06	176.5	55 57.1	1.00 06	176.4	56 27.1	1.00 06	176.4	56 57.0	1.00 06	176.4	57 27.0	1.00 06	176.3	57 57.0	1.00 06	176.3	58 26.9	1.00 06	176.2	2
3	54 53.6	1.00 08	174.8	55 23.6	1.00 08	174.7	55 53.5	1.00 08	174.7	56 23.4	1.00 08	174.6	56 53.3	1.00 08	174.5	57 23.2	1.00 08	174.4	57 53.1	1.00 08	174.4	58 23.0	1.00 08	174.3	3
4	54 48.7	1.00 11	173.1	55 18.6	1.00 11	173.0	55 48.4	1.00 11	172.9	56 18.3	1.00 11	172.8	56 48.1	1.00 11	172.7	57 18.0	99 11	172.6	57 47.8	99 11	172.5	58 17.7	99 11	172.4	4
05	54 42.4	99 13	171.3	55 12.2	99 13	171.2	55 42.0	99 13	171.1	56 11.7	99 13	171.0	56 41.5	99 13	170.9	57 11.3	99 14	170.8	57 41.0	99 14	170.7	58 10.8	99 14	170.6	05
6	54 34.7	99 15	169.6	55 04.4	99 15	169.5	55 34.1	99 15	169.4	56 03.8	99 16	169.3	56 33.4	99 16	169.1	57 03.1	99 16	169.0	57 32.8	99 16	168.9	58 02.4	99 16	168.7	6
7	54 25.6	99 17	167.9	54 55.2	99 18	167.8	55 24.8	99 18	167.5	55 54.4	99 18	167.5	56 23.9	98 18	167.3	56 53.5	98 18	167.2	57 23.0	98 18	167.0	57 52.5	98 19	166.9	7
8	54 15.2	98 20	166.3	54 44.7	98 20	166.1	55 14.1	98 20	165.9	55 43.6	98 20	165.8	56 13.0	98 20	165.6	56 42.4	98 21	165.4	57 11.8	98 21	165.2	57 41.2	98 21	165.0	8
9	54 03.5	98 22	164.6	54 32.8	98 22	164.4	55 02.1	98 22	164.2	55 31.4	98 22	164.0	56 00.7	98 23	163.8	56 30.0	98 23	163.6	56 59.2	97 23	163.4	57 28.5	97 24	163.2	9
10	53 50.4	97 24	162.9	54 19.6	97 24	162.7	54 48.8	97 24	162.5	55 17.9	97 25	162.3	55 47.1	97 25	162.1	56 16.2	97 25	161.9	56 45.3	97 26	161.7	57 14.3	97 26	161.4	10
1	53 36.1	97 26	161.3	54 05.1	97 26	161.1	54 34.1	97 27	160.9	55 03.1	97 27	160.6	55 32.1	97 27	160.4	56 01.0	96 27	160.2	56 29.9	96 28	159.9	56 58.8	96 28	159.7	1
2	53 20.5	96 28	159.7	53 49.4	96 28	159.4	54 18.2	96 29	159.2	54 47.0	96 29	159.0	55 15.8	96 29	158.7	55 44.6	96 30	158.5	56 13.3	96 30	158.2	56 42.0	96 30	157.9	2
3	53 03.7	96 30	158.1	53 32.4	96 30	157.8	54 01.0	95 31	157.6	54 29.7	95 31	157.3	54 58.3	95 31	157.1	55 26.8	95 32	156.8	55 55.3	95 32	156.5	56 23.8	95 32	156.2	3
4	52 45.7	95 32	156.5	53 14.2	95 32	156.2	53 42.7	95 33	156.0	54 11.1	95 33	155.7	54 39.5	95 33	155.4	55 07.8	94 34	155.1	55 36.1	94 34	154.8	56 04.4	94 34	154.5	4
15	52 26.5	94 34	154.9	52 54.8	94 34	154.7	53 23.1	94 35	154.4	53 51.3	94 35	154.1	54 19.5	94 35	153.8	54 47.6	94 36	153.5	55 15.7	94 36	153.2	55 43.8	93 36	152.9	15
6	52 06.2	94 36	153.4	52 34.3	94 36	153.1	53 02.4	93 36	152.8	53 30.4	93 37	152.5	53 58.3	93 37	152.2	54 26.2	93 38	151.9	54 54.1	93 38	151.6	55 21.9	93 38	151.3	6
7	51 44.8	93 38	151.9	52 12.7	93 38	151.6	52 40.5	93 38	151.3	53 08.3	93 39	151.0	53 36.0	92 39	150.7	54 03.7	92 39	150.3	54 31.4	92 40	150.0	54 58.9	92 40	149.7	7
8	51 22.3	92 39	150.4	51 49.9	92 40	150.1	52 17.6	92 40	149.8	52 45.1	92 40	149.5	53 12.6	92 41	149.1	53 40.1	91 41	148.8	54 07.5	91 42	148.4	54 34.8	91 42	148.1	8
9	50 58.7	92 41	148.9	51 26.2	91 41	148.6	51 53.6	91 42	148.3	52 20.9	91 42	148.0	52 48.2	91 43	147.6	53 15.4	91 43	147.3	53 42.6	90 43	146.9	54 09.6	90 44	146.5	9
20	50 34.2	91 43	147.5	51 01.4	91 43	147.2	51 28.6	90 43	146.8	51 55.7	90 44	146.5	52 22.7	90 44	146.1	52 49.7	90 45	145.8	53 16.6	89 45	145.4	53 43.4	89 45	145.0	20
1	50 08.7	90 44	146.1	50 35.6	90 45	145.8	51 02.6	90 45	145.4	51 29.4	89 45	145.1	51 56.2	89 46	144.7	52 23.0	89 46	144.3	52 49.6	89 47	143.9	53 16.2	88 47	143.6	1
2	49 42.2	89 46	144.7	50 08.9	89 46	144.4	50 35.6	89 46	144.0	51 02.2	89 47	143.6	51 28.8	88 47	143.3	51 55.3	88 48	142.9	52 21.7	88 48	142.5	52 48.0	88 48	142.1	2
3	49 14.8	89 47	143.3	49 41.3	88 48	143.0	50 07.8	88 48	142.6	50 34.1	88 48	142.2	51 00.5	88 49	141.9	51 26.7	87 49	141.5	51 52.9	87 50	141.1	52 18.9	87 50	140.7	3
4	48 46.5	88 49	141.9	49 12.8	88 49	141.6	49 39.0	87 49	141.3	50 05.2	87 50	140.8	50 31.2	87 50	140.5	50 57.2	86 51	140.1	51 23.1	86 51	139.7	51 48.9	86 51	139.3	4
25	48 17.4	87 50	140.7	48 43.4	87 50	140.3	49 09.4	86 51	139.9	49 35.3	86 51	139.5	50 01.1	86 51	139.1	50 26.9	86 52	138.7	50 52.5	85 52	138.3	51 18.1	85 53	137.9	25
6	47 47.4	86 51	139.4	48 13.2	86 52	139.0	48 39.0	86 52	138.6	49 04.6	85 52	138.2	49 30.2	85 53	137.7	49 55.7	85 53	137.4	50 21.1	84 54	137.0	50 46.5	84 54	136.6	6
7	47 16.7	85 52	138.1	47 42.3	85 53	137.7	48 07.8	85 53	137.3	48 33.2	85 54	136.9	48 58.5	84 54	136.5	49 23.8	84 54	136.1	49 49.0	84 55	135.7	50 14.0	83 55	135.3	7
8	46 45.2	84 54	136.9	47 10.5	84 54	136.5	47 35.8	84 54	136.1	48 01.0	84 55	135.7	48 26.1	84 55	135.3	48 51.1	83 56	134.9	49 16.0	83 56	134.4	49 40.8	83 56	134.0	8
9	46 12.9	84 55	135.7	46 38.1	84 55	135.3	47 03.1	83 56	134.9	47 28.1	83 56	134.4	47 52.9	83 56	134.0	48 17.7	82 57	133.6	48 42.4	82 57	133.2	49 07.0	82 58	132.7	9
30	45 40.0	83 56	134.5	46 04.9	83 56	134.1	46 29.7	83 57	133.7	46 54.4	82 57	133.2	47 19.1	82 58	132.8	47 43.6	82 58	132.4	48 08.0	81 58	132.0	48 32.4	81 59	131.5	30
1	45 06.4	82 57	133.3	45 31.1	82 58	132.9	45 55.6	82 58	132.5	46 20.1	81 58	132.1	46 44.5	81 59	131.6	47 08.8	81 59	131.2	47 33.0	81 59	130.8	47 57.1	80 60	130.3	1
2	44 32.1	82 58	132.1	44 56.6	81 58	131.7	45 20.9	81 59	131.3	45 45.2	81 59	130.9	46 09.4	80 60	130.5	46 33.4	80 60	130.0	46 57.4	80 60	129.6	47 21.3	79 61	129.1	2
3	43 57.2	81 59	131.0	44 21.5	81 60	130.6	44 45.5	80 60	130.2	45 09.6	80 60	129.8	45 33.6	80 61	129.3	45 57.2	79 61	128.9	46 21.2	79 61	128.4	46 44.8	79 62	128.0	3
4	43 21.8	80 60	129.9	43 45.8	80 60	129.5	44 09.7	80 61	129.1	44 33.5	79 61	128.6	44 57.2	79 62	128.2	45 20.9	79 62	127.8	45 44.4	78 62	127.3	46 07.8	78 63	126.9	4
35	42 45.7	79 61	128.8	43 09.5	79 61	128.4	43 33.2	79 62	128.0	43 56.8	79 62	127.5	44 20.3	78 62	127.1	44 43.7	78 63	126.7	45 07.0	78 63	126.2	45 30.2	77 64	125.8	35
6	42 09.1	79 62	127.7	42 32.7	78 62	127.3	42 56.2	78 63	126.9	43 19.6	78 63	126.5	43 42.9	77 63	126.0	44 06.1	77 64	125.6	44 29.2	77 64	125.1	44 52.1	76 64	124.7	6
7	41 31.9	78 63	126.7	41 55.3	78 63	126.3	42 18.6	77 63	125.8	42 41.8	77 64	125.5	43 04.9	77 64	125.0	43 27.9	76 64	124.5	43 50.8	76 65	124.1	44 13.6	76 65	123.6	7
8	40 54.3	77 64	125.6	41 17.5	77 64	125.2	41 40.6	77 64	124.8	42 03.6	76 65	124.4	42 26.4	76 65	123.9	42 49.2	76 65	123.5	43 11.9	75 66	123.0	43 34.5	75 66	122.6	8
9	40 16.2	77 64	124.6	40 39.2	76 65	124.2	41 02.0	76 65	123.8	41 24.8	76 65	123.4	41 47.5	75 66	122.9	42 10.1	75 66	122.5	42 32.6	75 66	122.0	42 55.0	74 67	121.6	9
40	39 37.6	76 65	123.6	40 00.4	76 65	123.2	40 23.1	75 66	122.8	40 45.7	75 66	122.4	41 08.2	75 66	121.9	41 30.6	74 67	121.5	41 52.9	74 67	121.0	42 15.1	74 67	120.6	40
1	38 58.5	75 66	122.7	39 21.1	75 66	122.2	39 43.6	75 66	121.8	40 06.1	75 67	121.4	40 28.4	74 67	120.9	40 50.6	74 67	120.5	41 12.7	74 68	120.0	41 34.7	73 68	119.6	1
2	38 19.1	75 66	121.7	38 41.5	75 66	121.3	39 03.8	74 67	120.9	39 26.0	74 67	120.4	39 48.2	74 68	120.0	40 10.2	73 68	119.5	40 32.1	73 68	119.1	40 54.0	73 68	118.6	2
3	37 39.2	74 67	120.8	38 01.4	74 67	120.3	38 23.6	73 68	119.9	38 45.6	73 68	119.5	39 07.6	73 68	119.0	39 29.5	73 69	118.6	39 51.2	72 69	118.1	40 12.9	72 69	117.7	3
4	36 58.9	74 68	119.8	37 21.0	73 68	119.4	37 43.0	73 68	119.0	38 04.9	73 69	118.5	38 26.6	72 69	118.1	38 48.3	72 69	117.7	39 09.9	72 69	117.2	39 31.4	71 70	116.8	4
45	36 18.3	73 68	118.9	36 40.2	73 69	118.5	37 02.0	73 69	118.1	37 23.7	72 69	117.6	37 45.3	72 69	117.2	38 06.9	72 70	116.8	38 28.3	71 70	116.3	38 49.6	71 70	115.9	45
6	35 37.3	73 69	118.0	35 59.1	72 69	117.6	36 20.7	72 70	117.2	36 42.2	72 70	116.7	37 03.7	71 70	116.3	37 25.1	71 70	115.9	37 46.3	71 71	115.4	38 07.5	71 71	115.0	6
7	34 56.0	72 69	117.1	35 17.6	72 70	116.7	35 39.0	72 70	116.3	36 00.4	71 70	115.9	36 21.7	71 71	115.4	36 42.9	71 71	115.0	37 04.1	70 71	114.5	37 25.1	70 71	114.1	7
8	34 14.3	72 70	116.3	34 35.8	71 70	115.8	34 57.1	71 70	115.4	35 18.3	71 71	115.0	35 39.5	70 71	114.5	36 00.5	70 71	114.1	36 21.5	70 71	113.7	36 42.3	69 72	113.2	8
9	33 32.4	71 70	115.4	33 53.6	71 71	115.0	34 14.8	70 71	114.6	34 35.9	70 71	114.1	34 56.9	70 71	113.7	35 17.8	70 72	113.3	35 38.6	69 72	112.8	35 59.4	69 72	112.4	9
50	32 50.1	71 71	114.6	33 11.2	70 71	114.1	33 32.3	70 71	113.7	33 53.2	70 72	113.3	34 14.1	69 72	112.9	34 34.9	69 72	112.4	34 55.5	69 72	112.0	35 16.1	68 72	111.5	50
1	32 07.6	70 71	113.7	32 28.5	70 72	113.3	32 49.4	70 72	112.9	33 10.3	69 72	112.5	33 31.0	69 72	112.0	33 51.6	69 73	111.6	34 12.2	68 73	111.1	34 32.6	68 73	110.7	1
2	31 24.7	70 72	112.9	31 45.6	69 72	112.5	32 06.4	69 72	112.1	32 27.0	69 73	111.6	32 47.6	69 73	111.2	33 08.1	68 73	110.8	33 28.6	68 73	110.3	33 48.9	68 73	109.9	2
3	30 41.7	69 72	112.1	31 02.4	69 72	111.7	31 23.0	69 73	111.3	31 43.6	68 73	110.8	32 04.0	68 73	110.4	32 24.4	68 73	110.0	32 44.7	67 73	109.5	33 04.9	67 74	109.1	3
4	29 58.3	69 73	111.3	30 18.9	69 73	110.9	30 39.5	68 73	110.5	30 59.9	68 73	110.0	31 20.2	68 73	109.6	31 40.5	67 74	109.2	32 00.7	67 74	108.7	32 20.8	67 74	108.3	4
55	29 14.8	69 73	110.5	29 35.3	68 73	110.1	29 55.7	68 74	109.7	30 16.0	68 74	109.3	30 36.2	67 74	108.8	30 56.4	67 74	108.4	31 16.4	67 74	108.0	31 36.4	66 75	107.5	55
6	28 31.0	68 73	109.7	28 51.4	68 74	109.3	29 11.6	67 74	108.9	29 31.8	67 74	108.5	29 52.0	67 74	108.1	30 12.0	67 74	107.6	30 32.0	66 74	107.2	30 51.8	66 75	106.8	6
7	27 47.0	68 74	109.0	28 07.3	67 74	108.6	28 27.4	67 74	108.1	28 47.5	67 74	107.7	29 07.5	67 74	107.3	29 27.5	66 75	106.9	29 47.3	66 75	106.4	30 07.1	66 75	106.0	7
8	27 02.8	67 74	108.2	27 23.0	67 74	107.8	27 43.0	67 74	107.4	28 03.0	67 74	107.0	28 22.9	66 75	106.5	28 42.8	66 75	106.1	29 02.5	66 75	105.7	29 22.2	65 75	105.2	8
9	26 18.4	67 74	107.5	26 38.5	67 74	107.1	26 58.4	66 75	106.6	27 18.3	66 75	106.2	27 38.1	66 75	105.8	27 57.9	65 75	105.4	28 17.5	65 75	104.9	28 37.1	65 75	104.5	9
60	25 33.9	67 75	106.7	25 53.8	66 75	106.3	26 13.7	66 75	105.9	26 33.5	66 75	105.5	26 53.2	66 75	105.1	27 12.8	65 76	104.6	27 32.4	65 76	104.2	27 51.9	65 76	103.8	60
1	24 49.1	66 75	106.0	25 09.0	66 75	105.6	25 28.8	66 75	105.2	25 48.5	66 75	104.7	26 08.1	66 75	104.3	26 27.7	65 76	103.9	26 47.1	65 76	103.5	27 06.6	65 76	103.1	1
2	24 04.2	66 75	105.3	24 24.0	66 75	104.9	24 43.7	66 75	104.4	25 03.3	65 76	104.0	25 22.8	65 76	103.6	25 42.3	65 76	103.2	26 01.7	65 76	102.8	26 21.1	64 76	102.3	2
3	23 19.2	66 75	104.6	23 38.8	65 75	104.2	23 58.4	65 76	103.7	24 17.9	65 76	103.3	24 37.5	65 76	102.9	24 56.9	65 76	102.5	25 16.2	64 76	102.1	25 35.4	64 76	101.6	3
4	22 34.0	65 76	103.8	22 53.6	65 76	103.4	23 13.1	65 76	103.0	23 32.5	65 76	102.6	23 51.9	65 76	102.2	24 11.3	64 76	101.8	24 30.5	64 76	101.4	24 49.7	64 76	100.9	4
65	21 48.6	65 76	103.1	22 08.1	65 76	102.7	22 27.6	65 76	102.3	22 47.0	65 76	101.9	23 06.3	64 76	101.5	23 25.6	64 76	101.1	23 44.8	64 77	100.7	24 03.9	64 77	100.2	65
6	21 03.1	65 76	102.4	21 22.6	65 76	102.0	21 42.0	64 76	101.6	22 01.3	64 76	101.2	22 20.6	64 76	100.8	22 39.8	64 77	100.4	22 58.9	64 77	100.0	23 18.0	63 77	99.5	6
7	20 17.6	65 76	101.8	20 36.9	64 76	101.3	20 56.2	64 76	100.9	21 15.5	64 76	100.5	21 34.7	64 77	100.1	21 53.8	64 77	99.7	22 12.9	63 77	99.3	22 31.9	63 77	98.9	7
8	19 31.8	64 76	101.1	19 51.2	64 76	100.7	20 10.4	64 77	100.2	20 29.6	64 77	99.8	20 48.8	64 77	99.4	21 07.8	63 77	99.0	21 26.9	63 77	98.6	21 45.8	63 77	98.2	8
9	18 46.0	64 77	100.4	19 05.3	64 77	100.0	19 24.5	64 77	99.6	19 43.6	64 77	99.2	20 02.7	63 77	98.8	20 21.7	63 77	98.3	20 40.7	63 77	97.9	20 59.6	63 77	97.5	9
70	18 00.1	64 77	99.7	18 19.3	64 77	99.3	18 38.5	64 77	98.9	18 57.5	64 77	98.5	19 16.6	63 77	98.1	19 35.6	63 77	97.7	19 54.5	63 77	97.3	20 13.4	63 77	96.9	70
1	17 14.1	64 77	99.0	17 33.3	64 77	98.6	17 52.4	64 77	98.2	18 11.4	63 77	97.8	18 30.4	63 77	97.4	18 49.3	63 77	97.0	19 08.2	63 77	96.6	19 27.0	63 77	96.2	1
2	16 28.0	64 77	98.4	16 47.1	63 77	98.0	17 06.2	63 77	97.6	17 25.2	63 77	97.2	17 44.1	63 77	96.8	18 03.0	63 77	96.4	18 21.9	63 77	95.9	18 40.6	63 77	95.5	2
3	15 41.9	63 77	97.7	16 00.9	63 77	97.3	16 19.9	63 77	96.9	16 38.9	63 77	96.5	16 57.8	63 77	96.1	17 16.6	63 77	95.7	17 35.4	63 78	95.3	17 54.2	62 78	94.9	3
4	14 55.6	63 77	97.1	15 14.6	63 77	96.7	15 33.6	63 77	96.3	15 52.5	63 77	95.9	16 11.4	63 77	95.5	16 30.2	63 78	95.0	16 49.0	63 78	94.6	17 07.7	62 78	94.2	4
75	14 09.3	63 77	96.4	14 28.3	63 77	96.0	14 47.2	63 77	95.6	15 06.1	63 77	95.2	15 24.9	63 78	94.8	15 43.7	63 78	94.4	16 02.5	62 78	94.0	16 21.2	62 78	93.6	75
6	13 22.9	63 77	95.8	13 41.9	63 77	95.4	14 00.8	63 78	95.0	14 19.6	63 78	94.6	14 38.5	63 78	94.2	14 57.2	62 78	93.8	15 16.0	62 78	93.4	15 34.7	62 78	92.9	6
7	12 36.5	63 77	95.1	12 55.4	63 77	94.7	13 14.3	63 78	94.3	13 33.1	63 78	93.9	13 51.9	63 78	93.5	14 10.7	62 78	93.1	14 29.4	62 78	92.7	14 48.1	62 78	92.3	7
8	11 50.1	63 78	94.5	12 08.9	63 78	94.1	12 27.8	63 78	93.7	12 46.6	63 78	93.3	13 05.4	62 78	92.9	13 24.1	62 78	92.5	13 42.8	62 78	92.1	14 01.5	62 78	91.7	8
9	11 03.6	63 78	93.8	11 22.4	63 78	93.4	11 41.2	63 78	93.0	12 00.0	62 78	92.6	12 18.8	62 78	92.2	12 37.5	62 78	91.8	12 56.2	62 78	91.4	13 14.9	62 78	91.0	9
80	10 17.0	63 78	93.2	10 35.9	63 78	92.8	10 54.7	63 78	92.4	11 13.4	62 78	92.0	11 32.2	62 78	91.6	11 50.9	62 78	91.2	12 09.6	62 78	90.8	12 28.2	62 78	90.4	80
1	9 30.4	63 78	92.6	9 49.3	63 78	92.2	10 08.1	63 78	91.8	10 26.8	63 78	91.4	10 45.6	62 78	91.0	11 04.3	62 78	90.6	11 23.0	62 78	90.2	11 41.6	62 78	89.8	1
2	8 43.9	63 78	91.9	9 02.7	63 78	91.5	9 21.5	63 78	91.1	9 40.2	63 78	90.7	9 58.9	62 78	90.3	10 17.7	62 78	89.9	10 36.3	62 78	89.5	10 55.0	62 78	89.1	2
3	7 57.2	63 78	91.3	8 16.0	63 78	90.9	8 34.8	63 78	90.5	8 53.6	63 78	90.1	9 12.3	62 78	89.7	9 31.0	62 78	89.3	9 49.7	62 78	88.9	10 08.4	62 78	88.5	3
4	7 10.6	63 78	90.7	7 29.4	63 78	90.3	7 48.2	63 78	89.9	8 07.0	63 78	89.5	8 25.7	62 78	89.1	8 44.4	62 78	88.7	9 03.1	62 78	88.3	9 21.8	62 78	87.9	4
85	6 24.0	63 78	90.0	6 42.8	63 78	89.6	7 01.6	63 78	89.2	7 20.3	63 78	88.8	7 39.1	62 78	88.5	7 57.8	62 78	88.1	8 16.5	62 78	87.7	8 35.2	62 78	87.3	85
6	5 37.4	63 78	89.4	5 56.2	63 78	89.0	6 15.0	63 78	88.6	6 33.7	63 78	88.2	6 52.5	62 78	87.8	7 11.2	62 78	87.4	7 29.9	62 78	87.0	7 48.6	62 78	86.6	6
7				5 09.6	63 78	88.4	5 28.3	63 78	88.0	5 47.1	63 78	87.6	6 05.9	63 78	87.2	6 24.6	62 78	86.8	6 43.4	62 78	86.4	7 02.1	62 78	86.0	7
8										5 00.5	63 78	87.0	5 19.3	63 78	86.6	5 38.1	63 78	86.2	5 56.8	62 78	85.8	6 15.6	62 77	85.4	8
9																			5 10.4	63 77	85.2	5 29.1	63 77	84.8	9

Each cell below lists: Alt. (° ′) · Δd · Δt · Az. (°)

H.A.	4° 00′	4° 30′	5° 00′	5° 30′	6° 00′	6° 30′	7° 00′	7° 30′	H.A.
00	47 00.0 1.00 01 180.0	46 30.0 1.00 01 180.0	46 00.0 1.00 01 180.0	45 30.0 1.00 01 180.0	45 00.0 1.00 01 180.0	44 30.0 1.00 01 180.0	44 00.0 1.00 01 180.0	43 30.0 1.00 01 180.0	00
1	46 59.4 1.00 03 178.5	46 29.4 1.00 03 178.6	45 59.4 1.00 03 178.6	45 29.4 1.00 03 178.6	44 59.4 1.00 03 178.6	44 29.4 1.00 03 178.6	43 59.4 1.00 03 178.6	43 29.4 1.00 03 178.6	1
2	46 57.6 1.00 05 177.1	46 27.6 1.00 05 177.1	45 57.7 1.00 05 177.2	45 27.7 1.00 05 177.2	44 57.7 1.00 05 177.2	44 27.7 1.00 05 177.2	43 57.8 1.00 05 177.3	43 27.8 1.00 05 177.3	2
3	46 54.6 1.00 07 175.6	46 24.7 1.00 07 175.7	45 54.8 1.00 07 175.7	45 24.8 1.00 07 175.7	44 54.9 1.00 07 175.8	44 24.9 1.00 07 175.8	43 55.0 1.00 07 175.9	43 25.0 1.00 06 175.9	3
4	46 50.5 1.00 09 174.2	46 20.6 1.00 09 174.2	45 50.7 1.00 09 174.3	45 20.8 1.00 09 174.3	44 50.9 1.00 09 174.4	44 20.9 1.00 08 174.4	43 51.0 1.00 08 174.5	43 21.1 1.00 08 174.5	4
05	46 45.2 1.00 11 172.7	46 15.3 1.00 11 172.8	45 45.5 1.00 11 172.9	45 15.6 1.00 11 172.9	44 45.7 1.00 10 173.0	44 15.9 1.00 10 173.1	43 46.0 1.00 10 173.1	43 16.1 1.00 10 173.2	05
6	46 38.7 99 13 171.3	46 08.9 99 13 171.3	45 39.1 99 12 171.4	45 09.3 99 12 171.5	44 39.5 99 12 171.6	44 09.7 99 12 171.7	43 39.9 99 12 171.8	43 10.0 99 12 171.8	6
7	46 31.0 99 15 169.8	46 01.3 99 15 169.9	45 31.6 99 14 170.0	45 01.8 99 14 170.1	44 32.1 99 14 170.2	44 02.4 99 14 170.3	43 32.6 99 14 170.4	43 02.9 99 14 170.5	7
8	46 22.2 99 17 168.4	45 52.6 99 16 168.5	45 22.9 99 16 168.6	44 53.3 99 16 168.7	44 23.6 99 16 168.8	43 54.0 99 16 168.9	43 24.3 99 16 169.0	42 54.6 99 16 169.1	8
9	46 12.2 98 18 167.0	45 42.7 98 18 167.1	45 13.2 98 18 167.2	44 43.6 98 18 167.3	44 14.0 99 18 167.5	43 44.5 99 18 167.6	43 14.9 99 17 167.7	42 45.3 99 17 167.8	9
10	46 01.2 98 20 165.6	45 31.7 98 20 165.7	45 02.3 98 20 165.8	44 32.8 98 20 166.0	44 03.4 98 20 166.1	43 33.9 98 19 166.2	43 04.4 98 19 166.4	42 34.9 98 19 166.5	10
1	45 49.0 98 22 164.2	45 19.7 98 22 164.3	44 50.3 98 22 164.5	44 21.0 98 22 164.6	43 51.6 98 21 164.7	43 22.3 98 21 164.9	42 52.9 98 21 165.0	42 23.5 98 21 165.2	1
2	45 35.7 97 24 162.8	45 06.5 97 24 162.9	44 37.3 97 24 163.1	44 08.1 97 23 163.2	43 38.8 97 23 163.4	43 09.6 98 23 163.5	42 40.3 98 23 163.7	42 11.1 98 22 163.8	2
3	45 21.3 97 26 161.4	44 52.3 97 25 161.6	44 23.2 97 25 161.7	43 54.1 97 25 161.9	43 25.0 97 25 162.1	42 55.9 97 25 162.2	42 26.7 97 24 162.4	41 57.6 97 24 162.5	3
4	45 05.9 96 27 160.0	44 37.0 96 27 160.2	44 08.1 97 27 160.4	43 39.1 97 27 160.6	43 10.1 97 26 160.7	42 41.1 97 26 160.9	42 12.1 97 26 161.1	41 43.1 97 26 161.3	4
15	44 49.5 96 29 158.7	44 20.7 96 29 158.9	43 51.9 96 28 159.0	43 23.1 96 28 159.2	42 54.2 96 28 159.4	42 25.4 96 28 159.6	41 56.5 96 28 159.8	41 27.6 96 27 160.0	15
6	44 32.0 95 31 157.3	44 03.4 95 31 157.5	43 34.7 96 30 157.7	43 06.0 96 30 157.9	42 37.4 96 30 158.1	42 08.6 96 30 158.3	41 39.9 96 29 158.5	41 11.1 96 29 158.7	6
7	44 13.5 95 32 156.0	43 45.0 95 32 156.2	43 16.6 95 32 156.4	42 48.0 95 32 156.6	42 19.5 95 31 156.8	41 50.9 95 31 157.0	41 22.4 95 31 157.3	40 53.8 95 31 157.5	7
8	43 54.0 94 34 154.7	43 25.7 94 34 154.9	42 57.4 94 33 155.1	42 29.1 95 33 155.3	42 00.7 95 33 155.6	41 32.3 95 33 155.8	41 03.9 95 32 156.0	40 35.4 95 32 156.2	8
9	43 33.6 94 36 153.4	43 05.5 94 35 153.6	42 37.3 94 35 153.8	42 09.1 94 35 154.1	41 40.9 94 34 154.3	41 12.7 94 34 154.5	40 44.4 94 34 154.8	40 16.1 94 34 155.0	9
20	43 12.3 93 37 152.1	42 44.3 93 37 152.3	42 16.3 93 37 152.6	41 48.3 93 36 152.8	41 20.3 94 36 153.1	40 52.2 94 36 153.3	40 24.1 94 35 153.5	39 56.0 94 35 153.8	20
1	42 50.0 93 39 150.8	42 22.2 93 38 151.1	41 54.4 93 38 151.3	41 26.6 93 38 151.6	40 58.7 93 37 151.8	40 30.8 93 37 152.1	40 02.9 93 37 152.3	39 34.9 93 37 152.5	1
2	42 26.8 92 40 149.6	41 59.2 92 40 149.8	41 31.6 92 39 150.1	41 03.9 92 39 150.4	40 36.2 92 39 150.6	40 08.5 92 39 150.9	39 40.8 93 38 151.1	39 13.0 93 38 151.4	2
3	42 02.8 91 42 148.3	41 35.4 91 41 148.6	41 07.9 92 41 148.9	40 40.4 92 41 149.1	40 12.9 92 40 149.4	39 45.4 92 40 149.7	39 17.8 92 40 149.9	38 50.2 92 39 150.2	3
4	41 37.9 91 43 147.1	41 10.6 91 43 147.4	40 43.4 91 42 147.7	40 16.1 91 42 148.0	39 48.8 91 42 148.2	39 21.4 91 41 148.5	38 54.0 91 41 148.8	38 26.6 91 41 149.0	4
25	41 12.1 90 44 145.9	40 45.1 90 44 146.2	40 18.1 90 44 146.5	39 51.0 90 43 146.8	39 23.8 91 43 147.1	38 56.7 91 43 147.3	38 29.4 91 42 147.6	38 02.2 91 42 147.9	25
6	40 45.6 90 46 144.7	40 18.8 89 45 145.0	39 51.9 90 45 145.3	39 25.0 90 45 145.6	38 58.1 90 44 145.9	38 31.1 90 44 146.2	38 04.1 90 44 146.5	37 37.0 90 43 146.7	6
7	40 18.3 89 47 143.6	39 51.7 89 46 143.9	39 25.0 89 46 144.2	38 58.3 89 46 144.5	38 31.5 89 45 144.8	38 04.8 89 45 145.0	37 37.9 90 45 145.3	37 11.0 90 45 145.5	7
8	39 50.2 88 48 142.4	39 23.8 88 48 142.7	38 57.3 88 47 143.0	38 30.8 88 47 143.3	38 04.3 89 47 143.6	37 37.7 89 46 143.9	37 11.0 89 46 144.2	36 44.3 89 46 144.5	8
9	39 21.4 87 49 141.3	38 55.2 87 49 141.6	38 28.9 88 49 141.9	38 02.6 88 48 142.2	37 36.2 88 48 142.5	37 09.8 88 48 142.8	36 43.4 88 47 143.1	36 16.9 88 47 143.4	9
30	38 51.9 87 50 140.2	38 25.9 87 50 140.5	37 59.8 87 50 140.8	37 33.7 87 49 141.1	37 07.5 87 49 141.4	36 41.3 87 49 141.7	36 15.0 88 48 142.0	35 48.7 88 48 142.3	30
1	38 21.7 86 51 139.1	37 55.9 86 51 139.4	37 30.0 86 51 139.7	37 04.1 87 50 140.0	36 38.1 87 50 140.3	36 12.1 87 50 140.6	35 46.0 87 50 140.9	35 19.9 87 49 141.3	1
2	37 50.8 85 53 138.0	37 25.2 86 52 138.3	36 59.5 86 52 138.6	36 33.8 86 53 139.0	36 08.0 86 51 139.3	35 42.2 86 51 139.6	35 16.3 86 51 139.9	34 50.4 87 50 140.2	2
3	37 19.3 85 54 136.9	36 53.8 85 53 137.2	36 28.4 85 53 137.6	36 02.8 85 53 137.9	35 37.2 85 52 138.2	35 11.6 86 52 138.5	34 45.9 86 52 138.8	34 20.2 86 51 139.2	3
4	36 47.1 84 55 135.9	36 21.9 84 54 136.2	35 56.6 84 54 136.5	35 31.3 85 54 136.9	35 05.9 85 53 137.2	34 40.4 85 53 137.5	34 14.9 85 53 137.8	33 49.4 85 52 138.1	4
35	36 14.3 83 56 134.8	35 49.3 84 55 135.2	35 24.2 84 55 135.5	34 59.1 84 55 135.8	34 33.9 84 54 136.2	34 08.6 84 54 136.5	33 43.3 84 54 136.8	33 18.0 85 53 137.1	35
6	35 41.0 83 57 133.8	35 16.1 83 56 134.1	34 51.2 83 56 134.5	34 26.3 83 56 134.8	34 01.3 83 55 135.1	33 36.2 84 55 135.5	33 11.1 84 55 135.8	32 45.9 84 54 136.1	6
7	35 07.0 82 58 132.8	34 42.4 82 57 133.1	34 17.7 82 57 133.5	33 52.9 83 57 133.8	33 28.1 83 56 134.2	33 03.2 83 56 134.5	32 38.3 83 56 134.8	32 13.3 83 55 135.1	7
8	34 32.5 81 58 131.8	34 08.1 81 58 132.1	33 43.6 82 58 132.5	33 19.0 82 57 132.8	32 54.4 82 57 133.2	32 29.7 82 57 133.5	32 04.9 83 56 133.8	31 40.2 83 56 134.2	8
9	33 57.5 81 59 130.8	33 33.2 81 59 131.2	33 08.9 81 59 131.5	32 44.5 81 58 131.9	32 20.1 82 58 132.2	31 55.6 82 58 132.5	31 31.1 82 57 132.9	31 06.5 82 57 133.2	9
40	33 21.9 80 60 129.8	32 57.9 80 60 130.2	32 33.7 81 59 130.6	32 09.5 81 59 130.9	31 45.3 81 59 131.3	31 21.0 81 59 131.6	30 56.6 81 58 131.9	30 32.2 81 58 132.3	40
1	32 45.9 80 61 128.9	32 22.0 80 61 129.3	31 58.1 80 60 129.6	31 34.0 80 60 130.0	31 10.0 80 60 130.3	30 45.9 80 60 130.7	30 21.7 81 59 131.0	29 57.5 81 59 131.3	1
2	32 09.4 79 62 128.0	31 45.7 79 61 128.3	31 21.7 79 61 128.7	30 58.3 80 61 129.0	30 34.2 80 60 129.4	30 10.2 80 60 129.7	29 46.3 80 60 130.1	29 22.2 80 60 130.4	2
3	31 32.4 78 62 127.0	31 08.8 79 62 127.4	30 45.3 79 62 127.8	30 21.6 79 62 128.1	29 57.9 79 61 128.5	29 34.2 79 61 128.8	29 10.3 79 61 129.2	28 46.5 80 60 129.5	3
4	30 54.9 78 63 126.1	30 31.6 78 63 126.5	30 08.2 78 63 126.9	29 44.7 78 62 127.2	29 21.2 79 62 127.6	28 57.6 79 62 127.9	28 34.0 79 61 128.3	28 10.3 79 61 128.6	4
45	30 17.0 77 64 125.2	29 53.9 77 64 125.6	29 30.6 78 63 126.0	29 07.3 78 63 126.3	28 44.0 78 63 126.7	28 20.6 78 62 127.0	27 57.1 78 62 127.4	27 33.6 78 62 127.7	45
6	29 38.7 77 64 124.3	29 15.7 77 64 124.7	28 52.7 77 64 125.1	28 29.6 77 64 125.4	28 06.4 77 63 125.8	27 43.2 78 63 126.2	27 19.9 78 63 126.5	26 56.5 78 62 126.9	6
7	29 00.0 76 65 123.5	28 37.2 76 65 123.8	28 14.3 76 65 124.2	27 51.4 77 64 124.6	27 28.4 77 64 124.9	27 05.3 77 64 125.3	26 42.2 77 63 125.7	26 19.0 77 63 126.0	7
8	28 21.0 76 66 122.6	27 58.3 76 66 123.0	27 35.6 76 65 123.4	27 12.8 76 65 123.7	26 49.9 76 65 124.1	26 27.0 76 64 124.4	26 04.1 77 64 124.8	25 41.1 77 64 125.2	8
9	27 41.5 75 66 121.8	27 19.0 75 66 122.1	26 56.4 75 66 122.5	26 33.8 76 66 122.9	26 11.1 76 65 123.2	25 48.4 76 65 123.6	25 25.6 76 65 124.0	25 02.8 76 64 124.3	9
50	27 01.7 74 67 120.9	26 39.3 75 67 121.3	26 16.9 75 66 121.7	25 54.5 75 66 122.0	25 31.9 75 66 122.4	25 09.4 75 66 122.8	24 46.7 76 65 123.1	24 24.1 76 65 123.5	50
1	26 21.5 74 68 120.1	25 59.3 74 67 120.5	25 37.1 74 67 120.8	25 14.8 74 67 121.2	24 52.4 75 66 121.6	24 30.0 75 66 121.9	24 07.5 75 66 122.3	23 45.0 75 66 122.7	1
2	25 41.0 73 68 119.3	25 19.0 74 68 119.7	24 56.9 74 68 120.0	24 34.7 74 67 120.4	24 12.5 74 67 120.8	23 50.2 74 67 121.1	23 27.9 74 67 121.5	23 05.6 74 66 121.9	2
3	25 00.2 73 69 118.5	24 38.3 73 68 118.8	24 16.3 73 68 119.2	23 54.3 73 68 119.6	23 32.3 74 68 120.0	23 10.2 74 67 120.3	22 48.0 74 67 120.7	22 25.8 74 67 121.1	3
4	24 19.0 72 69 117.7	23 57.3 73 69 118.1	23 35.5 73 69 118.4	23 13.6 73 68 118.8	22 51.7 73 68 119.2	22 29.8 73 68 119.5	22 07.7 73 68 119.9	21 45.7 74 67 120.3	4
55	23 37.6 72 70 116.9	23 16.0 72 69 117.3	22 54.3 72 69 117.6	22 32.6 72 69 118.0	22 10.8 73 69 118.4	21 49.0 73 68 118.8	21 27.2 73 68 119.1	21 05.3 73 68 119.5	55
6	22 55.8 71 70 116.1	22 34.4 72 70 116.5	22 12.9 72 70 116.9	21 51.3 72 69 117.2	21 29.7 72 69 117.6	21 08.0 72 69 118.0	20 46.3 72 69 118.4	20 24.5 73 68 118.7	6
7	22 13.8 71 70 115.3	21 52.5 71 70 115.7	21 31.1 71 70 116.0	21 09.7 72 70 116.5	20 48.2 72 70 116.8	20 26.7 72 69 117.2	20 05.1 72 69 117.6	19 43.5 72 69 118.0	7
8	21 31.6 71 71 114.6	21 10.4 71 71 115.0	20 49.1 71 70 115.3	20 27.8 71 70 115.7	20 06.5 71 70 116.1	19 45.1 71 70 116.5	19 23.6 72 70 116.8	19 02.1 72 69 117.2	8
9	20 49.0 70 71 113.8	20 28.0 71 71 114.2	20 06.8 71 71 114.6	19 45.7 71 71 115.0	19 24.5 71 70 115.3	19 03.2 71 70 115.7	18 41.9 71 70 116.1	18 20.5 71 70 116.5	9
60	20 06.2 70 72 113.1	19 45.3 70 72 113.5	19 24.3 70 71 113.8	19 03.3 70 71 114.2	18 42.2 70 71 114.6	18 21.0 71 71 115.0	17 59.9 71 70 115.3	17 38.7 71 70 115.7	60
1	19 23.2 69 72 112.3	19 02.4 69 72 112.7	18 41.5 70 72 113.1	18 20.6 70 72 113.5	17 59.7 70 71 113.9	17 38.7 70 71 114.2	17 17.6 70 71 114.6	16 56.5 70 71 115.0	1
2	18 40.0 69 73 111.5	18 19.3 69 72 112.0	17 58.5 69 72 112.4	17 37.7 69 72 112.8	17 16.9 70 71 113.3	16 56.0 70 71 113.6	16 35.1 70 71 113.9	16 14.1 70 71 114.3	2
3	17 56.5 69 73 110.9	17 35.9 69 73 111.3	17 15.3 69 72 111.7	16 54.6 69 72 112.0	16 33.9 69 72 112.4	16 13.1 69 72 112.8	15 52.3 69 72 113.2	15 31.5 70 72 113.5	3
4	17 12.9 68 73 110.2	16 52.4 68 73 110.6	16 31.9 68 73 110.9	16 11.3 69 73 111.3	15 50.7 69 72 111.7	15 30.0 69 72 112.1	15 09.3 69 72 112.4	14 48.6 69 72 112.8	4
65	16 29.0 68 73 109.5	16 08.6 68 73 109.8	15 48.2 68 73 110.2	15 27.7 68 73 110.6	15 07.2 68 73 111.0	14 46.7 69 73 111.4	14 26.1 69 72 111.7	14 05.5 69 72 112.1	65
6	15 44.9 68 74 108.8	15 24.7 68 74 109.1	15 04.4 68 73 109.5	14 44.0 68 73 109.9	14 23.6 68 73 110.3	14 03.2 68 73 110.7	13 42.7 68 73 111.0	13 22.2 68 73 111.4	6
7	15 00.7 67 74 108.1	14 40.5 67 74 108.4	14 20.3 67 74 108.8	14 00.1 68 74 109.2	13 39.8 68 73 109.6	13 19.5 68 73 110.0	12 59.1 68 73 110.3	12 38.7 68 73 110.7	7
8	14 16.3 67 74 107.4	13 56.2 67 74 107.8	13 36.1 67 74 108.1	13 15.9 67 74 108.5	12 55.8 67 74 108.9	12 35.5 67 74 109.3	12 15.3 68 73 109.7	11 55.0 68 73 110.0	8
9	13 31.7 67 75 106.7	13 11.7 67 74 107.1	12 51.7 67 74 107.5	12 31.6 67 74 107.8	12 11.5 67 74 108.2	11 51.4 67 74 108.6	11 31.3 67 74 109.0	11 11.1 67 73 109.4	9
70	12 47.0 66 75 106.0	12 27.1 66 75 106.4	12 07.1 66 75 106.8	11 47.2 67 74 107.2	11 27.2 67 74 107.5	11 07.1 67 74 107.9	10 47.1 67 74 108.3	10 27.0 67 74 108.7	70
1	12 02.1 66 75 105.3	11 42.2 66 75 105.7	11 22.4 66 75 106.1	11 02.5 66 75 106.5	10 42.6 66 74 106.9	10 22.7 66 74 107.2	10 02.7 67 74 107.6	9 42.8 67 74 108.0	1
2	11 17.0 66 76 104.7	10 57.3 66 75 105.0	10 37.5 66 75 105.4	10 17.7 66 75 105.8	9 57.9 66 75 106.2	9 38.1 66 74 106.6	9 18.2 66 74 107.0	8 58.3 66 74 107.3	2
3	10 31.8 65 76 104.0	10 12.2 66 75 104.4	9 52.5 66 75 104.8	9 32.8 66 75 105.1	9 13.1 66 75 105.5	8 53.3 66 75 105.9	8 33.5 66 75 106.3	8 13.7 66 75 106.7	3
4	9 46.5 65 76 103.3	9 27.0 65 76 103.7	9 07.4 65 75 104.1	8 47.7 65 75 104.5	8 28.1 66 75 104.9	8 08.4 66 75 105.2	7 48.7 66 75 105.6	7 29.0 66 75 106.0	4
75	9 01.1 65 76 102.7	8 41.6 65 76 103.1	8 22.1 65 76 103.4	8 02.5 65 76 103.8	7 42.9 65 75 104.2	7 23.3 65 75 104.6	7 03.7 65 75 105.0	6 44.1 65 75 105.4	75
6	8 15.6 65 76 102.0	7 56.1 65 76 102.4	7 36.7 65 76 102.8	7 17.2 65 76 103.2	6 57.7 65 76 103.6	6 38.2 65 76 103.9	6 18.6 65 75 104.3	5 59.1 65 75 104.7	6
7	7 29.9 65 76 101.4	7 10.5 65 76 101.8	6 51.1 65 76 102.1	6 31.7 65 76 102.5	6 12.3 65 76 102.9	5 52.8 65 76 103.3	5 33.4 65 76 103.7	5 13.9 65 76 104.1	7
8	6 44.1 64 76 100.7	6 24.8 64 76 101.1	6 05.5 64 76 101.5	5 46.1 65 76 101.9	5 26.8 65 76 102.3	5 07.4 65 76 102.6			8
9	5 58.3 64 77 100.1	5 39.0 64 76 100.5	5 19.7 64 76 100.8	5 00.4 64 76 101.2					9
80	5 12.3 64 77 99.4								80

Lat. 39°

H.A.	8° 00' Alt. / Δd Δt / Az.	8° 30' Alt. / Δd Δt / Az.	9° 00' Alt. / Δd Δt / Az.	9° 30' Alt. / Δd Δt / Az.	10° 00' Alt. / Δd Δt / Az.	10° 30' Alt. / Δd Δt / Az.	11° 00' Alt. / Δd Δt / Az.	11° 30' Alt. / Δd Δt / Az.	H.A.
00	59 00.0 1.00 1 180.0	59 30.0 1.00 1 180.0	60 00.0 1.00 1 180.0	60 30.0 1.00 1 180.0	61 00.0 1.00 1 180.0	61 30.0 1.00 1 180.0	62 00.0 1.00 1 180.0	62 30.0 1.00 1 180.0	00
1	58 59.2 1.00 4 178.1	59 29.2 1.00 4 178.1	59 59.2 1.00 4 178.0	60 29.2 1.00 4 178.0	60 59.2 1.00 4 178.0	61 29.2 1.00 4 177.9	61 59.1 1.00 4 177.9	62 29.1 1.00 4 177.9	1
2	58 56.9 1.00 6 176.2	59 25.8 1.00 7 176.1	59 56.5 1.00 7 176.0	60 25.7 1.00 7 176.0	60 56.7 1.00 7 176.0	61 26.5 1.00 7 175.8	61 56.5 1.00 7 175.8	62 26.5 1.00 7 175.8	2
3	58 53.0 1.00 9 174.2	59 22.9 1.00 9 174.2	59 52.8 1.00 9 174.1	60 22.7 1.00 9 174.0	60 52.6 1.00 10 173.9	61 22.5 1.00 10 173.8	61 52.4 1.00 10 173.7	62 22.2 1.00 10 173.7	3
4	58 47.5 99 12 172.3	59 17.4 99 12 172.2	59 47.2 99 12 172.1	60 17.0 99 12 172.0	60 46.8 99 12 171.9	61 16.6 99 12 171.8	61 46.4 99 13 171.7	62 16.2 99 13 171.6	4
05	58 40.5 99 14 170.4	59 10.3 99 14 170.3	59 40.0 99 15 170.2	60 09.7 99 15 170.1	60 39.5 99 15 169.9	61 09.2 99 15 169.8	61 38.9 99 16 169.6	62 08.6 99 16 169.5	05
6	58 32.0 99 17 168.6	59 01.7 99 17 168.4	59 31.3 99 17 168.3	60 00.9 99 17 168.1	60 30.5 99 18 167.9	61 00.1 99 18 167.8	61 29.6 99 18 167.6	61 59.2 98 18 167.4	6
7	58 22.1 98 19 166.7	58 51.6 98 19 166.5	59 21.0 98 20 166.2	59 50.5 98 20 166.0	60 20.0 98 20 166.0	60 49.4 98 20 165.8	61 18.8 98 21 165.6	61 48.2 98 21 165.4	7
8	58 10.6 98 22 164.8	58 40.0 98 22 164.7	59 09.3 98 22 164.6	59 38.6 98 22 164.2	60 07.9 98 23 164.0	60 37.2 98 23 163.8	61 06.4 97 23 163.6	61 35.6 97 24 163.3	8
9	57 57.7 97 24 163.0	58 26.9 97 24 162.8	58 56.0 97 24 162.6	59 25.2 97 25 162.3	59 54.3 97 25 162.1	60 23.4 97 25 161.9	60 52.5 97 26 161.6	61 21.5 97 26 161.3	9
10	57 43.4 97 26 161.2	58 12.4 97 26 161.0	58 41.4 97 27 160.7	59 10.3 96 27 160.5	59 39.3 96 27 160.2	60 08.2 96 28 159.9	60 37.0 96 28 159.7	61 05.8 96 29 159.4	10
1	57 27.7 96 28 159.4	57 56.5 96 29 159.2	58 25.3 96 29 158.9	58 54.0 96 29 158.6	59 22.8 96 30 158.3	59 51.4 96 30 158.1	60 20.1 95 31 157.8	60 48.7 95 31 157.5	1
2	57 10.6 95 31 157.7	57 39.2 96 31 157.4	58 07.8 96 31 157.1	58 36.4 95 32 156.8	59 04.9 95 32 156.5	59 33.3 95 32 156.2	60 01.7 95 33 155.9	60 30.1 94 33 155.6	2
3	56 52.3 95 33 155.9	57 20.7 95 33 155.6	57 49.0 94 34 155.3	58 17.3 94 34 155.0	58 45.6 94 34 154.7	59 13.8 94 35 154.4	59 42.0 94 35 154.0	60 10.1 94 35 153.7	3
4	56 32.6 94 35 154.2	57 00.8 94 35 153.9	57 28.9 94 36 153.6	57 57.0 94 36 153.3	58 25.0 93 36 152.9	58 53.0 93 37 152.6	59 20.9 93 37 152.2	59 48.8 93 38 151.9	4
15	56 11.8 93 37 152.6	56 39.7 93 37 152.2	57 07.6 93 38 151.9	57 35.4 93 38 151.6	58 03.2 92 38 151.2	58 30.9 92 39 150.8	58 58.6 92 39 150.5	59 26.2 92 40 150.1	15
6	55 49.7 92 39 150.9	56 17.4 92 39 150.6	56 45.0 92 40 150.2	57 12.6 92 40 149.9	57 40.1 92 40 149.5	58 07.6 91 41 149.1	58 35.0 91 41 148.7	59 02.3 91 42 148.3	6
7	55 26.4 92 41 149.3	55 53.9 91 41 149.0	56 21.3 91 41 148.6	56 48.6 91 42 148.2	57 15.9 91 42 147.8	57 43.1 90 43 147.4	58 10.2 90 43 147.0	58 37.2 90 44 146.6	7
8	55 02.1 91 42 147.7	55 29.3 91 43 147.4	55 56.4 90 43 147.0	56 23.5 90 44 146.6	56 50.5 90 44 146.2	57 17.4 90 45 145.8	57 44.2 89 45 145.4	58 11.0 89 46 144.9	8
9	54 36.7 90 44 146.2	55 03.6 90 45 145.8	55 30.5 89 45 145.4	55 57.3 89 45 145.0	56 24.0 89 46 144.6	56 50.6 89 46 144.2	57 17.2 88 47 143.7	57 43.7 88 47 143.3	9
20	54 10.2 89 46 144.6	54 36.9 89 46 144.3	55 03.5 89 47 143.9	55 30.0 88 47 143.4	55 56.5 88 48 143.0	56 22.8 88 48 142.6	56 49.1 87 48 142.2	57 15.3 87 49 141.7	20
1	53 42.7 88 47 143.2	54 09.1 88 48 142.9	54 35.5 88 48 142.3	55 01.8 87 49 141.9	55 27.9 87 49 141.5	55 54.0 87 50 141.0	56 20.0 86 50 140.6	56 45.9 86 51 140.2	1
2	53 14.3 87 49 141.7	53 40.5 87 49 141.3	54 06.5 87 50 140.9	54 32.5 86 50 140.4	54 58.4 86 51 140.0	55 24.2 86 51 139.6	55 49.9 86 52 139.1	56 15.5 85 52 138.6	2
3	52 44.9 87 50 140.3	53 10.8 86 51 139.8	53 36.7 86 51 139.4	54 02.4 86 52 139.0	54 28.0 85 52 138.5	54 53.5 85 53 138.1	55 19.0 85 53 137.6	55 44.3 84 54 137.1	3
4	52 14.7 86 52 138.9	52 40.3 85 52 138.4	53 05.9 85 53 138.0	53 31.3 85 53 137.6	53 56.7 84 54 137.1	54 22.0 84 54 136.7	54 47.1 84 54 136.2	55 12.1 83 55 135.7	4
25	51 43.6 85 53 137.5	52 09.0 84 54 137.1	52 34.3 84 54 136.6	52 59.5 84 54 136.2	53 24.6 83 55 135.7	53 49.5 83 55 135.3	54 14.4 83 56 134.8	54 39.2 83 56 134.3	25
6	51 11.7 84 54 136.2	51 36.8 84 55 135.7	52 01.9 83 55 135.3	52 26.8 83 56 134.8	52 51.6 83 56 134.4	53 16.3 82 57 133.9	53 40.9 82 57 133.4	54 05.4 81 58 132.9	6
7	50 39.0 83 56 134.8	51 03.9 83 56 134.4	51 28.7 82 57 134.0	51 53.3 82 57 133.5	52 17.9 82 57 133.0	52 42.3 81 58 132.5	53 06.7 81 58 132.1	53 30.9 80 59 131.6	7
8	50 05.6 82 57 133.6	50 30.2 82 57 133.1	50 54.7 82 58 132.7	51 19.1 81 58 132.2	51 43.4 81 59 131.7	52 07.6 80 59 131.2	52 31.7 80 59 130.8	52 55.6 80 60 130.3	8
9	49 31.4 81 58 132.3	49 55.8 81 58 131.9	50 20.1 81 59 131.4	50 44.2 80 59 130.9	51 08.3 80 60 130.5	51 32.2 80 60 130.0	51 56.0 79 61 129.5	52 19.7 79 61 129.0	9
30	48 56.6 81 59 131.1	49 20.7 80 60 130.6	49 44.8 80 60 130.2	50 08.7 80 60 129.7	50 32.5 79 61 129.2	50 56.2 79 61 128.7	51 19.7 78 62 128.2	51 43.1 78 62 127.7	30
1	48 21.1 80 60 129.9	48 45.0 79 61 129.4	49 08.8 79 61 129.0	49 32.5 79 61 128.5	49 56.0 78 62 128.0	50 19.5 78 62 127.5	50 42.8 77 63 127.0	51 06.0 77 63 126.5	1
2	47 45.0 79 61 128.7	48 08.7 79 62 128.2	48 32.3 78 62 127.8	48 55.7 78 62 127.3	49 19.0 78 63 126.8	49 42.2 77 63 126.3	50 05.3 77 63 125.8	50 28.2 76 64 125.3	2
3	47 08.4 78 62 127.5	47 31.8 78 62 127.1	47 55.1 78 63 126.6	48 18.3 77 63 126.1	48 41.4 77 64 125.7	49 04.4 76 64 125.2	49 27.2 76 64 124.7	49 49.9 75 65 124.2	3
4	46 31.4 78 63 126.4	46 54.3 77 63 126.0	47 17.4 77 64 125.5	47 40.0 77 64 125.0	48 03.2 76 64 124.5	48 26.0 76 65 124.0	48 48.6 75 65 123.5	49 11.1 75 66 123.0	4
35	45 53.3 77 64 125.3	46 16.3 76 64 124.8	46 39.2 76 65 124.4	47 01.9 76 65 123.9	47 24.6 75 65 123.4	47 47.1 75 66 122.9	48 09.5 74 66 122.4	48 31.7 74 66 121.9	35
6	45 15.0 76 65 124.2	45 37.8 76 65 123.8	46 00.5 76 65 123.3	46 23.0 75 66 122.8	46 45.4 75 66 122.3	47 07.7 74 66 121.8	47 29.9 74 67 121.3	47 51.9 73 67 120.8	6
7	44 36.2 75 65 123.2	44 58.8 75 66 122.7	45 21.2 75 66 122.2	45 43.6 74 66 121.8	46 05.8 74 67 121.3	46 27.9 73 67 120.8	46 49.8 73 67 120.3	47 11.7 73 68 119.8	7
8	43 57.0 75 66 122.1	44 19.3 74 66 121.7	44 41.6 74 67 121.2	45 03.7 74 67 120.7	45 25.7 73 68 120.2	45 47.6 73 68 119.8	46 09.4 72 68 119.3	46 31.0 72 68 118.8	8
9	43 17.3 74 67 121.1	43 39.4 74 67 120.7	44 01.5 73 68 120.2	44 23.4 73 68 119.7	44 45.2 73 69 119.2	45 06.9 72 68 118.7	45 28.5 72 69 118.2	45 49.9 71 69 117.7	9
40	42 37.1 73 68 120.1	42 59.1 73 68 119.7	43 21.0 73 68 119.2	43 42.7 72 68 118.7	44 04.3 72 69 118.2	44 25.8 71 69 117.7	44 47.2 71 69 117.2	45 08.5 71 70 116.7	40
1	41 56.6 73 68 119.1	42 18.4 72 68 118.7	42 40.1 72 69 118.2	43 01.6 72 69 117.7	43 23.1 71 69 117.3	43 44.4 71 70 116.8	44 05.6 70 70 116.3	44 26.6 70 70 115.8	1
2	41 15.7 72 69 118.2	41 37.3 72 69 117.7	41 58.8 71 69 117.2	42 20.2 71 70 116.8	42 41.4 71 70 116.3	43 02.6 70 70 115.8	43 23.6 70 70 115.3	43 44.5 69 71 114.8	2
3	40 34.4 72 69 117.2	40 55.8 71 70 116.7	41 17.2 71 70 116.3	41 38.4 71 70 115.8	41 59.5 70 70 115.4	42 20.4 70 71 114.9	42 41.3 69 71 114.4	43 02.0 69 71 113.9	3
4	39 52.8 71 70 116.3	40 14.0 71 70 115.8	40 35.2 70 70 115.4	40 56.2 70 71 114.9	41 17.2 70 71 114.4	41 38.0 69 71 114.0	41 58.7 69 72 113.5	42 19.2 68 72 113.0	4
45	39 10.8 71 70 115.4	39 31.9 70 71 114.9	39 52.9 70 71 114.5	40 13.8 69 71 114.0	40 34.6 69 72 113.5	40 55.2 69 72 113.1	41 15.7 68 72 112.6	41 36.2 68 72 112.1	45
6	38 28.5 70 71 114.5	38 49.5 70 71 114.0	39 10.3 69 71 113.6	39 31.1 69 72 113.1	39 51.7 69 72 112.6	40 12.2 68 72 112.2	40 32.6 68 72 111.7	40 52.8 67 73 111.2	6
7	37 46.0 70 71 113.6	38 06.8 69 72 113.2	38 27.5 69 72 112.7	38 48.0 68 72 112.2	39 08.5 68 72 111.8	39 28.8 68 73 111.3	39 49.1 67 73 110.8	40 09.2 67 73 110.3	7
8	37 03.1 69 72 112.8	37 23.8 69 72 112.3	37 44.3 68 72 111.9	38 04.7 68 73 111.4	38 25.1 68 73 110.9	38 45.3 67 73 110.4	39 05.4 67 73 109.9	39 25.4 66 73 109.3	8
9	36 20.0 69 72 111.9	36 40.5 68 73 111.5	37 00.9 68 73 111.0	37 21.2 67 73 110.5	37 41.4 67 73 110.1	38 01.5 67 74 109.6	38 21.4 66 74 109.1	38 41.3 66 74 108.7	9
50	35 36.6 68 73 111.1	35 57.0 68 73 110.6	36 17.2 67 73 110.2	36 37.4 67 73 109.7	36 57.5 67 74 109.2	37 17.4 66 74 108.7	37 37.3 66 74 108.3	37 57.0 66 74 107.8	50
1	34 53.0 68 73 110.3	35 13.2 67 73 109.8	35 33.4 67 74 109.4	35 53.4 67 74 108.9	36 13.4 66 74 108.4	36 33.2 66 74 108.0	36 52.9 66 74 107.5	37 12.5 65 74 107.0	1
2	34 09.1 67 73 109.4	34 29.2 67 74 108.9	34 49.3 67 74 108.5	35 09.2 66 74 108.1	35 29.0 66 74 107.6	35 48.7 66 75 107.2	36 08.3 65 75 106.7	36 27.8 65 75 106.2	2
3	33 25.0 67 74 108.6	33 45.0 67 74 108.2	34 05.0 66 74 107.8	34 24.8 66 74 107.3	34 44.5 66 75 106.8	35 04.1 65 75 106.4	35 23.6 65 75 105.9	35 43.0 64 75 105.4	3
4	32 40.7 66 74 107.9	33 00.6 66 74 107.4	33 20.5 66 74 107.0	33 40.2 66 75 106.5	33 59.8 65 75 106.1	34 19.3 65 75 105.6	34 38.7 64 75 105.1	34 58.0 64 76 104.7	4
55	31 56.3 66 74 107.1	32 16.1 66 75 106.6	32 35.8 66 75 106.2	32 55.4 65 75 105.7	33 14.9 65 75 105.3	33 34.3 65 75 104.8	33 53.6 64 75 104.4	34 12.8 64 76 103.9	55
6	31 11.6 66 75 106.3	31 31.3 65 75 105.9	31 50.9 65 75 105.4	32 10.4 65 75 105.0	32 29.8 65 75 104.5	32 49.1 64 76 104.1	33 08.3 64 76 103.6	33 27.4 64 76 103.2	6
7	30 26.8 65 75 105.6	30 46.4 65 75 105.1	31 05.9 65 75 104.7	31 25.3 65 76 104.2	31 44.6 64 76 103.8	32 03.8 64 76 103.3	32 22.9 64 76 102.9	32 42.0 63 76 102.4	7
8	29 41.8 65 75 104.8	30 01.3 65 75 104.4	30 20.7 65 76 103.9	30 40.0 64 76 103.5	30 59.2 64 76 103.0	31 18.4 64 76 102.6	31 37.4 63 76 102.1	31 56.4 63 76 101.7	8
9	28 56.6 65 76 104.1	29 16.0 64 76 103.6	29 35.4 64 76 103.2	29 54.6 64 76 102.8	30 13.7 64 76 102.3	30 32.8 63 76 101.9	30 51.8 63 76 101.4	31 10.6 63 76 101.0	9
60	28 11.3 65 76 103.3	28 30.6 64 76 102.9	28 49.9 64 76 102.5	29 09.1 64 76 102.0	29 28.1 63 76 101.6	29 47.1 63 76 101.1	30 06.0 63 76 100.7	30 24.8 63 77 100.2	60
1	27 25.9 64 76 102.6	27 45.1 64 76 102.2	28 04.3 64 76 101.8	28 23.4 63 76 101.3	28 42.4 63 76 100.9	29 01.3 63 77 100.4	29 20.1 63 77 100.0	29 38.9 62 77 99.5	1
2	26 40.3 64 76 101.9	26 59.5 64 76 101.5	27 18.6 64 76 101.0	27 37.6 63 76 100.7	27 56.6 63 77 100.2	28 15.4 63 77 99.7	28 34.2 62 77 99.3	28 52.9 62 77 98.8	2
3	25 54.6 64 76 101.2	26 13.7 64 76 100.8	26 32.8 63 77 100.3	26 51.7 63 77 99.9	27 10.6 63 77 99.5	27 29.4 63 77 99.0	27 48.1 62 77 98.6	28 06.7 62 77 98.1	3
4	25 08.8 64 76 100.5	25 27.9 63 77 100.1	25 46.9 63 77 99.6	26 05.8 63 77 99.2	26 24.6 63 77 98.8	26 43.3 62 77 98.3	27 02.0 62 77 97.9	27 20.5 62 77 97.5	4
65	24 22.9 63 77 99.8	24 41.9 63 77 99.4	25 00.8 63 77 99.0	25 19.7 63 77 98.5	25 38.4 62 77 98.1	25 57.1 62 77 97.7	26 15.7 62 77 97.2	26 34.3 62 77 96.8	65
6	23 36.9 63 77 99.1	23 55.9 63 77 98.7	24 14.7 63 77 98.3	24 33.5 62 77 97.8	24 52.2 62 77 97.4	25 10.9 62 77 96.9	25 29.4 62 77 96.5	25 47.9 61 77 96.1	6
7	22 50.9 63 77 98.4	23 09.7 63 77 98.0	23 28.6 63 77 97.6	23 47.3 62 77 97.2	24 06.0 62 77 96.7	24 24.6 62 77 96.3	24 43.1 61 77 95.9	25 01.5 61 77 95.4	7
8	22 04.7 63 77 97.8	22 23.5 63 77 97.4	22 42.3 62 77 96.9	23 01.0 62 77 96.5	23 19.6 62 77 96.1	23 38.2 62 77 95.6	23 56.7 61 77 95.2	24 15.1 61 77 94.8	8
9	21 18.5 63 77 97.1	21 37.3 63 77 96.7	21 56.0 62 77 96.3	22 14.6 62 77 95.8	22 33.2 62 77 95.4	22 51.8 61 77 95.0	23 10.2 61 78 94.6	23 28.6 61 78 94.1	9
70	20 32.2 63 77 96.4	20 50.9 62 77 96.0	21 09.6 62 77 95.6	21 28.2 62 77 95.2	21 46.8 62 78 94.8	22 05.3 61 78 94.3	22 23.7 61 78 93.9	22 42.1 61 78 93.5	70
1	19 45.8 62 77 95.8	20 04.5 62 77 95.4	20 23.2 62 77 94.9	20 41.8 62 78 94.5	21 00.3 61 78 94.1	21 18.8 61 78 93.7	21 37.2 61 78 93.3	21 55.5 61 78 92.8	1
2	18 59.4 62 77 95.1	19 18.1 62 77 94.7	19 36.7 62 78 94.3	19 55.3 61 78 93.9	20 13.8 61 78 93.5	20 32.2 61 78 93.0	20 50.6 61 78 92.6	21 08.9 61 78 92.2	2
3	18 12.9 62 78 94.5	18 31.6 62 78 94.1	18 50.2 62 78 93.6	19 08.7 61 78 93.2	19 27.2 61 78 92.8	19 45.7 61 78 92.4	20 04.0 61 78 92.0	20 22.3 61 78 91.6	3
4	17 26.4 62 78 93.8	17 45.0 62 78 93.4	18 03.6 62 78 93.0	18 22.2 61 78 92.6	18 40.6 61 78 92.2	18 59.1 61 78 91.8	19 17.4 61 78 91.3	19 35.7 61 78 90.9	4
75	16 39.9 62 78 93.2	16 58.5 62 78 92.8	17 17.1 62 78 92.4	17 35.6 61 78 91.9	17 54.0 61 78 91.5	18 12.4 61 78 91.1	18 30.8 61 78 90.7	18 49.1 61 78 90.3	75
6	15 53.3 62 78 92.5	16 11.9 62 78 92.1	16 30.5 62 78 91.7	16 49.0 61 78 91.3	17 07.4 61 78 90.9	17 25.8 61 78 90.5	17 44.2 61 78 90.1	18 02.5 61 78 89.7	6
7	15 06.7 62 78 91.9	15 25.3 62 78 91.5	15 43.8 62 78 91.1	16 02.3 61 78 90.7	16 20.7 61 78 90.3	16 39.2 61 78 89.9	16 57.5 61 78 89.4	17 15.8 61 78 89.0	7
8	14 20.1 62 78 91.3	14 38.7 62 78 90.9	14 57.2 62 78 90.5	15 15.7 61 78 90.0	15 34.2 61 78 89.6	15 52.6 61 78 89.2	16 10.9 61 78 88.8	16 29.2 61 78 88.4	8
9	13 33.5 62 78 90.6	13 52.1 62 78 90.2	14 10.6 62 78 89.8	14 29.1 61 78 89.4	14 47.5 61 78 89.0	15 05.9 61 78 88.6	15 24.3 61 78 88.2	15 42.6 61 78 87.8	9
80	12 46.8 62 78 90.0	13 05.4 62 78 89.6	13 24.0 62 78 89.2	13 42.5 62 78 88.8	14 00.9 61 78 88.4	14 19.3 61 78 88.0	14 37.7 61 78 87.6	14 56.0 61 78 87.2	80
1	12 00.2 62 78 89.4	12 18.8 62 78 89.0	12 37.3 62 78 88.6	12 55.8 62 78 88.2	13 14.3 61 78 87.8	13 32.7 61 78 87.4	13 51.1 61 78 87.0	14 09.5 61 78 86.5	1
2	11 13.6 62 78 88.7	11 32.2 62 78 88.3	11 50.7 62 78 87.9	12 09.2 62 78 87.5	12 27.7 61 78 87.1	12 46.2 61 78 86.7	13 04.6 61 78 86.3	13 23.0 61 77 85.9	2
3	10 27.0 62 78 88.1	10 45.6 62 78 87.7	11 04.1 62 78 87.3	11 22.7 62 78 86.9	11 41.2 61 78 86.5	11 59.6 61 78 86.1	12 18.1 61 77 85.7	12 36.5 61 77 85.3	3
4	9 40.4 62 78 87.5	9 59.0 62 78 87.1	10 17.6 62 78 86.7	10 36.1 62 78 86.3	10 54.6 62 78 85.9	11 13.1 61 77 85.5	11 31.6 61 77 85.1	11 50.0 61 77 84.7	4
85	8 53.8 62 78 86.9	9 12.4 62 78 86.5	9 31.0 62 78 86.1	9 49.6 62 77 85.7	10 08.2 62 77 85.3	10 26.7 62 77 84.9	10 45.2 62 77 84.5	11 03.6 61 77 84.1	85
6	8 07.1 62 78 86.3	8 25.9 62 77 85.9	8 44.5 62 77 85.5	9 03.1 62 77 85.1	9 21.7 62 77 84.7	9 40.3 62 77 84.3	9 58.8 62 77 83.9	10 17.3 62 77 83.5	6
7	7 20.8 62 78 85.6	7 39.4 62 77 85.2	7 58.1 62 77 84.8	8 16.7 62 77 84.4	8 35.3 62 77 84.0	8 53.9 62 77 83.7	9 12.4 62 77 83.3	9 31.0 62 77 82.9	7
8	6 34.3 62 77 85.0	6 53.0 62 77 84.6	7 11.7 62 77 84.2	7 30.3 62 77 83.8	7 49.0 62 77 83.4	8 07.6 62 77 83.0	8 26.2 62 77 82.6	8 44.7 62 77 82.2	8
9	5 47.9 62 77 84.4	6 06.6 62 77 84.0	6 25.3 62 77 83.6	6 44.0 62 77 83.2	7 02.7 62 77 82.8	7 21.3 62 77 82.4	7 39.9 62 77 82.0	7 58.6 62 77 81.6	9
90	5 01.5 63 77 83.8	5 20.2 63 77 83.4	5 39.0 62 77 83.0	5 57.7 62 77 82.6	6 16.4 62 77 82.2	6 35.1 62 77 81.8	6 53.8 62 77 81.4	7 12.5 62 77 81.0	90

Lat. 39°

Each cell lists: Alt. (° ′), Δd, Δt, Az. (°)

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
00	43 00.0 1.0 01 180.0	42 30.0 1.0 01 180.0	42 00.0 1.0 01 180.0	41 30.0 1.0 01 180.0	41 00.0 1.0 01 180.0	40 30.0 1.0 01 180.0	40 00.0 1.0 01 180.0	39 30.0 1.0 01 180.0	00
1	42 59.4 1.0 03 178.6	42 29.5 1.0 03 178.7	41 59.5 1.0 03 178.7	41 29.5 1.0 03 178.7	40 59.5 1.0 03 178.7	40 29.5 1.0 03 178.7	39 59.5 1.0 03 178.7	39 29.5 1.0 03 178.7	1
2	42 57.8 1.0 05 177.3	42 27.8 1.0 05 177.3	41 57.8 1.0 04 177.3	41 27.9 1.0 04 177.4	40 57.9 1.0 04 177.4	40 27.9 1.0 04 177.4	39 57.9 1.0 04 177.4	39 27.9 1.0 04 177.5	2
3	42 55.9 1.0 06 175.9	42 25.1 1.0 06 176.0	41 55.1 1.0 06 176.0	41 25.2 1.0 06 176.1	40 55.2 1.0 06 176.1	40 25.3 1.0 06 176.1	39 55.3 1.0 06 176.2	39 25.4 1.0 06 176.2	3
4	42 51.2 1.0 08 174.6	42 21.3 1.0 08 174.6	41 51.4 1.0 08 174.7	41 21.4 1.0 07 174.7	40 51.5 1.0 08 174.8	40 21.6 1.0 08 174.8	39 51.7 1.0 08 174.9	39 21.7 1.0 08 174.9	4
05	42 46.3 1.0 10 173.2	42 16.4 1.0 10 173.3	41 46.5 1.0 10 173.4	41 16.6 1.0 10 173.4	40 46.8 1.0 10 173.4	40 16.9 1.0 10 173.6	39 47.0 1.0 10 173.6	39 17.1 1.0 09 173.7	05
6	42 40.2 99 12 171.9	42 10.4 99 12 172.0	41 40.6 99 12 172.1	41 10.8 99 12 172.1	40 40.9 99 11 172.2	40 11.1 99 11 172.3	39 41.3 99 11 172.3	39 11.5 99 11 172.4	6
7	42 33.1 99 14 170.6	42 03.4 99 14 170.7	41 33.6 99 14 170.7	41 03.9 99 13 170.8	40 34.1 99 13 170.9	40 04.3 99 13 171.0	39 34.6 99 13 171.1	39 04.8 99 13 171.2	7
8	42 25.0 99 15 169.2	41 55.3 99 15 169.3	41 25.6 99 15 169.4	40 55.9 99 15 169.5	40 26.2 99 15 169.6	39 56.5 99 15 169.7	39 26.8 99 15 169.8	38 57.1 99 14 169.9	8
9	42 15.7 99 17 167.9	41 46.1 99 17 168.0	41 16.5 99 17 168.1	40 46.9 99 17 168.2	40 17.3 99 17 168.3	39 47.7 99 16 168.5	39 18.1 99 16 168.6	38 48.4 99 16 168.7	9
10	42 05.4 98 19 166.6	41 35.9 98 19 166.7	41 06.4 98 19 166.8	40 36.9 98 18 167.0	40 07.4 98 18 167.1	39 37.9 98 18 167.2	39 08.3 98 18 167.3	38 38.8 98 18 167.4	10
1	41 54.1 98 21 165.3	41 24.7 98 20 165.4	40 55.3 98 20 165.6	40 25.9 98 20 165.7	39 56.5 98 20 165.8	39 27.0 98 20 165.9	38 57.6 98 20 166.1	38 28.1 98 19 166.2	1
2	41 41.8 98 22 164.0	41 12.5 98 22 164.1	40 43.2 98 22 164.3	40 13.9 98 22 164.4	39 44.5 98 22 164.6	39 15.2 98 21 164.7	38 45.9 98 21 164.8	38 16.5 98 21 165.0	2
3	41 28.4 97 24 162.7	40 59.2 97 24 162.9	40 30.0 97 24 163.0	40 00.8 97 23 163.2	39 31.6 97 23 163.3	39 02.4 97 23 163.5	38 33.2 97 23 163.6	38 03.9 98 23 163.7	3
4	41 14.1 97 25 161.4	40 45.0 97 25 161.6	40 15.9 97 25 161.8	39 46.8 97 25 161.9	39 17.6 97 25 162.1	38 48.6 97 25 162.2	38 19.5 97 24 162.4	37 50.2 97 24 162.5	4
15	40 58.7 96 27 160.2	40 29.8 96 27 160.3	40 00.8 96 27 160.5	39 31.9 97 27 160.7	39 02.9 97 26 160.8	38 33.9 96 26 161.0	38 04.9 96 26 161.2	37 35.9 96 26 161.3	15
6	40 42.4 96 29 158.9	40 13.6 96 29 159.1	39 44.8 96 28 159.3	39 16.0 96 28 159.4	38 47.2 96 28 159.6	38 18.3 96 28 159.8	37 49.4 96 27 160.0	37 20.5 96 27 160.1	6
7	40 25.1 95 30 157.6	39 56.5 96 30 157.8	39 27.8 96 30 158.0	38 59.1 96 30 158.2	38 30.5 96 29 158.4	38 01.7 96 29 158.6	37 33.0 96 29 158.8	37 04.3 96 29 159.0	7
8	40 06.9 95 32 156.4	39 38.4 95 32 156.6	39 09.9 95 31 156.8	38 41.4 95 31 157.0	38 12.8 95 31 157.2	37 44.3 95 31 157.4	37 15.7 95 30 157.6	36 47.1 95 30 157.8	8
9	39 47.8 94 33 155.2	39 19.5 94 33 155.4	38 51.1 95 33 155.6	38 22.7 95 33 155.8	37 54.3 95 32 156.0	37 25.9 95 32 156.2	36 57.5 95 32 156.4	36 29.0 95 32 156.6	9
20	39 27.8 94 35 154.0	38 59.6 94 35 154.2	38 31.4 94 34 154.4	38 03.2 94 34 154.6	37 35.0 94 34 154.8	37 06.7 94 34 155.1	36 38.4 94 33 155.3	36 10.1 94 33 155.5	20
1	39 06.9 93 36 152.8	38 38.9 93 36 153.0	38 10.9 94 36 153.2	37 42.8 94 35 153.5	37 14.7 94 35 153.7	36 46.6 94 35 153.9	36 18.4 94 35 154.1	35 50.3 94 34 154.3	1
2	38 45.2 93 38 151.6	38 17.3 93 37 151.8	37 49.4 93 37 152.1	37 21.5 93 37 152.3	36 53.6 93 37 152.5	36 25.7 93 36 152.8	35 57.7 93 36 153.0	35 29.7 93 36 153.2	2
3	38 22.6 92 39 150.4	37 54.9 92 39 150.7	37 27.2 92 38 150.9	36 59.5 92 38 151.2	36 31.7 93 38 151.4	36 03.9 93 38 151.6	35 36.1 93 37 151.9	35 08.2 93 37 152.1	3
4	37 59.1 92 40 149.3	37 31.6 92 40 149.5	37 04.1 92 40 149.8	36 36.6 92 40 150.0	36 09.0 92 39 150.3	35 41.3 92 39 150.5	35 13.7 92 39 150.7	34 46.0 92 38 151.0	4
25	37 34.9 91 42 148.1	37 07.6 91 41 148.4	36 40.2 91 41 148.6	36 12.9 91 41 148.9	35 45.4 91 40 149.1	35 18.0 92 40 149.4	34 50.5 92 40 149.6	34 23.0 92 40 149.9	25
6	37 09.9 90 43 147.0	36 42.8 91 43 147.3	36 15.6 91 42 147.5	35 48.4 91 42 147.8	35 21.1 91 42 148.0	34 53.9 91 41 148.3	34 26.6 91 41 148.5	33 59.2 91 41 148.8	6
7	36 44.1 90 44 145.9	36 17.2 90 44 146.1	35 50.2 90 44 146.4	35 23.1 90 43 146.7	34 56.1 90 43 147.0	34 29.0 90 43 147.2	34 01.9 90 42 147.5	33 34.7 91 42 147.7	7
8	36 17.6 89 45 144.8	35 50.8 89 45 145.1	35 24.0 89 45 145.3	34 57.2 90 44 145.6	34 30.3 90 44 145.9	34 03.3 90 44 146.1	33 36.4 90 44 146.4	33 09.4 90 43 146.7	8
9	35 50.3 89 47 143.7	35 23.7 89 46 144.0	34 57.1 89 46 144.3	34 30.5 89 46 144.5	34 03.8 89 45 144.8	33 37.0 89 45 145.1	33 10.3 89 45 145.4	32 43.5 89 44 145.6	9
30	35 22.4 88 48 142.6	34 56.0 88 47 142.9	34 29.5 88 47 143.2	34 03.1 88 47 143.5	33 36.5 88 47 143.8	33 10.0 89 46 144.0	32 43.4 89 46 144.3	32 16.8 89 46 144.6	30
1	34 53.7 87 49 141.6	34 27.5 87 49 141.8	34 01.3 88 48 142.1	33 35.0 88 48 142.4	33 08.6 88 48 142.7	32 42.3 88 47 143.0	32 15.9 88 47 143.3	31 49.4 88 47 143.6	1
2	34 24.4 87 50 140.5	33 58.4 87 50 140.8	33 32.3 87 49 141.1	33 06.2 87 49 141.4	32 40.1 87 49 141.7	32 13.9 88 48 142.0	31 47.6 88 48 142.2	31 21.4 88 48 142.5	2
3	33 54.4 86 51 139.5	33 28.6 86 51 139.8	33 02.7 86 50 140.1	32 36.8 86 50 140.4	32 10.8 87 50 140.7	31 44.8 87 49 141.0	31 18.8 87 49 141.3	30 52.7 87 49 141.5	3
4	33 23.8 85 52 138.5	32 58.1 86 52 138.8	32 32.5 86 51 139.1	32 06.7 86 51 139.4	31 41.0 86 51 139.7	31 15.1 86 50 140.0	30 49.3 86 50 140.3	30 23.4 86 50 140.6	4
35	32 52.6 85 53 137.4	32 27.1 85 53 137.8	32 01.6 85 52 138.1	31 36.1 85 52 138.4	31 10.5 85 52 138.7	30 44.9 85 52 139.0	30 19.2 86 51 139.3	29 53.5 86 51 139.6	35
6	32 20.7 84 54 136.5	31 55.5 84 54 136.8	31 30.2 84 53 137.1	31 04.8 85 53 137.4	30 39.4 85 53 137.7	30 14.0 85 52 138.0	29 48.5 85 52 138.3	29 22.9 85 52 138.6	6
7	31 48.3 83 55 135.5	31 23.2 84 55 135.8	30 58.1 84 54 136.1	30 32.9 84 54 136.4	30 07.7 84 54 136.7	29 42.5 84 53 137.1	29 17.2 84 53 137.4	28 51.6 85 53 137.7	7
8	31 15.3 83 56 134.5	30 50.4 83 56 134.8	30 25.5 83 55 135.2	30 00.5 83 55 135.5	29 35.5 84 55 135.8	29 10.4 84 54 136.1	28 45.3 84 54 136.4	28 20.2 84 54 136.7	8
9	30 41.8 82 57 133.6	30 17.1 82 56 133.9	29 52.4 83 56 134.2	29 27.6 83 56 134.5	29 02.7 83 56 134.9	28 37.8 83 55 135.2	28 12.9 83 55 135.5	27 47.9 84 55 135.8	9
40	30 07.7 82 58 132.6	29 43.2 82 57 132.9	29 18.7 82 57 133.3	28 54.1 82 57 133.6	28 29.4 82 56 133.9	28 04.7 82 56 134.2	27 39.9 83 56 134.6	27 15.1 83 56 134.9	40
1	29 33.2 81 58 131.7	29 08.8 81 58 132.0	28 44.5 81 58 132.4	28 20.0 82 58 132.7	27 55.6 82 57 133.0	27 31.0 82 57 133.3	27 06.5 82 57 133.7	26 41.8 82 56 134.0	1
2	28 58.1 80 59 130.8	28 34.0 81 59 131.1	28 09.8 81 59 131.4	27 45.5 81 58 131.8	27 21.2 81 58 132.1	26 56.9 81 58 132.4	26 32.5 81 57 132.8	26 08.0 82 57 133.1	2
3	28 22.5 80 60 129.9	27 58.6 80 60 130.2	27 34.6 80 59 130.5	27 10.5 80 59 130.9	26 46.4 81 59 131.2	26 22.2 81 59 131.5	25 58.0 81 58 131.9	25 33.7 81 58 132.2	3
4	27 46.5 79 61 129.0	27 22.7 79 60 129.3	26 58.9 80 60 129.7	26 35.0 80 60 130.0	26 11.1 80 60 130.3	25 47.1 80 59 130.7	25 23.0 80 59 131.0	24 59.0 80 59 131.3	4
45	27 10.0 79 62 128.1	26 46.4 79 61 128.4	26 22.8 79 61 128.8	25 59.0 79 61 129.1	25 35.3 79 60 129.5	25 11.5 79 60 129.8	24 47.6 80 60 130.1	24 23.7 80 60 130.5	45
6	26 33.1 78 62 127.2	26 09.7 78 62 127.6	25 46.2 79 62 127.9	25 22.6 79 61 128.3	24 59.1 79 61 128.6	24 35.4 79 61 129.0	24 11.7 79 61 129.3	23 48.0 79 60 129.6	6
7	25 55.8 77 63 126.4	25 32.5 78 63 126.7	25 09.2 78 62 127.1	24 45.8 78 62 127.4	24 22.4 78 62 127.7	23 58.9 78 62 128.1	23 35.4 78 61 128.4	23 11.9 79 61 128.8	7
8	25 18.0 77 64 125.5	24 54.9 77 63 125.9	24 31.8 77 63 126.2	24 08.6 77 63 126.6	23 45.3 78 62 126.9	23 22.0 78 62 127.3	22 58.7 78 62 127.6	22 35.3 78 62 127.9	8
9	24 39.9 76 64 124.7	24 16.9 77 64 125.0	23 54.0 77 64 125.4	23 30.9 77 63 125.7	23 07.8 77 63 126.1	22 44.7 77 63 126.4	22 21.5 77 63 126.8	21 58.3 77 62 127.1	9
50	24 01.3 76 65 123.8	23 38.6 76 65 124.2	23 15.7 76 64 124.6	22 52.9 76 64 124.9	22 30.0 76 64 125.3	22 07.0 77 64 125.6	21 44.0 77 63 126.0	21 20.9 77 63 126.3	50
1	23 22.4 75 65 123.0	22 59.8 75 65 123.3	22 37.2 76 65 123.7	22 14.4 76 65 124.1	21 51.7 76 64 124.4	21 28.9 76 64 124.8	21 06.0 76 64 125.1	20 43.2 76 64 125.5	1
2	22 43.2 75 66 122.2	22 20.7 75 66 122.6	21 58.2 75 66 123.0	21 35.6 75 65 123.3	21 13.1 75 65 123.6	20 50.4 76 65 124.0	20 27.7 76 64 124.3	20 05.0 76 64 124.7	2
3	22 03.5 74 67 121.4	21 41.2 74 66 121.8	21 18.9 75 66 122.1	20 56.5 75 66 122.5	20 34.1 75 66 122.9	20 11.6 75 65 123.2	19 49.0 75 65 123.6	19 26.5 75 65 123.9	3
4	21 23.6 74 67 120.6	21 01.4 74 67 121.0	20 39.2 74 67 121.4	20 17.0 74 66 121.7	19 54.7 74 66 122.1	19 32.4 74 66 122.4	19 10.0 75 66 122.8	18 47.6 75 65 123.1	4
55	20 43.3 73 68 119.9	20 21.3 73 67 120.2	19 59.3 74 67 120.6	19 37.2 74 67 120.9	19 15.0 74 67 121.3	18 52.9 74 66 121.7	18 30.6 74 66 122.0	18 08.4 74 66 122.4	55
6	20 02.7 73 68 119.1	19 40.9 73 68 119.4	19 19.0 73 68 119.8	18 57.0 73 67 120.2	18 35.0 73 67 120.5	18 13.0 73 67 120.9	17 50.9 74 67 121.2	17 28.8 74 66 121.6	6
7	19 21.8 72 69 118.3	19 00.1 72 68 118.7	18 38.3 73 68 119.1	18 16.5 73 68 119.4	17 54.7 73 68 119.8	17 32.8 73 67 120.1	17 10.9 73 67 120.5	16 49.0 73 67 120.8	7
8	18 40.6 72 69 117.6	18 19.0 72 69 117.9	17 57.4 72 69 118.3	17 35.8 72 68 118.7	17 14.1 72 68 119.0	16 52.4 73 68 119.4	16 30.6 73 67 119.7	16 08.8 73 68 120.1	8
9	17 59.1 71 70 116.8	17 37.7 72 69 117.2	17 16.2 72 69 117.6	16 54.7 72 69 117.9	16 33.2 72 69 118.3	16 11.6 72 68 118.6	15 49.9 72 68 119.0	15 28.3 72 68 119.4	9
60	17 17.4 71 70 116.1	16 56.1 71 70 116.4	16 34.8 71 70 116.8	16 13.4 71 69 117.2	15 52.0 71 69 117.5	15 30.5 72 69 117.9	15 09.0 72 69 118.3	14 47.5 72 68 118.6	60
1	16 35.4 70 70 115.3	16 14.2 71 70 115.7	15 53.0 71 70 116.0	15 31.8 71 70 116.5	15 10.5 71 70 116.8	14 49.2 71 69 117.2	14 27.8 71 69 117.5	14 06.4 71 69 117.9	1
2	15 53.1 70 71 114.6	15 32.1 70 71 115.0	15 11.0 70 70 115.4	14 49.9 70 70 115.7	14 28.7 71 70 116.1	14 07.6 71 70 116.5	13 46.3 71 70 116.8	13 25.1 71 69 117.2	2
3	15 10.6 70 71 113.9	14 49.7 70 71 114.3	14 28.7 70 71 114.6	14 07.8 70 71 115.0	13 46.7 70 70 115.4	13 25.7 70 70 115.7	13 04.6 70 70 116.1	12 43.5 70 70 116.5	3
4	14 27.9 69 72 113.2	14 07.1 69 71 113.6	13 46.2 70 71 113.9	13 25.4 70 71 114.3	13 04.5 70 71 114.7	12 43.6 70 71 115.0	12 22.6 70 70 115.4	12 01.6 70 70 115.8	4
65	13 44.9 69 72 112.5	13 24.2 69 72 112.9	13 03.5 69 72 113.2	12 42.8 69 71 113.6	12 22.0 69 71 114.0	12 01.2 69 71 114.3	11 40.4 69 71 114.7	11 19.5 70 71 115.1	65
6	13 01.7 68 73 111.8	12 41.1 69 72 112.2	12 20.5 69 72 112.5	11 59.9 69 72 112.9	11 39.3 69 72 113.3	11 18.6 69 71 113.6	10 57.9 69 71 114.0	10 37.2 69 71 114.4	6
7	12 18.3 68 73 111.1	11 57.9 68 73 111.5	11 37.4 68 72 111.8	11 16.9 68 72 112.2	10 56.3 68 72 112.6	10 35.8 69 72 113.0	10 15.2 69 72 113.3	9 54.6 69 71 113.7	7
8	11 34.7 68 73 110.4	11 14.4 68 73 110.8	10 54.0 68 73 111.2	10 33.6 68 72 111.5	10 13.2 68 72 111.9	9 52.7 68 72 112.3	9 32.3 68 72 112.6	9 11.8 68 72 113.0	8
9	10 50.9 67 73 109.7	10 30.7 67 73 110.1	10 10.4 68 73 110.5	9 50.1 68 73 110.9	9 29.8 68 73 111.2	9 09.5 68 72 111.6	8 49.1 68 72 112.0	8 28.7 68 72 112.3	9
70	10 06.9 67 74 109.0	9 46.8 67 73 109.4	9 26.6 67 73 109.8	9 06.4 67 73 110.2	8 46.2 67 73 110.6	8 26.0 67 73 110.9	8 05.8 68 73 111.3	7 45.5 68 72 111.7	70
1	9 22.7 67 74 108.4	9 02.7 67 74 108.8	8 42.7 67 73 109.1	8 22.6 67 73 109.5	8 02.5 67 73 109.9	7 42.4 67 73 110.3	7 22.2 67 73 110.6	7 02.1 68 73 111.0	1
2	8 38.4 66 74 107.7	8 18.5 66 74 108.1	7 58.5 67 74 108.5	7 38.5 67 74 108.8	7 18.5 67 74 109.2	6 58.5 67 73 109.6	6 38.5 67 73 110.0	6 18.4 67 73 110.3	2
3	7 53.9 66 74 107.0	7 34.1 66 74 107.4	7 14.2 66 74 107.8	6 54.3 66 74 108.2	6 34.4 67 74 108.6	6 14.5 67 74 108.9	5 54.6 67 74 109.3	5 34.6 67 73 109.7	3
4	7 09.3 66 75 106.4	6 49.5 66 75 106.8	6 29.7 66 74 107.1	6 09.9 66 74 107.5	5 50.1 66 74 107.9	5 30.3 66 74 108.3	5 10.5 66 74 108.7		4
75	6 24.4 66 75 105.7	6 04.8 66 75 106.1	5 45.1 66 75 106.5	5 25.4 66 74 106.9	5 05.7 66 74 107.2				75
6	5 39.5 65 75 105.1	5 19.9 66 75 105.5	5 00.3 65 75 105.8						6

DECLINATION SAME NAME AS LATITUDE

H.A.	8° 00′	8° 30′	9° 00′	9° 30′	10° 00′	10° 30′	11° 00′	11° 30′	H.A.
91				5 11.5 63 77 82.0	5 30.3 63 77 81.6	5 49.0 62 77 81.2	6 07.7 62 77 80.8	6 26.4 62 77 80.4	91
2					5 03.0 63 77 80.6	5 21.7 63 76 80.2	5 40.5 63 76 79.8		2

Lat. 39°

H.A.	12° 00′ Alt. Δd Δt Az.	12° 30′ Alt. Δd Δt Az.	13° 00′ Alt. Δd Δt Az.	13° 30′ Alt. Δd Δt Az.	14° 00′ Alt. Δd Δt Az.	14° 30′ Alt. Δd Δt Az.	15° 00′ Alt. Δd Δt Az.	15° 30′ Alt. Δd Δt Az.	H.A.
00	63 00.0 1.00 1 180.0	63 30.0 1.00 2 180.0	64 00.0 1.00 2 180.0	64 30.0 1.00 2 180.0	65 00.0 1.00 2 180.0	65 30.0 1.00 2 180.0	66 00.0 1.00 2 180.0	66 30.0 1.00 2 180.0	00
1	62 59.1 1.00 4 177.8	63 29.1 1.00 4 177.8	63 59.1 1.00 5 177.8	64 29.1 1.00 5 177.7	64 59.1 1.00 5 177.7	65 29.0 1.00 5 177.7	65 59.0 1.00 5 177.6	66 29.0 1.00 5 177.6	1
2	62 56.5 1.00 7 175.7	63 26.4 1.00 7 175.6	63 56.4 1.00 8 175.6	64 26.3 1.00 8 175.5	64 56.3 1.00 8 175.4	65 26.2 1.00 8 175.3	65 56.1 1.00 8 175.3	66 26.1 1.00 8 175.2	2
3	62 52.1 1.0 10 173.6	63 22.0 1.0 10 173.6	63 51.9 1.0 10 173.4	64 21.8 1.0 11 173.3	64 51.6 1.0 11 173.1	65 21.5 1.0 11 173.0	65 51.3 1.0 11 172.8	66 21.2 99 11 172.8	3
4	62 46.0 99 13 171.4	63 15.8 99 13 171.3	63 45.6 99 13 171.2	64 15.4 99 14 171.0	64 45.1 99 14 170.9	65 14.9 99 14 170.7	65 44.6 99 14 170.6	66 14.4 99 15 170.4	4
05	62 38.2 99 16 169.3	63 07.9 99 16 169.1	63 37.6 99 16 169.0	64 07.2 99 17 168.8	64 36.8 99 17 168.6	65 06.4 99 17 168.4	65 36.0 99 17 168.2	66 05.6 99 18 168.0	05
6	62 28.7 98 19 167.2	62 58.3 98 19 167.0	63 27.8 98 19 166.8	63 57.3 98 19 166.6	64 26.7 98 20 166.4	64 56.2 98 20 166.2	65 25.6 98 21 165.9	65 55.0 98 21 165.7	6
7	62 17.6 98 21 165.1	62 47.0 98 21 164.9	63 16.3 98 22 164.7	63 45.6 98 22 164.5	64 14.9 98 23 164.2	64 44.2 98 23 164.0	65 13.4 97 24 163.7	65 42.6 97 24 163.4	7
8	62 04.8 97 24 163.1	62 34.0 97 24 162.8	63 03.2 97 25 162.6	63 32.3 97 25 162.3	64 01.4 97 25 162.0	64 30.4 97 26 161.8	64 59.4 97 26 161.5	65 28.4 97 27 161.2	8
9	61 50.5 97 26 161.1	62 19.5 97 27 160.8	62 48.4 97 27 160.5	63 17.3 96 28 160.2	63 46.2 96 28 159.9	64 15.0 96 28 159.6	64 43.8 96 29 159.3	65 12.5 96 29 158.9	9
10	61 34.6 96 29 159.1	62 03.4 96 29 158.8	62 32.1 96 30 158.5	63 00.7 96 30 158.2	63 29.4 96 31 157.8	63 57.9 96 31 157.5	64 26.5 95 32 157.1	64 54.9 95 32 156.8	10
1	61 17.2 95 31 157.1	61 45.8 95 32 156.8	62 14.2 95 32 156.5	62 42.6 95 33 156.1	63 11.0 94 33 155.8	63 39.3 94 34 155.4	64 07.5 94 34 155.0	64 35.7 94 35 154.6	1
2	60 58.4 94 34 155.2	61 26.7 94 34 154.9	61 54.9 94 35 154.5	62 23.0 94 35 154.1	62 51.1 94 36 153.8	63 19.1 93 36 153.4	63 47.1 93 37 153.0	64 15.0 93 37 152.5	2
3	60 38.2 93 36 153.3	61 06.2 93 36 153.0	61 34.1 93 37 152.6	62 02.0 93 37 152.2	62 29.8 93 38 151.8	62 57.5 92 38 151.4	63 25.2 92 39 150.9	63 52.7 92 39 150.5	3
4	60 16.6 93 38 151.5	60 44.3 92 39 151.1	61 12.0 92 39 150.7	61 39.5 92 40 150.3	62 07.1 92 40 149.9	62 34.5 91 41 149.4	63 01.8 91 41 149.0	63 29.1 91 42 148.5	4
15	59 53.7 92 40 149.7	60 21.1 91 41 149.3	60 48.5 91 41 148.9	61 15.8 91 42 148.4	61 43.0 91 42 148.0	62 10.1 90 43 147.5	62 37.1 90 43 147.1	63 04.1 90 44 146.6	15
6	59 29.5 91 42 147.9	59 56.7 90 43 147.5	60 23.8 90 43 147.1	60 50.7 90 44 146.6	61 17.6 90 44 146.2	61 44.4 89 45 145.7	62 11.2 89 45 145.2	62 37.8 88 46 144.7	6
7	59 04.2 90 44 146.2	59 31.0 89 45 145.8	59 57.8 89 45 145.3	60 24.5 89 46 144.9	60 51.1 88 46 144.4	61 17.6 88 47 143.9	61 43.9 88 47 143.2	62 10.2 87 48 142.9	7
8	58 37.7 89 46 144.5	59 04.2 88 47 144.1	59 30.7 88 47 143.6	59 57.1 88 48 143.1	60 23.3 87 48 142.6	60 49.5 87 49 142.1	61 15.6 87 49 141.6	61 41.5 86 50 141.1	8
9	58 10.0 88 48 142.9	58 36.3 87 48 142.4	59 02.5 87 49 141.9	59 28.6 87 49 141.4	59 54.5 86 50 140.9	60 20.3 86 50 140.4	60 46.1 86 51 139.9	61 11.7 85 51 139.4	9
20	57 41.4 87 49 141.3	58 07.3 86 50 140.8	58 33.2 86 50 140.3	58 59.0 86 51 139.8	59 24.6 85 52 139.3	59 50.1 85 52 138.8	60 15.5 84 53 138.2	60 40.8 84 53 137.7	20
1	57 11.7 86 51 139.7	57 37.4 85 52 139.2	58 02.9 85 52 138.7	58 28.4 85 53 138.2	58 53.7 84 53 137.7	59 18.9 84 54 137.2	59 44.0 83 54 136.6	60 08.9 83 55 136.1	1
2	56 41.0 85 52 138.2	57 06.4 84 53 137.7	57 31.7 84 54 137.2	57 56.8 84 54 136.7	58 21.9 83 55 136.1	58 46.7 83 55 135.6	59 11.5 82 56 135.0	59 36.1 82 56 134.5	2
3	56 09.5 84 54 136.7	56 34.6 83 55 136.2	56 59.5 83 55 135.7	57 24.4 83 56 135.1	57 49.1 82 56 134.6	58 13.7 82 57 134.1	58 38.1 81 57 133.5	59 02.4 81 58 133.0	3
4	55 37.1 83 55 135.2	56 01.9 82 56 134.7	56 26.5 82 56 134.2	56 51.1 82 57 133.7	57 15.5 81 57 133.1	57 39.8 81 58 132.6	58 03.9 80 58 132.0	58 27.9 80 59 131.5	4
25	55 03.8 82 57 133.8	55 28.3 82 57 133.3	55 52.7 81 58 132.8	56 16.9 81 58 132.2	56 41.1 80 59 131.7	57 05.0 80 59 131.2	57 28.9 79 60 130.6	57 52.5 79 60 130.0	25
6	54 29.8 81 58 132.4	54 54.0 81 58 131.9	55 18.1 80 59 131.4	55 42.1 80 59 130.8	56 05.9 79 60 130.3	56 29.6 79 60 129.8	56 53.1 78 61 129.2	57 16.5 78 61 128.6	6
7	53 55.0 80 59 131.1	54 18.9 80 60 130.6	54 42.7 79 60 130.0	55 06.4 79 61 129.5	55 30.0 78 61 128.9	55 53.4 78 61 128.4	56 16.6 77 62 127.8	56 39.7 77 62 127.2	7
8	53 19.4 79 60 129.8	53 43.1 79 61 129.2	54 06.7 78 61 128.7	54 30.1 78 62 128.2	54 53.4 77 62 127.6	55 16.5 77 63 127.1	55 39.4 76 63 126.5	56 02.2 76 63 125.9	8
9	52 43.3 78 61 128.5	53 06.7 78 62 128.0	53 30.0 77 62 127.4	53 53.1 77 63 126.9	54 16.1 76 63 126.3	54 39.0 76 64 125.8	55 01.6 75 64 125.2	55 24.2 75 64 124.6	9
30	52 06.4 77 62 127.2	52 29.6 77 63 126.7	52 52.6 77 63 126.2	53 15.5 76 64 125.6	53 38.3 76 64 125.1	54 00.8 75 64 124.5	54 23.3 74 65 124.0	54 45.5 74 65 123.4	30
1	51 29.0 76 63 126.0	51 51.9 76 64 125.5	52 14.7 75 64 125.0	52 37.3 75 65 124.4	52 59.8 75 65 123.9	53 22.1 74 65 123.3	53 44.3 74 66 122.7	54 06.3 73 66 122.2	1
2	50 51.0 75 64 124.8	51 13.7 75 65 124.3	51 36.2 75 65 123.8	51 58.6 74 66 123.2	52 20.8 74 66 122.7	52 42.9 73 66 122.1	53 04.8 73 67 121.6	53 26.6 72 67 121.0	2
3	50 12.5 75 65 123.7	50 34.9 75 66 123.1	50 57.2 74 66 122.6	51 19.3 74 66 122.1	51 41.3 73 67 121.5	52 03.2 73 67 121.0	52 24.9 72 67 120.4	52 46.4 71 68 119.8	3
4	49 33.4 74 66 122.5	49 55.6 74 66 122.0	50 17.7 73 67 121.5	50 39.6 73 67 120.9	51 01.3 72 67 120.4	51 23.0 72 68 119.8	51 44.4 71 68 119.3	52 05.7 71 69 118.7	4
35	48 53.8 74 67 121.4	49 15.8 73 67 120.9	49 37.7 73 67 120.4	49 59.4 72 68 119.8	50 20.9 72 68 119.3	50 42.3 71 68 118.7	51 03.5 71 69 118.2	51 24.6 70 69 117.6	35
6	48 13.8 73 67 120.3	48 35.6 72 68 119.8	48 57.2 72 68 119.3	49 18.7 71 68 118.8	49 40.0 71 69 118.2	50 01.2 70 69 117.7	50 22.2 70 70 117.1	50 43.1 69 70 116.5	6
7	47 33.4 72 68 119.3	47 54.9 72 68 118.8	48 16.3 71 69 118.2	48 37.5 71 69 117.7	48 58.7 70 69 117.2	49 19.7 70 70 116.6	49 40.5 69 70 116.1	50 01.2 69 70 115.5	7
8	46 52.5 71 69 118.2	47 13.8 71 69 117.7	47 35.1 70 69 117.2	47 56.1 70 70 116.7	48 17.1 70 70 116.1	48 37.8 69 70 115.6	48 58.4 68 71 115.0	49 18.9 68 71 114.5	8
9	46 11.2 71 69 117.2	46 32.4 70 70 116.7	46 53.4 70 70 116.2	47 14.3 69 70 115.7	47 35.0 69 71 115.1	47 55.6 68 71 114.6	48 16.0 68 71 114.0	48 36.3 67 72 113.5	9
40	45 29.6 70 70 116.2	45 50.5 70 70 115.7	46 11.4 69 71 115.2	46 32.1 69 71 114.7	46 52.6 68 71 114.2	47 13.0 68 71 113.6	47 33.3 67 72 113.1	47 53.4 67 72 112.5	40
1	44 47.6 70 71 115.3	45 08.4 70 71 114.8	45 29.0 69 71 114.2	45 49.6 69 71 113.7	46 09.9 68 72 113.2	46 30.2 67 72 112.7	46 50.2 67 72 112.1	47 10.2 66 72 111.6	1
2	44 05.2 69 71 114.3	44 25.9 69 71 113.8	44 46.4 68 72 113.3	45 06.7 68 72 112.8	45 26.9 67 72 112.3	45 47.0 67 72 111.7	46 06.9 66 73 111.2	46 26.7 66 73 110.6	2
3	43 22.6 68 72 113.4	43 43.1 68 72 112.9	44 03.4 67 72 112.4	44 23.6 67 73 111.9	44 43.6 67 73 111.3	45 03.5 66 73 110.8	45 23.3 66 73 110.3	45 42.9 65 73 109.7	3
4	42 39.7 68 72 112.5	43 00.0 67 72 112.0	43 20.1 67 73 111.5	43 40.2 67 73 111.0	44 00.1 66 73 110.4	44 19.8 66 73 109.9	44 39.4 65 74 109.4	44 58.9 65 74 108.9	4
45	41 56.4 67 72 111.6	42 16.6 67 73 111.1	42 36.6 67 73 110.6	42 56.5 66 73 110.1	43 16.3 66 73 109.6	43 35.9 65 74 109.0	43 55.3 65 74 108.5	44 14.7 64 74 108.0	45
6	41 12.9 67 73 110.7	41 33.0 66 73 110.2	41 52.8 66 73 109.7	42 12.6 66 74 109.2	42 32.2 65 74 108.7	42 51.7 65 74 108.2	43 11.0 64 74 107.7	43 30.2 64 75 107.1	6
7	40 29.2 66 73 109.8	40 49.1 66 74 109.4	41 08.8 66 74 108.9	41 28.4 65 74 108.4	41 47.9 65 74 107.8	42 07.3 64 74 107.3	42 26.5 64 75 106.8	42 45.5 63 75 106.3	7
8	39 45.2 66 74 109.0	40 05.0 66 74 108.5	40 24.6 65 74 108.0	40 44.1 65 74 107.5	41 03.4 64 74 107.0	41 22.7 64 75 106.5	41 41.7 63 75 106.0	42 00.7 63 75 105.5	8
9	39 01.0 66 74 108.2	39 20.7 65 74 107.7	39 40.1 65 74 107.2	39 59.5 64 75 106.7	40 18.7 64 75 106.2	40 37.8 63 75 105.7	40 56.8 63 75 105.2	41 15.7 63 75 104.7	9
50	38 16.6 65 74 107.4	38 36.1 65 75 106.9	38 55.5 64 75 106.4	39 14.8 64 75 105.9	39 33.9 64 75 105.4	39 53.0 63 75 104.9	40 11.7 63 75 104.4	40 30.5 62 76 103.9	50
1	37 32.0 65 75 106.7	37 51.4 64 75 106.1	38 10.7 64 75 105.6	38 29.8 63 75 105.1	38 48.8 63 75 104.6	39 07.7 63 76 104.1	39 26.5 62 76 103.6	39 45.1 62 76 103.1	1
2	36 47.2 64 75 105.8	37 06.5 64 75 105.3	37 25.7 64 75 104.8	37 44.7 63 75 104.3	38 03.6 63 76 103.8	38 22.4 62 76 103.3	38 41.1 62 76 102.8	38 59.6 62 76 102.3	2
3	36 02.3 64 75 105.0	36 21.4 64 75 104.5	36 40.5 63 76 104.0	36 59.5 63 76 103.5	37 18.3 63 76 103.0	37 37.0 62 76 102.5	37 55.6 62 76 102.1	38 14.0 61 76 101.6	3
4	35 17.2 64 75 104.3	35 36.2 63 76 103.7	35 55.2 63 76 103.2	36 14.0 63 76 102.7	36 32.8 62 76 102.3	36 51.4 62 76 101.8	37 09.9 61 76 101.3	37 28.3 61 76 100.8	4
55	34 31.9 63 76 103.4	34 50.9 63 76 103.0	35 09.7 63 76 102.5	35 28.5 62 76 102.0	35 47.2 62 76 101.5	36 05.7 62 76 101.1	36 24.1 61 76 100.6	36 42.4 61 77 100.1	55
6	33 46.5 63 76 102.7	34 05.4 63 76 102.2	34 24.1 62 76 101.8	34 42.8 62 76 101.3	35 01.4 62 76 100.8	35 19.9 61 77 100.3	35 38.2 61 77 99.8	35 56.4 61 77 99.3	6
7	33 00.9 63 76 102.0	33 19.7 63 76 101.5	33 38.4 62 76 101.0	33 57.0 62 76 100.5	34 15.6 61 77 100.1	34 33.9 61 77 99.6	34 52.2 61 77 99.1	35 10.4 60 77 98.6	7
8	32 15.2 63 76 101.2	32 34.0 62 76 100.8	32 52.6 62 77 100.3	33 11.2 62 77 99.8	33 29.6 61 77 99.4	33 47.9 61 77 98.9	34 06.1 61 77 98.4	34 24.2 60 77 97.9	8
9	31 29.4 62 76 100.5	31 48.1 62 77 100.0	32 06.7 62 77 99.6	32 25.2 61 77 99.1	32 43.5 61 77 98.6	33 01.8 61 77 98.2	33 20.0 60 77 97.7	33 38.0 60 77 97.2	9
60	30 43.5 62 77 99.8	31 02.1 62 77 99.3	31 20.7 62 77 98.9	31 39.1 61 77 98.4	31 57.4 61 77 97.9	32 15.6 61 77 97.5	32 33.7 60 77 97.0	32 51.7 60 77 96.5	60
1	29 57.5 62 77 99.1	30 16.1 62 77 98.6	30 34.5 61 77 98.2	30 52.9 61 77 97.7	31 11.2 61 77 97.3	31 29.3 60 77 96.8	31 47.4 60 77 96.3	32 05.4 60 77 95.8	1
2	29 11.4 62 77 98.4	29 29.9 62 77 97.9	29 48.4 61 77 97.5	30 06.7 61 77 97.0	30 24.9 61 77 96.6	30 43.0 60 77 96.1	31 01.0 60 77 95.6	31 19.0 60 77 95.2	2
3	28 25.3 61 77 97.7	28 43.7 61 77 97.3	29 02.1 61 77 96.8	29 20.4 61 77 96.3	29 38.5 60 77 95.9	29 56.6 60 77 95.4	30 14.6 60 77 95.0	30 32.5 59 78 94.5	3
4	27 39.0 61 77 97.0	27 57.4 61 77 96.6	28 15.8 61 77 96.1	28 34.0 60 77 95.7	28 52.1 60 77 95.2	29 10.2 60 77 94.8	29 28.1 60 78 94.3	29 46.0 59 78 93.8	4
65	26 52.7 61 77 96.3	27 11.1 61 77 95.9	27 29.4 61 77 95.5	27 47.6 61 77 95.0	28 05.7 60 78 94.6	28 23.7 60 78 94.1	28 41.6 60 78 93.6	28 59.4 59 78 93.2	65
6	26 06.3 61 77 95.7	26 24.7 61 77 95.2	26 42.9 61 77 94.8	27 01.1 60 78 94.3	27 19.2 60 78 93.9	27 37.2 60 78 93.4	27 55.1 59 78 93.0	28 12.9 59 78 92.5	6
7	25 19.9 61 77 95.0	25 38.2 61 78 94.6	25 56.4 61 78 94.1	26 14.6 60 78 93.7	26 32.6 60 78 93.2	26 50.6 59 78 92.8	27 08.3 59 78 92.3	27 26.3 59 78 91.9	7
8	24 33.4 61 78 94.4	24 51.7 61 78 93.9	25 09.9 60 78 93.5	25 28.0 60 78 93.0	25 46.1 60 78 92.6	26 04.0 59 78 92.1	26 21.9 59 78 91.7	26 39.3 59 78 91.2	8
9	23 46.9 61 78 93.7	24 05.2 61 78 93.3	24 23.4 60 78 92.8	24 41.4 60 78 92.4	24 59.5 60 78 91.9	25 17.4 59 78 91.5	25 35.3 59 78 91.1	25 53.1 59 78 90.6	9
70	23 00.4 61 78 93.0	23 18.6 61 78 92.6	23 36.8 60 78 92.2	23 54.8 60 78 91.7	24 12.9 60 78 91.3	24 30.8 60 78 90.9	24 48.6 59 78 90.4	25 06.4 59 78 90.0	70
1	22 13.8 61 78 92.4	22 32.0 61 78 92.0	22 50.2 60 78 91.5	23 08.2 60 78 91.1	23 26.2 60 78 90.7	23 44.2 60 78 90.2	24 02.0 59 78 89.8	24 19.8 59 78 89.4	1
2	21 27.2 61 78 91.8	21 45.4 61 78 91.3	22 03.5 60 78 90.9	22 21.6 60 78 90.5	22 39.6 60 78 90.0	22 57.5 59 78 89.6	23 15.4 59 78 89.2	23 33.7 59 78 88.7	2
3	20 40.6 61 78 91.1	20 58.8 61 78 90.7	21 16.9 60 78 90.3	21 35.0 60 78 89.8	21 53.0 60 78 89.4	22 10.9 60 78 89.0	22 28.8 59 78 88.5	22 46.6 59 78 88.1	3
4	19 54.0 61 78 90.5	20 12.2 61 78 90.1	20 30.3 60 78 89.6	20 48.4 60 78 89.2	21 06.4 60 78 88.8	21 24.3 60 78 88.4	21 42.2 59 78 87.9	22 00.0 59 78 87.5	4
75	19 07.3 61 78 89.9	19 25.5 61 78 89.4	19 43.7 60 78 89.0	20 01.7 60 78 88.6	20 19.7 60 78 88.2	20 37.7 60 78 87.7	20 55.6 59 78 87.3	21 13.4 59 78 86.9	75
6	18 20.7 61 78 89.2	18 38.9 61 78 88.8	18 57.0 60 78 88.4	19 15.1 60 78 88.0	19 33.1 60 78 87.6	19 51.1 60 78 87.1	20 09.0 60 78 86.7	20 26.9 59 78 86.3	6
7	17 34.1 61 78 88.6	17 52.3 61 78 88.2	18 10.4 60 78 87.8	18 28.5 60 78 87.4	18 46.6 60 78 86.9	19 04.6 60 78 86.5	19 22.5 60 77 86.1	19 40.3 59 77 85.7	7
8	16 47.5 61 78 88.0	17 05.7 61 78 87.6	17 23.9 60 78 87.2	17 42.0 60 78 86.7	18 00.0 60 78 86.3	18 18.0 60 78 85.9	18 36.0 60 77 85.5	18 53.9 59 77 85.1	8
9	16 00.9 61 78 87.4	16 19.1 61 78 87.0	16 37.3 60 78 86.5	16 55.4 60 78 86.1	17 13.5 60 77 85.7	17 31.5 60 77 85.3	17 49.5 60 77 84.9	18 07.4 60 77 84.4	9
80	15 14.3 61 78 86.8	15 32.6 61 78 86.3	15 50.8 61 78 85.9	16 08.9 60 78 85.5	16 27.0 60 77 85.1	16 45.1 60 77 84.7	17 03.1 60 77 84.3	17 21.0 60 77 83.8	80
1	14 27.8 61 78 86.1	14 46.1 61 78 85.7	15 04.3 61 77 85.3	15 22.5 60 77 84.9	15 40.6 60 77 84.5	15 58.7 60 77 84.1	16 16.7 60 77 83.7	16 34.7 60 77 83.2	1
2	13 41.3 61 77 85.5	13 59.6 61 77 85.1	14 17.8 61 77 84.7	14 36.0 60 77 84.3	14 54.2 60 77 83.9	15 12.3 60 77 83.5	15 30.4 60 77 83.1	15 48.4 60 77 82.6	2
3	12 54.8 61 77 84.9	13 13.1 61 77 84.5	13 31.4 61 77 84.1	13 49.7 61 77 83.7	14 07.9 60 77 83.3	14 26.0 60 77 82.9	14 44.2 60 77 82.5	15 02.2 60 77 82.0	3
4	12 08.4 61 77 84.3	12 26.8 61 77 83.9	12 45.1 61 77 83.5	13 03.4 61 77 83.1	13 21.6 60 77 82.7	13 39.8 60 77 82.3	13 58.0 60 77 81.8	14 16.1 60 77 81.4	4
85	11 22.0 61 77 83.7	11 40.4 61 77 83.3	11 58.8 61 77 82.9	12 17.1 61 77 82.5	12 35.4 61 77 82.1	12 53.6 60 77 81.7	13 11.8 60 77 81.2	13 30.0 60 77 80.8	85
6	10 35.7 61 77 83.1	10 54.0 61 77 82.7	11 12.5 61 77 82.3	11 30.9 61 77 81.9	11 49.2 61 77 81.5	12 07.5 60 77 81.1	12 25.8 60 77 80.8	12 44.0 60 77 80.2	6
7	9 49.5 62 77 82.5	10 07.9 62 77 82.1	10 26.4 61 77 81.7	10 44.8 61 77 81.3	11 03.2 61 77 80.9	11 21.5 61 77 80.4	11 39.8 61 76 80.0	11 58.1 61 76 79.6	7
8	9 03.3 62 77 81.8	9 21.8 62 77 81.4	9 40.3 61 77 81.0	9 58.7 61 77 80.6	10 17.2 61 77 80.2	10 35.5 61 76 79.8	10 53.9 61 76 79.4	11 12.3 61 76 79.0	8
9	8 17.1 62 77 81.2	8 35.7 62 77 80.8	8 54.2 61 77 80.4	9 12.8 61 77 80.0	9 31.3 62 76 79.6	9 49.7 61 76 79.2	10 08.1 61 76 78.8	10 26.5 61 76 78.4	9
90	7 31.1 62 77 80.6	7 49.7 62 77 80.2	8 08.3 62 76 79.8	8 26.9 62 76 79.4	8 45.4 62 76 79.0	9 04.0 62 76 78.6	9 22.4 62 76 78.2	9 40.9 61 76 77.6	90

Lat. 39°

Columns: H.A. | (for each declination: Alt ° ′ Δd Δt Az °)

H.A.	12° 00′	12° 30′	13° 00′	13° 30′	14° 00′	14° 30′	15° 00′	15° 30′	H.A.
00	39 00.0 1.00 1 180.0	38 30.0 1.00 3 180.0	38 00.0 1.00 1 180.0	37 30.0 1.00 1 180.0	37 00.0 1.00 1 180.0	36 30.0 1.00 1 180.0	36 00.0 1.00 1 180.0	35 30.0 1.00 1 180.0	00
1	38 59.5 1.00 3 178.7	38 29.5 1.00 3 178.8	37 59.5 1.00 3 178.8	37 29.5 1.00 2 178.8	36 59.5 1.00 2 178.8	36 29.5 1.00 2 178.8	35 59.5 1.00 2 178.8	35 29.5 1.00 2 178.8	1
2	38 58.0 1.00 4 177.5	38 28.0 1.00 4 177.5	37 58.0 1.00 4 177.5	37 28.0 1.00 4 177.5	36 58.0 1.00 4 177.6	36 28.0 1.00 4 177.6	35 58.1 1.00 4 177.6	35 28.1 1.00 4 177.6	2
3	38 55.4 1.00 6 176.2	38 25.4 1.00 6 176.3	37 55.5 1.00 6 176.3	37 25.5 1.00 6 176.3	36 55.6 1.00 6 176.4	36 25.6 1.00 6 176.4	35 55.6 1.00 6 176.4	35 25.7 1.00 6 176.5	3
4	38 51.8 1.00 8 175.0	38 21.9 1.00 8 175.0	37 52.0 1.00 8 175.1	37 22.0 1.00 7 175.1	36 52.1 1.00 7 175.1	36 22.1 1.00 7 175.2	35 52.2 1.00 7 175.2	35 22.3 1.00 7 175.3	4
05	38 47.2 1.00 9 173.7	38 17.3 1.00 9 173.8	37 47.4 1.00 9 173.8	37 17.6 99 11 173.9	36 47.7 1.00 9 173.9	36 17.8 1.00 9 174.0	35 47.9 1.00 9 174.0	35 18.0 1.00 9 174.1	05
6	38 41.6 99 11 172.7	38 11.8 99 11 172.5	37 41.9 99 11 172.6	37 12.1 99 11 172.7	36 42.3 99 11 172.7	36 12.4 99 11 172.8	35 42.6 99 10 172.9	35 12.7 1.00 10 172.9	6
7	38 35.0 99 13 171.2	38 05.2 99 13 171.3	37 35.4 99 12 171.4	37 05.7 99 12 171.5	36 35.9 99 12 171.5	36 06.1 99 12 171.6	35 36.3 99 12 171.7	35 06.5 99 12 171.7	7
8	38 27.4 99 14 170.0	37 57.7 99 14 170.1	37 28.0 99 14 170.2	36 58.2 99 14 170.2	36 28.5 99 14 170.3	35 58.8 99 14 170.4	35 29.1 99 14 170.5	34 59.3 99 14 170.6	8
9	38 18.8 99 16 168.8	37 49.2 99 16 168.9	37 19.5 99 16 168.9	36 49.9 99 16 169.1	36 20.2 99 15 169.1	35 50.6 99 15 169.2	35 20.9 99 15 169.3	34 51.2 99 15 169.4	9
10	38 09.2 99 18 167.5	37 39.7 99 17 167.6	37 10.1 99 17 167.7	36 40.5 99 17 167.8	36 11.0 99 17 168.0	35 41.4 99 17 168.1	35 11.8 99 17 168.2	34 42.2 99 17 168.3	10
1	37 58.7 98 19 166.3	37 29.2 98 19 166.4	36 59.7 98 19 166.5	36 30.2 98 19 166.7	36 00.7 98 19 166.8	35 31.3 98 18 166.9	35 01.7 98 18 167.0	34 32.2 98 18 167.1	1
2	37 47.1 98 21 165.1	37 17.8 98 21 165.2	36 48.4 98 20 165.3	36 19.0 98 20 165.5	35 49.6 98 20 165.6	35 20.2 98 20 165.7	34 50.8 98 20 165.8	34 21.4 98 20 166.0	2
3	37 34.7 98 22 163.9	37 05.4 98 22 164.0	36 36.1 98 22 164.2	36 06.8 98 22 164.3	35 37.5 98 22 164.4	35 08.2 98 21 164.6	34 38.9 98 21 164.7	34 09.6 98 21 164.8	3
4	37 21.3 97 24 162.7	36 52.1 97 24 162.8	36 22.9 97 24 163.0	35 53.8 97 23 163.1	35 24.6 97 23 163.3	34 55.4 97 23 163.4	34 26.2 97 23 163.5	33 57.0 97 23 163.7	4
15	37 06.9 97 25 161.5	36 37.9 97 25 161.6	36 08.8 97 25 161.8	35 39.8 97 25 162.0	35 10.7 97 25 162.1	34 41.6 97 24 162.3	34 12.5 97 24 162.4	33 43.4 97 24 162.6	15
6	36 51.6 96 27 160.3	36 22.7 96 27 160.5	35 53.8 96 27 160.6	35 24.9 96 26 160.8	34 55.9 97 26 161.0	34 27.0 97 26 161.1	33 58.0 97 26 161.3	33 29.0 97 25 161.4	6
7	36 35.5 96 28 159.1	36 06.7 96 28 159.3	35 37.9 96 28 159.5	35 09.1 96 28 159.7	34 40.3 96 28 159.8	34 11.4 96 27 160.0	33 42.6 96 27 160.2	33 13.7 96 27 160.3	7
8	36 18.4 95 30 158.0	35 49.8 95 30 158.2	35 21.1 96 29 158.3	34 52.5 96 29 158.5	34 23.8 96 29 158.7	33 55.0 96 29 158.9	33 26.3 96 28 159.0	32 57.6 96 28 159.2	8
9	36 00.5 95 31 156.8	35 32.0 95 31 157.0	35 03.5 95 31 157.2	34 34.9 95 31 157.4	34 06.4 95 30 157.6	33 37.8 95 30 157.8	33 09.2 95 30 157.9	32 40.6 95 30 158.1	9
20	35 41.7 94 33 155.7	35 13.4 94 33 155.9	34 45.0 95 32 156.1	34 16.6 95 32 156.3	33 48.2 95 32 156.5	33 19.7 95 31 156.7	32 51.3 95 31 156.8	32 22.8 95 31 157.0	20
1	35 22.1 94 34 154.5	34 53.9 94 34 154.7	34 25.7 94 34 155.0	33 57.4 94 33 155.2	33 29.1 94 33 155.4	33 00.9 94 33 155.6	32 32.6 94 33 155.8	32 04.2 94 32 156.0	1
2	35 01.6 93 35 153.4	34 33.6 94 35 153.6	34 05.5 94 35 153.8	33 37.4 94 35 154.1	33 09.3 94 34 154.3	32 41.2 94 34 154.5	32 13.0 94 34 154.7	31 44.8 94 34 154.9	2
3	34 40.4 93 37 152.3	34 12.5 93 36 152.5	33 44.6 93 36 152.8	33 16.6 93 36 153.0	32 48.7 93 36 153.2	32 20.7 93 35 153.4	31 52.7 93 35 153.6	31 24.6 93 35 153.8	3
4	34 18.3 92 38 151.2	33 50.6 92 38 151.4	33 22.8 93 38 151.7	32 55.0 93 37 151.9	32 27.2 93 37 152.1	31 59.4 93 37 152.3	31 31.6 93 36 152.6	31 03.7 93 36 152.8	4
25	33 55.5 92 39 150.1	33 27.9 92 39 150.4	33 00.3 92 39 150.6	32 32.7 92 39 150.8	32 05.1 92 38 151.1	31 37.4 92 38 151.3	31 09.7 92 38 151.5	30 42.0 92 37 151.7	25
6	33 31.9 91 41 149.0	33 04.5 91 40 149.3	32 37.0 91 40 149.5	32 09.6 92 40 149.8	31 42.1 92 39 150.0	31 14.6 92 39 150.2	30 47.1 92 39 150.5	30 19.5 92 39 150.7	6
7	33 07.5 91 42 148.0	32 40.3 91 42 148.2	32 13.0 91 41 148.5	31 45.7 91 41 148.7	31 18.4 91 41 149.0	30 51.1 91 40 149.2	30 23.7 91 40 149.4	29 56.3 91 40 149.7	7
8	32 42.4 90 43 146.9	32 15.4 90 43 147.2	31 48.3 90 42 147.4	31 21.2 90 42 147.7	30 54.0 91 42 147.9	30 26.9 91 41 148.2	29 59.7 91 41 148.4	29 32.5 91 41 148.7	8
9	32 16.6 90 44 145.9	31 49.7 90 44 146.1	31 22.8 90 44 146.4	30 55.9 90 43 146.7	30 28.9 90 43 146.9	30 01.9 90 43 147.2	29 34.9 90 42 147.4	29 07.9 90 42 147.7	9
30	31 50.0 89 45 144.9	31 23.4 89 45 145.1	30 56.7 89 45 145.4	30 29.9 89 44 145.6	30 03.1 89 44 145.9	29 36.3 89 44 146.2	29 09.5 90 44 146.4	28 42.6 90 43 146.7	30
1	31 22.9 88 46 143.8	30 56.4 88 46 144.1	30 29.9 89 46 144.4	30 03.3 89 46 144.6	29 36.7 89 45 144.9	29 10.0 89 45 145.2	28 43.3 89 45 145.4	28 16.6 89 44 145.7	1
2	30 55.1 88 48 142.8	30 28.7 88 47 143.1	30 02.4 88 47 143.4	29 36.0 88 47 143.7	29 09.5 88 46 143.9	28 43.1 88 46 144.2	28 16.6 88 46 144.5	27 50.0 88 45 144.7	2
3	30 26.6 87 49 141.8	30 00.4 87 49 142.1	29 34.2 87 48 142.4	29 08.0 87 48 142.7	28 41.8 88 47 143.0	28 15.5 88 47 143.2	27 49.1 88 47 143.5	27 22.8 88 46 143.8	3
4	29 57.5 87 50 140.9	29 31.5 87 49 141.1	29 05.5 87 49 141.4	28 39.4 87 49 141.7	28 13.4 87 48 142.0	27 47.2 87 48 142.3	27 21.1 87 48 142.5	26 54.9 87 47 142.8	4
35	29 27.7 86 51 139.9	29 01.9 86 50 140.2	28 36.1 86 50 140.5	28 10.2 86 50 140.8	27 44.3 86 49 141.0	27 18.4 87 49 141.3	26 52.4 87 49 141.6	26 26.4 87 48 141.9	35
6	28 57.4 85 52 138.9	28 31.8 85 51 139.2	28 06.1 86 51 139.5	27 40.4 86 51 139.8	27 14.7 86 50 140.1	26 49.0 86 50 140.4	26 23.2 86 50 140.7	25 57.4 86 49 141.0	6
7	28 26.4 85 52 138.0	28 01.0 85 52 138.3	27 35.6 85 52 138.6	27 10.1 85 52 138.9	26 44.5 85 51 139.2	26 18.9 85 51 139.5	25 53.3 85 51 139.7	25 27.7 86 50 140.0	7
8	27 54.9 84 53 137.0	27 29.7 84 53 137.3	27 04.4 84 53 137.6	26 39.1 84 52 137.9	26 13.7 84 52 138.2	25 48.4 84 52 138.5	25 22.9 84 52 138.7	24 57.5 85 51 139.1	8
9	27 22.9 84 54 136.1	26 57.8 84 54 136.4	26 32.7 84 54 136.7	26 07.6 84 53 137.0	25 42.4 84 53 137.3	25 17.2 84 53 137.6	24 52.0 84 52 137.9	24 26.7 84 52 138.2	9
40	26 50.3 83 55 135.2	26 25.4 83 55 135.5	26 00.5 83 55 135.8	25 35.5 83 54 136.1	25 10.6 83 54 136.4	24 45.5 84 54 136.7	24 20.4 84 53 137.0	23 55.3 84 53 137.3	40
1	26 17.2 82 56 134.3	25 52.5 82 56 134.6	25 27.8 83 55 134.9	25 03.0 83 55 135.2	24 38.2 83 55 135.5	24 13.3 83 55 135.9	23 48.4 83 54 136.2	23 23.5 84 54 136.5	1
2	25 43.6 82 57 133.4	25 19.0 82 57 133.7	24 54.5 82 56 134.0	24 29.9 82 56 134.4	24 05.2 82 56 134.7	23 40.6 82 56 135.0	23 15.9 83 55 135.3	22 51.1 83 55 135.6	2
3	25 09.4 81 57 132.5	24 45.1 81 57 132.8	24 20.7 81 57 133.2	23 56.3 81 57 133.5	23 31.8 82 56 133.8	23 07.3 82 56 134.1	22 42.8 82 56 134.4	22 18.2 82 56 134.7	3
4	24 34.8 80 58 131.7	24 10.7 81 58 132.0	23 46.5 81 58 132.3	23 22.2 81 58 132.6	22 57.9 81 57 132.9	22 33.6 81 57 133.3	22 09.3 81 57 133.6	21 44.9 81 56 133.9	4
45	23 59.8 80 59 130.8	23 35.8 80 59 131.1	23 11.7 80 59 131.4	22 47.7 80 58 131.8	22 23.6 80 58 132.1	21 59.4 81 58 132.4	21 35.2 81 57 132.7	21 11.0 81 57 133.0	45
6	23 24.2 79 60 129.9	23 00.4 79 60 130.3	22 36.6 80 59 130.6	22 12.7 80 59 130.9	21 48.7 80 59 131.3	21 24.8 80 58 131.6	21 00.8 80 58 131.9	20 36.7 80 58 132.2	6
7	22 48.3 79 61 129.1	22 24.6 79 60 129.4	22 00.9 79 60 129.8	21 37.2 79 60 130.1	21 13.5 79 60 130.4	20 49.7 79 59 130.8	20 25.8 80 59 131.1	20 02.0 80 59 131.4	7
8	22 11.9 78 61 128.3	21 48.4 78 61 128.6	21 24.9 78 61 128.9	21 01.3 79 60 129.3	20 37.8 79 60 129.6	20 14.1 79 60 129.9	19 50.5 79 60 130.3	19 26.8 79 59 130.6	8
9	21 35.1 78 62 127.4	21 11.8 78 62 127.8	20 48.4 78 61 128.1	20 25.0 78 61 128.5	20 01.6 78 61 128.8	19 38.2 78 61 129.1	19 14.7 78 60 129.5	18 51.1 78 60 129.8	9
50	20 57.8 77 63 126.6	20 34.7 77 62 127.0	20 11.5 77 62 127.3	19 48.3 77 62 127.7	19 25.1 78 62 128.0	19 01.8 78 61 128.3	18 38.5 78 61 128.7	18 15.1 78 61 129.0	50
1	20 20.2 76 63 125.8	19 57.3 77 63 126.2	19 34.3 77 63 126.5	19 11.2 77 62 126.9	18 48.1 77 62 127.2	18 25.0 77 62 127.5	18 01.9 77 62 127.9	17 38.7 77 61 128.2	1
2	19 42.2 76 64 125.0	19 19.4 76 64 125.4	18 56.6 76 63 125.7	18 33.7 76 63 126.1	18 10.8 76 63 126.4	17 47.8 77 63 126.7	17 24.8 77 62 127.1	17 01.8 77 62 127.4	2
3	19 03.9 75 65 124.3	18 41.2 76 64 124.6	18 18.6 76 64 124.9	17 55.8 76 64 125.3	17 33.1 76 63 125.6	17 10.3 76 63 126.0	16 47.5 76 63 126.3	16 24.6 76 63 126.7	3
4	18 25.2 75 65 123.5	18 02.7 75 65 123.8	17 40.2 75 65 124.2	17 17.6 75 64 124.5	16 55.0 76 64 124.9	16 32.4 76 64 125.2	16 09.7 76 64 125.6	15 47.0 76 63 125.9	4
55	17 46.1 74 66 122.7	17 23.8 74 65 123.1	17 01.4 75 65 123.4	16 39.0 75 65 123.8	16 16.6 75 65 124.1	15 54.1 75 64 124.5	15 31.6 75 64 124.8	15 09.1 75 64 125.1	55
6	17 06.7 74 66 122.0	16 44.5 74 66 122.3	16 22.3 74 66 122.7	16 00.1 74 65 123.0	15 37.8 74 65 123.4	15 15.5 75 65 123.7	14 53.1 75 65 124.0	14 30.7 75 64 124.4	6
7	16 27.0 73 67 121.2	16 05.0 73 66 121.6	15 42.9 74 66 121.9	15 20.8 74 66 122.3	14 58.7 74 66 122.6	14 36.5 74 65 123.0	14 14.3 74 65 123.3	13 52.1 74 65 123.7	7
8	15 46.9 73 67 120.5	15 25.1 73 67 120.8	15 03.1 73 67 121.2	14 41.2 73 66 121.5	14 19.2 73 66 121.9	13 57.2 73 66 122.2	13 35.2 74 66 122.6	13 13.1 74 66 122.9	8
9	15 06.6 72 68 119.7	14 44.9 72 68 120.1	14 23.1 73 67 120.4	14 01.3 73 67 120.8	13 39.5 73 67 121.1	13 17.6 73 67 121.5	12 55.7 73 66 121.8	12 33.8 73 66 122.2	9
60	14 25.9 72 68 119.0	14 04.4 72 68 119.3	13 42.7 72 68 119.7	13 21.1 72 68 120.1	12 59.4 72 67 120.4	12 37.7 72 67 120.8	12 16.0 73 67 121.1	11 54.2 73 67 121.5	60
1	13 45.0 71 69 118.3	13 23.6 71 68 118.6	13 02.1 72 69 119.0	12 40.6 72 68 119.3	12 19.1 72 68 119.7	11 57.5 72 68 120.1	11 35.9 72 67 120.4	11 14.3 72 67 120.8	1
2	13 03.8 71 69 117.6	12 42.5 71 69 117.9	12 21.2 71 69 118.3	11 59.8 71 68 118.6	11 38.4 72 68 119.0	11 17.0 72 68 119.3	10 55.5 72 68 119.7	10 34.1 72 68 120.1	2
3	12 22.3 71 70 116.8	12 01.2 71 69 117.2	11 40.0 71 69 117.6	11 18.7 71 69 117.9	10 57.5 71 69 118.3	10 36.2 71 68 118.6	10 14.9 71 68 119.0	9 53.6 71 68 119.4	3
4	11 40.6 70 70 116.1	11 19.6 70 70 116.5	10 58.5 70 70 116.9	10 37.4 70 69 117.2	10 16.3 70 69 117.6	9 55.1 71 69 117.9	9 34.0 71 68 118.3	9 12.8 71 68 118.7	4
65	10 58.6 70 70 115.4	10 37.7 70 70 115.8	10 16.8 70 70 116.2	9 55.8 70 70 116.5	9 34.8 70 70 116.9	9 13.8 70 69 117.3	8 52.8 70 69 117.6	8 31.7 70 69 118.0	65
6	10 16.4 69 71 114.8	9 55.6 69 71 115.1	9 34.8 69 71 115.5	9 14.0 69 70 115.8	8 53.1 70 70 116.2	8 32.2 70 70 116.6	8 11.4 70 69 116.9	7 50.4 70 69 117.3	6
7	9 33.9 69 71 114.1	9 13.3 69 71 114.4	8 52.6 69 71 114.8	8 31.9 69 71 115.2	8 11.2 69 70 115.5	7 50.4 69 70 115.9	7 29.7 69 70 116.3	7 08.9 69 70 116.6	7
8	8 51.2 68 72 113.4	8 30.7 68 71 113.8	8 10.1 69 71 114.1	7 49.6 69 71 114.5	7 29.0 69 71 114.9	7 08.4 69 70 115.2	6 47.7 69 70 115.6	6 27.1 69 70 116.0	8
9	8 08.3 68 72 112.7	7 47.9 68 72 113.1	7 27.5 68 72 113.4	7 07.0 68 71 113.8	6 46.5 68 71 114.2	6 26.1 69 71 114.6	6 05.6 69 70 114.9	5 45.0 69 70 115.3	9
70	7 25.2 68 72 112.0	7 04.9 68 72 112.4	6 44.6 68 72 112.8	6 24.3 68 72 113.2	6 03.9 68 71 113.5	5 43.5 68 71 113.9	5 23.2 68 71 114.3	5 02.8 68 71 114.6	70
1	6 41.9 67 73 111.4	6 21.7 67 72 111.7	6 01.5 67 72 112.1	5 41.3 67 72 112.5	5 21.0 67 72 112.9	5 00.8 68 72 113.2			1
2	5 58.4 67 73 110.7	5 38.3 67 73 111.1	5 18.2 67 73 111.5						2
3	5 14.7 67 73 110.1								3

DECLINATION SAME NAME AS LATITUDE

H.A.	12° 00′	12° 30′	13° 00′	13° 30′	14° 00′	14° 30′	15° 00′	15° 30′	H.A.
91	6 45.1 62 76 80.0	7 03.8 62 76 79.6	7 22.5 62 76 79.2	7 41.1 62 76 78.8	7 59.7 62 76 78.4	8 18.3 62 76 78.0	8 36.8 62 76 77.6	8 55.4 62 76 77.2	91
2	5 59.3 62 76 79.4	6 18.0 62 76 79.0	6 36.7 62 76 78.6	6 55.4 62 76 78.2	7 14.1 62 76 77.8	7 32.7 62 76 77.4	7 51.4 62 76 77.0	8 10.0 62 76 76.6	2
3	5 13.5 63 76 78.8	5 32.3 63 76 78.4	5 51.0 63 76 78.0	6 09.8 63 76 77.6	6 28.5 62 76 77.2	6 47.3 62 76 76.8	7 06.0 62 75 76.4	7 24.7 62 75 76.0	3
4			5 05.5 63 76 77.4	5 24.3 63 76 77.0	5 43.1 63 76 76.6	6 01.9 63 75 76.2	6 20.7 63 75 75.8	6 39.5 63 75 75.4	4
95						5 16.7 63 75 75.6	5 35.6 63 75 75.2	5 54.4 63 75 74.8	95
6								5 09.5 63 75 74.2	6

Lat. 39°

H.A.	16° 00′ Alt.	Δd Δt	Az.	16° 30′ Alt.	Δd Δt	Az.	17° 00′ Alt.	Δd Δt	Az.	17° 30′ Alt.	Δd Δt	Az.	18° 00′ Alt.	Δd Δt	Az.	18° 30′ Alt.	Δd Δt	Az.	19° 00′ Alt.	Δd Δt	Az.	19° 30′ Alt.	Δd Δt	Az.	H.A.
00	67 00.0	1.02	180.0	67 30.0	1.02	180.0	68 00.0	1.02	180.0	68 30.0	1.02	180.0	69 00.0	1.02	180.0	69 30.0	1.02	180.0	70 00.0	1.02	180.0	70 30.0	1.02	180.0	00
1	66 59.0	1.05	177.5	67 29.0	1.05	177.5	67 59.0	1.05	177.4	68 28.9	1.05	177.4	68 58.9	1.05	177.3	69 28.9	1.06	177.3	69 58.9	1.06	177.2	70 28.8	1.06	177.2	1
2	66 56.0	1.08	175.1	67 25.9	1.08	175.1	67 55.8	1.09	174.9	68 25.8	1.08	174.8	68 55.7	1.09	174.7	69 25.6	1.09	174.5	69 55.5	1.09	174.5	70 25.4	1.0	174.4	2
3	66 51.0	99 12	172.6	67 20.9	99 12	172.5	67 50.7	99 12	172.4	68 20.5	99 12	172.2	68 50.3	99 13	172.1	69 20.1	99 13	171.9	69 49.9	99 13	171.6	70 19.7	99 13	171.6	3
4	66 44.1	99 15	170.2	67 13.8	99 15	170.0	67 43.5	99 15	169.9	68 13.2	99 16	169.7	68 42.8	99 16	169.5	69 12.5	99 16	169.3	69 42.1	99 17	169.0	70 11.8	99 17	168.8	4
05	66 35.2	99 18	167.8	67 04.8	98 18	167.6	67 34.3	98 19	167.4	68 03.8	98 19	167.1	68 33.3	98 19	166.9	69 02.8	98 20	166.6	69 32.2	98 20	166.4	70 01.6	98 20	166.1	05
6	66 24.4	98 21	165.5	66 53.8	98 21	165.2	67 23.1	98 22	164.9	67 52.4	98 22	164.7	68 21.7	98 23	164.4	68 51.0	97 23	164.1	69 20.2	97 23	163.7	69 49.3	97 24	163.4	6
7	66 11.8	97 24	163.1	66 40.9	97 24	162.8	67 10.1	97 25	162.5	67 39.1	97 25	162.2	68 08.2	97 26	161.9	68 37.2	97 26	161.5	69 06.1	96 27	161.2	69 35.0	96 27	160.8	7
8	65 57.4	96 27	160.8	66 26.3	96 27	160.5	66 55.1	96 28	160.2	67 23.9	96 28	159.8	67 52.7	96 29	159.4	68 21.4	96 29	159.0	68 50.1	95 30	158.6	69 18.7	95 30	158.2	8
9	65 41.2	96 30	158.6	66 09.8	95 30	158.2	66 38.4	95 31	157.8	67 06.9	95 31	157.4	67 35.4	95 32	157.0	68 03.8	95 32	156.6	68 32.1	94 33	156.2	69 00.4	94 34	155.7	9
10	65 23.3	95 32	156.4	65 51.7	94 33	156.0	66 20.0	94 34	155.6	66 48.2	94 34	155.1	67 16.3	94 35	154.7	67 44.4	94 35	154.2	68 12.4	93 36	153.8	68 40.3	93 36	153.3	10
1	65 03.8	94 35	154.2	65 31.9	93 36	153.8	65 59.9	93 36	153.3	66 27.8	93 37	152.9	66 55.6	93 37	152.4	67 23.3	92 38	151.9	67 50.9	92 39	151.4	68 18.5	92 39	150.9	1
2	64 42.8	93 38	152.1	65 10.5	92 38	151.7	65 38.2	92 39	151.2	66 05.7	92 39	150.7	66 33.2	91 40	150.2	67 00.6	91 40	149.7	67 27.8	91 41	149.1	67 55.0	90 42	148.6	2
3	64 20.2	91 40	150.0	64 47.6	91 41	149.6	65 14.9	91 41	149.1	65 42.2	91 42	148.6	66 09.3	90 42	148.0	66 36.2	90 43	147.5	67 03.1	89 44	146.9	67 29.9	89 44	146.4	3
4	63 56.2	90 42	148.0	64 23.3	90 43	147.5	64 50.3	90 43	147.0	65 17.1	89 44	146.5	65 43.9	89 45	146.0	66 10.5	89 45	145.4	66 37.0	88 46	144.8	67 03.3	88 47	144.2	4
15	63 30.9	89 44	146.1	63 57.6	89 45	145.6	64 24.2	89 46	145.0	64 50.7	88 46	144.5	65 17.1	88 47	143.9	65 43.3	87 47	143.3	66 09.4	87 48	142.7	66 35.4	86 49	142.1	15
6	63 04.2	88 46	144.2	63 30.6	88 47	143.7	63 56.9	87 48	143.1	64 23.0	87 48	142.6	64 49.0	86 49	142.0	65 14.8	86 50	141.4	65 40.5	85 50	140.7	66 06.1	85 51	140.1	6
7	62 36.4	87 48	142.4	63 02.4	87 49	141.8	63 28.3	86 50	141.2	63 54.0	86 50	140.7	64 19.6	85 51	140.1	64 45.1	85 51	139.5	65 10.4	84 52	138.8	65 35.6	84 53	138.2	7
8	62 07.3	86 50	140.6	62 33.0	86 51	140.0	62 58.5	85 51	139.4	63 23.9	84 52	138.8	63 49.1	84 53	138.2	64 14.2	83 53	137.6	64 39.2	83 54	137.0	65 03.9	82 55	136.3	8
9	61 37.1	85 52	138.8	62 02.5	84 53	138.3	62 27.6	84 53	137.7	62 52.7	83 54	137.1	63 17.6	83 54	136.5	63 42.3	82 55	135.8	64 06.8	81 56	135.2	64 31.2	81 56	134.5	9
20	61 05.9	84 54	137.1	61 30.9	83 54	136.6	61 55.7	83 55	136.0	62 20.4	82 55	135.4	62 44.9	81 56	134.7	63 09.3	81 57	134.1	63 33.4	80 57	133.4	63 57.4	80 58	132.8	20
1	60 33.7	82 55	135.5	60 58.4	82 56	134.9	61 22.8	81 56	134.3	61 47.2	81 57	133.7	62 11.3	80 58	133.1	62 35.3	80 58	132.4	62 59.1	79 59	131.8	63 22.7	78 59	131.1	1
2	60 00.6	81 57	133.9	60 24.9	81 57	133.3	60 49.0	80 58	132.7	61 13.0	80 58	132.1	61 36.8	79 59	131.5	62 00.4	78 60	130.8	62 23.9	78 60	130.1	62 47.1	77 61	129.5	2
3	59 26.5	80 58	132.4	59 50.5	80 59	131.8	60 14.3	79 59	131.2	60 38.0	79 60	130.5	61 01.5	78 60	129.9	61 24.7	77 61	129.3	61 47.8	77 61	128.6	62 10.7	76 62	127.9	3
4	58 51.7	79 59	130.9	59 15.4	79 60	130.3	59 38.8	78 60	129.7	60 02.1	77 61	129.0	60 25.3	77 62	128.4	60 48.2	76 62	127.7	61 11.0	75 63	127.1	61 33.5	75 63	126.4	4
25	58 16.0	78 61	129.4	58 39.4	78 61	128.8	59 02.6	77 62	128.2	59 25.6	76 62	127.6	59 48.4	76 63	126.9	60 11.0	75 63	126.3	60 33.4	74 64	125.6	60 55.6	74 64	124.9	25
6	57 39.7	77 62	128.0	58 02.7	77 62	127.4	58 25.6	76 63	126.8	58 48.3	75 63	126.2	59 10.6	75 64	125.5	59 33.1	74 64	124.9	59 55.2	73 65	124.2	60 17.1	73 65	123.5	6
7	57 02.6	76 63	126.7	57 25.3	76 63	126.1	57 47.9	75 64	125.4	58 10.3	74 64	124.8	58 32.5	74 65	124.2	58 54.5	73 65	123.5	59 16.3	72 66	122.9	59 37.9	72 66	122.2	7
8	56 24.9	75 64	125.3	56 47.3	75 64	124.7	57 09.6	74 65	124.1	57 31.7	73 65	123.5	57 53.6	73 66	122.9	58 15.4	72 66	122.2	58 36.9	71 67	121.5	58 58.2	71 67	120.9	8
9	55 46.5	74 65	124.0	56 08.7	74 65	123.4	56 30.7	73 66	122.8	56 52.6	72 66	122.2	57 14.2	72 67	121.6	57 35.6	71 67	120.9	57 56.9	70 68	120.3	58 17.9	70 68	119.6	9
30	55 07.6	73 66	122.8	55 29.5	73 66	122.2	55 51.3	72 67	121.6	56 12.8	72 67	121.0	56 34.2	71 68	120.3	56 55.4	70 68	119.7	57 16.3	70 68	119.0	57 37.1	69 69	118.4	30
1	54 28.2	73 67	121.6	54 49.8	72 67	121.0	55 11.3	71 67	120.4	55 32.6	71 68	119.8	55 53.7	70 68	119.1	56 14.6	69 69	118.5	56 35.3	69 69	117.8	56 55.8	68 70	117.2	1
2	53 48.2	72 67	120.4	54 09.6	71 68	119.8	54 30.8	70 68	119.2	54 51.9	70 69	118.6	55 12.7	69 69	118.0	55 33.4	69 69	117.3	55 53.9	68 70	116.7	56 14.1	67 70	116.0	2
3	53 07.7	71 68	119.2	53 28.9	70 69	118.7	53 49.9	70 69	118.1	54 10.7	69 69	117.4	54 31.3	68 70	116.8	54 51.8	68 70	116.2	55 12.0	67 70	115.5	55 32.0	66 71	114.9	3
4	52 26.8	70 69	118.1	52 47.8	70 69	117.5	53 08.5	69 70	116.9	53 29.1	68 70	116.3	53 49.5	68 70	115.7	54 09.7	67 71	115.1	54 29.7	66 71	114.4	54 49.5	66 71	113.8	4
35	51 45.5	69 70	117.0	52 06.2	69 70	116.4	52 26.8	68 70	115.9	52 47.1	68 71	115.2	53 07.3	67 71	114.6	53 27.3	66 71	114.0	53 47.1	66 72	113.4	54 06.7	66 72	112.7	35
6	51 03.8	69 70	116.0	51 24.3	68 70	115.4	51 44.6	68 71	114.8	52 04.8	67 71	114.2	52 24.8	67 72	113.6	52 44.5	66 72	113.0	53 04.1	65 72	112.3	53 23.5	64 72	111.7	6
7	50 21.7	68 71	114.9	50 42.0	67 71	114.4	51 02.1	67 71	113.8	51 22.1	66 72	113.2	51 41.9	66 72	112.6	52 01.4	65 72	112.0	52 20.8	64 73	111.3	52 40.0	64 73	110.7	7
8	49 39.2	67 71	113.9	49 59.3	67 72	113.3	50 19.3	66 72	112.8	50 39.0	66 72	112.2	50 58.6	65 73	111.6	51 18.0	64 73	111.0	51 37.3	64 73	110.3	51 56.3	63 73	109.7	8
9	48 56.4	67 72	112.9	49 16.4	66 72	112.4	49 36.1	66 72	111.8	49 55.7	65 73	111.2	50 15.1	64 73	110.6	50 34.4	64 73	110.0	50 53.4	63 74	109.4	51 12.3	63 74	108.8	9
40	48 13.3	66 73	112.0	48 33.1	66 73	111.4	48 52.7	65 73	110.8	49 12.1	64 73	110.2	49 31.4	64 73	109.7	49 50.4	63 74	109.1	50 09.3	63 74	108.5	50 28.0	63 74	107.8	40
1	47 29.9	66 73	111.0	47 49.5	65 73	110.5	48 09.0	65 73	109.9	48 28.2	64 74	109.3	48 47.3	63 74	108.7	49 06.2	63 74	108.1	49 25.0	62 74	107.5	49 43.5	61 75	106.9	1
2	46 46.3	65 73	110.1	47 05.7	65 73	109.5	47 25.0	64 74	109.0	47 44.1	63 74	108.4	48 03.0	63 74	107.8	48 21.8	62 75	107.2	48 40.4	62 75	106.6	48 58.8	61 75	106.0	2
3	46 02.4	65 74	109.2	46 21.6	64 74	108.6	46 40.8	63 74	108.1	46 59.7	63 74	107.5	47 18.5	62 74	106.9	47 37.2	62 75	106.4	47 55.6	61 75	105.8	48 13.9	61 75	105.2	3
4	45 18.2	64 74	108.3	45 37.4	64 74	107.7	45 56.3	63 74	107.2	46 15.2	62 75	106.6	46 33.8	62 75	106.1	46 52.3	61 75	105.5	47 10.6	61 75	104.9	47 28.8	60 75	104.3	4
45	44 33.8	64 74	107.4	44 52.8	63 75	106.9	45 11.7	63 75	106.3	45 30.4	62 75	105.8	45 48.9	62 75	105.2	46 07.3	61 75	104.7	46 25.5	60 76	104.1	46 43.5	60 76	103.5	45
6	43 49.2	63 75	106.6	44 08.1	63 75	106.1	44 26.9	62 75	105.5	44 45.4	62 75	105.0	45 03.9	61 75	104.4	45 22.1	61 76	103.8	45 40.2	60 76	103.3	45 58.1	59 76	102.7	6
7	43 04.5	63 75	105.8	43 23.2	62 75	105.2	43 41.8	62 75	104.7	44 00.3	61 76	104.1	44 18.6	61 76	103.6	44 36.8	60 76	103.0	44 54.7	60 76	102.5	45 12.5	59 76	101.9	7
8	42 19.5	62 75	104.9	42 38.1	62 75	104.4	42 56.6	61 76	103.9	43 15.0	61 76	103.3	43 33.2	60 76	102.8	43 51.3	60 76	102.2	44 09.1	59 76	101.7	44 26.9	59 76	101.1	8
9	41 34.3	62 75	104.1	41 52.9	62 75	103.6	42 11.3	61 75	103.1	42 29.5	61 76	102.5	42 47.7	60 76	102.0	43 05.6	59 76	101.4	43 23.4	59 76	100.9	43 41.0	58 77	100.3	9
50	40 49.1	62 76	103.2	41 07.5	61 76	102.8	41 25.8	61 76	102.3	41 44.0	60 76	101.8	42 02.0	60 76	101.2	42 19.9	59 76	100.7	42 37.6	59 77	100.1	42 55.1	58 77	99.6	50
1	40 03.6	61 76	102.6	40 22.0	61 76	102.0	40 40.2	60 76	101.5	40 58.3	60 76	101.0	41 16.2	60 77	100.5	41 34.0	59 77	99.9	41 51.6	59 77	99.4	42 09.1	58 77	98.8	1
2	39 18.0	61 76	101.8	39 36.3	61 76	101.3	39 54.4	60 76	100.8	40 12.4	60 77	100.2	40 30.3	59 77	99.7	40 48.0	59 77	99.2	41 05.6	58 77	98.6	41 23.0	58 77	98.1	2
3	38 32.3	61 76	101.0	38 50.5	60 76	100.5	39 08.6	60 77	100.0	39 26.5	59 77	99.5	39 44.3	59 77	99.0	40 01.9	59 77	98.4	40 19.4	57 77	97.9	40 36.8	57 77	97.4	3
4	37 46.5	61 77	100.3	38 04.6	60 77	99.8	38 22.6	60 77	99.3	38 40.5	59 77	98.8	38 58.2	59 77	98.3	39 15.8	59 77	97.7	39 33.2	58 77	97.2	39 50.5	57 77	96.7	4
55	37 00.6	60 77	99.6	37 18.6	60 77	99.1	37 36.5	60 77	98.6	37 54.3	59 77	98.1	38 12.0	59 77	97.5	38 29.5	58 77	97.0	38 46.9	58 77	96.5	39 04.1	57 77	96.0	55
6	36 14.6	60 77	98.8	36 32.5	60 77	98.4	36 50.4	59 77	97.9	37 08.1	59 77	97.3	37 25.7	59 77	96.8	37 43.2	58 77	96.3	38 00.5	58 77	95.8	38 17.7	57 77	95.3	6
7	35 28.4	60 77	98.1	35 46.4	60 77	97.6	36 04.2	59 77	97.1	36 21.8	59 77	96.6	36 39.4	58 77	96.1	36 56.8	58 77	95.6	37 14.1	57 77	95.1	37 31.3	57 78	94.6	7
8	34 42.2	60 77	97.4	35 00.1	59 77	96.9	35 17.9	59 77	96.5	35 35.5	59 77	96.0	35 53.0	58 77	95.5	36 10.4	58 77	94.9	36 27.7	57 78	94.4	36 44.8	57 78	93.9	8
9	33 56.0	60 77	96.7	34 13.8	59 77	96.3	34 31.5	59 77	95.8	34 49.1	58 77	95.3	35 06.6	58 77	94.8	35 23.9	58 78	94.3	35 41.1	57 78	93.8	35 58.2	57 78	93.3	9
60	33 09.6	59 77	96.1	33 27.4	59 77	95.6	33 45.1	59 77	95.1	34 02.6	58 77	94.6	34 20.1	58 78	94.1	34 37.4	58 78	93.6	34 54.6	58 78	93.1	35 11.7	57 78	92.6	60
1	32 23.2	59 77	95.4	32 41.0	59 78	94.9	32 58.6	59 78	94.4	33 16.1	58 78	93.9	33 33.6	58 78	93.4	33 50.8	57 78	93.0	34 08.0	57 78	92.5	34 25.1	57 78	92.0	1
2	31 36.8	59 78	94.7	31 54.5	59 78	94.2	32 12.1	59 78	93.7	32 29.6	58 78	93.3	32 47.0	58 78	92.8	33 04.3	57 78	92.3	33 21.4	57 78	91.8	33 38.5	57 78	91.3	2
3	30 50.3	59 78	94.0	31 08.0	59 78	93.6	31 25.6	58 78	93.1	31 43.0	58 78	92.6	32 00.4	58 78	92.1	32 17.7	57 78	91.7	32 34.8	57 78	91.2	32 51.9	57 78	90.7	3
4	30 03.8	59 78	93.4	30 21.4	59 78	92.9	30 39.0	58 78	92.4	30 56.4	58 78	92.0	31 13.8	58 78	91.5	31 31.1	57 78	91.0	31 48.2	57 78	90.5	32 05.2	57 78	90.0	4
65	29 17.2	59 78	92.7	29 34.8	59 78	92.3	29 52.4	58 78	91.8	30 09.8	58 78	91.3	30 27.2	58 78	90.9	30 44.4	57 78	90.4	31 01.6	57 78	89.9	31 18.6	57 78	89.4	65
6	28 30.6	59 78	92.1	28 48.2	59 78	91.6	29 05.8	58 78	91.2	29 23.2	58 78	90.7	29 40.6	58 78	90.2	29 57.8	57 78	89.7	30 14.9	57 78	89.3	30 32.0	57 78	88.8	6
7	27 44.0	59 78	91.4	28 01.6	59 78	91.0	28 19.1	58 78	90.5	28 36.6	58 78	90.1	28 53.9	58 78	89.6	29 11.2	57 78	89.1	29 28.3	57 78	88.6	29 45.4	57 78	88.1	7
8	26 57.4	59 78	90.8	27 15.0	59 78	90.3	27 32.5	58 78	89.9	27 50.0	58 78	89.4	28 07.3	58 78	89.0	28 24.6	57 78	88.5	28 41.7	57 78	88.0	28 58.8	57 78	87.6	8
9	26 10.8	59 78	90.2	26 28.4	59 78	89.7	26 45.9	58 78	89.3	27 03.3	58 78	88.8	27 20.7	58 78	88.3	27 37.9	57 78	87.9	27 55.1	57 78	87.4	28 12.2	57 78	87.0	9
70	25 24.1	59 78	89.5	25 41.7	59 78	89.1	25 59.3	58 78	88.6	26 16.7	58 78	88.2	26 34.1	58 78	87.7	26 51.4	58 78	87.3	27 08.6	58 78	86.8	27 25.6	57 78	86.3	70
1	24 37.5	59 78	88.9	24 55.1	59 78	88.5	25 12.7	58 78	88.0	25 30.1	58 78	87.6	25 47.5	58 78	87.1	26 04.8	58 78	86.7	26 22.0	57 78	86.2	26 39.1	57 77	85.7	1
2	23 50.9	59 78	88.3	24 08.5	59 78	87.8	24 26.1	58 78	87.4	24 43.5	58 78	87.0	25 00.9	58 78	86.5	25 18.3	58 78	86.1	25 35.5	57 78	85.6	25 52.6	57 77	85.1	2
3	23 04.3	59 78	87.7	23 21.9	59 78	87.2	23 39.5	58 78	86.8	23 57.0	58 78	86.3	24 14.4	58 77	85.9	24 31.8	58 77	85.5	24 49.0	57 77	85.0	25 06.2	57 77	84.6	3
4	22 17.7	59 78	87.1	22 35.4	59 78	86.6	22 53.0	58 78	86.2	23 10.5	58 77	85.7	23 27.9	58 77	85.3	23 45.3	58 77	84.9	24 02.6	57 77	84.4	24 19.8	57 77	84.0	4
75	21 31.2	59 77	86.4	21 48.8	59 78	86.0	22 06.5	59 77	85.6	22 24.0	59 77	85.1	22 41.5	58 77	84.7	22 58.9	58 77	84.3	23 16.2	58 77	83.8	23 33.5	57 77	83.4	75
6	20 44.6	59 77	85.8	21 02.3	59 77	85.4	21 20.0	59 77	85.0	21 37.6	59 77	84.5	21 55.1	58 77	84.1	22 12.5	58 77	83.7	22 29.9	58 77	83.2	22 47.2	57 77	82.8	6
7	19 58.1	59 77	85.2	20 15.9	59 77	84.8	20 33.6	59 77	84.4	20 51.2	59 77	83.9	21 08.7	58 77	83.5	21 26.2	58 77	83.1	21 43.6	58 77	82.6	22 01.0	58 77	82.2	7
8	19 11.7	59 77	84.6	19 29.5	59 77	84.2	19 47.2	59 77	83.8	20 04.8	59 77	83.3	20 22.4	58 77	82.9	20 39.9	58 77	82.5	20 57.4	58 77	82.0	21 14.8	58 77	81.6	8
9	18 25.3	59 77	84.0	18 43.1	59 77	83.6	19 00.9	59 77	83.2	19 18.5	59 77	82.7	19 36.2	59 77	82.3	19 53.7	58 77	81.9	20 11.3	58 77	81.5	20 28.7	58 77	81.0	9
80	17 38.9	60 77	83.4	17 56.8	59 77	83.0	18 14.6	59 77	82.6	18 32.3	59 77	82.2	18 50.0	59 77	81.7	19 07.6	59 77	81.3	19 25.2	58 77	80.9	19 42.7	58 77	80.4	80
1	16 52.7	60 77	82.8	17 10.5	60 77	82.4	17 28.4	59 77	82.0	17 46.2	59 77	81.6	18 03.9	59 77	81.1	18 21.6	59 77	80.7	18 39.2	59 77	80.3	18 56.7	58 77	79.9	1
2	16 06.4	60 77	82.2	16 24.4	60 77	81.8	16 42.2	60 77	81.4	17 00.1	59 77	81.0	17 17.9	59 77	80.5	17 35.6	59 76	80.1	17 53.3	59 76	79.7	18 10.9	58 76	79.3	2
3	15 20.3	60 77	81.6	15 38.2	60 77	81.2	15 56.2	60 77	80.8	16 14.1	59 77	80.4	16 31.9	59 77	80.0	16 49.7	59 76	79.5	17 07.4	59 76	79.1	17 25.1	59 76	78.7	3
4	14 34.2	60 77	81.0	14 52.2	60 77	80.6	15 10.2	60 77	80.2	15 28.1	60 77	79.8	15 46.0	60 77	79.4	16 03.9	59 76	78.9	16 21.7	59 76	78.5	16 39.4	59 76	78.1	4
85	13 48.1	60 77	80.4	14 06.2	60 76	80.0	14 24.3	60 76	79.6	14 42.5	60 76	79.2	15 00.2	60 76	78.8	15 18.2	60 76	78.4	15 36.0	59 76	77.9	15 53.9	59 76	77.5	85
6	13 02.0	61 76	79.8	13 20.4	60 76	79.4	13 38.5	60 76	79.0	13 56.5	60 76	78.6	14 14.6	60 76	78.2	14 32.5	60 76	77.8	14 50.5	60 76	77.4	15 08.4	60 76	76.9	6
7	12 16.3	61 76	79.2	12 34.6	61 76	78.8	12 52.7	61 76	78.4	13 10.9	61 76	78.0	13 29.0	60 76	77.6	13 47.0	60 76	77.2	14 05.0	60 76	76.8	14 23.0	60 75	76.4	7
8	11 30.6	61 76	78.6	11 48.9	61 76	78.2	12 07.1	61 76	77.8	12 25.3	61 76	77.4	12 43.5	60 76	77.0	13 01.6	60 76	76.6	13 19.7	60 75	76.2	13 37.8	60 75	75.8	8
9	10 44.9	61 76	78.0	11 03.2	61 76	77.6	11 21.6	61 76	77.2	11 39.9	61 76	76.8	11 58.1	61 75	76.4	12 16.3	61 75	76.0	12 34.5	61 75	75.6	12 52.6	61 75	75.2	9
90	9 59.4	61 76	77.4	10 17.8	61 76	77.0	10 36.2	61 76	76.6	10 54.5	61 75	76.2	11 12.8	61 75	75.8	11 31.1	61 75	75.4	11 49.4	61 75	75.0	12 07.6	61 75	74.6	90

H.A.	16° 00' Alt.	Δd Δt	Az.	16° 30' Alt.	Δd Δt	Az.	17° 00' Alt.	Δd Δt	Az.	17° 30' Alt.	Δd Δt	Az.	18° 00' Alt.	Δd Δt	Az.	18° 30' Alt.	Δd Δt	Az.	19° 00' Alt.	Δd Δt	Az.	19° 30' Alt.	Δd Δt	Az.	H.A.
00	35 00.0	1.0 01	180.0	34 30.0	1.0 01	180.0	34 00.0	1.0 01	180.0	33 30.0	1.0 01	180.0	33 00.0	1.0 01	180.0	32 30.0	1.0 01	180.0	32 00.0	1.0 01	180.0	31 30.0	1.0 01	180.0	00
1	34 59.5	1.0 02	178.8	34 29.5	1.0 02	178.8	33 59.5	1.0 02	178.8	33 29.5	1.0 02	178.9	32 59.5	1.0 02	178.9	32 29.5	1.0 02	178.9	31 59.5	1.0 02	178.9	31 29.5	1.0 02	178.9	1
2	34 58.1	1.0 04	177.7	34 28.1	1.0 04	177.7	33 58.1	1.0 04	177.7	33 28.1	1.0 04	177.7	32 58.1	1.0 04	177.7	32 28.2	1.0 04	177.8	31 58.2	1.0 04	177.8	31 28.2	1.0 04	177.8	2
3	34 55.7	1.0 06	176.5	34 25.7	1.0 06	176.5	33 55.8	1.0 05	176.5	33 25.8	1.0 05	176.6	32 55.8	1.0 05	176.6	32 25.9	1.0 05	176.6	31 55.9	1.0 05	176.7	31 26.0	1.0 05	176.7	3
4	34 52.4	1.0 07	175.3	34 22.4	1.0 07	175.3	33 52.5	1.0 07	175.4	33 22.6	1.0 07	175.4	32 52.6	1.0 07	175.4	32 22.7	1.0 07	175.5	31 52.7	1.0 07	175.5	31 22.8	1.0 07	175.6	4
05	34 48.1	1.0 09	174.1	34 18.2	1.0 09	174.2	33 48.3	1.0 09	174.2	33 18.4	1.0 08	174.3	32 48.5	1.0 08	174.3	32 18.6	1.0 08	174.4	31 48.7	1.0 08	174.4	31 18.8	1.0 08	174.5	05
6	34 42.9	1.0 10	173.0	34 13.0	1.0 10	173.0	33 43.1	1.0 10	173.1	33 13.3	1.0 10	173.2	32 43.4	1.0 10	173.2	32 13.6	1.0 10	173.3	31 43.7	1.0 10	173.3	31 13.8	1.0 10	173.4	6
7	34 36.7	99 12	171.8	34 06.9	99 12	171.9	33 37.1	99 12	172.0	33 07.3	99 12	172.0	32 37.5	99 11	172.1	32 07.7	99 11	172.2	31 37.8	99 11	172.2	31 08.0	99 11	172.3	7
8	34 29.6	99 13	170.7	33 59.8	99 13	170.8	33 30.0	99 13	170.8	33 00.3	99 13	170.9	32 30.6	99 13	171.0	32 00.8	99 13	171.0	31 31.1	99 13	171.1	31 01.3	99 13	171.2	8
9	34 21.6	99 15	169.5	33 51.9	99 15	169.6	33 22.2	99 15	169.7	32 52.5	99 15	169.8	32 22.8	99 14	169.9	31 53.1	99 14	169.9	31 23.4	99 14	170.0	30 53.8	99 14	170.1	9
10	34 12.6	99 16	168.4	33 43.0	99 16	168.5	33 13.4	99 16	168.6	32 43.8	99 16	168.6	32 14.2	99 16	168.7	31 44.6	99 16	168.8	31 14.9	99 16	168.9	30 45.3	99 16	169.0	10
1	34 02.7	98 18	167.2	33 33.2	98 18	167.3	33 03.7	98 18	167.4	32 34.2	98 18	167.5	32 04.6	98 17	167.6	31 35.1	98 17	167.7	31 05.5	98 17	167.8	30 36.0	99 17	167.9	1
2	33 52.0	98 19	166.1	33 22.5	98 19	166.2	32 53.1	98 19	166.3	32 23.6	98 19	166.4	31 54.2	98 19	166.5	31 24.7	98 19	166.6	30 55.3	98 19	166.8	30 25.8	98 18	166.9	2
3	33 40.3	98 21	164.9	33 11.0	98 21	165.1	32 41.6	98 21	165.2	32 12.3	98 20	165.3	31 42.9	98 20	165.4	31 13.5	98 20	165.6	30 44.2	98 20	165.7	30 14.8	98 20	165.8	3
4	33 27.7	97 22	163.8	32 58.5	97 22	163.9	32 29.3	97 22	164.1	32 00.0	98 22	164.2	31 30.7	98 22	164.3	31 01.5	98 22	164.5	30 32.2	98 21	164.6	30 02.9	98 21	164.7	4
15	33 14.3	97 24	162.7	32 45.2	97 24	162.8	32 16.0	97 23	163.0	31 46.9	97 23	163.1	31 17.7	97 23	163.3	30 48.6	97 23	163.4	30 19.4	97 23	163.5	29 50.2	97 23	163.7	15
6	33 00.0	97 25	161.6	32 31.0	97 25	161.7	32 02.0	97 25	161.9	31 32.9	97 25	162.0	31 03.9	97 24	162.2	30 34.8	97 24	162.3	30 05.8	97 24	162.5	29 36.7	97 24	162.6	6
7	32 44.8	96 27	160.5	32 15.9	96 26	160.6	31 47.0	96 26	160.8	31 18.1	96 26	161.0	30 49.2	96 26	161.1	30 20.3	96 26	161.3	29 51.3	97 25	161.4	29 22.4	97 25	161.6	7
8	32 28.8	96 28	159.4	32 00.1	96 28	159.6	31 31.3	96 28	159.7	31 02.5	96 27	159.9	30 33.7	96 27	160.0	30 04.9	96 27	160.2	29 36.1	96 27	160.4	29 07.2	96 27	160.5	8
9	32 12.0	95 29	158.3	31 43.4	95 29	158.5	31 14.7	96 29	158.6	30 46.1	96 29	158.8	30 17.4	96 29	159.0	29 48.7	96 28	159.2	29 20.0	96 28	159.3	28 51.3	96 28	159.5	9
20	31 54.3	95 31	157.2	31 25.8	95 31	157.4	30 57.3	95 30	157.6	30 28.8	95 30	157.8	30 00.3	95 30	157.9	29 31.7	95 30	158.1	29 03.1	95 29	158.3	28 34.5	96 29	158.5	20
1	31 35.9	95 32	156.1	31 07.5	95 32	156.3	30 39.2	95 32	156.5	30 10.8	95 31	156.7	29 42.4	95 31	156.9	29 13.9	95 31	157.1	28 45.5	95 31	157.3	28 17.0	95 30	157.4	1
2	31 16.6	94 33	155.1	30 48.4	94 33	155.3	30 20.2	94 33	155.5	29 51.9	94 33	155.7	29 23.7	94 32	155.9	28 55.4	94 32	156.1	28 27.1	94 32	156.2	27 58.8	94 32	156.4	2
3	30 56.6	94 34	154.0	30 28.5	94 34	154.2	30 00.4	94 34	154.4	29 32.3	94 34	154.6	29 04.2	94 34	154.8	28 36.1	94 33	155.0	28 07.9	94 33	155.2	27 39.8	94 33	155.4	3
4	30 35.8	93 36	153.0	30 07.9	93 36	153.2	29 40.0	93 35	153.4	29 12.0	93 35	153.6	28 44.0	93 35	153.8	28 16.0	93 35	154.0	27 48.0	93 34	154.2	27 20.0	93 34	154.4	4
25	30 14.2	92 37	152.0	29 46.5	93 37	152.2	29 18.7	93 37	152.4	28 50.9	93 36	152.6	28 23.1	93 36	152.8	27 55.2	93 36	153.0	27 27.4	93 36	153.2	26 59.5	93 35	153.4	25
6	29 52.0	92 38	150.9	29 24.4	92 38	151.2	28 56.7	92 38	151.4	28 29.1	92 38	151.6	28 01.4	92 37	151.8	27 33.7	92 37	152.0	27 06.0	92 37	152.3	26 38.3	92 36	152.5	6
7	29 28.9	91 40	149.9	29 01.5	91 39	150.1	28 34.0	92 39	150.3	28 06.6	92 39	150.5	27 39.0	92 38	150.8	27 11.5	92 38	151.1	26 44.0	92 38	151.3	26 16.4	92 38	151.5	7
8	29 05.2	91 41	148.9	28 37.9	91 40	149.1	28 10.6	91 40	149.4	27 43.3	91 40	149.6	27 16.0	91 40	149.8	26 48.6	91 39	150.1	26 21.2	91 39	150.3	25 53.8	91 39	150.5	8
9	28 40.8	90 42	147.9	28 13.7	90 42	148.2	27 46.5	90 41	148.4	27 19.4	91 41	148.6	26 52.2	91 41	148.9	26 25.0	91 40	149.1	25 57.8	91 40	149.3	25 30.5	91 40	149.6	9
30	28 15.7	90 43	146.9	27 48.7	90 43	147.2	27 21.8	90 42	147.4	26 54.8	90 42	147.7	26 27.8	90 42	147.9	26 00.7	90 42	148.2	25 33.7	90 41	148.4	25 06.6	90 41	148.6	30
1	27 49.9	89 44	146.0	27 23.1	89 44	146.2	26 56.3	89 43	146.5	26 29.5	89 43	146.7	26 02.7	90 43	147.0	25 35.8	90 43	147.2	25 08.9	90 42	147.5	24 42.0	90 42	147.7	1
2	27 23.5	89 45	145.0	26 56.9	89 45	145.3	26 30.3	89 45	145.5	26 03.5	89 44	145.8	25 36.9	89 44	146.0	25 10.2	89 44	146.3	24 43.5	89 43	146.5	24 16.8	89 43	146.8	2
3	26 56.4	88 46	144.0	26 30.0	88 46	144.3	26 03.5	88 46	144.6	25 37.1	88 45	144.8	25 10.6	88 45	145.1	24 44.0	88 45	145.3	24 17.5	88 44	145.6	23 50.9	88 44	145.9	3
4	26 28.7	87 47	143.1	26 02.5	88 47	143.4	25 36.2	88 47	143.6	25 09.9	88 46	143.9	24 43.6	88 46	144.2	24 17.2	88 46	144.4	23 50.8	88 45	144.7	23 24.4	88 45	144.9	4
35	26 00.4	87 48	142.2	25 34.3	87 48	142.4	25 08.2	87 48	142.7	24 42.1	87 47	143.0	24 16.0	87 47	143.2	23 49.8	87 47	143.5	23 23.6	87 46	143.8	22 57.3	88 46	144.0	35
6	25 31.5	86 49	141.2	25 05.6	86 49	141.5	24 39.7	86 49	141.8	24 13.7	87 48	142.1	23 47.8	87 48	142.3	23 21.8	87 48	142.6	22 55.7	87 47	142.9	22 29.7	87 47	143.2	6
7	25 02.0	86 50	140.3	24 36.3	86 50	140.6	24 10.6	86 50	140.9	23 44.8	86 49	141.2	23 19.0	86 49	141.4	22 53.2	86 49	141.7	22 27.3	86 48	142.0	22 01.4	86 48	142.3	7
8	24 32.0	85 51	139.6	24 06.4	85 51	139.7	23 40.9	85 50	140.0	23 15.3	85 50	140.3	22 49.6	85 50	140.6	22 24.0	86 50	140.8	21 58.3	86 49	141.1	21 32.6	86 49	141.4	8
9	24 01.4	84 52	138.5	23 36.0	85 52	138.8	23 10.6	85 51	139.1	22 45.2	85 51	139.4	22 19.7	85 51	139.7	21 54.3	85 50	140.0	21 28.8	85 50	140.2	21 03.2	85 50	140.5	9
40	23 30.2	84 53	137.6	23 05.0	84 52	137.9	22 39.8	84 52	138.2	22 14.6	84 52	138.5	21 49.3	84 52	138.8	21 24.0	84 51	139.1	20 58.7	84 51	139.4	20 33.3	85 51	139.7	40
1	22 58.5	83 54	136.8	22 33.5	83 53	137.1	22 08.5	83 53	137.4	21 43.4	83 53	137.7	21 18.3	84 52	138.0	20 53.2	84 52	138.2	20 28.1	84 52	138.5	20 02.9	84 52	138.8	1
2	22 26.3	83 54	135.9	22 01.5	83 54	136.2	21 36.7	83 54	136.5	21 11.8	83 53	136.8	20 46.9	83 53	137.1	20 21.9	83 53	137.4	19 56.9	83 53	137.7	19 31.9	83 52	138.0	2
3	21 53.6	82 55	135.0	21 29.0	82 55	135.4	21 04.3	82 55	135.7	20 39.6	82 54	136.0	20 14.9	83 54	136.3	19 50.1	83 54	136.6	19 25.3	83 54	136.9	19 00.5	83 53	137.2	3
4	21 20.4	81 56	134.2	20 56.0	82 56	134.5	20 31.5	82 56	134.8	20 06.9	82 55	135.1	19 42.4	82 55	135.4	19 17.8	82 55	135.7	18 53.2	82 54	136.0	18 28.5	82 54	136.3	4
45	20 46.8	81 57	133.4	20 22.5	81 57	133.7	19 58.2	81 56	134.0	19 33.8	81 56	134.3	19 09.4	81 56	134.6	18 45.0	81 55	134.9	18 20.6	82 55	135.2	17 56.1	82 55	135.5	45
6	20 12.6	80 58	132.5	19 48.5	80 57	132.9	19 24.4	81 57	133.2	19 00.2	81 57	133.5	18 36.0	81 56	133.8	18 11.8	81 56	134.1	17 47.5	81 56	134.4	17 23.2	81 56	134.7	6
7	19 38.1	80 58	131.7	19 14.1	80 58	132.0	18 50.0	80 58	132.4	18 26.1	80 58	132.7	18 02.1	80 58	133.0	17 38.0	80 57	133.3	17 13.9	80 57	133.6	16 49.8	80 56	133.9	7
8	19 03.0	79 59	130.9	18 39.3	80 58	131.2	18 15.5	79 58	131.6	17 51.6	79 58	131.9	17 27.8	80 58	132.2	17 03.9	80 58	132.5	16 40.0	80 57	132.8	16 16.0	80 57	133.1	8
9	18 27.6	79 60	130.1	18 04.0	79 59	130.4	17 40.4	79 59	130.8	17 16.7	79 59	131.1	16 53.0	79 58	131.4	16 29.3	79 58	131.7	16 05.6	79 58	132.0	15 41.8	79 58	132.4	9
50	17 51.7	78 60	129.3	17 28.3	78 60	129.6	17 04.8	78 60	130.0	16 41.3	78 60	130.3	16 17.8	78 59	130.6	15 54.3	79 60	130.9	15 30.7	79 59	131.3	15 07.1	79 58	131.6	50
1	17 15.4	77 61	128.5	16 52.2	78 61	128.9	16 28.9	78 61	129.2	16 05.5	78 60	129.5	15 42.2	78 60	129.8	15 18.9	78 60	130.2	14 55.5	78 60	130.5	14 32.0	78 59	130.8	1
2	16 38.8	77 62	127.8	16 15.7	77 62	128.1	15 52.6	77 61	128.4	15 29.4	77 61	128.8	15 06.2	77 61	129.1	14 43.0	77 60	129.4	14 19.8	77 60	129.7	13 56.5	78 60	130.1	2
3	16 01.7	76 62	127.0	15 38.8	76 62	127.3	15 15.8	77 62	127.7	14 52.9	77 62	128.0	14 29.8	77 61	128.3	14 06.8	77 61	128.7	13 43.7	77 61	129.0	13 20.7	77 60	129.3	3
4	15 24.3	76 63	126.2	15 01.5	76 63	126.6	14 38.7	76 62	126.9	14 15.9	76 62	127.2	13 53.1	76 62	127.6	13 30.2	76 62	127.9	13 07.3	76 61	128.2	12 44.4	76 61	128.6	4
55	14 46.5	75 64	125.5	14 23.9	75 63	125.8	14 01.3	75 63	126.2	13 38.6	76 63	126.5	13 15.9	76 62	126.8	12 53.2	76 62	127.2	12 30.5	76 62	127.5	12 07.7	76 62	127.8	55
6	14 08.3	75 64	124.7	13 45.9	75 64	125.1	13 23.4	75 64	125.4	13 01.0	75 63	125.8	12 38.4	75 63	126.1	12 15.9	75 63	126.4	11 53.3	75 63	126.8	11 30.7	75 62	127.1	6
7	13 29.9	74 65	124.0	13 07.6	74 64	124.3	12 45.3	74 64	124.7	12 22.9	74 64	125.0	12 00.6	74 64	125.4	11 38.2	75 63	125.7	11 15.8	75 63	126.0	10 53.4	75 63	126.4	7
8	12 51.0	74 65	123.3	12 28.9	74 65	123.6	12 06.6	74 65	124.0	11 44.6	74 64	124.3	11 22.4	74 64	124.6	11 00.2	74 64	125.0	10 37.9	74 64	125.3	10 15.7	74 63	125.7	8
9	12 11.9	73 66	122.5	11 49.9	73 66	122.9	11 27.9	73 65	123.2	11 05.9	73 65	123.6	10 43.9	74 65	123.9	10 21.8	74 64	124.3	9 59.7	74 64	124.6	9 37.6	74 64	125.0	9
60	11 32.4	73 66	121.8	11 10.6	73 66	122.2	10 48.8	73 66	122.5	10 26.9	73 66	122.9	10 05.0	73 65	123.2	9 43.1	73 65	123.6	9 21.2	73 65	123.9	8 59.2	73 64	124.3	60
1	10 52.6	72 67	121.1	10 31.0	72 67	121.5	10 09.3	72 66	121.8	9 47.6	72 66	122.2	9 25.8	72 66	122.5	9 04.1	73 66	122.9	8 42.3	73 65	123.3	8 20.5	73 65	123.6	1
2	10 12.6	72 67	120.4	9 51.1	72 67	120.8	9 29.5	72 67	121.1	9 08.0	72 67	121.5	8 46.4	72 66	121.8	8 24.8	72 66	122.2	8 03.2	72 66	122.5	7 41.5	72 66	122.9	2
3	9 32.2	71 68	119.7	9 10.9	71 67	120.1	8 49.5	71 67	120.4	8 28.0	71 67	120.8	8 06.6	71 67	121.1	7 45.2	72 67	121.5	7 23.7	72 66	121.8	7 02.2	72 66	122.2	3
4	8 51.6	71 68	119.0	8 30.4	71 68	119.4	8 09.1	71 68	119.7	7 47.8	71 67	120.1	7 26.6	71 67	120.5	7 05.3	71 67	120.8	6 43.9	71 67	121.2	6 22.6	71 66	121.5	4
65	8 10.7	70 69	118.3	7 49.6	70 68	118.7	7 28.5	70 68	119.1	7 07.4	70 68	119.4	6 46.2	70 68	119.8	6 25.1	71 67	120.1	6 03.9	71 67	120.5	5 42.7	71 67	120.8	65
6	7 29.5	70 69	117.6	7 08.6	70 69	118.0	6 47.6	70 69	118.4	6 26.6	70 68	118.7	6 05.6	70 68	119.1	5 44.6	70 68	119.5	5 23.6	70 68	119.8				6
7	6 48.1	69 69	117.0	6 27.3	69 69	117.3	6 06.4	69 69	117.7	5 45.6	70 69	118.1	5 24.7	70 69	118.4	5 03.9	70 68	118.8							7
8	6 06.4	69 70	116.3	5 45.7	69 70	116.7	5 25.0	69 69	117.0	5 04.3	69 69	117.4													8
9	5 24.5	68 70	115.7	5 03.9	69 70	116.0																			9

DECLINATION SAME NAME AS LATITUDE

H.A.	16° 00' Alt.	Δd Δt	Az.	16° 30' Alt.	Δd Δt	Az.	17° 00' Alt.	Δd Δt	Az.	17° 30' Alt.	Δd Δt	Az.	18° 00' Alt.	Δd Δt	Az.	18° 30' Alt.	Δd Δt	Az.	19° 00' Alt.	Δd Δt	Az.	19° 30' Alt.	Δd Δt	Az.	H.A.
91	9 13.9	62 76	76.8	9 32.4	62 75	76.4	9 50.8	61 75	76.0	10 09.3	61 75	75.6	10 27.7	61 75	75.2	10 46.1	61 75	74.8	11 04.4	61 75	74.4	11 22.7	61 75	74.0	91
2	8 28.6	62 75	76.2	8 47.1	62 75	75.8	9 05.7	62 75	75.4	9 24.2	62 75	75.0	9 42.7	62 75	74.6	10 01.1	61 75	74.2	10 19.5	61 75	73.8	10 37.9	61 74	73.4	2
3	7 43.3	62 75	75.6	8 02.0	62 75	75.2	8 20.6	62 75	74.8	8 39.2	62 75	74.4	8 57.8	62 75	74.0	9 16.3	62 74	73.6	9 34.8	62 74	73.3	9 53.3	62 74	72.9	3
4	6 58.2	62 75	75.0	7 16.9	62 75	74.6	7 35.6	62 75	74.2	7 54.3	62 75	73.8	8 13.0	62 74	73.5	8 31.6	62 74	73.1	8 50.2	62 74	72.7	9 08.8	62 74	72.3	4
95	6 13.2	63 75	74.4	6 32.0	63 75	74.0	6 50.8	63 74	73.6	7 09.6	63 74	73.2	7 28.4	62 74	72.9	7 47.1	62 74	72.5	8 05.8	62 74	72.1	8 24.5	62 74	71.7	95
6	5 28.4	63 75	73.8	5 47.3	63 74	73.4	6 06.2	63 74	73.0	6 25.0	63 74	72.6	6 43.9	63 74	72.2	7 02.7	62 74	71.9	7 21.5	63 74	71.5	7 40.3	63 73	71.1	6
7				5 02.7	63 74	72.8	5 21.6	63 74	72.4	5 40.6	63 74	72.0	5 59.5	63 74	71.7	6 18.5	63 73	71.3	6 37.4	63 73	70.9	6 56.3	63 73	70.5	7
8													5 15.4	63 73	71.0	5 34.4	63 73	70.7	5 53.4	63 73	70.3	6 12.4	63 73	69.9	8
9																			5 09.6	64 73	69.7	5 28.7	63 73	69.3	9

Lat. 39°

H.A.	20° 00′			20° 30′			21° 00′			21° 30′			22° 00′			22° 30′			23° 00′			23° 30′			H.A.
	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	Alt.	Δd Δt	Az.	
00	71 00.0	1.0 02	180.0	71 30.0	1.0 02	180.0	72 00.0	1.0 02	180.0	72 30.0	1.0 02	180.0	73 00.0	1.0 02	180.0	73 30.0	1.0 02	180.0	74 00.0	1.0 02	180.0	74 30.0	1.0 02	180.0	00
1	70 58.8	1.0 06	177.1	71 28.8	1.0 06	177.0	71 58.8	1.0 06	177.0	72 28.7	1.0 06	176.9	72 58.7	1.0 06	176.8	73 28.7	1.0 07	176.7	73 58.6	1.0 07	176.7	74 28.6	1.0 07	176.6	1
2	70 55.3	1.0 10	174.2	71 25.2	1.0 10	174.1	71 55.1	1.0 10	174.1	72 25.0	1.0 10	173.8	72 54.8	1.0 11	173.7	73 24.7	1.0 11	173.5	73 54.6	1.0 11	173.3	74 24.4	99 12	173.2	2
3	70 49.5	99 14	171.4	71 19.2	99 14	171.2	71 49.0	99 14	171.0	72 18.7	99 14	170.8	72 48.4	98 16	170.6	73 18.2	98 16	170.3	73 47.8	98 17	170.1	74 17.5	98 17	169.8	3
4	70 41.4	99 17	168.6	71 10.9	99 18	168.3	71 40.5	99 18	168.0	72 10.0	98 18	167.8	72 39.6	98 19	167.5	73 09.0	98 19	167.2	73 38.5	98 20	166.8	74 07.9	98 20	166.5	4
05	70 31.0	98 21	165.8	71 00.4	98 21	165.5	71 29.7	98 22	165.1	71 59.0	98 22	164.8	72 28.2	97 23	164.4	72 57.4	97 23	164.1	73 26.6	97 24	163.6	73 55.7	97 24	163.2	05
6	70 18.5	97 24	163.1	70 47.6	97 25	162.7	71 16.6	97 25	162.3	71 45.6	97 26	161.9	72 14.6	96 27	161.5	72 43.5	96 27	161.0	73 12.3	96 28	160.5	73 41.0	96 28	160.0	6
7	70 03.9	96 28	160.4	70 32.6	96 28	160.0	71 01.4	96 29	159.5	71 30.0	96 30	159.1	71 58.6	95 30	158.6	72 27.2	95 31	158.1	72 55.6	95 32	157.5	73 23.9	94 32	157.0	7
8	69 47.2	95 31	157.8	70 15.6	95 32	157.3	70 44.0	94 32	156.8	71 12.3	94 33	156.3	71 40.5	94 34	155.8	72 08.7	94 34	155.2	72 36.7	93 35	154.6	73 04.6	93 36	154.0	8
9	69 28.6	94 34	155.2	69 56.7	94 35	154.7	70 24.7	93 35	154.2	70 52.6	93 36	153.6	71 20.4	93 37	153.0	71 48.1	92 38	152.4	72 15.7	92 38	151.8	72 43.1	91 39	151.1	9
10	69 08.1	93 37	152.7	69 35.8	92 38	152.2	70 03.4	92 38	151.6	70 30.9	91 39	151.0	70 58.3	91 40	150.4	71 25.5	91 41	149.8	71 52.7	90 41	149.1	72 19.6	90 42	148.4	10
1	68 45.9	91 40	150.3	69 13.2	91 41	149.7	69 40.4	90 41	149.1	70 07.5	90 42	148.5	70 34.4	89 43	147.8	71 01.2	89 43	147.2	71 28.0	88 44	146.5	71 54.2	88 45	145.7	1
2	68 22.0	90 42	148.0	68 49.9	90 43	147.3	69 15.6	89 44	146.8	69 42.3	88 45	146.1	70 08.7	88 45	145.4	70 35.0	87 46	144.7	71 01.2	87 47	144.0	71 27.1	86 48	143.2	2
3	67 56.5	89 45	145.7	68 23.0	88 46	145.1	68 49.3	88 46	144.5	69 15.5	87 47	143.8	69 41.5	86 48	143.1	70 07.3	86 49	142.3	70 32.9	85 50	141.6	70 58.4	84 50	140.7	3
4	67 29.5	87 47	143.6	67 55.6	87 48	142.9	68 21.5	86 49	142.2	68 47.2	85 49	141.5	69 12.7	85 50	140.8	69 38.1	84 51	140.0	70 03.2	83 52	139.2	70 28.1	83 53	138.4	4
15	67 01.1	86 50	141.5	67 26.8	85 50	140.8	67 52.2	85 51	140.1	68 17.5	84 52	139.4	68 42.6	83 52	138.6	69 07.5	83 53	137.9	69 32.1	82 54	137.0	69 56.5	81 55	136.2	15
6	66 31.5	84 52	139.4	66 56.7	83 53	138.8	67 21.7	83 53	138.0	67 46.5	82 54	137.3	68 11.1	82 55	136.5	68 35.5	80 56	135.8	68 59.7	80 56	134.9	69 23.6	79 57	134.1	6
7	66 00.5	83 53	137.5	66 25.3	82 54	136.8	66 49.9	82 55	136.1	67 14.3	81 56	135.3	67 38.5	80 56	134.6	68 02.4	79 57	133.8	68 26.1	79 58	132.9	68 49.6	78 59	132.1	7
8	65 28.5	82 55	135.6	65 52.8	81 56	134.9	66 17.0	80 57	134.2	66 41.0	79 57	133.4	67 04.7	79 58	132.6	67 28.2	78 59	131.8	67 51.4	77 59	131.0	68 14.4	76 60	130.1	8
9	64 55.3	80 57	133.8	65 19.3	80 58	133.1	65 43.0	79 58	132.3	66 06.6	78 59	131.6	66 29.9	78 59	130.8	66 53.0	76 60	130.0	67 15.8	76 61	129.2	67 38.3	75 62	128.3	9
20	64 21.2	79 59	132.1	64 44.8	78 60	131.3	65 08.1	77 60	130.6	65 31.2	77 61	129.8	65 54.1	76 61	129.0	66 16.8	74 62	128.2	66 39.2	74 63	127.4	67 01.3	73 63	126.5	20
1	63 46.1	78 60	130.4	64 09.3	77 61	129.6	64 32.3	76 61	128.9	64 55.0	75 62	128.1	65 17.5	75 62	127.2	65 39.7	74 63	126.5	66 01.7	73 64	125.7	66 23.4	72 64	124.9	1
2	63 10.1	76 61	128.7	63 33.0	76 62	128.0	63 55.6	75 62	127.3	64 17.9	74 63	126.5	64 40.0	73 64	125.7	65 01.9	72 64	124.9	65 23.5	71 66	124.1	65 44.8	71 66	123.2	2
3	62 33.4	75 63	127.2	62 55.8	74 63	126.5	63 18.1	74 64	125.7	63 40.1	73 64	125.0	64 01.8	72 65	124.2	64 23.3	71 65	123.4	64 44.5	70 66	122.6	65 05.4	69 67	121.7	3
4	61 55.9	73 64	125.7	62 18.0	73 64	125.0	62 39.9	73 65	124.3	63 01.5	72 65	123.5	63 22.9	71 66	122.7	63 44.0	70 66	121.9	64 04.9	69 67	121.1	64 25.5	68 68	120.2	4
25	61 17.6	73 65	124.2	61 39.4	72 65	123.5	62 01.0	71 66	122.8	62 22.3	71 66	122.0	62 43.3	70 67	121.2	63 04.1	69 67	120.5	63 24.6	68 68	119.6	63 44.9	67 69	118.8	25
6	60 38.8	72 66	122.8	61 00.2	71 66	122.1	61 21.5	70 67	121.4	61 42.4	70 67	120.6	62 03.2	69 68	119.9	62 23.6	68 68	119.1	62 43.8	67 69	118.3	63 03.8	66 69	117.5	6
7	59 59.3	71 67	121.5	60 20.4	70 67	120.8	60 41.4	70 68	120.0	61 02.0	69 68	119.3	61 22.5	68 69	118.5	61 42.6	67 69	117.7	62 02.5	66 70	117.0	62 22.1	65 70	116.1	7
8	59 19.2	70 68	120.2	59 40.1	69 68	119.5	60 00.7	68 69	118.7	60 21.1	68 69	118.0	60 41.2	67 70	117.2	61 01.1	66 70	116.5	61 20.7	65 71	115.7	61 40.1	64 71	114.9	8
9	58 38.7	69 68	118.9	58 59.3	68 69	118.2	59 19.6	67 69	117.5	59 39.7	67 70	116.7	59 59.6	66 70	116.0	60 19.2	65 71	115.2	60 38.5	64 71	114.5	60 57.5	63 72	113.7	9
30	57 57.6	68 69	117.7	58 17.9	68 70	117.0	58 38.0	67 70	116.3	58 57.8	66 71	115.5	59 17.4	65 71	114.8	59 36.8	64 71	114.0	59 55.8	63 72	113.3	60 14.6	62 72	112.5	30
1	57 16.1	67 70	116.5	57 36.1	66 70	115.8	57 56.0	66 71	115.1	58 15.6	65 71	114.4	58 34.9	64 72	113.6	58 54.0	63 72	112.9	59 12.8	62 72	112.1	59 31.4	61 73	111.4	1
2	56 34.2	66 71	115.3	56 54.0	66 71	114.6	57 13.6	65 71	113.9	57 32.9	64 72	113.2	57 52.0	63 72	112.5	58 10.9	62 72	111.8	58 29.5	62 73	111.0	58 47.8	61 73	110.3	2
3	55 51.8	65 71	114.2	56 11.4	65 72	113.5	56 30.8	64 72	112.8	56 49.9	63 73	112.1	57 08.8	63 73	111.4	57 27.4	62 73	110.6	57 45.8	61 74	110.0	58 04.0	59 74	109.2	3
4	55 09.1	65 72	113.1	55 28.5	64 72	112.5	55 47.6	63 73	111.8	56 06.5	63 73	111.1	56 25.2	62 73	110.4	56 43.6	61 74	109.7	57 01.8	60 74	108.9	57 19.8	59 74	108.2	4
35	54 26.1	64 72	112.1	54 45.2	64 73	111.4	55 04.2	63 73	110.7	55 22.9	62 73	110.1	55 41.4	61 74	109.4	55 59.6	60 74	108.7	56 17.6	60 74	107.9	56 35.3	59 74	107.2	35
6	53 42.7	64 73	111.1	54 01.7	63 73	110.4	54 20.4	62 73	109.7	54 38.9	61 74	109.1	54 57.2	61 74	108.4	55 15.3	60 75	107.7	55 33.1	59 75	107.0	55 50.7	58 75	106.2	6
7	52 59.0	63 73	110.1	53 17.8	62 74	109.4	53 36.4	62 74	108.7	53 54.7	61 74	108.1	54 12.9	60 75	107.4	54 30.8	59 75	106.7	54 48.4	58 75	106.0	55 05.8	58 75	105.3	7
8	52 15.1	62 74	109.1	52 33.7	61 74	108.4	52 52.1	61 74	107.8	53 10.3	60 75	107.1	53 28.3	59 75	106.5	53 46.0	58 75	105.8	54 03.5	58 75	105.1	54 20.7	57 76	104.4	8
9	51 30.9	62 74	108.1	51 49.4	61 74	107.5	52 07.6	60 75	106.9	52 25.6	60 75	106.2	52 43.4	59 75	105.5	53 01.0	58 75	104.9	53 18.4	57 76	104.2	53 35.5	57 76	103.5	9
40	50 46.5	61 74	107.2	51 04.8	61 75	106.6	51 22.9	60 75	106.0	51 40.7	59 75	105.3	51 58.4	58 76	104.7	52 15.9	58 76	104.0	52 33.1	57 76	103.3	52 50.1	56 76	102.6	40
1	50 01.8	61 75	106.3	50 20.0	60 75	105.7	50 37.9	59 75	105.1	50 55.7	59 75	104.4	51 13.2	58 76	103.8	51 30.5	57 76	103.1	51 47.6	57 76	102.5	52 04.5	56 76	101.8	1
2	49 17.0	60 75	105.4	49 35.0	60 75	104.8	49 52.8	59 75	104.2	50 10.4	58 76	103.6	50 27.8	58 76	102.9	50 45.0	57 76	102.3	51 02.0	56 76	101.6	51 18.8	55 76	101.0	2
3	48 32.0	60 75	104.6	48 49.9	59 76	104.0	49 07.5	59 76	103.4	49 25.0	58 76	102.7	49 42.3	57 76	102.1	49 59.4	56 76	101.5	50 16.3	56 77	100.8	50 32.9	55 77	100.2	3
4	47 46.7	60 76	103.7	48 04.5	59 76	103.1	48 22.1	58 76	102.5	48 39.5	58 76	101.9	48 56.7	57 76	101.3	49 13.7	56 77	100.7	49 30.4	56 77	100.0	49 47.0	55 77	99.4	4
45	47 01.4	59 76	102.9	47 19.0	59 76	102.3	47 36.5	58 76	101.7	47 53.8	57 77	101.1	48 10.9	57 77	100.5	48 27.8	56 77	99.9	48 44.5	55 77	99.2	49 00.9	54 77	98.6	45
6	46 15.8	59 76	102.1	46 33.4	58 76	101.5	46 50.8	58 76	100.9	47 08.0	57 77	100.3	47 25.0	56 77	99.7	47 41.8	56 77	99.1	47 58.4	55 77	98.5	48 14.6	54 77	97.9	6
7	45 30.2	58 76	101.3	45 47.7	58 76	100.7	46 04.9	57 76	100.1	46 22.0	57 77	99.6	46 39.0	56 77	99.0	46 55.7	55 77	98.3	47 12.2	55 77	97.7	47 28.6	54 77	97.1	7
8	44 44.4	58 76	100.5	45 01.8	58 77	100.0	45 19.0	57 77	99.4	45 36.0	56 77	98.8	45 52.9	56 77	98.2	46 09.5	55 77	97.6	46 26.0	54 77	97.0	46 42.3	54 77	96.4	8
9	43 58.5	58 77	99.8	44 15.8	57 77	99.2	44 32.9	57 77	98.6	44 49.9	56 77	98.1	45 06.7	56 77	97.5	45 23.3	55 77	96.9	45 39.7	54 77	96.3	45 55.9	54 77	95.7	9
50	43 12.5	58 77	99.0	43 29.7	57 77	98.5	43 46.8	57 77	97.9	44 03.7	56 77	97.3	44 20.4	55 77	96.7	44 36.9	54 78	96.2	44 53.3	54 77	95.6	45 09.5	54 77	95.0	50
1	42 26.4	57 77	98.3	42 43.6	57 77	97.7	43 00.6	56 77	97.2	43 17.4	56 77	96.6	43 34.1	55 77	96.0	43 50.7	54 78	95.4	44 06.8	54 78	94.9	44 23.0	53 78	94.3	1
2	41 40.2	57 77	97.6	41 57.3	57 77	97.0	42 14.3	56 77	96.5	42 31.0	56 77	95.9	42 47.7	55 78	95.3	43 04.1	54 78	94.8	43 20.4	54 78	94.2	43 36.5	53 78	93.6	2
3	40 54.0	57 77	96.8	41 11.0	56 77	96.3	41 27.9	56 77	95.7	41 44.6	55 78	95.2	42 01.2	54 78	94.6	42 17.6	54 78	94.1	42 33.8	53 78	93.5	42 49.9	53 78	92.9	3
4	40 07.6	57 77	96.1	40 24.6	56 77	95.6	40 41.5	56 78	95.1	40 58.2	55 78	94.5	41 14.7	54 78	94.0	41 31.1	54 78	93.4	41 47.3	53 78	92.8	42 03.3	53 78	92.3	4
55	39 21.2	57 77	95.4	39 38.2	56 77	94.9	39 55.0	56 78	94.4	40 11.7	55 78	93.8	40 28.2	54 78	93.3	40 44.5	54 78	92.7	41 00.7	53 78	92.2	41 16.7	53 78	91.6	55
6	38 34.8	57 78	94.8	38 51.7	56 78	94.2	39 08.5	56 78	93.7	39 25.1	55 78	93.2	39 41.6	54 78	92.6	39 57.9	54 78	92.1	40 14.1	53 78	91.5	40 30.1	53 78	91.0	6
7	37 48.3	57 78	94.1	38 05.2	56 78	93.6	38 21.9	56 78	93.0	38 38.6	55 78	92.5	38 55.0	55 78	92.0	39 11.3	54 78	91.4	39 27.5	54 78	90.9	39 43.5	53 78	90.3	7
8	37 01.8	56 78	93.4	37 18.6	56 78	92.9	37 35.4	56 78	92.4	37 52.0	55 78	91.8	38 08.4	55 78	91.3	38 24.7	54 78	90.8	38 40.8	54 78	90.2	38 56.9	53 78	89.7	8
9	36 15.2	56 78	92.8	36 32.1	56 78	92.2	36 48.8	56 78	91.7	37 05.3	55 78	91.2	37 21.8	54 78	90.7	37 38.1	54 78	90.1	37 54.2	54 78	89.6	38 10.2	53 78	89.1	9
60	35 28.6	56 78	92.1	35 45.5	56 78	91.6	36 02.2	55 78	91.1	36 18.7	55 78	90.6	36 35.1	54 78	90.0	36 51.4	54 78	89.5	37 07.6	53 78	89.0	37 23.6	53 78	88.5	60
1	34 42.0	56 78	91.5	34 58.8	56 78	91.0	35 15.5	55 78	90.4	35 32.0	55 78	89.9	35 48.5	54 78	89.4	36 04.8	54 78	88.9	36 21.0	53 78	88.4	36 37.0	53 78	87.9	1
2	33 55.4	56 78	90.8	34 12.2	56 78	90.3	34 28.9	55 78	89.8	34 45.5	55 78	89.3	35 01.9	54 78	88.8	35 18.2	54 78	88.3	35 34.4	53 78	87.8	35 50.4	53 78	87.2	2
3	33 08.8	56 78	90.2	33 25.6	56 78	89.7	33 42.3	55 78	89.2	33 58.8	55 78	88.7	34 15.3	54 78	88.2	34 31.6	54 78	87.7	34 47.8	54 78	87.2	35 03.9	53 78	86.6	3
4	32 22.2	56 78	89.6	32 39.0	56 78	89.1	32 55.7	55 78	88.6	33 12.2	55 78	88.1	33 28.7	54 78	87.6	33 45.0	54 78	87.1	34 01.2	54 78	86.6	34 17.3	53 78	86.1	4
65	31 35.5	56 78	88.9	31 52.3	56 78	88.4	32 09.0	55 78	88.0	32 25.6	55 78	87.5	32 42.1	54 78	87.0	32 58.5	54 78	86.5	33 14.7	54 77	86.0	33 30.8	53 77	85.5	65
6	30 48.9	56 78	88.3	31 05.7	56 78	87.8	31 22.5	55 78	87.3	31 39.1	55 78	86.9	31 55.6	54 78	86.4	32 11.9	54 78	85.9	32 28.2	54 77	85.4	32 44.4	53 77	84.9	6
7	30 02.5	56 78	87.7	30 19.2	55 78	87.2	30 35.9	55 78	86.7	30 52.5	55 77	86.3	31 09.0	54 77	85.8	31 25.5	54 77	85.3	31 41.8	54 77	84.8	31 57.9	53 77	84.3	7
8	29 15.7	56 78	87.1	29 32.6	56 78	86.6	29 49.4	55 77	86.1	30 06.0	55 77	85.7	30 22.6	54 77	85.2	30 39.0	54 77	84.7	30 55.3	54 77	84.2	31 11.6	53 77	83.7	8
9	28 29.2	56 78	86.5	28 46.1	56 78	86.0	29 02.8	55 77	85.5	29 19.5	55 77	85.1	29 36.1	54 77	84.6	29 52.6	54 77	84.1	30 09.0	54 77	83.6	30 25.2	54 77	83.1	9
70	27 42.7	57 77	85.9	27 59.6	56 77	85.3	28 16.4	56 77	84.9	28 33.1	55 77	84.5	28 49.7	55 77	84.0	29 06.2	55 77	83.5	29 22.7	55 77	83.0	29 39.0	54 77	82.6	70
1	26 56.2	57 77	85.3	27 13.1	56 77	84.8	27 30.0	55 77	84.4	27 46.7	55 77	83.9	28 03.4	54 77	83.4	28 19.9	54 77	82.9	28 36.4	54 77	82.5	28 52.8	54 77	82.0	1
2	26 09.7	57 77	84.7	26 26.7	56 77	84.2	26 43.6	55 77	83.8	27 00.4	55 77	83.3	27 17.1	54 77	82.8	27 33.7	54 77	82.4	27 50.2	54 77	81.9	28 06.6	53 77	81.4	2
3	25 23.3	57 77	84.1	25 40.3	56 77	83.6	25 57.3	55 77	83.2	26 14.1	55 77	82.7	26 30.8	55 77	82.3	26 47.5	54 77	81.8	27 04.1	54 77	81.3	27 20.6	53 77	80.9	3
4	24 37.0	57 77	83.5	24 54.0	56 77	83.1	25 11.0	55 77	82.6	25 27.9	55 77	82.1	25 44.7	55 77	81.7	26 01.4	54 77	81.2	26 18.0	54 77	80.8	26 34.6	53 77	80.3	4
75	23 50.6	57 77	82.9	24 07.8	56 77	82.5	24 24.8	55 77	82.0	24 41.7	55 77	81.6	24 58.6	55 77	81.1	25 15.3	54 77	80.7	25 32.0	54 76	80.2	25 48.6	53 76	79.7	75
6	23 04.4	57 77	82.3	23 21.6	57 77	81.9	23 38.6	55 77	81.4	23 55.6	55 77	81.0	24 12.5	54 77	80.5	24 29.4	54 77	80.1	24 46.1	54 76	79.6	25 02.8	53 76	79.2	6
7	22 18.2	57 77	81.7	22 35.4	57 77	81.3	22 52.6	55 77	80.9	23 09.6	55 77	80.4	23 26.6	54 77	80.0	23 43.5	54 76	79.5	24 00.0	54 76	79.1	24 17.0	53 76	78.6	7
8	21 32.1	56 77	81.2	21 49.4	56 77	80.7	22 06.6	55 77	80.3	22 23.7	55 77	79.8	22 40.7	54 76	79.4	22 57.7	54 76	78.9	23 14.6	54 76	78.5	23 31.4	53 76	78.0	8
9	20 46.1	56 76	80.6	21 03.4	56 76	80.1	21 20.6	55 76	79.7	21 37.8	55 76	79.3	21 54.9	54 76	78.8	22 12.0	54 76	78.4	22 28.9	53 76	77.9	22 45.7	53 76	77.5	9
80	20 00.1	58 76	80.0	20 17.5	58 76	79.6	20 34.8	57 76	79.2	20 52.0	57 76	78.7	21 09.2	57 76	78.3	21 26.3	57 76	77.8	21 43.4	56 76	77.4	22 00.3	56 76	76.9	80
1	19 14.2	58 76	79.4	19 31.7	58 76	79.0	19 49.1	57 76	78.6	20 06.4	57 76	78.1	20 23.6	57 76	77.7	20 40.8	57 76	77.3	20 57.9	56 76	76.8	21 15.0	55 76	76.4	1
2	18 28.4	58 76	78.8	18 45.9	58 76	78.4	19 03.4	58 76	78.0	19 20.8	57 76	77.6	19 38.1	57 76	77.1	19 55.4	57 75	76.7	20 12.6	57 75	76.3	20 29.7	55 75	75.8	2
3	17 42.7	58 76	78.3	18 00.3	58 76	77.9	18 17.8	58 76	77.4	18 35.3	58 75	77.0	18 52.7	58 75	76.6	19 10.1	58 75	76.1	19 27.3	58 75	75.7	19 44.6	57 75	75.3	3
4	16 57.1	59 76	77.7	17 14.8	59 76	77.3	17 32.4	59 76	76.8	17 49.9	58 75	76.4	18 07.4	58 75	76.0	18 24.8	58 75	75.6	18 42.4	58 75	75.1	18 59.5	58 75	74.7	4
85	16 11.6	59 76	77.1	16 29.4	59 76	76.7	16 47.0	59 76	76.3	17 04.7	59 75	75.8	17 22.2	59 75	75.4	17 39.7	59 75	75.0	17 57.2	58 75	74.6	18 14.6	58 75	74.1	85
6	15 26.2	59 76	76.5	15 44.0	59 75	76.1	16 01.8	59 75	75.7	16 19.5	59 75	75.3	16 37.2	59 75	74.9	16 54.8	58 75	74.4	17 12.3	58 74	74.0	17 29.8	58 74	73.6	6
7	14 40.9	60 75	75.9	14 58.8	60 75	75.5	15 16.7	59 75	75.1	15 34.5	59 75	74.7	15 52.2	59 75	74.3	16 09.9	59 74	73.9	16 27.6	59 74	73.4	16 45.2	59 74	73.0	7
8	13 55.8	60 75	75.4	14 13.7	60 75	74.9	14 31.7	60 75	74.5	14 49.6	60 75	74.1	15 07.4	59 74	73.7	15 25.2	59 74	73.3	15 42.9	59 74	72.9	16 00.6	59 74	72.5	8
9	13 10.7	60 75	74.8	13 28.6	60 75	74.4	13 46.6	60 75	74.0	14 04.6	60 74	73.6	14 22.4	60 74	73.1	14 40.6	60 74	72.7	14 58.4	59 74	72.3	15 16.2	59 74	71.9	9
90	12 25.8	61 74	74.2	12 43.9	60 75	73.8	13 02.0	60 74	73.4	13 20.1	60 74	73.0	13 38.1	60 74	72.6	13 56.1	60 74	72.2	14 14.1	60 74	71.7	14 32.0	59 74	71.3	90

H.A.	20° 00' Alt. / Δd Δt / Az.	20° 30'	21° 00'	21° 30'	22° 00'	22° 30'	23° 00'	23° 30'	H.A.
00	31 00.0 1.00 01 180.0	30 30.0 1.00 01 180.0	30 00.0 1.00 01 180.0	29 30.0 1.00 01 180.0	29 00.0 1.00 01 180.0	28 30.0 1.00 02 180.0	28 00.0 1.00 01 180.0	27 30.0 1.00 01 180.0	00
1	30 59.6 1.00 02 178.9	30 29.6 1.00 02 178.9	29 59.6 1.00 02 178.9	29 29.6 1.00 02 178.9	28 59.6 1.00 02 178.9	28 29.6 1.00 02 178.9	27 59.6 1.00 02 179.0	27 29.6 1.00 02 179.0	1
2	30 58.2 1.00 04 177.8	30 28.2 1.00 04 177.8	29 58.2 1.00 04 177.8	29 28.3 1.00 04 177.9	28 58.3 1.00 04 177.9	28 28.3 1.00 04 177.9	27 58.3 1.00 04 177.9	27 28.3 1.00 04 177.9	2
3	30 56.0 1.00 05 176.7	30 26.0 1.00 05 176.7	29 56.1 1.00 05 176.8	29 26.1 1.00 05 176.8	28 56.1 1.00 05 176.8	28 26.2 1.00 05 176.8	27 56.2 1.00 05 176.9	27 26.2 1.00 05 176.9	3
4	30 52.9 1.00 07 175.6	30 22.9 1.00 07 175.7	29 53.0 1.00 07 175.7	29 23.0 1.00 07 175.7	28 53.1 1.00 06 175.8	28 23.2 1.00 06 175.8	27 53.2 1.00 06 175.9	27 23.3 1.00 06 175.9	4
05	30 48.9 1.00 08 174.5	30 19.0 1.00 08 174.6	29 49.0 1.00 08 174.6	29 19.1 1.00 08 174.7	28 49.2 1.00 08 174.7	28 19.3 1.00 08 174.8	27 49.4 1.00 08 174.8	27 19.5 1.00 08 174.8	05
6	30 44.0 1.00 10 173.4	30 14.1 1.00 10 173.5	29 44.2 1.00 09 173.5	29 14.4 1.00 09 173.6	28 44.5 1.00 09 173.7	28 14.6 1.00 09 173.7	27 44.8 1.00 09 173.8	27 14.9 1.00 09 173.8	6
7	30 38.2 99 11 172.4	30 08.4 99 11 172.4	29 38.6 99 11 172.5	29 08.7 99 11 172.5	28 38.9 99 11 172.6	28 09.1 99 11 172.7	27 39.3 99 11 172.7	27 09.4 99 10 172.8	7
8	30 31.6 99 13 171.3	30 01.8 99 12 171.3	29 32.0 99 12 171.4	29 02.3 99 12 171.5	28 32.5 99 12 171.6	28 02.7 99 12 171.6	27 33.0 99 12 171.7	27 03.2 99 12 171.8	8
9	30 24.1 99 14 170.2	29 54.4 99 14 170.3	29 24.6 99 14 170.4	28 54.9 99 14 170.4	28 25.2 99 14 170.5	27 55.5 99 13 170.6	27 25.8 99 13 170.7	26 56.1 99 13 170.7	9
10	30 15.7 99 15 169.1	29 46.0 99 15 169.2	29 16.4 99 15 169.3	28 46.8 99 15 169.4	28 17.1 99 15 169.5	27 47.5 99 15 169.6	27 17.8 99 15 169.6	26 48.2 99 15 169.7	10
1	30 06.4 99 17 168.0	29 36.9 99 17 168.1	29 07.3 99 17 168.2	28 37.7 99 16 168.3	28 08.2 99 16 168.4	27 38.6 99 16 168.5	27 09.0 99 16 168.6	26 39.4 99 16 168.7	1
2	29 56.5 98 18 167.0	29 26.9 98 18 167.1	28 57.4 98 18 167.2	28 27.9 98 18 167.3	27 58.4 98 18 167.4	27 28.9 98 17 167.5	26 59.4 98 17 167.6	26 29.9 98 17 167.7	2
3	29 45.4 98 20 165.9	29 16.0 98 19 166.0	28 46.6 98 19 166.1	28 17.2 98 19 166.2	27 47.8 98 19 166.4	27 18.4 98 19 166.5	26 49.0 98 19 166.6	26 19.6 98 19 166.7	3
4	29 33.6 98 21 164.8	29 04.4 98 21 165.0	28 35.0 98 21 165.1	28 05.7 98 20 165.2	27 36.4 98 20 165.3	27 07.1 98 20 165.5	26 37.8 98 20 165.6	26 08.4 98 20 165.7	4
15	29 21.0 97 22 163.8	28 51.9 97 22 163.9	28 22.6 97 22 164.1	27 53.4 97 22 164.2	27 24.2 97 22 164.3	26 55.0 97 22 164.4	26 25.8 97 21 164.6	25 56.5 97 21 164.7	15
6	29 07.6 97 24 162.8	28 38.5 97 24 162.9	28 09.4 97 23 163.0	27 40.3 97 23 163.2	27 11.2 97 23 163.3	26 42.1 97 23 163.4	26 13.0 97 23 163.6	25 43.8 97 22 163.7	6
7	28 53.4 97 25 161.7	28 24.4 97 25 161.9	27 55.4 97 25 162.0	27 26.4 97 24 162.2	26 57.4 97 24 162.3	26 28.4 97 24 162.4	25 59.4 97 24 162.6	25 30.4 97 24 162.7	7
8	28 38.4 96 26 160.7	28 09.5 96 26 160.8	27 40.6 96 26 161.0	27 11.8 96 26 161.1	26 42.9 96 26 161.3	26 14.0 96 26 161.4	25 45.1 96 25 161.6	25 16.1 96 25 161.7	8
9	28 22.5 96 28 159.7	27 53.8 96 27 159.8	27 25.1 96 27 160.0	26 56.3 96 27 160.1	26 27.5 96 27 160.3	25 58.7 96 27 160.5	25 29.9 96 26 160.6	25 01.1 96 26 160.8	9
20	28 05.9 96 29 158.6	27 37.3 95 29 158.8	27 08.7 95 28 159.0	26 40.1 95 28 159.1	26 11.4 95 28 159.3	25 42.8 96 28 159.5	25 14.1 96 28 159.6	24 45.4 96 27 159.8	20
1	27 48.6 96 30 157.6	27 20.1 95 30 157.8	26 51.6 95 30 158.0	26 23.1 95 30 158.1	25 54.6 95 29 158.3	25 26.0 95 29 158.5	24 57.5 95 29 158.7	24 28.9 95 29 158.8	1
2	27 30.4 94 31 156.6	27 02.1 95 31 156.8	26 33.7 95 31 157.0	26 05.4 95 31 157.2	25 37.0 95 31 157.3	25 08.6 95 30 157.5	24 40.2 95 30 157.7	24 11.7 95 30 157.9	2
3	27 11.6 94 33 155.6	26 43.4 94 32 155.8	26 15.1 94 32 156.0	25 46.9 94 32 156.2	25 18.7 94 32 156.4	24 50.4 94 32 156.6	24 22.1 94 31 156.8	23 53.8 94 31 156.9	3
4	26 51.9 94 34 154.6	26 23.9 94 34 154.8	25 55.8 94 33 155.0	25 27.7 94 33 155.2	24 59.6 94 33 155.4	24 31.5 94 33 155.6	24 03.3 94 32 155.8	23 35.2 94 32 156.0	4
25	26 31.6 93 35 153.6	26 03.7 93 35 153.9	25 35.8 93 35 154.1	25 07.8 93 34 154.3	24 39.9 93 34 154.5	24 11.9 93 34 154.7	23 43.9 93 34 154.9	23 15.9 93 33 155.0	25
6	26 10.6 93 36 152.7	25 42.8 93 36 152.9	25 15.0 93 36 153.1	24 47.2 93 36 153.3	24 19.4 93 35 153.5	23 51.6 93 35 153.7	23 23.7 93 35 153.9	22 55.9 93 34 154.1	6
7	25 48.8 92 37 151.7	25 21.2 92 37 151.9	24 53.6 92 37 152.1	24 25.9 92 37 152.4	23 58.3 92 36 152.6	23 30.6 92 36 152.8	23 02.9 92 36 153.0	22 35.2 92 36 153.2	7
8	25 26.4 91 39 150.8	24 58.9 91 38 151.0	24 31.4 92 38 151.2	24 04.0 92 38 151.4	23 36.4 92 37 151.6	23 08.9 92 37 151.9	22 41.4 92 37 152.1	22 13.8 92 37 152.3	8
9	25 03.3 91 40 149.8	24 36.0 91 39 150.0	24 08.6 91 39 150.3	23 41.3 91 39 150.5	23 14.0 91 39 150.7	22 46.6 91 38 150.9	22 19.2 91 38 151.2	21 51.8 91 38 151.4	9
30	24 39.5 91 41 148.9	24 12.3 90 40 149.1	23 45.2 91 40 149.3	23 18.0 91 40 149.6	22 50.8 91 40 149.8	22 23.6 91 39 150.0	21 56.4 91 39 150.3	21 29.1 91 39 150.5	30
1	24 15.0 90 42 147.9	23 48.1 90 42 148.2	23 21.1 90 41 148.4	22 54.1 90 41 148.7	22 27.0 90 41 148.9	22 00.0 90 40 149.1	21 32.9 90 40 149.4	21 05.8 90 40 149.6	1
2	23 50.0 89 43 147.0	23 23.2 89 42 147.3	22 56.4 89 42 147.5	22 29.5 90 42 147.7	22 02.6 90 42 148.0	21 35.8 90 41 148.2	21 08.9 90 41 148.5	20 41.9 90 41 148.7	2
3	23 24.3 89 44 146.1	22 57.6 89 44 146.4	22 31.0 89 43 146.6	22 04.3 89 43 146.9	21 37.6 89 43 147.1	21 10.9 89 42 147.3	20 44.2 89 42 147.6	20 17.4 89 42 147.8	3
4	22 58.0 88 45 145.2	22 31.5 88 45 145.5	22 05.0 88 44 145.7	21 38.5 88 44 146.0	21 12.0 88 44 146.2	20 45.4 89 43 146.5	20 18.9 89 43 146.7	19 52.3 89 42 147.0	4
35	22 31.1 88 46 144.3	22 04.8 88 46 144.6	21 38.5 88 45 144.8	21 12.1 88 45 145.1	20 45.8 88 45 145.3	20 19.4 88 44 145.6	19 53.0 88 44 145.8	19 26.5 88 44 146.1	35
6	22 03.6 87 47 143.4	21 37.4 87 46 143.7	21 11.3 87 46 143.9	20 45.1 87 46 144.2	20 19.0 87 46 144.5	19 52.7 87 45 144.7	19 26.5 87 45 145.0	19 00.3 88 45 145.2	6
7	21 35.5 86 48 142.5	21 09.5 87 47 142.8	20 43.6 87 47 143.1	20 17.6 87 47 143.3	19 51.6 87 46 143.6	19 25.5 87 46 143.9	18 59.5 87 46 144.1	18 33.4 87 46 144.4	7
8	21 06.8 86 49 141.7	20 41.1 86 48 141.9	20 15.3 86 48 142.2	19 49.5 86 48 142.5	19 23.6 86 48 142.8	18 57.8 86 47 143.0	18 31.9 86 47 143.3	18 06.0 86 47 143.6	8
9	20 37.7 86 50 140.8	20 12.1 85 49 141.1	19 46.4 85 49 141.4	19 20.8 86 49 141.6	18 55.1 86 48 141.9	18 29.4 86 48 142.2	18 03.7 86 48 142.5	17 38.0 86 48 142.7	9
40	20 07.9 85 50 140.0	19 42.5 85 50 140.2	19 17.1 85 50 140.5	18 51.6 85 50 140.8	18 26.1 85 49 141.1	18 00.6 85 49 141.4	17 35.1 85 49 141.6	17 09.5 85 48 141.9	40
1	19 37.7 84 51 139.1	19 12.4 84 51 139.4	18 47.2 84 51 139.7	18 21.9 84 50 140.0	17 56.6 84 50 140.3	17 31.2 85 50 140.5	17 05.9 85 50 140.8	16 40.5 85 49 141.1	1
2	19 06.9 83 52 138.3	18 41.8 84 52 138.6	18 16.7 84 52 138.9	17 51.6 84 51 139.1	17 26.5 84 51 139.4	17 01.3 84 51 139.7	16 36.1 84 50 140.0	16 10.9 84 50 140.3	2
3	18 35.6 83 53 137.5	18 10.7 83 53 137.7	17 45.8 83 52 138.0	17 20.9 83 52 138.3	16 55.9 83 52 138.6	16 30.9 83 52 138.9	16 05.9 83 51 139.2	15 40.9 83 51 139.5	3
4	18 03.8 82 54 136.6	17 39.1 82 53 136.9	17 14.4 82 53 137.2	16 49.6 83 53 137.5	16 24.8 83 53 137.8	16 00.0 83 52 138.1	15 35.2 83 52 138.4	15 10.3 83 52 138.7	4
45	17 31.6 82 55 135.8	17 07.0 82 54 136.1	16 42.5 82 54 136.4	16 17.9 82 54 136.7	15 53.3 82 53 137.0	15 28.7 82 53 137.3	15 04.0 82 53 137.6	14 39.3 82 52 137.9	45
6	16 58.9 81 55 135.0	16 34.5 81 55 135.3	16 10.1 81 55 135.6	15 45.7 81 54 135.9	15 21.3 81 54 136.2	14 56.8 82 54 136.5	14 32.3 82 54 136.8	14 07.8 82 53 137.1	6
7	16 25.7 81 56 134.2	16 01.5 81 55 134.5	15 37.3 81 55 134.8	15 13.1 81 55 135.1	14 48.8 81 55 135.5	14 24.5 81 55 135.8	14 00.2 81 54 136.1	13 35.9 81 54 136.4	7
8	15 52.0 80 57 133.4	15 28.0 80 56 133.8	15 04.0 80 56 134.1	14 40.0 80 56 134.4	14 15.9 80 56 134.7	13 51.8 80 55 135.0	13 27.6 80 55 135.3	13 03.5 81 55 135.6	8
9	15 18.0 79 57 132.7	14 54.1 79 57 133.0	14 30.3 80 57 133.3	14 06.4 80 57 133.6	13 42.5 80 56 133.9	13 18.6 80 56 134.2	12 54.6 80 56 134.5	12 30.7 80 55 134.9	9
50	14 43.5 79 58 131.9	14 19.8 79 58 132.2	13 56.1 79 58 132.5	13 32.4 79 57 132.9	13 08.7 79 57 133.2	12 45.0 79 57 133.5	12 21.2 79 56 133.8	11 57.4 79 56 134.1	50
1	14 08.6 78 59 131.1	13 45.1 78 59 131.5	13 21.6 78 58 131.8	12 58.0 78 58 132.1	12 34.5 78 58 132.4	12 10.9 79 57 132.7	11 47.3 79 57 133.0	11 23.7 79 57 133.4	1
2	13 33.2 78 60 130.4	13 09.9 78 59 130.7	12 46.6 78 59 131.0	12 23.2 78 59 131.4	11 59.9 78 58 131.7	11 36.5 78 58 132.0	11 13.0 78 58 132.3	10 49.6 78 58 132.6	2
3	12 57.5 77 60 129.6	12 34.4 77 60 130.0	12 11.2 77 60 130.3	11 48.0 77 59 130.6	11 24.8 77 59 130.9	11 01.6 77 59 131.3	10 38.4 78 58 131.6	10 15.1 78 58 131.9	3
4	12 21.4 77 61 128.9	11 58.5 77 61 129.2	11 35.5 77 60 129.6	11 12.5 77 60 129.9	10 49.4 77 60 130.2	10 26.4 77 59 130.5	10 03.3 77 59 130.9	9 40.2 77 59 131.2	4
55	11 45.0 76 61 128.2	11 22.2 76 61 128.5	10 59.3 76 61 128.8	10 36.5 76 61 129.2	10 13.6 76 60 129.5	9 50.7 76 60 129.8	9 27.8 76 60 130.1	9 04.9 76 59 130.5	55
6	11 08.1 75 62 127.4	10 45.5 75 62 127.8	10 22.8 76 61 128.1	10 00.1 76 61 128.4	9 37.4 76 61 128.8	9 14.7 76 61 129.1	8 52.0 76 60 129.4	8 29.2 76 60 129.8	6
7	10 30.9 75 63 126.7	10 08.4 75 62 127.1	9 46.0 75 62 127.4	9 23.4 75 62 127.7	9 00.9 75 62 128.1	8 38.4 75 61 128.4	8 15.8 75 61 128.7	7 53.2 75 61 129.1	7
8	9 53.4 74 63 126.0	9 31.1 74 63 126.3	9 08.7 74 63 126.7	8 46.4 75 63 127.0	8 24.0 75 62 127.4	8 01.6 75 62 127.7	7 39.2 75 62 128.0	7 16.8 75 61 128.4	8
9	9 15.5 74 64 125.3	8 53.3 74 63 125.6	8 31.2 74 63 126.0	8 09.0 74 63 126.3	7 46.8 74 63 126.7	7 24.6 74 62 127.0	7 02.3 74 62 127.3	6 40.1 74 62 127.7	9
60	8 37.3 73 64 124.6	8 15.3 73 64 124.9	7 53.3 73 64 125.3	7 31.3 73 63 125.6	7 09.2 73 63 126.0	6 47.2 74 63 126.3	6 25.1 74 63 126.7	6 03.0 74 62 127.0	60
1	7 58.7 73 65 123.9	7 36.9 73 64 124.3	7 15.1 73 64 124.6	6 53.2 73 64 124.9	6 31.3 73 64 125.3	6 09.4 73 63 125.6	5 47.5 73 63 126.0	5 25.6 73 63 126.3	1
2	7 19.9 72 65 123.2	6 58.2 72 65 123.6	6 36.5 72 65 123.9	6 14.8 72 64 124.3	5 53.1 72 64 124.6	5 31.4 72 64 125.0	5 09.6 72 64 125.3		2
3	6 40.7 72 66 122.5	6 19.2 72 66 122.9	5 57.7 72 65 123.2	5 36.1 72 65 123.6	5 14.6 72 65 123.9				3
4	6 01.3 71 66 121.9	5 39.9 71 66 122.2	5 18.5 71 66 122.6						4
65	5 21.5 71 67 121.2	5 00.3 71 66 121.6							65

DECLINATION SAME NAME AS LATITUDE

H.A.	20° 00' Alt. / Δd Δt / Az.	20° 30'	21° 00'	21° 30'	22° 00'	22° 30'	23° 00'	23° 30'	H.A.
91	11 41.0 61 74 73.6	11 59.2 61 74 73.2	12 17.4 61 74 72.8	12 35.6 61 74 72.4	12 53.7 60 74 72.0	13 11.8 60 74 71.6	13 29.9 60 73 71.2	13 47.9 60 73 70.8	91
2	10 56.3 61 74 73.0	11 14.6 61 74 72.6	11 32.9 61 74 72.2	11 51.2 61 74 71.8	12 09.5 61 74 71.4	12 27.7 61 73 71.0	12 45.8 60 73 70.6	13 03.9 60 73 70.2	2
3	10 11.8 61 74 72.5	10 30.2 61 74 72.1	10 48.6 61 74 71.6	11 07.0 61 73 71.2	11 25.3 61 73 70.8	11 43.6 61 73 70.4	12 01.9 61 73 70.0	12 20.2 61 73 69.6	3
4	9 27.4 62 74 71.9	9 45.9 62 74 71.5	10 04.4 62 73 71.1	10 22.9 62 73 70.7	10 41.4 61 73 70.3	10 59.8 61 73 69.9	11 18.2 61 73 69.5	11 36.5 61 72 69.1	4
95	8 43.2 62 73 71.3	9 01.8 62 73 70.9	9 20.4 62 73 70.5	9 39.0 62 73 70.1	9 57.6 62 73 69.7	10 16.1 62 73 69.3	10 34.6 62 72 68.9	10 53.1 62 72 68.5	95
6	7 59.1 63 73 70.7	8 17.8 62 73 70.3	8 36.5 62 73 69.9	8 55.2 62 73 69.5	9 13.9 62 72 69.1	9 32.6 62 72 68.7	9 51.2 62 72 68.3	10 09.8 62 72 67.9	6
7	7 15.1 63 73 70.1	7 34.0 63 73 69.7	7 52.8 63 73 69.3	8 11.6 62 72 68.9	8 30.4 62 72 68.5	8 49.2 62 72 68.1	9 07.9 62 72 67.7	9 26.6 62 72 67.3	7
8	6 31.4 63 73 69.5	6 50.4 63 72 69.1	7 09.3 63 72 68.7	7 28.2 63 72 68.3	7 47.1 63 72 67.9	8 06.0 63 72 67.5	8 24.9 63 71 67.1	8 43.7 63 71 66.7	8
9	5 47.8 64 72 68.9	6 06.9 64 72 68.5	6 25.9 64 72 68.1	6 45.0 63 72 67.7	7 04.0 63 72 67.3	7 23.0 63 71 66.9	7 42.0 63 71 66.6	8 01.0 63 71 66.2	9
100	5 04.4 64 72 68.3	5 23.6 64 72 67.9	5 42.8 64 72 67.5	6 01.9 64 71 67.1	6 21.1 64 71 66.7	6 40.2 64 71 66.4	6 59.3 64 71 66.0	7 18.4 64 71 65.6	100
1				5 19.1 64 71 66.5	5 38.3 64 71 66.1	5 57.2 64 71 65.8	6 16.8 64 70 65.4	6 36.1 64 70 65.0	1
2						5 15.2 65 70 65.2	5 34.5 65 70 64.8	5 53.9 64 70 64.4	2
3								5 12.0 65 70 63.8	3

Lat. 39°

H.A.	24°00′ Alt.	Δd	Δt	24°00′ Az.	24°30′ Alt.	Δd	Δt	24°30′ Az.	25°00′ Alt.	Δd	Δt	25°00′ Az.	25°30′ Alt.	Δd	Δt	25°30′ Az.	26°00′ Alt.	Δd	Δt	26°00′ Az.	26°30′ Alt.	Δd	Δt	26°30′ Az.	27°00′ Alt.	Δd	Δt	27°00′ Az.	27°30′ Alt.	Δd	Δt	27°30′ Az.	H.A.
00	75 00.0	1.0	02	180.0	75 30.0	1.0	02	180.0	76 00.0	1.0	03	180.0	76 30.0	1.0	03	180.0	77 00.0	1.0	03	180.0	77 30.0	1.0	03	180.0	78 00.0	1.0	03	180.0	78 30.0	1.0	03	180.0	00
1	74 58.6	1.0	07	176.5	75 28.5	1.0	07	176.4	75 58.5	1.0	08	176.1	76 28.4	1.0	08	176.0	76 58.4	1.0	08	176.0	77 28.3	1.0	08	175.9	77 58.3	1.0	09	175.7	78 28.2	1.0	09	175.6	1
2	74 54.3	99	12	173.0	75 24.1	99	12	172.8	75 53.9	99	13	172.5	76 23.7	99	13	172.3	76 53.5	99	13	172.0	77 23.3	99	14	171.8	77 53.1	98	14	171.5	78 22.8	98	15	171.2	2
3	74 47.2	99	16	169.5	75 16.8	99	17	169.2	75 46.4	99	17	168.9	76 16.0	99	18	168.5	76 45.5	98	18	168.1	77 15.0	98	19	167.7	77 44.5	98	20	167.3	78 13.9	98	20	166.8	3
4	74 37.3	98	21	166.1	75 06.7	98	21	165.7	75 36.0	98	22	165.3	76 05.2	97	23	164.8	76 34.4	97	23	164.3	77 03.6	97	24	163.8	77 32.6	97	25	163.3	78 01.6	97	26	162.6	4
05	74 24.8	97	25	162.8	74 53.8	97	26	162.3	75 22.7	96	26	161.8	75 51.6	96	27	161.2	76 20.4	96	28	160.6	76 49.1	95	29	160.0	77 17.7	95	30	159.3	77 46.1	95	31	158.6	05
6	74 09.7	95	29	159.5	74 38.3	95	30	159.0	75 06.8	95	31	158.4	75 35.2	95	32	157.7	76 03.5	94	32	157.0	76 31.7	94	33	156.3	76 59.8	94	33	155.5	77 27.7	93	35	154.7	6
7	73 52.7	94	33	156.4	74 20.4	94	34	155.7	74 48.4	93	35	155.1	75 16.3	93	36	154.4	75 44.1	92	37	153.6	76 11.7	92	38	152.8	76 39.1	91	39	151.9	77 06.4	91	40	151.0	7
8	73 32.4	92	37	153.3	74 00.0	92	38	152.6	74 27.6	91	38	151.9	74 54.9	91	39	151.1	75 22.1	90	40	150.3	75 49.2	90	41	149.4	76 16.0	89	42	148.5	76 42.6	88	44	147.5	8
9	73 10.4	91	40	150.4	73 37.5	90	41	149.7	74 04.5	90	42	148.9	74 31.3	89	43	148.1	74 57.9	88	44	147.2	75 24.3	88	45	146.2	75 50.5	87	46	145.3	76 16.4	86	47	144.2	9
10	72 46.4	89	43	147.6	73 13.0	88	44	146.0	73 39.4	88	45	146.0	74 05.7	87	46	145.1	74 31.6	86	47	144.2	74 57.4	85	49	143.2	75 22.9	85	49	142.2	75 48.1	84	50	141.1	10
1	72 20.5	87	46	144.9	72 46.6	87	47	144.1	73 12.4	85	48	143.2	73 38.1	85	49	142.3	74 03.4	84	50	141.4	74 28.6	83	51	140.4	74 53.4	82	52	139.3	75 17.9	81	53	138.2	1
2	71 52.8	85	49	142.4	72 18.4	85	50	141.5	72 43.7	84	51	140.6	73 08.7	83	52	139.7	73 33.5	82	53	138.7	73 58.0	81	54	137.7	74 22.1	80	55	136.6	74 46.0	79	56	135.4	2
3	71 23.6	84	51	139.9	71 48.6	83	52	139.0	72 13.3	82	53	138.1	72 37.7	81	54	137.2	73 01.9	80	55	136.1	73 25.8	79	56	135.1	73 49.3	78	57	134.0	74 12.5	77	58	132.8	3
4	70 52.8	82	54	137.6	71 17.3	81	54	136.6	71 41.4	80	55	135.7	72 05.3	79	56	134.8	72 28.9	78	57	133.8	72 52.2	78	58	132.7	73 15.1	76	59	131.6	73 37.6	76	60	130.4	4
15	70 20.7	80	56	135.3	70 44.6	79	56	134.4	71 08.2	78	57	133.5	71 31.6	77	58	132.5	71 54.6	76	59	131.5	72 17.3	75	60	130.4	72 39.6	74	61	129.3	73 01.5	72	62	128.2	15
6	69 47.3	78	58	133.2	70 10.7	78	58	132.3	70 33.8	77	59	131.3	70 56.6	75	60	130.4	71 19.1	74	61	129.3	71 41.2	73	62	128.3	72 03.0	72	63	127.2	72 24.3	71	64	126.0	6
7	69 12.8	77	59	131.2	69 35.7	76	60	130.3	69 58.3	75	61	129.3	70 20.6	74	62	128.3	70 42.5	73	63	127.3	71 04.1	71	63	126.2	71 25.3	70	64	125.1	71 46.2	69	65	124.0	7
8	68 37.2	75	61	129.3	68 59.6	74	62	128.3	69 21.7	73	63	127.4	69 43.5	72	63	126.4	70 04.9	71	64	125.4	70 26.0	70	65	124.3	70 46.8	69	66	123.1	71 07.1	67	66	122.1	8
9	68 00.6	74	62	127.4	68 22.5	73	63	126.5	68 44.2	72	64	125.5	69 05.5	71	65	124.6	69 26.5	69	65	123.5	69 47.1	68	66	122.5	70 07.4	67	67	121.4	70 27.2	65	68	120.3	9
20	67 23.1	72	64	125.7	67 44.6	71	64	124.7	68 05.8	70	65	123.8	68 26.7	69	66	122.8	68 47.3	68	67	121.8	69 07.4	67	67	120.8	69 27.2	65	68	119.7	69 46.6	64	69	118.6	20
1	66 44.8	71	65	124.0	67 05.9	70	66	123.1	67 26.7	69	66	122.1	67 47.2	68	67	121.2	68 07.3	66	68	120.2	68 27.0	65	68	119.2	68 46.4	64	69	118.1	69 05.4	63	70	117.0	1
2	66 05.8	70	66	122.4	66 26.5	69	67	121.5	66 46.9	67	67	120.6	67 07.0	66	68	119.6	67 26.7	65	69	118.6	67 46.0	64	69	117.6	68 05.0	63	70	116.6	68 23.6	61	71	115.5	2
3	65 26.1	68	67	120.8	65 46.4	67	68	119.9	66 06.4	66	68	119.0	66 26.1	65	69	118.1	66 45.5	64	70	117.1	67 04.4	63	70	116.1	67 23.0	61	71	115.1	67 41.2	60	71	114.1	3
4	64 45.7	67	68	119.4	65 05.7	66	69	118.5	65 25.4	65	69	117.6	65 44.7	64	70	116.7	66 03.7	63	70	115.7	66 22.3	61	71	114.7	66 40.6	60	72	113.7	66 58.4	59	72	112.7	4
25	64 04.8	66	69	118.0	64 24.5	65	70	117.1	64 43.8	64	70	116.2	65 02.8	63	71	115.3	65 21.4	62	71	114.4	65 39.7	60	72	113.4	65 57.7	59	72	112.4	66 15.2	58	73	111.4	25
6	63 23.4	65	70	116.6	63 42.7	64	70	115.8	64 01.7	63	71	114.9	64 20.4	62	71	114.0	64 38.6	61	72	113.1	64 56.8	59	72	112.1	65 14.4	58	73	111.2	65 31.6	57	73	110.2	6
7	62 41.5	64	71	115.3	63 00.5	63	71	114.5	63 19.2	62	72	113.6	63 37.6	61	72	112.7	63 55.7	60	72	111.8	64 13.4	58	73	110.9	64 30.7	57	73	109.9	64 47.7	56	74	109.0	7
8	61 59.1	63	71	114.1	62 17.8	62	72	113.2	62 36.3	61	72	112.4	62 54.4	60	73	111.5	63 12.3	59	73	110.6	63 29.6	58	73	109.7	63 46.7	56	74	108.8	64 03.5	55	74	107.8	8
9	61 16.3	62	72	112.9	61 34.8	61	72	112.0	61 53.0	59	73	111.2	62 10.8	59	73	110.3	62 28.4	58	74	109.5	62 45.6	57	74	108.6	63 02.4	56	74	107.7	63 19.0	54	75	106.7	9
30	60 33.2	61	72	111.7	60 51.4	60	73	110.9	61 09.3	59	73	110.1	61 27.0	58	74	109.2	61 44.3	57	74	108.4	62 01.2	56	74	107.5	62 17.9	55	75	106.6	62 34.2	53	75	105.7	30
1	59 49.7	60	73	110.6	60 07.7	60	73	109.8	60 25.4	59	74	109.0	60 42.8	57	74	108.1	60 59.9	57	74	107.3	61 16.6	55	75	106.4	61 33.1	54	75	105.6	61 49.2	53	75	104.7	1
2	59 05.9	60	73	109.5	59 23.7	59	74	108.7	59 41.2	58	74	108.1	59 58.5	57	75	107.1	60 15.2	56	75	106.3	60 31.8	55	75	105.4	60 48.1	54	75	104.6	61 04.0	52	76	103.7	2
3	58 21.8	59	74	108.5	58 39.7	58	74	107.7	58 56.7	57	75	106.9	59 13.7	56	75	106.1	59 30.4	55	75	105.3	59 46.8	54	76	104.4	60 02.8	53	76	103.6	60 18.6	51	76	102.7	3
4	57 37.4	58	74	107.4	57 54.8	58	75	106.7	58 11.9	57	75	105.9	58 28.7	56	75	105.1	58 45.3	55	75	104.3	59 01.5	54	76	103.5	59 17.4	53	76	102.7	59 33.0	51	76	101.8	4
35	56 52.8	58	75	106.5	57 10.0	57	75	105.7	57 27.0	56	75	104.9	57 43.6	55	76	104.2	58 00.0	54	76	103.4	58 16.1	53	76	102.6	58 31.8	52	76	101.8	58 47.3	51	76	100.9	35
6	56 08.0	57	75	105.5	56 25.0	56	75	104.8	56 41.8	55	76	104.0	56 58.3	55	76	103.3	57 14.6	54	76	102.5	57 30.5	53	76	101.7	57 46.1	52	76	100.9	58 01.5	51	77	100.1	6
7	55 23.0	57	76	104.6	55 39.9	56	76	103.9	55 56.5	55	76	103.1	56 12.9	54	76	102.4	56 29.0	53	76	101.6	56 44.8	52	76	100.8	57 00.3	51	77	100.0	57 15.5	50	77	99.3	7
8	54 37.7	56	76	103.7	54 54.5	55	76	103.0	55 11.0	54	76	102.2	55 27.2	54	76	101.5	55 43.2	53	76	100.7	55 58.9	52	77	100.0	56 14.3	51	77	99.2	56 29.4	50	77	98.4	8
9	53 52.4	56	76	102.8	54 09.0	55	76	102.1	54 25.4	54	76	101.4	54 41.5	53	76	100.7	54 57.3	52	77	99.9	55 12.9	51	77	99.2	55 28.2	51	77	98.4	55 43.3	50	77	97.6	9
40	53 06.8	55	76	102.0	53 23.3	55	76	101.3	53 39.6	54	76	100.5	53 55.6	53	77	99.8	54 11.4	52	77	99.1	54 26.8	51	77	98.4	54 42.1	50	77	97.6	54 57.0	49	77	96.9	40
1	52 21.1	55	76	101.1	52 37.5	54	77	100.4	52 53.7	53	77	99.7	53 09.6	53	77	99.0	53 25.3	52	77	98.3	53 40.7	51	77	97.6	53 55.8	50	77	96.9	54 10.7	49	77	96.1	1
2	51 35.3	55	77	100.3	51 51.6	54	77	99.6	52 07.7	53	77	98.9	52 23.5	52	77	98.2	52 39.1	52	77	97.5	52 54.4	51	77	96.8	53 09.5	50	77	96.1	53 24.3	49	78	95.4	2
3	50 49.4	54	77	99.5	51 05.6	54	77	98.8	51 21.6	53	77	98.2	51 37.3	52	77	97.5	51 52.8	51	77	96.8	52 08.1	50	77	96.1	52 23.1	50	77	95.4	52 37.8	49	78	94.7	3
4	50 03.3	54	77	98.7	50 19.5	53	77	98.1	50 35.4	53	77	97.4	50 51.0	52	77	96.7	51 06.5	51	77	96.1	51 21.7	50	78	95.4	51 36.6	49	78	94.7	51 51.3	49	78	94.0	4
45	49 17.2	54	77	98.0	49 33.3	53	77	97.3	49 49.1	52	77	96.7	50 04.7	52	77	96.0	50 20.1	51	77	95.3	50 35.2	50	78	94.7	50 50.1	49	78	94.0	51 04.8	48	78	93.3	45
6	48 31.0	53	77	97.2	48 47.0	53	77	96.6	49 02.7	52	77	96.0	49 18.3	51	77	95.3	49 33.6	51	78	94.6	49 48.7	50	78	94.0	50 03.6	49	78	93.3	50 18.2	48	78	92.6	6
7	47 44.7	53	77	96.5	48 00.5	53	77	95.9	48 16.3	52	77	95.2	48 31.8	51	78	94.6	48 47.1	51	78	93.9	49 02.2	50	78	93.3	49 17.0	49	78	92.6	49 31.6	48	78	91.9	7
8	46 58.3	53	77	95.8	47 14.2	53	77	95.1	47 29.9	52	78	94.5	47 45.3	51	78	93.9	48 00.6	50	78	93.2	48 15.6	50	78	92.6	48 30.4	49	78	91.9	48 45.0	48	78	91.3	8
9	46 11.9	53	77	95.1	46 27.7	52	78	94.4	46 43.4	52	78	93.8	46 58.8	51	78	93.2	47 14.0	51	78	92.6	47 29.0	50	78	91.9	47 43.8	49	78	91.3	47 58.4	48	78	90.6	9
50	45 25.4	53	78	94.4	45 41.2	52	78	93.8	45 56.8	52	78	93.1	46 12.2	51	78	92.5	46 27.4	50	78	91.9	46 42.4	50	78	91.3	46 57.2	49	78	90.6	47 11.8	48	78	90.0	50
1	44 38.9	53	78	93.7	44 54.7	52	78	93.1	45 10.3	52	78	92.5	45 25.6	51	78	91.9	45 40.8	50	78	91.3	45 55.8	50	78	90.6	46 10.6	49	78	90.0	46 25.1	48	78	89.4	1
2	43 52.4	53	78	93.0	44 08.1	52	78	92.4	44 23.7	52	78	91.8	44 39.0	51	78	91.2	44 54.2	50	78	90.6	45 09.2	50	78	90.0	45 23.9	49	78	89.4	45 38.5	48	78	88.8	2
3	43 05.8	53	78	92.3	43 21.5	52	78	91.8	43 37.0	51	78	91.2	43 52.4	51	78	90.6	44 07.6	50	78	90.0	44 22.5	50	78	89.4	44 37.3	49	78	88.8	44 51.9	48	78	88.1	3
4	42 19.2	53	78	91.7	42 34.9	52	78	91.1	42 50.4	51	78	90.5	43 05.8	51	78	89.9	43 20.9	50	78	89.4	43 35.9	49	78	88.8	43 50.7	49	78	88.2	44 05.3	48	78	87.5	4
55	41 32.6	53	78	91.0	41 48.3	52	78	90.5	42 03.8	51	78	89.9	42 19.1	51	78	89.3	42 34.3	50	78	88.7	42 49.3	50	78	88.1	43 04.1	49	78	87.6	43 18.7	48	78	87.0	55
6	40 46.0	53	78	90.4	41 01.6	52	78	89.8	41 17.2	51	78	89.3	41 32.5	51	78	88.7	41 47.7	50	78	88.1	42 02.7	50	78	87.5	42 17.5	49	78	87.0	42 32.2	49	78	86.4	6
7	39 59.3	53	78	89.8	40 15.0	52	78	89.2	40 30.6	51	78	88.7	40 45.9	51	78	88.1	41 01.1	50	78	87.5	41 16.1	50	78	86.9	41 31.0	49	78	86.4	41 45.7	49	77	85.8	7
8	39 12.7	53	78	89.2	39 28.4	52	78	88.6	39 43.9	52	78	88.0	39 59.3	51	78	87.5	40 14.5	50	78	86.9	40 29.6	50	78	86.4	40 44.5	49	77	85.8	40 59.2	49	77	85.2	8
9	38 26.1	53	78	88.5	38 41.8	52	78	88.0	38 57.3	52	78	87.4	39 12.7	51	78	86.9	39 28.0	51	78	86.3	39 43.1	50	77	85.8	39 58.0	49	77	85.2	40 12.7	49	77	84.6	9
60	37 39.5	53	78	87.9	37 55.2	52	78	87.4	38 10.8	52	78	86.8	38 26.2	51	78	86.3	38 41.5	51	78	85.7	38 56.6	50	77	85.2	39 11.5	50	77	84.6	39 26.3	49	77	84.1	60
1	36 52.9	53	78	87.3	37 08.6	52	78	86.8	37 24.2	52	78	86.3	37 39.7	51	77	85.7	37 55.0	51	77	85.2	38 10.1	50	77	84.6	38 25.1	50	77	84.1	38 40.0	49	77	83.5	1
2	36 06.3	53	78	86.7	36 22.1	52	78	86.2	36 37.7	52	77	85.7	36 53.2	51	77	85.1	37 08.5	51	77	84.6	37 23.7	50	77	84.0	37 38.8	50	77	83.5	37 53.7	49	77	83.0	2
3	35 19.8	53	78	86.1	35 35.6	52	77	85.6	35 51.2	52	77	85.1	36 06.8	52	77	84.6	36 22.1	51	77	84.0	36 37.4	50	77	83.5	36 52.5	50	77	82.9	37 07.4	49	77	82.4	3
4	34 33.3	53	77	85.5	34 49.1	52	77	85.0	35 04.8	52	77	84.5	35 20.4	52	77	84.0	35 35.8	51	77	83.5	35 51.1	50	77	82.9	36 06.2	50	77	82.4	36 21.2	50	77	81.9	4
65	33 46.8	53	77	85.0	34 02.7	53	77	84.4	34 18.4	52	77	83.9	34 34.0	52	77	83.4	34 49.5	51	77	82.9	35 04.8	51	77	82.4	35 20.0	50	77	81.8	35 35.1	50	77	81.3	65
6	33 00.4	53	77	84.4	33 16.3	53	77	83.9	33 32.1	52	77	83.4	33 47.7	52	77	82.8	34 03.3	52	77	82.3	34 18.7	51	77	81.8	34 33.9	51	77	81.3	34 49.1	50	77	80.8	6
7	32 14.0	53	77	83.8	32 30.0	53	77	83.3	32 45.8	53	77	82.8	33 01.5	52	77	82.3	33 17.1	52	77	81.8	33 32.5	51	77	81.3	33 47.9	51	77	80.7	34 03.1	50	77	80.2	7
8	31 27.7	54	77	83.2	31 43.7	53	77	82.7	31 59.6	53	77	82.2	32 15.3	52	77	81.7	32 31.0	52	77	81.2	32 46.5	52	77	80.7	33 01.9	51	76	80.2	33 17.2	51	76	79.7	8
9	30 41.4	54	77	82.6	30 57.5	53	77	82.2	31 13.4	53	77	81.7	31 29.2	53	77	81.2	31 44.9	52	77	80.7	32 00.5	52	76	80.2	32 16.0	51	76	79.7	32 31.3	51	76	79.1	9
70	29 55.2	54	77	82.1	30 11.3	53	77	81.6	30 27.3	53	77	81.1	30 43.2	53	77	80.6	30 58.9	52	77	80.1	31 14.6	52	76	79.6	31 30.1	52	76	79.1	31 45.6	51	76	78.6	70
1	29 09.0	54	77	81.5	29 25.2	54	77	81.0	29 41.3	53	77	80.5	29 57.2	53	76	80.1	30 13.0	53	76	79.6	30 28.8	52	76	79.1	30 44.4	52	76	78.6	30 59.9	51	76	78.1	1
2	28 23.0	54	77	80.9	28 39.2	54	77	80.5	28 55.3	54	76	80.0	29 11.3	53	76	79.5	29 27.2	53	76	79.0	29 43.0	53	76	78.5	29 58.7	52	76	78.0	30 14.3	52	76	77.5	2
3	27 36.9	54	77	80.4	27 53.2	54	76	79.9	28 09.4	54	76	79.4	28 25.5	53	76	79.0	28 41.5	53	76	78.5	28 57.4	53	76	78.0	29 13.2	52	76	77.5	29 28.8	52	76	77.0	3
4	26 51.0	55	76	79.8	27 07.4	54	76	79.4	27 23.6	54	76	78.9	27 39.8	54	76	78.4	27 55.9	53	76	77.9	28 11.8	53	76	77.4	28 27.7	53	76	77.0	28 43.5	52	75	76.5	4
75	26 05.2	55	76	79.3	26 21.6	55	76	78.8	26 37.9	54	76	78.3	26 54.2	54	76	77.9	27 10.3	54	76	77.4	27 26.4	53	76	76.9	27 42.3	53	75	76.4	27 58.2	53	75	76.0	75
6	25 19.4	55	76	78.7	25 35.9	55	76	78.2	25 52.3	55	76	77.8	26 08.6	54	76	77.3	26 24.9	54	75	76.8	26 41.0	54	75	76.4	26 57.0	53	75	75.9	27 13.0	53	75	75.4	6
7	24 33.7	55	76	78.1	24 50.3	55	76	77.7	25 06.8	55	76	77.2	25 23.2	55	75	76.8	25 39.5	54	75	76.3	25 55.7	54	75	75.8	26 11.9	54	75	75.4	26 27.9	53	75	74.9	7
8	23 48.1	55	76	77.6	24 04.8	55	76	77.1	24 21.3	55	76	76.7	24 37.8	55	75	76.2	24 54.2	55	75	75.8	25 10.6	54	75	75.3	25 26.8	54	75	74.9	25 43.0	54	75	74.4	8
9	23 02.6	56	76	77.0	23 19.4	55	76	76.6	23 36.0	55	76	76.1	23 52.6	55	75	75.7	24 09.1	55	75	75.2	24 25.5	55	75	74.8	24 41.9	54	75	74.3	24 58.1	54	75	73.8	9
80	22 17.2	56	75	76.5	22 34.1	56	75	76.0	22 50.8	56	75	75.6	23 07.5	55	75	75.1	23 24.1	55	75	74.7	23 40.6	55	75	74.2	23 57.0	55	75	73.8	24 13.4	54	74	73.3	80
1	21 32.0	56	75	75.9	21 48.9	56	75	75.5	22 05.7	56	75	75.0	22 22.5	56	75	74.6	22 39.2	56	75	74.1	22 55.8	55	74	73.7	23 12.3	55	74	73.2	23 28.8	55	74	72.8	1
2	20 46.8	57	75	75.4	21 03.8	57	75	74.9	21 20.7	56	75	74.5	21 37.6	56	75	74.0	21 54.4	56	74	73.6	22 11.1	56	74	73.2	22 27.7	55	74	72.7	22 44.4	55	74	72.3	2
3	20 01.7	57	75	74.8	20 18.8	57	75	74.4	20 35.8	57	75	73.9	20 52.8	56	74	73.5	21 09.7	56	74	73.1	21 26.5	56	74	72.6	21 43.3	56	74	72.2	22 00.0	55	74	71.7	3
4	19 16.8	57	75	74.3	19 34.0	57	75	73.8	19 51.1	57	75	73.4	20 08.2	57	74	73.0	20 25.2	57	74	72.5	20 42.1	56	74	72.1	20 59.0	56	74	71.6	21 15.8	56	73	71.2	4
85	18 32.0	58	74	73.7	18 49.2	58	75	73.3	19 06.5	57	74	72.8	19 23.6	57	74	72.4	19 40.8	57	74	72.0	19 57.8	57	74	71.5	20 14.8	56	74	71.1	20 31.7	56	73	70.7	85
6	17 47.3	58	74	73.2	18 04.7	58	74	72.7	18 22.0	58	74	72.3	18 39.3	57	74	71.9	18 56.5	57	74	71.4	19 13.6	57	74	71.0	19 30.7	57	73	70.6	19 47.8	57	73	70.1	6
7	17 02.7	58	74	72.6	17 20.2	58	74	72.2	17 37.6	58	74	71.7	17 55.0	58	73	71.3	18 12.4	58	73	70.9	18 29.6	57	73	70.5	18 46.8	57	73	70.0	19 04.0	57	73	69.6	7
8	16 18.3	59	74	72.0	16 35.9	59	74	71.6	16 53.4	58	73	71.2	17 10.9	58	73	70.8	17 28.4	58	73	70.3	17 45.8	58	73	69.9	18 03.1	57	73	69.5	18 20.4	57	72	69.1	8
9	15 34.0	59	74	71.5	15 51.7	59	73	71.1	16 09.4	59	73	70.6	16 27.0	59	73	70.2	16 44.5	58	73	69.8	17 02.0	58	73	69.4	17 19.5	58	72	68.9	17 36.9	58	72	68.5	9
90	14 49.9	59	73	70.9	15 07.7	59	73	70.5	15 25.4	59	73	70.1	15 43.2	59	73	69.7	16 00.9	59	73	69.2	16 18.5	59	72	68.8	16 36.1	59	72	68.4	16 53.6	58	72	68.0	90

Lat. 39°

H.A.	24° 00′ Alt. Δd Δt Az.	24° 30′ Alt. Δd Δt Az.	25° 00′ Alt. Δd Δt Az.	25° 30′ Alt. Δd Δt Az.	26° 00′ Alt. Δd Δt Az.	26° 30′ Alt. Δd Δt Az.	27° 00′ Alt. Δd Δt Az.	27° 30′ Alt. Δd Δt Az.	H.A.
00	27 00.0 1.00 1 180.0	26 30.0 1.00 1 180.0	26 00.0 1.00 1 180.0	25 30.0 1.00 1 180.0	25 00.0 1.00 1 180.0	24 30.0 1.00 1 180.0	24 00.0 1.00 1 180.0	23 30.0 1.00 1 180.0	00
1	26 59.6 1.00 2 179.0	26 29.6 1.00 2 179.0	25 59.6 1.00 2 179.0	25 29.6 1.00 2 179.0	24 59.6 1.00 2 179.0	24 29.6 1.00 2 179.0	23 59.6 1.00 3 179.0	23 29.6 1.00 2 179.0	1
2	26 58.3 1.00 3 178.0	26 28.3 1.00 3 178.0	25 58.4 1.00 3 178.0	25 28.4 1.00 3 178.0	24 58.4 1.00 3 178.0	24 28.4 1.00 3 178.0	23 58.4 1.00 3 178.0	23 28.4 1.00 3 178.1	2
3	26 56.2 1.00 5 176.9	26 26.3 1.00 5 177.0	25 56.3 1.00 5 177.0	25 26.3 1.00 5 177.0	24 56.4 1.00 5 177.0	24 26.4 1.00 5 177.1	23 56.4 1.00 5 177.1	23 26.5 1.00 5 177.1	3
4	26 53.3 1.00 6 175.9	26 23.4 1.00 6 175.9	25 53.4 1.00 6 176.0	25 23.5 1.00 6 176.0	24 53.5 1.00 6 176.0	24 23.6 1.00 6 176.1	23 53.7 1.00 6 176.1	23 23.7 1.00 6 176.1	4
05	26 49.6 1.00 8 174.9	26 19.7 1.00 8 174.9	25 49.8 1.00 8 175.0	25 19.8 1.00 7 175.0	24 49.9 1.00 7 175.0	24 20.0 1.00 7 175.1	23 50.1 1.00 7 175.1	23 20.2 1.00 7 175.2	05
6	26 45.0 1.00 9 173.9	26 15.1 1.00 9 173.9	25 45.3 1.00 9 174.0	25 15.4 1.00 9 174.1	24 45.5 1.00 9 174.1	24 15.6 1.00 9 174.1	23 45.7 1.00 9 174.2	23 15.9 1.00 8 174.2	6
7	26 39.6 99 10 172.8	26 09.8 99 10 172.9	25 39.9 99 10 173.0	25 10.1 99 10 173.0	24 40.3 99 10 173.1	24 10.4 99 10 173.1	23 40.6 99 10 173.2	23 10.8 99 10 173.2	7
8	26 33.4 99 12 171.8	26 03.6 99 12 171.9	25 33.8 99 11 172.0	25 04.0 99 11 172.0	24 34.3 99 11 172.1	24 04.5 99 11 172.2	23 34.7 99 11 172.2	23 04.9 99 11 172.3	8
9	26 26.4 99 13 170.8	25 56.6 99 13 170.9	25 26.9 99 13 171.0	24 57.2 99 13 171.0	24 27.5 99 13 171.1	23 57.7 99 13 171.2	23 28.0 99 12 171.3	22 58.2 99 12 171.3	9
10	26 18.5 99 14 169.8	25 48.9 99 14 169.9	25 19.2 99 14 170.0	24 49.5 99 14 170.1	24 19.9 99 14 170.1	23 50.2 99 14 170.2	23 20.5 99 14 170.3	22 50.8 99 14 170.4	10
1	26 09.9 99 16 168.8	25 40.3 99 16 168.9	25 10.7 99 16 169.0	24 41.1 99 15 169.1	24 11.5 99 15 169.2	23 41.9 99 15 169.3	23 12.3 99 15 169.4	22 42.7 99 15 169.4	1
2	26 00.4 98 17 167.8	25 30.9 98 17 167.9	25 01.4 98 17 168.0	24 31.9 98 17 168.1	24 02.3 98 17 168.2	23 32.8 98 16 168.3	23 03.3 98 16 168.4	22 33.7 98 16 168.5	2
3	25 50.2 98 18 166.8	25 20.7 98 18 166.9	24 51.3 98 18 167.0	24 21.8 98 18 167.1	23 52.4 98 18 167.2	23 23.0 98 18 167.3	22 53.5 98 18 167.4	22 24.0 98 17 167.5	3
4	25 39.1 98 20 165.8	25 09.8 98 20 165.9	24 40.4 98 19 166.0	24 11.1 98 19 166.2	23 41.7 98 19 166.3	23 12.3 98 19 166.4	22 43.0 98 19 166.5	22 13.6 98 19 166.6	4
15	25 27.3 97 21 164.8	24 58.0 98 21 164.9	24 28.8 98 21 165.2	23 59.5 98 20 165.2	23 30.3 98 20 165.3	23 01.0 98 20 165.4	22 31.7 98 20 165.5	22 02.4 98 20 165.7	15
6	25 14.7 97 22 163.8	24 45.5 97 22 164.0	24 16.4 97 22 164.1	23 47.2 97 22 164.2	23 18.1 97 22 164.4	22 48.9 97 21 164.5	22 19.7 97 21 164.6	21 50.5 97 21 164.7	6
7	25 01.3 97 24 162.9	24 32.3 97 23 163.0	24 03.2 97 23 163.1	23 34.2 97 23 163.3	23 05.1 97 23 163.4	22 36.0 97 23 163.5	22 06.9 97 22 163.7	21 37.9 97 22 163.8	7
8	24 47.2 96 25 161.9	24 18.3 96 25 162.0	23 49.3 96 24 162.2	23 20.4 97 24 162.3	22 51.4 97 24 162.5	22 22.4 97 24 162.6	21 53.5 97 24 162.7	21 24.5 97 23 162.9	8
9	24 32.3 96 26 160.9	24 03.5 96 26 161.1	23 34.7 96 26 161.2	23 05.8 96 25 161.4	22 37.0 96 25 161.5	22 08.1 96 25 161.7	21 39.3 96 25 161.8	21 10.4 96 25 162.0	9
20	24 16.7 96 27 160.0	23 48.0 96 27 160.1	23 19.3 96 27 160.3	22 50.6 96 27 160.4	22 21.9 96 26 160.6	21 53.1 96 26 160.7	21 24.4 96 26 160.9	20 55.6 96 26 161.0	20
1	24 00.4 95 29 159.0	23 31.8 95 28 159.2	23 03.2 95 28 159.3	22 34.6 95 28 159.5	22 06.0 95 28 159.7	21 37.4 95 27 159.8	21 08.8 95 27 160.0	20 40.1 95 27 160.1	1
2	23 43.3 95 30 158.0	23 14.9 95 29 158.2	22 46.4 95 29 158.4	22 17.9 95 29 158.6	21 49.4 95 29 158.7	21 20.9 95 28 158.9	20 52.4 95 28 159.1	20 23.9 95 28 159.2	2
3	23 25.5 94 31 157.1	22 57.2 94 31 157.3	22 28.9 94 30 157.5	22 00.5 94 30 157.6	21 32.2 95 30 157.8	21 03.8 95 30 158.0	20 35.4 95 29 158.2	20 07.1 95 29 158.3	3
4	23 07.0 94 32 156.2	22 38.8 94 32 156.4	22 10.7 94 32 156.5	21 42.4 94 31 156.7	21 14.2 94 31 156.9	20 46.0 94 31 157.1	20 17.8 94 31 157.3	19 49.5 94 30 157.4	4
25	22 47.8 93 33 155.2	22 19.8 93 33 155.4	21 51.8 93 33 155.5	21 23.7 94 32 155.8	20 55.6 94 32 156.0	20 27.5 94 32 156.2	19 59.4 94 32 156.4	19 31.3 94 31 156.6	25
6	22 28.0 93 34 154.3	22 00.1 93 34 154.5	21 32.2 93 34 154.7	21 04.2 93 34 154.9	20 36.3 93 33 155.1	20 08.4 93 33 155.3	19 40.4 93 33 155.5	19 12.4 93 33 155.7	6
7	22 07.4 92 35 153.4	21 39.7 93 35 153.6	21 11.9 93 35 153.8	20 44.1 93 35 154.0	20 16.4 93 34 154.2	19 48.6 93 34 154.4	19 20.7 93 34 154.6	18 52.9 93 34 154.8	7
8	21 46.2 92 36 152.5	21 18.6 92 36 152.7	20 51.0 92 36 152.9	20 23.4 92 36 153.1	19 55.7 92 35 153.3	19 28.1 92 35 153.5	19 00.4 92 35 153.7	18 32.7 92 35 153.9	8
9	21 24.4 91 38 151.6	20 56.9 92 37 151.8	20 29.5 92 37 152.0	20 02.0 92 37 152.2	19 34.5 92 36 152.5	19 07.0 92 36 152.7	18 39.5 92 36 152.9	18 11.9 92 36 153.1	9
30	21 01.9 91 39 150.7	20 34.6 91 39 150.9	20 07.3 91 38 151.1	19 40.0 91 38 151.4	19 12.6 91 38 151.6	18 45.3 91 37 151.8	18 17.9 91 37 152.0	17 50.5 91 37 152.2	30
1	20 38.7 90 40 149.8	20 11.6 90 39 150.0	19 44.5 91 39 150.3	19 17.3 91 39 150.5	18 50.1 91 39 150.7	18 22.9 91 38 150.9	17 55.7 91 38 151.2	17 28.5 91 38 151.4	1
2	20 15.0 90 41 148.9	19 48.0 90 40 149.2	19 21.0 90 40 149.4	18 54.0 90 40 149.6	18 27.0 90 40 149.9	18 00.0 90 39 150.1	17 32.9 90 39 150.3	17 05.9 90 39 150.5	2
3	19 50.6 89 42 148.1	19 23.8 89 41 148.3	18 57.0 89 41 148.5	18 30.2 89 41 148.8	18 03.3 90 40 149.0	17 36.4 90 40 149.2	17 09.5 90 40 149.5	16 42.6 90 40 149.7	3
4	19 25.7 89 43 147.2	18 59.0 89 42 147.4	18 32.4 89 42 147.6	18 05.7 89 42 147.9	17 39.0 89 42 148.1	17 12.3 89 41 148.4	16 45.6 89 41 148.6	16 18.8 89 41 148.9	4
35	19 00.1 88 44 146.3	18 33.6 88 43 146.6	18 07.1 88 43 146.8	17 40.6 88 43 147.1	17 14.1 88 42 147.3	16 47.6 88 42 147.6	16 21.0 89 42 147.8	15 54.4 89 42 148.1	35
6	18 34.0 88 44 145.5	18 07.7 88 44 145.8	17 41.4 88 44 146.0	17 15.0 88 44 146.3	16 48.7 88 43 146.5	16 22.3 88 43 146.8	15 55.9 88 43 147.0	15 29.5 88 42 147.2	6
7	18 07.3 87 45 144.7	17 41.2 87 45 144.9	17 15.0 87 45 145.2	16 48.8 87 45 145.4	16 22.7 87 44 145.7	15 56.5 87 44 145.9	15 30.2 87 44 146.2	15 04.0 87 43 146.4	7
8	17 40.0 86 46 143.8	17 14.1 87 46 144.1	16 48.1 87 46 144.3	16 22.1 87 45 144.6	15 56.1 87 45 144.9	15 30.1 87 45 145.1	15 04.0 87 45 145.4	14 37.9 87 44 145.6	8
9	17 12.2 86 47 143.0	16 46.5 86 47 143.3	16 20.7 86 47 143.5	15 54.8 86 46 143.8	15 29.0 86 46 144.1	15 03.1 86 46 144.3	14 37.3 86 45 144.6	14 11.4 86 45 144.8	9
40	16 43.9 85 48 142.2	16 18.3 85 48 142.5	15 52.7 85 48 142.7	15 27.0 86 47 143.0	15 01.4 86 47 143.3	14 35.7 86 47 143.5	14 10.0 86 46 143.8	13 44.3 86 46 144.1	40
1	16 15.1 85 49 141.4	15 49.6 85 49 141.6	15 24.2 85 48 141.9	14 58.7 85 48 142.2	14 33.2 85 48 142.5	14 07.7 85 47 142.7	13 42.2 85 47 143.0	13 16.6 85 47 143.3	1
2	15 45.7 84 50 140.6	15 20.4 84 49 140.8	14 55.2 84 49 141.1	14 29.9 84 49 141.4	14 04.6 84 49 141.7	13 39.2 84 48 142.0	13 13.9 85 48 142.2	12 48.5 85 48 142.5	2
3	15 15.8 84 51 139.8	14 50.7 84 50 140.1	14 25.6 84 50 140.3	14 00.5 84 50 140.6	13 35.4 84 49 140.9	13 10.2 84 49 141.2	12 45.1 84 49 141.5	12 19.9 84 49 141.7	3
4	14 45.5 83 51 139.0	14 20.6 83 51 139.3	13 55.6 83 50 139.6	13 30.7 83 50 139.9	13 05.7 83 50 140.1	12 40.8 83 50 140.4	12 15.8 83 50 140.7	11 50.8 83 49 141.0	4
45	14 14.6 82 52 138.2	13 49.9 82 52 138.5	13 25.2 83 52 138.8	13 00.4 83 51 139.1	12 35.6 83 51 139.4	12 10.8 83 51 139.7	11 46.0 83 50 139.9	11 21.2 83 50 140.2	45
6	13 43.3 82 53 137.4	13 18.8 82 53 137.7	12 54.2 82 52 138.0	12 29.6 82 52 138.3	12 05.0 82 52 138.6	11 40.4 82 51 138.9	11 15.8 82 51 139.2	10 51.1 82 51 139.5	6
7	13 11.5 81 54 136.7	12 47.2 81 53 137.0	12 22.8 81 53 137.3	11 58.4 81 53 137.6	11 34.0 81 52 137.9	11 09.5 82 52 138.2	10 45.1 82 52 138.4	10 20.6 82 52 138.7	7
8	12 39.3 81 54 135.9	12 15.1 81 54 136.2	11 50.9 81 54 136.5	11 26.7 81 54 136.8	11 02.4 81 53 137.1	10 38.2 81 53 137.4	10 13.9 81 53 137.7	9 49.6 81 52 138.0	8
9	12 06.7 80 55 135.2	11 42.6 80 55 135.5	11 18.6 80 55 135.8	10 54.6 80 54 136.1	10 30.5 80 54 136.4	10 06.4 80 54 136.7	9 42.3 80 53 137.0	9 18.2 80 53 137.3	9
50	11 33.6 79 56 134.4	11 09.7 79 56 134.7	10 45.9 80 55 135.0	10 22.0 80 55 135.3	9 58.1 80 55 135.6	9 34.2 80 54 136.0	9 10.3 80 54 136.3	8 46.3 80 54 136.6	50
1	11 00.1 79 57 133.7	10 36.4 79 56 134.0	10 12.7 79 56 134.3	9 49.0 79 56 134.6	9 25.3 79 55 134.9	9 01.6 79 55 135.2	8 37.8 79 55 135.5	8 14.1 79 54 135.9	1
2	10 26.1 78 57 132.9	10 02.6 78 57 133.3	9 39.1 78 57 133.6	9 15.6 78 56 133.9	8 52.1 78 56 134.2	8 28.5 79 56 134.5	8 05.0 79 55 134.8	7 41.4 79 55 135.1	2
3	9 51.8 78 58 132.2	9 28.5 78 58 132.5	9 05.2 78 57 132.9	8 41.8 78 57 133.2	8 18.5 78 57 133.5	7 55.1 78 56 133.8	7 31.7 78 56 134.1	7 08.3 78 56 134.4	3
4	9 17.1 77 59 131.5	8 53.9 77 58 131.8	8 30.8 77 58 132.2	8 07.6 77 58 132.5	7 44.4 77 57 132.8	7 21.2 77 57 133.1	6 58.0 77 57 133.4	6 34.8 77 56 133.7	4
55	8 42.0 77 59 130.8	8 19.0 77 59 131.1	7 56.0 77 59 131.4	7 33.0 77 58 131.8	7 10.0 77 58 132.1	6 47.0 77 58 132.4	6 24.0 77 57 132.7	6 00.9 77 57 133.1	55
6	8 06.5 76 60 130.1	7 43.7 76 59 130.4	7 20.9 76 59 130.7	6 58.1 76 59 131.1	6 35.2 76 59 131.4	6 12.4 76 58 131.7	5 49.5 76 58 132.1	5 26.7 76 58 132.4	6
7	7 30.6 75 60 129.4	7 08.0 75 60 129.7	6 45.4 75 60 130.1	6 22.7 75 60 130.4	6 00.1 76 59 130.7	5 37.4 76 59 131.0	5 14.7 76 59 131.4		7
8	6 54.4 75 61 128.7	6 32.0 75 61 129.0	6 09.5 75 60 129.4	5 47.0 75 60 129.7	5 24.6 75 60 130.0	5 02.1 75 60 130.4			8
9	6 17.8 74 62 128.0	5 55.6 74 61 128.4	5 33.3 74 61 128.7	5 11.0 74 61 129.0					9
60	5 40.9 74 62 127.3	5 18.8 74 62 127.7							60
1	5 03.7 73 63 126.7								1

DECLINATION SAME NAME AS LATITUDE

H.A.	24° 00′ Alt. Δd Δt Az.	24° 30′ Alt. Δd Δt Az.	25° 00′ Alt. Δd Δt Az.	25° 30′ Alt. Δd Δt Az.	26° 00′ Alt. Δd Δt Az.	26° 30′ Alt. Δd Δt Az.	27° 00′ Alt. Δd Δt Az.	27° 30′ Alt. Δd Δt Az.	H.A.
91	14 05.9 60 73 70.4	14 23.8 60 73 69.5	14 41.7 60 73 69.1	14 59.5 59 72 69.1	15 17.3 59 72 68.7	15 35.1 59 72 68.3	15 52.8 59 72 67.9	16 10.4 59 72 67.4	91
2	13 22.0 60 73 69.8	13 40.1 60 73 69.4	13 58.1 60 73 69.0	14 16.1 60 72 68.6	14 34.0 60 72 68.1	14 51.9 60 72 67.7	15 09.7 59 72 67.3	15 27.5 59 72 66.9	2
3	12 38.4 61 73 69.2	12 56.5 60 73 68.8	13 14.6 60 72 68.4	13 32.7 60 72 68.0	13 50.8 60 72 67.6	14 08.8 60 71 67.2	14 26.8 60 71 66.8	14 44.7 60 71 66.3	3
4	11 54.8 61 72 68.7	12 13.1 61 72 68.2	12 31.4 61 72 67.8	12 49.6 61 72 67.4	13 07.8 61 71 67.0	13 25.9 60 71 66.6	13 44.0 60 71 66.2	14 02.1 60 71 65.8	4
95	11 11.5 61 72 68.1	11 29.9 61 72 67.7	11 48.3 61 72 67.3	12 06.6 61 71 66.9	12 24.9 61 71 66.5	12 43.2 61 71 66.1	13 01.4 61 71 65.7	13 19.6 61 70 65.2	95
6	10 28.3 62 72 67.5	10 46.9 62 71 67.1	11 05.4 62 71 66.7	11 23.8 62 71 66.3	11 42.3 61 71 65.9	12 00.7 61 71 65.5	12 19.0 61 70 65.1	12 37.4 61 70 64.7	6
7	9 45.3 62 71 66.9	10 04.0 62 71 66.5	10 22.6 62 71 66.1	10 41.2 62 71 65.7	10 59.8 62 70 65.3	11 18.3 62 70 64.9	11 36.8 62 70 64.5	11 55.3 62 70 64.1	7
8	9 02.5 63 71 66.4	9 21.3 63 71 66.0	9 40.1 62 71 65.6	9 58.8 62 70 65.2	10 17.5 62 70 64.8	10 36.2 62 70 64.4	10 54.8 62 70 64.0	11 13.5 62 69 63.6	8
9	8 19.9 63 71 65.8	8 38.8 63 70 65.4	8 57.7 63 70 65.0	9 16.6 63 70 64.6	9 35.4 63 70 64.2	9 54.3 63 70 63.8	10 13.0 63 69 63.4	10 31.8 62 69 63.0	9
100	7 37.5 64 70 65.2	7 56.5 63 70 64.8	8 15.6 63 70 64.4	8 34.6 63 70 64.0	8 53.6 63 69 63.6	9 12.5 63 69 63.2	9 31.5 63 69 62.8	9 50.4 63 69 62.4	100
1	6 55.3 64 70 64.6	7 14.4 64 70 64.2	7 33.6 64 70 63.8	7 52.8 64 69 63.4	8 11.9 64 69 62.9	8 31.0 64 69 62.7	8 50.1 64 69 62.3	9 09.1 63 68 61.9	1
2	6 13.2 64 70 64.0	6 32.6 64 69 63.6	6 51.9 64 69 63.2	7 11.2 64 69 62.9	7 30.4 64 69 62.5	7 49.7 64 68 62.1	8 08.9 64 68 61.7	8 28.1 64 68 61.3	2
3	5 31.4 65 69 63.4	5 50.9 65 69 63.0	6 10.3 65 69 62.7	6 29.8 65 69 62.3	6 49.2 65 68 61.9	7 08.6 65 68 61.5	7 28.0 65 68 61.1	7 47.3 64 68 60.7	3
4		5 09.5 65 69 62.4	5 29.0 65 68 62.1	5 48.6 65 68 61.7	6 08.2 65 68 61.3	6 27.7 65 68 60.9	6 47.3 65 67 60.5	7 06.8 65 67 60.2	4
105				5 07.7 66 68 61.1	5 27.4 66 68 60.7	5 47.1 66 67 60.3	6 06.8 66 67 59.9	6 26.4 66 67 59.6	105
6						5 06.7 66 67 59.7	5 26.5 66 67 59.4	5 46.4 66 66 59.0	6
7								5 06.5 67 66 58.4	7

16—65155-1

Lat. 39°

H.A.	28° 00' Alt. (Δd Δt)	Az.	28° 30' Alt. (Δd Δt)	Az.	29° 00' Alt. (Δd Δt)	Az.	30° 00' Alt. (Δd Δt)	Az.	32° 00' Alt. (Δd Δt)	Az.	34° 00' Alt. (Δd Δt)	Az.	34° 30' Alt. (Δd Δt)	Az.	35° 30' Alt. (Δd Δt)	Az.	H.A.
00	79 00.0 1.03	180.0	79 30.1 1.03	180.0	80 00.0 1.03	180.0	81 00.0 1.04	180.0	83 00.0 1.05	180.0	85 00.0 1.06	180.0	85 30.0 1.07	180.0	86 30.0 1.00	180.0	00
1	78 58.1 1.009	175.4	79 28.0 1.010	175.2	79 58.0 1.010	175.0	80 57.8 1.011	174.5	82 57.2 99 14	173.1	84 56.2 99 19	170.6	85 25.8 99 21	169.6	86 24.6 98 26	166.9	1
2	78 52.5 99 15	170.8	79 22.2 99 16	170.4	79 51.9 99 17	170.0	80 51.1 99 18	169.0	82 48.8 98 23	166.3	84 44.9 96 30	161.6	85 13.4 95 32	159.8	86 09.3 91 39	154.9	2
3	78 43.3 98 21	166.3	79 12.6 98 23	165.8	79 41.8 97 23	165.2	80 40.1 97 25	163.8	82 35.2 95 31	159.9	84 27.0 91 39	153.3	84 53.9 89 42	151.0	85 45.8 83 49	144.8	3
4	78 30.5 96 27	162.0	78 59.4 96 28	161.3	79 28.1 96 29	160.5	80 25.1 95 31	158.7	82 16.9 91 38	153.9	84 03.4 85 47	146.0	84 28.6 83 50	143.3	85 16.2 75 57	136.5	4
05	78 14.5 94 32	157.8	78 42.7 94 33	157.0	79 10.8 93 34	156.0	80 06.4 92 37	153.9	81 54.4 88 44	148.3	83 35.2 80 53	139.7	83 56.6 76 56	136.8	84 42.1 68 62	129.8	05
6	77 55.4 92 37	153.8	78 22.9 92 38	152.9	78 50.3 91 39	151.8	79 44.2 89 42	149.5	81 28.1 84 49	143.3	83 03.4 74 58	134.2	83 23.1 71 60	131.3	84 04.9 62 66	124.4	6
7	77 33.4 90 41	150.0	78 00.3 89 42	149.0	78 26.8 88 44	147.9	79 19.1 86 46	145.3	80 58.8 80 53	138.8	82 28.5 69 62	129.5	82 48.8 65 64	126.6	83 25.4 56 69	120.0	7
8	77 08.9 87 45	146.5	77 35.0 86 46	145.3	78 00.8 85 47	144.1	78 51.3 83 50	141.4	80 26.8 76 57	134.7	81 51.6 65 65	125.4	82 10.4 61 67	122.6	82 44.2 52 71	116.3	8
9	76 42.0 86 48	143.1	77 07.3 84 50	141.9	77 32.3 83 51	140.7	78 21.0 80 54	137.9	79 52.6 72 60	131.0	81 12.8 61 67	121.9	81 30.4 57 69	119.2	82 01.9 48 72	113.3	9
10	76 13.0 82 52	139.9	76 37.5 81 53	138.7	77 01.7 80 54	137.4	77 48.8 77 57	134.6	79 16.5 69 63	127.7	80 32.5 57 69	118.5	80 49.1 53 70	116.3	81 18.7 45 73	110.6	10
1	75 42.1 80 54	137.0	76 05.9 79 56	135.7	76 29.3 77 57	134.4	77 14.7 74 59	131.5	78 38.9 66 65	124.7	79 51.2 54 70	116.1	80 06.5 50 72	113.7	80 34.7 42 74	108.4	1
2	75 09.4 78 57	134.2	75 32.5 76 58	133.0	75 55.2 75 59	131.6	76 39.0 71 62	128.8	77 59.9 63 67	122.0	79 06.9 51 72	113.7	79 23.7 48 73	111.4	79 50.2 40 75	106.4	2
3	74 35.3 75 59	131.6	74 57.7 74 60	130.4	75 19.6 72 61	129.0	76 02.0 69 64	126.2	77 19.9 60 68	119.6	78 25.8 49 73	111.6	78 40.0 46 74	109.4	79 05.3 38 75	104.7	3
4	73 59.8 73 61	129.2	74 21.5 72 62	128.0	74 42.8 70 63	126.6	75 23.8 67 65	123.8	76 38.9 58 70	117.3	77 42.2 47 74	109.7	77 55.8 44 74	107.6	78 20.0 37 76	103.1	4
15	73 23.1 71 63	126.9	73 44.2 70 64	125.7	74 04.8 68 65	124.4	74 44.6 64 67	121.6	75 57.1 56 71	115.3	76 58.0 45 74	107.9	77 11.1 42 75	105.9	77 34.5 36 76	101.7	15
6	72 45.3 69 65	124.8	73 05.8 68 66	123.6	73 25.9 66 66	122.3	74 04.4 62 68	119.5	75 14.6 54 72	113.4	76 13.5 43 75	106.3	76 26.1 41 76	104.4	76 48.7 34 77	100.4	6
7	72 06.6 67 66	122.8	72 26.5 66 67	121.6	72 46.0 64 68	120.3	73 23.5 61 69	117.6	74 31.5 52 73	111.7	75 28.6 42 75	104.9	75 40.8 39 76	103.0	76 02.8 33 77	99.2	7
8	71 27.0 66 67	120.9	71 46.4 64 68	119.7	72 05.4 63 69	118.5	72 41.8 59 70	115.9	73 48.0 51 73	110.1	74 43.4 41 76	103.5	74 55.3 38 76	101.8	75 16.7 32 77	98.1	8
9	70 46.6 64 68	119.2	71 05.6 62 69	118.0	71 24.1 61 70	116.8	71 59.6 57 71	114.2	73 03.9 50 74	108.6	73 57.9 40 76	102.3	74 09.6 38 77	100.6	74 30.4 32 77	97.1	9
20	70 05.6 62 69	117.5	70 24.1 61 70	116.4	70 42.2 59 71	115.2	71 16.8 56 72	112.6	72 19.6 48 74	107.2	73 12.2 39 76	101.1	73 23.6 37 77	99.5	73 44.1 32 77	96.2	20
1	69 23.9 61 70	115.9	69 42.6 60 71	114.8	69 59.7 58 72	113.6	70 33.6 55 73	111.1	71 34.9 47 75	105.9	72 26.4 38 77	100.0	72 37.5 36 77	98.5	72 57.7 31 77	95.3	1
2	68 41.7 60 71	114.4	68 59.5 58 72	113.3	69 16.7 57 72	112.2	69 49.9 54 73	109.8	70 49.9 46 75	104.6	71 40.4 38 77	99.0	71 51.4 35 77	97.5	72 11.3 31 78	94.5	2
3	67 59.0 59 72	113.0	68 16.4 57 72	111.9	68 33.4 56 73	110.8	69 05.8 53 74	108.5	70 04.6 45 76	103.5	70 54.3 37 77	98.0	71 05.1 35 77	96.6	71 24.8 30 78	93.7	3
4	67 15.9 58 73	111.7	67 33.0 56 73	110.6	67 49.6 55 74	109.5	68 21.4 52 74	107.2	69 19.2 45 76	102.4	70 08.1 37 77	97.1	70 18.3 35 77	95.7	70 38.2 30 78	92.9	4
25	66 32.4 57 73	110.4	66 49.1 55 74	109.3	67 05.5 54 74	108.3	67 36.8 51 75	106.1	68 33.5 44 76	101.3	69 21.8 36 77	96.2	69 32.3 34 77	94.9	69 51.6 30 78	92.2	25
6	65 48.5 56 74	109.2	66 05.0 54 74	108.1	66 21.0 53 74	107.1	66 51.8 50 75	104.9	67 47.8 43 77	100.3	68 35.4 36 77	95.4	68 45.9 34 78	94.1	69 05.0 30 78	91.5	6
7	65 04.3 55 74	108.0	65 20.5 53 75	107.0	65 36.3 52 75	106.0	66 06.7 49 76	103.9	67 01.8 43 77	99.4	67 48.9 36 78	94.6	67 59.3 34 78	93.4	68 18.4 30 78	90.8	7
8	64 19.8 54 75	106.9	64 35.8 53 75	105.9	64 51.4 51 75	104.9	65 21.3 48 76	102.8	66 15.8 42 77	98.5	67 02.4 35 78	93.8	67 12.8 34 78	92.6	67 31.8 30 78	90.2	8
9	63 35.1 53 75	105.8	63 50.8 52 75	104.8	64 06.2 51 76	103.9	64 35.7 48 76	101.9	65 29.6 42 77	97.6	66 15.9 35 78	93.1	66 26.2 33 78	91.9	66 45.2 30 78	89.5	9
30	62 50.1 52 75	104.8	63 05.7 51 76	103.8	63 20.9 50 76	102.9	63 50.0 47 76	100.9	64 43.3 41 77	96.8	65 29.3 35 78	92.4	65 39.6 33 78	91.2	65 58.5 30 78	88.9	30
1	62 04.9 52 76	103.8	62 20.3 51 76	102.8	62 35.3 49 76	101.9	63 04.2 47 77	100.0	63 57.0 41 77	96.0	64 42.7 35 78	91.7	64 52.9 33 78	90.6	65 11.9 30 78	88.3	1
2	61 19.5 51 76	102.8	61 34.8 50 76	101.9	61 49.6 49 76	101.0	62 18.2 46 77	99.1	63 10.6 41 77	95.2	63 56.1 35 78	91.0	64 06.3 33 78	90.0	64 25.3 30 78	87.8	2
3	60 34.0 51 76	101.9	60 49.1 50 76	101.0	61 03.8 48 77	100.1	61 32.1 46 77	98.3	62 24.1 41 78	94.4	63 09.5 35 78	90.4	63 19.7 33 78	89.3	63 38.7 30 78	87.2	3
4	59 48.3 50 76	101.0	60 03.2 49 77	100.1	60 17.8 48 77	99.2	60 45.9 46 77	97.4	61 37.6 40 78	93.7	62 22.8 35 78	89.7	62 33.1 33 78	88.7	62 52.2 30 78	86.7	4
35	59 02.4 50 77	100.1	59 17.3 49 77	99.3	59 31.7 48 77	98.4	59 59.6 45 77	96.6	60 51.4 40 78	93.0	61 36.2 35 78	89.1	61 46.4 33 78	88.1	62 05.6 30 78	86.1	35
6	58 16.5 50 77	99.3	58 31.2 48 77	98.4	58 45.4 47 77	97.6	59 13.3 45 77	95.9	60 04.5 40 78	92.3	60 49.6 35 78	88.5	60 59.9 34 78	87.6	61 19.1 31 77	85.6	6
7	57 30.4 49 77	98.4	57 45.0 48 77	97.6	57 59.3 47 77	96.8	58 26.9 45 77	95.1	59 17.9 40 78	91.6	60 03.0 35 78	87.9	60 13.3 34 78	87.0	60 32.6 31 77	85.1	7
8	56 44.2 49 77	97.7	56 58.8 48 77	96.8	57 13.0 47 77	96.0	57 40.4 45 78	94.4	58 31.3 40 78	91.0	59 16.4 35 78	87.4	59 26.7 34 78	86.4	59 46.2 31 77	84.6	8
9	55 58.0 49 77	96.9	56 12.4 48 77	96.1	56 26.6 47 77	95.3	56 53.9 45 78	93.7	57 44.6 40 78	90.3	58 29.8 35 78	86.8	58 40.2 34 78	85.9	58 59.8 31 77	84.1	9
40	55 11.7 48 77	96.1	55 26.0 47 77	95.3	55 40.1 46 78	94.6	56 07.3 44 78	93.0	56 58.0 40 78	89.7	57 43.3 35 78	86.3	57 53.7 34 77	85.4	58 13.4 32 77	83.6	40
1	54 25.3 48 77	95.4	54 39.4 47 78	94.6	54 53.5 46 78	93.9	55 20.8 44 78	92.3	56 11.4 40 78	89.1	56 56.8 36 77	85.7	57 07.2 34 77	84.8	57 27.1 32 77	83.1	1
2	53 38.8 48 78	94.7	53 53.1 47 78	93.9	54 07.1 46 78	93.2	54 34.2 44 78	91.6	55 24.8 40 78	88.5	56 10.3 36 77	85.2	56 40.9 32 77	84.3	56 40.9 32 77	82.6	2
3	52 52.3 48 78	93.9	53 06.5 47 78	93.2	53 20.5 46 78	92.5	53 47.5 44 78	91.0	54 38.2 40 78	87.9	55 23.8 36 77	84.6	55 34.4 35 77	83.8	55 54.6 33 77	82.1	3
4	52 05.8 48 78	93.3	52 20.0 47 78	92.5	52 33.9 46 78	91.8	53 00.9 44 78	90.3	53 51.6 40 78	87.3	54 37.4 36 77	84.1	54 48.1 35 77	83.3	55 08.5 33 77	81.7	4
45	51 19.2 48 78	92.6	51 33.4 47 78	91.9	51 47.3 46 78	91.2	52 14.3 44 78	89.7	53 05.0 41 78	86.7	53 51.1 36 77	83.6	54 01.8 35 77	82.8	54 22.4 33 77	81.2	45
6	50 32.6 48 78	91.9	50 46.8 47 78	91.2	51 00.6 46 78	90.5	51 27.7 44 78	89.1	52 18.5 40 78	86.1	53 04.8 37 78	83.1	53 15.6 36 77	82.3	53 36.3 34 77	80.7	6
7	49 46.0 48 78	91.3	50 00.1 47 78	90.6	50 14.0 46 78	89.9	50 41.0 44 78	88.5	51 32.0 41 77	85.6	52 18.5 37 77	82.6	52 29.4 36 77	81.8	52 50.3 34 77	80.3	7
8	48 59.4 47 78	90.6	49 13.5 47 78	89.9	49 27.4 46 78	89.3	49 54.4 44 78	87.9	50 45.5 41 77	85.0	51 32.3 37 77	82.1	51 43.3 36 77	81.4	52 04.4 34 76	79.8	8
9	48 12.8 47 78	90.0	48 26.9 47 78	89.3	48 40.8 46 78	88.7	49 07.9 44 78	87.3	49 59.1 41 77	84.5	50 46.1 37 77	81.6	50 57.2 36 77	80.9	51 18.5 35 76	79.4	9
50	47 26.1 47 78	89.3	47 40.3 47 78	88.7	47 54.2 46 78	88.0	48 21.3 44 78	86.7	49 12.4 41 77	84.0	50 00.0 38 77	81.1	50 11.2 37 77	80.4	50 32.7 35 76	78.9	50
1	46 39.5 48 78	88.7	46 53.6 47 78	88.1	47 07.6 46 78	87.4	47 34.8 45 78	86.1	48 26.3 41 77	83.4	49 14.0 38 77	80.6	49 25.3 37 76	79.9	49 47.0 35 76	78.5	1
2	45 52.9 48 78	88.1	46 07.1 47 78	87.5	46 21.0 46 78	86.9	46 48.2 45 77	85.6	47 40.0 42 77	82.9	48 28.0 38 77	80.2	48 39.4 37 76	79.5	49 01.4 36 76	78.0	2
3	45 06.3 48 78	87.5	45 20.5 47 78	86.9	45 34.5 46 78	86.3	46 01.8 45 77	85.0	46 53.8 42 77	82.4	47 42.1 39 76	79.7	47 53.6 38 76	79.0	48 15.8 36 76	77.6	3
4	44 19.7 48 78	86.9	44 33.9 47 78	86.3	44 47.9 46 78	85.7	45 15.3 45 77	84.4	46 07.6 42 77	81.9	46 56.3 39 76	79.2	47 07.8 38 76	78.5	47 30.3 37 76	77.2	4
55	43 33.2 48 78	86.3	43 47.4 47 77	85.7	44 01.5 46 77	85.1	44 29.0 45 77	83.9	45 21.5 42 77	81.3	46 10.5 39 76	78.7	46 22.2 39 76	78.1	46 44.9 37 76	76.7	55
6	42 46.7 48 77	85.8	43 00.9 47 77	85.2	43 15.0 47 77	84.6	43 42.6 45 77	83.3	44 35.4 43 77	80.8	45 24.8 40 76	78.3	45 36.6 39 76	77.6	45 59.5 37 75	76.3	6
7	42 00.2 48 77	85.2	42 14.5 47 77	84.6	42 28.6 47 77	84.0	42 56.3 46 77	82.8	43 49.4 43 77	80.3	44 39.2 40 76	77.8	44 51.1 39 76	77.1	45 14.3 38 75	75.8	7
8	41 13.7 48 77	84.6	41 28.1 47 77	84.0	41 42.3 47 77	83.5	42 10.1 46 77	82.3	43 03.5 43 76	79.8	43 53.7 40 76	77.3	44 05.7 40 76	76.7	44 29.1 38 75	75.4	8
9	40 27.3 48 77	84.1	40 41.7 48 77	83.5	40 56.0 47 77	82.9	41 23.9 46 77	81.7	42 17.6 43 76	79.3	43 08.2 41 76	76.9	43 20.3 40 75	76.2	43 44.0 39 75	75.0	9
60	39 41.0 48 77	83.5	39 55.4 48 77	82.9	40 09.7 47 77	82.4	40 37.8 46 77	81.2	41 31.8 44 76	78.8	42 22.8 41 75	76.4	42 35.1 41 75	75.8	42 59.9 39 75	74.5	60
1	38 54.7 49 77	83.0	39 09.2 48 77	82.4	39 23.5 48 77	81.8	39 51.8 46 77	80.7	40 46.1 44 76	78.3	41 37.6 42 75	75.9	41 50.0 41 75	75.3	42 14.1 40 75	74.1	1
2	38 08.4 49 77	82.4	38 23.0 48 77	81.8	38 37.4 48 77	81.3	39 05.8 47 76	80.2	40 00.5 44 76	77.8	40 52.4 42 75	75.5	41 04.9 41 75	74.9	41 29.3 40 74	73.7	2
3	37 22.2 49 77	81.9	37 36.9 49 77	81.3	37 51.4 48 77	80.8	38 19.9 47 76	79.6	39 15.0 45 76	77.4	40 07.3 42 75	75.0	40 19.9 42 75	74.4	40 44.4 41 74	73.2	3
4	36 36.1 49 77	81.3	36 50.8 49 77	80.8	37 05.4 48 77	80.2	37 34.1 47 76	79.1	38 29.5 45 76	76.9	39 22.3 43 75	74.6	39 35.1 42 75	74.0	40 00.1 41 74	72.8	4
65	35 50.0 50 77	80.8	36 04.8 49 77	80.2	36 19.5 49 76	79.7	36 48.3 48 76	78.6	37 44.1 45 75	76.4	38 37.4 43 75	74.1	38 50.3 43 74	73.5	39 15.6 42 74	72.4	65
6	35 04.1 50 77	80.2	35 18.9 49 76	79.7	35 33.6 49 76	79.2	36 02.6 48 76	78.1	36 58.9 46 75	75.9	37 52.6 44 74	73.6	38 05.6 43 74	73.1	38 31.2 42 74	71.9	6
7	34 18.1 50 76	79.7	34 33.1 50 76	79.2	34 47.9 49 76	78.6	35 17.1 48 76	77.6	36 13.7 46 75	75.4	37 07.9 44 74	73.2	37 21.1 44 74	72.6	37 46.9 43 74	71.5	7
8	33 32.3 50 76	79.2	33 47.3 50 76	78.6	34 02.2 49 76	78.1	34 31.6 48 76	77.1	35 28.6 47 75	74.9	36 23.3 45 74	72.7	37 02.8 43 74	72.2	37 02.8 43 74	71.0	8
9	32 46.5 51 76	78.6	33 01.6 50 76	78.1	33 16.6 50 76	77.6	33 46.2 49 76	76.6	34 43.6 47 75	74.4	35 38.9 45 74	72.3	35 52.3 45 74	71.7	36 18.7 44 73	70.6	9
70	32 00.9 51 76	78.1	32 16.1 50 76	77.6	32 31.1 50 76	77.1	33 00.9 49 75	76.0	33 58.6 47 75	73.9	34 54.5 45 74	71.8	35 08.1 45 74	71.3	35 34.8 44 73	70.2	70
1	31 15.3 51 76	77.6	31 30.6 51 76	77.1	31 45.7 50 76	76.6	32 15.7 49 75	75.5	33 14.0 48 74	73.5	34 10.3 46 74	71.3	34 24.0 45 73	70.8	34 51.0 45 73	69.7	1
2	30 29.8 51 76	77.0	30 45.2 51 76	76.5	31 00.4 51 76	76.0	31 30.6 50 75	75.0	32 29.4 48 74	73.0	33 26.2 46 74	70.9	33 40.0 46 73	70.3	34 07.3 45 73	69.3	2
3	29 44.4 52 76	76.5	29 59.9 51 76	76.0	30 15.2 51 75	75.5	30 45.6 50 75	74.5	31 44.9 49 74	72.5	32 42.2 47 73	70.4	32 56.2 46 73	69.9	33 23.8 46 72	68.8	3
4	28 59.1 52 75	76.0	29 14.7 52 75	75.5	29 30.1 51 75	75.0	30 00.7 51 75	74.0	31 00.4 49 74	72.0	31 58.3 47 73	70.0	32 12.5 47 73	69.4	32 40.4 46 72	68.4	4
75	28 13.9 52 75	75.5	28 29.6 52 75	75.0	28 45.1 52 75	74.5	29 15.9 51 74	73.5	30 16.2 49 74	71.5	31 14.6 48 73	69.5	31 28.9 47 72	69.0	31 57.1 47 72	67.9	75
6	27 28.8 53 75	74.9	27 44.6 52 75	74.5	28 00.3 52 75	74.0	28 31.3 51 74	73.0	29 32.0 50 73	71.0	30 31.0 48 73	69.0	30 45.4 48 72	68.5	31 13.9 47 72	67.5	6
7	26 43.9 53 75	74.4	26 59.7 53 75	73.9	27 15.5 52 74	73.5	27 46.7 52 74	72.5	28 48.0 50 73	70.6	29 47.5 49 72	68.6	30 02.1 48 72	68.1	30 30.9 48 71	67.0	7
8	25 59.0 53 75	73.9	26 15.0 53 74	73.4	26 30.9 53 74	73.0	27 02.3 52 74	72.0	28 04.1 51 73	70.1	29 04.2 49 72	68.1	29 18.9 49 72	67.6	29 48.1 48 71	66.6	8
9	25 14.3 54 74	73.4	25 30.3 53 74	72.9	25 46.3 53 74	72.4	26 18.0 53 74	71.5	27 20.3 51 73	69.6	28 21.0 50 72	67.6	28 35.9 50 71	67.1	29 05.4 49 71	66.1	9
80	24 29.7 54 74	72.8	24 45.8 54 74	72.4	25 01.9 54 74	71.9	25 33.9 53 73	71.0	26 36.7 52 72	69.1	27 37.9 50 72	67.2	27 53.0 50 71	66.7	28 22.8 49 71	65.7	80
1	23 45.2 54 74	72.3	24 01.5 54 74	71.9	24 17.7 54 74	71.4	24 49.9 53 73	70.5	25 53.2 52 72	68.6	26 55.0 51 71	66.7	27 10.2 51 71	66.2	27 40.4 50 70	65.2	1
2	23 00.8 55 74	71.8	23 17.2 55 74	71.3	23 33.6 54 73	70.9	24 06.0 54 73	70.0	25 09.8 53 72	68.1	26 12.3 51 71	66.2	26 27.7 51 71	65.7	26 58.1 50 70	64.8	2
3	22 16.6 55 73	71.3	22 33.1 55 73	70.8	22 49.6 55 73	70.4	23 22.3 54 73	69.5	24 26.7 53 72	67.6	25 29.7 52 71	65.7	25 45.2 52 70	65.3	26 16.0 51 70	64.3	3
4	21 32.5 56 73	70.7	21 49.1 55 73	70.3	22 05.7 55 73	69.8	22 38.7 54 73	68.9	23 43.6 54 71	67.1	24 47.3 52 70	65.3	25 03.0 52 70	64.8	25 34.1 52 70	63.8	4
85	20 48.5 56 73	70.2	21 05.3 56 73	69.3	21 22.0 56 73	69.3	21 55.2 55 72	68.4	23 00.7 54 71	66.6	24 05.0 53 70	64.8	24 20.9 53 70	64.3	24 52.3 52 69	63.4	85
6	20 04.7 56 73	69.7	20 21.6 56 73	69.2	20 38.5 56 73	68.8	21 11.9 55 72	67.9	22 18.0 55 71	66.1	23 22.9 54 70	64.3	23 38.9 53 69	63.8	24 10.7 53 69	62.9	6
7	19 21.1 57 72	69.2	19 38.1 57 72	68.7	19 55.1 56 72	68.3	20 28.8 56 72	67.4	21 35.5 55 71	65.6	22 41.0 54 70	63.8	22 57.2 54 69	63.3	23 29.3 53 69	62.4	7
8	18 37.6 57 72	68.6	18 54.7 57 72	68.2	19 11.8 57 72	67.8	19 45.8 56 71	66.9	20 53.1 56 70	65.1	21 59.2 55 69	63.3	22 15.6 54 69	62.9	22 48.0 54 68	62.0	8
9	17 54.2 58 72	68.1	18 11.5 57 72	67.7	18 28.8 57 72	67.2	19 03.0 57 71	66.4	20 10.9 56 70	64.6	21 17.6 55 69	62.8	21 34.2 55 68	62.4	22 07.0 54 68	61.5	9
90	17 11.1 58 72	67.5	17 28.5 58 71	67.1	17 45.9 58 71	66.7	18 20.4 57 71	65.8	19 28.8 57 70	64.1	20 36.3 56 69	63.0	20 52.9 56 68	61.9	21 29.1 55 68	61.0	90

Lat. 39°

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	28° 00' Alt.	Az.	28° 30' Alt.	Az.	29° 00' Alt.	Az.	30° 00' Alt.	Az.	32° 00' Alt.	Az.	34° 00' Alt.	Az.	34° 30' Alt.	Az.	35° 30' Alt.	Az.	H.A.
00	23 00.0 1.00 01	180.0	22 30.0 1.00 01	180.0	22 00.0 1.00 01	180.0	21 00.0 1.00 01	180.0	19 00.0 1.00 01	180.0	17 00.0 1.00 01	180.0	16 30.0 1.00 01	180.0	15 30.0 1.00 01	180.0	00
1	22 59.6 1.00 02	179.0	22 29.6 1.00 02	179.0	21 59.6 1.00 02	179.1	20 59.6 1.00 02	179.1	18 59.6 1.00 02	179.1	16 59.6 1.00 02	179.1	16 29.6 1.00 02	179.1	15 29.7 1.00 02	179.2	1
2	22 58.4 1.00 03	178.1	22 28.5 1.00 03	178.1	21 58.5 1.00 03	178.1	20 58.5 1.00 03	178.1	18 58.5 1.00 03	178.2	16 58.6 1.00 03	178.3	16 28.6 1.00 03	178.3	15 28.6 1.00 03	178.3	2
3	22 56.5 1.00 05	177.1	22 26.5 1.00 04	177.1	21 56.5 1.00 04	177.2	20 56.6 1.00 04	177.2	18 56.7 1.00 04	177.3	16 56.8 1.00 04	177.4	16 26.9 1.00 04	177.4	15 26.9 1.00 04	177.5	3
4	22 53.8 1.00 06	176.2	22 23.8 1.00 06	176.2	21 53.9 1.00 06	176.2	20 54.0 1.00 06	176.3	18 54.2 1.00 05	176.4	16 54.4 1.00 05	176.5	16 24.4 1.00 05	176.6	15 24.5 1.00 05	176.6	4
05	22 50.3 1.00 07	175.2	22 20.3 1.00 07	175.2	21 50.4 1.00 07	175.3	20 50.6 1.00 07	175.4	18 50.9 1.00 07	175.5	16 51.2 1.00 06	175.7	16 21.3 1.00 06	175.7	15 21.4 1.00 06	175.8	05
6	22 46.0 1.00 08	174.3	22 16.1 1.00 08	174.3	21 46.2 1.00 08	174.4	20 46.4 1.00 08	174.4	18 46.9 1.00 08	174.6	16 47.3 1.00 08	174.8	16 17.4 1.00 08	174.9	15 17.6 1.00 07	174.9	6
7	22 40.9 99 10	173.3	22 11.1 99 10	173.4	21 41.2 99 10	173.4	20 41.5 99 09	173.5	18 42.2 99 09	173.7	16 42.8 1.00 09	173.9	16 12.9 1.00 09	174.0	15 13.2 1.00 09	174.1	7
8	22 35.1 99 11	172.4	22 05.3 99 11	172.4	21 35.5 99 11	172.5	20 35.9 99 11	172.6	18 36.7 99 10	172.8	16 37.5 99 10	173.1	16 07.7 99 10	173.1	15 08.1 99 10	173.3	8
9	22 28.5 99 12	171.4	21 58.9 99 12	171.5	21 29.0 99 12	171.5	20 29.5 99 12	171.7	18 30.5 99 11	171.9	16 31.5 99 11	172.2	16 01.8 99 11	172.3	15 02.2 99 11	172.4	9
10	22 21.2 99 14	170.5	21 51.5 99 13	170.5	21 21.8 99 13	170.6	20 22.4 99 13	170.8	18 23.7 99 13	171.1	16 24.9 99 12	171.4	15 55.2 99 12	171.4	14 55.8 99 12	171.6	10
1	22 13.1 99 15	169.5	21 43.4 99 15	169.6	21 13.8 99 15	169.7	20 14.6 99 14	169.9	18 16.1 99 14	170.2	16 17.5 99 13	170.5	15 47.9 99 13	170.6	14 48.6 99 13	170.8	1
2	22 04.2 98 16	168.6	21 34.6 98 16	168.7	21 05.1 98 16	168.8	20 06.0 98 16	168.9	18 07.8 99 15	169.3	16 09.5 99 14	169.7	15 39.9 99 14	169.7	14 40.8 99 14	169.9	2
3	21 54.6 98 17	167.6	21 25.1 98 17	167.7	20 55.6 98 17	167.8	19 56.7 98 17	168.0	17 58.8 98 16	168.5	16 00.8 98 16	168.8	15 31.3 98 16	168.9	14 32.3 98 15	169.1	3
4	21 44.2 98 18	166.7	21 14.8 98 18	166.8	20 45.5 98 18	166.9	19 46.7 98 18	167.1	17 49.1 98 17	167.6	15 51.4 98 17	168.0	15 22.0 98 17	168.1	14 23.1 98 16	168.3	4
15	21 33.1 98 20	165.8	21 03.8 98 20	165.9	20 34.5 98 19	166.0	19 35.9 98 19	166.2	17 38.7 98 18	166.7	15 41.4 98 18	167.1	15 12.0 98 18	167.2	14 13.3 98 17	167.4	15
6	21 21.3 97 21	164.9	20 52.1 97 21	165.0	20 22.9 97 21	165.1	19 24.5 97 20	165.3	17 27.6 97 20	165.8	15 30.6 97 19	166.3	15 01.4 98 19	166.4	14 02.9 98 19	166.6	6
7	21 08.8 97 22	163.9	20 39.7 97 22	164.1	20 10.6 97 22	164.2	19 12.3 97 21	164.4	17 15.8 97 21	165.0	15 19.2 97 20	165.4	14 50.1 97 20	165.6	13 51.8 97 20	165.8	7
8	20 55.5 97 23	163.0	20 26.5 97 23	163.1	19 57.5 97 23	163.3	18 59.5 97 23	163.6	17 03.4 97 22	164.1	15 07.2 97 21	164.7	14 38.1 97 21	164.7	13 40.0 97 21	165.0	8
9	20 41.5 96 24	162.1	20 12.6 96 24	162.2	19 43.8 96 24	162.4	18 45.9 96 24	162.7	16 50.3 96 23	163.2	14 54.5 97 22	163.8	14 25.5 97 22	163.9	13 27.6 97 22	164.2	9
20	20 26.9 96 26	161.2	19 58.1 96 25	161.3	19 29.3 96 25	161.5	18 31.7 96 25	161.8	16 36.5 96 24	162.4	14 41.1 96 23	163.0	14 12.3 96 23	163.1	13 14.6 96 23	163.4	20
1	20 11.5 95 27	160.3	19 42.8 96 27	160.5	19 14.2 96 26	160.6	18 16.8 96 26	160.9	16 22.0 96 25	161.5	14 27.2 96 24	162.1	13 58.4 96 24	162.3	13 00.9 96 24	162.6	1
2	19 55.4 95 28	159.4	19 26.9 95 28	159.6	18 58.3 95 27	159.7	18 01.2 95 27	160.1	16 06.9 95 26	160.7	14 12.5 95 25	161.3	13 43.9 95 25	161.5	12 46.7 95 25	161.8	2
3	19 38.7 95 29	158.5	19 10.3 95 29	158.7	18 41.9 95 29	158.8	17 45.0 95 28	159.2	15 51.2 95 27	159.9	13 57.3 95 26	160.5	13 28.8 95 26	160.7	12 31.8 95 26	161.0	3
4	19 21.3 94 30	157.6	18 53.0 94 30	157.8	18 24.7 94 30	158.0	17 28.1 94 29	158.3	15 34.8 94 28	159.0	13 41.4 95 27	159.7	13 13.0 95 27	159.9	12 16.3 95 27	160.2	4
25	19 03.2 94 31	156.7	18 35.0 94 31	156.9	18 06.9 94 31	157.1	17 10.6 94 30	157.5	15 17.8 94 29	158.2	13 24.9 94 28	158.9	12 56.7 94 28	159.1	12 00.2 94 28	159.4	25
6	18 44.4 93 32	155.9	18 16.4 93 32	156.1	17 48.4 93 32	156.3	16 52.4 93 31	156.6	15 00.2 94 30	157.4	13 07.8 94 30	158.1	12 39.7 94 29	158.3	11 43.5 94 29	158.6	6
7	18 25.1 93 33	155.0	17 57.2 93 33	155.2	17 29.3 93 33	155.4	16 33.6 93 32	155.8	14 41.9 93 31	156.5	12 50.1 93 30	157.3	12 22.1 93 30	157.5	11 26.2 93 30	157.8	7
8	18 05.0 92 34	154.1	17 37.3 92 34	154.3	17 09.6 92 34	154.5	16 14.1 92 33	154.9	14 23.1 93 32	155.7	12 31.8 93 31	156.5	12 04.0 93 31	156.7	11 08.3 93 31	157.1	8
9	17 44.4 92 35	153.3	17 16.8 92 35	153.5	16 49.3 92 35	153.7	15 54.1 92 34	154.1	14 03.6 92 33	154.9	12 12.9 92 32	155.7	11 45.3 92 32	155.9	10 49.9 92 32	156.3	9
30	17 23.1 91 36	152.4	16 55.7 91 36	152.7	16 28.3 91 36	152.9	15 33.4 92 35	153.3	13 43.5 92 34	154.1	11 53.5 92 33	154.9	11 25.9 92 33	155.1	10 30.8 92 33	155.5	30
1	17 01.3 91 37	151.6	16 34.0 91 37	151.8	16 06.7 91 37	152.0	15 12.2 91 36	152.5	13 22.9 91 35	153.3	11 33.4 91 34	154.2	11 06.0 91 34	154.4	10 11.2 91 34	154.8	1
2	16 38.8 90 38	150.8	16 11.7 90 38	151.0	15 44.6 90 38	151.2	14 50.3 90 37	151.7	13 01.7 91 36	152.5	11 12.8 91 35	153.4	10 45.6 91 35	153.6	9 51.1 91 34	154.0	2
3	16 15.7 90 39	149.9	15 48.8 90 39	150.2	15 21.8 90 39	150.4	14 27.9 90 38	150.8	12 39.9 90 37	151.7	10 51.7 90 36	152.6	10 24.6 90 36	152.8	9 30.4 90 35	153.3	3
4	15 52.1 89 40	149.1	15 25.3 89 40	149.4	14 58.5 89 40	149.6	14 04.9 89 39	150.0	12 17.5 90 38	151.0	10 30.0 90 37	151.9	10 03.0 90 37	152.1	9 09.2 90 36	152.5	4
35	15 27.9 89 41	148.3	15 01.2 89 41	148.5	14 34.6 89 41	148.8	13 41.3 89 40	149.3	11 54.6 89 39	150.2	10 07.7 89 38	151.1	9 40.9 89 38	151.3	8 47.4 89 37	151.8	35
6	15 03.1 88 42	147.5	14 36.6 88 42	147.7	14 10.2 88 42	148.0	13 17.2 88 41	148.5	11 31.2 88 40	149.4	9 44.9 89 39	150.4	9 18.3 89 39	150.6	8 25.1 89 38	151.1	6
7	14 37.7 88 43	146.7	14 11.5 88 43	146.9	13 45.2 88 43	147.2	12 52.6 88 42	147.7	11 07.2 88 41	148.7	9 21.6 88 40	149.6	8 55.2 88 39	149.9	8 02.3 88 39	150.3	7
8	14 11.9 87 44	145.9	13 45.8 87 44	146.1	13 19.6 87 43	146.4	12 27.4 87 43	146.9	10 42.7 87 42	147.9	8 57.8 87 41	148.9	8 31.5 88 40	149.1	7 39.0 88 40	149.6	8
9	13 45.5 86 45	145.1	13 19.5 86 45	145.4	12 53.6 87 44	145.6	12 01.6 87 44	146.1	10 17.6 87 43	147.2	8 33.4 87 41	148.2	8 07.3 87 41	148.4	7 15.1 87 41	148.9	9
40	13 18.5 86 46	144.3	12 52.8 86 45	144.6	12 27.0 86 45	144.8	11 35.4 86 45	145.4	9 52.1 86 43	146.4	8 08.6 86 42	147.4	7 42.7 86 42	147.7	6 50.8 86 41	148.2	40
1	12 51.1 85 47	143.5	12 25.5 85 46	143.8	11 59.9 85 46	144.1	11 08.7 85 45	144.6	9 26.0 86 44	145.7	7 43.2 86 43	146.7	7 17.5 86 43	147.0	6 26.0 86 42	147.5	1
2	12 23.1 85 47	142.8	11 57.7 85 47	143.1	11 32.3 85 47	143.3	10 41.4 85 46	143.9	8 59.5 85 45	144.9	7 17.4 85 44	146.0	6 51.8 85 44	146.3	6 00.7 85 43	146.8	2
3	11 54.7 84 48	142.0	11 29.4 84 48	142.3	11 04.2 84 48	142.6	10 13.7 84 47	143.1	8 32.5 84 46	144.2	6 51.1 85 45	145.3	6 25.7 85 44	145.6	5 34.9 85 44	146.1	3
4	11 25.7 83 49	141.3	11 00.7 84 49	141.5	10 35.6 84 48	141.8	9 45.4 84 48	142.4	8 04.9 84 47	143.5	6 24.3 84 45	144.6	5 59.1 84 45	144.9	5 08.7 84 45	145.4	4
45	10 56.3 83 50	140.5	10 31.4 83 50	140.8	10 06.6 83 49	141.1	9 16.7 83 49	141.6	7 37.0 83 47	142.8	5 57.0 83 46	143.9	5 32.0 83 46	144.2			45
6	10 26.4 82 51	139.8	10 01.7 82 50	140.1	9 37.0 82 50	140.3	8 47.6 82 49	140.9	7 08.5 83 48	142.1	5 29.3 83 47	143.2	5 04.5 83 47	143.5			6
7	9 56.1 82 51	139.0	9 31.6 82 51	139.3	9 07.0 82 51	139.6	8 18.0 82 50	140.2	6 39.6 82 49	141.4	5 01.1 82 48	142.5					7
8	9 25.3 81 52	138.3	9 01.0 81 52	138.6	8 36.6 81 51	138.9	7 47.9 81 51	139.5	6 10.3 81 50	140.7							8
9	8 54.1 80 53	137.6	8 29.9 81 52	137.9	8 05.7 81 52	138.8	7 17.4 81 52	138.8	5 40.5 81 50	140.0							9
50	8 22.4 80 53	136.9	7 58.4 80 53	137.2	7 34.4 80 53	137.5	6 46.4 80 52	138.1	5 10.3 80 51	139.3							50
1	7 50.3 79 54	136.2	7 26.5 79 54	136.5	7 02.7 79 54	136.8	6 15.1 79 53	137.4									1
2	7 17.8 79 55	135.5	6 54.2 79 55	135.8	6 30.6 79 54	136.1	5 43.3 79 54	136.7									2
3	6 44.9 78 55	134.8	6 21.5 78 55	135.1	5 58.0 78 55	135.4	5 11.1 78 54	136.0									3
4	6 11.6 77 56	134.1	5 48.3 78 56	134.4	5 25.1 78 56	134.7											4
55	5 37.9 77 57	133.4	5 14.8 77 56	133.7													55
6	5 03.8 76 57	132.7															6

DECLINATION SAME NAME AS LATITUDE

H.A.	28° 00' Alt.	Az.	28° 30' Alt.	Az.	29° 00' Alt.	Az.	30° 00' Alt.	Az.	32° 00' Alt.	Az.	34° 00' Alt.	Az.	34° 30' Alt.	Az.	35° 30' Alt.	Az.	H.A.
91	16 28.1 59 71	67.0	16 45.6 58 71	66.6	17 03.1 58 71	66.2	17 38.0 58 70	65.3	18 47.0 57 69	63.6	19 55.1 56 68	61.8	20 11.9 56 68	61.4	20 45.4 56 67	60.5	91
2	15 45.2 59 71	66.5	16 02.9 59 71	66.0	16 20.6 59 71	65.6	16 55.7 58 70	64.8	18 05.3 58 69	63.1	19 14.0 57 68	61.3	19 31.1 57 68	60.9	20 04.9 56 67	60.0	2
3	15 02.6 60 71	65.9	15 20.4 59 71	65.5	15 38.2 59 70	65.1	16 13.6 59 70	64.3	17 23.8 58 69	62.6	18 33.2 57 68	60.8	18 50.4 57 67	60.4	19 24.6 57 67	59.5	3
4	14 20.1 60 70	65.4	14 38.0 60 70	65.0	14 56.0 60 70	64.6	15 31.7 59 70	63.7	16 42.6 59 68	62.0	17 52.6 58 67	60.3	18 10.0 58 67	59.9	18 44.5 57 66	59.0	4
95	13 37.8 60 70	64.8	13 55.9 60 70	64.4	14 14.0 60 70	64.0	14 50.0 60 69	63.2	16 01.5 59 68	61.5	17 12.2 59 67	59.8	17 29.7 58 67	59.4	18 04.7 58 66	58.6	95
6	12 55.3 61 70	64.3	13 13.2 61 70	63.9	13 32.1 61 69	63.5	14 08.5 60 69	62.6	15 20.6 60 68	60.8	16 32.0 59 67	59.3	16 49.7 59 66	58.9	17 25.0 59 66	58.1	6
7	12 13.8 61 70	63.7	12 32.2 61 69	63.3	12 50.5 61 69	62.9	13 27.1 61 69	62.1	14 39.9 60 67	60.5	15 52.0 60 66	58.8	16 09.9 60 66	58.4	16 45.5 59 65	57.6	7
8	11 32.0 62 69	63.2	11 50.6 62 69	62.8	12 09.1 62 69	62.4	12 46.0 61 68	61.6	13 59.4 61 67	59.9	15 12.2 60 66	58.3	15 30.3 60 66	57.9	16 06.3 60 65	57.0	8
9	10 50.5 62 69	62.6	11 09.2 62 69	62.2	11 27.9 62 68	61.8	12 05.1 62 68	61.0	13 19.2 61 67	59.4	14 32.6 61 66	57.8	14 50.9 61 65	57.4	15 27.3 60 65	56.5	9
100	10 09.2 63 68	62.1	10 28.1 63 68	61.7	10 46.9 63 68	61.3	11 24.5 62 67	60.5	12 39.2 62 66	58.8	13 53.3 62 65	57.2	14 11.7 61 65	56.8	14 48.5 61 64	56.0	100
1	9 28.2 63 68	61.5	9 47.2 63 68	61.1	10 06.1 63 68	60.7	10 44.0 63 67	59.9	11 59.4 63 66	58.3	13 14.2 62 65	56.7	13 32.8 62 64	56.3	14 09.9 62 64	55.5	1
2	8 47.3 64 68	60.9	9 06.5 64 67	60.5	9 25.6 64 67	60.1	10 03.8 64 67	59.4	11 19.8 63 66	57.8	12 35.3 63 64	56.2	12 54.1 63 64	55.8	13 31.6 62 63	55.0	2
3	8 06.7 64 67	60.3	8 26.0 64 67	60.0	8 45.3 64 66	59.6	9 23.8 64 66	58.8	10 40.1 63 65	57.2	11 56.7 63 64	55.7	12 15.7 63 64	55.3	12 53.6 63 63	54.5	3
4	7 26.5 65 67	59.8	7 45.7 65 67	59.4	8 05.2 65 66	59.0	8 44.0 65 66	58.2	10 01.4 64 65	56.6	11 18.3 64 64	55.1	11 37.5 64 63	54.7	12 15.7 63 63	53.9	4
105	6 46.1 65 67	59.2	7 05.7 65 66	58.8	7 25.3 65 66	58.4	8 04.5 65 65	57.7	9 22.6 65 64	56.1	10 39.6 64 63	54.6	10 59.4 64 63	54.2	11 38.2 64 62	53.4	105
6	6 06.2 66 66	58.6	6 26.0 66 66	58.2	6 45.7 66 66	57.8	7 25.2 66 65	57.1	8 44.0 65 64	55.6	10 02.4 65 63	54.0	10 21.9 65 62	53.6	11 00.9 65 62	52.9	6
7	5 26.5 67 66	58.0	5 46.4 66 65	57.6	6 06.4 66 65	57.3	6 46.2 66 65	56.5	8 05.6 66 63	55.0	9 24.8 66 62	53.5	9 44.5 66 62	53.1	10 23.8 66 61	52.3	7
8			5 07.2 67 65	57.1	5 27.3 67 65	56.7	6 07.4 67 64	55.9	7 27.6 67 63	54.4	8 47.4 66 62	52.9	9 07.3 66 62	52.5	9 47.1 66 61	51.8	8
9					5 29.0 67 64	55.3	6 49.8 67 64	53.9	8 10.3 67 61	52.4	8 30.4 67 61	52.0	9 10.6 67 60	51.2			9
110									6 12.3 68 62	53.3	7 33.6 68 61	51.8	7 53.8 68 60	51.4	8 34.3 67 60	50.7	110
1									5 35.0 68 62	52.7	6 57.1 68 60	51.2	7 17.5 68 60	50.9	7 58.4 68 59	50.1	1
2											6 20.9 69 60	50.7	6 41.5 69 60	50.3	7 22.8 69 59	49.6	2
3											5 44.9 70 59	50.1	6 05.8 69 59	49.7	6 47.4 69 58	49.0	3
4											5 09.3 70 59	49.5	5 30.4 70 59	49.1	6 12.4 70 58	48.4	4
115															5 37.7 71 57	47.9	115
6															5 03.2 71 57	47.3	6

Lat. 39°

H.A.	36° 00' Alt.	Δd Δt	Az.	37° 00' Alt.	Δd Δt	Az.	38° 30' Alt.	Δd Δt	Az.	40° 00' Alt.	Δd Δt	Az.	42° 00' Alt.	Δd Δt	Az.	42° 30' Alt.	Δd Δt	Az.	43° 00' Alt.	Δd Δt	Az.	45° 00' Alt.	Δd Δt	Az.	H.A.
00	87 00.0	1.0 10	180.0	88 00.0	1.0 15	180.0	89 30.0	1.0 43	180.0	89 00.0	1.0 26	00.0	87 00.0	1.0 10	00.0	86 00.0	1.0 08	00.0	86 00.0	1.0 07	00.0	84 00.0	1.0 05	00.0	00
1	86 53.8	97 29	164.9	87 51.0	93 40	158.2	89 04.4	54 71	122.4	88 44.2	79 58	37.3	86 54.3	97 27	13.9	86 25.1	98 23	11.9	85 55.8	98 20	10.4	83 57.3	99 14	06.7	1
2	86 36.4	89 44	151.5	87 27.2	79 55	141.1	88 21.7	32 75	107.1	88 09.7	53 68	56.4	86 38.2	89 41	26.2	86 11.2	91 36	22.8	85 43.5	93 32	20.0	83 49.2	97 22	13.3	2
3	86 10.3	79 54	140.6	86 54.2	66 64	129.3	87 36.5	22 77	101.1	87 28.7	38 72	65.7	86 13.9	79 50	36.3	85 49.6	83 46	32.0	85 24.3	86 41	28.5	83 36.0	93 29	19.4	3
4	85 38.0	70 61	132.2	86 16.1	55 69	121.2	86 50.4	18 77	97.9	86 45.4	29 74	70.8	85 43.7	69 57	44.1	85 22.3	74 53	39.6	84 59.4	78 49	35.7	83 18.4	89 36	25.0	4
05	85 01.7	62 65	125.6	85 34.9	44 73	115.4	86 04.2	15 77	95.7	86 00.9	22 75	73.9	85 09.5	60 62	50.1	84 50.7	66 58	45.7	84 30.2	71 54	41.7	82 56.8	83 42	30.1	05
6	84 22.5	56 68	120.4	84 52.1	42 73	111.1	85 17.7	14 78	94.2	85 15.9	18 75	75.9	84 32.5	52 65	54.8	84 16.0	58 62	50.5	83 57.7	64 58	46.6	82 31.8	78 46	34.6	6
7	83 41.4	51 71	116.2	84 08.1	38 75	107.7	84 31.2	13 78	93.0	84 30.5	14 76	77.3	83 53.6	46 67	58.4	83 39.0	52 64	54.3	83 22.6	57 61	50.6	82 03.9	73 50	38.6	7
8	82 59.0	46 72	112.8	83 23.3	34 75	105.1	83 44.6	12 78	92.1	83 44.9	12 76	78.3	83 13.3	40 69	61.2	83 00.4	46 66	57.4	82 45.8	51 64	53.9	81 33.7	68 54	42.1	8
9	82 15.6	43 74	110.0	82 38.1	32 76	102.9	82 58.0	12 78	91.2	82 59.2	09 76	79.0	82 32.0	35 70	63.6	82 20.5	41 68	59.9	82 07.4	46 66	56.6	81 01.5	63 56	45.2	9
10	81 31.4	40 74	107.6	81 52.5	30 76	101.0	82 11.3	12 78	90.5	82 13.4	07 76	79.4	81 49.9	31 71	65.3	81 39.7	37 69	62.0	81 28.0	42 67	58.9	80 27.7	58 59	47.8	10
1	80 46.8	38 75	105.6	81 06.6	28 77	99.6	81 24.7	12 78	89.9	81 27.5	06 76	79.8	81 07.3	28 72	66.7	80 58.2	33 70	63.7	80 47.7	38 68	60.7	79 52.5	54 61	50.1	1
2	80 01.6	36 76	103.8	80 20.5	27 77	98.2	80 38.1	12 78	89.3	80 41.6	04 77	80.0	80 24.3	25 72	68.0	80 16.2	29 71	65.1	80 06.7	34 69	62.3	79 16.2	50 62	52.1	2
3	79 16.2	34 76	102.2	79 34.3	26 77	97.0	79 51.5	12 78	88.7	79 55.7	03 77	80.2	79 40.9	22 73	69.0	79 33.3	26 71	66.3	79 25.2	31 70	63.6	78 38.9	46 63	53.9	3
4	78 30.5	33 76	100.8	78 48.0	25 77	95.9	79 04.9	12 78	88.2	79 09.7	01 77	80.3	78 57.3	19 73	69.9	78 50.8	23 72	67.2	78 43.2	28 71	64.8	78 00.8	42 65	55.5	4
15	77 44.6	32 77	99.5	78 01.6	25 77	94.9	78 18.3	12 78	87.7	78 23.8	00 77	80.3	78 13.4	17 73	70.5	78 07.7	21 72	68.1	78 00.8	25 71	65.7	77 22.1	39 65	56.8	15
6	76 58.5	31 77	98.3	77 15.1	24 78	94.0	77 31.7	13 78	87.3	77 37.8	01 77	80.2	77 29.4	15 74	71.0	77 24.3	19 73	68.8	77 18.2	22 71	66.5	76 42.8	36 66	58.0	6
7	76 12.3	30 77	97.2	76 28.5	24 78	93.2	76 45.1	13 78	86.8	76 51.9	02 77	80.2	76 45.2	13 74	71.5	76 40.8	17 73	69.3	76 35.3	20 72	67.2	76 03.1	33 67	59.1	7
8	75 26.0	30 77	96.3	75 42.0	23 78	92.4	75 58.4	13 78	86.4	76 05.9	03 77	80.2	76 01.0	11 74	71.9	75 57.1	15 73	69.8	75 52.2	18 72	67.8	75 22.9	31 68	60.0	8
9	74 39.6	29 77	95.3	74 55.4	23 78	91.7	75 12.0	14 78	85.9	75 20.0	04 77	80.1	75 16.6	09 74	72.2	75 13.3	13 73	70.2	75 09.0	16 72	68.3	74 42.3	28 68	60.8	9
20	73 53.2	29 78	94.5	74 08.8	23 78	91.0	74 25.5	14 78	85.5	74 34.1	05 76	79.9	74 32.2	08 74	72.4	74 29.4	11 73	70.6	74 25.6	14 72	68.7	74 01.5	26 68	61.5	20
1	73 06.7	28 78	93.7	73 22.1	23 78	90.3	73 39.1	15 78	85.1	73 48.2	06 76	79.8	73 47.7	06 74	72.6	73 45.4	09 73	70.8	73 42.1	12 73	69.1	73 20.4	24 69	62.1	1
2	72 20.1	28 78	92.9	72 35.5	23 78	89.7	72 52.6	15 77	84.7	73 02.3	06 76	79.6	73 03.2	05 74	72.8	73 01.3	08 74	71.0	72 58.5	11 73	69.3	72 39.1	22 69	62.7	2
3	71 33.5	28 78	92.1	71 48.9	23 78	89.1	72 06.2	15 77	84.3	72 16.4	07 76	79.4	72 18.6	04 74	73.0	72 17.2	06 74	71.2	72 14.8	09 73	69.6	71 57.6	20 69	63.1	3
4	70 46.9	28 78	91.4	71 02.3	23 78	88.5	71 19.8	16 77	83.9	71 30.6	08 76	79.3	71 34.1	02 74	72.9	71 33.0	05 74	71.4	71 31.1	08 73	69.8	71 15.9	18 70	63.6	4
25	70 00.3	28 78	90.8	70 15.7	23 78	87.9	70 33.5	16 77	83.5	70 44.8	09 76	79.1	70 49.5	01 74	73.0	70 48.8	04 74	71.5	70 47.3	06 73	69.9	70 34.1	16 70	63.9	25
6	69 13.7	28 78	90.1	69 29.1	23 78	87.4	69 47.2	17 77	83.2	69 59.0	10 76	78.8	70 04.6	00 74	73.0	70 04.6	02 74	71.5	70 03.5	05 73	70.1	69 52.1	14 70	64.2	6
7	68 27.0	28 78	89.5	68 42.5	24 78	86.9	69 00.9	17 77	82.8	69 13.3	10 76	78.6	69 20.3	01 74	73.0	69 20.3	01 74	71.6	69 19.7	03 73	70.1	69 10.1	13 70	64.5	7
8	67 40.4	28 78	88.9	67 55.9	24 78	86.3	68 14.6	18 77	82.4	68 27.6	11 76	78.4	68 35.7	02 74	72.9	68 36.1	00 74	71.6	68 35.8	02 73	70.2	68 27.9	11 70	64.7	8
9	66 53.8	28 78	88.3	67 09.4	24 78	85.8	67 28.4	18 77	82.0	67 42.0	12 76	78.2	67 51.2	03 74	72.9	67 51.9	01 74	71.6	67 51.9	01 73	70.2	67 45.7	09 70	64.9	9
30	66 07.2	28 78	87.8	66 22.9	24 77	85.4	66 42.3	19 77	81.7	66 56.3	13 76	77.9	67 06.6	04 74	72.8	67 07.6	02 73	71.5	67 08.0	00 73	70.2	67 03.5	08 71	65.1	30
1	65 20.6	28 78	87.2	65 36.5	25 77	84.9	65 56.2	19 77	81.3	66 10.8	13 76	77.7	66 22.1	05 74	72.7	66 24.2	01 73	71.5	66 21.2	06 73	65.2	66 21.2	06 73	65.2	1
2	64 34.1	28 78	86.7	64 50.1	25 77	84.4	65 10.1	20 77	80.9	65 25.2	14 76	77.4	65 37.6	06 74	72.6	65 39.2	05 74	71.4	65 40.3	05 71	70.2	65 38.8	05 71	65.3	2
3	63 47.5	29 78	86.1	64 03.7	25 77	83.9	64 24.1	20 77	80.6	64 39.8	15 76	77.1	64 53.1	07 74	72.5	64 55.0	06 74	71.3	64 56.4	04 73	70.1	64 56.4	04 71	65.4	3
4	63 01.0	29 77	85.6	63 17.3	26 77	83.5	63 38.1	21 77	80.2	63 54.3	15 76	76.9	64 08.6	08 74	72.3	64 10.9	07 74	71.2	64 12.6	05 73	70.1	64 14.0	02 71	65.5	4
35	62 14.5	29 77	85.1	62 31.0	26 77	83.0	62 52.2	21 76	79.9	63 08.9	16 76	76.6	63 24.2	09 74	72.2	63 26.8	08 74	71.1	63 28.8	06 73	70.0	63 31.6	01 71	65.5	35
6	61 28.1	29 77	84.6	61 44.7	26 77	82.6	62 06.3	22 76	79.5	62 23.6	17 75	76.3	62 39.9	10 74	72.0	62 42.7	09 73	70.9	62 45.0	07 73	69.9	62 49.2	00 71	65.5	6
7	60 41.7	29 77	84.1	60 58.5	27 77	82.1	61 20.5	22 76	79.1	61 38.3	18 75	76.0	61 55.5	11 74	71.9	61 58.6	10 73	70.8	62 01.2	08 73	69.7	62 06.7	01 71	65.5	7
8	59 55.3	30 77	83.6	60 12.4	27 77	81.7	60 34.7	23 76	78.8	60 53.1	18 75	75.8	61 11.2	12 74	71.7	61 14.6	10 73	70.6	61 17.5	09 73	69.6	61 24.3	02 71	65.4	8
9	59 08.8	30 77	83.2	59 26.2	27 77	81.3	59 49.0	23 76	78.4	60 07.9	19 75	75.5	60 27.0	13 74	71.5	60 30.6	11 73	70.5	60 33.8	10 73	69.5	60 41.9	04 71	65.4	9
40	58 22.7	30 77	82.7	58 40.2	28 77	80.8	59 03.4	24 76	78.0	59 22.8	20 75	75.2	59 42.8	14 74	71.3	59 46.7	12 73	70.3	59 50.2	11 73	69.3	59 59.5	05 71	65.3	40
1	57 36.5	31 77	82.2	57 54.2	28 77	80.4	58 17.8	24 76	77.7	58 37.8	20 75	74.9	58 58.7	15 73	71.1	59 02.8	13 73	70.1	59 06.6	12 73	69.2	59 17.2	06 71	65.3	1
2	56 50.4	31 77	81.8	57 08.2	29 76	80.0	57 32.2	25 76	77.3	57 52.8	21 75	74.6	58 14.6	15 73	70.9	58 19.0	14 73	69.9	58 23.0	13 72	69.0	58 34.8	07 70	65.2	2
3	56 04.2	31 77	81.3	56 22.3	29 76	79.6	56 46.8	25 76	77.0	57 07.9	22 75	74.3	57 30.6	16 73	70.7	57 35.2	15 73	69.7	57 39.5	14 72	68.8	57 52.5	08 70	65.1	3
4	55 18.2	32 77	80.8	55 36.5	29 76	79.2	56 01.4	26 76	76.6	56 23.0	22 75	74.0	56 46.4	17 73	70.4	56 51.3	16 73	69.5	56 56.1	14 72	68.6	57 10.3	09 70	65.0	4
45	54 32.2	32 77	80.4	54 50.7	30 76	78.8	55 16.1	26 76	76.2	55 38.2	23 74	73.7	56 02.7	18 73	70.2	56 07.9	17 73	69.3	56 12.7	15 72	68.4	56 28.0	10 70	64.8	45
6	53 46.2	32 76	80.0	54 05.0	30 76	78.3	54 30.8	27 75	75.9	54 53.5	23 74	73.4	55 18.9	19 73	69.9	55 24.3	17 73	69.1	55 29.3	16 72	68.2	55 45.8	11 70	64.7	6
7	53 00.3	33 76	79.5	53 19.4	31 76	77.9	53 45.6	28 75	75.5	54 08.9	24 74	73.0	54 35.1	20 73	69.7	54 40.8	18 72	68.9	54 46.1	17 72	68.0	55 03.7	12 70	64.6	7
8	52 14.5	33 76	79.1	52 33.8	31 76	77.5	53 00.5	28 75	75.1	53 24.3	25 74	72.7	53 51.4	20 73	69.4	53 57.3	19 72	68.6	54 02.9	17 72	67.8	54 21.6	13 70	64.4	8
9	51 28.8	34 76	78.6	51 48.4	32 76	77.1	52 15.5	29 75	74.8	52 39.8	25 74	72.4	53 07.8	21 73	69.2	53 13.9	20 72	68.4	53 19.7	19 72	67.6	53 39.6	14 70	64.2	9.
50	50 43.1	34 76	78.2	51 02.9	32 76	76.7	51 30.5	29 75	74.4	51 55.4	26 74	72.1	52 24.2	22 72	68.9	52 30.6	21 72	68.1	52 36.7	20 72	67.3	52 57.7	15 70	64.1	50
1	49 57.5	34 76	77.8	50 17.6	33 75	76.3	50 45.7	30 75	74.0	51 11.1	27 74	71.8	51 40.7	23 72	68.7	51 47.4	22 72	67.9	51 53.7	21 72	67.1	52 15.8	16 70	63.9	1
2	49 12.0	35 76	77.3	49 32.3	33 75	75.9	50 00.9	30 74	73.7	50 26.8	27 74	71.4	50 57.4	23 72	68.4	51 04.2	22 72	67.6	51 10.8	21 71	66.8	51 33.9	17 70	63.7	2
3	48 26.5	35 76	76.9	48 47.2	34 75	75.5	49 16.2	31 74	73.3	49 42.7	28 73	71.1	50 14.0	24 72	68.1	50 21.2	23 72	67.3	50 28.0	22 71	66.6	50 52.0	18 69	63.5	3
4	47 41.1	36 76	76.5	48 02.1	34 75	75.1	48 31.5	31 74	72.9	48 58.6	29 73	70.8	49 30.8	25 72	67.8	49 38.2	24 72	67.1	49 45.2	23 71	66.3	50 10.5	19 69	63.3	4
55	46 55.8	36 75	76.0	47 17.1	35 75	74.7	47 47.0	32 74	72.6	48 14.6	29 73	70.4	48 47.7	26 72	67.5	48 55.3	25 71	66.8	49 02.6	24 71	66.1	49 28.9	20 69	63.1	55
6	46 10.6	37 75	75.6	46 32.1	35 75	74.3	47 02.6	33 74	72.2	47 30.7	30 73	70.1	48 04.7	26 72	67.2	48 12.5	26 71	66.5	48 20.0	25 71	65.8	48 47.3	21 69	62.8	6
7	45 25.5	37 75	75.2	45 47.3	36 75	73.8	46 18.2	33 74	71.8	46 46.9	31 73	69.8	47 21.7	27 71	66.9	47 29.7	26 71	66.2	47 37.5	25 71	65.5	48 05.9	22 69	62.6	7
8	44 40.5	38 75	74.8	45 02.6	36 74	73.4	45 34.0	34 74	71.4	46 03.2	31 73	69.4	46 38.8	28 71	66.6	46 47.1	27 71	65.9	46 55.1	26 70	65.2	47 24.5	23 69	62.4	8
9	43 55.5	38 75	74.3	44 17.9	37 74	73.0	44 49.8	34 73	71.1	45 19.6	32 72	69.1	45 56.1	29 71	66.3	46 04.6	28 71	65.6	46 12.8	27 70	65.0	46 43.3	24 69	62.1	9
60	43 10.7	38 75	73.9	43 33.4	37 74	72.6	44 05.8	35 73	70.7	44 36.1	33 72	68.7	45 13.4	29 71	66.0	45 22.2	29 71	65.3	45 30.6	28 70	64.7	46 02.1	25 68	61.9	60
1	42 25.9	39 74	73.5	42 48.9	38 74	72.2	43 21.8	35 73	70.3	43 52.8	33 72	68.4	44 30.9	30 71	65.7	44 39.8	29 70	65.0	44 48.5	29 70	64.4	45 21.0	25 68	61.6	1
2	41 41.3	39 74	73.0	42 04.6	38 74	71.8	42 38.0	36 73	69.9	43 09.5	34 72	68.0	43 48.4	31 71	65.4	43 57.6	30 70	64.7	44 06.6	29 70	64.1	44 40.0	26 68	61.4	2
3	40 56.7	40 74	72.6	41 20.3	39 74	71.4	41 54.2	37 73	69.5	42 26.3	35 72	67.6	43 06.1	32 70	65.1	43 15.5	31 70	64.4	43 24.7	30 70	63.8	43 59.1	27 68	61.1	3
4	40 12.3	40 74	72.2	40 36.2	39 73	71.0	41 10.6	37 73	69.2	41 43.2	35 72	67.3	42 23.9	32 70	64.8	42 33.5	32 70	64.1	42 42.9	31 69	63.5	43 18.4	28 68	60.9	4
65	39 27.9	41 74	71.8	39 52.1	40 73	70.6	40 27.1	38 72	68.8	41 00.3	36 71	66.9	41 41.7	33 70	64.4	41 51.6	33 70	63.8	42 01.2	32 69	63.2	42 37.7	29 68	60.6	65
6	38 43.7	41 73	71.3	39 08.2	40 73	70.2	39 43.7	38 72	68.4	40 17.4	37 71	66.6	40 59.7	34 70	64.1	41 09.8	33 69	63.5	41 19.7	33 69	62.8	41 57.1	30 67	60.3	6
7	37 59.6	42 73	70.9	38 24.4	41 73	69.7	39 00.4	39 72	68.0	39 34.7	37 71	66.2	40 17.9	35 70	63.8	40 28.2	34 69	63.1	40 38.3	33 69	62.5	41 16.7	31 67	60.0	7
8	37 15.6	42 73	70.5	37 40.7	41 73	69.3	38 17.2	40 72	67.6	38 52.1	38 71	65.8	39 36.1	35 69	63.4	39 46.6	35 69	62.8	39 57.0	34 69	62.2	40 36.4	31 67	59.7	8
9	36 31.7	43 73	70.0	36 57.2	42 72	68.9	37 34.2	40 72	67.2	38 09.6	39 71	65.4	38 54.5	36 69	63.1	39 05.2	36 69	62.5	39 15.8	35 68	61.9	39 56.1	32 67	59.4	9
70	35 47.6	44 73	69.6	36 13.7	42 72	68.5	36 51.2	41 71	66.8	37 27.3	39 70	65.1	38 12.9	37 69	62.7	38 23.9	36 69	62.1	38 34.7	36 68	61.5	39 16.1	33 67	59.1	70
1	35 04.3	44 73	69.2	35 30.4	43 72	68.1	36 08.4	41 71	66.4	36 45.1	40 70	64.7	37 31.6	38 69	62.4	37 42.8	37 68	61.8	37 53.8	36 68	61.2	38 36.1	34 66	58.8	1
2	34 20.8	45 72	68.7	34 47.2	44 72	67.6	35 25.8	42 71	66.0	36 03.0	41 70	64.3	36 50.3	38 68	62.0	37 01.7	38 68	61.4	37 13.0	37 68	60.9	37 56.3	35 66	58.5	2
3	33 37.4	45 72	68.3	34 04.2	44 72	67.2	34 43.3	43 71	65.6	35 21.0	41 70	63.9	36 09.2	39 68	61.7	36 20.9	39 68	61.1	36 32.3	38 68	60.5	37 16.6	36 66	58.2	3
4	32 54.1	46 72	67.9	33 21.2	45 71	66.8	34 00.9	43 70	65.2	34 39.2	42 69	63.5	35 28.2	40 68	61.3	35 40.1	39 68	60.7	35 51.8	39 67	60.2	36 37.0	37 66	57.9	4
75	32 11.0	46 72	67.4	32 38.5	45 70	66.4	33 18.6	44 70	64.8	33 57.5	43 69	63.1	34 47.4	41 68	60.9	34 59.6	40 67	60.4	35 11.4	40 67	59.8	35 57.6	39 65	57.5	75
6	31 28.0	47 71	67.0	31 55.8	46 71	65.9	32 36.5	45 70	64.4	33 16.0	43 69	62.7	34 06.7	41 68	60.5	34 19.0	41 67	60.0	34 31.2	40 67	59.5	35 18.3	38 65	57.2	6
7	30 45.2	47 71	66.5	31 13.3	46 71	65.5	31 54.6	45 70	63.9	32 34.6	44 69	62.3	33 26.2	42 67	60.2	33 38.7	42 67	59.6	33 51.1	41 67	59.1	34 39.2	39 65	56.9	7
8	30 02.5	48 71	66.1	30 30.9	47 70	65.1	31 12.7	46 69	63.5	31 53.4	45 68	61.9	32 45.8	43 67	59.8	32 58.6	42 67	59.3	33 11.2	42 66	58.7	34 00.2	40 65	56.5	8
9	29 19.9	48 71	65.6	29 48.7	48 70	64.6	30 31.1	46 69	63.1	31 12.3	45 68	61.5	32 05.6	43 67	59.4	32 18.4	43 66	58.9	32 31.4	43 66	58.4	33 21.4	41 64	56.2	9
80	28 37.5	49 70	65.2	29 06.7	48 70	64.2	29 49.6	47 69	62.7	30 31.4	46 68	61.1	31 25.4	44 67	59.1	31 38.7	44 66	58.5	31 51.8	43 66	58.0	32 42.7	42 64	55.9	80
1	27 55.3	50 70	64.7	28 24.8	49 70	63.7	29 08.2	48 69	62.2	29 50.7	47 68	60.7	30 45.6	45 66	58.7	30 59.0	44 66	58.1	31 12.5	44 66	57.6	32 04.3	42 64	55.5	1
2	27 13.2	50 70	64.3	27 43.1	49 69	63.3	28 27.1	48 68	61.8	29 10.1	47 67	60.3	30 05.9	46 66	58.3	30 19.5	45 66	57.8	30 33.0	45 66	57.2	31 25.9	43 64	55.1	2
3	26 31.3	51 70	63.8	27 01.5	50 69	62.9	27 46.0	49 68	61.4	28 29.7	48 67	59.9	29 26.3	46 66	57.9	29 53.9	45 66	56.9	29 53.9	45 66	56.9	30 47.7	43 63	54.8	3
4	25 49.5	51 69	63.4	26 20.1	51 69	62.4	27 05.2	50 68	61.0	27 49.4	49 67	59.5	28 46.9	47 65	57.5	29 01.0	47 65	56.9	29 14.9	46 65	56.5	30 09.7	45 63	54.4	4
85	25 07.9	52 69	62.9	25 38.8	51 68	62.0	26 24.5	50 68	60.5	27 09.3	49 66	59.1	28 07.6	48 65	57.1	28 22.0	48 65	56.6	28 36.2	47 64	56.1	29 31.8	46 63	54.1	85
6	24 26.5	52 69	62.4	24 57.8	52 68	61.5	25 44.0	51 67	60.1	26 29.4	50 66	58.6	27 28.6	49 65	56.7	27 43.1	48 64	56.2	27 57.6	48 64	55.7	28 54.2	46 62	53.7	6
7	23 45.2	53 68	62.0	24 16.9	52 68	61.0	25 03.7	52 67	59.6	25 49.7	51 66	58.2	26 49.7	49 64	56.3	27 04.5	49 64	55.8	27 19.1	49 64	55.3	28 16.7	47 62	53.3	7
8	23 04.2	54 68	61.5	23 36.2	53 68	60.6	24 23.5	52 67	59.2	25 10.2	51 66	57.8	26 10.9	50 64	55.9	26 26.0	50 64	55.4	26 40.8	49 63	54.9	27 39.4	48 62	52.9	8
9	22 23.3	54 68	61.0	22 55.7	54 67	60.1	23 43.6	53 66	58.7	24 30.7	52 65	57.3	25 32.5	51 64	55.4	25 47.7	51 63	55.0	26 02.8	50 63	54.5	27 02.3	49 62	52.5	9
90	21 42.6	55 68	60.5	22 15.3	54 67	59.6	23 03.8	54 66	58.3	23 51.7	53 65	56.9	24 54.2	52 64	55.0	25 09.7	51 63	54.5	25 25.0	51 63	54.1	26 25.4	50 61	52.1	90

Lat. 39°

DECLINATION CONTRARY NAME TO LATITUDE

H.A.	36°00′ Alt. (Δd Δt)	Az.	37°00′ Alt. (Δd Δt)	Az.	38°30′ Alt. (Δd Δt)	Az.	40°00′ Alt. (Δd Δt)	Az.	42°00′ Alt. (Δd Δt)	Az.	42°30′ Alt. (Δd Δt)	Az.	43°00′ Alt. (Δd Δt)	Az.	45°00′ Alt. (Δd Δt)	Az.	H.A.
00	15 00.0 1.0 01	180.0	14 00.0 1.0 01	180.0	12 30.0 1.0 01	180.0	11 00.0 1.0 01	180.0	9 00.0 1.0 00	180.0	8 30.0 1.0 00	180.0	8 00.0 1.0 00	180.0	6 00.0 1.0 00	180.0	00
1	14 59.7 1.0 02	179.2	13 59.7 1.0 02	179.2	12 29.7 1.0 02	179.2	10 59.7 1.0 02	179.3	8 59.7 1.0 02	179.3	8 29.7 1.0 02	179.3	7 59.7 1.0 02	179.3	5 59.7 1.0 01	179.3	1
2	14 58.6 1.0 03	178.3	13 58.7 1.0 03	178.4	12 28.7 1.0 03	178.4	10 58.7 1.0 03	178.4	8 58.7 1.0 03	178.5	8 28.8 1.0 03	178.5	7 58.8 1.0 02	178.5	5 58.8 1.0 02	178.6	2
3	14 56.9 1.0 04	177.5	13 57.0 1.0 04	177.5	12 27.1 1.0 04	177.6	10 57.1 1.0 04	177.7	8 57.2 1.0 04	177.7	8 27.3 1.0 04	177.8	7 57.3 1.0 04	177.8	5 57.4 1.0 03	177.9	3
4	14 54.6 1.0 05	176.7	13 54.6 1.0 05	176.7	12 24.8 1.0 05	176.8	10 54.9 1.0 05	176.9	8 55.1 1.0 05	177.0	8 25.1 1.0 05	177.0	7 55.2 1.0 04	177.0	5 55.1 1.0 04	177.2	4
05	14 51.5 1.0 06	175.8	13 51.6 1.0 06	175.9	12 21.9 1.0 06	176.1	10 52.1 1.0 06	176.1	8 52.4 1.0 06	176.2	8 22.4 1.0 06	176.3	7 52.5 1.0 06	176.4	5 52.8 1.0 05	176.4	05
6	14 47.7 1.0 07	175.0	13 48.0 1.0 07	175.1	12 18.3 1.0 07	175.2	10 48.6 1.0 07	175.3	8 49.0 1.0 07	175.5	8 19.1 1.0 07	175.5	7 49.2 1.0 06	175.6	5 49.6 1.0 06	175.7	6
7	14 43.3 1.0 08	174.1	13 43.6 1.0 08	174.2	12 14.0 1.0 08	174.5	10 44.5 1.0 08	174.5	8 45.0 1.0 08	174.7	8 15.2 1.0 08	174.8	7 45.3 1.0 08	174.8	5 45.8 1.0 07	175.0	7
8	14 38.2 99 10	173.3	13 38.6 99 09	173.4	12 09.2 99 09	173.6	10 39.7 99 09	173.8	8 40.4 99 09	174.0	8 10.6 99 09	174.0	7 40.8 99 08	174.1	5 41.5 99 08	174.3	8
9	14 32.5 99 11	172.5	13 33.0 99 11	172.6	12 03.7 99 10	172.8	10 34.3 99 10	173.0	8 35.3 99 10	173.2	8 05.5 99 10	173.3	7 35.7 99 09	173.4	5 36.6 99 09	173.6	9
10	14 26.1 99 12	171.8	13 26.6 99 12	171.8	11 57.5 99 11	172.0	10 28.4 99 11	172.2	8 29.5 99 11	172.5	7 59.8 99 11	172.6	7 30.0 99 10	172.6	5 31.2 99 10	172.9	10
1	14 19.0 99 13	171.0	13 19.7 99 13	171.0	11 50.7 99 12	171.2	10 21.7 99 12	171.5	8 23.1 99 12	171.8	7 53.4 99 12	171.8	7 23.8 99 11	171.9	5 25.1 99 11	172.2	1
2	14 11.2 99 14	170.0	13 12.0 99 14	170.2	11 43.3 99 13	170.4	10 14.5 99 13	170.7	8 16.1 99 13	171.0	7 46.5 99 12	171.1	7 16.9 99 12	171.2	5 18.5 99 12	171.5	2
3	14 02.8 98 15	169.2	13 03.8 98 15	169.4	11 35.2 98 14	169.6	10 06.6 98 14	169.9	8 08.5 98 14	170.3	7 39.0 98 14	170.4	7 09.5 98 13	170.5	5 11.4 98 13	170.8	3
4	13 53.7 98 16	168.4	12 54.8 98 16	168.6	11 26.5 98 16	168.9	9 58.2 98 15	169.2	8 00.4 98 15	169.5	7 30.9 98 14	169.6	7 01.5 98 14	169.7	5 03.6 98 14	170.1	4
15	13 44.0 98 17	167.6	12 45.3 98 17	167.8	11 17.2 98 17	168.0	9 49.1 98 16	168.4	7 51.6 98 16	168.9	7 22.2 98 16	168.9	6 52.9 98 15	169.0			15
6	13 33.6 98 18	166.7	12 35.1 98 18	167.0	11 07.3 98 18	167.3	9 39.4 98 17	167.6	7 42.3 98 17	168.1	7 13.0 98 16	168.2	6 43.7 98 16	168.3			6
7	13 22.6 97 19	165.9	12 24.2 97 19	166.2	10 56.7 97 19	166.5	9 29.1 97 18	166.9	7 32.3 97 18	167.3	7 03.1 97 17	167.5	6 33.9 97 17	167.6			7
8	13 10.9 97 20	165.1	12 12.8 97 20	165.4	10 45.5 97 20	165.7	9 18.2 97 19	166.1	7 21.8 97 18	166.6	6 52.7 97 18	166.7	6 23.6 97 18	166.9			8
9	12 58.6 97 22	164.3	12 00.7 97 21	164.6	10 33.7 97 21	165.0	9 06.8 97 20	165.4	7 10.7 97 19	165.9	6 41.7 97 19	166.0	6 12.7 97 19	166.1			9
20	12 45.7 96 23	163.5	11 48.0 96 22	163.8	10 21.3 96 22	164.2	8 54.7 96 21	164.6	6 59.1 96 20	165.2	6 30.2 96 20	165.3	6 01.3 96 20	165.4			20
1	12 32.2 96 24	162.7	11 34.7 96 23	163.0	10 08.4 96 23	163.4	8 42.0 96 22	163.9	6 46.9 96 21	164.4	6 18.1 96 21	164.6	5 49.3 96 21	164.7			1
2	12 18.0 95 25	161.9	11 20.7 95 24	162.2	9 54.8 96 24	162.7	8 28.8 96 23	163.1	6 34.1 96 22	163.7	6 05.4 96 22	163.9	5 36.7 96 22	164.0			2
3	12 03.3 95 26	161.1	11 06.2 95 25	161.5	9 40.6 95 25	161.9	8 15.0 95 24	162.4	6 20.7 95 23	163.0	5 52.2 95 23	163.2	5 23.6 95 23	163.3			3
4	11 47.9 95 27	160.4	10 51.1 95 26	160.7	9 25.9 95 26	161.2	8 00.6 95 25	161.7	6 06.8 95 24	162.3	5 38.4 95 24	162.5	5 09.9 95 24	162.6			4
25	11 31.9 94 28	159.6	10 35.4 94 27	159.9	9 10.5 94 26	160.4	7 45.6 94 26	160.9	5 52.4 94 25	161.6	5 24.1 94 25	161.8					25
6	11 15.3 94 29	158.8	10 19.1 94 28	159.2	8 54.6 94 27	159.7	7 30.1 94 27	160.2	5 37.4 94 26	160.9	5 09.2 94 26	161.1					6
7	10 58.2 93 30	158.0	10 02.2 93 29	158.4	8 38.1 93 28	158.9	7 14.0 93 28	159.5	5 21.9 94 27	160.2							7
8	10 40.5 93 30	157.3	9 44.7 93 30	157.6	8 21.1 93 29	158.2	6 57.4 93 29	158.8	5 05.8 93 28	159.5							8
9	10 22.1 92 31	156.5	9 26.7 92 31	156.9	8 03.5 92 30	157.5	6 40.3 93 30	158.0									9
30	10 03.3 92 32	155.7	9 08.1 92 32	156.1	7 45.4 92 31	156.7	6 22.6 92 30	157.3									30
1	9 43.8 91 33	155.0	8 49.0 91 33	155.4	7 26.7 91 32	156.0	6 04.3 92 31	156.6									1
2	9 23.9 91 34	154.2	8 29.3 91 34	154.7	7 07.5 91 33	155.3	5 45.6 91 32	155.9									2
3	9 03.3 90 35	153.5	8 09.1 90 35	153.9	6 47.7 90 34	155.2	5 26.3 91 32	155.2									3
4	8 42.2 90 36	152.8	7 48.3 90 35	153.2	6 27.4 90 35	153.9	5 06.5 90 34	154.5									4
35	8 20.6 89 37	152.0	7 27.1 89 36	152.5	6 06.6 89 36	153.2											35
6	7 58.5 89 38	151.3	7 05.3 89 37	151.8	5 45.3 89 36	152.5											6
7	7 35.9 88 39	150.6	6 42.9 88 38	151.1	5 23.5 88 37	151.8											7
8	7 12.7 88 39	149.9	6 20.1 88 39	150.3	5 01.2 88 38	151.1											8
9	6 49.0 87 40	149.2	5 56.8 87 40	149.6													9
40	6 24.9 86 41	148.4	5 33.0 86 40	149.0													40
1	6 00.2 86 42	147.7	5 08.7 86 41	148.3													1
2	5 35.1 85 43	147.0															2
3	5 09.5 85 43	146.4															3

DECLINATION SAME NAME AS LATITUDE

H.A.	36°00′ Alt. (Δd Δt)	Az.	37°00′ Alt. (Δd Δt)	Az.	38°30′ Alt. (Δd Δt)	Az.	40°00′ Alt. (Δd Δt)	Az.	42°00′ Alt. (Δd Δt)	Az.	42°30′ Alt. (Δd Δt)	Az.	43°00′ Alt. (Δd Δt)	Az.	45°00′ Alt. (Δd Δt)	Az.	H.A.
91	21 02.1 55 67	60.1	21 35.2 55 67	59.2	22 24.3 54 66	57.8	23 12.7 53 65	56.4	24 16.1 52 63	54.6	24 31.8 52 63	54.1	24 47.3 52 62	53.7	25 48.7 50 61	51.8	91
2	20 21.8 56 67	59.6	20 55.2 56 66	58.7	21 44.9 55 65	57.4	22 33.9 54 64	56.0	23 38.2 53 63	54.2	23 54.1 53 62	53.7	24 09.9 52 62	53.2	25 12.1 51 61	51.4	2
3	19 41.7 57 66	59.1	20 15.5 56 66	58.2	21 05.8 56 65	56.9	21 55.4 55 64	55.6	23 00.5 54 62	53.7	23 16.6 54 62	53.3	23 32.6 53 62	52.8	24 35.8 52 60	51.0	3
4	19 01.7 57 66	58.6	19 36.0 57 66	57.7	20 26.8 56 65	56.4	21 17.0 55 64	55.1	22 23.0 55 62	53.3	22 39.3 54 62	52.8	22 55.6 54 61	52.4	23 59.7 53 60	50.5	4
95	18 22.0 58 66	58.1	18 56.6 57 65	57.3	19 48.1 57 64	56.0	20 38.9 56 63	54.6	21 45.8 55 62	52.9	22 02.3 55 61	52.4	22 18.8 55 61	52.0	23 23.8 54 59	50.1	95
6	17 42.6 58 65	57.6	18 17.5 58 65	56.8	19 09.5 57 64	55.5	20 01.0 57 63	54.2	21 08.7 56 61	52.4	21 25.5 56 61	52.0	21 42.1 55 61	51.5	22 48.1 55 59	49.7	6
7	17 03.3 59 65	57.1	17 38.6 59 64	56.3	18 31.2 58 63	55.0	19 23.3 58 62	53.7	20 31.9 57 61	52.0	20 48.8 56 61	51.5	21 05.7 56 60	51.1	22 12.7 55 59	49.3	7
8	16 24.2 60 65	56.6	16 59.9 59 64	55.8	17 53.1 59 63	54.5	18 45.8 58 62	53.2	19 55.2 57 61	51.5	20 12.4 57 60	51.1	20 29.5 57 60	50.6	21 37.5 56 58	48.9	8
9	15 45.4 60 64	56.1	16 21.5 60 64	55.3	17 15.3 59 63	54.0	18 08.6 59 62	52.8	19 18.9 58 60	51.1	19 36.3 58 60	50.6	19 53.6 58 60	50.2	21 02.4 57 58	48.4	9
100	15 06.8 61 64	55.6	15 43.3 61 63	54.8	16 37.6 60 62	53.5	17 31.6 60 61	52.3	18 42.7 59 60	50.6	19 00.4 59 60	50.2	19 17.9 59 59	49.7	20 27.7 58 58	48.0	100
1	14 28.4 62 64	55.1	15 05.3 61 63	54.3	16 00.3 61 62	53.1	16 54.8 60 61	51.8	18 06.8 60 60	50.1	18 24.7 59 59	49.7	18 42.5 59 59	49.3	19 53.1 58 57	47.6	1
2	13 50.3 62 63	54.6	14 27.6 62 62	53.8	15 23.1 62 62	52.6	16 18.3 61 60	51.3	17 31.1 60 59	49.7	17 49.2 60 59	49.2	18 07.3 60 58	48.8	19 18.8 59 57	47.1	2
3	13 12.4 63 63	54.1	13 50.1 63 62	53.3	14 46.2 62 61	52.1	15 42.0 62 60	50.8	16 55.7 61 59	49.2	17 14.0 61 58	48.8	17 32.3 61 58	48.4	18 44.8 60 56	46.7	3
4	12 34.8 63 62	53.5	13 12.8 63 62	52.7	14 09.6 63 61	51.6	15 06.0 62 60	50.3	16 20.6 62 58	48.7	16 39.1 62 58	48.3	16 57.6 62 57	47.9	18 11.0 61 56	46.2	4
105	11 57.4 64 62	53.0	12 35.8 64 61	52.2	13 33.2 64 60	51.0	14 30.2 63 59	49.8	15 45.6 63 58	48.2	16 04.4 62 57	47.8	16 23.1 62 57	47.4	17 37.4 62 55	45.8	105
6	11 20.3 65 61	52.5	11 59.1 65 61	51.7	12 57.1 64 60	50.5	13 54.7 64 59	49.3	15 11.0 63 57	47.7	15 30.0 63 57	47.3	15 48.9 63 57	46.9	17 04.2 62 55	45.3	6
7	10 43.5 65 61	51.9	11 22.6 65 60	51.2	12 21.2 65 59	50.0	13 19.5 64 58	48.8	14 36.6 64 57	47.2	14 55.8 64 56	46.9	15 15.0 64 56	46.5	16 31.1 63 55	44.9	7
8	10 06.9 66 60	51.4	10 46.5 66 60	50.6	11 45.6 66 59	49.5	12 44.5 65 58	48.3	14 02.5 65 56	46.8	14 21.9 65 56	46.4	14 41.3 65 56	46.0	15 58.4 64 54	44.4	8
9	9 30.6 67 60	50.9	10 10.5 67 59	50.1	11 10.3 66 58	49.0	12 09.8 66 57	47.8	13 28.7 66 56	46.3	13 48.3 65 56	45.9	14 07.9 65 55	45.5	15 25.9 65 54	43.9	9
110	8 54.6 67 60	50.3	9 34.9 67 59	49.6	10 35.3 67 58	48.4	11 35.4 67 57	47.3	12 55.1 66 55	45.8	13 15.0 66 55	45.4	13 34.8 66 55	45.0	14 53.7 65 53	43.4	110
1	8 18.8 68 59	49.8	8 59.6 68 59	49.0	10 00.5 68 57	47.9	11 01.3 67 56	46.8	12 21.9 67 55	45.3	12 41.9 67 55	44.9	13 02.0 67 54	44.6	14 21.8 66 53	43.0	1
2	7 43.4 69 59	49.2	8 24.5 69 58	48.5	9 26.1 68 57	47.4	10 27.4 68 56	46.2	11 48.9 68 54	44.7	12 09.2 68 54	44.4	12 29.4 67 54	44.0	13 50.2 67 52	42.5	2
3	7 08.2 69 58	48.6	7 49.8 69 57	47.9	8 51.9 69 56	46.8	9 53.9 69 55	45.7	11 16.2 68 54	44.2	11 36.7 68 54	43.9	11 57.0 68 53	43.5	13 18.6 68 52	42.0	3
4	6 33.4 70 58	48.1	7 15.3 70 57	47.3	8 18.1 70 56	46.3	9 20.7 69 55	45.2	10 43.8 69 53	43.7	11 04.6 69 53	43.3	11 25.3 69 53	43.0	12 47.8 69 51	41.5	4
115	5 58.8 71 57	47.5	6 41.2 71 56	46.8	7 44.6 70 55	45.7	8 47.8 70 54	44.6	10 11.8 70 53	43.2	10 32.7 70 53	42.8	10 53.6 70 52	42.5	12 17.0 69 51	41.0	115
6	5 24.6 71 56	46.9	6 07.4 71 56	46.2	7 11.3 71 55	45.2	8 15.2 71 54	44.1	9 40.0 71 52	42.7	10 01.2 70 52	42.3	10 22.3 70 52	41.9	11 46.6 70 50	40.5	6
7			5 33.9 72 55	45.6	6 38.4 72 54	44.6	7 42.9 72 53	43.5	9 08.6 71 52	42.1	9 30.0 71 52	41.8	9 51.3 71 51	41.4	11 16.5 71 50	40.0	7
8			5 00.7 72 55	45.1	6 05.9 72 54	44.0	7 10.9 72 53	43.0	8 37.5 72 51	41.6	8 59.1 72 51	41.2	9 20.6 72 51	40.9	10 46.7 72 49	39.5	8
9					5 33.6 73 53	43.5	6 39.3 73 52	42.4	8 06.7 73 51	41.0	8 28.5 73 50	40.7	8 50.3 73 50	40.3	10 17.2 72 49	38.9	9
120					5 01.7 74 53	42.9	6 08.0 74 52	41.9	7 36.3 73 50	40.5	7 58.3 73 50	40.1	8 20.3 73 49	39.8	9 48.1 73 48	38.4	120
1							5 37.1 74 51	41.3	7 06.2 74 50	39.9	7 28.4 74 49	39.6	7 50.6 74 49	39.3	9 19.3 74 47	37.9	1
2							5 06.5 75 50	40.7	6 36.4 75 49	39.4	6 58.8 75 49	39.0	7 21.3 75 48	38.7	8 50.8 75 47	37.4	2
3									6 07.0 76 48	38.8	6 29.6 75 48	38.5	6 52.3 75 48	38.2	8 22.7 75 46	36.8	3
4									5 37.9 76 48	38.2	6 00.8 76 47	37.9	6 23.6 76 47	37.6	7 54.9 76 46	36.3	4
125									5 09.3 77 47	37.7	5 32.3 77 47	37.4	5 55.4 77 46	37.0	7 27.5 77 45	35.7	125
6											5 04.2 78 46	36.8	5 27.5 78 46	36.5	7 00.4 77 44	35.2	6
7													5 00.0 78 45	35.9	6 33.7 78 44	34.6	7
8															6 07.4 79 43	34.1	8
9															5 41.5 79 43	33.5	9
130															5 15.9 80 42	33.0	130

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Lat. 39°

H.A.	46° 00′ Alt.	Δd Δt	Az.	47° 00′ Alt.	Δd Δt	Az.	48° 30′ Alt.	Δd Δt	Az.	49° 30′ Alt.	Δd Δt	Az.	50° 30′ Alt.	Δd Δt	Az.	51° 30′ Alt.	Δd Δt	Az.	52° 30′ Alt.	Δd Δt	Az.	54° 00′ Alt.	Δd Δt	Az.	H.A.
00	83 00.0	1.0 04	00.0	82 00.0	1.0 03	00.0	80 30.0	1.0 03	00.0	79 30.0	1.0 02	00.0	78 30.0	1.0 02	00.0	77 30.0	1.0 02	00.0	76 30.0	1.0 02	00.0	75 00.0	1.0 02	00.0	00
1	82 57.7	99 11	05.7	81 58.0	1.0 10	04.9	80 28.4	1.0 08	04.0	79 28.6	1.0 07	03.6	78 28.7	1.0 06	03.2	77 28.8	1.0 06	02.9	76 28.9	1.0 05	02.6	74 59.1	1.0 05	02.3	1
2	82 50.8	98 19	11.2	81 52.1	98 16	09.7	80 23.5	99 13	08.0	79 24.2	99 12	07.1	78 24.8	99 11	06.3	77 25.3	99 10	05.7	76 25.8	99 09	05.2	74 56.3	99 08	04.5	2
3	82 39.6	95 25	16.5	81 42.4	96 22	14.3	80 15.5	97 18	11.8	79 17.1	98 16	10.5	78 18.4	98 16	09.5	77 19.5	98 15	08.5	76 20.5	99 12	07.8	74 51.7	99 11	06.8	3
4	82 24.4	91 31	21.5	81 29.1	93 28	18.7	80 04.4	95 23	15.6	79 07.2	96 21	13.9	78 09.5	96 19	12.5	77 11.5	97 17	11.3	76 13.2	97 16	10.3	74 45.3	98 14	09.0	4
05	82 05.6	87 37	26.1	81 12.5	90 33	22.9	79 50.5	92 28	19.1	78 54.7	94 25	17.1	77 58.3	95 23	15.4	77 01.3	95 20	14.0	76 03.9	96 19	12.7	74 37.2	97 16	11.1	05
6	81 43.5	83 41	30.3	80 52.9	86 37	26.7	79 34.0	89 32	22.5	78 39.8	91 29	20.2	77 44.8	92 26	18.3	76 49.0	93 24	16.6	75 52.7	94 22	15.1	74 27.3	95 19	13.3	6
7	81 18.6	78 45	34.1	80 30.7	82 41	30.3	79 14.9	86 35	25.7	78 22.6	88 32	23.1	77 29.1	90 29	21.0	76 34.7	91 27	19.1	75 39.6	92 25	17.4	74 15.8	94 22	15.3	7
8	80 51.4	73 49	37.5	80 06.0	78 45	33.5	78 53.7	83 39	28.6	78 03.2	85 36	25.9	77 11.5	87 33	23.5	76 18.6	89 30	21.5	75 24.8	90 28	19.7	74 02.7	92 24	17.3	8
9	80 22.0	69 52	40.5	79 39.3	74 48	36.4	78 30.4	79 42	31.3	77 41.9	82 39	28.5	76 51.9	84 35	26.0	76 00.6	86 33	23.8	75 08.3	88 30	21.8	73 48.1	90 27	19.2	9
10	79 50.9	64 54	43.2	79 10.7	70 50	39.1	78 05.2	76 45	33.9	77 18.8	79 41	30.9	76 30.7	82 38	28.3	75 41.0	84 35	25.9	74 50.2	86 33	23.8	73 32.0	88 29	21.1	10
1	79 18.3	60 56	45.6	78 40.5	66 53	41.5	77 38.4	72 47	36.2	76 54.1	76 44	33.1	76 07.8	79 41	30.4	75 19.9	81 38	28.0	74 30.6	83 35	25.8	73 14.5	86 31	22.9	1
2	78 44.4	56 58	47.7	78 09.0	62 55	43.7	77 10.2	69 49	38.3	76 27.7	72 46	35.2	75 43.5	76 43	32.4	74 57.3	78 40	29.9	74 09.6	81 37	27.6	72 55.8	83 33	24.6	2
3	78 09.4	52 60	49.6	77 36.2	58 56	45.6	76 40.6	65 51	40.3	76 00.3	69 48	37.2	75 17.8	72 45	34.3	74 33.4	75 42	31.7	73 47.4	78 39	29.4	72 35.7	81 35	26.2	3
4	77 33.4	49 61	51.3	77 02.4	55 58	47.4	76 09.9	62 53	42.1	75 31.6	66 50	38.9	74 51.0	69 47	36.1	74 08.3	73 44	33.4	73 23.9	75 41	31.0	72 14.6	79 37	27.8	4
15	76 56.7	46 62	52.7	76 27.6	51 59	48.9	75 38.2	59 54	43.7	75 01.7	63 51	40.6	74 23.0	66 48	37.7	73 42.1	70 45	35.0	72 59.4	73 43	32.6	71 52.3	76 39	29.3	15
6	76 19.2	42 63	54.1	75 52.1	48 60	50.3	75 05.5	55 56	45.2	74 30.9	60 53	42.1	73 54.0	64 50	39.2	73 14.8	67 46	37.3	72 33.7	70 44	34.1	71 29.0	74 40	30.7	6
7	75 41.2	39 64	55.2	75 15.8	45 61	51.6	74 32.0	52 57	46.6	73 59.2	57 54	43.5	73 24.0	61 51	40.6	72 46.6	64 48	37.9	72 07.2	67 46	35.4	71 04.7	71 42	32.0	7
8	75 02.6	37 65	56.3	74 39.0	42 62	52.8	73 57.8	49 58	47.8	73 26.8	54 55	44.8	72 53.3	58 53	41.9	72 17.5	61 50	39.2	71 39.7	65 47	36.7	70 39.6	69 43	33.3	8
9	74 23.6	34 66	57.2	74 01.6	39 63	53.8	73 22.9	47 59	49.0	72 53.6	51 56	46.0	72 21.8	55 54	43.1	71 47.6	59 51	40.4	71 11.4	62 48	37.9	70 13.6	66 45	34.4	9
20	73 44.3	31 66	58.0	73 23.8	37 64	54.7	72 47.4	44 60	50.0	72 19.4	48 57	47.0	71 49.6	52 55	44.2	71 17.0	56 52	41.6	70 42.4	59 50	39.1	69 46.8	64 46	35.6	20
1	73 04.5	29 67	58.8	72 45.5	34 64	55.5	72 11.5	41 61	50.9	71 45.4	46 58	48.0	71 16.7	50 56	45.3	70 45.8	53 53	42.6	70 12.7	57 51	40.1	69 19.4	61 47	36.6	1
2	72 24.5	27 67	59.4	72 06.9	32 65	56.3	71 35.0	39 61	51.8	71 10.4	43 59	48.9	70 43.3	47 56	46.2	70 13.9	51 54	43.6	69 42.3	54 52	41.1	68 51.2	59 48	37.6	2
3	71 44.2	25 68	60.0	71 28.0	30 65	57.0	70 58.2	36 62	52.6	70 35.1	41 60	49.8	70 09.4	45 57	47.1	69 41.5	48 55	44.5	69 11.4	52 52	42.0	68 22.5	57 49	38.5	3
4	71 03.8	23 68	60.5	70 48.7	27 66	57.6	70 21.0	34 63	53.3	69 59.3	38 60	50.5	69 35.1	42 58	47.9	69 08.6	46 56	45.3	68 39.9	50 53	42.9	67 53.1	54 50	39.4	4
25	70 23.1	21 68	61.0	70 09.3	25 66	58.1	69 43.5	32 63	53.9	69 23.1	36 61	51.2	69 00.3	40 59	48.6	68 35.2	44 56	46.8	68 07.9	47 54	43.7	67 23.3	52 51	40.2	25
6	69 42.2	19 68	61.4	69 29.6	23 66	58.6	69 05.7	30 63	54.5	68 46.6	34 61	51.9	68 25.1	38 59	49.3	68 01.4	41 57	46.8	67 35.5	45 55	44.4	66 52.9	50 51	41.0	6
7	69 01.2	17 69	61.7	68 49.7	21 67	59.0	68 27.6	28 64	55.0	68 09.8	32 62	52.4	67 49.6	36 60	49.9	67 27.2	39 58	47.5	67 02.6	43 55	45.1	66 22.1	47 52	41.7	7
8	68 20.1	15 69	62.0	68 09.6	20 67	59.4	67 49.3	26 64	55.5	67 32.7	30 62	53.0	67 13.8	33 60	50.5	66 52.7	37 58	48.1	66 29.4	40 56	45.8	65 50.8	45 53	42.4	8
9	67 38.8	14 69	62.3	67 29.4	18 67	59.7	67 10.7	24 64	55.9	66 55.3	28 63	53.4	66 37.7	31 61	51.0	66 17.8	35 59	48.7	65 55.8	38 56	46.4	65 19.2	43 53	43.0	9
30	66 57.5	12 69	62.5	66 49.1	16 67	60.0	66 32.0	22 65	56.3	66 17.8	26 63	53.9	66 01.3	29 61	51.5	65 42.7	33 59	49.2	65 21.9	36 57	46.9	64 47.2	41 54	43.6	30
1	66 16.1	10 69	62.7	66 08.6	14 68	60.3	65 53.2	20 65	56.6	65 40.0	24 63	54.3	65 24.7	27 61	51.9	65 07.2	31 59	49.6	64 47.8	34 57	47.4	64 14.9	39 54	44.2	1
2	65 34.6	09 69	62.9	65 28.1	13 68	60.5	65 14.1	18 65	57.0	65 02.1	22 64	54.6	64 47.9	25 62	52.3	64 31.6	29 60	50.1	64 13.3	32 58	47.9	63 42.2	37 55	44.7	2
3	64 53.1	07 69	63.0	64 47.5	11 68	60.7	64 35.0	17 65	57.2	64 24.0	20 64	54.9	64 10.9	24 62	52.7	63 55.7	27 60	50.5	63 38.6	30 58	48.3	63 09.3	35 55	45.1	3
4	64 11.5	06 69	63.2	64 06.8	10 68	60.9	63 55.7	15 66	57.5	63 45.7	18 64	55.2	63 33.7	22 62	53.0	63 19.6	25 60	50.8	63 03.6	28 59	48.7	62 36.1	33 56	45.6	4
35	63 29.9	05 69	63.2	63 26.0	08 68	61.0	63 16.4	13 66	57.7	63 07.4	17 64	55.5	62 56.4	20 62	53.3	62 43.4	23 61	51.2	62 28.5	26 59	49.1	62 02.7	31 56	46.0	35
6	62 48.2	03 69	63.3	62 45.2	07 68	61.1	62 36.9	12 66	57.9	62 28.9	15 64	55.7	62 18.9	18 63	53.6	62 07.0	21 61	51.5	61 53.2	25 59	49.4	61 29.1	29 56	46.4	6
7	62 06.5	02 69	63.3	62 04.4	05 68	61.2	61 57.4	10 66	58.0	61 50.3	13 64	55.9	61 41.3	17 63	53.8	61 30.4	20 61	51.8	61 17.7	23 59	49.7	60 55.2	27 57	46.7	7
8	61 24.9	01 69	63.4	61 23.5	04 68	61.3	61 17.8	09 66	58.1	61 11.7	12 65	56.1	61 03.6	15 63	54.0	60 53.8	18 61	52.0	60 42.1	21 60	50.0	60 21.2	25 57	47.0	8
9	60 43.2	01 69	63.4	60 42.6	03 68	61.3	60 38.2	07 66	58.3	60 32.9	10 65	56.2	60 25.9	13 63	54.2	60 17.0	16 62	52.2	60 06.3	19 60	50.2	59 47.0	24 57	47.3	9
40	60 01.5	02 69	63.3	60 01.7	01 68	61.3	59 58.5	06 66	58.3	59 54.2	09 65	56.4	59 48.0	12 63	54.4	59 40.1	15 62	52.4	59 30.4	18 60	50.5	59 12.6	22 57	47.6	40
1	59 19.8	03 69	63.3	59 20.8	00 68	61.4	59 18.8	04 66	58.4	59 15.3	07 65	56.5	59 10.1	10 63	54.5	59 03.1	13 62	52.6	58 54.4	16 60	50.7	58 38.2	20 58	47.8	1
2	58 38.2	04 69	63.3	58 39.9	01 68	61.3	58 39.1	03 66	58.5	58 36.4	06 65	56.5	58 32.1	09 63	54.6	58 26.0	12 62	52.7	58 18.3	14 60	50.8	58 03.6	18 58	48.0	2
3	57 56.6	05 69	63.2	57 58.9	03 68	61.3	57 59.3	02 66	58.5	57 57.5	04 65	56.6	57 54.0	07 64	54.7	57 48.9	10 62	53.0	57 42.1	13 60	51.0	57 28.8	17 58	48.2	3
4	57 15.0	06 69	63.1	57 18.0	04 68	61.3	57 19.6	00 66	58.5	57 18.6	03 65	56.6	57 15.9	06 64	54.8	57 11.7	08 62	53.0	57 05.8	11 61	51.1	56 54.0	15 58	48.4	4
45	56 33.4	08 69	63.0	56 37.1	05 68	61.2	56 39.8	01 66	58.5	56 39.6	02 65	56.7	56 37.8	04 64	54.9	56 34.4	07 62	53.0	56 29.5	10 61	51.2	56 19.1	13 58	48.5	45
6	55 51.8	09 69	62.9	55 56.3	06 68	61.2	56 00.1	02 66	58.5	56 00.7	00 65	56.7	55 59.7	03 64	54.9	55 57.2	05 62	53.1	55 53.1	08 61	51.3	55 44.1	12 58	48.7	6
7	55 10.3	10 69	62.8	55 15.5	07 68	61.1	55 20.3	04 66	58.5	55 21.7	01 65	56.7	55 21.6	02 64	54.9	55 19.9	04 62	53.2	55 16.7	07 61	51.4	55 09.1	10 59	48.8	7
8	54 28.9	11 69	62.7	54 34.7	08 68	61.0	54 40.6	05 66	58.4	54 42.7	02 65	56.7	54 43.4	00 64	54.9	54 42.5	03 62	53.2	54 40.2	05 61	51.5	54 34.0	09 59	48.9	8
9	53 47.5	12 69	62.6	53 53.9	10 68	60.9	54 00.9	06 66	58.3	54 03.8	04 65	56.6	54 05.2	01 64	54.9	54 05.2	01 62	53.2	54 03.7	04 61	51.5	53 58.8	07 59	49.0	9
50	53 06.1	13 69	62.4	53 13.2	11 68	60.8	53 21.2	07 66	58.3	53 24.8	05 65	56.6	53 27.0	02 64	54.9	53 27.8	00 62	53.2	53 27.2	02 61	51.5	53 23.6	06 59	49.0	50
1	52 24.8	14 69	62.3	52 32.3	12 68	60.6	52 41.6	08 66	58.2	52 45.9	06 65	56.5	52 48.9	04 64	54.9	52 50.5	01 62	53.2	52 50.7	01 61	51.6	52 48.4	04 59	49.1	1
2	51 43.6	15 69	62.1	51 51.9	13 68	60.5	52 02.0	10 66	58.1	52 07.1	07 65	56.5	52 10.8	05 64	54.8	52 13.1	03 62	53.2	52 14.2	01 61	51.6	52 13.2	03 59	49.1	2
3	51 02.4	16 68	61.9	51 11.4	14 68	60.3	51 22.5	11 66	58.0	51 28.2	09 65	56.4	51 32.7	06 63	54.8	51 35.8	04 62	53.2	51 37.6	02 61	51.6	51 37.9	01 59	49.1	3
4	50 21.3	17 68	61.7	50 30.9	15 67	60.2	50 42.9	12 66	57.8	50 49.4	10 65	56.3	50 54.6	08 63	54.7	50 58.5	05 62	53.1	51 01.1	03 61	51.5	51 02.6	00 59	49.1	4
55	49 40.3	18 68	61.6	49 50.5	16 67	60.0	50 03.5	13 66	57.7	50 10.6	11 65	56.2	50 16.6	09 63	54.6	50 21.2	07 62	53.1	50 24.6	05 61	51.5	50 27.4	01 59	49.1	55
6	48 59.3	19 68	61.4	49 09.9	17 67	59.9	49 24.1	14 66	57.6	49 31.9	12 64	56.1	49 38.6	10 63	54.5	49 44.4	08 62	53.0	49 48.2	06 61	51.4	49 52.1	03 60	49.1	6
7	48 18.4	20 68	61.2	48 29.1	18 67	59.7	48 44.8	15 65	57.4	48 53.3	13 64	55.9	49 00.6	11 63	54.4	49 06.8	09 62	52.9	49 11.7	07 61	51.3	49 16.9	04 60	49.1	7
8	47 37.6	21 68	60.9	47 49.6	19 67	59.5	48 05.5	16 65	57.3	48 14.7	14 64	55.8	48 22.7	12 63	54.3	48 29.6	10 62	52.8	48 35.3	09 61	51.3	48 41.6	06 59	49.0	8
9	46 56.9	22 68	60.7	47 09.5	20 67	59.3	47 26.3	17 65	57.1	47 36.2	15 64	55.7	47 44.9	14 63	54.2	47 52.5	12 62	52.7	47 58.9	10 61	51.2	48 06.4	07 59	49.0	9
60	46 16.3	23 68	60.5	46 29.4	21 67	59.1	46 47.2	18 65	56.9	46 57.7	17 64	55.5	47 07.1	15 63	54.0	47 15.4	13 62	52.6	47 22.6	11 60	51.1	47 31.3	08 59	48.9	60
1	45 35.7	24 67	60.3	45 49.5	22 66	58.9	46 08.2	19 65	56.8	46 19.3	18 64	55.3	46 29.4	16 63	53.9	46 38.4	14 62	52.5	46 46.3	12 60	51.0	46 56.2	10 58	48.8	1
2	44 55.3	25 67	60.0	45 09.6	23 66	58.6	45 29.2	21 65	56.6	45 41.0	19 64	55.2	45 51.8	17 63	53.8	46 01.5	15 61	52.3	46 10.1	14 60	50.9	46 21.1	11 58	48.8	2
3	44 15.0	26 67	59.8	44 29.8	24 66	58.4	44 50.3	22 65	56.4	45 02.8	20 64	55.0	45 14.2	18 62	53.6	45 24.6	16 61	52.2	45 33.9	15 60	50.7	45 46.0	12 58	48.7	3
4	43 34.7	27 67	59.5	43 50.2	25 66	58.2	44 11.6	23 64	56.2	44 24.6	21 63	54.8	44 36.7	19 62	53.4	44 47.8	18 61	52.0	44 57.9	16 60	50.7	45 11.1	13 58	48.6	4
65	42 54.6	27 67	59.3	43 10.9	26 66	58.0	43 32.9	24 64	56.0	43 46.6	23 63	54.6	43 59.3	20 62	53.2	44 11.1	19 61	51.9	44 21.8	17 60	50.5	44 35.4	15 58	48.4	65
6	42 14.6	28 67	59.0	42 31.1	27 66	57.7	42 54.3	25 64	55.7	43 08.6	23 63	54.4	43 22.0	22 62	53.1	43 34.4	20 61	51.7	43 45.9	18 60	50.4	44 01.3	16 58	48.2	6
7	41 34.6	29 66	58.7	41 51.8	28 65	57.5	42 15.8	26 64	55.5	42 30.7	24 63	54.2	42 44.8	23 62	52.9	42 57.9	21 61	51.5	43 10.0	19 60	50.2	43 26.5	17 58	48.2	7
8	40 54.8	30 66	58.5	41 12.5	29 65	57.2	41 37.4	27 64	55.3	41 53.0	25 63	54.0	42 07.6	24 62	52.7	42 21.4	22 61	51.4	42 34.2	21 59	50.0	42 51.8	18 58	48.0	8
9	40 15.2	31 66	58.2	40 33.2	30 65	56.9	40 59.0	28 64	55.0	41 15.3	26 63	53.8	41 30.8	25 62	52.5	41 45.0	23 60	51.2	41 58.5	22 59	49.9	42 17.2	20 58	47.9	9
70	39 35.6	32 66	57.9	39 54.4	31 65	56.7	40 21.0	29 63	54.8	40 37.8	27 62	53.5	40 53.7	26 61	52.3	41 08.7	24 60	51.0	41 22.9	23 59	49.7	41 42.6	21 57	47.7	70
1	38 56.2	33 66	57.6	39 15.5	32 65	56.4	39 43.0	30 63	54.5	40 00.3	28 62	53.3	40 16.9	27 61	52.0	40 32.6	25 60	50.8	40 47.4	24 59	49.5	41 08.2	22 57	47.6	1
2	38 16.9	34 65	57.3	38 36.7	32 64	56.1	39 05.1	31 63	54.3	39 23.0	29 62	53.0	39 40.2	28 61	51.8	39 56.5	27 60	50.6	40 12.0	25 59	49.3	40 33.8	23 57	47.4	2
3	37 37.7	35 65	57.0	37 58.1	33 64	55.8	38 27.3	32 63	54.0	38 45.8	30 62	52.8	39 03.6	29 60	51.6	39 20.6	28 60	50.3	39 36.8	26 59	49.1	39 59.5	24 57	47.2	3
4	36 58.6	35 65	56.7	37 19.6	34 64	55.5	37 49.6	32 63	53.7	38 08.7	31 62	52.5	38 27.1	30 61	51.4	38 44.7	29 60	50.1	39 01.6	27 58	48.9	39 25.4	25 57	47.0	4
75	36 19.7	36 65	56.4	36 41.2	35 64	55.2	37 12.1	33 62	53.5	37 31.8	32 61	52.3	37 50.8	31 60	51.1	38 09.0	30 59	49.9	38 26.5	29 58	48.7	38 51.3	27 57	46.8	75
6	35 41.0	37 64	56.1	36 02.9	36 63	54.9	36 34.7	34 62	53.2	36 54.9	33 61	52.0	37 14.5	32 60	50.8	37 33.4	31 59	49.6	37 51.6	30 58	48.4	38 17.4	28 56	46.6	6
7	35 02.3	38 64	55.8	35 24.8	37 63	54.6	35 57.4	35 62	52.9	36 18.3	34 61	51.7	36 38.5	33 60	50.6	36 58.0	32 59	49.4	37 16.7	31 58	48.2	37 43.6	29 56	46.4	7
8	34 23.9	39 64	55.5	34 46.9	38 63	54.3	35 20.3	36 62	52.6	35 41.7	35 61	51.5	36 02.5	34 60	50.3	36 22.6	33 59	49.1	36 42.0	32 58	48.0	37 09.9	30 56	46.2	8
9	33 45.6	40 64	55.1	34 09.1	39 63	54.0	34 43.3	37 61	52.3	35 05.3	36 60	51.2	35 26.7	35 59	50.0	35 47.4	34 58	48.9	36 07.5	33 57	47.7	36 36.3	31 56	46.0	9
80	33 07.4	41 63	54.8	33 31.5	40 62	53.7	34 06.5	38 61	52.0	34 29.1	37 60	50.9	34 51.0	36 59	49.8	35 12.4	35 58	48.6	35 33.1	34 57	47.5	36 02.8	32 56	45.7	80
1	32 29.4	41 63	54.4	32 54.0	41 62	53.3	33 29.8	39 61	51.7	33 53.0	38 60	50.6	34 15.5	37 59	49.5	34 37.5	36 58	48.3	34 58.8	35 57	47.2	35 29.5	33 55	45.5	1
2	31 51.5	42 63	54.1	32 16.6	41 62	53.0	32 53.3	40 61	51.4	33 17.0	39 60	50.3	33 40.1	38 59	49.2	34 02.7	37 58	48.1	34 24.6	36 57	46.9	34 56.3	34 55	45.2	2
3	31 13.8	43 63	53.7	31 39.5	42 62	52.7	32 16.9	41 60	51.1	32 41.2	40 59	50.0	33 04.9	39 58	48.9	33 28.1	38 57	47.8	33 50.6	37 56	46.7	34 23.3	35 55	45.0	3
4	30 36.3	44 62	53.4	31 02.5	43 61	52.3	31 40.7	42 60	50.7	32 05.6	41 59	49.7	32 29.9	40 58	48.6	32 53.6	39 57	47.5	33 16.8	38 56	46.4	33 50.4	37 55	44.7	4
85	29 59.0	45 62	53.0	30 25.7	44 61	52.0	31 04.7	43 60	50.4	31 30.1	42 59	49.4	31 55.0	41 58	48.3	32 19.3	40 57	47.2	32 43.1	39 56	46.1	33 17.7	38 54	44.5	85
6	29 21.8	46 62	52.7	29 49.0	45 61	51.6	30 28.9	44 60	50.1	30 54.8	43 59	49.0	31 20.3	42 58	47.9	31 45.2	41 57	46.9	32 09.6	40 56	45.8	32 45.1	39 54	44.2	6
7	28 44.8	47 61	52.3	29 12.5	46 60	51.3	29 53.2	45 59	49.7	30 19.7	44 58	48.7	30 45.7	43 57	47.7	31 11.2	42 56	46.6	31 36.2	41 55	45.5	32 12.7	40 53	43.9	7
8	28 08.0	47 61	51.9	28 36.2	47 60	50.9	29 17.7	45 59	49.4	29 44.8	45 58	48.4	30 11.3	44 57	47.3	30 37.4	43 56	46.3	31 03.0	42 55	45.2	31 40.4	41 54	43.6	8
9	27 31.4	48 61	51.6	28 00.1	47 60	50.6	28 42.4	46 59	49.1	29 10.0	46 58	48.0	29 37.1	45 57	47.0	30 03.8	44 56	46.0	30 30.0	43 55	44.9	31 08.3	42 53	43.4	9
90	26 55.0	49 60	51.2	27 24.2	48 60	50.2	28 07.3	47 58	48.7	28 35.4	47 57	47.7	29 03.1	46 56	46.7	29 30.3	45 55	45.7	29 57.1	44 54	44.6	30 36.4	43 53	43.1	90

H.A.	46° 00' Alt (° ' Δd Δt)	Az.	47° 00' Alt (° ' Δd Δt)	Az.	48° 30' Alt (° ' Δd Δt)	Az.	49° 30' Alt (° ' Δd Δt)	Az.	50° 30' Alt (° ' Δd Δt)	Az.	51° 30' Alt (° ' Δd Δt)	Az.	52° 30' Alt (° ' Δd Δt)	Az.	54° 00' Alt (° ' Δd Δt)	Az.	H.A.
91	26 18.8 50 60	50.8	26 48.5 49 59	49.8	27 32.3 48 58	48.3	28 01.0 47 57	47.4	28 29.3 47 56	46.4	28 57.1 46 55	45.3	29 24.4 45 54	44.3	30 04.6 44 53	42.8	91
2	25 42.7 51 60	50.4	26 13.0 50 59	49.4	26 57.6 49 58	48.0	27 26.8 48 57	47.0	27 55.6 48 56	46.0	28 24.0 47 55	45.0	28 52.0 46 54	44.0	29 33.0 45 52	42.5	2
3	25 06.9 52 59	50.0	25 37.6 51 59	49.1	26 23.0 50 57	47.6	26 52.8 49 56	46.6	27 22.2 49 55	45.7	27 51.1 48 54	44.7	28 19.7 47 54	43.7	29 01.6 46 52	42.2	3
4	24 31.3 52 50	49.6	25 02.5 52 58	48.7	25 48.7 51 57	47.2	26 19.0 50 56	46.3	26 48.9 50 55	45.3	27 18.4 49 54	44.3	27 47.6 48 53	43.4	28 30.4 47 52	41.9	4
95	23 55.9 53 59	49.2	24 27.6 53 58	48.3	25 14.6 52 57	46.9	25 45.4 51 56	45.9	26 15.9 50 55	45.0	26 46.0 50 54	44.0	27 15.6 49 53	43.0	27 59.4 48 51	41.5	95
6	23 20.7 54 58	48.8	23 52.9 53 57	47.9	24 40.6 53 56	46.5	25 12.0 52 55	45.5	25 43.0 51 54	44.6	26 13.7 51 53	43.6	26 43.9 50 52	42.7	27 28.6 49 51	41.2	6
7	22 45.7 55 58	48.4	23 18.4 54 57	47.5	24 06.9 53 56	46.1	24 38.8 53 55	45.2	25 10.4 52 54	44.2	25 41.6 52 53	43.3	26 12.4 51 52	42.3	26 58.0 50 51	40.9	7
8	22 11.0 56 58	48.0	22 44.2 55 57	47.1	23 33.4 54 55	45.7	24 05.9 54 55	44.8	24 38.0 53 54	43.9	25 09.7 53 53	42.9	25 41.1 52 52	42.0	26 27.5 51 50	40.6	8
9	21 36.4 56 57	47.6	22 10.2 56 56	46.7	23 00.2 55 55	45.3	23 33.1 55 54	44.4	24 05.8 54 53	43.5	24 38.1 54 52	42.6	25 10.0 53 51	41.6	25 57.3 52 50	40.2	9
100	21 02.1 57 57	47.1	21 36.4 57 56	46.3	22 27.1 56 55	44.9	23 00.6 56 54	44.0	23 33.8 55 53	43.1	24 06.6 54 52	42.2	24 39.2 54 51	41.3	25 27.3 53 50	39.9	100
1	20 28.1 58 57	46.7	21 02.8 58 56	45.8	21 54.3 57 54	44.5	22 28.3 56 53	43.6	23 02.0 56 53	42.7	23 35.4 55 52	41.8	24 08.5 55 51	40.9	24 57.5 54 49	39.5	1
2	19 54.3 59 56	46.3	20 29.5 58 55	45.4	21 21.8 58 54	44.1	21 56.3 57 53	43.2	22 30.5 57 52	42.3	23 04.5 56 51	41.4	23 38.1 56 50	40.5	24 28.0 55 49	39.2	2
3	19 20.7 60 56	45.8	19 56.4 59 55	45.0	20 49.4 59 53	43.7	21 24.5 58 53	42.8	21 59.2 58 52	41.9	22 33.7 57 51	41.1	23 07.9 57 50	40.2	23 58.6 56 49	38.8	3
4	18 47.4 60 55	45.4	19 23.5 60 54	44.6	20 17.3 59 53	43.3	20 52.9 59 52	42.4	21 28.2 59 51	41.5	22 03.2 58 50	40.7	22 38.0 58 50	39.8	23 29.5 57 48	38.5	4
105	18 14.3 61 55	44.9	18 51.0 61 54	44.1	19 45.5 60 53	42.9	20 21.6 60 52	42.0	20 57.4 59 51	41.1	21 32.9 59 50	40.3	22 08.2 59 49	39.4	23 00.6 58 48	38.1	105
6	17 41.5 62 54	44.5	18 18.6 62 53	43.7	19 13.9 61 52	42.4	19 50.5 61 51	41.6	20 26.8 60 50	40.7	21 02.9 60 50	39.9	21 38.8 60 49	39.0	22 32.0 59 47	37.7	6
7	17 08.9 63 54	44.0	17 46.6 63 53	43.2	18 42.6 62 52	42.0	19 19.7 62 51	41.2	19 56.5 61 50	40.3	20 33.2 61 49	39.5	21 09.5 60 48	38.6	22 03.6 60 47	37.3	7
8	16 36.7 64 53	43.6	17 14.8 63 53	42.8	18 11.5 63 51	41.6	18 49.1 62 50	40.7	19 26.5 62 50	39.9	20 03.6 62 49	39.1	20 40.5 61 48	38.2	21 35.4 61 46	37.0	8
9	16 04.6 64 53	43.1	16 43.2 64 52	42.3	17 40.7 64 51	41.1	18 18.8 63 50	40.3	18 56.7 63 49	39.5	19 34.4 63 48	38.7	20 11.8 62 47	37.8	21 07.5 62 46	36.6	9
110	15 32.9 65 52	42.7	16 12.0 65 52	41.9	17 10.2 64 50	40.7	17 48.8 64 50	39.9	18 27.2 64 49	39.1	19 05.4 63 48	38.2	19 43.3 63 47	37.4	20 39.9 63 46	36.2	110
1	15 01.5 66 52	42.2	15 41.0 66 51	41.4	16 40.0 65 50	40.2	17 19.0 65 49	39.4	17 57.9 64 48	38.6	18 36.6 64 47	37.8	19 15.1 64 47	37.0	20 12.5 63 45	35.8	1
2	14 30.3 67 51	41.7	15 10.3 67 51	40.9	16 10.0 66 49	39.8	16 49.6 66 49	39.0	17 29.0 66 48	38.2	18 08.2 65 47	37.4	18 47.2 65 46	36.6	19 45.4 64 45	35.4	2
3	13 59.4 68 51	41.2	14 39.9 67 50	40.5	15 40.3 67 49	39.3	16 20.4 67 48	38.5	17 00.3 66 47	37.8	17 40.0 66 46	37.0	18 19.5 66 46	36.2	19 18.5 65 44	35.0	3
4	13 28.8 68 50	40.7	14 09.8 68 50	40.0	15 10.9 68 48	38.8	15 51.5 67 48	38.1	16 31.9 67 47	37.3	17 12.1 67 46	36.5	17 52.2 67 45	35.8	18 51.9 66 44	34.6	4
115	12 58.6 69 50	40.2	13 40.0 69 49	39.5	14 41.8 69 48	38.4	15 22.9 68 47	37.6	16 03.8 68 46	36.9	16 44.5 68 46	36.1	17 25.1 67 45	35.3	18 25.6 67 43	34.2	115
6	12 28.6 70 49	39.8	13 10.5 70 49	39.0	14 13.0 69 48	37.9	14 54.5 69 47	37.2	15 35.9 69 46	36.4	16 17.2 69 45	35.7	16 58.2 68 44	34.9	17 59.5 68 43	33.7	6
7	11 58.9 71 49	39.3	12 41.3 70 48	38.5	13 44.5 70 47	37.4	14 26.5 70 46	36.7	15 08.4 70 45	36.0	15 50.1 69 45	35.2	16 31.7 69 44	34.5	17 33.8 69 42	33.3	7
8	11 29.6 71 48	38.7	12 12.4 71 48	38.0	13 16.3 71 46	36.9	13 58.8 71 46	36.2	14 41.2 70 45	35.5	15 23.4 70 44	34.8	16 05.5 70 43	34.0	17 08.3 70 42	32.9	8
9	11 00.6 72 48	38.2	11 43.8 72 47	37.5	12 48.5 72 46	36.5	13 31.4 72 45	35.7	14 14.3 71 44	35.0	14 57.0 71 44	34.3	15 39.5 71 43	33.6	16 43.1 70 41	32.5	9
120	10 31.9 73 47	37.7	11 15.6 73 47	37.0	12 20.9 72 45	36.0	13 04.3 72 45	35.3	13 47.7 72 44	34.6	14 30.8 72 43	33.8	15 13.9 72 42	33.1	16 16.2 71 41	32.0	120
1	10 03.5 74 47	37.2	10 47.6 73 46	36.5	11 53.7 73 45	35.5	12 37.6 73 44	34.8	13 21.4 73 43	34.1	14 05.0 73 42	33.4	14 48.6 72 42	32.7	15 53.7 72 40	31.6	1
2	9 35.5 74 46	36.7	10 20.1 74 45	36.0	11 26.8 74 44	35.0	12 11.1 74 44	34.3	12 55.4 74 43	33.6	13 39.5 73 42	32.9	14 23.6 73 41	32.2	15 29.4 73 40	31.1	2
3	9 07.8 75 46	36.2	9 52.8 75 45	35.5	11 00.2 75 44	34.5	11 45.0 75 43	33.8	12 29.8 74 42	33.1	13 14.4 74 41	32.4	13 58.9 74 41	31.7	15 05.4 74 39	30.7	3
4	8 40.4 76 45	35.6	9 25.9 76 44	35.0	10 34.0 76 43	34.0	11 19.3 75 42	33.3	12 04.4 75 42	32.5	12 49.5 75 41	32.0	13 34.5 75 40	31.3	14 41.8 75 39	30.3	4
125	8 13.5 77 44	35.1	8 59.4 76 44	34.4	10 08.1 76 43	33.5	10 53.8 76 42	32.8	11 39.5 76 41	32.1	12 25.0 76 40	31.5	13 10.5 76 40	30.8	14 18.4 75 38	29.8	125
6	7 46.8 77 44	34.6	8 33.2 77 43	33.9	9 42.6 77 42	32.9	10 28.7 77 41	32.3	11 14.8 77 40	31.6	12 00.8 77 40	31.0	12 46.8 76 39	30.3	13 55.4 76 38	29.3	6
7	7 20.6 78 43	34.0	8 07.3 78 42	33.4	9 17.4 78 41	32.4	10 04.0 78 41	31.8	10 50.5 78 40	31.1	11 37.0 77 39	30.5	12 23.4 77 38	29.9	13 32.8 77 37	28.9	7
8	6 54.7 79 43	33.5	7 41.9 79 42	32.8	8 52.6 78 41	31.9	9 39.6 78 40	31.3	10 26.6 78 39	30.6	11 13.5 78 39	30.0	12 00.3 78 38	29.4	13 10.4 78 37	28.4	8
9	6 29.1 79 42	32.9	7 16.8 79 41	32.3	8 28.1 79 40	31.4	9 15.6 79 39	30.8	10 03.0 79 39	30.1	10 50.4 79 38	29.5	11 37.6 79 37	28.9	12 48.4 79 36	27.9	9
130	6 04.0 80 41	32.4	6 52.0 80 41	31.8	8 04.0 80 40	30.8	8 51.9 80 39	30.2	9 39.8 80 38	29.6	10 27.6 80 37	29.0	11 15.3 79 37	28.4	12 26.7 79 36	27.5	130
1	5 39.2 81 41	31.8	6 27.7 81 40	31.2	7 40.3 81 39	30.3	8 28.6 81 38	29.7	9 16.9 80 38	29.1	10 05.1 80 37	28.5	10 53.3 80 36	27.9	12 05.4 80 35	27.0	1
2	5 14.9 81 40	31.2	6 03.7 81 39	30.6	7 17.0 81 38	29.8	8 05.7 81 38	29.2	8 54.4 81 37	28.6	9 43.1 81 36	28.0	10 31.7 81 35	27.4	11 44.4 81 34	26.5	2
3			5 40.2 82 39	30.1	6 54.0 82 38	29.2	7 43.2 82 37	28.6	8 32.3 82 36	28.1	9 21.4 82 36	27.5	10 10.4 82 35	26.9	11 23.8 81 34	26.0	3
4			5 17.0 83 38	29.5	6 31.4 83 37	28.7	7 21.0 83 36	28.1	8 10.6 83 36	27.5	9 00.0 82 35	27.0	9 49.5 82 34	26.4	11 03.5 82 33	25.5	4
135					6 09.3 83 36	28.1	6 59.2 83 36	27.6	7 49.2 83 35	27.0	8 39.1 83 34	26.4	9 28.9 83 34	25.9	10 43.6 83 33	25.0	135
6					5 47.5 84 36	27.6	6 37.9 84 35	27.0	7 28.2 84 34	26.5	8 18.5 84 34	25.9	9 08.8 84 33	25.4	10 24.1 84 32	24.5	6
7					5 26.1 85 35	27.0	6 16.9 85 34	26.5	7 07.6 85 34	25.9	7 58.3 84 33	25.4	8 49.0 84 32	24.8	10 04.9 84 31	24.0	7
8					5 05.2 85 34	26.4	5 56.3 85 34	25.9	6 47.4 85 33	25.4	7 38.5 85 32	24.9	8 29.6 85 32	24.3	9 46.1 85 31	23.5	8
9							5 36.1 86 33	25.3	6 27.7 86 32	24.8	7 19.1 86 32	24.3	8 10.6 86 31	23.8	9 27.7 86 30	23.0	9
140							5 16.4 87 32	24.8	6 08.3 86 32	24.3	7 00.1 86 31	23.8	7 52.0 86 30	23.3	9 09.7 86 29	22.5	140
1									5 49.3 87 31	23.7	6 41.5 87 30	23.2	7 33.8 87 30	22.7	8 52.0 87 29	22.0	1
2									5 30.8 88 30	23.2	6 23.4 88 30	22.7	7 15.9 88 29	22.2	8 34.7 88 28	21.5	2
3									5 12.6 88 30	22.6	6 05.6 88 29	22.1	6 58.5 88 28	21.7	8 17.9 88 27	20.9	3
4											5 48.2 89 28	21.6	6 41.5 89 28	21.1	8 01.4 89 27	20.4	4
145											5 31.3 89 28	21.0	6 24.9 89 27	20.6	7 45.3 89 26	19.9	145
6											5 14.8 90 27	20.5	6 08.7 90 26	20.0	7 29.7 90 25	19.4	6
7													5 53.0 90 26	19.5	7 14.4 90 25	18.8	7
8													5 37.7 91 25	18.9	6 59.6 91 24	18.3	8
9													5 22.8 92 24	18.4	6 45.2 92 23	17.7	9
150													5 08.3 92 23	17.8	6 31.1 92 23	17.2	150
1															6 17.6 93 22	16.7	1
2															6 04.4 93 21	16.1	2
3															5 51.7 93 20	15.6	3
4															5 39.4 94 20	15.0	4
155															5 27.5 94 19	14.5	155
6															5 16.1 95 18	13.9	6
7															5 05.2 95 18	13.3	7

Lat. 39°

H.A.	54° 30' Alt.	Δd Δt	Az.	55° 00' Alt.	Δd Δt	Az.	56° 00' Alt.	Δd Δt	Az.	56° 30' Alt.	Δd Δt	Az.	57° 00' Alt.	Δd Δt	Az.	57° 30' Alt.	Δd Δt	Az.	59° 00' Alt.	Δd Δt	Az.	59° 30' Alt.	Δd Δt	Az.	H.A.
00	74 30.0	1.00 1	00.0	74 00.0	1.00 1	00.0	73 00.0	1.00 1	00.0	72 30.0	1.00 1	00.0	72 00.0	1.00 1	00.0	71 30.0	1.00 1	00.0	70 00.0	1.00 1	00.0	69 30.0	1.00 1	00.0	00
1	74 29.1	1.00 4	02.2	73 59.2	1.00 4	02.1	72 59.1	1.00 4	01.9	72 29.1	1.00 4	01.8	71 59.3	1.00 4	01.8	71 29.3	1.00 4	01.7	69 59.4	1.00 3	01.5	69 29.4	1.00 3	01.4	1
2	74 26.5	99 07	04.3	73 56.6	1.00 7	04.2	72 56.9	1.00 6	03.8	72 27.0	1.00 6	03.7	71 57.1	1.00 6	03.5	71 27.2	1.00 6	03.4	69 57.6	1.00 5	03.0	69 27.6	1.00 5	02.9	2
3	74 22.1	99 10	06.5	73 52.4	99 10	06.2	72 53.0	99 09	05.7	72 23.3	99 09	05.5	71 53.6	99 09	05.3	71 23.8	99 09	05.1	69 54.5	99 07	04.5	69 24.7	99 07	04.3	3
4	74 16.0	98 13	08.6	73 46.6	98 12	08.3	72 47.6	98 12	07.6	72 18.1	98 11	07.3	71 48.6	98 11	07.0	71 19.0	99 10	06.7	69 50.2	99 09	06.0	69 20.6	99 09	05.8	4
05	74 06.2	97 16	10.7	73 39.1	97 15	10.2	72 40.7	97 14	09.4	72 11.5	98 13	09.0	71 42.2	98 13	08.7	71 12.9	98 12	08.4	69 44.8	98 11	07.5	69 15.4	98 11	07.2	05
6	73 58.7	96 18	12.7	73 30.0	96 18	12.2	72 32.4	96 16	11.2	72 03.5	96 16	10.8	71 34.5	97 15	10.4	71 05.5	97 15	10.0	69 38.2	97 13	08.9	69 09.0	97 13	08.6	6
7	73 47.7	94 21	14.7	73 19.4	94 20	14.1	72 22.6	95 19	13.0	71 54.0	95 18	12.5	71 25.4	95 17	12.0	70 56.6	96 17	11.6	69 30.4	96 15	10.3	69 01.5	96 14	10.0	7
8	73 35.1	92 23	16.6	73 07.3	92 23	16.0	72 11.4	94 21	14.7	71 43.3	94 20	14.2	71 15.1	94 19	13.6	70 46.8	94 19	13.1	69 21.4	95 17	11.7	68 52.9	95 16	11.3	8
9	73 21.0	91 26	18.5	72 53.8	91 25	17.8	71 58.9	92 23	16.4	71 31.2	92 22	15.8	71 03.5	93 21	15.2	70 35.6	93 21	14.7	69 11.4	94 19	13.1	68 43.2	94 18	12.6	9
10	73 05.5	89 28	20.3	72 38.9	89 27	19.5	71 45.0	90 25	18.1	71 17.9	91 24	17.4	70 50.6	91 23	16.8	70 23.2	92 23	16.1	69 00.3	93 20	14.5	68 32.5	93 20	13.9	10
1	72 48.7	86 30	22.0	72 22.7	87 29	21.2	71 30.0	88 27	19.6	71 03.4	89 26	18.9	70 36.6	89 25	18.2	70 09.7	90 24	17.6	68 48.1	91 22	15.8	68 20.7	92 21	15.2	1
2	72 30.6	84 32	23.7	72 05.2	85 31	22.8	71 13.7	86 29	21.2	70 47.7	87 28	20.4	70 21.4	88 27	19.7	69 55.0	88 26	19.0	68 35.0	90 24	17.1	68 08.0	90 23	16.5	2
3	72 11.3	82 34	25.3	71 46.5	83 33	24.4	70 56.3	84 31	22.7	70 30.8	85 30	21.9	70 05.2	86 29	21.1	69 39.4	86 28	20.3	68 20.8	88 25	18.3	67 54.3	88 24	17.7	3
4	71 50.8	80 36	26.8	71 26.7	81 35	25.9	70 37.8	82 33	24.1	70 13.0	83 32	23.2	69 47.9	84 30	22.4	69 22.6	85 29	21.7	68 05.7	86 27	19.5	67 39.7	87 26	18.8	4
15	71 29.2	77 38	28.3	71 05.9	78 36	27.3	70 18.3	80 34	25.4	69 54.1	81 33	24.6	69 29.6	82 32	23.7	69 04.9	83 31	22.9	67 49.7	85 28	20.7	67 24.2	85 27	20.0	15
6	71 06.7	75 39	29.6	70 44.0	76 38	28.6	69 57.8	78 36	26.7	69 34.2	79 35	25.8	69 10.4	80 34	25.0	68 46.3	81 33	24.1	67 32.8	83 30	21.8	67 07.8	83 29	21.1	6
7	70 43.1	73 41	30.9	70 21.2	74 39	29.9	69 36.3	76 37	28.0	69 13.4	77 36	27.1	68 50.3	78 35	26.2	68 26.8	79 34	25.3	67 15.0	81 31	22.9	66 50.6	82 30	22.2	7
8	70 18.7	70 42	32.2	69 57.5	71 41	31.1	69 14.0	74 39	29.2	68 51.8	75 37	28.2	68 29.3	76 36	27.3	68 06.5	76 35	26.4	66 56.5	79 32	24.0	66 32.7	80 31	23.2	8
9	69 53.5	68 43	33.4	69 33.0	69 42	32.3	68 50.9	71 40	30.3	68 29.4	72 39	29.3	68 07.5	73 38	28.4	67 45.3	74 37	27.5	66 37.1	77 33	25.0	66 13.9	78 32	24.2	9
20	69 27.5	65 45	34.5	69 07.7	67 43	33.4	68 27.0	69 41	31.4	68 06.1	70 40	30.4	67 44.9	71 39	29.5	67 23.4	72 38	28.6	66 17.1	75 35	26.0	65 54.4	76 34	25.2	20
1	69 00.7	63 46	35.5	68 41.7	64 44	34.5	68 02.4	67 42	32.4	67 42.2	68 41	31.4	67 21.6	69 40	30.5	67 00.7	70 39	29.5	65 56.3	73 36	26.6	65 34.3	74 35	26.1	1
2	68 33.3	60 47	36.5	68 14.9	62 46	35.4	67 37.0	64 43	33.4	67 17.5	66 42	32.4	66 57.6	67 41	31.4	66 37.4	68 40	30.5	65 34.9	71 37	27.8	65 13.4	72 36	27.0	2
3	68 05.3	58 48	37.4	67 47.6	60 47	36.4	67 11.1	62 44	34.3	66 52.2	63 43	33.3	66 33.0	65 42	32.3	66 13.4	66 41	31.4	65 12.8	69 38	28.7	64 52.0	70 37	27.8	3
4	67 36.6	56 49	38.3	67 19.7	57 48	37.2	66 44.5	60 45	35.2	66 26.3	61 44	34.2	66 07.8	62 43	33.2	65 48.9	64 42	32.2	64 50.1	67 39	29.5	64 29.9	68 38	28.7	4
25	67 07.4	53 50	39.1	66 51.2	55 48	38.0	66 17.4	58 46	36.0	65 59.5	59 45	35.0	65 42.0	60 44	34.0	65 23.7	61 43	33.1	64 26.9	65 40	30.3	64 07.3	66 39	29.4	25
6	66 37.8	51 50	39.9	66 22.2	53 49	38.8	65 49.7	55 47	36.8	65 32.9	57 46	35.8	65 15.6	58 45	34.8	64 58.0	59 44	33.8	64 03.1	63 41	31.1	63 44.1	64 39	30.2	6
7	66 07.6	49 51	40.6	65 52.7	50 50	39.6	65 21.5	53 48	37.5	65 05.4	54 47	36.5	64 48.8	56 46	35.5	64 31.8	57 44	34.6	63 38.7	61 41	31.8	63 20.4	62 40	30.9	7
8	65 37.0	47 52	41.3	65 22.8	48 51	40.3	64 52.9	51 48	38.2	64 37.4	52 47	37.2	64 21.5	54 46	36.2	64 05.1	55 45	35.3	63 14.0	59 42	32.5	62 56.2	60 41	31.6	8
9	65 06.0	45 52	41.9	64 52.4	46 51	40.9	64 23.9	49 49	38.9	64 08.9	50 48	37.9	63 53.7	52 47	36.9	63 38.0	53 46	35.9	62 48.7	57 43	33.1	62 31.5	58 42	32.2	9
30	64 34.7	43 53	42.6	64 21.7	44 52	41.5	63 54.4	47 50	39.5	63 40.2	48 49	38.5	63 25.5	50 48	37.5	63 10.4	51 47	36.5	62 23.0	55 44	33.7	62 06.5	56 42	32.9	30
1	64 03.0	40 53	43.1	63 50.6	42 52	42.1	63 24.6	45 50	40.0	63 11.0	46 49	39.1	62 56.9	47 48	38.1	62 42.5	49 47	37.1	61 56.9	52 44	34.3	61 41.0	54 43	33.4	1
2	63 30.9	38 54	43.6	63 19.2	40 53	42.6	62 54.4	43 51	40.6	62 41.4	44 50	39.6	62 28.0	45 49	38.6	62 14.2	47 48	37.7	61 30.4	50 45	34.9	61 15.1	52 44	34.0	2
3	62 58.6	34 55	44.0	62 47.5	38 53	43.1	62 23.9	41 51	41.1	62 11.5	42 50	40.1	61 58.7	43 49	39.2	61 45.5	45 49	38.2	61 03.5	48 45	35.4	60 48.8	50 44	34.5	3
4	62 26.0	34 55	44.6	62 15.5	36 54	43.6	61 53.1	39 52	41.6	61 41.3	40 51	40.6	61 29.1	41 50	39.6	61 16.5	43 49	38.7	60 36.3	46 46	35.9	60 22.2	48 45	35.0	4
35	61 53.2	32 55	45.0	61 43.2	34 54	44.0	61 22.1	37 52	42.0	61 10.8	38 51	41.1	60 59.2	39 50	40.1	60 47.2	41 49	39.2	60 08.8	45 46	36.4	59 55.3	46 45	35.5	35
6	61 20.1	31 55	45.4	61 10.7	32 55	44.4	60 50.7	35 53	42.4	60 40.1	36 52	41.5	60 29.1	37 51	40.5	60 17.6	39 50	39.6	59 41.0	43 47	36.9	59 28.1	44 46	36.0	6
7	60 46.8	29 56	45.7	60 38.0	30 55	44.7	60 19.1	33 53	42.8	60 09.1	34 52	41.9	59 58.6	36 51	40.9	59 47.8	37 50	40.0	59 12.9	41 47	37.3	59 00.5	42 46	36.4	7
8	60 13.4	27 56	46.0	60 05.1	28 55	45.1	59 47.4	31 53	43.2	59 37.7	32 52	42.2	59 27.8	34 51	41.3	59 17.7	35 51	40.4	58 44.5	39 48	37.7	58 32.7	40 47	36.8	8
9	59 39.7	25 56	46.3	59 32.0	26 55	45.4	59 15.3	29 54	43.5	59 06.4	30 53	42.6	58 57.1	32 52	41.6	58 47.4	33 51	40.7	58 15.9	37 48	38.0	58 04.7	38 47	37.2	9
40	59 05.9	23 57	46.6	58 58.7	25 56	45.7	58 43.2	27 54	43.8	58 34.8	29 53	42.9	58 26.0	30 52	42.0	58 16.8	31 51	41.1	57 47.1	35 48	38.4	57 36.4	36 48	37.5	40
1	58 31.9	21 57	46.9	58 25.3	23 56	45.9	58 10.8	25 54	44.1	58 03.0	27 53	43.2	57 54.7	28 52	42.3	57 46.1	29 52	41.4	57 18.0	33 49	38.7	57 07.9	34 48	37.8	1
2	57 57.8	20 57	47.1	57 51.7	21 56	46.2	57 38.3	24 54	44.4	57 31.0	25 54	43.4	57 23.3	26 53	42.5	57 15.2	28 52	41.7	56 48.8	31 49	39.0	56 39.2	32 48	38.2	2
3	57 23.6	18 57	47.3	57 18.0	19 56	46.4	57 05.6	22 55	44.6	56 58.8	23 54	43.7	56 51.7	24 53	42.8	56 44.1	26 52	41.9	56 19.3	29 49	39.3	56 10.3	31 48	38.4	3
4	56 49.3	16 57	47.5	56 44.2	18 57	46.6	56 32.8	20 55	44.8	56 26.6	21 54	43.9	56 19.9	23 53	43.0	56 12.9	24 52	42.2	55 49.7	28 50	39.6	55 41.2	29 49	38.7	4
45	56 14.9	15 58	47.7	56 10.3	16 57	46.8	55 59.9	19 55	45.0	55 54.1	20 54	44.1	55 48.0	21 53	43.2	55 41.5	22 52	42.4	55 19.9	26 50	39.8	55 12.0	27 49	39.0	45
6	55 40.4	13 58	47.8	55 36.3	14 57	46.9	55 26.9	17 55	45.2	55 21.6	18 54	44.3	55 16.0	19 54	43.4	55 10.0	21 53	42.6	54 50.0	24 50	40.0	54 42.6	25 49	39.2	6
7	55 05.8	12 58	47.9	55 02.2	13 57	47.0	54 53.8	15 55	45.3	54 48.9	16 55	44.5	54 43.8	17 53	43.6	54 38.4	19 53	42.9	54 19.9	22 50	40.2	54 13.0	23 49	39.4	7
8	54 31.2	10 58	48.0	54 28.0	11 57	47.1	54 20.6	14 55	45.5	54 16.3	15 55	44.6	54 11.7	16 54	43.8	54 06.7	17 53	42.9	53 49.7	21 50	40.4	53 43.4	22 50	39.6	8
9	53 56.5	08 58	48.1	53 53.8	10 57	47.3	53 47.3	12 56	45.7	53 43.5	13 55	44.8	53 39.4	14 54	44.0	53 34.9	15 53	43.1	53 19.4	19 51	40.6	53 13.6	20 50	39.8	9
50	53 21.7	07 58	48.2	53 19.5	08 57	47.4	53 13.9	10 56	45.7	53 10.6	12 55	44.9	53 07.0	13 54	44.0	53 03.0	14 53	43.2	52 49.1	17 51	40.8	52 43.7	18 50	39.9	50
1	52 47.0	05 58	48.3	52 45.2	07 57	47.5	52 40.5	09 56	45.8	52 37.7	10 55	45.0	52 34.4	11 54	44.1	52 31.1	12 53	43.4	52 18.6	16 51	41.0	52 13.7	17 50	40.1	1
2	52 12.2	04 58	48.3	52 10.8	05 57	47.5	52 07.1	07 56	45.9	52 04.7	08 55	45.0	52 02.1	10 54	44.2	51 59.0	11 53	43.4	51 48.0	14 51	41.0	51 43.7	15 50	40.2	2
3	51 37.3	02 58	48.3	51 36.4	04 57	47.5	51 33.6	06 56	45.9	51 31.7	07 55	45.1	51 29.5	08 54	44.3	51 27.0	09 54	43.5	51 17.4	12 51	41.1	51 13.5	13 50	40.3	3
4	51 02.5	01 58	48.3	51 02.0	02 57	47.6	51 00.1	04 56	46.0	50 58.7	05 55	45.2	50 56.9	06 54	44.4	50 54.8	07 54	43.6	50 46.7	11 51	41.2	50 43.3	12 50	40.4	4
55	50 27.6	00 58	48.4	50 27.6	01 57	47.6	50 26.6	03 56	46.0	50 25.6	04 55	45.2	50 24.3	05 54	44.4	50 22.7	06 54	43.6	50 15.9	09 51	41.3	50 13.0	10 51	40.5	55
6	49 52.8	02 58	48.3	49 53.2	01 57	47.6	49 53.0	01 56	46.0	49 52.6	02 55	45.3	49 51.6	02 55	44.5	49 50.5	04 54	43.7	49 45.1	07 51	41.4	49 42.7	09 51	40.6	6
7	49 18.0	03 58	48.3	49 18.8	02 57	47.6	49 19.5	00 56	46.0	49 19.4	01 55	45.3	49 19.0	02 54	44.5	49 18.3	03 54	43.7	49 14.3	05 51	41.4	49 12.4	07 51	40.7	7
8	48 43.2	05 58	48.3	48 44.4	04 57	47.5	48 45.9	02 56	46.0	48 46.3	01 55	45.3	48 46.3	00 55	44.5	48 46.0	01 54	43.7	48 43.4	04 51	41.5	48 42.0	05 51	40.7	8
9	48 08.4	06 58	48.2	48 10.0	05 57	47.5	48 12.4	03 56	46.0	48 13.2	02 55	45.2	48 13.6	01 54	44.5	48 13.8	00 54	43.7	48 12.5	03 52	41.5	48 11.5	04 51	40.7	9
60	47 33.6	07 58	48.2	47 35.6	06 57	47.4	47 38.9	04 56	46.0	47 40.0	03 55	45.2	47 40.9	04 54	44.5	47 41.6	03 54	43.7	47 41.1	02 51	41.5	47 41.1	02 51	40.8	60
1	46 58.9	09 58	48.1	47 01.3	08 57	47.4	47 05.4	06 56	45.9	47 07.0	05 55	45.2	47 08.3	04 54	44.4	47 09.3	03 54	43.7	47 10.7	00 52	41.5	47 10.7	01 51	40.8	1
2	46 24.2	10 58	48.0	46 27.0	09 57	47.3	46 31.9	07 56	45.9	46 33.9	06 55	45.1	46 35.6	05 54	44.4	46 37.1	04 54	43.7	46 39.8	02 52	41.5	46 40.2	01 51	40.8	2
3	45 49.5	11 58	47.9	45 52.8	10 57	47.2	45 58.4	09 56	45.8	46 00.9	08 55	45.1	46 03.0	07 54	44.3	46 04.9	06 54	43.6	46 09.0	03 51	41.5	46 09.8	02 51	40.8	3
4	45 14.9	13 58	47.8	45 18.6	12 57	47.1	45 25.0	10 56	45.7	45 28.0	09 56	45.0	45 30.4	08 54	44.2	45 32.7	07 54	43.6	45 38.1	04 51	41.5	45 39.3	04 51	40.7	4
65	44 40.4	14 57	47.7	44 44.4	13 57	47.0	44 51.7	11 56	45.6	44 54.9	10 55	44.9	44 57.9	10 54	44.2	45 00.6	09 54	43.5	45 07.2	06 51	41.4	45 08.9	05 51	40.7	65
6	44 05.9	15 57	47.6	44 10.3	14 57	46.9	44 18.3	13 55	45.5	44 22.0	12 55	44.9	44 25.4	11 54	44.2	44 28.5	10 53	43.5	44 36.4	07 51	41.4	44 38.5	07 51	40.7	6
7	43 31.5	16 57	47.5	43 36.3	15 57	46.8	43 45.1	14 55	45.4	43 49.1	13 55	44.8	43 52.9	12 54	44.1	43 56.5	11 53	43.4	44 05.6	09 51	41.3	44 08.1	08 51	40.6	7
8	42 57.2	17 57	47.4	43 02.3	17 56	46.8	43 11.9	15 55	45.3	43 16.3	14 55	44.7	43 20.5	14 54	44.0	43 24.5	13 53	43.4	43 34.8	10 51	41.2	43 37.8	09 51	40.6	8
9	42 22.9	19 57	47.2	42 28.4	18 56	46.6	42 38.8	16 55	45.2	42 43.6	16 54	44.5	42 48.2	15 54	43.9	42 52.5	14 53	43.2	43 04.1	11 51	41.2	43 07.5	11 50	40.5	9
70	41 48.7	20 57	47.1	41 54.6	19 56	46.4	42 05.7	18 55	45.1	42 10.9	17 54	44.4	42 15.9	16 54	43.8	42 20.6	15 53	43.1	42 33.4	13 51	41.1	42 37.3	12 50	40.4	70
1	41 14.6	21 57	46.9	41 20.9	20 56	46.3	41 32.7	19 55	44.9	41 38.3	18 54	44.3	41 43.7	17 53	43.6	41 48.8	17 53	43.0	42 02.8	14 51	41.0	42 07.1	14 50	40.3	1
2	40 40.6	22 57	46.7	40 47.2	22 56	46.1	40 59.8	20 55	44.8	41 05.8	20 54	44.2	41 11.5	19 53	43.5	41 17.1	18 53	42.8	41 32.3	16 51	40.9	41 36.9	15 50	40.2	2
3	40 06.7	24 56	46.6	40 13.7	23 56	46.0	40 27.0	21 55	44.6	40 33.4	21 54	44.0	40 39.5	20 53	43.4	40 45.4	19 53	42.7	41 01.8	17 51	40.8	41 06.8	16 50	40.1	3
4	39 32.9	25 56	46.4	39 40.2	24 56	45.7	39 54.3	23 54	44.4	40 01.0	22 54	43.8	40 07.5	21 53	43.2	40 13.8	21 52	42.6	40 31.4	18 51	40.6	40 36.8	18 50	40.0	4
75	38 59.2	26 56	46.2	39 06.9	25 55	45.6	39 21.7	24 54	44.3	39 28.8	23 54	43.7	39 35.6	23 53	43.1	39 42.3	22 52	42.4	40 01.1	20 50	40.5	40 06.9	19 50	39.9	75
6	38 25.6	27 56	46.0	38 33.7	26 55	45.4	38 49.1	25 54	44.1	38 56.6	25 53	43.5	39 03.8	24 53	42.9	39 10.9	23 52	42.3	39 30.8	21 50	40.4	39 37.1	20 50	39.7	6
7	37 52.1	28 55	45.8	38 00.5	28 55	45.2	38 16.7	26 54	44.0	38 24.5	26 53	43.3	38 32.2	25 52	42.7	38 39.6	24 52	42.1	39 00.7	22 50	40.2	39 07.3	22 49	39.6	7
8	37 18.8	29 55	45.6	37 27.5	29 55	45.0	37 44.4	28 54	43.8	37 52.6	27 53	43.2	38 00.8	26 52	42.6	38 08.4	26 52	41.9	38 30.6	24 50	40.1	38 37.6	23 49	39.5	8
9	36 45.5	31 55	45.4	36 54.6	30 55	44.8	37 12.2	29 53	43.6	37 20.8	28 53	43.0	37 29.1	28 52	42.4	37 37.3	27 52	41.8	38 00.6	25 50	39.9	38 08.0	24 49	39.3	9
80	36 12.4	32 55	45.1	36 21.8	31 54	44.5	36 40.1	30 53	43.4	36 49.0	29 53	42.8	36 57.7	29 52	42.2	37 06.3	28 51	41.6	37 30.8	26 50	39.8	37 38.6	26 49	39.1	80
1	35 39.4	33 55	44.9	35 49.2	32 54	44.3	36 08.2	31 53	43.1	36 17.4	31 52	42.6	36 26.5	30 52	42.0	36 35.4	29 51	41.4	37 01.0	28 49	39.6	37 09.2	27 49	39.0	1
2	35 06.1	34 55	44.7	35 16.5	33 54	44.1	35 36.4	32 53	42.9	35 45.8	31 52	42.3	35 55.4	31 51	41.8	36 04.6	31 51	41.2	36 31.3	29 49	39.4	36 39.9	28 49	38.8	2
3	34 33.9	35 54	44.4	34 44.3	34 54	43.9	35 04.7	33 53	42.7	35 14.6	33 52	42.1	35 24.4	32 51	41.5	35 34.0	32 51	41.0	36 01.8	30 49	39.2	36 10.7	30 48	38.6	3
4	34 01.3	36 54	44.2	34 12.1	36 53	43.6	34 33.1	35 52	42.5	34 43.4	34 52	41.9	34 53.5	33 51	41.3	35 03.5	33 51	40.8	35 32.4	31 49	39.0	35 41.7	31 48	38.4	4
85	33 28.9	37 54	43.9	33 40.0	37 53	43.4	34 01.7	36 52	42.2	34 12.3	35 52	41.7	34 22.8	35 51	41.1	34 33.1	34 50	40.5	35 03.1	33 49	38.8	35 12.8	32 48	38.2	85
6	32 56.4	38 54	43.7	33 08.1	38 53	43.1	33 30.4	37 52	42.0	33 41.4	37 51	41.4	33 52.2	36 50	40.9	34 02.9	36 50	40.3	34 34.0	34 48	38.6	34 44.0	34 48	38.0	6
7	32 24.5	39 53	43.4	32 36.3	39 53	42.8	32 59.3	38 52	41.7	33 10.6	37 51	41.2	33 21.8	37 50	40.6	33 32.8	36 50	40.1	34 04.9	35 48	38.4	34 15.3	34 48	37.8	7
8	31 52.6	40 53	43.1	32 04.6	40 52	42.6	32 28.4	39 51	41.5	32 40.0	39 51	40.9	32 51.5	38 50	40.4	33 02.9	38 50	39.8	33 36.0	36 48	38.2	33 46.8	36 47	37.6	8
9	31 20.8	41 53	42.8	31 33.2	41 52	42.3	31 57.5	40 51	41.2	32 09.5	40 51	40.7	32 21.4	39 50	40.1	32 33.1	39 49	39.6	33 07.3	37 48	37.9	33 18.4	37 47	37.4	9
90	30 49.2	43 52	42.5	31 01.9	42 52	42.0	31 26.9	41 51	41.0	31 39.2	41 50	40.4	31 51.4	40 50	39.9	32 03.4	40 49	39.3	32 38.7	38 47	37.7	32 49.6	38 47	37.2	90

Lat. 39°

H.A.	54°30′ Alt	Δd Δt	Az	55°00′ Alt	Δd Δt	Az	56°00′ Alt	Δd Δt	Az	56°30′ Alt	Δd Δt	Az	57°00′ Alt	Δd Δt	Az	57°30′ Alt	Δd Δt	Az	59°00′ Alt	Δd Δt	Az	59°30′ Alt	Δd Δt	Az	H.A.
91	30 17.7	44 52	42.3	30 30.8	43 52	41.7	30 56.4	42 50	40.7	31 09.1	42 50	40.2	31 21.6	41 49	39.6	31 33.9	41 49	39.1	32 10.3	40 47	37.5	32 22.1	39 47	36.9	91
2	29 46.5	45 52	42.0	29 59.8	44 51	41.4	30 26.1	43 50	40.4	30 39.1	43 50	39.9	30 51.9	43 49	39.4	31 04.6	42 49	38.8	31 42.0	41 47	37.2	31 54.1	40 46	36.7	2
3	29 15.4	46 52	41.7	29 29.0	45 51	41.1	29 56.0	44 50	40.1	30 09.3	44 49	39.6	30 22.4	44 49	39.1	30 35.5	43 48	38.6	31 13.8	42 47	37.0	31 26.4	42 46	36.4	3
4	28 44.5	47 51	41.4	28 58.4	46 51	40.8	29 26.0	46 50	39.8	29 39.6	45 49	39.3	29 53.1	45 49	38.8	30 06.5	44 48	38.3	30 45.9	43 46	36.7	30 58.8	43 46	36.2	4
95	28 13.8	48 51	41.0	28 28.0	47 50	40.5	28 56.2	47 49	39.5	29 10.2	46 49	39.0	29 24.0	46 48	38.5	29 37.7	45 48	38.0	30 18.1	44 46	36.5	30 31.3	44 45	35.9	95
6	27 43.3	49 51	40.7	27 57.8	48 50	40.2	28 26.7	48 49	39.2	28 40.9	47 48	38.7	28 55.0	47 48	38.2	29 09.1	47 47	37.7	29 50.5	45 46	36.2	30 04.0	45 45	35.7	6
7	27 12.9	50 50	40.4	27 27.8	49 50	39.9	27 57.3	49 49	38.9	28 11.8	48 48	38.4	28 26.3	48 48	37.9	28 40.6	48 47	37.4	29 23.0	47 45	35.9	29 36.9	46 45	35.4	7
8	26 42.8	51 50	40.1	26 58.0	50 49	39.6	27 28.1	50 48	38.6	27 42.9	49 48	38.1	27 57.7	49 47	37.6	28 11.8	49 47	37.1	28 55.7	48 45	35.6	29 10.0	47 45	35.1	8
9	26 12.9	52 50	39.7	26 28.4	51 49	39.3	26 59.1	51 48	38.3	27 14.3	50 47	37.8	27 29.3	50 47	37.3	27 44.3	50 46	36.8	28 28.7	49 45	35.4	28 43.2	48 44	34.9	9
100	25 43.2	53 49	39.4	25 59.0	52 49	38.9	26 30.3	52 48	38.0	26 45.8	52 47	37.5	27 01.2	51 47	37.0	27 16.5	51 46	36.5	28 01.8	50 44	35.1	28 16.7	49 44	34.6	100
1	25 13.7	54 49	39.1	25 29.8	53 48	38.6	26 01.7	53 47	37.7	26 17.5	53 47	37.2	26 33.2	52 46	36.7	26 48.8	52 46	36.2	27 35.1	51 44	34.8	27 50.3	51 44	34.3	1
2	24 44.4	55 48	38.7	25 00.8	54 48	38.3	25 33.3	54 47	37.3	25 49.4	54 46	36.9	26 05.4	53 46	36.4	26 21.4	53 45	35.9	27 08.6	52 44	34.5	27 24.1	52 43	34.0	2
3	24 15.4	56 48	38.4	24 32.1	55 48	37.9	25 05.1	55 47	37.0	25 21.6	55 46	36.5	25 37.9	54 46	36.1	25 54.1	54 45	35.6	26 42.3	53 43	34.2	26 58.2	53 43	33.7	3
4	23 46.6	57 48	38.0	24 03.5	56 47	37.6	24 37.2	56 46	36.6	24 53.9	56 46	36.2	25 10.5	55 45	35.7	25 27.1	55 45	35.3	26 16.2	54 43	33.9	26 32.4	54 43	33.4	4
105	23 18.0	58 47	37.6	23 35.2	57 47	37.2	24 09.5	57 46	36.3	24 26.5	57 45	35.8	24 43.4	56 45	35.4	25 00.3	56 44	34.9	25 50.3	55 43	33.6	26 06.8	55 42	33.1	105
6	22 49.6	59 47	37.3	23 07.1	58 46	36.8	23 42.0	58 45	35.9	23 59.3	58 45	35.5	24 16.5	57 44	35.1	24 33.7	57 44	34.6	25 24.7	56 42	33.2	25 41.5	56 42	32.8	6
7	22 21.5	60 46	36.9	22 39.3	59 46	36.5	23 14.7	59 45	35.6	23 32.3	59 45	35.2	23 49.9	58 44	34.7	24 07.3	58 44	34.3	24 59.2	57 42	32.9	25 16.3	57 42	32.5	7
8	21 53.6	61 46	36.5	22 11.7	60 46	36.1	22 47.7	60 45	35.2	23 05.6	60 44	34.8	23 23.4	59 44	34.4	23 41.2	59 43	33.9	24 34.0	58 42	32.6	24 51.4	58 41	32.1	8
9	21 26.0	61 46	36.1	21 44.4	61 45	35.7	22 20.9	61 44	34.9	22 39.1	60 44	34.4	22 57.2	60 43	34.0	23 15.3	60 43	33.6	24 09.0	59 41	32.3	24 26.7	59 41	31.8	9
110	20 58.6	62 45	35.8	21 17.3	62 45	35.3	21 54.4	62 44	34.5	22 12.9	61 43	34.1	22 31.3	61 43	33.6	22 49.6	61 42	33.2	23 44.2	60 41	31.9	24 02.3	60 40	31.5	110
1	20 31.5	63 45	35.4	20 50.4	63 44	35.0	21 28.1	63 43	34.1	21 46.9	62 43	33.7	22 05.6	62 42	33.3	22 24.2	62 42	32.9	23 19.7	61 40	31.6	23 38.0	61 40	31.1	1
2	20 04.6	64 44	35.0	20 23.8	64 44	34.6	21 02.1	64 43	33.7	21 21.1	63 42	33.3	21 40.1	63 42	32.9	21 59.0	63 42	32.5	22 55.4	62 40	31.2	23 14.0	62 40	30.8	2
3	19 38.0	65 44	34.6	19 57.5	65 43	34.2	20 36.3	64 42	33.4	20 55.6	64 42	33.0	21 14.9	64 42	32.5	21 34.1	64 41	32.1	22 31.3	63 40	30.9	22 50.3	63 39	30.5	3
4	19 11.7	66 43	34.2	19 31.5	66 43	33.8	20 10.8	65 42	33.0	20 30.4	65 42	32.6	20 49.9	65 41	32.2	21 09.4	65 41	31.8	22 07.5	64 39	30.5	22 26.8	64 39	30.1	4
115	18 45.6	67 43	33.8	19 05.7	67 43	33.4	19 45.6	66 42	32.6	20 05.4	66 41	32.2	20 25.3	66 41	31.8	20 45.0	66 40	31.4	21 44.0	65 39	30.2	22 03.5	65 38	29.8	115
6	18 19.9	68 42	33.4	18 40.2	68 42	33.0	19 20.6	67 41	32.2	19 40.7	67 41	31.8	20 00.8	67 40	31.4	20 20.9	67 40	31.0	21 20.7	66 38	29.8	21 40.5	66 38	29.4	6
7	17 54.4	69 42	32.9	18 14.9	68 42	32.6	18 55.9	68 41	31.8	19 16.3	68 40	31.4	19 36.7	68 40	31.0	19 57.0	68 39	30.6	20 57.6	67 38	29.4	21 17.7	67 38	29.0	7
8	17 29.2	70 42	32.5	17 50.0	69 41	32.1	18 31.5	69 40	31.4	18 52.2	69 40	31.0	19 12.8	69 39	30.6	19 33.4	69 39	30.2	20 34.8	68 38	29.1	20 55.2	68 37	28.7	8
9	17 04.2	70 41	32.1	17 25.3	70 41	31.7	18 07.3	70 40	31.0	18 28.3	70 39	30.6	18 49.2	70 39	30.2	19 10.0	69 38	29.8	20 12.3	69 37	28.7	20 33.0	69 37	28.3	9
120	16 39.6	71 41	31.7	17 00.9	71 40	31.3	17 43.5	71 39	30.6	18 04.7	71 39	30.2	18 25.9	70 38	29.8	18 47.0	70 38	29.4	19 50.1	70 37	28.3	20 11.0	70 36	27.9	120
1	16 15.3	72 40	31.2	16 36.9	72 40	30.9	17 19.9	72 39	30.1	17 41.4	71 38	29.8	18 02.8	71 38	29.4	18 24.2	71 37	29.0	19 28.1	71 36	27.9	19 49.3	71 36	27.5	1
2	15 51.3	73 40	30.8	16 13.1	73 39	30.4	16 56.7	72 38	29.7	17 18.4	72 38	29.4	17 40.1	72 37	29.0	18 01.7	72 37	28.6	19 06.4	72 36	27.5	19 27.9	72 35	27.2	2
3	15 27.5	74 39	30.4	15 49.6	74 39	30.0	16 33.7	73 38	29.3	16 55.7	73 37	28.9	17 17.6	73 37	28.6	17 39.5	73 36	28.2	18 45.0	73 35	27.1	19 06.7	72 35	26.8	3
4	15 04.1	74 38	29.9	15 26.5	74 38	29.6	16 11.0	74 37	28.9	16 33.3	74 37	28.5	16 55.5	74 36	28.2	17 17.6	74 36	27.8	18 23.9	73 35	26.7	18 45.9	73 34	26.4	4
125	14 41.0	75 38	29.5	15 03.6	75 38	29.1	15 48.7	75 37	28.4	16 11.2	75 36	28.1	16 33.6	75 36	27.7	16 56.0	75 36	27.4	18 03.0	74 34	26.3	18 25.3	74 34	26.0	125
6	14 18.3	76 37	29.0	14 41.1	76 37	28.7	15 26.6	76 36	28.0	15 49.4	76 36	27.7	16 12.0	76 35	27.3	16 34.7	75 35	27.0	17 42.5	75 34	25.9	18 05.0	75 33	25.6	6
7	13 55.8	77 37	28.5	14 18.9	77 36	28.2	15 04.9	77 36	27.6	15 27.9	77 35	27.2	15 50.8	76 35	26.9	16 13.7	76 34	26.5	17 22.2	76 33	25.5	17 45.0	76 33	25.2	7
8	13 33.7	78 36	28.1	13 57.0	78 36	27.8	14 43.5	77 35	27.1	15 06.7	77 35	26.8	15 29.9	77 34	26.4	15 53.0	77 34	26.1	17 02.3	77 33	25.1	17 25.3	77 32	24.8	8
9	13 11.9	78 36	27.6	13 35.5	78 35	27.3	14 22.4	78 35	26.7	14 45.9	78 34	26.3	15 09.3	78 34	26.0	15 32.7	78 33	25.7	16 42.6	78 32	24.7	17 05.9	78 32	24.4	9
130	12 50.5	79 35	27.1	13 14.2	79 35	26.8	14 01.7	79 34	26.2	14 25.3	79 34	25.9	14 49.0	79 33	25.6	15 12.6	79 33	25.2	16 23.3	78 32	24.3	16 46.8	78 31	24.0	130
1	12 29.4	80 35	26.7	12 53.4	80 34	26.4	13 41.2	80 33	25.7	14 05.1	80 33	25.4	14 29.0	80 33	25.1	14 52.9	79 32	24.8	16 04.3	79 31	23.9	16 28.0	79 31	23.5	1
2	12 08.6	81 34	26.2	12 32.8	81 34	25.9	13 21.2	80 33	25.3	13 45.3	80 33	25.0	14 09.4	80 32	24.7	14 33.5	80 32	24.4	15 45.6	80 31	23.4	16 09.6	80 30	23.1	2
3	11 48.2	81 33	25.7	12 12.6	81 33	25.4	13 01.4	81 32	24.8	13 25.8	81 32	24.5	13 50.1	81 32	24.2	14 14.4	81 31	23.9	15 27.2	81 30	23.0	15 51.4	81 30	22.7	3
4	11 28.2	82 33	25.2	11 52.8	82 32	24.9	12 42.0	82 32	24.4	13 06.6	82 31	24.1	13 31.1	82 31	23.8	13 55.7	82 31	23.5	15 09.2	82 30	22.6	15 33.6	81 29	22.3	4
135	11 08.5	83 32	24.7	11 33.3	83 32	24.5	12 23.0	83 31	23.9	12 47.8	83 31	23.6	13 12.5	83 30	23.3	13 37.3	82 30	23.0	14 51.4	82 29	22.1	15 16.1	82 29	21.8	135
6	10 49.1	84 32	24.2	11 14.2	83 31	24.0	12 04.3	83 31	23.4	12 29.3	83 30	23.1	12 54.3	83 30	22.8	13 19.2	83 30	22.6	14 34.0	83 28	21.7	14 58.9	83 28	21.4	6
7	10 30.2	84 31	23.8	10 55.4	84 31	23.5	11 45.9	84 30	22.9	12 11.1	84 30	22.6	12 36.3	84 29	22.4	13 01.5	84 29	22.1	14 16.9	84 28	21.3	14 42.0	84 28	21.0	7
8	10 11.6	85 31	23.3	10 37.0	85 30	23.0	11 27.9	85 29	22.4	11 53.4	85 29	22.0	12 18.8	85 29	21.7	12 44.1	85 28	21.4	14 00.2	84 27	20.5	14 25.5	84 27	20.1	8
9	9 53.4	86 30	22.8	10 19.0	86 29	22.5	11 10.3	85 29	22.0	11 35.9	85 28	21.7	12 01.5	85 28	21.4	12 27.1	85 28	21.2	13 43.8	85 27	20.4	14 09.2	85 26	20.1	9
140	9 35.5	86 29	22.2	10 01.4	86 29	22.0	10 53.1	86 28	21.5	11 18.9	86 28	21.2	11 44.7	86 27	21.0	12 10.5	86 27	20.7	13 27.8	86 26	19.9	13 53.5	86 26	19.6	140
1	9 18.1	87 28	21.7	9 44.1	87 28	21.5	10 36.2	87 28	21.0	11 02.2	87 27	20.7	11 28.2	87 27	20.5	11 54.2	87 27	20.2	13 12.1	86 26	19.4	13 38.0	86 25	19.2	1
2	9 01.0	87 28	21.2	9 27.2	87 27	21.0	10 19.7	87 27	20.5	10 45.9	87 27	20.2	11 12.1	87 26	20.0	11 38.3	87 26	19.7	12 56.7	87 25	19.0	13 22.9	87 25	18.7	2
3	8 44.3	88 27	20.7	9 10.7	88 27	20.5	10 03.5	88 26	20.0	10 29.9	88 26	19.8	10 56.3	88 26	19.5	11 22.7	88 25	19.3	12 41.7	88 24	18.6	13 08.1	88 24	18.3	3
4	8 28.0	89 26	20.2	8 54.6	89 26	20.0	9 47.8	89 26	19.5	10 14.4	89 25	19.2	10 40.9	89 25	19.0	11 07.5	89 25	18.8	12 27.1	88 24	18.1	12 53.6	88 23	17.8	4
145	8 12.1	89 26	19.7	8 38.9	89 26	19.4	9 32.4	89 25	19.0	9 59.2	89 25	18.8	10 25.9	89 24	18.5	10 52.7	89 24	18.3	12 12.8	89 23	17.6	12 39.5	89 23	17.4	145
6	7 56.6	90 25	19.1	8 23.6	90 25	18.9	9 17.5	90 24	18.5	9 44.4	90 24	18.2	10 11.3	90 24	18.0	10 38.2	90 23	17.8	11 58.9	90 22	17.1	12 25.8	90 22	16.9	6
7	7 41.5	90 24	18.6	8 08.7	90 24	18.4	9 02.9	90 24	18.0	9 30.0	90 23	17.7	9 57.1	90 23	17.5	10 24.2	90 23	17.3	11 45.4	90 22	16.6	12 12.4	90 22	16.4	7
8	7 26.9	91 24	18.1	7 54.4	91 24	17.9	8 48.7	91 23	17.4	9 16.0	91 23	17.2	9 43.2	91 22	17.0	10 10.5	91 22	16.8	11 32.2	91 21	16.2	11 59.4	91 21	16.0	8
9	7 12.6	92 23	17.5	7 40.1	91 23	17.3	8 34.9	91 22	16.9	9 02.4	91 22	16.7	9 29.8	91 22	16.5	9 57.2	91 22	16.3	11 19.4	91 20	15.7	11 46.8	91 20	15.5	9
150	6 58.8	92 22	17.0	7 26.4	92 22	16.8	8 21.5	92 22	16.4	8 49.1	92 21	16.2	9 16.7	92 21	16.0	9 44.3	92 21	15.8	11 07.0	92 20	15.2	11 34.5	92 20	15.0	150
1	6 45.3	93 22	16.5	7 13.1	93 21	16.3	8 08.6	92 21	15.9	8 36.3	92 21	15.7	9 04.0	92 20	15.5	9 31.8	92 20	15.3	10 54.9	92 19	14.7	11 22.6	92 19	14.5	1
2	6 32.3	93 21	15.9	7 00.2	93 21	15.7	7 56.0	93 20	15.4	8 23.9	93 20	15.2	8 51.8	93 20	15.0	9 19.7	93 20	14.8	10 43.3	93 19	14.2	11 11.1	93 19	14.1	2
3	6 19.7	93 20	15.4	6 47.8	93 20	15.2	7 43.9	93 19	14.8	8 11.9	93 19	14.7	8 39.9	93 19	14.5	9 07.9	93 19	14.3	10 32.0	93 18	13.8	11 00.0	93 18	13.6	3
4	6 07.6	94 20	14.8	6 35.8	94 19	14.7	7 32.1	94 19	14.3	8 00.3	94 19	14.1	8 28.4	94 18	14.0	8 56.6	94 18	13.8	10 21.1	94 18	13.3	10 49.2	94 17	13.1	4
155	5 55.9	94 19	14.3	6 24.2	94 19	14.1	7 20.8	94 18	13.8	7 49.1	94 18	13.6	8 17.4	94 18	13.5	8 45.7	94 18	13.3	10 10.6	94 17	12.8	10 38.8	94 17	12.6	155
6	5 44.6	95 18	13.7	6 13.0	95 18	13.6	7 09.9	95 17	13.3	7 38.3	95 17	13.1	8 06.8	95 17	12.9	8 35.2	95 17	12.8	10 00.5	95 16	12.3	10 28.9	95 16	12.1	6
7	5 33.7	95 17	13.2	6 02.3	95 17	13.0	6 59.4	95 17	12.7	7 28.0	95 17	12.6	7 56.5	95 16	12.4	8 25.1	95 16	12.3	9 50.7	95 16	11.8	10 19.3	95 15	11.6	7
8	5 23.3	96 17	12.6	5 52.0	96 16	12.5	6 49.4	96 16	12.2	7 18.1	96 16	12.0	7 46.7	96 16	11.9	8 15.4	96 15	11.7	9 41.4	96 15	11.3	10 10.1	96 15	11.1	8
9	5 13.3	96 16	12.1	5 42.2	96 16	11.9	6 39.7	96 15	11.6	7 08.5	96 15	11.5	7 37.3	96 15	11.4	8 06.1	96 15	11.2	9 32.5	96 14	10.8	10 01.3	96 14	10.6	9
160	5 03.8	96 15	11.5	5 32.7	96 15	11.4	6 30.6	96 15	11.1	6 59.5	96 14	11.0	7 28.4	96 14	10.8	7 57.3	96 14	10.7	9 23.9	96 14	10.3	9 52.8	96 13	10.1	160
1				5 23.8	97 14	10.8	6 21.8	97 14	10.6	6 50.8	97 14	10.4	7 19.8	97 14	10.3	7 48.8	97 13	10.2	9 15.8	97 13	09.8	9 44.8	97 13	09.7	1
2				5 15.2	97 13	10.3	6 13.5	97 13	10.0	6 42.6	97 13	09.9	7 11.7	97 13	09.8	7 40.8	97 13	09.6	9 08.1	97 12	09.3	9 37.2	97 12	09.2	2
3				5 07.2	97 13	09.7	6 05.6	97 12	09.5	6 34.8	97 12	09.3	7 04.0	97 12	09.2	7 33.2	97 12	09.1	9 00.8	97 11	08.7	9 30.0	97 11	08.7	3
4							5 58.1	98 12	08.9	6 27.4	98 12	08.8	6 56.7	98 11	08.7	7 26.0	98 11	08.6	8 53.9	98 11	08.3	9 23.2	98 11	08.2	4
165							5 51.1	98 11	08.4	6 20.5	98 11	08.3	6 49.9	98 11	08.2	7 19.3	98 11	08.1	8 47.4	98 10	07.8	9 16.8	98 10	07.6	165
6							5 44.6	98 10	07.8	6 14.0	98 10	07.7	6 43.5	98 10	07.6	7 12.9	98 10	07.5	8 41.3	98 09	07.2	9 10.8	98 09	07.1	6
7							5 38.5	98 09	07.3	6 08.0	98 09	07.2	6 37.5	98 09	07.1	7 07.1	98 09	07.0	8 35.6	98 09	06.7	9 05.2	98 09	06.6	7
8							5 32.8	99 09	06.7	6 02.4	99 09	06.6	6 32.0	99 08	06.5	7 01.6	99 08	06.5	8 30.4	99 08	06.2	9 00.0	99 08	06.1	8
9							5 27.6	99 08	06.2	5 57.2	99 08	06.1	6 26.9	99 08	06.0	6 56.6	99 08	05.9	8 25.5	99 07	05.7	8 55.2	99 07	05.6	9
170							5 22.9	99 07	05.6	5 52.5	99 07	05.5	6 22.2	99 07	05.5	6 52.0	99 07	05.4	8 21.1	99 07	05.2	8 50.8	99 07	05.1	170
1							5 18.5	99 06	05.0	5 48.2	99 06	05.0	6 18.0	99 06	04.9	6 47.8	99 06	04.9	8 17.1	99 06	04.6	8 46.9	99 06	04.6	1
2							5 14.6	99 06	04.5	5 44.4	99 06	04.4	6 14.2	99 06	04.4	6 44.1	99 06	04.3	8 13.5	99 05	04.2	8 43.3	99 05	04.1	2
3							5 11.2	1.00 05	03.9	5 41.0	1.00 05	03.9	6 10.9	1.00 05	03.8	6 40.8	1.00 05	03.8	8 10.4	1.00 05	03.6	8 40.2	1.00 04	03.6	3
4							5 08.2	1.00 04	03.4	5 38.1	1.00 04	03.3	6 08.0	1.00 04	03.3	6 37.9	1.00 04	03.2	8 07.6	1.00 04	03.1	8 37.5	1.00 04	03.1	4
175							5 05.7	1.00 03	02.8	5 35.6	1.00 03	02.8	6 05.5	1.00 03	02.7	6 35.5	1.00 03	02.7	8 05.3	1.00 03	02.6	8 35.2	1.00 03	02.6	175
6							5 03.7	1.00 02	02.2	5 33.6	1.00 02	02.2	6 03.6	1.00 02	02.2	6 33.5	1.00 02	02.1	8 03.4	1.00 02	02.1	8 33.3	1.00 02	02.1	6
7							5 02.1	1.00 02	01.7	5 32.0	1.00 02	01.7	6 02.0	1.00 02	01.6	6 32.0	1.00 02	01.6	8 01.9	1.00 02	01.6	8 31.9	1.00 02	01.5	7
8							5 00.9	1.00 01	01.1	5 30.9	1.00 01	01.1	6 00.9	1.00 01	01.1	6 30.9	1.00 01	01.1	8 00.8	1.00 01	01.0	8 30.8	1.00 01	01.0	8
9							5 00.2	1.00 00	00.6	5 30.2	1.00 00	00.6	6 00.2	1.00 00	00.5	6 30.2	1.00 00	00.5	8 00.2	1.00 00	00.5	8 30.2	1.00 00	00.5	9
180							5 00.0	1.00 00	00.0	5 30.0	1.00 00	00.0	6 00.0	1.00 00	00.0	6 30.0	1.00 00	00.0	8 00.0	1.00 00	00.0	8 30.0	1.00 00	00.0	180

Lat. 39°

H.A.	60° 00' Alt.	Δd Δt	Az.	60° 30' Alt.	Δd Δt	Az.	62° 00' Alt.	Δd Δt	Az.	62° 30' Alt.	Δd Δt	Az.	63° 00' Alt.	Δd Δt	Az.	69° 00' Alt.	Δd Δt	Az.	69° 30' Alt.	Δd Δt	Az.	74° 30' Alt.	Δd Δt	Az.	H.A.
00	69 00.0	1.001	00.0	68 30.0	1.001	00.0	67 00.0	1.001	00.0	66 30.0	1.001	00.0	66 00.0	1.001	00.0	60 00.0	1.000	00.0	59 30.0	1.000	00.0	54 30.0	1.000	00.0	00
1	68 59.4	1.003	01.4	68 29.5	1.003	01.3	66 59.5	1.002	01.2	66 29.5	1.002	01.2	65 59.5	1.002	01.1	59 59.7	1.001	00.7	59 29.7	1.001	00.7	54 29.8	1.001	00.5	1
2	68 57.7	1.005	02.8	68 27.8	1.005	02.7	66 58.0	1.004	02.4	66 28.1	1.004	02.3	65 58.2	1.004	02.2	59 58.8	1.002	01.4	59 28.9	1.002	01.4	54 29.3	1.002	00.9	2
3	68 54.9	99 07	04.2	68 25.1	99 06	04.0	66 55.5	99 07	04.0	66 25.1	99 07	03.5	65 55.9	99 07	03.3	59 57.4	1.003	02.1	59 27.5	1.003	02.1	54 28.3	1.003	01.4	3
4	68 51.0	99 08	05.5	68 21.3	99 08	05.3	66 52.2	99 07	04.8	66 22.5	99 07	04.6	65 52.8	99 07	04.4	59 55.3	99 04	02.9	59 25.5	99 04	02.8	54 27.0	1.003	01.8	4
05	68 45.9	98 10	06.9	68 16.4	98 10	06.7	66 47.8	99 09	06.0	66 18.3	99 09	05.7	65 48.7	99 08	05.5	59 52.7	99 05	03.6	59 23.0	99 05	03.4	54 25.3	99 03	02.3	05
6	68 39.7	97 12	08.3	68 10.5	98 12	08.0	66 42.5	98 10	07.1	66 13.1	98 10	06.9	65 43.8	98 10	06.6	59 49.5	99 06	04.3	59 19.9	99 06	04.1	54 23.3	99 04	02.7	6
7	68 32.5	97 14	09.6	68 03.5	97 13	09.2	66 36.3	97 12	08.3	66 07.1	97 12	08.0	65 37.9	97 11	07.7	59 45.8	98 07	05.0	59 16.3	98 07	04.8	54 20.9	99 05	03.2	7
8	68 24.2	96 16	10.9	67 55.5	96 15	10.5	66 29.1	96 13	09.4	66 00.2	96 13	09.1	65 31.2	97 13	08.8	59 41.4	98 08	05.7	59 12.1	98 08	05.5	54 18.1	98 05	03.7	8
9	68 14.9	94 17	12.2	67 46.5	95 17	11.8	66 21.0	95 15	10.5	65 52.4	95 14	10.2	65 23.7	96 14	09.8	59 36.6	97 09	06.4	59 07.4	97 09	06.1	54 14.9	98 06	04.1	9
10	68 04.5	93 19	13.4	67 36.5	94 18	13.0	66 12.0	94 16	11.7	65 43.7	94 16	11.2	65 15.3	95 15	10.9	59 31.1	96 10	07.0	59 02.6	96 10	06.8	54 11.4	97 06	04.5	10
1	67 53.2	92 20	14.7	67 25.6	92 20	14.2	66 02.2	93 18	12.7	65 34.2	93 17	12.3	65 06.2	94 17	11.9	59 25.1	96 11	07.7	58 56.4	96 11	07.4	54 07.5	97 07	05.0	1
2	67 40.9	90 22	15.9	67 13.7	91 21	15.3	65 51.5	92 19	13.8	65 23.9	92 19	13.3	64 56.2	92 18	12.9	59 18.6	95 12	08.4	58 50.1	95 11	08.1	54 03.3	96 08	05.4	2
3	67 27.7	89 24	17.1	67 00.9	89 23	16.5	65 39.9	91 21	14.8	65 12.7	91 20	14.3	64 45.4	91 19	13.9	59 11.5	94 13	09.1	58 43.3	94 12	08.7	53 58.7	95 08	05.9	3
4	67 13.6	87 25	18.2	66 47.3	88 24	17.6	65 27.6	89 22	15.9	65 00.8	90 21	15.3	64 33.8	90 20	14.8	59 03.9	93 14	09.7	58 36.0	93 13	09.4	53 53.7	95 09	06.3	4
15	66 58.6	86 26	19.3	66 32.7	86 26	18.7	65 14.4	88 23	16.9	64 48.0	88 22	16.3	64 21.5	89 22	15.8	58 55.5	92 14	10.4	58 28.1	92 14	10.0	53 48.5	94 09	06.7	15
6	66 42.7	84 28	20.4	66 17.4	85 27	19.7	65 00.5	86 24	17.8	64 34.6	87 24	17.2	64 08.5	87 23	16.7	58 47.2	91 15	11.0	58 19.8	91 15	10.6	53 42.8	93 10	07.1	6
7	66 26.1	82 29	21.4	66 01.3	83 28	20.7	64 45.9	85 26	18.8	64 20.4	85 25	18.2	63 54.8	86 24	17.6	58 38.0	90 16	11.6	58 11.0	90 16	11.2	53 36.9	92 10	07.6	7
8	66 08.6	80 30	22.5	65 44.4	81 29	21.7	64 30.5	83 27	19.7	64 05.5	84 26	19.1	63 40.4	84 25	18.4	58 28.4	89 17	12.2	58 01.7	89 16	11.8	53 30.5	91 11	08.0	8
9	65 50.4	79 32	23.4	65 26.7	79 31	22.7	64 14.4	81 28	20.6	63 50.0	82 27	19.9	63 25.3	82 26	19.3	58 18.3	88 18	12.8	57 51.9	88 17	12.4	53 23.9	91 12	08.4	9
20	65 31.5	77 33	24.4	65 08.4	77 32	23.6	63 57.7	80 29	21.5	63 33.7	80 28	20.8	63 09.6	81 27	20.1	58 07.7	86 18	13.4	57 41.7	87 18	13.0	53 16.9	90 12	08.8	20
1	65 12.0	75 34	25.3	64 49.4	76 33	24.5	63 40.3	78 30	22.3	63 16.9	79 29	21.6	62 53.2	79 28	20.9	57 56.6	85 19	14.0	57 31.0	86 19	13.5	53 09.6	89 13	09.2	1
2	64 51.7	73 35	26.2	64 29.7	74 34	25.4	63 22.3	76 31	23.1	62 59.4	77 30	22.4	62 36.3	77 29	21.7	57 45.1	84 20	14.6	57 19.9	84 19	14.1	53 02.0	88 13	09.6	2
3	64 30.8	71 36	27.0	64 09.5	72 35	26.2	63 03.8	74 32	23.9	62 41.4	75 31	23.2	62 18.8	76 30	22.4	57 33.2	82 21	15.1	57 08.4	83 20	14.6	52 54.1	86 14	10.0	3
4	64 09.4	69 37	27.8	63 48.6	70 36	27.0	62 44.6	72 33	24.6	62 22.8	73 32	23.9	62 00.7	74 31	23.2	57 20.8	81 21	15.7	56 56.4	82 21	15.1	52 45.9	85 14	10.3	4
25	63 47.3	67 38	28.6	63 27.1	68 37	27.8	62 24.9	70 34	25.4	62 03.6	71 33	24.6	61 42.1	72 32	23.9	57 08.0	80 22	16.2	56 44.0	80 21	15.7	52 37.4	84 15	10.7	25
6	63 24.8	65 38	29.3	63 05.2	66 37	28.5	62 04.6	69 35	26.1	61 43.9	69 34	25.3	61 23.0	70 33	24.6	56 54.8	78 23	16.7	56 31.5	79 22	16.2	52 28.5	83 15	11.1	6
7	63 01.7	63 39	30.0	62 42.7	64 38	29.2	61 43.9	67 35	26.7	61 23.8	68 34	26.0	61 03.3	68 34	25.2	56 41.1	77 23	17.2	56 18.1	77 23	16.7	52 19.4	82 16	11.4	7
8	62 38.1	61 40	30.7	62 19.7	62 39	29.9	61 22.7	65 36	27.4	61 03.1	66 35	26.6	60 43.2	67 34	25.8	56 27.1	75 24	17.7	56 04.5	76 23	17.1	52 10.0	80 16	11.8	8
9	62 14.1	59 41	31.4	61 56.3	60 40	30.5	61 01.0	63 37	28.0	60 42.0	64 36	27.2	60 22.7	65 35	26.4	56 12.8	74 25	18.2	55 50.6	74 24	17.6	52 00.4	79 17	12.2	9
30	61 49.6	57 41	32.0	61 32.4	58 40	31.1	60 38.9	61 38	28.6	60 20.4	62 37	27.8	60 01.7	63 36	27.0	55 58.0	72 25	18.7	55 36.3	73 24	18.1	51 50.4	78 17	12.5	30
1	61 24.7	55 42	32.6	61 08.1	56 41	31.7	60 16.3	59 38	29.2	59 58.5	60 37	28.4	59 40.3	61 36	27.6	55 42.9	70 26	19.1	55 21.7	71 25	18.5	51 40.2	76 17	12.8	1
2	60 59.4	53 43	33.1	60 43.4	54 42	32.2	59 53.4	57 39	29.7	59 36.1	58 38	28.9	59 18.6	59 37	28.1	55 27.5	69 26	19.6	55 06.7	69 26	18.9	51 29.7	75 18	13.1	2
3	60 33.7	51 43	33.6	60 18.3	52 42	32.8	59 30.1	55 39	30.3	59 13.4	56 38	29.4	58 56.4	57 38	28.6	55 11.7	67 27	20.0	54 51.4	68 26	19.4	51 19.0	74 18	13.5	3
4	60 07.7	49 44	34.2	59 52.9	50 43	33.3	59 06.4	53 40	30.8	58 50.3	54 39	29.9	58 33.9	55 38	29.1	54 55.6	65 27	20.4	54 35.8	66 27	19.8	51 08.0	72 19	13.8	4
35	59 41.4	47 44	34.6	59 27.2	48 43	33.8	58 42.4	51 41	31.2	58 26.9	52 40	30.4	58 11.0	53 39	29.6	54 39.2	64 28	20.8	54 19.9	64 27	20.2	50 56.8	71 19	14.1	35
6	59 14.8	45 45	35.1	59 01.1	46 44	34.2	58 18.1	49 41	31.7	58 03.1	50 40	30.9	57 47.8	52 39	30.0	54 22.4	62 28	21.2	54 03.7	63 28	20.5	50 45.3	69 19	14.4	6
7	58 47.8	43 45	35.5	58 34.7	44 44	34.6	57 53.5	48 42	32.1	57 39.0	49 41	31.3	57 24.3	50 40	30.5	54 05.5	61 29	21.6	53 47.2	61 28	20.9	50 33.6	68 20	14.7	7
8	58 20.6	41 46	35.9	58 08.1	42 45	35.0	57 28.5	46 42	32.5	57 14.7	47 41	31.7	57 00.5	48 40	30.9	53 48.1	59 29	21.9	53 30.4	59 28	21.3	50 21.7	66 20	14.9	8
9	57 53.1	39 46	36.3	57 41.2	40 45	35.4	57 03.3	44 42	32.9	56 50.0	45 42	32.1	56 36.4	46 41	31.3	53 30.6	57 30	22.3	53 13.4	58 29	21.6	50 09.6	65 21	15.2	9
40	57 25.4	37 47	36.6	57 14.0	38 46	35.8	56 37.9	42 43	33.3	56 25.1	43 42	32.5	56 12.1	44 41	31.6	53 12.8	55 30	22.6	52 56.1	56 29	21.9	49 57.2	63 21	15.5	40
1	56 57.5	35 47	37.0	56 46.6	37 46	36.1	56 12.2	40 43	33.6	56 00.0	41 42	32.8	55 47.5	42 41	32.0	52 54.7	53 30	22.9	52 38.6	54 30	22.2	49 44.7	61 21	15.7	1
2	56 29.3	34 47	37.3	56 19.0	35 46	36.5	55 46.2	38 44	33.9	55 34.6	39 43	33.1	55 22.7	40 42	32.3	52 36.4	52 31	23.3	52 20.8	52 30	22.6	49 31.9	60 22	16.0	2
3	56 00.9	32 48	37.6	55 51.2	33 47	36.7	55 20.1	36 44	34.3	55 09.0	37 43	33.4	54 57.7	38 42	32.6	52 17.9	50 31	23.6	52 02.8	51 30	22.9	49 19.0	58 22	16.2	3
4	55 32.4	30 48	37.9	55 23.3	31 47	37.0	54 53.7	34 44	34.5	54 43.2	36 43	33.7	54 32.4	37 42	32.9	51 59.2	48 32	23.8	51 44.6	49 31	23.1	49 05.9	57 22	16.5	4
45	55 03.7	28 48	38.1	54 55.1	29 47	37.3	54 27.2	33 44	34.8	54 17.3	34 44	34.0	54 07.0	35 43	33.2	51 40.2	46 32	24.1	51 26.2	47 31	23.4	48 52.6	55 22	16.7	45
6	54 34.8	26 48	38.4	54 26.8	28 47	37.5	54 00.5	31 45	35.1	53 51.1	32 44	34.3	53 41.3	33 43	33.5	51 21.1	45 32	24.4	51 07.6	45 31	23.7	48 39.1	53 23	16.9	6
7	54 05.8	25 49	38.6	53 58.3	26 48	37.8	53 33.6	29 45	35.3	53 24.7	30 44	34.5	53 15.5	31 43	33.8	51 01.7	43 33	24.6	50 48.7	44 32	23.9	48 25.4	52 23	17.1	7
8	53 36.7	23 49	38.8	53 29.7	24 48	38.0	53 06.6	27 45	35.5	52 58.2	28 44	34.7	52 49.6	29 44	33.9	50 42.2	41 33	24.9	50 29.8	42 32	24.1	48 11.6	50 23	17.3	8
9	53 07.4	21 49	39.0	53 00.9	22 48	38.2	52 39.4	26 46	35.7	52 31.6	27 45	34.9	52 23.5	28 44	34.2	50 22.5	39 33	25.1	50 10.6	40 32	24.4	47 57.6	48 24	17.5	9
50	52 38.1	19 49	39.1	52 32.1	21 48	38.3	52 12.1	24 46	35.9	52 04.8	25 45	35.1	51 57.2	26 44	34.4	50 02.7	38 33	25.3	49 51.3	38 32	24.6	47 43.5	47 24	17.7	50
1	52 08.6	18 49	39.3	52 03.1	19 48	38.5	51 44.7	22 46	36.1	51 37.9	23 45	35.3	51 30.9	24 44	34.5	49 42.6	36 34	25.5	49 31.8	37 33	24.8	47 29.3	45 24	17.9	1
2	51 39.0	16 49	39.4	51 34.0	17 49	38.6	51 17.2	20 46	36.3	51 10.9	21 45	35.5	51 04.4	22 44	34.7	49 22.5	34 34	25.7	49 12.2	35 33	25.0	47 14.9	43 24	18.1	2
3	51 09.4	14 50	39.5	51 04.9	15 49	38.8	50 49.5	19 46	36.4	50 43.8	20 45	35.6	50 37.8	21 44	34.9	49 02.2	32 34	25.9	48 52.4	33 33	25.2	47 00.3	41 24	18.2	3
4	50 39.6	13 50	39.7	50 35.7	14 49	38.9	50 21.8	17 46	36.5	50 16.6	18 46	35.8	50 11.1	19 45	35.0	48 41.8	30 34	26.1	48 32.5	31 33	25.3	46 45.7	40 25	18.4	4
55	50 09.9	11 50	39.7	50 06.4	12 49	39.0	49 54.0	15 46	36.7	49 49.3	16 46	35.9	49 44.4	17 45	35.1	48 21.2	30 34	26.2	48 12.5	30 34	25.5	46 30.9	38 25	18.5	55
6	49 40.0	10 50	39.8	49 37.0	11 49	39.1	49 26.1	14 47	36.8	49 21.9	15 46	36.0	49 17.4	16 45	35.3	48 00.6	27 35	26.4	47 52.4	28 34	25.6	46 16.0	36 25	18.7	6
7	49 10.1	08 50	39.9	49 07.6	09 49	39.1	48 58.2	12 47	36.9	48 54.5	13 46	36.1	48 50.5	14 45	35.3	47 39.8	25 35	26.5	47 32.1	26 34	25.8	46 01.0	35 25	18.8	7
8	48 40.2	06 50	39.9	48 38.2	07 49	39.2	48 30.2	10 47	36.9	48 27.0	11 46	36.2	48 23.5	12 45	35.4	47 19.0	23 35	26.6	47 11.8	24 34	25.9	45 45.9	33 25	19.0	8
9	48 10.3	05 50	40.0	48 08.7	06 49	39.2	48 02.2	09 47	36.9	47 59.4	10 46	36.3	47 56.4	11 45	35.5	46 58.0	22 35	26.8	46 51.4	23 34	26.0	45 30.7	31 25	19.1	9
60	47 40.3	03 50	40.0	47 39.2	04 49	39.3	47 34.1	07 47	37.1	47 31.8	08 46	36.3	47 29.3	09 45	35.5	46 37.0	20 35	26.9	46 30.9	21 34	26.1	45 15.4	29 26	19.3	60
1	47 10.3	02 50	40.0	47 09.6	03 49	39.3	47 06.0	05 47	37.1	47 04.2	06 46	36.4	47 02.1	07 45	35.6	46 15.9	18 35	27.0	46 10.3	19 34	26.3	45 00.1	28 26	19.3	1
2	46 40.3	00 50	40.0	46 40.1	01 49	39.3	46 37.8	04 47	37.1	46 36.5	05 46	36.4	46 35.0	06 45	35.7	45 54.7	17 35	27.1	45 49.6	17 35	26.3	44 44.6	26 26	19.4	2
3	46 10.3	01 50	40.0	46 10.5	00 49	39.3	46 09.7	02 47	37.2	46 08.9	03 46	36.4	46 07.8	04 45	35.7	45 33.5	15 36	27.1	45 28.9	16 35	26.4	44 29.1	24 26	19.5	3
4	45 40.3	03 50	40.0	45 41.0	02 49	39.3	45 41.5	01 47	37.2	45 41.2	02 46	36.4	45 40.5	03 45	35.7	45 12.2	13 36	27.2	45 08.1	15 35	26.5	44 13.5	22 26	19.6	4
65	45 10.3	04 50	40.0	45 11.5	03 49	39.3	45 13.4	01 47	37.2	45 13.5	00 46	36.5	45 13.3	01 45	35.7	44 50.8	11 36	27.3	44 47.3	12 35	26.6	43 57.8	21 26	19.7	65
6	44 40.4	06 50	40.0	44 42.0	05 49	39.3	44 45.2	02 47	37.2	44 45.8	01 46	36.5	44 46.1	01 45	35.7	44 29.5	10 36	27.3	44 26.4	11 35	26.6	43 42.1	19 26	19.7	6
7	44 10.4	07 50	39.9	44 12.5	06 49	39.2	44 17.0	04 47	37.1	44 18.1	03 46	36.4	44 18.8	02 45	35.7	44 08.1	08 36	27.4	44 05.5	09 35	26.7	43 26.3	17 26	19.8	7
8	43 40.4	09 50	39.9	43 43.0	08 49	39.2	43 48.9	06 47	37.1	43 50.4	04 46	36.4	43 51.6	04 45	35.7	43 46.6	06 36	27.4	43 44.6	07 35	26.7	43 10.5	16 26	19.8	8
9	43 10.6	10 50	39.8	43 13.5	09 49	39.1	43 20.8	07 47	37.1	43 22.7	06 46	36.4	43 24.4	05 45	35.7	43 25.1	05 36	27.4	43 23.6	06 35	26.7	42 54.6	14 26	19.9	9
70	42 40.8	11 50	39.7	42 44.1	11 49	39.0	42 52.7	08 47	37.0	42 55.1	07 46	36.3	42 57.2	07 45	35.7	43 03.7	03 36	27.4	43 02.6	04 35	26.8	42 38.7	12 27	20.0	70
1	42 11.0	13 50	39.6	42 14.8	12 49	39.0	42 24.6	10 47	37.0	42 27.4	09 46	36.3	42 30.0	08 45	35.6	42 42.2	01 36	27.5	42 41.6	02 35	26.8	42 22.8	10 27	20.0	1
2	41 41.3	14 49	39.6	41 45.5	14 49	38.9	41 56.6	11 47	36.9	41 59.9	10 46	36.2	42 02.9	10 45	35.6	42 20.7	00 36	27.5	42 20.6	01 35	26.8	42 06.8	09 27	20.0	2
3	41 11.7	16 49	39.5	41 16.2	15 49	38.8	41 28.7	13 47	36.9	41 32.3	12 46	36.1	41 35.5	11 45	35.5	41 59.6	01 35	27.5	41 59.6	00 35	26.8	41 50.9	07 27	20.1	3
4	40 42.1	17 49	39.3	40 47.1	16 49	38.7	41 00.7	14 46	36.7	41 04.9	13 46	36.1	41 08.3	13 45	35.5	41 37.7	03 35	27.4	41 38.6	03 35	26.8	41 34.9	05 27	20.1	4
75	40 12.5	18 49	39.2	40 18.0	18 48	38.6	40 32.9	16 46	36.6	40 37.4	15 46	36.0	40 41.8	14 45	35.3	41 16.2	05 36	27.4	41 17.5	04 35	26.8	41 18.8	03 27	20.1	75
6	39 43.1	20 49	39.1	39 48.9	19 48	38.5	40 05.1	17 46	36.5	40 10.1	16 46	35.9	40 14.8	15 45	35.2	40 54.7	07 36	27.4	40 56.6	06 35	26.7	41 02.8	02 27	20.1	6
7	39 13.7	21 49	39.0	39 19.9	20 48	38.3	39 37.4	18 46	36.4	39 42.8	18 45	35.8	39 47.9	17 45	35.2	40 33.3	09 36	27.4	40 35.6	07 35	26.7	40 46.8	00 27	20.1	7
8	38 44.4	22 49	38.8	38 51.1	22 48	38.2	39 09.7	20 46	36.3	39 15.5	19 45	35.7	39 21.1	18 45	35.1	40 11.9	10 36	27.3	40 14.7	09 35	26.7	40 30.7	02 27	20.1	8
9	38 15.2	24 48	38.7	38 22.3	23 48	38.1	38 42.1	21 46	36.2	38 48.4	20 45	35.6	38 54.4	20 44	34.9	39 50.5	11 36	27.3	39 53.8	11 35	26.6	40 14.7	03 27	20.1	9
80	37 46.2	25 48	38.5	37 53.6	24 48	37.9	38 14.6	22 46	36.1	38 21.3	22 45	35.4	38 27.7	21 44	34.8	39 29.1	13 36	27.2	39 32.9	12 35	26.6	39 58.7	05 27	20.1	80
1	37 17.2	26 48	38.4	37 25.0	26 48	37.8	37 47.2	24 46	35.9	37 54.3	23 45	35.3	38 01.1	23 44	34.7	39 07.8	14 35	27.1	39 12.1	14 35	26.5	39 42.7	07 27	20.1	1
2	36 48.3	28 48	38.2	36 56.5	27 48	37.6	37 19.9	25 45	35.8	37 27.4	25 45	35.2	37 34.6	24 44	34.6	38 46.5	15 35	27.1	38 51.3	15 35	26.4	39 26.7	08 27	20.0	2
3	36 19.5	29 48	38.0	36 28.1	28 47	37.4	36 52.7	26 45	35.6	37 00.6	26 45	35.0	37 08.2	25 44	34.4	38 25.4	18 35	27.0	38 30.5	17 34	26.4	39 10.7	10 27	20.0	3
4	35 50.8	30 48	37.8	35 59.8	30 47	37.3	36 25.6	28 45	35.5	36 33.9	27 44	34.9	36 41.9	27 44	34.3	38 04.2	19 35	26.9	38 09.8	18 34	26.3	38 54.8	12 26	20.0	4
85	35 22.3	31 47	37.7	35 31.6	31 47	37.1	35 58.6	29 45	35.3	36 07.2	29 45	34.7	36 15.7	28 44	34.1	37 43.2	21 35	26.8	37 49.2	20 34	26.2	38 38.9	13 26	19.9	85
6	34 53.9	33 47	37.5	35 03.6	32 47	36.9	35 31.7	30 45	35.1	35 40.8	30 44	34.5	35 49.6	29 43	34.0	37 22.2	22 35	26.7	37 28.7	21 34	26.1	38 23.0	15 26	19.9	6
7	34 25.6	34 47	37.3	34 35.7	33 46	36.7	35 04.9	32 44	35.0	35 14.4	31 44	34.2	35 23.6	31 43	33.8	37 01.2	22 35	26.6	37 08.2	23 34	26.0	38 07.2	16 26	19.8	7
8	33 57.4	35 47	37.0	34 07.9	35 46	36.5	34 38.3	33 44	34.8	34 48.1	32 44	34.2	34 57.8	32 43	33.6	36 40.4	25 35	26.5	36 47.8	24 34	25.9	37 51.4	18 26	19.8	8
9	33 29.4	36 46	36.8	33 40.2	36 46	36.3	34 11.8	34 44	34.6	34 22.0	34 43	34.0	34 32.0	33 43	33.4	36 19.6	26 34	26.4	36 27.4	26 34	25.8	37 35.6	20 26	19.7	9
90	33 01.5	38 46	36.6	33 12.7	37 46	36.1	33 45.4	36 44	34.4	33 55.9	35 43	33.8	34 06.4	35 42	33.2	35 58.9	28 34	26.3	36 07.2	27 34	25.7	37 19.9	21 26	19.6	90

La 39

H.A.	60° 00′ Alt (° ′ Δd Δt)	Az	60° 30′ Alt	Az	62° 00′ Alt	Az	62° 30′ Alt	Az	63° 00′ Alt	Az	69° 00′ Alt	Az	69° 30′ Alt	Az	74° 30′ Alt	Az	H.A.
91	32 33.8 39 46	36.4	32 45.3 38 45	35.8	33 19.1 37 44	34.2	33 30.1 36 43	33.6	33 40.9 36 42	33.1	35 38.3 29 34	26.2	35 47.0 29 33	25.6	37 04.3 23 26	19.6	91
2	32 06.2 40 46	36.1	32 18.1 39 45	35.6	32 53.0 38 43	34.0	33 04.3 38 43	33.8	33 15.5 37 42	32.7	35 17.8 31 34	26.0	35 26.9 30 33	25.4	36 48.7 24 26	19.5	2
3	31 38.8 41 45	35.9	31 51.0 41 45	35.4	32 27.0 39 43	33.7	32 38.7 39 42	33.2	32 50.3 38 42	32.7	34 57.4 32 34	25.9	35 06.9 32 33	25.3	36 33.2 26 26	19.4	3
4	31 11.5 42 45	35.7	31 24.1 42 45	35.1	32 01.2 40 43	33.5	32 13.2 40 42	33.0	32 25.2 40 42	32.4	34 37.0 34 34	25.7	34 47.0 33 33	25.2	36 17.7 27 26	19.3	4
95	30 44.4 43 45	35.4	30 57.4 43 44	34.9	31 35.5 42 43	33.3	31 47.9 41 42	32.8	32 00.2 41 41	32.2	34 16.8 35 34	25.6	34 27.2 34 33	25.0	36 02.3 29 26	19.2	95
6	30 17.5 45 45	35.2	30 30.8 44 44	34.6	31 10.0 43 42	33.1	31 22.8 42 42	32.5	31 35.4 42 41	32.0	33 56.8 36 33	25.4	34 07.6 36 33	24.9	35 47.0 30 25	19.1	6
7	29 50.7 46 44	34.9	30 04.1 46 43	34.4	30 44.6 44 42	32.9	30 57.8 44 41	32.3	31 10.8 43 41	31.7	33 36.8 38 33	25.3	33 48.0 37 33	24.7	35 31.8 32 25	19.0	7
8	29 24.1 47 44	34.6	29 38.1 46 43	34.1	30 19.4 45 42	32.6	30 32.9 44 41	32.1	30 46.3 44 41	31.5	33 16.9 39 33	25.1	33 28.6 39 32	24.6	35 16.6 33 25	18.9	8
9	28 57.7 48 44	34.4	29 12.0 48 43	33.9	29 54.4 46 41	32.3	30 08.3 46 41	31.8	30 22.0 46 40	31.3	32 57.2 40 33	24.9	33 09.2 40 32	24.4	35 01.5 35 25	18.8	9
100	28 31.5 49 43	34.1	28 46.1 49 43	33.6	29 29.5 48 41	32.1	29 43.8 47 41	31.6	29 57.9 47 40	31.1	32 37.6 42 32	24.8	32 50.0 41 32	24.2	34 46.6 36 25	18.7	100
1	28 05.4 50 43	33.8	28 20.4 50 42	33.3	29 04.8 49 41	31.8	29 19.4 48 40	31.3	29 33.9 48 40	30.8	32 18.1 43 32	24.6	32 31.0 43 32	24.1	34 31.7 38 25	18.6	1
2	27 39.6 51 43	33.5	27 54.9 51 42	33.0	28 40.3 50 41	31.6	28 55.3 50 40	31.1	29 10.1 49 39	30.6	31 58.8 44 32	24.4	32 12.0 44 31	23.9	34 16.9 39 24	18.4	2
3	27 13.9 52 42	33.2	27 29.6 52 42	32.7	28 16.0 51 40	31.3	28 31.3 51 40	30.8	28 46.5 50 39	30.3	31 39.6 46 32	24.2	31 53.2 45 31	23.7	34 02.0 41 24	18.3	3
4	26 48.5 53 42	32.9	27 04.5 53 42	32.5	27 51.9 52 40	31.0	28 07.5 52 39	30.5	28 23.0 52 39	30.0	31 20.5 47 32	24.0	31 34.5 47 31	23.5	33 47.6 42 24	18.2	4
105	26 23.2 55 42	32.6	26 39.6 54 41	32.2	27 28.0 53 39	30.7	27 43.9 53 39	30.3	27 59.8 53 38	29.8	31 01.6 48 31	23.8	31 16.0 48 31	23.3	33 33.1 43 24	18.0	105
6	25 58.2 56 41	32.3	26 14.9 55 41	31.9	27 04.2 54 39	30.5	27 20.5 54 39	30.0	27 36.7 54 38	29.5	30 42.8 49 31	23.6	30 57.6 49 30	23.1	33 18.7 45 24	17.9	6
7	25 33.4 57 41	31.9	25 51.1 56 41	31.5	26 40.7 55 38	30.2	26 57.3 55 38	29.7	27 13.8 55 38	29.2	30 24.2 51 31	23.4	30 39.4 50 30	22.9	33 04.4 46 24	17.8	7
8	25 08.8 58 41	31.7	25 26.1 57 40	31.2	26 17.4 57 39	29.9	26 34.3 56 38	29.4	26 51.2 56 37	28.9	30 05.8 53 30	23.2	30 21.3 53 30	22.7	32 50.2 48 23	17.6	8
9	24 44.4 59 40	31.4	25 02.0 59 40	30.9	25 54.3 58 38	29.6	26 11.5 57 38	29.1	26 28.7 57 37	28.7	29 47.5 53 30	23.0	30 03.4 53 30	22.5	32 36.2 49 23	17.5	9
110	24 20.2 60 40	31.0	24 38.1 60 39	30.6	25 31.4 59 38	29.3	25 49.0 58 37	28.8	26 06.5 58 37	28.4	29 29.4 54 30	22.8	29 45.7 54 29	22.3	32 22.3 50 23	17.3	110
1	23 56.3 61 39	30.7	24 14.5 61 39	30.3	25 08.7 60 37	29.0	25 26.6 60 37	28.5	25 44.4 59 36	28.1	29 11.4 56 30	22.5	29 28.1 55 29	22.1	32 08.5 52 23	17.1	1
2	23 32.6 62 39	30.4	23 51.1 62 39	29.9	24 46.2 61 37	28.6	25 04.4 61 37	28.2	25 22.6 60 36	27.8	28 53.5 57 29	22.3	29 10.6 56 29	21.8	31 54.8 53 23	17.0	2
3	23 09.2 63 39	30.0	23 28.0 63 38	29.6	24 24.0 62 37	28.3	24 42.5 62 37	27.9	25 01.0 61 36	27.5	28 36.0 58 29	22.1	28 53.4 58 28	21.6	31 41.2 54 22	16.8	3
4	22 45.9 64 38	29.7	23 05.0 64 38	29.3	24 02.0 63 36	28.0	24 20.8 63 36	27.6	24 39.6 62 35	27.2	28 18.6 59 29	21.8	28 36.3 59 28	21.4	31 27.8 55 22	16.6	4
115	22 23.0 65 38	29.3	22 42.4 65 37	28.9	23 40.2 64 36	27.7	23 59.3 64 35	27.3	24 18.4 63 35	26.8	28 01.4 60 28	21.6	28 19.4 60 28	21.1	31 14.6 57 22	16.5	115
6	22 00.2 66 37	29.0	22 19.9 66 37	28.6	23 18.6 65 36	27.4	23 38.1 65 35	26.9	23 57.5 64 34	26.5	27 44.3 61 28	21.3	28 02.7 61 28	20.9	31 01.4 58 22	16.3	6
7	21 37.6 67 37	28.6	21 57.7 67 37	28.2	22 57.3 66 35	27.1	23 17.1 66 35	26.6	23 36.8 65 34	26.2	27 27.4 63 28	21.1	27 46.1 62 27	20.6	30 48.4 59 21	16.1	7
8	21 15.5 68 37	28.3	21 35.8 68 36	27.9	22 36.3 67 35	26.7	22 56.3 67 34	26.2	23 16.3 66 34	25.9	27 10.7 64 27	20.8	27 29.8 63 27	20.4	30 35.6 60 21	15.9	8
9	20 53.6 69 36	27.9	21 14.1 68 36	27.5	22 15.5 68 34	26.3	22 35.8 68 34	25.9	22 56.1 67 33	25.5	26 54.3 65 27	20.6	27 13.6 64 27	20.1	30 22.9 62 21	15.7	9
120	20 31.9 70 36	27.5	20 52.7 69 35	27.2	21 54.9 69 34	26.0	22 15.5 69 33	25.6	22 36.1 68 33	25.2	26 38.0 66 27	20.3	26 57.7 66 26	19.9	30 10.3 63 21	15.5	120
1	20 10.5 70 35	27.2	20 31.6 70 35	26.8	21 34.6 70 33	25.6	21 55.5 70 33	25.3	22 16.4 69 32	24.9	26 21.9 67 26	20.0	26 41.9 67 26	19.6	29 57.9 64 20	15.3	1
2	19 49.3 71 35	26.8	20 10.6 71 34	26.4	21 14.4 71 33	25.3	21 35.7 71 33	24.9	21 56.9 70 32	24.5	26 06.0 68 26	19.8	26 26.3 68 26	19.4	29 45.6 65 20	15.1	2
3	19 28.4 72 34	26.4	19 50.1 72 34	26.0	20 54.8 72 33	24.9	21 16.2 71 32	24.6	21 37.6 71 32	24.2	25 50.3 69 26	19.5	26 11.0 69 25	19.1	29 33.5 66 20	14.9	3
4	19 07.8 73 34	26.0	19 29.7 73 33	25.7	20 35.2 73 32	24.6	20 57.0 72 32	24.2	21 18.7 72 31	23.8	25 34.8 70 25	19.2	25 55.8 70 25	18.8	29 21.6 67 20	14.7	4
125	18 47.5 74 33	25.6	19 09.7 74 33	25.3	20 16.0 73 32	24.2	20 38.0 73 31	23.8	21 00.0 73 31	23.5	25 19.6 71 25	19.0	25 40.9 71 25	18.6	29 09.8 68 19	14.5	125
6	18 27.5 75 33	25.2	18 49.9 75 32	24.9	19 57.0 74 31	23.8	20 19.3 74 31	23.5	20 41.5 74 30	23.1	25 04.6 72 25	18.7	25 26.1 72 24	18.3	28 58.2 70 19	14.3	6
7	18 07.7 76 32	24.8	18 30.4 76 32	24.5	19 38.3 75 31	23.5	20 00.9 75 30	23.1	20 23.4 75 30	22.8	24 49.7 73 24	18.4	25 11.6 73 24	18.0	28 46.8 71 19	14.1	7
8	17 48.3 77 32	24.4	18 11.3 76 32	24.1	19 19.9 76 30	23.1	19 42.7 76 30	22.7	20 05.5 76 29	22.4	24 35.2 74 24	18.1	24 57.3 74 23	17.7	28 35.6 73 18	13.9	8
9	17 29.2 77 31	24.0	17 52.4 77 31	23.7	19 01.8 77 30	22.7	19 24.8 77 29	22.4	19 47.8 77 29	22.0	24 20.8 75 24	17.8	24 43.2 75 23	17.4	28 24.4 73 18	13.7	9
130	17 10.3 78 31	23.6	17 33.8 78 30	23.3	18 43.9 78 29	22.3	19 07.2 78 28	22.0	19 30.5 78 28	21.7	24 06.6 76 23	17.5	24 29.4 76 23	17.1	28 13.5 74 18	13.4	130
1	16 51.8 79 30	23.2	17 15.5 79 30	22.9	18 26.3 79 29	21.9	18 49.9 78 28	21.6	19 13.4 78 28	21.3	23 52.7 77 23	17.2	24 15.7 77 22	16.9	28 02.8 75 18	13.2	1
2	16 33.5 80 30	22.8	16 57.5 80 29	22.5	18 09.1 79 28	21.5	18 32.9 79 28	21.2	18 56.7 79 27	20.9	23 39.1 78 22	16.9	24 02.3 78 22	16.6	27 52.2 76 17	13.0	2
3	16 15.6 81 29	22.4	16 39.8 80 29	22.1	17 52.1 80 28	21.1	18 16.2 80 27	20.8	18 40.2 80 27	20.5	23 25.6 79 22	16.6	23 49.2 78 22	16.3	27 41.8 77 17	12.8	3
4	15 58.0 81 29	22.0	16 22.4 81 28	21.7	17 35.4 81 27	20.7	17 59.7 81 27	20.4	18 24.0 81 26	20.1	23 12.4 79 22	16.3	23 36.2 79 21	16.0	27 31.6 78 17	12.5	4
135	15 40.7 82 28	21.5	16 05.4 82 28	21.2	17 19.1 82 27	20.3	17 43.6 82 26	20.0	18 08.1 82 26	19.7	22 59.5 80 21	16.0	23 23.5 80 21	15.7	27 21.6 79 16	12.3	135
6	15 23.8 83 28	21.1	15 48.6 83 27	20.8	17 03.0 83 26	19.9	17 27.8 82 26	19.6	17 52.5 82 26	19.4	22 46.8 81 21	15.7	23 11.1 81 20	15.3	27 11.8 79 16	12.0	6
7	15 07.1 84 27	20.7	15 32.2 84 27	20.4	16 47.3 83 26	19.5	17 12.2 83 25	19.2	17 37.2 83 25	19.0	22 34.3 82 20	15.3	22 58.8 82 20	15.0	27 02.1 80 16	11.8	7
8	14 50.8 84 27	20.3	15 16.1 84 26	20.0	16 31.8 84 25	19.1	16 57.0 84 25	18.8	17 22.2 84 24	18.5	22 22.1 83 20	15.0	22 46.9 83 20	14.7	26 52.7 81 15	11.6	8
9	14 34.9 85 26	19.8	15 00.3 85 26	19.5	16 16.7 85 25	18.7	16 42.1 85 24	18.4	17 07.5 85 24	18.2	22 10.1 84 20	14.7	22 35.1 83 19	14.4	26 43.4 82 15	11.3	9
140	14 19.2 86 26	19.4	14 44.9 86 25	19.1	16 01.9 85 24	18.3	16 27.5 85 24	18.0	16 53.1 85 23	17.8	21 58.4 84 19	14.4	22 23.7 84 19	14.1	26 34.4 83 15	11.1	140
1	14 03.9 86 25	18.9	14 29.8 86 25	18.7	15 47.4 86 24	17.9	16 13.2 86 23	17.6	16 39.0 86 23	17.4	21 46.9 85 19	14.1	22 12.4 85 18	13.8	26 25.5 84 14	10.8	1
2	13 49.0 87 24	18.5	14 15.1 87 24	18.2	15 33.3 87 23	17.5	15 59.3 87 23	17.2	16 25.3 87 22	16.9	21 35.7 86 18	13.7	22 01.5 86 18	13.4	26 16.9 85 14	10.6	2
3	13 34.4 88 24	18.1	14 00.7 88 23	17.8	15 19.4 87 22	17.0	15 45.7 87 22	16.8	16 11.9 87 22	16.5	21 24.8 86 18	13.4	21 50.7 86 17	13.1	26 08.4 85 14	10.3	3
4	13 20.1 88 23	17.6	13 46.6 88 23	17.3	15 05.9 88 22	16.6	15 32.4 88 22	16.4	15 58.8 88 21	16.1	21 14.1 87 17	13.1	21 40.3 87 17	12.8	26 00.2 86 13	10.1	4
145	13 06.2 89 23	17.1	13 32.9 89 22	16.9	14 52.8 89 21	16.2	15 19.4 89 21	15.9	15 46.0 89 21	15.7	21 03.7 88 17	12.7	21 30.1 88 17	12.5	25 52.1 87 13	09.8	145
6	12 52.6 90 22	16.7	13 19.5 89 22	16.4	14 40.0 89 21	15.7	15 06.8 89 20	15.5	15 33.5 89 20	15.3	20 53.6 89 16	12.4	21 20.2 89 16	12.1	25 44.3 88 13	09.5	6
7	12 39.5 90 22	16.2	13 06.5 90 21	16.0	14 27.5 90 20	15.3	14 54.5 90 20	15.1	15 21.4 90 20	14.9	20 43.7 89 16	12.0	21 10.5 89 16	11.8	25 36.6 88 12	09.3	7
8	12 26.6 91 21	15.7	12 53.8 91 20	15.5	14 15.3 91 20	14.9	14 42.5 90 19	14.7	15 09.6 90 19	14.4	20 34.1 90 16	11.7	21 01.1 90 15	11.5	25 29.2 89 12	09.0	8
9	12 14.1 91 20	15.3	12 41.5 91 20	15.1	14 03.5 91 19	14.4	14 30.9 91 19	14.2	14 58.2 91 19	14.0	20 24.8 90 15	11.4	20 51.9 90 15	11.1	25 22.0 90 12	08.8	9
150	12 02.0 92 20	14.8	12 29.6 92 19	14.6	13 52.1 92 18	14.0	14 19.6 92 18	13.8	14 47.1 92 18	13.6	20 15.8 91 15	11.0	20 43.1 91 14	10.8	25 15.0 90 11	08.5	150
1	11 50.3 92 19	14.3	12 18.0 92 19	14.1	13 41.0 92 18	13.5	14 08.6 92 18	13.3	14 36.3 92 17	13.1	20 07.0 92 14	10.7	20 34.5 92 14	10.4	25 08.2 91 11	08.2	1
2	11 38.9 93 18	13.9	12 06.8 93 18	13.7	13 30.2 93 17	13.1	13 58.1 93 17	12.9	14 25.8 93 17	12.7	19 58.5 92 14	10.3	20 26.2 92 13	10.1	25 01.7 92 10	07.7	2
3	11 28.0 93 18	13.4	11 55.9 93 17	13.2	13 19.9 93 17	12.7	13 47.8 93 16	12.5	14 15.8 93 16	12.3	19 50.3 93 13	10.0	20 18.1 93 13	09.8	24 55.3 92 10	07.7	3
4	11 17.3 94 17	12.9	11 45.5 94 17	12.7	13 09.8 94 16	12.2	13 37.9 94 16	12.0	14 06.0 94 16	11.8	19 42.4 93 13	09.6	20 10.4 93 12	09.4	24 49.2 93 10	07.4	4
155	11 07.1 94 16	12.4	11 35.4 94 16	12.3	13 00.1 94 16	11.7	13 28.4 94 15	11.6	13 56.6 94 15	11.4	19 34.8 94 12	09.3	20 02.9 94 12	09.1	24 43.3 93 09	07.1	155
6	10 57.1 95 16	12.0	11 25.7 95 16	11.8	12 50.8 95 15	11.3	13 19.2 95 15	11.1	13 47.6 95 15	11.0	19 27.4 94 12	08.9	19 55.7 94 12	08.7	24 37.6 94 09	06.9	6
7	10 47.8 95 15	11.5	11 16.3 95 15	11.3	12 41.9 95 14	10.8	13 10.4 95 14	10.7	13 38.9 95 14	10.5	19 20.3 95 11	08.6	19 48.7 95 11	08.4	24 32.1 94 09	06.6	7
8	10 38.7 96 14	11.0	11 07.4 96 14	10.8	12 33.3 96 14	10.4	13 01.9 96 14	10.2	13 30.6 95 14	10.1	19 13.6 95 11	08.2	19 42.1 95 11	08.0	24 26.9 95 08	06.3	8
9	10 30.0 96 14	10.5	10 58.8 96 14	10.4	12 25.1 96 13	09.9	12 53.8 96 13	09.8	13 22.6 96 13	09.6	19 07.1 96 10	07.8	19 35.7 96 10	07.7	24 21.9 95 08	06.0	9
160	10 21.7 96 13	10.0	10 50.6 96 13	09.9	12 17.2 96 12	09.5	12 46.1 96 12	09.3	13 15.0 96 12	09.2	19 00.9 96 10	07.4	19 29.7 96 10	07.3	24 17.1 96 08	05.8	160
1	10 13.8 97 12	09.5	10 42.8 97 12	09.4	12 09.7 97 12	09.0	12 38.7 97 12	08.9	13 07.7 97 12	08.8	18 55.0 96 09	07.1	19 23.9 96 09	06.9	24 12.5 96 07	05.5	1
2	10 06.3 97 12	09.0	10 35.4 97 12	08.9	12 02.7 97 11	08.5	12 31.7 97 11	08.4	13 00.8 97 11	08.3	18 49.4 97 09	06.7	19 18.4 97 09	06.6	24 08.2 96 07	05.2	2
3	9 59.2 97 11	08.5	10 28.4 97 11	08.4	11 55.9 97 11	08.1	12 25.1 97 10	07.9	12 54.3 97 10	07.8	18 44.1 97 08	06.4	19 13.2 97 08	06.2	24 04.1 97 06	04.9	3
4	9 52.5 98 11	08.0	10 21.7 98 10	07.9	11 49.6 98 10	07.6	12 18.8 98 10	07.5	12 48.1 98 10	07.4	18 39.1 97 08	06.0	19 08.3 97 08	05.9	24 00.2 97 06	04.6	4
165	9 46.1 98 10	07.5	10 15.5 98 10	07.4	11 43.6 98 09	07.1	12 13.0 98 09	07.0	12 42.3 98 09	06.9	18 34.4 98 07	05.6	19 03.7 98 07	05.5	23 56.6 98 06	04.3	165
6	9 40.2 98 09	07.0	10 09.7 98 09	06.9	11 38.0 98 09	06.7	12 07.4 98 09	06.6	12 36.9 98 08	06.5	18 29.9 98 07	05.2	18 59.3 98 07	05.1	23 53.2 98 05	04.1	6
7	9 34.7 98 09	06.5	10 04.2 98 08	06.5	11 32.8 98 08	06.2	12 02.3 98 08	06.1	12 31.8 98 08	06.0	18 25.8 98 06	04.9	18 55.3 98 06	04.8	23 50.0 98 05	03.8	7
8	9 29.6 99 08	06.1	9 59.1 99 08	06.0	11 27.9 99 07	05.7	11 57.5 99 07	05.6	12 27.1 99 07	05.5	18 22.0 99 06	04.5	18 51.6 99 06	04.4	23 47.0 98 05	03.5	8
9	9 24.7 99 07	05.5	9 54.5 99 07	05.5	11 23.5 99 07	05.2	11 53.1 99 07	05.2	12 22.8 99 07	05.1	18 18.5 99 05	04.1	18 48.1 99 05	04.0	23 44.3 99 04	03.2	9
170	9 20.6 99 06	05.0	9 50.3 99 06	05.0	11 19.4 99 06	04.8	11 49.1 99 06	04.7	12 18.8 99 06	04.6	18 15.3 99 05	03.8	18 45.0 99 05	03.7	23 41.8 99 04	02.9	170
1	9 16.7 99 06	04.5	9 46.4 99 06	04.5	11 15.7 99 06	04.3	11 45.5 99 05	04.2	12 15.3 99 05	04.2	18 12.4 99 04	03.4	18 42.2 99 04	03.3	23 39.6 99 03	02.6	1
2	9 13.2 99 05	04.0	9 43.0 99 05	04.0	11 12.4 99 05	03.8	11 42.3 99 05	03.8	12 12.1 99 05	03.7	18 09.8 99 04	03.0	18 39.6 99 04	02.9	23 37.6 99 03	02.3	2
3	9 10.1 1.004	03.5	9 39.9 1.004	03.5	11 09.5 1.004	03.3	11 39.4 1.004	03.3	12 09.2 1.004	03.2	18 07.5 1.003	02.6	18 37.4 99 03	02.6	23 35.8 99 03	02.0	3
4	9 07.4 1.004	03.0	9 37.3 1.004	03.0	11 07.0 1.004	02.9	11 36.9 1.004	02.8	12 06.8 1.004	02.8	18 05.5 1.003	02.3	18 35.4 1.003	02.2	23 34.3 1.002	01.7	4
175	9 05.1 1.003	02.5	9 35.1 1.003	02.5	11 04.9 1.003	02.4	11 34.8 1.003	02.4	12 04.7 1.003	02.3	18 03.8 1.002	01.9	18 33.8 1.002	01.8	23 33.0 1.002	01.5	175
6	9 03.3 1.002	02.0	9 33.2 1.002	01.9	11 03.0 1.002	01.9	11 33.1 1.002	01.9	12 03.1 1.002	01.9	18 02.5 1.002	01.5	18 32.4 1.002	01.5	23 31.9 1.001	01.2	6
7	9 01.9 1.002	01.5	9 31.8 1.002	01.5	11 01.8 1.002	01.4	11 31.7 1.002	01.4	12 01.7 1.002	01.4	18 01.4 1.001	01.1	18 31.4 1.001	01.1	23 31.1 1.001	00.9	7
8	9 00.8 1.001	01.0	9 30.8 1.001	01.0	11 00.8 1.001	01.0	11 30.8 1.001	00.9	12 00.8 1.001	00.9	18 00.6 1.001	00.8	18 30.6 1.001	00.8	23 30.5 1.001	00.6	8
9	9 00.2 1.000	00.5	9 30.2 1.000	00.5	11 00.2 1.000	00.5	11 30.2 1.000	00.5	12 00.2 1.000	00.4	18 00.2 1.000	00.4	18 30.1 1.000	00.4	23 30.1 1.000	00.3	9
180	9 00.0 1.000	00.0	9 30.0 1.000	00.0	11 00.0 1.000	00.0	11 30.0 1.000	00.0	12 00.0 1.000	00.0	18 00.0 1.000	00.0	18 30.0 1.000	00.0	23 30.0 1.000	00.0	180

Left margin index (H.A.): 00, 1, 2, 3, 4, 05, 6, 7, 8, 9, 10, 1, 2, 3, 4, 15, 6, 7, 8, 9, 20, 1, 2, 3, 4, 25, 6, 7, 8, 9, 30, 1, 2, 3, 4, 35, 6, 7, 8, 9, 40, 1, 2, 3, 4, 45, 6, 7, 8, 9, 50, 1, 2, 3, 4, 55, 6, 7, 8, 9, 60, 1, 2, 3, 4, 65, 6, 7, 8, 9, 70, 1, 2, 3, 4, 75, 6, 7, 8, 9, 80, 1, 2, 3, 4, 90

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STAR IDENTIFICATION TABLE

ALTITUDE

Lat. 39°

AZ.	4° Dec.	4° H.A.	8° Dec.	8° H.A.	12° Dec.	12° H.A.	16° Dec.	16° H.A.	20° Dec.	20° H.A.	24° Dec.	24° H.A.	28° Dec.	28° H.A.	32° Dec.	32° H.A.	36° Dec.	36° H.A.	40° Dec.	40° H.A.	44° Dec.	44° H.A.	AZ.
00	55	180	59	180	63	180	67	180	71	180	75	180	79	180	83	180	87	180	89	00	85	00	00
4	55	173	59	172	63	171	67	170	71	169	75	166	79	162	82	154	86	132	87	71	84	30	4
8	54	166	58	165	62	163	66	161	70	158	74	153	77	146	80	135	83	113	84	78	82	48	8
12	53	160	57	158	61	155	65	152	68	148	72	142	75	134	78	122	80	104	81	80	80	57	12
16	52	153	56	151	59	148	63	144	67	139	70	133	73	125	75	113	77	98	78	80	77	62	16
20	51	148	54	145	58	141	61	137	64	132	67	126	70	118	72	107	74	94	75	80	74	65	20
24	49	142	52	139	56	135	59	131	62	126	65	119	67	112	69	102	71	91	72	79	71	67	24
28	47	137	50	134	53	130	56	125	59	120	62	114	64	107	66	98	68	89	68	78	69	67	28
32	45	132	48	129	51	125	54	120	57	115	59	110	61	103	63	95	65	87	65	77	66	68	32
36	42	128	45	124	48	120	51	116	54	111	56	106	58	99	60	92	61	85	62	76	63	68	36
40	40	124	43	120	45	116	48	112	51	107	53	102	55	96	57	90	58	83	59	75	60	67	40
44	37	120	40	116	43	112	45	108	48	104	50	99	52	93	54	87	55	81	56	74	57	67	44
48	34	116	37	113	40	109	42	105	45	101	47	96	49	91	51	85	52	79	53	73	54	66	48
52	31	113	34	109	37	106	39	102	42	98	44	93	46	88	48	83	49	77	50	71	51	65	52
56	29	110	31	106	34	103	36	99	39	95	41	90	43	86	45	81	46	76	48	70	49	64	56
60	26	107	28	103	31	100	33	96	35	92	38	88	40	84	42	79	43	74	45	69	46	63	60
64	23	104	25	101	28	97	30	93	32	90	35	86	37	81	38	77	40	72	41	67	43	62	64
68	20	101	22	98	25	94	27	91	29	87	31	83	34	79	35	75	37	70	39	66	40	61	68
72	16	98	19	95	21	92	24	88	26	85	28	81	30	77	32	73	34	69	36	64	38	60	72
76	13	96	16	93	18	89	21	86	23	82	25	79	27	75	30	71	31	67	33	63	35	58	76
80	10	93	13	90	15	87	18	83	20	80	22	76	24	73	27	69	29	65	31	61	32	57	80
84	07	91	10	87	12	84	15	81	17	78	19	74	22	71	24	67	26	63	28	59	30	55	84
88	04	88	07	85	09	82	12	79	14	75	16	72	19	69	21	65	23	61	25	58	27	54	88
92	01	86	03	83	06	79	08	76	11	73	13	70	16	66	18	63	20	60	23	56	25	52	92
96	*02*	83	00	80	03	77	05	74	08	71	10	68	13	64	15	61	18	58	20	54	22	51	96
100	*05*	81	*03*	77	*00*	74	*03*	71	*05*	68	08	65	10	62	13	59	16	56	18	52	20	49	100
104	*08*	78	*06*	75	*03*	72	*00*	69	*02*	66	05	63	07	60	10	57	13	54	15	50	18	47	104
108	*11*	75	*09*	72	*06*	69	*03*	66	*01*	63	*02*	60	05	57	07	54	10	51	13	48	15	45	108
112	*14*	73	*12*	70	*09*	67	*06*	64	*03*	61	*01*	58	*02*	55	05	52	08	49	10	46	13	43	112
116	*17*	70	*14*	67	*12*	64	*09*	61	*06*	58	*03*	55	*00*	53	03	50	05	47	08	44	11	41	116
120	*20*	67	*17*	64	*14*	61	*12*	58	*09*	55	*06*	53	*03*	50	*00*	47	03	45	06	42	09	39	120
124	*23*	64	*20*	61	*17*	58	*14*	55	*11*	53	*08*	50	*05*	47	*02*	45	01	42	04	40	07	37	124
128	*26*	61	*23*	58	*20*	55	*17*	52	*14*	50	*10*	47	*07*	45	*04*	42	*01*	40	02	37	05	35	128
132	*28*	57	*25*	54	*22*	52	*19*	49	*16*	47	*13*	44	*09*	42	*06*	39	*03*	37	*00*	35	04	32	132
136	*31*	54	*28*	51	*25*	48	*21*	46	*18*	43	*15*	41	*11*	39	*08*	37	*05*	34	*01*	32	02	30	136
140	*33*	50	*30*	47	*27*	45	*24*	42	*20*	40	*17*	38	*13*	36	*10*	34	*06*	32	*03*	30	*01*	28	140
144	*36*	46	*32*	44	*29*	41	*26*	39	*22*	37	*19*	35	*15*	33	*12*	31	*08*	29	*04*	27	*01*	25	144
148	*38*	42	*34*	39	*31*	37	*27*	35	*24*	33	*20*	31	*17*	29	*13*	27	*09*	26	*06*	24	*02*	22	148
152	*40*	38	*36*	35	*33*	33	*29*	31	*25*	29	*22*	28	*18*	26	*14*	24	*11*	23	*07*	21	*03*	20	152
156	*42*	33	*38*	31	*34*	29	*31*	27	*27*	25	*23*	24	*19*	22	*16*	21	*12*	20	*08*	18	*04*	17	156
160	*43*	28	*39*	26	*36*	24	*32*	23	*28*	21	*24*	20	*20*	19	*17*	18	*13*	16	*09*	15	*05*	14	160
164	*45*	23	*41*	21	*37*	20	*33*	18	*29*	17	*25*	16	*21*	15	*17*	14	*14*	13	*10*	12	*06*	11	164
168	*46*	17	*42*	16	*38*	15	*34*	14	*30*	13	*26*	12	*22*	11	*18*	11	*14*	10	*10*	09	*06*	09	168
172	*46*	12	*42*	11	*38*	10	*34*	09	*31*	09	*27*	08	*23*	08	*19*	07	*15*	07	*11*	06	*07*	06	172
176	*47*	06	*43*	05	*39*	05	*35*	05	*31*	04	*27*	04	*23*	04	*19*	04	*15*	03	*11*	03	*07*	03	176
180	*47*	00	*43*	00	*39*	00	*35*	00	*31*	00	*27*	00	*23*	00	*19*	00	*15*	00	*11*	00	*07*	00	180

| | 4° | | 8° | | 12° | | 16° | | 20° | | 24° | | 28° | | 32° | | 36° | | 40° | | 44° | | |

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

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STAR IDENTIFICATION TABLE

ALTITUDE

AZ.	48° Dec.	48° H.A.	52° Dec.	52° H.A.	56° Dec.	56° H.A.	60° Dec.	60° H.A.	64° Dec.	64° H.A.	68° Dec.	68° H.A.	72° Dec.	72° H.A.	76° Dec.	76° H.A.	80° Dec.	80° H.A.	84° Dec.	84° H.A.	88° Dec.	88° H.A.	AZ.
00	81	00	77	00	73	00	69	00	65	00	61	00	57	00	53	00	49	00	45	00	41	00	00
4	81	17	77	11	73	08	69	06	65	04	61	03	57	02	53	02	49	01	45	01	41	00	4
8	79	30	76	21	72	15	68	11	65	08	61	05	57	04	53	03	49	02	45	01	41	00	8
12	78	40	75	29	71	21	68	16	64	12	60	09	56	07	53	05	49	03	45	02	41	01	12
16	75	47	73	35	70	27	67	20	63	16	60	12	56	09	52	06	49	04	45	02	41	01	16
20	73	52	71	40	68	31	66	24	62	19	59	14	56	11	52	08	48	05	45	03	41	01	20
24	71	55	69	44	67	35	64	28	61	22	58	17	55	13	51	09	48	06	44	03	41	01	24
28	68	57	67	47	65	38	63	31	60	25	57	19	54	14	51	10	48	07	44	04	41	01	28
32	65	58	64	49	63	41	61	33	59	27	56	21	53	16	50	12	47	08	44	04	41	01	32
36	63	59	62	50	61	42	59	35	57	28	55	23	52	17	50	13	47	09	44	05	41	02	36
40	60	59	60	51	59	44	57	37	56	30	54	24	51	19	49	14	46	09	43	05	41	02	40
44	57	59	57	52	57	45	56	38	54	31	52	25	50	20	48	15	46	10	43	06	40	02	44
48	55	59	55	52	54	45	54	39	53	32	51	26	49	21	47	15	45	11	43	06	40	02	48
52	52	59	52	52	52	46	52	39	51	33	50	27	48	21	47	16	45	11	43	06	40	02	52
56	49	58	50	52	50	46	50	40	49	34	48	28	47	22	46	17	44	12	42	07	40	02	56
60	47	58	47	52	48	46	48	40	47	34	47	28	46	23	45	17	43	12	42	07	40	02	60
64	44	57	45	51	45	46	46	40	46	34	45	29	45	23	44	18	43	12	41	07	40	02	64
68	41	56	42	51	43	45	44	40	44	34	44	29	44	23	43	18	42	13	41	07	40	02	68
72	39	55	40	50	41	45	42	40	42	34	42	29	42	23	42	18	41	13	41	08	40	02	72
76	36	54	38	49	39	44	40	39	40	34	41	29	41	23	41	18	41	13	40	08	39	03	76
80	34	53	35	48	37	43	38	39	39	34	39	28	40	23	40	18	40	13	40	08	39	03	80
84	31	51	33	47	35	42	36	38	37	33	38	28	39	23	39	18	39	13	39	08	39	03	84
88	29	50	31	46	32	41	34	37	35	32	36	28	37	23	38	18	39	13	39	08	39	03	88
92	27	48	29	45	30	40	32	36	34	32	35	27	36	22	37	18	38	13	39	08	39	03	92
96	24	47	26	43	28	39	30	35	32	31	34	27	35	22	36	17	37	13	38	08	39	03	96
100	22	45	24	42	27	38	29	34	30	30	32	26	34	21	35	17	37	12	38	07	39	03	100
104	20	44	22	40	25	37	27	33	29	29	31	25	33	21	34	17	36	12	37	07	38	02	104
108	18	42	20	39	23	35	25	32	27	28	30	24	32	20	34	16	35	12	37	07	38	02	108
112	16	40	18	37	21	34	24	30	26	27	28	23	31	19	33	15	35	11	37	07	38	02	112
116	14	38	17	35	19	32	22	29	25	26	27	22	30	19	32	15	34	11	36	07	38	02	116
120	12	36	15	33	18	31	21	28	23	24	26	21	29	18	31	14	34	10	36	06	38	02	120
124	10	34	13	32	16	29	19	26	22	23	25	20	28	17	30	13	33	10	35	06	38	02	124
128	08	32	12	30	15	27	18	24	21	22	24	19	27	16	30	13	32	09	35	06	38	02	128
132	07	30	10	28	13	25	17	23	20	20	23	18	26	15	29	12	32	09	35	05	38	02	132
136	05	28	09	26	12	23	15	21	19	19	22	16	25	14	28	11	32	08	35	05	38	02	136
140	04	26	07	24	11	21	14	19	18	17	21	15	24	13	28	10	31	07	34	05	37	02	140
144	03	23	06	21	10	19	13	18	17	16	20	14	24	11	27	09	31	07	34	04	37	01	144
148	02	21	05	19	09	17	12	16	16	14	20	12	23	10	27	08	30	06	34	04	37	01	148
152	00	18	04	17	08	15	12	14	15	12	19	11	23	09	26	07	30	05	34	03	37	01	152
156	*00*	16	03	15	07	13	11	12	15	11	19	09	22	08	26	06	30	05	33	03	37	01	156
160	*01*	13	03	12	07	11	10	10	14	09	18	08	22	07	26	05	30	04	33	02	37	01	160
164	*02*	11	02	10	06	09	10	08	14	07	18	06	22	05	25	04	29	03	33	02	37	01	164
168	*02*	08	02	07	06	07	09	06	13	05	17	05	21	04	25	03	29	02	33	01	37	01	168
172	*03*	05	01	05	05	04	09	04	13	04	17	03	21	03	25	02	29	02	33	01	37	00	172
176	*03*	03	01	02	05	02	09	02	13	02	17	02	21	01	25	01	29	01	33	00	37	00	176
180	*03*	00	01	00	05	00	09	00	13	00	17	00	21	00	25	00	29	00	33	00	37	00	180

| | 48° | | 52° | | 56° | | 60° | | 64° | | 68° | | 72° | | 76° | | 80° | | 84° | | 88° | |

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

ALTITUDE CORRECTION FOR D. R. LATITUDE

LATITUDE DIFFERENCE (minutes of arc)

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

LAT. DIFF. (tenths of minutes of arc)

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

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

ALTITUDE CORRECTION FOR D. R. LATITUDE

LATITUDE DIFFERENCE (minutes of arc)

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

LAT. DIFF. (tenths of minutes of arc)

Az.	Az.	0.1'	0.2'	0.3'	0.4'	0.5'	0.6'	0.7'	0.8'	0.9'
0	180	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
5	175	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
10	170	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
15	165	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9
20	160	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8
25	155	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
30	150	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8
35	145	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.7
40	140	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7
45	135	0.1	0.1	0.2	0.3		0.4		0.5	0.6
50	130	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6
55	125	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5
60	120	0.0	0.1	0.2	0.2	0.2	0.3	0.4	0.4	0.4
65	115	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4
70	110	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
75	105	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
80	100	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2
85	95	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1
90	90	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

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

MULTIPLICATION TABLE

Left label (row axis): Δd or Δt   ·   Right label: Δd or Δt

Δ	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	Δ	0.1'	0.2'	0.3'	0.4'	0.5'	0.6'	0.7'	0.8'	0.9'	Δ
	DEC. DIFF. OR H. A. DIFF. (minutes of arc)																**DEC. DIFF. OR H. A. DIFF. (tenths of minutes)**									
01	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.2	01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	01
02	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	02	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	02
03	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.4	0.5	03	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	03
04	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	0.4	0.4	0.5	0.5	0.6	0.6	04	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	04
05	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	0.5	0.6	0.6	0.7	0.7	0.8	05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	05
06	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	0.6	0.7	0.7	0.8	0.8	0.9	06	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	06
07	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	0.7	0.8	0.8	0.9	1.0	1.1	07	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	07
08	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8	0.9	1.0	1.0	1.1	1.2	08	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	08
09	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	09	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	09
10	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	10	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	10
11	0.1	0.2	0.3	0.4	0.6	0.7	0.8	0.9	1.0	1.1	1.2	1.3	1.4	1.5	1.7	11	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	11
12	0.1	0.2	0.4	0.5	0.6	0.7	0.8	1.0	1.1	1.2	1.3	1.4	1.6	1.7	1.8	12	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	12
13	0.1	0.3	0.4	0.5	0.7	0.8	0.9	1.0	1.2	1.3	1.4	1.6	1.7	1.8	2.0	13	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	13
14	0.1	0.3	0.4	0.6	0.7	0.8	1.0	1.1	1.3	1.4	1.5	1.7	1.8	2.0	2.1	14	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	14
15	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	1.5	1.7	1.8	2.0	2.1	2.3	15	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	15
16	0.2	0.3	0.5	0.6	0.8	1.0	1.1	1.3	1.4	1.6	1.8	1.9	2.1	2.2	2.4	16	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	16
17	0.2	0.3	0.5	0.7	0.9	1.0	1.2	1.4	1.5	1.7	1.9	2.0	2.2	2.4	2.6	17	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	17
18	0.2	0.4	0.5	0.7	0.9	1.1	1.3	1.4	1.6	1.8	2.0	2.2	2.3	2.5	2.7	18	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1	0.2	18
19	0.2	0.4	0.6	0.8	1.0	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	19	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	19
20	0.2	0.4	0.6	0.8	1.0	1.2	1.4	1.6	1.8	2.0	2.2	2.4	2.6	2.8	3.0	20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	20
21	0.2	0.4	0.6	0.8	1.1	1.3	1.5	1.7	1.9	2.1	2.3	2.5	2.7	2.9	3.2	21	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2	21
22	0.2	0.4	0.7	0.9	1.1	1.3	1.5	1.8	2.0	2.2	2.4	2.6	2.9	3.1	3.3	22	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	22
23	0.2	0.5	0.7	0.9	1.2	1.4	1.6	1.8	2.1	2.3	2.5	2.8	3.0	3.2	3.5	23	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	23
24	0.2	0.5	0.7	1.0	1.2	1.4	1.7	1.9	2.2	2.4	2.6	2.9	3.1	3.4	3.6	24	0.0	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	24
25	0.3	0.5	0.8	1.0	1.3	1.5	1.8	2.0	2.3	2.5	2.8	3.0	3.3	3.5	3.8	25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	25
26	0.3	0.5	0.8	1.0	1.3	1.6	1.8	2.1	2.3	2.6	2.9	3.1	3.4	3.6	3.9	26	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	26
27	0.3	0.5	0.8	1.1	1.4	1.6	1.9	2.2	2.4	2.7	3.0	3.2	3.5	3.8	4.1	27	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2	27
28	0.3	0.6	0.8	1.1	1.4	1.7	2.0	2.2	2.5	2.8	3.1	3.4	3.6	3.9	4.2	28	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	28
29	0.3	0.6	0.9	1.2	1.5	1.7	2.0	2.3	2.6	2.9	3.2	3.5	3.8	4.1	4.4	29	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.3	29
30	0.3	0.6	0.9	1.2	1.5	1.8	2.1	2.4	2.7	3.0	3.3	3.6	3.9	4.2	4.5	30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	30
31	0.3	0.6	0.9	1.2	1.6	1.9	2.2	2.5	2.8	3.1	3.4	3.7	4.0	4.3	4.7	31	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3	31
32	0.3	0.6	1.0	1.3	1.6	1.9	2.2	2.6	2.9	3.2	3.5	3.8	4.2	4.5	4.8	32	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	32
33	0.3	0.7	1.0	1.3	1.7	2.0	2.3	2.6	3.0	3.3	3.6	4.0	4.3	4.6	5.0	33	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	33
34	0.3	0.7	1.0	1.4	1.7	2.0	2.4	2.7	3.1	3.4	3.7	4.1	4.4	4.8	5.1	34	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	34
35	0.4	0.7	1.1	1.4	1.8	2.1	2.5	2.8	3.2	3.5	3.9	4.2	4.6	4.9	5.3	35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3	35
36	0.4	0.7	1.1	1.4	1.8	2.2	2.5	2.9	3.2	3.6	4.0	4.3	4.7	5.0	5.4	36	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	36
37	0.4	0.7	1.1	1.5	1.9	2.2	2.6	3.0	3.3	3.7	4.1	4.4	4.8	5.2	5.6	37	0.0	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	37
38	0.4	0.8	1.1	1.5	1.9	2.3	2.7	3.0	3.4	3.8	4.2	4.6	4.9	5.3	5.7	38	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	38
39	0.4	0.8	1.2	1.6	2.0	2.3	2.7	3.1	3.5	3.9	4.3	4.7	5.1	5.5	5.9	39	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.3	39
40	0.4	0.8	1.2	1.6	2.0	2.4	2.8	3.2	3.6	4.0	4.4	4.8	5.2	5.6	6.0	40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	40
41	0.4	0.8	1.2	1.6	2.1	2.5	2.9	3.3	3.7	4.1	4.5	4.9	5.3	5.7	6.2	41	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4	41
42	0.4	0.8	1.3	1.7	2.1	2.5	2.9	3.4	3.8	4.2	4.6	5.0	5.5	5.9	6.3	42	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	42
43	0.4	0.9	1.3	1.7	2.2	2.6	3.0	3.4	3.9	4.3	4.7	5.2	5.6	6.0	6.5	43	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.4	43
44	0.4	0.9	1.3	1.8	2.2	2.6	3.1	3.5	4.0	4.4	4.8	5.3	5.7	6.2	6.6	44	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	44
45	0.5	0.9	1.4	1.8	2.3	2.7	3.2	3.6	4.1	4.5	5.0	5.4	5.9	6.3	6.8	45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	45
46	0.5	0.9	1.4	1.8	2.3	2.8	3.2	3.7	4.1	4.6	5.1	5.5	6.0	6.4	6.9	46	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	46
47	0.5	0.9	1.4	1.9	2.4	2.8	3.3	3.8	4.2	4.7	5.2	5.6	6.1	6.6	7.1	47	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	47
48	0.5	1.0	1.4	1.9	2.4	2.9	3.4	3.8	4.3	4.8	5.3	5.8	6.2	6.7	7.2	48	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	48
49	0.5	1.0	1.5	2.0	2.5	2.9	3.4	3.9	4.4	4.9	5.4	5.9	6.4	6.9	7.4	49	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	49
50	0.5	1.0	1.5	2.0	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5	7.0	7.5	50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	50
51	0.5	1.0	1.5	2.0	2.6	3.1	3.6	4.1	4.6	5.1	5.6	6.1	6.6	7.1	7.7	51	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	51
52	0.5	1.0	1.6	2.1	2.6	3.1	3.6	4.2	4.7	5.2	5.7	6.2	6.8	7.3	7.8	52	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	52
53	0.5	1.1	1.6	2.1	2.7	3.2	3.7	4.2	4.8	5.3	5.8	6.4	6.9	7.4	8.0	53	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	53
54	0.5	1.1	1.6	2.2	2.7	3.2	3.8	4.3	4.9	5.4	5.9	6.5	7.0	7.6	8.1	54	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	54
55	0.6	1.1	1.7	2.2	2.8	3.3	3.9	4.4	5.0	5.5	6.1	6.6	7.2	7.7	8.3	55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	55
56	0.6	1.1	1.7	2.2	2.8	3.4	3.9	4.5	5.0	5.6	6.2	6.7	7.3	7.8	8.4	56	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5	56
57	0.6	1.1	1.7	2.3	2.9	3.4	4.0	4.6	5.1	5.7	6.3	6.8	7.4	8.0	8.6	57	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	57
58	0.6	1.2	1.7	2.3	2.9	3.5	4.1	4.6	5.2	5.8	6.4	7.0	7.5	8.1	8.7	58	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.5	0.5	58
59	0.6	1.2	1.8	2.4	3.0	3.5	4.1	4.7	5.3	5.9	6.5	7.1	7.7	8.3	8.9	59	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	59
60	0.6	1.2	1.8	2.4	3.0	3.6	4.2	4.8	5.4	6.0	6.6	7.2	7.8	8.4	9.0	60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	60
61	0.6	1.2	1.8	2.4	3.1	3.7	4.3	4.9	5.5	6.1	6.7	7.3	7.9	8.5	9.2	61	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5	61
62	0.6	1.2	1.9	2.5	3.1	3.7	4.3	5.0	5.6	6.2	6.8	7.4	8.1	8.7	9.3	62	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.6	62
63	0.6	1.3	1.9	2.5	3.2	3.8	4.4	5.0	5.7	6.3	6.9	7.6	8.2	8.8	9.5	63	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	63
64	0.6	1.3	1.9	2.6	3.2	3.8	4.5	5.1	5.8	6.4	7.0	7.7	8.3	9.0	9.6	64	0.1	0.1	0.2	0.3	0.3	0.4	0.4	0.5	0.6	64
65	0.7	1.3	2.0	2.6	3.3	3.9	4.6	5.2	5.9	6.5	7.2	7.8	8.5	9.1	9.8	65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	65
66	0.7	1.3	2.0	2.6	3.3	4.0	4.6	5.3	5.9	6.6	7.3	7.9	8.6	9.2	9.9	66	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	66
67	0.7	1.3	2.0	2.7	3.4	4.0	4.7	5.4	6.0	6.7	7.4	8.0	8.7	9.4	10.1	67	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	67
68	0.7	1.4	2.0	2.7	3.4	4.1	4.8	5.4	6.1	6.8	7.5	8.2	8.8	9.5	10.2	68	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6	68
69	0.7	1.4	2.1	2.8	3.5	4.1	4.8	5.5	6.2	6.9	7.6	8.3	9.0	9.7	10.4	69	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.6	69
70	0.7	1.4	2.1	2.8	3.5	4.2	4.9	5.6	6.3	7.0	7.7	8.4	9.1	9.8	10.5	70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	70
71	0.7	1.4	2.1	2.8	3.6	4.3	5.0	5.7	6.4	7.1	7.8	8.5	9.2	9.9	10.7	71	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	71
72	0.7	1.4	2.2	2.9	3.6	4.3	5.0	5.8	6.5	7.2	7.9	8.6	9.4	10.1	10.8	72	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6	72
73	0.7	1.5	2.2	2.9	3.7	4.4	5.1	5.8	6.6	7.3	8.0	8.8	9.5	10.2	11.0	73	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	73
74	0.7	1.5	2.2	3.0	3.7	4.4	5.2	5.9	6.7	7.4	8.1	8.9	9.6	10.4	11.1	74	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	74
75	0.8	1.5	2.3	3.0	3.8	4.5	5.3	6.0	6.8	7.5	8.3	9.0	9.8	10.5	11.3	75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	75
76	0.8	1.5	2.3	3.0	3.8	4.6	5.3	6.1	6.8	7.6	8.4	9.1	9.9	10.6	11.4	76	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	76
77	0.8	1.5	2.3	3.1	3.9	4.6	5.4	6.2	6.9	7.7	8.5	9.2	10.0	10.8	11.6	77	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	77
78	0.8	1.6	2.3	3.1	3.9	4.7	5.5	6.2	7.0	7.8	8.6	9.4	10.1	10.9	11.7	78	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7	78
79	0.8	1.6	2.4	3.2	4.0	4.7	5.5	6.3	7.1	7.9	8.7	9.5	10.3	11.1	11.9	79	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	79
80	0.8	1.6	2.4	3.2	4.0	4.8	5.6	6.4	7.2	8.0	8.8	9.6	10.4	11.2	12.0	80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	80
81	0.8	1.6	2.4	3.2	4.1	4.9	5.7	6.5	7.3	8.1	8.9	9.7	10.5	11.3	12.2	81	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7	81
82	0.8	1.6	2.5	3.3	4.1	4.9	5.7	6.6	7.4	8.2	9.0	9.8	10.7	11.5	12.3	82	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	82
83	0.8	1.7	2.5	3.3	4.2	5.0	5.8	6.6	7.5	8.3	9.1	10.0	10.8	11.6	12.5	83	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.7	83
84	0.8	1.7	2.5	3.4	4.2	5.0	5.9	6.7	7.6	8.4	9.2	10.1	10.9	11.8	12.6	84	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	84
85	0.9	1.7	2.6	3.4	4.3	5.1	6.0	6.8	7.7	8.5	9.4	10.2	11.1	11.9	12.8	85	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	85
86	0.9	1.7	2.6	3.4	4.3	5.2	6.0	6.9	7.7	8.6	9.5	10.3	11.2	12.0	12.9	86	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	86
87	0.9	1.7	2.6	3.5	4.4	5.2	6.1	7.0	7.8	8.7	9.6	10.4	11.3	12.2	13.1	87	0.1	0.2	0.3	0.3	0.4	0.5	0.6	0.7	0.8	87
88	0.9	1.8	2.6	3.5	4.4	5.3	6.2	7.0	7.9	8.8	9.7	10.6	11.4	12.3	13.2	88	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	88
89	0.9	1.8	2.7	3.6	4.5	5.3	6.2	7.1	8.0	8.9	9.8	10.7	11.6	12.5	13.4	89	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.7	0.8	89
90	0.9	1.8	2.7	3.6	4.5	5.4	6.3	7.2	8.1	9.0	9.9	10.8	11.7	12.6	13.5	90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	90
91	0.9	1.8	2.7	3.6	4.6	5.5	6.4	7.3	8.2	9.1	10.0	10.9	11.8	12.7	13.7	91	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8	91
92	0.9	1.8	2.8	3.7	4.6	5.5	6.4	7.4	8.3	9.2	10.1	11.0	12.0	12.9	13.8	92	0.1	0.2	0.3	0.4	0.5	0.6	0.6	0.7	0.8	92
93	0.9	1.9	2.8	3.7	4.7	5.6	6.5	7.4	8.4	9.3	10.2	11.2	12.1	13.0	14.0	93	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8	93
94	0.9	1.9	2.8	3.8	4.7	5.6	6.6	7.5	8.5	9.4	10.3	11.3	12.2	13.2	14.1	94	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.8	94
95	1.0	1.9	2.9	3.8	4.8	5.7	6.7	7.6	8.6	9.5	10.5	11.4	12.4	13.3	14.3	95	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	95
96	1.0	1.9	2.9	3.8	4.8	5.8	6.7	7.7	8.6	9.6	10.6	11.5	12.5	13.4	14.4	96	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	96
97	1.0	1.9	2.9	3.9	4.9	5.8	6.8	7.8	8.7	9.7	10.7	11.6	12.6	13.6	14.6	97	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	97
98	1.0	2.0	2.9	3.9	4.9	5.9	6.9	7.8	8.8	9.8	10.8	11.8	12.7	13.7	14.7	98	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	98
99	1.0	2.0	3.0	4.0	5.0	5.9	6.9	7.9	8.9	9.9	10.9	11.9	12.9	13.9	14.9	99	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	99
Δ	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'	13'	14'	15'	Δ	0.1'	0.2'	0.3'	0.4'	0.5'	0.6'	0.7'	0.8'	0.9'	Δ

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MULTIPLICATION TABLE

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

Δ	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′
01	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3
2	.3	.3	.4	.4	.4	.4	.4	.5	.5	.5	.5	.6	.6	.6	.6
3	.5	.5	.5	.6	.6	.6	.6	.7	.7	.8	.8	.8	.8	.9	.9
4	.6	.7	.7	.7	.8	.8	.9	.9	1.0	1.0	1.0	1.1	1.1	1.2	1.2
05	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.2	1.2	1.3	1.3	1.4	1.4	1.5	1.5
6	1.0	1.0	1.1	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.6	1.7	1.7	1.7	1.8
7	1.1	1.2	1.3	1.3	1.4	1.5	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.0	2.1
8	1.3	1.4	1.4	1.5	1.6	1.7	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.3	2.4
9	1.4	1.5	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.3	2.4	2.5	2.6	2.7
10	1.6	1.7	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	3.0
1	1.8	1.9	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.3
2	1.9	2.0	2.2	2.3	2.4	2.5	2.6	2.8	2.9	3.0	3.1	3.2	3.4	3.5	3.6
3	2.1	2.2	2.3	2.5	2.6	2.7	2.9	3.0	3.1	3.3	3.4	3.5	3.6	3.8	3.9
4	2.2	2.4	2.5	2.7	2.8	2.9	3.1	3.2	3.4	3.5	3.6	3.8	3.9	4.1	4.2
15	2.4	2.6	2.7	2.9	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	4.5
6	2.6	2.7	2.9	3.0	3.2	3.4	3.5	3.7	3.8	4.0	4.2	4.3	4.5	4.6	4.8
7	2.7	2.9	3.1	3.2	3.4	3.6	3.7	3.9	4.1	4.3	4.4	4.6	4.8	4.9	5.1
8	2.9	3.1	3.2	3.4	3.6	3.8	4.0	4.1	4.3	4.5	4.7	4.9	5.0	5.2	5.4
9	3.0	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	4.9	5.1	5.3	5.5	5.7
20	3.2	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.2	5.4	5.6	5.8	6.0
1	3.4	3.6	3.8	4.0	4.2	4.4	4.6	4.8	5.0	5.3	5.5	5.7	5.9	6.1	6.3
2	3.5	3.7	4.0	4.1	4.4	4.6	4.8	5.1	5.3	5.5	5.7	5.9	6.2	6.4	6.6
3	3.7	3.9	4.1	4.4	4.6	4.8	5.1	5.3	5.5	5.8	6.0	6.2	6.4	6.7	6.9
4	3.8	4.1	4.3	4.6	4.8	5.0	5.3	5.5	5.8	6.0	6.2	6.5	6.7	7.0	7.2
25	4.0	4.3	4.5	4.8	5.0	5.3	5.5	5.8	6.0	6.3	6.5	6.8	7.0	7.3	7.5
6	4.2	4.4	4.7	4.9	5.2	5.5	5.7	6.0	6.2	6.5	6.8	7.0	7.3	7.5	7.8
7	4.3	4.6	4.9	5.1	5.4	5.7	5.9	6.2	6.5	6.8	7.0	7.3	7.6	7.8	8.1
8	4.5	4.8	5.0	5.3	5.6	5.9	6.2	6.4	6.7	7.0	7.3	7.6	7.8	8.1	8.4
9	4.6	4.9	5.2	5.5	5.8	6.1	6.4	6.7	7.0	7.3	7.5	7.8	8.1	8.4	8.7
30	4.8	5.1	5.4	5.7	6.0	6.3	6.6	6.9	7.2	7.5	7.8	8.1	8.4	8.7	9.0
1	5.0	5.3	5.6	5.9	6.2	6.5	6.8	7.1	7.4	7.8	8.1	8.4	8.7	9.0	9.3
2	5.1	5.4	5.8	6.1	6.4	6.7	7.0	7.4	7.7	8.0	8.3	8.6	9.0	9.3	9.6
3	5.3	5.6	5.9	6.3	6.6	6.9	7.3	7.6	7.9	8.3	8.6	8.9	9.2	9.6	9.9
4	5.4	5.8	6.1	6.5	6.8	7.1	7.5	7.8	8.2	8.5	8.8	9.2	9.5	9.9	10.2
35	5.6	6.0	6.3	6.7	7.0	7.4	7.7	8.1	8.4	8.8	9.1	9.5	9.8	10.2	10.5
6	5.8	6.1	6.5	6.8	7.2	7.6	7.9	8.3	8.6	9.0	9.4	9.7	10.1	10.4	10.8
7	5.9	6.3	6.7	7.0	7.4	7.8	8.1	8.5	8.9	9.3	9.6	10.0	10.4	10.7	11.1
8	6.1	6.5	6.8	7.2	7.6	8.0	8.4	8.7	9.1	9.5	9.9	10.3	10.7	11.0	11.4
9	6.2	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.1	10.5	10.9	11.3	11.7
40	6.4	6.8	7.2	7.6	8.0	8.4	8.8	9.2	9.6	10.0	10.4	10.8	11.2	11.6	12.0
1	6.6	7.0	7.4	7.8	8.2	8.6	9.0	9.4	9.8	10.3	10.7	11.1	11.5	11.9	12.3
2	6.7	7.1	7.6	8.0	8.4	8.8	9.2	9.7	10.1	10.5	10.9	11.3	11.8	12.2	12.6
3	6.9	7.3	7.7	8.2	8.6	9.0	9.5	9.9	10.3	10.8	11.2	11.6	12.0	12.5	12.9
4	7.0	7.5	7.9	8.4	8.8	9.2	9.7	10.1	10.6	11.0	11.4	11.9	12.3	12.8	13.2
45	7.2	7.7	8.1	8.6	9.0	9.5	9.9	10.4	10.8	11.3	11.7	12.2	12.6	13.1	13.5
6	7.4	7.8	8.3	8.7	9.2	9.7	10.1	10.6	11.0	11.5	12.0	12.4	12.9	13.3	13.8
7	7.5	8.0	8.5	8.9	9.4	9.9	10.3	10.8	11.3	11.8	12.2	12.7	13.2	13.6	14.1
8	7.7	8.2	8.6	9.1	9.6	10.1	10.6	11.0	11.5	12.0	12.5	13.0	13.4	13.9	14.4
9	7.8	8.3	8.8	9.3	9.8	10.3	10.8	11.3	11.8	12.3	12.7	13.2	13.7	14.2	14.7
50	8.0	8.5	9.0	9.5	10.0	10.5	11.0	11.5	12.0	12.5	13.0	13.5	14.0	14.5	15.0
1	8.2	8.7	9.2	9.7	10.2	10.7	11.2	11.7	12.2	12.8	13.3	13.8	14.3	14.8	15.3
2	8.3	8.8	9.4	9.9	10.4	10.9	11.4	12.0	12.5	13.0	13.5	14.0	14.6	15.1	15.6
3	8.5	9.0	9.5	10.1	10.6	11.1	11.7	12.2	12.7	13.3	13.8	14.3	14.8	15.4	15.9
4	8.6	9.2	9.7	10.3	10.8	11.3	11.9	12.4	13.0	13.5	14.0	14.6	15.1	15.7	16.2
55	8.8	9.4	9.9	10.5	11.0	11.6	12.1	12.7	13.2	13.8	14.3	14.9	15.4	16.0	16.5
6	9.0	9.5	10.1	10.6	11.2	11.8	12.3	12.9	13.4	14.0	14.6	15.1	15.7	16.2	16.8
7	9.1	9.7	10.3	10.8	11.4	12.0	12.5	13.1	13.7	14.3	14.8	15.4	16.0	16.5	17.1
8	9.3	9.9	10.4	11.0	11.6	12.2	12.8	13.3	13.9	14.5	15.1	15.7	16.2	16.8	17.4
9	9.4	10.0	10.6	11.2	11.8	12.4	13.0	13.6	14.2	14.8	15.3	15.9	16.5	17.1	17.7
60	9.6	10.2	10.8	11.4	12.0	12.6	13.2	13.8	14.4	15.0	15.6	16.2	16.8	17.4	18.0
1	9.8	10.4	11.0	11.6	12.2	12.8	13.4	14.0	14.6	15.3	15.9	16.5	17.1	17.7	18.3
2	9.9	10.5	11.2	11.8	12.4	13.0	13.6	14.3	14.9	15.5	16.1	16.7	17.4	18.0	18.6
3	10.1	10.7	11.3	12.0	12.6	13.2	13.9	14.5	15.1	15.8	16.4	17.0	17.6	18.3	18.9
4	10.2	10.9	11.5	12.2	12.8	13.4	14.1	14.7	15.4	16.0	16.6	17.3	17.9	18.6	19.2
65	10.4	11.1	11.7	12.4	13.0	13.7	14.3	15.0	15.6	16.3	16.9	17.6	18.2	18.9	19.5
6	10.6	11.2	11.9	12.5	13.2	13.9	14.5	15.2	15.8	16.5	17.2	17.8	18.5	19.1	19.8
7	10.7	11.4	12.1	12.7	13.4	14.1	14.7	15.4	16.1	16.8	17.4	18.1	18.8	19.4	20.1
8	10.9	11.6	12.2	12.9	13.6	14.3	15.0	15.6	16.3	17.0	17.7	18.4	19.0	19.7	20.4
9	11.0	11.7	12.4	13.1	13.8	14.5	15.2	15.9	16.6	17.3	17.9	18.6	19.3	20.0	20.7
70	11.2	11.9	12.6	13.3	14.0	14.7	15.4	16.1	16.8	17.5	18.2	18.9	19.6	20.3	21.0
1	11.4	12.1	12.8	13.5	14.2	14.9	15.6	16.3	17.0	17.8	18.5	19.2	19.9	20.6	21.3
2	11.5	12.2	13.0	13.7	14.4	15.1	15.8	16.6	17.3	18.0	18.7	19.4	20.2	20.9	21.6
3	11.7	12.4	13.1	13.9	14.6	15.3	16.1	16.8	17.5	18.3	19.0	19.7	20.4	21.2	21.9
4	11.8	12.6	13.3	14.1	14.8	15.5	16.3	17.0	17.8	18.5	19.2	20.0	20.7	21.5	22.2
75	12.0	12.8	13.5	14.3	15.0	15.8	16.5	17.3	18.0	18.8	19.5	20.3	21.0	21.8	22.5
6	12.2	12.9	13.7	14.4	15.2	16.0	16.7	17.5	18.2	19.0	19.8	20.5	21.3	22.0	22.8
7	12.3	13.1	13.9	14.6	15.4	16.2	16.9	17.7	18.5	19.3	20.0	20.8	21.6	22.3	23.1
8	12.5	13.3	14.0	14.8	15.6	16.4	17.2	17.9	18.7	19.5	20.3	21.1	21.8	22.6	23.4
9	12.6	13.4	14.2	15.0	15.8	16.6	17.4	18.2	19.0	19.8	20.5	21.3	22.1	22.9	23.7
80	12.8	13.6	14.4	15.2	16.0	16.8	17.6	18.4	19.2	20.0	20.8	21.6	22.4	23.2	24.0
1	13.0	13.8	14.6	15.4	16.2	17.0	17.8	18.6	19.4	20.3	21.1	21.9	22.7	23.5	24.3
2	13.1	13.9	14.8	15.6	16.4	17.2	18.0	18.9	19.7	20.5	21.3	22.1	23.0	23.8	24.6
3	13.3	14.1	14.9	15.8	16.6	17.4	18.3	19.1	19.9	20.8	21.6	22.4	23.2	24.1	24.9
4	13.4	14.3	15.1	16.0	16.8	17.6	18.5	19.3	20.2	21.0	21.8	22.7	23.5	24.4	25.2
85	13.6	14.5	15.3	16.2	17.0	17.9	18.7	19.6	20.4	21.3	22.1	23.0	23.8	24.7	25.5
6	13.8	14.6	15.5	16.3	17.2	18.1	18.9	19.8	20.6	21.5	22.4	23.2	24.1	24.9	25.8
7	13.9	14.8	15.7	16.5	17.4	18.3	19.1	20.0	20.9	21.8	22.6	23.5	24.4	25.2	26.1
8	14.1	15.0	15.8	16.7	17.6	18.5	19.4	20.2	21.1	22.0	22.9	23.8	24.6	25.5	26.4
9	14.2	15.1	16.0	16.9	17.8	18.7	19.6	20.5	21.4	22.3	23.1	24.0	24.9	25.8	26.7
90	14.4	15.3	16.2	17.1	18.0	18.9	19.8	20.7	21.6	22.5	23.4	24.3	25.2	26.1	27.0
1	14.6	15.5	16.4	17.3	18.2	19.1	20.0	20.9	21.8	22.8	23.7	24.6	25.5	26.4	27.3
2	14.7	15.6	16.6	17.5	18.4	19.3	20.2	21.2	22.1	23.0	23.9	24.8	25.8	26.7	27.6
3	14.9	15.8	16.7	17.7	18.6	19.5	20.5	21.4	22.3	23.3	24.2	25.1	26.0	27.0	27.9
4	15.0	16.0	16.9	17.9	18.8	19.7	20.7	21.6	22.6	23.5	24.4	25.4	26.3	27.3	28.2
95	15.2	16.2	17.1	18.1	19.0	20.0	20.9	21.9	22.8	23.8	24.7	25.7	26.6	27.6	28.5
6	15.4	16.3	17.3	18.2	19.2	20.2	21.1	22.1	23.0	24.0	25.0	25.9	26.9	27.8	28.8
7	15.5	16.5	17.5	18.4	19.4	20.4	21.3	22.3	23.3	24.3	25.2	26.2	27.2	28.1	29.1
8	15.7	16.7	17.6	18.6	19.6	20.6	21.6	22.5	23.5	24.5	25.5	26.5	27.4	28.4	29.4
99	15.8	16.8	17.8	18.8	19.8	20.8	21.8	22.8	23.8	24.8	25.7	26.7	27.7	28.7	29.7
Δ	16′	17′	18′	19′	20′	21′	22′	23′	24′	25′	26′	27′	28′	29′	30′

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

Δ	0.1′	0.2′	0.3′	0.4′	0.5′	0.6′	0.7′	0.8′	0.9′
01	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
05	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1
15	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.1
20	0.0	0.0	0.1	0.1	0.1	0.1	0.1	0.2	0.2
25	0.0	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2
30	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.2	0.3
35	0.0	0.1	0.1	0.1	0.2	0.2	0.2	0.3	0.3
40	0.0	0.1	0.1	0.2	0.2	0.2	0.3	0.3	0.4
45	0.0	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4
50	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
55	0.1	0.1	0.2	0.2	0.3	0.3	0.4	0.4	0.5
60	0.1	0.1	0.2	0.2	0.3	0.4	0.4	0.5	0.5
65	0.1	0.1	0.2	0.3	0.3	0.4	0.5	0.5	0.6
70	0.1	0.1	0.2	0.3	0.4	0.4	0.5	0.6	0.6
75	0.1	0.2	0.2	0.3	0.4	0.5	0.5	0.6	0.7
80	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.6	0.7
85	0.1	0.2	0.2	0.3	0.4	0.5	0.6	0.7	0.8
90	0.1	0.2	0.3	0.4	0.5	0.5	0.6	0.7	0.8
95	0.1	0.2	.3	0.	.5	0.6	0.7	0.8	0.9
Δ							0.7′	0.8′	0.9′

10—8472